Computer Algebra Independent Integration Tests

Summer 2023 edition with Rubi V 4.17.3

210-4-Hebisch

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Contents

CHAPTER 1

Introduction

This report gives the result of running the computer algebra independent integration test.The download section in on the main webpage contains links to download the problems in plain text format used for all CAS systems. The number of integrals in this report is [1335]. This is test number [213].

1.1 Listing of CAS systems tested

The following are the CAS systems tested:

1. Mathematica 13.3.1 (August 16, 2023) on windows 10.
2. Rubi 4.17.3 (Sept 25, 2023) on Mathematica 13.3.1 on windows 10
3. Maple 2023.1 (July, 12, 2023) on windows 10.
4. Maxima 5.47 (June 1, 2023) using Lisp SBCL 2.3.0 on Linux via sagemath 10.1 (Aug 20, 2023).
5. FriCAS 1.3.9 (July 8, 2023) based on sbcl 2.3.0 on Linux via sagemath 10.1 (Aug 20, 2023).
6. Giac/Xcas 1.9.0-57 (June 26, 2023) on Linux via sagemath 10.1 (Aug 20, 2023).
7. Sympy 1.12 (May 10, 2023) Using Python 3.11.3 on Linux.
8. Mupad using Matlab 2021a with Symbolic Math Toolbox Version 8.7 on windows 10.

Maxima and Fricas and Giac are called using Sagemath. This was done using Sagemath `integrate` command by changing the name of the algorithm to use the different CAS systems.

Sympy was run directly in Python not via sagemath.

1.2 Results

Important note: A number of problems in this test suite have no antiderivative in closed form. This means the antiderivative of these integrals can not be expressed in terms of elementary, special functions or `Hypergeometric2F1` functions. `RootSum` and `RootOf` are not allowed. If a CAS returns the above integral unevaluated within the time limit, then the result is counted as passed and assigned an A grade.

However, if CAS times out, then it is assigned an F grade even if the integral is not integrable, as this implies CAS could not determine that the integral is not integrable in the time limit.

If a CAS returns an antiderivative to such an integral, it is assigned an A grade automatically and this special result is listed in the introduction section of each individual test report to make it easy to identify as this can be important result to investigate.

The results given in in the table below reflects the above.

System	% solved	% Failed
Fricas	99.85 (1333)	0.15 (2)
Maple	99.70 (1331)	0.30 (4)
Mathematica	97.23 (1298)	2.77 (37)
Sympy	95.51 (1275)	4.49 (60)
Maxima	92.36 (1233)	7.64 (102)
Mupad	90.56 (1209)	9.44 (126)
Giac	87.12 (1163)	12.88 (172)
Rubi	63.07 (842)	36.93 (493)

Table 1.1: Percentage solved for each CAS

The table below gives additional break down of the grading of quality of the antiderivatives generated by each CAS. The grading is given using the letters A,B,C and F with A being the best quality. The grading is accomplished by comparing the antiderivative generated with the optimal antiderivatives included in the test suite. The following table describes the meaning of these grades.

grade	description
A	Integral was solved and antiderivative is optimal in quality and leaf size.
B	Integral was solved and antiderivative is optimal in quality but leaf size is larger than twice the optimal antiderivatives leaf size.
C	Integral was solved and antiderivative is non-optimal in quality. This can be due to one or more of the following reasons 1. antiderivative contains a hypergeometric function and the optimal antiderivative does not. 2. antiderivative contains a special function and the optimal antiderivative does not. 3. antiderivative contains the imaginary unit and the optimal antiderivative does not.
F	Integral was not solved. Either the integral was returned unevaluated within the time limit, or it timed out, or CAS hanged or crashed or an exception was raised.

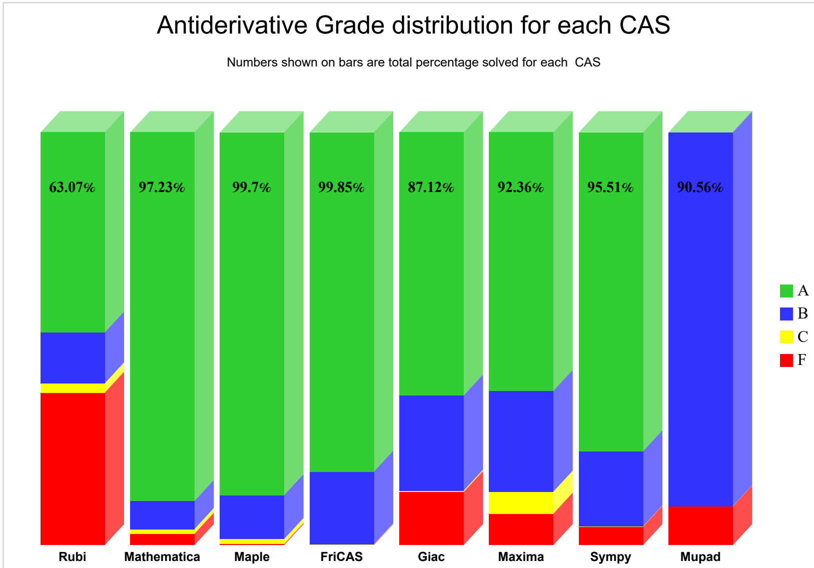
Table 1.2: Description of grading applied to integration result

Grading is implemented for all CAS systems. Based on the above, the following table summarizes the grading for this test suite.

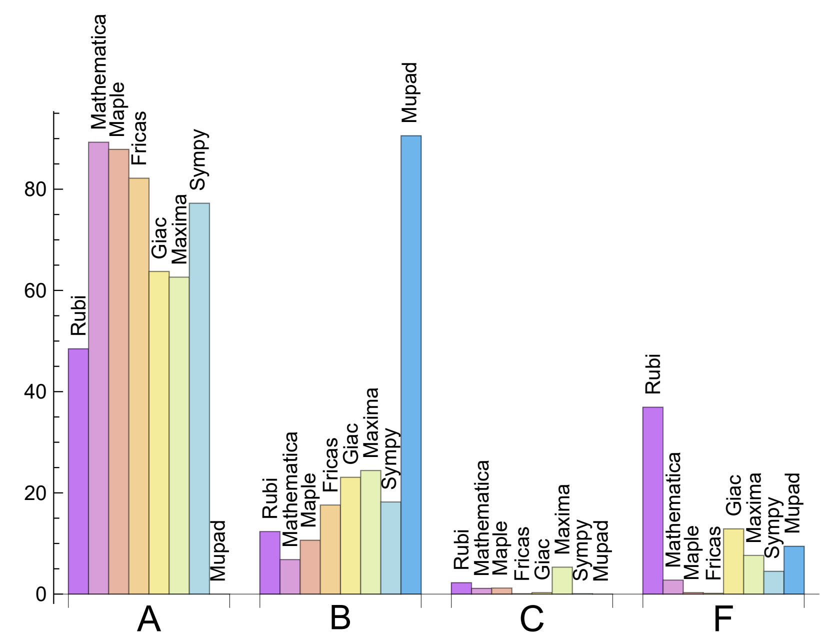
System	% A grade	% B grade	% C grade	% F grade
Mathematica	89.288	6.816	1.124	2.772
Maple	87.865	10.637	1.199	0.300
Fricas	82.172	17.603	0.075	0.150
Sympy	77.228	18.202	0.075	4.494
Giac	63.745	23.071	0.300	12.884
Maxima	62.622	24.419	5.318	7.640
Rubi	48.464	12.360	2.247	36.929
Mupad	0.000	90.562	0.000	9.438

Table 1.3: Antiderivative Grade distribution of each CAS

The following is a Bar chart illustration of the data in the above table.



The figure below compares the grades of the CAS systems.



The following table shows the distribution of the different types of failures for each CAS. There are 3 types failures. The first is when CAS returns the input within the time limit, which means it could not solve it. This is the typical failure and given as **F**.

The second failure is due to time out. CAS could not solve the integral within the 3 minutes time limit which is assigned. This is assigned **F(-1)**.

The third is due to an exception generated, indicated as **F(-2)**. This most likely indicates an interface problem between sagemath and the CAS (applicable only to FriCAS, Maxima and Giac) or it could be an indication of an internal error in the CAS itself. This type of error requires more investigation to determine the cause.

System	Number failed	Percentage normal failure	Percentage timeout failure	Percentage exception failure
Fricas	2	0.00	100.00	0.00
Maple	4	25.00	75.00	0.00
Mathematica	37	97.30	2.70	0.00
Sympy	60	0.00	66.67	33.33
Maxima	102	84.31	1.96	13.73
Mupad	126	0.00	100.00	0.00
Giac	172	87.21	4.65	8.14
Rubi	493	100.00	0.00	0.00

Table 1.4: Failure statistics for each CAS

1.3 Time and leaf size Performance

The table below summarizes the performance of each CAS system in terms of time used and leaf size of results.

Mean size is the average leaf size produced by the CAS (before any normalization). The Normalized mean is relative to the mean size of the optimal anti-derivative given in the input files.

For example, if CAS has **Normalized mean** of 3, then the mean size of its leaf size is 3 times as large as the mean size of the optimal leaf size.

Median size is value of leaf size where half the values are larger than this and half are smaller (before any normalization). i.e. The Middle value.

Similarly the **Normalized median** is relative to the median leaf size of the optimal.

For example, if a CAS has Normalized median of 1.2, then its median is 1.2 as large as the median leaf size of the optimal.

System	Mean time (sec)
Fricas	0.26
Maxima	0.34
Giac	0.60
Mathematica	0.63
Rubi	0.74
Sympy	1.36
Maple	5.83
Mupad	11.18

Table 1.5: Time performance for each CAS

System	Mean size	Normalized mean	Median size	Normalized median
Mathematica	31.22	1.29	25.00	1.00
Sympy	33.38	1.37	24.00	0.96
Fricas	35.70	1.45	28.00	1.13
Mupad	46.37	1.84	23.00	1.00
Giac	72.26	2.69	29.00	1.22
Maxima	72.67	2.96	31.00	1.23
Rubi	84.47	3.48	27.00	1.18
Maple	13438.87	671.60	25.00	1.00

Table 1.6: Leaf size performance for each CAS

1.4 Performance based on number of rules Rubi used

This section shows how each CAS performed based on the number of rules Rubi needed to solve the same integral. One diagram is given for each CAS.

On the y axis is the percentage solved which Rubi itself needed the number of rules given the x axis. These plots show that as more rules are needed then most CAS system percentage of solving decreases which indicates the integral is becoming more complicated to solve.

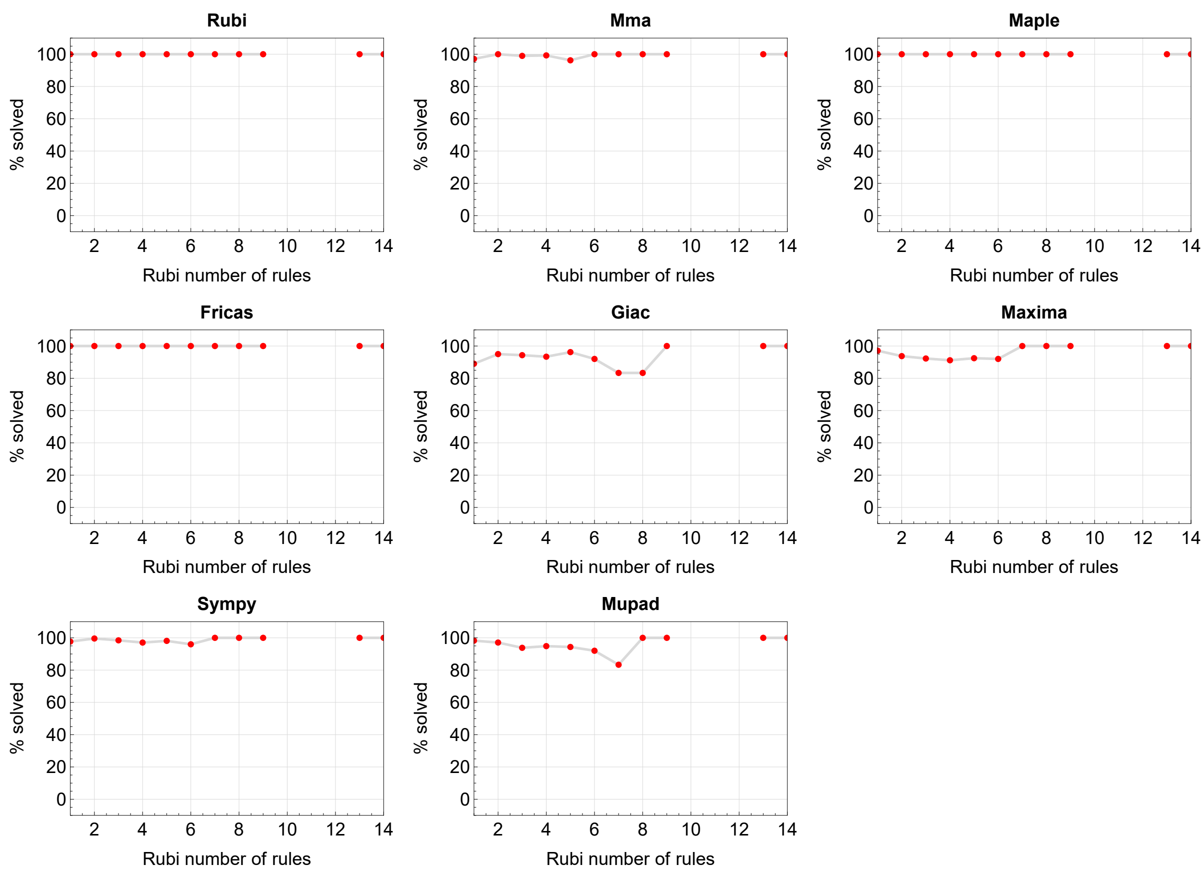


Figure 1.1: Solving statistics per number of Rubi rules used

1.5 Performance based on number of steps Rubi used

This section shows how each CAS performed based on the number of steps Rubi needed to solve the same integral. Note that the number of steps Rubi needed can be much higher than the number of rules, as the same rule could be used more than once.

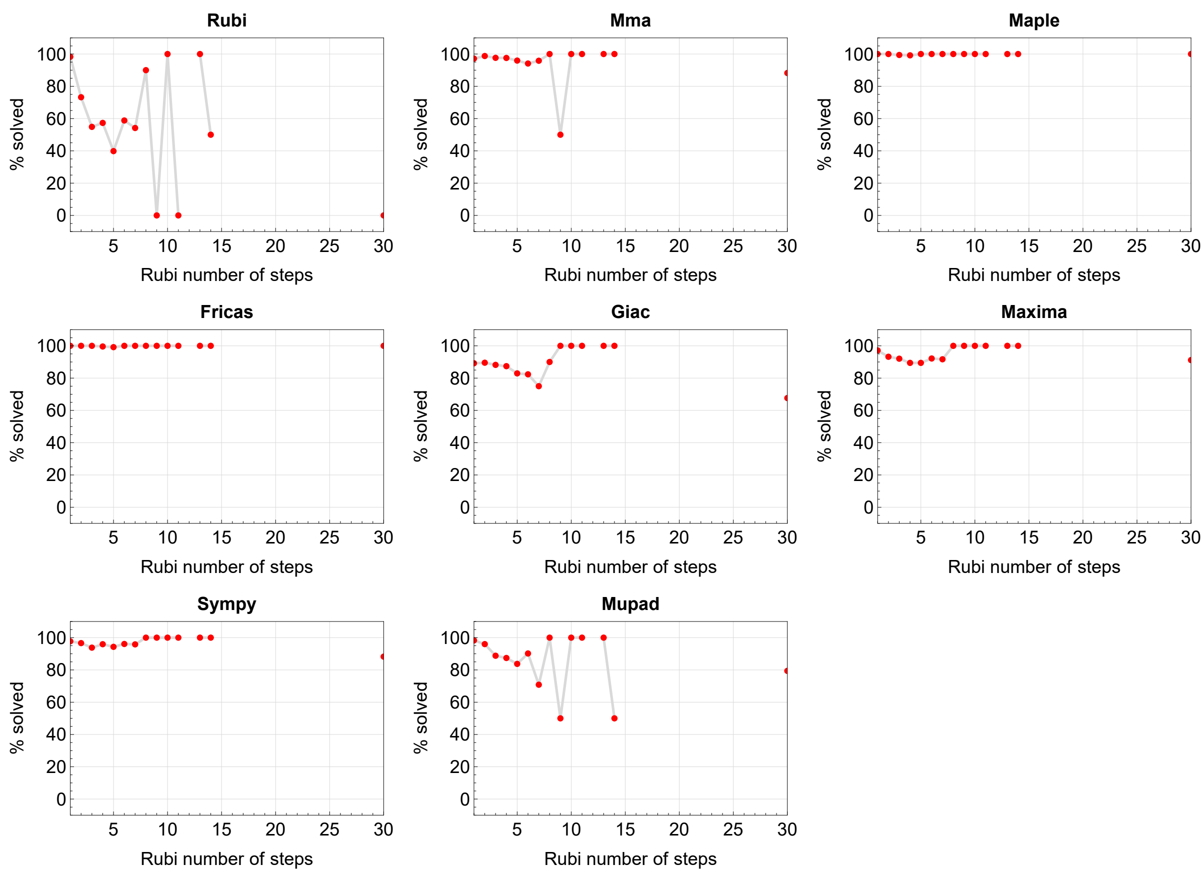


Figure 1.2: Solving statistics per number of Rubi steps used

The above diagram show that the precentage of solved intergals decreases for most CAS systems as the number of steps increases. As expected, for integrals that required less steps by Rubi, CAS systems had more success which indicates the integral was not as hard to solve. As Rubi needed more steps to solve the integral, the solved percentage decreased for most CAS systems which indicates the integral is becoming harder to solve.

1.6 Solved integrals histogram based on leaf size of result

The following shows the distribution of solved integrals for each CAS system based on leaf size of the antiderivatives produced by each CAS. It shows that most integrals solved produced leaf size less than about 100 to 150. The bin size used is 40.

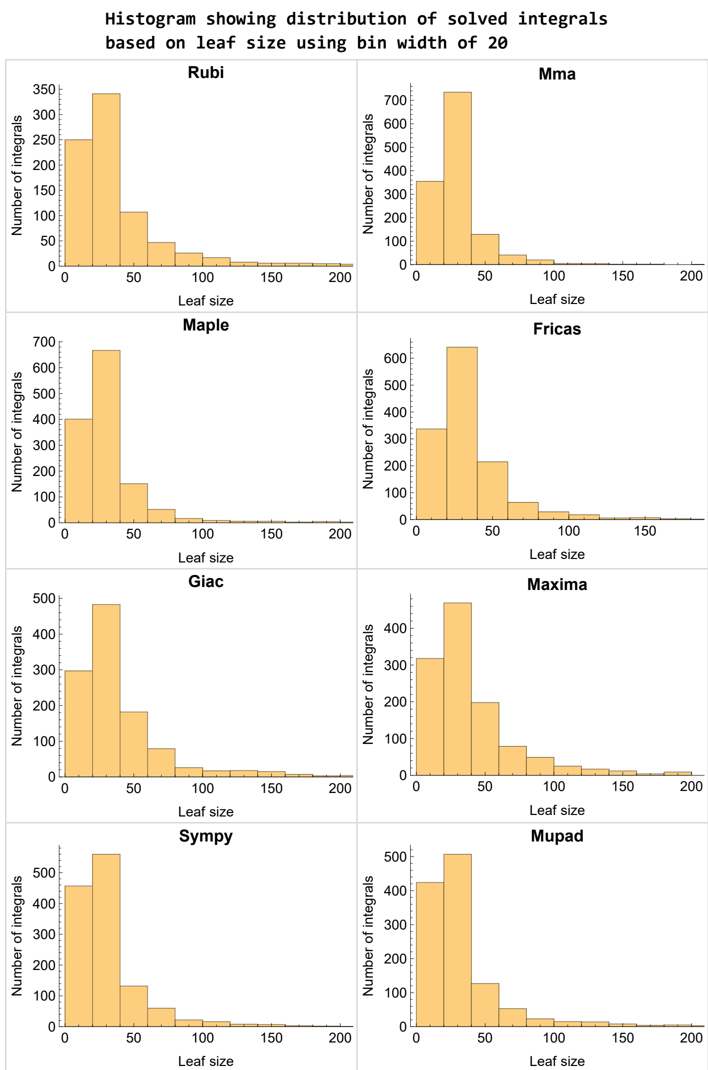


Figure 1.3: Solved integrals based on leaf size distribution

1.7 Solved integrals histogram based on CPU time used

The following shows the distribution of solved integrals for each CAS system based on CPU time used in seconds. The bin size used is 0.1 second.

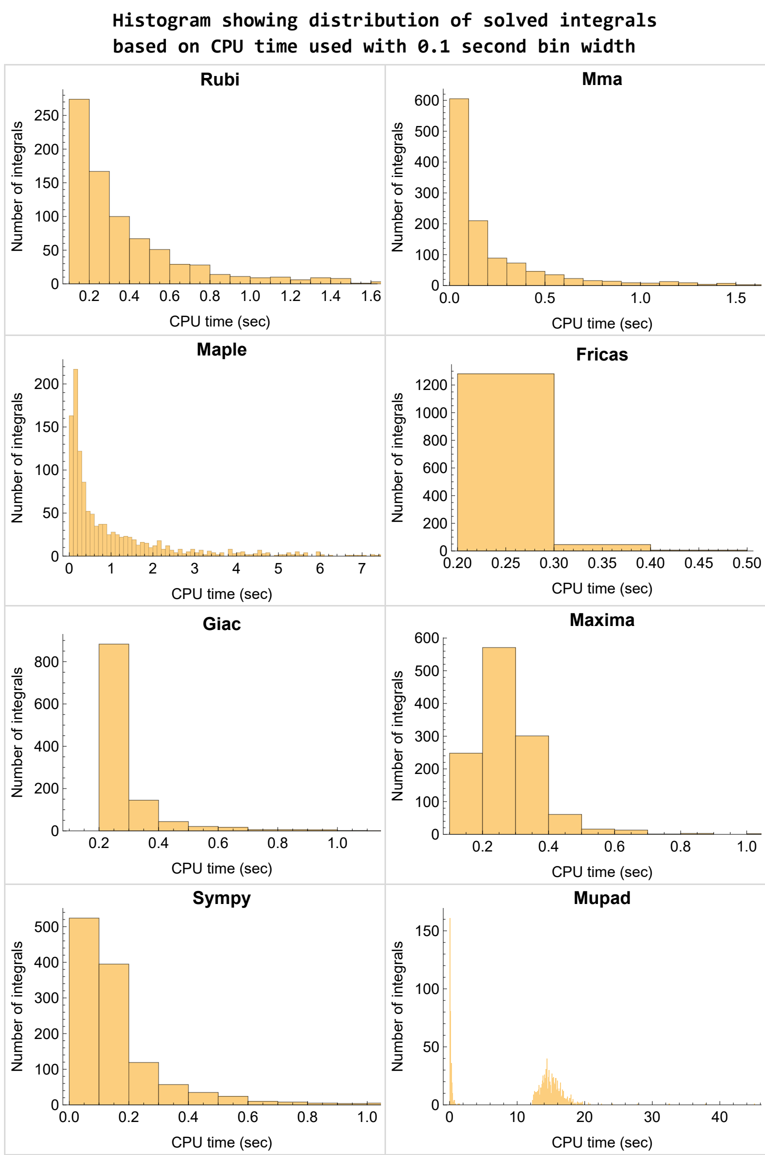


Figure 1.4: Solved integrals histogram based on CPU time used

1.8 Leaf size vs. CPU time used

The following gives the relation between the CPU time used to solve an integral and the leaf size of the antiderivative.

The result for Fricas, Maxima and Giac is shifted more to the right than the other CAS system due to the use of sagemath to call them, which causes an initial slight delay in the timing to start the integration due to overhead of starting a new process each time.

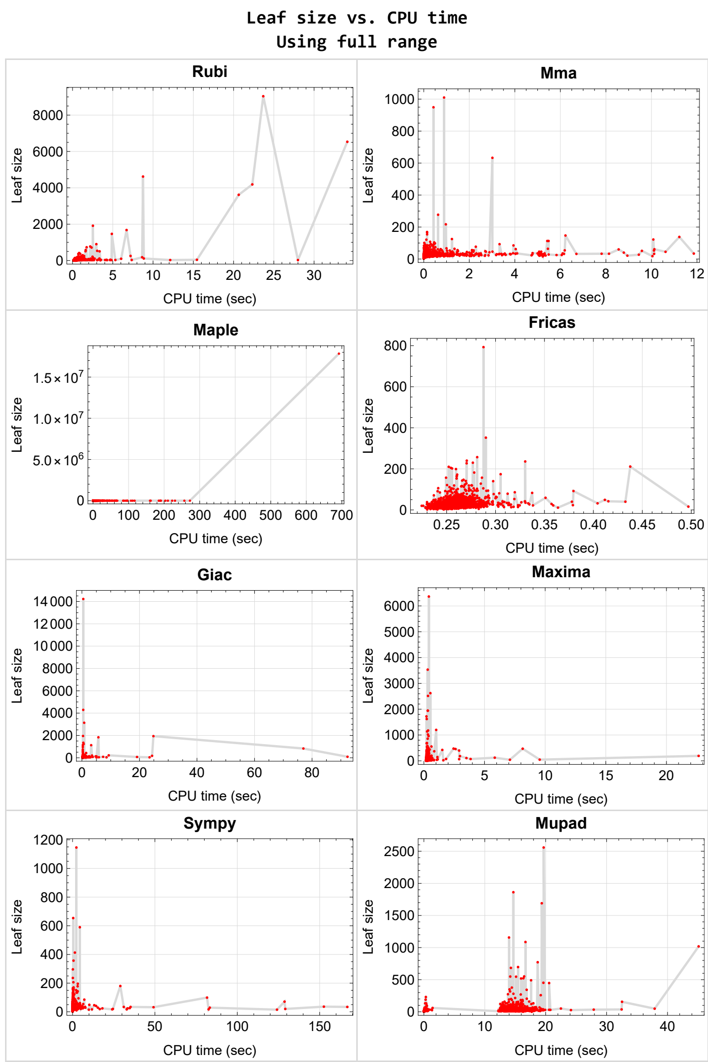


Figure 1.5: Leaf size vs. CPU time. Full range

1.9 list of integrals with no known antiderivative

{}

1.10 List of integrals solved by CAS but has no known antiderivative

Rubi {}

Mathematica {}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

Mupad {}

1.11 list of integrals solved by CAS but failed verification

The following are integrals solved by CAS but the verification phase failed to verify the anti-derivative produced is correct. This does not necessarily mean that the anti-derivative is wrong as additional methods of verification might be needed, or more time is needed (3 minutes time limit was used). These integrals are listed here to make it possible to do further investigation to determine why the result could not be verified.

Rubi $\{189, 699, 1196\}$

Mathematica $\{64\}$

Maple $\{44, 101, 269, 505, 566, 726, 728, 751, 870, 922, 953, 1011, 1051, 1081, 1148, 1190\}$

Maxima Verification phase not currently implemented.

Fricas Verification phase not currently implemented.

Sympy Verification phase not currently implemented.

Giac Verification phase not currently implemented.

Mupad Verification phase not currently implemented.

1.12 Timing

The command `AbsoluteTiming[]` was used in Mathematica to obtain the elapsed time for each integrate call. In Maple, the command `Usage` was used as in the following example

```
cpu_time := Usage(assign ('result_of_int',int(expr,x)),output='realtime'
```

For all other CAS systems, the elapsed time to complete each integral was found by taking the difference between the time after the call completed from the time before the call was made. This was done using Python's `time.time()` call.

All elapsed times shown are in seconds. A time limit of 3 CPU minutes was used for each integral. If the integrate command did not complete within this time limit, the integral was aborted and considered to have failed and assigned an F grade. The time used by failed integrals due to time out was not counted in the final statistics.

1.13 Verification

A verification phase was applied on the result of integration for `Rubi` and `Mathematica`.

Future version of this report will implement verification for the other CAS systems. For the integrals whose result was not run through a verification phase, it is assumed that the antiderivative was correct.

Verification phase also had 3 minutes time out. An integral whose result was not verified could still be correct, but further investigation is needed on those integrals. These integrals were marked in the summary table below and also in each integral separate section so they are easy to identify and locate.

1.14 Important notes about some of the results

1.14.1 Important note about Maxima results

Since tests were run in a batch mode, and using an automated script, then any integral where Maxima needed an interactive response from the user to answer a question during the evaluation of the integral will fail.

The exception raised is `ValueError`. Therefore Maxima results is lower than what would result if Maxima was run directly and each question was answered correctly.

The percentage of such failures were not counted for each test file, but for an example, for the `Timofeev` test file, there were about 14 such integrals out of total 705, or about 2 percent. This percentage can be higher or lower depending on the specific input test file.

Such integrals can be identified by looking at the output of the integration in each section for Maxima. The exception message will indicate the cause of error.

Maxima integrate was run using SageMath with the following settings set by default

```
'besselexpand : true'
'display2d : false'
'domain : complex'
'keepfloat : true'
'load(to_poly_solve)'
'load(simplify_sum)'
'load(abs_integrate)' 'load(diag)'
```

SageMath automatic loading of Maxima `abs_integrate` was found to cause some problems. So the following code was added to disable this effect.

```
from sage.interfaces.maxima_lib import maxima_lib
maxima_lib.set('extra_definite_integration_methods', '[]')
maxima_lib.set('extra_integration_methods', '[]')
```

See `https://ask.sagemath.org/question/43088/integrate-results-that-are-different-from-using-maxima/` for reference.

1.14.2 Important note about FriCAS result

There were few integrals which failed due to SageMath interface and not because FriCAS system could not do the integration.

These will fail With error `Exception raised: NotImplementedError`.

The number of such cases seems to be very small. About 1 or 2 percent of all integrals. These can be identified by looking at the exception message given in the result.

1.14.3 Important note about finding leaf size of antiderivative

For Mathematica, Rubi, and Maple, the builtin system function **LeafSize** was used to find the leaf size of each antiderivative.

The other CAS systems (SageMath and Sympy) do not have special builtin function for this purpose at this time. Therefore the leaf size for Fricas and Sympy antiderivative was determined using the following function, thanks to user **slelievre** at **https://ask.sagemath.org/question/57123/could-we-have-a-leaf_count-function-in-base-sagemath/**

```
def tree_size(expr):
    r"""
    Return the tree size of this expression.
    """
    if expr not in SR:
        # deal with lists, tuples, vectors
        return 1 + sum(tree_size(a) for a in expr)
    expr = SR(expr)
    x, aa = expr.operator(), expr.operands()
    if x is None:
        return 1
    else:
        return 1 + sum(tree_size(a) for a in aa)
```

For Sympy, which was called directly from Python, the following code was used to obtain the leafsize of its result

```
try:
  # 1.7 is a fudge factor since it is low side from actual leaf count
  leafCount = round(1.7*count_ops(anti))

  except Exception as ee:
        leafCount =1
```

1.14.4 Important note about Mupad results

Matlab's symbolic toolbox does not have a leaf count function to measure the size of the antiderivative. Maple was used to determine the leaf size of Mupad output by post processing Mupad result.

Currently no grading of the antiderivative for Mupad is implemented. If it can integrate the problem, it was assigned a B grade automatically as a placeholder. In the future, when grading function is implemented for Mupad, the tests will be rerun again.

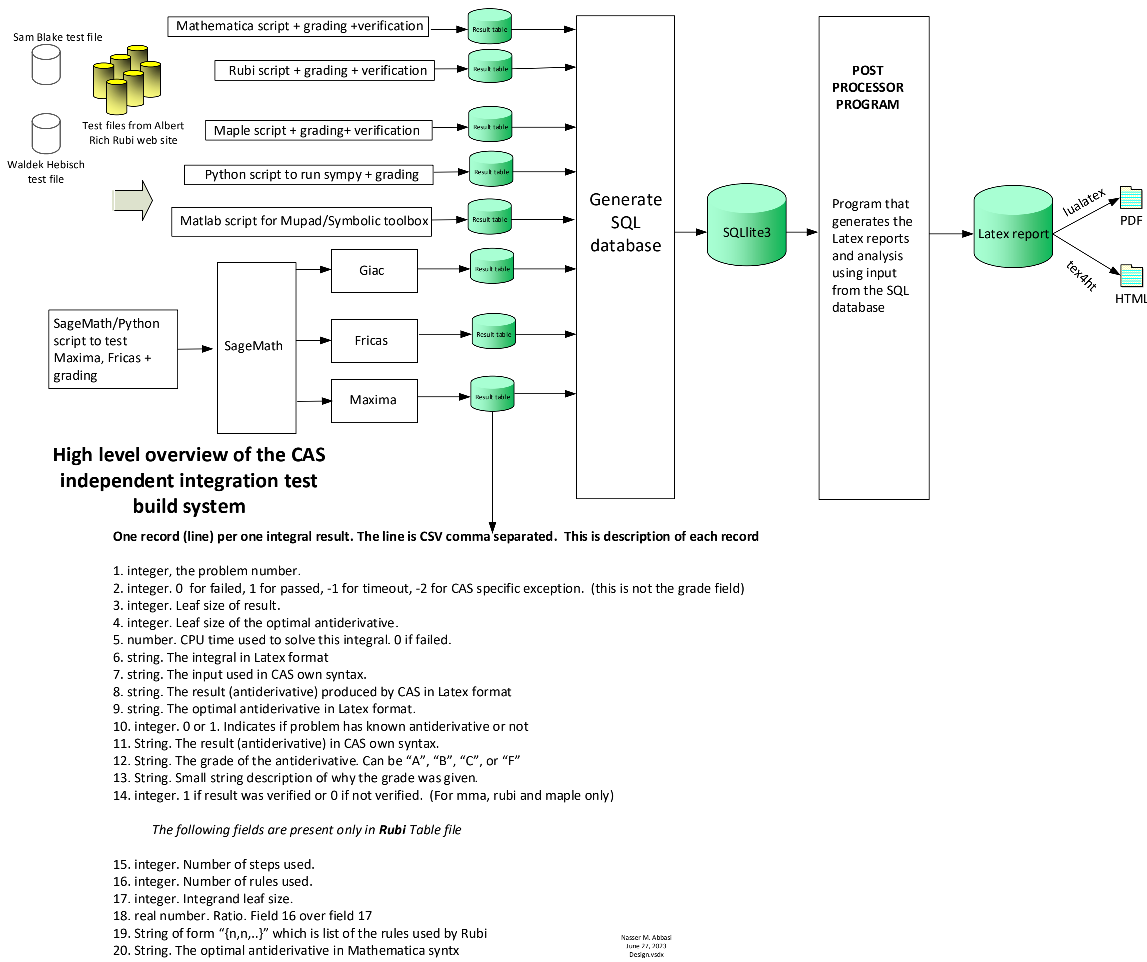
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

```
integrand = evalin(symengine,'cos(x)*sin(x)')
the_variable = evalin(symengine,'x')
anti = int(integrand,the_variable)
```

Which gives `sin(x)^2/2`

1.15 Design of the test system

The following diagram gives a high level view of the current test build system.



CHAPTER 2

DETAILED SUMMARY TABLES OF RESULTS

2.1 List of integrals sorted by grade for each CAS

2.1.1 Rubi

A grade { 4, 6, 7, 8, 10, 14, 17, 19, 21, 23, 24, 25, 28, 29, 30, 32, 36, 37, 38, 40, 45, 47, 48, 51, 52, 54, 57, 58, 63, 65, 68, 69, 73, 77, 78, 79, 82, 85, 89, 91, 92, 94, 96, 97, 98, 100, 102, 103, 106, 107, 108, 109, 110, 115, 116, 118, 121, 122, 125, 126, 127, 128, 129, 132, 134, 143, 145, 146, 149, 150, 152, 153, 157, 159, 162, 164, 166, 170, 171, 172, 173, 175, 177, 178, 179, 180, 185, 186, 189, 192, 193, 195, 200, 201, 202, 204, 205, 206, 208, 209, 210, 213, 215, 216, 218, 220, 221, 223, 224, 225, 226, 229, 230, 233, 238, 239, 240, 242, 243, 245, 246, 247, 248, 251, 252, 258, 261, 263, 268, 269, 270, 273, 274, 275, 278, 280, 281, 284, 285, 289, 290, 292, 296, 297, 298, 299, 301, 302, 304, 305, 306, 307, 308, 313, 314, 316, 318, 320, 322, 324, 325, 328, 333, 334, 335, 337, 338, 339, 344, 346, 348, 349, 351, 355, 356, 362, 367, 368, 372, 374, 379, 380, 381, 383, 384, 386, 387, 388, 389, 394, 396, 398, 399, 401, 404, 407, 412, 417, 418, 419, 423, 424, 425, 426, 429, 431, 433, 437, 438, 439, 441, 442, 446, 448, 449, 450, 452, 453, 454, 457, 458, 459, 463, 465, 468, 473, 474, 476, 479, 482, 485, 487, 488, 490, 496, 497, 501, 504, 507, 508, 509, 510, 512, 516, 519, 520, 522, 524, 526, 528, 530, 534, 535, 544, 545, 546, 547, 548, 549, 553, 556, 557, 559, 561, 565, 568, 569, 571, 572, 573, 577, 578, 579, 585, 588, 589, 590, 592, 593, 599, 600, 601, 603, 606, 608, 613, 614, 617, 619, 620, 621, 622, 623, 624, 627, 630, 631, 633, 634, 635, 636, 637, 640, 642, 643, 644, 645, 646, 647, 651, 652, 653, 655, 657, 660, 663, 665, 670, 672, 673, 677, 678, 682, 688, 689, 694, 695, 699, 701, 702, 705, 707, 708, 709, 711, 714, 715, 717, 718, 719, 720, 722, 724, 725, 732, 733, 734, 736, 738, 743, 752, 753, 754, 756, 757, 758, 759, 763, 764, 766, 773, 775, 776, 777, 778, 781, 787, 789, 791, 792, 794, 797, 800, 801, 804, 806, 807, 810, 813, 816, 817, 819, 820, 821, 824, 825, 828, 833, 837, 838, 841, 843, 845, 848, 851, 855, 858, 862, 863, 864, 865, 866, 869, 871, 873, 876, 877, 878, 880, 882, 884, 886, 887, 888, 891, 892, 893, 894, 895, 898, 899, 901, 902, 904, 905, 906, 907, 910, 913, 914, 916, 917, 918, 923, 925, 927, 928, 930, 931, 935, 936, 937, 942, 944, 945, 948, 949, 952, 955, 956, 959, 963, 969, 971, 974, 975, 977, 979, 981, 983, 985, 986, 987, 988, 990, 992, 993, 994, 995, 996, 1001, 1004, 1007, 1008, 1009, 1012, 1013, 1014, 1016, 1017, 1021, 1027, 1029, 1031, 1037, 1038, 1040, 1041, 1042, 1044, 1045, 1046, 1047, 1048, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1060, 1061, 1063, 1064, 1065, 1068, 1069, 1070, 1071, 1078, 1080, 1087, 1090, 1091, 1094, 1095, 1098, 1100, 1101, 1104, 1105, 1108, 1110, 1113, 1114, 1115, 1118, 1119, 1120, 1122, 1126, 1127, 1128, 1129, 1130, 1133, 1134, 1137, 1138, 1139, 1140, 1142, 1144, 1146, 1149, 1150, 1151, 1152, 1153, 1155, 1158, 1162, 1164, 1167, 1168, 1169, 1170, 1173, 1175, 1178, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1188, 1189, 1191, 1192, 1194, 1196, 1201, 1202, 1203, 1205, 1206, 1207, 1208, 1211, 1213, 1214, 1216, 1217, 1223, 1224, 1226, 1227, 1228, 1229, 1233, 1234, 1235, 1236, 1237, 1244, 1246, 1248, 1251, 1254, 1257, 1263, 1264, 1267, 1268, 1269, 1270, 1271, 1273, 1274, 1276, 1277, 1278, 1280, 1282, 1286, 1287, 1288, 1289, 1293, 1295, 1297, 1299, 1303, 1304, 1309, 1310, 1312, 1314, 1315, 1316, 1319, 1320, 1321, 1324, 1326, 1327, 1329, 1330, 1331, 1332, 1333, 1334 }

B grade { 1, 2, 5, 13, 18, 27, 41, 53, 74, 80, 81, 83, 87, 88, 90, 112, 123, 130, 131, 133, 137, 140, 160, 163, 183, 188, 190, 237, 241, 244, 250, 257, 264, 279, 283, 293, 295, 300, 326, 330, 358, 360, 361, 376, 377, 382, 385, 391, 397, 402, 409, 410, 416, 421, 432, 435, 436, 445, 467, 469, 475, 478, 484, 491, 495, 515, 521, 537, 538, 541, 552, 558, 567, 574, 580, 594, 597, 605, 611, 616, 625, 628, 629, 639, 656, 662, 671, 674, 698, 716, 721, 723, 735, 739, 742, 748, 749, 772, 774, 780, 786, 796, 798, 799, 802, 811, 812, 822, 832, 836, 840, 844, 849, 850, 853, 861, 883, 885, 903, 946, 947, 950, 951, 960, 964, 965, 968, 970, 972, 973, 984, 1000, 1002, 1003, 1015, 1026, 1032, 1049, 1059, 1066, 1067, 1074, 1117, 1141, 1145, 1156, 1159, 1165, 1166, 1197, 1215, 1219, 1221, 1230, 1242, 1243, 1249, 1250, 1252, 1255, 1258, 1279, 1291, 1317, 1322 }

C grade { 15, 113, 169, 217, 235, 265, 267, 357, 369, 472, 500, 693, 696, 700, 767, 771, 867, 874, 920, 940, 1028, 1077, 1102, 1124, 1154, 1177, 1198, 1218, 1296, 1298 }

F normal fail { 3, 9, 11, 12, 16, 20, 22, 26, 31, 33, 34, 35, 39, 42, 43, 44, 46, 49, 50, 55, 56, 59, 60, 61, 62, 64, 66, 67, 70, 71, 72, 75, 76, 84, 86, 93, 95, 99, 101, 104, 105, 111, 114, 117, 119, 120, 124, 135, 136, 138, 139, 141, 142, 144, 147, 148, 151, 154, 155, 156, 158, 161, 165, 167, 168, 174, 176, 181, 182, 184, 187, 191, 194, 196, 197, 198, 199, 203, 207, 211, 212, 214, 219, 222, 227, 228, 231, 232, 234, 236, 249, 253, 254, 255, 256, 259, 260, 262, 266, 271, 272, 276, 277, 282, 286, 287, 288, 291, 294, 303, 309, 310, 311, 312, 315, 317, 319, 321, 323, 327, 329, 331, 332, 336, 340, 341, 342, 343, 345, 347, 350, 352, 353, 354, 359, 363, 364, 365, 366, 370, 371, 373, 375, 378, 390, 392, 393, 395, 400, 403, 405, 406, 408, 411, 413, 414, 415, 420, 422, 427, 428, 430, 434, 440, 443, 444, 447, 451, 455, 456, 460, 461, 462, 464, 466, 470, 471, 477, 480, 481, 483, 486, 489, 492, 493, 494, 498, 499, 502, 503, 505, 506, 511, 513, 514, 517, 518, 523, 525, 527, 529, 531, 532, 533, 536, 539, 540, 542, 543, 550, 551, 554, 555, 560, 562, 563, 564, 566, 570, 575, 576, 581, 582, 583, 584, 586, 587, 591, 595, 596, 598, 602, 604, 607, 609, 610, 612, 615, 618, 626, 632, 638, 641, 648, 649, 650, 654, 658, 659, 661, 664, 666, 667, 668, 669, 675, 676, 679, 680, 681, 683, 684, 685, 686, 687, 690, 691, 692, 697, 703, 704, 706, 710, 712, 713, 726, 727, 728, 729, 730, 731, 737, 740, 741, 744, 745, 746, 747, 750, 751, 755, 760, 761, 762, 765, 768, 769, 770, 779, 782, 783, 784, 785, 788, 790, 793, 795, 803, 805, 808, 809, 814, 815, 818, 823, 826, 827, 829, 830, 831, 834, 835, 839, 842, 846, 847, 852, 854, 856, 857, 859, 860, 868, 870, 872, 875, 879, 881, 889, 890, 896, 897, 900, 908, 909, 911, 912, 915, 919, 921, 922, 924, 926, 929, 932, 933, 934, 938, 939, 941, 943, 953, 954, 957, 958, 961, 962, 966, 967, 976, 978, 980, 982, 989, 991, 997, 998, 999, 1005, 1006, 1010, 1011, 1018, 1019, 1020, 1022, 1023, 1024, 1025, 1030, 1033, 1034, 1035, 1036, 1039, 1043, 1062, 1072, 1073, 1075, 1076, 1079, 1081, 1082, 1083, 1084, 1085, 1086, 1088, 1089, 1092, 1093, 1096, 1097, 1099, 1103, 1106, 1107, 1109, 1111, 1112, 1116, 1121, 1123, 1125, 1131, 1132, 1135, 1136, 1143, 1147, 1148, 1157, 1160, 1161, 1163, 1171, 1172, 1174, 1176, 1179, 1187, 1190, 1193, 1195, 1199, 1200, 1204, 1209, 1210, 1212, 1220, 1222, 1225, 1231, 1232, 1238, 1239, 1240, 1241, 1245, 1247, 1253, 1256, 1259, 1260, 1261, 1262, 1265, 1266, 1272, 1275, 1281, 1283, 1284, 1285, 1290, 1292, 1294, 1300, 1301, 1302, 1305, 1306, 1307, 1308, 1311, 1313, 1318, 1323, 1325, 1328, 1335 }

F(-1) timedout fail { }

F(-2) exception fail { }

2.1.2 Mma

A grade { 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 65, 66, 67, 68, 69, 70, 73, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 106, 107, 108, 109, 111, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 132, 133, 134, 135, 136, 139, 140, 142, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 184, 185, 186, 187, 189, 190, 191, 192, 193, 194, 195, 196, 197, 200, 201, 202, 203, 204, 205, 206, 207, 209, 210, 211, 212, 213, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 230, 231, 232, 233, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 251, 252, 254, 255, 256, 257, 258, 259, 260, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 280, 281, 282, 283, 284, 285, 286, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 353, 354, 355, 356, 357, 358, 360, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 431, 433, 434, 435, 437, 438, 439, 441, 442, 443, 444, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 464, 465, 466, 467, 468, 469, 470, 471, 473, 474, 475, 476, 477, 478, 479, 480, 482, 483, 484, 485, 487, 488, 489, 490, 491, 492, 493, 494, 496, 497, 498, 499, 501, 502, 503, 504, 505, 506, 507, 509, 510, 512, 513, 514, 516, 517, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 547, 548, 549, 550, 551, 552, 553, 555, 556, 557, 559, 560, 561, 564, 565, 567, 568, 569, 570, 572, 573, 574, 575, 576, 577, 578, 579, 581, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 596, 597, 598, 599, 600, 601, 603, 604, 606, 607, 608, 609, 610, 612, 613, 614, 615, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 649, 650, 651, 652, 653, 654, 655, 657, 658, 660, 661, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 711, 712, 714, 715, 716, 717, 718, 719, 720, 722, 724, 725, 726, 727, 728, 729, 730, 732, 733, 734, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 773, 775, 776, 778, 779, 780, 781, 782, 783, 785, 786, 787, 788, 789, 790, 791, 792, 794, 795, 797, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 824, 825, 826, 827, 829, 830, 831, 832, 833, 834, 835, 837, 838, 839, 840, 841, 842, 843, 845, 847, 848, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 875, 876, 877, 878, 879, 880, 881, 882, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 915, 916, 917, 918, 919, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 961, 962, 963, 964, 966, 967, 968, 969, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 983, 985, 986, 987, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 1000, 1001, 1003, 1004, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1025, 1027, 1028, 1029, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1073, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1113, 1114, 1115, 1116, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1164, 1166, 1167, 1168, 1169, 1170, 1171, 1174, 1175, 1176, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1243, 1244, 1245, 1246, 1247, 1248, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1270, 1271, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1287, 1288, 1289, 1290, 1291, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335 }

B grade { 2, 18, 39, 41, 64, 72, 74, 87, 105, 110, 112, 131, 137, 141, 183, 188, 208, 234, 250, 253, 261, 279, 361, 376, 397, 408, 430, 432, 436, 445, 463, 481, 495, 511, 515, 518, 546, 558, 563, 580, 602, 605, 611, 616, 648, 656, 659, 662, 674, 699, 721, 723, 735, 748, 760, 772, 774, 784, 793, 796, 798, 844, 846, 849, 850, 874, 883, 914, 920, 960, 965, 970, 982, 984, 999, 1002, 1026, 1030, 1074, 1092, 1128, 1142, 1163, 1165, 1172, 1199, 1242, 1249, 1259, 1269, 1286 }

C grade { 169, 229, 299, 352, 359, 472, 500, 571, 595, 940, 1102, 1117, 1173, 1177, 1234 }

F normal fail { 1, 40, 71, 138, 143, 154, 198, 199, 214, 287, 331, 440, 462, 486, 508, 554, 562, 566, 582, 713, 731, 749, 777, 823, 828, 836, 988, 1005, 1024, 1072, 1084, 1112, 1143, 1221, 1272, 1292 }

F(-1) timedout fail { 710 }

F(-2) exception fail { }

2.1.3 Maple

A grade { 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 65, 66, 67, 68, 69, 70, 72, 73, 75, 76, 77, 79, 80, 81, 82, 84, 85, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 102, 103, 104, 106, 107, 108, 109, 110, 111, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 132, 133, 134, 135, 136, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 189, 190, 191, 192, 193, 194, 195, 196, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 249, 251, 252, 254, 255, 256, 257, 258, 259, 260, 262, 263, 264, 265, 266, 267, 268, 270, 271, 272, 273, 274, 275, 276, 277, 278, 280, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 300, 301, 302, 303, 304, 305, 306, 307, 308, 311, 312, 313, 315, 316, 318, 322, 323, 324, 325, 328, 329, 330, 332, 333, 334, 335, 337, 338, 339, 341, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 358, 360, 361, 362, 363, 364, 365, 366, 367, 368, 370, 371, 372, 373, 374, 375, 376, 378, 379, 380, 381, 382, 383, 384, 385, 387, 388, 389, 391, 392, 393, 394, 395, 396, 398, 399, 400, 401, 403, 404, 405, 406, 407, 409, 410, 411, 412, 414, 415, 416, 417, 418, 419, 420, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 446, 447, 448, 449, 450, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 467, 468, 469, 470, 471, 473, 474, 475, 476, 477, 478, 479, 480, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 499, 500, 501, 502, 503, 504, 506, 507, 508, 509, 510, 511, 512, 514, 515, 516, 517, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 553, 554, 555, 556, 557, 559, 560, 561, 563, 564, 565, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 581, 583, 584, 585, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 603, 604, 605, 606, 607, 608, 609, 611, 612, 613, 614, 615, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 642, 643, 644, 645, 646, 647, 649, 650, 652, 653, 655, 657, 658, 660, 661, 663, 664, 665, 666, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 722, 724, 725, 727, 729, 730, 731, 732, 733, 734, 736, 738, 739, 741, 742, 743, 744, 745, 746, 747, 749, 750, 752, 753, 754, 755, 756, 757, 758, 759, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 773, 775, 776, 777, 778, 779, 780, 781, 782, 784, 785, 786, 787, 788, 789, 791, 792, 793, 794, 795, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 845, 847, 848, 851, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 921, 923, 924, 925, 926, 927, 928, 930, 931, 932, 933, 934, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 966, 967, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 983, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1003, 1004, 1005, 1007, 1008, 1009, 1010, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1027, 1028, 1029, 1031, 1032, 1034, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1068, 1069, 1070, 1071, 1072, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1093, 1094, 1095, 1098, 1099, 1100, 1101, 1102, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1126, 1127, 1128, 1129, 1130, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1144, 1145, 1146, 1147, 1150, 1151, 1152, 1153, 1154, 1155, 1157, 1158, 1159, 1162, 1164, 1165, 1166, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1191, 1192, 1193, 1194, 1195, 1196, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1243, 1244, 1245, 1246, 1247, 1248, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335 }

B grade { 1, 3, 18, 22, 31, 41, 64, 71, 74, 78, 83, 86, 87, 105, 112, 131, 137, 138, 165, 188, 197, 198, 214, 248, 250, 253, 261, 279, 281, 299, 309, 310, 314, 317, 319, 320, 326, 327, 331, 336, 342, 357, 359, 369, 377, 386, 390, 397, 402, 408, 413, 421, 432, 445, 451, 466, 472, 481, 513, 518, 537, 552, 558, 562, 580, 582, 586, 602, 610, 616, 641, 648, 651, 654, 656, 659, 662, 667, 698, 699, 710, 721, 723, 735, 737, 740, 748, 760, 772, 774, 783, 790, 796, 809, 844, 846, 849, 850, 852, 883, 920, 929, 935, 965, 968, 982, 984, 1002, 1006, 1026, 1030, 1033, 1035, 1067, 1073, 1091, 1092, 1096, 1097, 1103, 1117, 1125, 1131, 1143, 1149, 1156, 1160, 1161, 1163, 1167, 1190, 1197, 1219, 1242, 1249, 1259, 1267, 1296, 1307, 1308, 1317, 1318 }

C grade { 44, 101, 154, 269, 505, 566, 726, 728, 751, 870, 922, 953, 1011, 1051, 1081, 1148 }

F normal fail { 340 }

F(-1) timedout fail { 321, 498, 1209 }

F(-2) exception fail { }

2.1.4 Fricas

A grade { 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 35, 36, 37, 38, 39, 40, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 77, 79, 82, 84, 85, 88, 89, 90, 91, 92, 93, 95, 96, 97, 98, 100, 101, 103, 104, 106, 107, 108, 111, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 162, 163, 164, 165, 166, 167, 169, 171, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 190, 191, 192, 193, 195, 196, 197, 199, 200, 201, 204, 205, 206, 207, 209, 210, 211, 212, 213, 215, 216, 218, 219, 220, 221, 222, 223, 224, 225, 226, 230, 231, 232, 233, 235, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 251, 252, 254, 255, 256, 257, 258, 259, 260, 262, 263, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 280, 282, 283, 284, 285, 286, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 310, 312, 313, 315, 316, 318, 321, 322, 324, 325, 328, 329, 330, 332, 333, 334, 335, 337, 338, 339, 340, 341, 343, 344, 345, 348, 349, 350, 351, 352, 353, 354, 355, 356, 358, 360, 361, 362, 364, 365, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 378, 379, 380, 382, 383, 384, 385, 387, 388, 389, 391, 392, 393, 394, 395, 396, 398, 401, 403, 404, 405, 406, 407, 409, 410, 411, 412, 414, 415, 417, 418, 419, 420, 422, 423, 424, 425, 426, 427, 428, 429, 431, 433, 434, 436, 438, 439, 440, 441, 444, 446, 447, 448, 449, 450, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 467, 469, 470, 471, 473, 474, 475, 476, 477, 478, 479, 480, 482, 483, 484, 485, 487, 488, 489, 490, 491, 492, 493, 494, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 512, 513, 514, 515, 516, 517, 519, 520, 521, 522, 524, 525, 526, 528, 529, 530, 531, 533, 534, 535, 536, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 553, 555, 557, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 575, 577, 578, 579, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 595, 596, 597, 598, 599, 600, 601, 603, 604, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 629, 630, 631, 632, 633, 634, 635, 636, 637, 639, 640, 642, 643, 644, 645, 646, 647, 649, 650, 652, 653, 655, 657, 658, 660, 661, 663, 664, 665, 666, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 682, 683, 684, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 700, 701, 702, 704, 705, 706, 707, 708, 711, 712, 713, 714, 715, 718, 719, 720, 722, 724, 725, 727, 728, 731, 732, 733, 734, 736, 738, 739, 740, 741, 742, 743, 744, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 773, 775, 776, 777, 778, 779, 780, 781, 782, 784, 785, 786, 787, 788, 789, 792, 794, 795, 797, 798, 799, 800, 801, 803, 804, 805, 806, 807, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 837, 838, 839, 840, 841, 842, 843, 845, 847, 848, 850, 851, 853, 854, 855, 856, 857, 858, 859, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 881, 882, 884, 885, 886, 887, 889, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 909, 910, 913, 914, 915, 916, 917, 918, 919, 921, 922, 923, 925, 927, 928, 929, 930, 931, 932, 933, 934, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 952, 953, 954, 955, 956, 957, 958, 961, 962, 963, 964, 966, 967, 969, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 983, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 1000, 1001, 1003, 1004, 1005, 1007, 1008, 1009, 1011, 1012, 1013, 1014, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1027, 1028, 1029, 1031, 1032, 1033, 1036, 1037, 1038, 1039, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1068, 1069, 1070, 1071, 1072, 1075, 1076, 1077, 1078, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1092, 1093, 1094, 1095, 1100, 1101, 1102, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1114, 1115, 1116, 1118, 1119, 1120, 1121, 1123, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1143, 1144, 1145, 1146, 1147, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1157, 1158, 1159, 1160, 1162, 1164, 1165, 1166, 1168, 1169, 1170, 1171, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1189, 1191, 1192, 1194, 1195, 1196, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1215, 1216, 1217, 1218, 1221, 1222, 1223, 1224, 1227, 1228, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1243, 1244, 1246, 1247, 1248, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1268, 1269, 1270, 1271, 1273, 1274, 1275, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1319, 1320, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1330, 1332, 1333, 1334, 1335 }

B grade { 5, 15, 18, 20, 31, 34, 41, 64, 76, 78, 80, 81, 83, 86, 87, 94, 99, 102, 105, 109, 110, 112, 113, 137, 138, 161, 168, 170, 172, 188, 189, 194, 198, 202, 203, 208, 214, 217, 228, 229, 234, 236, 248, 249, 250, 253, 261, 264, 279, 281, 287, 288, 309, 311, 314, 317, 319, 320, 323, 326, 327, 331, 336, 342, 346, 347, 357, 359, 363, 366, 377, 381, 386, 390, 397, 399, 400, 402, 408, 413, 416, 421, 430, 432, 435, 437, 442, 443, 445, 451, 466, 468, 472, 481, 486, 495, 511, 518, 523, 527, 532, 537, 538, 552, 554, 556, 558, 574, 580, 594, 602, 605, 616, 628, 638, 641, 648, 651, 654, 656, 659, 662, 667, 681, 685, 697, 698, 699, 703, 709, 710, 716, 717, 721, 723, 726, 729, 730, 735, 737, 745, 760, 772, 774, 783, 790, 791, 793, 796, 802, 808, 809, 836, 844, 846, 849, 852, 860, 880, 883, 888, 890, 908, 911, 912, 920, 924, 926, 935, 951, 959, 960, 965, 968, 970, 982, 984, 999, 1002, 1006, 1010, 1015, 1026, 1030, 1034, 1035, 1040, 1049, 1059, 1067, 1073, 1074, 1079, 1091, 1096, 1097, 1098, 1099, 1103, 1112, 1113, 1117, 1122, 1124, 1125, 1142, 1148, 1156, 1161, 1163, 1167, 1172, 1188, 1190, 1197, 1214, 1219, 1220, 1225, 1226, 1229, 1242, 1245, 1249, 1259, 1267, 1272, 1276, 1285, 1307, 1317, 1318, 1321, 1329, 1331 }

C grade { 576 }

F normal fail { }

F(-1) timedout fail { 227, 1193 }

F(-2) exception fail { }

2.1.5 Maxima

A grade { 3, 4, 6, 7, 8, 9, 10, 12, 13, 14, 17, 20, 21, 23, 26, 28, 32, 33, 35, 36, 37, 38, 39, 40, 42, 43, 44, 45, 46, 47, 48, 49, 50, 53, 54, 55, 56, 58, 59, 60, 61, 62, 63, 66, 67, 69, 70, 72, 73, 75, 76, 79, 80, 82, 83, 85, 88, 89, 90, 91, 92, 93, 94, 95, 96, 100, 101, 103, 104, 106, 107, 109, 111, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 125, 126, 129, 131, 134, 135, 136, 140, 143, 144, 146, 147, 148, 150, 151, 153, 155, 157, 158, 161, 162, 163, 164, 165, 166, 167, 168, 170, 173, 174, 175, 176, 177, 179, 180, 182, 184, 186, 187, 189, 190, 191, 192, 193, 194, 195, 196, 199, 200, 201, 203, 204, 205, 206, 208, 209, 210, 211, 213, 215, 216, 220, 221, 223, 224, 225, 226, 227, 230, 231, 233, 235, 238, 239, 241, 242, 244, 245, 246, 247, 251, 252, 254, 255, 258, 259, 260, 262, 263, 266, 268, 269, 270, 271, 272, 273, 275, 276, 277, 278, 280, 284, 286, 288, 290, 291, 294, 296, 297, 298, 299, 300, 301, 303, 304, 305, 306, 307, 310, 312, 313, 316, 318, 320, 321, 322, 324, 325, 328, 331, 333, 334, 335, 339, 341, 347, 348, 349, 351, 352, 355, 358, 360, 362, 363, 364, 365, 367, 368, 370, 371, 373, 374, 375, 378, 379, 380, 382, 383, 384, 385, 387, 389, 390, 392, 393, 394, 396, 398, 401, 403, 404, 406, 407, 409, 411, 412, 414, 415, 416, 417, 418, 419, 423, 424, 426, 427, 428, 429, 433, 434, 436, 439, 441, 444, 446, 447, 448, 449, 450, 452, 453, 455, 456, 457, 459, 461, 462, 463, 464, 465, 467, 470, 471, 473, 474, 475, 476, 477, 478, 479, 480, 482, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 497, 499, 500, 501, 502, 503, 504, 505, 506, 507, 510, 513, 514, 515, 517, 519, 520, 521, 522, 523, 524, 525, 526, 528, 529, 530, 531, 533, 535, 536, 539, 540, 542, 544, 547, 548, 549, 550, 553, 555, 559, 560, 561, 562, 563, 564, 565, 567, 568, 569, 570, 571, 573, 575, 576, 577, 578, 579, 585, 586, 587, 588, 589, 591, 592, 593, 596, 597, 598, 599, 600, 601, 603, 604, 606, 608, 609, 612, 613, 615, 618, 620, 621, 622, 623, 624, 627, 629, 630, 631, 632, 634, 636, 637, 638, 640, 642, 644, 645, 646, 647, 649, 650, 652, 653, 654, 655, 657, 660, 663, 664, 666, 670, 671, 672, 673, 675, 676, 679, 680, 682, 687, 688, 689, 690, 692, 693, 694, 695, 696, 702, 704, 707, 708, 709, 711, 712, 714, 715, 716, 717, 720, 722, 724, 725, 726, 727, 728, 732, 734, 736, 738, 739, 741, 744, 747, 750, 754, 755, 756, 757, 759, 761, 762, 763, 764, 765, 766, 767, 769, 770, 776, 777, 778, 779, 780, 781, 782, 787, 789, 791, 792, 794, 795, 797, 800, 803, 805, 807, 810, 811, 813, 814, 815, 816, 817, 818, 819, 821, 823, 826, 827, 828, 829, 830, 831, 833, 835, 837, 838, 839, 841, 842, 845, 848, 851, 854, 855, 856, 857, 858, 859, 861, 862, 863, 864, 865, 866, 868, 869, 870, 872, 873, 875, 876, 877, 878, 879, 881, 882, 884, 885, 886, 887, 888, 891, 892, 894, 895, 896, 897, 899, 900, 902, 903, 904, 905, 906, 907, 910, 912, 913, 916, 917, 918, 919, 921, 922, 923, 924, 925, 927, 929, 930, 934, 935, 936, 938, 940, 942, 943, 944, 945, 949, 950, 951, 952, 953, 955, 956, 958, 963, 964, 967, 969, 971, 973, 974, 975, 976, 977, 978, 979, 980, 983, 985, 988, 989, 990, 992, 993, 994, 995, 996, 997, 1001, 1004, 1005, 1007, 1008, 1011, 1012, 1016, 1017, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1032, 1036, 1037, 1041, 1044, 1045, 1046, 1047, 1048, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1061, 1062, 1063, 1065, 1068, 1069, 1070, 1071, 1072, 1075, 1077, 1078, 1080, 1081, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1092, 1093, 1094, 1095, 1096, 1100, 1101, 1102, 1105, 1108, 1110, 1111, 1113, 1115, 1118, 1119, 1120, 1121, 1126, 1127, 1128, 1129, 1130, 1132, 1134, 1136, 1140, 1141, 1144, 1145, 1146, 1147, 1148, 1150, 1151, 1152, 1153, 1155, 1156, 1162, 1164, 1165, 1168, 1170, 1171, 1173, 1174, 1175, 1176, 1179, 1180, 1182, 1183, 1184, 1186, 1187, 1189, 1191, 1192, 1193, 1194, 1195, 1196, 1200, 1201, 1202, 1203, 1205, 1206, 1208, 1210, 1211, 1212, 1213, 1215, 1217, 1222, 1223, 1227, 1228, 1231, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1243, 1244, 1245, 1246, 1247, 1248, 1250, 1254, 1256, 1257, 1260, 1262, 1268, 1269, 1270, 1271, 1273, 1274, 1275, 1276, 1278, 1279, 1280, 1281, 1283, 1284, 1285, 1286, 1287, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1297, 1298, 1300, 1302, 1305, 1307, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1318, 1323, 1324, 1326, 1327, 1329, 1332, 1334, 1335 }

B grade { 2, 5, 15, 18, 19, 25, 27, 29, 31, 34, 41, 52, 64, 71, 77, 78, 81, 84, 86, 87, 98, 99, 102, 105, 110, 112, 113, 124, 133, 137, 138, 139, 141, 142, 156, 159, 160, 172, 181, 183, 185, 198, 202, 207, 214, 218, 219, 222, 228, 229, 232, 234, 236, 237, 248, 249, 250, 261, 265, 281, 285, 287, 292, 295, 309, 311, 317, 319, 323, 326, 329, 330, 343, 344, 346, 350, 353, 354, 356, 357, 359, 361, 366, 372, 377, 381, 386, 391, 399, 400, 402, 405, 408, 413, 420, 421, 422, 430, 431, 432, 435, 437, 440, 442, 445, 451, 466, 468, 469, 472, 483, 496, 508, 509, 511, 518, 527, 532, 534, 537, 538, 546, 551, 552, 554, 556, 558, 574, 580, 581, 582, 584, 594, 602, 605, 607, 610, 614, 616, 617, 625, 628, 633, 639, 641, 648, 651, 656, 658, 659, 662, 665, 674, 677, 681, 686, 698, 699, 700, 701, 703, 706, 710, 713, 718, 721, 723, 729, 730, 731, 735, 737, 740, 743, 745, 746, 748, 752, 753, 758, 768, 771, 772, 774, 783, 784, 785, 786, 790, 793, 796, 798, 799, 802, 806, 808, 809, 820, 822, 824, 825, 832, 834, 836, 840, 843, 844, 846, 849, 850, 852, 853, 860, 880, 890, 908, 909, 914, 915, 928, 931, 933, 939, 941, 959, 960, 965, 966, 968, 970, 972, 982, 984, 986, 987, 991, 998, 999, 1002, 1003, 1006, 1009, 1010, 1013, 1014, 1026, 1027, 1028, 1030, 1031, 1033, 1034, 1035, 1038, 1039, 1040, 1043, 1049, 1059, 1067, 1073, 1074, 1076, 1079, 1082, 1097, 1098, 1099, 1103, 1104, 1107, 1112, 1114, 1116, 1117, 1122, 1123, 1124, 1125, 1131, 1135, 1137, 1142, 1143, 1157, 1159, 1160, 1161, 1163, 1166, 1167, 1172, 1188, 1190, 1197, 1199, 1214, 1219, 1220, 1224, 1225, 1226, 1229, 1232, 1249, 1251, 1252, 1255, 1258, 1259, 1263, 1264, 1265, 1266, 1267, 1272, 1282, 1288, 1296, 1301, 1317, 1320, 1321, 1325, 1331, 1333 }

C grade { 22, 65, 74, 108, 127, 128, 130, 149, 169, 171, 178, 188, 240, 257, 274, 279, 302, 337, 338, 376, 454, 458, 460, 495, 545, 557, 590, 611, 619, 643, 661, 668, 678, 719, 742, 751, 801, 804, 812, 867, 871, 874, 883, 898, 937, 948, 954, 957, 1029, 1042, 1058, 1060, 1091, 1133, 1138, 1149, 1154, 1158, 1169, 1177, 1178, 1181, 1185, 1198, 1207, 1209, 1218, 1277, 1299, 1303, 1304 }

F normal fail { 16, 24, 30, 51, 57, 68, 97, 145, 152, 154, 197, 212, 217, 243, 256, 264, 267, 282, 283, 289, 293, 308, 314, 315, 336, 340, 342, 369, 388, 395, 397, 410, 425, 438, 443, 481, 498, 512, 516, 543, 572, 583, 595, 626, 635, 669, 683, 684, 685, 691, 705, 733, 760, 773, 788, 847, 889, 893, 901, 920, 926, 932, 946, 961, 981, 1000, 1015, 1018, 1064, 1066, 1106, 1109, 1139, 1204, 1216, 1221, 1230, 1242, 1253, 1261, 1306, 1308, 1319, 1322, 1328, 1330 }

F(-1) timedout fail { 253, 327 }

F(-2) exception fail { 1, 11, 132, 332, 345, 541, 566, 667, 697, 749, 775, 911, 947, 962 }

2.1.6 Giac

A grade { 2, 3, 4, 6, 7, 8, 9, 10, 12, 13, 14, 16, 19, 21, 23, 27, 28, 32, 35, 36, 37, 38, 39, 40, 42, 45, 46, 48, 49, 50, 53, 54, 55, 56, 58, 60, 61, 63, 65, 66, 69, 70, 72, 73, 77, 79, 82, 83, 84, 85, 88, 89, 91, 92, 93, 95, 96, 97, 100, 103, 104, 106, 107, 108, 114, 115, 116, 118, 120, 121, 122, 123, 125, 126, 127, 128, 129, 131, 132, 134, 139, 140, 142, 143, 144, 146, 148, 150, 151, 152, 153, 154, 155, 158, 160, 162, 163, 164, 166, 167, 169, 170, 171, 172, 173, 175, 177, 178, 179, 180, 182, 183, 184, 185, 186, 187, 190, 191, 192, 195, 196, 200, 201, 204, 205, 206, 207, 209, 210, 211, 213, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 230, 233, 237, 238, 239, 245, 246, 247, 248, 251, 252, 255, 258, 259, 260, 262, 263, 265, 267, 268, 270, 271, 272, 273, 274, 276, 277, 278, 280, 282, 284, 285, 286, 289, 290, 292, 294, 295, 296, 298, 301, 302, 303, 304, 305, 306, 307, 308, 312, 313, 315, 316, 318, 320, 321, 322, 324, 325, 328, 329, 332, 333, 334, 335, 337, 338, 339, 341, 344, 347, 348, 349, 350, 351, 352, 354, 355, 356, 358, 360, 361, 362, 364, 365, 367, 368, 370, 372, 373, 374, 376, 379, 380, 382, 384, 387, 389, 391, 392, 393, 394, 395, 396, 398, 399, 401, 404, 405, 406, 407, 411, 412, 414, 415, 416, 417, 418, 419, 423, 424, 426, 427, 428, 429, 431, 433, 434, 438, 439, 441, 444, 446, 447, 449, 450, 452, 453, 454, 455, 456, 457, 458, 459, 462, 463, 464, 465, 466, 471, 473, 474, 475, 476, 477, 478, 479, 480, 482, 485, 487, 488, 490, 491, 492, 494, 497, 499, 500, 501, 502, 503, 504, 506, 507, 509, 510, 513, 517, 519, 520, 521, 522, 524, 526, 527, 528, 529, 530, 531, 535, 536, 538, 539, 540, 542, 544, 545, 546, 547, 548, 549, 553, 556, 557, 559, 560, 561, 563, 564, 565, 567, 568, 569, 571, 572, 573, 576, 577, 578, 579, 583, 588, 589, 590, 591, 592, 593, 598, 599, 600, 601, 603, 604, 606, 607, 609, 612, 613, 614, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 629, 630, 631, 632, 634, 635, 636, 637, 640, 642, 643, 644, 645, 646, 650, 652, 653, 655, 657, 658, 660, 661, 663, 666, 668, 670, 672, 673, 674, 677, 678, 679, 682, 684, 686, 687, 688, 689, 693, 694, 695, 701, 702, 703, 704, 706, 707, 711, 712, 714, 715, 716, 717, 719, 720, 722, 724, 725, 727, 732, 734, 736, 738, 739, 740, 741, 743, 744, 747, 748, 749, 753, 754, 756, 757, 758, 759, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 776, 777, 778, 780, 781, 786, 787, 789, 792, 794, 798, 799, 800, 801, 803, 805, 807, 810, 811, 813, 814, 815, 816, 817, 818, 819, 820, 821, 823, 825, 828, 829, 830, 832, 833, 834, 835, 837, 838, 839, 840, 841, 843, 848, 851, 853, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 869, 870, 871, 872, 873, 876, 877, 879, 881, 882, 884, 885, 886, 887, 892, 893, 896, 898, 899, 901, 903, 904, 905, 907, 910, 914, 915, 916, 917, 918, 921, 922, 923, 925, 927, 928, 930, 931, 932, 934, 936, 937, 938, 942, 943, 944, 945, 946, 947, 948, 949, 950, 952, 955, 956, 957, 963, 964, 966, 967, 969, 971, 972, 973, 974, 975, 976, 977, 978, 979, 981, 983, 985, 987, 988, 989, 990, 992, 993, 994, 995, 996, 999, 1001, 1004, 1005, 1007, 1008, 1009, 1011, 1012, 1013, 1014, 1016, 1017, 1019, 1020, 1021, 1022, 1023, 1027, 1029, 1032, 1036, 1037, 1038, 1039, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1068, 1069, 1070, 1072, 1077, 1078, 1080, 1081, 1084, 1085, 1087, 1090, 1093, 1094, 1095, 1100, 1101, 1102, 1104, 1105, 1108, 1110, 1111, 1118, 1119, 1120, 1121, 1123, 1126, 1127, 1128, 1130, 1132, 1133, 1134, 1135, 1137, 1138, 1139, 1140, 1141, 1142, 1144, 1146, 1147, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1158, 1159, 1160, 1161, 1162, 1164, 1165, 1166, 1168, 1169, 1170, 1171, 1173, 1174, 1175, 1176, 1177, 1178, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1191, 1192, 1194, 1195, 1196, 1198, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1209, 1210, 1211, 1212, 1213, 1216, 1217, 1218, 1222, 1223, 1224, 1227, 1228, 1229, 1230, 1231, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1243, 1244, 1245, 1246, 1247, 1248, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1261, 1262, 1263, 1264, 1266, 1268, 1270, 1271, 1273, 1274, 1276, 1277, 1278, 1279, 1280, 1281, 1283, 1284, 1287, 1289, 1290, 1293, 1294, 1295, 1297, 1298, 1299, 1302, 1303, 1304, 1305, 1308, 1309, 1310, 1312, 1313, 1314, 1315, 1316, 1319, 1320, 1321, 1323, 1324, 1326, 1327, 1329, 1330, 1331, 1332, 1334, 1335 }

B grade { 1, 5, 15, 18, 25, 29, 30, 34, 41, 43, 51, 52, 57, 64, 67, 74, 80, 81, 86, 87, 94, 98, 99, 102, 105, 109, 110, 111, 112, 113, 117, 119, 130, 136, 137, 138, 141, 147, 149, 156, 157, 159, 161, 165, 181, 188, 189, 193, 194, 198, 202, 208, 212, 214, 229, 234, 240, 241, 242, 243, 249, 250, 257, 261, 264, 266, 269, 275, 279, 281, 283, 291, 293, 299, 309, 310, 311, 317, 319, 323, 326, 327, 331, 343, 345, 346, 353, 357, 359, 363, 366, 369, 375, 377, 381, 383, 386, 390, 397, 400, 402, 403, 408, 410, 413, 421, 422, 425, 430, 432, 435, 437, 440, 443, 448, 451, 468, 469, 470, 483, 486, 489, 495, 496, 512, 518, 525, 532, 537, 543, 550, 552, 554, 555, 558, 562, 570, 574, 575, 580, 581, 582, 585, 586, 587, 605, 608, 610, 611, 616, 628, 633, 639, 651, 656, 659, 662, 665, 676, 680, 681, 690, 691, 696, 698, 699, 709, 721, 730, 731, 735, 737, 742, 745, 746, 750, 752, 755, 760, 772, 773, 774, 782, 790, 791, 793, 796, 797, 802, 804, 806, 808, 809, 812, 824, 831, 836, 842, 845, 849, 850, 852, 854, 868, 874, 875, 880, 883, 888, 890, 891, 895, 900, 906, 908, 909, 911, 912, 913, 920, 929, 935, 951, 954, 959, 960, 962, 965, 968, 970, 980, 982, 984, 986, 997, 998, 1003, 1006, 1010, 1015, 1024, 1026, 1028, 1030, 1031, 1033, 1040, 1057, 1066, 1067, 1071, 1073, 1074, 1076, 1079, 1089, 1091, 1092, 1096, 1097, 1098, 1099, 1103, 1107, 1109, 1112, 1113, 1114, 1116, 1122, 1124, 1125, 1129, 1131, 1143, 1149, 1172, 1179, 1190, 1193, 1200, 1208, 1214, 1219, 1220, 1225, 1226, 1242, 1249, 1258, 1259, 1260, 1265, 1267, 1269, 1272, 1282, 1286, 1288, 1296, 1300, 1301, 1306, 1311, 1317, 1318, 1325, 1333 }

C grade { 47, 101, 729, 940 }

F normal fail { 11, 17, 20, 24, 26, 31, 33, 44, 59, 62, 68, 71, 75, 76, 78, 90, 124, 133, 135, 145, 168, 174, 176, 197, 199, 203, 215, 231, 236, 244, 253, 254, 256, 287, 288, 297, 300, 314, 330, 336, 340, 342, 371, 378, 385, 409, 436, 442, 445, 460, 461, 467, 472, 481, 493, 505, 508, 511, 514, 516, 523, 533, 534, 541, 551, 566, 584, 594, 595, 596, 597, 615, 617, 638, 641, 647, 648, 649, 664, 669, 671, 675, 683, 692, 700, 705, 713, 723, 726, 728, 733, 779, 783, 784, 785, 788, 795, 822, 826, 827, 844, 846, 847, 855, 856, 878, 889, 894, 897, 902, 919, 924, 926, 933, 939, 953, 958, 961, 1000, 1002, 1018, 1025, 1034, 1035, 1075, 1082, 1083, 1086, 1106, 1115, 1136, 1145, 1148, 1157, 1163, 1167, 1197, 1199, 1215, 1221, 1232, 1241, 1250, 1275, 1285, 1291, 1292, 1307, 1322, 1328 }

F(-1) timedout fail { 22, 235, 420, 498, 710, 751, 941, 1117 }

F(-2) exception fail { 232, 388, 484, 515, 602, 654, 667, 685, 697, 708, 718, 775, 991, 1088 }

2.1.7 Mupad

A grade { }

B grade { 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 42, 44, 45, 48, 49, 50, 51, 52, 53, 54, 55, 57, 58, 59, 60, 61, 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 98, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 157, 158, 159, 160, 161, 162, 163, 164, 166, 168, 169, 170, 171, 172, 173, 174, 175, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 191, 192, 193, 194, 195, 196, 197, 198, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 219, 220, 221, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 235, 236, 237, 238, 239, 240, 241, 242, 243, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 267, 268, 270, 271, 272, 273, 274, 275, 276, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 312, 313, 314, 315, 316, 317, 318, 320, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 339, 340, 341, 342, 343, 344, 346, 347, 348, 349, 350, 351, 352, 354, 355, 356, 357, 358, 359, 360, 361, 362, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 389, 390, 391, 392, 393, 394, 395, 396, 398, 399, 400, 401, 402, 403, 404, 405, 407, 409, 410, 411, 412, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 448, 449, 450, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 463, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 478, 479, 480, 481, 482, 483, 485, 487, 488, 490, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 519, 520, 521, 522, 524, 525, 526, 527, 528, 529, 530, 531, 533, 535, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 563, 564, 565, 566, 567, 568, 569, 571, 572, 573, 574, 576, 577, 578, 579, 580, 581, 583, 584, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 618, 619, 620, 621, 622, 623, 624, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 649, 651, 652, 653, 654, 655, 656, 657, 658, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 725, 726, 728, 730, 731, 733, 734, 735, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 750, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 783, 784, 785, 786, 787, 788, 789, 791, 792, 793, 794, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 810, 811, 812, 813, 814, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 834, 835, 836, 837, 838, 839, 840, 841, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 935, 936, 937, 938, 939, 940, 941, 942, 944, 945, 946, 947, 948, 949, 950, 951, 952, 954, 955, 956, 957, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1007, 1008, 1009, 1010, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1031, 1032, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1094, 1095, 1096, 1098, 1099, 1100, 1101, 1102, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1118, 1119, 1120, 1121, 1123, 1126, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1173, 1174, 1175, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1206, 1207, 1208, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1297, 1299, 1300, 1301, 1303, 1304, 1306, 1307, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1329, 1330, 1331, 1332, 1333, 1334 }

C grade { }

F normal fail { }

F(-1) timedout fail { 9, 39, 43, 46, 47, 56, 63, 84, 97, 99, 124, 138, 156, 165, 167, 176, 190, 199, 218, 222, 234, 244, 266, 269, 277, 311, 319, 321, 338, 345, 353, 363, 388, 397, 406, 408, 413, 414, 447, 451, 462, 464, 477, 484, 486, 489, 491, 503, 518, 523, 532, 534, 536, 550, 562, 570, 575, 582, 585, 586, 604, 617, 625, 648, 650, 659, 685, 710, 724, 727, 729, 732, 736, 749, 751, 765, 782, 790, 795, 809, 815, 832, 833, 842, 857, 874, 875, 934, 943, 953, 958, 959, 981, 982, 998, 1006, 1011, 1029, 1030, 1033, 1051, 1079, 1093, 1097, 1103, 1117, 1122, 1124, 1125, 1127, 1149, 1172, 1176, 1205, 1209, 1219, 1220, 1262, 1272, 1296, 1298, 1302, 1305, 1308, 1328, 1335 }

F(-2) exception fail { }

2.1.8 Sympy

A grade { 2, 3, 4, 6, 7, 8, 9, 10, 12, 14, 15, 16, 17, 19, 21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 34, 35, 36, 37, 38, 39, 40, 42, 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 58, 59, 60, 61, 62, 63, 65, 66, 67, 68, 69, 70, 72, 73, 75, 76, 77, 79, 82, 84, 85, 88, 89, 90, 91, 92, 93, 94, 96, 97, 98, 100, 102, 103, 104, 106, 107, 108, 109, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 125, 126, 127, 129, 132, 133, 134, 135, 136, 139, 140, 142, 143, 144, 146, 147, 148, 150, 151, 152, 153, 154, 156, 157, 158, 160, 162, 163, 164, 166, 167, 168, 169, 171, 173, 174, 175, 176, 177, 179, 180, 181, 182, 184, 186, 187, 189, 190, 192, 193, 194, 195, 196, 197, 200, 201, 202, 203, 204, 205, 206, 207, 209, 210, 211, 212, 213, 215, 216, 217, 218, 219, 220, 221, 223, 224, 225, 226, 227, 230, 232, 233, 236, 237, 238, 239, 240, 241, 242, 244, 245, 246, 247, 249, 251, 252, 254, 255, 256, 257, 258, 259, 260, 262, 263, 265, 266, 267, 268, 270, 272, 273, 274, 275, 276, 278, 280, 282, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 300, 301, 302, 303, 304, 305, 306, 307, 308, 311, 312, 313, 315, 316, 318, 320, 321, 322, 324, 325, 328, 329, 333, 334, 335, 337, 338, 339, 341, 343, 344, 346, 347, 348, 349, 350, 351, 352, 355, 356, 360, 361, 362, 364, 365, 367, 368, 370, 372, 373, 374, 375, 378, 379, 380, 381, 382, 383, 384, 385, 387, 389, 391, 392, 393, 394, 395, 396, 398, 399, 400, 401, 403, 404, 405, 406, 407, 409, 411, 412, 414, 415, 416, 417, 418, 419, 420, 422, 423, 424, 425, 426, 427, 428, 429, 431, 433, 434, 436, 437, 438, 439, 441, 442, 443, 446, 447, 448, 449, 450, 452, 453, 454, 455, 456, 457, 458, 459, 460, 462, 465, 466, 467, 469, 471, 473, 474, 475, 476, 477, 478, 479, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 496, 497, 498, 499, 500, 501, 502, 503, 504, 507, 508, 509, 510, 512, 513, 514, 516, 517, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 533, 534, 535, 536, 539, 540, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 553, 555, 557, 559, 560, 561, 563, 564, 565, 566, 568, 569, 570, 571, 572, 575, 576, 577, 578, 579, 583, 585, 587, 588, 589, 590, 591, 592, 593, 595, 596, 597, 598, 599, 600, 601, 603, 604, 606, 607, 608, 609, 611, 612, 613, 614, 615, 617, 618, 619, 620, 621, 622, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 636, 637, 638, 639, 640, 642, 643, 644, 645, 646, 647, 649, 652, 653, 655, 657, 658, 660, 661, 663, 664, 665, 666, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 682, 683, 684, 685, 687, 688, 690, 691, 692, 693, 694, 696, 697, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 711, 712, 713, 714, 717, 719, 720, 722, 724, 725, 727, 731, 732, 733, 734, 736, 738, 739, 741, 742, 743, 744, 745, 746, 747, 748, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 761, 762, 763, 764, 766, 767, 769, 770, 771, 773, 776, 778, 779, 780, 781, 784, 786, 787, 788, 789, 792, 794, 797, 798, 799, 800, 801, 803, 805, 806, 807, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 823, 825, 827, 828, 829, 833, 834, 835, 836, 837, 838, 839, 841, 842, 843, 845, 847, 848, 851, 853, 854, 855, 856, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 871, 872, 873, 876, 877, 878, 879, 881, 882, 884, 885, 886, 887, 888, 889, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 921, 923, 924, 925, 926, 927, 928, 931, 933, 934, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 948, 949, 950, 952, 954, 955, 956, 957, 958, 961, 962, 964, 966, 967, 969, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 983, 985, 986, 987, 988, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1004, 1005, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1016, 1017, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1027, 1028, 1029, 1031, 1032, 1036, 1037, 1038, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1068, 1069, 1070, 1071, 1072, 1075, 1076, 1077, 1078, 1080, 1081, 1082, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1093, 1094, 1095, 1099, 1100, 1101, 1102, 1104, 1105, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1118, 1119, 1120, 1121, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1144, 1145, 1146, 1147, 1150, 1151, 1152, 1153, 1154, 1155, 1157, 1158, 1160, 1162, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1173, 1174, 1175, 1176, 1177, 1178, 1180, 1181, 1183, 1184, 1185, 1186, 1187, 1189, 1191, 1192, 1193, 1194, 1195, 1196, 1198, 1200, 1201, 1202, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1216, 1217, 1218, 1220, 1221, 1222, 1223, 1224, 1225, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1243, 1244, 1245, 1246, 1247, 1248, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1260, 1261, 1262, 1264, 1265, 1266, 1268, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1319, 1320, 1322, 1324, 1325, 1326, 1327, 1329, 1330, 1331, 1332, 1333, 1334, 1335 }

B grade { 5, 13, 18, 29, 41, 57, 71, 74, 78, 80, 81, 83, 86, 87, 99, 105, 110, 112, 123, 124, 128, 130, 131, 137, 138, 141, 145, 149, 159, 161, 165, 170, 172, 178, 183, 185, 188, 198, 199, 208, 214, 222, 228, 229, 234, 235, 243, 248, 250, 253, 261, 264, 271, 279, 281, 283, 299, 309, 314, 317, 319, 323, 326, 327, 331, 336, 342, 345, 353, 357, 358, 359, 363, 369, 371, 376, 377, 386, 390, 397, 402, 408, 410, 413, 421, 430, 432, 435, 440, 444, 445, 451, 463, 464, 468, 470, 472, 481, 495, 511, 515, 518, 532, 537, 538, 552, 554, 556, 558, 567, 573, 574, 580, 581, 582, 584, 586, 594, 602, 605, 610, 616, 623, 635, 641, 648, 651, 656, 662, 667, 681, 689, 695, 698, 699, 715, 716, 721, 723, 729, 730, 735, 737, 740, 760, 765, 768, 772, 774, 782, 783, 785, 790, 791, 793, 796, 802, 804, 808, 809, 822, 824, 830, 831, 832, 840, 844, 846, 849, 850, 852, 857, 874, 875, 880, 883, 890, 920, 929, 930, 932, 935, 951, 959, 960, 963, 965, 968, 970, 982, 984, 989, 1002, 1003, 1006, 1015, 1026, 1030, 1033, 1035, 1040, 1049, 1059, 1067, 1073, 1074, 1079, 1083, 1091, 1092, 1096, 1097, 1098, 1103, 1107, 1117, 1124, 1125, 1142, 1143, 1149, 1156, 1159, 1163, 1172, 1179, 1188, 1190, 1197, 1203, 1215, 1226, 1242, 1249, 1258, 1259, 1267, 1269, 1283, 1284, 1307, 1317, 1321 }

C grade { 795 }

F normal fail { }

F(-1) timedout fail { 20, 31, 33, 44, 64, 155, 191, 231, 269, 330, 332, 340, 354, 388, 461, 480, 505, 506, 562, 650, 654, 686, 710, 718, 726, 728, 777, 826, 870, 922, 953, 1018, 1039, 1106, 1122, 1182, 1199, 1219, 1292, 1328 }

F(-2) exception fail { 1, 11, 95, 101, 111, 277, 310, 366, 541, 659, 749, 775, 947, 1034, 1123, 1148, 1161, 1263, 1318, 1323 }

2.2 Detailed conclusion table per each integral for all CAS systems

Detailed conclusion table per each integral is given by the table below. The elapsed time is in seconds. For failed result it is given as **F(-1)** if the failure was due to timeout. It is given as **F(-2)** if the failure was due to an exception being raised, which could indicate a bug in the system. If the failure was due to integral not being evaluated within the time limit, then it is given as **F**.

In this table, the column `N.S.` means **normalized size** and is defined as $\frac{\text{antiderivative leaf size}}{\text{optimal antiderivative leaf size}}$. To make the table fit the page, the name `Mathematica` was abbreviated to `MMA`.

Problem 1	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	F	B	F(-2)	A	F(-2)	B	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	31	97	0	63	0	47	0	83	54
N.S.	1	3.13	0.00	2.03	0.00	1.52	0.00	2.68	1.74
time (sec)	N/A	6.036	0.000	4.148	0.000	0.256	0.000	0.328	13.334

Problem 2	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	49	56	13	41	12	10	12	12
N.S.	1	4.08	4.67	1.08	3.42	1.00	0.83	1.00	1.00
time (sec)	N/A	0.378	1.484	1.893	0.312	0.252	0.049	0.268	13.229

Problem 3	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	45	66	35	34	37	55	55
N.S.	1	0.00	1.45	2.13	1.13	1.10	1.19	1.77	1.77
time (sec)	N/A	0.000	0.066	6.899	0.315	0.252	0.276	0.424	13.643

Problem 4	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	8	8	9	8	8	7	8	8
N.S.	1	0.53	0.53	0.60	0.53	0.53	0.47	0.53	0.53
time (sec)	N/A	0.141	0.000	0.041	0.200	0.241	0.019	0.269	0.022

Problem 5	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	86	27	60	59	59	56	59	24
N.S.	1	3.44	1.08	2.40	2.36	2.36	2.24	2.36	0.96
time (sec)	N/A	0.306	0.178	0.134	0.194	0.261	0.072	0.267	13.065

Problem 6	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	6	6	5	4	4	5	5	4
N.S.	1	0.19	0.19	0.16	0.13	0.13	0.16	0.16	0.13
time (sec)	N/A	0.115	0.000	0.040	0.190	0.247	0.020	0.278	0.011

Problem 7	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	30	30	28	27	29	20	29	27
N.S.	1	1.00	1.00	0.93	0.90	0.97	0.67	0.97	0.90
time (sec)	N/A	2.668	0.086	0.645	0.343	0.262	0.146	0.303	13.733

Problem 8	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	22	22	21	22	22	20	24	22
N.S.	1	0.76	0.76	0.72	0.76	0.76	0.69	0.83	0.76
time (sec)	N/A	0.349	0.011	0.051	0.192	0.250	0.053	0.267	0.116

Problem 9	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	16	24	18	23	22	23	0
N.S.	1	0.00	0.73	1.09	0.82	1.05	1.00	1.05	0.00
time (sec)	N/A	0.000	5.227	1.251	0.312	0.249	0.087	0.329	0.000

Problem 10	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	19	20	19	17	18	15	19	17
N.S.	1	0.90	0.95	0.90	0.81	0.86	0.71	0.90	0.81
time (sec)	N/A	0.156	0.009	0.685	0.184	0.231	0.054	0.276	13.612

Problem 11	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F(-2)	A	F(-2)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	36	40	0	39	0	0	69
N.S.	1	0.00	1.20	1.33	0.00	1.30	0.00	0.00	2.30
time (sec)	N/A	0.000	0.298	210.643	0.000	0.251	0.000	0.000	14.020

Problem 12	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	33	26	33	28	22	33	25
N.S.	1	0.00	1.18	0.93	1.18	1.00	0.79	1.18	0.89
time (sec)	N/A	0.000	0.208	1.023	0.317	0.251	0.176	0.286	13.554

Problem 13	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	109	28	41	30	32	104	30	50
N.S.	1	3.63	0.93	1.37	1.00	1.07	3.47	1.00	1.67
time (sec)	N/A	2.498	1.743	0.454	0.247	0.267	0.154	0.283	13.199

Problem 14	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	21	24	23	40	37	29	22	34
N.S.	1	0.88	1.00	0.96	1.67	1.54	1.21	0.92	1.42
time (sec)	N/A	1.574	0.546	0.998	0.341	0.286	0.418	0.385	14.214

Problem 15	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	4620	46	41	304	76	44	83	50
N.S.	1	135.88	1.35	1.21	8.94	2.24	1.29	2.44	1.47
time (sec)	N/A	8.754	0.054	0.292	0.318	0.262	0.093	0.280	14.233

Problem 16	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	28	24	0	28	34	32	34
N.S.	1	0.00	1.40	1.20	0.00	1.40	1.70	1.60	1.70
time (sec)	N/A	0.000	1.035	0.559	0.000	0.265	0.142	0.280	13.731

Problem 17	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	32	29	26	27	23	29	0	26
N.S.	1	1.14	1.04	0.93	0.96	0.82	1.04	0.00	0.93
time (sec)	N/A	0.271	3.808	1.006	0.272	0.260	0.097	0.000	0.716

Problem 18	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	62	51	69	76	59	66	76	85
N.S.	1	2.95	2.43	3.29	3.62	2.81	3.14	3.62	4.05
time (sec)	N/A	0.525	2.124	0.296	0.490	0.267	0.103	0.424	13.552

Problem 19	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	22	24	24	41	16	24	21	16
N.S.	1	1.29	1.41	1.41	2.41	0.94	1.41	1.24	0.94
time (sec)	N/A	0.444	0.046	0.513	0.239	0.281	0.151	0.273	13.841

Problem 20	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	F(-1)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	0	17	16	15	34	0	0	15
N.S.	1	0.00	1.00	0.94	0.88	2.00	0.00	0.00	0.88
time (sec)	N/A	0.000	0.722	0.074	0.435	0.266	0.000	0.000	13.586

Problem 21	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	9	9	9	8	8	8	8	9
N.S.	1	0.53	0.53	0.53	0.47	0.47	0.47	0.47	0.53
time (sec)	N/A	0.142	0.025	0.125	0.217	0.246	0.030	0.266	13.422

Problem 22	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	C	A	A	F(-1)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	46	147	75	45	46	0	45
N.S.	1	0.00	1.44	4.59	2.34	1.41	1.44	0.00	1.41
time (sec)	N/A	0.000	2.181	65.172	0.363	0.254	0.420	0.000	14.176

Problem 23	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	12	12	11	10	10	8	11	10
N.S.	1	0.71	0.71	0.65	0.59	0.59	0.47	0.65	0.59
time (sec)	N/A	0.139	0.004	0.424	0.202	0.248	0.032	0.264	0.034

Problem 24	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	41	35	40	0	39	36	0	38
N.S.	1	1.17	1.00	1.14	0.00	1.11	1.03	0.00	1.09
time (sec)	N/A	1.992	0.312	1.761	0.000	0.262	0.183	0.000	14.734

Problem 25	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	23	20	21	167	20	20	74	24
N.S.	1	1.00	0.87	0.91	7.26	0.87	0.87	3.22	1.04
time (sec)	N/A	0.235	0.032	0.458	0.292	0.241	0.120	0.267	13.159

Problem 26	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	27	26	39	23	29	0	26
N.S.	1	0.00	1.04	1.00	1.50	0.88	1.12	0.00	1.00
time (sec)	N/A	0.000	1.142	0.211	0.255	0.260	0.140	0.000	12.888

Problem 27	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	162	29	33	165	21	26	32	21
N.S.	1	7.71	1.38	1.57	7.86	1.00	1.24	1.52	1.00
time (sec)	N/A	0.515	0.147	4.171	0.511	0.264	0.094	0.291	0.371

Problem 28	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	12	12	9	8	8	10	9	8
N.S.	1	0.60	0.60	0.45	0.40	0.40	0.50	0.45	0.40
time (sec)	N/A	0.135	0.003	0.073	0.189	0.268	0.032	0.270	0.023

Problem 29	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	32	31	39	689	36	107	1346	38
N.S.	1	0.94	0.91	1.15	20.26	1.06	3.15	39.59	1.12
time (sec)	N/A	1.064	0.079	3.131	0.258	0.279	0.275	0.486	13.791

Problem 30	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	42	28	34	0	52	20	61	27
N.S.	1	1.35	0.90	1.10	0.00	1.68	0.65	1.97	0.87
time (sec)	N/A	1.154	0.216	0.238	0.000	0.257	0.123	0.271	13.287

Problem 31	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	F(-1)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	36	65	1199	63	0	0	59
N.S.	1	0.00	1.29	2.32	42.82	2.25	0.00	0.00	2.11
time (sec)	N/A	0.000	0.154	65.769	1.016	0.259	0.000	0.000	14.733

Problem 32	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	22	28	31	32	35	27	32	22
N.S.	1	0.96	1.22	1.35	1.39	1.52	1.17	1.39	0.96
time (sec)	N/A	0.157	0.015	0.107	0.180	0.272	0.065	0.271	0.086

Problem 33	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-1)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	43	39	40	40	0	0	40
N.S.	1	0.00	1.72	1.56	1.60	1.60	0.00	0.00	1.60
time (sec)	N/A	0.000	1.192	4.104	0.382	0.241	0.000	0.000	13.446

Problem 34	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	24	25	81	82	37	54	89
N.S.	1	0.00	0.86	0.89	2.89	2.93	1.32	1.93	3.18
time (sec)	N/A	0.000	0.464	0.760	0.299	0.256	0.071	0.289	13.082

Problem 35	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	0	17	15	26	25	19	15	14
N.S.	1	0.00	1.00	0.88	1.53	1.47	1.12	0.88	0.82
time (sec)	N/A	0.000	0.187	0.092	0.229	0.260	0.107	0.280	12.848

Problem 36	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	21	13	12	23	15	15	24	15
N.S.	1	1.50	0.93	0.86	1.64	1.07	1.07	1.71	1.07
time (sec)	N/A	0.325	0.020	0.500	0.313	0.252	0.060	0.292	13.544

Problem 37	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	26	26	27	26	26	24	26	28
N.S.	1	1.00	1.00	1.04	1.00	1.00	0.92	1.00	1.08
time (sec)	N/A	0.450	0.079	25.895	0.356	0.254	0.909	0.444	12.876

Problem 38	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	26	26	25	26	26	22	41	24
N.S.	1	1.18	1.18	1.14	1.18	1.18	1.00	1.86	1.09
time (sec)	N/A	2.085	0.041	0.493	0.326	0.251	0.096	0.300	12.841

Problem 39	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	75	31	47	47	32	49	0
N.S.	1	0.00	2.50	1.03	1.57	1.57	1.07	1.63	0.00
time (sec)	N/A	0.000	0.279	2.056	0.313	0.271	0.153	0.305	0.000

Problem 40	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	A	A	A	A	A	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	27	32	0	33	31	32	39	34	30
N.S.	1	1.19	0.00	1.22	1.15	1.19	1.44	1.26	1.11
time (sec)	N/A	0.495	0.000	1.065	0.302	0.262	0.100	0.281	12.735

Problem 41	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	372	69	48	143	164	151	529	133
N.S.	1	15.50	2.88	2.00	5.96	6.83	6.29	22.04	5.54
time (sec)	N/A	0.945	0.054	0.667	0.186	0.260	2.174	0.306	13.439

Problem 42	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	27	23	29	29	19	29	22
N.S.	1	0.00	0.79	0.68	0.85	0.85	0.56	0.85	0.65
time (sec)	N/A	0.000	1.453	0.116	0.241	0.257	0.067	0.282	13.179

Problem 43	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	27	30	31	26	22	53	0
N.S.	1	0.00	1.00	1.11	1.15	0.96	0.81	1.96	0.00
time (sec)	N/A	0.000	2.468	0.799	0.253	0.260	0.102	0.350	0.000

Problem 44	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	A	F(-1)	F	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	26	0	26	266	21	49	0	0	97
N.S.	1	0.00	1.00	10.23	0.81	1.88	0.00	0.00	3.73
time (sec)	N/A	0.000	0.283	0.556	0.408	0.277	0.000	0.000	13.277

Problem 45	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	17	17	18	20	21	17	21	19
N.S.	1	0.94	0.94	1.00	1.11	1.17	0.94	1.17	1.06
time (sec)	N/A	0.179	0.005	0.105	0.194	0.238	0.065	0.262	0.041

Problem 46	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	25	25	23	36	20	23	0
N.S.	1	0.00	0.96	0.96	0.88	1.38	0.77	0.88	0.00
time (sec)	N/A	0.000	0.276	0.616	0.315	0.273	0.085	0.289	0.000

Problem 47	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	18	22	19	22	18	17	21	0
N.S.	1	1.00	1.22	1.06	1.22	1.00	0.94	1.17	0.00
time (sec)	N/A	0.530	0.580	9.306	0.329	0.253	0.330	0.340	0.000

Problem 48	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	29	30	24	23	23	26	23	25
N.S.	1	1.04	1.07	0.86	0.82	0.82	0.93	0.82	0.89
time (sec)	N/A	0.164	0.042	0.108	0.215	0.261	0.070	0.271	0.115

Problem 49	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	21	21	23	23	19	23	20
N.S.	1	0.00	0.91	0.91	1.00	1.00	0.83	1.00	0.87
time (sec)	N/A	0.000	1.275	0.090	0.223	0.247	0.047	0.268	12.932

Problem 50	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	27	28	27	29	34	29	27
N.S.	1	0.00	1.23	1.27	1.23	1.32	1.55	1.32	1.23
time (sec)	N/A	0.000	0.157	0.098	0.235	0.258	0.149	0.282	13.034

Problem 51	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	19	18	16	0	16	14	33	16
N.S.	1	1.06	1.00	0.89	0.00	0.89	0.78	1.83	0.89
time (sec)	N/A	0.172	0.024	0.331	0.000	0.255	0.103	0.282	0.076

Problem 52	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	18	18	17	137	16	19	137	16
N.S.	1	0.90	0.90	0.85	6.85	0.80	0.95	6.85	0.80
time (sec)	N/A	0.453	0.149	0.444	0.278	0.245	0.055	0.279	13.083

Problem 53	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	44	29	25	24	22	27	24	24
N.S.	1	2.59	1.71	1.47	1.41	1.29	1.59	1.41	1.41
time (sec)	N/A	0.206	0.009	0.132	0.178	0.249	0.064	0.261	14.201

Problem 54	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	11	7	8	7	7	5	7	5
N.S.	1	0.73	0.47	0.53	0.47	0.47	0.33	0.47	0.33
time (sec)	N/A	0.126	0.000	0.040	0.192	0.255	0.016	0.268	0.033

Problem 55	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	32	36	40	40	36	38	44
N.S.	1	0.00	0.94	1.06	1.18	1.18	1.06	1.12	1.29
time (sec)	N/A	0.000	5.155	0.872	0.233	0.259	3.206	0.337	14.418

Problem 56	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	33	30	32	32	34	32	0
N.S.	1	0.00	1.38	1.25	1.33	1.33	1.42	1.33	0.00
time (sec)	N/A	0.000	5.070	0.257	0.352	0.253	0.092	0.715	0.000

Problem 57	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	18	14	14	0	27	34	31	13
N.S.	1	1.00	0.78	0.78	0.00	1.50	1.89	1.72	0.72
time (sec)	N/A	0.220	0.145	0.207	0.000	0.260	0.081	0.270	13.775

Problem 58	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	13	12	12	11	11	10	11	8
N.S.	1	0.59	0.55	0.55	0.50	0.50	0.45	0.50	0.36
time (sec)	N/A	0.184	0.012	0.079	0.227	0.255	0.091	0.275	13.145

Problem 59	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	20	16	15	20	15	0	16
N.S.	1	0.00	0.87	0.70	0.65	0.87	0.65	0.00	0.70
time (sec)	N/A	0.000	0.210	0.246	0.561	0.264	0.161	0.000	0.189

Problem 60	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	19	17	39	39	17	39	17
N.S.	1	0.00	1.00	0.89	2.05	2.05	0.89	2.05	0.89
time (sec)	N/A	0.000	0.071	0.432	0.388	0.284	82.586	0.301	13.189

Problem 61	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	24	32	20	28	26	20	21
N.S.	1	0.00	0.96	1.28	0.80	1.12	1.04	0.80	0.84
time (sec)	N/A	0.000	0.937	0.558	0.288	0.254	0.117	0.392	13.417

Problem 62	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	0	15	15	14	14	12	0	14
N.S.	1	0.00	1.00	1.00	0.93	0.93	0.80	0.00	0.93
time (sec)	N/A	0.000	0.391	0.852	0.317	0.257	0.668	0.000	13.628

Problem 63	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	17	17	27	26	26	24	26	0
N.S.	1	0.81	0.81	1.29	1.24	1.24	1.14	1.24	0.00
time (sec)	N/A	0.520	0.106	0.120	0.228	0.264	0.066	0.271	0.000

Problem 64	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	F(-1)	B	B
verified	N/A	N/A	No	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	85	62	184	115	0	117	82
N.S.	1	0.00	2.66	1.94	5.75	3.59	0.00	3.66	2.56
time (sec)	N/A	0.000	0.363	3.192	2.974	0.265	0.000	0.996	16.596

Problem 65	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	45	27	23	231	31	26	31	29
N.S.	1	1.61	0.96	0.82	8.25	1.11	0.93	1.11	1.04
time (sec)	N/A	0.321	0.352	0.273	0.324	0.269	0.084	0.285	13.182

Problem 66	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	26	39	35	40	37	42	32
N.S.	1	0.00	0.79	1.18	1.06	1.21	1.12	1.27	0.97
time (sec)	N/A	0.000	0.168	96.027	0.245	0.257	0.530	0.381	13.084

Problem 67	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	21	20	20	18	17	43	18
N.S.	1	0.00	0.91	0.87	0.87	0.78	0.74	1.87	0.78
time (sec)	N/A	0.000	0.467	0.721	0.252	0.262	0.127	0.279	12.791

Problem 68	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	21	22	21	0	20	15	0	21
N.S.	1	0.95	1.00	0.95	0.00	0.91	0.68	0.00	0.95
time (sec)	N/A	0.553	0.149	0.316	0.000	0.249	0.085	0.000	12.966

Problem 69	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	8	8	8	8	7	7	7	7	7
N.S.	1	1.00	1.00	1.00	0.88	0.88	0.88	0.88	0.88
time (sec)	N/A	0.191	0.024	0.133	0.191	0.253	0.053	0.289	13.247

Problem 70	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	26	22	31	37	20	24	21
N.S.	1	0.00	1.00	0.85	1.19	1.42	0.77	0.92	0.81
time (sec)	N/A	0.000	0.033	0.128	0.253	0.261	0.153	0.293	0.156

Problem 71	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	B	B	A	B	F	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	0	113	263	53	53	0	53
N.S.	1	0.00	0.00	3.42	7.97	1.61	1.61	0.00	1.61
time (sec)	N/A	0.000	0.000	2.333	0.355	0.266	0.254	0.000	13.838

Problem 72	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	113	27	28	26	41	39	27
N.S.	1	0.00	3.53	0.84	0.88	0.81	1.28	1.22	0.84
time (sec)	N/A	0.000	5.424	0.697	0.272	0.256	0.652	0.326	13.797

Problem 73	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	4	4	5	4	4	3	5	4
N.S.	1	0.40	0.40	0.50	0.40	0.40	0.30	0.50	0.40
time (sec)	N/A	0.135	0.001	0.031	0.193	0.239	0.031	0.287	0.016

Problem 74	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	C	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	74	62	57	72	55	73	59	51
N.S.	1	2.55	2.14	1.97	2.48	1.90	2.52	2.03	1.76
time (sec)	N/A	0.364	4.039	0.107	0.229	0.250	0.093	0.282	12.681

Problem 75	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	42	27	31	34	36	0	37
N.S.	1	0.00	1.45	0.93	1.07	1.17	1.24	0.00	1.28
time (sec)	N/A	0.000	0.540	0.842	0.335	0.265	0.096	0.000	13.130

Problem 76	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	28	23	22	50	19	0	23
N.S.	1	0.00	0.97	0.79	0.76	1.72	0.66	0.00	0.79
time (sec)	N/A	0.000	0.648	0.266	0.397	0.259	0.263	0.000	13.099

Problem 77	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	19	19	16	56	17	15	17	15
N.S.	1	0.79	0.79	0.67	2.33	0.71	0.62	0.71	0.62
time (sec)	N/A	0.272	0.160	0.349	0.232	0.258	0.064	0.278	12.652

Problem 78	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	23	23	63	132	48	70	0	36
N.S.	1	1.00	1.00	2.74	5.74	2.09	3.04	0.00	1.57
time (sec)	N/A	0.487	0.026	0.656	0.309	0.253	0.197	0.000	13.297

Problem 79	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	28	19	14	16	28	14	14	13
N.S.	1	1.27	0.86	0.64	0.73	1.27	0.64	0.64	0.59
time (sec)	N/A	0.231	0.012	0.031	0.210	0.230	0.044	0.285	14.090

Problem 80	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	140	51	50	52	56	60	82	48
N.S.	1	5.19	1.89	1.85	1.93	2.07	2.22	3.04	1.78
time (sec)	N/A	1.437	0.049	0.120	0.242	0.250	0.153	0.279	14.390

Problem 81	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	176	20	31	1945	102	56	59	61
N.S.	1	7.65	0.87	1.35	84.57	4.43	2.43	2.57	2.65
time (sec)	N/A	0.897	0.048	0.187	0.326	0.261	0.110	0.275	14.184

Problem 82	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	18	18	17	16	16	14	17	16
N.S.	1	1.00	1.00	0.94	0.89	0.89	0.78	0.94	0.89
time (sec)	N/A	0.188	0.008	0.073	0.207	0.245	0.049	0.281	0.081

Problem 83	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	A	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	69	60	56	47	65	58	47	54
N.S.	1	2.30	2.00	1.87	1.57	2.17	1.93	1.57	1.80
time (sec)	N/A	1.267	0.126	1.044	0.582	0.249	0.136	0.295	13.745

Problem 84	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	36	37	106	31	20	31	0
N.S.	1	0.00	1.29	1.32	3.79	1.11	0.71	1.11	0.00
time (sec)	N/A	0.000	0.136	5.176	0.326	0.253	0.203	0.300	0.000

Problem 85	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	16	16	15	16	16	15	18	10
N.S.	1	0.76	0.76	0.71	0.76	0.76	0.71	0.86	0.48
time (sec)	N/A	0.180	0.006	0.773	0.199	0.253	0.050	0.280	0.055

Problem 86	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	39	0	47	129	77	129	126	129	77
N.S.	1	0.00	1.21	3.31	1.97	3.31	3.23	3.31	1.97
time (sec)	N/A	0.000	0.188	13.522	0.311	0.270	0.345	4.787	14.267

Problem 87	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	72	73	66	153	60	63	65	65
N.S.	1	3.00	3.04	2.75	6.38	2.50	2.62	2.71	2.71
time (sec)	N/A	0.319	0.032	0.059	0.213	0.263	0.084	0.274	13.610

Problem 88	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	79	19	18	17	20	17	20	18
N.S.	1	4.16	1.00	0.95	0.89	1.05	0.89	1.05	0.95
time (sec)	N/A	0.262	0.024	0.190	0.287	0.259	0.116	0.276	13.820

Problem 89	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	15	14	13	13	10	14	13
N.S.	1	1.00	0.88	0.82	0.76	0.76	0.59	0.82	0.76
time (sec)	N/A	0.147	0.001	0.029	0.189	0.252	0.029	0.271	0.030

Problem 90	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	124	34	31	29	29	31	0	29
N.S.	1	4.96	1.36	1.24	1.16	1.16	1.24	0.00	1.16
time (sec)	N/A	0.742	0.123	0.335	0.683	0.256	0.097	0.000	14.110

Problem 91	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	16	16	17	16	16	15	16	16
N.S.	1	0.62	0.62	0.65	0.62	0.62	0.58	0.62	0.62
time (sec)	N/A	0.286	0.105	0.168	0.315	0.262	0.095	0.281	14.050

Problem 92	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	6	4	4	5	4	4	3	5	4
N.S.	1	0.67	0.67	0.83	0.67	0.67	0.50	0.83	0.67
time (sec)	N/A	0.118	0.000	0.048	0.180	0.247	0.022	0.285	0.010

Problem 93	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	28	28	33	27	24	34	29
N.S.	1	0.00	1.08	1.08	1.27	1.04	0.92	1.31	1.12
time (sec)	N/A	0.000	2.278	0.094	0.226	0.258	0.074	0.279	0.161

Problem 94	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	32	32	23	14	47	27	58	23
N.S.	1	1.03	1.03	0.74	0.45	1.52	0.87	1.87	0.74
time (sec)	N/A	1.083	5.079	0.417	0.247	0.256	0.150	0.281	0.356

Problem 95	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-2)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	42	36	33	33	0	33	28
N.S.	1	0.00	1.45	1.24	1.14	1.14	0.00	1.14	0.97
time (sec)	N/A	0.000	0.840	3.187	0.236	0.244	0.000	0.271	14.458

Problem 96	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	14	14	28	25	26	27	25	15
N.S.	1	0.61	0.61	1.22	1.09	1.13	1.17	1.09	0.65
time (sec)	N/A	0.151	0.010	0.084	0.190	0.255	0.073	0.264	13.737

Problem 97	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	37	27	24	0	23	20	23	0
N.S.	1	1.68	1.23	1.09	0.00	1.05	0.91	1.05	0.00
time (sec)	N/A	0.626	0.141	1.144	0.000	0.271	5.035	0.287	0.000

Problem 98	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	18	18	14	28	13	14	28	16
N.S.	1	1.00	1.00	0.78	1.56	0.72	0.78	1.56	0.89
time (sec)	N/A	0.143	0.005	0.115	0.190	0.248	0.050	0.270	13.499

Problem 99	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	24	29	72	72	70	92	0
N.S.	1	0.00	0.96	1.16	2.88	2.88	2.80	3.68	0.00
time (sec)	N/A	0.000	0.138	0.414	0.379	0.259	0.345	0.302	0.000

Problem 100	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	23	19	18	17	17	14	28	17
N.S.	1	1.21	1.00	0.95	0.89	0.89	0.74	1.47	0.89
time (sec)	N/A	0.467	0.256	10.214	0.240	0.248	0.056	0.299	13.354

Problem 101	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	A	F(-2)	C	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	31	0	34	293	33	35	0	51	34
N.S.	1	0.00	1.10	9.45	1.06	1.13	0.00	1.65	1.10
time (sec)	N/A	0.000	0.115	5.266	0.336	0.273	0.000	0.364	14.516

Problem 102	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	52	53	40	127	78	37	112	41
N.S.	1	1.68	1.71	1.29	4.10	2.52	1.19	3.61	1.32
time (sec)	N/A	0.555	0.057	0.436	0.245	0.265	0.163	0.285	13.781

Problem 103	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	23	23	23	25	21	19	21	21
N.S.	1	0.88	0.88	0.88	0.96	0.81	0.73	0.81	0.81
time (sec)	N/A	0.673	2.010	2.228	0.323	0.252	0.200	0.300	14.585

Problem 104	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	0	22	13	19	19	7	19	12
N.S.	1	0.00	1.57	0.93	1.36	1.36	0.50	1.36	0.86
time (sec)	N/A	0.000	0.647	0.127	0.207	0.251	0.049	0.273	0.100

Problem 105	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	217	218	470	199	196	1836	1862
N.S.	1	0.00	6.78	6.81	14.69	6.22	6.12	57.38	58.19
time (sec)	N/A	0.000	0.969	0.529	8.147	0.260	3.185	5.727	14.693

Problem 106	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	6	8	6	10	9	6	5	11	9
N.S.	1	1.33	1.00	1.67	1.50	1.00	0.83	1.83	1.50
time (sec)	N/A	0.126	0.004	0.148	0.215	0.241	0.029	0.278	0.114

Problem 107	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	42	48	37	36	36	44	35	36
N.S.	1	1.68	1.92	1.48	1.44	1.44	1.76	1.40	1.44
time (sec)	N/A	0.253	0.012	0.134	0.203	0.253	0.070	0.261	13.690

Problem 108	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	25	18	16	32	15	15	15	15
N.S.	1	1.09	0.78	0.70	1.39	0.65	0.65	0.65	0.65
time (sec)	N/A	0.523	0.173	0.117	0.249	0.239	0.035	0.276	13.287

Problem 109	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	13	13	10	9	35	10	35	9
N.S.	1	1.00	1.00	0.77	0.69	2.69	0.77	2.69	0.69
time (sec)	N/A	0.222	0.040	0.561	0.211	0.254	0.076	0.273	13.390

Problem 110	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	47	79	45	87	88	94	82	91
N.S.	1	1.52	2.55	1.45	2.81	2.84	3.03	2.65	2.94
time (sec)	N/A	0.486	0.144	0.276	0.194	0.251	3.597	0.275	13.660

Problem 111	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-2)	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	28	35	39	33	0	70	115
N.S.	1	0.00	0.88	1.09	1.22	1.03	0.00	2.19	3.59
time (sec)	N/A	0.000	0.419	2.881	0.321	0.250	0.000	0.309	14.208

Problem 112	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	59	74	64	1021	47	49	47	48
N.S.	1	2.27	2.85	2.46	39.27	1.81	1.88	1.81	1.85
time (sec)	N/A	0.505	0.510	0.427	0.335	0.243	0.280	0.279	18.205

Problem 113	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	105	25	22	85	33	17	35	16
N.S.	1	7.00	1.67	1.47	5.67	2.20	1.13	2.33	1.07
time (sec)	N/A	0.799	0.069	0.240	0.241	0.264	0.076	0.278	13.147

Problem 114	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	34	34	32	36	29	36	51
N.S.	1	0.00	1.21	1.21	1.14	1.29	1.04	1.29	1.82
time (sec)	N/A	0.000	1.453	0.254	0.329	0.267	0.090	0.337	13.539

Problem 115	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	24	24	26	25	24	24	23	28
N.S.	1	1.09	1.09	1.18	1.14	1.09	1.09	1.05	1.27
time (sec)	N/A	0.194	0.011	0.104	0.196	0.253	0.070	0.264	12.900

Problem 116	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	27	18	21	21	26	20	44	26
N.S.	1	1.42	0.95	1.11	1.11	1.37	1.05	2.32	1.37
time (sec)	N/A	0.284	0.393	0.239	0.201	0.260	0.069	0.269	0.246

Problem 117	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	37	40	21	19	44	43	19
N.S.	1	0.00	1.61	1.74	0.91	0.83	1.91	1.87	0.83
time (sec)	N/A	0.000	0.506	25.062	0.343	0.265	1.630	0.541	14.111

Problem 118	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	17	13	12	11	17	10	12	11
N.S.	1	0.68	0.52	0.48	0.44	0.68	0.40	0.48	0.44
time (sec)	N/A	0.157	0.002	0.102	0.184	0.257	0.031	0.272	14.206

Problem 119	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	29	29	36	32	36	68	70
N.S.	1	0.00	1.16	1.16	1.44	1.28	1.44	2.72	2.80
time (sec)	N/A	0.000	5.145	0.519	0.303	0.261	0.128	0.329	15.273

Problem 120	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	0	16	20	14	30	15	14	16
N.S.	1	0.00	0.94	1.18	0.82	1.76	0.88	0.82	0.94
time (sec)	N/A	0.000	0.887	0.836	0.292	0.260	124.108	0.284	14.789

Problem 121	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	20	19	20	20	19	19	23	19
N.S.	1	0.67	0.63	0.67	0.67	0.63	0.63	0.77	0.63
time (sec)	N/A	0.229	0.010	0.075	0.200	0.273	0.045	0.277	0.084

Problem 122	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	33	29	21	20	29	22	30	22
N.S.	1	1.18	1.04	0.75	0.71	1.04	0.79	1.07	0.79
time (sec)	N/A	0.240	0.058	0.065	0.215	0.266	0.121	0.274	14.273

Problem 123	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	41	35	32	34	30	31	34	34
N.S.	1	2.16	1.84	1.68	1.79	1.58	1.63	1.79	1.79
time (sec)	N/A	0.259	0.064	0.146	0.235	0.270	0.132	0.273	13.934

Problem 124	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	B	F	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	34	50	73	35	53	0	0
N.S.	1	0.00	1.26	1.85	2.70	1.30	1.96	0.00	0.00
time (sec)	N/A	0.000	0.723	2.954	0.322	0.263	0.173	0.000	0.000

Problem 125	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	17	15	16	15	24	12	16	15
N.S.	1	0.68	0.60	0.64	0.60	0.96	0.48	0.64	0.60
time (sec)	N/A	0.233	0.013	0.067	0.190	0.267	0.040	0.266	0.060

Problem 126	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	10	10	10	9	9	10	9	9
N.S.	1	1.00	1.00	1.00	0.90	0.90	1.00	0.90	0.90
time (sec)	N/A	0.194	0.010	0.302	0.244	0.268	0.103	0.267	14.426

Problem 127	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	23	24	24	173	23	19	23	23
N.S.	1	0.92	0.96	0.96	6.92	0.92	0.76	0.92	0.92
time (sec)	N/A	0.528	0.312	1.275	0.299	0.302	0.125	0.292	15.750

Problem 128	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	44	43	36	58	38	42	38	22
N.S.	1	1.69	1.65	1.38	2.23	1.46	1.62	1.46	0.85
time (sec)	N/A	0.306	0.269	0.595	0.233	0.262	0.078	0.293	0.154

Problem 129	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	22	25	20	21	21	17	21	23
N.S.	1	1.38	1.56	1.25	1.31	1.31	1.06	1.31	1.44
time (sec)	N/A	0.157	0.018	0.072	0.197	0.273	0.045	0.282	0.078

Problem 130	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	C	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	70	20	35	424	33	39	45	20
N.S.	1	2.92	0.83	1.46	17.67	1.38	1.62	1.88	0.83
time (sec)	N/A	1.257	1.227	0.194	0.281	0.256	0.120	0.269	14.343

Problem 131	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	79	55	46	43	43	66	43	65
N.S.	1	3.43	2.39	2.00	1.87	1.87	2.87	1.87	2.83
time (sec)	N/A	0.254	0.198	0.147	0.201	0.272	0.102	0.281	0.111

Problem 132	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F(-2)	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	30	30	28	0	27	22	27	27
N.S.	1	1.03	1.03	0.97	0.00	0.93	0.76	0.93	0.93
time (sec)	N/A	0.636	0.067	2.393	0.000	0.264	0.088	0.299	24.148

Problem 133	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	39	15	17	34	15	14	0	15
N.S.	1	2.60	1.00	1.13	2.27	1.00	0.93	0.00	1.00
time (sec)	N/A	0.223	0.025	0.487	0.326	0.276	0.075	0.000	14.508

Problem 134	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	6	6	6	5	5	5	6	5
N.S.	1	0.60	0.60	0.60	0.50	0.50	0.50	0.60	0.50
time (sec)	N/A	0.124	0.000	0.137	0.199	0.283	0.020	0.261	15.063

Problem 135	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	27	24	35	23	19	0	38
N.S.	1	0.00	0.96	0.86	1.25	0.82	0.68	0.00	1.36
time (sec)	N/A	0.000	5.178	2.467	0.406	0.267	0.326	0.000	15.154

Problem 136	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	29	19	18	28	22	38	21
N.S.	1	0.00	1.26	0.83	0.78	1.22	0.96	1.65	0.91
time (sec)	N/A	0.000	1.624	0.655	0.238	0.251	0.100	0.278	0.321

Problem 137	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	103	57	68	63	63	66	63	91
N.S.	1	5.42	3.00	3.58	3.32	3.32	3.47	3.32	4.79
time (sec)	N/A	0.352	0.278	0.138	0.199	0.251	0.076	0.289	15.156

Problem 138	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	B	B	B	B	B	F(-1)
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	0	136	128	105	122	131	0
N.S.	1	0.00	0.00	5.04	4.74	3.89	4.52	4.85	0.00
time (sec)	N/A	0.000	0.000	1.813	0.393	0.255	1.073	0.459	0.000

Problem 139	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	46	55	100	54	44	48	55
N.S.	1	0.00	1.31	1.57	2.86	1.54	1.26	1.37	1.57
time (sec)	N/A	0.000	0.151	1.889	0.518	0.259	0.199	0.761	14.496

Problem 140	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	111	37	32	35	31	29	35	31
N.S.	1	4.11	1.37	1.19	1.30	1.15	1.07	1.30	1.15
time (sec)	N/A	3.336	0.701	12.408	0.306	0.260	7.754	0.311	15.376

Problem 141	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	B	A	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	57	51	57	51	53	65	63
N.S.	1	0.00	2.11	1.89	2.11	1.89	1.96	2.41	2.33
time (sec)	N/A	0.000	0.734	3.833	0.204	0.270	0.229	0.300	15.747

Problem 142	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	28	27	132	28	20	52	44
N.S.	1	0.00	0.80	0.77	3.77	0.80	0.57	1.49	1.26
time (sec)	N/A	0.000	1.012	1.131	0.277	0.261	0.142	0.398	0.622

Problem 143	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	A	A	A	A	A	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	20	36	0	16	31	18	17	20	24
N.S.	1	1.80	0.00	0.80	1.55	0.90	0.85	1.00	1.20
time (sec)	N/A	0.317	0.000	0.237	0.306	0.255	0.074	0.281	16.854

Problem 144	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	21	23	26	37	20	26	22
N.S.	1	0.00	0.75	0.82	0.93	1.32	0.71	0.93	0.79
time (sec)	N/A	0.000	0.414	1.073	0.303	0.243	0.057	0.281	13.862

Problem 145	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	48	47	44	0	40	54	0	31
N.S.	1	1.78	1.74	1.63	0.00	1.48	2.00	0.00	1.15
time (sec)	N/A	0.355	0.192	0.541	0.000	0.248	0.158	0.000	13.548

Problem 146	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	9	9	9	10	9	9	8	9	9
N.S.	1	1.00	1.00	1.11	1.00	1.00	0.89	1.00	1.00
time (sec)	N/A	0.147	0.044	0.478	0.189	0.242	0.045	0.277	12.579

Problem 147	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	30	23	31	40	22	50	30
N.S.	1	0.00	1.15	0.88	1.19	1.54	0.85	1.92	1.15
time (sec)	N/A	0.000	3.298	0.214	0.252	0.264	0.114	0.278	12.743

Problem 148	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	21	21	18	20	19	20	20
N.S.	1	0.00	0.95	0.95	0.82	0.91	0.86	0.91	0.91
time (sec)	N/A	0.000	0.641	0.796	0.319	0.280	0.159	0.330	12.718

Problem 149	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	38	61	38	47	83	53	70	114	53
N.S.	1	1.61	1.00	1.24	2.18	1.39	1.84	3.00	1.39
time (sec)	N/A	0.352	0.164	0.322	0.228	0.261	0.118	0.290	12.486

Problem 150	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	18	17	18	16	17	14	16	19
N.S.	1	1.06	1.00	1.06	0.94	1.00	0.82	0.94	1.12
time (sec)	N/A	0.310	0.098	0.423	0.253	0.255	0.065	0.282	12.240

Problem 151	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	23	25	22	22	20	24	24
N.S.	1	0.00	1.21	1.32	1.16	1.16	1.05	1.26	1.26
time (sec)	N/A	0.000	1.206	0.103	0.239	0.255	0.120	0.288	0.293

Problem 152	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	16	18	16	0	24	12	26	15
N.S.	1	0.89	1.00	0.89	0.00	1.33	0.67	1.44	0.83
time (sec)	N/A	0.280	0.095	0.868	0.000	0.244	0.057	0.285	0.093

Problem 153	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	28	27	18	18	27	14	18	17
N.S.	1	1.27	1.23	0.82	0.82	1.23	0.64	0.82	0.77
time (sec)	N/A	0.261	0.021	0.289	0.207	0.248	0.104	0.281	12.273

Problem 154	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	C	F	A	A	A	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	0	44	0	59	34	61	60
N.S.	1	0.00	0.00	1.26	0.00	1.69	0.97	1.74	1.71
time (sec)	N/A	0.000	0.000	2.412	0.000	0.260	0.209	0.446	12.568

Problem 155	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-1)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	29	25	25	30	0	25	24
N.S.	1	0.00	1.07	0.93	0.93	1.11	0.00	0.93	0.89
time (sec)	N/A	0.000	0.537	0.181	0.513	0.270	0.000	0.283	12.700

Problem 156	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	31	21	50	40	36	49	0
N.S.	1	0.00	0.94	0.64	1.52	1.21	1.09	1.48	0.00
time (sec)	N/A	0.000	2.427	0.852	0.237	0.270	0.098	0.286	0.000

Problem 157	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	15	15	18	21	15	46	20
N.S.	1	1.00	0.88	0.88	1.06	1.24	0.88	2.71	1.18
time (sec)	N/A	0.202	0.020	0.200	0.196	0.246	0.209	0.279	0.179

Problem 158	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	22	19	23	23	20	36	158
N.S.	1	0.00	1.00	0.86	1.05	1.05	0.91	1.64	7.18
time (sec)	N/A	0.000	0.553	25.934	0.250	0.236	0.064	0.272	13.245

Problem 159	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	26	24	25	141	27	42	45	24
N.S.	1	1.18	1.09	1.14	6.41	1.23	1.91	2.05	1.09
time (sec)	N/A	0.456	0.024	1.043	0.194	0.282	0.126	0.280	13.219

Problem 160	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	715	26	31	1175	29	26	30	30
N.S.	1	23.83	0.87	1.03	39.17	0.97	0.87	1.00	1.00
time (sec)	N/A	2.365	0.228	0.998	0.350	0.258	0.138	0.314	14.628

Problem 161	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	49	59	54	62	53	68	56
N.S.	1	0.00	1.48	1.79	1.64	1.88	1.61	2.06	1.70
time (sec)	N/A	0.000	0.167	0.728	0.374	0.266	0.207	0.631	12.888

Problem 162	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	36	31	25	35	35	20	35	24
N.S.	1	1.44	1.24	1.00	1.40	1.40	0.80	1.40	0.96
time (sec)	N/A	0.167	0.042	0.164	0.190	0.257	0.024	0.263	12.617

Problem 163	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	44	16	18	17	15	15	17	17
N.S.	1	2.59	0.94	1.06	1.00	0.88	0.88	1.00	1.00
time (sec)	N/A	0.274	0.016	0.460	0.198	0.257	0.180	0.278	0.197

Problem 164	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	26	22	16	15	15	19	15	15
N.S.	1	1.08	0.92	0.67	0.62	0.62	0.79	0.62	0.62
time (sec)	N/A	0.440	0.110	1.654	0.224	0.257	0.064	0.278	0.079

Problem 165	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	A	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	38	56	46	42	54	140	0
N.S.	1	0.00	1.36	2.00	1.64	1.50	1.93	5.00	0.00
time (sec)	N/A	0.000	0.659	3.631	0.350	0.268	0.136	0.952	0.000

Problem 166	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	23	23	20	19	19	17	21	19
N.S.	1	1.28	1.28	1.11	1.06	1.06	0.94	1.17	1.06
time (sec)	N/A	0.358	0.019	0.148	0.186	0.268	0.320	0.289	0.248

Problem 167	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	0	34	38	35	35	29	36	0
N.S.	1	0.00	0.94	1.06	0.97	0.97	0.81	1.00	0.00
time (sec)	N/A	0.000	0.096	1.766	0.347	0.272	0.179	0.310	0.000

Problem 168	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	20	16	15	128	17	0	17
N.S.	1	0.00	0.83	0.67	0.62	5.33	0.71	0.00	0.71
time (sec)	N/A	0.000	1.253	0.690	0.605	0.285	24.071	0.000	12.621

Problem 169	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	C	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	62	43	12	47	11	10	11	11
N.S.	1	5.17	3.58	1.00	3.92	0.92	0.83	0.92	0.92
time (sec)	N/A	0.227	0.133	0.152	0.216	0.268	0.040	0.289	0.045

Problem 170	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	25	35	47	44	67	58	39	35
N.S.	1	1.04	1.46	1.96	1.83	2.79	2.42	1.62	1.46
time (sec)	N/A	0.192	0.015	0.297	0.189	0.260	0.114	0.271	0.193

Problem 171	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	27	27	24	40	28	20	27	24
N.S.	1	1.17	1.17	1.04	1.74	1.22	0.87	1.17	1.04
time (sec)	N/A	0.376	0.129	0.164	0.226	0.260	0.044	0.295	12.473

Problem 172	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	24	24	26	89	49	49	43	104
N.S.	1	0.96	0.96	1.04	3.56	1.96	1.96	1.72	4.16
time (sec)	N/A	0.433	0.505	42.910	0.324	0.244	0.406	0.610	13.099

Problem 173	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	9	6	6	7	6	6	5	7	6
N.S.	1	0.67	0.67	0.78	0.67	0.67	0.56	0.78	0.67
time (sec)	N/A	0.133	0.001	0.074	0.195	0.234	0.027	0.282	0.019

Problem 174	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	17	16	24	15	15	0	24
N.S.	1	0.00	0.89	0.84	1.26	0.79	0.79	0.00	1.26
time (sec)	N/A	0.000	0.311	0.158	0.390	0.245	0.119	0.000	12.458

Problem 175	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	15	15	16	15	15	14	15	15
N.S.	1	0.88	0.88	0.94	0.88	0.88	0.82	0.88	0.88
time (sec)	N/A	0.534	0.074	1.048	0.220	0.256	0.110	0.277	12.599

Problem 176	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	21	17	23	22	19	0	0
N.S.	1	0.00	1.17	0.94	1.28	1.22	1.06	0.00	0.00
time (sec)	N/A	0.000	0.486	0.154	0.292	0.245	0.087	0.000	0.000

Problem 177	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	13	13	21	12	20	14	12	13
N.S.	1	1.00	1.00	1.62	0.92	1.54	1.08	0.92	1.00
time (sec)	N/A	0.398	0.084	0.332	0.282	0.278	0.104	0.267	12.646

Problem 178	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	53	46	50	67	48	48	50	47
N.S.	1	1.47	1.28	1.39	1.86	1.33	1.33	1.39	1.31
time (sec)	N/A	0.333	0.216	0.394	0.228	0.263	0.103	0.277	0.162

Problem 179	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	22	19	17	21	21	15	21	16
N.S.	1	0.88	0.76	0.68	0.84	0.84	0.60	0.84	0.64
time (sec)	N/A	0.143	0.003	0.148	0.182	0.232	0.021	0.264	12.268

Problem 180	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	9	9	7	6	6	5	6	6
N.S.	1	0.56	0.56	0.44	0.38	0.38	0.31	0.38	0.38
time (sec)	N/A	0.142	0.001	0.128	0.195	0.258	0.033	0.265	0.029

Problem 181	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	43	37	62	39	34	83	68
N.S.	1	0.00	1.54	1.32	2.21	1.39	1.21	2.96	2.43
time (sec)	N/A	0.000	0.370	20.868	0.372	0.264	5.810	0.541	13.708

Problem 182	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	28	31	29	29	29	29	90
N.S.	1	0.00	1.22	1.35	1.26	1.26	1.26	1.26	3.91
time (sec)	N/A	0.000	0.566	2.800	0.235	0.250	0.208	0.292	13.214

Problem 183	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	B	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	59	59	48	59	47	48	47	67
N.S.	1	2.46	2.46	2.00	2.46	1.96	2.00	1.96	2.79
time (sec)	N/A	0.432	0.033	0.115	0.190	0.268	0.091	0.271	13.197

Problem 184	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	24	27	39	26	37	36	21
N.S.	1	0.00	0.92	1.04	1.50	1.00	1.42	1.38	0.81
time (sec)	N/A	0.000	0.192	9.316	0.326	0.297	0.143	0.346	14.422

Problem 185	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	31	31	30	54	30	32	33	15
N.S.	1	1.82	1.82	1.76	3.18	1.76	1.88	1.94	0.88
time (sec)	N/A	0.329	0.047	0.926	0.226	0.240	0.098	0.279	14.641

Problem 186	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	24	25	23	26	22	20	38	22
N.S.	1	0.89	0.93	0.85	0.96	0.81	0.74	1.41	0.81
time (sec)	N/A	0.172	0.048	0.840	0.197	0.259	0.053	0.279	0.115

Problem 187	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	32	32	31	27	36	31	31
N.S.	1	0.00	1.10	1.10	1.07	0.93	1.24	1.07	1.07
time (sec)	N/A	0.000	0.403	0.388	0.334	0.276	0.103	0.285	14.179

Problem 188	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	C	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	67	47	65	78	61	61	69	59
N.S.	1	2.91	2.04	2.83	3.39	2.65	2.65	3.00	2.57
time (sec)	N/A	0.385	0.231	0.132	0.229	0.247	0.101	0.283	13.815

Problem 189	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	No	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	5	16	13	10	47	14	39	12
N.S.	1	0.31	1.00	0.81	0.62	2.94	0.88	2.44	0.75
time (sec)	N/A	0.357	0.142	0.352	0.195	0.263	0.145	0.301	14.374

Problem 190	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	48	22	20	19	19	20	19	0
N.S.	1	2.18	1.00	0.91	0.86	0.86	0.91	0.86	0.00
time (sec)	N/A	0.261	0.038	0.152	0.376	0.266	2.093	0.271	0.000

Problem 191	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-1)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	26	27	21	21	0	21	21
N.S.	1	0.00	0.96	1.00	0.78	0.78	0.00	0.78	0.78
time (sec)	N/A	0.000	0.063	111.490	0.443	0.255	0.000	0.353	14.211

Problem 192	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	40	40	39	30	30	27	31	31
N.S.	1	1.43	1.43	1.39	1.07	1.07	0.96	1.11	1.11
time (sec)	N/A	0.185	0.018	3.328	0.191	0.254	0.086	0.277	13.833

Problem 193	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	40	24	22	24	19	20	39	19
N.S.	1	1.67	1.00	0.92	1.00	0.79	0.83	1.62	0.79
time (sec)	N/A	0.649	0.091	0.711	0.323	0.256	0.108	0.288	0.264

Problem 194	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	19	17	40	44	49	83	44
N.S.	1	0.00	0.76	0.68	1.60	1.76	1.96	3.32	1.76
time (sec)	N/A	0.000	1.121	0.591	0.234	0.257	0.102	0.293	13.819

Problem 195	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	9	9	10	9	9	7	9	9
N.S.	1	0.75	0.75	0.83	0.75	0.75	0.58	0.75	0.75
time (sec)	N/A	0.131	0.001	0.059	0.175	0.232	0.022	0.265	0.034

Problem 196	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	37	31	30	36	31	30	109
N.S.	1	0.00	1.32	1.11	1.07	1.29	1.11	1.07	3.89
time (sec)	N/A	0.000	0.150	0.214	0.221	0.250	0.150	0.280	14.480

Problem 197	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	F	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	28	89	0	33	32	0	32
N.S.	1	0.00	1.00	3.18	0.00	1.18	1.14	0.00	1.14
time (sec)	N/A	0.000	0.037	4.437	0.000	0.259	0.156	0.000	14.534

Problem 198	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	B	B	B	B	B	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	0	89	78	87	87	95	89
N.S.	1	0.00	0.00	3.18	2.79	3.11	3.11	3.39	3.18
time (sec)	N/A	0.000	0.000	3.974	0.424	0.258	1.566	0.364	16.554

Problem 199	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	A	A	B	F	F(-1)
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	0	58	61	59	58	0	0
N.S.	1	0.00	0.00	1.66	1.74	1.69	1.66	0.00	0.00
time (sec)	N/A	0.000	0.000	256.936	0.337	0.253	0.332	0.000	0.000

Problem 200	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	7	7	8	7	11	5	7	7
N.S.	1	0.54	0.54	0.62	0.54	0.85	0.38	0.54	0.54
time (sec)	N/A	0.142	0.001	0.032	0.187	0.250	0.027	0.272	0.025

Problem 201	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	17	15	18	17	17	15	20	15
N.S.	1	0.85	0.75	0.90	0.85	0.85	0.75	1.00	0.75
time (sec)	N/A	0.221	0.007	0.033	0.192	0.243	0.051	0.272	0.104

Problem 202	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	20	20	16	148	48	17	48	36
N.S.	1	1.00	1.00	0.80	7.40	2.40	0.85	2.40	1.80
time (sec)	N/A	0.441	0.200	8.788	0.353	0.249	0.262	0.379	14.780

Problem 203	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	23	19	18	47	20	0	19
N.S.	1	0.00	1.00	0.83	0.78	2.04	0.87	0.00	0.83
time (sec)	N/A	0.000	0.853	0.573	0.423	0.253	0.306	0.000	14.427

Problem 204	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	37	43	34	35	35	36	38	33
N.S.	1	1.12	1.30	1.03	1.06	1.06	1.09	1.15	1.00
time (sec)	N/A	0.401	0.019	0.095	0.228	0.247	0.091	0.274	0.142

Problem 205	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	41	34	30	35	35	20	35	26
N.S.	1	1.46	1.21	1.07	1.25	1.25	0.71	1.25	0.93
time (sec)	N/A	0.227	0.059	0.264	0.202	0.252	0.102	0.286	13.905

Problem 206	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	20	19	14	16	13	10	16	13
N.S.	1	1.05	1.00	0.74	0.84	0.68	0.53	0.84	0.68
time (sec)	N/A	0.564	1.114	0.284	0.261	0.262	0.043	0.287	0.133

Problem 207	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	24	32	396	30	27	30	53
N.S.	1	0.00	0.80	1.07	13.20	1.00	0.90	1.00	1.77
time (sec)	N/A	0.000	0.113	1.209	0.397	0.253	0.211	0.414	14.713

Problem 208	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	A	A	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	43	65	41	40	48	44	50	30
N.S.	1	1.59	2.41	1.52	1.48	1.78	1.63	1.85	1.11
time (sec)	N/A	0.261	0.034	0.258	0.199	0.269	0.082	0.279	14.360

Problem 209	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	20	20	19	18	18	20	18	18
N.S.	1	1.00	1.00	0.95	0.90	0.90	1.00	0.90	0.90
time (sec)	N/A	0.346	0.073	0.145	0.271	0.256	0.071	0.274	14.478

Problem 210	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	13	13	13	12	12	12	13	12
N.S.	1	0.54	0.54	0.54	0.50	0.50	0.50	0.54	0.50
time (sec)	N/A	0.147	0.005	0.753	0.205	0.265	0.059	0.268	0.067

Problem 211	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	19	19	18	18	14	18	38
N.S.	1	0.00	1.00	1.00	0.95	0.95	0.74	0.95	2.00
time (sec)	N/A	0.000	0.150	4.749	0.243	0.256	0.055	0.269	14.480

Problem 212	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	20	18	0	17	17	35	17
N.S.	1	0.00	1.00	0.90	0.00	0.85	0.85	1.75	0.85
time (sec)	N/A	0.000	1.131	1.717	0.000	0.253	0.144	0.300	14.478

Problem 213	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	24	15	14	13	20	12	13	13
N.S.	1	1.20	0.75	0.70	0.65	1.00	0.60	0.65	0.65
time (sec)	N/A	0.163	0.009	0.102	0.206	0.245	0.049	0.268	0.064

Problem 214	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	B	B	B	B	B	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	0	51	75	62	54	62	73
N.S.	1	0.00	0.00	2.12	3.12	2.58	2.25	2.58	3.04
time (sec)	N/A	0.000	0.000	5.946	0.409	0.301	0.311	0.293	14.329

Problem 215	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	27	21	14	18	18	24	0	18
N.S.	1	1.29	1.00	0.67	0.86	0.86	1.14	0.00	0.86
time (sec)	N/A	0.311	0.419	0.437	0.293	0.238	0.111	0.000	0.160

Problem 216	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	10	10	10	9	9	8	9	9
N.S.	1	0.83	0.83	0.83	0.75	0.75	0.67	0.75	0.75
time (sec)	N/A	0.135	0.000	0.041	0.182	0.245	0.015	0.272	0.003

Problem 217	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	F	B	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	192	21	43	0	53	27	32	19
N.S.	1	7.68	0.84	1.72	0.00	2.12	1.08	1.28	0.76
time (sec)	N/A	0.734	0.360	0.377	0.000	0.246	0.102	0.277	0.534

Problem 218	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	19	19	42	3532	40	41	40	0
N.S.	1	0.68	0.68	1.50	126.14	1.43	1.46	1.43	0.00
time (sec)	N/A	0.463	0.042	0.847	0.317	0.269	0.098	0.325	0.000

Problem 219	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	21	19	39	17	20	17	17
N.S.	1	0.00	1.11	1.00	2.05	0.89	1.05	0.89	0.89
time (sec)	N/A	0.000	0.546	1.347	0.317	0.246	0.097	0.275	14.441

Problem 220	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	23	26	23	28	28	22	28	21
N.S.	1	0.85	0.96	0.85	1.04	1.04	0.81	1.04	0.78
time (sec)	N/A	0.156	0.000	0.088	0.181	0.239	0.022	0.279	0.039

Problem 221	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	26	25	21	20	42	19	20	20
N.S.	1	0.87	0.83	0.70	0.67	1.40	0.63	0.67	0.67
time (sec)	N/A	0.458	0.200	0.312	0.400	0.249	0.206	0.313	15.393

Problem 222	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	B	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	40	40	59	40	54	35	0
N.S.	1	0.00	1.29	1.29	1.90	1.29	1.74	1.13	0.00
time (sec)	N/A	0.000	0.424	2.037	0.414	0.261	6.474	0.290	0.000

Problem 223	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	12	11	10	9	9	8	9	9
N.S.	1	0.60	0.55	0.50	0.45	0.45	0.40	0.45	0.45
time (sec)	N/A	0.131	0.003	0.050	0.188	0.246	0.031	0.270	0.026

Problem 224	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	15	14	14	13	13	10	13	13
N.S.	1	1.07	1.00	1.00	0.93	0.93	0.71	0.93	0.93
time (sec)	N/A	0.155	0.005	0.092	0.181	0.262	0.050	0.274	14.233

Problem 225	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	15	15	14	13	16	12	13	13
N.S.	1	0.94	0.94	0.88	0.81	1.00	0.75	0.81	0.81
time (sec)	N/A	0.166	0.005	0.275	0.182	0.264	0.046	0.273	14.432

Problem 226	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	27	26	27	27	29	24	29	28
N.S.	1	0.96	0.93	0.96	0.96	1.04	0.86	1.04	1.00
time (sec)	N/A	0.768	0.070	1.832	0.317	0.257	0.092	0.293	15.048

Problem 227	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	F(-1)	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	20	16	15	0	19	15	18
N.S.	1	0.00	0.95	0.76	0.71	0.00	0.90	0.71	0.86
time (sec)	N/A	0.000	0.658	0.406	0.407	0.000	0.855	0.297	14.445

Problem 228	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	60	55	73	174	60	47	75
N.S.	1	0.00	1.71	1.57	2.09	4.97	1.71	1.34	2.14
time (sec)	N/A	0.000	0.398	1.109	1.833	0.305	0.220	0.386	15.993

Problem 229	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	32	61	36	104	41	48	100	24
N.S.	1	1.52	2.90	1.71	4.95	1.95	2.29	4.76	1.14
time (sec)	N/A	0.511	0.065	0.359	0.309	0.292	0.119	0.303	0.284

Problem 230	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	7	7	6	5	5	3	5	5
N.S.	1	0.44	0.44	0.38	0.31	0.31	0.19	0.31	0.31
time (sec)	N/A	0.119	0.000	0.010	0.186	0.256	0.020	0.267	0.029

Problem 231	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-1)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	19	19	18	18	0	0	18
N.S.	1	0.00	0.86	0.86	0.82	0.82	0.00	0.00	0.82
time (sec)	N/A	0.000	0.109	14.794	0.286	0.259	0.000	0.000	13.930

Problem 232	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F(-2)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	38	27	82	28	26	0	59
N.S.	1	0.00	1.15	0.82	2.48	0.85	0.79	0.00	1.79
time (sec)	N/A	0.000	0.358	203.392	0.353	0.275	1.184	0.000	14.511

Problem 233	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	21	23	17	16	23	19	25	21
N.S.	1	0.91	1.00	0.74	0.70	1.00	0.83	1.09	0.91
time (sec)	N/A	0.184	0.013	0.037	0.179	0.267	0.061	0.268	13.744

Problem 234	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	93	43	145	157	170	191	0
N.S.	1	0.00	2.74	1.26	4.26	4.62	5.00	5.62	0.00
time (sec)	N/A	0.000	3.328	1.217	1.117	0.286	0.632	0.642	0.000

Problem 235	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	A	A	B	F(-1)	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	259	20	22	34	33	34	0	21
N.S.	1	11.77	0.91	1.00	1.55	1.50	1.55	0.00	0.95
time (sec)	N/A	1.143	0.070	0.402	0.188	0.267	1.446	0.000	0.251

Problem 236	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	29	26	55	54	24	0	47
N.S.	1	0.00	1.04	0.93	1.96	1.93	0.86	0.00	1.68
time (sec)	N/A	0.000	1.444	0.910	0.437	0.266	0.148	0.000	14.102

Problem 237	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	90	23	39	493	26	39	40	27
N.S.	1	3.75	0.96	1.62	20.54	1.08	1.62	1.67	1.12
time (sec)	N/A	0.727	0.111	1.277	0.357	0.270	0.196	0.318	0.573

Problem 238	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	28	22	19	18	18	19	18	23
N.S.	1	1.22	0.96	0.83	0.78	0.78	0.83	0.78	1.00
time (sec)	N/A	0.213	0.158	0.148	0.195	0.264	0.094	0.290	13.737

Problem 239	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	18	17	17	18	18	17	19	16
N.S.	1	0.95	0.89	0.89	0.95	0.95	0.89	1.00	0.84
time (sec)	N/A	0.162	0.011	0.124	0.192	0.260	0.050	0.273	13.254

Problem 240	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	30	28	24	34	26	29	48	17
N.S.	1	1.07	1.00	0.86	1.21	0.93	1.04	1.71	0.61
time (sec)	N/A	0.208	0.023	0.848	0.216	0.297	0.066	0.271	13.439

Problem 241	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	57	27	25	24	23	27	40	27
N.S.	1	2.59	1.23	1.14	1.09	1.05	1.23	1.82	1.23
time (sec)	N/A	0.314	0.020	0.125	0.184	0.244	0.563	0.264	0.143

Problem 242	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	37	28	29	44	54	26	72	28
N.S.	1	1.32	1.00	1.04	1.57	1.93	0.93	2.57	1.00
time (sec)	N/A	0.215	0.057	0.201	0.188	0.271	0.111	0.270	0.175

Problem 243	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	24	33	33	0	25	590	159	132
N.S.	1	0.96	1.32	1.32	0.00	1.00	23.60	6.36	5.28
time (sec)	N/A	0.722	8.136	0.724	0.000	0.270	4.417	0.283	0.205

Problem 244	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	132	22	20	28	37	31	0	0
N.S.	1	5.50	0.92	0.83	1.17	1.54	1.29	0.00	0.00
time (sec)	N/A	0.704	0.174	4.636	0.211	0.265	3.221	0.000	0.000

Problem 245	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	26	19	30	18	27	26	18	19
N.S.	1	1.37	1.00	1.58	0.95	1.42	1.37	0.95	1.00
time (sec)	N/A	0.395	0.113	0.205	0.412	0.269	0.102	0.296	14.406

Problem 246	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	23	23	15	16	16	17	18	14
N.S.	1	1.21	1.21	0.79	0.84	0.84	0.89	0.95	0.74
time (sec)	N/A	0.163	0.012	0.687	0.207	0.275	0.097	0.307	14.557

Problem 247	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	9	9	9	10	9	9	7	9	9
N.S.	1	1.00	1.00	1.11	1.00	1.00	0.78	1.00	1.00
time (sec)	N/A	0.128	0.000	0.115	0.205	0.262	0.020	0.279	0.041

Problem 248	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	40	17	41	42	75	42	17	17
N.S.	1	1.82	0.77	1.86	1.91	3.41	1.91	0.77	0.77
time (sec)	N/A	0.301	0.035	0.224	0.203	0.260	0.133	0.275	0.181

Problem 249	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	25	27	105	105	44	148	1690
N.S.	1	0.00	0.93	1.00	3.89	3.89	1.63	5.48	62.59
time (sec)	N/A	0.000	0.198	8.847	0.391	0.287	0.294	1.540	19.357

Problem 250	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	98	70	74	70	70	73	70	88
N.S.	1	7.00	5.00	5.29	5.00	5.00	5.21	5.00	6.29
time (sec)	N/A	0.529	0.184	0.175	0.198	0.293	0.085	0.282	14.028

Problem 251	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	5	5	5	5	4	4	3	4	4
N.S.	1	1.00	1.00	1.00	0.80	0.80	0.60	0.80	0.80
time (sec)	N/A	0.135	0.000	0.151	0.199	0.255	0.029	0.279	0.011

Problem 252	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	26	27	18	18	18	20	18	17
N.S.	1	0.93	0.96	0.64	0.64	0.64	0.71	0.64	0.61
time (sec)	N/A	0.140	0.000	0.135	0.194	0.262	0.020	0.285	0.063

Problem 253	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	F(-1)	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	69	186	0	140	134	0	697
N.S.	1	0.00	2.30	6.20	0.00	4.67	4.47	0.00	23.23
time (sec)	N/A	0.000	0.464	1.727	0.000	0.298	2.765	0.000	15.462

Problem 254	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	25	26	24	41	44	0	29
N.S.	1	0.00	0.93	0.96	0.89	1.52	1.63	0.00	1.07
time (sec)	N/A	0.000	0.522	5.667	0.354	0.275	0.252	0.000	14.264

Problem 255	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	19	16	16	22	20	24	15
N.S.	1	0.00	0.83	0.70	0.70	0.96	0.87	1.04	0.65
time (sec)	N/A	0.000	0.074	0.344	0.279	0.279	1.497	0.283	13.896

Problem 256	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	25	27	0	30	19	0	22
N.S.	1	0.00	0.89	0.96	0.00	1.07	0.68	0.00	0.79
time (sec)	N/A	0.000	2.082	2.612	0.000	0.261	0.107	0.000	14.198

Problem 257	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	C	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	27	12	12	268	14	12	24	14
N.S.	1	2.25	1.00	1.00	22.33	1.17	1.00	2.00	1.17
time (sec)	N/A	0.203	0.043	0.143	0.341	0.261	0.042	0.275	0.080

Problem 258	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	31	29	28	49	45	17	60	27
N.S.	1	0.86	0.81	0.78	1.36	1.25	0.47	1.67	0.75
time (sec)	N/A	0.573	0.043	0.323	0.256	0.266	0.101	0.289	13.968

Problem 259	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	22	18	23	21	15	23	17
N.S.	1	0.00	1.22	1.00	1.28	1.17	0.83	1.28	0.94
time (sec)	N/A	0.000	0.236	0.688	0.245	0.270	0.078	0.274	14.279

Problem 260	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	24	25	28	24	24	28	25
N.S.	1	0.00	0.92	0.96	1.08	0.92	0.92	1.08	0.96
time (sec)	N/A	0.000	0.196	1.232	0.380	0.287	0.101	0.271	14.023

Problem 261	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	27	64	54	1721	63	71	268	133
N.S.	1	1.50	3.56	3.00	95.61	3.50	3.94	14.89	7.39
time (sec)	N/A	0.400	1.350	1.056	0.212	0.292	0.107	0.570	13.685

Problem 262	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	30	29	20	32	31	26	102
N.S.	1	0.00	1.20	1.16	0.80	1.28	1.24	1.04	4.08
time (sec)	N/A	0.000	5.113	1.800	0.233	0.267	0.140	0.268	0.464

Problem 263	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	11	11	9	9	9	5	9	8
N.S.	1	0.37	0.37	0.30	0.30	0.30	0.17	0.30	0.27
time (sec)	N/A	0.126	0.001	0.044	0.224	0.244	0.019	0.272	0.035

Problem 264	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	77	42	62	0	106	87	137	79
N.S.	1	2.75	1.50	2.21	0.00	3.79	3.11	4.89	2.82
time (sec)	N/A	1.622	0.076	0.866	0.000	0.273	0.154	0.270	14.405

Problem 265	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	1467	21	20	423	20	19	20	19
N.S.	1	86.29	1.24	1.18	24.88	1.18	1.12	1.18	1.12
time (sec)	N/A	4.880	0.472	0.577	1.520	0.270	0.112	0.274	13.751

Problem 266	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	27	29	34	35	32	628	0
N.S.	1	0.00	0.90	0.97	1.13	1.17	1.07	20.93	0.00
time (sec)	N/A	0.000	0.353	0.355	0.245	0.290	0.108	0.285	0.000

Problem 267	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	49	23	24	0	23	17	31	23
N.S.	1	1.75	0.82	0.86	0.00	0.82	0.61	1.11	0.82
time (sec)	N/A	0.393	0.103	1.394	0.000	0.280	0.115	0.276	12.812

Problem 268	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	21	21	27	24	25	27	37	21
N.S.	1	0.78	0.78	1.00	0.89	0.93	1.00	1.37	0.78
time (sec)	N/A	0.489	0.156	1.203	0.299	0.273	0.086	0.267	13.574

Problem 269	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	A	A	F(-1)	B	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	31	31	31	185	30	39	0	1938	0
N.S.	1	1.00	1.00	5.97	0.97	1.26	0.00	62.52	0.00
time (sec)	N/A	4.046	0.505	0.256	0.437	0.262	0.000	24.854	0.000

Problem 270	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	46	38	35	34	35	32	35	35
N.S.	1	1.39	1.15	1.06	1.03	1.06	0.97	1.06	1.06
time (sec)	N/A	1.800	0.088	1.185	0.255	0.253	0.192	0.333	13.217

Problem 271	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	30	36	47	33	61	36	49
N.S.	1	0.00	1.03	1.24	1.62	1.14	2.10	1.24	1.69
time (sec)	N/A	0.000	5.082	1.238	0.358	0.261	0.132	0.324	12.822

Problem 272	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	35	35	47	36	29	38	35
N.S.	1	0.00	1.21	1.21	1.62	1.24	1.00	1.31	1.21
time (sec)	N/A	0.000	0.134	0.613	0.480	0.285	0.372	0.526	13.820

Problem 273	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	19	19	15	14	14	14	14	16
N.S.	1	1.00	1.00	0.79	0.74	0.74	0.74	0.74	0.84
time (sec)	N/A	0.147	0.019	0.089	0.191	0.261	0.033	0.262	0.043

Problem 274	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	21	20	20	56	22	19	22	16
N.S.	1	1.05	1.00	1.00	2.80	1.10	0.95	1.10	0.80
time (sec)	N/A	0.206	0.023	0.279	0.231	0.264	0.073	0.268	12.438

Problem 275	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	34	32	27	35	36	34	57	26
N.S.	1	1.42	1.33	1.12	1.46	1.50	1.42	2.38	1.08
time (sec)	N/A	0.320	2.496	0.231	0.238	0.269	0.120	0.285	13.548

Problem 276	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	0	13	13	12	12	10	12	12
N.S.	1	0.00	0.81	0.81	0.75	0.75	0.62	0.75	0.75
time (sec)	N/A	0.000	0.139	0.063	0.218	0.271	0.048	0.269	0.089

Problem 277	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-2)	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	22	20	25	27	0	35	0
N.S.	1	0.00	1.00	0.91	1.14	1.23	0.00	1.59	0.00
time (sec)	N/A	0.000	0.167	65.451	0.260	0.290	0.000	0.302	0.000

Problem 278	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	8	8	9	8	8	7	9	8
N.S.	1	0.40	0.40	0.45	0.40	0.40	0.35	0.45	0.40
time (sec)	N/A	0.135	0.001	0.060	0.184	0.260	0.027	0.266	0.018

Problem 279	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	C	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	56	54	57	68	64	65	143	56
N.S.	1	2.80	2.70	2.85	3.40	3.20	3.25	7.15	2.80
time (sec)	N/A	0.323	2.192	0.345	0.227	0.251	0.115	0.278	0.160

Problem 280	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	15	15	14	13	17	10	13	13
N.S.	1	0.94	0.94	0.88	0.81	1.06	0.62	0.81	0.81
time (sec)	N/A	0.164	0.014	0.181	0.179	0.269	0.042	0.270	12.509

Problem 281	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	24	23	50	1942	50	44	746	1018
N.S.	1	0.86	0.82	1.79	69.36	1.79	1.57	26.64	36.36
time (sec)	N/A	0.571	0.058	0.736	0.324	0.272	0.101	0.298	45.109

Problem 282	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	18	24	0	23	19	17	17
N.S.	1	0.00	1.00	1.33	0.00	1.28	1.06	0.94	0.94
time (sec)	N/A	0.000	0.268	0.773	0.000	0.240	0.123	0.289	13.143

Problem 283	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	80	34	52	0	42	82	56	30
N.S.	1	3.33	1.42	2.17	0.00	1.75	3.42	2.33	1.25
time (sec)	N/A	0.715	0.323	0.183	0.000	0.307	0.246	0.264	13.151

Problem 284	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	36	36	29	26	34	29	26	26
N.S.	1	1.24	1.24	1.00	0.90	1.17	1.00	0.90	0.90
time (sec)	N/A	0.209	0.030	0.365	0.192	0.264	0.059	0.273	12.457

Problem 285	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	27	27	25	54	32	24	25	25
N.S.	1	1.23	1.23	1.14	2.45	1.45	1.09	1.14	1.14
time (sec)	N/A	0.326	0.046	0.059	0.198	0.252	0.059	0.248	13.510

Problem 286	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	26	28	21	30	24	24	22
N.S.	1	0.00	1.00	1.08	0.81	1.15	0.92	0.92	0.85
time (sec)	N/A	0.000	0.625	0.260	0.307	0.254	0.147	0.272	12.487

Problem 287	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	B	B	A	F	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	11	0	0	25	34	34	29	0	24
N.S.	1	0.00	0.00	2.27	3.09	3.09	2.64	0.00	2.18
time (sec)	N/A	0.000	0.000	0.565	0.311	0.259	0.157	0.000	12.426

Problem 288	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	21	19	18	61	19	0	20
N.S.	1	0.00	0.88	0.79	0.75	2.54	0.79	0.00	0.83
time (sec)	N/A	0.000	0.766	0.215	0.405	0.291	0.288	0.000	12.869

Problem 289	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	32	29	23	0	23	26	23	25
N.S.	1	1.19	1.07	0.85	0.00	0.85	0.96	0.85	0.93
time (sec)	N/A	0.409	1.496	0.712	0.000	0.256	0.177	0.311	0.261

Problem 290	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	30	25	27	21	26	22	21	24
N.S.	1	1.11	0.93	1.00	0.78	0.96	0.81	0.78	0.89
time (sec)	N/A	0.510	0.562	0.850	0.318	0.249	0.130	0.274	12.593

Problem 291	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	16	17	19	16	12	44	17
N.S.	1	0.00	0.89	0.94	1.06	0.89	0.67	2.44	0.94
time (sec)	N/A	0.000	0.087	1.053	0.318	0.283	0.060	0.275	13.030

Problem 292	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	34	45	31	54	28	27	28	28
N.S.	1	1.48	1.96	1.35	2.35	1.22	1.17	1.22	1.22
time (sec)	N/A	0.284	10.619	0.475	0.327	0.262	0.091	0.285	0.210

Problem 293	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	64	36	42	0	30	26	59	52
N.S.	1	2.67	1.50	1.75	0.00	1.25	1.08	2.46	2.17
time (sec)	N/A	0.313	0.320	0.730	0.000	0.265	0.146	0.284	12.693

Problem 294	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	27	22	30	40	20	40	21
N.S.	1	0.00	0.93	0.76	1.03	1.38	0.69	1.38	0.72
time (sec)	N/A	0.000	0.171	0.158	0.267	0.279	0.152	0.267	13.250

Problem 295	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	194	18	19	189	18	17	17	16
N.S.	1	9.24	0.86	0.90	9.00	0.86	0.81	0.81	0.76
time (sec)	N/A	0.585	0.070	0.576	0.211	0.260	0.118	0.270	13.729

Problem 296	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	30	27	20	31	22	22	25	19
N.S.	1	1.76	1.59	1.18	1.82	1.29	1.29	1.47	1.12
time (sec)	N/A	0.199	0.006	0.026	0.189	0.265	0.069	0.267	13.812

Problem 297	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	16	14	17	17	17	14	0	14
N.S.	1	0.89	0.78	0.94	0.94	0.94	0.78	0.00	0.78
time (sec)	N/A	0.397	0.107	0.665	0.217	0.257	0.112	0.000	14.625

Problem 298	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	20	20	22	32	22	20	24	20
N.S.	1	1.05	1.05	1.16	1.68	1.16	1.05	1.26	1.05
time (sec)	N/A	0.668	0.265	26.389	0.328	0.258	0.115	0.302	13.913

Problem 299	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	B	A	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	42	166	48	33	26	44	47	42
N.S.	1	1.83	7.22	2.09	1.43	1.13	1.91	2.04	1.83
time (sec)	N/A	15.448	0.148	0.204	0.270	0.267	0.099	0.307	13.500

Problem 300	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	129	37	30	34	31	22	0	29
N.S.	1	3.79	1.09	0.88	1.00	0.91	0.65	0.00	0.85
time (sec)	N/A	1.324	0.243	1.624	0.373	0.270	0.100	0.000	13.554

Problem 301	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	33	28	25	24	27	22	31	24
N.S.	1	1.10	0.93	0.83	0.80	0.90	0.73	1.03	0.80
time (sec)	N/A	0.659	0.081	0.304	0.190	0.268	0.072	0.282	13.572

Problem 302	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	21	15	22	36	21	22	21	21
N.S.	1	1.24	0.88	1.29	2.12	1.24	1.29	1.24	1.24
time (sec)	N/A	0.272	0.019	0.777	0.273	0.275	0.054	0.269	13.120

Problem 303	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	26	26	38	38	22	38	25
N.S.	1	0.00	0.93	0.93	1.36	1.36	0.79	1.36	0.89
time (sec)	N/A	0.000	0.181	25.578	0.297	0.273	0.190	0.320	12.575

Problem 304	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	13	13	12	9	11	10	11	11
N.S.	1	0.52	0.52	0.48	0.36	0.44	0.40	0.44	0.44
time (sec)	N/A	0.304	0.045	1.675	0.225	0.271	0.049	0.262	12.370

Problem 305	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	14	14	13	12	12	8	14	12
N.S.	1	0.88	0.88	0.81	0.75	0.75	0.50	0.88	0.75
time (sec)	N/A	0.175	0.006	0.719	0.180	0.263	0.043	0.279	12.767

Problem 306	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	48	32	29	37	28	29	28	32
N.S.	1	1.66	1.10	1.00	1.28	0.97	1.00	0.97	1.10
time (sec)	N/A	0.230	0.082	0.813	0.194	0.294	0.198	0.272	0.146

Problem 307	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	25	26	25	24	24	24	24	24
N.S.	1	0.89	0.93	0.89	0.86	0.86	0.86	0.86	0.86
time (sec)	N/A	0.218	0.069	0.131	0.217	0.255	0.096	0.266	13.432

Problem 308	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	32	18	19	0	21	14	18	20
N.S.	1	1.78	1.00	1.06	0.00	1.17	0.78	1.00	1.11
time (sec)	N/A	0.204	0.244	0.246	0.000	0.262	0.046	0.265	0.143

Problem 309	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	40	48	42	47	51	51	51
N.S.	1	0.00	1.90	2.29	2.00	2.24	2.43	2.43	2.43
time (sec)	N/A	0.000	0.195	106.688	7.094	0.260	3.153	0.418	14.416

Problem 310	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	A	F(-2)	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	33	77	44	45	0	67	55
N.S.	1	0.00	1.14	2.66	1.52	1.55	0.00	2.31	1.90
time (sec)	N/A	0.000	0.133	54.724	0.245	0.267	0.000	0.510	14.182

Problem 311	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	40	32	59	65	31	59	0
N.S.	1	0.00	1.29	1.03	1.90	2.10	1.00	1.90	0.00
time (sec)	N/A	0.000	8.787	0.386	0.262	0.259	0.101	0.332	0.000

Problem 312	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	0	11	11	10	10	8	10	10
N.S.	1	0.00	1.10	1.10	1.00	1.00	0.80	1.00	1.00
time (sec)	N/A	0.000	0.095	0.135	0.219	0.257	0.050	0.262	0.109

Problem 313	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	19	19	20	19	19	17	20	19
N.S.	1	0.90	0.90	0.95	0.90	0.90	0.81	0.95	0.90
time (sec)	N/A	0.343	0.012	0.172	0.178	0.266	0.058	0.264	13.202

Problem 314	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F	B	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	30	30	100	0	115	114	0	90
N.S.	1	1.11	1.11	3.70	0.00	4.26	4.22	0.00	3.33
time (sec)	N/A	0.637	0.947	4.059	0.000	0.265	0.445	0.000	12.790

Problem 315	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	31	43	0	39	32	33	145
N.S.	1	0.00	0.97	1.34	0.00	1.22	1.00	1.03	4.53
time (sec)	N/A	0.000	0.234	3.039	0.000	0.309	0.594	1.700	12.943

Problem 316	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	29	27	15	20	20	22	20	22
N.S.	1	1.45	1.35	0.75	1.00	1.00	1.10	1.00	1.10
time (sec)	N/A	1.350	0.167	38.684	0.244	0.271	0.597	0.327	12.534

Problem 317	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	37	95	107	93	94	107	123
N.S.	1	0.00	1.37	3.52	3.96	3.44	3.48	3.96	4.56
time (sec)	N/A	0.000	0.189	1.691	0.697	0.270	0.367	0.632	12.546

Problem 318	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	11	10	11	10	10	12	10	10
N.S.	1	0.69	0.62	0.69	0.62	0.62	0.75	0.62	0.62
time (sec)	N/A	0.139	0.003	0.064	0.207	0.261	0.058	0.258	12.240

Problem 319	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	54	71	89	86	99	100	0
N.S.	1	0.00	1.54	2.03	2.54	2.46	2.83	2.86	0.00
time (sec)	N/A	0.000	0.132	8.873	0.282	0.320	0.216	0.432	0.000

Problem 320	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	26	24	55	26	55	37	36	74
N.S.	1	1.18	1.09	2.50	1.18	2.50	1.68	1.64	3.36
time (sec)	N/A	0.779	0.069	2.590	0.193	0.277	0.107	0.334	12.673

Problem 321	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	F(-1)	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	31	0	28	0	43	35	27	33	0
N.S.	1	0.00	0.90	0.00	1.39	1.13	0.87	1.06	0.00
time (sec)	N/A	0.000	0.137	0.000	0.399	0.259	0.973	0.629	0.000

Problem 322	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	2	2	2	3	2	2	2	3	2
N.S.	1	1.00	1.00	1.50	1.00	1.00	1.00	1.50	1.00
time (sec)	N/A	0.120	0.000	0.070	0.189	0.247	0.034	0.263	0.008

Problem 323	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	32	30	66	62	53	71	44
N.S.	1	0.00	1.07	1.00	2.20	2.07	1.77	2.37	1.47
time (sec)	N/A	0.000	0.171	2.665	0.343	0.270	0.162	0.298	13.612

Problem 324	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	15	11	9	8	8	8	8	8
N.S.	1	1.25	0.92	0.75	0.67	0.67	0.67	0.67	0.67
time (sec)	N/A	0.141	0.002	0.125	0.194	0.260	0.031	0.250	12.503

Problem 325	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	15	15	13	12	12	14	12	12
N.S.	1	1.00	1.00	0.87	0.80	0.80	0.93	0.80	0.80
time (sec)	N/A	0.155	0.021	0.063	0.183	0.251	0.043	0.255	0.098

Problem 326	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	77	23	65	62	62	63	62	21
N.S.	1	3.50	1.05	2.95	2.82	2.82	2.86	2.82	0.95
time (sec)	N/A	0.542	2.844	0.130	0.185	0.264	0.077	0.269	12.779

Problem 327	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	F(-1)	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	31	157	0	147	143	175	1157
N.S.	1	0.00	1.03	5.23	0.00	4.90	4.77	5.83	38.57
time (sec)	N/A	0.000	0.439	65.118	0.000	0.267	3.136	24.389	13.977

Problem 328	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	39	51	52	31	35	54	41	35	35
N.S.	1	1.31	1.33	0.79	0.90	1.38	1.05	0.90	0.90
time (sec)	N/A	0.195	0.057	0.141	0.214	0.279	0.147	0.261	0.157

Problem 329	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	29	41	50	29	29	40	29
N.S.	1	0.00	1.16	1.64	2.00	1.16	1.16	1.60	1.16
time (sec)	N/A	0.000	0.130	2.502	0.347	0.306	0.192	0.292	12.743

Problem 330	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	F(-1)	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	107	45	34	54	33	0	0	39
N.S.	1	4.28	1.80	1.36	2.16	1.32	0.00	0.00	1.56
time (sec)	N/A	0.901	0.097	44.640	0.566	0.258	0.000	0.000	13.479

Problem 331	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	B	A	B	B	B	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	0	67	38	97	90	125	78
N.S.	1	0.00	0.00	2.31	1.31	3.34	3.10	4.31	2.69
time (sec)	N/A	0.000	0.000	54.435	0.384	0.260	0.525	5.080	13.300

Problem 332	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F(-2)	A	F(-1)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	22	33	0	32	0	20	21
N.S.	1	0.00	0.88	1.32	0.00	1.28	0.00	0.80	0.84
time (sec)	N/A	0.000	0.057	34.559	0.000	0.255	0.000	0.300	12.817

Problem 333	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	31	27	25	27	40	19	25	25
N.S.	1	1.00	0.87	0.81	0.87	1.29	0.61	0.81	0.81
time (sec)	N/A	0.362	0.019	0.092	0.207	0.243	0.065	0.262	0.067

Problem 334	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	12	12	12	11	11	12	11	11
N.S.	1	0.75	0.75	0.75	0.69	0.69	0.75	0.69	0.69
time (sec)	N/A	0.292	0.100	0.145	0.262	0.251	0.282	0.268	13.096

Problem 335	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	23	26	28	22	33	22	22	21
N.S.	1	1.00	1.13	1.22	0.96	1.43	0.96	0.96	0.91
time (sec)	N/A	0.233	0.026	1.408	0.217	0.240	0.115	0.254	0.140

Problem 336	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	F	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	25	113	0	93	654	0	155
N.S.	1	0.00	0.86	3.90	0.00	3.21	22.55	0.00	5.34
time (sec)	N/A	0.000	0.307	2.490	0.000	0.273	0.393	0.000	13.956

Problem 337	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	24	24	23	79	26	20	30	24
N.S.	1	1.09	1.09	1.05	3.59	1.18	0.91	1.36	1.09
time (sec)	N/A	0.187	0.049	0.188	0.244	0.266	0.084	0.264	12.575

Problem 338	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	42	26	27	37	26	31	35	0
N.S.	1	1.56	0.96	1.00	1.37	0.96	1.15	1.30	0.00
time (sec)	N/A	0.698	0.208	0.217	0.293	0.271	0.181	0.283	0.000

Problem 339	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	22	22	23	30	22	32	22	22
N.S.	1	1.16	1.16	1.21	1.58	1.16	1.68	1.16	1.16
time (sec)	N/A	0.517	0.058	0.866	0.251	0.258	0.211	0.271	13.264

Problem 340	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	F	F	A	F(-1)	F	B
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	0	23	0	0	39	0	0	20
N.S.	1	0.00	1.00	0.00	0.00	1.70	0.00	0.00	0.87
time (sec)	N/A	0.000	0.286	0.000	0.000	0.288	0.000	0.000	13.099

Problem 341	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	28	27	28	28	41	28	26
N.S.	1	0.00	1.12	1.08	1.12	1.12	1.64	1.12	1.04
time (sec)	N/A	0.000	0.376	11.258	0.253	0.249	0.133	0.287	12.481

Problem 342	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	F	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	22	200	0	119	117	0	122
N.S.	1	0.00	1.00	9.09	0.00	5.41	5.32	0.00	5.55
time (sec)	N/A	0.000	5.094	8.096	0.000	0.273	0.429	0.000	12.998

Problem 343	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	0	19	20	36	19	14	72	19
N.S.	1	0.00	1.12	1.18	2.12	1.12	0.82	4.24	1.12
time (sec)	N/A	0.000	0.184	7.293	0.237	0.252	0.055	0.278	0.238

Problem 344	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	30	22	26	62	25	24	25	38
N.S.	1	1.11	0.81	0.96	2.30	0.93	0.89	0.93	1.41
time (sec)	N/A	5.318	0.179	1.723	0.366	0.251	0.222	0.546	12.848

Problem 345	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F(-2)	A	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	36	54	0	50	46	122	0
N.S.	1	0.00	1.03	1.54	0.00	1.43	1.31	3.49	0.00
time (sec)	N/A	0.000	0.186	2.786	0.000	0.258	0.435	0.325	0.000

Problem 346	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	32	32	23	27	27	32	27	13
N.S.	1	1.78	1.78	1.28	1.50	1.50	1.78	1.50	0.72
time (sec)	N/A	0.158	0.003	0.102	0.208	0.249	0.023	0.258	0.042

Problem 347	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	30	29	36	64	29	52	50
N.S.	1	0.00	0.97	0.94	1.16	2.06	0.94	1.68	1.61
time (sec)	N/A	0.000	3.205	1.063	0.309	0.269	0.141	0.436	0.412

Problem 348	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	24	24	21	20	40	26	22	22
N.S.	1	1.04	1.04	0.91	0.87	1.74	1.13	0.96	0.96
time (sec)	N/A	0.199	0.056	0.182	0.284	0.246	0.109	0.258	13.254

Problem 349	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	49	43	42	39	39	42	39	41
N.S.	1	1.69	1.48	1.45	1.34	1.34	1.45	1.34	1.41
time (sec)	N/A	0.201	0.123	0.129	0.208	0.252	0.066	0.263	0.175

Problem 350	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	29	35	139	34	31	34	24
N.S.	1	0.00	1.26	1.52	6.04	1.48	1.35	1.48	1.04
time (sec)	N/A	0.000	0.146	1.266	0.236	0.242	0.082	0.297	13.891

Problem 351	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	20	23	19	19	19	19	19	19
N.S.	1	1.00	1.15	0.95	0.95	0.95	0.95	0.95	0.95
time (sec)	N/A	0.159	0.008	0.108	0.216	0.264	0.042	0.256	12.716

Problem 352	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	C	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	30	19	23	23	14	27	18
N.S.	1	0.00	1.30	0.83	1.00	1.00	0.61	1.17	0.78
time (sec)	N/A	0.000	0.130	1.596	0.261	0.250	0.133	0.288	12.902

Problem 353	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	60	57	55	53	71	57	0
N.S.	1	0.00	1.82	1.73	1.67	1.61	2.15	1.73	0.00
time (sec)	N/A	0.000	8.560	0.795	0.270	0.273	0.102	0.308	0.000

Problem 354	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	F(-1)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	29	34	68	33	0	41	22
N.S.	1	0.00	0.97	1.13	2.27	1.10	0.00	1.37	0.73
time (sec)	N/A	0.000	0.133	0.425	0.347	0.261	0.000	0.290	12.807

Problem 355	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	21	21	20	26	20	19	26	26
N.S.	1	1.05	1.05	1.00	1.30	1.00	0.95	1.30	1.30
time (sec)	N/A	0.385	0.737	0.784	0.354	0.251	0.151	0.351	12.729

Problem 356	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	27	27	22	32	21	24	21	13
N.S.	1	1.93	1.93	1.57	2.29	1.50	1.71	1.50	0.93
time (sec)	N/A	0.199	0.008	0.815	0.220	0.262	0.056	0.251	12.367

Problem 357	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	362	19	285	259	257	296	271	231
N.S.	1	19.05	1.00	15.00	13.63	13.53	15.58	14.26	12.16
time (sec)	N/A	0.715	0.061	0.236	0.306	0.281	0.207	0.264	0.327

Problem 358	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	65	20	33	37	37	32	37	32
N.S.	1	3.61	1.11	1.83	2.06	2.06	1.78	2.06	1.78
time (sec)	N/A	1.032	0.214	1.121	0.252	0.253	0.062	0.257	12.557

Problem 359	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	C	B	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	277	64	93	59	80	141	39
N.S.	1	0.00	8.66	2.00	2.91	1.84	2.50	4.41	1.22
time (sec)	N/A	0.000	0.630	10.265	0.383	0.271	0.290	0.367	0.479

Problem 360	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	59	25	26	29	27	29	31	684
N.S.	1	2.81	1.19	1.24	1.38	1.29	1.38	1.48	32.57
time (sec)	N/A	0.336	0.026	0.501	0.221	0.270	0.390	0.270	14.287

Problem 361	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	67	42	12	33	11	10	11	11
N.S.	1	5.15	3.23	0.92	2.54	0.85	0.77	0.85	0.85
time (sec)	N/A	0.434	0.053	0.257	0.249	0.258	0.059	0.254	0.193

Problem 362	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	19	17	12	11	11	14	12	11
N.S.	1	1.06	0.94	0.67	0.61	0.61	0.78	0.67	0.61
time (sec)	N/A	0.170	0.002	0.151	0.213	0.248	0.037	0.255	12.457

Problem 363	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	54	52	43	105	60	55	0
N.S.	1	0.00	1.93	1.86	1.54	3.75	2.14	1.96	0.00
time (sec)	N/A	0.000	0.155	7.582	0.293	0.278	2.761	0.316	0.000

Problem 364	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	20	19	30	30	14	21	18
N.S.	1	0.00	0.91	0.86	1.36	1.36	0.64	0.95	0.82
time (sec)	N/A	0.000	2.684	6.732	0.283	0.250	0.054	0.270	14.348

Problem 365	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	23	23	35	29	15	37	45
N.S.	1	0.00	0.96	0.96	1.46	1.21	0.62	1.54	1.88
time (sec)	N/A	0.000	1.783	5.436	0.242	0.251	0.096	0.272	14.273

Problem 366	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	F(-2)	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	35	33	52	62	0	66	30
N.S.	1	0.00	1.52	1.43	2.26	2.70	0.00	2.87	1.30
time (sec)	N/A	0.000	1.709	0.546	0.235	0.261	0.000	0.284	14.496

Problem 367	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	12	12	9	8	8	12	9	8
N.S.	1	0.60	0.60	0.45	0.40	0.40	0.60	0.45	0.40
time (sec)	N/A	0.150	0.003	0.054	0.214	0.250	0.032	0.259	14.312

Problem 368	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	9	9	9	9	8	8	7	8	8
N.S.	1	1.00	1.00	1.00	0.89	0.89	0.78	0.89	0.89
time (sec)	N/A	0.147	0.005	0.129	0.196	0.248	0.038	0.266	13.600

Problem 369	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	B	F	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	167	36	85	0	66	66	177	39
N.S.	1	4.91	1.06	2.50	0.00	1.94	1.94	5.21	1.15
time (sec)	N/A	2.519	0.090	0.908	0.000	0.251	0.248	0.258	14.174

Problem 370	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	22	19	16	16	24	16	16
N.S.	1	0.00	1.10	0.95	0.80	0.80	1.20	0.80	0.80
time (sec)	N/A	0.000	0.074	0.382	0.255	0.275	0.104	0.593	14.245

Problem 371	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	50	51	50	53	51	0	47
N.S.	1	0.00	1.72	1.76	1.72	1.83	1.76	0.00	1.62
time (sec)	N/A	0.000	1.505	0.416	0.301	0.259	0.148	0.000	13.918

Problem 372	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	46	35	25	50	39	29	34	22
N.S.	1	1.64	1.25	0.89	1.79	1.39	1.04	1.21	0.79
time (sec)	N/A	0.299	6.099	1.060	0.248	0.270	0.176	0.276	0.359

Problem 373	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	22	23	29	29	19	22	22
N.S.	1	0.00	0.96	1.00	1.26	1.26	0.83	0.96	0.96
time (sec)	N/A	0.000	0.374	1.356	0.251	0.275	0.141	0.270	14.045

Problem 374	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	24	24	21	20	20	22	20	22
N.S.	1	1.09	1.09	0.95	0.91	0.91	1.00	0.91	1.00
time (sec)	N/A	0.217	0.011	0.261	0.216	0.264	0.166	0.256	13.306

Problem 375	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	27	28	32	32	31	50	32
N.S.	1	0.00	0.96	1.00	1.14	1.14	1.11	1.79	1.14
time (sec)	N/A	0.000	0.384	0.475	0.211	0.265	0.117	0.271	13.651

Problem 376	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	C	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	41	42	29	48	29	31	28	17
N.S.	1	2.05	2.10	1.45	2.40	1.45	1.55	1.40	0.85
time (sec)	N/A	0.464	0.073	0.087	0.243	0.267	0.061	0.265	13.466

Problem 377	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	64	43	62	59	59	82	63	55
N.S.	1	2.29	1.54	2.21	2.11	2.11	2.93	2.25	1.96
time (sec)	N/A	0.205	0.036	0.151	0.214	0.244	0.097	0.263	13.729

Problem 378	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	26	25	30	24	20	0	22
N.S.	1	0.00	1.04	1.00	1.20	0.96	0.80	0.00	0.88
time (sec)	N/A	0.000	1.733	1.882	0.308	0.315	0.272	0.000	14.585

Problem 379	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	15	18	13	11	11	17	11	12
N.S.	1	0.71	0.86	0.62	0.52	0.52	0.81	0.52	0.57
time (sec)	N/A	0.168	0.008	0.161	0.212	0.364	0.074	0.262	14.488

Problem 380	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	18	16	15	16	16	19	16	15
N.S.	1	1.38	1.23	1.15	1.23	1.23	1.46	1.23	1.15
time (sec)	N/A	0.131	0.003	0.106	0.212	0.497	0.019	0.266	0.181

Problem 381	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	38	34	36	40	40	32	40	30
N.S.	1	1.73	1.55	1.64	1.82	1.82	1.45	1.82	1.36
time (sec)	N/A	0.172	0.007	0.093	0.208	0.433	0.031	0.269	0.047

Problem 382	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	70	31	37	36	42	34	36	28
N.S.	1	2.80	1.24	1.48	1.44	1.68	1.36	1.44	1.12
time (sec)	N/A	0.261	0.946	0.361	0.276	0.415	0.114	0.275	0.154

Problem 383	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	38	28	48	48	49	42	66	42
N.S.	1	1.36	1.00	1.71	1.71	1.75	1.50	2.36	1.50
time (sec)	N/A	0.429	0.034	0.256	0.214	0.412	0.091	0.279	13.973

Problem 384	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	28	29	29	30	22	22	22	21
N.S.	1	0.88	0.91	0.91	0.94	0.69	0.69	0.69	0.66
time (sec)	N/A	0.213	0.014	0.242	0.227	0.359	0.087	0.253	14.227

Problem 385	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	86	25	24	23	23	22	0	24
N.S.	1	3.19	0.93	0.89	0.85	0.85	0.81	0.00	0.89
time (sec)	N/A	1.077	3.178	190.470	0.266	0.379	0.538	0.000	14.453

Problem 386	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	32	30	64	67	59	58	72	31
N.S.	1	1.39	1.30	2.78	2.91	2.57	2.52	3.13	1.35
time (sec)	N/A	0.916	0.067	1.589	0.299	0.351	0.133	0.369	15.136

Problem 387	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	34	33	32	43	27	34	27	37
N.S.	1	1.26	1.22	1.19	1.59	1.00	1.26	1.00	1.37
time (sec)	N/A	0.217	0.027	0.183	0.229	0.335	0.115	0.257	13.838

Problem 388	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F(-1)	F(-2)	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	26	24	24	0	26	0	0	0
N.S.	1	1.08	1.00	1.00	0.00	1.08	0.00	0.00	0.00
time (sec)	N/A	0.357	0.132	4.397	0.000	0.316	0.000	0.000	0.000

Problem 389	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	24	22	19	19	19	17	19	19
N.S.	1	1.14	1.05	0.90	0.90	0.90	0.81	0.90	0.90
time (sec)	N/A	0.175	0.006	1.105	0.207	0.270	0.095	0.280	15.247

Problem 390	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	44	53	49	53	49	61	50
N.S.	1	0.00	1.76	2.12	1.96	2.12	1.96	2.44	2.00
time (sec)	N/A	0.000	0.127	41.240	0.405	0.319	1.243	0.896	15.313

Problem 391	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	57	24	22	142	32	31	32	21
N.S.	1	2.71	1.14	1.05	6.76	1.52	1.48	1.52	1.00
time (sec)	N/A	0.405	0.215	0.098	0.222	0.333	0.053	0.275	14.408

Problem 392	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	21	21	35	20	17	20	20
N.S.	1	0.00	1.00	1.00	1.67	0.95	0.81	0.95	0.95
time (sec)	N/A	0.000	0.686	0.701	0.246	0.275	0.129	0.337	14.293

Problem 393	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	32	33	32	31	29	33	31
N.S.	1	0.00	1.07	1.10	1.07	1.03	0.97	1.10	1.03
time (sec)	N/A	0.000	0.077	97.022	0.647	0.242	3.050	0.466	15.613

Problem 394	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	11	12	13	12	12	12	13	12
N.S.	1	0.85	0.92	1.00	0.92	0.92	0.92	1.00	0.92
time (sec)	N/A	0.144	0.004	0.794	0.194	0.235	0.074	0.264	14.757

Problem 395	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	24	20	0	20	17	20	20
N.S.	1	0.00	1.04	0.87	0.00	0.87	0.74	0.87	0.87
time (sec)	N/A	0.000	1.150	1.119	0.000	0.226	11.772	0.283	14.722

Problem 396	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	14	14	13	14	14	14	14	12
N.S.	1	0.88	0.88	0.81	0.88	0.88	0.88	0.88	0.75
time (sec)	N/A	0.145	0.000	0.147	0.218	0.309	0.022	0.264	0.036

Problem 397	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	F	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	87	87	81	0	83	75	119	0
N.S.	1	3.95	3.95	3.68	0.00	3.77	3.41	5.41	0.00
time (sec)	N/A	1.491	0.420	0.395	0.000	0.337	2.112	0.263	0.000

Problem 398	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	15	14	14	14	13	14	14	13
N.S.	1	0.83	0.78	0.78	0.78	0.72	0.78	0.78	0.72
time (sec)	N/A	0.128	0.000	0.013	0.206	0.285	0.016	0.267	0.002

Problem 399	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	31	31	24	49	49	20	23	27
N.S.	1	1.19	1.19	0.92	1.88	1.88	0.77	0.88	1.04
time (sec)	N/A	0.697	0.271	1.053	0.229	0.270	0.053	0.280	15.830

Problem 400	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	37	0	67	44	474	86	41	86	83
N.S.	1	0.00	1.81	1.19	12.81	2.32	1.11	2.32	2.24
time (sec)	N/A	0.000	0.998	40.392	2.449	0.260	0.781	7.355	16.968

Problem 401	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	40	16	15	20	14	15	14	13
N.S.	1	2.00	0.80	0.75	1.00	0.70	0.75	0.70	0.65
time (sec)	N/A	0.172	0.016	0.134	0.211	0.242	0.063	0.261	14.260

Problem 402	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	138	22	30	108	34	37	45	16
N.S.	1	9.20	1.47	2.00	7.20	2.27	2.47	3.00	1.07
time (sec)	N/A	0.322	0.083	0.271	0.192	0.254	0.119	0.258	14.638

Problem 403	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	19	18	17	34	14	81	17
N.S.	1	0.00	0.95	0.90	0.85	1.70	0.70	4.05	0.85
time (sec)	N/A	0.000	0.936	0.706	0.416	0.312	0.239	0.256	15.960

Problem 404	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	12	12	11	10	12	7	11	10
N.S.	1	1.00	1.00	0.92	0.83	1.00	0.58	0.92	0.83
time (sec)	N/A	0.175	0.005	1.075	0.194	0.260	0.039	0.252	0.051

Problem 405	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	23	24	122	22	19	22	22
N.S.	1	0.00	0.96	1.00	5.08	0.92	0.79	0.92	0.92
time (sec)	N/A	0.000	0.528	0.569	0.360	0.252	0.105	0.262	0.306

Problem 406	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	38	42	37	44	39	44	0
N.S.	1	0.00	1.09	1.20	1.06	1.26	1.11	1.26	0.00
time (sec)	N/A	0.000	0.094	2.110	0.279	0.275	0.164	0.445	0.000

Problem 407	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	24	24	22	21	21	22	21	24
N.S.	1	0.92	0.92	0.85	0.81	0.81	0.85	0.81	0.92
time (sec)	N/A	0.174	0.055	0.079	0.208	0.260	0.076	0.257	0.136

Problem 408	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	113	69	59	54	75	68	0
N.S.	1	0.00	5.38	3.29	2.81	2.57	3.57	3.24	0.00
time (sec)	N/A	0.000	5.482	3.835	0.334	0.274	0.151	0.296	0.000

Problem 409	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	70	23	24	23	23	20	0	24
N.S.	1	2.33	0.77	0.80	0.77	0.77	0.67	0.00	0.80
time (sec)	N/A	0.382	0.523	0.150	0.277	0.262	0.104	0.000	15.145

Problem 410	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	69	49	48	0	51	51	63	56
N.S.	1	2.09	1.48	1.45	0.00	1.55	1.55	1.91	1.70
time (sec)	N/A	1.163	0.450	0.108	0.000	0.249	0.126	0.280	14.446

Problem 411	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	31	46	42	38	26	42	32
N.S.	1	0.00	0.89	1.31	1.20	1.09	0.74	1.20	0.91
time (sec)	N/A	0.000	0.231	27.393	0.376	0.257	0.378	0.449	14.099

Problem 412	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	11	11	7	6	6	5	6	6
N.S.	1	0.92	0.92	0.58	0.50	0.50	0.42	0.50	0.50
time (sec)	N/A	0.136	0.001	0.099	0.192	0.237	0.033	0.247	0.038

Problem 413	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	29	74	72	73	82	71	0
N.S.	1	0.00	1.07	2.74	2.67	2.70	3.04	2.63	0.00
time (sec)	N/A	0.000	0.750	4.592	0.686	0.278	0.185	19.152	0.000

Problem 414	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	32	26	30	26	24	27	0
N.S.	1	0.00	1.03	0.84	0.97	0.84	0.77	0.87	0.00
time (sec)	N/A	0.000	5.171	2.181	0.369	0.250	0.136	0.436	0.000

Problem 415	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	32	32	41	46	44	44	110
N.S.	1	0.00	1.03	1.03	1.32	1.48	1.42	1.42	3.55
time (sec)	N/A	0.000	0.115	1.905	0.350	0.270	0.146	0.340	14.657

Problem 416	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	B	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	55	24	36	34	38	34	36	27
N.S.	1	2.50	1.09	1.64	1.55	1.73	1.55	1.64	1.23
time (sec)	N/A	0.611	0.148	2.122	0.237	0.249	0.046	0.268	14.222

Problem 417	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	17	17	18	17	21	17	17	18
N.S.	1	0.85	0.85	0.90	0.85	1.05	0.85	0.85	0.90
time (sec)	N/A	0.177	0.004	0.060	0.190	0.237	0.067	0.255	14.482

Problem 418	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	30	19	15	30	14	12	14	12
N.S.	1	1.15	0.73	0.58	1.15	0.54	0.46	0.54	0.46
time (sec)	N/A	0.202	0.056	0.079	0.198	0.252	0.040	0.255	0.056

Problem 419	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	16	12	16	15	15	14	15	11
N.S.	1	1.33	1.00	1.33	1.25	1.25	1.17	1.25	0.92
time (sec)	N/A	0.205	0.049	0.043	0.199	0.245	0.042	0.251	14.870

Problem 420	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F(-1)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	51	58	92	55	54	0	57
N.S.	1	0.00	1.65	1.87	2.97	1.77	1.74	0.00	1.84
time (sec)	N/A	0.000	0.406	116.989	0.439	0.270	3.302	0.000	15.597

Problem 421	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	79	16	60	51	52	58	55	21
N.S.	1	3.95	0.80	3.00	2.55	2.60	2.90	2.75	1.05
time (sec)	N/A	0.306	0.063	0.168	0.207	0.255	0.072	0.273	13.741

Problem 422	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	29	32	95	30	29	52	377
N.S.	1	0.00	1.12	1.23	3.65	1.15	1.12	2.00	14.50
time (sec)	N/A	0.000	0.608	0.524	0.365	0.236	0.138	0.350	14.446

Problem 423	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	16	18	13	13	13	14	13	12
N.S.	1	0.80	0.90	0.65	0.65	0.65	0.70	0.65	0.60
time (sec)	N/A	0.130	0.002	0.092	0.201	0.229	0.023	0.272	0.043

Problem 424	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	16	14	11	11	11	10	11	10
N.S.	1	1.33	1.17	0.92	0.92	0.92	0.83	0.92	0.83
time (sec)	N/A	0.131	0.000	0.109	0.187	0.230	0.020	0.262	13.938

Problem 425	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	34	32	34	0	50	32	60	38
N.S.	1	1.17	1.10	1.17	0.00	1.72	1.10	2.07	1.31
time (sec)	N/A	0.756	0.211	0.211	0.000	0.260	0.143	0.284	13.851

Problem 426	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	16	18	17	15	27	10	16	15
N.S.	1	0.94	1.06	1.00	0.88	1.59	0.59	0.94	0.88
time (sec)	N/A	0.208	0.018	1.915	0.201	0.250	0.047	0.265	13.288

Problem 427	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	28	28	44	32	31	46	27
N.S.	1	0.00	0.93	0.93	1.47	1.07	1.03	1.53	0.90
time (sec)	N/A	0.000	0.677	2.102	0.324	0.263	0.088	0.274	14.393

Problem 428	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	36	37	58	58	31	37	60
N.S.	1	0.00	1.09	1.12	1.76	1.76	0.94	1.12	1.82
time (sec)	N/A	0.000	0.059	1.105	0.234	0.294	0.103	0.274	14.094

Problem 429	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	25	12	14	14	14	15	14	13
N.S.	1	1.47	0.71	0.82	0.82	0.82	0.88	0.82	0.76
time (sec)	N/A	0.140	0.007	0.112	0.202	0.272	0.067	0.258	0.039

Problem 430	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	59	52	84	81	70	93	547
N.S.	1	0.00	2.11	1.86	3.00	2.89	2.50	3.32	19.54
time (sec)	N/A	0.000	0.159	2.747	0.240	0.304	0.164	0.289	15.134

Problem 431	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	21	14	21	32	16	22	20	16
N.S.	1	1.31	0.88	1.31	2.00	1.00	1.38	1.25	1.00
time (sec)	N/A	0.208	0.097	0.086	0.250	0.303	0.102	0.264	14.568

Problem 432	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	90	84	66	84	92	94	94	77
N.S.	1	2.73	2.55	2.00	2.55	2.79	2.85	2.85	2.33
time (sec)	N/A	0.565	0.073	0.264	0.191	0.380	0.908	0.268	14.304

Problem 433	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	16	16	16	15	13	17	15	15
N.S.	1	0.89	0.89	0.89	0.83	0.72	0.94	0.83	0.83
time (sec)	N/A	0.171	0.010	0.066	0.197	0.316	0.074	0.262	13.615

Problem 434	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	23	21	15	29	20	32	21
N.S.	1	0.00	0.92	0.84	0.60	1.16	0.80	1.28	0.84
time (sec)	N/A	0.000	0.295	0.513	0.248	0.305	0.103	0.260	14.676

Problem 435	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	234	40	30	59	57	54	64	79
N.S.	1	9.36	1.60	1.20	2.36	2.28	2.16	2.56	3.16
time (sec)	N/A	0.719	0.133	1.378	0.200	0.300	0.146	0.267	0.336

Problem 436	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	90	85	31	35	29	27	0	33
N.S.	1	3.60	3.40	1.24	1.40	1.16	1.08	0.00	1.32
time (sec)	N/A	0.553	0.244	1.194	0.398	0.303	0.106	0.000	15.086

Problem 437	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	36	14	14	37	37	27	37	15
N.S.	1	1.89	0.74	0.74	1.95	1.95	1.42	1.95	0.79
time (sec)	N/A	0.162	0.009	0.096	0.194	0.307	0.022	0.263	0.080

Problem 438	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	18	12	13	0	11	12	11	11
N.S.	1	1.38	0.92	1.00	0.00	0.85	0.92	0.85	0.85
time (sec)	N/A	0.257	0.254	1.419	0.000	0.275	0.059	0.260	14.826

Problem 439	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	33	30	24	23	30	20	23	23
N.S.	1	1.06	0.97	0.77	0.74	0.97	0.65	0.74	0.74
time (sec)	N/A	0.190	0.005	0.177	0.199	0.286	0.043	0.265	0.040

Problem 440	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	B	A	B	B	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	0	55	122	56	51	124	54
N.S.	1	0.00	0.00	1.77	3.94	1.81	1.65	4.00	1.74
time (sec)	N/A	0.000	0.000	12.651	0.259	0.278	0.487	2.608	14.810

Problem 441	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	8	8	9	8	8	10	9	8
N.S.	1	0.53	0.53	0.60	0.53	0.53	0.67	0.60	0.53
time (sec)	N/A	0.129	0.001	0.071	0.204	0.244	0.024	0.255	0.048

Problem 442	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	44	31	14	0	14
N.S.	1	1.00	1.00	0.93	2.93	2.07	0.93	0.00	0.93
time (sec)	N/A	0.318	0.048	0.245	0.216	0.267	0.197	0.000	13.071

Problem 443	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	32	27	0	103	22	124	37
N.S.	1	0.00	1.45	1.23	0.00	4.68	1.00	5.64	1.68
time (sec)	N/A	0.000	3.413	1.645	0.000	0.257	0.147	0.648	14.052

Problem 444	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	45	44	40	40	66	42	45
N.S.	1	0.00	1.36	1.33	1.21	1.21	2.00	1.27	1.36
time (sec)	N/A	0.000	0.578	1.754	0.254	0.235	0.181	0.298	15.868

Problem 445	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	89	66	72	336	99	76	0	62
N.S.	1	4.24	3.14	3.43	16.00	4.71	3.62	0.00	2.95
time (sec)	N/A	1.192	0.108	0.264	0.250	0.254	0.164	0.000	15.128

Problem 446	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	29	29	30	29	29	27	29	29
N.S.	1	0.97	0.97	1.00	0.97	0.97	0.90	0.97	0.97
time (sec)	N/A	0.603	0.034	2.117	0.228	0.232	0.112	0.281	14.982

Problem 447	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	35	37	33	32	44	34	0
N.S.	1	0.00	1.06	1.12	1.00	0.97	1.33	1.03	0.00
time (sec)	N/A	0.000	0.165	46.286	0.272	0.249	0.807	0.659	0.000

Problem 448	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	23	23	27	31	31	37	79	23
N.S.	1	0.96	0.96	1.12	1.29	1.29	1.54	3.29	0.96
time (sec)	N/A	0.231	0.021	0.296	0.206	0.305	0.623	0.265	0.243

Problem 449	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	43	43	41	40	40	34	40	45
N.S.	1	1.19	1.19	1.14	1.11	1.11	0.94	1.11	1.25
time (sec)	N/A	4.698	0.400	4.729	0.531	0.378	166.788	23.503	14.795

Problem 450	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	16	16	15	14	14	15	26	14
N.S.	1	1.07	1.07	1.00	0.93	0.93	1.00	1.73	0.93
time (sec)	N/A	0.235	0.035	0.125	0.256	0.323	1.613	0.270	13.892

Problem 451	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	46	58	196	236	158	302	0
N.S.	1	0.00	1.64	2.07	7.00	8.43	5.64	10.79	0.00
time (sec)	N/A	0.000	0.259	7.483	0.352	0.330	0.253	0.418	0.000

Problem 452	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	40	23	27	42	23	26	24	22
N.S.	1	1.74	1.00	1.17	1.83	1.00	1.13	1.04	0.96
time (sec)	N/A	0.245	0.092	1.191	0.249	0.323	0.131	0.281	15.594

Problem 453	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	24	23	25	22	24	19	24	23
N.S.	1	1.14	1.10	1.19	1.05	1.14	0.90	1.14	1.10
time (sec)	N/A	0.510	0.128	0.198	0.271	0.313	0.084	0.271	15.311

Problem 454	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	39	31	24	152	32	29	32	39
N.S.	1	1.62	1.29	1.00	6.33	1.33	1.21	1.33	1.62
time (sec)	N/A	0.399	0.396	0.162	0.261	0.404	0.085	0.271	0.144

Problem 455	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	25	23	22	22	19	22	47
N.S.	1	0.00	1.00	0.92	0.88	0.88	0.76	0.88	1.88
time (sec)	N/A	0.000	0.732	2.008	0.330	0.325	0.061	0.293	14.055

Problem 456	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	0	15	17	15	15	14	15	15
N.S.	1	0.00	0.88	1.00	0.88	0.88	0.82	0.88	0.88
time (sec)	N/A	0.000	0.232	1.457	0.319	0.318	0.062	0.286	14.232

Problem 457	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	42	25	20	22	22	20	33	22
N.S.	1	1.91	1.14	0.91	1.00	1.00	0.91	1.50	1.00
time (sec)	N/A	0.280	0.013	0.074	0.204	0.338	0.149	0.274	14.558

Problem 458	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	28	21	22	29	29	22	21	22
N.S.	1	1.75	1.31	1.38	1.81	1.81	1.38	1.31	1.38
time (sec)	N/A	0.261	0.036	0.156	0.219	0.357	0.044	0.281	14.495

Problem 459	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	31	31	28	45	42	26	27	37
N.S.	1	0.97	0.97	0.88	1.41	1.31	0.81	0.84	1.16
time (sec)	N/A	0.690	0.068	0.076	0.255	0.330	0.096	0.264	14.422

Problem 460	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	C	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	28	32	33	30	26	0	25
N.S.	1	0.00	0.80	0.91	0.94	0.86	0.74	0.00	0.71
time (sec)	N/A	0.000	0.433	0.291	0.294	0.288	0.110	0.000	15.550

Problem 461	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-1)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	52	35	48	34	0	0	33
N.S.	1	0.00	1.68	1.13	1.55	1.10	0.00	0.00	1.06
time (sec)	N/A	0.000	1.022	7.088	0.478	0.284	0.000	0.000	16.456

Problem 462	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	A	A	A	A	F(-1)
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	0	24	26	24	22	26	0
N.S.	1	0.00	0.00	1.04	1.13	1.04	0.96	1.13	0.00
time (sec)	N/A	0.000	0.000	1.575	0.318	0.270	0.111	0.329	0.000

Problem 463	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	45	53	34	27	28	49	35	19
N.S.	1	1.80	2.12	1.36	1.08	1.12	1.96	1.40	0.76
time (sec)	N/A	0.800	0.073	0.391	0.327	0.289	0.134	0.278	0.397

Problem 464	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	32	38	36	32	51	36	0
N.S.	1	0.00	1.14	1.36	1.29	1.14	1.82	1.29	0.00
time (sec)	N/A	0.000	4.029	0.479	0.268	0.279	0.170	0.287	0.000

Problem 465	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	14	20	12	11	11	12	12	11
N.S.	1	0.93	1.33	0.80	0.73	0.73	0.80	0.80	0.73
time (sec)	N/A	0.148	0.008	0.744	0.196	0.262	0.044	0.261	14.829

Problem 466	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	28	103	78	63	29	39	184
N.S.	1	0.00	1.00	3.68	2.79	2.25	1.04	1.39	6.57
time (sec)	N/A	0.000	0.150	4.065	0.268	0.290	0.186	0.568	16.187

Problem 467	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	95	26	24	24	23	22	0	32
N.S.	1	3.39	0.93	0.86	0.86	0.82	0.79	0.00	1.14
time (sec)	N/A	0.447	1.047	1.546	0.283	0.290	0.111	0.000	15.578

Problem 468	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	38	28	30	37	57	36	59	112
N.S.	1	1.81	1.33	1.43	1.76	2.71	1.71	2.81	5.33
time (sec)	N/A	0.298	0.040	1.382	0.191	0.289	0.172	0.265	14.741

Problem 469	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	53	29	30	39	29	27	39	28
N.S.	1	2.30	1.26	1.30	1.70	1.26	1.17	1.70	1.22
time (sec)	N/A	0.187	0.050	0.144	0.199	0.276	0.069	0.268	0.100

Problem 470	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	28	35	32	35	53	73	34
N.S.	1	0.00	1.22	1.52	1.39	1.52	2.30	3.17	1.48
time (sec)	N/A	0.000	0.548	1.429	0.339	0.292	0.127	0.401	14.798

Problem 471	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	28	44	28	46	41	42	164
N.S.	1	0.00	0.88	1.38	0.88	1.44	1.28	1.31	5.12
time (sec)	N/A	0.000	0.105	3.826	0.343	0.268	0.143	0.406	16.205

Problem 472	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	C	B	B	B	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	902	949	50	399	49	49	0	49
N.S.	1	32.21	33.89	1.79	14.25	1.75	1.75	0.00	1.75
time (sec)	N/A	2.956	0.426	0.494	2.908	0.267	3.878	0.000	37.890

Problem 473	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	18	16	14	13	13	12	13	13
N.S.	1	0.82	0.73	0.64	0.59	0.59	0.55	0.59	0.59
time (sec)	N/A	0.142	0.003	0.062	0.193	0.282	0.036	0.264	0.053

Problem 474	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	18	18	18	17	24	17	24	17
N.S.	1	0.67	0.67	0.67	0.63	0.89	0.63	0.89	0.63
time (sec)	N/A	0.184	0.031	0.113	0.204	0.284	0.072	0.264	15.096

Problem 475	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	51	26	25	27	27	24	27	27
N.S.	1	2.04	1.04	1.00	1.08	1.08	0.96	1.08	1.08
time (sec)	N/A	0.745	0.473	0.936	0.368	0.278	0.142	0.439	14.868

Problem 476	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	17	15	16	22	18	10	34	15
N.S.	1	0.85	0.75	0.80	1.10	0.90	0.50	1.70	0.75
time (sec)	N/A	0.338	0.021	0.834	0.331	0.287	0.061	0.273	14.803

Problem 477	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	30	28	39	40	37	34	0
N.S.	1	0.00	1.11	1.04	1.44	1.48	1.37	1.26	0.00
time (sec)	N/A	0.000	3.821	1.013	0.268	0.279	0.217	0.279	0.000

Problem 478	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	73	31	25	32	28	31	28	23
N.S.	1	2.81	1.19	0.96	1.23	1.08	1.19	1.08	0.88
time (sec)	N/A	0.598	0.469	2.144	0.366	0.285	0.058	0.275	14.426

Problem 479	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	15	14	10	18	8	10	19	10
N.S.	1	0.88	0.82	0.59	1.06	0.47	0.59	1.12	0.59
time (sec)	N/A	0.133	0.002	0.119	0.211	0.269	0.022	0.259	0.041

Problem 480	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-1)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	21	23	29	23	0	37	22
N.S.	1	0.00	0.88	0.96	1.21	0.96	0.00	1.54	0.92
time (sec)	N/A	0.000	0.124	1.674	0.259	0.269	0.000	0.303	14.284

Problem 481	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	F	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	71	77	0	71	76	0	38
N.S.	1	0.00	2.29	2.48	0.00	2.29	2.45	0.00	1.23
time (sec)	N/A	0.000	0.082	7.768	0.000	0.258	0.334	0.000	16.158

Problem 482	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	18	18	13	18	21	17	18	18
N.S.	1	1.29	1.29	0.93	1.29	1.50	1.21	1.29	1.29
time (sec)	N/A	0.523	0.048	3.079	0.244	0.257	0.088	0.269	16.728

Problem 483	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	21	18	47	17	19	104	519
N.S.	1	0.00	1.00	0.86	2.24	0.81	0.90	4.95	24.71
time (sec)	N/A	0.000	0.390	37.667	0.332	0.254	0.231	0.319	15.961

Problem 484	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F(-2)	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	104	28	30	30	34	31	0	0
N.S.	1	3.71	1.00	1.07	1.07	1.21	1.11	0.00	0.00
time (sec)	N/A	0.531	0.446	4.480	0.490	0.247	0.274	0.000	0.000

Problem 485	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	16	14	13	13	14	13	13
N.S.	1	1.00	1.00	0.88	0.81	0.81	0.88	0.81	0.81
time (sec)	N/A	0.416	0.131	0.263	0.232	0.262	0.070	0.270	14.709

Problem 486	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	A	B	A	B	F(-1)
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	0	43	36	55	32	55	0
N.S.	1	0.00	0.00	1.65	1.38	2.12	1.23	2.12	0.00
time (sec)	N/A	0.000	0.000	2.977	0.369	0.257	1.198	0.512	0.000

Problem 487	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	11	11	12	11	11	10	12	11
N.S.	1	0.85	0.85	0.92	0.85	0.85	0.77	0.92	0.85
time (sec)	N/A	0.145	0.001	0.108	0.211	0.234	0.035	0.264	13.964

Problem 488	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	16	21	16	15	12	15	18	15
N.S.	1	1.07	1.40	1.07	1.00	0.80	1.00	1.20	1.00
time (sec)	N/A	0.200	0.022	0.586	0.231	0.258	0.106	0.262	14.094

Problem 489	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	42	46	43	51	39	1129	0
N.S.	1	0.00	1.20	1.31	1.23	1.46	1.11	32.26	0.00
time (sec)	N/A	0.000	0.317	46.305	0.689	0.266	0.418	3.211	0.000

Problem 490	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	17	16	11	13	13	19	13	10
N.S.	1	0.85	0.80	0.55	0.65	0.65	0.95	0.65	0.50
time (sec)	N/A	0.149	0.003	0.166	0.201	0.241	0.023	0.260	0.032

Problem 491	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	53	21	20	21	19	22	19	0
N.S.	1	2.41	0.95	0.91	0.95	0.86	1.00	0.86	0.00
time (sec)	N/A	0.271	0.152	0.263	0.271	0.235	0.146	0.275	0.000

Problem 492	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	23	27	22	25	20	25	22
N.S.	1	0.00	0.85	1.00	0.81	0.93	0.74	0.93	0.81
time (sec)	N/A	0.000	0.589	0.138	0.241	0.254	0.101	0.266	15.202

Problem 493	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	48	49	53	43	34	0	58
N.S.	1	0.00	1.55	1.58	1.71	1.39	1.10	0.00	1.87
time (sec)	N/A	0.000	0.216	1.159	0.476	0.242	1.875	0.000	14.814

Problem 494	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	0	14	21	18	20	12	14	60
N.S.	1	0.00	1.00	1.50	1.29	1.43	0.86	1.00	4.29
time (sec)	N/A	0.000	0.114	1.534	0.254	0.225	0.141	0.287	14.609

Problem 495	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	C	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	51	46	34	103	36	36	41	37
N.S.	1	2.55	2.30	1.70	5.15	1.80	1.80	2.05	1.85
time (sec)	N/A	0.274	0.397	0.359	0.248	0.244	0.079	0.277	14.172

Problem 496	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	40	27	24	55	27	22	55	44
N.S.	1	1.33	0.90	0.80	1.83	0.90	0.73	1.83	1.47
time (sec)	N/A	0.248	0.759	0.547	0.383	0.242	0.092	0.281	0.150

Problem 497	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	32	31	23	27	28	29	27	27
N.S.	1	1.78	1.72	1.28	1.50	1.56	1.61	1.50	1.50
time (sec)	N/A	0.167	0.008	1.302	0.206	0.263	0.134	0.264	14.011

Problem 498	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	F(-1)	F	A	A	F(-1)	B
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	28	0	53	0	0	40	39	0	40
N.S.	1	0.00	1.89	0.00	0.00	1.43	1.39	0.00	1.43
time (sec)	N/A	0.000	0.488	0.000	0.000	0.249	5.944	0.000	14.461

Problem 499	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	27	25	23	25	19	48	25
N.S.	1	0.00	1.04	0.96	0.88	0.96	0.73	1.85	0.96
time (sec)	N/A	0.000	0.633	1.231	0.224	0.251	0.082	0.293	0.368

Problem 500	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	C	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	81	81	22	21	21	20	21	23
N.S.	1	2.70	2.70	0.73	0.70	0.70	0.67	0.70	0.77
time (sec)	N/A	0.289	0.142	0.187	0.195	0.308	0.075	0.276	0.087

Problem 501	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	27	26	29	30	27	29	32	30
N.S.	1	1.00	0.96	1.07	1.11	1.00	1.07	1.19	1.11
time (sec)	N/A	0.193	0.017	0.139	0.198	0.305	0.084	0.274	0.079

Problem 502	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	32	29	26	28	29	28	28
N.S.	1	0.00	1.23	1.12	1.00	1.08	1.12	1.08	1.08
time (sec)	N/A	0.000	0.050	0.770	0.230	0.248	0.103	0.283	13.654

Problem 503	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	28	25	31	24	24	49	0
N.S.	1	0.00	0.88	0.78	0.97	0.75	0.75	1.53	0.00
time (sec)	N/A	0.000	0.795	2.961	0.336	0.254	0.115	0.297	0.000

Problem 504	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	18	18	18	15	26	15	29	17
N.S.	1	0.75	0.75	0.75	0.62	1.08	0.62	1.21	0.71
time (sec)	N/A	0.349	0.098	0.164	0.219	0.253	0.075	0.287	14.811

Problem 505	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	A	F(-1)	F	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	33	0	32	142	32	41	0	0	28
N.S.	1	0.00	0.97	4.30	0.97	1.24	0.00	0.00	0.85
time (sec)	N/A	0.000	0.313	0.089	0.405	0.285	0.000	0.000	15.882

Problem 506	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-1)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	22	32	42	24	0	53	20
N.S.	1	0.00	0.73	1.07	1.40	0.80	0.00	1.77	0.67
time (sec)	N/A	0.000	0.803	2.653	0.250	0.283	0.000	0.285	15.373

Problem 507	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	14	14	13	13	10	13	13
N.S.	1	1.00	0.88	0.88	0.81	0.81	0.62	0.81	0.81
time (sec)	N/A	0.339	0.034	0.154	0.230	0.259	0.063	0.274	0.175

Problem 508	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	A	B	A	A	F	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	24	38	0	26	92	29	39	0	29
N.S.	1	1.58	0.00	1.08	3.83	1.21	1.62	0.00	1.21
time (sec)	N/A	0.676	0.000	3.809	0.366	0.258	1.132	0.000	14.856

Problem 509	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	44	37	30	66	36	26	32	25
N.S.	1	1.57	1.32	1.07	2.36	1.29	0.93	1.14	0.89
time (sec)	N/A	0.721	0.082	0.590	0.228	0.243	0.127	0.269	14.316

Problem 510	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	37	28	27	26	26	27	26	23
N.S.	1	1.32	1.00	0.96	0.93	0.93	0.96	0.93	0.82
time (sec)	N/A	0.165	0.010	0.130	0.196	0.248	0.079	0.262	14.157

Problem 511	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	B	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	71	73	78	71	73	0	87
N.S.	1	0.00	2.37	2.43	2.60	2.37	2.43	0.00	2.90
time (sec)	N/A	0.000	0.153	0.631	0.610	0.237	0.388	0.000	15.222

Problem 512	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	17	17	22	0	21	17	72	21
N.S.	1	0.61	0.61	0.79	0.00	0.75	0.61	2.57	0.75
time (sec)	N/A	0.672	0.420	3.060	0.000	0.250	0.167	0.426	15.198

Problem 513	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	41	70	40	38	48	49	39
N.S.	1	0.00	1.24	2.12	1.21	1.15	1.45	1.48	1.18
time (sec)	N/A	0.000	0.069	46.391	0.333	0.249	0.501	0.509	16.332

Problem 514	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	34	30	39	32	29	0	30
N.S.	1	0.00	1.00	0.88	1.15	0.94	0.85	0.00	0.88
time (sec)	N/A	0.000	0.278	1.416	0.270	0.247	0.261	0.000	15.185

Problem 515	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	A	A	B	F(-2)	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	68	70	56	57	50	61	0	62
N.S.	1	2.12	2.19	1.75	1.78	1.56	1.91	0.00	1.94
time (sec)	N/A	0.752	0.089	0.923	0.206	0.258	4.511	0.000	15.550

Problem 516	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	23	21	17	0	16	19	0	16
N.S.	1	1.00	0.91	0.74	0.00	0.70	0.83	0.00	0.70
time (sec)	N/A	0.179	0.026	1.000	0.000	0.241	0.129	0.000	13.868

Problem 517	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	23	19	17	18	17	25	19
N.S.	1	0.00	0.88	0.73	0.65	0.69	0.65	0.96	0.73
time (sec)	N/A	0.000	0.141	0.249	0.245	0.247	0.102	0.274	0.220

Problem 518	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	62	82	275	210	119	121	0
N.S.	1	0.00	2.07	2.73	9.17	7.00	3.97	4.03	0.00
time (sec)	N/A	0.000	0.128	3.323	0.359	0.252	0.249	0.334	0.000

Problem 519	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	23	16	15	19	14	15	19	14
N.S.	1	1.53	1.07	1.00	1.27	0.93	1.00	1.27	0.93
time (sec)	N/A	0.150	0.004	0.106	0.198	0.240	0.053	0.275	13.980

Problem 520	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	5	5	5	5	4	4	3	4	5
N.S.	1	1.00	1.00	1.00	0.80	0.80	0.60	0.80	1.00
time (sec)	N/A	0.134	0.001	0.142	0.198	0.237	0.037	0.268	0.022

Problem 521	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	89	21	21	20	20	19	20	1
N.S.	1	3.87	0.91	0.91	0.87	0.87	0.83	0.87	0.04
time (sec)	N/A	0.588	0.017	0.730	0.197	0.244	0.797	1.228	16.280

Problem 522	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	18	18	20	15	19	15	19	16
N.S.	1	1.00	1.00	1.11	0.83	1.06	0.83	1.06	0.89
time (sec)	N/A	0.257	0.111	0.723	0.262	0.252	0.083	0.262	14.413

Problem 523	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	F	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	33	42	30	63	42	0	0
N.S.	1	0.00	1.22	1.56	1.11	2.33	1.56	0.00	0.00
time (sec)	N/A	0.000	0.485	160.295	0.574	0.262	0.357	0.000	0.000

Problem 524	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	36	16	15	20	14	10	14	14
N.S.	1	1.80	0.80	0.75	1.00	0.70	0.50	0.70	0.70
time (sec)	N/A	0.465	0.152	1.860	0.327	0.242	0.060	0.266	15.423

Problem 525	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	0	20	21	15	21	17	37	32
N.S.	1	0.00	1.54	1.62	1.15	1.62	1.31	2.85	2.46
time (sec)	N/A	0.000	0.220	0.319	0.309	0.237	0.081	0.264	14.063

Problem 526	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	8	8	8	7	7	5	7	7
N.S.	1	0.62	0.62	0.62	0.54	0.54	0.38	0.54	0.54
time (sec)	N/A	0.119	0.001	0.118	0.208	0.259	0.031	0.268	0.022

Problem 527	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	26	27	45	45	34	26	26
N.S.	1	0.00	1.00	1.04	1.73	1.73	1.31	1.00	1.00
time (sec)	N/A	0.000	0.449	1.739	0.250	0.241	0.305	0.267	14.245

Problem 528	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	27	21	24	17	23	20	17	20
N.S.	1	1.08	0.84	0.96	0.68	0.92	0.80	0.68	0.80
time (sec)	N/A	0.487	0.264	0.187	0.276	0.253	0.150	0.272	13.819

Problem 529	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	30	27	31	26	24	46	31
N.S.	1	0.00	1.03	0.93	1.07	0.90	0.83	1.59	1.07
time (sec)	N/A	0.000	0.201	4.515	0.312	0.244	1.488	2.725	15.246

Problem 530	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	25	25	24	23	23	20	24	23
N.S.	1	1.32	1.32	1.26	1.21	1.21	1.05	1.26	1.21
time (sec)	N/A	0.171	0.003	0.084	0.207	0.233	0.041	0.261	0.029

Problem 531	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	22	30	27	25	22	32	25
N.S.	1	0.00	1.10	1.50	1.35	1.25	1.10	1.60	1.25
time (sec)	N/A	0.000	0.299	4.048	0.321	0.247	0.229	0.292	17.057

Problem 532	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	48	52	94	94	66	114	0
N.S.	1	0.00	1.78	1.93	3.48	3.48	2.44	4.22	0.00
time (sec)	N/A	0.000	0.171	17.835	0.307	0.270	0.200	0.448	0.000

Problem 533	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	48	30	31	33	26	0	31
N.S.	1	0.00	1.55	0.97	1.00	1.06	0.84	0.00	1.00
time (sec)	N/A	0.000	0.826	0.765	0.251	0.250	0.235	0.000	0.343

Problem 534	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	43	36	36	64	34	32	0	0
N.S.	1	1.87	1.57	1.57	2.78	1.48	1.39	0.00	0.00
time (sec)	N/A	1.250	0.210	4.704	0.331	0.271	49.159	0.000	0.000

Problem 535	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	17	15	14	16	16	15	16	15
N.S.	1	0.85	0.75	0.70	0.80	0.80	0.75	0.80	0.75
time (sec)	N/A	0.435	0.114	0.337	0.243	0.252	0.072	0.258	17.324

Problem 536	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	24	28	43	39	29	53	0
N.S.	1	0.00	0.96	1.12	1.72	1.56	1.16	2.12	0.00
time (sec)	N/A	0.000	5.119	61.593	0.342	0.260	0.249	0.278	0.000

Problem 537	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	78	47	84	75	68	102	119	89
N.S.	1	2.44	1.47	2.62	2.34	2.12	3.19	3.72	2.78
time (sec)	N/A	0.251	0.197	0.652	0.215	0.249	0.264	0.265	15.797

Problem 538	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	77	39	52	515	85	49	54	52
N.S.	1	2.75	1.39	1.86	18.39	3.04	1.75	1.93	1.86
time (sec)	N/A	0.742	0.112	0.130	0.269	0.243	0.145	0.275	15.844

Problem 539	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	31	25	30	38	24	30	26
N.S.	1	0.00	1.19	0.96	1.15	1.46	0.92	1.15	1.00
time (sec)	N/A	0.000	2.057	0.849	0.248	0.270	0.117	0.277	16.409

Problem 540	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	39	22	40	42	15	42	24
N.S.	1	0.00	1.62	0.92	1.67	1.75	0.62	1.75	1.00
time (sec)	N/A	0.000	1.299	0.185	0.333	0.250	0.090	0.281	0.241

Problem 541	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F(-2)	A	F(-2)	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	164	28	28	0	27	0	0	62
N.S.	1	6.07	1.04	1.04	0.00	1.00	0.00	0.00	2.30
time (sec)	N/A	1.118	0.086	1.274	0.000	0.250	0.000	0.000	15.671

Problem 542	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	37	34	37	37	36	37	33
N.S.	1	0.00	1.68	1.55	1.68	1.68	1.64	1.68	1.50
time (sec)	N/A	0.000	5.118	0.923	0.247	0.235	0.148	0.274	15.028

Problem 543	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	40	27	0	34	24	68	25
N.S.	1	0.00	1.54	1.04	0.00	1.31	0.92	2.62	0.96
time (sec)	N/A	0.000	1.993	0.877	0.000	0.246	6.242	0.293	14.647

Problem 544	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	39	34	28	32	26	22	26	33
N.S.	1	1.50	1.31	1.08	1.23	1.00	0.85	1.00	1.27
time (sec)	N/A	0.965	4.032	4.203	0.447	0.245	0.276	0.342	14.410

Problem 545	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	20	14	17	23	16	14	21	16
N.S.	1	0.87	0.61	0.74	1.00	0.70	0.61	0.91	0.70
time (sec)	N/A	0.210	0.075	0.296	0.233	0.232	0.050	0.265	0.077

Problem 546	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	23	57	29	108	26	27	26	19
N.S.	1	1.10	2.71	1.38	5.14	1.24	1.29	1.24	0.90
time (sec)	N/A	0.719	0.129	20.806	0.255	0.255	0.372	0.336	14.667

Problem 547	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	25	23	22	24	27	24	21	24
N.S.	1	0.93	0.85	0.81	0.89	1.00	0.89	0.78	0.89
time (sec)	N/A	0.297	0.008	1.158	0.211	0.246	0.062	0.281	0.097

Problem 548	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	16	16	16	21	15	15	21	15
N.S.	1	0.80	0.80	0.80	1.05	0.75	0.75	1.05	0.75
time (sec)	N/A	0.384	0.005	0.193	0.190	0.244	0.077	0.262	14.706

Problem 549	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	17	13	13	12	12	10	12	12
N.S.	1	1.31	1.00	1.00	0.92	0.92	0.77	0.92	0.92
time (sec)	N/A	0.427	0.040	0.106	0.276	0.251	0.112	0.303	15.304

Problem 550	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	30	31	42	39	17	1136	0
N.S.	1	0.00	1.07	1.11	1.50	1.39	0.61	40.57	0.00
time (sec)	N/A	0.000	2.266	0.970	0.266	0.268	0.151	0.323	0.000

Problem 551	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	37	31	86	51	31	0	41
N.S.	1	0.00	1.09	0.91	2.53	1.50	0.91	0.00	1.21
time (sec)	N/A	0.000	0.160	3.541	0.407	0.274	0.172	0.000	15.024

Problem 552	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	98	22	87	65	65	88	65	75
N.S.	1	4.26	0.96	3.78	2.83	2.83	3.83	2.83	3.26
time (sec)	N/A	0.235	0.073	0.395	0.203	0.250	0.045	0.261	15.276

Problem 553	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	11	11	11	10	10	10	8	10	9
N.S.	1	1.00	1.00	0.91	0.91	0.91	0.73	0.91	0.82
time (sec)	N/A	0.125	0.001	0.118	0.206	0.233	0.025	0.270	0.036

Problem 554	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	B	B	B	B	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	0	48	53	56	53	58	491
N.S.	1	0.00	0.00	1.66	1.83	1.93	1.83	2.00	16.93
time (sec)	N/A	0.000	0.000	1.796	0.339	0.273	0.727	0.309	17.601

Problem 555	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	42	31	29	33	31	68	82
N.S.	1	0.00	1.24	0.91	0.85	0.97	0.91	2.00	2.41
time (sec)	N/A	0.000	2.884	0.697	0.512	0.238	0.342	0.277	14.014

Problem 556	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	27	16	24	31	31	48	16	28
N.S.	1	1.69	1.00	1.50	1.94	1.94	3.00	1.00	1.75
time (sec)	N/A	0.196	0.010	0.158	0.219	0.247	0.173	0.262	0.103

Problem 557	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	40	19	17	285	17	20	17	17
N.S.	1	2.00	0.95	0.85	14.25	0.85	1.00	0.85	0.85
time (sec)	N/A	0.206	0.358	0.369	0.365	0.240	0.088	0.264	12.607

Problem 558	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	91	60	46	197	59	65	66	65
N.S.	1	4.14	2.73	2.09	8.95	2.68	2.95	3.00	2.95
time (sec)	N/A	1.316	0.155	0.569	0.357	0.258	0.320	0.274	13.099

Problem 559	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	14	14	15	14	14	10	14	1
N.S.	1	1.00	1.00	1.07	1.00	1.00	0.71	1.00	0.07
time (sec)	N/A	0.192	0.011	0.165	0.216	0.241	0.142	0.260	17.704

Problem 560	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	16	14	16	13	12	13	13
N.S.	1	0.00	0.84	0.74	0.84	0.68	0.63	0.68	0.68
time (sec)	N/A	0.000	0.425	0.919	0.230	0.256	0.065	0.266	0.105

Problem 561	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	29	21	22	21	21	19	32	21
N.S.	1	1.07	0.78	0.81	0.78	0.78	0.70	1.19	0.78
time (sec)	N/A	0.420	0.187	0.550	0.254	0.253	0.086	0.270	14.073

Problem 562	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	B	A	A	F(-1)	B	F(-1)
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	0	76	48	42	0	97	0
N.S.	1	0.00	0.00	2.45	1.55	1.35	0.00	3.13	0.00
time (sec)	N/A	0.000	0.000	68.300	0.375	0.249	0.000	0.459	0.000

Problem 563	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	38	0	90	37	37	54	32	37	38
N.S.	1	0.00	2.37	0.97	0.97	1.42	0.84	0.97	1.00
time (sec)	N/A	0.000	0.063	0.248	0.206	0.242	0.571	0.274	0.222

Problem 564	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	30	29	28	28	26	28	28
N.S.	1	0.00	1.07	1.04	1.00	1.00	0.93	1.00	1.00
time (sec)	N/A	0.000	0.188	5.275	0.339	0.252	0.559	0.323	13.672

Problem 565	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	4	4	5	4	4	3	5	4
N.S.	1	0.25	0.25	0.31	0.25	0.25	0.19	0.31	0.25
time (sec)	N/A	0.121	0.000	0.433	0.204	0.250	0.029	0.267	0.010

Problem 566	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	C	F(-2)	A	A	F	B
verified	N/A	N/A	N/A	No	TBD	TBD	TBD	TBD	TBD
size	30	0	0	58	0	30	24	0	53
N.S.	1	0.00	0.00	1.93	0.00	1.00	0.80	0.00	1.77
time (sec)	N/A	0.000	0.000	0.844	0.000	0.256	33.340	0.000	14.080

Problem 567	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	48	25	29	28	28	39	32	34
N.S.	1	2.40	1.25	1.45	1.40	1.40	1.95	1.60	1.70
time (sec)	N/A	0.254	0.038	0.165	0.186	0.231	0.455	0.272	0.163

Problem 568	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	43	20	22	22	20	20	22	22
N.S.	1	1.95	0.91	1.00	1.00	0.91	0.91	1.00	1.00
time (sec)	N/A	0.294	0.024	0.556	0.207	0.240	0.292	0.273	13.698

Problem 569	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	17	17	14	16	15	16	18
N.S.	1	1.00	1.00	1.00	0.82	0.94	0.88	0.94	1.06
time (sec)	N/A	0.353	0.024	0.444	0.274	0.252	0.132	0.273	14.006

Problem 570	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	31	23	31	22	20	3138	0
N.S.	1	0.00	1.19	0.88	1.19	0.85	0.77	120.69	0.00
time (sec)	N/A	0.000	0.154	5.938	0.371	0.245	0.262	0.780	0.000

Problem 571	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	30	48	27	26	20	27	26	27
N.S.	1	1.15	1.85	1.04	1.00	0.77	1.04	1.00	1.04
time (sec)	N/A	0.286	0.038	1.297	0.395	0.259	0.085	0.267	0.153

Problem 572	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	35	31	24	0	29	22	32	22
N.S.	1	1.30	1.15	0.89	0.00	1.07	0.81	1.19	0.81
time (sec)	N/A	0.400	0.765	1.677	0.000	0.247	0.092	0.266	0.118

Problem 573	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	50	36	38	44	44	46	44	34
N.S.	1	1.72	1.24	1.31	1.52	1.52	1.59	1.52	1.17
time (sec)	N/A	0.183	0.023	0.112	0.204	0.237	0.030	0.262	0.053

Problem 574	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	78	47	41	148	49	56	58	42
N.S.	1	2.79	1.68	1.46	5.29	1.75	2.00	2.07	1.50
time (sec)	N/A	0.663	0.093	0.223	0.240	0.260	0.178	0.272	13.855

Problem 575	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	18	17	20	16	14	247	0
N.S.	1	0.00	1.00	0.94	1.11	0.89	0.78	13.72	0.00
time (sec)	N/A	0.000	10.043	2.273	0.328	0.246	0.127	0.314	0.000

Problem 576	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	C	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	22	23	31	53	22	36	18
N.S.	1	0.00	1.00	1.05	1.41	2.41	1.00	1.64	0.82
time (sec)	N/A	0.000	0.348	0.776	0.369	0.257	0.149	0.287	13.657

Problem 577	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	19	19	16	15	22	19	22	15
N.S.	1	0.95	0.95	0.80	0.75	1.10	0.95	1.10	0.75
time (sec)	N/A	0.175	0.006	0.115	0.223	0.259	0.080	0.271	0.096

Problem 578	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	16	16	14	16	16	12	16	13
N.S.	1	0.84	0.84	0.74	0.84	0.84	0.63	0.84	0.68
time (sec)	N/A	0.139	0.000	0.156	0.204	0.232	0.032	0.265	0.030

Problem 579	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	30	22	28	26	27	29	26	28
N.S.	1	1.36	1.00	1.27	1.18	1.23	1.32	1.18	1.27
time (sec)	N/A	0.582	2.083	0.916	0.277	0.257	0.167	0.279	12.540

Problem 580	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	74	88	51	91	91	100	87	109
N.S.	1	4.35	5.18	3.00	5.35	5.35	5.88	5.12	6.41
time (sec)	N/A	0.356	0.053	0.345	0.203	0.241	0.544	0.270	12.702

Problem 581	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	29	28	92	27	53	92	58
N.S.	1	0.00	1.53	1.47	4.84	1.42	2.79	4.84	3.05
time (sec)	N/A	0.000	5.171	2.222	0.245	0.245	0.632	0.372	13.244

Problem 582	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	B	B	A	B	B	F(-1)
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	0	56	54	45	70	74	0
N.S.	1	0.00	0.00	2.24	2.16	1.80	2.80	2.96	0.00
time (sec)	N/A	0.000	0.000	3.648	0.325	0.255	0.224	0.304	0.000

Problem 583	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	27	26	0	24	20	39	25
N.S.	1	0.00	0.96	0.93	0.00	0.86	0.71	1.39	0.89
time (sec)	N/A	0.000	0.081	2.284	0.000	0.254	0.446	0.298	14.692

Problem 584	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	28	48	85	47	49	0	72
N.S.	1	0.00	1.00	1.71	3.04	1.68	1.75	0.00	2.57
time (sec)	N/A	0.000	0.302	2.405	0.416	0.264	0.554	0.000	14.913

Problem 585	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	34	31	34	37	34	39	153	0
N.S.	1	1.03	0.94	1.03	1.12	1.03	1.18	4.64	0.00
time (sec)	N/A	0.903	0.056	3.349	0.325	0.243	0.237	0.321	0.000

Problem 586	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	A	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	49	58	52	52	153	177	0
N.S.	1	0.00	1.75	2.07	1.86	1.86	5.46	6.32	0.00
time (sec)	N/A	0.000	0.074	1.429	0.244	0.256	0.435	0.296	0.000

Problem 587	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	21	37	24	34	31	71	75
N.S.	1	0.00	0.78	1.37	0.89	1.26	1.15	2.63	2.78
time (sec)	N/A	0.000	5.093	2.349	0.371	0.269	0.215	0.301	14.838

Problem 588	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	22	27	23	21	26	22	22	25
N.S.	1	1.16	1.42	1.21	1.11	1.37	1.16	1.16	1.32
time (sec)	N/A	0.185	0.007	0.155	0.193	0.249	0.059	0.264	13.907

Problem 589	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	32	29	29	42	26	26	29	28
N.S.	1	1.14	1.04	1.04	1.50	0.93	0.93	1.04	1.00
time (sec)	N/A	0.512	0.201	0.699	0.253	0.255	0.160	0.270	14.448

Problem 590	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	39	23	20	38	30	20	26	18
N.S.	1	1.70	1.00	0.87	1.65	1.30	0.87	1.13	0.78
time (sec)	N/A	0.222	0.059	0.471	0.233	0.255	0.098	0.270	14.061

Problem 591	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	53	32	46	33	31	40	31
N.S.	1	0.00	1.77	1.07	1.53	1.10	1.03	1.33	1.03
time (sec)	N/A	0.000	0.112	4.590	0.252	0.261	0.282	0.283	14.843

Problem 592	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	14	14	15	14	14	17	14	14
N.S.	1	0.70	0.70	0.75	0.70	0.70	0.85	0.70	0.70
time (sec)	N/A	0.136	0.003	0.058	0.190	0.252	0.032	0.295	0.075

Problem 593	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	14	13	9	11	11	14	11	11
N.S.	1	0.54	0.50	0.35	0.42	0.42	0.54	0.42	0.42
time (sec)	N/A	0.131	0.001	0.138	0.199	0.235	0.033	0.273	0.070

Problem 594	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	144	30	30	46	47	61	0	26
N.S.	1	6.26	1.30	1.30	2.00	2.04	2.65	0.00	1.13
time (sec)	N/A	0.914	0.361	6.650	0.259	0.276	0.294	0.000	14.963

Problem 595	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	C	A	F	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	85	22	0	21	24	0	21
N.S.	1	0.00	3.27	0.85	0.00	0.81	0.92	0.00	0.81
time (sec)	N/A	0.000	3.940	3.155	0.000	0.246	18.118	0.000	15.762

Problem 596	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	22	19	24	21	20	0	26
N.S.	1	0.00	1.00	0.86	1.09	0.95	0.91	0.00	1.18
time (sec)	N/A	0.000	5.243	5.314	0.552	0.268	24.506	0.000	14.392

Problem 597	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	49	17	28	15	20	14	0	15
N.S.	1	2.88	1.00	1.65	0.88	1.18	0.82	0.00	0.88
time (sec)	N/A	0.236	0.033	30.648	0.271	0.260	0.136	0.000	14.465

Problem 598	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	29	30	32	29	26	31	29
N.S.	1	0.00	1.04	1.07	1.14	1.04	0.93	1.11	1.04
time (sec)	N/A	0.000	0.045	2.655	0.318	0.252	0.275	0.301	15.758

Problem 599	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	14	16	14	13	13	12	13	13
N.S.	1	0.93	1.07	0.93	0.87	0.87	0.80	0.87	0.87
time (sec)	N/A	0.205	0.033	0.070	0.203	0.266	0.108	0.274	13.752

Problem 600	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	16	16	16	15	15	14	15	15
N.S.	1	0.94	0.94	0.94	0.88	0.88	0.82	0.88	0.88
time (sec)	N/A	0.394	0.017	0.077	0.210	0.255	0.098	0.268	15.335

Problem 601	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	6	2	2	3	2	2	2	3	2
N.S.	1	0.33	0.33	0.50	0.33	0.33	0.33	0.50	0.33
time (sec)	N/A	0.116	0.000	0.011	0.210	0.230	0.051	0.267	0.008

Problem 602	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	F(-2)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	59	64	82	79	61	0	103
N.S.	1	0.00	2.27	2.46	3.15	3.04	2.35	0.00	3.96
time (sec)	N/A	0.000	0.306	5.618	0.359	0.251	0.412	0.000	15.159

Problem 603	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	19	19	22	27	26	26	26	20
N.S.	1	0.79	0.79	0.92	1.12	1.08	1.08	1.08	0.83
time (sec)	N/A	0.286	0.021	0.083	0.200	0.238	0.228	0.268	0.117

Problem 604	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	43	44	43	42	44	58	0
N.S.	1	0.00	1.30	1.33	1.30	1.27	1.33	1.76	0.00
time (sec)	N/A	0.000	0.151	3.844	0.353	0.250	0.551	0.323	0.000

Problem 605	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	109	88	29	94	92	102	99	138
N.S.	1	4.54	3.67	1.21	3.92	3.83	4.25	4.12	5.75
time (sec)	N/A	0.357	0.046	0.486	0.219	0.249	0.423	0.272	15.446

Problem 606	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	25	25	23	24	22	17	24	22
N.S.	1	0.81	0.81	0.74	0.77	0.71	0.55	0.77	0.71
time (sec)	N/A	0.511	0.058	0.266	0.336	0.248	0.122	0.291	16.506

Problem 607	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	39	40	58	39	36	45	270
N.S.	1	0.00	1.30	1.33	1.93	1.30	1.20	1.50	9.00
time (sec)	N/A	0.000	0.125	13.569	0.314	0.266	0.254	5.894	15.907

Problem 608	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	14	14	17	16	16	14	72	13
N.S.	1	0.88	0.88	1.06	1.00	1.00	0.88	4.50	0.81
time (sec)	N/A	0.422	0.132	1.973	0.249	0.238	0.122	0.286	16.440

Problem 609	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	29	30	28	28	27	34	27
N.S.	1	0.00	1.07	1.11	1.04	1.04	1.00	1.26	1.00
time (sec)	N/A	0.000	0.280	31.996	0.338	0.252	0.096	0.279	15.731

Problem 610	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	A	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	0	18	47	43	21	46	46	22
N.S.	1	0.00	1.06	2.76	2.53	1.24	2.71	2.71	1.29
time (sec)	N/A	0.000	0.122	1.969	0.321	0.252	0.367	0.373	15.745

Problem 611	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	C	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	158	60	26	512	26	22	149	26
N.S.	1	7.18	2.73	1.18	23.27	1.18	1.00	6.77	1.18
time (sec)	N/A	0.671	0.049	2.077	0.372	0.247	0.136	0.367	1.332

Problem 612	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	49	31	32	28	32	32	27
N.S.	1	0.00	1.81	1.15	1.19	1.04	1.19	1.19	1.00
time (sec)	N/A	0.000	0.682	0.171	0.345	0.262	0.093	0.275	15.965

Problem 613	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	13	13	13	12	12	14	12	12
N.S.	1	0.54	0.54	0.54	0.50	0.50	0.58	0.50	0.50
time (sec)	N/A	0.163	0.006	0.154	0.204	0.252	0.070	0.274	0.053

Problem 614	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	9	9	9	8	17	7	8	7	7
N.S.	1	1.00	1.00	0.89	1.89	0.78	0.89	0.78	0.78
time (sec)	N/A	0.149	0.004	0.068	0.209	0.248	0.065	0.271	15.651

Problem 615	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	37	25	44	33	27	0	26
N.S.	1	0.00	1.19	0.81	1.42	1.06	0.87	0.00	0.84
time (sec)	N/A	0.000	0.839	2.313	0.335	0.235	0.312	0.000	15.751

Problem 616	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	42	42	42	41	41	41	41	41
N.S.	1	2.33	2.33	2.33	2.28	2.28	2.28	2.28	2.28
time (sec)	N/A	0.164	0.014	0.066	0.206	0.242	0.046	0.264	15.480

Problem 617	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	23	30	24	95	27	24	0	0
N.S.	1	0.82	1.07	0.86	3.39	0.96	0.86	0.00	0.00
time (sec)	N/A	2.292	0.543	4.549	0.358	0.255	2.596	0.000	0.000

Problem 618	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	21	17	16	16	20	16	22
N.S.	1	0.00	0.81	0.65	0.62	0.62	0.77	0.62	0.85
time (sec)	N/A	0.000	0.298	1.220	0.261	0.252	0.095	0.273	16.678

Problem 619	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	28	21	27	35	22	31	27	24
N.S.	1	1.33	1.00	1.29	1.67	1.05	1.48	1.29	1.14
time (sec)	N/A	0.236	0.147	0.513	0.247	0.256	0.086	0.268	0.086

Problem 620	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	20	21	19	20	18	14	37	29
N.S.	1	0.74	0.78	0.70	0.74	0.67	0.52	1.37	1.07
time (sec)	N/A	0.191	0.025	0.870	0.210	0.243	0.092	0.261	16.260

Problem 621	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	36	32	28	22	27	31	27	27
N.S.	1	1.06	0.94	0.82	0.65	0.79	0.91	0.79	0.79
time (sec)	N/A	0.226	0.009	0.793	0.208	0.239	0.078	0.275	0.714

Problem 622	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	28	24	18	23	20	19	21	17
N.S.	1	1.00	0.86	0.64	0.82	0.71	0.68	0.75	0.61
time (sec)	N/A	0.679	0.156	0.882	0.248	0.253	0.141	0.268	16.504

Problem 623	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	19	19	19	18	18	102	18	18
N.S.	1	0.70	0.70	0.70	0.67	0.67	3.78	0.67	0.67
time (sec)	N/A	0.676	0.117	0.887	0.237	0.262	0.214	0.265	16.883

Problem 624	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	7	7	8	7	9	5	7	7
N.S.	1	0.54	0.54	0.62	0.54	0.69	0.38	0.54	0.54
time (sec)	N/A	0.133	0.001	0.060	0.209	0.264	0.036	0.267	0.025

Problem 625	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	69	25	49	62	46	34	33	0
N.S.	1	2.56	0.93	1.81	2.30	1.70	1.26	1.22	0.00
time (sec)	N/A	2.572	0.396	0.220	0.269	0.264	0.190	0.287	0.000

Problem 626	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	32	35	0	32	34	34	35
N.S.	1	0.00	1.33	1.46	0.00	1.33	1.42	1.42	1.46
time (sec)	N/A	0.000	0.113	5.980	0.000	0.241	0.662	0.841	16.134

Problem 627	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	23	21	18	19	17	17	22	17
N.S.	1	0.85	0.78	0.67	0.70	0.63	0.63	0.81	0.63
time (sec)	N/A	0.212	0.010	1.531	0.211	0.231	0.054	0.264	14.720

Problem 628	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	51	44	25	108	46	29	46	33
N.S.	1	2.22	1.91	1.09	4.70	2.00	1.26	2.00	1.43
time (sec)	N/A	0.854	0.357	0.096	0.264	0.262	0.096	0.269	0.208

Problem 629	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	52	23	23	22	22	24	22	23
N.S.	1	2.17	0.96	0.96	0.92	0.92	1.00	0.92	0.96
time (sec)	N/A	0.232	1.256	0.505	0.280	0.249	0.084	0.276	0.152

Problem 630	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	19	19	17	19	19	17	19	19
N.S.	1	1.12	1.12	1.00	1.12	1.12	1.00	1.12	1.12
time (sec)	N/A	0.141	0.000	0.087	0.219	0.244	0.036	0.262	0.033

Problem 631	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	15	15	16	15	21	12	17	15
N.S.	1	0.52	0.52	0.55	0.52	0.72	0.41	0.59	0.52
time (sec)	N/A	0.193	0.008	1.186	0.219	0.240	0.050	0.274	0.049

Problem 632	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	21	22	13	13	17	21	21
N.S.	1	0.00	0.91	0.96	0.57	0.57	0.74	0.91	0.91
time (sec)	N/A	0.000	0.123	2.074	0.232	0.257	0.194	0.269	15.288

Problem 633	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	25	18	32	103	26	24	79	26
N.S.	1	1.39	1.00	1.78	5.72	1.44	1.33	4.39	1.44
time (sec)	N/A	0.461	0.046	0.510	0.326	0.243	0.197	0.302	14.410

Problem 634	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	13	15	13	13	13	12	13	12
N.S.	1	0.57	0.65	0.57	0.57	0.57	0.52	0.57	0.52
time (sec)	N/A	0.128	0.001	0.143	0.207	0.249	0.021	0.266	13.137

Problem 635	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	35	27	34	0	44	73	44	27
N.S.	1	1.46	1.12	1.42	0.00	1.83	3.04	1.83	1.12
time (sec)	N/A	0.846	0.311	0.230	0.000	0.248	0.126	0.276	0.499

Problem 636	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	15	15	19	24	18	15	18	18
N.S.	1	0.75	0.75	0.95	1.20	0.90	0.75	0.90	0.90
time (sec)	N/A	0.306	0.051	4.688	0.541	0.240	0.084	0.280	13.351

Problem 637	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	24	25	27	25	24	31	25	23
N.S.	1	1.04	1.09	1.17	1.09	1.04	1.35	1.09	1.00
time (sec)	N/A	0.179	0.012	0.392	0.206	0.237	1.026	0.271	0.248

Problem 638	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	31	33	28	100	29	0	60
N.S.	1	0.00	1.00	1.06	0.90	3.23	0.94	0.00	1.94
time (sec)	N/A	0.000	0.683	9.720	0.377	0.273	15.362	0.000	14.072

Problem 639	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	111	19	15	97	15	15	49	14
N.S.	1	5.29	0.90	0.71	4.62	0.71	0.71	2.33	0.67
time (sec)	N/A	0.311	0.099	0.338	0.308	0.255	0.065	0.260	13.707

Problem 640	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	16	16	17	17	17	22	17	18
N.S.	1	0.89	0.89	0.94	0.94	0.94	1.22	0.94	1.00
time (sec)	N/A	0.299	0.067	1.107	0.228	0.243	0.061	0.273	13.566

Problem 641	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	56	147	370	157	158	0	549
N.S.	1	0.00	1.87	4.90	12.33	5.23	5.27	0.00	18.30
time (sec)	N/A	0.000	0.787	5.444	0.855	0.249	0.663	0.000	14.181

Problem 642	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	23	21	21	30	25	31	28	20
N.S.	1	0.92	0.84	0.84	1.20	1.00	1.24	1.12	0.80
time (sec)	N/A	0.271	0.010	0.253	0.213	0.241	0.255	0.273	0.146

Problem 643	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	36	24	21	44	27	17	32	26
N.S.	1	1.64	1.09	0.95	2.00	1.23	0.77	1.45	1.18
time (sec)	N/A	0.345	0.108	0.218	0.249	0.251	0.042	0.281	13.385

Problem 644	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	30	30	30	30	28	27	30	18
N.S.	1	1.36	1.36	1.36	1.36	1.27	1.23	1.36	0.82
time (sec)	N/A	0.367	0.087	1.074	0.241	0.238	0.144	0.267	13.841

Problem 645	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	8	6	6	7	6	6	8	7	6
N.S.	1	0.75	0.75	0.88	0.75	0.75	1.00	0.88	0.75
time (sec)	N/A	0.155	0.007	0.386	0.202	0.246	0.051	0.260	13.475

Problem 646	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	36	20	17	20	21	22	21	21
N.S.	1	1.33	0.74	0.63	0.74	0.78	0.81	0.78	0.78
time (sec)	N/A	0.161	0.007	0.125	0.205	0.247	0.143	0.268	13.468

Problem 647	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	22	24	25	24	23	22	0	27
N.S.	1	1.16	1.26	1.32	1.26	1.21	1.16	0.00	1.42
time (sec)	N/A	0.402	0.361	0.463	0.380	0.257	0.135	0.000	13.463

Problem 648	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	F	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	68	264	233	124	100	0	0
N.S.	1	0.00	2.19	8.52	7.52	4.00	3.23	0.00	0.00
time (sec)	N/A	0.000	0.178	10.016	0.368	0.269	0.385	0.000	0.000

Problem 649	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	30	35	31	39	36	0	41
N.S.	1	0.00	1.15	1.35	1.19	1.50	1.38	0.00	1.58
time (sec)	N/A	0.000	5.119	1.478	0.401	0.254	0.218	0.000	13.758

Problem 650	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-1)	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	25	24	23	27	0	32	0
N.S.	1	0.00	0.96	0.92	0.88	1.04	0.00	1.23	0.00
time (sec)	N/A	0.000	0.698	17.173	0.371	0.255	0.000	0.284	0.000

Problem 651	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	26	26	83	83	63	73	83	67
N.S.	1	0.87	0.87	2.77	2.77	2.10	2.43	2.77	2.23
time (sec)	N/A	0.487	0.054	5.262	0.326	0.274	0.290	0.291	13.746

Problem 652	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	24	20	18	17	26	17	17	17
N.S.	1	1.04	0.87	0.78	0.74	1.13	0.74	0.74	0.74
time (sec)	N/A	0.255	0.017	0.157	0.202	0.250	0.059	0.256	0.090

Problem 653	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	26	26	21	25	21	20	21	21
N.S.	1	1.04	1.04	0.84	1.00	0.84	0.80	0.84	0.84
time (sec)	N/A	0.188	0.146	0.136	0.215	0.250	0.107	0.258	0.108

Problem 654	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	B	F(-1)	F(-2)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	37	0	35	79	60	78	0	0	129
N.S.	1	0.00	0.95	2.14	1.62	2.11	0.00	0.00	3.49
time (sec)	N/A	0.000	1.872	57.589	0.320	0.271	0.000	0.000	14.620

Problem 655	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	12	12	11	10	10	8	11	10
N.S.	1	1.00	1.00	0.92	0.83	0.83	0.67	0.92	0.83
time (sec)	N/A	0.139	0.004	0.705	0.206	0.248	0.042	0.270	13.896

Problem 656	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	39	39	39	37	35	37	37	26
N.S.	1	2.79	2.79	2.79	2.64	2.50	2.64	2.64	1.86
time (sec)	N/A	0.208	0.004	0.179	0.206	0.245	0.107	0.260	13.535

Problem 657	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	34	21	19	26	34	34	27	25
N.S.	1	1.42	0.88	0.79	1.08	1.42	1.42	1.12	1.04
time (sec)	N/A	0.171	0.015	0.929	0.198	0.241	0.082	0.260	0.084

Problem 658	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	15	30	38	29	20	29	14
N.S.	1	0.00	0.83	1.67	2.11	1.61	1.11	1.61	0.78
time (sec)	N/A	0.000	0.025	0.144	0.343	0.247	0.126	0.265	13.865

Problem 659	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	F(-2)	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	95	96	93	93	0	95	0
N.S.	1	0.00	3.17	3.20	3.10	3.10	0.00	3.17	0.00
time (sec)	N/A	0.000	0.457	11.302	0.404	0.291	0.000	0.840	0.000

Problem 660	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	21	21	15	14	15	15	15	14
N.S.	1	0.95	0.95	0.68	0.64	0.68	0.68	0.68	0.64
time (sec)	N/A	0.170	0.028	0.119	0.207	0.244	0.072	0.265	0.069

Problem 661	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	C	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	21	22	32	21	17	21	349
N.S.	1	0.00	0.95	1.00	1.45	0.95	0.77	0.95	15.86
time (sec)	N/A	0.000	0.061	2.897	0.359	0.255	0.097	0.320	14.064

Problem 662	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	56	56	45	68	44	60	44	44
N.S.	1	3.11	3.11	2.50	3.78	2.44	3.33	2.44	2.44
time (sec)	N/A	0.713	0.141	0.230	0.222	0.250	0.152	0.263	14.163

Problem 663	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	13	13	12	13	13	12	14	11
N.S.	1	0.54	0.54	0.50	0.54	0.54	0.50	0.58	0.46
time (sec)	N/A	0.153	0.006	0.023	0.205	0.243	0.046	0.264	0.063

Problem 664	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	29	39	42	43	39	0	69
N.S.	1	0.00	0.88	1.18	1.27	1.30	1.18	0.00	2.09
time (sec)	N/A	0.000	0.289	5.497	0.353	0.267	0.154	0.000	14.130

Problem 665	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	38	20	21	72	25	24	34	22
N.S.	1	2.00	1.05	1.11	3.79	1.32	1.26	1.79	1.16
time (sec)	N/A	0.271	0.216	0.147	0.223	0.256	0.071	0.262	0.076

Problem 666	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	33	30	40	62	49	52	100
N.S.	1	0.00	0.97	0.88	1.18	1.82	1.44	1.53	2.94
time (sec)	N/A	0.000	0.095	2.298	0.385	0.277	0.177	0.301	14.011

Problem 667	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	F(-2)	B	B	F(-2)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	24	66	0	65	66	0	131
N.S.	1	0.00	0.92	2.54	0.00	2.50	2.54	0.00	5.04
time (sec)	N/A	0.000	0.345	2.925	0.000	0.264	2.425	0.000	0.393

Problem 668	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	C	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	24	22	81	46	17	46	21
N.S.	1	0.00	0.89	0.81	3.00	1.70	0.63	1.70	0.78
time (sec)	N/A	0.000	0.068	0.147	0.254	0.278	0.194	0.269	14.066

Problem 669	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	24	22	0	21	19	0	22
N.S.	1	0.00	1.00	0.92	0.00	0.88	0.79	0.00	0.92
time (sec)	N/A	0.000	0.333	1.688	0.000	0.250	16.522	0.000	14.833

Problem 670	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	39	30	27	26	35	24	26	26
N.S.	1	1.30	1.00	0.90	0.87	1.17	0.80	0.87	0.87
time (sec)	N/A	0.231	0.155	0.346	0.204	0.259	0.265	0.260	14.323

Problem 671	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	42	34	22	23	24	24	0	21
N.S.	1	2.10	1.70	1.10	1.15	1.20	1.20	0.00	1.05
time (sec)	N/A	0.451	0.222	1.160	0.358	0.241	0.125	0.000	14.665

Problem 672	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	17	17	16	15	15	17	17	15
N.S.	1	0.47	0.47	0.44	0.42	0.42	0.47	0.47	0.42
time (sec)	N/A	0.205	0.008	0.861	0.214	0.234	0.055	0.266	14.279

Problem 673	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	26	19	19	21	17	17	17	19
N.S.	1	1.30	0.95	0.95	1.05	0.85	0.85	0.85	0.95
time (sec)	N/A	0.156	0.052	0.072	0.201	0.247	0.050	0.257	14.097

Problem 674	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	84	61	19	50	24	14	23	18
N.S.	1	3.65	2.65	0.83	2.17	1.04	0.61	1.00	0.78
time (sec)	N/A	0.618	0.198	0.215	0.335	0.245	0.077	0.259	14.214

Problem 675	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	24	19	18	18	17	0	20
N.S.	1	0.00	0.92	0.73	0.69	0.69	0.65	0.00	0.77
time (sec)	N/A	0.000	1.727	0.583	0.479	0.255	2.652	0.000	15.084

Problem 676	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	29	28	31	29	46	50	27
N.S.	1	0.00	1.12	1.08	1.19	1.12	1.77	1.92	1.04
time (sec)	N/A	0.000	1.340	6.043	0.336	0.265	13.174	0.344	14.712

Problem 677	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	37	24	20	679	20	20	22	18
N.S.	1	1.95	1.26	1.05	35.74	1.05	1.05	1.16	0.95
time (sec)	N/A	0.352	0.104	0.807	0.227	0.250	0.085	0.276	0.302

Problem 678	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	27	27	24	116	20	22	20	35
N.S.	1	1.12	1.12	1.00	4.83	0.83	0.92	0.83	1.46
time (sec)	N/A	0.231	0.098	0.127	0.327	0.257	0.170	0.296	16.349

Problem 679	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	36	25	42	43	24	43	24
N.S.	1	0.00	1.38	0.96	1.62	1.65	0.92	1.65	0.92
time (sec)	N/A	0.000	1.158	0.412	0.332	0.242	0.086	0.267	0.724

Problem 680	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	20	21	26	26	20	55	20
N.S.	1	0.00	1.00	1.05	1.30	1.30	1.00	2.75	1.00
time (sec)	N/A	0.000	0.359	1.384	0.258	0.258	0.069	0.266	15.500

Problem 681	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	37	0	59	55	83	202	51	83	343
N.S.	1	0.00	1.59	1.49	2.24	5.46	1.38	2.24	9.27
time (sec)	N/A	0.000	0.220	188.224	0.337	0.256	0.421	0.690	16.878

Problem 682	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	4	4	5	4	4	3	5	4
N.S.	1	0.40	0.40	0.50	0.40	0.40	0.30	0.50	0.40
time (sec)	N/A	0.129	0.000	0.050	0.198	0.233	0.026	0.253	0.002

Problem 683	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	24	24	0	26	19	0	21
N.S.	1	0.00	0.86	0.86	0.00	0.93	0.68	0.00	0.75
time (sec)	N/A	0.000	0.337	0.391	0.000	0.286	0.127	0.000	15.972

Problem 684	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	25	25	0	24	20	25	41
N.S.	1	0.00	0.93	0.93	0.00	0.89	0.74	0.93	1.52
time (sec)	N/A	0.000	0.493	1.234	0.000	0.245	0.171	0.305	13.942

Problem 685	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	B	A	F(-2)	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	35	28	0	57	19	0	0
N.S.	1	0.00	1.21	0.97	0.00	1.97	0.66	0.00	0.00
time (sec)	N/A	0.000	0.313	13.464	0.000	0.252	0.935	0.000	0.000

Problem 686	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	F(-1)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	33	28	69	27	0	29	30
N.S.	1	0.00	1.32	1.12	2.76	1.08	0.00	1.16	1.20
time (sec)	N/A	0.000	0.066	1.516	0.491	0.257	0.000	0.359	15.290

Problem 687	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	20	17	16	16	17	20	110
N.S.	1	0.00	1.11	0.94	0.89	0.89	0.94	1.11	6.11
time (sec)	N/A	0.000	0.146	4.344	0.322	0.275	0.078	0.271	14.214

Problem 688	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	20	18	16	17	17	15	17	18
N.S.	1	1.33	1.20	1.07	1.13	1.13	1.00	1.13	1.20
time (sec)	N/A	0.152	0.000	0.167	0.199	0.262	0.023	0.277	0.032

Problem 689	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	40	39	57	54	49	110	54	45
N.S.	1	1.18	1.15	1.68	1.59	1.44	3.24	1.59	1.32
time (sec)	N/A	4.227	0.191	5.582	0.332	0.284	0.599	0.375	14.154

Problem 690	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	21	22	58	58	41	66	38
N.S.	1	0.00	0.70	0.73	1.93	1.93	1.37	2.20	1.27
time (sec)	N/A	0.000	0.174	1.257	0.215	0.283	0.095	0.283	13.588

Problem 691	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	25	34	0	42	31	58	60
N.S.	1	0.00	0.93	1.26	0.00	1.56	1.15	2.15	2.22
time (sec)	N/A	0.000	1.301	1.546	0.000	0.282	0.157	0.408	13.567

Problem 692	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	20	16	16	16	19	0	17
N.S.	1	0.00	1.00	0.80	0.80	0.80	0.95	0.00	0.85
time (sec)	N/A	0.000	0.611	2.441	0.424	0.285	3.351	0.000	14.705

Problem 693	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	172	36	58	46	40	36	52	43
N.S.	1	5.06	1.06	1.71	1.35	1.18	1.06	1.53	1.26
time (sec)	N/A	0.819	0.534	2.937	0.317	0.269	0.366	0.282	14.225

Problem 694	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	20	20	17	16	17	12	16	17
N.S.	1	0.77	0.77	0.65	0.62	0.65	0.46	0.62	0.65
time (sec)	N/A	0.151	0.004	0.108	0.195	0.266	0.031	0.257	0.046

Problem 695	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	55	49	46	45	45	44	45	49
N.S.	1	1.72	1.53	1.44	1.41	1.41	1.38	1.41	1.53
time (sec)	N/A	0.629	2.701	1.118	0.365	0.293	0.146	0.268	14.287

Problem 696	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	774	46	35	34	37	32	55	24
N.S.	1	25.80	1.53	1.17	1.13	1.23	1.07	1.83	0.80
time (sec)	N/A	2.197	2.728	1.112	0.314	0.265	0.079	0.263	15.285

Problem 697	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F(-2)	B	A	F(-2)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	20	35	0	51	31	0	20
N.S.	1	0.00	1.00	1.75	0.00	2.55	1.55	0.00	1.00
time (sec)	N/A	0.000	0.614	26.421	0.000	0.270	0.372	0.000	16.074

Problem 698	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	1914	13	130	1620	240	357	448	448
N.S.	1	127.60	0.87	8.67	108.00	16.00	23.80	29.87	29.87
time (sec)	N/A	2.530	0.068	0.473	0.239	0.271	0.586	0.347	20.561

Problem 699	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	B	B	B	B	B	B
verified	N/A	No	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	13	77	54	411	65	58	65	61
N.S.	1	0.81	4.81	3.38	25.69	4.06	3.62	4.06	3.81
time (sec)	N/A	0.400	2.286	2.350	0.220	0.259	0.108	0.275	16.500

Problem 700	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	B	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	3616	33	34	66	34	31	0	30
N.S.	1	106.35	0.97	1.00	1.94	1.00	0.91	0.00	0.88
time (sec)	N/A	20.641	0.105	3.320	0.411	0.287	0.255	0.000	18.231

Problem 701	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	18	18	14	41	16	15	13	13
N.S.	1	0.95	0.95	0.74	2.16	0.84	0.79	0.68	0.68
time (sec)	N/A	0.203	0.014	0.436	0.181	0.263	0.051	0.264	17.965

Problem 702	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	18	18	15	17	14	14	16	14
N.S.	1	1.00	1.00	0.83	0.94	0.78	0.78	0.89	0.78
time (sec)	N/A	0.572	0.045	0.806	0.311	0.271	0.058	0.271	16.229

Problem 703	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	32	26	68	55	27	41	30
N.S.	1	0.00	1.14	0.93	2.43	1.96	0.96	1.46	1.07
time (sec)	N/A	0.000	10.118	1.209	0.334	0.276	0.137	0.268	16.703

Problem 704	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	24	35	33	35	36	36	34
N.S.	1	0.00	1.00	1.46	1.38	1.46	1.50	1.50	1.42
time (sec)	N/A	0.000	0.048	2.125	0.212	0.297	152.565	0.338	27.888

Problem 705	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	29	34	24	0	25	29	0	20
N.S.	1	1.00	1.17	0.83	0.00	0.86	1.00	0.00	0.69
time (sec)	N/A	0.425	0.992	2.119	0.000	0.262	83.307	0.000	15.627

Problem 706	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	26	36	56	36	32	41	64
N.S.	1	0.00	0.79	1.09	1.70	1.09	0.97	1.24	1.94
time (sec)	N/A	0.000	1.472	0.304	0.351	0.251	0.221	1.239	16.843

Problem 707	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	23	23	22	24	21	19	24	21
N.S.	1	1.10	1.10	1.05	1.14	1.00	0.90	1.14	1.00
time (sec)	N/A	1.160	0.228	2.981	0.328	0.266	0.190	0.422	16.184

Problem 708	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F(-2)	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	17	17	17	15	15	14	0	16
N.S.	1	0.94	0.94	0.94	0.83	0.83	0.78	0.00	0.89
time (sec)	N/A	0.154	0.012	1.117	0.215	0.258	0.117	0.000	0.167

Problem 709	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	25	23	20	30	40	42	42	19
N.S.	1	0.89	0.82	0.71	1.07	1.43	1.50	1.50	0.68
time (sec)	N/A	0.404	0.441	0.609	0.329	0.278	0.072	0.267	16.045

Problem 710	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F(-1)	B	B	B	F(-1)	F(-1)	F(-1)
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	39	0	0	225	192	211	0	0	0
N.S.	1	0.00	0.00	5.77	4.92	5.41	0.00	0.00	0.00
time (sec)	N/A	0.000	0.000	4.198	22.653	0.438	0.000	0.000	0.000

Problem 711	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	32	32	29	28	30	27	31	28
N.S.	1	1.39	1.39	1.26	1.22	1.30	1.17	1.35	1.22
time (sec)	N/A	0.335	0.016	0.081	0.218	0.246	0.089	0.270	0.153

Problem 712	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	24	21	24	24	20	26	20
N.S.	1	0.00	1.04	0.91	1.04	1.04	0.87	1.13	0.87
time (sec)	N/A	0.000	0.167	2.037	0.229	0.303	0.062	0.272	15.928

Problem 713	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	B	A	A	F	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	0	26	58	45	24	0	49
N.S.	1	0.00	0.00	0.79	1.76	1.36	0.73	0.00	1.48
time (sec)	N/A	0.000	0.000	1.776	0.366	0.267	0.138	0.000	15.783

Problem 714	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	7	7	7	8	7	7	7	7	7
N.S.	1	1.00	1.00	1.14	1.00	1.00	1.00	1.00	1.00
time (sec)	N/A	0.126	0.000	0.053	0.212	0.238	0.021	0.258	0.003

Problem 715	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	24	23	24	27	27	32	27	24
N.S.	1	1.14	1.10	1.14	1.29	1.29	1.52	1.29	1.14
time (sec)	N/A	0.158	0.007	1.461	0.214	0.264	0.102	0.249	0.121

Problem 716	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	57	33	28	27	39	31	27	27
N.S.	1	2.71	1.57	1.33	1.29	1.86	1.48	1.29	1.29
time (sec)	N/A	0.188	0.031	0.044	0.214	0.243	0.082	0.253	0.109

Problem 717	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	34	24	23	28	55	19	28	21
N.S.	1	1.42	1.00	0.96	1.17	2.29	0.79	1.17	0.88
time (sec)	N/A	0.177	0.040	0.327	0.280	0.263	0.116	0.253	0.294

Problem 718	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	F(-1)	F(-2)	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	22	22	20	264	19	0	0	20
N.S.	1	1.00	1.00	0.91	12.00	0.86	0.00	0.00	0.91
time (sec)	N/A	1.118	0.084	0.182	0.414	0.254	0.000	0.000	16.271

Problem 719	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	22	21	19	33	16	19	27	18
N.S.	1	1.16	1.11	1.00	1.74	0.84	1.00	1.42	0.95
time (sec)	N/A	0.231	0.021	0.809	0.304	0.261	0.066	0.260	0.267

Problem 720	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	20	20	13	17	17	29	12	19
N.S.	1	1.00	1.00	0.65	0.85	0.85	1.45	0.60	0.95
time (sec)	N/A	0.152	0.004	0.222	0.205	0.291	0.056	0.261	15.648

Problem 721	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	70	70	73	72	72	76	72	71
N.S.	1	2.19	2.19	2.28	2.25	2.25	2.38	2.25	2.22
time (sec)	N/A	0.222	0.000	0.145	0.203	0.254	0.036	0.262	16.103

Problem 722	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	23	32	24	22	50	49	24	50
N.S.	1	0.92	1.28	0.96	0.88	2.00	1.96	0.96	2.00
time (sec)	N/A	0.147	0.017	0.360	0.214	0.266	0.045	0.258	14.722

Problem 723	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	68	64	57	80	56	53	0	56
N.S.	1	2.72	2.56	2.28	3.20	2.24	2.12	0.00	2.24
time (sec)	N/A	1.198	5.452	2.293	0.269	0.278	1.391	0.000	13.693

Problem 724	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	34	27	28	27	27	29	27	0
N.S.	1	1.89	1.50	1.56	1.50	1.50	1.61	1.50	0.00
time (sec)	N/A	0.848	0.226	1.539	0.245	0.280	0.145	0.272	0.000

Problem 725	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	19	19	23	25	22	24	23	17
N.S.	1	0.68	0.68	0.82	0.89	0.79	0.86	0.82	0.61
time (sec)	N/A	0.409	0.140	3.477	0.340	0.260	0.271	0.331	15.637

Problem 726	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	B	F(-1)	F	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	26	0	24	71	25	120	0	0	28
N.S.	1	0.00	0.92	2.73	0.96	4.62	0.00	0.00	1.08
time (sec)	N/A	0.000	0.350	1.027	0.828	0.275	0.000	0.000	15.588

Problem 727	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	31	39	40	48	34	50	0
N.S.	1	0.00	0.97	1.22	1.25	1.50	1.06	1.56	0.00
time (sec)	N/A	0.000	0.198	0.296	0.290	0.268	0.194	0.298	0.000

Problem 728	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	A	F(-1)	F	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	32	0	32	130	37	32	0	0	37
N.S.	1	0.00	1.00	4.06	1.16	1.00	0.00	0.00	1.16
time (sec)	N/A	0.000	0.204	0.539	0.428	0.283	0.000	0.000	15.529

Problem 729	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	C	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	46	47	91	72	65	145	0
N.S.	1	0.00	1.31	1.34	2.60	2.06	1.86	4.14	0.00
time (sec)	N/A	0.000	5.069	2.181	0.378	0.261	0.174	0.408	0.000

Problem 730	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	46	45	81	57	54	175	183
N.S.	1	0.00	1.92	1.88	3.38	2.38	2.25	7.29	7.62
time (sec)	N/A	0.000	0.083	15.859	0.659	0.267	0.247	0.290	15.905

Problem 731	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	B	A	A	B	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	0	30	96	58	22	74	123
N.S.	1	0.00	0.00	1.03	3.31	2.00	0.76	2.55	4.24
time (sec)	N/A	0.000	0.000	1.352	0.332	0.266	0.267	0.674	16.163

Problem 732	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	36	38	36	34	35	37	35	0
N.S.	1	1.33	1.41	1.33	1.26	1.30	1.37	1.30	0.00
time (sec)	N/A	0.961	0.060	8.255	0.241	0.267	0.191	0.360	0.000

Problem 733	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	0	13	14	0	13
N.S.	1	1.00	1.00	0.93	0.00	0.87	0.93	0.00	0.87
time (sec)	N/A	0.167	0.127	1.429	0.000	0.259	0.533	0.000	15.413

Problem 734	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	19	13	11	10	10	8	10	10
N.S.	1	1.36	0.93	0.79	0.71	0.71	0.57	0.71	0.71
time (sec)	N/A	0.146	0.027	0.030	0.219	0.258	0.050	0.286	0.072

Problem 735	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	6532	633	961	6363	793	1146	1952	772
N.S.	1	210.71	20.42	31.00	205.26	25.58	36.97	62.97	24.90
time (sec)	N/A	34.127	3.015	1.598	0.411	0.288	2.331	0.388	18.689

Problem 736	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	15	15	17	13	16	19	18	0
N.S.	1	0.88	0.88	1.00	0.76	0.94	1.12	1.06	0.00
time (sec)	N/A	0.279	0.095	0.328	0.319	0.255	0.114	0.284	0.000

Problem 737	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	38	0	37	54	64	64	60	71	81
N.S.	1	0.00	0.97	1.42	1.68	1.68	1.58	1.87	2.13
time (sec)	N/A	0.000	0.073	2.051	0.263	0.252	0.137	0.347	14.336

Problem 738	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	19	23	22	25	21	19	28	19
N.S.	1	0.68	0.82	0.79	0.89	0.75	0.68	1.00	0.68
time (sec)	N/A	0.890	0.441	0.710	0.256	0.274	0.108	0.284	15.235

Problem 739	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	35	11	11	10	10	8	10	10
N.S.	1	2.33	0.73	0.73	0.67	0.67	0.53	0.67	0.67
time (sec)	N/A	0.203	0.003	0.172	0.202	0.255	0.076	0.278	15.680

Problem 740	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	A	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	43	97	45	28	44	41	27
N.S.	1	0.00	1.54	3.46	1.61	1.00	1.57	1.46	0.96
time (sec)	N/A	0.000	0.372	2.646	0.338	0.259	0.272	0.654	15.783

Problem 741	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	23	26	25	24	22	25	22
N.S.	1	0.00	0.88	1.00	0.96	0.92	0.85	0.96	0.85
time (sec)	N/A	0.000	0.378	0.411	0.318	0.250	0.092	0.302	0.738

Problem 742	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	C	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	295	31	27	391	24	24	120	23
N.S.	1	11.35	1.19	1.04	15.04	0.92	0.92	4.62	0.88
time (sec)	N/A	1.266	0.072	0.979	0.399	0.263	0.161	0.506	14.929

Problem 743	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	26	26	27	40	19	24	24	19
N.S.	1	1.18	1.18	1.23	1.82	0.86	1.09	1.09	0.86
time (sec)	N/A	0.199	0.027	0.185	0.216	0.267	0.078	0.267	13.410

Problem 744	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	28	29	28	27	24	28	27
N.S.	1	0.00	1.12	1.16	1.12	1.08	0.96	1.12	1.08
time (sec)	N/A	0.000	0.133	26.854	0.297	0.268	0.831	0.642	14.273

Problem 745	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	32	26	68	52	26	83	192
N.S.	1	0.00	1.28	1.04	2.72	2.08	1.04	3.32	7.68
time (sec)	N/A	0.000	0.157	2.030	0.467	0.270	0.188	0.683	13.980

Problem 746	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	27	33	81	38	34	72	200
N.S.	1	0.00	0.90	1.10	2.70	1.27	1.13	2.40	6.67
time (sec)	N/A	0.000	0.364	38.872	0.332	0.254	0.106	0.289	14.321

Problem 747	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	30	27	34	34	36	27	34
N.S.	1	0.00	1.11	1.00	1.26	1.26	1.33	1.00	1.26
time (sec)	N/A	0.000	0.368	1.390	0.241	0.274	0.243	0.270	14.262

Problem 748	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	58	56	32	858	30	34	30	32
N.S.	1	3.22	3.11	1.78	47.67	1.67	1.89	1.67	1.78
time (sec)	N/A	0.330	0.078	1.830	0.313	0.275	0.098	0.305	1.222

Problem 749	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	F	A	F(-2)	A	F(-2)	A	F(-1)
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	25	99	0	28	0	29	0	29	0
N.S.	1	3.96	0.00	1.12	0.00	1.16	0.00	1.16	0.00
time (sec)	N/A	2.248	0.000	4.137	0.000	0.291	0.000	0.948	0.000

Problem 750	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	21	21	20	28	24	51	52
N.S.	1	0.00	0.88	0.88	0.83	1.17	1.00	2.12	2.17
time (sec)	N/A	0.000	1.130	0.698	0.358	0.273	0.201	0.279	0.350

Problem 751	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	C	A	A	F(-1)	F(-1)
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	38	0	41	111	112	61	44	0	0
N.S.	1	0.00	1.08	2.92	2.95	1.61	1.16	0.00	0.00
time (sec)	N/A	0.000	0.273	30.555	0.481	0.265	0.433	0.000	0.000

Problem 752	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	15	15	24	57	23	20	47	14
N.S.	1	1.00	1.00	1.60	3.80	1.53	1.33	3.13	0.93
time (sec)	N/A	3.464	0.589	2.353	1.141	0.263	0.106	0.447	15.629

Problem 753	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	32	29	22	47	32	34	32	32
N.S.	1	1.39	1.26	0.96	2.04	1.39	1.48	1.39	1.39
time (sec)	N/A	0.248	0.027	0.845	0.212	0.268	0.104	0.277	0.243

Problem 754	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	22	20	19	18	25	19	25	16
N.S.	1	1.10	1.00	0.95	0.90	1.25	0.95	1.25	0.80
time (sec)	N/A	0.176	0.029	0.203	0.207	0.265	0.060	0.269	0.096

Problem 755	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	0	58	36	55	43	37	14225	274
N.S.	1	0.00	1.61	1.00	1.53	1.19	1.03	395.14	7.61
time (sec)	N/A	0.000	0.194	5.110	0.274	0.259	0.280	0.467	13.807

Problem 756	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	7	7	8	7	9	3	7	7
N.S.	1	0.28	0.28	0.32	0.28	0.36	0.12	0.28	0.28
time (sec)	N/A	0.136	0.001	0.063	0.218	0.259	0.026	0.262	0.023

Problem 757	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	51	44	32	37	37	39	37	31
N.S.	1	1.42	1.22	0.89	1.03	1.03	1.08	1.03	0.86
time (sec)	N/A	0.201	0.011	0.191	0.204	0.248	0.031	0.269	0.043

Problem 758	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	14	14	11	39	10	12	14	10
N.S.	1	0.78	0.78	0.61	2.17	0.56	0.67	0.78	0.56
time (sec)	N/A	0.310	0.043	1.005	0.250	0.261	0.078	0.265	14.112

Problem 759	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	22	22	23	22	22	22	22	22
N.S.	1	1.22	1.22	1.28	1.22	1.22	1.22	1.22	1.22
time (sec)	N/A	0.285	0.010	0.100	0.232	0.266	0.125	0.266	14.024

Problem 760	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	F	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	92	166	0	99	150	165	150
N.S.	1	0.00	3.54	6.38	0.00	3.81	5.77	6.35	5.77
time (sec)	N/A	0.000	0.434	10.951	0.000	0.269	0.432	0.330	14.668

Problem 761	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	26	22	25	25	22	25	21
N.S.	1	0.00	1.04	0.88	1.00	1.00	0.88	1.00	0.84
time (sec)	N/A	0.000	0.131	4.071	0.269	0.276	0.207	0.280	14.739

Problem 762	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	37	41	46	39	39	47	113
N.S.	1	0.00	1.12	1.24	1.39	1.18	1.18	1.42	3.42
time (sec)	N/A	0.000	0.072	1.637	0.350	0.276	0.184	0.279	15.433

Problem 763	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	31	34	23	22	22	31	22	25
N.S.	1	1.29	1.42	0.96	0.92	0.92	1.29	0.92	1.04
time (sec)	N/A	0.160	0.006	0.166	0.200	0.251	0.034	0.272	0.055

Problem 764	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	16	16	15	14	14	12	21	15
N.S.	1	0.73	0.73	0.68	0.64	0.64	0.55	0.95	0.68
time (sec)	N/A	0.171	0.030	0.388	0.219	0.262	0.063	0.263	0.070

Problem 765	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	32	30	45	47	51	52	0
N.S.	1	0.00	1.03	0.97	1.45	1.52	1.65	1.68	0.00
time (sec)	N/A	0.000	0.086	1.278	0.342	0.248	0.207	0.297	0.000

Problem 766	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	22	20	15	18	18	20	18	15
N.S.	1	1.47	1.33	1.00	1.20	1.20	1.33	1.20	1.00
time (sec)	N/A	0.135	0.002	0.106	0.201	0.239	0.023	0.261	14.990

Problem 767	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	202	23	22	29	21	22	21	21
N.S.	1	10.10	1.15	1.10	1.45	1.05	1.10	1.05	1.05
time (sec)	N/A	0.872	0.200	0.452	0.287	0.247	0.091	0.288	0.288

Problem 768	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	0	59	50	66	52	46	58	89
N.S.	1	0.00	1.69	1.43	1.89	1.49	1.31	1.66	2.54
time (sec)	N/A	0.000	0.375	0.821	0.362	0.250	0.270	0.893	15.170

Problem 769	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	0	14	15	22	22	20	14	14
N.S.	1	0.00	0.93	1.00	1.47	1.47	1.33	0.93	0.93
time (sec)	N/A	0.000	0.073	1.237	0.240	0.258	0.162	0.267	14.591

Problem 770	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	26	23	23	23	20	23	23
N.S.	1	0.00	1.18	1.05	1.05	1.05	0.91	1.05	1.05
time (sec)	N/A	0.000	2.068	0.069	0.244	0.245	0.112	0.274	14.507

Problem 771	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	1678	36	24	119	38	20	38	23
N.S.	1	67.12	1.44	0.96	4.76	1.52	0.80	1.52	0.92
time (sec)	N/A	6.711	0.577	0.188	0.315	0.291	0.075	0.271	15.575

Problem 772	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	60	83	55	58	58	53	58	49
N.S.	1	3.00	4.15	2.75	2.90	2.90	2.65	2.90	2.45
time (sec)	N/A	0.193	0.008	0.176	0.199	0.255	0.028	0.264	0.068

Problem 773	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	37	24	31	0	40	20	55	29
N.S.	1	1.48	0.96	1.24	0.00	1.60	0.80	2.20	1.16
time (sec)	N/A	0.736	0.292	0.204	0.000	0.275	0.137	0.268	15.269

Problem 774	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	221	98	128	294	122	133	153	143
N.S.	1	6.70	2.97	3.88	8.91	3.70	4.03	4.64	4.33
time (sec)	N/A	0.791	0.493	0.317	0.214	0.268	0.178	0.257	15.949

Problem 775	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F(-2)	A	F(-2)	F(-2)	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	24	29	25	0	24	0	0	24
N.S.	1	0.96	1.16	1.00	0.00	0.96	0.00	0.00	0.96
time (sec)	N/A	1.482	4.770	2.388	0.000	0.247	0.000	0.000	15.993

Problem 776	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	27	46	34	43	42	39	43	42
N.S.	1	1.00	1.70	1.26	1.59	1.56	1.44	1.59	1.56
time (sec)	N/A	3.057	5.160	7.400	0.319	0.266	0.502	0.271	16.582

Problem 777	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	A	A	A	F(-1)	A	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	33	30	0	22	29	24	0	22	21
N.S.	1	0.91	0.00	0.67	0.88	0.73	0.00	0.67	0.64
time (sec)	N/A	4.654	0.000	5.941	0.386	0.266	0.000	0.572	15.657

Problem 778	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	16	14	13	13	14	13	13
N.S.	1	1.00	1.00	0.88	0.81	0.81	0.88	0.81	0.81
time (sec)	N/A	0.137	0.002	0.479	0.211	0.252	0.031	0.260	14.555

Problem 779	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	32	20	28	41	31	0	28
N.S.	1	0.00	1.03	0.65	0.90	1.32	1.00	0.00	0.90
time (sec)	N/A	0.000	6.159	13.316	0.334	0.262	7.188	0.000	15.057

Problem 780	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	77	24	23	38	38	22	38	42
N.S.	1	3.21	1.00	0.96	1.58	1.58	0.92	1.58	1.75
time (sec)	N/A	1.447	0.092	2.566	0.376	0.286	0.208	0.419	15.355

Problem 781	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	15	20	15	17	14	14	14	15
N.S.	1	1.07	1.43	1.07	1.21	1.00	1.00	1.00	1.07
time (sec)	N/A	0.261	0.127	2.169	0.229	0.255	0.068	0.262	0.071

Problem 782	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	53	68	58	58	102	131	0
N.S.	1	0.00	1.71	2.19	1.87	1.87	3.29	4.23	0.00
time (sec)	N/A	0.000	0.095	2.093	0.275	0.261	0.459	0.494	0.000

Problem 783	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	38	185	458	90	85	0	522
N.S.	1	0.00	1.31	6.38	15.79	3.10	2.93	0.00	18.00
time (sec)	N/A	0.000	1.046	12.648	2.609	0.277	7.140	0.000	16.338

Problem 784	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	B	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	95	32	58	31	26	0	28
N.S.	1	0.00	2.97	1.00	1.81	0.97	0.81	0.00	0.88
time (sec)	N/A	0.000	0.460	84.620	0.344	0.262	0.495	0.000	15.872

Problem 785	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	35	26	120	25	85	0	34
N.S.	1	0.00	1.03	0.76	3.53	0.74	2.50	0.00	1.00
time (sec)	N/A	0.000	5.308	3.450	0.384	0.265	1.133	0.000	16.707

Problem 786	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	100	48	44	81	35	39	39	42
N.S.	1	3.33	1.60	1.47	2.70	1.17	1.30	1.30	1.40
time (sec)	N/A	0.608	0.087	0.960	0.240	0.253	0.124	0.256	16.315

Problem 787	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	24	23	19	18	18	20	18	18
N.S.	1	1.33	1.28	1.06	1.00	1.00	1.11	1.00	1.00
time (sec)	N/A	0.180	0.006	0.151	0.196	0.265	0.107	0.263	15.936

Problem 788	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	25	16	0	23	12	0	21
N.S.	1	0.00	1.32	0.84	0.00	1.21	0.63	0.00	1.11
time (sec)	N/A	0.000	0.825	1.183	0.000	0.252	0.102	0.000	16.490

Problem 789	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	20	18	13	12	26	15	12	12
N.S.	1	0.71	0.64	0.46	0.43	0.93	0.54	0.43	0.43
time (sec)	N/A	0.150	0.006	0.074	0.190	0.252	0.083	0.256	17.327

Problem 790	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	38	58	194	227	139	264	0
N.S.	1	0.00	1.73	2.64	8.82	10.32	6.32	12.00	0.00
time (sec)	N/A	0.000	0.221	2.878	0.601	0.270	0.397	0.702	0.000

Problem 791	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	44	39	29	32	47	49	57	32
N.S.	1	1.69	1.50	1.12	1.23	1.81	1.88	2.19	1.23
time (sec)	N/A	0.218	0.020	0.162	0.196	0.260	0.131	0.262	0.148

Problem 792	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	19	16	15	21	14	15	13
N.S.	1	1.00	1.19	1.00	0.94	1.31	0.88	0.94	0.81
time (sec)	N/A	0.133	0.002	0.504	0.187	0.267	0.028	0.261	16.439

Problem 793	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	122	63	121	121	99	968	1087
N.S.	1	0.00	3.94	2.03	3.90	3.90	3.19	31.23	35.06
time (sec)	N/A	0.000	10.083	4.629	0.327	0.250	0.122	0.315	16.680

Problem 794	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	42	24	38	37	38	34	38	37
N.S.	1	1.62	0.92	1.46	1.42	1.46	1.31	1.46	1.42
time (sec)	N/A	0.225	0.012	0.158	0.180	0.230	0.143	0.267	16.668

Problem 795	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	C	F	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	40	22	27	37	39	0	0
N.S.	1	0.00	1.90	1.05	1.29	1.76	1.86	0.00	0.00
time (sec)	N/A	0.000	0.723	3.190	0.349	0.250	0.374	0.000	0.000

Problem 796	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	107	60	43	45	42	51	107	33
N.S.	1	5.35	3.00	2.15	2.25	2.10	2.55	5.35	1.65
time (sec)	N/A	0.364	0.266	0.453	0.195	0.250	0.146	0.271	0.134

Problem 797	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	20	16	16	17	15	15	153	15
N.S.	1	1.05	0.84	0.84	0.89	0.79	0.79	8.05	0.79
time (sec)	N/A	0.307	0.024	1.496	0.198	0.244	0.080	0.280	15.258

Problem 798	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	49	86	21	44	20	20	20	20
N.S.	1	2.45	4.30	1.05	2.20	1.00	1.00	1.00	1.00
time (sec)	N/A	0.462	0.157	1.070	0.326	0.259	0.095	0.290	16.413

Problem 799	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	50	19	26	68	22	24	22	24
N.S.	1	2.17	0.83	1.13	2.96	0.96	1.04	0.96	1.04
time (sec)	N/A	0.311	0.007	1.134	0.206	0.244	0.085	0.273	15.477

Problem 800	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	53	37	37	42	46	34	42	38
N.S.	1	1.89	1.32	1.32	1.50	1.64	1.21	1.50	1.36
time (sec)	N/A	0.587	2.094	0.510	0.463	0.251	0.167	0.278	15.946

Problem 801	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	19	19	28	127	18	31	18	20
N.S.	1	0.90	0.90	1.33	6.05	0.86	1.48	0.86	0.95
time (sec)	N/A	0.223	0.032	0.318	0.320	0.240	0.163	0.269	15.165

Problem 802	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	127	30	35	367	34	39	34	16
N.S.	1	7.94	1.88	2.19	22.94	2.12	2.44	2.12	1.00
time (sec)	N/A	0.735	0.098	0.921	0.213	0.245	0.099	0.264	0.356

Problem 803	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	36	36	43	35	31	43	35
N.S.	1	0.00	1.09	1.09	1.30	1.06	0.94	1.30	1.06
time (sec)	N/A	0.000	0.093	1.544	0.275	0.251	0.694	0.417	17.909

Problem 804	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	63	55	43	57	55	60	68	54
N.S.	1	1.97	1.72	1.34	1.78	1.72	1.88	2.12	1.69
time (sec)	N/A	0.364	0.493	0.648	0.223	0.243	0.144	0.276	0.182

Problem 805	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	0	14	14	17	13	8	13	13
N.S.	1	0.00	0.88	0.88	1.06	0.81	0.50	0.81	0.81
time (sec)	N/A	0.000	0.013	0.586	0.226	0.237	0.059	0.273	15.928

Problem 806	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	23	16	13	43	12	14	43	12
N.S.	1	0.88	0.62	0.50	1.65	0.46	0.54	1.65	0.46
time (sec)	N/A	0.219	0.156	0.348	0.197	0.258	0.053	0.265	0.103

Problem 807	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	20	20	16	19	19	15	19	18
N.S.	1	1.00	1.00	0.80	0.95	0.95	0.75	0.95	0.90
time (sec)	N/A	0.150	0.000	0.155	0.193	0.249	0.021	0.256	16.859

Problem 808	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	21	22	61	119	63	281	82
N.S.	1	0.00	0.95	1.00	2.77	5.41	2.86	12.77	3.73
time (sec)	N/A	0.000	0.138	6.249	0.287	0.258	0.226	0.519	15.757

Problem 809	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	22	60	44	48	48	257	0
N.S.	1	0.00	0.92	2.50	1.83	2.00	2.00	10.71	0.00
time (sec)	N/A	0.000	1.183	5.687	0.254	0.237	0.154	1.034	0.000

Problem 810	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	16	16	14	13	14	12	22	20
N.S.	1	0.84	0.84	0.74	0.68	0.74	0.63	1.16	1.05
time (sec)	N/A	0.144	0.006	1.790	0.193	0.248	0.065	0.291	15.382

Problem 811	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	75	21	21	22	20	15	20	20
N.S.	1	3.41	0.95	0.95	1.00	0.91	0.68	0.91	0.91
time (sec)	N/A	0.503	0.055	0.359	0.349	0.256	0.119	0.284	0.266

Problem 812	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	C	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	35	15	21	59	23	19	35	15
N.S.	1	2.19	0.94	1.31	3.69	1.44	1.19	2.19	0.94
time (sec)	N/A	0.539	0.132	0.106	0.227	0.245	0.038	0.272	15.212

Problem 813	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	24	13	11	14	20	10	12	12
N.S.	1	1.20	0.65	0.55	0.70	1.00	0.50	0.60	0.60
time (sec)	N/A	0.175	0.052	0.130	0.185	0.262	0.054	0.266	0.053

Problem 814	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	38	0	31	25	25	25	32	25	54
N.S.	1	0.00	0.82	0.66	0.66	0.66	0.84	0.66	1.42
time (sec)	N/A	0.000	2.328	1.378	0.337	0.260	0.104	0.273	14.937

Problem 815	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	32	40	41	41	37	45	0
N.S.	1	0.00	1.14	1.43	1.46	1.46	1.32	1.61	0.00
time (sec)	N/A	0.000	0.528	1.163	0.223	0.254	0.213	0.282	0.000

Problem 816	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	9	9	10	9	9	10	9	9
N.S.	1	0.53	0.53	0.59	0.53	0.53	0.59	0.53	0.53
time (sec)	N/A	0.166	0.034	0.074	0.213	0.259	0.079	0.266	16.262

Problem 817	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	7	7	7	6	5	5	7	5	5
N.S.	1	1.00	1.00	0.86	0.71	0.71	1.00	0.71	0.71
time (sec)	N/A	0.122	0.000	0.062	0.184	0.237	0.017	0.264	0.002

Problem 818	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	21	21	34	34	15	32	20
N.S.	1	0.00	0.70	0.70	1.13	1.13	0.50	1.07	0.67
time (sec)	N/A	0.000	1.016	0.431	0.221	0.257	0.064	0.272	14.191

Problem 819	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	19	17	12	13	19	8	13	13
N.S.	1	0.59	0.53	0.38	0.41	0.59	0.25	0.41	0.41
time (sec)	N/A	0.167	0.009	1.090	0.183	0.240	0.040	0.269	0.045

Problem 820	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	31	27	21	91	20	15	31	20
N.S.	1	1.41	1.23	0.95	4.14	0.91	0.68	1.41	0.91
time (sec)	N/A	0.544	0.185	0.863	0.356	0.254	0.150	0.280	0.307

Problem 821	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	9	8	9	9	8	8	9	9
N.S.	1	0.64	0.57	0.64	0.64	0.57	0.57	0.64	0.64
time (sec)	N/A	0.123	0.000	0.029	0.206	0.242	0.021	0.256	0.002

Problem 822	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	200	48	48	83	52	51	0	90
N.S.	1	6.90	1.66	1.66	2.86	1.79	1.76	0.00	3.10
time (sec)	N/A	1.331	0.229	3.496	0.404	0.255	0.335	0.000	0.480

Problem 823	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	A	A	A	A	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	0	44	39	42	39	44	45
N.S.	1	0.00	0.00	1.47	1.30	1.40	1.30	1.47	1.50
time (sec)	N/A	0.000	0.000	60.957	0.512	0.248	0.705	0.297	15.609

Problem 824	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	45	39	40	45	36	41	39	39
N.S.	1	1.55	1.34	1.38	1.55	1.24	1.41	1.34	1.34
time (sec)	N/A	0.267	0.188	0.226	0.240	0.266	0.169	0.270	16.077

Problem 825	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	40	26	32	70	31	31	31	23
N.S.	1	1.60	1.04	1.28	2.80	1.24	1.24	1.24	0.92
time (sec)	N/A	0.449	0.074	0.743	0.195	0.249	0.139	0.265	16.096

Problem 826	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-1)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	30	23	45	37	0	0	21
N.S.	1	0.00	1.20	0.92	1.80	1.48	0.00	0.00	0.84
time (sec)	N/A	0.000	0.105	1.998	0.249	0.269	0.000	0.000	14.814

Problem 827	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	26	30	23	29	29	0	215
N.S.	1	0.00	1.00	1.15	0.88	1.12	1.12	0.00	8.27
time (sec)	N/A	0.000	0.175	0.052	0.296	0.261	3.350	0.000	14.985

Problem 828	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	A	A	A	A	A	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	14	14	0	13	17	12	14	17	12
N.S.	1	1.00	0.00	0.93	1.21	0.86	1.00	1.21	0.86
time (sec)	N/A	0.238	0.000	184.902	0.266	0.255	0.118	0.280	15.702

Problem 829	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	21	17	18	18	14	29	18
N.S.	1	0.00	0.91	0.74	0.78	0.78	0.61	1.26	0.78
time (sec)	N/A	0.000	1.570	1.053	0.254	0.248	0.107	0.270	14.929

Problem 830	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	23	25	40	40	39	40	40
N.S.	1	0.00	0.96	1.04	1.67	1.67	1.62	1.67	1.67
time (sec)	N/A	0.000	0.047	4.562	0.198	0.241	4.402	0.274	16.724

Problem 831	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	29	23	33	27	32	39	19
N.S.	1	0.00	1.53	1.21	1.74	1.42	1.68	2.05	1.00
time (sec)	N/A	0.000	0.164	1.332	0.229	0.252	0.127	0.273	16.171

Problem 832	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	B	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	81	31	28	95	26	71	39	0
N.S.	1	3.12	1.19	1.08	3.65	1.00	2.73	1.50	0.00
time (sec)	N/A	1.965	0.725	1.343	0.237	0.249	0.239	0.269	0.000

Problem 833	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	25	25	27	32	26	20	32	0
N.S.	1	0.78	0.78	0.84	1.00	0.81	0.62	1.00	0.00
time (sec)	N/A	1.148	0.660	1.614	0.296	0.251	0.146	0.311	0.000

Problem 834	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	30	26	85	25	29	48	551
N.S.	1	0.00	0.91	0.79	2.58	0.76	0.88	1.45	16.70
time (sec)	N/A	0.000	0.088	8.319	0.368	0.240	0.177	0.457	16.467

Problem 835	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	22	17	19	16	15	21	18
N.S.	1	0.00	1.05	0.81	0.90	0.76	0.71	1.00	0.86
time (sec)	N/A	0.000	0.318	0.329	0.214	0.250	0.077	0.267	15.366

Problem 836	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	F	A	B	B	A	B	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	27	97	0	19	36	37	29	36	38
N.S.	1	3.59	0.00	0.70	1.33	1.37	1.07	1.33	1.41
time (sec)	N/A	0.449	0.000	0.354	0.345	0.243	0.211	0.344	15.874

Problem 837	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	10	10	11	10	10	8	10	10
N.S.	1	0.59	0.59	0.65	0.59	0.59	0.47	0.59	0.59
time (sec)	N/A	0.138	0.002	0.045	0.185	0.250	0.050	0.264	14.467

Problem 838	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	35	33	30	29	29	34	32	91
N.S.	1	1.35	1.27	1.15	1.12	1.12	1.31	1.23	3.50
time (sec)	N/A	0.327	0.045	0.224	0.193	0.239	1.083	0.275	14.441

Problem 839	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	20	24	33	33	19	23	37
N.S.	1	0.00	0.80	0.96	1.32	1.32	0.76	0.92	1.48
time (sec)	N/A	0.000	0.291	1.217	0.222	0.262	0.061	0.277	14.420

Problem 840	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	74	23	40	67	43	53	42	20
N.S.	1	2.85	0.88	1.54	2.58	1.65	2.04	1.62	0.77
time (sec)	N/A	0.276	0.024	0.342	0.196	0.265	0.097	0.268	16.746

Problem 841	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	19	24	22	28	21	24	21	19
N.S.	1	1.12	1.41	1.29	1.65	1.24	1.41	1.24	1.12
time (sec)	N/A	0.576	0.213	1.911	0.214	0.284	0.105	0.273	16.743

Problem 842	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	24	30	47	43	49	59	0
N.S.	1	0.00	1.00	1.25	1.96	1.79	2.04	2.46	0.00
time (sec)	N/A	0.000	5.096	0.259	0.305	0.258	0.166	0.270	0.000

Problem 843	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	30	28	40	64	40	32	56	38
N.S.	1	1.03	0.97	1.38	2.21	1.38	1.10	1.93	1.31
time (sec)	N/A	1.856	0.057	0.336	0.357	0.261	0.152	0.354	14.195

Problem 844	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	534	169	165	1137	230	180	0	178
N.S.	1	18.41	5.83	5.69	39.21	7.93	6.21	0.00	6.14
time (sec)	N/A	3.062	0.144	0.614	0.269	0.277	29.004	0.000	16.075

Problem 845	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	27	25	22	41	21	20	149	29
N.S.	1	1.08	1.00	0.88	1.64	0.84	0.80	5.96	1.16
time (sec)	N/A	2.344	0.900	0.499	0.298	0.238	0.119	0.333	15.141

Problem 846	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	61	144	128	153	99	0	121
N.S.	1	0.00	2.03	4.80	4.27	5.10	3.30	0.00	4.03
time (sec)	N/A	0.000	0.620	2.900	0.397	0.260	81.647	0.000	15.143

Problem 847	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	34	50	0	36	37	0	105
N.S.	1	0.00	1.06	1.56	0.00	1.12	1.16	0.00	3.28
time (sec)	N/A	0.000	0.158	5.403	0.000	0.270	0.227	0.000	13.938

Problem 848	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	13	13	11	12	12	12	13	10
N.S.	1	0.65	0.65	0.55	0.60	0.60	0.60	0.65	0.50
time (sec)	N/A	0.132	0.004	0.674	0.193	0.236	0.047	0.266	0.109

Problem 849	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	115	121	84	557	106	110	139	33
N.S.	1	4.60	4.84	3.36	22.28	4.24	4.40	5.56	1.32
time (sec)	N/A	0.613	0.113	0.427	0.256	0.241	0.432	0.267	14.110

Problem 850	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	48	54	56	55	36	49	59	43
N.S.	1	2.40	2.70	2.80	2.75	1.80	2.45	2.95	2.15
time (sec)	N/A	0.367	0.032	0.517	0.191	0.251	10.172	0.261	13.890

Problem 851	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	21	27	17	18	24	12	32	18
N.S.	1	0.84	1.08	0.68	0.72	0.96	0.48	1.28	0.72
time (sec)	N/A	0.507	0.057	0.635	0.229	0.284	0.093	0.268	13.659

Problem 852	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	33	59	49	62	46	67	317
N.S.	1	0.00	1.14	2.03	1.69	2.14	1.59	2.31	10.93
time (sec)	N/A	0.000	0.175	51.583	0.291	0.275	0.415	0.559	14.156

Problem 853	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	43	33	22	67	22	24	22	30
N.S.	1	2.05	1.57	1.05	3.19	1.05	1.14	1.05	1.43
time (sec)	N/A	0.334	0.060	0.855	0.188	0.244	0.082	0.275	0.223

Problem 854	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	25	24	34	25	22	57	26
N.S.	1	0.00	0.86	0.83	1.17	0.86	0.76	1.97	0.90
time (sec)	N/A	0.000	5.831	0.202	0.230	0.252	0.176	0.279	14.486

Problem 855	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	18	17	19	20	17	14	0	18
N.S.	1	1.20	1.13	1.27	1.33	1.13	0.93	0.00	1.20
time (sec)	N/A	0.258	0.274	0.336	0.316	0.247	0.200	0.000	14.575

Problem 856	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	0	15	14	13	13	12	0	13
N.S.	1	0.00	1.00	0.93	0.87	0.87	0.80	0.00	0.87
time (sec)	N/A	0.000	0.107	0.145	0.333	0.251	0.120	0.000	0.122

Problem 857	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	35	39	39	39	41	42	0
N.S.	1	0.00	1.21	1.34	1.34	1.34	1.41	1.45	0.00
time (sec)	N/A	0.000	4.997	0.188	0.251	0.264	0.209	0.289	0.000

Problem 858	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	11	11	12	13	13	10	13	51
N.S.	1	0.73	0.73	0.80	0.87	0.87	0.67	0.87	3.40
time (sec)	N/A	0.162	0.006	1.548	0.196	0.231	0.102	0.270	15.144

Problem 859	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	32	37	45	33	37	48	33
N.S.	1	0.00	1.19	1.37	1.67	1.22	1.37	1.78	1.22
time (sec)	N/A	0.000	0.294	5.447	0.323	0.242	0.121	0.292	15.727

Problem 860	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	25	29	50	50	26	29	44
N.S.	1	0.00	0.89	1.04	1.79	1.79	0.93	1.04	1.57
time (sec)	N/A	0.000	0.336	1.571	0.221	0.239	0.109	0.288	15.744

Problem 861	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	58	19	22	16	23	20	17	16
N.S.	1	3.05	1.00	1.16	0.84	1.21	1.05	0.89	0.84
time (sec)	N/A	0.225	0.020	0.117	0.266	0.259	0.125	0.265	15.422

Problem 862	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	19	19	18	17	21	14	21	17
N.S.	1	0.95	0.95	0.90	0.85	1.05	0.70	1.05	0.85
time (sec)	N/A	0.212	0.060	0.395	0.209	0.249	0.087	0.284	0.101

Problem 863	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	46	28	30	34	34	34	34	28
N.S.	1	1.59	0.97	1.03	1.17	1.17	1.17	1.17	0.97
time (sec)	N/A	0.193	0.009	0.129	0.189	0.248	0.031	0.272	16.730

Problem 864	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	19	15	17	15	19	14	15	17
N.S.	1	1.00	0.79	0.89	0.79	1.00	0.74	0.79	0.89
time (sec)	N/A	0.173	0.011	1.353	0.191	0.241	0.071	0.270	17.153

Problem 865	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	25	21	15	26	14	17	14	13
N.S.	1	1.32	1.11	0.79	1.37	0.74	0.89	0.74	0.68
time (sec)	N/A	0.158	0.057	0.116	0.181	0.250	0.074	0.263	0.059

Problem 866	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	28	24	21	21	21	19	21	15
N.S.	1	1.33	1.14	1.00	1.00	1.00	0.90	1.00	0.71
time (sec)	N/A	0.159	0.006	0.138	0.184	0.241	0.072	0.263	0.061

Problem 867	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	63	34	26	52	26	24	37	27
N.S.	1	2.52	1.36	1.04	2.08	1.04	0.96	1.48	1.08
time (sec)	N/A	0.304	0.121	0.502	0.241	0.259	0.089	0.269	16.883

Problem 868	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	35	28	28	31	32	47	36
N.S.	1	0.00	1.46	1.17	1.17	1.29	1.33	1.96	1.50
time (sec)	N/A	0.000	0.491	0.937	0.425	0.245	0.245	0.308	18.161

Problem 869	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	10	10	10	38	9	8	9	9
N.S.	1	0.53	0.53	0.53	2.00	0.47	0.42	0.47	0.47
time (sec)	N/A	0.234	0.052	0.211	0.196	0.240	0.051	0.277	16.491

Problem 870	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	A	F(-1)	A	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	30	0	29	876	37	34	0	34	32
N.S.	1	0.00	0.97	29.20	1.23	1.13	0.00	1.13	1.07
time (sec)	N/A	0.000	0.463	0.026	0.412	0.283	0.000	1.058	17.811

Problem 871	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	32	32	25	32	28	24	24	24
N.S.	1	1.14	1.14	0.89	1.14	1.00	0.86	0.86	0.86
time (sec)	N/A	0.404	0.040	0.495	0.221	0.255	0.130	0.276	17.925

Problem 872	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	24	25	24	30	20	24	24
N.S.	1	0.00	0.96	1.00	0.96	1.20	0.80	0.96	0.96
time (sec)	N/A	0.000	0.227	1.225	0.235	0.250	0.146	0.285	18.959

Problem 873	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	31	17	19	31	24	20	24	19
N.S.	1	1.48	0.81	0.90	1.48	1.14	0.95	1.14	0.90
time (sec)	N/A	0.191	0.020	0.151	0.204	0.260	0.085	0.265	16.857

Problem 874	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	B	A	C	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	253	125	40	59	33	65	66	0
N.S.	1	7.91	3.91	1.25	1.84	1.03	2.03	2.06	0.00
time (sec)	N/A	7.205	1.236	1.083	0.341	0.264	0.192	0.295	0.000

Problem 875	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	38	0	61	66	59	59	94	100	0
N.S.	1	0.00	1.61	1.74	1.55	1.55	2.47	2.63	0.00
time (sec)	N/A	0.000	10.129	1.393	0.399	0.279	0.341	0.360	0.000

Problem 876	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	41	29	33	41	40	44	40	39
N.S.	1	1.24	0.88	1.00	1.24	1.21	1.33	1.21	1.18
time (sec)	N/A	0.146	0.018	0.121	0.193	0.272	0.134	0.274	17.966

Problem 877	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	22	22	21	21	21	19	21	21
N.S.	1	0.85	0.85	0.81	0.81	0.81	0.73	0.81	0.81
time (sec)	N/A	0.179	0.051	0.066	0.189	0.245	0.082	0.271	18.233

Problem 878	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	14	14	13	12	12	10	0	12
N.S.	1	0.64	0.64	0.59	0.55	0.55	0.45	0.00	0.55
time (sec)	N/A	0.180	0.014	0.115	0.270	0.266	0.060	0.000	0.154

Problem 879	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	22	22	27	21	15	27	22
N.S.	1	0.00	0.88	0.88	1.08	0.84	0.60	1.08	0.88
time (sec)	N/A	0.000	0.399	11.051	0.337	0.258	0.101	0.330	15.241

Problem 880	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	17	16	32	32	36	32	32
N.S.	1	1.00	1.00	0.94	1.88	1.88	2.12	1.88	1.88
time (sec)	N/A	0.595	0.075	3.917	0.272	0.254	0.134	0.322	15.766

Problem 881	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	20	22	32	21	24	22	19
N.S.	1	0.00	0.95	1.05	1.52	1.00	1.14	1.05	0.90
time (sec)	N/A	0.000	0.504	0.232	0.195	0.265	2.815	0.335	16.009

Problem 882	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	20	17	17	18	17	15	21	15
N.S.	1	0.83	0.71	0.71	0.75	0.71	0.62	0.88	0.62
time (sec)	N/A	0.223	0.011	0.076	0.186	0.248	0.058	0.258	0.091

Problem 883	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	C	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	180	94	75	2622	103	88	228	94
N.S.	1	6.67	3.48	2.78	97.11	3.81	3.26	8.44	3.48
time (sec)	N/A	8.644	0.312	0.360	0.536	0.281	0.209	0.315	0.473

Problem 884	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	20	16	15	17	12	17	15
N.S.	1	1.00	1.25	1.00	0.94	1.06	0.75	1.06	0.94
time (sec)	N/A	0.161	0.010	0.031	0.198	0.292	0.061	0.260	16.122

Problem 885	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	51	21	24	20	23	22	23	22
N.S.	1	2.12	0.88	1.00	0.83	0.96	0.92	0.96	0.92
time (sec)	N/A	0.195	0.033	1.122	0.257	0.282	0.517	0.272	15.609

Problem 886	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	28	28	20	19	19	41	19	19
N.S.	1	1.00	1.00	0.71	0.68	0.68	1.46	0.68	0.68
time (sec)	N/A	0.206	0.049	0.255	0.290	0.290	0.152	0.273	0.085

Problem 887	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	8	10	8	7	6	6	7	7	6
N.S.	1	1.25	1.00	0.88	0.75	0.75	0.88	0.88	0.75
time (sec)	N/A	0.121	0.002	0.946	0.187	0.252	0.028	0.266	0.098

Problem 888	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	37	34	46	41	65	36	99	65
N.S.	1	1.19	1.10	1.48	1.32	2.10	1.16	3.19	2.10
time (sec)	N/A	0.422	0.056	1.305	0.209	0.277	1.018	0.273	16.787

Problem 889	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	45	41	0	45	42	0	41
N.S.	1	0.00	1.45	1.32	0.00	1.45	1.35	0.00	1.32
time (sec)	N/A	0.000	0.158	0.354	0.000	0.284	0.183	0.000	17.080

Problem 890	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	29	32	123	70	61	91	452
N.S.	1	0.00	0.94	1.03	3.97	2.26	1.97	2.94	14.58
time (sec)	N/A	0.000	0.200	9.307	5.845	0.277	0.329	92.323	19.625

Problem 891	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	29	29	28	27	27	24	253	28
N.S.	1	0.88	0.88	0.85	0.82	0.82	0.73	7.67	0.85
time (sec)	N/A	0.577	0.153	1.055	0.250	0.268	0.103	0.358	17.438

Problem 892	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	11	9	9	7	6	6	7	7	6
N.S.	1	0.82	0.82	0.64	0.55	0.55	0.64	0.64	0.55
time (sec)	N/A	0.118	0.000	0.093	0.190	0.260	0.025	0.264	0.039

Problem 893	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	39	23	22	0	23	22	23	23
N.S.	1	1.95	1.15	1.10	0.00	1.15	1.10	1.15	1.15
time (sec)	N/A	0.365	0.045	0.352	0.000	0.266	0.068	0.265	0.117

Problem 894	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	14	14	13	16	11	10	0	16
N.S.	1	1.00	1.00	0.93	1.14	0.79	0.71	0.00	1.14
time (sec)	N/A	0.254	0.074	0.436	0.213	0.273	0.091	0.000	0.163

Problem 895	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	39	33	31	38	34	26	73	26
N.S.	1	1.62	1.38	1.29	1.58	1.42	1.08	3.04	1.08
time (sec)	N/A	0.172	0.028	0.701	0.195	0.278	0.072	0.266	18.538

Problem 896	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	28	26	35	35	32	34	25
N.S.	1	0.00	0.85	0.79	1.06	1.06	0.97	1.03	0.76
time (sec)	N/A	0.000	0.374	3.681	0.247	0.331	0.092	0.283	17.962

Problem 897	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	26	24	41	36	37	0	21
N.S.	1	0.00	1.00	0.92	1.58	1.38	1.42	0.00	0.81
time (sec)	N/A	0.000	5.043	0.332	0.280	0.271	0.170	0.000	16.468

Problem 898	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	39	32	32	110	37	36	41	50
N.S.	1	1.26	1.03	1.03	3.55	1.19	1.16	1.32	1.61
time (sec)	N/A	0.417	1.609	0.374	0.329	0.278	0.479	0.279	0.156

Problem 899	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	21	22	21	20	20	20	20	20
N.S.	1	0.78	0.81	0.78	0.74	0.74	0.74	0.74	0.74
time (sec)	N/A	0.178	0.010	0.186	0.211	0.274	0.077	0.267	0.067

Problem 900	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	26	31	51	38	22	66	204
N.S.	1	0.00	0.87	1.03	1.70	1.27	0.73	2.20	6.80
time (sec)	N/A	0.000	0.140	21.258	0.338	0.265	1.544	0.461	16.897

Problem 901	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	26	15	15	0	14	15	14	15
N.S.	1	1.53	0.88	0.88	0.00	0.82	0.88	0.82	0.88
time (sec)	N/A	0.405	0.114	1.457	0.000	0.275	0.160	0.275	15.191

Problem 902	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	35	23	22	28	20	26	0	19
N.S.	1	1.21	0.79	0.76	0.97	0.69	0.90	0.00	0.66
time (sec)	N/A	0.399	0.037	2.401	0.332	0.278	0.580	0.000	14.698

Problem 903	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	91	23	22	22	23	20	23	23
N.S.	1	4.55	1.15	1.10	1.10	1.15	1.00	1.15	1.15
time (sec)	N/A	0.351	0.026	0.704	0.209	0.276	0.394	0.277	0.147

Problem 904	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	17	17	12	11	17	8	11	13
N.S.	1	0.53	0.53	0.38	0.34	0.53	0.25	0.34	0.41
time (sec)	N/A	0.164	0.009	1.783	0.205	0.258	0.030	0.262	14.163

Problem 905	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	11	9	8	7	7	5	7	8
N.S.	1	0.58	0.47	0.42	0.37	0.37	0.26	0.37	0.42
time (sec)	N/A	0.121	0.001	0.041	0.199	0.248	0.018	0.265	0.043

Problem 906	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	19	19	20	19	28	15	39	20
N.S.	1	1.00	1.00	1.05	1.00	1.47	0.79	2.05	1.05
time (sec)	N/A	0.239	0.026	0.207	0.201	0.273	0.076	0.266	14.618

Problem 907	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	11	21	12	11	20	20	17	20	10
N.S.	1	1.91	1.09	1.00	1.82	1.82	1.55	1.82	0.91
time (sec)	N/A	0.140	0.001	0.102	0.206	0.252	0.028	0.266	15.315

Problem 908	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	41	29	69	94	24	254	61
N.S.	1	0.00	1.46	1.04	2.46	3.36	0.86	9.07	2.18
time (sec)	N/A	0.000	0.276	0.338	0.300	0.282	0.150	0.377	0.356

Problem 909	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	28	27	185	26	24	59	61
N.S.	1	0.00	0.90	0.87	5.97	0.84	0.77	1.90	1.97
time (sec)	N/A	0.000	0.106	5.265	0.450	0.261	0.442	1.681	17.851

Problem 910	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	25	25	22	21	23	19	21	20
N.S.	1	0.89	0.89	0.79	0.75	0.82	0.68	0.75	0.71
time (sec)	N/A	0.213	0.012	0.093	0.195	0.250	0.074	0.261	16.317

Problem 911	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F(-2)	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	34	29	0	50	26	530	29
N.S.	1	0.00	1.55	1.32	0.00	2.27	1.18	24.09	1.32
time (sec)	N/A	0.000	2.429	8.655	0.000	0.261	0.222	0.295	16.884

Problem 912	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	27	21	20	43	20	43	21
N.S.	1	0.00	1.08	0.84	0.80	1.72	0.80	1.72	0.84
time (sec)	N/A	0.000	0.209	0.643	0.341	0.270	0.128	0.277	16.663

Problem 913	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	26	21	23	20	20	26	61	17
N.S.	1	1.00	0.81	0.88	0.77	0.77	1.00	2.35	0.65
time (sec)	N/A	27.994	8.943	1.054	0.198	0.259	34.719	0.969	14.427

Problem 914	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	30	61	24	53	23	22	25	24
N.S.	1	1.15	2.35	0.92	2.04	0.88	0.85	0.96	0.92
time (sec)	N/A	0.661	0.114	0.909	0.311	0.288	0.103	0.296	14.914

Problem 915	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	41	44	104	43	37	44	43
N.S.	1	0.00	1.21	1.29	3.06	1.26	1.09	1.29	1.26
time (sec)	N/A	0.000	0.181	5.692	0.346	0.269	0.270	2.987	18.565

Problem 916	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	16	11	10	10	15	10	11
N.S.	1	1.00	0.94	0.65	0.59	0.59	0.88	0.59	0.65
time (sec)	N/A	0.141	0.018	0.157	0.186	0.255	0.042	0.252	0.068

Problem 917	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	25	19	22	21	45	17	39	21
N.S.	1	1.14	0.86	1.00	0.95	2.05	0.77	1.77	0.95
time (sec)	N/A	0.327	0.024	1.539	0.209	0.269	0.087	0.269	0.265

Problem 918	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	13	13	11	10	10	10	10	10
N.S.	1	1.00	1.00	0.85	0.77	0.77	0.77	0.77	0.77
time (sec)	N/A	0.179	0.016	0.230	0.193	0.269	0.051	0.250	14.975

Problem 919	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	0	36	29	28	34	29	0	26
N.S.	1	0.00	1.00	0.81	0.78	0.94	0.81	0.00	0.72
time (sec)	N/A	0.000	3.924	0.445	0.286	0.293	0.437	0.000	0.168

Problem 920	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	B	B	F	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	575	51	49	0	57	206	61	62
N.S.	1	26.14	2.32	2.23	0.00	2.59	9.36	2.77	2.82
time (sec)	N/A	1.634	9.581	0.339	0.000	0.275	0.505	0.259	13.657

Problem 921	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	46	24	44	44	20	44	23
N.S.	1	0.00	1.70	0.89	1.63	1.63	0.74	1.63	0.85
time (sec)	N/A	0.000	3.016	0.178	0.250	0.263	0.088	0.263	13.810

Problem 922	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	A	F(-1)	A	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	27	0	36	274	33	31	0	40	31
N.S.	1	0.00	1.33	10.15	1.22	1.15	0.00	1.48	1.15
time (sec)	N/A	0.000	0.480	11.712	0.485	0.286	0.000	1.842	20.557

Problem 923	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	22	20	21	27	25	26	27	22
N.S.	1	0.71	0.65	0.68	0.87	0.81	0.84	0.87	0.71
time (sec)	N/A	0.224	0.013	0.166	0.186	0.257	0.216	0.258	0.100

Problem 924	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	21	18	17	45	17	0	19
N.S.	1	0.00	1.00	0.86	0.81	2.14	0.81	0.00	0.90
time (sec)	N/A	0.000	1.878	10.190	0.270	0.278	32.890	0.000	14.607

Problem 925	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	14	14	14	13	13	12	17	13
N.S.	1	0.78	0.78	0.78	0.72	0.72	0.67	0.94	0.72
time (sec)	N/A	0.365	0.579	1.499	0.235	0.257	0.166	0.266	14.776

Problem 926	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	B	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	33	30	0	94	29	0	34
N.S.	1	0.00	1.03	0.94	0.00	2.94	0.91	0.00	1.06
time (sec)	N/A	0.000	0.269	24.020	0.000	0.292	0.332	0.000	16.434

Problem 927	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	15	15	15	14	14	14	14	14
N.S.	1	1.00	1.00	1.00	0.93	0.93	0.93	0.93	0.93
time (sec)	N/A	0.163	0.011	0.267	0.221	0.278	0.097	0.253	14.645

Problem 928	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	35	35	29	61	43	39	43	25
N.S.	1	1.25	1.25	1.04	2.18	1.54	1.39	1.54	0.89
time (sec)	N/A	0.230	0.041	0.359	0.213	0.269	0.097	0.262	15.224

Problem 929	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	A	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	34	50	44	35	65	51	51
N.S.	1	0.00	1.36	2.00	1.76	1.40	2.60	2.04	2.04
time (sec)	N/A	0.000	3.558	0.311	0.240	0.277	0.109	0.272	15.148

Problem 930	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	28	34	37	35	36	48	36	34
N.S.	1	1.33	1.62	1.76	1.67	1.71	2.29	1.71	1.62
time (sec)	N/A	0.289	0.025	0.741	0.200	0.264	0.712	0.252	0.278

Problem 931	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	29	22	19	40	22	17	18	33
N.S.	1	1.32	1.00	0.86	1.82	1.00	0.77	0.82	1.50
time (sec)	N/A	0.195	0.023	0.968	0.189	0.259	0.066	0.260	15.501

Problem 932	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	28	25	0	24	134	26	27
N.S.	1	0.00	1.12	1.00	0.00	0.96	5.36	1.04	1.08
time (sec)	N/A	0.000	0.042	0.815	0.000	0.259	2.378	0.266	0.203

Problem 933	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	26	32	91	34	17	0	20
N.S.	1	0.00	0.93	1.14	3.25	1.21	0.61	0.00	0.71
time (sec)	N/A	0.000	2.133	0.341	0.342	0.261	0.363	0.000	15.724

Problem 934	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	27	23	26	22	31	37	0
N.S.	1	0.00	1.00	0.85	0.96	0.81	1.15	1.37	0.00
time (sec)	N/A	0.000	0.099	47.987	0.335	0.259	0.452	0.343	0.000

Problem 935	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	23	21	50	33	141	42	40	33
N.S.	1	1.00	0.91	2.17	1.43	6.13	1.83	1.74	1.43
time (sec)	N/A	1.076	0.428	1.449	0.378	0.270	0.393	0.271	16.312

Problem 936	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	25	29	23	25	21	19	25	22
N.S.	1	0.86	1.00	0.79	0.86	0.72	0.66	0.86	0.76
time (sec)	N/A	0.581	0.064	0.895	0.244	0.281	0.155	0.287	16.416

Problem 937	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	17	16	29	15	14	27	15
N.S.	1	1.00	1.00	0.94	1.71	0.88	0.82	1.59	0.88
time (sec)	N/A	0.214	0.084	0.914	0.248	0.249	0.068	0.258	15.230

Problem 938	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	33	37	37	37	27	37	29
N.S.	1	0.00	0.97	1.09	1.09	1.09	0.79	1.09	0.85
time (sec)	N/A	0.000	0.334	4.223	0.320	0.261	0.105	0.272	15.372

Problem 939	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	18	17	36	16	17	0	16
N.S.	1	0.00	0.82	0.77	1.64	0.73	0.77	0.00	0.73
time (sec)	N/A	0.000	0.208	2.249	0.383	0.268	0.364	0.000	15.701

Problem 940	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	C	A	A	A	A	C	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	72	70	33	32	32	34	43	25
N.S.	1	2.88	2.80	1.32	1.28	1.28	1.36	1.72	1.00
time (sec)	N/A	0.218	0.091	0.254	0.185	0.266	0.051	0.268	0.075

Problem 941	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F(-1)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	34	30	55	52	27	0	40
N.S.	1	0.00	1.06	0.94	1.72	1.62	0.84	0.00	1.25
time (sec)	N/A	0.000	0.549	0.240	0.349	0.278	1.175	0.000	15.527

Problem 942	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	45	47	36	31	48	26	54	31
N.S.	1	1.32	1.38	1.06	0.91	1.41	0.76	1.59	0.91
time (sec)	N/A	0.580	0.052	2.308	0.260	0.273	4.556	0.276	15.738

Problem 943	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	25	31	26	26	29	26	0
N.S.	1	0.00	0.81	1.00	0.84	0.84	0.94	0.84	0.00
time (sec)	N/A	0.000	6.059	7.396	0.333	0.265	0.102	0.301	0.000

Problem 944	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	18	16	13	12	12	12	12	14
N.S.	1	0.95	0.84	0.68	0.63	0.63	0.63	0.63	0.74
time (sec)	N/A	0.227	0.024	0.189	0.186	0.260	0.083	0.282	0.076

Problem 945	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	16	19	16	15	15	14	15	15
N.S.	1	0.64	0.76	0.64	0.60	0.60	0.56	0.60	0.60
time (sec)	N/A	0.181	0.031	0.095	0.188	0.265	0.055	0.287	0.064

Problem 946	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	53	18	18	0	22	17	21	17
N.S.	1	2.52	0.86	0.86	0.00	1.05	0.81	1.00	0.81
time (sec)	N/A	0.290	0.050	0.319	0.000	0.244	0.140	0.283	14.640

Problem 947	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F(-2)	A	F(-2)	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	197	36	32	0	36	0	37	69
N.S.	1	5.97	1.09	0.97	0.00	1.09	0.00	1.12	2.09
time (sec)	N/A	1.303	0.094	1.944	0.000	0.262	0.000	0.860	14.235

Problem 948	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	25	23	23	29	22	26	22	18
N.S.	1	1.39	1.28	1.28	1.61	1.22	1.44	1.22	1.00
time (sec)	N/A	0.205	0.029	0.398	0.217	0.286	0.079	0.284	13.328

Problem 949	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	30	14	12	24	19	15	24	13
N.S.	1	1.67	0.78	0.67	1.33	1.06	0.83	1.33	0.72
time (sec)	N/A	0.153	0.002	0.261	0.189	0.263	0.057	0.284	13.373

Problem 950	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	29	14	17	12	16	10	12	13
N.S.	1	2.07	1.00	1.21	0.86	1.14	0.71	0.86	0.93
time (sec)	N/A	0.196	0.019	0.878	0.250	0.282	0.088	0.275	13.425

Problem 951	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	247	24	43	36	52	49	52	50
N.S.	1	10.29	1.00	1.79	1.50	2.17	2.04	2.17	2.08
time (sec)	N/A	1.441	0.168	2.900	0.306	0.257	0.347	2.231	14.755

Problem 952	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	22	22	23	22	22	26	22	22
N.S.	1	1.69	1.69	1.77	1.69	1.69	2.00	1.69	1.69
time (sec)	N/A	0.177	0.010	0.241	0.183	0.271	0.055	0.265	14.807

Problem 953	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	A	F(-1)	F	F(-1)
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	32	0	41	172	46	49	0	0	0
N.S.	1	0.00	1.28	5.38	1.44	1.53	0.00	0.00	0.00
time (sec)	N/A	0.000	0.251	0.201	0.469	0.285	0.000	0.000	0.000

Problem 954	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	C	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	24	33	43	33	20	79	22
N.S.	1	0.00	1.04	1.43	1.87	1.43	0.87	3.43	0.96
time (sec)	N/A	0.000	0.280	5.581	0.299	0.276	0.088	0.444	17.969

Problem 955	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	26	23	23	26	42	24	28	27
N.S.	1	0.90	0.79	0.79	0.90	1.45	0.83	0.97	0.93
time (sec)	N/A	0.287	0.021	0.158	0.184	0.262	0.177	0.274	14.312

Problem 956	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	28	28	26	26	26	26	27	26
N.S.	1	1.00	1.00	0.93	0.93	0.93	0.93	0.96	0.93
time (sec)	N/A	0.470	0.027	0.244	0.210	0.268	0.258	0.266	0.166

Problem 957	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	C	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	28	26	46	28	26	28	24
N.S.	1	0.00	1.12	1.04	1.84	1.12	1.04	1.12	0.96
time (sec)	N/A	0.000	0.180	0.314	0.236	0.270	0.048	0.281	14.739

Problem 958	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	32	36	38	38	37	0	0
N.S.	1	0.00	0.97	1.09	1.15	1.15	1.12	0.00	0.00
time (sec)	N/A	0.000	1.196	272.625	0.227	0.280	0.274	0.000	0.000

Problem 959	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	19	18	26	69	65	73	206	0
N.S.	1	0.95	0.90	1.30	3.45	3.25	3.65	10.30	0.00
time (sec)	N/A	0.566	0.038	3.302	0.337	0.269	0.221	0.286	0.000

Problem 960	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	85	70	56	79	57	53	65	47
N.S.	1	2.93	2.41	1.93	2.72	1.97	1.83	2.24	1.62
time (sec)	N/A	0.292	0.016	0.315	0.202	0.273	0.081	0.279	15.186

Problem 961	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	29	21	0	20	20	0	20
N.S.	1	0.00	1.12	0.81	0.00	0.77	0.77	0.00	0.77
time (sec)	N/A	0.000	0.619	222.633	0.000	0.280	0.371	0.000	0.427

Problem 962	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F(-2)	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	26	28	0	42	20	49	73
N.S.	1	0.00	0.96	1.04	0.00	1.56	0.74	1.81	2.70
time (sec)	N/A	0.000	0.606	3.584	0.000	0.267	0.102	0.318	15.877

Problem 963	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	42	37	39	41	41	54	41	49
N.S.	1	1.45	1.28	1.34	1.41	1.41	1.86	1.41	1.69
time (sec)	N/A	0.171	0.021	0.211	0.194	0.255	0.025	0.266	15.116

Problem 964	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	45	18	18	17	17	15	17	17
N.S.	1	2.05	0.82	0.82	0.77	0.77	0.68	0.77	0.77
time (sec)	N/A	0.662	0.357	0.089	0.233	0.255	0.061	0.264	15.269

Problem 965	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	414	147	216	188	182	236	176	189
N.S.	1	14.79	5.25	7.71	6.71	6.50	8.43	6.29	6.75
time (sec)	N/A	0.814	6.224	0.513	0.275	0.278	0.195	0.283	0.282

Problem 966	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	21	19	60	18	15	18	18
N.S.	1	0.00	1.05	0.95	3.00	0.90	0.75	0.90	0.90
time (sec)	N/A	0.000	0.335	2.286	0.243	0.270	0.279	1.480	15.100

Problem 967	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	35	36	32	32	34	36	36
N.S.	1	0.00	1.13	1.16	1.03	1.03	1.10	1.16	1.16
time (sec)	N/A	0.000	4.101	0.105	0.240	0.271	0.189	0.280	15.310

Problem 968	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	58	52	56	54	54	61	54	54
N.S.	1	2.15	1.93	2.07	2.00	2.00	2.26	2.00	2.00
time (sec)	N/A	0.522	0.177	0.321	0.275	0.270	0.117	0.280	15.155

Problem 969	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	26	18	18	21	17	15	19	12
N.S.	1	1.44	1.00	1.00	1.17	0.94	0.83	1.06	0.67
time (sec)	N/A	0.212	0.120	0.192	0.213	0.274	0.133	0.284	15.345

Problem 970	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	80	89	28	93	59	99	100	185
N.S.	1	3.64	4.05	1.27	4.23	2.68	4.50	4.55	8.41
time (sec)	N/A	0.336	0.049	1.690	0.185	0.281	0.183	0.262	14.443

Problem 971	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	21	28	19	18	18	19	18	18
N.S.	1	1.05	1.40	0.95	0.90	0.90	0.95	0.90	0.90
time (sec)	N/A	0.165	0.029	0.130	0.183	0.271	0.044	0.282	14.957

Problem 972	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	113	20	23	90	25	31	25	26
N.S.	1	4.04	0.71	0.82	3.21	0.89	1.11	0.89	0.93
time (sec)	N/A	1.038	2.419	0.545	0.234	0.278	0.092	0.276	0.173

Problem 973	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	49	20	20	26	20	20	20	18
N.S.	1	2.33	0.95	0.95	1.24	0.95	0.95	0.95	0.86
time (sec)	N/A	0.483	0.301	1.344	0.236	0.270	0.084	0.271	0.111

Problem 974	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	16	16	15	16	16	15	17	16
N.S.	1	0.73	0.73	0.68	0.73	0.73	0.68	0.77	0.73
time (sec)	N/A	0.153	0.006	0.141	0.208	0.261	0.062	0.294	0.085

Problem 975	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	10	14	10	9	12	10	9	9
N.S.	1	0.56	0.78	0.56	0.50	0.67	0.56	0.50	0.50
time (sec)	N/A	0.126	0.000	0.126	0.215	0.258	0.021	0.267	0.002

Problem 976	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	20	19	18	18	17	22	18
N.S.	1	0.00	0.91	0.86	0.82	0.82	0.77	1.00	0.82
time (sec)	N/A	0.000	0.647	0.976	0.247	0.276	0.079	0.285	0.115

Problem 977	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	13	13	14	13	13	10	13	13
N.S.	1	0.76	0.76	0.82	0.76	0.76	0.59	0.76	0.76
time (sec)	N/A	0.164	0.002	0.138	0.199	0.264	0.055	0.276	14.417

Problem 978	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	19	19	29	29	17	29	20
N.S.	1	0.00	0.95	0.95	1.45	1.45	0.85	1.45	1.00
time (sec)	N/A	0.000	2.086	0.135	0.216	0.269	0.064	0.271	16.068

Problem 979	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	23	23	23	24	22	20	27	20
N.S.	1	0.79	0.79	0.79	0.83	0.76	0.69	0.93	0.69
time (sec)	N/A	0.266	0.019	0.204	0.197	0.271	0.359	0.277	15.193

Problem 980	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	20	27	24	24	26	50	24
N.S.	1	0.00	0.83	1.12	1.00	1.00	1.08	2.08	1.00
time (sec)	N/A	0.000	0.282	94.447	0.358	0.267	0.453	1.891	19.320

Problem 981	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	56	25	51	0	49	26	48	0
N.S.	1	1.75	0.78	1.59	0.00	1.53	0.81	1.50	0.00
time (sec)	N/A	0.512	5.074	1.436	0.000	0.273	0.134	0.267	0.000

Problem 982	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	0	104	1104	124	352	413	830	0
N.S.	1	0.00	2.89	30.67	3.44	9.78	11.47	23.06	0.00
time (sec)	N/A	0.000	0.458	6.988	0.444	0.290	1.419	76.990	0.000

Problem 983	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	20	20	17	18	16	19	18	18
N.S.	1	0.91	0.91	0.77	0.82	0.73	0.86	0.82	0.82
time (sec)	N/A	0.472	0.036	1.400	0.315	0.273	0.130	0.323	15.904

Problem 984	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	126	101	91	120	78	90	129	74
N.S.	1	7.00	5.61	5.06	6.67	4.33	5.00	7.17	4.11
time (sec)	N/A	0.265	0.023	0.224	0.186	0.276	0.131	0.284	15.222

Problem 985	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	19	18	19	18	18	17	18	14
N.S.	1	1.12	1.06	1.12	1.06	1.06	1.00	1.06	0.82
time (sec)	N/A	0.170	0.007	0.169	0.179	0.252	0.050	0.274	0.069

Problem 986	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	37	24	29	65	34	37	161	44
N.S.	1	1.42	0.92	1.12	2.50	1.31	1.42	6.19	1.69
time (sec)	N/A	0.353	0.024	1.995	0.303	0.259	0.212	0.294	14.824

Problem 987	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	48	32	28	93	34	26	27	41
N.S.	1	1.71	1.14	1.00	3.32	1.21	0.93	0.96	1.46
time (sec)	N/A	0.585	0.090	0.479	0.254	0.257	0.103	0.272	13.772

Problem 988	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	A	A	A	A	A	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	28	31	0	29	31	42	34	31	41
N.S.	1	1.11	0.00	1.04	1.11	1.50	1.21	1.11	1.46
time (sec)	N/A	0.452	0.000	0.390	0.184	0.259	0.195	0.330	13.932

Problem 989	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	37	40	35	39	39	52	36
N.S.	1	0.00	1.19	1.29	1.13	1.26	1.26	1.68	1.16
time (sec)	N/A	0.000	4.778	0.183	0.250	0.296	0.143	0.297	14.902

Problem 990	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	24	26	21	19	36	26	21	20
N.S.	1	0.86	0.93	0.75	0.68	1.29	0.93	0.75	0.71
time (sec)	N/A	0.180	0.006	0.182	0.192	0.258	0.055	0.270	0.074

Problem 991	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F(-2)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	33	35	61	39	37	0	68
N.S.	1	0.00	1.22	1.30	2.26	1.44	1.37	0.00	2.52
time (sec)	N/A	0.000	0.164	2.097	0.415	0.276	0.255	0.000	15.158

Problem 992	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	5	5	5	4	4	3	4	4
N.S.	1	0.50	0.50	0.50	0.40	0.40	0.30	0.40	0.40
time (sec)	N/A	0.129	0.000	0.167	0.194	0.252	0.039	0.266	0.009

Problem 993	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	18	28	17	14	14	14	14	16
N.S.	1	1.29	2.00	1.21	1.00	1.00	1.00	1.00	1.14
time (sec)	N/A	0.130	0.000	0.109	0.189	0.241	0.024	0.264	0.002

Problem 994	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	11	12	13	11	14	14	12	14	13
N.S.	1	1.09	1.18	1.00	1.27	1.27	1.09	1.27	1.18
time (sec)	N/A	0.126	0.000	0.229	0.216	0.243	0.030	0.276	0.044

Problem 995	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	11	11	11	10	10	7	10	10
N.S.	1	0.92	0.92	0.92	0.83	0.83	0.58	0.83	0.83
time (sec)	N/A	0.147	0.002	0.116	0.190	0.280	0.038	0.266	14.004

Problem 996	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	19	17	15	14	14	15	14	14
N.S.	1	0.79	0.71	0.62	0.58	0.58	0.62	0.58	0.58
time (sec)	N/A	0.149	0.002	0.200	0.206	0.288	0.023	0.273	0.032

Problem 997	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	24	20	19	31	27	49	20
N.S.	1	0.00	1.09	0.91	0.86	1.41	1.23	2.23	0.91
time (sec)	N/A	0.000	0.497	0.293	0.217	0.261	0.099	0.287	0.107

Problem 998	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	28	29	47	25	22	1234	0
N.S.	1	0.00	1.04	1.07	1.74	0.93	0.81	45.70	0.00
time (sec)	N/A	0.000	0.120	4.559	0.353	0.260	0.506	0.605	0.000

Problem 999	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	B	B	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	41	24	43	43	31	24	24
N.S.	1	0.00	2.16	1.26	2.26	2.26	1.63	1.26	1.26
time (sec)	N/A	0.000	0.334	1.760	0.233	0.278	0.411	0.292	15.730

Problem 1000	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	141	33	31	0	38	41	0	57
N.S.	1	5.22	1.22	1.15	0.00	1.41	1.52	0.00	2.11
time (sec)	N/A	0.667	0.164	9.621	0.000	0.259	1.116	0.000	15.573

Problem 1001	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	28	28	26	25	26	19	25	27
N.S.	1	1.00	1.00	0.93	0.89	0.93	0.68	0.89	0.96
time (sec)	N/A	0.839	5.129	1.502	0.367	0.253	0.495	0.337	16.377

Problem 1002	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	52	48	47	137	60	49	0	44
N.S.	1	2.48	2.29	2.24	6.52	2.86	2.33	0.00	2.10
time (sec)	N/A	0.831	0.078	0.194	0.260	0.273	0.120	0.000	16.011

Problem 1003	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	62	56	40	72	42	41	43	35
N.S.	1	2.21	2.00	1.43	2.57	1.50	1.46	1.54	1.25
time (sec)	N/A	0.357	0.127	0.386	0.274	0.258	0.196	0.276	0.171

Problem 1004	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	24	23	21	20	23	22	20	20
N.S.	1	1.04	1.00	0.91	0.87	1.00	0.96	0.87	0.87
time (sec)	N/A	0.146	0.010	0.196	0.197	0.243	0.022	0.275	17.280

Problem 1005	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	A	A	A	A	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	0	31	43	29	31	29	30
N.S.	1	0.00	0.00	1.24	1.72	1.16	1.24	1.16	1.20
time (sec)	N/A	0.000	0.000	1.508	0.287	0.275	0.325	0.329	16.980

Problem 1006	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	37	89	155	96	95	135	0
N.S.	1	0.00	1.19	2.87	5.00	3.10	3.06	4.35	0.00
time (sec)	N/A	0.000	0.174	6.076	0.335	0.275	0.407	0.310	0.000

Problem 1007	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	10	10	11	10	10	10	11	10
N.S.	1	1.00	1.00	1.10	1.00	1.00	1.00	1.10	1.00
time (sec)	N/A	0.183	0.002	0.115	0.187	0.256	0.068	0.277	16.367

Problem 1008	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	14	12	11	12	10	8	12	10
N.S.	1	1.08	0.92	0.85	0.92	0.77	0.62	0.92	0.77
time (sec)	N/A	0.151	0.002	0.049	0.190	0.265	0.042	0.276	16.049

Problem 1009	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	31	19	18	43	17	19	27	19
N.S.	1	1.63	1.00	0.95	2.26	0.89	1.00	1.42	1.00
time (sec)	N/A	0.221	0.105	0.610	0.212	0.270	0.076	0.271	0.066

Problem 1010	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	43	46	95	57	34	235	70
N.S.	1	0.00	1.59	1.70	3.52	2.11	1.26	8.70	2.59
time (sec)	N/A	0.000	0.064	61.330	0.242	0.257	0.108	0.388	18.190

Problem 1011	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	27	0	27	195	36	23	26	29	0
N.S.	1	0.00	1.00	7.22	1.33	0.85	0.96	1.07	0.00
time (sec)	N/A	0.000	0.109	0.437	0.344	0.257	1.453	0.294	0.000

Problem 1012	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	5	5	6	5	5	3	5	5
N.S.	1	0.36	0.36	0.43	0.36	0.36	0.21	0.36	0.36
time (sec)	N/A	0.119	0.000	0.026	0.190	0.248	0.026	0.278	0.017

Problem 1013	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	39	22	23	54	22	17	27	25
N.S.	1	1.62	0.92	0.96	2.25	0.92	0.71	1.12	1.04
time (sec)	N/A	0.457	0.057	0.529	0.320	0.264	0.078	0.283	16.278

Problem 1014	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	42	28	27	229	44	22	46	30
N.S.	1	1.24	0.82	0.79	6.74	1.29	0.65	1.35	0.88
time (sec)	N/A	1.835	1.164	0.348	0.240	0.288	0.080	0.279	16.692

Problem 1015	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	56	36	48	0	54	53	70	49
N.S.	1	2.24	1.44	1.92	0.00	2.16	2.12	2.80	1.96
time (sec)	N/A	1.426	0.549	0.176	0.000	0.271	0.145	0.360	15.976

Problem 1016	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	22	14	14	16	16	14	16	18
N.S.	1	1.47	0.93	0.93	1.07	1.07	0.93	1.07	1.20
time (sec)	N/A	0.139	0.003	0.202	0.194	0.253	0.023	0.293	0.121

Problem 1017	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	17	17	16	15	20	12	20	15
N.S.	1	0.94	0.94	0.89	0.83	1.11	0.67	1.11	0.83
time (sec)	N/A	0.168	0.014	0.321	0.206	0.247	0.073	0.286	0.087

Problem 1018	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	F(-1)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	38	37	0	29	0	0	118
N.S.	1	0.00	1.46	1.42	0.00	1.12	0.00	0.00	4.54
time (sec)	N/A	0.000	0.542	0.145	0.000	0.274	0.000	0.000	16.286

Problem 1019	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	28	32	46	45	26	46	59
N.S.	1	0.00	0.82	0.94	1.35	1.32	0.76	1.35	1.74
time (sec)	N/A	0.000	5.486	0.398	0.249	0.261	0.111	0.296	15.691

Problem 1020	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	14	15	14	14	10	14	14
N.S.	1	0.00	0.70	0.75	0.70	0.70	0.50	0.70	0.70
time (sec)	N/A	0.000	0.262	1.399	0.232	0.239	0.054	0.282	0.315

Problem 1021	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	19	18	21	30	20	19	27	20
N.S.	1	1.00	0.95	1.11	1.58	1.05	1.00	1.42	1.05
time (sec)	N/A	1.137	0.319	2.152	0.220	0.253	0.438	0.348	15.318

Problem 1022	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	18	18	27	20	19	20	17
N.S.	1	0.00	1.00	1.00	1.50	1.11	1.06	1.11	0.94
time (sec)	N/A	0.000	0.477	4.781	0.343	0.253	0.090	0.303	17.023

Problem 1023	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	29	24	23	23	24	33	23
N.S.	1	0.00	1.16	0.96	0.92	0.92	0.96	1.32	0.92
time (sec)	N/A	0.000	0.686	0.556	0.253	0.259	0.179	0.288	19.192

Problem 1024	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	A	A	A	B	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	0	21	23	20	19	42	17
N.S.	1	0.00	0.00	1.05	1.15	1.00	0.95	2.10	0.85
time (sec)	N/A	0.000	0.000	0.896	0.333	0.255	0.160	0.268	18.846

Problem 1025	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	27	31	35	30	27	0	30
N.S.	1	0.00	1.00	1.15	1.30	1.11	1.00	0.00	1.11
time (sec)	N/A	0.000	0.098	16.682	0.260	0.254	4.970	0.000	19.902

Problem 1026	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	140	76	70	70	73	76	73	68
N.S.	1	5.19	2.81	2.59	2.59	2.70	2.81	2.70	2.52
time (sec)	N/A	0.312	0.068	0.267	0.284	0.266	0.202	0.275	18.983

Problem 1027	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	29	26	36	74	44	22	48	25
N.S.	1	0.97	0.87	1.20	2.47	1.47	0.73	1.60	0.83
time (sec)	N/A	1.347	1.621	0.626	0.223	0.265	0.100	0.286	17.715

Problem 1028	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	210	18	18	224	17	17	139	17
N.S.	1	8.08	0.69	0.69	8.62	0.65	0.65	5.35	0.65
time (sec)	N/A	0.985	0.327	1.380	0.277	0.264	0.099	0.272	0.186

Problem 1029	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	36	26	30	50	30	22	29	0
N.S.	1	1.80	1.30	1.50	2.50	1.50	1.10	1.45	0.00
time (sec)	N/A	0.246	0.128	0.214	0.234	0.260	0.147	0.270	0.000

Problem 1030	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	49	53	103	103	70	75	0
N.S.	1	0.00	2.04	2.21	4.29	4.29	2.92	3.12	0.00
time (sec)	N/A	0.000	0.078	1.486	0.239	0.255	0.126	0.294	0.000

Problem 1031	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	55	53	28	115	27	22	117	27
N.S.	1	1.90	1.83	0.97	3.97	0.93	0.76	4.03	0.93
time (sec)	N/A	0.361	0.052	2.139	0.237	0.275	0.169	0.283	0.263

Problem 1032	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	44	17	16	15	15	14	17	16
N.S.	1	2.10	0.81	0.76	0.71	0.71	0.67	0.81	0.76
time (sec)	N/A	0.252	0.013	1.434	0.183	0.250	0.098	0.280	0.085

Problem 1033	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	A	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	18	42	199	34	37	56	0
N.S.	1	0.00	1.00	2.33	11.06	1.89	2.06	3.11	0.00
time (sec)	N/A	0.000	0.358	1.705	0.632	0.257	0.520	1.143	0.000

Problem 1034	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	F(-2)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	23	20	51	68	0	0	26
N.S.	1	0.00	1.00	0.87	2.22	2.96	0.00	0.00	1.13
time (sec)	N/A	0.000	5.280	28.123	0.546	0.274	0.000	0.000	17.708

Problem 1035	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	29	75	112	79	75	0	121
N.S.	1	0.00	1.07	2.78	4.15	2.93	2.78	0.00	4.48
time (sec)	N/A	0.000	0.276	5.086	0.671	0.260	1.004	0.000	17.645

Problem 1036	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	26	31	48	47	26	30	45
N.S.	1	0.00	0.90	1.07	1.66	1.62	0.90	1.03	1.55
time (sec)	N/A	0.000	0.419	1.901	0.313	0.260	0.074	0.274	18.262

Problem 1037	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	15	15	15	15	15	15	15	14
N.S.	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.93
time (sec)	N/A	0.173	0.009	0.226	0.193	0.250	0.095	0.275	17.768

Problem 1038	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	25	25	26	88	25	22	25	25
N.S.	1	1.39	1.39	1.44	4.89	1.39	1.22	1.39	1.39
time (sec)	N/A	0.205	0.015	0.055	0.189	0.265	0.071	0.280	16.987

Problem 1039	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	F(-1)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	23	23	78	18	0	22	21
N.S.	1	0.00	1.00	1.00	3.39	0.78	0.00	0.96	0.91
time (sec)	N/A	0.000	0.103	0.562	0.227	0.246	0.000	0.278	18.073

Problem 1040	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	26	26	28	555	61	60	72	72
N.S.	1	0.93	0.93	1.00	19.82	2.18	2.14	2.57	2.57
time (sec)	N/A	4.836	0.137	32.720	0.625	0.254	1.942	3.757	18.390

Problem 1041	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	28	32	23	24	22	24	23	22
N.S.	1	1.04	1.19	0.85	0.89	0.81	0.89	0.85	0.81
time (sec)	N/A	0.218	0.011	0.102	0.184	0.250	0.105	0.276	18.260

Problem 1042	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	19	22	20	33	25	22	19	12
N.S.	1	1.12	1.29	1.18	1.94	1.47	1.29	1.12	0.71
time (sec)	N/A	0.306	0.072	0.350	0.208	0.244	0.103	0.280	17.620

Problem 1043	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	31	30	43	37	29	29	44
N.S.	1	0.00	1.35	1.30	1.87	1.61	1.26	1.26	1.91
time (sec)	N/A	0.000	0.271	1.750	0.313	0.259	0.212	0.286	15.435

Problem 1044	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	21	22	16	21	21	17	21	19
N.S.	1	1.11	1.16	0.84	1.11	1.11	0.89	1.11	1.00
time (sec)	N/A	0.153	0.000	0.137	0.184	0.254	0.025	0.270	0.032

Problem 1045	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	27	17	17	34	19	12	19	17
N.S.	1	1.35	0.85	0.85	1.70	0.95	0.60	0.95	0.85
time (sec)	N/A	0.209	0.105	0.074	0.193	0.279	0.101	0.288	15.198

Problem 1046	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	16	13	10	11	11	10	11	11
N.S.	1	0.67	0.54	0.42	0.46	0.46	0.42	0.46	0.46
time (sec)	N/A	0.128	0.001	0.165	0.187	0.231	0.029	0.297	0.037

Problem 1047	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	20	17	14	13	13	15	13	15
N.S.	1	0.83	0.71	0.58	0.54	0.54	0.62	0.54	0.62
time (sec)	N/A	0.219	0.032	0.380	0.191	0.268	0.053	0.273	0.097

Problem 1048	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	17	17	18	30	17	19	30	15
N.S.	1	0.94	0.94	1.00	1.67	0.94	1.06	1.67	0.83
time (sec)	N/A	0.150	0.005	0.149	0.197	0.266	0.061	0.273	15.431

Problem 1049	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	62	21	28	37	37	36	27	21
N.S.	1	3.44	1.17	1.56	2.06	2.06	2.00	1.50	1.17
time (sec)	N/A	0.278	0.010	0.084	0.203	0.247	0.070	0.279	14.986

Problem 1050	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	27	27	26	25	25	26	25	25
N.S.	1	1.69	1.69	1.62	1.56	1.56	1.62	1.56	1.56
time (sec)	N/A	0.774	0.137	1.358	0.241	0.245	0.109	0.286	15.261

Problem 1051	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	23	23	23	92	25	23	22	25	0
N.S.	1	1.00	1.00	4.00	1.09	1.00	0.96	1.09	0.00
time (sec)	N/A	2.524	0.090	0.014	0.260	0.258	0.622	5.058	0.000

Problem 1052	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	29	19	17	28	20	15	20	16
N.S.	1	1.00	0.66	0.59	0.97	0.69	0.52	0.69	0.55
time (sec)	N/A	0.299	0.021	0.240	0.191	0.268	0.093	0.277	15.591

Problem 1053	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	26	19	11	18	18	17	18	10
N.S.	1	1.30	0.95	0.55	0.90	0.90	0.85	0.90	0.50
time (sec)	N/A	0.143	0.001	0.235	0.183	0.236	0.026	0.280	0.036

Problem 1054	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	24	22	30	22	33	24	26	20
N.S.	1	1.09	1.00	1.36	1.00	1.50	1.09	1.18	0.91
time (sec)	N/A	0.193	0.017	0.502	0.194	0.252	0.075	0.277	15.492

Problem 1055	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	31	28	24	30	22	22	30	18
N.S.	1	1.29	1.17	1.00	1.25	0.92	0.92	1.25	0.75
time (sec)	N/A	0.159	0.060	0.209	0.192	0.254	0.063	0.285	0.154

Problem 1056	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	16	22	16	15	20	12	25	20
N.S.	1	0.94	1.29	0.94	0.88	1.18	0.71	1.47	1.18
time (sec)	N/A	0.442	0.304	1.633	0.226	0.262	0.074	0.285	0.098

Problem 1057	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	28	26	37	23	36	36	72	47
N.S.	1	1.08	1.00	1.42	0.88	1.38	1.38	2.77	1.81
time (sec)	N/A	0.799	0.185	9.300	1.606	0.261	0.295	0.436	16.712

Problem 1058	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	29	29	28	31	32	27	32	27
N.S.	1	1.00	1.00	0.97	1.07	1.10	0.93	1.10	0.93
time (sec)	N/A	0.210	0.031	0.389	0.240	0.272	0.052	0.279	15.694

Problem 1059	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	69	34	41	49	49	48	48	53
N.S.	1	2.56	1.26	1.52	1.81	1.81	1.78	1.78	1.96
time (sec)	N/A	0.446	0.031	0.226	0.201	0.249	0.519	0.293	15.970

Problem 1060	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	36	16	13	311	15	15	17	17
N.S.	1	1.80	0.80	0.65	15.55	0.75	0.75	0.85	0.85
time (sec)	N/A	0.174	0.403	0.362	0.345	0.261	0.061	0.278	0.133

Problem 1061	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	30	27	28	27	29	24	27	30
N.S.	1	1.20	1.08	1.12	1.08	1.16	0.96	1.08	1.20
time (sec)	N/A	0.540	0.558	0.673	0.307	0.247	0.157	0.347	17.078

Problem 1062	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	28	25	28	23	26	24	23
N.S.	1	0.00	0.97	0.86	0.97	0.79	0.90	0.83	0.79
time (sec)	N/A	0.000	0.168	1.205	0.241	0.261	0.134	0.280	16.044

Problem 1063	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	9	13	9	7	6	6	7	6	6
N.S.	1	1.44	1.00	0.78	0.67	0.67	0.78	0.67	0.67
time (sec)	N/A	0.135	0.001	0.176	0.203	0.262	0.037	0.270	15.625

Problem 1064	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	28	28	24	0	34	27	35	34
N.S.	1	1.00	1.00	0.86	0.00	1.21	0.96	1.25	1.21
time (sec)	N/A	0.553	0.252	0.589	0.000	0.273	0.190	0.298	16.512

Problem 1065	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	14	14	14	13	13	12	13	13
N.S.	1	0.56	0.56	0.56	0.52	0.52	0.48	0.52	0.52
time (sec)	N/A	0.414	0.181	1.516	0.259	0.253	0.194	0.283	16.396

Problem 1066	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	62	36	33	0	27	48	39	39
N.S.	1	2.30	1.33	1.22	0.00	1.00	1.78	1.44	1.44
time (sec)	N/A	0.495	0.383	0.387	0.000	0.268	0.196	0.273	16.250

Problem 1067	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	89	23	60	69	74	70	78	24
N.S.	1	3.42	0.88	2.31	2.65	2.85	2.69	3.00	0.92
time (sec)	N/A	0.313	0.069	0.676	0.287	0.263	0.134	0.277	0.233

Problem 1068	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	21	21	20	19	27	19	19	21
N.S.	1	1.00	1.00	0.95	0.90	1.29	0.90	0.90	1.00
time (sec)	N/A	0.218	0.038	0.234	0.197	0.248	0.081	0.272	15.674

Problem 1069	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	19	19	18	17	17	15	19	17
N.S.	1	1.19	1.19	1.12	1.06	1.06	0.94	1.19	1.06
time (sec)	N/A	0.246	0.011	0.113	0.192	0.260	0.067	0.267	16.373

Problem 1070	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	10	10	11	10	12	7	10	12
N.S.	1	0.53	0.53	0.58	0.53	0.63	0.37	0.53	0.63
time (sec)	N/A	0.155	0.001	0.063	0.199	0.264	0.039	0.270	0.026

Problem 1071	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	33	28	29	25	37	26	48	55
N.S.	1	1.43	1.22	1.26	1.09	1.61	1.13	2.09	2.39
time (sec)	N/A	1.776	0.321	1.243	0.292	0.275	0.150	0.308	17.243

Problem 1072	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	A	A	A	A	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	0	24	39	23	24	30	51
N.S.	1	0.00	0.00	0.86	1.39	0.82	0.86	1.07	1.82
time (sec)	N/A	0.000	0.000	0.208	0.341	0.252	0.163	0.439	22.499

Problem 1073	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	24	75	68	56	73	69	259
N.S.	1	0.00	0.92	2.88	2.62	2.15	2.81	2.65	9.96
time (sec)	N/A	0.000	2.698	1.566	0.343	0.262	0.144	0.366	19.189

Problem 1074	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	193	62	46	58	53	58	58	53
N.S.	1	7.72	2.48	1.84	2.32	2.12	2.32	2.32	2.12
time (sec)	N/A	1.394	0.035	2.007	0.291	0.252	0.725	0.282	17.388

Problem 1075	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	20	22	29	30	24	0	19
N.S.	1	0.00	0.87	0.96	1.26	1.30	1.04	0.00	0.83
time (sec)	N/A	0.000	0.390	2.325	0.328	0.252	0.144	0.000	17.584

Problem 1076	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	31	21	49	40	34	54	44
N.S.	1	0.00	1.29	0.88	2.04	1.67	1.42	2.25	1.83
time (sec)	N/A	0.000	1.510	0.966	0.516	0.274	0.218	0.318	17.338

Problem 1077	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	510	26	27	34	30	32	38	26
N.S.	1	16.45	0.84	0.87	1.10	0.97	1.03	1.23	0.84
time (sec)	N/A	1.613	3.599	1.454	0.258	0.281	0.117	0.267	16.733

Problem 1078	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	9	12	10	11	12	12	8	10	10
N.S.	1	1.33	1.11	1.22	1.33	1.33	0.89	1.11	1.11
time (sec)	N/A	0.175	0.023	0.224	0.214	0.244	0.051	0.269	16.717

Problem 1079	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	24	26	116	116	117	432	0
N.S.	1	0.00	1.00	1.08	4.83	4.83	4.88	18.00	0.00
time (sec)	N/A	0.000	5.075	13.376	0.419	0.266	0.300	1.472	0.000

Problem 1080	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	19	17	18	18	17	17	17	17
N.S.	1	0.90	0.81	0.86	0.86	0.81	0.81	0.81	0.81
time (sec)	N/A	0.201	0.074	0.173	0.200	0.282	0.092	0.265	17.424

Problem 1081	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	A	A	A	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	23	0	21	441	25	21	19	23	24
N.S.	1	0.00	0.91	19.17	1.09	0.91	0.83	1.00	1.04
time (sec)	N/A	0.000	0.111	51.939	0.351	0.262	0.365	0.420	17.327

Problem 1082	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	33	29	42	28	29	0	28
N.S.	1	0.00	1.57	1.38	2.00	1.33	1.38	0.00	1.33
time (sec)	N/A	0.000	0.113	1.134	0.388	0.262	0.245	0.000	17.223

Problem 1083	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	54	57	50	55	56	0	58
N.S.	1	0.00	1.80	1.90	1.67	1.83	1.87	0.00	1.93
time (sec)	N/A	0.000	6.192	10.146	0.484	0.257	0.334	0.000	17.022

Problem 1084	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	A	A	A	A	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	36	0	0	36	42	41	32	42	42
N.S.	1	0.00	0.00	1.00	1.17	1.14	0.89	1.17	1.17
time (sec)	N/A	0.000	0.000	1.846	0.486	0.265	1.452	0.716	16.263

Problem 1085	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	24	23	37	37	26	22	22
N.S.	1	0.00	1.20	1.15	1.85	1.85	1.30	1.10	1.10
time (sec)	N/A	0.000	2.531	0.101	0.240	0.262	0.173	0.265	0.217

Problem 1086	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	25	31	27	28	29	0	28
N.S.	1	0.00	0.81	1.00	0.87	0.90	0.94	0.00	0.90
time (sec)	N/A	0.000	5.149	0.224	0.309	0.270	0.168	0.000	17.365

Problem 1087	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	30	32	24	24	22	31	23	24
N.S.	1	1.36	1.45	1.09	1.09	1.00	1.41	1.05	1.09
time (sec)	N/A	0.164	0.005	0.124	0.199	0.254	0.032	0.276	0.078

Problem 1088	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F(-2)	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	47	32	41	31	36	0	27
N.S.	1	0.00	1.42	0.97	1.24	0.94	1.09	0.00	0.82
time (sec)	N/A	0.000	1.257	0.138	0.257	0.254	0.442	0.000	17.449

Problem 1089	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	18	17	21	16	19	65	29
N.S.	1	0.00	0.90	0.85	1.05	0.80	0.95	3.25	1.45
time (sec)	N/A	0.000	0.079	1.736	0.347	0.281	0.081	0.276	17.430

Problem 1090	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	31	26	26	25	25	24	25	28
N.S.	1	1.29	1.08	1.08	1.04	1.04	1.00	1.04	1.17
time (sec)	N/A	0.980	1.901	3.846	0.376	0.258	0.336	0.272	16.125

Problem 1091	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	C	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	37	74	32	72	86	205	165	197	30
N.S.	1	2.00	0.86	1.95	2.32	5.54	4.46	5.32	0.81
time (sec)	N/A	1.242	3.326	0.362	0.252	0.254	0.213	0.281	16.489

Problem 1092	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	A	A	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	43	59	35	25	46	45	25
N.S.	1	0.00	2.05	2.81	1.67	1.19	2.19	2.14	1.19
time (sec)	N/A	0.000	0.215	1.648	0.253	0.254	0.373	0.618	15.850

Problem 1093	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	32	33	31	39	39	33	0
N.S.	1	0.00	1.10	1.14	1.07	1.34	1.34	1.14	0.00
time (sec)	N/A	0.000	0.950	0.229	0.253	0.269	0.170	0.296	0.000

Problem 1094	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	19	19	17	18	16	12	16	15
N.S.	1	0.83	0.83	0.74	0.78	0.70	0.52	0.70	0.65
time (sec)	N/A	0.360	0.007	0.141	0.185	0.258	0.041	0.264	13.924

Problem 1095	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	28	27	28	28	28	41	28	24
N.S.	1	1.00	0.96	1.00	1.00	1.00	1.46	1.00	0.86
time (sec)	N/A	0.160	0.003	0.147	0.195	0.251	0.027	0.273	13.768

Problem 1096	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	46	194	47	172	178	202	178
N.S.	1	0.00	1.64	6.93	1.68	6.14	6.36	7.21	6.36
time (sec)	N/A	0.000	0.129	15.135	9.551	0.261	3.084	3.505	16.193

Problem 1097	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	34	42	81	59	100	105	0
N.S.	1	0.00	1.48	1.83	3.52	2.57	4.35	4.57	0.00
time (sec)	N/A	0.000	11.861	1.437	0.278	0.256	0.305	0.309	0.000

Problem 1098	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	39	39	36	35	35	36	37	35
N.S.	1	1.95	1.95	1.80	1.75	1.75	1.80	1.85	1.75
time (sec)	N/A	0.344	0.017	0.128	0.217	0.303	0.087	0.279	0.120

Problem 1099	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	32	50	78	75	26	90	76
N.S.	1	0.00	1.19	1.85	2.89	2.78	0.96	3.33	2.81
time (sec)	N/A	0.000	6.704	0.796	0.300	0.266	0.160	0.384	14.938

Problem 1100	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	8	8	8	6	5	5	5	5	5
N.S.	1	1.00	1.00	0.75	0.62	0.62	0.62	0.62	0.62
time (sec)	N/A	0.122	0.000	0.052	0.194	0.249	0.017	0.278	0.002

Problem 1101	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	13	13	13	15	15	20	15	10
N.S.	1	0.65	0.65	0.65	0.75	0.75	1.00	0.75	0.50
time (sec)	N/A	0.131	0.002	0.133	0.208	0.251	0.032	0.277	0.055

Problem 1102	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	C	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	56	56	15	8	14	15	14	10
N.S.	1	3.73	3.73	1.00	0.53	0.93	1.00	0.93	0.67
time (sec)	N/A	0.345	0.059	0.467	0.245	0.259	0.121	0.275	0.220

Problem 1103	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	43	57	83	83	63	60	0
N.S.	1	0.00	1.79	2.38	3.46	3.46	2.62	2.50	0.00
time (sec)	N/A	0.000	0.104	2.622	0.394	0.259	0.305	0.332	0.000

Problem 1104	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	31	31	35	53	30	31	30	30
N.S.	1	1.03	1.03	1.17	1.77	1.00	1.03	1.00	1.00
time (sec)	N/A	7.347	0.117	17.917	0.257	0.255	0.425	0.327	14.782

Problem 1105	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	10	8	9	8	8	7	9	8
N.S.	1	0.67	0.53	0.60	0.53	0.53	0.47	0.60	0.53
time (sec)	N/A	0.140	0.003	1.018	0.194	0.243	0.032	0.267	0.034

Problem 1106	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	F(-1)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	29	30	0	44	0	0	45
N.S.	1	0.00	1.04	1.07	0.00	1.57	0.00	0.00	1.61
time (sec)	N/A	0.000	0.503	17.631	0.000	0.260	0.000	0.000	15.636

Problem 1107	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	44	45	82	49	49	51	95
N.S.	1	0.00	1.38	1.41	2.56	1.53	1.53	1.59	2.97
time (sec)	N/A	0.000	0.263	3.878	0.365	0.252	4.706	1.357	15.166

Problem 1108	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	16	19	16	15	15	10	15	15
N.S.	1	0.80	0.95	0.80	0.75	0.75	0.50	0.75	0.75
time (sec)	N/A	0.147	0.006	0.092	0.193	0.270	0.049	0.268	14.317

Problem 1109	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	0	33	29	0	26	34	56	32
N.S.	1	0.00	1.38	1.21	0.00	1.08	1.42	2.33	1.33
time (sec)	N/A	0.000	0.075	0.214	0.000	0.270	31.088	0.280	15.181

Problem 1110	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	22	15	15	16	16	17	16	16
N.S.	1	1.16	0.79	0.79	0.84	0.84	0.89	0.84	0.84
time (sec)	N/A	0.145	0.003	0.191	0.191	0.250	0.028	0.277	0.407

Problem 1111	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	35	33	32	34	31	34	34
N.S.	1	0.00	1.13	1.06	1.03	1.10	1.00	1.10	1.10
time (sec)	N/A	0.000	0.145	12.360	0.347	0.261	0.345	0.578	0.900

Problem 1112	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	B	B	A	B	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	0	33	62	68	32	4292	41
N.S.	1	0.00	0.00	1.10	2.07	2.27	1.07	143.07	1.37
time (sec)	N/A	0.000	0.000	0.606	0.272	0.264	0.203	0.453	14.843

Problem 1113	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	34	27	18	25	39	15	46	20
N.S.	1	1.48	1.17	0.78	1.09	1.70	0.65	2.00	0.87
time (sec)	N/A	0.403	0.387	0.410	0.202	0.247	0.067	0.281	16.839

Problem 1114	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	36	28	28	105	28	20	145	25
N.S.	1	1.24	0.97	0.97	3.62	0.97	0.69	5.00	0.86
time (sec)	N/A	0.283	0.011	1.565	0.286	0.259	0.100	0.279	0.635

Problem 1115	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	29	37	23	28	22	20	0	23
N.S.	1	1.12	1.42	0.88	1.08	0.85	0.77	0.00	0.88
time (sec)	N/A	1.327	0.826	0.699	0.306	0.265	0.103	0.000	17.525

Problem 1116	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	36	49	64	48	48	147	160
N.S.	1	0.00	1.16	1.58	2.06	1.55	1.55	4.74	5.16
time (sec)	N/A	0.000	1.278	0.844	2.910	0.251	0.214	0.293	17.285

Problem 1117	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	C	B	B	B	B	F(-1)	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	68	1010	68	66	69	71	0	0
N.S.	1	2.62	38.85	2.62	2.54	2.65	2.73	0.00	0.00
time (sec)	N/A	0.577	0.892	0.876	0.220	0.281	128.688	0.000	0.000

Problem 1118	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	36	30	33	48	30	29	30	29
N.S.	1	1.24	1.03	1.14	1.66	1.03	1.00	1.03	1.00
time (sec)	N/A	0.206	0.026	0.434	0.193	0.256	0.097	0.286	16.694

Problem 1119	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	11	11	11	10	9	9	7	9	9
N.S.	1	1.00	1.00	0.91	0.82	0.82	0.64	0.82	0.82
time (sec)	N/A	0.124	0.000	0.149	0.184	0.241	0.026	0.285	0.054

Problem 1120	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	14	14	17	15	16	14	16	15
N.S.	1	1.17	1.17	1.42	1.25	1.33	1.17	1.33	1.25
time (sec)	N/A	0.146	0.018	0.250	0.183	0.264	0.069	0.272	0.029

Problem 1121	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	21	20	24	20	27	30	60
N.S.	1	0.00	0.91	0.87	1.04	0.87	1.17	1.30	2.61
time (sec)	N/A	0.000	2.214	2.884	0.309	0.252	0.120	0.276	1.431

Problem 1122	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	F(-1)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	35	33	37	71	71	0	80	0
N.S.	1	1.17	1.10	1.23	2.37	2.37	0.00	2.67	0.00
time (sec)	N/A	1.353	0.873	2.033	3.854	0.261	0.000	0.473	0.000

Problem 1123	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	F(-2)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	20	21	47	19	0	29	20
N.S.	1	0.00	1.00	1.05	2.35	0.95	0.00	1.45	1.00
time (sec)	N/A	0.000	0.364	7.773	0.307	0.265	0.000	0.382	16.913

Problem 1124	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	B	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	9038	21	22	91	89	110	216	0
N.S.	1	430.38	1.00	1.05	4.33	4.24	5.24	10.29	0.00
time (sec)	N/A	23.686	2.003	3.013	0.252	0.255	0.269	0.366	0.000

Problem 1125	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	42	76	71	93	156	76	0
N.S.	1	0.00	1.83	3.30	3.09	4.04	6.78	3.30	0.00
time (sec)	N/A	0.000	0.117	3.829	0.259	0.281	0.267	0.289	0.000

Problem 1126	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	12	12	10	14	9	10	9	9
N.S.	1	1.00	1.00	0.83	1.17	0.75	0.83	0.75	0.75
time (sec)	N/A	0.362	0.011	0.296	0.311	0.254	2.418	0.298	15.306

Problem 1127	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	30	33	36	39	37	31	39	0
N.S.	1	0.94	1.03	1.12	1.22	1.16	0.97	1.22	0.00
time (sec)	N/A	0.739	0.067	3.263	0.237	0.253	0.150	0.532	0.000

Problem 1128	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	26	154	27	26	23	26	28	26
N.S.	1	1.18	7.00	1.23	1.18	1.05	1.18	1.27	1.18
time (sec)	N/A	0.223	0.147	0.319	0.192	0.250	0.451	0.302	0.248

Problem 1129	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	28	28	27	26	26	22	146	91
N.S.	1	1.00	1.00	0.96	0.93	0.93	0.79	5.21	3.25
time (sec)	N/A	12.130	0.116	24.159	0.250	0.259	0.240	0.517	16.122

Problem 1130	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	11	8	7	8	7	14	10	7	7
N.S.	1	0.73	0.64	0.73	0.64	1.27	0.91	0.64	0.64
time (sec)	N/A	0.173	0.021	0.250	0.180	0.272	0.096	0.290	15.453

Problem 1131	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	25	51	76	25	27	148	29
N.S.	1	0.00	1.00	2.04	3.04	1.00	1.08	5.92	1.16
time (sec)	N/A	0.000	0.077	4.489	0.363	0.273	0.239	0.360	16.638

Problem 1132	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	34	31	50	52	34	50	30
N.S.	1	0.00	1.00	0.91	1.47	1.53	1.00	1.47	0.88
time (sec)	N/A	0.000	0.305	10.093	0.469	0.276	7.640	0.665	20.770

Problem 1133	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	27	27	25	31	29	26	29	23
N.S.	1	0.87	0.87	0.81	1.00	0.94	0.84	0.94	0.74
time (sec)	N/A	0.210	0.065	1.131	0.221	0.267	0.072	0.302	16.736

Problem 1134	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	48	30	28	27	27	27	27	27
N.S.	1	1.78	1.11	1.04	1.00	1.00	1.00	1.00	1.00
time (sec)	N/A	1.052	0.276	1.325	0.251	0.264	0.348	0.289	17.277

Problem 1135	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	30	27	61	31	26	54	63
N.S.	1	0.00	0.94	0.84	1.91	0.97	0.81	1.69	1.97
time (sec)	N/A	0.000	5.235	2.508	0.403	0.260	0.340	0.342	16.215

Problem 1136	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	0	13	25	19	11	15	0	11
N.S.	1	0.00	1.00	1.92	1.46	0.85	1.15	0.00	0.85
time (sec)	N/A	0.000	0.178	0.808	0.252	0.262	9.896	0.000	15.878

Problem 1137	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	14	14	29	13	14	13	13
N.S.	1	1.00	0.88	0.88	1.81	0.81	0.88	0.81	0.81
time (sec)	N/A	0.152	0.010	0.677	0.197	0.264	0.076	0.260	15.666

Problem 1138	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	24	17	20	61	19	15	19	12
N.S.	1	1.60	1.13	1.33	4.07	1.27	1.00	1.27	0.80
time (sec)	N/A	0.207	0.021	0.662	0.218	0.256	0.071	0.281	15.306

Problem 1139	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	36	27	21	0	26	29	29	25
N.S.	1	1.57	1.17	0.91	0.00	1.13	1.26	1.26	1.09
time (sec)	N/A	0.638	0.273	0.229	0.000	0.258	0.222	0.279	15.546

Problem 1140	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	26	24	19	24	28	20	22	22
N.S.	1	1.18	1.09	0.86	1.09	1.27	0.91	1.00	1.00
time (sec)	N/A	0.222	0.292	0.272	0.195	0.270	0.162	0.280	15.090

Problem 1141	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	57	23	22	39	22	17	37	21
N.S.	1	2.11	0.85	0.81	1.44	0.81	0.63	1.37	0.78
time (sec)	N/A	1.251	0.090	2.145	0.321	0.265	0.177	0.302	15.549

Problem 1142	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	A	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	16	40	18	33	41	32	26	25
N.S.	1	0.94	2.35	1.06	1.94	2.41	1.88	1.53	1.47
time (sec)	N/A	0.179	0.021	0.454	0.189	0.264	0.173	0.269	15.340

Problem 1143	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	B	B	A	B	B	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	0	61	63	62	68	124	65
N.S.	1	0.00	0.00	2.03	2.10	2.07	2.27	4.13	2.17
time (sec)	N/A	0.000	0.000	0.953	0.447	0.270	0.368	0.493	15.407

Problem 1144	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	22	22	23	37	23	20	39	24
N.S.	1	1.00	1.00	1.05	1.68	1.05	0.91	1.77	1.09
time (sec)	N/A	1.024	0.093	13.808	0.322	0.269	0.718	0.952	16.986

Problem 1145	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	57	26	29	23	31	29	0	26
N.S.	1	2.19	1.00	1.12	0.88	1.19	1.12	0.00	1.00
time (sec)	N/A	0.366	0.123	1.863	0.279	0.262	0.202	0.000	15.531

Problem 1146	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	27	19	15	19	19	27	19	18
N.S.	1	1.50	1.06	0.83	1.06	1.06	1.50	1.06	1.00
time (sec)	N/A	0.146	0.002	0.145	0.197	0.246	0.028	0.264	0.080

Problem 1147	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	34	35	46	35	34	37	38
N.S.	1	0.00	1.21	1.25	1.64	1.25	1.21	1.32	1.36
time (sec)	N/A	0.000	0.254	3.471	0.325	0.253	0.159	0.293	16.828

Problem 1148	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	C	A	B	F(-2)	F	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	32	0	56	155	38	69	0	0	68
N.S.	1	0.00	1.75	4.84	1.19	2.16	0.00	0.00	2.12
time (sec)	N/A	0.000	2.116	90.030	1.068	0.267	0.000	0.000	17.840

Problem 1149	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	C	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	56	34	48	63	37	48	47	0
N.S.	1	1.87	1.13	1.60	2.10	1.23	1.60	1.57	0.00
time (sec)	N/A	3.246	0.703	3.171	0.329	0.326	0.199	0.285	0.000

Problem 1150	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	38	44	34	35	34	29	32	32
N.S.	1	1.15	1.33	1.03	1.06	1.03	0.88	0.97	0.97
time (sec)	N/A	3.528	1.893	0.674	0.332	0.289	0.147	0.287	0.313

Problem 1151	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	42	33	27	30	30	27	30	24
N.S.	1	1.45	1.14	0.93	1.03	1.03	0.93	1.03	0.83
time (sec)	N/A	0.169	0.018	2.446	0.185	0.257	0.030	0.284	0.052

Problem 1152	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	30	28	23	23	36	19	48	29
N.S.	1	1.07	1.00	0.82	0.82	1.29	0.68	1.71	1.04
time (sec)	N/A	0.387	0.035	0.420	0.240	0.264	0.144	0.282	15.491

Problem 1153	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	24	22	20	23	23	20	23	23
N.S.	1	0.96	0.88	0.80	0.92	0.92	0.80	0.92	0.92
time (sec)	N/A	0.147	0.002	0.110	0.199	0.253	0.024	0.277	15.696

Problem 1154	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	80	30	34	44	30	20	32	26
N.S.	1	2.67	1.00	1.13	1.47	1.00	0.67	1.07	0.87
time (sec)	N/A	0.278	0.196	1.040	0.223	0.257	0.131	0.280	15.177

Problem 1155	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	20	21	20	19	20	22	22	21
N.S.	1	0.74	0.78	0.74	0.70	0.74	0.81	0.81	0.78
time (sec)	N/A	0.195	0.014	0.257	0.189	0.245	0.341	0.276	14.884

Problem 1156	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	A	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	49	26	52	39	58	39	38	23
N.S.	1	2.04	1.08	2.17	1.62	2.42	1.62	1.58	0.96
time (sec)	N/A	0.345	0.029	11.303	0.274	0.267	1.405	0.293	15.298

Problem 1157	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	32	32	108	40	32	0	32
N.S.	1	0.00	0.97	0.97	3.27	1.21	0.97	0.00	0.97
time (sec)	N/A	0.000	0.574	1.340	0.358	0.278	0.157	0.000	0.689

Problem 1158	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	20	20	16	37	21	19	29	15
N.S.	1	1.00	1.00	0.80	1.85	1.05	0.95	1.45	0.75
time (sec)	N/A	0.178	0.027	1.025	0.249	0.270	0.074	0.276	0.087

Problem 1159	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	131	32	48	67	35	42	44	63
N.S.	1	5.04	1.23	1.85	2.58	1.35	1.62	1.69	2.42
time (sec)	N/A	0.332	0.045	0.219	0.190	0.277	0.114	0.287	14.619

Problem 1160	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	31	90	62	56	26	49	150
N.S.	1	0.00	0.97	2.81	1.94	1.75	0.81	1.53	4.69
time (sec)	N/A	0.000	0.813	190.866	0.332	0.257	0.190	0.525	15.222

Problem 1161	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	F(-2)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	38	115	93	94	0	57	281
N.S.	1	0.00	1.23	3.71	3.00	3.03	0.00	1.84	9.06
time (sec)	N/A	0.000	0.141	5.064	0.249	0.270	0.000	0.364	14.701

Problem 1162	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	19	16	15	17	17	14	17	14
N.S.	1	1.12	0.94	0.88	1.00	1.00	0.82	1.00	0.82
time (sec)	N/A	0.145	0.012	0.335	0.187	0.259	0.055	0.272	14.258

Problem 1163	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	62	76	74	77	83	0	82
N.S.	1	0.00	2.30	2.81	2.74	2.85	3.07	0.00	3.04
time (sec)	N/A	0.000	0.743	1.895	0.234	0.298	0.201	0.000	14.791

Problem 1164	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	17	17	18	17	17	14	17	16
N.S.	1	0.89	0.89	0.95	0.89	0.89	0.74	0.89	0.84
time (sec)	N/A	0.141	0.002	0.053	0.190	0.263	0.055	0.267	14.135

Problem 1165	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	65	83	48	54	44	44	56	47
N.S.	1	2.24	2.86	1.66	1.86	1.52	1.52	1.93	1.62
time (sec)	N/A	0.351	0.068	0.409	0.196	0.253	1.931	0.284	14.416

Problem 1166	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	506	36	38	961	37	37	40	37
N.S.	1	21.08	1.50	1.58	40.04	1.54	1.54	1.67	1.54
time (sec)	N/A	3.359	0.069	2.117	0.388	0.276	0.164	0.402	32.465

Problem 1167	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	22	28	114	59	64	32	0	23
N.S.	1	0.92	1.17	4.75	2.46	2.67	1.33	0.00	0.96
time (sec)	N/A	2.397	0.095	7.217	0.399	0.300	0.287	0.000	14.045

Problem 1168	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	10	10	10	9	9	8	9	9
N.S.	1	0.71	0.71	0.71	0.64	0.64	0.57	0.64	0.64
time (sec)	N/A	0.128	0.000	0.021	0.188	0.247	0.022	0.277	0.002

Problem 1169	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	33	18	18	153	17	15	17	18
N.S.	1	1.50	0.82	0.82	6.95	0.77	0.68	0.77	0.82
time (sec)	N/A	0.201	0.247	0.165	0.342	0.267	0.061	0.283	13.977

Problem 1170	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	11	15	10	10	13	14	10	13	9
N.S.	1	1.36	0.91	0.91	1.18	1.27	0.91	1.18	0.82
time (sec)	N/A	0.144	0.002	0.237	0.199	0.272	0.033	0.270	14.105

Problem 1171	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	33	28	37	37	29	39	27
N.S.	1	0.00	1.27	1.08	1.42	1.42	1.12	1.50	1.04
time (sec)	N/A	0.000	5.066	2.347	0.312	0.277	0.105	0.286	15.344

Problem 1172	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	B	B	B	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	50	42	57	57	42	57	0
N.S.	1	0.00	2.27	1.91	2.59	2.59	1.91	2.59	0.00
time (sec)	N/A	0.000	0.064	0.952	0.316	0.265	0.155	0.714	0.000

Problem 1173	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	47	108	47	42	38	39	43	41
N.S.	1	1.42	3.27	1.42	1.27	1.15	1.18	1.30	1.24
time (sec)	N/A	0.879	0.280	1.872	0.317	0.264	0.181	0.282	15.473

Problem 1174	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	20	25	52	24	20	24	24
N.S.	1	0.00	0.71	0.89	1.86	0.86	0.71	0.86	0.86
time (sec)	N/A	0.000	0.376	0.815	0.276	0.256	0.113	0.282	15.274

Problem 1175	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	15	15	16	15	17	12	15	14
N.S.	1	0.56	0.56	0.59	0.56	0.63	0.44	0.56	0.52
time (sec)	N/A	0.174	0.004	0.211	0.187	0.259	0.064	0.271	15.927

Problem 1176	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	38	59	30	45	29	53	0
N.S.	1	0.00	1.15	1.79	0.91	1.36	0.88	1.61	0.00
time (sec)	N/A	0.000	0.450	2.110	0.230	0.256	0.179	0.288	0.000

Problem 1177	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	C	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	64	64	23	80	21	20	24	24
N.S.	1	3.37	3.37	1.21	4.21	1.11	1.05	1.26	1.26
time (sec)	N/A	0.248	0.065	0.343	0.242	0.257	0.066	0.275	0.078

Problem 1178	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	28	31	25	119	33	31	36	36
N.S.	1	1.04	1.15	0.93	4.41	1.22	1.15	1.33	1.33
time (sec)	N/A	0.246	0.093	1.937	0.331	0.253	0.346	0.326	16.457

Problem 1179	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	0	53	57	41	45	54	66	49
N.S.	1	0.00	1.47	1.58	1.14	1.25	1.50	1.83	1.36
time (sec)	N/A	0.000	10.110	3.101	0.252	0.251	0.404	0.288	16.441

Problem 1180	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	28	23	25	23	23	42	28	25
N.S.	1	1.33	1.10	1.19	1.10	1.10	2.00	1.33	1.19
time (sec)	N/A	0.175	0.022	2.140	0.207	0.246	0.297	0.277	0.214

Problem 1181	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	41	29	27	173	29	31	29	29
N.S.	1	1.71	1.21	1.12	7.21	1.21	1.29	1.21	1.21
time (sec)	N/A	0.324	0.084	0.181	0.331	0.282	0.154	0.284	0.128

Problem 1182	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	25	25	31	29	27	0	30	26
N.S.	1	1.04	1.04	1.29	1.21	1.12	0.00	1.25	1.08
time (sec)	N/A	1.090	0.093	3.917	0.353	0.250	0.000	0.347	15.772

Problem 1183	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	29	30	30	52	32	29	33	29
N.S.	1	0.85	0.88	0.88	1.53	0.94	0.85	0.97	0.85
time (sec)	N/A	0.493	0.068	0.431	0.334	0.260	0.117	0.322	16.085

Problem 1184	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	35	19	20	40	19	19	19	19
N.S.	1	1.75	0.95	1.00	2.00	0.95	0.95	0.95	0.95
time (sec)	N/A	0.267	0.034	2.111	0.173	0.284	0.057	0.275	0.148

Problem 1185	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	34	23	25	36	31	22	34	22
N.S.	1	1.31	0.88	0.96	1.38	1.19	0.85	1.31	0.85
time (sec)	N/A	0.217	0.155	0.323	0.215	0.256	0.131	0.270	15.888

Problem 1186	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	35	24	22	27	24	22	23	23
N.S.	1	1.40	0.96	0.88	1.08	0.96	0.88	0.92	0.92
time (sec)	N/A	0.702	0.196	0.270	0.324	0.255	0.138	0.280	17.034

Problem 1187	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	23	23	21	29	17	21	156
N.S.	1	0.00	1.00	1.00	0.91	1.26	0.74	0.91	6.78
time (sec)	N/A	0.000	0.264	1.817	0.251	0.254	0.245	0.276	15.482

Problem 1188	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	48	40	36	52	53	134	49	42
N.S.	1	1.92	1.60	1.44	2.08	2.12	5.36	1.96	1.68
time (sec)	N/A	0.290	0.023	2.670	0.183	0.259	0.436	0.276	0.245

Problem 1189	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	16	18	17	17	19	17	17
N.S.	1	1.00	1.00	1.12	1.06	1.06	1.19	1.06	1.06
time (sec)	N/A	0.439	0.120	8.674	0.219	0.251	0.169	0.270	15.739

Problem 1190	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	B	B	B	B	B
verified	N/A	N/A	Yes	No	TBD	TBD	TBD	TBD	TBD
size	20	0	20	17841276	146	63	61	109	41
N.S.	1	0.00	1.00	892063.80	7.30	3.15	3.05	5.45	2.05
time (sec)	N/A	0.000	0.068	691.840	0.325	0.273	0.336	0.426	15.441

Problem 1191	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	32	32	20	19	19	29	19	19
N.S.	1	0.94	0.94	0.59	0.56	0.56	0.85	0.56	0.56
time (sec)	N/A	0.146	0.000	0.136	0.199	0.233	0.023	0.264	0.003

Problem 1192	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	21	19	15	14	15	14	15	14
N.S.	1	0.84	0.76	0.60	0.56	0.60	0.56	0.60	0.56
time (sec)	N/A	0.173	0.029	0.086	0.183	0.243	0.060	0.272	14.617

Problem 1193	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	F(-1)	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	22	32	36	0	34	121	35
N.S.	1	0.00	1.00	1.45	1.64	0.00	1.55	5.50	1.59
time (sec)	N/A	0.000	5.353	2.743	0.829	0.000	35.214	0.430	15.140

Problem 1194	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	27	26	20	23	21	17	35	19
N.S.	1	1.29	1.24	0.95	1.10	1.00	0.81	1.67	0.90
time (sec)	N/A	0.494	0.608	162.329	0.229	0.244	0.098	0.276	0.310

Problem 1195	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	0	21	21	31	22	19	35	20
N.S.	1	0.00	1.00	1.00	1.48	1.05	0.90	1.67	0.95
time (sec)	N/A	0.000	0.051	15.400	0.308	0.252	0.088	0.291	14.996

Problem 1196	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	No	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	8	17	15	22	14	12	14	14
N.S.	1	0.47	1.00	0.88	1.29	0.82	0.71	0.82	0.82
time (sec)	N/A	0.269	0.010	1.841	0.281	0.245	0.057	0.266	0.263

Problem 1197	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	209	42	39	44	36	41	0	46
N.S.	1	9.50	1.91	1.77	2.00	1.64	1.86	0.00	2.09
time (sec)	N/A	2.481	0.350	19.983	0.426	0.253	14.262	0.000	14.707

Problem 1198	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	9	102	9	10	17	9	8	9	9
N.S.	1	11.33	1.00	1.11	1.89	1.00	0.89	1.00	1.00
time (sec)	N/A	0.403	0.085	0.125	0.224	0.235	0.049	0.269	14.781

Problem 1199	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	A	B	A	F(-1)	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	138	25	63	46	0	0	60
N.S.	1	0.00	4.93	0.89	2.25	1.64	0.00	0.00	2.14
time (sec)	N/A	0.000	11.225	2.348	0.242	0.273	0.000	0.000	15.131

Problem 1200	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	20	19	18	30	14	281	106
N.S.	1	0.00	0.71	0.68	0.64	1.07	0.50	10.04	3.79
time (sec)	N/A	0.000	0.472	0.420	0.234	0.241	0.195	0.292	14.370

Problem 1201	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	14	6	6	12	5	5	5	5
N.S.	1	0.93	0.40	0.40	0.80	0.33	0.33	0.33	0.33
time (sec)	N/A	0.167	0.001	0.111	0.224	0.254	0.039	0.269	0.020

Problem 1202	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	11	9	8	7	7	5	7	7
N.S.	1	0.55	0.45	0.40	0.35	0.35	0.25	0.35	0.35
time (sec)	N/A	0.138	0.001	0.124	0.184	0.230	0.026	0.264	0.019

Problem 1203	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	27	25	37	46	40	49	40	42
N.S.	1	0.93	0.86	1.28	1.59	1.38	1.69	1.38	1.45
time (sec)	N/A	3.101	0.165	85.537	0.700	0.239	1.416	8.554	14.685

Problem 1204	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	24	23	0	25	34	24	24
N.S.	1	0.00	0.89	0.85	0.00	0.93	1.26	0.89	0.89
time (sec)	N/A	0.000	1.773	0.314	0.000	0.235	0.107	0.273	0.294

Problem 1205	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	17	17	16	16	19	16	0
N.S.	1	1.00	1.00	1.00	0.94	0.94	1.12	0.94	0.00
time (sec)	N/A	0.556	0.086	29.048	0.278	0.246	0.129	0.278	0.000

Problem 1206	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	17	13	11	10	10	8	10	10
N.S.	1	1.21	0.93	0.79	0.71	0.71	0.57	0.71	0.71
time (sec)	N/A	0.136	0.011	0.649	0.185	0.228	0.035	0.269	13.876

Problem 1207	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	30	32	27	29	29	26	32	26
N.S.	1	1.03	1.10	0.93	1.00	1.00	0.90	1.10	0.90
time (sec)	N/A	0.201	0.033	0.576	0.208	0.239	0.092	0.276	13.872

Problem 1208	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	41	22	23	37	28	20	71	22
N.S.	1	1.71	0.92	0.96	1.54	1.17	0.83	2.96	0.92
time (sec)	N/A	0.222	0.162	0.588	0.194	0.232	0.072	0.262	0.101

Problem 1209	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	F(-1)	C	A	A	A	F(-1)
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	18	0	24	18	15	20	0
N.S.	1	0.00	1.00	0.00	1.33	1.00	0.83	1.11	0.00
time (sec)	N/A	0.000	1.042	0.000	0.313	0.239	0.272	0.354	0.000

Problem 1210	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	0	25	21	20	34	22	21	22
N.S.	1	0.00	1.09	0.91	0.87	1.48	0.96	0.91	0.96
time (sec)	N/A	0.000	0.882	3.204	0.248	0.238	0.267	0.350	14.940

Problem 1211	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	20	19	23	31	30	20	21	26
N.S.	1	0.87	0.83	1.00	1.35	1.30	0.87	0.91	1.13
time (sec)	N/A	0.441	0.167	2.328	0.228	0.239	0.169	0.267	14.769

Problem 1212	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	19	18	19	32	14	35	17
N.S.	1	0.00	0.68	0.64	0.68	1.14	0.50	1.25	0.61
time (sec)	N/A	0.000	2.019	1.745	0.224	0.250	0.062	0.283	14.967

Problem 1213	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	36	28	24	28	24	22	25	27
N.S.	1	1.29	1.00	0.86	1.00	0.86	0.79	0.89	0.96
time (sec)	N/A	0.208	0.010	0.111	0.190	0.239	0.072	0.274	14.766

Problem 1214	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	29	27	24	53	45	31	67	28
N.S.	1	1.21	1.12	1.00	2.21	1.88	1.29	2.79	1.17
time (sec)	N/A	0.838	0.046	2.665	0.229	0.243	0.168	0.270	15.935

Problem 1215	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	B	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	119	28	35	38	30	39	0	33
N.S.	1	4.96	1.17	1.46	1.58	1.25	1.62	0.00	1.38
time (sec)	N/A	0.516	0.048	1.450	0.199	0.232	0.598	0.000	15.335

Problem 1216	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	24	22	16	0	17	15	18	18
N.S.	1	1.33	1.22	0.89	0.00	0.94	0.83	1.00	1.00
time (sec)	N/A	0.349	0.097	1.478	0.000	0.243	0.059	0.265	15.315

Problem 1217	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	20	24	17	18	18	17	21	16
N.S.	1	0.91	1.09	0.77	0.82	0.82	0.77	0.95	0.73
time (sec)	N/A	0.209	0.008	1.827	0.201	0.239	0.060	0.265	0.091

Problem 1218	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	66	26	21	28	22	19	22	20
N.S.	1	2.44	0.96	0.78	1.04	0.81	0.70	0.81	0.74
time (sec)	N/A	0.369	0.240	0.584	0.221	0.240	0.074	0.264	15.601

Problem 1219	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	F(-1)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	38	113	52	128	104	111	0	139	0
N.S.	1	2.97	1.37	3.37	2.74	2.92	0.00	3.66	0.00
time (sec)	N/A	8.850	0.517	0.149	0.637	0.253	0.000	2.443	0.000

Problem 1220	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	33	37	59	79	34	82	0
N.S.	1	0.00	1.10	1.23	1.97	2.63	1.13	2.73	0.00
time (sec)	N/A	0.000	7.812	0.760	0.302	0.312	0.196	0.660	0.000

Problem 1221	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	F	A	F	A	A	F	B
verified	N/A	Yes	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	24	104	0	24	0	21	20	0	21
N.S.	1	4.33	0.00	1.00	0.00	0.88	0.83	0.00	0.88
time (sec)	N/A	0.414	0.000	29.651	0.000	0.282	0.319	0.000	16.370

Problem 1222	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	26	25	42	42	20	42	24
N.S.	1	0.00	1.04	1.00	1.68	1.68	0.80	1.68	0.96
time (sec)	N/A	0.000	0.075	0.315	0.227	0.297	0.095	0.291	15.490

Problem 1223	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	28	35	25	41	26	24	24	24
N.S.	1	0.93	1.17	0.83	1.37	0.87	0.80	0.80	0.80
time (sec)	N/A	0.209	0.013	0.045	0.190	0.255	0.119	0.269	15.421

Problem 1224	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	13	13	12	30	11	10	11	13
N.S.	1	1.00	1.00	0.92	2.31	0.85	0.77	0.85	1.00
time (sec)	N/A	0.148	0.005	0.011	0.204	0.260	0.074	0.271	16.159

Problem 1225	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	0	17	17	35	35	17	35	30
N.S.	1	0.00	1.00	1.00	2.06	2.06	1.00	2.06	1.76
time (sec)	N/A	0.000	0.355	0.059	0.231	0.275	0.132	0.333	16.993

Problem 1226	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	26	24	45	53	55	46	53	33
N.S.	1	1.04	0.96	1.80	2.12	2.20	1.84	2.12	1.32
time (sec)	N/A	0.475	0.399	0.046	0.205	0.258	0.120	0.283	16.233

Problem 1227	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	16	19	13	15	15	17	15	12
N.S.	1	0.70	0.83	0.57	0.65	0.65	0.74	0.65	0.52
time (sec)	N/A	0.144	0.002	0.016	0.203	0.245	0.030	0.274	0.044

Problem 1228	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	11	11	9	9	9	8	9	8
N.S.	1	0.52	0.52	0.43	0.43	0.43	0.38	0.43	0.38
time (sec)	N/A	0.123	0.001	0.008	0.185	0.237	0.024	0.276	0.038

Problem 1229	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	47	27	34	354	119	34	36	58
N.S.	1	1.74	1.00	1.26	13.11	4.41	1.26	1.33	2.15
time (sec)	N/A	0.461	0.040	2.186	0.411	0.276	0.173	0.297	15.888

Problem 1230	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	144	26	36	0	33	17	40	21
N.S.	1	6.00	1.08	1.50	0.00	1.38	0.71	1.67	0.88
time (sec)	N/A	0.944	0.568	0.185	0.000	0.273	0.098	0.275	0.236

Problem 1231	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	27	24	25	25	22	25	50
N.S.	1	0.00	1.08	0.96	1.00	1.00	0.88	1.00	2.00
time (sec)	N/A	0.000	9.446	0.538	0.228	0.238	0.081	0.271	0.118

Problem 1232	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	42	33	104	37	37	0	41
N.S.	1	0.00	1.40	1.10	3.47	1.23	1.23	0.00	1.37
time (sec)	N/A	0.000	0.157	230.601	0.339	0.252	0.560	0.000	15.963

Problem 1233	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	13	13	14	13	14	10	13	13
N.S.	1	0.45	0.45	0.48	0.45	0.48	0.34	0.45	0.45
time (sec)	N/A	0.478	0.097	0.050	0.227	0.254	0.074	0.269	15.699

Problem 1234	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	27	62	22	22	21	22	24	21
N.S.	1	1.35	3.10	1.10	1.10	1.05	1.10	1.20	1.05
time (sec)	N/A	0.302	0.029	0.050	0.194	0.239	0.231	0.267	15.792

Problem 1235	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	32	18	17	30	16	12	16	16
N.S.	1	1.52	0.86	0.81	1.43	0.76	0.57	0.76	0.76
time (sec)	N/A	0.718	0.285	0.062	0.230	0.255	0.073	0.274	15.362

Problem 1236	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	17	13	15	14	20	12	14	14
N.S.	1	0.77	0.59	0.68	0.64	0.91	0.55	0.64	0.64
time (sec)	N/A	0.173	0.014	0.085	0.192	0.235	0.051	0.260	14.592

Problem 1237	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	36	23	20	35	35	39	35	36
N.S.	1	1.12	0.72	0.62	1.09	1.09	1.22	1.09	1.12
time (sec)	N/A	0.179	0.011	0.023	0.191	0.256	0.040	0.274	0.090

Problem 1238	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	23	22	32	23	19	23	23
N.S.	1	0.00	0.92	0.88	1.28	0.92	0.76	0.92	0.92
time (sec)	N/A	0.000	0.165	0.180	0.284	0.240	0.123	0.263	15.500

Problem 1239	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	0	30	28	30	30	26	30	32
N.S.	1	0.00	0.91	0.85	0.91	0.91	0.79	0.91	0.97
time (sec)	N/A	0.000	3.516	0.069	0.238	0.260	0.082	0.268	15.229

Problem 1240	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	21	19	18	18	19	18	18
N.S.	1	0.00	0.95	0.86	0.82	0.82	0.86	0.82	0.82
time (sec)	N/A	0.000	1.304	0.031	0.222	0.267	0.137	0.280	0.138

Problem 1241	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	32	43	35	35	41	0	47
N.S.	1	0.00	0.94	1.26	1.03	1.03	1.21	0.00	1.38
time (sec)	N/A	0.000	3.790	0.224	0.243	0.279	0.232	0.000	0.482

Problem 1242	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	F	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	129	53	55	0	64	58	69	52
N.S.	1	4.96	2.04	2.12	0.00	2.46	2.23	2.65	2.00
time (sec)	N/A	1.447	1.142	0.255	0.000	0.257	0.232	0.289	16.034

Problem 1243	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	57	29	32	34	36	31	43	40
N.S.	1	2.19	1.12	1.23	1.31	1.38	1.19	1.65	1.54
time (sec)	N/A	0.528	0.933	0.187	0.244	0.249	0.081	0.268	14.840

Problem 1244	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	26	34	27	33	19	15	17	18
N.S.	1	1.04	1.36	1.08	1.32	0.76	0.60	0.68	0.72
time (sec)	N/A	0.190	0.011	0.047	0.202	0.254	0.075	0.271	15.398

Problem 1245	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	0	16	22	12	31	20	12	13
N.S.	1	0.00	1.00	1.38	0.75	1.94	1.25	0.75	0.81
time (sec)	N/A	0.000	0.110	0.137	0.343	0.252	0.146	0.266	16.012

Problem 1246	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	12	12	13	12	16	10	12	12
N.S.	1	0.75	0.75	0.81	0.75	1.00	0.62	0.75	0.75
time (sec)	N/A	0.151	0.002	0.013	0.189	0.243	0.041	0.268	0.031

Problem 1247	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	0	27	26	34	33	29	34	116
N.S.	1	0.00	0.79	0.76	1.00	0.97	0.85	1.00	3.41
time (sec)	N/A	0.000	5.148	1.095	0.277	0.259	0.265	0.525	15.698

Problem 1248	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	11	9	13	10	12	12	12	12
N.S.	1	0.69	0.56	0.81	0.62	0.75	0.75	0.75	0.75
time (sec)	N/A	0.260	0.045	0.044	0.308	0.277	0.080	0.278	0.553

Problem 1249	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	46	83	61	59	95	63	50	126
N.S.	1	2.19	3.95	2.90	2.81	4.52	3.00	2.38	6.00
time (sec)	N/A	0.354	0.091	0.117	0.189	0.279	0.330	0.275	14.677

Problem 1250	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	71	22	23	22	30	24	0	23
N.S.	1	3.23	1.00	1.05	1.00	1.36	1.09	0.00	1.05
time (sec)	N/A	0.672	0.110	0.312	0.275	0.247	0.107	0.000	14.748

Problem 1251	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	24	23	23	45	24	19	19	22
N.S.	1	1.33	1.28	1.28	2.50	1.33	1.06	1.06	1.22
time (sec)	N/A	0.259	0.126	0.025	0.197	0.248	0.061	0.269	0.084

Problem 1252	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	76	22	20	290	37	32	37	38
N.S.	1	3.30	0.96	0.87	12.61	1.61	1.39	1.61	1.65
time (sec)	N/A	1.402	0.168	1.133	0.440	0.262	0.269	0.306	14.779

Problem 1253	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	28	18	0	17	20	17	17
N.S.	1	0.00	1.12	0.72	0.00	0.68	0.80	0.68	0.68
time (sec)	N/A	0.000	0.065	0.088	0.000	0.258	0.132	0.270	0.088

Problem 1254	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	3	3	3	3	2	2	2	2	2
N.S.	1	1.00	1.00	1.00	0.67	0.67	0.67	0.67	0.67
time (sec)	N/A	0.123	0.000	0.010	0.203	0.241	0.035	0.273	0.010

Problem 1255	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	50	22	20	40	30	24	37	19
N.S.	1	2.27	1.00	0.91	1.82	1.36	1.09	1.68	0.86
time (sec)	N/A	0.188	0.077	0.058	0.195	0.240	0.113	0.267	0.094

Problem 1256	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	21	26	25	31	26	25	24
N.S.	1	0.00	1.17	1.44	1.39	1.72	1.44	1.39	1.33
time (sec)	N/A	0.000	0.134	0.232	0.320	0.259	0.072	0.291	14.882

Problem 1257	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	30	30	21	20	20	20	24	20
N.S.	1	1.20	1.20	0.84	0.80	0.80	0.80	0.96	0.80
time (sec)	N/A	0.643	0.160	0.219	0.234	0.247	0.113	0.273	14.801

Problem 1258	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	B	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	91	33	51	391	30	53	53	49
N.S.	1	3.14	1.14	1.76	13.48	1.03	1.83	1.83	1.69
time (sec)	N/A	2.212	0.085	0.745	0.271	0.255	2.654	0.354	16.354

Problem 1259	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	B	B	B	B	B	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	75	82	121	112	73	282	122
N.S.	1	0.00	2.68	2.93	4.32	4.00	2.61	10.07	4.36
time (sec)	N/A	0.000	0.420	14.809	0.460	0.268	0.639	0.829	15.924

Problem 1260	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	23	26	28	28	20	62	21
N.S.	1	0.00	0.92	1.04	1.12	1.12	0.80	2.48	0.84
time (sec)	N/A	0.000	4.735	0.151	0.246	0.268	0.096	0.280	14.695

Problem 1261	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	25	21	0	21	26	21	21
N.S.	1	0.00	0.86	0.72	0.00	0.72	0.90	0.72	0.72
time (sec)	N/A	0.000	0.597	0.111	0.000	0.255	0.166	0.275	0.195

Problem 1262	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	22	19	18	30	19	18	0
N.S.	1	0.00	1.00	0.86	0.82	1.36	0.86	0.82	0.00
time (sec)	N/A	0.000	2.187	0.135	0.237	0.250	0.100	0.277	0.000

Problem 1263	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	F(-2)	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	23	23	36	49	38	0	38	36
N.S.	1	0.92	0.92	1.44	1.96	1.52	0.00	1.52	1.44
time (sec)	N/A	4.286	0.179	3.644	0.251	0.257	0.000	2.406	14.240

Problem 1264	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	23	19	21	577	20	19	24	22
N.S.	1	1.15	0.95	1.05	28.85	1.00	0.95	1.20	1.10
time (sec)	N/A	0.332	0.088	0.204	0.295	0.278	0.106	0.269	14.705

Problem 1265	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	28	31	66	54	26	72	58
N.S.	1	0.00	0.90	1.00	2.13	1.74	0.84	2.32	1.87
time (sec)	N/A	0.000	0.105	0.194	0.323	0.269	0.131	0.302	15.832

Problem 1266	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	40	37	45	39	44	36	34
N.S.	1	0.00	1.48	1.37	1.67	1.44	1.63	1.33	1.26
time (sec)	N/A	0.000	5.053	0.084	0.317	0.259	0.287	0.262	16.013

Problem 1267	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	17	34	439	33	34	37	16
N.S.	1	1.00	1.00	2.00	25.82	1.94	2.00	2.18	0.94
time (sec)	N/A	0.401	0.032	0.510	0.481	0.253	0.115	0.283	0.441

Problem 1268	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	14	14	15	14	14	12	16	14
N.S.	1	0.93	0.93	1.00	0.93	0.93	0.80	1.07	0.93
time (sec)	N/A	0.171	0.005	0.184	0.215	0.240	0.073	0.277	0.049

Problem 1269	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	A	A	A	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	49	60	42	35	40	60	53	41
N.S.	1	1.96	2.40	1.68	1.40	1.60	2.40	2.12	1.64
time (sec)	N/A	0.489	0.013	5.917	0.257	0.249	0.179	0.269	15.353

Problem 1270	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	18	16	17	22	25	17	22	21
N.S.	1	0.75	0.67	0.71	0.92	1.04	0.71	0.92	0.88
time (sec)	N/A	0.237	0.011	0.020	0.201	0.242	0.046	0.254	0.058

Problem 1271	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	16	16	16	15	19	12	20	15
N.S.	1	0.80	0.80	0.80	0.75	0.95	0.60	1.00	0.75
time (sec)	N/A	0.270	0.004	0.033	0.213	0.284	0.039	0.269	15.604

Problem 1272	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	B	B	A	B	F(-1)
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	0	42	67	67	44	73	0
N.S.	1	0.00	0.00	1.62	2.58	2.58	1.69	2.81	0.00
time (sec)	N/A	0.000	0.000	0.261	0.352	0.263	0.178	0.298	0.000

Problem 1273	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	15	15	17	18	22	19	18	16
N.S.	1	1.00	1.00	1.13	1.20	1.47	1.27	1.20	1.07
time (sec)	N/A	0.772	0.352	0.187	0.325	0.261	0.076	0.272	0.166

Problem 1274	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	11	11	11	10	10	7	10	10
N.S.	1	0.92	0.92	0.92	0.83	0.83	0.58	0.83	0.83
time (sec)	N/A	0.138	0.008	0.010	0.202	0.249	0.061	0.259	0.074

Problem 1275	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	0	22	19	18	18	20	0	22
N.S.	1	0.00	0.85	0.73	0.69	0.69	0.77	0.00	0.85
time (sec)	N/A	0.000	0.042	0.307	0.330	0.259	0.108	0.000	16.328

Problem 1276	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	26	21	23	19	33	24	19	18
N.S.	1	1.24	1.00	1.10	0.90	1.57	1.14	0.90	0.86
time (sec)	N/A	0.165	0.037	0.057	0.195	0.256	0.124	0.263	0.181

Problem 1277	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	23	23	25	57	24	27	24	24
N.S.	1	0.92	0.92	1.00	2.28	0.96	1.08	0.96	0.96
time (sec)	N/A	0.912	1.093	5.399	0.364	0.287	1.562	0.464	16.844

Problem 1278	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	9	9	10	9	9	8	10	9
N.S.	1	0.47	0.47	0.53	0.47	0.47	0.42	0.53	0.47
time (sec)	N/A	0.129	0.004	0.173	0.205	0.243	0.035	0.272	15.702

Problem 1279	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	41	19	19	21	23	17	23	21
N.S.	1	2.05	0.95	0.95	1.05	1.15	0.85	1.15	1.05
time (sec)	N/A	0.204	0.074	0.051	0.251	0.242	0.086	0.283	15.603

Problem 1280	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	15	15	16	15	14	19	15	15
N.S.	1	1.00	1.00	1.07	1.00	0.93	1.27	1.00	1.00
time (sec)	N/A	0.155	0.003	0.031	0.187	0.254	0.100	0.257	16.483

Problem 1281	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	28	29	44	44	26	28	28
N.S.	1	0.00	1.27	1.32	2.00	2.00	1.18	1.27	1.27
time (sec)	N/A	0.000	0.049	0.293	0.241	0.267	0.106	0.317	16.472

Problem 1282	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	39	27	41	68	53	20	235	44
N.S.	1	1.44	1.00	1.52	2.52	1.96	0.74	8.70	1.63
time (sec)	N/A	0.861	0.291	15.226	0.375	0.265	0.321	0.622	15.988

Problem 1283	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	40	37	35	36	41	36	41
N.S.	1	0.00	1.48	1.37	1.30	1.33	1.52	1.33	1.52
time (sec)	N/A	0.000	0.320	0.377	0.260	0.266	0.178	0.272	15.582

Problem 1284	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	B	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	0	24	22	26	33	29	26	27
N.S.	1	0.00	1.26	1.16	1.37	1.74	1.53	1.37	1.42
time (sec)	N/A	0.000	3.438	0.326	0.377	0.258	0.210	0.272	15.829

Problem 1285	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	B	A	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	0	22	17	23	58	19	0	25
N.S.	1	0.00	1.00	0.77	1.05	2.64	0.86	0.00	1.14
time (sec)	N/A	0.000	5.068	4.996	0.562	0.254	0.730	0.000	19.073

Problem 1286	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	34	69	34	34	33	34	71	2558
N.S.	1	1.26	2.56	1.26	1.26	1.22	1.26	2.63	94.74
time (sec)	N/A	0.317	0.053	0.078	0.202	0.261	0.866	0.270	19.670

Problem 1287	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	21	30	25	23	23	27	23	29
N.S.	1	1.40	2.00	1.67	1.53	1.53	1.80	1.53	1.93
time (sec)	N/A	0.149	0.003	0.012	0.204	0.246	0.031	0.265	0.089

Problem 1288	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	22	25	24	467	23	22	181	156
N.S.	1	1.22	1.39	1.33	25.94	1.28	1.22	10.06	8.67
time (sec)	N/A	0.403	0.090	0.243	0.288	0.274	0.120	0.276	32.533

Problem 1289	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	26	21	25	29	24	26	30	24
N.S.	1	1.24	1.00	1.19	1.38	1.14	1.24	1.43	1.14
time (sec)	N/A	0.297	0.334	0.732	0.310	0.268	0.282	0.286	19.649

Problem 1290	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	18	23	22	20	17	20	20
N.S.	1	0.00	1.00	1.28	1.22	1.11	0.94	1.11	1.11
time (sec)	N/A	0.000	0.340	0.282	0.237	0.248	0.112	0.279	17.864

Problem 1291	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	95	22	21	20	20	20	0	23
N.S.	1	4.52	1.05	1.00	0.95	0.95	0.95	0.00	1.10
time (sec)	N/A	0.803	0.425	0.143	0.278	0.284	129.131	0.000	17.495

Problem 1292	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	F	A	A	A	F(-1)	F	B
verified	N/A	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD
size	20	0	0	19	28	18	0	0	16
N.S.	1	0.00	0.00	0.95	1.40	0.90	0.00	0.00	0.80
time (sec)	N/A	0.000	0.000	0.041	0.371	0.274	0.000	0.000	18.130

Problem 1293	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	23	15	15	22	22	14	22	14
N.S.	1	1.53	1.00	1.00	1.47	1.47	0.93	1.47	0.93
time (sec)	N/A	0.157	0.003	0.029	0.184	0.237	0.020	0.273	0.039

Problem 1294	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	19	19	26	26	20	25	27
N.S.	1	0.00	0.76	0.76	1.04	1.04	0.80	1.00	1.08
time (sec)	N/A	0.000	1.164	0.072	0.248	0.252	0.080	0.287	16.708

Problem 1295	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	20	15	14	20	14	14	20	13
N.S.	1	1.33	1.00	0.93	1.33	0.93	0.93	1.33	0.87
time (sec)	N/A	0.197	0.115	0.233	0.202	0.251	0.064	0.273	0.640

Problem 1296	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	B	B	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	4186	57	112	2515	58	36	115	0
N.S.	1	123.12	1.68	3.29	73.97	1.71	1.06	3.38	0.00
time (sec)	N/A	22.328	0.185	3.336	0.341	0.271	0.318	0.337	0.000

Problem 1297	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	23	16	16	19	15	15	17	11
N.S.	1	1.77	1.23	1.23	1.46	1.15	1.15	1.31	0.85
time (sec)	N/A	0.156	0.005	0.025	0.206	0.261	0.062	0.266	16.421

Problem 1298	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	730	22	24	27	25	24	27	0
N.S.	1	31.74	0.96	1.04	1.17	1.09	1.04	1.17	0.00
time (sec)	N/A	1.751	0.817	0.194	0.323	0.258	0.146	0.283	0.000

Problem 1299	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	29	29	27	28	47	22	57	26
N.S.	1	0.91	0.91	0.84	0.88	1.47	0.69	1.78	0.81
time (sec)	N/A	0.248	0.037	0.079	0.239	0.253	0.149	0.262	17.130

Problem 1300	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	0	35	31	24	30	26	66	39
N.S.	1	0.00	1.30	1.15	0.89	1.11	0.96	2.44	1.44
time (sec)	N/A	0.000	2.315	0.204	0.484	0.256	0.311	0.265	17.964

Problem 1301	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	43	39	73	43	37	73	78
N.S.	1	0.00	1.54	1.39	2.61	1.54	1.32	2.61	2.79
time (sec)	N/A	0.000	0.182	18.233	0.431	0.258	0.250	0.512	16.610

Problem 1302	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	0	26	26	27	25	22	25	0
N.S.	1	0.00	0.87	0.87	0.90	0.83	0.73	0.83	0.00
time (sec)	N/A	0.000	0.110	0.230	0.457	0.252	0.200	0.599	0.000

Problem 1303	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	21	25	25	25	31	24	19	24	19
N.S.	1	1.19	1.19	1.19	1.48	1.14	0.90	1.14	0.90
time (sec)	N/A	0.216	0.019	0.083	0.235	0.251	0.083	0.267	18.879

Problem 1304	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	19	19	19	26	24	15	32	18
N.S.	1	1.00	1.00	1.00	1.37	1.26	0.79	1.68	0.95
time (sec)	N/A	0.397	0.133	0.074	0.231	0.254	0.092	0.278	18.956

Problem 1305	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	30	33	30	30	27	32	0
N.S.	1	0.00	0.94	1.03	0.94	0.94	0.84	1.00	0.00
time (sec)	N/A	0.000	3.310	0.094	0.262	0.251	0.154	0.279	0.000

Problem 1306	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	26	28	0	26	31	46	20
N.S.	1	0.00	0.90	0.97	0.00	0.90	1.07	1.59	0.69
time (sec)	N/A	0.000	1.831	0.095	0.000	0.257	0.133	0.265	0.107

Problem 1307	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	B	B	F	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	32	62	26	82	53	0	48
N.S.	1	0.00	1.14	2.21	0.93	2.93	1.89	0.00	1.71
time (sec)	N/A	0.000	0.222	1.407	0.477	0.267	0.428	0.000	19.234

Problem 1308	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	F	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	36	67	0	61	31	62	0
N.S.	1	0.00	1.12	2.09	0.00	1.91	0.97	1.94	0.00
time (sec)	N/A	0.000	0.172	0.404	0.000	0.263	0.190	0.302	0.000

Problem 1309	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	29	24	28	21	22	27	22	24
N.S.	1	1.04	0.86	1.00	0.75	0.79	0.96	0.79	0.86
time (sec)	N/A	0.617	0.136	4.553	0.245	0.249	0.097	0.270	19.525

Problem 1310	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	11	11	10	9	9	10	9	9
N.S.	1	0.69	0.69	0.62	0.56	0.56	0.62	0.56	0.56
time (sec)	N/A	0.139	0.016	0.012	0.207	0.242	0.049	0.274	0.020

Problem 1311	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	0	40	37	46	40	36	219	40
N.S.	1	0.00	1.43	1.32	1.64	1.43	1.29	7.82	1.43
time (sec)	N/A	0.000	0.240	1.345	0.330	0.255	0.212	9.323	19.565

Problem 1312	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	44	21	18	17	17	14	17	18
N.S.	1	2.00	0.95	0.82	0.77	0.77	0.64	0.77	0.82
time (sec)	N/A	0.189	0.042	0.028	0.200	0.258	0.083	0.261	0.088

Problem 1313	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	0	17	18	20	20	15	22	17
N.S.	1	0.00	0.94	1.00	1.11	1.11	0.83	1.22	0.94
time (sec)	N/A	0.000	0.156	0.980	0.245	0.244	0.064	0.268	17.132

Problem 1314	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	31	22	21	30	20	20	30	18
N.S.	1	1.35	0.96	0.91	1.30	0.87	0.87	1.30	0.78
time (sec)	N/A	0.161	0.016	0.039	0.190	0.240	0.093	0.257	16.429

Problem 1315	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	26	25	18	17	25	12	17	17
N.S.	1	0.96	0.93	0.67	0.63	0.93	0.44	0.63	0.63
time (sec)	N/A	0.247	0.021	0.084	0.194	0.259	0.085	0.262	16.527

Problem 1316	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	18	23	17	15	14	22	14	14	14
N.S.	1	1.28	0.94	0.83	0.78	1.22	0.78	0.78	0.78
time (sec)	N/A	0.246	0.023	0.041	0.197	0.261	0.055	0.269	0.085

Problem 1317	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	167	35	107	227	91	128	96	33
N.S.	1	5.57	1.17	3.57	7.57	3.03	4.27	3.20	1.10
time (sec)	N/A	0.565	2.506	0.103	0.202	0.252	0.162	0.265	17.745

Problem 1318	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	B	A	B	F(-2)	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	34	68	34	67	0	74	67
N.S.	1	0.00	1.36	2.72	1.36	2.68	0.00	2.96	2.68
time (sec)	N/A	0.000	0.081	14.112	0.349	0.253	0.000	0.496	18.433

Problem 1319	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	27	13	19	0	12	15	21	12
N.S.	1	1.42	0.68	1.00	0.00	0.63	0.79	1.11	0.63
time (sec)	N/A	0.371	0.115	0.080	0.000	0.252	0.131	0.278	19.095

Problem 1320	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	21	43	21	49	20	17	22	20
N.S.	1	0.64	1.30	0.64	1.48	0.61	0.52	0.67	0.61
time (sec)	N/A	0.230	1.459	0.075	0.344	0.251	0.085	0.274	17.195

Problem 1321	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	46	37	47	141	143	53	59	133
N.S.	1	1.35	1.09	1.38	4.15	4.21	1.56	1.74	3.91
time (sec)	N/A	1.841	0.458	0.637	0.313	0.266	0.159	0.308	17.971

Problem 1322	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	A	F	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	104	31	33	0	31	26	0	55
N.S.	1	3.59	1.07	1.14	0.00	1.07	0.90	0.00	1.90
time (sec)	N/A	2.744	1.798	0.533	0.000	0.269	0.221	0.000	17.517

Problem 1323	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	F(-2)	A	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	0	32	37	30	29	0	30	47
N.S.	1	0.00	1.00	1.16	0.94	0.91	0.00	0.94	1.47
time (sec)	N/A	0.000	0.126	1.354	0.321	0.271	0.000	0.292	17.486

Problem 1324	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	28	23	25	21	30	19	24	24
N.S.	1	1.00	0.82	0.89	0.75	1.07	0.68	0.86	0.86
time (sec)	N/A	0.164	0.010	0.026	0.193	0.247	0.061	0.268	0.069

Problem 1325	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	0	28	25	108	34	37	62	43
N.S.	1	0.00	1.12	1.00	4.32	1.36	1.48	2.48	1.72
time (sec)	N/A	0.000	0.243	0.036	3.508	0.314	0.857	0.404	17.805

Problem 1326	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	11	11	11	10	10	8	10	10
N.S.	1	0.38	0.38	0.38	0.34	0.34	0.28	0.34	0.34
time (sec)	N/A	0.162	0.005	0.022	0.193	0.254	0.051	0.271	0.059

Problem 1327	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	19	16	15	16	15	15	14	15	15
N.S.	1	0.84	0.79	0.84	0.79	0.79	0.74	0.79	0.79
time (sec)	N/A	0.135	0.000	0.011	0.190	0.242	0.023	0.266	17.584

Problem 1328	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	F	A	F(-1)	F	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	0	28	26	0	32	0	0	0
N.S.	1	0.00	0.97	0.90	0.00	1.10	0.00	0.00	0.00
time (sec)	N/A	0.000	0.257	0.033	0.000	0.263	0.000	0.000	0.000

Problem 1329	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	13	27	12	13	14
N.S.	1	1.00	1.00	0.82	0.76	1.59	0.71	0.76	0.82
time (sec)	N/A	0.157	0.019	0.036	0.193	0.272	0.069	0.270	17.830

Problem 1330	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	17	17	15	0	14	15	14	14
N.S.	1	0.85	0.85	0.75	0.00	0.70	0.75	0.70	0.70
time (sec)	N/A	0.345	0.155	0.046	0.000	0.270	0.076	0.263	17.423

Problem 1331	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	31	24	20	51	58	19	24	24
N.S.	1	1.29	1.00	0.83	2.12	2.42	0.79	1.00	1.00
time (sec)	N/A	0.412	0.203	0.109	0.295	0.281	0.105	0.264	17.992

Problem 1332	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	13	18	15	17	16	16	17	16	16
N.S.	1	1.38	1.15	1.31	1.23	1.23	1.31	1.23	1.23
time (sec)	N/A	0.147	0.010	0.022	0.191	0.257	0.056	0.260	18.095

Problem 1333	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	23	25	25	18	62	17	26	62	17
N.S.	1	1.09	1.09	0.78	2.70	0.74	1.13	2.70	0.74
time (sec)	N/A	0.161	0.011	0.037	0.196	0.253	0.059	0.264	16.334

Problem 1334	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	24	21	21	21	21	20	19	20	20
N.S.	1	0.88	0.88	0.88	0.88	0.83	0.79	0.83	0.83
time (sec)	N/A	0.318	0.359	0.263	0.241	0.266	0.284	0.300	17.724

Problem 1335	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	F	A	A	A	A	A	A	F(-1)
verified	N/A	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	0	23	22	42	42	42	46	0
N.S.	1	0.00	0.74	0.71	1.35	1.35	1.35	1.48	0.00
time (sec)	N/A	0.000	0.587	0.605	0.274	0.246	0.112	0.310	0.000

2.3 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi only. It gives additional statistics for each integral. the column **steps** is the number of steps used by Rubi to obtain the antiderivative. The **rules** column is the number of unique rules used. The **integrand size** column is the leaf size of the integrand. Finally the ratio $\frac{\text{number of rules}}{\text{integrand size}}$ is also given. The larger this ratio is, the harder the integral is to solve. In this test file, problem number [251] had the largest ratio of [.4000000000000000022]

Table 2.1: Rubi specific breakdown of results for each integral

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1	B	4	4	3.13	107	0.037
2	B	2	2	4.08	27	0.074
3	F	0	0	N/A	0.000	N/A
4	A	1	1	0.53	12	0.083
5	B	2	2	3.44	68	0.029
6	A	1	1	0.19	7	0.143
7	A	3	3	1.00	134	0.022
8	A	3	3	0.76	42	0.071
9	F	0	0	N/A	0.000	N/A
10	A	3	3	0.90	23	0.130
11	F	0	0	N/A	0.000	N/A
12	F	0	0	N/A	0.000	N/A
13	B	7	7	3.63	68	0.103
14	A	4	3	0.88	116	0.026
15	C	2	2	135.88	103	0.019
16	F	0	0	N/A	0.000	N/A
17	A	2	2	1.14	63	0.032
18	B	1	1	2.95	114	0.009
19	A	5	5	1.29	38	0.132
20	F	0	0	N/A	0.000	N/A
21	A	2	2	0.53	11	0.182

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
22	F	0	0	N/A	0.000	N/A
23	A	2	2	0.71	11	0.182
24	A	1	1	1.17	88	0.011
25	A	2	2	1.00	36	0.056
26	F	0	0	N/A	0.000	N/A
27	B	2	2	7.71	70	0.029
28	A	4	4	0.60	12	0.333
29	A	3	3	0.94	132	0.023
30	A	5	5	1.35	80	0.062
31	F	0	0	N/A	0.000	N/A
32	A	3	3	0.96	33	0.091
33	F	0	0	N/A	0.000	N/A
34	F	0	0	N/A	0.000	N/A
35	F	0	0	N/A	0.000	N/A
36	A	3	3	1.50	44	0.068
37	A	1	1	1.00	118	0.008
38	A	3	3	1.18	86	0.035
39	F	0	0	N/A	0.000	N/A
40	A	3	3	1.19	83	0.036
41	B	10	9	15.50	168	0.054
42	F	0	0	N/A	0.000	N/A
43	F	0	0	N/A	0.000	N/A
44	F	0	0	N/A	0.000	N/A
45	A	2	2	0.94	19	0.105
46	F	0	0	N/A	0.000	N/A
47	A	3	3	1.00	112	0.027
48	A	2	2	1.04	28	0.071
49	F	0	0	N/A	0.000	N/A
50	F	0	0	N/A	0.000	N/A
51	A	3	3	1.06	24	0.125
52	A	3	3	0.90	33	0.091
53	B	4	4	2.59	35	0.114

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
54	A	1	1	0.73	5	0.200
55	F	0	0	N/A	0.000	N/A
56	F	0	0	N/A	0.000	N/A
57	A	2	2	1.00	59	0.034
58	A	2	2	0.59	22	0.091
59	F	0	0	N/A	0.000	N/A
60	F	0	0	N/A	0.000	N/A
61	F	0	0	N/A	0.000	N/A
62	F	0	0	N/A	0.000	N/A
63	A	4	4	0.81	92	0.043
64	F	0	0	N/A	0.000	N/A
65	A	4	4	1.61	53	0.075
66	F	0	0	N/A	0.000	N/A
67	F	0	0	N/A	0.000	N/A
68	A	2	2	0.95	53	0.038
69	A	1	1	1.00	20	0.050
70	F	0	0	N/A	0.000	N/A
71	F	0	0	N/A	0.000	N/A
72	F	0	0	N/A	0.000	N/A
73	A	2	2	0.40	7	0.286
74	B	4	4	2.55	67	0.060
75	F	0	0	N/A	0.000	N/A
76	F	0	0	N/A	0.000	N/A
77	A	2	2	0.79	38	0.053
78	A	4	4	1.00	72	0.056
79	A	3	3	1.27	39	0.077
80	B	4	4	5.19	101	0.040
81	B	3	3	7.65	159	0.019
82	A	2	2	1.00	24	0.083
83	B	1	1	2.30	130	0.008
84	F	0	0	N/A	0.000	N/A
85	A	2	2	0.76	23	0.087

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
86	F	0	0	N/A	0.000	N/A
87	B	2	2	3.00	84	0.024
88	B	1	1	4.16	41	0.024
89	A	4	4	1.00	17	0.235
90	B	1	1	4.96	77	0.013
91	A	2	2	0.62	39	0.051
92	A	1	1	0.67	5	0.200
93	F	0	0	N/A	0.000	N/A
94	A	5	5	1.03	78	0.064
95	F	0	0	N/A	0.000	N/A
96	A	2	2	0.61	29	0.069
97	A	2	2	1.68	45	0.044
98	A	2	2	1.00	23	0.087
99	F	0	0	N/A	0.000	N/A
100	A	5	5	1.21	75	0.067
101	F	0	0	N/A	0.000	N/A
102	A	3	3	1.68	91	0.033
103	A	2	2	0.88	72	0.028
104	F	0	0	N/A	0.000	N/A
105	F	0	0	N/A	0.000	N/A
106	A	3	3	1.33	14	0.214
107	A	3	3	1.68	45	0.067
108	A	2	2	1.09	27	0.074
109	A	2	2	1.00	29	0.069
110	A	3	3	1.52	131	0.023
111	F	0	0	N/A	0.000	N/A
112	B	7	7	2.27	92	0.076
113	C	4	4	7.00	55	0.073
114	F	0	0	N/A	0.000	N/A
115	A	3	3	1.09	28	0.107
116	A	3	3	1.42	41	0.073
117	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
118	A	4	4	0.68	17	0.235
119	F	0	0	N/A	0.000	N/A
120	F	0	0	N/A	0.000	N/A
121	A	3	3	0.67	30	0.100
122	A	4	4	1.18	42	0.095
123	B	2	2	2.16	50	0.040
124	F	0	0	N/A	0.000	N/A
125	A	3	3	0.68	38	0.079
126	A	2	2	1.00	23	0.087
127	A	3	3	0.92	99	0.030
128	A	2	2	1.69	57	0.035
129	A	2	2	1.38	20	0.100
130	B	3	3	2.92	50	0.060
131	B	2	2	3.43	45	0.044
132	A	4	4	1.03	142	0.028
133	B	1	1	2.60	29	0.034
134	A	1	1	0.60	7	0.143
135	F	0	0	N/A	0.000	N/A
136	F	0	0	N/A	0.000	N/A
137	B	1	1	5.42	67	0.015
138	F	0	0	N/A	0.000	N/A
139	F	0	0	N/A	0.000	N/A
140	B	5	5	4.11	131	0.038
141	F	0	0	N/A	0.000	N/A
142	F	0	0	N/A	0.000	N/A
143	A	3	3	1.80	42	0.071
144	F	0	0	N/A	0.000	N/A
145	A	2	2	1.78	66	0.030
146	A	2	2	1.00	14	0.143
147	F	0	0	N/A	0.000	N/A
148	F	0	0	N/A	0.000	N/A
149	A	3	3	1.61	75	0.040

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
150	A	1	1	1.06	37	0.027
151	F	0	0	N/A	0.000	N/A
152	A	3	3	0.89	37	0.081
153	A	3	3	1.27	52	0.058
154	F	0	0	N/A	0.000	N/A
155	F	0	0	N/A	0.000	N/A
156	F	0	0	N/A	0.000	N/A
157	A	5	5	1.00	48	0.104
158	F	0	0	N/A	0.000	N/A
159	A	6	6	1.18	48	0.125
160	B	2	2	23.83	99	0.020
161	F	0	0	N/A	0.000	N/A
162	A	2	2	1.44	36	0.056
163	B	6	5	2.59	45	0.111
164	A	4	4	1.08	25	0.160
165	F	0	0	N/A	0.000	N/A
166	A	3	3	1.28	34	0.088
167	F	0	0	N/A	0.000	N/A
168	F	0	0	N/A	0.000	N/A
169	C	2	2	5.17	17	0.118
170	A	4	4	1.04	56	0.071
171	A	2	2	1.17	40	0.050
172	A	1	1	0.96	63	0.016
173	A	2	2	0.67	9	0.222
174	F	0	0	N/A	0.000	N/A
175	A	3	3	0.88	35	0.086
176	F	0	0	N/A	0.000	N/A
177	A	1	1	1.00	27	0.037
178	A	2	2	1.47	63	0.032
179	A	2	2	0.88	21	0.095
180	A	1	1	0.56	7	0.143
181	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
182	F	0	0	N/A	0.000	N/A
183	B	2	2	2.46	82	0.024
184	F	0	0	N/A	0.000	N/A
185	A	3	3	1.82	39	0.077
186	A	5	5	0.89	30	0.167
187	F	0	0	N/A	0.000	N/A
188	B	2	2	2.91	78	0.026
189	A	6	5	0.31	36	0.139
190	B	1	1	2.18	40	0.025
191	F	0	0	N/A	0.000	N/A
192	A	1	1	1.43	31	0.032
193	A	4	4	1.67	66	0.061
194	F	0	0	N/A	0.000	N/A
195	A	1	1	0.75	8	0.125
196	F	0	0	N/A	0.000	N/A
197	F	0	0	N/A	0.000	N/A
198	F	0	0	N/A	0.000	N/A
199	F	0	0	N/A	0.000	N/A
200	A	2	2	0.54	11	0.182
201	A	3	3	0.85	25	0.120
202	A	2	2	1.00	48	0.042
203	F	0	0	N/A	0.000	N/A
204	A	3	3	1.12	67	0.045
205	A	4	4	1.46	35	0.114
206	A	4	3	1.05	40	0.075
207	F	0	0	N/A	0.000	N/A
208	A	4	4	1.59	64	0.062
209	A	4	4	1.00	42	0.095
210	A	2	2	0.54	19	0.105
211	F	0	0	N/A	0.000	N/A
212	F	0	0	N/A	0.000	N/A
213	A	1	1	1.20	18	0.056

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
214	F	0	0	N/A	0.000	N/A
215	A	2	2	1.29	55	0.036
216	A	1	1	0.83	9	0.111
217	C	6	6	7.68	68	0.088
218	A	4	4	0.68	120	0.033
219	F	0	0	N/A	0.000	N/A
220	A	3	3	0.85	21	0.143
221	A	4	3	0.87	67	0.045
222	F	0	0	N/A	0.000	N/A
223	A	1	1	0.60	9	0.111
224	A	2	2	1.07	16	0.125
225	A	2	2	0.94	19	0.105
226	A	2	2	0.96	100	0.020
227	F	0	0	N/A	0.000	N/A
228	F	0	0	N/A	0.000	N/A
229	A	8	8	1.52	120	0.067
230	A	1	1	0.44	3	0.333
231	F	0	0	N/A	0.000	N/A
232	F	0	0	N/A	0.000	N/A
233	A	3	3	0.91	24	0.125
234	F	0	0	N/A	0.000	N/A
235	C	2	2	11.77	122	0.016
236	F	0	0	N/A	0.000	N/A
237	B	3	3	3.75	79	0.038
238	A	2	2	1.22	41	0.049
239	A	1	1	0.95	35	0.029
240	A	2	2	1.07	32	0.062
241	B	8	8	2.59	48	0.167
242	A	3	3	1.32	39	0.077
243	A	2	2	0.96	41	0.049
244	B	5	5	5.50	165	0.030
245	A	3	3	1.37	51	0.059
246	A	2	2	1.21	24	0.083

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
247	A	1	1	1.00	7	0.143
248	A	4	4	1.82	99	0.040
249	F	0	0	N/A	0.000	N/A
250	B	1	1	7.00	103	0.010
251	A	2	2	1.00	5	0.400
252	A	1	1	0.93	20	0.050
253	F	0	0	N/A	0.000	N/A
254	F	0	0	N/A	0.000	N/A
255	F	0	0	N/A	0.000	N/A
256	F	0	0	N/A	0.000	N/A
257	B	2	2	2.25	26	0.077
258	A	4	4	0.86	103	0.039
259	F	0	0	N/A	0.000	N/A
260	F	0	0	N/A	0.000	N/A
261	A	8	8	1.50	122	0.066
262	F	0	0	N/A	0.000	N/A
263	A	1	1	0.37	9	0.111
264	B	4	4	2.75	130	0.031
265	C	3	3	86.29	76	0.039
266	F	0	0	N/A	0.000	N/A
267	C	2	2	1.75	43	0.047
268	A	5	5	0.78	53	0.094
269	A	4	4	1.00	618	0.006
270	A	2	2	1.39	139	0.014
271	F	0	0	N/A	0.000	N/A
272	F	0	0	N/A	0.000	N/A
273	A	2	2	1.00	19	0.105
274	A	2	2	1.05	30	0.067
275	A	1	1	1.42	77	0.013
276	F	0	0	N/A	0.000	N/A
277	F	0	0	N/A	0.000	N/A
278	A	2	2	0.40	9	0.222

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
279	B	2	2	2.80	69	0.029
280	A	2	2	0.94	17	0.118
281	A	3	3	0.86	135	0.022
282	F	0	0	N/A	0.000	N/A
283	B	2	2	3.33	83	0.024
284	A	4	4	1.24	40	0.100
285	A	2	2	1.23	39	0.051
286	F	0	0	N/A	0.000	N/A
287	F	0	0	N/A	0.000	N/A
288	F	0	0	N/A	0.000	N/A
289	A	2	2	1.19	68	0.029
290	A	3	3	1.11	57	0.053
291	F	0	0	N/A	0.000	N/A
292	A	1	1	1.48	63	0.016
293	B	4	4	2.67	56	0.071
294	F	0	0	N/A	0.000	N/A
295	B	5	5	9.24	54	0.093
296	A	4	4	1.76	22	0.182
297	A	3	3	0.89	56	0.054
298	A	3	3	1.05	54	0.056
299	A	4	4	1.83	85	0.047
300	B	6	6	3.79	68	0.088
301	A	4	4	1.10	43	0.093
302	A	3	3	1.24	35	0.086
303	F	0	0	N/A	0.000	N/A
304	A	3	3	0.52	24	0.125
305	A	3	3	0.88	18	0.167
306	A	1	1	1.66	45	0.022
307	A	2	2	0.89	41	0.049
308	A	3	3	1.78	26	0.115
309	F	0	0	N/A	0.000	N/A
310	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
311	F	0	0	N/A	0.000	N/A
312	F	0	0	N/A	0.000	N/A
313	A	3	3	0.90	35	0.086
314	A	4	4	1.11	176	0.023
315	F	0	0	N/A	0.000	N/A
316	A	5	5	1.45	85	0.059
317	F	0	0	N/A	0.000	N/A
318	A	1	1	0.69	11	0.091
319	F	0	0	N/A	0.000	N/A
320	A	2	2	1.18	50	0.040
321	F	0	0	N/A	0.000	N/A
322	A	1	1	1.00	3	0.333
323	F	0	0	N/A	0.000	N/A
324	A	2	2	1.25	13	0.154
325	A	1	1	1.00	14	0.071
326	B	1	1	3.50	91	0.011
327	F	0	0	N/A	0.000	N/A
328	A	2	2	1.31	52	0.038
329	F	0	0	N/A	0.000	N/A
330	B	4	4	4.28	118	0.034
331	F	0	0	N/A	0.000	N/A
332	F	0	0	N/A	0.000	N/A
333	A	3	3	1.00	55	0.055
334	A	1	1	0.75	38	0.026
335	A	5	5	1.00	47	0.106
336	F	0	0	N/A	0.000	N/A
337	A	2	2	1.09	36	0.056
338	A	3	3	1.56	65	0.046
339	A	4	4	1.16	45	0.089
340	F	0	0	N/A	0.000	N/A
341	F	0	0	N/A	0.000	N/A
342	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
343	F	0	0	N/A	0.000	N/A
344	A	2	2	1.11	160	0.012
345	F	0	0	N/A	0.000	N/A
346	A	2	2	1.78	23	0.087
347	F	0	0	N/A	0.000	N/A
348	A	1	1	1.04	28	0.036
349	A	1	1	1.69	54	0.019
350	F	0	0	N/A	0.000	N/A
351	A	1	1	1.00	18	0.056
352	F	0	0	N/A	0.000	N/A
353	F	0	0	N/A	0.000	N/A
354	F	0	0	N/A	0.000	N/A
355	A	1	1	1.05	49	0.020
356	A	3	3	1.93	27	0.111
357	C	1	1	19.05	288	0.003
358	B	5	5	3.61	63	0.079
359	F	0	0	N/A	0.000	N/A
360	B	6	5	2.81	66	0.076
361	B	2	2	5.15	31	0.065
362	A	5	5	1.06	23	0.217
363	F	0	0	N/A	0.000	N/A
364	F	0	0	N/A	0.000	N/A
365	F	0	0	N/A	0.000	N/A
366	F	0	0	N/A	0.000	N/A
367	A	4	4	0.60	12	0.333
368	A	2	2	1.00	12	0.167
369	C	2	2	4.91	106	0.019
370	F	0	0	N/A	0.000	N/A
371	F	0	0	N/A	0.000	N/A
372	A	1	1	1.64	59	0.017
373	F	0	0	N/A	0.000	N/A
374	A	8	7	1.09	50	0.140

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2.3. Detailed conclusion table specific for Rubi results

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
375	F	0	0	N/A	0.000	N/A
376	B	4	4	2.05	56	0.071
377	B	2	2	2.29	43	0.047
378	F	0	0	N/A	0.000	N/A
379	A	5	5	0.71	27	0.185
380	A	1	1	1.38	13	0.077
381	A	6	6	1.73	38	0.158
382	B	1	1	2.80	70	0.014
383	A	2	2	1.36	58	0.034
384	A	4	4	0.88	36	0.111
385	B	2	2	3.19	73	0.027
386	A	4	4	1.39	144	0.028
387	A	4	4	1.26	36	0.111
388	A	1	1	1.08	85	0.012
389	A	4	4	1.14	33	0.121
390	F	0	0	N/A	0.000	N/A
391	B	3	3	2.71	38	0.079
392	F	0	0	N/A	0.000	N/A
393	F	0	0	N/A	0.000	N/A
394	A	2	2	0.85	17	0.118
395	F	0	0	N/A	0.000	N/A
396	A	1	1	0.88	12	0.083
397	B	2	2	3.95	140	0.014
398	A	1	1	0.83	13	0.077
399	A	4	4	1.19	96	0.042
400	F	0	0	N/A	0.000	N/A
401	A	1	1	2.00	23	0.043
402	B	4	4	9.20	77	0.052
403	F	0	0	N/A	0.000	N/A
404	A	3	3	1.00	20	0.150
405	F	0	0	N/A	0.000	N/A
406	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
407	A	1	1	0.92	28	0.036
408	F	0	0	N/A	0.000	N/A
409	B	1	1	2.33	51	0.020
410	B	4	4	2.09	96	0.042
411	F	0	0	N/A	0.000	N/A
412	A	2	2	0.92	9	0.222
413	F	0	0	N/A	0.000	N/A
414	F	0	0	N/A	0.000	N/A
415	F	0	0	N/A	0.000	N/A
416	B	5	5	2.50	61	0.082
417	A	2	2	0.85	23	0.087
418	A	3	3	1.15	17	0.176
419	A	1	1	1.33	22	0.045
420	F	0	0	N/A	0.000	N/A
421	B	1	1	3.95	67	0.015
422	F	0	0	N/A	0.000	N/A
423	A	1	1	0.80	14	0.071
424	A	1	1	1.33	10	0.100
425	A	4	4	1.17	79	0.051
426	A	4	4	0.94	35	0.114
427	F	0	0	N/A	0.000	N/A
428	F	0	0	N/A	0.000	N/A
429	A	1	1	1.47	13	0.077
430	F	0	0	N/A	0.000	N/A
431	A	2	2	1.31	40	0.050
432	B	7	7	2.73	105	0.067
433	A	2	2	0.89	19	0.105
434	F	0	0	N/A	0.000	N/A
435	B	4	4	9.36	68	0.059
436	B	2	2	3.60	82	0.024
437	A	2	2	1.89	33	0.061
438	A	3	3	1.38	22	0.136

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
439	A	4	4	1.06	33	0.121
440	F	0	0	N/A	0.000	N/A
441	A	1	1	0.53	9	0.111
442	A	1	1	1.00	42	0.024
443	F	0	0	N/A	0.000	N/A
444	F	0	0	N/A	0.000	N/A
445	B	7	7	4.24	98	0.071
446	A	3	3	0.97	103	0.029
447	F	0	0	N/A	0.000	N/A
448	A	8	8	0.96	81	0.099
449	A	1	1	1.19	161	0.006
450	A	2	2	1.07	26	0.077
451	F	0	0	N/A	0.000	N/A
452	A	2	2	1.74	50	0.040
453	A	2	2	1.14	44	0.045
454	A	2	2	1.62	39	0.051
455	F	0	0	N/A	0.000	N/A
456	F	0	0	N/A	0.000	N/A
457	A	5	5	1.91	42	0.119
458	A	4	4	1.75	33	0.121
459	A	5	5	0.97	57	0.088
460	F	0	0	N/A	0.000	N/A
461	F	0	0	N/A	0.000	N/A
462	F	0	0	N/A	0.000	N/A
463	A	2	2	1.80	85	0.024
464	F	0	0	N/A	0.000	N/A
465	A	2	2	0.93	18	0.111
466	F	0	0	N/A	0.000	N/A
467	B	3	3	3.39	87	0.034
468	A	6	6	1.81	66	0.091
469	B	2	2	2.30	49	0.041
470	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
471	F	0	0	N/A	0.000	N/A
472	C	5	5	32.21	108	0.046
473	A	2	2	0.82	16	0.125
474	A	2	2	0.67	25	0.080
475	B	2	2	2.04	71	0.028
476	A	3	3	0.85	34	0.088
477	F	0	0	N/A	0.000	N/A
478	B	3	3	2.81	54	0.056
479	A	1	1	0.88	17	0.059
480	F	0	0	N/A	0.000	N/A
481	F	0	0	N/A	0.000	N/A
482	A	4	4	1.29	89	0.045
483	F	0	0	N/A	0.000	N/A
484	B	1	1	3.71	94	0.011
485	A	4	4	1.00	32	0.125
486	F	0	0	N/A	0.000	N/A
487	A	2	2	0.85	14	0.143
488	A	2	2	1.07	27	0.074
489	F	0	0	N/A	0.000	N/A
490	A	2	2	0.85	15	0.133
491	B	2	2	2.41	60	0.033
492	F	0	0	N/A	0.000	N/A
493	F	0	0	N/A	0.000	N/A
494	F	0	0	N/A	0.000	N/A
495	B	4	4	2.55	57	0.070
496	A	2	2	1.33	46	0.043
497	A	3	3	1.78	50	0.060
498	F	0	0	N/A	0.000	N/A
499	F	0	0	N/A	0.000	N/A
500	C	1	1	2.70	29	0.034
501	A	2	2	1.00	27	0.074
502	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
503	F	0	0	N/A	0.000	N/A
504	A	2	2	0.75	34	0.059
505	F	0	0	N/A	0.000	N/A
506	F	0	0	N/A	0.000	N/A
507	A	4	4	1.00	41	0.098
508	A	1	1	1.58	114	0.009
509	A	5	5	1.57	52	0.096
510	A	2	2	1.32	28	0.071
511	F	0	0	N/A	0.000	N/A
512	A	3	3	0.61	58	0.052
513	F	0	0	N/A	0.000	N/A
514	F	0	0	N/A	0.000	N/A
515	B	3	3	2.12	143	0.021
516	A	3	3	1.00	38	0.079
517	F	0	0	N/A	0.000	N/A
518	F	0	0	N/A	0.000	N/A
519	A	1	1	1.53	14	0.071
520	A	1	1	1.00	5	0.200
521	B	4	4	3.87	72	0.056
522	A	3	3	1.00	33	0.091
523	F	0	0	N/A	0.000	N/A
524	A	2	2	1.80	46	0.043
525	F	0	0	N/A	0.000	N/A
526	A	1	1	0.62	8	0.125
527	F	0	0	N/A	0.000	N/A
528	A	1	1	1.08	48	0.021
529	F	0	0	N/A	0.000	N/A
530	A	2	2	1.32	24	0.083
531	F	0	0	N/A	0.000	N/A
532	F	0	0	N/A	0.000	N/A
533	F	0	0	N/A	0.000	N/A
534	A	4	4	1.87	76	0.053

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
535	A	4	3	0.85	28	0.107
536	F	0	0	N/A	0.000	N/A
537	B	2	2	2.44	99	0.020
538	B	5	5	2.75	123	0.041
539	F	0	0	N/A	0.000	N/A
540	F	0	0	N/A	0.000	N/A
541	B	1	1	6.07	120	0.008
542	F	0	0	N/A	0.000	N/A
543	F	0	0	N/A	0.000	N/A
544	A	1	1	1.50	70	0.014
545	A	2	2	0.87	22	0.091
546	A	2	2	1.10	149	0.013
547	A	4	4	0.93	49	0.082
548	A	6	6	0.80	32	0.188
549	A	4	4	1.31	76	0.053
550	F	0	0	N/A	0.000	N/A
551	F	0	0	N/A	0.000	N/A
552	B	1	1	4.26	70	0.014
553	A	1	1	1.00	9	0.111
554	F	0	0	N/A	0.000	N/A
555	F	0	0	N/A	0.000	N/A
556	A	5	5	1.69	41	0.122
557	A	1	1	2.00	32	0.031
558	B	7	7	4.14	92	0.076
559	A	4	4	1.00	38	0.105
560	F	0	0	N/A	0.000	N/A
561	A	4	4	1.07	42	0.095
562	F	0	0	N/A	0.000	N/A
563	F	0	0	N/A	0.000	N/A
564	F	0	0	N/A	0.000	N/A
565	A	1	1	0.25	5	0.200
566	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
567	B	4	4	2.40	53	0.075
568	A	6	5	1.95	50	0.100
569	A	1	1	1.00	35	0.029
570	F	0	0	N/A	0.000	N/A
571	A	2	2	1.15	39	0.051
572	A	4	4	1.30	42	0.095
573	A	2	2	1.72	39	0.051
574	B	4	4	2.79	61	0.066
575	F	0	0	N/A	0.000	N/A
576	F	0	0	N/A	0.000	N/A
577	A	4	4	0.95	25	0.160
578	A	1	1	0.84	14	0.071
579	A	1	1	1.36	70	0.014
580	B	3	3	4.35	100	0.030
581	F	0	0	N/A	0.000	N/A
582	F	0	0	N/A	0.000	N/A
583	F	0	0	N/A	0.000	N/A
584	F	0	0	N/A	0.000	N/A
585	A	5	5	1.03	172	0.029
586	F	0	0	N/A	0.000	N/A
587	F	0	0	N/A	0.000	N/A
588	A	3	3	1.16	27	0.111
589	A	4	4	1.14	45	0.089
590	A	3	3	1.70	41	0.073
591	F	0	0	N/A	0.000	N/A
592	A	1	1	0.70	17	0.059
593	A	1	1	0.54	9	0.111
594	B	1	1	6.26	180	0.006
595	F	0	0	N/A	0.000	N/A
596	F	0	0	N/A	0.000	N/A
597	B	1	1	2.88	43	0.023
598	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
599	A	2	2	0.93	22	0.091
600	A	2	2	0.94	24	0.083
601	A	1	1	0.33	3	0.333
602	F	0	0	N/A	0.000	N/A
603	A	6	6	0.79	42	0.143
604	F	0	0	N/A	0.000	N/A
605	B	3	3	4.54	72	0.042
606	A	4	4	0.81	100	0.040
607	F	0	0	N/A	0.000	N/A
608	A	2	2	0.88	59	0.034
609	F	0	0	N/A	0.000	N/A
610	F	0	0	N/A	0.000	N/A
611	B	3	3	7.18	76	0.039
612	F	0	0	N/A	0.000	N/A
613	A	2	2	0.54	18	0.111
614	A	3	3	1.00	13	0.231
615	F	0	0	N/A	0.000	N/A
616	B	1	1	2.33	38	0.026
617	A	2	2	0.82	80	0.025
618	F	0	0	N/A	0.000	N/A
619	A	4	4	1.33	27	0.148
620	A	3	3	0.74	27	0.111
621	A	2	2	1.06	45	0.044
622	A	3	3	1.00	89	0.034
623	A	6	6	0.70	41	0.146
624	A	2	2	0.54	9	0.222
625	B	3	3	2.56	81	0.037
626	F	0	0	N/A	0.000	N/A
627	A	3	3	0.85	30	0.100
628	B	5	5	2.22	69	0.072
629	B	3	3	2.17	43	0.070
630	A	1	1	1.12	15	0.067
631	A	3	3	0.52	22	0.136

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
632	F	0	0	N/A	0.000	N/A
633	A	1	1	1.39	58	0.017
634	A	1	1	0.57	13	0.077
635	A	5	5	1.46	86	0.058
636	A	2	2	0.75	49	0.041
637	A	1	1	1.04	42	0.024
638	F	0	0	N/A	0.000	N/A
639	B	5	5	5.29	31	0.161
640	A	4	4	0.89	39	0.103
641	F	0	0	N/A	0.000	N/A
642	A	6	6	0.92	40	0.150
643	A	4	4	1.64	38	0.105
644	A	2	2	1.36	38	0.053
645	A	2	2	0.75	13	0.154
646	A	4	4	1.33	26	0.154
647	A	2	2	1.16	46	0.043
648	F	0	0	N/A	0.000	N/A
649	F	0	0	N/A	0.000	N/A
650	F	0	0	N/A	0.000	N/A
651	A	3	3	0.87	135	0.022
652	A	3	3	1.04	30	0.100
653	A	3	3	1.04	27	0.111
654	F	0	0	N/A	0.000	N/A
655	A	2	2	1.00	11	0.182
656	B	2	2	2.79	30	0.067
657	A	4	4	1.42	38	0.105
658	F	0	0	N/A	0.000	N/A
659	F	0	0	N/A	0.000	N/A
660	A	4	4	0.95	21	0.190
661	F	0	0	N/A	0.000	N/A
662	B	2	2	3.11	78	0.026
663	A	1	1	0.54	20	0.050

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
664	F	0	0	N/A	0.000	N/A
665	A	4	4	2.00	32	0.125
666	F	0	0	N/A	0.000	N/A
667	F	0	0	N/A	0.000	N/A
668	F	0	0	N/A	0.000	N/A
669	F	0	0	N/A	0.000	N/A
670	A	2	2	1.30	53	0.038
671	B	3	3	2.10	71	0.042
672	A	3	3	0.47	27	0.111
673	A	1	1	1.30	18	0.056
674	B	5	5	3.65	44	0.114
675	F	0	0	N/A	0.000	N/A
676	F	0	0	N/A	0.000	N/A
677	A	4	4	1.95	61	0.066
678	A	4	4	1.12	35	0.114
679	F	0	0	N/A	0.000	N/A
680	F	0	0	N/A	0.000	N/A
681	F	0	0	N/A	0.000	N/A
682	A	1	1	0.40	5	0.200
683	F	0	0	N/A	0.000	N/A
684	F	0	0	N/A	0.000	N/A
685	F	0	0	N/A	0.000	N/A
686	F	0	0	N/A	0.000	N/A
687	F	0	0	N/A	0.000	N/A
688	A	1	1	1.33	15	0.067
689	A	5	5	1.18	226	0.022
690	F	0	0	N/A	0.000	N/A
691	F	0	0	N/A	0.000	N/A
692	F	0	0	N/A	0.000	N/A
693	C	4	4	5.06	73	0.055
694	A	4	4	0.77	21	0.190

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2.3. Detailed conclusion table specific for Rubi results

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
695	A	3	3	1.72	84	0.036
696	C	3	3	25.80	76	0.039
697	F	0	0	N/A	0.000	N/A
698	B	2	2	127.60	429	0.005
699	A	7	6	0.81	61	0.098
700	C	6	6	106.35	189	0.032
701	A	2	2	0.95	20	0.100
702	A	6	6	1.00	32	0.188
703	F	0	0	N/A	0.000	N/A
704	F	0	0	N/A	0.000	N/A
705	A	3	3	1.00	71	0.042
706	F	0	0	N/A	0.000	N/A
707	A	3	3	1.10	90	0.033
708	A	3	3	0.94	28	0.107
709	A	6	6	0.89	94	0.064
710	F	0	0	N/A	0.000	N/A
711	A	3	3	1.39	55	0.055
712	F	0	0	N/A	0.000	N/A
713	F	0	0	N/A	0.000	N/A
714	A	1	1	1.00	6	0.167
715	A	3	3	1.14	38	0.079
716	B	2	2	2.71	43	0.047
717	A	2	2	1.42	40	0.050
718	A	1	1	1.00	97	0.010
719	A	2	2	1.16	25	0.080
720	A	3	3	1.00	28	0.107
721	B	1	1	2.19	71	0.014
722	A	1	1	0.92	22	0.045
723	B	3	3	2.72	119	0.025
724	A	3	3	1.89	58	0.052
725	A	3	3	0.68	70	0.043
726	F	0	0	N/A	0.000	N/A
727	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
728	F	0	0	N/A	0.000	N/A
729	F	0	0	N/A	0.000	N/A
730	F	0	0	N/A	0.000	N/A
731	F	0	0	N/A	0.000	N/A
732	A	3	3	1.33	90	0.033
733	A	1	1	1.00	30	0.033
734	A	2	2	1.36	18	0.111
735	B	5	5	210.71	781	0.006
736	A	7	6	0.88	38	0.158
737	F	0	0	N/A	0.000	N/A
738	A	3	3	0.68	48	0.062
739	B	2	2	2.33	30	0.067
740	F	0	0	N/A	0.000	N/A
741	F	0	0	N/A	0.000	N/A
742	B	3	3	11.35	98	0.031
743	A	4	4	1.18	34	0.118
744	F	0	0	N/A	0.000	N/A
745	F	0	0	N/A	0.000	N/A
746	F	0	0	N/A	0.000	N/A
747	F	0	0	N/A	0.000	N/A
748	B	6	6	3.22	87	0.069
749	B	5	5	3.96	150	0.033
750	F	0	0	N/A	0.000	N/A
751	F	0	0	N/A	0.000	N/A
752	A	4	4	1.00	86	0.047
753	A	3	3	1.39	33	0.091
754	A	2	2	1.10	27	0.074
755	F	0	0	N/A	0.000	N/A
756	A	2	2	0.28	9	0.222
757	A	2	2	1.42	39	0.051
758	A	3	3	0.78	27	0.111
759	A	2	2	1.22	35	0.057

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
760	F	0	0	N/A	0.000	N/A
761	F	0	0	N/A	0.000	N/A
762	F	0	0	N/A	0.000	N/A
763	A	2	2	1.29	24	0.083
764	A	2	2	0.73	19	0.105
765	F	0	0	N/A	0.000	N/A
766	A	1	1	1.47	17	0.059
767	C	2	2	10.10	88	0.023
768	F	0	0	N/A	0.000	N/A
769	F	0	0	N/A	0.000	N/A
770	F	0	0	N/A	0.000	N/A
771	C	3	3	67.12	74	0.041
772	B	1	1	3.00	52	0.019
773	A	3	3	1.48	66	0.045
774	B	2	2	6.70	151	0.013
775	A	2	2	0.96	119	0.017
776	A	5	4	1.00	119	0.034
777	A	1	1	0.91	125	0.008
778	A	1	1	1.00	16	0.062
779	F	0	0	N/A	0.000	N/A
780	B	2	2	3.21	81	0.025
781	A	2	2	1.07	25	0.080
782	F	0	0	N/A	0.000	N/A
783	F	0	0	N/A	0.000	N/A
784	F	0	0	N/A	0.000	N/A
785	F	0	0	N/A	0.000	N/A
786	B	3	3	3.33	67	0.045
787	A	3	3	1.33	25	0.120
788	F	0	0	N/A	0.000	N/A
789	A	2	2	0.71	18	0.111
790	F	0	0	N/A	0.000	N/A
791	A	4	4	1.69	51	0.078

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
792	A	2	2	1.00	19	0.105
793	F	0	0	N/A	0.000	N/A
794	A	2	2	1.62	40	0.050
795	F	0	0	N/A	0.000	N/A
796	B	2	2	5.35	71	0.028
797	A	2	2	1.05	50	0.040
798	B	3	3	2.45	47	0.064
799	B	7	6	2.17	35	0.171
800	A	1	1	1.89	81	0.012
801	A	2	2	0.90	44	0.045
802	B	4	4	7.94	65	0.062
803	F	0	0	N/A	0.000	N/A
804	A	3	3	1.97	61	0.049
805	F	0	0	N/A	0.000	N/A
806	A	2	2	0.88	29	0.069
807	A	1	1	1.00	15	0.067
808	F	0	0	N/A	0.000	N/A
809	F	0	0	N/A	0.000	N/A
810	A	1	1	0.84	15	0.067
811	B	4	4	3.41	66	0.061
812	B	3	3	2.19	36	0.083
813	A	3	3	1.20	23	0.130
814	F	0	0	N/A	0.000	N/A
815	F	0	0	N/A	0.000	N/A
816	A	1	1	0.53	12	0.083
817	A	1	1	1.00	6	0.167
818	F	0	0	N/A	0.000	N/A
819	A	4	4	0.59	23	0.174
820	A	4	4	1.41	61	0.066
821	A	1	1	0.64	7	0.143
822	B	1	1	6.90	123	0.008
823	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
824	A	2	2	1.55	57	0.035
825	A	5	5	1.60	46	0.109
826	F	0	0	N/A	0.000	N/A
827	F	0	0	N/A	0.000	N/A
828	A	6	5	1.00	32	0.156
829	F	0	0	N/A	0.000	N/A
830	F	0	0	N/A	0.000	N/A
831	F	0	0	N/A	0.000	N/A
832	B	4	4	3.12	94	0.043
833	A	3	3	0.78	73	0.041
834	F	0	0	N/A	0.000	N/A
835	F	0	0	N/A	0.000	N/A
836	B	1	1	3.59	66	0.015
837	A	1	1	0.59	16	0.062
838	A	3	3	1.35	64	0.047
839	F	0	0	N/A	0.000	N/A
840	B	4	4	2.85	62	0.065
841	A	4	3	1.12	39	0.077
842	F	0	0	N/A	0.000	N/A
843	A	3	3	1.03	97	0.031
844	B	8	8	18.41	259	0.031
845	A	4	3	1.08	77	0.039
846	F	0	0	N/A	0.000	N/A
847	F	0	0	N/A	0.000	N/A
848	A	1	1	0.65	14	0.071
849	B	3	3	4.60	141	0.021
850	B	3	3	2.40	42	0.071
851	A	4	4	0.84	43	0.093
852	F	0	0	N/A	0.000	N/A
853	B	2	2	2.05	43	0.047
854	F	0	0	N/A	0.000	N/A
855	A	1	1	1.20	49	0.020

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
856	F	0	0	N/A	0.000	N/A
857	F	0	0	N/A	0.000	N/A
858	A	4	4	0.73	26	0.154
859	F	0	0	N/A	0.000	N/A
860	F	0	0	N/A	0.000	N/A
861	B	3	3	3.05	41	0.073
862	A	1	1	0.95	30	0.033
863	A	2	2	1.59	32	0.062
864	A	4	4	1.00	25	0.160
865	A	1	1	1.32	21	0.048
866	A	1	1	1.33	21	0.048
867	C	2	2	2.52	36	0.056
868	F	0	0	N/A	0.000	N/A
869	A	3	3	0.53	17	0.176
870	F	0	0	N/A	0.000	N/A
871	A	4	4	1.14	44	0.091
872	F	0	0	N/A	0.000	N/A
873	A	2	2	1.48	31	0.065
874	C	3	3	7.91	115	0.026
875	F	0	0	N/A	0.000	N/A
876	A	2	2	1.24	41	0.049
877	A	1	1	0.85	25	0.040
878	A	1	1	0.64	25	0.040
879	F	0	0	N/A	0.000	N/A
880	A	4	4	1.00	91	0.044
881	F	0	0	N/A	0.000	N/A
882	A	3	3	0.83	32	0.094
883	B	5	5	6.67	177	0.028
884	A	2	2	1.00	21	0.095
885	B	1	1	2.12	36	0.028
886	A	4	3	1.00	46	0.065
887	A	1	1	1.25	11	0.091

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
888	A	14	14	1.19	164	0.085
889	F	0	0	N/A	0.000	N/A
890	F	0	0	N/A	0.000	N/A
891	A	2	2	0.88	113	0.018
892	A	1	1	0.82	10	0.100
893	A	4	4	1.95	38	0.105
894	A	4	3	1.00	27	0.111
895	A	2	2	1.62	36	0.056
896	F	0	0	N/A	0.000	N/A
897	F	0	0	N/A	0.000	N/A
898	A	4	4	1.26	42	0.095
899	A	3	3	0.78	25	0.120
900	F	0	0	N/A	0.000	N/A
901	A	3	3	1.53	47	0.064
902	A	4	4	1.21	54	0.074
903	B	7	6	4.55	73	0.082
904	A	4	4	0.53	23	0.174
905	A	1	1	0.58	9	0.111
906	A	2	2	1.00	25	0.080
907	A	1	1	1.91	12	0.083
908	F	0	0	N/A	0.000	N/A
909	F	0	0	N/A	0.000	N/A
910	A	3	3	0.89	32	0.094
911	F	0	0	N/A	0.000	N/A
912	F	0	0	N/A	0.000	N/A
913	A	4	4	1.00	59	0.068
914	A	3	3	1.15	69	0.043
915	F	0	0	N/A	0.000	N/A
916	A	1	1	1.00	14	0.071
917	A	2	2	1.14	38	0.053
918	A	4	4	1.00	20	0.200
919	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
920	C	5	5	26.14	104	0.048
921	F	0	0	N/A	0.000	N/A
922	F	0	0	N/A	0.000	N/A
923	A	5	5	0.71	36	0.139
924	F	0	0	N/A	0.000	N/A
925	A	3	3	0.78	56	0.054
926	F	0	0	N/A	0.000	N/A
927	A	3	3	1.00	23	0.130
928	A	3	3	1.25	46	0.065
929	F	0	0	N/A	0.000	N/A
930	A	6	5	1.33	114	0.044
931	A	5	5	1.32	38	0.132
932	F	0	0	N/A	0.000	N/A
933	F	0	0	N/A	0.000	N/A
934	F	0	0	N/A	0.000	N/A
935	A	3	3	1.00	124	0.024
936	A	3	3	0.86	51	0.059
937	A	2	2	1.00	25	0.080
938	F	0	0	N/A	0.000	N/A
939	F	0	0	N/A	0.000	N/A
940	C	1	1	2.88	33	0.030
941	F	0	0	N/A	0.000	N/A
942	A	4	4	1.32	57	0.070
943	F	0	0	N/A	0.000	N/A
944	A	3	3	0.95	31	0.097
945	A	2	2	0.64	22	0.091
946	B	3	3	2.52	25	0.120
947	B	3	3	5.97	121	0.025
948	A	4	4	1.39	24	0.167
949	A	2	2	1.67	21	0.095
950	B	3	3	2.07	26	0.115
951	B	2	2	10.29	148	0.014

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
952	A	2	2	1.69	23	0.087
953	F	0	0	N/A	0.000	N/A
954	F	0	0	N/A	0.000	N/A
955	A	4	4	0.90	55	0.073
956	A	3	3	1.00	55	0.055
957	F	0	0	N/A	0.000	N/A
958	F	0	0	N/A	0.000	N/A
959	A	4	4	0.95	177	0.023
960	B	3	3	2.93	62	0.048
961	F	0	0	N/A	0.000	N/A
962	F	0	0	N/A	0.000	N/A
963	A	3	3	1.45	39	0.077
964	B	2	2	2.05	46	0.043
965	B	1	1	14.79	198	0.005
966	F	0	0	N/A	0.000	N/A
967	F	0	0	N/A	0.000	N/A
968	B	3	3	2.15	75	0.040
969	A	3	3	1.44	33	0.091
970	B	3	3	3.64	50	0.060
971	A	1	1	1.05	26	0.038
972	B	2	2	4.04	53	0.038
973	B	4	4	2.33	35	0.114
974	A	1	1	0.73	28	0.036
975	A	1	1	0.56	9	0.111
976	F	0	0	N/A	0.000	N/A
977	A	2	2	0.76	15	0.133
978	F	0	0	N/A	0.000	N/A
979	A	3	3	0.79	51	0.059
980	F	0	0	N/A	0.000	N/A
981	A	2	2	1.75	93	0.022
982	F	0	0	N/A	0.000	N/A
983	A	3	3	0.91	94	0.032

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
984	B	1	1	7.00	73	0.014
985	A	1	1	1.12	20	0.050
986	A	8	8	1.42	84	0.095
987	A	4	4	1.71	45	0.089
988	A	1	1	1.11	52	0.019
989	F	0	0	N/A	0.000	N/A
990	A	4	4	0.86	24	0.167
991	F	0	0	N/A	0.000	N/A
992	A	2	2	0.50	5	0.400
993	A	1	1	1.29	17	0.059
994	A	1	1	1.09	8	0.125
995	A	1	1	0.92	11	0.091
996	A	2	2	0.79	17	0.118
997	F	0	0	N/A	0.000	N/A
998	F	0	0	N/A	0.000	N/A
999	F	0	0	N/A	0.000	N/A
1000	B	3	3	5.22	88	0.034
1001	A	1	1	1.00	75	0.013
1002	B	7	7	2.48	66	0.106
1003	B	4	4	2.21	75	0.053
1004	A	1	1	1.04	23	0.043
1005	F	0	0	N/A	0.000	N/A
1006	F	0	0	N/A	0.000	N/A
1007	A	5	4	1.00	14	0.286
1008	A	4	4	1.08	14	0.286
1009	A	3	3	1.63	22	0.136
1010	F	0	0	N/A	0.000	N/A
1011	F	0	0	N/A	0.000	N/A
1012	A	1	1	0.36	5	0.200
1013	A	4	4	1.62	39	0.103
1014	A	2	2	1.24	87	0.023
1015	B	2	2	2.24	100	0.020
1016	A	1	1	1.47	15	0.067

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1017	A	2	2	0.94	23	0.087
1018	F	0	0	N/A	0.000	N/A
1019	F	0	0	N/A	0.000	N/A
1020	F	0	0	N/A	0.000	N/A
1021	A	2	2	1.00	79	0.025
1022	F	0	0	N/A	0.000	N/A
1023	F	0	0	N/A	0.000	N/A
1024	F	0	0	N/A	0.000	N/A
1025	F	0	0	N/A	0.000	N/A
1026	B	2	2	5.19	95	0.021
1027	A	3	3	0.97	100	0.030
1028	C	6	6	8.08	51	0.118
1029	A	3	3	1.80	48	0.062
1030	F	0	0	N/A	0.000	N/A
1031	A	2	2	1.90	56	0.036
1032	B	4	4	2.10	28	0.143
1033	F	0	0	N/A	0.000	N/A
1034	F	0	0	N/A	0.000	N/A
1035	F	0	0	N/A	0.000	N/A
1036	F	0	0	N/A	0.000	N/A
1037	A	6	6	1.00	27	0.222
1038	A	1	1	1.39	37	0.027
1039	F	0	0	N/A	0.000	N/A
1040	A	4	4	0.93	383	0.010
1041	A	3	3	1.04	35	0.086
1042	A	6	6	1.12	35	0.171
1043	F	0	0	N/A	0.000	N/A
1044	A	2	2	1.11	16	0.125
1045	A	2	2	1.35	25	0.080
1046	A	1	1	0.67	11	0.091
1047	A	3	3	0.83	34	0.088
1048	A	1	1	0.94	22	0.045

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
1049	B	2	2	3.44	53	0.038
1050	A	3	3	1.69	62	0.048
1051	A	3	3	1.00	126	0.024
1052	A	3	3	1.00	39	0.077
1053	A	2	2	1.30	15	0.133
1054	A	4	4	1.09	39	0.103
1055	A	1	1	1.29	35	0.029
1056	A	3	3	0.94	37	0.081
1057	A	3	2	1.08	131	0.015
1058	A	2	2	1.00	39	0.051
1059	B	3	3	2.56	83	0.036
1060	A	1	1	1.80	34	0.029
1061	A	2	2	1.20	50	0.040
1062	F	0	0	N/A	0.000	N/A
1063	A	2	2	1.44	11	0.182
1064	A	2	2	1.00	49	0.041
1065	A	3	3	0.56	42	0.071
1066	B	4	4	2.30	56	0.071
1067	B	4	4	3.42	99	0.040
1068	A	1	1	1.00	30	0.033
1069	A	3	3	1.19	35	0.086
1070	A	2	2	0.53	14	0.143
1071	A	5	5	1.43	70	0.071
1072	F	0	0	N/A	0.000	N/A
1073	F	0	0	N/A	0.000	N/A
1074	B	13	13	7.72	98	0.133
1075	F	0	0	N/A	0.000	N/A
1076	F	0	0	N/A	0.000	N/A
1077	C	4	4	16.45	69	0.058
1078	A	5	4	1.33	16	0.250
1079	F	0	0	N/A	0.000	N/A
1080	A	1	1	0.90	29	0.034
1081	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1082	F	0	0	N/A	0.000	N/A
1083	F	0	0	N/A	0.000	N/A
1084	F	0	0	N/A	0.000	N/A
1085	F	0	0	N/A	0.000	N/A
1086	F	0	0	N/A	0.000	N/A
1087	A	3	3	1.36	26	0.115
1088	F	0	0	N/A	0.000	N/A
1089	F	0	0	N/A	0.000	N/A
1090	A	1	1	1.29	127	0.008
1091	A	4	4	2.00	81	0.049
1092	F	0	0	N/A	0.000	N/A
1093	F	0	0	N/A	0.000	N/A
1094	A	4	4	0.83	22	0.182
1095	A	2	2	1.00	23	0.087
1096	F	0	0	N/A	0.000	N/A
1097	F	0	0	N/A	0.000	N/A
1098	A	2	2	1.95	71	0.028
1099	F	0	0	N/A	0.000	N/A
1100	A	1	1	1.00	7	0.143
1101	A	1	1	0.65	21	0.048
1102	C	2	2	3.73	36	0.056
1103	F	0	0	N/A	0.000	N/A
1104	A	3	3	1.03	173	0.017
1105	A	2	2	0.67	9	0.222
1106	F	0	0	N/A	0.000	N/A
1107	F	0	0	N/A	0.000	N/A
1108	A	1	1	0.80	13	0.077
1109	F	0	0	N/A	0.000	N/A
1110	A	2	2	1.16	15	0.133
1111	F	0	0	N/A	0.000	N/A
1112	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
1113	A	3	2	1.48	75	0.027
1114	A	6	5	1.24	38	0.132
1115	A	5	4	1.12	74	0.054
1116	F	0	0	N/A	0.000	N/A
1117	B	2	2	2.62	206	0.010
1118	A	3	3	1.24	44	0.068
1119	A	1	1	1.00	11	0.091
1120	A	2	2	1.17	16	0.125
1121	F	0	0	N/A	0.000	N/A
1122	A	3	3	1.17	169	0.018
1123	F	0	0	N/A	0.000	N/A
1124	C	7	7	430.38	163	0.043
1125	F	0	0	N/A	0.000	N/A
1126	A	3	3	1.00	33	0.091
1127	A	4	3	0.94	218	0.014
1128	A	2	2	1.18	41	0.049
1129	A	4	4	1.00	92	0.043
1130	A	1	1	0.73	13	0.077
1131	F	0	0	N/A	0.000	N/A
1132	F	0	0	N/A	0.000	N/A
1133	A	3	3	0.87	39	0.077
1134	A	3	3	1.78	89	0.034
1135	F	0	0	N/A	0.000	N/A
1136	F	0	0	N/A	0.000	N/A
1137	A	2	2	1.00	19	0.105
1138	A	3	3	1.60	37	0.081
1139	A	4	4	1.57	53	0.075
1140	A	1	1	1.18	48	0.021
1141	B	3	3	2.11	87	0.034
1142	A	2	2	0.94	42	0.048
1143	F	0	0	N/A	0.000	N/A
1144	A	3	3	1.00	88	0.034
1145	B	2	2	2.19	57	0.035

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1146	A	2	2	1.50	21	0.095
1147	F	0	0	N/A	0.000	N/A
1148	F	0	0	N/A	0.000	N/A
1149	A	7	7	1.87	94	0.074
1150	A	3	3	1.15	108	0.028
1151	A	2	2	1.45	34	0.059
1152	A	3	3	1.07	71	0.042
1153	A	1	1	0.96	17	0.059
1154	C	4	4	2.67	55	0.073
1155	A	5	5	0.74	33	0.152
1156	B	4	4	2.04	68	0.059
1157	F	0	0	N/A	0.000	N/A
1158	A	5	5	1.00	39	0.128
1159	B	2	2	5.04	44	0.045
1160	F	0	0	N/A	0.000	N/A
1161	F	0	0	N/A	0.000	N/A
1162	A	2	2	1.12	18	0.111
1163	F	0	0	N/A	0.000	N/A
1164	A	1	1	0.89	13	0.077
1165	B	4	4	2.24	73	0.055
1166	B	3	3	21.08	148	0.020
1167	A	3	3	0.92	120	0.025
1168	A	1	1	0.71	7	0.143
1169	A	2	2	1.50	34	0.059
1170	A	3	3	1.36	16	0.188
1171	F	0	0	N/A	0.000	N/A
1172	F	0	0	N/A	0.000	N/A
1173	A	3	3	1.42	75	0.040
1174	F	0	0	N/A	0.000	N/A
1175	A	2	2	0.56	20	0.100
1176	F	0	0	N/A	0.000	N/A
1177	C	1	1	3.37	31	0.032

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
1178	A	2	2	1.04	60	0.033
1179	F	0	0	N/A	0.000	N/A
1180	A	3	3	1.33	37	0.081
1181	A	2	2	1.71	60	0.033
1182	A	4	4	1.04	114	0.035
1183	A	3	3	0.85	63	0.048
1184	A	2	2	1.75	35	0.057
1185	A	3	3	1.31	40	0.075
1186	A	3	3	1.40	49	0.061
1187	F	0	0	N/A	0.000	N/A
1188	A	7	7	1.92	58	0.121
1189	A	2	2	1.00	63	0.032
1190	F	0	0	N/A	0.000	N/A
1191	A	1	1	0.94	30	0.033
1192	A	4	4	0.84	23	0.174
1193	F	0	0	N/A	0.000	N/A
1194	A	6	6	1.29	77	0.078
1195	F	0	0	N/A	0.000	N/A
1196	A	8	7	0.47	27	0.259
1197	B	1	1	9.50	125	0.008
1198	C	3	3	11.33	18	0.167
1199	F	0	0	N/A	0.000	N/A
1200	F	0	0	N/A	0.000	N/A
1201	A	2	2	0.93	9	0.222
1202	A	2	2	0.55	11	0.182
1203	A	5	5	0.93	136	0.037
1204	F	0	0	N/A	0.000	N/A
1205	A	3	3	1.00	38	0.079
1206	A	2	2	1.21	15	0.133
1207	A	3	3	1.03	41	0.073
1208	A	2	2	1.71	44	0.045
1209	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
1210	F	0	0	N/A	0.000	N/A
1211	A	2	2	0.87	68	0.029
1212	F	0	0	N/A	0.000	N/A
1213	A	2	2	1.29	22	0.091
1214	A	5	5	1.21	70	0.071
1215	B	5	4	4.96	79	0.051
1216	A	3	3	1.33	37	0.081
1217	A	6	5	0.91	24	0.208
1218	C	4	4	2.44	33	0.121
1219	B	6	6	2.97	262	0.023
1220	F	0	0	N/A	0.000	N/A
1221	B	1	1	4.33	124	0.008
1222	F	0	0	N/A	0.000	N/A
1223	A	4	4	0.93	33	0.121
1224	A	2	2	1.00	17	0.118
1225	F	0	0	N/A	0.000	N/A
1226	A	3	3	1.04	62	0.048
1227	A	2	2	0.70	12	0.167
1228	A	1	1	0.52	9	0.111
1229	A	5	5	1.74	120	0.042
1230	B	6	6	6.00	61	0.098
1231	F	0	0	N/A	0.000	N/A
1232	F	0	0	N/A	0.000	N/A
1233	A	5	5	0.45	26	0.192
1234	A	6	6	1.35	51	0.118
1235	A	3	3	1.52	29	0.103
1236	A	4	4	0.77	32	0.125
1237	A	2	2	1.12	33	0.061
1238	F	0	0	N/A	0.000	N/A
1239	F	0	0	N/A	0.000	N/A
1240	F	0	0	N/A	0.000	N/A
1241	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1242	B	3	3	4.96	84	0.036
1243	B	3	3	2.19	53	0.057
1244	A	2	2	1.04	30	0.067
1245	F	0	0	N/A	0.000	N/A
1246	A	2	2	0.75	16	0.125
1247	F	0	0	N/A	0.000	N/A
1248	A	6	5	0.69	21	0.238
1249	B	3	3	2.19	139	0.022
1250	B	4	4	3.23	53	0.075
1251	A	2	2	1.33	24	0.083
1252	B	4	4	3.30	110	0.036
1253	F	0	0	N/A	0.000	N/A
1254	A	1	1	1.00	3	0.333
1255	B	2	2	2.27	32	0.062
1256	F	0	0	N/A	0.000	N/A
1257	A	4	4	1.20	53	0.075
1258	B	3	3	3.14	125	0.024
1259	F	0	0	N/A	0.000	N/A
1260	F	0	0	N/A	0.000	N/A
1261	F	0	0	N/A	0.000	N/A
1262	F	0	0	N/A	0.000	N/A
1263	A	3	3	0.92	254	0.012
1264	A	4	4	1.15	57	0.070
1265	F	0	0	N/A	0.000	N/A
1266	F	0	0	N/A	0.000	N/A
1267	A	3	3	1.00	75	0.040
1268	A	3	3	0.93	20	0.150
1269	A	4	4	1.96	88	0.045
1270	A	3	3	0.75	42	0.071
1271	A	2	2	0.80	27	0.074
1272	F	0	0	N/A	0.000	N/A
1273	A	4	4	1.00	45	0.089

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	number of rules / integrand leaf size
1274	A	1	1	0.92	11	0.091
1275	F	0	0	N/A	0.000	N/A
1276	A	1	1	1.24	29	0.034
1277	A	4	4	0.92	141	0.028
1278	A	1	1	0.47	16	0.062
1279	B	2	2	2.05	36	0.056
1280	A	2	2	1.00	17	0.118
1281	F	0	0	N/A	0.000	N/A
1282	A	2	2	1.44	179	0.011
1283	F	0	0	N/A	0.000	N/A
1284	F	0	0	N/A	0.000	N/A
1285	F	0	0	N/A	0.000	N/A
1286	A	8	7	1.26	117	0.060
1287	A	1	1	1.40	21	0.048
1288	A	3	3	1.22	64	0.047
1289	A	2	2	1.24	65	0.031
1290	F	0	0	N/A	0.000	N/A
1291	B	1	1	4.52	73	0.014
1292	F	0	0	N/A	0.000	N/A
1293	A	2	2	1.53	21	0.095
1294	F	0	0	N/A	0.000	N/A
1295	A	2	2	1.33	27	0.074
1296	C	4	4	123.12	235	0.017
1297	A	1	1	1.77	15	0.067
1298	C	2	2	31.74	95	0.021
1299	A	2	2	0.91	45	0.044
1300	F	0	0	N/A	0.000	N/A
1301	F	0	0	N/A	0.000	N/A
1302	F	0	0	N/A	0.000	N/A
1303	A	2	2	1.19	35	0.057
1304	A	2	2	1.00	35	0.057
1305	F	0	0	N/A	0.000	N/A

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1306	F	0	0	N/A	0.000	N/A
1307	F	0	0	N/A	0.000	N/A
1308	F	0	0	N/A	0.000	N/A
1309	A	6	6	1.04	71	0.085
1310	A	2	2	0.69	11	0.182
1311	F	0	0	N/A	0.000	N/A
1312	A	2	2	2.00	25	0.080
1313	F	0	0	N/A	0.000	N/A
1314	A	1	1	1.35	27	0.037
1315	A	3	3	0.96	50	0.060
1316	A	4	4	1.28	38	0.105
1317	B	2	2	5.57	101	0.020
1318	F	0	0	N/A	0.000	N/A
1319	A	2	2	1.42	28	0.071
1320	A	1	1	0.64	40	0.025
1321	A	5	5	1.35	88	0.057
1322	B	4	4	3.59	78	0.051
1323	F	0	0	N/A	0.000	N/A
1324	A	5	5	1.00	32	0.156
1325	F	0	0	N/A	0.000	N/A
1326	A	2	2	0.38	17	0.118
1327	A	1	1	0.84	10	0.100
1328	F	0	0	N/A	0.000	N/A
1329	A	1	1	1.00	22	0.045
1330	A	3	3	0.85	27	0.111
1331	A	4	3	1.29	60	0.050
1332	A	1	1	1.38	16	0.062
1333	A	1	1	1.09	25	0.040
1334	A	1	1	0.88	63	0.016
1335	F	0	0	N/A	0.000	N/A

CHAPTER 3

LISTING OF INTEGRALS

3.45 $\int \frac{6x^2-x^3-48\log(3)}{x^4}\,dx$ . . . 705

3.46 $\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+\left(-18e^{3+x}-6e^{x^2}x\right)\log(\log(3))+9\log^2(\log(3))}\,dx$ . . . 709

3.47 $\int \frac{-2-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)\log\left(1+\cdots\right.}$

3.48 $\int \frac{1}{5}\left(5+e^3+e^{4-2x+x^2}(2-2x)-10x\right)\,dx$ . . . 721

3.49 $\int \frac{100x^4+e^{x^2}\left(200x+60x^2-200x^3-40x^4\right)}{e^{2x^2}+10e^{x^2}x^2+25x^4}\,dx$ . . . 726

3.50 $\int \frac{-x-128\log(x)-1908\log^2(x)-6240\log^3(x)+500\log^4(x)}{-x^2-64x\log^2(x)-636x\log^3(x)-1560x\log^4(x)+100x\log^5(x)}\,dx$ . . . 730

3.51 $\int \frac{e^{e^x}\left(-1+e^x\left(-17+e^2-x\right)\right)}{\log(3)}\,dx$ . . . 735

3.52 $\int e^{4e^{1+\log^2(5)}x}\left(-4x^3-4e^{1+\log^2(5)}x^4\right)\,dx$ . . . 739

3.53 $\int \frac{5+20x+x^2+8e^2x^2+12x^3+2x^2\log(x)}{4x}\,dx$ . . . 744

3.54 $\int (5+2x)\,dx$ . . . 749

3.55 $\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}\left(-32x+8x^2+14x^3+2x^4\right)\right)}{16+8x+x^2}\,dx$ . . . 753

3.56 $\int \frac{130x^3+e^{2x}\left(78x+52x^2\right)+e^x\left(208x^2+52x^3\right)+26\log(2)}{12e^{4x}x^5+48e^{3x}x^6+12x^9+12x^6\log(2)+3x^3\log^2(2)+e^{2x}(72x^7+12x^4\log(2))+e^x(48x^8+24x^5\log(2))}\,dx$ 759

3.57 $\int \frac{e^x\left(21-3x-3\log^2(5)\right)}{-125+75x-15x^2+x^3+(75-30x+3x^2)\log^2(5)+(-15+3x)\log^4(5)+\log^6(5)}\,dx$ . . . 764

3.58 $\int \frac{e^x(-4-4x)-4e^xx\log(x)}{x}\,dx$ . . . 769

3.59 $\int \frac{1}{8}e^{16+\frac{1}{8}e^{-e^{16+7x+x^2}}-e^{16+7x+x^2}+7x+x^2}(-7-2x)\,dx$ . . . 773

3.60 $\int 8e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}+\frac{8}{5}x^5(i\pi+\log(4))}x^4(i\pi+\log(4))\,dx$ . . . 778

3.61 $\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx$ . . . 783

3.62 $\int \frac{-x+e^xx+(e^x-x-\log(3))\log(e^x-x-\log(3))\log(\log(e^x-x-\log(3)))}{(e^x-x-\log(3))\log(e^x-x-\log(3))}\,dx$ . . . 788

3.63 $\int \frac{14049280-5e^x-48168960x+55050240x\cdots}{377801998336+e^{2x}-3454189699072x+13816758796288x^2-31581162962944x^3+45115947089920x^4-41248865910784x^5+2357078052\cdots}$

3.64 $\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)-\log^2(x)\right)}{16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2-8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\log(x)+\log^2(x)}\,dx$ 798

3.65 $\int \frac{-1-4x^2+e^{2+x+\left(-16-8x-x^2\right)\log(7)}\left(-2x^2+\left(16x^2+4x^3\right)\log(7)\right)}{2x^2}\,dx$ . . . 805

3.66 $\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\log^2(x)\right)}{x^4}\right)}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x)}\,dx$ 811

3.67 $\int \frac{e^{-\frac{x^2}{-1+x}}\left(2+16x-4x^2-2x^3+e^4\left(4x-2x^2\right)\right)}{1-2x+x^2}\,dx$ . . . 816

3.68 $\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}\left(-1-e^{21}-x\right)\log(x)}{x^3\log^2(x)}\,dx$ . . . 821

3.69 $\int \frac{1+2e^{x^2}x}{e^{x^2}+x}\,dx$ . . . 826

3.70 $\int \frac{1}{2}e^{-2+e^{x^2}-2x}\left(-17e^{2+x}+e^{-e^{x^2}+x}(10-10x)+34e^{2+x+x^2}x\right)\,dx$ . . . 830

3.71 $\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}\left(98+98x+\left(112x+112x^2\right)\log(3)+(6\cdots\right.\right.}{\cdots}$

3.102 $\int \frac{-32x+48x^2+32x^3-12x^4-18x^5-4x^6+e^{e^x+x}(1+3x+3x^2+x^3)+e^{x^2}(-2x-6x^2-6x^3-2x^4)}{1+3x+3x^2+x^3}\,dx$ 998

3.103 $\int \frac{1-3x^2+e^x(-x+x^3)}{-3x+3x^3+e^5(x-x^3)+e^x(-x+x^3)+(-x+x^3)\log\left(-\frac{3}{-x+x^3}\right)}\,dx$ 1003

3.104 $\int \frac{12+e^{2x}+e^x(-12-2x)+x^2}{e^{2x}-2e^x x+x^2}\,dx$ 1008

3.105 $\int e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-4\right.}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}$

3.106 $\int \frac{2x^2}{-x+x^3}\,dx$ 1025

3.107 $\int \frac{25+36x-72x^2+6x^3-48x^4-6x^6+(-18+36x+18x^3)\log(x)}{25x}\,dx$ 1030

3.108 $\int \frac{1+e^{e^{e^4}}+x^4-4x^4\log(x)}{x\log^2(x)}\,dx$ 1035

3.109 $\int \frac{-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}+x^9}{x^9}\,dx$ 1040

3.110 $\int \frac{4000-4000x+e(960x^2-320x^3-400x^4+160x^5)+(-400x+400x^2+e(-16x^4+16x^5-4x^6))\log(4)+(10x^2-10x^3)\log^2(4)}{1600x^2-1600x^3+400x^4+(-160x^3+160x^4-40x^5)\log(4)+(4x^4-4x^5+x^6)\log^2(4)}\,dx$ 1045

3.111 $\int \frac{-36x+36x^2+(3x-3x^2)\log(x)+(33x-108x^2+(-3x+9x^2)\log(x))\log(2x)+(-36x+3x\log(x)+(72x-6x\log(x))\log(2x))\log\left(\frac{-12+\log(}{8x}\right.}{(-12+\log(x))\log^2(2x)}$

3.112 $\int \frac{-2x+14e^3x-24e^6x+(-2e^3+6e^6)\log(5e^x)}{x^2-8e^3x^2+e^6(-3+16x^2)+(2e^3x-8e^6x)\log(5e^x)+e^6\log^2(5e^x)}\,dx$ 1057

3.113 $\int \frac{x^3+3x^4+3x^5+x^6+(-2-2x)\log(x)+(2+4x)\log^2(x)}{x^3+3x^4+3x^5+x^6}\,dx$ 1064

3.114 $\int \frac{e^{\frac{6+6x-15x^2-5x^3}{3x^2+x^3}}(-180-216x-96x^2-21x^3-6x^4-x^5)}{7875x^3+8400x^4+3290x^5+560x^6+35x^7}\,dx$ 1069

3.115 $\int \frac{8-4x+3x^3+x^3\log(3x^3)}{x^3\log(4)}\,dx$ 1074

3.116 $\int 4e^{-8+\frac{4(25x-4x^3-x^3\log(4))}{e^8}}(25-12x^2-3x^2\log(4))\,dx$ 1078

3.117 $\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))\log(\log(x+e^x(-1-x^2)\log(16)))}{(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))}\,dx$ 1083

3.118 $\int \frac{-4+2x-5x^2}{2x^2}\,dx$ 1088

3.119 $\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}(14+6x+7x^2+2x^3+e(-10-5x^2)+e^x(-80-10x-40x^2-\right.$

3.120 $\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-e^{x+\frac{1+2x}{x}}-10e^{\frac{1+2x}{x}}x^2\right)\right)}{x^2}\,dx$ 1098

3.121 $\int \frac{900+1757x+168x^2+4x^3}{450x+43x^2+x^3}\,dx$ 1102

3.122 $\int \frac{-3+5x^2+e^x(-x+4x^2)+(x^2-e^x x^2)\log(x)}{4x^2}\,dx$ 1106

3.123 $\int \frac{38e^x x-2e^{2x}x+2x^2+(-76+4e^x)\log(x)+2e^x x\log^2(x)-4\log^3(x)}{x}\,dx$ 1111

3.124 $\int \frac{10+20x+20x^2+10x^3+(5+10x)\log(x^2)+e^{e^x}(2+4x+4x^2+2x^3+(1+2x+e^x(x+2x^2+2x^3+x^4))\log(x^2))}{3+6x+9x^2+6x^3+3x^4}\,dx$ 1116

3.125 $\int \frac{4+26x+x^2+72x^6-72x^7+18x^8}{4x-4x^2+x^3}\,dx$ 1122

3.126 $\int \frac{2e^{4+x}+e^{4+x}x\log(x^2)}{x}\,dx$ 1126

3.127 $\int \frac{-1+(16+12x-4x^2+e^4(8+6x-2x^2))\log(4-x)+(-8-6x+2x^2)\log(4-x)\log(\log(4-x))}{(8+e^4(4-x)-2x)\log(4-x)+(-4+x)\log(4-x)\log(\log(4-x))}\,dx$ 1130

3.128 $\int \frac{e^{\frac{2}{5}(7-5x+5\log(\log(5)))}(-1-2x)+e^{\frac{1}{5}(7-5x+5\log(\log(5)))}(2+2x)\log(4)-\log^2(4)}{x^2}\,dx$ 1135

3.129 $\int \frac{2-2x+2e^{x^2}x\log(4)}{\log(4)}\,dx$ 1140

3.130 $\int e^{-5x+x^2}(-240-272x+160x^2+e^x(88+96x-80x^2)+e^{2x}(-7-7x+10x^2))\,dx$ 1144

3.131 $\int \frac{1}{2}(30+9x+e^x(108+66x+9x^2)\log(19)+e^{2x}(54+45x+9x^2)\log^2(19))\,dx$ 1149

3.244 $\int \frac{50+e^2(-2-3x)+e^{e^5}(-2-3x)+72x-4x^2}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4(x^3+2x^4+x^5)+e^{2e^5}(x^3+2x^4+x^5)+e^2(-50x^3-98x^4-46x^5+2x^6)+e^{e^5}(-50x^3-98x^4-46x^5+2x}$

3.245 $\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}\left(8x^2\log^2(3)-6400\log^3(x)\right)}{x\log^2(3)}\,dx$ 1762

3.246 $\int \frac{-15e^5-20x}{5e^5x+4x^2}\,dx$ 1766

3.247 $\int \frac{20x}{\log(4)}\,dx$ 1770

3.248 $\int \frac{-36x^2-2x^5+(-36x+10x^4)\log(5)-20x^3\log^2(5)+20x^2\log^3(5)-10x\log^4(5)+2\log^5(5)}{-x^5+5x^4\log(5)-10x^3\log^2(5)+10x^2\log^3(5)-5x\log^4(5)+\log^5(5)}\,dx$ 1774

3.249 $\int \frac{-54x-108x^2-60x^3-21x^4-3x^5+e^3(-3x^3+x^4)+(3x^3-x^4)\log(x)+(216x+}{108x^3+135x^4+63x^5+13x^6+x^7+e^3(-27x^3-27x^4-9x^5-x^6)+(27x^3+27x^4+9x^5+x^6)\log(x)+(324x^2+405x^3+189x^4+39x^5+3x^6+e^3(-}$

3.250 $\int (1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}(60-8x-12x^2)+e^{2x}(300-120x-120x^2+24$

3.251 $\int -e^x\,dx$ 1793

3.252 $\int \left(21+i\pi+18x+\log\left(\frac{1}{4}(-5+e^2)\right)\right)\,dx$ 1797

3.253 $\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}(2426112-11664ex-8748e^2x^2)+e^{10/x}(316368+1404ex-972e^2x^2)+e^{20/x}(1314144+50382ex+4374e^2x^2)+e^{40/x}(1}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$

3.254 $\int \frac{e^{-3+\frac{8ex^2+e^2(4x^2+e(-2x+4x^2))-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+(8ex^2+e^2(4x^2+4ex^2))\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx$ 1813

3.255 $\int -\frac{e^{5-\frac{1}{125}e^{1+2\log(5)\log(x)}+2\log(5)\log(x)}\log(5)}{500x}\,dx$ 1818

3.256 $\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx$ 1823

3.257 $\int e^{3x+3x^2}(2x+3x^2+6x^3)\,dx$ 1828

3.258 $\int \frac{-e^{12}+2e^6x^2-x^4+(e^{12}-2e^6x^2+x^4)\log(x)+(e^{12}(-1-2x)+x^2-x^4-2x^5+e^6(1+2x^2+4x^3))\log^2(x)}{(e^{12}-2e^6x^2+x^4)\log^2(x)}\,dx$ 1833

3.259 $\int \frac{-25e^{-7+x}x+e^{-7+x}(50+75x+25x^2)\log(2+x)+(50+25x)\log^2(2+x)}{(2+x)\log^2(2+x)}\,dx$ 1839

3.260 $\int \frac{-5+(-10x^2+10x^3)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{(-x+x^2)\log\left(\frac{-1+x}{2x}\right)}\,dx$ 1844

3.261 $\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+(-2ex^2-2e^2x^2)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+(-4ex-4e^2x)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx$ 1849

3.262 $\int \frac{240+e^{2-x}(60+60x)+e^x(240-30x+e^{2-x}(60+60x))+(15+15e^x)\log(1+2e^x+e^{2x})}{x^2+e^xx^2}\,dx$ 1857

3.263 $\int \frac{1}{3}(1-6x)\,dx$ 1862

3.264 $\int \frac{e^{-2x}(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2-443400x^3+315300x^4+121500x^5+1}{1000x^3+300x^4+30x^5+x^6}$

3.265 $\int \frac{e^6+e^3(5x+x^2)+(-e^6+e^3(-10x-3x^2))\log(x)}{e^6x^2+25x^4+10x^5+x^6+e^3(10x^3+2x^4)}\,dx$ 1873

3.266 $\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)\log(5-x)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10x-2x^2)\log(5-x)+(-5+x)\log^2(5-x)}\,dx$ 1880

3.267 $\int \frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx$ 1886

3.268 $\int \frac{-3+6x+6x^2+e(-1+2x+2x^2)+(3x+ex)\log(2x)}{8x+4x^2+2x\log(2x)}\,dx$ 1891

3.269 $\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+(e^{e^5+x^2}(-9+}{-16e^{e^5+x^2}x^2-16e^{x^2}x^3+\left(4e^{e^5+x^2}x^2+4e^{x^2}x^3\right)\log\left(e^{e^5}+x\right)+\left(-16e^{e^5}x^2-16x^3+\left(4e^{e^5}x^2+4x^3\right)\log\left(e^{e^5}+x\right)\right)\log\left(-4+\log\left(e^{e^5}+x\right)\right.}$

3.270 $\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^8x-e^{x^2}x+10e^4x^2+25x^3\right)}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}\,dx$ 1907

3.325 $\int \left(1-170e^{-1-80x^2}x\right)\,dx$ 2189

3.326 $\int \left(2x-6x^2+4x^3+e^x(8x-8x^2-4x^3)+e^{3x}(12x^2+12x^3)+e^{2x}(8x+14x^2-4x^3-4x^4)+e^{4x}(4\cdots\right.$

3.327 $\int \frac{e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3\cdots\right.}{27+405x+1863x^2+1755x^3-3726x^4+1620x^5-216x^6+e^{2x}(225x^2+945x^3\cdots}$

3.328 $\int \frac{3-2x+\log(4)+4e^{16+e^{16+4x}+4x}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}\,dx$ 2210

3.329 $\int \frac{\left(15x+4x^2+e^x\left(-6x-x^2\right)\right)\log\left(x^2\right)+(20+4x)\log\left(2\log\left(x^2\right)\right)+x\log\left(x^2\right)\log^2\left(2\log\left(x^2\right)\right)}{x\log\left(x^2\right)}\,dx$ 2215

3.330 $\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}{\left(2e^5x+2e^xx\right)\log\left(\frac{e^5+e^x}{x}\right)}\,dx$ 2220

3.331 $\int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+x^2\log^2\left(\frac{x}{3}\right)\log^2(x)\cdots}{\log^2\left(\frac{x}{3}\right)}\right.}$

3.332 $\int \frac{e^{\frac{-9+2x\log\left(3+e^x+4x^2\right)}{x\log\left(3+e^x+4x^2\right)}}\left(9e^xx+72x^2+\left(27+9e^x+36x^2\right)\log\left(3+e^x+4x^2\right)\right)}{\left(3x^2+e^xx^2+4x^4\right)\log^2\left(3+e^x+4x^2\right)}\,dx$ 2233

3.333 $\int \frac{-4-6x+7x^2-x^3-x^4+2x^5-x^6}{x^3+2x^4-x^5-2x^6+x^7}\,dx$ 2238

3.334 $\int \frac{5-5e^x}{(e^x-x)\log(-e^x+x)\log(\log(-e^x+x))}\,dx$ 2243

3.335 $\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2}\,dx$ 2247

3.336 $\int \frac{e^x\left(-4050x-2025x^2+81x^3+\left(-2025-2106x+81x^2\right)\log(5)\right)+e^{2+e^x}\left(e^{2x}\left(2700x^2-108x^3+\left(2700x-108x^2\right)\log(5)\right)+e^x\left(5400x+2700x^2\cdots\right.\right.}{\cdots}$

3.337 $\int \frac{-64+16e^5x^2+e^{-1-x+x^2}\left(-x^5+2x^6\right)}{x^5}\,dx$ 2262

3.338 $\int \frac{4e^{2x}+\left(e^x\left(-x+x^2\right)+e^{2x}\left(-10x+20x^2\right)\right)\log(x)+e^{2x}(-8+8x)\log(x)\log(\log(x))}{15x^3\log(x)}\,dx$ 2267

3.339 $\int \frac{16x-8x^3+\left(-24x^2-12x^3\right)\log(x)+\left(-24x^2-12x^3\right)\log(2+x)}{2+x}\,dx$ 2272

3.340 $\int \frac{x+\left(24x-5x^2\right)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}\,dx$ 2277

3.341 $\int \frac{-6x+9x^2+e^{x^2}\left(3-3x+9x^2-12x^3-6x^4\right)+\left(-3x^2+6e^{x^2}x^3\right)\log(x)}{1-4x+2x^2+4x^3+x^4+\left(2x-4x^2-2x^3\right)\log(x)+x^2\log^2(x)}\,dx$ 2283

3.342 $\int \frac{128x^{14}+64x^{15}+8x^{16}+\left(64x^{14}+288x^{15}+140x^{16}+18x^{17}\right)\log(3x)+\left(384x^{13}+192x^{14}+24x^{15}+\left(192x^{13}+1056x^{14}+524x^{15}+68x^{16}\right)\log(3\cdots\right.}{\cdots}$

3.343 $\int \frac{-7x-7\log(3)+\left(2+9x+4x^2\right)\log\left(\frac{1+4x}{2+x}\right)}{\left(2+9x+4x^2\right)\log^2\left(\frac{1+4x}{2+x}\right)}\,dx$ 2298

3.344 $\int \frac{-768+448x-64x^2-4x^3+x^4+\left(-192+112x-20x^2+x^3\right)\log(2)+e^{-\frac{4x}{-4+x}}\left(64-32x+20x^2+\left(16-8x+x^2\right)\log(2)\right)+\left(-384x+224x^2-40x\cdots\right.}{\cdots-192+112x-20x^2+x^3+e^{-\frac{4x}{-4+x}}\left(16-8x+x^2\right)}$

3.345 $\int \frac{e^{-2x}\left(e^{2x}\left(-2x+x^2\right)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+e^{\frac{9+3x}{2\log(2-x)}}\left(e^x\left(9x+3x^2\right)+e^x\left(6x-3x\cdots\right.\right.\right.}{\cdots(-4+2x)\log^2(2-x)}$

3.346 $\int \frac{1}{15}\left(-4+42x+75x^2+e^4(-4+50x)\right)\,dx$ 2315

3.347 $\int \frac{-12x^3+e^{2x}\left(24x^2-24x^3\right)+e^{1-x}x\left(e^{4x}(-1+x)-x^2-3x^3+e^{2x}\left(2x+6x^2-8x^3\right)\right)}{3e^{4x}x-6e^{2x}x^2+3x^3+e^{1-x}x\left(e^{4x}x-2e^{2x}x^2+x^3\right)}\,dx$ 2320

3.348 $\int \left(e^2-2e^{3+x}+2e^{-1+e^{-3+x^2}+x^2}x\right)\,dx$ 2325

3.349 $\int \left(e^{4e^4+6x-3x^2}(60-60x)+e^{8e^4+12x-6x^2}(12-12x)+e^5(1+2x)\right)\,dx$ 2329

3.350 $\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx$ 2333

3.351 $\int \left(-4e^{x^4}x^3+e(2+50x)\right)\,dx$ 2342

3.352 $\int \frac{-x\log(x)+(5+x+(5+x)\log(x))\log(5+x)+(-5+e^x(-5-x)-x)\log^2(5+x)}{(5+x)\log^2(5+x)}\,dx$ 2346

3.353 $\int \frac{54+e^{2x}-396x-282x^2-48x^3+e^x\left(-3-81x-17x^2+15x^3+4x^4+e^4\left(9+6x+x^2\right)\right)}{3e^{2x}+27x^2-198x^3+291x^4+264x^5+48x^6+e^8\left(27+18x+3x^2\right)+e^4\left(-54x+180x^2+138x^3+24x^4\right)+e^x\left(-18x+66x^2+24x^3+e^4(18+6x)\right)}\,d$

3.354 $\int \frac{e^{20+4x}(-1-4x)+2x+e^{x^2}\left(e^{20+4x}(-4-24x)+8x+8x^2\right)+\left(1-4e^{20+4x}+e^{x^2}\left(4-16e^{20+4x}\right)\right)\log\left(\frac{1}{5}\left(3+12e^{x^2}\right)\right)}{1+4e^{x^2}}\,dx$ 2357

3.355 $\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx$ 2362

3.356 $\int \frac{80+36x+(-40+18x)\log(x)-9x\log^2(x)}{9x}\,dx$ 2366

3.357 $\int \left(125000+30000x+8e^{4x^2}x+2400x^2+64x^3+\left(150000+24000x+960x^2\right)\log(2)+(75000+72\right.$

3.358 $\int \frac{-1030725+20952000x-144180000x^2+350400000x^3-100000000x^4+\left(-202500+4050000x-27000000x^2+60000000x^3\right)\log(x)}{14641x^5+6050x^5\log(x)+625x^5\log^2(x)}\,dx$ 238

3.359 $\int \frac{\left(-100x+50e^5x\right)\log\left(\frac{1}{3}\left(9+2x-e^5x\right)\right)+\left(450+100x-50e^5x\right)\log^2\left(\frac{1}{3}\left(9+2x-e^5x\right)\right)+e^{10e^x}\left(\left(-4x+2e^5x\right)\log\left(\frac{1}{3}\left(9+2x-e^5x\right)\right)+(18+4x-\right.}{}$

3.360 $\int \frac{-48x^2+\left(-40-80x+8x^2\right)\log(5)}{25x^2-10x^3+x^4+\left(50x-20x^2+2x^3\right)\log(5)+\left(25-10x+x^2\right)\log^2(5)}\,dx$ 2395

3.361 $\int \frac{32-8x+(-8+8x)\log(-1+x)}{-16+24x-9x^2+x^3}\,dx$ 2401

3.362 $\int \frac{x+\frac{11e^2x}{5}+6e^xx}{6x}\,dx$ 2406

3.363 $\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x)}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2(x)}\,dx$ 2411

3.364 $\int \frac{-4x^2-8x^3+\left(3x^2+4x^3\right)\log(x)+\left(16+64x+64x^2\right)\log^5(x)}{\left(16+64x+64x^2\right)\log^5(x)}\,dx$ 2420

3.365 $\int \frac{20+8x+8x\log(x)+e^{14-x}\left(25x+20x^2+4x^3\right)\log^2(x)}{\left(25x+20x^2+4x^3\right)\log^2(x)}\,dx$ 2425

3.366 $\int \frac{16e^4+e^{4+2x}x^2+e^{4+x}(-4+4x)}{-32+16x+e^x\left(-20x+8x^2\right)+e^{2x}\left(-3x^2+x^3\right)}\,dx$ 2430

3.367 $\int \frac{-64-324x}{15x}\,dx$ 2435

3.368 $\int -\frac{15e^{-3/x}}{x^2}\,dx$ 2440

3.369 $\int \frac{e^{-2x}\left(-4+14x-8x^2+e\left(-16+18x-4x^2\right)+e^{2x}\left(-4x+5x^2+e\left(3-6x+2x^2\right)\right)+\left(-2+6x-4x^2+e(-4+4x)+e^{2x}\left(e(1-x)-2x+2x^2\right)\right)\log(1-\right.}{-1+x}$

3.370 $\int \frac{1}{3}e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)}x^{\frac{2}{3}e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)}x}(2+2\log(x))\,dx$ 2450

3.371 $\int \frac{-x^2+2x^3+e^{\frac{2\left(30-40x^2+x^3+x^2\log(x)\right)}{x}}\left(-60-78x^2+4x^3+2x^2\log(x)\right)+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}\left(-60x+2x^2-78x^3+4x^4+2x^3\log(x)\right)}{x^2}\,d$

3.372 $\int \frac{50x+e^{-2e^x+2x}\left(-2e^{2+x}x+e^2(1+2x)\right)}{-400+4e^{2-2e^x+2x}x+100x^2}\,dx$ 2460

3.373 $\int \frac{120x+44x^2+4x^3+\left(-20x^2-4x^3\right)\log(x)+\left(72-48x\log(x)+8x^2\log^2(x)\right)\log(5+x)}{45+9x+\left(-30x-6x^2\right)\log(x)+\left(5x^2+x^3\right)\log^2(x)}\,dx$ 2465

3.374 $\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8\left(8+32x+32x^2\right)}\,dx$ 2470

3.375 $\int \frac{-48-470x-378x^2+30x^3+50x^4+\left(-48-16x+216x^2-240x^3-200x^4\right)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}\,dx$ . . 2476

3.376 $\int \frac{-9025-190x-x^2+\left(190x+2x^2\right)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}\,dx$ 2484

3.377 $\int \frac{1}{4}\left((3-10x+(3-2x)\log(3))\log(4)+(-4-4\log(3))\log(4)\log(x)+(1+\log(3))\log(4)\log^2(x)\right)$

3.378 $\int \frac{e^{\frac{-9+6x+x^2}{9x}}\left(9+x^2\right)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx$ . . 2494

3.405 $\int \frac{74919334050x+2360474820x^2+27882962x^3+146352x^4+288x^5+e^{\frac{x}{193545+3049x+12x^2}}(149838668100+4721723820x+55765924x^2+29\cdots}{37459667025+1180237410x+13941481x^2+73176x^3+144x^4}$

3.406 $\int \frac{-600-390x+30x^2+600x^3+660x^4+90x^5-105x^6-\cdots}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(-400x-160x^2+20x^3+1600x^4+2240x^5+960x^6+80x^7-20x^8)\log\cdots}$

3.407 $\int \left(2-15e^{3x}+e^{260+e^4-32x+x^2}(-32+2x)\right)\,dx$ 2652

3.408 $\int \frac{\cdots}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+(2048x-12544x^2+27648x^3-25792x^4+9344x^5-1584x^6+128x^7\cdots}$

3.409 $\int \frac{e^{2x+e^{x^2}x^2-4x^3}\left(-5+10x-60x^3+e^{x^2}(10x^2+10x^4)\right)}{x^2}\,dx$ 2663

3.410 $\int \frac{-4x^2+2e^{1+x}x^2-2x^4+(4x^2+6x^4+e^{1+x}(-2x^2-2x^3))\log(x)+(4-2x^2+2x^3+e^{1+x}(-2+2x-x^2))\log^2(x)}{6x^2\log^2(x)}\,dx$ 2667

3.411 $\int \frac{176+124x+20x^2+e^x(-88-62x-10x^2)+(88+256x+134x^2+20x^3+e^x(-44-216x-129x^2-20x^3)+e^{2x}(44x+31x^2+5x^3))\log(x^2)+e^x\cdots}{(176x+124x^2+20x^3+e^x(-176x-124x^2-20x^3)+e^{2x}(44x+31x^2+5x^3))\log(x^2)\cdots}$

3.412 $\int \frac{1}{2}(2+e^x)\,dx$ 2678

3.413 $\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-100x)\log^3(x)}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3))\log^2(x)+(8e^{3x}x^3+12e^{2x}x^2\log(3)\cdots}$

3.414 $\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}(32-14x+2x^2)+(32-16x+2x^2)\log(16)\cdots}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}(2048x^2-1024x^3+128x^4)+(-2048x^2+1024x^3-128x^4)\log(16)+(2048x^2-1024x^3+128x^4)\log^2(16)+e\cdots}$

3.415 $\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4x^3))+(16x^2+32x^3+e^x(-8x-8x^2+4x\cdots}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}(e^{2x}-8e^xx+16x^2)+e^{e^2}(-2e^{2x}x+16e^xx^2-32x^3)+\left(2e^{2x}x-16e^xx^2+32x^3+e^{e^2}(-2e^{2x}+16e^xx-32x^2)\right)\log(\cdots}$

3.416 $\int \frac{-128x-256x^2-128x^3+(128x+384x^2+256x^3)\log(x^2)+(512x+1536x^2+1024x^3)\log^2(x^2)}{\log^2(x^2)}\,dx$ 2701

3.417 $\int \frac{4+12x^3+2x^4-4x^3\log(x)}{x^3}\,dx$ 2706

3.418 $\int \frac{1}{2}e^{-x}(31-18x+x^2)\,dx$ 2710

3.419 $\int (48x+3x^2+e^x(3x^2+x^3))\,dx$ 2714

3.420 $\int \frac{24e^{2x}+(e^x(-120-24e^5)+24e^{2x}x)\log\left(\frac{2}{x}\right)+e^x(-120x-24e^5x)\log^2\left(\frac{2}{x}\right)+(12e^{3x}x\log\left(\frac{2}{x}\right)+e^{2x}(-120x-24e^5x)\log^2\left(\frac{2}{x}\right)+e^x(299x+12\cdots}{(12e^{2x}x\log\left(\frac{2}{x}\right)+e^x(-120x-24e^5x)\log^2\left(\frac{2}{x}\right)+(299x+120e^5x+12e^{10}x)\log^3\left(\frac{2}{x}\right))\log\left(\frac{-12e^{2x}+e\cdots}{\cdots}\right)}$

3.421 $\int (26+54x+6x^2+4x^3+e^4(2+4x)+e^{2x}(2x+2x^2)+e^x(26+30x+8x^2+2x^3+e^4(2+2x)))\,d\cdots$

3.422 $\int \frac{2x^2+8x^3+8x^4+e^x(-2-8x-8x^2)+(e^x(-2-4x)+2x+4x^2)\log\left(-\frac{4e^xx}{e^x-x}\right)}{(e^xx^3-x^4)\log^3\left(-\frac{4e^xx}{e^x-x}\right)}\,dx$ 2730

3.423 $\int \frac{1}{5}(-81+5e^2+22x)\,dx$ 2736

3.424 $\int \left(15+\sqrt[25]{e}+2x\right)\,dx$ 2740

3.425 $\int \frac{140+70x-77x^2+35x^3+77x^4+21x^5+e^x(28x+28x^2+7x^3)+(-56x^2-56x^3-14x^4)\log(5x)}{4x+4x^2+x^3}\,dx$ 2744

3.426 $\int \frac{-37-16x-2x^2+e^5(-16-8x-x^2)}{16+8x+x^2}\,dx$ 2749

3.427 $\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log\left(\frac{3}{x}\right)}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log\left(\frac{3}{x}\right)+(81x^2-18x^4+x^6)\log^2\left(\frac{3}{x}\right)}\,dx$ 2754

3.428 $\int \frac{8x^2+9x^3+6x^4+2x^5+(120x+4x^2-50x^3-29x^4-4x^5)\log(x)+(-300-120x+88x^2+90x^3+24x^4+2x^5)\log^2(x)}{2x^4+(-20x^3-4x^4)\log(x)+(50x^2+20x^3+2x^4)\log^2(x)}\,dx$ 2760

3.429 $\int \frac{-768-30x-12\log(4)}{x^3}\,dx$ 2766

3.430 $\int \frac{-10e^xx^2+25x^3-2e^{2x}x^3+(9325x^2-750e^{2x}x^2+e^x(-1250x-10x^3))\log(x)+(1171875x-93750e^{2x}x+e^x(-1250x-2500x^2))\log^2(x)+(\cdots}{25x^3+9375x^2\log(x)+1171875x\log^2(x)+48828125\log^3(x)}$

3.431 $\int \frac{3+6x^2+e^xx^2+(12x^2+e^x(2x^2+x^3))\log(x)}{x}\,dx$ 2778

3.432 $\int \frac{25+50x+(75x^2+150x^3)\log(4)+(-36e^8x^3+75x^4+90e^4x^4+96x^5)\log^2(4)+(25x^6+18e^4x^6+32x^7)\log^3(4)}{25+75x^2\log(4)+75x^4\log^2(4)+25x^6\log^3(4)}\,dx$ 2782

3.433 $\int \frac{-18+9x+e^xx+6x\log(x)}{x}\,dx$ 2789

3.461 $\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x-36x^2\right)\log\left(-e^{\frac{1}{9}\left(e^{x/2}-6\right.}\right.}{-36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}+36x+}$

3.462 $\int \frac{8x-9\log(2)+(-2x+2\log(2))\log(x)+(x-\log(2))\log(2x-2}{-49x+28x^2-4x^3+(49-28x+4x^2)\log(2)+(-4x+4\log(2))\log^2(x)+(-14x+4x^2+(14-4x)\log(2))\log(2x-2\log(2))+(-x+\log(2))\log^2}$

3.463 $\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500+37500x-15100x^2+100x^3+(-22500+37500x-15100x^2+100x^3}{-5625+5775x-151x^2+x^3}$

3.464 $\int \frac{224e^{10+2x}+e^{5+x}(40-56x+32x^2-4x^3)}{25x^2-10x^3+x^4+e^{10+2x}(4096-512x+16x^2)+e^{5+x}(640x-168x^2+8x^3)}\,dx$ 2962

3.465 $\int \frac{-4+10e-5x}{8e-4x}\,dx$ 2967

3.466 $\int \frac{10x-2x^2-10x\log(x)+\left((10x-2x^2)\log(x)+(450-180x+18x^2)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left((65x+77x^2-18x^3)\log(x)+(2925+2\right.}{\left((5x-x^2)\log(x)+(225-90x+9x^2)\log^2(x)\right)\log^2\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)}$

3.467 $\int \frac{e^{4e^{2x}+x^2}\left(16+32x^2-2x^3-2e^5x^3+e^{2x}(128x-8x^2-8e^5x^2)\right)}{256-32x+x^2+e^{10}x^2+e^5(-32x+2x^2)}\,dx$ 2977

3.468 $\int \frac{36x^2+(12-36x+12x^2)\log(4)+(8-6x+x^2)\log^2(4)}{36x^2+(-36x+12x^2)\log(4)+(9-6x+x^2)\log^2(4)}\,dx$ 2982

3.469 $\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(-2e^{8-2x}+2e^{4-x}\right)\log\left(\frac{4}{e^4}\right)\right)\,dx$ 2988

3.470 $\int \frac{-4\log^2(5)\log(x^2)+2\log^2(5)\log^2(x^2)+(-34+3x)\log^4(x^2)}{x^3\log^4(5)+(-34x^3+2x^4)\log^2(5)\log^2(x^2)+(289x^3-34x^4+x^5)\log^4(x^2)}\,dx$ 2993

3.471 $\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x}\right.}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)+(16+7x+17x^2+7x^3+x^4)}$

3.472 $\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx$ 3005

3.473 $\int \frac{1}{5}\left(4-5e^x-60x^2\right)\,dx$ 3015

3.474 $\int \frac{-45+50x^3-45e^{1+x}x^3+90\log(x)}{x^3}\,dx$ 3019

3.475 $\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log\left(4+x^2\right)}\left(-8-26x^2-4x^3-6x^4+(-16x-4x^3)\log(4+x^2)\right)}{4+x^2}\,dx$ 3023

3.476 $\int \frac{x-7x^2+x^3+(-7+x)\log\left(-\frac{12}{-7+x}\right)}{-7x^2+x^3}\,dx$ 3028

3.477 $\int \frac{2-e^{-1+x}-e^x+(e^{-1+x}x+e^xx)\log(x)-x\log^2(x)}{(2x-e^{-1+x}x-e^xx)\log(x)+(4x+x^2)\log^2(x)}\,dx$ 3033

3.478 $\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}\left(11+3e^4+3x\right)}(24x+16x^2+4x^3)}{9+6x+x^2}\,dx$ 3038

3.479 $\int \frac{\log(2)-\log(2)\log(5)}{x\log(64)}\,dx$ 3043

3.480 $\int \frac{-2e^{1+x}x+e^{5+2x}(-1+x+x^2)+(-e^{1+x}x^2+e^{5+2x}(-x+x^2))\log(x^2+e^{4+x}(x-x^2))}{-x^2+e^{4+x}(-x+x^2)}\,dx$ 3047

3.481 $\int \frac{20x+4x^2+e^4(-60x^2-144x^3-24x^4)+72x^2\log(4)+(44x^2+8x^3)\log(x)+(10+2x+e^4(-30x-72x^2-12x^3)+36x\log(4)+(22x+4x^2)\log(}{e^4(-15x^2-3x^3)+9x\log(4)+(5x+x^2)\log(x)}$

3.482 $\int \frac{-1-x-\frac{e^xx}{4}}{e^2x+\frac{1}{16}e^{2x}x+2ex^2+x^3+(2ex+2x^2)\log(x)+x\log^2(x)+\frac{e^x\left(2ex^2+2x^3+2x^2\log(x)\right)}{4x}}\,dx$ 3059

3.483 $\int \frac{-16-8x^2\log(x)+(-8x^2\log(x)-32\log(x)\log(\log(x)))\log\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}{(9x^7\log(x)+36x^5\log(x)\log(\log(x)))\log^3\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}\,dx$ 3065

3.484 $\int \frac{e^{-2-\frac{-4x+e^2x\log\left(x^2\right)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+(-20+e^2(10-2x)+4x)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5-x)\log(x^2)\right)}{(-5+x)\log^2(5-x)}\,dx$ 3071

3.485 $\int \frac{-2e^{4x}+e^{4x}(-4+8x)\log(x)}{3x^3\log^2(x)}\,dx$ 3076

3.486 $\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+(18-12x+2x^2)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-36x^2+15x^3-2x^4+(-18x+18x^2-\right.}{9x-6x^2+x^3+(-6x+2x^2)\log(4)+x\log^2(4)}$

3.487 $\int \frac{3+3x+2x^2}{x}\,dx$ 3087

3.488 $\int \frac{175+25e^{-25+15x}+375e^{-25+15x}x\log(x)}{x}\,dx$ 3091

3.489 $\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+(e^{-2-2x}(-18+18e^3)-3x^2+3e^3x^2+e^{-1-x}(-12x+15e^3x+3x^2))}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-x}x^3-2e^3x^4)\log\left(\frac{3e^{-1-x}x+x^2}{2e^{-1-x}+x}\right)+(6}$

3.490 $\int e^{15/4}(10x-15x^2)\,dx$ 3103

3.491 $\int \frac{1}{9}\left(9+9e^{\frac{1}{9}(36x^2+16x^5)}+\left(9+e^{\frac{1}{9}(36x^2+16x^5)}(9+72x^2+80x^5)\right)\log(x)\right)\,dx$ . . 3107

3.492 $\int \frac{e^x(-105+25x+25x^2-25x^3)+e^x(105+55x+25x^2)\log(x)-105e^x\log^2(x)}{25x^4-210x^2\log(x)+441\log^2(x)}\,dx$ 3112

3.493 $\int \frac{e^{-x}\left(-e^xx+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}}(-10+2x)\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^xx^2)+e^x(10x^2-2x^3)\right)\right)}{x^2}\,dx$ 3117

3.494 $\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log(x^2)+(-4+x)\log^2(x^2)}{(-4+x)\log^2(x^2)}\,dx$ 3123

3.495 $\int \frac{-256+16x^4+15e^{\frac{5x^3}{2}}x^5+e^{\frac{5x^3}{4}}(32x+8x^3-120x^4+30x^6)}{2x^3}\,dx$ 3128

3.496 $\int \frac{e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}(18-24x-15x^2)-\log(\log(5))}{\log(\log(5))}\,dx$ 3134

3.497 $\int \frac{144e^{34}}{16x^2+e^{16}(-24e^2x-24x^2)+e^{32}(9e^4+18e^2x+9x^2)}\,dx$ 3139

3.498 $\int \frac{(16x+16x^2+e^{2x}(-x-x^2))\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^x(x+x^2)\log\left(-\frac{1}{x+x^2}\right)\right)}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}\,dx$ 3144

3.499 $\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx$ 3150

3.500 $\int \left(4+e^{-16-4e^{3x}+4x}(4-12e^{3x})+6x\right)\,dx$ 3156

3.501 $\int \frac{2-2x^4-4\log(4)+(2+50x^4)\log^2(4)}{x^3}\,dx$ 3160

3.502 $\int \frac{5832-3420x+668x^2-58x^3+2x^4+(-738x+206x^2-27x^3+x^4)\log\left(\frac{1}{x^2}\right)}{(2916x-1710x^2+334x^3-29x^4+x^5)\log\left(\frac{1}{x^2}\right)}\,dx$ 3165

3.503 $\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5(32x^2-16x^3)+e^{10}(-8x^4+4x^5)+(e^5(16x-8x^2)+e^{10}(-8x^3+4x^4))\log\left(\frac{2-x}{2}\right)+e^{10}(-2x^2+x^3)\log^2\left(\frac{2-x}{2}\right)}\,dx$ 3170

3.504 $\int \frac{96x^3-192x^3\log(x^2)+(8+e^x)\log^2(x^2)}{\log^2(x^2)}\,dx$ 3176

3.505 $\int \frac{-e^xx+e^xx\log(x)-e^xx\log^2(x)+e^{e^{-x}x^2}(e^x+(-2x^2+x^3)\log(x))+\left(-e^{x+e^{-x}x^2}\log(x)+e^xx\log(x)-e^xx\log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log}{5\log(x)}\right.}{\left(e^{x+e^{-x}x^2}\log(x)-e^xx\log(x)+e^xx\log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)}$

3.506 $\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^xx)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{-1+e^{4-x}x}\,dx$ 3187

3.507 $\int \frac{-8-32e^{x^2}x}{256+4e^{2x^2}-32x+x^2+e^{x^2}(-64+4x)}\,dx$ 3192

3.508 $\int \frac{\left(4x+25\ 2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}(-20-5\ 2^{5+8x}x\log(2))\right)\log\left(\frac{1}{25}\left(100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)\right)\right)}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)}\,dx$ 3197

3.509 $\int \frac{-5775+1520x-28975x^2+7700x^3-500x^4+(5775-1500x+100x^2)\log(x)}{5929x^2-1540x^3+100x^4}\,dx$ 3202

3.510 $\int \frac{1}{2}(-36+45x-18\log(4)-18\log(x^2-e^4x^2))\,dx$ 3208

3.511 $\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^x(400x^2+200x^4+25x^6)}(e^{5x}(50x+125x^2)+e^{4x}(-$

3.512 $\int \frac{-5\log(x)+(1+x)\log^2(x)+(-20-4x\log^2(x))\log^3\left(\frac{-5+(1+x)\log(x)}{\log(x)}\right)}{-5x\log(x)+(x+x^2)\log^2(x)}\,dx$ 3222

3.513 $\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)\log\left(\log\left(\log\left(\frac{x}{1+x}\right)\right)\right)}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}\,dx$ 3227

3.514 $\int \frac{x^2+e^{2-x}\left(x^2+x^3\right)-x^2\log(x)+e^{e^{5-x}}\left(1+e^{7-2x}x+e^{2-x}(3+x)+\left(-3-e^{5-x}x\right)\log(x)\right)}{-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}\left(-e^{2-x}x+x\log(x)\right)}\,dx$ 3233

3.515 $\int \frac{3x^2+3x^3-x^4+e^{e^5}\left(-3-3x-6x^3-6x^4+2x^5\right)+e^{2e^5}\left(6x+3x^2+3x^4+3x^5-x^6\right)}{-4x^2-x^3+x^4+e^{e^5}\left(3x+8x^3+2x^4-2x^5\right)+e^{2e^5}\left(-3x^2-4x^4-x^5+x^6\right)}\,dx$ 3238

3.516 $\int \frac{1}{4}e^{-13-6e^{\frac{3x}{e^3}}}\left(-e^3+e^{\frac{3x}{e^3}}(-18+18x)\right)\,dx$ 3244

3.517 $\int \frac{e^{-e^{14}+e^x}\left(-1+e^x x\right)}{3e^{-e^{14}+e^x}x+3x^2}\,dx$ 3249

3.518 $\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+\left(18-60x^2+390x^3-29400x^4-44100x^5-14700x^6\right)\log^2(5)+\left(-30x^3+4200x^4+6\right.}{}$

3.519 $\int \left(1-4e^3-e^3\log(x)\right)\,dx$ 3262

3.520 $\int e^{-5+x}\,dx$ 3266

3.521 $\int \frac{-640e^5x-80x^3}{9+30x^4+6400e^{10}x^4+25x^8+e^5\left(480x^2+800x^6\right)+\left(6+160e^5x^2+10x^4\right)\log(2)+\log^2(2)}\,dx$ 3270

3.522 $\int \frac{x^2+e^{\frac{-2+2x+x^2}{x}}\left(-2-x^2\right)}{10x^2}\,dx$ 3275

3.523 $\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}\left(3x^2+2x^3\right)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}\left(-10x^3-2x^3\log(3)\right)}\,dx$ 3279

3.524 $\int \frac{-2x^3+\left(-2500x+2x^3\right)\log\left(\frac{1}{125}\left(-1250+x^2\right)\right)}{\left(-1250+x^2\right)\log^2\left(\frac{1}{125}\left(-1250+x^2\right)\right)}\,dx$ 3285

3.525 $\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx$ 3290

3.526 $\int -\frac{4e^3}{x^2}\,dx$ 3295

3.527 $\int \frac{25+14x^2+\left(-75-14x^2\right)\log(x)}{-9e^e x^4+\left(25x+14x^3\right)\log(x)}\,dx$ 3299

3.528 $\int \frac{e^{\frac{225+9x+45e^{5+x}x-5x^2}{5x}}\left(-45-x^2+9e^{5+x}x^2\right)}{x^2}\,dx$ 3304

3.529 $\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\log(x)+3\log^2(x)\right)\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right.\right.}{-4x^3+4x^4+\left(-x^2+5x^3\right)\log(x)+x^2\log^2(x)}$

3.530 $\int \frac{-1+44x-40x^2-6x^3+2x^4}{x}\,dx$ 3315

3.531 $\int \frac{-6-6\log(x)+\left(2+3x^2\right)\log^2(x)+\left(-6\log(x)+\left(2-3x^2\right)\log^2(x)\right)\log\left(\frac{6+\left(-2+3x^2\right)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+\left(-2x^2+3x^4\right)\log^2(x)}\,dx$ 3319

3.532 $\int \frac{-2x^6+e^x\left(-216x^3+54x^5\right)+\left(e^{3x}\left(-46656+11664x^2\right)+e^{2x}\left(-216x^3-216x^4-54x^5+54x^6\right)+e^x\left(2x^6-2x^7\right)\right)\log(x)+\left(-216x^3+54x^5+(2\right.}{e^{3x}x^5\log(x)+3e^2}$

3.533 $\int \frac{12+22x^2-2x^3+e^{e^{-4+x}}\left(-x^2+2x^3+e^{-4+x}\left(-x^3+x^4\right)\right)}{-12x-9x^2+22x^3-x^4+e^{e^{-4+x}}\left(-x^3+x^4\right)}\,dx$ 3331

3.534 $\int \frac{e^{-2x}\left(32e^x x^4+\left(-x^9+e^x\left(-160x^4+32x^5\right)\log(x)\right)\log\left(\frac{3}{\log(x)}\right)+\left(5x^9-x^{10}\right)\log(x)\log^2\left(\frac{3}{\log(x)}\right)\right)}{128\log(x)}\,dx$ . . 3336

3.535 $\int \frac{e^{-1+x}(-32+32x)}{e^{2x}-2e^x x+x^2}\,dx$ 3342

3.536 $\int \frac{16x^2+4x^4+4x\log(5)+e^{8e}\left(16x^2+8x^4+x^6+\left(8x+2x^3\right)\log(5)+\log^2(5)\right)+\left(-8x^4+4x\log(5)\right)\log(x)\log(\log(x))}{\left(16x^3+8x^5+x^7+\left(8x^2+2x^4\right)\log(5)+x\log^2(5)\right)\log(x)}\,dx$ 3346

3.537 $\int \frac{-13+e^4(52-32x)+8x+e^{2e^x}\left(-1+4e^4+e^x\left(6-2x+e^4(-24+8x)\right)\right)+e^{e^x}\left(10-4x+e^4(-40+16x)+e^x\left(-12+10x-2x^2+e^4\left(48-40x+8x^2\right)\right.\right.}{e^4}$

3.538 $\int \frac{953694x+1262196x^2+694960x^3+196000x^4+28000x^5+1600x^6+\left(-33614x-48020x^2-27440x^3-7840x^4-1120x^5-64x^6\right)\log(x)+\left(-33\right.}{16807+24010x+13720x^2+3920x^3+560x^4+32x^5}$

3.539 $\int \frac{-20e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)+e^{\frac{1}{10}(11x+10\log(3x))}\left(30+30x+\left(60+123x+33x^2\right)\log(x)\right)}{90-120e^{\frac{1}{10}(11x+10\log(3x))}x\log(x)+40e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)}\,dx$ 3364

3.540 $\int \frac{e^{4x-2x^2}+16x^2+4\log(5)+e^{2x-x^2}(-8x+(-2+2x)\log(5))}{e^{4x-2x^2}-8e^{2x-x^2}x+16x^2}\,dx$ . . . 3370

3.541 $\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+(246x+120x^2+123x^3+60x^4)\log\left(\frac{2+x^2}{x}\right)+(20+10x^2)\log^2\left(\frac{2+x^2}{x}\right)\right)}{(20+10x^2)\log^2\left(\frac{2+x^2}{x}\right)}\,dx$ 3375

3.542 $\int \frac{-8-3e^{10}x^3+e^{10+x}x^3}{4x-e^{15}x^3+e^{10+x}x^3+e^{10}(4x^3-3x^4)}\,dx$ . . . 3380

3.543 $\int \frac{1}{10}e^{2-2e^x}\left(4+20e^{-2+2e^x}x-8e^xx-2\log(6x)+(-1+2e^xx)\log^2(6x)\right)\,dx$ . . . 3385

3.544 $\int \frac{e^{\frac{2e^{\frac{5e^5}{x}}-x^2+2\log(2x)}{x}}\left(e^{\frac{5e^5}{x}}(-10e^5-2x)+2x-x^3-2x\log(2x)\right)}{x^3}\,dx$ . . . 3390

3.545 $\int \frac{e^x(-256+256x-255x^2+256x^3)}{x^2}\,dx$ . . . 3394

3.546 $\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(144x^3+18e^3x^4)}{-320+64x+e^9(-5+x)x^3+e^6x^2(-60+12x)+e^3x(-240+48x)+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(576+432e^3x+108e^6x^2+9e^9x^3)}\,dx$ 3398

3.547 $\int \frac{x^2+4x^3+e^3(-21x-8x^2)(x+4x^2)+(5+20x)\log(5)}{x^2+4x^3}\,dx$ . . . 3404

3.548 $\int \frac{-e^2+(-2e^2-e^{50}x)\log(x)}{e^2x\log(x)}\,dx$ . . . 3409

3.549 $\int \frac{-25-50e^x-25x}{16x-8x^2+x^3+e^x(16-8x+x^2)+(-8x+2x^2+e^x(-8+2x))\log(e^x+x)+(e^x+x)\log^2(e^x+x)}\,dx$ . . . 3414

3.550 $\int \frac{-1+e^{-10+2e^x-2x}(-16+8x-x^2)+e^{-5+e^x-x}(2+e^x(-8+2x))}{1+e^{-5+e^x-x}(8-2x)+e^{-10+2e^x-2x}(16-8x+x^2)}\,dx$ . . . 3419

3.551 $\int \frac{20x^2-20x^3+5x^4+e(-20+20x-5x^2)+e^{2e^4-2x+(-e^4+x)\log^4(x)}(3x^2-2x^3+(-8x^2+4x^3+e^4(8x-4x^2))\log^3(x)+(-2x^2+x^3)\log^4(x))}{20x^2-20x^3+5x^4}$

3.552 $\int \left(512x-640x^3+400x^4-90x^5+7x^6+e^{10+2e^{40}}(2x+3x^2)+e^{5+e^{40}}(64x+48x^2-56x^3+10x^4)\right)$

3.553 $\int \frac{1}{2}(2e+x)\,dx$ . . . 3436

3.554 $\int \frac{4-x+8x\log(8e^{-x/4}x)+(-1-2x^2+2x^3+2x\log(x))\log^2(8e^{-x/4}x)}{4x\log(8e^{-x/4}x)+(x^3+x\log(x))\log^2(8e^{-x/4}x)}\,dx$ . . . 3440

3.555 $\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4))}{3375x^2+1350x^3+135x^4}\,dx$ . . . 3446

3.556 $\int \frac{126-153x-18x^2}{e(64+160x+160x^2+80x^3+20x^4+2x^5)}\,dx$ . . . 3452

3.557 $\int e^{-3+2x+e^{e^4}x^2}\left(-3-6x-6e^{e^4}x^2\right)\,dx$ . . . 3457

3.558 $\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25x\log^4(4)\log^2(x^2)}{128x-160x^2\log^2(4)+50x^3\log^4(4)}\,dx$ 3462

3.559 $\int \frac{50-2x^2-2\log(5)}{625+50x^2+x^4+(-50-2x^2)\log(5)+\log^2(5)}\,dx$ . . . 3469

3.560 $\int \frac{64+5e^{\frac{8+x}{4}}+64x}{4e^{\frac{8+x}{4}}+64x}\,dx$ . . . 3474

3.561 $\int \frac{e^{4x}(16120x^4+e(-1690x-3380x^2))}{169e^2-1612ex^2+3844x^4}\,dx$ . . . 3479

3.562 $\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4+3x}(25+25\log(3))+e^x(100-50x+100\log(3))+e^{2+x}(1-x+e^x(1}{4-2x+4\log(3)+e^{4+2x}(1+\log}$

3.563 $\int \frac{-25x^4+60x^5-21x^6+2x^7+(120x^2-264x^3+48x^4)\log(3)+(-144+288x)\log^2(3)+(16x^4\log(3)-384x\log^2(3))\log(5)}{(25x^4-10x^5+x^6+(-120x^2+24x^3)\log(3)+144\log^2(3))\log(5)}\,dx$ 3491

3.564 $\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(-50+10e^3-15x+(10-2e^3+3x)\log(x))\log}{e^x(25x-5e^3x+5x^2)+e^x(-5x+e^3x-x^2)\log(x)+(25x-5e^3x+5x^2+(-5x+e^3x-x^2)\log(x))\log(5-\log(x))}$

3.565 $\int -\frac{1}{x}\,dx$ . . . 3502

3.566 $\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log(\log(25x^2))}}(10x\log(2)+2e^xx\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x(1-x+x^2)\log(2)-e^xx\log(2)\log(}{(25x+10e^xx+e^{2x}x)\log(25x^2)\log^2(\log(25x^2))}$

3.567 $\int \frac{-96+48x-6x^2+e^2(-160+16x-8x^2)}{e^2(16000-3200x-920x^2+76x^3+22x^4+x^5)}\,dx$ . . . 3512

3.568 $\int \frac{-132e^5+9000x+180x^2}{900x^4+e^{10}(9+6x+x^2)+e^5(-180x^2-60x^3)}\,dx$ . . . 3517

3.569 $\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}(-6-12x^2+18\log(x^2))}{x^7}\,dx$ . . . 3523

3.570 $\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^x x^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4)))}\,dx$ 3527

3.571 $\int \frac{-1+192x+6x^2+15x^4+(-4-4x^2)\log(1+x^2)}{2+2x^2}\,dx$ . . . 3533

3.572 $\int \frac{-9e^{2/3}-9e^3+e^{-4+x}(162-72x+8x^2)}{162-72x+8x^2}\,dx$ . . . 3538

3.573 $\int \left(12-16x+6x^2+e^{3/4}(4-8x+3x^2)+(4-8x+3x^2)\log(2)\right)\,dx$ . . . 3543

3.574 $\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx$ . . . 3548

3.575 $\int \frac{-2x-x^2-2\log(\frac{5}{4})}{4x+4x^2+x^3+(4+4x+x^2)\log(\frac{5}{4})+(-4x^2-2x^3+(-4x-2x^2)\log(\frac{5}{4}))\log(x+\log(\frac{5}{4}))+(x^3+x^2\log(\frac{5}{4}))\log^2(x+\log(\frac{5}{4}))}\,dx$ 3554

3.576 $\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log(-\frac{x}{3})}{x}\right)}{x\log^2(-\frac{x}{3})}\,dx$ . . . 3559

3.577 $\int \frac{-6e^{25}-3x^3+e^x x^3}{2x^3}\,dx$ . . . 3564

3.578 $\int (-198x+60x^2-4x^3)\,dx$ . . . 3569

3.579 $\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx$ . . . 3573

3.580 $\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5x^4)}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}\,dx$ . . . 3577

3.581 $\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}\,dx$ 3583

3.582 $\int \frac{-16x-16x^2\log(2)+(-20+20x-4x^3)\log^2(2)+(16x\log(2)+8x^2\log^2(2))\log(-x)-4x\log\cdots}{64x-32x^2+4x^3+(-80x+84x^2-32x^3+4x^4)\log(2)+(25x-40x^2+26x^3-8x^4+x^5)\log^2(2)+((-64x+32x^2-4x^3)\log(2)+(40x-42x^2+16\cdots}$

3.583 $\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}(-24x^2-18x^3)+e^{-\frac{3x}{-5+3e^{14}x^2}}(-25+30e^{14}x^2-9e^{28}x^4)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$ . . 3595

3.584 $\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+400e^x+40e^{2x})\log(x)+\cdots}{25+10e^x+e^{2x}}$

3.585 $\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2-2x)+2x)\log(x))\log(2+\log(2))+(-x+e^3\cdots}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2))+(x+2\log(2+\log(2)))\log(\frac{1}{2}(x+2\log(2\cdots}$

3.586 $\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+192x^5)\log(x)+(-75x^2-64x^3+16x^4-72x^5)\cdots}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x^4-2560x^5+2048x^6-512x^7)\log(x)+(2\cdots}$

3.587 $\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x(-1+x^2)}{-1+x^2}}(-3+9x^2-4x^4+e^x(-1+2x^2-x^4))}{1-2x^2+x^4}\,dx$ . . . 3622

3.588 $\int \frac{64+8x^2+10x^5-2ex^5+2x^6}{x^5}\,dx$ . . . 3627

3.589 $\int \frac{e^{\frac{45-9x}{x^2}}(270-27x)+3e^5x^3-6e^{7-2x}x^3}{e^5x^3}\,dx$ . . . 3631

3.590 $\int \frac{e^x(2-x)-14x^3+e^{5-x}(14x^3-14x^4)}{14x^3}\,dx$ . . . 3636

3.591 $\int \frac{36-12x+4x^3+e^{-2-x}x(-24x^2+20x^3-4x^4)+(-12x^2+4x^3)\log(-3+x)}{-36x+9x^2+x^3+e^{-2-x}x(-12x^3+4x^4)+(-12x^3+4x^4)\log(-3+x)}\,dx$ . . . 3641

3.592 $\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx$ . . . 3646

3.593 $\int e^4(-2+4x)\,dx$ . . . 3650

3.594 $\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}(-10x^3+20e^3x^3-10e^6x^3)+e^{x^2}(-2x^2+6e^3x^2-6e^6x^2+2e^9x^2)\log(x)\right)}{-125x^4+(-75x^3+75e^3x^3)\log(x)+(-15x^2+30e^3x^2-15e^6x^2)\log^2(x)+(-x+3e^3x-3e^6x+e^9x)\log^3(x)}\,dx$ 3654

3.595 $\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}(5e^x+2x-2x^2)+e^{(-4+e^5)^x}\left(-5e^x-5(e(-4+e^5))^x x\log(-4+e^5)\right)\right)dx$ 3660

3.596 $\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}(-4+4x-4x^2+e^x(4x-4x^2))}{x}\right)dx$ . . . 3665

3.597 $\int e^{-1+e^{4x}x^2}x^4(8x^3+e^{4x}x^2(2x^3+4x^4))\,dx$ . . . 3670

3.598 $\int \frac{1+e^2+2x^2-\log(x)+(e^2(-1-2x)+2x^2+x\log(5)+\log(x))\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$ . . . 3674

3.599 $\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx$ . . . 3679

3.600 $\int \frac{1+(-1+2x-e^x x)\log(x)}{x\log(x)}\,dx$ . . . 3683

3.601 $\int \frac{1}{x}\,dx$ . . . 3687

3.602 $\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2)+e^{\frac{2(e^{21+x}-3x^2-e^x x^2)}{3x+e^x x}}(-18x^2-12e^x x^2-2e^{2x}x^2+e^{21+x}(-6-2e^x-}{9x^2+6e^x x^2+e^{2x}x^2}$

3.603 $\int \frac{-375+300x-64x^2+(-125+100x-20x^2)\log(4)}{25x^2-20x^3+4x^4}\,dx$ . . . 3697

3.604 $\int \frac{4x^2-2e^x x^2+3x^3+x^4+(x^2+x^3)\log(9)+(-2x^2-2x\log(9)+e^x(2x^2+2x\log(9)))\log(x+\log(9))+\log(\frac{1}{5}(-2+e^x-x))(-4x+2e^x x-2x^2+}{-2x^3-x^4+(-2x^2-x^3)\log(9)+e^x(x^3+x^2\log(9))}$

3.605 $\int \frac{-9x^3-18x^4-15x^5-4x^6+e^4(27x^2+36x^3+25x^4+6x^5)}{e^{12}-3e^8x+3e^4x^2-x^3}\,dx$ . . . 3709

3.606 $\int \frac{-40+40x+e^{2x}(-16+80x-40x^2)}{e^{4x}(2-10x+5x^2)+e^{2x}(-4+20x-10x^2)\log(\frac{1}{5}(-2+10x-5x^2))+(2-10x+5x^2)\log^2(\frac{1}{5}(-2+10x-5x^2))}\,dx$ 3715

3.607 $\int \frac{-2400x+1200x^2+(-3750+1875x+4800x^2-1800x^3)\log(x)+(2400-1200x-}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400x^3+3200x^4+2048x^5-1024x^6)\log(x)\log((2-x)\log(x))+(3200x^2}$

3.608 $\int \frac{4x^2+e^8(-3+3x)}{3e^8x^2+4x^3+(3e^8x+4x^2)\log\left(\frac{3e^8+4x}{x}\right)}\,dx$ . . . 3728

3.609 $\int \frac{30-75x+10x^2-25x^3+(-55x-70x^2+25x^3)\log(x)+(-10x+25x^2+10x\log(x))\log(5x^2)}{(4x-20x^2+25x^3)\log^2(x)}\,dx$ . . . 3733

3.610 $\int \frac{e^5(-12-2x+2x^2)+e^5(1-3x+2x^2)\log(1-2x+x^2)\log(\log(1-2x+x^2))}{(-1+x)\log(1-2x+x^2)}\,dx$ . . . 3738

3.611 $\int \frac{20x+(50+60x+16x^2+(25+40x+16x^2)\log(8))\log\left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50+60x+16x^2+(25+40x+16x^2)\log(8)}\,dx$ . . . 3743

3.612 $\int \frac{-10-20x+(-5-10x-10x^2)\log(3)+e^x(-20-10x+(-5-20x-5x^2+5x^3)\log(3))}{x^2+2x^3+x^4+e^{2x}(1+2x+x^2)+e^x(2x+4x^2+2x^3)}\,dx$ . . . 3750

3.613 $\int \frac{1+e^x x-4x\log^2(5)}{x}\,dx$ . . . 3755

3.614 $\int \frac{9-27\log(x)}{40x^4}\,dx$ . . . 3759

3.615 $\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx$ . . . 3763

3.616 $\int (-6750000+e^x+10845000x-7095600x^2+2436696x^3-473040x^4+52056x^5-3024x^6+72x^7$

3.617 $\int \frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^x x+e^{x^2}x-3x^2+4x\log(2)}\,dx$ . . . 3773

3.618 $\int \frac{-12-21x+e^{2x}(-27x+6x^2)-3x\log(x)}{32x+2e^{4x}x+16x^2+2x^3+e^{2x}(16x+4x^2)+(16x+4e^{2x}x+4x^2)\log(x)+2x\log^2(x)}\,dx$ . . . 3778

3.619 $\int \frac{-60+e^{-4+x}(-3+3x-x^2)}{x^2\log(\log(4))}\,dx$ . . . 3783

3.620 $\int \frac{-4e^{4/x}+2x-x^2-x\log(3)}{x^2}\,dx$ . . . 3788

3.621 $\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2(e^{10}-2e^5x+x^2)}\,dx$ . . . 3792

3.622 $\int \frac{e^{1-x}(1-x)x+e^{5-x}(1-5x+e^4x)-e^{5-x}x\log(x)}{e^{1-x}x^2+e^{5-x}(5x-e^4x)+e^{5-x}x\log(x)}\,dx$ . . . 3797

3.623 $\int \frac{-10+2e^4-2x+(5-e^4)\log(x)}{(-5x+e^4x-x^2)\log(x)}\,dx$ . . . 3802

3.624 $\int \frac{-1600+x^3}{x^3}\,dx$ 3807

3.625 $\int e^{-9x-24x^3-16x^5}\Big(40+e^{9x+24x^3+16x^5}(-3-x)+\Big(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-32$

3.626 $\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+\left(-40x+10x^2\right)\log(4)+5x\log^2(4)+\left(150x-40x^2+\left(-80x+10x^2\right)\log(4)+10x\log\right.\right.}{225-240x+244x^2-96x^3+36x^4+\left(-240+188x-128x^2+24x^3\right)\log(4)+\left(94-48x+16x^2\right)\log^2(4)+(-16+4x)\log^3(4)+\log^4(4}$

3.627 $\int \frac{54-27x-9x^2+3x^3+x^4}{-27x+3x^3}\,dx$ 3823

3.628 $\int \frac{3208x^2-11212x^3+12006x^4-5201x^5+800x^6+e^x\left(-2406+6015x-6003x^2+1200x^3\right)}{-3200x^2+4800x^3-2400x^4+400x^5}\,dx$ 3827

3.629 $\int \frac{e^{\frac{1}{16}\left(e^9-8e^5x+16ex^2\right)}\left(-2-e^5x+4ex^2\right)}{5x^2}\,dx$ 3833

3.630 $\int \left(-3-10x-6x^2-4x^3\right)\,dx$ 3838

3.631 $\int \frac{-1-x^2-x^3}{x^2+x^3}\,dx$ 3842

3.632 $\int \frac{-25+25x+x^2-x^3+\left(-2x^3+2x^2\log(x)\right)\log(x-\log(x))}{-x^2+x\log(x)}\,dx$ 3846

3.633 $\int \frac{\left(2-6x^3-4\log(x\log(4))\right)\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx$ 3850

3.634 $\int \frac{1}{2}(8-3x+2\log(3))\,dx$ 3855

3.635 $\int \frac{e^{2x}\left((-32+32x)\log^2(6)-96\log^3(6)\right)+e^x\left(\left(-144x+144x^2\right)\log(6)+(432-864x)\log^2(6)+1296\log^3(6)\right)}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6)}\,dx$ 3859

3.636 $\int \frac{-4+4x^2+\left(4-3x+4x^2\right)\log\left(\frac{-4+3x-4x^2}{2x}\right)}{4-3x+4x^2}\,dx$ 3865

3.637 $\int \frac{-4+e^4\left(12x^2+4x^3\right)}{-4x+e^4\left(4x^3+x^4\right)+12\log(\log(4))}\,dx$ 3870

3.638 $\int \frac{e^{x+x^2}\left(9+24x+13x^2+2x^3\right)+e^{x+x^2}\left(6+14x+4x^2\right)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}x+\frac{-13+x+\log(5x)}{3+x+\log(5x)}}(-25-22x-}{9+6x+x^2+(6+2x)\log(5x)+\log^2(5x)}$

3.639 $\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-155-75x+(-16-15x)\log(3))\,dx$ 3880

3.640 $\int \frac{(-10-20x-10\log(x))\log(2\log(4))}{3x^4+6x^3\log(x)+3x^2\log^2(x)}\,dx$ 3886

3.641 $\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}(12150+1995}{}$

3.642 $\int \frac{270x^2-225x^4}{-32+160x^2-200x^4+e\left(8-40x^2+50x^4\right)}\,dx$ 3903

3.643 $\int \frac{-5-x^2+\left(5+3x^2\right)\log(x)+e^7(1-2x)\log^2(x)}{e^7\log^2(x)}\,dx$ 3908

3.644 $\int \frac{8-8x+\left(-32x+432x^2-512x^3\right)\log(x)+(8-16x)\log(x)\log(\log(x))}{\log(x)}\,dx$ 3913

3.645 $\int \frac{1+5^x x\log(5)}{x}\,dx$ 3918

3.646 $\int \frac{-50-2e^{10}+e^5(20-60x)+300x}{81x^3}\,dx$ 3922

3.647 $\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}\left(e^5(-16-4x)-8x\right)+x^3}{x^3}\,dx$ 3927

3.648 $\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+\left(600+240x^2+24x^4\right)\log(x)+\left(-60-12x^2\right)\log^2(x)+2\log^3(x)\right)+\left(-840x-210x^3+(164x+20\right.}{(-1000-600x}$

3.649 $\int \frac{e^{\frac{x^2+\left(2+x^2\right)\log^2\left(x^2\right)+x\log\left(e^{4/5}x\right)\log^2\left(x^2\right)}{x}}\left(x^2+\left(8+4x^2\right)\log\left(x^2\right)+4x\log\left(e^{4/5}x\right)\log\left(x^2\right)+\left(-2+x+x^2\right)\log^2\left(x^2\right)\right)}{x^2}\,dx$ 3939

3.650 $\int \frac{e^{-e^x}\left(e^{e^x}\left(-4x+10x^3\right)+\left(2-5x^2\right)\log^2\left(2-5x^2\right)+\log(x)\left(-20x^2\log\left(2-5x^2\right)+e^x\left(-2x+5x^3\right)\log^2\left(2-5x^2\right)\right)\right)}{-2x+5x^3}\,dx$ 3944

3.651 $\int \frac{100+100x+202x^2+304x^3+6x^4+10x^5+6x^6+\left(200x+300x^2+4x^3+10x^4+6x^5\right)\log(x)+\left(-102x-2x^2-6x^3-8x^4+\left(-100-6x^2-8x^3\right)\log\right.}{625x+625\log(x)}$

3.652 $\int \frac{1}{3}e^{-x^2}\left(e^{x^2}\left(9+9x^2\right)+8x\log(4)\right)\,dx$ 3955

3.681 $\int \frac{e^{2x^2}\left(-96x^2+24x^3-24e^xx^4\right)+e^{4x^2}\left(-32x^2+8x^3-8e^xx^4\right)+e^{x^2}\left(32x^2-8x^3+8e^xx^4\right)+e^{3x^2}\left(96x^2-24x^3+24e^xx^4\right)+\left(20-30x+5x^2+15e\right.}{}$

3.682 $\int -\frac{1}{x}\,dx$ 4116

3.683 $\int \frac{-11552x^3-4864x^3\log\left(x^2\right)-512x^3\log^2\left(x^2\right)+e^{-\frac{1}{19+4\log\left(x^2\right)}}\left(-353-152\log\left(x^2\right)-16\log^2\left(x^2\right)\right)}{361x^2+152x^2\log\left(x^2\right)+16x^2\log^2\left(x^2\right)}\,dx$ . . 4120

3.684 $\int \frac{e^{\frac{-1+125x-25x^2}{25+5x}}\left(626-250x-25x^2\right)+e^x\left(-125-175x-55x^2-5x^3\right)}{125+50x+5x^2}\,dx$ 4126

3.685 $\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+\left(-160x-120x^2+10x^4\right)\log^2(4-x)\right)}{\left(-16-12x+x^3\right)\log^2(4-x)}\,dx$ 4131

3.686 $\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)}\,dx$ . . 4136

3.687 $\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{\left(288x+288x^2+\left(-192x-192x^2\right)\log(x)+\left(32x+32x^2\right)\log^2(x)\right)\log^2(1+x)}\,dx$ 4142

3.688 $\int \left(1-e^3+20x+75x^2\right)\,dx$ 4148

3.689 $\int \frac{4x^4+24x^5-24x^6+\left(-8x^3-48x^4+48x^5\right)\log(4)+\left(4x^2+24x^3-24x^4\right)\log^2(4)+e^x\left(-12x^2-20x^3+\left(8x+20x^2\right)\log(4)\right)+\left(-8x^4+8x^5+(16x\right.}{5x^3-5x^4+\left(-10x^2+10x^3\right)\log(4)+\left(5x-5x^2\right)\log^2(4)+e^x(}$

3.690 $\int \frac{248+398x+216x^2+24x^3+\left(2120+830x+180x^2\right)\log(x)+(1350+450x)\log^2(x)+375\log^3(x)}{216+216x+72x^2+8x^3+\left(540+360x+60x^2\right)\log(x)+(450+150x)\log^2(x)+125\log^3(x)}\,dx$ 4159

3.691 $\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}\left(2x-4x^3\right)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx$ 4165

3.692 $\int \frac{1}{64}e^{20+\frac{1}{256}e^{20+4x+4x^{12x}}+4x+4x^{12x}}\left(1+x^{12x}(12+12\log(x))\right)\,dx$ 4170

3.693 $\int \frac{6x-e^5x+6x^2-5x^3-2x^4-x\log\left(\frac{1}{x^2}\right)+\left(6+2x+e^5(3+x)+(3+x)\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{3x^2+x^3}\,dx$ 4175

3.694 $\int \frac{e^{-e^2}\left(-16+81x^2\right)}{64x^2}\,dx$ 4180

3.695 $\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(x)\right)}{4x}\,dx$ 4185

3.696 $\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^xx^2\left(2+x+3x^2-x^3\right)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx$ 4190

3.697 $\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$ 4197

3.698 $\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2\left(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7\right)+(e}{}$

3.699 $\int \frac{16-48\log\left(\frac{-32-7x}{4+x}\right)+48\log^2\left(\frac{-32-7x}{4+x}\right)-16\log^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2}\,dx$ 4214

3.700 $\int \frac{\left(e^3\left(-4x^3+4x^4\right)+e^6\left(2x^3-6x^4+4x^5\right)\right)\log\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right)+\left(-3x^2+2x^3+e^3\left(-6x^3+4x^4\right)+e^6\left(3x^3-5x^4+2x^5\right)\right)\log^2\left(\frac{-1-2e^3x}{}\right.}{20-40x+20x^2+e^3\left(40x-80x^2+40x^3\right)+e^6\left(-20x+60x^2-60x^3+20x^4\right)}$

3.701 $\int \frac{1}{4}\left(109+e^{2x}x^2(105+70x)\right)\,dx$ 4229

3.702 $\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{\left(-4x+x^2\right)\log\left(\frac{x}{2}\right)}\,dx$ 4234

3.703 $\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)\right)}{\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)}\,dx$ 4239

3.704 $\int \frac{\left(9+e-x^2-18x^4+8x^5-7x^8\right)(i\pi+\log(3))}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6x^{10}+12x^{12}-4x^{13}+x^{16}+e\left(18-12x+2x^2+12x^4-4x^5+2x^8\right)}\,dx$ 4

3.705 $\int \frac{2^{-2x}e^{e^{\frac{2-12x-2x^2}{3x}}}\left(-3x+e^{\frac{2-12x-2x^2}{3x}}(2+2x^2)+6x^2\log(2)\right)}{3x}\,dx$ 4250

3.706 $\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx$ 4255

3.707 $\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}\,dx$ 4262

3.708 $\int \frac{e^5(-e^{21}-3x^2)\log(3)}{(e^{21}x+x^3)^2}\,dx$ 4267

3.709 $\int \frac{-16+e^x(-8x-4x^2)}{40000x^2-40000e^3x^2+10000e^6x^2+e^x(20000x^3-20000e^3x^3+5000e^6x^3)+e^{2x}(2500x^4-2500e^3x^4+625e^6x^4)}\,dx$ 4272

3.710 $\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}}$

3.711 $\int \frac{36-168x-245x^2-82x^3-54x^4+4x^5}{36x-87x^2-77x^3-17x^4-10x^5+x^6}\,dx$ 4299

3.712 $\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2+2x^3)\log^2(x)}\,dx$ 4304

3.713 $\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx$ 4309

3.714 $\int 225\log^2(4)\,dx$ 4314

3.715 $\int \frac{-400\log(3)-4\log(2)\log^2(3)}{16x^2\log(2)-8x\log(2)\log(3)+\log(2)\log^2(3)}\,dx$ 4318

3.716 $\int \frac{1}{20}(1-40e^{-2x}+40e^{2x}+e^x(-40-40x)+e^{-x}(40-40x)+40x)\,dx$ 4323

3.717 $\int \frac{1+e^{x+e^x\log^2(2)}\log^2(2)(2+i\pi+\log(14))}{2+i\pi+\log(14)}\,dx$ 4328

3.718 $\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}\left(-25+e^{2x}(-50-10x)-5x\right)\right)}{\left(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x)\right)\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx$ 4333

3.719 $\int \frac{20+x+2\log\left(\frac{1}{5}(-80-4x)\log(5)\right)}{180+9x}\,dx$ 4338

3.720 $\int -\frac{16(i\pi+\log(\log(16)))}{-3+9x-9x^2+3x^3}\,dx$ 4343

3.721 $\int (18x^2+44x^3+30x^4+30x^5+112x^6+128x^7+36x^8+60x^9+154x^{10}+72x^{11}+56x^{13}+60x^{14}+$

3.722 $\int \left(2x+2(i\pi+\log(4))^2\log(4e^x)\right)\,dx$ 4353

3.723 $\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)(x-x^2)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)(x-x^2)^{2\sqrt[4]{e}}+\sqrt[4]{e}(-1200+2400x)(x-x^2)^{3\sqrt[4]{e}}+\sqrt[4]{e}(-100+200x)(}{-x+x^2}$

3.724 $\int \frac{1+(x^2+x^3+2x^4)\log(x)-2\log(x)\log(\log(x))}{(-6x^3+x^4+x^5)\log(x)+x^3\log^2(x)+x\log(x)\log(\log(x))}\,dx$ 4363

3.725 $\int \frac{-x+(-5+2x)\log(-5+2x)}{(-20x+8x^2)\log(5)\log(-5+2x)+(-10x+4x^2)\log(-5+2x)\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)}\,dx$ 4368

3.726 $\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}\left(16e^{2x}x+e^x(4+4x)+(-e^xx-4e^{2x}x)\log(x^2)\right)}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx$ 4373

3.727 $\int \frac{e^{e^xx}\left(e^5+x^2+e^x(x^3+x^4)+e^{2x}(-e^5x-2x^3+e^x(-2x^4-2x^5))+e^{4x}(x^4+e^x(x^5+x^6))+(-e^5+e^{5+x}(x+x^2)+e^{2x}(e^5(2x+2x^2)+e^{5+x}(-\right.}{x^2-2e^{2x}x^3+e^{4x}x^4}$

3.728 $\int \frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\right)\right)}{x^3\log\left(\frac{e^{-x}}{x}\right)}\,dx$ 4384

3.729 $\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+(-2x^3+x^4+2x^5)\log^3\left(\frac{2}{-2}\right.}$

3.730 $\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-7081471x^4-786624x^5-55}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+4x^6}$

3.731 $\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+x^2}}(20-15x-12x^2+9x^3-2x^4+(-}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3)+e^{\frac{-9+\log(x)}{-2x+x^2}}(-8x^2+8x^3-2x^4)}$

3.732 $\int \frac{-16x^2+(-2e^4x^2+6x^4)\log(x)+(16+4x^2\log(x))\log(\log^2(x))-10\log(x)\log^2(\log^2(x))}{(e^4x^3+x^5)\log(x)-2x^3\log(x)\log(\log^2(x))+x\log(x)\log^2(\log^2(x))}\,dx$ 4409

3.733 $\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)\,dx$ 4414

3.734 $\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)\,dx$ 4418

3.735 $\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}}{}$

3.736 $\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}(1-8x+16x^2)\right)}\,dx$ 4441

3.737 $\int \frac{1853x-7252x^2+10252x^3-5952x^4+1508x^5+784x^6-1856x^7+768x^8+(2890-7752x+10312x^2-10688x^3+8296x^4-4448x^5+1920x^6-5}{-500x+200x^2+940x^3-464x^4-448x^5+256x^6+(-1000x+1400x^2+480x^3-1408x^4+512x^5)\log^2(}$

3.738 $\int \frac{-5-22x-4x^2+2e^{-2-x}(16+3x)}{-5x-x^2+2e^{-2-x}(5+x)}\,dx$ 4454

3.739 $\int \frac{-e^2\log(x\log(5))-x\log(x\log(5))}{x\log(x\log(5))}\,dx$ 4458

3.740 $\int \frac{32x^2+24x^3-8x^4+(-8x+7x^2+3x^3-2x^4)\log(1-2x+x^2)\log(\log^4(1-2x+x^2))}{(-5-5x+5x^2+5x^3)\log(1-2x+x^2)}\,dx$ 4462

3.741 $\int \frac{2+e^x(3-x)+(-120-120x+30x^2)\log(5)}{4+e^{2x}+(-240x-120x^2)\log(5)+(3600x^2+3600x^3+900x^4)\log^2(5)+e^x(4+(-120x-60x^2)\log(5))}\,dx$ . . 4467

3.742 $\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx$ . . . 4472

3.743 $\int \frac{6e^{2e^4}+6x-3e^{2e^4}\log(x^2)}{x^2\log(8)}\,dx$ 4479

3.744 $\int \frac{(6-30x+5x^2)\log(x)+(150x^2-25x^3+(30x-5x^2)\log(\frac{6-x}{x}))\log^2(x)+(30x-5x^2+(6-x)\log(\frac{6-x}{x}))\log(5x+\log(\frac{6-x}{x}))}{(150x^3-25x^4+(30x^2-5x^3)\log(\frac{6-x}{x}))\log^2(x)+(-30x^2+5x^3+(-6x+x^2)\log(\frac{6-x}{x}))\log(x)\log(5x+\log(\frac{6-x}{x}))}\,dx$ 4484

3.745 $\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+40x^4-4x^5+e^{-5+x}(-90+100x^3-40x^4+4}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+e^{-5+x}(50x^2-20x^3+2x^4))\log(-1+e^{-5}}$

3.746 $\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx$ 4497

3.747 $\int \frac{90x+45x^2-60x^4+e^x(-15+20x^2)+(20x+5e^xx^2-15x^4)\log(x)}{-12+16x^2+4x^2\log(x)}\,dx$ 4503

3.748 $\int \frac{234x+156e^4x+26e^8x+(1725+234x+156e^4x+26e^8x)\log\left(\frac{-1725-234x-156e^4x-26e^8x}{621+414e^4+69e^8}\right)}{1725+234x+156e^4x+26e^8x}\,dx$ 4508

3.749 $\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}(25+e^8+14x^3+e^4(10+3x^3)+(9x^2+2e^4x^2)\log(4)+(10+2e^4+3x}{25+10e^4+e^8+(10+2e^4)\log(x)+\log^2(x)}$

3.750 $\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx$ 4521

3.751 $\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6)\log\left(-\frac{4}{-3+x}\right)\log(5}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-210x+30x^2)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}(-144+1}$

3.752 $\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}(27x+x^2)}\,dx$ 4537

3.753 $\int \frac{x+(16+x)\log(-16-x)}{(16+x)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}\,dx$ 4543

3.754 $\int \frac{-e^{-6+x}x^2+2e^xx^2+5\log(2)}{x^2}\,dx$ 4548

3.755 $$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx$$ 4552

3.756 $$\int \frac{12+x^2}{x^2}\,dx$$ 4562

3.757 $$\int \frac{-48+e^3\left(-175x^6+240x^7+99x^8-120x^9-44x^{10}\right)}{80e^3}\,dx$$ 4566

3.758 $$\int \frac{-24-5x+(-8-2x)\log(4+x)}{4x^3+x^4}\,dx$$ 4571

3.759 $$\int \frac{1+\left(2x+12x^2+16x^3+5x^4\right)\log(x)+\log(x)\log(\log(x))}{\log(x)}\,dx$$ 4575

3.760 $$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}\left(-64+320x-400x^2\right)+e^{-\frac{9x}{-2+5x}}\left(512-2688x+3840x^2-800x^3\right)+e \cdots}{\cdots}$$

3.761 $$\int \frac{72x^2\log(x)+e^2\left(400x+80x^2\right)\log^2(x)+\left(-360x-72x^2+\left(720x+144x^2\right)\log(x)\right)\log(5+x)}{(25+5x)\log^2(x)}\,dx$$ 4588

3.762 $$\int \frac{-2000-600x-80x^2+12x^3+e^2\left(-4500-1420x-84x^2+8x^3\right)+\left(2000+700x+40x^2-4x^3\right)\log\left(\frac{1}{4}(-20+x)\right)}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+\left(1000+2550x+750x^2+36x^3-4x^4\right)\log\left(\frac{1}{4}(-20+x)\right)+\left(-500-175x-10x^2+x^3\right)\log^2\left(\frac{1}{4}(-20 \cdots\right.}$$

3.763 $$\int \frac{1}{5}\left(15+e^5\left(-4x-9x^2+4x^3\right)\right)\,dx$$ 4599

3.764 $$\int \frac{1+x+e^{1+e^2-x}x}{x}\,dx$$ 4603

3.765 $$\int \frac{-400+2000x-600x^2-400x^3+e^{2x}\left(80x-40x^2-80x^3\right)+(4 \cdots}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}\left(-10x^3+50x^4+10x^5\right)+\left(-100x+1000x^2-2300x^3-4e^{4x}x^3-1000x^4-100x^5+e^{2x}(40x^2 \cdots\right.}$$

3.766 $$\int \frac{-5+2x+5\log(4)}{5\log(4)}\,dx$$ 4613

3.767 $$\int \frac{2040x+1008x^2+144x^3+16x^4+\left(7225+2040x+504x^2+48x^3+4x^4\right)\log\left(\frac{1}{4}\left(7225+2040x+504x^2+48x^3+4x^4\right)\right)}{7225+2040x+504x^2+48x^3+4x^4}\,dx$$ 4617

3.768 $$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}\left(-4x-48x^2-32x^3+34x^4-6x^5\right)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-1 \cdots\right.}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}\left(6x-2x^2\right)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right) \cdots}$$

3.769 $$\int \frac{4+x-x\log(x)-x\log^2(x)}{\left(4x+x^2\right)\log(x)+x^2\log^2(x)}\,dx$$ 4632

3.770 $$\int \frac{75+e^x(-28224-39984x)+460992e^{2x}x^2}{576-240x+25x^2+153664e^{2x}x^4+e^x\left(18816x^2-3920x^3\right)}\,dx$$ 4636

3.771 $$\int \frac{-2560000x^2-96000x^3-20100x^4-360x^5-36x^6+e^x\left(-240000+231000x+1800x^2+900x^3\right)}{640000x^2+24000x^3+5025x^4+90x^5+9x^6}\,dx$$ 4640

3.772 $$\int \left(1650+838x+108x^2+4x^3+e^4(6+2x)+e^3\left(30+2e^2+2x\right)+e^2\left(198+84x+6x^2\right)\right)dx$$ 4647

3.773 $$\int \frac{-256+32x+255x^2-32x^3+x^4+e^{-10+x}\left(32x^2-17x^4+x^5\right)+\left(256-32x+x^2\right)\log(x)}{256x^2-32x^3+x^4}\,dx$$ 4652

3.774 $$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4\left(-6x^3-16x^4-42x^5-24x^6\right)+e^{2x}\left(2x^4+8x^5+8x^6+2x^7\right)+e^x\left(-4x^4-8x^5-10x^6- \cdots\right.}{x^3}$$

3.775 $$\int \frac{\left(e^{10}-e^5x\right)\log^2\left(e^{10}-2e^5x+x^2\right)+e^{\frac{4x^3}{e^5\log\left(e^{10}-2e^5x+x^2\right)}}\left(8x^3+\left(12e^5x^2-12x^3\right)\log\left(e^{10}-2e^5x+x^2\right)\right)}{\left(e^{10}-e^5x\right)\log^2\left(e^{10}-2e^5x+x^2\right)}\,dx$$ 4663

3.776 $$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\left(\frac{1}{x}\right)\right)}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}\,dx$$ 4668

3.777 $$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}\left(4x+4x^2\right)+\left(6-4e^{4+x}-x+4x^2\right)\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)\right)}{-6x^2+4e^{4+x}x^2+x^3-4x^4}\,dx$$ 4674

3.778 $$\int -\frac{4e^{2e^{4e^2}}}{x^3}\,dx$$ 4679

3.779 $$\int \frac{2x^3+e^{\frac{1}{2}\left(-e^{\frac{1}{x^2}+e^x x}+e^{\frac{1}{x^2}}(3+x)\right)}\left(e^{\frac{1}{x^2}}\left(-6-2x+x^3\right)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}\left(-x^3-x^4\right)\right)\right)}{2x^3}\,dx$$ 4683

3.780 $$\int \frac{-e^{40+e^4-x^2\log^2(3x)}+e^{40+e^4-x^2\log^2(3x)}\left(-2x^2\log(x)\log(3x)-2x^2\log(x)\log^2(3x)\right)\log(\log(x))}{x\log(x)\log^2(\log(x))}\,dx$$ 4688

3.781 $$\int \frac{-4+e^{3+x}(-4+2x)}{x+e^{3+x}x}\,dx$$ 4693

3.782 $$\int \frac{-1090000-336000x+313600x^2+(236 \cdots}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-570189600x^2+174361600x^3-1966899 \cdots}$$

3.811 $\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}\left(-5-30x^2-243x^3-45x^4-243x^5\right)}{5+30x^2+45x^4}\,dx$ . . . 4869

3.812 $\int \frac{-36963+11655x+219x^2+x^3+\left(36963-23310x-657x^2-4x^3\right)\log(x)}{\log^2(x)}\,dx$ . . . 4874

3.813 $\int \frac{2-2e^xx+e^xx(1+x)}{2x}\,dx$ . . . 4879

3.814 $\int \frac{-40e^{3+2e^x}x\log^2(2)+e^{e^x}\left(125e^3\log(2)-125e^{3+x}x\log(2)\right)}{1250x^2-400e^{e^x}x^3\log(2)+32e^{2e^x}x^4\log^2(2)}\,dx$ . . . 4883

3.815 $\int \frac{-6480-4320x-924x^2-70x^3-x^4+\left(1296+864x+216x^2+24x^3+x^4\right)\log(x)}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+\left(-10368+2664x+4344x^2+1250x^3+144x^4+6x^5\right)\log(x)+\left(1296+864x+216x^2\cdots\right.}$

3.816 $\int \left(-10+x^x(-1-\log(x))\right)\,dx$ . . . 4894

3.817 $\int -\frac{\log(6)}{2}\,dx$ . . . 4898

3.818 $\int \frac{e^{2x}(1-6x)-3x^2-6x^3+e^x\left(6x+8x^2\right)}{e^{2x}-2e^xx+x^2}\,dx$ . . . 4902

3.819 $\int \frac{-274-68x-4x^2}{289+68x+4x^2}\,dx$ . . . 4906

3.820 $\int \frac{e^{\frac{x^3}{e^4\left(4+x^2\right)}}\left(-12x^2-x^4\right)+e^4\left(32+16x^2+2x^4\right)}{e^4\left(16+8x^2+x^4\right)}\,dx$ . . . 4911

3.821 $\int (1+10\log(\log(2)))\,dx$ . . . 4916

3.822 $\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}\left(-8x^2+16e^{2x}x^3\right)+e^{3-e^{2x}}\left(-16x^2+16e^{2x}x^3\right)\log(\log(4))-8x^2\log^2(\cdots\right.}{x^2}$

3.823 $\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x^5\right)\log(5)+\left(-40x^4-25x^5\right)\cdots\right.\right.}{\left(6400-4000x+625x^2\right)\log^2(5)+e^x\left(\left(-800x^3+250x^4\right)\log(5)+\left(-480x^2-650x^3+250x^4\right)\log^2(5)\right)+e^{2x}\left(25x^6+\left(30x^5+50x^6\right)\log(5)+\left(9x^4\cdots\right.\right.}$

3.824 $\int \frac{x+2e^{2x}x+2x^2+12x^3+4x^4+e^x\left(2+2x+2x^2\right)+\left(2+2x+2e^xx\right)\log(x)}{x}\,dx$ . . . 4935

3.825 $\int \frac{20+\left(16x+8x^2+x^3\right)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{\left(16x+8x^2+x^3\right)\log(19)}\,dx$ . . . 4940

3.826 $\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}\left(-x^2-2x^3\right)\right)}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}\,dx$ . . . 4946

3.827 $\int \frac{e^{e^{2x}}\left(-1+2e^{2x}x\right)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(512+(1-x)\log(x)\log^3(\log(x))\right)}{e^{\frac{2\left(256+x\log^2(\log(x))\right)}{\log^2(\log(x))}}\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(-2e^{e^{2x}}\log(x)+2x\log(x)\right)\log^3(\log(x))+\left(e^{2e^{2x}}\log(x)-2e^{e^{2x}}x\log(x)+\cdots\right.}$

3.828 $\int \frac{1}{\left(22x+x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22-\log\left(\sqrt[3]{2}x\right)\right)}\,dx$ . . . 4959

3.829 $\int \frac{e^{-e^x-x}\left(3-3x-x^2+e^x\left(10-3x-x^2\right)\right)}{4-4x+x^2}\,dx$ . . . 4964

3.830 $\int \frac{-40x+60x^5+\frac{\left(-10+15x^4\right)^5\left(-100x-1350x^5\right)}{e}}{-8+12x^4+\frac{\left(-10+15x^4\right)^5\left(-40+60x^4\right)}{e}+\frac{\left(-10+15x^4\right)^{10}\left(-50+75x^4\right)}{e^2}}\,dx$ . . . 4969

3.831 $\int \frac{-18x^2+60x^3+e^{e^x}\left(12x-30x^2+e^x\left(6x^2-30x^3\right)\right)}{1-10x+25x^2}\,dx$ . . . 4976

3.832 $\int \frac{24+e^x(-24-12x)+12x+e^2(24+12x)+e^{-3+2x}(24+12x)+\left(-12x-12e^2x+e^x\left(-12x-12x^2\right)+e^{-3+2x}\left(36x+24x^2\right)\right)\log(x)}{4x+4x^2+x^3}\,dx$ 4981

3.833 $\int \frac{e^{-x}\left(4\log^2(5)+\left(\left(-x-x^2\right)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}\,dx$ . . . 4987

3.834 $\int \frac{-8x^3-8x^4+8x^5+e^{e^2}\left(8x^3-8x^4\right)+\left(-16x^3+16e^{e^2}x^3-16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{\left(-1+e^{e^2}-x\right)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}\,dx$ . . . 4992

3.835 $\int \frac{14-4x}{5+e^{-3+x}-2x}\,dx$ . . . 4998

3.836 $\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx$ 5002

3.866 $\int \left(3+e^{2+e^3}+e^x(-1-x)-2x\right)\,dx$ . . . 5165

3.867 $\int \frac{2x^2+e^{-4+5x}(2-10x+(-9+45x+15x^2)\log(2))}{x^2}\,dx$ . . . 5169

3.868 $\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log\left(3x^2\right)}{-1+x}}(e^3(6-6x)+3e^3x\log(3)+3e^3x\log(3x^2))}{x-2x^2+x^3}\,dx$ . . . 5174

3.869 $\int e^{-16x}(675x^2-3600x^3)\,dx$ . . . 5180

3.870 $\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+x)\log\left(\frac{1}{3}(-3x-x^2)\right)+(225+84x+3x^2)}{(-375-140x-5x}$

3.871 $\int \frac{e^{-x}(-5x+e^x(e^{4/x}(4-x)+e^4x-2x^2))}{5x}\,dx$ . . . 5190

3.872 $\int \frac{-8x-40x^2+(-1-10x)\log^2(x)+(-4-20x+(1+5x)\log^2(x))\log(x+5x^2)}{(2x^2+10x^3)\log^2(x)+(x+5x^2)\log^2(x)\log(x+5x^2)}\,dx$ . . . 5195

3.873 $\int \frac{e^3(10+x^2)+e^{3+x}(-5x^2-5x^3)}{x^2}\,dx$ . . . 5200

3.874 $\int \frac{e^{-x}(-20x^2-2e^{2x}x^2-2x^4+e^x(4x^2-4x^3)+(-50-50x+15x^2+5x^3-x^4+x^5+e^x(10-2x^2)+e^{2x}(-5+5x+x^2-x^3))\log(10-2x^2))}{-5x^2+x^4}\,dx$ 52

3.875 $\int \frac{20-12e^{10-8x}-40x-8x^2+24x^3-12x^4+e^{5-4x}(-76-8x+24x^2)}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}(e^6-6e^3x+9x^2)+e^6(x^2-2x^3+x^4)+e^3(-10x+12x^2-8x^3+12x^4-6x^5)+e^{5-4x}(30x-6}$

3.876 $\int \frac{4e^5x+24e^5\log(3)-x\log\left(\frac{1}{25}(\log^2(4)-2\log(4)\log(5)+\log^2(5))\right)}{x^3}\,dx$ . . . 5216

3.877 $\int \left(-6+e^{5x-x^3}(-20+12x^2)-\log(x)\right)\,dx$ . . . 5221

3.878 $\int \frac{e^{5+e^{x^2}}\left(-3+6e^{x^2}x^2\right)}{x^2}\,dx$ . . . 5225

3.879 $\int \frac{(4+5x+x^2)\log\left(\frac{4+x}{2+2x}\right)+\log(2x)\left(3x+(-4-5x-x^2)\log\left(\frac{4+x}{2+2x}\right)\right)}{(4x^2+5x^3+x^4)\log^2\left(\frac{4+x}{2+2x}\right)}\,dx$ . . . 5229

3.880 $\int \frac{-2+e^{1+e^xx}(-6x+e^x(-6x^2-6x^3))}{27e^{3+3e^xx}x^4+27e^{2+2e^xx}x^3\log(x)+9e^{1+e^xx}x^2\log^2(x)+x\log^3(x)}\,dx$ . . . 5234

3.881 $\int (e^{2x}(7+14x)+x^{-3+6x}(e^{2x}(-2+8x)+6e^{2x}x\log(x)))\,dx$ . . . 5240

3.882 $\int \frac{18+18x-15x^2+2x^3}{18x-13x^2+2x^3}\,dx$ . . . 5244

3.883 $\int \frac{e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}(-256x-768x^2+512\log^2(4))+e^{\frac{2x+3x^2}{2\log^2(4)}}(-384x^2-1152x^3+7\right.}{\log^2(4)}$

3.884 $\int \frac{-20+4e^{4x}x^2+8x^3}{x^2}\,dx$ . . . 5256

3.885 $\int e^{-4+2x-2x^2-\frac{4(4+x)}{x}}(16+2x+2x^2-4x^3)\,dx$ . . . 5260

3.886 $\int 1250e^{\frac{2}{3}\left(1+3e^{x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\right)+x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\,dx$ . . . 5264

3.887 $\int \frac{2}{-8+2x+\log(4)}\,dx$ . . . 5269

3.888 $\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+(-20x^2+20x^2\log(3)-5x^2\log^2(3))\log^2(\log(3e^3))+\log^4(\log(3e^3))}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+(-8x^2+8x^2\log(3)-2x^2\log^2(3))\log^2(\log(3e^3))+\log^4(\log(3e^3))}\,dx$ 52

3.889 $\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(1250e^5+300x^2+4x^3)+e^{e^{-x}x}(-7500x^2-100e^xx^2+7400x^3+100x^4)\right)}{625x^2}\,dx$ 5281

3.890 $\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-2x^3)+8\log\left(\frac{2+e^2x}{x}\right)+(4+2e^2\right.}{16+24x+12x^2+2x^3+e^2(8x+12x^2+6x^3+x^4)+e^{\frac{3\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}(2x^3+e^2x^4)+e^{\frac{2\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}(12x^2+6x^3+e^2(6x^3+3x^4))+}$

3.891 $\int \frac{-5+10x-15x^2+e^{2+x+e^4x^2}(-5-5x-10e^4x^2)}{1+2x-x^2+e^{4+2x+2e^4x^2}x^2+3x^4-2x^5+x^6+e^{2+x+e^4x^2}(2x+2x^2-2x^3+2x^4)}\,dx$ . . . 5293

3.892 $\int \frac{e^2}{3x}\,dx$ . . . 5298

3.893 $\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}(-1+8x^2+8x\log(4))}{2x^2}\,dx$ . . . 5302

3.894 $\int e^{e^{-x}(24+2e^{256})-x}(-24-2e^{256})\,dx$ . . . 5307

3.895 $\int \frac{2x+e^5(-1-12x-3x^2)+e^5\log\left(\frac{2-e}{x}\right)}{e^5}\,dx$ . . . 5312

3.896 $\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}\,dx$ . . . 5317

3.897 $\int \frac{1}{5}e^{\frac{4e^x+20x}{5x}}(120x+60x^2+e^{2x}(-12+8x+4x^2)+e^x(-48+62x+46x^2+5x^3))\,dx$ 5322

3.898 $\int \frac{1}{3}e^{-\frac{x^2}{3}}\left(-3+e^{\frac{72+6x\log(\log(4))}{\log(\log(4))}}(54-6x)+2x^2\right)dx$ . . . 5327

3.899 $\int \frac{-1+16x+8e^3x+e^xx-48x^2}{x}\,dx$ . . . 5332

3.900 $\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-x)-2x)\log(x))\log(x+\log(x))\log^2\Big(}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$

3.901 $\int \frac{e^{\frac{1}{16}(33+16x)}(1+2x+x^2)-2^{1+\frac{4}{1+x}}\log(4)}{1+2x+x^2}\,dx$ . . . 5342

3.902 $\int \frac{-10x\log(5)\log(e^{-x}x)+(-1+x)\log^{\frac{2}{\log(5)}}(e^{-x}x)}{10x\log(5)\log(e^{-x}x)}\,dx$ . . . 5347

3.903 $\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}(60x+12ex+24x^2)+e(40x^2+16x^3)}\,dx$ . . . 5352

3.904 $\int \frac{43+12x-6x^2}{6-12x+6x^2}\,dx$ . . . 5358

3.905 $\int \frac{1}{4}(-1+8x)\,dx$ . . . 5363

3.906 $\int e^{3-e-x}(1+e^{-3+e+x}(1-2x))\,dx$ . . . 5367

3.907 $\int (-160+e(10-4x)+64x)\,dx$ . . . 5371

3.908 $\int \frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}+\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}(-6-\log(2))+(3+\log(2))\log(6)}{(3+\log(2))\log(6)}\,dx$ . . . 5375

3.909 $\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)}\,dx$ 5381

3.910 $\int \frac{6+(-3+20x^3)\log(x^2)+10x^3\log^2(x^2)}{45x^2}\,dx$ . . . 5387

3.911 $\int \frac{-e^{2-2x}x^2+e^{1-x+\frac{1}{4}(4+\log(4))}(-5+5x-2x^2)+e^{\frac{1}{2}(4+\log(4))}(-5-x^2)}{e^{2-2x}x^2+e^{\frac{1}{2}(4+\log(4))}x^2+2e^{1-x+\frac{1}{4}(4+\log(4))}x^2}\,dx$ . . . 5392

3.912 $\int \frac{3x+e^{3+e^4+\frac{2}{x}+2e^{2/x}x}(-4+2x)}{4x}\,dx$ . . . 5398

3.913 $\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx$ . . . 5403

3.914 $\int \frac{2x-x^2+(8-6x)\log\left(\frac{1}{4}(2x^2-x^3)\right)+(-4+2x)\log^2\left(\frac{1}{4}(2x^2-x^3)\right)}{-4x^3+2x^4}\,dx$ . . . 5408

3.915 $\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5(-510x^2-600x^3)+(-100e^{10}x-72x^3-160x^4-100x^5+e^5(180x^2+200x^3))\log\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)+}{450e^{10}+324x^2+765x^3+450x^4+e^5(-765x-900x^2)+(300e^{10}+216x^2+510x^3+300x^4+e^5(-510x-600x^2))\log^2\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)}$

3.916 $\int \left(1+e^{8/3}+e^{\frac{8}{3}+x}\right)dx$ . . . 5420

3.917 $\int \frac{-15+\frac{3e^{1+\frac{e}{5-x}}}{5-x}+33x-6x^2}{-5+x}\,dx$ . . . 5424

3.918 $\int -2e^{\frac{1}{2}(-237-2x^2+2\log(2))}x\,dx$ . . . 5429

3.919 $\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^xx)\right)\right)\right)dx$ 5434

3.920 $\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3+(30+48x-6x^2)\log(2))}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}\,dx$ 5439

3.921 $\int \frac{-7500+e^{4x}+4600x+2600x^2-19900x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}(-300+100x+2x^2+50x^4)}{2500+e^{4x}+5000x+2600x^2+100x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}(100+100x+2x^2+50x^4)}\,dx$ 5446

3.922 $\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(- \cdots}{((-2x+x^2)\log(x) \cdots}$

3.923 $\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx$ 5462

3.924 $\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}(3-6\log(x)+3\log^2(x))\right)}{3-6\log(x)+3\log^2(x)}\,dx$ 5467

3.925 $\int \frac{6+e^3-x-2\log(6+e^3-x)}{6x+e^3x-x^2+(6+e^3-x)\log^2(6+e^3-x)}\,dx$ 5473

3.926 $\int \frac{e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)+e^{\frac{e^4}{45+5e+30x+5x^2}}(405+5e^2+540x+ \cdots\right.}{405x^2+5e^2x^2+540x^3+270x^4+60x^5+5x^6+e(90x^2+60x^3+10x^4)+e^{10}(405+5e^2+540x+270x^2+60x^3+5x^4+e(90+60x+10x^2))+e^5(-8 \cdots}$

3.927 $\int \frac{e^{e^x}(28x+14e^xx^2)}{18+e}\,dx$ 5486

3.928 $\int \frac{13122x^4+e(-160x^2-6561x^3+12800x^4)+2e\log(x)-2e\log^2(x)}{6561ex^3}\,dx$ 5490

3.929 $\int \frac{-290x+e^{x^3}(-100-600x+1850x^2-300x^3+900x^4-150x^5)+e^{2x^3}(-120-340x+2220x^2-720x^3+1140x^4-360x^5+30x^6)}{4+4x^2+x^4}\,dx$ 5495

3.930 $\int \frac{-100-40x-20\log(5)}{625+1000x+600x^2+160x^3+16x^4+(500+600x+240x^2+32x^3)\log(5)+(150+120x+24x^2)\log^2(5)+(20+8x)\log^3(5)+\log^4(5)+(-50-40 \cdots}$

3.931 $\int \frac{e^{\frac{16}{x^4}}(-51200-6400e^5)+2x^5}{200x^5+25e^5x^5}\,dx$ 5507

3.932 $\int \frac{64+128x+64x^2+8x^3+4x^4+e^{5/4}(16+32x+16x^2)}{256+512x+256x^2-32x^3-32x^4+x^6+e^{5/2}(16+32x+16x^2)+e^{5/4}(128+256x+128x^2-8x^3-8x^4)}\,dx$ . . 5512

3.933 $\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}(-1-2x^2-4x^3-2x^5)+e^{x+x^2}(x^2+2x^5+x^8)\right)}{x^2+2x^5+x^8}\,dx$ 5517

3.934 $\int \frac{e^{\frac{1}{16}(80+x^2)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}(-8x+12x^2-5x^3+x^4)\log(-1+x)\log(x)\right) \cdots}{(-5x+5x^2)\log(-1+x)\log^2(x)}$

3.935 $\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}(1-2e^{x^5}x)}{x}}+\frac{e^{-x^5}(1-2e^{x^5}x)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}(1-2e^{x^5}x)}{x}}+\frac{e^{-x^5}(1-2e^{x^5}x)}{x}}(8+40x^5)\right)}{x^2}\,dx$ 5528

3.936 $\int \frac{(-5+10x-x^2-2x^3)\log(x)+(5-x^2)\log\left(\frac{5-x^2}{x}\right)}{-10x+2x^3}\,dx$ 5534

3.937 $\int \frac{e^{6-x}(-12+e^5(-12-6x)-6x)}{x^3}\,dx$ 5539

3.938 $\int \frac{e^4x-e^5x+e^3\log(2e^{-2x})\log(x)+(-2e^2x+e^3x)\log^2(x)+x\log^4(x)}{2e^4x-4e^2x\log^2(x)+2x\log^4(x)}\,dx$ 5544

3.939 $\int \frac{(-20x-20x^2-5x^3)\log(2x)+\log^{\frac{9}{2+x}}(2x)(216+108x-108x\log(2x)\log(\log(2x)))}{(48x+48x^2+12x^3)\log(2x)}\,dx$ 5550

3.940 $\int \left(6-6x^2+e^{x^3}(2+6x^3)-8x\log(\log(5))-2\log^2(\log(5))\right)\,dx$ 5555

3.941 $\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}(6x+2x^2+6x\log(x))+e^{e^x}(-3+3e^xx)\log(x)\log\left(\frac{\log(x)}{2}\right)+\left((6x^2+2x^3)\log(x)+3x^2\log \cdots\right.}{(3e^{2e^x}\log(x)+6e^{e^x}x\log(x)+3x^2\log(x)) \cdots}$

3.942 $\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}(32-48x+34x^2-10x^3+x^4)}{16-8x+x^2}\,dx$ 5566

3.943 $\int \frac{((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+((15x^2-3x^3)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log(5-x))\log(x))\log(\log(2))}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(-5x^2+x^3)\log^2(4)\log^2(5-x)}\,dx$ 5571

3.944 $\int \frac{1}{8}e^{\frac{1}{8}(-96+24e^{5x}-x)}(-1+120e^{5x})\,dx$ 5577

3.945 $\int \frac{4+x+2x^2-2e^{x^2}x^2}{x}\,dx$ 5581

3.946 $\int \frac{1}{10}e^{-136-x}(1-2\log(4)+(1-x)\log(x))\,dx$ 5585

3.947 $\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}(-6x^2-22x^3-24x^4-8x^5+(6x^2+21x^3+28x^4+12x^5)\log(x^2)+(-8-32x-32x^2)\log^2(x^2))}{(4x^3+16x^4+16x^5)\log^2(x^2)}\,dx$ 5589

3.948 $\int \frac{-12+e^x(-3+x)-3x^4\log(100)}{x^4\log(100)}\,dx$ 5595

3.949 $\int \frac{5+4e^8-e^8\log(x)}{5e^8}\,dx$ 5600

3.950 $\int \frac{1}{4}e^{1-e^x+x}x(8+4x-4e^xx)\,dx$ 5604

3.951 $\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)+(8x+20x^2+(-16x+}{2x^2+5x^3}$

3.952 $\int \frac{11x+10x^2+(10+10x)\log(-3x)}{x}\,dx$ 5614

3.953 $\int \frac{e^{-\frac{x^2+(16x+4x^2)\log^2(x)+(64+36x+4x^2)\log^4(x)}{4\log^4(x)}}(e^5(-2x^2+2x^3)\log(x-x^2)+e^5(x^2-x^3)\log(x)\log(x-x^2)+e^5(-16x+12x^2+4x^3)\log^2}{(-2x+2x^2)\log^5(x)}$

3.954 $\int \frac{-10x-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\,dx$ 5624

3.955 $\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5(11x^2+6x^3+x^4)}{9x^2+6x^3+x^4}\,dx$ 5630

3.956 $\int \frac{e^5(-4-x)-40x+19x^2+2x^3+e^5\log(2)}{-e^5x-5x^2+2x^3+e^5\log(2)}\,dx$ 5635

3.957 $\int \frac{14e^5+63x+42x^2+(-63x-84x^2)\log(x)-6e^5x\log^2(x)}{7e^5x\log^2(x)}\,dx$ 5639

3.958 $\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+e^{e^x}(-3x\log^2(x)+(18+6x+e^x(-9x-}{(3x^3+x^4)\log^2(x)}$

3.959 $\int \frac{32x+160\,\mathrm{lo}}{-x^4-9x^3\log(3)-27x^2\log^2(3)-27x\log^3(3)+(-15x^3\log(3)+(-90x^2+3x^3)\log^2(3)+(-135x+18x^2)\log^3(3)+27x\log^4(3))\log(x)+(-7}$

3.960 $\int \frac{35x+8e^2x+7x^2+26x^3+(-5x-e^2x-2x^2-3x^3)\log(x)+e^3x(5-17x+2x\log(x))}{x}\,dx$ 5656

3.961 $\int \frac{-4+4e^3-4e^{e^x}x^4+e^{e^x}(40x^3+10e^xx^4)\log\left(1-e^3+e^{e^x}x^4\right)}{5-5e^3+5e^{e^x}x^4}\,dx$ 5661

3.962 $\int \frac{10x+2x^2+2\sqrt[3]{e}x^2+4e^{2/3}x^2+\left(-10x-x^2+\sqrt[3]{e}(-20x-4x^2)\right)\log(x^2)+(25+10x+x^2)\log^2(x^2)}{4e^{2/3}x^2+\sqrt[3]{e}(-20x-4x^2)\log(x^2)+(25+10x+x^2)\log^2(x^2)}\,dx$ . . 5666

3.963 $\int \frac{-50x+10e^3x+32000x^4-38400x^5+16800x^6-3200x^7+225x^8}{e^3}\,dx$ 5672

3.964 $\int \frac{e^{2x}(-16-24x-12x^2+4x^3)}{128+128x+8x^2-20x^3-2x^4+x^5}\,dx$ 5677

3.965 $\int (36-24e^5+18x+(72+32e^{10}+e^5(-96-80x)+120x+36x^2)\log(4)+(72x+32e^{10}x+72x^2$

3.966 $\int \frac{\left(-4e^xx+e^{x+x^2}(4x+8x^2)\right)\log^3\left(e^x-e^{x+x^2}\right)+\left(4e^x-4e^{x+x^2}\right)\log^4\left(e^x-e^{x+x^2}\right)}{-e^xx^5+e^{x+x^2}x^5}\,dx$ 5691

3.967 $\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3+4x^4)}\,dx$ 5697

3.968 $\int \frac{1}{25}(10x+16x^3+e^{4x}(6x^5+4x^6)+12x^2\log(2)+2x\log^2(2)+e^{2x}(-20x^4-8x^5+(-8x^3-4x^4)\log$

3.969 $\int \frac{e^x(2+6x-x^2)+2e^xx\log(x)}{2e^3x}\,dx$ 5707

3.970 $\int \frac{-4x^2+4900x^5-125x^6+(196-8x+6125x^4-150x^5)\log(5)}{x^2+2x\log(5)+\log^2(5)}\,dx$ 5711

3.971 $\int \left(131+44x+2e^{\frac{1}{3}(1+3x^2)}x+3x^2\right)\,dx$ 5717

3.972 $\int \frac{15-15x+30x^2+e^{2x}(-3-3x-6x^2+6x^3)}{1+x-2x^2-2x^3+x^4+x^5}\,dx$ 5721

3.973 $\int \frac{8+e^{21x}(-16x-152x^2+336x^3)}{1-4x+4x^2}\,dx$ 5726

3.974 $\int \frac{-17-10x+9x^2}{9-17x-5x^2+3x^3}\,dx$ 5731

3.975 $\int e^e(2+e^4)\,dx$ 5735

3.976 $\int \frac{-24+8e^6+e^{2x}+2x-x^2}{24-8e^6+e^{2x}+x^2}\,dx$ 5739

3.1006 $\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x-20x^2)\right)\log\left(\frac{3}{x}\right)+x\log^2\left(\frac{3}{x}\right)+\left(2e^{-2-6x+x^2}x+e^{-4-12x+2x^2}(x-\right.}{x}$

3.1007 $\int \frac{2+4\log(x)}{x\log(x)}\,dx$ . . . 5898

3.1008 $\int \frac{-1-80x^8}{10x}\,dx$ . . . 5903

3.1009 $\int \frac{1}{2}e^{-6-x}(10-e-2x+x^2)\,dx$ . . . 5908

3.1010 $\int \frac{18x+(-2160+876x-90x^2)\log\left(\frac{24-5x}{-5+x}\right)+(1440-588x+60x^2)\log^2\left(\frac{24-5x}{-5+x}\right)+(-240+98x-10x^2+120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}{(120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}\,d$

3.1011 $\int \frac{e^x x-x^2+(e^x(-3+x)+3x-x^2)\log(x)+(x^2-e^x x^2)\log(x)\log(-10e^{3/x}x\log(x))\log(\log(-10e^{3/x}x\log(x)))}{(3e^{2x}x^2-6e^x x^3+3x^4)\log(x)\log(-10e^{3/x}x\log(x))}\,dx$ 5919

3.1012 $\int \frac{16}{x^2}\,dx$ . . . 5925

3.1013 $\int \frac{-5700-3020x-400x^2+(-76-40x)\log(2x)}{361x^2+190x^3+25x^4}\,dx$ . . . 5929

3.1014 $\int \frac{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6+e^x(104-200x-27x^2+76x^3-25x^4)}{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6}\,dx$ . . . 5934

3.1015 $\int \frac{-2x^6+(-8x^3+2e^{-4+x}x^4+4x^6)\log(x)+(8x^3+e^{-4+x}(-4x^4-2x^5))\log^2(x)+(-32+2e^{-8+2x}x^3+e^{-4+x}(8x-8x^2))\log^3(x)}{x^3\log^3(x)}\,dx$ 5939

3.1016 $\int \frac{2e^4+6x\log(9)}{e^4}\,dx$ . . . 5944

3.1017 $\int \frac{e^4+2x^2+20e^{20x}x^2}{x^2}\,dx$ . . . 5948

3.1018 $\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+\right.}{e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x}$

3.1019 $\int \frac{-9+e^{2x^2}(-4+16e)-8x-4x^2+e^{x^2}(13+e(-72-32x)+8x-10x^2)+e(81+72x+16x^2)}{81x^2+16e^{2x^2}x^2+72x^3+16x^4+e^{x^2}(-72x^2-32x^3)}\,dx$ . . . 5958

3.1020 $\int \frac{-5x^2+2x^3+(-4x+2x^2)\log(-2+x)}{-8x^2+4x^3+(-8x+4x^2)\log(-2+x)+(-2+x)\log^2(-2+x)}\,dx$ . . . 5963

3.1021 $\int \frac{-64x+32e^{2x}x+(-64x+e^{2x}(32x+64x^2))\log(x)+(-128x+64e^{2x}x)\log(x)\log((2x-e^{2x}x)\log(x))}{(-2+e^{2x})\log(x)}\,dx$. 5968

3.1022 $\int \frac{-16x^4+8x^4\log(x)+(-8+2x^4+(8-2x^4)\log(x))\log(-4+x^4)}{e(-4+x^4)\log^2(-4+x^4)}\,dx$ . . . 5973

3.1023 $\int \frac{-2x^3+e^{\frac{e^x}{x}}(3x-3x^2+e^x(3-4x+x^2))}{-9x^3+3x^4+e^{\frac{e^x}{x}}(-9x^2+3x^3)}\,dx$ . . . 5978

3.1024 $\int \frac{e^{\frac{4+x+x^2}{x}}(32-4x-7x^2+x^3+(-8+2x^2)\log(2))}{2x^2}\,dx$ . . . 5983

3.1025 $\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\log\left(\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\right)}{(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)}\,dx$ 5988

3.1026 $\int \frac{1}{4}\left(20-e^{x/4}+e^{4x}(4+16x)+e^{3x}(-144-432x)\log(3)+1296\log^2(3)+26244\log^4(3)+e^{2x}(16+\right.$

3.1027 $\int \frac{18x-6x^2+54x^6+e^x(-12x+2x^2-x^3-36x^6)+e^{2x}(2x+6x^6)+(-18+e^x(12-12x)+18x+e^{2x}(-2+2x))\log(x)}{9x-6e^x x+e^{2x}x}\,dx$ 6000

3.1028 $\int \frac{-10+e^{2x}(-40+80x)+40\log(3)}{1+16e^{4x}+e^{2x}(8-32\log(3))-8\log(3)+16\log^2(3)}\,dx$ . . . 6005

3.1029 $\int \frac{25+25x+e^{1-x^6}(4+4x-24x^7)-24e^{1-x^6}x^6\log(x)}{4x}\,dx$ . . . 6011

3.1030 $\int \frac{1144x^3+168x^4-48x^5-39754x^6-29862x^7-5292x^8+504x^9+144x^{10}+(168x-24x^2-2288x^3-18186x^4-7794x^5+216x^7)\log(x)+(-336}{3087x^6+2646x^7+756x^8+72x^9+(1323x^4+756x^5+108x^6)\log(x)+(189x^2+54x^3)\log^2(x)}$

3.1031 $\int \frac{15200-12683x+3758x^2-471x^3+21x^4+(-190+73x-7x^2)\log\left(\frac{-38+7x}{-5+x}\right)}{190-73x+7x^2}\,dx$ . . . 6023

3.1032 $\int \frac{-4x^2+(-5+4x)\log(3)}{-5x^2+5x\log(3)}\,dx$ . . . 6028

3.1033 $\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}(16-4e^x x+4e^{2x}x-32e^x x\log(6x)+64x\log^2(6x))}{e^{2x}x-8e^x x\log(6x)+16x\log^2(6x)}\,dx$ . . . 6033

3.1034 $\int \frac{e^{9e^{\frac{2(-4x-x^2)}{6-3x+3\log(x)}}+\frac{2(-4x-x^2)}{6-3x+3\log(x)}}(-24-18x+6x^2+(-24-12x)\log(x))}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}\,dx$ 6042

3.1035 $\int e^{-2x+e^{-2x}(x^2+2e^xx^3+e^{2x}x^4+(-10x^2-2x^3+e^x(-10x^3-2x^4))\log^2(x)+(25x^2+10x^3+x^4)\log^4(x))}\left(2x-2x^2+4e^{2x}x^3+e\right.$

3.1036 $\int \frac{-12x^2+36x\log^2(2)+(-36-36x)\log^4(2)+(-24x^2+(24x+24x^2)\log^2(2))\log(x)+(-4x^2-4x^3)\log^2(x)}{9x^3\log^4(2)-6x^4\log^2(2)\log(x)+x^5\log^2(x)}\,dx$ 6058

3.1037 $\int \frac{9-24x}{e^3(9x^2-24x^3+16x^4)}\,dx$ 6063

3.1038 $\int \left(1-4x^3+4x^2\log(x)+6x^2\log^2(x)-4x\log^3(x)-2x\log^4(x)\right)\,dx$ 6068

3.1039 $\int \frac{(-20+12x+(4-2x)\log(e^{8+x}))\log\left(\frac{1}{5}e^{-x}(-10x^2+2x^2\log(e^{8+x}))\right)}{-5x+x\log(e^{8+x})}\,dx$ 6073

3.1040 $\int \frac{}{46875+37500x-84375x^2+48750x^3-13875x^4+2160x^5-177x^6+6x^7+(5625x+6750x^2-7650x^3+2520x^4-351x^5+18x^6)\log(2+4x)+(2}$

3.1041 $\int \frac{16-3x-16x^3+3x^4+(-48+6x+3x^4)\log(x)}{5x^4}\,dx$ 6086

3.1042 $\int \frac{\frac{6}{e^3}+\left(6+\frac{12x}{e^3}\right)\log(x)+\frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx$ 6091

3.1043 $\int \frac{-90-5x+4x^3+(-180+13x+x^2)\log\left(\frac{5}{x}\right)}{4x^3+(18x+x^2)\log\left(\frac{5}{x}\right)}\,dx$ 6096

3.1044 $\int \left(2-4x+4e^2x+6x^2\right)\,dx$ 6101

3.1045 $\int \frac{-50e^{25-50x}x^2-2\log(x)+\log^2(x)}{x^2}\,dx$ 6105

3.1046 $\int \frac{1}{2}(-2-x\log(2))\,dx$ 6109

3.1047 $\int \frac{1}{5}e^{\frac{1}{5}(-6x+6x^2+5x^3)}\left(-6+12x+15x^2\right)\,dx$ 6113

3.1048 $\int \left((45-15x^2)\log(2)-15x^2\log(2)\log\left(x^3\right)\right)\,dx$ 6117

3.1049 $\int \frac{4+32x+15x^2-150x^3-125x^4}{1+6x+27x^2+68x^3+135x^4+150x^5+125x^6}\,dx$ 6121

3.1050 $\int \frac{-6-7x+27x^2-9x^3+x^4-2x\log(x^2)}{-81x+72x^2-9x^3-5x^4+x^5+(-3x+x^2)\log(x^2)}\,dx$ 6126

3.1051 $\int \frac{1+\log(x)+(x-x^2-x^3-4x^4-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\log(\log(\log(-x}{(x^2-x^3-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\log(\log(\log(-x\log(x))))}$

3.1052 $\int \frac{e^{-x}(e^x(4-36x^2)+e^{4+2x}(x^2+x^3))}{4x^2}\,dx$ 6136

3.1053 $\int \frac{1}{2}(-4+4x+(-1+x)\log(9))\,dx$ 6141

3.1054 $\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}\,dx$ 6145

3.1055 $\int \left(-4+\log(5)+e^{\sqrt{e}(-2+2x)}\left(8\sqrt{e}-2\sqrt{e}\log(5)\right)\right)\,dx$ 6150

3.1056 $\int \frac{677x^2+x^3+e^{-1+x}(676-675x-x^2)}{676x^2+x^3}\,dx$ 6154

3.1057 $\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x(-48\log(2)+16\log^2(2)))+e^x\log^2(2)\log(5)\right)}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x(-6\log(2)+2\log^2(2))}\,d$

3.1058 $\int \frac{9x^2+26e^xx^2-6x^3-6x^4+e^{2x}(-13+26x)}{x^2}\,dx$ 6164

3.1059 $\int \frac{-3125+20625x-49125x^2+49775x^3-19650x^4+3300x^5-200x^6+e^{10}(-5+33x-10x^2)}{125x^2-825x^3+1965x^4-1991x^5+786x^6-132x^7+8x^8}\,dx$ 6169

3.1060 $\int e^{\frac{1}{2}e^2(8x-x^2)}\left(3+e^2(12x-3x^2)\right)\,dx$ 6175

3.1061 $\int \frac{e^{\frac{-2e^{1+x}-4x+e(8+16x)}{x}}(-8e+e^{1+x}(2-2x))-x^2}{x^2}\,dx$ 6180

3.1062 $\int \frac{-6-369x+149x^2-15x^3+(12+369x-15x^3)\log(x)\log(\log(x))}{x^3\log(x)}\,dx$ 6184

3.1063 $\int \frac{1}{24}(25+24e^x)\,dx$ 6189

3.1117 $\int \frac{12x-24x^2+8x^3+3x^4+e^6(7-12x+3x^2+2x^3)+(26x-22x^2-6x^3+e^6(14-10x-4x^2))\log(3)+(14x+3x^2+e^6(7+2x))\log^2(}{-2+4x+4x^2-12x^3+5x^4+x^5+e^6(7x-13x^2+5x^3+x^4)+(-4+4x+13x^2-12x^3-2x^4+e^6(14x-12x^2-2x^3))\log(3)+(-2+7x^2+x^3+e^6(7}$

3.1118 $\int \frac{10x^2+2e^3x^3+2e^3\log(x)-e^3\log^2(x)}{2e^3x^2\log(2)}\,dx$ 6483

3.1119 $\int \frac{3x^2}{2\log(28)}\,dx$ 6488

3.1120 $\int \frac{e^{11+x}(1+2\log(3))}{\log(3)}\,dx$ 6492

3.1121 $\int \frac{3+e^{5+x}(-18+6e+6x)}{32+2e^2-16x+2x^2+e(-16+4x)+e^{5+x}(128+8e^2-64x+8x^2+e(-64+16x))+e^{10+2x}(128+8e^2-64x+8x^2+e(-64+16x))}\,dx$ 6497

3.1122 $\int \frac{(10-4x)(i\pi+\log(2))^2+e^{e^{3+x}+e^3x}\left(-2e^{3+x}x(i\pi+\log(2))^2+(-2-2e^3x)(i\pi+\log(2))^2\right)}{-125x^3+e^{3e^{3+x}+3e^3x}x^3+75x^4-15x^5+x^6+e^{2e^{3+x}+2e^3x}(-15x^3+3x^4)+e^{e^{3+x}+e^3x}(75x^3-30x^4+3x^5)}\,dx$ 6502

3.1123 $\int \frac{7x^2+(12+4x)\log^3(5x)\log(3+x)+\log^4(5x)(-x+(-3-x)\log(3+x))}{147x^2+49x^3+(-42x-14x^2)\log^4(5x)+(3+x)\log^8(5x)}\,dx$ 6508

3.1124 $\int \frac{e^x(18-18x+27x^2-3x^3+e^5(-75x+15x^2))}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}(-18750x^6-3125x^8)+e^{15}(45000x^5+15000x^7+1250x^9)+e^{10}(-54000}$

3.1125 $\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96x^5+128x^6)+(-256-256x+e^{2x}(128x^2+1152x^3+1024x^4)+e^{4x}(12}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log^2(x)+e^{4x}x^5\log^3(x)}$

3.1126 $\int \frac{2e^x+e^xx\log(x^2)\log(\log(x^2))}{2x\log(x^2)}\,dx$ 6526

3.1127 $\int \frac{135x-7x^2-4x^3+e^3(10x-2x^2)+(-135x+44x^2+4x^3+e^3(-150+50x+4x^2))\log(27x+2x^2+e^3(}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-34x^3-4x^4+e^3(300x-40x^2-4x^3))\log(27x+2x^2+e^3(30+2x))+(27x}$

3.1128 $\int \frac{3+(-25+24x+4x^2)\log(3)}{-9-3x+(12-17x+5x^2+4x^3)\log(3)}\,dx$ 6536

3.1129 $\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}\left(1-x-2e^{1+2x}x+8\log(x)\right)\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}\,dx$ 6541

3.1130 $\int \frac{1+\log(x)}{-2+x\log(x)}\,dx$ 6547

3.1131 $\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+(2-2x^2+4x^2\log(x)+8x\log^2(x))\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}\,dx$ 6551

3.1132 $\int \frac{-20x+12e^{x/5}x+(-60e^{x/5}+20x)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\right)\log\left(\log\left(\log\left(\frac{1}{4}\left(-3\right.\right.\right.\right.}{(60e^{x/5}-20x)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)}$

3.1133 $\int \frac{e^{5+2x}(3-2x)+2x^4-e^5x^4-e^xx^4}{x^4}\,dx$ 6564

3.1134 $\int \frac{-5x-4x^2+x^3+e^{7+x}(4+3x-x^2)+(-8-10x+3x^2+e^{7+x}(4x+3x^2-x^3))\log(x)+(-4-3x+x^2)\log(1+x)}{-4x-3x^2+x^3}\,dx$ 6569

3.1135 $\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}(2+x^2-2x^3)\right)}{160+240x^2+120x^4+20x^6}\,dx$ 6574

3.1136 $\int \frac{e^3(-1-x)\left(e^{-1+x}(-3e^{1-x}+x)\right)^{e^3}}{3e^{1-x}-x}\,dx$ 6580

3.1137 $\int \frac{-6\log(x)-3\log^2(x)}{-7+e^2}\,dx$ 6585

3.1138 $\int \frac{18x^3+e^{\frac{20+9x^2}{9x^2}}(-40+9x^2)}{9x^2}\,dx$ 6589

3.1139 $\int \frac{e^{-x}(e^x(-5-8x)-6x+2x^2+(-6x-8e^xx+10x^2-2x^3)\log(x))}{2x}\,dx$ 6594

3.1140 $\int \frac{33-4x+12x^3+3\log\left(\frac{x^2}{2}\right)}{27x-2x^2+3x^4+3x\log\left(\frac{x^2}{2}\right)}\,dx$ 6599

3.1141 $\int \frac{6+x^2+(6+x^2)\log(24+4x^2)+\frac{e^{e^2+x}\left(-6+2x-x^2+(-6-x^2)\log(24+4x^2)\right)}{1+\log(24+4x^2)}}{6+x^2+(6+x^2)\log(24+4x^2)}\,dx$ 6604

3.1142 $\int \frac{-150000e^{10}x^2+390625x^3}{4096e^{30}-96000e^{20}x+750000e^{10}x^2-1953125x^3}\,dx$ 6609

3.1143 $\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+(4x-4x^2)\log(\right.$

3.1144 $\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2\left(\frac{4}{\log^2(x)}\right)}\right)}{x\log(x)+\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)}\,dx$ 6621

3.1145 $\int \frac{x^2+e^{\frac{-25-9x-e^2x-e^xx+3x^2+x\log(x)}{x}}\left(25+x+3x^2-e^xx^2\right)}{x^2}\,dx$ 6627

3.1146 $\int \frac{1}{5}\left(e^2(-18-4x)+6e^2\log(3)\right)\,dx$ 6631

3.1147 $\int \frac{-225-300\log(2)+(-60x+75\log(2))\log(49x^4)+(-4x^2+20x\log(2))\log^2(49x^4)}{225x^2+60x^3\log(49x^4)+4x^4\log^2(49x^4)}\,dx$ 6635

3.1148 $\int \frac{e^{-\frac{-5x+e^5x+(-5+e^5)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(e^{\frac{-5x+e^5x+(-5+e^5)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(x^2\log(x)+2x\log^2(x)+\log^3(x)\right)+e^{-\frac{-5x+e^5x+(-5\ldots}{\ldots}}\ldots\right.}{x^2\log\ldots}$

3.1149 $\int \frac{-2x^3+e^{2x}(32-50x+16x^2)+e^x(-32x+52x^2-16x^3)+\left(e^{2x}(-8+12x-4x^2)+e^x(8x-12x^2+4x^3)\right)\log(96-48x)}{-2x^3+x^4}\,dx$ 6648

3.1150 $\int \frac{32-512x-240x^2+128x^3+64x^4+e^{4x}(2-40x+53x^2+12x^3-44x^4-16x^5)}{32x-272x^2-16x^3+192x^4+64x^5+e^{4x}(2x-17x^2-x^3+12x^4+4x^5)}\,dx$ 6654

3.1151 $\int \frac{64x^3+e^2(3+192x^3-40x^4+6x^5)}{4e^2}\,dx$ 6659

3.1152 $\int \frac{-3x+\left(48-144x+108x^2-24x^3+4e^5(-48+48x-12x^2)\right)\log(x)+(-48x+48x^2-12x^3)\log^2(x)}{4x-4x^2+x^3}\,dx$ . . . 6664

3.1153 $\int \left(4-2x+3x^2+e(-2+4x)\right)\,dx$ 6669

3.1154 $\int \frac{e^{x/5}\left(e^4(-5+x)-10x+5x^2+x^3\right)-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}\,dx$ 6673

3.1155 $\int \frac{8-6x-x\log(4)}{-4x+6x^2+80x^3+x^2\log(4)}\,dx$ 6678

3.1156 $\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^xx^3\right)\right)}{144x^3}\,dx$ 6683

3.1157 $\int \frac{(-20-20x^2-5x^4)\log(3)+e^{-4e^{x}+4x+4x^2}\left(e^x(-32x-16x^3)\log(3)+(8+32x+60x^2+16x^3+32x^4)\log(3)\right)}{16+16x^2+4x^4}\,dx$ 6689

3.1158 $\int \frac{e^{x/4}(-128+16x)+e^{x/4}(-8+x)\log\left(\frac{\log(2)}{4}\right)}{4x^3}\,dx$ 6695

3.1159 $\int \frac{-4-12x-12x^2-20x^3+(4x+8x^2+12x^3)\log\left(\frac{4}{x+x^2}\right)}{x}\,dx$ 6700

3.1160 $\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4\ldots}{\ldots}\right.\right.}{\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4)}{x}\right)\right)\log^2\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)}$

3.1161 $\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7)\log(x)+(2-296x+82x^2-258x^3+64x^4-48x\ldots}{(16-8x+x^2\ldots}$

3.1162 $\int \frac{4e^{10}-4e^x\log(5)}{\log(5)}\,dx$ 6718

3.1163 $\int \frac{-500x^3+500x^3\log(x)+(500x-500x^2)\log^2(x)+(-500x+750x^2)\log^3(x)+128000e^{2e^{256x^2}+256x^2}x\log^5(x)+(-250+250x)\log^5(x)+e^{e\ldots}}{\log^5(x)}$

3.1164 $\int \left(8x-4x^3-\log(x)\right)\,dx$ 6730

3.1165 $\int \frac{e^6(-42-64x-36x^2-8x^3)}{-125-75x+60x^2+29x^3-12x^4-3x^5+x^6+e^6(-45-69x-23x^2+8x^3+4x^4)}\,dx$ 6734

3.1166 $\int \frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+\left(-25x+25x^2+25x^3\log(3)+(-5+10x+10x^2\log(3))\log(625)+(1+x\log(3)\ldots\right.}{-50x+50x^2+50x^3\log(3)+(-10+20x+20x^2\log(3))\log(625)+(2+2x\log(3))\log^2(\ldots}$

3.1167 $\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(4x^2+6x^3+(2x^2+3x^3)\log(x)\right)\log^2(2x+x\log(x))\right)}{(2x+x\log(x))\log^2(2x+x\log(x))}\,dx$ 6747

3.1168 $\int \left(-25-2e^2\right) dx$ 6753

3.1169 $\int \frac{2x^2+e^{3968-1512x+144x^2}x\left(1-1512x+288x^2\right)}{x} dx$ 6757

3.1170 $\int \frac{32+e^4x^2}{e^4x^2} dx$ 6762

3.1171 $\int \frac{9e^{10}x^3\log(4)+\left(-27-36x-18x^2\right)\log(5)+\left(18e^{10}x^2\log(4)-9x\log(5)\right)\log(x)+9e^{10}x\log(4)\log^2(x)}{9x^3+6x^4+x^5+\left(18x^2+12x^3+2x^4\right)\log(x)+\left(9x+6x^2+x^3\right)\log^2(x)} dx$. 6766

3.1172 $\int \frac{-4x^2-4e^{x^2}x^3+\left(8x^2+e^{x^2}\left(2x+4x^3\right)+2x\log(8)\right)\log\left(e^{x^2}+2x+\log(8)\right)+\left(-4e^{x^2}x-8x^2-4x\log(8)\right)\log^2\left(e^{x^2}+2x+\log(8)\right)+\left(2e^{x^2}x+\right.}{\left(e^{x^2}+2x+\log(8)\right)\log^3\left(e^{x^2}+2x+\log(8)\right)}$

3.1173 $\int \frac{34x^2+20x^3+14x^4+10x^5+e^x\left(-12+12x+11x^2+4x^3+5x^4\right)+\left(12+4x^2\right)\log\left(\frac{1}{4}\left(3+x^2\right)\right)}{3x^2+x^4} dx$ 6778

3.1174 $\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}\left(-2x+20x^3-112x^5+128x^7\right)}{-1+12x^2-48x^4+64x^6} dx$ 6783

3.1175 $\int \frac{1-103x^2+50x^3-\log(x)}{x^2} dx$ 6789

3.1176 $\int \frac{-25x+e^{4x^2}\left(-50x^3-200x^5\right)-25x\log\left(e^{e^{4x^2}x^2}x\right)+(2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)} dx$ 6793

3.1177 $\int \left(-2+e^{x^4}\left(6x^2+8x^6+\left(-4x-8x^5\right)\log(4)\right)\right) dx$ 6799

3.1178 $\int \frac{e^{e^x+x}x+\frac{e^{2+2\log^2(5x)}\left(-4e^{6+2e^4}+4e^{6+2e^4}\log(5x)\right)}{625x^4}}{x} dx$ 6803

3.1179 $\int \frac{e^{-x^2}\left(8x-x^2+8x^3-2x^4+e^5\left(4+8x^2-2x^3\right)+e^{x^2}\left(-2e^{10}+6x^2+e^5\left(-4x+2x^2\right)+e^x\left(-8x+5x^2-x^3+e^5\left(-4+4x-x^2\right)\right)\right)\right)}{e^{10}x^2+2e^5x^3+x^4} dx$ 6808

3.1180 $\int \frac{6x-32x\log^2(2)}{-15+3x^2+\left(80-16x^2\right)\log^2(2)+3\log(9)} dx$ 6814

3.1181 $\int \frac{1+x+e^{x+x^2}\left(-4x-8x^2\right)+e^{4+x}\left(2x+2x^2\right)+e^{2x+2x^2}\left(2x+4x^2\right)}{x} dx$ 6819

3.1182 $\int \frac{e^x(1-x)+\left(-4e^{2x}+e^xx\right)\log\left(e^{-x}\left(-4e^x+x\right)\right)\log\left(\log\left(e^{-x}\left(-4e^x+x\right)\right)\right)+\left(8e^{2x}-2e^xx\right)\log\left(e^{-x}\left(-4e^x+x\right)\right)\log(\log(\log(16)))}{\left(8e^x-2x\right)\log\left(e^{-x}\left(-4e^x+x\right)\right)} dx$ 6824

3.1183 $\int \frac{48-120x+4x^2+\left(15-100x-5x^2\right)\log\left(\frac{9-120x+394x^2+40x^3+x^4}{x^4}\right)}{-15x^2+100x^3+5x^4} dx$ 6829

3.1184 $\int \frac{-18+24x+31x^2+6x^3+(45+10x)\log(9+2x)}{9+2x} dx$ 6834

3.1185 $\int \frac{e^x(1-x)+e^2\left(-20x+11x^2\right)+4e^2x^2\log(x)}{e^2x^2} dx$ 6839

3.1186 $\int \frac{4x+e^{-x}\log(5)(-12-8x+(-4-4x)\log(x))}{4x^2+4x^2\log(x)+x^2\log^2(x)} dx$ 6844

3.1187 $\int \frac{-x^2+x^5+\left(x^2+x^3\right)\log(x)+\left(3x^3+3x^4+3x^2\log(x)\right)\log\left(\frac{e^{-x}\left(x+x^2+\log(x)\right)}{x}\right)}{\left(x+x^2+\log(x)\right)\log^2\left(\frac{e^{-x}\left(x+x^2+\log(x)\right)}{x}\right)} dx$ 6849

3.1188 $\int \frac{\left(-2x^2+e^2(12+8x)+\left(-10x^2+e^2(60+40x)\right)\log(5)\right)\log(\log(25))}{\left(4e^4-4e^2x+x^2\right)\log(5)} dx$ 6854

3.1189 $\int \frac{-1+4x+4x^2}{-2x^2+4x^3+e\left(-x+2x^2\right)+\left(-x+2x^2\right)\log(x)+\left(-2x+4x^2\right)\log(-1+2x)} dx$ 6860

3.1190 $\int \frac{-40x-22x^2+2x^3+\left(8x+6x^2\right)\log\left(x^3\right)+\left(200+134x-4x^2+\left(-80-52x+2x^2\right)\log\left(x^3\right)+(8+6x)\log^2\left(x^3\right)\right)\log\left(32x+16x^2+2x^3\right)+(-120-}{4x+x^2}$

3.1191 $\int \log\left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log(3))))\right) dx$ 6871

3.1192 $\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2} dx$ 6875

3.1193 $\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)+\left(2x+e^{1+e^{32}-2x+x^2}\right.\right.$

3.1194 $\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}\left(10x^2-2e^4x^2\right)} dx$ 6886

3.1195 $\int \frac{-2-x+2\log(-5x+x(i\pi+\log(3)))}{\left(4+4x+x^2\right)\log^2(-5x+x(i\pi+\log(3)))} dx$ 6891

3.1196 $\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx$ 6896

3.1197 $\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^xx^2)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}(-80x-80e^xx^2+(4x+4e\cdots\right.\right.}{x^{41}}$

3.1198 $\int \frac{-960x^2+1440x^2\log(x)}{\log^3(x)}\,dx$ 6908

3.1199 $\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750-120x-70x^2+3x\cdots}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750+30x+e^3(-150+6\cdots}$

3.1200 $\int \frac{x+2e^{e^{2x}+2x}x+\left(5-e^{e^{2x}}-x\right)\log\left(5-e^{e^{2x}}-x\right)}{\left(-5+e^{e^{2x}}+x\right)\log^2\left(5-e^{e^{2x}}-x\right)}\,dx$ 6920

3.1201 $\int e^x(6+6x)\,dx$ 6925

3.1202 $\int \frac{1}{5}(5+4x^3)\,dx$ 6929

3.1203 $\int \frac{e^{\frac{1}{9}\left(225e\log^2(x^2)-150e\log(x^2)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log(x^2)+(50ex+e(1200-300\cdots\right.}{(-36x+9x^2)\log\left(\frac{4-x}{4}\right)}$

3.1204 $\int \frac{-62181x^2-64827x^3+e^x(-882+1764x)}{4e^{3x}+e^{2x}(24x-588x^2)+e^x(36x^2-1764x^3+21609x^4)}\,dx$ 6939

3.1205 $\int \frac{e^{-2x}\left(180e^5\log(\log(x))+e^5(-180-180x)\log(x)\log^2(\log(x))\right)}{x^3\log(x)}\,dx$ 6944

3.1206 $\int \frac{-3969-1024e^{1024x/3969}}{3969}\,dx$ 6949

3.1207 $\int \frac{e^x(5-5x)+4x^2+4x^3-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)}{4x^2}\,dx$ 6953

3.1208 $\int \frac{-2e^2x+e^2\log(4)+e^{\frac{32x}{e^2}}(-2e^2x-32x^2)\log(4)}{e^2\log(4)}\,dx$ 6958

3.1209 $\int \frac{-x+(-x+x^2)\log(x)+(-2x^2\log(x)+2x\log(x)\log(x\log(x)))\log(8x-8\log(x\log(x)))}{(-x\log(x)+\log(x)\log(x\log(x)))\log^2(8x-8\log(x\log(x)))}\,dx$ 6963

3.1210 $\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log(x^2)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log(x^2)\right)}{4x}\,dx$ 6968

3.1211 $\int \frac{-4+3x+6x^2-3x^3+(-2+x)\log(2x-x^2)}{4-4x+x^2+2x^3-x^4+(-2x+x^2)\log(2x-x^2)}\,dx$ 6973

3.1212 $\int \frac{e^8+e^{2x}+150x^2-2e^4x^2+x^4+e^x(2e^4-75x-2x^2)}{e^8x+e^{2x}x-2e^4x^3+x^5+e^x(2e^4x-2x^3)}\,dx$ 6978

3.1213 $\int \frac{12+1246x-622x^3+(-8-623x)\log(x)}{x^3}\,dx$ 6983

3.1214 $\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-600x^2+50x^3)\log(\log(x))}{(-64x+48x^2-12x^3+x^4)\log(x)}\,dx$ 6987

3.1215 $\int \frac{-6e^{-3+e}+e^{-6+2e}(4-4x+x^2)}{4+8x+4x^2+e^{-3+e}(-8x-4x^2+4x^3)+e^{-6+2e}(4x^2-4x^3+x^4)}\,dx$ 6993

3.1216 $\int \frac{8+10x+e^{9+x}(4+5x)(-9x-5x^2)}{4x+5x^2}\,dx$ 6999

3.1217 $\int \frac{-24+2x^2+10x^4}{-4x+5x^3}\,dx$ 7003

3.1218 $\int \frac{-4x+8x\log(x)+20e^{13-x}\log^2(x)}{5e^3\log^2(x)}\,dx$ 7008

3.1219 $\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log(x-\log^2(x))+\left(-4e^{4+x}x^3(i\pi+\log(3))^2+8e^{4+x}x^2(i\pi\cdots\right.}{\cdots}$

3.1220 $\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5\left(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3)\right)+e^{\frac{x}{e^5}}\left(e(8x+4x^2)+e^5\left(-24x-24x^2-6x^3+e(-8+12x+6x^2)\right)\right)}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}\left(-24x-24x^2-6x^3+e(12x+6x^2)\right)+e^5\left(12x^2+3e^2x^2+12x^3+3x^4+e(-12x^2-6x^3)\right)}\,d\cdots$

3.1221 $\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+(54-54x-108x^2)\log(3)+(1620+324x+324x^2)\log(x)-162\log^2(x)\right)}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+(-10x^7-2x^8-2x^9)\log(x)+x^7\log^2(x)}\,dx$ 5

3.1222 $\int \frac{-2x+2e^{2/x}x+20x^3+12x^4+2x^5+e^{\frac{1}{x}}(-2-2x+12x^2+4x^3)+\left(2x-4e^{\frac{1}{x}}x-12x^2-4x^3\right)\log(x)+2x\log^2(x)}{e^{2/x}x+9x^3+6x^4+x^5+e^{\frac{1}{x}}(6x^2+2x^3)+\left(-2e^{\frac{1}{x}}x-6x^2-2x^3\right)\log(x)+x\log^2(x)}\,dx$ 7033

3.1223 $\int \frac{-2-4x-5x^2-10x^3-\log(2)+(2+\log(2))\log(x)}{5x^2}\,dx$ 7038

3.1224 $\int \frac{1-\log(10x\log(3))}{25x^2}\,dx$ 7043

3.1225 $\int \frac{71+e^{18+12x+2x^2}+e^{9+6x+x^2}(17-6x-2x^2)+\left(17+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}{64+16e^{9+6x+x^2}+e^{18+12x+2x^2}+\left(16+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}\,dx$ 7047

3.1226 $\int \frac{1+\left(-1-162x^2+216e^ex^2-108e^{2e}x^2+24e^{3e}x^2-2e^{4e}x^2\right)\log\left(\frac{1}{x}\right)}{x\log\left(\frac{1}{x}\right)}\,dx$ 7052

3.1227 $\int (-8x+16x^2)\log(3)\,dx$ 7057

3.1228 $\int \frac{1}{3}(1+80x)\,dx$ 7061

3.1229 $\int \frac{(x-2x\log(4)+x\log^2(4))\log\left(\frac{x}{2}\right)+\left(2x^2-4x^2\log(4)+2x^2\log^2(4)\right)\log\left(\frac{x}{2}\right)\log(x)+\left(2x^2-4x^2\log(4)+2x^2\log^2(4)\right)\log\left(\frac{x}{2}\right)\log^2(x)+100\text{ lo}}{(x-2x\log(4)+x\log^2(4))\log\left(\frac{x}{2}\right)}$

3.1230 $\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}\,dx$ 7072

3.1231 $\int \frac{8e^5x^{14}+e^{4x}\left(16x^7-8x^8+e^5\left(-14x^6+8x^7\right)\right)}{e^{8x}+8e^{4x}x^8+16x^{16}}\,dx$ 7078

3.1232 $\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x}-x^6}\left(-e^{x^6}+e^{e^x}\left(e^xx-6x^6+\left(-e^x+6x^5\right)\log(\log(3))\right)\right)}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}\,dx$ 7083

3.1233 $\int \frac{38x+2x^2+36\log(x)}{x^3+x^2\log(x)}\,dx$ 7089

3.1234 $\int \frac{-4x+x^6(3+x)+x^3(3+2x)\log(2)+x\log^2(2)}{-4x+x^7+2x^4\log(2)+x\log^2(2)}\,dx$ 7094

3.1235 $\int \frac{-2-2x+e^x\left(-6+x^2\right)}{1+2e^x+e^{2x}}\,dx$ 7100

3.1236 $\int \frac{20-20e^2+20ex-5x^2}{4e^2-4ex+x^2}\,dx$ 7104

3.1237 $\int \left(-300e^4x-100x^3+\left(150e^4+150x^2\right)\log(4)-50x\log^2(4)\right)\,dx$ 7109

3.1238 $\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}\left(6x+7x^2-2x^4\right)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx$ 7114

3.1239 $\int \frac{81x^2-66x^3+18x^4-2x^5+63x^6-30x^7+5x^8+e^x\left(-9x^2+7x^3-x^4-7x^6+x^7\right)}{162+2e^{2x}-180x+86x^2-20x^3+2x^4+e^x\left(-36+20x-4x^2\right)}\,dx$ 7119

3.1240 $\int \frac{2+2e^{2x}+e^x(1+4x)+e^{3x^2}\left(6e^xx+12x^2\right)}{e^x+2x}\,dx$ 7124

3.1241 $\int \frac{e^{e^x+x^2}\left(4+2x-8x^2-2x^3+e^x\left(-4x-x^2\right)\right)+e^{x^2}\left(-x^2+8x^3+2x^4+e^x\left(32-16x-78x^2-34x^3-4x^4\right)\right)}{16x^2+8x^3+x^4}\,dx$ . . 7128

3.1242 $\int \frac{300+690x+204x^2+18x^3+e^x\left(-500-2150x-1215x^2-240x^3-15x^4\right)+\left(-300-120x-12x^2+e^x\left(500+700x+220x^2+20x^3\right)\right)\log(x)}{100+40x+4x^2}\,dx$ 71

3.1243 $\int \frac{-24576+1152x^2+96x^3+e^{2x}\left(8192x+2560x^2-2560x^3+96x^4+64x^5\right)}{64+16x+x^2}\,dx$ 7140

3.1244 $\int \frac{-64-4x+x^2+32\log(2)-4\log^2(2)+4\log(2e^x)}{x^2}\,dx$ 7145

3.1245 $\int \frac{e^{-2x+\frac{e^{-2x}\left(9-10000e^{2x}x^2\right)}{10000x^2}}(-9-9x)}{5000x^3}\,dx$ 7150

3.1246 $\int \frac{-1+2x^2+4x^3}{x^2}\,dx$ 7155

3.1247 $\int \frac{e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\left(27+6831x+1215x^2-19x^3+2x^4\right)\right)}{-243+405x-270x^2+90x^3-15x^4+x^5+e^{\frac{2\left(2304+768x+64x^2\right)}{9-6x+x^2}}\left(-27x^2+27x^3-9x^4+x^5\right)+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\left(162x-216x^2+108x^3-24x^4+\right.}$

3.1248 $\int \frac{1}{-2e-2x+(e+x)\log(5e+5x)}\,dx$ 7166

3.1249 $\int \frac{618-164770x-24360x^2-33206x^3-4820x^4-240x^5-4x^6+e^{15}\left(20x+4x^3\right)+e^{10}\left(-1212x-60x^2-240x^3-12x^4\right)+e^5\left(-30+24480x+2418\right.}{-8000+e^{15}+e^{10}(-60-3x)-1200x-60x^2-x^3+e^5\left(1200+120x+3x^2\right)}$

3.1250 $\int \frac{e^{2x^2+4e^{4x}x^2}\left(e^5\left(-18+36x^2\right)+e^{5+4x}\left(72x^2+144x^3\right)\right)}{x^3}\,dx$ 7177

3.1251 $\int e^{-x}\left(e^x+e^4\left(2-8x+3x^2\right)\right)\,dx$ 7182

3.1252 $\int \frac{1953125x^3-1953125x^4+781250x^5-156250x^6+15625x^7-625x^8+e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}(10-6x)\log^4(3)}{-1953125x^3+1953125x^4-781250x^5+156250x^6-15625x^7+625x^8}\,dx$ 718

3.1311 $\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-\cdots}}\cdots}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}(e^{10}-4e^5x+4x^2)+e^{-\frac{15x}{e^5-2x}}(4e^{10}x-16e^5x^2+16x^3)+e^{10}(36-12x^2+x^4)+e^5(-144x+48x^3-4x^5)+e^{-\frac{10}{e^5-\cdots}}\cdots}$

3.1312 $\int \frac{1}{8}\left(8+e^{-2-e^x+x}(-8+8e^x)+x\right)\,dx$ 7502

3.1313 $\int \frac{87+3x-87x^2-3x^3+(-87-6x-87x^2)\log(x)}{(1-2x^2+x^4)\log^2(x)}\,dx$ 7506

3.1314 $\int (-e^{21}+e^{4+x}(-15-15x)+60x-e^{21}\log(x))\,dx$ 7511

3.1315 $\int \frac{4x+2e^{40}x^2+2x^4+e^{20}(-2-4x^3)}{e^{40}x^2-2e^{20}x^3+x^4}\,dx$ 7515

3.1316 $\int \frac{1}{125}e^{\frac{7500-9x^4}{2500}}\left(750e^{\frac{-7500+9x^4}{2500}}-9x^3\right)\,dx$ 7520

3.1317 $\int \frac{1}{4}(12e^{8+3x}+e^{2x}(e^4(-32+32x)+e^8(16+32x+48x^2))+e^x(-12-16x+16x^2+e^4(12-128x+\cdots$

3.1318 $\int \frac{(-208x-60x^2+108x^3-36x^4+4x^5)\log(2x)+(-60+164x-57x^2-15x^3+9x^4-x^5)\log\left(\frac{400-1920x+2424x^2-48x^3-607x^4+132x^5+30x^6-12x^{\cdots}}{81-108x+54x^2-12x^3+x^4}\cdots\right.}{(60x-164x^2+57x^3+15x^4-9x^5+x^6)\log^2(2x)}$

3.1319 $\int \frac{e^{-x}(-10+2x+(6x-x^2)\log(x^2))}{x}\,dx$ 7537

3.1320 $\int \frac{-e^{25-x}\log(3)+(8-2x)\log(3)}{-13+e^{25-x}+8x-x^2}\,dx$ 7541

3.1321 $\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+2x^2-20x^3+50x^4+(-5+50x)\log(x))\log^3(2x)}{(x^2-10x^3+25x^4)\log^3(2x)}\,dx$ 7545

3.1322 $\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}(-150+120x-24x^2+e^x(-40+5x+2x^2)\log(5))}{75-60x+12x^2}\,dx$ 7551

3.1323 $\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x^2))\log^2(x)+(5+(5-x)\log(x)-x\log^2(x))\log(\frac{1}{2}(-5+x\log(x)))}{-5x^2\log^2(x)+x^3\log^3(x)}\,d\cdots$

3.1324 $\int \frac{9e^7-x^2+e^2x^2+x^2\log(5)}{x^2\log(5)}\,dx$ 7562

3.1325 $\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}((-4608x-576e^x x)\log^3(x)+(4608x+e^x(576x-144x^2))\log^4(x)+(-2304+e^x(-288+144x))\log^6(x))}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}\,d\cdots$

3.1326 $\int \frac{-1+x+2e^{x^2}x^2}{x}\,dx$ 7577

3.1327 $\int (3+4x+2\log(\log(3)))\,dx$ 7581

3.1328 $\int e^{-2e^{1-5e^{1-x}+5x}}x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}}\left(1+e^{2e^{1-5e^{1-x}+5x}}x^2-2\log(x)+e^{-5e^{1-x}+5x}(-10ex-10e^{2-x}x)\log\cdots\right.$

3.1329 $\int \left(-1+5e^{1+\frac{1}{4}(3+20e^{1+x})+x}\right)\,dx$ 7591

3.1330 $\int \frac{2+x+x^2+e^x(-x+x^2)}{-x+x^2}\,dx$ 7595

3.1331 $\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx$ 7599

3.1332 $\int (5+10e^{2x}+10e^x\log(7))\,dx$ 7604

3.1333 $\int \left(1+\log\left(\frac{x+ex(i\pi+\log(5-\log(5)))}{e}\right)\right)\,dx$ 7608

3.1334 $\int \frac{-3+2x^3+e^{2x}(-3+6x)}{(3x+3e^{2x}x+1876x^2+x^4)\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)}\,dx$ 7612

3.1335 $\int \frac{162x^5+9x^6+e^{2e^x}(135x^4-108e^x x^5)}{27e^{6e^x}+216x^3+108x^4+18x^5+x^6+e^{4e^x}(162x+27x^2)+e^{2e^x}(324x^2+108x^3+9x^4)}\,dx$ 7616

3.1 $\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}(-2+2\log(x)-\right.}{}$

3.1.1 Optimal result

Integrand size = 107, antiderivative size = 31

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x\right.}{5\log^2(x)}$$
$$=\frac{1}{5}e^{\frac{2x}{\log(x)}}\left(-e^{-15+x-x\log(2x)}+x\right)^2$$

output
```
1/5*exp(x/ln(x))^2*(x-exp(-x*ln(2*x)+x-15))^2
```

3.1.2 Mathematica [F]

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x\right.}{5\log^2(x)}$$
$$=\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x\right.}{5\log^2(x)}$$

input
```
Integrate[(E^((2*x)/Log[x])*(-2*x^2 + 2*x^2*Log[x] + 2*x*Log[x]^2 + E^(-30
 + 2*x - 2*x*Log[2*x])*(-2 + 2*Log[x] - 2*Log[x]^2*Log[2*x]) + E^(-15 + x
- x*Log[2*x])*(4*x - 4*x*Log[x] - 2*Log[x]^2 + 2*x*Log[x]^2*Log[2*x])))/(5
*Log[x]^2),x]
```

3.1.

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x\log(2x)}\left(4x-4x\log(x)-2\log^2(x)+2x\log^2\right.\right.}{5\log^2(x)}$$

output
```
Integrate[(E^((2*x)/Log[x])*(-2*x^2 + 2*x^2*Log[x] + 2*x*Log[x]^2 + E^(-30
 + 2*x - 2*x*Log[2*x])*(-2 + 2*Log[x] - 2*Log[x]^2*Log[2*x]) + E^(-15 + x
- x*Log[2*x])*(4*x - 4*x*Log[x] - 2*Log[x]^2 + 2*x*Log[x]^2*Log[2*x])))/Lo
g[x]^2, x]/5
```

3.1.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 97 vs. $2(31) = 62$.

Time = 6.04 (sec) , antiderivative size = 97, normalized size of antiderivative = 3.13, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$, Rules used = {27, 25, 7292, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{2x-2x\log(2x)-30}\left(-2\log(2x)\log^2(x)+2\log(x)-2\right)+e^{x+x(-\log(2x))-1}\right.}{5\log^2(x)}$$

$$\Big\downarrow \; 27$$

$$\frac{1}{5}\int -\frac{e^{\frac{2x}{\log(x)}}\left(2^{1-2x}e^{2x-30}\left(\log(2x)\log^2(x)-\log(x)+1\right)x^{-2x}-2^{1-x}e^{x-15}\left(x\log(2x)\log^2(x)-\log^2(x)-2x\log(x\right.\right.}{\log^2(x)}$$

$$\Big\downarrow \; 25$$

$$-\frac{1}{5}\int \frac{e^{\frac{2x}{\log(x)}}\left(2^{1-2x}e^{2x-30}\left(\log(2x)\log^2(x)-\log(x)+1\right)x^{-2x}-2^{1-x}e^{x-15}\left(x\log(2x)\log^2(x)-\log^2(x)-2x\log(x\right.\right.}{\log^2(x)}$$

$$\Big\downarrow \; 7292$$

$$-\frac{1}{5}\int \frac{2^{1-2x}e^{\frac{2x}{\log(x)}-30}x^{-2x}\left(e^x-2^xe^{15}x^{x+1}\right)\left(2^xe^{15}\log^2(x)x^x+2^xe^{15}\log(x)x^{x+1}-2^xe^{15}x^{x+1}+e^x-e^x\log(x)+\right.}{\log^2(x)}$$

$$\Big\downarrow \; 2726$$

$$\frac{2^{-2x}x^{-2x}\left(e^x-e^{15}2^xx^{x+1}\right)e^{\frac{2x}{\log(x)}-30}\left(-e^{15}2^xx^{x+1}+e^{15}2^xx^{x+1}\log(x)+e^x-e^x\log(x)\right)}{5\left(\frac{1}{\log^2(x)}-\frac{1}{\log(x)}\right)\log^2(x)}$$

3.1. $\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x\log(2x)}\left(4x-4x\log(x)-2\log^2(x)+2x\log^2\right.\right.}{5\log^2(x)}$

input
```
Int[(E^((2*x)/Log[x])*(-2*x^2 + 2*x^2*Log[x] + 2*x*Log[x]^2 + E^(-30 + 2*x
 - 2*x*Log[2*x])*(-2 + 2*Log[x] - 2*Log[x]^2*Log[2*x]) + E^(-15 + x - x*Lo
g[2*x])*(4*x - 4*x*Log[x] - 2*Log[x]^2 + 2*x*Log[x]^2*Log[2*x])))/(5*Log[x
]^2),x]
```

output
```
(E^(-30 + (2*x)/Log[x])*(E^x - 2^x*E^15*x^(1 + x))*(E^x - 2^x*E^15*x^(1 +
x) - E^x*Log[x] + 2^x*E^15*x^(1 + x)*Log[x]))/(5*2^(2*x)*x^(2*x)*(Log[x]^(
-2) - Log[x]^(-1))*Log[x]^2)
```

3.1.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(28) = 56$.

Time = 4.15 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.03

method	result	size
parallelrisch	$-\frac{2x\,\mathrm{e}^{\frac{2x}{\ln(x)}}\,\mathrm{e}^{-x\ln(2x)+x-15}}{5}+\frac{\mathrm{e}^{-2x\ln(2x)+2x-30}\,\mathrm{e}^{\frac{2x}{\ln(x)}}}{5}+\frac{x^{2}\mathrm{e}^{\frac{2x}{\ln(x)}}}{5}$	63
risch	$\frac{x^{2}\mathrm{e}^{\frac{2x}{\ln(x)}}}{5}-\frac{2\left(\frac{1}{2}\right)^{x}x^{-x}x\,\mathrm{e}^{\frac{x\ln(x)-15\ln(x)+2x}{\ln(x)}}}{5}+\frac{2^{-2x}x^{-2x}\mathrm{e}^{\frac{2x\ln(x)-30\ln(x)+2x}{\ln(x)}}}{5}$	75

input
```
int(1/5*((-2*ln(x)^2*ln(2*x)+2*ln(x)-2)*exp(-x*ln(2*x)+x-15)^2+(2*x*ln(x)^
2*ln(2*x)-2*ln(x)^2-4*x*ln(x)+4*x)*exp(-x*ln(2*x)+x-15)+2*x*ln(x)^2+2*x^2*
ln(x)-2*x^2)*exp(x/ln(x))^2/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
-2/5*x*exp(x/ln(x))^2*exp(-x*ln(2*x)+x-15)+1/5*exp(-x*ln(2*x)+x-15)^2*exp(
x/ln(x))^2+1/5*x^2*exp(x/ln(x))^2
```

3.1.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.52

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x}\right.}{5\log^2(x)}$$
$$=\frac{1}{5}\left(x^2-2\,xe^{(-x\log(2)-x\log(x)+x-15)}+e^{(-2\,x\log(2)-2\,x\log(x)+2\,x-30)}\right)e^{\left(\frac{2\,x}{\log(x)}\right)}$$

input
```
integrate(1/5*((-2*log(x)^2*log(2*x)+2*log(x)-2)*exp(-x*log(2*x)+x-15)^2+(
2*x*log(x)^2*log(2*x)-2*log(x)^2-4*x*log(x)+4*x)*exp(-x*log(2*x)+x-15)+2*x
*log(x)^2+2*x^2*log(x)-2*x^2)*exp(x/log(x))^2/log(x)^2,x, algorithm=\
```

output
```
1/5*(x^2 - 2*x*e^(-x*log(2) - x*log(x) + x - 15) + e^(-2*x*log(2) - 2*x*lo
g(x) + 2*x - 30))*e^(2*x/log(x))
```

3.1.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x}\right.}{5\log^2(x)}$$
= Exception raised: TypeError

input
```
integrate(1/5*((-2*ln(x)**2*ln(2*x)+2*ln(x)-2)*exp(-x*ln(2*x)+x-15)**2+(2*
x*ln(x)**2*ln(2*x)-2*ln(x)**2-4*x*ln(x)+4*x)*exp(-x*ln(2*x)+x-15)+2*x*ln(x
)**2+2*x**2*ln(x)-2*x**2)*exp(x/ln(x))**2/ln(x)**2,x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.1.

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x\log(2x)}\left(4x-4x\log(x)-2\log^2(x)+2x\log^2\right.\right.}{5\log^2(x)}$$

3.1.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x}\right.}{5\log^2(x)}$$

$=$ Exception raised: RuntimeError

input
```
integrate(1/5*((-2*log(x)^2*log(2*x)+2*log(x)-2)*exp(-x*log(2*x)+x-15)^2+(
2*x*log(x)^2*log(2*x)-2*log(x)^2-4*x*log(x)+4*x)*exp(-x*log(2*x)+x-15)+2*x
*log(x)^2+2*x^2*log(x)-2*x^2)*exp(x/log(x))^2/log(x)^2,x, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.1.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(27) = 54$.

Time = 0.33 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.68

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x}\right.}{5\log^2(x)}$$

$$= \frac{1}{5}x^2e^{\left(\frac{2x}{\log(x)}\right)} - \frac{2}{5}xe^{\left(-\frac{x\log(2)\log(x)+x\log(x)^2-x\log(x)-2x+15\log(x)}{\log(x)}\right)} + \frac{1}{5}e^{\left(-\frac{2\left(x\log(2)\log(x)+x\log(x)^2-x\log(x)-x+15\log(x)\right)}{\log(x)}\right)}$$

input
```
integrate(1/5*((-2*log(x)^2*log(2*x)+2*log(x)-2)*exp(-x*log(2*x)+x-15)^2+(
2*x*log(x)^2*log(2*x)-2*log(x)^2-4*x*log(x)+4*x)*exp(-x*log(2*x)+x-15)+2*x
*log(x)^2+2*x^2*log(x)-2*x^2)*exp(x/log(x))^2/log(x)^2,x, algorithm=\
```

output
```
1/5*x^2*e^(2*x/log(x)) - 2/5*x*e^(-(x*log(2)*log(x) + x*log(x)^2 - x*log(x
) - 2*x + 15*log(x))/log(x)) + 1/5*e^(-2*(x*log(2)*log(x) + x*log(x)^2 - x
*log(x) - x + 15*log(x))/log(x))
```

3.1. $\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x\log(2x)}\left(4x-4x\log(x)-2\log^2(x)+2x\log^2\right.\right.}{5\log^2(x)}$

3.1.9 Mupad [B] (verification not implemented)

Time = 13.33 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.74

$$\int \frac{e^{\frac{2x}{\log(x)}}\left(-2x^2+2x^2\log(x)+2x\log^2(x)+e^{-30+2x-2x\log(2x)}\left(-2+2\log(x)-2\log^2(x)\log(2x)\right)+e^{-15+x-x}\right.}{5\log^2(x)}$$

$$= \mathrm{e}^{\frac{2\,x}{\ln(x)}}\left(\frac{x^2}{5}+\frac{\mathrm{e}^{2\,x-30}}{5\,2^{2\,x}\,x^{2\,x}}-\frac{2\,x\,\mathrm{e}^{x-15}}{5\,2^{x}\,x^{x}}\right)$$

input
```
int((exp((2*x)/log(x))*(2*x*log(x)^2 + 2*x^2*log(x) - exp(2*x - 2*x*log(2*
x) - 30)*(2*log(2*x)*log(x)^2 - 2*log(x) + 2) + exp(x - x*log(2*x) - 15)*(
4*x - 2*log(x)^2 - 4*x*log(x) + 2*x*log(2*x)*log(x)^2) - 2*x^2))/(5*log(x)
^2),x)
```

output
```
exp((2*x)/log(x))*(x^2/5 + exp(2*x - 30)/(5*2^(2*x)*x^(2*x)) - (2*x*exp(x
- 15))/(5*2^x*x^x))
```

3.2 $\int \frac{16+e^{8x}(-1+8x)}{-16x+e^{8x}x} \, dx$

3.2.1 Optimal result

Integrand size = 27, antiderivative size = 12

$$\int \frac{16+e^{8x}(-1+8x)}{-16x+e^{8x}x} \, dx = \log \left(\frac{-16+e^{8x}}{x}\right)$$

output
```
ln((exp(8*x)-16)/x)
```

3.2.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 56 vs. 2(12) = 24.

Time = 1.48 (sec) , antiderivative size = 56, normalized size of antiderivative = 4.67

$$\int \frac{16+e^{8x}(-1+8x)}{-16x+e^{8x}x} \, dx = 8x-8\log\left(e^x\right)+\log\left(-2+e^{2x}\right)+\log\left(2+e^{2x}\right) + \log\left(2-2e^x+e^{2x}\right)+\log\left(2+2e^x+e^{2x}\right)-\log(x)$$

input
```
Integrate[(16 + E^(8*x)*(-1 + 8*x))/(-16*x + E^(8*x)*x),x]
```

output
```
8*x - 8*Log[E^x] + Log[-2 + E^(2*x)] + Log[2 + E^(2*x)] + Log[2 - 2*E^x +
E^(2*x)] + Log[2 + 2*E^x + E^(2*x)] - Log[x]
```

3.2.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 49 vs. 2(12) = 24.

Time = 0.38 (sec) , antiderivative size = 49, normalized size of antiderivative = 4.08, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{8x}(8x-1)+16}{e^{8x}x-16x}\,dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2(e^x-2)}{-2e^x+e^{2x}+2}+\frac{8x-1}{x}+\frac{4}{e^{2x}-2}-\frac{4}{e^{2x}+2}-\frac{2(e^x+2)}{2e^x+e^{2x}+2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log\left(2-e^{2x}\right)+\log\left(e^{2x}+2\right)+\log\left(-2e^x+e^{2x}+2\right)+\log\left(2e^x+e^{2x}+2\right)-\log(x)$$

input
```
Int[(16 + E^(8*x)*(-1 + 8*x))/(-16*x + E^(8*x)*x),x]
```

output
```
Log[2 - E^(2*x)] + Log[2 + E^(2*x)] + Log[2 - 2*E^x + E^(2*x)] + Log[2 + 2
*E^x + E^(2*x)] - Log[x]
```

3.2.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.2.4 Maple [A] (verified)

Time = 1.89 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.08

method	result	size
norman	$-\ln(x)+\ln(e^{8x}-16)$	13
risch	$-\ln(x)+\ln(e^{8x}-16)$	13
parallelrisch	$-\ln(x)+\ln(e^{8x}-16)$	13

input
```
int(((8*x-1)*exp(8*x)+16)/(x*exp(8*x)-16*x),x,method=_RETURNVERBOSE)
```

output
```
-ln(x)+ln(exp(8*x)-16)
```

3.2.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{16+e^{8x}(-1+8x)}{-16x+e^{8x}x}\,dx=-\log(x)+\log\left(e^{(8x)}-16\right)$$

input
```
integrate(((8*x-1)*exp(8*x)+16)/(x*exp(8*x)-16*x),x, algorithm=\
```

output
```
-log(x) + log(e^(8*x) - 16)
```

3.2.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{16+e^{8x}(-1+8x)}{-16x+e^{8x}x}\,dx=-\log(x)+\log\left(e^{8x}-16\right)$$

input
```
integrate(((8*x-1)*exp(8*x)+16)/(x*exp(8*x)-16*x),x)
```

output
```
-log(x) + log(exp(8*x) - 16)
```

3.2.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(11) = 22.

Time = 0.31 (sec) , antiderivative size = 41, normalized size of antiderivative = 3.42

$$\int \frac{16+e^{8x}(-1+8x)}{-16x+e^{8x}x}\,dx = -\log(x)+\log\left(e^{(2x)}+2e^{x}+2\right)+\log\left(e^{(2x)}-2e^{x}+2\right)+\log\left(e^{(2x)}+2\right)+\log\left(e^{(2x)}-2\right)$$

input
```
integrate(((8*x-1)*exp(8*x)+16)/(x*exp(8*x)-16*x),x, algorithm=\
```

output
```
-log(x) + log(e^(2*x) + 2*e^x + 2) + log(e^(2*x) - 2*e^x + 2) + log(e^(2*x
) + 2) + log(e^(2*x) - 2)
```

3.2.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{16+e^{8x}(-1+8x)}{-16x+e^{8x}x}\,dx = -\log(x)+\log\left(e^{(8x)}-16\right)$$

input
```
integrate(((8*x-1)*exp(8*x)+16)/(x*exp(8*x)-16*x),x, algorithm=\
```

output
```
-log(x) + log(e^(8*x) - 16)
```

3.2.9 Mupad [B] (verification not implemented)

Time = 13.23 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{16+e^{8x}(-1+8x)}{-16x+e^{8x}x}\,dx = \ln\left(\mathrm{e}^{8x}-16\right)-\ln(x)$$

input
```
int(-(exp(8*x)*(8*x - 1) + 16)/(16*x - x*exp(8*x)),x)
```

output
```
log(exp(8*x) - 16) - log(x)
```

3.3 $\int \frac{-75-75x-x^2+x^3+2x^4+\left(\left(75-x^2+x^3\right)\log(2)+\left(-75+x^2-x^3\right)\log\left(\frac{75-x^2}{x}\right.\right.}{\left(-75x^2+x^4-x^5\right)\log(2)+\left(75x^2-x^4+x^5\right)\log\left(\right.}$

3.3.1 Optimal result

Integrand size = 136, antiderivative size = 31

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left(\left(75-x^2+x^3\right)\log(2)+\left(-75+x^2-x^3\right)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log}{\log}\right.}{\left(-75x^2+x^4-x^5\right)\log(2)+\left(75x^2-x^4+x^5\right)\log\left(\frac{75-x^2+x^3}{x}\right)}$$

$$= 5+\frac{(1+x)\log\left(-1+\frac{\log\left(-x+x\left(\frac{75}{x^2}+x\right)\right)}{\log(2)}\right)}{x}$$

output
```
ln(ln(x*(75/x^2+x)-x)/ln(2)-1)/x*(1+x)+5
```

3.3.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.45

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left(\left(75-x^2+x^3\right)\log(2)+\left(-75+x^2-x^3\right)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log}{\log}\right.}{\left(-75x^2+x^4-x^5\right)\log(2)+\left(75x^2-x^4+x^5\right)\log\left(\frac{75-x^2+x^3}{x}\right)}$$

$$= \log\left(\log(2)-\log\left(\frac{75}{x}-x+x^2\right)\right)+\frac{\log\left(-1+\frac{\log\left(\frac{75}{x}-x+x^2\right)}{\log(2)}\right)}{x}$$

3.3.

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left(\left(75-x^2+x^3\right)\log(2)+\left(-75+x^2-x^3\right)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log\left(\frac{75-x^2+x^3}{x}\right)}{\log(2)}\right)}{}$$

input
```
Integrate[(-75 - 75*x - x^2 + x^3 + 2*x^4 + ((75 - x^2 + x^3)*Log[2] + (-7
5 + x^2 - x^3)*Log[(75 - x^2 + x^3)/x])*Log[(-Log[2] + Log[(75 - x^2 + x^3
)/x])/Log[2]])/((-75*x^2 + x^4 - x^5)*Log[2] + (75*x^2 - x^4 + x^5)*Log[(7
5 - x^2 + x^3)/x]),x]
```

output
```
Log[Log[2] - Log[75/x - x + x^2]] + Log[-1 + Log[75/x - x + x^2]/Log[2]]/x
```

3.3.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4+x^3-x^2+\left(\left(x^3-x^2+75\right)\log(2)+\left(-x^3+x^2-75\right)\log\left(\frac{x^3-x^2+75}{x}\right)\right)\log\left(\frac{\log\left(\frac{x^3-x^2+75}{x}\right)-\log(2)}{\log(2)}\right)-75x}{\left(-x^5+x^4-75x^2\right)\log(2)+\left(x^5-x^4+75x^2\right)\log\left(\frac{x^3-x^2+75}{x}\right)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-2x^4-x^3+x^2-\left(\left(x^3-x^2+75\right)\log(2)+\left(-x^3+x^2-75\right)\log\left(\frac{x^3-x^2+75}{x}\right)\right)\log\left(\frac{\log\left(\frac{x^3-x^2+75}{x}\right)-\log(2)}{\log(2)}\right)+75}{x^2\left(x^3-x^2+75\right)\left(\log(2)-\log\left(x^2-x+\frac{75}{x}\right)\right)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{\log\left(\frac{\log\left(x^2-x+\frac{75}{x}\right)}{\log(2)}-1\right)}{x^2}-\frac{2x^2}{\left(x^3-x^2+75\right)\left(\log(2)-\log\left(x^2-x+\frac{75}{x}\right)\right)}-\frac{x}{\left(x^3-x^2+75\right)\left(\log(2)-\log\left(x^2-\right.\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{1}{x^2\left(\log(2)-\log\left(x^2-x+\frac{75}{x}\right)\right)}dx+\int \frac{1}{x\left(\log(2)-\log\left(x^2-x+\frac{75}{x}\right)\right)}dx-\int \frac{\log\left(\frac{\log\left(x^2-x+\frac{75}{x}\right)}{\log(2)}-1\right)}{x^2}dx+2\int \frac{1}{\left(x^3-x^2+75\right)\left(\log(2)-\log\left(x^2-x+\frac{75}{x}\right)\right)}dx-\int \frac{x}{\left(x^3-x^2+75\right)\left(\log(2)-\log\left(x^2-x+\frac{75}{x}\right)\right)}dx-3\int \frac{x^2}{\left(x^3-x^2+75\right)\left(\log(2)-\log\left(x^2-x+\frac{75}{x}\right)\right)}dx$$

3.3.

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left(\left(75-x^2+x^3\right)\log(2)+\left(-75+x^2-x^3\right)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log\left(\frac{75-x^2+x^3}{x}\right)}{\log(2)}\right)}{}$$

input
```
Int[(-75 - 75*x - x^2 + x^3 + 2*x^4 + ((75 - x^2 + x^3)*Log[2] + (-75 + x^
2 - x^3)*Log[(75 - x^2 + x^3)/x])*Log[(-Log[2] + Log[(75 - x^2 + x^3)/x])/
Log[2]])/((-75*x^2 + x^4 - x^5)*Log[2] + (75*x^2 - x^4 + x^5)*Log[(75 - x^
2 + x^3)/x]),x]
```

output
```
$Aborted
```

3.3.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.3.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(31) = 62$.

Time = 6.90 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.13

method	result	size
parallelrisch	$-\frac{-\ln\left(-\frac{-\ln\left(\frac{x^3-x^2+75}{x}\right)+\ln(2)}{\ln(2)}\right)x-\ln\left(-\frac{-\ln\left(\frac{x^3-x^2+75}{x}\right)+\ln(2)}{\ln(2)}\right)}{x}$	66

input
```
int((((-x^3+x^2-75)*ln((x^3-x^2+75)/x)+(x^3-x^2+75)*ln(2))*ln((ln((x^3-x^2
+75)/x)-ln(2))/ln(2))+2*x^4+x^3-x^2-75*x-75)/((x^5-x^4+75*x^2)*ln((x^3-x^2
+75)/x)+(-x^5+x^4-75*x^2)*ln(2)),x,method=_RETURNVERBOSE)
```

output
```
-1/x*(-ln(-(-ln((x^3-x^2+75)/x)+ln(2))/ln(2))*x-ln(-(-ln((x^3-x^2+75)/x)+l
n(2))/ln(2)))
```

3.3.

$$-75-75x-x^2+x^3+2x^4+\left(\left(75-x^2+x^3\right)\log(2)+\left(-75+x^2-x^3\right)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log\left(\frac{75-x^2+x^3}{x}\right)}{\log(2)}\right)$$

3.3.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left((75-x^2+x^3)\log(2)+(-75+x^2-x^3)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log\left(\frac{75-x^2+x^3}{x}\right)}{\log(2)}\right)}{(-75x^2+x^4-x^5)\log(2)+(75x^2-x^4+x^5)\log\left(\frac{75-x^2+x^3}{x}\right)}$$

$$= \frac{(x+1)\log\left(-\frac{\log(2)-\log\left(\frac{x^3-x^2+75}{x}\right)}{\log(2)}\right)}{x}$$

input
```
integrate((((-x^3+x^2-75)*log((x^3-x^2+75)/x)+(x^3-x^2+75)*log(2))*log((lo
g((x^3-x^2+75)/x)-log(2))/log(2))+2*x^4+x^3-x^2-75*x-75)/((x^5-x^4+75*x^2)
*log((x^3-x^2+75)/x)+(-x^5+x^4-75*x^2)*log(2)),x, algorithm=\
```

output
```
(x + 1)*log(-(log(2) - log((x^3 - x^2 + 75)/x))/log(2))/x
```

3.3.6 Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.19

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left((75-x^2+x^3)\log(2)+(-75+x^2-x^3)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log\left(\frac{75-x^2+x^3}{x}\right)}{\log(2)}\right)}{(-75x^2+x^4-x^5)\log(2)+(75x^2-x^4+x^5)\log\left(\frac{75-x^2+x^3}{x}\right)}$$

$$= \log\left(\log\left(\frac{x^3-x^2+75}{x}\right)-\log(2)\right)+\frac{\log\left(\frac{\log\left(\frac{x^3-x^2+75}{x}\right)-\log(2)}{\log(2)}\right)}{x}$$

input
```
integrate((((-x**3+x**2-75)*ln((x**3-x**2+75)/x)+(x**3-x**2+75)*ln(2))*ln(
(ln((x**3-x**2+75)/x)-ln(2))/ln(2))+2*x**4+x**3-x**2-75*x-75)/((x**5-x**4+
75*x**2)*ln((x**3-x**2+75)/x)+(-x**5+x**4-75*x**2)*ln(2)),x)
```

output
```
log(log((x**3 - x**2 + 75)/x) - log(2)) + log((log((x**3 - x**2 + 75)/x) -
 log(2))/log(2))/x
```

3.3.

$$\frac{-75-75x-x^2+x^3+2x^4+\left((75-x^2+x^3)\log(2)+(-75+x^2-x^3)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log\left(\frac{75-x^2+x^3}{x}\right)}{\log(2)}\right)}{}$$

3.3.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.13

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left((75-x^2+x^3)\log(2)+(-75+x^2-x^3)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log}{\log}\right.}{(-75x^2+x^4-x^5)\log(2)+(75x^2-x^4+x^5)\log\left(\frac{75-x^2+x^3}{x}\right)}$$
$$=\frac{(x+1)\log\left(-\log(2)+\log\left(x^3-x^2+75\right)-\log(x)\right)-\log(\log(2))}{x}$$

input
```
integrate((((-x^3+x^2-75)*log((x^3-x^2+75)/x)+(x^3-x^2+75)*log(2))*log((lo
g((x^3-x^2+75)/x)-log(2))/log(2))+2*x^4+x^3-x^2-75*x-75)/((x^5-x^4+75*x^2)
*log((x^3-x^2+75)/x)+(-x^5+x^4-75*x^2)*log(2)),x, algorithm=\
```

output
```
((x + 1)*log(-log(2) + log(x^3 - x^2 + 75) - log(x)) - log(log(2)))/x
```

3.3.8 Giac [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.77

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left((75-x^2+x^3)\log(2)+(-75+x^2-x^3)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log}{\log}\right.}{(-75x^2+x^4-x^5)\log(2)+(75x^2-x^4+x^5)\log\left(\frac{75-x^2+x^3}{x}\right)}$$
$$=\frac{\log\left(-\log(2)+\log\left(x^3-x^2+75\right)-\log(x)\right)}{x}-\frac{\log(\log(2))}{x}$$
$$+\log\left(-\log(2)+\log\left(x^3-x^2+75\right)-\log(x)\right)$$

input
```
integrate((((-x^3+x^2-75)*log((x^3-x^2+75)/x)+(x^3-x^2+75)*log(2))*log((lo
g((x^3-x^2+75)/x)-log(2))/log(2))+2*x^4+x^3-x^2-75*x-75)/((x^5-x^4+75*x^2)
*log((x^3-x^2+75)/x)+(-x^5+x^4-75*x^2)*log(2)),x, algorithm=\
```

output
```
log(-log(2) + log(x^3 - x^2 + 75) - log(x))/x - log(log(2))/x + log(-log(2
) + log(x^3 - x^2 + 75) - log(x))
```

3.3.

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left((75-x^2+x^3)\log(2)+(-75+x^2-x^3)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log\left(\frac{75-x^2+x^3}{x}\right)}{\log(2)}\right)}{}$$

3.3.9 Mupad [B] (verification not implemented)

Time = 13.64 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.77

$$\int \frac{-75-75x-x^2+x^3+2x^4+\left((75-x^2+x^3)\log(2)+(-75+x^2-x^3)\log\left(\frac{75-x^2+x^3}{x}\right)\right)\log\left(\frac{-\log(2)+\log}{\log}\right.}{(-75x^2+x^4-x^5)\log(2)+(75x^2-x^4+x^5)\log\left(\frac{75-x^2+x^3}{x}\right)}$$

$$=\ln\left(\ln\left(\frac{x^3-x^2+75}{x}\right)-\ln(2)\right)-\frac{\ln(\ln(2))}{x}+\frac{\ln\left(\ln\left(\frac{x^3-x^2+75}{x}\right)-\ln(2)\right)}{x}$$

input
```
int(-(75*x - log((log((x^3 - x^2 + 75)/x) - log(2))/log(2))*(log(2)*(x^3 -
 x^2 + 75) - log((x^3 - x^2 + 75)/x)*(x^3 - x^2 + 75)) + x^2 - x^3 - 2*x^4
 + 75)/(log((x^3 - x^2 + 75)/x)*(75*x^2 - x^4 + x^5) - log(2)*(75*x^2 - x^
4 + x^5)),x)
```

output
```
log(log((x^3 - x^2 + 75)/x) - log(2)) - log(log(2))/x + log(log((x^3 - x^2
 + 75)/x) - log(2))/x
```

3.4 $\int (1+4x^3+5x^4)\,dx$

3.4.1 Optimal result

Integrand size = 12, antiderivative size = 15

$$\int (1+4x^3+5x^4)\,dx = 2+e^3+x+x^3(x+x^2)$$

output
```
x+exp(3)+2+x^3*(x^2+x)
```

3.4.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int (1+4x^3+5x^4)\,dx = x+x^4+x^5$$

input
```
Integrate[1 + 4*x^3 + 5*x^4,x]
```

output
```
x + x^4 + x^5
```

3.4.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(5x^4+4x^3+1\right) \, dx$$

$$\Big\downarrow \text{2009}$$

$$x^5+x^4+x$$

input
```
Int[1 + 4*x^3 + 5*x^4,x]
```

output
```
x + x^4 + x^5
```

3.4.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.4.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.60

method	result	size
gosper	x^5+x^4+x	9
default	x^5+x^4+x	9
norman	x^5+x^4+x	9
risch	x^5+x^4+x	9
parallelrisch	x^5+x^4+x	9
parts	x^5+x^4+x	9

input
```
int(5*x^4+4*x^3+1,x,method=_RETURNVERBOSE)
```

output
```
x^5+x^4+x
```

3.4.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int (1 + 4x^3 + 5x^4) \, dx = x^5 + x^4 + x$$

input
```
integrate(5*x^4+4*x^3+1,x, algorithm=\
```

output
```
x^5 + x^4 + x
```

3.4.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.47

$$\int (1 + 4x^3 + 5x^4) \, dx = x^5 + x^4 + x$$

input
```
integrate(5*x**4+4*x**3+1,x)
```

output
```
x**5 + x**4 + x
```

3.4.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int (1 + 4x^3 + 5x^4) \, dx = x^5 + x^4 + x$$

input
```
integrate(5*x^4+4*x^3+1,x, algorithm=\
```

output
```
x^5 + x^4 + x
```

3.4.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int (1+4x^3+5x^4)\ dx = x^5+x^4+x$$

input
```
integrate(5*x^4+4*x^3+1,x, algorithm=\
```

output
```
x^5 + x^4 + x
```

3.4.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int (1+4x^3+5x^4)\ dx = x^5+x^4+x$$

input
```
int(4*x^3 + 5*x^4 + 1,x)
```

output
```
x + x^4 + x^5
```

3.5 $\int \frac{1}{32}(8192e^{4x} + x - 192x^2 + 8192x^3 + e^{3x}(8192 + 24576$

3.5.1 Optimal result

Integrand size = 68, antiderivative size = 25

$$\int \frac{1}{32}\left(8192e^{4x} + x - 192x^2 + 8192x^3 + e^{3x}(8192 + 24576x) + e^{2x}\left(-64 + 24448x + 24576x^2\right) + e^x\left(-256x + 24448x^2 + 8192x^3\right)\right) dx = -2 + 4\left(\frac{x}{16} - (2e^x + 2x)^2\right)^2$$

output
```
2*(1/16*x-(2*exp(x)+2*x)^2)*(1/8*x-2*(2*exp(x)+2*x)^2)-2
```

3.5.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{1}{32}\left(8192e^{4x} + x - 192x^2 + 8192x^3 + e^{3x}(8192 + 24576x) + e^{2x}\left(-64 + 24448x + 24576x^2\right) + e^x\left(-256x + 24448x^2 + 8192x^3\right)\right) dx = \frac{1}{64}\left(64e^{2x} + 128e^x x + x(-1 + 64x)\right)^2$$

input
```
Integrate[(8192*E^(4*x) + x - 192*x^2 + 8192*x^3 + E^(3*x)*(8192 + 24576*x
) + E^(2*x)*(-64 + 24448*x + 24576*x^2) + E^x*(-256*x + 24448*x^2 + 8192*x
^3))/32,x]
```

output
```
(64*E^(2*x) + 128*E^x*x + x*(-1 + 64*x))^2/64
```

3.5.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 86 vs. 2(25) = 50.

Time = 0.31 (sec) , antiderivative size = 86, normalized size of antiderivative = 3.44, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.029$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{32}(8192x^3 - 192x^2 + e^{2x}(24576x^2 + 24448x - 64) + e^x(8192x^3 + 24448x^2 - 256x) + x + 8192e^{4x} + e^{3x}(2457$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{32}\int (8192x^3 - 192x^2 + x + 8192e^{4x} + 8192e^{3x}(3x+1) - 64e^{2x}(-384x^2 - 382x + 1) - 128e^x(-64x^3 - 191x^2 +$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{32}\Bigg(2048x^4 + 8192e^x x^3 - 64x^3 - 128e^x x^2 + 12288e^{2x}x^2 + \frac{x^2}{2} - 64e^{2x}x - \frac{8192e^{3x}}{3} + 2048e^{4x} + \frac{8192}{3}e^{3x}(3x+1)$$

input
```
Int[(8192*E^(4*x) + x - 192*x^2 + 8192*x^3 + E^(3*x)*(8192 + 24576*x) + E^
(2*x)*(-64 + 24448*x + 24576*x^2) + E^x*(-256*x + 24448*x^2 + 8192*x^3))/3
2,x]
```

output
```
((-8192*E^(3*x))/3 + 2048*E^(4*x) - 64*E^(2*x)*x + x^2/2 - 128*E^x*x^2 + 1
2288*E^(2*x)*x^2 - 64*x^3 + 8192*E^x*x^3 + 2048*x^4 + (8192*E^(3*x)*(1 + 3
*x))/3)/32
```

3.5.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.5.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.40

method	result	size
default	$\frac{x^2}{64}+256x\,\mathrm{e}^{3x}-2x\,\mathrm{e}^{2x}+384\,\mathrm{e}^{2x}x^2-4\,\mathrm{e}^{x}x^2+256\,\mathrm{e}^{x}x^3-2x^3+64x^4+64\,\mathrm{e}^{4x}$	60
norman	$\frac{x^2}{64}+256x\,\mathrm{e}^{3x}-2x\,\mathrm{e}^{2x}+384\,\mathrm{e}^{2x}x^2-4\,\mathrm{e}^{x}x^2+256\,\mathrm{e}^{x}x^3-2x^3+64x^4+64\,\mathrm{e}^{4x}$	60
risch	$\frac{x^2}{64}+256x\,\mathrm{e}^{3x}-2x\,\mathrm{e}^{2x}+384\,\mathrm{e}^{2x}x^2-4\,\mathrm{e}^{x}x^2+256\,\mathrm{e}^{x}x^3-2x^3+64x^4+64\,\mathrm{e}^{4x}$	60
parallelrisch	$\frac{x^2}{64}+256x\,\mathrm{e}^{3x}-2x\,\mathrm{e}^{2x}+384\,\mathrm{e}^{2x}x^2-4\,\mathrm{e}^{x}x^2+256\,\mathrm{e}^{x}x^3-2x^3+64x^4+64\,\mathrm{e}^{4x}$	60
parts	$\frac{x^2}{64}+256x\,\mathrm{e}^{3x}-2x\,\mathrm{e}^{2x}+384\,\mathrm{e}^{2x}x^2-4\,\mathrm{e}^{x}x^2+256\,\mathrm{e}^{x}x^3-2x^3+64x^4+64\,\mathrm{e}^{4x}$	60

input
```
int(256*exp(x)^4+1/32*(24576*x+8192)*exp(x)^3+1/32*(24576*x^2+24448*x-64)*
exp(x)^2+1/32*(8192*x^3+24448*x^2-256*x)*exp(x)+256*x^3-6*x^2+1/32*x,x,met
hod=_RETURNVERBOSE)
```

output
```
1/64*x^2+256*x*exp(x)^3-2*x*exp(x)^2+384*exp(x)^2*x^2-4*exp(x)*x^2+256*exp
(x)*x^3-2*x^3+64*x^4+64*exp(x)^4
```

3.5.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. 2(18) = 36.

Time = 0.26 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.36

$$\int \frac{1}{32}\left(8192e^{4x}+x-192x^2+8192x^3+e^{3x}(8192+24576x)+e^{2x}\left(-64+24448x+24576x^2\right)+e^x\left(-256x+24448x^2+8192x^3\right)\right)\,dx=64\,x^4-2\,x^3+\frac{1}{64}\,x^2+256\,xe^{(3\,x)}+2\,\left(192\,x^2-x\right)e^{(2\,x)}+4\,\left(64\,x^3-x^2\right)e^x+64\,e^{(4\,x)}$$

input
```
integrate(256*exp(x)^4+1/32*(24576*x+8192)*exp(x)^3+1/32*(24576*x^2+24448*
x-64)*exp(x)^2+1/32*(8192*x^3+24448*x^2-256*x)*exp(x)+256*x^3-6*x^2+1/32*x
,x, algorithm=\
```

output
```
64*x^4 - 2*x^3 + 1/64*x^2 + 256*x*e^(3*x) + 2*(192*x^2 - x)*e^(2*x) + 4*(6
4*x^3 - x^2)*e^x + 64*e^(4*x)
```

3.5.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(17) = 34$.

Time = 0.07 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.24

$$\int \frac{1}{32}\left(8192e^{4x}+x-192x^2+8192x^3+e^{3x}(8192+24576x)+e^{2x}\left(-64+24448x+24576x^2\right)+e^x\left(-256x+24448x^2+8192x^3\right)\right)\,dx=64x^4-2x^3+\frac{x^2}{64}+256xe^{3x}+\left(384x^2-2x\right)e^{2x}+\left(256x^3-4x^2\right)e^x+64e^{4x}$$

input
```
integrate(256*exp(x)**4+1/32*(24576*x+8192)*exp(x)**3+1/32*(24576*x**2+244
48*x-64)*exp(x)**2+1/32*(8192*x**3+24448*x**2-256*x)*exp(x)+256*x**3-6*x**
2+1/32*x,x)
```

output
```
64*x**4 - 2*x**3 + x**2/64 + 256*x*exp(3*x) + (384*x**2 - 2*x)*exp(2*x) +
(256*x**3 - 4*x**2)*exp(x) + 64*exp(4*x)
```

3.5.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(18) = 36$.

Time = 0.19 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.36

$$\int \frac{1}{32}\left(8192e^{4x}+x-192x^2+8192x^3+e^{3x}(8192+24576x)+e^{2x}\left(-64+24448x+24576x^2\right)+e^x\left(-256x+24448x^2+8192x^3\right)\right)\,dx=64\,x^4-2\,x^3+\frac{1}{64}\,x^2+256\,xe^{(3\,x)}+2\,\left(192\,x^2-x\right)e^{(2\,x)}+4\,\left(64\,x^3-x^2\right)e^x+64\,e^{(4\,x)}$$

input
```
integrate(256*exp(x)^4+1/32*(24576*x+8192)*exp(x)^3+1/32*(24576*x^2+24448*
x-64)*exp(x)^2+1/32*(8192*x^3+24448*x^2-256*x)*exp(x)+256*x^3-6*x^2+1/32*x
,x, algorithm=\
```

output
```
64*x^4 - 2*x^3 + 1/64*x^2 + 256*x*e^(3*x) + 2*(192*x^2 - x)*e^(2*x) + 4*(6
4*x^3 - x^2)*e^x + 64*e^(4*x)
```

3.5.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(18) = 36$.

Time = 0.27 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.36

$$\int \frac{1}{32}\left(8192e^{4x} + x - 192x^2 + 8192x^3 + e^{3x}(8192 + 24576x) + e^{2x}\left(-64 + 24448x + 24576x^2\right) + e^x\left(-256x + 24448x^2 + 8192x^3\right)\right) dx = 64\,x^4 - 2\,x^3 + \frac{1}{64}\,x^2 + 256\,xe^{(3\,x)} + 2\,\left(192\,x^2 - x\right)e^{(2\,x)} + 4\,\left(64\,x^3 - x^2\right)e^x + 64\,e^{(4\,x)}$$

input
```
integrate(256*exp(x)^4+1/32*(24576*x+8192)*exp(x)^3+1/32*(24576*x^2+24448*
x-64)*exp(x)^2+1/32*(8192*x^3+24448*x^2-256*x)*exp(x)+256*x^3-6*x^2+1/32*x
,x, algorithm=\
```

output
```
64*x^4 - 2*x^3 + 1/64*x^2 + 256*x*e^(3*x) + 2*(192*x^2 - x)*e^(2*x) + 4*(6
4*x^3 - x^2)*e^x + 64*e^(4*x)
```

3.5.9 Mupad [B] (verification not implemented)

Time = 13.06 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{1}{32}\left(8192e^{4x} + x - 192x^2 + 8192x^3 + e^{3x}(8192 + 24576x) + e^{2x}\left(-64 + 24448x + 24576x^2\right) + e^x\left(-256x + 24448x^2 + 8192x^3\right)\right) dx = \frac{\left(64\,\mathrm{e}^{2\,x} - x + 128\,x\,\mathrm{e}^x + 64\,x^2\right)^2}{64}$$

input
```
int(x/32 + 256*exp(4*x) + (exp(2*x)*(24448*x + 24576*x^2 - 64))/32 + (exp(
3*x)*(24576*x + 8192))/32 - 6*x^2 + 256*x^3 + (exp(x)*(24448*x^2 - 256*x +
 8192*x^3))/32,x)
```

output
```
(64*exp(2*x) - x + 128*x*exp(x) + 64*x^2)^2/64
```

3.6 $\int \frac{4}{3x}\,dx$

3.6.1 Optimal result

Integrand size = 7, antiderivative size = 31

$$\int \frac{4}{3x}\,dx = e^5 + \frac{4}{3}\left(-4 - e^4 - e^6 - \log\left(\frac{4e^4}{x}\right)\right)$$

output
```
exp(5)-16/3-4/3*exp(3)^2-4/3*exp(4)-4/3*ln(4*exp(4)/x)
```

3.6.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.19

$$\int \frac{4}{3x}\,dx = \frac{4\log(x)}{3}$$

input
```
Integrate[4/(3*x),x]
```

output
```
(4*Log[x])/3
```

3.6.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.19, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4}{3x}\,dx$$
$$\Big\downarrow \; 14$$
$$\frac{4\log(x)}{3}$$

input
```
Int[4/(3*x),x]
```

output
```
(4*Log[x])/3
```

3.6.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.6.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.16

method	result	size
default	$\frac{4\ln(x)}{3}$	5
norman	$\frac{4\ln(x)}{3}$	5
risch	$\frac{4\ln(x)}{3}$	5
parallelrisch	$\frac{4\ln(x)}{3}$	5

input
```
int(4/3/x,x,method=_RETURNVERBOSE)
```

output
```
4/3*ln(x)
```

3.6.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.13

$$\int \frac{4}{3x}\,dx = \frac{4}{3}\log\left(x\right)$$

input
```
integrate(4/3/x,x, algorithm=\
```

output
```
4/3*log(x)
```

3.6.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.16

$$\int \frac{4}{3x}\,dx = \frac{4\log\left(x\right)}{3}$$

input
```
integrate(4/3/x,x)
```

output
```
4*log(x)/3
```

3.6.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.13

$$\int \frac{4}{3x}\,dx = \frac{4}{3}\log\left(x\right)$$

input
```
integrate(4/3/x,x, algorithm=\
```

output
```
4/3*log(x)
```

3.6.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.16

$$\int \frac{4}{3x} \, dx = \frac{4}{3} \log(|x|)$$

input
```
integrate(4/3/x,x, algorithm=\
```

output
```
4/3*log(abs(x))
```

3.6.9 Mupad [B] (verification not implemented)

Time = 0.01 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.13

$$\int \frac{4}{3x} \, dx = \frac{4 \ln(x)}{3}$$

input
```
int(4/(3*x),x)
```

output
```
(4*log(x))/3
```

3.7 $\int \frac{-168x^2+48x^3+e^{3/x}(-45x-20x^2+10x^3)+\left(72x-24x^2+e^{3/x}(45-5x^2)\right) \mathrm{l}}{72x^3-24x^4+e^{3/x}(15x^3-5x^4)+\left(-72x^2+24x^3+e^{3/x}(-15x^2+5x^3)\right) \log}$

3.7.1 Optimal result

Integrand size = 134, antiderivative size = 30

$$\int \frac{-168x^2+48x^3+e^{3/x}(-45x-20x^2+10x^3)+\left(72x-24x^2+e^{3/x}(45-5x^2)\right)\log(3-x)}{72x^3-24x^4+e^{3/x}\left(15x^3-5x^4\right)+\left(-72x^2+24x^3+e^{3/x}\left(-15x^2+5x^3\right)\right)\log(3-x)}\,dx=\log\Bigg(\frac{\quad}{x(-}$$

output
```
ln((-24/5-exp(3/x))/(ln(-x+3)-x)/x)
```

3.7.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{-168x^2+48x^3+e^{3/x}(-45x-20x^2+10x^3)+\left(72x-24x^2+e^{3/x}(45-5x^2)\right)\log(3-x)}{72x^3-24x^4+e^{3/x}\left(15x^3-5x^4\right)+\left(-72x^2+24x^3+e^{3/x}\left(-15x^2+5x^3\right)\right)\log(3-x)}\,dx=\log\left(24+\right.$$

input
```
Integrate[(-168*x^2 + 48*x^3 + E^(3/x)*(-45*x - 20*x^2 + 10*x^3) + (72*x -
 24*x^2 + E^(3/x)*(45 - 5*x^2))*Log[3 - x])/(72*x^3 - 24*x^4 + E^(3/x)*(15
*x^3 - 5*x^4) + (-72*x^2 + 24*x^3 + E^(3/x)*(-15*x^2 + 5*x^3))*Log[3 - x])
,x]
```

output
```
Log[24 + 5*E^(3/x)] - Log[x] - Log[x - Log[3 - x]]
```

3.7.3 Rubi [A] (verified)

Time = 2.67 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.022$, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{48x^3-168x^2+\left(-24x^2+e^{3/x}\left(45-5x^2\right)+72x\right)\log(3-x)+e^{3/x}\left(10x^3-20x^2-45x\right)}{-24x^4+72x^3+e^{3/x}\left(15x^3-5x^4\right)+\left(24x^3-72x^2+e^{3/x}\left(5x^3-15x^2\right)\right)\log(3-x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{48x^3-168x^2+\left(-24x^2+e^{3/x}\left(45-5x^2\right)+72x\right)\log(3-x)+e^{3/x}\left(10x^3-20x^2-45x\right)}{\left(5e^{3/x}+24\right)(3-x)x^2(x-\log(3-x))}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{72}{\left(5e^{3/x}+24\right)x^2}+\frac{-2x^3+4x^2+x^2\log(3-x)+9x-9\log(3-x)}{(x-3)x^2(x-\log(3-x))}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log\left(5e^{3/x}+24\right)-\log(x)-\log(x-\log(3-x))$$

input
```
Int[(-168*x^2 + 48*x^3 + E^(3/x)*(-45*x - 20*x^2 + 10*x^3) + (72*x - 24*x^
2 + E^(3/x)*(45 - 5*x^2))*Log[3 - x])/(72*x^3 - 24*x^4 + E^(3/x)*(15*x^3 -
 5*x^4) + (-72*x^2 + 24*x^3 + E^(3/x)*(-15*x^2 + 5*x^3))*Log[3 - x]),x]
```

output
```
Log[24 + 5*E^(3/x)] - Log[x] - Log[x - Log[3 - x]]
```

3.7.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.7.4 Maple [A] (verified)

Time = 0.64 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.93

method	result	size
risch	$-\ln(x)+\ln\left(\mathrm{e}^{\frac{3}{x}}+\frac{24}{5}\right)-\ln(\ln(-x+3)-x)$	28
parallelrisch	$-\ln(x)-\ln(x-\ln(-x+3))+\ln\left(\mathrm{e}^{\frac{3}{x}}+\frac{24}{5}\right)$	28
norman	$-\ln(x)-\ln(x-\ln(-x+3))+\ln\left(5\,\mathrm{e}^{\frac{3}{x}}+24\right)$	30

input
```
int((((-5*x^2+45)*exp(3/x)-24*x^2+72*x)*ln(-x+3)+(10*x^3-20*x^2-45*x)*exp(
3/x)+48*x^3-168*x^2)/(((5*x^3-15*x^2)*exp(3/x)+24*x^3-72*x^2)*ln(-x+3)+(-5
*x^4+15*x^3)*exp(3/x)-24*x^4+72*x^3),x,method=_RETURNVERBOSE)
```

output
```
-ln(x)+ln(exp(3/x)+24/5)-ln(ln(-x+3)-x)
```

3.7.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{-168x^2+48x^3+e^{3/x}(-45x-20x^2+10x^3)+\left(72x-24x^2+e^{3/x}(45-5x^2)\right)\log(3-x)}{72x^3-24x^4+e^{3/x}\left(15x^3-5x^4\right)+\left(-72x^2+24x^3+e^{3/x}\left(-15x^2+5x^3\right)\right)\log(3-x)}\,dx = -\log(x)-\log(-x+\log(-x+3))+\log\left(5\,e^{\frac{3}{x}}+24\right)$$

input
```
integrate((((-5*x^2+45)*exp(3/x)-24*x^2+72*x)*log(-x+3)+(10*x^3-20*x^2-45*
x)*exp(3/x)+48*x^3-168*x^2)/(((5*x^3-15*x^2)*exp(3/x)+24*x^3-72*x^2)*log(-
x+3)+(-5*x^4+15*x^3)*exp(3/x)-24*x^4+72*x^3),x, algorithm=\
```

output
```
-log(x) - log(-x + log(-x + 3)) + log(5*e^(3/x) + 24)
```

3.7.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \frac{-168x^2+48x^3+e^{3/x}(-45x-20x^2+10x^3)+\left(72x-24x^2+e^{3/x}(45-5x^2)\right)\log(3-x)}{72x^3-24x^4+e^{3/x}\left(15x^3-5x^4\right)+\left(-72x^2+24x^3+e^{3/x}\left(-15x^2+5x^3\right)\right)\log(3-x)}\,dx =$$
$$-\log\left(x\right)-\log\left(-x+\log\left(3-x\right)\right)+\log\left(e^{\frac{3}{x}}+\frac{24}{5}\right)$$

input
```
integrate(((((-5*x**2+45)*exp(3/x)-24*x**2+72*x)*ln(-x+3)+(10*x**3-20*x**2-
45*x)*exp(3/x)+48*x**3-168*x**2)/(((5*x**3-15*x**2)*exp(3/x)+24*x**3-72*x*
*2)*ln(-x+3)+(-5*x**4+15*x**3)*exp(3/x)-24*x**4+72*x**3),x)
```

output
```
-log(x) - log(-x + log(3 - x)) + log(exp(3/x) + 24/5)
```

3.7.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{-168x^2+48x^3+e^{3/x}(-45x-20x^2+10x^3)+\left(72x-24x^2+e^{3/x}(45-5x^2)\right)\log(3-x)}{72x^3-24x^4+e^{3/x}\left(15x^3-5x^4\right)+\left(-72x^2+24x^3+e^{3/x}\left(-15x^2+5x^3\right)\right)\log(3-x)}\,dx =$$
$$-\log\left(x\right)-\log\left(-x+\log\left(-x+3\right)\right)+\log\left(e^{\frac{3}{x}}+\frac{24}{5}\right)$$

input
```
integrate(((((-5*x^2+45)*exp(3/x)-24*x^2+72*x)*log(-x+3)+(10*x^3-20*x^2-45*
x)*exp(3/x)+48*x^3-168*x^2)/(((5*x^3-15*x^2)*exp(3/x)+24*x^3-72*x^2)*log(-
x+3)+(-5*x^4+15*x^3)*exp(3/x)-24*x^4+72*x^3),x, algorithm=\
```

output
```
-log(x) - log(-x + log(-x + 3)) + log(e^(3/x) + 24/5)
```

3.7.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{-168x^2+48x^3+e^{3/x}(-45x-20x^2+10x^3)+\left(72x-24x^2+e^{3/x}(45-5x^2)\right)\log(3-x)}{72x^3-24x^4+e^{3/x}\left(15x^3-5x^4\right)+\left(-72x^2+24x^3+e^{3/x}\left(-15x^2+5x^3\right)\right)\log(3-x)}\,dx = -\log\left(x\right)-\log\left(-x+\log\left(-x+3\right)\right)+\log\left(5\,e^{\frac{3}{x}}+24\right)$$

input
```
integrate((((-5*x^2+45)*exp(3/x)-24*x^2+72*x)*log(-x+3)+(10*x^3-20*x^2-45*
x)*exp(3/x)+48*x^3-168*x^2)/(((5*x^3-15*x^2)*exp(3/x)+24*x^3-72*x^2)*log(-
x+3)+(-5*x^4+15*x^3)*exp(3/x)-24*x^4+72*x^3),x, algorithm=\
```

output
```
-log(x) - log(-x + log(-x + 3)) + log(5*e^(3/x) + 24)
```

3.7.9 Mupad [B] (verification not implemented)

Time = 13.73 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{-168x^2+48x^3+e^{3/x}(-45x-20x^2+10x^3)+\left(72x-24x^2+e^{3/x}(45-5x^2)\right)\log(3-x)}{72x^3-24x^4+e^{3/x}\left(15x^3-5x^4\right)+\left(-72x^2+24x^3+e^{3/x}\left(-15x^2+5x^3\right)\right)\log(3-x)}\,dx = \ln\left(e^{3/x}+\right.$$

input
```
int((log(3 - x)*(exp(3/x)*(5*x^2 - 45) - 72*x + 24*x^2) + exp(3/x)*(45*x +
 20*x^2 - 10*x^3) + 168*x^2 - 48*x^3)/(log(3 - x)*(exp(3/x)*(15*x^2 - 5*x^
3) + 72*x^2 - 24*x^3) - exp(3/x)*(15*x^3 - 5*x^4) - 72*x^3 + 24*x^4),x)
```

output
```
log(exp(3/x) + 24/5) - log(log(3 - x) - x) - log(x)
```

3.8 $\int \frac{-5+5x-4x^2+20x^3+9x^4}{5x-6x^2+2x^3+9x^4} dx$

3.8.1 Optimal result

Integrand size = 42, antiderivative size = 29

$$\int \frac{-5+5x-4x^2+20x^3+9x^4}{5x-6x^2+2x^3+9x^4} dx = \log\left(e^x(3-x)-\frac{1}{2}e^x\left(\frac{5}{x}+9x^2\right)\right)$$

output
```
ln((-x+3)*exp(x)-1/2*(9*x^2+5/x)*exp(x))
```

3.8.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{-5+5x-4x^2+20x^3+9x^4}{5x-6x^2+2x^3+9x^4} dx = x-\log(x)+\log\left(5-6x+2x^2+9x^3\right)$$

input
```
Integrate[(-5 + 5*x - 4*x^2 + 20*x^3 + 9*x^4)/(5*x - 6*x^2 + 2*x^3 + 9*x^4
),x]
```

output
```
x - Log[x] + Log[5 - 6*x + 2*x^2 + 9*x^3]
```

3.8.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{9x^4+20x^3-4x^2+5x-5}{9x^4+2x^3-6x^2+5x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{9x^4+20x^3-4x^2+5x-5}{x\left(9x^3+2x^2-6x+5\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{27x^2+4x-6}{9x^3+2x^2-6x+5}-\frac{1}{x}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log\left(9x^3+2x^2-6x+5\right)+x-\log(x)$$

input
```
Int[(-5 + 5*x - 4*x^2 + 20*x^3 + 9*x^4)/(5*x - 6*x^2 + 2*x^3 + 9*x^4),x]
```

output
```
x - Log[x] + Log[5 - 6*x + 2*x^2 + 9*x^3]
```

3.8.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.8.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.72

method	result	size
parallelrisch	$x-\ln\left(x\right)+\ln\left(x^{3}+\frac{2}{9}x^{2}-\frac{2}{3}x+\frac{5}{9}\right)$	21
default	$x-\ln\left(x\right)+\ln\left(9x^{3}+2x^{2}-6x+5\right)$	23
norman	$x-\ln\left(x\right)+\ln\left(9x^{3}+2x^{2}-6x+5\right)$	23
risch	$x-\ln\left(x\right)+\ln\left(9x^{3}+2x^{2}-6x+5\right)$	23

input
```
int((9*x^4+20*x^3-4*x^2+5*x-5)/(9*x^4+2*x^3-6*x^2+5*x),x,method=_RETURNVER
BOSE)
```

output
```
x-ln(x)+ln(x^3+2/9*x^2-2/3*x+5/9)
```

3.8.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{-5+5x-4x^2+20x^3+9x^4}{5x-6x^2+2x^3+9x^4}\,dx = x+\log\left(9\,x^{3}+2\,x^{2}-6\,x+5\right)-\log\left(x\right)$$

input
```
integrate((9*x^4+20*x^3-4*x^2+5*x-5)/(9*x^4+2*x^3-6*x^2+5*x),x, algorithm=
\
```

output
```
x + log(9*x^3 + 2*x^2 - 6*x + 5) - log(x)
```

3.8.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{-5+5x-4x^2+20x^3+9x^4}{5x-6x^2+2x^3+9x^4}\,dx = x-\log\left(x\right)+\log\left(9x^{3}+2x^{2}-6x+5\right)$$

input
```
integrate((9*x**4+20*x**3-4*x**2+5*x-5)/(9*x**4+2*x**3-6*x**2+5*x),x)
```

output
```
x - log(x) + log(9*x**3 + 2*x**2 - 6*x + 5)
```

3.8.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{-5+5x-4x^2+20x^3+9x^4}{5x-6x^2+2x^3+9x^4}\,dx = x+\log\left(9\,x^3+2\,x^2-6\,x+5\right)-\log\left(x\right)$$

input
```
integrate((9*x^4+20*x^3-4*x^2+5*x-5)/(9*x^4+2*x^3-6*x^2+5*x),x, algorithm=
\
```

output
```
x + log(9*x^3 + 2*x^2 - 6*x + 5) - log(x)
```

3.8.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

$$\int \frac{-5+5x-4x^2+20x^3+9x^4}{5x-6x^2+2x^3+9x^4}\,dx = x+\log\left(\left|9\,x^3+2\,x^2-6\,x+5\right|\right)-\log\left(|x|\right)$$

input
```
integrate((9*x^4+20*x^3-4*x^2+5*x-5)/(9*x^4+2*x^3-6*x^2+5*x),x, algorithm=
\
```

output
```
x + log(abs(9*x^3 + 2*x^2 - 6*x + 5)) - log(abs(x))
```

3.8.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{-5+5x-4x^2+20x^3+9x^4}{5x-6x^2+2x^3+9x^4}\,dx = x+\ln\left(9\,x^3+2\,x^2-6\,x+5\right)-\ln\left(x\right)$$

input
```
int((5*x - 4*x^2 + 20*x^3 + 9*x^4 - 5)/(5*x - 6*x^2 + 2*x^3 + 9*x^4),x)
```

output
```
x + log(2*x^2 - 6*x + 9*x^3 + 5) - log(x)
```

3.9 $\int \frac{2x}{25x^2+x^3+(50x+2x^2)\log(5)+(25+x)\log^2(5)+(100x+4x^2+(100+4x)\log}$

3.9.1 Optimal result

Integrand size = 145, antiderivative size = 22

$$\int \frac{2x+(25+x)\log(5)+(50}{25x^2+x^3+(50x+2x^2)\log(5)+(25+x)\log^2(5)+(100x+4x^2+(100+4x)\log(5))\log(16)+(100+4}$$
$$=2+\frac{x}{x+\log(5)+2\log(16)-\log\left((25+x)^2\right)}$$

output
```
x/(8*ln(2)-ln((x+25)^2)+ln(5)+x)+2
```

3.9.2 Mathematica [A] (verified)

Time = 5.23 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{2x+(25+x)\log(5)+(50}{25x^2+x^3+(50x+2x^2)\log(5)+(25+x)\log^2(5)+(100x+4x^2+(100+4x)\log(5))\log(16)+(100+4}$$
$$=\frac{x}{x+\log(1280)-\log\left((25+x)^2\right)}$$

input
```
Integrate[(2*x + (25 + x)*Log[5] + (50 + 2*x)*Log[16] + (-25 - x)*Log[625
+ 50*x + x^2])/(25*x^2 + x^3 + (50*x + 2*x^2)*Log[5] + (25 + x)*Log[5]^2 +
 (100*x + 4*x^2 + (100 + 4*x)*Log[5])*Log[16] + (100 + 4*x)*Log[16]^2 + (-
50*x - 2*x^2 + (-50 - 2*x)*Log[5] + (-100 - 4*x)*Log[16])*Log[625 + 50*x +
 x^2] + (25 + x)*Log[625 + 50*x + x^2]^2),x]
```

output
```
x/(x + Log[1280] - Log[(25 + x)^2])
```

3.9.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-x-25)\log\left(x^2+50x+625\right) -}{x^3+25x^2+(x+25)\log^2\left(x^2+50x+625\right)+\left(-2x^2-50x+(-4x-100)\log(16)+(-2x-50)\log(5)\right)\log\left(x^2\right.}$$

$$\Big\downarrow \; 7239$$

$$\int \frac{x(2+\log(1280))-(x+25)\log\left((x+25)^2\right)+25\log(1280)}{(x+25)\left(x-\log\left((x+25)^2\right)+\log(1280)\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{1}{x-\log\left((x+25)^2\right)+\log(1280)}-\frac{x(x+23)}{(x+25)\left(x-\log\left((x+25)^2\right)+\log(1280)\right)^2}\right)dx$$

$$\Big\downarrow \; 2009$$

$$2\int \frac{1}{\left(x-\log\left((x+25)^2\right)+\log(1280)\right)^2}dx-\int \frac{x}{\left(x-\log\left((x+25)^2\right)+\log(1280)\right)^2}dx-50\int \frac{1}{(x+25)\left(x-\log\left((x+25)^2\right)+\log(1280)\right)^2}dx+\int \frac{1}{x-\log\left((x+25)^2\right)+\log(1280)}dx$$

input
```
Int[(2*x + (25 + x)*Log[5] + (50 + 2*x)*Log[16] + (-25 - x)*Log[625 + 50*x
 + x^2])/(25*x^2 + x^3 + (50*x + 2*x^2)*Log[5] + (25 + x)*Log[5]^2 + (100*
x + 4*x^2 + (100 + 4*x)*Log[5])*Log[16] + (100 + 4*x)*Log[16]^2 + (-50*x -
 2*x^2 + (-50 - 2*x)*Log[5] + (-100 - 4*x)*Log[16])*Log[625 + 50*x + x^2]
+ (25 + x)*Log[625 + 50*x + x^2]^2),x]
```

output
```
$Aborted
```

3.9.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.9.4 Maple [A] (verified)

Time = 1.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

method	result	size
risch	$\frac{x}{\ln(5)+8\ln(2)-\ln(x^2+50x+625)+x}$	24
parallelrisch	$\frac{x}{\ln(5)+8\ln(2)-\ln(x^2+50x+625)+x}$	24
norman	$\frac{\ln(x^2+50x+625)-\ln(5)-8\ln(2)}{\ln(5)+8\ln(2)-\ln(x^2+50x+625)+x}$	41

input
```
int(((-x-25)*ln(x^2+50*x+625)+4*(2*x+50)*ln(2)+(x+25)*ln(5)+2*x)/((x+25)*l
n(x^2+50*x+625)^2+(4*(-4*x-100)*ln(2)+(-2*x-50)*ln(5)-2*x^2-50*x)*ln(x^2+5
0*x+625)+16*(4*x+100)*ln(2)^2+4*((4*x+100)*ln(5)+4*x^2+100*x)*ln(2)+(x+25)
*ln(5)^2+(2*x^2+50*x)*ln(5)+x^3+25*x^2),x,method=_RETURNVERBOSE)
```

output
```
x/(ln(5)+8*ln(2)-ln(x^2+50*x+625)+x)
```

3.9.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{2x+(25+x)\log(5)+(50}{25x^2+x^3+(50x+2x^2)\log(5)+(25+x)\log^2(5)+(100x+4x^2+(100+4x)\log(5))\log(16)+(100+}$$
$$=\frac{x}{x+\log(5)+8\log(2)-\log(x^2+50x+625)}$$

input
```
integrate(((-x-25)*log(x^2+50*x+625)+4*(2*x+50)*log(2)+(x+25)*log(5)+2*x)/
((x+25)*log(x^2+50*x+625)^2+(4*(-4*x-100)*log(2)+(-2*x-50)*log(5)-2*x^2-50
*x)*log(x^2+50*x+625)+16*(4*x+100)*log(2)^2+4*((4*x+100)*log(5)+4*x^2+100*
x)*log(2)+(x+25)*log(5)^2+(2*x^2+50*x)*log(5)+x^3+25*x^2),x, algorithm=\
```

output
```
x/(x + log(5) + 8*log(2) - log(x^2 + 50*x + 625))
```

3.9.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{2x+(25+x)\log(5)+(50}{25x^2+x^3+(50x+2x^2)\log(5)+(25+x)\log^2(5)+(100x+4x^2+(100+4x)\log(5))\log(16)+(100+}$$
$$= -\frac{x}{-x+\log(x^2+50x+625)-8\log(2)-\log(5)}$$

input
```
integrate(((-x-25)*ln(x**2+50*x+625)+4*(2*x+50)*ln(2)+(x+25)*ln(5)+2*x)/((
x+25)*ln(x**2+50*x+625)**2+(4*(-4*x-100)*ln(2)+(-2*x-50)*ln(5)-2*x**2-50*x
)*ln(x**2+50*x+625)+16*(4*x+100)*ln(2)**2+4*((4*x+100)*ln(5)+4*x**2+100*x)
*ln(2)+(x+25)*ln(5)**2+(2*x**2+50*x)*ln(5)+x**3+25*x**2),x)
```

output
```
-x/(-x + log(x**2 + 50*x + 625) - 8*log(2) - log(5))
```

3.9.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{2x+(25+x)\log(5)+(50}{25x^2+x^3+(50x+2x^2)\log(5)+(25+x)\log^2(5)+(100x+4x^2+(100+4x)\log(5))\log(16)+(100+}$$
$$= \frac{x}{x+\log(5)+8\log(2)-2\log(x+25)}$$

input
```
integrate(((-x-25)*log(x^2+50*x+625)+4*(2*x+50)*log(2)+(x+25)*log(5)+2*x)/
((x+25)*log(x^2+50*x+625)^2+(4*(-4*x-100)*log(2)+(-2*x-50)*log(5)-2*x^2-50
*x)*log(x^2+50*x+625)+16*(4*x+100)*log(2)^2+4*((4*x+100)*log(5)+4*x^2+100*
x)*log(2)+(x+25)*log(5)^2+(2*x^2+50*x)*log(5)+x^3+25*x^2),x, algorithm=\
```

output
```
x/(x + log(5) + 8*log(2) - 2*log(x + 25))
```

3.9.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{2x + (25 + x)\log(5) + (50}{25x^2 + x^3 + (50x + 2x^2)\log(5) + (25 + x)\log^2(5) + (100x + 4x^2 + (100 + 4x)\log(5))\log(16) + (100 + 4}$$
$$= \frac{x}{x + \log(5) + 8\log(2) - \log(x^2 + 50x + 625)}$$

input
```
integrate(((-x-25)*log(x^2+50*x+625)+4*(2*x+50)*log(2)+(x+25)*log(5)+2*x)/
((x+25)*log(x^2+50*x+625)^2+(4*(-4*x-100)*log(2)+(-2*x-50)*log(5)-2*x^2-50
*x)*log(x^2+50*x+625)+16*(4*x+100)*log(2)^2+4*((4*x+100)*log(5)+4*x^2+100*
x)*log(2)+(x+25)*log(5)^2+(2*x^2+50*x)*log(5)+x^3+25*x^2),x, algorithm=\
```

output
```
x/(x + log(5) + 8*log(2) - log(x^2 + 50*x + 625))
```

3.9.9 Mupad [F(-1)]

Timed out.

$$\int \frac{2x + (25 + x)\log(5) + (50}{25x^2 + x^3 + (50x + 2x^2)\log(5) + (25 + x)\log^2(5) + (100x + 4x^2 + (100 + 4x)\log(5))\log(16) + (100 + 4}$$
$$= \int \frac{2x + 4\ln(2)(2x + 50)}{\ln(5)^2(x + 25) + \ln(x^2 + 50x + 625)^2(x + 25) + \ln(5)(2x^2 + 50x) + 4\ln(2)(100x + \ln(5)(4x +}$$

input
```
int((2*x + 4*log(2)*(2*x + 50) + log(5)*(x + 25) - log(50*x + x^2 + 625)*(
x + 25))/(log(5)^2*(x + 25) + log(50*x + x^2 + 625)^2*(x + 25) + log(5)*(5
0*x + 2*x^2) + 4*log(2)*(100*x + log(5)*(4*x + 100) + 4*x^2) - log(50*x +
x^2 + 625)*(50*x + log(5)*(2*x + 50) + 4*log(2)*(4*x + 100) + 2*x^2) + 16*
log(2)^2*(4*x + 100) + 25*x^2 + x^3),x)
```

output
```
int((2*x + 4*log(2)*(2*x + 50) + log(5)*(x + 25) - log(50*x + x^2 + 625)*(
x + 25))/(log(5)^2*(x + 25) + log(50*x + x^2 + 625)^2*(x + 25) + log(5)*(5
0*x + 2*x^2) + 4*log(2)*(100*x + log(5)*(4*x + 100) + 4*x^2) - log(50*x +
x^2 + 625)*(50*x + log(5)*(2*x + 50) + 4*log(2)*(4*x + 100) + 2*x^2) + 16*
log(2)^2*(4*x + 100) + 25*x^2 + x^3), x)
```

3.10 $\int \frac{4-x+(4-x)\log(5)+\log^2(5)}{-4+x}\,dx$

3.10.1 Optimal result

Integrand size = 23, antiderivative size = 21

$$\int \frac{4-x+(4-x)\log(5)+\log^2(5)}{-4+x}\,dx = 8-x+\log(5)(-x+\log(5)\log(4-x))$$

output
```
ln(5)*(ln(-x+4)*ln(5)-x)-x+8
```

3.10.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{4-x+(4-x)\log(5)+\log^2(5)}{-4+x}\,dx = (-4+x)(-1-\log(5))+\log^2(5)\log(-4+x)$$

input
```
Integrate[(4 - x + (4 - x)*Log[5] + Log[5]^2)/(-4 + x),x]
```

output
```
(-4 + x)*(-1 - Log[5]) + Log[5]^2*Log[-4 + x]
```

3.10.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {204, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x+(4-x)\log(5)+4+\log^2(5)}{x-4}\,dx$$

$$\Big\downarrow \text{ 204}$$

$$\int \frac{(2+\log(5))^2-x(1+\log(5))}{x-4}dx$$

$$\Big\downarrow \text{ 49}$$

$$\int \left(\frac{\log^2(5)}{x-4}-1-\log(5)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\log^2(5)\log(4-x)-x(1+\log(5))$$

input
```
Int[(4 - x + (4 - x)*Log[5] + Log[5]^2)/(-4 + x),x]
```

output
```
-(x*(1 + Log[5])) + Log[5]^2*Log[4 - x]
```

3.10.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 204
```
Int[(u_)^(m_.)*(v_)^(n_.), x_Symbol] :> Int[ExpandToSum[u, x]^m*ExpandToSum
[v, x]^n, x] /; FreeQ[{m, n}, x] && LinearQ[{u, v}, x] &&  !LinearMatchQ[{u
, v}, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.10.4 Maple [A] (verified)

Time = 0.68 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

method	result
default	$-x\ln(5)-x+\ln(5)^{2}\ln(x-4)$
norman	$(-\ln(5)-1)\,x+\ln(5)^{2}\ln(x-4)$
risch	$-x\ln(5)-x+\ln(5)^{2}\ln(x-4)$
parallelrisch	$-x\ln(5)-x+\ln(5)^{2}\ln(x-4)$
meijerg	$4\ln\left(-\frac{x}{4}+1\right)-4(-\ln(5)-1)\left(-\frac{x}{4}-\ln\left(-\frac{x}{4}+1\right)\right)+\ln(5)^{2}\ln\left(-\frac{x}{4}+1\right)+4\ln(5)\ln\left(-\frac{x}{4}\right.$

input
```
int((ln(5)^2+(-x+4)*ln(5)-x+4)/(x-4),x,method=_RETURNVERBOSE)
```

output
```
-x*ln(5)-x+ln(5)^2*ln(x-4)
```

3.10.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{4-x+(4-x)\log(5)+\log^2(5)}{-4+x}\,dx=\log(5)^2\log(x-4)-x\log(5)-x$$

input
```
integrate((log(5)^2+(-x+4)*log(5)-x+4)/(x-4),x, algorithm=\
```

output
```
log(5)^2*log(x - 4) - x*log(5) - x
```

3.10.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \frac{4-x+(4-x)\log(5)+\log^2(5)}{-4+x}\,dx=-x(1+\log(5))+\log(5)^2\log(x-4)$$

input
```
integrate((ln(5)**2+(-x+4)*ln(5)-x+4)/(x-4),x)
```

output
```
-x*(1 + log(5)) + log(5)**2*log(x - 4)
```

3.10.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{4-x+(4-x)\log(5)+\log^2(5)}{-4+x}\,dx = \log{(5)}^2\log{(x-4)} - x(\log{(5)}+1)$$

input
```
integrate((log(5)^2+(-x+4)*log(5)-x+4)/(x-4),x, algorithm=\
```

output
```
log(5)^2*log(x - 4) - x*(log(5) + 1)
```

3.10.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{4-x+(4-x)\log(5)+\log^2(5)}{-4+x}\,dx = \log{(5)}^2\log{(|x-4|)} - x\log{(5)} - x$$

input
```
integrate((log(5)^2+(-x+4)*log(5)-x+4)/(x-4),x, algorithm=\
```

output
```
log(5)^2*log(abs(x - 4)) - x*log(5) - x
```

3.10.9 Mupad [B] (verification not implemented)

Time = 13.61 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{4-x+(4-x)\log(5)+\log^2(5)}{-4+x}\,dx = \ln{(x-4)}\,\ln{(5)}^2 - x\,(\ln{(5)}+1)$$

input
```
int(-(x + log(5)*(x - 4) - log(5)^2 - 4)/(x - 4),x)
```

output
```
log(x - 4)*log(5)^2 - x*(log(5) + 1)
```

3.11 $\int \frac{e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x\right.}{e^{10}x^3\log(x)-2e^{10}x^3\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}x^3\log}$

3.11.1 Optimal result

Integrand size = 160, antiderivative size = 30

$$\int \frac{e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x)+(-6-e^{10}x^3)\log(x)\log\left(\frac{x}{5\log(x)}\right.\right.}{e^{10}x^3\log(x)-2e^{10}x^3\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}x^3\log(x)\log^2\left(\frac{x}{5\log(x)}\right)}$$

$$= e^{\frac{-1+\frac{3}{e^{10}x^2}-x}{-1+\log\left(\frac{x}{5\log(x)}\right)}}$$

output
```
exp(1/(ln(1/5*x/ln(x))-1)*(3/x^2/exp(5)^2-x-1))
```

3.11.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.20

$$\int \frac{e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x)+(-6-e^{10}x^3)\log(x)\log\left(\frac{x}{5\log(x)}\right.\right.}{e^{10}x^3\log(x)-2e^{10}x^3\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}x^3\log(x)\log^2\left(\frac{x}{5\log(x)}\right)}$$

$$= e^{\frac{3-e^{10}x^2(1+x)}{e^{10}x^2\left(-1+\log\left(\frac{x}{5\log(x)}\right)\right)}}$$

3.11.

$e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x)+(-6-e^{10}x^3)\log(x)\log\left(\frac{x}{\ldots}\right)\right)$

input
```
Integrate[(E^((3 + E^10*(-x^2 - x^3))/(-(E^10*x^2) + E^10*x^2*Log[x/(5*Log
[x])]))*(3 + E^10*(-x^2 - x^3) + (3 + E^10*(x^2 + 2*x^3))*Log[x] + (-6 - E
^10*x^3)*Log[x]*Log[x/(5*Log[x])]))/(E^10*x^3*Log[x] - 2*E^10*x^3*Log[x]*L
og[x/(5*Log[x])] + E^10*x^3*Log[x]*Log[x/(5*Log[x])]^2),x]
```

output
```
E^((3 - E^10*x^2*(1 + x))/(E^10*x^2*(-1 + Log[x/(5*Log[x])])))
```

3.11.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\left(-e^{10}x^3-6\right)\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}\left(-x^3-x^2\right)+\left(e^{10}\left(2x^3+x^2\right)+3\right)\log(x)+3\right)\exp\left(\frac{e^{10}\left(-x^3-x^2\right)+3}{e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)-e\right.}{e^{10}x^3\log(x)\log^2\left(\frac{x}{5\log(x)}\right)+e^{10}x^3\log(x)-2e^{10}x^3\log(x)\log\left(\frac{x}{5\log(x)}\right)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\left(\left(-e^{10}x^3-6\right)\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}\left(-x^3-x^2\right)+\left(e^{10}\left(2x^3+x^2\right)+3\right)\log(x)+3\right)\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-\right.}\right.}{x^3\log(x)\left(1-\log\left(\frac{x}{5\log(x)}\right)\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{\left(-e^{10}x^3-6\right)\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}-10\right)}{x^3\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}+\frac{\left(e^{10}x^3+e^{10}x^2-3\right)(\log(x)-1)\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}\right.}{x^3\log(x)\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}\right)}{\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)^2}dx-3\int \frac{\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}-10\right)}{x^3\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)^2}dx+\int \frac{\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}\right)}{x\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)^2}dx-\int \frac{\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}\right)}{\log(x)\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)^2}dx+3\int \frac{\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}-10\right)}{x^3\log(x)\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)^2}dx-\int \frac{\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}\right)}{x\log(x)\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)^2}dx-\int \frac{\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}\right)}{\log\left(\frac{x}{5\log(x)}\right)-1}dx-6\int \frac{\exp\left(\frac{-e^{10}x^3-e^{10}x^2+3}{e^{10}x^2\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}-10\right)}{x^3\left(\log\left(\frac{x}{5\log(x)}\right)-1\right)}dx$$

input
```
Int[(E^((3 + E^10*(-x^2 - x^3))/(-(E^10*x^2) + E^10*x^2*Log[x/(5*Log[x])])
)*(3 + E^10*(-x^2 - x^3) + (3 + E^10*(x^2 + 2*x^3))*Log[x] + (-6 - E^10*x^
3)*Log[x]*Log[x/(5*Log[x])]))/(E^10*x^3*Log[x] - 2*E^10*x^3*Log[x]*Log[x/(
5*Log[x])] + E^10*x^3*Log[x]*Log[x/(5*Log[x])]^2),x]
```

output
```
$Aborted
```

3.11.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.11.4 Maple [A] (verified)

Time = 210.64 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.33

method	result
parallelrisch	$\mathrm{e}^{\frac{\left(\left(-x^{3}-x^{2}\right)\mathrm{e}^{10}+3\right)\mathrm{e}^{-10}}{x^{2}\left(\ln\left(\frac{x}{5\ln(x)}\right)-1\right)}}$
risch	$\mathrm{e}^{\frac{2\left(x^{3}\mathrm{e}^{10}+x^{2}\mathrm{e}^{10}-3\right)\mathrm{e}^{-10}}{x^{2}\left(i\pi\,\mathrm{csgn}\left(\frac{ix}{\ln(x)}\right)^{3}-i\pi\,\mathrm{csgn}\left(\frac{ix}{\ln(x)}\right)^{2}\mathrm{csgn}(ix)-i\pi\,\mathrm{csgn}\left(\frac{ix}{\ln(x)}\right)^{2}\mathrm{csgn}\left(\frac{i}{\ln(x)}\right)+i\pi\,\mathrm{csgn}\left(\frac{ix}{\ln(x)}\right)\mathrm{csgn}(ix)\,\mathrm{csgn}\left(\frac{i}{\ln(x)}\right)+2\ln(5)-2\ln(x)-}}$

input
```
int(((-x^3*exp(5)^2-6)*ln(x)*ln(1/5*x/ln(x))+((2*x^3+x^2)*exp(5)^2+3)*ln(x
)+(-x^3-x^2)*exp(5)^2+3)*exp(((-x^3-x^2)*exp(5)^2+3)/(x^2*exp(5)^2*ln(1/5*
x/ln(x))-x^2*exp(5)^2))/(x^3*exp(5)^2*ln(x)*ln(1/5*x/ln(x))^2-2*x^3*exp(5)
^2*ln(x)*ln(1/5*x/ln(x))+x^3*exp(5)^2*ln(x)),x,method=_RETURNVERBOSE)
```

output
```
exp(((-x^3-x^2)*exp(5)^2+3)/x^2/exp(5)^2/(ln(1/5*x/ln(x))-1))
```

3.11.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.30

$$\int \frac{e^{\frac{3+e^{10}\left(-x^{2}-x^{3}\right)}{-e^{10}x^{2}+e^{10}x^{2}\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^{2}-x^{3})+(3+e^{10}(x^{2}+2x^{3}))\log(x)+(-6-e^{10}x^{3})\log(x)\log\left(\frac{x}{5\log(x)}\right)\right)}{e^{10}x^{3}\log(x)-2e^{10}x^{3}\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}x^{3}\log(x)\log^{2}\left(\frac{x}{5\log(x)}\right)}$$
$$= e^{\left(-\frac{\left(x^{3}+x^{2}\right)e^{10}-3}{x^{2}e^{10}\log\left(\frac{x}{5\log(x)}\right)-x^{2}e^{10}}\right)}$$

input
```
integrate(((-x^3*exp(5)^2-6)*log(x)*log(1/5*x/log(x))+((2*x^3+x^2)*exp(5)^
2+3)*log(x)+(-x^3-x^2)*exp(5)^2+3)*exp(((-x^3-x^2)*exp(5)^2+3)/(x^2*exp(5)
^2*log(1/5*x/log(x))-x^2*exp(5)^2))/(x^3*exp(5)^2*log(x)*log(1/5*x/log(x))
^2-2*x^3*exp(5)^2*log(x)*log(1/5*x/log(x))+x^3*exp(5)^2*log(x)),x, algorit
hm=\
```

output
```
e^(-((x^3 + x^2)*e^10 - 3)/(x^2*e^10*log(1/5*x/log(x)) - x^2*e^10))
```

3.11. $e^{\frac{3+e^{10}\left(-x^{2}-x^{3}\right)}{-e^{10}x^{2}+e^{10}x^{2}\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^{2}-x^{3})+(3+e^{10}(x^{2}+2x^{3}))\log(x)+(-6-e^{10}x^{3})\log(x)\log\left(\frac{x}{5\log(x)}\right)\right)$

3.11.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x)+(-6-e^{10}x^3)\log(x)\log\left(\frac{x}{5\log(x)}\right)\right)}{e^{10}x^3\log(x)-2e^{10}x^3\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}x^3\log(x)\log^2\left(\frac{x}{5\log(x)}\right)}$$
= Exception raised: TypeError

input
```
integrate((((-x**3*exp(5)**2-6)*ln(x)*ln(1/5*x/ln(x))+((2*x**3+x**2)*exp(5)
**2+3)*ln(x)+(-x**3-x**2)*exp(5)**2+3)*exp(((-x**3-x**2)*exp(5)**2+3)/(x**
2*exp(5)**2*ln(1/5*x/ln(x))-x**2*exp(5)**2))/(x**3*exp(5)**2*ln(x)*ln(1/5*
x/ln(x))**2-2*x**3*exp(5)**2*ln(x)*ln(1/5*x/ln(x))+x**3*exp(5)**2*ln(x)),x
)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.11.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x)+(-6-e^{10}x^3)\log(x)\log\left(\frac{x}{5\log(x)}\right)\right)}{e^{10}x^3\log(x)-2e^{10}x^3\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}x^3\log(x)\log^2\left(\frac{x}{5\log(x)}\right)}$$
= Exception raised: RuntimeError

input
```
integrate((((-x^3*exp(5)^2-6)*log(x)*log(1/5*x/log(x))+((2*x^3+x^2)*exp(5)^
2+3)*log(x)+(-x^3-x^2)*exp(5)^2+3)*exp(((-x^3-x^2)*exp(5)^2+3)/(x^2*exp(5)
^2*log(1/5*x/log(x))-x^2*exp(5)^2))/(x^3*exp(5)^2*log(x)*log(1/5*x/log(x))
^2-2*x^3*exp(5)^2*log(x)*log(1/5*x/log(x))+x^3*exp(5)^2*log(x)),x, algorit
hm=\
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.11. $e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x)+(-6-e^{10}x^3)\log(x)\log\left(\frac{x}{\dots}\right)\right)$

3.11.8 Giac [F]

$$\int \frac{e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x)+(-6-e^{10}x^3)\log(x)\log\left(\frac{x}{5\log(x)}\right.\right.}{e^{10}x^3\log(x)-2e^{10}x^3\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}x^3\log(x)\log^2\left(\frac{x}{5\log(x)}\right)}$$

$$=\int -\frac{\left((x^3e^{10}+6)\log(x)\log\left(\frac{x}{5\log(x)}\right)+(x^3+x^2)e^{10}-((2x^3+x^2)e^{10}+3)\log(x)-3\right)e^{\left(-\frac{(x^3+x^2)e^{10}}{x^2e^{10}\log\left(\frac{x}{5\log(x)}\right.}\right.}}{x^3e^{10}\log(x)\log\left(\frac{x}{5\log(x)}\right)^2-2x^3e^{10}\log(x)\log\left(\frac{x}{5\log(x)}\right)+x^3e^{10}\log(x)}$$

input
```
integrate(((-x^3*exp(5)^2-6)*log(x)*log(1/5*x/log(x))+((2*x^3+x^2)*exp(5)^
2+3)*log(x)+(-x^3-x^2)*exp(5)^2+3)*exp(((-x^3-x^2)*exp(5)^2+3)/(x^2*exp(5)
^2*log(1/5*x/log(x))-x^2*exp(5)^2))/(x^3*exp(5)^2*log(x)*log(1/5*x/log(x))
^2-2*x^3*exp(5)^2*log(x)*log(1/5*x/log(x))+x^3*exp(5)^2*log(x)),x, algorit
hm=\
```

output
```
undef
```

3.11.9 Mupad [B] (verification not implemented)

Time = 14.02 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.30

$$\int \frac{e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x)+(-6-e^{10}x^3)\log(x)\log\left(\frac{x}{5\log(x)}\right.\right.}{e^{10}x^3\log(x)-2e^{10}x^3\log(x)\log\left(\frac{x}{5\log(x)}\right)+e^{10}x^3\log(x)\log^2\left(\frac{x}{5\log(x)}\right)}$$

$$=\mathrm{e}^{-\frac{3}{x^2\,\mathrm{e}^{10}+x^2\,\mathrm{e}^{10}\,\ln(5)-x^2\,\mathrm{e}^{10}\,\ln\left(\frac{x}{\ln(x)}\right)}}\,\mathrm{e}^{\frac{x}{\ln(5)-\ln\left(\frac{x}{\ln(x)}\right)+1}}\,\mathrm{e}^{\frac{1}{\ln(5)-\ln\left(\frac{x}{\ln(x)}\right)+1}}$$

input
```
int(-(exp((exp(10)*(x^2 + x^3) - 3)/(x^2*exp(10) - x^2*exp(10)*log(x/(5*lo
g(x)))))*(exp(10)*(x^2 + x^3) - log(x)*(exp(10)*(x^2 + 2*x^3) + 3) + log(x
/(5*log(x)))*log(x)*(x^3*exp(10) + 6) - 3))/(x^3*exp(10)*log(x) - 2*x^3*ex
p(10)*log(x/(5*log(x)))*log(x) + x^3*exp(10)*log(x/(5*log(x)))^2*log(x)),x
)
```

output
```
exp(-3/(x^2*exp(10) + x^2*exp(10)*log(5) - x^2*exp(10)*log(x/log(x))))*exp
(x/(log(5) - log(x/log(x)) + 1))*exp(1/(log(5) - log(x/log(x)) + 1))
```

3.11.

$$e^{\frac{3+e^{10}\left(-x^2-x^3\right)}{-e^{10}x^2+e^{10}x^2\log\left(\frac{x}{5\log(x)}\right)}}\left(3+e^{10}(-x^2-x^3)+(3+e^{10}(x^2+2x^3))\log(x)+(-6-e^{10}x^3)\log(x)\log\left(\frac{x}{\ldots}\right)\right)$$

3.12 $\int \frac{9-6x+x^2+18x^3+16x^4+3x^5}{9x-6x^2-3x^3+6x^4+5x^5+x^6+(9x+6x^2+x^3)\log(5x)}\,dx$

3.12.1 Optimal result

Integrand size = 70, antiderivative size = 28

$$\int \frac{9-6x+x^2+18x^3+16x^4+3x^5}{9x-6x^2-3x^3+6x^4+5x^5+x^6+(9x+6x^2+x^3)\log(5x)}\,dx = \log\left(-1+x+\frac{x-x^2(1+x)^2}{3+x}-\log(5x)\right)$$

output
```
ln(x-1+(-x^2*(1+x)^2+x)/(3+x)-ln(5*x))
```

3.12.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.18

$$\int \frac{9-6x+x^2+18x^3+16x^4+3x^5}{9x-6x^2-3x^3+6x^4+5x^5+x^6+(9x+6x^2+x^3)\log(5x)}\,dx = -\log(3+x)+\log\left(3-3x+2x^3+x^4+3\log(5x)+x\log(5x)\right)$$

input
```
Integrate[(9 - 6*x + x^2 + 18*x^3 + 16*x^4 + 3*x^5)/(9*x - 6*x^2 - 3*x^3 +
 6*x^4 + 5*x^5 + x^6 + (9*x + 6*x^2 + x^3)*Log[5*x]),x]
```

output
```
-Log[3 + x] + Log[3 - 3*x + 2*x^3 + x^4 + 3*Log[5*x] + x*Log[5*x]]
```

3.12.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^5+16x^4+18x^3+x^2-6x+9}{x^6+5x^5+6x^4-3x^3-6x^2+(x^3+6x^2+9x)\log(5x)+9x}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{3x^5+16x^4+18x^3+x^2-6x+9}{x(x+3)(x^4+2x^3-3x+x\log(5x)+3\log(5x)+3)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{3x^3}{x^4+2x^3-3x+x\log(5x)+3\log(5x)+3}-\frac{3x}{x^4+2x^3-3x+x\log(5x)+3\log(5x)+3}-\frac{}{(x+3)(x^4+2x^3}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$10\int \frac{1}{x^4+2x^3+\log(5x)x-3x+3\log(5x)+3}dx+3\int \frac{1}{x(x^4+2x^3+\log(5x)x-3x+3\log(5x)+3)}dx-3\int \frac{x}{x^4+2x^3+\log(5x)x-3x+3\log(5x)+3}dx+3\int \frac{x^3}{x^4+2x^3+\log(5x)x-3x+3\log(5x)+3}dx-39\int \frac{1}{(x+3)(x^4+2x^3+\log(5x)x-3x+3\log(5x)+3)}dx+7\int \frac{x^2}{x^4+2x^3+\log(5x)x-3x+3\log(5x)+3}dx$$

input
```
Int[(9 - 6*x + x^2 + 18*x^3 + 16*x^4 + 3*x^5)/(9*x - 6*x^2 - 3*x^3 + 6*x^4
 + 5*x^5 + x^6 + (9*x + 6*x^2 + x^3)*Log[5*x]),x]
```

output
```
$Aborted
```

3.12.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.12.4 Maple [A] (verified)

Time = 1.02 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

method	result	s
risch	$\ln\left(\ln(5x)+\frac{x^4+2x^3-3x+3}{3+x}\right)$	2
norman	$-\ln(3+x)+\ln(x^4+2x^3+x\ln(5x)-3x+3\ln(5x)+3)$	3
parallelrisch	$-\ln(3+x)+\ln(x^4+2x^3+x\ln(5x)-3x+3\ln(5x)+3)$	3
derivativedivides	$-\ln(5x+15)+\ln(625x^4+1250x^3+625x\ln(5x)+1875\ln(5x)-1875x+1875)$	3
default	$-\ln(5x+15)+\ln(625x^4+1250x^3+625x\ln(5x)+1875\ln(5x)-1875x+1875)$	3

input
```
int((3*x^5+16*x^4+18*x^3+x^2-6*x+9)/((x^3+6*x^2+9*x)*ln(5*x)+x^6+5*x^5+6*x
^4-3*x^3-6*x^2+9*x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(5*x)+(x^4+2*x^3-3*x+3)/(3+x))
```

3.12.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{9-6x+x^2+18x^3+16x^4+3x^5}{9x-6x^2-3x^3+6x^4+5x^5+x^6+(9x+6x^2+x^3)\log(5x)}\,dx = \log\left(\frac{x^4+2\,x^3+(x+3)\log(5\,x)-3\,x+3}{x+3}\right)$$

input
```
integrate((3*x^5+16*x^4+18*x^3+x^2-6*x+9)/((x^3+6*x^2+9*x)*log(5*x)+x^6+5*
x^5+6*x^4-3*x^3-6*x^2+9*x),x, algorithm=\
```

output
```
log((x^4 + 2*x^3 + (x + 3)*log(5*x) - 3*x + 3)/(x + 3))
```

3.12.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{9-6x+x^2+18x^3+16x^4+3x^5}{9x-6x^2-3x^3+6x^4+5x^5+x^6+(9x+6x^2+x^3)\log(5x)}\,dx = \log\left(\log(5x)+\frac{x^4+2x^3-3x+3}{x+3}\right)$$

input
```
integrate((3*x**5+16*x**4+18*x**3+x**2-6*x+9)/((x**3+6*x**2+9*x)*ln(5*x)+x
**6+5*x**5+6*x**4-3*x**3-6*x**2+9*x),x)
```

output
```
log(log(5*x) + (x**4 + 2*x**3 - 3*x + 3)/(x + 3))
```

3.12.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.18

$$\int \frac{9-6x+x^2+18x^3+16x^4+3x^5}{9x-6x^2-3x^3+6x^4+5x^5+x^6+(9x+6x^2+x^3)\log(5x)}\,dx = \log\left(\frac{x^4+2\,x^3+x(\log(5)-3)+(x+3)\log(x)+3\,\log(5)+3}{x+3}\right)$$

input
```
integrate((3*x^5+16*x^4+18*x^3+x^2-6*x+9)/((x^3+6*x^2+9*x)*log(5*x)+x^6+5*
x^5+6*x^4-3*x^3-6*x^2+9*x),x, algorithm=\
```

output
```
log((x^4 + 2*x^3 + x*(log(5) - 3) + (x + 3)*log(x) + 3*log(5) + 3)/(x + 3)
)
```

3.12.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.18

$$\int \frac{9-6x+x^2+18x^3+16x^4+3x^5}{9x-6x^2-3x^3+6x^4+5x^5+x^6+(9x+6x^2+x^3)\log(5x)}\,dx$$
$$=\log\left(x^4+2\,x^3+x\log\left(5\,x\right)-3\,x+3\,\log\left(5\,x\right)+3\right)-\log\left(x+3\right)$$

input
```
integrate((3*x^5+16*x^4+18*x^3+x^2-6*x+9)/((x^3+6*x^2+9*x)*log(5*x)+x^6+5*
x^5+6*x^4-3*x^3-6*x^2+9*x),x, algorithm=\
```

output
```
log(x^4 + 2*x^3 + x*log(5*x) - 3*x + 3*log(5*x) + 3) - log(x + 3)
```

3.12.9 Mupad [B] (verification not implemented)

Time = 13.55 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{9-6x+x^2+18x^3+16x^4+3x^5}{9x-6x^2-3x^3+6x^4+5x^5+x^6+(9x+6x^2+x^3)\log(5x)}\,dx$$
$$=\ln\left(3\,x+\ln\left(5\,x\right)+\frac{39}{x+3}-x^2+x^3-12\right)$$

input
```
int((x^2 - 6*x + 18*x^3 + 16*x^4 + 3*x^5 + 9)/(9*x - 6*x^2 - 3*x^3 + 6*x^4
 + 5*x^5 + x^6 + log(5*x)*(9*x + 6*x^2 + x^3)),x)
```

output
```
log(3*x + log(5*x) + 39/(x + 3) - x^2 + x^3 - 12)
```

3.13 $\int \frac{e^{-x}\left(e^8\left(-10-20x-5x^2\right)+e^{5+2x}\left(-20-20x+10x^2\right)+e^{2+4x}\left(-10+15x^2\right)\right)}{x^3+2x^4+x^5}$

3.13.1 Optimal result

Integrand size = 68, antiderivative size = 30

$$\int \frac{e^{-x}(e^8(-10-20x-5x^2)+e^{5+2x}(-20-20x+10x^2)+e^{2+4x}(-10+15x^2))}{x^3+2x^4+x^5}\,dx = \frac{5e^{-x}(e^4+e^{1+2x})^2}{x\,(x+x^2)}$$

output
```
5*(exp(1+2*x)+exp(4))^2/exp(x)/x/(x^2+x)
```

3.13.2 Mathematica [A] (verified)

Time = 1.74 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.93

$$\int \frac{e^{-x}(e^8(-10-20x-5x^2)+e^{5+2x}(-20-20x+10x^2)+e^{2+4x}(-10+15x^2))}{x^3+2x^4+x^5}\,dx = \frac{5e^{2-x}(e^3+e^{2x})^2}{x^2(1+x)}$$

input
```
Integrate[(E^8*(-10 - 20*x - 5*x^2) + E^(5 + 2*x)*(-20 - 20*x + 10*x^2) +
E^(2 + 4*x)*(-10 + 15*x^2))/(E^x*(x^3 + 2*x^4 + x^5)),x]
```

output
```
(5*E^(2 - x)*(E^3 + E^(2*x))^2)/(x^2*(1 + x))
```

3.13.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 109 vs. 2(30) = 60.

Time = 2.50 (sec) , antiderivative size = 109, normalized size of antiderivative = 3.63, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.103, Rules used = {2026, 2007, 7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(e^8\left(-5x^2-20x-10\right)+e^{2x+5}\left(10x^2-20x-20\right)+e^{4x+2}\left(15x^2-10\right)\right)}{x^5+2x^4+x^3}dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{e^{-x}\left(e^8\left(-5x^2-20x-10\right)+e^{2x+5}\left(10x^2-20x-20\right)+e^{4x+2}\left(15x^2-10\right)\right)}{x^3\left(x^2+2x+1\right)}dx$$

$$\Big\downarrow \ 2007$$

$$\int \frac{e^{-x}\left(e^8\left(-5x^2-20x-10\right)+e^{2x+5}\left(10x^2-20x-20\right)+e^{4x+2}\left(15x^2-10\right)\right)}{x^3(x+1)^2}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{5e^{2-x}\left(e^{2x}+e^3\right)\left(3e^{2x}x^2-e^3x^2-4e^3x-2e^{2x}-2e^3\right)}{x^3(x+1)^2}dx$$

$$\Big\downarrow \ 27$$

$$5\int -\frac{e^{2-x}\left(e^3+e^{2x}\right)\left(-3e^{2x}x^2+e^3x^2+4e^3x+2e^{2x}+2e^3\right)}{x^3(x+1)^2}dx$$

$$\Big\downarrow \ 25$$

$$-5\int \frac{e^{2-x}\left(e^3+e^{2x}\right)\left(-3e^{2x}x^2+e^3x^2+4e^3x+2e^{2x}+2e^3\right)}{x^3(x+1)^2}dx$$

$$\Big\downarrow \ 7293$$

$$-5\int \left(-\frac{2e^{x+5}\left(x^2-2x-2\right)}{x^3(x+1)^2}+\frac{e^{8-x}\left(x^2+4x+2\right)}{x^3(x+1)^2}-\frac{e^{3x+2}\left(3x^2-2\right)}{x^3(x+1)^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-5\left(-\frac{e^{8-x}}{x^2}-\frac{2e^{x+5}}{x^2}-\frac{e^{3x+2}}{x^2}-\frac{e^{8-x}}{x+1}-\frac{2e^{x+5}}{x+1}-\frac{e^{3x+2}}{x+1}+\frac{e^{8-x}}{x}+\frac{2e^{x+5}}{x}+\frac{e^{3x+2}}{x}\right)$$

3.13. $\int \frac{e^{-x}\left(e^8\left(-10-20x-5x^2\right)+e^{5+2x}\left(-20-20x+10x^2\right)+e^{2+4x}\left(-10+15x^2\right)\right)}{x^3+2x^4+x^5}dx$

input
```
Int[(E^8*(-10 - 20*x - 5*x^2) + E^(5 + 2*x)*(-20 - 20*x + 10*x^2) + E^(2 +
 4*x)*(-10 + 15*x^2))/(E^x*(x^3 + 2*x^4 + x^5)),x]
```

output
```
-5*(-(E^(8 - x)/x^2) - (2*E^(5 + x))/x^2 - E^(2 + 3*x)/x^2 + E^(8 - x)/x +
 (2*E^(5 + x))/x + E^(2 + 3*x)/x - E^(8 - x)/(1 + x) - (2*E^(5 + x))/(1 +
x) - E^(2 + 3*x)/(1 + x))
```

3.13.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.13.4 Maple [A] (verified)

Time = 0.45 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.37

method	result
norman	$\frac{(5\,\mathrm{e}^{8}+5\,\mathrm{e}^{2}\mathrm{e}^{4x}+10\,\mathrm{e}^{4}\mathrm{e}\,\mathrm{e}^{2x})\mathrm{e}^{-x}}{x^{2}(1+x)}$
parallelrisch	$\frac{(5\,\mathrm{e}^{8}+10\,\mathrm{e}^{4}\mathrm{e}^{1+2x}+5\,\mathrm{e}^{4x+2})\mathrm{e}^{-x}}{(1+x)x^{2}}$
risch	$\frac{5\,\mathrm{e}^{2+3x}}{x^{2}(1+x)}+\frac{10\,\mathrm{e}^{5+x}}{x^{2}(1+x)}+\frac{5\,\mathrm{e}^{8-x}}{x^{2}(1+x)}$
default	$-10\,\mathrm{e}^{8}\left(\frac{\mathrm{e}^{-x}(7x^{2}+4x-1)}{2x^{2}(1+x)}-\frac{11\,\mathrm{Ei}_{1}(x)}{2}+2\,\mathrm{e}\,\mathrm{Ei}_{1}\left(1+x\right)\right)-10\,\mathrm{e}^{2}\left(-\frac{\mathrm{e}^{3x}}{2x^{2}}+\frac{\mathrm{e}^{3x}}{2x}-\frac{3\,\mathrm{Ei}_{1}(-3x)}{2}+\frac{\mathrm{e}^{3x}}{1+x}+\right.$

input
```
int(((15*x^2-10)*exp(1+2*x)^2+(10*x^2-20*x-20)*exp(4)*exp(1+2*x)+(-5*x^2-2
0*x-10)*exp(4)^2)/(x^5+2*x^4+x^3)/exp(x),x,method=_RETURNVERBOSE)
```

output
```
(5*exp(4)^2+5*exp(1)^2*exp(x)^4+10*exp(4)*exp(1)*exp(x)^2)/x^2/(1+x)/exp(x
)
```

3.13.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{e^{-x}(e^8(-10-20x-5x^2)+e^{5+2x}(-20-20x+10x^2)+e^{2+4x}(-10+15x^2))}{x^3+2x^4+x^5}\,dx = \frac{5\left(e^2+2\,e^{(-2\,x+5)}+e^{(-4\,x+8)}\right)e^{(3\,x)}}{x^3+x^2}$$

input
```
integrate(((15*x^2-10)*exp(1+2*x)^2+(10*x^2-20*x-20)*exp(4)*exp(1+2*x)+(-5
*x^2-20*x-10)*exp(4)^2)/(x^5+2*x^4+x^3)/exp(x),x, algorithm=\
```

output
```
5*(e^2 + 2*e^(-2*x + 5) + e^(-4*x + 8))*e^(3*x)/(x^3 + x^2)
```

3.13.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 104 vs. 2(22) = 44.

Time = 0.15 (sec) , antiderivative size = 104, normalized size of antiderivative = 3.47

$$\int \frac{e^{-x}(e^8(-10-20x-5x^2)+e^{5+2x}(-20-20x+10x^2)+e^{2+4x}(-10+15x^2))}{x^3+2x^4+x^5}\,dx = \frac{(5x^6e^2+10x^5e^2+5x^4e^2)\,e^{3x}+(10x^6e^5+20x^5e^5+10x^4e^5)\,e^x+(5x^6e^8+10x^5e^8+5x^4e^8)\,e^{-x}}{x^9+3x^8+3x^7+x^6}$$

input
```
integrate(((15*x**2-10)*exp(1+2*x)**2+(10*x**2-20*x-20)*exp(4)*exp(1+2*x)+
(-5*x**2-20*x-10)*exp(4)**2)/(x**5+2*x**4+x**3)/exp(x),x)
```

output
```
((5*x**6*exp(2) + 10*x**5*exp(2) + 5*x**4*exp(2))*exp(3*x) + (10*x**6*exp(
5) + 20*x**5*exp(5) + 10*x**4*exp(5))*exp(x) + (5*x**6*exp(8) + 10*x**5*ex
p(8) + 5*x**4*exp(8))*exp(-x))/(x**9 + 3*x**8 + 3*x**7 + x**6)
```

3.13.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{e^{-x}(e^8(-10-20x-5x^2)+e^{5+2x}(-20-20x+10x^2)+e^{2+4x}(-10+15x^2))}{x^3+2x^4+x^5}\,dx = \frac{5\left(e^{(3x+2)}+2\,e^{(x+5)}+e^{(-x+8)}\right)}{x^3+x^2}$$

input
```
integrate(((15*x^2-10)*exp(1+2*x)^2+(10*x^2-20*x-20)*exp(4)*exp(1+2*x)+(-5
*x^2-20*x-10)*exp(4)^2)/(x^5+2*x^4+x^3)/exp(x),x, algorithm=\
```

output
```
5*(e^(3*x + 2) + 2*e^(x + 5) + e^(-x + 8))/(x^3 + x^2)
```

3.13.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{e^{-x}(e^8(-10-20x-5x^2)+e^{5+2x}(-20-20x+10x^2)+e^{2+4x}(-10+15x^2))}{x^3+2x^4+x^5}\,dx$$
$$=\frac{5\left(e^{(3x+2)}+2e^{(x+5)}+e^{(-x+8)}\right)}{x^3+x^2}$$

input
```
integrate((((15*x^2-10)*exp(1+2*x)^2+(10*x^2-20*x-20)*exp(4)*exp(1+2*x)+(-5
*x^2-20*x-10)*exp(4)^2)/(x^5+2*x^4+x^3)/exp(x),x, algorithm=\
```

output
```
5*(e^(3*x + 2) + 2*e^(x + 5) + e^(-x + 8))/(x^3 + x^2)
```

3.13.9 Mupad [B] (verification not implemented)

Time = 13.20 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.67

$$\int \frac{e^{-x}(e^8(-10-20x-5x^2)+e^{5+2x}(-20-20x+10x^2)+e^{2+4x}(-10+15x^2))}{x^3+2x^4+x^5}\,dx$$
$$=\frac{10\,e^5\,e^x}{x^3+x^2}+\frac{5\,e^{3x}\,e^2}{x^3+x^2}+\frac{5\,e^{-x}\,e^8}{x^3+x^2}$$

input
```
int(-(exp(-x)*(exp(8)*(20*x + 5*x^2 + 10) - exp(4*x + 2)*(15*x^2 - 10) + e
xp(4)*exp(2*x + 1)*(20*x - 10*x^2 + 20)))/(x^3 + 2*x^4 + x^5),x)
```

output
```
(10*exp(5)*exp(x))/(x^2 + x^3) + (5*exp(3*x)*exp(2))/(x^2 + x^3) + (5*exp(
-x)*exp(8))/(x^2 + x^3)
```

3.14 $\int \frac{\left(-x+e^{4+4x+x^2}(-4x-2x^2)\right)\log(2x)+\left(-e^{4+4x+x^2}-x\right)\log\left(e^{4+4x+x^2}+x\right)}{-5e^{4+4x+x^2}x-5x^2+\left(e^{4+4x+x^2}x+x^2\right)\log(2x)\log\left(e^{4+4x+x^2}+x\right)}$

3.14.1 Optimal result

Integrand size = 116, antiderivative size = 24

$$\int \frac{\left(-x+e^{4+4x+x^2}(-4x-2x^2)\right)\log(2x)+\left(-e^{4+4x+x^2}-x\right)\log\left(e^{4+4x+x^2}+x\right)}{-5e^{4+4x+x^2}x-5x^2+(e^{4+4x+x^2}x+x^2)\log(2x)\log(e^{4+4x+x^2}+x)}\,dx$$
$$=\log(5)-\log\left(5-\log(2x)\log\left(e^{(2+x)^2}+x\right)\right)$$

output
```
ln(5)-ln(5-ln(x+exp((2+x)^2))*ln(2*x))
```

3.14.2 Mathematica [A] (verified)

Time = 0.55 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{\left(-x+e^{4+4x+x^2}(-4x-2x^2)\right)\log(2x)+\left(-e^{4+4x+x^2}-x\right)\log\left(e^{4+4x+x^2}+x\right)}{-5e^{4+4x+x^2}x-5x^2+(e^{4+4x+x^2}x+x^2)\log(2x)\log(e^{4+4x+x^2}+x)}\,dx$$
$$=-\log\left(5-\log(2x)\log\left(e^{4+4x+x^2}+x\right)\right)$$

input
```
Integrate[((-x + E^(4 + 4*x + x^2)*(-4*x - 2*x^2))*Log[2*x] + (-E^(4 + 4*x
 + x^2) - x)*Log[E^(4 + 4*x + x^2) + x])/(-5*E^(4 + 4*x + x^2)*x - 5*x^2 +
 (E^(4 + 4*x + x^2)*x + x^2)*Log[2*x]*Log[E^(4 + 4*x + x^2) + x]),x]
```

output
```
-Log[5 - Log[2*x]*Log[E^(4 + 4*x + x^2) + x]]
```

3.14.3 Rubi [A] (verified)

Time = 1.57 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.026, Rules used = {7292, 7259, 16}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{x^2+4x+4}(-2x^2-4x)-x\right)\log(2x)+\left(-e^{x^2+4x+4}-x\right)\log\left(e^{x^2+4x+4}+x\right)}{-5x^2-5e^{x^2+4x+4}x+\left(x^2+e^{x^2+4x+4}x\right)\log(2x)\log\left(e^{x^2+4x+4}+x\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-\left(\left(e^{x^2+4x+4}(-2x^2-4x)-x\right)\log(2x)\right)-\left(-e^{x^2+4x+4}-x\right)\log\left(e^{x^2+4x+4}+x\right)}{x\left(x+e^{(x+2)^2}\right)\left(5-\log(2x)\log\left(x+e^{(x+2)^2}\right)\right)}dx$$

$$\Big\downarrow \text{7259}$$

$$\int \frac{1}{5-\log(2x)\log\left(x+e^{(x+2)^2}\right)}d\left(\log(2x)\log\left(x+e^{(x+2)^2}\right)\right)$$

$$\Big\downarrow \text{16}$$

$$-\log\left(5-\log(2x)\log\left(x+e^{(x+2)^2}\right)\right)$$

input
```
Int[((-x + E^(4 + 4*x + x^2)*(-4*x - 2*x^2))*Log[2*x] + (-E^(4 + 4*x + x^2
) - x)*Log[E^(4 + 4*x + x^2) + x])/(-5*E^(4 + 4*x + x^2)*x - 5*x^2 + (E^(4
 + 4*x + x^2)*x + x^2)*Log[2*x]*Log[E^(4 + 4*x + x^2) + x]),x]
```

output
```
-Log[5 - Log[2*x]*Log[E^(2 + x)^2 + x]]
```

3.14.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 7259
```
Int[(u_)*((a_) + (b_.)*(v_)^(p_.)*(w_)^(p_.))^(m_.), x_Symbol] :> With[{c =
 Simplify[u/(w*D[v, x] + v*D[w, x])]}, Simp[c   Subst[Int[(a + b*x^p)^m, x]
, x, v*w], x] /; FreeQ[c, x]] /; FreeQ[{a, b, m, p}, x] && IntegerQ[p]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.14.4 Maple [A] (verified)

Time = 1.00 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

method	result	size
parallelrisch	$-\ln\left(\ln(2x)\ln\left(e^{x^2+4x+4}+x\right)-5\right)$	23
risch	$-\ln(\ln(2x))-\ln\left(\ln\left(x+e^{(2+x)^2}\right)-\frac{5}{\ln(2x)}\right)$	30

input
```
int(((-exp(x^2+4*x+4)-x)*ln(exp(x^2+4*x+4)+x)+((-2*x^2-4*x)*exp(x^2+4*x+4)
-x)*ln(2*x))/((x*exp(x^2+4*x+4)+x^2)*ln(2*x)*ln(exp(x^2+4*x+4)+x)-5*x*exp(
x^2+4*x+4)-5*x^2),x,method=_RETURNVERBOSE)
```

output
```
-ln(ln(2*x)*ln(exp(x^2+4*x+4)+x)-5)
```

3.14.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{\left(-x+e^{4+4x+x^2}(-4x-2x^2)\right)\log(2x)+\left(-e^{4+4x+x^2}-x\right)\log\left(e^{4+4x+x^2}+x\right)}{-5e^{4+4x+x^2}x-5x^2+\left(e^{4+4x+x^2}x+x^2\right)\log(2x)\log\left(e^{4+4x+x^2}+x\right)}\,dx$$
$$=-\log\left(\frac{\log(2x)\log\left(x+e^{(x^2+4x+4)}\right)-5}{\log(2x)}\right)-\log(\log(2x))$$

input
```
integrate((((-exp(x^2+4*x+4)-x)*log(exp(x^2+4*x+4)+x)+((-2*x^2-4*x)*exp(x^2
+4*x+4)-x)*log(2*x))/((x*exp(x^2+4*x+4)+x^2)*log(2*x)*log(exp(x^2+4*x+4)+x
)-5*x*exp(x^2+4*x+4)-5*x^2),x, algorithm=\
```

output
```
-log((log(2*x)*log(x + e^(x^2 + 4*x + 4)) - 5)/log(2*x)) - log(log(2*x))
```

3.14.6 Sympy [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{\left(-x+e^{4+4x+x^2}(-4x-2x^2)\right)\log(2x)+\left(-e^{4+4x+x^2}-x\right)\log\left(e^{4+4x+x^2}+x\right)}{-5e^{4+4x+x^2}x-5x^2+(e^{4+4x+x^2}x+x^2)\log(2x)\log\left(e^{4+4x+x^2}+x\right)}\,dx$$
$$=-\log\left(\log\left(x+e^{x^2+4x+4}\right)-\frac{5}{\log\left(2x\right)}\right)-\log\left(\log\left(2x\right)\right)$$

input
```
integrate(((-exp(x**2+4*x+4)-x)*ln(exp(x**2+4*x+4)+x)+((-2*x**2-4*x)*exp(x
**2+4*x+4)-x)*ln(2*x))/((x*exp(x**2+4*x+4)+x**2)*ln(2*x)*ln(exp(x**2+4*x+4
)+x)-5*x*exp(x**2+4*x+4)-5*x**2),x)
```

output
```
-log(log(x + exp(x**2 + 4*x + 4)) - 5/log(2*x)) - log(log(2*x))
```

3.14.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{\left(-x+e^{4+4x+x^2}(-4x-2x^2)\right)\log(2x)+\left(-e^{4+4x+x^2}-x\right)\log\left(e^{4+4x+x^2}+x\right)}{-5e^{4+4x+x^2}x-5x^2+(e^{4+4x+x^2}x+x^2)\log(2x)\log\left(e^{4+4x+x^2}+x\right)}\,dx$$
$$=-\log\left(\frac{\left(\log\left(2\right)+\log\left(x\right)\right)\log\left(x+e^{\left(x^2+4\,x+4\right)}\right)-5}{\log\left(2\right)+\log\left(x\right)}\right)-\log\left(\log\left(2\right)+\log\left(x\right)\right)$$

input
```
integrate(((-exp(x^2+4*x+4)-x)*log(exp(x^2+4*x+4)+x)+((-2*x^2-4*x)*exp(x^2
+4*x+4)-x)*log(2*x))/((x*exp(x^2+4*x+4)+x^2)*log(2*x)*log(exp(x^2+4*x+4)+x
)-5*x*exp(x^2+4*x+4)-5*x^2),x, algorithm=\
```

output
```
-log(((log(2) + log(x))*log(x + e^(x^2 + 4*x + 4)) - 5)/(log(2) + log(x)))
 - log(log(2) + log(x))
```

3.14.8 Giac [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\left(-x+e^{4+4x+x^2}(-4x-2x^2)\right)\log(2x)+\left(-e^{4+4x+x^2}-x\right)\log\left(e^{4+4x+x^2}+x\right)}{-5e^{4+4x+x^2}x-5x^2+\left(e^{4+4x+x^2}x+x^2\right)\log(2x)\log\left(e^{4+4x+x^2}+x\right)}\,dx$$
$$=-\log\left(\log\left(2\,x\right)\log\left(x+e^{\left(x^2+4\,x+4\right)}\right)-5\right)$$

input
```
integrate((((-exp(x^2+4*x+4)-x)*log(exp(x^2+4*x+4)+x)+((-2*x^2-4*x)*exp(x^2
+4*x+4)-x)*log(2*x))/((x*exp(x^2+4*x+4)+x^2)*log(2*x)*log(exp(x^2+4*x+4)+x
)-5*x*exp(x^2+4*x+4)-5*x^2),x, algorithm=\
```

output
```
-log(log(2*x)*log(x + e^(x^2 + 4*x + 4)) - 5)
```

3.14.9 Mupad [B] (verification not implemented)

Time = 14.21 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{\left(-x+e^{4+4x+x^2}(-4x-2x^2)\right)\log(2x)+\left(-e^{4+4x+x^2}-x\right)\log\left(e^{4+4x+x^2}+x\right)}{-5e^{4+4x+x^2}x-5x^2+\left(e^{4+4x+x^2}x+x^2\right)\log(2x)\log\left(e^{4+4x+x^2}+x\right)}\,dx$$
$$=-\ln\left(\frac{\ln\left(2\,x\right)\,\ln\left(x+\mathrm{e}^{{\left(x+2\right)}^2}\right)-5}{\ln\left(2\,x\right)}\right)-\ln\left(\ln\left(2\,x\right)\right)$$

input
```
int((log(x + exp(4*x + x^2 + 4))*(x + exp(4*x + x^2 + 4)) + log(2*x)*(x +
exp(4*x + x^2 + 4)*(4*x + 2*x^2)))/(5*x*exp(4*x + x^2 + 4) + 5*x^2 - log(2
*x)*log(x + exp(4*x + x^2 + 4))*(x*exp(4*x + x^2 + 4) + x^2)),x)
```

output
```
- log((log(2*x)*log(x + exp((x + 2)^2)) - 5)/log(2*x)) - log(log(2*x))
```

3.15 $\int \frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x(27-54x+27x}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}$

3.15.1 Optimal result

Integrand size = 103, antiderivative size = 34

$$\int \frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x(27-54x+27x^2+27x^3-45x^4+27x}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}$$
$$=-5-2x-x\left(-e^x+\frac{\left(x+\frac{4}{-3+\frac{3}{x}+x}\right)^2}{x}\right)$$

output
```
-2*x-x*((x+4/(-3+x+3/x))^2/x-exp(x))-5
```

3.15.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.35

$$\int \frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x(27-54x+27x^2+27x^3-45x^4+27x}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}$$
$$=-2x+e^x x-x^2-\frac{48(-1+x)}{(3-3x+x^2)^2}-\frac{8(-1+3x)}{3-3x+x^2}$$

input
```
Integrate[(-54 - 132*x + 162*x^2 - 142*x^3 + 114*x^4 - 54*x^5 + 16*x^6 - 2
*x^7 + E^x*(27 - 54*x + 27*x^2 + 27*x^3 - 45*x^4 + 27*x^5 - 8*x^6 + x^7))/
(27 - 81*x + 108*x^2 - 81*x^3 + 36*x^4 - 9*x^5 + x^6),x]
```

output
```
-2*x + E^x*x - x^2 - (48*(-1 + x))/(3 - 3*x + x^2)^2 - (8*(-1 + 3*x))/(3 -
 3*x + x^2)
```

3.15.3 Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 8.75 (sec) , antiderivative size = 4620, normalized size of antiderivative = 135.88, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.019, Rules used = {2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^7+16x^6-54x^5+114x^4-142x^3+162x^2+e^x\left(x^7-8x^6+27x^5-45x^4+27x^3+27x^2-54x+27\right)-13}{x^6-9x^5+36x^4-81x^3+108x^2-81x+27}$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{4i\left(-2x^7+16x^6-54x^5+114x^4-142x^3+162x^2+e^x\left(x^7-8x^6+27x^5-45x^4+27x^3+27x^2-54x+27\right)\right.}{3\sqrt{3}\left(-2x+i\sqrt{3}+3\right)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{2ie^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^6}{3\sqrt{3}}+\frac{10(i+\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^5}{3\left(3i+\sqrt{3}\right)}+\frac{4ie^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^5}{\sqrt{3}}-$$

$$\frac{2(11i+3\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^4}{3\left(i+\sqrt{3}\right)}+\frac{50(i+\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^4}{3\left(3i+\sqrt{3}\right)}+\frac{59ie^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^4}{3\sqrt{3}}-$$

$$\frac{8(11i+3\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^3}{3\left(i+\sqrt{3}\right)}+\frac{200(i+\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^3}{3\left(3i+\sqrt{3}\right)}+\frac{(i-3\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^3}{3\left(3i+\sqrt{3}\right)}-$$

$$\frac{1}{3}\left(3-5i\sqrt{3}\right)e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^3+\frac{236ie^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^3}{3\sqrt{3}}-\frac{8(11i+3\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^2}{i+\sqrt{3}}+$$

$$\frac{200(i+\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^2}{3i+\sqrt{3}}+\frac{(i-3\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^2}{3i+\sqrt{3}}-\left(3-5i\sqrt{3}\right)e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^2+$$

$$80i\sqrt{3}e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^2-\frac{4ie^x\left(\frac{6}{3-i\sqrt{3}}-x\right)^2}{\sqrt{3}}-\frac{16(11i+3\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)}{i+\sqrt{3}}+$$

$$\frac{400(i+\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)}{3i+\sqrt{3}}+\frac{2(i-3\sqrt{3})\,e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)}{3i+\sqrt{3}}-2\left(3-5i\sqrt{3}\right)e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)+$$

$$160i\sqrt{3}e^x\left(\frac{6}{3-i\sqrt{3}}-x\right)-\frac{8ie^x\left(\frac{6}{3-i\sqrt{3}}-x\right)}{\sqrt{3}}-\frac{16(11i+3\sqrt{3})\,e^x}{i+\sqrt{3}}+\frac{2(i+3\sqrt{3})\,e^x}{3i-\sqrt{3}}+$$

$$\frac{4(3i+2\sqrt{3})\,e^x}{i-\sqrt{3}}-\frac{16(6i+\sqrt{3})\,e^x}{3i-\sqrt{3}}+\frac{400(i+\sqrt{3})\,e^x}{3i+\sqrt{3}}-\frac{16(6i-\sqrt{3})\,e^x}{3i+\sqrt{3}}+\frac{2(i-3\sqrt{3})\,e^x}{3i+\sqrt{3}}+$$

$$\frac{4(3i-2\sqrt{3})\,e^x}{i+\sqrt{3}}-2\left(3+5i\sqrt{3}\right)e^x-2\left(3-5i\sqrt{3}\right)e^x+\frac{400(i-\sqrt{3})\,e^x}{3i-\sqrt{3}}-\frac{16(11i-3\sqrt{3})\,e^x}{i-\sqrt{3}}+$$

$$80e^x-\frac{2ie^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^6}{3\sqrt{3}}-\frac{1}{9}\left(1+i\sqrt{3}\right)x^6-\frac{1}{9}\left(1-i\sqrt{3}\right)x^6+\frac{2x^6}{9}+$$

$$\frac{10(i-\sqrt{3})\,e^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^5}{3\left(3i-\sqrt{3}\right)}-\frac{4ie^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^5}{\sqrt{3}}+\frac{1}{3}ie^x\left(ix+\frac{6}{3i-\sqrt{3}}\right)^5+$$

$$\frac{1}{3}ie^x\left(ix+\frac{6}{3i+\sqrt{3}}\right)^5+\frac{16}{15}\left(1+i\sqrt{3}\right)x^5+\frac{16}{15}\left(1-i\sqrt{3}\right)x^5-\frac{32x^5}{15}+$$

$$\frac{50(i-\sqrt{3})\,e^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^4}{3\left(3i-\sqrt{3}\right)}-\frac{2(11i-3\sqrt{3})\,e^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^4}{3\left(i-\sqrt{3}\right)}-\frac{59ie^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^4}{3\sqrt{3}}-$$

$$\frac{2(6i+\sqrt{3})\,e^x\left(ix+\frac{6}{3i-\sqrt{3}}\right)^4}{3\left(3i-\sqrt{3}\right)}+\frac{5}{3}e^x\left(ix+\frac{6}{3i-\sqrt{3}}\right)^4-\frac{2(6i-\sqrt{3})\,e^x\left(ix+\frac{6}{3i+\sqrt{3}}\right)^4}{3\left(3i+\sqrt{3}\right)}+$$

$$\frac{5}{3}e^x\left(ix+\frac{6}{3i+\sqrt{3}}\right)^4-\frac{17}{4}\left(1+i\sqrt{3}\right)x^4-\frac{7}{2}\left(1-i\sqrt{3}\right)x^4-\frac{1}{8}\left(3i-\sqrt{3}\right)^2x^4+7x^4+$$

$$\frac{(i+3\sqrt{3})\,e^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^3}{3\left(3i-\sqrt{3}\right)}-\frac{1}{3}\left(3+5i\sqrt{3}\right)e^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^3+\frac{200(i-\sqrt{3})\,e^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^3}{3\left(3i-\sqrt{3}\right)}-$$

$$\frac{8(11i-3\sqrt{3})\,e^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^3}{3\left(i-\sqrt{3}\right)}-\frac{236ie^x\left(\frac{6}{3+i\sqrt{3}}-x\right)^3}{3\sqrt{3}}+\frac{8(6i+\sqrt{3})\,e^x\left(ix+\frac{6}{3i-\sqrt{3}}\right)^3}{3\left(3+i\sqrt{3}\right)}+$$

$$\frac{2(3-2i\sqrt{3})\,e^x\left(ix+\frac{6}{3i-\sqrt{3}}\right)^3}{3\left(i-\sqrt{3}\right)}-\frac{20}{3}ie^x\left(ix+\frac{6}{3i-\sqrt{3}}\right)^3+\frac{8(6+i\sqrt{3})\,e^x\left(ix+\frac{6}{3i+\sqrt{3}}\right)^3}{3\left(3i+\sqrt{3}\right)}+$$

3.15. $$\int\frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x\left(27-54x+27x^2+27x^3-45x^4+27x^5-8x^6+x^7\right)}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}\,dx$$

input
```
Int[(-54 - 132*x + 162*x^2 - 142*x^3 + 114*x^4 - 54*x^5 + 16*x^6 - 2*x^7 +
 E^x*(27 - 54*x + 27*x^2 + 27*x^3 - 45*x^4 + 27*x^5 - 8*x^6 + x^7))/(27 -
81*x + 108*x^2 - 81*x^3 + 36*x^4 - 9*x^5 + x^6),x]
```

output
```
80*E^x - (16*(11*I - 3*Sqrt[3])*E^x)/(I - Sqrt[3]) + (400*(I - Sqrt[3])*E^
x)/(3*I - Sqrt[3]) - 2*(3 - (5*I)*Sqrt[3])*E^x - 2*(3 + (5*I)*Sqrt[3])*E^x
 + (4*(3*I - 2*Sqrt[3])*E^x)/(I + Sqrt[3]) + (2*(I - 3*Sqrt[3])*E^x)/(3*I
+ Sqrt[3]) - (16*(6*I - Sqrt[3])*E^x)/(3*I + Sqrt[3]) + (400*(I + Sqrt[3])
*E^x)/(3*I + Sqrt[3]) - (16*(6*I + Sqrt[3])*E^x)/(3*I - Sqrt[3]) + (4*(3*I
 + 2*Sqrt[3])*E^x)/(I - Sqrt[3]) + (2*(I + 3*Sqrt[3])*E^x)/(3*I - Sqrt[3])
 - (16*(11*I + 3*Sqrt[3])*E^x)/(I + Sqrt[3]) - ((8*I)*E^x*(6/(3 - I*Sqrt[3
]) - x))/Sqrt[3] + (160*I)*Sqrt[3]*E^x*(6/(3 - I*Sqrt[3]) - x) - 2*(3 - (5
*I)*Sqrt[3])*E^x*(6/(3 - I*Sqrt[3]) - x) + (2*(I - 3*Sqrt[3])*E^x*(6/(3 -
I*Sqrt[3]) - x))/(3*I + Sqrt[3]) + (400*(I + Sqrt[3])*E^x*(6/(3 - I*Sqrt[3
]) - x))/(3*I + Sqrt[3]) - (16*(11*I + 3*Sqrt[3])*E^x*(6/(3 - I*Sqrt[3]) -
 x))/(I + Sqrt[3]) - ((4*I)*E^x*(6/(3 - I*Sqrt[3]) - x)^2)/Sqrt[3] + (80*I
)*Sqrt[3]*E^x*(6/(3 - I*Sqrt[3]) - x)^2 - (3 - (5*I)*Sqrt[3])*E^x*(6/(3 -
I*Sqrt[3]) - x)^2 + ((I - 3*Sqrt[3])*E^x*(6/(3 - I*Sqrt[3]) - x)^2)/(3*I +
 Sqrt[3]) + (200*(I + Sqrt[3])*E^x*(6/(3 - I*Sqrt[3]) - x)^2)/(3*I + Sqrt[
3]) - (8*(11*I + 3*Sqrt[3])*E^x*(6/(3 - I*Sqrt[3]) - x)^2)/(I + Sqrt[3]) +
 (((236*I)/3)*E^x*(6/(3 - I*Sqrt[3]) - x)^3)/Sqrt[3] - ((3 - (5*I)*Sqrt[3]
)*E^x*(6/(3 - I*Sqrt[3]) - x)^3)/3 + ((I - 3*Sqrt[3])*E^x*(6/(3 - I*Sqrt[3
]) - x)^3)/(3*(3*I + Sqrt[3])) + (200*(I + Sqrt[3])*E^x*(6/(3 - I*Sqrt[3])
 - x)^3)/(3*(3*I + Sqrt[3])) - (8*(11*I + 3*Sqrt[3])*E^x*(6/(3 - I*Sqrt...
```

3.15.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.15.4 Maple [A] (verified)

Time = 0.29 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.21

method	result
parts	$e^{x}x-x^{2}-2x+\frac{-24x^{3}+80x^{2}-144x+72}{\left(x^{2}-3x+3\right)^{2}}$
risch	$-x^{2}-2x+\frac{-24x^{3}+80x^{2}-144x+72}{x^{4}-6x^{3}+15x^{2}-18x+9}+e^{x}x$
norman	$\frac{x^{5}e^{x}-216x-54x^{3}+152x^{2}+4x^{5}-x^{6}+9\,e^{x}x-18\,e^{x}x^{2}+15\,e^{x}x^{3}-6\,e^{x}x^{4}+99}{\left(x^{2}-3x+3\right)^{2}}$
parallelrisch	$-\frac{x^{6}-x^{5}e^{x}-4x^{5}+6\,e^{x}x^{4}-99-15\,e^{x}x^{3}+54x^{3}+18\,e^{x}x^{2}-152x^{2}-9\,e^{x}x+216x}{x^{4}-6x^{3}+15x^{2}-18x+9}$
default	$-2x-x^{2}-8\,e^{x}-\frac{9\,e^{x}\left(7x^{3}-18x^{2}+15x+3\right)}{2\left(x^{4}-6x^{3}+15x^{2}-18x+9\right)}+\frac{81\,e^{x}\left(5x^{3}-31x^{2}+60x-45\right)}{2\left(x^{4}-6x^{3}+15x^{2}-18x+9\right)}-\frac{9\,e^{x}\left(7x^{3}-30x^{2}+51x-33\right)}{x^{4}-6x^{3}+15x^{2}-18x+9}+\frac{36\,e^{x}}{x^{4}-6}$

input
```
int(((x^7-8*x^6+27*x^5-45*x^4+27*x^3+27*x^2-54*x+27)*exp(x)-2*x^7+16*x^6-5
4*x^5+114*x^4-142*x^3+162*x^2-132*x-54)/(x^6-9*x^5+36*x^4-81*x^3+108*x^2-8
1*x+27),x,method=_RETURNVERBOSE)
```

output
```
exp(x)*x-x^2-2*x+8*(-3*x^3+10*x^2-18*x+9)/(x^2-3*x+3)^2
```

3.15.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. 2(33) = 66.

Time = 0.26 (sec) , antiderivative size = 76, normalized size of antiderivative = 2.24

$$\int \frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x(27-54x+27x^2+27x^3-45x^4+27x^5-8x^6+x^7)}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}\,dx$$
$$=-\frac{x^{6}-4\,x^{5}+3\,x^{4}+36\,x^{3}-107\,x^{2}-(x^{5}-6\,x^{4}+15\,x^{3}-18\,x^{2}+9\,x)e^{x}+162\,x-72}{x^{4}-6\,x^{3}+15\,x^{2}-18\,x+9}$$

input
```
integrate(((x^7-8*x^6+27*x^5-45*x^4+27*x^3+27*x^2-54*x+27)*exp(x)-2*x^7+16
*x^6-54*x^5+114*x^4-142*x^3+162*x^2-132*x-54)/(x^6-9*x^5+36*x^4-81*x^3+108
*x^2-81*x+27),x, algorithm=\
```

output
```
-(x^6 - 4*x^5 + 3*x^4 + 36*x^3 - 107*x^2 - (x^5 - 6*x^4 + 15*x^3 - 18*x^2
+ 9*x)*e^x + 162*x - 72)/(x^4 - 6*x^3 + 15*x^2 - 18*x + 9)
```

3.15.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.29

$$\int \frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x(27-54x+27x^2+27x^3-45x^4+27x}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}$$
$$=-x^2+xe^x-2x-\frac{24x^3-80x^2+144x-72}{x^4-6x^3+15x^2-18x+9}$$

input
```
integrate(((x**7-8*x**6+27*x**5-45*x**4+27*x**3+27*x**2-54*x+27)*exp(x)-2*
x**7+16*x**6-54*x**5+114*x**4-142*x**3+162*x**2-132*x-54)/(x**6-9*x**5+36*
x**4-81*x**3+108*x**2-81*x+27),x)
```

output
```
-x**2 + x*exp(x) - 2*x - (24*x**3 - 80*x**2 + 144*x - 72)/(x**4 - 6*x**3 +
 15*x**2 - 18*x + 9)
```

3.15.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 304 vs. $2(33) = 66$.

Time = 0.32 (sec) , antiderivative size = 304, normalized size of antiderivative = 8.94

$$\int \frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x(27-54x+27x^2+27x^3-45x^4+27x}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}$$
$$=-x^2+xe^x-2x+\frac{27(10x^3-45x^2+78x-54)}{x^4-6x^3+15x^2-18x+9}+\frac{57(10x^3-51x^2+90x-63)}{x^4-6x^3+15x^2-18x+9}-\frac{71(6x^3-28x^2+48x-33)}{x^4-6x^3+15x^2-18x+9}-\frac{9(4x^3-18x^2+32x-21)}{x^4-6x^3+15x^2-18x+9}-\frac{81(4x^3-25x^2+48x-36)}{x^4-6x^3+15x^2-18x+9}+\frac{27(2x^3-5x^2+4x+1)}{x^4-6x^3+15x^2-18x+9}-\frac{66(2x^3-9x^2+16x-11)}{x^4-6x^3+15x^2-18x+9}-\frac{72(6x^2-16x+15)}{x^4-6x^3+15x^2-18x+9}$$

input
```
integrate(((x^7-8*x^6+27*x^5-45*x^4+27*x^3+27*x^2-54*x+27)*exp(x)-2*x^7+16
*x^6-54*x^5+114*x^4-142*x^3+162*x^2-132*x-54)/(x^6-9*x^5+36*x^4-81*x^3+108
*x^2-81*x+27),x, algorithm=\
```

output
```
-x^2 + x*e^x - 2*x + 27*(10*x^3 - 45*x^2 + 78*x - 54)/(x^4 - 6*x^3 + 15*x^
2 - 18*x + 9) + 57*(10*x^3 - 51*x^2 + 90*x - 63)/(x^4 - 6*x^3 + 15*x^2 - 1
8*x + 9) - 71*(6*x^3 - 28*x^2 + 48*x - 33)/(x^4 - 6*x^3 + 15*x^2 - 18*x +
9) - 9*(4*x^3 - 18*x^2 + 32*x - 21)/(x^4 - 6*x^3 + 15*x^2 - 18*x + 9) - 81
*(4*x^3 - 25*x^2 + 48*x - 36)/(x^4 - 6*x^3 + 15*x^2 - 18*x + 9) + 27*(2*x^
3 - 5*x^2 + 4*x + 1)/(x^4 - 6*x^3 + 15*x^2 - 18*x + 9) - 66*(2*x^3 - 9*x^2
 + 16*x - 11)/(x^4 - 6*x^3 + 15*x^2 - 18*x + 9) - 72*(6*x^2 - 16*x + 15)/(
x^4 - 6*x^3 + 15*x^2 - 18*x + 9)
```

3.15.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(33) = 66$.

Time = 0.28 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.44

$$\int \frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x(27-54x+27x^2+27x^3-45x^4+27x}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}$$
$$= -\frac{x^6-x^5e^x-4\,x^5+6\,x^4e^x+3\,x^4-15\,x^3e^x+36\,x^3+18\,x^2e^x-107\,x^2-9\,xe^x+162\,x-72}{x^4-6\,x^3+15\,x^2-18\,x+9}$$

input
```
integrate(((x^7-8*x^6+27*x^5-45*x^4+27*x^3+27*x^2-54*x+27)*exp(x)-2*x^7+16
*x^6-54*x^5+114*x^4-142*x^3+162*x^2-132*x-54)/(x^6-9*x^5+36*x^4-81*x^3+108
*x^2-81*x+27),x, algorithm=\
```

output
```
-(x^6 - x^5*e^x - 4*x^5 + 6*x^4*e^x + 3*x^4 - 15*x^3*e^x + 36*x^3 + 18*x^2
*e^x - 107*x^2 - 9*x*e^x + 162*x - 72)/(x^4 - 6*x^3 + 15*x^2 - 18*x + 9)
```

3.15.9 Mupad [B] (verification not implemented)

Time = 14.23 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.47

$$\int \frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x(27-54x+27x^2+27x^3-45x^4+27x}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}$$
$$= x\,e^x-2\,x-x^2-\frac{24\,x^3-80\,x^2+144\,x-72}{x^4-6\,x^3+15\,x^2-18\,x+9}$$

input
```
int(-(132*x - exp(x)*(27*x^2 - 54*x + 27*x^3 - 45*x^4 + 27*x^5 - 8*x^6 + x
^7 + 27) - 162*x^2 + 142*x^3 - 114*x^4 + 54*x^5 - 16*x^6 + 2*x^7 + 54)/(10
8*x^2 - 81*x - 81*x^3 + 36*x^4 - 9*x^5 + x^6 + 27),x)
```

output
```
x*exp(x) - 2*x - x^2 - (144*x - 80*x^2 + 24*x^3 - 72)/(15*x^2 - 18*x - 6*x
^3 + x^4 + 9)
```

3.15. $$\int \frac{-54-132x+162x^2-142x^3+114x^4-54x^5+16x^6-2x^7+e^x\left(27-54x+27x^2+27x^3-45x^4+27x^5-8x^6+x^7\right)}{27-81x+108x^2-81x^3+36x^4-9x^5+x^6}\,dx$$

3.16 $\int \frac{e^{\frac{1}{72}\left(-4-4x+7x^2-2x^3+\left(4-4x+x^2\right)\log(x)\right)}\left(4-8x+15x^2-6x^3+\left(-4x+2x^2\right)\log(x)\right)}{72x}\,dx$

3.16.1 Optimal result

Integrand size = 66, antiderivative size = 20

$$\int \frac{e^{\frac{1}{72}\left(-4-4x+7x^2-2x^3+\left(4-4x+x^2\right)\log(x)\right)}\left(4-8x+15x^2-6x^3+\left(-4x+2x^2\right)\log(x)\right)}{72x}\,dx = e^{\frac{1}{72}(2-x)^2(-1-2x+\log(x))}$$

output
```
exp(1/72*(ln(x)-2*x-1)*(2-x)^2)
```

3.16.2 Mathematica [A] (verified)

Time = 1.03 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.40

$$\int \frac{e^{\frac{1}{72}\left(-4-4x+7x^2-2x^3+\left(4-4x+x^2\right)\log(x)\right)}\left(4-8x+15x^2-6x^3+\left(-4x+2x^2\right)\log(x)\right)}{72x}\,dx = e^{-\frac{1}{72}(-2+x)^2(1+2x)}x^{\frac{1}{72}(-2+x)^2}$$

input
```
Integrate[(E^((-4 - 4*x + 7*x^2 - 2*x^3 + (4 - 4*x + x^2)*Log[x])/72)*(4 -
 8*x + 15*x^2 - 6*x^3 + (-4*x + 2*x^2)*Log[x]))/(72*x),x]
```

output
```
x^((-2 + x)^2/72)/E^(((-2 + x)^2*(1 + 2*x))/72)
```

3.16.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-6x^3+15x^2+(2x^2-4x)\log(x)-8x+4)\exp\left(\frac{1}{72}\left(-2x^3+7x^2+(x^2-4x+4)\log(x)-4x-4\right)\right)}{72x}\,dx$$
$$\Big\downarrow \; 27$$
$$\frac{1}{72}\int e^{\frac{1}{72}(-2x^3+7x^2-4x-4)}x^{\frac{1}{72}(x^2-4x+4)-1}\left(-6x^3+15x^2-8x-2(2x-x^2)\log(x)+4\right)dx$$
$$\Big\downarrow \; 7292$$
$$\frac{1}{72}\int e^{\frac{1}{72}(-2x^3+7x^2-4x-4)}(2-x)x^{\frac{x^2}{72}-\frac{x}{18}-\frac{17}{18}}\left(6x^2-2\log(x)x-3x+2\right)dx$$
$$\Big\downarrow \; 7293$$
$$\frac{1}{72}\int \left(4e^{\frac{1}{72}(-2x^3+7x^2-4x-4)}x^{\frac{x^2}{72}-\frac{x}{18}-\frac{17}{18}}-8e^{\frac{1}{72}(-2x^3+7x^2-4x-4)}x^{\frac{x^2}{72}-\frac{x}{18}+\frac{1}{18}}+2e^{\frac{1}{72}(-2x^3+7x^2-4x-4)}(x-2)\log(x)x^{\frac{x^2}{72}}\right.$$
$$\Big\downarrow \; 2009$$
$$\frac{1}{72}\left(4\int\frac{\int e^{-\frac{1}{72}(x-2)^2(2x+1)}x^{\frac{1}{72}(x-2)^2}dx}{x}dx-2\int\frac{\int e^{-\frac{1}{72}(x-2)^2(2x+1)}x^{\frac{1}{72}(x^2-4x+76)}dx}{x}dx+4\int e^{\frac{1}{72}(-2x^3+7x^2-4x-4)}\right.$$

input
```
Int[(E^((-4 - 4*x + 7*x^2 - 2*x^3 + (4 - 4*x + x^2)*Log[x])/72)*(4 - 8*x +
 15*x^2 - 6*x^3 + (-4*x + 2*x^2)*Log[x]))/(72*x),x]
```

output
```
$Aborted
```

3.16.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.16.4 Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

method	result	size
risch	$x^{\frac{(-2+x)^2}{72}} \mathrm{e}^{-\frac{(1+2x)(-2+x)^2}{72}}$	24
norman	$\mathrm{e}^{\frac{\left(x^2-4x+4\right)\ln(x)}{72}-\frac{x^3}{36}+\frac{7x^2}{72}-\frac{x}{18}-\frac{1}{18}}$	29
parallelrisch	$\mathrm{e}^{\frac{\left(x^2-4x+4\right)\ln(x)}{72}-\frac{x^3}{36}+\frac{7x^2}{72}-\frac{x}{18}-\frac{1}{18}}$	29

input
```
int(1/72*((2*x^2-4*x)*ln(x)-6*x^3+15*x^2-8*x+4)*exp(1/72*(x^2-4*x+4)*ln(x)
-1/36*x^3+7/72*x^2-1/18*x-1/18)/x,x,method=_RETURNVERBOSE)
```

output
```
x^(1/72*(-2+x)^2)*exp(-1/72*(1+2*x)*(-2+x)^2)
```

3.16.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.40

$$\int \frac{e^{\frac{1}{72}(-4-4x+7x^2-2x^3+(4-4x+x^2)\log(x))}(4-8x+15x^2-6x^3+(-4x+2x^2)\log(x))}{72x}\,dx = e^{\left(-\frac{1}{36}\,x^3+\frac{7}{72}\,x^2+\frac{1}{72}\,(x^2-4\,x+4)\log(x)-\frac{1}{18}\,x-\frac{1}{18}\right)}$$

input
```
integrate(1/72*((2*x^2-4*x)*log(x)-6*x^3+15*x^2-8*x+4)*exp(1/72*(x^2-4*x+4
)*log(x)-1/36*x^3+7/72*x^2-1/18*x-1/18)/x,x, algorithm=\
```

output
```
e^(-1/36*x^3 + 7/72*x^2 + 1/72*(x^2 - 4*x + 4)*log(x) - 1/18*x - 1/18)
```

3.16.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.70

$$\int \frac{e^{\frac{1}{72}(-4-4x+7x^2-2x^3+(4-4x+x^2)\log(x))}(4-8x+15x^2-6x^3+(-4x+2x^2)\log(x))}{72x}\,dx = e^{-\frac{x^3}{36}+\frac{7x^2}{72}-\frac{x}{18}+\left(\frac{x^2}{72}-\frac{x}{18}+\frac{1}{18}\right)\log(x)-\frac{1}{18}}$$

input
```
integrate(1/72*((2*x**2-4*x)*ln(x)-6*x**3+15*x**2-8*x+4)*exp(1/72*(x**2-4*
x+4)*ln(x)-1/36*x**3+7/72*x**2-1/18*x-1/18)/x,x)
```

output
```
exp(-x**3/36 + 7*x**2/72 - x/18 + (x**2/72 - x/18 + 1/18)*log(x) - 1/18)
```

3.16.7 Maxima [F]

$$\int \frac{e^{\frac{1}{72}(-4-4x+7x^2-2x^3+(4-4x+x^2)\log(x))}(4-8x+15x^2-6x^3+(-4x+2x^2)\log(x))}{72x}\,dx = \int -\frac{(6\,x^3-15\,x^2-2\,(x^2-2\,x)\log(x)+8\,x-4)e^{\left(-\frac{1}{36}\,x^3+\frac{7}{72}\,x^2+\frac{1}{72}\,(x^2-4\,x+4)\log(x)-\frac{1}{18}\,x-\frac{1}{18}\right)}}{72\,x}\,dx$$

input
```
integrate(1/72*((2*x^2-4*x)*log(x)-6*x^3+15*x^2-8*x+4)*exp(1/72*(x^2-4*x+4
)*log(x)-1/36*x^3+7/72*x^2-1/18*x-1/18)/x,x, algorithm=\
```

output
```
-1/72*integrate((6*x^3 - 15*x^2 - 2*(x^2 - 2*x)*log(x) + 8*x - 4)*e^(-1/36
*x^3 + 7/72*x^2 + 1/72*(x^2 - 4*x + 4)*log(x) - 1/18*x - 1/18)/x, x)
```

3.16.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.60

$$\int \frac{e^{\frac{1}{72}(-4-4x+7x^2-2x^3+(4-4x+x^2)\log(x))}(4-8x+15x^2-6x^3+(-4x+2x^2)\log(x))}{72x}\,dx = e^{\left(-\frac{1}{36}\,x^3+\frac{1}{72}\,x^2\log(x)+\frac{7}{72}\,x^2-\frac{1}{18}\,x\log(x)-\frac{1}{18}\,x+\frac{1}{18}\,\log(x)-\frac{1}{18}\right)}$$

input
```
integrate(1/72*((2*x^2-4*x)*log(x)-6*x^3+15*x^2-8*x+4)*exp(1/72*(x^2-4*x+4
)*log(x)-1/36*x^3+7/72*x^2-1/18*x-1/18)/x,x, algorithm=\
```

output
```
e^(-1/36*x^3 + 1/72*x^2*log(x) + 7/72*x^2 - 1/18*x*log(x) - 1/18*x + 1/18*
log(x) - 1/18)
```

3.16.9 Mupad [B] (verification not implemented)

Time = 13.73 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.70

$$\int \frac{e^{\frac{1}{72}\left(-4-4x+7x^2-2x^3+(4-4x+x^2)\log(x)\right)}\left(4-8x+15x^2-6x^3+(-4x+2x^2)\log(x)\right)}{72x}\,dx$$
$$= x^{\frac{x^2}{72}+\frac{1}{18}}\,\mathrm{e}^{-\frac{x\ln(x)}{18}}\,\mathrm{e}^{-\frac{x}{18}}\,\mathrm{e}^{-\frac{1}{18}}\,\mathrm{e}^{-\frac{x^3}{36}}\,\mathrm{e}^{\frac{7x^2}{72}}$$

input
```
int(-(exp((log(x)*(x^2 - 4*x + 4))/72 - x/18 + (7*x^2)/72 - x^3/36 - 1/18)
*(8*x + log(x)*(4*x - 2*x^2) - 15*x^2 + 6*x^3 - 4))/(72*x),x)
```

output
```
x^(x^2/72 + 1/18)*exp(-(x*log(x))/18)*exp(-x/18)*exp(-1/18)*exp(-x^3/36)*e
xp((7*x^2)/72)
```

3.17 $\int \frac{e^{\frac{1}{25}\left(-4775-560x-16x^2\right)}\left(-1680-96x+e^5\left(1145+624x+32x^2\right)\right)}{225+e^5(-300-150x)+e^{10}\left(100+100x+25x^2\right)}\,dx$

3.17.1 Optimal result

Integrand size = 63, antiderivative size = 28

$$\int \frac{e^{\frac{1}{25}\left(-4775-560x-16x^2\right)}\left(-1680-96x+e^5\left(1145+624x+32x^2\right)\right)}{225+e^5(-300-150x)+e^{10}\left(100+100x+25x^2\right)}\,dx=\frac{e^{5-\left(-14-\frac{4x}{5}\right)^2}}{3-e^5(2+x)}$$

output
```
exp(5-(-14-4/5*x)^2)/(3-(2+x)*exp(5))
```

3.17.2 Mathematica [A] (verified)

Time = 3.81 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{e^{\frac{1}{25}\left(-4775-560x-16x^2\right)}\left(-1680-96x+e^5\left(1145+624x+32x^2\right)\right)}{225+e^5(-300-150x)+e^{10}\left(100+100x+25x^2\right)}\,dx=-\frac{e^{-191-\frac{112x}{5}-\frac{16x^2}{25}}}{-3+e^5(2+x)}$$

input
```
Integrate[(E^((-4775 - 560*x - 16*x^2)/25)*(-1680 - 96*x + E^5*(1145 + 624
*x + 32*x^2)))/(225 + E^5*(-300 - 150*x) + E^10*(100 + 100*x + 25*x^2)),x]
```

output
```
-(E^(-191 - (112*x)/5 - (16*x^2)/25)/(-3 + E^5*(2 + x)))
```

3.17.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.032, Rules used = {2007, 2727}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{1}{25}\left(-16x^2-560x-4775\right)}\left(e^5\left(32x^2+624x+1145\right)-96x-1680\right)}{e^{10}\left(25x^2+100x+100\right)+e^5(-150x-300)+225}dx$$

$$\Big\downarrow \ 2007$$

$$\int \frac{e^{\frac{1}{25}\left(-16x^2-560x-4775\right)}\left(e^5\left(32x^2+624x+1145\right)-96x-1680\right)}{\left(5e^5x+5\left(2e^5-3\right)\right)^2}dx$$

$$\Big\downarrow \ 2727$$

$$\frac{e^{\frac{1}{25}\left(-16x^2-560x-4775\right)}}{-e^5x-2e^5+3}$$

input
```
Int[(E^((-4775 - 560*x - 16*x^2)/25)*(-1680 - 96*x + E^5*(1145 + 624*x + 3
2*x^2)))/(225 + E^5*(-300 - 150*x) + E^10*(100 + 100*x + 25*x^2)),x]
```

output
```
E^((-4775 - 560*x - 16*x^2)/25)/(3 - 2*E^5 - E^5*x)
```

3.17.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2727
```
Int[(F_)^(u_)*(v_)^(n_.)*(w_), x_Symbol] :> With[{z = Log[F]*v*D[u, x] + (n
 + 1)*D[v, x]}, Simp[(Coefficient[w, x, Exponent[w, x]]/Coefficient[z, x, E
xponent[z, x]])*F^u*v^(n + 1), x] /; EqQ[Exponent[w, x], Exponent[z, x]] &&
 EqQ[w*Coefficient[z, x, Exponent[z, x]], z*Coefficient[w, x, Exponent[w, x
]]]] /; FreeQ[{F, n}, x] && PolynomialQ[u, x] && PolynomialQ[v, x] && Polyn
omialQ[w, x]
```

3.17.4 Maple [A] (verified)

Time = 1.01 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

method	result	size
gosper	$-\frac{e^{-\frac{16}{25}x^2-\frac{112}{5}x-191}}{x\,e^5+2\,e^5-3}$	26
norman	$-\frac{e^{-\frac{16}{25}x^2-\frac{112}{5}x-191}}{x\,e^5+2\,e^5-3}$	26
risch	$-\frac{e^{-\frac{16}{25}x^2-\frac{112}{5}x-191}}{x\,e^5+2\,e^5-3}$	26
parallelrisch	$-\frac{e^{-\frac{16}{25}x^2-\frac{112}{5}x-191}}{x\,e^5+2\,e^5-3}$	26

input
```
int(((32*x^2+624*x+1145)*exp(5)-96*x-1680)*exp(-16/25*x^2-112/5*x-191)/((2
5*x^2+100*x+100)*exp(5)^2+(-150*x-300)*exp(5)+225),x,method=_RETURNVERBOSE
)
```

output
```
-exp(-16/25*x^2-112/5*x-191)/(x*exp(5)+2*exp(5)-3)
```

3.17.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{e^{\frac{1}{25}(-4775-560x-16x^2)}(-1680-96x+e^5(1145+624x+32x^2))}{225+e^5(-300-150x)+e^{10}(100+100x+25x^2)}\,dx=-\frac{e^{\left(-\frac{16}{25}x^2-\frac{112}{5}x-191\right)}}{(x+2)e^5-3}$$

input
```
integrate(((32*x^2+624*x+1145)*exp(5)-96*x-1680)*exp(-16/25*x^2-112/5*x-19
1)/((25*x^2+100*x+100)*exp(5)^2+(-150*x-300)*exp(5)+225),x, algorithm=\
```

output
```
-e^(-16/25*x^2 - 112/5*x - 191)/((x + 2)*e^5 - 3)
```

3.17.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{e^{\frac{1}{25}(-4775-560x-16x^2)}(-1680-96x+e^5(1145+624x+32x^2))}{225+e^5(-300-150x)+e^{10}(100+100x+25x^2)}\,dx = -\frac{e^{-\frac{16x^2}{25}-\frac{112x}{5}-191}}{xe^5-3+2e^5}$$

input
```
integrate(((32*x**2+624*x+1145)*exp(5)-96*x-1680)*exp(-16/25*x**2-112/5*x-
191)/((25*x**2+100*x+100)*exp(5)**2+(-150*x-300)*exp(5)+225),x)
```

output
```
-exp(-16*x**2/25 - 112*x/5 - 191)/(x*exp(5) - 3 + 2*exp(5))
```

3.17.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{1}{25}(-4775-560x-16x^2)}(-1680-96x+e^5(1145+624x+32x^2))}{225+e^5(-300-150x)+e^{10}(100+100x+25x^2)}\,dx$$
$$= -\frac{e^{\left(-\frac{16}{25}x^2-\frac{112}{5}x\right)}}{xe^{196}+2e^{196}-3e^{191}}$$

input
```
integrate(((32*x^2+624*x+1145)*exp(5)-96*x-1680)*exp(-16/25*x^2-112/5*x-19
1)/((25*x^2+100*x+100)*exp(5)^2+(-150*x-300)*exp(5)+225),x, algorithm=\
```

output
```
-e^(-16/25*x^2 - 112/5*x)/(x*e^196 + 2*e^196 - 3*e^191)
```

3.17.8 Giac [F]

$$\int \frac{e^{\frac{1}{25}(-4775-560x-16x^2)}(-1680-96x+e^5(1145+624x+32x^2))}{225+e^5(-300-150x)+e^{10}(100+100x+25x^2)}\,dx$$
$$= \int \frac{((32x^2+624x+1145)e^5-96x-1680)e^{\left(-\frac{16}{25}x^2-\frac{112}{5}x-191\right)}}{25((x^2+4x+4)e^{10}-6(x+2)e^5+9)}\,dx$$

input
```
integrate(((32*x^2+624*x+1145)*exp(5)-96*x-1680)*exp(-16/25*x^2-112/5*x-19
1)/((25*x^2+100*x+100)*exp(5)^2+(-150*x-300)*exp(5)+225),x, algorithm=\
```

output
```
integrate(1/25*((32*x^2 + 624*x + 1145)*e^5 - 96*x - 1680)*e^(-16/25*x^2 -
 112/5*x - 191)/((x^2 + 4*x + 4)*e^10 - 6*(x + 2)*e^5 + 9), x)
```

3.17.9 Mupad [B] (verification not implemented)

Time = 0.72 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^{\frac{1}{25}(-4775-560x-16x^2)}(-1680-96x+e^5(1145+624x+32x^2))}{225+e^5(-300-150x)+e^{10}(100+100x+25x^2)}\,dx = -\frac{e^{-\frac{112x}{5}}\,e^{-191}\,e^{-\frac{16x^2}{25}}}{2\,e^5+x\,e^5-3}$$

input
```
int(-(exp(- (112*x)/5 - (16*x^2)/25 - 191)*(96*x - exp(5)*(624*x + 32*x^2
+ 1145) + 1680))/(exp(10)*(100*x + 25*x^2 + 100) - exp(5)*(150*x + 300) +
225),x)
```

output
```
-(exp(-(112*x)/5)*exp(-191)*exp(-(16*x^2)/25))/(2*exp(5) + x*exp(5) - 3)
```

3.18 $\int e^{x^2+(-6e^2x+24ex^2-24x^3)\log(5)+(9e^4-72e^3x+216e^2x^2-288ex^3+14$

3.18.1 Optimal result

Integrand size = 114, antiderivative size = 21

$$\int e^{x^2+(-6e^2x+24ex^2-24x^3)\log(5)+(9e^4-72e^3x+216e^2x^2-288ex^3+144x^4)\log^2(5)}\left(2x+\left(-6e^2+48ex-72x^2\right)\log(5)+\left(-72e^3+432e^2x-864ex^2+576x^3\right)\log^2(5)\right)\,dx=e^{\left(-x+3(-e+2x)^2\log(5)\right)^2}$$

output
```
exp((3*ln(5)*(-exp(1)+2*x)^2-x)^2)
```

3.18.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 51 vs. 2(21) = 42.

Time = 2.12 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.43

$$\int e^{x^2+(-6e^2x+24ex^2-24x^3)\log(5)+(9e^4-72e^3x+216e^2x^2-288ex^3+144x^4)\log^2(5)}\left(2x+\left(-6e^2+48ex-72x^2\right)\log(5)+\left(-72e^3+432e^2x-864ex^2+576x^3\right)\log^2(5)\right)\,dx=5^{-6(e-2x)^2x}e^{\frac{1}{4}\left(e^2-2e(e-2x)+(e-2x)^2+36(e-2x)^4\log^2(5)\right)}$$

input
```
Integrate[E^(x^2 + (-6*E^2*x + 24*E*x^2 - 24*x^3)*Log[5] + (9*E^4 - 72*E^3
*x + 216*E^2*x^2 - 288*E*x^3 + 144*x^4)*Log[5]^2)*(2*x + (-6*E^2 + 48*E*x
- 72*x^2)*Log[5] + (-72*E^3 + 432*E^2*x - 864*E*x^2 + 576*x^3)*Log[5]^2),x
]
```

output
```
E^((E^2 - 2*E*(E - 2*x) + (E - 2*x)^2 + 36*(E - 2*x)^4*Log[5]^2)/4)/5^(6*(
E - 2*x)^2*x)
```

3.18.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 62 vs. $2(21) = 42$.

Time = 0.52 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.95, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.009$, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\left(-72x^2+48ex-6e^2\right)\log(5)+\left(576x^3-864ex^2+432e^2x-72e^3\right)\log^2(5)+2x\right)\exp\left(x^2+\left(-24x^3+24ex^2-\right.\right.$$

$$\Big\downarrow \text{7257}$$

$$5^{-24x^3+24ex^2-6e^2x}\exp\left(x^2+9\left(16x^4-32ex^3+24e^2x^2-8e^3x+e^4\right)\log^2(5)\right)$$

input
```
Int[E^(x^2 + (-6*E^2*x + 24*E*x^2 - 24*x^3)*Log[5] + (9*E^4 - 72*E^3*x + 2
16*E^2*x^2 - 288*E*x^3 + 144*x^4)*Log[5]^2)*(2*x + (-6*E^2 + 48*E*x - 72*x
^2)*Log[5] + (-72*E^3 + 432*E^2*x - 864*E*x^2 + 576*x^3)*Log[5]^2),x]
```

output
```
5^(-6*E^2*x + 24*E*x^2 - 24*x^3)*E^(x^2 + 9*(E^4 - 8*E^3*x + 24*E^2*x^2 -
32*E*x^3 + 16*x^4)*Log[5]^2)
```

3.18.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.18.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(21) = 42$.

Time = 0.30 (sec) , antiderivative size = 69, normalized size of antiderivative = 3.29

method	result
derivativedivides	$\mathrm{e}^{\left(9\,\mathrm{e}^{4}-72x\,\mathrm{e}^{3}+216x^{2}\mathrm{e}^{2}-288x^{3}\mathrm{e}+144x^{4}\right)\ln\left(5\right)^{2}+\left(-6\,\mathrm{e}^{2}x+24x^{2}\mathrm{e}-24x^{3}\right)\ln\left(5\right)+x^{2}}$
default	$\mathrm{e}^{\left(9\,\mathrm{e}^{4}-72x\,\mathrm{e}^{3}+216x^{2}\mathrm{e}^{2}-288x^{3}\mathrm{e}+144x^{4}\right)\ln\left(5\right)^{2}+\left(-6\,\mathrm{e}^{2}x+24x^{2}\mathrm{e}-24x^{3}\right)\ln\left(5\right)+x^{2}}$
norman	$\mathrm{e}^{\left(9\,\mathrm{e}^{4}-72x\,\mathrm{e}^{3}+216x^{2}\mathrm{e}^{2}-288x^{3}\mathrm{e}+144x^{4}\right)\ln\left(5\right)^{2}+\left(-6\,\mathrm{e}^{2}x+24x^{2}\mathrm{e}-24x^{3}\right)\ln\left(5\right)+x^{2}}$
parallelrisch	$\mathrm{e}^{\left(9\,\mathrm{e}^{4}-72x\,\mathrm{e}^{3}+216x^{2}\mathrm{e}^{2}-288x^{3}\mathrm{e}+144x^{4}\right)\ln\left(5\right)^{2}+\left(-6\,\mathrm{e}^{2}x+24x^{2}\mathrm{e}-24x^{3}\right)\ln\left(5\right)+x^{2}}$
risch	$15625^{-\left(-4x\,\mathrm{e}+4x^{2}+\mathrm{e}^{2}\right)x}\mathrm{e}^{-288\ln\left(5\right)^{2}\mathrm{e}x^{3}+144x^{4}\ln\left(5\right)^{2}+216\ln\left(5\right)^{2}\mathrm{e}^{2}x^{2}-72\ln\left(5\right)^{2}\mathrm{e}^{3}x+9\ln\left(5\right)^{2}\mathrm{e}^{4}+x^{2}}$
gosper	$\mathrm{e}^{-288\ln\left(5\right)^{2}\mathrm{e}x^{3}+144x^{4}\ln\left(5\right)^{2}+216\ln\left(5\right)^{2}\mathrm{e}^{2}x^{2}-72\ln\left(5\right)^{2}\mathrm{e}^{3}x+24x^{2}\mathrm{e}\ln\left(5\right)-24x^{3}\ln\left(5\right)+9\ln\left(5\right)^{2}\mathrm{e}^{4}-6x\,\mathrm{e}^{2}\ln\left(5\right)+x^{2}}$

input
```
int(((-72*exp(1)^3+432*x*exp(1)^2-864*x^2*exp(1)+576*x^3)*ln(5)^2+(-6*exp(
1)^2+48*x*exp(1)-72*x^2)*ln(5)+2*x)*exp((9*exp(1)^4-72*x*exp(1)^3+216*x^2*
exp(1)^2-288*x^3*exp(1)+144*x^4)*ln(5)^2+(-6*x*exp(1)^2+24*x^2*exp(1)-24*x
^3)*ln(5)+x^2),x,method=_RETURNVERBOSE)
```

output
```
exp((9*exp(1)^4-72*x*exp(1)^3+216*x^2*exp(1)^2-288*x^3*exp(1)+144*x^4)*ln(
5)^2+(-6*x*exp(1)^2+24*x^2*exp(1)-24*x^3)*ln(5)+x^2)
```

3.18.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(21) = 42$.

Time = 0.27 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.81

$$\int e^{x^2+(-6e^2x+24ex^2-24x^3)\log(5)+(9e^4-72e^3x+216e^2x^2-288ex^3+144x^4)\log^2(5)}\big(2x + (-6e^2+48ex-72x^2)\log(5) + (-72e^3+432e^2x-864ex^2 + 576x^3)\log^2(5)\big)\,dx = e^{\left(9\,(16\,x^4-32\,x^3e+24\,x^2e^2-8\,xe^3+e^4)\log(5)^2+x^2-6\,(4\,x^3-4\,x^2e+xe^2)\log(5)\right)}$$

input
```
integrate(((-72*exp(1)^3+432*x*exp(1)^2-864*x^2*exp(1)+576*x^3)*log(5)^2+(
-6*exp(1)^2+48*x*exp(1)-72*x^2)*log(5)+2*x)*exp((9*exp(1)^4-72*x*exp(1)^3+
216*x^2*exp(1)^2-288*x^3*exp(1)+144*x^4)*log(5)^2+(-6*x*exp(1)^2+24*x^2*ex
p(1)-24*x^3)*log(5)+x^2),x, algorithm=\
```

output
```
e^(9*(16*x^4 - 32*x^3*e + 24*x^2*e^2 - 8*x*e^3 + e^4)*log(5)^2 + x^2 - 6*(
4*x^3 - 4*x^2*e + x*e^2)*log(5))
```

3.18.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(17) = 34$.

Time = 0.10 (sec) , antiderivative size = 66, normalized size of antiderivative = 3.14

$$\int e^{x^2+(-6e^2x+24ex^2-24x^3)\log(5)+(9e^4-72e^3x+216e^2x^2-288ex^3+144x^4)\log^2(5)}\big(2x + (-6e^2+48ex-72x^2)\log(5) + (-72e^3+432e^2x-864ex^2 + 576x^3)\log^2(5)\big)\,dx = e^{x^2+(-24x^3+24ex^2-6xe^2)\log(5)+(144x^4-288ex^3+216x^2e^2-72xe^3+9e^4)\log(5)^2}$$

input
```
integrate(((-72*exp(1)**3+432*x*exp(1)**2-864*x**2*exp(1)+576*x**3)*ln(5)*
*2+(-6*exp(1)**2+48*x*exp(1)-72*x**2)*ln(5)+2*x)*exp((9*exp(1)**4-72*x*exp
(1)**3+216*x**2*exp(1)**2-288*x**3*exp(1)+144*x**4)*ln(5)**2+(-6*x*exp(1)*
*2+24*x**2*exp(1)-24*x**3)*ln(5)+x**2),x)
```

output
```
exp(x**2 + (-24*x**3 + 24*E*x**2 - 6*x*exp(2))*log(5) + (144*x**4 - 288*E*
x**3 + 216*x**2*exp(2) - 72*x*exp(3) + 9*exp(4))*log(5)**2)
```

3.18.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. $2(21) = 42$.

Time = 0.49 (sec) , antiderivative size = 76, normalized size of antiderivative = 3.62

$$\int e^{x^2+(-6e^2x+24ex^2-24x^3)\log(5)+(9e^4-72e^3x+216e^2x^2-288ex^3+144x^4)\log^2(5)}\big(2x + (-6e^2+48ex-72x^2)\log(5) + (-72e^3+432e^2x-864ex^2+576x^3)\log^2(5)\big)\,dx = e^{\left(144\,x^4\log(5)^2-288\,x^3e\log(5)^2+216\,x^2e^2\log(5)^2-24\,x^3\log(5)+24\,x^2e\log(5)-72\,xe^3\log(5)^2-6\,xe^2\log(5)+9\,e^4\log(5)^2+x^2\right)}$$

3.18.

$\int e^{x^2+(-6e^2x+24ex^2-24x^3)\log(5)+(9e^4-72e^3x+216e^2x^2-288ex^3+144x^4)\log^2(5)}\big(2x + (-6e^2+48ex-72x^2)\log(5) + (-72e$

input
```
integrate(((-72*exp(1)^3+432*x*exp(1)^2-864*x^2*exp(1)+576*x^3)*log(5)^2+(
-6*exp(1)^2+48*x*exp(1)-72*x^2)*log(5)+2*x)*exp((9*exp(1)^4-72*x*exp(1)^3+
216*x^2*exp(1)^2-288*x^3*exp(1)+144*x^4)*log(5)^2+(-6*x*exp(1)^2+24*x^2*ex
p(1)-24*x^3)*log(5)+x^2),x, algorithm=\
```

output
```
e^(144*x^4*log(5)^2 - 288*x^3*e*log(5)^2 + 216*x^2*e^2*log(5)^2 - 24*x^3*l
og(5) + 24*x^2*e*log(5) - 72*x*e^3*log(5)^2 - 6*x*e^2*log(5) + 9*e^4*log(5
)^2 + x^2)
```

3.18.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. 2(21) = 42.

Time = 0.42 (sec) , antiderivative size = 76, normalized size of antiderivative = 3.62

$$\int e^{x^2+\left(-6e^2x+24ex^2-24x^3\right)\log(5)+\left(9e^4-72e^3x+216e^2x^2-288ex^3+144x^4\right)\log^2(5)}\left(2x+\left(-6e^2+48ex-72x^2\right)\log(5)+\left(-72e^3+432e^2x-864ex^2+576x^3\right)\log^2(5)\right)\,dx$$
$$=e^{\left(144\,x^4\log(5)^2-288\,x^3e\log(5)^2+216\,x^2e^2\log(5)^2-24\,x^3\log(5)+24\,x^2e\log(5)-72\,xe^3\log(5)^2-6\,xe^2\log(5)+9\,e^4\log(5)^2+x^2\right)}$$

input
```
integrate(((-72*exp(1)^3+432*x*exp(1)^2-864*x^2*exp(1)+576*x^3)*log(5)^2+(
-6*exp(1)^2+48*x*exp(1)-72*x^2)*log(5)+2*x)*exp((9*exp(1)^4-72*x*exp(1)^3+
216*x^2*exp(1)^2-288*x^3*exp(1)+144*x^4)*log(5)^2+(-6*x*exp(1)^2+24*x^2*ex
p(1)-24*x^3)*log(5)+x^2),x, algorithm=\
```

output
```
e^(144*x^4*log(5)^2 - 288*x^3*e*log(5)^2 + 216*x^2*e^2*log(5)^2 - 24*x^3*l
og(5) + 24*x^2*e*log(5) - 72*x*e^3*log(5)^2 - 6*x*e^2*log(5) + 9*e^4*log(5
)^2 + x^2)
```

3.18.9 Mupad [B] (verification not implemented)

Time = 13.55 (sec) , antiderivative size = 85, normalized size of antiderivative = 4.05

$$\int e^{x^2+\left(-6e^2x+24ex^2-24x^3\right)\log(5)+\left(9e^4-72e^3x+216e^2x^2-288ex^3+144x^4\right)\log^2(5)}\left(2x+\left(-6e^2+48ex-72x^2\right)\log(5)+\left(-72e^3+432e^2x-864ex^2+576x^3\right)\log^2(5)\right)\,dx$$
$$=\frac{5^{24\,x^2\,\mathrm{e}}\,\mathrm{e}^{x^2}\,\mathrm{e}^{144\,x^4\ln(5)^2}\,\mathrm{e}^{-72\,x\,\mathrm{e}^3\ln(5)^2}\,\mathrm{e}^{216\,x^2\,\mathrm{e}^2\ln(5)^2}\,\mathrm{e}^{-288\,x^3\,\mathrm{e}\ln(5)^2}\,\mathrm{e}^{9\,\mathrm{e}^4\ln(5)^2}}{5^{24\,x^3}\,5^{6\,x\,\mathrm{e}^2}}$$

input
```
int(-exp(x^2 - log(5)*(6*x*exp(2) - 24*x^2*exp(1) + 24*x^3) + log(5)^2*(9*
exp(4) - 72*x*exp(3) + 216*x^2*exp(2) - 288*x^3*exp(1) + 144*x^4))*(log(5)
^2*(72*exp(3) - 432*x*exp(2) + 864*x^2*exp(1) - 576*x^3) - 2*x + log(5)*(6
*exp(2) - 48*x*exp(1) + 72*x^2)),x)
```

output
```
(5^(24*x^2*exp(1))*exp(x^2)*exp(144*x^4*log(5)^2)*exp(-72*x*exp(3)*log(5)^
2)*exp(216*x^2*exp(2)*log(5)^2)*exp(-288*x^3*exp(1)*log(5)^2)*exp(9*exp(4)
*log(5)^2))/(5^(24*x^3)*5^(6*x*exp(2)))
```

3.18.

$\int e^{x^2+(-6e^2x+24ex^2-24x^3)\log(5)+(9e^4-72e^3x+216e^2x^2-288ex^3+144x^4)\log^2(5)}\left(2x+(-6e^2+48ex-72x^2)\log(5)+(-72e\right.$

3.19 $\int \frac{-7-14x+(7+7x)\log(-1-x)+(7+7x)\log(x)}{e^2(x^2+x^3)}\,dx$

3.19.1 Optimal result

Integrand size = 38, antiderivative size = 17

$$\int \frac{-7-14x+(7+7x)\log(-1-x)+(7+7x)\log(x)}{e^2(x^2+x^3)}\,dx = -\frac{7(\log(-1-x)+\log(x))}{e^2x}$$

output
```
-7/x/exp(2)*(ln(x)+ln(-1-x))
```

3.19.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.41

$$\int \frac{-7-14x+(7+7x)\log(-1-x)+(7+7x)\log(x)}{e^2(x^2+x^3)}\,dx = \frac{7\left(-\frac{\log(-1-x)}{x}-\frac{\log(x)}{x}\right)}{e^2}$$

input
```
Integrate[(-7 - 14*x + (7 + 7*x)*Log[-1 - x] + (7 + 7*x)*Log[x])/(E^2*(x^2
 + x^3)),x]
```

output
```
(7*(-(Log[-1 - x]/x) - Log[x]/x))/E^2
```

3.19.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.132, Rules used = {27, 27, 2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-14x+(7x+7)\log(-x-1)+(7x+7)\log(x)-7}{e^2(x^3+x^2)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int -\frac{7(2x-(x+1)\log(-x-1)-(x+1)\log(x)+1)}{x^3+x^2}dx}{e^2}$$

$$\Big\downarrow \text{27}$$

$$-\frac{7\int \frac{2x-(x+1)\log(-x-1)-(x+1)\log(x)+1}{x^3+x^2}dx}{e^2}$$

$$\Big\downarrow \text{2026}$$

$$-\frac{7\int \frac{2x-(x+1)\log(-x-1)-(x+1)\log(x)+1}{x^2(x+1)}dx}{e^2}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{7\int \left(\frac{-\log(-x-1)x+2x-\log(-x-1)+1}{x^2(x+1)}-\frac{\log(x)}{x^2}\right)dx}{e^2}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{7\left(\frac{\log(-x-1)}{x}+\frac{\log(x)}{x}\right)}{e^2}$$

input
```
Int[(-7 - 14*x + (7 + 7*x)*Log[-1 - x] + (7 + 7*x)*Log[x])/(E^2*(x^2 + x^3
)),x]
```

output
```
(-7*(Log[-1 - x]/x + Log[x]/x))/E^2
```

3.19.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.19.4 Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.41

method	result	si
risch	$-\frac{7\,\mathrm{e}^{-2}\ln(-1-x)}{x}-\frac{7\,\mathrm{e}^{-2}\ln(x)}{x}$	24
parallelrisch	$-\frac{\mathrm{e}^{-2}(7\ln(1+x)x-7\ln(-1-x)x+14\ln(x)+14\ln(-1-x))}{2x}$	39
default	$\mathrm{e}^{-2}\left(7\ln\left(-x\right)+\frac{7\ln(-1-x)(-1-x)}{x}-\frac{7\ln(x)}{x}-7\ln\left(x\right)+7\ln\left(1+x\right)\right)$	46
parts	$7\,\mathrm{e}^{-2}\left(-\frac{\ln(x)}{x}-\frac{1}{x}\right)+7\,\mathrm{e}^{-2}\left(\ln\left(-x\right)+\frac{\ln(-1-x)(-1-x)}{x}\right)-7\,\mathrm{e}^{-2}\left(-\frac{1}{x}+\ln\left(x\right)-\ln\left(1+x\right)\right)$	67

input
```
int(((7*x+7)*ln(x)+(7*x+7)*ln(-1-x)-14*x-7)/(x^3+x^2)/exp(2),x,method=_RET
URNVERBOSE)
```

output
```
-7*exp(-2)/x*ln(-1-x)-7*exp(-2)*ln(x)/x
```

3.19.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{-7-14x+(7+7x)\log(-1-x)+(7+7x)\log(x)}{e^2\left(x^2+x^3\right)}\,dx = -\frac{7\left(\log\left(x\right)+\log\left(-x-1\right)\right)e^{(-2)}}{x}$$

input
```
integrate((((7*x+7)*log(x)+(7*x+7)*log(-1-x)-14*x-7)/(x^3+x^2)/exp(2),x, al
gorithm=\
```

output
```
-7*(log(x) + log(-x - 1))*e^(-2)/x
```

3.19.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.41

$$\int \frac{-7-14x+(7+7x)\log(-1-x)+(7+7x)\log(x)}{e^2\left(x^2+x^3\right)}\,dx = -\frac{7\log\left(x\right)}{xe^2}-\frac{7\log\left(-x-1\right)}{xe^2}$$

input
```
integrate((((7*x+7)*ln(x)+(7*x+7)*ln(-1-x)-14*x-7)/(x**3+x**2)/exp(2),x)
```

output
```
-7*exp(-2)*log(x)/x - 7*exp(-2)*log(-x - 1)/x
```

3.19.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(16) = 32.

Time = 0.24 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.41

$$\int \frac{-7-14x+(7+7x)\log(-1-x)+(7+7x)\log(x)}{e^2\left(x^2+x^3\right)}\,dx = -7\left(\frac{(x+1)\log\left(x\right)-(x-1)\log\left(-x-1\right)+1}{x}-\frac{1}{x}+\log\left(x+1\right)-\log\left(x\right)\right)e^{(-2)}$$

input
```
integrate((((7*x+7)*log(x)+(7*x+7)*log(-1-x)-14*x-7)/(x^3+x^2)/exp(2),x, al
gorithm=\
```

output
```
-7*(((x + 1)*log(x) - (x - 1)*log(-x - 1) + 1)/x - 1/x + log(x + 1) - log(
x))*e^(-2)
```

3.19.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int \frac{-7-14x+(7+7x)\log(-1-x)+(7+7x)\log(x)}{e^2(x^2+x^3)}\,dx = -7\left(\frac{\log(x)}{x}+\frac{\log(-x-1)}{x}\right)e^{(-2)}$$

input
```
integrate((((7*x+7)*log(x)+(7*x+7)*log(-1-x)-14*x-7)/(x^3+x^2)/exp(2),x, al
gorithm=\
```

output
```
-7*(log(x)/x + log(-x - 1)/x)*e^(-2)
```

3.19.9 Mupad [B] (verification not implemented)

Time = 13.84 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{-7-14x+(7+7x)\log(-1-x)+(7+7x)\log(x)}{e^2(x^2+x^3)}\,dx = -\frac{7\,e^{-2}\,(\ln(-x-1)+\ln(x))}{x}$$

input
```
int(-(exp(-2)*(14*x - log(- x - 1)*(7*x + 7) - log(x)*(7*x + 7) + 7))/(x^2
 + x^3),x)
```

output
```
-(7*exp(-2)*(log(- x - 1) + log(x)))/x
```

3.20 $\int e^{-x}x^{4+e^{e^{e^{16e^{-x}}}}}\left(5e^x+e^{e^{e^{16e^{-x}}}}\left(e^x-16e^{e^{16e^{-x}}+16e^{-x}}x\log(x)\right)\right)dx$

3.20.1 Optimal result

Integrand size = 71, antiderivative size = 17

$$\int e^{-x}x^{4+e^{e^{e^{16e^{-x}}}}}\left(5e^x+e^{e^{e^{16e^{-x}}}}\left(e^x-16e^{e^{16e^{-x}}+16e^{-x}}x\log(x)\right)\right)dx=x^{5+e^{e^{e^{16e^{-x}}}}}$$

output
```
exp((5+exp(exp(exp(4/exp(x))^4)))*ln(x))
```

3.20.2 Mathematica [A] (verified)

Time = 0.72 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int e^{-x}x^{4+e^{e^{e^{16e^{-x}}}}}\left(5e^x+e^{e^{e^{16e^{-x}}}}\left(e^x-16e^{e^{16e^{-x}}+16e^{-x}}x\log(x)\right)\right)dx=x^{5+e^{e^{e^{16e^{-x}}}}}$$

input
```
Integrate[(x^(4 + E^E^E^(16/E^x))*(5*E^x + E^E^E^(16/E^x)*(E^x - 16*E^(E^(
16/E^x) + 16/E^x)*x*Log[x])))/E^x,x]
```

output
```
x^(5 + E^E^E^(16/E^x))
```

3.20.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-x} x^{e^{e^{e^{16e^{-x}}}}+4}\left(5e^x+e^{e^{e^{16e^{-x}}}}\left(e^x-16e^{e^{16e^{-x}}+16e^{-x}}x\log(x)\right)\right)dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(5x^{e^{e^{e^{16e^{-x}}}}+4}+e^{e^{e^{16e^{-x}}}-x}x^{e^{e^{e^{16e^{-x}}}}+4}\left(e^x-16e^{e^{16e^{-x}}+16e^{-x}}x\log(x)\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-16\log(x)\int \exp\left(e^{-x}\left(16+e^{x+16e^{-x}}\right)+e^{e^{16e^{-x}}}-x\right)x^{5+e^{e^{e^{16e^{-x}}}}}dx+5\int x^{4+e^{e^{e^{16e^{-x}}}}}dx+\int e^{e^{e^{16e^{-x}}}}x^{4+e^{e^{e^{16e^{-x}}}}}dx+16\int \frac{\int e^{-x+e^{e^{16e^{-x}}}+e^{16e^{-x}}+16e^{-x}}x^{5+e^{e^{e^{16e^{-x}}}}}dx}{x}dx$$

input
```
Int[(x^(4 + E^E^E^(16/E^x))*(5*E^x + E^E^E^(16/E^x)*(E^x - 16*E^(E^(16/E^x
) + 16/E^x)*x*Log[x])))/E^x,x]
```

output
```
$Aborted
```

3.20.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.20.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$x^{{\mathrm e}^{{\mathrm e}^{{\mathrm e}^{16 \,{\mathrm e}^{-x}}}}} x^{5}$$

input
```
int(((-16*x*ln(x)*exp(4/exp(x))^4*exp(exp(4/exp(x))^4)+exp(x))*exp(exp(exp
(4/exp(x))^4))+5*exp(x))*exp(ln(x)*exp(exp(exp(4/exp(x))^4))+5*ln(x))/exp(
x)/x,x)
```

output
```
x^exp(exp(exp(16*exp(-x))))*x^5
```

3.20.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. 2(13) = 26.

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 2.00

$$\int e^{-x}x^{4+e^{e^{e^{16e^{-x}}}}}\left(5e^x+e^{e^{e^{16e^{-x}}}}\left(e^x-16e^{e^{16e^{-x}}+16e^{-x}}x\log(x)\right)\right)\,dx = e^{\left(e^{\left(e^{\left(\left(e^{\left(x+16\,e^{(-x)}\right)}+16\right)e^{(-x)}-16\,e^{(-x)}\right)}\right)}\log(x)+5\,\log(x)\right)}$$

input
```
integrate(((-16*x*log(x)*exp(4/exp(x))^4*exp(exp(4/exp(x))^4)+exp(x))*exp(
exp(exp(4/exp(x))^4))+5*exp(x))*exp(log(x)*exp(exp(exp(4/exp(x))^4))+5*log
(x))/exp(x)/x,x, algorithm=\
```

output
```
e^(e^(e^((e^(x + 16*e^(-x)) + 16)*e^(-x) - 16*e^(-x)))*log(x) + 5*log(x))
```

3.20.6 Sympy [F(-1)]

Timed out.

$$\int e^{-x}x^{4+e^{e^{e^{16e^{-x}}}}}\left(5e^x+e^{e^{e^{16e^{-x}}}}\left(e^x-16e^{e^{16e^{-x}}+16e^{-x}}x\log(x)\right)\right)\,dx=\text{Timed out}$$

input
```
integrate(((-16*x*ln(x)*exp(4/exp(x))**4*exp(exp(4/exp(x))**4)+exp(x))*exp
(exp(exp(4/exp(x))**4))+5*exp(x))*exp(ln(x)*exp(exp(exp(4/exp(x))**4))+5*l
n(x))/exp(x)/x,x)
```

output
```
Timed out
```

3.20.7 Maxima [A] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int e^{-x}x^{4+e^{e^{e^{16e^{-x}}}}}\left(5e^x+e^{e^{e^{16e^{-x}}}}\left(e^x-16e^{e^{16e^{-x}}+16e^{-x}}x\log(x)\right)\right)\,dx=x^5x^{e^{\left(e^{\left(e^{\left(16\,e^{(-x)}\right)}\right)}\right)}}$$

input
```
integrate(((-16*x*log(x)*exp(4/exp(x))^4*exp(exp(4/exp(x))^4)+exp(x))*exp(
exp(exp(4/exp(x))^4))+5*exp(x))*exp(log(x)*exp(exp(exp(4/exp(x))^4))+5*log
(x))/exp(x)/x,x, algorithm=\
```

output
```
x^5*x^e^(e^(e^(16*e^(-x))))
```

3.20.8 Giac [F]

$$\int e^{-x}x^{4+e^{e^{e^{16e^{-x}}}}}\left(5e^x+e^{e^{e^{16e^{-x}}}}\left(e^x-16e^{e^{16e^{-x}}+16e^{-x}}x\log(x)\right)\right)\,dx$$

$$=\int-\frac{\left(\left(16\,xe^{\left(16\,e^{(-x)}+e^{\left(16\,e^{(-x)}\right)}\right)}\log\left(x\right)-e^{x}\right)e^{\left(e^{\left(e^{\left(16\,e^{(-x)}\right)}\right)}\right)}-5\,e^{x}\right)e^{\left(e^{\left(e^{\left(e^{\left(16\,e^{(-x)}\right)}\right)}\right)}\log(x)-x+5\,\log(x)\right)}}{x}\,d$$

input
```
integrate(((-16*x*log(x)*exp(4/exp(x))^4*exp(exp(4/exp(x))^4)+exp(x))*exp(
exp(exp(4/exp(x))^4))+5*exp(x))*exp(log(x)*exp(exp(exp(4/exp(x))^4))+5*log
(x))/exp(x)/x,x, algorithm=\
```

output
```
integrate(-((16*x*e^(16*e^(-x) + e^(16*e^(-x)))*log(x) - e^x)*e^(e^(e^(16*
e^(-x)))) - 5*e^x)*e^(e^(e^(e^(16*e^(-x))))*log(x) - x + 5*log(x))/x, x)
```

3.20.9 Mupad [B] (verification not implemented)

Time = 13.59 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int e^{-x} x^{4+e^{e^{e^{16e^{-x}}}}} \left(5e^x + e^{e^{e^{16e^{-x}}}} \left(e^x - 16e^{e^{16e^{-x}}+16e^{-x}} x \log(x)\right)\right) dx = x^{e^{e^{e^{16\,e^{-x}}}}}\, x^5$$

input
```
int((exp(5*log(x) + exp(exp(exp(16*exp(-x))))*log(x))*exp(-x)*(5*exp(x) +
exp(exp(exp(16*exp(-x))))*(exp(x) - 16*x*exp(16*exp(-x))*exp(exp(16*exp(-x
)))*log(x))))/x,x)
```

output
```
x^exp(exp(exp(16*exp(-x))))*x^5
```

3.21 $\int 2e^{e^e+2x}\,dx$

3.21.1 Optimal result

Integrand size = 11, antiderivative size = 17

$$\int 2e^{e^e+2x}\,dx = e^{26+e^{32}} + e^{e^e+2x}$$

output
```
exp(1+exp(32))*exp(25)+exp(2*x+exp(exp(1)))
```

3.21.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53

$$\int 2e^{e^e+2x}\,dx = e^{e^e+2x}$$

input
```
Integrate[2*E^(E^E + 2*x),x]
```

output
```
E^(E^E + 2*x)
```

3.21.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {27, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int 2e^{2x+e^e}\,dx$$

$$\Big\downarrow \; 27$$

$$2\int e^{2x+e^e}dx$$

$$\Big\downarrow \; 2624$$

$$e^{2x+e^e}$$

input
```
Int[2*E^(E^E + 2*x),x]
```

output
```
E^(E^E + 2*x)
```

3.21.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

3.21.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53

method	result	size
gosper	$\mathrm{e}^{2x+\mathrm{e}^{\mathrm{e}}}$	9
derivativedivides	$\mathrm{e}^{2x+\mathrm{e}^{\mathrm{e}}}$	9
default	$\mathrm{e}^{2x+\mathrm{e}^{\mathrm{e}}}$	9
norman	$\mathrm{e}^{2x+\mathrm{e}^{\mathrm{e}}}$	9
risch	$\mathrm{e}^{2x+\mathrm{e}^{\mathrm{e}}}$	9
parallelrisch	$\mathrm{e}^{2x+\mathrm{e}^{\mathrm{e}}}$	9
parts	$\mathrm{e}^{2x+\mathrm{e}^{\mathrm{e}}}$	9
meijerg	$-\mathrm{e}^{\mathrm{e}^{\mathrm{e}}}(1-\mathrm{e}^{2x})$	15

input
```
int(2*exp(2*x+exp(exp(1))),x,method=_RETURNVERBOSE)
```

output
```
exp(2*x+exp(exp(1)))
```

3.21.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.47

$$\int 2e^{e^e+2x}\,dx = e^{\left(2\,x+e^{e}\right)}$$

input
```
integrate(2*exp(2*x+exp(exp(1))),x, algorithm=\
```

output
```
e^(2*x + e^e)
```

3.21.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.47

$$\int 2e^{e^e+2x}\,dx = e^{2x+e^{e}}$$

input
```
integrate(2*exp(2*x+exp(exp(1))),x)
```

output
```
exp(2*x + exp(E))
```

3.21.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.47

$$\int 2e^{e^e+2x}\,dx = e^{(2\,x+e^e)}$$

input
```
integrate(2*exp(2*x+exp(exp(1))),x, algorithm=\
```

output
```
e^(2*x + e^e)
```

3.21.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.47

$$\int 2e^{e^e+2x}\,dx = e^{(2\,x+e^e)}$$

input
```
integrate(2*exp(2*x+exp(exp(1))),x, algorithm=\
```

output
```
e^(2*x + e^e)
```

3.21.9 Mupad [B] (verification not implemented)

Time = 13.42 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53

$$\int 2e^{e^e+2x}\,dx = \mathrm{e}^{\mathrm{e}^{\mathrm{e}}}\,\mathrm{e}^{2\,x}$$

input
```
int(2*exp(2*x + exp(exp(1))),x)
```

output
```
exp(exp(exp(1)))*exp(2*x)
```

3.22 $\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+\left(-24x+44x^2-16x^3\right)\log^2\left(\frac{1}{4}\right.}{}$

3.22.1 Optimal result

Integrand size = 257, antiderivative size = 32

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+\left(-24x+44x^2-16x^3\right)\log^2\left(\frac{1}{4}(-2+x)\right)+\left(-16x^2+8\right.}{-6x^3+23x^4-26x^5+8x^6} = \frac{\log\left(-x+\frac{x}{3-x\left(4-4\log^2\left(\frac{1}{4}(-2+x)\right)\right)}\right)}{x^2}$$

output
```
ln(x/(3-(4-4*ln(1/4*x-1/2)^2)*x)-x)/x^2
```

3.22.2 Mathematica [A] (verified)

Time = 2.18 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.44

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+\left(-24x+44x^2-16x^3\right)\log^2\left(\frac{1}{4}(-2+x)\right)+\left(-16x^2+8\right.}{-6x^3+23x^4-26x^5+8x^6} = \frac{\log\left(-\frac{2x\left(1-2x+2x\log^2\left(\frac{1}{4}(-2+x)\right)\right)}{3-4x+4x\log^2\left(\frac{1}{4}(-2+x)\right)}\right)}{x^2}$$

3.22.

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+\left(-24x+44x^2-16x^3\right)\log^2\left(\frac{1}{4}(-2+x)\right)+\left(-16x^2+8x^3\right)\log^4\left(\frac{1}{4}(-2+x)\right)+\left(12-46x+52x^2-16x^3+(40x-\right.}{}$$

input
```
Integrate[(-6 + 27*x - 28*x^2 + 8*x^3 + 4*x^2*Log[(-2 + x)/4] + (-24*x + 4
4*x^2 - 16*x^3)*Log[(-2 + x)/4]^2 + (-16*x^2 + 8*x^3)*Log[(-2 + x)/4]^4 +
(12 - 46*x + 52*x^2 - 16*x^3 + (40*x - 84*x^2 + 32*x^3)*Log[(-2 + x)/4]^2
+ (32*x^2 - 16*x^3)*Log[(-2 + x)/4]^4)*Log[(-2*x + 4*x^2 - 4*x^2*Log[(-2 +
 x)/4]^2)/(3 - 4*x + 4*x*Log[(-2 + x)/4]^2)])/(-6*x^3 + 23*x^4 - 26*x^5 +
8*x^6 + (-20*x^4 + 42*x^5 - 16*x^6)*Log[(-2 + x)/4]^2 + (-16*x^5 + 8*x^6)*
Log[(-2 + x)/4]^4),x]
```

output
```
Log[(-2*x*(1 - 2*x + 2*x*Log[(-2 + x)/4]^2))/(3 - 4*x + 4*x*Log[(-2 + x)/4
]^2)]/x^2
```

3.22.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^3-28x^2+4x^2\log\left(\frac{x-2}{4}\right)+\left(8x^3-16x^2\right)\log^4\left(\frac{x-2}{4}\right)+\left(-16x^3+44x^2-24x\right)\log^2\left(\frac{x-2}{4}\right)+\left(-16x^3+52x^2+\cdots\right.}{8x^6-26x^5+23x^4-6x^3+\left(8x^6-16x^5\right)\log\cdots}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-8x^3+28x^2-4x^2\log\left(\frac{x-2}{4}\right)-\left(\left(8x^3-16x^2\right)\log^4\left(\frac{x-2}{4}\right)\right)-\left(-16x^3+44x^2-24x\right)\log^2\left(\frac{x-2}{4}\right)-\left(-16x^3+52\cdots\right.}{(2-x)x^3\left(8x^2+8x^2\log^4\left(\frac{x-2}{4}\right)-16\cdots\right.}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2\log\left(-\frac{2x\left(-2x+2x\log^2\left(\frac{x-2}{4}\right)+1\right)}{-4x+4x\log^2\left(\frac{x-2}{4}\right)+3}\right)}{x^3}-\frac{6}{(x-2)x^3\left(-2x+2x\log^2\left(\frac{x-2}{4}\right)+1\right)\left(-4x+4x\log^2\left(\frac{x-2}{4}\right)+3\right)}+\frac{\cdots}{x^2\left(\cdots\right.}\right.$$

$$\Big\downarrow \text{7299}$$

$$\int \left(-\frac{2\log\left(-\frac{2x\left(-2x+2x\log^2\left(\frac{x-2}{4}\right)+1\right)}{-4x+4x\log^2\left(\frac{x-2}{4}\right)+3}\right)}{x^3}-\frac{6}{(x-2)x^3\left(-2x+2x\log^2\left(\frac{x-2}{4}\right)+1\right)\left(-4x+4x\log^2\left(\frac{x-2}{4}\right)+3\right)}+\frac{\cdots}{x^2\left(\cdots\right.}\right.$$

3.22. $\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+\left(-24x+44x^2-16x^3\right)\log^2\left(\frac{1}{4}(-2+x)\right)+\left(-16x^2+8x^3\right)\log^4\left(\frac{1}{4}(-2+x)\right)+\left(12-46x+52x^2-16x^3+(40x-\cdots\right.}{\cdots}$

input
```
Int[(-6 + 27*x - 28*x^2 + 8*x^3 + 4*x^2*Log[(-2 + x)/4] + (-24*x + 44*x^2
- 16*x^3)*Log[(-2 + x)/4]^2 + (-16*x^2 + 8*x^3)*Log[(-2 + x)/4]^4 + (12 -
46*x + 52*x^2 - 16*x^3 + (40*x - 84*x^2 + 32*x^3)*Log[(-2 + x)/4]^2 + (32*
x^2 - 16*x^3)*Log[(-2 + x)/4]^4)*Log[(-2*x + 4*x^2 - 4*x^2*Log[(-2 + x)/4]
^2)/(3 - 4*x + 4*x*Log[(-2 + x)/4]^2)])/(-6*x^3 + 23*x^4 - 26*x^5 + 8*x^6
+ (-20*x^4 + 42*x^5 - 16*x^6)*Log[(-2 + x)/4]^2 + (-16*x^5 + 8*x^6)*Log[(-
2 + x)/4]^4),x]
```

output
```
$Aborted
```

3.22.3.1 Defintions of rubi rules used

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.22.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 146 vs. $2(30) = 60$.

Time = 65.17 (sec) , antiderivative size = 147, normalized size of antiderivative = 4.59

method	result
parallelrisch	$-\frac{-3552x^2\ln(x)-3552\ln\left(\frac{1}{2}+x\ln\left(\frac{x}{4}-\frac{1}{2}\right)^2-x\right)x^2+3552\ln\left(\frac{3}{4}+x\ln\left(\frac{x}{4}-\frac{1}{2}\right)^2-x\right)x^2+3552\ln\left(\frac{-4x^2\ln\left(\frac{x}{4}-\frac{1}{2}\right)^2+4x^2-2x}{4x\ln\left(\frac{x}{4}-\frac{1}{2}\right)^2+3-4x}\right)x^2-}{1920x^2}$
risch	Expression too large to display

3.22.

$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+\left(-24x+44x^2-16x^3\right)\log^2\left(\frac{1}{4}(-2+x)\right)+\left(-16x^2+8x^3\right)\log^4\left(\frac{1}{4}(-2+x)\right)+\left(12-46x+52x^2-16x^3+(40x-\right.}{}$

input
```
int((((-16*x^3+32*x^2)*ln(1/4*x-1/2)^4+(32*x^3-84*x^2+40*x)*ln(1/4*x-1/2)^
2-16*x^3+52*x^2-46*x+12)*ln((-4*x^2*ln(1/4*x-1/2)^2+4*x^2-2*x)/(4*x*ln(1/4
*x-1/2)^2+3-4*x))+(8*x^3-16*x^2)*ln(1/4*x-1/2)^4+(-16*x^3+44*x^2-24*x)*ln(
1/4*x-1/2)^2+4*x^2*ln(1/4*x-1/2)+8*x^3-28*x^2+27*x-6)/((8*x^6-16*x^5)*ln(1
/4*x-1/2)^4+(-16*x^6+42*x^5-20*x^4)*ln(1/4*x-1/2)^2+8*x^6-26*x^5+23*x^4-6*
x^3),x,method=_RETURNVERBOSE)
```

output
```
-1/1920*(-3552*x^2*ln(x)-3552*ln(1/2+x*ln(1/4*x-1/2)^2-x)*x^2+3552*ln(3/4+
x*ln(1/4*x-1/2)^2-x)*x^2+3552*ln((-4*x^2*ln(1/4*x-1/2)^2+4*x^2-2*x)/(4*x*l
n(1/4*x-1/2)^2+3-4*x))*x^2-1920*ln((-4*x^2*ln(1/4*x-1/2)^2+4*x^2-2*x)/(4*x
*ln(1/4*x-1/2)^2+3-4*x)))/x^2
```

3.22.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.41

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+(-24x+44x^2-16x^3)\log^2\left(\frac{1}{4}(-2+x)\right)+(-16x^2+8x\ldots}{-6x^3+23x^4-26x^5+8x^6\ldots}$$

$$= \frac{\log\left(-\frac{2\left(2\,x^2\log\left(\frac{1}{4}\,x-\frac{1}{2}\right)^2-2\,x^2+x\right)}{4\,x\log\left(\frac{1}{4}\,x-\frac{1}{2}\right)^2-4\,x+3}\right)}{x^2}$$

input
```
integrate((((-16*x^3+32*x^2)*log(1/4*x-1/2)^4+(32*x^3-84*x^2+40*x)*log(1/4
*x-1/2)^2-16*x^3+52*x^2-46*x+12)*log((-4*x^2*log(1/4*x-1/2)^2+4*x^2-2*x)/(
4*x*log(1/4*x-1/2)^2+3-4*x))+(8*x^3-16*x^2)*log(1/4*x-1/2)^4+(-16*x^3+44*x
^2-24*x)*log(1/4*x-1/2)^2+4*x^2*log(1/4*x-1/2)+8*x^3-28*x^2+27*x-6)/((8*x^
6-16*x^5)*log(1/4*x-1/2)^4+(-16*x^6+42*x^5-20*x^4)*log(1/4*x-1/2)^2+8*x^6-
26*x^5+23*x^4-6*x^3),x, algorithm=\
```

output
```
log(-2*(2*x^2*log(1/4*x - 1/2)^2 - 2*x^2 + x)/(4*x*log(1/4*x - 1/2)^2 - 4*
x + 3))/x^2
```

3.22.6 Sympy [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.44

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+(-24x+44x^2-16x^3)\log^2\left(\frac{1}{4}(-2+x)\right)+(-16x^2+8x}{-6x^3+23x^4-26x^5+8x^6}$$

$$=\frac{\log\left(\frac{-4x^2\log\left(\frac{x}{4}-\frac{1}{2}\right)^2+4x^2-2x}{4x\log\left(\frac{x}{4}-\frac{1}{2}\right)^2-4x+3}\right)}{x^2}$$

input
```
integrate((((-16*x**3+32*x**2)*ln(1/4*x-1/2)**4+(32*x**3-84*x**2+40*x)*ln(
1/4*x-1/2)**2-16*x**3+52*x**2-46*x+12)*ln((-4*x**2*ln(1/4*x-1/2)**2+4*x**2
-2*x)/(4*x*ln(1/4*x-1/2)**2+3-4*x))+(8*x**3-16*x**2)*ln(1/4*x-1/2)**4+(-16
*x**3+44*x**2-24*x)*ln(1/4*x-1/2)**2+4*x**2*ln(1/4*x-1/2)+8*x**3-28*x**2+2
7*x-6)/((8*x**6-16*x**5)*ln(1/4*x-1/2)**4+(-16*x**6+42*x**5-20*x**4)*ln(1/
4*x-1/2)**2+8*x**6-26*x**5+23*x**4-6*x**3),x)
```

output
```
log((-4*x**2*log(x/4 - 1/2)**2 + 4*x**2 - 2*x)/(4*x*log(x/4 - 1/2)**2 - 4*
x + 3))/x**2
```

3.22.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.36 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.34

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+(-24x+44x^2-16x^3)\log^2\left(\frac{1}{4}(-2+x)\right)+(-16x^2+8x}{-6x^3+23x^4-26x^5+8x^6}$$

$$=-\frac{-i\pi-\log(2)+\log\left(4\left(4\log(2)^2-4\log(2)\log(x-2)+\log(x-2)^2-1\right)x+3\right)-\log\left(2\left(4\log(2)^2\right.\right.}{x^2}$$

input
```
integrate((((-16*x^3+32*x^2)*log(1/4*x-1/2)^4+(32*x^3-84*x^2+40*x)*log(1/4
*x-1/2)^2-16*x^3+52*x^2-46*x+12)*log((-4*x^2*log(1/4*x-1/2)^2+4*x^2-2*x)/(
4*x*log(1/4*x-1/2)^2+3-4*x))+(8*x^3-16*x^2)*log(1/4*x-1/2)^4+(-16*x^3+44*x
^2-24*x)*log(1/4*x-1/2)^2+4*x^2*log(1/4*x-1/2)+8*x^3-28*x^2+27*x-6)/((8*x^
6-16*x^5)*log(1/4*x-1/2)^4+(-16*x^6+42*x^5-20*x^4)*log(1/4*x-1/2)^2+8*x^6-
26*x^5+23*x^4-6*x^3),x, algorithm=\
```

3.22.

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+(-24x+44x^2-16x^3)\log^2\left(\frac{1}{4}(-2+x)\right)+(-16x^2+8x^3)\log^4\left(\frac{1}{4}(-2+x)\right)+(12-46x+52x^2-16x^3+(40x-}{}$$

output
```
-(-I*pi - log(2) + log(4*(4*log(2)^2 - 4*log(2)*log(x - 2) + log(x - 2)^2
- 1)*x + 3) - log(2*(4*log(2)^2 - 4*log(2)*log(x - 2) + log(x - 2)^2 - 1)*
x + 1) - log(x))/x^2
```

3.22.8 Giac [F(-1)]

Timed out.

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+(-24x+44x^2-16x^3)\log^2\left(\frac{1}{4}(-2+x)\right)+(-16x^2+8x}{-6x^3+23x^4-26x^5+8x^6}$$
$= \text{Timed out}$

input
```
integrate((((-16*x^3+32*x^2)*log(1/4*x-1/2)^4+(32*x^3-84*x^2+40*x)*log(1/4
*x-1/2)^2-16*x^3+52*x^2-46*x+12)*log((-4*x^2*log(1/4*x-1/2)^2+4*x^2-2*x)/(
4*x*log(1/4*x-1/2)^2+3-4*x))+(8*x^3-16*x^2)*log(1/4*x-1/2)^4+(-16*x^3+44*x
^2-24*x)*log(1/4*x-1/2)^2+4*x^2*log(1/4*x-1/2)+8*x^3-28*x^2+27*x-6)/((8*x^
6-16*x^5)*log(1/4*x-1/2)^4+(-16*x^6+42*x^5-20*x^4)*log(1/4*x-1/2)^2+8*x^6-
26*x^5+23*x^4-6*x^3),x, algorithm=\
```

output
```
Timed out
```

3.22.9 Mupad [B] (verification not implemented)

Time = 14.18 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.41

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+(-24x+44x^2-16x^3)\log^2\left(\frac{1}{4}(-2+x)\right)+(-16x^2+8x}{-6x^3+23x^4-26x^5+8x^6}$$
$$= \frac{\ln\left(-\frac{2\left(2x^2\ln\left(\frac{x}{4}-\frac{1}{2}\right)^2-2x^2+x\right)}{4x\ln\left(\frac{x}{4}-\frac{1}{2}\right)^2-4x+3}\right)}{x^2}$$

input
```
int(-(27*x - log(x/4 - 1/2)^2*(24*x - 44*x^2 + 16*x^3) + log(-(2*x + 4*x^2
*log(x/4 - 1/2)^2 - 4*x^2)/(4*x*log(x/4 - 1/2)^2 - 4*x + 3))*(log(x/4 - 1/
2)^2*(40*x - 84*x^2 + 32*x^3) - 46*x + log(x/4 - 1/2)^4*(32*x^2 - 16*x^3)
+ 52*x^2 - 16*x^3 + 12) - log(x/4 - 1/2)^4*(16*x^2 - 8*x^3) - 28*x^2 + 8*x
^3 + 4*x^2*log(x/4 - 1/2) - 6)/(log(x/4 - 1/2)^4*(16*x^5 - 8*x^6) + log(x/
4 - 1/2)^2*(20*x^4 - 42*x^5 + 16*x^6) + 6*x^3 - 23*x^4 + 26*x^5 - 8*x^6),x
)
```

3.22.

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+(-24x+44x^2-16x^3)\log^2\left(\frac{1}{4}(-2+x)\right)+(-16x^2+8x^3)\log^4\left(\frac{1}{4}(-2+x)\right)+(12-46x+52x^2-16x^3+(40x-}{}$$

output
```
log(-(2*(x + 2*x^2*log(x/4 - 1/2)^2 - 2*x^2))/(4*x*log(x/4 - 1/2)^2 - 4*x
+ 3))/x^2
```

3.22.

$$\int \frac{-6+27x-28x^2+8x^3+4x^2\log\left(\frac{1}{4}(-2+x)\right)+\left(-24x+44x^2-16x^3\right)\log^2\left(\frac{1}{4}(-2+x)\right)+\left(-16x^2+8x^3\right)\log^4\left(\frac{1}{4}(-2+x)\right)+\left(12-46x+52x^2-16x^3+(40x-\cdots\right.}{\cdots}$$

3.23 $\int \frac{-1-x}{-2+x} \, dx$

3.23.1 Optimal result

Integrand size = 11, antiderivative size = 17

$$\int \frac{-1-x}{-2+x} \, dx = -4-x+3(-2-\log(2-x))$$

output
```
-10-3*ln(2-x)-x
```

3.23.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

$$\int \frac{-1-x}{-2+x} \, dx = -x-3\log(2-x)$$

input
```
Integrate[(-1 - x)/(-2 + x),x]
```

output
```
-x - 3*Log[2 - x]
```

3.23.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x-1}{x-2} \, dx$$

$$\Big\downarrow \; 49$$

$$\int \left(-\frac{3}{x-2}-1\right) dx$$

$$\Big\downarrow \; 2009$$

$$-x-3\log(2-x)$$

input
```
Int[(-1 - x)/(-2 + x),x]
```

output
```
-x - 3*Log[2 - x]
```

3.23.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.23.4 Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.65

method	result	size
default	$-x-3\ln\left(-2+x\right)$	11
norman	$-x-3\ln\left(-2+x\right)$	11
risch	$-x-3\ln\left(-2+x\right)$	11
parallelrisch	$-x-3\ln\left(-2+x\right)$	11
meijerg	$-3\ln\left(1-\frac{x}{2}\right)-x$	13

input
```
int((-1-x)/(-2+x),x,method=_RETURNVERBOSE)
```

output
```
-x-3*ln(-2+x)
```

3.23.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \frac{-1-x}{-2+x}\,dx = -x - 3\,\log\left(x-2\right)$$

input
```
integrate((-1-x)/(-2+x),x, algorithm=\
```

output
```
-x - 3*log(x - 2)
```

3.23.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.47

$$\int \frac{-1-x}{-2+x}\,dx = -x - 3\log\left(x-2\right)$$

input
```
integrate((-1-x)/(-2+x),x)
```

output
```
-x - 3*log(x - 2)
```

3.23.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \frac{-1-x}{-2+x}\,dx = -x - 3\,\log\left(x-2\right)$$

input
```
integrate((-1-x)/(-2+x),x, algorithm=\
```

output
```
-x - 3*log(x - 2)
```

3.23.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.65

$$\int \frac{-1-x}{-2+x}\,dx = -x - 3\,\log\left(|x-2|\right)$$

input
```
integrate((-1-x)/(-2+x),x, algorithm=\
```

output
```
-x - 3*log(abs(x - 2))
```

3.23.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \frac{-1-x}{-2+x}\,dx = -x - 3\,\ln\left(x-2\right)$$

input
```
int(-(x + 1)/(x - 2),x)
```

output
```
- x - 3*log(x - 2)
```

3.24 $\int \frac{\left(-2x\log^2(3)+e^{2+x-x^4}(-2+4x-16x^4)\log^2(3)\right)\log\left(\frac{e^{4+2x-2x^4}-2e^{2+x-x^4}x+x^2}{x}\right)}{e^{2+x-x^4}x-x^2}$

3.24.1 Optimal result

Integrand size = 88, antiderivative size = 35

$$\int \frac{\left(-2x\log^2(3)+e^{2+x-x^4}(-2+4x-16x^4)\log^2(3)\right)\log\left(\frac{e^{4+2x-2x^4}-2e^{2+x-x^4}x+x^2}{x}\right)}{e^{2+x-x^4}x-x^2}\,dx = \log^2(3)\log^2\left(\frac{\left(e^{x\left(-x^3+\frac{2+x}{x}\right)}-x\right)^2}{x}\right)$$

output
```
ln((exp(x*((2+x)/x-x^3))-x)^2/x)^2*ln(3)^2
```

3.24.2 Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.00

$$\int \frac{\left(-2x\log^2(3)+e^{2+x-x^4}(-2+4x-16x^4)\log^2(3)\right)\log\left(\frac{e^{4+2x-2x^4}-2e^{2+x-x^4}x+x^2}{x}\right)}{e^{2+x-x^4}x-x^2}\,dx = \log^2(3)\log^2\left(\frac{e^{-2x^4}\left(e^{2+x}-e^{x^4}x\right)^2}{x}\right)$$

input
```
Integrate[((-2*x*Log[3]^2 + E^(2 + x - x^4)*(-2 + 4*x - 16*x^4)*Log[3]^2)*
Log[(E^(4 + 2*x - 2*x^4) - 2*E^(2 + x - x^4)*x + x^2)/x])/(E^(2 + x - x^4)
*x - x^2),x]
```

output
```
Log[3]^2*Log[(E^(2 + x) - E^x^4*x)^2/(E^(2*x^4)*x)]^2
```

3.24.3 Rubi [A] (verified)

Time = 1.99 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.17, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.011$, Rules used = {7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{-x^4+x+2}\left(-16x^4+4x-2\right)\log^2(3)-2x\log^2(3)\right)\log\left(\frac{-2e^{-x^4+x+2}x+e^{-2x^4+2x+4}+x^2}{x}\right)}{e^{-x^4+x+2}x-x^2}dx$$
$$\Big\downarrow \text{7237}$$
$$\log^2(3)\log^2\left(\frac{-2e^{-x^4+x+2}x+e^{-2x^4+2x+4}+x^2}{x}\right)$$

input
```
Int[((-2*x*Log[3]^2 + E^(2 + x - x^4)*(-2 + 4*x - 16*x^4)*Log[3]^2)*Log[(E
^(4 + 2*x - 2*x^4) - 2*E^(2 + x - x^4)*x + x^2)/x])/(E^(2 + x - x^4)*x - x
^2),x]
```

output
```
Log[3]^2*Log[(E^(4 + 2*x - 2*x^4) - 2*E^(2 + x - x^4)*x + x^2)/x]^2
```

3.24.3.1 Defintions of rubi rules used

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

3.24.4 Maple [A] (verified)

Time = 1.76 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.14

method	result	size
norman	$\ln(3)^2 \ln\left(\frac{e^{-2x^4+2x+4}-2x\,e^{-x^4+x+2}+x^2}{x}\right)^2$	40
parallelrisch	$\ln(3)^2 \ln\left(\frac{e^{-2x^4+2x+4}-2x\,e^{-x^4+x+2}+x^2}{x}\right)^2$	40
risch	Expression too large to display	1442

input
```
int(((-16*x^4+4*x-2)*ln(3)^2*exp(-x^4+x+2)-2*x*ln(3)^2)*ln((exp(-x^4+x+2)^
2-2*x*exp(-x^4+x+2)+x^2)/x)/(x*exp(-x^4+x+2)-x^2),x,method=_RETURNVERBOSE)
```

output
```
ln(3)^2*ln((exp(-x^4+x+2)^2-2*x*exp(-x^4+x+2)+x^2)/x)^2
```

3.24.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.11

$$\int \frac{\left(-2x\log^2(3)+e^{2+x-x^4}(-2+4x-16x^4)\log^2(3)\right)\log\left(\frac{e^{4+2x-2x^4}-2e^{2+x-x^4}x+x^2}{x}\right)}{e^{2+x-x^4}x-x^2}\,dx$$
$$=\log(3)^2\log\left(\frac{x^2-2\,xe^{(-x^4+x+2)}+e^{(-2\,x^4+2\,x+4)}}{x}\right)^2$$

input
```
integrate(((-16*x^4+4*x-2)*log(3)^2*exp(-x^4+x+2)-2*x*log(3)^2)*log((exp(-
x^4+x+2)^2-2*x*exp(-x^4+x+2)+x^2)/x)/(x*exp(-x^4+x+2)-x^2),x, algorithm=\
```

output
```
log(3)^2*log((x^2 - 2*x*e^(-x^4 + x + 2) + e^(-2*x^4 + 2*x + 4))/x)^2
```

3.24.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.03

$$\int \frac{\left(-2x\log^2(3)+e^{2+x-x^4}(-2+4x-16x^4)\log^2(3)\right)\log\left(\frac{e^{4+2x-2x^4}-2e^{2+x-x^4}x+x^2}{x}\right)}{e^{2+x-x^4}x-x^2}\,dx$$
$$=\log{(3)}^2\log{\left(\frac{x^2-2xe^{-x^4+x+2}+e^{-2x^4+2x+4}}{x}\right)}^2$$

input
```
integrate(((-16*x**4+4*x-2)*ln(3)**2*exp(-x**4+x+2)-2*x*ln(3)**2)*ln((exp(
-x**4+x+2)**2-2*x*exp(-x**4+x+2)+x**2)/x)/(x*exp(-x**4+x+2)-x**2),x)
```

output
```
log(3)**2*log((x**2 - 2*x*exp(-x**4 + x + 2) + exp(-2*x**4 + 2*x + 4))/x)*
*2
```

3.24.7 Maxima [F]

$$\int \frac{\left(-2x\log^2(3)+e^{2+x-x^4}(-2+4x-16x^4)\log^2(3)\right)\log\left(\frac{e^{4+2x-2x^4}-2e^{2+x-x^4}x+x^2}{x}\right)}{e^{2+x-x^4}x-x^2}\,dx$$
$$=\int \frac{2\left((8\,x^4-2\,x+1)e^{\left(-x^4+x+2\right)}\log{(3)}^2+x\log{(3)}^2\right)\log\left(\frac{x^2-2\,xe^{\left(-x^4+x+2\right)}+e^{\left(-2\,x^4+2\,x+4\right)}}{x}\right)}{x^2-xe^{\left(-x^4+x+2\right)}}\,dx$$

input
```
integrate(((-16*x^4+4*x-2)*log(3)^2*exp(-x^4+x+2)-2*x*log(3)^2)*log((exp(-
x^4+x+2)^2-2*x*exp(-x^4+x+2)+x^2)/x)/(x*exp(-x^4+x+2)-x^2),x, algorithm=\
```

output
```
2*integrate(((8*x^4 - 2*x + 1)*e^(-x^4 + x + 2)*log(3)^2 + x*log(3)^2)*log
((x^2 - 2*x*e^(-x^4 + x + 2) + e^(-2*x^4 + 2*x + 4))/x)/(x^2 - x*e^(-x^4 +
 x + 2)), x)
```

3.24.8 Giac [F]

$$\int \frac{\left(-2x\log^2(3)+e^{2+x-x^4}(-2+4x-16x^4)\log^2(3)\right)\log\left(\frac{e^{4+2x-2x^4}-2e^{2+x-x^4}x+x^2}{x}\right)}{e^{2+x-x^4}x-x^2}\,dx$$
$$=\int \frac{2\left((8\,x^4-2\,x+1)e^{(-x^4+x+2)}\log(3)^2+x\log(3)^2\right)\log\left(\frac{x^2-2\,xe^{(-x^4+x+2)}+e^{(-2\,x^4+2\,x+4)}}{x}\right)}{x^2-xe^{(-x^4+x+2)}}\,dx$$

input
```
integrate((((-16*x^4+4*x-2)*log(3)^2*exp(-x^4+x+2)-2*x*log(3)^2)*log((exp(-
x^4+x+2)^2-2*x*exp(-x^4+x+2)+x^2)/x)/(x*exp(-x^4+x+2)-x^2),x, algorithm=\
```

output
```
integrate(2*((8*x^4 - 2*x + 1)*e^(-x^4 + x + 2)*log(3)^2 + x*log(3)^2)*log
((x^2 - 2*x*e^(-x^4 + x + 2) + e^(-2*x^4 + 2*x + 4))/x)/(x^2 - x*e^(-x^4 +
 x + 2)), x)
```

3.24.9 Mupad [B] (verification not implemented)

Time = 14.73 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.09

$$\int \frac{\left(-2x\log^2(3)+e^{2+x-x^4}(-2+4x-16x^4)\log^2(3)\right)\log\left(\frac{e^{4+2x-2x^4}-2e^{2+x-x^4}x+x^2}{x}\right)}{e^{2+x-x^4}x-x^2}\,dx$$
$$=\ln(3)^2\ln\left(x-2\,\mathrm{e}^2\,\mathrm{e}^{-x^4}\,\mathrm{e}^x+\frac{\mathrm{e}^{2\,x}\,\mathrm{e}^4\,\mathrm{e}^{-2\,x^4}}{x}\right)^2$$

input
```
int(-(log((exp(2*x - 2*x^4 + 4) - 2*x*exp(x - x^4 + 2) + x^2)/x)*(2*x*log(
3)^2 + exp(x - x^4 + 2)*log(3)^2*(16*x^4 - 4*x + 2)))/(x*exp(x - x^4 + 2)
- x^2),x)
```

output
```
log(3)^2*log(x - 2*exp(2)*exp(-x^4)*exp(x) + (exp(2*x)*exp(4)*exp(-2*x^4))
/x)^2
```

3.25 $\int \frac{x+(2-2x-4x^2)\log\left(\frac{4}{5}e^{-x-x^2}x\log(4)\right)}{x}\,dx$

3.25.1 Optimal result

Integrand size = 36, antiderivative size = 23

$$\int \frac{x+(2-2x-4x^2)\log\left(\frac{4}{5}e^{-x-x^2}x\log(4)\right)}{x}\,dx = x+\log^2\left(\frac{4}{5}e^{-x-x^2}x\log(4)\right)$$

output
```
x+ln(8/5*x*ln(2)/exp(x)/exp(x^2))^2
```

3.25.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{x+(2-2x-4x^2)\log\left(\frac{4}{5}e^{-x-x^2}x\log(4)\right)}{x}\,dx = x+\log^2\left(\frac{4}{5}e^{-x(1+x)}x\log(4)\right)$$

input
```
Integrate[(x + (2 - 2*x - 4*x^2)*Log[(4*E^(-x - x^2)*x*Log[4])/5])/x,x]
```

output
```
x + Log[(4*x*Log[4])/(5*E^(x*(1 + x)))]^2
```

3.25.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-4x^2-2x+2)\log\left(\frac{4}{5}e^{-x^2-x}x\log(4)\right)+x}{x}\,dx$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(\frac{2(1-2x)(x+1)\log\left(\frac{4}{5}e^{-x^2-x}x\log(4)\right)}{x}+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\log^2\left(\frac{4}{5}e^{-x^2-x}x\log(4)\right)+x$$

input
```
Int[(x + (2 - 2*x - 4*x^2)*Log[(4*E^(-x - x^2)*x*Log[4])/5])/x,x]
```

output
```
x + Log[(4*E^(-x - x^2)*x*Log[4])/5]^2
```

3.25.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.25.4 Maple [A] (verified)

Time = 0.46 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

method	result	size
default	$x+\ln\left(\frac{8x\ln(2)\mathrm{e}^{-x}\mathrm{e}^{-x^2}}{5}\right)^2$	21
parallelrisch	$x+\ln\left(\frac{8x\ln(2)\mathrm{e}^{-x}\mathrm{e}^{-x^2}}{5}\right)^2$	21
parts	$x+\ln\left(\frac{8x\ln(2)\mathrm{e}^{-x}\mathrm{e}^{-x^2}}{5}\right)^2$	21
risch	Expression too large to display	779

input
```
int(((-4*x^2-2*x+2)*ln(8/5*x*ln(2)/exp(x)/exp(x^2))+x)/x,x,method=_RETURNV
ERBOSE)
```

output
```
x+ln(8/5*x*ln(2)/exp(x)/exp(x^2))^2
```

3.25.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{x+(2-2x-4x^2)\log\left(\frac{4}{5}e^{-x-x^2}x\log(4)\right)}{x}\,dx=\log\left(\frac{8}{5}\,xe^{(-x^2-x)}\log(2)\right)^2+x$$

input
```
integrate(((-4*x^2-2*x+2)*log(8/5*x*log(2)/exp(x)/exp(x^2))+x)/x,x, algori
thm=\
```

output
```
log(8/5*x*e^(-x^2 - x)*log(2))^2 + x
```

3.25.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{x+(2-2x-4x^2)\log\left(\frac{4}{5}e^{-x-x^2}x\log(4)\right)}{x}\,dx = x+\log\left(\frac{8xe^{-x}e^{-x^2}\log(2)}{5}\right)^2$$

input
```
integrate(((-4*x**2-2*x+2)*ln(8/5*x*ln(2)/exp(x)/exp(x**2))+x)/x,x)
```

output
```
x + log(8*x*exp(-x)*exp(-x**2)*log(2)/5)**2
```

3.25.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 167 vs. 2(20) = 40.

Time = 0.29 (sec) , antiderivative size = 167, normalized size of antiderivative = 7.26

$$\begin{aligned}&\int \frac{x+(2-2x-4x^2)\log\left(\frac{4}{5}e^{-x-x^2}x\log(4)\right)}{x}\,dx\\ &= -2x^2\log\left(\frac{8}{5}xe^{(-x^2-x)}\log(2)\right)-2x\log\left(\frac{8}{5}xe^{(-x^2-x)}\log(2)\right)\\ &\quad+2\log\left(\frac{8}{5}xe^{(-x^2-x)}\log(2)\right)\log(x)+x\\ &\quad+\frac{2\left(x^2\log(2)+x\log(2)-\log(2)\log(x)\right)\log(x)}{\log(2)}\\ &\quad-\frac{3x^4\log(2)+2x^3\log(2)-3x^2\log(2)}{3\log(2)}-\frac{4x^3\log(2)+3x^2\log(2)-6x\log(2)}{3\log(2)}\\ &\quad-\frac{x^2\log(2)-\log(2)\log(x)^2+2x\log(2)}{\log(2)}\end{aligned}$$

input
```
integrate(((-4*x^2-2*x+2)*log(8/5*x*log(2)/exp(x)/exp(x^2))+x)/x,x, algori
thm=\
```

output
```
-2*x^2*log(8/5*x*e^(-x^2 - x)*log(2)) - 2*x*log(8/5*x*e^(-x^2 - x)*log(2))
 + 2*log(8/5*x*e^(-x^2 - x)*log(2))*log(x) + x + 2*(x^2*log(2) + x*log(2)
- log(2)*log(x))*log(x)/log(2) - 1/3*(3*x^4*log(2) + 2*x^3*log(2) - 3*x^2*
log(2))/log(2) - 1/3*(4*x^3*log(2) + 3*x^2*log(2) - 6*x*log(2))/log(2) - (
x^2*log(2) - log(2)*log(x)^2 + 2*x*log(2))/log(2)
```

3.25.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. $2(20) = 40$.

Time = 0.27 (sec) , antiderivative size = 74, normalized size of antiderivative = 3.22

$$\int \frac{x + (2 - 2x - 4x^2)\log\left(\frac{4}{5}e^{-x-x^2}x\log(4)\right)}{x}\,dx$$
$$= x^4 + 2x^3 + x^2(2\log(5) - 6\log(2) - 2\log(\log(2)) + 1) + x(2\log(5) - 6\log(2) - 2\log(\log(2)) + 1) - 2(x^2 + x)\log(x) - 2(\log(5) - 3\log(2) - \log(\log(2)))\log(x) + \log(x)^2$$

input
```
integrate(((-4*x^2-2*x+2)*log(8/5*x*log(2)/exp(x)/exp(x^2))+x)/x,x, algori
thm=\
```

output
```
x^4 + 2*x^3 + x^2*(2*log(5) - 6*log(2) - 2*log(log(2)) + 1) + x*(2*log(5)
- 6*log(2) - 2*log(log(2)) + 1) - 2*(x^2 + x)*log(x) - 2*(log(5) - 3*log(2
) - log(log(2)))*log(x) + log(x)^2
```

3.25.9 Mupad [B] (verification not implemented)

Time = 13.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{x + (2 - 2x - 4x^2)\log\left(\frac{4}{5}e^{-x-x^2}x\log(4)\right)}{x}\,dx = x + \left(x + \ln(5) - \ln(8) - \ln(\ln(2)) - \ln(x) + x^2\right)^2$$

input
```
int((x - log((8*x*exp(-x)*exp(-x^2)*log(2))/5)*(2*x + 4*x^2 - 2))/x,x)
```

output
```
x + (x + log(5) - log(8) - log(log(2)) - log(x) + x^2)^2
```

3.26 $\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}(2e^x-90e^{2x}+18e^{3x})+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx$

3.26.1 Optimal result

Integrand size = 72, antiderivative size = 26

$$\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}(2e^x-90e^{2x}+18e^{3x})+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx = 2+e^2+x+\log\left(e^x\left(2+e^{9(-5+e^x)^2}\right)+x\right)$$

output
```
x+exp(2)+2+ln(exp(x)*(exp(3*(exp(x)-5)*(3*exp(x)-15))+2)+x)
```

3.26.2 Mathematica [A] (verified)

Time = 1.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}(2e^x-90e^{2x}+18e^{3x})+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx = x+\log\left(2e^x+e^{225-90e^x+9e^{2x}+x}+x\right)$$

input
```
Integrate[(1 + 4*E^x + E^(225 - 90*E^x + 9*E^(2*x))*(2*E^x - 90*E^(2*x) +
18*E^(3*x)) + x)/(2*E^x + E^(225 - 90*E^x + 9*E^(2*x) + x) + x),x]
```

output
```
x + Log[2*E^x + E^(225 - 90*E^x + 9*E^(2*x) + x) + x]
```

3.26.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-90e^x+9e^{2x}+225}(2e^x-90e^{2x}+18e^{3x})+4e^x+x+1}{x+2e^x+e^{x-90e^x+9e^{2x}+225}}\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \Bigg(\frac{2\Big(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3(x+3e^{2x}+75)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \Bigg(\frac{2\Big(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3(x+3e^{2x}+75)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \Bigg(\frac{2\Big(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3(x+3e^{2x}+75)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \Bigg(\frac{2\Big(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3\left(x+3e^{2x}+75\right)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3\left(x+3e^{2x}+75\right)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3\left(x+3e^{2x}+75\right)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3\left(x+3e^{2x}+75\right)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3\left(x+3e^{2x}+75\right)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$\Big\downarrow$ 7293

3.26. $\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}\left(2e^x-90e^{2x}+18e^{3x}\right)+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx$

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3\left(x+3e^{2x}+75\right)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$\downarrow$ 7293

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3\left(x+3e^{2x}+75\right)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$\downarrow$ 7293

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3\left(x+3e^{2x}+75\right)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$\downarrow$ 7293

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3\left(x+3e^{2x}+75\right)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$\downarrow$ 7293

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

3.26. $\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}\left(2e^x-90e^{2x}+18e^{3x}\right)+x}{2e^x+e^{225-90e^x+9e^{2x}}+x+x}\,dx$

$$\Big\downarrow \text{7239}$$

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3(x+3e^{2x}+75)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3(x+3e^{2x}+75)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2\left(9e^{180e^x+9e^{2x}+225}x^2+90e^{180e^x+9e^{2x}+225}x+45e^{90e^x+18e^{2x}+450}x+8e^{270e^x}+12e^{180e^x+9e^{2x}+225}+6e^{90e^x+18e^{2x}}\right.}{\left(2e^{90e^x}+e^{9e^{2x}+225}\right)^3}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{e^{90e^x}(x+1)+4e^{x+90e^x}+18e^{3(x+3e^{2x}+75)}+2e^{x+9e^{2x}+225}-90e^{2x+9e^{2x}+225}}{e^{90e^x}x+2e^{x+90e^x}+e^{x+9e^{2x}+225}}dx$$

input
```
Int[(1 + 4*E^x + E^(225 - 90*E^x + 9*E^(2*x))*(2*E^x - 90*E^(2*x) + 18*E^(
3*x)) + x)/(2*E^x + E^(225 - 90*E^x + 9*E^(2*x) + x) + x),x]
```

output
```
$Aborted
```

3.26.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.26. $\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}(2e^x-90e^{2x}+18e^{3x})+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx$

3.26.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

method	result	size
norman	$x+\ln\left(\mathrm{e}^{x} \mathrm{e}^{9 \mathrm{e}^{2 x}-90 \mathrm{e}^{x}+225}+2 \mathrm{e}^{x}+x\right)$	26
parallelrisch	$x+\ln\left(\mathrm{e}^{x} \mathrm{e}^{9 \mathrm{e}^{2 x}-90 \mathrm{e}^{x}+225}+2 \mathrm{e}^{x}+x\right)$	26
risch	$2x-225+\ln\left(2+x \mathrm{e}^{-x}+\mathrm{e}^{9 \mathrm{e}^{2 x}-90 \mathrm{e}^{x}+225}\right)$	28

input
```
int(((18*exp(x)^3-90*exp(x)^2+2*exp(x))*exp(9*exp(x)^2-90*exp(x)+225)+4*ex
p(x)+x+1)/(exp(x)*exp(9*exp(x)^2-90*exp(x)+225)+2*exp(x)+x),x,method=_RETU
RNVERBOSE)
```

output
```
x+ln(exp(x)*exp(9*exp(x)^2-90*exp(x)+225)+2*exp(x)+x)
```

3.26.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}\left(2e^x-90e^{2x}+18e^{3x}\right)+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx$$
$$=x+\log\left(x+e^{\left(x+9\,e^{\left(2\,x\right)}-90\,e^{x}+225\right)}+2\,e^{x}\right)$$

input
```
integrate(((18*exp(x)^3-90*exp(x)^2+2*exp(x))*exp(9*exp(x)^2-90*exp(x)+225
)+4*exp(x)+x+1)/(exp(x)*exp(9*exp(x)^2-90*exp(x)+225)+2*exp(x)+x),x, algor
ithm=\
```

output
```
x + log(x + e^(x + 9*e^(2*x) - 90*e^x + 225) + 2*e^x)
```

3.26.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}(2e^x-90e^{2x}+18e^{3x})+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx$$
$$=2x+\log\left((x+2e^x)e^{-x}+e^{9e^{2x}-90e^x+225}\right)$$

input
```
integrate(((18*exp(x)**3-90*exp(x)**2+2*exp(x))*exp(9*exp(x)**2-90*exp(x)+
225)+4*exp(x)+x+1)/(exp(x)*exp(9*exp(x)**2-90*exp(x)+225)+2*exp(x)+x),x)
```

output
```
2*x + log((x + 2*exp(x))*exp(-x) + exp(9*exp(2*x) - 90*exp(x) + 225))
```

3.26.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.50

$$\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}(2e^x-90e^{2x}+18e^{3x})+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx$$
$$=2\,x-90\,e^x+\log\left(\left((x+2\,e^x)e^{(90\,e^x)}+e^{\left(x+9\,e^{(2\,x)}+225\right)}\right)e^{(-x-225)}\right)$$

input
```
integrate(((18*exp(x)^3-90*exp(x)^2+2*exp(x))*exp(9*exp(x)^2-90*exp(x)+225
)+4*exp(x)+x+1)/(exp(x)*exp(9*exp(x)^2-90*exp(x)+225)+2*exp(x)+x),x, algor
ithm=\
```

output
```
2*x - 90*e^x + log(((x + 2*e^x)*e^(90*e^x) + e^(x + 9*e^(2*x) + 225))*e^(-
x - 225))
```

3.26.8 Giac [F]

$$\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}(2e^x-90e^{2x}+18e^{3x})+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx$$
$$=\int \frac{2\left(9\,e^{(3\,x)}-45\,e^{(2\,x)}+e^x\right)e^{\left(9\,e^{(2\,x)}-90\,e^x+225\right)}+x+4\,e^x+1}{x+e^{\left(x+9\,e^{(2\,x)}-90\,e^x+225\right)}+2\,e^x}\,dx$$

input
```
integrate(((18*exp(x)^3-90*exp(x)^2+2*exp(x))*exp(9*exp(x)^2-90*exp(x)+225
)+4*exp(x)+x+1)/(exp(x)*exp(9*exp(x)^2-90*exp(x)+225)+2*exp(x)+x),x, algor
ithm=\
```

output
```
integrate((2*(9*e^(3*x) - 45*e^(2*x) + e^x)*e^(9*e^(2*x) - 90*e^x + 225) +
 x + 4*e^x + 1)/(x + e^(x + 9*e^(2*x) - 90*e^x + 225) + 2*e^x), x)
```

3.26.9 Mupad [B] (verification not implemented)

Time = 12.89 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1+4e^x+e^{225-90e^x+9e^{2x}}(2e^x-90e^{2x}+18e^{3x})+x}{2e^x+e^{225-90e^x+9e^{2x}+x}+x}\,dx = x+\ln\left(x+2\,\mathrm{e}^x+\mathrm{e}^{9\,\mathrm{e}^{2\,x}}\,\mathrm{e}^{225}\,\mathrm{e}^{-90\,\mathrm{e}^x}\,\mathrm{e}^x\right)$$

input
```
int((x + 4*exp(x) + exp(9*exp(2*x) - 90*exp(x) + 225)*(18*exp(3*x) - 90*ex
p(2*x) + 2*exp(x)) + 1)/(x + 2*exp(x) + exp(9*exp(2*x) - 90*exp(x) + 225)*
exp(x)),x)
```

output
```
x + log(x + 2*exp(x) + exp(9*exp(2*x))*exp(225)*exp(-90*exp(x))*exp(x))
```

3.27 $\int \frac{-4+9x-2x^2+(-x^2+2x^3)\log(2)+(-12+x-x^2+(24x-2x^2+2x^3)\log(2)}{12-x+x^2}$

3.27.1 Optimal result

Integrand size = 70, antiderivative size = 21

$$\int \frac{-4+9x-2x^2+(-x^2+2x^3)\log(2)+(-12+x-x^2+(24x-2x^2+2x^3)\log(2))\log(-12+x-x^2)}{12-x+x^2}\,dx$$
$$= (4-x+x^2\log(2))\log(-12+x-x^2)$$

output
```
ln(-x^2+x-12)*(4-x+x^2*ln(2))
```

3.27.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.38

$$\int \frac{-4+9x-2x^2+(-x^2+2x^3)\log(2)+(-12+x-x^2+(24x-2x^2+2x^3)\log(2))\log(-12+x-x^2)}{12-x+x^2}\,dx$$
$$= x(-1+x\log(2))\log(-12+x-x^2)+4\log(12-x+x^2)$$

input
```
Integrate[(-4 + 9*x - 2*x^2 + (-x^2 + 2*x^3)*Log[2] + (-12 + x - x^2 + (24
*x - 2*x^2 + 2*x^3)*Log[2])*Log[-12 + x - x^2])/(12 - x + x^2),x]
```

output
```
x*(-1 + x*Log[2])*Log[-12 + x - x^2] + 4*Log[12 - x + x^2]
```

3.27.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 162 vs. 2(21) = 42.

Time = 0.51 (sec) , antiderivative size = 162, normalized size of antiderivative = 7.71, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.029$, Rules used = {7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^2+\left(-x^2+\left(2x^3-2x^2+24x\right)\log(2)+x-12\right)\log\left(-x^2+x-12\right)+\left(2x^3-x^2\right)\log(2)+9x-4}{x^2-x+12}dx$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{(2x-1)\left(x^2\log(2)-x+4\right)}{x^2-x+12}+(x\log(4)-1)\log\left(-x^2+x-12\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\sqrt{47}(2-\log(4))\arctan\left(\frac{1-2x}{\sqrt{47}}\right)-\sqrt{47}(1-\log(2))\arctan\left(\frac{1-2x}{\sqrt{47}}\right)-\frac{\left(2-23\log^2(4)-\log(16)\right)\log\left(x^2-x+12\right)}{4\log(4)}-\frac{1}{2}x^2\log(4)+x^2\log(2)+\frac{(1-x\log(4))^2\log\left(-x^2+x-12\right)}{2\log(4)}+\frac{1}{2}(7-23\log(2))\log\left(x^2-x+12\right)+\frac{1}{2}x(4-\log(4))-x(2-\log(2))$$

input
```
Int[(-4 + 9*x - 2*x^2 + (-x^2 + 2*x^3)*Log[2] + (-12 + x - x^2 + (24*x - 2
*x^2 + 2*x^3)*Log[2])*Log[-12 + x - x^2])/(12 - x + x^2),x]
```

output
```
-(Sqrt[47]*ArcTan[(1 - 2*x)/Sqrt[47]]*(1 - Log[2])) - x*(2 - Log[2]) + x^2
*Log[2] + (Sqrt[47]*ArcTan[(1 - 2*x)/Sqrt[47]]*(2 - Log[4]))/2 + (x*(4 - L
og[4]))/2 - (x^2*Log[4])/2 + ((1 - x*Log[4])^2*Log[-12 + x - x^2])/(2*Log[
4]) + ((7 - 23*Log[2])*Log[12 - x + x^2])/2 - ((2 - 23*Log[4]^2 - Log[16])
*Log[12 - x + x^2])/(4*Log[4])
```

3.27.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.27.4 Maple [A] (verified)

Time = 4.17 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.57

method	result
risch	$(x^2\ln(2)-x)\ln(-x^2+x-12)+4\ln(x^2-x+12)$
default	$\ln(2)\ln(-x^2+x-12)x^2+4\ln(x^2-x+12)-\ln(-x^2+x-12)x$
norman	$4\ln(-x^2+x-12)+\ln(2)\ln(-x^2+x-12)x^2-\ln(-x^2+x-12)x$
parallelrisch	$4\ln(-x^2+x-12)+\ln(2)\ln(-x^2+x-12)x^2-\ln(-x^2+x-12)x$
parts	$2\ln(2)\left(\frac{\ln(-x^2+x-12)x^2}{2}-\frac{x}{2}-\frac{x^2}{2}+\frac{23\ln(x^2-x+12)}{4}+\frac{\sqrt{47}\arctan\left(\frac{(-1+2x)\sqrt{47}}{47}\right)}{2}\right)-\ln(-x^2+x-1$

input
```
int((((2*x^3-2*x^2+24*x)*ln(2)-x^2+x-12)*ln(-x^2+x-12)+(2*x^3-x^2)*ln(2)-2
*x^2+9*x-4)/(x^2-x+12),x,method=_RETURNVERBOSE)
```

output
```
(x^2*ln(2)-x)*ln(-x^2+x-12)+4*ln(x^2-x+12)
```

3.27.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{-4+9x-2x^2+(-x^2+2x^3)\log(2)+(-12+x-x^2+(24x-2x^2+2x^3)\log(2))\log(-12+x-x^2)}{12-x+x^2}\,dx$$
$$=(x^2\log(2)-x+4)\log(-x^2+x-12)$$

input
```
integrate((((2*x^3-2*x^2+24*x)*log(2)-x^2+x-12)*log(-x^2+x-12)+(2*x^3-x^2)
*log(2)-2*x^2+9*x-4)/(x^2-x+12),x, algorithm=\
```

output
```
(x^2*log(2) - x + 4)*log(-x^2 + x - 12)
```

3.27.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

$$\int \frac{-4+9x-2x^2+(-x^2+2x^3)\log(2)+(-12+x-x^2+(24x-2x^2+2x^3)\log(2))\log(-12+x-x^2)}{12-x+x^2}\,dx$$
$$= \left(x^2\log(2)-x\right)\log\left(-x^2+x-12\right)+4\log\left(x^2-x+12\right)$$

input
```
integrate((((2*x**3-2*x**2+24*x)*ln(2)-x**2+x-12)*ln(-x**2+x-12)+(2*x**3-x
**2)*ln(2)-2*x**2+9*x-4)/(x**2-x+12),x)
```

output
```
(x**2*log(2) - x)*log(-x**2 + x - 12) + 4*log(x**2 - x + 12)
```

3.27.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 165 vs. 2(21) = 42.

Time = 0.51 (sec) , antiderivative size = 165, normalized size of antiderivative = 7.86

$$\int \frac{-4+9x-2x^2+(-x^2+2x^3)\log(2)+(-12+x-x^2+(24x-2x^2+2x^3)\log(2))\log(-12+x-x^2)}{12-x+x^2}\,dx$$
$$= -x^2\log(2)+\sqrt{47}(\log(2)-1)\arctan\left(\frac{1}{47}\sqrt{47}(2x-1)\right)-x(\log(2)-2)$$
$$+\frac{1}{47}\left(47x^2-70\sqrt{47}\arctan\left(\frac{1}{47}\sqrt{47}(2x-1)\right)+94x-517\log\left(x^2-x+12\right)\right)\log(2)$$
$$+\frac{1}{94}\left(46\sqrt{47}\arctan\left(\frac{1}{47}\sqrt{47}(2x-1)\right)-94x-47\log\left(x^2-x+12\right)\right)\log(2)$$
$$+\frac{1}{2}\left(2x^2\log(2)-2x+23\log(2)+1\right)\log\left(-x^2+x-12\right)$$
$$+\sqrt{47}\arctan\left(\frac{1}{47}\sqrt{47}(2x-1)\right)-2x+\frac{7}{2}\log\left(x^2-x+12\right)$$

input
```
integrate((((2*x^3-2*x^2+24*x)*log(2)-x^2+x-12)*log(-x^2+x-12)+(2*x^3-x^2)
*log(2)-2*x^2+9*x-4)/(x^2-x+12),x, algorithm=\
```

output
```
-x^2*log(2) + sqrt(47)*(log(2) - 1)*arctan(1/47*sqrt(47)*(2*x - 1)) - x*(l
og(2) - 2) + 1/47*(47*x^2 - 70*sqrt(47)*arctan(1/47*sqrt(47)*(2*x - 1)) +
94*x - 517*log(x^2 - x + 12))*log(2) + 1/94*(46*sqrt(47)*arctan(1/47*sqrt(
47)*(2*x - 1)) - 94*x - 47*log(x^2 - x + 12))*log(2) + 1/2*(2*x^2*log(2) -
 2*x + 23*log(2) + 1)*log(-x^2 + x - 12) + sqrt(47)*arctan(1/47*sqrt(47)*(
2*x - 1)) - 2*x + 7/2*log(x^2 - x + 12)
```

3.27.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.52

$$\int \frac{-4+9x-2x^2+(-x^2+2x^3)\log(2)+(-12+x-x^2+(24x-2x^2+2x^3)\log(2))\log(-12+x-x^2)}{12-x+x^2}\,dx$$
$$= (x^2\log(2)-x)\log(-x^2+x-12)+4\log(x^2-x+12)$$

input
```
integrate((((2*x^3-2*x^2+24*x)*log(2)-x^2+x-12)*log(-x^2+x-12)+(2*x^3-x^2)
*log(2)-2*x^2+9*x-4)/(x^2-x+12),x, algorithm=\
```

output
```
(x^2*log(2) - x)*log(-x^2 + x - 12) + 4*log(x^2 - x + 12)
```

3.27.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{-4+9x-2x^2+(-x^2+2x^3)\log(2)+(-12+x-x^2+(24x-2x^2+2x^3)\log(2))\log(-12+x-x^2)}{12-x+x^2}\,dx$$
$$= \ln(-x^2+x-12)\,(\ln(2)\,x^2-x+4)$$

input
```
int(-(log(2)*(x^2 - 2*x^3) - 9*x - log(x - x^2 - 12)*(x + log(2)*(24*x - 2
*x^2 + 2*x^3) - x^2 - 12) + 2*x^2 + 4)/(x^2 - x + 12),x)
```

output
```
log(x - x^2 - 12)*(x^2*log(2) - x + 4)
```

3.28 $\int \frac{-21+12x}{20x}\,dx$

3.28.1 Optimal result

Integrand size = 12, antiderivative size = 20

$$\int \frac{-21+12x}{20x}\,dx = 4+\frac{3}{5}\left(5-e^4+x-\frac{7\log(x)}{4}\right)$$

output
```
7+3/5*x-21/20*ln(x)-3/5*exp(4)
```

3.28.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int \frac{-21+12x}{20x}\,dx = \frac{3}{20}(4x-7\log(x))$$

input
```
Integrate[(-21 + 12*x)/(20*x),x]
```

output
```
(3*(4*x - 7*Log[x]))/20
```

3.28.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {27, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{12x-21}{20x}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{20}\int -\frac{3(7-4x)}{x}dx$$

$$\Big\downarrow \ 27$$

$$-\frac{3}{20}\int \frac{7-4x}{x}dx$$

$$\Big\downarrow \ 49$$

$$-\frac{3}{20}\int \left(\frac{7}{x}-4\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{3}{20}(7\log(x)-4x)$$

input
```
Int[(-21 + 12*x)/(20*x),x]
```

output
```
(-3*(-4*x + 7*Log[x]))/20
```

3.28.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.28.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

method	result	size
default	$\frac{3x}{5}-\frac{21\ln(x)}{20}$	9
norman	$\frac{3x}{5}-\frac{21\ln(x)}{20}$	9
risch	$\frac{3x}{5}-\frac{21\ln(x)}{20}$	9
parallelrisch	$\frac{3x}{5}-\frac{21\ln(x)}{20}$	9

input
```
int(1/20*(12*x-21)/x,x,method=_RETURNVERBOSE)
```

output
```
3/5*x-21/20*ln(x)
```

3.28.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{-21+12x}{20x}\,dx = \frac{3}{5}\,x - \frac{21}{20}\,\log\left(x\right)$$

input
```
integrate(1/20*(12*x-21)/x,x, algorithm=\
```

output
```
3/5*x - 21/20*log(x)
```

3.28.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int \frac{-21+12x}{20x}\,dx = \frac{3x}{5} - \frac{21\log{(x)}}{20}$$

input
```
integrate(1/20*(12*x-21)/x,x)
```

output
```
3*x/5 - 21*log(x)/20
```

3.28.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{-21+12x}{20x}\,dx = \frac{3}{5}\,x - \frac{21}{20}\,\log\left(x\right)$$

input
```
integrate(1/20*(12*x-21)/x,x, algorithm=\
```

output
```
3/5*x - 21/20*log(x)
```

3.28.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

$$\int \frac{-21+12x}{20x}\,dx = \frac{3}{5}\,x - \frac{21}{20}\,\log\left(|x|\right)$$

input
```
integrate(1/20*(12*x-21)/x,x, algorithm=\
```

output
```
3/5*x - 21/20*log(abs(x))
```

3.28.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{-21+12x}{20x}\,dx = \frac{3\,x}{5} - \frac{21\,\ln{(x)}}{20}$$

input
```
int(((3*x)/5 - 21/20)/x,x)
```

output
```
(3*x)/5 - (21*log(x))/20
```

3.29 $\int \frac{-2x^2+(e^3x+2x^2)(i\pi+\log(4+3e))+(-2x^2+(2e^3x+2x^2)(i\pi+\log(4+3e)}{-x+(e^3+x)(i\pi+\log(4+3e))}$

3.29.1 Optimal result

Integrand size = 132, antiderivative size = 34

$$\int \frac{-2x^2+(e^3x+2x^2)(i\pi+\log(4+3e))+(-2x^2+(2e^3x+2x^2)(i\pi+\log(4+3e)))\log\left(\frac{x^2+(-e^3x-x^2)(i\pi+\log}{i\pi+\log(4+3e}\right.}{-x+(e^3+x)(i\pi+\log(4+3e))}$$

$$= x^2\log\left(x\left(-e^3-x+\frac{x}{i\pi+\log(-5+3(3+e))}\right)\right)$$

output
```
x^2*ln((x/ln(-3*exp(1)-4)-exp(3)-x)*x)
```

3.29.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int \frac{-2x^2+(e^3x+2x^2)(i\pi+\log(4+3e))+(-2x^2+(2e^3x+2x^2)(i\pi+\log(4+3e)))\log\left(\frac{x^2+(-e^3x-x^2)(i\pi+\log}{i\pi+\log(4+3e}\right.}{-x+(e^3+x)(i\pi+\log(4+3e))}$$

$$= x^2\log\left(x\left(-e^3+x\left(-1+\frac{1}{i\pi+\log(4+3e)}\right)\right)\right)$$

input
```
Integrate[(-2*x^2 + (E^3*x + 2*x^2)*(I*Pi + Log[4 + 3*E]) + (-2*x^2 + (2*E
^3*x + 2*x^2)*(I*Pi + Log[4 + 3*E]))*Log[(x^2 + (-(E^3*x) - x^2)*(I*Pi + L
og[4 + 3*E]))/(I*Pi + Log[4 + 3*E])])/(-x + (E^3 + x)*(I*Pi + Log[4 + 3*E]
)),x]
```

3.29.

$$\int \frac{-2x^2+(e^3x+2x^2)(i\pi+\log(4+3e))+(-2x^2+(2e^3x+2x^2)(i\pi+\log(4+3e)))\log\left(\frac{x^2+(-e^3x-x^2)(i\pi+\log(4+3e))}{i\pi+\log(4+3e)}\right)}{\dots}\,dx$$

output
```
x^2*Log[x*(-E^3 + x*(-1 + (I*Pi + Log[4 + 3*E])^(-1)))]
```

3.29.3 Rubi [A] (verified)

Time = 1.06 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.94, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.023, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^2+\left(-2x^2+\left(2x^2+2e^3x\right)(\log(4+3e)+i\pi)\right)\log\left(\frac{x^2+\left(-x^2-e^3x\right)(\log(4+3e)+i\pi)}{\log(4+3e)+i\pi}\right)+\left(2x^2+e^3x\right)(\log(4+3e)}{-x+\left(x+e^3\right)(\log(4+3e)+i\pi)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{2x^2-\left(-2x^2+\left(2x^2+2e^3x\right)(\log(4+3e)+i\pi)\right)\log\left(\frac{x^2+\left(-x^2-e^3x\right)(\log(4+3e)+i\pi)}{\log(4+3e)+i\pi}\right)-\left(2x^2+e^3x\right)(\log(4+3e)+}{x(1-i\pi-\log(4+3e))-e^3(\log(4+3e)+i\pi)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{x\left(2x(\pi+i(1-\log(4+3e)))+e^3(\pi-i\log(4+3e))\right)}{x(\pi+i(1-\log(4+3e)))+e^3(\pi-i\log(4+3e))}+2x\log\left(x\left(-e^3-\left(x\left(1-\frac{1}{\log(4+3e)+i\pi}\right)\right)\right)\right)\right)$$

$$\Big\downarrow \text{ 2009}$$

$$x^2\log\left(-x\left(e^3+x\left(1-\frac{1}{\log(4+3e)+i\pi}\right)\right)\right)$$

input
```
Int[(-2*x^2 + (E^3*x + 2*x^2)*(I*Pi + Log[4 + 3*E]) + (-2*x^2 + (2*E^3*x +
 2*x^2)*(I*Pi + Log[4 + 3*E]))*Log[(x^2 + (-(E^3*x) - x^2)*(I*Pi + Log[4 +
 3*E]))/(I*Pi + Log[4 + 3*E])])/(-x + (E^3 + x)*(I*Pi + Log[4 + 3*E])),x]
```

output
```
x^2*Log[-(x*(E^3 + x*(1 - (I*Pi + Log[4 + 3*E])^(-1))))]
```

3.29.

$$\int \frac{-2x^2+\left(e^3x+2x^2\right)(i\pi+\log(4+3e))+\left(-2x^2+\left(2e^3x+2x^2\right)(i\pi+\log(4+3e))\right)\log\left(\frac{x^2+\left(-e^3x-x^2\right)(i\pi+\log(4+3e))}{i\pi+\log(4+3e)}\right)}{} \, dx$$

3.29.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.29.4 Maple [A] (verified)

Time = 3.13 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.15

method	result
norman	$x^2 \ln\left(\frac{(-x\,\mathrm{e}^3-x^2)\ln(-3\,\mathrm{e}-4)+x^2}{\ln(-3\,\mathrm{e}-4)}\right)$
risch	$x^2 \ln\left(\frac{(-x\,\mathrm{e}^3-x^2)\ln(-3\,\mathrm{e}-4)+x^2}{\ln(-3\,\mathrm{e}-4)}\right)$
default	$x^2 \ln\left(\frac{x(-\mathrm{e}^3\ln(-3\,\mathrm{e}-4)-\ln(-3\,\mathrm{e}-4)x+x)}{\ln(-3\,\mathrm{e}-4)}\right)$
parts	$x^2 \ln\left(\frac{x(-\mathrm{e}^3\ln(-3\,\mathrm{e}-4)-\ln(-3\,\mathrm{e}-4)x+x)}{\ln(-3\,\mathrm{e}-4)}\right)$
parallelrisch	$\frac{\ln(-3\,\mathrm{e}-4)^2x^2\ln\left(\frac{(-x\,\mathrm{e}^3-x^2)\ln(-3\,\mathrm{e}-4)+x^2}{\ln(-3\,\mathrm{e}-4)}\right)-2\ln(-3\,\mathrm{e}-4)x^2\ln\left(\frac{(-x\,\mathrm{e}^3-x^2)\ln(-3\,\mathrm{e}-4)+x^2}{\ln(-3\,\mathrm{e}-4)}\right)+x^2\ln\left(\frac{(-x\,\mathrm{e}^3-x^2)\ln(-3\,\mathrm{e}-4}{\ln(-3\,\mathrm{e}-4)}\right.}{(\ln(-3\,\mathrm{e}-4)-1)^2}$

input
```
int((((2*x*exp(3)+2*x^2)*ln(-3*exp(1)-4)-2*x^2)*ln(((-x*exp(3)-x^2)*ln(-3*
exp(1)-4)+x^2)/ln(-3*exp(1)-4))+(x*exp(3)+2*x^2)*ln(-3*exp(1)-4)-2*x^2)/((
exp(3)+x)*ln(-3*exp(1)-4)-x),x,method=_RETURNVERBOSE)
```

output
```
x^2*ln(((-x*exp(3)-x^2)*ln(-3*exp(1)-4)+x^2)/ln(-3*exp(1)-4))
```

3.29.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06

$$\int \frac{-2x^2+\left(e^3x+2x^2\right)(i\pi+\log(4+3e))+\left(-2x^2+\left(2e^3x+2x^2\right)(i\pi+\log(4+3e))\right)\log\left(\frac{x^2+\left(-e^3x-x^2\right)(i\pi+\mathrm{l}}{i\pi+\log(4+3e}\right.}{-x+\left(e^3+x\right)(i\pi+\log(4+3e))}$$

$$= x^2\log\left(\frac{x^2-\left(x^2+xe^3\right)\log\left(-3\,e-4\right)}{\log\left(-3\,e-4\right)}\right)$$

input
```
integrate((((2*x*exp(3)+2*x^2)*log(-3*exp(1)-4)-2*x^2)*log(((-x*exp(3)-x^2
)*log(-3*exp(1)-4)+x^2)/log(-3*exp(1)-4))+(x*exp(3)+2*x^2)*log(-3*exp(1)-4
)-2*x^2)/((exp(3)+x)*log(-3*exp(1)-4)-x),x, algorithm=\
```

output
```
x^2*log((x^2 - (x^2 + x*e^3)*log(-3*e - 4))/log(-3*e - 4))
```

3.29.6 Sympy [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 107 vs. 2(24) = 48.

Time = 0.27 (sec) , antiderivative size = 107, normalized size of antiderivative = 3.15

$$\int \frac{-2x^2+\left(e^3x+2x^2\right)(i\pi+\log(4+3e))+\left(-2x^2+\left(2e^3x+2x^2\right)(i\pi+\log(4+3e))\right)\log\left(\frac{x^2+\left(-e^3x-x^2\right)(i\pi+\mathrm{l}}{i\pi+\log(4+3e}\right.}{-x+\left(e^3+x\right)(i\pi+\log(4+3e))}$$

$$= x^2\log\left(-\frac{i\pi x^2}{\log(4+3e)+i\pi}+\frac{x^2}{\log(4+3e)+i\pi}-\frac{x^2\log(4+3e)}{\log(4+3e)+i\pi}-\frac{i\pi xe^3}{\log(4+3e)+i\pi}-\frac{xe^3\log(4+3}{\log(4+3e)+}\right.$$

input
```
integrate((((2*x*exp(3)+2*x**2)*ln(-3*exp(1)-4)-2*x**2)*ln(((-x*exp(3)-x**
2)*ln(-3*exp(1)-4)+x**2)/ln(-3*exp(1)-4))+(x*exp(3)+2*x**2)*ln(-3*exp(1)-4
)-2*x**2)/((exp(3)+x)*ln(-3*exp(1)-4)-x),x)
```

output
```
x**2*log(-I*pi*x**2/(log(4 + 3*E) + I*pi) + x**2/(log(4 + 3*E) + I*pi) - x
**2*log(4 + 3*E)/(log(4 + 3*E) + I*pi) - I*pi*x*exp(3)/(log(4 + 3*E) + I*p
i) - x*exp(3)*log(4 + 3*E)/(log(4 + 3*E) + I*pi))
```

3.29.

$$\int \frac{-2x^2+\left(e^3x+2x^2\right)(i\pi+\log(4+3e))+\left(-2x^2+\left(2e^3x+2x^2\right)(i\pi+\log(4+3e))\right)\log\left(\frac{x^2+\left(-e^3x-x^2\right)(i\pi+\log(4+3e))}{i\pi+\log(4+3e)}\right)}{\cdots}\,dx$$

3.29.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 689 vs. $2(24) = 48$.

Time = 0.26 (sec) , antiderivative size = 689, normalized size of antiderivative = 20.26

$$\int \frac{-2x^2 + (e^3x + 2x^2)(i\pi + \log(4 + 3e)) + (-2x^2 + (2e^3x + 2x^2)(i\pi + \log(4 + 3e))) \log \left(\frac{x^2+(-e^3x-x^2)(i\pi+\log(4+3e))}{i\pi+\log(4+3e)}\right)}{-x + (e^3 + x)(i\pi + \log(4 + 3e))}$$
= Too large to display

input
```
integrate((((2*x*exp(3)+2*x^2)*log(-3*exp(1)-4)-2*x^2)*log(((-x*exp(3)-x^2
)*log(-3*exp(1)-4)+x^2)/log(-3*exp(1)-4))+(x*exp(3)+2*x^2)*log(-3*exp(1)-4
)-2*x^2)/((exp(3)+x)*log(-3*exp(1)-4)-x),x, algorithm=\
```

output
```
-(e^3*log(x*(log(-3*e - 4) - 1) + e^3*log(-3*e - 4))*log(-3*e - 4)/(log(-3
*e - 4)^2 - 2*log(-3*e - 4) + 1) - x/(log(-3*e - 4) - 1))*e^3*log(-3*e - 4
) - 2*e^6*log(x*(log(-3*e - 4) - 1) + e^3*log(-3*e - 4))*log(-3*e - 4)^2/(
log(-3*e - 4)^3 - 3*log(-3*e - 4)^2 + 3*log(-3*e - 4) - 1) + (2*e^6*log(x*
(log(-3*e - 4) - 1) + e^3*log(-3*e - 4))*log(-3*e - 4)^2/(log(-3*e - 4)^3
- 3*log(-3*e - 4)^2 + 3*log(-3*e - 4) - 1) + (x^2*(log(-3*e - 4) - 1) - 2*
x*e^3*log(-3*e - 4))/(log(-3*e - 4)^2 - 2*log(-3*e - 4) + 1))*log(-3*e - 4
) + (((log(-3*e - 4)^2 - 2*log(-3*e - 4) + 1)*log(-3*e - 4) - log(-3*e - 4
)^2 + 2*log(-3*e - 4) - 1)*x^2*log(x) + (log(-3*e - 4)^2 - 2*log(-3*e - 4)
 + 1)*x*e^3*log(-3*e - 4) - ((log(-3*e - 4)^2 + (log(-3*e - 4)^2 - 2*log(-
3*e - 4) + 1)*log(log(-3*e - 4)) - 2*log(-3*e - 4) + 1)*log(-3*e - 4) - lo
g(-3*e - 4)^2 - (log(-3*e - 4)^2 - 2*log(-3*e - 4) + 1)*log(log(-3*e - 4))
 + 2*log(-3*e - 4) - 1)*x^2 + (((log(-3*e - 4)^2 - 2*log(-3*e - 4) + 1)*lo
g(-3*e - 4) - log(-3*e - 4)^2 + 2*log(-3*e - 4) - 1)*x^2 - (log(-3*e - 4)^
3 - log(-3*e - 4)^2)*e^6)*log(-x*(log(-3*e - 4) - 1) - e^3*log(-3*e - 4)))
/((log(-3*e - 4)^2 - 2*log(-3*e - 4) + 1)*log(-3*e - 4) - log(-3*e - 4)^2
+ 2*log(-3*e - 4) - 1) - (x^2*(log(-3*e - 4) - 1) - 2*x*e^3*log(-3*e - 4))
/(log(-3*e - 4)^2 - 2*log(-3*e - 4) + 1)
```


$$\int \frac{-2x^2+(e^3x+2x^2)(i\pi+\log(4+3e))+(-2x^2+(2e^3x+2x^2)(i\pi+\log(4+3e)))\log\left(\frac{x^2+(-e^3x-x^2)(i\pi+\log(4+3e))}{i\pi+\log(4+3e)}\right)}{\ldots}\,dx$$

3.29.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1346 vs. $2(24) = 48$.

Time = 0.49 (sec) , antiderivative size = 1346, normalized size of antiderivative = 39.59

$$\int \frac{-2x^2 + (e^3x + 2x^2)(i\pi + \log(4+3e)) + (-2x^2 + (2e^3x + 2x^2)(i\pi + \log(4+3e)))\log\left(\frac{x^2+(-e^3x-x^2)(i\pi+\log(4+3e))}{i\pi+\log(4+3e)}\right)}{-x + (e^3+x)(i\pi + \log(4+3e))}$$
= Too large to display

input
```
integrate((((2*x*exp(3)+2*x^2)*log(-3*exp(1)-4)-2*x^2)*log(((-x*exp(3)-x^2
)*log(-3*exp(1)-4)+x^2)/log(-3*exp(1)-4))+(x*exp(3)+2*x^2)*log(-3*exp(1)-4
)-2*x^2)/((exp(3)+x)*log(-3*exp(1)-4)-x),x, algorithm=\
```

output
```
1/2*(pi^4*x^2*log(pi^2*x^4 + 2*pi^2*x^3*e^3 + x^4*log(3*e + 4)^2 + 2*x^3*e
^3*log(3*e + 4)^2 + pi^2*x^2*e^6 - 2*x^4*log(3*e + 4) - 2*x^3*e^3*log(3*e
+ 4) + x^2*e^6*log(3*e + 4)^2 + x^4) + 2*pi^2*x^2*log(pi^2*x^4 + 2*pi^2*x^
3*e^3 + x^4*log(3*e + 4)^2 + 2*x^3*e^3*log(3*e + 4)^2 + pi^2*x^2*e^6 - 2*x
^4*log(3*e + 4) - 2*x^3*e^3*log(3*e + 4) + x^2*e^6*log(3*e + 4)^2 + x^4)*l
og(3*e + 4)^2 + x^2*log(pi^2*x^4 + 2*pi^2*x^3*e^3 + x^4*log(3*e + 4)^2 + 2
*x^3*e^3*log(3*e + 4)^2 + pi^2*x^2*e^6 - 2*x^4*log(3*e + 4) - 2*x^3*e^3*lo
g(3*e + 4) + x^2*e^6*log(3*e + 4)^2 + x^4)*log(3*e + 4)^4 - 2*pi^4*x^2*log
(abs(log(-3*e - 4))) - 4*pi^2*x^2*log(3*e + 4)^2*log(abs(log(-3*e - 4))) -
 2*x^2*log(3*e + 4)^4*log(abs(log(-3*e - 4))) - 4*pi^2*x^2*log(pi^2*x^4 +
2*pi^2*x^3*e^3 + x^4*log(3*e + 4)^2 + 2*x^3*e^3*log(3*e + 4)^2 + pi^2*x^2*
e^6 - 2*x^4*log(3*e + 4) - 2*x^3*e^3*log(3*e + 4) + x^2*e^6*log(3*e + 4)^2
 + x^4)*log(3*e + 4) - 4*x^2*log(pi^2*x^4 + 2*pi^2*x^3*e^3 + x^4*log(3*e +
 4)^2 + 2*x^3*e^3*log(3*e + 4)^2 + pi^2*x^2*e^6 - 2*x^4*log(3*e + 4) - 2*x
^3*e^3*log(3*e + 4) + x^2*e^6*log(3*e + 4)^2 + x^4)*log(3*e + 4)^3 + 8*pi^
2*x^2*log(3*e + 4)*log(abs(log(-3*e - 4))) + 8*x^2*log(3*e + 4)^3*log(abs(
log(-3*e - 4))) - 4*pi^4*e^6*sgn(pi*x + pi*e^3) - 4*pi^2*e^6*log(3*e + 4)^
2*sgn(pi*x + pi*e^3) + 2*pi^2*x^2*log(pi^2*x^4 + 2*pi^2*x^3*e^3 + x^4*log(
3*e + 4)^2 + 2*x^3*e^3*log(3*e + 4)^2 + pi^2*x^2*e^6 - 2*x^4*log(3*e + 4)
- 2*x^3*e^3*log(3*e + 4) + x^2*e^6*log(3*e + 4)^2 + x^4) + 6*x^2*log(pi...
```

3.29.9 Mupad [B] (verification not implemented)

Time = 13.79 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.12

$$\int \frac{-2x^2+\left(e^3x+2x^2\right)\left(i\pi+\log(4+3e)\right)+\left(-2x^2+\left(2e^3x+2x^2\right)\left(i\pi+\log(4+3e)\right)\right)\log\left(\frac{x^2+\left(-e^3x-x^2\right)\left(i\pi+\log(4+3e)\right)}{i\pi+\log(4+3e)}\right)}{-x+\left(e^3+x\right)\left(i\pi+\log(4+3e)\right)}\,dx$$

$$=x^2\,\ln\left(-\frac{\ln\left(-3\,\mathrm{e}-4\right)\,\left(x^2+\mathrm{e}^3\,x\right)-x^2}{\ln\left(-3\,\mathrm{e}-4\right)}\right)$$

input
```
int(-(log(-(log(- 3*exp(1) - 4)*(x*exp(3) + x^2) - x^2)/log(- 3*exp(1) - 4
))*(log(- 3*exp(1) - 4)*(2*x*exp(3) + 2*x^2) - 2*x^2) + log(- 3*exp(1) - 4
)*(x*exp(3) + 2*x^2) - 2*x^2)/(x - log(- 3*exp(1) - 4)*(x + exp(3))),x)
```

output
```
x^2*log(-(log(- 3*exp(1) - 4)*(x*exp(3) + x^2) - x^2)/log(- 3*exp(1) - 4))
```

3.30 $\int \frac{36-42x+16x^2-16x^3+6x^4-x^5+e^x(-9x^3+6x^4-x^5)+(-36+33x-10x^2$

$9x^3-6x^4+x^5$

3.30.1 Optimal result

Integrand size = 80, antiderivative size = 31

$$\int \frac{36-42x+16x^2-16x^3+6x^4-x^5+e^x(-9x^3+6x^4-x^5)+(-36+33x-10x^2+x^3)\log(x^2)}{9x^3-6x^4+x^5}\,dx$$
$$=-2-e^x-\frac{5}{3-x}-x-\frac{(-2+x)\log(x^2)}{x^2}$$

output
```
-x-exp(x)-2-ln(x^2)/x^2*(-2+x)-5/(-x+3)
```

3.30.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.90

$$\int \frac{36-42x+16x^2-16x^3+6x^4-x^5+e^x(-9x^3+6x^4-x^5)+(-36+33x-10x^2+x^3)\log(x^2)}{9x^3-6x^4+x^5}\,dx$$
$$=-e^x+\frac{5}{-3+x}-x-\frac{(-2+x)\log(x^2)}{x^2}$$

input
```
Integrate[(36 - 42*x + 16*x^2 - 16*x^3 + 6*x^4 - x^5 + E^x*(-9*x^3 + 6*x^4
 - x^5) + (-36 + 33*x - 10*x^2 + x^3)*Log[x^2])/(9*x^3 - 6*x^4 + x^5),x]
```

output
```
-E^x + 5/(-3 + x) - x - ((-2 + x)*Log[x^2])/x^2
```

3.30.3 Rubi [A] (verified)

Time = 1.15 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.35, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {2026, 7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^5+6x^4-16x^3+16x^2+(x^3-10x^2+33x-36)\log(x^2)+e^x(-x^5+6x^4-9x^3)-42x+36}{x^5-6x^4+9x^3}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-x^5+6x^4-16x^3+16x^2+(x^3-10x^2+33x-36)\log(x^2)+e^x(-x^5+6x^4-9x^3)-42x+36}{x^3(x^2-6x+9)}dx$$

$$\Big\downarrow \text{7277}$$

$$4\int \frac{-x^5+6x^4-16x^3+16x^2-42x-e^x(x^5-6x^4+9x^3)-(-x^3+10x^2-33x+36)\log(x^2)+36}{4(3-x)^2x^3}dx$$

$$\Big\downarrow \text{27}$$

$$\int \frac{-x^5+6x^4-16x^3+16x^2-(-x^3+10x^2-33x+36)\log(x^2)-e^x(x^5-6x^4+9x^3)-42x+36}{(3-x)^2x^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{36}{(x-3)^2x^3}-\frac{x^2}{(x-3)^2}-\frac{42}{(x-3)^2x^2}+\frac{(x-4)\log(x^2)}{x^3}+\frac{6x}{(x-3)^2}-e^x-\frac{16}{(x-3)^2}+\frac{16}{(x-3)^2x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{(4-x)^2\log(x^2)}{8x^2}-e^x-x-\frac{5}{3-x}-\frac{\log(x)}{4}$$

input
```
Int[(36 - 42*x + 16*x^2 - 16*x^3 + 6*x^4 - x^5 + E^x*(-9*x^3 + 6*x^4 - x^5
) + (-36 + 33*x - 10*x^2 + x^3)*Log[x^2])/(9*x^3 - 6*x^4 + x^5),x]
```

output
```
-E^x - 5/(3 - x) - x - Log[x]/4 + ((4 - x)^2*Log[x^2])/(8*x^2)
```

3.30.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.30.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

method	result
default	$-\frac{\ln(x^2)}{x}+\frac{2\ln(x^2)}{x^2}-x+\frac{5}{-3+x}-e^x$
parts	$-\frac{\ln(x^2)}{x}+\frac{2\ln(x^2)}{x^2}-x+\frac{5}{-3+x}-e^x$
parallelrisch	$\frac{2x^3\ln(x)-3x^4-3e^x x^3-x^3\ln(x^2)-6x^2\ln(x)+9e^x x^2+42x^2+15x\ln(x^2)-18\ln(x^2)}{3x^2(-3+x)}$
risch	$-\frac{2(-2+x)\ln(x)}{x^2}-\frac{-i\pi x^2\operatorname{csgn}(ix)^2\operatorname{csgn}(ix^2)+2i\pi x^2\operatorname{csgn}(ix)\operatorname{csgn}(ix^2)^2-i\pi x^2\operatorname{csgn}(ix^2)^3+5i\pi x\operatorname{csgn}(ix)^2\operatorname{csgn}(ix^2)-1}{}$

input
```
int(((x^3-10*x^2+33*x-36)*ln(x^2)+(-x^5+6*x^4-9*x^3)*exp(x)-x^5+6*x^4-16*x
^3+16*x^2-42*x+36)/(x^5-6*x^4+9*x^3),x,method=_RETURNVERBOSE)
```

output
```
-ln(x^2)/x+2*ln(x^2)/x^2-x+5/(-3+x)-exp(x)
```

3.30.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.68

$$\int \frac{36-42x+16x^2-16x^3+6x^4-x^5+e^x(-9x^3+6x^4-x^5)+(-36+33x-10x^2+x^3)\log(x^2)}{9x^3-6x^4+x^5}\,dx$$
$$= -\frac{x^4-3\,x^3-5\,x^2+(x^3-3\,x^2)e^x+(x^2-5\,x+6)\log(x^2)}{x^3-3\,x^2}$$

input
```
integrate(((x^3-10*x^2+33*x-36)*log(x^2)+(-x^5+6*x^4-9*x^3)*exp(x)-x^5+6*x
^4-16*x^3+16*x^2-42*x+36)/(x^5-6*x^4+9*x^3),x, algorithm=\
```

output
```
-(x^4 - 3*x^3 - 5*x^2 + (x^3 - 3*x^2)*e^x + (x^2 - 5*x + 6)*log(x^2))/(x^3
 - 3*x^2)
```

3.30.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.65

$$\int \frac{36-42x+16x^2-16x^3+6x^4-x^5+e^x(-9x^3+6x^4-x^5)+(-36+33x-10x^2+x^3)\log(x^2)}{9x^3-6x^4+x^5}\,dx$$
$$= -x-e^x+\frac{5}{x-3}+\frac{(2-x)\log(x^2)}{x^2}$$

input
```
integrate(((x**3-10*x**2+33*x-36)*ln(x**2)+(-x**5+6*x**4-9*x**3)*exp(x)-x*
*5+6*x**4-16*x**3+16*x**2-42*x+36)/(x**5-6*x**4+9*x**3),x)
```

output
```
-x - exp(x) + 5/(x - 3) + (2 - x)*log(x**2)/x**2
```

3.30.7 Maxima [F]

$$\int \frac{36-42x+16x^2-16x^3+6x^4-x^5+e^x(-9x^3+6x^4-x^5)+(-36+33x-10x^2+x^3)\log(x^2)}{9x^3-6x^4+x^5}\,dx$$
$$= \int -\frac{x^5-6\,x^4+16\,x^3-16\,x^2+(x^5-6\,x^4+9\,x^3)e^x-(x^3-10\,x^2+33\,x-36)\log(x^2)+42\,x-36}{x^5-6\,x^4+9\,x^3}\,dx$$

input
```
integrate(((x^3-10*x^2+33*x-36)*log(x^2)+(-x^5+6*x^4-9*x^3)*exp(x)-x^5+6*x
^4-16*x^3+16*x^2-42*x+36)/(x^5-6*x^4+9*x^3),x, algorithm=\
```

output
```
-x + 9*e^3*exp_integral_e(2, -x + 3)/(x - 3) - 2*(2*x^2 - 3*x - 3)/(x^3 -
3*x^2) + 14/3*(2*x - 3)/(x^2 - 3*x) + 5/3/(x - 3) - 2*((x - 2)*log(x) + x
- 1)/x^2 - integrate((x^2 - 6*x)*e^x/(x^2 - 6*x + 9), x)
```

3.30.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. $2(28) = 56$.

Time = 0.27 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.97

$$\int \frac{36-42x+16x^2-16x^3+6x^4-x^5+e^x(-9x^3+6x^4-x^5)+(-36+33x-10x^2+x^3)\log(x^2)}{9x^3-6x^4+x^5}\,dx$$
$$= -\frac{x^4+x^3e^x-3\,x^3-3\,x^2e^x+x^2\log(x^2)-5\,x^2-5\,x\log(x^2)+6\,\log(x^2)}{x^3-3\,x^2}$$

input
```
integrate(((x^3-10*x^2+33*x-36)*log(x^2)+(-x^5+6*x^4-9*x^3)*exp(x)-x^5+6*x
^4-16*x^3+16*x^2-42*x+36)/(x^5-6*x^4+9*x^3),x, algorithm=\
```

output
```
-(x^4 + x^3*e^x - 3*x^3 - 3*x^2*e^x + x^2*log(x^2) - 5*x^2 - 5*x*log(x^2)
+ 6*log(x^2))/(x^3 - 3*x^2)
```

3.30.9 Mupad [B] (verification not implemented)

Time = 13.29 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{36-42x+16x^2-16x^3+6x^4-x^5+e^x(-9x^3+6x^4-x^5)+(-36+33x-10x^2+x^3)\log(x^2)}{9x^3-6x^4+x^5}\,dx$$
$$= \frac{5}{x-3}-e^x-x-\frac{\ln(x^2)\,(x-2)}{x^2}$$

input
```
int(-(42*x - 16*x^2 + 16*x^3 - 6*x^4 + x^5 + exp(x)*(9*x^3 - 6*x^4 + x^5)
- log(x^2)*(33*x - 10*x^2 + x^3 - 36) - 36)/(9*x^3 - 6*x^4 + x^5),x)
```

output
```
5/(x - 3) - exp(x) - x - (log(x^2)*(x - 2))/x^2
```

3.31 $\int \frac{e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2\ldots}\right.}{-125-75x-15x^{2}\ldots}$

3.31.1 Optimal result

Integrand size = 246, antiderivative size = 28

$$\int \frac{e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2(-\ldots\right.}{-125-75x-15x^2-x^3+e^{2+2x}(5+x)+e^{2+x}\left(-200-80x-8x\ldots\right.}$$
$$=e^{\log^2\left(5-\frac{1}{e^2}-x+\left(-4+\frac{e^x}{5+x}\right)^2\right)}$$

output
```
exp(ln(5+(exp(x)/(5+x)-4)^2-x-1/exp(2))^2)
```

3.31.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2(-\ldots\right.}{-125-75x-15x^2-x^3+e^{2+2x}(5+x)+e^{2+x}\left(-200-80x-8x\ldots\right.}$$
$$=e^{\log^2\left(21-\frac{1}{e^2}-x+\frac{e^{2x}}{(5+x)^2}-\frac{8e^x}{5+x}\right)}$$

3.31. $e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250-150x-30x^2-2x^3\right)\right)\log\ldots$

input
```
Integrate[(E^Log[(-25 + E^(2 + 2*x) + E^(2 + x)*(-40 - 8*x) - 10*x - x^2 +
 E^2*(525 + 185*x + 11*x^2 - x^3))/(E^2*(25 + 10*x + x^2))]^2*(E^(2 + 2*x)
*(16 + 4*x) + E^(2 + x)*(-320 - 144*x - 16*x^2) + E^2*(-250 - 150*x - 30*x
^2 - 2*x^3))*Log[(-25 + E^(2 + 2*x) + E^(2 + x)*(-40 - 8*x) - 10*x - x^2 +
 E^2*(525 + 185*x + 11*x^2 - x^3))/(E^2*(25 + 10*x + x^2))])/(-125 - 75*x
- 15*x^2 - x^3 + E^(2 + 2*x)*(5 + x) + E^(2 + x)*(-200 - 80*x - 8*x^2) + E
^2*(2625 + 1450*x + 240*x^2 + 6*x^3 - x^4)),x]
```

output
```
E^Log[21 - E^(-2) - x + E^(2*x)/(5 + x)^2 - (8*E^x)/(5 + x)]^2
```

3.31.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{x+2}\left(-16x^2-144x-320\right)+e^2\left(-2x^3-30x^2-150x-250\right)+e^{2x+2}(4x+16)\right)\log\left(\frac{-x^2+e^2\left(-x^3+11x^2+185x+5\right.}{e^2(x}\right.}{-x^3-15x^2+e^{x+2}\left(-8x^2-80x-200\right)+e^2\left(-x^4+6x^3+24\right.}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\left(-e^{x+2}\left(-16x^2-144x-320\right)-e^2\left(-2x^3-30x^2-150x-250\right)-e^{2x+2}(4x+16)\right)\log\left(\frac{-x^2+e^2\left(-x^3+11x^2+185x\right.}{e^2}\right.}{(x+5)\left(e^2x^3+\left(1-11e^2\right)x^2+8e^{x+2}x+10\left(1-\right.\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2\left(-8e^x\left(x^2+9x+20\right)-(x+5)^3+2e^{2x}(x+4)\right)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)\exp\left(\log^2\left(-x-\frac{8e}{x+}\right.\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(e^2(21-x)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \text{7292}$$

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(e^2(21-x)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \text{7293}$$

3.31.

$$e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250-150x-30x^2-2x^3\right)\right)\log$$

$$2\int \left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$\downarrow$ 7239

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$\downarrow$ 7293

$$2\int \left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$\downarrow$ 7239

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$\downarrow$ 7293

$$2\int \left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$\downarrow$ 7239

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$\downarrow$ 7293

$$2\int \left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$\downarrow$ 7239

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

3.31.

$$e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250-150x-30x^2-2x^3\right)\right)\log$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

3.31.

$$e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250-150x-30x^2-2x^3\right)\right)\log$$

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e^x}{x+5}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \; 7293$$

$$2\int\left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$$\Big\downarrow \; 7239$$

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e^x}{x+5}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \; 7293$$

$$2\int\left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$$\Big\downarrow \; 7239$$

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e^x}{x+5}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \; 7293$$

$$2\int\left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$$\Big\downarrow \; 7239$$

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e^x}{x+5}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$$\Big\downarrow \; 7293$$

$$2\int\left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

3.31.

$$e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250-150x-30x^2-2x^3\right)\right)\log$$

$\downarrow$ 7239

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

$\downarrow$ 7293

$$2\int\left(\frac{2\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)\right)(x+4)\log\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}+21\left(1-\frac{1}{21e^2}\right)\right)}{x+5}+\frac{\exp\left(\log^2\right.}{}\right.$$

$\downarrow$ 7239

$$2\int \frac{\exp\left(\log^2\left(-x-\frac{8e^x}{x+5}+\frac{e^{2x}}{(x+5)^2}-\frac{1}{e^2}+21\right)+2\right)\left(-(x+5)^3+2e^{2x}(x+4)-8e^x\left(x^2+9x+20\right)\right)\log\left(-x-\frac{8e}{x-}\right.}{(x+5)\left(-e^2(x-21)(x+5)^2-(x+5)^2-8e^{x+2}(x+5)+e^{2x+2}\right)}$$

input
```
Int[(E^Log[(-25 + E^(2 + 2*x) + E^(2 + x)*(-40 - 8*x) - 10*x - x^2 + E^2*(
525 + 185*x + 11*x^2 - x^3))/(E^2*(25 + 10*x + x^2))]^2*(E^(2 + 2*x)*(16 +
 4*x) + E^(2 + x)*(-320 - 144*x - 16*x^2) + E^2*(-250 - 150*x - 30*x^2 - 2
*x^3))*Log[(-25 + E^(2 + 2*x) + E^(2 + x)*(-40 - 8*x) - 10*x - x^2 + E^2*(
525 + 185*x + 11*x^2 - x^3))/(E^2*(25 + 10*x + x^2))])/(-125 - 75*x - 15*x
^2 - x^3 + E^(2 + 2*x)*(5 + x) + E^(2 + x)*(-200 - 80*x - 8*x^2) + E^2*(26
25 + 1450*x + 240*x^2 + 6*x^3 - x^4)),x]
```

output
```
$Aborted
```

3.31.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.31.

$$e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250-150x-30x^2-2x^3\right)\right)\log$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.31.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. $2(27) = 54$.

Time = 65.77 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.32

method	result
parallelrisch	$\mathrm{e}^{\ln\left(\frac{\left(\mathrm{e}^{2}\mathrm{e}^{2x}+(-8x-40)\mathrm{e}^{2}\mathrm{e}^{x}+\left(-x^{3}+11x^{2}+185x+525\right)\mathrm{e}^{2}-x^{2}-10x-25\right)\mathrm{e}^{-2}}{x^{2}+10x+25}\right)^{2}}$
risch	$\mathrm{e}^{\frac{\left(-i\pi\,\mathrm{csgn}\left(i(5+x)^{2}\right)^{3}+2i\pi\,\mathrm{csgn}\left(i(5+x)^{2}\right)^{2}\mathrm{csgn}(i(5+x))-i\pi\,\mathrm{csgn}\left(i(5+x)^{2}\right)\mathrm{csgn}(i(5+x))^{2}-i\pi\,\mathrm{csgn}\left(i\left(\left(x^{3}-11x^{2}+(8\,\mathrm{e}^{x}-185)x-\mathrm{e}^{2x}+40\right.\right.\right.}{}}$

input
```
int(((4*x+16)*exp(2)*exp(x)^2+(-16*x^2-144*x-320)*exp(2)*exp(x)+(-2*x^3-30
*x^2-150*x-250)*exp(2))*ln((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)+(-x^3+
11*x^2+185*x+525)*exp(2)-x^2-10*x-25)/(x^2+10*x+25)/exp(2))*exp(ln((exp(2)
*exp(x)^2+(-8*x-40)*exp(2)*exp(x)+(-x^3+11*x^2+185*x+525)*exp(2)-x^2-10*x-
25)/(x^2+10*x+25)/exp(2))^2)/((5+x)*exp(2)*exp(x)^2+(-8*x^2-80*x-200)*exp(
2)*exp(x)+(-x^4+6*x^3+240*x^2+1450*x+2625)*exp(2)-x^3-15*x^2-75*x-125),x,m
ethod=_RETURNVERBOSE)
```

output
```
exp(ln((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)+(-x^3+11*x^2+185*x+525)*ex
p(2)-x^2-10*x-25)/(x^2+10*x+25)/exp(2))^2)
```

3.31.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(25) = 50$.

Time = 0.26 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.25

$$\int \frac{e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}(-320-144x-16x^2)+e^2(-\right.}{-125-75x-15x^2-x^3+e^{2+2x}(5+x)+e^{2+x}\left(-200-80x-8x\right.}$$
$$= e^{\left(\log\left(-\frac{\left(\left(x^{3}-11\,x^{2}-185\,x-525\right)e^{4}+\left(x^{2}+10\,x+25\right)e^{2}+8\,(x+5)e^{(x+4)}-e^{(2\,x+4)}\right)e^{(-4)}}{x^{2}+10\,x+25}\right)^{2}\right)}$$

3.31. $e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250-150x-30x^2-2x^3\right)\right)\,\mathrm{lo}$

input
```
integrate(((4*x+16)*exp(2)*exp(x)^2+(-16*x^2-144*x-320)*exp(2)*exp(x)+(-2*
x^3-30*x^2-150*x-250)*exp(2))*log((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)
+(-x^3+11*x^2+185*x+525)*exp(2)-x^2-10*x-25)/(x^2+10*x+25)/exp(2))*exp(log
((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)+(-x^3+11*x^2+185*x+525)*exp(2)-x
^2-10*x-25)/(x^2+10*x+25)/exp(2))^2)/((5+x)*exp(2)*exp(x)^2+(-8*x^2-80*x-2
00)*exp(2)*exp(x)+(-x^4+6*x^3+240*x^2+1450*x+2625)*exp(2)-x^3-15*x^2-75*x-
125),x, algorithm=\
```

output
```
e^(log(-((x^3 - 11*x^2 - 185*x - 525)*e^4 + (x^2 + 10*x + 25)*e^2 + 8*(x +
 5)*e^(x + 4) - e^(2*x + 4))*e^(-4)/(x^2 + 10*x + 25))^2)
```

3.31.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}(-320-144x-16x^2)+e^2(-\cdots\right.}{-125-75x-15x^2-x^3+e^{2+2x}(5+x)+e^{2+x}\left(-200-80x-8x\cdots\right.}$$
$= \text{Timed out}$

input
```
integrate(((4*x+16)*exp(2)*exp(x)**2+(-16*x**2-144*x-320)*exp(2)*exp(x)+(-
2*x**3-30*x**2-150*x-250)*exp(2))*ln((exp(2)*exp(x)**2+(-8*x-40)*exp(2)*ex
p(x)+(-x**3+11*x**2+185*x+525)*exp(2)-x**2-10*x-25)/(x**2+10*x+25)/exp(2))
*exp(ln((exp(2)*exp(x)**2+(-8*x-40)*exp(2)*exp(x)+(-x**3+11*x**2+185*x+525
)*exp(2)-x**2-10*x-25)/(x**2+10*x+25)/exp(2))**2)/((5+x)*exp(2)*exp(x)**2+
(-8*x**2-80*x-200)*exp(2)*exp(x)+(-x**4+6*x**3+240*x**2+1450*x+2625)*exp(2
)-x**3-15*x**2-75*x-125),x)
```

output
```
Timed out
```

3.31.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1199 vs. $2(25) = 50$.

Time = 1.02 (sec) , antiderivative size = 1199, normalized size of antiderivative = 42.82

$$\int \frac{e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}(-320-144x-16x^2)+e^2(-\cdots\right.}{-125-75x-15x^2-x^3+e^{2+2x}(5+x)+e^{2+x}\left(-200-80x-8x\cdots\right.}$$
$= \text{Too large to display}$

3.31.

$$e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250-150x-30x^2-2x^3\right)\right)\text{lo}\cdots$$

input
```
integrate(((4*x+16)*exp(2)*exp(x)^2+(-16*x^2-144*x-320)*exp(2)*exp(x)+(-2*
x^3-30*x^2-150*x-250)*exp(2))*log((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)
+(-x^3+11*x^2+185*x+525)*exp(2)-x^2-10*x-25)/(x^2+10*x+25)/exp(2))*exp(log
((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)+(-x^3+11*x^2+185*x+525)*exp(2)-x
^2-10*x-25)/(x^2+10*x+25)/exp(2))^2)/((5+x)*exp(2)*exp(x)^2+(-8*x^2-80*x-2
00)*exp(2)*exp(x)+(-x^4+6*x^3+240*x^2+1450*x+2625)*exp(2)-x^3-15*x^2-75*x-
125),x, algorithm=\
```

output
```
(x^8*e^4 + 40*x^7*e^4 + 700*x^6*e^4 + 7000*x^5*e^4 + 43750*x^4*e^4 + 17500
0*x^3*e^4 + 437500*x^2*e^4 + 625000*x*e^4 + 390625*e^4)*e^(log(-x^3*e^2 +
x^2*(11*e^2 - 1) + 5*x*(37*e^2 - 2) - 8*(x*e^2 + 5*e^2)*e^x + 525*e^2 + e^
(2*x + 2) - 25)^2 - 4*log(-x^3*e^2 + x^2*(11*e^2 - 1) + 5*x*(37*e^2 - 2) -
 8*(x*e^2 + 5*e^2)*e^x + 525*e^2 + e^(2*x + 2) - 25)*log(x + 5) + 4*log(x
+ 5)^2)/(x^12*e^8 - 4*x^11*(11*e^8 - e^6) - 2*x^10*(7*e^8 + 46*e^6 - 3*e^4
) + 4*x^9*(4249*e^8 - 497*e^6 - 3*e^4 + e^2) + x^8*(20671*e^8 + 26236*e^6
- 3234*e^4 + 76*e^2 + 1) - 40*x^7*(78239*e^8 - 15841*e^6 + 714*e^4 + 14*e^
2 - 1) - 700*x^6*(30959*e^8 - 1126*e^6 - 501*e^4 + 44*e^2 - 1) + 1000*x^5*
(167617*e^8 - 70133*e^6 + 8547*e^4 - 413*e^2 + 7) + 3125*x^4*(1002035*e^8
- 256744*e^6 + 23772*e^4 - 952*e^2 + 14) + 12500*x^3*(1555869*e^8 - 345871
*e^6 + 28524*e^4 - 1036*e^2 + 14) + 31250*x^2*(2014929*e^8 - 415926*e^6 +
32079*e^4 - 1096*e^2 + 14) + 312500*x*(342657*e^8 - 67473*e^6 + 4977*e^4 -
 163*e^2 + 2) - 32*(x*e^8 + 5*e^8)*e^(7*x) - 4*(x^3*e^8 - x^2*(107*e^8 - e
^6) - 5*x*(229*e^8 - 2*e^6) - 2925*e^8 + 25*e^6)*e^(6*x) + 32*(3*x^4*e^8 -
 x^3*(82*e^8 - 3*e^6) - 15*x^2*(112*e^8 - 3*e^6) - 75*x*(122*e^8 - 3*e^6)
- 15875*e^8 + 375*e^6)*e^(5*x) + 2*(3*x^6*e^8 - 6*x^5*(75*e^8 - e^6) + x^4
*(1685*e^8 - 390*e^6 + 3*e^4) + 20*x^3*(7685*e^8 - 465*e^6 + 3*e^4) + 75*x
^2*(19495*e^8 - 980*e^6 + 6*e^4) + 250*x*(21595*e^8 - 1005*e^6 + 6*e^4) +
7146875*e^8 - 318750*e^6 + 1875*e^4)*e^(4*x) - 32*(3*x^7*e^8 - x^6*(115...
```

3.31.8 Giac [F]

$$\int \frac{e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}(-320-144x-16x^2)+e^2(-\cdots\right.}{-125-75x-15x^2-x^3+e^{2+2x}(5+x)+e^{2+x}\left(-200-80x-8x\cdots\right.}$$

$$=\int \frac{2\left((x^3+15\,x^2+75\,x+125)e^2-2\,(x+4)e^{(2\,x+2)}+8\,(x^2+9\,x+20)e^{(x+2)}\right)e^{\left(\log\left(-\frac{\left(x^2+\left(x^3-11\,x^2-185\,x-525\right)\cdots\right.}{\cdots}\right.\right.}}{x^3+15\,x^2+(x^4-6\,x^3-240\,x^2-1450\,x-2625)e^2-(x\cdots}$$

3.31.

$$e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}(-320-144x-16x^2)+e^2(-250-150x-30x^2-2x^3)\right)\log\cdots$$

input
```
integrate(((4*x+16)*exp(2)*exp(x)^2+(-16*x^2-144*x-320)*exp(2)*exp(x)+(-2*
x^3-30*x^2-150*x-250)*exp(2))*log((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)
+(-x^3+11*x^2+185*x+525)*exp(2)-x^2-10*x-25)/(x^2+10*x+25)/exp(2))*exp(log
((exp(2)*exp(x)^2+(-8*x-40)*exp(2)*exp(x)+(-x^3+11*x^2+185*x+525)*exp(2)-x
^2-10*x-25)/(x^2+10*x+25)/exp(2))^2)/((5+x)*exp(2)*exp(x)^2+(-8*x^2-80*x-2
00)*exp(2)*exp(x)+(-x^4+6*x^3+240*x^2+1450*x+2625)*exp(2)-x^3-15*x^2-75*x-
125),x, algorithm=\
```

output
```
integrate(2*((x^3 + 15*x^2 + 75*x + 125)*e^2 - 2*(x + 4)*e^(2*x + 2) + 8*(
x^2 + 9*x + 20)*e^(x + 2))*e^(log(-(x^2 + (x^3 - 11*x^2 - 185*x - 525)*e^2
 + 8*(x + 5)*e^(x + 2) + 10*x - e^(2*x + 2) + 25)*e^(-2)/(x^2 + 10*x + 25)
)^2)*log(-(x^2 + (x^3 - 11*x^2 - 185*x - 525)*e^2 + 8*(x + 5)*e^(x + 2) +
10*x - e^(2*x + 2) + 25)*e^(-2)/(x^2 + 10*x + 25))/(x^3 + 15*x^2 + (x^4 -
6*x^3 - 240*x^2 - 1450*x - 2625)*e^2 - (x + 5)*e^(2*x + 2) + 8*(x^2 + 10*x
 + 25)*e^(x + 2) + 75*x + 125), x)
```

3.31.9 Mupad [B] (verification not implemented)

Time = 14.73 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.11

$$\int \frac{e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}(-320-144x-16x^2)+e^2(-\right.}{-125-75x-15x^2-x^3+e^{2+2x}(5+x)+e^{2+x}\left(-200-80x-8x\right.}$$
$$= \mathrm{e}^{\ln\left(\mathrm{e}^{-2}\,\left(21\,\mathrm{e}^2-1\right)-\frac{40\,\mathrm{e}^2\,\mathrm{e}^x-\mathrm{e}^{2\,x}\,\mathrm{e}^2+8\,x\,\mathrm{e}^2\,\mathrm{e}^x}{\mathrm{e}^2\,x^2+10\,\mathrm{e}^2\,x+25\,\mathrm{e}^2}-x\right)^2}$$

input
```
int((exp(log(-(exp(-2)*(10*x - exp(2*x)*exp(2) - exp(2)*(185*x + 11*x^2 -
x^3 + 525) + x^2 + exp(2)*exp(x)*(8*x + 40) + 25))/(10*x + x^2 + 25))^2)*l
og(-(exp(-2)*(10*x - exp(2*x)*exp(2) - exp(2)*(185*x + 11*x^2 - x^3 + 525)
 + x^2 + exp(2)*exp(x)*(8*x + 40) + 25))/(10*x + x^2 + 25))*(exp(2)*(150*x
 + 30*x^2 + 2*x^3 + 250) + exp(2)*exp(x)*(144*x + 16*x^2 + 320) - exp(2*x)
*exp(2)*(4*x + 16)))/(75*x - exp(2)*(1450*x + 240*x^2 + 6*x^3 - x^4 + 2625
) + 15*x^2 + x^3 + exp(2)*exp(x)*(80*x + 8*x^2 + 200) - exp(2*x)*exp(2)*(x
 + 5) + 125),x)
```

output
```
exp(log(exp(-2)*(21*exp(2) - 1) - (40*exp(2)*exp(x) - exp(2*x)*exp(2) + 8*
x*exp(2)*exp(x))/(25*exp(2) + 10*x*exp(2) + x^2*exp(2)) - x)^2)
```

3.31. $e^{\log^2\left(\frac{-25+e^{2+2x}+e^{2+x}(-40-8x)-10x-x^2+e^2\left(525+185x+11x^2-x^3\right)}{e^2\left(25+10x+x^2\right)}\right)}\left(e^{2+2x}(16+4x)+e^{2+x}\left(-320-144x-16x^2\right)+e^2\left(-250-150x-30x^2-2x^3\right)\right)$ lo

3.32 $\int \frac{1-e^x+2x\log(3)+2x\log(4e^6)}{\log(3)+\log(4e^6)}\,dx$

3.32.1 Optimal result

Integrand size = 33, antiderivative size = 23

$$\int \frac{1-e^x+2x\log(3)+2x\log(4e^6)}{\log(3)+\log(4e^6)}\,dx = x^2+\frac{-e^x+x}{\log(3)+\log(4e^6)}$$

output
```
(x-exp(x))/(ln(4*exp(6))+ln(3))+x^2
```

3.32.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{1-e^x+2x\log(3)+2x\log(4e^6)}{\log(3)+\log(4e^6)}\,dx = \frac{-e^x+x+6x^2+\frac{1}{2}x^2\log(144)}{6+\log(12)}$$

input
```
Integrate[(1 - E^x + 2*x*Log[3] + 2*x*Log[4*E^6])/(Log[3] + Log[4*E^6]),x]
```

output
```
(-E^x + x + 6*x^2 + (x^2*Log[144])/2)/(6 + Log[12])
```

3.32.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {6, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^x+2x\log(4e^6)+2x\log(3)+1}{\log(3)+\log(4e^6)}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{-e^x+2x(\log(3)+\log(4e^6))+1}{\log(3)+\log(4e^6)}dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int (2(6+\log(12))x-e^x+1)\,dx}{6+\log(12)}$$

$$\Big\downarrow \; 2009$$

$$\frac{x^2(6+\log(12))+x-e^x}{6+\log(12)}$$

input
```
Int[(1 - E^x + 2*x*Log[3] + 2*x*Log[4*E^6])/(Log[3] + Log[4*E^6]),x]
```

output
```
(-E^x + x + x^2*(6 + Log[12]))/(6 + Log[12])
```

3.32.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.32.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

method	result	size
norman	$x^{2}+\frac{x}{6+2\ln(2)+\ln(3)}-\frac{\mathrm{e}^{x}}{6+2\ln(2)+\ln(3)}$	31
default	$\frac{x+x^{2}\ln(3)+\ln(4\,\mathrm{e}^{6})x^{2}-\mathrm{e}^{x}}{\ln(4\,\mathrm{e}^{6})+\ln(3)}$	33
parallelrisch	$\frac{x+x^{2}\ln(3)+\ln(4\,\mathrm{e}^{6})x^{2}-\mathrm{e}^{x}}{\ln(4\,\mathrm{e}^{6})+\ln(3)}$	33
parts	$\frac{x+x^{2}\ln(3)+\ln(4\,\mathrm{e}^{6})x^{2}}{\ln(4\,\mathrm{e}^{6})+\ln(3)}-\frac{\mathrm{e}^{x}}{\ln(4\,\mathrm{e}^{6})+\ln(3)}$	44
risch	$\frac{2x^{2}\ln(2)}{6+2\ln(2)+\ln(3)}+\frac{x^{2}\ln(3)}{6+2\ln(2)+\ln(3)}+\frac{6x^{2}}{6+2\ln(2)+\ln(3)}+\frac{x}{6+2\ln(2)+\ln(3)}-\frac{\mathrm{e}^{x}}{6+2\ln(2)+\ln(3)}$	76

input
```
int((2*x*ln(4*exp(6))-exp(x)+2*x*ln(3)+1)/(ln(4*exp(6))+ln(3)),x,method=_R
ETURNVERBOSE)
```

output
```
x^2+1/(6+2*ln(2)+ln(3))*x-1/(6+2*ln(2)+ln(3))*exp(x)
```

3.32.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.52

$$\int \frac{1-e^x+2x\log(3)+2x\log\left(4e^6\right)}{\log(3)+\log\left(4e^6\right)}\,dx=\frac{x^{2}\log\left(3\right)+2\,x^{2}\log\left(2\right)+6\,x^{2}+x-e^{x}}{\log\left(3\right)+2\,\log\left(2\right)+6}$$

input
```
integrate((2*x*log(4*exp(6))-exp(x)+2*x*log(3)+1)/(log(4*exp(6))+log(3)),x
, algorithm=\
```

output
```
(x^2*log(3) + 2*x^2*log(2) + 6*x^2 + x - e^x)/(log(3) + 2*log(2) + 6)
```

3.32.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{1-e^x+2x\log(3)+2x\log(4e^6)}{\log(3)+\log(4e^6)}\,dx = x^2+\frac{x}{\log(3)+2\log(2)+6}-\frac{e^x}{\log(3)+2\log(2)+6}$$

input
```
integrate((2*x*ln(4*exp(6))-exp(x)+2*x*ln(3)+1)/(ln(4*exp(6))+ln(3)),x)
```

output
```
x**2 + x/(log(3) + 2*log(2) + 6) - exp(x)/(log(3) + 2*log(2) + 6)
```

3.32.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{1-e^x+2x\log(3)+2x\log(4e^6)}{\log(3)+\log(4e^6)}\,dx = \frac{x^2\log(3)+x^2\log(4e^6)+x-e^x}{\log(3)+\log(4e^6)}$$

input
```
integrate((2*x*log(4*exp(6))-exp(x)+2*x*log(3)+1)/(log(4*exp(6))+log(3)),x
, algorithm=\
```

output
```
(x^2*log(3) + x^2*log(4*e^6) + x - e^x)/(log(3) + log(4*e^6))
```

3.32.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{1-e^x+2x\log(3)+2x\log(4e^6)}{\log(3)+\log(4e^6)}\,dx = \frac{x^2\log(3)+x^2\log(4e^6)+x-e^x}{\log(3)+\log(4e^6)}$$

input
```
integrate((2*x*log(4*exp(6))-exp(x)+2*x*log(3)+1)/(log(4*exp(6))+log(3)),x
, algorithm=\
```

output
```
(x^2*log(3) + x^2*log(4*e^6) + x - e^x)/(log(3) + log(4*e^6))
```

3.32.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{1 - e^x + 2x\log(3) + 2x\log\left(4e^6\right)}{\log(3) + \log\left(4e^6\right)}\,dx = \frac{x - \mathrm{e}^x + x^2\left(\ln\left(12\right) + 6\right)}{\ln\left(12\,\mathrm{e}^6\right)}$$

input
```
int((2*x*log(4*exp(6)) - exp(x) + 2*x*log(3) + 1)/(log(4*exp(6)) + log(3))
,x)
```

output
```
(x - exp(x) + x^2*(log(12) + 6))/log(12*exp(6))
```

3.33 $\int \frac{e^{2e^{2x}-4e^x \log\left(-e^{e^x}+\log(4)\right)+2\log^2\left(-e^{e^x}+\log(4)\right)}\left(-100e^{2x}\log(4)+100e^x \log(4)\log\left(-e^{e^x}+\log(4)\right)\right)}{e^{e^x}-\log(4)}\,dx$

3.33.1 Optimal result

Integrand size = 82, antiderivative size = 25

$$\int \frac{e^{2e^{2x}-4e^x \log\left(-e^{e^x}+\log(4)\right)+2\log^2\left(-e^{e^x}+\log(4)\right)}\left(-100e^{2x}\log(4)+100e^x \log(4)\log\left(-e^{e^x}+\log(4)\right)\right)}{e^{e^x}-\log(4)}\,dx = 25e^{2\left(-e^x+\log\left(-e^{e^x}+\log(4)\right)\right)^2}$$

output
```
25*exp((ln(-exp(exp(x))+2*ln(2))-exp(x))^2)^2
```

3.33.2 Mathematica [A] (verified)

Time = 1.19 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.72

$$\int \frac{e^{2e^{2x}-4e^x \log\left(-e^{e^x}+\log(4)\right)+2\log^2\left(-e^{e^x}+\log(4)\right)}\left(-100e^{2x}\log(4)+100e^x \log(4)\log\left(-e^{e^x}+\log(4)\right)\right)}{e^{e^x}-\log(4)}\,dx = 25e^{2e^{2x}+2\log^2\left(-e^{e^x}+\log(4)\right)}\left(-e^{e^x}+\log(4)\right)^{-4e^x}$$

input
```
Integrate[(E^(2*E^(2*x) - 4*E^x*Log[-E^E^x + Log[4]] + 2*Log[-E^E^x + Log[
4]]^2)*(-100*E^(2*x)*Log[4] + 100*E^x*Log[4]*Log[-E^E^x + Log[4]]))/(E^E^x
 - Log[4]),x]
```

output
```
(25*E^(2*E^(2*x) + 2*Log[-E^E^x + Log[4]]^2))/(-E^E^x + Log[4])^(4*E^x)
```

3.33.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(100e^x\log(4)\log\left(\log(4)-e^{e^x}\right)-100e^{2x}\log(4)\right)\exp\left(2e^{2x}+2\log^2\left(\log(4)-e^{e^x}\right)-4e^x\log\left(\log(4)-e^{e^x}\right)\right)}{e^{e^x}-\log(4)}\,dx$$

$$\Big\downarrow \ 2720$$

$$\int 100\log(4)e^{2\left(e^{2x}+\log^2\left(\log(4)-e^{e^x}\right)\right)}\left(\log(4)-e^{e^x}\right)^{-4e^x-1}\left(e^x-\log\left(\log(4)-e^{e^x}\right)\right)de^x$$

$$\Big\downarrow \ 27$$

$$100\log(4)\int e^{2\left(\log^2\left(-e^{e^x}+\log(4)\right)+e^{2x}\right)}\left(-e^{e^x}+\log(4)\right)^{-1-4e^x}\left(e^x-\log\left(-e^{e^x}+\log(4)\right)\right)de^x$$

$$\Big\downarrow \ 7293$$

$$100\log(4)\int\left(e^{x+2\left(\log^2\left(-e^{e^x}+\log(4)\right)+e^{2x}\right)}\left(-e^{e^x}+\log(4)\right)^{-1-4e^x}-e^{2\left(\log^2\left(-e^{e^x}+\log(4)\right)+e^{2x}\right)}\left(-e^{e^x}+\log(4)\right)^{-1-4e^x}\right.$$

$$\Big\downarrow \ 2009$$

$$100\log(4)\left(\int e^{x+2\left(\log^2\left(-e^{e^x}+\log(4)\right)+e^{2x}\right)}\left(-e^{e^x}+\log(4)\right)^{-1-4e^x}de^x-\int e^{2\left(\log^2\left(-e^{e^x}+\log(4)\right)+e^{2x}\right)}\left(-e^{e^x}+\log(4)\right)\right.$$

input
```
Int[(E^(2*E^(2*x) - 4*E^x*Log[-E^E^x + Log[4]] + 2*Log[-E^E^x + Log[4]]^2)
*(-100*E^(2*x)*Log[4] + 100*E^x*Log[4]*Log[-E^E^x + Log[4]]))/(E^E^x - Log
[4]),x]
```

output
```
$Aborted
```

3.33.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2720
```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ
[{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))
*(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.33.4 Maple [A] (verified)

Time = 4.10 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.56

method	result	size
parallelrisch	$25\,\mathrm{e}^{2\ln\left(-\mathrm{e}^{\mathrm{e}^{x}}+2\ln(2)\right)^{2}-4\,\mathrm{e}^{x}\ln\left(-\mathrm{e}^{\mathrm{e}^{x}}+2\ln(2)\right)+2\,\mathrm{e}^{2x}}$	39
risch	$25\left(-\mathrm{e}^{\mathrm{e}^{x}}+2\ln(2)\right)^{-4\,\mathrm{e}^{x}}\mathrm{e}^{2\ln\left(-\mathrm{e}^{\mathrm{e}^{x}}+2\ln(2)\right)^{2}+2\,\mathrm{e}^{2x}}$	43

input
```
int((200*ln(2)*exp(x)*ln(-exp(exp(x))+2*ln(2))-200*ln(2)*exp(x)^2)*exp(ln(
-exp(exp(x))+2*ln(2))^2-2*exp(x)*ln(-exp(exp(x))+2*ln(2))+exp(x)^2)^2/(exp
(exp(x))-2*ln(2)),x,method=_RETURNVERBOSE)
```

output
```
25*exp(ln(-exp(exp(x))+2*ln(2))^2-2*exp(x)*ln(-exp(exp(x))+2*ln(2))+exp(x)
^2)^2
```

3.33.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60

$$\int \frac{e^{2e^{2x}-4e^x\log\left(-e^{e^x}+\log(4)\right)+2\log^2\left(-e^{e^x}+\log(4)\right)}\left(-100e^{2x}\log(4)+100e^x\log(4)\log\left(-e^{e^x}+\log(4)\right)\right)}{e^{e^x}-\log(4)}\,dx$$
$$= 25\,e^{\left(-4\,e^x\log\left(-e^{\left(e^x\right)}+2\,\log(2)\right)+2\,\log\left(-e^{\left(e^x\right)}+2\,\log(2)\right)^2+2\,e^{\left(2\,x\right)}\right)}$$

input
```
integrate((200*log(2)*exp(x)*log(-exp(exp(x))+2*log(2))-200*log(2)*exp(x)^
2)*exp(log(-exp(exp(x))+2*log(2))^2-2*exp(x)*log(-exp(exp(x))+2*log(2))+ex
p(x)^2)^2/(exp(exp(x))-2*log(2)),x, algorithm=\
```

output
```
25*e^(-4*e^x*log(-e^(e^x) + 2*log(2)) + 2*log(-e^(e^x) + 2*log(2))^2 + 2*e
^(2*x))
```

3.33.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{2e^{2x}-4e^x\log\left(-e^{e^x}+\log(4)\right)+2\log^2\left(-e^{e^x}+\log(4)\right)}\left(-100e^{2x}\log(4)+100e^x\log(4)\log\left(-e^{e^x}+\log(4)\right)\right)}{e^{e^x}-\log(4)}\,dx$$
$= \text{Timed out}$

input
```
integrate((200*ln(2)*exp(x)*ln(-exp(exp(x))+2*ln(2))-200*ln(2)*exp(x)**2)*
exp(ln(-exp(exp(x))+2*ln(2))**2-2*exp(x)*ln(-exp(exp(x))+2*ln(2))+exp(x)**
2)**2/(exp(exp(x))-2*ln(2)),x)
```

output
```
Timed out
```

3.33.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60

$$\int \frac{e^{2e^{2x}-4e^x\log\left(-e^{e^x}+\log(4)\right)+2\log^2\left(-e^{e^x}+\log(4)\right)}\left(-100e^{2x}\log(4)+100e^x\log(4)\log\left(-e^{e^x}+\log(4)\right)\right)}{e^{e^x}-\log(4)}\,dx$$
$$= 25\,e^{\left(-4\,e^{x}\log\left(-e^{\left(e^{x}\right)}+2\,\log(2)\right)+2\,\log\left(-e^{\left(e^{x}\right)}+2\,\log(2)\right)^{2}+2\,e^{(2\,x)}\right)}$$

input
```
integrate((200*log(2)*exp(x)*log(-exp(exp(x))+2*log(2))-200*log(2)*exp(x)^
2)*exp(log(-exp(exp(x))+2*log(2))^2-2*exp(x)*log(-exp(exp(x))+2*log(2))+ex
p(x)^2)^2/(exp(exp(x))-2*log(2)),x, algorithm=\
```

output
```
25*e^(-4*e^x*log(-e^(e^x) + 2*log(2)) + 2*log(-e^(e^x) + 2*log(2))^2 + 2*e
^(2*x))
```

3.33.8 Giac [F]

$$\int \frac{e^{2e^{2x}-4e^x\log\left(-e^{e^x}+\log(4)\right)+2\log^2\left(-e^{e^x}+\log(4)\right)}\left(-100e^{2x}\log(4)+100e^x\log(4)\log\left(-e^{e^x}+\log(4)\right)\right)}{e^{e^x}-\log(4)}\,dx$$
$$= \int \frac{200\left(e^x\log(2)\log\left(-e^{(e^x)}+2\log(2)\right)-e^{(2x)}\log(2)\right)e^{\left(-4e^x\log\left(-e^{(e^x)}+2\log(2)\right)+2\log\left(-e^{(e^x)}+2\log(2)\right)^2+2e^{(2x)}\right)}}{e^{(e^x)}-2\log(2)}$$

input
```
integrate((200*log(2)*exp(x)*log(-exp(exp(x))+2*log(2))-200*log(2)*exp(x)^
2)*exp(log(-exp(exp(x))+2*log(2))^2-2*exp(x)*log(-exp(exp(x))+2*log(2))+ex
p(x)^2)^2/(exp(exp(x))-2*log(2)),x, algorithm=\
```

output
```
integrate(200*(e^x*log(2)*log(-e^(e^x) + 2*log(2)) - e^(2*x)*log(2))*e^(-4
*e^x*log(-e^(e^x) + 2*log(2)) + 2*log(-e^(e^x) + 2*log(2))^2 + 2*e^(2*x))/
(e^(e^x) - 2*log(2)), x)
```

3.33.9 Mupad [B] (verification not implemented)

Time = 13.45 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60

$$\int \frac{e^{2e^{2x}-4e^x\log\left(-e^{e^x}+\log(4)\right)+2\log^2\left(-e^{e^x}+\log(4)\right)}\left(-100e^{2x}\log(4)+100e^x\log(4)\log\left(-e^{e^x}+\log(4)\right)\right)}{e^{e^x}-\log(4)}\,dx$$
$$= \frac{25\,e^{2\,e^{2\,x}}\,e^{2\ln\left(\ln(4)-e^{e^x}\right)^2}}{\left(2\,\ln(2)-e^{e^x}\right)^{4\,e^x}}$$

input
```
int(-(exp(2*exp(2*x) - 4*log(2*log(2) - exp(exp(x)))*exp(x) + 2*log(2*log(
2) - exp(exp(x)))^2)*(200*exp(2*x)*log(2) - 200*log(2*log(2) - exp(exp(x))
)*exp(x)*log(2)))/(exp(exp(x)) - 2*log(2)),x)
```

output
```
(25*exp(2*exp(2*x))*exp(2*log(log(4) - exp(exp(x)))^2))/(2*log(2) - exp(ex
p(x)))^(4*exp(x))
```

3.34 $\int \frac{-18x-2x^3+16x^4-6x^3\log(5)+(18x-6x^2+48x^3-18x^2\log(5))\log(x)+(}{9x^3+27x^2\log(x)+27x\log}$

3.34.1 Optimal result

Integrand size = 107, antiderivative size = 28

$$\int \frac{-18x-2x^3+16x^4-6x^3\log(5)+(18x-6x^2+48x^3-18x^2\log(5))\log(x)+(-6x+48x^2-18x\log(5)}{9x^3+27x^2\log(x)+27x\log^2(x)+9\log^3(x)}$$
$$=x^2-\left(\frac{1+x}{3}+\log(5)\right)^2+\frac{x^2}{(x+\log(x))^2}$$

output
```
x^2/(x+ln(x))^2+x^2-(1/3*x+1/3+ln(5))^2
```

3.34.2 Mathematica [A] (verified)

Time = 0.46 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{-18x-2x^3+16x^4-6x^3\log(5)+(18x-6x^2+48x^3-18x^2\log(5))\log(x)+(-6x+48x^2-18x\log(5)}{9x^3+27x^2\log(x)+27x\log^2(x)+9\log^3(x)}$$
$$=\frac{1}{9}x\left(-2(1+\log(125))+x\left(8+\frac{9}{(x+\log(x))^2}\right)\right)$$

input
```
Integrate[(-18*x - 2*x^3 + 16*x^4 - 6*x^3*Log[5] + (18*x - 6*x^2 + 48*x^3
- 18*x^2*Log[5])*Log[x] + (-6*x + 48*x^2 - 18*x*Log[5])*Log[x]^2 + (-2 + 1
6*x - 6*Log[5])*Log[x]^3)/(9*x^3 + 27*x^2*Log[x] + 27*x*Log[x]^2 + 9*Log[x
]^3),x]
```

output
```
(x*(-2*(1 + Log[125]) + x*(8 + 9/(x + Log[x])^2)))/9
```

3.34.
$$\int \frac{-18x-2x^3+16x^4-6x^3\log(5)+(18x-6x^2+48x^3-18x^2\log(5))\log(x)+(-6x+48x^2-18x\log(5))\log^2(x)+(-2+16x-6\log(5))\log^3(x)}{9x^3+27x^2\log(x)+27x\log^2(x)+9\log^3(x)}\,dx$$

3.34.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16x^4-2x^3-6x^3\log(5)+\left(48x^2-6x-18x\log(5)\right)\log^2(x)+\left(48x^3-6x^2-18x^2\log(5)+18x\right)\log(x)-18x}{9x^3+27x^2\log(x)+9\log^3(x)+27x\log^2(x)}$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{16x^4+x^3(-2-6\log(5))+\left(48x^2-6x-18x\log(5)\right)\log^2(x)+\left(48x^3-6x^2-18x^2\log(5)+18x\right)\log(x)-18x}{9x^3+27x^2\log(x)+9\log^3(x)+27x\log^2(x)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{16x^4+x^3(-2-6\log(5))+\left(48x^2-6x-18x\log(5)\right)\log^2(x)+\left(48x^3-6x^2-18x^2\log(5)+18x\right)\log(x)-18x}{9(x+\log(x))^3}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{9}\int -\frac{2\left(-8x^4+(1+\log(125))x^3+9x+(-8x+3\log(5)+1)\log^3(x)+3\left(-8x^2+3\log(5)x+x\right)\log^2(x)-3(8x}{(x+\log(x))^3}$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{2}{9}\int \frac{-8x^4+(1+\log(125))x^3+9x+(-8x+\log(125)+1)\log^3(x)+3\left(-8x^2+3\log(5)x+x\right)\log^2(x)-3(8x^3}{(x+\log(x))^3}$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{2}{9}\int \left(-\frac{9x}{(x+\log(x))^2}+\frac{9(x+1)x}{(x+\log(x))^3}-8x+\log(125)+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{2}{9}\left(9\int \frac{x^2}{(x+\log(x))^3}dx+9\int \frac{x}{(x+\log(x))^3}dx-9\int \frac{x}{(x+\log(x))^2}dx-4x^2+x(1+\log(125))\right)$$

input
```
Int[(-18*x - 2*x^3 + 16*x^4 - 6*x^3*Log[5] + (18*x - 6*x^2 + 48*x^3 - 18*x
^2*Log[5])*Log[x] + (-6*x + 48*x^2 - 18*x*Log[5])*Log[x]^2 + (-2 + 16*x -
6*Log[5])*Log[x]^3)/(9*x^3 + 27*x^2*Log[x] + 27*x*Log[x]^2 + 9*Log[x]^3),x
]
```

3.34. $\int \frac{-18x-2x^3+16x^4-6x^3\log(5)+(18x-6x^2+48x^3-18x^2\log(5))\log(x)+(-6x+48x^2-18x\log(5))\log^2(x)+(-2+16x-6\log(5))\log^3(x)}{9x^3+27x^2\log(x)+27x\log^2(x)+9\log^3(x)}\,dx$

output
```
$Aborted
```

3.34.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.34.4 Maple [A] (verified)

Time = 0.76 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

method	result	size
risch	$-\frac{2x\ln(5)}{3}+\frac{8x^2}{9}-\frac{2x}{9}+\frac{x^2}{(x+\ln(x))^2}$	25
default	$\frac{x^2-\frac{2x^3}{9}+\frac{8x^4}{9}-\frac{4x^2\ln(x)}{9}-\frac{2x\ln(x)^2}{9}+\frac{8x^2\ln(x)^2}{9}+\frac{16x^3\ln(x)}{9}}{(x+\ln(x))^2}-\frac{2x\ln(5)}{3}$	61
norman	$\frac{-\ln(x)^2+\left(-\frac{2\ln(5)}{3}-\frac{2}{9}\right)x^3-2x\ln(x)+\left(-\frac{4\ln(5)}{3}-\frac{4}{9}\right)x^2\ln(x)+\left(-\frac{2\ln(5)}{3}-\frac{2}{9}\right)x\ln(x)^2+\frac{8x^4}{9}+\frac{8x^2\ln(x)^2}{9}+\frac{16x^3\ln(x)}{9}}{(x+\ln(x))^2}$	75
parallelrisch	$-\frac{6x^3\ln(5)+12x^2\ln(5)\ln(x)+6\ln(x)^2\ln(5)x-8x^4-16x^3\ln(x)-8x^2\ln(x)^2+2x^3+4x^2\ln(x)+2x\ln(x)^2-9x^2}{9\left(\ln(x)^2+2x\ln(x)+x^2\right)}$	89

input
```
int(((-6*ln(5)+16*x-2)*ln(x)^3+(-18*x*ln(5)+48*x^2-6*x)*ln(x)^2+(-18*x^2*l
n(5)+48*x^3-6*x^2+18*x)*ln(x)-6*x^3*ln(5)+16*x^4-2*x^3-18*x)/(9*ln(x)^3+27
*x*ln(x)^2+27*x^2*ln(x)+9*x^3),x,method=_RETURNVERBOSE)
```

output
```
-2/3*x*ln(5)+8/9*x^2-2/9*x+x^2/(x+ln(x))^2
```

3.34.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. $2(25) = 50$.

Time = 0.26 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.93

$$\int \frac{-18x - 2x^3 + 16x^4 - 6x^3\log(5) + (18x - 6x^2 + 48x^3 - 18x^2\log(5))\log(x) + (-6x + 48x^2 - 18x\log(5)}{9x^3 + 27x^2\log(x) + 27x\log^2(x) + 9\log^3(x)}$$
$$= \frac{8\,x^4 - 6\,x^3\log(5) - 2\,x^3 + 2\left(4\,x^2 - 3\,x\log(5) - x\right)\log(x)^2 + 9\,x^2 + 4\left(4\,x^3 - 3\,x^2\log(5) - x^2\right)\log(x)}{9\left(x^2 + 2\,x\log(x) + \log(x)^2\right)}$$

input
```
integrate(((-6*log(5)+16*x-2)*log(x)^3+(-18*x*log(5)+48*x^2-6*x)*log(x)^2+
(-18*x^2*log(5)+48*x^3-6*x^2+18*x)*log(x)-6*x^3*log(5)+16*x^4-2*x^3-18*x)/
(9*log(x)^3+27*x*log(x)^2+27*x^2*log(x)+9*x^3),x, algorithm=\
```

output
```
1/9*(8*x^4 - 6*x^3*log(5) - 2*x^3 + 2*(4*x^2 - 3*x*log(5) - x)*log(x)^2 +
9*x^2 + 4*(4*x^3 - 3*x^2*log(5) - x^2)*log(x))/(x^2 + 2*x*log(x) + log(x)^
2)
```

3.34.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

$$\int \frac{-18x - 2x^3 + 16x^4 - 6x^3\log(5) + (18x - 6x^2 + 48x^3 - 18x^2\log(5))\log(x) + (-6x + 48x^2 - 18x\log(5)}{9x^3 + 27x^2\log(x) + 27x\log^2(x) + 9\log^3(x)}$$
$$= \frac{8x^2}{9} + \frac{x^2}{x^2 + 2x\log(x) + \log(x)^2} + x\left(-\frac{2\log(5)}{3} - \frac{2}{9}\right)$$

input
```
integrate(((-6*ln(5)+16*x-2)*ln(x)**3+(-18*x*ln(5)+48*x**2-6*x)*ln(x)**2+(
-18*x**2*ln(5)+48*x**3-6*x**2+18*x)*ln(x)-6*x**3*ln(5)+16*x**4-2*x**3-18*x
)/(9*ln(x)**3+27*x*ln(x)**2+27*x**2*ln(x)+9*x**3),x)
```

output
```
8*x**2/9 + x**2/(x**2 + 2*x*log(x) + log(x)**2) + x*(-2*log(5)/3 - 2/9)
```

3.34.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. $2(25) = 50$.

Time = 0.30 (sec) , antiderivative size = 81, normalized size of antiderivative = 2.89

$$\int \frac{-18x - 2x^3 + 16x^4 - 6x^3\log(5) + (18x - 6x^2 + 48x^3 - 18x^2\log(5))\log(x) + (-6x + 48x^2 - 18x\log(5)}{9x^3 + 27x^2\log(x) + 27x\log^2(x) + 9\log^3(x)}$$
$$= \frac{8\,x^4 - 2\,x^3(3\,\log(5) + 1) + 2\,(4\,x^2 - x(3\,\log(5) + 1))\log(x)^2 + 9\,x^2 + 4\,(4\,x^3 - x^2(3\,\log(5) + 1))\log(x}{9\,(x^2 + 2\,x\log(x) + \log(x)^2)}$$

input
```
integrate(((-6*log(5)+16*x-2)*log(x)^3+(-18*x*log(5)+48*x^2-6*x)*log(x)^2+
(-18*x^2*log(5)+48*x^3-6*x^2+18*x)*log(x)-6*x^3*log(5)+16*x^4-2*x^3-18*x)/
(9*log(x)^3+27*x*log(x)^2+27*x^2*log(x)+9*x^3),x, algorithm=\
```

output
```
1/9*(8*x^4 - 2*x^3*(3*log(5) + 1) + 2*(4*x^2 - x*(3*log(5) + 1))*log(x)^2
+ 9*x^2 + 4*(4*x^3 - x^2*(3*log(5) + 1))*log(x))/(x^2 + 2*x*log(x) + log(x
)^2)
```

3.34.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(25) = 50$.

Time = 0.29 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.93

$$\int \frac{-18x - 2x^3 + 16x^4 - 6x^3\log(5) + (18x - 6x^2 + 48x^3 - 18x^2\log(5))\log(x) + (-6x + 48x^2 - 18x\log(5)}{9x^3 + 27x^2\log(x) + 27x\log^2(x) + 9\log^3(x)}$$
$$= \frac{8}{9}\,x^2 - \frac{2}{9}\,x(3\,\log(5) + 1) + \frac{x^3 + x^2}{x^3 + 2\,x^2\log(x) + x\log(x)^2 + x^2 + 2\,x\log(x) + \log(x)^2}$$

input
```
integrate(((-6*log(5)+16*x-2)*log(x)^3+(-18*x*log(5)+48*x^2-6*x)*log(x)^2+
(-18*x^2*log(5)+48*x^3-6*x^2+18*x)*log(x)-6*x^3*log(5)+16*x^4-2*x^3-18*x)/
(9*log(x)^3+27*x*log(x)^2+27*x^2*log(x)+9*x^3),x, algorithm=\
```

output
```
8/9*x^2 - 2/9*x*(3*log(5) + 1) + (x^3 + x^2)/(x^3 + 2*x^2*log(x) + x*log(x
)^2 + x^2 + 2*x*log(x) + log(x)^2)
```

3.34. $\int \frac{-18x-2x^3+16x^4-6x^3\log(5)+(18x-6x^2+48x^3-18x^2\log(5))\log(x)+(-6x+48x^2-18x\log(5))\log^2(x)+(-2+16x-6\log(5))\log^3(x)}{9x^3+27x^2\log(x)+27x\log^2(x)+9\log^3(x)}\,dx$

3.34.9 Mupad [B] (verification not implemented)

Time = 13.08 (sec) , antiderivative size = 89, normalized size of antiderivative = 3.18

$$\int \frac{-18x-2x^3+16x^4-6x^3\log(5)+\left(18x-6x^2+48x^3-18x^2\log(5)\right)\log(x)+\left(-6x+48x^2-18x\log(5)\right)}{9x^3+27x^2\log(x)+27x\log^2(x)+9\log^3(x)}$$

$$=\frac{8\,x^5+16\,x^4\,\ln\left(x\right)+\left(-6\,\ln\left(5\right)-2\right)\,x^4+8\,x^3\,{\ln\left(x\right)}^2+\left(-12\,\ln\left(5\right)-4\right)\,x^3\,\ln\left(x\right)+9\,x^3+\left(-6\,\ln\left(5\right)-\right.}{9\,x^3+18\,x^2\,\ln\left(x\right)+9\,x\,{\ln\left(x\right)}^2}$$

input
```
int(-(18*x + log(x)^2*(6*x + 18*x*log(5) - 48*x^2) - log(x)*(18*x - 18*x^2
*log(5) - 6*x^2 + 48*x^3) + 6*x^3*log(5) + log(x)^3*(6*log(5) - 16*x + 2)
+ 2*x^3 - 16*x^4)/(27*x*log(x)^2 + 27*x^2*log(x) + 9*log(x)^3 + 9*x^3),x)
```

output
```
(16*x^4*log(x) - x^4*(6*log(5) + 2) + 8*x^3*log(x)^2 + 9*x^3 + 8*x^5 - x^3
*log(x)*(12*log(5) + 4) - x^2*log(x)^2*(6*log(5) + 2))/(9*x*log(x)^2 + 18*
x^2*log(x) + 9*x^3)
```

3.35 $\int \frac{-e^{-8+4x}-x-4e^{-8+4x}x\log(x)}{x^2+e^{-8+4x}x\log(x)}\,dx$

3.35.1 Optimal result

Integrand size = 43, antiderivative size = 17

$$\int \frac{-e^{-8+4x}-x-4e^{-8+4x}x\log(x)}{x^2+e^{-8+4x}x\log(x)}\,dx=\log\left(\frac{4}{x+e^{4(-2+x)}\log(x)}\right)$$

output
```
ln(4/(x+ln(x)*exp(4*x-8)))
```

3.35.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{-e^{-8+4x}-x-4e^{-8+4x}x\log(x)}{x^2+e^{-8+4x}x\log(x)}\,dx=-\log\left(e^8x+e^{4x}\log(x)\right)$$

input
```
Integrate[(-E^(-8 + 4*x) - x - 4*E^(-8 + 4*x)*x*Log[x])/(x^2 + E^(-8 + 4*x
)*x*Log[x]),x]
```

output
```
-Log[E^8*x + E^(4*x)*Log[x]]
```

3.35.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x-e^{4x-8}-4e^{4x-8}x\log(x)}{x^2+e^{4x-8}x\log(x)}\,dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{-e^8x-e^{4x}-4e^{4x}x\log(x)}{e^8\left(x^2+e^{4x-8}x\log(x)\right)}dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int -\frac{4e^{4x}\log(x)x+e^8x+e^{4x}}{x^2+e^{4x-8}\log(x)x}dx}{e^8}$$

$$\Big\downarrow \; 25$$

$$-\frac{\int \frac{4e^{4x}\log(x)x+e^8x+e^{4x}}{x^2+e^{4x-8}\log(x)x}dx}{e^8}$$

$$\Big\downarrow \; 7293$$

$$-\frac{\int \left(\frac{e^8(4x\log(x)+1)}{x\log(x)}-\frac{e^{16}(4x\log(x)-\log(x)+1)}{\log(x)(e^8x+e^{4x}\log(x))}\right)dx}{e^8}$$

$$\Big\downarrow \; 2009$$

$$-\frac{e^{16}\int \frac{1}{e^8x+e^{4x}\log(x)}dx-4e^{16}\int \frac{x}{e^8x+e^{4x}\log(x)}dx-e^{16}\int \frac{1}{\log(x)(e^8x+e^{4x}\log(x))}dx+4e^8x+e^8\log(\log(x))}{e^8}$$

input
```
Int[(-E^(-8 + 4*x) - x - 4*E^(-8 + 4*x)*x*Log[x])/(x^2 + E^(-8 + 4*x)*x*Lo
g[x]),x]
```

output
```
$Aborted
```

3.35.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.35.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

method	result	size
norman	$-\ln\left(x+\ln\left(x\right) {\mathrm e}^{4 x -8}\right)$	15
parallelrisch	$-\ln\left(x+\ln\left(x\right) {\mathrm e}^{4 x -8}\right)$	15
risch	$-4 x -\ln\left(\ln\left(x\right)+x \,{\mathrm e}^{-4 x +8}\right)$	19

input
```
int((-4*x*exp(4*x-8)*ln(x)-exp(4*x-8)-x)/(x*exp(4*x-8)*ln(x)+x^2),x,method
=_RETURNVERBOSE)
```

output
```
-ln(x+ln(x)*exp(4*x-8))
```

3.35.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.47

$$\int \frac{-e^{-8+4x}-x-4e^{-8+4x}x\log(x)}{x^2+e^{-8+4x}x\log(x)}\,dx=-4\,x-\log\left(\left(e^{(4\,x-8)}\log\left(x\right)+x\right)e^{(-4\,x+8)}\right)$$

input
```
integrate((-4*x*exp(4*x-8)*log(x)-exp(4*x-8)-x)/(x*exp(4*x-8)*log(x)+x^2),
x, algorithm=\
```

output
```
-4*x - log((e^(4*x - 8)*log(x) + x)*e^(-4*x + 8))
```

3.35.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{-e^{-8+4x}-x-4e^{-8+4x}x\log(x)}{x^2+e^{-8+4x}x\log(x)}\,dx=-\log\left(\frac{x}{\log\left(x\right)}+e^{4x-8}\right)-\log\left(\log\left(x\right)\right)$$

input
```
integrate((-4*x*exp(4*x-8)*ln(x)-exp(4*x-8)-x)/(x*exp(4*x-8)*ln(x)+x**2),x
)
```

output
```
-log(x/log(x) + exp(4*x - 8)) - log(log(x))
```

3.35.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.53

$$\int \frac{-e^{-8+4x}-x-4e^{-8+4x}x\log(x)}{x^2+e^{-8+4x}x\log(x)}\,dx=-\log\left(\frac{xe^8+e^{(4\,x)}\log\left(x\right)}{\log\left(x\right)}\right)-\log\left(\log\left(x\right)\right)$$

input
```
integrate((-4*x*exp(4*x-8)*log(x)-exp(4*x-8)-x)/(x*exp(4*x-8)*log(x)+x^2),
x, algorithm=\
```

output
```
-log((x*e^8 + e^(4*x)*log(x))/log(x)) - log(log(x))
```

3.35.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{-e^{-8+4x}-x-4e^{-8+4x}x\log(x)}{x^2+e^{-8+4x}x\log(x)}\,dx = -\log\left(xe^8+e^{(4\,x)}\log\left(x\right)\right)$$

input
```
integrate((-4*x*exp(4*x-8)*log(x)-exp(4*x-8)-x)/(x*exp(4*x-8)*log(x)+x^2),
x, algorithm=\
```

output
```
-log(x*e^8 + e^(4*x)*log(x))
```

3.35.9 Mupad [B] (verification not implemented)

Time = 12.85 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{-e^{-8+4x}-x-4e^{-8+4x}x\log(x)}{x^2+e^{-8+4x}x\log(x)}\,dx = -\ln\left(x+\mathrm{e}^{4\,x-8}\,\ln\left(x\right)\right)$$

input
```
int(-(x + exp(4*x - 8) + 4*x*exp(4*x - 8)*log(x))/(x^2 + x*exp(4*x - 8)*lo
g(x)),x)
```

output
```
-log(x + exp(4*x - 8)*log(x))
```

3.36 $\int \frac{3-2x-\log(13)}{\left(-3x+x^2+x\log(13)\right)\log^2\left(\frac{1}{3}\left(3x-x^2-x\log(13)\right)\right)}\,dx$

3.36.1 Optimal result

Integrand size = 44, antiderivative size = 14

$$\int \frac{3-2x-\log(13)}{\left(-3x+x^2+x\log(13)\right)\log^2\left(\frac{1}{3}\left(3x-x^2-x\log(13)\right)\right)}\,dx=\frac{1}{\log\left(x-\frac{1}{3}x(x+\log(13))\right)}$$

output
```
1/ln(x-1/3*x*(ln(13)+x))
```

3.36.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{3-2x-\log(13)}{\left(-3x+x^2+x\log(13)\right)\log^2\left(\frac{1}{3}\left(3x-x^2-x\log(13)\right)\right)}\,dx=\frac{1}{\log\left(-\frac{1}{3}x(-3+x+\log(13))\right)}$$

input
```
Integrate[(3 - 2*x - Log[13])/((-3*x + x^2 + x*Log[13])*Log[(3*x - x^2 - x
*Log[13])/3]^2),x]
```

output
```
Log[-1/3*(x*(-3 + x + Log[13]))]^(-1)
```

3.36.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.50, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.068, Rules used = {6, 2026, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x+3-\log(13)}{(x^2-3x+x\log(13))\log^2\left(\frac{1}{3}(-x^2+3x-x\log(13))\right)}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{-2x+3-\log(13)}{(x^2+x(\log(13)-3))\log^2\left(\frac{1}{3}(-x^2+3x-x\log(13))\right)}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{-2x+3-\log(13)}{x(x-3+\log(13))\log^2\left(\frac{1}{3}(-x^2+3x-x\log(13))\right)}dx$$

$$\Big\downarrow \text{ 7237}$$

$$\frac{1}{\log\left(\frac{1}{3}(-x^2+3x-x\log(13))\right)}$$

input
```
Int[(3 - 2*x - Log[13])/((-3*x + x^2 + x*Log[13])*Log[(3*x - x^2 - x*Log[1
3])/3]^2),x]
```

output
```
Log[(3*x - x^2 - x*Log[13])/3]^(-1)
```

3.36.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
 + (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

3.36.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.86

method	result	size
parallelrisch	$\frac{1}{\ln\left(-\frac{x(\ln(13)+x-3)}{3}\right)}$	12
norman	$\frac{1}{\ln\left(-\frac{x\ln(13)}{3}-\frac{x^2}{3}+x\right)}$	16
risch	$\frac{1}{\ln\left(-\frac{x\ln(13)}{3}-\frac{x^2}{3}+x\right)}$	16
default	$-\frac{1}{\ln(3)-\ln(-x\ln(13)-x^2+3x)}$	25

input
```
int((-ln(13)+3-2*x)/(x*ln(13)+x^2-3*x)/ln(-1/3*x*ln(13)-1/3*x^2+x)^2,x,met
hod=_RETURNVERBOSE)
```

output
```
1/ln(-1/3*x*(ln(13)+x-3))
```

3.36.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.07

$$\int \frac{3-2x-\log(13)}{(-3x+x^2+x\log(13))\log^2\left(\frac{1}{3}(3x-x^2-x\log(13))\right)}\,dx = \frac{1}{\log\left(-\frac{1}{3}x^2-\frac{1}{3}x\log(13)+x\right)}$$

input
```
integrate((-log(13)+3-2*x)/(x*log(13)+x^2-3*x)/log(-1/3*x*log(13)-1/3*x^2+
x)^2,x, algorithm=\
```

output
```
1/log(-1/3*x^2 - 1/3*x*log(13) + x)
```

3.36.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.07

$$\int \frac{3-2x-\log(13)}{(-3x+x^2+x\log(13))\log^2\left(\frac{1}{3}(3x-x^2-x\log(13))\right)}\,dx = \frac{1}{\log\left(-\frac{x^2}{3}-\frac{x\log(13)}{3}+x\right)}$$

input
```
integrate((-ln(13)+3-2*x)/(x*ln(13)+x**2-3*x)/ln(-1/3*x*ln(13)-1/3*x**2+x)
**2,x)
```

output
```
1/log(-x**2/3 - x*log(13)/3 + x)
```

3.36.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.64

$$\int \frac{3-2x-\log(13)}{(-3x+x^2+x\log(13))\log^2\left(\frac{1}{3}(3x-x^2-x\log(13))\right)}\,dx = -\frac{1}{\log(3)-\log(x)-\log(-x-\log(13)+3)}$$

input
```
integrate((-log(13)+3-2*x)/(x*log(13)+x^2-3*x)/log(-1/3*x*log(13)-1/3*x^2+
x)^2,x, algorithm=\
```

output
```
-1/(log(3) - log(x) - log(-x - log(13) + 3))
```

3.36.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.71

$$\int \frac{3-2x-\log(13)}{(-3x+x^2+x\log(13))\log^2\left(\frac{1}{3}(3x-x^2-x\log(13))\right)}\,dx = -\frac{1}{\log(3)-\log(-x^2-x\log(13)+3x)}$$

input
```
integrate((-log(13)+3-2*x)/(x*log(13)+x^2-3*x)/log(-1/3*x*log(13)-1/3*x^2+
x)^2,x, algorithm=\
```

output
```
-1/(log(3) - log(-x^2 - x*log(13) + 3*x))
```

3.36.9 Mupad [B] (verification not implemented)

Time = 13.54 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.07

$$\int \frac{3-2x-\log(13)}{(-3x+x^2+x\log(13))\log^2\left(\frac{1}{3}\left(3x-x^2-x\log(13)\right)\right)}\,dx=\frac{1}{\ln\left(x-\frac{x\ln(13)}{3}-\frac{x^2}{3}\right)}$$

input
```
int(-(2*x + log(13) - 3)/(log(x - (x*log(13))/3 - x^2/3)^2*(x*log(13) - 3*
x + x^2)),x)
```

output
```
1/log(x - (x*log(13))/3 - x^2/3)
```

3.37 $\int \frac{e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left(\left(4x^3-2x^4\right)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x\right.\right.}{(e-x)\log^2(2)+\log^2(2)\log\left(2x^2\right.}$

3.37.1 Optimal result

Integrand size = 118, antiderivative size = 26

$$\int \frac{e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left(\left(4x^3-2x^4\right)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x^4+4x^3\log\left(2x^2\right)\right)\log^2\left(-e+x-\right.\right.}{(e-x)\log^2(2)+\log^2(2)\log\left(2x^2\right)}$$
$$=e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}$$

output
```
exp(x^4*ln(-ln(2*x^2)+x-exp(1))^2/ln(2)^2)
```

3.37.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left(\left(4x^3-2x^4\right)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x^4+4x^3\log\left(2x^2\right)\right)\log^2\left(-e+x-\right.\right.}{(e-x)\log^2(2)+\log^2(2)\log\left(2x^2\right)}$$
$$=e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}$$

input
```
Integrate[(E^((x^4*Log[-E + x - Log[2*x^2]]^2)/Log[2]^2)*((4*x^3 - 2*x^4)*
Log[-E + x - Log[2*x^2]] + (4*E*x^3 - 4*x^4 + 4*x^3*Log[2*x^2])*Log[-E + x
 - Log[2*x^2]]^2))/((E - x)*Log[2]^2 + Log[2]^2*Log[2*x^2]),x]
```

3.37.

$$\int \frac{e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left(\left(4x^3-2x^4\right)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x^4+4x^3\log\left(2x^2\right)\right)\log^2\left(-e+x-\log\left(2x^2\right)\right)\right)}{\ldots}\,dx$$

output
```
E^((x^4*Log[-E + x - Log[2*x^2]]^2)/Log[2]^2)
```

3.37.3 Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.008, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{x^4 \log^2\left(-\log\left(2x^2\right)+x-e\right)}{\log^2(2)}} \left(\left(-4x^4+4ex^3+4x^3\log\left(2x^2\right)\right)\log^2\left(-\log\left(2x^2\right)+x-e\right)+\left(4x^3-2x^4\right)\log\left(-\log\left(2x^2\right)\right.\right.}{\log^2(2)\log\left(2x^2\right)+(e-x)\log^2(2)}$$

$$\Big\downarrow \; 7257$$

$$e^{\frac{x^4 \log^2\left(-\log\left(2x^2\right)+x-e\right)}{\log^2(2)}}$$

input
```
Int[(E^((x^4*Log[-E + x - Log[2*x^2]]^2)/Log[2]^2)*((4*x^3 - 2*x^4)*Log[-E
 + x - Log[2*x^2]] + (4*E*x^3 - 4*x^4 + 4*x^3*Log[2*x^2])*Log[-E + x - Log
[2*x^2]]^2))/((E - x)*Log[2]^2 + Log[2]^2*Log[2*x^2]),x]
```

output
```
E^((x^4*Log[-E + x - Log[2*x^2]]^2)/Log[2]^2)
```

3.37.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.37.4 Maple [A] (verified)

Time = 25.90 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

method	result	size
parallelrisch	$\mathrm{e}^{\frac{x^4 \ln\left(-\ln\left(2x^2\right)+x-\mathrm{e}\right)^2}{\ln(2)^2}}$	27

input
```
int(((4*x^3*ln(2*x^2)+4*x^3*exp(1)-4*x^4)*ln(-ln(2*x^2)+x-exp(1))^2+(-2*x^
4+4*x^3)*ln(-ln(2*x^2)+x-exp(1)))*exp(x^4*ln(-ln(2*x^2)+x-exp(1))^2/ln(2)^
2)/(ln(2)^2*ln(2*x^2)+(exp(1)-x)*ln(2)^2),x,method=_RETURNVERBOSE)
```

output
```
exp(x^4*ln(-ln(2*x^2)+x-exp(1))^2/ln(2)^2)
```

3.37.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{x^4 \log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left(\left(4x^3-2x^4\right)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x^4+4x^3\log\left(2x^2\right)\right)\log^2\left(-e+x-\log\left(2x^2\right)\right)\right)}{(e-x)\log^2(2)+\log^2(2)\log\left(2x^2\right)}\,dx = e^{\left(\frac{x^4 \log\left(x-e-\log\left(2x^2\right)\right)^2}{\log(2)^2}\right)}$$

input
```
integrate(((4*x^3*log(2*x^2)+4*x^3*exp(1)-4*x^4)*log(-log(2*x^2)+x-exp(1))
^2+(-2*x^4+4*x^3)*log(-log(2*x^2)+x-exp(1)))*exp(x^4*log(-log(2*x^2)+x-exp
(1))^2/log(2)^2)/(log(2)^2*log(2*x^2)+(exp(1)-x)*log(2)^2),x, algorithm=\
```

output
```
e^(x^4*log(x - e - log(2*x^2))^2/log(2)^2)
```

3.37.6 Sympy [A] (verification not implemented)

Time = 0.91 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left((4x^3-2x^4)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x^4+4x^3\log\left(2x^2\right)\right)\log^2\left(-e+x-\log\left(2x^2\right)\right)\right)}{(e-x)\log^2(2)+\log^2(2)\log\left(2x^2\right)}$$
$$=e^{\frac{x^4\log\left(x-\log\left(2x^2\right)-e\right)^2}{\log(2)^2}}$$

input
```
integrate(((4*x**3*ln(2*x**2)+4*x**3*exp(1)-4*x**4)*ln(-ln(2*x**2)+x-exp(1
))**2+(-2*x**4+4*x**3)*ln(-ln(2*x**2)+x-exp(1)))*exp(x**4*ln(-ln(2*x**2)+x
-exp(1))**2/ln(2)**2)/(ln(2)**2*ln(2*x**2)+(exp(1)-x)*ln(2)**2),x)
```

output
```
exp(x**4*log(x - log(2*x**2) - E)**2/log(2)**2)
```

3.37.7 Maxima [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left((4x^3-2x^4)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x^4+4x^3\log\left(2x^2\right)\right)\log^2\left(-e+x-\log\left(2x^2\right)\right)\right)}{(e-x)\log^2(2)+\log^2(2)\log\left(2x^2\right)}$$
$$=e^{\left(\frac{x^4\log(x-e-\log(2)-2\log(x))^2}{\log(2)^2}\right)}$$

input
```
integrate(((4*x^3*log(2*x^2)+4*x^3*exp(1)-4*x^4)*log(-log(2*x^2)+x-exp(1))
^2+(-2*x^4+4*x^3)*log(-log(2*x^2)+x-exp(1)))*exp(x^4*log(-log(2*x^2)+x-exp
(1))^2/log(2)^2)/(log(2)^2*log(2*x^2)+(exp(1)-x)*log(2)^2),x, algorithm=\
```

output
```
e^(x^4*log(x - e - log(2) - 2*log(x))^2/log(2)^2)
```

3.37.8 Giac [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left(\left(4x^3-2x^4\right)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x^4+4x^3\log\left(2x^2\right)\right)\log^2\left(-e+x-\log\left(2x^2\right)\right)\right)}{(e-x)\log^2(2)+\log^2(2)\log\left(2x^2\right)}$$

$$= e^{\left(\frac{x^4\log\left(x-e-\log\left(2x^2\right)\right)^2}{\log(2)^2}\right)}$$

input
```
integrate(((4*x^3*log(2*x^2)+4*x^3*exp(1)-4*x^4)*log(-log(2*x^2)+x-exp(1))
^2+(-2*x^4+4*x^3)*log(-log(2*x^2)+x-exp(1)))*exp(x^4*log(-log(2*x^2)+x-exp
(1))^2/log(2)^2)/(log(2)^2*log(2*x^2)+(exp(1)-x)*log(2)^2),x, algorithm=\
```

output
```
e^(x^4*log(x - e - log(2*x^2))^2/log(2)^2)
```

3.37.9 Mupad [B] (verification not implemented)

Time = 12.88 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left(\left(4x^3-2x^4\right)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x^4+4x^3\log\left(2x^2\right)\right)\log^2\left(-e+x-\log\left(2x^2\right)\right)\right)}{(e-x)\log^2(2)+\log^2(2)\log\left(2x^2\right)}$$

$$= \mathrm{e}^{\frac{x^4\ln\left(x-\ln\left(x^2\right)-\mathrm{e}-\ln(2)\right)^2}{\ln(2)^2}}$$

input
```
int(-(exp((x^4*log(x - exp(1) - log(2*x^2))^2)/log(2)^2)*(log(x - exp(1) -
 log(2*x^2))*(4*x^3 - 2*x^4) + log(x - exp(1) - log(2*x^2))^2*(4*x^3*exp(1
) - 4*x^4 + 4*x^3*log(2*x^2))))/(log(2)^2*(x - exp(1)) - log(2)^2*log(2*x^
2)),x)
```

output
```
exp((x^4*log(x - log(x^2) - exp(1) - log(2))^2)/log(2)^2)
```

3.37. $\int \frac{e^{\frac{x^4\log^2\left(-e+x-\log\left(2x^2\right)\right)}{\log^2(2)}}\left(\left(4x^3-2x^4\right)\log\left(-e+x-\log\left(2x^2\right)\right)+\left(4ex^3-4x^4+4x^3\log\left(2x^2\right)\right)\log^2\left(-e+x-\log\left(2x^2\right)\right)\right)}{(e-x)\log^2(2)+\log^2(2)\log\left(2x^2\right)}\,dx$

3.38 $\int \frac{33x+20x^3+3x^5+(-726+33x-352x^2+16x^3-66x^4+3x^5)\log(22-x)}{(-726x+33x^2-440x^3+20x^4-66x^5+3x^6)\log(22-x)}\,dx$

3.38.1 Optimal result

Integrand size = 86, antiderivative size = 22

$$\int \frac{33x+20x^3+3x^5+(-726+33x-352x^2+16x^3-66x^4+3x^5)\log(22-x)}{(-726x+33x^2-440x^3+20x^4-66x^5+3x^6)\log(22-x)}\,dx = \log\left(\left(x+\frac{2x}{3(3+x^2)}\right)\log(22-x)\right)$$

output
```
ln((x+2*x/(3*x^2+9))*ln(22-x))
```

3.38.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{33x+20x^3+3x^5+(-726+33x-352x^2+16x^3-66x^4+3x^5)\log(22-x)}{(-726x+33x^2-440x^3+20x^4-66x^5+3x^6)\log(22-x)}\,dx = \log(x)-\log\left(3+x^2\right)+\log\left(11+3x^2\right)+\log(\log(22-x))$$

input
```
Integrate[(33*x + 20*x^3 + 3*x^5 + (-726 + 33*x - 352*x^2 + 16*x^3 - 66*x^
4 + 3*x^5)*Log[22 - x])/((-726*x + 33*x^2 - 440*x^3 + 20*x^4 - 66*x^5 + 3*
x^6)*Log[22 - x]),x]
```

output
```
Log[x] - Log[3 + x^2] + Log[11 + 3*x^2] + Log[Log[22 - x]]
```

3.38.3 Rubi [A] (verified)

Time = 2.09 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.035, Rules used = {2026, 2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^5+20x^3+\left(3x^5-66x^4+16x^3-352x^2+33x-726\right)\log(22-x)+33x}{\left(3x^6-66x^5+20x^4-440x^3+33x^2-726x\right)\log(22-x)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{3x^5+20x^3+\left(3x^5-66x^4+16x^3-352x^2+33x-726\right)\log(22-x)+33x}{x\left(3x^5-66x^4+20x^3-440x^2+33x-726\right)\log(22-x)}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{3x^5+20x^3+\left(3x^5-66x^4+16x^3-352x^2+33x-726\right)\log(22-x)+33x}{712481(x-22)x\log(22-x)}+\frac{(-x-22)\left(3x^5+20x^3+\left(3x^5\right.\right.}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\log\left(x^2+3\right)+\log\left(3x^2+11\right)+\log(x)+\log(\log(22-x))$$

input
```
Int[(33*x + 20*x^3 + 3*x^5 + (-726 + 33*x - 352*x^2 + 16*x^3 - 66*x^4 + 3*
x^5)*Log[22 - x])/((-726*x + 33*x^2 - 440*x^3 + 20*x^4 - 66*x^5 + 3*x^6)*L
og[22 - x]),x]
```

output
```
Log[x] - Log[3 + x^2] + Log[11 + 3*x^2] + Log[Log[22 - x]]
```

3.38.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.38.4 Maple [A] (verified)

Time = 0.49 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

method	result
parallelrisch	$\ln(x) + \ln(\ln(22-x)) + \ln\left(x^2 + \frac{11}{3}\right) - \ln(x^2+3)$
norman	$-\ln(x^2+3) + \ln(x) + \ln(\ln(22-x)) + \ln(3x^2+11)$
risch	$-\ln(x^2+3) + \ln(3x^3+11x) + \ln(\ln(22-x))$
parts	$-\ln(x^2+3) + \ln(x) + \ln(\ln(22-x)) + \ln(3x^2+11)$
derivativedivides	$\ln(\ln(22-x)) + \ln\left(3(22-x)^2 - 1441 + 132x\right) + \ln(-x) - \ln\left((22-x)^2 - 481 + 44$
default	$\ln(\ln(22-x)) + \ln\left(3(22-x)^2 - 1441 + 132x\right) + \ln(-x) - \ln\left((22-x)^2 - 481 + 44$

input
```
int(((3*x^5-66*x^4+16*x^3-352*x^2+33*x-726)*ln(22-x)+3*x^5+20*x^3+33*x)/(3
*x^6-66*x^5+20*x^4-440*x^3+33*x^2-726*x)/ln(22-x),x,method=_RETURNVERBOSE)
```

output
```
ln(x)+ln(ln(22-x))+ln(x^2+11/3)-ln(x^2+3)
```

3.38.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{33x + 20x^3 + 3x^5 + (-726 + 33x - 352x^2 + 16x^3 - 66x^4 + 3x^5)\log(22-x)}{(-726x + 33x^2 - 440x^3 + 20x^4 - 66x^5 + 3x^6)\log(22-x)}\,dx$$
$$= \log\left(3\,x^3 + 11\,x\right) - \log\left(x^2 + 3\right) + \log\left(\log\left(-x + 22\right)\right)$$

input
```
integrate(((3*x^5-66*x^4+16*x^3-352*x^2+33*x-726)*log(22-x)+3*x^5+20*x^3+3
3*x)/(3*x^6-66*x^5+20*x^4-440*x^3+33*x^2-726*x)/log(22-x),x, algorithm=\
```

output
```
log(3*x^3 + 11*x) - log(x^2 + 3) + log(log(-x + 22))
```

3.38.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{33x + 20x^3 + 3x^5 + (-726 + 33x - 352x^2 + 16x^3 - 66x^4 + 3x^5)\log(22 - x)}{(-726x + 33x^2 - 440x^3 + 20x^4 - 66x^5 + 3x^6)\log(22 - x)}\,dx$$
$$= -\log\left(x^2 + 3\right) + \log\left(3x^3 + 11x\right) + \log\left(\log\left(22 - x\right)\right)$$

input
```
integrate(((3*x**5-66*x**4+16*x**3-352*x**2+33*x-726)*ln(22-x)+3*x**5+20*x
**3+33*x)/(3*x**6-66*x**5+20*x**4-440*x**3+33*x**2-726*x)/ln(22-x),x)
```

output
```
-log(x**2 + 3) + log(3*x**3 + 11*x) + log(log(22 - x))
```

3.38.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{33x + 20x^3 + 3x^5 + (-726 + 33x - 352x^2 + 16x^3 - 66x^4 + 3x^5)\log(22 - x)}{(-726x + 33x^2 - 440x^3 + 20x^4 - 66x^5 + 3x^6)\log(22 - x)}\,dx$$
$$= \log\left(3\,x^2 + 11\right) - \log\left(x^2 + 3\right) + \log\left(x\right) + \log\left(\log\left(-x + 22\right)\right)$$

input
```
integrate(((3*x^5-66*x^4+16*x^3-352*x^2+33*x-726)*log(22-x)+3*x^5+20*x^3+3
3*x)/(3*x^6-66*x^5+20*x^4-440*x^3+33*x^2-726*x)/log(22-x),x, algorithm=\
```

output
```
log(3*x^2 + 11) - log(x^2 + 3) + log(x) + log(log(-x + 22))
```

3.38.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.86

$$\int \frac{33x + 20x^3 + 3x^5 + (-726 + 33x - 352x^2 + 16x^3 - 66x^4 + 3x^5)\log(22 - x)}{(-726x + 33x^2 - 440x^3 + 20x^4 - 66x^5 + 3x^6)\log(22 - x)}\,dx$$
$$= \log\left(-3\,(x - 22)^3 - 198\,(x - 22)^2 - 4367\,x + 63888\right)$$
$$- \log\left((x - 22)^2 + 44\,x - 481\right) + \log\left(\log\left(-x + 22\right)\right)$$

input
```
integrate(((3*x^5-66*x^4+16*x^3-352*x^2+33*x-726)*log(22-x)+3*x^5+20*x^3+3
3*x)/(3*x^6-66*x^5+20*x^4-440*x^3+33*x^2-726*x)/log(22-x),x, algorithm=\
```

output
```
log(-3*(x - 22)^3 - 198*(x - 22)^2 - 4367*x + 63888) - log((x - 22)^2 + 44
*x - 481) + log(log(-x + 22))
```

3.38.9 Mupad [B] (verification not implemented)

Time = 12.84 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{33x+20x^3+3x^5+(-726+33x-352x^2+16x^3-66x^4+3x^5)\log(22-x)}{(-726x+33x^2-440x^3+20x^4-66x^5+3x^6)\log(22-x)}\,dx$$
$$=\ln\left(\ln\left(22-x\right)\right)+\ln\left(x^3+\frac{11\,x}{3}\right)-\ln\left(x^2+3\right)$$

input
```
int(-(33*x + log(22 - x)*(33*x - 352*x^2 + 16*x^3 - 66*x^4 + 3*x^5 - 726)
+ 20*x^3 + 3*x^5)/(log(22 - x)*(726*x - 33*x^2 + 440*x^3 - 20*x^4 + 66*x^5
 - 3*x^6)),x)
```

output
```
log(log(22 - x)) + log((11*x)/3 + x^3) - log(x^2 + 3)
```

3.39 $\int \frac{2x^2\log^2(4)+e^x\left(-6x^4+\left(6x^3-18x^4-6x^5\right)\log(4)\right)+\left(-4x^2\log(4)+4x\log\cdots\right.}{3x^2\log^2(4)+\left(-6x^2\log(4)+6x\log\cdots\right.}$

3.39.1 Optimal result

Integrand size = 161, antiderivative size = 30

$$\int \frac{2x^2\log^2(4)+e^x\left(-6x^4+\left(6x^3-18x^4-6x^5\right)\log(4)\right)+\left(-4x^2\log(4)+4x\log^2(4)+e^x\left(18x^4+6x^5+(-2\cdots\right.\right.}{3x^2\log^2(4)+\left(-6x^2\log(4)+6x\log^2(4)\right)\log(x)+\left(3x^2-6x\log\cdots\right.}$$
$$=x\left(\frac{2}{3}+\frac{2e^xx^2}{\log(x)-\frac{\log(4)(x+\log(x))}{x}}\right)$$

output
```
(2/3+2/(ln(x)-2*ln(2)*(x+ln(x))/x)*exp(x)*x^2)*x
```

3.39.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 75 vs. 2(30) = 60.

Time = 0.28 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.50

$$\int \frac{2x^2\log^2(4)+e^x\left(-6x^4+\left(6x^3-18x^4-6x^5\right)\log(4)\right)+\left(-4x^2\log(4)+4x\log^2(4)+e^x\left(18x^4+6x^5+(-2\cdots\right.\right.}{3x^2\log^2(4)+\left(-6x^2\log(4)+6x\log^2(4)\right)\log(x)+\left(3x^2-6x\log\cdots\right.}$$
$$=\frac{2}{3}\left(x-\frac{3e^xx^4\left(x^2+\log^2(4)+x\left(4\log^2(4)-\log(16)-\log(4)\log(64)\right)\right)}{\left(x^2+x(-2+\log(4))\log(4)+\log^2(4)\right)\left(x\log(4)+(-x+\log(4))\log(x)\right)}\right)$$

3.39.
$\int \frac{2x^2\log^2(4)+e^x\left(-6x^4+\left(6x^3-18x^4-6x^5\right)\log(4)\right)+\left(-4x^2\log(4)+4x\log^2(4)+e^x\left(18x^4+6x^5+\left(-24x^3-6x^4\right)\log(4)\right)\right)\log(x)+\left(2x^2-4x\log(4)+2\,\mathrm{lo}\cdots\right.}{3x^2\log^2(4)+\left(-6x^2\log(4)+6x\log^2(4)\right)\log(x)+\left(3x^2-6x\log(4)+3\log^2(4)\right)\log^2(x)}$

input
```
Integrate[(2*x^2*Log[4]^2 + E^x*(-6*x^4 + (6*x^3 - 18*x^4 - 6*x^5)*Log[4])
 + (-4*x^2*Log[4] + 4*x*Log[4]^2 + E^x*(18*x^4 + 6*x^5 + (-24*x^3 - 6*x^4)
*Log[4]))*Log[x] + (2*x^2 - 4*x*Log[4] + 2*Log[4]^2)*Log[x]^2)/(3*x^2*Log[
4]^2 + (-6*x^2*Log[4] + 6*x*Log[4]^2)*Log[x] + (3*x^2 - 6*x*Log[4] + 3*Log
[4]^2)*Log[x]^2),x]
```

output
```
(2*(x - (3*E^x*x^4*(x^2 + Log[4]^2 + x*(4*Log[4]^2 - Log[16] - Log[4]*Log[
64])))/((x^2 + x*(-2 + Log[4])*Log[4] + Log[4]^2)*(x*Log[4] + (-x + Log[4]
)*Log[x]))))/3
```

3.39.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2\log^2(4)+\left(2x^2-4x\log(4)+2\log^2(4)\right)\log^2(x)+e^x\left(\left(-6x^5-18x^4+6x^3\right)\log(4)-6x^4\right)+\left(-4x^2\log(4)+\right.}{3x^2\log^2(4)+\left(3x^2-6x\log(4)+3\log^2(4)\right)\log^2(x)+\left(6x\log^2(4)-\right.}$$

$\downarrow$ 7292

$$\int \frac{2x^2\log^2(4)+\left(2x^2-4x\log(4)+2\log^2(4)\right)\log^2(x)+e^x\left(\left(-6x^5-18x^4+6x^3\right)\log(4)-6x^4\right)+\left(-4x^2\log(4)+\right.}{3(x(-\log(x))+x\log(4)+\log(4)\log(x))^2}$$

$\downarrow$ 27

$$\frac{1}{3}\int \frac{2\left(\log^2(4)x^2+\left(x^2-2\log(4)x+\log^2(4)\right)\log^2(x)-3e^x\left(x^4-\left(-x^5-3x^4+x^3\right)\log(4)\right)-\left(2\log(4)x^2-2\log^2\right.\right.}{(-\log(x)x+\log(4)x+\log(4)\log(x))^2}$$

$\downarrow$ 27

$$\frac{2}{3}\int \frac{\log^2(4)x^2+\left(x^2-2\log(4)x+\log^2(4)\right)\log^2(x)-3e^x\left(x^4-\left(-x^5-3x^4+x^3\right)\log(4)\right)-\left(2\log(4)x^2-2\log^2(4\right.}{(-\log(x)x+\log(4)x+\log(4)\log(x))^2}$$

$\downarrow$ 7293

$$\frac{2}{3}\int \left(\frac{3e^x\left(\log(x)x^2-\log(4)x^2+3\left(1-\frac{2\log(2)}{3}\right)\log(x)x-(1+\log(64))x-\log(256)\log(x)+\log(4)\right)x^3}{(-\log(x)x+\log(4)x+\log(4)\log(x))^2}-\frac{}{(-\mathrm{lo}}\right.$$

$\downarrow$ 2009

$$\frac{2}{3}\left(-3\int \frac{e^x x^4}{(-\log(x)x+\log(4)x+\log(4)\log(x))^2}dx-3\int \frac{e^x x^4}{-\log(x)x+\log(4)x+\log(4)\log(x)}dx+3(1-\log(4))\right.$$

input
```
Int[(2*x^2*Log[4]^2 + E^x*(-6*x^4 + (6*x^3 - 18*x^4 - 6*x^5)*Log[4]) + (-4
*x^2*Log[4] + 4*x*Log[4]^2 + E^x*(18*x^4 + 6*x^5 + (-24*x^3 - 6*x^4)*Log[4
]))*Log[x] + (2*x^2 - 4*x*Log[4] + 2*Log[4]^2)*Log[x]^2)/(3*x^2*Log[4]^2 +
 (-6*x^2*Log[4] + 6*x*Log[4]^2)*Log[x] + (3*x^2 - 6*x*Log[4] + 3*Log[4]^2)
*Log[x]^2),x]
```

output
```
$Aborted
```

3.39.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.39.4 Maple [A] (verified)

Time = 2.06 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

method	result	size
risch	$\frac{2x}{3}-\frac{2x^4 e^x}{2\ln(2)\ln(x)-x\ln(x)+2x\ln(2)}$	31
parallelrisch	$-\frac{6\,e^x x^4-8x\ln(2)^2-8\ln(2)^2\ln(x)-4x^2\ln(2)+2x^2\ln(x)}{3(2\ln(2)\ln(x)-x\ln(x)+2x\ln(2))}$	59

3.39.
$$\int \frac{2x^2\log^2(4)+e^x(-6x^4+(6x^3-18x^4-6x^5)\log(4))+(-4x^2\log(4)+4x\log^2(4)+e^x(18x^4+6x^5+(-24x^3-6x^4)\log(4)))\log(x)+(2x^2-4x\log(4)+2\log}{3x^2\log^2(4)+(-6x^2\log(4)+6x\log^2(4))\log(x)+(3x^2-6x\log(4)+3\log^2(4))\log^2(x)}$$

input
```
int(((8*ln(2)^2-8*x*ln(2)+2*x^2)*ln(x)^2+((2*(-6*x^4-24*x^3)*ln(2)+6*x^5+1
8*x^4)*exp(x)+16*x*ln(2)^2-8*x^2*ln(2))*ln(x)+(2*(-6*x^5-18*x^4+6*x^3)*ln(
2)-6*x^4)*exp(x)+8*x^2*ln(2)^2)/((12*ln(2)^2-12*x*ln(2)+3*x^2)*ln(x)^2+(24
*x*ln(2)^2-12*x^2*ln(2))*ln(x)+12*x^2*ln(2)^2),x,method=_RETURNVERBOSE)
```

output
```
2/3*x-2*x^4*exp(x)/(2*ln(2)*ln(x)-x*ln(x)+2*x*ln(2))
```

3.39.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.57

$$\int \frac{2x^2 \log^2(4) + e^x(-6x^4 + (6x^3 - 18x^4 - 6x^5)\log(4)) + \left(-4x^2\log(4) + 4x\log^2(4) + e^x(18x^4 + 6x^5 + (-2}{3x^2\log^2(4) + \left(-6x^2\log(4) + 6x\log^2(4)\right)\log(x) + \left(3x^2 - 6x\log}$$
$$= -\frac{2\left(3\,x^4e^x - 2\,x^2\log\left(2\right) + \left(x^2 - 2\,x\log\left(2\right)\right)\log\left(x\right)\right)}{3\left(2\,x\log\left(2\right) - \left(x - 2\,\log\left(2\right)\right)\log\left(x\right)\right)}$$

input
```
integrate(((8*log(2)^2-8*x*log(2)+2*x^2)*log(x)^2+((2*(-6*x^4-24*x^3)*log(
2)+6*x^5+18*x^4)*exp(x)+16*x*log(2)^2-8*x^2*log(2))*log(x)+(2*(-6*x^5-18*x
^4+6*x^3)*log(2)-6*x^4)*exp(x)+8*x^2*log(2)^2)/((12*log(2)^2-12*x*log(2)+3
*x^2)*log(x)^2+(24*x*log(2)^2-12*x^2*log(2))*log(x)+12*x^2*log(2)^2),x, al
gorithm=\
```

output
```
-2/3*(3*x^4*e^x - 2*x^2*log(2) + (x^2 - 2*x*log(2))*log(x))/(2*x*log(2) -
(x - 2*log(2))*log(x))
```

3.39.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{2x^2 \log^2(4) + e^x(-6x^4 + (6x^3 - 18x^4 - 6x^5)\log(4)) + \left(-4x^2\log(4) + 4x\log^2(4) + e^x(18x^4 + 6x^5 + (-2}{3x^2\log^2(4) + \left(-6x^2\log(4) + 6x\log^2(4)\right)\log(x) + \left(3x^2 - 6x\log}$$
$$= \frac{2x^4e^x}{x\log\left(x\right) - 2x\log\left(2\right) - 2\log\left(2\right)\log\left(x\right)} + \frac{2x}{3}$$

3.39.
$$\int \frac{2x^2\log^2(4)+e^x\left(-6x^4+\left(6x^3-18x^4-6x^5\right)\log(4)\right)+\left(-4x^2\log(4)+4x\log^2(4)+e^x\left(18x^4+6x^5+\left(-24x^3-6x^4\right)\log(4)\right)\right)\log(x)+\left(2x^2-4x\log(4)+2\log}{3x^2\log^2(4)+\left(-6x^2\log(4)+6x\log^2(4)\right)\log(x)+\left(3x^2-6x\log(4)+3\log^2(4)\right)\log^2(x)}$$

input
```
integrate(((8*ln(2)**2-8*x*ln(2)+2*x**2)*ln(x)**2+((2*(-6*x**4-24*x**3)*ln
(2)+6*x**5+18*x**4)*exp(x)+16*x*ln(2)**2-8*x**2*ln(2))*ln(x)+(2*(-6*x**5-1
8*x**4+6*x**3)*ln(2)-6*x**4)*exp(x)+8*x**2*ln(2)**2)/((12*ln(2)**2-12*x*ln
(2)+3*x**2)*ln(x)**2+(24*x*ln(2)**2-12*x**2*ln(2))*ln(x)+12*x**2*ln(2)**2)
,x)
```

output
```
2*x**4*exp(x)/(x*log(x) - 2*x*log(2) - 2*log(2)*log(x)) + 2*x/3
```

3.39.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.57

$$\int \frac{2x^2\log^2(4)+e^x(-6x^4+(6x^3-18x^4-6x^5)\log(4))+\left(-4x^2\log(4)+4x\log^2(4)+e^x(18x^4+6x^5+(-2\right.}{3x^2\log^2(4)+\left(-6x^2\log(4)+6x\log^2(4)\right)\log(x)+\left(3x^2-6x\log\right.}$$
$$= -\frac{2\left(3x^4e^x-2x^2\log(2)+(x^2-2x\log(2))\log(x)\right)}{3\left(2x\log(2)-(x-2\log(2))\log(x)\right)}$$

input
```
integrate(((8*log(2)^2-8*x*log(2)+2*x^2)*log(x)^2+((2*(-6*x^4-24*x^3)*log(
2)+6*x^5+18*x^4)*exp(x)+16*x*log(2)^2-8*x^2*log(2))*log(x)+(2*(-6*x^5-18*x
^4+6*x^3)*log(2)-6*x^4)*exp(x)+8*x^2*log(2)^2)/((12*log(2)^2-12*x*log(2)+3
*x^2)*log(x)^2+(24*x*log(2)^2-12*x^2*log(2))*log(x)+12*x^2*log(2)^2),x, al
gorithm=\
```

output
```
-2/3*(3*x^4*e^x - 2*x^2*log(2) + (x^2 - 2*x*log(2))*log(x))/(2*x*log(2) -
(x - 2*log(2))*log(x))
```

3.39.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.63

$$\int \frac{2x^2\log^2(4)+e^x(-6x^4+(6x^3-18x^4-6x^5)\log(4))+\left(-4x^2\log(4)+4x\log^2(4)+e^x(18x^4+6x^5+(-2\right.}{3x^2\log^2(4)+\left(-6x^2\log(4)+6x\log^2(4)\right)\log(x)+\left(3x^2-6x\log\right.}$$
$$= -\frac{2\left(3x^4e^x-2x^2\log(2)+x^2\log(x)-2x\log(2)\log(x)\right)}{3\left(2x\log(2)-x\log(x)+2\log(2)\log(x)\right)}$$

input
```
integrate(((8*log(2)^2-8*x*log(2)+2*x^2)*log(x)^2+((2*(-6*x^4-24*x^3)*log(
2)+6*x^5+18*x^4)*exp(x)+16*x*log(2)^2-8*x^2*log(2))*log(x)+(2*(-6*x^5-18*x
^4+6*x^3)*log(2)-6*x^4)*exp(x)+8*x^2*log(2)^2)/((12*log(2)^2-12*x*log(2)+3
*x^2)*log(x)^2+(24*x*log(2)^2-12*x^2*log(2))*log(x)+12*x^2*log(2)^2),x, al
gorithm=\
```

output
```
-2/3*(3*x^4*e^x - 2*x^2*log(2) + x^2*log(x) - 2*x*log(2)*log(x))/(2*x*log(
2) - x*log(x) + 2*log(2)*log(x))
```

3.39.9 Mupad [F(-1)]

Timed out.

$$\int \frac{2x^2\log^2(4)+e^x(-6x^4+(6x^3-18x^4-6x^5)\log(4))+\left(-4x^2\log(4)+4x\log^2(4)+e^x(18x^4+6x^5+(-2}{3x^2\log^2(4)+\left(-6x^2\log(4)+6x\log^2(4)\right)\log(x)+\left(3x^2-6x\log}$$

$$=\int \frac{8\,x^2\ln(2)^2+\ln(x)\,\left(\mathrm{e}^x\left(18\,x^4-2\,\ln(2)\,\left(6\,x^4+24\,x^3\right)+6\,x^5\right)+16\,x\ln(2)^2-8\,x^2\,\ln(2)\right)-\mathrm{e}^x\left(2\,\ln(2}{12\,x^2\ln(2)^2+\ln(x)^2\,\left(3\,x^2-12\,\ln(2)\,x+12\ln(2)^2\right)+\ln(x}$$

input
```
int((8*x^2*log(2)^2 + log(x)*(exp(x)*(18*x^4 - 2*log(2)*(24*x^3 + 6*x^4) +
 6*x^5) + 16*x*log(2)^2 - 8*x^2*log(2)) - exp(x)*(2*log(2)*(18*x^4 - 6*x^3
 + 6*x^5) + 6*x^4) + log(x)^2*(8*log(2)^2 - 8*x*log(2) + 2*x^2))/(12*x^2*l
og(2)^2 + log(x)^2*(12*log(2)^2 - 12*x*log(2) + 3*x^2) + log(x)*(24*x*log(
2)^2 - 12*x^2*log(2))),x)
```

output
```
int((8*x^2*log(2)^2 + log(x)*(exp(x)*(18*x^4 - 2*log(2)*(24*x^3 + 6*x^4) +
 6*x^5) + 16*x*log(2)^2 - 8*x^2*log(2)) - exp(x)*(2*log(2)*(18*x^4 - 6*x^3
 + 6*x^5) + 6*x^4) + log(x)^2*(8*log(2)^2 - 8*x*log(2) + 2*x^2))/(12*x^2*l
og(2)^2 + log(x)^2*(12*log(2)^2 - 12*x*log(2) + 3*x^2) + log(x)*(24*x*log(
2)^2 - 12*x^2*log(2))), x)
```

3.40 $\int \frac{-45+54x+7x^2+x^3+(-18+18x+6x^2)\log(3)+(-9+9x)\log^2(3)+(-9+9x)\log(x)}{54x+6x^2+x^3+(18x+6x^2)\log(3)+9x\log^2(3)+9x\log(x)}$

3.40.1 Optimal result

Integrand size = 83, antiderivative size = 27

$$\int \frac{-45+54x+7x^2+x^3+(-18+18x+6x^2)\log(3)+(-9+9x)\log^2(3)+(-9+9x)\log(x)}{54x+6x^2+x^3+(18x+6x^2)\log(3)+9x\log^2(3)+9x\log(x)}\,dx$$
$$= x+\log\left(\frac{5+\left(-1-\frac{x}{3}-\log(3)\right)^2+\log(x)}{26x}\right)$$

output
```
ln(1/26*(ln(x)+(-1-ln(3)-1/3*x)^2+5)/x)+x
```

3.40.2 Mathematica [F]

$$\int \frac{-45+54x+7x^2+x^3+(-18+18x+6x^2)\log(3)+(-9+9x)\log^2(3)+(-9+9x)\log(x)}{54x+6x^2+x^3+(18x+6x^2)\log(3)+9x\log^2(3)+9x\log(x)}\,dx$$
$$=\int \frac{-45+54x+7x^2+x^3+(-18+18x+6x^2)\log(3)+(-9+9x)\log^2(3)+(-9+9x)\log(x)}{54x+6x^2+x^3+(18x+6x^2)\log(3)+9x\log^2(3)+9x\log(x)}\,dx$$

input
```
Integrate[(-45 + 54*x + 7*x^2 + x^3 + (-18 + 18*x + 6*x^2)*Log[3] + (-9 +
9*x)*Log[3]^2 + (-9 + 9*x)*Log[x])/(54*x + 6*x^2 + x^3 + (18*x + 6*x^2)*Lo
g[3] + 9*x*Log[3]^2 + 9*x*Log[x]),x]
```

output
```
Integrate[(-45 + 54*x + 7*x^2 + x^3 + (-18 + 18*x + 6*x^2)*Log[3] + (-9 +
9*x)*Log[3]^2 + (-9 + 9*x)*Log[x])/(54*x + 6*x^2 + x^3 + (18*x + 6*x^2)*Lo
g[3] + 9*x*Log[3]^2 + 9*x*Log[x]), x]
```

3.40.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.036, Rules used = {6, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3+7x^2+\left(6x^2+18x-18\right)\log(3)+54x+(9x-9)\log^2(3)+(9x-9)\log(x)-45}{x^3+6x^2+\left(6x^2+18x\right)\log(3)+54x+9x\log^2(3)+9x\log(x)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{x^3+7x^2+\left(6x^2+18x-18\right)\log(3)+54x+(9x-9)\log^2(3)+(9x-9)\log(x)-45}{x^3+6x^2+\left(6x^2+18x\right)\log(3)+x\left(54+9\log^2(3)\right)+9x\log(x)}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{2x^2+6x(1+\log(3))+9}{x\left(x^2+6x(1+\log(3))+9\log(x)+54\left(1+\frac{1}{6}\left(\log^2(3)+\log(9)\right)\right)\right)}+\frac{x-1}{x}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\log\left(x^2+6x(1+\log(3))+9\log(x)+9\left(6+\log^2(3)+\log(9)\right)\right)+x-\log(x)$$

input
```
Int[(-45 + 54*x + 7*x^2 + x^3 + (-18 + 18*x + 6*x^2)*Log[3] + (-9 + 9*x)*L
og[3]^2 + (-9 + 9*x)*Log[x])/(54*x + 6*x^2 + x^3 + (18*x + 6*x^2)*Log[3] +
 9*x*Log[3]^2 + 9*x*Log[x]),x]
```

output
```
x - Log[x] + Log[x^2 + 6*x*(1 + Log[3]) + 9*(6 + Log[3]^2 + Log[9]) + 9*Lo
g[x]]
```

3.40.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.40.4 Maple [A] (verified)

Time = 1.06 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

method	result	size
risch	$x-\ln(x)+\ln\left(\ln(3)^2+\frac{2x\ln(3)}{3}+\frac{x^2}{9}+2\ln(3)+\frac{2x}{3}+\ln(x)+6\right)$	33
default	$-\ln(x)+x+\ln\left(9\ln(3)^2+6x\ln(3)+x^2+9\ln(x)+18\ln(3)+6x+54\right)$	35
norman	$-\ln(x)+x+\ln\left(9\ln(3)^2+6x\ln(3)+x^2+9\ln(x)+18\ln(3)+6x+54\right)$	35
parallelrisch	$-\ln(x)+x+\ln\left(9\ln(3)^2+6x\ln(3)+x^2+9\ln(x)+18\ln(3)+6x+54\right)$	35

input
```
int(((9*x-9)*ln(x)+(9*x-9)*ln(3)^2+(6*x^2+18*x-18)*ln(3)+x^3+7*x^2+54*x-45
)/(9*x*ln(x)+9*x*ln(3)^2+(6*x^2+18*x)*ln(3)+x^3+6*x^2+54*x),x,method=_RETU
RNVERBOSE)
```

output
```
x-ln(x)+ln(ln(3)^2+2/3*x*ln(3)+1/9*x^2+2*ln(3)+2/3*x+ln(x)+6)
```

3.40.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{-45+54x+7x^2+x^3+(-18+18x+6x^2)\log(3)+(-9+9x)\log^2(3)+(-9+9x)\log(x)}{54x+6x^2+x^3+(18x+6x^2)\log(3)+9x\log^2(3)+9x\log(x)}\,dx$$
$$=x+\log\left(x^2+6\,(x+3)\log(3)+9\,\log(3)^2+6\,x+9\,\log(x)+54\right)-\log(x)$$

input
```
integrate(((9*x-9)*log(x)+(9*x-9)*log(3)^2+(6*x^2+18*x-18)*log(3)+x^3+7*x^
2+54*x-45)/(9*x*log(x)+9*x*log(3)^2+(6*x^2+18*x)*log(3)+x^3+6*x^2+54*x),x,
 algorithm=\
```

output
```
x + log(x^2 + 6*(x + 3)*log(3) + 9*log(3)^2 + 6*x + 9*log(x) + 54) - log(x
)
```

3.40.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44

$$\int \frac{-45+54x+7x^2+x^3+(-18+18x+6x^2)\log(3)+(-9+9x)\log^2(3)+(-9+9x)\log(x)}{54x+6x^2+x^3+(18x+6x^2)\log(3)+9x\log^2(3)+9x\log(x)}\,dx$$
$$= x-\log(x)+\log\left(\frac{x^2}{9}+\frac{2x}{3}+\frac{2x\log(3)}{3}+\log(x)+\log(3)^2+2\log(3)+6\right)$$

input
```
integrate(((9*x-9)*ln(x)+(9*x-9)*ln(3)**2+(6*x**2+18*x-18)*ln(3)+x**3+7*x*
*2+54*x-45)/(9*x*ln(x)+9*x*ln(3)**2+(6*x**2+18*x)*ln(3)+x**3+6*x**2+54*x),
x)
```

output
```
x - log(x) + log(x**2/9 + 2*x/3 + 2*x*log(3)/3 + log(x) + log(3)**2 + 2*lo
g(3) + 6)
```

3.40.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{-45+54x+7x^2+x^3+(-18+18x+6x^2)\log(3)+(-9+9x)\log^2(3)+(-9+9x)\log(x)}{54x+6x^2+x^3+(18x+6x^2)\log(3)+9x\log^2(3)+9x\log(x)}\,dx$$
$$= x+\log\left(\frac{1}{9}x^2+\frac{2}{3}x(\log(3)+1)+\log(3)^2+2\log(3)+\log(x)+6\right)-\log(x)$$

input
```
integrate(((9*x-9)*log(x)+(9*x-9)*log(3)^2+(6*x^2+18*x-18)*log(3)+x^3+7*x^
2+54*x-45)/(9*x*log(x)+9*x*log(3)^2+(6*x^2+18*x)*log(3)+x^3+6*x^2+54*x),x,
 algorithm=\
```

output
```
x + log(1/9*x^2 + 2/3*x*(log(3) + 1) + log(3)^2 + 2*log(3) + log(x) + 6) -
 log(x)
```

3.40.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{-45+54x+7x^2+x^3+(-18+18x+6x^2)\log(3)+(-9+9x)\log^2(3)+(-9+9x)\log(x)}{54x+6x^2+x^3+(18x+6x^2)\log(3)+9x\log^2(3)+9x\log(x)}\,dx$$
$$= x+\log\left(x^2+6\,x\log(3)+9\,\log(3)^2+6\,x+18\,\log(3)+9\,\log(x)+54\right)-\log(x)$$

input
```
integrate(((9*x-9)*log(x)+(9*x-9)*log(3)^2+(6*x^2+18*x-18)*log(3)+x^3+7*x^
2+54*x-45)/(9*x*log(x)+9*x*log(3)^2+(6*x^2+18*x)*log(3)+x^3+6*x^2+54*x),x,
 algorithm=\
```

output
```
x + log(x^2 + 6*x*log(3) + 9*log(3)^2 + 6*x + 18*log(3) + 9*log(x) + 54) -
 log(x)
```

3.40.9 Mupad [B] (verification not implemented)

Time = 12.73 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{-45+54x+7x^2+x^3+(-18+18x+6x^2)\log(3)+(-9+9x)\log^2(3)+(-9+9x)\log(x)}{54x+6x^2+x^3+(18x+6x^2)\log(3)+9x\log^2(3)+9x\log(x)}\,dx$$
$$= x+\ln\left(\frac{2\,x}{3}+\ln(9\,x)+\frac{2\,x\,\ln(3)}{3}+\ln(3)^2+\frac{x^2}{9}+6\right)-\ln(x)$$

input
```
int((54*x + log(3)*(18*x + 6*x^2 - 18) + log(3)^2*(9*x - 9) + log(x)*(9*x
- 9) + 7*x^2 + x^3 - 45)/(54*x + log(3)*(18*x + 6*x^2) + 9*x*log(3)^2 + 9*
x*log(x) + 6*x^2 + x^3),x)
```

output
```
x + log((2*x)/3 + log(9*x) + (2*x*log(3))/3 + log(3)^2 + x^2/9 + 6) - log(
x)
```

3.41 $\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9(160x^6+208x^7)+e^3(1}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(}$

3.41.1 Optimal result

Integrand size = 168, antiderivative size = 24

$$\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9(160x^6+208x^7)+e^3(192x^5+480x^6+208x^7)+}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x}$$
$$=\frac{x^4}{-3+\left(4+\frac{4}{(1+e^3)x}\right)^2}$$

output
```
x^4/(-3+(4+4/(exp(3)+1)/x)^2)
```

3.41.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 69 vs. 2(24) = 48.

Time = 0.05 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.88

$$\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9(160x^6+208x^7)+e^3(192x^5+480x^6+208x^7)+}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x}$$
$$=-\frac{7245824+14491648(1+e^3)x+5887232(1+e^3)^2x^2-371293(1+e^3)^6x^6}{371293(1+e^3)^4(16+32(1+e^3)x+13(1+e^3)^2x^2)}$$

3.41.
$$\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9(160x^6+208x^7)+e^3(192x^5+480x^6+208x^7)+e^6(96x^5+480x^6+312x^7)}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x^3+676x^4)+e^6(1440x^2+2496x^3+1014x^4)}\,dx$$

input
```
Integrate[(96*x^5 + 160*x^6 + 52*x^7 + 52*E^12*x^7 + E^9*(160*x^6 + 208*x^
7) + E^3*(192*x^5 + 480*x^6 + 208*x^7) + E^6*(96*x^5 + 480*x^6 + 312*x^7))
/(256 + 1024*x + 1440*x^2 + 832*x^3 + 169*x^4 + 169*E^12*x^4 + E^9*(832*x^
3 + 676*x^4) + E^3*(1024*x + 2880*x^2 + 2496*x^3 + 676*x^4) + E^6*(1440*x^
2 + 2496*x^3 + 1014*x^4)),x]
```

output
```
-1/371293*(7245824 + 14491648*(1 + E^3)*x + 5887232*(1 + E^3)^2*x^2 - 3712
93*(1 + E^3)^6*x^6)/((1 + E^3)^4*(16 + 32*(1 + E^3)*x + 13*(1 + E^3)^2*x^2
))
```

3.41.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 372 vs. $2(24) = 48$.

Time = 0.95 (sec) , antiderivative size = 372, normalized size of antiderivative = 15.50, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.054$, Rules used = {6, 6, 2459, 1380, 27, 2345, 27, 2019, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{52e^{12}x^7+52x^7+160x^6+96x^5+e^9\left(208x^7+160x^6\right)+e^3\left(208x^7+480x^6+192x^5\right)+e^6\left(31\right.}{169e^{12}x^4+169x^4+832x^3+1440x^2+e^9\left(676x^4+832x^3\right)+e^3\left(676x^4+2496x^3+2880x^2+1024x\right)+e^6\left(1014\right.}$$

$$\Big\downarrow 6$$

$$\int \frac{52e^{12}x^7+52x^7+160x^6+96x^5+e^9\left(208x^7+160x^6\right)+e^3\left(208x^7+480x^6+192x^5\right)+e^6\left(31\right.}{\left(169+169e^{12}\right)x^4+832x^3+1440x^2+e^9\left(676x^4+832x^3\right)+e^3\left(676x^4+2496x^3+2880x^2+1024x\right)+e^6\left(1014\right.}$$

$$\Big\downarrow 6$$

$$\int \frac{\left(52+52e^{12}\right)x^7+160x^6+96x^5+e^9\left(208x^7+160x^6\right)+e^3\left(208x^7+480x^6+192x^5\right)+e^6\left(31\right.}{\left(169+169e^{12}\right)x^4+832x^3+1440x^2+e^9\left(676x^4+832x^3\right)+e^3\left(676x^4+2496x^3+2880x^2+1024x\right)+e^6\left(1014\right.}$$

$$\Big\downarrow 2459$$

$$\int \frac{52\left(1+e^3\right)^4\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4(169+676e^3+1014e^6+676e^9+169e^{12})}\right)^7-288\left(1+e^3\right)^3\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4(169+676e^3+1014e^6+676e^9+169e^{12})}\right)^6+\frac{73}{1}}{}$$

$$\Big\downarrow 1380$$

$$169\left(1+e^3\right)^4\int \frac{4\left(62748517\left(1+e^3\right)^4\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4(169+676e^3+1014e^6+676e^9+169e^{12})}\right)^7-347530248\left(1+e^3\right)^3\left(x+\frac{832+}{4(169+67}\right.\right.}{}$$

$\downarrow$ 27

$$4\int \frac{62748517(1+e^3)^4\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4\left(169+676e^3+1014e^6+676e^9+169e^{12}\right)}\right)^7-347530248(1+e^3)^3\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4\left(169+676e^3+1014e^6+676e^9+169e^{12}\right)}\right)^6+686149464(1}{}$$

$\downarrow$ 2345

$$4\left(-\frac{1}{96}\int \frac{1248\left(28561(1+e^3)^2\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4\left(169+676e^3+1014e^6+676e^9+169e^{12}\right)}\right)^5-158184(1+e^3)\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4\left(169+676e^3+1014e^6+676e^9+169e^{12}\right)}\right)^4+32042\right.}{48-169(1+e^3)^2\left(\right.}\right.$$

$\downarrow$ 27

$$4\left(-13\int \frac{28561(1+e^3)^2\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4\left(169+676e^3+1014e^6+676e^9+169e^{12}\right)}\right)^5-158184(1+e^3)\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4\left(169+676e^3+1014e^6+676e^9+169e^{12}\right)}\right)^4+320424\left(x+\right.}{48-169(1+e^3)^2\left(x+\right.}\right.$$

$\downarrow$ 2019

3.41.

$$\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9\left(160x^6+208x^7\right)+e^3\left(192x^5+480x^6+208x^7\right)+e^6\left(96x^5+480x^6+312x^7\right)}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x^3+676x^4)+e^6(1440x^2+2496x^3+1014x^4)}\,dx$$

$$4\left(-13\int\left(-169\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4(169+676e^3+1014e^6+676e^9+169e^{12})}\right)^3+\left(\frac{936}{(1+e^3)^2}+\frac{936e^3}{(1+e^3)^2}\right)\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4(169+676e^3+1014e^6+676e^9+169e^{1}}\right.\right.\right.$$

$\downarrow$ 2009

$$4\left(-\frac{1024\left(\frac{17803}{(1+e^3)^2}-\frac{33150\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4\left(169+676e^3+1014e^6+676e^9+169e^{12}\right)}\right)}{1+e^3}\right)}{13(1+e^3)^2\left(48-169(1+e^3)^2\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4\left(169+676e^3+1014e^6+676e^9+169e^{12}\right)}\right)^2\right)}-13\left(-\frac{169}{4}\left(x+\frac{832+2496e^3+2496e^6+832e^9}{4(169+676e^3+1014e^6+676e^9+169e^{12})}\right)\right.\right.$$

input
```
Int[(96*x^5 + 160*x^6 + 52*x^7 + 52*E^12*x^7 + E^9*(160*x^6 + 208*x^7) + E
^3*(192*x^5 + 480*x^6 + 208*x^7) + E^6*(96*x^5 + 480*x^6 + 312*x^7))/(256
+ 1024*x + 1440*x^2 + 832*x^3 + 169*x^4 + 169*E^12*x^4 + E^9*(832*x^3 + 67
6*x^4) + E^3*(1024*x + 2880*x^2 + 2496*x^3 + 676*x^4) + E^6*(1440*x^2 + 24
96*x^3 + 1014*x^4)),x]
```

output
```
(4*((-1024*(17803/(1 + E^3)^2 - (33150*((832 + 2496*E^3 + 2496*E^6 + 832*E
^9)/(4*(169 + 676*E^3 + 1014*E^6 + 676*E^9 + 169*E^12)) + x))/(1 + E^3)))/
(13*(1 + E^3)^2*(48 - 169*(1 + E^3)^2*((832 + 2496*E^3 + 2496*E^6 + 832*E^
9)/(4*(169 + 676*E^3 + 1014*E^6 + 676*E^9 + 169*E^12)) + x)^2)) - 13*((166
4*((832 + 2496*E^3 + 2496*E^6 + 832*E^9)/(4*(169 + 676*E^3 + 1014*E^6 + 67
6*E^9 + 169*E^12)) + x))/(1 + E^3)^3 - (972*((832 + 2496*E^3 + 2496*E^6 +
832*E^9)/(4*(169 + 676*E^3 + 1014*E^6 + 676*E^9 + 169*E^12)) + x)^2)/(1 +
E^3)^2 + (312*((832 + 2496*E^3 + 2496*E^6 + 832*E^9)/(4*(169 + 676*E^3 + 1
014*E^6 + 676*E^9 + 169*E^12)) + x)^3)/(1 + E^3) - (169*((832 + 2496*E^3 +
 2496*E^6 + 832*E^9)/(4*(169 + 676*E^3 + 1014*E^6 + 676*E^9 + 169*E^12)) +
 x)^4)/4)))/28561
```

3.41.

$$\int\frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9(160x^6+208x^7)+e^3(192x^5+480x^6+208x^7)+e^6(96x^5+480x^6+312x^7)}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x^3+676x^4)+e^6(1440x^2+2496x^3+1014x^4)}\,dx$$

3.41.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2019
```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

rule 2345
```
Int[(Pq_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q = PolynomialQuot
ient[Pq, a + b*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x,
 0], g = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b
*f*x)*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   In
t[(a + b*x^2)^(p + 1)*ExpandToSum[2*a*(p + 1)*Q + f*(2*p + 3), x], x], x]]
/; FreeQ[{a, b}, x] && PolyQ[Pq, x] && LtQ[p, -1]
```

rule 2459
```
Int[(Pn_)^(p_.)*(Qx_), x_Symbol] :> With[{S = Coeff[Pn, x, Expon[Pn, x] - 1
]/(Expon[Pn, x]*Coeff[Pn, x, Expon[Pn, x]])}, Subst[Int[ExpandToSum[Pn /. x
 -> x - S, x]^p*ExpandToSum[Qx /. x -> x - S, x], x], x, x + S] /; Binomial
Q[Pn /. x -> x - S, x] || (IntegerQ[Expon[Pn, x]/2] && TrinomialQ[Pn /. x -
> x - S, x])] /; FreeQ[p, x] && PolyQ[Pn, x] && GtQ[Expon[Pn, x], 2] && NeQ
[Coeff[Pn, x, Expon[Pn, x] - 1], 0] && PolyQ[Qx, x] &&  !(MonomialQ[Qx, x]
&& IGtQ[p, 0])
```

3.41.

$$\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9\left(160x^6+208x^7\right)+e^3\left(192x^5+480x^6+208x^7\right)+e^6\left(96x^5+480x^6+312x^7\right)}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x^3+676x^4)+e^6(1440x^2+2496x^3+1014x^4)}\,dx$$

3.41.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. 2(23) = 46.

Time = 0.67 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.00

method	result
gosper	$\frac{x^6(2\,\mathrm{e}^3+\mathrm{e}^6+1)}{26x^2\mathrm{e}^3+13x^2\mathrm{e}^6+32x\,\mathrm{e}^3+13x^2+32x+16}$
norman	$\frac{x^6(2\,\mathrm{e}^3+\mathrm{e}^6+1)}{26x^2\mathrm{e}^3+13x^2\mathrm{e}^6+32x\,\mathrm{e}^3+13x^2+32x+16}$
parallelrisch	$\frac{16\,\mathrm{e}^6x^6+32x^6\mathrm{e}^3+16x^6}{416x^2\mathrm{e}^3+208x^2\mathrm{e}^6+512x\,\mathrm{e}^3+208x^2+512x+256}$
risch	$\frac{-7245824-14491648x-14491648x\,\mathrm{e}^3-11774464x^2\mathrm{e}^3+2227758x^6\mathrm{e}^3+371293x^6-5887232x^2-5887232x^2\mathrm{e}^6+2227758x^6\mathrm{e}^{15}+5}{371293(\mathrm{e}^3+1)^4(26x^2\mathrm{e}^3+13x^2\mathrm{e}^6+32x\,\mathrm{e}^3+13x^2+32x+16)}$
default	Expression too large to display

input
```
int((52*x^7*exp(3)^4+(208*x^7+160*x^6)*exp(3)^3+(312*x^7+480*x^6+96*x^5)*e
xp(3)^2+(208*x^7+480*x^6+192*x^5)*exp(3)+52*x^7+160*x^6+96*x^5)/(169*x^4*e
xp(3)^4+(676*x^4+832*x^3)*exp(3)^3+(1014*x^4+2496*x^3+1440*x^2)*exp(3)^2+(
676*x^4+2496*x^3+2880*x^2+1024*x)*exp(3)+169*x^4+832*x^3+1440*x^2+1024*x+2
56),x,method=_RETURNVERBOSE)
```

output
```
x^6*(exp(3)^2+2*exp(3)+1)/(13*x^2*exp(3)^2+26*x^2*exp(3)+32*x*exp(3)+13*x^
2+32*x+16)
```

3.41.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 164 vs. 2(24) = 48.

Time = 0.26 (sec) , antiderivative size = 164, normalized size of antiderivative = 6.83

$$\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9(160x^6+208x^7)+e^3(192x^5+480x^6+208x^7)+}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9\left(832x^3+676x^4\right)+e^3\left(1024x+2880x^2+2496x\right.}$$
$$=\frac{371293\,x^6e^{18}+2227758\,x^6e^{15}+5569395\,x^6e^{12}+7425860\,x^6e^9+371293\,x^6-5887232\,x^2+13\,(428415\,x^6}{371293\,(13\,x^2e^{18}+13\,x^2+2\,(39\,x^2+16\,x)e^{15}+(195\,x^2+160\,x+16)e^{12}+4\,(65\,x^2+80\,x}$$

input
```
integrate((52*x^7*exp(3)^4+(208*x^7+160*x^6)*exp(3)^3+(312*x^7+480*x^6+96*
x^5)*exp(3)^2+(208*x^7+480*x^6+192*x^5)*exp(3)+52*x^7+160*x^6+96*x^5)/(169
*x^4*exp(3)^4+(676*x^4+832*x^3)*exp(3)^3+(1014*x^4+2496*x^3+1440*x^2)*exp(
3)^2+(676*x^4+2496*x^3+2880*x^2+1024*x)*exp(3)+169*x^4+832*x^3+1440*x^2+10
24*x+256),x, algorithm=\
```

output
```
1/371293*(371293*x^6*e^18 + 2227758*x^6*e^15 + 5569395*x^6*e^12 + 7425860*
x^6*e^9 + 371293*x^6 - 5887232*x^2 + 13*(428415*x^6 - 452864*x^2)*e^6 + 2*
(1113879*x^6 - 5887232*x^2 - 7245824*x)*e^3 - 14491648*x - 7245824)/(13*x^
2*e^18 + 13*x^2 + 2*(39*x^2 + 16*x)*e^15 + (195*x^2 + 160*x + 16)*e^12 + 4
*(65*x^2 + 80*x + 16)*e^9 + (195*x^2 + 320*x + 96)*e^6 + 2*(39*x^2 + 80*x
+ 32)*e^3 + 32*x + 16)
```

3.41.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 151 vs. $2(15) = 30$.

Time = 2.17 (sec) , antiderivative size = 151, normalized size of antiderivative = 6.29

$$\int \frac{96x^5 + 160x^6 + 52x^7 + 52e^{12}x^7 + e^9(160x^6 + 208x^7) + e^3(192x^5 + 480x^6 + 208x^7) +}{256 + 1024x + 1440x^2 + 832x^3 + 169x^4 + 169e^{12}x^4 + e^9(832x^3 + 676x^4) + e^3(1024x + 2880x^2 + 2496x}$$

$$= \frac{x^4}{13} - \frac{32x^3}{169 + 169e^3} + \frac{816x^2}{2197 + 4394e^3 + 2197e^6} - \frac{19456x}{28561 + 85683e^3 + 85683e^6 + 28561e^9}$$

$$+ \frac{}{x^2 \cdot (4826809 + 28960854e^3 + 72402135e^6 + 96536180e^9 + 72402135e^{12} + 28960854e^{15} + 4826809e^{18})}$$

input
```
integrate((52*x**7*exp(3)**4+(208*x**7+160*x**6)*exp(3)**3+(312*x**7+480*x
**6+96*x**5)*exp(3)**2+(208*x**7+480*x**6+192*x**5)*exp(3)+52*x**7+160*x**
6+96*x**5)/(169*x**4*exp(3)**4+(676*x**4+832*x**3)*exp(3)**3+(1014*x**4+24
96*x**3+1440*x**2)*exp(3)**2+(676*x**4+2496*x**3+2880*x**2+1024*x)*exp(3)+
169*x**4+832*x**3+1440*x**2+1024*x+256),x)
```

output
```
x**4/13 - 32*x**3/(169 + 169*exp(3)) + 816*x**2/(2197 + 4394*exp(3) + 2197
*exp(6)) - 19456*x/(28561 + 85683*exp(3) + 85683*exp(6) + 28561*exp(9)) +
(x*(-10444800*exp(3) - 10444800) - 7245824)/(x**2*(4826809 + 28960854*exp(
3) + 72402135*exp(6) + 96536180*exp(9) + 72402135*exp(12) + 28960854*exp(1
5) + 4826809*exp(18)) + x*(11881376 + 59406880*exp(3) + 118813760*exp(6) +
 118813760*exp(9) + 59406880*exp(12) + 11881376*exp(15)) + 5940688 + 23762
752*exp(3) + 35644128*exp(6) + 23762752*exp(9) + 5940688*exp(12))
```

3.41.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 143 vs. $2(24) = 48$.

Time = 0.19 (sec) , antiderivative size = 143, normalized size of antiderivative = 5.96

$$\int \frac{96x^5 + 160x^6 + 52x^7 + 52e^{12}x^7 + e^9(160x^6 + 208x^7) + e^3(192x^5 + 480x^6 + 208x^7) +}{256 + 1024x + 1440x^2 + 832x^3 + 169x^4 + 169e^{12}x^4 + e^9(832x^3 + 676x^4) + e^3(1024x + 2880x^2 + 2496x}$$
$$= -\frac{4096\,(2550\,x(e^3+1)+1769)}{371293\,(13\,x^2(e^{18}+6\,e^{15}+15\,e^{12}+20\,e^9+15\,e^6+6\,e^3+1)+32\,x(e^{15}+5\,e^{12}+10\,e^9+10\,e^6+5\,e^3+}$$
$$+\frac{2197\,x^4(e^9+3\,e^6+3\,e^3+1)-5408\,x^3(e^6+2\,e^3+1)+10608\,x^2(e^3+1)-19456\,x}{28561\,(e^9+3\,e^6+3\,e^3+1)}$$

input
```
integrate((52*x^7*exp(3)^4+(208*x^7+160*x^6)*exp(3)^3+(312*x^7+480*x^6+96*
x^5)*exp(3)^2+(208*x^7+480*x^6+192*x^5)*exp(3)+52*x^7+160*x^6+96*x^5)/(169
*x^4*exp(3)^4+(676*x^4+832*x^3)*exp(3)^3+(1014*x^4+2496*x^3+1440*x^2)*exp(
3)^2+(676*x^4+2496*x^3+2880*x^2+1024*x)*exp(3)+169*x^4+832*x^3+1440*x^2+10
24*x+256),x, algorithm=\
```

output
```
-4096/371293*(2550*x*(e^3 + 1) + 1769)/(13*x^2*(e^18 + 6*e^15 + 15*e^12 +
20*e^9 + 15*e^6 + 6*e^3 + 1) + 32*x*(e^15 + 5*e^12 + 10*e^9 + 10*e^6 + 5*e
^3 + 1) + 16*e^12 + 64*e^9 + 96*e^6 + 64*e^3 + 16) + 1/28561*(2197*x^4*(e^
9 + 3*e^6 + 3*e^3 + 1) - 5408*x^3*(e^6 + 2*e^3 + 1) + 10608*x^2*(e^3 + 1)
- 19456*x)/(e^9 + 3*e^6 + 3*e^3 + 1)
```

3.41.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 529 vs. $2(24) = 48$.

Time = 0.31 (sec) , antiderivative size = 529, normalized size of antiderivative = 22.04

$$\int \frac{96x^5 + 160x^6 + 52x^7 + 52e^{12}x^7 + e^9(160x^6 + 208x^7) + e^3(192x^5 + 480x^6 + 208x^7) +}{256 + 1024x + 1440x^2 + 832x^3 + 169x^4 + 169e^{12}x^4 + e^9(832x^3 + 676x^4) + e^3(1024x + 2880x^2 + 2496x}$$
= Too large to display

input
```
integrate((52*x^7*exp(3)^4+(208*x^7+160*x^6)*exp(3)^3+(312*x^7+480*x^6+96*
x^5)*exp(3)^2+(208*x^7+480*x^6+192*x^5)*exp(3)+52*x^7+160*x^6+96*x^5)/(169
*x^4*exp(3)^4+(676*x^4+832*x^3)*exp(3)^3+(1014*x^4+2496*x^3+1440*x^2)*exp(
3)^2+(676*x^4+2496*x^3+2880*x^2+1024*x)*exp(3)+169*x^4+832*x^3+1440*x^2+10
24*x+256),x, algorithm=\
```

3.41. $\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9(160x^6+208x^7)+e^3(192x^5+480x^6+208x^7)+e^6(96x^5+480x^6+312x^7)}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x^3+676x^4)+e^6(1440x^2+2496x^3+1014x^4)}\,dx$

output
```
1/28561*(2197*x^4*e^48 + 35152*x^4*e^45 + 263640*x^4*e^42 + 1230320*x^4*e^
39 + 3998540*x^4*e^36 + 9596496*x^4*e^33 + 17593576*x^4*e^30 + 25133680*x^
4*e^27 + 28275390*x^4*e^24 + 25133680*x^4*e^21 + 17593576*x^4*e^18 + 95964
96*x^4*e^15 + 3998540*x^4*e^12 + 1230320*x^4*e^9 + 263640*x^4*e^6 + 35152*
x^4*e^3 + 2197*x^4 - 5408*x^3*e^45 - 81120*x^3*e^42 - 567840*x^3*e^39 - 24
60640*x^3*e^36 - 7381920*x^3*e^33 - 16240224*x^3*e^30 - 27067040*x^3*e^27
- 34800480*x^3*e^24 - 34800480*x^3*e^21 - 27067040*x^3*e^18 - 16240224*x^3
*e^15 - 7381920*x^3*e^12 - 2460640*x^3*e^9 - 567840*x^3*e^6 - 81120*x^3*e^
3 - 5408*x^3 + 10608*x^2*e^42 + 148512*x^2*e^39 + 965328*x^2*e^36 + 386131
2*x^2*e^33 + 10618608*x^2*e^30 + 21237216*x^2*e^27 + 31855824*x^2*e^24 + 3
6406656*x^2*e^21 + 31855824*x^2*e^18 + 21237216*x^2*e^15 + 10618608*x^2*e^
12 + 3861312*x^2*e^9 + 965328*x^2*e^6 + 148512*x^2*e^3 + 10608*x^2 - 19456
*x*e^39 - 252928*x*e^36 - 1517568*x*e^33 - 5564416*x*e^30 - 13911040*x*e^2
7 - 25039872*x*e^24 - 33386496*x*e^21 - 33386496*x*e^18 - 25039872*x*e^15
- 13911040*x*e^12 - 5564416*x*e^9 - 1517568*x*e^6 - 252928*x*e^3 - 19456*x
)/(e^48 + 16*e^45 + 120*e^42 + 560*e^39 + 1820*e^36 + 4368*e^33 + 8008*e^3
0 + 11440*e^27 + 12870*e^24 + 11440*e^21 + 8008*e^18 + 4368*e^15 + 1820*e^
12 + 560*e^9 + 120*e^6 + 16*e^3 + 1) - 4096/371293*(2550*x*e^3 + 2550*x +
1769)/((13*x^2*e^6 + 26*x^2*e^3 + 13*x^2 + 32*x*e^3 + 32*x + 16)*(e^12 + 4
*e^9 + 6*e^6 + 4*e^3 + 1))
```

3.41.9 Mupad [B] (verification not implemented)

Time = 13.44 (sec) , antiderivative size = 133, normalized size of antiderivative = 5.54

$$\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9(160x^6+208x^7)+e^3(192x^5+480x^6+208x^7)+}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x}$$
$$= \frac{816\,x^2}{2197\,(e^3+1)^2} - \frac{32\,x^3}{169\,(e^3+1)} + x\left(\frac{33792}{28561\,(e^3+1)^3} - \frac{4\,(1024\,e^3+1024)}{2197\,(e^3+1)^4}\right) + \frac{x^4}{13}$$
$$- \frac{\frac{10444800\,x}{13} + \frac{7}{13}}{(1856465\,e^3+3712930\,e^6+3712930\,e^9+1856465\,e^{12}+371293\,e^{15}+371293)\;x^2+(3655808\,e^3+5483}$$

input
```
int((exp(9)*(160*x^6 + 208*x^7) + 52*x^7*exp(12) + exp(3)*(192*x^5 + 480*x
^6 + 208*x^7) + exp(6)*(96*x^5 + 480*x^6 + 312*x^7) + 96*x^5 + 160*x^6 + 5
2*x^7)/(1024*x + exp(9)*(832*x^3 + 676*x^4) + 169*x^4*exp(12) + exp(3)*(10
24*x + 2880*x^2 + 2496*x^3 + 676*x^4) + exp(6)*(1440*x^2 + 2496*x^3 + 1014
*x^4) + 1440*x^2 + 832*x^3 + 169*x^4 + 256),x)
```

3.41.

$$\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9(160x^6+208x^7)+e^3(192x^5+480x^6+208x^7)+e^6(96x^5+480x^6+312x^7)}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x^3+676x^4)+e^6(1440x^2+2496x^3+1014x^4)}\,dx$$

output
```
(816*x^2)/(2197*(exp(3) + 1)^2) - (32*x^3)/(169*(exp(3) + 1)) + x*(33792/(
28561*(exp(3) + 1)^3) - (4*(1024*exp(3) + 1024))/(2197*(exp(3) + 1)^4)) +
x^4/13 - ((10444800*x)/13 + 7245824/(13*(exp(3) + 1)))/(1370928*exp(3) + 1
370928*exp(6) + 456976*exp(9) + x*(3655808*exp(3) + 5483712*exp(6) + 36558
08*exp(9) + 913952*exp(12) + 913952) + x^2*(1856465*exp(3) + 3712930*exp(6
) + 3712930*exp(9) + 1856465*exp(12) + 371293*exp(15) + 371293) + 456976)
```

3.41.

$$\int \frac{96x^5+160x^6+52x^7+52e^{12}x^7+e^9\left(160x^6+208x^7\right)+e^3\left(192x^5+480x^6+208x^7\right)+e^6\left(96x^5+480x^6+312x^7\right)}{256+1024x+1440x^2+832x^3+169x^4+169e^{12}x^4+e^9(832x^3+676x^4)+e^3(1024x+2880x^2+2496x^3+676x^4)+e^6(1440x^2+2496x^3+1014x^4)}\,dx$$

3.42 $\int \frac{1800x+800e^{2x}x-135x^2+3x^3+e^x(-2400x+90x^2+50x^3)}{1800+800e^{2x}-360x+18x^2+e^x(-2400+240x)}\,dx$

3.42.1 Optimal result

Integrand size = 69, antiderivative size = 34

$$\int \frac{1800x+800e^{2x}x-135x^2+3x^3+e^x(-2400x+90x^2+50x^3)}{1800+800e^{2x}-360x+18x^2+e^x(-2400+240x)}\,dx = e^4+\frac{x^2}{2-\frac{x}{-4e^x+\frac{1}{2}\left(12-\frac{x}{5}\right)}}$$

output
```
exp(4)+x^2/(2-x/(6-1/10*x-4*exp(x)))
```

3.42.2 Mathematica [A] (verified)

Time = 1.45 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \frac{1800x+800e^{2x}x-135x^2+3x^3+e^x(-2400x+90x^2+50x^3)}{1800+800e^{2x}-360x+18x^2+e^x(-2400+240x)}\,dx = \frac{1}{2}\left(x^2-\frac{5x^3}{2(-30+20e^x+3x)}\right)$$

input
```
Integrate[(1800*x + 800*E^(2*x)*x - 135*x^2 + 3*x^3 + E^x*(-2400*x + 90*x^
2 + 50*x^3))/(1800 + 800*E^(2*x) - 360*x + 18*x^2 + E^x*(-2400 + 240*x)),x
]
```

output
```
(x^2 - (5*x^3)/(2*(-30 + 20*E^x + 3*x)))/2
```

3.42.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^3-135x^2+e^x\left(50x^3+90x^2-2400x\right)+800e^{2x}x+1800x}{18x^2-360x+800e^{2x}+e^x(240x-2400)+1800}\,dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{3x^3-135x^2+e^x\left(50x^3+90x^2-2400x\right)+800e^{2x}x+1800x}{2\left(-3x-20e^x+30\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int \frac{3x^3-135x^2+800e^{2x}x+1800x-10e^x\left(-5x^3-9x^2+240x\right)}{\left(-3x-20e^x+30\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{2}\int \left(-\frac{15(x-11)x^3}{2\left(3x+20e^x-30\right)^2}+\frac{5(x-3)x^2}{2\left(3x+20e^x-30\right)}+2x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(-\frac{15}{2}\int \frac{x^4}{\left(3x+20e^x-30\right)^2}dx+\frac{165}{2}\int \frac{x^3}{\left(3x+20e^x-30\right)^2}dx+\frac{5}{2}\int \frac{x^3}{3x+20e^x-30}dx-\frac{15}{2}\int \frac{x^2}{3x+20e^x-30}\right.$$

input
```
Int[(1800*x + 800*E^(2*x)*x - 135*x^2 + 3*x^3 + E^x*(-2400*x + 90*x^2 + 50
*x^3))/(1800 + 800*E^(2*x) - 360*x + 18*x^2 + E^x*(-2400 + 240*x)),x]
```

output
```
$Aborted
```

3.42.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.42.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.68

method	result	size
risch	$\frac{x^2}{2}-\frac{5x^3}{4(-30+20\,\mathrm{e}^x+3x)}$	23
norman	$\frac{-15x^2+\frac{x^3}{4}+10\,\mathrm{e}^x x^2}{-30+20\,\mathrm{e}^x+3x}$	31
parallelrisch	$\frac{10x^3+400\,\mathrm{e}^x x^2-600x^2}{-1200+800\,\mathrm{e}^x+120x}$	32

input
```
int((800*x*exp(x)^2+(50*x^3+90*x^2-2400*x)*exp(x)+3*x^3-135*x^2+1800*x)/(8
00*exp(x)^2+(240*x-2400)*exp(x)+18*x^2-360*x+1800),x,method=_RETURNVERBOSE
)
```

output
```
1/2*x^2-5/4*x^3/(-30+20*exp(x)+3*x)
```

3.42.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{1800x+800e^{2x}x-135x^2+3x^3+e^x(-2400x+90x^2+50x^3)}{1800+800e^{2x}-360x+18x^2+e^x(-2400+240x)}\,dx=\frac{x^3+40\,x^2e^x-60\,x^2}{4\,(3\,x+20\,e^x-30)}$$

input
```
integrate((800*x*exp(x)^2+(50*x^3+90*x^2-2400*x)*exp(x)+3*x^3-135*x^2+1800
*x)/(800*exp(x)^2+(240*x-2400)*exp(x)+18*x^2-360*x+1800),x, algorithm=\
```

output
```
1/4*(x^3 + 40*x^2*e^x - 60*x^2)/(3*x + 20*e^x - 30)
```

3.42.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.56

$$\int \frac{1800x + 800e^{2x}x - 135x^2 + 3x^3 + e^x(-2400x + 90x^2 + 50x^3)}{1800 + 800e^{2x} - 360x + 18x^2 + e^x(-2400 + 240x)}\,dx = -\frac{5x^3}{12x + 80e^x - 120} + \frac{x^2}{2}$$

input
```
integrate((800*x*exp(x)**2+(50*x**3+90*x**2-2400*x)*exp(x)+3*x**3-135*x**2
+1800*x)/(800*exp(x)**2+(240*x-2400)*exp(x)+18*x**2-360*x+1800),x)
```

output
```
-5*x**3/(12*x + 80*exp(x) - 120) + x**2/2
```

3.42.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{1800x + 800e^{2x}x - 135x^2 + 3x^3 + e^x(-2400x + 90x^2 + 50x^3)}{1800 + 800e^{2x} - 360x + 18x^2 + e^x(-2400 + 240x)}\,dx = \frac{x^3 + 40\,x^2e^x - 60\,x^2}{4\,(3\,x + 20\,e^x - 30)}$$

input
```
integrate((800*x*exp(x)^2+(50*x^3+90*x^2-2400*x)*exp(x)+3*x^3-135*x^2+1800
*x)/(800*exp(x)^2+(240*x-2400)*exp(x)+18*x^2-360*x+1800),x, algorithm=\
```

output
```
1/4*(x^3 + 40*x^2*e^x - 60*x^2)/(3*x + 20*e^x - 30)
```

3.42.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{1800x + 800e^{2x}x - 135x^2 + 3x^3 + e^x(-2400x + 90x^2 + 50x^3)}{1800 + 800e^{2x} - 360x + 18x^2 + e^x(-2400 + 240x)}\,dx = \frac{x^3 + 40\,x^2e^x - 60\,x^2}{4\,(3\,x + 20\,e^x - 30)}$$

input
```
integrate((800*x*exp(x)^2+(50*x^3+90*x^2-2400*x)*exp(x)+3*x^3-135*x^2+1800
*x)/(800*exp(x)^2+(240*x-2400)*exp(x)+18*x^2-360*x+1800),x, algorithm=\
```

output
```
1/4*(x^3 + 40*x^2*e^x - 60*x^2)/(3*x + 20*e^x - 30)
```

3.42.9 Mupad [B] (verification not implemented)

Time = 13.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.65

$$\int \frac{1800x+800e^{2x}x-135x^2+3x^3+e^x(-2400x+90x^2+50x^3)}{1800+800e^{2x}-360x+18x^2+e^x(-2400+240x)}\,dx$$
$$=\frac{x^2}{2}-\frac{5\,x^3}{2\,\left(6\,x+40\,\mathrm{e}^x-60\right)}$$

input
```
int((1800*x + 800*x*exp(2*x) - 135*x^2 + 3*x^3 + exp(x)*(90*x^2 - 2400*x +
 50*x^3))/(800*exp(2*x) - 360*x + exp(x)*(240*x - 2400) + 18*x^2 + 1800),x
)
```

output
```
x^2/2 - (5*x^3)/(2*(6*x + 40*exp(x) - 60))
```

3.43 $\int \frac{-75-20x+10x^2+e^{e^2+x}(-5+10x-5x^2)}{225x^2+60x^3+4x^4+e^{2e^2+2x}(1-2x+x^2)+e^{e^2+x}(30x-26x^2-4x^3)}\,dx$

3.43.1 Optimal result

Integrand size = 89, antiderivative size = 27

$$\int \frac{-75-20x+10x^2+e^{e^2+x}(-5+10x-5x^2)}{225x^2+60x^3+4x^4+e^{2e^2+2x}\left(1-2x+x^2\right)+e^{e^2+x}\left(30x-26x^2-4x^3\right)}\,dx = \frac{5}{e^{e^2+x}-x+\frac{x(16+x)}{1-x}}$$

output
```
5/(x*(x+16)/(1-x)+exp(x+exp(2))-x)
```

3.43.2 Mathematica [A] (verified)

Time = 2.47 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{-75-20x+10x^2+e^{e^2+x}(-5+10x-5x^2)}{225x^2+60x^3+4x^4+e^{2e^2+2x}\left(1-2x+x^2\right)+e^{e^2+x}\left(30x-26x^2-4x^3\right)}\,dx = -\frac{5(-1+x)}{-e^{e^2+x}(-1+x)+x(15+2x)}$$

input
```
Integrate[(-75 - 20*x + 10*x^2 + E^(E^2 + x)*(-5 + 10*x - 5*x^2))/(225*x^2
 + 60*x^3 + 4*x^4 + E^(2*E^2 + 2*x)*(1 - 2*x + x^2) + E^(E^2 + x)*(30*x -
26*x^2 - 4*x^3)),x]
```

output
```
(-5*(-1 + x))/(-(E^(E^2 + x)*(-1 + x)) + x*(15 + 2*x))
```

3.43.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{10x^2+e^{x+e^2}(-5x^2+10x-5)-20x-75}{4x^4+60x^3+225x^2+e^{2x+2e^2}(x^2-2x+1)+e^{x+e^2}(-4x^3-26x^2+30x)}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{5\left(2x^2-e^{x+e^2}(x-1)^2-4x-15\right)}{\left(e^{x+e^2}(x-1)-x(2x+15)\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$5\int -\frac{e^{x+e^2}(1-x)^2-2x^2+4x+15}{\left(e^{x+e^2}(1-x)+x(2x+15)\right)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-5\int \frac{e^{x+e^2}(1-x)^2-2x^2+4x+15}{\left(e^{x+e^2}(1-x)+x(2x+15)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-5\int \left(\frac{2x^3+11x^2-11x+15}{\left(-2x^2+e^{x+e^2}x-15x-e^{x+e^2}\right)^2}-\frac{x-1}{2x^2-e^{x+e^2}x+15x+e^{x+e^2}}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-5\left(15\int \frac{1}{\left(-2x^2+e^{x+e^2}x-15x-e^{x+e^2}\right)^2}dx-\int \frac{1}{-2x^2+e^{x+e^2}x-15x-e^{x+e^2}}dx-11\int \frac{x}{(2x^2-e^{x+e^2}x+15x\right.$$

input
```
Int[(-75 - 20*x + 10*x^2 + E^(E^2 + x)*(-5 + 10*x - 5*x^2))/(225*x^2 + 60*
x^3 + 4*x^4 + E^(2*E^2 + 2*x)*(1 - 2*x + x^2) + E^(E^2 + x)*(30*x - 26*x^2
 - 4*x^3)),x]
```

output
```
$Aborted
```

3.43.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.43.4 Maple [A] (verified)

Time = 0.80 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

method	result	size
risch	$-\frac{5(-1+x)}{2x^2-\mathrm{e}^{x+\mathrm{e}^2}x+15x+\mathrm{e}^{x+\mathrm{e}^2}}$	30
norman	$\frac{-5x+5}{2x^2-\mathrm{e}^{x+\mathrm{e}^2}x+15x+\mathrm{e}^{x+\mathrm{e}^2}}$	31
parallelrisch	$-\frac{5x-5}{2x^2-\mathrm{e}^{x+\mathrm{e}^2}x+15x+\mathrm{e}^{x+\mathrm{e}^2}}$	32

input
```
int(((-5*x^2+10*x-5)*exp(x+exp(2))+10*x^2-20*x-75)/((x^2-2*x+1)*exp(x+exp(
2))^2+(-4*x^3-26*x^2+30*x)*exp(x+exp(2))+4*x^4+60*x^3+225*x^2),x,method=_R
ETURNVERBOSE)
```

output
```
-5*(-1+x)/(2*x^2-exp(x+exp(2))*x+15*x+exp(x+exp(2)))
```

3.43.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{-75-20x+10x^2+e^{e^2+x}(-5+10x-5x^2)}{225x^2+60x^3+4x^4+e^{2e^2+2x}\left(1-2x+x^2\right)+e^{e^2+x}\left(30x-26x^2-4x^3\right)}\,dx = -\frac{5\,(x-1)}{2\,x^2-(x-1)e^{\left(x+e^2\right)}+15\,x}$$

input
```
integrate((((-5*x^2+10*x-5)*exp(x+exp(2))+10*x^2-20*x-75)/((x^2-2*x+1)*exp(
x+exp(2))^2+(-4*x^3-26*x^2+30*x)*exp(x+exp(2))+4*x^4+60*x^3+225*x^2),x, al
gorithm=\
```

output
```
-5*(x - 1)/(2*x^2 - (x - 1)*e^(x + e^2) + 15*x)
```

3.43.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{-75-20x+10x^2+e^{e^2+x}(-5+10x-5x^2)}{225x^2+60x^3+4x^4+e^{2e^2+2x}\left(1-2x+x^2\right)+e^{e^2+x}\left(30x-26x^2-4x^3\right)}\,dx = \frac{5x-5}{-2x^2-15x+(x-1)\,e^{x+e^2}}$$

input
```
integrate((((-5*x**2+10*x-5)*exp(x+exp(2))+10*x**2-20*x-75)/((x**2-2*x+1)*e
xp(x+exp(2))**2+(-4*x**3-26*x**2+30*x)*exp(x+exp(2))+4*x**4+60*x**3+225*x*
*2),x)
```

output
```
(5*x - 5)/(-2*x**2 - 15*x + (x - 1)*exp(x + exp(2)))
```

3.43.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{-75-20x+10x^2+e^{e^2+x}(-5+10x-5x^2)}{225x^2+60x^3+4x^4+e^{2e^2+2x}\left(1-2x+x^2\right)+e^{e^2+x}\left(30x-26x^2-4x^3\right)}\,dx = -\frac{5\,(x-1)}{2\,x^2-\left(xe^{\left(e^2\right)}-e^{\left(e^2\right)}\right)e^x+15\,x}$$

input
```
integrate(((-5*x^2+10*x-5)*exp(x+exp(2))+10*x^2-20*x-75)/((x^2-2*x+1)*exp(
x+exp(2))^2+(-4*x^3-26*x^2+30*x)*exp(x+exp(2))+4*x^4+60*x^3+225*x^2),x, al
gorithm=\
```

output
```
-5*(x - 1)/(2*x^2 - (x*e^(e^2) - e^(e^2))*e^x + 15*x)
```

3.43.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(23) = 46$.

Time = 0.35 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.96

$$\int \frac{-75-20x+10x^2+e^{e^2+x}(-5+10x-5x^2)}{225x^2+60x^3+4x^4+e^{2e^2+2x}(1-2x+x^2)+e^{e^2+x}(30x-26x^2-4x^3)}\,dx$$
$$= -\frac{5\,(x-1)}{2\,(x+e^2)^2-4\,(x+e^2)e^2-(x+e^2)e^{(x+e^2)}+15\,x+2\,e^4+e^{(x+e^2+2)}+e^{(x+e^2)}}$$

input
```
integrate(((-5*x^2+10*x-5)*exp(x+exp(2))+10*x^2-20*x-75)/((x^2-2*x+1)*exp(
x+exp(2))^2+(-4*x^3-26*x^2+30*x)*exp(x+exp(2))+4*x^4+60*x^3+225*x^2),x, al
gorithm=\
```

output
```
-5*(x - 1)/(2*(x + e^2)^2 - 4*(x + e^2)*e^2 - (x + e^2)*e^(x + e^2) + 15*x
 + 2*e^4 + e^(x + e^2 + 2) + e^(x + e^2))
```

3.43.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-75-20x+10x^2+e^{e^2+x}(-5+10x-5x^2)}{225x^2+60x^3+4x^4+e^{2e^2+2x}(1-2x+x^2)+e^{e^2+x}(30x-26x^2-4x^3)}\,dx$$
$$= \int -\frac{20\,x+\mathrm{e}^{x+\mathrm{e}^2}\,(5\,x^2-10\,x+5)-10\,x^2+75}{\mathrm{e}^{2\,x+2\,\mathrm{e}^2}\,(x^2-2\,x+1)-\mathrm{e}^{x+\mathrm{e}^2}\,(4\,x^3+26\,x^2-30\,x)+225\,x^2+60\,x^3+4\,x^4}\,dx$$

input
```
int(-(20*x + exp(x + exp(2))*(5*x^2 - 10*x + 5) - 10*x^2 + 75)/(exp(2*x +
2*exp(2))*(x^2 - 2*x + 1) - exp(x + exp(2))*(26*x^2 - 30*x + 4*x^3) + 225*
x^2 + 60*x^3 + 4*x^4),x)
```

output
```
int(-(20*x + exp(x + exp(2))*(5*x^2 - 10*x + 5) - 10*x^2 + 75)/(exp(2*x +
2*exp(2))*(x^2 - 2*x + 1) - exp(x + exp(2))*(26*x^2 - 30*x + 4*x^3) + 225*
x^2 + 60*x^3 + 4*x^4), x)
```

3.43. $$\int \frac{-75-20x+10x^2+e^{e^2+x}(-5+10x-5x^2)}{225x^2+60x^3+4x^4+e^{2e^2+2x}(1-2x+x^2)+e^{e^2+x}(30x-26x^2-4x^3)}\,dx$$

3.44 $\displaystyle \int \frac{e^{\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}}\left(1280x-5x^2+\left(65536-512x+x^2\right)^{2 \ldots}\right.}{-256x^3+x^4+\left(65536-512x+x^2\right)^{4\log^2\left(x^2\right)}\left(-256 \ldots\right.}$

3.44.1 Optimal result

Integrand size = 172, antiderivative size = 26

$$\int \frac{e^{\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}}\left(1280x-5x^2+\left(65536-512x+x^2\right)^{2\log^2(x^2)}\left(20x\log^2\left(x^2\right)+\left(-10240+40 \ldots\right.\right.\right.}{-256x^3+x^4+\left(65536-512x+x^2\right)^{4\log^2(x^2)}\left(-256x+x^2\right)+\left(65536-512x+x^2\right)^{2\log \ldots}}$$
$$= e^{3+\frac{5}{-\left(\left(-256+x\right)^2\right)^{2\log^2\left(x^2\right)}+x}}$$

output
```
exp(5/(x-exp(ln((x-256)^2)*ln(x^2)^2)^2)+3)
```

3.44.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}}\left(1280x-5x^2+\left(65536-512x+x^2\right)^{2\log^2(x^2)}\left(20x\log^2\left(x^2\right)+\left(-10240+40 \ldots\right.\right.\right.}{-256x^3+x^4+\left(65536-512x+x^2\right)^{4\log^2(x^2)}\left(-256x+x^2\right)+\left(65536-512x+x^2\right)^{2\log \ldots}}$$
$$= e^{3-\frac{5}{\left(\left(-256+x\right)^2\right)^{2\log^2\left(x^2\right)}-x}}$$

3.44.

$$e^{\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}} \ldots$$

input
```
Integrate[(E^((-5 - 3*x + 3*(65536 - 512*x + x^2)^(2*Log[x^2]^2))/(-x + (6
5536 - 512*x + x^2)^(2*Log[x^2]^2)))*(1280*x - 5*x^2 + (65536 - 512*x + x^
2)^(2*Log[x^2]^2)*(20*x*Log[x^2]^2 + (-10240 + 40*x)*Log[x^2]*Log[65536 -
512*x + x^2])))/(-256*x^3 + x^4 + (65536 - 512*x + x^2)^(4*Log[x^2]^2)*(-2
56*x + x^2) + (65536 - 512*x + x^2)^(2*Log[x^2]^2)*(512*x^2 - 2*x^3)),x]
```

output
```
E^(3 - 5/(((-256 + x)^2)^(2*Log[x^2]^2) - x))
```

3.44.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-5x^2+\left(20x\log^2\left(x^2\right)+(40x-10240)\log\left(x^2-512x+65536\right)\log\left(x^2\right)\right)\left(x^2-512x+65536\right)^{2\log^2\left(x^2\right)}+128}{x^4-256x^3+\left(x^2-256x\right)\left(x^2-512x+65536\right)^{4\log^2\left(x^2\right)}+\left(512x^2-2x^3\right)\left(x^2-512x-\right.}$$

$\Big\downarrow$ 7292

$$\int \frac{\left(5x^2-\left(\left(20x\log^2\left(x^2\right)+(40x-10240)\log\left(x^2-512x+65536\right)\log\left(x^2\right)\right)\left(x^2-512x+65536\right)^{2\log^2\left(x^2\right)}\right)-12}{(256-x)x\left(\left((x-256)^2\right)^{2\log^2\left(x^2\right)}-x\right)^2}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{20\left((x-256)^2\right)^{2\log^2\left(x^2\right)}\log\left(x^2\right)\left(x\log\left(x^2\right)+2x\log\left((x-256)^2\right)-512\log\left((x-256)^2\right)\right)\exp\left(\frac{3(x^2-512x+655}{(x^2-512x+65}\right.}{(x-256)x\left(\left((x-256)^2\right)^{2\log^2\left(x^2\right)}-x\right)^2}\right.$$

$\Big\downarrow$ 7293

$$\int \left(\frac{20\left((x-256)^2\right)^{2\log^2\left(x^2\right)}\log\left(x^2\right)\left(-x\log\left(x^2\right)-2x\log\left((x-256)^2\right)+512\log\left((x-256)^2\right)\right)\exp\left(\frac{3((x-256)^2)^{2}}{((x-256)^2)}\right.}{(256-x)x\left(\left((x-256)^2\right)^{2\log^2\left(x^2\right)}-x\right)^2}\right.$$

$\Big\downarrow$ 7299

$$\int \left(\frac{20\left((x-256)^2\right)^{2\log^2(x^2)} \log\left(x^2\right)\left(-x\log\left(x^2\right)-2x\log\left((x-256)^2\right)+512\log\left((x-256)^2\right)\right)\exp\left(\frac{3\left((x-256)^2\right)^{2\log}}{\left((x-256)^2\right)^{2}}\right.}{(256-x)x\left(\left((x-256)^2\right)^{2\log^2(x^2)}-x\right)^2}\right.$$

input
```
Int[(E^((-5 - 3*x + 3*(65536 - 512*x + x^2)^(2*Log[x^2]^2))/(-x + (65536 -
 512*x + x^2)^(2*Log[x^2]^2)))*(1280*x - 5*x^2 + (65536 - 512*x + x^2)^(2*
Log[x^2]^2)*(20*x*Log[x^2]^2 + (-10240 + 40*x)*Log[x^2]*Log[65536 - 512*x
+ x^2])))/(-256*x^3 + x^4 + (65536 - 512*x + x^2)^(4*Log[x^2]^2)*(-256*x +
 x^2) + (65536 - 512*x + x^2)^(2*Log[x^2]^2)*(512*x^2 - 2*x^3)),x]
```

output
```
$Aborted
```

3.44.3.1 Defintions of rubi rules used

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.44.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.56 (sec) , antiderivative size = 266, normalized size of antiderivative = 10.23

$$e^{\frac{-3\,e^{\frac{\left(-i\,\mathrm{csgn}\left(i(x-256)^2\right)^3\pi+2i\,\mathrm{csgn}\left(i(x-256)^2\right)^2\mathrm{csgn}(i(x-256))\pi-i\,\mathrm{csgn}\left(i(x-256)^2\right)\mathrm{csgn}(i(x-256))^2\pi+4\ln(x-256)\right)\left(4\ln(x)-i\pi\,\mathrm{csgn}\left(ix^2\right)\mathrm{csgn}(ix)^2+2i\pi\,\mathrm{csg}\right.}{4}}}{-e^{\frac{\left(-i\,\mathrm{csgn}\left(i(x-256)^2\right)^3\pi+2i\,\mathrm{csgn}\left(i(x-256)^2\right)^2\mathrm{csgn}(i(x-256))\pi-i\,\mathrm{csgn}\left(i(x-256)^2\right)\mathrm{csgn}(i(x-256))^2\pi+4\ln(x-256)\right)\left(4\ln(x)-i\pi\,\mathrm{csgn}\left(ix^2\right)\mathrm{csgn}(ix)^2+2i\pi\,\mathrm{c}\right.}{4}}}}$$

$$\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}$$

input
```
int(((20*x*ln(x^2)^2+(40*x-10240)*ln(x^2-512*x+65536)*ln(x^2))*exp(ln(x^2-
512*x+65536)*ln(x^2)^2)^2-5*x^2+1280*x)*exp((3*exp(ln(x^2-512*x+65536)*ln(
x^2)^2)^2-3*x-5)/(exp(ln(x^2-512*x+65536)*ln(x^2)^2)^2-x))/((x^2-256*x)*ex
p(ln(x^2-512*x+65536)*ln(x^2)^2)^4+(-2*x^3+512*x^2)*exp(ln(x^2-512*x+65536
)*ln(x^2)^2)^2+x^4-256*x^3),x)
```

output
```
exp((-3*exp(1/4*(-I*csgn(I*(x-256)^2)^3*Pi+2*I*csgn(I*(x-256)^2)^2*csgn(I*
(x-256))*Pi-I*csgn(I*(x-256)^2)*csgn(I*(x-256))^2*Pi+4*ln(x-256))*(4*ln(x)
-I*Pi*csgn(I*x^2)*csgn(I*x)^2+2*I*Pi*csgn(I*x^2)^2*csgn(I*x)-I*Pi*csgn(I*x
^2)^3)^2)+3*x+5)/(-exp(1/4*(-I*csgn(I*(x-256)^2)^3*Pi+2*I*csgn(I*(x-256)^2
)^2*csgn(I*(x-256))*Pi-I*csgn(I*(x-256)^2)*csgn(I*(x-256))^2*Pi+4*ln(x-256
))*(4*ln(x)-I*Pi*csgn(I*x^2)*csgn(I*x)^2+2*I*Pi*csgn(I*x^2)^2*csgn(I*x)-I*
Pi*csgn(I*x^2)^3)^2)+x))
```

3.44.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.88

$$\int \frac{e^{\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}}\left(1280x-5x^2+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}\left(20x\log^2\left(x^2\right)+\left(-10240+40x\right.\right.\right.}{-256x^3+x^4+\left(65536-512x+x^2\right)^{4\log^2\left(x^2\right)}\left(-256x+x^2\right)+\left(65536-512x+x^2\right)^{2\log^2}}$$

$$= e^{\left(\frac{3\left(x^2-512x+65536\right)^{2\log\left(x^2\right)^2}-3x-5}{\left(x^2-512x+65536\right)^{2\log\left(x^2\right)^2}-x}\right)}$$

input
```
integrate(((20*x*log(x^2)^2+(40*x-10240)*log(x^2-512*x+65536)*log(x^2))*ex
p(log(x^2-512*x+65536)*log(x^2)^2)^2-5*x^2+1280*x)*exp((3*exp(log(x^2-512*
x+65536)*log(x^2)^2)^2-3*x-5)/(exp(log(x^2-512*x+65536)*log(x^2)^2)^2-x))/
((x^2-256*x)*exp(log(x^2-512*x+65536)*log(x^2)^2)^4+(-2*x^3+512*x^2)*exp(l
og(x^2-512*x+65536)*log(x^2)^2)^2+x^4-256*x^3),x, algorithm=\
```

output
```
e^((3*(x^2 - 512*x + 65536)^(2*log(x^2)^2) - 3*x - 5)/((x^2 - 512*x + 6553
6)^(2*log(x^2)^2) - x))
```

3.44.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}}\left(1280x-5x^2+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}\left(20x\log^2\left(x^2\right)+\left(-10240+40x\right.\right.\right.}{-256x^3+x^4+\left(65536-512x+x^2\right)^{4\log^2\left(x^2\right)}\left(-256x+x^2\right)+\left(65536-512x+x^2\right)^{2\log^2}}$$
$$=\text{Timed out}$$

input
```
integrate(((20*x*ln(x**2)**2+(40*x-10240)*ln(x**2-512*x+65536)*ln(x**2))*e
xp(ln(x**2-512*x+65536)*ln(x**2)**2)**2-5*x**2+1280*x)*exp((3*exp(ln(x**2-
512*x+65536)*ln(x**2)**2)**2-3*x-5)/(exp(ln(x**2-512*x+65536)*ln(x**2)**2)
**2-x))/((x**2-256*x)*exp(ln(x**2-512*x+65536)*ln(x**2)**2)**4+(-2*x**3+51
2*x**2)*exp(ln(x**2-512*x+65536)*ln(x**2)**2)**2+x**4-256*x**3),x)
```

output
```
Timed out
```

3.44.7 Maxima [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{e^{\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}}\left(1280x-5x^2+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}\left(20x\log^2\left(x^2\right)+\left(-10240+40x\right.\right.\right.}{-256x^3+x^4+\left(65536-512x+x^2\right)^{4\log^2\left(x^2\right)}\left(-256x+x^2\right)+\left(65536-512x+x^2\right)^{2\log^2}}$$
$$=e^{\left(-\frac{5}{(x-256)^{16\log(x)^2}-x}+3\right)}$$

input
```
integrate(((20*x*log(x^2)^2+(40*x-10240)*log(x^2-512*x+65536)*log(x^2))*ex
p(log(x^2-512*x+65536)*log(x^2)^2)^2-5*x^2+1280*x)*exp((3*exp(log(x^2-512*
x+65536)*log(x^2)^2)^2-3*x-5)/(exp(log(x^2-512*x+65536)*log(x^2)^2)^2-x))/
((x^2-256*x)*exp(log(x^2-512*x+65536)*log(x^2)^2)^4+(-2*x^3+512*x^2)*exp(l
og(x^2-512*x+65536)*log(x^2)^2)^2+x^4-256*x^3),x, algorithm=\
```

output
```
e^(-5/((x - 256)^(16*log(x)^2) - x) + 3)
```

3.44.8 Giac [F]

$$\int \frac{e^{\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}}\left(1280x-5x^2+\left(65536-512x+x^2\right)^{2\log^2(x^2)}\left(20x\log^2\left(x^2\right)+(-10240+40x\right.\right.}{-256x^3+x^4+\left(65536-512x+x^2\right)^{4\log^2(x^2)}\left(-256x+x^2\right)+\left(65536-512x+x^2\right)^{2\log^2}}$$

$$=\int \frac{5\left(4\left(2\left(x-256\right)\log\left(x^2-512\,x+65536\right)\log\left(x^2\right)+x\log\left(x^2\right)^2\right)\left(x^2-512\,x+65536\right)^{2\,\log\left(x^2\right)^2}-x^2+\right.}{x^4-256\,x^3+\left(x^2-256\,x\right)\left(x^2-512\,x+65536\right)^{4\,\log\left(x^2\right)^2}-2\left(x^3-256\,x^2\right)\left(x^2-512\right.}$$

input
```
integrate(((20*x*log(x^2)^2+(40*x-10240)*log(x^2-512*x+65536)*log(x^2))*ex
p(log(x^2-512*x+65536)*log(x^2)^2)^2-5*x^2+1280*x)*exp((3*exp(log(x^2-512*
x+65536)*log(x^2)^2)^2-3*x-5)/(exp(log(x^2-512*x+65536)*log(x^2)^2)^2-x))/
((x^2-256*x)*exp(log(x^2-512*x+65536)*log(x^2)^2)^4+(-2*x^3+512*x^2)*exp(l
og(x^2-512*x+65536)*log(x^2)^2)^2+x^4-256*x^3),x, algorithm=\
```

output
```
integrate(5*(4*(2*(x - 256)*log(x^2 - 512*x + 65536)*log(x^2) + x*log(x^2)
^2)*(x^2 - 512*x + 65536)^(2*log(x^2)^2) - x^2 + 256*x)*e^((3*(x^2 - 512*x
 + 65536)^(2*log(x^2)^2) - 3*x - 5)/((x^2 - 512*x + 65536)^(2*log(x^2)^2)
- x))/(x^4 - 256*x^3 + (x^2 - 256*x)*(x^2 - 512*x + 65536)^(4*log(x^2)^2)
- 2*(x^3 - 256*x^2)*(x^2 - 512*x + 65536)^(2*log(x^2)^2)), x)
```

3.44.9 Mupad [B] (verification not implemented)

Time = 13.28 (sec) , antiderivative size = 97, normalized size of antiderivative = 3.73

$$\int \frac{e^{\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{-x+\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}}\left(1280x-5x^2+\left(65536-512x+x^2\right)^{2\log^2(x^2)}\left(20x\log^2\left(x^2\right)+(-10240+40x\right.\right.}{-256x^3+x^4+\left(65536-512x+x^2\right)^{4\log^2(x^2)}\left(-256x+x^2\right)+\left(65536-512x+x^2\right)^{2\log^2}}$$

$$=\mathrm{e}^{-\frac{3\left(x^2-512\,x+65536\right)^{2\ln\left(x^2\right)^2}}{x-\left(x^2-512\,x+65536\right)^{2\ln\left(x^2\right)^2}}}\,\mathrm{e}^{\frac{3\,x}{x-\left(x^2-512\,x+65536\right)^{2\ln\left(x^2\right)^2}}}\,\mathrm{e}^{\frac{5}{x-\left(x^2-512\,x+65536\right)^{2\ln\left(x^2\right)^2}}}$$

3.44.

$$\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{\dots}$$

input
```
int((exp((3*x - 3*exp(2*log(x^2)^2*log(x^2 - 512*x + 65536)) + 5)/(x - exp
(2*log(x^2)^2*log(x^2 - 512*x + 65536))))*(1280*x + exp(2*log(x^2)^2*log(x
^2 - 512*x + 65536))*(20*x*log(x^2)^2 + log(x^2)*log(x^2 - 512*x + 65536)*
(40*x - 10240)) - 5*x^2))/(exp(2*log(x^2)^2*log(x^2 - 512*x + 65536))*(512
*x^2 - 2*x^3) - exp(4*log(x^2)^2*log(x^2 - 512*x + 65536))*(256*x - x^2) -
 256*x^3 + x^4),x)
```

output
```
exp(-(3*(x^2 - 512*x + 65536)^(2*log(x^2)^2))/(x - (x^2 - 512*x + 65536)^(
2*log(x^2)^2)))*exp((3*x)/(x - (x^2 - 512*x + 65536)^(2*log(x^2)^2)))*exp(
5/(x - (x^2 - 512*x + 65536)^(2*log(x^2)^2)))
```

3.44.

$$\frac{-5-3x+3\left(65536-512x+x^2\right)^{2\log^2\left(x^2\right)}}{\ldots}$$

3.45 $\int \frac{6x^2-x^3-48\log(3)}{x^4}\,dx$

3.45.1 Optimal result

Integrand size = 19, antiderivative size = 18

$$\int \frac{6x^2-x^3-48\log(3)}{x^4}\,dx=\frac{-6+\frac{16\log(3)}{x^2}-x\log(x)}{x}$$

output
```
(16/x^2*ln(3)-x*ln(x)-6)/x
```

3.45.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{6x^2-x^3-48\log(3)}{x^4}\,dx=-\frac{6}{x}+\frac{16\log(3)}{x^3}-\log(x)$$

input
```
Integrate[(6*x^2 - x^3 - 48*Log[3])/x^4,x]
```

output
```
-6/x + (16*Log[3])/x^3 - Log[x]
```

3.45.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^3+6x^2-48\log(3)}{x^4}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-\frac{48\log(3)}{x^4}+\frac{6}{x^2}-\frac{1}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{16\log(3)}{x^3}-\frac{6}{x}-\log(x)$$

input
```
Int[(6*x^2 - x^3 - 48*Log[3])/x^4,x]
```

output
```
-6/x + (16*Log[3])/x^3 - Log[x]
```

3.45.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.45.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

method	result	size
default	$-\frac{6}{x}-\ln\left(x\right)+\frac{16\ln\left(3\right)}{x^{3}}$	18
norman	$\frac{-6x^{2}+16\ln\left(3\right)}{x^{3}}-\ln\left(x\right)$	20
risch	$\frac{-6x^{2}+16\ln\left(3\right)}{x^{3}}-\ln\left(x\right)$	20
parallelrisch	$\frac{-x^{3}\ln\left(x\right)-6x^{2}+16\ln\left(3\right)}{x^{3}}$	22

input
```
int((-48*ln(3)-x^3+6*x^2)/x^4,x,method=_RETURNVERBOSE)
```

output
```
-6/x-ln(x)+16*ln(3)/x^3
```

3.45.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{6x^2-x^3-48\log(3)}{x^4}\,dx=-\frac{x^{3}\log\left(x\right)+6\,x^{2}-16\,\log\left(3\right)}{x^{3}}$$

input
```
integrate((-48*log(3)-x^3+6*x^2)/x^4,x, algorithm=\
```

output
```
-(x^3*log(x) + 6*x^2 - 16*log(3))/x^3
```

3.45.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{6x^2-x^3-48\log(3)}{x^4}\,dx=-\log\left(x\right)-\frac{6x^{2}-16\log\left(3\right)}{x^{3}}$$

input
```
integrate((-48*ln(3)-x**3+6*x**2)/x**4,x)
```

output
```
-log(x) - (6*x**2 - 16*log(3))/x**3
```

3.45.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{6x^2 - x^3 - 48\log(3)}{x^4}\,dx = -\frac{2\,(3\,x^2 - 8\,\log{(3)})}{x^3} - \log{(x)}$$

input
```
integrate((-48*log(3)-x^3+6*x^2)/x^4,x, algorithm=\
```

output
```
-2*(3*x^2 - 8*log(3))/x^3 - log(x)
```

3.45.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{6x^2 - x^3 - 48\log(3)}{x^4}\,dx = -\frac{2\,(3\,x^2 - 8\,\log{(3)})}{x^3} - \log{(|x|)}$$

input
```
integrate((-48*log(3)-x^3+6*x^2)/x^4,x, algorithm=\
```

output
```
-2*(3*x^2 - 8*log(3))/x^3 - log(abs(x))
```

3.45.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{6x^2 - x^3 - 48\log(3)}{x^4}\,dx = \frac{16\,\ln{(3)} - 6\,x^2}{x^3} - \ln{(x)}$$

input
```
int(-(48*log(3) - 6*x^2 + x^3)/x^4,x)
```

output
```
(16*log(3) - 6*x^2)/x^3 - log(x)
```

3.46 $\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+\left(-18e^{3+x}-6e^{x^2}x\right)\log(\log(3))+9\log^2(\log(3))}\,dx$

3.46.1 Optimal result

Integrand size = 89, antiderivative size = 26

$$\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+\left(-18e^{3+x}-6e^{x^2}x\right)\log(\log(3))+9\log^2(\log(3))}\,dx = \frac{3x}{e^{3+x}+\frac{e^{x^2}x}{3}-\log(\log(3))}$$

output
```
3*x/(exp(3+x)+1/3*exp(x^2)*x-ln(ln(3)))
```

3.46.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+\left(-18e^{3+x}-6e^{x^2}x\right)\log(\log(3))+9\log^2(\log(3))}\,dx = \frac{9x}{3e^{3+x}+e^{x^2}x-3\log(\log(3))}$$

input
```
Integrate[(E^(3 + x)*(27 - 27*x) - 18*E^x^2*x^3 - 27*Log[Log[3]])/(9*E^(6
+ 2*x) + 6*E^(3 + x + x^2)*x + E^(2*x^2)*x^2 + (-18*E^(3 + x) - 6*E^x^2*x)
*Log[Log[3]] + 9*Log[Log[3]]^2),x]
```

output
```
(9*x)/(3*E^(3 + x) + E^x^2*x - 3*Log[Log[3]])
```

3.46.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-18e^{x^2}x^3+e^{x+3}(27-27x)-27\log(\log(3))}{e^{2x^2}x^2+6e^{x^2+x+3}x+\left(-6e^{x^2}x-18e^{x+3}\right)\log(\log(3))+9e^{2x+6}+9\log^2(\log(3))}dx$$

$$\Big\downarrow \; 7239$$

$$\int \frac{9\left(-2e^{x^2}x^3-3e^{x+3}(x-1)-3\log(\log(3))\right)}{\left(e^{x^2}x+3e^{x+3}-3\log(\log(3))\right)^2}dx$$

$$\Big\downarrow \; 27$$

$$9\int \frac{-2e^{x^2}x^3+3e^{x+3}(1-x)-3\log(\log(3))}{\left(e^{x^2}x+3e^{x+3}-3\log(\log(3))\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$9\int \left(\frac{3\left(2e^{x+3}x^2-2\log(\log(3))x^2-e^{x+3}x+e^{x+3}-\log(\log(3))\right)}{\left(e^{x^2}x+3e^{x+3}-3\log(\log(3))\right)^2}-\frac{2x^2}{e^{x^2}x+3e^{x+3}-3\log(\log(3))}\right)dx$$

$$\Big\downarrow \; 2009$$

$$9\left(-3\log(\log(3))\int \frac{1}{\left(e^{x^2}x+3e^{x+3}-3\log(\log(3))\right)^2}dx+3\int \frac{e^{x+3}}{\left(e^{x^2}x+3e^{x+3}-3\log(\log(3))\right)^2}dx-3\int \frac{}{\left(e^{x^2}x+3\right.}\right.$$

input
```
Int[(E^(3 + x)*(27 - 27*x) - 18*E^x^2*x^3 - 27*Log[Log[3]])/(9*E^(6 + 2*x)
 + 6*E^(3 + x + x^2)*x + E^(2*x^2)*x^2 + (-18*E^(3 + x) - 6*E^x^2*x)*Log[L
og[3]] + 9*Log[Log[3]]^2),x]
```

output
```
$Aborted
```

3.46.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.46.4 Maple [A] (verified)

Time = 0.62 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

method	result	size
risch	$-\frac{9x}{-e^{x^2}x+3\ln(\ln(3))-3\,e^{3+x}}$	25
parallelrisch	$-\frac{9x}{-e^{x^2}x+3\ln(\ln(3))-3\,e^{3+x}}$	25

input
```
int((-27*ln(ln(3))-18*x^3*exp(x^2)+(-27*x+27)*exp(3+x))/(9*ln(ln(3))^2+(-6
*exp(x^2)*x-18*exp(3+x))*ln(ln(3))+x^2*exp(x^2)^2+6*x*exp(3+x)*exp(x^2)+9*
exp(3+x)^2),x,method=_RETURNVERBOSE)
```

output
```
-9*x/(-exp(x^2)*x+3*ln(ln(3))-3*exp(3+x))
```

3.46. $\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+\left(-18e^{3+x}-6e^{x^2}x\right)\log(\log(3))+9\log^2(\log(3))}\,dx$

3.46.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+(-18e^{3+x}-6e^{x^2}x)\log(\log(3))+9\log^2(\log(3))}\,dx$$
$$= \frac{9\,xe^{\left(x^2\right)}}{xe^{\left(2\,x^2\right)}-3\,e^{\left(x^2\right)}\log\left(\log\left(3\right)\right)+3\,e^{\left(x^2+x+3\right)}}$$

input
```
integrate((-27*log(log(3))-18*x^3*exp(x^2)+(-27*x+27)*exp(3+x))/(9*log(log
(3))^2+(-6*exp(x^2)*x-18*exp(3+x))*log(log(3))+x^2*exp(x^2)^2+6*x*exp(3+x)
*exp(x^2)+9*exp(3+x)^2),x, algorithm=\
```

output
```
9*x*e^(x^2)/(x*e^(2*x^2) - 3*e^(x^2)*log(log(3)) + 3*e^(x^2 + x + 3))
```

3.46.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+(-18e^{3+x}-6e^{x^2}x)\log(\log(3))+9\log^2(\log(3))}\,dx$$
$$= \frac{3x}{\frac{xe^{x^2}}{3}+e^{x+3}-\log\left(\log\left(3\right)\right)}$$

input
```
integrate((-27*ln(ln(3))-18*x**3*exp(x**2)+(-27*x+27)*exp(3+x))/(9*ln(ln(3
))**2+(-6*exp(x**2)*x-18*exp(3+x))*ln(ln(3))+x**2*exp(x**2)**2+6*x*exp(3+x
)*exp(x**2)+9*exp(3+x)**2),x)
```

output
```
3*x/(x*exp(x**2)/3 + exp(x + 3) - log(log(3)))
```

3.46.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+\left(-18e^{3+x}-6e^{x^2}x\right)\log(\log(3))+9\log^2(\log(3))}\,dx = \frac{9\,x}{xe^{(x^2)}+3\,e^{(x+3)}-3\,\log\left(\log\left(3\right)\right)}$$

input
```
integrate((-27*log(log(3))-18*x^3*exp(x^2)+(-27*x+27)*exp(3+x))/(9*log(log
(3))^2+(-6*exp(x^2)*x-18*exp(3+x))*log(log(3))+x^2*exp(x^2)^2+6*x*exp(3+x)
*exp(x^2)+9*exp(3+x)^2),x, algorithm=\
```

output
```
9*x/(x*e^(x^2) + 3*e^(x + 3) - 3*log(log(3)))
```

3.46.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+\left(-18e^{3+x}-6e^{x^2}x\right)\log(\log(3))+9\log^2(\log(3))}\,dx = \frac{9\,x}{xe^{(x^2)}+3\,e^{(x+3)}-3\,\log\left(\log\left(3\right)\right)}$$

input
```
integrate((-27*log(log(3))-18*x^3*exp(x^2)+(-27*x+27)*exp(3+x))/(9*log(log
(3))^2+(-6*exp(x^2)*x-18*exp(3+x))*log(log(3))+x^2*exp(x^2)^2+6*x*exp(3+x)
*exp(x^2)+9*exp(3+x)^2),x, algorithm=\
```

output
```
9*x/(x*e^(x^2) + 3*e^(x + 3) - 3*log(log(3)))
```

3.46.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+\left(-18e^{3+x}-6e^{x^2}x\right)\log(\log(3))+9\log^2(\log(3))}\,dx = \int -\frac{27\,\ln\left(\ln\left(3\right)\right)+18\,x^3\,\mathrm{e}^{x^2}+\mathrm{e}^{x+3}\,\left(27\,x-27\right)}{9\,\mathrm{e}^{2\,x+6}+9\,{\ln\left(\ln\left(3\right)\right)}^2-\ln\left(\ln\left(3\right)\right)\,\left(18\,\mathrm{e}^{x+3}+6\,x\,\mathrm{e}^{x^2}\right)+x^2\,\mathrm{e}^{2\,x^2}+6\,x\,\mathrm{e}^{x+3}\,\mathrm{e}^{x^2}}\,dx$$

input
```
int(-(27*log(log(3)) + 18*x^3*exp(x^2) + exp(x + 3)*(27*x - 27))/(9*exp(2*
x + 6) + 9*log(log(3))^2 - log(log(3))*(18*exp(x + 3) + 6*x*exp(x^2)) + x^
2*exp(2*x^2) + 6*x*exp(x + 3)*exp(x^2)),x)
```

output
```
int(-(27*log(log(3)) + 18*x^3*exp(x^2) + exp(x + 3)*(27*x - 27))/(9*exp(2*
x + 6) + 9*log(log(3))^2 - log(log(3))*(18*exp(x + 3) + 6*x*exp(x^2)) + x^
2*exp(2*x^2) + 6*x*exp(x + 3)*exp(x^2)), x)
```

3.46. $$\int \frac{e^{3+x}(27-27x)-18e^{x^2}x^3-27\log(\log(3))}{9e^{6+2x}+6e^{3+x+x^2}x+e^{2x^2}x^2+\left(-18e^{3+x}-6e^{x^2}x\right)\log(\log(3))+9\log^2(\log(3))}\,dx$$

3.47 $\int \frac{-2-x+\log(48)+(-3-}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-\right.}$

3.47.1 Optimal result

Integrand size = 112, antiderivative size = 18

$$\int \frac{-2-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+}\right.}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-x+\log(48)+(-3-x+\mathrm{l}\right.}$$
$$=\log\left(x+\log\left(1+\log\left(\frac{5}{3+x-\log(48)}\right)\right)\right)$$

output
```
ln(ln(1+ln(5/(-ln(48)+3+x)))+x)
```

3.47.2 Mathematica [A] (verified)

Time = 0.58 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{-2-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{}{-3-x+}\right.}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-x+\log(48)+(-3-x+\mathrm{l}\right.}$$
$$=\log\left(-x-\log\left(1+\log\left(\frac{5}{3+x-\log(48)}\right)\right)\right)$$

3.47.

$$\int \frac{-2-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)\log\left(1+\log\left(-\right.\right.}$$

input
```
Integrate[(-2 - x + Log[48] + (-3 - x + Log[48])*Log[-5/(-3 - x + Log[48])
])/(-3*x - x^2 + x*Log[48] + (-3*x - x^2 + x*Log[48])*Log[-5/(-3 - x + Log
[48])] + (-3 - x + Log[48] + (-3 - x + Log[48])*Log[-5/(-3 - x + Log[48])]
)*Log[1 + Log[-5/(-3 - x + Log[48])]]),x]
```

output
```
Log[-x - Log[1 + Log[5/(3 + x - Log[48])]]]
```

3.47.3 Rubi [A] (verified)

Time = 0.53 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.027, Rules used = {6, 7292, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x+(-x-3+\log(48))\log\left(-\frac{5}{-x-3+\log(48)}\right)-2+\log(4}{-x^2+(-x^2-3x+x\log(48))\log\left(-\frac{5}{-x-3+\log(48)}\right)-3x+x\log(48)+\left(-x+(-x-3+\log(48))\log\left(-\frac{}{-x-3+}\right.\right.}$$

$$\Big\downarrow \ 6$$

$$\int \frac{-x+(-x-3+\log(48))\log\left(-\frac{5}{-x-3+\log(48)}\right)-2+\log(4}{-x^2+(-x^2-3x+x\log(48))\log\left(-\frac{5}{-x-3+\log(48)}\right)+x(\log(48)-3)+\left(-x+(-x-3+\log(48))\log\left(-\frac{}{-x-3-}\right.\right.}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{x-(-x-3+\log(48))\log\left(-\frac{5}{-x-3+\log(48)}\right)+2\left(1-\frac{\log(48)}{2}\right)}{(x+3-\log(48))\left(\log\left(\frac{5}{x+3-\log(48)}\right)+1\right)\left(x+\log\left(\log\left(\frac{5}{x+3-\log(48)}\right)+1\right)\right)}dx$$

$$\Big\downarrow \ 7235$$

$$\log\left(x+\log\left(\log\left(\frac{5}{x+3-\log(48)}\right)+1\right)\right)$$

input
```
Int[(-2 - x + Log[48] + (-3 - x + Log[48])*Log[-5/(-3 - x + Log[48])])/(-3
*x - x^2 + x*Log[48] + (-3*x - x^2 + x*Log[48])*Log[-5/(-3 - x + Log[48])]
 + (-3 - x + Log[48] + (-3 - x + Log[48])*Log[-5/(-3 - x + Log[48])])*Log[
1 + Log[-5/(-3 - x + Log[48])]]),x]
```

output
```
Log[x + Log[1 + Log[5/(3 + x - Log[48])]]]
```

3.47.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.47.4 Maple [A] (verified)

Time = 9.31 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

method	result	size
norman	$\ln\left(\ln\left(\ln\left(-\frac{5}{\ln(48)-3-x}\right)+1\right)+x\right)$	19
parallelrisch	$\ln\left(\ln\left(\ln\left(-\frac{5}{\ln(48)-3-x}\right)+1\right)+x\right)$	19

input
```
int(((ln(48)-3-x)*ln(-5/(ln(48)-3-x))+ln(48)-x-2)/(((ln(48)-3-x)*ln(-5/(ln
(48)-3-x))+ln(48)-3-x)*ln(ln(-5/(ln(48)-3-x))+1)+(x*ln(48)-x^2-3*x)*ln(-5/
(ln(48)-3-x))+x*ln(48)-x^2-3*x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(ln(-5/(ln(48)-3-x))+1)+x)
```

3.47.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{-2-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)\log\left(1+\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)}\,dx = \log\left(x+\log\left(\log\left(\frac{5}{x-\log(48)+3}\right)+1\right)\right)$$

input
```
integrate(((log(48)-3-x)*log(-5/(log(48)-3-x))+log(48)-x-2)/(((log(48)-3-x
)*log(-5/(log(48)-3-x))+log(48)-3-x)*log(log(-5/(log(48)-3-x))+1)+(x*log(4
8)-x^2-3*x)*log(-5/(log(48)-3-x))+x*log(48)-x^2-3*x),x, algorithm=\
```

output
```
log(x + log(log(5/(x - log(48) + 3)) + 1))
```

3.47.6 Sympy [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{-2-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)\log\left(1+\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)}\,dx = \log\left(x+\log\left(\log\left(-\frac{5}{-x-3+\log(48)}\right)+1\right)\right)$$

input
```
integrate(((ln(48)-3-x)*ln(-5/(ln(48)-3-x))+ln(48)-x-2)/(((ln(48)-3-x)*ln(
-5/(ln(48)-3-x))+ln(48)-3-x)*ln(ln(-5/(ln(48)-3-x))+1)+(x*ln(48)-x**2-3*x)
*ln(-5/(ln(48)-3-x))+x*ln(48)-x**2-3*x),x)
```

output
```
log(x + log(log(-5/(-x - 3 + log(48))) + 1))
```

3.47.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{-2-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)\log\left(1+\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)}\,dx$$
$$= \log\left(x+\log\left(\log\left(5\right)-\log\left(x-\log\left(3\right)-4\,\log\left(2\right)+3\right)+1\right)\right)$$

input
```
integrate(((log(48)-3-x)*log(-5/(log(48)-3-x))+log(48)-x-2)/(((log(48)-3-x
)*log(-5/(log(48)-3-x))+log(48)-3-x)*log(log(-5/(log(48)-3-x))+1)+(x*log(4
8)-x^2-3*x)*log(-5/(log(48)-3-x))+x*log(48)-x^2-3*x),x, algorithm=\
```

output
```
log(x + log(log(5) - log(x - log(3) - 4*log(2) + 3) + 1))
```

3.47.8 Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.34 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{-2-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)\log\left(1+\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)}\,dx$$
$$= \log\left(x+\log\left(2i\,\pi+\log\left(5\right)-\log\left(x-\log\left(48\right)+3\right)+1\right)\right)$$

input
```
integrate(((log(48)-3-x)*log(-5/(log(48)-3-x))+log(48)-x-2)/(((log(48)-3-x
)*log(-5/(log(48)-3-x))+log(48)-3-x)*log(log(-5/(log(48)-3-x))+1)+(x*log(4
8)-x^2-3*x)*log(-5/(log(48)-3-x))+x*log(48)-x^2-3*x),x, algorithm=\
```

output
```
log(x + log(2*I*pi + log(5) - log(x - log(48) + 3) + 1))
```

3.47.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-2-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)}{-3x-x^2+x\log(48)+(-3x-x^2+x\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)+\left(-3-x+\log(48)+(-3-x+\log(48))\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)\log\left(1+\log\left(-\frac{5}{-3-x+\log(48)}\right)\right)}\,dx$$
$= \text{Hanged}$

input
```
int((x - log(48) + log(5/(x - log(48) + 3))*(x - log(48) + 3) + 2)/(3*x -
x*log(48) + log(log(5/(x - log(48) + 3)) + 1)*(x - log(48) + log(5/(x - lo
g(48) + 3))*(x - log(48) + 3) + 3) + log(5/(x - log(48) + 3))*(3*x - x*log
(48) + x^2) + x^2),x)
```

output
```
\text{Hanged}
```

3.48 $\int \frac{1}{5}\left(5+e^3+e^{4-2x+x^2}(2-2x)-10x\right)\,dx$

3.48.1 Optimal result

Integrand size = 28, antiderivative size = 28

$$\int \frac{1}{5}\left(5+e^3+e^{4-2x+x^2}(2-2x)-10x\right)\,dx=-5+x-x^2+\frac{1}{5}e^3\left(-e^{(1-x)^2}+x\right)$$

output
```
x-5-x^2+1/5*(-exp((1-x)^2)+x)*exp(3)
```

3.48.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{1}{5}\left(5+e^3+e^{4-2x+x^2}(2-2x)-10x\right)\,dx=\frac{1}{5}\left(-e^{4-2x+x^2}+5x+e^3x-5x^2\right)$$

input
```
Integrate[(5 + E^3 + E^(4 - 2*x + x^2)*(2 - 2*x) - 10*x)/5,x]
```

output
```
(-E^(4 - 2*x + x^2) + 5*x + E^3*x - 5*x^2)/5
```

3.48.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5}\left(e^{x^2-2x+4}(2-2x)-10x+e^3+5\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int \left(2e^{x^2-2x+4}(1-x)-10x+e^3+5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(-5x^2-e^{x^2-2x+4}+\left(5+e^3\right)x\right)$$

input
```
Int[(5 + E^3 + E^(4 - 2*x + x^2)*(2 - 2*x) - 10*x)/5,x]
```

output
```
(-E^(4 - 2*x + x^2) + (5 + E^3)*x - 5*x^2)/5
```

3.48.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.48.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result	size
risch	$-\frac{e^{x^2-2x+4}}{5}+\frac{x\,e^3}{5}-x^2+x$	24
norman	$\left(\frac{e^3}{5}+1\right)x-x^2-\frac{e^3 e^{x^2-2x+1}}{5}$	28
parallelrisch	$\left(\frac{e^3}{5}+1\right)x-x^2-\frac{e^3 e^{x^2-2x+1}}{5}$	28
parts	$-x^2+x-\frac{2\,e^3\left(e\left(\frac{e^{x^2-2x}}{2}-\frac{i\sqrt{\pi}\,e^{-1}\operatorname{erf}(ix-i)}{2}\right)+\frac{ie\sqrt{\pi}\,e^{-1}\operatorname{erf}(ix-i)}{2}\right)}{5}+\frac{x\,e^3}{5}$	66
default	$x+\frac{2\,e^3\left(-\frac{ie\sqrt{\pi}\,e^{-1}\operatorname{erf}(ix-i)}{2}-e\left(\frac{e^{x^2-2x}}{2}-\frac{i\sqrt{\pi}\,e^{-1}\operatorname{erf}(ix-i)}{2}\right)\right)}{5}-x^2+\frac{x\,e^3}{5}$	67

input
```
int(1/5*(2-2*x)*exp(3)*exp(x^2-2*x+1)+1/5*exp(3)-2*x+1,x,method=_RETURNVER
BOSE)
```

output
```
-1/5*exp(x^2-2*x+4)+1/5*x*exp(3)-x^2+x
```

3.48.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{1}{5}\left(5+e^3+e^{4-2x+x^2}(2-2x)-10x\right)\,dx=-x^2+\frac{1}{5}\,xe^3+x-\frac{1}{5}\,e^{\left(x^2-2\,x+4\right)}$$

input
```
integrate(1/5*(2-2*x)*exp(3)*exp(x^2-2*x+1)+1/5*exp(3)-2*x+1,x, algorithm=
\
```

output
```
-x^2 + 1/5*x*e^3 + x - 1/5*e^(x^2 - 2*x + 4)
```

3.48.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{1}{5}\left(5+e^3+e^{4-2x+x^2}(2-2x)-10x\right)\,dx=-x^2+x\left(1+\frac{e^3}{5}\right)-\frac{e^3e^{x^2-2x+1}}{5}$$

input
```
integrate(1/5*(2-2*x)*exp(3)*exp(x**2-2*x+1)+1/5*exp(3)-2*x+1,x)
```

output
```
-x**2 + x*(1 + exp(3)/5) - exp(3)*exp(x**2 - 2*x + 1)/5
```

3.48.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{1}{5}\left(5+e^3+e^{4-2x+x^2}(2-2x)-10x\right)\,dx=-x^2+\frac{1}{5}\,xe^3+x-\frac{1}{5}\,e^{\left(x^2-2\,x+4\right)}$$

input
```
integrate(1/5*(2-2*x)*exp(3)*exp(x^2-2*x+1)+1/5*exp(3)-2*x+1,x, algorithm=
\
```

output
```
-x^2 + 1/5*x*e^3 + x - 1/5*e^(x^2 - 2*x + 4)
```

3.48.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{1}{5}\left(5+e^3+e^{4-2x+x^2}(2-2x)-10x\right)\,dx=-x^2+\frac{1}{5}\,xe^3+x-\frac{1}{5}\,e^{\left(x^2-2\,x+4\right)}$$

input
```
integrate(1/5*(2-2*x)*exp(3)*exp(x^2-2*x+1)+1/5*exp(3)-2*x+1,x, algorithm=
\
```

output
```
-x^2 + 1/5*x*e^3 + x - 1/5*e^(x^2 - 2*x + 4)
```

3.48.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{1}{5}\left(5+e^3+e^{4-2x+x^2}(2-2x)-10x\right)\,dx = x\left(\frac{\mathrm{e}^3}{5}+1\right)-x^2-\frac{\mathrm{e}^{x^2-2\,x+4}}{5}$$

input
```
int(exp(3)/5 - 2*x - (exp(3)*exp(x^2 - 2*x + 1)*(2*x - 2))/5 + 1,x)
```

output
```
x*(exp(3)/5 + 1) - x^2 - exp(x^2 - 2*x + 4)/5
```

3.49 $\int \frac{100x^4+e^{x^2}(200x+60x^2-200x^3-40x^4)}{e^{2x^2}+10e^{x^2}x^2+25x^4}\,dx$

3.49.1 Optimal result

Integrand size = 57, antiderivative size = 23

$$\int \frac{100x^4+e^{x^2}(200x+60x^2-200x^3-40x^4)}{e^{2x^2}+10e^{x^2}x^2+25x^4}\,dx = \frac{4x^2(5+x)}{\frac{e^{x^2}}{5}+x^2}$$

output
```
x^2/(x^2+1/5*exp(x^2))*(20+4*x)
```

3.49.2 Mathematica [A] (verified)

Time = 1.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{100x^4+e^{x^2}(200x+60x^2-200x^3-40x^4)}{e^{2x^2}+10e^{x^2}x^2+25x^4}\,dx = \frac{20x^2(5+x)}{e^{x^2}+5x^2}$$

input
```
Integrate[(100*x^4 + E^x^2*(200*x + 60*x^2 - 200*x^3 - 40*x^4))/(E^(2*x^2)
 + 10*E^x^2*x^2 + 25*x^4),x]
```

output
```
(20*x^2*(5 + x))/(E^x^2 + 5*x^2)
```

3.49.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{100x^4+e^{x^2}(-40x^4-200x^3+60x^2+200x)}{25x^4+10e^{x^2}x^2+e^{2x^2}}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{100x^4+e^{x^2}(-40x^4-200x^3+60x^2+200x)}{\left(5x^2+e^{x^2}\right)^2}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{200x^3(x^3+5x^2-x-5)}{\left(5x^2+e^{x^2}\right)^2}-\frac{20x(2x^3+10x^2-3x-10)}{5x^2+e^{x^2}}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-500\text{Subst}\left(\int \frac{x}{(5x+e^x)^2}dx,x,x^2\right)+500\text{Subst}\left(\int \frac{x^2}{(5x+e^x)^2}dx,x,x^2\right)+100\text{Subst}\left(\int \frac{1}{5x+e^x}dx,x,x^2\right)-100\text{Subst}\left(\int \frac{x}{5x+e^x}dx,x,x^2\right)+60\int \frac{x^2}{5x^2+e^{x^2}}dx+200\int \frac{x^6}{\left(5x^2+e^{x^2}\right)^2}dx-200\int \frac{x^4}{\left(5x^2+e^{x^2}\right)^2}dx-40\int \frac{x^4}{5x^2+e^{x^2}}dx$$

input
```
Int[(100*x^4 + E^x^2*(200*x + 60*x^2 - 200*x^3 - 40*x^4))/(E^(2*x^2) + 10*
E^x^2*x^2 + 25*x^4),x]
```

output
```
$Aborted
```

3.49.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.49.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

method	result	size
risch	$\frac{20x^2(5+x)}{5x^2+e^{x^2}}$	21
parallelrisch	$\frac{20x^3+100x^2}{5x^2+e^{x^2}}$	25
norman	$\frac{-20\,e^{x^2}+20x^3}{5x^2+e^{x^2}}$	26

input
```
int(((-40*x^4-200*x^3+60*x^2+200*x)*exp(x^2)+100*x^4)/(exp(x^2)^2+10*x^2*e
xp(x^2)+25*x^4),x,method=_RETURNVERBOSE)
```

output
```
20*x^2*(5+x)/(5*x^2+exp(x^2))
```

3.49.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{100x^4+e^{x^2}(200x+60x^2-200x^3-40x^4)}{e^{2x^2}+10e^{x^2}x^2+25x^4}\,dx=\frac{20\,(x^3+5\,x^2)}{5\,x^2+e^{(x^2)}}$$

input
```
integrate(((-40*x^4-200*x^3+60*x^2+200*x)*exp(x^2)+100*x^4)/(exp(x^2)^2+10
*x^2*exp(x^2)+25*x^4),x, algorithm=\
```

output
```
20*(x^3 + 5*x^2)/(5*x^2 + e^(x^2))
```

3.49.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{100x^4+e^{x^2}(200x+60x^2-200x^3-40x^4)}{e^{2x^2}+10e^{x^2}x^2+25x^4}\,dx=\frac{20x^3+100x^2}{5x^2+e^{x^2}}$$

input
```
integrate(((-40*x**4-200*x**3+60*x**2+200*x)*exp(x**2)+100*x**4)/(exp(x**2
)**2+10*x**2*exp(x**2)+25*x**4),x)
```

output
```
(20*x**3 + 100*x**2)/(5*x**2 + exp(x**2))
```

3.49.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{100x^4 + e^{x^2}(200x + 60x^2 - 200x^3 - 40x^4)}{e^{2x^2} + 10e^{x^2}x^2 + 25x^4}\,dx = \frac{20\,(x^3 + 5\,x^2)}{5\,x^2 + e^{(x^2)}}$$

input
```
integrate(((-40*x^4-200*x^3+60*x^2+200*x)*exp(x^2)+100*x^4)/(exp(x^2)^2+10
*x^2*exp(x^2)+25*x^4),x, algorithm=\
```

output
```
20*(x^3 + 5*x^2)/(5*x^2 + e^(x^2))
```

3.49.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{100x^4 + e^{x^2}(200x + 60x^2 - 200x^3 - 40x^4)}{e^{2x^2} + 10e^{x^2}x^2 + 25x^4}\,dx = \frac{20\,(x^3 + 5\,x^2)}{5\,x^2 + e^{(x^2)}}$$

input
```
integrate(((-40*x^4-200*x^3+60*x^2+200*x)*exp(x^2)+100*x^4)/(exp(x^2)^2+10
*x^2*exp(x^2)+25*x^4),x, algorithm=\
```

output
```
20*(x^3 + 5*x^2)/(5*x^2 + e^(x^2))
```

3.49.9 Mupad [B] (verification not implemented)

Time = 12.93 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{100x^4 + e^{x^2}(200x + 60x^2 - 200x^3 - 40x^4)}{e^{2x^2} + 10e^{x^2}x^2 + 25x^4}\,dx = \frac{20\,x^2\,(x + 5)}{\mathrm{e}^{x^2} + 5\,x^2}$$

input
```
int((exp(x^2)*(200*x + 60*x^2 - 200*x^3 - 40*x^4) + 100*x^4)/(exp(2*x^2) +
 10*x^2*exp(x^2) + 25*x^4),x)
```

output
```
(20*x^2*(x + 5))/(exp(x^2) + 5*x^2)
```

3.50 $\int \frac{-x-128\log(x)-1908\log^2(x)-6240\log^3(x)+500\log^4(x)}{-x^2-64x\log^2(x)-636x\log^3(x)-1560x\log^4(x)+100x\log^5(x)}\,dx$

3.50.1 Optimal result

Integrand size = 63, antiderivative size = 22

$$\int \frac{-x-128\log(x)-1908\log^2(x)-6240\log^3(x)+500\log^4(x)}{-x^2-64x\log^2(x)-636x\log^3(x)-1560x\log^4(x)+100x\log^5(x)}\,dx = \log\left(-x+4(-16+\log(x))\left(\log(x)+5\log^2(x)\right)^2\right)$$

output
```
ln(4*(ln(x)-16)*(ln(x)+5*ln(x)^2)^2-x)
```

3.50.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-x-128\log(x)-1908\log^2(x)-6240\log^3(x)+500\log^4(x)}{-x^2-64x\log^2(x)-636x\log^3(x)-1560x\log^4(x)+100x\log^5(x)}\,dx = \log\left(x+64\log^2(x)+636\log^3(x)+1560\log^4(x)-100\log^5(x)\right)$$

input
```
Integrate[(-x - 128*Log[x] - 1908*Log[x]^2 - 6240*Log[x]^3 + 500*Log[x]^4)
/(-x^2 - 64*x*Log[x]^2 - 636*x*Log[x]^3 - 1560*x*Log[x]^4 + 100*x*Log[x]^5
),x]
```

output
```
Log[x + 64*Log[x]^2 + 636*Log[x]^3 + 1560*Log[x]^4 - 100*Log[x]^5]
```

3.50.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x+500\log^4(x)-6240\log^3(x)-1908\log^2(x)-128\log(x)}{-x^2+100x\log^5(x)-1560x\log^4(x)-636x\log^3(x)-64x\log^2(x)}\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{500\log^4(x)}{x\left(x-100\log^5(x)+1560\log^4(x)+636\log^3(x)+64\log^2(x)\right)}+\frac{6240\log^3(x)}{x\left(x-100\log^5(x)+1560\log^4(x)+636\log^3(x)+64\log^2(x)\right)}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\int \frac{1}{-100\log^5(x)+1560\log^4(x)+636\log^3(x)+64\log^2(x)+x}dx+128\int \frac{\log(x)}{x\left(-100\log^5(x)+1560\log^4(x)+636\log^3(x)+64\log^2(x)+x\right)}dx+1908\int \frac{\log^2(x)}{x\left(-100\log^5(x)+1560\log^4(x)+636\log^3(x)+64\log^2(x)+x\right)}dx+6240\int \frac{\log^3(x)}{x\left(-100\log^5(x)+1560\log^4(x)+636\log^3(x)+64\log^2(x)+x\right)}dx-500\int \frac{\log^4(x)}{x\left(-100\log^5(x)+1560\log^4(x)+636\log^3(x)+64\log^2(x)+x\right)}dx$$

input
```
Int[(-x - 128*Log[x] - 1908*Log[x]^2 - 6240*Log[x]^3 + 500*Log[x]^4)/(-x^2
 - 64*x*Log[x]^2 - 636*x*Log[x]^3 - 1560*x*Log[x]^4 + 100*x*Log[x]^5),x]
```

output
```
$Aborted
```

3.50.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.50.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

method	result	size
norman	$\ln\left(-100\ln\left(x\right)^{5}+1560\ln\left(x\right)^{4}+636\ln\left(x\right)^{3}+64\ln\left(x\right)^{2}+x\right)$	28
risch	$\ln\left(\ln\left(x\right)^{5}-\frac{78\ln(x)^{4}}{5}-\frac{159\ln(x)^{3}}{25}-\frac{16\ln(x)^{2}}{25}-\frac{x}{100}\right)$	28
parallelrisch	$\ln\left(-100\ln\left(x\right)^{5}+1560\ln\left(x\right)^{4}+636\ln\left(x\right)^{3}+64\ln\left(x\right)^{2}+x\right)$	28
default	$\ln\left(100\ln\left(x\right)^{5}-1560\ln\left(x\right)^{4}-636\ln\left(x\right)^{3}-64\ln\left(x\right)^{2}-x\right)$	30

input
```
int((500*ln(x)^4-6240*ln(x)^3-1908*ln(x)^2-128*ln(x)-x)/(100*x*ln(x)^5-156
0*x*ln(x)^4-636*x*ln(x)^3-64*x*ln(x)^2-x^2),x,method=_RETURNVERBOSE)
```

output
```
ln(-100*ln(x)^5+1560*ln(x)^4+636*ln(x)^3+64*ln(x)^2+x)
```

3.50.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.32

$$\int \frac{-x-128\log(x)-1908\log^2(x)-6240\log^3(x)+500\log^4(x)}{-x^2-64x\log^2(x)-636x\log^3(x)-1560x\log^4(x)+100x\log^5(x)}\,dx = \log\left(100\,\log\left(x\right)^{5}-1560\,\log\left(x\right)^{4}-636\,\log\left(x\right)^{3}-64\,\log\left(x\right)^{2}-x\right)$$

input
```
integrate((500*log(x)^4-6240*log(x)^3-1908*log(x)^2-128*log(x)-x)/(100*x*l
og(x)^5-1560*x*log(x)^4-636*x*log(x)^3-64*x*log(x)^2-x^2),x, algorithm=\
```

output
```
log(100*log(x)^5 - 1560*log(x)^4 - 636*log(x)^3 - 64*log(x)^2 - x)
```

3.50.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int \frac{-x-128\log(x)-1908\log^2(x)-6240\log^3(x)+500\log^4(x)}{-x^2-64x\log^2(x)-636x\log^3(x)-1560x\log^4(x)+100x\log^5(x)}\,dx$$
$$=\log\left(-\frac{x}{100}+\log(x)^5-\frac{78\log(x)^4}{5}-\frac{159\log(x)^3}{25}-\frac{16\log(x)^2}{25}\right)$$

input
```
integrate((500*ln(x)**4-6240*ln(x)**3-1908*ln(x)**2-128*ln(x)-x)/(100*x*ln
(x)**5-1560*x*ln(x)**4-636*x*ln(x)**3-64*x*ln(x)**2-x**2),x)
```

output
```
log(-x/100 + log(x)**5 - 78*log(x)**4/5 - 159*log(x)**3/25 - 16*log(x)**2/
25)
```

3.50.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-x-128\log(x)-1908\log^2(x)-6240\log^3(x)+500\log^4(x)}{-x^2-64x\log^2(x)-636x\log^3(x)-1560x\log^4(x)+100x\log^5(x)}\,dx$$
$$=\log\left(\log(x)^5-\frac{78}{5}\log(x)^4-\frac{159}{25}\log(x)^3-\frac{16}{25}\log(x)^2-\frac{1}{100}x\right)$$

input
```
integrate((500*log(x)^4-6240*log(x)^3-1908*log(x)^2-128*log(x)-x)/(100*x*l
og(x)^5-1560*x*log(x)^4-636*x*log(x)^3-64*x*log(x)^2-x^2),x, algorithm=\
```

output
```
log(log(x)^5 - 78/5*log(x)^4 - 159/25*log(x)^3 - 16/25*log(x)^2 - 1/100*x)
```

3.50.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.32

$$\int \frac{-x-128\log(x)-1908\log^2(x)-6240\log^3(x)+500\log^4(x)}{-x^2-64x\log^2(x)-636x\log^3(x)-1560x\log^4(x)+100x\log^5(x)}\,dx$$
$$=\log\left(100\log(x)^5-1560\log(x)^4-636\log(x)^3-64\log(x)^2-x\right)$$

input
```
integrate((500*log(x)^4-6240*log(x)^3-1908*log(x)^2-128*log(x)-x)/(100*x*l
og(x)^5-1560*x*log(x)^4-636*x*log(x)^3-64*x*log(x)^2-x^2),x, algorithm=\
```

output
```
log(100*log(x)^5 - 1560*log(x)^4 - 636*log(x)^3 - 64*log(x)^2 - x)
```

3.50.9 Mupad [B] (verification not implemented)

Time = 13.03 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-x-128\log(x)-1908\log^2(x)-6240\log^3(x)+500\log^4(x)}{-x^2-64x\log^2(x)-636x\log^3(x)-1560x\log^4(x)+100x\log^5(x)}\,dx = \ln\left(-100\ln(x)^5+1560\ln(x)^4+636\ln(x)^3+64\ln(x)^2+x\right)$$

input
```
int((x + 128*log(x) + 1908*log(x)^2 + 6240*log(x)^3 - 500*log(x)^4)/(64*x*
log(x)^2 + 636*x*log(x)^3 + 1560*x*log(x)^4 - 100*x*log(x)^5 + x^2),x)
```

output
```
log(x + 64*log(x)^2 + 636*log(x)^3 + 1560*log(x)^4 - 100*log(x)^5)
```

3.51 $\int \frac{e^{e^x} (-1+e^x (-17+e^2-x))}{\log(3)} \, dx$

3.51.1 Optimal result

Integrand size = 24, antiderivative size = 18

$$\int \frac{e^{e^x} (-1+e^x (-17+e^2-x))}{\log(3)} \, dx = \frac{e^{e^x} (-17+e^2-x)}{\log(3)}$$

output
```
(exp(2)-x-17)/ln(3)*exp(exp(x))
```

3.51.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{e^{e^x} (-1+e^x (-17+e^2-x))}{\log(3)} \, dx = \frac{e^{e^x} (-17+e^2-x)}{\log(3)}$$

input
```
Integrate[(E^E^x*(-1 + E^x*(-17 + E^2 - x)))/Log[3],x]
```

output
```
(E^E^x*(-17 + E^2 - x))/Log[3]
```

3.51.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {27, 25, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^x}\left(e^x\left(-x+e^2-17\right)-1\right)}{\log(3)}dx$$
$$\Big\downarrow \text{ 27}$$
$$\frac{\int -e^{e^x}\left(e^x\left(x-e^2+17\right)+1\right)dx}{\log(3)}$$
$$\Big\downarrow \text{ 25}$$
$$-\frac{\int e^{e^x}\left(e^x\left(x-e^2+17\right)+1\right)dx}{\log(3)}$$
$$\Big\downarrow \text{ 2726}$$
$$-\frac{e^{e^x}\left(x-e^2+17\right)}{\log(3)}$$

input
```
Int[(E^E^x*(-1 + E^x*(-17 + E^2 - x)))/Log[3],x]
```

output
```
-((E^E^x*(17 - E^2 + x))/Log[3])
```

3.51.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.51.4 Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

method	result	size
risch	$\frac{(\mathrm{e}^2-x-17)\,\mathrm{e}^{\mathrm{e}^x}}{\ln(3)}$	16
norman	$\frac{(\mathrm{e}^2-17)\,\mathrm{e}^{\mathrm{e}^x}}{\ln(3)}-\frac{x\,\mathrm{e}^{\mathrm{e}^x}}{\ln(3)}$	24
parallelrisch	$\frac{\mathrm{e}^2\mathrm{e}^{\mathrm{e}^x}-x\,\mathrm{e}^{\mathrm{e}^x}-17\,\mathrm{e}^{\mathrm{e}^x}}{\ln(3)}$	24

input
```
int(((exp(2)-x-17)*exp(x)-1)*exp(exp(x))/ln(3),x,method=_RETURNVERBOSE)
```

output
```
(exp(2)-x-17)/ln(3)*exp(exp(x))
```

3.51.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{e^{e^x}(-1+e^x(-17+e^2-x))}{\log(3)}\,dx=-\frac{(x-e^2+17)e^{(e^x)}}{\log(3)}$$

input
```
integrate(((exp(2)-x-17)*exp(x)-1)*exp(exp(x))/log(3),x, algorithm=\
```

output
```
-(x - e^2 + 17)*e^(e^x)/log(3)
```

3.51.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{e^{e^x}(-1+e^x(-17+e^2-x))}{\log(3)}\,dx=\frac{(-x-17+e^2)\,e^{e^x}}{\log(3)}$$

input
```
integrate(((exp(2)-x-17)*exp(x)-1)*exp(exp(x))/ln(3),x)
```

output
```
(-x - 17 + exp(2))*exp(exp(x))/log(3)
```

3.51.7 Maxima [F]

$$\int \frac{e^{e^x}(-1+e^x(-17+e^2-x))}{\log(3)}\,dx = \int -\frac{((x-e^2+17)e^x+1)e^{(e^x)}}{\log(3)}\,dx$$

input
```
integrate(((exp(2)-x-17)*exp(x)-1)*exp(exp(x))/log(3),x, algorithm=\
```

output
```
-((x - e^2)*e^(e^x) + Ei(e^x) + 17*e^(e^x) - integrate(e^(e^x), x))/log(3)
```

3.51.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 33 vs. 2(16) = 32.

Time = 0.28 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.83

$$\int \frac{e^{e^x}(-1+e^x(-17+e^2-x))}{\log(3)}\,dx = -\frac{\left(xe^{(x+e^x)}-e^{(x+e^x+2)}+17\,e^{(x+e^x)}\right)e^{(-x)}}{\log(3)}$$

input
```
integrate(((exp(2)-x-17)*exp(x)-1)*exp(exp(x))/log(3),x, algorithm=\
```

output
```
-(x*e^(x + e^x) - e^(x + e^x + 2) + 17*e^(x + e^x))*e^(-x)/log(3)
```

3.51.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{e^{e^x}(-1+e^x(-17+e^2-x))}{\log(3)}\,dx = -\frac{e^{e^x}\,(x-e^2+17)}{\ln(3)}$$

input
```
int(-(exp(exp(x))*(exp(x)*(x - exp(2) + 17) + 1))/log(3),x)
```

output
```
-(exp(exp(x))*(x - exp(2) + 17))/log(3)
```

3.52 $\int e^{4e^{1+\log^2(5)}x}\left(-4x^3-4e^{1+\log^2(5)}x^4\right)\,dx$

3.52.1 Optimal result

Integrand size = 33, antiderivative size = 20

$$\int e^{4e^{1+\log^2(5)}x}\left(-4x^3-4e^{1+\log^2(5)}x^4\right)\,dx=2-e^{4e^{1+\log^2(5)}x}x^4$$

output
```
2-exp(x*exp(1)*exp(ln(5)^2))^4*x^4
```

3.52.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int e^{4e^{1+\log^2(5)}x}\left(-4x^3-4e^{1+\log^2(5)}x^4\right)\,dx=-e^{4e^{1+\log^2(5)}x}x^4$$

input
```
Integrate[E^(4*E^(1 + Log[5]^2)*x)*(-4*x^3 - 4*E^(1 + Log[5]^2)*x^4),x]
```

output
```
-(E^(4*E^(1 + Log[5]^2)*x)*x^4)
```

3.52.3 Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2027, 2626, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{4xe^{1+\log^2(5)}}\left(-4x^4e^{1+\log^2(5)}-4x^3\right)dx$$

$$\Big\downarrow \text{2027}$$

$$\int x^3e^{4xe^{1+\log^2(5)}}\left(-4xe^{1+\log^2(5)}-4\right)dx$$

$$\Big\downarrow \text{2626}$$

$$\int \left(-4x^4e^{4xe^{1+\log^2(5)}+1+\log^2(5)}-4x^3e^{4xe^{1+\log^2(5)}}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^4\left(-e^{4xe^{1+\log^2(5)}}\right)$$

input
```
Int[E^(4*E^(1 + Log[5]^2)*x)*(-4*x^3 - 4*E^(1 + Log[5]^2)*x^4),x]
```

output
```
-(E^(4*E^(1 + Log[5]^2)*x)*x^4)
```

3.52.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2027
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.))^(p_.), x_Symbol] :> Int[x^
(p*r)*(a + b*x^(s - r))^p*Fx, x] /; FreeQ[{a, b, r, s}, x] && IntegerQ[p] &
& PosQ[s - r] && !(EqQ[p, 1] && EqQ[u, 1])
```

rule 2626
```
Int[(F_)^(v_)*(Px_), x_Symbol] :> Int[ExpandIntegrand[F^v, Px, x], x] /; Fr
eeQ[F, x] && PolynomialQ[Px, x] && LinearQ[v, x] && !TrueQ[$UseGamma]
```

3.52.4 Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

method	result
risch	$-\mathrm{e}^{4x\,\mathrm{e}^{\ln(5)^2+1}}x^4$
gosper	$-\mathrm{e}^{4x\,\mathrm{e}^{\ln(5)^2+1}}x^4$
norman	$-\mathrm{e}^{4x\,\mathrm{e}^{\ln(5)^2+1}}x^4$
parallelrisch	$-\mathrm{e}^{4x\,\mathrm{e}^{\ln(5)^2+1}}x^4$
meijerg	$\frac{\mathrm{e}^{-4-4\ln(5)^2}\left(24-\frac{\mathrm{e}^{4x\,\mathrm{e}^{\ln(5)^2+1}}\left(1280x^4\mathrm{e}^{4+4\ln(5)^2}-1280x^3\mathrm{e}^{3+3\ln(5)^2}+960x^2\mathrm{e}^{2+2\ln(5)^2}-480x\,\mathrm{e}^{\ln(5)^2+1}+120\right)}{5}\right)}{256}-\frac{\mathrm{e}^{-4-}}{}$
derivativedivides	$4\,\mathrm{e}^{-1}\mathrm{e}^{-\ln(5)^2}\left(-\mathrm{e}^{-3}\mathrm{e}^{-3\ln(5)^2}\left(\frac{\mathrm{e}^{4x\,\mathrm{e}^{\ln(5)^2+1}}x^3\mathrm{e}^3\mathrm{e}^{3\ln(5)^2}}{4}-\frac{3x^2\mathrm{e}^2\mathrm{e}^{2\ln(5)^2}\mathrm{e}^{4x\,\mathrm{e}^{\ln(5)^2+1}}}{16}+\frac{3x\,\mathrm{e}\,\mathrm{e}^{\ln(5)^2}\mathrm{e}^{4x\,\mathrm{e}^{\ln}}}{32}\right.\right.$
default	$4\,\mathrm{e}^{-1}\mathrm{e}^{-\ln(5)^2}\left(-\mathrm{e}^{-3}\mathrm{e}^{-3\ln(5)^2}\left(\frac{\mathrm{e}^{4x\,\mathrm{e}^{\ln(5)^2+1}}x^3\mathrm{e}^3\mathrm{e}^{3\ln(5)^2}}{4}-\frac{3x^2\mathrm{e}^2\mathrm{e}^{2\ln(5)^2}\mathrm{e}^{4x\,\mathrm{e}^{\ln(5)^2+1}}}{16}+\frac{3x\,\mathrm{e}\,\mathrm{e}^{\ln(5)^2}\mathrm{e}^{4x\,\mathrm{e}^{\ln}}}{32}\right.\right.$

input
```
int((-4*x^4*exp(1)*exp(ln(5)^2)-4*x^3)*exp(x*exp(1)*exp(ln(5)^2))^4,x,meth
od=_RETURNVERBOSE)
```

output
```
-exp(4*x*exp(ln(5)^2+1))*x^4
```

3.52.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int e^{4e^{1+\log^2(5)}x}\left(-4x^3-4e^{1+\log^2(5)}x^4\right)\,dx=-x^4e^{\left(4\,xe^{\left(\log(5)^2+1\right)}\right)}$$

input
```
integrate((-4*x^4*exp(1)*exp(log(5)^2)-4*x^3)*exp(x*exp(1)*exp(log(5)^2))^
4,x, algorithm=\
```

output
```
-x^4*e^(4*x*e^(log(5)^2 + 1))
```

3.52.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int e^{4e^{1+\log^2(5)}x}\left(-4x^3-4e^{1+\log^2(5)}x^4\right)\,dx=-x^4e^{4exe^{\log(5)^2}}$$

input
```
integrate((-4*x**4*exp(1)*exp(ln(5)**2)-4*x**3)*exp(x*exp(1)*exp(ln(5)**2)
)**4,x)
```

output
```
-x**4*exp(4*E*x*exp(log(5)**2))
```

3.52.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 137 vs. $2(18) = 36$.

Time = 0.28 (sec) , antiderivative size = 137, normalized size of antiderivative = 6.85

$$\int e^{4e^{1+\log^2(5)}x}\left(-4x^3-4e^{1+\log^2(5)}x^4\right)\,dx=$$
$$-\frac{1}{32}\left(32\,x^4e^{\left(4\,\log(5)^2+4\right)}-32\,x^3e^{\left(3\,\log(5)^2+3\right)}+24\,x^2e^{\left(2\,\log(5)^2+2\right)}-12\,xe^{\left(\log(5)^2+1\right)}+3\right)e^{\left(4\,xe^{\left(\log(5)^2+1\right)}-4\,\mathrm{lo}\right.}$$
$$-\frac{1}{32}\left(32\,x^3e^{\left(3\,\log(5)^2+3\right)}-24\,x^2e^{\left(2\,\log(5)^2+2\right)}+12\,xe^{\left(\log(5)^2+1\right)}-3\right)e^{\left(4\,xe^{\left(\log(5)^2+1\right)}-4\,\log(5)^2-4\right)}$$

input
```
integrate((-4*x^4*exp(1)*exp(log(5)^2)-4*x^3)*exp(x*exp(1)*exp(log(5)^2))^
4,x, algorithm=\
```

output
```
-1/32*(32*x^4*e^(4*log(5)^2 + 4) - 32*x^3*e^(3*log(5)^2 + 3) + 24*x^2*e^(2
*log(5)^2 + 2) - 12*x*e^(log(5)^2 + 1) + 3)*e^(4*x*e^(log(5)^2 + 1) - 4*lo
g(5)^2 - 4) - 1/32*(32*x^3*e^(3*log(5)^2 + 3) - 24*x^2*e^(2*log(5)^2 + 2)
+ 12*x*e^(log(5)^2 + 1) - 3)*e^(4*x*e^(log(5)^2 + 1) - 4*log(5)^2 - 4)
```

3.52.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 137 vs. 2(18) = 36.

Time = 0.28 (sec) , antiderivative size = 137, normalized size of antiderivative = 6.85

$$\int e^{4e^{1+\log^2(5)}x}\left(-4x^3-4e^{1+\log^2(5)}x^4\right)\,dx =$$
$$-\frac{1}{32}\left(32\,x^4e^{\left(4\,\log(5)^2+4\right)}-32\,x^3e^{\left(3\,\log(5)^2+3\right)}+24\,x^2e^{\left(2\,\log(5)^2+2\right)}-12\,xe^{\left(\log(5)^2+1\right)}+3\right)e^{\left(4\,xe^{\left(\log(5)^2+1\right)}-4\,\mathrm{lo}\right.}$$
$$-\frac{1}{32}\left(32\,x^3e^{\left(3\,\log(5)^2+3\right)}-24\,x^2e^{\left(2\,\log(5)^2+2\right)}+12\,xe^{\left(\log(5)^2+1\right)}-3\right)e^{\left(4\,xe^{\left(\log(5)^2+1\right)}-4\,\log(5)^2-4\right)}$$

input
```
integrate((-4*x^4*exp(1)*exp(log(5)^2)-4*x^3)*exp(x*exp(1)*exp(log(5)^2))^
4,x, algorithm=\
```

output
```
-1/32*(32*x^4*e^(4*log(5)^2 + 4) - 32*x^3*e^(3*log(5)^2 + 3) + 24*x^2*e^(2
*log(5)^2 + 2) - 12*x*e^(log(5)^2 + 1) + 3)*e^(4*x*e^(log(5)^2 + 1) - 4*lo
g(5)^2 - 4) - 1/32*(32*x^3*e^(3*log(5)^2 + 3) - 24*x^2*e^(2*log(5)^2 + 2)
+ 12*x*e^(log(5)^2 + 1) - 3)*e^(4*x*e^(log(5)^2 + 1) - 4*log(5)^2 - 4)
```

3.52.9 Mupad [B] (verification not implemented)

Time = 13.08 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int e^{4e^{1+\log^2(5)}x}\left(-4x^3-4e^{1+\log^2(5)}x^4\right)\,dx = -x^4\,\mathrm{e}^{4\,x\,\mathrm{e}^{\ln(5)^2}\,\mathrm{e}}$$

input
```
int(-exp(4*x*exp(log(5)^2)*exp(1))*(4*x^3 + 4*x^4*exp(log(5)^2)*exp(1)),x)
```

output
```
-x^4*exp(4*x*exp(log(5)^2)*exp(1))
```

3.53 $\int \frac{5+20x+x^2+8e^2x^2+12x^3+2x^2\log(x)}{4x}\,dx$

3.53.1 Optimal result

Integrand size = 35, antiderivative size = 17

$$\int \frac{5+20x+x^2+8e^2x^2+12x^3+2x^2\log(x)}{4x}\,dx=\left(5+x^2\right)\left(e^2+x+\frac{\log(x)}{4}\right)$$

output
```
(exp(2)+1/4*ln(x)+x)*(x^2+5)
```

3.53.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.71

$$\int \frac{5+20x+x^2+8e^2x^2+12x^3+2x^2\log(x)}{4x}\,dx=5x+e^2x^2+x^3+\frac{5\log(x)}{4}+\frac{1}{4}x^2\log(x)$$

input
```
Integrate[(5 + 20*x + x^2 + 8*E^2*x^2 + 12*x^3 + 2*x^2*Log[x])/(4*x),x]
```

output
```
5*x + E^2*x^2 + x^3 + (5*Log[x])/4 + (x^2*Log[x])/4
```

3.53.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 44 vs. $2(17) = 34$.

Time = 0.21 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.59, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.114$, Rules used = {6, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{12x^3+8e^2x^2+x^2+2x^2\log(x)+20x+5}{4x}\,dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{12x^3+\left(1+8e^2\right)x^2+2x^2\log(x)+20x+5}{4x}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{4}\int \frac{12x^3+2\log(x)x^2+\left(1+8e^2\right)x^2+20x+5}{x}dx$$

$$\Big\downarrow \ 2010$$

$$\frac{1}{4}\int \left(\frac{12x^3+\left(1+8e^2\right)x^2+20x+5}{x}+2x\log(x)\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{4}\left(4x^3+\frac{1}{2}\left(1+8e^2\right)x^2-\frac{x^2}{2}+x^2\log(x)+20x+5\log(x)\right)$$

input
```
Int[(5 + 20*x + x^2 + 8*E^2*x^2 + 12*x^3 + 2*x^2*Log[x])/(4*x),x]
```

output
```
(20*x - x^2/2 + ((1 + 8*E^2)*x^2)/2 + 4*x^3 + 5*Log[x] + x^2*Log[x])/4
```

3.53.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.53.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.47

method	result	size
default	$\frac{x^2 \ln(x)}{4} + x^2 e^2 + x^3 + 5x + \frac{5 \ln(x)}{4}$	25
norman	$\frac{x^2 \ln(x)}{4} + x^2 e^2 + x^3 + 5x + \frac{5 \ln(x)}{4}$	25
risch	$\frac{x^2 \ln(x)}{4} + x^2 e^2 + x^3 + 5x + \frac{5 \ln(x)}{4}$	25
parallelrisch	$\frac{x^2 \ln(x)}{4} + x^2 e^2 + x^3 + 5x + \frac{5 \ln(x)}{4}$	25
parts	$\frac{x^2 \ln(x)}{4} + x^2 e^2 + x^3 + 5x + \frac{5 \ln(x)}{4}$	25

input
```
int(1/4*(2*x^2*ln(x)+8*x^2*exp(2)+12*x^3+x^2+20*x+5)/x,x,method=_RETURNVER
BOSE)
```

output
```
1/4*x^2*ln(x)+x^2*exp(2)+x^3+5*x+5/4*ln(x)
```

3.53.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

$$\int \frac{5+20x+x^2+8e^2x^2+12x^3+2x^2\log(x)}{4x}\,dx = x^3+x^2e^2+\frac{1}{4}\left(x^2+5\right)\log\left(x\right)+5\,x$$

input
```
integrate(1/4*(2*x^2*log(x)+8*x^2*exp(2)+12*x^3+x^2+20*x+5)/x,x, algorithm
=\
```

output
```
x^3 + x^2*e^2 + 1/4*(x^2 + 5)*log(x) + 5*x
```

3.53.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.59

$$\int \frac{5+20x+x^2+8e^2x^2+12x^3+2x^2\log(x)}{4x}\,dx = x^3+\frac{x^2\log\left(x\right)}{4}+x^2e^2+5x+\frac{5\log\left(x\right)}{4}$$

input
```
integrate(1/4*(2*x**2*ln(x)+8*x**2*exp(2)+12*x**3+x**2+20*x+5)/x,x)
```

output
```
x**3 + x**2*log(x)/4 + x**2*exp(2) + 5*x + 5*log(x)/4
```

3.53.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.41

$$\int \frac{5+20x+x^2+8e^2x^2+12x^3+2x^2\log(x)}{4x}\,dx = x^3+x^2e^2+\frac{1}{4}\,x^2\log\left(x\right)+5\,x+\frac{5}{4}\,\log\left(x\right)$$

input
```
integrate(1/4*(2*x^2*log(x)+8*x^2*exp(2)+12*x^3+x^2+20*x+5)/x,x, algorithm
=\
```

output
```
x^3 + x^2*e^2 + 1/4*x^2*log(x) + 5*x + 5/4*log(x)
```

3.53.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.41

$$\int \frac{5+20x+x^2+8e^2x^2+12x^3+2x^2\log(x)}{4x}\,dx = x^3 + x^2e^2 + \frac{1}{4}\,x^2\log\left(x\right) + 5\,x + \frac{5}{4}\,\log\left(x\right)$$

input
```
integrate(1/4*(2*x^2*log(x)+8*x^2*exp(2)+12*x^3+x^2+20*x+5)/x,x, algorithm
=\
```

output
```
x^3 + x^2*e^2 + 1/4*x^2*log(x) + 5*x + 5/4*log(x)
```

3.53.9 Mupad [B] (verification not implemented)

Time = 14.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.41

$$\int \frac{5+20x+x^2+8e^2x^2+12x^3+2x^2\log(x)}{4x}\,dx = 5\,x + \frac{5\,\ln\left(x\right)}{4} + \frac{x^2\,\ln\left(x\right)}{4} + x^2\,\mathrm{e}^2 + x^3$$

input
```
int((5*x + (x^2*log(x))/2 + 2*x^2*exp(2) + x^2/4 + 3*x^3 + 5/4)/x,x)
```

output
```
5*x + (5*log(x))/4 + (x^2*log(x))/4 + x^2*exp(2) + x^3
```

3.54 $\int (5+2x)\,dx$

3.54.1 Optimal result

Integrand size = 5, antiderivative size = 15

$$\int (5+2x)\,dx = 5x + x^2 + \left(-1+\log^2(9)\right)^2$$

output
```
(4*ln(3)^2-1)^2+x^2+5*x
```

3.54.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.47

$$\int (5+2x)\,dx = 5x + x^2$$

input
```
Integrate[5 + 2*x,x]
```

output
```
5*x + x^2
```

3.54.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.73, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (2x+5)\,dx$$
$$\Big\downarrow \, 17$$
$$\frac{1}{4}(2x+5)^2$$

input
```
Int[5 + 2*x,x]
```

output
```
(5 + 2*x)^2/4
```

3.54.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.54.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

method	result	size
gosper	x^2+5x	8
default	x^2+5x	8
norman	x^2+5x	8
risch	x^2+5x	8
parallelrisch	x^2+5x	8
parts	x^2+5x	8

input
```
int(5+2*x,x,method=_RETURNVERBOSE)
```

output
```
x^2+5*x
```

3.54.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.47

$$\int (5+2x)\,dx = x^2 + 5\,x$$

input
```
integrate(5+2*x,x, algorithm=\
```

output
```
x^2 + 5*x
```

3.54.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.33

$$\int (5+2x)\,dx = x^2 + 5x$$

input
```
integrate(5+2*x,x)
```

output
```
x**2 + 5*x
```

3.54.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.47

$$\int (5+2x)\,dx = x^2 + 5\,x$$

input
```
integrate(5+2*x,x, algorithm=\
```

output
```
x^2 + 5*x
```

3.54.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.47

$$\int (5+2x)\,dx = x^2 + 5\,x$$

input
```
integrate(5+2*x,x, algorithm=\
```

output
```
x^2 + 5*x
```

3.54.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.33

$$\int (5+2x)\,dx = x\,(x+5)$$

input
```
int(2*x + 5,x)
```

output
```
x*(x + 5)
```

3.55 $\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}(-32x+8x^2+14x^3+2x^4)\right)}{16+8x+x^2}\,dx$

3.55.1 Optimal result

Integrand size = 92, antiderivative size = 34

$$\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}(-32x+8x^2+14x^3+2x^4)\right)}{16+8x+x^2}\,dx$$
$$= x^2\left(7-x-e^x x\left(\frac{e^{x\left(-3+\frac{2}{4+x}\right)}}{x}+x\right)\right)$$

output
```
(7-exp(x)*(x+exp((2/(4+x)-3)*x)/x)*x-x)*x^2
```

3.55.2 Mathematica [A] (verified)

Time = 5.15 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.94

$$\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}(-32x+8x^2+14x^3+2x^4)\right)}{16+8x+x^2}\,dx$$
$$= x^2\left(7-e^{-\frac{2x(3+x)}{4+x}}-x-e^x x^2\right)$$

input
```
Integrate[(224*x + 64*x^2 - 10*x^3 - 3*x^4 + E^x*(-64*x^3 - 48*x^4 - 12*x^
5 - x^6 + E^((-10*x - 3*x^2)/(4 + x))*(-32*x + 8*x^2 + 14*x^3 + 2*x^4)))/(
16 + 8*x + x^2),x]
```

3.55. $\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}(-32x+8x^2+14x^3+2x^4)\right)}{16+8x+x^2}\,dx$

output
```
x^2*(7 - E^((-2*x*(3 + x))/(4 + x)) - x - E^x*x^2)
```

3.55.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^4-10x^3+64x^2+e^x\left(-x^6-12x^5-48x^4-64x^3+e^{\frac{-3x^2-10x}{x+4}}\left(2x^4+14x^3+8x^2-32x\right)\right)+224x}{x^2+8x+16}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{-3x^4-10x^3+64x^2+e^x\left(-x^6-12x^5-48x^4-64x^3+e^{\frac{-3x^2-10x}{x+4}}\left(2x^4+14x^3+8x^2-32x\right)\right)+224x}{(x+4)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{e^x x^6}{(x+4)^2}-\frac{12e^x x^5}{(x+4)^2}-\frac{48e^x x^4}{(x+4)^2}-\frac{3x^4}{(x+4)^2}-\frac{64e^x x^3}{(x+4)^2}-\frac{10x^3}{(x+4)^2}+\frac{64x^2}{(x+4)^2}+\frac{2e^{-\frac{2x(x+3)}{x+4}}\left(x^3+7x^2+4x\right.}{(x+4)^2}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$2\int e^{-\frac{2x(x+3)}{x+4}}x^2dx-8\int e^{-\frac{2x(x+3)}{x+4}}dx-2\int e^{-\frac{2x(x+3)}{x+4}}xdx-128\int \frac{e^{-\frac{2x(x+3)}{x+4}}}{(x+4)^2}dx+64\int \frac{e^{-\frac{2x(x+3)}{x+4}}}{x+4}dx-e^x x^4-x^3+7x^2$$

input
```
Int[(224*x + 64*x^2 - 10*x^3 - 3*x^4 + E^x*(-64*x^3 - 48*x^4 - 12*x^5 - x^
6 + E^((-10*x - 3*x^2)/(4 + x))*(-32*x + 8*x^2 + 14*x^3 + 2*x^4)))/(16 + 8
*x + x^2),x]
```

output
```
$Aborted
```

3.55.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.55.4 Maple [A] (verified)

Time = 0.87 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06

method	result	size
risch	$-{\rm e}^{x} x^{4}-x^{2} {\rm e}^{-\frac{2 (3+x) x}{4+x}}-x^{3}+7 x^{2}$	36
parallelrisch	$-{\rm e}^{x} x^{4}-{\rm e}^{x} x^{2} {\rm e}^{\frac{-3 x^{2}-10 x}{4+x}}-x^{3}+7 x^{2}-\frac{56}{3}$	43
parts	$\frac{-4 \,{\rm e}^{x} x^{4}-x^{5} {\rm e}^{x}-4 \,{\rm e}^{x} x^{2} {\rm e}^{\frac{-3 x^{2}-10 x}{4+x}}-{\rm e}^{x} x^{3} {\rm e}^{\frac{-3 x^{2}-10 x}{4+x}}}{4+x}-x^{3}+7 x^{2}$	79
norman	$\frac{28 x^{2}+3 x^{3}-x^{4}-x^{5} {\rm e}^{x}-4 \,{\rm e}^{x} x^{4}-4 \,{\rm e}^{x} x^{2} {\rm e}^{\frac{-3 x^{2}-10 x}{4+x}}-{\rm e}^{x} x^{3} {\rm e}^{\frac{-3 x^{2}-10 x}{4+x}}}{4+x}$	83

input
```
int((((2*x^4+14*x^3+8*x^2-32*x)*exp((-3*x^2-10*x)/(4+x))-x^6-12*x^5-48*x^4
-64*x^3)*exp(x)-3*x^4-10*x^3+64*x^2+224*x)/(x^2+8*x+16),x,method=_RETURNVE
RBOSE)
```

output
```
-exp(x)*x^4-x^2*exp(-2*(3+x)*x/(4+x))-x^3+7*x^2
```

3.55. $\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}\left(-32x+8x^2+14x^3+2x^4\right)\right)}{16+8x+x^2}\,dx$

3.55.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.18

$$\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}(-32x+8x^2+14x^3+2x^4)\right)}{16+8x+x^2}\,dx$$
$$= -x^3+7\,x^2-\left(x^4+x^2e^{\left(-\frac{3\,x^2+10\,x}{x+4}\right)}\right)e^x$$

input
```
integrate((((2*x^4+14*x^3+8*x^2-32*x)*exp((-3*x^2-10*x)/(4+x))-x^6-12*x^5-
48*x^4-64*x^3)*exp(x)-3*x^4-10*x^3+64*x^2+224*x)/(x^2+8*x+16),x, algorithm
=\
```

output
```
-x^3 + 7*x^2 - (x^4 + x^2*e^(-(3*x^2 + 10*x)/(x + 4)))*e^x
```

3.55.6 Sympy [A] (verification not implemented)

Time = 3.21 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06

$$\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}(-32x+8x^2+14x^3+2x^4)\right)}{16+8x+x^2}\,dx$$
$$= -x^4e^x-x^3-x^2e^xe^{\frac{-3x^2-10x}{x+4}}+7x^2$$

input
```
integrate((((2*x**4+14*x**3+8*x**2-32*x)*exp((-3*x**2-10*x)/(4+x))-x**6-12
*x**5-48*x**4-64*x**3)*exp(x)-3*x**4-10*x**3+64*x**2+224*x)/(x**2+8*x+16),
x)
```

output
```
-x**4*exp(x) - x**3 - x**2*exp(x)*exp((-3*x**2 - 10*x)/(x + 4)) + 7*x**2
```

3.55.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.18

$$\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}\left(-32x+8x^2+14x^3+2x^4\right)\right)}{16+8x+x^2}\,dx$$
$$= -x^3+7\,x^2-\left(x^4e^{(3\,x)}+x^2e^{\left(-\frac{8}{x+4}+2\right)}\right)e^{(-2\,x)}$$

input
```
integrate((((2*x^4+14*x^3+8*x^2-32*x)*exp((-3*x^2-10*x)/(4+x))-x^6-12*x^5-
48*x^4-64*x^3)*exp(x)-3*x^4-10*x^3+64*x^2+224*x)/(x^2+8*x+16),x, algorithm
=\
```

output
```
-x^3 + 7*x^2 - (x^4*e^(3*x) + x^2*e^(-8/(x + 4) + 2))*e^(-2*x)
```

3.55.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.12

$$\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}\left(-32x+8x^2+14x^3+2x^4\right)\right)}{16+8x+x^2}\,dx$$
$$= -x^4e^x-x^3-x^2e^{\left(-\frac{2\,\left(x^2+3\,x\right)}{x+4}\right)}+7\,x^2$$

input
```
integrate((((2*x^4+14*x^3+8*x^2-32*x)*exp((-3*x^2-10*x)/(4+x))-x^6-12*x^5-
48*x^4-64*x^3)*exp(x)-3*x^4-10*x^3+64*x^2+224*x)/(x^2+8*x+16),x, algorithm
=\
```

output
```
-x^4*e^x - x^3 - x^2*e^(-2*(x^2 + 3*x)/(x + 4)) + 7*x^2
```

3.55.9 Mupad [B] (verification not implemented)

Time = 14.42 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.29

$$\int \frac{224x+64x^2-10x^3-3x^4+e^x\left(-64x^3-48x^4-12x^5-x^6+e^{\frac{-10x-3x^2}{4+x}}(-32x+8x^2+14x^3+2x^4)\right)}{16+8x+x^2}\,dx$$
$$=7\,x^2-x^4\,\mathrm{e}^x-x^3-x^2\,\mathrm{e}^{x-\frac{10\,x}{x+4}-\frac{3\,x^2}{x+4}}$$

input
```
int(-(exp(x)*(64*x^3 - exp(-(10*x + 3*x^2)/(x + 4))*(8*x^2 - 32*x + 14*x^3
 + 2*x^4) + 48*x^4 + 12*x^5 + x^6) - 224*x - 64*x^2 + 10*x^3 + 3*x^4)/(8*x
 + x^2 + 16),x)
```

output
```
7*x^2 - x^4*exp(x) - x^3 - x^2*exp(x - (10*x)/(x + 4) - (3*x^2)/(x + 4))
```

3.56 $\int \frac{130x^3+e^{2x}(78x+52x^2)+e^x(208x^2+52x^3)+26\log(2)}{12e^{4x}x^5+48e^{3x}x^6+12x^9+12x^6\log(2)+3x^3\log^2(2)+e^{2x}(72x^7+12x^4\log(2))+e^x(48x^8+24x^5\log(2))}\,dx$

3.56.1 Optimal result

Integrand size = 121, antiderivative size = 24

$$\int \frac{130x^3+e^{2x}(78x+52x^2)+e^x(208x^2+52x^3)+26\log(2)}{12e^{4x}x^5+48e^{3x}x^6+12x^9+12x^6\log(2)+3x^3\log^2(2)+e^{2x}\left(72x^7+12x^4\log(2)\right)+e^x\left(48x^8+24x^5\log(2)\right)}\,dx = 5-\frac{13}{3x^2\left(2x\left(e^x+x\right)^2+\log(2)\right)}$$

output
```
-13/3/x^2/(ln(2)+2*x*(exp(x)+x)^2)+5
```

3.56.2 Mathematica [A] (verified)

Time = 5.07 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.38

$$\int \frac{130x^3+e^{2x}(78x+52x^2)+e^x(208x^2+52x^3)+26\log(2)}{12e^{4x}x^5+48e^{3x}x^6+12x^9+12x^6\log(2)+3x^3\log^2(2)+e^{2x}\left(72x^7+12x^4\log(2)\right)+e^x\left(48x^8+24x^5\log(2)\right)}\,dx = -\frac{13}{3x^2\left(2e^{2x}x+4e^xx^2+2x^3+\log(2)\right)}$$

input
```
Integrate[(130*x^3 + E^(2*x)*(78*x + 52*x^2) + E^x*(208*x^2 + 52*x^3) + 26
*Log[2])/(12*E^(4*x)*x^5 + 48*E^(3*x)*x^6 + 12*x^9 + 12*x^6*Log[2] + 3*x^3
*Log[2]^2 + E^(2*x)*(72*x^7 + 12*x^4*Log[2]) + E^x*(48*x^8 + 24*x^5*Log[2]
)),x]
```

output
```
-13/(3*x^2*(2*E^(2*x)*x + 4*E^x*x^2 + 2*x^3 + Log[2]))
```

3.56.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{130x^3+e^{2x}(52x^2+78x)+e^x(52x^3+208x^2)+26\log(2)}{12x^9+48e^{3x}x^6+12x^6\log(2)+12e^{4x}x^5+3x^3\log^2(2)+e^x(48x^8+24x^5\log(2))+e^{2x}(72x^7+12x^4\log(2))}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{26(5x^3+2e^x(x+4)x^2+e^{2x}(2x+3)x+\log(2))}{3x^3(2x^3+4e^xx^2+2e^{2x}x+\log(2))^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{26}{3}\int \frac{5x^3+2e^x(x+4)x^2+e^{2x}(2x+3)x+\log(2)}{x^3(2x^3+4e^xx^2+2e^{2x}x+\log(2))^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{26}{3}\int \left(\frac{2x+3}{x^3(4x^3+8e^xx^2+4e^{2x}x+\log(4))}-\frac{4x^4+4e^xx^3-4x^3-4e^xx^2+\log(4)x+\log(2)}{2x^3(2x^3+4e^xx^2+2e^{2x}x+\log(2))^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{26}{3}\left(2\int \frac{1}{(2x^3+4e^xx^2+2e^{2x}x+\log(2))^2}dx-2\int \frac{e^x}{(2x^3+4e^xx^2+2e^{2x}x+\log(2))^2}dx-\frac{1}{2}\log(2)\int \frac{}{x^3(2x^3+4e}\right.$$

input
```
Int[(130*x^3 + E^(2*x)*(78*x + 52*x^2) + E^x*(208*x^2 + 52*x^3) + 26*Log[2
])/(12*E^(4*x)*x^5 + 48*E^(3*x)*x^6 + 12*x^9 + 12*x^6*Log[2] + 3*x^3*Log[2
]^2 + E^(2*x)*(72*x^7 + 12*x^4*Log[2]) + E^x*(48*x^8 + 24*x^5*Log[2])),x]
```

output
```
$Aborted
```

3.56.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.56.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.25

method	result	size
risch	$-\frac{13}{3x^2(2x\,e^{2x}+4\,e^{x}x^2+2x^3+\ln(2))}$	30
parallelrisch	$-\frac{13}{3x^2(2x\,e^{2x}+4\,e^{x}x^2+2x^3+\ln(2))}$	30

input
```
int(((52*x^2+78*x)*exp(x)^2+(52*x^3+208*x^2)*exp(x)+26*ln(2)+130*x^3)/(12*
x^5*exp(x)^4+48*x^6*exp(x)^3+(12*x^4*ln(2)+72*x^7)*exp(x)^2+(24*x^5*ln(2)+
48*x^8)*exp(x)+3*x^3*ln(2)^2+12*x^6*ln(2)+12*x^9),x,method=_RETURNVERBOSE)
```

output
```
-13/3/x^2/(2*x*exp(x)^2+4*exp(x)*x^2+2*x^3+ln(2))
```

3.56.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int \frac{130x^3+e^{2x}(78x+52x^2)+e^x(208x^2+52x^3)+26\log(2)}{12e^{4x}x^5+48e^{3x}x^6+12x^9+12x^6\log(2)+3x^3\log^2(2)+e^{2x}\left(72x^7+12x^4\log(2)\right)+e^x\left(48x^8+24x^5\log(2)\right)}\,dx$$
$$=-\frac{13}{3\left(2\,x^5+4\,x^4e^x+2\,x^3e^{(2\,x)}+x^2\log\left(2\right)\right)}$$

input
```
integrate(((52*x^2+78*x)*exp(x)^2+(52*x^3+208*x^2)*exp(x)+26*log(2)+130*x^
3)/(12*x^5*exp(x)^4+48*x^6*exp(x)^3+(12*x^4*log(2)+72*x^7)*exp(x)^2+(24*x^
5*log(2)+48*x^8)*exp(x)+3*x^3*log(2)^2+12*x^6*log(2)+12*x^9),x, algorithm=
\
```

output
```
-13/3/(2*x^5 + 4*x^4*e^x + 2*x^3*e^(2*x) + x^2*log(2))
```

3.56.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{130x^3 + e^{2x}(78x + 52x^2) + e^x(208x^2 + 52x^3) + 26\log(2)}{12e^{4x}x^5 + 48e^{3x}x^6 + 12x^9 + 12x^6\log(2) + 3x^3\log^2(2) + e^{2x}(72x^7 + 12x^4\log(2)) + e^x(48x^8 + 24x^5\log(2}$$
$$= -\frac{13}{6x^5 + 12x^4e^x + 6x^3e^{2x} + 3x^2\log(2)}$$

input
```
integrate(((52*x**2+78*x)*exp(x)**2+(52*x**3+208*x**2)*exp(x)+26*ln(2)+130
*x**3)/(12*x**5*exp(x)**4+48*x**6*exp(x)**3+(12*x**4*ln(2)+72*x**7)*exp(x)
**2+(24*x**5*ln(2)+48*x**8)*exp(x)+3*x**3*ln(2)**2+12*x**6*ln(2)+12*x**9),
x)
```

output
```
-13/(6*x**5 + 12*x**4*exp(x) + 6*x**3*exp(2*x) + 3*x**2*log(2))
```

3.56.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int \frac{130x^3 + e^{2x}(78x + 52x^2) + e^x(208x^2 + 52x^3) + 26\log(2)}{12e^{4x}x^5 + 48e^{3x}x^6 + 12x^9 + 12x^6\log(2) + 3x^3\log^2(2) + e^{2x}(72x^7 + 12x^4\log(2)) + e^x(48x^8 + 24x^5\log(2}$$
$$= -\frac{13}{3\,(2\,x^5 + 4\,x^4e^x + 2\,x^3e^{(2\,x)} + x^2\log(2))}$$

input
```
integrate(((52*x^2+78*x)*exp(x)^2+(52*x^3+208*x^2)*exp(x)+26*log(2)+130*x^
3)/(12*x^5*exp(x)^4+48*x^6*exp(x)^3+(12*x^4*log(2)+72*x^7)*exp(x)^2+(24*x^
5*log(2)+48*x^8)*exp(x)+3*x^3*log(2)^2+12*x^6*log(2)+12*x^9),x, algorithm=
\
```

output
```
-13/3/(2*x^5 + 4*x^4*e^x + 2*x^3*e^(2*x) + x^2*log(2))
```

3.56.8 Giac [A] (verification not implemented)

Time = 0.72 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int \frac{130x^3 + e^{2x}(78x + 52x^2) + e^x(208x^2 + 52x^3) + 26\log(2)}{12e^{4x}x^5 + 48e^{3x}x^6 + 12x^9 + 12x^6\log(2) + 3x^3\log^2(2) + e^{2x}\left(72x^7 + 12x^4\log(2)\right) + e^x\left(48x^8 + 24x^5\log(2\right.}$$
$$= -\frac{26}{3\left(2x^5 + 4x^4e^x + 2x^3e^{(2x)} + x^2\log(2)\right)}$$

input
```
integrate(((52*x^2+78*x)*exp(x)^2+(52*x^3+208*x^2)*exp(x)+26*log(2)+130*x^
3)/(12*x^5*exp(x)^4+48*x^6*exp(x)^3+(12*x^4*log(2)+72*x^7)*exp(x)^2+(24*x^
5*log(2)+48*x^8)*exp(x)+3*x^3*log(2)^2+12*x^6*log(2)+12*x^9),x, algorithm=
\
```

output
```
-26/3/(2*x^5 + 4*x^4*e^x + 2*x^3*e^(2*x) + x^2*log(2))
```

3.56.9 Mupad [F(-1)]

Timed out.

$$\int \frac{130x^3 + e^{2x}(78x + 52x^2) + e^x(208x^2 + 52x^3) + 26\log(2)}{12e^{4x}x^5 + 48e^{3x}x^6 + 12x^9 + 12x^6\log(2) + 3x^3\log^2(2) + e^{2x}\left(72x^7 + 12x^4\log(2)\right) + e^x\left(48x^8 + 24x^5\log(2\right.}$$
$$= \int \frac{26\ln(2) + e^{2x}\left(52x^2 + 78x\right) + e^x\left(52x^3 + 208x^2\right) + 130x^3}{3x^3\ln(2)^2 + 12x^5e^{4x} + 48x^6e^{3x} + e^x\left(48x^8 + 24\ln(2)\,x^5\right) + 12x^6\ln(2) + e^{2x}\left(72x^7 + 12\ln(2)\,x\right.}$$

input
```
int((26*log(2) + exp(2*x)*(78*x + 52*x^2) + exp(x)*(208*x^2 + 52*x^3) + 13
0*x^3)/(3*x^3*log(2)^2 + 12*x^5*exp(4*x) + 48*x^6*exp(3*x) + exp(x)*(24*x^
5*log(2) + 48*x^8) + 12*x^6*log(2) + exp(2*x)*(12*x^4*log(2) + 72*x^7) + 1
2*x^9),x)
```

output
```
int((26*log(2) + exp(2*x)*(78*x + 52*x^2) + exp(x)*(208*x^2 + 52*x^3) + 13
0*x^3)/(3*x^3*log(2)^2 + 12*x^5*exp(4*x) + 48*x^6*exp(3*x) + exp(x)*(24*x^
5*log(2) + 48*x^8) + 12*x^6*log(2) + exp(2*x)*(12*x^4*log(2) + 72*x^7) + 1
2*x^9), x)
```

3.57 $\int \frac{e^x(21-3x-3\log^2(5))}{-125+75x-15x^2+x^3+(75-30x+3x^2)\log^2(5)+(-15+3x)\log^4(5)+\log^6(5)}$

3.57.1 Optimal result

Integrand size = 59, antiderivative size = 18

$$\int \frac{e^x(21-3x-3\log^2(5))}{-125+75x-15x^2+x^3+(75-30x+3x^2)\log^2(5)+(-15+3x)\log^4(5)+\log^6(5)}\,dx = 3\left(2-\frac{e^x}{(-5+x+\log^2(5))^2}\right)$$

output
```
6-3/(ln(5)^2-5+x)^2*exp(x)
```

3.57.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{e^x(21-3x-3\log^2(5))}{-125+75x-15x^2+x^3+(75-30x+3x^2)\log^2(5)+(-15+3x)\log^4(5)+\log^6(5)}\,dx = -\frac{3e^x}{(-5+x+\log^2(5))^2}$$

input
```
Integrate[(E^x*(21 - 3*x - 3*Log[5]^2))/(-125 + 75*x - 15*x^2 + x^3 + (75
- 30*x + 3*x^2)*Log[5]^2 + (-15 + 3*x)*Log[5]^4 + Log[5]^6),x]
```

output
```
(-3*E^x)/(-5 + x + Log[5]^2)^2
```

3.57.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034, Rules used = {2007, 2627}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(-3x+21-3\log^2(5))}{x^3-15x^2+(3x^2-30x+75)\log^2(5)+75x+(3x-15)\log^4(5)-125+\log^6(5)}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{e^x(-3x+21-3\log^2(5))}{(x-5+\log^2(5))^3}dx$$

$$\Big\downarrow \text{ 2627}$$

$$-\frac{3e^x}{(-x+5-\log^2(5))^2}$$

input
```
Int[(E^x*(21 - 3*x - 3*Log[5]^2))/(-125 + 75*x - 15*x^2 + x^3 + (75 - 30*x
 + 3*x^2)*Log[5]^2 + (-15 + 3*x)*Log[5]^4 + Log[5]^6),x]
```

output
```
(-3*E^x)/(5 - x - Log[5]^2)^2
```

3.57.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2627
```
Int[(F_)^(v_)*((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_)), x_Symbol] :>
 Simp[g*(d + e*x)^(m + 1)*(F^v/(D[v, x]*e*Log[F])), x] /; FreeQ[{F, d, e, f
, g, m}, x] && LinearQ[v, x] && EqQ[e*g*(m + 1) - D[v, x]*(e*f - d*g)*Log[F
], 0]
```

3.57.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

method	result
norman	$-\frac{3\,\mathrm{e}^{x}}{\left(\ln(5)^{2}-5+x\right)^{2}}$
risch	$-\frac{3\,\mathrm{e}^{x}}{\left(\ln(5)^{2}-5+x\right)^{2}}$
gosper	$-\frac{3\,\mathrm{e}^{x}}{\ln(5)^{4}+2x\ln(5)^{2}-10\ln(5)^{2}+x^{2}-10x+25}$
parallelrisch	$-\frac{3\,\mathrm{e}^{x}}{\ln(5)^{4}+2x\ln(5)^{2}-10\ln(5)^{2}+x^{2}-10x+25}$
default	$-\frac{21\,\mathrm{e}^{x}}{2\left(\ln(5)^{2}-5+x\right)^{2}}-\frac{15\,\mathrm{e}^{x}}{2\left(\ln(5)^{2}-5+x\right)}-\frac{15\,\mathrm{e}^{-\ln(5)^{2}+5}\,\mathrm{Ei}_{1}\left(-x-\ln(5)^{2}+5\right)}{2}-3\left(-\ln\left(5\right)^{2}+5\right)\left(-\frac{\mathrm{e}^{x}}{2\left(\ln(5)^{2}-5\right.}\right.$

input
```
int((-3*ln(5)^2+21-3*x)*exp(x)/(ln(5)^6+(3*x-15)*ln(5)^4+(3*x^2-30*x+75)*l
n(5)^2+x^3-15*x^2+75*x-125),x,method=_RETURNVERBOSE)
```

output
```
-3/(ln(5)^2-5+x)^2*exp(x)
```

3.57.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{e^{x}\left(21-3x-3\log^{2}(5)\right)}{-125+75x-15x^{2}+x^{3}+(75-30x+3x^{2})\log^{2}(5)+(-15+3x)\log^{4}(5)+\log^{6}(5)}\,dx$$
$$=-\frac{3\,e^{x}}{\log\left(5\right)^{4}+2\left(x-5\right)\log\left(5\right)^{2}+x^{2}-10\,x+25}$$

input
```
integrate((-3*log(5)^2+21-3*x)*exp(x)/(log(5)^6+(3*x-15)*log(5)^4+(3*x^2-3
0*x+75)*log(5)^2+x^3-15*x^2+75*x-125),x, algorithm=\
```

output
```
-3*e^x/(log(5)^4 + 2*(x - 5)*log(5)^2 + x^2 - 10*x + 25)
```

3.57.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. $2(15) = 30$.

Time = 0.08 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.89

$$\int \frac{e^x(21-3x-3\log^2(5))}{-125+75x-15x^2+x^3+(75-30x+3x^2)\log^2(5)+(-15+3x)\log^4(5)+\log^6(5)}\,dx = -\frac{3e^x}{x^2-10x+2x\log(5)^2-10\log(5)^2+\log(5)^4+25}$$

input
```
integrate((-3*ln(5)**2+21-3*x)*exp(x)/(ln(5)**6+(3*x-15)*ln(5)**4+(3*x**2-
30*x+75)*ln(5)**2+x**3-15*x**2+75*x-125),x)
```

output
```
-3*exp(x)/(x**2 - 10*x + 2*x*log(5)**2 - 10*log(5)**2 + log(5)**4 + 25)
```

3.57.7 Maxima [F]

$$\int \frac{e^x(21-3x-3\log^2(5))}{-125+75x-15x^2+x^3+(75-30x+3x^2)\log^2(5)+(-15+3x)\log^4(5)+\log^6(5)}\,dx = \int -\frac{3\left(\log(5)^2+x-7\right)e^x}{\log(5)^6+3(x-5)\log(5)^4+x^3+3(x^2-10x+25)\log(5)^2-15x^2+75x-125}\,dx$$

input
```
integrate((-3*log(5)^2+21-3*x)*exp(x)/(log(5)^6+(3*x-15)*log(5)^4+(3*x^2-3
0*x+75)*log(5)^2+x^3-15*x^2+75*x-125),x, algorithm=\
```

output
```
3*e^(-log(5)^2 + 5)*exp_integral_e(3, -log(5)^2 - x + 5)*log(5)^2/(log(5)^
2 + x - 5)^2 - 3*x*e^x/(log(5)^6 - 15*log(5)^4 + 3*(log(5)^2 - 5)*x^2 + x^
3 + 3*(log(5)^4 - 10*log(5)^2 + 25)*x + 75*log(5)^2 - 125) - 21*e^(-log(5)
^2 + 5)*exp_integral_e(3, -log(5)^2 - x + 5)/(log(5)^2 + x - 5)^2 - 3*inte
grate(-(log(5)^2 - 2*x - 5)*e^x/(log(5)^8 - 20*log(5)^6 + 4*(log(5)^2 - 5)
*x^3 + x^4 + 150*log(5)^4 + 6*(log(5)^4 - 10*log(5)^2 + 25)*x^2 + 4*(log(5
)^6 - 15*log(5)^4 + 75*log(5)^2 - 125)*x - 500*log(5)^2 + 625), x)
```

3.57.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. $2(15) = 30$.

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.72

$$\int \frac{e^x (21 - 3x - 3\log^2(5))}{-125 + 75x - 15x^2 + x^3 + (75 - 30x + 3x^2)\log^2(5) + (-15 + 3x)\log^4(5) + \log^6(5)}\,dx$$
$$= -\frac{3\,e^x}{\log(5)^4 + 2\,x\log(5)^2 + x^2 - 10\,\log(5)^2 - 10\,x + 25}$$

input
```
integrate((-3*log(5)^2+21-3*x)*exp(x)/(log(5)^6+(3*x-15)*log(5)^4+(3*x^2-3
0*x+75)*log(5)^2+x^3-15*x^2+75*x-125),x, algorithm=\
```

output
```
-3*e^x/(log(5)^4 + 2*x*log(5)^2 + x^2 - 10*log(5)^2 - 10*x + 25)
```

3.57.9 Mupad [B] (verification not implemented)

Time = 13.78 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int \frac{e^x (21 - 3x - 3\log^2(5))}{-125 + 75x - 15x^2 + x^3 + (75 - 30x + 3x^2)\log^2(5) + (-15 + 3x)\log^4(5) + \log^6(5)}\,dx$$
$$= -\frac{3\,\mathrm{e}^x}{\left(x + \ln(5)^2 - 5\right)^2}$$

input
```
int(-(exp(x)*(3*x + 3*log(5)^2 - 21))/(75*x + log(5)^4*(3*x - 15) + log(5)
^2*(3*x^2 - 30*x + 75) + log(5)^6 - 15*x^2 + x^3 - 125),x)
```

output
```
-(3*exp(x))/(x + log(5)^2 - 5)^2
```

3.58 $\int \frac{e^x(-4-4x)-4e^x x \log(x)}{x} \, dx$

3.58.1 Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{e^x(-4-4x)-4e^x x \log(x)}{x} \, dx = \log(4)+4\left(-9+e^5-e^x-e^x\log(x)\right)$$

output
```
2*ln(2)-36+4*exp(5)-4*exp(x)*ln(x)-4*exp(x)
```

3.58.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.55

$$\int \frac{e^x(-4-4x)-4e^x x \log(x)}{x} \, dx = -4(e^x+e^x\log(x))$$

input
```
Integrate[(E^x*(-4 - 4*x) - 4*E^x*x*Log[x])/x,x]
```

output
```
-4*(E^x + E^x*Log[x])
```

3.58.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.59, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(-4x-4)-4e^x x\log(x)}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-4e^x-\frac{4e^x}{x}-4e^x\log(x)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-4e^x-4e^x\log(x)$$

input
```
Int[(E^x*(-4 - 4*x) - 4*E^x*x*Log[x])/x,x]
```

output
```
-4*E^x - 4*E^x*Log[x]
```

3.58.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.58.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.55

method	result	size
norman	$-4\,\mathrm{e}^{x} \ln \left(x \right)-4\,\mathrm{e}^{x}$	12
risch	$-4\,\mathrm{e}^{x} \ln \left(x \right)-4\,\mathrm{e}^{x}$	12
parallelrisch	$-4\,\mathrm{e}^{x} \ln \left(x \right)-4\,\mathrm{e}^{x}$	12

input
```
int((-4*x*exp(x)*ln(x)+(-4-4*x)*exp(x))/x,x,method=_RETURNVERBOSE)
```

output
```
-4*exp(x)*ln(x)-4*exp(x)
```

3.58.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.50

$$\int \frac{e^x(-4-4x)-4e^x x\log(x)}{x}\,dx=-4\,e^{x}\log\left(x\right)-4\,e^{x}$$

input
```
integrate((-4*x*exp(x)*log(x)+(-4-4*x)*exp(x))/x,x, algorithm=\
```

output
```
-4*e^x*log(x) - 4*e^x
```

3.58.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.45

$$\int \frac{e^x(-4-4x)-4e^x x\log(x)}{x}\,dx=\left(-4\log\left(x\right)-4\right)e^{x}$$

input
```
integrate((-4*x*exp(x)*ln(x)+(-4-4*x)*exp(x))/x,x)
```

output
```
(-4*log(x) - 4)*exp(x)
```

3.58.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.50

$$\int \frac{e^x(-4-4x)-4e^x x\log(x)}{x}\,dx = -4\,e^x\log\left(x\right)-4\,e^x$$

input
```
integrate((-4*x*exp(x)*log(x)+(-4-4*x)*exp(x))/x,x, algorithm=\
```

output
```
-4*e^x*log(x) - 4*e^x
```

3.58.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.50

$$\int \frac{e^x(-4-4x)-4e^x x\log(x)}{x}\,dx = -4\,e^x\log\left(x\right)-4\,e^x$$

input
```
integrate((-4*x*exp(x)*log(x)+(-4-4*x)*exp(x))/x,x, algorithm=\
```

output
```
-4*e^x*log(x) - 4*e^x
```

3.58.9 Mupad [B] (verification not implemented)

Time = 13.15 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.36

$$\int \frac{e^x(-4-4x)-4e^x x\log(x)}{x}\,dx = -4\,\mathrm{e}^x\left(\ln\left(x\right)+1\right)$$

input
```
int(-(exp(x)*(4*x + 4) + 4*x*exp(x)*log(x))/x,x)
```

output
```
-4*exp(x)*(log(x) + 1)
```

3.59 $\int \frac{1}{8} e^{16+\frac{1}{8} e^{-e^{16+7x+x^2}}-e^{16+7x+x^2}+7x+x^2}(-7-2x)\,dx$

3.59.1 Optimal result

Integrand size = 49, antiderivative size = 23

$$\int \frac{1}{8} e^{16+\frac{1}{8} e^{-e^{16+7x+x^2}}-e^{16+7x+x^2}+7x+x^2}(-7-2x)\,dx = e^{\frac{1}{8} e^{-e^{(-4-x)^2-x}}}$$

output
```
exp(1/2/exp(2*ln(2)+exp((-4-x)^2-x)))
```

3.59.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{1}{8} e^{16+\frac{1}{8} e^{-e^{16+7x+x^2}}-e^{16+7x+x^2}+7x+x^2}(-7-2x)\,dx = e^{\frac{1}{8} e^{-e^{16+7x+x^2}}}$$

input
```
Integrate[(E^(16 + 1/(8*E^E^(16 + 7*x + x^2)) - E^(16 + 7*x + x^2) + 7*x +
 x^2)*(-7 - 2*x))/8,x]
```

output
```
E^(1/(8*E^E^(16 + 7*x + x^2)))
```

3.59.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{8}(-2x-7)\exp\left(x^2+\frac{1}{8}e^{-e^{x^2+7x+16}}-e^{x^2+7x+16}+7x+16\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{8}\int -\exp\left(x^2+7x+\frac{1}{8}e^{-e^{x^2+7x+16}}-e^{x^2+7x+16}+16\right)(2x+7)dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{8}\int \exp\left(x^2+7x+\frac{1}{8}e^{-e^{x^2+7x+16}}-e^{x^2+7x+16}+16\right)(2x+7)dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{8}\int \left(2\exp\left(x^2+7x+\frac{1}{8}e^{-e^{x^2+7x+16}}-e^{x^2+7x+16}+16\right)x+7\exp\left(x^2+7x+\frac{1}{8}e^{-e^{x^2+7x+16}}-e^{x^2+7x+16}+16\right)\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{8}\left(-7\int \exp\left(x^2+7x+\frac{1}{8}e^{-e^{x^2+7x+16}}-e^{x^2+7x+16}+16\right)dx-2\int \exp\left(x^2+7x+\frac{1}{8}e^{-e^{x^2+7x+16}}-e^{x^2+7x+16}+1\right.\right.$$

input
```
Int[(E^(16 + 1/(8*E^E^(16 + 7*x + x^2)) - E^(16 + 7*x + x^2) + 7*x + x^2)*
(-7 - 2*x))/8,x]
```

output
```
$Aborted
```

3.59.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.59.4 Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

method	result	size
risch	$\mathrm{e}^{\frac{\mathrm{e}^{-\mathrm{e}^{x^2+7x+16}}}{8}}$	16
norman	$\mathrm{e}^{\frac{\mathrm{e}^{-\mathrm{e}^{x^2+7x+16}}}{8}}$	21
parallelrisch	$\mathrm{e}^{\frac{\mathrm{e}^{-\mathrm{e}^{x^2+7x+16}}}{8}}$	21

input
```
int(1/2*(-2*x-7)*exp(x^2+7*x+16)*exp(1/2/exp(exp(x^2+7*x+16)+2*ln(2)))/exp
(exp(x^2+7*x+16)+2*ln(2)),x,method=_RETURNVERBOSE)
```

output
```
exp(1/8*exp(-exp(x^2+7*x+16)))
```

3.59.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{1}{8}e^{16+\frac{1}{8}e^{-e^{16+7x+x^2}}-e^{16+7x+x^2}+7x+x^2}(-7-2x)\,dx = e^{\left(\frac{1}{2}\,e^{\left(-e^{\left(x^2+7\,x+16\right)}-2\,\log\left(2\right)\right)}\right)}$$

input
```
integrate(1/2*(-2*x-7)*exp(x^2+7*x+16)*exp(1/2/exp(exp(x^2+7*x+16)+2*log(2
)))/exp(exp(x^2+7*x+16)+2*log(2)),x, algorithm=\
```

output
```
e^(1/2*e^(-e^(x^2 + 7*x + 16) - 2*log(2)))
```

3.59.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{1}{8} e^{16+\frac{1}{8}e^{-e^{16+7x+x^2}}-e^{16+7x+x^2}+7x+x^2}(-7-2x)\,dx = e^{\frac{e^{-e^{x^2+7x+16}}}{8}}$$

input
```
integrate(1/2*(-2*x-7)*exp(x**2+7*x+16)*exp(1/2/exp(exp(x**2+7*x+16)+2*ln(
2)))/exp(exp(x**2+7*x+16)+2*ln(2)),x)
```

output
```
exp(exp(-exp(x**2 + 7*x + 16))/8)
```

3.59.7 Maxima [A] (verification not implemented)

Time = 0.56 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{1}{8} e^{16+\frac{1}{8}e^{-e^{16+7x+x^2}}-e^{16+7x+x^2}+7x+x^2}(-7-2x)\,dx = e^{\left(\frac{1}{8}\,e^{\left(-e^{\left(x^2+7\,x+16\right)}\right)}\right)}$$

input
```
integrate(1/2*(-2*x-7)*exp(x^2+7*x+16)*exp(1/2/exp(exp(x^2+7*x+16)+2*log(2
)))/exp(exp(x^2+7*x+16)+2*log(2)),x, algorithm=\
```

output
```
e^(1/8*e^(-e^(x^2 + 7*x + 16)))
```

3.59.8 Giac [F]

$$\int \frac{1}{8} e^{16+\frac{1}{8}e^{-e^{16+7x+x^2}}-e^{16+7x+x^2}+7x+x^2}(-7-2x)\,dx$$
$$= \int -\frac{1}{2}\,(2\,x+7)e^{\left(x^2+7\,x-e^{\left(x^2+7\,x+16\right)}+\frac{1}{2}\,e^{\left(-e^{\left(x^2+7\,x+16\right)}-2\,\log(2)\right)}-2\,\log(2)+16\right)}\,dx$$

input
```
integrate(1/2*(-2*x-7)*exp(x^2+7*x+16)*exp(1/2/exp(exp(x^2+7*x+16)+2*log(2
)))/exp(exp(x^2+7*x+16)+2*log(2)),x, algorithm=\
```

output
```
integrate(-1/2*(2*x + 7)*e^(x^2 + 7*x - e^(x^2 + 7*x + 16) + 1/2*e^(-e^(x^
2 + 7*x + 16) - 2*log(2)) - 2*log(2) + 16), x)
```

3.59.9 Mupad [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

$$\int \frac{1}{8}e^{16+\frac{1}{8}e^{-e^{16+7x+x^2}}-e^{16+7x+x^2}+7x+x^2}(-7-2x)\,dx = \mathrm{e}^{\frac{\mathrm{e}^{-\mathrm{e}^{7x}\,\mathrm{e}^{x^2}\,\mathrm{e}^{16}}}{8}}$$

input
```
int(-(exp(exp(- 2*log(2) - exp(7*x + x^2 + 16))/2)*exp(- 2*log(2) - exp(7*
x + x^2 + 16))*exp(7*x + x^2 + 16)*(2*x + 7))/2,x)
```

output
```
exp(exp(-exp(7*x)*exp(x^2)*exp(16))/8)
```

3.60 $\int 8e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}+\frac{8}{5}x^5(i\pi+\log(4))}x^4(i\pi+\log(4))\,dx$

3.60.1 Optimal result

Integrand size = 48, antiderivative size = 19

$$\int 8e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}+\frac{8}{5}x^5(i\pi+\log(4))}x^4(i\pi+\log(4))\,dx=e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}}$$

output
```
exp(exp(8/5*x^5*(2*ln(2)+I*Pi)))
```

3.60.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int 8e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}+\frac{8}{5}x^5(i\pi+\log(4))}x^4(i\pi+\log(4))\,dx=e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}}$$

input
```
Integrate[8*E^(E^((8*x^5*(I*Pi + Log[4]))/5) + (8*x^5*(I*Pi + Log[4]))/5)*
x^4*(I*Pi + Log[4]),x]
```

output
```
E^E^((8*x^5*(I*Pi + Log[4]))/5)
```

3.60.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int 8x^4(\log(4)+i\pi)\exp\left(\frac{8}{5}x^5(\log(4)+i\pi)+e^{\frac{8}{5}x^5(\log(4)+i\pi)}\right)dx$$

$$\Big\downarrow \text{27}$$

$$8(\log(4)+i\pi)\int \exp\left(\frac{8}{5}(i\pi+\log(4))x^5+2^{\frac{16x^5}{5}}e^{\frac{8}{5}i\pi x^5}\right)x^4dx$$

$$\Big\downarrow \text{7266}$$

$$\frac{8}{5}(\log(4)+i\pi)\int \exp\left(\frac{8}{5}(i\pi+\log(4))x^5+2^{\frac{16x^5}{5}}e^{\frac{8}{5}i\pi x^5}\right)dx^5$$

$$\Big\downarrow \text{7281}$$

$$(\log(4)+i\pi)\int \exp\left(\frac{8}{5}(i\pi+\log(4))x^5+2^{\frac{16x^5}{5}}e^{\frac{8}{5}i\pi x^5}\right)d\frac{8x^5}{5}$$

$$\Big\downarrow \text{7299}$$

$$(\log(4)+i\pi)\int \exp\left(\frac{8}{5}(i\pi+\log(4))x^5+2^{\frac{16x^5}{5}}e^{\frac{8}{5}i\pi x^5}\right)d\frac{8x^5}{5}$$

input
```
Int[8*E^(E^((8*x^5*(I*Pi + Log[4]))/5) + (8*x^5*(I*Pi + Log[4]))/5)*x^4*(I
*Pi + Log[4]),x]
```

output
```
$Aborted
```

3.60.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7266
```
Int[(u_)*(x_)^(m_.), x_Symbol] :> Simp[1/(m + 1)   Subst[Int[SubstFor[x^(m
+ 1), u, x], x], x, x^(m + 1)], x] /; FreeQ[m, x] && NeQ[m, -1] && Function
OfQ[x^(m + 1), u, x]
```

rule 7281
```
Int[u_, x_Symbol] :> With[{lst = FunctionOfLinear[u, x]}, Simp[1/lst[[3]]
 Subst[Int[lst[[1]], x], x, lst[[2]] + lst[[3]]*x], x] /;  !FalseQ[lst]]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.60.4 Maple [A] (verified)

Time = 0.43 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

method	result	size
derivativedivides	$e^{e^{\frac{8x^5(2\ln(2)+i\pi)}{5}}}$	17
norman	$e^{e^{\frac{8x^5(2\ln(2)+i\pi)}{5}}}$	17
default	$e^{e^{\frac{8x^5(2\ln(2)+i\pi)}{5}}}$	39
parallelrisch	$e^{e^{\frac{8x^5(2\ln(2)+i\pi)}{5}}}$	39
risch	$\frac{e^{2^{\frac{16x^5}{5}} e^{\frac{8i\pi x^5}{5}}}\pi}{-2i\ln(2)+\pi} - \frac{2i e^{2^{\frac{16x^5}{5}} e^{\frac{8i\pi x^5}{5}}}\ln(2)}{-2i\ln(2)+\pi}$	61

input
```
int(8*x^4*(2*ln(2)+I*Pi)*exp(8/5*x^5*(2*ln(2)+I*Pi))*exp(exp(8/5*x^5*(2*ln
(2)+I*Pi))),x,method=_RETURNVERBOSE)
```

output
```
exp(exp(8/5*x^5*(2*ln(2)+I*Pi)))
```

3.60.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.05

$$\int 8e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}+\frac{8}{5}x^5(i\pi+\log(4))}x^4(i\pi+\log(4))\,dx$$
$$= \cosh\left(-e^{\left(\frac{8}{5}i\,\pi x^5+\frac{16}{5}\,x^5\log(2)\right)}\right) - \sinh\left(-e^{\left(\frac{8}{5}i\,\pi x^5+\frac{16}{5}\,x^5\log(2)\right)}\right)$$

input
```
integrate(8*x^4*(2*log(2)+I*pi)*exp(8/5*x^5*(2*log(2)+I*pi))*exp(exp(8/5*x
^5*(2*log(2)+I*pi))),x, algorithm=\
```

output
```
cosh(-e^(8/5*I*pi*x^5 + 16/5*x^5*log(2))) - sinh(-e^(8/5*I*pi*x^5 + 16/5*x
^5*log(2)))
```

3.60.6 Sympy [A] (verification not implemented)

Time = 82.59 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int 8e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}+\frac{8}{5}x^5(i\pi+\log(4))}x^4(i\pi+\log(4))\,dx = e^{e^{\frac{8x^5\cdot(2\log(2)+i\pi)}{5}}}$$

input
```
integrate(8*x**4*(2*ln(2)+I*pi)*exp(8/5*x**5*(2*ln(2)+I*pi))*exp(exp(8/5*x
**5*(2*ln(2)+I*pi))),x)
```

output
```
exp(exp(8*x**5*(2*log(2) + I*pi)/5))
```

3.60.7 Maxima [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.05

$$\int 8e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}+\frac{8}{5}x^5(i\pi+\log(4))}x^4(i\pi+\log(4))\,dx$$
$$= \cosh\left(-e^{\left(\frac{8}{5}i\pi x^5+\frac{16}{5}x^5\log(2)\right)}\right) - \sinh\left(-e^{\left(\frac{8}{5}i\pi x^5+\frac{16}{5}x^5\log(2)\right)}\right)$$

input
```
integrate(8*x^4*(2*log(2)+I*pi)*exp(8/5*x^5*(2*log(2)+I*pi))*exp(exp(8/5*x
^5*(2*log(2)+I*pi))),x, algorithm=\
```

output
```
cosh(-e^(8/5*I*pi*x^5 + 16/5*x^5*log(2))) - sinh(-e^(8/5*I*pi*x^5 + 16/5*x
^5*log(2)))
```

3.60.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.05

$$\int 8e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}+\frac{8}{5}x^5(i\pi+\log(4))}x^4(i\pi+\log(4))\,dx$$
$$=\cosh\left(-e^{\left(\frac{8}{5}i\pi x^5+\frac{16}{5}x^5\log(2)\right)}\right)-\sinh\left(-e^{\left(\frac{8}{5}i\pi x^5+\frac{16}{5}x^5\log(2)\right)}\right)$$

input
```
integrate(8*x^4*(2*log(2)+I*pi)*exp(8/5*x^5*(2*log(2)+I*pi))*exp(exp(8/5*x
^5*(2*log(2)+I*pi))),x, algorithm=\
```

output
```
cosh(-e^(8/5*I*pi*x^5 + 16/5*x^5*log(2))) - sinh(-e^(8/5*I*pi*x^5 + 16/5*x
^5*log(2)))
```

3.60.9 Mupad [B] (verification not implemented)

Time = 13.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int 8e^{e^{\frac{8}{5}x^5(i\pi+\log(4))}+\frac{8}{5}x^5(i\pi+\log(4))}x^4(i\pi+\log(4))\,dx=e^{2^{\frac{16x^5}{5}}\,e^{\frac{\Pi x^5\,8i}{5}}}$$

input
```
int(8*x^4*exp((8*x^5*(Pi*1i + 2*log(2)))/5)*exp(exp((8*x^5*(Pi*1i + 2*log(
2)))/5))*(Pi*1i + 2*log(2)),x)
```

output
```
exp(2^((16*x^5)/5)*exp((Pi*x^5*8i)/5))
```

3.61 $\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx$

3.61.1 Optimal result

Integrand size = 70, antiderivative size = 25

$$\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx=4\left(e^{\frac{-81-x+45e^{-x/9}x}{x}}+x\right)$$

output
```
4*exp((45*x/exp(1/9*x)-81-x)/x)+4*x
```

3.61.2 Mathematica [A] (verified)

Time = 0.94 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx=4e^{-1+45e^{-x/9}-\frac{81}{x}}+4x$$

input
```
Integrate[(4*E^(x/9)*x^2 + E^((E^(x/9)*(-81 - x) + 45*x)/(E^(x/9)*x))*(324
*E^(x/9) - 20*x^2))/(E^(x/9)*x^2),x]
```

output
```
4*E^(-1 + 45/E^(x/9) - 81/x) + 4*x
```

3.61. $\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx$

3.61.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x/9}\left(\left(324e^{x/9}-20x^2\right)\exp\left(\frac{e^{-x/9}\left(e^{x/9}(-x-81)+45x\right)}{x}\right)+4e^{x/9}x^2\right)}{x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4e^{-\frac{81}{x}-1}\left(e^{\frac{81}{x}+1}x^2+81e^{45e^{-x/9}}\right)}{x^2}-20e^{-\frac{x}{9}+45e^{-x/9}-\frac{81}{x}-1}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$324\int \frac{e^{45e^{-x/9}-1-\frac{81}{x}}}{x^2}dx-20\int e^{-\frac{x}{9}+45e^{-x/9}-1-\frac{81}{x}}dx+4x$$

input
```
Int[(4*E^(x/9)*x^2 + E^((E^(x/9)*(-81 - x) + 45*x)/(E^(x/9)*x))*(324*E^(x/
9) - 20*x^2))/(E^(x/9)*x^2),x]
```

output
```
$Aborted
```

3.61.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.61.4 Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

method	result	size
parallelrisch	$4x+4\,\mathrm{e}^{\frac{\left((-x-81)\,\mathrm{e}^{\frac{x}{9}}+45x\right)\mathrm{e}^{-\frac{x}{9}}}{x}}$	32
parts	$4x+4\,\mathrm{e}^{\frac{\left((-x-81)\,\mathrm{e}^{\frac{x}{9}}+45x\right)\mathrm{e}^{-\frac{x}{9}}}{x}}$	32
risch	$4x+4\,\mathrm{e}^{-\frac{\left(x\,\mathrm{e}^{\frac{x}{9}}+81\,\mathrm{e}^{\frac{x}{9}}-45x\right)\mathrm{e}^{-\frac{x}{9}}}{x}}$	33
norman	$\frac{\left(4x^{2}\mathrm{e}^{\frac{x}{9}}+4x\,\mathrm{e}^{\frac{x}{9}}\,\mathrm{e}^{\frac{\left((-x-81)\,\mathrm{e}^{\frac{x}{9}}+45x\right)\mathrm{e}^{-\frac{x}{9}}}{x}}\right)\mathrm{e}^{-\frac{x}{9}}}{x}$	53

input
```
int(((324*exp(1/9*x)-20*x^2)*exp(((-x-81)*exp(1/9*x)+45*x)/x/exp(1/9*x))+4
*x^2*exp(1/9*x))/x^2/exp(1/9*x),x,method=_RETURNVERBOSE)
```

output
```
4*x+4*exp(((-x-81)*exp(1/9*x)+45*x)/x/exp(1/9*x))
```

3.61.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx = 4\,x + 4\,e^{\left(-\frac{\left((x+81)e^{\left(\frac{1}{9}\,x\right)}-45\,x\right)e^{\left(-\frac{1}{9}\,x\right)}}{x}\right)}$$

input
```
integrate(((324*exp(1/9*x)-20*x^2)*exp(((-x-81)*exp(1/9*x)+45*x)/x/exp(1/9
*x))+4*x^2*exp(1/9*x))/x^2/exp(1/9*x),x, algorithm=\
```

output
```
4*x + 4*e^(-((x + 81)*e^(1/9*x) - 45*x)*e^(-1/9*x)/x)
```

3.61.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx=4x+4e^{\frac{\left(45x+(-x-81)e^{\frac{x}{9}}\right)e^{-\frac{x}{9}}}{x}}$$

input
```
integrate(((324*exp(1/9*x)-20*x**2)*exp(((-x-81)*exp(1/9*x)+45*x)/x/exp(1/
9*x))+4*x**2*exp(1/9*x))/x**2/exp(1/9*x),x)
```

output
```
4*x + 4*exp((45*x + (-x - 81)*exp(x/9))*exp(-x/9)/x)
```

3.61.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx=4\,x+4\,e^{\left(-\frac{81}{x}+45\,e^{\left(-\frac{1}{9}\,x\right)}-1\right)}$$

input
```
integrate(((324*exp(1/9*x)-20*x^2)*exp(((-x-81)*exp(1/9*x)+45*x)/x/exp(1/9
*x))+4*x^2*exp(1/9*x))/x^2/exp(1/9*x),x, algorithm=\
```

output
```
4*x + 4*e^(-81/x + 45*e^(-1/9*x) - 1)
```

3.61.8 Giac [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx=4\,x+4\,e^{\left(-\frac{81}{x}+45\,e^{\left(-\frac{1}{9}\,x\right)}-1\right)}$$

input
```
integrate(((324*exp(1/9*x)-20*x^2)*exp(((-x-81)*exp(1/9*x)+45*x)/x/exp(1/9
*x))+4*x^2*exp(1/9*x))/x^2/exp(1/9*x),x, algorithm=\
```

output
```
4*x + 4*e^(-81/x + 45*e^(-1/9*x) - 1)
```

3.61.9 Mupad [B] (verification not implemented)

Time = 13.42 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{e^{-x/9}\left(4e^{x/9}x^2+e^{\frac{e^{-x/9}\left(e^{x/9}(-81-x)+45x\right)}{x}}\left(324e^{x/9}-20x^2\right)\right)}{x^2}\,dx = 4\,x+4\,\mathrm{e}^{\frac{45}{{\left(\mathrm{e}^{x}\right)}^{1/9}}}\,\mathrm{e}^{-1}\,\mathrm{e}^{-\frac{81}{x}}$$

input
```
int((exp(-x/9)*(exp((exp(-x/9)*(45*x - exp(x/9)*(x + 81)))/x)*(324*exp(x/9
) - 20*x^2) + 4*x^2*exp(x/9)))/x^2,x)
```

output
```
4*x + 4*exp(45/exp(x)^(1/9))*exp(-1)*exp(-81/x)
```

3.62 $\int \frac{-x+e^x x+(e^x-x-\log(3))\log(e^x-x-\log(3))\log(\log(e^x-x-\log(3)))}{(e^x-x-\log(3))\log(e^x-x-\log(3))}\,dx$

3.62.1 Optimal result

Integrand size = 74, antiderivative size = 15

$$\int \frac{-x+e^x x+(e^x-x-\log(3))\log(e^x-x-\log(3))\log(\log(e^x-x-\log(3)))}{(e^x-x-\log(3))\log(e^x-x-\log(3))}\,dx = x\log(\log(e^x-x-\log(3)))$$

output
```
ln(ln(exp(x)-ln(3)-x))*x
```

3.62.2 Mathematica [A] (verified)

Time = 0.39 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{-x+e^x x+(e^x-x-\log(3))\log(e^x-x-\log(3))\log(\log(e^x-x-\log(3)))}{(e^x-x-\log(3))\log(e^x-x-\log(3))}\,dx = x\log(\log(e^x-x-\log(3)))$$

input
```
Integrate[(-x + E^x*x + (E^x - x - Log[3])*Log[E^x - x - Log[3]]*Log[Log[E
^x - x - Log[3]]])/((E^x - x - Log[3])*Log[E^x - x - Log[3]]),x]
```

output
```
x*Log[Log[E^x - x - Log[3]]]
```

3.62.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x - x + (-x + e^x - \log(3)) \log(-x + e^x - \log(3)) \log(\log(-x + e^x - \log(3)))}{(-x + e^x - \log(3)) \log(-x + e^x - \log(3))} \, dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{x + \log(-x + e^x - \log(3)) \log(\log(-x + e^x - \log(3)))}{\log(-x + e^x - \log(3))} - \frac{x(x - 1 + \log(3))}{(x - e^x + \log(3)) \log(-x + e^x - \log(3))}\right) dx$$

$$\Big\downarrow \ 2009$$

$$-\int \frac{x^2}{(x - e^x + \log(3)) \log(-x + e^x - \log(3))} dx + \int \frac{x}{\log(-x + e^x - \log(3))} dx + (1 - \log(3)) \int \frac{x}{(x - e^x + \log(3)) \log(-x + e^x - \log(3))} dx + \int \log(\log(-x + e^x - \log(3))) \, dx$$

input
```
Int[(-x + E^x*x + (E^x - x - Log[3])*Log[E^x - x - Log[3]]*Log[Log[E^x - x
 - Log[3]]])/((E^x - x - Log[3])*Log[E^x - x - Log[3]]),x]
```

output
```
$Aborted
```

3.62.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.62.4 Maple [A] (verified)

Time = 0.85 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result	size
risch	$\ln(\ln(e^x - \ln(3) - x))\, x$	15
parallelrisch	$\ln(\ln(e^x - \ln(3) - x))\, x$	15

input
```
int(((exp(x)-ln(3)-x)*ln(exp(x)-ln(3)-x)*ln(ln(exp(x)-ln(3)-x))+exp(x)*x-x
)/(exp(x)-ln(3)-x)/ln(exp(x)-ln(3)-x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(exp(x)-ln(3)-x))*x
```

3.62.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{-x + e^x x + (e^x - x - \log(3))\log(e^x - x - \log(3))\log(\log(e^x - x - \log(3)))}{(e^x - x - \log(3))\log(e^x - x - \log(3))}\,dx$$
$$= x\log(\log(-x + e^x - \log(3)))$$

input
```
integrate(((exp(x)-log(3)-x)*log(exp(x)-log(3)-x)*log(log(exp(x)-log(3)-x)
)+exp(x)*x-x)/(exp(x)-log(3)-x)/log(exp(x)-log(3)-x),x, algorithm=\
```

output
```
x*log(log(-x + e^x - log(3)))
```

3.62.6 Sympy [A] (verification not implemented)

Time = 0.67 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \frac{-x + e^x x + (e^x - x - \log(3))\log(e^x - x - \log(3))\log(\log(e^x - x - \log(3)))}{(e^x - x - \log(3))\log(e^x - x - \log(3))}\,dx$$
$$= x\log(\log(-x + e^x - \log(3)))$$

input
```
integrate(((exp(x)-ln(3)-x)*ln(exp(x)-ln(3)-x)*ln(ln(exp(x)-ln(3)-x))+exp(
x)*x-x)/(exp(x)-ln(3)-x)/ln(exp(x)-ln(3)-x),x)
```

output
```
x*log(log(-x + exp(x) - log(3)))
```

3.62.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{-x+e^x x+(e^x-x-\log(3))\log(e^x-x-\log(3))\log(\log(e^x-x-\log(3)))}{(e^x-x-\log(3))\log(e^x-x-\log(3))}\,dx$$
$$= x\log(\log(-x+e^x-\log(3)))$$

input
```
integrate(((exp(x)-log(3)-x)*log(exp(x)-log(3)-x)*log(log(exp(x)-log(3)-x)
)+exp(x)*x-x)/(exp(x)-log(3)-x)/log(exp(x)-log(3)-x),x, algorithm=\
```

output
```
x*log(log(-x + e^x - log(3)))
```

3.62.8 Giac [F]

$$\int \frac{-x+e^x x+(e^x-x-\log(3))\log(e^x-x-\log(3))\log(\log(e^x-x-\log(3)))}{(e^x-x-\log(3))\log(e^x-x-\log(3))}\,dx$$
$$= \int \frac{(x-e^x+\log(3))\log(-x+e^x-\log(3))\log(\log(-x+e^x-\log(3)))-xe^x+x}{(x-e^x+\log(3))\log(-x+e^x-\log(3))}\,dx$$

input
```
integrate(((exp(x)-log(3)-x)*log(exp(x)-log(3)-x)*log(log(exp(x)-log(3)-x)
)+exp(x)*x-x)/(exp(x)-log(3)-x)/log(exp(x)-log(3)-x),x, algorithm=\
```

output
```
integrate(((x - e^x + log(3))*log(-x + e^x - log(3))*log(log(-x + e^x - lo
g(3))) - x*e^x + x)/((x - e^x + log(3))*log(-x + e^x - log(3))), x)
```

3.62.9 Mupad [B] (verification not implemented)

Time = 13.63 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{-x+e^x x+(e^x-x-\log(3))\log(e^x-x-\log(3))\log(\log(e^x-x-\log(3)))}{(e^x-x-\log(3))\log(e^x-x-\log(3))}\,dx$$
$$= x\,\ln(\ln(\mathrm{e}^x-\ln(3)-x))$$

input
```
int((x - x*exp(x) + log(exp(x) - log(3) - x)*log(log(exp(x) - log(3) - x))
*(x + log(3) - exp(x)))/(log(exp(x) - log(3) - x)*(x + log(3) - exp(x))),x
)
```

output
```
x*log(log(exp(x) - log(3) - x))
```

3.63 $\int \frac{}{377801998336+e^{2x}-3454189699072x+13816758796288x^2-3158116296}$

3.63.1 Optimal result

Integrand size = 92, antiderivative size = 21

$$\int \frac{1404}{377801998336+e^{2x}-3454189699072x+13816758796288x^2-31581162962944x^3+45115947089920x^4}$$
$$=\frac{5}{e^x+16(-2+4(4-4x))^4}$$

output
```
5/(exp(x)+4*(14-16*x)^2*(28-32*x)^2)
```

3.63.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{1404}{377801998336+e^{2x}-3454189699072x+13816758796288x^2-31581162962944x^3+45115947089920x^4}$$
$$=\frac{5}{e^x+256(7-8x)^4}$$

input
```
Integrate[(14049280 - 5*E^x - 48168960*x + 55050240*x^2 - 20971520*x^3)/(3
77801998336 + E^(2*x) - 3454189699072*x + 13816758796288*x^2 - 31581162962
944*x^3 + 45115947089920*x^4 - 41248865910784*x^5 + 23570780520448*x^6 - 7
696581394432*x^7 + 1099511627776*x^8 + E^x*(1229312 - 5619712*x + 9633792*
x^2 - 7340032*x^3 + 2097152*x^4)),x]
```

output
```
5/(E^x + 256*(7 - 8*x)^4)
```

3.63.
$\int \frac{14049280-5e^x-48168960x+55050240x^2-209715}{377801998336+e^{2x}-3454189699072x+13816758796288x^2-31581162962944x^3+45115947089920x^4-41248865910784x^5+23570780520448x^6-7}$

3.63.3 Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {7239, 27, 25, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-20971520x}{1099511627776x^8 - 7696581394432x^7 + 23570780520448x^6 - 41248865910784x^5 + 45115947089920x^4 - 3158}$$

$$\Big\downarrow \ 7239$$

$$\int \frac{5\left(-8192(8x-7)^3 - e^x\right)}{\left(256(7-8x)^4 + e^x\right)^2}dx$$

$$\Big\downarrow \ 27$$

$$5\int -\frac{e^x - 8192(7-8x)^3}{\left(256(7-8x)^4 + e^x\right)^2}dx$$

$$\Big\downarrow \ 25$$

$$-5\int \frac{e^x - 8192(7-8x)^3}{\left(256(7-8x)^4 + e^x\right)^2}dx$$

$$\Big\downarrow \ 7237$$

$$\frac{5}{256(7-8x)^4 + e^x}$$

input
```
Int[(14049280 - 5*E^x - 48168960*x + 55050240*x^2 - 20971520*x^3)/(3778019
98336 + E^(2*x) - 3454189699072*x + 13816758796288*x^2 - 31581162962944*x^
3 + 45115947089920*x^4 - 41248865910784*x^5 + 23570780520448*x^6 - 7696581
394432*x^7 + 1099511627776*x^8 + E^x*(1229312 - 5619712*x + 9633792*x^2 -
7340032*x^3 + 2097152*x^4)),x]
```

output
```
5/(E^x + 256*(7 - 8*x)^4)
```

3.63. $\int \frac{14049280-5e^x-48168960x+55050240x^2-209715}{377801998336+e^{2x}-3454189699072x+13816758796288x^2-31581162962944x^3+45115947089920x^4-41248865910784x^5+23570780520448x^6-7}$

3.63.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.63.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

method	result	size
norman	$\frac{5}{1048576x^4-3670016x^3+4816896x^2+e^x-2809856x+614656}$	27
risch	$\frac{5}{1048576x^4-3670016x^3+4816896x^2+e^x-2809856x+614656}$	27
parallelrisch	$\frac{5}{1048576x^4-3670016x^3+4816896x^2+e^x-2809856x+614656}$	27

input
```
int((-5*exp(x)-20971520*x^3+55050240*x^2-48168960*x+14049280)/(exp(x)^2+(2
097152*x^4-7340032*x^3+9633792*x^2-5619712*x+1229312)*exp(x)+1099511627776
*x^8-7696581394432*x^7+23570780520448*x^6-41248865910784*x^5+4511594708992
0*x^4-31581162962944*x^3+13816758796288*x^2-3454189699072*x+377801998336),
x,method=_RETURNVERBOSE)
```

output
```
5/(1048576*x^4-3670016*x^3+4816896*x^2+exp(x)-2809856*x+614656)
```

3.63.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

$$\int \frac{1404}{377801998336 + e^{2x} - 3454189699072x + 13816758796288x^2 - 31581162962944x^3 + 45115947089920x^4}$$
$$= \frac{5}{1048576\,x^4 - 3670016\,x^3 + 4816896\,x^2 - 2809856\,x + e^x + 614656}$$

input
```
integrate((-5*exp(x)-20971520*x^3+55050240*x^2-48168960*x+14049280)/(exp(x
)^2+(2097152*x^4-7340032*x^3+9633792*x^2-5619712*x+1229312)*exp(x)+1099511
627776*x^8-7696581394432*x^7+23570780520448*x^6-41248865910784*x^5+4511594
7089920*x^4-31581162962944*x^3+13816758796288*x^2-3454189699072*x+37780199
8336),x, algorithm=\
```

output
```
5/(1048576*x^4 - 3670016*x^3 + 4816896*x^2 - 2809856*x + e^x + 614656)
```

3.63.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{1404}{377801998336 + e^{2x} - 3454189699072x + 13816758796288x^2 - 31581162962944x^3 + 45115947089920x^4}$$
$$= \frac{5}{1048576x^4 - 3670016x^3 + 4816896x^2 - 2809856x + e^x + 614656}$$

input
```
integrate((-5*exp(x)-20971520*x**3+55050240*x**2-48168960*x+14049280)/(exp
(x)**2+(2097152*x**4-7340032*x**3+9633792*x**2-5619712*x+1229312)*exp(x)+1
099511627776*x**8-7696581394432*x**7+23570780520448*x**6-41248865910784*x*
*5+45115947089920*x**4-31581162962944*x**3+13816758796288*x**2-34541896990
72*x+377801998336),x)
```

output
```
5/(1048576*x**4 - 3670016*x**3 + 4816896*x**2 - 2809856*x + exp(x) + 61465
6)
```

3.63.

$$\int \frac{14049280-5e^x-48168960x+55050240x^2-209715}{377801998336+e^{2x}-3454189699072x+13816758796288x^2-31581162962944x^3+45115947089920x^4-41248865910784x^5+23570780520448x^6-7}$$

3.63.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

$$\int \frac{1404}{377801998336 + e^{2x} - 3454189699072x + 13816758796288x^2 - 31581162962944x^3 + 45115947089920x^4}$$

$$= \frac{5}{1048576\,x^4 - 3670016\,x^3 + 4816896\,x^2 - 2809856\,x + e^x + 614656}$$

input
```
integrate((-5*exp(x)-20971520*x^3+55050240*x^2-48168960*x+14049280)/(exp(x
)^2+(2097152*x^4-7340032*x^3+9633792*x^2-5619712*x+1229312)*exp(x)+1099511
627776*x^8-7696581394432*x^7+23570780520448*x^6-41248865910784*x^5+4511594
7089920*x^4-31581162962944*x^3+13816758796288*x^2-3454189699072*x+37780199
8336),x, algorithm=\
```

output
```
5/(1048576*x^4 - 3670016*x^3 + 4816896*x^2 - 2809856*x + e^x + 614656)
```

3.63.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

$$\int \frac{1404}{377801998336 + e^{2x} - 3454189699072x + 13816758796288x^2 - 31581162962944x^3 + 45115947089920x^4}$$

$$= \frac{5}{1048576\,x^4 - 3670016\,x^3 + 4816896\,x^2 - 2809856\,x + e^x + 614656}$$

input
```
integrate((-5*exp(x)-20971520*x^3+55050240*x^2-48168960*x+14049280)/(exp(x
)^2+(2097152*x^4-7340032*x^3+9633792*x^2-5619712*x+1229312)*exp(x)+1099511
627776*x^8-7696581394432*x^7+23570780520448*x^6-41248865910784*x^5+4511594
7089920*x^4-31581162962944*x^3+13816758796288*x^2-3454189699072*x+37780199
8336),x, algorithm=\
```

output
```
5/(1048576*x^4 - 3670016*x^3 + 4816896*x^2 - 2809856*x + e^x + 614656)
```

3.63. $\int \frac{14049280-5e^x-48168960x+55050240x^2-209715}{377801998336+e^{2x}-3454189699072x+13816758796288x^2-31581162962944x^3+45115947089920x^4-41248865910784x^5+23570780520448x^6-7}$

3.63.9 Mupad [F(-1)]

Timed out.

$$\int \frac{1404}{377801998336 + e^{2x} - 3454189699072x + 13816758796288x^2 - 31581162962944x^3 + 45115947089920x^4}$$

$$= \int -\frac{4}{e^{2x} - 3454189699072x + e^x (2097152x^4 - 7340032x^3 + 9633792x^2 - 5619712x + 1229312) + 13816}$$

input
```
int(-(48168960*x + 5*exp(x) - 55050240*x^2 + 20971520*x^3 - 14049280)/(exp
(2*x) - 3454189699072*x + exp(x)*(9633792*x^2 - 5619712*x - 7340032*x^3 +
2097152*x^4 + 1229312) + 13816758796288*x^2 - 31581162962944*x^3 + 4511594
7089920*x^4 - 41248865910784*x^5 + 23570780520448*x^6 - 7696581394432*x^7
+ 1099511627776*x^8 + 377801998336),x)
```

output
```
int(-(48168960*x + 5*exp(x) - 55050240*x^2 + 20971520*x^3 - 14049280)/(exp
(2*x) - 3454189699072*x + exp(x)*(9633792*x^2 - 5619712*x - 7340032*x^3 +
2097152*x^4 + 1229312) + 13816758796288*x^2 - 31581162962944*x^3 + 4511594
7089920*x^4 - 41248865910784*x^5 + 23570780520448*x^6 - 7696581394432*x^7
+ 1099511627776*x^8 + 377801998336), x)
```

3.64 $\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\dots\right)}{16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2-8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\log(x)+\dots}$

3.64.1 Optimal result

Integrand size = 147, antiderivative size = 32

$$\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)\dots\right)}{16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2-8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\log(x)+\log^2(x)}$$
$$=3-e^{4+x+\frac{x}{4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-\log(x)}}$$

output
```
3-exp(x+x/(4*ln(2/5)+4*I*Pi-ln(x))+4)
```

3.64.2 Mathematica [B] (warning: unable to verify)

Both result and optimal contain complex but leaf count is larger than twice the leaf count of optimal. 85 vs. 2(32) = 64.

Time = 0.36 (sec) , antiderivative size = 85, normalized size of antiderivative = 2.66

$$\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)\dots\right)}{16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2-8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\log(x)+\log^2(x)}$$
$$=-e^{4+x+\frac{4\pi(4+x)+i\left(16\log\left(\frac{5}{2}\right)+x\left(-1+4\log\left(\frac{5}{2}\right)\right)\right)}{4\pi+4i\log\left(\frac{5}{2}\right)+i\log(x)}}x^{(4+x)\left(-\frac{1}{\log(x)}+\frac{1}{-4i\pi+4\log\left(\frac{5}{2}\right)+\log(x)}\right)}$$

3.64.

$$\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)-\log^2(x)\right)}{\dots}$$

input
```
Integrate[(E^((-x + (-16 - 4*x)*(I*Pi - Log[5/2]) + (4 + x)*Log[x])/(-4*(I
*Pi - Log[5/2]) + Log[x]))*(-1 - 4*(I*Pi - Log[5/2]) - 16*(I*Pi - Log[5/2]
)^2 + (1 + 8*(I*Pi - Log[5/2]))*Log[x] - Log[x]^2))/(16*(I*Pi - Log[5/2])^
2 - 8*(I*Pi - Log[5/2])*Log[x] + Log[x]^2),x]
```

output
```
-(E^(4 + x + (4*Pi*(4 + x) + I*(16*Log[5/2] + x*(-1 + 4*Log[5/2])))/(4*Pi
+ (4*I)*Log[5/2] + I*Log[x]))*x^((4 + x)*(-Log[x]^(-1) + ((-4*I)*Pi + 4*Lo
g[5/2] + Log[x])^(-1))))
```

3.64.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-\log^2(x)+\left(1+8\left(-\log\left(\frac{5}{2}\right)+i\pi\right)\right)\log(x)-1-16\left(-\log\left(\frac{5}{2}\right)+i\pi\right)^2-4\left(-\log\left(\frac{5}{2}\right)+i\pi\right)\right)\exp\left(\frac{-x+(-4x-16)\dots}{\log(\dots}\right.}{\log^2(x)-8\left(-\log\left(\frac{5}{2}\right)+i\pi\right)\log(x)+16\left(-\log\left(\frac{5}{2}\right)+i\pi\right)^2}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\left(\log^2(x)-\left(1+8\left(-\log\left(\frac{5}{2}\right)+i\pi\right)\right)\log(x)+1-4\left(\pi+i\log\left(\frac{5}{2}\right)\right)\left(-i+4\pi+4i\log\left(\frac{5}{2}\right)\right)\right)\exp\left(\frac{-x+(-4x-16)(-\log\dots}{\log(x)-4(\dots}\right.}{\left(i\log(x)+4\pi\left(1+\frac{i\log\left(\frac{5}{2}\right)}{\pi}\right)\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\exp\left(\frac{-x+(-4x-16)\left(-\log\left(\frac{5}{2}\right)+i\pi\right)+(x+4)\log(x)}{\log(x)-4\left(-\log\left(\frac{5}{2}\right)+i\pi\right)}\right)+\frac{i\exp\left(\frac{-x+(-4x-16)\left(-\log\left(\frac{5}{2}\right)+i\pi\right)+(x+4)\log(x)}{\log(x)-4\left(-\log\left(\frac{5}{2}\right)+i\pi\right)}\right)}{i\log(x)+4\pi\left(1+\frac{i\log\left(\frac{5}{2}\right)}{\pi}\right)}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\int \exp\left(\frac{\left(i\pi-\log\left(\frac{5}{2}\right)\right)(-4x-16)-x+(x+4)\log(x)}{\log(x)-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)}\right)dx+$$
$$\int \frac{\exp\left(\frac{\left(i\pi-\log\left(\frac{5}{2}\right)\right)(-4x-16)-x+(x+4)\log(x)}{\log(x)-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)}\right)}{\left(i\log(x)+4\pi\left(1+\frac{i\log\left(\frac{5}{2}\right)}{\pi}\right)\right)^2}dx+i\int \frac{\exp\left(\frac{\left(i\pi-\log\left(\frac{5}{2}\right)\right)(-4x-16)-x+(x+4)\log(x)}{\log(x)-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)}\right)}{i\log(x)+4\pi\left(1+\frac{i\log\left(\frac{5}{2}\right)}{\pi}\right)}dx$$

3.64. $\int e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)-\log^2(x)\right)\dots$

input
```
Int[(E^((-x + (-16 - 4*x)*(I*Pi - Log[5/2]) + (4 + x)*Log[x])/(-4*(I*Pi -
Log[5/2]) + Log[x]))*(-1 - 4*(I*Pi - Log[5/2]) - 16*(I*Pi - Log[5/2])^2 +
(1 + 8*(I*Pi - Log[5/2]))*Log[x] - Log[x]^2))/(16*(I*Pi - Log[5/2])^2 - 8*
(I*Pi - Log[5/2])*Log[x] + Log[x]^2),x]
```

output
```
$Aborted
```

3.64.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.64.4 Maple [B] (verified)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 61 vs. $2(25) = 50$.

Time = 3.19 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.94

method	result
risch	$-\mathrm{e}^{\frac{4 i \pi x - x \ln(x) + 16 i \pi + 4 x \ln(2) - 4 x \ln(5) - 4 \ln(x) + 16 \ln(2) - 16 \ln(5) + x}{-4 \ln(5) + 4 \ln(2) + 4 i \pi - \ln(x)}}$
norman	$\frac{\left(-16\pi^2 - 16\ln(2)^2 + 32\ln(2)\ln(5) - 16\ln(5)^2\right)\mathrm{e}^{\frac{(4+x)\ln(x) + (-16-4x)\left(\ln\left(\frac{2}{5}\right) + i\pi\right) - x}{\ln(x) - 4\ln\left(\frac{2}{5}\right) - 4i\pi}} + (-8\ln(5) + 8\ln(2))\ln(x)\mathrm{e}^{\frac{(4+x)\ln(x) + (-16-4x)\left(\ldots\right.}{\ln(x) - 4\ln\left(\frac{2}{5}\right)\ldots}}}{16\pi^2 + 16\ln(2)^2 - 32\ln(2)\ln(5) - 8\ln(2)\ln(x) + 16\ln(5)^2 + 8\ln(5)\ln(x) + \ln(x\ldots}$

input
```
int((-ln(x)^2+(8*ln(2/5)+8*I*Pi+1)*ln(x)-16*(ln(2/5)+I*Pi)^2-4*ln(2/5)-4*I
*Pi-1)*exp(((4+x)*ln(x)+(-16-4*x)*(ln(2/5)+I*Pi)-x)/(ln(x)-4*ln(2/5)-4*I*P
i))/(ln(x)^2-8*(ln(2/5)+I*Pi)*ln(x)+16*(ln(2/5)+I*Pi)^2),x,method=_RETURNV
ERBOSE)
```

output
```
-exp((4*I*Pi*x-x*ln(x)+16*I*Pi+4*x*ln(2)-4*x*ln(5)-4*ln(x)+16*ln(2)-16*ln(
5)+x)/(-4*ln(5)+4*ln(2)+4*I*Pi-ln(x)))
```

3.64.5 Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 115 vs. 2(50) = 100.

Time = 0.26 (sec) , antiderivative size = 115, normalized size of antiderivative = 3.59

$$\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)\right.}{16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2-8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\log(x)+\log^2(x)}$$
$$= -e^{\left(-\frac{4i\pi x}{-4i\pi-4\log\left(\frac{2}{5}\right)+\log(x)}-\frac{4x\log\left(\frac{2}{5}\right)}{-4i\pi-4\log\left(\frac{2}{5}\right)+\log(x)}+\frac{x\log(x)}{-4i\pi-4\log\left(\frac{2}{5}\right)+\log(x)}-\frac{16i\pi}{-4i\pi-4\log\left(\frac{2}{5}\right)+\log(x)}-\frac{x}{-4i\pi-4\log\left(\frac{2}{5}\right)+\log(x)}-\frac{16\log\left(\frac{2}{5}\right.}{-4i\pi-4\log\left(\frac{2}{5}\right.}\right.}$$

input
```
integrate((-log(x)^2+(8*log(2/5)+8*I*pi+1)*log(x)-16*(log(2/5)+I*pi)^2-4*l
og(2/5)-4*I*pi-1)*exp(((4+x)*log(x)+(-16-4*x)*(log(2/5)+I*pi)-x)/(log(x)-4
*log(2/5)-4*I*pi))/(log(x)^2-8*(log(2/5)+I*pi)*log(x)+16*(log(2/5)+I*pi)^2
),x, algorithm=\
```

output
```
-e^(-4*I*pi*x/(-4*I*pi - 4*log(2/5) + log(x)) - 4*x*log(2/5)/(-4*I*pi - 4*
log(2/5) + log(x)) + x*log(x)/(-4*I*pi - 4*log(2/5) + log(x)) - 16*I*pi/(-
4*I*pi - 4*log(2/5) + log(x)) - x/(-4*I*pi - 4*log(2/5) + log(x)) - 16*log
(2/5)/(-4*I*pi - 4*log(2/5) + log(x)) + 4*log(x)/(-4*I*pi - 4*log(2/5) + l
og(x))
```

3.64.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)\right.}{16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2-8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\log(x)+\log^2(x)}$$
$$= \text{Timed out}$$

3.64.

$$\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)-\log^2(x)\right)}{}$$

input
```
integrate((-ln(x)**2+(8*ln(2/5)+8*I*pi+1)*ln(x)-16*(ln(2/5)+I*pi)**2-4*ln(
2/5)-4*I*pi-1)*exp(((4+x)*ln(x)+(-16-4*x)*(ln(2/5)+I*pi)-x)/(ln(x)-4*ln(2/
5)-4*I*pi))/(ln(x)**2-8*(ln(2/5)+I*pi)*ln(x)+16*(ln(2/5)+I*pi)**2),x)
```

output
```
Timed out
```

3.64.7 Maxima [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 184 vs. $2(50) = 100$.

Time = 2.97 (sec) , antiderivative size = 184, normalized size of antiderivative = 5.75

$$\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)}{16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2-8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\log(x)+\log^2(x)}$$
$$= -e^{\left(-\frac{4i\pi x}{-4i\pi+4\log(5)-4\log(2)+\log(x)}+\frac{4x\log(5)}{-4i\pi+4\log(5)-4\log(2)+\log(x)}-\frac{4x\log(2)}{-4i\pi+4\log(5)-4\log(2)+\log(x)}+\frac{x\log(x)}{-4i\pi+4\log(5)-4\log(2)+\log(x)}-\frac{}{-4i\pi+4\log}\right.}$$

input
```
integrate((-log(x)^2+(8*log(2/5)+8*I*pi+1)*log(x)-16*(log(2/5)+I*pi)^2-4*l
og(2/5)-4*I*pi-1)*exp(((4+x)*log(x)+(-16-4*x)*(log(2/5)+I*pi)-x)/(log(x)-4
*log(2/5)-4*I*pi))/(log(x)^2-8*(log(2/5)+I*pi)*log(x)+16*(log(2/5)+I*pi)^2
),x, algorithm=\
```

output
```
-e^(-4*I*pi*x/(-4*I*pi + 4*log(5) - 4*log(2) + log(x)) + 4*x*log(5)/(-4*I*
pi + 4*log(5) - 4*log(2) + log(x)) - 4*x*log(2)/(-4*I*pi + 4*log(5) - 4*lo
g(2) + log(x)) + x*log(x)/(-4*I*pi + 4*log(5) - 4*log(2) + log(x)) - 16*I*
pi/(-4*I*pi + 4*log(5) - 4*log(2) + log(x)) - x/(-4*I*pi + 4*log(5) - 4*lo
g(2) + log(x)) + 16*log(5)/(-4*I*pi + 4*log(5) - 4*log(2) + log(x)) - 16*l
og(2)/(-4*I*pi + 4*log(5) - 4*log(2) + log(x)) + 4*log(x)/(-4*I*pi + 4*log
(5) - 4*log(2) + log(x)))
```

3.64.8 Giac [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 117 vs. $2(50) = 100$.

Time = 1.00 (sec) , antiderivative size = 117, normalized size of antiderivative = 3.66

$$\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)\right.}{16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2-8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\log(x)+\log^2(x)}$$

$$= -e^{\left(\frac{4\pi x}{4\pi+4i\log(5)-4i\log(2)+i\log(x)}+\frac{4ix\log(5)}{4\pi+4i\log(5)-4i\log(2)+i\log(x)}-\frac{4ix\log(2)}{4\pi+4i\log(5)-4i\log(2)+i\log(x)}+\frac{ix\log(x)}{4\pi+4i\log(5)-4i\log(2)+i\log(x)}-\frac{}{4\pi+4i\log(}\right.}$$

input
```
integrate((-log(x)^2+(8*log(2/5)+8*I*pi+1)*log(x)-16*(log(2/5)+I*pi)^2-4*l
og(2/5)-4*I*pi-1)*exp(((4+x)*log(x)+(-16-4*x)*(log(2/5)+I*pi)-x)/(log(x)-4
*log(2/5)-4*I*pi))/(log(x)^2-8*(log(2/5)+I*pi)*log(x)+16*(log(2/5)+I*pi)^2
),x, algorithm=\
```

output
```
-e^(4*pi*x/(4*pi + 4*I*log(5) - 4*I*log(2) + I*log(x)) + 4*I*x*log(5)/(4*p
i + 4*I*log(5) - 4*I*log(2) + I*log(x)) - 4*I*x*log(2)/(4*pi + 4*I*log(5)
- 4*I*log(2) + I*log(x)) + I*x*log(x)/(4*pi + 4*I*log(5) - 4*I*log(2) + I*
log(x)) - I*x/(4*pi + 4*I*log(5) - 4*I*log(2) + I*log(x)) + 4)
```

3.64.9 Mupad [B] (verification not implemented)

Time = 16.60 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.56

$$\int \frac{e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)-16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\right)\log(x)\right.}{16\left(i\pi-\log\left(\frac{5}{2}\right)\right)^2-8\left(i\pi-\log\left(\frac{5}{2}\right)\right)\log(x)+\log^2(x)}$$

$$= -e^{\frac{\Pi\,16i}{-\ln\left(\frac{625\,x}{16}\right)+\Pi\,4i}+\frac{x}{-\ln\left(\frac{625\,x}{16}\right)+\Pi\,4i}+\frac{\Pi\,x\,4i}{-\ln\left(\frac{625\,x}{16}\right)+\Pi\,4i}}\left(\frac{625\,x}{16}\right)^{\frac{x\,1i+4i}{4\,\Pi-\ln\left(\frac{2}{5}\right)4i+\ln(x)\,1i}}$$

input
```
int(-(exp((x + (4*x + 16)*(Pi*1i + log(2/5)) - log(x)*(x + 4))/(Pi*4i + 4*
log(2/5) - log(x)))*(Pi*4i + 4*log(2/5) - log(x)*(Pi*8i + 8*log(2/5) + 1)
+ log(x)^2 + 16*(Pi*1i + log(2/5))^2 + 1))/(log(x)^2 - 8*log(x)*(Pi*1i + l
og(2/5)) + 16*(Pi*1i + log(2/5))^2),x)
```

output
```
-exp((Pi*16i)/(Pi*4i - log((625*x)/16)) + x/(Pi*4i - log((625*x)/16)) + (P
i*x*4i)/(Pi*4i - log((625*x)/16)))*((625*x)/16)^((x*1i + 4i)/(4*Pi - log(2
/5)*4i + log(x)*1i))
```

3.64.

$$\int e^{\frac{-x+(-16-4x)\left(i\pi-\log\left(\frac{5}{2}\right)\right)+(4+x)\log(x)}{-4\left(i\pi-\log\left(\frac{5}{2}\right)\right)+\log(x)}}\left(-1-4\left(i\pi-\log\left(\tfrac{5}{2}\right)\right)-16\left(i\pi-\log\left(\tfrac{5}{2}\right)\right)^2+\left(1+8\left(i\pi-\log\left(\tfrac{5}{2}\right)\right)\right)\log(x)-\log^2(x)\right)\,d$$

3.65 $\int \frac{-1-4x^2+e^{2+x+\left(-16-8x-x^2\right)\log(7)}\left(-2x^2+\left(16x^2+4x^3\right)\log(7)\right)}{2x^2}\,dx$

3.65.1 Optimal result

Integrand size = 53, antiderivative size = 28

$$\int \frac{-1-4x^2+e^{2+x+(-16-8x-x^2)\log(7)}(-2x^2+(16x^2+4x^3)\log(7))}{2x^2}\,dx = e-e^{2+x-(4+x)^2\log(7)}+\frac{1}{2x}-2x$$

output
```
exp(1)-2*x+1/2/x-exp(x+2-ln(7)*(4+x)^2)
```

3.65.2 Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{-1-4x^2+e^{2+x+(-16-8x-x^2)\log(7)}(-2x^2+(16x^2+4x^3)\log(7))}{2x^2}\,dx = -7^{-(4+x)^2}e^{2+x}+\frac{1}{2x}-2x$$

input
```
Integrate[(-1 - 4*x^2 + E^(2 + x + (-16 - 8*x - x^2)*Log[7])*(-2*x^2 + (16
*x^2 + 4*x^3)*Log[7]))/(2*x^2),x]
```

output
```
-(E^(2 + x)/7^(4 + x)^2) + 1/(2*x) - 2*x
```

3.65.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.61, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.075, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^2+e^{\left(-x^2-8x-16\right)\log(7)+x+2}\left(\left(4x^3+16x^2\right)\log(7)-2x^2\right)-1}{2x^2}dx$$

$$\Big\downarrow \textbf{27}$$

$$\frac{1}{2}\int -\frac{4x^2+2\,7^{-x^2-8x-16}e^{x+2}\left(x^2-2\left(x^3+4x^2\right)\log(7)\right)+1}{x^2}dx$$

$$\Big\downarrow \textbf{25}$$

$$-\frac{1}{2}\int \frac{4x^2+2\,7^{-x^2-8x-16}e^{x+2}\left(x^2-2\left(x^3+4x^2\right)\log(7)\right)+1}{x^2}dx$$

$$\Big\downarrow \textbf{2010}$$

$$-\frac{1}{2}\int \left(\frac{4x^2+1}{x^2}-2\,7^{-(x+4)^2}e^{x+2}(\log(49)x+8\log(7)-1)\right)dx$$

$$\Big\downarrow \textbf{2009}$$

$$\frac{1}{2}\left(-\frac{7^{-x^2}\log(49)e^{x(1-8\log(7))+2(1-8\log(7))}}{\log(7)}-4x+\frac{1}{x}\right)$$

input
```
Int[(-1 - 4*x^2 + E^(2 + x + (-16 - 8*x - x^2)*Log[7])*(-2*x^2 + (16*x^2 +
 4*x^3)*Log[7]))/(2*x^2),x]
```

output
```
(x^(-1) - 4*x - (E^(2*(1 - 8*Log[7]) + x*(1 - 8*Log[7]))*Log[49])/(7^x^2*L
og[7]))/2
```

3.65.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.65.4 Maple [A] (verified)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

method	result
risch	$-2x+\frac{1}{2x}-\left(\frac{1}{7}\right)^{(4+x)^2} e^{2+x}$
norman	$\frac{\frac{1}{2}-2x^2-x\,e^{\left(-x^2-8x-16\right)\ln(7)+2+x}}{x}$
parallelrisch	$-\frac{4x^2+2x\,e^{\left(-x^2-8x-16\right)\ln(7)+2+x}-1}{2x}$
parts	$-e^{-x^2\ln(7)+(-8\ln(7)+1)x-16\ln(7)+2}-2x+\frac{1}{2x}$
default	$-e^{-x^2\ln(7)+(-8\ln(7)+1)x-16\ln(7)+2}+\frac{(-8\ln(7)+1)\sqrt{\pi}\,e^{-16\ln(7)+2+\frac{(-8\ln(7)+1)^2}{4\ln(7)}}\operatorname{erf}\left(\sqrt{\ln(7)}\,x-\frac{-8\ln(7)+1}{2\sqrt{\ln(7)}}\right)}{2\sqrt{\ln(7)}}+4$

input
```
int(1/2*(((4*x^3+16*x^2)*ln(7)-2*x^2)*exp((-x^2-8*x-16)*ln(7)+2+x)-4*x^2-1
)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-2*x+1/2/x-(1/7)^((4+x)^2)*exp(2+x)
```

3.65.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{-1-4x^2+e^{2+x+(-16-8x-x^2)\log(7)}(-2x^2+(16x^2+4x^3)\log(7))}{2x^2}\,dx$$
$$= -\frac{4\,x^2+2\,xe^{\left(-\left(x^2+8\,x+16\right)\log(7)+x+2\right)}-1}{2\,x}$$

input
```
integrate(1/2*(((4*x^3+16*x^2)*log(7)-2*x^2)*exp((-x^2-8*x-16)*log(7)+2+x)
-4*x^2-1)/x^2,x, algorithm=\
```

output
```
-1/2*(4*x^2 + 2*x*e^(-(x^2 + 8*x + 16)*log(7) + x + 2) - 1)/x
```

3.65.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{-1-4x^2+e^{2+x+(-16-8x-x^2)\log(7)}(-2x^2+(16x^2+4x^3)\log(7))}{2x^2}\,dx$$
$$= -2x-e^{x+(-x^2-8x-16)\log(7)+2}+\frac{1}{2x}$$

input
```
integrate(1/2*(((4*x**3+16*x**2)*ln(7)-2*x**2)*exp((-x**2-8*x-16)*ln(7)+2+
x)-4*x**2-1)/x**2,x)
```

output
```
-2*x - exp(x + (-x**2 - 8*x - 16)*log(7) + 2) + 1/(2*x)
```

3.65.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.32 (sec) , antiderivative size = 231, normalized size of antiderivative = 8.25

$$\int \frac{-1-4x^2+e^{2+x+(-16-8x-x^2)\log(7)}(-2x^2+(16x^2+4x^3)\log(7))}{2x^2}\,dx$$
$$= \frac{4}{33232930569601}\sqrt{\pi}\,\mathrm{erf}\left(x\sqrt{\log(7)}+\frac{8\log(7)-1}{2\sqrt{\log(7)}}\right)e^{\left(\frac{(8\log(7)-1)^2}{4\log(7)}+2\right)}\sqrt{\log(7)}$$
$$-\frac{\left(\frac{\sqrt{\pi}(2x\log(7)+8\log(7)-1)\left(\mathrm{erf}\left(\frac{1}{2}\sqrt{\frac{(2x\log(7)+8\log(7)-1)^2}{\log(7)}}\right)-1\right)(8\log(7)-1)}{\sqrt{\frac{(2x\log(7)+8\log(7)-1)^2}{\log(7)}}(-\log(7))^{\frac{3}{2}}}+\frac{2e^{\left(-\frac{(2x\log(7)+8\log(7)-1)^2}{4\log(7)}\right)}\log(7)}{(-\log(7))^{\frac{3}{2}}}\right)e^{\left(\frac{(8\log(7)-1)^2}{4\log(7)}+2\right)}\log(7)}{66465861139202\sqrt{-\log(7)}}$$
$$-\frac{\sqrt{\pi}\,\mathrm{erf}\left(x\sqrt{\log(7)}+\frac{8\log(7)-1}{2\sqrt{\log(7)}}\right)e^{\left(\frac{(8\log(7)-1)^2}{4\log(7)}+2\right)}}{66465861139202\sqrt{\log(7)}}-2x+\frac{1}{2x}$$

input
```
integrate(1/2*((((4*x^3+16*x^2)*log(7)-2*x^2)*exp((-x^2-8*x-16)*log(7)+2+x)
-4*x^2-1)/x^2,x, algorithm=\
```

output
```
4/33232930569601*sqrt(pi)*erf(x*sqrt(log(7)) + 1/2*(8*log(7) - 1)/sqrt(log
(7)))*e^(1/4*(8*log(7) - 1)^2/log(7) + 2)*sqrt(log(7)) - 1/66465861139202*
(sqrt(pi)*(2*x*log(7) + 8*log(7) - 1)*(erf(1/2*sqrt((2*x*log(7) + 8*log(7)
 - 1)^2/log(7))) - 1)*(8*log(7) - 1)/(sqrt((2*x*log(7) + 8*log(7) - 1)^2/l
og(7))*(-log(7))^(3/2)) + 2*e^(-1/4*(2*x*log(7) + 8*log(7) - 1)^2/log(7))*
log(7)/(-log(7))^(3/2))*e^(1/4*(8*log(7) - 1)^2/log(7) + 2)*log(7)/sqrt(-l
og(7)) - 1/66465861139202*sqrt(pi)*erf(x*sqrt(log(7)) + 1/2*(8*log(7) - 1)
/sqrt(log(7)))*e^(1/4*(8*log(7) - 1)^2/log(7) + 2)/sqrt(log(7)) - 2*x + 1/
2/x
```

3.65.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{-1-4x^2+e^{2+x+(-16-8x-x^2)\log(7)}(-2x^2+(16x^2+4x^3)\log(7))}{2x^2}\,dx$$
$$= -\frac{132931722278404\,x^2+2\,xe^{(-x^2\log(7)-8\,x\log(7)+x+2)}-33232930569601}{66465861139202\,x}$$

input
```
integrate(1/2*((((4*x^3+16*x^2)*log(7)-2*x^2)*exp((-x^2-8*x-16)*log(7)+2+x)
-4*x^2-1)/x^2,x, algorithm=\
```

output
```
-1/66465861139202*(132931722278404*x^2 + 2*x*e^(-x^2*log(7) - 8*x*log(7) +
 x + 2) - 33232930569601)/x
```

3.65.9 Mupad [B] (verification not implemented)

Time = 13.18 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{-1-4x^2+e^{2+x+\left(-16-8x-x^2\right)\log(7)}\left(-2x^2+\left(16x^2+4x^3\right)\log(7)\right)}{2x^2}\,dx$$
$$=\frac{1}{2\,x}-2\,x-\frac{e^2\,e^x}{33232930569601\,7^{8\,x}\,7^{x^2}}$$

input
```
int(-(2*x^2 - (exp(x - log(7)*(8*x + x^2 + 16) + 2)*(log(7)*(16*x^2 + 4*x^
3) - 2*x^2))/2 + 1/2)/x^2,x)
```

output
```
1/(2*x) - 2*x - (exp(2)*exp(x))/(33232930569601*7^(8*x)*7^(x^2))
```

3.66 $\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x}$

3.66.1 Optimal result

Integrand size = 125, antiderivative size = 33

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\mathrm{l}\right.}{x^4}\right.}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x)}$$

$$=\frac{\log\left(6-\log(x)+\frac{e^{-2x}\left(1-\frac{x+\log(x)}{x}\right)^2}{x^2}\right)}{x}$$

output
```
ln((1-(x+ln(x))/x)^2/exp(x)^2/x^2-ln(x)+6)/x
```

3.66.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.79

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\mathrm{l}\right.}{x^4}\right.}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x)}$$

$$=2+\frac{\log\left(6-\log(x)+\frac{e^{-2x}\log^2(x)}{x^4}\right)}{x}$$

3.66.

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\log^2(x)\right)}{x^4}\right)}{\ldots}\,dx$$

input
```
Integrate[(-(E^(2*x)*x^4) + 2*Log[x] + (-4 - 2*x)*Log[x]^2 + (-6*E^(2*x)*x
^4 + E^(2*x)*x^4*Log[x] - Log[x]^2)*Log[(6*E^(2*x)*x^4 - E^(2*x)*x^4*Log[x
] + Log[x]^2)/(E^(2*x)*x^4)])/(6*E^(2*x)*x^6 - E^(2*x)*x^6*Log[x] + x^2*Lo
g[x]^2),x]
```

output
```
2 + Log[6 - Log[x] + Log[x]^2/(E^(2*x)*x^4)]/x
```

3.66.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^{2x}x^4+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\log^2(x)\right)}{x^4}\right)+(-2x-4)\log^2(x)+2\log}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x)}$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{\log(x)\left(2x\log^2(x)+4\log^2(x)-12x\log(x)-25\log(x)+12\right)}{x^2(\log(x)-6)\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)}+\frac{-\log(x)\log\left(\frac{e^{-2x}\log^2(x)}{x^4}-\log(x)+6\right)+6\log}{x^2(\log(x)-6}\right.$$

$$\Big\downarrow \; 2009$$

$$-12\int \frac{\log^2(x)}{x(\log(x)-6)\left(-6e^{2x}x^4+e^{2x}\log(x)x^4-\log^2(x)\right)}dx+2\int \frac{\log^3(x)}{x(\log(x)-6)\left(-6e^{2x}x^4+e^{2x}\log(x)x^4-\log^2(x)\right)}dx+12\int \frac{\log(x)}{x^2(\log(x)-6)\left(-6e^{2x}x^4+e^{2x}\log(x)x^4-\log^2(x)\right)}dx-25\int \frac{\log^2(x)}{x^2(\log(x)-6)\left(-6e^{2x}x^4+e^{2x}\log(x)x^4-\log^2(x)\right)}dx-\int \frac{\log\left(\frac{e^{-2x}\log^2(x)}{x^4}-\log(x)+6\right)}{x^2}dx+4\int \frac{\log^3(x)}{x^2(\log(x)-6)\left(-6e^{2x}x^4+e^{2x}\log(x)x^4-\log^2(x)\right)}dx+\frac{\text{ExpIntegralEi}(6-\log(x))}{e^6}$$

input
```
Int[(-(E^(2*x)*x^4) + 2*Log[x] + (-4 - 2*x)*Log[x]^2 + (-6*E^(2*x)*x^4 + E
^(2*x)*x^4*Log[x] - Log[x]^2)*Log[(6*E^(2*x)*x^4 - E^(2*x)*x^4*Log[x] + Lo
g[x]^2)/(E^(2*x)*x^4)])/(6*E^(2*x)*x^6 - E^(2*x)*x^6*Log[x] + x^2*Log[x]^2
),x]
```

3.66.

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\log^2(x)\right)}{x^4}\right)}{}dx$$

output
```
$Aborted
```

3.66.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.66.4 Maple [A] (verified)

Time = 96.03 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.18

method	result	size
parallelrisch	$\frac{\ln\left(\frac{\left(\ln(x)^{2}-x^{4}\mathrm{e}^{2x}\ln(x)+6\,\mathrm{e}^{2x}x^{4}\right)\mathrm{e}^{-2x}}{x^{4}}\right)}{x}$	39
risch	Expression too large to display	722

input
```
int(((-ln(x)^2+x^4*exp(x)^2*ln(x)-6*exp(x)^2*x^4)*ln((ln(x)^2-x^4*exp(x)^2
*ln(x)+6*exp(x)^2*x^4)/exp(x)^2/x^4)+(-2*x-4)*ln(x)^2+2*ln(x)-exp(x)^2*x^4
)/(x^2*ln(x)^2-x^6*exp(x)^2*ln(x)+6*x^6*exp(x)^2),x,method=_RETURNVERBOSE)
```

output
```
ln((ln(x)^2-x^4*exp(x)^2*ln(x)+6*exp(x)^2*x^4)/exp(x)^2/x^4)/x
```

3.66.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.21

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+l\right.}{x^4}\right.}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x)}$$
$$=\frac{\log\left(-\frac{\left(x^4e^{(2x)}\log(x)-6\,x^4e^{(2x)}-\log(x)^2\right)e^{(-2x)}}{x^4}\right)}{x}$$

3.66.
$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\log^2(x)\right)}{x^4}\right)}{\ldots}\,dx$$

input
```
integrate(((-log(x)^2+x^4*exp(x)^2*log(x)-6*exp(x)^2*x^4)*log((log(x)^2-x^
4*exp(x)^2*log(x)+6*exp(x)^2*x^4)/exp(x)^2/x^4)+(-2*x-4)*log(x)^2+2*log(x)
-exp(x)^2*x^4)/(x^2*log(x)^2-x^6*exp(x)^2*log(x)+6*x^6*exp(x)^2),x, algori
thm=\
```

output
```
log(-(x^4*e^(2*x)*log(x) - 6*x^4*e^(2*x) - log(x)^2)*e^(-2*x)/x^4)/x
```

3.66.6 Sympy [A] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.12

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\log^2(x)\right)}{x^4}\right)}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x)}\,dx = \frac{\log\left(\frac{\left(-x^4e^{2x}\log(x)+6x^4e^{2x}+\log(x)^2\right)e^{-2x}}{x^4}\right)}{x}$$

input
```
integrate(((-ln(x)**2+x**4*exp(x)**2*ln(x)-6*exp(x)**2*x**4)*ln((ln(x)**2-
x**4*exp(x)**2*ln(x)+6*exp(x)**2*x**4)/exp(x)**2/x**4)+(-2*x-4)*ln(x)**2+2
*ln(x)-exp(x)**2*x**4)/(x**2*ln(x)**2-x**6*exp(x)**2*ln(x)+6*x**6*exp(x)**
2),x)
```

output
```
log((-x**4*exp(2*x)*log(x) + 6*x**4*exp(2*x) + log(x)**2)*exp(-2*x)/x**4)/
x
```

3.66.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\log^2(x)\right)}{x^4}\right)}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x)}\,dx = \frac{\log\left(-x^4e^{(2x)}\log(x)+6x^4e^{(2x)}+\log(x)^2\right)-4\log(x)}{x}$$

input
```
integrate(((-log(x)^2+x^4*exp(x)^2*log(x)-6*exp(x)^2*x^4)*log((log(x)^2-x^
4*exp(x)^2*log(x)+6*exp(x)^2*x^4)/exp(x)^2/x^4)+(-2*x-4)*log(x)^2+2*log(x)
-exp(x)^2*x^4)/(x^2*log(x)^2-x^6*exp(x)^2*log(x)+6*x^6*exp(x)^2),x, algori
thm=\
```

output
```
(log(-x^4*e^(2*x)*log(x) + 6*x^4*e^(2*x) + log(x)^2) - 4*log(x))/x
```

3.66.8 Giac [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.27

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\mathrm{l}\right.}{x^4}\right.}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x)}$$

$$=\frac{\log\left(-\left(x^4e^{(2x)}\log(x)-6x^4e^{(2x)}-\log(x)^2\right)e^{(-2x)}\right)-4\log(x)}{x}$$

input
```
integrate(((-log(x)^2+x^4*exp(x)^2*log(x)-6*exp(x)^2*x^4)*log((log(x)^2-x^
4*exp(x)^2*log(x)+6*exp(x)^2*x^4)/exp(x)^2/x^4)+(-2*x-4)*log(x)^2+2*log(x)
-exp(x)^2*x^4)/(x^2*log(x)^2-x^6*exp(x)^2*log(x)+6*x^6*exp(x)^2),x, algori
thm=\
```

output
```
(log(-(x^4*e^(2*x)*log(x) - 6*x^4*e^(2*x) - log(x)^2)*e^(-2*x)) - 4*log(x)
)/x
```

3.66.9 Mupad [B] (verification not implemented)

Time = 13.08 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\mathrm{l}\right.}{x^4}\right.}{6e^{2x}x^6-e^{2x}x^6\log(x)+x^2\log^2(x)}$$

$$=\frac{\ln\left(\frac{1}{x^4}\right)+\ln\left(6x^4-x^4\ln(x)+\mathrm{e}^{-2x}\ln(x)^2\right)}{x}$$

input
```
int(-(log((exp(-2*x)*(log(x)^2 + 6*x^4*exp(2*x) - x^4*exp(2*x)*log(x)))/x^
4)*(log(x)^2 + 6*x^4*exp(2*x) - x^4*exp(2*x)*log(x)) - 2*log(x) + x^4*exp(
2*x) + log(x)^2*(2*x + 4))/(6*x^6*exp(2*x) + x^2*log(x)^2 - x^6*exp(2*x)*l
og(x)),x)
```

output
```
(log(1/x^4) + log(6*x^4 - x^4*log(x) + exp(-2*x)*log(x)^2))/x
```

3.66.

$$\int \frac{-e^{2x}x^4+2\log(x)+(-4-2x)\log^2(x)+\left(-6e^{2x}x^4+e^{2x}x^4\log(x)-\log^2(x)\right)\log\left(\frac{e^{-2x}\left(6e^{2x}x^4-e^{2x}x^4\log(x)+\log^2(x)\right)}{x^4}\right)}{\cdots}\,dx$$

3.67 $\int \frac{e^{-\frac{x^2}{-1+x}}\left(2+16x-4x^2-2x^3+e^4\left(4x-2x^2\right)\right)}{1-2x+x^2}\,dx$

3.67.1 Optimal result

Integrand size = 51, antiderivative size = 23

$$\int \frac{e^{-\frac{x^2}{-1+x}}\left(2+16x-4x^2-2x^3+e^4\left(4x-2x^2\right)\right)}{1-2x+x^2}\,dx=2e^{-x+\frac{x}{1-x}}\left(5+e^4+x\right)$$

output
```
2*(exp(4)+x+5)/exp(x-x/(1-x))
```

3.67.2 Mathematica [A] (verified)

Time = 0.47 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{e^{-\frac{x^2}{-1+x}}\left(2+16x-4x^2-2x^3+e^4\left(4x-2x^2\right)\right)}{1-2x+x^2}\,dx=2e^{\frac{x^2}{1-x}}\left(5+e^4+x\right)$$

input
```
Integrate[(2 + 16*x - 4*x^2 - 2*x^3 + E^4*(4*x - 2*x^2))/(E^(x^2/(-1 + x))
*(1 - 2*x + x^2)),x]
```

output
```
2*E^(x^2/(1 - x))*(5 + E^4 + x)
```

3.67.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-\frac{x^2}{x-1}}\left(-2x^3-4x^2+e^4\left(4x-2x^2\right)+16x+2\right)}{x^2-2x+1}\,dx$$

$$\Big\downarrow \text{7277}$$

$$4\int \frac{e^{\frac{x^2}{1-x}}\left(-x^3-2x^2+8x+e^4\left(2x-x^2\right)+1\right)}{2(1-x)^2}dx$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{e^{\frac{x^2}{1-x}}\left(-x^3-2x^2+8x+e^4\left(2x-x^2\right)+1\right)}{(1-x)^2}dx$$

$$\Big\downarrow \text{7292}$$

$$2\int \frac{e^{\frac{x^2}{1-x}}\left(-x^3-\left(2+e^4\right)x^2+2\left(4+e^4\right)x+1\right)}{(1-x)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(-e^{\frac{x^2}{1-x}}x+\frac{e^{\frac{x^2}{1-x}}}{x-1}+\frac{e^{\frac{x^2}{1-x}}\left(6+e^4\right)}{(x-1)^2}-4e^{\frac{x^2}{1-x}}\left(1+\frac{e^4}{4}\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\left(-\left(\left(4+e^4\right)\int e^{\frac{x^2}{1-x}}dx\right)+\left(6+e^4\right)\int \frac{e^{\frac{x^2}{1-x}}}{(x-1)^2}dx+\int \frac{e^{\frac{x^2}{1-x}}}{x-1}dx-\int e^{\frac{x^2}{1-x}}xdx\right)$$

input
```
Int[(2 + 16*x - 4*x^2 - 2*x^3 + E^4*(4*x - 2*x^2))/(E^(x^2/(-1 + x))*(1 -
2*x + x^2)),x]
```

output
```
$Aborted
```

3.67.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.67.4 Maple [A] (verified)

Time = 0.72 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

method	result	size
gosper	$2(e^{4}+x+5)\,e^{-\frac{x^{2}}{-1+x}}$	20
risch	$(2x+2\,e^{4}+10)\,e^{-\frac{x^{2}}{-1+x}}$	22
norman	$\frac{((2\,e^{4}+8)x+2x^{2}-10-2\,e^{4})e^{-\frac{x^{2}}{-1+x}}}{-1+x}$	38
parallelrisch	$\frac{(-10+2x\,e^{4}+2x^{2}-2\,e^{4}+8x)e^{-\frac{x^{2}}{-1+x}}}{-1+x}$	38

input
```
int(((-2*x^2+4*x)*exp(4)-2*x^3-4*x^2+16*x+2)/(x^2-2*x+1)/exp(x^2/(-1+x)),x
,method=_RETURNVERBOSE)
```

output
```
2*(exp(4)+x+5)/exp(x^2/(-1+x))
```

3.67. $\int \frac{e^{-\frac{x^2}{-1+x}}\left(2+16x-4x^2-2x^3+e^4\left(4x-2x^2\right)\right)}{1-2x+x^2}\,dx$

3.67.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{e^{-\frac{x^2}{-1+x}}(2+16x-4x^2-2x^3+e^4(4x-2x^2))}{1-2x+x^2}\,dx = 2\left(x+e^4+5\right)e^{\left(-\frac{x^2}{x-1}\right)}$$

input
```
integrate(((-2*x^2+4*x)*exp(4)-2*x^3-4*x^2+16*x+2)/(x^2-2*x+1)/exp(x^2/(-1
+x)),x, algorithm=\
```

output
```
2*(x + e^4 + 5)*e^(-x^2/(x - 1))
```

3.67.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \frac{e^{-\frac{x^2}{-1+x}}(2+16x-4x^2-2x^3+e^4(4x-2x^2))}{1-2x+x^2}\,dx = \left(2x+10+2e^4\right)e^{-\frac{x^2}{x-1}}$$

input
```
integrate(((-2*x**2+4*x)*exp(4)-2*x**3-4*x**2+16*x+2)/(x**2-2*x+1)/exp(x**
2/(-1+x)),x)
```

output
```
(2*x + 10 + 2*exp(4))*exp(-x**2/(x - 1))
```

3.67.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{e^{-\frac{x^2}{-1+x}}(2+16x-4x^2-2x^3+e^4(4x-2x^2))}{1-2x+x^2}\,dx = 2\left(x+e^4+5\right)e^{\left(-x-\frac{1}{x-1}-1\right)}$$

input
```
integrate(((-2*x^2+4*x)*exp(4)-2*x^3-4*x^2+16*x+2)/(x^2-2*x+1)/exp(x^2/(-1
+x)),x, algorithm=\
```

output
```
2*(x + e^4 + 5)*e^(-x - 1/(x - 1) - 1)
```

3.67.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. $2(20) = 40$.

Time = 0.28 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.87

$$\int \frac{e^{-\frac{x^2}{-1+x}}(2+16x-4x^2-2x^3+e^4(4x-2x^2))}{1-2x+x^2}\,dx = 2\,xe^{\left(-\frac{x^2}{x-1}\right)} + 2\,e^{\left(-\frac{x^2}{x-1}+4\right)} + 10\,e^{\left(-\frac{x^2}{x-1}\right)}$$

input
```
integrate((((-2*x^2+4*x)*exp(4)-2*x^3-4*x^2+16*x+2)/(x^2-2*x+1)/exp(x^2/(-1
+x)),x, algorithm=\
```

output
```
2*x*e^(-x^2/(x - 1)) + 2*e^(-x^2/(x - 1) + 4) + 10*e^(-x^2/(x - 1))
```

3.67.9 Mupad [B] (verification not implemented)

Time = 12.79 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{e^{-\frac{x^2}{-1+x}}(2+16x-4x^2-2x^3+e^4(4x-2x^2))}{1-2x+x^2}\,dx = 2\,\mathrm{e}^{-\frac{x^2}{x-1}}\left(x+\mathrm{e}^4+5\right)$$

input
```
int((exp(-x^2/(x - 1))*(16*x + exp(4)*(4*x - 2*x^2) - 4*x^2 - 2*x^3 + 2))/
(x^2 - 2*x + 1),x)
```

output
```
2*exp(-x^2/(x - 1))*(x + exp(4) + 5)
```

3.68 $\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}(-1-e^{21}-x)\log(x)}{x^3\log^2(x)}\,dx$

3.68.1 Optimal result

Integrand size = 53, antiderivative size = 22

$$\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}(-1-e^{21}-x)\log(x)}{x^3\log^2(x)}\,dx=\frac{e^{\frac{1+e^{21}+2x}{x}}}{x\log(x)}$$

output
```
exp((exp(21)+2*x+1)/x)/x/ln(x)
```

3.68.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}(-1-e^{21}-x)\log(x)}{x^3\log^2(x)}\,dx=\frac{e^{\frac{1+e^{21}+2x}{x}}}{x\log(x)}$$

input
```
Integrate[(-(E^((1 + E^21 + 2*x)/x)*x) + E^((1 + E^21 + 2*x)/x)*(-1 - E^21
 - x)*Log[x])/(x^3*Log[x]^2),x]
```

output
```
E^((1 + E^21 + 2*x)/x)/(x*Log[x])
```

3.68.3 Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.038$, Rules used = {7292, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{2x+e^{21}+1}{x}}(-x-e^{21}-1)\log(x)-e^{\frac{2x+e^{21}+1}{x}}x}{x^3\log^2(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{\frac{1+e^{21}}{x}+2}(-x+x(-\log(x))-(1+e^{21})\log(x))}{x^3\log^2(x)}dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{e^{\frac{1+e^{21}}{x}+2}}{x\log(x)}$$

input
```
Int[(-(E^((1 + E^21 + 2*x)/x)*x) + E^((1 + E^21 + 2*x)/x)*(-1 - E^21 - x)*
Log[x])/(x^3*Log[x]^2),x]
```

output
```
E^(2 + (1 + E^21)/x)/(x*Log[x])
```

3.68.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.68.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

method	result	size
risch	$\frac{\mathrm{e}^{\frac{\mathrm{e}^{21}+2x+1}{x}}}{x\ln(x)}$	21
parallelrisch	$\frac{\mathrm{e}^{\frac{\mathrm{e}^{21}+2x+1}{x}}}{x\ln(x)}$	21

input
```
int(((-exp(21)-x-1)*exp((exp(21)+2*x+1)/x)*ln(x)-x*exp((exp(21)+2*x+1)/x))
/x^3/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
exp((exp(21)+2*x+1)/x)/x/ln(x)
```

3.68.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}(-1-e^{21}-x)\log(x)}{x^3\log^2(x)}\,dx=\frac{e^{\left(\frac{2\,x+e^{21}+1}{x}\right)}}{x\log(x)}$$

input
```
integrate(((-exp(21)-x-1)*exp((exp(21)+2*x+1)/x)*log(x)-x*exp((exp(21)+2*x
+1)/x))/x^3/log(x)^2,x, algorithm=\
```

output
```
e^((2*x + e^21 + 1)/x)/(x*log(x))
```

3.68.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}(-1-e^{21}-x)\log(x)}{x^3\log^2(x)}\,dx=\frac{e^{\frac{2x+1+e^{21}}{x}}}{x\log(x)}$$

input
```
integrate(((-exp(21)-x-1)*exp((exp(21)+2*x+1)/x)*ln(x)-x*exp((exp(21)+2*x+
1)/x))/x**3/ln(x)**2,x)
```

output
```
exp((2*x + 1 + exp(21))/x)/(x*log(x))
```

3.68.7 Maxima [F]

$$\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}(-1-e^{21}-x)\log(x)}{x^3\log^2(x)}\,dx$$
$$=\int -\frac{(x+e^{21}+1)e^{\left(\frac{2x+e^{21}+1}{x}\right)}\log(x)+xe^{\left(\frac{2x+e^{21}+1}{x}\right)}}{x^3\log(x)^2}\,dx$$

input
```
integrate(((-exp(21)-x-1)*exp((exp(21)+2*x+1)/x)*log(x)-x*exp((exp(21)+2*x
+1)/x))/x^3/log(x)^2,x, algorithm=\
```

output
```
-integrate(((x + e^21 + 1)*e^((2*x + e^21 + 1)/x)*log(x) + x*e^((2*x + e^2
1 + 1)/x))/(x^3*log(x)^2), x)
```

3.68.8 Giac [F]

$$\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}(-1-e^{21}-x)\log(x)}{x^3\log^2(x)}\,dx$$
$$=\int -\frac{(x+e^{21}+1)e^{\left(\frac{2x+e^{21}+1}{x}\right)}\log(x)+xe^{\left(\frac{2x+e^{21}+1}{x}\right)}}{x^3\log(x)^2}\,dx$$

input
```
integrate(((-exp(21)-x-1)*exp((exp(21)+2*x+1)/x)*log(x)-x*exp((exp(21)+2*x
+1)/x))/x^3/log(x)^2,x, algorithm=\
```

output
```
integrate(-((x + e^21 + 1)*e^((2*x + e^21 + 1)/x)*log(x) + x*e^((2*x + e^2
1 + 1)/x))/(x^3*log(x)^2), x)
```

3.68.9 Mupad [B] (verification not implemented)

Time = 12.97 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}(-1-e^{21}-x)\log(x)}{x^3\log^2(x)}\,dx=\frac{\mathrm{e}^{\frac{\mathrm{e}^{21}}{x}}\,\mathrm{e}^{1/x}\,\mathrm{e}^2}{x\,\ln(x)}$$

input
```
int(-(x*exp((2*x + exp(21) + 1)/x) + exp((2*x + exp(21) + 1)/x)*log(x)*(x
+ exp(21) + 1))/(x^3*log(x)^2),x)
```

output
```
(exp(exp(21)/x)*exp(1/x)*exp(2))/(x*log(x))
```

3.68. $\int \frac{-e^{\frac{1+e^{21}+2x}{x}}x+e^{\frac{1+e^{21}+2x}{x}}\left(-1-e^{21}-x\right)\log(x)}{x^3\log^2(x)}\,dx$

3.69 $\int \frac{1+2e^{x^2}x}{e^{x^2}+x}\,dx$

3.69.1 Optimal result

Integrand size = 20, antiderivative size = 8

$$\int \frac{1+2e^{x^2}x}{e^{x^2}+x}\,dx=\log\left(e^{x^2}+x\right)$$

output
```
ln(exp(x^2)+x)
```

3.69.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 8, normalized size of antiderivative = 1.00

$$\int \frac{1+2e^{x^2}x}{e^{x^2}+x}\,dx=\log\left(e^{x^2}+x\right)$$

input
```
Integrate[(1 + 2*E^x^2*x)/(E^x^2 + x),x]
```

output
```
Log[E^x^2 + x]
```

3.69.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 8, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.050$, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2e^{x^2}x+1}{e^{x^2}+x}\,dx$$

$$\Big\downarrow \text{ 7235}$$

$$\log\left(e^{x^2}+x\right)$$

input
```
Int[(1 + 2*E^x^2*x)/(E^x^2 + x),x]
```

output
```
Log[E^x^2 + x]
```

3.69.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.69.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 8, normalized size of antiderivative = 1.00

method	result	size
derivativedivides	$\ln\left(\mathrm{e}^{x^2}+x\right)$	8
default	$\ln\left(\mathrm{e}^{x^2}+x\right)$	8
norman	$\ln\left(\mathrm{e}^{x^2}+x\right)$	8
risch	$\ln\left(\mathrm{e}^{x^2}+x\right)$	8
parallelrisch	$\ln\left(\mathrm{e}^{x^2}+x\right)$	8

input
```
int((2*exp(x^2)*x+1)/(exp(x^2)+x),x,method=_RETURNVERBOSE)
```

output
```
ln(exp(x^2)+x)
```

3.69.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

$$\int \frac{1+2e^{x^2}x}{e^{x^2}+x}\,dx = \log\left(x+e^{(x^2)}\right)$$

input
```
integrate((2*exp(x^2)*x+1)/(exp(x^2)+x),x, algorithm=\
```

output
```
log(x + e^(x^2))
```

3.69.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

$$\int \frac{1+2e^{x^2}x}{e^{x^2}+x}\,dx = \log\left(x+e^{x^2}\right)$$

input
```
integrate((2*exp(x**2)*x+1)/(exp(x**2)+x),x)
```

output
```
log(x + exp(x**2))
```

3.69.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

$$\int \frac{1+2e^{x^2}x}{e^{x^2}+x}\,dx = \log\left(x+e^{(x^2)}\right)$$

input
```
integrate((2*exp(x^2)*x+1)/(exp(x^2)+x),x, algorithm=\
```

output
```
log(x + e^(x^2))
```

3.69.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

$$\int \frac{1+2e^{x^2}x}{e^{x^2}+x}\,dx = \log\left(x+e^{(x^2)}\right)$$

input
```
integrate((2*exp(x^2)*x+1)/(exp(x^2)+x),x, algorithm=\
```

output
```
log(x + e^(x^2))
```

3.69.9 Mupad [B] (verification not implemented)

Time = 13.25 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

$$\int \frac{1+2e^{x^2}x}{e^{x^2}+x}\,dx = \ln\left(x+\mathrm{e}^{x^2}\right)$$

input
```
int((2*x*exp(x^2) + 1)/(x + exp(x^2)),x)
```

output
```
log(x + exp(x^2))
```

3.70 $\int \frac{1}{2}e^{-2+e^{x^2}-2x}\left(-17e^{2+x}+e^{-e^{x^2}+x}(10-10x)+34e^{2+x}\right.$

3.70.1 Optimal result

Integrand size = 52, antiderivative size = 26

$$\int \frac{1}{2}e^{-2+e^{x^2}-2x}\left(-17e^{2+x}+e^{-e^{x^2}+x}(10-10x)+34e^{2+x+x^2}x\right)\,dx=\frac{17}{2}e^{e^{x^2}-x}+5e^{-2-x}x$$

output
```
5*x/exp(2+x)+17/2/exp(-exp(x^2)+x)
```

3.70.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{2}e^{-2+e^{x^2}-2x}\left(-17e^{2+x}+e^{-e^{x^2}+x}(10-10x)+34e^{2+x+x^2}x\right)\,dx=\frac{1}{2}e^{-2-x}\left(17e^{2+e^{x^2}}+10x\right)$$

input
```
Integrate[(E^(-2 + E^x^2 - 2*x)*(-17*E^(2 + x) + E^(-E^x^2 + x)*(10 - 10*x
) + 34*E^(2 + x + x^2)*x))/2,x]
```

output
```
(E^(-2 - x)*(17*E^(2 + E^x^2) + 10*x))/2
```

3.70.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}e^{e^{x^2}-2x-2}\left(e^{x-e^{x^2}}(10-10x)+34e^{x^2+x+2}x-17e^{x+2}\right)\,dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{2}\int -e^{-2x+e^{x^2}-2}\left(-10e^{x-e^{x^2}}(1-x)+17e^{x+2}-34e^{x^2+x+2}x\right)dx$$

$$\Big\downarrow \; 25$$

$$-\frac{1}{2}\int e^{-2x+e^{x^2}-2}\left(-10e^{x-e^{x^2}}(1-x)+17e^{x+2}-34e^{x^2+x+2}x\right)dx$$

$$\Big\downarrow \; 7293$$

$$-\frac{1}{2}\int \left(10e^{-x-2}(x-1)+17e^{e^{x^2}-x}-34e^{x^2-x+e^{x^2}}x\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{2}\left(-17\int e^{e^{x^2}-x}dx+34\int e^{x^2-x+e^{x^2}}xdx-10e^{-x-2}(1-x)+10e^{-x-2}\right)$$

input
```
Int[(E^(-2 + E^x^2 - 2*x)*(-17*E^(2 + x) + E^(-E^x^2 + x)*(10 - 10*x) + 34
*E^(2 + x + x^2)*x))/2,x]
```

output
```
$Aborted
```

3.70.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.70.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

method	result	size
risch	$5x\,\mathrm{e}^{-2-x}+\frac{17\,\mathrm{e}^{\mathrm{e}^{x^2}-x}}{2}$	22
norman	$\left(5\,\mathrm{e}^{-\mathrm{e}^{x^2}+x}x+\frac{17\,\mathrm{e}^{2+x}}{2}\right)\mathrm{e}^{-2-x}\mathrm{e}^{\mathrm{e}^{x^2}-x}$	38
parallelrisch	$-\frac{\left(-10\,\mathrm{e}^{-\mathrm{e}^{x^2}+x}x-17\,\mathrm{e}^{2+x}\right)\mathrm{e}^{-2-x}\mathrm{e}^{\mathrm{e}^{x^2}-x}}{2}$	39

input
```
int(1/2*((-10*x+10)*exp(-exp(x^2)+x)+34*x*exp(2+x)*exp(x^2)-17*exp(2+x))/e
xp(2+x)/exp(-exp(x^2)+x),x,method=_RETURNVERBOSE)
```

output
```
5*x*exp(-2-x)+17/2*exp(exp(x^2)-x)
```

3.70.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\int \frac{1}{2}e^{-2+e^{x^2}-2x}\left(-17e^{2+x}+e^{-e^{x^2}+x}(10-10x)+34e^{2+x+x^2}x\right)\,dx$$
$$=\frac{1}{2}\left(10\,xe^{\left(2\,x^2\right)}+17\,e^{\left(2\,x^2+e^{\left(x^2\right)}+2\right)}\right)e^{\left(-2\,x^2-x-2\right)}$$

input
```
integrate(1/2*((-10*x+10)*exp(-exp(x^2)+x)+34*x*exp(2+x)*exp(x^2)-17*exp(2
+x))/exp(2+x)/exp(-exp(x^2)+x),x, algorithm=\
```

output
```
1/2*(10*x*e^(2*x^2) + 17*e^(2*x^2 + e^(x^2) + 2))*e^(-2*x^2 - x - 2)
```

3.70.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{1}{2}e^{-2+e^{x^2}-2x}\left(-17e^{2+x}+e^{-e^{x^2}+x}(10-10x)+34e^{2+x+x^2}x\right)\,dx=5xe^{-x-2}+\frac{17e^{-x+e^{x^2}}}{2}$$

input
```
integrate(1/2*((-10*x+10)*exp(-exp(x**2)+x)+34*x*exp(2+x)*exp(x**2)-17*exp
(2+x))/exp(2+x)/exp(-exp(x**2)+x),x)
```

output
```
5*x*exp(-x - 2) + 17*exp(-x + exp(x**2))/2
```

3.70.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{1}{2}e^{-2+e^{x^2}-2x}\left(-17e^{2+x}+e^{-e^{x^2}+x}(10-10x)+34e^{2+x+x^2}x\right)\,dx$$
$$=5\,(x+1)e^{(-x-2)}+\frac{17}{2}\,e^{\left(-x+e^{\left(x^2\right)}\right)}-5\,e^{(-x-2)}$$

input
```
integrate(1/2*((-10*x+10)*exp(-exp(x^2)+x)+34*x*exp(2+x)*exp(x^2)-17*exp(2
+x))/exp(2+x)/exp(-exp(x^2)+x),x, algorithm=\
```

output
```
5*(x + 1)*e^(-x - 2) + 17/2*e^(-x + e^(x^2)) - 5*e^(-x - 2)
```

3.70.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{2}e^{-2+e^{x^2}-2x}\left(-17e^{2+x}+e^{-e^{x^2}+x}(10-10x)+34e^{2+x+x^2}x\right)\,dx$$
$$=\frac{1}{2}\left(10\,xe^{(-x)}+17\,e^{\left(-x+e^{\left(x^2\right)}+2\right)}\right)e^{(-2)}$$

input
```
integrate(1/2*((-10*x+10)*exp(-exp(x^2)+x)+34*x*exp(2+x)*exp(x^2)-17*exp(2
+x))/exp(2+x)/exp(-exp(x^2)+x),x, algorithm=\
```

output
```
1/2*(10*x*e^(-x) + 17*e^(-x + e^(x^2) + 2))*e^(-2)
```

3.70.9 Mupad [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{1}{2}e^{-2+e^{x^2}-2x}\left(-17e^{2+x}+e^{-e^{x^2}+x}(10-10x)+34e^{2+x+x^2}x\right)\,dx=\frac{e^{-x}\,e^{-2}\,\left(10\,x+17\,e^2\,e^{e^{x^2}}\right)}{2}$$

input
```
int(-exp(- x - 2)*exp(exp(x^2) - x)*((17*exp(x + 2))/2 + (exp(x - exp(x^2)
)*(10*x - 10))/2 - 17*x*exp(x + 2)*exp(x^2)),x)
```

output
```
(exp(-x)*exp(-2)*(10*x + 17*exp(2)*exp(exp(x^2))))/2
```

3.71 $\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(}{}$

3.71.1 Optimal result

Integrand size = 270, antiderivative size = 33

$$\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}(98}{}$$

$$=-x+\left(3+(2+x\log(3))^2\right)^2\log^2\left(\left(e^{16}-e^{4+x}\right)x\right)$$

output
```
(3+(x*ln(3)+2)^2)^2*ln(x*(exp(16)-exp(4+x)))^2-x
```

3.71.2 Mathematica [F]

$$\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}(98}{}$$

$$=\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}(}{}$$

input
```
Integrate[(E^16*x - E^(4 + x)*x + (-98*E^16 - 112*E^16*x*Log[3] - 60*E^16*
x^2*Log[3]^2 - 16*E^16*x^3*Log[3]^3 - 2*E^16*x^4*Log[3]^4 + E^(4 + x)*(98
+ 98*x + (112*x + 112*x^2)*Log[3] + (60*x^2 + 60*x^3)*Log[3]^2 + (16*x^3 +
 16*x^4)*Log[3]^3 + (2*x^4 + 2*x^5)*Log[3]^4))*Log[E^16*x - E^(4 + x)*x] +
 (-56*E^16*x*Log[3] - 60*E^16*x^2*Log[3]^2 - 24*E^16*x^3*Log[3]^3 - 4*E^16
*x^4*Log[3]^4 + E^(4 + x)*(56*x*Log[3] + 60*x^2*Log[3]^2 + 24*x^3*Log[3]^3
 + 4*x^4*Log[3]^4))*Log[E^16*x - E^(4 + x)*x]^2)/(-(E^16*x) + E^(4 + x)*x)
,x]
```

3.71.

$$\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}\left(98+98x+\left(112x+112x^2\right)\log(3)+\left(60x^2+60x^3\right)}{}$$

output
```
Integrate[(E^16*x - E^(4 + x)*x + (-98*E^16 - 112*E^16*x*Log[3] - 60*E^16*
x^2*Log[3]^2 - 16*E^16*x^3*Log[3]^3 - 2*E^16*x^4*Log[3]^4 + E^(4 + x)*(98
+ 98*x + (112*x + 112*x^2)*Log[3] + (60*x^2 + 60*x^3)*Log[3]^2 + (16*x^3 +
 16*x^4)*Log[3]^3 + (2*x^4 + 2*x^5)*Log[3]^4))*Log[E^16*x - E^(4 + x)*x] +
 (-56*E^16*x*Log[3] - 60*E^16*x^2*Log[3]^2 - 24*E^16*x^3*Log[3]^3 - 4*E^16
*x^4*Log[3]^4 + E^(4 + x)*(56*x*Log[3] + 60*x^2*Log[3]^2 + 24*x^3*Log[3]^3
 + 4*x^4*Log[3]^4))*Log[E^16*x - E^(4 + x)*x]^2)/(-(E^16*x) + E^(4 + x)*x)
, x]
```

3.71.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-4e^{16}x^4\log^4(3)-24e^{16}x^3\log^3(3)-60e^{16}x^2\log^2(3)+e^{x+4}\left(4x^4\log^4(3)+24x^3\log^3(3)+60x^2\log^2(3)+56x\log\right.\right.}{}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-2\left(e^x(x+1)-e^{12}\right)\log\left(e^{16}x-e^{x+4}x\right)\left(x^2\log^2(3)+x\log(81)+7\right)^2-4\left(e^x-e^{12}\right)x\log(3)\left(x^3\log^3(3)+6x^2\log\right.}{\left(e^{12}-e^x\right)x}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2e^{12}\log\left(e^4\left(e^{12}-e^x\right)x\right)\left(x^2\log^2(3)+x\log(81)+7\right)^2}{e^x-e^{12}}+\frac{2x^5\log^4(3)\log\left(e^{16}x-e^{x+4}x\right)+4x^4\log^4(3)\log^2\left(e^{1}\right.}{}\right.$$

$$\Big\downarrow \text{2009}$$

$\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}\left(98+98x+\left(112x+112x^2\right)\log(3)+\left(60x^2+60x^3\right)\right.\right.}{}$

$$-\frac{2}{5}\log^4(3)\log\left(1-e^{x-12}\right)x^5+\frac{2}{5}\log^4(3)\log\left(e^4\left(e^{12}-e^x\right)x\right)x^5-\frac{2}{25}\log^4(3)x^5-\frac{1}{2}\log^2(3)\left(\log^2(3)+\log(6561)\right)\log\left(1-e^{x-12}\right)x^4+\frac{1}{2}\log^2(3)\left(\log^2(3)+\log(6561)\right)\log\left(e^4\left(e^{12}-e^x\right)x\right)x^4-2\log^4(3)\operatorname{PolyLog}\left(2,e^{x-12}\right)x^4-\frac{1}{8}\log^2(3)\left(\log^2(3)+\log(6561)\right)x^4-\frac{2}{3}\left(\log^2(81)+2\log^2(3)(7+\log(81))\right)\log\left(1-e^{x-12}\right)x^3+\frac{2}{3}\left(\log^2(81)+2\log^2(3)(7+\log(81))\right)\log\left(e^4\left(e^{12}-e^x\right)x\right)x^3-2\log^2(3)\left(\log^2(3)+\log(6561)\right)\operatorname{PolyLog}\left(2,e^{x-12}\right)x^3+8\log^4(3)\operatorname{PolyLog}\left(3,e^{x-12}\right)x^3-\frac{2}{9}\left(\log^2(81)+2\log^2(3)(7+\log(81))\right)x^3-\left(14\log^2(3)+\log(81)(14+\log(81))\right)\log\left(1-e^{x-12}\right)x^2+\left(14\log^2(3)+\log(81)(14+\log(81))\right)\log\left(e^4\left(e^{12}-e^x\right)x\right)x^2-2\left(\log^2(81)+2\log^2(3)(7+\log(81))\right)\operatorname{PolyLog}\left(2,e^{x-12}\right)x^2+6\log^2(3)\left(\log^2(3)+\log(6561)\right)\operatorname{PolyLog}\left(3,e^{x-12}\right)x^2-24\log^4(3)\operatorname{PolyLog}\left(4,e^{x-12}\right)x^2-\frac{1}{2}\left(14\log^2(3)+\log(81)(14+\log(81))\right)x^2-14(7+\log(6561))\log\left(1-e^{x-12}\right)x+14(7+\log(6561))\log\left(e^4\left(e^{12}-e^x\right)x\right)x-2\left(14\log^2(3)+\log(81)(14+\log(81))\right)\operatorname{PolyLog}\left(2,e^{x-12}\right)x+4\left(\log^2(81)+2\log^2(3)(7+\log(81))\right)\operatorname{PolyLog}\left(3,e^{x-12}\right)x-12\log^2(3)\left(\log^2(3)+\log(6561)\right)\operatorname{PolyLog}\left(4,e^{x-12}\right)x+48\log^4(3)\operatorname{PolyLog}\left(5,e^{x-12}\right)x-14(7+\log(6561))x-x-14(7+\log(6561))\operatorname{PolyLog}\left(2,e^{x-12}\right)+2\left(14\log^2(3)+\log(81)(14+\log(81))\right)\operatorname{PolyLog}\left(3,e^{x-12}\right)-4\left(\log^2(81)+2\log^2(3)(7+\log(81))\right)\operatorname{PolyLog}\left(4,e^{x-12}\right)+12\log^2(3)\left(\log^2(3)+\log(6561)\right)\operatorname{PolyLog}\left(5,e^{x-12}\right)-48\log^4(3)\operatorname{PolyLog}\left(6,e^{x-12}\right)+98e^{12}\int\frac{\log\left(e^4\left(e^{12}-e^x\right)x\right)}{-e^{12}+e^x}dx+98\int\frac{\log\left(e^4\left(e^{12}-e^x\right)x\right)}{x}dx+28e^{12}\log(81)\int\frac{x\log\left(e^4\left(e^{12}-e^x\right)x\right)}{-e^{12}+e^x}dx+2e^{12}\left(14\log^2(3)+\log^2(81)\right)\int\frac{x^2\log\left(e^4\left(e^{12}-e^x\right)x\right)}{-e^{12}+e^x}dx+4e^{12}\log^2(3)\log(81)\int\frac{x^3\log\left(e^4\left(e^{12}-e^x\right)x\right)}{-e^{12}+e^x}dx+2e^{12}\log^4(3)\int\frac{x^4\log\left(e^4\left(e^{12}-e^x\right)x\right)}{-e^{12}+e^x}dx+56\log(3)\int\log^2\left(e^4\left(e^{12}-e^x\right)x\right)dx+60\log^2(3)\int x\log^2\left(e^4\left(e^{12}-e^x\right)x\right)dx+24\log^3(3)\int x^2\log^2\left(e^4\left(e^{12}-e^x\right)x\right)dx+4\log^4(3)\int x^3\log^2\left(e^4\left(e^{12}-e^x\right)x\right)dx$$

input
```
Int[(E^16*x - E^(4 + x)*x + (-98*E^16 - 112*E^16*x*Log[3] - 60*E^16*x^2*Lo
g[3]^2 - 16*E^16*x^3*Log[3]^3 - 2*E^16*x^4*Log[3]^4 + E^(4 + x)*(98 + 98*x
 + (112*x + 112*x^2)*Log[3] + (60*x^2 + 60*x^3)*Log[3]^2 + (16*x^3 + 16*x^
4)*Log[3]^3 + (2*x^4 + 2*x^5)*Log[3]^4))*Log[E^16*x - E^(4 + x)*x] + (-56*
E^16*x*Log[3] - 60*E^16*x^2*Log[3]^2 - 24*E^16*x^3*Log[3]^3 - 4*E^16*x^4*L
og[3]^4 + E^(4 + x)*(56*x*Log[3] + 60*x^2*Log[3]^2 + 24*x^3*Log[3]^3 + 4*x
^4*Log[3]^4))*Log[E^16*x - E^(4 + x)*x]^2)/(-(E^16*x) + E^(4 + x)*x),x]
```

3.71.

$$\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}\left(98+98x+\left(112x+112x^2\right)\log(3)+\left(60x^2+60x^3\right)\right.\right.}{}$$

output
```
$Aborted
```

3.71.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.71.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 112 vs. 2(31) = 62.

Time = 2.33 (sec) , antiderivative size = 113, normalized size of antiderivative = 3.42

method	result
parallelrisch	$\ln(3)^4 x^4 \ln(-x(e^{4+x}-e^{16}))^2 + 8\ln(3)^3 x^3 \ln(-x(e^{4+x}-e^{16}))^2 + 30\ln(3)^2 x^2 \ln(-x(e^{4+x}-$
risch	Expression too large to display

input
```
int((((4*x^4*ln(3)^4+24*x^3*ln(3)^3+60*x^2*ln(3)^2+56*x*ln(3))*exp(4+x)-4*
x^4*exp(16)*ln(3)^4-24*x^3*exp(16)*ln(3)^3-60*x^2*exp(16)*ln(3)^2-56*x*exp
(16)*ln(3))*ln(-x*exp(4+x)+x*exp(16))^2+(((2*x^5+2*x^4)*ln(3)^4+(16*x^4+16
*x^3)*ln(3)^3+(60*x^3+60*x^2)*ln(3)^2+(112*x^2+112*x)*ln(3)+98*x+98)*exp(4
+x)-2*x^4*exp(16)*ln(3)^4-16*x^3*exp(16)*ln(3)^3-60*x^2*exp(16)*ln(3)^2-11
2*x*exp(16)*ln(3)-98*exp(16))*ln(-x*exp(4+x)+x*exp(16))-x*exp(4+x)+x*exp(1
6))/(x*exp(4+x)-x*exp(16)),x,method=_RETURNVERBOSE)
```

output
```
ln(3)^4*x^4*ln(-x*(exp(4+x)-exp(16)))^2+8*ln(3)^3*x^3*ln(-x*(exp(4+x)-exp(
16)))^2+30*ln(3)^2*x^2*ln(-x*(exp(4+x)-exp(16)))^2+56*ln(3)*x*ln(-x*(exp(4
+x)-exp(16)))^2+49*ln(-x*(exp(4+x)-exp(16)))^2-x
```

3.71.

$\int \frac{e^{16}x-e^{4+x}x+(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}(98+98x+(112x+112x^2)\log(3)+(60x^2+60x^3)}{}$

3.71.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.61

$$\int \frac{e^{16}x - e^{4+x}x + \left(-98e^{16} - 112e^{16}x\log(3) - 60e^{16}x^2\log^2(3) - 16e^{16}x^3\log^3(3) - 2e^{16}x^4\log^4(3) + e^{4+x}(98}{}$$

$$= \left(x^4\log\left(3\right)^4 + 8\,x^3\log\left(3\right)^3 + 30\,x^2\log\left(3\right)^2 + 56\,x\log\left(3\right) + 49\right)\log\left(xe^{16} - xe^{(x+4)}\right)^2 - x$$

input
```
integrate((((4*x^4*log(3)^4+24*x^3*log(3)^3+60*x^2*log(3)^2+56*x*log(3))*e
xp(4+x)-4*x^4*exp(16)*log(3)^4-24*x^3*exp(16)*log(3)^3-60*x^2*exp(16)*log(
3)^2-56*x*exp(16)*log(3))*log(-x*exp(4+x)+x*exp(16))^2+(((2*x^5+2*x^4)*log
(3)^4+(16*x^4+16*x^3)*log(3)^3+(60*x^3+60*x^2)*log(3)^2+(112*x^2+112*x)*lo
g(3)+98*x+98)*exp(4+x)-2*x^4*exp(16)*log(3)^4-16*x^3*exp(16)*log(3)^3-60*x
^2*exp(16)*log(3)^2-112*x*exp(16)*log(3)-98*exp(16))*log(-x*exp(4+x)+x*exp
(16))-x*exp(4+x)+x*exp(16))/(x*exp(4+x)-x*exp(16)),x, algorithm=\
```

output
```
(x^4*log(3)^4 + 8*x^3*log(3)^3 + 30*x^2*log(3)^2 + 56*x*log(3) + 49)*log(x
*e^16 - x*e^(x + 4))^2 - x
```

3.71.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(26) = 52.

Time = 0.25 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.61

$$\int \frac{e^{16}x - e^{4+x}x + \left(-98e^{16} - 112e^{16}x\log(3) - 60e^{16}x^2\log^2(3) - 16e^{16}x^3\log^3(3) - 2e^{16}x^4\log^4(3) + e^{4+x}(98}{}$$

$$= -x + \left(x^4\log\left(3\right)^4 + 8x^3\log\left(3\right)^3 + 30x^2\log\left(3\right)^2 + 56x\log\left(3\right) + 49\right)\log\left(-xe^{x+4} + xe^{16}\right)^2$$

input
```
integrate((((4*x**4*ln(3)**4+24*x**3*ln(3)**3+60*x**2*ln(3)**2+56*x*ln(3))
*exp(4+x)-4*x**4*exp(16)*ln(3)**4-24*x**3*exp(16)*ln(3)**3-60*x**2*exp(16)
*ln(3)**2-56*x*exp(16)*ln(3))*ln(-x*exp(4+x)+x*exp(16))**2+(((2*x**5+2*x**
4)*ln(3)**4+(16*x**4+16*x**3)*ln(3)**3+(60*x**3+60*x**2)*ln(3)**2+(112*x**
2+112*x)*ln(3)+98*x+98)*exp(4+x)-2*x**4*exp(16)*ln(3)**4-16*x**3*exp(16)*l
n(3)**3-60*x**2*exp(16)*ln(3)**2-112*x*exp(16)*ln(3)-98*exp(16))*ln(-x*exp
(4+x)+x*exp(16))-x*exp(4+x)+x*exp(16))/(x*exp(4+x)-x*exp(16)),x)
```

output
```
-x + (x**4*log(3)**4 + 8*x**3*log(3)**3 + 30*x**2*log(3)**2 + 56*x*log(3)
+ 49)*log(-x*exp(x + 4) + x*exp(16))**2
```

3.71.

$$\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}\left(98+98x+\left(112x+112x^2\right)\log(3)+\left(60x^2+60x^3\right)}{}$$

3.71.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 263 vs. $2(31) = 62$.

Time = 0.36 (sec) , antiderivative size = 263, normalized size of antiderivative = 7.97

$$\int \frac{e^{16}x - e^{4+x}x + \left(-98e^{16} - 112e^{16}x\log(3) - 60e^{16}x^2\log^2(3) - 16e^{16}x^3\log^3(3) - 2e^{16}x^4\log^4(3) + e^{4+x}(98\right.}{}$$

$$\begin{aligned}&= 16\,x^4\log(3)^4 + 128\,x^3\log(3)^3 + 480\,x^2\log(3)^2 \\ &\quad + \left(x^4\log(3)^4 + 8\,x^3\log(3)^3 + 30\,x^2\log(3)^2 + 56\,x\log(3) + 49\right)\log(x)^2 \\ &\quad + \left(x^4\log(3)^4 + 8\,x^3\log(3)^3 + 30\,x^2\log(3)^2 + 56\,x\log(3) + 49\right)\log\left(e^{12} - e^x\right)^2 \\ &\quad - \left(xe^{(-16)} - e^{(-16)}\log\left(-e^{12} + e^x\right)\right)e^{16} + 896\,x\log(3) \\ &\quad + 8\left(x^4\log(3)^4 + 8\,x^3\log(3)^3 + 30\,x^2\log(3)^2 + 56\,x\log(3) + 49\right)\log(x) \\ &\quad + 2\left(4\,x^4\log(3)^4 + 32\,x^3\log(3)^3 + 120\,x^2\log(3)^2 + 224\,x\log(3) + \left(x^4\log(3)^4 + 8\,x^3\log(3)^3 + 30\,x^2\log\right.\right. \\ &\qquad \left. - e^x\right) - \log\left(-e^{12} + e^x\right)\end{aligned}$$

input
```
integrate((((4*x^4*log(3)^4+24*x^3*log(3)^3+60*x^2*log(3)^2+56*x*log(3))*e
xp(4+x)-4*x^4*exp(16)*log(3)^4-24*x^3*exp(16)*log(3)^3-60*x^2*exp(16)*log(
3)^2-56*x*exp(16)*log(3))*log(-x*exp(4+x)+x*exp(16))^2+(((2*x^5+2*x^4)*log
(3)^4+(16*x^4+16*x^3)*log(3)^3+(60*x^3+60*x^2)*log(3)^2+(112*x^2+112*x)*lo
g(3)+98*x+98)*exp(4+x)-2*x^4*exp(16)*log(3)^4-16*x^3*exp(16)*log(3)^3-60*x
^2*exp(16)*log(3)^2-112*x*exp(16)*log(3)-98*exp(16))*log(-x*exp(4+x)+x*exp
(16))-x*exp(4+x)+x*exp(16))/(x*exp(4+x)-x*exp(16)),x, algorithm=\
```

output
```
16*x^4*log(3)^4 + 128*x^3*log(3)^3 + 480*x^2*log(3)^2 + (x^4*log(3)^4 + 8*
x^3*log(3)^3 + 30*x^2*log(3)^2 + 56*x*log(3) + 49)*log(x)^2 + (x^4*log(3)^
4 + 8*x^3*log(3)^3 + 30*x^2*log(3)^2 + 56*x*log(3) + 49)*log(e^12 - e^x)^2
 - (x*e^(-16) - e^(-16)*log(-e^12 + e^x))*e^16 + 896*x*log(3) + 8*(x^4*log
(3)^4 + 8*x^3*log(3)^3 + 30*x^2*log(3)^2 + 56*x*log(3) + 49)*log(x) + 2*(4
*x^4*log(3)^4 + 32*x^3*log(3)^3 + 120*x^2*log(3)^2 + 224*x*log(3) + (x^4*l
og(3)^4 + 8*x^3*log(3)^3 + 30*x^2*log(3)^2 + 56*x*log(3) + 49)*log(x) + 19
6)*log(e^12 - e^x) - log(-e^12 + e^x)
```

3.71.

$$\int \frac{e^{16}x - e^{4+x}x + \left(-98e^{16} - 112e^{16}x\log(3) - 60e^{16}x^2\log^2(3) - 16e^{16}x^3\log^3(3) - 2e^{16}x^4\log^4(3) + e^{4+x}\left(98 + 98x + (112x + 112x^2)\log(3) + (60x^2 + 60x^3)\right.\right.}{}$$

3.71.8 Giac [F]

$$\int \frac{e^{16}x - e^{4+x}x + \left(-98e^{16} - 112e^{16}x\log(3) - 60e^{16}x^2\log^2(3) - 16e^{16}x^3\log^3(3) - 2e^{16}x^4\log^4(3) + e^{4+x}(98$$

$$= \int \frac{4\left(x^4e^{16}\log(3)^4 + 6x^3e^{16}\log(3)^3 + 15x^2e^{16}\log(3)^2 + 14xe^{16}\log(3) - \left(x^4\log(3)^4 + 6x^3\log(3)^3 + 15\right.}{}$$

input
```
integrate((((4*x^4*log(3)^4+24*x^3*log(3)^3+60*x^2*log(3)^2+56*x*log(3))*e
xp(4+x)-4*x^4*exp(16)*log(3)^4-24*x^3*exp(16)*log(3)^3-60*x^2*exp(16)*log(
3)^2-56*x*exp(16)*log(3))*log(-x*exp(4+x)+x*exp(16))^2+(((2*x^5+2*x^4)*log
(3)^4+(16*x^4+16*x^3)*log(3)^3+(60*x^3+60*x^2)*log(3)^2+(112*x^2+112*x)*lo
g(3)+98*x+98)*exp(4+x)-2*x^4*exp(16)*log(3)^4-16*x^3*exp(16)*log(3)^3-60*x
^2*exp(16)*log(3)^2-112*x*exp(16)*log(3)-98*exp(16))*log(-x*exp(4+x)+x*exp
(16))-x*exp(4+x)+x*exp(16))/(x*exp(4+x)-x*exp(16)),x, algorithm=\
```

output
```
integrate((4*(x^4*e^16*log(3)^4 + 6*x^3*e^16*log(3)^3 + 15*x^2*e^16*log(3)
^2 + 14*x*e^16*log(3) - (x^4*log(3)^4 + 6*x^3*log(3)^3 + 15*x^2*log(3)^2 +
 14*x*log(3))*e^(x + 4))*log(x*e^16 - x*e^(x + 4))^2 - x*e^16 + x*e^(x + 4
) + 2*(x^4*e^16*log(3)^4 + 8*x^3*e^16*log(3)^3 + 30*x^2*e^16*log(3)^2 + 56
*x*e^16*log(3) - ((x^5 + x^4)*log(3)^4 + 8*(x^4 + x^3)*log(3)^3 + 30*(x^3
+ x^2)*log(3)^2 + 56*(x^2 + x)*log(3) + 49*x + 49)*e^(x + 4) + 49*e^16)*lo
g(x*e^16 - x*e^(x + 4)))/(x*e^16 - x*e^(x + 4)), x)
```

3.71.9 Mupad [B] (verification not implemented)

Time = 13.84 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.61

$$\int \frac{e^{16}x - e^{4+x}x + \left(-98e^{16} - 112e^{16}x\log(3) - 60e^{16}x^2\log^2(3) - 16e^{16}x^3\log^3(3) - 2e^{16}x^4\log^4(3) + e^{4+x}(98$$

$$= \ln\left(x\,e^{16} - x\,e^4\,e^x\right)^2\left(\ln(3)^4x^4 + 8\ln(3)^3x^3 + 30\ln(3)^2x^2 + 56\ln(3)\,x + 49\right) - x$$

input
```
int(-(x*exp(x + 4) - x*exp(16) + log(x*exp(16) - x*exp(x + 4))^2*(60*x^2*e
xp(16)*log(3)^2 - exp(x + 4)*(60*x^2*log(3)^2 + 24*x^3*log(3)^3 + 4*x^4*lo
g(3)^4 + 56*x*log(3)) + 24*x^3*exp(16)*log(3)^3 + 4*x^4*exp(16)*log(3)^4 +
 56*x*exp(16)*log(3)) + log(x*exp(16) - x*exp(x + 4))*(98*exp(16) - exp(x
+ 4)*(98*x + log(3)*(112*x + 112*x^2) + log(3)^4*(2*x^4 + 2*x^5) + log(3)^
3*(16*x^3 + 16*x^4) + log(3)^2*(60*x^2 + 60*x^3) + 98) + 60*x^2*exp(16)*lo
g(3)^2 + 16*x^3*exp(16)*log(3)^3 + 2*x^4*exp(16)*log(3)^4 + 112*x*exp(16)*
log(3)))/(x*exp(x + 4) - x*exp(16)),x)
```

output
```
log(x*exp(16) - x*exp(4)*exp(x))^2*(30*x^2*log(3)^2 + 8*x^3*log(3)^3 + x^4
*log(3)^4 + 56*x*log(3) + 49) - x
```

3.71.

$$\int \frac{e^{16}x-e^{4+x}x+\left(-98e^{16}-112e^{16}x\log(3)-60e^{16}x^2\log^2(3)-16e^{16}x^3\log^3(3)-2e^{16}x^4\log^4(3)+e^{4+x}\left(98+98x+\left(112x+112x^2\right)\log(3)+\left(60x^2+60x^3\right)\right.\right.}{}$$

3.72 $\int \frac{-3x-8x^2+x^3-8x^4-x^5+(-6x^2+3x^3)\log(2)+(45+15x+3}{270-90x-30x^2-170x^3+20x^5+30x^6+10x^7+(-540x+60x^3+180x^4+60}$

3.72.1 Optimal result

Integrand size = 127, antiderivative size = 32

$$\int \frac{-3x-8x^2+x^3-8x^4-x^5+(-6x^2+3x^3)\log(2)+(45+15x+30x^3+10x^4)\log(3+x)}{270-90x-30x^2-170x^3+20x^5+30x^6+10x^7+(-540x+60x^3+180x^4+60x^5)\log(2)+(270x^2+9} = \frac{-\frac{x}{5}+\log(3+x)}{2\left(-1+\frac{3}{x}-x^2-3\log(2)\right)}$$

output
```
1/2*(ln(3+x)-1/5*x)/(3/x-3*ln(2)-1-x^2)
```

3.72.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 113 vs. 2(32) = 64.

Time = 5.42 (sec) , antiderivative size = 113, normalized size of antiderivative = 3.53

$$\int \frac{-3x-8x^2+x^3-8x^4-x^5+(-6x^2+3x^3)\log(2)+(45+15x+30x^3+10x^4)\log(3+x)}{270-90x-30x^2-170x^3+20x^5+30x^6+10x^7+(-540x+60x^3+180x^4+60x^5)\log(2)+(270x^2+9} = \frac{x(x(2717+68\log^3(8)+4\log^4(8)+\log(8)(319-3\log(64))-6\log^2(8)(-25+\log(64))+30\log(64))-5}{10(11+\log(8))(-3+x+x^3+x\log(8))(247+12\log(8)}$$

input
```
Integrate[(-3*x - 8*x^2 + x^3 - 8*x^4 - x^5 + (-6*x^2 + 3*x^3)*Log[2] + (4
5 + 15*x + 30*x^3 + 10*x^4)*Log[3 + x])/(270 - 90*x - 30*x^2 - 170*x^3 + 2
0*x^5 + 30*x^6 + 10*x^7 + (-540*x + 60*x^3 + 180*x^4 + 60*x^5)*Log[2] + (2
70*x^2 + 90*x^3)*Log[2]^2),x]
```

output
```
(x*(x*(2717 + 68*Log[8]^3 + 4*Log[8]^4 + Log[8]*(319 - 3*Log[64]) - 6*Log[
8]^2*(-25 + Log[64]) + 30*Log[64]) - 5*(2717 + 379*Log[8] + 144*Log[8]^2 +
 56*Log[8]^3 + 4*Log[8]^4)*Log[3 + x]))/(10*(11 + Log[8])*(-3 + x + x^3 +
x*Log[8])*(247 + 12*Log[8] + 12*Log[8]^2 + 4*Log[8]^3))
```

3.72.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^5-8x^4+x^3-8x^2+\left(10x^4+30x^3+15x+45\right)\log(x+3)+\left(3x^3-6x^2\right)\log(2)-3x}{10x^7+30x^6+20x^5-170x^3-30x^2+\left(90x^3+270x^2\right)\log^2(2)+\left(60x^5+180x^4+60x^3-540x\right)\log(2)-90x+}$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{\left(x^2-3x+10+\log(8)\right)\left(-x^5-8x^4+x^3-8x^2+\left(10x^4+30x^3+15x+45\right)\log(x+3)+\left(3x^3-6x^2\right)\log(2)\right.}{90(11+\log(8))^2\left(-x^3-x(1+\log(8))+3\right)}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{5\left(2x^4+6x^3+3x+9\right)\log(x+3)-x\left(x^4+8x^3-x^2(1+\log(8))+x(8+\log(64))+3\right)}{10(x+3)\left(-x^3-x(1+\log(8))+3\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{10}\int -\frac{x\left(x^4+8x^3-(1+\log(8))x^2+(8+\log(64))x+3\right)-5\left(2x^4+6x^3+3x+9\right)\log(x+3)}{(x+3)\left(-x^3-(1+\log(8))x+3\right)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{10}\int \frac{x\left(x^4+8x^3-(1+\log(8))x^2+(8+\log(64))x+3\right)-5\left(2x^4+6x^3+3x+9\right)\log(x+3)}{(x+3)\left(-x^3-(1+\log(8))x+3\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{10}\int \left(\frac{x\left(x^4+8x^3-(1+\log(8))x^2+(8+\log(64))x+3\right)}{(x+3)\left(-x^3-(1+\log(8))x+3\right)^2}+\frac{5\left(-2x^3-3\right)\log(x+3)}{\left(-x^3-(1+\log(8))x+3\right)^2}\right)dx$$

$$\Big\downarrow \text{7299}$$

$$-\frac{1}{10}\int \left(\frac{x\left(x^4+8x^3-(1+\log(8))x^2+(8+\log(64))x+3\right)}{(x+3)\left(-x^3-(1+\log(8))x+3\right)^2}+\frac{5\left(-2x^3-3\right)\log(x+3)}{\left(-x^3-(1+\log(8))x+3\right)^2}\right)dx$$

input
```
Int[(-3*x - 8*x^2 + x^3 - 8*x^4 - x^5 + (-6*x^2 + 3*x^3)*Log[2] + (45 + 15
*x + 30*x^3 + 10*x^4)*Log[3 + x])/(270 - 90*x - 30*x^2 - 170*x^3 + 20*x^5
+ 30*x^6 + 10*x^7 + (-540*x + 60*x^3 + 180*x^4 + 60*x^5)*Log[2] + (270*x^2
 + 90*x^3)*Log[2]^2),x]
```

output
```
$Aborted
```

3.72.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.72. $\int \frac{-3x-8x^2+x^3-8x^4-x^5+(-6x^2+3x^3)\log(2)+(45+15x+30x^3+10x^4)\log(3+x)}{270-90x-30x^2-170x^3+20x^5+30x^6+10x^7+(-540x+60x^3+180x^4+60x^5)\log(2)+(270x^2+90x^3)\log^2(2)}\,dx$

3.72.4 Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.84

method	result
parallelrisch	$\frac{x^2-5x\ln(3+x)}{10x^3+30x\ln(2)+10x-30}$
norman	$\frac{-\frac{x\ln(3+x)}{2}+\frac{x^2}{10}}{x^3+3x\ln(2)+x-3}$
risch	$-\frac{x\ln(3+x)}{2(x^3+3x\ln(2)+x-3)}+\frac{x^2}{10x^3+30x\ln(2)+10x-30}$
parts	$\frac{\frac{\left(\ln(2)+\frac{11}{3}\right)x^2}{\frac{x^3}{3}+x\ln(2)+\frac{x}{3}-1}+5\left(\sum_{\_R=\mathrm{RootOf}\left(-3+\_Z^3+(3\ln(2)+1)\_Z\right)}\frac{\left(\_R^2-3\_R-1\right)\ln\left(x-\_R\right)}{3\_R^2+3\ln(2)+1}\right)}{30\ln(2)+110}-\frac{\ln(3+x)}{2(3\ln(2)+11)}-\frac{}{}$
derivativedivides	$\frac{\frac{\left(\ln(2)+\frac{11}{3}\right)(3+x)^2+(-6\ln(2)-22)(3+x)+9\ln(2)+33}{\frac{(3+x)^3}{3}+(3+x)\ln(2)-3(3+x)^2-3\ln(2)+17+\frac{28x}{3}}+5\left(\sum_{\_R=\mathrm{RootOf}\left(\_Z^3-9\_Z^2+(3\ln(2)+28)\_Z-9\ln(2)-33\right)}\frac{\left(\_R^2-9\_\right.}{3\_R^2+}\right.}{30\ln(2)+110}$
default	$\frac{\frac{\left(\ln(2)+\frac{11}{3}\right)(3+x)^2+(-6\ln(2)-22)(3+x)+9\ln(2)+33}{\frac{(3+x)^3}{3}+(3+x)\ln(2)-3(3+x)^2-3\ln(2)+17+\frac{28x}{3}}+5\left(\sum_{\_R=\mathrm{RootOf}\left(\_Z^3-9\_Z^2+(3\ln(2)+28)\_Z-9\ln(2)-33\right)}\frac{\left(\_R^2-9\_\right.}{3\_R^2+}\right.}{30\ln(2)+110}$

input
```
int(((10*x^4+30*x^3+15*x+45)*ln(3+x)+(3*x^3-6*x^2)*ln(2)-x^5-8*x^4+x^3-8*x
^2-3*x)/((90*x^3+270*x^2)*ln(2)^2+(60*x^5+180*x^4+60*x^3-540*x)*ln(2)+10*x
^7+30*x^6+20*x^5-170*x^3-30*x^2-90*x+270),x,method=_RETURNVERBOSE)
```

output
```
1/10*(x^2-5*x*ln(3+x))/(x^3+3*x*ln(2)+x-3)
```

3.72.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{-3x-8x^2+x^3-8x^4-x^5+(-6x^2+3x^3)\log(2)+(45+15x+30x^3+10x^4)\log(3+x)}{270-90x-30x^2-170x^3+20x^5+30x^6+10x^7+(-540x+60x^3+180x^4+60x^5)\log(2)+(270x^2+9}$$
$$=\frac{x^2-5x\log(x+3)}{10(x^3+3x\log(2)+x-3)}$$

input
```
integrate(((10*x^4+30*x^3+15*x+45)*log(3+x)+(3*x^3-6*x^2)*log(2)-x^5-8*x^4
+x^3-8*x^2-3*x)/((90*x^3+270*x^2)*log(2)^2+(60*x^5+180*x^4+60*x^3-540*x)*l
og(2)+10*x^7+30*x^6+20*x^5-170*x^3-30*x^2-90*x+270),x, algorithm=\
```

output
```
1/10*(x^2 - 5*x*log(x + 3))/(x^3 + 3*x*log(2) + x - 3)
```

3.72.6 Sympy [A] (verification not implemented)

Time = 0.65 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.28

$$\int \frac{-3x - 8x^2 + x^3 - 8x^4 - x^5 + (-6x^2 + 3x^3)\log(2) + (45 + 15x + 30x^3 + 10x^4)\log(3 + x)}{270 - 90x - 30x^2 - 170x^3 + 20x^5 + 30x^6 + 10x^7 + (-540x + 60x^3 + 180x^4 + 60x^5)\log(2) + (270x^2 + 9}$$
$$= \frac{x^2}{10x^3 + x(10 + 30\log(2)) - 30} - \frac{x\log(x+3)}{2x^3 + 2x + 6x\log(2) - 6}$$

input
```
integrate(((10*x**4+30*x**3+15*x+45)*ln(3+x)+(3*x**3-6*x**2)*ln(2)-x**5-8*
x**4+x**3-8*x**2-3*x)/((90*x**3+270*x**2)*ln(2)**2+(60*x**5+180*x**4+60*x*
*3-540*x)*ln(2)+10*x**7+30*x**6+20*x**5-170*x**3-30*x**2-90*x+270),x)
```

output
```
x**2/(10*x**3 + x*(10 + 30*log(2)) - 30) - x*log(x + 3)/(2*x**3 + 2*x + 6*
x*log(2) - 6)
```

3.72.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.88

$$\int \frac{-3x - 8x^2 + x^3 - 8x^4 - x^5 + (-6x^2 + 3x^3)\log(2) + (45 + 15x + 30x^3 + 10x^4)\log(3 + x)}{270 - 90x - 30x^2 - 170x^3 + 20x^5 + 30x^6 + 10x^7 + (-540x + 60x^3 + 180x^4 + 60x^5)\log(2) + (270x^2 + 9}$$
$$= \frac{x^2 - 5x\log(x+3)}{10(x^3 + x(3\log(2) + 1) - 3)}$$

input
```
integrate(((10*x^4+30*x^3+15*x+45)*log(3+x)+(3*x^3-6*x^2)*log(2)-x^5-8*x^4
+x^3-8*x^2-3*x)/((90*x^3+270*x^2)*log(2)^2+(60*x^5+180*x^4+60*x^3-540*x)*l
og(2)+10*x^7+30*x^6+20*x^5-170*x^3-30*x^2-90*x+270),x, algorithm=\
```

output
```
1/10*(x^2 - 5*x*log(x + 3))/(x^3 + x*(3*log(2) + 1) - 3)
```

3.72.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.22

$$\int \frac{-3x-8x^2+x^3-8x^4-x^5+(-6x^2+3x^3)\log(2)+(45+15x+30x^3+10x^4)\log(3+x)}{270-90x-30x^2-170x^3+20x^5+30x^6+10x^7+(-540x+60x^3+180x^4+60x^5)\log(2)+(270x^2+9}$$
$$=\frac{x^2}{10\,(x^3+3\,x\log{(2)}+x-3)}-\frac{x\log{(x+3)}}{2\,(x^3+3\,x\log{(2)}+x-3)}$$

input
```
integrate(((10*x^4+30*x^3+15*x+45)*log(3+x)+(3*x^3-6*x^2)*log(2)-x^5-8*x^4
+x^3-8*x^2-3*x)/((90*x^3+270*x^2)*log(2)^2+(60*x^5+180*x^4+60*x^3-540*x)*l
og(2)+10*x^7+30*x^6+20*x^5-170*x^3-30*x^2-90*x+270),x, algorithm=\
```

output
```
1/10*x^2/(x^3 + 3*x*log(2) + x - 3) - 1/2*x*log(x + 3)/(x^3 + 3*x*log(2) +
 x - 3)
```

3.72.9 Mupad [B] (verification not implemented)

Time = 13.80 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.84

$$\int \frac{-3x-8x^2+x^3-8x^4-x^5+(-6x^2+3x^3)\log(2)+(45+15x+30x^3+10x^4)\log(3+x)}{270-90x-30x^2-170x^3+20x^5+30x^6+10x^7+(-540x+60x^3+180x^4+60x^5)\log(2)+(270x^2+9}$$
$$=\frac{x\,(x-5\,\ln{(x+3)})}{10\,\left(x+3\,x\,\ln{(2)}+x^3-3\right)}$$

input
```
int(-(3*x - log(x + 3)*(15*x + 30*x^3 + 10*x^4 + 45) + log(2)*(6*x^2 - 3*x
^3) + 8*x^2 - x^3 + 8*x^4 + x^5)/(log(2)*(60*x^3 - 540*x + 180*x^4 + 60*x^
5) - 90*x - 30*x^2 - 170*x^3 + 20*x^5 + 30*x^6 + 10*x^7 + log(2)^2*(270*x^
2 + 90*x^3) + 270),x)
```

output
```
(x*(x - 5*log(x + 3)))/(10*(x + 3*x*log(2) + x^3 - 3))
```

3.73 $\int \frac{1+x}{x} \, dx$

3.73.1 Optimal result

Integrand size = 7, antiderivative size = 10

$$\int \frac{1+x}{x} \, dx = -\frac{28}{3} + \frac{1}{e^3} + x + \log(x)$$

output
```
1/exp(3)-28/3+ln(x)+x
```

3.73.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int \frac{1+x}{x} \, dx = x + \log(x)$$

input
```
Integrate[(1 + x)/x,x]
```

output
```
x + Log[x]
```

3.73.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x+1}{x}\,dx$$

$$\Big\downarrow \text{49}$$

$$\int \left(\frac{1}{x}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x+\log(x)$$

input
```
Int[(1 + x)/x,x]
```

output
```
x + Log[x]
```

3.73.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.73.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

method	result	size
default	$x+\ln(x)$	5
norman	$x+\ln(x)$	5
risch	$x+\ln(x)$	5
parallelrisch	$x+\ln(x)$	5

input
```
int((1+x)/x,x,method=_RETURNVERBOSE)
```

output
```
x+ln(x)
```

3.73.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int \frac{1+x}{x}\,dx = x+\log(x)$$

input
```
integrate((1+x)/x,x, algorithm=\
```

output
```
x + log(x)
```

3.73.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.30

$$\int \frac{1+x}{x}\,dx = x+\log(x)$$

input
```
integrate((1+x)/x,x)
```

output
```
x + log(x)
```

3.73.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int \frac{1+x}{x} \, dx = x + \log{(x)}$$

input
```
integrate((1+x)/x,x, algorithm=\
```

output
```
x + log(x)
```

3.73.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

$$\int \frac{1+x}{x} \, dx = x + \log{(|x|)}$$

input
```
integrate((1+x)/x,x, algorithm=\
```

output
```
x + log(abs(x))
```

3.73.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int \frac{1+x}{x} \, dx = x + \ln{(x)}$$

input
```
int((x + 1)/x,x)
```

output
```
x + log(x)
```

3.74 $\int \frac{-50-350x-1600x^3-2000x^4+2400x^5+1600x^6+e^{2x}(-18+18x)+e^x(-6$

3.74.1 Optimal result

Integrand size = 67, antiderivative size = 29

$$\int \frac{-50-350x-1600x^3-2000x^4+2400x^5+1600x^6+e^{2x}(-18+18x)+e^x(-60-180x+210x^2-240x$$

$$= \left(\frac{e^x}{x}-\frac{5(-1+x)\left(-3+(2+2x)^2\right)}{3x}\right)^2$$

output
```
(exp(x)/x-5/3*(-1+x)*((2+2*x)^2-3)/x)^2
```

3.74.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 62 vs. 2(29) = 58.

Time = 4.04 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.14

$$\int \frac{-50-350x-1600x^3-2000x^4+2400x^5+1600x^6+e^{2x}(-18+18x)+e^x(-60-180x+210x^2-240x$$

$$= \frac{1}{9}\left(e^x\left(-120+\frac{30}{x^2}+\frac{210}{x}-120x\right)+\frac{25}{x^2}+\frac{9e^{2x}}{x^2}+\frac{350}{x}-1600x-1000x^2+800x^3+400x^4\right)$$

input
```
Integrate[(-50 - 350*x - 1600*x^3 - 2000*x^4 + 2400*x^5 + 1600*x^6 + E^(2*
x)*(-18 + 18*x) + E^x*(-60 - 180*x + 210*x^2 - 240*x^3 - 120*x^4))/(9*x^3)
,x]
```

output
```
(E^x*(-120 + 30/x^2 + 210/x - 120*x) + 25/x^2 + (9*E^(2*x))/x^2 + 350/x -
1600*x - 1000*x^2 + 800*x^3 + 400*x^4)/9
```

3.74.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 74 vs. $2(29) = 58$.

Time = 0.36 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.55, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.060$, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1600x^6+2400x^5-2000x^4-1600x^3+e^x\left(-120x^4-240x^3+210x^2-180x-60\right)-350x+e^{2x}(18x-18)-5}{9x^3}$$

$$\Big\downarrow \ 27$$

$$\frac{1}{9}\int -\frac{2\left(-800x^6-1200x^5+1000x^4+800x^3+175x+9e^{2x}(1-x)+15e^x\left(4x^4+8x^3-7x^2+6x+2\right)+25\right)}{x^3}dx$$

$$\Big\downarrow \ 27$$

$$-\frac{2}{9}\int \frac{-800x^6-1200x^5+1000x^4+800x^3+175x+9e^{2x}(1-x)+15e^x\left(4x^4+8x^3-7x^2+6x+2\right)+25}{x^3}dx$$

$$\Big\downarrow \ 2010$$

$$-\frac{2}{9}\int \left(-\frac{9e^{2x}(x-1)}{x^3}+\frac{15e^x\left(4x^4+8x^3-7x^2+6x+2\right)}{x^3}-\frac{25\left(32x^6+48x^5-40x^4-32x^3-7x-1\right)}{x^3}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{2}{9}\left(-200x^4-400x^3+500x^2-\frac{15e^x}{x^2}-\frac{9e^{2x}}{2x^2}-\frac{25}{2x^2}+60e^xx+800x+60e^x-\frac{105e^x}{x}-\frac{175}{x}\right)$$

input
```
Int[(-50 - 350*x - 1600*x^3 - 2000*x^4 + 2400*x^5 + 1600*x^6 + E^(2*x)*(-1
8 + 18*x) + E^x*(-60 - 180*x + 210*x^2 - 240*x^3 - 120*x^4))/(9*x^3),x]
```

output
```
(-2*(60*E^x - 25/(2*x^2) - (15*E^x)/x^2 - (9*E^(2*x))/(2*x^2) - 175/x - (1
05*E^x)/x + 800*x + 60*E^x*x + 500*x^2 - 400*x^3 - 200*x^4))/9
```

3.74.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.74.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(26) = 52$.

Time = 0.11 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.97

method	result	size
norman	$\frac{\frac{25}{9}+{\mathrm e}^{2 x}+\frac{350 x}{9}-\frac{1600 x^{3}}{9}-\frac{1000 x^{4}}{9}+\frac{800 x^{5}}{9}+\frac{400 x^{6}}{9}+\frac{70 \,{\mathrm e}^{x} x}{3}-\frac{40 \,{\mathrm e}^{x} x^{2}}{3}-\frac{40 \,{\mathrm e}^{x} x^{3}}{3}+\frac{10 \,{\mathrm e}^{x}}{3}}{x^{2}}$	57
risch	$\frac{400 x^{4}}{9}+\frac{800 x^{3}}{9}-\frac{1000 x^{2}}{9}-\frac{1600 x}{9}+\frac{350 x +25}{9 x^{2}}+\frac{{\mathrm e}^{2 x}}{x^{2}}-\frac{10 \left(4 x^{3}+4 x^{2}-7 x -1\right) {\mathrm e}^{x}}{3 x^{2}}$	60
parallelrisch	$\frac{400 x^{6}+800 x^{5}-1000 x^{4}-120 \,{\mathrm e}^{x} x^{3}-1600 x^{3}-120 \,{\mathrm e}^{x} x^{2}+25+210 \,{\mathrm e}^{x} x +9 \,{\mathrm e}^{2 x}+350 x +30 \,{\mathrm e}^{x}}{9 x^{2}}$	60
default	$-\frac{1000 x^{2}}{9}-\frac{1600 x}{9}+\frac{25}{9 x^{2}}+\frac{350}{9 x}+\frac{800 x^{3}}{9}+\frac{400 x^{4}}{9}+\frac{{\mathrm e}^{2 x}}{x^{2}}+\frac{10 \,{\mathrm e}^{x}}{3 x^{2}}+\frac{70 \,{\mathrm e}^{x}}{3 x}-\frac{40 \,{\mathrm e}^{x} x}{3}-\frac{40 \,{\mathrm e}^{x}}{3}$	61
parts	$-\frac{1000 x^{2}}{9}-\frac{1600 x}{9}+\frac{25}{9 x^{2}}+\frac{350}{9 x}+\frac{800 x^{3}}{9}+\frac{400 x^{4}}{9}+\frac{{\mathrm e}^{2 x}}{x^{2}}+\frac{10 \,{\mathrm e}^{x}}{3 x^{2}}+\frac{70 \,{\mathrm e}^{x}}{3 x}-\frac{40 \,{\mathrm e}^{x} x}{3}-\frac{40 \,{\mathrm e}^{x}}{3}$	61

input
```
int(1/9*((18*x-18)*exp(x)^2+(-120*x^4-240*x^3+210*x^2-180*x-60)*exp(x)+160
0*x^6+2400*x^5-2000*x^4-1600*x^3-350*x-50)/x^3,x,method=_RETURNVERBOSE)
```

output
```
(25/9+exp(x)^2+350/9*x-1600/9*x^3-1000/9*x^4+800/9*x^5+400/9*x^6+70/3*exp(
x)*x-40/3*exp(x)*x^2-40/3*exp(x)*x^3+10/3*exp(x))/x^2
```

3.74.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.90

$$\int \frac{-50-350x-1600x^3-2000x^4+2400x^5+1600x^6+e^{2x}(-18+18x)+e^x(-60-180x+210x^2-240x}{9x^3}$$

$$= \frac{400\,x^6+800\,x^5-1000\,x^4-1600\,x^3-30\,(4\,x^3+4\,x^2-7\,x-1)e^x+350\,x+9\,e^{(2\,x)}+25}{9\,x^2}$$

input
```
integrate(1/9*((18*x-18)*exp(x)^2+(-120*x^4-240*x^3+210*x^2-180*x-60)*exp(
x)+1600*x^6+2400*x^5-2000*x^4-1600*x^3-350*x-50)/x^3,x, algorithm=\
```

output
```
1/9*(400*x^6 + 800*x^5 - 1000*x^4 - 1600*x^3 - 30*(4*x^3 + 4*x^2 - 7*x - 1
)*e^x + 350*x + 9*e^(2*x) + 25)/x^2
```

3.74.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. 2(24) = 48.

Time = 0.09 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.52

$$\int \frac{-50-350x-1600x^3-2000x^4+2400x^5+1600x^6+e^{2x}(-18+18x)+e^x(-60-180x+210x^2-240x}{9x^3}$$

$$= \frac{400x^4}{9}+\frac{800x^3}{9}-\frac{1000x^2}{9}-\frac{1600x}{9}+\frac{350x+25}{9x^2}+\frac{3x^2e^{2x}+(-40x^5-40x^4+70x^3+10x^2)\,e^x}{3x^4}$$

input
```
integrate(1/9*((18*x-18)*exp(x)**2+(-120*x**4-240*x**3+210*x**2-180*x-60)*
exp(x)+1600*x**6+2400*x**5-2000*x**4-1600*x**3-350*x-50)/x**3,x)
```

output
```
400*x**4/9 + 800*x**3/9 - 1000*x**2/9 - 1600*x/9 + (350*x + 25)/(9*x**2) +
 (3*x**2*exp(2*x) + (-40*x**5 - 40*x**4 + 70*x**3 + 10*x**2)*exp(x))/(3*x*
*4)
```

3.74.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.48

$$\int \frac{-50-350x-1600x^3-2000x^4+2400x^5+1600x^6+e^{2x}(-18+18x)+e^x(-60-180x+210x^2-240x^3-120x^4)}{9x^3}\,dx$$
$$= \frac{400}{9}x^4+\frac{800}{9}x^3-\frac{1000}{9}x^2-\frac{40}{3}(x-1)e^x-\frac{1600}{9}x+\frac{350}{9x}+\frac{25}{9x^2}+\frac{70}{3}\,\mathrm{Ei}(x) - \frac{80}{3}e^x-20\,\Gamma(-1,-x)+4\,\Gamma(-1,-2x)+\frac{20}{3}\Gamma(-2,-x)+8\,\Gamma(-2,-2x)$$

input
```
integrate(1/9*((18*x-18)*exp(x)^2+(-120*x^4-240*x^3+210*x^2-180*x-60)*exp(
x)+1600*x^6+2400*x^5-2000*x^4-1600*x^3-350*x-50)/x^3,x, algorithm=\
```

output
```
400/9*x^4 + 800/9*x^3 - 1000/9*x^2 - 40/3*(x - 1)*e^x - 1600/9*x + 350/9/x
 + 25/9/x^2 + 70/3*Ei(x) - 80/3*e^x - 20*gamma(-1, -x) + 4*gamma(-1, -2*x)
 + 20/3*gamma(-2, -x) + 8*gamma(-2, -2*x)
```

3.74.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. 2(29) = 58.

Time = 0.28 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.03

$$\int \frac{-50-350x-1600x^3-2000x^4+2400x^5+1600x^6+e^{2x}(-18+18x)+e^x(-60-180x+210x^2-240x^3-120x^4)}{9x^3}\,dx$$
$$= \frac{400\,x^6+800\,x^5-1000\,x^4-120\,x^3e^x-1600\,x^3-120\,x^2e^x+210\,xe^x+350\,x+9\,e^{(2\,x)}+30\,e^x+25}{9\,x^2}$$

input
```
integrate(1/9*((18*x-18)*exp(x)^2+(-120*x^4-240*x^3+210*x^2-180*x-60)*exp(
x)+1600*x^6+2400*x^5-2000*x^4-1600*x^3-350*x-50)/x^3,x, algorithm=\
```

output
```
1/9*(400*x^6 + 800*x^5 - 1000*x^4 - 120*x^3*e^x - 1600*x^3 - 120*x^2*e^x +
 210*x*e^x + 350*x + 9*e^(2*x) + 30*e^x + 25)/x^2
```

3.74.9 Mupad [B] (verification not implemented)

Time = 12.68 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.76

$$\int \frac{-50-350x-1600x^3-2000x^4+2400x^5+1600x^6+e^{2x}(-18+18x)+e^x(-60-180x+210x^2-240x}{9x^3}$$

$$=\frac{e^{2x}+\frac{10\,e^x}{3}+x\left(\frac{70\,e^x}{3}+\frac{350}{9}\right)+\frac{25}{9}}{x^2}-x\left(\frac{40\,e^x}{3}+\frac{1600}{9}\right)-\frac{40\,e^x}{3}-\frac{1000\,x^2}{9}+\frac{800\,x^3}{9}+\frac{400\,x^4}{9}$$

input
```
int(-((350*x)/9 + (exp(x)*(180*x - 210*x^2 + 240*x^3 + 120*x^4 + 60))/9 -
(exp(2*x)*(18*x - 18))/9 + (1600*x^3)/9 + (2000*x^4)/9 - (800*x^5)/3 - (16
00*x^6)/9 + 50/9)/x^3,x)
```

output
```
(exp(2*x) + (10*exp(x))/3 + x*((70*exp(x))/3 + 350/9) + 25/9)/x^2 - x*((40
*exp(x))/3 + 1600/9) - (40*exp(x))/3 - (1000*x^2)/9 + (800*x^3)/9 + (400*x
^4)/9
```

3.75 $\int \frac{e^{-1-e^x}(-16e^{2x}x-15x^2-15e^2x^2+e^x(-16+16x+15x^3+15e^2x^3))}{16x^2+16e^2x^2}\,dx$

3.75.1 Optimal result

Integrand size = 70, antiderivative size = 29

$$\int \frac{e^{-1-e^x}(-16e^{2x}x-15x^2-15e^2x^2+e^x(-16+16x+15x^3+15e^2x^3))}{16x^2+16e^2x^2}\,dx = e^{-1-e^x}\left(-\frac{15x}{16}+\frac{e^x}{x+e^2x}\right)$$

output
```
(-15/16*x+exp(x)/(x+exp(2)*x))/exp(exp(x)+1)
```

3.75.2 Mathematica [A] (verified)

Time = 0.54 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45

$$\int \frac{e^{-1-e^x}(-16e^{2x}x-15x^2-15e^2x^2+e^x(-16+16x+15x^3+15e^2x^3))}{16x^2+16e^2x^2}\,dx = \frac{e^{-1-e^x}(16e^x-15x^2-15e^2x^2)}{16(1+e^2)x}$$

input
```
Integrate[(E^(-1 - E^x)*(-16*E^(2*x)*x - 15*x^2 - 15*E^2*x^2 + E^x*(-16 + 
16*x + 15*x^3 + 15*E^2*x^3)))/(16*x^2 + 16*E^2*x^2),x]
```

output
```
(E^(-1 - E^x)*(16*E^x - 15*x^2 - 15*E^2*x^2))/(16*(1 + E^2)*x)
```

3.75.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-e^x-1}\left(e^x\left(15e^2x^3+15x^3+16x-16\right)-15e^2x^2-15x^2-16e^{2x}x\right)}{16e^2x^2+16x^2}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{e^{-e^x-1}\left(e^x\left(15e^2x^3+15x^3+16x-16\right)-15e^2x^2-15x^2-16e^{2x}x\right)}{\left(16+16e^2\right)x^2}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{e^{-e^x-1}\left(e^x\left(15e^2x^3+15x^3+16x-16\right)+\left(-15-15e^2\right)x^2-16e^{2x}x\right)}{\left(16+16e^2\right)x^2}dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int -\frac{e^{-1-e^x}\left(15(1+e^2)x^2+16e^{2x}x+e^x\left(-15e^2x^3-15x^3-16x+16\right)\right)}{x^2}dx}{16\left(1+e^2\right)}$$

$$\Big\downarrow \; 25$$

$$-\frac{\int \frac{e^{-1-e^x}\left(15(1+e^2)x^2+16e^{2x}x+e^x\left(-15e^2x^3-15x^3-16x+16\right)\right)}{x^2}dx}{16\left(1+e^2\right)}$$

$$\Big\downarrow \; 7293$$

$$-\frac{\int \left(\frac{e^{x-e^x-1}\left(-15(1+e^2)x^3-16x+16\right)}{x^2}+\frac{16e^{2x-e^x-1}}{x}+15e^{-1-e^x}\left(1+e^2\right)\right)dx}{16\left(1+e^2\right)}$$

$$\Big\downarrow \; 2009$$

$$-\frac{16\int \frac{e^{x-e^x-1}}{x^2}dx-16\int \frac{e^{x-e^x-1}}{x}dx+16\int \frac{e^{2x-e^x-1}}{x}dx-15\left(1+e^2\right)\int e^{x-e^x-1}xdx+\frac{15(1+e^2)\,\text{ExpIntegralEi}(-e^x)}{e}}{16\left(1+e^2\right)}$$

input
```
Int[(E^(-1 - E^x)*(-16*E^(2*x)*x - 15*x^2 - 15*E^2*x^2 + E^x*(-16 + 16*x +
 15*x^3 + 15*E^2*x^3)))/(16*x^2 + 16*E^2*x^2),x]
```

output
```
$Aborted
```

3.75. $\int \frac{e^{-1-e^x}\left(-16e^{2x}x-15x^2-15e^2x^2+e^x\left(-16+16x+15x^3+15e^2x^3\right)\right)}{16x^2+16e^2x^2}dx$

3.75.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.75.4 Maple [A] (verified)

Time = 0.84 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

method	result	size
norman	$\frac{\left(\frac{{\mathrm e}^{x}}{{\mathrm e}^{2}+1}-\frac{15 x^{2}}{16}\right) {\mathrm e}^{-{\mathrm e}^{x}-1}}{x}$	27
risch	$-\frac{\left(15 x^{2} {\mathrm e}^{2}+15 x^{2}-16 \,{\mathrm e}^{x}\right) {\mathrm e}^{-{\mathrm e}^{x}-1}}{16 x \left({\mathrm e}^{2}+1\right)}$	36
parallelrisch	$\frac{\left(-15 x^{2} {\mathrm e}^{2}-15 x^{2}+16 \,{\mathrm e}^{x}\right) {\mathrm e}^{-{\mathrm e}^{x}-1}}{16 \left({\mathrm e}^{2}+1\right) x}$	36

input
```
int((-16*x*exp(x)^2+(15*x^3*exp(2)+15*x^3+16*x-16)*exp(x)-15*x^2*exp(2)-15
*x^2)/(16*x^2*exp(2)+16*x^2)/exp(exp(x)+1),x,method=_RETURNVERBOSE)
```

output
```
(1/(exp(2)+1)*exp(x)-15/16*x^2)/x/exp(exp(x)+1)
```

3.75.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

$$\int \frac{e^{-1-e^x}(-16e^{2x}x-15x^2-15e^2x^2+e^x(-16+16x+15x^3+15e^2x^3))}{16x^2+16e^2x^2}\,dx$$
$$=-\frac{(15\,x^2e^2+15\,x^2-16\,e^x)e^{(-e^x-1)}}{16\,(xe^2+x)}$$

input
```
integrate((-16*x*exp(x)^2+(15*x^3*exp(2)+15*x^3+16*x-16)*exp(x)-15*x^2*exp
(2)-15*x^2)/(16*x^2*exp(2)+16*x^2)/exp(exp(x)+1),x, algorithm=\
```

output
```
-1/16*(15*x^2*e^2 + 15*x^2 - 16*e^x)*e^(-e^x - 1)/(x*e^2 + x)
```

3.75.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24

$$\int \frac{e^{-1-e^x}(-16e^{2x}x-15x^2-15e^2x^2+e^x(-16+16x+15x^3+15e^2x^3))}{16x^2+16e^2x^2}\,dx$$
$$=\frac{(-15x^2e^2-15x^2+16e^x)\,e^{-e^x-1}}{16x+16xe^2}$$

input
```
integrate((-16*x*exp(x)**2+(15*x**3*exp(2)+15*x**3+16*x-16)*exp(x)-15*x**2
*exp(2)-15*x**2)/(16*x**2*exp(2)+16*x**2)/exp(exp(x)+1),x)
```

output
```
(-15*x**2*exp(2) - 15*x**2 + 16*exp(x))*exp(-exp(x) - 1)/(16*x + 16*x*exp(
2))
```

3.75.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{e^{-1-e^x}(-16e^{2x}x-15x^2-15e^2x^2+e^x(-16+16x+15x^3+15e^2x^3))}{16x^2+16e^2x^2}\,dx$$
$$=-\frac{(15\,x^2(e^2+1)-16\,e^x)e^{(-e^x)}}{16\,x(e^3+e)}$$

input
```
integrate((-16*x*exp(x)^2+(15*x^3*exp(2)+15*x^3+16*x-16)*exp(x)-15*x^2*exp
(2)-15*x^2)/(16*x^2*exp(2)+16*x^2)/exp(exp(x)+1),x, algorithm=\
```

output
```
-1/16*(15*x^2*(e^2 + 1) - 16*e^x)*e^(-e^x)/(x*(e^3 + e))
```

3.75.8 Giac [F]

$$\int \frac{e^{-1-e^x}(-16e^{2x}x-15x^2-15e^2x^2+e^x(-16+16x+15x^3+15e^2x^3))}{16x^2+16e^2x^2}\,dx$$
$$=\int -\frac{\left(15\,x^2e^2+15\,x^2+16\,xe^{(2\,x)}-\left(15\,x^3e^2+15\,x^3+16\,x-16\right)e^x\right)e^{\left(-e^x-1\right)}}{16\left(x^2e^2+x^2\right)}\,dx$$

input
```
integrate((-16*x*exp(x)^2+(15*x^3*exp(2)+15*x^3+16*x-16)*exp(x)-15*x^2*exp
(2)-15*x^2)/(16*x^2*exp(2)+16*x^2)/exp(exp(x)+1),x, algorithm=\
```

output
```
integrate(-1/16*(15*x^2*e^2 + 15*x^2 + 16*x*e^(2*x) - (15*x^3*e^2 + 15*x^3
 + 16*x - 16)*e^x)*e^(-e^x - 1)/(x^2*e^2 + x^2), x)
```

3.75.9 Mupad [B] (verification not implemented)

Time = 13.13 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.28

$$\int \frac{e^{-1-e^x}(-16e^{2x}x-15x^2-15e^2x^2+e^x(-16+16x+15x^3+15e^2x^3))}{16x^2+16e^2x^2}\,dx$$
$$=\frac{e^{x-e^x-1}-\frac{x^2\,e^{-e^x-1}\,\left(15\,e^2+15\right)}{16}}{x\,\left(e^2+1\right)}$$

input
```
int(-(exp(- exp(x) - 1)*(16*x*exp(2*x) - exp(x)*(16*x + 15*x^3*exp(2) + 15
*x^3 - 16) + 15*x^2*exp(2) + 15*x^2))/(16*x^2*exp(2) + 16*x^2),x)
```

output
```
(exp(x - exp(x) - 1) - (x^2*exp(- exp(x) - 1)*(15*exp(2) + 15))/16)/(x*(ex
p(2) + 1))
```

3.76 $\int \frac{1}{2}\left(4e^{2x}+e^{-e^x+\frac{3}{2}e^{-e^x-x+x^4}-x+x^4}(3+3e^x-12x^3)\right)\,dx$

3.76.1 Optimal result

Integrand size = 57, antiderivative size = 29

$$\int \frac{1}{2}\left(4e^{2x}+e^{-e^x+\frac{3}{2}e^{-e^x-x+x^4}-x+x^4}(3+3e^x-12x^3)\right)\,dx=-1-e^{\frac{3}{2}e^{-e^x-x+x^4}}+e^{2x}$$

output
```
-1-exp(3/2*exp(-exp(x)+x^4-x))+exp(2*x)
```

3.76.2 Mathematica [A] (verified)

Time = 0.65 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{1}{2}\left(4e^{2x}+e^{-e^x+\frac{3}{2}e^{-e^x-x+x^4}-x+x^4}(3+3e^x-12x^3)\right)\,dx=-e^{\frac{3}{2}e^{-e^x-x+x^4}}+e^{2x}$$

input
```
Integrate[(4*E^(2*x) + E^(-E^x + (3*E^(-E^x - x + x^4))/2 - x + x^4)*(3 +
3*E^x - 12*x^3))/2,x]
```

output
```
-E^((3*E^(-E^x - x + x^4))/2) + E^(2*x)
```

3.76.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}\left(e^{x^4+\frac{3}{2}e^{x^4-x-e^x}-x-e^x}\left(-12x^3+3e^x+3\right)+4e^{2x}\right)dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2}\int \left(3e^{x^4-x-e^x+\frac{3}{2}e^{x^4-x-e^x}}\left(-4x^3+e^x+1\right)+4e^{2x}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{2}\left(3\int e^{x^4-e^x+\frac{3}{2}e^{x^4-x-e^x}}dx+3\int e^{x^4-x-e^x+\frac{3}{2}e^{x^4-x-e^x}}dx-12\int e^{x^4-x-e^x+\frac{3}{2}e^{x^4-x-e^x}}x^3dx+2e^{2x}\right)$$

input
```
Int[(4*E^(2*x) + E^(-E^x + (3*E^(-E^x - x + x^4))/2 - x + x^4)*(3 + 3*E^x
- 12*x^3))/2,x]
```

output
```
$Aborted
```

3.76.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.76.4 Maple [A] (verified)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

method	result	size
default	$-\mathrm{e}^{\frac{3\,\mathrm{e}^{-\mathrm{e}^{x}+x^{4}-x}}{2}}+\mathrm{e}^{2x}$	23
risch	$-\mathrm{e}^{\frac{3\,\mathrm{e}^{-\mathrm{e}^{x}+x^{4}-x}}{2}}+\mathrm{e}^{2x}$	23
parallelrisch	$-\mathrm{e}^{\frac{3\,\mathrm{e}^{-\mathrm{e}^{x}+x^{4}-x}}{2}}+\mathrm{e}^{2x}$	23

input
```
int(1/2*(3*exp(x)-12*x^3+3)*exp(-exp(x)+x^4-x)*exp(3/2*exp(-exp(x)+x^4-x))
+2*exp(2*x),x,method=_RETURNVERBOSE)
```

output
```
-exp(3/2*exp(-exp(x)+x^4-x))+exp(2*x)
```

3.76.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(23) = 46$.

Time = 0.26 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.72

$$\int \frac{1}{2}\left(4e^{2x} + e^{-e^x+\frac{3}{2}e^{-e^x-x+x^4}-x+x^4}(3+3e^x-12x^3)\right)\,dx = \left(e^{\left(x^4+x-e^x\right)} - e^{\left(x^4-x+\frac{3}{2}\,e^{\left(x^4-x-e^x\right)}-e^x\right)}\right)e^{\left(-x^4+x+e^x\right)}$$

input
```
integrate(1/2*(3*exp(x)-12*x^3+3)*exp(-exp(x)+x^4-x)*exp(3/2*exp(-exp(x)+x
^4-x))+2*exp(2*x),x, algorithm=\
```

output
```
(e^(x^4 + x - e^x) - e^(x^4 - x + 3/2*e^(x^4 - x - e^x) - e^x))*e^(-x^4 +
x + e^x)
```

3.76.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.66

$$\int \frac{1}{2}\left(4e^{2x} + e^{-e^x+\frac{3}{2}e^{-e^x-x+x^4}-x+x^4}(3+3e^x-12x^3)\right)\,dx = e^{2x} - e^{\frac{3e^{x^4-x-e^x}}{2}}$$

input
```
integrate(1/2*(3*exp(x)-12*x**3+3)*exp(-exp(x)+x**4-x)*exp(3/2*exp(-exp(x)
+x**4-x))+2*exp(2*x),x)
```

output
```
exp(2*x) - exp(3*exp(x**4 - x - exp(x))/2)
```

3.76.7 Maxima [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{1}{2}\left(4e^{2x}+e^{-e^x+\frac{3}{2}e^{-e^x-x+x^4}-x+x^4}(3+3e^x-12x^3)\right)\,dx = e^{(2\,x)}-e^{\left(\frac{3}{2}\,e^{\left(x^4-x-e^x\right)}\right)}$$

input
```
integrate(1/2*(3*exp(x)-12*x^3+3)*exp(-exp(x)+x^4-x)*exp(3/2*exp(-exp(x)+x
^4-x))+2*exp(2*x),x, algorithm=\
```

output
```
e^(2*x) - e^(3/2*e^(x^4 - x - e^x))
```

3.76.8 Giac [F]

$$\int \frac{1}{2}\left(4e^{2x}+e^{-e^x+\frac{3}{2}e^{-e^x-x+x^4}-x+x^4}(3+3e^x-12x^3)\right)\,dx$$
$$= \int -\frac{3}{2}\,(4\,x^3-e^x-1)e^{\left(x^4-x+\frac{3}{2}\,e^{\left(x^4-x-e^x\right)}-e^x\right)}+2\,e^{(2\,x)}\,dx$$

input
```
integrate(1/2*(3*exp(x)-12*x^3+3)*exp(-exp(x)+x^4-x)*exp(3/2*exp(-exp(x)+x
^4-x))+2*exp(2*x),x, algorithm=\
```

output
```
integrate(-3/2*(4*x^3 - e^x - 1)*e^(x^4 - x + 3/2*e^(x^4 - x - e^x) - e^x)
 + 2*e^(2*x), x)
```

3.76.9 Mupad [B] (verification not implemented)

Time = 13.10 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \frac{1}{2}\left(4e^{2x}+e^{-e^x+\frac{3}{2}e^{-e^x-x+x^4}-x+x^4}(3+3e^x-12x^3)\right)\,dx = \mathrm{e}^{2\,x}-\mathrm{e}^{\frac{3\,\mathrm{e}^{-x}\,\mathrm{e}^{x^4}\,\mathrm{e}^{-\mathrm{e}^x}}{2}}$$

input
```
int(2*exp(2*x) + (exp((3*exp(x^4 - exp(x) - x))/2)*exp(x^4 - exp(x) - x)*(
3*exp(x) - 12*x^3 + 3))/2,x)
```

output
```
exp(2*x) - exp((3*exp(-x)*exp(x^4)*exp(-exp(x)))/2)
```

3.77 $\int \frac{2+e^x\left(-25e^4-2x\right)+50e^4x+4x^2}{25e^4+2x}\,dx$

3.77.1 Optimal result

Integrand size = 38, antiderivative size = 24

$$\int \frac{2+e^x(-25e^4-2x)+50e^4x+4x^2}{25e^4+2x}\,dx = x^2+\log\left(\frac{1}{4}e^{-e^x}\left(25+\frac{2x}{e^4}\right)\right)$$

output
```
ln(1/4*(2*x/exp(4)+25)/exp(exp(x)))+x^2
```

3.77.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{2+e^x(-25e^4-2x)+50e^4x+4x^2}{25e^4+2x}\,dx = -e^x+x^2+\log\left(25e^4+2x\right)$$

input
```
Integrate[(2 + E^x*(-25*E^4 - 2*x) + 50*E^4*x + 4*x^2)/(25*E^4 + 2*x),x]
```

output
```
-E^x + x^2 + Log[25*E^4 + 2*x]
```

3.77.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^2+50e^4x+e^x\left(-2x-25e^4\right)+2}{2x+25e^4}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2\left(2x^2+25e^4x+1\right)}{2x+25e^4}-e^x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^2-e^x+\log\left(2x+25e^4\right)$$

input
```
Int[(2 + E^x*(-25*E^4 - 2*x) + 50*E^4*x + 4*x^2)/(25*E^4 + 2*x),x]
```

output
```
-E^x + x^2 + Log[25*E^4 + 2*x]
```

3.77.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.77.4 Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.67

method	result	size
parallelrisch	$x^2 - e^x + \ln\left(x + \frac{25\,e^4}{2}\right)$	16
norman	$-e^x + x^2 + \ln(25\,e^4 + 2x)$	18
risch	$-e^x + x^2 + \ln(25\,e^4 + 2x)$	18
parts	$-e^x + x^2 + \ln(25\,e^4 + 2x)$	18
default	$-e^x + x^2 + \ln(25\,e^4 + 2x)$	46

input
```
int(((-25*exp(4)-2*x)*exp(x)+50*x*exp(4)+4*x^2+2)/(25*exp(4)+2*x),x,method
=_RETURNVERBOSE)
```

output
```
x^2-exp(x)+ln(x+25/2*exp(4))
```

3.77.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{2+e^x(-25e^4-2x)+50e^4x+4x^2}{25e^4+2x}\,dx = x^2 - e^x + \log\left(2\,x + 25\,e^4\right)$$

input
```
integrate(((-25*exp(4)-2*x)*exp(x)+50*x*exp(4)+4*x^2+2)/(25*exp(4)+2*x),x,
 algorithm=\
```

output
```
x^2 - e^x + log(2*x + 25*e^4)
```

3.77.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{2+e^x(-25e^4-2x)+50e^4x+4x^2}{25e^4+2x}\,dx = x^2 - e^x + \log\left(2x + 25e^4\right)$$

input
```
integrate(((-25*exp(4)-2*x)*exp(x)+50*x*exp(4)+4*x**2+2)/(25*exp(4)+2*x),x
)
```

output
```
x**2 - exp(x) + log(2*x + 25*exp(4))
```

3.77.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(19) = 38$.

Time = 0.23 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.33

$$\int \frac{2+e^x(-25e^4-2x)+50e^4x+4x^2}{25e^4+2x}\,dx = x^2 - \frac{25}{2}\left(25\,e^4\log\left(2\,x+25\,e^4\right)-2\,x\right)e^4 - 25\,xe^4 + \frac{625}{2}\,e^8\log\left(2\,x+25\,e^4\right) - e^x + \log\left(2\,x+25\,e^4\right)$$

input
```
integrate(((-25*exp(4)-2*x)*exp(x)+50*x*exp(4)+4*x^2+2)/(25*exp(4)+2*x),x,
 algorithm=\
```

output
```
x^2 - 25/2*(25*e^4*log(2*x + 25*e^4) - 2*x)*e^4 - 25*x*e^4 + 625/2*e^8*log
(2*x + 25*e^4) - e^x + log(2*x + 25*e^4)
```

3.77.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{2+e^x(-25e^4-2x)+50e^4x+4x^2}{25e^4+2x}\,dx = x^2 - e^x + \log\left(2\,x+25\,e^4\right)$$

input
```
integrate(((-25*exp(4)-2*x)*exp(x)+50*x*exp(4)+4*x^2+2)/(25*exp(4)+2*x),x,
 algorithm=\
```

output
```
x^2 - e^x + log(2*x + 25*e^4)
```

3.77.9 Mupad [B] (verification not implemented)

Time = 12.65 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{2+e^x(-25e^4-2x)+50e^4x+4x^2}{25e^4+2x}\,dx = \ln\left(x+\frac{25\,\mathrm{e}^4}{2}\right)-\mathrm{e}^x+x^2$$

input
```
int((50*x*exp(4) - exp(x)*(2*x + 25*exp(4)) + 4*x^2 + 2)/(2*x + 25*exp(4))
,x)
```

output
```
log(x + (25*exp(4))/2) - exp(x) + x^2
```

3.78 $\int \frac{2+4x+4x^2+2x^3+e^3(-2-2x-2x^2)+e^4(2+2x+2x^2)+(-2-2x-2x^2)\log$

3.78.1 Optimal result

Integrand size = 72, antiderivative size = 23

$$\int \frac{2+4x+4x^2+2x^3+e^3(-2-2x-2x^2)+e^4(2+2x+2x^2)+(-2-2x-2x^2)\log\left(\frac{3+3x}{x}\right)}{x+x^2}\,dx = \left(-1+e^3-e^4-x+\log\left(3+\frac{3}{x}\right)\right)^2$$

output
```
(exp(3)-exp(4)+ln(3/x+3)-1-x)^2
```

3.78.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{2+4x+4x^2+2x^3+e^3(-2-2x-2x^2)+e^4(2+2x+2x^2)+(-2-2x-2x^2)\log\left(\frac{3+3x}{x}\right)}{x+x^2}\,dx = \left(1-e^3+e^4+x-\log\left(3+\frac{3}{x}\right)\right)^2$$

input
```
Integrate[(2 + 4*x + 4*x^2 + 2*x^3 + E^3*(-2 - 2*x - 2*x^2) + E^4*(2 + 2*x
 + 2*x^2) + (-2 - 2*x - 2*x^2)*Log[(3 + 3*x)/x])/(x + x^2),x]
```

output
```
(1 - E^3 + E^4 + x - Log[3 + 3/x])^2
```

3.78.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {2026, 7239, 27, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3+4x^2+e^3\left(-2x^2-2x-2\right)+e^4\left(2x^2+2x+2\right)+\left(-2x^2-2x-2\right)\log\left(\frac{3x+3}{x}\right)+4x+2}{x^2+x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{2x^3+4x^2+e^3\left(-2x^2-2x-2\right)+e^4\left(2x^2+2x+2\right)+\left(-2x^2-2x-2\right)\log\left(\frac{3x+3}{x}\right)+4x+2}{x(x+1)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2\left(x^2+x+1\right)\left(x-\log\left(\frac{3}{x}+3\right)+(e-1)e^3+1\right)}{x(x+1)}dx$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{\left(x^2+x+1\right)\left(x-\log\left(3+\frac{3}{x}\right)-(1-e)e^3+1\right)}{x(x+1)}dx$$

$$\Big\downarrow \text{7237}$$

$$\left(x-\log\left(\frac{3}{x}+3\right)+e^4-e^3+1\right)^2$$

input
```
Int[(2 + 4*x + 4*x^2 + 2*x^3 + E^3*(-2 - 2*x - 2*x^2) + E^4*(2 + 2*x + 2*x
^2) + (-2 - 2*x - 2*x^2)*Log[(3 + 3*x)/x])/(x + x^2),x]
```

output
```
(1 - E^3 + E^4 + x - Log[3 + 3/x])^2
```

3.78.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.78.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(21) = 42$.

Time = 0.66 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.74

method	result
derivativedivides	$-2(e^4 - e^3)\ln\left(\frac{3}{x}+3\right) + \frac{2(3e^4-3e^3+3)x}{3} + x^2 + \ln\left(\frac{3}{x}+3\right)^2 - \frac{2\ln\left(\frac{3}{x}+3\right)\left(\frac{3}{x}+3\right)x}{3}$
default	$-2(e^4 - e^3)\ln\left(\frac{3}{x}+3\right) + \frac{2(3e^4-3e^3+3)x}{3} + x^2 + \ln\left(\frac{3}{x}+3\right)^2 - \frac{2\ln\left(\frac{3}{x}+3\right)\left(\frac{3}{x}+3\right)x}{3}$
norman	$x^2 + \ln\left(\frac{3x+3}{x}\right)^2 + (2+2e^4-2e^3)x + (-2e^4+2e^3-2)\ln\left(\frac{3x+3}{x}\right) - 2x\ln\left(\frac{3x+3}{x}\right)$
parts	$x^2 + 2x e^4 - 2x e^3 + 2x + 2(e^4 - e^3 + 1)\ln(x) + 2(-e^4 + e^3)\ln(1+x) + \ln\left(\frac{3}{x}+3\right)^2 -$
parallelrisch	$2x e^4 - 2e^4\ln\left(\frac{3x+3}{x}\right) - 2x e^3 + 2\ln\left(\frac{3x+3}{x}\right)e^3 - 5 + x^2 - 2x\ln\left(\frac{3x+3}{x}\right) + \ln\left(\frac{3x+3}{x}\right)^2 - 4$
risch	$2x e^4 - 2x e^3 + x^2 + 2x + 2e^4\ln(x) - 2\ln(x)e^3 + 2\ln(x) - 2e^3\ln(1+x)e + 2e^3\ln($

input
```
int(((-2*x^2-2*x-2)*ln((3*x+3)/x)+(2*x^2+2*x+2)*exp(4)+(-2*x^2-2*x-2)*exp(
3)+2*x^3+4*x^2+4*x+2)/(x^2+x),x,method=_RETURNVERBOSE)
```

output
```
-2*(exp(4)-exp(3))*ln(3/x+3)+2/3*(3*exp(4)-3*exp(3)+3)*x+x^2+ln(3/x+3)^2-2
/3*ln(3/x+3)*(3/x+3)*x
```

3.78.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(21) = 42$.

Time = 0.25 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.09

$$\int \frac{2+4x+4x^2+2x^3+e^3(-2-2x-2x^2)+e^4(2+2x+2x^2)+(-2-2x-2x^2)\log\left(\frac{3+3x}{x}\right)}{x+x^2}\,dx$$
$$= x^2+2\,xe^4-2\,xe^3-2\left(x+e^4-e^3+1\right)\log\left(\frac{3\,(x+1)}{x}\right)+\log\left(\frac{3\,(x+1)}{x}\right)^2+2\,x$$

input
```
integrate(((-2*x^2-2*x-2)*log((3*x+3)/x)+(2*x^2+2*x+2)*exp(4)+(-2*x^2-2*x-
2)*exp(3)+2*x^3+4*x^2+4*x+2)/(x^2+x),x, algorithm=\
```

output
```
x^2 + 2*x*e^4 - 2*x*e^3 - 2*(x + e^4 - e^3 + 1)*log(3*(x + 1)/x) + log(3*(
x + 1)/x)^2 + 2*x
```

3.78.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. $2(17) = 34$.

Time = 0.20 (sec) , antiderivative size = 70, normalized size of antiderivative = 3.04

$$\int \frac{2+4x+4x^2+2x^3+e^3(-2-2x-2x^2)+e^4(2+2x+2x^2)+(-2-2x-2x^2)\log\left(\frac{3+3x}{x}\right)}{x+x^2}\,dx$$
$$= x^2-2x\log\left(\frac{3x+3}{x}\right)+x\left(-2e^3+2+2e^4\right)+\left(-2e^3+2+2e^4\right)\log(x)$$
$$+\log\left(\frac{3x+3}{x}\right)^2+\left(-2e^4-2+2e^3\right)\log(x+1)$$

input
```
integrate(((-2*x**2-2*x-2)*ln((3*x+3)/x)+(2*x**2+2*x+2)*exp(4)+(-2*x**2-2*
x-2)*exp(3)+2*x**3+4*x**2+4*x+2)/(x**2+x),x)
```

output
```
x**2 - 2*x*log((3*x + 3)/x) + x*(-2*exp(3) + 2 + 2*exp(4)) + (-2*exp(3) +
2 + 2*exp(4))*log(x) + log((3*x + 3)/x)**2 + (-2*exp(4) - 2 + 2*exp(3))*lo
g(x + 1)
```

3.78.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(21) = 42.

Time = 0.31 (sec) , antiderivative size = 132, normalized size of antiderivative = 5.74

$$\int \frac{2+4x+4x^2+2x^3+e^3(-2-2x-2x^2)+e^4(2+2x+2x^2)+(-2-2x-2x^2)\log\left(\frac{3+3x}{x}\right)}{x+x^2}\,dx$$
$$= x^2+2\,x(e^4-e^3-\log(3)+1)-2\,(\log(x+1)-\log(x))e^4 + 2\,(\log(x+1)-\log(x))e^3-2\,\left(x+e^4-e^3+2\right)\log(x+1)+2\,e^4\log(x+1) - 2\,e^3\log(x+1)-\log(x+1)^2+2\,x\log(x)+2\,\log(x+1)\log(x) - \log(x)^2+2\,(\log(x+1)-\log(x))\log\left(\frac{3}{x}+3\right)+2\,\log(x+1)+2\,\log(x)$$

input
```
integrate(((-2*x^2-2*x-2)*log((3*x+3)/x)+(2*x^2+2*x+2)*exp(4)+(-2*x^2-2*x-
2)*exp(3)+2*x^3+4*x^2+4*x+2)/(x^2+x),x, algorithm=\
```

output
```
x^2 + 2*x*(e^4 - e^3 - log(3) + 1) - 2*(log(x + 1) - log(x))*e^4 + 2*(log(
x + 1) - log(x))*e^3 - 2*(x + e^4 - e^3 + 2)*log(x + 1) + 2*e^4*log(x + 1)
 - 2*e^3*log(x + 1) - log(x + 1)^2 + 2*x*log(x) + 2*log(x + 1)*log(x) - lo
g(x)^2 + 2*(log(x + 1) - log(x))*log(3/x + 3) + 2*log(x + 1) + 2*log(x)
```

3.78.8 Giac [F]

$$\int \frac{2+4x+4x^2+2x^3+e^3(-2-2x-2x^2)+e^4(2+2x+2x^2)+(-2-2x-2x^2)\log\left(\frac{3+3x}{x}\right)}{x+x^2}\,dx$$
$$=\int \frac{2\left(x^3+2\,x^2+(x^2+x+1)e^4-(x^2+x+1)e^3-(x^2+x+1)\log\left(\frac{3\,(x+1)}{x}\right)+2\,x+1\right)}{x^2+x}\,dx$$

input
```
integrate(((-2*x^2-2*x-2)*log((3*x+3)/x)+(2*x^2+2*x+2)*exp(4)+(-2*x^2-2*x-
2)*exp(3)+2*x^3+4*x^2+4*x+2)/(x^2+x),x, algorithm=\
```

output
```
integrate(2*(x^3 + 2*x^2 + (x^2 + x + 1)*e^4 - (x^2 + x + 1)*e^3 - (x^2 +
x + 1)*log(3*(x + 1)/x) + 2*x + 1)/(x^2 + x), x)
```

3.78.9 Mupad [B] (verification not implemented)

Time = 13.30 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.57

$$\int \frac{2+4x+4x^2+2x^3+e^3(-2-2x-2x^2)+e^4(2+2x+2x^2)+(-2-2x-2x^2)\log\left(\frac{3+3x}{x}\right)}{x+x^2}\,dx$$
$$=\left(x-\ln\left(\frac{3\,(x+1)}{x}\right)\right)\,\left(x-2\,\mathrm{e}^3+2\,\mathrm{e}^4-\ln\left(\frac{3\,(x+1)}{x}\right)+2\right)$$

input
```
int((4*x - exp(3)*(2*x + 2*x^2 + 2) + exp(4)*(2*x + 2*x^2 + 2) - log((3*x
+ 3)/x)*(2*x + 2*x^2 + 2) + 4*x^2 + 2*x^3 + 2)/(x + x^2),x)
```

output
```
(x - log((3*(x + 1))/x))*(x - 2*exp(3) + 2*exp(4) - log((3*(x + 1))/x) + 2
)
```

3.79 $\int \frac{-4+3x+8x^2-8x^3+2x^4}{8x^3-8x^4+2x^5} \, dx$

3.79.1 Optimal result

Integrand size = 39, antiderivative size = 22

$$\int \frac{-4+3x+8x^2-8x^3+2x^4}{8x^3-8x^4+2x^5} \, dx = -1+\frac{1}{2(2-x)x^2}+\log\left(\frac{x}{5}\right)$$

output
```
ln(1/5*x)+1/2/(2-x)/x^2-1
```

3.79.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{-4+3x+8x^2-8x^3+2x^4}{8x^3-8x^4+2x^5} \, dx = \frac{1}{2}\left(-\frac{1}{(-2+x)x^2}+2\log(x)\right)$$

input
```
Integrate[(-4 + 3*x + 8*x^2 - 8*x^3 + 2*x^4)/(8*x^3 - 8*x^4 + 2*x^5),x]
```

output
```
(-(1/((-2 + x)*x^2)) + 2*Log[x])/2
```

3.79.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {2026, 2159, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4-8x^3+8x^2+3x-4}{2x^5-8x^4+8x^3}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{2x^4-8x^3+8x^2+3x-4}{x^3(2x^2-8x+8)}dx$$

$$\Big\downarrow \text{2159}$$

$$\int \left(-\frac{1}{2x^3}-\frac{1}{8x^2}+\frac{1}{8(x-2)^2}+\frac{1}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4x^2}+\frac{1}{8(2-x)}+\frac{1}{8x}+\log(x)$$

input
```
Int[(-4 + 3*x + 8*x^2 - 8*x^3 + 2*x^4)/(8*x^3 - 8*x^4 + 2*x^5),x]
```

output
```
1/(8*(2 - x)) + 1/(4*x^2) + 1/(8*x) + Log[x]
```

3.79.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2159
```
Int[(Pq_)*((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p
_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*Pq*(a + b*x + c*x^2)^p, x
], x] /; FreeQ[{a, b, c, d, e, m}, x] && PolyQ[Pq, x] && IGtQ[p, -2]
```

3.79.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

method	result	size
norman	$-\frac{1}{2x^2(-2+x)}+\ln(x)$	14
risch	$-\frac{1}{2x^2(-2+x)}+\ln(x)$	14
default	$\frac{1}{4x^2}+\frac{1}{8x}+\ln(x)-\frac{1}{8(-2+x)}$	21
parallelrisch	$\frac{2x^3\ln(x)-1-4x^2\ln(x)}{2x^2(-2+x)}$	27

input
```
int((2*x^4-8*x^3+8*x^2+3*x-4)/(2*x^5-8*x^4+8*x^3),x,method=_RETURNVERBOSE)
```

output
```
-1/2/x^2/(-2+x)+ln(x)
```

3.79.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

$$\int \frac{-4+3x+8x^2-8x^3+2x^4}{8x^3-8x^4+2x^5}\,dx=\frac{2\,(x^3-2\,x^2)\log(x)-1}{2\,(x^3-2\,x^2)}$$

input
```
integrate((2*x^4-8*x^3+8*x^2+3*x-4)/(2*x^5-8*x^4+8*x^3),x, algorithm=\
```

output
```
1/2*(2*(x^3 - 2*x^2)*log(x) - 1)/(x^3 - 2*x^2)
```

3.79.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{-4+3x+8x^2-8x^3+2x^4}{8x^3-8x^4+2x^5}\,dx=\log(x)-\frac{1}{2x^3-4x^2}$$

input
```
integrate((2*x**4-8*x**3+8*x**2+3*x-4)/(2*x**5-8*x**4+8*x**3),x)
```

output
```
log(x) - 1/(2*x**3 - 4*x**2)
```

3.79.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{-4+3x+8x^2-8x^3+2x^4}{8x^3-8x^4+2x^5}\,dx = -\frac{1}{2\,(x^3-2\,x^2)}+\log{(x)}$$

input
```
integrate((2*x^4-8*x^3+8*x^2+3*x-4)/(2*x^5-8*x^4+8*x^3),x, algorithm=\
```

output
```
-1/2/(x^3 - 2*x^2) + log(x)
```

3.79.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{-4+3x+8x^2-8x^3+2x^4}{8x^3-8x^4+2x^5}\,dx = -\frac{1}{2\,(x-2)x^2}+\log{(|x|)}$$

input
```
integrate((2*x^4-8*x^3+8*x^2+3*x-4)/(2*x^5-8*x^4+8*x^3),x, algorithm=\
```

output
```
-1/2/((x - 2)*x^2) + log(abs(x))
```

3.79.9 Mupad [B] (verification not implemented)

Time = 14.09 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.59

$$\int \frac{-4+3x+8x^2-8x^3+2x^4}{8x^3-8x^4+2x^5}\,dx = \ln{(x)}-\frac{1}{2\,x^2\,(x-2)}$$

input
```
int((3*x + 8*x^2 - 8*x^3 + 2*x^4 - 4)/(8*x^3 - 8*x^4 + 2*x^5),x)
```

output
```
log(x) - 1/(2*x^2*(x - 2))
```

3.80 $\int \frac{3456x^3+6912x^4-8x^5-2x^6+(1728x^2+864x^3-1728x^4)\log(x)+(288x-}{4x^4+4x}$

3.80.1 Optimal result

Integrand size = 101, antiderivative size = 27

$$\int \frac{3456x^3+6912x^4-8x^5-2x^6+(1728x^2+864x^3-1728x^4)\log(x)+(288x-720x^2-864x^3)\log^2(x)+}{4x^4+4x^5+x^6}$$

$$=\frac{2\left(2-x\left(-1+x-\left(6+\frac{\log(x)}{x}\right)^4\right)\right)}{2+x}$$

output
```
2/(2+x)*(2-x*(x-1-(6+ln(x)/x)^4))
```

3.80.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.89

$$\int \frac{3456x^3+6912x^4-8x^5-2x^6+(1728x^2+864x^3-1728x^4)\log(x)+(288x-720x^2-864x^3)\log^2(x)+}{4x^4+4x^5+x^6}$$

$$=\frac{2(-x^3(2596+2x+x^2)+864x^3\log(x)+216x^2\log^2(x)+24x\log^3(x)+\log^4(x))}{x^3(2+x)}$$

input
```
Integrate[(3456*x^3 + 6912*x^4 - 8*x^5 - 2*x^6 + (1728*x^2 + 864*x^3 - 172
8*x^4)*Log[x] + (288*x - 720*x^2 - 864*x^3)*Log[x]^2 + (16 - 184*x - 144*x
^2)*Log[x]^3 + (-12 - 8*x)*Log[x]^4)/(4*x^4 + 4*x^5 + x^6),x]
```

output
```
(2*(-(x^3*(2596 + 2*x + x^2)) + 864*x^3*Log[x] + 216*x^2*Log[x]^2 + 24*x*L
og[x]^3 + Log[x]^4))/(x^3*(2 + x))
```

3.80.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 140 vs. $2(27) = 54$.

Time = 1.44 (sec) , antiderivative size = 140, normalized size of antiderivative = 5.19, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.040$, Rules used = {2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^6-8x^5+6912x^4+3456x^3+\left(-144x^2-184x+16\right)\log^3(x)+\left(-864x^3-720x^2+288x\right)\log^2(x)+\left(-172\right.}{x^6+4x^5+4x^4}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-2x^6-8x^5+6912x^4+3456x^3+\left(-144x^2-184x+16\right)\log^3(x)+\left(-864x^3-720x^2+288x\right)\log^2(x)+\left(-172\right.}{x^4\left(x^2+4x+4\right)}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-2x^6-8x^5+6912x^4+3456x^3+\left(-144x^2-184x+16\right)\log^3(x)+\left(-864x^3-720x^2+288x\right)\log^2(x)+\left(-172\right.}{x^4(x+2)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{4(2x+3)\log^4(x)}{x^4(x+2)^2}-\frac{2x^2}{(x+2)^2}-\frac{864\left(2x^2-x-2\right)\log(x)}{x^2(x+2)^2}-\frac{8\left(18x^2+23x-2\right)\log^3(x)}{x^4(x+2)^2}-\frac{144\left(6x^2+5x-2\right.}{x^3(x+2)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{\log^4(x)}{x^3}-\frac{\log^4(x)}{2x^2}+\frac{24\log^3(x)}{x^2}-2x-\frac{5192}{x+2}+\frac{\log^4(x)}{4x}+\frac{x\log^4(x)}{8(x+2)}-\frac{\log^4(x)}{8}-\frac{12\log^3(x)}{x}-\frac{6x\log^3(x)}{x+2}+6\log^3(x)+\frac{216\log^2(x)}{x}+\frac{108x\log^2(x)}{x+2}-108\log^2(x)-\frac{864x\log(x)}{x+2}+864\log(x)$$

input
```
Int[(3456*x^3 + 6912*x^4 - 8*x^5 - 2*x^6 + (1728*x^2 + 864*x^3 - 1728*x^4)
*Log[x] + (288*x - 720*x^2 - 864*x^3)*Log[x]^2 + (16 - 184*x - 144*x^2)*Lo
g[x]^3 + (-12 - 8*x)*Log[x]^4)/(4*x^4 + 4*x^5 + x^6),x]
```

output
```
-2*x - 5192/(2 + x) + 864*Log[x] - (864*x*Log[x])/(2 + x) - 108*Log[x]^2 +
 (216*Log[x]^2)/x + (108*x*Log[x]^2)/(2 + x) + 6*Log[x]^3 + (24*Log[x]^3)/
x^2 - (12*Log[x]^3)/x - (6*x*Log[x]^3)/(2 + x) - Log[x]^4/8 + Log[x]^4/x^3
 - Log[x]^4/(2*x^2) + Log[x]^4/(4*x) + (x*Log[x]^4)/(8*(2 + x))
```

3.80.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.80.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.85

method	result	size
parallelrisch	$\frac{-2x^5+1728x^3\ln(x)+432x^2\ln(x)^2+48x\ln(x)^3+2\ln(x)^4-5184x^3}{x^3(2+x)}$	50
risch	$\frac{2\ln(x)^4}{x^3(2+x)}+\frac{48\ln(x)^3}{x^2(2+x)}+\frac{432\ln(x)^2}{x(2+x)}+\frac{1728\ln(x)}{2+x}-\frac{2(x^2+2x+2596)}{2+x}$	68

input
```
int(((-8*x-12)*ln(x)^4+(-144*x^2-184*x+16)*ln(x)^3+(-864*x^3-720*x^2+288*x
)*ln(x)^2+(-1728*x^4+864*x^3+1728*x^2)*ln(x)-2*x^6-8*x^5+6912*x^4+3456*x^3
)/(x^6+4*x^5+4*x^4),x,method=_RETURNVERBOSE)
```

output
```
1/x^3*(-2*x^5+1728*x^3*ln(x)+432*x^2*ln(x)^2+48*x*ln(x)^3+2*ln(x)^4-5184*x
^3)/(2+x)
```

3.80.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(26) = 52$.

Time = 0.25 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.07

$$\int \frac{3456x^3 + 6912x^4 - 8x^5 - 2x^6 + (1728x^2 + 864x^3 - 1728x^4)\log(x) + (288x - 720x^2 - 864x^3)\log^2(x) +}{4x^4 + 4x^5 + x^6}$$
$$= -\frac{2\left(x^5 + 2x^4 - 864x^3\log(x) - 216x^2\log(x)^2 - 24x\log(x)^3 - \log(x)^4 + 2596x^3\right)}{x^4 + 2x^3}$$

input
```
integrate(((-8*x-12)*log(x)^4+(-144*x^2-184*x+16)*log(x)^3+(-864*x^3-720*x
^2+288*x)*log(x)^2+(-1728*x^4+864*x^3+1728*x^2)*log(x)-2*x^6-8*x^5+6912*x^
4+3456*x^3)/(x^6+4*x^5+4*x^4),x, algorithm=\
```

output
```
-2*(x^5 + 2*x^4 - 864*x^3*log(x) - 216*x^2*log(x)^2 - 24*x*log(x)^3 - log(
x)^4 + 2596*x^3)/(x^4 + 2*x^3)
```

3.80.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(19) = 38$.

Time = 0.15 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.22

$$\int \frac{3456x^3 + 6912x^4 - 8x^5 - 2x^6 + (1728x^2 + 864x^3 - 1728x^4)\log(x) + (288x - 720x^2 - 864x^3)\log^2(x) +}{4x^4 + 4x^5 + x^6}$$
$$= -2x + \frac{2\log(x)^4}{x^4 + 2x^3} + \frac{48\log(x)^3}{x^3 + 2x^2} + \frac{432\log(x)^2}{x^2 + 2x} + \frac{1728\log(x)}{x + 2} - \frac{5192}{x + 2}$$

input
```
integrate(((-8*x-12)*ln(x)**4+(-144*x**2-184*x+16)*ln(x)**3+(-864*x**3-720
*x**2+288*x)*ln(x)**2+(-1728*x**4+864*x**3+1728*x**2)*ln(x)-2*x**6-8*x**5+
6912*x**4+3456*x**3)/(x**6+4*x**5+4*x**4),x)
```

output
```
-2*x + 2*log(x)**4/(x**4 + 2*x**3) + 48*log(x)**3/(x**3 + 2*x**2) + 432*lo
g(x)**2/(x**2 + 2*x) + 1728*log(x)/(x + 2) - 5192/(x + 2)
```

3.80. $\int \frac{3456x^3+6912x^4-8x^5-2x^6+(1728x^2+864x^3-1728x^4)\log(x)+(288x-720x^2-864x^3)\log^2(x)+(16-184x-144x^2)\log^3(x)+(-12-8x)\log^4(x)}{4x^4+4x^5+x^6} d$

3.80.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.93

$$\int \frac{3456x^3+6912x^4-8x^5-2x^6+(1728x^2+864x^3-1728x^4)\log(x)+(288x-720x^2-864x^3)\log^2(x)+}{4x^4+4x^5+x^6}$$
$$= -2\,x + \frac{2\,\left(864\,x^3\log\left(x\right) + 216\,x^2\log\left(x\right)^2 + 24\,x\log\left(x\right)^3 + \log\left(x\right)^4\right)}{x^4+2\,x^3} - \frac{5192}{x+2}$$

input
```
integrate(((-8*x-12)*log(x)^4+(-144*x^2-184*x+16)*log(x)^3+(-864*x^3-720*x
^2+288*x)*log(x)^2+(-1728*x^4+864*x^3+1728*x^2)*log(x)-2*x^6-8*x^5+6912*x^
4+3456*x^3)/(x^6+4*x^5+4*x^4),x, algorithm=\
```

output
```
-2*x + 2*(864*x^3*log(x) + 216*x^2*log(x)^2 + 24*x*log(x)^3 + log(x)^4)/(x
^4 + 2*x^3) - 5192/(x + 2)
```

3.80.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. 2(26) = 52.

Time = 0.28 (sec) , antiderivative size = 82, normalized size of antiderivative = 3.04

$$\int \frac{3456x^3+6912x^4-8x^5-2x^6+(1728x^2+864x^3-1728x^4)\log(x)+(288x-720x^2-864x^3)\log^2(x)+}{4x^4+4x^5+x^6}$$
$$= -\frac{1}{4}\left(\frac{1}{x+2} - \frac{x^2-2\,x+4}{x^3}\right)\log\left(x\right)^4 + 12\left(\frac{1}{x+2} - \frac{x-2}{x^2}\right)\log\left(x\right)^3$$
$$- 216\left(\frac{1}{x+2} - \frac{1}{x}\right)\log\left(x\right)^2 - 2\,x + \frac{1728\,\log\left(x\right)}{x+2} - \frac{5192}{x+2}$$

input
```
integrate(((-8*x-12)*log(x)^4+(-144*x^2-184*x+16)*log(x)^3+(-864*x^3-720*x
^2+288*x)*log(x)^2+(-1728*x^4+864*x^3+1728*x^2)*log(x)-2*x^6-8*x^5+6912*x^
4+3456*x^3)/(x^6+4*x^5+4*x^4),x, algorithm=\
```

output
```
-1/4*(1/(x + 2) - (x^2 - 2*x + 4)/x^3)*log(x)^4 + 12*(1/(x + 2) - (x - 2)/
x^2)*log(x)^3 - 216*(1/(x + 2) - 1/x)*log(x)^2 - 2*x + 1728*log(x)/(x + 2)
 - 5192/(x + 2)
```

3.80. $\int \frac{3456x^3+6912x^4-8x^5-2x^6+(1728x^2+864x^3-1728x^4)\log(x)+(288x-720x^2-864x^3)\log^2(x)+(16-184x-144x^2)\log^3(x)+(-12-8x)\log^4(x)}{4x^4+4x^5+x^6}\,d$

3.80.9 Mupad [B] (verification not implemented)

Time = 14.39 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.78

$$\int \frac{3456x^3 + 6912x^4 - 8x^5 - 2x^6 + (1728x^2 + 864x^3 - 1728x^4)\log(x) + (288x - 720x^2 - 864x^3)\log^2(x) +}{4x^4 + 4x^5 + x^6}$$

$$= \frac{2\left(-x^5 + 1296\,x^4 + 864\,x^3\ \ln(x) + 216\,x^2\ln(x)^2 + 24\,x\ln(x)^3 + \ln(x)^4\right)}{x^3\ (x+2)}$$

input
```
int(-(log(x)^3*(184*x + 144*x^2 - 16) + log(x)^2*(720*x^2 - 288*x + 864*x^
3) - log(x)*(1728*x^2 + 864*x^3 - 1728*x^4) - 3456*x^3 - 6912*x^4 + 8*x^5
+ 2*x^6 + log(x)^4*(8*x + 12))/(4*x^4 + 4*x^5 + x^6),x)
```

output
```
(2*(24*x*log(x)^3 + 864*x^3*log(x) + log(x)^4 + 216*x^2*log(x)^2 + 1296*x^
4 - x^5))/(x^3*(x + 2))
```

3.80. $\int \frac{3456x^3+6912x^4-8x^5-2x^6+(1728x^2+864x^3-1728x^4)\log(x)+(288x-720x^2-864x^3)\log^2(x)+(16-184x-144x^2)\log^3(x)+(-12-8x)\log^4(x)}{4x^4+4x^5+x^6} \, d$

3.81 $\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14}{-1+9x-36x}$

3.81.1 Optimal result

Integrand size = 159, antiderivative size = 23

$$\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14x^{10}-2x^{11}+(-2+26}{-1+9x-36x^2+84x^3-126x^4+126}$$
$$=\frac{x}{(-1+x)^8}-2\left(-x+x^2(2+x)\right)\log(x)$$

output
```
x/(-1+x)^8-2*ln(x)*(x^2*(2+x)-x)
```

3.81.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14x^{10}-2x^{11}+(-2+26}{-1+9x-36x^2+84x^3-126x^4+126}$$
$$=x\left(\frac{1}{(-1+x)^8}-2\left(-1+2x+x^2\right)\log(x)\right)$$

input
```
Integrate[(-3 + 15*x - 106*x^2 + 294*x^3 - 516*x^4 + 588*x^5 - 420*x^6 + 1
56*x^7 + 6*x^8 - 34*x^9 + 14*x^10 - 2*x^11 + (-2 + 26*x - 138*x^2 + 402*x^
3 - 708*x^4 + 756*x^5 - 420*x^6 - 12*x^7 + 198*x^8 - 142*x^9 + 46*x^10 - 6
*x^11)*Log[x])/(-1 + 9*x - 36*x^2 + 84*x^3 - 126*x^4 + 126*x^5 - 84*x^6 +
36*x^7 - 9*x^8 + x^9),x]
```

output
```
x*((-1 + x)^(-8) - 2*(-1 + 2*x + x^2)*Log[x])
```

3.81.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 176 vs. $2(23) = 46$.

Time = 0.90 (sec) , antiderivative size = 176, normalized size of antiderivative = 7.65, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.019$, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^{11}+14x^{10}-34x^9+6x^8+156x^7-420x^6+588x^5-516x^4+294x^3-106x^2+15x+\left(-6x^{11}+46x^{10}-1\right.}{x^9-9x^8+36x^7-84x^6+126x^5-126x^4+8}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-2x^{11}+14x^{10}-34x^9+6x^8+156x^7-420x^6+588x^5-516x^4+294x^3-106x^2+15x+\left(-6x^{11}+46x^{10}-1\right.}{(x-1)^9}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2x^{11}}{(x-1)^9}+\frac{14x^{10}}{(x-1)^9}-\frac{34x^9}{(x-1)^9}+\frac{6x^8}{(x-1)^9}+\frac{156x^7}{(x-1)^9}-\frac{420x^6}{(x-1)^9}+\frac{588x^5}{(x-1)^9}-\frac{516x^4}{(x-1)^9}+\frac{294x^3}{(x-1)^9}-\frac{1}{(x}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{39x^8}{2(1-x)^8}+\frac{15x^7}{2(1-x)^7}+\frac{105x^7}{2(1-x)^8}-\frac{7x^6}{2(1-x)^6}-\frac{21x^6}{(1-x)^7}-\frac{147x^6}{2(1-x)^8}-2x^3\log(x)-4x^2\log(x)-\frac{156}{1-x}+\frac{336}{(1-x)^2}-\frac{448}{(1-x)^3}+\frac{525}{(1-x)^4}-\frac{588}{(1-x)^5}+\frac{476}{(1-x)^6}-\frac{217}{(1-x)^7}+\frac{83}{2(1-x)^8}+2x\log(x)$$

input
```
Int[(-3 + 15*x - 106*x^2 + 294*x^3 - 516*x^4 + 588*x^5 - 420*x^6 + 156*x^7
 + 6*x^8 - 34*x^9 + 14*x^10 - 2*x^11 + (-2 + 26*x - 138*x^2 + 402*x^3 - 70
8*x^4 + 756*x^5 - 420*x^6 - 12*x^7 + 198*x^8 - 142*x^9 + 46*x^10 - 6*x^11)
*Log[x])/(-1 + 9*x - 36*x^2 + 84*x^3 - 126*x^4 + 126*x^5 - 84*x^6 + 36*x^7
 - 9*x^8 + x^9),x]
```

output
```
83/(2*(1 - x)^8) - 217/(1 - x)^7 + 476/(1 - x)^6 - 588/(1 - x)^5 + 525/(1
- x)^4 - 448/(1 - x)^3 + 336/(1 - x)^2 - 156/(1 - x) - (147*x^6)/(2*(1 - x
)^8) - (21*x^6)/(1 - x)^7 - (7*x^6)/(2*(1 - x)^6) + (105*x^7)/(2*(1 - x)^8
) + (15*x^7)/(2*(1 - x)^7) - (39*x^8)/(2*(1 - x)^8) + 2*x*Log[x] - 4*x^2*L
og[x] - 2*x^3*Log[x]
```

3.81.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.81.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

method	result
default	$-2x^3 \ln(x) - 4x^2 \ln(x) + 2x \ln(x) + \frac{1}{(-1+x)^8} + \frac{1}{(-1+x)^7}$
parts	$-2x^3 \ln(x) - 4x^2 \ln(x) + 2x \ln(x) + \frac{1}{(-1+x)^8} + \frac{1}{(-1+x)^7}$
risch	$(-2x^3 - 4x^2 + 2x) \ln(x) + \frac{x}{x^8-8x^7+28x^6-56x^5+70x^4-56x^3+28x^2-8x+1}$
norman	$\frac{x+2x\ln(x)-20x^2\ln(x)+86x^3\ln(x)-208x^4\ln(x)+308x^5\ln(x)-280x^6\ln(x)+140x^7\ln(x)-16x^8\ln(x)-22x^9\ln(x)+12x^{10}\ln(x}{(-1+x)^8}$
parallelrisch	$\frac{280x-6160x^9\ln(x)-560x^{11}\ln(x)-78400x^6\ln(x)+39200x^7\ln(x)+86240x^5\ln(x)-4480x^8\ln(x)-58240x^4\ln(x)+560x\ln(x)+}{280x^8-2240x^7+7840x^6-15680x^5+19600x^4-15680x^3+7840x^2-2240x+280}$

input
```
int(((-6*x^11+46*x^10-142*x^9+198*x^8-12*x^7-420*x^6+756*x^5-708*x^4+402*x
^3-138*x^2+26*x-2)*ln(x)-2*x^11+14*x^10-34*x^9+6*x^8+156*x^7-420*x^6+588*x
^5-516*x^4+294*x^3-106*x^2+15*x-3)/(x^9-9*x^8+36*x^7-84*x^6+126*x^5-126*x^
4+84*x^3-36*x^2+9*x-1),x,method=_RETURNVERBOSE)
```

output
```
-2*x^3*ln(x)-4*x^2*ln(x)+2*x*ln(x)+1/(-1+x)^8+1/(-1+x)^7
```


$\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14x^{10}-2x^{11}+(-2+26x-138x^2+402x^3-708x^4+756x^5-420x^6-12x^7+198x}{-1+9x-36x^2+84x^3-126x^4+126x^5-84x^6+36x^7-9x^8+x^9}$

3.81.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 102 vs. 2(23) = 46.

Time = 0.26 (sec) , antiderivative size = 102, normalized size of antiderivative = 4.43

$$\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14x^{10}-2x^{11}+(-2+26x}{-1+9x-36x^2+84x^3-126x^4+126x}$$
$$= -\frac{2\,(x^{11}-6\,x^{10}+11\,x^9+8\,x^8-70\,x^7+140\,x^6-154\,x^5+104\,x^4-43\,x^3+10\,x^2-x)\log{(x)}-x}{x^8-8\,x^7+28\,x^6-56\,x^5+70\,x^4-56\,x^3+28\,x^2-8\,x+1}$$

input
```
integrate(((-6*x^11+46*x^10-142*x^9+198*x^8-12*x^7-420*x^6+756*x^5-708*x^4
+402*x^3-138*x^2+26*x-2)*log(x)-2*x^11+14*x^10-34*x^9+6*x^8+156*x^7-420*x^
6+588*x^5-516*x^4+294*x^3-106*x^2+15*x-3)/(x^9-9*x^8+36*x^7-84*x^6+126*x^5
-126*x^4+84*x^3-36*x^2+9*x-1),x, algorithm=\
```

output
```
-(2*(x^11 - 6*x^10 + 11*x^9 + 8*x^8 - 70*x^7 + 140*x^6 - 154*x^5 + 104*x^4
 - 43*x^3 + 10*x^2 - x)*log(x) - x)/(x^8 - 8*x^7 + 28*x^6 - 56*x^5 + 70*x^
4 - 56*x^3 + 28*x^2 - 8*x + 1)
```

3.81.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. 2(19) = 38.

Time = 0.11 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.43

$$\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14x^{10}-2x^{11}+(-2+26x}{-1+9x-36x^2+84x^3-126x^4+126x}$$
$$= \frac{x}{x^8-8x^7+28x^6-56x^5+70x^4-56x^3+28x^2-8x+1}+\left(-2x^3-4x^2+2x\right)\log{(x)}$$

input
```
integrate(((-6*x**11+46*x**10-142*x**9+198*x**8-12*x**7-420*x**6+756*x**5-
708*x**4+402*x**3-138*x**2+26*x-2)*ln(x)-2*x**11+14*x**10-34*x**9+6*x**8+1
56*x**7-420*x**6+588*x**5-516*x**4+294*x**3-106*x**2+15*x-3)/(x**9-9*x**8+
36*x**7-84*x**6+126*x**5-126*x**4+84*x**3-36*x**2+9*x-1),x)
```

output
```
x/(x**8 - 8*x**7 + 28*x**6 - 56*x**5 + 70*x**4 - 56*x**3 + 28*x**2 - 8*x +
 1) + (-2*x**3 - 4*x**2 + 2*x)*log(x)
```

3.81. $\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14x^{10}-2x^{11}+(-2+26x-138x^2+402x^3-708x^4+756x^5-420x^6-12x^7+198x}{-1+9x-36x^2+84x^3-126x^4+126x^5-84x^6+36x^7-9x^8+x^9}$

3.81.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1945 vs. $2(23) = 46$.

Time = 0.33 (sec) , antiderivative size = 1945, normalized size of antiderivative = 84.57

$$\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14x^{10}-2x^{11}+(-2+26x\cdots}{-1+9x-36x^2+84x^3-126x^4+126x\cdots}$$
= Too large to display

input
```
integrate(((-6*x^11+46*x^10-142*x^9+198*x^8-12*x^7-420*x^6+756*x^5-708*x^4
+402*x^3-138*x^2+26*x-2)*log(x)-2*x^11+14*x^10-34*x^9+6*x^8+156*x^7-420*x^
6+588*x^5-516*x^4+294*x^3-106*x^2+15*x-3)/(x^9-9*x^8+36*x^7-84*x^6+126*x^5
-126*x^4+84*x^3-36*x^2+9*x-1),x, algorithm=\
```

output
```
-2/3*x^3 - 2*x^2 + 2*x + 3/2*(8*x^7 - 28*x^6 + 56*x^5 - 70*x^4 + 56*x^3 -
28*x^2 + 8*x - 1)*log(x)/(x^8 - 8*x^7 + 28*x^6 - 56*x^5 + 70*x^4 - 56*x^3
+ 28*x^2 - 8*x + 1) + 15/2*(28*x^6 - 56*x^5 + 70*x^4 - 56*x^3 + 28*x^2 - 8
*x + 1)*log(x)/(x^8 - 8*x^7 + 28*x^6 - 56*x^5 + 70*x^4 - 56*x^3 + 28*x^2 -
 8*x + 1) - 9/2*(56*x^5 - 70*x^4 + 56*x^3 - 28*x^2 + 8*x - 1)*log(x)/(x^8
- 8*x^7 + 28*x^6 - 56*x^5 + 70*x^4 - 56*x^3 + 28*x^2 - 8*x + 1) + 177/70*(
70*x^4 - 56*x^3 + 28*x^2 - 8*x + 1)*log(x)/(x^8 - 8*x^7 + 28*x^6 - 56*x^5
+ 70*x^4 - 56*x^3 + 28*x^2 - 8*x + 1) - 201/140*(56*x^3 - 28*x^2 + 8*x - 1
)*log(x)/(x^8 - 8*x^7 + 28*x^6 - 56*x^5 + 70*x^4 - 56*x^3 + 28*x^2 - 8*x +
 1) + 23/28*(28*x^2 - 8*x + 1)*log(x)/(x^8 - 8*x^7 + 28*x^6 - 56*x^5 + 70*
x^4 - 56*x^3 + 28*x^2 - 8*x + 1) - 13/28*(8*x - 1)*log(x)/(x^8 - 8*x^7 + 2
8*x^6 - 56*x^5 + 70*x^4 - 56*x^3 + 28*x^2 - 8*x + 1) + 2/105*(35*x^11 - 17
5*x^10 + 35*x^9 + 1820*x^8 - 7840*x^7 + 15680*x^6 - 15680*x^5 + 4900*x^4 +
 5488*x^3 - 6664*x^2 - 105*(x^11 - 6*x^10 + 11*x^9)*log(x) + 2864*x - 463)
/(x^8 - 8*x^7 + 28*x^6 - 56*x^5 + 70*x^4 - 56*x^3 + 28*x^2 - 8*x + 1) + 1/
84*(55440*x^7 - 349272*x^6 + 957264*x^5 - 1473780*x^4 + 1373064*x^3 - 7727
72*x^2 + 242968*x - 32891)/(x^8 - 8*x^7 + 28*x^6 - 56*x^5 + 70*x^4 - 56*x^
3 + 28*x^2 - 8*x + 1) + 17/140*(10080*x^7 - 58800*x^6 + 152880*x^5 - 22638
0*x^4 + 204624*x^3 - 112392*x^2 + 34632*x - 4609)/(x^8 - 8*x^7 + 28*x^6 -
56*x^5 + 70*x^4 - 56*x^3 + 28*x^2 - 8*x + 1) - 1/140*(6720*x^7 - 35280*...
```

3.81.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(23) = 46$.

Time = 0.28 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.57

$$\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14x^{10}-2x^{11}+(-2+26x}{-1+9x-36x^2+84x^3-126x^4+126x}$$
$$= -2\left(x^3+2\,x^2-x\right)\log\left(x\right)+\frac{x}{x^8-8\,x^7+28\,x^6-56\,x^5+70\,x^4-56\,x^3+28\,x^2-8\,x+1}$$

input
```
integrate(((-6*x^11+46*x^10-142*x^9+198*x^8-12*x^7-420*x^6+756*x^5-708*x^4
+402*x^3-138*x^2+26*x-2)*log(x)-2*x^11+14*x^10-34*x^9+6*x^8+156*x^7-420*x^
6+588*x^5-516*x^4+294*x^3-106*x^2+15*x-3)/(x^9-9*x^8+36*x^7-84*x^6+126*x^5
-126*x^4+84*x^3-36*x^2+9*x-1),x, algorithm=\
```

output
```
-2*(x^3 + 2*x^2 - x)*log(x) + x/(x^8 - 8*x^7 + 28*x^6 - 56*x^5 + 70*x^4 -
56*x^3 + 28*x^2 - 8*x + 1)
```

3.81.9 Mupad [B] (verification not implemented)

Time = 14.18 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.65

$$\int \frac{-3+15x-106x^2+294x^3-516x^4+588x^5-420x^6+156x^7+6x^8-34x^9+14x^{10}-2x^{11}+(-2+26x}{-1+9x-36x^2+84x^3-126x^4+126x}$$
$$= \frac{x}{x^8-8\,x^7+28\,x^6-56\,x^5+70\,x^4-56\,x^3+28\,x^2-8\,x+1}-\ln\left(x\right)\,\left(2\,x^3+4\,x^2-2\,x\right)$$

input
```
int(-(log(x)*(138*x^2 - 26*x - 402*x^3 + 708*x^4 - 756*x^5 + 420*x^6 + 12*
x^7 - 198*x^8 + 142*x^9 - 46*x^10 + 6*x^11 + 2) - 15*x + 106*x^2 - 294*x^3
 + 516*x^4 - 588*x^5 + 420*x^6 - 156*x^7 - 6*x^8 + 34*x^9 - 14*x^10 + 2*x^
11 + 3)/(9*x - 36*x^2 + 84*x^3 - 126*x^4 + 126*x^5 - 84*x^6 + 36*x^7 - 9*x
^8 + x^9 - 1),x)
```

output
```
x/(28*x^2 - 8*x - 56*x^3 + 70*x^4 - 56*x^5 + 28*x^6 - 8*x^7 + x^8 + 1) - l
og(x)*(4*x^2 - 2*x + 2*x^3)
```

3.82 $\int \frac{5-20x+x^2}{-250+55x-13x^2+x^3}\,dx$

3.82.1 Optimal result

Integrand size = 24, antiderivative size = 18

$$\int \frac{5-20x+x^2}{-250+55x-13x^2+x^3}\,dx=\log\left(5-x+\frac{x(9+x)}{10-x}\right)$$

output
```
ln(5-x+(x+9)*x/(10-x))
```

3.82.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{5-20x+x^2}{-250+55x-13x^2+x^3}\,dx=-\log(10-x)+\log\left(25-3x+x^2\right)$$

input
```
Integrate[(5 - 20*x + x^2)/(-250 + 55*x - 13*x^2 + x^3),x]
```

output
```
-Log[10 - x] + Log[25 - 3*x + x^2]
```

3.82.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2-20x+5}{x^3-13x^2+55x-250}dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{2x-3}{x^2-3x+25}+\frac{1}{10-x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log\left(x^2-3x+25\right)-\log(10-x)$$

input
```
Int[(5 - 20*x + x^2)/(-250 + 55*x - 13*x^2 + x^3),x]
```

output
```
-Log[10 - x] + Log[25 - 3*x + x^2]
```

3.82.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.82.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

method	result	size
default	$-\ln(x-10)+\ln(x^2-3x+25)$	17
norman	$-\ln(x-10)+\ln(x^2-3x+25)$	17
risch	$-\ln(x-10)+\ln(x^2-3x+25)$	17
parallelrisch	$-\ln(x-10)+\ln(x^2-3x+25)$	17

input
```
int((x^2-20*x+5)/(x^3-13*x^2+55*x-250),x,method=_RETURNVERBOSE)
```

output
```
-ln(x-10)+ln(x^2-3*x+25)
```

3.82.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{5-20x+x^2}{-250+55x-13x^2+x^3}\,dx = \log\left(x^2-3\,x+25\right)-\log\left(x-10\right)$$

input
```
integrate((x^2-20*x+5)/(x^3-13*x^2+55*x-250),x, algorithm=\
```

output
```
log(x^2 - 3*x + 25) - log(x - 10)
```

3.82.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{5-20x+x^2}{-250+55x-13x^2+x^3}\,dx = -\log\left(x-10\right)+\log\left(x^2-3x+25\right)$$

input
```
integrate((x**2-20*x+5)/(x**3-13*x**2+55*x-250),x)
```

output
```
-log(x - 10) + log(x**2 - 3*x + 25)
```

3.82.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{5-20x+x^2}{-250+55x-13x^2+x^3}\,dx = \log\left(x^2-3\,x+25\right)-\log\left(x-10\right)$$

input
```
integrate((x^2-20*x+5)/(x^3-13*x^2+55*x-250),x, algorithm=\
```

output
```
log(x^2 - 3*x + 25) - log(x - 10)
```

3.82.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{5-20x+x^2}{-250+55x-13x^2+x^3}\,dx = \log\left(x^2-3\,x+25\right)-\log\left(|x-10|\right)$$

input
```
integrate((x^2-20*x+5)/(x^3-13*x^2+55*x-250),x, algorithm=\
```

output
```
log(x^2 - 3*x + 25) - log(abs(x - 10))
```

3.82.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{5-20x+x^2}{-250+55x-13x^2+x^3}\,dx = \ln\left(x^2-3\,x+25\right)-\ln\left(x-10\right)$$

input
```
int((x^2 - 20*x + 5)/(55*x - 13*x^2 + x^3 - 250),x)
```

output
```
log(x^2 - 3*x + 25) - log(x - 10)
```

3.83 $\int \frac{e^{-2e^{5/3}+\frac{e^{-2e^{5/3}}\left(-4x^7+e^{2e^{5/3}}\left(1-4x+x^2-4x^3-x^5\right)+e^{e^{5/3}}\left(8x^4+4x^6\right)\right)}{x}}\left(-\right.}{x^2}$

3.83.1 Optimal result

Integrand size = 130, antiderivative size = 30

$$\int \frac{e^{-2e^{5/3}+\frac{e^{-2e^{5/3}}\left(-4x^7+e^{2e^{5/3}}\left(1-4x+x^2-4x^3-x^5\right)+e^{e^{5/3}}\left(8x^4+4x^6\right)\right)}{x}}\left(-24x^7+e^{2e^{5/3}}(-1+x^2-8x^3-4x^5)+e^{e^{5/3}}(24x^4\right.}{x^2}$$

output
```
exp(1/x-(x^2+2-2*x^3/exp(exp(5/3)))^2+x)
```

3.83.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.00

$$\int \frac{e^{-2e^{5/3}+\frac{e^{-2e^{5/3}}\left(-4x^7+e^{2e^{5/3}}\left(1-4x+x^2-4x^3-x^5\right)+e^{e^{5/3}}\left(8x^4+4x^6\right)\right)}{x}}\left(-24x^7+e^{2e^{5/3}}(-1+x^2-8x^3-4x^5)+e^{e^{5/3}}(24x^4\right.}{x^2}$$

input
```
Integrate[(E^(-2*E^(5/3) + (-4*x^7 + E^(2*E^(5/3))*(1 - 4*x + x^2 - 4*x^3
- x^5) + E^E^(5/3)*(8*x^4 + 4*x^6))/(E^(2*E^(5/3))*x))*(-24*x^7 + E^(2*E^(
5/3))*(-1 + x^2 - 8*x^3 - 4*x^5) + E^E^(5/3)*(24*x^4 + 20*x^6)))/x^2,x]
```

output
```
E^(-4 + x^(-1) + x - 4*x^2 + (8*x^3)/E^E^(5/3) - x^4 + (4*x^5)/E^E^(5/3) -
 (4*x^6)/E^(2*E^(5/3)))
```

3.83.

$$\int \frac{e^{-2e^{5/3}+\frac{e^{-2e^{5/3}}\left(-4x^7+e^{2e^{5/3}}\left(1-4x+x^2-4x^3-x^5\right)+e^{e^{5/3}}\left(8x^4+4x^6\right)\right)}{x}}\left(-24x^7+e^{2e^{5/3}}(-1+x^2-8x^3-4x^5)+e^{e^{5/3}}(24x^4+20x^6)\right)}{x^2}\,d$$

3.83.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 69 vs. $2(30) = 60$.

Time = 1.27 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.30, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.008$, Rules used = $\{7257\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-24x^7+e^{e^{5/3}}\left(20x^6+24x^4\right)+e^{2e^{5/3}}\left(-4x^5-8x^3+x^2-1\right)\right)\exp\left(\frac{e^{-2e^{5/3}}\left(-4x^7+e^{e^{5/3}}\left(4x^6+8x^4\right)+e^{2e^{5/3}}\left(-x^5-4x^3\cdots\right.\right.}{x}\right.}{x^2}$$

$$\Big\downarrow \text{7257}$$

$$\exp\left(-\frac{e^{-2e^{5/3}}\left(4x^7-4e^{e^{5/3}}\left(x^6+2x^4\right)-e^{2e^{5/3}}\left(-x^5-4x^3+x^2-4x+1\right)\right)}{x}\right)$$

input
```
Int[(E^(-2*E^(5/3) + (-4*x^7 + E^(2*E^(5/3))*(1 - 4*x + x^2 - 4*x^3 - x^5)
 + E^E^(5/3)*(8*x^4 + 4*x^6))/(E^(2*E^(5/3))*x))*(-24*x^7 + E^(2*E^(5/3))*
(-1 + x^2 - 8*x^3 - 4*x^5) + E^E^(5/3)*(24*x^4 + 20*x^6)))/x^2,x]
```

output
```
E^(-((4*x^7 - E^(2*E^(5/3))*(1 - 4*x + x^2 - 4*x^3 - x^5) - 4*E^E^(5/3)*(2
*x^4 + x^6))/(E^(2*E^(5/3))*x)))
```

3.83.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.83.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(25) = 50$.

Time = 1.04 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.87

method	result	size
norman	$e^{\frac{\left(\left(-x^5-4x^3+x^2-4x+1\right)e^{2e^{\frac{5}{3}}}+\left(4x^6+8x^4\right)e^{e^{\frac{5}{3}}}-4x^7\right)e^{-2e^{\frac{5}{3}}}}{x}}$	56
parallelrisch	$e^{\frac{\left(\left(-x^5-4x^3+x^2-4x+1\right)e^{2e^{\frac{5}{3}}}+\left(4x^6+8x^4\right)e^{e^{\frac{5}{3}}}-4x^7\right)e^{-2e^{\frac{5}{3}}}}{x}}$	56
gosper	$e^{-\frac{\left(-4e^{e^{\frac{5}{3}}}x^6+4x^7+e^{2e^{\frac{5}{3}}}x^5-8e^{e^{\frac{5}{3}}}x^4+4e^{2e^{\frac{5}{3}}}x^3-e^{2e^{\frac{5}{3}}}x^2+4e^{2e^{\frac{5}{3}}}x-e^{2e^{\frac{5}{3}}}\right)e^{-2e^{\frac{5}{3}}}}{x}}$	78
risch	$e^{-\frac{\left(-4e^{e^{\frac{5}{3}}}x^6+4x^7+e^{2e^{\frac{5}{3}}}x^5-8e^{e^{\frac{5}{3}}}x^4+4e^{2e^{\frac{5}{3}}}x^3-e^{2e^{\frac{5}{3}}}x^2+4e^{2e^{\frac{5}{3}}}x-e^{2e^{\frac{5}{3}}}\right)e^{-2e^{\frac{5}{3}}}}{x}}$	78

input
```
int(((-4*x^5-8*x^3+x^2-1)*exp(exp(5/3))^2+(20*x^6+24*x^4)*exp(exp(5/3))-24
*x^7)*exp(((-x^5-4*x^3+x^2-4*x+1)*exp(exp(5/3))^2+(4*x^6+8*x^4)*exp(exp(5/
3))-4*x^7)/x/exp(exp(5/3))^2)/x^2/exp(exp(5/3))^2,x,method=_RETURNVERBOSE)
```

output
```
exp(((-x^5-4*x^3+x^2-4*x+1)*exp(exp(5/3))^2+(4*x^6+8*x^4)*exp(exp(5/3))-4*
x^7)/x/exp(exp(5/3))^2)
```

3.83.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(27) = 54$.

Time = 0.25 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.17

$$\int \frac{e^{-2e^{5/3}+\frac{e^{-2e^{5/3}}\left(-4x^7+e^{2e^{5/3}}\left(1-4x+x^2-4x^3-x^5\right)+e^{e^{5/3}}\left(8x^4+4x^6\right)\right)}{x}}\left(-24x^7+e^{2e^{5/3}}\left(-1+x^2-8x^3-4x^5\right)+e^{e^{5/3}}(24x^4)\right)}{x^2}$$

input
```
integrate(((-4*x^5-8*x^3+x^2-1)*exp(exp(5/3))^2+(20*x^6+24*x^4)*exp(exp(5/
3))-24*x^7)*exp(((-x^5-4*x^3+x^2-4*x+1)*exp(exp(5/3))^2+(4*x^6+8*x^4)*exp(
exp(5/3))-4*x^7)/x/exp(exp(5/3))^2)/x^2/exp(exp(5/3))^2,x, algorithm=\
```

output
```
e^(-(4*x^7 + (x^5 + 4*x^3 - x^2 + 2*x*e^(5/3) + 4*x - 1)*e^(2*e^(5/3)) - 4
*(x^6 + 2*x^4)*e^(e^(5/3)))*e^(-2*e^(5/3))/x + 2*e^(5/3))
```

3.83.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(24) = 48$.

Time = 0.14 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.93

$$\int \frac{e^{-2e^{5/3}+\frac{e^{-2e^{5/3}}\left(-4x^7+e^{2e^{5/3}}\left(1-4x+x^2-4x^3-x^5\right)+e^{e^{5/3}}\left(8x^4+4x^6\right)\right)}{x}}\left(-24x^7+e^{2e^{5/3}}(-1+x^2-8x^3-4x^5)+e^{e^{5/3}}(24x^4}{x^2}$$

input
```
integrate(((-4*x**5-8*x**3+x**2-1)*exp(exp(5/3))**2+(20*x**6+24*x**4)*exp(
exp(5/3))-24*x**7)*exp(((-x**5-4*x**3+x**2-4*x+1)*exp(exp(5/3))**2+(4*x**6
+8*x**4)*exp(exp(5/3))-4*x**7)/x/exp(exp(5/3))**2)/x**2/exp(exp(5/3))**2,x
)
```

output
```
exp((-4*x**7 + (4*x**6 + 8*x**4)*exp(exp(5/3)) + (-x**5 - 4*x**3 + x**2 -
4*x + 1)*exp(2*exp(5/3)))*exp(-2*exp(5/3))/x)
```

3.83.7 Maxima [A] (verification not implemented)

Time = 0.58 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.57

$$\int \frac{e^{-2e^{5/3}+\frac{e^{-2e^{5/3}}\left(-4x^7+e^{2e^{5/3}}\left(1-4x+x^2-4x^3-x^5\right)+e^{e^{5/3}}\left(8x^4+4x^6\right)\right)}{x}}\left(-24x^7+e^{2e^{5/3}}(-1+x^2-8x^3-4x^5)+e^{e^{5/3}}(24x^4}{x^2}$$

input
```
integrate(((-4*x^5-8*x^3+x^2-1)*exp(exp(5/3))^2+(20*x^6+24*x^4)*exp(exp(5/
3))-24*x^7)*exp(((-x^5-4*x^3+x^2-4*x+1)*exp(exp(5/3))^2+(4*x^6+8*x^4)*exp(
exp(5/3))-4*x^7)/x/exp(exp(5/3))^2)/x^2/exp(exp(5/3))^2,x, algorithm=\
```

output
```
e^(-4*x^6*e^(-2*e^(5/3)) + 4*x^5*e^(-e^(5/3)) - x^4 + 8*x^3*e^(-e^(5/3)) -
 4*x^2 + x + 1/x - 4)
```

3.83.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.57

$$\int \frac{e^{-2e^{5/3}+\frac{e^{-2e^{5/3}}\left(-4x^7+e^{2e^{5/3}}\left(1-4x+x^2-4x^3-x^5\right)+e^{e^{5/3}}\left(8x^4+4x^6\right)\right)}{x}}\left(-24x^7+e^{2e^{5/3}}(-1+x^2-8x^3-4x^5)+e^{e^{5/3}}(24x^4}{x^2}$$

input
```
integrate((((-4*x^5-8*x^3+x^2-1)*exp(exp(5/3))^2+(20*x^6+24*x^4)*exp(exp(5/
3))-24*x^7)*exp((((-x^5-4*x^3+x^2-4*x+1)*exp(exp(5/3))^2+(4*x^6+8*x^4)*exp(
exp(5/3))-4*x^7)/x/exp(exp(5/3))^2)/x^2/exp(exp(5/3))^2,x, algorithm=\
```

output
```
e^(-4*x^6*e^(-2*e^(5/3)) + 4*x^5*e^(-e^(5/3)) - x^4 + 8*x^3*e^(-e^(5/3)) -
 4*x^2 + x + 1/x - 4)
```

3.83.9 Mupad [B] (verification not implemented)

Time = 13.74 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.80

$$\int \frac{e^{-2e^{5/3}+\frac{e^{-2e^{5/3}}\left(-4x^7+e^{2e^{5/3}}\left(1-4x+x^2-4x^3-x^5\right)+e^{e^{5/3}}\left(8x^4+4x^6\right)\right)}{x}}\left(-24x^7+e^{2e^{5/3}}(-1+x^2-8x^3-4x^5)+e^{e^{5/3}}(24x^4}{x^2}$$

input
```
int(-(exp(-2*exp(5/3))*exp(-(exp(-2*exp(5/3))*(exp(2*exp(5/3))*(4*x - x^2
+ 4*x^3 + x^5 - 1) + 4*x^7 - exp(exp(5/3))*(8*x^4 + 4*x^6)))/x)*(exp(2*exp
(5/3))*(8*x^3 - x^2 + 4*x^5 + 1) + 24*x^7 - exp(exp(5/3))*(24*x^4 + 20*x^6
)))/x^2,x)
```

output
```
exp(1/x)*exp(-4)*exp(-x^4)*exp(-4*x^2)*exp(4*x^5*exp(-exp(5/3)))*exp(8*x^3
*exp(-exp(5/3)))*exp(-4*x^6*exp(-2*exp(5/3)))*exp(x)
```

3.84 $\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)}{30x^2-30x^3}$

3.84.1 Optimal result

Integrand size = 142, antiderivative size = 28

$$\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x)}$$
$$= x\log(5)+\frac{e^x(-1+\log(5-\log(1-x)))}{6x}$$

output
```
x*ln(5)+1/6*(ln(-ln(1-x)+5)-1)*exp(x)/x
```

3.84.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x)}$$
$$= \frac{1}{6}\left(-\frac{e^x}{x}+6x\log(5)+\frac{e^x\log(5-\log(1-x))}{x}\right)$$

input
```
Integrate[(E^x*(5 - 9*x + 5*x^2) + (30*x^2 - 30*x^3)*Log[5] + (E^x*(-1 + 2
*x - x^2) + (-6*x^2 + 6*x^3)*Log[5])*Log[1 - x] + (E^x*(-5 + 10*x - 5*x^2)
 + E^x*(1 - 2*x + x^2)*Log[1 - x])*Log[5 - Log[1 - x]])/(30*x^2 - 30*x^3 +
 (-6*x^2 + 6*x^3)*Log[1 - x]),x]
```

output
```
(-(E^x/x) + 6*x*Log[5] + (E^x*Log[5 - Log[1 - x]])/x)/6
```

3.84. $\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-5+10x-5x^2)+e^x(1-2x+x^2)\log(1-x))\log(5-l}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x)}$

3.84.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(5x^2-9x+5\right)+\left(e^x\left(-5x^2+10x-5\right)+e^x\left(x^2-2x+1\right)\log(1-x)\right)\log(5-\log(1-x))+\left(e^x\left(-x^2+2x-\right.\right.}{-30x^3+30x^2+\left(6x^3-6x^2\right)\log(1-x)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^x\left(5x^2-9x+5\right)+\left(e^x\left(-5x^2+10x-5\right)+e^x\left(x^2-2x+1\right)\log(1-x)\right)\log(5-\log(1-x))+\left(e^x\left(-x^2+2x-\right.\right.}{6(1-x)x^2(5-\log(1-x))}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{6}\int \frac{e^x\left(5x^2-9x+5\right)-\left(e^x\left(x^2-2x+1\right)+6\left(x^2-x^3\right)\log(5)\right)\log(1-x)-\left(5e^x\left(x^2-2x+1\right)-e^x\left(x^2-2x+1\right.\right.}{(1-x)x^2(5-\log(1-x))}$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{6}\int \left(\frac{e^x\left(-\log(1-x)x^2+\log(1-x)\log(5-\log(1-x))x^2-5\log(5-\log(1-x))x^2+5x^2+2\log(1-x)x-2\mathrm{l}\right.}{}\right.$$

$$\Big\downarrow \text{ 7299}$$

$$\frac{1}{6}\int \left(\frac{e^x\left(-\log(1-x)x^2+\log(1-x)\log(5-\log(1-x))x^2-5\log(5-\log(1-x))x^2+5x^2+2\log(1-x)x-2\mathrm{l}\right.}{}\right.$$

input
```
Int[(E^x*(5 - 9*x + 5*x^2) + (30*x^2 - 30*x^3)*Log[5] + (E^x*(-1 + 2*x - x
^2) + (-6*x^2 + 6*x^3)*Log[5])*Log[1 - x] + (E^x*(-5 + 10*x - 5*x^2) + E^x
*(1 - 2*x + x^2)*Log[1 - x])*Log[5 - Log[1 - x]])/(30*x^2 - 30*x^3 + (-6*x
^2 + 6*x^3)*Log[1 - x]),x]
```

output
```
$Aborted
```

3.84. $\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-5+10x-5x^2)+e^x(1-2x+x^2)\log(1-x))\log(5-\mathrm{l}}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x)}$

3.84.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.84.4 Maple [A] (verified)

Time = 5.18 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

method	result	size
risch	$\frac{e^{x} \ln(-\ln(1-x)+5)}{6x}+\frac{6x^{2} \ln(5)-e^{x}}{6x}$	37
parallelrisch	$\frac{6x^{2} \ln(5)+12x \ln(5)+e^{x} \ln(-\ln(1-x)+5)-e^{x}}{6x}$	37

input
```
int((((x^2-2*x+1)*exp(x)*ln(1-x)+(-5*x^2+10*x-5)*exp(x))*ln(-ln(1-x)+5)+((
-x^2+2*x-1)*exp(x)+(6*x^3-6*x^2)*ln(5))*ln(1-x)+(5*x^2-9*x+5)*exp(x)+(-30*
x^3+30*x^2)*ln(5))/((6*x^3-6*x^2)*ln(1-x)-30*x^3+30*x^2),x,method=_RETURNV
ERBOSE)
```

output
```
1/6/x*exp(x)*ln(-ln(1-x)+5)+1/6*(6*x^2*ln(5)-exp(x))/x
```

3.84.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x}$$

$$=\frac{6\,x^2\log(5)+e^x\log(-\log(-x+1)+5)-e^x}{6\,x}$$

input
```
integrate((((x^2-2*x+1)*exp(x)*log(1-x)+(-5*x^2+10*x-5)*exp(x))*log(-log(1
-x)+5)+((-x^2+2*x-1)*exp(x)+(6*x^3-6*x^2)*log(5))*log(1-x)+(5*x^2-9*x+5)*e
xp(x)+(-30*x^3+30*x^2)*log(5))/((6*x^3-6*x^2)*log(1-x)-30*x^3+30*x^2),x, a
lgorithm=\
```

output
```
1/6*(6*x^2*log(5) + e^x*log(-log(-x + 1) + 5) - e^x)/x
```

3.84.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x}$$

$$=x\log(5)+\frac{(\log(5-\log(1-x))-1)\,e^x}{6x}$$

input
```
integrate((((x**2-2*x+1)*exp(x)*ln(1-x)+(-5*x**2+10*x-5)*exp(x))*ln(-ln(1-
x)+5)+((-x**2+2*x-1)*exp(x)+(6*x**3-6*x**2)*ln(5))*ln(1-x)+(5*x**2-9*x+5)*
exp(x)+(-30*x**3+30*x**2)*ln(5))/((6*x**3-6*x**2)*ln(1-x)-30*x**3+30*x**2)
,x)
```

output
```
x*log(5) + (log(5 - log(1 - x)) - 1)*exp(x)/(6*x)
```

3.84.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 106 vs. 2(25) = 50.

Time = 0.33 (sec) , antiderivative size = 106, normalized size of antiderivative = 3.79

$$\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x)}$$
$$= -\log(5)\log(-x+1)\log(\log(-x+1)-5) + ((\log(-x+1)-5)\log(\log(-x+1)-5)-\log(-x+1)+5)\log(5) + 5\log(5)\log(\log(-x+1)-5) + \frac{6x^2\log(5)+6x\log(5)\log(-x+1)+e^x\log(-\log(-x+1)+5)-e^x}{6x}$$

input
```
integrate((((x^2-2*x+1)*exp(x)*log(1-x)+(-5*x^2+10*x-5)*exp(x))*log(-log(1
-x)+5)+((-x^2+2*x-1)*exp(x)+(6*x^3-6*x^2)*log(5))*log(1-x)+(5*x^2-9*x+5)*e
xp(x)+(-30*x^3+30*x^2)*log(5))/((6*x^3-6*x^2)*log(1-x)-30*x^3+30*x^2),x, a
lgorithm=\
```

output
```
-log(5)*log(-x + 1)*log(log(-x + 1) - 5) + ((log(-x + 1) - 5)*log(log(-x +
 1) - 5) - log(-x + 1) + 5)*log(5) + 5*log(5)*log(log(-x + 1) - 5) + 1/6*(
6*x^2*log(5) + 6*x*log(5)*log(-x + 1) + e^x*log(-log(-x + 1) + 5) - e^x)/x
```

3.84.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x)}$$
$$= \frac{6x^2\log(5)+e^x\log(-\log(-x+1)+5)-e^x}{6x}$$

input
```
integrate((((x^2-2*x+1)*exp(x)*log(1-x)+(-5*x^2+10*x-5)*exp(x))*log(-log(1
-x)+5)+((-x^2+2*x-1)*exp(x)+(6*x^3-6*x^2)*log(5))*log(1-x)+(5*x^2-9*x+5)*e
xp(x)+(-30*x^3+30*x^2)*log(5))/((6*x^3-6*x^2)*log(1-x)-30*x^3+30*x^2),x, a
lgorithm=\
```

output
```
1/6*(6*x^2*log(5) + e^x*log(-log(-x + 1) + 5) - e^x)/x
```

3.84. $\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-5+10x-5x^2)+e^x(1-2x+x^2)\log(1-x))\log(5-l}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x)}$

3.84.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x)}$$
$$=\int \frac{\ln(5-\ln(1-x))\,(e^x\,(5\,x^2-10\,x+5)-e^x\,\ln(1-x)\,(x^2-2\,x+1))+\ln(1-x)\,(e^x\,(x^2-2\,x+1)}{\ln(1-x)\,(6\,x^2-6\,x^3)-30\,x^2+30\,}$$

input
```
int((log(5 - log(1 - x))*(exp(x)*(5*x^2 - 10*x + 5) - exp(x)*log(1 - x)*(x
^2 - 2*x + 1)) + log(1 - x)*(exp(x)*(x^2 - 2*x + 1) + log(5)*(6*x^2 - 6*x^
3)) - log(5)*(30*x^2 - 30*x^3) - exp(x)*(5*x^2 - 9*x + 5))/(log(1 - x)*(6*
x^2 - 6*x^3) - 30*x^2 + 30*x^3),x)
```

output
```
int((log(5 - log(1 - x))*(exp(x)*(5*x^2 - 10*x + 5) - exp(x)*log(1 - x)*(x
^2 - 2*x + 1)) + log(1 - x)*(exp(x)*(x^2 - 2*x + 1) + log(5)*(6*x^2 - 6*x^
3)) - log(5)*(30*x^2 - 30*x^3) - exp(x)*(5*x^2 - 9*x + 5))/(log(1 - x)*(6*
x^2 - 6*x^3) - 30*x^2 + 30*x^3), x)
```

3.84. $\int \frac{e^x(5-9x+5x^2)+(30x^2-30x^3)\log(5)+(e^x(-1+2x-x^2)+(-6x^2+6x^3)\log(5))\log(1-x)+(e^x(-5+10x-5x^2)+e^x(1-2x+x^2)\log(1-x))\log(5-}{30x^2-30x^3+(-6x^2+6x^3)\log(1-x)}$

3.85 $\int \frac{43+16x+15x^2}{1+16x+15x^2} \, dx$

3.85.1 Optimal result

Integrand size = 23, antiderivative size = 21

$$\int \frac{43+16x+15x^2}{1+16x+15x^2} \, dx = x+3\log\left(\frac{\left(3+\frac{1}{5x}\right)x}{1+x}\right)$$

output
```
x+3*ln((3+1/5/x)*x/(1+x))
```

3.85.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

$$\int \frac{43+16x+15x^2}{1+16x+15x^2} \, dx = x-3\log(1+x)+3\log(1+15x)$$

input
```
Integrate[(43 + 16*x + 15*x^2)/(1 + 16*x + 15*x^2),x]
```

output
```
x - 3*Log[1 + x] + 3*Log[1 + 15*x]
```

3.85.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2188, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{15x^2+16x+43}{15x^2+16x+1}\,dx$$

$$\Big\downarrow \text{2188}$$

$$\int \left(\frac{42}{15x^2+16x+1}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x-3\log(x+1)+3\log(15x+1)$$

input
```
Int[(43 + 16*x + 15*x^2)/(1 + 16*x + 15*x^2),x]
```

output
```
x - 3*Log[1 + x] + 3*Log[1 + 15*x]
```

3.85.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2188
```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

3.85.4 Maple [A] (verified)

Time = 0.77 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

method	result	size
parallelrisch	$x-3\ln\left(1+x\right)+3\ln\left(x+\frac{1}{15}\right)$	15
default	$x-3\ln\left(1+x\right)+3\ln\left(15x+1\right)$	17
norman	$x-3\ln\left(1+x\right)+3\ln\left(15x+1\right)$	17
risch	$x-3\ln\left(1+x\right)+3\ln\left(15x+1\right)$	17

input
```
int((15*x^2+16*x+43)/(15*x^2+16*x+1),x,method=_RETURNVERBOSE)
```

output
```
x-3*ln(1+x)+3*ln(x+1/15)
```

3.85.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

$$\int \frac{43+16x+15x^2}{1+16x+15x^2}\,dx = x+3\,\log\left(15\,x+1\right)-3\,\log\left(x+1\right)$$

input
```
integrate((15*x^2+16*x+43)/(15*x^2+16*x+1),x, algorithm=\
```

output
```
x + 3*log(15*x + 1) - 3*log(x + 1)
```

3.85.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \frac{43+16x+15x^2}{1+16x+15x^2}\,dx = x+3\log\left(x+\frac{1}{15}\right)-3\log\left(x+1\right)$$

input
```
integrate((15*x**2+16*x+43)/(15*x**2+16*x+1),x)
```

output
```
x + 3*log(x + 1/15) - 3*log(x + 1)
```

3.85.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

$$\int \frac{43+16x+15x^2}{1+16x+15x^2}\,dx = x + 3\,\log\left(15\,x+1\right) - 3\,\log\left(x+1\right)$$

input
```
integrate((15*x^2+16*x+43)/(15*x^2+16*x+1),x, algorithm=\
```

output
```
x + 3*log(15*x + 1) - 3*log(x + 1)
```

3.85.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{43+16x+15x^2}{1+16x+15x^2}\,dx = x + 3\,\log\left(|15\,x+1|\right) - 3\,\log\left(|x+1|\right)$$

input
```
integrate((15*x^2+16*x+43)/(15*x^2+16*x+1),x, algorithm=\
```

output
```
x + 3*log(abs(15*x + 1)) - 3*log(abs(x + 1))
```

3.85.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.48

$$\int \frac{43+16x+15x^2}{1+16x+15x^2}\,dx = x - 6\,\mathrm{atanh}\left(\frac{15\,x}{7} + \frac{8}{7}\right)$$

input
```
int((16*x + 15*x^2 + 43)/(16*x + 15*x^2 + 1),x)
```

output
```
x - 6*atanh((15*x)/7 + 8/7)
```

3.86 $\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(}$

3.86.1 Optimal result

Integrand size = 445, antiderivative size = 39

$$\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e^x(45-60x+165x^2-30}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(-18x^2+12x^3-66x^4+}$$
$$= -4+\frac{5e^x}{x+\frac{x}{\frac{x}{3}+\log\left(\left(-x+(1-x)^4x^2\right)^2\right)}}$$

output
```
5*exp(x)/(x/(1/3*x+ln(((1-x)^4*x^2-x)^2))+x)-4
```

3.86.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.21

$$\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e^x(45-60x+165x^2-30}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(-18x^2+12x^3-66x^4+}$$
$$= \frac{5e^x\left(1-\frac{3}{3+x+3\log\left(x^2(-1+x-4x^2+6x^3-4x^4+x^5)^2\right)}\right)}{x}$$

input
```
Integrate[(E^x*(-90 + 180*x - 1090*x^2 + 2165*x^3 - 1835*x^4 + 580*x^5 - 1
0*x^6 - 10*x^7 + 5*x^8) + E^x*(45 - 60*x + 165*x^2 - 300*x^3 + 150*x^4 + 7
5*x^5 - 105*x^6 + 30*x^7)*Log[x^2 - 2*x^3 + 9*x^4 - 20*x^5 + 36*x^6 - 58*x
^7 + 70*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x^12] + E^x*(45 - 90*x + 225*x^2
 - 450*x^3 + 450*x^4 - 225*x^5 + 45*x^6)*Log[x^2 - 2*x^3 + 9*x^4 - 20*x^5
+ 36*x^6 - 58*x^7 + 70*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x^12]^2)/(-9*x^2
+ 3*x^3 - 31*x^4 + 31*x^5 - 4*x^6 - 9*x^7 + 2*x^8 + x^9 + (-18*x^2 + 12*x^
3 - 66*x^4 + 84*x^5 - 36*x^6 - 6*x^7 + 6*x^8)*Log[x^2 - 2*x^3 + 9*x^4 - 20
*x^5 + 36*x^6 - 58*x^7 + 70*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x^12] + (-9*
x^2 + 9*x^3 - 36*x^4 + 54*x^5 - 36*x^6 + 9*x^7)*Log[x^2 - 2*x^3 + 9*x^4 -
20*x^5 + 36*x^6 - 58*x^7 + 70*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x^12]^2),x
]
```

output
```
(5*E^x*(1 - 3/(3 + x + 3*Log[x^2*(-1 + x - 4*x^2 + 6*x^3 - 4*x^4 + x^5)^2]
)))/x
```

3.86.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(5x^8-10x^7-10x^6+580x^5-1835x^4+2165x^3-1090x^2+180x-90\right)+e^x\left(45x^6-225x^5+450x^4-450x\right.}{x^9+2x^8-9x^7-4x^6+31x^5-31x^4+3x^3-9x^2+\left(9x^7-36x^6+54x^5-36x^4+9\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{5e^x\left(-x^8+2x^7+2x^6-116x^5+367x^4-433x^3+218x^2-9\left(x^6-5x^5+10x^4-10x^3+5x^2-2x+1\right)\log^2\left(x\right.\right.}{x^2\left(-x^5+4x^4-6x^3+4x^2-\right.}$$

$$\Big\downarrow \text{27}$$

$$5\int \frac{e^x\left(-x^8+2x^7+2x^6-116x^5+367x^4-433x^3+218x^2-36x-9\left(x^6-5x^5+10x^4-10x^3+5x^2-2x+1\right)\right.}{x^2\left(-x^5+4x^4-6x^3+4x^2\right.}$$

$$\Big\downarrow \text{7293}$$

3.86.
$$\int \frac{e^x\left(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8\right)+e^x\left(45-60x+165x^2-300x^3+150x^4+75x^5-105x^6+30x^7\right)\log\left(x^2-2x^3+9x\right.}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+\left(-18x^2+12x^3-66x^4+84x^5-36x^6-6x^7+6x^8\right)\log\left(x^2-2x^3+9x^4-20x^5+36\right.}$$

$$5\int \left(-\frac{3e^x(x-1)}{x^2\left(x+3\log\left(x^2\left(x^5-4x^4+6x^3-4x^2+x-1\right)^2\right)+3\right)}+\frac{e^x(x-1)}{x^2}+\frac{3e^x\left(x^6+32\right.}{x^2\left(x^5-4x^4+6x^3-4x^2+x-\right.}\right.$$

$\downarrow$ 2009

$$5\left(18\int \frac{e^x}{x^2\left(x+3\log\left(x^2\left(x^5-4x^4+6x^3-4x^2+x-1\right)^2\right)+3\right)^2}dx-15\int \frac{e^x}{x\left(x+3\log\left(x^2\left(x^5-4x^4+6x^3-\right.\right.\right.}\right.$$

input
```
Int[(E^x*(-90 + 180*x - 1090*x^2 + 2165*x^3 - 1835*x^4 + 580*x^5 - 10*x^6
- 10*x^7 + 5*x^8) + E^x*(45 - 60*x + 165*x^2 - 300*x^3 + 150*x^4 + 75*x^5
- 105*x^6 + 30*x^7)*Log[x^2 - 2*x^3 + 9*x^4 - 20*x^5 + 36*x^6 - 58*x^7 + 7
0*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x^12] + E^x*(45 - 90*x + 225*x^2 - 450
*x^3 + 450*x^4 - 225*x^5 + 45*x^6)*Log[x^2 - 2*x^3 + 9*x^4 - 20*x^5 + 36*x
^6 - 58*x^7 + 70*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x^12]^2)/(-9*x^2 + 3*x^
3 - 31*x^4 + 31*x^5 - 4*x^6 - 9*x^7 + 2*x^8 + x^9 + (-18*x^2 + 12*x^3 - 66
*x^4 + 84*x^5 - 36*x^6 - 6*x^7 + 6*x^8)*Log[x^2 - 2*x^3 + 9*x^4 - 20*x^5 +
 36*x^6 - 58*x^7 + 70*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x^12] + (-9*x^2 +
9*x^3 - 36*x^4 + 54*x^5 - 36*x^6 + 9*x^7)*Log[x^2 - 2*x^3 + 9*x^4 - 20*x^5
 + 36*x^6 - 58*x^7 + 70*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x^12]^2),x]
```

output
```
$Aborted
```

3.86.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.86.

$$\int \frac{e^x\left(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8\right)+e^x\left(45-60x+165x^2-300x^3+150x^4+75x^5-105x^6+30x^7\right)\log\left(x^2-2x^3+9x^4\right.}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+\left(-18x^2+12x^3-66x^4+84x^5-36x^6-6x^7+6x^8\right)\log\left(x^2-2x^3+9x^4-20x^5+36\right.}$$

3.86.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 128 vs. 2(36) = 72.

Time = 13.52 (sec) , antiderivative size = 129, normalized size of antiderivative = 3.31

method	result
parallelrisch	$-\frac{-1260\,e^{x}x-3780\,e^{x}\ln\left(x^{2}\left(x^{10}-8x^{9}+28x^{8}-56x^{7}+70x^{6}-58x^{5}+36x^{4}-20x^{3}+9x^{2}-2x+1\right)\right)}{252x\left(x+3\ln\left(x^{2}\left(x^{10}-8x^{9}+28x^{8}-56x^{7}+70x^{6}-58x^{5}+36x^{4}-20x^{3}+9x^{2}-2x+1\right)\right)+3\right)}$
risch	$\frac{5\,e^{x}}{x}-\frac{}{x\left(3\pi\mathrm{csgn}\left(i\left(x^{5}-4x^{4}+6x^{3}-4x^{2}+x-1\right)\right)^{2}\mathrm{csgn}\left(i\left(x^{5}-4x^{4}+6x^{3}-4x^{2}+x-1\right)^{2}\right)-6\pi\,\mathrm{csgn}\left(i\left(x^{5}-4x^{4}+6x^{3}-4x^{2}+x-1\right)\right)\right.}$

input
```
int(((45*x^6-225*x^5+450*x^4-450*x^3+225*x^2-90*x+45)*exp(x)*ln(x^12-8*x^1
1+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-2*x^3+x^2)^2+(30*x^7-10
5*x^6+75*x^5+150*x^4-300*x^3+165*x^2-60*x+45)*exp(x)*ln(x^12-8*x^11+28*x^1
0-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-2*x^3+x^2)+(5*x^8-10*x^7-10*x^6
+580*x^5-1835*x^4+2165*x^3-1090*x^2+180*x-90)*exp(x))/((9*x^7-36*x^6+54*x^
5-36*x^4+9*x^3-9*x^2)*ln(x^12-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-2
0*x^5+9*x^4-2*x^3+x^2)^2+(6*x^8-6*x^7-36*x^6+84*x^5-66*x^4+12*x^3-18*x^2)*
ln(x^12-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-2*x^3+x^2)
+x^9+2*x^8-9*x^7-4*x^6+31*x^5-31*x^4+3*x^3-9*x^2),x,method=_RETURNVERBOSE)
```

output
```
-1/252*(-1260*exp(x)*x-3780*exp(x)*ln(x^2*(x^10-8*x^9+28*x^8-56*x^7+70*x^6
-58*x^5+36*x^4-20*x^3+9*x^2-2*x+1)))/x/(x+3*ln(x^2*(x^10-8*x^9+28*x^8-56*x
^7+70*x^6-58*x^5+36*x^4-20*x^3+9*x^2-2*x+1))+3)
```

3.86.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 129 vs. 2(35) = 70.

Time = 0.27 (sec) , antiderivative size = 129, normalized size of antiderivative = 3.31

$$\int \frac{e^{x}(-90+180x-1090x^{2}+2165x^{3}-1835x^{4}+580x^{5}-10x^{6}-10x^{7}+5x^{8})+e^{x}(45-60x+165x^{2}-30}{-9x^{2}+3x^{3}-31x^{4}+31x^{5}-4x^{6}-9x^{7}+2x^{8}+x^{9}+(-18x^{2}+12x^{3}-66x^{4}+}$$
$$=\frac{5\left(xe^{x}+3\,e^{x}\log\left(x^{12}-8\,x^{11}+28\,x^{10}-56\,x^{9}+70\,x^{8}-58\,x^{7}+36\,x^{6}-20\,x^{5}+9\,x^{4}-2\,x^{3}+x^{2}\right)\right)}{x^{2}+3\,x\log\left(x^{12}-8\,x^{11}+28\,x^{10}-56\,x^{9}+70\,x^{8}-58\,x^{7}+36\,x^{6}-20\,x^{5}+9\,x^{4}-2\,x^{3}+x^{2}\right)+3\,x}$$

3.86.

$$\int \frac{e^{x}(-90+180x-1090x^{2}+2165x^{3}-1835x^{4}+580x^{5}-10x^{6}-10x^{7}+5x^{8})+e^{x}(45-60x+165x^{2}-300x^{3}+150x^{4}+75x^{5}-105x^{6}+30x^{7})\log(x^{2}-2x^{3}+9x}{-9x^{2}+3x^{3}-31x^{4}+31x^{5}-4x^{6}-9x^{7}+2x^{8}+x^{9}+(-18x^{2}+12x^{3}-66x^{4}+84x^{5}-36x^{6}-6x^{7}+6x^{8})\log(x^{2}-2x^{3}+9x^{4}-20x^{5}+36}$$

input
```
integrate(((45*x^6-225*x^5+450*x^4-450*x^3+225*x^2-90*x+45)*exp(x)*log(x^1
2-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-2*x^3+x^2)^2+(30
*x^7-105*x^6+75*x^5+150*x^4-300*x^3+165*x^2-60*x+45)*exp(x)*log(x^12-8*x^1
1+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-2*x^3+x^2)+(5*x^8-10*x^
7-10*x^6+580*x^5-1835*x^4+2165*x^3-1090*x^2+180*x-90)*exp(x))/((9*x^7-36*x
^6+54*x^5-36*x^4+9*x^3-9*x^2)*log(x^12-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7
+36*x^6-20*x^5+9*x^4-2*x^3+x^2)^2+(6*x^8-6*x^7-36*x^6+84*x^5-66*x^4+12*x^3
-18*x^2)*log(x^12-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-
2*x^3+x^2)+x^9+2*x^8-9*x^7-4*x^6+31*x^5-31*x^4+3*x^3-9*x^2),x, algorithm=\
```

output
```
5*(x*e^x + 3*e^x*log(x^12 - 8*x^11 + 28*x^10 - 56*x^9 + 70*x^8 - 58*x^7 +
36*x^6 - 20*x^5 + 9*x^4 - 2*x^3 + x^2))/(x^2 + 3*x*log(x^12 - 8*x^11 + 28*
x^10 - 56*x^9 + 70*x^8 - 58*x^7 + 36*x^6 - 20*x^5 + 9*x^4 - 2*x^3 + x^2) +
 3*x)
```

3.86.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 126 vs. $2(26) = 52$.

Time = 0.35 (sec) , antiderivative size = 126, normalized size of antiderivative = 3.23

$$\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e^x(45-60x+165x^2-30}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(-18x^2+12x^3-66x^4+}$$
$$= \frac{(5x+15\log(x^{12}-8x^{11}+28x^{10}-56x^9+70x^8-58x^7+36x^6-20x^5+9x^4-2x^3+x^2))e^x}{x^2+3x\log(x^{12}-8x^{11}+28x^{10}-56x^9+70x^8-58x^7+36x^6-20x^5+9x^4-2x^3+x^2)+3x}$$

input
```
integrate(((45*x**6-225*x**5+450*x**4-450*x**3+225*x**2-90*x+45)*exp(x)*ln
(x**12-8*x**11+28*x**10-56*x**9+70*x**8-58*x**7+36*x**6-20*x**5+9*x**4-2*x
**3+x**2)**2+(30*x**7-105*x**6+75*x**5+150*x**4-300*x**3+165*x**2-60*x+45)
*exp(x)*ln(x**12-8*x**11+28*x**10-56*x**9+70*x**8-58*x**7+36*x**6-20*x**5+
9*x**4-2*x**3+x**2)+(5*x**8-10*x**7-10*x**6+580*x**5-1835*x**4+2165*x**3-1
090*x**2+180*x-90)*exp(x))/((9*x**7-36*x**6+54*x**5-36*x**4+9*x**3-9*x**2)
*ln(x**12-8*x**11+28*x**10-56*x**9+70*x**8-58*x**7+36*x**6-20*x**5+9*x**4-
2*x**3+x**2)**2+(6*x**8-6*x**7-36*x**6+84*x**5-66*x**4+12*x**3-18*x**2)*ln
(x**12-8*x**11+28*x**10-56*x**9+70*x**8-58*x**7+36*x**6-20*x**5+9*x**4-2*x
**3+x**2)+x**9+2*x**8-9*x**7-4*x**6+31*x**5-31*x**4+3*x**3-9*x**2),x)
```

3.86. $\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e^x(45-60x+165x^2-300x^3+150x^4+75x^5-105x^6+30x^7)\log(x^2-2x^3+9x}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(-18x^2+12x^3-66x^4+84x^5-36x^6-6x^7+6x^8)\log(x^2-2x^3+9x^4-20x^5+36}$

output
```
(5*x + 15*log(x**12 - 8*x**11 + 28*x**10 - 56*x**9 + 70*x**8 - 58*x**7 + 3
6*x**6 - 20*x**5 + 9*x**4 - 2*x**3 + x**2))*exp(x)/(x**2 + 3*x*log(x**12 -
 8*x**11 + 28*x**10 - 56*x**9 + 70*x**8 - 58*x**7 + 36*x**6 - 20*x**5 + 9*
x**4 - 2*x**3 + x**2) + 3*x)
```

3.86.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 77 vs. $2(35) = 70$.

Time = 0.31 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.97

$$\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e^x(45-60x+165x^2-30}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(-18x^2+12x^3-66x^4+}$$
$$=\frac{5\left((x+6\log(x))e^x+6e^x\log\left(x^5-4x^4+6x^3-4x^2+x-1\right)\right)}{x^2+6x\log\left(x^5-4x^4+6x^3-4x^2+x-1\right)+6x\log(x)+3x}$$

input
```
integrate(((45*x^6-225*x^5+450*x^4-450*x^3+225*x^2-90*x+45)*exp(x)*log(x^1
2-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-2*x^3+x^2)^2+(30
*x^7-105*x^6+75*x^5+150*x^4-300*x^3+165*x^2-60*x+45)*exp(x)*log(x^12-8*x^1
1+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-2*x^3+x^2)+(5*x^8-10*x^
7-10*x^6+580*x^5-1835*x^4+2165*x^3-1090*x^2+180*x-90)*exp(x))/((9*x^7-36*x
^6+54*x^5-36*x^4+9*x^3-9*x^2)*log(x^12-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7
+36*x^6-20*x^5+9*x^4-2*x^3+x^2)^2+(6*x^8-6*x^7-36*x^6+84*x^5-66*x^4+12*x^3
-18*x^2)*log(x^12-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-
2*x^3+x^2)+x^9+2*x^8-9*x^7-4*x^6+31*x^5-31*x^4+3*x^3-9*x^2),x, algorithm=\
```

output
```
5*((x + 6*log(x))*e^x + 6*e^x*log(x^5 - 4*x^4 + 6*x^3 - 4*x^2 + x - 1))/(x
^2 + 6*x*log(x^5 - 4*x^4 + 6*x^3 - 4*x^2 + x - 1) + 6*x*log(x) + 3*x)
```

3.86.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 129 vs. $2(35) = 70$.

Time = 4.79 (sec) , antiderivative size = 129, normalized size of antiderivative = 3.31

$$\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e^x(45-60x+165x^2-30}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(-18x^2+12x^3-66x^4+}$$
$$=\frac{5\left(xe^x+3e^x\log\left(x^{12}-8x^{11}+28x^{10}-56x^9+70x^8-58x^7+36x^6-20x^5+9x^4-2x^3+x^2\right)\right)}{x^2+3x\log\left(x^{12}-8x^{11}+28x^{10}-56x^9+70x^8-58x^7+36x^6-20x^5+9x^4-2x^3+x^2\right)+3x}$$

3.86.
$$\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e^x(45-60x+165x^2-300x^3+150x^4+75x^5-105x^6+30x^7)\log(x^2-2x^3+9x}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(-18x^2+12x^3-66x^4+84x^5-36x^6-6x^7+6x^8)\log(x^2-2x^3+9x^4-20x^5+36}$$

input
```
integrate(((45*x^6-225*x^5+450*x^4-450*x^3+225*x^2-90*x+45)*exp(x)*log(x^1
2-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-2*x^3+x^2)^2+(30
*x^7-105*x^6+75*x^5+150*x^4-300*x^3+165*x^2-60*x+45)*exp(x)*log(x^12-8*x^1
1+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-2*x^3+x^2)+(5*x^8-10*x^
7-10*x^6+580*x^5-1835*x^4+2165*x^3-1090*x^2+180*x-90)*exp(x))/((9*x^7-36*x
^6+54*x^5-36*x^4+9*x^3-9*x^2)*log(x^12-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7
+36*x^6-20*x^5+9*x^4-2*x^3+x^2)^2+(6*x^8-6*x^7-36*x^6+84*x^5-66*x^4+12*x^3
-18*x^2)*log(x^12-8*x^11+28*x^10-56*x^9+70*x^8-58*x^7+36*x^6-20*x^5+9*x^4-
2*x^3+x^2)+x^9+2*x^8-9*x^7-4*x^6+31*x^5-31*x^4+3*x^3-9*x^2),x, algorithm=\
```

output
```
5*(x*e^x + 3*e^x*log(x^12 - 8*x^11 + 28*x^10 - 56*x^9 + 70*x^8 - 58*x^7 +
36*x^6 - 20*x^5 + 9*x^4 - 2*x^3 + x^2))/(x^2 + 3*x*log(x^12 - 8*x^11 + 28*
x^10 - 56*x^9 + 70*x^8 - 58*x^7 + 36*x^6 - 20*x^5 + 9*x^4 - 2*x^3 + x^2) +
 3*x)
```

3.86.9 Mupad [B] (verification not implemented)

Time = 14.27 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.97

$$\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e^x(45-60x+165x^2-30}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(-18x^2+12x^3-66x^4+}$$
$$= \frac{5\,e^x}{x} - \frac{15\,e^x}{3\,x+3\,x\,\ln\left(x^{12}-8\,x^{11}+28\,x^{10}-56\,x^9+70\,x^8-58\,x^7+36\,x^6-20\,x^5+9\,x^4-2\,x^3+x^2\right)+x^2}$$

input
```
int(-(exp(x)*log(x^2 - 2*x^3 + 9*x^4 - 20*x^5 + 36*x^6 - 58*x^7 + 70*x^8 -
 56*x^9 + 28*x^10 - 8*x^11 + x^12)*(165*x^2 - 60*x - 300*x^3 + 150*x^4 + 7
5*x^5 - 105*x^6 + 30*x^7 + 45) - exp(x)*(1090*x^2 - 180*x - 2165*x^3 + 183
5*x^4 - 580*x^5 + 10*x^6 + 10*x^7 - 5*x^8 + 90) + exp(x)*log(x^2 - 2*x^3 +
 9*x^4 - 20*x^5 + 36*x^6 - 58*x^7 + 70*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x
^12)^2*(225*x^2 - 90*x - 450*x^3 + 450*x^4 - 225*x^5 + 45*x^6 + 45))/(log(
x^2 - 2*x^3 + 9*x^4 - 20*x^5 + 36*x^6 - 58*x^7 + 70*x^8 - 56*x^9 + 28*x^10
 - 8*x^11 + x^12)*(18*x^2 - 12*x^3 + 66*x^4 - 84*x^5 + 36*x^6 + 6*x^7 - 6*
x^8) + log(x^2 - 2*x^3 + 9*x^4 - 20*x^5 + 36*x^6 - 58*x^7 + 70*x^8 - 56*x^
9 + 28*x^10 - 8*x^11 + x^12)^2*(9*x^2 - 9*x^3 + 36*x^4 - 54*x^5 + 36*x^6 -
 9*x^7) + 9*x^2 - 3*x^3 + 31*x^4 - 31*x^5 + 4*x^6 + 9*x^7 - 2*x^8 - x^9),x
)
```

3.86.
$$\int \frac{e^x(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8)+e^x(45-60x+165x^2-300x^3+150x^4+75x^5-105x^6+30x^7)\log(x^2-2x^3+9x}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+(-18x^2+12x^3-66x^4+84x^5-36x^6-6x^7+6x^8)\log(x^2-2x^3+9x^4-20x^5+36}$$

output
```
(5*exp(x))/x - (15*exp(x))/(3*x + 3*x*log(x^2 - 2*x^3 + 9*x^4 - 20*x^5 + 3
6*x^6 - 58*x^7 + 70*x^8 - 56*x^9 + 28*x^10 - 8*x^11 + x^12) + x^2)
```

3.86.

$$\int \frac{e^x\left(-90+180x-1090x^2+2165x^3-1835x^4+580x^5-10x^6-10x^7+5x^8\right)+e^x\left(45-60x+165x^2-300x^3+150x^4+75x^5-105x^6+30x^7\right)\log\left(x^2-2x^3+9x\right.}{-9x^2+3x^3-31x^4+31x^5-4x^6-9x^7+2x^8+x^9+\left(-18x^2+12x^3-66x^4+84x^5-36x^6-6x^7+6x^8\right)\log\left(x^2-2x^3+9x^4-20x^5+36\right.}$$

3.87 $\int \frac{1}{25}\left(25+200x-60x^2+4x^3+500x^4-60x^5+200x^7\right.$

3.87.1 Optimal result

Integrand size = 84, antiderivative size = 24

$$\int \frac{1}{25}\left(25+200x-60x^2+4x^3+500x^4-60x^5+200x^7+\left(-200x+20x^2-100x^4\right)\log(x)+\left(-200x+30x^2-250x^4\right)\log^2(x)+100x\log^3(x)+50x\log^4(x)\right)\,dx=x+\left(2x+x^4-\frac{1}{5}x\left(x+5\log^2(x)\right)\right)^2$$

output
```
x+(2*x+x^4-1/5*x*(5*ln(x)^2+x))^2
```

3.87.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 73 vs. 2(24) = 48.

Time = 0.03 (sec) , antiderivative size = 73, normalized size of antiderivative = 3.04

$$\int \frac{1}{25}\left(25+200x-60x^2+4x^3+500x^4-60x^5+200x^7+\left(-200x+20x^2-100x^4\right)\log(x)+\left(-200x+30x^2-250x^4\right)\log^2(x)+100x\log^3(x)+50x\log^4(x)\right)\,dx=x+4x^2-\frac{4x^3}{5}+\frac{x^4}{25}+4x^5-\frac{2x^6}{5}+x^8-4x^2\log^2(x)+\frac{2}{5}x^3\log^2(x)-2x^5\log^2(x)+x^2\log^4(x)$$

input
```
Integrate[(25 + 200*x - 60*x^2 + 4*x^3 + 500*x^4 - 60*x^5 + 200*x^7 + (-20
0*x + 20*x^2 - 100*x^4)*Log[x] + (-200*x + 30*x^2 - 250*x^4)*Log[x]^2 + 10
0*x*Log[x]^3 + 50*x*Log[x]^4)/25,x]
```

output
```
x + 4*x^2 - (4*x^3)/5 + x^4/25 + 4*x^5 - (2*x^6)/5 + x^8 - 4*x^2*Log[x]^2
+ (2*x^3*Log[x]^2)/5 - 2*x^5*Log[x]^2 + x^2*Log[x]^4
```

3.87.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 72 vs. $2(24) = 48$.

Time $= 0.32$ (sec) , antiderivative size $= 72$, normalized size of antiderivative $= 3.00$, number of steps used $= 2$, number of rules used $= 2$, $\frac{\text{number of rules}}{\text{integrand size}} = 0.024$, Rules used $= \{27, 2009\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{25}\left(200x^7 - 60x^5 + 500x^4 + 4x^3 - 60x^2 + \left(-250x^4 + 30x^2 - 200x\right)\log^2(x) + \left(-100x^4 + 20x^2 - 200x\right)\log(x)\right.$$

$$\Big\downarrow \; 27$$

$$\frac{1}{25}\int \left(200x^7 - 60x^5 + 500x^4 + 4x^3 - 60x^2 + 50\log^4(x)x + 100\log^3(x)x + 200x - 10\left(25x^4 - 3x^2 + 20x\right)\log^2(x)\right.$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{25}\left(25x^8 - 10x^6 + 100x^5 - 50x^5\log^2(x) + x^4 - 20x^3 + 10x^3\log^2(x) + 100x^2 + 25x^2\log^4(x) - 100x^2\log^2(x) + 25\right.$$

input
```
Int[(25 + 200*x - 60*x^2 + 4*x^3 + 500*x^4 - 60*x^5 + 200*x^7 + (-200*x +
20*x^2 - 100*x^4)*Log[x] + (-200*x + 30*x^2 - 250*x^4)*Log[x]^2 + 100*x*Lo
g[x]^3 + 50*x*Log[x]^4)/25,x]
```

output
```
(25*x + 100*x^2 - 20*x^3 + x^4 + 100*x^5 - 10*x^6 + 25*x^8 - 100*x^2*Log[x
]^2 + 10*x^3*Log[x]^2 - 50*x^5*Log[x]^2 + 25*x^2*Log[x]^4)/25
```

3.87.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.87.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(22) = 44$.

Time = 0.06 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.75

method	result	siz
default	$x-2x^5\ln(x)^2+\frac{2x^3\ln(x)^2}{5}-4x^2\ln(x)^2+4x^2-\frac{4x^3}{5}+\frac{x^4}{25}+4x^5-\frac{2x^6}{5}+x^8+x^2\ln(x)^4$	66
risch	$x-2x^5\ln(x)^2+\frac{2x^3\ln(x)^2}{5}-4x^2\ln(x)^2+4x^2-\frac{4x^3}{5}+\frac{x^4}{25}+4x^5-\frac{2x^6}{5}+x^8+x^2\ln(x)^4$	66
parallelrisch	$x-2x^5\ln(x)^2+\frac{2x^3\ln(x)^2}{5}-4x^2\ln(x)^2+4x^2-\frac{4x^3}{5}+\frac{x^4}{25}+4x^5-\frac{2x^6}{5}+x^8+x^2\ln(x)^4$	66
parts	$x-2x^5\ln(x)^2+\frac{2x^3\ln(x)^2}{5}-4x^2\ln(x)^2+4x^2-\frac{4x^3}{5}+\frac{x^4}{25}+4x^5-\frac{2x^6}{5}+x^8+x^2\ln(x)^4$	66

input
```
int(2*x*ln(x)^4+4*x*ln(x)^3+1/25*(-250*x^4+30*x^2-200*x)*ln(x)^2+1/25*(-10
0*x^4+20*x^2-200*x)*ln(x)+8*x^7-12/5*x^5+20*x^4+4/25*x^3-12/5*x^2+8*x+1,x,
method=_RETURNVERBOSE)
```

output
```
x-2*x^5*ln(x)^2+2/5*x^3*ln(x)^2-4*x^2*ln(x)^2+4*x^2-4/5*x^3+1/25*x^4+4*x^5
-2/5*x^6+x^8+x^2*ln(x)^4
```

3.87.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(26) = 52$.

Time = 0.26 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.50

$$\int \frac{1}{25}\left(25+200x-60x^2+4x^3+500x^4-60x^5+200x^7+\left(-200x+20x^2-100x^4\right)\log(x)+\left(-200x+30x^2-250x^4\right)\log^2(x)+100x\log^3(x)+50x\log^4(x)\right)\,dx = x^8-\frac{2}{5}x^6+x^2\log(x)^4+4\,x^5+\frac{1}{25}\,x^4-\frac{4}{5}\,x^3-\frac{2}{5}\left(5\,x^5-x^3+10\,x^2\right)\log(x)^2+4\,x^2+x$$

input
```
integrate(2*x*log(x)^4+4*x*log(x)^3+1/25*(-250*x^4+30*x^2-200*x)*log(x)^2+
1/25*(-100*x^4+20*x^2-200*x)*log(x)+8*x^7-12/5*x^5+20*x^4+4/25*x^3-12/5*x^
2+8*x+1,x, algorithm=\
```

output
```
x^8 - 2/5*x^6 + x^2*log(x)^4 + 4*x^5 + 1/25*x^4 - 4/5*x^3 - 2/5*(5*x^5 - x
^3 + 10*x^2)*log(x)^2 + 4*x^2 + x
```

3.87.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(20) = 40$.

Time = 0.08 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.62

$$\int \frac{1}{25}\left(25 + 200x - 60x^2 + 4x^3 + 500x^4 - 60x^5 + 200x^7 + \left(-200x + 20x^2 - 100x^4\right)\log(x) + \left(-200x + 30x^2 - 250x^4\right)\log^2(x) + 100x\log^3(x) + 50x\log^4(x)\right)dx = x^8 - \frac{2x^6}{5} + 4x^5 + \frac{x^4}{25} - \frac{4x^3}{5} + x^2\log(x)^4 + 4x^2 + x + \left(-2x^5 + \frac{2x^3}{5} - 4x^2\right)\log(x)^2$$

input
```
integrate(2*x*ln(x)**4+4*x*ln(x)**3+1/25*(-250*x**4+30*x**2-200*x)*ln(x)**
2+1/25*(-100*x**4+20*x**2-200*x)*ln(x)+8*x**7-12/5*x**5+20*x**4+4/25*x**3-
12/5*x**2+8*x+1,x)
```

output
```
x**8 - 2*x**6/5 + 4*x**5 + x**4/25 - 4*x**3/5 + x**2*log(x)**4 + 4*x**2 +
x + (-2*x**5 + 2*x**3/5 - 4*x**2)*log(x)**2
```

3.87.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 153 vs. 2(26) = 52.

Time = 0.21 (sec) , antiderivative size = 153, normalized size of antiderivative = 6.38

$$\int \frac{1}{25}\left(25+200x-60x^2+4x^3+500x^4-60x^5+200x^7+\left(-200x+20x^2-100x^4\right)\log(x)+\left(-200x+30x^2-250x^4\right)\log^2(x)+100x\log^3(x)+50x\log^4(x)\right)\,dx = x^8 - \frac{2}{25}\left(25\log(x)^2-10\log(x)+2\right)x^5 - \frac{2}{5}x^6 + \frac{104}{25}x^5 + \frac{2}{45}\left(9\log(x)^2-6\log(x)+2\right)x^3 + \frac{1}{25}x^4 + \frac{1}{2}\left(2\log(x)^4-4\log(x)^3+6\log(x)^2-6\log(x)+3\right)x^2 + \frac{1}{2}\left(4\log(x)^3-6\log(x)^2+6\log(x)-3\right)x^2 - 2\left(2\log(x)^2-2\log(x)+1\right)x^2 - \frac{8}{9}x^3 + 6x^2 - \frac{4}{15}\left(3x^5-x^3+15x^2\right)\log(x) + x$$

input
```
integrate(2*x*log(x)^4+4*x*log(x)^3+1/25*(-250*x^4+30*x^2-200*x)*log(x)^2+
1/25*(-100*x^4+20*x^2-200*x)*log(x)+8*x^7-12/5*x^5+20*x^4+4/25*x^3-12/5*x^
2+8*x+1,x, algorithm=\
```

output
```
x^8 - 2/25*(25*log(x)^2 - 10*log(x) + 2)*x^5 - 2/5*x^6 + 104/25*x^5 + 2/45
*(9*log(x)^2 - 6*log(x) + 2)*x^3 + 1/25*x^4 + 1/2*(2*log(x)^4 - 4*log(x)^3
 + 6*log(x)^2 - 6*log(x) + 3)*x^2 + 1/2*(4*log(x)^3 - 6*log(x)^2 + 6*log(x
) - 3)*x^2 - 2*(2*log(x)^2 - 2*log(x) + 1)*x^2 - 8/9*x^3 + 6*x^2 - 4/15*(3
*x^5 - x^3 + 15*x^2)*log(x) + x
```

3.87.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. 2(26) = 52.

Time = 0.27 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.71

$$\int \frac{1}{25}\left(25+200x-60x^2+4x^3+500x^4-60x^5+200x^7+\left(-200x+20x^2-100x^4\right)\log(x)+\left(-200x+30x^2-250x^4\right)\log^2(x)+100x\log^3(x)+50x\log^4(x)\right)\,dx = x^8 - 2x^5\log(x)^2 - \frac{2}{5}x^6 + x^2\log(x)^4 + 4x^5 + \frac{2}{5}x^3\log(x)^2 + \frac{1}{25}x^4 - 4x^2\log(x)^2 - \frac{4}{5}x^3 + 4x^2 + x$$

input
```
integrate(2*x*log(x)^4+4*x*log(x)^3+1/25*(-250*x^4+30*x^2-200*x)*log(x)^2+
1/25*(-100*x^4+20*x^2-200*x)*log(x)+8*x^7-12/5*x^5+20*x^4+4/25*x^3-12/5*x^
2+8*x+1,x, algorithm=\
```

output
```
x^8 - 2*x^5*log(x)^2 - 2/5*x^6 + x^2*log(x)^4 + 4*x^5 + 2/5*x^3*log(x)^2 +
 1/25*x^4 - 4*x^2*log(x)^2 - 4/5*x^3 + 4*x^2 + x
```

3.87.9 Mupad [B] (verification not implemented)

Time = 13.61 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.71

$$\int \frac{1}{25}\left(25+200x-60x^2+4x^3+500x^4-60x^5+200x^7+\left(-200x+20x^2-100x^4\right)\log(x)+\left(-200x+30x^2-250x^4\right)\log^2(x)+100x\log^3(x)+50x\log^4(x)\right)\,dx=x^8-\frac{2\,x^6}{5}-2\,x^5\ln\left(x\right)^2+4\,x^5+\frac{x^4}{25}+\frac{2\,x^3\ln\left(x\right)^2}{5}-\frac{4\,x^3}{5}+x^2\ln\left(x\right)^4-4\,x^2\ln\left(x\right)^2+4\,x^2+x$$

input
```
int(8*x + 4*x*log(x)^3 + 2*x*log(x)^4 - (log(x)^2*(200*x - 30*x^2 + 250*x^
4))/25 - (12*x^2)/5 + (4*x^3)/25 + 20*x^4 - (12*x^5)/5 + 8*x^7 - (log(x)*(
200*x - 20*x^2 + 100*x^4))/25 + 1,x)
```

output
```
x - 4*x^2*log(x)^2 + (2*x^3*log(x)^2)/5 + x^2*log(x)^4 - 2*x^5*log(x)^2 +
4*x^2 - (4*x^3)/5 + x^4/25 + 4*x^5 - (2*x^6)/5 + x^8
```

3.87. $\int \frac{1}{25}\left(25+200x-60x^2+4x^3+500x^4-60x^5+200x^7+\left(-200x+20x^2-100x^4\right)\log(x)+\left(-200x+30x^2\right.\right.$

3.88 $\int \frac{e^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}\left(x+\frac{-1+2x+3\log(x)}{x^2}\right)}{x}\,dx$

3.88.1 Optimal result

Integrand size = 41, antiderivative size = 19

$$\int \frac{e^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}\left(x+\frac{-1+2x+3\log(x)}{x^2}\right)}{x}\,dx=e^{2-\frac{1+\frac{\log(x)}{x}}{x^2}}x$$

output
```
x*exp(2-(1+ln(x)/x)/x^2)
```

3.88.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}\left(x+\frac{-1+2x+3\log(x)}{x^2}\right)}{x}\,dx=e^{2-\frac{1}{x^2}}x^{1-\frac{1}{x^3}}$$

input
```
Integrate[(E^((2*x + (-x - Log[x])/x^2)/x)*(x + (-1 + 2*x + 3*Log[x])/x^2)
)/x,x]
```

output
```
E^(2 - x^(-2))*x^(1 - x^(-3))
```

3.88.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 79 vs. $2(19) = 38$.

Time = 0.26 (sec) , antiderivative size = 79, normalized size of antiderivative = 4.16, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.024$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{\frac{-x-\log(x)}{x^2}+2x}{x}}\left(\frac{2x+3\log(x)-1}{x^2}+x\right)}{x}\,dx$$

$$\Big\downarrow \text{2726}$$

$$-\frac{e^{\frac{2x-\frac{x+\log(x)}{x^2}}{x}}(-2x-3\log(x)+1)}{x^3\left(\frac{\frac{2(x+\log(x))}{x^3}-\frac{\frac{1}{x}+1}{x^2}+2}{x}-\frac{2x-\frac{x+\log(x)}{x^2}}{x^2}\right)}$$

input
```
Int[(E^((2*x + (-x - Log[x])/x^2)/x)*(x + (-1 + 2*x + 3*Log[x])/x^2))/x,x]
```

output
```
-((E^((2*x - (x + Log[x])/x^2)/x)*(1 - 2*x - 3*Log[x]))/(x^3*((2 - (1 + x^
(-1))/x^2 + (2*(x + Log[x]))/x^3)/x - (2*x - (x + Log[x])/x^2)/x^2)))
```

3.88.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.88.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

method	result	size
risch	$\mathrm{e}^{-\frac{-2x^3+\ln(x)+x}{x^3}}x$	18
parallelrisch	$\mathrm{e}^{-\frac{-2x^3+\ln(x)+x}{x^3}}x$	18
norman	$\mathrm{e}^{\frac{\frac{-x-\ln(x)}{x^2}+2x}{x}}x$	24

3.88. $\int \frac{e^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}\left(x+\frac{-1+2x+3\log(x)}{x^2}\right)}{x}\,dx$

input
```
int(((3*ln(x)+2*x-1)/x^2+x)*exp(((-x-ln(x))/x^2+2*x)/x)/x,x,method=_RETURN
VERBOSE)
```

output
```
exp(-(-2*x^3+ln(x)+x)/x^3)*x
```

3.88.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{e^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}\left(x+\frac{-1+2x+3\log(x)}{x^2}\right)}{x}\,dx = xe^{\left(\frac{2\,x^3-x-\log(x)}{x^3}\right)}$$

input
```
integrate(((3*log(x)+2*x-1)/x^2+x)*exp(((-x-log(x))/x^2+2*x)/x)/x,x, algor
ithm=\
```

output
```
x*e^((2*x^3 - x - log(x))/x^3)
```

3.88.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}\left(x+\frac{-1+2x+3\log(x)}{x^2}\right)}{x}\,dx = xe^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}$$

input
```
integrate(((3*ln(x)+2*x-1)/x**2+x)*exp(((-x-ln(x))/x**2+2*x)/x)/x,x)
```

output
```
x*exp((2*x + (-x - log(x))/x**2)/x)
```

3.88.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}\left(x+\frac{-1+2x+3\log(x)}{x^2}\right)}{x}\,dx = xe^{\left(-\frac{1}{x^2}-\frac{\log(x)}{x^3}+2\right)}$$

input
```
integrate(((3*log(x)+2*x-1)/x^2+x)*exp(((-x-log(x))/x^2+2*x)/x)/x,x, algor
ithm=\
```

output
```
x*e^(-1/x^2 - log(x)/x^3 + 2)
```

3.88.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{e^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}\left(x+\frac{-1+2x+3\log(x)}{x^2}\right)}{x}\,dx = xe^{\left(\frac{2x^3-x-\log(x)}{x^3}\right)}$$

input
```
integrate(((3*log(x)+2*x-1)/x^2+x)*exp(((-x-log(x))/x^2+2*x)/x)/x,x, algor
ithm=\
```

output
```
x*e^((2*x^3 - x - log(x))/x^3)
```

3.88.9 Mupad [B] (verification not implemented)

Time = 13.82 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{e^{\frac{2x+\frac{-x-\log(x)}{x^2}}{x}}\left(x+\frac{-1+2x+3\log(x)}{x^2}\right)}{x}\,dx = x^{1-\frac{1}{x^3}}\,\mathrm{e}^2\,\mathrm{e}^{-\frac{1}{x^2}}$$

input
```
int((exp((2*x - (x + log(x))/x^2)/x)*(x + (2*x + 3*log(x) - 1)/x^2))/x,x)
```

output
```
x^(1 - 1/x^3)*exp(2)*exp(-1/x^2)
```

3.89 $\int \frac{-1+8x-8x^2}{4x}\,dx$

3.89.1 Optimal result

Integrand size = 17, antiderivative size = 17

$$\int \frac{-1+8x-8x^2}{4x}\,dx = -3+e+2x-x^2-\frac{\log(x)}{4}$$

output
```
2*x-1/4*ln(x)+exp(1)-3-x^2
```

3.89.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{-1+8x-8x^2}{4x}\,dx = 2x-x^2-\frac{\log(x)}{4}$$

input
```
Integrate[(-1 + 8*x - 8*x^2)/(4*x),x]
```

output
```
2*x - x^2 - Log[x]/4
```

3.89.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.235$, Rules used = {27, 25, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x^2+8x-1}{4x}dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{4}\int -\frac{8x^2-8x+1}{x}dx$$

$$\Big\downarrow \; 25$$

$$-\frac{1}{4}\int \frac{8x^2-8x+1}{x}dx$$

$$\Big\downarrow \; 1140$$

$$-\frac{1}{4}\int \left(8x-8+\frac{1}{x}\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{4}\left(-4x^2+8x-\log(x)\right)$$

input
```
Int[(-1 + 8*x - 8*x^2)/(4*x),x]
```

output
```
(8*x - 4*x^2 - Log[x])/4
```

3.89.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.89.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

method	result	size
default	$-x^2+2x-\frac{\ln(x)}{4}$	14
norman	$-x^2+2x-\frac{\ln(x)}{4}$	14
risch	$-x^2+2x-\frac{\ln(x)}{4}$	14
parallelrisch	$-x^2+2x-\frac{\ln(x)}{4}$	14

input
```
int(1/4*(-8*x^2+8*x-1)/x,x,method=_RETURNVERBOSE)
```

output
```
-x^2+2*x-1/4*ln(x)
```

3.89.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{-1+8x-8x^2}{4x}\,dx=-x^2+2\,x-\frac{1}{4}\,\log\left(x\right)$$

input
```
integrate(1/4*(-8*x^2+8*x-1)/x,x, algorithm=\
```

output
```
-x^2 + 2*x - 1/4*log(x)
```

3.89.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \frac{-1+8x-8x^2}{4x}\,dx = -x^2+2x-\frac{\log(x)}{4}$$

input
```
integrate(1/4*(-8*x**2+8*x-1)/x,x)
```

output
```
-x**2 + 2*x - log(x)/4
```

3.89.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{-1+8x-8x^2}{4x}\,dx = -x^2+2\,x-\frac{1}{4}\,\log(x)$$

input
```
integrate(1/4*(-8*x^2+8*x-1)/x,x, algorithm=\
```

output
```
-x^2 + 2*x - 1/4*log(x)
```

3.89.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{-1+8x-8x^2}{4x}\,dx = -x^2+2\,x-\frac{1}{4}\,\log(|x|)$$

input
```
integrate(1/4*(-8*x^2+8*x-1)/x,x, algorithm=\
```

output
```
-x^2 + 2*x - 1/4*log(abs(x))
```

3.89.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{-1+8x-8x^2}{4x}\,dx = 2\,x-\frac{\ln\left(x\right)}{4}-x^2$$

input
```
int(-(2*x^2 - 2*x + 1/4)/x,x)
```

output
```
2*x - log(x)/4 - x^2
```

3.90 $\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-\right.}\right.}{x^2}$

3.90.1 Optimal result

Integrand size = 77, antiderivative size = 25

$$\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}\left(4x+x^2-18x\log(3)\right)\right)}{x^2}\,dx$$

$$=\frac{e^{e^{1+\frac{1}{2}(-4-x+18\log(3))^2}}}{x}$$

output
```
exp(exp(1+1/2*(18*ln(3)-4-x)^2))/x
```

3.90.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

$$\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}\left(4x+x^2-18x\log(3)\right)\right)}{x^2}\,dx$$

$$=\frac{e^{3^{-72-18x}e^{9+4x+\frac{x^2}{2}+162\log^2(3)}}}{x}$$

input
```
Integrate[(E^E^((18 + 8*x + x^2 + (-144 - 36*x)*Log[3] + 324*Log[3]^2)/2)*
(-1 + E^((18 + 8*x + x^2 + (-144 - 36*x)*Log[3] + 324*Log[3]^2)/2)*(4*x +
x^2 - 18*x*Log[3])))/x^2,x]
```

3.90.

$$\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}\left(4x+x^2-18x\log(3)\right)\right)}{x^2}\,dx$$

output
```
E^(3^(-72 - 18*x)*E^(9 + 4*x + x^2/2 + 162*Log[3]^2))/x
```

3.90.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 124 vs. 2(25) = 50.

Time = 0.74 (sec) , antiderivative size = 124, normalized size of antiderivative = 4.96, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.013, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\exp\left(\exp\left(\frac{1}{2}\left(x^2+8x+(-36x-144)\log(3)+18+324\log^2(3)\right)\right)\right)\left(\left(x^2+4x-18x\log(3)\right)\exp\left(\frac{1}{2}\left(x^2+8x+(-\right.\right.\right.}{x^2}$$

$$\Big\downarrow \text{2726}$$

$$\frac{\left(x^2+4x-18x\log(3)\right)\exp\left(\frac{1}{2}\left(-x^2-8x+36(x+4)\log(3)-18\left(1+18\log^2(3)\right)\right)\right)+3^{\frac{1}{2}(-36x-144)}e^{\frac{1}{2}\left(x^2+8x+18(1+1\right.}}{x^2(x+2(2-9\log(3)))}$$

input
```
Int[(E^E^((18 + 8*x + x^2 + (-144 - 36*x)*Log[3] + 324*Log[3]^2)/2)*(-1 +
E^((18 + 8*x + x^2 + (-144 - 36*x)*Log[3] + 324*Log[3]^2)/2)*(4*x + x^2 -
18*x*Log[3])))/x^2,x]
```

output
```
(E^(3^((-144 - 36*x)/2)*E^((8*x + x^2 + 18*(1 + 18*Log[3]^2))/2) + (-8*x -
 x^2 + 36*(4 + x)*Log[3] - 18*(1 + 18*Log[3]^2))/2 + (8*x + x^2 - 36*(4 +
x)*Log[3] + 18*(1 + 18*Log[3]^2))/2)*(4*x + x^2 - 18*x*Log[3]))/(x^2*(x +
2*(2 - 9*Log[3])))
```

3.90.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.90.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

method	result	size
risch	$\frac{e^{3^{-72-18x} e^{162 \ln(3)^2+9+\frac{x^2}{2}+4x}}}{x}$	31
norman	$\frac{e^{e^{162 \ln(3)^2+\frac{(-36x-144)\ln(3)}{2}+\frac{x^2}{2}+4x+9}}}{x}$	32

input
```
int(((-18*x*ln(3)+x^2+4*x)*exp(162*ln(3)^2+1/2*(-36*x-144)*ln(3)+1/2*x^2+4
*x+9)-1)*exp(exp(162*ln(3)^2+1/2*(-36*x-144)*ln(3)+1/2*x^2+4*x+9))/x^2,x,m
ethod=_RETURNVERBOSE)
```

output
```
exp(3^(-72-18*x)*exp(162*ln(3)^2+9+1/2*x^2+4*x))/x
```

3.90.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}(4x+x^2-18x\log(3))\right)}{x^2}\,dx = \frac{e^{\left(e^{\left(\frac{1}{2}x^2-18(x+4)\log(3)+162\log(3)^2+4x+9\right)}\right)}}{x}$$

input
```
integrate(((-18*x*log(3)+x^2+4*x)*exp(162*log(3)^2+1/2*(-36*x-144)*log(3)+
1/2*x^2+4*x+9)-1)*exp(exp(162*log(3)^2+1/2*(-36*x-144)*log(3)+1/2*x^2+4*x+
9))/x^2,x, algorithm=\
```

output
```
e^(e^(1/2*x^2 - 18*(x + 4)*log(3) + 162*log(3)^2 + 4*x + 9))/x
```

3.90. $\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}(4x+x^2-18x\log(3))\right)}{x^2}\,dx$

3.90.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

$$\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}\left(4x+x^2-18x\log(3)\right)\right)}{x^2}\,dx$$
$$=\frac{e^{e^{\frac{x^2}{2}+4x+(-18x-72)\log{(3)}+9+162\log{(3)}^2}}}{x}$$

input
```
integrate(((-18*x*ln(3)+x**2+4*x)*exp(162*ln(3)**2+1/2*(-36*x-144)*ln(3)+1
/2*x**2+4*x+9)-1)*exp(exp(162*ln(3)**2+1/2*(-36*x-144)*ln(3)+1/2*x**2+4*x+
9))/x**2,x)
```

output
```
exp(exp(x**2/2 + 4*x + (-18*x - 72)*log(3) + 9 + 162*log(3)**2))/x
```

3.90.7 Maxima [A] (verification not implemented)

Time = 0.68 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}\left(4x+x^2-18x\log(3)\right)\right)}{x^2}\,dx$$
$$=\frac{e^{\left(\frac{1}{2252839954493917441184014787477264 1}e^{\left(\frac{1}{2}x^2-18x\log(3)+162\log(3)^2+4x+9\right)}\right)}}{x}$$

input
```
integrate(((-18*x*log(3)+x^2+4*x)*exp(162*log(3)^2+1/2*(-36*x-144)*log(3)+
1/2*x^2+4*x+9)-1)*exp(exp(162*log(3)^2+1/2*(-36*x-144)*log(3)+1/2*x^2+4*x+
9))/x^2,x, algorithm=\
```

output
```
e^(1/22528399544939174411840147874772641*e^(1/2*x^2 - 18*x*log(3) + 162*lo
g(3)^2 + 4*x + 9))/x
```

3.90. $\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}\left(4x+x^2-18x\log(3)\right)\right)}{x^2}\,dx$

3.90.8 Giac [F]

$$\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}\left(4x+x^2-18x\log(3)\right)\right)}{x^2}\,dx$$
$$=\int \frac{\left((x^2-18\,x\log(3)+4\,x)e^{\left(\frac{1}{2}\,x^2-18\,(x+4)\log(3)+162\,\log(3)^2+4\,x+9\right)}-1\right)e^{\left(e^{\left(\frac{1}{2}\,x^2-18\,(x+4)\log(3)+162\,\log(3)^2+4\,x+9\right)}\right)}}{x^2}\,dx$$

input
```
integrate(((-18*x*log(3)+x^2+4*x)*exp(162*log(3)^2+1/2*(-36*x-144)*log(3)+
1/2*x^2+4*x+9)-1)*exp(exp(162*log(3)^2+1/2*(-36*x-144)*log(3)+1/2*x^2+4*x+
9))/x^2,x, algorithm=\
```

output
```
integrate(((x^2 - 18*x*log(3) + 4*x)*e^(1/2*x^2 - 18*(x + 4)*log(3) + 162*
log(3)^2 + 4*x + 9) - 1)*e^(e^(1/2*x^2 - 18*(x + 4)*log(3) + 162*log(3)^2
+ 4*x + 9))/x^2, x)
```

3.90.9 Mupad [B] (verification not implemented)

Time = 14.11 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{e^{e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}}\left(-1+e^{\frac{1}{2}\left(18+8x+x^2+(-144-36x)\log(3)+324\log^2(3)\right)}\left(4x+x^2-18x\log(3)\right)\right)}{x^2}\,dx$$
$$=\frac{e^{\frac{\left(\frac{1}{387420489}\right)^x\,e^{4\,x}\,e^9\,e^{162\ln(3)^2}\,e^{\frac{x^2}{2}}}{22528399544939174411840147874772641}}}{x}$$

input
```
int((exp(exp(4*x - (log(3)*(36*x + 144))/2 + 162*log(3)^2 + x^2/2 + 9))*(e
xp(4*x - (log(3)*(36*x + 144))/2 + 162*log(3)^2 + x^2/2 + 9)*(4*x - 18*x*l
og(3) + x^2) - 1))/x^2,x)
```

output
```
exp(((1/387420489)^x*exp(4*x)*exp(9)*exp(162*log(3)^2)*exp(x^2/2))/2252839
9544939174411840147874772641)/x
```

3.91 $\int \frac{20x-15x^2}{(-4-10x^2+5x^3)\log(4+10x^2-5x^3)}\,dx$

3.91.1 Optimal result

Integrand size = 39, antiderivative size = 26

$$\int \frac{20x-15x^2}{(-4-10x^2+5x^3)\log(4+10x^2-5x^3)}\,dx = 3-\log\left(\frac{5}{2}\right)-\log\left(\log\left(2\left(2-\frac{5}{2}(-2+x)x^2\right)\right)\right)$$

output
```
ln(2/5)+3-ln(ln(-5*(-2+x)*x^2+4))
```

3.91.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{20x-15x^2}{(-4-10x^2+5x^3)\log(4+10x^2-5x^3)}\,dx = -\log\left(\log\left(4+10x^2-5x^3\right)\right)$$

input
```
Integrate[(20*x - 15*x^2)/((-4 - 10*x^2 + 5*x^3)*Log[4 + 10*x^2 - 5*x^3]),
x]
```

output
```
-Log[Log[4 + 10*x^2 - 5*x^3]]
```

3.91.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.051, Rules used = {2027, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{20x-15x^2}{(5x^3-10x^2-4)\log(-5x^3+10x^2+4)}dx$$
$$\Big\downarrow \text{2027}$$
$$\int \frac{(20-15x)x}{(5x^3-10x^2-4)\log(-5x^3+10x^2+4)}dx$$
$$\Big\downarrow \text{7235}$$
$$-\log\left(\log\left(-5x^3+10x^2+4\right)\right)$$

input
```
Int[(20*x - 15*x^2)/((-4 - 10*x^2 + 5*x^3)*Log[4 + 10*x^2 - 5*x^3]),x]
```

output
```
-Log[Log[4 + 10*x^2 - 5*x^3]]
```

3.91.3.1 Defintions of rubi rules used

rule 2027
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.))^(p_.), x_Symbol] :> Int[x^
(p*r)*(a + b*x^(s - r))^p*Fx, x] /; FreeQ[{a, b, r, s}, x] && IntegerQ[p] &
& PosQ[s - r] &&  !(EqQ[p, 1] && EqQ[u, 1])
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.91.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

method	result	size
default	$-\ln\left(\ln\left(-5x^3+10x^2+4\right)\right)$	17
norman	$-\ln\left(\ln\left(-5x^3+10x^2+4\right)\right)$	17
risch	$-\ln\left(\ln\left(-5x^3+10x^2+4\right)\right)$	17
parallelrisch	$-\ln\left(\ln\left(-5x^3+10x^2+4\right)\right)$	17

input
```
int((-15*x^2+20*x)/(5*x^3-10*x^2-4)/ln(-5*x^3+10*x^2+4),x,method=_RETURNVE
RBOSE)
```

output
```
-ln(ln(-5*x^3+10*x^2+4))
```

3.91.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{20x-15x^2}{(-4-10x^2+5x^3)\log(4+10x^2-5x^3)}\,dx = -\log\left(\log\left(-5\,x^3+10\,x^2+4\right)\right)$$

input
```
integrate((-15*x^2+20*x)/(5*x^3-10*x^2-4)/log(-5*x^3+10*x^2+4),x, algorit
m=\
```

output
```
-log(log(-5*x^3 + 10*x^2 + 4))
```

3.91.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.58

$$\int \frac{20x-15x^2}{(-4-10x^2+5x^3)\log(4+10x^2-5x^3)}\,dx = -\log\left(\log\left(-5x^3+10x^2+4\right)\right)$$

input
```
integrate((-15*x**2+20*x)/(5*x**3-10*x**2-4)/ln(-5*x**3+10*x**2+4),x)
```

output
```
-log(log(-5*x**3 + 10*x**2 + 4))
```

3.91.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{20x-15x^2}{(-4-10x^2+5x^3)\log(4+10x^2-5x^3)}\,dx=-\log\left(\log\left(-5\,x^3+10\,x^2+4\right)\right)$$

input
```
integrate((-15*x^2+20*x)/(5*x^3-10*x^2-4)/log(-5*x^3+10*x^2+4),x, algorith
m=\
```

output
```
-log(log(-5*x^3 + 10*x^2 + 4))
```

3.91.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{20x-15x^2}{(-4-10x^2+5x^3)\log(4+10x^2-5x^3)}\,dx=-\log\left(\log\left(-5\,x^3+10\,x^2+4\right)\right)$$

input
```
integrate((-15*x^2+20*x)/(5*x^3-10*x^2-4)/log(-5*x^3+10*x^2+4),x, algorith
m=\
```

output
```
-log(log(-5*x^3 + 10*x^2 + 4))
```

3.91.9 Mupad [B] (verification not implemented)

Time = 14.05 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{20x-15x^2}{(-4-10x^2+5x^3)\log(4+10x^2-5x^3)}\,dx=-\ln\left(\ln\left(-5\,x^3+10\,x^2+4\right)\right)$$

input
```
int(-(20*x - 15*x^2)/(log(10*x^2 - 5*x^3 + 4)*(10*x^2 - 5*x^3 + 4)),x)
```

output
```
-log(log(10*x^2 - 5*x^3 + 4))
```

3.92 $\int \frac{5}{x} dx$

3.92.1 Optimal result

Integrand size = 5, antiderivative size = 6

$$\int \frac{5}{x} dx = 4 + 5\log(x)$$

output
```
5*ln(x)+4
```

3.92.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.67

$$\int \frac{5}{x} dx = 5\log(x)$$

input
```
Integrate[5/x,x]
```

output
```
5*Log[x]
```

3.92.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.67, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = $\{14\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5}{x}\,dx$$

$$\Big\downarrow \; 14$$

$$5\log(x)$$

input
```
Int[5/x,x]
```

output
```
5*Log[x]
```

3.92.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.92.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.83

method	result	size
default	$5\ln(x)$	5
norman	$5\ln(x)$	5
risch	$5\ln(x)$	5
parallelrisch	$5\ln(x)$	5

input
```
int(5/x,x,method=_RETURNVERBOSE)
```

output
```
5*ln(x)
```

3.92.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.67

$$\int \frac{5}{x}\,dx = 5\,\log\left(x\right)$$

input
```
integrate(5/x,x, algorithm=\
```

output
```
5*log(x)
```

3.92.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.50

$$\int \frac{5}{x}\,dx = 5\log\left(x\right)$$

input
```
integrate(5/x,x)
```

output
```
5*log(x)
```

3.92.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.67

$$\int \frac{5}{x}\,dx = 5\,\log\left(x\right)$$

input
```
integrate(5/x,x, algorithm=\
```

output
```
5*log(x)
```

3.92.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.83

$$\int \frac{5}{x} \, dx = 5 \log \left(|x|\right)$$

input
```
integrate(5/x,x, algorithm=\
```

output
```
5*log(abs(x))
```

3.92.9 Mupad [B] (verification not implemented)

Time = 0.01 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.67

$$\int \frac{5}{x} \, dx = 5 \ln \left(x\right)$$

input
```
int(5/x,x)
```

output
```
5*log(x)
```

3.93 $\int \frac{3e^{1+16x^2}-2x^2-64x^4}{e^{1+16x^2}x-2x^3}\,dx$

3.93.1 Optimal result

Integrand size = 42, antiderivative size = 26

$$\int \frac{3e^{1+16x^2}-2x^2-64x^4}{e^{1+16x^2}x-2x^3}\,dx = \log\left(\frac{2x^3}{3\left(2-4e^{-1-16x^2}x^2\right)}\right)$$

output
```
ln(2/3*x^3/(2-4*x^2/exp(16*x^2+1)))
```

3.93.2 Mathematica [A] (verified)

Time = 2.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{3e^{1+16x^2}-2x^2-64x^4}{e^{1+16x^2}x-2x^3}\,dx = 16x^2+3\log(x)-\log\left(e^{1+16x^2}-2x^2\right)$$

input
```
Integrate[(3*E^(1 + 16*x^2) - 2*x^2 - 64*x^4)/(E^(1 + 16*x^2)*x - 2*x^3),x
]
```

output
```
16*x^2 + 3*Log[x] - Log[E^(1 + 16*x^2) - 2*x^2]
```

3.93.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-64x^4 - 2x^2 + 3e^{16x^2+1}}{e^{16x^2+1}x - 2x^3} \, dx$$
$$\Big\downarrow \text{ 7293}$$
$$\int \left(\frac{3}{x} - \frac{4x(16x^2-1)}{e^{16x^2+1} - 2x^2}\right) dx$$
$$\Big\downarrow \text{ 2009}$$
$$2\text{Subst}\left(\int \frac{1}{e^{16x+1} - 2x} dx, x, x^2\right) - 32\text{Subst}\left(\int \frac{x}{e^{16x+1} - 2x} dx, x, x^2\right) + 3\log(x)$$

input
```
Int[(3*E^(1 + 16*x^2) - 2*x^2 - 64*x^4)/(E^(1 + 16*x^2)*x - 2*x^3),x]
```

output
```
$Aborted
```

3.93.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.93.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

method	result	size
parallelrisch	$16x^2 + 3\ln(x) - \ln\left(x^2 - \frac{e^{16x^2+1}}{2}\right)$	28
risch	$3\ln(x) + 16x^2 + 1 - \ln\left(-2x^2 + e^{16x^2+1}\right)$	29
norman	$16x^2 + 3\ln(x) - \ln\left(2x^2 - e^{16x^2+1}\right)$	30

input
```
int((3*exp(16*x^2+1)-64*x^4-2*x^2)/(x*exp(16*x^2+1)-2*x^3),x,method=_RETUR
NVERBOSE)
```

output
```
16*x^2+3*ln(x)-ln(x^2-1/2*exp(16*x^2+1))
```

3.93.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{3e^{1+16x^2}-2x^2-64x^4}{e^{1+16x^2}x-2x^3}\,dx = 16\,x^2-\log\left(-2\,x^2+e^{\left(16\,x^2+1\right)}\right)+3\,\log\left(x\right)$$

input
```
integrate((3*exp(16*x^2+1)-64*x^4-2*x^2)/(x*exp(16*x^2+1)-2*x^3),x, algori
thm=\
```

output
```
16*x^2 - log(-2*x^2 + e^(16*x^2 + 1)) + 3*log(x)
```

3.93.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{3e^{1+16x^2}-2x^2-64x^4}{e^{1+16x^2}x-2x^3}\,dx = 16x^2+3\log\left(x\right)-\log\left(-2x^2+e^{16x^2+1}\right)$$

input
```
integrate((3*exp(16*x**2+1)-64*x**4-2*x**2)/(x*exp(16*x**2+1)-2*x**3),x)
```

output
```
16*x**2 + 3*log(x) - log(-2*x**2 + exp(16*x**2 + 1))
```

3.93.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.27

$$\int \frac{3e^{1+16x^2}-2x^2-64x^4}{e^{1+16x^2}x-2x^3}\,dx = 16\,x^2-\log\left(-\left(2\,x^2-e^{\left(16\,x^2+1\right)}\right)e^{(-1)}\right)+3\,\log\left(x\right)$$

input
```
integrate((3*exp(16*x^2+1)-64*x^4-2*x^2)/(x*exp(16*x^2+1)-2*x^3),x, algori
thm=\
```

output
```
16*x^2 - log(-(2*x^2 - e^(16*x^2 + 1))*e^(-1)) + 3*log(x)
```

3.93.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int \frac{3e^{1+16x^2}-2x^2-64x^4}{e^{1+16x^2}x-2x^3}\,dx = 16\,x^2+\frac{3}{2}\,\log\left(16\,x^2\right)-\log\left(16\,x^2-8\,e^{\left(16\,x^2+1\right)}\right)+1$$

input
```
integrate((3*exp(16*x^2+1)-64*x^4-2*x^2)/(x*exp(16*x^2+1)-2*x^3),x, algori
thm=\
```

output
```
16*x^2 + 3/2*log(16*x^2) - log(16*x^2 - 8*e^(16*x^2 + 1)) + 1
```

3.93.9 Mupad [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{3e^{1+16x^2}-2x^2-64x^4}{e^{1+16x^2}x-2x^3}\,dx = 3\,\ln\left(x\right)-\ln\left(2\,x^2-\mathrm{e}\,\mathrm{e}^{16\,x^2}\right)+16\,x^2$$

input
```
int(-(2*x^2 - 3*exp(16*x^2 + 1) + 64*x^4)/(x*exp(16*x^2 + 1) - 2*x^3),x)
```

output
```
3*log(x) - log(2*x^2 - exp(1)*exp(16*x^2)) + 16*x^2
```

3.94 $\int \frac{-16e^{4x}+288x-576x^2+e^{e^{5-x}}\left(e^{4x}\left(-1-9e^{5-x}\right)+18x-36x^2\right)}{144e^{4x}+9e^{e^{5-x}+4x}}\,dx$

3.94.1 Optimal result

Integrand size = 78, antiderivative size = 31

$$\int \frac{-16e^{4x}+288x-576x^2+e^{e^{5-x}}\left(e^{4x}\left(-1-9e^{5-x}\right)+18x-36x^2\right)}{144e^{4x}+9e^{e^{5-x}+4x}}\,dx$$
$$=\frac{1}{9}(-1-x)+e^{-4x}x^2+\log\left(16+e^{e^{5-x}}\right)$$

output
```
ln(16+exp(exp(5-x)))-1/9*x-1/9+x^2/exp(4*x)
```

3.94.2 Mathematica [A] (verified)

Time = 5.08 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{-16e^{4x}+288x-576x^2+e^{e^{5-x}}\left(e^{4x}\left(-1-9e^{5-x}\right)+18x-36x^2\right)}{144e^{4x}+9e^{e^{5-x}+4x}}\,dx$$
$$=\frac{1}{9}\left(-x+9e^{-4x}x^2+9\log\left(16+e^{e^{5-x}}\right)\right)$$

input
```
Integrate[(-16*E^(4*x) + 288*x - 576*x^2 + E^E^(5 - x)*(E^(4*x)*(-1 - 9*E^
(5 - x)) + 18*x - 36*x^2))/(144*E^(4*x) + 9*E^(E^(5 - x) + 4*x)),x]
```

output
```
(-x + (9*x^2)/E^(4*x) + 9*Log[16 + E^E^(5 - x)])/9
```

3.94.3 Rubi [A] (verified)

Time = 1.08 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.064, Rules used = {7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-576x^2+e^{e^{5-x}}\left(-36x^2+18x+e^{4x}\left(-9e^{5-x}-1\right)\right)+288x-16e^{4x}}{144e^{4x}+9e^{4x+e^{5-x}}}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{-4x}\left(-576x^2+e^{e^{5-x}}\left(-36x^2+18x+e^{4x}\left(-9e^{5-x}-1\right)\right)+288x-16e^{4x}\right)}{9\left(e^{e^{5-x}}+16\right)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{9}\int -\frac{e^{-4x}\left(576x^2-288x+16e^{4x}+e^{e^{5-x}}\left(36x^2-18x+e^{4x}\left(1+9e^{5-x}\right)\right)\right)}{16+e^{e^{5-x}}}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{9}\int \frac{e^{-4x}\left(576x^2-288x+16e^{4x}+e^{e^{5-x}}\left(36x^2-18x+e^{4x}\left(1+9e^{5-x}\right)\right)\right)}{16+e^{e^{5-x}}}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{9}\int \left(18e^{-4x}x(2x-1)+\frac{9e^{-x+e^{5-x}+5}}{16+e^{e^{5-x}}}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{9}\left(9e^{-4x}x^2-x+9\log\left(e^{e^{5-x}}+16\right)\right)$$

input
```
Int[(-16*E^(4*x) + 288*x - 576*x^2 + E^E^(5 - x)*(E^(4*x)*(-1 - 9*E^(5 - x
)) + 18*x - 36*x^2))/(144*E^(4*x) + 9*E^(E^(5 - x) + 4*x)),x]
```

output
```
(-x + (9*x^2)/E^(4*x) + 9*Log[16 + E^E^(5 - x)])/9
```

3.94.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.94.4 Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.74

method	result	size
risch	$-\frac{x}{9}+x^{2} \mathrm{e}^{-4 x}+\ln\left(16+\mathrm{e}^{\mathrm{e}^{5-x}}\right)$	23
parallelrisch	$\frac{\left(9 \ln\left(16+\mathrm{e}^{\mathrm{e}^{5-x}}\right) \mathrm{e}^{4 x}+9 x^{2}-x\,\mathrm{e}^{4 x}\right) \mathrm{e}^{-4 x}}{9}$	38

input
```
int((((-9*exp(5-x)-1)*exp(4*x)-36*x^2+18*x)*exp(exp(5-x))-16*exp(4*x)-576*
x^2+288*x)/(9*exp(4*x)*exp(exp(5-x))+144*exp(4*x)),x,method=_RETURNVERBOSE
)
```

output
```
-1/9*x+x^2*exp(-4*x)+ln(16+exp(exp(5-x)))
```

3.94.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(23) = 46$.

Time = 0.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.52

$$\int \frac{-16e^{4x}+288x-576x^2+e^{e^{5-x}}(e^{4x}(-1-9e^{5-x})+18x-36x^2)}{144e^{4x}+9e^{e^{5-x}+4x}}\,dx$$
$$=\frac{1}{9}\left(9\,x^2e^{(-4\,x+20)}-37\,xe^{20}+9\,e^{20}\log\left(\left(16\,e^{20}+e^{\left(e^{(-x+5)}+20\right)}\right)e^{(4\,x-20)}\right)\right)e^{(-20)}$$

input
```
integrate((((-9*exp(5-x)-1)*exp(4*x)-36*x^2+18*x)*exp(exp(5-x))-16*exp(4*x
)-576*x^2+288*x)/(9*exp(4*x)*exp(exp(5-x))+144*exp(4*x)),x, algorithm=\
```

output
```
1/9*(9*x^2*e^(-4*x + 20) - 37*x*e^20 + 9*e^20*log((16*e^20 + e^(e^(-x + 5)
 + 20))*e^(4*x - 20)))*e^(-20)
```

3.94.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{-16e^{4x}+288x-576x^2+e^{e^{5-x}}(e^{4x}(-1-9e^{5-x})+18x-36x^2)}{144e^{4x}+9e^{e^{5-x}+4x}}\,dx$$
$$=x^2e^{-4x}-\frac{x}{9}+\log\left(e^{\frac{e^5}{\sqrt[4]{e^{4x}}}}+16\right)$$

input
```
integrate((((-9*exp(5-x)-1)*exp(4*x)-36*x**2+18*x)*exp(exp(5-x))-16*exp(4*
x)-576*x**2+288*x)/(9*exp(4*x)*exp(exp(5-x))+144*exp(4*x)),x)
```

output
```
x**2*exp(-4*x) - x/9 + log(exp(exp(5)/exp(4*x)**(1/4)) + 16)
```

3.94.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.45

$$\int \frac{-16e^{4x}+288x-576x^2+e^{e^{5-x}}(e^{4x}(-1-9e^{5-x})+18x-36x^2)}{144e^{4x}+9e^{e^{5-x}+4x}}\,dx$$
$$= -\frac{1}{9}\,x + \log\left(e^{\left(e^{(-x+5)}\right)} + 16\right)$$

input
```
integrate((((-9*exp(5-x)-1)*exp(4*x)-36*x^2+18*x)*exp(exp(5-x))-16*exp(4*x
)-576*x^2+288*x)/(9*exp(4*x)*exp(exp(5-x))+144*exp(4*x)),x, algorithm=\
```

output
```
-1/9*x + log(e^(e^(-x + 5)) + 16)
```

3.94.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(23) = 46.

Time = 0.28 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.87

$$\int \frac{-16e^{4x}+288x-576x^2+e^{e^{5-x}}(e^{4x}(-1-9e^{5-x})+18x-36x^2)}{144e^{4x}+9e^{e^{5-x}+4x}}\,dx$$
$$= \frac{1}{9}\left(9\,(x-5)^2e^{(-4\,x+20)} - (x-5)e^{20} + 90\,(x-5)e^{(-4\,x+20)} + 9\,e^{20}\log\left(e^{\left(e^{(-x+5)}\right)} + 16\right) + 225\,e^{(-4\,x+20)}\right)e^{(-$$

input
```
integrate((((-9*exp(5-x)-1)*exp(4*x)-36*x^2+18*x)*exp(exp(5-x))-16*exp(4*x
)-576*x^2+288*x)/(9*exp(4*x)*exp(exp(5-x))+144*exp(4*x)),x, algorithm=\
```

output
```
1/9*(9*(x - 5)^2*e^(-4*x + 20) - (x - 5)*e^20 + 90*(x - 5)*e^(-4*x + 20) +
 9*e^20*log(e^(e^(-x + 5)) + 16) + 225*e^(-4*x + 20))*e^(-20)
```

3.94.9 Mupad [B] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.74

$$\int \frac{-16e^{4x}+288x-576x^2+e^{e^{5-x}}(e^{4x}(-1-9e^{5-x})+18x-36x^2)}{144e^{4x}+9e^{e^{5-x}+4x}}\,dx$$
$$= \ln\left(\mathrm{e}^{\mathrm{e}^{-x}\,\mathrm{e}^5} + 16\right) - \frac{x}{9} + x^2\,\mathrm{e}^{-4\,x}$$

input
```
int(-(16*exp(4*x) - 288*x + exp(exp(5 - x))*(36*x^2 - 18*x + exp(4*x)*(9*e
xp(5 - x) + 1)) + 576*x^2)/(144*exp(4*x) + 9*exp(exp(5 - x))*exp(4*x)),x)
```

output
```
log(exp(exp(-x)*exp(5)) + 16) - x/9 + x^2*exp(-4*x)
```

3.94. $\int \frac{-16e^{4x}+288x-576x^2+e^{e^{5-x}}\left(e^{4x}\left(-1-9e^{5-x}\right)+18x-36x^2\right)}{144e^{4x}+9e^{e^{5-x}+4x}}\,dx$

3.95 $\int \frac{30+30x+e^4(10+25x+15x^2)+(3x+e^4(-15x-15x^2))\log(x)+e^4(15+15}{e^4(15x+15x^2)\log^2(x)}$

3.95.1 Optimal result

Integrand size = 81, antiderivative size = 29

$$\int \frac{30+30x+e^4(10+25x+15x^2)+(3x+e^4(-15x-15x^2))\log(x)+e^4(15+15x)\log^2(x)+(-3-3x)\log}{e^4(15x+15x^2)\log^2(x)}$$

$$=\log(x)+\frac{-\frac{2}{3}-x+\frac{-2+\frac{1}{5}\log(1+x)}{e^4}}{\log(x)}$$

output
```
ln(x)+(-2/3+(1/5*ln(1+x)-2)/exp(4)-x)/ln(x)
```

3.95.2 Mathematica [A] (verified)

Time = 0.84 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45

$$\int \frac{30+30x+e^4(10+25x+15x^2)+(3x+e^4(-15x-15x^2))\log(x)+e^4(15+15x)\log^2(x)+(-3-3x)\log}{e^4(15x+15x^2)\log^2(x)}$$

$$=-\frac{6+2e^4+3e^4x}{3e^4\log(x)}+\log(x)+\frac{\log(1+x)}{5e^4\log(x)}$$

input
```
Integrate[(30 + 30*x + E^4*(10 + 25*x + 15*x^2) + (3*x + E^4*(-15*x - 15*x
^2))*Log[x] + E^4*(15 + 15*x)*Log[x]^2 + (-3 - 3*x)*Log[1 + x])/(E^4*(15*x
 + 15*x^2)*Log[x]^2),x]
```

output
```
-1/3*(6 + 2*E^4 + 3*E^4*x)/(E^4*Log[x]) + Log[x] + Log[1 + x]/(5*E^4*Log[x
])
```

3.95.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^4(15x^2+25x+10)+(e^4(-15x^2-15x)+3x)\log(x)+30x+e^4(15x+15)\log^2(x)+(-3x-3)\log(x+1)+}{e^4(15x^2+15x)\log^2(x)}$$

$$\Big\downarrow \ 27$$

$$\frac{\int \frac{15e^4(x+1)\log^2(x)+3(x-5e^4(x^2+x))\log(x)+30x+5e^4(3x^2+5x+2)-3(x+1)\log(x+1)+30}{15(x^2+x)\log^2(x)}dx}{e^4}$$

$$\Big\downarrow \ 27$$

$$\frac{\int \frac{15e^4(x+1)\log^2(x)+3(x-5e^4(x^2+x))\log(x)+30x+5e^4(3x^2+5x+2)-3(x+1)\log(x+1)+30}{(x^2+x)\log^2(x)}dx}{15e^4}$$

$$\Big\downarrow \ 2026$$

$$\frac{\int \frac{15e^4(x+1)\log^2(x)+3(x-5e^4(x^2+x))\log(x)+30x+5e^4(3x^2+5x+2)-3(x+1)\log(x+1)+30}{x(x+1)\log^2(x)}dx}{15e^4}$$

$$\Big\downarrow \ 7293$$

$$\frac{\int \left(\frac{-15e^4\log(x)x^2+15e^4x^2+15e^4\log^2(x)x+3(1-5e^4)\log(x)x+30\left(1+\frac{5e^4}{6}\right)x+15e^4\log^2(x)+30\left(1+\frac{e^4}{3}\right)}{x(x+1)\log^2(x)}-\frac{3\log(x+1)}{x\log^2(x)}\right)dx}{15e^4}$$

$$\Big\downarrow \ 2009$$

$$\frac{-3\int \frac{\log(x+1)}{x\log^2(x)}dx-3\int \frac{5e^4x+5e^4-1}{(x+1)\log(x)}dx+15e^4\,\text{LogIntegral}(x)-\frac{15e^4x}{\log(x)}+15e^4\log(x)-\frac{10(3+e^4)}{\log(x)}}{15e^4}$$

input
```
Int[(30 + 30*x + E^4*(10 + 25*x + 15*x^2) + (3*x + E^4*(-15*x - 15*x^2))*L
og[x] + E^4*(15 + 15*x)*Log[x]^2 + (-3 - 3*x)*Log[1 + x])/(E^4*(15*x + 15*
x^2)*Log[x]^2),x]
```

output
```
$Aborted
```

3.95.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.95.4 Maple [A] (verified)

Time = 3.19 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24

method	result	size
parallelrisch	$-\frac{{\mathrm e}^{-4} \left(-15 \,{\mathrm e}^{4} \ln \left(x \right)^{2}+15 x \,{\mathrm e}^{4}+30+10 \,{\mathrm e}^{4}-3 \ln \left(1+x \right)\right)}{15 \ln \left(x \right)}$	36
risch	$\frac{{\mathrm e}^{-4} \ln \left(1+x \right)}{5 \ln \left(x \right)}+\frac{{\mathrm e}^{-4} \left(3 \,{\mathrm e}^{4} \ln \left(x \right)^{2}-3 x \,{\mathrm e}^{4}-2 \,{\mathrm e}^{4}-6\right)}{3 \ln \left(x \right)}$	41
default	$\frac{{\mathrm e}^{-4} \left(\frac{3 \ln \left(1+x \right)}{\ln \left(x \right)}-\frac{10 \,{\mathrm e}^{4}+30}{\ln \left(x \right)}+15 \,{\mathrm e}^{4} \left(-\frac{x}{\ln \left(x \right)}-\operatorname{Ei}_{1}\left(-\ln \left(x \right)\right)\right)+15 \,{\mathrm e}^{4} \ln \left(x \right)+15 \,{\mathrm e}^{4} \operatorname{Ei}_{1}\left(-\ln \left(x \right)\right)\right)}{15}$	66

input
```
int(((-3*x-3)*ln(1+x)+(15*x+15)*exp(4)*ln(x)^2+((-15*x^2-15*x)*exp(4)+3*x)
*ln(x)+(15*x^2+25*x+10)*exp(4)+30*x+30)/(15*x^2+15*x)/exp(4)/ln(x)^2,x,met
hod=_RETURNVERBOSE)
```

output
```
-1/15/exp(4)*(-15*exp(4)*ln(x)^2+15*x*exp(4)+30+10*exp(4)-3*ln(1+x))/ln(x)
```

3.95.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

$$\int \frac{30+30x+e^4(10+25x+15x^2)+(3x+e^4(-15x-15x^2))\log(x)+e^4(15+15x)\log^2(x)+(-3-3x)\,\mathrm{lo}}{e^4\left(15x+15x^2\right)\log^2(x)}$$
$$=\frac{\left(15\,e^4\log\left(x\right)^2-5\left(3\,x+2\right)e^4+3\,\log\left(x+1\right)-30\right)e^{(-4)}}{15\,\log\left(x\right)}$$

input
```
integrate(((-3*x-3)*log(1+x)+(15*x+15)*exp(4)*log(x)^2+((-15*x^2-15*x)*exp
(4)+3*x)*log(x)+(15*x^2+25*x+10)*exp(4)+30*x+30)/(15*x^2+15*x)/exp(4)/log(
x)^2,x, algorithm=\
```

output
```
1/15*(15*e^4*log(x)^2 - 5*(3*x + 2)*e^4 + 3*log(x + 1) - 30)*e^(-4)/log(x)
```

3.95.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{30+30x+e^4(10+25x+15x^2)+(3x+e^4(-15x-15x^2))\log(x)+e^4(15+15x)\log^2(x)+(-3-3x)\,\mathrm{lo}}{e^4\left(15x+15x^2\right)\log^2(x)}$$
= Exception raised: TypeError

input
```
integrate(((-3*x-3)*ln(1+x)+(15*x+15)*exp(4)*ln(x)**2+((-15*x**2-15*x)*exp
(4)+3*x)*ln(x)+(15*x**2+25*x+10)*exp(4)+30*x+30)/(15*x**2+15*x)/exp(4)/ln(
x)**2,x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.95.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

$$\int \frac{30+30x+e^4(10+25x+15x^2)+(3x+e^4(-15x-15x^2))\log(x)+e^4(15+15x)\log^2(x)+(-3-3x)\,\mathrm{lo}}{e^4\left(15x+15x^2\right)\log^2(x)}$$
$$=\frac{\left(15\,e^4\log\left(x\right)^2-15\,xe^4-10\,e^4+3\,\log\left(x+1\right)-30\right)e^{(-4)}}{15\,\log\left(x\right)}$$

input
```
integrate(((-3*x-3)*log(1+x)+(15*x+15)*exp(4)*log(x)^2+((-15*x^2-15*x)*exp
(4)+3*x)*log(x)+(15*x^2+25*x+10)*exp(4)+30*x+30)/(15*x^2+15*x)/exp(4)/log(
x)^2,x, algorithm=\
```

output
```
1/15*(15*e^4*log(x)^2 - 15*x*e^4 - 10*e^4 + 3*log(x + 1) - 30)*e^(-4)/log(
x)
```

3.95.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

$$\int \frac{30+30x+e^4(10+25x+15x^2)+(3x+e^4(-15x-15x^2))\log(x)+e^4(15+15x)\log^2(x)+(-3-3x)\,\mathrm{lo}}{e^4\,(15x+15x^2)\log^2(x)}$$
$$=\frac{\left(15\,e^4\log\left(x\right)^2-15\,xe^4-10\,e^4+3\,\log\left(x+1\right)-30\right)e^{(-4)}}{15\,\log\left(x\right)}$$

input
```
integrate(((-3*x-3)*log(1+x)+(15*x+15)*exp(4)*log(x)^2+((-15*x^2-15*x)*exp
(4)+3*x)*log(x)+(15*x^2+25*x+10)*exp(4)+30*x+30)/(15*x^2+15*x)/exp(4)/log(
x)^2,x, algorithm=\
```

output
```
1/15*(15*e^4*log(x)^2 - 15*x*e^4 - 10*e^4 + 3*log(x + 1) - 30)*e^(-4)/log(
x)
```

3.95.9 Mupad [B] (verification not implemented)

Time = 14.46 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{30+30x+e^4(10+25x+15x^2)+(3x+e^4(-15x-15x^2))\log(x)+e^4(15+15x)\log^2(x)+(-3-3x)\,\mathrm{lo}}{e^4\,(15x+15x^2)\log^2(x)}$$
$$=\ln\left(x\right)-\frac{\mathrm{e}^{-4}\left(10\,\mathrm{e}^4-3\,\ln\left(x+1\right)+15\,x\,\mathrm{e}^4+30\right)}{15\,\ln\left(x\right)}$$

input
```
int((exp(-4)*(30*x + exp(4)*(25*x + 15*x^2 + 10) + log(x)*(3*x - exp(4)*(1
5*x + 15*x^2)) - log(x + 1)*(3*x + 3) + exp(4)*log(x)^2*(15*x + 15) + 30))
/(log(x)^2*(15*x + 15*x^2)),x)
```

output
```
log(x) - (exp(-4)*(10*exp(4) - 3*log(x + 1) + 15*x*exp(4) + 30))/(15*log(x
))
```

3.96 $\int \frac{-196608-49152e-4608e^2-192e^3-3e^4-x^2}{x^2} dx$

3.96.1 Optimal result

Integrand size = 29, antiderivative size = 23

$$\int \frac{-196608-49152e-4608e^2-192e^3-3e^4-x^2}{x^2} dx = \frac{11}{5}+2\left(\frac{3(16+e)^4}{2x}-x\right)+x$$

output
```
3/x*(16+exp(1))^4-x+11/5
```

3.96.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.61

$$\int \frac{-196608-49152e-4608e^2-192e^3-3e^4-x^2}{x^2} dx = \frac{3(16+e)^4}{x}-x$$

input
```
Integrate[(-196608 - 49152*E - 4608*E^2 - 192*E^3 - 3*E^4 - x^2)/x^2,x]
```

output
```
(3*(16 + E)^4)/x - x
```

3.96.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.61, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.069, Rules used = {244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2-3e^4-192e^3-4608e^2-49152e-196608}{x^2}\,dx$$

$$\Big\downarrow \; 244$$

$$\int \left(-\frac{3(16+e)^4}{x^2}-1\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{3(16+e)^4}{x}-x$$

input
```
Int[(-196608 - 49152*E - 4608*E^2 - 192*E^3 - 3*E^4 - x^2)/x^2,x]
```

output
```
(3*(16 + E)^4)/x - x
```

3.96.3.1 Defintions of rubi rules used

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.96.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

method	result	size
default	$-x-\frac{-4608\,\mathrm{e}^{2}-49152\,\mathrm{e}-3\,\mathrm{e}^{4}-192\,\mathrm{e}^{3}-196608}{x}$	28
gosper	$\frac{-x^{2}+4608\,\mathrm{e}^{2}+49152\,\mathrm{e}+3\,\mathrm{e}^{4}+192\,\mathrm{e}^{3}+196608}{x}$	34
parallelrisch	$\frac{-x^{2}+4608\,\mathrm{e}^{2}+49152\,\mathrm{e}+3\,\mathrm{e}^{4}+192\,\mathrm{e}^{3}+196608}{x}$	34
risch	$-x+\frac{4608\,\mathrm{e}^{2}}{x}+\frac{49152\,\mathrm{e}}{x}+\frac{3\,\mathrm{e}^{4}}{x}+\frac{192\,\mathrm{e}^{3}}{x}+\frac{196608}{x}$	38

input
```
int((-3*exp(1)^4-192*exp(1)^3-4608*exp(1)^2-49152*exp(1)-x^2-196608)/x^2,x
,method=_RETURNVERBOSE)
```

output
```
-x-(-4608*exp(2)-49152*exp(1)-3*exp(4)-192*exp(3)-196608)/x
```

3.96.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{-196608-49152e-4608e^2-192e^3-3e^4-x^2}{x^2}\,dx = -\frac{x^{2}-3\,e^{4}-192\,e^{3}-4608\,e^{2}-49152\,e-196608}{x}$$

input
```
integrate((-3*exp(1)^4-192*exp(1)^3-4608*exp(1)^2-49152*exp(1)-x^2-196608)
/x^2,x, algorithm=\
```

output
```
-(x^2 - 3*e^4 - 192*e^3 - 4608*e^2 - 49152*e - 196608)/x
```

3.96.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{-196608-49152e-4608e^2-192e^3-3e^4-x^2}{x^2}\,dx = -x-\frac{-196608-49152e-4608e^2-192e^3-3e^4}{x}$$

input
```
integrate((-3*exp(1)**4-192*exp(1)**3-4608*exp(1)**2-49152*exp(1)-x**2-196
608)/x**2,x)
```

output
```
-x - (-196608 - 49152*E - 4608*exp(2) - 192*exp(3) - 3*exp(4))/x
```

3.96.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{-196608-49152e-4608e^2-192e^3-3e^4-x^2}{x^2}\,dx = -x+\frac{3\,(e^4+64\,e^3+1536\,e^2+16384\,e+65536)}{x}$$

input
```
integrate((-3*exp(1)^4-192*exp(1)^3-4608*exp(1)^2-49152*exp(1)-x^2-196608)
/x^2,x, algorithm=\
```

output
```
-x + 3*(e^4 + 64*e^3 + 1536*e^2 + 16384*e + 65536)/x
```

3.96.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{-196608-49152e-4608e^2-192e^3-3e^4-x^2}{x^2}\,dx = -x+\frac{3\,(e^4+64\,e^3+1536\,e^2+16384\,e+65536)}{x}$$

input
```
integrate((-3*exp(1)^4-192*exp(1)^3-4608*exp(1)^2-49152*exp(1)-x^2-196608)
/x^2,x, algorithm=\
```

output
```
-x + 3*(e^4 + 64*e^3 + 1536*e^2 + 16384*e + 65536)/x
```

3.96.9 Mupad [B] (verification not implemented)

Time = 13.74 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{-196608-49152e-4608e^2-192e^3-3e^4-x^2}{x^2} \, dx = \frac{3\,(\mathrm{e}+16)^4}{x}-x$$

input
```
int(-(49152*exp(1) + 4608*exp(2) + 192*exp(3) + 3*exp(4) + x^2 + 196608)/x
^2,x)
```

output
```
(3*(exp(1) + 16)^4)/x - x
```

3.97 $\int \frac{e^{-x}\left(2+(-1+e^x)\log(x)-x\log^2(x)-x\log(x)\log\left(\frac{100\log^2(x)}{x^2}\right)\right)}{x\log(x)}\,dx$

3.97.1 Optimal result

Integrand size = 45, antiderivative size = 22

$$\int \frac{e^{-x}\left(2+(-1+e^x)\log(x)-x\log^2(x)-x\log(x)\log\left(\frac{100\log^2(x)}{x^2}\right)\right)}{x\log(x)}\,dx = \log(x)+e^{-x}\left(\log(x)+\log\left(\frac{100\log^2(x)}{x^2}\right)\right)$$

output
```
ln(x)+(ln(100*ln(x)^2/x^2)+ln(x))/exp(x)
```

3.97.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{e^{-x}\left(2+(-1+e^x)\log(x)-x\log^2(x)-x\log(x)\log\left(\frac{100\log^2(x)}{x^2}\right)\right)}{x\log(x)}\,dx = \log(x)+e^{-x}\log(x)+e^{-x}\log\left(\frac{100\log^2(x)}{x^2}\right)$$

input
```
Integrate[(2 + (-1 + E^x)*Log[x] - x*Log[x]^2 - x*Log[x]*Log[(100*Log[x]^2
)/x^2])/(E^x*x*Log[x]),x]
```

output
```
Log[x] + Log[x]/E^x + Log[(100*Log[x]^2)/x^2]/E^x
```

3.97.3 Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.68, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.044$, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(-x\log\left(\frac{100\log^2(x)}{x^2}\right)\log(x)-x\log^2(x)+(e^x-1)\log(x)+2\right)}{x\log(x)}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{e^{-x}\left(-x\log\left(\frac{100\log^2(x)}{x^2}\right)\log(x)-x\log^2(x)-\log(x)+2\right)}{x\log(x)}+\frac{1}{x}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{e^{-x}\left(x\log\left(\frac{100\log^2(x)}{x^2}\right)\log(x)+x\log^2(x)\right)}{x\log(x)}+\log(x)$$

input
```
Int[(2 + (-1 + E^x)*Log[x] - x*Log[x]^2 - x*Log[x]*Log[(100*Log[x]^2)/x^2]
)/(E^x*x*Log[x]),x]
```

output
```
Log[x] + (x*Log[x]^2 + x*Log[x]*Log[(100*Log[x]^2)/x^2])/(E^x*x*Log[x])
```

3.97.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.97.4 Maple [A] (verified)

Time = 1.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

method	result
parallelrisch	$\left(e^{x} \ln\left(x\right)+\ln\left(x\right)+\ln\left(\frac{100 \ln(x)^{2}}{x^{2}}\right)\right) e^{-x}$
risch	$2\,e^{-x} \ln\left(\ln\left(x\right)\right)+\frac{\left(i\pi \operatorname{csgn}\left(i x^{2}\right)^{3}+2 i\pi \operatorname{csgn}\left(i \ln(x)^{2}\right)^{2} \operatorname{csgn}(i \ln(x))+i\pi \operatorname{csgn}\left(\frac{i \ln(x)^{2}}{x^{2}}\right)^{2} \operatorname{csgn}\left(\frac{i}{x^{2}}\right)-i\pi \operatorname{csgn}\left(i \ln(x)^{2}\right)\right.}{}$

input
```
int((-x*ln(x)*ln(100*ln(x)^2/x^2)-x*ln(x)^2+(exp(x)-1)*ln(x)+2)/x/exp(x)/l
n(x),x,method=_RETURNVERBOSE)
```

output
```
(exp(x)*ln(x)+ln(x)+ln(100*ln(x)^2/x^2))/exp(x)
```

3.97.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{e^{-x}\left(2+\left(-1+e^{x}\right)\log(x)-x\log^{2}(x)-x\log(x)\log\left(\frac{100\log^{2}(x)}{x^{2}}\right)\right)}{x\log(x)}\,dx = \left(\left(e^{x}+1\right)\log\left(x\right)+\log\left(\frac{100\,\log\left(x\right)^{2}}{x^{2}}\right)\right)e^{\left(-x\right)}$$

input
```
integrate((-x*log(x)*log(100*log(x)^2/x^2)-x*log(x)^2+(exp(x)-1)*log(x)+2)
/x/exp(x)/log(x),x, algorithm=\
```

output
```
((e^x + 1)*log(x) + log(100*log(x)^2/x^2))*e^(-x)
```

3.97.6 Sympy [A] (verification not implemented)

Time = 5.03 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{e^{-x}\left(2+(-1+e^x)\log(x)-x\log^2(x)-x\log(x)\log\left(\frac{100\log^2(x)}{x^2}\right)\right)}{x\log(x)}\,dx = \left(\log\left(x\right)+\log\left(\frac{100\log\left(x\right)^2}{x^2}\right)\right)e^{-x}+\log\left(x\right)$$

input
```
integrate((-x*ln(x)*ln(100*ln(x)**2/x**2)-x*ln(x)**2+(exp(x)-1)*ln(x)+2)/x
/exp(x)/ln(x),x)
```

output
```
(log(x) + log(100*log(x)**2/x**2))*exp(-x) + log(x)
```

3.97.7 Maxima [F]

$$\int \frac{e^{-x}\left(2+(-1+e^x)\log(x)-x\log^2(x)-x\log(x)\log\left(\frac{100\log^2(x)}{x^2}\right)\right)}{x\log(x)}\,dx = \int -\frac{\left(x\log\left(x\right)^2+x\log\left(x\right)\log\left(\frac{100\,\log(x)^2}{x^2}\right)-(e^x-1)\log\left(x\right)-2\right)e^{(-x)}}{x\log\left(x\right)}\,dx$$

input
```
integrate((-x*log(x)*log(100*log(x)^2/x^2)-x*log(x)^2+(exp(x)-1)*log(x)+2)
/x/exp(x)/log(x),x, algorithm=\
```

output
```
-(log(x) - 2*log(log(x)))*e^(-x) - Ei(-x) - integrate((2*x*(log(5) + log(2
)) - 1)*e^(-x)/x, x) + log(x)
```

3.97.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{e^{-x}\left(2+(-1+e^x)\log(x)-x\log^2(x)-x\log(x)\log\left(\frac{100\log^2(x)}{x^2}\right)\right)}{x\log(x)}\,dx = e^{(-x)}\log\left(100\log(x)^2\right)-e^{(-x)}\log(x)+\log(x)$$

input
```
integrate((-x*log(x)*log(100*log(x)^2/x^2)-x*log(x)^2+(exp(x)-1)*log(x)+2)
/x/exp(x)/log(x),x, algorithm=\
```

output
```
e^(-x)*log(100*log(x)^2) - e^(-x)*log(x) + log(x)
```

3.97.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-x}\left(2+(-1+e^x)\log(x)-x\log^2(x)-x\log(x)\log\left(\frac{100\log^2(x)}{x^2}\right)\right)}{x\log(x)}\,dx = \int -\frac{e^{-x}\left(x\ln(x)^2-\ln(x)\left(e^x-1\right)+x\ln(x)\ln\left(\frac{100\ln(x)^2}{x^2}\right)-2\right)}{x\ln(x)}\,dx$$

input
```
int(-(exp(-x)*(x*log(x)^2 - log(x)*(exp(x) - 1) + x*log(x)*log((100*log(x)
^2)/x^2) - 2))/(x*log(x)),x)
```

output
```
int(-(exp(-x)*(x*log(x)^2 - log(x)*(exp(x) - 1) + x*log(x)*log((100*log(x)
^2)/x^2) - 2))/(x*log(x)), x)
```

3.98 $\int \frac{1}{18}\left(e^4x+e^4x\log\left(\frac{x^2}{5}\right)\right)\,dx$

3.98.1 Optimal result

Integrand size = 23, antiderivative size = 18

$$\int \frac{1}{18}\left(e^4x+e^4x\log\left(\frac{x^2}{5}\right)\right)\,dx=\frac{1}{36}e^4x^2\log\left(\frac{x^2}{5}\right)$$

output
```
1/36*x^2*ln(1/5*x^2)*exp(4)
```

3.98.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{1}{18}\left(e^4x+e^4x\log\left(\frac{x^2}{5}\right)\right)\,dx=\frac{1}{36}e^4x^2\log\left(\frac{x^2}{5}\right)$$

input
```
Integrate[(E^4*x + E^4*x*Log[x^2/5])/18,x]
```

output
```
(E^4*x^2*Log[x^2/5])/36
```

3.98.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{18}\left(e^4 x \log\left(\frac{x^2}{5}\right)+e^4 x\right) dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{18}\int \left(e^4 \log\left(\frac{x^2}{5}\right) x+e^4 x\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{36}e^4 x^2 \log\left(\frac{x^2}{5}\right)$$

input
```
Int[(E^4*x + E^4*x*Log[x^2/5])/18,x]
```

output
```
(E^4*x^2*Log[x^2/5])/36
```

3.98.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.98.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

method	result	size
norman	$\frac{x^2 \ln\left(\frac{x^2}{5}\right) e^4}{36}$	14
risch	$\frac{x^2 \ln\left(\frac{x^2}{5}\right) e^4}{36}$	14
parallelrisch	$\frac{x^2 \ln\left(\frac{x^2}{5}\right) e^4}{36}$	14
default	$\frac{x^2 e^4}{36} + \frac{e^4 \left(\frac{x^2 \ln\left(\frac{x^2}{5}\right)}{2} - \frac{x^2}{2}\right)}{18}$	30
parts	$\frac{x^2 e^4}{36} + \frac{e^4 \left(\frac{x^2 \ln\left(\frac{x^2}{5}\right)}{2} - \frac{x^2}{2}\right)}{18}$	30

input
```
int(1/18*x*exp(4)*ln(1/5*x^2)+1/18*x*exp(4),x,method=_RETURNVERBOSE)
```

output
```
1/36*x^2*ln(1/5*x^2)*exp(4)
```

3.98.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int \frac{1}{18}\left(e^4 x + e^4 x \log\left(\frac{x^2}{5}\right)\right) dx = \frac{1}{36} x^2 e^4 \log\left(\frac{1}{5} x^2\right)$$

input
```
integrate(1/18*x*exp(4)*log(1/5*x^2)+1/18*x*exp(4),x, algorithm=\
```

output
```
1/36*x^2*e^4*log(1/5*x^2)
```

3.98.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{1}{18}\left(e^4x+e^4x\log\left(\frac{x^2}{5}\right)\right)\,dx=\frac{x^2e^4\log\left(\frac{x^2}{5}\right)}{36}$$

input
```
integrate(1/18*x*exp(4)*ln(1/5*x**2)+1/18*x*exp(4),x)
```

output
```
x**2*exp(4)*log(x**2/5)/36
```

3.98.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 28 vs. 2(13) = 26.

Time = 0.19 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.56

$$\int \frac{1}{18}\left(e^4x+e^4x\log\left(\frac{x^2}{5}\right)\right)\,dx=\frac{1}{36}\,x^2e^4+\frac{1}{36}\left(x^2\log\left(\frac{1}{5}\,x^2\right)-x^2\right)e^4$$

input
```
integrate(1/18*x*exp(4)*log(1/5*x^2)+1/18*x*exp(4),x, algorithm=\
```

output
```
1/36*x^2*e^4 + 1/36*(x^2*log(1/5*x^2) - x^2)*e^4
```

3.98.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 28 vs. 2(13) = 26.

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.56

$$\int \frac{1}{18}\left(e^4x+e^4x\log\left(\frac{x^2}{5}\right)\right)\,dx=\frac{1}{36}\,x^2e^4+\frac{1}{36}\left(x^2\log\left(\frac{1}{5}\,x^2\right)-x^2\right)e^4$$

input
```
integrate(1/18*x*exp(4)*log(1/5*x^2)+1/18*x*exp(4),x, algorithm=\
```

output
```
1/36*x^2*e^4 + 1/36*(x^2*log(1/5*x^2) - x^2)*e^4
```

3.98.9 Mupad [B] (verification not implemented)

Time = 13.50 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{1}{18}\left(e^4x+e^4x\log\left(\frac{x^2}{5}\right)\right)\,dx=\frac{x^2\,\mathrm{e}^4\,\left(\ln\left(x^2\right)-\ln\left(5\right)\right)}{36}$$

input
```
int((x*exp(4))/18 + (x*exp(4)*log(x^2/5))/18,x)
```

output
```
(x^2*exp(4)*(log(x^2) - log(5)))/36
```

3.99 $\int \frac{}{91125000-2186392500x+21860281350x^2-116581690799x^3+34976450}$

3.99.1 Optimal result

Integrand size = 158, antiderivative size = 25

$$\int \frac{}{91125000-2186392500x+21860281350x^2-116581690799x^3+349764501600x^4-559716480000x^5+}$$
$$=\frac{1}{\left(x+\frac{225(2+e^x)(-x+4x^2)^2}{x^2}\right)^2}$$

output
```
1/(x+225*(4*x^2-x)^2/x^2*(exp(x)+2))^2
```

3.99.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{}{91125000-2186392500x+21860281350x^2-116581690799x^3+349764501600x^4-559716480000x^5+}$$
$$=\frac{1}{(450+225e^x(1-4x)^2-3599x+7200x^2)^2}$$

3.99.
$\int \frac{}{91125000-2186392500x+21860281350x^2-116581690799x^3+349764501600x^4-559716480000x^5+373248000000x^6+e^{3x}(11390625-273375000x}$

input
```
Integrate[(7198 - 28800*x + E^x*(3150 - 10800*x - 7200*x^2))/(91125000 - 2
186392500*x + 21860281350*x^2 - 116581690799*x^3 + 349764501600*x^4 - 5597
16480000*x^5 + 373248000000*x^6 + E^(3*x)*(11390625 - 273375000*x + 273375
0000*x^2 - 14580000000*x^3 + 43740000000*x^4 - 69984000000*x^5 + 466560000
00*x^6) + E^(2*x)*(68343750 - 1640098125*x + 16400070000*x^2 - 87465420000
*x^3 + 262401120000*x^4 - 419865120000*x^5 + 279936000000*x^6) + E^x*(1366
87500 - 3279892500*x + 32795280675*x^2 - 174901685400*x^3 + 524724490800*x
^4 - 839652480000*x^5 + 559872000000*x^6)),x]
```

output
```
(450 + 225*E^x*(1 - 4*x)^2 - 3599*x + 7200*x^2)^(-2)
```

3.99.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{}{373248000000x^6 - 559716480000x^5 + 349764501600x^4 - 116581690799x^3 + 21860281350x^2 + e^{3x}(466560000}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-450e^x(16x^2+24x-7)-28800x+7198}{(7200x^2+225e^x(1-4x)^2-3599x+450)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2(28800x^3-21596x^2+5403x-449)}{(4x-1)(3600e^xx^2+7200x^2-1800e^xx-3599x+225e^x+450)^3} - \frac{2(4x+7)}{(4x-1)(3600e^xx^2+7200x^2-1800e^x}\right.$$

$$\Big\downarrow \text{2009}$$

$$902\int \frac{1}{(3600e^xx^2+7200x^2-1800e^xx-3599x+225e^x+450)^3}dx - 7198\int \frac{x}{(3600e^xx^2+7200x^2-1800e^xx-3599x+225e^x+450)^3}dx + 14400\int \frac{x^2}{(3600e^xx^2+7200x^2-1800e^xx-3599x+225e^x+450)^3}dx + 4\int \frac{1}{(4x-1)(3600e^xx^2+7200x^2-1800e^xx-3599x+225e^x+450)^3}dx - 2\int \frac{1}{(3600e^xx^2+7200x^2-1800e^xx-3599x+225e^x+450)^2}dx - 16\int \frac{1}{(4x-1)(3600e^xx^2+7200x^2-1800e^xx-3599x+225e^x+450)^2}dx$$

3.99.

$$\int \frac{}{91125000-2186392500x+21860281350x^2-116581690799x^3+349764501600x^4-559716480000x^5+373248000000x^6+e^{3x}(11390625-273375000x}$$

input
```
Int[(7198 - 28800*x + E^x*(3150 - 10800*x - 7200*x^2))/(91125000 - 2186392
500*x + 21860281350*x^2 - 116581690799*x^3 + 349764501600*x^4 - 5597164800
00*x^5 + 373248000000*x^6 + E^(3*x)*(11390625 - 273375000*x + 2733750000*x
^2 - 14580000000*x^3 + 43740000000*x^4 - 69984000000*x^5 + 46656000000*x^6
) + E^(2*x)*(68343750 - 1640098125*x + 16400070000*x^2 - 87465420000*x^3 +
 262401120000*x^4 - 419865120000*x^5 + 279936000000*x^6) + E^x*(136687500
- 3279892500*x + 32795280675*x^2 - 174901685400*x^3 + 524724490800*x^4 - 8
39652480000*x^5 + 559872000000*x^6)),x]
```

output
```
$Aborted
```

3.99.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.99.4 Maple [A] (verified)

Time = 0.41 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

method	result
norman	$\frac{1}{\left(3600\,\mathrm{e}^{x} x^{2}-1800\,\mathrm{e}^{x} x+7200 x^{2}+225\,\mathrm{e}^{x}-3599 x+450\right)^{2}}$
risch	$\frac{1}{\left(3600\,\mathrm{e}^{x} x^{2}-1800\,\mathrm{e}^{x} x+7200 x^{2}+225\,\mathrm{e}^{x}-3599 x+450\right)^{2}}$
parallelrisch	$\frac{1}{12960000\,\mathrm{e}^{2 x} x^{4}+51840000\,\mathrm{e}^{x} x^{4}-12960000\,\mathrm{e}^{2 x} x^{3}+51840000 x^{4}-51832800\,\mathrm{e}^{x} x^{3}+4860000\,\mathrm{e}^{2 x} x^{2}-51825600 x^{3}+19436400\,\mathrm{e}^{x} x^{2}}$

3.99.

$\int \frac{}{91125000-2186392500x+21860281350x^2-116581690799x^3+349764501600x^4-559716480000x^5+373248000000x^6+e^{3x}(11390625-273375000x}$

input
```
int(((-7200*x^2-10800*x+3150)*exp(x)-28800*x+7198)/((46656000000*x^6-69984
000000*x^5+43740000000*x^4-14580000000*x^3+2733750000*x^2-273375000*x+1139
0625)*exp(x)^3+(279936000000*x^6-419865120000*x^5+262401120000*x^4-8746542
0000*x^3+16400070000*x^2-1640098125*x+68343750)*exp(x)^2+(559872000000*x^6
-839652480000*x^5+524724490800*x^4-174901685400*x^3+32795280675*x^2-327989
2500*x+136687500)*exp(x)+373248000000*x^6-559716480000*x^5+349764501600*x^
4-116581690799*x^3+21860281350*x^2-2186392500*x+91125000),x,method=_RETURN
VERBOSE)
```

output
```
1/(3600*exp(x)*x^2-1800*exp(x)*x+7200*x^2+225*exp(x)-3599*x+450)^2
```

3.99.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(24) = 48$.

Time = 0.26 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.88

$$\int \frac{}{91125000 - 2186392500x + 21860281350x^2 - 116581690799x^3 + 349764501600x^4 - 559716480000x^5 + }$$

$$= \frac{1}{51840000\, x^4 - 51825600\, x^3 + 19432801\, x^2 + 50625\, (256\, x^4 - 256\, x^3 + 96\, x^2 - 16\, x + 1)e^{(2\,x)} + 450\, (1152}$$

input
```
integrate(((-7200*x^2-10800*x+3150)*exp(x)-28800*x+7198)/((46656000000*x^6
-69984000000*x^5+43740000000*x^4-14580000000*x^3+2733750000*x^2-273375000*
x+11390625)*exp(x)^3+(279936000000*x^6-419865120000*x^5+262401120000*x^4-8
7465420000*x^3+16400070000*x^2-1640098125*x+68343750)*exp(x)^2+(5598720000
00*x^6-839652480000*x^5+524724490800*x^4-174901685400*x^3+32795280675*x^2-
3279892500*x+136687500)*exp(x)+373248000000*x^6-559716480000*x^5+349764501
600*x^4-116581690799*x^3+21860281350*x^2-2186392500*x+91125000),x, algorit
hm=\
```

output
```
1/(51840000*x^4 - 51825600*x^3 + 19432801*x^2 + 50625*(256*x^4 - 256*x^3 +
 96*x^2 - 16*x + 1)*e^(2*x) + 450*(115200*x^4 - 115184*x^3 + 43192*x^2 - 7
199*x + 450)*e^x - 3239100*x + 202500)
```

3.99.

$$\int \frac{}{91125000-2186392500x+21860281350x^2-116581690799x^3+349764501600x^4-559716480000x^5+373248000000x^6+e^{3x}(11390625-273375000x}$$

3.99.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. 2(22) = 44.

Time = 0.35 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.80

$$\int \frac{}{91125000 - 2186392500x + 21860281350x^2 - 116581690799x^3 + 349764501600x^4 - 559716480000x^5 +}$$
$$= \frac{1}{51840000x^4 - 51825600x^3 + 19432801x^2 - 3239100x + (12960000x^4 - 12960000x^3 + 4860000x^2 - 8100}$$

input
```
integrate(((-7200*x**2-10800*x+3150)*exp(x)-28800*x+7198)/((46656000000*x*
*6-69984000000*x**5+43740000000*x**4-14580000000*x**3+2733750000*x**2-2733
75000*x+11390625)*exp(x)**3+(279936000000*x**6-419865120000*x**5+262401120
000*x**4-87465420000*x**3+16400070000*x**2-1640098125*x+68343750)*exp(x)**
2+(559872000000*x**6-839652480000*x**5+524724490800*x**4-174901685400*x**3
+32795280675*x**2-3279892500*x+136687500)*exp(x)+373248000000*x**6-5597164
80000*x**5+349764501600*x**4-116581690799*x**3+21860281350*x**2-2186392500
*x+91125000),x)
```

output
```
1/(51840000*x**4 - 51825600*x**3 + 19432801*x**2 - 3239100*x + (12960000*x
**4 - 12960000*x**3 + 4860000*x**2 - 810000*x + 50625)*exp(2*x) + (5184000
0*x**4 - 51832800*x**3 + 19436400*x**2 - 3239550*x + 202500)*exp(x) + 2025
00)
```

3.99.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(24) = 48.

Time = 0.38 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.88

$$\int \frac{}{91125000 - 2186392500x + 21860281350x^2 - 116581690799x^3 + 349764501600x^4 - 559716480000x^5 +}$$
$$= \frac{1}{51840000\,x^4 - 51825600\,x^3 + 19432801\,x^2 + 50625\,(256\,x^4 - 256\,x^3 + 96\,x^2 - 16\,x + 1)e^{(2\,x)} + 450\,(1152}$$

input
```
integrate(((-7200*x^2-10800*x+3150)*exp(x)-28800*x+7198)/((46656000000*x^6
-69984000000*x^5+43740000000*x^4-14580000000*x^3+2733750000*x^2-273375000*
x+11390625)*exp(x)^3+(279936000000*x^6-419865120000*x^5+262401120000*x^4-8
7465420000*x^3+16400070000*x^2-1640098125*x+68343750)*exp(x)^2+(5598720000
00*x^6-839652480000*x^5+524724490800*x^4-174901685400*x^3+32795280675*x^2-
3279892500*x+136687500)*exp(x)+373248000000*x^6-559716480000*x^5+349764501
600*x^4-116581690799*x^3+21860281350*x^2-2186392500*x+91125000),x, algorit
hm=\
```

output
```
1/(51840000*x^4 - 51825600*x^3 + 19432801*x^2 + 50625*(256*x^4 - 256*x^3 +
 96*x^2 - 16*x + 1)*e^(2*x) + 450*(115200*x^4 - 115184*x^3 + 43192*x^2 - 7
199*x + 450)*e^x - 3239100*x + 202500)
```

3.99.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 92 vs. $2(24) = 48$.

Time = 0.30 (sec) , antiderivative size = 92, normalized size of antiderivative = 3.68

$$\int \frac{}{91125000 - 2186392500x + 21860281350x^2 - 116581690799x^3 + 349764501600x^4 - 559716480000x^5 +}$$

$$= \frac{}{12960000\,x^4e^{(2\,x)} + 51840000\,x^4e^x + 51840000\,x^4 - 12960000\,x^3e^{(2\,x)} - 51832800\,x^3e^x - 51825600\,x^3 + 4}$$

input
```
integrate(((-7200*x^2-10800*x+3150)*exp(x)-28800*x+7198)/((46656000000*x^6
-69984000000*x^5+43740000000*x^4-14580000000*x^3+2733750000*x^2-273375000*
x+11390625)*exp(x)^3+(279936000000*x^6-419865120000*x^5+262401120000*x^4-8
7465420000*x^3+16400070000*x^2-1640098125*x+68343750)*exp(x)^2+(5598720000
00*x^6-839652480000*x^5+524724490800*x^4-174901685400*x^3+32795280675*x^2-
3279892500*x+136687500)*exp(x)+373248000000*x^6-559716480000*x^5+349764501
600*x^4-116581690799*x^3+21860281350*x^2-2186392500*x+91125000),x, algorit
hm=\
```

output
```
1/(12960000*x^4*e^(2*x) + 51840000*x^4*e^x + 51840000*x^4 - 12960000*x^3*e
^(2*x) - 51832800*x^3*e^x - 51825600*x^3 + 4860000*x^2*e^(2*x) + 19436400*
x^2*e^x + 19432801*x^2 - 810000*x*e^(2*x) - 3239550*x*e^x - 3239100*x + 50
625*e^(2*x) + 202500*e^x + 202500)
```

3.99.

$$\int \frac{}{91125000-2186392500x+21860281350x^2-116581690799x^3+349764501600x^4-559716480000x^5+373248000000x^6+e^{3x}(11390625-273375000x}$$

3.99.9 Mupad [F(-1)]

Timed out.

$$\int \frac{}{91125000 - 2186392500x + 21860281350x^2 - 116581690799x^3 + 349764501600x^4 - 559716480000x^5 +}$$

$$= \int$$

$$- \frac{}{e^{3x} \left(46656000000\,x^6 - 69984000000\,x^5 + 43740000000\,x^4 - 14580000000\,x^3 + 2733750000\,x^2 - 27337\right.}$$

input

```
int(-(28800*x + exp(x)*(10800*x + 7200*x^2 - 3150) - 7198)/(exp(3*x)*(2733
750000*x^2 - 273375000*x - 14580000000*x^3 + 43740000000*x^4 - 69984000000
*x^5 + 46656000000*x^6 + 11390625) - 2186392500*x + exp(2*x)*(16400070000*
x^2 - 1640098125*x - 87465420000*x^3 + 262401120000*x^4 - 419865120000*x^5
 + 279936000000*x^6 + 68343750) + exp(x)*(32795280675*x^2 - 3279892500*x -
 174901685400*x^3 + 524724490800*x^4 - 839652480000*x^5 + 559872000000*x^6
 + 136687500) + 21860281350*x^2 - 116581690799*x^3 + 349764501600*x^4 - 55
9716480000*x^5 + 373248000000*x^6 + 91125000),x)
```

output

```
int(-(28800*x + exp(x)*(10800*x + 7200*x^2 - 3150) - 7198)/(exp(3*x)*(2733
750000*x^2 - 273375000*x - 14580000000*x^3 + 43740000000*x^4 - 69984000000
*x^5 + 46656000000*x^6 + 11390625) - 2186392500*x + exp(2*x)*(16400070000*
x^2 - 1640098125*x - 87465420000*x^3 + 262401120000*x^4 - 419865120000*x^5
 + 279936000000*x^6 + 68343750) + exp(x)*(32795280675*x^2 - 3279892500*x -
 174901685400*x^3 + 524724490800*x^4 - 839652480000*x^5 + 559872000000*x^6
 + 136687500) + 21860281350*x^2 - 116581690799*x^3 + 349764501600*x^4 - 55
9716480000*x^5 + 373248000000*x^6 + 91125000), x)
```

3.99.

$$\int \frac{}{91125000-2186392500x+21860281350x^2-116581690799x^3+349764501600x^4-559716480000x^5+373248000000x^6+e^{3x}(11390625-273375000x}$$

3.100 $\int \frac{-20x+5e^4x+e^{\frac{2+x}{x}}(10+5x)}{16x-8e^4x+e^8x+e^{\frac{2(2+x)}{x}}x+e^{\frac{2+x}{x}}(-8x+2e^4x)}\,dx$

3.100.1 Optimal result

Integrand size = 75, antiderivative size = 19

$$\int \frac{-20x+5e^4x+e^{\frac{2+x}{x}}(10+5x)}{16x-8e^4x+e^8x+e^{\frac{2(2+x)}{x}}x+e^{\frac{2+x}{x}}(-8x+2e^4x)}\,dx=\frac{5x}{-4+e^4+e^{1+\frac{2}{x}}}$$

output
```
5/(exp(2/x+1)+exp(4)-4)*x
```

3.100.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{-20x+5e^4x+e^{\frac{2+x}{x}}(10+5x)}{16x-8e^4x+e^8x+e^{\frac{2(2+x)}{x}}x+e^{\frac{2+x}{x}}(-8x+2e^4x)}\,dx=\frac{5x}{-4+e^4+e^{1+\frac{2}{x}}}$$

input
```
Integrate[(-20*x + 5*E^4*x + E^((2 + x)/x)*(10 + 5*x))/(16*x - 8*E^4*x + E
^8*x + E^((2*(2 + x))/x)*x + E^((2 + x)/x)*(-8*x + 2*E^4*x)),x]
```

output
```
(5*x)/(-4 + E^4 + E^(1 + 2/x))
```

3.100.3 Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {6, 6, 6, 7292, 7238}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5e^4x-20x+e^{\frac{x+2}{x}}(5x+10)}{e^{\frac{2(x+2)}{x}}x+e^8x-8e^4x+16x+e^{\frac{x+2}{x}}(2e^4x-8x)}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{\left(5e^4-20\right)x+e^{\frac{x+2}{x}}(5x+10)}{e^{\frac{2(x+2)}{x}}x+e^8x-8e^4x+16x+e^{\frac{x+2}{x}}(2e^4x-8x)}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{\left(5e^4-20\right)x+e^{\frac{x+2}{x}}(5x+10)}{e^{\frac{2(x+2)}{x}}x+\left(16-8e^4\right)x+e^8x+e^{\frac{x+2}{x}}(2e^4x-8x)}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{\left(5e^4-20\right)x+e^{\frac{x+2}{x}}(5x+10)}{e^{\frac{2(x+2)}{x}}x+\left(16-8e^4+e^8\right)x+e^{\frac{x+2}{x}}(2e^4x-8x)}dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{\left(5e^4-20\right)x+e^{\frac{x+2}{x}}(5x+10)}{\left(e^{\frac{2}{x}+1}-4\left(1-\frac{e^4}{4}\right)\right)^2x}dx$$

$$\Big\downarrow \; 7238$$

$$-\frac{5x}{-e^{\frac{2}{x}+1}+4-e^4}$$

input
```
Int[(-20*x + 5*E^4*x + E^((2 + x)/x)*(10 + 5*x))/(16*x - 8*E^4*x + E^8*x +
 E^((2*(2 + x))/x)*x + E^((2 + x)/x)*(-8*x + 2*E^4*x)),x]
```

output
```
(-5*x)/(4 - E^4 - E^(1 + 2/x))
```

3.100.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 7238
```
Int[(u_)*(y_)^(m_.)*(z_)^(n_.), x_Symbol] :> With[{q = DerivativeDivides[y*
z, u*z^(n - m), x]}, Simp[q*y^(m + 1)*(z^(m + 1)/(m + 1)), x] /;  !FalseQ[q
]] /; FreeQ[{m, n}, x] && NeQ[m, -1]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.100.4 Maple [A] (verified)

Time = 10.21 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

method	result	size
norman	$\frac{5x}{-4+e^{4}+e^{\frac{2+x}{x}}}$	18
risch	$\frac{5x}{-4+e^{4}+e^{\frac{2+x}{x}}}$	18
parallelrisch	$\frac{5x}{-4+e^{4}+e^{\frac{2+x}{x}}}$	18

input
```
int(((5*x+10)*exp((2+x)/x)+5*x*exp(4)-20*x)/(x*exp((2+x)/x)^2+(2*x*exp(4)-
8*x)*exp((2+x)/x)+x*exp(4)^2-8*x*exp(4)+16*x),x,method=_RETURNVERBOSE)
```

output
```
5*x/(-4+exp(4)+exp((2+x)/x))
```

3.100.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{-20x+5e^4x+e^{\frac{2+x}{x}}(10+5x)}{16x-8e^4x+e^8x+e^{\frac{2(2+x)}{x}}x+e^{\frac{2+x}{x}}(-8x+2e^4x)}\,dx=\frac{5\,x}{e^4+e^{\left(\frac{x+2}{x}\right)}-4}$$

input
```
integrate(((5*x+10)*exp((2+x)/x)+5*x*exp(4)-20*x)/(x*exp((2+x)/x)^2+(2*x*e
xp(4)-8*x)*exp((2+x)/x)+x*exp(4)^2-8*x*exp(4)+16*x),x, algorithm=\
```

output
```
5*x/(e^4 + e^((x + 2)/x) - 4)
```

3.100.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \frac{-20x+5e^4x+e^{\frac{2+x}{x}}(10+5x)}{16x-8e^4x+e^8x+e^{\frac{2(2+x)}{x}}x+e^{\frac{2+x}{x}}(-8x+2e^4x)}\,dx=\frac{5x}{e^{\frac{x+2}{x}}-4+e^4}$$

input
```
integrate(((5*x+10)*exp((2+x)/x)+5*x*exp(4)-20*x)/(x*exp((2+x)/x)**2+(2*x*
exp(4)-8*x)*exp((2+x)/x)+x*exp(4)**2-8*x*exp(4)+16*x),x)
```

output
```
5*x/(exp((x + 2)/x) - 4 + exp(4))
```

3.100.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{-20x+5e^4x+e^{\frac{2+x}{x}}(10+5x)}{16x-8e^4x+e^8x+e^{\frac{2(2+x)}{x}}x+e^{\frac{2+x}{x}}(-8x+2e^4x)}\,dx=\frac{5\,x}{e^4+e^{\left(\frac{2}{x}+1\right)}-4}$$

input
```
integrate(((5*x+10)*exp((2+x)/x)+5*x*exp(4)-20*x)/(x*exp((2+x)/x)^2+(2*x*e
xp(4)-8*x)*exp((2+x)/x)+x*exp(4)^2-8*x*exp(4)+16*x),x, algorithm=\
```

output
```
5*x/(e^4 + e^(2/x + 1) - 4)
```

3.100.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.47

$$\int \frac{-20x+5e^4x+e^{\frac{2+x}{x}}(10+5x)}{16x-8e^4x+e^8x+e^{\frac{2(2+x)}{x}}x+e^{\frac{2+x}{x}}(-8x+2e^4x)}\,dx=\frac{5}{\frac{e^4}{x}+\frac{e^{\left(\frac{2}{x}+1\right)}}{x}-\frac{4}{x}}$$

input
```
integrate(((5*x+10)*exp((2+x)/x)+5*x*exp(4)-20*x)/(x*exp((2+x)/x)^2+(2*x*e
xp(4)-8*x)*exp((2+x)/x)+x*exp(4)^2-8*x*exp(4)+16*x),x, algorithm=\
```

output
```
5/(e^4/x + e^(2/x + 1)/x - 4/x)
```

3.100.9 Mupad [B] (verification not implemented)

Time = 13.35 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{-20x+5e^4x+e^{\frac{2+x}{x}}(10+5x)}{16x-8e^4x+e^8x+e^{\frac{2(2+x)}{x}}x+e^{\frac{2+x}{x}}\left(-8x+2e^4x\right)}\,dx=\frac{5\,x}{\mathrm{e}^4+\mathrm{e}^{\frac{2}{x}+1}-4}$$

input
```
int((exp((x + 2)/x)*(5*x + 10) - 20*x + 5*x*exp(4))/(16*x - 8*x*exp(4) + x
*exp(8) - exp((x + 2)/x)*(8*x - 2*x*exp(4)) + x*exp((2*(x + 2))/x)),x)
```

output
```
(5*x)/(exp(4) + exp(2/x + 1) - 4)
```

3.101 $\int \frac{2x\log(x)+(-x+(x+x^2-x^3)\log(x))\log(2x^2)+(-2\log(x)+(-1+x^2)}{-x^3\log(5)\log(x)\log^2(2x}$

3.101.1 Optimal result

Integrand size = 124, antiderivative size = 31

$$\int \frac{2x\log(x)+(-x+(x+x^2-x^3)\log(x))\log(2x^2)+(-2\log(x)+(-1+x^2)\log(x)\log(2x^2))\log(\log(x))}{-x^3\log(5)\log(x)\log^2(2x^2)+x^2\log(5)\log(x)\log^2(2x^2)\log}$$
$$=\frac{\frac{1}{x}+\log\left(\frac{e^x}{-x+\log(\log(x))}\right)}{\log(5)\log(2x^2)}$$

output
```
(ln(exp(x)/(ln(ln(x))-x))+1/x)/ln(2*x^2)/ln(5)
```

3.101.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{2x\log(x)+(-x+(x+x^2-x^3)\log(x))\log(2x^2)+(-2\log(x)+(-1+x^2)\log(x)\log(2x^2))\log(\log(x))}{-x^3\log(5)\log(x)\log^2(2x^2)+x^2\log(5)\log(x)\log^2(2x^2)\log}$$
$$=\frac{1+x\log\left(\frac{e^x}{-x+\log(\log(x))}\right)}{x\log(5)\log(2x^2)}$$

input
```
Integrate[(2*x*Log[x] + (-x + (x + x^2 - x^3)*Log[x])*Log[2*x^2] + (-2*Log
[x] + (-1 + x^2)*Log[x]*Log[2*x^2])*Log[Log[x]] + (2*x^2*Log[x] - 2*x*Log[
x]*Log[Log[x]])*Log[E^x/(-x + Log[Log[x]])])/(-(x^3*Log[5]*Log[x]*Log[2*x^
2]^2) + x^2*Log[5]*Log[x]*Log[2*x^2]^2*Log[Log[x]]),x]
```

3.101.

$$\int \frac{2x\log(x)+(-x+(x+x^2-x^3)\log(x))\log(2x^2)+(-2\log(x)+(-1+x^2)\log(x)\log(2x^2))\log(\log(x))+(2x^2\log(x)-2x\log(x)\log(\log(x)))\log\left(\frac{}{-x+\log}\right.}{-x^3\log(5)\log(x)\log^2(2x^2)+x^2\log(5)\log(x)\log^2(2x^2)\log(\log(x))}$$

output
```
(1 + x*Log[E^x/(-x + Log[Log[x]])])/(x*Log[5]*Log[2*x^2])
```

3.101.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\left(x^2-1\right)\log(x)\log\left(2x^2\right)-2\log(x)\right)\log(\log(x))+\left(2x^2\log(x)-2x\log(x)\log(\log(x))\right)\log\left(\frac{e^x}{\log(\log(x))-x}\right)+((}{x^2\log(5)\log(x)\log^2\left(2x^2\right)\log(\log(x))-x^3\log(5)\log(x)\log^2\left(2x^2\right.}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{-\left(\left(x^2-1\right)\log(x)\log\left(2x^2\right)-2\log(x)\right)\log(\log(x))-\left(2x^2\log(x)-2x\log(x)\log(\log(x))\right)\log\left(\frac{e^x}{\log(\log(x))-x}\right)-}{x^2\log(5)\log(x)\log^2\left(2x^2\right)(x-\log(\log(x)))}$$

$$\Big\downarrow \ 27$$

$$\frac{\int -\frac{2x\log(x)-(x-(-x^3+x^2+x)\log(x))\log(2x^2)-((1-x^2)\log(2x^2)\log(x)+2\log(x))\log(\log(x))+2(x^2\log(x)-x\log(x)\log(\log(x)))\log\left(-\frac{}{x-\log}\right.}{x^2\log(x)\log^2(2x^2)(x-\log(\log(x)))}}{\log(5)}$$

$$\Big\downarrow \ 25$$

$$-\frac{\int \frac{2x\log(x)-(x-(-x^3+x^2+x)\log(x))\log(2x^2)-((1-x^2)\log(2x^2)\log(x)+2\log(x))\log(\log(x))+2(x^2\log(x)-x\log(x)\log(\log(x)))\log\left(-\frac{}{x-\log}\right.}{x^2\log(x)\log^2(2x^2)(x-\log(\log(x)))}}{\log(5)}$$

$$\Big\downarrow \ 7293$$

$$-\frac{\int \left(\frac{-\log(x)\log(2x^2)x^3+\log(x)\log(2x^2)x^2+\log(x)\log(2x^2)\log(\log(x))x^2+2\log(x)x+\log(x)\log(2x^2)x-\log(2x^2)x-2\log(x)\log(\log(x))-\log}{x^2\log(x)\log^2(2x^2)(x-\log(\log(x)))}\right.}{\log(5)}$$

$$\Big\downarrow \ 2009$$

$$-\frac{2\int \frac{\log\left(-\frac{e^x}{x-\log(\log(x))}\right)}{x\log^2(2x^2)}dx+\int \frac{1}{\log(2x^2)(x-\log(\log(x)))}dx-\int \frac{1}{x\log(x)\log(2x^2)(x-\log(\log(x)))}dx-\frac{x\,\text{ExpIntegralEi}\left(\frac{1}{2}\log(2x^2)\right)}{2\sqrt{2}\sqrt{x^2}}-}{\log(5)}$$

3.101.
$$\int \frac{2x\log(x)+(-x+(x+x^2-x^3)\log(x))\log(2x^2)+(-2\log(x)+(-1+x^2)\log(x)\log(2x^2))\log(\log(x))+(2x^2\log(x)-2x\log(x)\log(\log(x)))\log\left(\frac{}{-x+\log}\right.}{-x^3\log(5)\log(x)\log^2(2x^2)+x^2\log(5)\log(x)\log^2(2x^2)\log(\log(x))}$$

input
```
Int[(2*x*Log[x] + (-x + (x + x^2 - x^3)*Log[x])*Log[2*x^2] + (-2*Log[x] +
(-1 + x^2)*Log[x]*Log[2*x^2])*Log[Log[x]] + (2*x^2*Log[x] - 2*x*Log[x]*Log
[Log[x]])*Log[E^x/(-x + Log[Log[x]])])/(-(x^3*Log[5]*Log[x]*Log[2*x^2]^2)
+ x^2*Log[5]*Log[x]*Log[2*x^2]^2*Log[Log[x]]),x]
```

output
```
$Aborted
```

3.101.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.101.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 5.27 (sec) , antiderivative size = 293, normalized size of antiderivative = 9.45

$$\frac{2i\ln\left(\mathrm{e}^{x}\right)}{\ln\left(5\right)\left(\pi\,\mathrm{csgn}\left(ix\right)^{2}\mathrm{csgn}\left(ix^{2}\right)-2\pi\,\mathrm{csgn}\left(ix\right)\mathrm{csgn}\left(ix^{2}\right)^{2}+\pi\,\mathrm{csgn}\left(ix^{2}\right)^{3}+2i\ln\left(2\right)+4i\ln\left(x\right)\right)}+\frac{-2ix\ln\left(x-\right.}{}$$

input
```
int(((-2*x*ln(x)*ln(ln(x))+2*x^2*ln(x))*ln(exp(x)/(ln(ln(x))-x))+((x^2-1)*
ln(x)*ln(2*x^2)-2*ln(x))*ln(ln(x))+((-x^3+x^2+x)*ln(x)-x)*ln(2*x^2)+2*x*ln
(x))/(x^2*ln(5)*ln(x)*ln(2*x^2)^2*ln(ln(x))-x^3*ln(5)*ln(x)*ln(2*x^2)^2),x
)
```

3.101.

$$\int \frac{2x\log(x)+\left(-x+\left(x+x^2-x^3\right)\log(x)\right)\log\left(2x^2\right)+\left(-2\log(x)+\left(-1+x^2\right)\log(x)\log\left(2x^2\right)\right)\log(\log(x))+\left(2x^2\log(x)-2x\log(x)\log(\log(x))\right)\log\left(\frac{}{-x+\log}\right.}{-x^3\log(5)\log(x)\log^2\left(2x^2\right)+x^2\log(5)\log(x)\log^2\left(2x^2\right)\log(\log(x))}$$

output
```
2*I/ln(5)/(Pi*csgn(I*x)^2*csgn(I*x^2)-2*Pi*csgn(I*x)*csgn(I*x^2)^2+Pi*csgn
(I*x^2)^3+2*I*ln(2)+4*I*ln(x))*ln(exp(x))+(-2*I*x*ln(x-ln(ln(x)))+2*Pi*x*c
sgn(I*exp(x)/(x-ln(ln(x))))^2-Pi*x*csgn(I/(x-ln(ln(x))))*csgn(I*exp(x)/(x-
ln(ln(x))))^2+Pi*x*csgn(I/(x-ln(ln(x))))*csgn(I*exp(x)/(x-ln(ln(x))))*csgn
(I*exp(x))-Pi*x*csgn(I*exp(x)/(x-ln(ln(x))))^3-Pi*x*csgn(I*exp(x)/(x-ln(ln
(x))))^2*csgn(I*exp(x))-2*Pi*x+2*I)/ln(5)/(Pi*csgn(I*x)^2*csgn(I*x^2)-2*Pi
*csgn(I*x)*csgn(I*x^2)^2+Pi*csgn(I*x^2)^3+2*I*ln(2)+4*I*ln(x))/x
```

3.101.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.13

$$\int \frac{2x\log(x) + (-x + (x + x^2 - x^3)\log(x))\log(2x^2) + (-2\log(x) + (-1 + x^2)\log(x)\log(2x^2))\log(\log(x))}{-x^3\log(5)\log(x)\log^2(2x^2) + x^2\log(5)\log(x)\log^2(2x^2)\,\mathrm{lo}}$$
$$= \frac{x\log\left(-\frac{e^x}{x-\log(\log(x))}\right) + 1}{x\log(5)\log(2) + 2\,x\log(5)\log(x)}$$

input
```
integrate(((-2*x*log(x)*log(log(x))+2*x^2*log(x))*log(exp(x)/(log(log(x))-
x))+((x^2-1)*log(x)*log(2*x^2)-2*log(x))*log(log(x))+((-x^3+x^2+x)*log(x)-
x)*log(2*x^2)+2*x*log(x))/(x^2*log(5)*log(x)*log(2*x^2)^2*log(log(x))-x^3*
log(5)*log(x)*log(2*x^2)^2),x, algorithm=\
```

output
```
(x*log(-e^x/(x - log(log(x)))) + 1)/(x*log(5)*log(2) + 2*x*log(5)*log(x))
```

3.101.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{2x\log(x) + (-x + (x + x^2 - x^3)\log(x))\log(2x^2) + (-2\log(x) + (-1 + x^2)\log(x)\log(2x^2))\log(\log(x))}{-x^3\log(5)\log(x)\log^2(2x^2) + x^2\log(5)\log(x)\log^2(2x^2)\,\mathrm{lo}}$$
$$= \text{Exception raised: TypeError}$$

input
```
integrate(((-2*x*ln(x)*ln(ln(x))+2*x**2*ln(x))*ln(exp(x)/(ln(ln(x))-x))+((
x**2-1)*ln(x)*ln(2*x**2)-2*ln(x))*ln(ln(x))+((-x**3+x**2+x)*ln(x)-x)*ln(2*
x**2)+2*x*ln(x))/(x**2*ln(5)*ln(x)*ln(2*x**2)**2*ln(ln(x))-x**3*ln(5)*ln(x
)*ln(2*x**2)**2),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.101.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.06

$$\int \frac{2x\log(x)+(-x+(x+x^2-x^3)\log(x))\log(2x^2)+(-2\log(x)+(-1+x^2)\log(x)\log(2x^2))\log(\log(x))}{-x^3\log(5)\log(x)\log^2(2x^2)+x^2\log(5)\log(x)\log^2(2x^2)\log}$$
$$= \frac{x^2 - x\log(-x+\log(\log(x)))+1}{x\log(5)\log(2)+2\,x\log(5)\log(x)}$$

input
```
integrate(((-2*x*log(x)*log(log(x))+2*x^2*log(x))*log(exp(x)/(log(log(x))-
x))+((x^2-1)*log(x)*log(2*x^2)-2*log(x))*log(log(x))+((-x^3+x^2+x)*log(x)-
x)*log(2*x^2)+2*x*log(x))/(x^2*log(5)*log(x)*log(2*x^2)^2*log(log(x))-x^3*
log(5)*log(x)*log(2*x^2)^2),x, algorithm=\
```

output
```
(x^2 - x*log(-x + log(log(x))) + 1)/(x*log(5)*log(2) + 2*x*log(5)*log(x))
```

3.101.8 Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.36 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.65

$$\int \frac{2x\log(x)+(-x+(x+x^2-x^3)\log(x))\log(2x^2)+(-2\log(x)+(-1+x^2)\log(x)\log(2x^2))\log(\log(x))}{-x^3\log(5)\log(x)\log^2(2x^2)+x^2\log(5)\log(x)\log^2(2x^2)\log}$$
$$= \frac{i\,\pi x+x^2+1}{x\log(5)\log(2)+2\,x\log(5)\log(x)} - \frac{\log(x-\log(\log(x)))}{\log(5)\log(2)+2\,\log(5)\log(x)}$$

input
```
integrate(((-2*x*log(x)*log(log(x))+2*x^2*log(x))*log(exp(x)/(log(log(x))-
x))+((x^2-1)*log(x)*log(2*x^2)-2*log(x))*log(log(x))+((-x^3+x^2+x)*log(x)-
x)*log(2*x^2)+2*x*log(x))/(x^2*log(5)*log(x)*log(2*x^2)^2*log(log(x))-x^3*
log(5)*log(x)*log(2*x^2)^2),x, algorithm=\
```

output
```
(I*pi*x + x^2 + 1)/(x*log(5)*log(2) + 2*x*log(5)*log(x)) - log(x - log(log
(x)))/(log(5)*log(2) + 2*log(5)*log(x))
```

3.101. $\int \frac{2x\log(x)+(-x+(x+x^2-x^3)\log(x))\log(2x^2)+(-2\log(x)+(-1+x^2)\log(x)\log(2x^2))\log(\log(x))+(2x^2\log(x)-2x\log(x)\log(\log(x)))\log\left(\frac{}{-x+\log}\right.}{-x^3\log(5)\log(x)\log^2(2x^2)+x^2\log(5)\log(x)\log^2(2x^2)\log(\log(x))}$

3.101.9 Mupad [B] (verification not implemented)

Time = 14.52 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{2x\log(x) + (-x + (x + x^2 - x^3)\log(x))\log(2x^2) + (-2\log(x) + (-1 + x^2)\log(x)\log(2x^2))\log(\log(x))}{-x^3\log(5)\log(x)\log^2(2x^2) + x^2\log(5)\log(x)\log^2(2x^2)\,\mathrm{lo}}$$
$$= \frac{x\,\ln\left(-\frac{\mathrm{e}^x}{x-\ln(\ln(x))}\right) + 1}{x\,\ln(5)\,\ln(2\,x^2)}$$

input
```
int((log(2*x^2)*(x - log(x)*(x + x^2 - x^3)) + log(log(x))*(2*log(x) - log
(2*x^2)*log(x)*(x^2 - 1)) - log(-exp(x)/(x - log(log(x))))*(2*x^2*log(x) -
 2*x*log(log(x))*log(x)) - 2*x*log(x))/(x^3*log(5)*log(2*x^2)^2*log(x) - x
^2*log(log(x))*log(5)*log(2*x^2)^2*log(x)),x)
```

output
```
(x*log(-exp(x)/(x - log(log(x)))) + 1)/(x*log(5)*log(2*x^2))
```

3.102 $\int \frac{-32x+48x^2+32x^3-12x^4-18x^5-4x^6+e^{e^x+x}(1+3x+3x^2+x^3)+e^{x^2}(-$

3.102.1 Optimal result

Integrand size = 91, antiderivative size = 31

$$\int \frac{-32x+48x^2+32x^3-12x^4-18x^5-4x^6+e^{e^x+x}(1+3x+3x^2+x^3)+e^{x^2}(-2x-6x^2-6x^3-2x^4)}{1+3x+3x^2+x^3}\,dx$$
$$= -5+e^{e^x}-e^{x^2}-\left(x+x^2-\frac{5x}{1+x}\right)^2$$

output
```
exp(exp(x))-5-exp(x^2)-(x-5*x/(1+x)+x^2)^2
```

3.102.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.71

$$\int \frac{-32x+48x^2+32x^3-12x^4-18x^5-4x^6+e^{e^x+x}(1+3x+3x^2+x^3)+e^{x^2}(-2x-6x^2-6x^3-2x^4)}{1+3x+3x^2+x^3}\,dx$$
$$= e^{e^x}-e^{x^2}-\frac{25}{(1+x)^2}+\frac{50}{1+x}-20(1+x)+9(1+x)^2+2(1+x)^3-(1+x)^4$$

input
```
Integrate[(-32*x + 48*x^2 + 32*x^3 - 12*x^4 - 18*x^5 - 4*x^6 + E^(E^x + x)
*(1 + 3*x + 3*x^2 + x^3) + E^x^2*(-2*x - 6*x^2 - 6*x^3 - 2*x^4))/(1 + 3*x
+ 3*x^2 + x^3),x]
```

output
```
E^E^x - E^x^2 - 25/(1 + x)^2 + 50/(1 + x) - 20*(1 + x) + 9*(1 + x)^2 + 2*(
1 + x)^3 - (1 + x)^4
```

3.102.3 Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.68, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.033, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^6-18x^5-12x^4+32x^3+48x^2+e^{x+e^x}\left(x^3+3x^2+3x+1\right)+e^{x^2}\left(-2x^4-6x^3-6x^2-2x\right)-32x}{x^3+3x^2+3x+1}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-4x^6-18x^5-12x^4+32x^3+48x^2+e^{x+e^x}\left(x^3+3x^2+3x+1\right)+e^{x^2}\left(-2x^4-6x^3-6x^2-2x\right)-32x}{(x+1)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{4x^6}{(x+1)^3}-\frac{18x^5}{(x+1)^3}-\frac{12x^4}{(x+1)^3}+\frac{32x^3}{(x+1)^3}+\frac{48x^2}{(x+1)^3}-2e^{x^2}x-\frac{32x}{(x+1)^3}+e^{x+e^x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-x^4-2x^3-\frac{16x^2}{(x+1)^2}+9x^2-e^{x^2}+e^{e^x}+\frac{18}{x+1}-\frac{9}{(x+1)^2}$$

input
```
Int[(-32*x + 48*x^2 + 32*x^3 - 12*x^4 - 18*x^5 - 4*x^6 + E^(E^x + x)*(1 +
3*x + 3*x^2 + x^3) + E^x^2*(-2*x - 6*x^2 - 6*x^3 - 2*x^4))/(1 + 3*x + 3*x^
2 + x^3),x]
```

output
```
E^E^x - E^x^2 + 9*x^2 - 2*x^3 - x^4 - 9/(1 + x)^2 - (16*x^2)/(1 + x)^2 + 1
8/(1 + x)
```

3.102.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.102.4 Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.29

method	result	size
parts	$e^{e^{x}}-e^{x^{2}}+\frac{50}{1+x}-\frac{25}{\left(1+x\right)^{2}}-x^{4}-2x^{3}+9x^{2}$	40
risch	$-x^{4}-2x^{3}+9x^{2}+\frac{50x+25}{x^{2}+2x+1}-e^{x^{2}}+e^{e^{x}}$	42
parallelrisch	$-\frac{2x^{6}+8x^{5}-8x^{4}-32x^{3}+2x^{2}e^{x^{2}}-2\,e^{e^{x}}x^{2}+32x^{2}+4\,e^{x^{2}}x-4x\,e^{e^{x}}+2\,e^{x^{2}}-2\,e^{e^{x}}}{2\left(x^{2}+2x+1\right)}$	80

input
```
int(((x^3+3*x^2+3*x+1)*exp(x)*exp(exp(x))+(-2*x^4-6*x^3-6*x^2-2*x)*exp(x^2
)-4*x^6-18*x^5-12*x^4+32*x^3+48*x^2-32*x)/(x^3+3*x^2+3*x+1),x,method=_RETU
RNVERBOSE)
```

output
```
exp(exp(x))-exp(x^2)+50/(1+x)-25/(1+x)^2-x^4-2*x^3+9*x^2
```

3.102.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. $2(28) = 56$.

Time = 0.27 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.52

$$\int \frac{-32x+48x^2+32x^3-12x^4-18x^5-4x^6+e^{e^x+x}(1+3x+3x^2+x^3)+e^{x^2}(-2x-6x^2-6x^3-2x^4)}{1+3x+3x^2+x^3}\,dx$$
$$= -\frac{\left((x^2+2\,x+1)e^{(x^2+x)}-(x^2+2\,x+1)e^{(x+e^x)}+(x^6+4\,x^5-4\,x^4-16\,x^3-9\,x^2-50\,x-25)e^x\right)e^{(-x)}}{x^2+2\,x+1}$$

input
```
integrate(((x^3+3*x^2+3*x+1)*exp(x)*exp(exp(x))+(-2*x^4-6*x^3-6*x^2-2*x)*e
xp(x^2)-4*x^6-18*x^5-12*x^4+32*x^3+48*x^2-32*x)/(x^3+3*x^2+3*x+1),x, algor
ithm=\
```

output
```
-((x^2 + 2*x + 1)*e^(x^2 + x) - (x^2 + 2*x + 1)*e^(x + e^x) + (x^6 + 4*x^5
 - 4*x^4 - 16*x^3 - 9*x^2 - 50*x - 25)*e^x)*e^(-x)/(x^2 + 2*x + 1)
```

3.102.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.19

$$\int \frac{-32x+48x^2+32x^3-12x^4-18x^5-4x^6+e^{e^x+x}(1+3x+3x^2+x^3)+e^{x^2}(-2x-6x^2-6x^3-2x^4)}{1+3x+3x^2+x^3}\,dx$$
$$= -x^4-2x^3+9x^2-\frac{-50x-25}{x^2+2x+1}-e^{x^2}+e^{e^x}$$

input
```
integrate(((x**3+3*x**2+3*x+1)*exp(x)*exp(exp(x))+(-2*x**4-6*x**3-6*x**2-2
*x)*exp(x**2)-4*x**6-18*x**5-12*x**4+32*x**3+48*x**2-32*x)/(x**3+3*x**2+3*
x+1),x)
```

output
```
-x**4 - 2*x**3 + 9*x**2 - (-50*x - 25)/(x**2 + 2*x + 1) - exp(x**2) + exp(
exp(x))
```

3.102.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 127 vs. 2(28) = 56.

Time = 0.25 (sec) , antiderivative size = 127, normalized size of antiderivative = 4.10

$$\int \frac{-32x+48x^2+32x^3-12x^4-18x^5-4x^6+e^{e^x+x}(1+3x+3x^2+x^3)+e^{x^2}(-2x-6x^2-6x^3-2x^4)}{1+3x+3x^2+x^3}\,dx$$
$$= -x^4-2x^3+9x^2-\frac{2(12x+11)}{x^2+2x+1}+\frac{9(10x+9)}{x^2+2x+1}-\frac{6(8x+7)}{x^2+2x+1}-\frac{16(6x+5)}{x^2+2x+1}+\frac{24(4x+3)}{x^2+2x+1}+\frac{16(2x+1)}{x^2+2x+1}-e^{(x^2)}+e^{(e^x)}$$

input
```
integrate(((x^3+3*x^2+3*x+1)*exp(x)*exp(exp(x))+(-2*x^4-6*x^3-6*x^2-2*x)*e
xp(x^2)-4*x^6-18*x^5-12*x^4+32*x^3+48*x^2-32*x)/(x^3+3*x^2+3*x+1),x, algor
ithm=\
```

output
```
-x^4 - 2*x^3 + 9*x^2 - 2*(12*x + 11)/(x^2 + 2*x + 1) + 9*(10*x + 9)/(x^2 +
 2*x + 1) - 6*(8*x + 7)/(x^2 + 2*x + 1) - 16*(6*x + 5)/(x^2 + 2*x + 1) + 2
4*(4*x + 3)/(x^2 + 2*x + 1) + 16*(2*x + 1)/(x^2 + 2*x + 1) - e^(x^2) + e^(
e^x)
```

3.102.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 112 vs. 2(28) = 56.

Time = 0.28 (sec) , antiderivative size = 112, normalized size of antiderivative = 3.61

$$\int \frac{-32x+48x^2+32x^3-12x^4-18x^5-4x^6+e^{e^x+x}(1+3x+3x^2+x^3)+e^{x^2}(-2x-6x^2-6x^3-2x^4)}{1+3x+3x^2+x^3}\,dx$$
$$= -\frac{x^6e^x+4\,x^5e^x-4\,x^4e^x-16\,x^3e^x+x^2e^{(x^2+x)}-x^2e^{(x+e^x)}-9\,x^2e^x+2\,xe^{(x^2+x)}-2\,xe^{(x+e^x)}-50\,xe^x+}{x^2e^x+2\,xe^x+e^x}$$

input
```
integrate(((x^3+3*x^2+3*x+1)*exp(x)*exp(exp(x))+(-2*x^4-6*x^3-6*x^2-2*x)*e
xp(x^2)-4*x^6-18*x^5-12*x^4+32*x^3+48*x^2-32*x)/(x^3+3*x^2+3*x+1),x, algor
ithm=\
```

output
```
-(x^6*e^x + 4*x^5*e^x - 4*x^4*e^x - 16*x^3*e^x + x^2*e^(x^2 + x) - x^2*e^(
x + e^x) - 9*x^2*e^x + 2*x*e^(x^2 + x) - 2*x*e^(x + e^x) - 50*x*e^x + e^(x
^2 + x) - e^(x + e^x) - 25*e^x)/(x^2*e^x + 2*x*e^x + e^x)
```

3.102.9 Mupad [B] (verification not implemented)

Time = 13.78 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.32

$$\int \frac{-32x+48x^2+32x^3-12x^4-18x^5-4x^6+e^{e^x+x}(1+3x+3x^2+x^3)+e^{x^2}(-2x-6x^2-6x^3-2x^4)}{1+3x+3x^2+x^3}\,dx$$
$$= \mathrm{e}^{\mathrm{e}^x}-\mathrm{e}^{x^2}+\frac{50\,x+25}{x^2+2\,x+1}+9\,x^2-2\,x^3-x^4$$

input
```
int(-(32*x + exp(x^2)*(2*x + 6*x^2 + 6*x^3 + 2*x^4) - 48*x^2 - 32*x^3 + 12
*x^4 + 18*x^5 + 4*x^6 - exp(exp(x))*exp(x)*(3*x + 3*x^2 + x^3 + 1))/(3*x +
 3*x^2 + x^3 + 1),x)
```

output
```
exp(exp(x)) - exp(x^2) + (50*x + 25)/(2*x + x^2 + 1) + 9*x^2 - 2*x^3 - x^4
```

3.103 $\int \frac{1-3x^2+e^x(-x+x^3)}{-3x+3x^3+e^5(x-x^3)+e^x(-x+x^3)+(-x+x^3)\log\left(-\frac{3}{-x+x^3}\right)}\,dx$

3.103.1 Optimal result

Integrand size = 72, antiderivative size = 26

$$\int \frac{1-3x^2+e^x(-x+x^3)}{-3x+3x^3+e^5\left(x-x^3\right)+e^x\left(-x+x^3\right)+\left(-x+x^3\right)\log\left(-\frac{3}{-x+x^3}\right)}\,dx = \log\left(3-e^5+e^x+\log\left(\frac{3}{x\left(1-x^2\right)}\right)\right)$$

output
```
ln(exp(x)+ln(3/x/(-x^2+1))-exp(5)+3)
```

3.103.2 Mathematica [A] (verified)

Time = 2.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{1-3x^2+e^x(-x+x^3)}{-3x+3x^3+e^5\left(x-x^3\right)+e^x\left(-x+x^3\right)+\left(-x+x^3\right)\log\left(-\frac{3}{-x+x^3}\right)}\,dx = \log\left(3-e^5+e^x+\log\left(\frac{3}{x-x^3}\right)\right)$$

input
```
Integrate[(1 - 3*x^2 + E^x*(-x + x^3))/(-3*x + 3*x^3 + E^5*(x - x^3) + E^x
*(-x + x^3) + (-x + x^3)*Log[-3/(-x + x^3)]),x]
```

output
```
Log[3 - E^5 + E^x + Log[3/(x - x^3)]]
```

3.103.3 Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.028, Rules used = {7292, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x (x^3-x)-3x^2+1}{3x^3+e^5 (x-x^3)+e^x (x^3-x)+(x^3-x) \log \left(-\frac{3}{x^3-x}\right)-3x} \, dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-e^x (x^3-x)+3x^2-1}{x (1-x^2) \left(\log \left(\frac{3}{x-x^3}\right)+e^x+3 \left(1-\frac{e^5}{3}\right)\right)}dx$$

$$\Big\downarrow \text{7235}$$

$$\log \left(\log \left(\frac{3}{x-x^3}\right)+e^x-e^5+3\right)$$

input
```
Int[(1 - 3*x^2 + E^x*(-x + x^3))/(-3*x + 3*x^3 + E^5*(x - x^3) + E^x*(-x +
 x^3) + (-x + x^3)*Log[-3/(-x + x^3)]),x]
```

output
```
Log[3 - E^5 + E^x + Log[3/(x - x^3)]]
```

3.103.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.103.4 Maple [A] (verified)

Time = 2.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

method	result
parallelrisch	$\ln\left(-\mathrm{e}^{5}+\mathrm{e}^{x}+\ln\left(-\frac{3}{x(x^{2}-1)}\right)+3\right)$
default	$\ln\left(\mathrm{e}^{5}-\mathrm{e}^{x}-\ln\left(-\frac{3}{x^{3}-x}\right)-3\right)$
norman	$\ln\left(\mathrm{e}^{5}-\mathrm{e}^{x}-\ln\left(-\frac{3}{x^{3}-x}\right)-3\right)$
risch	$\ln\left(-\frac{i\pi\ \mathrm{csgn}\left(\frac{i}{x^{2}-1}\right)\mathrm{csgn}\left(\frac{i}{x\left(x^{2}-1\right)}\right)^{2}}{2}+\frac{i\pi\ \mathrm{csgn}\left(\frac{i}{x^{2}-1}\right)\ \mathrm{csgn}\left(\frac{i}{x\left(x^{2}-1\right)}\right)\ \mathrm{csgn}\left(\frac{i}{x}\right)}{2}-\frac{i\pi\mathrm{csgn}\left(\frac{i}{x\left(x^{2}-1\right)}\right)^{3}}{2}+i\pi\mathrm{cs}\right.$

input
```
int(((x^3-x)*exp(x)-3*x^2+1)/((x^3-x)*ln(-3/(x^3-x))+(x^3-x)*exp(x)+(-x^3+
x)*exp(5)+3*x^3-3*x),x,method=_RETURNVERBOSE)
```

output
```
ln(-exp(5)+exp(x)+ln(-3/x/(x^2-1))+3)
```

3.103.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{1-3x^{2}+e^{x}(-x+x^{3})}{-3x+3x^{3}+e^{5}\left(x-x^{3}\right)+e^{x}\left(-x+x^{3}\right)+\left(-x+x^{3}\right)\log\left(-\frac{3}{-x+x^{3}}\right)}\,dx$$
$$=\log\left(-e^{5}+e^{x}+\log\left(-\frac{3}{x^{3}-x}\right)+3\right)$$

input
```
integrate(((x^3-x)*exp(x)-3*x^2+1)/((x^3-x)*log(-3/(x^3-x))+(x^3-x)*exp(x)
+(-x^3+x)*exp(5)+3*x^3-3*x),x, algorithm=\
```

output
```
log(-e^5 + e^x + log(-3/(x^3 - x)) + 3)
```

3.103.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.73

$$\int \frac{1-3x^2+e^x(-x+x^3)}{-3x+3x^3+e^5(x-x^3)+e^x(-x+x^3)+(-x+x^3)\log\left(-\frac{3}{-x+x^3}\right)}\,dx = \log\left(e^x+\log\left(-\frac{3}{x^3-x}\right)-e^5+3\right)$$

input
```
integrate(((x**3-x)*exp(x)-3*x**2+1)/((x**3-x)*ln(-3/(x**3-x))+(x**3-x)*ex
p(x)+(-x**3+x)*exp(5)+3*x**3-3*x),x)
```

output
```
log(exp(x) + log(-3/(x**3 - x)) - exp(5) + 3)
```

3.103.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{1-3x^2+e^x(-x+x^3)}{-3x+3x^3+e^5(x-x^3)+e^x(-x+x^3)+(-x+x^3)\log\left(-\frac{3}{-x+x^3}\right)}\,dx = \log\left(e^5-e^x-\log(3)+\log(x+1)+\log(x)+\log(-x+1)-3\right)$$

input
```
integrate(((x^3-x)*exp(x)-3*x^2+1)/((x^3-x)*log(-3/(x^3-x))+(x^3-x)*exp(x)
+(-x^3+x)*exp(5)+3*x^3-3*x),x, algorithm=\
```

output
```
log(e^5 - e^x - log(3) + log(x + 1) + log(x) + log(-x + 1) - 3)
```

3.103.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{1-3x^2+e^x(-x+x^3)}{-3x+3x^3+e^5(x-x^3)+e^x(-x+x^3)+(-x+x^3)\log\left(-\frac{3}{-x+x^3}\right)}\,dx = \log\left(-e^5+e^x+\log\left(-\frac{3}{x^3-x}\right)+3\right)$$

input
```
integrate((((x^3-x)*exp(x)-3*x^2+1)/((x^3-x)*log(-3/(x^3-x))+(x^3-x)*exp(x)
+(-x^3+x)*exp(5)+3*x^3-3*x),x, algorithm=\
```

output
```
log(-e^5 + e^x + log(-3/(x^3 - x)) + 3)
```

3.103.9 Mupad [B] (verification not implemented)

Time = 14.58 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{1-3x^2+e^x(-x+x^3)}{-3x+3x^3+e^5(x-x^3)+e^x(-x+x^3)+(-x+x^3)\log\left(-\frac{3}{-x+x^3}\right)}\,dx$$
$$=\ln\left(\ln\left(\frac{3}{x-x^3}\right)-\mathrm{e}^5+\mathrm{e}^x+3\right)$$

input
```
int((exp(x)*(x - x^3) + 3*x^2 - 1)/(3*x + exp(x)*(x - x^3) + log(3/(x - x^
3))*(x - x^3) - exp(5)*(x - x^3) - 3*x^3),x)
```

output
```
log(log(3/(x - x^3)) - exp(5) + exp(x) + 3)
```

3.104 $\int \frac{12+e^{2x}+e^x(-12-2x)+x^2}{e^{2x}-2e^xx+x^2}\,dx$

3.104.1 Optimal result

Integrand size = 37, antiderivative size = 14

$$\int \frac{12+e^{2x}+e^x(-12-2x)+x^2}{e^{2x}-2e^xx+x^2}\,dx=1+x-\frac{12}{-e^x+x}$$

output
```
1+x-12/(x-exp(x))
```

3.104.2 Mathematica [A] (verified)

Time = 0.65 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.57

$$\int \frac{12+e^{2x}+e^x(-12-2x)+x^2}{e^{2x}-2e^xx+x^2}\,dx=\frac{12+e^xx-x^2}{e^x-x}$$

input
```
Integrate[(12 + E^(2*x) + E^x*(-12 - 2*x) + x^2)/(E^(2*x) - 2*E^x*x + x^2)
,x]
```

output
```
(12 + E^x*x - x^2)/(E^x - x)
```

3.104.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+e^{2x}+e^x(-2x-12)+12}{x^2-2e^x x+e^{2x}} \, dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{x^2+e^{2x}+e^x(-2x-12)+12}{(e^x-x)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{12(x-1)}{(e^x-x)^2}-\frac{12}{e^x-x}+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$12\int \frac{1}{(e^x-x)^2}dx-12\int \frac{1}{e^x-x}dx-12\int \frac{x}{(e^x-x)^2}dx+x$$

input
```
Int[(12 + E^(2*x) + E^x*(-12 - 2*x) + x^2)/(E^(2*x) - 2*E^x*x + x^2),x]
```

output
```
$Aborted
```

3.104.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.104.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

method	result	size
risch	$x-\frac{12}{x-e^{x}}$	13
norman	$\frac{-12+x^{2}-e^{x} x}{x-e^{x}}$	20
parallelrisch	$\frac{-12+x^{2}-e^{x} x}{x-e^{x}}$	20

input
```
int((exp(x)^2+(-2*x-12)*exp(x)+x^2+12)/(exp(x)^2-2*exp(x)*x+x^2),x,method=
_RETURNVERBOSE)
```

output
```
x-12/(x-exp(x))
```

3.104.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.36

$$\int \frac{12+e^{2x}+e^x(-12-2x)+x^2}{e^{2x}-2e^x x+x^2}\,dx=\frac{x^2-xe^x-12}{x-e^x}$$

input
```
integrate((exp(x)^2+(-2*x-12)*exp(x)+x^2+12)/(exp(x)^2-2*exp(x)*x+x^2),x,
algorithm=\
```

output
```
(x^2 - x*e^x - 12)/(x - e^x)
```

3.104.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.50

$$\int \frac{12+e^{2x}+e^x(-12-2x)+x^2}{e^{2x}-2e^x x+x^2}\,dx=x+\frac{12}{-x+e^x}$$

input
```
integrate((exp(x)**2+(-2*x-12)*exp(x)+x**2+12)/(exp(x)**2-2*exp(x)*x+x**2)
,x)
```

output
```
x + 12/(-x + exp(x))
```

3.104.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.36

$$\int \frac{12 + e^{2x} + e^x(-12 - 2x) + x^2}{e^{2x} - 2e^x x + x^2} \, dx = \frac{x^2 - xe^x - 12}{x - e^x}$$

input
```
integrate((exp(x)^2+(-2*x-12)*exp(x)+x^2+12)/(exp(x)^2-2*exp(x)*x+x^2),x,
algorithm=\
```

output
```
(x^2 - x*e^x - 12)/(x - e^x)
```

3.104.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.36

$$\int \frac{12 + e^{2x} + e^x(-12 - 2x) + x^2}{e^{2x} - 2e^x x + x^2} \, dx = \frac{x^2 - xe^x - 12}{x - e^x}$$

input
```
integrate((exp(x)^2+(-2*x-12)*exp(x)+x^2+12)/(exp(x)^2-2*exp(x)*x+x^2),x,
algorithm=\
```

output
```
(x^2 - x*e^x - 12)/(x - e^x)
```

3.104.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.86

$$\int \frac{12 + e^{2x} + e^x(-12 - 2x) + x^2}{e^{2x} - 2e^x x + x^2} \, dx = x - \frac{12}{x - e^x}$$

input
```
int((exp(2*x) - exp(x)*(2*x + 12) + x^2 + 12)/(exp(2*x) - 2*x*exp(x) + x^2
),x)
```

output
```
x - 12/(x - exp(x))
```

3.105 $\int e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x}{9x^2-6x^4+24x^5-35x}}$

3.105.1 Optimal result

Integrand size = 427, antiderivative size = 32

$$\int e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}$$

$$= e^{-1+e^{4x}(-5+x)-\frac{1}{x^2\left(3-(-1+x)^4x^2\right)^2}}$$

output

```
exp(exp(4*x)*(-5+x)-1/x^2/(3-(-1+x)^4*x^2)^2-1)
```

3.105.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 217 vs. 2(32) = 64.

Time = 0.97 (sec) , antiderivative size = 217, normalized size of antiderivative = 6.78

$$\int e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}$$

$$= e^{\frac{-1-9\left(1+5e^{4x}\right)x^2+9e^{4x}x^3+6\left(1+5e^{4x}\right)x^4-6\left(4+21e^{4x}\right)x^5+\left(35+199e^{4x}\right)x^6-\left(16+115e^{4x}\right)x^7-2\left(11+47e^{4x}\right)x^8+\left(56+302e^{4x}\right)x^9-14\left(5+29e^{4x}\right)x^{10}+14\left(4+}{x^2\left(-3+x^2-4x^3+6x^4-4x^5+x^6\right)^2}}$$

$$\int e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}$$

input
```
Integrate[(E^((-1 - 9*x^2 + 6*x^4 - 24*x^5 + 35*x^6 - 16*x^7 - 22*x^8 + 56
*x^9 - 70*x^10 + 56*x^11 - 28*x^12 + 8*x^13 - x^14 + E^(4*x)*(-45*x^2 + 9*
x^3 + 30*x^4 - 126*x^5 + 199*x^6 - 115*x^7 - 94*x^8 + 302*x^9 - 406*x^10 +
 350*x^11 - 196*x^12 + 68*x^13 - 13*x^14 + x^15))/(9*x^2 - 6*x^4 + 24*x^5
- 35*x^6 + 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13
 + x^14))*(-6 + 6*x^2 - 32*x^3 + 60*x^4 - 48*x^5 + 14*x^6 + E^(4*x)*(513*x
^3 - 108*x^4 - 513*x^5 + 2160*x^6 - 3339*x^7 + 1296*x^8 + 4112*x^9 - 10244
*x^10 + 12684*x^11 - 7652*x^12 - 3481*x^13 + 14652*x^14 - 20265*x^15 + 187
08*x^16 - 12573*x^17 + 6160*x^18 - 2134*x^19 + 492*x^20 - 67*x^21 + 4*x^22
)))/(-27*x^3 + 27*x^5 - 108*x^6 + 153*x^7 - 36*x^8 - 224*x^9 + 492*x^10 -
564*x^11 + 284*x^12 + 243*x^13 - 720*x^14 + 915*x^15 - 792*x^16 + 495*x^17
 - 220*x^18 + 66*x^19 - 12*x^20 + x^21),x]
```

output
```
E^((-1 - 9*(1 + 5*E^(4*x))*x^2 + 9*E^(4*x)*x^3 + 6*(1 + 5*E^(4*x))*x^4 - 6
*(4 + 21*E^(4*x))*x^5 + (35 + 199*E^(4*x))*x^6 - (16 + 115*E^(4*x))*x^7 -
2*(11 + 47*E^(4*x))*x^8 + (56 + 302*E^(4*x))*x^9 - 14*(5 + 29*E^(4*x))*x^1
0 + 14*(4 + 25*E^(4*x))*x^11 - 28*(1 + 7*E^(4*x))*x^12 + (8 + 68*E^(4*x))*
x^13 - (1 + 13*E^(4*x))*x^14 + E^(4*x)*x^15)/(x^2*(-3 + x^2 - 4*x^3 + 6*x^
4 - 4*x^5 + x^6)^2))
```

3.105.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(14x^6 - 48x^5 + 60x^4 - 32x^3 + 6x^2 + e^{4x}(4x^{22} - 67x^{21} + 492x^{20} - 2134x^{19} + 6160x^{18} - 12573x^{17} + 18708x^{16}}{}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(14x^6 - 48x^5 + 60x^4 - 32x^3 + 6x^2 + e^{4x}(4x^{22} - 67x^{21} + 492x^{20} - 2134x^{19} + 6160x^{18} - 12573x^{17} + 18708x^{16}}{}$$

$$\Big\downarrow \text{2463}$$

$$\int \frac{(14x^6 - 48x^5 + 60x^4 - 32x^3 + 6x^2 + e^{4x}(4x^{22} - 67x^{21} + 492x^{20} - 2134x^{19} + 6160x^{18} - 12573x^{17} + 18708x^{16}}{}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{27x^3+27x^5}$$

$$\int \frac{\left(-14x^6+48x^5-60x^4+32x^3-6x^2-e^{4x}\left(4x^{22}-67x^{21}+492x^{20}-2134x^{19}+6160x^{18}-12573x^{17}+18708x\right.\right.}{}$$

$\downarrow$ 7293

$$\int \left(\frac{14e^{\frac{-x^{14}+8x^{13}-28x^{12}+56x^{11}-70x^{10}+56x^9-22x^8-16x^7+35x^6-24x^5+6x^4-9x^2+e^{4x}\left(x^{15}-13x^{14}+68x^{13}-196x^{12}+350x^{11}-406x^{10}+302x^9-94x^8-115\right.}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3} \right.$$

$\downarrow$ 7239

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

$\downarrow$ 7293

$$\int \left(\frac{14e^{\frac{e^{4x}x^{15}-\left(1+13e^{4x}\right)x^{14}+\left(8+68e^{4x}\right)x^{13}-28\left(1+7e^{4x}\right)x^{12}+14\left(4+25e^{4x}\right)x^{11}-14\left(5+29e^{4x}\right)x^{10}+\left(56+302e^{4x}\right)x^9-2\left(11+47e^{4x}\right)x^8-\left(16+115e^{4x}\right)x^7}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3} \right.$$

$\downarrow$ 7239

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

$\downarrow$ 7293

$$\int \left(\frac{14e^{\frac{e^{4x}x^{15}-\left(1+13e^{4x}\right)x^{14}+\left(8+68e^{4x}\right)x^{13}-28\left(1+7e^{4x}\right)x^{12}+14\left(4+25e^{4x}\right)x^{11}-14\left(5+29e^{4x}\right)x^{10}+\left(56+302e^{4x}\right)x^9-2\left(11+47e^{4x}\right)x^8-\left(16+115e^{4x}\right)x^7}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3} \right.$$

$\downarrow$ 7239

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

$\downarrow$ 7293

3.105.

$$\int e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x\right.}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}$$

$$\int \left(\frac{14 e^{\frac{e^{4x} x^{15} - \left(1+13 e^{4x}\right) x^{14} + \left(8+68 e^{4x}\right) x^{13} - 28 \left(1+7 e^{4x}\right) x^{12} + 14 \left(4+25 e^{4x}\right) x^{11} - 14 \left(5+29 e^{4x}\right) x^{10} + \left(56+302 e^{4x}\right) x^9 - 2 \left(11+47 e^{4x}\right) x^8 - \left(16+115 e^{4x}\right) x^7}{x^2 \left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3}$$

$\big\downarrow$ 7239

$$\int \frac{\left(-4 e^{4x} x^{22} + 67 e^{4x} x^{21} - 492 e^{4x} x^{20} + 2134 e^{4x} x^{19} - 6160 e^{4x} x^{18} + 12573 e^{4x} x^{17} - 18708 e^{4x} x^{16} + 20265 e^{4x} x^{15} - \right.}{}$$

$\big\downarrow$ 7293

$$\int \left(\frac{14 e^{\frac{e^{4x} x^{15} - \left(1+13 e^{4x}\right) x^{14} + \left(8+68 e^{4x}\right) x^{13} - 28 \left(1+7 e^{4x}\right) x^{12} + 14 \left(4+25 e^{4x}\right) x^{11} - 14 \left(5+29 e^{4x}\right) x^{10} + \left(56+302 e^{4x}\right) x^9 - 2 \left(11+47 e^{4x}\right) x^8 - \left(16+115 e^{4x}\right) x^7}{x^2 \left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3}$$

$\big\downarrow$ 7239

$$\int \frac{\left(-4 e^{4x} x^{22} + 67 e^{4x} x^{21} - 492 e^{4x} x^{20} + 2134 e^{4x} x^{19} - 6160 e^{4x} x^{18} + 12573 e^{4x} x^{17} - 18708 e^{4x} x^{16} + 20265 e^{4x} x^{15} - \right.}{}$$

$\big\downarrow$ 7293

$$\int \left(\frac{14 e^{\frac{e^{4x} x^{15} - \left(1+13 e^{4x}\right) x^{14} + \left(8+68 e^{4x}\right) x^{13} - 28 \left(1+7 e^{4x}\right) x^{12} + 14 \left(4+25 e^{4x}\right) x^{11} - 14 \left(5+29 e^{4x}\right) x^{10} + \left(56+302 e^{4x}\right) x^9 - 2 \left(11+47 e^{4x}\right) x^8 - \left(16+115 e^{4x}\right) x^7}{x^2 \left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3}$$

$\big\downarrow$ 7239

$$\int \frac{\left(-4 e^{4x} x^{22} + 67 e^{4x} x^{21} - 492 e^{4x} x^{20} + 2134 e^{4x} x^{19} - 6160 e^{4x} x^{18} + 12573 e^{4x} x^{17} - 18708 e^{4x} x^{16} + 20265 e^{4x} x^{15} - \right.}{}$$

$\big\downarrow$ 7293

$$\int \left(\frac{14 e^{\frac{e^{4x} x^{15} - \left(1+13 e^{4x}\right) x^{14} + \left(8+68 e^{4x}\right) x^{13} - 28 \left(1+7 e^{4x}\right) x^{12} + 14 \left(4+25 e^{4x}\right) x^{11} - 14 \left(5+29 e^{4x}\right) x^{10} + \left(56+302 e^{4x}\right) x^9 - 2 \left(11+47 e^{4x}\right) x^8 - \left(16+115 e^{4x}\right) x^7}{x^2 \left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3}$$

3.105.

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x\right.}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{27x^3+27x^5}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{14e^{\frac{e^{4x}x^{15}-\left(1+13e^{4x}\right)x^{14}+\left(8+68e^{4x}\right)x^{13}-28\left(1+7e^{4x}\right)x^{12}+14\left(4+25e^{4x}\right)x^{11}-14\left(5+29e^{4x}\right)x^{10}+\left(56+302e^{4x}\right)x^{9}-2\left(11+47e^{4x}\right)x^{8}-\left(16+115e^{4x}\right)x^{7}}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3} \right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{14e^{\frac{e^{4x}x^{15}-\left(1+13e^{4x}\right)x^{14}+\left(8+68e^{4x}\right)x^{13}-28\left(1+7e^{4x}\right)x^{12}+14\left(4+25e^{4x}\right)x^{11}-14\left(5+29e^{4x}\right)x^{10}+\left(56+302e^{4x}\right)x^{9}-2\left(11+47e^{4x}\right)x^{8}-\left(16+115e^{4x}\right)x^{7}}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3} \right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{14e^{\frac{e^{4x}x^{15}-\left(1+13e^{4x}\right)x^{14}+\left(8+68e^{4x}\right)x^{13}-28\left(1+7e^{4x}\right)x^{12}+14\left(4+25e^{4x}\right)x^{11}-14\left(5+29e^{4x}\right)x^{10}+\left(56+302e^{4x}\right)x^{9}-2\left(11+47e^{4x}\right)x^{8}-\left(16+115e^{4x}\right)x^{7}}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3} \right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

3.105.

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x\right.}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{}$$

$$\downarrow 7293$$

$$\int \left(\frac{14 e^{\frac{e^{4x}x^{15}-\left(1+13e^{4x}\right)x^{14}+\left(8+68e^{4x}\right)x^{13}-28\left(1+7e^{4x}\right)x^{12}+14\left(4+25e^{4x}\right)x^{11}-14\left(5+29e^{4x}\right)x^{10}+\left(56+302e^{4x}\right)x^{9}-2\left(11+47e^{4x}\right)x^{8}-\left(16+115e^{4x}\right)x^{7}}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3} \right.$$

$$\downarrow 7239$$

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

$$\downarrow 7293$$

$$\int \left(\frac{14 e^{\frac{e^{4x}x^{15}-\left(1+13e^{4x}\right)x^{14}+\left(8+68e^{4x}\right)x^{13}-28\left(1+7e^{4x}\right)x^{12}+14\left(4+25e^{4x}\right)x^{11}-14\left(5+29e^{4x}\right)x^{10}+\left(56+302e^{4x}\right)x^{9}-2\left(11+47e^{4x}\right)x^{8}-\left(16+115e^{4x}\right)x^{7}}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3} \right.$$

$$\downarrow 7239$$

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

$$\downarrow 7293$$

$$\int \left(\frac{14 e^{\frac{e^{4x}x^{15}-\left(1+13e^{4x}\right)x^{14}+\left(8+68e^{4x}\right)x^{13}-28\left(1+7e^{4x}\right)x^{12}+14\left(4+25e^{4x}\right)x^{11}-14\left(5+29e^{4x}\right)x^{10}+\left(56+302e^{4x}\right)x^{9}-2\left(11+47e^{4x}\right)x^{8}-\left(16+115e^{4x}\right)x^{7}}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3} \right.$$

$$\downarrow 7239$$

$$\int \frac{\left(-4e^{4x}x^{22}+67e^{4x}x^{21}-492e^{4x}x^{20}+2134e^{4x}x^{19}-6160e^{4x}x^{18}+12573e^{4x}x^{17}-18708e^{4x}x^{16}+20265e^{4x}x^{15}-\right.}{}$$

$$\downarrow 7293$$

3.105.

$$\int e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x\right.}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}$$

$$\int \left(\frac{14e^{\frac{e^{4x}x^{15}-\left(1+13e^{4x}\right)x^{14}+\left(8+68e^{4x}\right)x^{13}-28\left(1+7e^{4x}\right)x^{12}+14\left(4+25e^{4x}\right)x^{11}-14\left(5+29e^{4x}\right)x^{10}+\left(56+302e^{4x}\right)x^{9}-2\left(11+47e^{4x}\right)x^{8}-\left(16+115e^{4x}\right)x^{7}}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}}{\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^3}$$

input
```
Int[(E^((-1 - 9*x^2 + 6*x^4 - 24*x^5 + 35*x^6 - 16*x^7 - 22*x^8 + 56*x^9 -
 70*x^10 + 56*x^11 - 28*x^12 + 8*x^13 - x^14 + E^(4*x)*(-45*x^2 + 9*x^3 +
30*x^4 - 126*x^5 + 199*x^6 - 115*x^7 - 94*x^8 + 302*x^9 - 406*x^10 + 350*x
^11 - 196*x^12 + 68*x^13 - 13*x^14 + x^15))/(9*x^2 - 6*x^4 + 24*x^5 - 35*x
^6 + 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13 + x^1
4))*(-6 + 6*x^2 - 32*x^3 + 60*x^4 - 48*x^5 + 14*x^6 + E^(4*x)*(513*x^3 - 1
08*x^4 - 513*x^5 + 2160*x^6 - 3339*x^7 + 1296*x^8 + 4112*x^9 - 10244*x^10
+ 12684*x^11 - 7652*x^12 - 3481*x^13 + 14652*x^14 - 20265*x^15 + 18708*x^1
6 - 12573*x^17 + 6160*x^18 - 2134*x^19 + 492*x^20 - 67*x^21 + 4*x^22)))/(-
27*x^3 + 27*x^5 - 108*x^6 + 153*x^7 - 36*x^8 - 224*x^9 + 492*x^10 - 564*x^
11 + 284*x^12 + 243*x^13 - 720*x^14 + 915*x^15 - 792*x^16 + 495*x^17 - 220
*x^18 + 66*x^19 - 12*x^20 + x^21),x]
```

output
```
$Aborted
```

3.105.3.1 Defintions of rubi rules used

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```


$$\int e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x\right.}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.105.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 217 vs. $2(30) = 60$.

Time = 0.53 (sec) , antiderivative size = 218, normalized size of antiderivative = 6.81

$$e^{\frac{-1+9x^3 e^{4x}-45x^2 e^{4x}+56x^{11}-28x^{12}+8x^{13}-x^{14}-16x^7-22x^8-70x^{10}+56x^9+35x^6-24x^5+6x^4-9x^2-406\,e^{4x}x^{10}+302\,e^{4x}x^9-94\,e^{4x}x^8-115\,e^{4x}x^7+199\,e^{4x}x^6-1\cdots}{x^2\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)^2}}$$

input
```
int(((4*x^22-67*x^21+492*x^20-2134*x^19+6160*x^18-12573*x^17+18708*x^16-20
265*x^15+14652*x^14-3481*x^13-7652*x^12+12684*x^11-10244*x^10+4112*x^9+129
6*x^8-3339*x^7+2160*x^6-513*x^5-108*x^4+513*x^3)*exp(4*x)+14*x^6-48*x^5+60
*x^4-32*x^3+6*x^2-6)*exp(((x^15-13*x^14+68*x^13-196*x^12+350*x^11-406*x^10
+302*x^9-94*x^8-115*x^7+199*x^6-126*x^5+30*x^4+9*x^3-45*x^2)*exp(4*x)-x^14
+8*x^13-28*x^12+56*x^11-70*x^10+56*x^9-22*x^8-16*x^7+35*x^6-24*x^5+6*x^4-9
*x^2-1)/(x^14-8*x^13+28*x^12-56*x^11+70*x^10-56*x^9+22*x^8+16*x^7-35*x^6+2
4*x^5-6*x^4+9*x^2))/(x^21-12*x^20+66*x^19-220*x^18+495*x^17-792*x^16+915*x
^15-720*x^14+243*x^13+284*x^12-564*x^11+492*x^10-224*x^9-36*x^8+153*x^7-10
8*x^6+27*x^5-27*x^3),x)
```

output
```
exp((-1+9*x^3*exp(4*x)-45*x^2*exp(4*x)+56*x^11-28*x^12+8*x^13-x^14-16*x^7-
22*x^8-70*x^10+56*x^9+35*x^6-24*x^5+6*x^4-9*x^2-406*exp(4*x)*x^10+302*exp(
4*x)*x^9-94*exp(4*x)*x^8-115*exp(4*x)*x^7+199*exp(4*x)*x^6-126*exp(4*x)*x^
5+exp(4*x)*x^15-13*exp(4*x)*x^14+68*exp(4*x)*x^13-196*exp(4*x)*x^12+350*ex
p(4*x)*x^11+30*exp(4*x)*x^4)/x^2/(x^6-4*x^5+6*x^4-4*x^3+x^2-3)^2)
```

3.105.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 199 vs. $2(29) = 58$.

Time = 0.26 (sec) , antiderivative size = 199, normalized size of antiderivative = 6.22

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350\cdots\right.}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{\cdots}$$

$$=e^{\left(-\frac{x^{14}-8\,x^{13}+28\,x^{12}-56\,x^{11}+70\,x^{10}-56\,x^{9}+22\,x^{8}+16\,x^{7}-35\,x^{6}+24\,x^{5}-6\,x^{4}+9\,x^{2}-\left(x^{15}-13\,x^{14}+68\,x^{13}-196\,x^{12}+350\,x^{11}-406\,x^{10}+302\,x^{9}-94\,x^{8}-115\,x^{7}\cdots\right.}{x^{14}-8\,x^{13}+28\,x^{12}-56\,x^{11}+70\,x^{10}-56\,x^{9}+22\,x^{8}+16\,x^{7}-35\,x^{6}+24\,x^{5}-6\,x^{4}+9\,x^{2}}\cdots\right.}$$

3.105.

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x\cdots\right.}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{\cdots 27x^3+27x^5\cdots}$$

input
```
integrate(((4*x^22-67*x^21+492*x^20-2134*x^19+6160*x^18-12573*x^17+18708*x
^16-20265*x^15+14652*x^14-3481*x^13-7652*x^12+12684*x^11-10244*x^10+4112*x
^9+1296*x^8-3339*x^7+2160*x^6-513*x^5-108*x^4+513*x^3)*exp(4*x)+14*x^6-48*
x^5+60*x^4-32*x^3+6*x^2-6)*exp(((x^15-13*x^14+68*x^13-196*x^12+350*x^11-40
6*x^10+302*x^9-94*x^8-115*x^7+199*x^6-126*x^5+30*x^4+9*x^3-45*x^2)*exp(4*x
)-x^14+8*x^13-28*x^12+56*x^11-70*x^10+56*x^9-22*x^8-16*x^7+35*x^6-24*x^5+6
*x^4-9*x^2-1)/(x^14-8*x^13+28*x^12-56*x^11+70*x^10-56*x^9+22*x^8+16*x^7-35
*x^6+24*x^5-6*x^4+9*x^2))/(x^21-12*x^20+66*x^19-220*x^18+495*x^17-792*x^16
+915*x^15-720*x^14+243*x^13+284*x^12-564*x^11+492*x^10-224*x^9-36*x^8+153*
x^7-108*x^6+27*x^5-27*x^3),x, algorithm=\
```

output
```
e^(-(x^14 - 8*x^13 + 28*x^12 - 56*x^11 + 70*x^10 - 56*x^9 + 22*x^8 + 16*x^
7 - 35*x^6 + 24*x^5 - 6*x^4 + 9*x^2 - (x^15 - 13*x^14 + 68*x^13 - 196*x^12
 + 350*x^11 - 406*x^10 + 302*x^9 - 94*x^8 - 115*x^7 + 199*x^6 - 126*x^5 +
30*x^4 + 9*x^3 - 45*x^2)*e^(4*x) + 1)/(x^14 - 8*x^13 + 28*x^12 - 56*x^11 +
 70*x^10 - 56*x^9 + 22*x^8 + 16*x^7 - 35*x^6 + 24*x^5 - 6*x^4 + 9*x^2))
```

3.105.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 196 vs. $2(27) = 54$.

Time = 3.19 (sec) , antiderivative size = 196, normalized size of antiderivative = 6.12

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{}$$

$$= e^{\frac{-x^{14}+8x^{13}-28x^{12}+56x^{11}-70x^{10}+56x^9-22x^8-16x^7+35x^6-24x^5+6x^4-9x^2+\left(x^{15}-13x^{14}+68x^{13}-196x^{12}+350x^{11}-406x^{10}+302x^9-94x^8-115x^7+199x^6-}{x^{14}-8x^{13}+28x^{12}-56x^{11}+70x^{10}-56x^9+22x^8+16x^7-35x^6+24x^5-6x^4+9x^2}}$$

input
```
integrate(((4*x**22-67*x**21+492*x**20-2134*x**19+6160*x**18-12573*x**17+1
8708*x**16-20265*x**15+14652*x**14-3481*x**13-7652*x**12+12684*x**11-10244
*x**10+4112*x**9+1296*x**8-3339*x**7+2160*x**6-513*x**5-108*x**4+513*x**3)
*exp(4*x)+14*x**6-48*x**5+60*x**4-32*x**3+6*x**2-6)*exp(((x**15-13*x**14+6
8*x**13-196*x**12+350*x**11-406*x**10+302*x**9-94*x**8-115*x**7+199*x**6-1
26*x**5+30*x**4+9*x**3-45*x**2)*exp(4*x)-x**14+8*x**13-28*x**12+56*x**11-7
0*x**10+56*x**9-22*x**8-16*x**7+35*x**6-24*x**5+6*x**4-9*x**2-1)/(x**14-8*
x**13+28*x**12-56*x**11+70*x**10-56*x**9+22*x**8+16*x**7-35*x**6+24*x**5-6
*x**4+9*x**2))/(x**21-12*x**20+66*x**19-220*x**18+495*x**17-792*x**16+915*
x**15-720*x**14+243*x**13+284*x**12-564*x**11+492*x**10-224*x**9-36*x**8+1
53*x**7-108*x**6+27*x**5-27*x**3),x)
```

3.105.

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{}$$

output
```
exp((-x**14 + 8*x**13 - 28*x**12 + 56*x**11 - 70*x**10 + 56*x**9 - 22*x**8
 - 16*x**7 + 35*x**6 - 24*x**5 + 6*x**4 - 9*x**2 + (x**15 - 13*x**14 + 68*
x**13 - 196*x**12 + 350*x**11 - 406*x**10 + 302*x**9 - 94*x**8 - 115*x**7
+ 199*x**6 - 126*x**5 + 30*x**4 + 9*x**3 - 45*x**2)*exp(4*x) - 1)/(x**14 -
 8*x**13 + 28*x**12 - 56*x**11 + 70*x**10 - 56*x**9 + 22*x**8 + 16*x**7 -
35*x**6 + 24*x**5 - 6*x**4 + 9*x**2))
```

3.105.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 470 vs. $2(29) = 58$.

Time = 8.15 (sec) , antiderivative size = 470, normalized size of antiderivative = 14.69

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+35\right.}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{}$$

$$= e^{\left(-\frac{x^4}{3\left(x^{12}-8x^{11}+28x^{10}-56x^9+70x^8-56x^7+22x^6+16x^5-35x^4+24x^3-6x^2+9\right)}+\frac{x^4}{9\left(x^6-4x^5+6x^4-4x^3+x^2-3\right)}+\frac{}{3\left(x^{12}-8x^{11}+28x^{10}-56x^9+70x^8-\right.}\right.}$$

input
```
integrate(((4*x^22-67*x^21+492*x^20-2134*x^19+6160*x^18-12573*x^17+18708*x
^16-20265*x^15+14652*x^14-3481*x^13-7652*x^12+12684*x^11-10244*x^10+4112*x
^9+1296*x^8-3339*x^7+2160*x^6-513*x^5-108*x^4+513*x^3)*exp(4*x)+14*x^6-48*
x^5+60*x^4-32*x^3+6*x^2-6)*exp(((x^15-13*x^14+68*x^13-196*x^12+350*x^11-40
6*x^10+302*x^9-94*x^8-115*x^7+199*x^6-126*x^5+30*x^4+9*x^3-45*x^2)*exp(4*x
)-x^14+8*x^13-28*x^12+56*x^11-70*x^10+56*x^9-22*x^8-16*x^7+35*x^6-24*x^5+6
*x^4-9*x^2-1)/(x^14-8*x^13+28*x^12-56*x^11+70*x^10-56*x^9+22*x^8+16*x^7-35
*x^6+24*x^5-6*x^4+9*x^2))/(x^21-12*x^20+66*x^19-220*x^18+495*x^17-792*x^16
+915*x^15-720*x^14+243*x^13+284*x^12-564*x^11+492*x^10-224*x^9-36*x^8+153*
x^7-108*x^6+27*x^5-27*x^3),x, algorithm=\
```

output
```
e^(-1/3*x^4/(x^12 - 8*x^11 + 28*x^10 - 56*x^9 + 70*x^8 - 56*x^7 + 22*x^6 +
 16*x^5 - 35*x^4 + 24*x^3 - 6*x^2 + 9) + 1/9*x^4/(x^6 - 4*x^5 + 6*x^4 - 4*
x^3 + x^2 - 3) + 4/3*x^3/(x^12 - 8*x^11 + 28*x^10 - 56*x^9 + 70*x^8 - 56*x
^7 + 22*x^6 + 16*x^5 - 35*x^4 + 24*x^3 - 6*x^2 + 9) - 4/9*x^3/(x^6 - 4*x^5
 + 6*x^4 - 4*x^3 + x^2 - 3) + x*e^(4*x) - 2*x^2/(x^12 - 8*x^11 + 28*x^10 -
 56*x^9 + 70*x^8 - 56*x^7 + 22*x^6 + 16*x^5 - 35*x^4 + 24*x^3 - 6*x^2 + 9)
 + 2/3*x^2/(x^6 - 4*x^5 + 6*x^4 - 4*x^3 + x^2 - 3) + 4/3*x/(x^12 - 8*x^11
+ 28*x^10 - 56*x^9 + 70*x^8 - 56*x^7 + 22*x^6 + 16*x^5 - 35*x^4 + 24*x^3 -
 6*x^2 + 9) - 4/9*x/(x^6 - 4*x^5 + 6*x^4 - 4*x^3 + x^2 - 3) - 1/3/(x^12 -
8*x^11 + 28*x^10 - 56*x^9 + 70*x^8 - 56*x^7 + 22*x^6 + 16*x^5 - 35*x^4 + 2
4*x^3 - 6*x^2 + 9) + 1/9/(x^6 - 4*x^5 + 6*x^4 - 4*x^3 + x^2 - 3) - 1/9/x^2
 - 5*e^(4*x) - 1)
```

3.105.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1836 vs. $2(29) = 58$.

Time = 5.73 (sec) , antiderivative size = 1836, normalized size of antiderivative = 57.38

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+35}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{}$$

= Too large to display

input
```
integrate(((4*x^22-67*x^21+492*x^20-2134*x^19+6160*x^18-12573*x^17+18708*x
^16-20265*x^15+14652*x^14-3481*x^13-7652*x^12+12684*x^11-10244*x^10+4112*x
^9+1296*x^8-3339*x^7+2160*x^6-513*x^5-108*x^4+513*x^3)*exp(4*x)+14*x^6-48*
x^5+60*x^4-32*x^3+6*x^2-6)*exp(((x^15-13*x^14+68*x^13-196*x^12+350*x^11-40
6*x^10+302*x^9-94*x^8-115*x^7+199*x^6-126*x^5+30*x^4+9*x^3-45*x^2)*exp(4*x
)-x^14+8*x^13-28*x^12+56*x^11-70*x^10+56*x^9-22*x^8-16*x^7+35*x^6-24*x^5+6
*x^4-9*x^2-1)/(x^14-8*x^13+28*x^12-56*x^11+70*x^10-56*x^9+22*x^8+16*x^7-35
*x^6+24*x^5-6*x^4+9*x^2))/(x^21-12*x^20+66*x^19-220*x^18+495*x^17-792*x^16
+915*x^15-720*x^14+243*x^13+284*x^12-564*x^11+492*x^10-224*x^9-36*x^8+153*
x^7-108*x^6+27*x^5-27*x^3),x, algorithm=\
```


$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{27x^3+27x^5}$$

output
```
e^(x^15*e^(4*x)/(x^14 - 8*x^13 + 28*x^12 - 56*x^11 + 70*x^10 - 56*x^9 + 22
*x^8 + 16*x^7 - 35*x^6 + 24*x^5 - 6*x^4 + 9*x^2) - 13*x^14*e^(4*x)/(x^14 -
 8*x^13 + 28*x^12 - 56*x^11 + 70*x^10 - 56*x^9 + 22*x^8 + 16*x^7 - 35*x^6
+ 24*x^5 - 6*x^4 + 9*x^2) - x^14/(x^14 - 8*x^13 + 28*x^12 - 56*x^11 + 70*x
^10 - 56*x^9 + 22*x^8 + 16*x^7 - 35*x^6 + 24*x^5 - 6*x^4 + 9*x^2) + 68*x^1
3*e^(4*x)/(x^14 - 8*x^13 + 28*x^12 - 56*x^11 + 70*x^10 - 56*x^9 + 22*x^8 +
 16*x^7 - 35*x^6 + 24*x^5 - 6*x^4 + 9*x^2) + 8*x^13/(x^14 - 8*x^13 + 28*x^
12 - 56*x^11 + 70*x^10 - 56*x^9 + 22*x^8 + 16*x^7 - 35*x^6 + 24*x^5 - 6*x^
4 + 9*x^2) - 196*x^12*e^(4*x)/(x^14 - 8*x^13 + 28*x^12 - 56*x^11 + 70*x^10
 - 56*x^9 + 22*x^8 + 16*x^7 - 35*x^6 + 24*x^5 - 6*x^4 + 9*x^2) - 28*x^12/(
x^14 - 8*x^13 + 28*x^12 - 56*x^11 + 70*x^10 - 56*x^9 + 22*x^8 + 16*x^7 - 3
5*x^6 + 24*x^5 - 6*x^4 + 9*x^2) + 350*x^11*e^(4*x)/(x^14 - 8*x^13 + 28*x^1
2 - 56*x^11 + 70*x^10 - 56*x^9 + 22*x^8 + 16*x^7 - 35*x^6 + 24*x^5 - 6*x^4
 + 9*x^2) + 56*x^11/(x^14 - 8*x^13 + 28*x^12 - 56*x^11 + 70*x^10 - 56*x^9
+ 22*x^8 + 16*x^7 - 35*x^6 + 24*x^5 - 6*x^4 + 9*x^2) - 406*x^10*e^(4*x)/(x
^14 - 8*x^13 + 28*x^12 - 56*x^11 + 70*x^10 - 56*x^9 + 22*x^8 + 16*x^7 - 35
*x^6 + 24*x^5 - 6*x^4 + 9*x^2) - 70*x^10/(x^14 - 8*x^13 + 28*x^12 - 56*x^1
1 + 70*x^10 - 56*x^9 + 22*x^8 + 16*x^7 - 35*x^6 + 24*x^5 - 6*x^4 + 9*x^2)
+ 302*x^9*e^(4*x)/(x^14 - 8*x^13 + 28*x^12 - 56*x^11 + 70*x^10 - 56*x^9 +
22*x^8 + 16*x^7 - 35*x^6 + 24*x^5 - 6*x^4 + 9*x^2) + 56*x^9/(x^14 - 8*x...
```

3.105.9 Mupad [B] (verification not implemented)

Time = 14.69 (sec) , antiderivative size = 1862, normalized size of antiderivative = 58.19

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350\cdots}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{\cdots}$$
$$= \text{Too large to display}$$

3.105.

$$\int \frac{e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x\cdots}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}}{27x^3+27x\cdots}$$

input
```
int(-(exp(-(9*x^2 - 6*x^4 + 24*x^5 - 35*x^6 + 16*x^7 + 22*x^8 - 56*x^9 + 7
0*x^10 - 56*x^11 + 28*x^12 - 8*x^13 + x^14 + exp(4*x)*(45*x^2 - 9*x^3 - 30
*x^4 + 126*x^5 - 199*x^6 + 115*x^7 + 94*x^8 - 302*x^9 + 406*x^10 - 350*x^1
1 + 196*x^12 - 68*x^13 + 13*x^14 - x^15) + 1)/(9*x^2 - 6*x^4 + 24*x^5 - 35
*x^6 + 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13 + x
^14))*(exp(4*x)*(513*x^3 - 108*x^4 - 513*x^5 + 2160*x^6 - 3339*x^7 + 1296*
x^8 + 4112*x^9 - 10244*x^10 + 12684*x^11 - 7652*x^12 - 3481*x^13 + 14652*x
^14 - 20265*x^15 + 18708*x^16 - 12573*x^17 + 6160*x^18 - 2134*x^19 + 492*x
^20 - 67*x^21 + 4*x^22) + 6*x^2 - 32*x^3 + 60*x^4 - 48*x^5 + 14*x^6 - 6))/
(27*x^3 - 27*x^5 + 108*x^6 - 153*x^7 + 36*x^8 + 224*x^9 - 492*x^10 + 564*x
^11 - 284*x^12 - 243*x^13 + 720*x^14 - 915*x^15 + 792*x^16 - 495*x^17 + 22
0*x^18 - 66*x^19 + 12*x^20 - x^21),x)
```

output
```
exp((6*x^4)/(9*x^2 - 6*x^4 + 24*x^5 - 35*x^6 + 16*x^7 + 22*x^8 - 56*x^9 +
70*x^10 - 56*x^11 + 28*x^12 - 8*x^13 + x^14))*exp(-(9*x^2)/(9*x^2 - 6*x^4
+ 24*x^5 - 35*x^6 + 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 - 56*x^11 + 28*x^12
 - 8*x^13 + x^14))*exp(-x^14/(9*x^2 - 6*x^4 + 24*x^5 - 35*x^6 + 16*x^7 + 2
2*x^8 - 56*x^9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13 + x^14))*exp((8*x^13
)/(9*x^2 - 6*x^4 + 24*x^5 - 35*x^6 + 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 -
56*x^11 + 28*x^12 - 8*x^13 + x^14))*exp(-(16*x^7)/(9*x^2 - 6*x^4 + 24*x^5
- 35*x^6 + 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13
 + x^14))*exp(-(24*x^5)/(9*x^2 - 6*x^4 + 24*x^5 - 35*x^6 + 16*x^7 + 22*x^8
 - 56*x^9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13 + x^14))*exp(-(22*x^8)/(9
*x^2 - 6*x^4 + 24*x^5 - 35*x^6 + 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 - 56*x
^11 + 28*x^12 - 8*x^13 + x^14))*exp(-(28*x^12)/(9*x^2 - 6*x^4 + 24*x^5 - 3
5*x^6 + 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13 +
x^14))*exp((35*x^6)/(9*x^2 - 6*x^4 + 24*x^5 - 35*x^6 + 16*x^7 + 22*x^8 - 5
6*x^9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13 + x^14))*exp((56*x^9)/(9*x^2
- 6*x^4 + 24*x^5 - 35*x^6 + 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 - 56*x^11 +
 28*x^12 - 8*x^13 + x^14))*exp((56*x^11)/(9*x^2 - 6*x^4 + 24*x^5 - 35*x^6
+ 16*x^7 + 22*x^8 - 56*x^9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13 + x^14))
*exp(-(70*x^10)/(9*x^2 - 6*x^4 + 24*x^5 - 35*x^6 + 16*x^7 + 22*x^8 - 56*x^
9 + 70*x^10 - 56*x^11 + 28*x^12 - 8*x^13 + x^14))*exp(-1/(9*x^2 - 6*x^4...
```

3.105.

$$\int e^{\frac{-1-9x^2+6x^4-24x^5+35x^6-16x^7-22x^8+56x^9-70x^{10}+56x^{11}-28x^{12}+8x^{13}-x^{14}+e^{4x}\left(-45x^2+9x^3+30x^4-126x^5+199x^6-115x^7-94x^8+302x^9-406x^{10}+350x}{9x^2-6x^4+24x^5-35x^6+16x^7+22x^8-56x^9+70x^{10}-56x^{11}+28x^{12}-8x^{13}+x^{14}}}$$

3.106 $\int \frac{2x^2}{-x+x^3} dx$

3.106.1 Optimal result

Integrand size = 14, antiderivative size = 6

$$\int \frac{2x^2}{-x+x^3} dx = \log(-1+x^2)$$

output
```
ln(exp(ln(x^2/exp(x))+x)-1)
```

3.106.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 6, normalized size of antiderivative = 1.00

$$\int \frac{2x^2}{-x+x^3} dx = \log(-1+x^2)$$

input
```
Integrate[(2*x^2)/(-x + x^3),x]
```

output
```
Log[-1 + x^2]
```

3.106.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 8, normalized size of antiderivative = 1.33, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.214, Rules used = {9, 27, 240}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2}{x^3-x}\,dx$$

$$\Big\downarrow \; 9$$

$$\int -\frac{2x}{1-x^2}dx$$

$$\Big\downarrow \; 27$$

$$-2\int \frac{x}{1-x^2}dx$$

$$\Big\downarrow \; 240$$

$$\log\left(1-x^2\right)$$

input
```
Int[(2*x^2)/(-x + x^3),x]
```

output
```
Log[1 - x^2]
```

3.106.3.1 Defintions of rubi rules used

rule 9
```
Int[(u_.)*(Px_)^(p_.)*((e_.)*(x_))^(m_.), x_Symbol] :> With[{r = Expon[Px,
x, Min]}, Simp[1/e^(p*r)   Int[u*(e*x)^(m + p*r)*ExpandToSum[Px/x^r, x]^p,
x], x] /; IGtQ[r, 0]] /; FreeQ[{e, m}, x] && PolyQ[Px, x] && IntegerQ[p] &&
 !MonomialQ[Px, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 240
```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

3.106.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.67

method	result
norman	$\ln(-1+x)+\ln(1+x)$
parallelrisch	$\ln\left(\mathrm{e}^{\ln(x^2\mathrm{e}^{-x})+x}-1\right)$
default	$\ln\left(x^2\mathrm{e}^{x+\ln(x^2\mathrm{e}^{-x})-2\ln(x)}-1\right)$
risch	$\ln(\mathrm{e}^x)+\frac{i\pi\ \mathrm{csgn}(ix^2)(-\mathrm{csgn}(ix^2)+\mathrm{csgn}(ix))^2}{2}+\frac{i\pi\ \mathrm{csgn}(ix^2\mathrm{e}^{-x})(-\mathrm{csgn}(ix^2\mathrm{e}^{-x})+\mathrm{csgn}(ix^2))(-\mathrm{csgn}(ix^2\mathrm{e}^{-x})+\mathrm{csgn}}{2}$

input
```
int(2*exp(ln(x^2/exp(x))+x)/(x*exp(ln(x^2/exp(x))+x)-x),x,method=_RETURNVE
RBOSE)
```

output
```
ln(-1+x)+ln(1+x)
```

3.106.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 6, normalized size of antiderivative = 1.00

$$\int \frac{2x^2}{-x+x^3}\,dx = \log\left(x^2-1\right)$$

input
```
integrate(2*exp(log(x^2/exp(x))+x)/(x*exp(log(x^2/exp(x))+x)-x),x, algorit
hm=\
```

output
```
log(x^2 - 1)
```

3.106.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.83

$$\int \frac{2x^2}{-x+x^3}\,dx = \log\left(x^2-1\right)$$

input
```
integrate(2*exp(ln(x**2/exp(x))+x)/(x*exp(ln(x**2/exp(x))+x)-x),x)
```

output
```
log(x**2 - 1)
```

3.106.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.50

$$\int \frac{2x^2}{-x+x^3}\,dx = \log\left(x+1\right)+\log\left(x-1\right)$$

input
```
integrate(2*exp(log(x^2/exp(x))+x)/(x*exp(log(x^2/exp(x))+x)-x),x, algorit
hm=\
```

output
```
log(x + 1) + log(x - 1)
```

3.106.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.83

$$\int \frac{2x^2}{-x+x^3}\,dx = \log\left(|x+1|\right)+\log\left(|x-1|\right)$$

input
```
integrate(2*exp(log(x^2/exp(x))+x)/(x*exp(log(x^2/exp(x))+x)-x),x, algorit
hm=\
```

output
```
log(abs(x + 1)) + log(abs(x - 1))
```

3.106.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.50

$$\int \frac{2x^2}{-x+x^3}\,dx = \ln(x-1) + \ln(x+1)$$

input
```
int(-(2*exp(x + log(x^2*exp(-x))))/(x - x*exp(x + log(x^2*exp(-x)))),x)
```

output
```
log(x - 1) + log(x + 1)
```

3.107 $\int \frac{25+36x-72x^2+6x^3-48x^4-6x^6+(-18+36x+18x^3)\log(x)}{25x}\,dx$

3.107.1 Optimal result

Integrand size = 45, antiderivative size = 25

$$\int \frac{25+36x-72x^2+6x^3-48x^4-6x^6+(-18+36x+18x^3)\log(x)}{25x}\,dx = 2+\log(x)-\frac{1}{25}x^2\left(6+x^2-\frac{3\log(x)}{x}\right)^2$$

output
```
2+ln(x)-1/25*x^2*(6-3*ln(x)/x+x^2)^2
```

3.107.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.92

$$\int \frac{25+36x-72x^2+6x^3-48x^4-6x^6+(-18+36x+18x^3)\log(x)}{25x}\,dx = -\frac{36x^2}{25}-\frac{12x^4}{25}-\frac{x^6}{25}+\log(x)+\frac{36}{25}x\log(x)+\frac{6}{25}x^3\log(x)-\frac{9\log^2(x)}{25}$$

input
```
Integrate[(25 + 36*x - 72*x^2 + 6*x^3 - 48*x^4 - 6*x^6 + (-18 + 36*x + 18*
x^3)*Log[x])/(25*x),x]
```

output
```
(-36*x^2)/25 - (12*x^4)/25 - x^6/25 + Log[x] + (36*x*Log[x])/25 + (6*x^3*L
og[x])/25 - (9*Log[x]^2)/25
```

3.107.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.68, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x^6-48x^4+6x^3+\left(18x^3+36x-18\right)\log(x)-72x^2+36x+25}{25x}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{25}\int \frac{-6x^6-48x^4+6x^3-72x^2+36x-18\left(-x^3-2x+1\right)\log(x)+25}{x}dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{25}\int \left(\frac{-6x^6-48x^4+6x^3-72x^2+36x+25}{x}+\frac{18\left(x^3+2x-1\right)\log(x)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{25}\left(-x^6-12x^4+6x^3\log(x)-36x^2-9\log^2(x)+36x\log(x)+25\log(x)\right)$$

input
```
Int[(25 + 36*x - 72*x^2 + 6*x^3 - 48*x^4 - 6*x^6 + (-18 + 36*x + 18*x^3)*L
og[x])/(25*x),x]
```

output
```
(-36*x^2 - 12*x^4 - x^6 + 25*Log[x] + 36*x*Log[x] + 6*x^3*Log[x] - 9*Log[x
]^2)/25
```

3.107.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.107.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.48

method	result	size
default	$-\frac{x^6}{25}+\frac{6x^3\ln(x)}{25}-\frac{12x^4}{25}+\frac{36x\ln(x)}{25}-\frac{36x^2}{25}-\frac{9\ln(x)^2}{25}+\ln(x)$	37
norman	$-\frac{x^6}{25}+\frac{6x^3\ln(x)}{25}-\frac{12x^4}{25}+\frac{36x\ln(x)}{25}-\frac{36x^2}{25}-\frac{9\ln(x)^2}{25}+\ln(x)$	37
parallelrisch	$-\frac{x^6}{25}+\frac{6x^3\ln(x)}{25}-\frac{12x^4}{25}+\frac{36x\ln(x)}{25}-\frac{36x^2}{25}-\frac{9\ln(x)^2}{25}+\ln(x)$	37
parts	$-\frac{x^6}{25}+\frac{6x^3\ln(x)}{25}-\frac{12x^4}{25}+\frac{36x\ln(x)}{25}-\frac{36x^2}{25}-\frac{9\ln(x)^2}{25}+\ln(x)$	37
risch	$-\frac{9\ln(x)^2}{25}+\frac{(6x^3+36x)\ln(x)}{25}-\frac{x^6}{25}-\frac{12x^4}{25}-\frac{36x^2}{25}+\ln(x)-\frac{32}{25}$	39

input
```
int(1/25*((18*x^3+36*x-18)*ln(x)-6*x^6-48*x^4+6*x^3-72*x^2+36*x+25)/x,x,me
thod=_RETURNVERBOSE)
```

output
```
-1/25*x^6+6/25*x^3*ln(x)-12/25*x^4+36/25*x*ln(x)-36/25*x^2-9/25*ln(x)^2+ln
(x)
```

3.107.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \frac{25+36x-72x^2+6x^3-48x^4-6x^6+(-18+36x+18x^3)\log(x)}{25x}\,dx$$
$$=-\frac{1}{25}x^6-\frac{12}{25}x^4-\frac{36}{25}x^2+\frac{1}{25}\left(6x^3+36x+25\right)\log(x)-\frac{9}{25}\log(x)^2$$

input
```
integrate(1/25*((18*x^3+36*x-18)*log(x)-6*x^6-48*x^4+6*x^3-72*x^2+36*x+25)
/x,x, algorithm=\
```

output
```
-1/25*x^6 - 12/25*x^4 - 36/25*x^2 + 1/25*(6*x^3 + 36*x + 25)*log(x) - 9/25
*log(x)^2
```

3.107.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.76

$$\int \frac{25+36x-72x^2+6x^3-48x^4-6x^6+(-18+36x+18x^3)\log(x)}{25x}\,dx = -\frac{x^6}{25}-\frac{12x^4}{25}-\frac{36x^2}{25}+\left(\frac{6x^3}{25}+\frac{36x}{25}\right)\log(x)-\frac{9\log(x)^2}{25}+\log(x)$$

input
```
integrate(1/25*((18*x**3+36*x-18)*ln(x)-6*x**6-48*x**4+6*x**3-72*x**2+36*x
+25)/x,x)
```

output
```
-x**6/25 - 12*x**4/25 - 36*x**2/25 + (6*x**3/25 + 36*x/25)*log(x) - 9*log(
x)**2/25 + log(x)
```

3.107.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \frac{25+36x-72x^2+6x^3-48x^4-6x^6+(-18+36x+18x^3)\log(x)}{25x}\,dx = -\frac{1}{25}x^6-\frac{12}{25}x^4+\frac{6}{25}x^3\log(x)-\frac{36}{25}x^2+\frac{36}{25}x\log(x)-\frac{9}{25}\log(x)^2+\log(x)$$

input
```
integrate(1/25*((18*x^3+36*x-18)*log(x)-6*x^6-48*x^4+6*x^3-72*x^2+36*x+25)
/x,x, algorithm=\
```

output
```
-1/25*x^6 - 12/25*x^4 + 6/25*x^3*log(x) - 36/25*x^2 + 36/25*x*log(x) - 9/2
5*log(x)^2 + log(x)
```

3.107.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.40

$$\int \frac{25+36x-72x^2+6x^3-48x^4-6x^6+(-18+36x+18x^3)\log(x)}{25x}\,dx = -\frac{1}{25}x^6-\frac{12}{25}x^4-\frac{36}{25}x^2+\frac{6}{25}\left(x^3+6x\right)\log(x)-\frac{9}{25}\log(x)^2+\log(x)$$

input
```
integrate(1/25*((18*x^3+36*x-18)*log(x)-6*x^6-48*x^4+6*x^3-72*x^2+36*x+25)
/x,x, algorithm=\
```

output
```
-1/25*x^6 - 12/25*x^4 - 36/25*x^2 + 6/25*(x^3 + 6*x)*log(x) - 9/25*log(x)^
2 + log(x)
```

3.107.9 Mupad [B] (verification not implemented)

Time = 13.69 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \frac{25+36x-72x^2+6x^3-48x^4-6x^6+(-18+36x+18x^3)\log(x)}{25x}\,dx$$
$$=-\frac{x^6}{25}-\frac{12\,x^4}{25}+\frac{6\,x^3\,\ln\left(x\right)}{25}-\frac{36\,x^2}{25}+\frac{36\,x\,\ln\left(x\right)}{25}-\frac{9\ln\left(x\right)^2}{25}+\ln\left(x\right)$$

input
```
int(((36*x)/25 + (log(x)*(36*x + 18*x^3 - 18))/25 - (72*x^2)/25 + (6*x^3)/
25 - (48*x^4)/25 - (6*x^6)/25 + 1)/x,x)
```

output
```
log(x) + (6*x^3*log(x))/25 - (9*log(x)^2)/25 + (36*x*log(x))/25 - (36*x^2)
/25 - (12*x^4)/25 - x^6/25
```

3.108 $\int \frac{1+e^{e^{e^4}}+x^4-4x^4\log(x)}{x\log^2(x)}\,dx$

3.108.1 Optimal result

Integrand size = 27, antiderivative size = 23

$$\int \frac{1+e^{e^{e^4}}+x^4-4x^4\log(x)}{x\log^2(x)}\,dx = \frac{-1-e^{e^{e^4}}-x^4+\log(x)}{\log(x)}$$

output
```
(-1+ln(x)-exp(exp(exp(4)))-x^4)/ln(x)
```

3.108.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{1+e^{e^{e^4}}+x^4-4x^4\log(x)}{x\log^2(x)}\,dx = -\frac{1+e^{e^{e^4}}+x^4}{\log(x)}$$

input
```
Integrate[(1 + E^E^E^4 + x^4 - 4*x^4*Log[x])/(x*Log[x]^2),x]
```

output
```
-((1 + E^E^E^4 + x^4)/Log[x])
```

3.108.3 Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4-4x^4\log(x)+e^{e^{e^4}}+1}{x\log^2(x)}\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{x^4+e^{e^{e^4}}+1}{x\log^2(x)}-\frac{4x^3}{\log(x)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{x^4}{\log(x)}-\frac{1+e^{e^{e^4}}}{\log(x)}$$

input
```
Int[(1 + E^E^E^4 + x^4 - 4*x^4*Log[x])/(x*Log[x]^2),x]
```

output
```
-((1 + E^E^E^4)/Log[x]) - x^4/Log[x]
```

3.108.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.108.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

method	result	size
risch	$-\frac{x^4+{\mathrm e}^{{\mathrm e}^{{\mathrm e}^4}}+1}{\ln(x)}$	16
norman	$\frac{-x^4-1-{\mathrm e}^{{\mathrm e}^{{\mathrm e}^4}}}{\ln(x)}$	19
parallelrisch	$\frac{-x^4-1-{\mathrm e}^{{\mathrm e}^{{\mathrm e}^4}}}{\ln(x)}$	19
default	$-\frac{x^4}{\ln(x)}-\frac{{\mathrm e}^{{\mathrm e}^{{\mathrm e}^4}}}{\ln(x)}-\frac{1}{\ln(x)}$	27
parts	$-\frac{x^4}{\ln(x)}-\frac{{\mathrm e}^{{\mathrm e}^{{\mathrm e}^4}}}{\ln(x)}-\frac{1}{\ln(x)}$	27

input
```
int((exp(exp(exp(4)))-4*x^4*ln(x)+x^4+1)/x/ln(x)^2,x,method=_RETURNVERBOSE
)
```

output
```
-(x^4+exp(exp(exp(4)))+1)/ln(x)
```

3.108.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{1+e^{e^{e^4}}+x^4-4x^4\log(x)}{x\log^2(x)}\,dx=-\frac{x^4+e^{\left(e^{\left(e^4\right)}\right)}+1}{\log(x)}$$

input
```
integrate((exp(exp(exp(4)))-4*x^4*log(x)+x^4+1)/x/log(x)^2,x, algorithm=\
```

output
```
-(x^4 + e^(e^(e^4)) + 1)/log(x)
```

3.108.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{1+e^{e^{e^4}}+x^4-4x^4\log(x)}{x\log^2(x)}\,dx=\frac{-x^4-1-e^{e^{e^4}}}{\log{(x)}}$$

input
```
integrate((exp(exp(exp(4)))-4*x**4*ln(x)+x**4+1)/x/ln(x)**2,x)
```

output
```
(-x**4 - 1 - exp(exp(exp(4))))/log(x)
```

3.108.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{1+e^{e^{e^4}}+x^4-4x^4\log(x)}{x\log^2(x)}\,dx=-\frac{e^{\left(e^{\left(e^4\right)}\right)}}{\log{(x)}}-\frac{1}{\log{(x)}}-4\,\mathrm{Ei}(4\,\log{(x)})+4\,\Gamma(-1,-4\,\log{(x)})$$

input
```
integrate((exp(exp(exp(4)))-4*x^4*log(x)+x^4+1)/x/log(x)^2,x, algorithm=\
```

output
```
-e^(e^(e^4))/log(x) - 1/log(x) - 4*Ei(4*log(x)) + 4*gamma(-1, -4*log(x))
```

3.108.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{1+e^{e^{e^4}}+x^4-4x^4\log(x)}{x\log^2(x)}\,dx=-\frac{x^4+e^{\left(e^{\left(e^4\right)}\right)}+1}{\log{(x)}}$$

input
```
integrate((exp(exp(exp(4)))-4*x^4*log(x)+x^4+1)/x/log(x)^2,x, algorithm=\
```

output
```
-(x^4 + e^(e^(e^4)) + 1)/log(x)
```

3.108.9 Mupad [B] (verification not implemented)

Time = 13.29 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{1+e^{e^{e^4}}+x^4-4x^4\log(x)}{x\log^2(x)}\,dx = -\frac{x^4+\mathrm{e}^{\mathrm{e}^{\mathrm{e}^4}}+1}{\ln(x)}$$

input
```
int((exp(exp(exp(4))) - 4*x^4*log(x) + x^4 + 1)/(x*log(x)^2),x)
```

output
```
-(exp(exp(exp(4))) + x^4 + 1)/log(x)
```

3.109 $\int \frac{-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}+x^9}{x^9}\,dx$

3.109.1 Optimal result

Integrand size = 29, antiderivative size = 13

$$\int \frac{-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}+x^9}{x^9}\,dx = e^{e^{\frac{1}{4x^8}}}+x$$

output
```
exp(exp(1/4/x^8))+x
```

3.109.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int \frac{-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}+x^9}{x^9}\,dx = e^{e^{\frac{1}{4x^8}}}+x$$

input
```
Integrate[(-2*E^(E^(1/(4*x^8)) + 1/(4*x^8)) + x^9)/x^9,x]
```

output
```
E^E^(1/(4*x^8)) + x
```

3.109.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.069, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^9-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}}{x^9} \, dx$$

$$\Big\downarrow \ 2010$$

$$\int \left(1-\frac{2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}}{x^9}\right)dx$$

$$\Big\downarrow \ 2009$$

$$e^{e^{\frac{1}{4x^8}}}+x$$

input
```
Int[(-2*E^(E^(1/(4*x^8)) + 1/(4*x^8)) + x^9)/x^9,x]
```

output
```
E^E^(1/(4*x^8)) + x
```

3.109.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.109.4 Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

method	result	size
default	$e^{e^{\frac{1}{4x^8}}}+x$	10
risch	$e^{e^{\frac{1}{4x^8}}}+x$	10
parallelrisch	$e^{e^{\frac{1}{4x^8}}}+x$	10
parts	$e^{e^{\frac{1}{4x^8}}}+x$	10

input
```
int((-2*exp(1/4/x^8)*exp(exp(1/4/x^8))+x^9)/x^9,x,method=_RETURNVERBOSE)
```

output
```
exp(exp(1/4/x^8))+x
```

3.109.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. 2(9) = 18.

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.69

$$\int \frac{-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}+x^9}{x^9}\,dx=\left(xe^{\left(\frac{1}{4\,x^8}\right)}+e^{\left(\frac{4\,x^8e^{\left(\frac{1}{4\,x^8}\right)}+1}{4\,x^8}\right)}\right)e^{\left(-\frac{1}{4\,x^8}\right)}$$

input
```
integrate((-2*exp(1/4/x^8)*exp(exp(1/4/x^8))+x^9)/x^9,x, algorithm=\
```

output
```
(x*e^(1/4/x^8) + e^(1/4*(4*x^8*e^(1/4/x^8) + 1)/x^8))*e^(-1/4/x^8)
```

3.109.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int \frac{-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}+x^9}{x^9}\,dx = x + e^{e^{\frac{1}{4x^8}}}$$

input
```
integrate((-2*exp(1/4/x**8)*exp(exp(1/4/x**8))+x**9)/x**9,x)
```

output
```
x + exp(exp(1/(4*x**8)))
```

3.109.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.69

$$\int \frac{-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}+x^9}{x^9}\,dx = x + e^{\left(e^{\left(\frac{1}{4x^8}\right)}\right)}$$

input
```
integrate((-2*exp(1/4/x^8)*exp(exp(1/4/x^8))+x^9)/x^9,x, algorithm=\
```

output
```
x + e^(e^(1/4/x^8))
```

3.109.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. 2(9) = 18.

Time = 0.27 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.69

$$\int \frac{-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}+x^9}{x^9}\,dx = \left(xe^{\left(\frac{1}{4x^8}\right)} + e^{\left(\frac{4x^8e^{\left(\frac{1}{4x^8}\right)}+1}{4x^8}\right)}\right)e^{\left(-\frac{1}{4x^8}\right)}$$

input
```
integrate((-2*exp(1/4/x^8)*exp(exp(1/4/x^8))+x^9)/x^9,x, algorithm=\
```

output
```
(x*e^(1/4/x^8) + e^(1/4*(4*x^8*e^(1/4/x^8) + 1)/x^8))*e^(-1/4/x^8)
```

3.109.9 Mupad [B] (verification not implemented)

Time = 13.39 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.69

$$\int \frac{-2e^{e^{\frac{1}{4x^8}}+\frac{1}{4x^8}}+x^9}{x^9}\,dx = x+\mathrm{e}^{\mathrm{e}^{\frac{1}{4\,x^8}}}$$

input
```
int((x^9 - 2*exp(exp(1/(4*x^8)))*exp(1/(4*x^8)))/x^9,x)
```

output
```
x + exp(exp(1/(4*x^8)))
```

3.110 $\int \frac{4000-4000x+e(960x^2-320x^3-400x^4+160x^5)+(-400x+400x^2+e(-}{1600x^2-1600x^3+400x^4+(-160x^3+160x^4-40x^5)\,\mathrm{l}}$

3.110.1 Optimal result

Integrand size = 131, antiderivative size = 31

$$\int \frac{4000-4000x+e(960x^2-320x^3-400x^4+160x^5)+(-400x+400x^2+e(-16x^4+16x^5-4x^6))\log(4)}{1600x^2-1600x^3+400x^4+(-160x^3+160x^4-40x^5)\log(4)+(4x^4-4x^5+x^6)\log}$$
$$=\frac{5}{(-2+x)x}-\frac{e(-3-x)x}{5-\frac{1}{4}x\log(4)}$$

output
```
5/(-2+x)/x-exp(1)*x*(-3-x)/(5-1/2*x*ln(2))
```

3.110.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 79 vs. 2(31) = 62.

Time = 0.14 (sec) , antiderivative size = 79, normalized size of antiderivative = 2.55

$$\int \frac{4000-4000x+e(960x^2-320x^3-400x^4+160x^5)+(-400x+400x^2+e(-16x^4+16x^5-4x^6))\log(4)}{1600x^2-1600x^3+400x^4+(-160x^3+160x^4-40x^5)\log(4)+(4x^4-4x^5+x^6)\log}$$
$$=-2\left(\frac{5}{4x}+\frac{ex\log(16)}{\log^2(4)}+5\left(\frac{1}{8-4x}+\frac{8e(-500\log^2(4)-40\log^3(4)+3\log^4(4)+1000\log(16)+200\log(4)\log(16))}{(-10+\log(4))^2\log^3(4)(-20+x\log(4))}\right)\right)$$

3.110.
$$\int \frac{4000-4000x+e(960x^2-320x^3-400x^4+160x^5)+(-400x+400x^2+e(-16x^4+16x^5-4x^6))\log(4)+(10x^2-10x^3)\log^2(4)}{1600x^2-1600x^3+400x^4+(-160x^3+160x^4-40x^5)\log(4)+(4x^4-4x^5+x^6)\log^2(4)}\,dx$$

input
```
Integrate[(4000 - 4000*x + E*(960*x^2 - 320*x^3 - 400*x^4 + 160*x^5) + (-4
00*x + 400*x^2 + E*(-16*x^4 + 16*x^5 - 4*x^6))*Log[4] + (10*x^2 - 10*x^3)*
Log[4]^2)/(1600*x^2 - 1600*x^3 + 400*x^4 + (-160*x^3 + 160*x^4 - 40*x^5)*L
og[4] + (4*x^4 - 4*x^5 + x^6)*Log[4]^2),x]
```

output
```
-2*(5/(4*x) + (E*x*Log[16])/Log[4]^2 + 5*((8 - 4*x)^(-1) + (8*E*(-500*Log[
4]^2 - 40*Log[4]^3 + 3*Log[4]^4 + 1000*Log[16] + 200*Log[4]*Log[16]))/((-1
0 + Log[4])^2*Log[4]^3*(-20 + x*Log[4]))))
```

3.110.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.52, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.023, Rules used = {2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(10x^2-10x^3)\log^2(4)+\left(400x^2+e\left(-4x^6+16x^5-16x^4\right)-400x\right)\log(4)+e\left(160x^5-400x^4-320x^3+960x^2\right.}{400x^4-1600x^3+1600x^2+(x^6-4x^5+4x^4)\log^2(4)+(-40x^5+160x^4-160x^3)\log(4)}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(10x^2-10x^3)\log^2(4)+\left(400x^2+e\left(-4x^6+16x^5-16x^4\right)-400x\right)\log(4)+e\left(160x^5-400x^4-320x^3+960x^2\right.}{x^2\left(x^4\log^2(4)-4x^3\log(4)(10+\log(4))+4x^2\left(100+\log^2(4)+40\log(4)\right)-160x(10+\log(4))+1\right.}$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{5}{2x^2}-\frac{5}{2(x-2)^2}+\frac{80e(20+\log(64))}{\log(4)(x\log(4)-20)^2}-\frac{4e}{\log(4)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{5}{2(2-x)}-\frac{5}{2x}+\frac{80e(20+\log(64))}{\log^2(4)(20-x\log(4))}-\frac{4ex}{\log(4)}$$

input
```
Int[(4000 - 4000*x + E*(960*x^2 - 320*x^3 - 400*x^4 + 160*x^5) + (-400*x +
 400*x^2 + E*(-16*x^4 + 16*x^5 - 4*x^6))*Log[4] + (10*x^2 - 10*x^3)*Log[4]
^2)/(1600*x^2 - 1600*x^3 + 400*x^4 + (-160*x^3 + 160*x^4 - 40*x^5)*Log[4]
+ (4*x^4 - 4*x^5 + x^6)*Log[4]^2),x]
```

output
```
-5/(2*(2 - x)) - 5/(2*x) - (4*E*x)/Log[4] + (80*E*(20 + Log[64]))/(Log[4]^
2*(20 - x*Log[4]))
```

3.110.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.110.4 Maple [A] (verified)

Time = 0.28 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.45

method	result	size
default	$-\frac{2x\,\mathrm{e}}{\ln(2)}-\frac{5}{2x}-\frac{20\,\mathrm{e}(3\ln(2)+10)}{\ln(2)^{2}(x\ln(2)-10)}+\frac{5}{2(-2+x)}$	45
norman	$\frac{-50+\left(-\frac{\ln(2)^{2}}{4}-2\,\mathrm{e}\right)x^{3}+\left(\frac{\ln(2)^{2}}{2}+\frac{5\ln(2)}{2}+12\,\mathrm{e}\right)x^{2}-2x^{4}\mathrm{e}}{x(-2+x)(x\ln(2)-10)}$	61
gosper	$-\frac{x^{3}\ln(2)^{2}+8x^{4}\mathrm{e}-2x^{2}\ln(2)^{2}+8x^{3}\mathrm{e}-10x^{2}\ln(2)-48x^{2}\mathrm{e}+200}{4x(x^{2}\ln(2)-2x\ln(2)-10x+20)}$	71
parallelrisch	$-\frac{5x^{3}\ln(2)^{2}+1000+40x^{4}\mathrm{e}-10x^{2}\ln(2)^{2}+40x^{3}\mathrm{e}-50x^{2}\ln(2)-240x^{2}\mathrm{e}}{20x(x^{2}\ln(2)-2x\ln(2)-10x+20)}$	72
risch	$-\frac{2x\,\mathrm{e}}{\ln(2)}+\frac{-\frac{20\,\mathrm{e}(3\ln(2)+10)x^{2}}{\ln(2)}+\frac{5\left(\ln(2)^{3}+24\,\mathrm{e}\ln(2)+80\,\mathrm{e}\right)x}{\ln(2)}-50\ln(2)}{\ln(2)x(x^{2}\ln(2)-2x\ln(2)-10x+20)}$	81

input
```
int((4*(-10*x^3+10*x^2)*ln(2)^2+2*((-4*x^6+16*x^5-16*x^4)*exp(1)+400*x^2-4
00*x)*ln(2)+(160*x^5-400*x^4-320*x^3+960*x^2)*exp(1)-4000*x+4000)/(4*(x^6-
4*x^5+4*x^4)*ln(2)^2+2*(-40*x^5+160*x^4-160*x^3)*ln(2)+400*x^4-1600*x^3+16
00*x^2),x,method=_RETURNVERBOSE)
```

3.110.

$$\int \frac{4000-4000x+e\left(960x^{2}-320x^{3}-400x^{4}+160x^{5}\right)+\left(-400x+400x^{2}+e\left(-16x^{4}+16x^{5}-4x^{6}\right)\right)\log(4)+\left(10x^{2}-10x^{3}\right)\log^{2}(4)}{1600x^{2}-1600x^{3}+400x^{4}+\left(-160x^{3}+160x^{4}-40x^{5}\right)\log(4)+\left(4x^{4}-4x^{5}+x^{6}\right)\log^{2}(4)}\,dx$$

output
```
-2*x*exp(1)/ln(2)-5/2/x-20*exp(1)*(3*ln(2)+10)/ln(2)^2/(x*ln(2)-10)+5/2/(-
2+x)
```

3.110.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 88 vs. $2(27) = 54$.

Time = 0.25 (sec) , antiderivative size = 88, normalized size of antiderivative = 2.84

$$\int \frac{4000-4000x+e(960x^2-320x^3-400x^4+160x^5)+(-400x+400x^2+e(-16x^4+16x^5-4x^6))\log(4)}{1600x^2-1600x^3+400x^4+(-160x^3+160x^4-40x^5)\log(4)+(4x^4-4x^5+x^6)\log} = \frac{5\,x\log(2)^3+20\,(x^3-5\,x^2+6\,x)e\log(2)-2\,((x^4-2\,x^3)e+25)\log(2)^2-200\,(x^2-2\,x)e}{(x^3-2\,x^2)\log(2)^3-10\,(x^2-2\,x)\log(2)^2}$$

input
```
integrate((4*(-10*x^3+10*x^2)*log(2)^2+2*((-4*x^6+16*x^5-16*x^4)*exp(1)+40
0*x^2-400*x)*log(2)+(160*x^5-400*x^4-320*x^3+960*x^2)*exp(1)-4000*x+4000)/
(4*(x^6-4*x^5+4*x^4)*log(2)^2+2*(-40*x^5+160*x^4-160*x^3)*log(2)+400*x^4-1
600*x^3+1600*x^2),x, algorithm=\
```

output
```
(5*x*log(2)^3 + 20*(x^3 - 5*x^2 + 6*x)*e*log(2) - 2*((x^4 - 2*x^3)*e + 25)
*log(2)^2 - 200*(x^2 - 2*x)*e)/((x^3 - 2*x^2)*log(2)^3 - 10*(x^2 - 2*x)*lo
g(2)^2)
```

3.110.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. $2(24) = 48$.

Time = 3.60 (sec) , antiderivative size = 94, normalized size of antiderivative = 3.03

$$\int \frac{4000-4000x+e(960x^2-320x^3-400x^4+160x^5)+(-400x+400x^2+e(-16x^4+16x^5-4x^6))\log(4)}{1600x^2-1600x^3+400x^4+(-160x^3+160x^4-40x^5)\log(4)+(4x^4-4x^5+x^6)\log} = -\frac{2ex}{\log(2)}-\frac{x^2\cdot(60e\log(2)+200e)+x\left(-400e-120e\log(2)-5\log(2)^3\right)+50\log(2)^2}{x^3\log(2)^3+x^2\left(-10\log(2)^2-2\log(2)^3\right)+20x\log(2)^2}$$

input
```
integrate((4*(-10*x**3+10*x**2)*ln(2)**2+2*((-4*x**6+16*x**5-16*x**4)*exp(
1)+400*x**2-400*x)*ln(2)+(160*x**5-400*x**4-320*x**3+960*x**2)*exp(1)-4000
*x+4000)/(4*(x**6-4*x**5+4*x**4)*ln(2)**2+2*(-40*x**5+160*x**4-160*x**3)*l
n(2)+400*x**4-1600*x**3+1600*x**2),x)
```

3.110. $\int \frac{4000-4000x+e(960x^2-320x^3-400x^4+160x^5)+(-400x+400x^2+e(-16x^4+16x^5-4x^6))\log(4)+(10x^2-10x^3)\log^2(4)}{1600x^2-1600x^3+400x^4+(-160x^3+160x^4-40x^5)\log(4)+(4x^4-4x^5+x^6)\log^2(4)}\,dx$

output
```
-2*E*x/log(2) - (x**2*(60*E*log(2) + 200*E) + x*(-400*E - 120*E*log(2) - 5
*log(2)**3) + 50*log(2)**2)/(x**3*log(2)**3 + x**2*(-10*log(2)**2 - 2*log(
2)**3) + 20*x*log(2)**2)
```

3.110.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 87 vs. $2(27) = 54$.

Time = 0.19 (sec) , antiderivative size = 87, normalized size of antiderivative = 2.81

$$\int \frac{4000 - 4000x + e(960x^2 - 320x^3 - 400x^4 + 160x^5) + (-400x + 400x^2 + e(-16x^4 + 16x^5 - 4x^6))\log(4)}{1600x^2 - 1600x^3 + 400x^4 + (-160x^3 + 160x^4 - 40x^5)\log(4) + (4x^4 - 4x^5 + x^6)\log}$$
$$= -\frac{2\,xe}{\log(2)} - \frac{5\left(4\,(3\,e\log(2) + 10\,e)x^2 - \left(\log(2)^3 + 24\,e\log(2) + 80\,e\right)x + 10\,\log(2)^2\right)}{x^3\log(2)^3 - 2\left(\log(2)^3 + 5\,\log(2)^2\right)x^2 + 20\,x\log(2)^2}$$

input
```
integrate((4*(-10*x^3+10*x^2)*log(2)^2+2*((-4*x^6+16*x^5-16*x^4)*exp(1)+40
0*x^2-400*x)*log(2)+(160*x^5-400*x^4-320*x^3+960*x^2)*exp(1)-4000*x+4000)/
(4*(x^6-4*x^5+4*x^4)*log(2)^2+2*(-40*x^5+160*x^4-160*x^3)*log(2)+400*x^4-1
600*x^3+1600*x^2),x, algorithm=\
```

output
```
-2*x*e/log(2) - 5*(4*(3*e*log(2) + 10*e)*x^2 - (log(2)^3 + 24*e*log(2) + 8
0*e)*x + 10*log(2)^2)/(x^3*log(2)^3 - 2*(log(2)^3 + 5*log(2)^2)*x^2 + 20*x
*log(2)^2)
```

3.110.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. $2(27) = 54$.

Time = 0.27 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.65

$$\int \frac{4000 - 4000x + e(960x^2 - 320x^3 - 400x^4 + 160x^5) + (-400x + 400x^2 + e(-16x^4 + 16x^5 - 4x^6))\log(4)}{1600x^2 - 1600x^3 + 400x^4 + (-160x^3 + 160x^4 - 40x^5)\log(4) + (4x^4 - 4x^5 + x^6)\log}$$
$$= -\frac{2\,xe}{\log(2)} - \frac{5\left(12\,x^2e\log(2) - x\log(2)^3 + 40\,x^2e - 24\,xe\log(2) - 80\,xe + 10\,\log(2)^2\right)}{\left(x^3\log(2) - 2\,x^2\log(2) - 10\,x^2 + 20\,x\right)\log(2)^2}$$

input
```
integrate((4*(-10*x^3+10*x^2)*log(2)^2+2*((-4*x^6+16*x^5-16*x^4)*exp(1)+40
0*x^2-400*x)*log(2)+(160*x^5-400*x^4-320*x^3+960*x^2)*exp(1)-4000*x+4000)/
(4*(x^6-4*x^5+4*x^4)*log(2)^2+2*(-40*x^5+160*x^4-160*x^3)*log(2)+400*x^4-1
600*x^3+1600*x^2),x, algorithm=\
```

output
```
-2*x*e/log(2) - 5*(12*x^2*e*log(2) - x*log(2)^3 + 40*x^2*e - 24*x*e*log(2)
 - 80*x*e + 10*log(2)^2)/((x^3*log(2) - 2*x^2*log(2) - 10*x^2 + 20*x)*log(
2)^2)
```

3.110.9 Mupad [B] (verification not implemented)

Time = 13.66 (sec) , antiderivative size = 91, normalized size of antiderivative = 2.94

$$\int \frac{4000-4000x+e(960x^2-320x^3-400x^4+160x^5)+(-400x+400x^2+e(-16x^4+16x^5-4x^6))\log(4)}{1600x^2-1600x^3+400x^4+(-160x^3+160x^4-40x^5)\log(4)+(4x^4-4x^5+x^6)\log}$$

$$= -\frac{\frac{20\,(10\,\mathrm{e}+3\,\mathrm{e}\,\ln(2))\,x^2}{\ln(2)}-\frac{5\left(80\,\mathrm{e}+24\,\mathrm{e}\,\ln(2)+\ln(2)^3\right)x}{\ln(2)}+50\,\ln(2)}{\ln(2)^2\,x^3+\left(-10\,\ln(2)-2\ln(2)^2\right)\,x^2+20\,\ln(2)\,x}-\frac{2\,x\,\mathrm{e}}{\ln(2)}$$

input
```
int((4*log(2)^2*(10*x^2 - 10*x^3) - 2*log(2)*(400*x + exp(1)*(16*x^4 - 16*
x^5 + 4*x^6) - 400*x^2) - 4000*x + exp(1)*(960*x^2 - 320*x^3 - 400*x^4 + 1
60*x^5) + 4000)/(4*log(2)^2*(4*x^4 - 4*x^5 + x^6) - 2*log(2)*(160*x^3 - 16
0*x^4 + 40*x^5) + 1600*x^2 - 1600*x^3 + 400*x^4),x)
```

output
```
- (50*log(2) + (20*x^2*(10*exp(1) + 3*exp(1)*log(2)))/log(2) - (5*x*(80*ex
p(1) + 24*exp(1)*log(2) + log(2)^3))/log(2))/(x^3*log(2)^2 + 20*x*log(2) -
 x^2*(10*log(2) + 2*log(2)^2)) - (2*x*exp(1))/log(2)
```

3.111 $\int \frac{-36x+36x^2+(3x-3x^2)\log(x)+(33x-108x^2+(-3x+9x^2)\log(x))\log$

$(-12+\log(x$

3.111.1 Optimal result

Integrand size = 96, antiderivative size = 32

$$\int \frac{-36x+36x^2+(3x-3x^2)\log(x)+(33x-108x^2+(-3x+9x^2)\log(x))\log(2x)+(-36x+3x\log(x)+}{(-12+\log(x))\log^2(2x)}$$

$$=\frac{3x^2\left(-1+x-\log\left(\frac{-3+\frac{\log(x)}{4}}{2x}\right)\right)}{\log(2x)}$$

output
```
3*x^2*(x-1-ln(1/2*(1/4*ln(x)-3)/x))/ln(2*x)
```

3.111.2 Mathematica [A] (verified)

Time = 0.42 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.88

$$\int \frac{-36x+36x^2+(3x-3x^2)\log(x)+(33x-108x^2+(-3x+9x^2)\log(x))\log(2x)+(-36x+3x\log(x)+}{(-12+\log(x))\log^2(2x)}$$

$$=\frac{3x^2\left(-1+x-\log\left(\frac{-12+\log(x)}{8x}\right)\right)}{\log(2x)}$$

input
```
Integrate[(-36*x + 36*x^2 + (3*x - 3*x^2)*Log[x] + (33*x - 108*x^2 + (-3*x
 + 9*x^2)*Log[x])*Log[2*x] + (-36*x + 3*x*Log[x] + (72*x - 6*x*Log[x])*Log
[2*x])*Log[(-12 + Log[x])/(8*x)])/((-12 + Log[x])*Log[2*x]^2),x]
```

3.111.

$$\int \frac{-36x+36x^2+(3x-3x^2)\log(x)+(33x-108x^2+(-3x+9x^2)\log(x))\log(2x)+(-36x+3x\log(x)+(72x-6x\log(x))\log(2x))\log\left(\frac{-12+\log(x)}{8x}\right)}{(-12+\log(x))\log^2(2x)}\,dx$$

output
```
(3*x^2*(-1 + x - Log[(-12 + Log[x])/(8*x)]))/Log[2*x]
```

3.111.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{36x^2+(3x-3x^2)\log(x)+(-108x^2+(9x^2-3x)\log(x)+33x)\log(2x)-36x+(-36x+3x\log(x)+(72x-}{(\log(x)-12)\log^2(2x)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{3x(12x+x(-\log(x))+3x\log(x)\log(2x)-36x\log(2x)+\log(x)-\log(x)\log(2x)+11\log(2x)-12)}{(\log(x)-12)\log^2(2x)}-\frac{3x(2}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-108\int \frac{x^2}{(\log(x)-12)\log(2x)}dx+9\int \frac{x^2\log(x)}{(\log(x)-12)\log(2x)}dx+3\int \frac{x\log\left(\frac{\log(x)-12}{8x}\right)}{\log^2(2x)}dx+ 33\int \frac{x}{(\log(x)-12)\log(2x)}dx-3\int \frac{x\log(x)}{(\log(x)-12)\log(2x)}dx-6\int \frac{x\log\left(\frac{\log(x)-12}{8x}\right)}{\log(2x)}dx+ \frac{3}{2}\text{ExpIntegralEi}(2\log(2x))-\frac{9}{8}\text{ExpIntegralEi}(3\log(2x))+\frac{3x^3}{\log(2x)}-\frac{3x^2}{\log(2x)}$$

input
```
Int[(-36*x + 36*x^2 + (3*x - 3*x^2)*Log[x] + (33*x - 108*x^2 + (-3*x + 9*x
^2)*Log[x])*Log[2*x] + (-36*x + 3*x*Log[x] + (72*x - 6*x*Log[x])*Log[2*x])
*Log[(-12 + Log[x])/(8*x)])/((-12 + Log[x])*Log[2*x]^2),x]
```

output
```
$Aborted
```

3.111.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.111.4 Maple [A] (verified)

Time = 2.88 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.09

method	result
parallelrisch	$-\frac{-72x^3+72x^2+72\ln\left(\frac{\ln(x)-12}{8x}\right)x^2}{24\ln(2x)}$
risch	$\frac{6ix^2\ln(\ln(x)-12)}{-2i\ln(2)-2i\ln(x)}+\frac{18x^2\ln(2)+6x^2\ln(x)-3i\pi x^2\,\mathrm{csgn}(i(\ln(x)-12))\,\mathrm{csgn}\left(\frac{i(\ln(x)-12)}{x}\right)^2+3i\pi x^2\,\mathrm{csgn}(i(\ln(x)-12))\,\mathrm{csgn}\left(\frac{i(\cdots}{}\right.}{2\ln(x)+2\ln\cdots}$

input
```
int((((-6*x*ln(x)+72*x)*ln(2*x)+3*x*ln(x)-36*x)*ln(1/8*(ln(x)-12)/x)+((9*x
^2-3*x)*ln(x)-108*x^2+33*x)*ln(2*x)+(-3*x^2+3*x)*ln(x)+36*x^2-36*x)/(ln(x)
-12)/ln(2*x)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/24*(-72*x^3+72*x^2+72*ln(1/8*(ln(x)-12)/x)*x^2)/ln(2*x)
```

3.111.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.03

$$\int \frac{-36x+36x^2+(3x-3x^2)\log(x)+(33x-108x^2+(-3x+9x^2)\log(x))\log(2x)+(-36x+3x\log(x)+\cdots}{(-12+\log(x))\log^2(2x)}$$
$$=\frac{3\left(x^3-x^2\log\left(\frac{\log(x)-12}{8\,x}\right)-x^2\right)}{\log(2)+\log(x)}$$

input
```
integrate((((-6*x*log(x)+72*x)*log(2*x)+3*x*log(x)-36*x)*log(1/8*(log(x)-1
2)/x)+((9*x^2-3*x)*log(x)-108*x^2+33*x)*log(2*x)+(-3*x^2+3*x)*log(x)+36*x^
2-36*x)/(log(x)-12)/log(2*x)^2,x, algorithm=\
```

output
```
3*(x^3 - x^2*log(1/8*(log(x) - 12)/x) - x^2)/(log(2) + log(x))
```

3.111.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{-36x+36x^2+(3x-3x^2)\log(x)+(33x-108x^2+(-3x+9x^2)\log(x))\log(2x)+(-36x+3x\log(x)+}{(-12+\log(x))\log^2(2x)}$$
= Exception raised: TypeError

input
```
integrate((((-6*x*ln(x)+72*x)*ln(2*x)+3*x*ln(x)-36*x)*ln(1/8*(ln(x)-12)/x)
+((9*x**2-3*x)*ln(x)-108*x**2+33*x)*ln(2*x)+(-3*x**2+3*x)*ln(x)+36*x**2-36
*x)/(ln(x)-12)/ln(2*x)**2,x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.111.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.22

$$\int \frac{-36x+36x^2+(3x-3x^2)\log(x)+(33x-108x^2+(-3x+9x^2)\log(x))\log(2x)+(-36x+3x\log(x)+}{(-12+\log(x))\log^2(2x)}$$
$$= \frac{3\left(x^3+x^2(3\log(2)-1)+x^2\log(x)-x^2\log(\log(x)-12)\right)}{\log(2)+\log(x)}$$

input
```
integrate((((-6*x*log(x)+72*x)*log(2*x)+3*x*log(x)-36*x)*log(1/8*(log(x)-1
2)/x)+((9*x^2-3*x)*log(x)-108*x^2+33*x)*log(2*x)+(-3*x^2+3*x)*log(x)+36*x^
2-36*x)/(log(x)-12)/log(2*x)^2,x, algorithm=\
```

output
```
3*(x^3 + x^2*(3*log(2) - 1) + x^2*log(x) - x^2*log(log(x) - 12))/(log(2) +
 log(x))
```

3.111.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. $2(26) = 52$.

Time = 0.31 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.19

$$\int \frac{-36x + 36x^2 + (3x - 3x^2)\log(x) + (33x - 108x^2 + (-3x + 9x^2)\log(x))\log(2x) + (-36x + 3x\log(x) +}{(-12 + \log(x))\log^2(2x)}$$

$$= \frac{3\,x^3}{\log(2) + \log(x)} + \frac{9\,x^2\log(2)}{\log(2) + \log(x)} + \frac{3\,x^2\log(x)}{\log(2) + \log(x)} - \frac{3\,x^2\log(\log(x) - 12)}{\log(2) + \log(x)} - \frac{3\,x^2}{\log(2) + \log(x)}$$

input
```
integrate((((-6*x*log(x)+72*x)*log(2*x)+3*x*log(x)-36*x)*log(1/8*(log(x)-1
2)/x)+((9*x^2-3*x)*log(x)-108*x^2+33*x)*log(2*x)+(-3*x^2+3*x)*log(x)+36*x^
2-36*x)/(log(x)-12)/log(2*x)^2,x, algorithm=\
```

output
```
3*x^3/(log(2) + log(x)) + 9*x^2*log(2)/(log(2) + log(x)) + 3*x^2*log(x)/(l
og(2) + log(x)) - 3*x^2*log(log(x) - 12)/(log(2) + log(x)) - 3*x^2/(log(2)
 + log(x))
```

3.111.9 Mupad [B] (verification not implemented)

Time = 14.21 (sec) , antiderivative size = 115, normalized size of antiderivative = 3.59

$$\int \frac{-36x + 36x^2 + (3x - 3x^2)\log(x) + (33x - 108x^2 + (-3x + 9x^2)\log(x))\log(2x) + (-36x + 3x\log(x) +}{(-12 + \log(x))\log^2(2x)}$$

$$= 9\,x^3 - 6\,x^2 - \frac{3\,x^2\,(2\,\ln(x) - 2\,\ln(2\,x) - x + 3\,x\,(\ln(2\,x) - \ln(x)) + 1) + 3\,x^2\,\ln(x)\,(3\,x - 2)}{\ln(2\,x)} - \frac{\ln\left(\frac{\frac{\ln(x)}{8} - \frac{3}{2}}{x}\right)\,(6\,x^2\,(\ln(2\,x) - \ln(x)) + 3\,x^2\,(2\,\ln(x) - 2\,\ln(2\,x) + 1))}{\ln(2\,x)}$$

input
```
int((log((log(x)/8 - 3/2)/x)*(log(2*x)*(72*x - 6*x*log(x)) - 36*x + 3*x*lo
g(x)) - 36*x + log(x)*(3*x - 3*x^2) - log(2*x)*(log(x)*(3*x - 9*x^2) - 33*
x + 108*x^2) + 36*x^2)/(log(2*x)^2*(log(x) - 12)),x)
```

3.111. $\int \frac{-36x+36x^2+(3x-3x^2)\log(x)+(33x-108x^2+(-3x+9x^2)\log(x))\log(2x)+(-36x+3x\log(x)+(72x-6x\log(x))\log(2x))\log\left(\frac{-12+\log(x)}{8x}\right)}{(-12+\log(x))\log^2(2x)}\,dx$

output
```
9*x^3 - 6*x^2 - (3*x^2*(2*log(x) - 2*log(2*x) - x + 3*x*(log(2*x) - log(x)
) + 1) + 3*x^2*log(x)*(3*x - 2))/log(2*x) - (log((log(x)/8 - 3/2)/x)*(6*x^
2*(log(2*x) - log(x)) + 3*x^2*(2*log(x) - 2*log(2*x) + 1)))/log(2*x)
```

3.111.

$$\int \frac{-36x+36x^2+\left(3x-3x^2\right)\log(x)+\left(33x-108x^2+\left(-3x+9x^2\right)\log(x)\right)\log(2x)+\left(-36x+3x\log(x)+\left(72x-6x\log(x)\right)\log(2x)\right)\log\left(\frac{-12+\log(x)}{8x}\right)}{\left(-12+\log(x)\right)\log^2(2x)}\,dx$$

3.112 $\int \frac{-2x+14e^3x-24e^6x+(-2e^3+6e^6)\log(5e^x)}{x^2-8e^3x^2+e^6(-3+16x^2)+(2e^3x-8e^6x)\log(5e^x)+e^6\log^2(5e^x)}\,dx$

3.112.1 Optimal result

Integrand size = 92, antiderivative size = 26

$$\int \frac{-2x+14e^3x-24e^6x+(-2e^3+6e^6)\log(5e^x)}{x^2-8e^3x^2+e^6(-3+16x^2)+(2e^3x-8e^6x)\log(5e^x)+e^6\log^2(5e^x)}\,dx = \log\left(\frac{1}{4\left(-3+\left(-4x+\frac{x}{e^3}+\log(5e^x)\right)^2\right)}\right)$$

output
```
ln(1/(4*(ln(5*exp(x))-4*x+x/exp(3))^2-12))
```

3.112.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 74 vs. 2(26) = 52.

Time = 0.51 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.85

$$\int \frac{-2x+14e^3x-24e^6x+(-2e^3+6e^6)\log(5e^x)}{x^2-8e^3x^2+e^6(-3+16x^2)+(2e^3x-8e^6x)\log(5e^x)+e^6\log^2(5e^x)}\,dx = -\frac{2(-1+3e^3)\log\left(x^2-8e^3x^2+e^6(-3+16x^2)+(2e^3x-8e^6x)\log(5e^x)+e^6\log^2(5e^x)\right)}{-2+6e^3}$$

input
```
Integrate[(-2*x + 14*E^3*x - 24*E^6*x + (-2*E^3 + 6*E^6)*Log[5*E^x])/(x^2
- 8*E^3*x^2 + E^6*(-3 + 16*x^2) + (2*E^3*x - 8*E^6*x)*Log[5*E^x] + E^6*Log
[5*E^x]^2),x]
```

output
```
(-2*(-1 + 3*E^3)*Log[x^2 - 8*E^3*x^2 + E^6*(-3 + 16*x^2) + (2*E^3*x - 8*E^
6*x)*Log[5*E^x] + E^6*Log[5*E^x]^2])/(-2 + 6*E^3)
```

3.112.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 59 vs. $2(26) = 52$.

Time = 0.50 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.27, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.076$, Rules used = {6, 6, 6, 7292, 27, 25, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-24e^6x+14e^3x-2x+\left(6e^6-2e^3\right)\log\left(5e^x\right)}{-8e^3x^2+x^2+e^6\left(16x^2-3\right)+e^6\log^2\left(5e^x\right)+\left(2e^3x-8e^6x\right)\log\left(5e^x\right)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{\left(14e^3-2\right)x-24e^6x+\left(6e^6-2e^3\right)\log\left(5e^x\right)}{-8e^3x^2+x^2+e^6\left(16x^2-3\right)+e^6\log^2\left(5e^x\right)+\left(2e^3x-8e^6x\right)\log\left(5e^x\right)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{\left(-2+14e^3-24e^6\right)x+\left(6e^6-2e^3\right)\log\left(5e^x\right)}{-8e^3x^2+x^2+e^6\left(16x^2-3\right)+e^6\log^2\left(5e^x\right)+\left(2e^3x-8e^6x\right)\log\left(5e^x\right)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{\left(-2+14e^3-24e^6\right)x+\left(6e^6-2e^3\right)\log\left(5e^x\right)}{\left(1-8e^3\right)x^2+e^6\left(16x^2-3\right)+e^6\log^2\left(5e^x\right)+\left(2e^3x-8e^6x\right)\log\left(5e^x\right)}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{2\left(1-3e^3\right)\left(-\left(\left(1-4e^3\right)x\right)-e^3\log\left(5e^x\right)\right)}{\left(1-8e^3\right)x^2+e^6\left(16x^2-3\right)+e^6\log^2\left(5e^x\right)+\left(2e^3x-8e^6x\right)\log\left(5e^x\right)}dx$$

$$\Big\downarrow \ 27$$

$$2\left(1-3e^3\right)\int -\frac{\left(1-4e^3\right)x+e^3\log\left(5e^x\right)}{\left(1-8e^3\right)x^2+2\left(e^3-4e^6\right)\log\left(5e^x\right)x+e^6\log^2\left(5e^x\right)-e^6\left(3-16x^2\right)}dx$$

$$\Big\downarrow \ 25$$

$$-2\left(1-3e^3\right)\int \frac{\left(1-4e^3\right)x+e^3\log\left(5e^x\right)}{\left(1-8e^3\right)x^2+2e^3\left(1-4e^3\right)\log\left(5e^x\right)x+e^6\log^2\left(5e^x\right)-e^6\left(3-16x^2\right)}dx$$

$$\Big\downarrow \ 7235$$

$$-\log\left(-\left(\left(1-8e^3\right)x^2\right)+e^6\left(3-16x^2\right)-e^6\log^2\left(5e^x\right)-2e^3\left(1-4e^3\right)x\log\left(5e^x\right)\right)$$

input
```
Int[(-2*x + 14*E^3*x - 24*E^6*x + (-2*E^3 + 6*E^6)*Log[5*E^x])/(x^2 - 8*E^
3*x^2 + E^6*(-3 + 16*x^2) + (2*E^3*x - 8*E^6*x)*Log[5*E^x] + E^6*Log[5*E^x
]^2),x]
```

output
```
-Log[-((1 - 8*E^3)*x^2) + E^6*(3 - 16*x^2) - 2*E^3*(1 - 4*E^3)*x*Log[5*E^x
] - E^6*Log[5*E^x]^2]
```

3.112.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.112.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(24) = 48$.

Time = 0.43 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.46

method	result
norman	$-\ln\left(e^{6}\ln\left(5\,e^{x}\right)^{2}-8\ln\left(5\,e^{x}\right)x\,e^{6}+16x^{2}e^{6}+2\ln\left(5\,e^{x}\right)x\,e^{3}-8x^{2}e^{3}-3\,e^{6}+x^{2}\right)$
risch	$-\ln\left(\ln\left(5\right)^{2}+2\ln\left(e^{x}\right)\ln\left(5\right)+2x\ln\left(5\right)e^{-3}-8x\ln\left(5\right)-8x\ln\left(e^{x}\right)-8\,e^{-3}x^{2}+16x^{2}+2\ln$
parallelrisch	$-\ln\left(\frac{e^{6}\ln(5\,e^{x})^{2}-8\ln(5\,e^{x})x\,e^{6}+16x^{2}e^{6}+2\ln(5\,e^{x})x\,e^{3}-8x^{2}e^{3}-3\,e^{6}+x^{2}}{16\,e^{6}-8\,e^{3}+1}\right)$
default	$-\frac{\left(-2+6\,e^{3}\right)\ln\left(9x^{2}e^{6}-6\,e^{6}x(\ln(5\,e^{x})-x)+e^{6}(\ln(5\,e^{x})-x)^{2}-6x^{2}e^{3}+2\,e^{3}x(\ln(5\,e^{x})-x)-3\,e^{6}+x^{2}\right)}{2(-1+3\,e^{3})}$

input
```
int(((6*exp(3)^2-2*exp(3))*ln(5*exp(x))-24*x*exp(3)^2+14*x*exp(3)-2*x)/(ex
p(3)^2*ln(5*exp(x))^2+(-8*x*exp(3)^2+2*x*exp(3))*ln(5*exp(x))+(16*x^2-3)*e
xp(3)^2-8*x^2*exp(3)+x^2),x,method=_RETURNVERBOSE)
```

output
```
-ln(exp(3)^2*ln(5*exp(x))^2-8*ln(5*exp(x))*x*exp(3)^2+16*x^2*exp(3)^2+2*ln
(5*exp(x))*x*exp(3)-8*x^2*exp(3)-3*exp(3)^2+x^2)
```

3.112.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(22) = 44$.

Time = 0.24 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.81

$$\int \frac{-2x+14e^{3}x-24e^{6}x+\left(-2e^{3}+6e^{6}\right)\log\left(5e^{x}\right)}{x^{2}-8e^{3}x^{2}+e^{6}\left(-3+16x^{2}\right)+\left(2e^{3}x-8e^{6}x\right)\log\left(5e^{x}\right)+e^{6}\log^{2}\left(5e^{x}\right)}\,dx$$
$$=-\log\left(-6\,x^{2}e^{3}+e^{6}\log\left(5\right)^{2}+x^{2}+3\left(3\,x^{2}-1\right)e^{6}-2\left(3\,xe^{6}-xe^{3}\right)\log\left(5\right)\right)$$

input
```
integrate(((6*exp(3)^2-2*exp(3))*log(5*exp(x))-24*x*exp(3)^2+14*x*exp(3)-2
*x)/(exp(3)^2*log(5*exp(x))^2+(-8*x*exp(3)^2+2*x*exp(3))*log(5*exp(x))+(16
*x^2-3)*exp(3)^2-8*x^2*exp(3)+x^2),x, algorithm=\
```

output
```
-log(-6*x^2*e^3 + e^6*log(5)^2 + x^2 + 3*(3*x^2 - 1)*e^6 - 2*(3*x*e^6 - x*
e^3)*log(5))
```

3.112.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(22) = 44.

Time = 0.28 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.88

$$\int \frac{-2x+14e^3x-24e^6x+(-2e^3+6e^6)\log(5e^x)}{x^2-8e^3x^2+e^6(-3+16x^2)+(2e^3x-8e^6x)\log(5e^x)+e^6\log^2(5e^x)}\,dx$$
$$= -\log\left(x^2\left(-6e^3+1+9e^6\right)+x\left(-6e^6\log(5)+2e^3\log(5)\right)-3e^6+e^6\log(5)^2\right)$$

input
```
integrate(((6*exp(3)**2-2*exp(3))*ln(5*exp(x))-24*x*exp(3)**2+14*x*exp(3)-
2*x)/(exp(3)**2*ln(5*exp(x))**2+(-8*x*exp(3)**2+2*x*exp(3))*ln(5*exp(x))+(
16*x**2-3)*exp(3)**2-8*x**2*exp(3)+x**2),x)
```

output
```
-log(x**2*(-6*exp(3) + 1 + 9*exp(6)) + x*(-6*exp(6)*log(5) + 2*exp(3)*log(
5)) - 3*exp(6) + exp(6)*log(5)**2)
```

3.112.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1021 vs. 2(22) = 44.

Time = 0.34 (sec) , antiderivative size = 1021, normalized size of antiderivative = 39.27

$$\int \frac{-2x+14e^3x-24e^6x+(-2e^3+6e^6)\log(5e^x)}{x^2-8e^3x^2+e^6(-3+16x^2)+(2e^3x-8e^6x)\log(5e^x)+e^6\log^2(5e^x)}\,dx$$
$$= \text{Too large to display}$$

input
```
integrate(((6*exp(3)^2-2*exp(3))*log(5*exp(x))-24*x*exp(3)^2+14*x*exp(3)-2
*x)/(exp(3)^2*log(5*exp(x))^2+(-8*x*exp(3)^2+2*x*exp(3))*log(5*exp(x))+(16
*x^2-3)*exp(3)^2-8*x^2*exp(3)+x^2),x, algorithm=\
```

output
```
sqrt(3)*e^3*log(5*e^x)*log(-(sqrt(3)*(3*e^3 - 1)*e^3 - x*(9*e^6 - 6*e^3 +
1) + 3*e^6*log(5) - e^3*log(5))/(sqrt(3)*(3*e^3 - 1)*e^3 + x*(9*e^6 - 6*e^
3 + 1) - 3*e^6*log(5) + e^3*log(5)))/(3*e^3 - 1) - 4*(sqrt(3)*log(5)*log(-
(sqrt(3)*(3*e^3 - 1)*e^3 - x*(9*e^6 - 6*e^3 + 1) + 3*e^6*log(5) - e^3*log(
5))/(sqrt(3)*(3*e^3 - 1)*e^3 + x*(9*e^6 - 6*e^3 + 1) - 3*e^6*log(5) + e^3*
log(5)))/(3*e^3 - 1)^2 + 3*log(x^2*(9*e^6 - 6*e^3 + 1) - 2*(3*e^6*log(5) -
 e^3*log(5))*x + (log(5)^2 - 3)*e^6)/(9*e^6 - 6*e^3 + 1))*e^6 + 7/3*(sqrt(
3)*log(5)*log(-(sqrt(3)*(3*e^3 - 1)*e^3 - x*(9*e^6 - 6*e^3 + 1) + 3*e^6*lo
g(5) - e^3*log(5))/(sqrt(3)*(3*e^3 - 1)*e^3 + x*(9*e^6 - 6*e^3 + 1) - 3*e^
6*log(5) + e^3*log(5)))/(3*e^3 - 1)^2 + 3*log(x^2*(9*e^6 - 6*e^3 + 1) - 2*
(3*e^6*log(5) - e^3*log(5))*x + (log(5)^2 - 3)*e^6)/(9*e^6 - 6*e^3 + 1))*e
^3 - sqrt(3)*(x*log(-(sqrt(3)*(3*e^3 - 1)*e^3 - x*(9*e^6 - 6*e^3 + 1) + 3*
e^6*log(5) - e^3*log(5))/(sqrt(3)*(3*e^3 - 1)*e^3 + x*(9*e^6 - 6*e^3 + 1)
- 3*e^6*log(5) + e^3*log(5))) + (e^3*log(5) - sqrt(3)*e^3)*log(x*(3*e^3 -
1) - e^3*log(5) + sqrt(3)*e^3)/(3*e^3 - 1) - (e^3*log(5) + sqrt(3)*e^3)*lo
g(x*(3*e^3 - 1) - e^3*log(5) - sqrt(3)*e^3)/(3*e^3 - 1))*e^3/(3*e^3 - 1) -
 1/3*sqrt(3)*log(5*e^x)*log(-(sqrt(3)*(3*e^3 - 1)*e^3 - x*(9*e^6 - 6*e^3 +
 1) + 3*e^6*log(5) - e^3*log(5))/(sqrt(3)*(3*e^3 - 1)*e^3 + x*(9*e^6 - 6*e
^3 + 1) - 3*e^6*log(5) + e^3*log(5)))/(3*e^3 - 1) + 1/3*sqrt(3)*(x*log(-(s
qrt(3)*(3*e^3 - 1)*e^3 - x*(9*e^6 - 6*e^3 + 1) + 3*e^6*log(5) - e^3*log...
```

3.112.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(22) = 44$.

Time = 0.28 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.81

$$\int \frac{-2x + 14e^3x - 24e^6x + (-2e^3 + 6e^6)\log(5e^x)}{x^2 - 8e^3x^2 + e^6(-3 + 16x^2) + (2e^3x - 8e^6x)\log(5e^x) + e^6\log^2(5e^x)}\,dx$$
$$= -\log\left(\left|9\,x^2e^6 - 6\,x^2e^3 - 6\,xe^6\log(5) + 2\,xe^3\log(5) + e^6\log(5)^2 + x^2 - 3\,e^6\right|\right)$$

input
```
integrate(((6*exp(3)^2-2*exp(3))*log(5*exp(x))-24*x*exp(3)^2+14*x*exp(3)-2
*x)/(exp(3)^2*log(5*exp(x))^2+(-8*x*exp(3)^2+2*x*exp(3))*log(5*exp(x))+(16
*x^2-3)*exp(3)^2-8*x^2*exp(3)+x^2),x, algorithm=\
```

output
```
-log(abs(9*x^2*e^6 - 6*x^2*e^3 - 6*x*e^6*log(5) + 2*x*e^3*log(5) + e^6*log
(5)^2 + x^2 - 3*e^6))
```

3.112.9 Mupad [B] (verification not implemented)

Time = 18.21 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.85

$$\int \frac{-2x + 14e^3x - 24e^6x + (-2e^3 + 6e^6)\log(5e^x)}{x^2 - 8e^3x^2 + e^6(-3 + 16x^2) + (2e^3x - 8e^6x)\log(5e^x) + e^6\log^2(5e^x)}\,dx$$
$$= -\ln\left(3\,\mathrm{e}^6 - \mathrm{e}^6\ln(5)^2 + 6\,x^2\,\mathrm{e}^3 - 9\,x^2\,\mathrm{e}^6 - x^2 + 2\,x\,\mathrm{e}^3\,\ln(5)\,\left(3\,\mathrm{e}^3 - 1\right)\right)$$

input
```
int(-(2*x - 14*x*exp(3) + 24*x*exp(6) + log(5*exp(x))*(2*exp(3) - 6*exp(6)
))/(exp(6)*(16*x^2 - 3) - 8*x^2*exp(3) + exp(6)*log(5*exp(x))^2 + x^2 + lo
g(5*exp(x))*(2*x*exp(3) - 8*x*exp(6))),x)
```

output
```
-log(3*exp(6) - exp(6)*log(5)^2 + 6*x^2*exp(3) - 9*x^2*exp(6) - x^2 + 2*x*
exp(3)*log(5)*(3*exp(3) - 1))
```

3.113 $\int \frac{x^3+3x^4+3x^5+x^6+(-2-2x)\log(x)+(2+4x)\log^2(x)}{x^3+3x^4+3x^5+x^6} dx$

3.113.1 Optimal result

Integrand size = 55, antiderivative size = 15

$$\int \frac{x^3+3x^4+3x^5+x^6+(-2-2x)\log(x)+(2+4x)\log^2(x)}{x^3+3x^4+3x^5+x^6} dx = x-\frac{\log^2(x)}{(x+x^2)^2}$$

output
```
x-1/(x^2+x)^2*ln(x)^2
```

3.113.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.67

$$\int \frac{x^3+3x^4+3x^5+x^6+(-2-2x)\log(x)+(2+4x)\log^2(x)}{x^3+3x^4+3x^5+x^6} dx = \frac{x^3(1+x)^2-\log^2(x)}{x^2(1+x)^2}$$

input
```
Integrate[(x^3 + 3*x^4 + 3*x^5 + x^6 + (-2 - 2*x)*Log[x] + (2 + 4*x)*Log[x
]^2)/(x^3 + 3*x^4 + 3*x^5 + x^6),x]
```

output
```
(x^3*(1 + x)^2 - Log[x]^2)/(x^2*(1 + x)^2)
```

3.113.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.80 (sec) , antiderivative size = 105, normalized size of antiderivative = 7.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.073, Rules used = {2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^6+3x^5+3x^4+x^3+(4x+2)\log^2(x)+(-2x-2)\log(x)}{x^6+3x^5+3x^4+x^3}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{x^6+3x^5+3x^4+x^3+(4x+2)\log^2(x)+(-2x-2)\log(x)}{x^3(x^3+3x^2+3x+1)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{x^6+3x^5+3x^4+x^3+(4x+2)\log^2(x)+(-2x-2)\log(x)}{x^3(x+1)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x^3}{(x+1)^3}+\frac{2(2x+1)\log^2(x)}{(x+1)^3x^3}-\frac{2\log(x)}{(x+1)^2x^3}+\frac{3x^2}{(x+1)^3}+\frac{3x}{(x+1)^3}+\frac{1}{(x+1)^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-4\,\text{PolyLog}\left(2,-\frac{1}{x}\right)-4\,\text{PolyLog}(2,-x)+\frac{3x^2}{2(x+1)^2}-\frac{\log^2(x)}{x^2}+x+\frac{3}{x+1}-\frac{3}{2(x+1)^2}+\frac{2x\log^2(x)}{x+1}-\frac{\log^2(x)}{(x+1)^2}+\frac{2\log^2(x)}{x}+4\log\left(\frac{1}{x}+1\right)\log(x)-4\log(x)\log(x+1)$$

input
```
Int[(x^3 + 3*x^4 + 3*x^5 + x^6 + (-2 - 2*x)*Log[x] + (2 + 4*x)*Log[x]^2)/(
x^3 + 3*x^4 + 3*x^5 + x^6),x]
```

output
```
x - 3/(2*(1 + x)^2) + (3*x^2)/(2*(1 + x)^2) + 3/(1 + x) + 4*Log[1 + x^(-1)
]*Log[x] - Log[x]^2/x^2 + (2*Log[x]^2)/x - Log[x]^2/(1 + x)^2 + (2*x*Log[x
]^2)/(1 + x) - 4*Log[x]*Log[1 + x] - 4*PolyLog[2, -x^(-1)] - 4*PolyLog[2,
-x]
```

3.113.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.113.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47

method	result	size
risch	$-\frac{\ln(x)^2}{x^2(x^2+2x+1)}+x$	22
norman	$\frac{x^5-3x^3-2x^2-\ln(x)^2}{x^2(1+x)^2}$	30
parallelrisch	$\frac{x^5-3x^3-2x^2-\ln(x)^2}{x^2(x^2+2x+1)}$	35

input
```
int(((4*x+2)*ln(x)^2+(-2-2*x)*ln(x)+x^6+3*x^5+3*x^4+x^3)/(x^6+3*x^5+3*x^4+
x^3),x,method=_RETURNVERBOSE)
```

output
```
-1/x^2/(x^2+2*x+1)*ln(x)^2+x
```

3.113.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 33 vs. $2(15) = 30$.

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 2.20

$$\int \frac{x^3+3x^4+3x^5+x^6+(-2-2x)\log(x)+(2+4x)\log^2(x)}{x^3+3x^4+3x^5+x^6}\,dx = \frac{x^5+2\,x^4+x^3-\log\left(x\right)^2}{x^4+2\,x^3+x^2}$$

input
```
integrate(((4*x+2)*log(x)^2+(-2-2*x)*log(x)+x^6+3*x^5+3*x^4+x^3)/(x^6+3*x^
5+3*x^4+x^3),x, algorithm=\
```

output
```
(x^5 + 2*x^4 + x^3 - log(x)^2)/(x^4 + 2*x^3 + x^2)
```

3.113.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int \frac{x^3+3x^4+3x^5+x^6+(-2-2x)\log(x)+(2+4x)\log^2(x)}{x^3+3x^4+3x^5+x^6}\,dx = x-\frac{\log\left(x\right)^2}{x^4+2x^3+x^2}$$

input
```
integrate(((4*x+2)*ln(x)**2+(-2-2*x)*ln(x)+x**6+3*x**5+3*x**4+x**3)/(x**6+
3*x**5+3*x**4+x**3),x)
```

output
```
x - log(x)**2/(x**4 + 2*x**3 + x**2)
```

3.113.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 85 vs. $2(15) = 30$.

Time = 0.24 (sec) , antiderivative size = 85, normalized size of antiderivative = 5.67

$$\begin{aligned}&\int \frac{x^3+3x^4+3x^5+x^6+(-2-2x)\log(x)+(2+4x)\log^2(x)}{x^3+3x^4+3x^5+x^6}\,dx\\&= x-\frac{\log\left(x\right)^2}{x^4+2\,x^3+x^2}-\frac{6\,x+5}{2\,(x^2+2\,x+1)}\\&\quad+\frac{3\,(4\,x+3)}{2\,(x^2+2\,x+1)}-\frac{3\,(2\,x+1)}{2\,(x^2+2\,x+1)}-\frac{1}{2\,(x^2+2\,x+1)}\end{aligned}$$

input
```
integrate(((4*x+2)*log(x)^2+(-2-2*x)*log(x)+x^6+3*x^5+3*x^4+x^3)/(x^6+3*x^
5+3*x^4+x^3),x, algorithm=\
```

output
```
x - log(x)^2/(x^4 + 2*x^3 + x^2) - 1/2*(6*x + 5)/(x^2 + 2*x + 1) + 3/2*(4*
x + 3)/(x^2 + 2*x + 1) - 3/2*(2*x + 1)/(x^2 + 2*x + 1) - 1/2/(x^2 + 2*x +
1)
```

3.113.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. $2(15) = 30$.

Time = 0.28 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.33

$$\int \frac{x^3+3x^4+3x^5+x^6+(-2-2x)\log(x)+(2+4x)\log^2(x)}{x^3+3x^4+3x^5+x^6}\,dx = -\left(\frac{2\,x+3}{x^2+2\,x+1}-\frac{2\,x-1}{x^2}\right)\log\left(x\right)^2+x$$

input
```
integrate(((4*x+2)*log(x)^2+(-2-2*x)*log(x)+x^6+3*x^5+3*x^4+x^3)/(x^6+3*x^
5+3*x^4+x^3),x, algorithm=\
```

output
```
-((2*x + 3)/(x^2 + 2*x + 1) - (2*x - 1)/x^2)*log(x)^2 + x
```

3.113.9 Mupad [B] (verification not implemented)

Time = 13.15 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \frac{x^3+3x^4+3x^5+x^6+(-2-2x)\log(x)+(2+4x)\log^2(x)}{x^3+3x^4+3x^5+x^6}\,dx = x-\frac{\ln\left(x\right)^2}{x^2\,{\left(x+1\right)}^2}$$

input
```
int((x^3 - log(x)*(2*x + 2) + 3*x^4 + 3*x^5 + x^6 + log(x)^2*(4*x + 2))/(x
^3 + 3*x^4 + 3*x^5 + x^6),x)
```

output
```
x - log(x)^2/(x^2*(x + 1)^2)
```

3.114 $\int \frac{e^{\frac{6+6x-15x^2-5x^3}{3x^2+x^3}}(-180-216x-96x^2-21x^3-6x^4-x^5)}{7875x^3+8400x^4+3290x^5+560x^6+35x^7}\,dx$

3.114.1 Optimal result

Integrand size = 83, antiderivative size = 28

$$\int \frac{e^{\frac{6+6x-15x^2-5x^3}{3x^2+x^3}}(-180-216x-96x^2-21x^3-6x^4-x^5)}{7875x^3+8400x^4+3290x^5+560x^6+35x^7}\,dx = \frac{e^{-5+\frac{2}{x^2}+\frac{4}{x(3+x)}}}{35(5+x)}$$

output
```
1/35*exp(2/x^2+4/(3+x)/x-5)/(5+x)
```

3.114.2 Mathematica [A] (verified)

Time = 1.45 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{e^{\frac{6+6x-15x^2-5x^3}{3x^2+x^3}}(-180-216x-96x^2-21x^3-6x^4-x^5)}{7875x^3+8400x^4+3290x^5+560x^6+35x^7}\,dx = \frac{e^{-5+\frac{2}{x^2}+\frac{4}{3x}-\frac{4}{3(3+x)}}}{35(5+x)}$$

input
```
Integrate[(E^((6 + 6*x - 15*x^2 - 5*x^3)/(3*x^2 + x^3))*(-180 - 216*x - 96
*x^2 - 21*x^3 - 6*x^4 - x^5))/(7875*x^3 + 8400*x^4 + 3290*x^5 + 560*x^6 +
35*x^7),x]
```

output
```
E^(-5 + 2/x^2 + 4/(3*x) - 4/(3*(3 + x)))/(35*(5 + x))
```

3.114.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^3+3x^2}}\left(-x^5-6x^4-21x^3-96x^2-216x-180\right)}{35x^7+560x^6+3290x^5+8400x^4+7875x^3}\,dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^3+3x^2}}\left(-x^5-6x^4-21x^3-96x^2-216x-180\right)}{x^3\left(35x^4+560x^3+3290x^2+8400x+7875\right)}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(-\frac{e^{\frac{-5x^3-15x^2+6x+6}{x^3+3x^2}}\left(-x^5-6x^4-21x^3-96x^2-216x-180\right)}{140x^3(x+3)}+\frac{e^{\frac{-5x^3-15x^2+6x+6}{x^3+3x^2}}\left(-x^5-6x^4-21x^3-96x^2-2\right.}{140x^3(x+5)}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{4}{175}\int \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^2(x+3)}}}{x^3}dx-\frac{8\int \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^2(x+3)}}}{x^2}dx}{2625}+\frac{8\int \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^2(x+3)}}}{x}dx}{13125}+\frac{2}{105}\int \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^2(x+3)}}}{(x+3)^2}dx-\frac{1}{105}\int \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^2(x+3)}}}{x+3}dx-\frac{1}{35}\int \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^2(x+3)}}}{(x+5)^2}dx+\frac{39\int \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^2(x+3)}}}{x+5}dx}{4375}$$

input
```
Int[(E^((6 + 6*x - 15*x^2 - 5*x^3)/(3*x^2 + x^3))*(-180 - 216*x - 96*x^2 -
 21*x^3 - 6*x^4 - x^5))/(7875*x^3 + 8400*x^4 + 3290*x^5 + 560*x^6 + 35*x^7
),x]
```

output
```
$Aborted
```

3.114.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.114.4 Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

method	result	size
gosper	$\frac{{\mathrm e}^{-\frac{5 x^{3}+15 x^{2}-6 x -6}{x^{2} \left(3+x \right)}}}{175+35 x}$	34
risch	$\frac{{\mathrm e}^{-\frac{5 x^{3}+15 x^{2}-6 x -6}{x^{2} \left(3+x \right)}}}{175+35 x}$	34
parallelrisch	$\frac{{\mathrm e}^{-\frac{5 x^{3}+15 x^{2}-6 x -6}{x^{2} \left(3+x \right)}}}{175+35 x}$	34
norman	$\frac{\frac{3 x^{2} {\mathrm e}^{\frac{-5 x^{3}-15 x^{2}+6 x +6}{x^{3}+3 x^{2}}}}{35}+\frac{x^{3} {\mathrm e}^{\frac{-5 x^{3}-15 x^{2}+6 x +6}{x^{3}+3 x^{2}}}}{35}}{x^{2} \left(x^{2}+8 x +15\right)}$	82

input
```
int((-x^5-6*x^4-21*x^3-96*x^2-216*x-180)*exp((-5*x^3-15*x^2+6*x+6)/(x^3+3*
x^2))/(35*x^7+560*x^6+3290*x^5+8400*x^4+7875*x^3),x,method=_RETURNVERBOSE)
```

output
```
1/35*exp(-(5*x^3+15*x^2-6*x-6)/x^2/(3+x))/(5+x)
```

3.114.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{e^{\frac{6+6x-15x^2-5x^3}{3x^2+x^3}}(-180-216x-96x^2-21x^3-6x^4-x^5)}{7875x^3+8400x^4+3290x^5+560x^6+35x^7}\,dx = \frac{e^{\left(-\frac{5\,x^3+15\,x^2-6\,x-6}{x^3+3\,x^2}\right)}}{35\,(x+5)}$$

input
```
integrate((-x^5-6*x^4-21*x^3-96*x^2-216*x-180)*exp((-5*x^3-15*x^2+6*x+6)/(
x^3+3*x^2))/(35*x^7+560*x^6+3290*x^5+8400*x^4+7875*x^3),x, algorithm=\
```

output
```
1/35*e^(-(5*x^3 + 15*x^2 - 6*x - 6)/(x^3 + 3*x^2))/(x + 5)
```

3.114.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{e^{\frac{6+6x-15x^2-5x^3}{3x^2+x^3}}(-180-216x-96x^2-21x^3-6x^4-x^5)}{7875x^3+8400x^4+3290x^5+560x^6+35x^7}\,dx = \frac{e^{\frac{-5x^3-15x^2+6x+6}{x^3+3x^2}}}{35x+175}$$

input
```
integrate((-x**5-6*x**4-21*x**3-96*x**2-216*x-180)*exp((-5*x**3-15*x**2+6*
x+6)/(x**3+3*x**2))/(35*x**7+560*x**6+3290*x**5+8400*x**4+7875*x**3),x)
```

output
```
exp((-5*x**3 - 15*x**2 + 6*x + 6)/(x**3 + 3*x**2))/(35*x + 175)
```

3.114.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{e^{\frac{6+6x-15x^2-5x^3}{3x^2+x^3}}(-180-216x-96x^2-21x^3-6x^4-x^5)}{7875x^3+8400x^4+3290x^5+560x^6+35x^7}\,dx = \frac{e^{\left(-\frac{4}{3\,(x+3)}+\frac{4}{3\,x}+\frac{2}{x^2}\right)}}{35\,(xe^5+5\,e^5)}$$

input
```
integrate((-x^5-6*x^4-21*x^3-96*x^2-216*x-180)*exp((-5*x^3-15*x^2+6*x+6)/(
x^3+3*x^2))/(35*x^7+560*x^6+3290*x^5+8400*x^4+7875*x^3),x, algorithm=\
```

output
```
1/35*e^(-4/3/(x + 3) + 4/3/x + 2/x^2)/(x*e^5 + 5*e^5)
```

3.114.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{e^{\frac{6+6x-15x^2-5x^3}{3x^2+x^3}}(-180-216x-96x^2-21x^3-6x^4-x^5)}{7875x^3+8400x^4+3290x^5+560x^6+35x^7}\,dx = \frac{e^{\left(-\frac{5x^3+15x^2-6x-6}{x^3+3x^2}\right)}}{35(x+5)}$$

input
```
integrate((-x^5-6*x^4-21*x^3-96*x^2-216*x-180)*exp((-5*x^3-15*x^2+6*x+6)/(
x^3+3*x^2))/(35*x^7+560*x^6+3290*x^5+8400*x^4+7875*x^3),x, algorithm=\
```

output
```
1/35*e^(-(5*x^3 + 15*x^2 - 6*x - 6)/(x^3 + 3*x^2))/(x + 5)
```

3.114.9 Mupad [B] (verification not implemented)

Time = 13.54 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.82

$$\int \frac{e^{\frac{6+6x-15x^2-5x^3}{3x^2+x^3}}(-180-216x-96x^2-21x^3-6x^4-x^5)}{7875x^3+8400x^4+3290x^5+560x^6+35x^7}\,dx = \frac{e^{\frac{6}{x^2+3x}}\,e^{-\frac{5x}{x+3}}\,e^{\frac{6}{x^3+3x^2}}\,e^{-\frac{15}{x+3}}}{35\,(x+5)}$$

input
```
int(-(exp((6*x - 15*x^2 - 5*x^3 + 6)/(3*x^2 + x^3))*(216*x + 96*x^2 + 21*x
^3 + 6*x^4 + x^5 + 180))/(7875*x^3 + 8400*x^4 + 3290*x^5 + 560*x^6 + 35*x^
7),x)
```

output
```
(exp(6/(3*x + x^2))*exp(-(5*x)/(x + 3))*exp(6/(3*x^2 + x^3))*exp(-15/(x +
3)))/(35*(x + 5))
```

3.115 $\int \frac{8-4x+3x^3+x^3\log(3x^3)}{x^3\log(4)}\,dx$

3.115.1 Optimal result

Integrand size = 28, antiderivative size = 22

$$\int \frac{8-4x+3x^3+x^3\log(3x^3)}{x^3\log(4)}\,dx = \frac{x\left(\frac{-4+4x}{x^3}+\log(3x^3)\right)}{\log(4)}$$

output
```
1/2*x/ln(2)*((-4+4*x)/x^3+ln(3*x^3))
```

3.115.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{8-4x+3x^3+x^3\log(3x^3)}{x^3\log(4)}\,dx = \frac{-\frac{4}{x^2}+\frac{4}{x}+x\log(3x^3)}{\log(4)}$$

input
```
Integrate[(8 - 4*x + 3*x^3 + x^3*Log[3*x^3])/(x^3*Log[4]),x]
```

output
```
(-4/x^2 + 4/x + x*Log[3*x^3])/Log[4]
```

3.115.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.107, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^3+x^3\log\left(3x^3\right)-4x+8}{x^3\log(4)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \frac{\log\left(3x^3\right)x^3+3x^3-4x+8}{x^3}dx}{\log(4)}$$

$$\Big\downarrow \text{2010}$$

$$\frac{\int \left(\frac{3x^3-4x+8}{x^3}+\log\left(3x^3\right)\right)dx}{\log(4)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{x\log\left(3x^3\right)-\frac{4}{x^2}+\frac{4}{x}}{\log(4)}$$

input
```
Int[(8 - 4*x + 3*x^3 + x^3*Log[3*x^3])/(x^3*Log[4]),x]
```

output
```
(-4/x^2 + 4/x + x*Log[3*x^3])/Log[4]
```

3.115.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.115.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

method	result	size
parallelrisch	$-\frac{4-x^{3} \ln\left(3 x^{3}\right)-4 x}{2 \ln\left(2\right) x^{2}}$	26
risch	$\frac{x \ln\left(3 x^{3}\right)}{2 \ln\left(2\right)}+\frac{-2+2 x}{x^{2} \ln\left(2\right)}$	27
default	$\frac{-\frac{4}{x^{2}}+\frac{4}{x}+x \ln\left(3\right)+x \ln\left(x^{3}\right)}{2 \ln\left(2\right)}$	28
norman	$\frac{-\frac{2}{\ln\left(2\right)}+\frac{2 x}{\ln\left(2\right)}+\frac{x^{3} \ln\left(3 x^{3}\right)}{2 \ln\left(2\right)}}{x^{2}}$	34
parts	$\frac{x \ln\left(3\right)+x \ln\left(x^{3}\right)-3 x}{2 \ln\left(2\right)}+\frac{3 x-\frac{4}{x^{2}}+\frac{4}{x}}{2 \ln\left(2\right)}$	42

input
```
int(1/2*(x^3*ln(3*x^3)+3*x^3-4*x+8)/x^3/ln(2),x,method=_RETURNVERBOSE)
```

output
```
-1/2/ln(2)/x^2*(4-x^3*ln(3*x^3)-4*x)
```

3.115.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{8-4x+3x^3+x^3\log\left(3x^3\right)}{x^3\log(4)}\,dx=\frac{x^{3} \log\left(3 \, x^{3}\right)+4 \, x-4}{2 \, x^{2} \log\left(2\right)}$$

input
```
integrate(1/2*(x^3*log(3*x^3)+3*x^3-4*x+8)/x^3/log(2),x, algorithm=\
```

output
```
1/2*(x^3*log(3*x^3) + 4*x - 4)/(x^2*log(2))
```

3.115.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{8-4x+3x^3+x^3\log\left(3x^3\right)}{x^3\log(4)}\,dx=\frac{x\log\left(3x^{3}\right)}{2\log\left(2\right)}-\frac{2-2x}{x^{2}\log\left(2\right)}$$

input
```
integrate(1/2*(x**3*ln(3*x**3)+3*x**3-4*x+8)/x**3/ln(2),x)
```

output
```
x*log(3*x**3)/(2*log(2)) - (2 - 2*x)/(x**2*log(2))
```

3.115.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

$$\int \frac{8-4x+3x^3+x^3\log(3x^3)}{x^3\log(4)}\,dx = \frac{x\log(3\,x^3)+\frac{4}{x}-\frac{4}{x^2}}{2\,\log(2)}$$

input
```
integrate(1/2*(x^3*log(3*x^3)+3*x^3-4*x+8)/x^3/log(2),x, algorithm=\
```

output
```
1/2*(x*log(3*x^3) + 4/x - 4/x^2)/log(2)
```

3.115.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{8-4x+3x^3+x^3\log(3x^3)}{x^3\log(4)}\,dx = \frac{x\log(3\,x^3)+\frac{4\,(x-1)}{x^2}}{2\,\log(2)}$$

input
```
integrate(1/2*(x^3*log(3*x^3)+3*x^3-4*x+8)/x^3/log(2),x, algorithm=\
```

output
```
1/2*(x*log(3*x^3) + 4*(x - 1)/x^2)/log(2)
```

3.115.9 Mupad [B] (verification not implemented)

Time = 12.90 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

$$\int \frac{8-4x+3x^3+x^3\log(3x^3)}{x^3\log(4)}\,dx = \frac{4\,x^2-4\,x+x^4\,\ln(3\,x^3)}{2\,x^3\,\ln(2)}$$

input
```
int(((3*x^3)/2 - 2*x + (x^3*log(3*x^3))/2 + 4)/(x^3*log(2)),x)
```

output
```
(4*x^2 - 4*x + x^4*log(3*x^3))/(2*x^3*log(2))
```

3.116 $\int 4e^{-8+\frac{4\left(25x-4x^3-x^3\log(4)\right)}{e^8}}\left(25-12x^2-3x^2\log(4)\right)\,dx$

3.116.1 Optimal result

Integrand size = 41, antiderivative size = 19

$$\int 4e^{-8+\frac{4\left(25x-4x^3-x^3\log(4)\right)}{e^8}}\left(25-12x^2-3x^2\log(4)\right)\,dx=e^{\frac{4x\left(25-x^2(4+\log(4))\right)}{e^8}}$$

output
```
exp((25-x^2*(4+2*ln(2)))/exp(8-2*ln(2))*x)
```

3.116.2 Mathematica [A] (verified)

Time = 0.39 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int 4e^{-8+\frac{4\left(25x-4x^3-x^3\log(4)\right)}{e^8}}\left(25-12x^2-3x^2\log(4)\right)\,dx=e^{-\frac{4x\left(-25+x^2(4+\log(4))\right)}{e^8}}$$

input
```
Integrate[4*E^(-8 + (4*(25*x - 4*x^3 - x^3*Log[4]))/E^8)*(25 - 12*x^2 - 3*
x^2*Log[4]),x]
```

output
```
E^((-4*x*(-25 + x^2*(4 + Log[4])))/E^8)
```

3.116.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.073, Rules used = {6, 27, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int 4\left(-12x^2-3x^2\log(4)+25\right)\exp\left(\frac{4\left(-4x^3+x^3(-\log(4))+25x\right)}{e^8}-8\right)dx$$

$$\Big\downarrow \; 6$$

$$\int 4\left(x^2(-12-3\log(4))+25\right)\exp\left(\frac{4\left(-4x^3+x^3(-\log(4))+25x\right)}{e^8}-8\right)dx$$

$$\Big\downarrow \; 27$$

$$4\int e^{\frac{4\left(-\log(4)x^3-4x^3+25x\right)}{e^8}-8}\left(25-3x^2(4+\log(4))\right)dx$$

$$\Big\downarrow \; 7257$$

$$4^{-\frac{4x^3}{e^8}}e^{\frac{4\left(25x-4x^3\right)}{e^8}}$$

input
```
Int[4*E^(-8 + (4*(25*x - 4*x^3 - x^3*Log[4]))/E^8)*(25 - 12*x^2 - 3*x^2*Lo
g[4]),x]
```

output
```
E^((4*(25*x - 4*x^3))/E^8)/4^((4*x^3)/E^8)
```

3.116.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
 + (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.116.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

method	result	size
risch	$e^{-4x\left(2x^{2}\ln(2)+4x^{2}-25\right)e^{-8}}$	21
gosper	$e^{-x\left(2x^{2}\ln(2)+4x^{2}-25\right)e^{2\ln(2)-8}}$	26
derivativedivides	$e^{\left(-2x^{3}\ln(2)-4x^{3}+25x\right)e^{2\ln(2)-8}}$	26
default	$e^{\left(-2x^{3}\ln(2)-4x^{3}+25x\right)e^{2\ln(2)-8}}$	26
parallelrisch	$e^{\left(-2x^{3}\ln(2)-4x^{3}+25x\right)e^{2\ln(2)-8}}$	26
norman	$e^{-8}e^{8}e^{\left(-2x^{3}\ln(2)-4x^{3}+25x\right)e^{2\ln(2)-8}}$	35

input
```
int((-6*x^2*ln(2)-12*x^2+25)*exp(2*ln(2)-8)*exp((-2*x^3*ln(2)-4*x^3+25*x)*
exp(2*ln(2)-8)),x,method=_RETURNVERBOSE)
```

output
```
exp(-4*x*(2*x^2*ln(2)+4*x^2-25)*exp(-8))
```

3.116.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.37

$$\int 4e^{-8+\frac{4\left(25x-4x^{3}-x^{3}\log(4)\right)}{e^{8}}}\left(25-12x^{2}-3x^{2}\log(4)\right)\,dx=e^{\left(-\left(2\,x^{3}\log(2)+4\,x^{3}-25\,x\right)e^{\left(2\,\log(2)-8\right)}\right)}$$

input
```
integrate((-6*x^2*log(2)-12*x^2+25)*exp(2*log(2)-8)*exp((-2*x^3*log(2)-4*x
^3+25*x)*exp(2*log(2)-8)),x, algorithm=\
```

output
```
e^(-(2*x^3*log(2) + 4*x^3 - 25*x)*e^(2*log(2) - 8))
```

3.116.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int 4e^{-8+\frac{4\left(25x-4x^3-x^3\log(4)\right)}{e^8}}\left(25-12x^2-3x^2\log(4)\right)\,dx=e^{\frac{4\left(-4x^3-2x^3\log(2)+25x\right)}{e^8}}$$

input
```
integrate((-6*x**2*ln(2)-12*x**2+25)*exp(2*ln(2)-8)*exp((-2*x**3*ln(2)-4*x
**3+25*x)*exp(2*ln(2)-8)),x)
```

output
```
exp(4*(-4*x**3 - 2*x**3*log(2) + 25*x)*exp(-8))
```

3.116.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int 4e^{-8+\frac{4\left(25x-4x^3-x^3\log(4)\right)}{e^8}}\left(25-12x^2-3x^2\log(4)\right)\,dx=e^{\left(-4\left(2x^3\log(2)+4x^3-25x\right)e^{(-8)}\right)}$$

input
```
integrate((-6*x^2*log(2)-12*x^2+25)*exp(2*log(2)-8)*exp((-2*x^3*log(2)-4*x
^3+25*x)*exp(2*log(2)-8)),x, algorithm=\
```

output
```
e^(-4*(2*x^3*log(2) + 4*x^3 - 25*x)*e^(-8))
```

3.116.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.32

$$\int 4e^{-8+\frac{4\left(25x-4x^3-x^3\log(4)\right)}{e^8}}\left(25-12x^2-3x^2\log(4)\right)\,dx$$
$$=\frac{1}{4}e^{\left(-2x^3e^{(2\log(2)-8)}\log(2)-4x^3e^{(2\log(2)-8)}+25xe^{(2\log(2)-8)}+2\log(2)\right)}$$

input
```
integrate((-6*x^2*log(2)-12*x^2+25)*exp(2*log(2)-8)*exp((-2*x^3*log(2)-4*x
^3+25*x)*exp(2*log(2)-8)),x, algorithm=\
```

output
```
1/4*e^(-2*x^3*e^(2*log(2) - 8)*log(2) - 4*x^3*e^(2*log(2) - 8) + 25*x*e^(2
*log(2) - 8) + 2*log(2))
```

3.116.9 Mupad [B] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.37

$$\int 4e^{-8+\frac{4\left(25x-4x^3-x^3\log(4)\right)}{e^8}}\left(25-12x^2-3x^2\log(4)\right)\,dx=\frac{\mathrm{e}^{-16\,x^3\,\mathrm{e}^{-8}}\,\mathrm{e}^{100\,x\,\mathrm{e}^{-8}}}{2^{8\,x^3\,\mathrm{e}^{-8}}}$$

input
```
int(-exp(-exp(2*log(2) - 8)*(2*x^3*log(2) - 25*x + 4*x^3))*exp(2*log(2) -
8)*(6*x^2*log(2) + 12*x^2 - 25),x)
```

output
```
(exp(-16*x^3*exp(-8))*exp(100*x*exp(-8)))/2^(8*x^3*exp(-8))
```

3.117 $\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))\log(\log(x+e^x(-1-x^2)\log(16)))}{(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))}\,dx$

3.117.1 Optimal result

Integrand size = 109, antiderivative size = 23

$$\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))\log(\log(x+e^x(-1-x^2)\log(16)))}{(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))}\,dx = (-3+x)\log\left(\log\left(x-\left(e^x+e^xx^2\right)\log(16)\right)\right)$$

output
```
(-3+x)*ln(ln(x-4*ln(2)*(exp(x)*x^2+exp(x))))
```

3.117.2 Mathematica [A] (verified)

Time = 0.51 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.61

$$\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))\log(\log(x+e^x(-1-x^2)\log(16)))}{(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))}\,dx = -3\log\left(\log\left(x-e^x\left(1+x^2\right)\log(16)\right)\right)+x\log\left(\log\left(x-e^x\left(1+x^2\right)\log(16)\right)\right)$$

input
```
Integrate[(3 - x + E^x*(-3 - 5*x - x^2 + x^3)*Log[16] + (-x + E^x*(1 + x^2
)*Log[16])*Log[x + E^x*(-1 - x^2)*Log[16]]*Log[Log[x + E^x*(-1 - x^2)*Log[
16]]])/((-x + E^x*(1 + x^2)*Log[16])*Log[x + E^x*(-1 - x^2)*Log[16]]),x]
```

output
```
-3*Log[Log[x - E^x*(1 + x^2)*Log[16]]] + x*Log[Log[x - E^x*(1 + x^2)*Log[1
6]]]
```

3.117.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^x\left(x^2+1\right)\log(16)-x\right)\log\left(e^x\left(-x^2-1\right)\log(16)+x\right)\log\left(\log\left(e^x\left(-x^2-1\right)\log(16)+x\right)\right)+e^x\left(x^3-x^2-5x\right.}{\left(e^x\left(x^2+1\right)\log(16)-x\right)\log\left(e^x\left(-x^2-1\right)\log(16)+x\right)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{x^3-x^2+x^2\log\left(x-e^x\left(x^2+1\right)\log(16)\right)\log\left(\log\left(x-e^x\left(x^2+1\right)\log(16)\right)\right)+\log\left(x-e^x\left(x^2+1\right)\log(16)\right)\text{lo}}{\left(x^2+1\right)\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-\int \frac{1}{\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}dx+(3-i)\int \frac{1}{(i-x)\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}dx+\int \frac{x}{\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}dx-(3+i)\int \frac{1}{(x+i)\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}dx-3\int \frac{1}{\left(e^x\log(16)x^2-x+e^x\log(16)\right)\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}dx+(1+3i)\int \frac{1}{(i-x)\left(e^x\log(16)x^2-x+e^x\log(16)\right)\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}dx-2\int \frac{x}{\left(e^x\log(16)x^2-x+e^x\log(16)\right)\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}dx+\int \frac{x^2}{\left(e^x\log(16)x^2-x+e^x\log(16)\right)\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}dx-(1-3i)\int \frac{1}{(x+i)\left(e^x\log(16)x^2-x+e^x\log(16)\right)\log\left(x-e^x\left(x^2+1\right)\log(16)\right)}dx+\int \log\left(\log\left(x-e^x\left(x^2+1\right)\log(16)\right)\right)dx$$

input
```
Int[(3 - x + E^x*(-3 - 5*x - x^2 + x^3)*Log[16] + (-x + E^x*(1 + x^2)*Log[
16])*Log[x + E^x*(-1 - x^2)*Log[16]]*Log[Log[x + E^x*(-1 - x^2)*Log[16]]])
/((-x + E^x*(1 + x^2)*Log[16])*Log[x + E^x*(-1 - x^2)*Log[16]]),x]
```

output
```
$Aborted
```

3.117.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.117.4 Maple [A] (verified)

Time = 25.06 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.74

method	result	size
risch	$\ln(\ln(4(-x^2-1)\ln(2)\,\mathrm{e}^x+x))\,x-3\ln(\ln(4(-x^2-1)\ln(2)\,\mathrm{e}^x+x))$	40
parallelrisch	$\ln(\ln(4(-x^2-1)\ln(2)\,\mathrm{e}^x+x))\,x-3\ln(\ln(4(-x^2-1)\ln(2)\,\mathrm{e}^x+x))$	40

input
```
int(((4*(x^2+1)*ln(2)*exp(x)-x)*ln(4*(-x^2-1)*ln(2)*exp(x)+x)*ln(ln(4*(-x^
2-1)*ln(2)*exp(x)+x))+4*(x^3-x^2-5*x-3)*ln(2)*exp(x)+3-x)/(4*(x^2+1)*ln(2)
*exp(x)-x)/ln(4*(-x^2-1)*ln(2)*exp(x)+x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(4*(-x^2-1)*ln(2)*exp(x)+x))*x-3*ln(ln(4*(-x^2-1)*ln(2)*exp(x)+x))
```

3.117.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))\log(\mathrm{lo}}{(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))}$$
$$=(x-3)\log\left(\log\left(-4\left(x^2+1\right)e^x\log(2)+x\right)\right)$$

input
```
integrate(((4*(x^2+1)*log(2)*exp(x)-x)*log(4*(-x^2-1)*log(2)*exp(x)+x)*log
(log(4*(-x^2-1)*log(2)*exp(x)+x))+4*(x^3-x^2-5*x-3)*log(2)*exp(x)+3-x)/(4*
(x^2+1)*log(2)*exp(x)-x)/log(4*(-x^2-1)*log(2)*exp(x)+x),x, algorithm=\
```

output
```
(x - 3)*log(log(-4*(x^2 + 1)*e^x*log(2) + x))
```

3.117.6 Sympy [A] (verification not implemented)

Time = 1.63 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.91

$$\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log\left(x+e^x(-1-x^2)\log(16)\right)\log(\log}{(-x+e^x\left(1+x^2\right)\log(16))\log\left(x+e^x\left(-1-x^2\right)\log(16)\right)}$$
$$= (x-1)\log\left(\log\left(x+\left(-4x^2-4\right)e^x\log(2)\right)\right)-2\log\left(\log\left(x+\left(-4x^2-4\right)e^x\log(2)\right)\right)$$

input
```
integrate(((4*(x**2+1)*ln(2)*exp(x)-x)*ln(4*(-x**2-1)*ln(2)*exp(x)+x)*ln(l
n(4*(-x**2-1)*ln(2)*exp(x)+x))+4*(x**3-x**2-5*x-3)*ln(2)*exp(x)+3-x)/(4*(x
**2+1)*ln(2)*exp(x)-x)/ln(4*(-x**2-1)*ln(2)*exp(x)+x),x)
```

output
```
(x - 1)*log(log(x + (-4*x**2 - 4)*exp(x)*log(2))) - 2*log(log(x + (-4*x**2
 - 4)*exp(x)*log(2)))
```

3.117.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log\left(x+e^x(-1-x^2)\log(16)\right)\log(\log}{(-x+e^x\left(1+x^2\right)\log(16))\log\left(x+e^x\left(-1-x^2\right)\log(16)\right)}$$
$$= (x-3)\log\left(\log\left(-4\left(x^2\log(2)+\log(2)\right)e^x+x\right)\right)$$

input
```
integrate(((4*(x^2+1)*log(2)*exp(x)-x)*log(4*(-x^2-1)*log(2)*exp(x)+x)*log
(log(4*(-x^2-1)*log(2)*exp(x)+x))+4*(x^3-x^2-5*x-3)*log(2)*exp(x)+3-x)/(4*
(x^2+1)*log(2)*exp(x)-x)/log(4*(-x^2-1)*log(2)*exp(x)+x),x, algorithm=\
```

output
```
(x - 3)*log(log(-4*(x^2*log(2) + log(2))*e^x + x))
```

3.117.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. 2(21) = 42.

Time = 0.54 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.87

$$\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log\left(x+e^x(-1-x^2)\log(16)\right)\log(\log}{(-x+e^x\left(1+x^2\right)\log(16))\log\left(x+e^x\left(-1-x^2\right)\log(16)\right)}$$
$$= x\log\left(\log\left(-4x^2e^x\log(2)-4e^x\log(2)+x\right)\right)-3\log\left(\log\left(-4x^2e^x\log(2)-4e^x\log(2)+x\right)\right)$$

input
```
integrate(((4*(x^2+1)*log(2)*exp(x)-x)*log(4*(-x^2-1)*log(2)*exp(x)+x)*log
(log(4*(-x^2-1)*log(2)*exp(x)+x))+4*(x^3-x^2-5*x-3)*log(2)*exp(x)+3-x)/(4*
(x^2+1)*log(2)*exp(x)-x)/log(4*(-x^2-1)*log(2)*exp(x)+x),x, algorithm=\
```

output
```
x*log(log(-4*x^2*e^x*log(2) - 4*e^x*log(2) + x)) - 3*log(log(-4*x^2*e^x*lo
g(2) - 4*e^x*log(2) + x))
```

3.117.9 Mupad [B] (verification not implemented)

Time = 14.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log\left(x+e^x(-1-x^2)\log(16)\right)\log\left(\log\right.}{(-x+e^x\left(1+x^2\right)\log(16))\log\left(x+e^x\left(-1-x^2\right)\log(16)\right)}$$
$$=\ln\left(\ln\left(x-4\,\mathrm{e}^x\,\ln\left(2\right)\,\left(x^2+1\right)\right)\right)\,\left(x-3\right)$$

input
```
int((x + log(x - 4*exp(x)*log(2)*(x^2 + 1))*log(log(x - 4*exp(x)*log(2)*(x
^2 + 1)))*(x - 4*exp(x)*log(2)*(x^2 + 1)) + 4*exp(x)*log(2)*(5*x + x^2 - x
^3 + 3) - 3)/(log(x - 4*exp(x)*log(2)*(x^2 + 1))*(x - 4*exp(x)*log(2)*(x^2
 + 1))),x)
```

output
```
log(log(x - 4*exp(x)*log(2)*(x^2 + 1)))*(x - 3)
```

3.117.
$$\int \frac{3-x+e^x(-3-5x-x^2+x^3)\log(16)+(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))\log(\log(x+e^x(-1-x^2)\log(16)))}{(-x+e^x(1+x^2)\log(16))\log(x+e^x(-1-x^2)\log(16))}\,dx$$

3.118 $\int \frac{-4+2x-5x^2}{2x^2} dx$

3.118.1 Optimal result

Integrand size = 17, antiderivative size = 25

$$\int \frac{-4+2x-5x^2}{2x^2} dx = \frac{2}{x} - \frac{x}{2} - \log\left(4e^{-1+2x}\right) + \log(x)$$

output
```
2/x+ln(x)-ln(4*exp(-1+2*x))-1/2*x
```

3.118.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.52

$$\int \frac{-4+2x-5x^2}{2x^2} dx = \frac{2}{x} - \frac{5x}{2} + \log(x)$$

input
```
Integrate[(-4 + 2*x - 5*x^2)/(2*x^2),x]
```

output
```
2/x - (5*x)/2 + Log[x]
```

3.118.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235, Rules used = {27, 25, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-5x^2+2x-4}{2x^2} \, dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{2}\int -\frac{5x^2-2x+4}{x^2}dx$$

$$\Big\downarrow \; 25$$

$$-\frac{1}{2}\int \frac{5x^2-2x+4}{x^2}dx$$

$$\Big\downarrow \; 1140$$

$$-\frac{1}{2}\int \left(5-\frac{2}{x}+\frac{4}{x^2}\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{2}\left(-5x+\frac{4}{x}+2\log(x)\right)$$

input
```
Int[(-4 + 2*x - 5*x^2)/(2*x^2),x]
```

output
```
(4/x - 5*x + 2*Log[x])/2
```

3.118.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.118.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.48

method	result	size
default	$-\frac{5x}{2}+\frac{2}{x}+\ln(x)$	12
risch	$-\frac{5x}{2}+\frac{2}{x}+\ln(x)$	12
norman	$\frac{2-\frac{5x^2}{2}}{x}+\ln(x)$	15
parallelrisch	$\frac{2x\ln(x)-5x^2+4}{2x}$	18

input
```
int(1/2*(-5*x^2+2*x-4)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-5/2*x+2/x+ln(x)
```

3.118.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

$$\int \frac{-4+2x-5x^2}{2x^2}\,dx=-\frac{5\,x^2-2\,x\log(x)-4}{2\,x}$$

input
```
integrate(1/2*(-5*x^2+2*x-4)/x^2,x, algorithm=\
```

output
```
-1/2*(5*x^2 - 2*x*log(x) - 4)/x
```

3.118.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.40

$$\int \frac{-4+2x-5x^2}{2x^2}\,dx = -\frac{5x}{2} + \log(x) + \frac{2}{x}$$

input
```
integrate(1/2*(-5*x**2+2*x-4)/x**2,x)
```

output
```
-5*x/2 + log(x) + 2/x
```

3.118.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.44

$$\int \frac{-4+2x-5x^2}{2x^2}\,dx = -\frac{5}{2}\,x + \frac{2}{x} + \log(x)$$

input
```
integrate(1/2*(-5*x^2+2*x-4)/x^2,x, algorithm=\
```

output
```
-5/2*x + 2/x + log(x)
```

3.118.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.48

$$\int \frac{-4+2x-5x^2}{2x^2}\,dx = -\frac{5}{2}\,x + \frac{2}{x} + \log(|x|)$$

input
```
integrate(1/2*(-5*x^2+2*x-4)/x^2,x, algorithm=\
```

output
```
-5/2*x + 2/x + log(abs(x))
```

3.118.9 Mupad [B] (verification not implemented)

Time = 14.21 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.44

$$\int \frac{-4+2x-5x^2}{2x^2}\,dx = \ln(x) - \frac{5\,x}{2} + \frac{2}{x}$$

input
```
int(-((5*x^2)/2 - x + 2)/x^2,x)
```

output
```
log(x) - (5*x)/2 + 2/x
```

3.119 $\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}(14+6x+7x^2+2$

3.119.1 Optimal result

Integrand size = 71, antiderivative size = 25

$$\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}\left(14+6x+7x^2+2x^3+e\left(-10-5x^2\right)+e^x\left(-80-10x-40x^2-5x^3\right)\right)\right)\,dx=5x+e^{(7+x)(-5(e+e^x)+x)}\left(2+x^2\right)$$

output
```
5*x+exp((x-5*exp(1)-5*exp(x))*(x+7))*(x^2+2)
```

3.119.2 Mathematica [A] (verified)

Time = 5.15 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}\left(14+6x+7x^2+2x^3+e\left(-10-5x^2\right)+e^x\left(-80-10x-40x^2-5x^3\right)\right)\right)\,dx=5x+e^{-((5e+5e^x-x)(7+x))}\left(2+x^2\right)$$

input
```
Integrate[5 + E^(E*(-35 - 5*x) + E^x*(-35 - 5*x) + 7*x + x^2)*(14 + 6*x +
7*x^2 + 2*x^3 + E*(-10 - 5*x^2) + E^x*(-80 - 10*x - 40*x^2 - 5*x^3)),x]
```

output
```
5*x + (2 + x^2)/E^((5*E + 5*E^x - x)*(7 + x))
```

3.119.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\left(2x^3+7x^2+e\left(-5x^2-10\right)+e^x\left(-5x^3-40x^2-10x-80\right)+6x+14\right)\exp\left(x^2+7x+e^x(-5x-35)+e(-5x\right.\right.$$

$$\Big\downarrow \text{2009}$$

$$2\int e^{-((-x+5e^x+5e)(x+7))}x^3dx-5\int e^{x-(-x+5e^x+5e)(x+7)}x^3dx+7\int e^{-((-x+5e^x+5e)(x+7))}x^2dx-5\int e^{1-(-x+5e^x+5e)(x+7)}x^2dx-40\int e^{x-(-x+5e^x+5e)(x+7)}x^2dx+14\int e^{-((-x+5e^x+5e)(x+7))}dx-10\int e^{1-(-x+5e^x+5e)(x+7)}dx-80\int e^{x-(-x+5e^x+5e)(x+7)}dx+6\int e^{-((-x+5e^x+5e)(x+7))}xdx-10\int e^{x-(-x+5e^x+5e)(x+7)}xdx+5x$$

input
```
Int[5 + E^(E*(-35 - 5*x) + E^x*(-35 - 5*x) + 7*x + x^2)*(14 + 6*x + 7*x^2
+ 2*x^3 + E*(-10 - 5*x^2) + E^x*(-80 - 10*x - 40*x^2 - 5*x^3)),x]
```

output
```
$Aborted
```

3.119.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.119.4 Maple [A] (verified)

Time = 0.52 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

method	result	size
risch	$\left(x^2+2\right)\mathrm{e}^{-(x+7)(-x+5\,\mathrm{e}+5\,\mathrm{e}^x)}+5x$	29
default	$5x+x^2\mathrm{e}^{(-5x-35)\mathrm{e}^x+(-5x-35)\mathrm{e}+x^2+7x}+2\,\mathrm{e}^{(-5x-35)\mathrm{e}^x+(-5x-35)\mathrm{e}+x^2+7x}$	59
norman	$5x+x^2\mathrm{e}^{(-5x-35)\mathrm{e}^x+(-5x-35)\mathrm{e}+x^2+7x}+2\,\mathrm{e}^{(-5x-35)\mathrm{e}^x+(-5x-35)\mathrm{e}+x^2+7x}$	59
parallelrisch	$5x+x^2\mathrm{e}^{(-5x-35)\mathrm{e}^x+(-5x-35)\mathrm{e}+x^2+7x}+2\,\mathrm{e}^{(-5x-35)\mathrm{e}^x+(-5x-35)\mathrm{e}+x^2+7x}$	59

3.119.

$\int\left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}\left(14+6x+7x^2+2x^3+e\left(-10-5x^2\right)+e^x\left(-80-10x-40x^2-5x^3\right)\right)\right)$ d

input
```
int(((-5*x^3-40*x^2-10*x-80)*exp(x)+(-5*x^2-10)*exp(1)+2*x^3+7*x^2+6*x+14)
*exp((-5*x-35)*exp(x)+(-5*x-35)*exp(1)+x^2+7*x)+5,x,method=_RETURNVERBOSE)
```

output
```
(x^2+2)*exp(-(x+7)*(-x+5*exp(1)+5*exp(x)))+5*x
```

3.119.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}\left(14+6x+7x^2+2x^3+e\left(-10-5x^2\right)+e^x\left(-80-10x-40x^2-5x^3\right)\right)\right)dx = \left(x^2+2\right)e^{\left(x^2-5\,(x+7)e-5\,(x+7)e^x+7\,x\right)}+5\,x$$

input
```
integrate(((-5*x^3-40*x^2-10*x-80)*exp(x)+(-5*x^2-10)*exp(1)+2*x^3+7*x^2+6
*x+14)*exp((-5*x-35)*exp(x)+(-5*x-35)*exp(1)+x^2+7*x)+5,x, algorithm=\
```

output
```
(x^2 + 2)*e^(x^2 - 5*(x + 7)*e - 5*(x + 7)*e^x + 7*x) + 5*x
```

3.119.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}\left(14+6x+7x^2+2x^3+e\left(-10-5x^2\right)+e^x\left(-80-10x-40x^2-5x^3\right)\right)\right)dx = 5x+\left(x^2+2\right)e^{x^2+7x+(-5x-35)e^x+e(-5x-35)}$$

input
```
integrate((((-5*x**3-40*x**2-10*x-80)*exp(x)+(-5*x**2-10)*exp(1)+2*x**3+7*x
**2+6*x+14)*exp((-5*x-35)*exp(x)+(-5*x-35)*exp(1)+x**2+7*x)+5,x)
```

output
```
5*x + (x**2 + 2)*exp(x**2 + 7*x + (-5*x - 35)*exp(x) + E*(-5*x - 35))
```

3.119.

$\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}(14+6x+7x^2+2x^3+e(-10-5x^2)+e^x(-80-10x-40x^2-5x^3))\right)$ d

3.119.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}\left(14+6x+7x^2+2x^3+e\left(-10-5x^2\right)+e^x\left(-80-10x-40x^2-5x^3\right)\right)\right)\,dx=\left(x^2+2\right)e^{\left(x^2-5\,xe-5\,xe^x+7\,x-35\,e-35\,e^x\right)}+5\,x$$

input
```
integrate(((-5*x^3-40*x^2-10*x-80)*exp(x)+(-5*x^2-10)*exp(1)+2*x^3+7*x^2+6
*x+14)*exp((-5*x-35)*exp(x)+(-5*x-35)*exp(1)+x^2+7*x)+5,x, algorithm=\
```

output
```
(x^2 + 2)*e^(x^2 - 5*x*e - 5*x*e^x + 7*x - 35*e - 35*e^x) + 5*x
```

3.119.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. 2(25) = 50.

Time = 0.33 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.72

$$\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}\left(14+6x+7x^2+2x^3+e\left(-10-5x^2\right)+e^x\left(-80-10x-40x^2-5x^3\right)\right)\right)\,dx=\left(x^2e^{\left(x^2-5\,xe-5\,xe^x+7\,x-35\,e-35\,e^x+1\right)}+2\,e^{\left(x^2-5\,xe-5\,xe^x+7\,x-35\,e-35\,e^x+1\right)}\right)e^{(-1)}+5\,x$$

input
```
integrate(((-5*x^3-40*x^2-10*x-80)*exp(x)+(-5*x^2-10)*exp(1)+2*x^3+7*x^2+6
*x+14)*exp((-5*x-35)*exp(x)+(-5*x-35)*exp(1)+x^2+7*x)+5,x, algorithm=\
```

output
```
(x^2*e^(x^2 - 5*x*e - 5*x*e^x + 7*x - 35*e - 35*e^x + 1) + 2*e^(x^2 - 5*x*
e - 5*x*e^x + 7*x - 35*e - 35*e^x + 1))*e^(-1) + 5*x
```

3.119.9 Mupad [B] (verification not implemented)

Time = 15.27 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.80

$$\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}\left(14+6x+7x^2+2x^3+e\left(-10-5x^2\right)+e^x\left(-80-10x-40x^2-5x^3\right)\right)\right)\,dx=5\,x+2\,\mathrm{e}^{-5\,x\,\mathrm{e}^x}\,\mathrm{e}^{-35\,\mathrm{e}}\,\mathrm{e}^{7\,x}\,\mathrm{e}^{x^2}\,\mathrm{e}^{-5\,x\,\mathrm{e}}\,\mathrm{e}^{-35\,\mathrm{e}^x}+x^2\,\mathrm{e}^{-5\,x\,\mathrm{e}^x}\,\mathrm{e}^{-35\,\mathrm{e}}\,\mathrm{e}^{7\,x}\,\mathrm{e}^{x^2}\,\mathrm{e}^{-5\,x\,\mathrm{e}}\,\mathrm{e}^{-35\,\mathrm{e}^x}$$

input
```
int(exp(7*x - exp(x)*(5*x + 35) + x^2 - exp(1)*(5*x + 35))*(6*x - exp(1)*(
5*x^2 + 10) + 7*x^2 + 2*x^3 - exp(x)*(10*x + 40*x^2 + 5*x^3 + 80) + 14) +
5,x)
```

output
```
5*x + 2*exp(-5*x*exp(x))*exp(-35*exp(1))*exp(7*x)*exp(x^2)*exp(-5*x*exp(1)
)*exp(-35*exp(x)) + x^2*exp(-5*x*exp(x))*exp(-35*exp(1))*exp(7*x)*exp(x^2)
*exp(-5*x*exp(1))*exp(-35*exp(x))
```

3.119.
$\int \left(5+e^{e(-35-5x)+e^x(-35-5x)+7x+x^2}(14+6x+7x^2+2x^3+e(-10-5x^2)+e^x(-80-10x-40x^2-5x^3))\right) d$

3.120 $\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-e^{x+\frac{1+2x}{x}}-10e^{\frac{1+2x}{x}}x^2\right)\right)}{x^2}\,dx$

3.120.1 Optimal result

Integrand size = 59, antiderivative size = 17

$$\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-e^{x+\frac{1+2x}{x}}-10e^{\frac{1+2x}{x}}x^2\right)\right)}{x^2}\,dx=-8+e^{2+10e^{-x}+\frac{1}{x}}+x$$

output
```
x+exp(2+1/x)*exp(5/exp(x))^2-8
```

3.120.2 Mathematica [A] (verified)

Time = 0.89 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-e^{x+\frac{1+2x}{x}}-10e^{\frac{1+2x}{x}}x^2\right)\right)}{x^2}\,dx=e^{2+10e^{-x}+\frac{1}{x}}+x$$

input
```
Integrate[(E^x*x^2 + E^(10/E^x)*(-E^(x + (1 + 2*x)/x) - 10*E^((1 + 2*x)/x)
*x^2))/(E^x*x^2),x]
```

output
```
E^(2 + 10/E^x + x^(-1)) + x
```

3.120.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-10e^{\frac{2x+1}{x}}x^2-e^{x+\frac{2x+1}{x}}\right)\right)}{x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x^2-e^{10e^{-x}+\frac{1}{x}+2}}{x^2}-10e^{-x+10e^{-x}+\frac{1}{x}+2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\int \frac{e^{10e^{-x}+2+\frac{1}{x}}}{x^2}dx-10\int e^{-x+10e^{-x}+2+\frac{1}{x}}dx+x$$

input
```
Int[(E^x*x^2 + E^(10/E^x)*(-E^(x + (1 + 2*x)/x) - 10*E^((1 + 2*x)/x)*x^2))
/(E^x*x^2),x]
```

output
```
$Aborted
```

3.120.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.120.4 Maple [A] (verified)

Time = 0.84 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

method	result	size
risch	$e^{\frac{10x\,e^{-x}+2x+1}{x}}+x$	20
parallelrisch	$e^{\frac{1+2x}{x}}e^{10\,e^{-x}}+x$	23

input
```
int(((-exp((1+2*x)/x)*exp(x)-10*x^2*exp((1+2*x)/x))*exp(5/exp(x))^2+exp(x)
*x^2)/exp(x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
exp((10*x*exp(-x)+2*x+1)/x)+x
```

3.120.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.76

$$\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-e^{x+\frac{1+2x}{x}}-10e^{\frac{1+2x}{x}}x^2\right)\right)}{x^2}\,dx=\left(xe^x+e^{\left(\frac{x^2+2\,x+1}{x}+10\,e^{(-x)}\right)}\right)e^{(-x)}$$

input
```
integrate(((-exp((1+2*x)/x)*exp(x)-10*x^2*exp((1+2*x)/x))*exp(5/exp(x))^2+
exp(x)*x^2)/exp(x)/x^2,x, algorithm=\
```

output
```
(x*e^x + e^((x^2 + 2*x + 1)/x + 10*e^(-x)))*e^(-x)
```

3.120.6 Sympy [A] (verification not implemented)

Time = 124.11 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-e^{x+\frac{1+2x}{x}}-10e^{\frac{1+2x}{x}}x^2\right)\right)}{x^2}\,dx=x+e^{\frac{2x+1}{x}}e^{10e^{-x}}$$

input
```
integrate(((-exp((1+2*x)/x)*exp(x)-10*x**2*exp((1+2*x)/x))*exp(5/exp(x))**
2+exp(x)*x**2)/exp(x)/x**2,x)
```

output
```
x + exp((2*x + 1)/x)*exp(10*exp(-x))
```

3.120.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-e^{x+\frac{1+2x}{x}}-10e^{\frac{1+2x}{x}}x^2\right)\right)}{x^2}\,dx=x+e^{\left(\frac{1}{x}+10\,e^{(-x)}+2\right)}$$

input
```
integrate(((-exp((1+2*x)/x)*exp(x)-10*x^2*exp((1+2*x)/x))*exp(5/exp(x))^2+
exp(x)*x^2)/exp(x)/x^2,x, algorithm=\
```

output
```
x + e^(1/x + 10*e^(-x) + 2)
```

3.120.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-e^{x+\frac{1+2x}{x}}-10e^{\frac{1+2x}{x}}x^2\right)\right)}{x^2}\,dx=x+e^{\left(\frac{1}{x}+10\,e^{(-x)}+2\right)}$$

input
```
integrate(((-exp((1+2*x)/x)*exp(x)-10*x^2*exp((1+2*x)/x))*exp(5/exp(x))^2+
exp(x)*x^2)/exp(x)/x^2,x, algorithm=\
```

output
```
x + e^(1/x + 10*e^(-x) + 2)
```

3.120.9 Mupad [B] (verification not implemented)

Time = 14.79 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{e^{-x}\left(e^x x^2+e^{10e^{-x}}\left(-e^{x+\frac{1+2x}{x}}-10e^{\frac{1+2x}{x}}x^2\right)\right)}{x^2}\,dx=x+\mathrm{e}^{10\,\mathrm{e}^{-x}}\,\mathrm{e}^{1/x}\,\mathrm{e}^2$$

input
```
int((exp(-x)*(x^2*exp(x) - exp(10*exp(-x))*(10*x^2*exp((2*x + 1)/x) + exp(
(2*x + 1)/x)*exp(x))))/x^2,x)
```

output
```
x + exp(10*exp(-x))*exp(1/x)*exp(2)
```

3.121 $\int \frac{900+1757x+168x^2+4x^3}{450x+43x^2+x^3} \, dx$

3.121.1 Optimal result

Integrand size = 30, antiderivative size = 30

$$\int \frac{900+1757x+168x^2+4x^3}{450x+43x^2+x^3} \, dx = x-\log(x)+3\log\left(\frac{e^{-4+x}x}{\left(9+\frac{x}{2}\right)(25+x)}\right)$$

output
```
3*ln(exp(x-4)*x/(x+25)/(9+1/2*x))+x-ln(x)
```

3.121.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.63

$$\int \frac{900+1757x+168x^2+4x^3}{450x+43x^2+x^3} \, dx = 4x+2\log(x)-3\log\left(450+43x+x^2\right)$$

input
```
Integrate[(900 + 1757*x + 168*x^2 + 4*x^3)/(450*x + 43*x^2 + x^3),x]
```

output
```
4*x + 2*Log[x] - 3*Log[450 + 43*x + x^2]
```

3.121.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2026, 2159, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^3+168x^2+1757x+900}{x^3+43x^2+450x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{4x^3+168x^2+1757x+900}{x(x^2+43x+450)}dx$$

$$\Big\downarrow \text{2159}$$

$$\int \left(-\frac{3}{x+18}-\frac{3}{x+25}+\frac{2}{x}+4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$4x+2\log(x)-3\log(x+18)-3\log(x+25)$$

input
```
Int[(900 + 1757*x + 168*x^2 + 4*x^3)/(450*x + 43*x^2 + x^3),x]
```

output
```
4*x + 2*Log[x] - 3*Log[18 + x] - 3*Log[25 + x]
```

3.121.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2159
```
Int[(Pq_)*((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p
_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*Pq*(a + b*x + c*x^2)^p, x
], x] /; FreeQ[{a, b, c, d, e, m}, x] && PolyQ[Pq, x] && IGtQ[p, -2]
```

3.121.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

method	result	size
risch	$4x+2\ln(x)-3\ln(x^2+43x+450)$	20
default	$4x+2\ln(x)-3\ln(18+x)-3\ln(x+25)$	21
norman	$4x+2\ln(x)-3\ln(18+x)-3\ln(x+25)$	21
parallelrisch	$4x+2\ln(x)-3\ln(18+x)-3\ln(x+25)$	21

input
```
int((4*x^3+168*x^2+1757*x+900)/(x^3+43*x^2+450*x),x,method=_RETURNVERBOSE)
```

output
```
4*x+2*ln(x)-3*ln(x^2+43*x+450)
```

3.121.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.63

$$\int \frac{900+1757x+168x^2+4x^3}{450x+43x^2+x^3}\,dx = 4\,x-3\,\log\left(x^2+43\,x+450\right)+2\,\log\left(x\right)$$

input
```
integrate((4*x^3+168*x^2+1757*x+900)/(x^3+43*x^2+450*x),x, algorithm=\
```

output
```
4*x - 3*log(x^2 + 43*x + 450) + 2*log(x)
```

3.121.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.63

$$\int \frac{900+1757x+168x^2+4x^3}{450x+43x^2+x^3}\,dx = 4x+2\log\left(x\right)-3\log\left(x^2+43x+450\right)$$

input
```
integrate((4*x**3+168*x**2+1757*x+900)/(x**3+43*x**2+450*x),x)
```

output
```
4*x + 2*log(x) - 3*log(x**2 + 43*x + 450)
```

3.121.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \frac{900 + 1757x + 168x^2 + 4x^3}{450x + 43x^2 + x^3} \, dx = 4\,x - 3\,\log\left(x + 25\right) - 3\,\log\left(x + 18\right) + 2\,\log\left(x\right)$$

input
```
integrate((4*x^3+168*x^2+1757*x+900)/(x^3+43*x^2+450*x),x, algorithm=\
```

output
```
4*x - 3*log(x + 25) - 3*log(x + 18) + 2*log(x)
```

3.121.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.77

$$\int \frac{900 + 1757x + 168x^2 + 4x^3}{450x + 43x^2 + x^3} \, dx = 4\,x - 3\,\log\left(|x + 25|\right) - 3\,\log\left(|x + 18|\right) + 2\,\log\left(|x|\right)$$

input
```
integrate((4*x^3+168*x^2+1757*x+900)/(x^3+43*x^2+450*x),x, algorithm=\
```

output
```
4*x - 3*log(abs(x + 25)) - 3*log(abs(x + 18)) + 2*log(abs(x))
```

3.121.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.63

$$\int \frac{900 + 1757x + 168x^2 + 4x^3}{450x + 43x^2 + x^3} \, dx = 4\,x - 3\,\ln\left(x^2 + 43\,x + 450\right) + 2\,\ln\left(x\right)$$

input
```
int((1757*x + 168*x^2 + 4*x^3 + 900)/(450*x + 43*x^2 + x^3),x)
```

output
```
4*x - 3*log(43*x + x^2 + 450) + 2*log(x)
```

3.122 $\int \frac{-3+5x^2+e^x(-x+4x^2)+(x^2-e^x x^2)\log(x)}{4x^2}\,dx$

3.122.1 Optimal result

Integrand size = 42, antiderivative size = 28

$$\int \frac{-3+5x^2+e^x(-x+4x^2)+(x^2-e^x x^2)\log(x)}{4x^2}\,dx = -\frac{3}{2}+e^x+x+\frac{1}{4}\left(\frac{3}{x}+(-e^x+x)\log(x)\right)$$

output
```
x-3/2+exp(x)+1/4*(x-exp(x))*ln(x)+3/4/x
```

3.122.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{-3+5x^2+e^x(-x+4x^2)+(x^2-e^x x^2)\log(x)}{4x^2}\,dx = \frac{1}{4}\left(4e^x+\frac{3}{x}+4x-e^x\log(x)+x\log(x)\right)$$

input
```
Integrate[(-3 + 5*x^2 + E^x*(-x + 4*x^2) + (x^2 - E^x*x^2)*Log[x])/(4*x^2)
,x]
```

output
```
(4*E^x + 3/x + 4*x - E^x*Log[x] + x*Log[x])/4
```

3.122.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.18, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5x^2+e^x(4x^2-x)+(x^2-e^xx^2)\log(x)-3}{4x^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{4}\int -\frac{-5x^2+e^x(x-4x^2)-(x^2-e^xx^2)\log(x)+3}{x^2}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{4}\int \frac{-5x^2+e^x(x-4x^2)-(x^2-e^xx^2)\log(x)+3}{x^2}dx$$

$$\Big\downarrow \ 2010$$

$$-\frac{1}{4}\int \left(\frac{e^x(\log(x)x-4x+1)}{x}+\frac{-\log(x)x^2-5x^2+3}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{4}\left(4x+\frac{3}{x}+x\log(x)+\frac{e^x(4x-x\log(x))}{x}\right)$$

input
```
Int[(-3 + 5*x^2 + E^x*(-x + 4*x^2) + (x^2 - E^x*x^2)*Log[x])/(4*x^2),x]
```

output
```
(3/x + 4*x + x*Log[x] + (E^x*(4*x - x*Log[x]))/x)/4
```

3.122.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.122.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

method	result	size
default	$-\frac{e^{x} \ln(x)}{4}+e^{x}+x+\frac{3}{4x}+\frac{x\ln(x)}{4}$	21
parts	$-\frac{e^{x} \ln(x)}{4}+e^{x}+x+\frac{3}{4x}+\frac{x\ln(x)}{4}$	21
norman	$\frac{\frac{3}{4}+x^{2}+e^{x} x+\frac{x^{2} \ln(x)}{4}-\frac{x\,e^{x} \ln(x)}{4}}{x}$	28
risch	$\frac{(x-e^{x}) \ln(x)}{4}+\frac{4x^{2}+4\,e^{x} x+3}{4x}$	29
parallelrisch	$-\frac{x\,e^{x} \ln(x)-x^{2} \ln(x)-4\,e^{x} x-4x^{2}-3}{4x}$	31

input
```
int(1/4*((-exp(x)*x^2+x^2)*ln(x)+(4*x^2-x)*exp(x)+5*x^2-3)/x^2,x,method=_R
ETURNVERBOSE)
```

output
```
-1/4*exp(x)*ln(x)+exp(x)+x+3/4/x+1/4*x*ln(x)
```

3.122.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{-3+5x^2+e^x(-x+4x^2)+(x^2-e^xx^2)\log(x)}{4x^2}\,dx=\frac{4\,x^2+4\,xe^x+(x^2-xe^x)\log{(x)}+3}{4\,x}$$

input
```
integrate(1/4*((-exp(x)*x^2+x^2)*log(x)+(4*x^2-x)*exp(x)+5*x^2-3)/x^2,x, a
lgorithm=\
```

output
```
1/4*(4*x^2 + 4*x*e^x + (x^2 - x*e^x)*log(x) + 3)/x
```

3.122.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{-3+5x^2+e^x(-x+4x^2)+(x^2-e^xx^2)\log(x)}{4x^2}\,dx = \frac{x\log(x)}{4}+x+\frac{(4-\log(x))\,e^x}{4}+\frac{3}{4x}$$

input
```
integrate(1/4*((-exp(x)*x**2+x**2)*ln(x)+(4*x**2-x)*exp(x)+5*x**2-3)/x**2,
x)
```

output
```
x*log(x)/4 + x + (4 - log(x))*exp(x)/4 + 3/(4*x)
```

3.122.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{-3+5x^2+e^x(-x+4x^2)+(x^2-e^xx^2)\log(x)}{4x^2}\,dx = \frac{1}{4}\,x\log(x)-\frac{1}{4}\,e^x\log(x)+x+\frac{3}{4\,x}+e^x$$

input
```
integrate(1/4*((-exp(x)*x^2+x^2)*log(x)+(4*x^2-x)*exp(x)+5*x^2-3)/x^2,x, a
lgorithm=\
```

output
```
1/4*x*log(x) - 1/4*e^x*log(x) + x + 3/4/x + e^x
```

3.122.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{-3+5x^2+e^x(-x+4x^2)+(x^2-e^xx^2)\log(x)}{4x^2}\,dx = \frac{x^2\log(x)-xe^x\log(x)+4\,x^2+4\,xe^x+3}{4\,x}$$

input
```
integrate(1/4*((-exp(x)*x^2+x^2)*log(x)+(4*x^2-x)*exp(x)+5*x^2-3)/x^2,x, a
lgorithm=\
```

output
```
1/4*(x^2*log(x) - x*e^x*log(x) + 4*x^2 + 4*x*e^x + 3)/x
```

3.122.9 Mupad [B] (verification not implemented)

Time = 14.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{-3+5x^2+e^x(-x+4x^2)+(x^2-e^xx^2)\log(x)}{4x^2}\,dx = \mathrm{e}^x - \frac{\mathrm{e}^x\,\ln(x)}{4} + x\left(\frac{\ln(x)}{4}+1\right) + \frac{3}{4\,x}$$

input
```
int(-((exp(x)*(x - 4*x^2))/4 - (5*x^2)/4 + (log(x)*(x^2*exp(x) - x^2))/4 +
 3/4)/x^2,x)
```

output
```
exp(x) - (exp(x)*log(x))/4 + x*(log(x)/4 + 1) + 3/(4*x)
```

3.123 $\int \frac{38e^x x-2e^{2x}x+2x^2+(-76+4e^x)\log(x)+2e^x x\log^2(x)-4\log^3(x)}{x}\,dx$

3.123.1 Optimal result

Integrand size = 50, antiderivative size = 19

$$\int \frac{38e^x x-2e^{2x}x+2x^2+(-76+4e^x)\log(x)+2e^x x\log^2(x)-4\log^3(x)}{x}\,dx = x^2-\left(19-e^x+\log^2(x)\right)^2$$

output
```
x^2-(ln(x)^2-exp(x)+19)^2
```

3.123.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.84

$$\int \frac{38e^x x-2e^{2x}x+2x^2+(-76+4e^x)\log(x)+2e^x x\log^2(x)-4\log^3(x)}{x}\,dx = 38e^x-e^{2x}+x^2+2e^x\log^2(x)-\left(19+\log^2(x)\right)^2$$

input
```
Integrate[(38*E^x*x - 2*E^(2*x)*x + 2*x^2 + (-76 + 4*E^x)*Log[x] + 2*E^x*x
*Log[x]^2 - 4*Log[x]^3)/x,x]
```

output
```
38*E^x - E^(2*x) + x^2 + 2*E^x*Log[x]^2 - (19 + Log[x]^2)^2
```

3.123.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 41 vs. $2(19) = 38$.

Time = 0.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.16, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.040$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2 + 38e^x x - 2e^{2x}x - 4\log^3(x) + 2e^x x\log^2(x) + (4e^x - 76)\log(x)}{x} \, dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2\left(x^2 - 2\log^3(x) - 38\log(x)\right)}{x} - 2e^{2x} + \frac{2e^x\left(19x + x\log^2(x) + 2\log(x)\right)}{x}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$x^2 - e^{2x} - \log^4(x) - 38\log^2(x) + \frac{2e^x\left(19x + x\log^2(x)\right)}{x}$$

input
```
Int[(38*E^x*x - 2*E^(2*x)*x + 2*x^2 + (-76 + 4*E^x)*Log[x] + 2*E^x*x*Log[x
]^2 - 4*Log[x]^3)/x,x]
```

output
```
-E^(2*x) + x^2 - 38*Log[x]^2 - Log[x]^4 + (2*E^x*(19*x + x*Log[x]^2))/x
```

3.123.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.123.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.68

method	result	size
risch	$-\ln(x)^4+(2\,\mathrm{e}^x-38)\ln(x)^2+x^2-\mathrm{e}^{2x}+38\,\mathrm{e}^x$	32
default	$-\ln(x)^4+2\,\mathrm{e}^x\ln(x)^2-38\ln(x)^2+x^2+38\,\mathrm{e}^x-\mathrm{e}^{2x}$	35
parallelrisch	$-\ln(x)^4+2\,\mathrm{e}^x\ln(x)^2-38\ln(x)^2+x^2+38\,\mathrm{e}^x-\mathrm{e}^{2x}$	35
parts	$-\ln(x)^4+2\,\mathrm{e}^x\ln(x)^2-38\ln(x)^2+x^2+38\,\mathrm{e}^x-\mathrm{e}^{2x}$	35

input
```
int((-4*ln(x)^3+2*x*exp(x)*ln(x)^2+(4*exp(x)-76)*ln(x)-2*x*exp(x)^2+38*exp
(x)*x+2*x^2)/x,x,method=_RETURNVERBOSE)
```

output
```
-ln(x)^4+(2*exp(x)-38)*ln(x)^2+x^2-exp(2*x)+38*exp(x)
```

3.123.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.58

$$\int \frac{38e^x x-2e^{2x}x+2x^2+(-76+4e^x)\log(x)+2e^x x\log^2(x)-4\log^3(x)}{x}\,dx$$
$$=-\log(x)^4+2\,(e^x-19)\log(x)^2+x^2-e^{(2\,x)}+38\,e^x$$

input
```
integrate((-4*log(x)^3+2*x*exp(x)*log(x)^2+(4*exp(x)-76)*log(x)-2*x*exp(x)
^2+38*exp(x)*x+2*x^2)/x,x, algorithm=\
```

output
```
-log(x)^4 + 2*(e^x - 19)*log(x)^2 + x^2 - e^(2*x) + 38*e^x
```

3.123.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. 2(14) = 28.

Time = 0.13 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.63

$$\int \frac{38e^x x-2e^{2x}x+2x^2+(-76+4e^x)\log(x)+2e^x x\log^2(x)-4\log^3(x)}{x}\,dx$$
$$=x^2+\left(2\log(x)^2+38\right)e^x-e^{2x}-\log(x)^4-38\log(x)^2$$

input
```
integrate((-4*ln(x)**3+2*x*exp(x)*ln(x)**2+(4*exp(x)-76)*ln(x)-2*x*exp(x)*
*2+38*exp(x)*x+2*x**2)/x,x)
```

output
```
x**2 + (2*log(x)**2 + 38)*exp(x) - exp(2*x) - log(x)**4 - 38*log(x)**2
```

3.123.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.79

$$\int \frac{38e^x x - 2e^{2x}x + 2x^2 + (-76 + 4e^x)\log(x) + 2e^x x \log^2(x) - 4\log^3(x)}{x}\,dx$$
$$= -\log(x)^4 + 2\,e^x \log(x)^2 + x^2 - 38\,\log(x)^2 - e^{(2\,x)} + 38\,e^x$$

input
```
integrate((-4*log(x)^3+2*x*exp(x)*log(x)^2+(4*exp(x)-76)*log(x)-2*x*exp(x)
^2+38*exp(x)*x+2*x^2)/x,x, algorithm=\
```

output
```
-log(x)^4 + 2*e^x*log(x)^2 + x^2 - 38*log(x)^2 - e^(2*x) + 38*e^x
```

3.123.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.79

$$\int \frac{38e^x x - 2e^{2x}x + 2x^2 + (-76 + 4e^x)\log(x) + 2e^x x \log^2(x) - 4\log^3(x)}{x}\,dx$$
$$= -\log(x)^4 + 2\,e^x \log(x)^2 + x^2 - 38\,\log(x)^2 - e^{(2\,x)} + 38\,e^x$$

input
```
integrate((-4*log(x)^3+2*x*exp(x)*log(x)^2+(4*exp(x)-76)*log(x)-2*x*exp(x)
^2+38*exp(x)*x+2*x^2)/x,x, algorithm=\
```

output
```
-log(x)^4 + 2*e^x*log(x)^2 + x^2 - 38*log(x)^2 - e^(2*x) + 38*e^x
```

3.123.9 Mupad [B] (verification not implemented)

Time = 13.93 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.79

$$\int \frac{38e^x x - 2e^{2x}x + 2x^2 + (-76 + 4e^x)\log(x) + 2e^x x \log^2(x) - 4\log^3(x)}{x}\,dx$$
$$= 38\,\mathrm{e}^x - \mathrm{e}^{2\,x} - 38\ln(x)^2 - \ln(x)^4 + 2\,\mathrm{e}^x\ln(x)^2 + x^2$$

input
```
int((38*x*exp(x) - 4*log(x)^3 - 2*x*exp(2*x) + 2*x^2 + log(x)*(4*exp(x) -
76) + 2*x*exp(x)*log(x)^2)/x,x)
```

output
```
38*exp(x) - exp(2*x) - 38*log(x)^2 - log(x)^4 + 2*exp(x)*log(x)^2 + x^2
```

3.124 $\int \frac{10+20x+20x^2+10x^3+(5+10x)\log(x^2)+e^{e^x}(2+4x+4x^2+2x^3+(1+2x}{3+6x+9x^2+6x^3+3x^4}$

3.124.1 Optimal result

Integrand size = 98, antiderivative size = 27

$$\int \frac{10+20x+20x^2+10x^3+(5+10x)\log(x^2)+e^{e^x}(2+4x+4x^2+2x^3+(1+2x+e^x(x+2x^2+2x^3+}{3+6x+9x^2+6x^3+3x^4}$$
$$=\frac{\left(5+e^{e^x}\right)x\log(x^2)}{3+\frac{3x^2}{1+x}}$$

output
```
(exp(exp(x))+5)*ln(x^2)/(3+3*x^2/(1+x))*x
```

3.124.2 Mathematica [A] (verified)

Time = 0.72 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{10+20x+20x^2+10x^3+(5+10x)\log(x^2)+e^{e^x}(2+4x+4x^2+2x^3+(1+2x+e^x(x+2x^2+2x^3+}{3+6x+9x^2+6x^3+3x^4}$$
$$=\frac{1}{3}\left(10\log(x)+\frac{\left(-5+e^{e^x}x(1+x)\right)\log(x^2)}{1+x+x^2}\right)$$

input
```
Integrate[(10 + 20*x + 20*x^2 + 10*x^3 + (5 + 10*x)*Log[x^2] + E^E^x*(2 +
4*x + 4*x^2 + 2*x^3 + (1 + 2*x + E^x*(x + 2*x^2 + 2*x^3 + x^4))*Log[x^2]))
/(3 + 6*x + 9*x^2 + 6*x^3 + 3*x^4),x]
```

output
```
(10*Log[x] + ((-5 + E^E^x*x*(1 + x))*Log[x^2])/(1 + x + x^2))/3
```

3.124.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{10x^3+20x^2+(10x+5)\log(x^2)+e^{e^x}(2x^3+4x^2+(e^x(x^4+2x^3+2x^2+x)+2x+1)\log(x^2)+4x+2)+2}{3x^4+6x^3+9x^2+6x+3}$$

$$\Big\downarrow \text{2463}$$

$$\int \frac{10x^3+20x^2+(10x+5)\log(x^2)+e^{e^x}(2x^3+4x^2+(e^x(x^4+2x^3+2x^2+x)+2x+1)\log(x^2)+4x+2)+2}{3(x^2+x+1)^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\int \frac{10x^3+20x^2+20x+5(2x+1)\log(x^2)+e^{e^x}(2x^3+4x^2+4x+(2x+e^x(x^4+2x^3+2x^2+x)+1)\log(x^2)}{(x^2+x+1)^2}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{3}\int\left(\frac{2e^{e^x}x^3}{(x^2+x+1)^2}+\frac{10x^3}{(x^2+x+1)^2}+\frac{4e^{e^x}x^2}{(x^2+x+1)^2}+\frac{20x^2}{(x^2+x+1)^2}+\frac{e^{x+e^x}(x+1)\log(x^2)x}{x^2+x+1}+\frac{2e^{e^x}\log(x^2)}{(x^2+x+1)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(-\frac{10(x+2)x^2}{3(x^2+x+1)}-\frac{20\log(x^2)x}{3(1-i\sqrt{3})(2x-i\sqrt{3}+1)}+\frac{20\log(x^2)x}{3(2x-i\sqrt{3}+1)}-\frac{20\log(x^2)x}{3(1+i\sqrt{3})(2x+i\sqrt{3}+1)}+\frac{20\log}{3(2x+}\right.$$

input
```
Int[(10 + 20*x + 20*x^2 + 10*x^3 + (5 + 10*x)*Log[x^2] + E^E^x*(2 + 4*x +
4*x^2 + 2*x^3 + (1 + 2*x + E^x*(x + 2*x^2 + 2*x^3 + x^4))*Log[x^2]))/(3 +
6*x + 9*x^2 + 6*x^3 + 3*x^4),x]
```

output
```
$Aborted
```

3.124.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.124.4 Maple [A] (verified)

Time = 2.95 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.85

method	result
parallelrisch	$\frac{2\ln\left(x^2\right)\mathrm{e}^{\mathrm{e}^x}x^2+10x^2\ln\left(x^2\right)+2\ln\left(x^2\right)\mathrm{e}^{\mathrm{e}^x}x+10x\ln\left(x^2\right)}{6x^2+6x+6}$
risch	$-\frac{10\ln(x)}{3(x^2+x+1)}+\frac{\frac{5i\pi\ \mathrm{csgn}\left(ix^2\right)\mathrm{csgn}(ix)^2}{6}-\frac{5i\pi\,\mathrm{csgn}\left(ix^2\right)^2\mathrm{csgn}(ix)}{3}+\frac{5i\pi\,\mathrm{csgn}\left(ix^2\right)^3}{6}+\frac{10x^2\ln(x)}{3}+\frac{10x\ln(x)}{3}+\frac{10\ln(x)}{3}}{x^2+x+1}+\frac{x\left(-i\pi x\right.}{}$

input
```
int(((((x^4+2*x^3+2*x^2+x)*exp(x)+2*x+1)*ln(x^2)+2*x^3+4*x^2+4*x+2)*exp(ex
p(x))+(10*x+5)*ln(x^2)+10*x^3+20*x^2+20*x+10)/(3*x^4+6*x^3+9*x^2+6*x+3),x,
method=_RETURNVERBOSE)
```

output
```
1/6*(2*ln(x^2)*exp(exp(x))*x^2+10*x^2*ln(x^2)+2*ln(x^2)*exp(exp(x))*x+10*x
*ln(x^2))/(x^2+x+1)
```

3.124.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

$$\int \frac{10+20x+20x^2+10x^3+(5+10x)\log(x^2)+e^{e^x}(2+4x+4x^2+2x^3+(1+2x+e^x(x+2x^2+2x^3+$$
$$\frac{}{3+6x+9x^2+6x^3+3x^4}$$
$$=\frac{(x^2+x)e^{(e^x)}\log(x^2)+5(x^2+x)\log(x^2)}{3(x^2+x+1)}$$

input
```
integrate(((((x^4+2*x^3+2*x^2+x)*exp(x)+2*x+1)*log(x^2)+2*x^3+4*x^2+4*x+2)
*exp(exp(x))+(10*x+5)*log(x^2)+10*x^3+20*x^2+20*x+10)/(3*x^4+6*x^3+9*x^2+6
*x+3),x, algorithm=\
```

output
```
1/3*((x^2 + x)*e^(e^x)*log(x^2) + 5*(x^2 + x)*log(x^2))/(x^2 + x + 1)
```

3.124.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(22) = 44.

Time = 0.17 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.96

$$\int \frac{10+20x+20x^2+10x^3+(5+10x)\log(x^2)+e^{e^x}(2+4x+4x^2+2x^3+(1+2x+e^x(x+2x^2+2x^3+$$
$$\frac{}{3+6x+9x^2+6x^3+3x^4}$$
$$=\frac{(x^2\log(x^2)+x\log(x^2))e^{e^x}}{3x^2+3x+3}+\frac{10\log(x)}{3}-\frac{5\log(x^2)}{3x^2+3x+3}$$

input
```
integrate(((((x**4+2*x**3+2*x**2+x)*exp(x)+2*x+1)*ln(x**2)+2*x**3+4*x**2+4
*x+2)*exp(exp(x))+(10*x+5)*ln(x**2)+10*x**3+20*x**2+20*x+10)/(3*x**4+6*x**
3+9*x**2+6*x+3),x)
```

output
```
(x**2*log(x**2) + x*log(x**2))*exp(exp(x))/(3*x**2 + 3*x + 3) + 10*log(x)/
3 - 5*log(x**2)/(3*x**2 + 3*x + 3)
```

3.124.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. 2(25) = 50.

Time = 0.32 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.70

$$\int \frac{10+20x+20x^2+10x^3+(5+10x)\log(x^2)+e^{e^x}(2+4x+4x^2+2x^3+(1+2x+e^x(x+2x^2+2x^3+}{3+6x+9x^2+6x^3+3x^4}$$

$$= \frac{2\left((x^2+x)e^{(e^x)}\log(x)+5(x^2+x)\log(x)\right)}{3(x^2+x+1)} + \frac{20(2x+1)}{9(x^2+x+1)} - \frac{20(x+2)}{9(x^2+x+1)} - \frac{20(x-1)}{9(x^2+x+1)}$$

input
```
integrate(((((x^4+2*x^3+2*x^2+x)*exp(x)+2*x+1)*log(x^2)+2*x^3+4*x^2+4*x+2)
*exp(exp(x))+(10*x+5)*log(x^2)+10*x^3+20*x^2+20*x+10)/(3*x^4+6*x^3+9*x^2+6
*x+3),x, algorithm=\
```

output
```
2/3*((x^2 + x)*e^(e^x)*log(x) + 5*(x^2 + x)*log(x))/(x^2 + x + 1) + 20/9*(
2*x + 1)/(x^2 + x + 1) - 20/9*(x + 2)/(x^2 + x + 1) - 20/9*(x - 1)/(x^2 +
x + 1)
```

3.124.8 Giac [F]

$$\int \frac{10+20x+20x^2+10x^3+(5+10x)\log(x^2)+e^{e^x}(2+4x+4x^2+2x^3+(1+2x+e^x(x+2x^2+2x^3+}{3+6x+9x^2+6x^3+3x^4}$$

$$= \int \frac{10x^3+20x^2+(2x^3+4x^2+((x^4+2x^3+2x^2+x)e^x+2x+1)\log(x^2)+4x+2)e^{(e^x)}+5(2x+1}{3(x^4+2x^3+3x^2+2x+1)}$$

input
```
integrate(((((x^4+2*x^3+2*x^2+x)*exp(x)+2*x+1)*log(x^2)+2*x^3+4*x^2+4*x+2)
*exp(exp(x))+(10*x+5)*log(x^2)+10*x^3+20*x^2+20*x+10)/(3*x^4+6*x^3+9*x^2+6
*x+3),x, algorithm=\
```

output
```
integrate(1/3*(10*x^3 + 20*x^2 + (2*x^3 + 4*x^2 + ((x^4 + 2*x^3 + 2*x^2 +
x)*e^x + 2*x + 1)*log(x^2) + 4*x + 2)*e^(e^x) + 5*(2*x + 1)*log(x^2) + 20*
x + 10)/(x^4 + 2*x^3 + 3*x^2 + 2*x + 1), x)
```

3.124.9 Mupad [F(-1)]

Timed out.

$$\int \frac{10+20x+20x^2+10x^3+(5+10x)\log(x^2)+e^{e^x}(2+4x+4x^2+2x^3+(1+2x+e^x(x+2x^2+2x^3+}{3+6x+9x^2+6x^3+3x^4}$$

$$=\int \frac{20\,x+\mathrm{e}^{\mathrm{e}^x}\,\left(4\,x+\ln\left(x^2\right)\,\left(2\,x+\mathrm{e}^x\,\left(x^4+2\,x^3+2\,x^2+x\right)+1\right)+4\,x^2+2\,x^3+2\right)+20\,x^2+10\,x^3+\ln(x}{3\,x^4+6\,x^3+9\,x^2+6\,x+3}$$

input
```
int((20*x + exp(exp(x))*(4*x + log(x^2)*(2*x + exp(x)*(x + 2*x^2 + 2*x^3 +
 x^4) + 1) + 4*x^2 + 2*x^3 + 2) + 20*x^2 + 10*x^3 + log(x^2)*(10*x + 5) +
10)/(6*x + 9*x^2 + 6*x^3 + 3*x^4 + 3),x)
```

output
```
int((20*x + exp(exp(x))*(4*x + log(x^2)*(2*x + exp(x)*(x + 2*x^2 + 2*x^3 +
 x^4) + 1) + 4*x^2 + 2*x^3 + 2) + 20*x^2 + 10*x^3 + log(x^2)*(10*x + 5) +
10)/(6*x + 9*x^2 + 6*x^3 + 3*x^4 + 3), x)
```

3.125 $\int \frac{4+26x+x^2+72x^6-72x^7+18x^8}{4x-4x^2+x^3} dx$

3.125.1 Optimal result

Integrand size = 38, antiderivative size = 25

$$\int \frac{4+26x+x^2+72x^6-72x^7+18x^8}{4x-4x^2+x^3} dx = -3\left(\frac{5x}{-2+x}-x^6+(3+\log(2))^2\right)+\log(x)$$

output
```
ln(x)-15*x/(-2+x)-3*(3+ln(2))^2+3*x^6
```

3.125.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{4+26x+x^2+72x^6-72x^7+18x^8}{4x-4x^2+x^3} dx = -\frac{30}{-2+x}+3x^6+\log(x)$$

input
```
Integrate[(4 + 26*x + x^2 + 72*x^6 - 72*x^7 + 18*x^8)/(4*x - 4*x^2 + x^3),
x]
```

output
```
-30/(-2 + x) + 3*x^6 + Log[x]
```

3.125.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.079, Rules used = {2026, 2159, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{18x^8-72x^7+72x^6+x^2+26x+4}{x^3-4x^2+4x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{18x^8-72x^7+72x^6+x^2+26x+4}{x\left(x^2-4x+4\right)}dx$$

$$\Big\downarrow \text{2159}$$

$$\int \left(18x^5+\frac{30}{(x-2)^2}+\frac{1}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$3x^6+\frac{30}{2-x}+\log(x)$$

input
```
Int[(4 + 26*x + x^2 + 72*x^6 - 72*x^7 + 18*x^8)/(4*x - 4*x^2 + x^3),x]
```

output
```
30/(2 - x) + 3*x^6 + Log[x]
```

3.125.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2159
```
Int[(Pq_)*((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p
_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*Pq*(a + b*x + c*x^2)^p, x
], x] /; FreeQ[{a, b, c, d, e, m}, x] && PolyQ[Pq, x] && IGtQ[p, -2]
```

3.125.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.64

method	result	size
default	$3x^6+\ln(x)-\frac{30}{-2+x}$	16
risch	$3x^6+\ln(x)-\frac{30}{-2+x}$	16
norman	$\frac{3x^7-6x^6-30}{-2+x}+\ln(x)$	22
parallelrisch	$\frac{3x^7-6x^6+x\ln(x)-30-2\ln(x)}{-2+x}$	27

input
```
int((18*x^8-72*x^7+72*x^6+x^2+26*x+4)/(x^3-4*x^2+4*x),x,method=_RETURNVERB
OSE)
```

output
```
3*x^6+ln(x)-30/(-2+x)
```

3.125.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{4+26x+x^2+72x^6-72x^7+18x^8}{4x-4x^2+x^3}\,dx=\frac{3\,x^7-6\,x^6+(x-2)\log(x)-30}{x-2}$$

input
```
integrate((18*x^8-72*x^7+72*x^6+x^2+26*x+4)/(x^3-4*x^2+4*x),x, algorithm=\
```

output
```
(3*x^7 - 6*x^6 + (x - 2)*log(x) - 30)/(x - 2)
```

3.125.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.48

$$\int \frac{4+26x+x^2+72x^6-72x^7+18x^8}{4x-4x^2+x^3}\,dx=3x^6+\log(x)-\frac{30}{x-2}$$

input
```
integrate((18*x**8-72*x**7+72*x**6+x**2+26*x+4)/(x**3-4*x**2+4*x),x)
```

output
```
3*x**6 + log(x) - 30/(x - 2)
```

3.125.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{4+26x+x^2+72x^6-72x^7+18x^8}{4x-4x^2+x^3}\,dx = 3\,x^6 - \frac{30}{x-2} + \log\left(x\right)$$

input
```
integrate((18*x^8-72*x^7+72*x^6+x^2+26*x+4)/(x^3-4*x^2+4*x),x, algorithm=\
```

output
```
3*x^6 - 30/(x - 2) + log(x)
```

3.125.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.64

$$\int \frac{4+26x+x^2+72x^6-72x^7+18x^8}{4x-4x^2+x^3}\,dx = 3\,x^6 - \frac{30}{x-2} + \log\left(|x|\right)$$

input
```
integrate((18*x^8-72*x^7+72*x^6+x^2+26*x+4)/(x^3-4*x^2+4*x),x, algorithm=\
```

output
```
3*x^6 - 30/(x - 2) + log(abs(x))
```

3.125.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{4+26x+x^2+72x^6-72x^7+18x^8}{4x-4x^2+x^3}\,dx = \ln\left(x\right) - \frac{30}{x-2} + 3\,x^6$$

input
```
int((26*x + x^2 + 72*x^6 - 72*x^7 + 18*x^8 + 4)/(4*x - 4*x^2 + x^3),x)
```

output
```
log(x) - 30/(x - 2) + 3*x^6
```

3.126 $\int \frac{2e^{4+x}+e^{4+x}x\log(x^2)}{x}\,dx$

3.126.1 Optimal result

Integrand size = 23, antiderivative size = 10

$$\int \frac{2e^{4+x}+e^{4+x}x\log(x^2)}{x}\,dx = e^{4+x}\log\left(x^2\right)$$

output
```
ln(x^2)*exp(4)*exp(x)
```

3.126.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{2e^{4+x}+e^{4+x}x\log(x^2)}{x}\,dx = e^{4+x}\log\left(x^2\right)$$

input
```
Integrate[(2*E^(4 + x) + E^(4 + x)*x*Log[x^2])/x,x]
```

output
```
E^(4 + x)*Log[x^2]
```

3.126.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+4}x\log(x^2)+2e^{x+4}}{x}\,dx$$
$$\Big\downarrow \text{ 2010}$$
$$\int \left(e^{x+4}\log(x^2)+\frac{2e^{x+4}}{x}\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$e^{x+4}\log(x^2)$$

input
```
Int[(2*E^(4 + x) + E^(4 + x)*x*Log[x^2])/x,x]
```

output
```
E^(4 + x)*Log[x^2]
```

3.126.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.126.4 Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

method	result	size
norman	$\ln(x^2)\,e^4 e^x$	10
parallelrisch	$\ln(x^2)\,e^4 e^x$	10
default	$e^4(\ln(x^2)-2\ln(x))\,e^x+2\,e^x e^4\ln(x)$	24
risch	$2\,e^{4+x}\ln(x)-\frac{i\left(\operatorname{csgn}(ix)^2-2\operatorname{csgn}(ix^2)\operatorname{csgn}(ix)+\operatorname{csgn}(ix^2)^2\right)\operatorname{csgn}(ix^2)\pi\,e^{4+x}}{2}$	56

input
```
int((x*exp(4)*exp(x)*ln(x^2)+2*exp(4)*exp(x))/x,x,method=_RETURNVERBOSE)
```

output
```
ln(x^2)*exp(4)*exp(x)
```

3.126.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.90

$$\int \frac{2e^{4+x}+e^{4+x}x\log(x^2)}{x}\,dx=e^{(x+4)}\log(x^2)$$

input
```
integrate((x*exp(4)*exp(x)*log(x^2)+2*exp(4)*exp(x))/x,x, algorithm=\
```

output
```
e^(x + 4)*log(x^2)
```

3.126.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{2e^{4+x}+e^{4+x}x\log(x^2)}{x}\,dx=e^4e^x\log(x^2)$$

input
```
integrate((x*exp(4)*exp(x)*ln(x**2)+2*exp(4)*exp(x))/x,x)
```

output
```
exp(4)*exp(x)*log(x**2)
```

3.126.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.90

$$\int \frac{2e^{4+x} + e^{4+x} x \log(x^2)}{x} \, dx = e^{(x+4)} \log(x^2)$$

input
```
integrate((x*exp(4)*exp(x)*log(x^2)+2*exp(4)*exp(x))/x,x, algorithm=\
```

output
```
e^(x + 4)*log(x^2)
```

3.126.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.90

$$\int \frac{2e^{4+x} + e^{4+x} x \log(x^2)}{x} \, dx = e^{(x+4)} \log(x^2)$$

input
```
integrate((x*exp(4)*exp(x)*log(x^2)+2*exp(4)*exp(x))/x,x, algorithm=\
```

output
```
e^(x + 4)*log(x^2)
```

3.126.9 Mupad [B] (verification not implemented)

Time = 14.43 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.90

$$\int \frac{2e^{4+x} + e^{4+x} x \log(x^2)}{x} \, dx = \ln(x^2) \, e^4 \, e^x$$

input
```
int((2*exp(4)*exp(x) + x*log(x^2)*exp(4)*exp(x))/x,x)
```

output
```
log(x^2)*exp(4)*exp(x)
```

3.127 $\int \frac{-1+(16+12x-4x^2+e^4(8+6x-2x^2))\log(4-x)+(-8-6x+2x^2)\log(4-x)\log(\log(4-x))}{(8+e^4(4-x)-2x)\log(4-x)+(-4+x)\log(4-x)\log(\log(4-x))}$

3.127.1 Optimal result

Integrand size = 99, antiderivative size = 25

$$\int \frac{-1+(16+12x-4x^2+e^4(8+6x-2x^2))\log(4-x)+(-8-6x+2x^2)\log(4-x)\log(\log(4-x))}{(8+e^4(4-x)-2x)\log(4-x)+(-4+x)\log(4-x)\log(\log(4-x))}\,dx$$
$$= -5+2x+x^2-\log\left(2+e^4-\log(\log(4-x))\right)$$

output
```
2*x-5-ln(2-ln(ln(-x+4))+exp(4))+x^2
```

3.127.2 Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{-1+(16+12x-4x^2+e^4(8+6x-2x^2))\log(4-x)+(-8-6x+2x^2)\log(4-x)\log(\log(4-x))}{(8+e^4(4-x)-2x)\log(4-x)+(-4+x)\log(4-x)\log(\log(4-x))}\,dx$$
$$= 2x+x^2-\log\left(2+e^4-\log(\log(4-x))\right)$$

input
```
Integrate[(-1 + (16 + 12*x - 4*x^2 + E^4*(8 + 6*x - 2*x^2))*Log[4 - x] + (
-8 - 6*x + 2*x^2)*Log[4 - x]*Log[Log[4 - x]])/((8 + E^4*(4 - x) - 2*x)*Log
[4 - x] + (-4 + x)*Log[4 - x]*Log[Log[4 - x]]),x]
```

output
```
2*x + x^2 - Log[2 + E^4 - Log[Log[4 - x]]]
```

3.127.3 Rubi [A] (verified)

Time = 0.53 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.030$, Rules used = {7239, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-4x^2+e^4(-2x^2+6x+8)+12x+16)\log(4-x)+(2x^2-6x-8)\log(\log(4-x))\log(4-x)-1}{(e^4(4-x)-2x+8)\log(4-x)+(x-4)\log(\log(4-x))\log(4-x)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-2x^2+6x-\frac{1}{\log(4-x)(-\log(\log(4-x))+e^4+2)}+8}{4-x}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(2(x+1)+\frac{1}{(x-4)\log(4-x)\left(2\left(1+\frac{e^4}{2}\right)-\log(\log(4-x))\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$(x+1)^2-\log\left(-\log(\log(4-x))+e^4+2\right)$$

input
```
Int[(-1 + (16 + 12*x - 4*x^2 + E^4*(8 + 6*x - 2*x^2))*Log[4 - x] + (-8 - 6
*x + 2*x^2)*Log[4 - x]*Log[Log[4 - x]])/((8 + E^4*(4 - x) - 2*x)*Log[4 - x
] + (-4 + x)*Log[4 - x]*Log[Log[4 - x]]),x]
```

output
```
(1 + x)^2 - Log[2 + E^4 - Log[Log[4 - x]]]
```

3.127.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.127.4 Maple [A] (verified)

Time = 1.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

method	result	size
default	$2x - \ln(2 - \ln(\ln(-x+4)) + e^4) + x^2$	24
norman	$2x - \ln(2 - \ln(\ln(-x+4)) + e^4) + x^2$	24
risch	$x^2 + 2x - \ln(-e^4 + \ln(\ln(-x+4)) - 2)$	24
parallelrisch	$x^2 + 2x - \ln(-e^4 + \ln(\ln(-x+4)) - 2)$	24
parts	$2x - \ln(2 - \ln(\ln(-x+4)) + e^4) + x^2$	24

input
```
int(((2*x^2-6*x-8)*ln(-x+4)*ln(ln(-x+4))+((-2*x^2+6*x+8)*exp(4)-4*x^2+12*x
+16)*ln(-x+4)-1)/((x-4)*ln(-x+4)*ln(ln(-x+4))+((-x+4)*exp(4)-2*x+8)*ln(-x+
4)),x,method=_RETURNVERBOSE)
```

output
```
2*x-ln(2-ln(ln(-x+4))+exp(4))+x^2
```

3.127.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-1+(16+12x-4x^2+e^4(8+6x-2x^2))\log(4-x)+(-8-6x+2x^2)\log(4-x)\log(\log(4-x))}{(8+e^4(4-x)-2x)\log(4-x)+(-4+x)\log(4-x)\log(\log(4-x))}\,dx$$
$$= x^2 + 2\,x - \log\left(-e^4 + \log\left(\log\left(-x+4\right)\right) - 2\right)$$

input
```
integrate(((2*x^2-6*x-8)*log(-x+4)*log(log(-x+4))+((-2*x^2+6*x+8)*exp(4)-4
*x^2+12*x+16)*log(-x+4)-1)/((x-4)*log(-x+4)*log(log(-x+4))+((-x+4)*exp(4)-
2*x+8)*log(-x+4)),x, algorithm=\
```

output
```
x^2 + 2*x - log(-e^4 + log(log(-x + 4)) - 2)
```

3.127.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{-1+(16+12x-4x^2+e^4(8+6x-2x^2))\log(4-x)+(-8-6x+2x^2)\log(4-x)\log(\log(4-x))}{(8+e^4(4-x)-2x)\log(4-x)+(-4+x)\log(4-x)\log(\log(4-x))}\,dx$$
$$= x^2+2x-\log\left(\log\left(\log\left(4-x\right)\right)-e^4-2\right)$$

input
```
integrate(((2*x**2-6*x-8)*ln(-x+4)*ln(ln(-x+4))+((-2*x**2+6*x+8)*exp(4)-4*
x**2+12*x+16)*ln(-x+4)-1)/((x-4)*ln(-x+4)*ln(ln(-x+4))+((-x+4)*exp(4)-2*x+
8)*ln(-x+4)),x)
```

output
```
x**2 + 2*x - log(log(log(4 - x)) - exp(4) - 2)
```

3.127.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.30 (sec) , antiderivative size = 173, normalized size of antiderivative = 6.92

$$\int \frac{-1+(16+12x-4x^2+e^4(8+6x-2x^2))\log(4-x)+(-8-6x+2x^2)\log(4-x)\log(\log(4-x))}{(8+e^4(4-x)-2x)\log(4-x)+(-4+x)\log(4-x)\log(\log(4-x))}\,dx$$
$$\begin{aligned}&= 8\,e^4\log\left(-x+4\right)\log\left(-e^4+\log\left(\log\left(-x+4\right)\right)-2\right)\\&\quad+8\,e^{\left(e^4+2\right)}E_1\left(e^4-\log\left(\log\left(-x+4\right)\right)+2\right)\log\left(\log\left(-x+4\right)\right)+x^2\\&\quad-8\left(e^{\left(e^4+2\right)}E_1\left(e^4-\log\left(\log\left(-x+4\right)\right)+2\right)+\log\left(-x+4\right)\log\left(-e^4+\log\left(\log\left(-x+4\right)\right)-2\right)\right)e^4\\&\quad-8\,e^{\left(e^4+2\right)}E_2\left(e^4-\log\left(\log\left(-x+4\right)\right)+2\right)-16\,e^{\left(e^4+2\right)}E_1\left(e^4-\log\left(\log\left(-x+4\right)\right)+2\right)\\&\quad+2\,x+8\,\log\left(x-4\right)-\log\left(-e^4+\log\left(\log\left(-x+4\right)\right)-2\right)\end{aligned}$$

input
```
integrate(((2*x^2-6*x-8)*log(-x+4)*log(log(-x+4))+((-2*x^2+6*x+8)*exp(4)-4
*x^2+12*x+16)*log(-x+4)-1)/((x-4)*log(-x+4)*log(log(-x+4))+((-x+4)*exp(4)-
2*x+8)*log(-x+4)),x, algorithm=\
```

output
```
8*e^4*log(-x + 4)*log(-e^4 + log(log(-x + 4)) - 2) + 8*e^(e^4 + 2)*exp_int
egral_e(1, e^4 - log(log(-x + 4)) + 2)*log(log(-x + 4)) + x^2 - 8*(e^(e^4
+ 2)*exp_integral_e(1, e^4 - log(log(-x + 4)) + 2) + log(-x + 4)*log(-e^4
+ log(log(-x + 4)) - 2))*e^4 - 8*e^(e^4 + 2)*exp_integral_e(2, e^4 - log(l
og(-x + 4)) + 2) - 16*e^(e^4 + 2)*exp_integral_e(1, e^4 - log(log(-x + 4))
 + 2) + 2*x + 8*log(x - 4) - log(-e^4 + log(log(-x + 4)) - 2)
```

3.127.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-1+(16+12x-4x^2+e^4(8+6x-2x^2))\log(4-x)+(-8-6x+2x^2)\log(4-x)\log(\log(4-x))}{(8+e^4(4-x)-2x)\log(4-x)+(-4+x)\log(4-x)\log(\log(4-x))}\,dx$$
$$=x^2+2\,x-\log\left(-e^4+\log\left(\log\left(-x+4\right)\right)-2\right)$$

input
```
integrate(((2*x^2-6*x-8)*log(-x+4)*log(log(-x+4))+((-2*x^2+6*x+8)*exp(4)-4
*x^2+12*x+16)*log(-x+4)-1)/((x-4)*log(-x+4)*log(log(-x+4))+((-x+4)*exp(4)-
2*x+8)*log(-x+4)),x, algorithm=\
```

output
```
x^2 + 2*x - log(-e^4 + log(log(-x + 4)) - 2)
```

3.127.9 Mupad [B] (verification not implemented)

Time = 15.75 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-1+(16+12x-4x^2+e^4(8+6x-2x^2))\log(4-x)+(-8-6x+2x^2)\log(4-x)\log(\log(4-x))}{(8+e^4(4-x)-2x)\log(4-x)+(-4+x)\log(4-x)\log(\log(4-x))}\,dx$$
$$=2\,x-\ln\left(\ln\left(\ln\left(4-x\right)\right)-\mathrm{e}^4-2\right)+x^2$$

input
```
int((log(log(4 - x))*log(4 - x)*(6*x - 2*x^2 + 8) - log(4 - x)*(12*x + exp
(4)*(6*x - 2*x^2 + 8) - 4*x^2 + 16) + 1)/(log(4 - x)*(2*x + exp(4)*(x - 4)
 - 8) - log(log(4 - x))*log(4 - x)*(x - 4)),x)
```

output
```
2*x - log(log(log(4 - x)) - exp(4) - 2) + x^2
```

3.128 $\int \frac{e^{\frac{2}{5}(7-5x+5\log(\log(5)))}(-1-2x)+e^{\frac{1}{5}(7-5x+5\log(\log(5)))}(2+2x)\log(4)-\log^2(4)}{x^2}\,dx$

3.128.1 Optimal result

Integrand size = 57, antiderivative size = 26

$$\int \frac{e^{\frac{2}{5}(7-5x+5\log(\log(5)))}(-1-2x)+e^{\frac{1}{5}(7-5x+5\log(\log(5)))}(2+2x)\log(4)-\log^2(4)}{x^2}\,dx = \frac{-2x+\left(\log(4)-e^{\frac{7}{5}-x}\log(5)\right)^2}{x}$$

output
```
((2*ln(2)-exp(ln(ln(5))+7/5-x))^2-2*x)/x
```

3.128.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.65

$$\int \frac{e^{\frac{2}{5}(7-5x+5\log(\log(5)))}(-1-2x)+e^{\frac{1}{5}(7-5x+5\log(\log(5)))}(2+2x)\log(4)-\log^2(4)}{x^2}\,dx = \frac{2\log^2(4)+e^{\frac{14}{5}-2x}\log(5)\log(25)-e^{\frac{7}{5}-x}\log(16)\log(25)}{2x}$$

input
```
Integrate[(E^((2*(7 - 5*x + 5*Log[Log[5]]))/5)*(-1 - 2*x) + E^((7 - 5*x +
5*Log[Log[5]])/5)*(2 + 2*x)*Log[4] - Log[4]^2)/x^2,x]
```

output
```
(2*Log[4]^2 + E^(14/5 - 2*x)*Log[5]*Log[25] - E^(7/5 - x)*Log[16]*Log[25])
/(2*x)
```

3.128.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.69, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.035, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-2x-1)e^{\frac{2}{5}(-5x+7+5\log(\log(5)))}+(2x+2)\log(4)e^{\frac{1}{5}(-5x+7+5\log(\log(5)))}-\log^2(4)}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-\frac{e^{\frac{14}{5}-2x}(2x+1)\log^2(5)}{x^2}-\frac{\log^2(4)}{x^2}+\frac{2e^{\frac{7}{5}-x}(x+1)\log(4)\log(5)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^{\frac{14}{5}-2x}\log^2(5)}{x}+\frac{\log^2(4)}{x}-\frac{2e^{\frac{7}{5}-x}\log(4)\log(5)}{x}$$

input
```
Int[(E^((2*(7 - 5*x + 5*Log[Log[5]]))/5)*(-1 - 2*x) + E^((7 - 5*x + 5*Log[
Log[5]])/5)*(2 + 2*x)*Log[4] - Log[4]^2)/x^2,x]
```

output
```
Log[4]^2/x - (2*E^(7/5 - x)*Log[4]*Log[5])/x + (E^(14/5 - 2*x)*Log[5]^2)/x
```

3.128.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.128.4 Maple [A] (verified)

Time = 0.60 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

method	result
norman	$\frac{\ln(5)^2 e^{\frac{14}{5}-2x}+4\ln(2)^2-4\ln(2)e^{\ln(\ln(5))+\frac{7}{5}-x}}{x}$
parallelrisch	$\frac{\ln(5)^2 e^{\frac{14}{5}-2x}+4\ln(2)^2-4\ln(2)e^{\ln(\ln(5))+\frac{7}{5}-x}}{x}$
risch	$\frac{4\ln(2)^2}{x}+\frac{\ln(5)^2 e^{\frac{14}{5}-2x}}{x}-\frac{4\ln(2)\ln(5)e^{\frac{7}{5}-x}}{x}$
parts	$\frac{4\ln(2)^2}{x}+\frac{\ln(5)^2 e^{\frac{14}{5}-2x}}{x}-\frac{4\ln(2)e^{\ln(\ln(5))+\frac{7}{5}-x}}{x}$
derivativedivides	$\frac{19\ln(5)^2 e^{\frac{14}{5}-2x}}{5x}-\frac{28 e^{\frac{14}{5}+2\ln(\ln(5))}\mathrm{Ei}_1(2x)}{5}+\frac{4\ln(2)^2}{x}-10(5\ln(\ln(5))+7)\left(\frac{\ln(5)^2 e^{\frac{14}{5}-2x}}{25x}-\frac{2e^{\frac{14}{5}+}}{}\right.$
default	$\frac{19\ln(5)^2 e^{\frac{14}{5}-2x}}{5x}-\frac{28 e^{\frac{14}{5}+2\ln(\ln(5))}\mathrm{Ei}_1(2x)}{5}+\frac{4\ln(2)^2}{x}-10(5\ln(\ln(5))+7)\left(\frac{\ln(5)^2 e^{\frac{14}{5}-2x}}{25x}-\frac{2e^{\frac{14}{5}+}}{}\right.$

input
```
int(((-1-2*x)*exp(ln(ln(5))+7/5-x)^2+2*(2+2*x)*ln(2)*exp(ln(ln(5))+7/5-x)-
4*ln(2)^2)/x^2,x,method=_RETURNVERBOSE)
```

output
```
(exp(ln(ln(5))+7/5-x)^2+4*ln(2)^2-4*ln(2)*exp(ln(ln(5))+7/5-x))/x
```

3.128.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.46

$$\int \frac{e^{\frac{2}{5}(7-5x+5\log(\log(5)))}(-1-2x)+e^{\frac{1}{5}(7-5x+5\log(\log(5)))}(2+2x)\log(4)-\log^2(4)}{x^2}\,dx = -\frac{4\,e^{\left(-x+\log(\log(5))+\frac{7}{5}\right)}\log(2)-4\,\log(2)^2-e^{\left(-2\,x+2\,\log(\log(5))+\frac{14}{5}\right)}}{x}$$

input
```
integrate(((-1-2*x)*exp(log(log(5))+7/5-x)^2+2*(2+2*x)*log(2)*exp(log(log(
5))+7/5-x)-4*log(2)^2)/x^2,x, algorithm=\
```

output
```
-(4*e^(-x + log(log(5)) + 7/5)*log(2) - 4*log(2)^2 - e^(-2*x + 2*log(log(5
)) + 14/5))/x
```

3.128.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. 2(20) = 40.

Time = 0.08 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.62

$$\int \frac{e^{\frac{2}{5}(7-5x+5\log(\log(5)))}(-1-2x)+e^{\frac{1}{5}(7-5x+5\log(\log(5)))}(2+2x)\log(4)-\log^2(4)}{x^2}\,dx = \frac{4\log(2)^2}{x}+\frac{-4xe^{\frac{7}{5}-x}\log(2)\log(5)+xe^{\frac{14}{5}-2x}\log(5)^2}{x^2}$$

input
```
integrate(((-1-2*x)*exp(ln(ln(5))+7/5-x)**2+2*(2+2*x)*ln(2)*exp(ln(ln(5))+
7/5-x)-4*ln(2)**2)/x**2,x)
```

output
```
4*log(2)**2/x + (-4*x*exp(7/5 - x)*log(2)*log(5) + x*exp(14/5 - 2*x)*log(5
)**2)/x**2
```

3.128.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.23

$$\int \frac{e^{\frac{2}{5}(7-5x+5\log(\log(5)))}(-1-2x)+e^{\frac{1}{5}(7-5x+5\log(\log(5)))}(2+2x)\log(4)-\log^2(4)}{x^2}\,dx = -2\,\mathrm{Ei}(-2\,x)\,e^{\frac{14}{5}}\log(5)^2+2\,e^{\frac{14}{5}}\Gamma(-1,2\,x)\log(5)^2 + 4\,\mathrm{Ei}(-x)\,e^{\frac{7}{5}}\log(5)\log(2)-4\,e^{\frac{7}{5}}\Gamma(-1,x)\log(5)\log(2)+\frac{4\,\log(2)^2}{x}$$

input
```
integrate(((-1-2*x)*exp(log(log(5))+7/5-x)^2+2*(2+2*x)*log(2)*exp(log(log(
5))+7/5-x)-4*log(2)^2)/x^2,x, algorithm=\
```

output
```
-2*Ei(-2*x)*e^(14/5)*log(5)^2 + 2*e^(14/5)*gamma(-1, 2*x)*log(5)^2 + 4*Ei(
-x)*e^(7/5)*log(5)*log(2) - 4*e^(7/5)*gamma(-1, x)*log(5)*log(2) + 4*log(2
)^2/x
```

3.128.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.46

$$\int \frac{e^{\frac{2}{5}(7-5x+5\log(\log(5)))}(-1-2x)+e^{\frac{1}{5}(7-5x+5\log(\log(5)))}(2+2x)\log(4)-\log^2(4)}{x^2}\,dx$$
$$= -\frac{4\,e^{\left(-x+\log(\log(5))+\frac{7}{5}\right)}\log(2)-4\,\log(2)^2-e^{\left(-2\,x+2\,\log(\log(5))+\frac{14}{5}\right)}}{x}$$

input
```
integrate(((-1-2*x)*exp(log(log(5))+7/5-x)^2+2*(2+2*x)*log(2)*exp(log(log(
5))+7/5-x)-4*log(2)^2)/x^2,x, algorithm=\
```

output
```
-(4*e^(-x + log(log(5)) + 7/5)*log(2) - 4*log(2)^2 - e^(-2*x + 2*log(log(5
)) + 14/5))/x
```

3.128.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{e^{\frac{2}{5}(7-5x+5\log(\log(5)))}(-1-2x)+e^{\frac{1}{5}(7-5x+5\log(\log(5)))}(2+2x)\log(4)-\log^2(4)}{x^2}\,dx$$
$$= \frac{e^{-2\,x}\left(e^{7/5}\,\ln(5)-2\,e^{x}\,\ln(2)\right)^2}{x}$$

input
```
int(-(exp(2*log(log(5)) - 2*x + 14/5)*(2*x + 1) + 4*log(2)^2 - 2*exp(log(l
og(5)) - x + 7/5)*log(2)*(2*x + 2))/x^2,x)
```

output
```
(exp(-2*x)*(exp(7/5)*log(5) - 2*exp(x)*log(2))^2)/x
```

3.129 $\int \frac{2-2x+2e^{x^2}x\log(4)}{\log(4)}\,dx$

3.129.1 Optimal result

Integrand size = 20, antiderivative size = 16

$$\int \frac{2-2x+2e^{x^2}x\log(4)}{\log(4)}\,dx = e^{x^2}-\frac{(-2+x)x}{\log(4)}$$

output
```
exp(x^2)-1/2*x*(-2+x)/ln(2)
```

3.129.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.56

$$\int \frac{2-2x+2e^{x^2}x\log(4)}{\log(4)}\,dx = \frac{2x-x^2+\frac{1}{2}e^{x^2}\log(16)}{\log(4)}$$

input
```
Integrate[(2 - 2*x + 2*E^x^2*x*Log[4])/Log[4],x]
```

output
```
(2*x - x^2 + (E^x^2*Log[16])/2)/Log[4]
```

3.129.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.38, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2e^{x^2}x\log(4)-2x+2}{\log(4)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \left(2e^{x^2}\log(4)x-2x+2\right)dx}{\log(4)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{-x^2+e^{x^2}\log(4)+2x}{\log(4)}$$

input
```
Int[(2 - 2*x + 2*E^x^2*x*Log[4])/Log[4],x]
```

output
```
(2*x - x^2 + E^x^2*Log[4])/Log[4]
```

3.129.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.129.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.25

method	result	size
default	$\frac{x-\frac{x^2}{2}+\ln(2)e^{x^2}}{\ln(2)}$	20
norman	$\frac{x}{\ln(2)}-\frac{x^2}{2\ln(2)}+e^{x^2}$	21
risch	$\frac{x}{\ln(2)}-\frac{x^2}{2\ln(2)}+e^{x^2}$	21
parts	$-\frac{\frac{1}{2}x^2-x}{\ln(2)}+e^{x^2}$	21
parallelrisch	$\frac{2\ln(2)e^{x^2}-x^2+2x}{2\ln(2)}$	24

input
```
int(1/2*(4*x*ln(2)*exp(x^2)-2*x+2)/ln(2),x,method=_RETURNVERBOSE)
```

output
```
1/ln(2)*(x-1/2*x^2+ln(2)*exp(x^2))
```

3.129.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.31

$$\int \frac{2-2x+2e^{x^2}x\log(4)}{\log(4)}\,dx=-\frac{x^2-2\,e^{(x^2)}\log(2)-2\,x}{2\,\log(2)}$$

input
```
integrate(1/2*(4*x*log(2)*exp(x^2)-2*x+2)/log(2),x, algorithm=\
```

output
```
-1/2*(x^2 - 2*e^(x^2)*log(2) - 2*x)/log(2)
```

3.129.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{2-2x+2e^{x^2}x\log(4)}{\log(4)}\,dx=-\frac{x^2}{2\log(2)}+\frac{x}{\log(2)}+e^{x^2}$$

input
```
integrate(1/2*(4*x*ln(2)*exp(x**2)-2*x+2)/ln(2),x)
```

output
```
-x**2/(2*log(2)) + x/log(2) + exp(x**2)
```

3.129.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.31

$$\int \frac{2-2x+2e^{x^2}x\log(4)}{\log(4)}\,dx = -\frac{x^2-2\,e^{(x^2)}\log(2)-2\,x}{2\,\log(2)}$$

input
```
integrate(1/2*(4*x*log(2)*exp(x^2)-2*x+2)/log(2),x, algorithm=\
```

output
```
-1/2*(x^2 - 2*e^(x^2)*log(2) - 2*x)/log(2)
```

3.129.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.31

$$\int \frac{2-2x+2e^{x^2}x\log(4)}{\log(4)}\,dx = -\frac{x^2-2\,e^{(x^2)}\log(2)-2\,x}{2\,\log(2)}$$

input
```
integrate(1/2*(4*x*log(2)*exp(x^2)-2*x+2)/log(2),x, algorithm=\
```

output
```
-1/2*(x^2 - 2*e^(x^2)*log(2) - 2*x)/log(2)
```

3.129.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.44

$$\int \frac{2-2x+2e^{x^2}x\log(4)}{\log(4)}\,dx = \frac{2\,x+2\,e^{x^2}\,\ln(2)-x^2}{2\,\ln(2)}$$

input
```
int((2*x*exp(x^2)*log(2) - x + 1)/log(2),x)
```

output
```
(2*x + 2*exp(x^2)*log(2) - x^2)/(2*log(2))
```

3.130 $\int e^{-5x+x^2}(-240-272x+160x^2+e^x(88+96x-80$

3.130.1 Optimal result

Integrand size = 50, antiderivative size = 24

$$\int e^{-5x+x^2}\left(-240-272x+160x^2+e^x\left(88+96x-80x^2\right)+e^{2x}\left(-7-7x+10x^2\right)\right)\,dx$$
$$=e^{-5x+x^2}\left(4-e^x\right)^2\left(4+5x\right)$$

output
```
(-exp(x)+4)^2*exp(x^2-5*x)*(4+5*x)
```

3.130.2 Mathematica [A] (verified)

Time = 1.23 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int e^{-5x+x^2}\left(-240-272x+160x^2+e^x\left(88+96x-80x^2\right)+e^{2x}\left(-7-7x+10x^2\right)\right)\,dx$$
$$=e^{(-5+x)x}\left(-4+e^x\right)^2\left(4+5x\right)$$

input
```
Integrate[E^(-5*x + x^2)*(-240 - 272*x + 160*x^2 + E^x*(88 + 96*x - 80*x^2
) + E^(2*x)*(-7 - 7*x + 10*x^2)),x]
```

output
```
E^((-5 + x)*x)*(-4 + E^x)^2*(4 + 5*x)
```

3.130.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 70 vs. $2(24) = 48$.

Time = 1.26 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.92, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.060$, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{x^2-5x}\left(160x^2+e^x\left(-80x^2+96x+88\right)+e^{2x}\left(10x^2-7x-7\right)-272x-240\right)dx$$

$$\Big\downarrow \text{7292}$$

$$\int e^{x^2-5x}(4-e^x)\left(-10e^x x^2+40x^2+7e^x x-68x+7e^x-60\right)dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(16e^{x^2-5x}\left(10x^2-17x-15\right)-8e^{x^2-4x}\left(10x^2-12x-11\right)+e^{x^2-3x}\left(10x^2-7x-7\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$80e^{x^2-5x}x-40e^{x^2-4x}x+5e^{x^2-3x}x+64e^{x^2-5x}-32e^{x^2-4x}+4e^{x^2-3x}$$

input
```
Int[E^(-5*x + x^2)*(-240 - 272*x + 160*x^2 + E^x*(88 + 96*x - 80*x^2) + E^
(2*x)*(-7 - 7*x + 10*x^2)),x]
```

output
```
64*E^(-5*x + x^2) - 32*E^(-4*x + x^2) + 4*E^(-3*x + x^2) + 80*E^(-5*x + x^
2)*x - 40*E^(-4*x + x^2)*x + 5*E^(-3*x + x^2)*x
```

3.130.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.130.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

method	result	size
risch	$\left(5x\,{\mathrm e}^{2x}-40\,{\mathrm e}^{x} x+4\,{\mathrm e}^{2x}+80x-32\,{\mathrm e}^{x}+64\right) {\mathrm e}^{\left(-5+x\right) x}$	35
default	$64\,{\mathrm e}^{x^{2}-5x}+80x\,{\mathrm e}^{x^{2}-5x}-32\,{\mathrm e}^{x^{2}-4x}-40x\,{\mathrm e}^{x^{2}-4x}+4\,{\mathrm e}^{x^{2}-3x}+5x\,{\mathrm e}^{x^{2}-3x}$	65
parts	$64\,{\mathrm e}^{x^{2}-5x}+80x\,{\mathrm e}^{x^{2}-5x}-32\,{\mathrm e}^{x^{2}-4x}-40x\,{\mathrm e}^{x^{2}-4x}+4\,{\mathrm e}^{x^{2}-3x}+5x\,{\mathrm e}^{x^{2}-3x}$	65
norman	$80x\,{\mathrm e}^{x^{2}-5x}-32\,{\mathrm e}^{x} {\mathrm e}^{x^{2}-5x}+4\,{\mathrm e}^{2x} {\mathrm e}^{x^{2}-5x}+5x\,{\mathrm e}^{2x} {\mathrm e}^{x^{2}-5x}-40\,{\mathrm e}^{x} x\,{\mathrm e}^{x^{2}-5x}+64\,{\mathrm e}^{x^{2}-5x}$	77
parallelrisch	$80x\,{\mathrm e}^{x^{2}-5x}-32\,{\mathrm e}^{x} {\mathrm e}^{x^{2}-5x}+4\,{\mathrm e}^{2x} {\mathrm e}^{x^{2}-5x}+5x\,{\mathrm e}^{2x} {\mathrm e}^{x^{2}-5x}-40\,{\mathrm e}^{x} x\,{\mathrm e}^{x^{2}-5x}+64\,{\mathrm e}^{x^{2}-5x}$	77

input
```
int(((10*x^2-7*x-7)*exp(x)^2+(-80*x^2+96*x+88)*exp(x)+160*x^2-272*x-240)*e
xp(x^2-5*x),x,method=_RETURNVERBOSE)
```

output
```
(5*x*exp(2*x)-40*exp(x)*x+4*exp(2*x)+80*x-32*exp(x)+64)*exp((-5+x)*x)
```

3.130.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.38

$$\int e^{-5x+x^2}\left(-240-272x+160x^2+e^x\left(88+96x-80x^2\right)+e^{2x}\left(-7-7x+10x^2\right)\right)\,dx = \left((5\,x+4)e^{(2\,x)}-8\,(5\,x+4)e^{x}+80\,x+64\right)e^{(x^2-5\,x)}$$

input
```
integrate(((10*x^2-7*x-7)*exp(x)^2+(-80*x^2+96*x+88)*exp(x)+160*x^2-272*x-
240)*exp(x^2-5*x),x, algorithm=\
```

output
```
((5*x + 4)*e^(2*x) - 8*(5*x + 4)*e^x + 80*x + 64)*e^(x^2 - 5*x)
```

3.130.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(19) = 38.

Time = 0.12 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int e^{-5x+x^2}\left(-240-272x+160x^2+e^x\left(88+96x-80x^2\right)+e^{2x}\left(-7-7x+10x^2\right)\right)\,dx$$
$$=\left(5xe^{2x}-40xe^x+80x+4e^{2x}-32e^x+64\right)e^{x^2-5x}$$

input
```
integrate(((10*x**2-7*x-7)*exp(x)**2+(-80*x**2+96*x+88)*exp(x)+160*x**2-27
2*x-240)*exp(x**2-5*x),x)
```

output
```
(5*x*exp(2*x) - 40*x*exp(x) + 80*x + 4*exp(2*x) - 32*exp(x) + 64)*exp(x**2
 - 5*x)
```

3.130.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.28 (sec) , antiderivative size = 424, normalized size of antiderivative = 17.67

$$\int e^{-5x+x^2}\left(-240-272x+160x^2+e^x\left(88+96x-80x^2\right)+e^{2x}\left(-7-7x+10x^2\right)\right)\,dx$$
$$=\text{Too large to display}$$

input
```
integrate(((10*x^2-7*x-7)*exp(x)^2+(-80*x^2+96*x+88)*exp(x)+160*x^2-272*x-
240)*exp(x^2-5*x),x, algorithm=\
```

output
```
7/2*I*sqrt(pi)*erf(I*x - 3/2*I)*e^(-9/4) - 44*I*sqrt(pi)*erf(I*x - 2*I)*e^
(-4) + 120*I*sqrt(pi)*erf(I*x - 5/2*I)*e^(-25/4) - 5/4*(4*(2*x - 3)^3*gamm
a(3/2, -1/4*(2*x - 3)^2)/(-(2*x - 3)^2)^(3/2) - 9*sqrt(pi)*(2*x - 3)*(erf(
1/2*sqrt(-(2*x - 3)^2)) - 1)/sqrt(-(2*x - 3)^2) - 12*e^(1/4*(2*x - 3)^2))*
e^(-9/4) - 7/4*(3*sqrt(pi)*(2*x - 3)*(erf(1/2*sqrt(-(2*x - 3)^2)) - 1)/sqr
t(-(2*x - 3)^2) + 2*e^(1/4*(2*x - 3)^2))*e^(-9/4) + 40*((x - 2)^3*gamma(3/
2, -(x - 2)^2)/(-(x - 2)^2)^(3/2) - 4*sqrt(pi)*(x - 2)*(erf(sqrt(-(x - 2)^
2)) - 1)/sqrt(-(x - 2)^2) - 4*e^((x - 2)^2))*e^(-4) + 48*(2*sqrt(pi)*(x -
2)*(erf(sqrt(-(x - 2)^2)) - 1)/sqrt(-(x - 2)^2) + e^((x - 2)^2))*e^(-4) -
20*(4*(2*x - 5)^3*gamma(3/2, -1/4*(2*x - 5)^2)/(-(2*x - 5)^2)^(3/2) - 25*s
qrt(pi)*(2*x - 5)*(erf(1/2*sqrt(-(2*x - 5)^2)) - 1)/sqrt(-(2*x - 5)^2) - 2
0*e^(1/4*(2*x - 5)^2))*e^(-25/4) - 68*(5*sqrt(pi)*(2*x - 5)*(erf(1/2*sqrt(
-(2*x - 5)^2)) - 1)/sqrt(-(2*x - 5)^2) + 2*e^(1/4*(2*x - 5)^2))*e^(-25/4)
```

3.130.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(20) = 40.

Time = 0.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.88

$$\int e^{-5x+x^2}\left(-240-272x+160x^2+e^x\left(88+96x-80x^2\right)+e^{2x}\left(-7-7x+10x^2\right)\right)\,dx$$
$$=(5\,x+4)e^{\left(x^2-3\,x\right)}-8\,(5\,x+4)e^{\left(x^2-4\,x\right)}+16\,(5\,x+4)e^{\left(x^2-5\,x\right)}$$

input
```
integrate(((10*x^2-7*x-7)*exp(x)^2+(-80*x^2+96*x+88)*exp(x)+160*x^2-272*x-
240)*exp(x^2-5*x),x, algorithm=\
```

output
```
(5*x + 4)*e^(x^2 - 3*x) - 8*(5*x + 4)*e^(x^2 - 4*x) + 16*(5*x + 4)*e^(x^2
- 5*x)
```

3.130.9 Mupad [B] (verification not implemented)

Time = 14.34 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int e^{-5x+x^2}\left(-240-272x+160x^2+e^x\left(88+96x-80x^2\right)+e^{2x}\left(-7-7x+10x^2\right)\right)\,dx$$
$$=\mathrm{e}^{x^2-5\,x}\,(5\,x+4)\,\left(\mathrm{e}^x-4\right)^2$$

input
```
int(-exp(x^2 - 5*x)*(272*x + exp(2*x)*(7*x - 10*x^2 + 7) - exp(x)*(96*x -
80*x^2 + 88) - 160*x^2 + 240),x)
```

output
```
exp(x^2 - 5*x)*(5*x + 4)*(exp(x) - 4)^2
```

3.131 $\int \frac{1}{2}\left(30+9x+e^x(108+66x+9x^2)\log(19)+e^{2x}(54\right.$

3.131.1 Optimal result

Integrand size = 45, antiderivative size = 23

$$\int \frac{1}{2}\left(30+9x+e^x\left(108+66x+9x^2\right)\log(19)+e^{2x}\left(54+45x+9x^2\right)\log^2(19)\right)\,dx = \left(2+\frac{3(2+x)\left(x+e^x x\log(19)\right)}{2x}\right)^2$$

output
```
(2+3/2/x*(x*exp(x)*ln(19)+x)*(2+x))^2
```

3.131.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 55 vs. 2(23) = 46.

Time = 0.20 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.39

$$\int \frac{1}{2}\left(30+9x+e^x\left(108+66x+9x^2\right)\log(19)+e^{2x}\left(54+45x+9x^2\right)\log^2(19)\right)\,dx = \frac{1}{2}\left(30x+\frac{9x^2}{2}+3e^x\left(20+16x+3x^2\right)\log(19)+9e^{2x}\left(2+2x+\frac{x^2}{2}\right)\log^2(19)\right)$$

input
```
Integrate[(30 + 9*x + E^x*(108 + 66*x + 9*x^2)*Log[19] + E^(2*x)*(54 + 45*
x + 9*x^2)*Log[19]^2)/2,x]
```

output
```
(30*x + (9*x^2)/2 + 3*E^x*(20 + 16*x + 3*x^2)*Log[19] + 9*E^(2*x)*(2 + 2*x
 + x^2/2)*Log[19]^2)/2
```

3.131.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 79 vs. 2(23) = 46.

Time = 0.25 (sec) , antiderivative size = 79, normalized size of antiderivative = 3.43, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.044, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}\left(e^{2x}\left(9x^2+45x+54\right)\log^2(19)+e^x\left(9x^2+66x+108\right)\log(19)+9x+30\right)\,dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int \left(9x+9e^{2x}\left(x^2+5x+6\right)\log^2(19)+3e^x\left(3x^2+22x+36\right)\log(19)+30\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{2}\left(\frac{9x^2}{2}+\frac{9}{2}e^{2x}x^2\log^2(19)+9e^xx^2\log(19)+30x+18e^{2x}x\log^2(19)+18e^{2x}\log^2(19)+48e^xx\log(19)+60e^x\log(1$$

input
```
Int[(30 + 9*x + E^x*(108 + 66*x + 9*x^2)*Log[19] + E^(2*x)*(54 + 45*x + 9*
x^2)*Log[19]^2)/2,x]
```

output
```
(30*x + (9*x^2)/2 + 60*E^x*Log[19] + 48*E^x*x*Log[19] + 9*E^x*x^2*Log[19]
+ 18*E^(2*x)*Log[19]^2 + 18*E^(2*x)*x*Log[19]^2 + (9*E^(2*x)*x^2*Log[19]^2
)/2)/2
```

3.131.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.131.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(20) = 40$.

Time = 0.15 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.00

method	result
risch	$\frac{\ln(19)^2(18+18x+\frac{9}{2}x^2)e^{2x}}{2}+\frac{\ln(19)(9x^2+48x+60)e^{x}}{2}+\frac{9x^2}{4}+15x$
default	$15x+\frac{9\ln(19)^2\left(\frac{e^{2x}x^2}{2}+2x\,e^{2x}+2\,e^{2x}\right)}{2}+\frac{3\ln(19)(16\,e^{x}x+20\,e^{x}+3\,e^{x}x^2)}{2}+\frac{9x^2}{4}$
parts	$15x+\frac{9\ln(19)^2\left(\frac{e^{2x}x^2}{2}+2x\,e^{2x}+2\,e^{2x}\right)}{2}+\frac{3\ln(19)(16\,e^{x}x+20\,e^{x}+3\,e^{x}x^2)}{2}+\frac{9x^2}{4}$
norman	$9\ln(19)^2e^{2x}+9\ln(19)^2e^{2x}x+\frac{9\ln(19)^2e^{2x}x^2}{4}+\frac{9\,e^{x}\ln(19)x^2}{2}+24x\,e^{x}\ln(19)+30\ln(19)\,e^{x}+$ 9
parallelrisch	$9\ln(19)^2e^{2x}+9\ln(19)^2e^{2x}x+\frac{9\ln(19)^2e^{2x}x^2}{4}+\frac{9\,e^{x}\ln(19)x^2}{2}+24x\,e^{x}\ln(19)+30\ln(19)\,e^{x}+$ 9

input
```
int(1/2*(9*x^2+45*x+54)*ln(19)^2*exp(x)^2+1/2*(9*x^2+66*x+108)*ln(19)*exp(
x)+9/2*x+15,x,method=_RETURNVERBOSE)
```

output
```
1/2*ln(19)^2*(18+18*x+9/2*x^2)*exp(x)^2+1/2*ln(19)*(9*x^2+48*x+60)*exp(x)+
9/4*x^2+15*x
```

3.131.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.87

$$\int \frac{1}{2}\left(30+9x+e^x\left(108+66x+9x^2\right)\log(19)+e^{2x}\left(54+45x+9x^2\right)\log^2(19)\right)\,dx$$
$$=\frac{9}{4}\left(x^2+4\,x+4\right)e^{(2\,x)}\log\left(19\right)^2+\frac{3}{2}\left(3\,x^2+16\,x+20\right)e^x\log\left(19\right)+\frac{9}{4}\,x^2+15\,x$$

input
```
integrate(1/2*(9*x^2+45*x+54)*log(19)^2*exp(x)^2+1/2*(9*x^2+66*x+108)*log(
19)*exp(x)+9/2*x+15,x, algorithm=\
```

output
```
9/4*(x^2 + 4*x + 4)*e^(2*x)*log(19)^2 + 3/2*(3*x^2 + 16*x + 20)*e^x*log(19
) + 9/4*x^2 + 15*x
```

3.131.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(20) = 40.

Time = 0.10 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.87

$$\int \frac{1}{2}\left(30+9x+e^x\left(108+66x+9x^2\right)\log(19)+e^{2x}\left(54+45x+9x^2\right)\log^2(19)\right)\,dx = \frac{9x^2}{4}+15x+\frac{\left(36x^2\log{(19)}+192x\log{(19)}+240\log{(19)}\right)e^x}{8} + \frac{\left(18x^2\log{(19)}^2+72x\log{(19)}^2+72\log{(19)}^2\right)e^{2x}}{8}$$

input
```
integrate(1/2*(9*x**2+45*x+54)*ln(19)**2*exp(x)**2+1/2*(9*x**2+66*x+108)*l
n(19)*exp(x)+9/2*x+15,x)
```

output
```
9*x**2/4 + 15*x + (36*x**2*log(19) + 192*x*log(19) + 240*log(19))*exp(x)/8
 + (18*x**2*log(19)**2 + 72*x*log(19)**2 + 72*log(19)**2)*exp(2*x)/8
```

3.131.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.87

$$\int \frac{1}{2}\left(30+9x+e^x\left(108+66x+9x^2\right)\log(19)+e^{2x}\left(54+45x+9x^2\right)\log^2(19)\right)\,dx = \frac{9}{4}\left(x^2+4x+4\right)e^{(2x)}\log{(19)}^2+\frac{3}{2}\left(3x^2+16x+20\right)e^x\log{(19)}+\frac{9}{4}x^2+15x$$

input
```
integrate(1/2*(9*x^2+45*x+54)*log(19)^2*exp(x)^2+1/2*(9*x^2+66*x+108)*log(
19)*exp(x)+9/2*x+15,x, algorithm=\
```

output
```
9/4*(x^2 + 4*x + 4)*e^(2*x)*log(19)^2 + 3/2*(3*x^2 + 16*x + 20)*e^x*log(19
) + 9/4*x^2 + 15*x
```

3.131.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.87

$$\int \frac{1}{2}\left(30+9x+e^x\left(108+66x+9x^2\right)\log(19)+e^{2x}\left(54+45x+9x^2\right)\log^2(19)\right)\,dx$$
$$=\frac{9}{4}\left(x^2+4\,x+4\right)e^{(2\,x)}\log\left(19\right)^2+\frac{3}{2}\left(3\,x^2+16\,x+20\right)e^x\log\left(19\right)+\frac{9}{4}\,x^2+15\,x$$

input
```
integrate(1/2*(9*x^2+45*x+54)*log(19)^2*exp(x)^2+1/2*(9*x^2+66*x+108)*log(
19)*exp(x)+9/2*x+15,x, algorithm=\
```

output
```
9/4*(x^2 + 4*x + 4)*e^(2*x)*log(19)^2 + 3/2*(3*x^2 + 16*x + 20)*e^x*log(19
) + 9/4*x^2 + 15*x
```

3.131.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.83

$$\int \frac{1}{2}\left(30+9x+e^x\left(108+66x+9x^2\right)\log(19)+e^{2x}\left(54+45x+9x^2\right)\log^2(19)\right)\,dx$$
$$=15\,x+9\,e^{2\,x}\ln\left(19\right)^2+30\,e^x\,\ln\left(19\right)+\frac{9\,x^2}{4}+24\,x\,e^x\,\ln\left(19\right)$$
$$+\frac{9\,x^2\,e^{2\,x}\ln\left(19\right)^2}{4}+\frac{9\,x^2\,e^x\,\ln\left(19\right)}{2}+9\,x\,e^{2\,x}\ln\left(19\right)^2$$

input
```
int((9*x)/2 + (exp(x)*log(19)*(66*x + 9*x^2 + 108))/2 + (exp(2*x)*log(19)^
2*(45*x + 9*x^2 + 54))/2 + 15,x)
```

output
```
15*x + 9*exp(2*x)*log(19)^2 + 30*exp(x)*log(19) + (9*x^2)/4 + 24*x*exp(x)*
log(19) + (9*x^2*exp(2*x)*log(19)^2)/4 + (9*x^2*exp(x)*log(19))/2 + 9*x*ex
p(2*x)*log(19)^2
```

3.132 $\int \frac{240-320x^4+e^2 \cdots}{-256x+128x^5-16x^9+e^{2/3}\left(16x^3-8x^7+x^{11}\right)+\left(-128x+32x^5+e^{2/3}(8 \cdots\right.}$

3.132.1 Optimal result

Integrand size = 142, antiderivative size = 29

$$\int \frac{240-320x^4+e^{2/3}(-5x^2+20x^6)}{-256x+128x^5-16x^9+e^{2/3}\left(16x^3-8x^7+x^{11}\right)+\left(-128x+32x^5+e^{2/3}\left(8x^3-2x^7\right)\right)\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right) \cdots}$$

output
```
5/(4+ln(x/(16/x^2-exp(2/3)))-x^4)
```

3.132.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{240-320x^4+e^{2/3}(-5x^2+20x^6)}{-256x+128x^5-16x^9+e^{2/3}\left(16x^3-8x^7+x^{11}\right)+\left(-128x+32x^5+e^{2/3}\left(8x^3-2x^7\right)\right)\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right) \cdots}$$

input
```
Integrate[(240 - 320*x^4 + E^(2/3)*(-5*x^2 + 20*x^6))/(-256*x + 128*x^5 -
16*x^9 + E^(2/3)*(16*x^3 - 8*x^7 + x^11) + (-128*x + 32*x^5 + E^(2/3)*(8*x
^3 - 2*x^7))*Log[-(x^3/(-16 + E^(2/3)*x^2))] + (-16*x + E^(2/3)*x^3)*Log[-
(x^3/(-16 + E^(2/3)*x^2))]^2),x]
```

output
```
5/(4 - x^4 + Log[x^3/(16 - E^(2/3)*x^2)])
```

3.132.

$$\int \frac{240-320x^4+e^{2/3}(-5x^2+20x^6)}{-256x+128x^5-16x^9+e^{2/3}(16x^3-8x^7+x^{11})+(-128x+32x^5+e^{2/3}(8x^3-2x^7))\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right)+(-16x+e^{2/3}x^3)\log^2\left(-\frac{x^3}{-16+e^{2/3}x^2}\right)}\,dx$$

3.132.3 Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.028, Rules used = {7239, 27, 25, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-320x^4+e^{2/3}\left(20x^6-5x^2\right)+240}{-16x^9+128x^5+\left(e^{2/3}x^3-16x\right)\log^2\left(-\frac{x^3}{e^{2/3}x^2-16}\right)+e^{2/3}\left(x^{11}-8x^7+16x^3\right)+\left(32x^5+e^{2/3}\left(8x^3-2x^7\right)-12\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{5\left(64x^4-e^{2/3}\left(4x^4-1\right)x^2-48\right)}{x\left(16-e^{2/3}x^2\right)\left(-x^4+\log\left(\frac{x^3}{16-e^{2/3}x^2}\right)+4\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$5\int -\frac{-64x^4-e^{2/3}\left(1-4x^4\right)x^2+48}{x\left(16-e^{2/3}x^2\right)\left(-x^4+\log\left(\frac{x^3}{16-e^{2/3}x^2}\right)+4\right)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-5\int \frac{-64x^4-e^{2/3}\left(1-4x^4\right)x^2+48}{x\left(16-e^{2/3}x^2\right)\left(-x^4+\log\left(\frac{x^3}{16-e^{2/3}x^2}\right)+4\right)^2}dx$$

$$\Big\downarrow \text{ 7237}$$

$$\frac{5}{-x^4+\log\left(\frac{x^3}{16-e^{2/3}x^2}\right)+4}$$

input
```
Int[(240 - 320*x^4 + E^(2/3)*(-5*x^2 + 20*x^6))/(-256*x + 128*x^5 - 16*x^9
 + E^(2/3)*(16*x^3 - 8*x^7 + x^11) + (-128*x + 32*x^5 + E^(2/3)*(8*x^3 - 2
*x^7))*Log[-(x^3/(-16 + E^(2/3)*x^2))] + (-16*x + E^(2/3)*x^3)*Log[-(x^3/(
-16 + E^(2/3)*x^2))]^2),x]
```

output
```
5/(4 - x^4 + Log[x^3/(16 - E^(2/3)*x^2)])
```

3.132.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.132.4 Maple [A] (verified)

Time = 2.39 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

method	result	size
risch	$-\frac{5}{x^{4}-\ln\left(-\frac{x^{3}}{x^{2} {\mathrm e}^{\frac{2}{3}}-16}\right)-4}$	28
parallelrisch	$-\frac{5}{x^{4}-\ln\left(-\frac{x^{3}}{x^{2} {\mathrm e}^{\frac{2}{3}}-16}\right)-4}$	28

input
```
int(((20*x^6-5*x^2)*exp(2/3)-320*x^4+240)/((x^3*exp(2/3)-16*x)*ln(-x^3/(x^
2*exp(2/3)-16))^2+((-2*x^7+8*x^3)*exp(2/3)+32*x^5-128*x)*ln(-x^3/(x^2*exp(
2/3)-16))+(x^11-8*x^7+16*x^3)*exp(2/3)-16*x^9+128*x^5-256*x),x,method=_RET
URNVERBOSE)
```

output
```
-5/(x^4-ln(-x^3/(x^2*exp(2/3)-16))-4)
```

3.132.

$$\int \frac{240-320x^4+e^{2/3}\left(-5x^2+20x^6\right)}{-256x+128x^5-16x^9+e^{2/3}\left(16x^3-8x^7+x^{11}\right)+\left(-128x+32x^5+e^{2/3}\left(8x^3-2x^7\right)\right)\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right)+\left(-16x+e^{2/3}x^3\right)\log^2\left(-\frac{x^3}{-16+e^{2/3}x^2}\right)}\,dx$$

3.132.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{240-320x^4+e^{2/3}(-5x^2+20x^6)}{-256x+128x^5-16x^9+e^{2/3}\left(16x^3-8x^7+x^{11}\right)+\left(-128x+32x^5+e^{2/3}\left(8x^3-2x^7\right)\right)\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right)}$$

$$-\frac{5}{x^4-\log\left(-\frac{x^3}{x^2e^{\frac{2}{3}}-16}\right)-4}$$

input
```
integrate(((20*x^6-5*x^2)*exp(2/3)-320*x^4+240)/((x^3*exp(2/3)-16*x)*log(-
x^3/(x^2*exp(2/3)-16))^2+((-2*x^7+8*x^3)*exp(2/3)+32*x^5-128*x)*log(-x^3/(
x^2*exp(2/3)-16))+(x^11-8*x^7+16*x^3)*exp(2/3)-16*x^9+128*x^5-256*x),x, al
gorithm=\
```

output
```
-5/(x^4 - log(-x^3/(x^2*e^(2/3) - 16)) - 4)
```

3.132.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{240-320x^4+e^{2/3}(-5x^2+20x^6)}{-256x+128x^5-16x^9+e^{2/3}\left(16x^3-8x^7+x^{11}\right)+\left(-128x+32x^5+e^{2/3}\left(8x^3-2x^7\right)\right)\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right)}$$

input
```
integrate(((20*x**6-5*x**2)*exp(2/3)-320*x**4+240)/((x**3*exp(2/3)-16*x)*l
n(-x**3/(x**2*exp(2/3)-16))**2+((-2*x**7+8*x**3)*exp(2/3)+32*x**5-128*x)*l
n(-x**3/(x**2*exp(2/3)-16))+(x**11-8*x**7+16*x**3)*exp(2/3)-16*x**9+128*x*
*5-256*x),x)
```

output
```
5/(-x**4 + log(-x**3/(x**2*exp(2/3) - 16)) + 4)
```

3.132.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{240-320x^4+e^{2/3}(-5x^2+20x^6)}{-256x+128x^5-16x^9+e^{2/3}\left(16x^3-8x^7+x^{11}\right)+\left(-128x+32x^5+e^{2/3}\left(8x^3-2x^7\right)\right)\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right.}$$

input
```
integrate(((20*x^6-5*x^2)*exp(2/3)-320*x^4+240)/((x^3*exp(2/3)-16*x)*log(-
x^3/(x^2*exp(2/3)-16))^2+((-2*x^7+8*x^3)*exp(2/3)+32*x^5-128*x)*log(-x^3/(
x^2*exp(2/3)-16))+(x^11-8*x^7+16*x^3)*exp(2/3)-16*x^9+128*x^5-256*x),x, al
gorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is un
defined.
```

3.132.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{240-320x^4+e^{2/3}(-5x^2+20x^6)}{-256x+128x^5-16x^9+e^{2/3}\left(16x^3-8x^7+x^{11}\right)+\left(-128x+32x^5+e^{2/3}\left(8x^3-2x^7\right)\right)\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right.}$$

$$-\frac{5}{x^4-\log\left(-\frac{x^3}{x^2e^{\frac{2}{3}}-16}\right)-4}$$

input
```
integrate(((20*x^6-5*x^2)*exp(2/3)-320*x^4+240)/((x^3*exp(2/3)-16*x)*log(-
x^3/(x^2*exp(2/3)-16))^2+((-2*x^7+8*x^3)*exp(2/3)+32*x^5-128*x)*log(-x^3/(
x^2*exp(2/3)-16))+(x^11-8*x^7+16*x^3)*exp(2/3)-16*x^9+128*x^5-256*x),x, al
gorithm=\
```

output
```
-5/(x^4 - log(-x^3/(x^2*e^(2/3) - 16)) - 4)
```

3.132.9 Mupad [B] (verification not implemented)

Time = 24.15 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{240-320x^4+e^{2/3}(-5x^2+20x^6)}{-256x+128x^5-16x^9+e^{2/3}\left(16x^3-8x^7+x^{11}\right)+\left(-128x+32x^5+e^{2/3}\left(8x^3-2x^7\right)\right)\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right)}$$

input
```
int((exp(2/3)*(5*x^2 - 20*x^6) + 320*x^4 - 240)/(256*x - log(-x^3/(x^2*exp
(2/3) - 16))*(exp(2/3)*(8*x^3 - 2*x^7) - 128*x + 32*x^5) - exp(2/3)*(16*x^
3 - 8*x^7 + x^11) + log(-x^3/(x^2*exp(2/3) - 16))^2*(16*x - x^3*exp(2/3))
- 128*x^5 + 16*x^9),x)
```

output
```
5/(log(-x^3/(x^2*exp(2/3) - 16)) - x^4 + 4)
```

3.132.

$$\int \frac{240-320x^4+e^{2/3}(-5x^2+20x^6)}{-256x+128x^5-16x^9+e^{2/3}(16x^3-8x^7+x^{11})+\left(-128x+32x^5+e^{2/3}(8x^3-2x^7)\right)\log\left(-\frac{x^3}{-16+e^{2/3}x^2}\right)+\left(-16x+e^{2/3}x^3\right)\log^2\left(-\frac{x^3}{-16+e^{2/3}x^2}\right)}\,dx$$

3.133 $\int \frac{6^{\frac{-1+15x}{x^4}}(-x^4+(4-45x)\log(6))}{x^6}\,dx$

3.133.1 Optimal result

Integrand size = 29, antiderivative size = 15

$$\int \frac{6^{\frac{-1+15x}{x^4}}(-x^4+(4-45x)\log(6))}{x^6}\,dx = \frac{6^{\frac{-1+15x}{x^4}}}{x}$$

output
```
exp((15*x-1)*ln(6)/x^4)/x
```

3.133.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{6^{\frac{-1+15x}{x^4}}(-x^4+(4-45x)\log(6))}{x^6}\,dx = \frac{6^{\frac{-1+15x}{x^4}}}{x}$$

input
```
Integrate[(6^((-1 + 15*x)/x^4)*(-x^4 + (4 - 45*x)*Log[6]))/x^6,x]
```

output
```
6^((-1 + 15*x)/x^4)/x
```

3.133.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 39 vs. $2(15) = 30$.

Time = 0.22 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.60, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.034$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6^{\frac{15x-1}{x^4}}\left((4-45x)\log(6)-x^4\right)}{x^6}\,dx$$

$$\Big\downarrow \; 2726$$

$$\frac{6^{-\frac{1-15x}{x^4}}(4-45x)}{\left(\frac{4(1-15x)}{x^5}+\frac{15}{x^4}\right)x^6}$$

input
```
Int[(6^((-1 + 15*x)/x^4)*(-x^4 + (4 - 45*x)*Log[6]))/x^6,x]
```

output
```
(4 - 45*x)/(6^((1 - 15*x)/x^4)*((4*(1 - 15*x))/x^5 + 15/x^4)*x^6)
```

3.133.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.133.4 Maple [A] (verified)

Time = 0.49 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

method	result	size
gosper	$\frac{{\mathrm e}^{\frac{(15x-1)\ln(6)}{x^4}}}{x}$	17
norman	$\frac{{\mathrm e}^{\frac{(15x-1)\ln(6)}{x^4}}}{x}$	17
parallelrisch	$\frac{{\mathrm e}^{\frac{(15x-1)\ln(6)}{x^4}}}{x}$	17
risch	$\frac{{\mathrm e}^{\frac{(15x-1)(\ln(2)+\ln(3))}{x^4}}}{x}$	20

input
```
int(((-45*x+4)*ln(6)-x^4)*exp((15*x-1)*ln(6)/x^4)/x^6,x,method=_RETURNVERB
OSE)
```

output
```
exp((15*x-1)*ln(6)/x^4)/x
```

3.133.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{6^{\frac{-1+15x}{x^4}}\left(-x^4+(4-45x)\log(6)\right)}{x^6}\,dx = \frac{6^{\frac{15\,x-1}{x^4}}}{x}$$

input
```
integrate(((-45*x+4)*log(6)-x^4)*exp((15*x-1)*log(6)/x^4)/x^6,x, algorithm
=\
```

output
```
6^((15*x - 1)/x^4)/x
```

3.133.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{6^{\frac{-1+15x}{x^4}}\left(-x^4+(4-45x)\log(6)\right)}{x^6}\,dx = \frac{e^{\frac{(15x-1)\log(6)}{x^4}}}{x}$$

input
```
integrate(((-45*x+4)*ln(6)-x**4)*exp((15*x-1)*ln(6)/x**4)/x**6,x)
```

output
```
exp((15*x - 1)*log(6)/x**4)/x
```

3.133.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. $2(15) = 30$.

Time = 0.33 (sec) , antiderivative size = 34, normalized size of antiderivative = 2.27

$$\int \frac{6^{\frac{-1+15x}{x^4}}(-x^4 + (4 - 45x)\log(6))}{x^6}\,dx = \frac{e^{\left(\frac{15\log(3)}{x^3} + \frac{15\log(2)}{x^3} - \frac{\log(3)}{x^4} - \frac{\log(2)}{x^4}\right)}}{x}$$

input
```
integrate(((-45*x+4)*log(6)-x^4)*exp((15*x-1)*log(6)/x^4)/x^6,x, algorithm
=\
```

output
```
e^(15*log(3)/x^3 + 15*log(2)/x^3 - log(3)/x^4 - log(2)/x^4)/x
```

3.133.8 Giac [F]

$$\int \frac{6^{\frac{-1+15x}{x^4}}(-x^4 + (4 - 45x)\log(6))}{x^6}\,dx = \int -\frac{(x^4 + (45x - 4)\log(6))6^{\frac{15x-1}{x^4}}}{x^6}\,dx$$

input
```
integrate(((-45*x+4)*log(6)-x^4)*exp((15*x-1)*log(6)/x^4)/x^6,x, algorithm
=\
```

output
```
integrate(-(x^4 + (45*x - 4)*log(6))*6^((15*x - 1)/x^4)/x^6, x)
```

3.133.9 Mupad [B] (verification not implemented)

Time = 14.51 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{6^{\frac{-1+15x}{x^4}}(-x^4 + (4 - 45x)\log(6))}{x^6}\,dx = \frac{6^{\frac{15x-1}{x^4}}}{x}$$

input
```
int(-(exp((log(6)*(15*x - 1))/x^4)*(log(6)*(45*x - 4) + x^4))/x^6,x)
```

output
```
6^((15*x - 1)/x^4)/x
```

3.134 $\int \frac{1}{e^6 x} \, dx$

3.134.1 Optimal result

Integrand size = 7, antiderivative size = 10

$$\int \frac{1}{e^6 x} \, dx = 8 + \frac{4 + \log(x)}{e^6}$$

output
```
8+(ln(x)+4)/exp(6)
```

3.134.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.60

$$\int \frac{1}{e^6 x} \, dx = \frac{\log(x)}{e^6}$$

input
```
Integrate[1/(E^6*x),x]
```

output
```
Log[x]/E^6
```

3.134.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.60, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{e^6 x} \, dx \Big\downarrow 14 \quad \frac{\log(x)}{e^6}$$

input
```
Int[1/(E^6*x),x]
```

output
```
Log[x]/E^6
```

3.134.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.134.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.60

method	result	size
risch	$\mathrm{e}^{-6} \ln(x)$	6
default	$\mathrm{e}^{-6} \ln(x)$	8
norman	$\mathrm{e}^{-6} \ln(x)$	8
parallelrisch	$\mathrm{e}^{-6} \ln(x)$	8

input
```
int(1/x/exp(6),x,method=_RETURNVERBOSE)
```

output
```
exp(-6)*ln(x)
```

3.134.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

$$\int \frac{1}{e^6 x} \, dx = e^{(-6)} \log{(x)}$$

input
```
integrate(1/x/exp(6),x, algorithm=\
```

output
```
e^(-6)*log(x)
```

3.134.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

$$\int \frac{1}{e^6 x} \, dx = \frac{\log{(x)}}{e^6}$$

input
```
integrate(1/x/exp(6),x)
```

output
```
exp(-6)*log(x)
```

3.134.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

$$\int \frac{1}{e^6 x} \, dx = e^{(-6)} \log{(x)}$$

input
```
integrate(1/x/exp(6),x, algorithm=\
```

output
```
e^(-6)*log(x)
```

3.134.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.60

$$\int \frac{1}{e^6 x} \, dx = e^{(-6)} \log(|x|)$$

input
```
integrate(1/x/exp(6),x, algorithm=\
```

output
```
e^(-6)*log(abs(x))
```

3.134.9 Mupad [B] (verification not implemented)

Time = 15.06 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

$$\int \frac{1}{e^6 x} \, dx = \mathrm{e}^{-6} \ln(x)$$

input
```
int(exp(-6)/x,x)
```

output
```
exp(-6)*log(x)
```

3.135 $\int \frac{e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}(-4+5x+e^{2x}(4x+8x^2-2x^3)-x\log(e^2x))}{16x-8x^2+x^3}\,dx$

3.135.1 Optimal result

Integrand size = 75, antiderivative size = 28

$$\int \frac{e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}(-4+5x+e^{2x}(4x+8x^2-2x^3)-x\log(e^2x))}{16x-8x^2+x^3}\,dx=2+e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}$$

output
```
2+exp((ln(exp(2)*x)-x*exp(2*x)-x)/(x-4))
```

3.135.2 Mathematica [A] (verified)

Time = 5.18 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}(-4+5x+e^{2x}(4x+8x^2-2x^3)-x\log(e^2x))}{16x-8x^2+x^3}\,dx=e^{-\frac{-2+x+e^{2x}x}{-4+x}}x^{\frac{1}{-4+x}}$$

input
```
Integrate[(E^((-x - E^(2*x)*x + Log[E^2*x])/(-4 + x))*(-4 + 5*x + E^(2*x)*
(4*x + 8*x^2 - 2*x^3) - x*Log[E^2*x]))/(16*x - 8*x^2 + x^3),x]
```

output
```
x^(-4 + x)^(-1)/E^((-2 + x + E^(2*x)*x)/(-4 + x))
```

3.135.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-e^{2x}x-x+\log(e^2x)}{x-4}}\left(e^{2x}\left(-2x^3+8x^2+4x\right)+5x+x(-\log(e^2x))-4\right)}{x^3-8x^2+16x}dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{e^{\frac{-e^{2x}x-x+\log(e^2x)}{x-4}}\left(e^{2x}\left(-2x^3+8x^2+4x\right)+5x+x(-\log(e^2x))-4\right)}{x\left(x^2-8x+16\right)}dx$$
$$\Big\downarrow \text{7277}$$
$$4\int -\frac{e^{\frac{e^{2x}x+x}{4-x}-\frac{2}{4-x}}x^{\frac{1}{x-4}-1}\left(\log(e^2x)x-5x-2e^{2x}\left(-x^3+4x^2+2x\right)+4\right)}{4(4-x)^2}dx$$
$$\Big\downarrow \text{27}$$
$$-\int \frac{e^{\frac{e^{2x}x+x}{4-x}-\frac{2}{4-x}}x^{\frac{1}{x-4}-1}\left(\log(e^2x)x-5x-2e^{2x}\left(-x^3+4x^2+2x\right)+4\right)}{(4-x)^2}dx$$
$$\Big\downarrow \text{7292}$$
$$-\int \frac{e^{-\frac{e^{2x}x+x-2}{x-4}}x^{\frac{1}{x-4}-1}\left(\log(e^2x)x-5x-2e^{2x}\left(-x^3+4x^2+2x\right)+4\right)}{(4-x)^2}dx$$
$$\Big\downarrow \text{7293}$$
$$-\int \left(\frac{e^{-\frac{e^{2x}x+x-2}{x-4}}(\log(x)x-3x+4)x^{\frac{1}{x-4}-1}}{(x-4)^2}+\frac{2e^{2x-\frac{e^{2x}x+x-2}{x-4}}\left(x^2-4x-2\right)x^{\frac{1}{x-4}}}{(x-4)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$8\int \frac{e^{-\frac{e^{2x}x+x-2}{x-4}}x^{\frac{1}{x-4}-1}}{(x-4)^2}dx+3\int \frac{e^{-\frac{e^{2x}x+x-2}{x-4}}x^{\frac{1}{x-4}-1}}{x-4}dx-2\int e^{2x-\frac{e^{2x}x+x-2}{x-4}}x^{\frac{1}{x-4}}dx+$$
$$4\int \frac{e^{2x-\frac{e^{2x}x+x-2}{x-4}}x^{\frac{1}{x-4}}}{(x-4)^2}dx-8\int \frac{e^{2x-\frac{e^{2x}x+x-2}{x-4}}x^{\frac{1}{x-4}}}{x-4}dx+\int \frac{\int \frac{e^{-\frac{e^{2x}x+x-2}{x-4}}x^{\frac{1}{x-4}}}{(x-4)^2}dx}{x}dx-$$
$$\log(x)\int \frac{e^{-\frac{e^{2x}x+x-2}{x-4}}x^{\frac{1}{x-4}}}{(x-4)^2}dx$$

input
```
Int[(E^((-x - E^(2*x)*x + Log[E^2*x])/(-4 + x))*(-4 + 5*x + E^(2*x)*(4*x +
 8*x^2 - 2*x^3) - x*Log[E^2*x]))/(16*x - 8*x^2 + x^3),x]
```

3.135. $\int \frac{e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}\left(-4+5x+e^{2x}\left(4x+8x^2-2x^3\right)-x\log(e^2x)\right)}{16x-8x^2+x^3}dx$

output
```
$Aborted
```

3.135.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.135.4 Maple [A] (verified)

Time = 2.47 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result	size
risch	$e^{-\frac{-\ln\left(e^{2} x\right)+x\,e^{2 x}+x}{x-4}}$	24
parallelrisch	$e^{\frac{\ln\left(e^{2} x\right)-x\,e^{2 x}-x}{x-4}}$	24

3.135. $\int \frac{e^{\frac{-x-e^{2x}x+\log\left(e^2x\right)}{-4+x}}\left(-4+5x+e^{2x}\left(4x+8x^2-2x^3\right)-x\log\left(e^2x\right)\right)}{16x-8x^2+x^3}\,dx$

input
```
int((-x*ln(exp(2)*x)+(-2*x^3+8*x^2+4*x)*exp(2*x)+5*x-4)*exp((ln(exp(2)*x)-
x*exp(2*x)-x)/(x-4))/(x^3-8*x^2+16*x),x,method=_RETURNVERBOSE)
```

output
```
exp(-(-ln(exp(2)*x)+x*exp(2*x)+x)/(x-4))
```

3.135.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}\left(-4+5x+e^{2x}(4x+8x^2-2x^3)-x\log(e^2x)\right)}{16x-8x^2+x^3}\,dx=e^{\left(-\frac{xe^{(2x)}+x-\log(xe^2)}{x-4}\right)}$$

input
```
integrate((-x*log(exp(2)*x)+(-2*x^3+8*x^2+4*x)*exp(2*x)+5*x-4)*exp((log(ex
p(2)*x)-x*exp(2*x)-x)/(x-4))/(x^3-8*x^2+16*x),x, algorithm=\
```

output
```
e^(-(x*e^(2*x) + x - log(x*e^2))/(x - 4))
```

3.135.6 Sympy [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}\left(-4+5x+e^{2x}(4x+8x^2-2x^3)-x\log(e^2x)\right)}{16x-8x^2+x^3}\,dx=e^{\frac{-xe^{2x}-x+\log(xe^2)}{x-4}}$$

input
```
integrate((-x*ln(exp(2)*x)+(-2*x**3+8*x**2+4*x)*exp(2*x)+5*x-4)*exp((ln(ex
p(2)*x)-x*exp(2*x)-x)/(x-4))/(x**3-8*x**2+16*x),x)
```

output
```
exp((-x*exp(2*x) - x + log(x*exp(2)))/(x - 4))
```

3.135.7 Maxima [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}\left(-4+5x+e^{2x}\left(4x+8x^2-2x^3\right)-x\log\left(e^2x\right)\right)}{16x-8x^2+x^3}\,dx$$
$$=e^{\left(-\frac{4\,e^{(2\,x)}}{x-4}+\frac{\log(x)}{x-4}-\frac{2}{x-4}-e^{(2\,x)}-1\right)}$$

input
```
integrate((-x*log(exp(2)*x)+(-2*x^3+8*x^2+4*x)*exp(2*x)+5*x-4)*exp((log(ex
p(2)*x)-x*exp(2*x)-x)/(x-4))/(x^3-8*x^2+16*x),x, algorithm=\
```

output
```
e^(-4*e^(2*x)/(x - 4) + log(x)/(x - 4) - 2/(x - 4) - e^(2*x) - 1)
```

3.135.8 Giac [F]

$$\int \frac{e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}\left(-4+5x+e^{2x}\left(4x+8x^2-2x^3\right)-x\log\left(e^2x\right)\right)}{16x-8x^2+x^3}\,dx$$
$$=\int -\frac{\left(2\left(x^3-4\,x^2-2\,x\right)e^{(2\,x)}+x\log\left(xe^2\right)-5\,x+4\right)e^{\left(-\frac{xe^{(2\,x)}+x-\log\left(xe^2\right)}{x-4}\right)}}{x^3-8\,x^2+16\,x}\,dx$$

input
```
integrate((-x*log(exp(2)*x)+(-2*x^3+8*x^2+4*x)*exp(2*x)+5*x-4)*exp((log(ex
p(2)*x)-x*exp(2*x)-x)/(x-4))/(x^3-8*x^2+16*x),x, algorithm=\
```

output
```
integrate(-(2*(x^3 - 4*x^2 - 2*x)*e^(2*x) + x*log(x*e^2) - 5*x + 4)*e^(-(x
*e^(2*x) + x - log(x*e^2))/(x - 4))/(x^3 - 8*x^2 + 16*x), x)
```

3.135.9 Mupad [B] (verification not implemented)

Time = 15.15 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.36

$$\int \frac{e^{\frac{-x-e^{2x}x+\log(e^2x)}{-4+x}}\left(-4+5x+e^{2x}\left(4x+8x^2-2x^3\right)-x\log\left(e^2x\right)\right)}{16x-8x^2+x^3}\,dx=x^{\frac{1}{x-4}}\,\mathrm{e}^{-\frac{x}{x-4}}\,\mathrm{e}^{-\frac{x\,\mathrm{e}^{2\,x}}{x-4}}\,\mathrm{e}^{\frac{2}{x-4}}$$

---

input
```
int((exp(-(x - log(x*exp(2)) + x*exp(2*x))/(x - 4))*(5*x + exp(2*x)*(4*x +
 8*x^2 - 2*x^3) - x*log(x*exp(2)) - 4))/(16*x - 8*x^2 + x^3),x)
```

output
```
x^(1/(x - 4))*exp(-x/(x - 4))*exp(-(x*exp(2*x))/(x - 4))*exp(2/(x - 4))
```

3.135. $$\int \frac{e^{\frac{-x-e^{2x}x+\log\left(e^2x\right)}{-4+x}}\left(-4+5x+e^{2x}\left(4x+8x^2-2x^3\right)-x\log\left(e^2x\right)\right)}{16x-8x^2+x^3}\,dx$$

3.136 $\int \frac{15e^{32}+40e^{16}x+15x^2+e^x\left(12e^{32}+12x^2+e^{16}(8+24x)\right)}{15e^{32}x+30e^{16}x^2+15x^3+e^x\left(12e^{32}+24e^{16}x+12x^2\right)}\,dx$

3.136.1 Optimal result

Integrand size = 85, antiderivative size = 23

$$\int \frac{15e^{32}+40e^{16}x+15x^2+e^x(12e^{32}+12x^2+e^{16}(8+24x))}{15e^{32}x+30e^{16}x^2+15x^3+e^x\left(12e^{32}+24e^{16}x+12x^2\right)}\,dx=\frac{2x}{3\left(e^{16}+x\right)}+\log\left(\frac{4e^x}{5}+x\right)$$

output
```
ln(x+4/5*exp(x))+2*x/(3*x+3*exp(16))
```

3.136.2 Mathematica [A] (verified)

Time = 1.62 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\begin{aligned}&\int \frac{15e^{32}+40e^{16}x+15x^2+e^x(12e^{32}+12x^2+e^{16}(8+24x))}{15e^{32}x+30e^{16}x^2+15x^3+e^x\left(12e^{32}+24e^{16}x+12x^2\right)}\,dx\\&=\frac{1}{3}\left(-\frac{2e^{16}}{e^{16}+x}+3\log\left(4e^x+5x\right)\right)\end{aligned}$$

input
```
Integrate[(15*E^32 + 40*E^16*x + 15*x^2 + E^x*(12*E^32 + 12*x^2 + E^16*(8
+ 24*x)))/(15*E^32*x + 30*E^16*x^2 + 15*x^3 + E^x*(12*E^32 + 24*E^16*x + 1
2*x^2)),x]
```

output
```
((-2*E^16)/(E^16 + x) + 3*Log[4*E^x + 5*x])/3
```

3.136.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{15x^2+e^x\left(12x^2+e^{16}(24x+8)+12e^{32}\right)+40e^{16}x+15e^{32}}{15x^3+30e^{16}x^2+e^x\left(12x^2+24e^{16}x+12e^{32}\right)+15e^{32}x}\,dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{15x^2+e^x\left(12x^2+e^{16}(24x+8)+12e^{32}\right)+40e^{16}x+15e^{32}}{3\left(x+e^{16}\right)^2\left(5x+4e^x\right)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{3}\int \frac{15x^2+40e^{16}x+4e^x\left(3x^2+2e^{16}(3x+1)+3e^{32}\right)+15e^{32}}{\left(x+e^{16}\right)^2\left(5x+4e^x\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{3}\int \left(\frac{3x^2+6e^{16}x+e^{16}\left(2+3e^{16}\right)}{\left(x+e^{16}\right)^2}-\frac{15(x-1)}{5x+4e^x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{3}\left(15\int \frac{1}{5x+4e^x}dx-15\int \frac{x}{5x+4e^x}dx+3x-\frac{2e^{16}}{x+e^{16}}\right)$$

input
```
Int[(15*E^32 + 40*E^16*x + 15*x^2 + E^x*(12*E^32 + 12*x^2 + E^16*(8 + 24*x
)))/(15*E^32*x + 30*E^16*x^2 + 15*x^3 + E^x*(12*E^32 + 24*E^16*x + 12*x^2)
),x]
```

output
```
$Aborted
```

3.136.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.136.4 Maple [A] (verified)

Time = 0.66 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

method	result	size
risch	$-\frac{2\,\mathrm{e}^{16}}{3(x+\mathrm{e}^{16})}+\ln\left(\frac{5x}{4}+\mathrm{e}^{x}\right)$	19
norman	$-\frac{2\,\mathrm{e}^{16}}{3(x+\mathrm{e}^{16})}+\ln\left(5x+4\,\mathrm{e}^{x}\right)$	21
parallelrisch	$\frac{3\ln\left(x+\frac{4\,\mathrm{e}^{x}}{5}\right)\mathrm{e}^{16}+3\ln\left(x+\frac{4\,\mathrm{e}^{x}}{5}\right)x-2\,\mathrm{e}^{16}}{3x+3\,\mathrm{e}^{16}}$	35

input
```
int(((12*exp(16)^2+(24*x+8)*exp(16)+12*x^2)*exp(x)+15*exp(16)^2+40*x*exp(1
6)+15*x^2)/((12*exp(16)^2+24*x*exp(16)+12*x^2)*exp(x)+15*x*exp(16)^2+30*x^
2*exp(16)+15*x^3),x,method=_RETURNVERBOSE)
```

output
```
-2/3*exp(16)/(x+exp(16))+ln(5/4*x+exp(x))
```

3.136.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{15e^{32}+40e^{16}x+15x^2+e^x(12e^{32}+12x^2+e^{16}(8+24x))}{15e^{32}x+30e^{16}x^2+15x^3+e^x\left(12e^{32}+24e^{16}x+12x^2\right)}\,dx = \frac{3\left(x+e^{16}\right)\log\left(5\,x+4\,e^x\right)-2\,e^{16}}{3\left(x+e^{16}\right)}$$

input
```
integrate(((12*exp(16)^2+(24*x+8)*exp(16)+12*x^2)*exp(x)+15*exp(16)^2+40*x
*exp(16)+15*x^2)/((12*exp(16)^2+24*x*exp(16)+12*x^2)*exp(x)+15*x*exp(16)^2
+30*x^2*exp(16)+15*x^3),x, algorithm=\
```

output
```
1/3*(3*(x + e^16)*log(5*x + 4*e^x) - 2*e^16)/(x + e^16)
```

3.136.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{15e^{32}+40e^{16}x+15x^2+e^x(12e^{32}+12x^2+e^{16}(8+24x))}{15e^{32}x+30e^{16}x^2+15x^3+e^x\left(12e^{32}+24e^{16}x+12x^2\right)}\,dx=\log\left(\frac{5x}{4}+e^x\right)-\frac{2e^{16}}{3x+3e^{16}}$$

input
```
integrate((((12*exp(16)**2+(24*x+8)*exp(16)+12*x**2)*exp(x)+15*exp(16)**2+4
0*x*exp(16)+15*x**2)/((12*exp(16)**2+24*x*exp(16)+12*x**2)*exp(x)+15*x*exp
(16)**2+30*x**2*exp(16)+15*x**3),x)
```

output
```
log(5*x/4 + exp(x)) - 2*exp(16)/(3*x + 3*exp(16))
```

3.136.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{15e^{32}+40e^{16}x+15x^2+e^x(12e^{32}+12x^2+e^{16}(8+24x))}{15e^{32}x+30e^{16}x^2+15x^3+e^x\left(12e^{32}+24e^{16}x+12x^2\right)}\,dx$$
$$=-\frac{2\,e^{16}}{3\,(x+e^{16})}+\log\left(\frac{5}{4}\,x+e^x\right)$$

input
```
integrate(((12*exp(16)^2+(24*x+8)*exp(16)+12*x^2)*exp(x)+15*exp(16)^2+40*x
*exp(16)+15*x^2)/((12*exp(16)^2+24*x*exp(16)+12*x^2)*exp(x)+15*x*exp(16)^2
+30*x^2*exp(16)+15*x^3),x, algorithm=\
```

output
```
-2/3*e^16/(x + e^16) + log(5/4*x + e^x)
```

3.136.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 38 vs. 2(17) = 34.

Time = 0.28 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.65

$$\int \frac{15e^{32}+40e^{16}x+15x^2+e^x(12e^{32}+12x^2+e^{16}(8+24x))}{15e^{32}x+30e^{16}x^2+15x^3+e^x\left(12e^{32}+24e^{16}x+12x^2\right)}\,dx$$
$$=\frac{3\,x\log\left(5\,x+4\,e^x\right)+3\,e^{16}\log\left(5\,x+4\,e^x\right)-2\,e^{16}}{3\,(x+e^{16})}$$

input
```
integrate(((12*exp(16)^2+(24*x+8)*exp(16)+12*x^2)*exp(x)+15*exp(16)^2+40*x
*exp(16)+15*x^2)/((12*exp(16)^2+24*x*exp(16)+12*x^2)*exp(x)+15*x*exp(16)^2
+30*x^2*exp(16)+15*x^3),x, algorithm=\
```

output
```
1/3*(3*x*log(5*x + 4*e^x) + 3*e^16*log(5*x + 4*e^x) - 2*e^16)/(x + e^16)
```

3.136.9 Mupad [B] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{15e^{32}+40e^{16}x+15x^2+e^x(12e^{32}+12x^2+e^{16}(8+24x))}{15e^{32}x+30e^{16}x^2+15x^3+e^x\left(12e^{32}+24e^{16}x+12x^2\right)}\,dx=\ln\left(x+\frac{4\,e^x}{5}\right)+\frac{2\,x}{3\,x+3\,e^{16}}$$

input
```
int((15*exp(32) + 40*x*exp(16) + exp(x)*(12*exp(32) + 12*x^2 + exp(16)*(24
*x + 8)) + 15*x^2)/(15*x*exp(32) + 30*x^2*exp(16) + exp(x)*(12*exp(32) + 2
4*x*exp(16) + 12*x^2) + 15*x^3),x)
```

output
```
log(x + (4*exp(x))/5) + (2*x)/(3*x + 3*exp(16))
```

3.137 $\int (-13824 + 4608x + e^{4x}(4320 - 3168x + 576x^2) +$

3.137.1 Optimal result

Integrand size = 67, antiderivative size = 19

$$\int \left(-13824+4608x+e^{4x}\left(4320-3168x+576x^2\right)+e^{3x}\left(24192-18432x+3456x^2\right)+e^x\left(13824-18432x+4608x^2\right)+e^{2x}\left(41472-34560x+6912x^2\right)\right)\,dx=9(-3+x)^2\left(4+\log\left(e^{2e^x}\right)\right)^4$$

output
```
9*(-3+x)^2*(ln(exp(exp(x))^2)+4)^4
```

3.137.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 57 vs. 2(19) = 38.

Time = 0.28 (sec) , antiderivative size = 57, normalized size of antiderivative = 3.00

$$\int \left(-13824+4608x+e^{4x}\left(4320-3168x+576x^2\right)+e^{3x}\left(24192-18432x+3456x^2\right)+e^x\left(13824-18432x+4608x^2\right)+e^{2x}\left(41472-34560x+6912x^2\right)\right)\,dx=288\left(16e^x(-3+x)^2+12e^{2x}(-3+x)^2+4e^{3x}(-3+x)^2+\frac{1}{2}e^{4x}(-3+x)^2+8(-6+x)x\right)$$

input
```
Integrate[-13824 + 4608*x + E^(4*x)*(4320 - 3168*x + 576*x^2) + E^(3*x)*(2
4192 - 18432*x + 3456*x^2) + E^x*(13824 - 18432*x + 4608*x^2) + E^(2*x)*(4
1472 - 34560*x + 6912*x^2),x]
```

output
```
288*(16*E^x*(-3 + x)^2 + 12*E^(2*x)*(-3 + x)^2 + 4*E^(3*x)*(-3 + x)^2 + (E
^(4*x)*(-3 + x)^2)/2 + 8*(-6 + x)*x)
```

3.137.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 103 vs. 2(19) = 38.

Time = 0.35 (sec) , antiderivative size = 103, normalized size of antiderivative = 5.42, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.015, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{4x}\left(576x^2-3168x+4320\right)+e^{3x}\left(3456x^2-18432x+24192\right)+e^x\left(4608x^2-18432x+13824\right)+e^{2x}\left(6912x^2\right.\right.$$

$$\Big\downarrow \text{2009}$$

$$4608e^xx^2+3456e^{2x}x^2+1152e^{3x}x^2+144e^{4x}x^2+2304x^2-27648e^xx-20736e^{2x}x-6912e^{3x}x-864e^{4x}x-13824x+41472e^x+31104e^{2x}+10368e^{3x}+1296e^{4x}$$

input
```
Int[-13824 + 4608*x + E^(4*x)*(4320 - 3168*x + 576*x^2) + E^(3*x)*(24192 -
 18432*x + 3456*x^2) + E^x*(13824 - 18432*x + 4608*x^2) + E^(2*x)*(41472 -
 34560*x + 6912*x^2),x]
```

output
```
41472*E^x + 31104*E^(2*x) + 10368*E^(3*x) + 1296*E^(4*x) - 13824*x - 27648
*E^x*x - 20736*E^(2*x)*x - 6912*E^(3*x)*x - 864*E^(4*x)*x + 2304*x^2 + 460
8*E^x*x^2 + 3456*E^(2*x)*x^2 + 1152*E^(3*x)*x^2 + 144*E^(4*x)*x^2
```

3.137.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.137.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(17) = 34$.

Time = 0.14 (sec) , antiderivative size = 68, normalized size of antiderivative = 3.58

method	result
risch	$(144x^2 - 864x + 1296)\,e^{4x} + (1152x^2 - 6912x + 10368)\,e^{3x} + (3456x^2 - 20736x + 31104)\,e$
default	$4608\,e^x x^2 + 144x^2 e^{4x} + 1152x^2 e^{3x} + 3456\,e^{2x} x^2 - 27648\,e^x x - 864x\,e^{4x} - 6912x\,e^{3x} - 2073$
norman	$4608\,e^x x^2 + 144x^2 e^{4x} + 1152x^2 e^{3x} + 3456\,e^{2x} x^2 - 27648\,e^x x - 864x\,e^{4x} - 6912x\,e^{3x} - 2073$
parallelrisch	$4608\,e^x x^2 + 144x^2 e^{4x} + 1152x^2 e^{3x} + 3456\,e^{2x} x^2 - 27648\,e^x x - 864x\,e^{4x} - 6912x\,e^{3x} - 2073$
parts	$4608\,e^x x^2 + 144x^2 e^{4x} + 1152x^2 e^{3x} + 3456\,e^{2x} x^2 - 27648\,e^x x - 864x\,e^{4x} - 6912x\,e^{3x} - 2073$

input
```
int((576*x^2-3168*x+4320)*exp(x)^4+(3456*x^2-18432*x+24192)*exp(x)^3+(6912
*x^2-34560*x+41472)*exp(x)^2+(4608*x^2-18432*x+13824)*exp(x)+4608*x-13824,
x,method=_RETURNVERBOSE)
```

output
```
(144*x^2-864*x+1296)*exp(x)^4+(1152*x^2-6912*x+10368)*exp(x)^3+(3456*x^2-2
0736*x+31104)*exp(x)^2+(4608*x^2-27648*x+41472)*exp(x)+2304*x^2-13824*x
```

3.137.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(17) = 34$.

Time = 0.25 (sec) , antiderivative size = 63, normalized size of antiderivative = 3.32

$$\int \left(-13824 + 4608x + e^{4x}(4320 - 3168x + 576x^2) + e^{3x}(24192 - 18432x + 3456x^2) + e^x(13824 - 18432x + 4608x^2) + e^{2x}(41472 - 34560x + 6912x^2)\right) dx = 2304\,x^2 + 144\,(x^2 - 6\,x + 9)e^{(4\,x)} + 1152\,(x^2 - 6\,x + 9)e^{(3\,x)} + 3456\,(x^2 - 6\,x + 9)e^{(2\,x)} + 4608\,(x^2 - 6\,x + 9)e^x - 13824\,x$$

input
```
integrate((576*x^2-3168*x+4320)*exp(x)^4+(3456*x^2-18432*x+24192)*exp(x)^3
+(6912*x^2-34560*x+41472)*exp(x)^2+(4608*x^2-18432*x+13824)*exp(x)+4608*x-
13824,x, algorithm=\
```

output
```
2304*x^2 + 144*(x^2 - 6*x + 9)*e^(4*x) + 1152*(x^2 - 6*x + 9)*e^(3*x) + 34
56*(x^2 - 6*x + 9)*e^(2*x) + 4608*(x^2 - 6*x + 9)*e^x - 13824*x
```

3.137.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(17) = 34$.

Time = 0.08 (sec) , antiderivative size = 66, normalized size of antiderivative = 3.47

$$\int \left(-13824 + 4608x + e^{4x}\left(4320 - 3168x + 576x^2\right) + e^{3x}\left(24192 - 18432x + 3456x^2\right) + e^x\left(13824 - 18432x + 4608x^2\right) + e^{2x}\left(41472 - 34560x + 6912x^2\right)\right) dx = 2304x^2 - 13824x + \left(144x^2 - 864x + 1296\right)e^{4x} + \left(1152x^2 - 6912x + 10368\right)e^{3x} + \left(3456x^2 - 20736x + 31104\right)e^{2x} + \left(4608x^2 - 27648x + 41472\right)e^{x}$$

input
```
integrate((576*x**2-3168*x+4320)*exp(x)**4+(3456*x**2-18432*x+24192)*exp(x
)**3+(6912*x**2-34560*x+41472)*exp(x)**2+(4608*x**2-18432*x+13824)*exp(x)+
4608*x-13824,x)
```

output
```
2304*x**2 - 13824*x + (144*x**2 - 864*x + 1296)*exp(4*x) + (1152*x**2 - 69
12*x + 10368)*exp(3*x) + (3456*x**2 - 20736*x + 31104)*exp(2*x) + (4608*x*
*2 - 27648*x + 41472)*exp(x)
```

3.137.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(17) = 34$.

Time = 0.20 (sec) , antiderivative size = 63, normalized size of antiderivative = 3.32

$$\int \left(-13824 + 4608x + e^{4x}\left(4320 - 3168x + 576x^2\right) + e^{3x}\left(24192 - 18432x + 3456x^2\right) + e^x\left(13824 - 18432x + 4608x^2\right) + e^{2x}\left(41472 - 34560x + 6912x^2\right)\right) dx = 2304\,x^2 + 144\left(x^2 - 6\,x + 9\right)e^{(4\,x)} + 1152\left(x^2 - 6\,x + 9\right)e^{(3\,x)} + 3456\left(x^2 - 6\,x + 9\right)e^{(2\,x)} + 4608\left(x^2 - 6\,x + 9\right)e^{x} - 13824\,x$$

input
```
integrate((576*x^2-3168*x+4320)*exp(x)^4+(3456*x^2-18432*x+24192)*exp(x)^3
+(6912*x^2-34560*x+41472)*exp(x)^2+(4608*x^2-18432*x+13824)*exp(x)+4608*x-
13824,x, algorithm=\
```

output
```
2304*x^2 + 144*(x^2 - 6*x + 9)*e^(4*x) + 1152*(x^2 - 6*x + 9)*e^(3*x) + 34
56*(x^2 - 6*x + 9)*e^(2*x) + 4608*(x^2 - 6*x + 9)*e^x - 13824*x
```

3.137.
$\int (-13824 + 4608x + e^{4x}(4320 - 3168x + 576x^2) + e^{3x}(24192 - 18432x + 3456x^2) + e^x(13824 - 18432x +$

3.137.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(17) = 34$.

Time = 0.29 (sec) , antiderivative size = 63, normalized size of antiderivative = 3.32

$$\int \left(-13824+4608x+e^{4x}\left(4320-3168x+576x^2\right)+e^{3x}\left(24192-18432x+3456x^2\right)+e^x\left(13824-18432x+4608x^2\right)+e^{2x}\left(41472-34560x+6912x^2\right)\right)\,dx = 2304\,x^2+144\,\left(x^2-6\,x+9\right)e^{(4\,x)}+1152\,\left(x^2-6\,x+9\right)e^{(3\,x)}+3456\,\left(x^2-6\,x+9\right)e^{(2\,x)}+4608\,\left(x^2-6\,x+9\right)e^x-13824\,x$$

input
```
integrate((576*x^2-3168*x+4320)*exp(x)^4+(3456*x^2-18432*x+24192)*exp(x)^3
+(6912*x^2-34560*x+41472)*exp(x)^2+(4608*x^2-18432*x+13824)*exp(x)+4608*x-
13824,x, algorithm=\
```

output
```
2304*x^2 + 144*(x^2 - 6*x + 9)*e^(4*x) + 1152*(x^2 - 6*x + 9)*e^(3*x) + 34
56*(x^2 - 6*x + 9)*e^(2*x) + 4608*(x^2 - 6*x + 9)*e^x - 13824*x
```

3.137.9 Mupad [B] (verification not implemented)

Time = 15.16 (sec) , antiderivative size = 91, normalized size of antiderivative = 4.79

$$\int \left(-13824+4608x+e^{4x}\left(4320-3168x+576x^2\right)+e^{3x}\left(24192-18432x+3456x^2\right)+e^x\left(13824-18432x+4608x^2\right)+e^{2x}\left(41472-34560x+6912x^2\right)\right)\,dx = 31104\,e^{2\,x}-13824\,x+10368\,e^{3\,x}+1296\,e^{4\,x}+41472\,e^x-20736\,x\,e^{2\,x}-6912\,x\,e^{3\,x}-864\,x\,e^{4\,x}+4608\,x^2\,e^x+3456\,x^2\,e^{2\,x}+1152\,x^2\,e^{3\,x}+144\,x^2\,e^{4\,x}-27648\,x\,e^x+2304\,x^2$$

input
```
int(4608*x + exp(4*x)*(576*x^2 - 3168*x + 4320) + exp(3*x)*(3456*x^2 - 184
32*x + 24192) + exp(2*x)*(6912*x^2 - 34560*x + 41472) + exp(x)*(4608*x^2 -
 18432*x + 13824) - 13824,x)
```

output
```
31104*exp(2*x) - 13824*x + 10368*exp(3*x) + 1296*exp(4*x) + 41472*exp(x) -
 20736*x*exp(2*x) - 6912*x*exp(3*x) - 864*x*exp(4*x) + 4608*x^2*exp(x) + 3
456*x^2*exp(2*x) + 1152*x^2*exp(3*x) + 144*x^2*exp(4*x) - 27648*x*exp(x) +
 2304*x^2
```

3.137.
$\int (-13824+4608x+e^{4x}(4320-3168x+576x^2)+e^{3x}(24192-18432x+3456x^2)+e^x(13824-18432x+$

3.138 $\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{3}}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e}$

3.138.1 Optimal result

Integrand size = 281, antiderivative size = 27

$$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}\left(24x^3+2x\log(2)\right)+e}$$
$$=\log\left(-x+\left(\left(e^{15+x}+2x\right)^2+\log(2)+\log\left(3x^2\right)\right)^2\right)$$

output
```
ln((ln(3*x^2)+(2*x+exp(x+15))^2+ln(2))^2-x)
```

3.138.2 Mathematica [F]

$$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}\left(24x^3+2x\log(2)\right)+e}$$
$$=\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}\left(24x^3+2x\log(2)\right)}$$

3.138.
$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log(2))+e^{15+x}(16x+96x^3+32x^4+(8x+8x^2)\log(2}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}(24x^3+2x\log(2))+e^{15+x}(32x^4+8x^2\log(2))+(2e^{30+2x}x+8e^{15+x}x^2}$

input
```
Integrate[(-x + 4*E^(60 + 4*x)*x + 16*x^2 + 64*x^4 + E^(45 + 3*x)*(8*x + 2
4*x^2) + (4 + 16*x^2)*Log[2] + E^(30 + 2*x)*(4 + 48*x^2 + 48*x^3 + 4*x*Log
[2]) + E^(15 + x)*(16*x + 96*x^3 + 32*x^4 + (8*x + 8*x^2)*Log[2]) + (4 + 4
*E^(30 + 2*x)*x + 16*x^2 + E^(15 + x)*(8*x + 8*x^2))*Log[3*x^2])/(E^(60 +
4*x)*x - x^2 + 8*E^(45 + 3*x)*x^2 + 16*x^5 + 8*x^3*Log[2] + x*Log[2]^2 + E
^(30 + 2*x)*(24*x^3 + 2*x*Log[2]) + E^(15 + x)*(32*x^4 + 8*x^2*Log[2]) + (
2*E^(30 + 2*x)*x + 8*E^(15 + x)*x^2 + 8*x^3 + 2*x*Log[2])*Log[3*x^2] + x*L
og[3*x^2]^2),x]
```

output
```
Integrate[(-x + 4*E^(60 + 4*x)*x + 16*x^2 + 64*x^4 + E^(45 + 3*x)*(8*x + 2
4*x^2) + (4 + 16*x^2)*Log[2] + E^(30 + 2*x)*(4 + 48*x^2 + 48*x^3 + 4*x*Log
[2]) + E^(15 + x)*(16*x + 96*x^3 + 32*x^4 + (8*x + 8*x^2)*Log[2]) + (4 + 4
*E^(30 + 2*x)*x + 16*x^2 + E^(15 + x)*(8*x + 8*x^2))*Log[3*x^2])/(E^(60 +
4*x)*x - x^2 + 8*E^(45 + 3*x)*x^2 + 16*x^5 + 8*x^3*Log[2] + x*Log[2]^2 + E
^(30 + 2*x)*(24*x^3 + 2*x*Log[2]) + E^(15 + x)*(32*x^4 + 8*x^2*Log[2]) + (
2*E^(30 + 2*x)*x + 8*E^(15 + x)*x^2 + 8*x^3 + 2*x*Log[2])*Log[3*x^2] + x*L
og[3*x^2]^2), x]
```

3.138.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{64x^4+16x^2+e^{3x+45}\left(24x^2+8x\right)+\left(16x^2+e^{x+15}\left(8x^2+8x\right)+4e^{2x+30}x+4\right)\log\left(3x^2\right)+\left(16x^2+4\right)\log(2)+}{16x^5+8x^3\log(2)+e^{2x+30}\left(24x^3+2x\log(2)\right)+8e^{3x+45}x^2-x^2+x\log^2\left(3x^2\right)+e^{x+15}\left(32x^4+\right.}$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{-64x^5-96e^{x+15}x^4+64x^4+96e^{x+15}x^3-48e^{2x+30}x^3-32x^3\log(2)+48e^{2x+30}x^2-8e^{3x+45}x^2-4x\log^2\left(3x\right.}{x\left(16x^4+32e^{x+15}x^3+\right.}\right.$$

$$\Big\downarrow \; 7299$$

$$\int \left(\frac{-64x^5-96e^{x+15}x^4+64x^4+96e^{x+15}x^3-48e^{2x+30}x^3-32x^3\log(2)+48e^{2x+30}x^2-8e^{3x+45}x^2-4x\log^2\left(3x\right.}{x\left(16x^4+32e^{x+15}x^3+\right.}\right.$$

3.138.
$$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}\left(8x+24x^2\right)+\left(4+16x^2\right)\log(2)+e^{30+2x}\left(4+48x^2+48x^3+4x\log(2)\right)+e^{15+x}\left(16x+96x^3+32x^4+\left(8x+8x^2\right)\log(\right.}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}\left(24x^3+2x\log(2)\right)+e^{15+x}\left(32x^4+8x^2\log(2)\right)+\left(2e^{30+2x}x+8e^{15+x}x^2\right.}$$

input
```
Int[(-x + 4*E^(60 + 4*x)*x + 16*x^2 + 64*x^4 + E^(45 + 3*x)*(8*x + 24*x^2)
 + (4 + 16*x^2)*Log[2] + E^(30 + 2*x)*(4 + 48*x^2 + 48*x^3 + 4*x*Log[2]) +
 E^(15 + x)*(16*x + 96*x^3 + 32*x^4 + (8*x + 8*x^2)*Log[2]) + (4 + 4*E^(30
 + 2*x)*x + 16*x^2 + E^(15 + x)*(8*x + 8*x^2))*Log[3*x^2])/(E^(60 + 4*x)*x
 - x^2 + 8*E^(45 + 3*x)*x^2 + 16*x^5 + 8*x^3*Log[2] + x*Log[2]^2 + E^(30 +
 2*x)*(24*x^3 + 2*x*Log[2]) + E^(15 + x)*(32*x^4 + 8*x^2*Log[2]) + (2*E^(3
0 + 2*x)*x + 8*E^(15 + x)*x^2 + 8*x^3 + 2*x*Log[2])*Log[3*x^2] + x*Log[3*x
^2]^2),x]
```

output
```
$Aborted
```

3.138.3.1 Defintions of rubi rules used

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.138.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 135 vs. $2(26) = 52$.

Time = 1.81 (sec) , antiderivative size = 136, normalized size of antiderivative = 5.04

method	result
parallelrisch	$\ln\left(\frac{e^{4x+60}}{16} + \frac{e^{3x+45}x}{2} + \frac{3\,e^{2x+30}x^2}{2} + 2\,e^{x+15}x^3 + x^4 + \frac{\ln(2)e^{2x+30}}{8} + \frac{\ln(2)e^{x+15}x}{2} + \frac{x^2\ln(2)}{2} + \frac{\ln(3x^2)e^{2x}}{8}\right.$
risch	$\ln\left(2\,e^{3x+45}x + 6\,e^{2x+30}x^2 - \frac{x}{4} + 2x^2\ln(2) + \frac{\ln(2)\ln(3)}{2} + 2x^2\ln(3) + \frac{\ln(3)^2}{4} + \frac{\ln(2)^2}{4} + \ln(x)^2\right.$

input
```
int(((4*x*exp(x+15)^2+(8*x^2+8*x)*exp(x+15)+16*x^2+4)*ln(3*x^2)+4*x*exp(x+
15)^4+(24*x^2+8*x)*exp(x+15)^3+(4*x*ln(2)+48*x^3+48*x^2+4)*exp(x+15)^2+((8
*x^2+8*x)*ln(2)+32*x^4+96*x^3+16*x)*exp(x+15)+(16*x^2+4)*ln(2)+64*x^4+16*x
^2-x)/(x*ln(3*x^2)^2+(2*x*exp(x+15)^2+8*x^2*exp(x+15)+2*x*ln(2)+8*x^3)*ln(
3*x^2)+x*exp(x+15)^4+8*x^2*exp(x+15)^3+(2*x*ln(2)+24*x^3)*exp(x+15)^2+(8*x
^2*ln(2)+32*x^4)*exp(x+15)+x*ln(2)^2+8*x^3*ln(2)+16*x^5-x^2),x,method=_RET
URNVERBOSE)
```

3.138.
$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log(2))+e^{15+x}(16x+96x^3+32x^4+(8x+8x^2)\log(2}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}(24x^3+2x\log(2))+e^{15+x}(32x^4+8x^2\log(2))+(2e^{30+2x}x+8e^{15+x}x^2}$

output
```
ln(1/16*exp(x+15)^4+1/2*x*exp(x+15)^3+3/2*exp(x+15)^2*x^2+2*exp(x+15)*x^3+
x^4+1/8*ln(2)*exp(x+15)^2+1/2*ln(2)*exp(x+15)*x+1/2*x^2*ln(2)+1/8*exp(x+15
)^2*ln(3*x^2)+1/2*exp(x+15)*ln(3*x^2)*x+1/2*ln(3*x^2)*x^2+1/16*ln(2)^2+1/8
*ln(2)*ln(3*x^2)+1/16*ln(3*x^2)^2-1/16*x)
```

3.138.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 105 vs. 2(26) = 52.

Time = 0.26 (sec) , antiderivative size = 105, normalized size of antiderivative = 3.89

$$\int \frac{-x + 4e^{60+4x}x + 16x^2 + 64x^4 + e^{45+3x}(8x + 24x^2) + (4 + 16x^2)\log(2) + e^{30+2x}(4 + 48x^2 + 48x^3 + 4x\log}{e^{60+4x}x - x^2 + 8e^{45+3x}x^2 + 16x^5 + 8x^3\log(2) + x\log^2(2) + e^{30+2x}(24x^3 + 2x\log(2)) + e}$$

$$= \log\left(16\,x^4 + 8\,x^2\log(2) + 8\,xe^{(3\,x+45)} + 2\left(12\,x^2 + \log(2)\right)e^{(2\,x+30)} + 8\left(4\,x^3 + x\log(2)\right)e^{(x+15)} + \log(2)^2 + 2\left(4\,x^2 + 4\,xe^{(x+15)} + e^{(2\,x+30)} + \log(2)\right)\log\left(3\,x^2\right) + \log\left(3\,x^2\right)^2 - x + e^{(4\,x+60)}\right)$$

input
```
integrate(((4*x*exp(x+15)^2+(8*x^2+8*x)*exp(x+15)+16*x^2+4)*log(3*x^2)+4*x
*exp(x+15)^4+(24*x^2+8*x)*exp(x+15)^3+(4*x*log(2)+48*x^3+48*x^2+4)*exp(x+1
5)^2+((8*x^2+8*x)*log(2)+32*x^4+96*x^3+16*x)*exp(x+15)+(16*x^2+4)*log(2)+6
4*x^4+16*x^2-x)/(x*log(3*x^2)^2+(2*x*exp(x+15)^2+8*x^2*exp(x+15)+2*x*log(2
)+8*x^3)*log(3*x^2)+x*exp(x+15)^4+8*x^2*exp(x+15)^3+(2*x*log(2)+24*x^3)*ex
p(x+15)^2+(8*x^2*log(2)+32*x^4)*exp(x+15)+x*log(2)^2+8*x^3*log(2)+16*x^5-x
^2),x, algorithm=\
```

output
```
log(16*x^4 + 8*x^2*log(2) + 8*x*e^(3*x + 45) + 2*(12*x^2 + log(2))*e^(2*x
+ 30) + 8*(4*x^3 + x*log(2))*e^(x + 15) + log(2)^2 + 2*(4*x^2 + 4*x*e^(x +
 15) + e^(2*x + 30) + log(2))*log(3*x^2) + log(3*x^2)^2 - x + e^(4*x + 60)
)
```

3.138.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 122 vs. 2(24) = 48.

Time = 1.07 (sec) , antiderivative size = 122, normalized size of antiderivative = 4.52

$$\int \frac{-x + 4e^{60+4x}x + 16x^2 + 64x^4 + e^{45+3x}(8x + 24x^2) + (4 + 16x^2)\log(2) + e^{30+2x}(4 + 48x^2 + 48x^3 + 4x\log}{e^{60+4x}x - x^2 + 8e^{45+3x}x^2 + 16x^5 + 8x^3\log(2) + x\log^2(2) + e^{30+2x}(24x^3 + 2x\log(2)) + e}$$

$$= \log\left(16x^4 + 8x^2\log\left(3x^2\right) + 8x^2\log(2) + 8xe^{3x+45} - x + \left(24x^2 + 2\log\left(3x^2\right) + 2\log(2)\right)e^{2x+30} + \left(32x^3\right.\right.$$

3.138. $\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log(2))+e^{15+x}(16x+96x^3+32x^4+(8x+8x^2)\log(}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}(24x^3+2x\log(2))+e^{15+x}(32x^4+8x^2\log(2))+(2e^{30+2x}x+8e^{15+x}x^2}$

input
```
integrate(((4*x*exp(x+15)**2+(8*x**2+8*x)*exp(x+15)+16*x**2+4)*ln(3*x**2)+
4*x*exp(x+15)**4+(24*x**2+8*x)*exp(x+15)**3+(4*x*ln(2)+48*x**3+48*x**2+4)*
exp(x+15)**2+((8*x**2+8*x)*ln(2)+32*x**4+96*x**3+16*x)*exp(x+15)+(16*x**2+
4)*ln(2)+64*x**4+16*x**2-x)/(x*ln(3*x**2)**2+(2*x*exp(x+15)**2+8*x**2*exp(
x+15)+2*x*ln(2)+8*x**3)*ln(3*x**2)+x*exp(x+15)**4+8*x**2*exp(x+15)**3+(2*x
*ln(2)+24*x**3)*exp(x+15)**2+(8*x**2*ln(2)+32*x**4)*exp(x+15)+x*ln(2)**2+8
*x**3*ln(2)+16*x**5-x**2),x)
```

output
```
log(16*x**4 + 8*x**2*log(3*x**2) + 8*x**2*log(2) + 8*x*exp(3*x + 45) - x +
 (24*x**2 + 2*log(3*x**2) + 2*log(2))*exp(2*x + 30) + (32*x**3 + 8*x*log(3
*x**2) + 8*x*log(2))*exp(x + 15) + exp(4*x + 60) + log(3*x**2)**2 + 2*log(
2)*log(3*x**2) + log(2)**2)
```

3.138.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 128 vs. 2(26) = 52.

Time = 0.39 (sec) , antiderivative size = 128, normalized size of antiderivative = 4.74

$$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log(2))+\cdots}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}\left(24x^3+2x\log(2)\right)+\cdots}$$
$$=\log\left(\left(16\,x^4+8\,x^2(\log(3)+\log(2))+2\left(12\,x^2e^{30}+(\log(3)+\log(2))e^{30}+2\,e^{30}\log(x)\right)e^{(2\,x)}+8\,xe^{(3\,x+45)}\cdots\right.\right.$$

input
```
integrate(((4*x*exp(x+15)^2+(8*x^2+8*x)*exp(x+15)+16*x^2+4)*log(3*x^2)+4*x
*exp(x+15)^4+(24*x^2+8*x)*exp(x+15)^3+(4*x*log(2)+48*x^3+48*x^2+4)*exp(x+1
5)^2+((8*x^2+8*x)*log(2)+32*x^4+96*x^3+16*x)*exp(x+15)+(16*x^2+4)*log(2)+6
4*x^4+16*x^2-x)/(x*log(3*x^2)^2+(2*x*exp(x+15)^2+8*x^2*exp(x+15)+2*x*log(2
)+8*x^3)*log(3*x^2)+x*exp(x+15)^4+8*x^2*exp(x+15)^3+(2*x*log(2)+24*x^3)*ex
p(x+15)^2+(8*x^2*log(2)+32*x^4)*exp(x+15)+x*log(2)^2+8*x^3*log(2)+16*x^5-x
^2),x, algorithm=\
```

output
```
log((16*x^4 + 8*x^2*(log(3) + log(2)) + 2*(12*x^2*e^30 + (log(3) + log(2))
*e^30 + 2*e^30*log(x))*e^(2*x) + 8*x*e^(3*x + 45) + 8*(4*x^3*e^15 + x*(log
(3) + log(2))*e^15 + 2*x*e^15*log(x))*e^x + log(3)^2 + 2*log(3)*log(2) + l
og(2)^2 + 4*(4*x^2 + log(3) + log(2))*log(x) + 4*log(x)^2 - x + e^(4*x + 6
0))*e^(-60))
```

3.138. $\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log(2))+e^{15+x}(16x+96x^3+32x^4+(8x+8x^2)\log(2)\cdots}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}(24x^3+2x\log(2))+e^{15+x}(32x^4+8x^2\log(2))+(2e^{30+2x}x+8e^{15+x}x^2\cdots}$

3.138.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 131 vs. 2(26) = 52.

Time = 0.46 (sec) , antiderivative size = 131, normalized size of antiderivative = 4.85

$$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log(2))+\ldots}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}\left(24x^3+2x\log(2)\right)+\ldots}$$
$$= \log\left(16x^4+32x^3e^{(x+15)}+24x^2e^{(2x+30)}+8x^2\log(2)+8xe^{(x+15)}\log(2)+8x^2\log(3x^2)+8xe^{(x+15)}\log(3x^2)+8xe^{(3x+45)}+2e^{(2x+30)}\log(2)+\log(2)^2+2e^{(2x+30)}\log(3x^2)+2\log(2)\log(3x^2)+\log(3x^2)^2-x+e^{(4x+60)}\right)$$

input
```
integrate(((4*x*exp(x+15)^2+(8*x^2+8*x)*exp(x+15)+16*x^2+4)*log(3*x^2)+4*x
*exp(x+15)^4+(24*x^2+8*x)*exp(x+15)^3+(4*x*log(2)+48*x^3+48*x^2+4)*exp(x+1
5)^2+((8*x^2+8*x)*log(2)+32*x^4+96*x^3+16*x)*exp(x+15)+(16*x^2+4)*log(2)+6
4*x^4+16*x^2-x)/(x*log(3*x^2)^2+(2*x*exp(x+15)^2+8*x^2*exp(x+15)+2*x*log(2
)+8*x^3)*log(3*x^2)+x*exp(x+15)^4+8*x^2*exp(x+15)^3+(2*x*log(2)+24*x^3)*ex
p(x+15)^2+(8*x^2*log(2)+32*x^4)*exp(x+15)+x*log(2)^2+8*x^3*log(2)+16*x^5-x
^2),x, algorithm=\
```

output
```
log(16*x^4 + 32*x^3*e^(x + 15) + 24*x^2*e^(2*x + 30) + 8*x^2*log(2) + 8*x*
e^(x + 15)*log(2) + 8*x^2*log(3*x^2) + 8*x*e^(x + 15)*log(3*x^2) + 8*x*e^(
3*x + 45) + 2*e^(2*x + 30)*log(2) + log(2)^2 + 2*e^(2*x + 30)*log(3*x^2) +
 2*log(2)*log(3*x^2) + log(3*x^2)^2 - x + e^(4*x + 60))
```

3.138.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log(2))+\ldots}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}\left(24x^3+2x\log(2)\right)+\ldots}$$
$$= \int \frac{e^{2x+30}\left(48x^3+48x^2+4\ln(2)\,x+4\right)-x+\ln(3x^2)\left(e^{x+15}\left(8x^2+8x\right)+4x\,e^{2x+30}+16x^2+4\right)+\ldots}{x\,e^{4x+60}+x\ln(2)^2+8x^3\ln(2)+\ln(3x^2)\left(2x\ln(2)+2x\,e^{2x+30}+8x^2\,e^{x+15}+8x^3\ldots\right)}$$

3.138.

$$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log(2))+e^{15+x}(16x+96x^3+32x^4+(8x+8x^2)\log(\ldots}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}(24x^3+2x\log(2))+e^{15+x}(32x^4+8x^2\log(2))+(2e^{30+2x}x+8e^{15+x}x^2\ldots}$$

input
```
int((exp(2*x + 30)*(4*x*log(2) + 48*x^2 + 48*x^3 + 4) - x + log(3*x^2)*(ex
p(x + 15)*(8*x + 8*x^2) + 4*x*exp(2*x + 30) + 16*x^2 + 4) + log(2)*(16*x^2
 + 4) + exp(3*x + 45)*(8*x + 24*x^2) + 4*x*exp(4*x + 60) + exp(x + 15)*(16
*x + log(2)*(8*x + 8*x^2) + 96*x^3 + 32*x^4) + 16*x^2 + 64*x^4)/(x*exp(4*x
 + 60) + x*log(2)^2 + 8*x^3*log(2) + log(3*x^2)*(2*x*log(2) + 2*x*exp(2*x
+ 30) + 8*x^2*exp(x + 15) + 8*x^3) + 8*x^2*exp(3*x + 45) + exp(2*x + 30)*(
2*x*log(2) + 24*x^3) + exp(x + 15)*(8*x^2*log(2) + 32*x^4) - x^2 + 16*x^5
+ x*log(3*x^2)^2),x)
```

output
```
int((exp(2*x + 30)*(4*x*log(2) + 48*x^2 + 48*x^3 + 4) - x + log(3*x^2)*(ex
p(x + 15)*(8*x + 8*x^2) + 4*x*exp(2*x + 30) + 16*x^2 + 4) + log(2)*(16*x^2
 + 4) + exp(3*x + 45)*(8*x + 24*x^2) + 4*x*exp(4*x + 60) + exp(x + 15)*(16
*x + log(2)*(8*x + 8*x^2) + 96*x^3 + 32*x^4) + 16*x^2 + 64*x^4)/(x*exp(4*x
 + 60) + x*log(2)^2 + 8*x^3*log(2) + log(3*x^2)*(2*x*log(2) + 2*x*exp(2*x
+ 30) + 8*x^2*exp(x + 15) + 8*x^3) + 8*x^2*exp(3*x + 45) + exp(2*x + 30)*(
2*x*log(2) + 24*x^3) + exp(x + 15)*(8*x^2*log(2) + 32*x^4) - x^2 + 16*x^5
+ x*log(3*x^2)^2), x)
```

3.138.

$$\int \frac{-x+4e^{60+4x}x+16x^2+64x^4+e^{45+3x}(8x+24x^2)+(4+16x^2)\log(2)+e^{30+2x}(4+48x^2+48x^3+4x\log(2))+e^{15+x}(16x+96x^3+32x^4+(8x+8x^2)\log(}{e^{60+4x}x-x^2+8e^{45+3x}x^2+16x^5+8x^3\log(2)+x\log^2(2)+e^{30+2x}(24x^3+2x\log(2))+e^{15+x}(32x^4+8x^2\log(2))+(2e^{30+2x}x+8e^{15+x}x^2}$$

3.139 $\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x}{x}\right.}}{-x+x^3}$

3.139.1 Optimal result

Integrand size = 126, antiderivative size = 35

$$\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x^2}{x}\right)}\left(2x+2x^2+2x^3-2x^4+(-2-2\right.}{-x+x^3}$$
$$= e^{e^2-\left(x-\log\left(\frac{1}{x}-x\right)\right)^2}-4(4-x)^2x^4$$

output
```
exp(exp(2)-(x-ln(1/x-x))^2)-4*x^4*(-x+4)^2
```

3.139.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.31

$$\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x^2}{x}\right)}\left(2x+2x^2+2x^3-2x^4+(-2-2\right.}{-x+x^3}$$
$$= e^{e^2-x^2-\log^2\left(\frac{1}{x}-x\right)}\left(\frac{1}{x}-x\right)^{2x}-4(-4+x)^2x^4$$

input
```
Integrate[(256*x^4 - 160*x^5 - 232*x^6 + 160*x^7 - 24*x^8 + E^(E^2 - x^2 +
 2*x*Log[(1 - x^2)/x] - Log[(1 - x^2)/x]^2)*(2*x + 2*x^2 + 2*x^3 - 2*x^4 +
 (-2 - 2*x - 2*x^2 + 2*x^3)*Log[(1 - x^2)/x]))/(-x + x^3),x]
```

3.139.

$$\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x^2}{x}\right)}\left(2x+2x^2+2x^3-2x^4+(-2-2x-2x^2+2x^3)\log\left(\frac{1-x^2}{x}\right)\right)}{-x+x^3}\,dx$$

output
```
E^(E^2 - x^2 - Log[x^(-1) - x]^2)*(x^(-1) - x)^(2*x) - 4*(-4 + x)^2*x^4
```

3.139.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-2x^4+2x^3+2x^2+\left(2x^3-2x^2-2x-2\right)\log\left(\frac{1-x^2}{x}\right)+2x\right)\exp\left(-x^2-\log^2\left(\frac{1-x^2}{x}\right)+2x\log\left(\frac{1-x^2}{x}\right)+e^2\right)}{x^3-x}$$

$$\Big\downarrow \; 2026$$

$$\int \frac{\left(-2x^4+2x^3+2x^2+\left(2x^3-2x^2-2x-2\right)\log\left(\frac{1-x^2}{x}\right)+2x\right)\exp\left(-x^2-\log^2\left(\frac{1-x^2}{x}\right)+2x\log\left(\frac{1-x^2}{x}\right)+e^2\right)}{x\left(x^2-1\right)}$$

$$\Big\downarrow \; 7276$$

$$\int \left(-\frac{24x^7}{x^2-1}+\frac{160x^6}{x^2-1}-\frac{232x^5}{x^2-1}-\frac{160x^4}{x^2-1}+\frac{256x^3}{x^2-1}+\frac{2\left(-x^3+x^2+x+1\right)\left(\frac{1-x^2}{x}\right)^{2x}e^{-x^2-\log^2\left(\frac{1}{x}-x\right)+e^2}\left(\log\left(\frac{1}{x}\right.\right.}{x\left(1-x^2\right)}\right.$$

$$\Big\downarrow \; 2009$$

$$2\int e^{-x^2-\log^2\left(\frac{1}{x}-x\right)+e^2}\left(\frac{1-x^2}{x}\right)^{2x}dx-2\int \frac{e^{-x^2-\log^2\left(\frac{1}{x}-x\right)+e^2}\left(\frac{1-x^2}{x}\right)^{2x}}{1-x}dx-2\int e^{-x^2-\log^2\left(\frac{1}{x}-x\right)+e^2}x\left(\frac{1-x^2}{x}\right)^{2x}dx-2\int \frac{e^{-x^2-\log^2\left(\frac{1}{x}-x\right)+e^2}\left(\frac{1-x^2}{x}\right)^{2x}}{x+1}dx+2\int e^{-x^2-\log^2\left(\frac{1}{x}-x\right)+e^2}\left(\frac{1-x^2}{x}\right)^{2x}\log\left(\frac{1-x^2}{x}\right)dx+2\int \frac{e^{-x^2-\log^2\left(\frac{1}{x}-x\right)+e^2}\left(\frac{1-x^2}{x}\right)^{2x}\log\left(\frac{1-x^2}{x}\right)}{-x-1}dx+2\int \frac{e^{-x^2-\log^2\left(\frac{1}{x}-x\right)+e^2}\left(\frac{1-x^2}{x}\right)^{2x}\log\left(\frac{1-x^2}{x}\right)}{1-x}dx+2\int \frac{e^{-x^2-\log^2\left(\frac{1}{x}-x\right)+e^2}\left(\frac{1-x^2}{x}\right)^{2x}\log\left(\frac{1-x^2}{x}\right)}{x}dx-4x^6+32x^5-64x^4$$

input
```
Int[(256*x^4 - 160*x^5 - 232*x^6 + 160*x^7 - 24*x^8 + E^(E^2 - x^2 + 2*x*L
og[(1 - x^2)/x] - Log[(1 - x^2)/x]^2)*(2*x + 2*x^2 + 2*x^3 - 2*x^4 + (-2 -
 2*x - 2*x^2 + 2*x^3)*Log[(1 - x^2)/x]))/(-x + x^3),x]
```

3.139.

$$\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x^2}{x}\right)}\left(2x+2x^2+2x^3-2x^4+\left(-2-2x-2x^2+2x^3\right)\log\left(\frac{1-x^2}{x}\right)\right)}{-x+x^3}dx$$

output
```
$Aborted
```

3.139.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.139.4 Maple [A] (verified)

Time = 1.89 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.57

method	result	size
parallelrisch	$-4x^{6}+32x^{5}-64x^{4}+{\mathrm e}^{-\ln\left(-\frac{x^{2}-1}{x}\right)^{2}+2x\ln\left(-\frac{x^{2}-1}{x}\right)+{\mathrm e}^{2}-x^{2}}$	55
default	${\mathrm e}^{-\ln\left(\frac{-x^{2}+1}{x}\right)^{2}+2x\ln\left(\frac{-x^{2}+1}{x}\right)+{\mathrm e}^{2}-x^{2}}-4x^{6}+32x^{5}-64x^{4}$	57
parts	${\mathrm e}^{-\ln\left(\frac{-x^{2}+1}{x}\right)^{2}+2x\ln\left(\frac{-x^{2}+1}{x}\right)+{\mathrm e}^{2}-x^{2}}-4x^{6}+32x^{5}-64x^{4}$	57
risch	$\left(\frac{-x^{2}+1}{x}\right)^{2x}{\mathrm e}^{-\ln\left(\frac{-x^{2}+1}{x}\right)^{2}+{\mathrm e}^{2}-x^{2}}-4x^{6}+32x^{5}-64x^{4}$	58

input
```
int((((2*x^3-2*x^2-2*x-2)*ln((-x^2+1)/x)-2*x^4+2*x^3+2*x^2+2*x)*exp(-ln((-
x^2+1)/x)^2+2*x*ln((-x^2+1)/x)+exp(2)-x^2)-24*x^8+160*x^7-232*x^6-160*x^5+
256*x^4)/(x^3-x),x,method=_RETURNVERBOSE)
```

output
```
-4*x^6+32*x^5-64*x^4+exp(-ln(-(x^2-1)/x)^2+2*x*ln(-(x^2-1)/x)+exp(2)-x^2)
```

3.139.

$$\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x^2}{x}\right)}\left(2x+2x^2+2x^3-2x^4+\left(-2-2x-2x^2+2x^3\right)\log\left(\frac{1-x^2}{x}\right)\right)}{-x+x^3}\,dx$$

3.139.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.54

$$\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x^2}{x}\right)}\left(2x+2x^2+2x^3-2x^4+(-2-2\right.}{-x+x^3}$$

$$= -4\,x^6+32\,x^5-64\,x^4+e^{\left(-x^2+2\,x\log\left(-\frac{x^2-1}{x}\right)-\log\left(-\frac{x^2-1}{x}\right)^2+e^2\right)}$$

input
```
integrate((((2*x^3-2*x^2-2*x-2)*log((-x^2+1)/x)-2*x^4+2*x^3+2*x^2+2*x)*exp
(-log((-x^2+1)/x)^2+2*x*log((-x^2+1)/x)+exp(2)-x^2)-24*x^8+160*x^7-232*x^6
-160*x^5+256*x^4)/(x^3-x),x, algorithm=\
```

output
```
-4*x^6 + 32*x^5 - 64*x^4 + e^(-x^2 + 2*x*log(-(x^2 - 1)/x) - log(-(x^2 - 1
)/x)^2 + e^2)
```

3.139.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.26

$$\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x^2}{x}\right)}\left(2x+2x^2+2x^3-2x^4+(-2-2\right.}{-x+x^3}$$

$$= -4x^6+32x^5-64x^4+e^{-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log\left(\frac{1-x^2}{x}\right)^2+e^2}$$

input
```
integrate((((2*x**3-2*x**2-2*x-2)*ln((-x**2+1)/x)-2*x**4+2*x**3+2*x**2+2*x
)*exp(-ln((-x**2+1)/x)**2+2*x*ln((-x**2+1)/x)+exp(2)-x**2)-24*x**8+160*x**
7-232*x**6-160*x**5+256*x**4)/(x**3-x),x)
```

output
```
-4*x**6 + 32*x**5 - 64*x**4 + exp(-x**2 + 2*x*log((1 - x**2)/x) - log((1 -
 x**2)/x)**2 + exp(2))
```

3.139.

$$\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x^2}{x}\right)}\left(2x+2x^2+2x^3-2x^4+(-2-2x-2x^2+2x^3)\log\left(\frac{1-x^2}{x}\right)\right)}{-x+x^3}\,dx$$

3.139.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 100 vs. $2(31) = 62$.

Time = 0.52 (sec) , antiderivative size = 100, normalized size of antiderivative = 2.86

$$\int \frac{256x^4 - 160x^5 - 232x^6 + 160x^7 - 24x^8 + e^{e^2 - x^2 + 2x\log\left(\frac{1-x^2}{x}\right) - \log^2\left(\frac{1-x^2}{x}\right)} \left(2x + 2x^2 + 2x^3 - 2x^4 + (-2 - 2}{-x + x^3}$$

$$= -4\,x^6 + 32\,x^5 - 64\,x^4 + e^{\left(-x^2 + 2\,x\log(x+1) - \log(x+1)^2 - 2\,x\log(x) + 2\,\log(x+1)\log(x) - \log(x)^2 + 2\,x\log(-x+1) - 2\,\log(x+1)\log(-x+1) + 2\,\log(x)\log(-x+1) - \log(}$$

input
```
integrate((((2*x^3-2*x^2-2*x-2)*log((-x^2+1)/x)-2*x^4+2*x^3+2*x^2+2*x)*exp
(-log((-x^2+1)/x)^2+2*x*log((-x^2+1)/x)+exp(2)-x^2)-24*x^8+160*x^7-232*x^6
-160*x^5+256*x^4)/(x^3-x),x, algorithm=\
```

output
```
-4*x^6 + 32*x^5 - 64*x^4 + e^(-x^2 + 2*x*log(x + 1) - log(x + 1)^2 - 2*x*l
og(x) + 2*log(x + 1)*log(x) - log(x)^2 + 2*x*log(-x + 1) - 2*log(x + 1)*lo
g(-x + 1) + 2*log(x)*log(-x + 1) - log(-x + 1)^2 + e^2)
```

3.139.8 Giac [A] (verification not implemented)

Time = 0.76 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.37

$$\int \frac{256x^4 - 160x^5 - 232x^6 + 160x^7 - 24x^8 + e^{e^2 - x^2 + 2x\log\left(\frac{1-x^2}{x}\right) - \log^2\left(\frac{1-x^2}{x}\right)} \left(2x + 2x^2 + 2x^3 - 2x^4 + (-2 - 2}{-x + x^3}$$

$$= -4\,x^6 + 32\,x^5 - 64\,x^4 + e^{\left(-x^2 + 2\,x\log\left(-x + \frac{1}{x}\right) - \log\left(-x + \frac{1}{x}\right)^2 + e^2\right)}$$

input
```
integrate((((2*x^3-2*x^2-2*x-2)*log((-x^2+1)/x)-2*x^4+2*x^3+2*x^2+2*x)*exp
(-log((-x^2+1)/x)^2+2*x*log((-x^2+1)/x)+exp(2)-x^2)-24*x^8+160*x^7-232*x^6
-160*x^5+256*x^4)/(x^3-x),x, algorithm=\
```

output
```
-4*x^6 + 32*x^5 - 64*x^4 + e^(-x^2 + 2*x*log(-x + 1/x) - log(-x + 1/x)^2 +
 e^2)
```

3.139.9 Mupad [B] (verification not implemented)

Time = 14.50 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.57

$$\int \frac{256x^4 - 160x^5 - 232x^6 + 160x^7 - 24x^8 + e^{e^2 - x^2 + 2x\log\left(\frac{1-x^2}{x}\right) - \log^2\left(\frac{1-x^2}{x}\right)} \left(2x + 2x^2 + 2x^3 - 2x^4 + (-2 - 2}{-x + x^3}$$

$$= 32\,x^5 - 64\,x^4 - 4\,x^6 + \mathrm{e}^{-x^2 - \ln\left(-\frac{x^2-1}{x}\right)^2 + \mathrm{e}^2} \left(-\frac{x^2 - 1}{x}\right)^{2\,x}$$

input
```
int(-(exp(exp(2) - log(-(x^2 - 1)/x)^2 + 2*x*log(-(x^2 - 1)/x) - x^2)*(2*x
 + 2*x^2 + 2*x^3 - 2*x^4 - log(-(x^2 - 1)/x)*(2*x + 2*x^2 - 2*x^3 + 2)) +
256*x^4 - 160*x^5 - 232*x^6 + 160*x^7 - 24*x^8)/(x - x^3),x)
```

output
```
32*x^5 - 64*x^4 - 4*x^6 + exp(exp(2) - log(-(x^2 - 1)/x)^2 - x^2)*(-(x^2 -
 1)/x)^(2*x)
```

3.139.

$$\int \frac{256x^4-160x^5-232x^6+160x^7-24x^8+e^{e^2-x^2+2x\log\left(\frac{1-x^2}{x}\right)-\log^2\left(\frac{1-x^2}{x}\right)}\left(2x+2x^2+2x^3-2x^4+\left(-2-2x-2x^2+2x^3\right)\log\left(\frac{1-x^2}{x}\right)\right)}{-x+x^3}\,dx$$

3.140 $\int \frac{-837x+e^x(-3-279x-279x^2)\log(3)+(-567x+e^x(-189x-189x^2)\log(3)) \log(x)+ \ldots}{}$

3.140.1 Optimal result

Integrand size = 131, antiderivative size = 27

$$\int \frac{-837x+e^x(-3-279x-279x^2)\log(3)+(-567x+e^x(-189x-189x^2)\log(3))\log(x)+(-96x+e^x(-\ldots}{837x+567x\log\ldots}$$
$$=3-x-\frac{1}{3}e^x\log(3)\left(x+\log\left(32-\frac{3}{3+\log(x)}\right)\right)$$

output
```
3-x-1/3*exp(x)*ln(3)*(x+ln(32-3/(3+ln(x))))
```

3.140.2 Mathematica [A] (verified)

Time = 0.70 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{-837x+e^x(-3-279x-279x^2)\log(3)+(-567x+e^x(-189x-189x^2)\log(3))\log(x)+(-96x+e^x(-\ldots}{837x+567x\log\ldots}$$
$$=\frac{1}{3}\left(-3x-e^x x\log(3)-e^x\log(3)\log\left(\frac{93+32\log(x)}{3+\log(x)}\right)\right)$$

input
```
Integrate[(-837*x + E^x*(-3 - 279*x - 279*x^2)*Log[3] + (-567*x + E^x*(-18
9*x - 189*x^2)*Log[3])*Log[x] + (-96*x + E^x*(-32*x - 32*x^2)*Log[3])*Log[
x]^2 + (-279*E^x*x*Log[3] - 189*E^x*x*Log[3]*Log[x] - 32*E^x*x*Log[3]*Log[
x]^2)*Log[(93 + 32*Log[x])/(3 + Log[x])])/(837*x + 567*x*Log[x] + 96*x*Log
[x]^2),x]
```

3.140.
$$\int \frac{-837x+e^x(-3-279x-279x^2)\log(3)+(-567x+e^x(-189x-189x^2)\log(3))\log(x)+(-96x+e^x(-32x-32x^2)\log(3))\log^2(x)+(-279e^x x\log(3)-1\ldots}{837x+567x\log(x)+96x\log^2(x)}$$

output
```
(-3*x - E^x*x*Log[3] - E^x*Log[3]*Log[(93 + 32*Log[x])/(3 + Log[x])])/3
```

3.140.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 111 vs. $2(27) = 54$.

Time = 3.34 (sec) , antiderivative size = 111, normalized size of antiderivative = 4.11, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.038$, Rules used = {7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^x\left(-32x^2-32x\right)\log(3)-96x\right)\log^2(x)+\left(e^x\left(-189x^2-189x\right)\log(3)-567x\right)\log(x)+e^x\left(-279x^2-279x-\right.}{837x+96x\log^2(x)+}$$

$\Big\downarrow$ 7292

$$\int \frac{\left(e^x\left(-32x^2-32x\right)\log(3)-96x\right)\log^2(x)+\left(e^x\left(-189x^2-189x\right)\log(3)-567x\right)\log(x)+e^x\left(-279x^2-279x-\right.}{3x\left(32\log^2(x)+189\log\right.}$$

$\Big\downarrow$ 27

$$\frac{1}{3}\int -\frac{32\left(3x+e^x\left(x^2+x\right)\log(3)\right)\log^2(x)+189\left(3x+e^x\left(x^2+x\right)\log(3)\right)\log(x)+837x+\left(32e^x x\log(3)\log^2(x)+\right.}{x\left(32\log^2(x)+189\log(x)-\right.}$$

$\Big\downarrow$ 25

$$-\frac{1}{3}\int \frac{32\left(3x+e^x\left(x^2+x\right)\log(3)\right)\log^2(x)+189\left(3x+e^x\left(x^2+x\right)\log(3)\right)\log(x)+837x+\left(32e^x x\log(3)\log^2(x)+\right.}{x\left(32\log^2(x)+189\log(x)-\right.}$$

$\Big\downarrow$ 7293

$$-\frac{1}{3}\int\left(\frac{e^x\log(3)\left(32\log^2(x)x^2+189\log(x)x^2+279x^2+32\log^2(x)x+189\log(x)x+32\log^2(x)\log\left(\frac{32\log(x)+93}{\log(x)+3}\right)\right.}{x(\log(x)+3)(32\log(x)+93)}\right.$$

$\Big\downarrow$ 2009

3.140.

$$\int \frac{-837x+e^x\left(-3-279x-279x^2\right)\log(3)+\left(-567x+e^x\left(-189x-189x^2\right)\log(3)\right)\log(x)+\left(-96x+e^x\left(-32x-32x^2\right)\log(3)\right)\log^2(x)+\left(-279e^x x\log(3)-1\right.}{837x+567x\log(x)+96x\log^2(x)}$$

$$\frac{1}{3}\left(-\frac{e^x\log(3)\left(279x^2+32x^2\log^2(x)+189x^2\log(x)+32x\log^2(x)\log\left(\frac{32\log(x)+93}{\log(x)+3}\right)+189x\log(x)\log\left(\frac{32\log(x)+93}{\log(x)+3}\right.\right.}{x(\log(x)+3)(32\log(x)+93)}\right.$$

input
```
Int[(-837*x + E^x*(-3 - 279*x - 279*x^2)*Log[3] + (-567*x + E^x*(-189*x -
189*x^2)*Log[3])*Log[x] + (-96*x + E^x*(-32*x - 32*x^2)*Log[3])*Log[x]^2 +
 (-279*E^x*x*Log[3] - 189*E^x*x*Log[3]*Log[x] - 32*E^x*x*Log[3]*Log[x]^2)*
Log[(93 + 32*Log[x])/(3 + Log[x])])/(837*x + 567*x*Log[x] + 96*x*Log[x]^2)
,x]
```

output
```
(-3*x - (E^x*Log[3]*(279*x^2 + 189*x^2*Log[x] + 32*x^2*Log[x]^2 + 279*x*Lo
g[(93 + 32*Log[x])/(3 + Log[x])] + 189*x*Log[x]*Log[(93 + 32*Log[x])/(3 +
Log[x])] + 32*x*Log[x]^2*Log[(93 + 32*Log[x])/(3 + Log[x])]))/(x*(3 + Log[
x])*(93 + 32*Log[x])))/3
```

3.140.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.140.

$$\int\frac{-837x+e^x\left(-3-279x-279x^2\right)\log(3)+\left(-567x+e^x\left(-189x-189x^2\right)\log(3)\right)\log(x)+\left(-96x+e^x\left(-32x-32x^2\right)\log(3)\right)\log^2(x)+\left(-279e^xx\log(3)-1\right.}{837x+567x\log(x)+96x\log^2(x)}$$

3.140.4 Maple [A] (verified)

Time = 12.41 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

method	result
parallelrisch	$-\frac{x\ln(3)\mathrm{e}^{x}}{3}-\frac{\ln(3)\ln\left(\frac{32\ln(x)+93}{3+\ln(x)}\right)\mathrm{e}^{x}}{3}-x$
risch	$-\frac{\ln(3)\mathrm{e}^{x}\ln\left(\frac{93}{32}+\ln(x)\right)}{3}+\frac{\ln(3)\mathrm{e}^{x}\ln(3+\ln(x))}{3}-x+\frac{i\pi\ln(3)\,\mathrm{csgn}\left(\frac{i}{3+\ln(x)}\right)\mathrm{csgn}\left(i\left(\frac{93}{32}+\ln(x)\right)\right)\mathrm{csgn}\left(\frac{i\left(\frac{93}{32}+\ln(x)\right)}{3+\ln(x)}\right)\mathrm{e}^{x}}{6}$

input
```
int(((-32*x*ln(3)*exp(x)*ln(x)^2-189*x*ln(3)*exp(x)*ln(x)-279*x*ln(3)*exp(
x))*ln((32*ln(x)+93)/(3+ln(x)))+((-32*x^2-32*x)*ln(3)*exp(x)-96*x)*ln(x)^2
+((-189*x^2-189*x)*ln(3)*exp(x)-567*x)*ln(x)+(-279*x^2-279*x-3)*ln(3)*exp(
x)-837*x)/(96*x*ln(x)^2+567*x*ln(x)+837*x),x,method=_RETURNVERBOSE)
```

output
```
-1/3*x*ln(3)*exp(x)-1/3*ln(3)*ln((32*ln(x)+93)/(3+ln(x)))*exp(x)-x
```

3.140.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{-837x+e^{x}(-3-279x-279x^{2})\log(3)+(-567x+e^{x}(-189x-189x^{2})\log(3))\log(x)+(-96x+e^{x}(-3}{837x+567x\,\mathrm{l}}$$

$$=-\frac{1}{3}\,xe^{x}\log\left(3\right)-\frac{1}{3}\,e^{x}\log\left(3\right)\log\left(\frac{32\,\log\left(x\right)+93}{\log\left(x\right)+3}\right)-x$$

input
```
integrate(((-32*x*log(3)*exp(x)*log(x)^2-189*x*log(3)*exp(x)*log(x)-279*x*
log(3)*exp(x))*log((32*log(x)+93)/(3+log(x)))+((-32*x^2-32*x)*log(3)*exp(x
)-96*x)*log(x)^2+((-189*x^2-189*x)*log(3)*exp(x)-567*x)*log(x)+(-279*x^2-2
79*x-3)*log(3)*exp(x)-837*x)/(96*x*log(x)^2+567*x*log(x)+837*x),x, algorit
hm=\
```

output
```
-1/3*x*e^x*log(3) - 1/3*e^x*log(3)*log((32*log(x) + 93)/(log(x) + 3)) - x
```

3.140.6 Sympy [A] (verification not implemented)

Time = 7.75 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{-837x + e^x(-3 - 279x - 279x^2)\log(3) + (-567x + e^x(-189x - 189x^2)\log(3))\log(x) + (-96x + e^x(-3}{837x + 567x\,\mathrm{l}}$$

$$= -x + \frac{\left(-x\log(3) - \log(3)\log\left(\frac{32\log(x)+93}{\log(x)+3}\right)\right)e^x}{3}$$

input
```
integrate(((-32*x*ln(3)*exp(x)*ln(x)**2-189*x*ln(3)*exp(x)*ln(x)-279*x*ln(
3)*exp(x))*ln((32*ln(x)+93)/(3+ln(x)))+((-32*x**2-32*x)*ln(3)*exp(x)-96*x)
*ln(x)**2+((-189*x**2-189*x)*ln(3)*exp(x)-567*x)*ln(x)+(-279*x**2-279*x-3)
*ln(3)*exp(x)-837*x)/(96*x*ln(x)**2+567*x*ln(x)+837*x),x)
```

output
```
-x + (-x*log(3) - log(3)*log((32*log(x) + 93)/(log(x) + 3)))*exp(x)/3
```

3.140.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

$$\int \frac{-837x + e^x(-3 - 279x - 279x^2)\log(3) + (-567x + e^x(-189x - 189x^2)\log(3))\log(x) + (-96x + e^x(-3}{837x + 567x\,\mathrm{l}}$$

$$= -\frac{1}{3}xe^x\log(3) - \frac{1}{3}e^x\log(3)\log(32\log(x) + 93) + \frac{1}{3}e^x\log(3)\log(\log(x) + 3) - x$$

input
```
integrate(((-32*x*log(3)*exp(x)*log(x)^2-189*x*log(3)*exp(x)*log(x)-279*x*
log(3)*exp(x))*log((32*log(x)+93)/(3+log(x)))+((-32*x^2-32*x)*log(3)*exp(x
)-96*x)*log(x)^2+((-189*x^2-189*x)*log(3)*exp(x)-567*x)*log(x)+(-279*x^2-2
79*x-3)*log(3)*exp(x)-837*x)/(96*x*log(x)^2+567*x*log(x)+837*x),x, algorit
hm=\
```

output
```
-1/3*x*e^x*log(3) - 1/3*e^x*log(3)*log(32*log(x) + 93) + 1/3*e^x*log(3)*lo
g(log(x) + 3) - x
```

3.140.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

$$\int \frac{-837x+e^x(-3-279x-279x^2)\log(3)+(-567x+e^x(-189x-189x^2)\log(3))\log(x)+(-96x+e^x(-3}{837x+567x\,\mathrm{l}}$$

$$=-\frac{1}{3}\,xe^x\log(3)-\frac{1}{3}\,e^x\log(3)\log(32\,\log(x)+93)+\frac{1}{3}\,e^x\log(3)\log(\log(x)+3)-x$$

input
```
integrate(((-32*x*log(3)*exp(x)*log(x)^2-189*x*log(3)*exp(x)*log(x)-279*x*
log(3)*exp(x))*log((32*log(x)+93)/(3+log(x)))+((-32*x^2-32*x)*log(3)*exp(x
)-96*x)*log(x)^2+((-189*x^2-189*x)*log(3)*exp(x)-567*x)*log(x)+(-279*x^2-2
79*x-3)*log(3)*exp(x)-837*x)/(96*x*log(x)^2+567*x*log(x)+837*x),x, algorit
hm=\
```

output
```
-1/3*x*e^x*log(3) - 1/3*e^x*log(3)*log(32*log(x) + 93) + 1/3*e^x*log(3)*lo
g(log(x) + 3) - x
```

3.140.9 Mupad [B] (verification not implemented)

Time = 15.38 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{-837x+e^x(-3-279x-279x^2)\log(3)+(-567x+e^x(-189x-189x^2)\log(3))\log(x)+(-96x+e^x(-3}{837x+567x\,\mathrm{l}}$$

$$=-x-\frac{x\,\mathrm{e}^x\,\ln(3)}{3}-\frac{\ln\left(\frac{32\,\ln(x)+93}{\ln(x)+3}\right)\,\mathrm{e}^x\,\ln(3)}{3}$$

input
```
int(-(837*x + log((32*log(x) + 93)/(log(x) + 3))*(279*x*exp(x)*log(3) + 18
9*x*exp(x)*log(3)*log(x) + 32*x*exp(x)*log(3)*log(x)^2) + log(x)*(567*x +
exp(x)*log(3)*(189*x + 189*x^2)) + log(x)^2*(96*x + exp(x)*log(3)*(32*x +
32*x^2)) + exp(x)*log(3)*(279*x + 279*x^2 + 3))/(837*x + 96*x*log(x)^2 + 5
67*x*log(x)),x)
```

output
```
- x - (x*exp(x)*log(3))/3 - (log((32*log(x) + 93)/(log(x) + 3))*exp(x)*log
(3))/3
```

3.140.

$$\int \frac{-837x+e^x(-3-279x-279x^2)\log(3)+(-567x+e^x(-189x-189x^2)\log(3))\log(x)+(-96x+e^x(-32x-32x^2)\log(3))\log^2(x)+(-279e^xx\log(3)-1}{837x+567x\log(x)+96x\log^2(x)}$$

3.141 $\int \left(2x+6x^2+4x^3+e^{\frac{8(5e^x-5\log(x))}{x}}(-40x^2+4x^3+e^x($

3.141.1 Optimal result

Integrand size = 122, antiderivative size = 27

$$\int \left(2x+6x^2+4x^3+e^{\frac{8(5e^x-5\log(x))}{x}}\left(-40x^2+4x^3+e^x\left(-40x^2+40x^3\right)+40x^2\log(x)\right)+e^{\frac{4(5e^x-5\log(x))}{x}}\left(40x+34x^2-8x^3+e^x\left(40x-40x^3\right)+\left(-40x-40x^2\right)\log(x)\right)\right)dx=\left(x+x^2-e^{\frac{20(e^x-\log(x))}{x}}x^2\right)^2$$

output
```
(x^2-exp(5*(exp(x)-ln(x))/x)^4*x^2+x)^2
```

3.141.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 57 vs. 2(27) = 54.

Time = 0.73 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.11

$$\int \left(2x+6x^2+4x^3+e^{\frac{8(5e^x-5\log(x))}{x}}\left(-40x^2+4x^3+e^x\left(-40x^2+40x^3\right)+40x^2\log(x)\right)+e^{\frac{4(5e^x-5\log(x))}{x}}\left(40x+34x^2-8x^3+e^x\left(40x-40x^3\right)+\left(-40x-40x^2\right)\log(x)\right)\right)dx=-2e^{\frac{20e^x}{x}}x^{3-\frac{20}{x}}(1+x)+x^2\left(1+2x+x^2+e^{\frac{40e^x}{x}}x^{2-\frac{40}{x}}\right)$$

input
```
Integrate[2*x + 6*x^2 + 4*x^3 + E^((8*(5*E^x - 5*Log[x]))/x)*(-40*x^2 + 4*
x^3 + E^x*(-40*x^2 + 40*x^3) + 40*x^2*Log[x]) + E^((4*(5*E^x - 5*Log[x]))/
x)*(40*x + 34*x^2 - 8*x^3 + E^x*(40*x - 40*x^3) + (-40*x - 40*x^2)*Log[x])
,x]
```

output
```
-2*E^((20*E^x)/x)*x^(3 - 20/x)*(1 + x) + x^2*(1 + 2*x + x^2 + E^((40*E^x)/
x)*x^(2 - 40/x))
```

3.141.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(4x^3+6x^2+e^{\frac{8(5e^x-5\log(x))}{x}}\left(4x^3-40x^2+40x^2\log(x)+e^x\left(40x^3-40x^2\right)\right)+e^{\frac{4(5e^x-5\log(x))}{x}}\left(-8x^3+e^x\left(40x-4\right.\right.\right.$$

$$\Big\downarrow \ 2009$$

$$-40\int e^{x+\frac{20(e^x-\log(x))}{x}}x^3dx-8\int e^{\frac{20(e^x-\log(x))}{x}}x^3dx+34\int e^{\frac{20(e^x-\log(x))}{x}}x^2dx-40\int e^{\frac{20(e^x-\log(x))}{x}}x^2\log(x)dx+40\int e^{x+\frac{20(e^x-\log(x))}{x}}xdx+40\int e^{\frac{20(e^x-\log(x))}{x}}xdx-40\int e^{\frac{20(e^x-\log(x))}{x}}x\log(x)dx+x^4+2x^3+x^2-\frac{e^{\frac{40e^x}{x}}x^{-40/x}\left(x^2+x^2(-\log(x))+e^x\left(x^2-x^3\right)\right)}{\frac{e^x-\frac{1}{x}}{x}-\frac{e^x-\log(x)}{x^2}}$$

input
```
Int[2*x + 6*x^2 + 4*x^3 + E^((8*(5*E^x - 5*Log[x]))/x)*(-40*x^2 + 4*x^3 +
E^x*(-40*x^2 + 40*x^3) + 40*x^2*Log[x]) + E^((4*(5*E^x - 5*Log[x]))/x)*(40
*x + 34*x^2 - 8*x^3 + E^x*(40*x - 40*x^3) + (-40*x - 40*x^2)*Log[x]),x]
```

output
```
$Aborted
```

3.141.
$\int \left(2x+6x^2+4x^3+e^{\frac{8(5e^x-5\log(x))}{x}}(-40x^2+4x^3+e^x(-40x^2+40x^3)+40x^2\log(x))+e^{\frac{4(5e^x-5\log(x))}{x}}(40x+3\right.$

3.141.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.141.4 Maple [A] (verified)

Time = 3.83 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.89

method	result	size
risch	$x^4 e^{\frac{40\,e^x-40\ln(x)}{x}} - 2x^3(1+x)\,e^{\frac{-20\ln(x)+20\,e^x}{x}} + x^4 + 2x^3 + x^2$	51
parallelrisch	$x^4 e^{-\frac{40(\ln(x)-e^x)}{x}} - 2\,e^{-\frac{20(\ln(x)-e^x)}{x}} x^4 - 2\,e^{-\frac{20(\ln(x)-e^x)}{x}} x^3 + x^4 + 2x^3 + x^2$	72

input
```
int((40*x^2*ln(x)+(40*x^3-40*x^2)*exp(x)+4*x^3-40*x^2)*exp((-5*ln(x)+5*exp
(x))/x)^8+((-40*x^2-40*x)*ln(x)+(-40*x^3+40*x)*exp(x)-8*x^3+34*x^2+40*x)*e
xp((-5*ln(x)+5*exp(x))/x)^4+4*x^3+6*x^2+2*x,x,method=_RETURNVERBOSE)
```

output
```
x^4*exp(40*(exp(x)-ln(x))/x)-2*x^3*(1+x)*exp(20*(exp(x)-ln(x))/x)+x^4+2*x^
3+x^2
```

3.141.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.89

$$\int \left(2x + 6x^2 + 4x^3 + e^{\frac{8(5e^x-5\log(x))}{x}}\left(-40x^2 + 4x^3 + e^x\left(-40x^2 + 40x^3\right) + 40x^2\log(x)\right) + e^{\frac{4(5e^x-5\log(x))}{x}}\left(40x + 34x^2 - 8x^3 + e^x\left(40x - 40x^3\right) + \left(-40x - 40x^2\right)\log(x)\right)\right) dx = x^4 e^{\left(\frac{40\,(e^x-\log(x))}{x}\right)} + x^4 + 2\,x^3 + x^2 - 2\,\left(x^4 + x^3\right)e^{\left(\frac{20\,(e^x-\log(x))}{x}\right)}$$

input
```
integrate((40*x^2*log(x)+(40*x^3-40*x^2)*exp(x)+4*x^3-40*x^2)*exp((-5*log(
x)+5*exp(x))/x)^8+((-40*x^2-40*x)*log(x)+(-40*x^3+40*x)*exp(x)-8*x^3+34*x^
2+40*x)*exp((-5*log(x)+5*exp(x))/x)^4+4*x^3+6*x^2+2*x,x, algorithm=\
```

output
```
x^4*e^(40*(e^x - log(x))/x) + x^4 + 2*x^3 + x^2 - 2*(x^4 + x^3)*e^(20*(e^x
 - log(x))/x)
```

3.141.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(22) = 44$.

Time = 0.23 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.96

$$\int \left(2x + 6x^2 + 4x^3 + e^{\frac{8(5e^x - 5\log(x))}{x}}\left(-40x^2 + 4x^3 + e^x\left(-40x^2 + 40x^3\right) + 40x^2\log(x)\right) + e^{\frac{4(5e^x - 5\log(x))}{x}}\left(40x + 34x^2 - 8x^3 + e^x\left(40x - 40x^3\right) + \left(-40x - 40x^2\right)\log(x)\right)\right) dx = x^4 e^{\frac{8\cdot(5e^x - 5\log(x))}{x}} + x^4 + 2x^3 + x^2 + \left(-2x^4 - 2x^3\right) e^{\frac{4\cdot(5e^x - 5\log(x))}{x}}$$

input
```
integrate((40*x**2*ln(x)+(40*x**3-40*x**2)*exp(x)+4*x**3-40*x**2)*exp((-5*
ln(x)+5*exp(x))/x)**8+((-40*x**2-40*x)*ln(x)+(-40*x**3+40*x)*exp(x)-8*x**3
+34*x**2+40*x)*exp((-5*ln(x)+5*exp(x))/x)**4+4*x**3+6*x**2+2*x,x)
```

output
```
x**4*exp(8*(5*exp(x) - 5*log(x))/x) + x**4 + 2*x**3 + x**2 + (-2*x**4 - 2*
x**3)*exp(4*(5*exp(x) - 5*log(x))/x)
```

3.141.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(28) = 56$.

Time = 0.20 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.11

$$\int \left(2x + 6x^2 + 4x^3 + e^{\frac{8(5e^x - 5\log(x))}{x}}\left(-40x^2 + 4x^3 + e^x\left(-40x^2 + 40x^3\right) + 40x^2\log(x)\right) + e^{\frac{4(5e^x - 5\log(x))}{x}}\left(40x + 34x^2 - 8x^3 + e^x\left(40x - 40x^3\right) + \left(-40x - 40x^2\right)\log(x)\right)\right) dx = x^4 e^{\left(\frac{40\,e^x}{x} - \frac{40\,\log(x)}{x}\right)} + x^4 + 2\,x^3 + x^2 - 2\,\left(x^4 + x^3\right)e^{\left(\frac{20\,e^x}{x} - \frac{20\,\log(x)}{x}\right)}$$

input
```
integrate((40*x^2*log(x)+(40*x^3-40*x^2)*exp(x)+4*x^3-40*x^2)*exp((-5*log(
x)+5*exp(x))/x)^8+((-40*x^2-40*x)*log(x)+(-40*x^3+40*x)*exp(x)-8*x^3+34*x^
2+40*x)*exp((-5*log(x)+5*exp(x))/x)^4+4*x^3+6*x^2+2*x,x, algorithm=\
```

output
```
x^4*e^(40*e^x/x - 40*log(x)/x) + x^4 + 2*x^3 + x^2 - 2*(x^4 + x^3)*e^(20*e
^x/x - 20*log(x)/x)
```

3.141.

$\int \left(2x + 6x^2 + 4x^3 + e^{\frac{8(5e^x - 5\log(x))}{x}}(-40x^2 + 4x^3 + e^x(-40x^2 + 40x^3) + 40x^2\log(x)) + e^{\frac{4(5e^x - 5\log(x))}{x}}(40x + 3\right.$

3.141.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(28) = 56$.

Time = 0.30 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.41

$$\int \left(2x+6x^2+4x^3+e^{\frac{8(5e^x-5\log(x))}{x}}\left(-40x^2+4x^3+e^x\left(-40x^2+40x^3\right)+40x^2\log(x)\right)+e^{\frac{4(5e^x-5\log(x))}{x}}\left(40x+34x^2-8x^3+e^x\left(40x-40x^3\right)+\left(-40x-40x^2\right)\log(x)\right)\right)dx = x^4e^{\left(\frac{40\,(e^x-\log(x))}{x}\right)} - 2\,x^4e^{\left(\frac{20\,(e^x-\log(x))}{x}\right)} + x^4 - 2\,x^3e^{\left(\frac{20\,(e^x-\log(x))}{x}\right)} + 2\,x^3 + x^2$$

input
```
integrate((40*x^2*log(x)+(40*x^3-40*x^2)*exp(x)+4*x^3-40*x^2)*exp((-5*log(
x)+5*exp(x))/x)^8+((-40*x^2-40*x)*log(x)+(-40*x^3+40*x)*exp(x)-8*x^3+34*x^
2+40*x)*exp((-5*log(x)+5*exp(x))/x)^4+4*x^3+6*x^2+2*x,x, algorithm=\
```

output
```
x^4*e^(40*(e^x - log(x))/x) - 2*x^4*e^(20*(e^x - log(x))/x) + x^4 - 2*x^3*
e^(20*(e^x - log(x))/x) + 2*x^3 + x^2
```

3.141.9 Mupad [B] (verification not implemented)

Time = 15.75 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.33

$$\int \left(2x+6x^2+4x^3+e^{\frac{8(5e^x-5\log(x))}{x}}\left(-40x^2+4x^3+e^x\left(-40x^2+40x^3\right)+40x^2\log(x)\right)+e^{\frac{4(5e^x-5\log(x))}{x}}\left(40x+34x^2-8x^3+e^x\left(40x-40x^3\right)+\left(-40x-40x^2\right)\log(x)\right)\right)dx = x^2 + 2\,x^3 + x^4 - \frac{\mathrm{e}^{\frac{20\,\mathrm{e}^x}{x}}\,\left(2\,x^4+2\,x^3\right)}{x^{20/x}} + \frac{x^4\,\mathrm{e}^{\frac{40\,\mathrm{e}^x}{x}}}{x^{40/x}}$$

input
```
int(2*x - exp((8*(5*exp(x) - 5*log(x)))/x)*(exp(x)*(40*x^2 - 40*x^3) - 40*
x^2*log(x) + 40*x^2 - 4*x^3) + 6*x^2 + 4*x^3 + exp((4*(5*exp(x) - 5*log(x)
))/x)*(40*x + exp(x)*(40*x - 40*x^3) - log(x)*(40*x + 40*x^2) + 34*x^2 - 8
*x^3),x)
```

output
```
x^2 + 2*x^3 + x^4 - (exp((20*exp(x))/x)*(2*x^3 + 2*x^4))/x^(20/x) + (x^4*e
xp((40*exp(x))/x))/x^(40/x)
```

3.142 $\int \frac{-240e^4-120e^2x-15x^2+e^{\frac{4+3x+2x^2}{4e^2+x}}\left(-4x^2+2x^4+e^2\left(12x^2+16x^3\right)\right)}{16e^4x^2+8e^2x^3+x^4} dx$

3.142.1 Optimal result

Integrand size = 89, antiderivative size = 35

$$\int \frac{-240e^4-120e^2x-15x^2+e^{\frac{4+3x+2x^2}{4e^2+x}}\left(-4x^2+2x^4+e^2(12x^2+16x^3)\right)}{16e^4x^2+8e^2x^3+x^4} dx = e^{\frac{-x+x^2+(2+x)^2}{4e^2+x}}+\frac{3(5-x)}{x}$$

output
```
3*(5-x)/x+exp(((2+x)^2+x^2-x)/(4*exp(1)^2+x))
```

3.142.2 Mathematica [A] (verified)

Time = 1.01 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.80

$$\int \frac{-240e^4-120e^2x-15x^2+e^{\frac{4+3x+2x^2}{4e^2+x}}\left(-4x^2+2x^4+e^2(12x^2+16x^3)\right)}{16e^4x^2+8e^2x^3+x^4} dx = e^{\frac{4+3x+2x^2}{4e^2+x}}+\frac{15}{x}$$

input
```
Integrate[(-240*E^4 - 120*E^2*x - 15*x^2 + E^((4 + 3*x + 2*x^2)/(4*E^2 + x
))*(-4*x^2 + 2*x^4 + E^2*(12*x^2 + 16*x^3)))/(16*E^4*x^2 + 8*E^2*x^3 + x^4
),x]
```

output
```
E^((4 + 3*x + 2*x^2)/(4*E^2 + x)) + 15/x
```

3.142.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-15x^2+e^{\frac{2x^2+3x+4}{x+4e^2}}\left(2x^4-4x^2+e^2\left(16x^3+12x^2\right)\right)-120e^2x-240e^4}{x^4+8e^2x^3+16e^4x^2}dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{-15x^2+e^{\frac{2x^2+3x+4}{x+4e^2}}\left(2x^4-4x^2+e^2\left(16x^3+12x^2\right)\right)-120e^2x-240e^4}{x^2\left(x^2+8e^2x+16e^4\right)}dx$$

$$\Big\downarrow \ 2007$$

$$\int \frac{-15x^2+e^{\frac{2x^2+3x+4}{x+4e^2}}\left(2x^4-4x^2+e^2\left(16x^3+12x^2\right)\right)-120e^2x-240e^4}{x^2\left(x+4e^2\right)^2}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{2e^{\frac{2x^2+3x+4}{x+4e^2}}\left(x^2+8e^2x-2\left(1-3e^2\right)\right)}{\left(x+4e^2\right)^2}-\frac{15}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$2\int e^{\frac{2x^2+3x+4}{x+4e^2}}dx-4\left(1-3e^2+8e^4\right)\int \frac{e^{\frac{2x^2+3x+4}{x+4e^2}}}{\left(x+4e^2\right)^2}dx+\frac{15}{x}$$

input
```
Int[(-240*E^4 - 120*E^2*x - 15*x^2 + E^((4 + 3*x + 2*x^2)/(4*E^2 + x))*(-4
*x^2 + 2*x^4 + E^2*(12*x^2 + 16*x^3)))/(16*E^4*x^2 + 8*E^2*x^3 + x^4),x]
```

output
```
$Aborted
```

3.142.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.142.4 Maple [A] (verified)

Time = 1.13 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.77

method	result	size
risch	$\frac{15}{x}+\mathrm{e}^{\frac{2x^2+3x+4}{4\,\mathrm{e}^2+x}}$	27
parallelrisch	$\frac{\mathrm{e}^{\frac{2x^2+3x+4}{4\,\mathrm{e}^2+x}}x+15}{x}$	31
parts	$\frac{15}{x}+\frac{\mathrm{e}^{\frac{2x^2+3x+4}{4\,\mathrm{e}^2+x}}x+4\,\mathrm{e}^2\mathrm{e}^{\frac{2x^2+3x+4}{4\,\mathrm{e}^2+x}}}{4\,\mathrm{e}^2+x}$	71
norman	$\frac{\mathrm{e}^{\frac{2x^2+3x+4}{4\,\mathrm{e}^2+x}}x^2+15x+60\,\mathrm{e}^2+4x\,\mathrm{e}^2\mathrm{e}^{\frac{2x^2+3x+4}{4\,\mathrm{e}^2+x}}}{x(4\,\mathrm{e}^2+x)}$	80

input
```
int((((16*x^3+12*x^2)*exp(1)^2+2*x^4-4*x^2)*exp((2*x^2+3*x+4)/(4*exp(1)^2+
x))-240*exp(1)^4-120*x*exp(1)^2-15*x^2)/(16*x^2*exp(1)^4+8*x^3*exp(1)^2+x^
4),x,method=_RETURNVERBOSE)
```

output
```
15/x+exp((2*x^2+3*x+4)/(4*exp(2)+x))
```

3.142.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.80

$$\int \frac{-240e^4-120e^2x-15x^2+e^{\frac{4+3x+2x^2}{4e^2+x}}\left(-4x^2+2x^4+e^2\left(12x^2+16x^3\right)\right)}{16e^4x^2+8e^2x^3+x^4}\,dx$$
$$=\frac{xe^{\left(\frac{2\,x^2+3\,x+4}{x+4\,e^2}\right)}+15}{x}$$

input
```
integrate((((16*x^3+12*x^2)*exp(1)^2+2*x^4-4*x^2)*exp((2*x^2+3*x+4)/(4*exp
(1)^2+x))-240*exp(1)^4-120*x*exp(1)^2-15*x^2)/(16*x^2*exp(1)^4+8*x^3*exp(1
)^2+x^4),x, algorithm=\
```

output
```
(x*e^((2*x^2 + 3*x + 4)/(x + 4*e^2)) + 15)/x
```

3.142.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.57

$$\int \frac{-240e^4-120e^2x-15x^2+e^{\frac{4+3x+2x^2}{4e^2+x}}(-4x^2+2x^4+e^2(12x^2+16x^3))}{16e^4x^2+8e^2x^3+x^4}\,dx = e^{\frac{2x^2+3x+4}{x+4e^2}}+\frac{15}{x}$$

input
```
integrate((((16*x**3+12*x**2)*exp(1)**2+2*x**4-4*x**2)*exp((2*x**2+3*x+4)/
(4*exp(1)**2+x))-240*exp(1)**4-120*x*exp(1)**2-15*x**2)/(16*x**2*exp(1)**4
+8*x**3*exp(1)**2+x**4),x)
```

output
```
exp((2*x**2 + 3*x + 4)/(x + 4*exp(2))) + 15/x
```

3.142.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(31) = 62.

Time = 0.28 (sec) , antiderivative size = 132, normalized size of antiderivative = 3.77

$$\begin{aligned}&\int \frac{-240e^4-120e^2x-15x^2+e^{\frac{4+3x+2x^2}{4e^2+x}}(-4x^2+2x^4+e^2(12x^2+16x^3))}{16e^4x^2+8e^2x^3+x^4}\,dx\\&=-\frac{15}{2}\left(e^{(-6)}\log\left(x+4\,e^2\right)-e^{(-6)}\log\left(x\right)-\frac{4\,(x+2\,e^2)}{x^2e^4+4\,xe^6}\right)e^4\\&\quad+\frac{15}{2}\left(e^{(-4)}\log\left(x+4\,e^2\right)-e^{(-4)}\log\left(x\right)-\frac{4}{xe^2+4\,e^4}\right)e^2\\&\quad+\frac{15}{x+4\,e^2}+e^{\left(2\,x+\frac{32\,e^4}{x+4\,e^2}-\frac{12\,e^2}{x+4\,e^2}+\frac{4}{x+4\,e^2}-8\,e^2+3\right)}\end{aligned}$$

input
```
integrate((((16*x^3+12*x^2)*exp(1)^2+2*x^4-4*x^2)*exp((2*x^2+3*x+4)/(4*exp
(1)^2+x))-240*exp(1)^4-120*x*exp(1)^2-15*x^2)/(16*x^2*exp(1)^4+8*x^3*exp(1
)^2+x^4),x, algorithm=\
```

output
```
-15/2*(e^(-6)*log(x + 4*e^2) - e^(-6)*log(x) - 4*(x + 2*e^2)/(x^2*e^4 + 4*
x*e^6))*e^4 + 15/2*(e^(-4)*log(x + 4*e^2) - e^(-4)*log(x) - 4/(x*e^2 + 4*e
^4))*e^2 + 15/(x + 4*e^2) + e^(2*x + 32*e^4/(x + 4*e^2) - 12*e^2/(x + 4*e^
2) + 4/(x + 4*e^2) - 8*e^2 + 3)
```

3.142.8 Giac [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.49

$$\int \frac{-240e^4-120e^2x-15x^2+e^{\frac{4+3x+2x^2}{4e^2+x}}(-4x^2+2x^4+e^2(12x^2+16x^3))}{16e^4x^2+8e^2x^3+x^4}\,dx$$
$$=\frac{\left(xe^{\left((2\,e^2+1)e^{(-2)}+\frac{2\,x^2e^2+3\,xe^2-x}{xe^2+4\,e^4}\right)}+15\,e^2\right)e^{(-2)}}{x}$$

input
```
integrate((((16*x^3+12*x^2)*exp(1)^2+2*x^4-4*x^2)*exp((2*x^2+3*x+4)/(4*exp
(1)^2+x))-240*exp(1)^4-120*x*exp(1)^2-15*x^2)/(16*x^2*exp(1)^4+8*x^3*exp(1
)^2+x^4),x, algorithm=\
```

output
```
(x*e^((2*e^2 + 1)*e^(-2) + (2*x^2*e^2 + 3*x*e^2 - x)/(x*e^2 + 4*e^4)) + 15
*e^2)*e^(-2)/x
```

3.142.9 Mupad [B] (verification not implemented)

Time = 0.62 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.26

$$\int \frac{-240e^4-120e^2x-15x^2+e^{\frac{4+3x+2x^2}{4e^2+x}}(-4x^2+2x^4+e^2(12x^2+16x^3))}{16e^4x^2+8e^2x^3+x^4}\,dx$$
$$=\frac{15}{x}+\mathrm{e}^{\frac{3\,x}{x+4\,\mathrm{e}^2}}\,\mathrm{e}^{\frac{2\,x^2}{x+4\,\mathrm{e}^2}}\,\mathrm{e}^{\frac{4}{x+4\,\mathrm{e}^2}}$$

input
```
int(-(240*exp(4) + 120*x*exp(2) + 15*x^2 - exp((3*x + 2*x^2 + 4)/(x + 4*ex
p(2)))*(exp(2)*(12*x^2 + 16*x^3) - 4*x^2 + 2*x^4))/(8*x^3*exp(2) + 16*x^2*
exp(4) + x^4),x)
```

output
```
15/x + exp((3*x)/(x + 4*exp(2)))*exp((2*x^2)/(x + 4*exp(2)))*exp(4/(x + 4*
exp(2)))
```

3.143 $\int \frac{e^{-5+\left(-2x+x^2\right)\log(2)}(-6+6x)\log(2)}{-20+3e^{-5+\left(-2x+x^2\right)\log(2)}}\,dx$

3.143.1 Optimal result

Integrand size = 42, antiderivative size = 20

$$\int \frac{e^{-5+\left(-2x+x^2\right)\log(2)}(-6+6x)\log(2)}{-20+3e^{-5+\left(-2x+x^2\right)\log(2)}}\,dx = 3+\log\left(-5+\frac{3}{4}e^{-5+(-2+x)x\log(2)}\right)$$

output
```
3+ln(3/4*exp((-2+x)*x*ln(2)-5)-5)
```

3.143.2 Mathematica [F]

$$\int \frac{e^{-5+\left(-2x+x^2\right)\log(2)}(-6+6x)\log(2)}{-20+3e^{-5+\left(-2x+x^2\right)\log(2)}}\,dx = \int \frac{e^{-5+\left(-2x+x^2\right)\log(2)}(-6+6x)\log(2)}{-20+3e^{-5+\left(-2x+x^2\right)\log(2)}}\,dx$$

input
```
Integrate[(E^(-5 + (-2*x + x^2)*Log[2])*(-6 + 6*x)*Log[2])/(-20 + 3*E^(-5
+ (-2*x + x^2)*Log[2])),x]
```

output
```
Integrate[(E^(-5 + (-2*x + x^2)*Log[2])*(-6 + 6*x)*Log[2])/(-20 + 3*E^(-5
+ (-2*x + x^2)*Log[2])), x]
```

3.143.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {27, 27, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(6x-6)\log(2)e^{(x^2-2x)\log(2)-5}}{3e^{(x^2-2x)\log(2)-5}-20}dx$$

$$\Big\downarrow \text{27}$$

$$\log(2)\int \frac{3\ 2^{x^2-2x+1}(1-x)}{\left(20-\frac{3\ 2^{x^2-2x}}{e^5}\right)e^5}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{3\log(2)\int \frac{2^{x^2-2x+1}(1-x)}{20-\frac{3\ 2^{x^2-2x}}{e^5}}dx}{e^5}$$

$$\Big\downarrow \text{7235}$$

$$\frac{3\log(2)\log\left(-2^{-2x}\left(3\ 2^{x^2}-5e^5 2^{2x+2}\right)\right)}{\log(8)}$$

input
```
Int[(E^(-5 + (-2*x + x^2)*Log[2])*(-6 + 6*x)*Log[2])/(-20 + 3*E^(-5 + (-2*
x + x^2)*Log[2])),x]
```

output
```
(3*Log[2]*Log[-((3*2^x^2 - 5*2^(2 + 2*x)*E^5)/2^(2*x))])/Log[8]
```

3.143.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.143.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result	size
risch	$\ln\left(2^{(-2+x)x} \mathrm{e}^{-5}-\frac{20}{3}\right)+5$	16
parallelrisch	$\ln\left(\mathrm{e}^{\left(x^{2}-2x\right)\ln(2)-5}-\frac{20}{3}\right)$	17
norman	$\ln\left(3\,\mathrm{e}^{\left(x^{2}-2x\right)\ln(2)-5}-20\right)$	19

input
```
int((6*x-6)*ln(2)*exp((x^2-2*x)*ln(2)-5)/(3*exp((x^2-2*x)*ln(2)-5)-20),x,m
ethod=_RETURNVERBOSE)
```

output
```
ln(2^((-2+x)*x)*exp(-5)-20/3)+5
```

3.143.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{e^{-5+(-2x+x^2)\log(2)}(-6+6x)\log(2)}{-20+3e^{-5+(-2x+x^2)\log(2)}}\,dx = \log\left(3\,e^{\left(\left(x^2-2\,x\right)\log(2)-5\right)}-20\right)$$

input
```
integrate((6*x-6)*log(2)*exp((x^2-2*x)*log(2)-5)/(3*exp((x^2-2*x)*log(2)-5
)-20),x, algorithm=\
```

output
```
log(3*e^((x^2 - 2*x)*log(2) - 5) - 20)
```

3.143.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{e^{-5+(-2x+x^2)\log(2)}(-6+6x)\log(2)}{-20+3e^{-5+(-2x+x^2)\log(2)}}\,dx = \log\left(e^{\left(x^2-2x\right)\log(2)-5}-\frac{20}{3}\right)$$

input
```
integrate((6*x-6)*ln(2)*exp((x**2-2*x)*ln(2)-5)/(3*exp((x**2-2*x)*ln(2)-5)
-20),x)
```

output
```
log(exp((x**2 - 2*x)*log(2) - 5) - 20/3)
```

3.143.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.55

$$\int \frac{e^{-5+(-2x+x^2)\log(2)}(-6+6x)\log(2)}{-20+3e^{-5+(-2x+x^2)\log(2)}}\,dx = -\left(2\,x - \frac{\log\left(2^{(x^2)} - \frac{20}{3}\,e^{(2\,x\log(2)+5)}\right)}{\log(2)}\right)\log(2)$$

input
```
integrate((6*x-6)*log(2)*exp((x^2-2*x)*log(2)-5)/(3*exp((x^2-2*x)*log(2)-5
)-20),x, algorithm=\
```

output
```
-(2*x - log(2^(x^2) - 20/3*e^(2*x*log(2) + 5))/log(2))*log(2)
```

3.143.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{e^{-5+(-2x+x^2)\log(2)}(-6+6x)\log(2)}{-20+3e^{-5+(-2x+x^2)\log(2)}}\,dx = \log\left(\left|3\,e^{(x^2\log(2)-2\,x\log(2)-5)} - 20\right|\right)$$

input
```
integrate((6*x-6)*log(2)*exp((x^2-2*x)*log(2)-5)/(3*exp((x^2-2*x)*log(2)-5
)-20),x, algorithm=\
```

output
```
log(abs(3*e^(x^2*log(2) - 2*x*log(2) - 5) - 20))
```

3.143.9 Mupad [B] (verification not implemented)

Time = 16.85 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{e^{-5+(-2x+x^2)\log(2)}(-6+6x)\log(2)}{-20+3e^{-5+(-2x+x^2)\log(2)}}\,dx = \ln\left(3\,2^{x^2}\,\mathrm{e}^{-5} - 20\,2^{2\,x}\right) - 2\,x\,\ln(2)$$

input
```
int((exp(- log(2)*(2*x - x^2) - 5)*log(2)*(6*x - 6))/(3*exp(- log(2)*(2*x
- x^2) - 5) - 20),x)
```

output
```
log(3*2^(x^2)*exp(-5) - 20*2^(2*x)) - 2*x*log(2)
```

3.144 $\int \frac{-e+e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}-x-x^2+\left(e-e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}+2x\right)\log(x)}{x^2-2x\log(x)+\log^2(x)}$

3.144.1 Optimal result

Integrand size = 80, antiderivative size = 28

$$\int \frac{-e+e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}-x-x^2+\left(e-e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}+2x\right)\log(x)}{x^2-2x\log(x)+\log^2(x)}\,dx$$
$$=\frac{x\left(e-e^{\left(-\log\left(\frac{3}{2}\right)+\log(3)\right)^2}+x\right)}{-x+\log(x)}$$

output
```
x/(ln(x)-x)*(exp(1)-exp((ln(3)+ln(2/3))^2)+x)
```

3.144.2 Mathematica [A] (verified)

Time = 0.41 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{-e+e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}-x-x^2+\left(e-e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}+2x\right)\log(x)}{x^2-2x\log(x)+\log^2(x)}\,dx$$
$$=\frac{x\left(e-e^{\log^2(2)}+x\right)}{-x+\log(x)}$$

input
```
Integrate[(-E + E^(Log[3/2]^2 - 2*Log[3/2]*Log[3] + Log[3]^2) - x - x^2 +
(E - E^(Log[3/2]^2 - 2*Log[3/2]*Log[3] + Log[3]^2) + 2*x)*Log[x])/(x^2 - 2
*x*Log[x] + Log[x]^2),x]
```

output
```
(x*(E - E^Log[2]^2 + x))/(-x + Log[x])
```

3.144.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2-x+\left(2x+e-e^{\log^2\left(\frac{3}{2}\right)+\log^2(3)-2\log\left(\frac{3}{2}\right)\log(3)}\right)\log(x)-e+e^{\log^2\left(\frac{3}{2}\right)+\log^2(3)-2\log\left(\frac{3}{2}\right)\log(3)}}{x^2+\log^2(x)-2x\log(x)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-x(x+1)+\left(2x+e-e^{\log^2(2)}\right)\log(x)-e\left(1-e^{\log^2(2)-1}\right)}{(x-\log(x))^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-2x-e+e^{\log^2(2)}}{x-\log(x)}-\frac{(x-1)\left(-x-e+e^{\log^2(2)}\right)}{(x-\log(x))^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{x^2}{(x-\log(x))^2}dx-\left(\left(e-e^{\log^2(2)}\right)\int \frac{1}{(x-\log(x))^2}dx\right)-\left(1-e+e^{\log^2(2)}\right)\int \frac{x}{(x-\log(x))^2}dx-\left(e-e^{\log^2(2)}\right)\int \frac{1}{x-\log(x)}dx-2\int \frac{x}{x-\log(x)}dx$$

input
```
Int[(-E + E^(Log[3/2]^2 - 2*Log[3/2]*Log[3] + Log[3]^2) - x - x^2 + (E - E
^(Log[3/2]^2 - 2*Log[3/2]*Log[3] + Log[3]^2) + 2*x)*Log[x])/(x^2 - 2*x*Log
[x] + Log[x]^2),x]
```

output
```
$Aborted
```

3.144.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.144.4 Maple [A] (verified)

Time = 1.07 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

method	result	size
risch	$-\frac{\left(x+\mathrm{e}-\mathrm{e}^{\ln(2)^{2}}\right)x}{x-\ln(x)}$	23
default	$\frac{x^{2}+\left(\mathrm{e}-\mathrm{e}^{\ln(2)^{2}}\right)x}{\ln(x)-x}$	26
norman	$\frac{\left(-\mathrm{e}+\mathrm{e}^{\ln(2)^{2}}\right)\ln(x)-x^{2}}{x-\ln(x)}$	29
parallelrisch	$-\frac{x\,\mathrm{e}-\mathrm{e}^{\ln(3)^{2}+2\ln\left(\frac{2}{3}\right)\ln(3)+\ln\left(\frac{2}{3}\right)^{2}}x+x^{2}}{x-\ln(x)}$	38

input
```
int(((-exp(ln(3)^2+2*ln(2/3)*ln(3)+ln(2/3)^2)+exp(1)+2*x)*ln(x)+exp(ln(3)^
2+2*ln(2/3)*ln(3)+ln(2/3)^2)-exp(1)-x^2-x)/(ln(x)^2-2*x*ln(x)+x^2),x,metho
d=_RETURNVERBOSE)
```

output
```
-(x+exp(1)-exp(ln(2)^2))*x/(x-ln(x))
```

3.144.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

$$\int \frac{-e+e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}-x-x^2+\left(e-e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}+2x\right)\log(x)}{x^2-2x\log(x)+\log^2(x)}\,dx$$
$$= -\frac{x^2+xe-xe^{\left(\log(3)^2+2\,\log(3)\log\left(\frac{2}{3}\right)+\log\left(\frac{2}{3}\right)^2\right)}}{x-\log(x)}$$

input
```
integrate(((-exp(log(3)^2+2*log(2/3)*log(3)+log(2/3)^2)+exp(1)+2*x)*log(x)
+exp(log(3)^2+2*log(2/3)*log(3)+log(2/3)^2)-exp(1)-x^2-x)/(log(x)^2-2*x*lo
g(x)+x^2),x, algorithm=\
```

output
```
-(x^2 + x*e - x*e^(log(3)^2 + 2*log(3)*log(2/3) + log(2/3)^2))/(x - log(x)
)
```

3.144.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{-e+e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}-x-x^2+\left(e-e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}+2x\right)\log(x)}{x^2-2x\log(x)+\log^2(x)}\,dx$$
$$= \frac{x^2-xe^{\log(2)^2}+ex}{-x+\log(x)}$$

input
```
integrate(((-exp(ln(3)**2+2*ln(2/3)*ln(3)+ln(2/3)**2)+exp(1)+2*x)*ln(x)+ex
p(ln(3)**2+2*ln(2/3)*ln(3)+ln(2/3)**2)-exp(1)-x**2-x)/(ln(x)**2-2*x*ln(x)+
x**2),x)
```

output
```
(x**2 - x*exp(log(2)**2) + E*x)/(-x + log(x))
```

3.144.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{-e+e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}-x-x^2+\left(e-e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}+2x\right)\log(x)}{x^2-2x\log(x)+\log^2(x)}\,dx$$
$$=-\frac{x^2+x\left(e-e^{\left(\log(2)^2\right)}\right)}{x-\log\left(x\right)}$$

input
```
integrate(((-exp(log(3)^2+2*log(2/3)*log(3)+log(2/3)^2)+exp(1)+2*x)*log(x)
+exp(log(3)^2+2*log(2/3)*log(3)+log(2/3)^2)-exp(1)-x^2-x)/(log(x)^2-2*x*lo
g(x)+x^2),x, algorithm=\
```

output
```
-(x^2 + x*(e - e^(log(2)^2)))/(x - log(x))
```

3.144.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{-e+e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}-x-x^2+\left(e-e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}+2x\right)\log(x)}{x^2-2x\log(x)+\log^2(x)}\,dx$$
$$=-\frac{x^2+xe-xe^{\left(\log(2)^2\right)}}{x-\log\left(x\right)}$$

input
```
integrate(((-exp(log(3)^2+2*log(2/3)*log(3)+log(2/3)^2)+exp(1)+2*x)*log(x)
+exp(log(3)^2+2*log(2/3)*log(3)+log(2/3)^2)-exp(1)-x^2-x)/(log(x)^2-2*x*lo
g(x)+x^2),x, algorithm=\
```

output
```
-(x^2 + x*e - x*e^(log(2)^2))/(x - log(x))
```

3.144.9 Mupad [B] (verification not implemented)

Time = 13.86 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{-e+e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}-x-x^2+\left(e-e^{\log^2\left(\frac{3}{2}\right)-2\log\left(\frac{3}{2}\right)\log(3)+\log^2(3)}+2x\right)\log(x)}{x^2-2x\log(x)+\log^2(x)}\,dx$$
$$=-\frac{x\left(x-e^{\ln(2)^2}+e\right)}{x-\ln(x)}$$

input
```
int(-(x + exp(1) - exp(2*log(3)*log(2/3) + log(3)^2 + log(2/3)^2) - log(x)
*(2*x + exp(1) - exp(2*log(3)*log(2/3) + log(3)^2 + log(2/3)^2)) + x^2)/(l
og(x)^2 - 2*x*log(x) + x^2),x)
```

output
```
-(x*(x - exp(log(2)^2) + exp(1)))/(x - log(x))
```

3.145 $\int \frac{24x+5^{8x}(-2+8x\log(5))+5^{4x}(-8+6x-24x^2\log(5))+(32-24x+5^{4x}(\ldots}{x^3}$

3.145.1 Optimal result

Integrand size = 66, antiderivative size = 27

$$\int \frac{24x+5^{8x}(-2+8x\log(5))+5^{4x}(-8+6x-24x^2\log(5))+(32-24x+5^{4x}(16-32x\log(5)))\log(x)-3\ldots}{x^3}$$
$$=\left(-3+\frac{5^{4x}-x}{x}+\frac{x-4\log(x)}{x}\right)^2$$

output
```
((exp(4*x*ln(5))-x)/x-3+(x-4*ln(x))/x)^2
```

3.145.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.74

$$\int \frac{24x+5^{8x}(-2+8x\log(5))+5^{4x}(-8+6x-24x^2\log(5))+(32-24x+5^{4x}(16-32x\log(5)))\log(x)-3\ldots}{x^3}$$
$$=\frac{4(625^x(625^x-6x)\log(5)+(-4625^x\log(25)+6x\log(625))\log(x)+4\log(625)\log^2(x))}{x^2\log(625)}$$

input
```
Integrate[(24*x + 5^(8*x)*(-2 + 8*x*Log[5]) + 5^(4*x)*(-8 + 6*x - 24*x^2*L
og[5]) + (32 - 24*x + 5^(4*x)*(16 - 32*x*Log[5]))*Log[x] - 32*Log[x]^2)/x^
3,x]
```

output
```
(4*(625^x*(625^x - 6*x)*Log[5] + (-4*625^x*Log[25] + 6*x*Log[625])*Log[x]
+ 4*Log[625]*Log[x]^2))/(x^2*Log[625])
```

3.145.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.78, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.030, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5^{4x}\left(-24x^2\log(5)+6x-8\right)+24x-32\log^2(x)+\left(-24x+5^{4x}(16-32x\log(5))+32\right)\log(x)+5^{8x}(8x\log(5)-}{x^3}$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2\ 5^{8x}(4x\log(5)-1)}{x^3}-\frac{8(\log(x)-1)(3x+4\log(x))}{x^3}-\frac{2\ 625^x\left(12x^2\log(5)-3x+8x\log(25)\log(x)-8\log(x\right.}{x^3}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{5^{8x}}{x^2}-\frac{8\ 625^x\left(3x^2\log(5)+2x\log(25)\log(x)\right)}{x^3\log(625)}+\left(\frac{4\log(x)}{x}+3\right)^2$$

input
```
Int[(24*x + 5^(8*x)*(-2 + 8*x*Log[5]) + 5^(4*x)*(-8 + 6*x - 24*x^2*Log[5])
 + (32 - 24*x + 5^(4*x)*(16 - 32*x*Log[5]))*Log[x] - 32*Log[x]^2)/x^3,x]
```

output
```
5^(8*x)/x^2 + (3 + (4*Log[x])/x)^2 - (8*625^x*(3*x^2*Log[5] + 2*x*Log[25]*
Log[x]))/(x^3*Log[625])
```

3.145.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.145.4 Maple [A] (verified)

Time = 0.54 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

method	result	size
risch	$\frac{16\ln(x)^2}{x^2}+\frac{8(3x-625^x)\ln(x)}{x^2}-\frac{625^x(6x-625^x)}{x^2}$	44
parallelrisch	$\frac{24x\ln(x)-6\,\mathrm{e}^{4x\ln(5)}x+16\ln(x)^2-8\ln(x)\mathrm{e}^{4x\ln(5)}+\mathrm{e}^{8x\ln(5)}}{x^2}$	44
default	$\frac{-6\,\mathrm{e}^{4x\ln(5)}x-8\ln(x)\mathrm{e}^{4x\ln(5)}}{x^2}+\frac{16\ln(x)^2}{x^2}+\frac{24\ln(x)}{x}+\frac{\mathrm{e}^{8x\ln(5)}}{x^2}$	54
parts	$\frac{-6\,\mathrm{e}^{4x\ln(5)}x-8\ln(x)\mathrm{e}^{4x\ln(5)}}{x^2}+\frac{16\ln(x)^2}{x^2}+\frac{24\ln(x)}{x}+\frac{\mathrm{e}^{8x\ln(5)}}{x^2}$	54

input
```
int((-32*ln(x)^2+((-32*x*ln(5)+16)*exp(4*x*ln(5))-24*x+32)*ln(x)+(8*x*ln(5
)-2)*exp(4*x*ln(5))^2+(-24*x^2*ln(5)+6*x-8)*exp(4*x*ln(5))+24*x)/x^3,x,met
hod=_RETURNVERBOSE)
```

output
```
16*ln(x)^2/x^2+8*(3*x-625^x)/x^2*ln(x)-625^x*(6*x-625^x)/x^2
```

3.145.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.48

$$\int \frac{24x+5^{8x}(-2+8x\log(5))+5^{4x}(-8+6x-24x^2\log(5))+(32-24x+5^{4x}(16-32x\log(5)))\log(x)-3}{x^3}$$

$$=-\frac{6\cdot 5^{4\,x}x+8\,(5^{4\,x}-3\,x)\log{(x)}-16\,\log{(x)}^2-5^{8\,x}}{x^2}$$

input
```
integrate((-32*log(x)^2+((-32*x*log(5)+16)*exp(4*x*log(5))-24*x+32)*log(x)
+(8*x*log(5)-2)*exp(4*x*log(5))^2+(-24*x^2*log(5)+6*x-8)*exp(4*x*log(5))+2
4*x)/x^3,x, algorithm=\
```

output
```
-(6*5^(4*x)*x + 8*(5^(4*x) - 3*x)*log(x) - 16*log(x)^2 - 5^(8*x))/x^2
```

3.145.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(22) = 44.

Time = 0.16 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.00

$$\int \frac{24x + 5^{8x}(-2 + 8x\log(5)) + 5^{4x}(-8 + 6x - 24x^2\log(5)) + (32 - 24x + 5^{4x}(16 - 32x\log(5)))\log(x) - 3}{x^3}$$

$$= \frac{24\log(x)}{x} + \frac{16\log(x)^2}{x^2} + \frac{x^2e^{8x\log(5)} + (-6x^3 - 8x^2\log(x))\,e^{4x\log(5)}}{x^4}$$

input
```
integrate((-32*ln(x)**2+((-32*x*ln(5)+16)*exp(4*x*ln(5))-24*x+32)*ln(x)+(8
*x*ln(5)-2)*exp(4*x*ln(5))**2+(-24*x**2*ln(5)+6*x-8)*exp(4*x*ln(5))+24*x)/
x**3,x)
```

output
```
24*log(x)/x + 16*log(x)**2/x**2 + (x**2*exp(8*x*log(5)) + (-6*x**3 - 8*x**
2*log(x))*exp(4*x*log(5)))/x**4
```

3.145.7 Maxima [F]

$$\int \frac{24x + 5^{8x}(-2 + 8x\log(5)) + 5^{4x}(-8 + 6x - 24x^2\log(5)) + (32 - 24x + 5^{4x}(16 - 32x\log(5)))\log(x) - 3}{x^3}$$

$$= \int \frac{2\left((4x\log(5) - 1)5^{8x} - (12x^2\log(5) - 3x + 4)5^{4x} - 4\left(2(2x\log(5) - 1)5^{4x} + 3x - 4\right)\log(x) - 16}{x^3}$$

input
```
integrate((-32*log(x)^2+((-32*x*log(5)+16)*exp(4*x*log(5))-24*x+32)*log(x)
+(8*x*log(5)-2)*exp(4*x*log(5))^2+(-24*x^2*log(5)+6*x-8)*exp(4*x*log(5))+2
4*x)/x^3,x, algorithm=\
```

output
```
64*gamma(-1, -8*x*log(5))*log(5)^2 + 128*gamma(-2, -4*x*log(5))*log(5)^2 +
 128*gamma(-2, -8*x*log(5))*log(5)^2 - 24*Ei(4*x*log(5))*log(5) + 24*gamma
(-1, -4*x*log(5))*log(5) + 24*log(x)/x - 8*(5^(4*x)*log(x) - 2*log(x)^2 -
2*log(x) - 1)/x^2 - 16*log(x)/x^2 - 8/x^2 + 8*integrate(5^(4*x)/x^3, x)
```

3.145.8 Giac [F]

$$\int \frac{24x+5^{8x}(-2+8x\log(5))+5^{4x}(-8+6x-24x^2\log(5))+(32-24x+5^{4x}(16-32x\log(5)))\log(x)-3}{x^3}$$

$$=\int \frac{2\left((4\,x\log(5)-1)5^{8\,x}-(12\,x^2\log(5)-3\,x+4)5^{4\,x}-4\,(2\,(2\,x\log(5)-1)5^{4\,x}+3\,x-4)\log(x)-16\right.}{x^3}$$

input
```
integrate((-32*log(x)^2+((-32*x*log(5)+16)*exp(4*x*log(5))-24*x+32)*log(x)
+(8*x*log(5)-2)*exp(4*x*log(5))^2+(-24*x^2*log(5)+6*x-8)*exp(4*x*log(5))+2
4*x)/x^3,x, algorithm=\
```

output
```
integrate(2*((4*x*log(5) - 1)*5^(8*x) - (12*x^2*log(5) - 3*x + 4)*5^(4*x)
- 4*(2*(2*x*log(5) - 1)*5^(4*x) + 3*x - 4)*log(x) - 16*log(x)^2 + 12*x)/x^
3, x)
```

3.145.9 Mupad [B] (verification not implemented)

Time = 13.55 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{24x+5^{8x}(-2+8x\log(5))+5^{4x}(-8+6x-24x^2\log(5))+(32-24x+5^{4x}(16-32x\log(5)))\log(x)-3}{x^3}$$

$$=\frac{\left(4\,\ln(x)-5^{4\,x}\right)\,\left(6\,x+4\,\ln(x)-5^{4\,x}\right)}{x^2}$$

input
```
int(-(log(x)*(24*x + exp(4*x*log(5))*(32*x*log(5) - 16) - 32) - 24*x + 32*
log(x)^2 - exp(8*x*log(5))*(8*x*log(5) - 2) + exp(4*x*log(5))*(24*x^2*log(
5) - 6*x + 8))/x^3,x)
```

output
```
((4*log(x) - 5^(4*x))*(6*x + 4*log(x) - 5^(4*x)))/x^2
```

3.146 $\int -25^{2-x^2} x \log(5)\, dx$

3.146.1 Optimal result

Integrand size = 14, antiderivative size = 9

$$\int -25^{2-x^2} x \log(5)\, dx = 5^{2-x^2}$$

output
```
exp((-x^2+2)*ln(5))
```

3.146.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int -25^{2-x^2} x \log(5)\, dx = 5^{2-x^2}$$

input
```
Integrate[-2*5^(2 - x^2)*x*Log[5],x]
```

output
```
5^(2 - x^2)
```

3.146.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {27, 2638}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -25^{2-x^2} x \log(5) \, dx$$

$$\Big\downarrow \text{27}$$

$$-2 \log(5) \int 5^{2-x^2} x dx$$

$$\Big\downarrow \text{2638}$$

$$5^{2-x^2}$$

input
```
Int[-2*5^(2 - x^2)*x*Log[5],x]
```

output
```
5^(2 - x^2)
```

3.146.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2638
```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^(n_))*((e_.) + (f_.)*(x_))^(m_
.), x_Symbol] :> Simp[(e + f*x)^n*(F^(a + b*(c + d*x)^n)/(b*f*n*(c + d*x)^n
*Log[F])), x] /; FreeQ[{F, a, b, c, d, e, f, n}, x] && EqQ[m, n - 1] && EqQ
[d*e - c*f, 0]
```

3.146.4 Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.11

method	result	siz
risch	5^{-x^2+2}	10
gosper	$\mathrm{e}^{-\left(x^2-2\right)\ln(5)}$	11
derivativedivides	$\mathrm{e}^{\left(-x^2+2\right)\ln(5)}$	12
default	$\mathrm{e}^{\left(-x^2+2\right)\ln(5)}$	12
norman	$\mathrm{e}^{\left(-x^2+2\right)\ln(5)}$	12
parallelrisch	$\mathrm{e}^{\left(-x^2+2\right)\ln(5)}$	12
meijerg	$-25+25\,\mathrm{e}^{-x^2\ln(5)}$	13
parts	$-25x\sqrt{\ln(5)}\,\sqrt{\pi}\,\operatorname{erf}\left(\sqrt{\ln(5)}\,x\right)+25\sqrt{\pi}\left(\operatorname{erf}\left(\sqrt{\ln(5)}\,x\right)\sqrt{\ln(5)}\,x+\frac{\mathrm{e}^{-x^2\ln(5)}}{\sqrt{\pi}}\right)$	50

input
```
int(-2*x*ln(5)*exp((-x^2+2)*ln(5)),x,method=_RETURNVERBOSE)
```

output
```
5^(-x^2+2)
```

3.146.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int -25^{2-x^2}x\log(5)\,dx = 5^{-x^2+2}$$

input
```
integrate(-2*x*log(5)*exp((-x^2+2)*log(5)),x, algorithm=\
```

output
```
5^(-x^2 + 2)
```

3.146.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.89

$$\int -25^{2-x^2} x \log(5)\, dx = e^{(2-x^2)\log(5)}$$

input
```
integrate(-2*x*ln(5)*exp((-x**2+2)*ln(5)),x)
```

output
```
exp((2 - x**2)*log(5))
```

3.146.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int -25^{2-x^2} x \log(5)\, dx = 5^{-x^2+2}$$

input
```
integrate(-2*x*log(5)*exp((-x^2+2)*log(5)),x, algorithm=\
```

output
```
5^(-x^2 + 2)
```

3.146.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int -25^{2-x^2} x \log(5)\, dx = 5^{-x^2+2}$$

input
```
integrate(-2*x*log(5)*exp((-x^2+2)*log(5)),x, algorithm=\
```

output
```
5^(-x^2 + 2)
```

3.146.9 Mupad [B] (verification not implemented)

Time = 12.58 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int -25^{2-x^2} x \log(5)\, dx = \frac{25}{5^{x^2}}$$

input
```
int(-2*x*exp(-log(5)*(x^2 - 2))*log(5),x)
```

output
```
25/5^(x^2)
```

3.147 $\int \frac{1+e^{e^x+x}\left(5x-e^{2x}x+x^2+e^{9+x}(-2x-e^xx)+e^x\left(2x+x^2\right)\right)}{x}\,dx$

3.147.1 Optimal result

Integrand size = 56, antiderivative size = 26

$$\int \frac{1+e^{e^x+x}(5x-e^{2x}x+x^2+e^{9+x}(-2x-e^xx)+e^x(2x+x^2))}{x}\,dx = e^{e^x+x}\left(4-e^x-e^{9+x}+x\right)+\log(x)$$

output
```
exp(exp(x)+x)*(x-exp(x)-exp(x+9)+4)+ln(x)
```

3.147.2 Mathematica [A] (verified)

Time = 3.30 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

$$\int \frac{1+e^{e^x+x}(5x-e^{2x}x+x^2+e^{9+x}(-2x-e^xx)+e^x(2x+x^2))}{x}\,dx = e^{e^x}\left(e^{2x}\left(-1-e^9\right)+e^x(4+x)\right)+\log(x)$$

input
```
Integrate[(1 + E^(E^x + x)*(5*x - E^(2*x)*x + x^2 + E^(9 + x)*(-2*x - E^x*
x) + E^x*(2*x + x^2)))/x,x]
```

output
```
E^E^x*(E^(2*x)*(-1 - E^9) + E^x*(4 + x)) + Log[x]
```

3.147.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+e^x}\left(x^2+e^x\left(x^2+2x\right)-e^{2x}x+5x+e^{x+9}(-e^x x-2x)\right)+1}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-e^{2x+e^x}\left(-x+2e^9-2\right)+e^{x+e^x}(x+5)+\frac{1}{x}-\left(1+e^9\right)e^{3x+e^x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int e^{x+e^x}xdx+\int e^{2x+e^x}xdx+5e^{e^x}-2\left(1+e^9\right)e^{e^x}+2\left(1+e^9\right)e^{x+e^x}-\left(1+e^9\right)e^{2x+e^x}-2\left(1-e^9\right)e^{e^x}+2\left(1-e^9\right)e^{x+e^x}+\log(x)$$

input
```
Int[(1 + E^(E^x + x)*(5*x - E^(2*x)*x + x^2 + E^(9 + x)*(-2*x - E^x*x) + E
^x*(2*x + x^2)))/x,x]
```

output
```
$Aborted
```

3.147.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.147.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

method	result	size
risch	$\mathrm{e}^{\mathrm{e}^x+x}(x-\mathrm{e}^x-\mathrm{e}^{x+9}+4)+\ln(x)$	23
norman	$\mathrm{e}^{\mathrm{e}^x+x}x+(-\mathrm{e}^9-1)\,\mathrm{e}^x\mathrm{e}^{\mathrm{e}^x+x}+4\,\mathrm{e}^{\mathrm{e}^x+x}+\ln(x)$	32
parallelrisch	$-\mathrm{e}^{\mathrm{e}^x+x}\mathrm{e}^x-\mathrm{e}^{\mathrm{e}^x+x}\mathrm{e}^{x+9}+\mathrm{e}^{\mathrm{e}^x+x}x+\ln(x)+4\,\mathrm{e}^{\mathrm{e}^x+x}$	38

input
```
int((((-exp(x)*x-2*x)*exp(x+9)-x*exp(x)^2+(x^2+2*x)*exp(x)+x^2+5*x)*exp(ex
p(x)+x)+1)/x,x,method=_RETURNVERBOSE)
```

output
```
exp(exp(x)+x)*(x-exp(x)-exp(x+9)+4)+ln(x)
```

3.147.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.54

$$\int \frac{1+e^{e^x+x}(5x-e^{2x}x+x^2+e^{9+x}(-2x-e^xx)+e^x(2x+x^2))}{x}\,dx$$
$$=\left(\left((x+4)e^9-\left(e^9+1\right)e^{(x+9)}\right)e^{\left((xe^9+e^{(x+9)})e^{(-9)}\right)}+e^9\log\left(x\right)\right)e^{(-9)}$$

input
```
integrate(((((-exp(x)*x-2*x)*exp(x+9)-x*exp(x)^2+(x^2+2*x)*exp(x)+x^2+5*x)*
exp(exp(x)+x)+1)/x,x, algorithm=\
```

output
```
(((x + 4)*e^9 - (e^9 + 1)*e^(x + 9))*e^((x*e^9 + e^(x + 9))*e^(-9)) + e^9*
log(x))*e^(-9)
```

3.147.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{1+e^{e^x+x}(5x-e^{2x}x+x^2+e^{9+x}(-2x-e^xx)+e^x(2x+x^2))}{x}\,dx$$
$$=\left(x-e^9e^x-e^x+4\right)e^{x+e^x}+\log\left(x\right)$$

input
```
integrate(((((-exp(x)*x-2*x)*exp(x+9)-x*exp(x)**2+(x**2+2*x)*exp(x)+x**2+5*
x)*exp(exp(x)+x)+1)/x,x)
```

output
```
(x - exp(9)*exp(x) - exp(x) + 4)*exp(x + exp(x)) + log(x)
```

3.147.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{1+e^{e^x+x}(5x-e^{2x}x+x^2+e^{9+x}(-2x-e^xx)+e^x(2x+x^2))}{x}\,dx$$
$$= -\big((e^9+1)e^{(2\,x)} - (x+4)e^x + 5\big)e^{(e^x)} + 5\,e^{(e^x)} + \log{(x)}$$

input
```
integrate((((-exp(x)*x-2*x)*exp(x+9)-x*exp(x)^2+(x^2+2*x)*exp(x)+x^2+5*x)*
exp(exp(x)+x)+1)/x,x, algorithm=\
```

output
```
-((e^9 + 1)*e^(2*x) - (x + 4)*e^x + 5)*e^(e^x) + 5*e^(e^x) + log(x)
```

3.147.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. 2(22) = 44.

Time = 0.28 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.92

$$\int \frac{1+e^{e^x+x}(5x-e^{2x}x+x^2+e^{9+x}(-2x-e^xx)+e^x(2x+x^2))}{x}\,dx$$
$$= \big(xe^{(4\,x+e^x)} + e^{(3\,x)}\log{(x)} - e^{(5\,x+e^x+9)} - e^{(5\,x+e^x)} + 4\,e^{(4\,x+e^x)}\big)e^{(-3\,x)}$$

input
```
integrate((((-exp(x)*x-2*x)*exp(x+9)-x*exp(x)^2+(x^2+2*x)*exp(x)+x^2+5*x)*
exp(exp(x)+x)+1)/x,x, algorithm=\
```

output
```
(x*e^(4*x + e^x) + e^(3*x)*log(x) - e^(5*x + e^x + 9) - e^(5*x + e^x) + 4*
e^(4*x + e^x))*e^(-3*x)
```

3.147.9 Mupad [B] (verification not implemented)

Time = 12.74 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

$$\int \frac{1+e^{e^x+x}(5x-e^{2x}x+x^2+e^{9+x}(-2x-e^xx)+e^x(2x+x^2))}{x}\,dx$$
$$= 4\,\mathrm{e}^{x+\mathrm{e}^x} + \ln{(x)} - \mathrm{e}^{2\,x+\mathrm{e}^x}\,\left(\mathrm{e}^9+1\right) + x\,\mathrm{e}^{x+\mathrm{e}^x}$$

input
```
int((exp(x + exp(x))*(5*x - x*exp(2*x) + exp(x)*(2*x + x^2) - exp(x + 9)*(
2*x + x*exp(x)) + x^2) + 1)/x,x)
```

output
```
4*exp(x + exp(x)) + log(x) - exp(2*x + exp(x))*(exp(9) + 1) + x*exp(x + ex
p(x))
```

3.147. $\int \frac{1+e^{e^x+x}(5x-e^{2x}x+x^2+e^{9+x}(-2x-e^x x)+e^x(2x+x^2))}{x}\,dx$

3.148 $\int \frac{-4x-4e^{4x}x+(-2-2e^{4x})\log(1+e^{4x})+(2x+6e^{4x}x)\log(x^2)}{(2x^2+2e^{4x}x^2)\log(x^2)+(x+e^{4x}x)\log(1+e^{4x})\log(x^2)}\,dx$

3.148.1 Optimal result

Integrand size = 94, antiderivative size = 22

$$\int \frac{-4x-4e^{4x}x+(-2-2e^{4x})\log(1+e^{4x})+(2x+6e^{4x}x)\log(x^2)}{(2x^2+2e^{4x}x^2)\log(x^2)+(x+e^{4x}x)\log(1+e^{4x})\log(x^2)}\,dx = \log\left(\frac{-2x-\log(1+e^{4x})}{\log(x^2)}\right)$$

output
```
ln(1/ln(x^2)*(-2*x-ln(exp(4*x)+1)))
```

3.148.2 Mathematica [A] (verified)

Time = 0.64 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{-4x-4e^{4x}x+(-2-2e^{4x})\log(1+e^{4x})+(2x+6e^{4x}x)\log(x^2)}{(2x^2+2e^{4x}x^2)\log(x^2)+(x+e^{4x}x)\log(1+e^{4x})\log(x^2)}\,dx = \log\left(2x+\log\left(1+e^{4x}\right)\right)-\log\left(\log\left(x^2\right)\right)$$

input
```
Integrate[(-4*x - 4*E^(4*x)*x + (-2 - 2*E^(4*x))*Log[1 + E^(4*x)] + (2*x +
 6*E^(4*x)*x)*Log[x^2])/((2*x^2 + 2*E^(4*x)*x^2)*Log[x^2] + (x + E^(4*x)*x
)*Log[1 + E^(4*x)]*Log[x^2]),x]
```

output
```
Log[2*x + Log[1 + E^(4*x)]] - Log[Log[x^2]]
```

3.148.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(6e^{4x}x+2x)\log(x^2)-4e^{4x}x-4x+(-2e^{4x}-2)\log(e^{4x}+1)}{(2e^{4x}x^2+2x^2)\log(x^2)+(e^{4x}x+x)\log(e^{4x}+1)\log(x^2)}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{(6e^{4x}x+2x)\log(x^2)-4e^{4x}x-4x+(-2e^{4x}-2)\log(e^{4x}+1)}{(e^{4x}+1)\,x\,(2x+\log(e^{4x}+1))\log(x^2)}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{2(3x\log(x^2)-2x-\log(e^{4x}+1))}{x\,(2x+\log(e^{4x}+1))\log(x^2)}-\frac{4}{(e^{4x}+1)\,(2x+\log(e^{4x}+1))}\right)dx$$

$$\Big\downarrow \ 2009$$

$$3\text{Subst}\left(\int \frac{1}{x+\log(1+e^{2x})}dx,x,2x\right)-2\text{Subst}\left(\int \frac{1}{(1+e^{2x})\,(x+\log(1+e^{2x}))}dx,x,2x\right)-\log(\log(x^2))$$

input
```
Int[(-4*x - 4*E^(4*x)*x + (-2 - 2*E^(4*x))*Log[1 + E^(4*x)] + (2*x + 6*E^(
4*x)*x)*Log[x^2])/((2*x^2 + 2*E^(4*x)*x^2)*Log[x^2] + (x + E^(4*x)*x)*Log[
1 + E^(4*x)]*Log[x^2]),x]
```

output
```
$Aborted
```

3.148.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.148.4 Maple [A] (verified)

Time = 0.80 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

method	result	size
parallelrisch	$-\ln\left(\ln\left(x^2\right)\right)+\ln\left(x+\frac{\ln\left(e^{4x}+1\right)}{2}\right)$	21
risch	$-\ln\left(\ln\left(x\right)-\frac{i\pi\ \mathrm{csgn}\left(ix^2\right)\left(\mathrm{csgn}\left(ix\right)^2-2\ \mathrm{csgn}\left(ix^2\right)\mathrm{csgn}\left(ix\right)+\mathrm{csgn}\left(ix^2\right)^2\right)}{4}\right)+\ln\left(\ln\left(e^{4x}+1\right)+2x\right)$	62

input
```
int(((-2*exp(4*x)-2)*ln(exp(4*x)+1)+(6*x*exp(4*x)+2*x)*ln(x^2)-4*x*exp(4*x
)-4*x)/((x*exp(4*x)+x)*ln(x^2)*ln(exp(4*x)+1)+(2*x^2*exp(4*x)+2*x^2)*ln(x^
2)),x,method=_RETURNVERBOSE)
```

output
```
-ln(ln(x^2))+ln(x+1/2*ln(exp(4*x)+1))
```

3.148.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-4x-4e^{4x}x+(-2-2e^{4x})\log(1+e^{4x})+(2x+6e^{4x}x)\log(x^2)}{(2x^2+2e^{4x}x^2)\log(x^2)+(x+e^{4x}x)\log(1+e^{4x})\log(x^2)}\,dx$$
$$=\log\left(2\,x+\log\left(e^{(4\,x)}+1\right)\right)-\log\left(\log\left(x^2\right)\right)$$

input
```
integrate(((-2*exp(4*x)-2)*log(exp(4*x)+1)+(6*x*exp(4*x)+2*x)*log(x^2)-4*x
*exp(4*x)-4*x)/((x*exp(4*x)+x)*log(x^2)*log(exp(4*x)+1)+(2*x^2*exp(4*x)+2*
x^2)*log(x^2)),x, algorithm=\
```

output
```
log(2*x + log(e^(4*x) + 1)) - log(log(x^2))
```

3.148.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{-4x-4e^{4x}x+(-2-2e^{4x})\log(1+e^{4x})+(2x+6e^{4x}x)\log(x^2)}{(2x^2+2e^{4x}x^2)\log(x^2)+(x+e^{4x}x)\log(1+e^{4x})\log(x^2)}\,dx$$
$$=\log\left(2x+\log\left(e^{4x}+1\right)\right)-\log\left(\log\left(x^2\right)\right)$$

input
```
integrate(((-2*exp(4*x)-2)*ln(exp(4*x)+1)+(6*x*exp(4*x)+2*x)*ln(x**2)-4*x*
exp(4*x)-4*x)/((x*exp(4*x)+x)*ln(x**2)*ln(exp(4*x)+1)+(2*x**2*exp(4*x)+2*x
**2)*ln(x**2)),x)
```

output
```
log(2*x + log(exp(4*x) + 1)) - log(log(x**2))
```

3.148.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-4x-4e^{4x}x+(-2-2e^{4x})\log(1+e^{4x})+(2x+6e^{4x}x)\log(x^2)}{(2x^2+2e^{4x}x^2)\log(x^2)+(x+e^{4x}x)\log(1+e^{4x})\log(x^2)}\,dx$$
$$=\log\left(2\,x+\log\left(e^{(4\,x)}+1\right)\right)-\log\left(\log\left(x\right)\right)$$

input
```
integrate(((-2*exp(4*x)-2)*log(exp(4*x)+1)+(6*x*exp(4*x)+2*x)*log(x^2)-4*x
*exp(4*x)-4*x)/((x*exp(4*x)+x)*log(x^2)*log(exp(4*x)+1)+(2*x^2*exp(4*x)+2*
x^2)*log(x^2)),x, algorithm=\
```

output
```
log(2*x + log(e^(4*x) + 1)) - log(log(x))
```

3.148.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-4x-4e^{4x}x+(-2-2e^{4x})\log(1+e^{4x})+(2x+6e^{4x}x)\log(x^2)}{(2x^2+2e^{4x}x^2)\log(x^2)+(x+e^{4x}x)\log(1+e^{4x})\log(x^2)}\,dx$$
$$=\log\left(2\,x+\log\left(e^{(4\,x)}+1\right)\right)-\log\left(\log\left(x^2\right)\right)$$

input
```
integrate(((-2*exp(4*x)-2)*log(exp(4*x)+1)+(6*x*exp(4*x)+2*x)*log(x^2)-4*x
*exp(4*x)-4*x)/((x*exp(4*x)+x)*log(x^2)*log(exp(4*x)+1)+(2*x^2*exp(4*x)+2*
x^2)*log(x^2)),x, algorithm=\
```

output
```
log(2*x + log(e^(4*x) + 1)) - log(log(x^2))
```

3.148.9 Mupad [B] (verification not implemented)

Time = 12.72 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-4x-4e^{4x}x+(-2-2e^{4x})\log(1+e^{4x})+(2x+6e^{4x}x)\log(x^2)}{(2x^2+2e^{4x}x^2)\log(x^2)+(x+e^{4x}x)\log(1+e^{4x})\log(x^2)}\,dx$$
$$=\ln\left(2\,x+\ln\left(\mathrm{e}^{4\,x}+1\right)\right)-\ln\left(\ln\left(x^2\right)\right)$$

input
```
int(-(4*x + 4*x*exp(4*x) + log(exp(4*x) + 1)*(2*exp(4*x) + 2) - log(x^2)*(
2*x + 6*x*exp(4*x)))/(log(x^2)*(2*x^2*exp(4*x) + 2*x^2) + log(exp(4*x) + 1
)*log(x^2)*(x + x*exp(4*x))),x)
```

output
```
log(2*x + log(exp(4*x) + 1)) - log(log(x^2))
```

3.149 $\int \frac{e^{8-x}(100+100x+100x^2)+e^5(2x^2+4x^3)+e^{3x}(100e^{8-x}x^2+e^5(-2x^3-$

3.149.1 Optimal result

Integrand size = 75, antiderivative size = 38

$$\int \frac{e^{8-x}(100+100x+100x^2)+e^5(2x^2+4x^3)+e^{3x}(100e^{8-x}x^2+e^5(-2x^3-3x^4))}{25x^2}\,dx = e^5\left(4+\left(2-e^{3x}+\frac{2}{x}\right)\left(-2e^{3-x}+\frac{x^2}{25}\right)\right)$$

output
```
((1/25*x^2-2*exp(-x+3))*(2/x-exp(3*x)+2)+4)*exp(5)
```

3.149.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.00

$$\int \frac{e^{8-x}(100+100x+100x^2)+e^5(2x^2+4x^3)+e^{3x}(100e^{8-x}x^2+e^5(-2x^3-3x^4))}{25x^2}\,dx = -\frac{e^{5-x}(-2+(-2+e^{3x})x)(-50e^3+e^xx^2)}{25x}$$

input
```
Integrate[(E^(8 - x)*(100 + 100*x + 100*x^2) + E^5*(2*x^2 + 4*x^3) + E^(3*
x)*(100*E^(8 - x)*x^2 + E^5*(-2*x^3 - 3*x^4)))/(25*x^2),x]
```

output
```
-1/25*(E^(5 - x)*(-2 + (-2 + E^(3*x))*x)*(-50*E^3 + E^x*x^2))/x
```

3.149.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.61, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.040, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{8-x}(100x^2+100x+100)+e^5(4x^3+2x^2)+e^{3x}(100e^{8-x}x^2+e^5(-3x^4-2x^3))}{25x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{25}\int \frac{100e^{8-x}(x^2+x+1)+2e^5(2x^3+x^2)+e^{3x}(100e^{8-x}x^2-e^5(3x^4+2x^3))}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{25}\int \left(2e^5(2x+1)+100e^{2x+8}-e^{3x+5}x(3x+2)+\frac{100e^{8-x}(x^2+x+1)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{25}\left(-e^{3x+5}x^2-100e^{8-x}+50e^{2x+8}+\frac{1}{2}e^5(2x+1)^2-\frac{100e^{8-x}}{x}\right)$$

input
```
Int[(E^(8 - x)*(100 + 100*x + 100*x^2) + E^5*(2*x^2 + 4*x^3) + E^(3*x)*(10
0*E^(8 - x)*x^2 + E^5*(-2*x^3 - 3*x^4)))/(25*x^2),x]
```

output
```
(-100*E^(8 - x) + 50*E^(8 + 2*x) - (100*E^(8 - x))/x - E^(5 + 3*x)*x^2 + (
E^5*(1 + 2*x)^2)/2)/25
```

3.149.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.149.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.24

method	result
risch	$\frac{2x^2 e^5}{25} + \frac{2x\, e^5}{25} - \frac{x^2 e^{3x+5}}{25} + 2\, e^{2x+8} - \frac{4(1+x) e^{8-x}}{x}$
norman	$\frac{\left(-4\, e^3 e^5 - 4x\, e^3 e^5 + \frac{2x^2 e^5 e^x}{25} + \frac{2x^3 e^5 e^x}{25} - \frac{x^3 e^5 e^{4x}}{25} + 2x\, e^3 e^5 e^{3x}\right) e^{-x}}{x}$
parallelrisch	$-\frac{e^5 x^3 e^{3x} - 2x^3 e^5 - 50\, e^5 x\, e^{3x} e^{-x+3} - 2x^2 e^5 + 100x\, e^5 e^{-x+3} + 100\, e^5 e^{-x+3}}{25x}$
parts	$-\frac{2\, e^5 \left(\frac{x\, e^{3x}}{3} - \frac{e^{3x}}{9}\right)}{25} - \frac{3\, e^5 \left(\frac{x^2 e^{3x}}{3} - \frac{2x\, e^{3x}}{9} + \frac{2\, e^{3x}}{27}\right)}{25} + 2\, e^{2x} e^5 e^3 + \frac{2\, e^5 (x^2+x)}{25} + 4\, e^5 \left(-e^{-x+3} - \frac{e^{-x+3}}{x}\right)$
default	$\frac{2x^2 e^5}{25} - \frac{2\, e^5 \left(\frac{x\, e^{3x}}{3} - \frac{e^{3x}}{9}\right)}{25} - \frac{3\, e^5 \left(\frac{x^2 e^{3x}}{3} - \frac{2x\, e^{3x}}{9} + \frac{2\, e^{3x}}{27}\right)}{25} - 4\, e^5 e^{-x} e^3 + 2\, e^{2x} e^5 e^3 + 4\, e^3 e^5 \left(-\frac{e^{-x}}{x} + \mathrm{Ei}_1 (\right.$

input
```
int(1/25*((100*x^2*exp(5)*exp(-x+3)+(-3*x^4-2*x^3)*exp(5))*exp(3*x)+(100*x
^2+100*x+100)*exp(5)*exp(-x+3)+(4*x^3+2*x^2)*exp(5))/x^2,x,method=_RETURNV
ERBOSE)
```

output
```
2/25*x^2*exp(5)+2/25*x*exp(5)-1/25*x^2*exp(3*x+5)+2*exp(2*x+8)-4*(1+x)/x*e
xp(8-x)
```

3.149.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.39

$$\int \frac{e^{8-x}(100 + 100x + 100x^2) + e^5(2x^2 + 4x^3) + e^{3x}(100e^{8-x}x^2 + e^5(-2x^3 - 3x^4))}{25x^2}\, dx$$
$$= -\frac{\left(x^3 e^{29} - 50\, x e^{(-x+32)} - 2\,(x^3 + x^2) e^{(-3\,x+29)} + 100\,(x+1) e^{(-4\,x+32)}\right) e^{(3\,x-24)}}{25\,x}$$

input
```
integrate(1/25*((100*x^2*exp(5)*exp(-x+3)+(-3*x^4-2*x^3)*exp(5))*exp(3*x)+
(100*x^2+100*x+100)*exp(5)*exp(-x+3)+(4*x^3+2*x^2)*exp(5))/x^2,x, algorith
m=\
```

output
```
-1/25*(x^3*e^29 - 50*x*e^(-x + 32) - 2*(x^3 + x^2)*e^(-3*x + 29) + 100*(x
+ 1)*e^(-4*x + 32))*e^(3*x - 24)/x
```

3.149.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. $2(26) = 52$.

Time = 0.12 (sec) , antiderivative size = 70, normalized size of antiderivative = 1.84

$$\int \frac{e^{8-x}(100+100x+100x^2)+e^5(2x^2+4x^3)+e^{3x}(100e^{8-x}x^2+e^5(-2x^3-3x^4))}{25x^2}\,dx$$
$$=\frac{2x^2e^5}{25}+\frac{2xe^5}{25}+\frac{-x^3e^5e^{3x}+50xe^8(e^{3x})^{\frac{2}{3}}+\frac{-100xe^8-100e^8}{\sqrt[3]{e^{3x}}}}{25x}$$

input
```
integrate(1/25*((100*x**2*exp(5)*exp(-x+3)+(-3*x**4-2*x**3)*exp(5))*exp(3*
x)+(100*x**2+100*x+100)*exp(5)*exp(-x+3)+(4*x**3+2*x**2)*exp(5))/x**2,x)
```

output
```
2*x**2*exp(5)/25 + 2*x*exp(5)/25 + (-x**3*exp(5)*exp(3*x) + 50*x*exp(8)*ex
p(3*x)**(2/3) + (-100*x*exp(8) - 100*exp(8))/exp(3*x)**(1/3))/(25*x)
```

3.149.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.18

$$\int \frac{e^{8-x}(100+100x+100x^2)+e^5(2x^2+4x^3)+e^{3x}(100e^{8-x}x^2+e^5(-2x^3-3x^4))}{25x^2}\,dx$$
$$=\frac{2}{25}\,x^2e^5+4\,\mathrm{Ei}(-x)\,e^8+\frac{2}{25}\,xe^5-\frac{1}{225}\left(9\,x^2e^5-6\,xe^5+2\,e^5\right)e^{(3\,x)}$$
$$-\frac{2}{225}\left(3\,xe^5-e^5\right)e^{(3\,x)}-4\,e^8\Gamma(-1,x)+2\,e^{(2\,x+8)}-4\,e^{(-x+8)}$$

input
```
integrate(1/25*((100*x^2*exp(5)*exp(-x+3)+(-3*x^4-2*x^3)*exp(5))*exp(3*x)+
(100*x^2+100*x+100)*exp(5)*exp(-x+3)+(4*x^3+2*x^2)*exp(5))/x^2,x, algorith
m=\
```

output
```
2/25*x^2*e^5 + 4*Ei(-x)*e^8 + 2/25*x*e^5 - 1/225*(9*x^2*e^5 - 6*x*e^5 + 2*
e^5)*e^(3*x) - 2/225*(3*x*e^5 - e^5)*e^(3*x) - 4*e^8*gamma(-1, x) + 2*e^(2
*x + 8) - 4*e^(-x + 8)
```

3.149.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 114 vs. $2(32) = 64$.

Time = 0.29 (sec) , antiderivative size = 114, normalized size of antiderivative = 3.00

$$\int \frac{e^{8-x}(100+100x+100x^2)+e^5(2x^2+4x^3)+e^{3x}(100e^{8-x}x^2+e^5(-2x^3-3x^4))}{25x^2}\,dx$$
$$= \frac{2\,(x-8)^3e^5-(x-8)^3e^{(3\,x+5)}+50\,(x-8)^2e^5-24\,(x-8)^2e^{(3\,x+5)}+272\,(x-8)e^5-192\,(x-8)e^{(3\,x+5)}}{25\,x}$$

input
```
integrate(1/25*((100*x^2*exp(5)*exp(-x+3)+(-3*x^4-2*x^3)*exp(5))*exp(3*x)+
(100*x^2+100*x+100)*exp(5)*exp(-x+3)+(4*x^3+2*x^2)*exp(5))/x^2,x, algorith
m=\
```

output
```
1/25*(2*(x - 8)^3*e^5 - (x - 8)^3*e^(3*x + 5) + 50*(x - 8)^2*e^5 - 24*(x -
 8)^2*e^(3*x + 5) + 272*(x - 8)*e^5 - 192*(x - 8)*e^(3*x + 5) + 50*(x - 8)
*e^(2*x + 8) - 100*(x - 8)*e^(-x + 8) - 512*e^(3*x + 5) + 400*e^(2*x + 8)
- 900*e^(-x + 8))/x
```

3.149.9 Mupad [B] (verification not implemented)

Time = 12.49 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.39

$$\int \frac{e^{8-x}(100+100x+100x^2)+e^5(2x^2+4x^3)+e^{3x}(100e^{8-x}x^2+e^5(-2x^3-3x^4))}{25x^2}\,dx$$
$$= 2\,\mathrm{e}^{2\,x+8}+\frac{2\,x\,\mathrm{e}^5}{25}+\frac{2\,x^2\,\mathrm{e}^5}{25}-\frac{x^2\,\mathrm{e}^{3\,x+5}}{25}-\frac{\mathrm{e}^{3-x}\,(4\,\mathrm{e}^5+4\,x\,\mathrm{e}^5)}{x}$$

input
```
int(((exp(5)*(2*x^2 + 4*x^3))/25 - (exp(3*x)*(exp(5)*(2*x^3 + 3*x^4) - 100
*x^2*exp(5)*exp(3 - x)))/25 + (exp(5)*exp(3 - x)*(100*x + 100*x^2 + 100))/
25)/x^2,x)
```

output
```
2*exp(2*x + 8) + (2*x*exp(5))/25 + (2*x^2*exp(5))/25 - (x^2*exp(3*x + 5))/
25 - (exp(3 - x)*(4*exp(5) + 4*x*exp(5)))/x
```

3.150 $\int \frac{e^{\frac{-5-x+2x^2-x^3}{x}}(5+2x^2-2x^3)}{x^2}\,dx$

3.150.1 Optimal result

Integrand size = 37, antiderivative size = 17

$$\int \frac{e^{\frac{-5-x+2x^2-x^3}{x}}(5+2x^2-2x^3)}{x^2}\,dx = e^{-1-\frac{5}{x}+2x-x^2}$$

output
```
exp(2*x-5/x-x^2-1)
```

3.150.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{-5-x+2x^2-x^3}{x}}(5+2x^2-2x^3)}{x^2}\,dx = e^{-1-\frac{5}{x}+2x-x^2}$$

input
```
Integrate[(E^((-5 - x + 2*x^2 - x^3)/x)*(5 + 2*x^2 - 2*x^3))/x^2,x]
```

output
```
E^(-1 - 5/x + 2*x - x^2)
```

3.150.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.027, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-x^3+2x^2-x-5}{x}}\left(-2x^3+2x^2+5\right)}{x^2}\,dx$$

$$\Big\downarrow \text{7257}$$

$$e^{-\frac{x^3-2x^2+x+5}{x}}$$

input
```
Int[(E^((-5 - x + 2*x^2 - x^3)/x)*(5 + 2*x^2 - 2*x^3))/x^2,x]
```

output
```
E^(-((5 + x - 2*x^2 + x^3)/x))
```

3.150.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.150.4 Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

method	result	size
gosper	$\mathrm{e}^{-\frac{x^3-2x^2+x+5}{x}}$	18
risch	$\mathrm{e}^{-\frac{x^3-2x^2+x+5}{x}}$	18
parallelrisch	$\mathrm{e}^{-\frac{x^3-2x^2+x+5}{x}}$	18
norman	$\mathrm{e}^{\frac{-x^3+2x^2-x-5}{x}}$	21

input
```
int((-2*x^3+2*x^2+5)*exp((-x^3+2*x^2-x-5)/x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
exp(-(x^3-2*x^2+x+5)/x)
```

3.150.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{-5-x+2x^2-x^3}{x}}(5+2x^2-2x^3)}{x^2}\,dx = e^{\left(-\frac{x^3-2\,x^2+x+5}{x}\right)}$$

input
```
integrate((-2*x^3+2*x^2+5)*exp((-x^3+2*x^2-x-5)/x)/x^2,x, algorithm=\
```

output
```
e^(-(x^3 - 2*x^2 + x + 5)/x)
```

3.150.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{e^{\frac{-5-x+2x^2-x^3}{x}}(5+2x^2-2x^3)}{x^2}\,dx = e^{\frac{-x^3+2x^2-x-5}{x}}$$

input
```
integrate((-2*x**3+2*x**2+5)*exp((-x**3+2*x**2-x-5)/x)/x**2,x)
```

output
```
exp((-x**3 + 2*x**2 - x - 5)/x)
```

3.150.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{e^{\frac{-5-x+2x^2-x^3}{x}}(5+2x^2-2x^3)}{x^2}\,dx = e^{\left(-x^2+2\,x-\frac{5}{x}-1\right)}$$

input
```
integrate((-2*x^3+2*x^2+5)*exp((-x^3+2*x^2-x-5)/x)/x^2,x, algorithm=\
```

output
```
e^(-x^2 + 2*x - 5/x - 1)
```

3.150.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{e^{\frac{-5-x+2x^2-x^3}{x}}(5+2x^2-2x^3)}{x^2}\,dx = e^{\left(-x^2+2\,x-\frac{5}{x}-1\right)}$$

input
```
integrate((-2*x^3+2*x^2+5)*exp((-x^3+2*x^2-x-5)/x)/x^2,x, algorithm=\
```

output
```
e^(-x^2 + 2*x - 5/x - 1)
```

3.150.9 Mupad [B] (verification not implemented)

Time = 12.24 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{e^{\frac{-5-x+2x^2-x^3}{x}}(5+2x^2-2x^3)}{x^2}\,dx = \mathrm{e}^{2\,x}\,\mathrm{e}^{-1}\,\mathrm{e}^{-x^2}\,\mathrm{e}^{-\frac{5}{x}}$$

input
```
int((exp(-(x - 2*x^2 + x^3 + 5)/x)*(2*x^2 - 2*x^3 + 5))/x^2,x)
```

output
```
exp(2*x)*exp(-1)*exp(-x^2)*exp(-5/x)
```

3.151 $\int \frac{75-30x-15x^2+e^x(15+30x+15x^2)}{225+300x+130x^2+20x^3+x^4+e^{2x}(1+2x+x^2)+e^x(-30-50x-22x^2-$

3.151.1 Optimal result

Integrand size = 78, antiderivative size = 19

$$\int \frac{75-30x-15x^2+e^x(15+30x+15x^2)}{225+300x+130x^2+20x^3+x^4+e^{2x}(1+2x+x^2)+e^x(-30-50x-22x^2-2x^3)}\,dx = -\frac{15}{-9+e^x-x-\frac{6}{1+x}}$$

output
```
-15/(exp(x)-x-9-6/(1+x))
```

3.151.2 Mathematica [A] (verified)

Time = 1.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

$$\int \frac{75-30x-15x^2+e^x(15+30x+15x^2)}{225+300x+130x^2+20x^3+x^4+e^{2x}(1+2x+x^2)+e^x(-30-50x-22x^2-2x^3)}\,dx = \frac{15(1+x)}{15+10x+x^2-e^x(1+x)}$$

input
```
Integrate[(75 - 30*x - 15*x^2 + E^x*(15 + 30*x + 15*x^2))/(225 + 300*x + 1
30*x^2 + 20*x^3 + x^4 + E^(2*x)*(1 + 2*x + x^2) + E^x*(-30 - 50*x - 22*x^2
 - 2*x^3)),x]
```

output
```
(15*(1 + x))/(15 + 10*x + x^2 - E^x*(1 + x))
```

3.151.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-15x^2+e^x(15x^2+30x+15)-30x+75}{x^4+20x^3+130x^2+e^{2x}(x^2+2x+1)+e^x(-2x^3-22x^2-50x-30)+300x+225}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{15(-x^2-2x+e^x(x+1)^2+5)}{(x^2+10x-e^x(x+1)+15)^2}dx$$

$$\Big\downarrow \text{27}$$

$$15\int \frac{-x^2-2x+e^x(x+1)^2+5}{(x^2+10x-e^x(x+1)+15)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$15\int \left(\frac{x^3+10x^2+23x+20}{(-x^2+e^x x-10x+e^x-15)^2}-\frac{x+1}{x^2-e^x x+10x-e^x+15}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$15\left(20\int \frac{1}{(-x^2+e^x x-10x+e^x-15)^2}dx+\int \frac{1}{-x^2+e^x x-10x+e^x-15}dx+23\int \frac{x}{(x^2-e^x x+10x-e^x+15}\right.$$

input
```
Int[(75 - 30*x - 15*x^2 + E^x*(15 + 30*x + 15*x^2))/(225 + 300*x + 130*x^2
 + 20*x^3 + x^4 + E^(2*x)*(1 + 2*x + x^2) + E^x*(-30 - 50*x - 22*x^2 - 2*x
^3)),x]
```

output
```
$Aborted
```

3.151.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.151.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.32

method	result	size
risch	$\frac{15x+15}{x^2-e^x x+10x-e^x+15}$	25
norman	$\frac{15x+15}{x^2-e^x x+10x-e^x+15}$	26
parallelrisch	$-\frac{-15x-15}{x^2-e^x x+10x-e^x+15}$	27

input
```
int(((15*x^2+30*x+15)*exp(x)-15*x^2-30*x+75)/((x^2+2*x+1)*exp(x)^2+(-2*x^3
-22*x^2-50*x-30)*exp(x)+x^4+20*x^3+130*x^2+300*x+225),x,method=_RETURNVERB
OSE)
```

output
```
15*(1+x)/(x^2-exp(x)*x+10*x-exp(x)+15)
```

3.151.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{75-30x-15x^2+e^x(15+30x+15x^2)}{225+300x+130x^2+20x^3+x^4+e^{2x}(1+2x+x^2)+e^x(-30-50x-22x^2-2x^3)}\,dx = \frac{15\,(x+1)}{x^2-(x+1)e^x+10\,x+15}$$

input
```
integrate(((15*x^2+30*x+15)*exp(x)-15*x^2-30*x+75)/((x^2+2*x+1)*exp(x)^2+(
-2*x^3-22*x^2-50*x-30)*exp(x)+x^4+20*x^3+130*x^2+300*x+225),x, algorithm=\
```

output
```
15*(x + 1)/(x^2 - (x + 1)*e^x + 10*x + 15)
```

3.151.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{75-30x-15x^2+e^x(15+30x+15x^2)}{225+300x+130x^2+20x^3+x^4+e^{2x}(1+2x+x^2)+e^x(-30-50x-22x^2-2x^3)}\,dx = \frac{-15x-15}{-x^2-10x+(x+1)e^x-15}$$

input
```
integrate(((15*x**2+30*x+15)*exp(x)-15*x**2-30*x+75)/((x**2+2*x+1)*exp(x)*
*2+(-2*x**3-22*x**2-50*x-30)*exp(x)+x**4+20*x**3+130*x**2+300*x+225),x)
```

output
```
(-15*x - 15)/(-x**2 - 10*x + (x + 1)*exp(x) - 15)
```

3.151.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{75-30x-15x^2+e^x(15+30x+15x^2)}{225+300x+130x^2+20x^3+x^4+e^{2x}(1+2x+x^2)+e^x(-30-50x-22x^2-2x^3)}\,dx = \frac{15(x+1)}{x^2-(x+1)e^x+10x+15}$$

input
```
integrate(((15*x^2+30*x+15)*exp(x)-15*x^2-30*x+75)/((x^2+2*x+1)*exp(x)^2+(
-2*x^3-22*x^2-50*x-30)*exp(x)+x^4+20*x^3+130*x^2+300*x+225),x, algorithm=\
```

output
```
15*(x + 1)/(x^2 - (x + 1)*e^x + 10*x + 15)
```

3.151.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{75-30x-15x^2+e^x(15+30x+15x^2)}{225+300x+130x^2+20x^3+x^4+e^{2x}(1+2x+x^2)+e^x(-30-50x-22x^2-2x^3)}\,dx = \frac{15(x+1)}{x^2-xe^x+10x-e^x+15}$$

input
```
integrate(((15*x^2+30*x+15)*exp(x)-15*x^2-30*x+75)/((x^2+2*x+1)*exp(x)^2+(
-2*x^3-22*x^2-50*x-30)*exp(x)+x^4+20*x^3+130*x^2+300*x+225),x, algorithm=\
```

output
```
15*(x + 1)/(x^2 - x*e^x + 10*x - e^x + 15)
```

3.151.9 Mupad [B] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{75-30x-15x^2+e^x(15+30x+15x^2)}{225+300x+130x^2+20x^3+x^4+e^{2x}\left(1+2x+x^2\right)+e^x\left(-30-50x-22x^2-2x^3\right)}\,dx$$
$$=-\frac{15\,x+15}{\mathrm{e}^x+x\,\left(\mathrm{e}^x-10\right)-x^2-15}$$

input
```
int(-(30*x - exp(x)*(30*x + 15*x^2 + 15) + 15*x^2 - 75)/(300*x + exp(2*x)*
(2*x + x^2 + 1) + 130*x^2 + 20*x^3 + x^4 - exp(x)*(50*x + 22*x^2 + 2*x^3 +
 30) + 225),x)
```

output
```
-(15*x + 15)/(exp(x) + x*(exp(x) - 10) - x^2 - 15)
```

3.152 $\int \frac{29+4x+2x^2+e^{2x}(2+4x+2x^2)}{1+2x+x^2} \, dx$

3.152.1 Optimal result

Integrand size = 37, antiderivative size = 18

$$\int \frac{29+4x+2x^2+e^{2x}(2+4x+2x^2)}{1+2x+x^2} \, dx = e^{2x}+x+\frac{-28+x^2}{1+x}$$

output
```
x+(x^2-28)/(1+x)+exp(2*x)
```

3.152.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{29+4x+2x^2+e^{2x}(2+4x+2x^2)}{1+2x+x^2} \, dx = e^{2x}-\frac{27}{1+x}+2(1+x)$$

input
```
Integrate[(29 + 4*x + 2*x^2 + E^(2*x)*(2 + 4*x + 2*x^2))/(1 + 2*x + x^2),x
]
```

output
```
E^(2*x) - 27/(1 + x) + 2*(1 + x)
```

3.152.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.081, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+e^{2x}(2x^2+4x+2)+4x+29}{x^2+2x+1}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{2x^2+e^{2x}(2x^2+4x+2)+4x+29}{(x+1)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2x^2+4x+29}{(x+1)^2}+2e^{2x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2x+e^{2x}-\frac{27}{x+1}$$

input
```
Int[(29 + 4*x + 2*x^2 + E^(2*x)*(2 + 4*x + 2*x^2))/(1 + 2*x + x^2),x]
```

output
```
E^(2*x) + 2*x - 27/(1 + x)
```

3.152.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.152.4 Maple [A] (verified)

Time = 0.87 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

method	result	size
risch	$2x-\frac{27}{1+x}+{\mathrm e}^{2x}$	16
parts	$2x-\frac{27}{1+x}+{\mathrm e}^{2x}$	16
derivativedivides	$2x-\frac{54}{2+2x}+{\mathrm e}^{2x}$	18
default	$2x-\frac{54}{2+2x}+{\mathrm e}^{2x}$	18
norman	$\frac{x\,{\mathrm e}^{2x}+2x^{2}-29+{\mathrm e}^{2x}}{1+x}$	24
parallelrisch	$\frac{x\,{\mathrm e}^{2x}+2x^{2}-29+{\mathrm e}^{2x}}{1+x}$	24

input
```
int(((2*x^2+4*x+2)*exp(2*x)+2*x^2+4*x+29)/(x^2+2*x+1),x,method=_RETURNVERB
OSE)
```

output
```
2*x-27/(1+x)+exp(2*x)
```

3.152.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33

$$\int \frac{29+4x+2x^2+e^{2x}(2+4x+2x^2)}{1+2x+x^2}\,dx=\frac{2\,x^{2}+(x+1)e^{(2\,x)}+2\,x-27}{x+1}$$

input
```
integrate(((2*x^2+4*x+2)*exp(2*x)+2*x^2+4*x+29)/(x^2+2*x+1),x, algorithm=\
```

output
```
(2*x^2 + (x + 1)*e^(2*x) + 2*x - 27)/(x + 1)
```

3.152.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

$$\int \frac{29+4x+2x^2+e^{2x}(2+4x+2x^2)}{1+2x+x^2}\,dx = 2x+e^{2x}-\frac{27}{x+1}$$

input
```
integrate(((2*x**2+4*x+2)*exp(2*x)+2*x**2+4*x+29)/(x**2+2*x+1),x)
```

output
```
2*x + exp(2*x) - 27/(x + 1)
```

3.152.7 Maxima [F]

$$\int \frac{29+4x+2x^2+e^{2x}(2+4x+2x^2)}{1+2x+x^2}\,dx = \int \frac{2\,x^2+2\,(x^2+2\,x+1)e^{(2\,x)}+4\,x+29}{x^2+2\,x+1}\,dx$$

input
```
integrate(((2*x^2+4*x+2)*exp(2*x)+2*x^2+4*x+29)/(x^2+2*x+1),x, algorithm=\
```

output
```
2*x + (x^2 + 2*x)*e^(2*x)/(x^2 + 2*x + 1) - 2*e^(-2)*exp_integral_e(2, -2*
x - 2)/(x + 1) - 27/(x + 1) - 2*integrate(e^(2*x)/(x^3 + 3*x^2 + 3*x + 1),
 x)
```

3.152.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.44

$$\int \frac{29+4x+2x^2+e^{2x}(2+4x+2x^2)}{1+2x+x^2}\,dx = \frac{2\,x^2+xe^{(2\,x)}+2\,x+e^{(2\,x)}-27}{x+1}$$

input
```
integrate(((2*x^2+4*x+2)*exp(2*x)+2*x^2+4*x+29)/(x^2+2*x+1),x, algorithm=\
```

output
```
(2*x^2 + x*e^(2*x) + 2*x + e^(2*x) - 27)/(x + 1)
```

3.152.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{29+4x+2x^2+e^{2x}(2+4x+2x^2)}{1+2x+x^2}\,dx = 2\,x+\mathrm{e}^{2\,x}-\frac{27}{x+1}$$

input
```
int((4*x + exp(2*x)*(4*x + 2*x^2 + 2) + 2*x^2 + 29)/(2*x + x^2 + 1),x)
```

output
```
2*x + exp(2*x) - 27/(x + 1)
```

3.153 $\int \frac{40-100x^2-4e^{32}x^4+e^{16}(-16x+40x^3)}{25x^2-10e^{16}x^3+e^{32}x^4}\,dx$

3.153.1 Optimal result

Integrand size = 52, antiderivative size = 22

$$\int \frac{40-100x^2-4e^{32}x^4+e^{16}(-16x+40x^3)}{25x^2-10e^{16}x^3+e^{32}x^4}\,dx=4\left(\frac{2}{\left(e^{16}-\frac{5}{x}\right)x^2}-x\right)$$

output
```
8/x^2/(exp(16)-5/x)-4*x
```

3.153.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{40-100x^2-4e^{32}x^4+e^{16}(-16x+40x^3)}{25x^2-10e^{16}x^3+e^{32}x^4}\,dx=-4\left(\frac{2}{5x}+x-\frac{2e^{16}}{5\left(-5+e^{16}x\right)}\right)$$

input
```
Integrate[(40 - 100*x^2 - 4*E^32*x^4 + E^16*(-16*x + 40*x^3))/(25*x^2 - 10
*E^16*x^3 + E^32*x^4),x]
```

output
```
-4*(2/(5*x) + x - (2*E^16)/(5*(-5 + E^16*x)))
```

3.153.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.058, Rules used = {2026, 2159, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4e^{32}x^4+e^{16}(40x^3-16x)-100x^2+40}{e^{32}x^4-10e^{16}x^3+25x^2}dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{-4e^{32}x^4+e^{16}(40x^3-16x)-100x^2+40}{x^2\left(e^{32}x^2-10e^{16}x+25\right)}dx$$

$$\Big\downarrow \ 2159$$

$$\int \left(\frac{8}{5x^2}-\frac{8e^{32}}{5\left(e^{16}x-5\right)^2}-4\right)dx$$

$$\Big\downarrow \ 2009$$

$$-4x-\frac{8e^{16}}{5\left(5-e^{16}x\right)}-\frac{8}{5x}$$

input
```
Int[(40 - 100*x^2 - 4*E^32*x^4 + E^16*(-16*x + 40*x^3))/(25*x^2 - 10*E^16*
x^3 + E^32*x^4),x]
```

output
```
-8/(5*x) - 4*x - (8*E^16)/(5*(5 - E^16*x))
```

3.153.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2159
```
Int[(Pq_)*((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p
_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*Pq*(a + b*x + c*x^2)^p, x
], x] /; FreeQ[{a, b, c, d, e, m}, x] && PolyQ[Pq, x] && IGtQ[p, -2]
```

3.153.4 Maple [A] (verified)

Time = 0.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

method	result	size
risch	$-4x+\frac{8}{x(x\,\mathrm{e}^{16}-5)}$	18
gosper	$-\frac{4(x^3\mathrm{e}^{16}-5x^2-2)}{x(x\,\mathrm{e}^{16}-5)}$	27
norman	$\frac{8+20x^2-4x^3\mathrm{e}^{16}}{x(x\,\mathrm{e}^{16}-5)}$	27
parallelrisch	$-\frac{20x^3\mathrm{e}^{16}-40-100x^2}{5x(x\,\mathrm{e}^{16}-5)}$	28

input
```
int((-4*x^4*exp(16)^2+(40*x^3-16*x)*exp(16)-100*x^2+40)/(x^4*exp(16)^2-10*
x^3*exp(16)+25*x^2),x,method=_RETURNVERBOSE)
```

output
```
-4*x+8/x/(x*exp(16)-5)
```

3.153.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{40-100x^2-4e^{32}x^4+e^{16}(-16x+40x^3)}{25x^2-10e^{16}x^3+e^{32}x^4}\,dx=-\frac{4\,(x^3e^{16}-5\,x^2-2)}{x^2e^{16}-5\,x}$$

input
```
integrate((-4*x^4*exp(16)^2+(40*x^3-16*x)*exp(16)-100*x^2+40)/(x^4*exp(16)
^2-10*x^3*exp(16)+25*x^2),x, algorithm=\
```

output
```
-4*(x^3*e^16 - 5*x^2 - 2)/(x^2*e^16 - 5*x)
```

3.153.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{40-100x^2-4e^{32}x^4+e^{16}(-16x+40x^3)}{25x^2-10e^{16}x^3+e^{32}x^4}\,dx = -4x+\frac{8}{x^2e^{16}-5x}$$

input
```
integrate((-4*x**4*exp(16)**2+(40*x**3-16*x)*exp(16)-100*x**2+40)/(x**4*ex
p(16)**2-10*x**3*exp(16)+25*x**2),x)
```

output
```
-4*x + 8/(x**2*exp(16) - 5*x)
```

3.153.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{40-100x^2-4e^{32}x^4+e^{16}(-16x+40x^3)}{25x^2-10e^{16}x^3+e^{32}x^4}\,dx = -4\,x+\frac{8}{x^2e^{16}-5\,x}$$

input
```
integrate((-4*x^4*exp(16)^2+(40*x^3-16*x)*exp(16)-100*x^2+40)/(x^4*exp(16)
^2-10*x^3*exp(16)+25*x^2),x, algorithm=\
```

output
```
-4*x + 8/(x^2*e^16 - 5*x)
```

3.153.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{40-100x^2-4e^{32}x^4+e^{16}(-16x+40x^3)}{25x^2-10e^{16}x^3+e^{32}x^4}\,dx = -4\,x+\frac{8}{x^2e^{16}-5\,x}$$

input
```
integrate((-4*x^4*exp(16)^2+(40*x^3-16*x)*exp(16)-100*x^2+40)/(x^4*exp(16)
^2-10*x^3*exp(16)+25*x^2),x, algorithm=\
```

output
```
-4*x + 8/(x^2*e^16 - 5*x)
```

3.153.9 Mupad [B] (verification not implemented)

Time = 12.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{40-100x^2-4e^{32}x^4+e^{16}(-16x+40x^3)}{25x^2-10e^{16}x^3+e^{32}x^4}\,dx=\frac{8}{x\,\left(x\,\mathrm{e}^{16}-5\right)}-4\,x$$

input
```
int(-(exp(16)*(16*x - 40*x^3) + 4*x^4*exp(32) + 100*x^2 - 40)/(x^4*exp(32)
 - 10*x^3*exp(16) + 25*x^2),x)
```

output
```
8/(x*(x*exp(16) - 5)) - 4*x
```

3.154 $\int \frac{-40+70x+(10-20x)\log(2x)+e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(-36+72x+36\log\left(\frac{4}{x}\right)-\right.}{9-6\log(2x)+}$

3.154.1 Optimal result

Integrand size = 101, antiderivative size = 35

$$\int \frac{-40+70x+(10-20x)\log(2x)+e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(-36+72x+36\log\left(\frac{4}{x}\right)+\left(24-48x-24\log\left(\frac{4}{x}\right)\right)\log(2\right.}{9-6\log(2x)+\log^2(2x)}$$

$$=2\left(e^{2x\left(x+\log\left(\frac{4}{x}\right)\right)}+\frac{5(-x+x^2)}{3-\log(2x)}\right)$$

output
```
10*(x^2-x)/(3-ln(2*x))+2*exp((ln(4/x)+x)*x)^2
```

3.154.2 Mathematica [F]

$$\int \frac{-40+70x+(10-20x)\log(2x)+e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(-36+72x+36\log\left(\frac{4}{x}\right)+\left(24-48x-24\log\left(\frac{4}{x}\right)\right)\log(2\right.}{9-6\log(2x)+\log^2(2x)}$$

$$=\int \frac{-40+70x+(10-20x)\log(2x)+e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(-36+72x+36\log\left(\frac{4}{x}\right)+\left(24-48x-24\log\left(\frac{4}{x}\right)\right)\log\right.}{9-6\log(2x)+\log^2(2x)}$$

input
```
Integrate[(-40 + 70*x + (10 - 20*x)*Log[2*x] + E^(2*x^2 + 2*x*Log[4/x])*(-
36 + 72*x + 36*Log[4/x] + (24 - 48*x - 24*Log[4/x])*Log[2*x] + (-4 + 8*x +
 4*Log[4/x])*Log[2*x]^2))/(9 - 6*Log[2*x] + Log[2*x]^2),x]
```

output
```
Integrate[(-40 + 70*x + (10 - 20*x)*Log[2*x] + E^(2*x^2 + 2*x*Log[4/x])*(-
36 + 72*x + 36*Log[4/x] + (24 - 48*x - 24*Log[4/x])*Log[2*x] + (-4 + 8*x +
 4*Log[4/x])*Log[2*x]^2))/(9 - 6*Log[2*x] + Log[2*x]^2), x]
```

3.154.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(72x+\left(8x+4\log\left(\frac{4}{x}\right)-4\right)\log^2(2x)+\left(-48x-24\log\left(\frac{4}{x}\right)+24\right)\log(2x)+36\log\left(\frac{4}{x}\right)-36\right)+70}{\log^2(2x)-6\log(2x)+9}$$

$$\Big\downarrow \; 7292$$

$$\int \frac{e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(72x+\left(8x+4\log\left(\frac{4}{x}\right)-4\right)\log^2(2x)+\left(-48x-24\log\left(\frac{4}{x}\right)+24\right)\log(2x)+36\log\left(\frac{4}{x}\right)-36\right)+70}{(3-\log(2x))^2}$$

$$\Big\downarrow \; 7293$$

$$\int \left(4^{2x+1}e^{2x^2}\left(\frac{1}{x}\right)^{2x}\left(2x+\log\left(\frac{4}{x}\right)-1\right)-\frac{10(-7x+2x\log(2x)-\log(2x)+4)}{(\log(2x)-3)^2}\right)dx$$

$$\Big\downarrow \; 2009$$

$$4\int \frac{\int 16^x e^{2x^2}\left(\frac{1}{x}\right)^{2x}dx}{x}dx+4\log\left(\frac{4}{x}\right)\int e^{2x^2+2\log(4)x}\left(\frac{1}{x}\right)^{2x}dx-4\int e^{2x^2+2\log(4)x}\left(\frac{1}{x}\right)^{2x}dx+8\int e^{2x^2+2\log(4)x}\left(\frac{1}{x}\right)^{2x-1}dx-\frac{10(1-x)x}{3-\log(2x)}$$

input
```
Int[(-40 + 70*x + (10 - 20*x)*Log[2*x] + E^(2*x^2 + 2*x*Log[4/x])*(-36 + 7
2*x + 36*Log[4/x] + (24 - 48*x - 24*Log[4/x])*Log[2*x] + (-4 + 8*x + 4*Log
[4/x])*Log[2*x]^2))/(9 - 6*Log[2*x] + Log[2*x]^2),x]
```

output
```
$Aborted
```

3.154.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.154.4 Maple [C] (verified)

Result contains complex when optimal does not.

Time = 2.41 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.26

method	result	size
risch	$\frac{20ix(-1+x)}{-2i\ln(2)-2i\ln(x)+6i}+2\,4^{2x}x^{-2x}\mathrm{e}^{2x^2}$	44
parallelrisch	$-\frac{-300x+180\,\mathrm{e}^{2\left(\ln\left(\frac{4}{x}\right)+x\right)x}+300x^2-60\ln(2x)\mathrm{e}^{2\left(\ln\left(\frac{4}{x}\right)+x\right)x}}{30(\ln(2x)-3)}$	54
default	$\frac{10x}{\ln(2)+\ln(x)-3}-\frac{10x^2}{\ln(2)+\ln(x)-3}+\frac{(2\ln(2)-6)\mathrm{e}^{2\left(\ln\left(\frac{4}{x}\right)+x\right)x}+2\ln(x)\mathrm{e}^{2\left(\ln\left(\frac{4}{x}\right)+x\right)x}}{\ln(2)+\ln(x)-3}$	71

input
```
int((((4*ln(4/x)+8*x-4)*ln(2*x)^2+(-24*ln(4/x)-48*x+24)*ln(2*x)+36*ln(4/x)
+72*x-36)*exp(x*ln(4/x)+x^2)^2+(-20*x+10)*ln(2*x)+70*x-40)/(ln(2*x)^2-6*ln
(2*x)+9),x,method=_RETURNVERBOSE)
```

output
```
20*I*x*(-1+x)/(-2*I*ln(2)-2*I*ln(x)+6*I)+2*(4^x)^2*(x^(-x))^2*exp(2*x^2)
```

3.154.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.69

$$\int \frac{-40+70x+(10-20x)\log(2x)+e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(-36+72x+36\log\left(\frac{4}{x}\right)+\left(24-48x-24\log\left(\frac{4}{x}\right)\right)\log(2x)\right)}{9-6\log(2x)+\log^2(2x)}$$

$$= -\frac{2\left(5x^2-\left(3\log(2)-\log\left(\frac{4}{x}\right)-3\right)e^{\left(2x^2+2x\log\left(\frac{4}{x}\right)\right)}-5x\right)}{3\log(2)-\log\left(\frac{4}{x}\right)-3}$$

input
```
integrate((((4*log(4/x)+8*x-4)*log(2*x)^2+(-24*log(4/x)-48*x+24)*log(2*x)+
36*log(4/x)+72*x-36)*exp(x*log(4/x)+x^2)^2+(-20*x+10)*log(2*x)+70*x-40)/(l
og(2*x)^2-6*log(2*x)+9),x, algorithm=\
```

output
```
-2*(5*x^2 - (3*log(2) - log(4/x) - 3)*e^(2*x^2 + 2*x*log(4/x)) - 5*x)/(3*l
og(2) - log(4/x) - 3)
```

3.154.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 34, normalized size of antiderivative = 0.97

$$\int \frac{-40+70x+(10-20x)\log(2x)+e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(-36+72x+36\log\left(\frac{4}{x}\right)+\left(24-48x-24\log\left(\frac{4}{x}\right)\right)\log(2x)\right)}{9-6\log(2x)+\log^2(2x)}$$

$$= \frac{-10x^2+10x}{\log(2x)-3} + 2e^{2x^2+2x(-\log(2x)+\log(8))}$$

input
```
integrate((((4*ln(4/x)+8*x-4)*ln(2*x)**2+(-24*ln(4/x)-48*x+24)*ln(2*x)+36*
ln(4/x)+72*x-36)*exp(x*ln(4/x)+x**2)**2+(-20*x+10)*ln(2*x)+70*x-40)/(ln(2*
x)**2-6*ln(2*x)+9),x)
```

output
```
(-10*x**2 + 10*x)/(log(2*x) - 3) + 2*exp(2*x**2 + 2*x*(-log(2*x) + log(8))
)
```

3.154.7 Maxima [F]

$$\int \frac{-40 + 70x + (10 - 20x)\log(2x) + e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(-36 + 72x + 36\log\left(\frac{4}{x}\right) + \left(24 - 48x - 24\log\left(\frac{4}{x}\right)\right)\log(2\right.}{9 - 6\log(2x) + \log^2(2x)}$$

$$= \int \frac{2\left(2\left(\left(2x + \log\left(\frac{4}{x}\right) - 1\right)\log(2x)^2 - 6\left(2x + \log\left(\frac{4}{x}\right) - 1\right)\log(2x) + 18x + 9\log\left(\frac{4}{x}\right) - 9\right)e^{\left(2x^2+2x\log\right.}\right.}{\log(2x)^2 - 6\log(2x) + 9}$$

input
```
integrate((((4*log(4/x)+8*x-4)*log(2*x)^2+(-24*log(4/x)-48*x+24)*log(2*x)+
36*log(4/x)+72*x-36)*exp(x*log(4/x)+x^2)^2+(-20*x+10)*log(2*x)+70*x-40)/(l
og(2*x)^2-6*log(2*x)+9),x, algorithm=\
```

output
```
20*e^3*exp_integral_e(2, -log(2*x) + 3)/(log(2*x) - 3) - 35/2*e^6*exp_inte
gral_e(2, -2*log(2*x) + 6)/(log(2*x) - 3) + 2*(30*x^2 + (log(2) + log(x) -
 3)*e^(2*x^2 + 4*x*log(2) - 2*x*log(x)) - 15*x)/(log(2) + log(x) - 3) - 2*
integrate(10*(7*x - 2)/(log(2) + log(x) - 3), x)
```

3.154.8 Giac [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.74

$$\int \frac{-40 + 70x + (10 - 20x)\log(2x) + e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(-36 + 72x + 36\log\left(\frac{4}{x}\right) + \left(24 - 48x - 24\log\left(\frac{4}{x}\right)\right)\log(2\right.}{9 - 6\log(2x) + \log^2(2x)}$$

$$= -\frac{2\left(5x^2 - e^{\left(2x^2+4x\log(2)-2x\log(x)\right)}\log(2x) - 5x + 3e^{\left(2x^2+4x\log(2)-2x\log(x)\right)}\right)}{\log(2x) - 3}$$

input
```
integrate((((4*log(4/x)+8*x-4)*log(2*x)^2+(-24*log(4/x)-48*x+24)*log(2*x)+
36*log(4/x)+72*x-36)*exp(x*log(4/x)+x^2)^2+(-20*x+10)*log(2*x)+70*x-40)/(l
og(2*x)^2-6*log(2*x)+9),x, algorithm=\
```

output
```
-2*(5*x^2 - e^(2*x^2 + 4*x*log(2) - 2*x*log(x))*log(2*x) - 5*x + 3*e^(2*x^
2 + 4*x*log(2) - 2*x*log(x)))/(log(2*x) - 3)
```

3.154.9 Mupad [B] (verification not implemented)

Time = 12.57 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.71

$$\int \frac{-40+70x+(10-20x)\log(2x)+e^{2x^2+2x\log\left(\frac{4}{x}\right)}\left(-36+72x+36\log\left(\frac{4}{x}\right)+\left(24-48x-24\log\left(\frac{4}{x}\right)\right)\log(2x)+\left(-4+8x+4\log\left(\frac{4}{x}\right)\right)\log^2(2x)\right)}{9-6\log(2x)+\log^2(2x)}$$

$$= 10\,x-\frac{10\,x\,(7\,x-4)-10\,x\,\ln(2\,x)\,(2\,x-1)}{\ln(2\,x)-3}-20\,x^2+2\,2^{4\,x}\,\mathrm{e}^{2\,x^2}\,\left(\frac{1}{x}\right)^{2\,x}$$

input
```
int((70*x + exp(2*x*log(4/x) + 2*x^2)*(72*x + 36*log(4/x) + log(2*x)^2*(8*
x + 4*log(4/x) - 4) - log(2*x)*(48*x + 24*log(4/x) - 24) - 36) - log(2*x)*
(20*x - 10) - 40)/(log(2*x)^2 - 6*log(2*x) + 9),x)
```

output
```
10*x - (10*x*(7*x - 4) - 10*x*log(2*x)*(2*x - 1))/(log(2*x) - 3) - 20*x^2
+ 2*2^(4*x)*exp(2*x^2)*(1/x)^(2*x)
```

3.155

$$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}(2e^{5+x}x-4e^5x^2)+e^x(-2x^2+4x^3)\right)}{e^{2x}-2e^xx^2+x^4}$$

3.155.1 Optimal result

Integrand size = 142, antiderivative size = 27

$$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}(2e^{5+x}x-4e^5x^2)+e^x(-2x^2+4x^3)\right)}{e^{2x}-2e^xx^2+x^4}\,dx = e^{e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x}$$

output
```
exp(x/exp(2*exp(exp(5)/(exp(x)-x^2))+2*x))
```

3.155.2 Mathematica [A] (verified)

Time = 0.54 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}(2e^{5+x}x-4e^5x^2)+e^x(-2x^2+4x^3)\right)}{e^{2x}-2e^xx^2+x^4}\,dx = e^{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}$$

3.155. $\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}(2e^{5+x}x-4e^5x^2)+e^x(-2x^2+4x^3)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$

input
```
Integrate[(E^(-2*E^(E^5/(E^x - x^2)) - 2*x + E^(-2*E^(E^5/(E^x - x^2)) - 2
*x)*x)*(E^(2*x)*(1 - 2*x) + x^4 - 2*x^5 + E^(E^5/(E^x - x^2))*(2*E^(5 + x)
*x - 4*E^5*x^2) + E^x*(-2*x^2 + 4*x^3)))/(E^(2*x) - 2*E^x*x^2 + x^4),x]
```

output
```
E^(E^(-2*E^(E^5/(E^x - x^2)) - 2*x)*x)
```

3.155.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-2x^5+x^4+e^{\frac{e^5}{e^x-x^2}}\left(2e^{x+5}x-4e^5x^2\right)+e^x\left(4x^3-2x^2\right)+e^{2x}(1-2x)\right)\exp\left(e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x-2e^{\frac{e^5}{e^x-x^2}}-2x\right)}{x^4-2e^xx^2+e^{2x}}$$

$\big\downarrow$ 7292

$$\int \frac{\left(-2x^5+x^4+e^{\frac{e^5}{e^x-x^2}}\left(2e^{x+5}x-4e^5x^2\right)+e^x\left(4x^3-2x^2\right)+e^{2x}(1-2x)\right)\exp\left(e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x-2e^{\frac{e^5}{e^x-x^2}}-2x\right)}{\left(e^x-x^2\right)^2}$$

$\big\downarrow$ 7293

$$\int \left(\frac{2(2x-1)x^2\exp\left(e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{\left(e^x-x^2\right)^2}+\frac{2\left(e^x-2x\right)x\exp\left(e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}-2\right.}{\left(e^x-x^2\right)^2}\right.$$

$\big\downarrow$ 7239

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\right.}{\left(e^x-x^2\right)^2}$$

$\big\downarrow$ 7293

3.155. $\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}\left(2e^{5+x}x-4e^5x^2\right)+e^x\left(-2x^2+4x^3\right)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$

$$\int \left(\frac{2(2x-1)x^2 \exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{(e^x-x^2)^2} + \frac{2(e^x-2x)\,x \exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\right.}{(e^x-x^2)^2}\right.$$

$\downarrow$ 7239

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\right.}{(e^x-x^2)^2}$$

$\downarrow$ 7293

$$\int \left(\frac{2(2x-1)x^2 \exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{(e^x-x^2)^2} + \frac{2(e^x-2x)\,x \exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\right.}{(e^x-x^2)^2}\right.$$

$\downarrow$ 7239

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\right.}{(e^x-x^2)^2}$$

$\downarrow$ 7293

$$\int \left(\frac{2(2x-1)x^2 \exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{(e^x-x^2)^2} + \frac{2(e^x-2x)\,x \exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\right.}{(e^x-x^2)^2}\right.$$

$\downarrow$ 7239

3.155. $$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}\left(2e^{5+x}x-4e^5x^2\right)+e^x\left(-2x^2+4x^3\right)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\right.}{\left(e^x-x^2\right)^2}$$

$\downarrow$ 7293

$$\int \left(\frac{2(2x-1)x^2\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{\left(e^x-x^2\right)^2}+\frac{2\left(e^x-2x\right)x\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\right.}{\left(e^x-x^2\right)^2}\right.$$

$\downarrow$ 7239

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\right.}{\left(e^x-x^2\right)^2}$$

$\downarrow$ 7293

$$\int \left(\frac{2(2x-1)x^2\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{\left(e^x-x^2\right)^2}+\frac{2\left(e^x-2x\right)x\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\right.}{\left(e^x-x^2\right)^2}\right.$$

$\downarrow$ 7239

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\right.}{\left(e^x-x^2\right)^2}$$

$\downarrow$ 7293

3.155. $$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}\left(2e^{5+x}x-4e^5x^2\right)+e^x\left(-2x^2+4x^3\right)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$

$$\int \left(\frac{2(2x-1)x^2\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{(e^x-x^2)^2}+\frac{2(e^x-2x)\,x\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\right.}{(e^x-x^2)^2}\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\right.}{(e^x-x^2)^2}$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{2(2x-1)x^2\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{(e^x-x^2)^2}+\frac{2(e^x-2x)\,x\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\right.}{(e^x-x^2)^2}\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\right.}{(e^x-x^2)^2}$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{2(2x-1)x^2\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{(e^x-x^2)^2}+\frac{2(e^x-2x)\,x\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\right.}{(e^x-x^2)^2}\right.$$

$$\Big\downarrow \; 7239$$

3.155. $$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}\left(2e^{5+x}x-4e^5x^2\right)+e^x\left(-2x^2+4x^3\right)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\Big(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\cdots}{(e^x-x^2)^2}$$

$\downarrow$ 7293

$$\int \Bigg(\frac{2(2x-1)x^2\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{(e^x-x^2)^2}+\frac{2(e^x-2x)\,x\exp\Big(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\cdots}{(e^x-x^2)^2}$$

$\downarrow$ 7239

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\Big(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\cdots}{(e^x-x^2)^2}$$

$\downarrow$ 7293

$$\int \Bigg(\frac{2(2x-1)x^2\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{(e^x-x^2)^2}+\frac{2(e^x-2x)\,x\exp\Big(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\cdots}{(e^x-x^2)^2}$$

$\downarrow$ 7239

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\Big(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\cdots}{(e^x-x^2)^2}$$

$\downarrow$ 7293

3.155. $$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}\left(2e^{5+x}x-4e^5x^2\right)+e^x\left(-2x^2+4x^3\right)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$

$$\int \left(\frac{2(2x-1)x^2 \exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x - 2e^{\frac{e^5}{e^x-x^2}} - x\right)}{(e^x-x^2)^2} + \frac{2(e^x-2x)\,x\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x - 2e^{\frac{e^5}{e^x-x^2}} + \frac{e^5}{e^x-x^2} \cdots\right.}{(e^x-x^2)^2} \right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}} \cdots\right.}{(e^x-x^2)^2}$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{2(2x-1)x^2 \exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x - 2e^{\frac{e^5}{e^x-x^2}} - x\right)}{(e^x-x^2)^2} + \frac{2(e^x-2x)\,x\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x - 2e^{\frac{e^5}{e^x-x^2}} + \frac{e^5}{e^x-x^2} \cdots\right.}{(e^x-x^2)^2} \right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}} \cdots\right.}{(e^x-x^2)^2}$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{2(2x-1)x^2 \exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x - 2e^{\frac{e^5}{e^x-x^2}} - x\right)}{(e^x-x^2)^2} + \frac{2(e^x-2x)\,x\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x - 2e^{\frac{e^5}{e^x-x^2}} + \frac{e^5}{e^x-x^2} \cdots\right.}{(e^x-x^2)^2} \right.$$

$$\Big\downarrow \; 7239$$

3.155. $$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}\left(2e^{5+x}x-4e^5x^2\right)+e^x\left(-2x^2+4x^3\right)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$

$$\int \frac{\left(-2x^5+x^4-4e^{\frac{e^5}{e^x-x^2}+5}x^2+2e^x(2x-1)x^2+2e^{\frac{e^5}{e^x-x^2}+x+5}x+e^{2x}(1-2x)\right)\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}\right.}{(e^x-x^2)^2}$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{2(2x-1)x^2\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}-x\right)}{(e^x-x^2)^2}+\frac{2(e^x-2x)\,x\exp\left(e^{-2\left(e^{\frac{e^5}{e^x-x^2}}+x\right)}x-2e^{\frac{e^5}{e^x-x^2}}+\frac{e^5}{e^x-x^2}\right.}{(e^x-x^2)^2}\right.$$

input
```
Int[(E^(-2*E^(E^5/(E^x - x^2)) - 2*x + E^(-2*E^(E^5/(E^x - x^2)) - 2*x)*x)
*(E^(2*x)*(1 - 2*x) + x^4 - 2*x^5 + E^(E^5/(E^x - x^2))*(2*E^(5 + x)*x - 4
*E^5*x^2) + E^x*(-2*x^2 + 4*x^3)))/(E^(2*x) - 2*E^x*x^2 + x^4),x]
```

output
```
$Aborted
```

3.155.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.155.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$e^{x\,e^{-2\,e^{\frac{e^{5}}{e^{x}-x^{2}}}-2x}}$$

input
```
int(((2*x*exp(5)*exp(x)-4*x^2*exp(5))*exp(exp(5)/(exp(x)-x^2))+(1-2*x)*exp
(x)^2+(4*x^3-2*x^2)*exp(x)-2*x^5+x^4)*exp(x/exp(2*exp(exp(5)/(exp(x)-x^2))
+2*x))/(exp(x)^2-2*exp(x)*x^2+x^4)/exp(2*exp(exp(5)/(exp(x)-x^2))+2*x),x)
```

output
```
exp(x*exp(-2*exp(exp(5)/(exp(x)-x^2))-2*x))
```

3.155.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}\left(2e^{5+x}x-4e^5x^2\right)+e^x\left(-2x^2+4x^3\right)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$
$$= e^{\left(xe^{\left(-2\,x-2\,e^{\left(-\frac{e^{10}}{x^2e^5-e^{(x+5)}}\right)}\right)}\right)}$$

input
```
integrate(((2*x*exp(5)*exp(x)-4*x^2*exp(5))*exp(exp(5)/(exp(x)-x^2))+(1-2*
x)*exp(x)^2+(4*x^3-2*x^2)*exp(x)-2*x^5+x^4)*exp(x/exp(2*exp(exp(5)/(exp(x)
-x^2))+2*x))/(exp(x)^2-2*exp(x)*x^2+x^4)/exp(2*exp(exp(5)/(exp(x)-x^2))+2*
x),x, algorithm=\
```

output
```
e^(x*e^(-2*x - 2*e^(-e^10/(x^2*e^5 - e^(x + 5)))))
```

3.155.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}(2e^{5+x}x-4e^5x^2)+e^x(-2x^2+4x^3)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$
$$= \text{Timed out}$$

input
```
integrate(((2*x*exp(5)*exp(x)-4*x**2*exp(5))*exp(exp(5)/(exp(x)-x**2))+(1-
2*x)*exp(x)**2+(4*x**3-2*x**2)*exp(x)-2*x**5+x**4)*exp(x/exp(2*exp(exp(5)/
(exp(x)-x**2))+2*x))/(exp(x)**2-2*exp(x)*x**2+x**4)/exp(2*exp(exp(5)/(exp(
x)-x**2))+2*x),x)
```

output
```
Timed out
```

3.155.7 Maxima [A] (verification not implemented)

Time = 0.51 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}(2e^{5+x}x-4e^5x^2)+e^x(-2x^2+4x^3)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$
$$= e^{\left(xe^{\left(-2\,x-2\,e^{\left(-\frac{e^5}{x^2-e^x}\right)}\right)}\right)}$$

input
```
integrate(((2*x*exp(5)*exp(x)-4*x^2*exp(5))*exp(exp(5)/(exp(x)-x^2))+(1-2*
x)*exp(x)^2+(4*x^3-2*x^2)*exp(x)-2*x^5+x^4)*exp(x/exp(2*exp(exp(5)/(exp(x)
-x^2))+2*x))/(exp(x)^2-2*exp(x)*x^2+x^4)/exp(2*exp(exp(5)/(exp(x)-x^2))+2*
x),x, algorithm=\
```

output
```
e^(x*e^(-2*x - 2*e^(-e^5/(x^2 - e^x))))
```

3.155.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}(2e^{5+x}x-4e^5x^2)+e^x(-2x^2+4x^3)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$

$$= e^{\left(xe^{\left(-2\,x-2\,e^{\left(-\frac{e^5}{x^2-e^x}\right)}\right)}\right)}$$

input
```
integrate(((2*x*exp(5)*exp(x)-4*x^2*exp(5))*exp(exp(5)/(exp(x)-x^2))+(1-2*
x)*exp(x)^2+(4*x^3-2*x^2)*exp(x)-2*x^5+x^4)*exp(x/exp(2*exp(exp(5)/(exp(x)
-x^2))+2*x))/(exp(x)^2-2*exp(x)*x^2+x^4)/exp(2*exp(exp(5)/(exp(x)-x^2))+2*
x),x, algorithm=\
```

output
```
e^(x*e^(-2*x - 2*e^(-e^5/(x^2 - e^x))))
```

3.155.9 Mupad [B] (verification not implemented)

Time = 12.70 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{e^{-2e^{\frac{e^5}{e^x-x^2}}-2x+e^{-2e^{\frac{e^5}{e^x-x^2}}-2x}x}\left(e^{2x}(1-2x)+x^4-2x^5+e^{\frac{e^5}{e^x-x^2}}(2e^{5+x}x-4e^5x^2)+e^x(-2x^2+4x^3)\right)}{e^{2x}-2e^xx^2+x^4}\,dx$$

$$= \mathrm{e}^{x\,\mathrm{e}^{-2\,x}\,\mathrm{e}^{-2\,\mathrm{e}^{\frac{\mathrm{e}^5}{\mathrm{e}^x-x^2}}}}$$

input
```
int(-(exp(x*exp(- 2*x - 2*exp(exp(5)/(exp(x) - x^2))))*exp(- 2*x - 2*exp(e
xp(5)/(exp(x) - x^2)))*(exp(x)*(2*x^2 - 4*x^3) + exp(exp(5)/(exp(x) - x^2)
)*(4*x^2*exp(5) - 2*x*exp(5)*exp(x)) + exp(2*x)*(2*x - 1) - x^4 + 2*x^5))/
(exp(2*x) - 2*x^2*exp(x) + x^4),x)
```

output
```
exp(x*exp(-2*x)*exp(-2*exp(exp(5)/(exp(x) - x^2))))
```

3.156 $\int \frac{131250x^6-46875x^8+e^{-5+x}(131...}{432000+432e^{-15+3x}-1080000x^2+900000x^4-250000x^6+e^{-10+2x}(12...}$

3.156.1 Optimal result

Integrand size = 90, antiderivative size = 33

$$\int \frac{131250x^6-46875x^8+e^{-5+x}(13125x^6-3750x^7)}{432000+432e^{-15+3x}-1080000x^2+900000x^4-250000x^6+e^{-10+2x}(12960-10800x^2)+e^{-5+x}(12960...}$$
$$=4+\frac{x^5}{16\left(\frac{3\left(2+\frac{e^{-5+x}}{5}\right)}{5x}-x\right)^2}$$

output
```
1/16*x^5/(3/5*(2+1/5*exp(-5+x))/x-x)^2+4
```

3.156.2 Mathematica [A] (verified)

Time = 2.43 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.94

$$\int \frac{131250x^6-46875x^8+e^{-5+x}(13125x^6-3750x^7)}{432000+432e^{-15+3x}-1080000x^2+900000x^4-250000x^6+e^{-10+2x}(12960-10800x^2)+e^{-5+x}(12960...}$$
$$=\frac{625e^{10}x^7}{16(30e^5+3e^x-25e^5x^2)^2}$$

input
```
Integrate[(131250*x^6 - 46875*x^8 + E^(-5 + x)*(13125*x^6 - 3750*x^7))/(43
2000 + 432*E^(-15 + 3*x) - 1080000*x^2 + 900000*x^4 - 250000*x^6 + E^(-10
+ 2*x)*(12960 - 10800*x^2) + E^(-5 + x)*(129600 - 216000*x^2 + 90000*x^4))
,x]
```

output
```
(625*E^10*x^7)/(16*(30*E^5 + 3*E^x - 25*E^5*x^2)^2)
```

3.156.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-46875x^8+131250x^6+e^{x-5}(13125x^6-3750x^7)}{-250000x^6+900000x^4-1080000x^2+e^{2x-10}(12960-10800x^2)+e^{x-5}(90000x^4-216000x^2+129600)+43$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{1875e^{10}x^6(-5e^5(5x^2-14)-e^x(2x-7))}{16(3e^x-5e^5(5x^2-6))^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1875}{16}e^{10}\int \frac{x^6(e^x(7-2x)+5e^5(14-5x^2))}{(5e^5(6-5x^2)+3e^x)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1875}{16}e^{10}\int \left(\frac{10e^5x^7(5x^2-10x-6)}{3(25e^5x^2-3e^x-30e^5)^3}-\frac{x^6(2x-7)}{3(25e^5x^2-3e^x-30e^5)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1875}{16}e^{10}\left(\frac{50}{3}e^5\int \frac{x^9}{(25e^5x^2-3e^x-30e^5)^3}dx-\frac{100}{3}e^5\int \frac{x^8}{(25e^5x^2-3e^x-30e^5)^3}dx-20e^5\int \frac{x^7}{(25e^5x^2-3e^x-30e$$

input
```
Int[(131250*x^6 - 46875*x^8 + E^(-5 + x)*(13125*x^6 - 3750*x^7))/(432000 +
 432*E^(-15 + 3*x) - 1080000*x^2 + 900000*x^4 - 250000*x^6 + E^(-10 + 2*x)
*(12960 - 10800*x^2) + E^(-5 + x)*(129600 - 216000*x^2 + 90000*x^4)),x]
```

output
```
$Aborted
```

3.156.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.156.4 Maple [A] (verified)

Time = 0.85 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.64

method	result	size
risch	$\frac{625x^7}{16(25x^2-3\,\mathrm{e}^{-5+x}-30)^2}$	21
parallelrisch	$\frac{625x^7}{16(625x^4-150x^2\mathrm{e}^{-5+x}-1500x^2+9\,\mathrm{e}^{2x-10}+180\,\mathrm{e}^{-5+x}+900)}$	43

input
```
int(((-3750*x^7+13125*x^6)*exp(-5+x)-46875*x^8+131250*x^6)/(432*exp(-5+x)^
3+(-10800*x^2+12960)*exp(-5+x)^2+(90000*x^4-216000*x^2+129600)*exp(-5+x)-2
50000*x^6+900000*x^4-1080000*x^2+432000),x,method=_RETURNVERBOSE)
```

output
```
625/16*x^7/(25*x^2-3*exp(-5+x)-30)^2
```

3.156.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.21

$$\int \frac{131250x^6-46875x^8+e^{-5+x}(13125x^6-3750x^7)}{432000+432e^{-15+3x}-1080000x^2+900000x^4-250000x^6+e^{-10+2x}\left(12960-10800x^2\right)+e^{-5+x}\left(12960\right.}$$
$$=\frac{625\,x^7}{16\,(625\,x^4-1500\,x^2-30\,(5\,x^2-6)e^{(x-5)}+9\,e^{(2\,x-10)}+900)}$$

input
```
integrate(((-3750*x^7+13125*x^6)*exp(-5+x)-46875*x^8+131250*x^6)/(432*exp(
-5+x)^3+(-10800*x^2+12960)*exp(-5+x)^2+(90000*x^4-216000*x^2+129600)*exp(-
5+x)-250000*x^6+900000*x^4-1080000*x^2+432000),x, algorithm=\
```

output
```
625/16*x^7/(625*x^4 - 1500*x^2 - 30*(5*x^2 - 6)*e^(x - 5) + 9*e^(2*x - 10)
 + 900)
```

3.156.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

$$\int \frac{131250x^6-46875x^8+e^{-5+x}(13125x^6-3750x^7)}{432000+432e^{-15+3x}-1080000x^2+900000x^4-250000x^6+e^{-10+2x}\left(12960-10800x^2\right)+e^{-5+x}\left(12960\right.}$$
$$=\frac{625x^7}{10000x^4-24000x^2+(2880-2400x^2)\,e^{x-5}+144e^{2x-10}+14400}$$

input
```
integrate(((-3750*x**7+13125*x**6)*exp(-5+x)-46875*x**8+131250*x**6)/(432*
exp(-5+x)**3+(-10800*x**2+12960)*exp(-5+x)**2+(90000*x**4-216000*x**2+1296
00)*exp(-5+x)-250000*x**6+900000*x**4-1080000*x**2+432000),x)
```

output
```
625*x**7/(10000*x**4 - 24000*x**2 + (2880 - 2400*x**2)*exp(x - 5) + 144*ex
p(2*x - 10) + 14400)
```

3.156.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(24) = 48$.

Time = 0.24 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.52

$$\int \frac{131250x^6 - 46875x^8 + e^{-5+x}(13125x^6 - 3750x^7)}{432000 + 432e^{-15+3x} - 1080000x^2 + 900000x^4 - 250000x^6 + e^{-10+2x}(12960 - 10800x^2) + e^{-5+x}(12960$$
$$= \frac{625\,x^7e^{10}}{16\left(625\,x^4e^{10} - 1500\,x^2e^{10} - 30\,(5\,x^2e^5 - 6\,e^5)e^x + 900\,e^{10} + 9\,e^{(2\,x)}\right)}$$

input
```
integrate(((-3750*x^7+13125*x^6)*exp(-5+x)-46875*x^8+131250*x^6)/(432*exp(
-5+x)^3+(-10800*x^2+12960)*exp(-5+x)^2+(90000*x^4-216000*x^2+129600)*exp(-
5+x)-250000*x^6+900000*x^4-1080000*x^2+432000),x, algorithm=\
```

output
```
625/16*x^7*e^10/(625*x^4*e^10 - 1500*x^2*e^10 - 30*(5*x^2*e^5 - 6*e^5)*e^x
 + 900*e^10 + 9*e^(2*x))
```

3.156.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(24) = 48$.

Time = 0.29 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.48

$$\int \frac{131250x^6 - 46875x^8 + e^{-5+x}(13125x^6 - 3750x^7)}{432000 + 432e^{-15+3x} - 1080000x^2 + 900000x^4 - 250000x^6 + e^{-10+2x}(12960 - 10800x^2) + e^{-5+x}(12960$$
$$= \frac{625\,x^7e^{10}}{16\left(625\,x^4e^{10} - 1500\,x^2e^{10} - 150\,x^2e^{(x+5)} + 900\,e^{10} + 9\,e^{(2\,x)} + 180\,e^{(x+5)}\right)}$$

input
```
integrate(((-3750*x^7+13125*x^6)*exp(-5+x)-46875*x^8+131250*x^6)/(432*exp(
-5+x)^3+(-10800*x^2+12960)*exp(-5+x)^2+(90000*x^4-216000*x^2+129600)*exp(-
5+x)-250000*x^6+900000*x^4-1080000*x^2+432000),x, algorithm=\
```

output
```
625/16*x^7*e^10/(625*x^4*e^10 - 1500*x^2*e^10 - 150*x^2*e^(x + 5) + 900*e^
10 + 9*e^(2*x) + 180*e^(x + 5))
```

3.156.9 Mupad [F(-1)]

Timed out.

$$\int \frac{131250x^6 - 46875x^8 + e^{-5+x}(13125x^6 - 3750x^7)}{432000 + 432e^{-15+3x} - 1080000x^2 + 900000x^4 - 250000x^6 + e^{-10+2x}(12960 - 10800x^2) + e^{-5+x}(12960}$$
$$= \int \frac{\mathrm{e}^{x-5}(13125\,x^6 - 3750\,x^7) + 131250\,x^6 - 46875\,x^8}{432\,\mathrm{e}^{3\,x-15} + \mathrm{e}^{x-5}(90000\,x^4 - 216000\,x^2 + 129600) - \mathrm{e}^{2\,x-10}(10800\,x^2 - 12960) - 1080000\,x^2 + 9000}$$

input
```
int((exp(x - 5)*(13125*x^6 - 3750*x^7) + 131250*x^6 - 46875*x^8)/(432*exp(
3*x - 15) + exp(x - 5)*(90000*x^4 - 216000*x^2 + 129600) - exp(2*x - 10)*(
10800*x^2 - 12960) - 1080000*x^2 + 900000*x^4 - 250000*x^6 + 432000),x)
```

output
```
int((exp(x - 5)*(13125*x^6 - 3750*x^7) + 131250*x^6 - 46875*x^8)/(432*exp(
3*x - 15) + exp(x - 5)*(90000*x^4 - 216000*x^2 + 129600) - exp(2*x - 10)*(
10800*x^2 - 12960) - 1080000*x^2 + 900000*x^4 - 250000*x^6 + 432000), x)
```

3.157 $\int \frac{150-30e-225x}{100x^3+4e^2x^3-200x^4+100x^5+e(-40x^3+40x^4)}\,dx$

3.157.1 Optimal result

Integrand size = 48, antiderivative size = 17

$$\int \frac{150-30e-225x}{100x^3+4e^2x^3-200x^4+100x^5+e(-40x^3+40x^4)}\,dx = 4+\frac{15}{4x^2(-5+e+5x)}$$

output
```
4+5/(4/3*exp(1)+20/3*x-20/3)/x^2
```

3.157.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{150-30e-225x}{100x^3+4e^2x^3-200x^4+100x^5+e(-40x^3+40x^4)}\,dx = \frac{15}{4x^2(-5+e+5x)}$$

input
```
Integrate[(150 - 30*E - 225*x)/(100*x^3 + 4*E^2*x^3 - 200*x^4 + 100*x^5 +
E*(-40*x^3 + 40*x^4)),x]
```

output
```
15/(4*x^2*(-5 + E + 5*x))
```

3.157.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.104, Rules used = {6, 2026, 1184, 27, 83}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-225x-30e+150}{100x^5-200x^4+4e^2x^3+100x^3+e\left(40x^4-40x^3\right)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{-225x-30e+150}{100x^5-200x^4+\left(100+4e^2\right)x^3+e\left(40x^4-40x^3\right)}dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{-225x-30e+150}{x^3\left(100x^2-40(5-e)x+4(5-e)^2\right)}dx$$

$$\Big\downarrow \ 1184$$

$$100\int \frac{3(2(5-e)-15x)}{80(-5x-e+5)^2x^3}dx$$

$$\Big\downarrow \ 27$$

$$\frac{15}{4}\int \frac{2(5-e)-15x}{(-5x-e+5)^2x^3}dx$$

$$\Big\downarrow \ 83$$

$$-\frac{15}{4(-5x-e+5)x^2}$$

input
```
Int[(150 - 30*E - 225*x)/(100*x^3 + 4*E^2*x^3 - 200*x^4 + 100*x^5 + E*(-40
*x^3 + 40*x^4)),x]
```

output
```
-15/(4*(5 - E - 5*x)*x^2)
```

3.157.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 83
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] /; FreeQ[{a, b, c, d, e, f, n, p}, x] && NeQ[n + p + 2, 0] && EqQ[a*d*f
*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)), 0]
```

rule 1184
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_) + (b_.)*(x_
) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/c^p   Int[(d + e*x)^m*(f + g*x
)^n*(b/2 + c*x)^(2*p), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x] && E
qQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

3.157.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

method	result	size
gosper	$\frac{15}{4x^2(-5+e+5x)}$	15
norman	$\frac{15}{4x^2(-5+e+5x)}$	15
risch	$\frac{15}{4x^2(-5+e+5x)}$	15
parallelrisch	$\frac{15}{4x^2(-5+e+5x)}$	15

input
```
int((-30*exp(1)-225*x+150)/(4*x^3*exp(1)^2+(40*x^4-40*x^3)*exp(1)+100*x^5-
200*x^4+100*x^3),x,method=_RETURNVERBOSE)
```

output
```
15/4/x^2/(-5+exp(1)+5*x)
```

3.157.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int \frac{150-30e-225x}{100x^3+4e^2x^3-200x^4+100x^5+e\left(-40x^3+40x^4\right)}\,dx=\frac{15}{4\left(5\,x^3+x^2e-5\,x^2\right)}$$

input
```
integrate((-30*exp(1)-225*x+150)/(4*x^3*exp(1)^2+(40*x^4-40*x^3)*exp(1)+10
0*x^5-200*x^4+100*x^3),x, algorithm=\
```

output
```
15/4/(5*x^3 + x^2*e - 5*x^2)
```

3.157.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{150-30e-225x}{100x^3+4e^2x^3-200x^4+100x^5+e\left(-40x^3+40x^4\right)}\,dx=\frac{15}{20x^3+x^2\left(-20+4e\right)}$$

input
```
integrate((-30*exp(1)-225*x+150)/(4*x**3*exp(1)**2+(40*x**4-40*x**3)*exp(1
)+100*x**5-200*x**4+100*x**3),x)
```

output
```
15/(20*x**3 + x**2*(-20 + 4*E))
```

3.157.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \frac{150-30e-225x}{100x^3+4e^2x^3-200x^4+100x^5+e\left(-40x^3+40x^4\right)}\,dx=\frac{15}{4\left(5\,x^3+x^2(e-5)\right)}$$

input
```
integrate((-30*exp(1)-225*x+150)/(4*x^3*exp(1)^2+(40*x^4-40*x^3)*exp(1)+10
0*x^5-200*x^4+100*x^3),x, algorithm=\
```

output
```
15/4/(5*x^3 + x^2*(e - 5))
```

3.157.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(16) = 32$.

Time = 0.28 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.71

$$\int \frac{150-30e-225x}{100x^3+4e^2x^3-200x^4+100x^5+e(-40x^3+40x^4)}\,dx = \frac{375}{4\,(5\,x+e-5)(e^2-10\,e+25)} - \frac{15\,(5\,x-e+5)}{4\,x^2(e^2-10\,e+25)}$$

input
```
integrate((-30*exp(1)-225*x+150)/(4*x^3*exp(1)^2+(40*x^4-40*x^3)*exp(1)+10
0*x^5-200*x^4+100*x^3),x, algorithm=\
```

output
```
375/4/((5*x + e - 5)*(e^2 - 10*e + 25)) - 15/4*(5*x - e + 5)/(x^2*(e^2 - 1
0*e + 25))
```

3.157.9 Mupad [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

$$\int \frac{150-30e-225x}{100x^3+4e^2x^3-200x^4+100x^5+e(-40x^3+40x^4)}\,dx = \frac{15}{20\,x^3+(4\,\mathrm{e}-20)\,x^2}$$

input
```
int(-(225*x + 30*exp(1) - 150)/(4*x^3*exp(2) - exp(1)*(40*x^3 - 40*x^4) +
100*x^3 - 200*x^4 + 100*x^5),x)
```

output
```
15/(x^2*(4*exp(1) - 20) + 20*x^3)
```

3.158 $\int \frac{45x^4-27x^5+(180x^3-144x^4+27x^5)\log(-2+x)}{(2000-4600x+3960x^2-1512x^3+216x^4)\log^3(-2+x)}\,dx$

3.158.1 Optimal result

Integrand size = 61, antiderivative size = 22

$$\int \frac{45x^4-27x^5+(180x^3-144x^4+27x^5)\log(-2+x)}{(2000-4600x+3960x^2-1512x^3+216x^4)\log^3(-2+x)}\,dx = 15+\frac{x^4}{16\left(-\frac{5}{3}+x\right)^2\log^2(-2+x)}$$

output
```
1/4*x^4/(2*x-10/3)^2/ln(-2+x)^2+15
```

3.158.2 Mathematica [A] (verified)

Time = 0.55 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{45x^4-27x^5+(180x^3-144x^4+27x^5)\log(-2+x)}{(2000-4600x+3960x^2-1512x^3+216x^4)\log^3(-2+x)}\,dx = \frac{9x^4}{16(1+3(-2+x))^2\log^2(-2+x)}$$

input
```
Integrate[(45*x^4 - 27*x^5 + (180*x^3 - 144*x^4 + 27*x^5)*Log[-2 + x])/((2
000 - 4600*x + 3960*x^2 - 1512*x^3 + 216*x^4)*Log[-2 + x]^3),x]
```

output
```
(9*x^4)/(16*(1 + 3*(-2 + x))^2*Log[-2 + x]^2)
```

3.158.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-27x^5+45x^4+(27x^5-144x^4+180x^3)\log(x-2)}{(216x^4-1512x^3+3960x^2-4600x+2000)\log^3(x-2)}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{-27x^5+45x^4+(27x^5-144x^4+180x^3)\log(x-2)}{8(x-2)\log^3(x-2)}-\frac{3(-27x^5+45x^4+(27x^5-144x^4+180x^3)\log(x-2}{8(3x-5)\log^3(x-2)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{625}{24}\int \frac{1}{(3x-5)^2\log^3(x-2)}dx+\frac{375}{8}\int \frac{1}{(3x-5)\log^3(x-2)}dx-\frac{625}{24}\int \frac{1}{(3x-5)^3\log^2(x-2)}dx-\frac{125}{12}\int \frac{1}{(3x-5)^2\log^2(x-2)}dx-\frac{x(2-x)}{16\log^2(x-2)}-\frac{2-x}{3\log^2(x-2)}+\frac{9}{\log^2(x-2)}$$

input
```
Int[(45*x^4 - 27*x^5 + (180*x^3 - 144*x^4 + 27*x^5)*Log[-2 + x])/((2000 -
4600*x + 3960*x^2 - 1512*x^3 + 216*x^4)*Log[-2 + x]^3),x]
```

output
```
$Aborted
```

3.158.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.158.4 Maple [A] (verified)

Time = 25.93 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

method	result
norman	$\frac{9x^4}{16(3x-5)^2\ln(-2+x)^2}$
risch	$\frac{9x^4}{16(9x^2-30x+25)\ln(-2+x)^2}$
parallelrisch	$\frac{9x^4}{16(9x^2-30x+25)\ln(-2+x)^2}$
derivativedivides	$\frac{\frac{125(-2+x)\ln(-2+x)}{12}+\frac{125\ln(-2+x)}{16}-\frac{3125}{72}+\frac{625x}{24}}{\ln(-2+x)^3(3x-5)^2}+\frac{19}{16\ln(-2+x)^2}+\frac{-\frac{11}{12}+\frac{11x}{24}}{\ln(-2+x)^2}+\frac{(-2+x)^2}{16\ln(-2+x)^2}-\frac{625}{72\ln(-2+x)^3}$
default	$\frac{\frac{125(-2+x)\ln(-2+x)}{12}+\frac{125\ln(-2+x)}{16}-\frac{3125}{72}+\frac{625x}{24}}{\ln(-2+x)^3(3x-5)^2}+\frac{19}{16\ln(-2+x)^2}+\frac{-\frac{11}{12}+\frac{11x}{24}}{\ln(-2+x)^2}+\frac{(-2+x)^2}{16\ln(-2+x)^2}-\frac{625}{72\ln(-2+x)^3}$

input
```
int(((27*x^5-144*x^4+180*x^3)*ln(-2+x)-27*x^5+45*x^4)/(216*x^4-1512*x^3+39
60*x^2-4600*x+2000)/ln(-2+x)^3,x,method=_RETURNVERBOSE)
```

output
```
9/16*x^4/(3*x-5)^2/ln(-2+x)^2
```

3.158.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{45x^4-27x^5+(180x^3-144x^4+27x^5)\log(-2+x)}{(2000-4600x+3960x^2-1512x^3+216x^4)\log^3(-2+x)}\,dx = \frac{9\,x^4}{16\,(9\,x^2-30\,x+25)\log{(x-2)}^2}$$

input
```
integrate(((27*x^5-144*x^4+180*x^3)*log(-2+x)-27*x^5+45*x^4)/(216*x^4-1512
*x^3+3960*x^2-4600*x+2000)/log(-2+x)^3,x, algorithm=\
```

output
```
9/16*x^4/((9*x^2 - 30*x + 25)*log(x - 2)^2)
```

3.158.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{45x^4-27x^5+(180x^3-144x^4+27x^5)\log(-2+x)}{(2000-4600x+3960x^2-1512x^3+216x^4)\log^3(-2+x)}\,dx = \frac{9x^4}{(144x^2-480x+400)\log{(x-2)}^2}$$

input
```
integrate(((27*x**5-144*x**4+180*x**3)*ln(-2+x)-27*x**5+45*x**4)/(216*x**4
-1512*x**3+3960*x**2-4600*x+2000)/ln(-2+x)**3,x)
```

output
```
9*x**4/((144*x**2 - 480*x + 400)*log(x - 2)**2)
```

3.158.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{45x^4-27x^5+(180x^3-144x^4+27x^5)\log(-2+x)}{(2000-4600x+3960x^2-1512x^3+216x^4)\log^3(-2+x)}\,dx = \frac{9\,x^4}{16\,(9\,x^2-30\,x+25)\log{(x-2)}^2}$$

input
```
integrate(((27*x^5-144*x^4+180*x^3)*log(-2+x)-27*x^5+45*x^4)/(216*x^4-1512
*x^3+3960*x^2-4600*x+2000)/log(-2+x)^3,x, algorithm=\
```

output
```
9/16*x^4/((9*x^2 - 30*x + 25)*log(x - 2)^2)
```

3.158.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

$$\int \frac{45x^4-27x^5+(180x^3-144x^4+27x^5)\log(-2+x)}{(2000-4600x+3960x^2-1512x^3+216x^4)\log^3(-2+x)}\,dx = \frac{9\,x^4}{16\,\left(9\,x^2\log{(x-2)}^2-30\,x\log{(x-2)}^2+25\,\log{(x-2)}^2\right)}$$

input
```
integrate(((27*x^5-144*x^4+180*x^3)*log(-2+x)-27*x^5+45*x^4)/(216*x^4-1512
*x^3+3960*x^2-4600*x+2000)/log(-2+x)^3,x, algorithm=\
```

output
```
9/16*x^4/(9*x^2*log(x - 2)^2 - 30*x*log(x - 2)^2 + 25*log(x - 2)^2)
```

3.158.9 Mupad [B] (verification not implemented)

Time = 13.25 (sec) , antiderivative size = 158, normalized size of antiderivative = 7.18

$$\int \frac{45x^4-27x^5+(180x^3-144x^4+27x^5)\log(-2+x)}{(2000-4600x+3960x^2-1512x^3+216x^4)\log^3(-2+x)}\,dx$$
$$= \frac{\frac{9\,x^4}{16\,{(3\,x-5)}^2}-\frac{9\,x^3\,\ln(x-2)\,(3\,x-10)\,(x-2)}{16\,{(3\,x-5)}^3}}{{\ln\left(x-2\right)}^2} - \frac{\frac{9\,\left(10\,x^3-3\,x^4\right)\,(x-2)}{16\,{(3\,x-5)}^3}-\frac{9\,\ln(x-2)\,(x-2)\,\left(-18\,x^5+123\,x^4-320\,x^3+300\,x^2\right)}{16\,{(3\,x-5)}^4}}{\ln\left(x-2\right)} - \frac{13\,x}{48}+\frac{x^2}{8}+\frac{\frac{125\,x^3}{216}-\frac{1625\,x^2}{648}+\frac{11125\,x}{3888}-\frac{625}{1944}}{x^4-\frac{20\,x^3}{3}+\frac{50\,x^2}{3}-\frac{500\,x}{27}+\frac{625}{81}}$$

input
```
int((log(x - 2)*(180*x^3 - 144*x^4 + 27*x^5) + 45*x^4 - 27*x^5)/(log(x - 2
)^3*(3960*x^2 - 4600*x - 1512*x^3 + 216*x^4 + 2000)),x)
```

output
```
((9*x^4)/(16*(3*x - 5)^2) - (9*x^3*log(x - 2)*(3*x - 10)*(x - 2))/(16*(3*x
 - 5)^3))/log(x - 2)^2 - ((9*(10*x^3 - 3*x^4)*(x - 2))/(16*(3*x - 5)^3) -
(9*log(x - 2)*(x - 2)*(300*x^2 - 320*x^3 + 123*x^4 - 18*x^5))/(16*(3*x - 5
)^4))/log(x - 2) - (13*x)/48 + x^2/8 + ((11125*x)/3888 - (1625*x^2)/648 +
(125*x^3)/216 - 625/1944)/((50*x^2)/3 - (500*x)/27 - (20*x^3)/3 + x^4 + 62
5/81)
```

3.159 $\int \frac{-156+52x+(60-20x)\log(25)+(-156+60\log(25))\log(x)}{-162+108x-18x^2+(45-30x+5x^2)\log(25)}\,dx$

3.159.1 Optimal result

Integrand size = 48, antiderivative size = 22

$$\int \frac{-156+52x+(60-20x)\log(25)+(-156+60\log(25))\log(x)}{-162+108x-18x^2+(45-30x+5x^2)\log(25)}\,dx = -\frac{x\left(4+\frac{4}{-\frac{18}{5}+\log(25)}\right)\log(x)}{-3+x}$$

output
```
-ln(x)*(4/(-18/5+2*ln(5))+4)*x/(-3+x)
```

3.159.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-156+52x+(60-20x)\log(25)+(-156+60\log(25))\log(x)}{-162+108x-18x^2+(45-30x+5x^2)\log(25)}\,dx = -\frac{4x(-13+5\log(25))\log(x)}{(-3+x)(-18+5\log(25))}$$

input
```
Integrate[(-156 + 52*x + (60 - 20*x)*Log[25] + (-156 + 60*Log[25])*Log[x])
/(-162 + 108*x - 18*x^2 + (45 - 30*x + 5*x^2)*Log[25]),x]
```

output
```
(-4*x*(-13 + 5*Log[25])*Log[x])/((-3 + x)*(-18 + 5*Log[25]))
```

3.159.3 Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {7292, 27, 7239, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{52x+(60-20x)\log(25)+(60\log(25)-156)\log(x)-156}{-18x^2+(5x^2-30x+45)\log(25)+108x-162}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{4(13-5\log(25))(-x+3\log(x)+3)}{x^2(18-5\log(25))-6x(18-5\log(25))+9(18-5\log(25))}dx$$

$$\Big\downarrow \text{27}$$

$$4(13-5\log(25))\int \frac{-x+3\log(x)+3}{(18-5\log(25))x^2-6(18-5\log(25))x+9(18-5\log(25))}dx$$

$$\Big\downarrow \text{7239}$$

$$4(13-5\log(25))\int \frac{-x+3\log(x)+3}{(3-x)^2(18-5\log(25))}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{4(13-5\log(25))\int \frac{-x+3\log(x)+3}{(3-x)^2}dx}{18-5\log(25)}$$

$$\Big\downarrow \text{7293}$$

$$\frac{4(13-5\log(25))\int \left(\frac{3\log(x)}{(x-3)^2}+\frac{1}{3-x}\right)dx}{18-5\log(25)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{4x(13-5\log(25))\log(x)}{(3-x)(18-5\log(25))}$$

input
```
Int[(-156 + 52*x + (60 - 20*x)*Log[25] + (-156 + 60*Log[25])*Log[x])/(-162
 + 108*x - 18*x^2 + (45 - 30*x + 5*x^2)*Log[25]),x]
```

output
```
(4*x*(13 - 5*Log[25])*Log[x])/((3 - x)*(18 - 5*Log[25]))
```

3.159. $\int \frac{-156+52x+(60-20x)\log(25)+(-156+60\log(25))\log(x)}{-162+108x-18x^2+(45-30x+5x^2)\log(25)}dx$

3.159.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.159.4 Maple [A] (verified)

Time = 1.04 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

method	result	size
norman	$-\frac{2(10\ln(5)-13)x\ln(x)}{(5\ln(5)-9)(-3+x)}$	25
parallelrisch	$\frac{-20x\ln(5)\ln(x)+26x\ln(x)}{(5\ln(5)-9)(-3+x)}$	28
risch	$-\frac{6(10\ln(5)-13)\ln(x)}{5x\ln(5)-15\ln(5)-9x+27}-\frac{20\ln(x)\ln(5)}{5\ln(5)-9}+\frac{26\ln(x)}{5\ln(5)-9}$	54
parts	$\frac{(-20\ln(5)+26)\ln((5\ln(5)-9)x-15\ln(5)+27)}{5\ln(5)-9}+\frac{(60\ln(5)-78)\left(\frac{\ln(-3+x)}{3}-\frac{\ln(x)x}{3(-3+x)}\right)}{5\ln(5)-9}$	64
default	$\frac{(-40\ln(5)+52)\ln((5\ln(5)-9)x-15\ln(5)+27)}{10\ln(5)-18}+\frac{(120\ln(5)-156)\left(\frac{\ln(-3+x)}{3}-\frac{\ln(x)x}{3(-3+x)}\right)}{10\ln(5)-18}$	66

input
```
int(((120*ln(5)-156)*ln(x)+2*(-20*x+60)*ln(5)+52*x-156)/(2*(5*x^2-30*x+45)
*ln(5)-18*x^2+108*x-162),x,method=_RETURNVERBOSE)
```

output
```
-2*(10*ln(5)-13)/(5*ln(5)-9)*x*ln(x)/(-3+x)
```

3.159.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-156+52x+(60-20x)\log(25)+(-156+60\log(25))\log(x)}{-162+108x-18x^2+(45-30x+5x^2)\log(25)}\,dx$$
$$=-\frac{2\,(10\,x\log(5)-13\,x)\log(x)}{5\,(x-3)\log(5)-9\,x+27}$$

input
```
integrate(((120*log(5)-156)*log(x)+2*(-20*x+60)*log(5)+52*x-156)/(2*(5*x^2
-30*x+45)*log(5)-18*x^2+108*x-162),x, algorithm=\
```

output
```
-2*(10*x*log(5) - 13*x)*log(x)/(5*(x - 3)*log(5) - 9*x + 27)
```

3.159.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. 2(20) = 40.

Time = 0.13 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.91

$$\int \frac{-156+52x+(60-20x)\log(25)+(-156+60\log(25))\log(x)}{-162+108x-18x^2+(45-30x+5x^2)\log(25)}\,dx$$
$$=\frac{(26-20\log(5))\log(x)}{-9+5\log(5)}+\frac{(78-60\log(5))\log(x)}{-9x+5x\log(5)-15\log(5)+27}$$

input
```
integrate(((120*ln(5)-156)*ln(x)+2*(-20*x+60)*ln(5)+52*x-156)/(2*(5*x**2-3
0*x+45)*ln(5)-18*x**2+108*x-162),x)
```

output
```
(26 - 20*log(5))*log(x)/(-9 + 5*log(5)) + (78 - 60*log(5))*log(x)/(-9*x +
5*x*log(5) - 15*log(5) + 27)
```

3.159.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. $2(22) = 44$.

Time = 0.19 (sec) , antiderivative size = 141, normalized size of antiderivative = 6.41

$$\int \frac{-156+52x+(60-20x)\log(25)+(-156+60\log(25))\log(x)}{-162+108x-18x^2+(45-30x+5x^2)\log(25)}\,dx$$
$$= 20\left(\frac{\log(x-3)}{5\log(5)-9}-\frac{\log(x)}{5\log(5)-9}\right)\log(5) - 20\left(\frac{\log(x-3)}{5\log(5)-9}-\frac{3}{x(5\log(5)-9)-15\log(5)+27}\right)\log(5) - \frac{60\log(5)\log(x)}{x(5\log(5)-9)-15\log(5)+27} - \frac{60\log(5)}{x(5\log(5)-9)-15\log(5)+27} + \frac{78\log(x)}{x(5\log(5)-9)-15\log(5)+27} + \frac{26\log(x)}{5\log(5)-9}$$

input
```
integrate(((120*log(5)-156)*log(x)+2*(-20*x+60)*log(5)+52*x-156)/(2*(5*x^2
-30*x+45)*log(5)-18*x^2+108*x-162),x, algorithm=\
```

output
```
20*(log(x - 3)/(5*log(5) - 9) - log(x)/(5*log(5) - 9))*log(5) - 20*(log(x
- 3)/(5*log(5) - 9) - 3/(x*(5*log(5) - 9) - 15*log(5) + 27))*log(5) - 60*l
og(5)*log(x)/(x*(5*log(5) - 9) - 15*log(5) + 27) - 60*log(5)/(x*(5*log(5)
- 9) - 15*log(5) + 27) + 78*log(x)/(x*(5*log(5) - 9) - 15*log(5) + 27) + 2
6*log(x)/(5*log(5) - 9)
```

3.159.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(22) = 44$.

Time = 0.28 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.05

$$\int \frac{-156+52x+(60-20x)\log(25)+(-156+60\log(25))\log(x)}{-162+108x-18x^2+(45-30x+5x^2)\log(25)}\,dx = -\frac{6(10\log(5)-13)\log(x)}{5x\log(5)-9x-15\log(5)+27} - \frac{2(10\log(5)-13)\log(x)}{5\log(5)-9}$$

input
```
integrate(((120*log(5)-156)*log(x)+2*(-20*x+60)*log(5)+52*x-156)/(2*(5*x^2
-30*x+45)*log(5)-18*x^2+108*x-162),x, algorithm=\
```

output
```
-6*(10*log(5) - 13)*log(x)/(5*x*log(5) - 9*x - 15*log(5) + 27) - 2*(10*log
(5) - 13)*log(x)/(5*log(5) - 9)
```

3.159.9 Mupad [B] (verification not implemented)

Time = 13.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-156+52x+(60-20x)\log(25)+(-156+60\log(25))\log(x)}{-162+108x-18x^2+(45-30x+5x^2)\log(25)}\,dx$$
$$=-\frac{2\,x\,\ln(x)\,\left(10\,\ln(5)-13\right)}{\left(5\,\ln(5)-9\right)\,\left(x-3\right)}$$

input
```
int((52*x - 2*log(5)*(20*x - 60) + log(x)*(120*log(5) - 156) - 156)/(108*x
 + 2*log(5)*(5*x^2 - 30*x + 45) - 18*x^2 - 162),x)
```

output
```
-(2*x*log(x)*(10*log(5) - 13))/((5*log(5) - 9)*(x - 3))
```

3.160 $\int \frac{-15-12x+3x^2+e^4(-4-2x^2+10x^3-2x^4)+(-3+e^4(-2x+2x^2)) \log(}{-12+12x-3x^2+e^4(-8x+16x^2-10x^3+2x^4)}$

3.160.1 Optimal result

Integrand size = 99, antiderivative size = 30

$$\int \frac{-15-12x+3x^2+e^4(-4-2x^2+10x^3-2x^4)+(-3+e^4(-2x+2x^2)) \log(3+e^4(2x-2x^2))}{-12+12x-3x^2+e^4(-8x+16x^2-10x^3+2x^4)} \, dx = -x+\frac{9+\log(3+e^4(2x-2x^2))}{2-x}$$

output
```
(9+ln((-2*x^2+2*x)*exp(4)+3))/(2-x)-x
```

3.160.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{-15-12x+3x^2+e^4(-4-2x^2+10x^3-2x^4)+(-3+e^4(-2x+2x^2)) \log(3+e^4(2x-2x^2))}{-12+12x-3x^2+e^4(-8x+16x^2-10x^3+2x^4)} \, dx = -x+\frac{-9-\log(3-2e^4(-1+x)x)}{-2+x}$$

input
```
Integrate[(-15 - 12*x + 3*x^2 + E^4*(-4 - 2*x^2 + 10*x^3 - 2*x^4) + (-3 +
E^4*(-2*x + 2*x^2))*Log[3 + E^4*(2*x - 2*x^2)])/(-12 + 12*x - 3*x^2 + E^4*
(-8*x + 16*x^2 - 10*x^3 + 2*x^4)),x]
```

output
```
-x + (-9 - Log[3 - 2*E^4*(-1 + x)*x])/(-2 + x)
```

3.160.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 715 vs. $2(30) = 60$.

Time = 2.36 (sec) , antiderivative size = 715, normalized size of antiderivative = 23.83, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.020$, Rules used = {2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^2+\left(e^4\left(2x^2-2x\right)-3\right)\log\left(e^4\left(2x-2x^2\right)+3\right)+e^4\left(-2x^4+10x^3-2x^2-4\right)-12x-15}{-3x^2+e^4\left(2x^4-10x^3+16x^2-8x\right)+12x-12}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(-\frac{6e^4\left(3x^2+\left(e^4\left(2x^2-2x\right)-3\right)\log\left(e^4\left(2x-2x^2\right)+3\right)+e^4\left(-2x^4+10x^3-2x^2-4\right)-12x-15\right)}{\left(4e^4-3\right)^2(x-2)}+\frac{2e^4(6e\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2e^2\sqrt{6+e^4}\left(3+5e^4\right)\text{arctanh}\left(\frac{e^2(1-2x)}{\sqrt{6+e^4}}\right)}{\left(3-4e^4\right)^2}+\frac{2e^2\sqrt{6+e^4}\text{arctanh}\left(\frac{e^2(1-2x)}{\sqrt{6+e^4}}\right)}{3-4e^4}+\frac{18e^6\sqrt{6+e^4}\text{arctanh}\left(\frac{e^2(1-2x)}{\sqrt{6+e^4}}\right)}{\left(3-4e^4\right)^2}+\frac{2e^4x^3}{3\left(3-4e^4\right)}-\frac{2e^4\left(3-22e^4\right)x^3}{3\left(3-4e^4\right)^2}-\frac{12e^8x^3}{\left(3-4e^4\right)^2}+\frac{2e^4\left(6+13e^4\right)x^2}{\left(3-4e^4\right)^2}-\frac{3e^4\left(3+10e^4\right)x^2}{\left(3-4e^4\right)^2}-\frac{e^4x^2}{3-4e^4}-\frac{6e^8x^2\log\left(-2e^4x^2+2e^4x+3\right)}{\left(3-4e^4\right)^2}-\frac{2e^4x\log\left(-2e^4x^2+2e^4x+3\right)}{3-4e^4}-\frac{12e^8x\log\left(-2e^4x^2+2e^4x+3\right)}{\left(3-4e^4\right)^2}+\frac{\left(6e^4x+2e^4+3\right)^2\log\left(-2e^4x^2+2e^4x+3\right)}{6\left(3-4e^4\right)^2}+\frac{\log\left(-2e^4x^2+2e^4x+3\right)}{2-x}-\frac{\left(9+84e^4+34e^8\right)\log\left(-2e^4x^2+2e^4x+3\right)}{6\left(3-4e^4\right)^2}+\frac{3e^4\left(3+e^4\right)\log\left(-2e^4x^2+2e^4x+3\right)}{\left(3-4e^4\right)^2}+\frac{e^4\log\left(-2e^4x^2+2e^4x+3\right)}{3-4e^4}+\frac{6e^8\log\left(-2e^4x^2+2e^4x+3\right)}{\left(3-4e^4\right)^2}+\frac{6e^4\left(3+8e^4\right)x}{\left(3-4e^4\right)^2}-\frac{2e^4\left(6+7e^4\right)x}{\left(3-4e^4\right)^2}-\frac{10e^4x}{3-4e^4}-\frac{3x}{3-4e^4}+\frac{12e^4\left(3-10e^4\right)x}{\left(3-4e^4\right)^2}+\frac{30e^8x}{\left(3-4e^4\right)^2}-\frac{36e^4}{\left(3-4e^4\right)(2-x)}+\frac{27}{\left(3-4e^4\right)(2-x)}$$

input
```
Int[(-15 - 12*x + 3*x^2 + E^4*(-4 - 2*x^2 + 10*x^3 - 2*x^4) + (-3 + E^4*(-
2*x + 2*x^2))*Log[3 + E^4*(2*x - 2*x^2)])/(-12 + 12*x - 3*x^2 + E^4*(-8*x
+ 16*x^2 - 10*x^3 + 2*x^4)),x]
```

output
```
27/((3 - 4*E^4)*(2 - x)) - (36*E^4)/((3 - 4*E^4)*(2 - x)) + (30*E^8*x)/(3
- 4*E^4)^2 + (12*E^4*(3 - 10*E^4)*x)/(3 - 4*E^4)^2 - (3*x)/(3 - 4*E^4) - (
10*E^4*x)/(3 - 4*E^4) - (2*E^4*(6 + 7*E^4)*x)/(3 - 4*E^4)^2 + (6*E^4*(3 +
8*E^4)*x)/(3 - 4*E^4)^2 - (E^4*x^2)/(3 - 4*E^4) - (3*E^4*(3 + 10*E^4)*x^2)
/(3 - 4*E^4)^2 + (2*E^4*(6 + 13*E^4)*x^2)/(3 - 4*E^4)^2 - (12*E^8*x^3)/(3
- 4*E^4)^2 - (2*E^4*(3 - 22*E^4)*x^3)/(3*(3 - 4*E^4)^2) + (2*E^4*x^3)/(3*(
3 - 4*E^4)) + (18*E^6*Sqrt[6 + E^4]*ArcTanh[(E^2*(1 - 2*x))/Sqrt[6 + E^4]]
)/(3 - 4*E^4)^2 + (2*E^2*Sqrt[6 + E^4]*ArcTanh[(E^2*(1 - 2*x))/Sqrt[6 + E^
4]])/(3 - 4*E^4) - (2*E^2*Sqrt[6 + E^4]*(3 + 5*E^4)*ArcTanh[(E^2*(1 - 2*x)
)/Sqrt[6 + E^4]])/(3 - 4*E^4)^2 + (6*E^8*Log[3 + 2*E^4*x - 2*E^4*x^2])/(3
- 4*E^4)^2 + (E^4*Log[3 + 2*E^4*x - 2*E^4*x^2])/(3 - 4*E^4) + (3*E^4*(3 +
E^4)*Log[3 + 2*E^4*x - 2*E^4*x^2])/(3 - 4*E^4)^2 - ((9 + 84*E^4 + 34*E^8)*
Log[3 + 2*E^4*x - 2*E^4*x^2])/(6*(3 - 4*E^4)^2) + Log[3 + 2*E^4*x - 2*E^4*
x^2]/(2 - x) - (12*E^8*x*Log[3 + 2*E^4*x - 2*E^4*x^2])/(3 - 4*E^4)^2 - (2*
E^4*x*Log[3 + 2*E^4*x - 2*E^4*x^2])/(3 - 4*E^4) - (6*E^8*x^2*Log[3 + 2*E^4
*x - 2*E^4*x^2])/(3 - 4*E^4)^2 + ((3 + 2*E^4 + 6*E^4*x)^2*Log[3 + 2*E^4*x
- 2*E^4*x^2])/(6*(3 - 4*E^4)^2)
```

3.160.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.160.4 Maple [A] (verified)

Time = 1.00 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

method	result	size
norman	$\frac{-\ln\left(\left(-2x^2+2x\right)e^4+3\right)-x^2-5}{-2+x}$	31
parallelrisch	$\frac{-18x^2-45x-18\ln\left(\left(-2x^2+2x\right)e^4+3\right)}{-36+18x}$	34
risch	$-\frac{\ln\left(\left(-2x^2+2x\right)e^4+3\right)}{-2+x}-\frac{x^2-2x+9}{-2+x}$	39

3.160. $\int \frac{-15-12x+3x^2+e^4\left(-4-2x^2+10x^3-2x^4\right)+\left(-3+e^4\left(-2x+2x^2\right)\right)\log\left(3+e^4\left(2x-2x^2\right)\right)}{-12+12x-3x^2+e^4\left(-8x+16x^2-10x^3+2x^4\right)}\,dx$

input
```
int((((2*x^2-2*x)*exp(4)-3)*ln((-2*x^2+2*x)*exp(4)+3)+(-2*x^4+10*x^3-2*x^2
-4)*exp(4)+3*x^2-12*x-15)/((2*x^4-10*x^3+16*x^2-8*x)*exp(4)-3*x^2+12*x-12)
,x,method=_RETURNVERBOSE)
```

output
```
(-ln((-2*x^2+2*x)*exp(4)+3)-x^2-5)/(-2+x)
```

3.160.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{-15-12x+3x^2+e^4(-4-2x^2+10x^3-2x^4)+(-3+e^4(-2x+2x^2))\log(3+e^4(2x-2x^2))}{-12+12x-3x^2+e^4(-8x+16x^2-10x^3+2x^4)}\,dx$$
$$=-\frac{x^2-2\,x+\log\left(-2\left(x^2-x\right)e^4+3\right)+9}{x-2}$$

input
```
integrate((((2*x^2-2*x)*exp(4)-3)*log((-2*x^2+2*x)*exp(4)+3)+(-2*x^4+10*x^
3-2*x^2-4)*exp(4)+3*x^2-12*x-15)/((2*x^4-10*x^3+16*x^2-8*x)*exp(4)-3*x^2+1
2*x-12),x, algorithm=\
```

output
```
-(x^2 - 2*x + log(-2*(x^2 - x)*e^4 + 3) + 9)/(x - 2)
```

3.160.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{-15-12x+3x^2+e^4(-4-2x^2+10x^3-2x^4)+(-3+e^4(-2x+2x^2))\log(3+e^4(2x-2x^2))}{-12+12x-3x^2+e^4(-8x+16x^2-10x^3+2x^4)}\,dx$$
$$=-x-\frac{\log\left(\left(-2x^2+2x\right)e^4+3\right)}{x-2}-\frac{9}{x-2}$$

input
```
integrate((((2*x**2-2*x)*exp(4)-3)*ln((-2*x**2+2*x)*exp(4)+3)+(-2*x**4+10*
x**3-2*x**2-4)*exp(4)+3*x**2-12*x-15)/((2*x**4-10*x**3+16*x**2-8*x)*exp(4)
-3*x**2+12*x-12),x)
```

output
```
-x - log((-2*x**2 + 2*x)*exp(4) + 3)/(x - 2) - 9/(x - 2)
```

3.160.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1175 vs. $2(27) = 54$.

Time = 0.35 (sec) , antiderivative size = 1175, normalized size of antiderivative = 39.17

$$\int \frac{-15-12x+3x^2+e^4(-4-2x^2+10x^3-2x^4)+(-3+e^4(-2x+2x^2))\log(3+e^4(2x-2x^2))}{-12+12x-3x^2+e^4(-8x+16x^2-10x^3+2x^4)}\,dx$$
= Too large to display

input
```
integrate((((2*x^2-2*x)*exp(4)-3)*log((-2*x^2+2*x)*exp(4)+3)+(-2*x^4+10*x^
3-2*x^2-4)*exp(4)+3*x^2-12*x-15)/((2*x^4-10*x^3+16*x^2-8*x)*exp(4)-3*x^2+1
2*x-12),x, algorithm=\
```

output
```
-1/2*(2*x*e^(-4) + (16*e^12 + 120*e^8 + 189*e^4 + 27)*e^(-2)*log((2*x*e^4
- sqrt(e^4 + 6)*e^2 - e^4)/(2*x*e^4 + sqrt(e^4 + 6)*e^2 - e^4))/((16*e^12
- 24*e^8 + 9*e^4)*sqrt(e^4 + 6)) + (16*e^8 + 72*e^4 + 45)*log(2*x^2*e^4 -
2*x*e^4 - 3)/(16*e^12 - 24*e^8 + 9*e^4) + 128*(e^4 - 3)*log(x - 2)/(16*e^8
 - 24*e^4 + 9) - 64/(x*(4*e^4 - 3) - 8*e^4 + 6))*e^4 + 5/2*((16*e^8 + 96*e
^4 + 81)*e^(-2)*log((2*x*e^4 - sqrt(e^4 + 6)*e^2 - e^4)/(2*x*e^4 + sqrt(e^
4 + 6)*e^2 - e^4))/((16*e^8 - 24*e^4 + 9)*sqrt(e^4 + 6)) + (16*e^8 + 48*e^
4 + 9)*log(2*x^2*e^4 - 2*x*e^4 - 3)/(16*e^12 - 24*e^8 + 9*e^4) - 144*log(x
 - 2)/(16*e^8 - 24*e^4 + 9) - 32/(x*(4*e^4 - 3) - 8*e^4 + 6))*e^4 - ((8*e^
8 + 36*e^4 + 9)*e^(-2)*log((2*x*e^4 - sqrt(e^4 + 6)*e^2 - e^4)/(2*x*e^4 +
sqrt(e^4 + 6)*e^2 - e^4))/((16*e^8 - 24*e^4 + 9)*sqrt(e^4 + 6)) + 4*(2*e^4
 + 3)*log(2*x^2*e^4 - 2*x*e^4 - 3)/(16*e^8 - 24*e^4 + 9) - 8*(2*e^4 + 3)*l
og(x - 2)/(16*e^8 - 24*e^4 + 9) - 8/(x*(4*e^4 - 3) - 8*e^4 + 6))*e^4 - 4*(
(5*e^8 + 3*e^4)*e^(-2)*log((2*x*e^4 - sqrt(e^4 + 6)*e^2 - e^4)/(2*x*e^4 +
sqrt(e^4 + 6)*e^2 - e^4))/((16*e^8 - 24*e^4 + 9)*sqrt(e^4 + 6)) + 3*e^4*lo
g(2*x^2*e^4 - 2*x*e^4 - 3)/(16*e^8 - 24*e^4 + 9) - 6*e^4*log(x - 2)/(16*e^
8 - 24*e^4 + 9) - 1/(x*(4*e^4 - 3) - 8*e^4 + 6))*e^4 + 3/2*(8*e^8 + 36*e^4
 + 9)*e^(-2)*log((2*x*e^4 - sqrt(e^4 + 6)*e^2 - e^4)/(2*x*e^4 + sqrt(e^4 +
 6)*e^2 - e^4))/((16*e^8 - 24*e^4 + 9)*sqrt(e^4 + 6)) - 6*(8*e^8 + 21*e^4)
*e^(-2)*log((2*x*e^4 - sqrt(e^4 + 6)*e^2 - e^4)/(2*x*e^4 + sqrt(e^4 + 6...
```

3.160.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{-15-12x+3x^2+e^4(-4-2x^2+10x^3-2x^4)+(-3+e^4(-2x+2x^2))\log(3+e^4(2x-2x^2))}{-12+12x-3x^2+e^4(-8x+16x^2-10x^3+2x^4)}\,dx$$
$$=-\frac{x^2-2\,x+\log\left(-2\,x^2e^4+2\,xe^4+3\right)+9}{x-2}$$

input
```
integrate((((2*x^2-2*x)*exp(4)-3)*log((-2*x^2+2*x)*exp(4)+3)+(-2*x^4+10*x^
3-2*x^2-4)*exp(4)+3*x^2-12*x-15)/((2*x^4-10*x^3+16*x^2-8*x)*exp(4)-3*x^2+1
2*x-12),x, algorithm=\
```

output
```
-(x^2 - 2*x + log(-2*x^2*e^4 + 2*x*e^4 + 3) + 9)/(x - 2)
```

3.160.9 Mupad [B] (verification not implemented)

Time = 14.63 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{-15-12x+3x^2+e^4(-4-2x^2+10x^3-2x^4)+(-3+e^4(-2x+2x^2))\log(3+e^4(2x-2x^2))}{-12+12x-3x^2+e^4(-8x+16x^2-10x^3+2x^4)}\,dx$$
$$=-\frac{\ln\left(\mathrm{e}^4\left(2\,x-2\,x^2\right)+3\right)-2\,x+x^2+9}{x-2}$$

input
```
int((12*x + exp(4)*(2*x^2 - 10*x^3 + 2*x^4 + 4) - 3*x^2 + log(exp(4)*(2*x
- 2*x^2) + 3)*(exp(4)*(2*x - 2*x^2) + 3) + 15)/(exp(4)*(8*x - 16*x^2 + 10*
x^3 - 2*x^4) - 12*x + 3*x^2 + 12),x)
```

output
```
-(log(exp(4)*(2*x - 2*x^2) + 3) - 2*x + x^2 + 9)/(x - 2)
```

3.161 $\int \frac{-6e^{2x^2-2x^3+2\left(x-x^2\right)\log(x)}x^2+e^{x^2-x^3+\left(x-x^2\right)\log(x)}\left(\left(1+5x+3x^2-x\right.\right.}{18e^{2x^2-2x^3+2\left(x-x^2\right)\log(x)}x^2-12e^{x^2-x^3+\left(x-x^2\right)\log}}$

3.161.1 Optimal result

Integrand size = 161, antiderivative size = 33

$$\int \frac{-6e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2+e^{x^2-x^3+(x-x^2)\log(x)}\left((1+5x+3x^2-x^3-6x^4)\log\left(\frac{21}{5}\right)+(x-4x^3)\log\left(\frac{21}{5}\right)\mathrm{l}\right.}{18e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2-12e^{x^2-x^3+(x-x^2)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}$$
$$=\frac{\frac{1}{2}+x}{-3+\frac{e^{-\left(\left(x-x^2\right)(x+\log(x))\right)}\log\left(\frac{21}{5}\right)}{x}}$$

output
```
(1/2+x)/(ln(21/5)/x/exp((x+ln(x))*(-x^2+x))-3)
```

3.161.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.48

$$\int \frac{-6e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2+e^{x^2-x^3+(x-x^2)\log(x)}\left((1+5x+3x^2-x^3-6x^4)\log\left(\frac{21}{5}\right)+(x-4x^3)\log\left(\frac{21}{5}\right)\mathrm{l}\right.}{18e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2-12e^{x^2-x^3+(x-x^2)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}$$
$$=\frac{e^{x^2}x^{1+x}(1+2x)}{2\left(-3e^{x^2}x^{1+x}+e^{x^3}x^{x^2}\log\left(\frac{21}{5}\right)\right)}$$

3.161.
$\int \frac{-6e^{2x^2-2x^3+2\left(x-x^2\right)\log(x)}x^2+e^{x^2-x^3+\left(x-x^2\right)\log(x)}\left((1+5x+3x^2-x^3-6x^4)\log\left(\frac{21}{5}\right)+(x-4x^3)\log\left(\frac{21}{5}\right)\log(x)\right)}{18e^{2x^2-2x^3+2\left(x-x^2\right)\log(x)}x^2-12e^{x^2-x^3+\left(x-x^2\right)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}\,dx$

input
```
Integrate[(-6*E^(2*x^2 - 2*x^3 + 2*(x - x^2)*Log[x])*x^2 + E^(x^2 - x^3 +
(x - x^2)*Log[x])*((1 + 5*x + 3*x^2 - x^3 - 6*x^4)*Log[21/5] + (x - 4*x^3)
*Log[21/5]*Log[x]))/(18*E^(2*x^2 - 2*x^3 + 2*(x - x^2)*Log[x])*x^2 - 12*E^
(x^2 - x^3 + (x - x^2)*Log[x])*x*Log[21/5] + 2*Log[21/5]^2),x]
```

output
```
(E^x^2*x^(1 + x)*(1 + 2*x))/(2*(-3*E^x^2*x^(1 + x) + E^x^3*x^x^2*Log[21/5]
))
```

3.161.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x^3+x^2+(x-x^2)\log(x)}\left(\left(x-4x^3\right)\log\left(\frac{21}{5}\right)\log(x)+\left(-6x^4-x^3+3x^2+5x+1\right)\log\left(\frac{21}{5}\right)\right)-6x^2e^{-2x^3+2x^2+2(x-x^2}}{18x^2e^{-2x^3+2x^2+2(x-x^2)\log(x)}-12x\log\left(\frac{21}{5}\right)e^{-x^3+x^2+(x-x^2)\log(x)}+2\log^2\left(\frac{21}{5}\right)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{2x^3}x^{2x^2}\left(e^{-x^3+x^2+(x-x^2)\log(x)}\left(\left(x-4x^3\right)\log\left(\frac{21}{5}\right)\log(x)+\left(-6x^4-x^3+3x^2+5x+1\right)\log\left(\frac{21}{5}\right)\right)-6x^2e^{-2x^3+2}\right.}{2\left(3e^{x^2}x^{x+1}-e^{x^3}x^{x^2}\log\left(\frac{21}{5}\right)\right)^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int -\frac{e^{2x^3}x^{2x^2}\left(6e^{2x^2-2x^3}x^{2(x-x^2)+2}-e^{x^2-x^3}x^{x-x^2}\left(\log\left(\frac{21}{5}\right)\left(-6x^4-x^3+3x^2+5x+1\right)+\left(x-4x^3\right)\log\left(\frac{21}{5}\right)\log\right.\right.}{\left(3e^{x^2}x^{x+1}-e^{x^3}x^{x^2}\log\left(\frac{21}{5}\right)\right)^2}$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{1}{2}\int \frac{e^{2x^3}x^{2x^2}\left(6e^{2x^2-2x^3}x^{2(x-x^2)+2}-e^{x^2-x^3}x^{x-x^2}\left(\log\left(\frac{21}{5}\right)\left(-6x^4-x^3+3x^2+5x+1\right)+\left(x-4x^3\right)\log\left(\frac{21}{5}\right)\log\right.\right.}{\left(3e^{x^2}x^{x+1}-e^{x^3}x^{x^2}\log\left(\frac{21}{5}\right)\right)^2}$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{1}{2}\int \left(\frac{1}{9}e^{x^3-x^2}\log\left(\frac{21}{5}\right)\left(6x^4+4\log(x)x^3+x^3-3x^2-\log(x)x-x-1\right)x^{x^2-x-2}+\frac{e^{2x^3}(2x+1)\log^2\left(\frac{21}{5}\right)\left(3x\right.}{3\left(3e^{x}\right.}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$-\frac{1}{2}\int \frac{e^{x^2}x^x\left(e^{x^3}\left(6x^4+x^3-3x^2-5x-1\right)\log\left(\frac{21}{5}\right)x^{x^2}+6e^{x^2}x^{x+2}+e^{x^3}\left(4x^2-1\right)\log\left(\frac{21}{5}\right)\log(x)x^{x^2+1}\right)}{\left(3e^{x^2}x^{x+1}-e^{x^3}x^{x^2}\log\left(\frac{21}{5}\right)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{2}\int \left(\frac{3e^{2x^2}x^{2x+1}(2x+1)\left(3x^3+2\log(x)x^2-x^2-\log(x)x-x-1\right)}{\left(3e^{x^2}x^{x+1}-e^{x^3}x^{x^2}\log\left(\frac{21}{5}\right)\right)^2}-\frac{e^{x^2}x^x\left(6x^4+4\log(x)x^3+x^3-3x^2-\log\right.}{3e^{x^2}x^{x+1}-e^{x^3}x^{x^2}\log\left(\frac{2}{5}\right.}\right.$$

$$\Big\downarrow \text{7299}$$

$$-\frac{1}{2}\int \left(\frac{3e^{2x^2}x^{2x+1}(2x+1)\left(3x^3+2\log(x)x^2-x^2-\log(x)x-x-1\right)}{\left(3e^{x^2}x^{x+1}-e^{x^3}x^{x^2}\log\left(\frac{21}{5}\right)\right)^2}-\frac{e^{x^2}x^x\left(6x^4+4\log(x)x^3+x^3-3x^2-\log\right.}{3e^{x^2}x^{x+1}-e^{x^3}x^{x^2}\log\left(\frac{2}{5}\right.}\right.$$

input
```
Int[(-6*E^(2*x^2 - 2*x^3 + 2*(x - x^2)*Log[x])*x^2 + E^(x^2 - x^3 + (x - x
^2)*Log[x])*((1 + 5*x + 3*x^2 - x^3 - 6*x^4)*Log[21/5] + (x - 4*x^3)*Log[2
1/5]*Log[x]))/(18*E^(2*x^2 - 2*x^3 + 2*(x - x^2)*Log[x])*x^2 - 12*E^(x^2 -
 x^3 + (x - x^2)*Log[x])*x*Log[21/5] + 2*Log[21/5]^2),x]
```

output
```
$Aborted
```

3.161.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

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$$\int \frac{-6e^{2x^2-2x^3+2\left(x-x^2\right)\log(x)}x^2+e^{x^2-x^3+\left(x-x^2\right)\log(x)}\left(\left(1+5x+3x^2-x^3-6x^4\right)\log\left(\frac{21}{5}\right)+\left(x-4x^3\right)\log\left(\frac{21}{5}\right)\log(x)\right)}{18e^{2x^2-2x^3+2\left(x-x^2\right)\log(x)}x^2-12e^{x^2-x^3+\left(x-x^2\right)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}\,dx$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.161.4 Maple [A] (verified)

Time = 0.73 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.79

method	result	size
parallelrisch	$\frac{6x^2 e^{\left(-x^2+x\right)\ln(x)-x^3+x^2}+\ln\left(\frac{21}{5}\right)}{-18x\,e^{\left(-x^2+x\right)\ln(x)-x^3+x^2}+6\ln\left(\frac{21}{5}\right)}$	59
risch	$-\frac{x}{3}+\frac{2x\ln(5)-2x\ln(3)-2x\ln(7)+\ln(5)-\ln(3)-\ln(7)}{18x\,x^{-x(-1+x)}e^{-(-1+x)x^2}+6\ln(5)-6\ln(3)-6\ln(7)}$	66

input
```
int((-6*x^2*exp((-x^2+x)*ln(x)-x^3+x^2)^2+((-4*x^3+x)*ln(21/5)*ln(x)+(-6*x
^4-x^3+3*x^2+5*x+1)*ln(21/5))*exp((-x^2+x)*ln(x)-x^3+x^2))/(18*x^2*exp((-x
^2+x)*ln(x)-x^3+x^2)^2-12*x*ln(21/5)*exp((-x^2+x)*ln(x)-x^3+x^2)+2*ln(21/5
)^2),x,method=_RETURNVERBOSE)
```

output
```
1/6*(6*x^2*exp((-x^2+x)*ln(x)-x^3+x^2)+ln(21/5))/(-3*x*exp((-x^2+x)*ln(x)-
x^3+x^2)+ln(21/5))
```

3.161.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(30) = 60$.

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.88

$$\int \frac{-6e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2+e^{x^2-x^3+(x-x^2)\log(x)}\left(\left(1+5x+3x^2-x^3-6x^4\right)\log\left(\frac{21}{5}\right)+\left(x-4x^3\right)\log\left(\frac{21}{5}\right)\log(x)\right)}{18e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2-12e^{x^2-x^3+(x-x^2)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}\,dx$$
$$= -\frac{6\,x^2e^{\left(-x^3+x^2-\left(x^2-x\right)\log(x)\right)}+\log\left(\frac{21}{5}\right)}{6\left(3\,xe^{\left(-x^3+x^2-\left(x^2-x\right)\log(x)\right)}-\log\left(\frac{21}{5}\right)\right)}$$

input
```
integrate((-6*x^2*exp((-x^2+x)*log(x)-x^3+x^2)^2+((-4*x^3+x)*log(21/5)*log
(x)+(-6*x^4-x^3+3*x^2+5*x+1)*log(21/5))*exp((-x^2+x)*log(x)-x^3+x^2))/(18*
x^2*exp((-x^2+x)*log(x)-x^3+x^2)^2-12*x*log(21/5)*exp((-x^2+x)*log(x)-x^3+
x^2)+2*log(21/5)^2),x, algorithm=\
```

output
```
-1/6*(6*x^2*e^(-x^3 + x^2 - (x^2 - x)*log(x)) + log(21/5))/(3*x*e^(-x^3 +
x^2 - (x^2 - x)*log(x)) - log(21/5))
```

3.161.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(24) = 48.

Time = 0.21 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.61

$$\int \frac{-6e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2+e^{x^2-x^3+(x-x^2)\log(x)}\left((1+5x+3x^2-x^3-6x^4)\log\left(\frac{21}{5}\right)+(x-4x^3)\log\left(\frac{21}{5}\right)\mathrm{l}\cdots\right.}{18e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2-12e^{x^2-x^3+(x-x^2)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}$$
$$= -\frac{x}{3} + \frac{-2x\log(21)+2x\log(5)-\log(21)+\log(5)}{18xe^{-x^3+x^2+(-x^2+x)\log(x)}-6\log(21)+6\log(5)}$$

input
```
integrate((-6*x**2*exp((-x**2+x)*ln(x)-x**3+x**2)**2+((-4*x**3+x)*ln(21/5)
*ln(x)+(-6*x**4-x**3+3*x**2+5*x+1)*ln(21/5))*exp((-x**2+x)*ln(x)-x**3+x**2
))/(18*x**2*exp((-x**2+x)*ln(x)-x**3+x**2)**2-12*x*ln(21/5)*exp((-x**2+x)*
ln(x)-x**3+x**2)+2*ln(21/5)**2),x)
```

output
```
-x/3 + (-2*x*log(21) + 2*x*log(5) - log(21) + log(5))/(18*x*exp(-x**3 + x*
*2 + (-x**2 + x)*log(x)) - 6*log(21) + 6*log(5))
```

3.161.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.64

$$\int \frac{-6e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2+e^{x^2-x^3+(x-x^2)\log(x)}\left((1+5x+3x^2-x^3-6x^4)\log\left(\frac{21}{5}\right)+(x-4x^3)\log\left(\frac{21}{5}\right)\mathrm{l}\cdots\right.}{18e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2-12e^{x^2-x^3+(x-x^2)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}$$
$$= \frac{(2x^2+x)e^{(x^2+x\log(x))}}{2\left((\log(7)-\log(5)+\log(3))e^{(x^3+x^2\log(x))}-3xe^{(x^2+x\log(x))}\right)}$$

input
```
integrate((-6*x^2*exp((-x^2+x)*log(x)-x^3+x^2)^2+((-4*x^3+x)*log(21/5)*log
(x)+(-6*x^4-x^3+3*x^2+5*x+1)*log(21/5))*exp((-x^2+x)*log(x)-x^3+x^2))/(18*
x^2*exp((-x^2+x)*log(x)-x^3+x^2)^2-12*x*log(21/5)*exp((-x^2+x)*log(x)-x^3+
x^2)+2*log(21/5)^2),x, algorithm=\
```

output
```
1/2*(2*x^2 + x)*e^(x^2 + x*log(x))/((log(7) - log(5) + log(3))*e^(x^3 + x^
2*log(x)) - 3*x*e^(x^2 + x*log(x)))
```

3.161.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(30) = 60$.

Time = 0.63 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.06

$$\int \frac{-6e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2+e^{x^2-x^3+(x-x^2)\log(x)}\left((1+5x+3x^2-x^3-6x^4)\log\left(\frac{21}{5}\right)+(x-4x^3)\log\left(\frac{21}{5}\right)\mathrm{l}\right.}{18e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2-12e^{x^2-x^3+(x-x^2)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}$$

$$= -\frac{6\,x^2e^{\left(-x^3-x^2\log(x)+x^2+x\log(x)\right)}+\log(21)-\log(5)}{6\left(3\,xe^{\left(-x^3-x^2\log(x)+x^2+x\log(x)\right)}-\log(21)+\log(5)\right)}$$

input
```
integrate((-6*x^2*exp((-x^2+x)*log(x)-x^3+x^2)^2+((-4*x^3+x)*log(21/5)*log
(x)+(-6*x^4-x^3+3*x^2+5*x+1)*log(21/5))*exp((-x^2+x)*log(x)-x^3+x^2))/(18*
x^2*exp((-x^2+x)*log(x)-x^3+x^2)^2-12*x*log(21/5)*exp((-x^2+x)*log(x)-x^3+
x^2)+2*log(21/5)^2),x, algorithm=\
```

output
```
-1/6*(6*x^2*e^(-x^3 - x^2*log(x) + x^2 + x*log(x)) + log(21) - log(5))/(3*
x*e^(-x^3 - x^2*log(x) + x^2 + x*log(x)) - log(21) + log(5))
```

3.161.9 Mupad [B] (verification not implemented)

Time = 12.89 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.70

$$\int \frac{-6e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2+e^{x^2-x^3+(x-x^2)\log(x)}\left((1+5x+3x^2-x^3-6x^4)\log\left(\frac{21}{5}\right)+(x-4x^3)\log\left(\frac{21}{5}\right)\mathrm{l}\right.}{18e^{2x^2-2x^3+2(x-x^2)\log(x)}x^2-12e^{x^2-x^3+(x-x^2)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}$$

$$= \frac{x^{x^2}\,\ln\left(\frac{21}{5}\right)+6\,x^x\,x^2\,\mathrm{e}^{x^2-x^3}}{6\,\left(x^{x^2}\,\ln\left(\frac{21}{5}\right)-3\,x\,x^x\,\mathrm{e}^{x^2-x^3}\right)}$$

input
```
int((exp(log(x)*(x - x^2) + x^2 - x^3)*(log(21/5)*(5*x + 3*x^2 - x^3 - 6*x
^4 + 1) + log(21/5)*log(x)*(x - 4*x^3)) - 6*x^2*exp(2*log(x)*(x - x^2) + 2
*x^2 - 2*x^3))/(18*x^2*exp(2*log(x)*(x - x^2) + 2*x^2 - 2*x^3) + 2*log(21/
5)^2 - 12*x*exp(log(x)*(x - x^2) + x^2 - x^3)*log(21/5)),x)
```

output
```
(x^(x^2)*log(21/5) + 6*x^x*x^2*exp(x^2 - x^3))/(6*(x^(x^2)*log(21/5) - 3*x
*x^x*exp(x^2 - x^3)))
```

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$$\int \frac{-6e^{2x^2-2x^3+2\left(x-x^2\right)\log(x)}x^2+e^{x^2-x^3+\left(x-x^2\right)\log(x)}\left((1+5x+3x^2-x^3-6x^4)\log\left(\frac{21}{5}\right)+(x-4x^3)\log\left(\frac{21}{5}\right)\log(x)\right)}{18e^{2x^2-2x^3+2\left(x-x^2\right)\log(x)}x^2-12e^{x^2-x^3+\left(x-x^2\right)\log(x)}x\log\left(\frac{21}{5}\right)+2\log^2\left(\frac{21}{5}\right)}\,dx$$

3.162 $\int e^{-e^4}\left(3x^2+e^{e^4}\left(6x-2x\log(2)+2x\log^2(2)\right)\right)\,dx$

3.162.1 Optimal result

Integrand size = 36, antiderivative size = 25

$$\int e^{-e^4}\left(3x^2+e^{e^4}\left(6x-2x\log(2)+2x\log^2(2)\right)\right)\,dx=x\left(x+x\left(2+e^{-e^4}x-\log(2)+\log^2(2)\right)\right)$$

output
```
x*(x*(x/exp(exp(4))+2+ln(2)^2-ln(2))+x)
```

3.162.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

$$\int e^{-e^4}\left(3x^2+e^{e^4}\left(6x-2x\log(2)+2x\log^2(2)\right)\right)\,dx=e^{-e^4}x^3+\frac{1}{2}x^2\left(6+2\log^2(2)-\log(4)\right)$$

input
```
Integrate[(3*x^2 + E^E^4*(6*x - 2*x*Log[2] + 2*x*Log[2]^2))/E^E^4,x]
```

output
```
x^3/E^E^4 + (x^2*(6 + 2*Log[2]^2 - Log[4]))/2
```

3.162.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-e^4}\left(3x^2+e^{e^4}\left(6x+2x\log^2(2)-2x\log(2)\right)\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$e^{-e^4}\int \left(3x^2+e^{e^4}\left(6+2\log^2(2)-\log(4)\right)x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$e^{-e^4}\left(x^3+\frac{1}{2}e^{e^4}x^2\left(6+2\log^2(2)-\log(4)\right)\right)$$

input
```
Int[(3*x^2 + E^E^4*(6*x - 2*x*Log[2] + 2*x*Log[2]^2))/E^E^4,x]
```

output
```
(x^3 + (E^E^4*x^2*(6 + 2*Log[2]^2 - Log[4]))/2)/E^E^4
```

3.162.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.162.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

method	result	size
norman	$\left(\ln \left(2\right)^{2}-\ln \left(2\right)+3\right) x^{2}+{\mathrm e}^{-{\mathrm e}^{4}} x^{3}$	25
risch	$x^{2} \ln \left(2\right)^{2}-x^{2} \ln \left(2\right)+3 x^{2}+{\mathrm e}^{-{\mathrm e}^{4}} x^{3}$	31
gosper	$\left(\ln \left(2\right)^{2} {\mathrm e}^{{\mathrm e}^{4}}-\ln \left(2\right) {\mathrm e}^{{\mathrm e}^{4}}+3 \,{\mathrm e}^{{\mathrm e}^{4}}+x \right) x^{2} {\mathrm e}^{-{\mathrm e}^{4}}$	32
default	${\mathrm e}^{-{\mathrm e}^{4}} \left(x^{3}+\frac{\left(2 \ln \left(2\right)^{2} {\mathrm e}^{{\mathrm e}^{4}}-2 \ln \left(2\right) {\mathrm e}^{{\mathrm e}^{4}}+6 \,{\mathrm e}^{{\mathrm e}^{4}}\right) x^{2}}{2}\right)$	38
parallelrisch	${\mathrm e}^{-{\mathrm e}^{4}} \left(\ln \left(2\right)^{2} {\mathrm e}^{{\mathrm e}^{4}} x^{2}-\ln \left(2\right) {\mathrm e}^{{\mathrm e}^{4}} x^{2}+3 x^{2} {\mathrm e}^{{\mathrm e}^{4}}+x^{3}\right)$	40

input
```
int(((2*x*ln(2)^2-2*x*ln(2)+6*x)*exp(exp(4))+3*x^2)/exp(exp(4)),x,method=_
RETURNVERBOSE)
```

output
```
(ln(2)^2-ln(2)+3)*x^2+1/exp(exp(4))*x^3
```

3.162.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.40

$$\int e^{-e^4} \left(3x^2+e^{e^4} (6x-2x\log(2)+2x\log^2(2))\right) dx$$
$$= \left(x^{3} + {\left(x^{2} \log\left(2\right)^{2} - x^{2} \log\left(2\right) + 3 \, x^{2}\right)} e^{\left(e^{4}\right)}\right)} e^{\left(-e^{4}\right)}$$

input
```
integrate(((2*x*log(2)^2-2*x*log(2)+6*x)*exp(exp(4))+3*x^2)/exp(exp(4)),x,
 algorithm=\
```

output
```
(x^3 + (x^2*log(2)^2 - x^2*log(2) + 3*x^2)*e^(e^4))*e^(-e^4)
```

3.162.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int e^{-e^4}\left(3x^2+e^{e^4}\left(6x-2x\log(2)+2x\log^2(2)\right)\right)\,dx=\frac{x^3}{e^{e^4}}+x^2\left(-\log{(2)}+\log{(2)}^2+3\right)$$

input
```
integrate(((2*x*ln(2)**2-2*x*ln(2)+6*x)*exp(exp(4))+3*x**2)/exp(exp(4)),x)
```

output
```
x**3*exp(-exp(4)) + x**2*(-log(2) + log(2)**2 + 3)
```

3.162.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.40

$$\int e^{-e^4}\left(3x^2+e^{e^4}\left(6x-2x\log(2)+2x\log^2(2)\right)\right)\,dx$$
$$=\left(x^3+\left(x^2\log{(2)}^2-x^2\log{(2)}+3\,x^2\right)e^{\left(e^4\right)}\right)e^{\left(-e^4\right)}$$

input
```
integrate(((2*x*log(2)^2-2*x*log(2)+6*x)*exp(exp(4))+3*x^2)/exp(exp(4)),x,
 algorithm=\
```

output
```
(x^3 + (x^2*log(2)^2 - x^2*log(2) + 3*x^2)*e^(e^4))*e^(-e^4)
```

3.162.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.40

$$\int e^{-e^4}\left(3x^2+e^{e^4}\left(6x-2x\log(2)+2x\log^2(2)\right)\right)\,dx$$
$$=\left(x^3+\left(x^2\log{(2)}^2-x^2\log{(2)}+3\,x^2\right)e^{\left(e^4\right)}\right)e^{\left(-e^4\right)}$$

input
```
integrate(((2*x*log(2)^2-2*x*log(2)+6*x)*exp(exp(4))+3*x^2)/exp(exp(4)),x,
 algorithm=\
```

output
```
(x^3 + (x^2*log(2)^2 - x^2*log(2) + 3*x^2)*e^(e^4))*e^(-e^4)
```

3.162.9 Mupad [B] (verification not implemented)

Time = 12.62 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int e^{-e^4}\left(3x^2+e^{e^4}\left(6x-2x\log(2)+2x\log^2(2)\right)\right)\,dx = \mathrm{e}^{-\mathrm{e}^4}\,x^3+\left(\ln\left(2\right)^2-\ln\left(2\right)+3\right)\,x^2$$

input
```
int(exp(-exp(4))*(exp(exp(4))*(6*x - 2*x*log(2) + 2*x*log(2)^2) + 3*x^2),x
)
```

output
```
x^2*(log(2)^2 - log(2) + 3) + x^3*exp(-exp(4))
```

3.163 $\int \frac{2500e^{10}-4x^2}{x^4+e^{20}(390625+1250x+x^2)+e^{10}(1250x^2+2x^3)}\,dx$

3.163.1 Optimal result

Integrand size = 45, antiderivative size = 17

$$\int \frac{2500e^{10}-4x^2}{x^4+e^{20}(390625+1250x+x^2)+e^{10}(1250x^2+2x^3)}\,dx = \frac{4}{e^{10}\left(1+\frac{625}{x}\right)+x}$$

output
```
4/((1+625/x)*exp(5)^2+x)
```

3.163.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{2500e^{10}-4x^2}{x^4+e^{20}(390625+1250x+x^2)+e^{10}(1250x^2+2x^3)}\,dx = \frac{4x}{x^2+e^{10}(625+x)}$$

input
```
Integrate[(2500*E^10 - 4*x^2)/(x^4 + E^20*(390625 + 1250*x + x^2) + E^10*(
1250*x^2 + 2*x^3)),x]
```

output
```
(4*x)/(x^2 + E^10*(625 + x))
```

3.163.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 44 vs. $2(17) = 34$.

Time = 0.27 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.59, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2459, 1380, 27, 2345, 24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2500e^{10}-4x^2}{x^4+e^{20}\left(x^2+1250x+390625\right)+e^{10}\left(2x^3+1250x^2\right)}dx$$

$$\Big\downarrow \ 2459$$

$$\int \frac{-4\left(x+\frac{e^{10}}{2}\right)^2+4e^{10}\left(x+\frac{e^{10}}{2}\right)+e^{10}\left(2500-e^{10}\right)}{\left(x+\frac{e^{10}}{2}\right)^4+\frac{1}{2}e^{10}\left(2500-e^{10}\right)\left(x+\frac{e^{10}}{2}\right)^2+\frac{1}{16}e^{20}\left(2500-e^{10}\right)^2}d\left(x+\frac{e^{10}}{2}\right)$$

$$\Big\downarrow \ 1380$$

$$\int \frac{16\left(-4\left(x+\frac{e^{10}}{2}\right)^2+4e^{10}\left(x+\frac{e^{10}}{2}\right)+e^{10}\left(2500-e^{10}\right)\right)}{\left(4\left(x+\frac{e^{10}}{2}\right)^2+e^{10}\left(2500-e^{10}\right)\right)^2}d\left(x+\frac{e^{10}}{2}\right)$$

$$\Big\downarrow \ 27$$

$$16\int \frac{-4\left(x+\frac{e^{10}}{2}\right)^2+4e^{10}\left(x+\frac{e^{10}}{2}\right)+e^{10}\left(2500-e^{10}\right)}{\left(4\left(x+\frac{e^{10}}{2}\right)^2+e^{10}\left(2500-e^{10}\right)\right)^2}d\left(x+\frac{e^{10}}{2}\right)$$

$$\Big\downarrow \ 2345$$

$$16\left(-\frac{\int 0d\left(x+\frac{e^{10}}{2}\right)}{2e^{10}\left(2500-e^{10}\right)}-\frac{e^{10}-2\left(x+\frac{e^{10}}{2}\right)}{2\left(4\left(x+\frac{e^{10}}{2}\right)^2+e^{10}\left(2500-e^{10}\right)\right)}\right)$$

$$\Big\downarrow \ 24$$

$$-\frac{8\left(e^{10}-2\left(x+\frac{e^{10}}{2}\right)\right)}{4\left(x+\frac{e^{10}}{2}\right)^2+e^{10}\left(2500-e^{10}\right)}$$

input
```
Int[(2500*E^10 - 4*x^2)/(x^4 + E^20*(390625 + 1250*x + x^2) + E^10*(1250*x
^2 + 2*x^3)),x]
```

output
```
(-8*(E^10 - 2*(E^10/2 + x)))/(E^10*(2500 - E^10) + 4*(E^10/2 + x)^2)
```

3.163.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2345
```
Int[(Pq_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q = PolynomialQuot
ient[Pq, a + b*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x,
 0], g = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b
*f*x)*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   In
t[(a + b*x^2)^(p + 1)*ExpandToSum[2*a*(p + 1)*Q + f*(2*p + 3), x], x], x]]
/; FreeQ[{a, b}, x] && PolyQ[Pq, x] && LtQ[p, -1]
```

rule 2459
```
Int[(Pn_)^(p_.)*(Qx_), x_Symbol] :> With[{S = Coeff[Pn, x, Expon[Pn, x] - 1
]/(Expon[Pn, x]*Coeff[Pn, x, Expon[Pn, x]])}, Subst[Int[ExpandToSum[Pn /. x
 -> x - S, x]^p*ExpandToSum[Qx /. x -> x - S, x], x], x, x + S] /; Binomial
Q[Pn /. x -> x - S, x] || (IntegerQ[Expon[Pn, x]/2] && TrinomialQ[Pn /. x -
> x - S, x])] /; FreeQ[p, x] && PolyQ[Pn, x] && GtQ[Expon[Pn, x], 2] && NeQ
[Coeff[Pn, x, Expon[Pn, x] - 1], 0] && PolyQ[Qx, x] &&  !(MonomialQ[Qx, x]
&& IGtQ[p, 0])
```

3.163. $\int \frac{2500e^{10}-4x^2}{x^4+e^{20}(390625+1250x+x^2)+e^{10}(1250x^2+2x^3)}\,dx$

3.163.4 Maple [A] (verified)

Time = 0.46 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

method	result
risch	$\frac{4x}{x\,\mathrm{e}^{10}+625\,\mathrm{e}^{10}+x^{2}}$
gosper	$\frac{4x}{x\,\mathrm{e}^{10}+625\,\mathrm{e}^{10}+x^{2}}$
norman	$\frac{4x}{x\,\mathrm{e}^{10}+625\,\mathrm{e}^{10}+x^{2}}$
parallelrisch	$\frac{4x}{x\,\mathrm{e}^{10}+625\,\mathrm{e}^{10}+x^{2}}$
default	$2\left(\sum_{\_R=\mathrm{RootOf}(\_Z^{4}+2\_Z^{3}\mathrm{e}^{10}+(\mathrm{e}^{20}+1250\,\mathrm{e}^{10})\_Z^{2}+1250\_Z\,\mathrm{e}^{20}+390625\,\mathrm{e}^{20})}\frac{\left(625\,\mathrm{e}^{10}-\_R^{2}\right)\ln\left(x-\_R\right)}{\_R\,\mathrm{e}^{20}+625\,\mathrm{e}^{20}+3\_R^{2}\mathrm{e}^{10}+1250\_R\,\mathrm{e}^{1}}\right.$

input
```
int((2500*exp(5)^2-4*x^2)/((x^2+1250*x+390625)*exp(5)^4+(2*x^3+1250*x^2)*e
xp(5)^2+x^4),x,method=_RETURNVERBOSE)
```

output
```
4*x/(x*exp(10)+625*exp(10)+x^2)
```

3.163.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{2500e^{10}-4x^2}{x^4+e^{20}\left(390625+1250x+x^2\right)+e^{10}\left(1250x^2+2x^3\right)}\,dx=\frac{4\,x}{x^2+(x+625)e^{10}}$$

input
```
integrate((2500*exp(5)^2-4*x^2)/((x^2+1250*x+390625)*exp(5)^4+(2*x^3+1250*
x^2)*exp(5)^2+x^4),x, algorithm=\
```

output
```
4*x/(x^2 + (x + 625)*e^10)
```

3.163.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{2500e^{10}-4x^2}{x^4+e^{20}\left(390625+1250x+x^2\right)+e^{10}\left(1250x^2+2x^3\right)}\,dx=\frac{4x}{x^2+xe^{10}+625e^{10}}$$

input
```
integrate((2500*exp(5)**2-4*x**2)/((x**2+1250*x+390625)*exp(5)**4+(2*x**3+
1250*x**2)*exp(5)**2+x**4),x)
```

output
```
4*x/(x**2 + x*exp(10) + 625*exp(10))
```

3.163.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{2500e^{10}-4x^2}{x^4+e^{20}\left(390625+1250x+x^2\right)+e^{10}\left(1250x^2+2x^3\right)}\,dx=\frac{4\,x}{x^2+xe^{10}+625\,e^{10}}$$

input
```
integrate((2500*exp(5)^2-4*x^2)/((x^2+1250*x+390625)*exp(5)^4+(2*x^3+1250*
x^2)*exp(5)^2+x^4),x, algorithm=\
```

output
```
4*x/(x^2 + x*e^10 + 625*e^10)
```

3.163.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{2500e^{10}-4x^2}{x^4+e^{20}\left(390625+1250x+x^2\right)+e^{10}\left(1250x^2+2x^3\right)}\,dx=\frac{4\,x}{x^2+xe^{10}+625\,e^{10}}$$

input
```
integrate((2500*exp(5)^2-4*x^2)/((x^2+1250*x+390625)*exp(5)^4+(2*x^3+1250*
x^2)*exp(5)^2+x^4),x, algorithm=\
```

output
```
4*x/(x^2 + x*e^10 + 625*e^10)
```

3.163.9 Mupad [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{2500e^{10}-4x^2}{x^4+e^{20}\left(390625+1250x+x^2\right)+e^{10}\left(1250x^2+2x^3\right)}\,dx=\frac{4\,x}{x^2+\mathrm{e}^{10}\,x+625\,\mathrm{e}^{10}}$$

input
```
int((2500*exp(10) - 4*x^2)/(exp(10)*(1250*x^2 + 2*x^3) + exp(20)*(1250*x +
 x^2 + 390625) + x^4),x)
```

output
```
(4*x)/(625*exp(10) + x*exp(10) + x^2)
```

3.164 $\int \frac{-10+e^x(5-3x)+x}{-4x+2e^x x} \, dx$

3.164.1 Optimal result

Integrand size = 25, antiderivative size = 24

$$\int \frac{-10+e^x(5-3x)+x}{-4x+2e^x x} \, dx = 1+x-\frac{5}{4}\left(x-\log\left(-\frac{4x^2}{-2+e^x}\right)\right)$$

output
```
-1/4*x+5/4*ln(-4*x^2/(exp(x)-2))+1
```

3.164.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-10+e^x(5-3x)+x}{-4x+2e^x x} \, dx = \frac{1}{2}(-3x-5\text{arctanh}(1-e^x)+5\log(x))$$

input
```
Integrate[(-10 + E^x*(5 - 3*x) + x)/(-4*x + 2*E^x*x),x]
```

output
```
(-3*x - 5*ArcTanh[1 - E^x] + 5*Log[x])/2
```

3.164.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {7292, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(5-3x)+x-10}{2e^x x-4x}\,dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-e^x(5-3x)-x+10}{2\left(2-e^x\right)x}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int \frac{-e^x(5-3x)-x+10}{\left(2-e^x\right)x}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{2}\int \left(\frac{5-3x}{x}-\frac{5}{-2+e^x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{2}\left(-\frac{x}{2}-\frac{5}{2}\log\left(2-e^x\right)+5\log(x)\right)$$

input
```
Int[(-10 + E^x*(5 - 3*x) + x)/(-4*x + 2*E^x*x),x]
```

output
```
(-1/2*x - (5*Log[2 - E^x])/2 + 5*Log[x])/2
```

3.164.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.164.4 Maple [A] (verified)

Time = 1.65 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.67

method	result	size
norman	$-\frac{x}{4}+\frac{5\ln(x)}{2}-\frac{5\ln(\mathrm{e}^{x}-2)}{4}$	16
risch	$-\frac{x}{4}+\frac{5\ln(x)}{2}-\frac{5\ln(\mathrm{e}^{x}-2)}{4}$	16
parallelrisch	$-\frac{x}{4}+\frac{5\ln(x)}{2}-\frac{5\ln(\mathrm{e}^{x}-2)}{4}$	16

input
```
int(((-3*x+5)*exp(x)+x-10)/(2*exp(x)*x-4*x),x,method=_RETURNVERBOSE)
```

output
```
-1/4*x+5/2*ln(x)-5/4*ln(exp(x)-2)
```

3.164.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{-10+e^x(5-3x)+x}{-4x+2e^x x}\,dx=-\frac{1}{4}\,x+\frac{5}{2}\,\log\left(x\right)-\frac{5}{4}\,\log\left(e^x-2\right)$$

input
```
integrate(((-3*x+5)*exp(x)+x-10)/(2*exp(x)*x-4*x),x, algorithm=\
```

output
```
-1/4*x + 5/2*log(x) - 5/4*log(e^x - 2)
```

3.164.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{-10+e^x(5-3x)+x}{-4x+2e^x x}\,dx = -\frac{x}{4}+\frac{5\log{(x)}}{2}-\frac{5\log{(e^x-2)}}{4}$$

input
```
integrate(((-3*x+5)*exp(x)+x-10)/(2*exp(x)*x-4*x),x)
```

output
```
-x/4 + 5*log(x)/2 - 5*log(exp(x) - 2)/4
```

3.164.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{-10+e^x(5-3x)+x}{-4x+2e^x x}\,dx = -\frac{1}{4}\,x+\frac{5}{2}\,\log{(x)}-\frac{5}{4}\,\log{(e^x-2)}$$

input
```
integrate(((-3*x+5)*exp(x)+x-10)/(2*exp(x)*x-4*x),x, algorithm=\
```

output
```
-1/4*x + 5/2*log(x) - 5/4*log(e^x - 2)
```

3.164.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{-10+e^x(5-3x)+x}{-4x+2e^x x}\,dx = -\frac{1}{4}\,x+\frac{5}{2}\,\log{(x)}-\frac{5}{4}\,\log{(e^x-2)}$$

input
```
integrate(((-3*x+5)*exp(x)+x-10)/(2*exp(x)*x-4*x),x, algorithm=\
```

output
```
-1/4*x + 5/2*log(x) - 5/4*log(e^x - 2)
```

3.164.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{-10+e^x(5-3x)+x}{-4x+2e^xx}\,dx=\frac{5\,\ln{(x)}}{2}-\frac{5\,\ln{(\mathrm{e}^x-2)}}{4}-\frac{x}{4}$$

input
```
int((exp(x)*(3*x - 5) - x + 10)/(4*x - 2*x*exp(x)),x)
```

output
```
(5*log(x))/2 - (5*log(exp(x) - 2))/4 - x/4
```

3.165 $\int \frac{-8+(-x-2x^2) \ldots}{16x\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right) \ldots}$

3.165.1 Optimal result

Integrand size = 188, antiderivative size = 28

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log \ldots}{16x\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right) \ldots}$$
$$=\frac{1}{1+x(1+x)-\frac{4}{\log\left(\log\left(\frac{1}{2}x^2(4-\log(3))\right)\right)}}$$

output
```
1/(1-4/ln(ln(1/2*x^2*(-ln(3)+4)))+(1+x)*x)
```

3.165.2 Mathematica [A] (verified)

Time = 0.66 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.36

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log \ldots}{16x\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right) \ldots}$$
$$=\frac{\log\left(\log\left(-\frac{1}{2}x^2(-4+\log(3))\right)\right)}{-4+(1+x+x^2)\log\left(\log\left(-\frac{1}{2}x^2(-4+\log(3))\right)\right)}$$

input
```
Integrate[(-8 + (-x - 2*x^2)*Log[(4*x^2 - x^2*Log[3])/2]*Log[Log[(4*x^2 -
x^2*Log[3])/2]]^2)/(16*x*Log[(4*x^2 - x^2*Log[3])/2] + (-8*x - 8*x^2 - 8*x
^3)*Log[(4*x^2 - x^2*Log[3])/2]*Log[Log[(4*x^2 - x^2*Log[3])/2]] + (x + 2*
x^2 + 3*x^3 + 2*x^4 + x^5)*Log[(4*x^2 - x^2*Log[3])/2]*Log[Log[(4*x^2 - x^
2*Log[3])/2]]^2),x]
```

3.165.

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log^2\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\right)}{16x\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\right)+(x+2x^2+3x^3+2x^4+x^5)\log\left(\frac{1}{2}(4x^2-x^2\log(3 \ldots}$$

output
```
Log[Log[-1/2*(x^2*(-4 + Log[3]))]]/(-4 + (1 + x + x^2)*Log[Log[-1/2*(x^2*(
-4 + Log[3]))]])
```

3.165.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-2x^2-x\right)\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\log^2\left(\log\left(\frac{1}{2}\left(4\right.\right.\right.}{16x\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)+\left(-8x^3-8x^2-8x\right)\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\log\left(\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\right)+\left(x\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-\left(x^2+x+1\right)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int\left(\frac{-2x-1}{\left(x^2+x+1\right)^2}-\frac{8(2x+1)}{\left(x^2+x+1\right)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log\left(\log\left(\right.\right.\right.}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-\left(x^2+x+1\right)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int\left(\frac{-2x-1}{\left(x^2+x+1\right)^2}-\frac{8(2x+1)}{\left(x^2+x+1\right)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log\left(\log\left(\right.\right.\right.}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-\left(x^2+x+1\right)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int\left(\frac{-2x-1}{\left(x^2+x+1\right)^2}-\frac{8(2x+1)}{\left(x^2+x+1\right)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log\left(\log\left(\right.\right.\right.}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2}-\frac{8(2x+1)}{(x^2+x+1)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log\left(\log\left(\right.\right.\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2}-\frac{8(2x+1)}{(x^2+x+1)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log\left(\log\left(\right.\right.\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2}-\frac{8(2x+1)}{(x^2+x+1)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log\left(\log\left(\right.\right.\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2}-\frac{8(2x+1)}{(x^2+x+1)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log\left(\log\left(\right.\right.\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

3.165.

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log^2\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\right)}{16x\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\right)+(x+2x^2+3x^3+2x^4+x^5)\log\left(\frac{1}{2}(4x^2-x^2\log(3\right.\right.}$$

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2} - \frac{8(2x+1)}{(x^2+x+1)^2 \left(x^2 \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + x \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + \log\left(\log\left(\right.\right.\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$\downarrow$ 7293

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2} - \frac{8(2x+1)}{(x^2+x+1)^2 \left(x^2 \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + x \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + \log\left(\log\left(\right.\right.\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$\downarrow$ 7293

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2} - \frac{8(2x+1)}{(x^2+x+1)^2 \left(x^2 \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + x \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + \log\left(\log\left(\right.\right.\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$\downarrow$ 7293

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2} - \frac{8(2x+1)}{(x^2+x+1)^2 \left(x^2 \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + x \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + \log\left(\log\left(\right.\right.\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$\downarrow$ 7293

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2} - \frac{8(2x+1)}{(x^2+x+1)^2 \left(x^2 \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + x \log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right) + \log\left(\log\left(\right.\right.\right.}\right.$$

$\downarrow$ 7239

3.165.

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\log^2\left(\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\right)}{16x\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\right)+(x+2x^2+3x^3+2x^4+x^5)\log\left(\frac{1}{2}(4x^2-x^2\log(3)\right.}$$

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2}-\frac{8(2x+1)}{(x^2+x+1)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log(\log(\cdots\right.}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2}-\frac{8(2x+1)}{(x^2+x+1)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log(\log(\cdots\right.}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{-x(2x+1)\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\log^2\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)-8}{x\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\left(4-(x^2+x+1)\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)\right)^2}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{-2x-1}{(x^2+x+1)^2}-\frac{8(2x+1)}{(x^2+x+1)^2\left(x^2\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+x\log\left(\log\left(-\frac{1}{2}x^2(\log(3)-4)\right)\right)+\log(\log(\cdots\right.}\right.$$

input

```
Int[(-8 + (-x - 2*x^2)*Log[(4*x^2 - x^2*Log[3])/2]*Log[Log[(4*x^2 - x^2*Lo
g[3])/2]]^2)/(16*x*Log[(4*x^2 - x^2*Log[3])/2] + (-8*x - 8*x^2 - 8*x^3)*Lo
g[(4*x^2 - x^2*Log[3])/2]*Log[Log[(4*x^2 - x^2*Log[3])/2]] + (x + 2*x^2 +
3*x^3 + 2*x^4 + x^5)*Log[(4*x^2 - x^2*Log[3])/2]*Log[Log[(4*x^2 - x^2*Log[
3])/2]]^2),x]
```

output

```
$Aborted
```

3.165.

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log^2\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\right)}{16x\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\right)+(x+2x^2+3x^3+2x^4+x^5)\log\left(\frac{1}{2}(4x^2-x^2\log(3)\cdots\right.}$$

3.165.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.165.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(26) = 52.

Time = 3.63 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.00

method	result	size
parallelrisch	$\frac{\ln\left(\ln\left(-\frac{(-4+\ln(3))x^2}{2}\right)\right)}{\ln\left(\ln\left(-\frac{(-4+\ln(3))x^2}{2}\right)\right)x^2+\ln\left(\ln\left(-\frac{(-4+\ln(3))x^2}{2}\right)\right)x+\ln\left(\ln\left(-\frac{(-4+\ln(3))x^2}{2}\right)\right)-4}$	56

input
```
int(((-2*x^2-x)*ln(-1/2*x^2*ln(3)+2*x^2)*ln(ln(-1/2*x^2*ln(3)+2*x^2))^2-8)
/((x^5+2*x^4+3*x^3+2*x^2+x)*ln(-1/2*x^2*ln(3)+2*x^2)*ln(ln(-1/2*x^2*ln(3)+
2*x^2))^2+(-8*x^3-8*x^2-8*x)*ln(-1/2*x^2*ln(3)+2*x^2)*ln(ln(-1/2*x^2*ln(3)
+2*x^2))+16*x*ln(-1/2*x^2*ln(3)+2*x^2)),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(-1/2*(-4+ln(3))*x^2))/(ln(ln(-1/2*(-4+ln(3))*x^2))*x^2+ln(ln(-1/2*(-
4+ln(3))*x^2))*x+ln(ln(-1/2*(-4+ln(3))*x^2))-4)
```

3.165.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log}{16x\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\log\left(\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\right.}$$
$$= \frac{\log\left(\log\left(-\frac{1}{2}\,x^2\log\left(3\right)+2\,x^2\right)\right)}{(x^2+x+1)\log\left(\log\left(-\frac{1}{2}\,x^2\log\left(3\right)+2\,x^2\right)\right)-4}$$

input
```
integrate(((-2*x^2-x)*log(-1/2*x^2*log(3)+2*x^2)*log(log(-1/2*x^2*log(3)+2
*x^2))^2-8)/((x^5+2*x^4+3*x^3+2*x^2+x)*log(-1/2*x^2*log(3)+2*x^2)*log(log(
-1/2*x^2*log(3)+2*x^2))^2+(-8*x^3-8*x^2-8*x)*log(-1/2*x^2*log(3)+2*x^2)*lo
g(log(-1/2*x^2*log(3)+2*x^2))+16*x*log(-1/2*x^2*log(3)+2*x^2)),x, algorith
m=\
```

output
```
log(log(-1/2*x^2*log(3) + 2*x^2))/((x^2 + x + 1)*log(log(-1/2*x^2*log(3) +
 2*x^2)) - 4)
```

3.165.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(22) = 44.

Time = 0.14 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.93

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log}{16x\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\log\left(\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\right.}$$
$$= \frac{4}{-4x^2-4x+(x^4+2x^3+3x^2+2x+1)\log\left(\log\left(-\frac{x^2\log(3)}{2}+2x^2\right)\right)-4}+\frac{1}{x^2+x+1}$$

input
```
integrate(((-2*x**2-x)*ln(-1/2*x**2*ln(3)+2*x**2)*ln(ln(-1/2*x**2*ln(3)+2*
x**2))**2-8)/((x**5+2*x**4+3*x**3+2*x**2+x)*ln(-1/2*x**2*ln(3)+2*x**2)*ln(
ln(-1/2*x**2*ln(3)+2*x**2))**2+(-8*x**3-8*x**2-8*x)*ln(-1/2*x**2*ln(3)+2*x
**2)*ln(ln(-1/2*x**2*ln(3)+2*x**2))+16*x*ln(-1/2*x**2*ln(3)+2*x**2)),x)
```

output
```
4/(-4*x**2 - 4*x + (x**4 + 2*x**3 + 3*x**2 + 2*x + 1)*log(log(-x**2*log(3)
/2 + 2*x**2)) - 4) + 1/(x**2 + x + 1)
```

3.165.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.64

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log}{16x\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\log\left(\log\left(\frac{1}{2}\left(4x^2-x^2\log(3)\right)\right)\right.}$$
$$= \frac{\log\left(-\log(2)+2\log(x)+\log(-\log(3)+4)\right)}{(x^2+x+1)\log\left(-\log(2)+2\log(x)+\log(-\log(3)+4)\right)-4}$$

input
```
integrate(((-2*x^2-x)*log(-1/2*x^2*log(3)+2*x^2)*log(log(-1/2*x^2*log(3)+2
*x^2))^2-8)/((x^5+2*x^4+3*x^3+2*x^2+x)*log(-1/2*x^2*log(3)+2*x^2)*log(log(
-1/2*x^2*log(3)+2*x^2))^2+(-8*x^3-8*x^2-8*x)*log(-1/2*x^2*log(3)+2*x^2)*lo
g(log(-1/2*x^2*log(3)+2*x^2))+16*x*log(-1/2*x^2*log(3)+2*x^2)),x, algorith
m=\
```

output
```
log(-log(2) + 2*log(x) + log(-log(3) + 4))/((x^2 + x + 1)*log(-log(2) + 2*
log(x) + log(-log(3) + 4)) - 4)
```

3.165.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(24) = 48$.

Time = 0.95 (sec) , antiderivative size = 140, normalized size of antiderivative = 5.00

$$\int \frac{-8 + (-x - 2x^2)\log\left(\frac{1}{2}(4x^2 - x^2\log(3))\right)\log}{16x\log\left(\frac{1}{2}\left(4x^2 - x^2\log(3)\right)\right) + (-8x - 8x^2 - 8x^3)\log\left(\frac{1}{2}\left(4x^2 - x^2\log(3)\right)\right)\log\left(\log\left(\frac{1}{2}\left(4x^2 - x^2\log(3)\right)\right)\right.}$$

$$= \frac{}{x^4\log\left(-\log(2) + \log\left(-x^2\log(3) + 4x^2\right)\right) + 2x^3\log\left(-\log(2) + \log\left(-x^2\log(3) + 4x^2\right)\right) + 3x^2\log(-\log}$$
$$+ \frac{1}{x^2 + x + 1}$$

input
```
integrate(((-2*x^2-x)*log(-1/2*x^2*log(3)+2*x^2)*log(log(-1/2*x^2*log(3)+2
*x^2))^2-8)/((x^5+2*x^4+3*x^3+2*x^2+x)*log(-1/2*x^2*log(3)+2*x^2)*log(log(
-1/2*x^2*log(3)+2*x^2))^2+(-8*x^3-8*x^2-8*x)*log(-1/2*x^2*log(3)+2*x^2)*lo
g(log(-1/2*x^2*log(3)+2*x^2))+16*x*log(-1/2*x^2*log(3)+2*x^2)),x, algorith
m=\
```

output
```
4/(x^4*log(-log(2) + log(-x^2*log(3) + 4*x^2)) + 2*x^3*log(-log(2) + log(-
x^2*log(3) + 4*x^2)) + 3*x^2*log(-log(2) + log(-x^2*log(3) + 4*x^2)) - 4*x
^2 + 2*x*log(-log(2) + log(-x^2*log(3) + 4*x^2)) - 4*x + log(-log(2) + log
(-x^2*log(3) + 4*x^2)) - 4) + 1/(x^2 + x + 1)
```

3.165.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-8+(-x-2x^2)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log}{16x\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)+(-8x-8x^2-8x^3)\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\log\left(\log\left(\frac{1}{2}(4x^2-x^2\log(3))\right)\right)}$$
$$=\int -\frac{\ln\left(2x^2-\frac{x^2\ln(3)}{2}\right)(2x^2+x)\ln\left(\ln\left(2x^2-\frac{x^2\ln(}{2}\right.\right.}{\ln\left(2x^2-\frac{x^2\ln(3)}{2}\right)(x^5+2x^4+3x^3+2x^2+x)\ln\left(\ln\left(2x^2-\frac{x^2\ln(3)}{2}\right)\right)^2-\ln\left(2x^2-\frac{x^2\ln(3)}{2}\right)(8x^3+}$$

input
```
int(-(log(log(2*x^2 - (x^2*log(3))/2))^2*log(2*x^2 - (x^2*log(3))/2)*(x +
2*x^2) + 8)/(16*x*log(2*x^2 - (x^2*log(3))/2) - log(log(2*x^2 - (x^2*log(3
))/2))*log(2*x^2 - (x^2*log(3))/2)*(8*x + 8*x^2 + 8*x^3) + log(log(2*x^2 -
 (x^2*log(3))/2))^2*log(2*x^2 - (x^2*log(3))/2)*(x + 2*x^2 + 3*x^3 + 2*x^4
 + x^5)),x)
```

output
```
int(-(log(log(2*x^2 - (x^2*log(3))/2))^2*log(2*x^2 - (x^2*log(3))/2)*(x +
2*x^2) + 8)/(16*x*log(2*x^2 - (x^2*log(3))/2) - log(log(2*x^2 - (x^2*log(3
))/2))*log(2*x^2 - (x^2*log(3))/2)*(8*x + 8*x^2 + 8*x^3) + log(log(2*x^2 -
 (x^2*log(3))/2))^2*log(2*x^2 - (x^2*log(3))/2)*(x + 2*x^2 + 3*x^3 + 2*x^4
 + x^5)), x)
```

3.166 $\int \frac{-1-x^2-2x^3}{x+e^5x^2-x^3-x^4}\,dx$

3.166.1 Optimal result

Integrand size = 34, antiderivative size = 18

$$\int \frac{-1-x^2-2x^3}{x+e^5x^2-x^3-x^4}\,dx = -4+\log\left(-e^5-\frac{1}{x}+x+x^2\right)$$

output
```
ln(x-1/x+x^2-exp(5))-4
```

3.166.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

$$\int \frac{-1-x^2-2x^3}{x+e^5x^2-x^3-x^4}\,dx = -\log(x)+\log\left(1+e^5x-x^2-x^3\right)$$

input
```
Integrate[(-1 - x^2 - 2*x^3)/(x + E^5*x^2 - x^3 - x^4),x]
```

output
```
-Log[x] + Log[1 + E^5*x - x^2 - x^3]
```

3.166.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.088, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^3-x^2-1}{-x^4-x^3+e^5x^2+x}\,dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{-2x^3-x^2-1}{x\left(-x^3-x^2+e^5x+1\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{-3x^2-2x+e^5}{-x^3-x^2+e^5x+1}-\frac{1}{x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\log\left(-x^3-x^2+e^5x+1\right)-\log(x)$$

input
```
Int[(-1 - x^2 - 2*x^3)/(x + E^5*x^2 - x^3 - x^4),x]
```

output
```
-Log[x] + Log[1 + E^5*x - x^2 - x^3]
```

3.166.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.166.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

method	result	size
default	$-\ln(x)+\ln(x^3-x\,\mathrm{e}^5+x^2-1)$	20
risch	$-\ln(x)+\ln(x^3-x\,\mathrm{e}^5+x^2-1)$	20
parallelrisch	$-\ln(x)+\ln(x^3-x\,\mathrm{e}^5+x^2-1)$	20
norman	$-\ln(x)+\ln(-x^3+x\,\mathrm{e}^5-x^2+1)$	23

input
```
int((-2*x^3-x^2-1)/(x^2*exp(5)-x^4-x^3+x),x,method=_RETURNVERBOSE)
```

output
```
-ln(x)+ln(x^3-x*exp(5)+x^2-1)
```

3.166.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{-1-x^2-2x^3}{x+e^5x^2-x^3-x^4}\,dx = \log\left(x^3+x^2-xe^5-1\right)-\log(x)$$

input
```
integrate((-2*x^3-x^2-1)/(x^2*exp(5)-x^4-x^3+x),x, algorithm=\
```

output
```
log(x^3 + x^2 - x*e^5 - 1) - log(x)
```

3.166.6 Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{-1-x^2-2x^3}{x+e^5x^2-x^3-x^4}\,dx = -\log(x)+\log\left(x^3+x^2-xe^5-1\right)$$

input
```
integrate((-2*x**3-x**2-1)/(x**2*exp(5)-x**4-x**3+x),x)
```

output
```
-log(x) + log(x**3 + x**2 - x*exp(5) - 1)
```

3.166.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{-1-x^2-2x^3}{x+e^5x^2-x^3-x^4}\,dx = \log\left(x^3+x^2-xe^5-1\right)-\log\left(x\right)$$

input
```
integrate((-2*x^3-x^2-1)/(x^2*exp(5)-x^4-x^3+x),x, algorithm=\
```

output
```
log(x^3 + x^2 - x*e^5 - 1) - log(x)
```

3.166.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{-1-x^2-2x^3}{x+e^5x^2-x^3-x^4}\,dx = \log\left(\left|x^3+x^2-xe^5-1\right|\right)-\log\left(|x|\right)$$

input
```
integrate((-2*x^3-x^2-1)/(x^2*exp(5)-x^4-x^3+x),x, algorithm=\
```

output
```
log(abs(x^3 + x^2 - x*e^5 - 1)) - log(abs(x))
```

3.166.9 Mupad [B] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{-1-x^2-2x^3}{x+e^5x^2-x^3-x^4}\,dx = \ln\left(x^3+x^2-\mathrm{e}^5\,x-1\right)-\ln\left(x\right)$$

input
```
int(-(x^2 + 2*x^3 + 1)/(x + x^2*exp(5) - x^3 - x^4),x)
```

output
```
log(x^2 - x*exp(5) + x^3 - 1) - log(x)
```

3.167 $\int \frac{1+75x^2+5x^3-5x^4+e^x(15x^2+6x^3-2x^4)+(-75x^2+20x^3+e^x(-1}{1+50x^3-10x^4+625x^6-250x^7+25x^8+e^{2x}(25x^6-10x^7+x^8)+e^x(10x^3}$

3.167.1 Optimal result

Integrand size = 155, antiderivative size = 36

$$\int \frac{1+75x^2+5x^3-5x^4+e^x(15x^2+6x^3-2x^4)+(-75x^2+20x^3+e^x(-15x^2-x^3+x^4))\log\left(\frac{e^x}{2}\right)}{1+50x^3-10x^4+625x^6-250x^7+25x^8+e^{2x}\left(25x^6-10x^7+x^8\right)+e^x\left(10x^3-2x^4+250x^6-100x^7+\right.}$$
$$=\frac{-x+x\log\left(\frac{e^x}{2}\right)}{x\left(1+(5+e^x)\left(5-x\right)x^3\right)}$$

output
```
(ln(1/2*exp(x))*x-x)/(1+x^3*(5-x)*(exp(x)+5))/x
```

3.167.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 34, normalized size of antiderivative = 0.94

$$\int \frac{1+75x^2+5x^3-5x^4+e^x(15x^2+6x^3-2x^4)+(-75x^2+20x^3+e^x(-15x^2-x^3+x^4))\log\left(\frac{e^x}{2}\right)}{1+50x^3-10x^4+625x^6-250x^7+25x^8+e^{2x}\left(25x^6-10x^7+x^8\right)+e^x\left(10x^3-2x^4+250x^6-100x^7+\right.}$$
$$=\frac{1+\log(2)-\log\left(e^x\right)}{-1-5\left(5+e^x\right)x^3+\left(5+e^x\right)x^4}$$

input
```
Integrate[(1 + 75*x^2 + 5*x^3 - 5*x^4 + E^x*(15*x^2 + 6*x^3 - 2*x^4) + (-7
5*x^2 + 20*x^3 + E^x*(-15*x^2 - x^3 + x^4))*Log[E^x/2])/(1 + 50*x^3 - 10*x
^4 + 625*x^6 - 250*x^7 + 25*x^8 + E^(2*x)*(25*x^6 - 10*x^7 + x^8) + E^x*(1
0*x^3 - 2*x^4 + 250*x^6 - 100*x^7 + 10*x^8)),x]
```

output
```
(1 + Log[2] - Log[E^x])/(-1 - 5*(5 + E^x)*x^3 + (5 + E^x)*x^4)
```

3.167.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-5x^4+5x^3+75x^2+e^x\left(-2x^4+6x^3+15x^2\right)+\left(20x^3-75x^2+e^x\left(x^4-x^3-15x^2\right)\right)\log\left(\frac{e^x}{2}\right)+1}{25x^8-250x^7+625x^6-10x^4+50x^3+e^{2x}\left(x^8-10x^7+25x^6\right)+e^x\left(10x^8-100x^7+250x^6-2x^4+10x^3\right)+1}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-\left(\left(2e^x+5\right)x^4\right)+\left(6e^x+5\right)x^3+15(e^x+5)\,x^2+\left(e^x\left(x^2-x-15\right)+20x-75\right)x^2\log\left(\frac{e^x}{2}\right)+1}{\left(-\left(\left(e^x+5\right)x^4\right)+5\left(e^x+5\right)x^3+1\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-2x^2+x^2\log\left(\frac{e^x}{2}\right)+6x-x\log\left(\frac{e^x}{2}\right)-15\log\left(\frac{e^x}{2}\right)+15}{(x-5)x\left(e^xx^4+5x^4-5e^xx^3-25x^3-1\right)}-\frac{\left(5x^6-50x^5+125x^4-x^2+x+15\right)\left(\log\left(\frac{e^x}{2}\right)-1\right.}{(x-5)x\left(e^xx^4+5x^4-5e^xx^3-25x^3-1\right)^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$\log (e^x) \int \frac{1}{(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx - (1 + \log(2)) \int \frac{1}{(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx + \log (e^x) \int \frac{1}{(x-5)(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx - (1 + \log(2)) \int \frac{1}{(x-5)(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx + 3\log (e^x) \int \frac{1}{x(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx - (3 + \log(8)) \int \frac{1}{x(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx + 25\log\left(\frac{e^x}{2}\right) \int \frac{x^3}{(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx - 25 \int \frac{x^3}{(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx - 5\log\left(\frac{e^x}{2}\right) \int \frac{x^4}{(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx + 5 \int \frac{x^4}{(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)^2} dx + \frac{4}{5}\log\left(\frac{e^x}{2}\right) \int \frac{1}{e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1} dx + \frac{1}{5}\log (e^x) \int \frac{1}{e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1} dx - \frac{1}{5}\log(2) \int \frac{1}{e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1} dx - 2 \int \frac{1}{e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1} dx + \log\left(\frac{e^x}{2}\right) \int \frac{1}{(x-5)(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)} dx - \int \frac{1}{(x-5)(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)} dx + 3\log\left(\frac{e^x}{2}\right) \int \frac{1}{x(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)} dx - 3 \int \frac{1}{x(e^x x^4 + 5x^4 - 5e^x x^3 - 25x^3 - 1)} dx - \int \int \frac{1}{(-((5+e^x)x^4) + 5(5+e^x)x^3 + 1)^2} dx dx - \int \int \frac{1}{(x-5)(-((5+e^x)x^4) + 5(5+e^x)x^3 + 1)^2} dx dx - 3 \int \int \frac{1}{x(-((5+e^x)x^4) + 5(5+e^x)x^3 + 1)^2} dx dx - 25 \int \int \frac{x^3}{(-((5+e^x)x^4) + 5(5+e^x)x^3 + 1)^2} dx dx + 5 \int \int \frac{x^4}{(-((5+e^x)x^4) + 5(5+e^x)x^3 + 1)^2} dx dx - \int \int \frac{1}{(5+e^x)x^4 - 5(5+e^x)x^3 - 1} dx dx - \int \int \frac{1}{(x-5)((5+e^x)x^4 - 5(5+e^x)x^3 - 1)} dx dx - 3 \int \int \frac{1}{x((5+e^x)x^4 - 5(5+e^x)x^3 - 1)} dx dx$$

input
```
Int[(1 + 75*x^2 + 5*x^3 - 5*x^4 + E^x*(15*x^2 + 6*x^3 - 2*x^4) + (-75*x^2
+ 20*x^3 + E^x*(-15*x^2 - x^3 + x^4))*Log[E^x/2])/(1 + 50*x^3 - 10*x^4 + 6
25*x^6 - 250*x^7 + 25*x^8 + E^(2*x)*(25*x^6 - 10*x^7 + x^8) + E^x*(10*x^3
- 2*x^4 + 250*x^6 - 100*x^7 + 10*x^8)),x]
```

3.167. $\int \frac{1+75x^2+5x^3-5x^4+e^x(15x^2+6x^3-2x^4)+(-75x^2+20x^3+e^x(-15x^2-x^3+x^4))\log\left(\frac{e^x}{2}\right)}{1+50x^3-10x^4+625x^6-250x^7+25x^8+e^{2x}(25x^6-10x^7+x^8)+e^x(10x^3-2x^4+250x^6-100x^7+10x^8)}\,dx$

output
```
$Aborted
```

3.167.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.167.4 Maple [A] (verified)

Time = 1.77 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.06

method	result	size
default	$\frac{1-\ln\left(\frac{{\mathrm e}^{x}}{2}\right)}{{\mathrm e}^{x} x^{4}-5 \,{\mathrm e}^{x} x^{3}+5 x^{4}-25 x^{3}-1}$	38
parallelrisch	$-\frac{-60+60 \ln\left(\frac{{\mathrm e}^{x}}{2}\right)}{60 \left({\mathrm e}^{x} x^{4}-5 \,{\mathrm e}^{x} x^{3}+5 x^{4}-25 x^{3}-1\right)}$	39
risch	$-\frac{\ln\left({\mathrm e}^{x}\right)}{{\mathrm e}^{x} x^{4}-5 \,{\mathrm e}^{x} x^{3}+5 x^{4}-25 x^{3}-1}+\frac{1}{{\mathrm e}^{x} x^{4}-5 \,{\mathrm e}^{x} x^{3}+5 x^{4}-25 x^{3}-1}+\frac{\ln\left(2\right)}{{\mathrm e}^{x} x^{4}-5 \,{\mathrm e}^{x} x^{3}+5 x^{4}-25 x^{3}-1}$	91

input
```
int((((x^4-x^3-15*x^2)*exp(x)+20*x^3-75*x^2)*ln(1/2*exp(x))+(-2*x^4+6*x^3+
15*x^2)*exp(x)-5*x^4+5*x^3+75*x^2+1)/((x^8-10*x^7+25*x^6)*exp(x)^2+(10*x^8
-100*x^7+250*x^6-2*x^4+10*x^3)*exp(x)+25*x^8-250*x^7+625*x^6-10*x^4+50*x^3
+1),x,method=_RETURNVERBOSE)
```

output
```
(1-ln(1/2*exp(x)))/(exp(x)*x^4-5*exp(x)*x^3+5*x^4-25*x^3-1)
```

3.167.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 35, normalized size of antiderivative = 0.97

$$\int \frac{1+75x^2+5x^3-5x^4+e^x(15x^2+6x^3-2x^4)+(-75x^2+20x^3+e^x(-15x^2-x^3+x^4))\log\left(\frac{e^x}{2}\right)}{1+50x^3-10x^4+625x^6-250x^7+25x^8+e^{2x}\left(25x^6-10x^7+x^8\right)+e^x\left(10x^3-2x^4+250x^6-100x^7+\right.}$$
$$= -\frac{x-\log(2)-1}{5\,x^4-25\,x^3+(x^4-5\,x^3)e^x-1}$$

input
```
integrate((((x^4-x^3-15*x^2)*exp(x)+20*x^3-75*x^2)*log(1/2*exp(x))+(-2*x^4
+6*x^3+15*x^2)*exp(x)-5*x^4+5*x^3+75*x^2+1)/((x^8-10*x^7+25*x^6)*exp(x)^2+
(10*x^8-100*x^7+250*x^6-2*x^4+10*x^3)*exp(x)+25*x^8-250*x^7+625*x^6-10*x^4
+50*x^3+1),x, algorithm=\
```

output
```
-(x - log(2) - 1)/(5*x^4 - 25*x^3 + (x^4 - 5*x^3)*e^x - 1)
```

3.167.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.81

$$\int \frac{1+75x^2+5x^3-5x^4+e^x(15x^2+6x^3-2x^4)+(-75x^2+20x^3+e^x(-15x^2-x^3+x^4))\log\left(\frac{e^x}{2}\right)}{1+50x^3-10x^4+625x^6-250x^7+25x^8+e^{2x}\left(25x^6-10x^7+x^8\right)+e^x\left(10x^3-2x^4+250x^6-100x^7+\right.}$$
$$= \frac{-x+\log(2)+1}{5x^4-25x^3+(x^4-5x^3)\,e^x-1}$$

input
```
integrate((((x**4-x**3-15*x**2)*exp(x)+20*x**3-75*x**2)*ln(1/2*exp(x))+(-2
*x**4+6*x**3+15*x**2)*exp(x)-5*x**4+5*x**3+75*x**2+1)/((x**8-10*x**7+25*x*
*6)*exp(x)**2+(10*x**8-100*x**7+250*x**6-2*x**4+10*x**3)*exp(x)+25*x**8-25
0*x**7+625*x**6-10*x**4+50*x**3+1),x)
```

output
```
(-x + log(2) + 1)/(5*x**4 - 25*x**3 + (x**4 - 5*x**3)*exp(x) - 1)
```

3.167.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 35, normalized size of antiderivative = 0.97

$$\int \frac{1+75x^2+5x^3-5x^4+e^x(15x^2+6x^3-2x^4)+(-75x^2+20x^3+e^x(-15x^2-x^3+x^4))\log\left(\frac{e^x}{2}\right)}{1+50x^3-10x^4+625x^6-250x^7+25x^8+e^{2x}\left(25x^6-10x^7+x^8\right)+e^x\left(10x^3-2x^4+250x^6-100x^7+\right.}$$
$$=-\frac{x-\log(2)-1}{5\,x^4-25\,x^3+(x^4-5\,x^3)e^x-1}$$

input
```
integrate((((x^4-x^3-15*x^2)*exp(x)+20*x^3-75*x^2)*log(1/2*exp(x))+(-2*x^4
+6*x^3+15*x^2)*exp(x)-5*x^4+5*x^3+75*x^2+1)/((x^8-10*x^7+25*x^6)*exp(x)^2+
(10*x^8-100*x^7+250*x^6-2*x^4+10*x^3)*exp(x)+25*x^8-250*x^7+625*x^6-10*x^4
+50*x^3+1),x, algorithm=\
```

output
```
-(x - log(2) - 1)/(5*x^4 - 25*x^3 + (x^4 - 5*x^3)*e^x - 1)
```

3.167.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.00

$$\int \frac{1+75x^2+5x^3-5x^4+e^x(15x^2+6x^3-2x^4)+(-75x^2+20x^3+e^x(-15x^2-x^3+x^4))\log\left(\frac{e^x}{2}\right)}{1+50x^3-10x^4+625x^6-250x^7+25x^8+e^{2x}\left(25x^6-10x^7+x^8\right)+e^x\left(10x^3-2x^4+250x^6-100x^7+\right.}$$
$$=-\frac{x-\log(2)-1}{x^4e^x+5\,x^4-5\,x^3e^x-25\,x^3-1}$$

input
```
integrate((((x^4-x^3-15*x^2)*exp(x)+20*x^3-75*x^2)*log(1/2*exp(x))+(-2*x^4
+6*x^3+15*x^2)*exp(x)-5*x^4+5*x^3+75*x^2+1)/((x^8-10*x^7+25*x^6)*exp(x)^2+
(10*x^8-100*x^7+250*x^6-2*x^4+10*x^3)*exp(x)+25*x^8-250*x^7+625*x^6-10*x^4
+50*x^3+1),x, algorithm=\
```

output
```
-(x - log(2) - 1)/(x^4*e^x + 5*x^4 - 5*x^3*e^x - 25*x^3 - 1)
```

3.167.9 Mupad [F(-1)]

Timed out.

$$\int \frac{1+75x^2+5x^3-5x^4+e^x(15x^2+6x^3-2x^4)+(-75x^2+20x^3+e^x(-15x^2-x^3+x^4))\log\left(\frac{e^x}{2}\right)}{1+50x^3-10x^4+625x^6-250x^7+25x^8+e^{2x}(25x^6-10x^7+x^8)+e^x(10x^3-2x^4+250x^6-100x^7+}$$

$$=\int \frac{e^x\left(-2x^4+6x^3+15x^2\right)-\ln\left(\frac{e^x}{2}\right)\left(75x^2-20x^3+e^x\left(-x^4+x^3+15x^2\right)\right)+75x^2+5x^3-5}{e^{2x}\left(x^8-10x^7+25x^6\right)+e^x\left(10x^8-100x^7+250x^6-2x^4+10x^3\right)+50x^3-10x^4+625x^6-250}$$

input
```
int((exp(x)*(15*x^2 + 6*x^3 - 2*x^4) - log(exp(x)/2)*(75*x^2 - 20*x^3 + ex
p(x)*(15*x^2 + x^3 - x^4)) + 75*x^2 + 5*x^3 - 5*x^4 + 1)/(exp(2*x)*(25*x^6
 - 10*x^7 + x^8) + exp(x)*(10*x^3 - 2*x^4 + 250*x^6 - 100*x^7 + 10*x^8) +
50*x^3 - 10*x^4 + 625*x^6 - 250*x^7 + 25*x^8 + 1),x)
```

output
```
int((exp(x)*(15*x^2 + 6*x^3 - 2*x^4) - log(exp(x)/2)*(75*x^2 - 20*x^3 + ex
p(x)*(15*x^2 + x^3 - x^4)) + 75*x^2 + 5*x^3 - 5*x^4 + 1)/(exp(2*x)*(25*x^6
 - 10*x^7 + x^8) + exp(x)*(10*x^3 - 2*x^4 + 250*x^6 - 100*x^7 + 10*x^8) +
50*x^3 - 10*x^4 + 625*x^6 - 250*x^7 + 25*x^8 + 1), x)
```

3.168 $\int e^{e^{e^x}+e^{e^{e^{e^x}-5x+6x^2}}+e^{e^{e^x}-5x+6x^2}-5x+6x^2}\left(-5+e^{e^x+x}+12x\right)dx$

3.168.1 Optimal result

Integrand size = 63, antiderivative size = 24

$$\int e^{e^{e^x}+e^{e^{e^{e^x}-5x+6x^2}}+e^{e^{e^x}-5x+6x^2}-5x+6x^2}\left(-5+e^{e^x+x}+12x\right)dx=e^{e^{e^{e^{e^x}+x^2+5(-x+x^2)}}}$$

output
```
exp(exp(1/exp(-exp(exp(x))-6*x^2+5*x)))
```

3.168.2 Mathematica [A] (verified)

Time = 1.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int e^{e^{e^x}+e^{e^{e^{e^x}-5x+6x^2}}+e^{e^{e^x}-5x+6x^2}-5x+6x^2}\left(-5+e^{e^x+x}+12x\right)dx=e^{e^{e^{e^{e^x}-5x+6x^2}}}$$

input
```
Integrate[E^(E^E^x + E^E^(E^E^x - 5*x + 6*x^2) + E^(E^E^x - 5*x + 6*x^2) -
 5*x + 6*x^2)*(-5 + E^(E^x + x) + 12*x),x]
```

output
```
E^E^E^(E^E^x - 5*x + 6*x^2)
```

3.168.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(12x+e^{x+e^x}-5\right)\exp\left(6x^2+e^{e^{6x^2-5x+e^{e^x}}}+e^{6x^2-5x+e^{e^x}}-5x+e^{e^x}\right)dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(12x\exp\left(6x^2+e^{e^{6x^2-5x+e^{e^x}}}+e^{6x^2-5x+e^{e^x}}-5x+e^{e^x}\right)-5\exp\left(6x^2+e^{e^{6x^2-5x+e^{e^x}}}+e^{6x^2-5x+e^{e^x}}-5x+e^{e^x}\right.\right.$$

$$\Big\downarrow \text{2009}$$

$$-5\int \exp\left(6x^2-5x+e^{e^x}+e^{e^{6x^2-5x+e^{e^x}}}+e^{6x^2-5x+e^{e^x}}\right)dx+\int \exp\left(6x^2-4x+e^{e^x}+e^{e^{6x^2-5x+e^{e^x}}}+e^x+e^{6x^2-5x+e^{e^x}}\right)dx+12\int \exp\left(6x^2-5x+e^{e^x}+e^{e^{6x^2-5x+e^{e^x}}}+e^{6x^2-5x+e^{e^x}}\right)xdx$$

input
```
Int[E^(E^E^x + E^E^(E^E^x - 5*x + 6*x^2) + E^(E^E^x - 5*x + 6*x^2) - 5*x +
 6*x^2)*(-5 + E^(E^x + x) + 12*x),x]
```

output
```
$Aborted
```

3.168.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.168.4 Maple [A] (verified)

Time = 0.69 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.67

method	result	size
risch	$e^{e^{e^{e^{e^{x}}}+6x^{2}-5x}}$	16
derivativedivides	$e^{e^{e^{e^{e^{x}}}+6x^{2}-5x}}$	20
default	$e^{e^{e^{e^{e^{x}}}+6x^{2}-5x}}$	20
parallelrisch	$e^{e^{e^{e^{e^{x}}}+6x^{2}-5x}}$	20

input
```
int((exp(x)*exp(exp(x))+12*x-5)*exp(1/exp(-exp(exp(x))-6*x^2+5*x))*exp(exp
(1/exp(-exp(exp(x))-6*x^2+5*x)))/exp(-exp(exp(x))-6*x^2+5*x),x,method=_RET
URNVERBOSE)
```

output
```
exp(exp(exp(exp(exp(x))+6*x^2-5*x)))
```

3.168.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 128 vs. 2(15) = 30.

Time = 0.28 (sec) , antiderivative size = 128, normalized size of antiderivative = 5.33

$$\int e^{e^{e^x}+e^{e^{e^{e^x}}-5x+6x^2}+e^{e^{e^x}}-5x+6x^2-5x+6x^2}\left(-5+e^{e^x+x}+12x\right)\,dx$$
$$=e^{\left(\left((6x^2-5x)e^x+e^{\left(\left((6x^2-5x)e^x+e^{(x+e^x)}\right)e^{(-x)}+x\right)}+e^{\left(x+e^{\left(\left((6x^2-5x)e^x+e^{(x+e^x)}\right)e^{(-x)}\right)}\right)}+e^{(x+e^x)}\right)e^{(-x)}-\left((6x^2-5x)e^x+e^{(x+e^x)}\right.}$$

input
```
integrate((exp(x)*exp(exp(x))+12*x-5)*exp(1/exp(-exp(exp(x))-6*x^2+5*x))*e
xp(exp(1/exp(-exp(exp(x))-6*x^2+5*x)))/exp(-exp(exp(x))-6*x^2+5*x),x, algo
rithm=\
```

output
```
e^(((6*x^2 - 5*x)*e^x + e^(((6*x^2 - 5*x)*e^x + e^(x + e^x))*e^(-x) + x) +
 e^(x + e^(((6*x^2 - 5*x)*e^x + e^(x + e^x))*e^(-x))) + e^(x + e^x))*e^(-x
) - ((6*x^2 - 5*x)*e^x + e^(x + e^x))*e^(-x) - e^(((6*x^2 - 5*x)*e^x + e^(
x + e^x))*e^(-x)))
```

3.168.6 Sympy [A] (verification not implemented)

Time = 24.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int e^{e^{e^x}+e^{e^{e^{e^x}}-5x+6x^2}+e^{e^{e^x}-5x+6x^2}-5x+6x^2}\left(-5+e^{e^x+x}+12x\right)\,dx=e^{e^{e^{6x^2-5x+e^{e^x}}}}$$

input
```
integrate((exp(x)*exp(exp(x))+12*x-5)*exp(1/exp(-exp(exp(x))-6*x**2+5*x))*
exp(exp(1/exp(-exp(exp(x))-6*x**2+5*x)))/exp(-exp(exp(x))-6*x**2+5*x),x)
```

output
```
exp(exp(exp(6*x**2 - 5*x + exp(exp(x)))))
```

3.168.7 Maxima [A] (verification not implemented)

Time = 0.61 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int e^{e^{e^x}+e^{e^{e^{e^x}}-5x+6x^2}+e^{e^{e^x}-5x+6x^2}-5x+6x^2}\left(-5+e^{e^x+x}+12x\right)\,dx=e^{\left(e^{\left(e^{\left(6\,x^2-5\,x+e^{\left(e^x\right)}\right)}\right)}\right)}$$

input
```
integrate((exp(x)*exp(exp(x))+12*x-5)*exp(1/exp(-exp(exp(x))-6*x^2+5*x))*e
xp(exp(1/exp(-exp(exp(x))-6*x^2+5*x)))/exp(-exp(exp(x))-6*x^2+5*x),x, algo
rithm=\
```

output
```
e^(e^(e^(6*x^2 - 5*x + e^(e^x))))
```

3.168.8 Giac [F]

$$\int e^{e^{e^x}+e^{e^{e^{e^x}}-5x+6x^2}+e^{e^{e^x}-5x+6x^2}-5x+6x^2}\left(-5+e^{e^x+x}+12x\right)\,dx$$
$$=\int \left(12\,x+e^{\left(x+e^x\right)}-5\right)e^{\left(6\,x^2-5\,x+e^{\left(6\,x^2-5\,x+e^{\left(e^x\right)}\right)}+e^{\left(e^{\left(6\,x^2-5\,x+e^{\left(e^x\right)}\right)}\right)}+e^{\left(e^x\right)}\right)}\,dx$$

input
```
integrate((exp(x)*exp(exp(x))+12*x-5)*exp(1/exp(-exp(exp(x))-6*x^2+5*x))*e
xp(exp(1/exp(-exp(exp(x))-6*x^2+5*x)))/exp(-exp(exp(x))-6*x^2+5*x),x, algo
rithm=\
```

output
```
integrate((12*x + e^(x + e^x) - 5)*e^(6*x^2 - 5*x + e^(6*x^2 - 5*x + e^(e^
x)) + e^(e^(6*x^2 - 5*x + e^(e^x))) + e^(e^x)), x)
```

3.168.9 Mupad [B] (verification not implemented)

Time = 12.62 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int e^{e^{e^x}+e^{e^{e^{e^x}-5x+6x^2}}+e^{e^{e^x}-5x+6x^2}-5x+6x^2}\left(-5+e^{e^x+x}+12x\right)\,dx=\mathrm{e}^{\mathrm{e}^{\mathrm{e}^{-5\,x}\,\mathrm{e}^{6\,x^2}\,\mathrm{e}^{\mathrm{e}^{\mathrm{e}^x}}}}$$

input
```
int(exp(exp(exp(x)) - 5*x + 6*x^2)*exp(exp(exp(exp(x)) - 5*x + 6*x^2))*exp
(exp(exp(exp(exp(x)) - 5*x + 6*x^2)))*(12*x + exp(exp(x))*exp(x) - 5),x)
```

output
```
exp(exp(exp(-5*x)*exp(6*x^2)*exp(exp(exp(x)))))
```

3.169 $\int e^{5+6x^3}(-1-18x^3)\,dx$

3.169.1 Optimal result

Integrand size = 17, antiderivative size = 12

$$\int e^{5+6x^3}\left(-1-18x^3\right)\,dx=-e^{5+6x^3}x$$

output
```
-x*exp(6*x^3+5)
```

3.169.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.13 (sec) , antiderivative size = 43, normalized size of antiderivative = 3.58

$$\int e^{5+6x^3}\left(-1-18x^3\right)\,dx=\frac{e^5x\left(\Gamma\left(\frac{1}{3},-6x^3\right)-3\Gamma\left(\frac{4}{3},-6x^3\right)\right)}{3\sqrt[3]{6}\sqrt[3]{-x^3}}$$

input
```
Integrate[E^(5 + 6*x^3)*(-1 - 18*x^3),x]
```

output
```
(E^5*x*(Gamma[1/3, -6*x^3] - 3*Gamma[4/3, -6*x^3]))/(3*6^(1/3)*(-x^3)^(1/3
))
```

3.169.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.23 (sec) , antiderivative size = 62, normalized size of antiderivative = 5.17, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$, Rules used = {2656, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{6x^3+5}\left(-18x^3-1\right)dx$$

$$\Big\downarrow \text{2656}$$

$$\int \left(-18e^{6x^3+5}x^3-e^{6x^3+5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^5x\Gamma\left(\frac{1}{3},-6x^3\right)}{3\sqrt[3]{6}\sqrt[3]{-x^3}}+\frac{e^5x^4\Gamma\left(\frac{4}{3},-6x^3\right)}{\sqrt[3]{6}\left(-x^3\right)^{4/3}}$$

input
```
Int[E^(5 + 6*x^3)*(-1 - 18*x^3),x]
```

output
```
(E^5*x*Gamma[1/3, -6*x^3])/(3*6^(1/3)*(-x^3)^(1/3)) + (E^5*x^4*Gamma[4/3,
-6*x^3])/(6^(1/3)*(-x^3)^(4/3))
```

3.169.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2656
```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^(n_))*(Px_), x_Symbol] :> Int[
ExpandLinearProduct[F^(a + b*(c + d*x)^n), Px, c, d, x], x] /; FreeQ[{F, a,
 b, c, d, n}, x] && PolynomialQ[Px, x]
```

3.169.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

method	result
gosper	$-x\,\mathrm{e}^{6x^3+5}$
norman	$-x\,\mathrm{e}^{6x^3+5}$
risch	$-x\,\mathrm{e}^{6x^3+5}$
parallelrisch	$-x\,\mathrm{e}^{6x^3+5}$
meijerg	$-\frac{\mathrm{e}^5 6^{\frac{2}{3}} (-1)^{\frac{2}{3}} \left(\frac{2x(-1)^{\frac{1}{3}}\pi\sqrt{3}}{9\Gamma\left(\frac{2}{3}\right)\left(-x^3\right)^{\frac{1}{3}}}-x 6^{\frac{1}{3}}(-1)^{\frac{1}{3}}\mathrm{e}^{6x^3}-\frac{x(-1)^{\frac{1}{3}}\Gamma\left(\frac{1}{3},-6x^3\right)}{3\left(-x^3\right)^{\frac{1}{3}}}\right)}{6}+\frac{\mathrm{e}^5 6^{\frac{2}{3}} (-1)^{\frac{2}{3}} \left(\frac{2x(-1)^{\frac{1}{3}}\pi\sqrt{3}}{3\Gamma\left(\frac{2}{3}\right)\left(-x^3\right)^{\frac{1}{3}}}-\frac{x(-1)^{\frac{1}{3}}\Gamma\left(\frac{1}{3},-6x^3\right)}{\left(-x^3\right)^{\frac{1}{3}}}\right.}{18}$

input
```
int((-18*x^3-1)*exp(6*x^3+5),x,method=_RETURNVERBOSE)
```

output
```
-x*exp(6*x^3+5)
```

3.169.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int e^{5+6x^3}\left(-1-18x^3\right)\,dx=-xe^{\left(6\,x^3+5\right)}$$

input
```
integrate((-18*x^3-1)*exp(6*x^3+5),x, algorithm=\
```

output
```
-x*e^(6*x^3 + 5)
```

3.169.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int e^{5+6x^3}\left(-1-18x^3\right)\,dx=-xe^{6x^3+5}$$

input
```
integrate((-18*x**3-1)*exp(6*x**3+5),x)
```

output
```
-x*exp(6*x**3 + 5)
```

3.169.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 47, normalized size of antiderivative = 3.92

$$\int e^{5+6x^3}\left(-1-18x^3\right)\,dx=\frac{6^{\frac{2}{3}}x^4e^5\Gamma\left(\frac{4}{3},-6\,x^3\right)}{6\,\left(-x^3\right)^{\frac{4}{3}}}+\frac{6^{\frac{2}{3}}xe^5\Gamma\left(\frac{1}{3},-6\,x^3\right)}{18\,\left(-x^3\right)^{\frac{1}{3}}}$$

input
```
integrate((-18*x^3-1)*exp(6*x^3+5),x, algorithm=\
```

output
```
1/6*6^(2/3)*x^4*e^5*gamma(4/3, -6*x^3)/(-x^3)^(4/3) + 1/18*6^(2/3)*x*e^5*g
amma(1/3, -6*x^3)/(-x^3)^(1/3)
```

3.169.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int e^{5+6x^3}\left(-1-18x^3\right)\,dx=-xe^{(6\,x^3+5)}$$

input
```
integrate((-18*x^3-1)*exp(6*x^3+5),x, algorithm=\
```

output
```
-x*e^(6*x^3 + 5)
```

3.169.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int e^{5+6x^3}\left(-1-18x^3\right)\,dx=-x\,\mathrm{e}^5\,\mathrm{e}^{6\,x^3}$$

input
```
int(-exp(6*x^3 + 5)*(18*x^3 + 1),x)
```

output
```
-x*exp(5)*exp(6*x^3)
```

3.170 $\int \frac{e^3\left(4+8 \log \left(2+e^5\right)+4 \log ^2\left(2+e^5\right)\right)}{\left(\frac{e^9}{x^5}-\frac{3 e^6}{x^3}+\frac{3 e^3}{x}-x\right) x^2} \, dx$

3.170.1 Optimal result

Integrand size = 56, antiderivative size = 24

$$\int \frac{e^3\left(4+8 \log \left(2+e^5\right)+4 \log ^2\left(2+e^5\right)\right)}{\left(\frac{e^9}{x^5}-\frac{3 e^6}{x^3}+\frac{3 e^3}{x}-x\right) x^2} \, dx=2+\frac{\left(1+\log \left(2+e^5\right)\right)^2}{\left(-1+\frac{e^3}{x^2}\right)^2}$$

output
```
(ln(exp(5)+2)+1)^2/(-1+exp(3-ln(x^2)))^2+2
```

3.170.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

$$\int \frac{e^3\left(4+8 \log \left(2+e^5\right)+4 \log ^2\left(2+e^5\right)\right)}{\left(\frac{e^9}{x^5}-\frac{3 e^6}{x^3}+\frac{3 e^3}{x}-x\right) x^2} \, dx=-\frac{e^3\left(e^3-2 x^2\right)\left(1+\log \left(2+e^5\right)\right)^2}{\left(e^3-x^2\right)^2}$$

input
```
Integrate[(E^3*(4 + 8*Log[2 + E^5] + 4*Log[2 + E^5]^2))/((E^9/x^5 - (3*E^6
)/x^3 + (3*E^3)/x - x)*x^2),x]
```

output
```
-((E^3*(E^3 - 2*x^2)*(1 + Log[2 + E^5])^2)/(E^3 - x^2)^2)
```

3.170.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {12, 27, 2070, 242}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^3\left(4+4\log^2\left(2+e^5\right)+8\log\left(2+e^5\right)\right)}{\left(\frac{e^9}{x^5}-\frac{3e^6}{x^3}-x+\frac{3e^3}{x}\right)x^2}dx$$

$$\Big\downarrow \text{ 12}$$

$$\int \frac{4e^3x^3\left(1+\log\left(2+e^5\right)\right)^2}{-x^6+3e^3x^4-3e^6x^2+e^9}dx$$

$$\Big\downarrow \text{ 27}$$

$$4e^3\left(1+\log\left(2+e^5\right)\right)^2\int \frac{x^3}{-x^6+3e^3x^4-3e^6x^2+e^9}dx$$

$$\Big\downarrow \text{ 2070}$$

$$4e^3\left(1+\log\left(2+e^5\right)\right)^2\int \frac{x^3}{\left(e^3-x^2\right)^3}dx$$

$$\Big\downarrow \text{ 242}$$

$$\frac{x^4\left(1+\log\left(2+e^5\right)\right)^2}{\left(e^3-x^2\right)^2}$$

input
```
Int[(E^3*(4 + 8*Log[2 + E^5] + 4*Log[2 + E^5]^2))/((E^9/x^5 - (3*E^6)/x^3
+ (3*E^3)/x - x)*x^2),x]
```

output
```
(x^4*(1 + Log[2 + E^5])^2)/(E^3 - x^2)^2
```

3.170.3.1 Defintions of rubi rules used

rule 12
```
Int[(u_.)*((e_.)*(x_))^(m_.)*((d_.)*(x_)^(q_.) + (a_.)*(x_)^(r_.) + (b_.)*(
x_)^(s_.) + (c_.)*(x_)^(t_.))^(p_.), x_Symbol] :> Simp[1/e^(p*r)   Int[u*(e
*x)^(m + p*r)*(a + b*x^(s - r) + c*x^(t - r) + d*x^(q - r))^p, x], x] /; Fr
eeQ[{a, b, c, d, e, m, r, s, t, q}, x] && IntegerQ[p] && (IntegerQ[p*r] ||
GtQ[e, 0]) && PosQ[s - r] && PosQ[t - r] && PosQ[q - r]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 242
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^(p + 1)/(a*c*(m + 1))), x] /; FreeQ[{a, b, c, m, p}, x
] && EqQ[m + 2*p + 3, 0] && NeQ[m, -1]
```

rule 2070
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x^2, 0], Expon[Px
, x^2]], b = Rt[Coeff[Px, x^2, Expon[Px, x^2]], Expon[Px, x^2]]}, Int[u*(a
+ b*x^2)^(Expon[Px, x^2]*p), x] /; EqQ[Px, (a + b*x^2)^Expon[Px, x^2]]] /;
IntegerQ[p] && PolyQ[Px, x^2] && GtQ[Expon[Px, x^2], 1] && NeQ[Coeff[Px, x^
2, 0], 0]
```

3.170.4 Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.96

method	result
risch	$\frac{\left(4 \ln\left(\mathrm{e}^{5}+2\right)^{2}+8 \ln\left(\mathrm{e}^{5}+2\right)+4\right) \mathrm{e}^{3} \left(-\frac{\mathrm{e}^{3}}{4}+\frac{x^{2}}{2}\right)}{\mathrm{e}^{6}-2 x^{2} \mathrm{e}^{3}+x^{4}}$
parallelrisch	$\frac{4 \ln\left(\mathrm{e}^{5}+2\right)^{2}+8 \ln\left(\mathrm{e}^{5}+2\right)+4}{\frac{4 \,\mathrm{e}^{6}}{x^{4}}-8 \,\mathrm{e}^{3-\ln\left(x^{2}\right)}+4}$
norman	$\frac{-\mathrm{e}^{6} \left(\ln\left(\mathrm{e}^{5}+2\right)^{2}+2 \ln\left(\mathrm{e}^{5}+2\right)+1\right) x+\left(2 \,\mathrm{e}^{3} \ln\left(\mathrm{e}^{5}+2\right)^{2}+4 \,\mathrm{e}^{3} \ln\left(\mathrm{e}^{5}+2\right)+2 \,\mathrm{e}^{3}\right) x^{3}}{x \left(-x^{2}+\mathrm{e}^{3}\right)^{2}}$
default	$\frac{\left(4 \ln\left(\mathrm{e}^{5}+2\right)^{2}+8 \ln\left(\mathrm{e}^{5}+2\right)+4\right) \mathrm{e}^{3-\ln\left(x^{2}\right)+2 \ln\left(x\right)} \left(\sum_{\_R =\operatorname{RootOf}\left(-3 \,\mathrm{e}^{3-\ln\left(x^{2}\right)+2 \ln\left(x\right)} \_Z^{2}+\_Z^{3}+3 \,\mathrm{e}^{6-2 \ln\left(x^{2}\right)+4 \ln\left(x\right)} \_Z-\mathrm{e}^{9-3}\right.}\right.}{6}$

3.170. $\int \frac{e^3 \left(4+8 \log \left(2+e^5\right)+4 \log ^2\left(2+e^5\right)\right)}{\left(\frac{e^9}{x^5}-\frac{3 e^6}{x^3}+\frac{3 e^3}{x}-x\right) x^2} \, dx$

input
```
int((4*ln(exp(5)+2)^2+8*ln(exp(5)+2)+4)*exp(3-ln(x^2))/(x*exp(3-ln(x^2))^3
-3*x*exp(3-ln(x^2))^2+3*x*exp(3-ln(x^2))-x),x,method=_RETURNVERBOSE)
```

output
```
(4*ln(exp(5)+2)^2+8*ln(exp(5)+2)+4)*exp(3)*(-1/4*exp(3)+1/2*x^2)/(exp(6)-2
*x^2*exp(3)+x^4)
```

3.170.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(25) = 50$.

Time = 0.26 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.79

$$\int \frac{e^3(4 + 8\log(2 + e^5) + 4\log^2(2 + e^5))}{\left(\frac{e^9}{x^5} - \frac{3e^6}{x^3} + \frac{3e^3}{x} - x\right)x^2}\,dx = \frac{2\,x^2e^3 + (2\,x^2e^3 - e^6)\log(e^5 + 2)^2 + 2\,(2\,x^2e^3 - e^6)\log(e^5 + 2) - e^6}{x^4 - 2\,x^2e^3 + e^6}$$

input
```
integrate((4*log(exp(5)+2)^2+8*log(exp(5)+2)+4)*exp(3-log(x^2))/(x*exp(3-l
og(x^2))^3-3*x*exp(3-log(x^2))^2+3*x*exp(3-log(x^2))-x),x, algorithm=\
```

output
```
(2*x^2*e^3 + (2*x^2*e^3 - e^6)*log(e^5 + 2)^2 + 2*(2*x^2*e^3 - e^6)*log(e^
5 + 2) - e^6)/(x^4 - 2*x^2*e^3 + e^6)
```

3.170.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(20) = 40$.

Time = 0.11 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.42

$$\int \frac{e^3(4 + 8\log(2 + e^5) + 4\log^2(2 + e^5))}{\left(\frac{e^9}{x^5} - \frac{3e^6}{x^3} + \frac{3e^3}{x} - x\right)x^2}\,dx = \frac{(-2x^2 + e^3)\left(-4e^3\log(2 + e^5)^2 - 8e^3\log(2 + e^5) - 4e^3\right)}{4x^4 - 8x^2e^3 + 4e^6}$$

input
```
integrate((4*ln(exp(5)+2)**2+8*ln(exp(5)+2)+4)*exp(3-ln(x**2))/(x*exp(3-ln
(x**2))**3-3*x*exp(3-ln(x**2))**2+3*x*exp(3-ln(x**2))-x),x)
```

output
```
(-2*x**2 + exp(3))*(-4*exp(3)*log(2 + exp(5))**2 - 8*exp(3)*log(2 + exp(5)
) - 4*exp(3))/(4*x**4 - 8*x**2*exp(3) + 4*exp(6))
```

3.170.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.83

$$\int \frac{e^3(4+8\log(2+e^5)+4\log^2(2+e^5))}{\left(\frac{e^9}{x^5}-\frac{3e^6}{x^3}+\frac{3e^3}{x}-x\right)x^2}\,dx = \frac{(2\,x^2-e^3)\left(\log\left(e^5+2\right)^2+2\,\log\left(e^5+2\right)+1\right)e^3}{x^4-2\,x^2e^3+e^6}$$

input
```
integrate((4*log(exp(5)+2)^2+8*log(exp(5)+2)+4)*exp(3-log(x^2))/(x*exp(3-l
og(x^2))^3-3*x*exp(3-log(x^2))^2+3*x*exp(3-log(x^2))-x),x, algorithm=\
```

output
```
(2*x^2 - e^3)*(log(e^5 + 2)^2 + 2*log(e^5 + 2) + 1)*e^3/(x^4 - 2*x^2*e^3 +
 e^6)
```

3.170.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{e^3(4+8\log(2+e^5)+4\log^2(2+e^5))}{\left(\frac{e^9}{x^5}-\frac{3e^6}{x^3}+\frac{3e^3}{x}-x\right)x^2}\,dx = \frac{(2\,x^2-e^3)\left(\log\left(e^5+2\right)^2+2\,\log\left(e^5+2\right)+1\right)e^3}{\left(x^2-e^3\right)^2}$$

input
```
integrate((4*log(exp(5)+2)^2+8*log(exp(5)+2)+4)*exp(3-log(x^2))/(x*exp(3-l
og(x^2))^3-3*x*exp(3-log(x^2))^2+3*x*exp(3-log(x^2))-x),x, algorithm=\
```

output
```
(2*x^2 - e^3)*(log(e^5 + 2)^2 + 2*log(e^5 + 2) + 1)*e^3/(x^2 - e^3)^2
```

3.170.9 Mupad [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

$$\int \frac{e^3 \left(4+8 \log \left(2+e^5\right)+4 \log ^2\left(2+e^5\right)\right)}{\left(\frac{e^9}{x^5}-\frac{3 e^6}{x^3}+\frac{3 e^3}{x}-x\right) x^2} \, dx=\frac{x^4\,\left(2\,\ln \left({\mathrm{e}}^5+2\right)+{\ln \left({\mathrm{e}}^5+2\right)}^2+1\right)}{x^4-2\,{\mathrm{e}}^3\,x^2+{\mathrm{e}}^6}$$

input
```
int(-(exp(3 - log(x^2))*(8*log(exp(5) + 2) + 4*log(exp(5) + 2)^2 + 4))/(x
- 3*x*exp(3 - log(x^2)) + 3*x*exp(6 - 2*log(x^2)) - x*exp(9 - 3*log(x^2)))
,x)
```

output
```
(x^4*(2*log(exp(5) + 2) + log(exp(5) + 2)^2 + 1))/(exp(6) - 2*x^2*exp(3) +
 x^4)
```

3.171 $\int \frac{x-x^3+(-2x+4x^3)\log(x)+2x\log^2(x)+20\log^2(x)\log(\log(2))}{\log^2(x)}\,dx$

3.171.1 Optimal result

Integrand size = 40, antiderivative size = 23

$$\int \frac{x-x^3+(-2x+4x^3)\log(x)+2x\log^2(x)+20\log^2(x)\log(\log(2))}{\log^2(x)}\,dx = \frac{x(-x+x^3)}{\log(x)}+(x+10\log(\log(2)))^2$$

output
```
(x+10*ln(ln(2)))^2+x*(x^3-x)/ln(x)
```

3.171.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{x-x^3+(-2x+4x^3)\log(x)+2x\log^2(x)+20\log^2(x)\log(\log(2))}{\log^2(x)}\,dx = x^2-\frac{x^2}{\log(x)}+\frac{x^4}{\log(x)}+20x\log(\log(2))$$

input
```
Integrate[(x - x^3 + (-2*x + 4*x^3)*Log[x] + 2*x*Log[x]^2 + 20*Log[x]^2*Lo
g[Log[2]])/Log[x]^2,x]
```

output
```
x^2 - x^2/Log[x] + x^4/Log[x] + 20*x*Log[Log[2]]
```

3.171.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.050$, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^3+(4x^3-2x)\log(x)+x+2x\log^2(x)+20\log(\log(2))\log^2(x)}{\log^2(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x(1-x^2)}{\log^2(x)}+\frac{2x(2x^2-1)}{\log(x)}+2(x+10\log(\log(2)))\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{x^4}{\log(x)}-\frac{x^2}{\log(x)}+(x+10\log(\log(2)))^2$$

input
```
Int[(x - x^3 + (-2*x + 4*x^3)*Log[x] + 2*x*Log[x]^2 + 20*Log[x]^2*Log[Log[
2]])/Log[x]^2,x]
```

output
```
-(x^2/Log[x]) + x^4/Log[x] + (x + 10*Log[Log[2]])^2
```

3.171.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.171.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

method	result	size
risch	$20x\ln(\ln(2))+x^2+\frac{x^2(x^2-1)}{\ln(x)}$	24
default	$20x\ln(\ln(2))+x^2+\frac{x^4}{\ln(x)}-\frac{x^2}{\ln(x)}$	28
parts	$20x\ln(\ln(2))+x^2+\frac{x^4}{\ln(x)}-\frac{x^2}{\ln(x)}$	28
norman	$\frac{x^4+x^2\ln(x)-x^2+20x\ln(\ln(2))\ln(x)}{\ln(x)}$	29
parallelrisch	$\frac{x^4+x^2\ln(x)-x^2+20x\ln(\ln(2))\ln(x)}{\ln(x)}$	29

input
```
int((20*ln(x)^2*ln(ln(2))+2*x*ln(x)^2+(4*x^3-2*x)*ln(x)-x^3+x)/ln(x)^2,x,m
ethod=_RETURNVERBOSE)
```

output
```
20*x*ln(ln(2))+x^2+x^2*(x^2-1)/ln(x)
```

3.171.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{x-x^3+(-2x+4x^3)\log(x)+2x\log^2(x)+20\log^2(x)\log(\log(2))}{\log^2(x)}\,dx$$
$$=\frac{x^4+x^2\log(x)+20\,x\log(x)\log(\log(2))-x^2}{\log(x)}$$

input
```
integrate((20*log(x)^2*log(log(2))+2*x*log(x)^2+(4*x^3-2*x)*log(x)-x^3+x)/
log(x)^2,x, algorithm=\
```

output
```
(x^4 + x^2*log(x) + 20*x*log(x)*log(log(2)) - x^2)/log(x)
```

3.171.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{x - x^3 + (-2x + 4x^3)\log(x) + 2x\log^2(x) + 20\log^2(x)\log(\log(2))}{\log^2(x)}\,dx = x^2 + 20x\log(\log(2)) + \frac{x^4 - x^2}{\log(x)}$$

input
```
integrate((20*ln(x)**2*ln(ln(2))+2*x*ln(x)**2+(4*x**3-2*x)*ln(x)-x**3+x)/l
n(x)**2,x)
```

output
```
x**2 + 20*x*log(log(2)) + (x**4 - x**2)/log(x)
```

3.171.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.74

$$\int \frac{x - x^3 + (-2x + 4x^3)\log(x) + 2x\log^2(x) + 20\log^2(x)\log(\log(2))}{\log^2(x)}\,dx = x^2 + 20\,x\log(\log(2)) + 4\,\mathrm{Ei}(4\,\log(x)) - 2\,\mathrm{Ei}(2\,\log(x)) + 2\,\Gamma(-1, -2\,\log(x)) - 4\,\Gamma(-1, -4\,\log(x))$$

input
```
integrate((20*log(x)^2*log(log(2))+2*x*log(x)^2+(4*x^3-2*x)*log(x)-x^3+x)/
log(x)^2,x, algorithm=\
```

output
```
x^2 + 20*x*log(log(2)) + 4*Ei(4*log(x)) - 2*Ei(2*log(x)) + 2*gamma(-1, -2*
log(x)) - 4*gamma(-1, -4*log(x))
```

3.171.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{x-x^3+(-2x+4x^3)\log(x)+2x\log^2(x)+20\log^2(x)\log(\log(2))}{\log^2(x)}\,dx$$
$$=\frac{x^4}{\log(x)}+x^2+20\,x\log(\log(2))-\frac{x^2}{\log(x)}$$

input
```
integrate((20*log(x)^2*log(log(2))+2*x*log(x)^2+(4*x^3-2*x)*log(x)-x^3+x)/
log(x)^2,x, algorithm=\
```

output
```
x^4/log(x) + x^2 + 20*x*log(log(2)) - x^2/log(x)
```

3.171.9 Mupad [B] (verification not implemented)

Time = 12.47 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{x-x^3+(-2x+4x^3)\log(x)+2x\log^2(x)+20\log^2(x)\log(\log(2))}{\log^2(x)}\,dx$$
$$=x\,(x+20\,\ln(\ln(2)))-\frac{x\,(x-x^3)}{\ln(x)}$$

input
```
int((x + 2*x*log(x)^2 + 20*log(log(2))*log(x)^2 - log(x)*(2*x - 4*x^3) - x
^3)/log(x)^2,x)
```

output
```
x*(x + 20*log(log(2))) - (x*(x - x^3))/log(x)
```

3.172 $\int \frac{\log\left(5e^{-2x^3-5x^2\log\left(\log\left(12x^2\right)\right)}\right)\left(-20x-12x^2\log\left(12x^2\right)-20x\log\left(12x^2\right)\log\left(\log\left(12x^2\right)\right)\right)}{\log\left(12x^2\right)}dx$

3.172.1 Optimal result

Integrand size = 63, antiderivative size = 25

$$\int \frac{\log\left(5e^{-2x^3-5x^2\log(\log(12x^2))}\right)\left(-20x-12x^2\log\left(12x^2\right)-20x\log\left(12x^2\right)\log\left(\log\left(12x^2\right)\right)\right)}{\log\left(12x^2\right)}dx = \log^2\left(5e^{-x^2(2x+5\log(\log(12x^2)))}\right)$$

output
```
ln(5/exp(x^2*(2*x+5*ln(ln(12*x^2)))))^2
```

3.172.2 Mathematica [A] (verified)

Time = 0.51 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{\log\left(5e^{-2x^3-5x^2\log(\log(12x^2))}\right)\left(-20x-12x^2\log\left(12x^2\right)-20x\log\left(12x^2\right)\log\left(\log\left(12x^2\right)\right)\right)}{\log\left(12x^2\right)}dx = \log^2\left(5e^{-2x^3}\log^{-5x^2}\left(12x^2\right)\right)$$

input
```
Integrate[(Log[5*E^(-2*x^3 - 5*x^2*Log[Log[12*x^2]])]*(-20*x - 12*x^2*Log[
12*x^2] - 20*x*Log[12*x^2]*Log[Log[12*x^2]]))/Log[12*x^2],x]
```

output
```
Log[5/(E^(2*x^3)*Log[12*x^2]^(5*x^2))]^2
```

3.172.3 Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.016$, Rules used = {7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log\left(5e^{-2x^3-5x^2\log(\log(12x^2))}\right)\left(-12x^2\log\left(12x^2\right)-20x\log\left(12x^2\right)\log\left(\log\left(12x^2\right)\right)-20x\right)}{\log\left(12x^2\right)}dx$$

$$\Big\downarrow \text{7237}$$

$$\log^2\left(5e^{-2x^3}\log^{-5x^2}\left(12x^2\right)\right)$$

input
```
Int[(Log[5*E^(-2*x^3 - 5*x^2*Log[Log[12*x^2]])]*(-20*x - 12*x^2*Log[12*x^2
] - 20*x*Log[12*x^2]*Log[Log[12*x^2]]))/Log[12*x^2],x]
```

output
```
Log[5/(E^(2*x^3)*Log[12*x^2]^(5*x^2))]^2
```

3.172.3.1 Defintions of rubi rules used

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

3.172.4 Maple [A] (verified)

Time = 42.91 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

method	result	size
parallelrisch	$\ln\left(5\,\mathrm{e}^{-x^2(2x+5\ln(\ln(12x^2)))}\right)^2$	26

input
```
int((-20*x*ln(12*x^2)*ln(ln(12*x^2))-12*x^2*ln(12*x^2)-20*x)*ln(5/exp(5*x^
2*ln(ln(12*x^2))+2*x^3))/ln(12*x^2),x,method=_RETURNVERBOSE)
```

output
```
ln(5/exp(x^2*(2*x+5*ln(ln(12*x^2)))))^2
```

3.172.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(24) = 48.

Time = 0.24 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \frac{\log \left(5e^{-2x^3-5x^2\log(\log(12x^2))}\right)\left(-20x-12x^2\log(12x^2)-20x\log(12x^2)\log(\log(12x^2))\right)}{\log(12x^2)}\,dx$$
$$= 4\,x^6+25\,x^4\log\left(\log\left(12\,x^2\right)\right)^2-4\,x^3\log(5)+10\left(2\,x^5-x^2\log(5)\right)\log\left(\log\left(12\,x^2\right)\right)$$

input
```
integrate((-20*x*log(12*x^2)*log(log(12*x^2))-12*x^2*log(12*x^2)-20*x)*log
(5/exp(5*x^2*log(log(12*x^2))+2*x^3))/log(12*x^2),x, algorithm=\
```

output
```
4*x^6 + 25*x^4*log(log(12*x^2))^2 - 4*x^3*log(5) + 10*(2*x^5 - x^2*log(5))
*log(log(12*x^2))
```

3.172.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(22) = 44.

Time = 0.41 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \frac{\log \left(5e^{-2x^3-5x^2\log(\log(12x^2))}\right)\left(-20x-12x^2\log(12x^2)-20x\log(12x^2)\log(\log(12x^2))\right)}{\log(12x^2)}\,dx$$
$$= 4x^6+25x^4\log\left(\log\left(12x^2\right)\right)^2-4x^3\log(5)+\left(20x^5-10x^2\log(5)\right)\log\left(\log\left(12x^2\right)\right)$$

input
```
integrate((-20*x*ln(12*x**2)*ln(ln(12*x**2))-12*x**2*ln(12*x**2)-20*x)*ln(
5/exp(5*x**2*ln(ln(12*x**2))+2*x**3))/ln(12*x**2),x)
```

output
```
4*x**6 + 25*x**4*log(log(12*x**2))**2 - 4*x**3*log(5) + (20*x**5 - 10*x**2
*log(5))*log(log(12*x**2))
```

3.172.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 89 vs. $2(24) = 48$.

Time = 0.32 (sec) , antiderivative size = 89, normalized size of antiderivative = 3.56

$$\int \frac{\log\left(5e^{-2x^3-5x^2\log(\log(12x^2))}\right)\left(-20x-12x^2\log(12x^2)-20x\log(12x^2)\log(\log(12x^2))\right)}{\log(12x^2)}\,dx$$
$$= -4\,x^6 - 20\,x^5\log(\log(3)+2\,\log(2)+2\,\log(x)) - 25\,x^4\log(\log(3)+2\,\log(2)+2\,\log(x))^2 - 2\left(2\,x^3+5\,x^2\log(\log(3)+2\,\log(2)+2\,\log(x))\right)\log\left(5\,e^{\left(-2\,x^3-5\,x^2\log(\log(12\,x^2))\right)}\right)$$

input
```
integrate((-20*x*log(12*x^2)*log(log(12*x^2))-12*x^2*log(12*x^2)-20*x)*log
(5/exp(5*x^2*log(log(12*x^2))+2*x^3))/log(12*x^2),x, algorithm=\
```

output
```
-4*x^6 - 20*x^5*log(log(3) + 2*log(2) + 2*log(x)) - 25*x^4*log(log(3) + 2*
log(2) + 2*log(x))^2 - 2*(2*x^3 + 5*x^2*log(log(3) + 2*log(2) + 2*log(x)))
*log(5*e^(-2*x^3 - 5*x^2*log(log(12*x^2))))
```

3.172.8 Giac [A] (verification not implemented)

Time = 0.61 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.72

$$\int \frac{\log\left(5e^{-2x^3-5x^2\log(\log(12x^2))}\right)\left(-20x-12x^2\log(12x^2)-20x\log(12x^2)\log(\log(12x^2))\right)}{\log(12x^2)}\,dx$$
$$= \left(2\,x^3+5\,x^2\log\left(\log\left(12\,x^2\right)\right)\right)^2 - 2\left(2\,x^3+5\,x^2\log\left(\log\left(12\,x^2\right)\right)\right)\log(5)$$

input
```
integrate((-20*x*log(12*x^2)*log(log(12*x^2))-12*x^2*log(12*x^2)-20*x)*log
(5/exp(5*x^2*log(log(12*x^2))+2*x^3))/log(12*x^2),x, algorithm=\
```

output
```
(2*x^3 + 5*x^2*log(log(12*x^2)))^2 - 2*(2*x^3 + 5*x^2*log(log(12*x^2)))*lo
g(5)
```

3.172.9 Mupad [B] (verification not implemented)

Time = 13.10 (sec) , antiderivative size = 104, normalized size of antiderivative = 4.16

$$\int \frac{\log\left(5e^{-2x^3-5x^2\log(\log(12x^2))}\right)\left(-20x-12x^2\log(12x^2)-20x\log(12x^2)\log(\log(12x^2))\right)}{\log(12x^2)}\,dx$$
$$= 25\,x^4\ln\left(\ln\left(12\,x^2\right)\right)^2+4\,x^6-4\,x^3\left(\ln\left(\frac{5}{\ln\left(12\,x^2\right)^{5\,x^2}}\right)+5\,x^2\,\ln\left(\ln\left(12\,x^2\right)\right)\right)$$
$$+\ln\left(\ln\left(12\,x^2\right)\right)\,\left(20\,x^5-10\,x^2\left(\ln\left(\frac{5}{\ln\left(12\,x^2\right)^{5\,x^2}}\right)+5\,x^2\,\ln\left(\ln\left(12\,x^2\right)\right)\right)\right)$$

input
```
int(-(log(5*exp(- 5*x^2*log(log(12*x^2)) - 2*x^3))*(20*x + 12*x^2*log(12*x
^2) + 20*x*log(log(12*x^2))*log(12*x^2)))/log(12*x^2),x)
```

output
```
25*x^4*log(log(12*x^2))^2 + 4*x^6 - 4*x^3*(log(5/log(12*x^2)^(5*x^2)) + 5*
x^2*log(log(12*x^2))) + log(log(12*x^2))*(20*x^5 - 10*x^2*(log(5/log(12*x^
2)^(5*x^2)) + 5*x^2*log(log(12*x^2))))
```

3.173 $\int \frac{1+3x}{x} \, dx$

3.173.1 Optimal result

Integrand size = 9, antiderivative size = 9

$$\int \frac{1+3x}{x} \, dx = \frac{13}{4} + 3x + \log(x)$$

output
```
3*x+ln(x)+13/4
```

3.173.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.67

$$\int \frac{1+3x}{x} \, dx = 3x + \log(x)$$

input
```
Integrate[(1 + 3*x)/x,x]
```

output
```
3*x + Log[x]
```

3.173.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.67, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x+1}{x} \, dx$$

$$\Big\downarrow \; 49$$

$$\int \left(\frac{1}{x}+3\right) dx$$

$$\Big\downarrow \; 2009$$

$$3x+\log(x)$$

input
```
Int[(1 + 3*x)/x,x]
```

output
```
3*x + Log[x]
```

3.173.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.173.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.78

method	result	size
default	$\ln(x) + 3x$	7
norman	$\ln(x) + 3x$	7
risch	$\ln(x) + 3x$	7
parallelrisch	$\ln(x) + 3x$	7

input
```
int((1+3*x)/x,x,method=_RETURNVERBOSE)
```

output
```
ln(x)+3*x
```

3.173.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.67

$$\int \frac{1+3x}{x}\,dx = 3\,x + \log(x)$$

input
```
integrate((1+3*x)/x,x, algorithm=\
```

output
```
3*x + log(x)
```

3.173.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.56

$$\int \frac{1+3x}{x}\,dx = 3x + \log(x)$$

input
```
integrate((1+3*x)/x,x)
```

output
```
3*x + log(x)
```

3.173.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.67

$$\int \frac{1+3x}{x}\,dx = 3\,x + \log\left(x\right)$$

input
```
integrate((1+3*x)/x,x, algorithm=\
```

output
```
3*x + log(x)
```

3.173.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.78

$$\int \frac{1+3x}{x}\,dx = 3\,x + \log\left(|x|\right)$$

input
```
integrate((1+3*x)/x,x, algorithm=\
```

output
```
3*x + log(abs(x))
```

3.173.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.67

$$\int \frac{1+3x}{x}\,dx = 3\,x + \ln\left(x\right)$$

input
```
int((3*x + 1)/x,x)
```

output
```
3*x + log(x)
```

3.174 $\int e^{-16+e^{-16-4x^2}(-1+x)-4x^2}(-1-8x+8x^2)\,dx$

3.174.1 Optimal result

Integrand size = 33, antiderivative size = 19

$$\int e^{-16+e^{-16-4x^2}(-1+x)-4x^2}(-1-8x+8x^2)\,dx=4-e^{e^{-16-4x^2}(-1+x)}$$

output
```
4-exp((-1+x)/exp(4*x^2+16))
```

3.174.2 Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int e^{-16+e^{-16-4x^2}(-1+x)-4x^2}(-1-8x+8x^2)\,dx=-e^{e^{-16-4x^2}(-1+x)}$$

input
```
Integrate[E^(-16 + E^(-16 - 4*x^2)*(-1 + x) - 4*x^2)*(-1 - 8*x + 8*x^2),x]
```

output
```
-E^(E^(-16 - 4*x^2)*(-1 + x))
```

3.174.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-4x^2+e^{-4x^2-16}(x-1)-16}\left(8x^2-8x-1\right)\,dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(8e^{-4x^2+e^{-4x^2-16}(x-1)-16}x^2-8e^{-4x^2+e^{-4x^2-16}(x-1)-16}x-e^{-4x^2+e^{-4x^2-16}(x-1)-16}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\int e^{-4x^2+e^{-4x^2-16}(x-1)-16}dx-8\int e^{-4x^2+e^{-4x^2-16}(x-1)-16}xdx+8\int e^{-4x^2+e^{-4x^2-16}(x-1)-16}x^2dx$$

input
```
Int[E^(-16 + E^(-16 - 4*x^2)*(-1 + x) - 4*x^2)*(-1 - 8*x + 8*x^2),x]
```

output
```
$Aborted
```

3.174.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.174.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

method	result	size
risch	$-{\rm e}^{(-1+x){\rm e}^{-4x^2-16}}$	16
derivativedivides	$-{\rm e}^{(-1+x){\rm e}^{-4x^2-16}}$	18
default	$-{\rm e}^{(-1+x){\rm e}^{-4x^2-16}}$	18
norman	$-{\rm e}^{(-1+x){\rm e}^{-4x^2-16}}$	18
parallelrisch	$-{\rm e}^{(-1+x){\rm e}^{-4x^2-16}}$	18

input
```
int((8*x^2-8*x-1)*exp((-1+x)/exp(4*x^2+16))/exp(4*x^2+16),x,method=_RETURN
VERBOSE)
```

output
```
-exp((-1+x)*exp(-4*x^2-16))
```

3.174.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int e^{-16+e^{-16-4x^2}(-1+x)-4x^2}\left(-1-8x+8x^2\right)\,dx=-e^{\left((x-1)e^{\left(-4\,x^2-16\right)}\right)}$$

input
```
integrate((8*x^2-8*x-1)*exp((-1+x)/exp(4*x^2+16))/exp(4*x^2+16),x, algorit
hm=\
```

output
```
-e^((x - 1)*e^(-4*x^2 - 16))
```

3.174.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int e^{-16+e^{-16-4x^2}(-1+x)-4x^2}\left(-1-8x+8x^2\right)\,dx=-e^{(x-1)e^{-4x^2-16}}$$

input
```
integrate((8*x**2-8*x-1)*exp((-1+x)/exp(4*x**2+16))/exp(4*x**2+16),x)
```

output
```
-exp((x - 1)*exp(-4*x**2 - 16))
```

3.174.7 Maxima [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int e^{-16+e^{-16-4x^2}(-1+x)-4x^2}\left(-1-8x+8x^2\right)\,dx=-e^{\left(xe^{\left(-4\,x^2-16\right)}-e^{\left(-4\,x^2-16\right)}\right)}$$

input
```
integrate((8*x^2-8*x-1)*exp((-1+x)/exp(4*x^2+16))/exp(4*x^2+16),x, algorit
hm=\
```

output
```
-e^(x*e^(-4*x^2 - 16) - e^(-4*x^2 - 16))
```

3.174.8 Giac [F]

$$\int e^{-16+e^{-16-4x^2}(-1+x)-4x^2}\left(-1-8x+8x^2\right)\,dx$$
$$=\int\left(8\,x^2-8\,x-1\right)e^{\left(-4\,x^2+(x-1)e^{\left(-4\,x^2-16\right)}-16\right)}\,dx$$

input
```
integrate((8*x^2-8*x-1)*exp((-1+x)/exp(4*x^2+16))/exp(4*x^2+16),x, algorit
hm=\
```

output
```
integrate((8*x^2 - 8*x - 1)*e^(-4*x^2 + (x - 1)*e^(-4*x^2 - 16) - 16), x)
```

3.174.9 Mupad [B] (verification not implemented)

Time = 12.46 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int e^{-16+e^{-16-4x^2}(-1+x)-4x^2}\left(-1-8x+8x^2\right)\,dx=-\mathrm{e}^{x\,\mathrm{e}^{-16}\,\mathrm{e}^{-4\,x^2}}\,\mathrm{e}^{-\mathrm{e}^{-16}\,\mathrm{e}^{-4\,x^2}}$$

input
```
int(-exp(exp(- 4*x^2 - 16)*(x - 1))*exp(- 4*x^2 - 16)*(8*x - 8*x^2 + 1),x)
```

output
```
-exp(x*exp(-16)*exp(-4*x^2))*exp(-exp(-16)*exp(-4*x^2))
```

3.175 $\int \frac{1+2x^3+3x^3\log(x)}{x^4+(x+x^4)\log(x)+x\log^2(x)}\,dx$

3.175.1 Optimal result

Integrand size = 35, antiderivative size = 17

$$\int \frac{1+2x^3+3x^3\log(x)}{x^4+(x+x^4)\log(x)+x\log^2(x)}\,dx = -\log(3(1+\log(x)))+\log\left(x^3+\log(x)\right)$$

output
```
ln(ln(x)+x^3)-ln(3*ln(x)+3)
```

3.175.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{1+2x^3+3x^3\log(x)}{x^4+(x+x^4)\log(x)+x\log^2(x)}\,dx = -\log(1+\log(x))+\log\left(x^3+\log(x)\right)$$

input
```
Integrate[(1 + 2*x^3 + 3*x^3*Log[x])/(x^4 + (x + x^4)*Log[x] + x*Log[x]^2)
,x]
```

output
```
-Log[1 + Log[x]] + Log[x^3 + Log[x]]
```

3.175.3 Rubi [A] (verified)

Time = 0.53 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.086, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3+3x^3\log(x)+1}{x^4+(x^4+x)\log(x)+x\log^2(x)}\,dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{2x^3+3x^3\log(x)+1}{x(\log(x)+1)\left(x^3+\log(x)\right)}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{3x^3+1}{x\left(x^3+\log(x)\right)}-\frac{1}{x(\log(x)+1)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\log\left(x^3+\log(x)\right)-\log(\log(x)+1)$$

input
```
Int[(1 + 2*x^3 + 3*x^3*Log[x])/(x^4 + (x + x^4)*Log[x] + x*Log[x]^2),x]
```

output
```
-Log[1 + Log[x]] + Log[x^3 + Log[x]]
```

3.175.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.175.4 Maple [A] (verified)

Time = 1.05 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

method	result	size
default	$-\ln(\ln(x)+1)+\ln(\ln(x)+x^3)$	16
norman	$-\ln(\ln(x)+1)+\ln(\ln(x)+x^3)$	16
risch	$-\ln(\ln(x)+1)+\ln(\ln(x)+x^3)$	16
parallelrisch	$-\ln(\ln(x)+1)+\ln(\ln(x)+x^3)$	16

input
```
int((3*x^3*ln(x)+2*x^3+1)/(x*ln(x)^2+(x^4+x)*ln(x)+x^4),x,method=_RETURNVE
RBOSE)
```

output
```
-ln(ln(x)+1)+ln(ln(x)+x^3)
```

3.175.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{1+2x^3+3x^3\log(x)}{x^4+(x+x^4)\log(x)+x\log^2(x)}\,dx = \log\left(x^3+\log(x)\right)-\log(\log(x)+1)$$

input
```
integrate((3*x^3*log(x)+2*x^3+1)/(x*log(x)^2+(x^4+x)*log(x)+x^4),x, algori
thm=\
```

output
```
log(x^3 + log(x)) - log(log(x) + 1)
```

3.175.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{1+2x^3+3x^3\log(x)}{x^4+(x+x^4)\log(x)+x\log^2(x)}\,dx = \log\left(x^3+\log(x)\right)-\log(\log(x)+1)$$

input
```
integrate((3*x**3*ln(x)+2*x**3+1)/(x*ln(x)**2+(x**4+x)*ln(x)+x**4),x)
```

output
```
log(x**3 + log(x)) - log(log(x) + 1)
```

3.175.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{1+2x^3+3x^3\log(x)}{x^4+(x+x^4)\log(x)+x\log^2(x)}\,dx = \log\left(x^3+\log\left(x\right)\right)-\log\left(\log\left(x\right)+1\right)$$

input
```
integrate((3*x^3*log(x)+2*x^3+1)/(x*log(x)^2+(x^4+x)*log(x)+x^4),x, algori
thm=\
```

output
```
log(x^3 + log(x)) - log(log(x) + 1)
```

3.175.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{1+2x^3+3x^3\log(x)}{x^4+(x+x^4)\log(x)+x\log^2(x)}\,dx = \log\left(x^3+\log\left(x\right)\right)-\log\left(\log\left(x\right)+1\right)$$

input
```
integrate((3*x^3*log(x)+2*x^3+1)/(x*log(x)^2+(x^4+x)*log(x)+x^4),x, algori
thm=\
```

output
```
log(x^3 + log(x)) - log(log(x) + 1)
```

3.175.9 Mupad [B] (verification not implemented)

Time = 12.60 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{1+2x^3+3x^3\log(x)}{x^4+(x+x^4)\log(x)+x\log^2(x)}\,dx = \ln\left(\ln\left(x\right)+x^3\right)-\ln\left(\ln\left(x\right)+1\right)$$

input
```
int((3*x^3*log(x) + 2*x^3 + 1)/(x*log(x)^2 + x^4 + log(x)*(x + x^4)),x)
```

output
```
log(log(x) + x^3) - log(log(x) + 1)
```

3.176 $\int \frac{6+4^{4x+x^2}(-48-24x)\log(4)}{484+4^{1+8x+2x^2}+4^{4x+x^2}(88-4x)-44x+x^2}\,dx$

3.176.1 Optimal result

Integrand size = 57, antiderivative size = 18

$$\int \frac{6+4^{4x+x^2}(-48-24x)\log(4)}{484+4^{1+8x+2x^2}+4^{4x+x^2}(88-4x)-44x+x^2}\,dx=\frac{3}{11+4^{x(4+x)}-\frac{x}{2}}$$

output
```
3/(11+exp(2*x*(4+x)*ln(2))-1/2*x)
```

3.176.2 Mathematica [A] (verified)

Time = 0.49 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{6+4^{4x+x^2}(-48-24x)\log(4)}{484+4^{1+8x+2x^2}+4^{4x+x^2}(88-4x)-44x+x^2}\,dx=\frac{6}{22+2^{1+8x+2x^2}-x}$$

input
```
Integrate[(6 + 4^(4*x + x^2)*(-48 - 24*x)*Log[4])/(484 + 4^(1 + 8*x + 2*x^
2) + 4^(4*x + x^2)*(88 - 4*x) - 44*x + x^2),x]
```

output
```
6/(22 + 2^(1 + 8*x + 2*x^2) - x)
```

3.176.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4^{x^2+4x}(-24x-48)\log(4)+6}{x^2+4^{2x^2+8x+1}+4^{x^2+4x}(88-4x)-44x+484}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{4^{x^2+4x}(-24x-48)\log(4)+6}{\left(2^{2x^2+8x+1}-x+22\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{12(x+2)\log(4)}{2^{2x^2+8x+1}-x+22}-\frac{6\left(2x^2\log(4)-40x\log(4)-1-88\log(4)\right)}{\left(2^{2x^2+8x+1}-x+22\right)^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$6(1+88\log(4))\int \frac{1}{\left(-x+2^{2x^2+8x+1}+22\right)^2}dx-24\log(4)\int \frac{1}{-x+2^{2x^2+8x+1}+22}dx+240\log(4)\int \frac{x}{\left(-x+2^{2x^2+8x+1}+22\right)^2}dx-12\log(4)\int \frac{x}{-x+2^{2x^2+8x+1}+22}dx-12\log(4)\int \frac{x^2}{\left(-x+2^{2x^2+8x+1}+22\right)^2}dx$$

input
```
Int[(6 + 4^(4*x + x^2)*(-48 - 24*x)*Log[4])/(484 + 4^(1 + 8*x + 2*x^2) + 4
^(4*x + x^2)*(88 - 4*x) - 44*x + x^2),x]
```

output
```
$Aborted
```

3.176.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.176.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

method	result	size
risch	$-\frac{6}{x-2\,4^{(4+x)x}-22}$	17
parallelrisch	$-\frac{6}{x-2\,\mathrm{e}^{2x(4+x)\ln(2)}-22}$	19
norman	$-\frac{6}{x-2\,\mathrm{e}^{2\left(x^2+4x\right)\ln(2)}-22}$	22

input
```
int((2*(-24*x-48)*ln(2)*exp(2*(x^2+4*x)*ln(2))+6)/(4*exp(2*(x^2+4*x)*ln(2)
)^2+(-4*x+88)*exp(2*(x^2+4*x)*ln(2))+x^2-44*x+484),x,method=_RETURNVERBOSE
)
```

output
```
-6/(x-2*4^((4+x)*x)-22)
```

3.176.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{6+4^{4x+x^2}(-48-24x)\log(4)}{484+4^{1+8x+2x^2}+4^{4x+x^2}(88-4x)-44x+x^2}\,dx = \frac{6}{2\cdot 2^{2\,x^2+8\,x}-x+22}$$

input
```
integrate((2*(-24*x-48)*log(2)*exp(2*(x^2+4*x)*log(2))+6)/(4*exp(2*(x^2+4*
x)*log(2))^2+(-4*x+88)*exp(2*(x^2+4*x)*log(2))+x^2-44*x+484),x, algorithm=
\
```

output
```
6/(2*2^(2*x^2 + 8*x) - x + 22)
```

3.176.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{6+4^{4x+x^2}(-48-24x)\log(4)}{484+4^{1+8x+2x^2}+4^{4x+x^2}(88-4x)-44x+x^2}\,dx = \frac{3}{-\frac{x}{2}+e^{(2x^2+8x)\log(2)}+11}$$

input
```
integrate((2*(-24*x-48)*ln(2)*exp(2*(x**2+4*x)*ln(2))+6)/(4*exp(2*(x**2+4*
x)*ln(2))**2+(-4*x+88)*exp(2*(x**2+4*x)*ln(2))+x**2-44*x+484),x)
```

output
```
3/(-x/2 + exp((2*x**2 + 8*x)*log(2)) + 11)
```

3.176.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

$$\int \frac{6+4^{4x+x^2}(-48-24x)\log(4)}{484+4^{1+8x+2x^2}+4^{4x+x^2}(88-4x)-44x+x^2}\,dx=-\frac{6}{x-2\,e^{(2\,x^2\log(2)+8\,x\log(2))}-22}$$

input
```
integrate((2*(-24*x-48)*log(2)*exp(2*(x^2+4*x)*log(2))+6)/(4*exp(2*(x^2+4*
x)*log(2))^2+(-4*x+88)*exp(2*(x^2+4*x)*log(2))+x^2-44*x+484),x, algorithm=
\
```

output
```
-6/(x - 2*e^(2*x^2*log(2) + 8*x*log(2)) - 22)
```

3.176.8 Giac [F]

$$\int \frac{6+4^{4x+x^2}(-48-24x)\log(4)}{484+4^{1+8x+2x^2}+4^{4x+x^2}(88-4x)-44x+x^2}\,dx$$
$$=\int \frac{6\left(8\cdot 2^{2\,x^2+8\,x}(x+2)\log(2)-1\right)}{4\cdot 2^{2\,x^2+8\,x}(x-22)-x^2-4\cdot 2^{4\,x^2+16\,x}+44\,x-484}\,dx$$

input
```
integrate((2*(-24*x-48)*log(2)*exp(2*(x^2+4*x)*log(2))+6)/(4*exp(2*(x^2+4*
x)*log(2))^2+(-4*x+88)*exp(2*(x^2+4*x)*log(2))+x^2-44*x+484),x, algorithm=
\
```

output
```
integrate(6*(8*2^(2*x^2 + 8*x)*(x + 2)*log(2) - 1)/(4*2^(2*x^2 + 8*x)*(x -
 22) - x^2 - 4*2^(4*x^2 + 16*x) + 44*x - 484), x)
```

3.176.9 Mupad [F(-1)]

Timed out.

$$\int \frac{6 + 4^{4x+x^2}(-48 - 24x)\log(4)}{484 + 4^{1+8x+2x^2} + 4^{4x+x^2}(88 - 4x) - 44x + x^2}\,dx$$
$$= \int -\frac{2\,e^{2\ln(2)\,(x^2+4\,x)}\,\ln(2)\,(24\,x + 48) - 6}{4\,e^{4\ln(2)\,(x^2+4\,x)} - 44\,x - e^{2\ln(2)\,(x^2+4\,x)}\,(4\,x - 88) + x^2 + 484}\,dx$$

input
```
int(-(2*exp(2*log(2)*(4*x + x^2))*log(2)*(24*x + 48) - 6)/(4*exp(4*log(2)*
(4*x + x^2)) - 44*x - exp(2*log(2)*(4*x + x^2))*(4*x - 88) + x^2 + 484),x)
```

output
```
int(-(2*exp(2*log(2)*(4*x + x^2))*log(2)*(24*x + 48) - 6)/(4*exp(4*log(2)*
(4*x + x^2)) - 44*x - exp(2*log(2)*(4*x + x^2))*(4*x - 88) + x^2 + 484), x
)
```

3.177 $\int \frac{e^{-2+\frac{16}{x^2\log^2(x)}}(-32-32\log(x))}{x^3\log^3(x)}\,dx$

3.177.1 Optimal result

Integrand size = 27, antiderivative size = 13

$$\int \frac{e^{-2+\frac{16}{x^2\log^2(x)}}(-32-32\log(x))}{x^3\log^3(x)}\,dx = e^{-2+\frac{16}{x^2\log^2(x)}}$$

output
```
exp(8/x^2/ln(x)^2)^2/exp(1)^2
```

3.177.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int \frac{e^{-2+\frac{16}{x^2\log^2(x)}}(-32-32\log(x))}{x^3\log^3(x)}\,dx = e^{-2+\frac{16}{x^2\log^2(x)}}$$

input
```
Integrate[(E^(-2 + 16/(x^2*Log[x]^2))*(-32 - 32*Log[x]))/(x^3*Log[x]^3),x]
```

output
```
E^(-2 + 16/(x^2*Log[x]^2))
```

3.177.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.037, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{16}{x^2\log^2(x)}-2}(-32\log(x)-32)}{x^3\log^3(x)}\,dx$$

$$\Big\downarrow \; 7257$$

$$e^{\frac{16}{x^2\log^2(x)}-2}$$

input
```
Int[(E^(-2 + 16/(x^2*Log[x]^2))*(-32 - 32*Log[x]))/(x^3*Log[x]^3),x]
```

output
```
E^(-2 + 16/(x^2*Log[x]^2))
```

3.177.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.177.4 Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.62

method	result	size
risch	$\mathrm{e}^{-\frac{2\left(x^2\ln(x)^2-8\right)}{\ln(x)^2x^2}}$	21

input
```
int((-32*ln(x)-32)*exp(8/x^2/ln(x)^2)^2/x^3/exp(1)^2/ln(x)^3,x,method=_RET
URNVERBOSE)
```

output
```
exp(-2*(x^2*ln(x)^2-8)/ln(x)^2/x^2)
```

3.177.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.54

$$\int \frac{e^{-2+\frac{16}{x^2\log^2(x)}}(-32-32\log(x))}{x^3\log^3(x)}\,dx = e^{\left(-\frac{2\left(x^2\log(x)^2-8\right)}{x^2\log(x)^2}\right)}$$

input
```
integrate((-32*log(x)-32)*exp(8/x^2/log(x)^2)^2/x^3/exp(1)^2/log(x)^3,x, a
lgorithm=\
```

output
```
e^(-2*(x^2*log(x)^2 - 8)/(x^2*log(x)^2))
```

3.177.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.08

$$\int \frac{e^{-2+\frac{16}{x^2\log^2(x)}}(-32-32\log(x))}{x^3\log^3(x)}\,dx = \frac{e^{\frac{16}{x^2\log(x)^2}}}{e^2}$$

input
```
integrate((-32*ln(x)-32)*exp(8/x**2/ln(x)**2)**2/x**3/exp(1)**2/ln(x)**3,x
)
```

output
```
exp(-2)*exp(16/(x**2*log(x)**2))
```

3.177.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{e^{-2+\frac{16}{x^2\log^2(x)}}(-32-32\log(x))}{x^3\log^3(x)}\,dx = e^{\left(\frac{16}{x^2\log(x)^2}-2\right)}$$

input
```
integrate((-32*log(x)-32)*exp(8/x^2/log(x)^2)^2/x^3/exp(1)^2/log(x)^3,x, a
lgorithm=\
```

output
```
e^(16/(x^2*log(x)^2) - 2)
```

3.177.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{e^{-2+\frac{16}{x^2\log^2(x)}}(-32-32\log(x))}{x^3\log^3(x)}\,dx = e^{\left(\frac{16}{x^2\log(x)^2}-2\right)}$$

input
```
integrate((-32*log(x)-32)*exp(8/x^2/log(x)^2)^2/x^3/exp(1)^2/log(x)^3,x, a
lgorithm=\
```

output
```
e^(16/(x^2*log(x)^2) - 2)
```

3.177.9 Mupad [B] (verification not implemented)

Time = 12.65 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int \frac{e^{-2+\frac{16}{x^2\log^2(x)}}(-32-32\log(x))}{x^3\log^3(x)}\,dx = \mathrm{e}^{-2}\,\mathrm{e}^{\frac{16}{x^2\ln(x)^2}}$$

input
```
int(-(exp(-2)*exp(16/(x^2*log(x)^2))*(32*log(x) + 32))/(x^3*log(x)^3),x)
```

output
```
exp(-2)*exp(16/(x^2*log(x)^2))
```

3.178 $\int \frac{30x^2-20x^5-3x^6+e^x(3x^2-3x^3-2x^5-x^6)+(48x-8x^4)\log(2)+9\log^2(2)}{x^4}$

3.178.1 Optimal result

Integrand size = 63, antiderivative size = 36

$$\int \frac{30x^2-20x^5-3x^6+e^x(3x^2-3x^3-2x^5-x^6)+(48x-8x^4)\log(2)+9\log^2(2)}{x^4}\,dx = \left(\frac{3}{x}+x^2\right)\left(6-e^x-x-\left(-5+\frac{x-\log(2)}{x}\right)^2\right)$$

output
```
(6-x-exp(x)-((x-ln(2))/x-5)^2)*(x^2+3/x)
```

3.178.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.28

$$\int \frac{30x^2-20x^5-3x^6+e^x(3x^2-3x^3-2x^5-x^6)+(48x-8x^4)\log(2)+9\log^2(2)}{x^4}\,dx = -\frac{3(10+e^x)\,x^2+(10+e^x)\,x^5+x^6+24x\log(2)+8x^4\log(2)+3\log^2(2)}{x^3}$$

input
```
Integrate[(30*x^2 - 20*x^5 - 3*x^6 + E^x*(3*x^2 - 3*x^3 - 2*x^5 - x^6) + (
48*x - 8*x^4)*Log[2] + 9*Log[2]^2)/x^4,x]
```

output
```
-((3*(10 + E^x)*x^2 + (10 + E^x)*x^5 + x^6 + 24*x*Log[2] + 8*x^4*Log[2] +
3*Log[2]^2)/x^3)
```

3.178.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.47, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.032, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^6-20x^5+\left(48x-8x^4\right)\log(2)+30x^2+e^x\left(-x^6-2x^5-3x^3+3x^2\right)+9\log^2(2)}{x^4}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{-3x^6-20x^5-8x^4\log(2)+30x^2+48x\log(2)+9\log^2(2)}{x^4}-\frac{e^x\left(x^4+2x^3+3x-3\right)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-x^3-\frac{3\log^2(2)}{x^3}-e^xx^2-10x^2-\frac{24\log(2)}{x^2}-\frac{3e^x}{x}-\frac{30}{x}-8x\log(2)$$

input
```
Int[(30*x^2 - 20*x^5 - 3*x^6 + E^x*(3*x^2 - 3*x^3 - 2*x^5 - x^6) + (48*x -
 8*x^4)*Log[2] + 9*Log[2]^2)/x^4,x]
```

output
```
-30/x - (3*E^x)/x - 10*x^2 - E^x*x^2 - x^3 - (24*Log[2])/x^2 - 8*x*Log[2]
- (3*Log[2]^2)/x^3
```

3.178.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.178.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.39

method	result	size
risch	$-x^{3}-8x\ln\left(2\right)-10x^{2}+\frac{-3\ln\left(2\right)^{2}-24x\ln\left(2\right)-30x^{2}}{x^{3}}-\frac{\left(x^{3}+3\right){\mathrm e}^{x}}{x}$	50
parallelrisch	$-\frac{x^{5}{\mathrm e}^{x}+x^{6}+8x^{4}\ln\left(2\right)+10x^{5}+3\,{\mathrm e}^{x}x^{2}+3\ln\left(2\right)^{2}+24x\ln\left(2\right)+30x^{2}}{x^{3}}$	51
default	$-10x^{2}-\frac{30}{x}-x^{3}-\frac{24\ln\left(2\right)}{x^{2}}-\frac{3\,{\mathrm e}^{x}}{x}-{\mathrm e}^{x}x^{2}-\frac{3\ln\left(2\right)^{2}}{x^{3}}-8x\ln\left(2\right)$	52
parts	$-10x^{2}-\frac{30}{x}-x^{3}-\frac{24\ln\left(2\right)}{x^{2}}-\frac{3\,{\mathrm e}^{x}}{x}-{\mathrm e}^{x}x^{2}-\frac{3\ln\left(2\right)^{2}}{x^{3}}-8x\ln\left(2\right)$	52
norman	$\frac{-30x^{2}-10x^{5}-x^{6}-3\ln\left(2\right)^{2}-24x\ln\left(2\right)-8x^{4}\ln\left(2\right)-x^{5}{\mathrm e}^{x}-3\,{\mathrm e}^{x}x^{2}}{x^{3}}$	53

input
```
int(((-x^6-2*x^5-3*x^3+3*x^2)*exp(x)+9*ln(2)^2+(-8*x^4+48*x)*ln(2)-3*x^6-2
0*x^5+30*x^2)/x^4,x,method=_RETURNVERBOSE)
```

output
```
-x^3-8*x*ln(2)-10*x^2+(-3*ln(2)^2-24*x*ln(2)-30*x^2)/x^3-(x^3+3)/x*exp(x)
```

3.178.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.33

$$\int \frac{30x^2-20x^5-3x^6+e^x(3x^2-3x^3-2x^5-x^6)+(48x-8x^4)\log(2)+9\log^2(2)}{x^4}\,dx$$
$$=-\frac{x^{6}+10\,x^{5}+30\,x^{2}+(x^{5}+3\,x^{2})e^{x}+8\,(x^{4}+3\,x)\log\left(2\right)+3\,\log\left(2\right)^{2}}{x^{3}}$$

input
```
integrate(((-x^6-2*x^5-3*x^3+3*x^2)*exp(x)+9*log(2)^2+(-8*x^4+48*x)*log(2)
-3*x^6-20*x^5+30*x^2)/x^4,x, algorithm=\
```

output
```
-(x^6 + 10*x^5 + 30*x^2 + (x^5 + 3*x^2)*e^x + 8*(x^4 + 3*x)*log(2) + 3*log
(2)^2)/x^3
```

3.178.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(22) = 44$.

Time = 0.10 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.33

$$\int \frac{30x^2 - 20x^5 - 3x^6 + e^x(3x^2 - 3x^3 - 2x^5 - x^6) + (48x - 8x^4)\log(2) + 9\log^2(2)}{x^4}\,dx$$
$$= -x^3 - 10x^2 - 8x\log(2) + \frac{(-x^3 - 3)\,e^x}{x} - \frac{30x^2 + 24x\log(2) + 3\log(2)^2}{x^3}$$

input
```
integrate((((-x**6-2*x**5-3*x**3+3*x**2)*exp(x)+9*ln(2)**2+(-8*x**4+48*x)*l
n(2)-3*x**6-20*x**5+30*x**2)/x**4,x)
```

output
```
-x**3 - 10*x**2 - 8*x*log(2) + (-x**3 - 3)*exp(x)/x - (30*x**2 + 24*x*log(
2) + 3*log(2)**2)/x**3
```

3.178.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.86

$$\int \frac{30x^2 - 20x^5 - 3x^6 + e^x(3x^2 - 3x^3 - 2x^5 - x^6) + (48x - 8x^4)\log(2) + 9\log^2(2)}{x^4}\,dx$$
$$= -x^3 - 10\,x^2 - (x^2 - 2\,x + 2)e^x - 2\,(x - 1)e^x - 8\,x\log(2)$$
$$- \frac{30}{x} - \frac{24\,\log(2)}{x^2} - \frac{3\,\log(2)^2}{x^3} - 3\,\mathrm{Ei}(x) + 3\,\Gamma(-1, -x)$$

input
```
integrate((((-x^6-2*x^5-3*x^3+3*x^2)*exp(x)+9*log(2)^2+(-8*x^4+48*x)*log(2)
-3*x^6-20*x^5+30*x^2)/x^4,x, algorithm=\
```

output
```
-x^3 - 10*x^2 - (x^2 - 2*x + 2)*e^x - 2*(x - 1)*e^x - 8*x*log(2) - 30/x -
24*log(2)/x^2 - 3*log(2)^2/x^3 - 3*Ei(x) + 3*gamma(-1, -x)
```

3.178.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.39

$$\int \frac{30x^2-20x^5-3x^6+e^x(3x^2-3x^3-2x^5-x^6)+(48x-8x^4)\log(2)+9\log^2(2)}{x^4}\,dx$$
$$= -\frac{x^6+x^5e^x+10\,x^5+8\,x^4\log(2)+3\,x^2e^x+30\,x^2+24\,x\log(2)+3\,\log(2)^2}{x^3}$$

input
```
integrate((((-x^6-2*x^5-3*x^3+3*x^2)*exp(x)+9*log(2)^2+(-8*x^4+48*x)*log(2)
-3*x^6-20*x^5+30*x^2)/x^4,x, algorithm=\
```

output
```
-(x^6 + x^5*e^x + 10*x^5 + 8*x^4*log(2) + 3*x^2*e^x + 30*x^2 + 24*x*log(2)
 + 3*log(2)^2)/x^3
```

3.178.9 Mupad [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.31

$$\int \frac{30x^2-20x^5-3x^6+e^x(3x^2-3x^3-2x^5-x^6)+(48x-8x^4)\log(2)+9\log^2(2)}{x^4}\,dx$$
$$= -x\,\ln(256)-x^2\,(\mathrm{e}^x+10)-x^3-\frac{24\,x\,\ln(2)+3\ln(2)^2+x^2\,(3\,\mathrm{e}^x+30)}{x^3}$$

input
```
int(-(exp(x)*(3*x^3 - 3*x^2 + 2*x^5 + x^6) - log(2)*(48*x - 8*x^4) - 9*log
(2)^2 - 30*x^2 + 20*x^5 + 3*x^6)/x^4,x)
```

output
```
- x*log(256) - x^2*(exp(x) + 10) - x^3 - (24*x*log(2) + 3*log(2)^2 + x^2*(
3*exp(x) + 30))/x^3
```

3.179 $\int \frac{-6x+2x\log(3)}{e^4+e^{e^5}}\,dx$

3.179.1 Optimal result

Integrand size = 21, antiderivative size = 25

$$\int \frac{-6x+2x\log(3)}{e^4+e^{e^5}}\,dx=\frac{\left(-\frac{1}{e^3}+x^2\right)(-3+\log(3))}{e^4+e^{e^5}}$$

output
```
(x^2-exp(-3))*(ln(3)-3)/(exp(exp(5))+exp(4))
```

3.179.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{-6x+2x\log(3)}{e^4+e^{e^5}}\,dx=\frac{x^2(-3+\log(3))}{e^4+e^{e^5}}$$

input
```
Integrate[(-6*x + 2*x*Log[3])/(E^4 + E^E^5),x]
```

output
```
(x^2*(-3 + Log[3]))/(E^4 + E^E^5)
```

3.179.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {6, 15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x\log(3)-6x}{e^4+e^{e^5}}\,dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{x(2\log(3)-6)}{e^4+e^{e^5}}dx$$

$$\Big\downarrow \; 15$$

$$-\frac{x^2(3-\log(3))}{e^4+e^{e^5}}$$

input
```
Int[(-6*x + 2*x*Log[3])/(E^4 + E^E^5),x]
```

output
```
-((x^2*(3 - Log[3]))/(E^4 + E^E^5))
```

3.179.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.179.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

method	result	size
gosper	$\frac{x^2(\ln(3)-3)}{e^{e^5}+e^4}$	17
default	$\frac{x^2(\ln(3)-3)}{e^{e^5}+e^4}$	17
norman	$\frac{x^2(\ln(3)-3)}{e^{e^5}+e^4}$	17
parallelrisch	$\frac{x^2\ln(3)-3x^2}{e^{e^5}+e^4}$	22
risch	$\frac{x^2\ln(3)}{e^{e^5}+e^4}-\frac{3x^2}{e^{e^5}+e^4}$	29

input
```
int((2*x*ln(3)-6*x)/(exp(exp(5))+exp(4)),x,method=_RETURNVERBOSE)
```

output
```
x^2*(ln(3)-3)/(exp(exp(5))+exp(4))
```

3.179.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{-6x+2x\log(3)}{e^4+e^{e^5}}\,dx = \frac{x^2\log(3)-3\,x^2}{e^4+e^{(e^5)}}$$

input
```
integrate((2*x*log(3)-6*x)/(exp(exp(5))+exp(4)),x, algorithm=\
```

output
```
(x^2*log(3) - 3*x^2)/(e^4 + e^(e^5))
```

3.179.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{-6x+2x\log(3)}{e^4+e^{e^5}}\,dx = \frac{x^2(-3+\log(3))}{e^4+e^{e^5}}$$

input
```
integrate((2*x*ln(3)-6*x)/(exp(exp(5))+exp(4)),x)
```

output
```
x**2*(-3 + log(3))/(exp(4) + exp(exp(5)))
```

3.179.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{-6x+2x\log(3)}{e^4+e^{e^5}}\,dx = \frac{x^2\log(3)-3\,x^2}{e^4+e^{(e^5)}}$$

input
```
integrate((2*x*log(3)-6*x)/(exp(exp(5))+exp(4)),x, algorithm=\
```

output
```
(x^2*log(3) - 3*x^2)/(e^4 + e^(e^5))
```

3.179.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{-6x+2x\log(3)}{e^4+e^{e^5}}\,dx = \frac{x^2\log(3)-3\,x^2}{e^4+e^{(e^5)}}$$

input
```
integrate((2*x*log(3)-6*x)/(exp(exp(5))+exp(4)),x, algorithm=\
```

output
```
(x^2*log(3) - 3*x^2)/(e^4 + e^(e^5))
```

3.179.9 Mupad [B] (verification not implemented)

Time = 12.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.64

$$\int \frac{-6x+2x\log(3)}{e^4+e^{e^5}}\,dx = \frac{x^2\,(\ln(3)-3)}{\mathrm{e}^4+\mathrm{e}^{\mathrm{e}^5}}$$

input
```
int(-(6*x - 2*x*log(3))/(exp(4) + exp(exp(5))),x)
```

output
```
(x^2*(log(3) - 3))/(exp(4) + exp(exp(5)))
```

3.180 $\int e^{x^2} x \, dx$

3.180.1 Optimal result

Integrand size = 7, antiderivative size = 16

$$\int e^{x^2} x \, dx = \frac{e^{x^2}}{2} - \log(-1+e)$$

output
```
1/2*exp(x^2)-ln(exp(1)-1)
```

3.180.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.56

$$\int e^{x^2} x \, dx = \frac{e^{x^2}}{2}$$

input
```
Integrate[E^x^2*x,x]
```

output
```
E^x^2/2
```

3.180.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.56, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2638}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{x^2} x \, dx$$

$$\Big\downarrow \text{2638}$$

$$\frac{e^{x^2}}{2}$$

input
```
Int[E^x^2*x,x]
```

output
```
E^x^2/2
```

3.180.3.1 Defintions of rubi rules used

rule 2638
```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^(n_))*((e_.) + (f_.)*(x_))^(m_
.), x_Symbol] :> Simp[(e + f*x)^n*(F^(a + b*(c + d*x)^n)/(b*f*n*(c + d*x)^n
*Log[F])), x] /; FreeQ[{F, a, b, c, d, e, f, n}, x] && EqQ[m, n - 1] && EqQ
[d*e - c*f, 0]
```

3.180.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.44

method	result	size
gosper	$\frac{e^{x^2}}{2}$	7
derivativedivides	$\frac{e^{x^2}}{2}$	7
default	$\frac{e^{x^2}}{2}$	7
norman	$\frac{e^{x^2}}{2}$	7
risch	$\frac{e^{x^2}}{2}$	7
parallelrisch	$\frac{e^{x^2}}{2}$	7
meijerg	$-\frac{1}{2}+\frac{e^{x^2}}{2}$	9
parts	$\frac{x\sqrt{\pi}\,\mathrm{erfi}(x)}{2}-\frac{\sqrt{\pi}\left(\mathrm{erfi}(x)x-\frac{e^{x^2}}{\sqrt{\pi}}\right)}{2}$	29

input
```
int(exp(x^2)*x,x,method=_RETURNVERBOSE)
```

output
```
1/2*exp(x^2)
```

3.180.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.38

$$\int e^{x^2}x\,dx=\frac{1}{2}\,e^{\left(x^2\right)}$$

input
```
integrate(exp(x^2)*x,x, algorithm=\
```

output
```
1/2*e^(x^2)
```

3.180.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.31

$$\int e^{x^2} x\,dx = \frac{e^{x^2}}{2}$$

input
```
integrate(exp(x**2)*x,x)
```

output
```
exp(x**2)/2
```

3.180.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.38

$$\int e^{x^2} x\,dx = \frac{1}{2}\,e^{\left(x^2\right)}$$

input
```
integrate(exp(x^2)*x,x, algorithm=\
```

output
```
1/2*e^(x^2)
```

3.180.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.38

$$\int e^{x^2} x\,dx = \frac{1}{2}\,e^{\left(x^2\right)}$$

input
```
integrate(exp(x^2)*x,x, algorithm=\
```

output
```
1/2*e^(x^2)
```

3.180.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.38

$$\int e^{x^2} x \, dx = \frac{e^{x^2}}{2}$$

input
```
int(x*exp(x^2),x)
```

output
```
exp(x^2)/2
```

3.181 $\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}\left(72x+72e^2x^3-x^4-2x^5+e\left(-144x^2+x^5+x\right.\right.}{-x^4+2ex^5-e^2x^6+e^e}$

3.181.1 Optimal result

Integrand size = 172, antiderivative size = 28

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}\left(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(14\right.}{-x^4+2ex^5-e^2x^6+e^e\left(x^3-2ex^4+e^2x^5\right)}$$
$$=e^{\frac{36}{x^2}-\frac{x(x+\log(e^e-x))}{-1+ex}}$$

output
```
exp(36/x^2-(x+ln(exp(exp(1))-x))/(x*exp(1)-1)*x)
```

3.181.2 Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.54

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}\left(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(14\right.}{-x^4+2ex^5-e^2x^6+e^e\left(x^3-2ex^4+e^2x^5\right)}$$
$$=e^{\frac{36-36ex+x^4}{x^2-ex^3}}(e^e-x)^{\frac{x}{1-ex}}$$

input
```
Integrate[(E^((-36 + 36*E*x - x^4 - x^3*Log[E^E - x])/(-x^2 + E*x^3))*(72*
x + 72*E^2*x^3 - x^4 - 2*x^5 + E*(-144*x^2 + x^5 + x^6) + E^E*(-72 - 72*E^
2*x^2 + 2*x^4 + E*(144*x - x^5)) + (E^E*x^3 - x^4)*Log[E^E - x]))/(-x^4 +
2*E*x^5 - E^2*x^6 + E^E*(x^3 - 2*E*x^4 + E^2*x^5)),x]
```

output
```
E^((36 - 36*E*x + x^4)/(x^2 - E*x^3))*(E^E - x)^(x/(1 - E*x))
```

3.181.

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}\left(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(144x-x^5))+(e^ex^3-x^4)\log(e^e-x)\right)}{-x^4+2ex^5-e^2x^6+e^e(x^3-2ex^4+e^2x^5)}\,dx$$

3.181.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-2x^5-x^4+72e^2x^3+\left(e^ex^3-x^4\right)\log\left(e^e-x\right)+e\left(x^6+x^5-144x^2\right)+e^e\left(e\left(144x-x^5\right)+2x^4-72e^2x^2-72\right.}{-e^2x^6+2ex^5-x^4+e^e\left(e^2x^5-2ex^4+x^3\right)}$$

$\big\downarrow$ 2026

$$\int \frac{\left(-2x^5-x^4+72e^2x^3+\left(e^ex^3-x^4\right)\log\left(e^e-x\right)+e\left(x^6+x^5-144x^2\right)+e^e\left(e\left(144x-x^5\right)+2x^4-72e^2x^2-72\right.}{x^3\left(-e^2x^3+e\left(2+e^{1+e}\right)x^2-\left(1+2e^{1+e}\right)x+e^e\right)}$$

$\big\downarrow$ 2463

$$\int \left(\frac{\left(-2x^5-x^4+72e^2x^3+\left(e^ex^3-x^4\right)\log\left(e^e-x\right)+e\left(x^6+x^5-144x^2\right)+e^e\left(e\left(144x-x^5\right)+2x^4-72e^2x^2-\right.}{\left(e^{1+e}-1\right)^2x^3(ex-1)}\right.$$

$\big\downarrow$ 7239

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{-\frac{(1+e)x-1}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$\big\downarrow$ 7293

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{-\frac{(1+e)x-1}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{-\frac{(1+e)x-1}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e}}{x(e}\right.$$

$\big\downarrow$ 7239

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$\big\downarrow$ 7293

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}}{x(ex-}\right.$$

$\big\downarrow$ 7239

3.181. $\int \frac{e^{\frac{-36+36ex-x^4-x^3\log\left(e^e-x\right)}{-x^2+ex^3}}\left(72x+72e^2x^3-x^4-2x^5+e\left(-144x^2+x^5+x^6\right)+e^e\left(-72-72e^2x^2+2x^4+e\left(144x-x^5\right)\right)+\left(e^ex^3-x^4\right)\log\left(e^e-x\right)\right)}{-x^4+2ex^5-e^2x^6+e^e\left(x^3-2ex^4+e^2x^5\right)}\,dx$

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}}{x(ex-}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}}{x(ex-}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}}{x(ex-}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}}{x(ex-}\right.$$

3.181.

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}\left(72x+72e^2x^3-x^4-2x^5+e\left(-144x^2+x^5+x^6\right)+e^e\left(-72-72e^2x^2+2x^4+e\left(144x-x^5\right)\right)+\left(e^ex^3-x^4\right)\log(e^e-x)\right)}{-x^4+2ex^5-e^2x^6+e^e\left(x^3-2ex^4+e^2x^5\right)}\,dx$$

$$\downarrow 7239$$

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}(e^e-x)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}(x^4-144)x+2e^e(x^4-36)+72e^2x^3+(e^e-x)x^3\log(e^e-x)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$$\downarrow 7293$$

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}(x^2-12)(x^2+12)(e^e-x)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}(e^e-x)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}}{x(ex-}\right.$$

$$\downarrow 7239$$

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}(e^e-x)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}(x^4-144)x+2e^e(x^4-36)+72e^2x^3+(e^e-x)x^3\log(e^e-x)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$$\downarrow 7293$$

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}(x^2-12)(x^2+12)(e^e-x)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}(e^e-x)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}}{x(ex-}\right.$$

$$\downarrow 7239$$

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}(e^e-x)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}(x^4-144)x+2e^e(x^4-36)+72e^2x^3+(e^e-x)x^3\log(e^e-x)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$$\downarrow 7293$$

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}(x^2-12)(x^2+12)(e^e-x)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}(e^e-x)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}}{x(ex-}\right.$$

$$\downarrow 7239$$

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}(e^e-x)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}(x^4-144)x+2e^e(x^4-36)+72e^2x^3+(e^e-x)x^3\log(e^e-x)-72e^{2+e}x^2\right.}{x^3(1-ex)^2}$$

$$\downarrow 7293$$

3.181.

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}\left(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(144x-x^5))+(e^ex^3-x^4)\log(e^e-x)\right)}{-x^4+2ex^5-e^2x^6+e^e(x^3-2ex^4+e^2x^5)}\,dx$$

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}\cdots}{x(ex-\cdots}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\cdots\right.}{x^3(1-ex)^2}$$

$\downarrow$ 7293

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}\cdots}{x(ex-\cdots}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\cdots\right.}{x^3(1-ex)^2}$$

$\downarrow$ 7293

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}\cdots}{x(ex-\cdots}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\cdots\right.}{x^3(1-ex)^2}$$

$\downarrow$ 7293

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2}+\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2}-\frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}\cdots}{x(ex-\cdots}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}\left(-e^{1+e}\left(x^4-144\right)x+2e^e\left(x^4-36\right)+72e^2x^3+\left(e^e-x\right)x^3\log\left(e^e-x\right)-72e^{2+e}x^2\cdots\right.}{x^3(1-ex)^2}$$

3.181.

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}\left(72x+72e^2x^3-x^4-2x^5+e\left(-144x^2+x^5+x^6\right)+e^e\left(-72-72e^2x^2+2x^4+e\left(144x-x^5\right)\right)+\left(e^ex^3-x^4\right)\log(e^e-x)\right)}{-x^4+2ex^5-e^2x^6+e^e\left(x^3-2ex^4+e^2x^5\right)}\,dx$$

$\downarrow$ 7293

$$\int \left(-\frac{e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+1}\left(x^2-12\right)\left(x^2+12\right)\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{x^2(ex-1)^2} + \frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+2}\left(e^e-x\right)^{\frac{1-(1+e)x}{ex-1}}}{(ex-1)^2} - \frac{72e^{\frac{x^4-36ex+36}{x^2(1-ex)}+e+2}}{x(ex-}\right.$$

input
```
Int[(E^((-36 + 36*E*x - x^4 - x^3*Log[E^E - x])/(-x^2 + E*x^3))*(72*x + 72
*E^2*x^3 - x^4 - 2*x^5 + E*(-144*x^2 + x^5 + x^6) + E^E*(-72 - 72*E^2*x^2
+ 2*x^4 + E*(144*x - x^5)) + (E^E*x^3 - x^4)*Log[E^E - x]))/(-x^4 + 2*E*x^
5 - E^2*x^6 + E^E*(x^3 - 2*E*x^4 + E^2*x^5)),x]
```

output
```
$Aborted
```

3.181.3.1 Defintions of rubi rules used

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.181.

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}\left(72x+72e^2x^3-x^4-2x^5+e\left(-144x^2+x^5+x^6\right)+e^e\left(-72-72e^2x^2+2x^4+e\left(144x-x^5\right)\right)+\left(e^ex^3-x^4\right)\log\left(e^e-x\right)\right)}{-x^4+2ex^5-e^2x^6+e^e\left(x^3-2ex^4+e^2x^5\right)}\,dx$$

3.181.4 Maple [A] (verified)

Time = 20.87 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

method	result	size
parallelrisch	$\mathrm{e}^{-\frac{x^{3} \ln \left(\mathrm{e}^{\mathrm{e}}-x\right)+x^{4}-36 x \,\mathrm{e}+36}{x^{2} \left(x \,\mathrm{e}-1\right)}}$	37
risch	$\mathrm{e}^{\frac{-x^{3} \ln \left(\mathrm{e}^{\mathrm{e}}-x\right)+36 x \,\mathrm{e}-x^{4}-36}{x^{2} \left(x \,\mathrm{e}-1\right)}}$	39

input
```
int(((x^3*exp(exp(1))-x^4)*ln(exp(exp(1))-x)+(-72*x^2*exp(1)^2+(-x^5+144*x
)*exp(1)+2*x^4-72)*exp(exp(1))+72*x^3*exp(1)^2+(x^6+x^5-144*x^2)*exp(1)-2*
x^5-x^4+72*x)*exp((-x^3*ln(exp(exp(1))-x)+36*x*exp(1)-x^4-36)/(x^3*exp(1)-
x^2))/((x^5*exp(1)^2-2*x^4*exp(1)+x^3)*exp(exp(1))-x^6*exp(1)^2+2*x^5*exp(
1)-x^4),x,method=_RETURNVERBOSE)
```

output
```
exp(-(x^3*ln(exp(exp(1))-x)+x^4-36*x*exp(1)+36)/x^2/(x*exp(1)-1))
```

3.181.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(14}{-x^4+2ex^5-e^2x^6+e^e(x^3-2ex^4+e^2x^5)}$$

$$= e^{\left(-\frac{x^4+x^3\log(-x+e^e)-36\,xe+36}{x^3e-x^2}\right)}$$

input
```
integrate(((x^3*exp(exp(1))-x^4)*log(exp(exp(1))-x)+(-72*x^2*exp(1)^2+(-x^
5+144*x)*exp(1)+2*x^4-72)*exp(exp(1))+72*x^3*exp(1)^2+(x^6+x^5-144*x^2)*ex
p(1)-2*x^5-x^4+72*x)*exp((-x^3*log(exp(exp(1))-x)+36*x*exp(1)-x^4-36)/(x^3
*exp(1)-x^2))/((x^5*exp(1)^2-2*x^4*exp(1)+x^3)*exp(exp(1))-x^6*exp(1)^2+2*
x^5*exp(1)-x^4),x, algorithm=\
```

output
```
e^(-(x^4 + x^3*log(-x + e^e) - 36*x*e + 36)/(x^3*e - x^2))
```

3.181.6 Sympy [A] (verification not implemented)

Time = 5.81 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(14}{-x^4+2ex^5-e^2x^6+e^e(x^3-2ex^4+e^2x^5)}$$
$$= e^{\frac{-x^4-x^3\log(-x+e^e)+36ex-36}{ex^3-x^2}}$$

input
```
integrate(((x**3*exp(exp(1))-x**4)*ln(exp(exp(1))-x)+(-72*x**2*exp(1)**2+(
-x**5+144*x)*exp(1)+2*x**4-72)*exp(exp(1))+72*x**3*exp(1)**2+(x**6+x**5-14
4*x**2)*exp(1)-2*x**5-x**4+72*x)*exp((-x**3*ln(exp(exp(1))-x)+36*x*exp(1)-
x**4-36)/(x**3*exp(1)-x**2))/((x**5*exp(1)**2-2*x**4*exp(1)+x**3)*exp(exp(
1))-x**6*exp(1)**2+2*x**5*exp(1)-x**4),x)
```

output
```
exp((-x**4 - x**3*log(-x + exp(E)) + 36*E*x - 36)/(E*x**3 - x**2))
```

3.181.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(28) = 56.

Time = 0.37 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.21

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(14}{-x^4+2ex^5-e^2x^6+e^e(x^3-2ex^4+e^2x^5)}$$
$$= e^{\left(-xe^{(-1)}-e^{(-1)}\log(-x+e^e)-\frac{\log(-x+e^e)}{xe^2-e}-\frac{1}{xe^3-e^2}+\frac{36}{x^2}-e^{(-2)}\right)}$$

input
```
integrate(((x^3*exp(exp(1))-x^4)*log(exp(exp(1))-x)+(-72*x^2*exp(1)^2+(-x^
5+144*x)*exp(1)+2*x^4-72)*exp(exp(1))+72*x^3*exp(1)^2+(x^6+x^5-144*x^2)*ex
p(1)-2*x^5-x^4+72*x)*exp((-x^3*log(exp(exp(1))-x)+36*x*exp(1)-x^4-36)/(x^3
*exp(1)-x^2))/((x^5*exp(1)^2-2*x^4*exp(1)+x^3)*exp(exp(1))-x^6*exp(1)^2+2*
x^5*exp(1)-x^4),x, algorithm=\
```

output
```
e^(-x*e^(-1) - e^(-1)*log(-x + e^e) - log(-x + e^e)/(x*e^2 - e) - 1/(x*e^3
 - e^2) + 36/x^2 - e^(-2))
```

3.181.

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(144x-x^5))+(e^ex^3-x^4)\log(e^e-x))}{-x^4+2ex^5-e^2x^6+e^e(x^3-2ex^4+e^2x^5)}\,dx$$

3.181.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. 2(28) = 56.

Time = 0.54 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.96

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(14}{-x^4+2ex^5-e^2x^6+e^e(x^3-2ex^4+e^2x^5)}$$
$$= e^{\left(-\frac{x^4}{x^3e-x^2}-\frac{x^3\log(-x+e^e)}{x^3e-x^2}+\frac{36\,xe}{x^3e-x^2}-\frac{36}{x^3e-x^2}\right)}$$

input
```
integrate(((x^3*exp(exp(1))-x^4)*log(exp(exp(1))-x)+(-72*x^2*exp(1)^2+(-x^
5+144*x)*exp(1)+2*x^4-72)*exp(exp(1))+72*x^3*exp(1)^2+(x^6+x^5-144*x^2)*ex
p(1)-2*x^5-x^4+72*x)*exp((-x^3*log(exp(exp(1))-x)+36*x*exp(1)-x^4-36)/(x^3
*exp(1)-x^2))/((x^5*exp(1)^2-2*x^4*exp(1)+x^3)*exp(exp(1))-x^6*exp(1)^2+2*
x^5*exp(1)-x^4),x, algorithm=\
```

output
```
e^(-x^4/(x^3*e - x^2) - x^3*log(-x + e^e)/(x^3*e - x^2) + 36*x*e/(x^3*e -
x^2) - 36/(x^3*e - x^2))
```

3.181.9 Mupad [B] (verification not implemented)

Time = 13.71 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.43

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(14}{-x^4+2ex^5-e^2x^6+e^e(x^3-2ex^4+e^2x^5)}$$
$$= \frac{e^{-\frac{36}{x^3\,e-x^2}}\,e^{-\frac{x^2}{x\,e-1}}\,e^{-\frac{36\,e}{x-x^2\,e}}}{(e^e-x)^{\frac{x}{x\,e-1}}}$$

input
```
int((exp(-(x^3*log(exp(exp(1)) - x) - 36*x*exp(1) + x^4 + 36)/(x^3*exp(1)
- x^2))*(72*x + exp(1)*(x^5 - 144*x^2 + x^6) + log(exp(exp(1)) - x)*(x^3*e
xp(exp(1)) - x^4) + exp(exp(1))*(exp(1)*(144*x - x^5) - 72*x^2*exp(2) + 2*
x^4 - 72) + 72*x^3*exp(2) - x^4 - 2*x^5))/(exp(exp(1))*(x^5*exp(2) - 2*x^4
*exp(1) + x^3) + 2*x^5*exp(1) - x^6*exp(2) - x^4),x)
```

output
```
(exp(-36/(x^3*exp(1) - x^2))*exp(-x^2/(x*exp(1) - 1))*exp(-(36*exp(1))/(x
- x^2*exp(1))))/(exp(exp(1)) - x)^(x/(x*exp(1) - 1))
```

3.181.

$$\int \frac{e^{\frac{-36+36ex-x^4-x^3\log(e^e-x)}{-x^2+ex^3}}(72x+72e^2x^3-x^4-2x^5+e(-144x^2+x^5+x^6)+e^e(-72-72e^2x^2+2x^4+e(144x-x^5))+(e^ex^3-x^4)\log(e^e-x))}{-x^4+2ex^5-e^2x^6+e^e(x^3-2ex^4+e^2x^5)}\,dx$$

3.182 $\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log(x)}{(3+x)\log^2(x)}$

3.182.1 Optimal result

Integrand size = 101, antiderivative size = 23

$$\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log^2(x)+(9x^3+3x^4+(-36x}{(3+x)\log^2(x)}$$
$$=x^3\left(2+\frac{3x(e^x-\log(3+x))}{\log(x)}\right)$$

output
```
x^3*(3/ln(x)*x*(exp(x)-ln(3+x))+2)
```

3.182.2 Mathematica [A] (verified)

Time = 0.57 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log^2(x)+(9x^3+3x^4+(-36x}{(3+x)\log^2(x)}$$
$$=3\left(\frac{2x^3}{3}+\frac{x^4(e^x-\log(3+x))}{\log(x)}\right)$$

input
```
Integrate[(E^x*(-9*x^3 - 3*x^4) + (-3*x^4 + E^x*(36*x^3 + 21*x^4 + 3*x^5))
*Log[x] + (18*x^2 + 6*x^3)*Log[x]^2 + (9*x^3 + 3*x^4 + (-36*x^3 - 12*x^4)*
Log[x])*Log[3 + x])/((3 + x)*Log[x]^2),x]
```

output
```
3*((2*x^3)/3 + (x^4*(E^x - Log[3 + x]))/Log[x])
```

3.182.
$\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log^2(x)+(9x^3+3x^4+(-36x^3-12x^4)\log(x))\log(3+x)}{(3+x)\log^2(x)}\,dx$

3.182.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(-3x^4-9x^3\right)+\left(3x^4+9x^3+\left(-12x^4-36x^3\right)\log(x)\right)\log(x+3)+\left(6x^3+18x^2\right)\log^2(x)+\left(e^x\left(3x^5+21x^4\right.\right.}{(x+3)\log^2(x)}$$

$$\Big\downarrow \text{7239}$$

$$\int 3x^2\left(\frac{x\left(e^x\left(x^2+7x+12\right)-x-4(x+3)\log(x+3)\right)}{(x+3)\log(x)}+\frac{x(\log(x+3)-e^x)}{\log^2(x)}+2\right)dx$$

$$\Big\downarrow \text{27}$$

$$3\int x^2\left(-\frac{x(e^x-\log(x+3))}{\log^2(x)}-\frac{x\left(x-e^x\left(x^2+7x+12\right)+4(x+3)\log(x+3)\right)}{(x+3)\log(x)}+2\right)dx$$

$$\Big\downarrow \text{2010}$$

$$3\int\left(\frac{e^x x^3(x\log(x)+4\log(x)-1)}{\log^2(x)}-\frac{x^2\left(\log(x)x^2+4\log(x)\log(x+3)x^2-\log(x+3)x^2-2\log^2(x)x+12\log(x\right.}{(x+3)\log^2(x)}\right.$$

$$\Big\downarrow \text{2009}$$

$$3\left(-\int\frac{x^4}{(x+3)\log(x)}dx+\int\frac{x^3\log(x+3)}{\log^2(x)}dx-4\int\frac{x^3\log(x+3)}{\log(x)}dx+\frac{e^x x^4}{\log(x)}+\frac{2x^3}{3}\right)$$

input
```
Int[(E^x*(-9*x^3 - 3*x^4) + (-3*x^4 + E^x*(36*x^3 + 21*x^4 + 3*x^5))*Log[x
] + (18*x^2 + 6*x^3)*Log[x]^2 + (9*x^3 + 3*x^4 + (-36*x^3 - 12*x^4)*Log[x]
)*Log[3 + x])/((3 + x)*Log[x]^2),x]
```

output
```
$Aborted
```

3.182.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.182.4 Maple [A] (verified)

Time = 2.80 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

method	result	size
parallelrisch	$-\frac{-18\,{\rm e}^{x} x^{4}+18 \ln \left(3+x \right) x^{4}-12 x^{3} \ln \left(x \right)}{6 \ln \left(x \right)}$	31
risch	$-\frac{3 x^{4} \ln \left(3+x \right)}{\ln \left(x \right)}+\frac{x^{3} \left(3\,{\rm e}^{x} x +2 \ln \left(x \right)\right)}{\ln \left(x \right)}$	33

input
```
int((((-12*x^4-36*x^3)*ln(x)+3*x^4+9*x^3)*ln(3+x)+(6*x^3+18*x^2)*ln(x)^2+(
(3*x^5+21*x^4+36*x^3)*exp(x)-3*x^4)*ln(x)+(-3*x^4-9*x^3)*exp(x))/(3+x)/ln(
x)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/6*(-18*exp(x)*x^4+18*ln(3+x)*x^4-12*x^3*ln(x))/ln(x)
```

3.182.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log^2(x)+(9x^3+3x^4+(-36x}{(3+x)\log^2(x)}$$
$$= \frac{3\,x^4e^x-3\,x^4\log\left(x+3\right)+2\,x^3\log\left(x\right)}{\log\left(x\right)}$$

input
```
integrate((((-12*x^4-36*x^3)*log(x)+3*x^4+9*x^3)*log(3+x)+(6*x^3+18*x^2)*l
og(x)^2+((3*x^5+21*x^4+36*x^3)*exp(x)-3*x^4)*log(x)+(-3*x^4-9*x^3)*exp(x))
/(3+x)/log(x)^2,x, algorithm=\
```

output
```
(3*x^4*e^x - 3*x^4*log(x + 3) + 2*x^3*log(x))/log(x)
```

3.182.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log^2(x)+(9x^3+3x^4+(-36x}{(3+x)\log^2(x)}$$
$$= \frac{3x^4e^x}{\log\left(x\right)}-\frac{3x^4\log\left(x+3\right)}{\log\left(x\right)}+2x^3$$

input
```
integrate((((-12*x**4-36*x**3)*ln(x)+3*x**4+9*x**3)*ln(3+x)+(6*x**3+18*x**
2)*ln(x)**2+((3*x**5+21*x**4+36*x**3)*exp(x)-3*x**4)*ln(x)+(-3*x**4-9*x**3
)*exp(x))/(3+x)/ln(x)**2,x)
```

output
```
3*x**4*exp(x)/log(x) - 3*x**4*log(x + 3)/log(x) + 2*x**3
```

3.182.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log^2(x)+(9x^3+3x^4+(-36x^3-12x^4)\log(x))\log(3+x)}{(3+x)\log^2(x)}$$
$$=\frac{3\,x^4e^x-3\,x^4\log\left(x+3\right)+2\,x^3\log\left(x\right)}{\log\left(x\right)}$$

input
```
integrate(((((-12*x^4-36*x^3)*log(x)+3*x^4+9*x^3)*log(3+x)+(6*x^3+18*x^2)*l
og(x)^2+((3*x^5+21*x^4+36*x^3)*exp(x)-3*x^4)*log(x)+(-3*x^4-9*x^3)*exp(x))
/(3+x)/log(x)^2,x, algorithm=\
```

output
```
(3*x^4*e^x - 3*x^4*log(x + 3) + 2*x^3*log(x))/log(x)
```

3.182.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log^2(x)+(9x^3+3x^4+(-36x^3-12x^4)\log(x))\log(3+x)}{(3+x)\log^2(x)}$$
$$=\frac{3\,x^4e^x-3\,x^4\log\left(x+3\right)+2\,x^3\log\left(x\right)}{\log\left(x\right)}$$

input
```
integrate(((((-12*x^4-36*x^3)*log(x)+3*x^4+9*x^3)*log(3+x)+(6*x^3+18*x^2)*l
og(x)^2+((3*x^5+21*x^4+36*x^3)*exp(x)-3*x^4)*log(x)+(-3*x^4-9*x^3)*exp(x))
/(3+x)/log(x)^2,x, algorithm=\
```

output
```
(3*x^4*e^x - 3*x^4*log(x + 3) + 2*x^3*log(x))/log(x)
```

3.182.9 Mupad [B] (verification not implemented)

Time = 13.21 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.91

$$\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log^2(x)+(9x^3+3x^4+(-36x}{(3+x)\log^2(x)}$$

$$= \mathrm{e}^x\left(3x^5+12x^4\right)+2x^3+\frac{3x^4\,\mathrm{e}^x-3x^4\,\mathrm{e}^x\,\ln(x)\,(x+4)}{\ln(x)} + \frac{\ln(x+3)\,\left(\ln(x)\,\left(12x^4-\frac{12x^6+36x^5}{x\,(x+3)}\right)-3x^4\right)}{\ln(x)}$$

input
```
int((log(x)*(exp(x)*(36*x^3 + 21*x^4 + 3*x^5) - 3*x^4) - exp(x)*(9*x^3 + 3
*x^4) + log(x)^2*(18*x^2 + 6*x^3) + log(x + 3)*(9*x^3 - log(x)*(36*x^3 + 1
2*x^4) + 3*x^4))/(log(x)^2*(x + 3)),x)
```

output
```
exp(x)*(12*x^4 + 3*x^5) + 2*x^3 + (3*x^4*exp(x) - 3*x^4*exp(x)*log(x)*(x +
 4))/log(x) + (log(x + 3)*(log(x)*(12*x^4 - (36*x^5 + 12*x^6)/(x*(x + 3)))
 - 3*x^4))/log(x)
```

3.182. $\int \frac{e^x(-9x^3-3x^4)+(-3x^4+e^x(36x^3+21x^4+3x^5))\log(x)+(18x^2+6x^3)\log^2(x)+(9x^3+3x^4+(-36x^3-12x^4)\log(x))\log(3+x)}{(3+x)\log^2(x)}\,dx$

3.183 $\int \frac{-80-800x-3320x^2-7400x^3-9605x^4-7360x^5-3320x^6-800x^7-80x^8}{}$

3.183.1 Optimal result

Integrand size = 82, antiderivative size = 24

$$\int \frac{-80-800x-3320x^2-7400x^3-9605x^4-7360x^5-3320x^6-800x^7-80x^8+(400+3200x+9960x^2}{x^6}$$

$$= 5\left(9-\frac{x+\left(5+2\left(\frac{1}{x}+x\right)\right)^4}{x}\right)\log(x)$$

output
```
5*(9-(x+(2*x+2/x+5)^4)/x)*ln(x)
```

3.183.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 59 vs. 2(24) = 48.

Time = 0.03 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.46

$$\int \frac{-80-800x-3320x^2-7400x^3-9605x^4-7360x^5-3320x^6-800x^7-80x^8+(400+3200x+9960x^2}{x^6}$$

$$= -7360\log(x)-\frac{80\log(x)}{x^5}-\frac{800\log(x)}{x^4}-\frac{3320\log(x)}{x^3}-\frac{7400\log(x)}{x^2}-\frac{9605\log(x)}{x}-3320x\log(x)-800x^2\log(x)-80x^3\log(x)$$

input
```
Integrate[(-80 - 800*x - 3320*x^2 - 7400*x^3 - 9605*x^4 - 7360*x^5 - 3320*
x^6 - 800*x^7 - 80*x^8 + (400 + 3200*x + 9960*x^2 + 14800*x^3 + 9605*x^4 -
 3320*x^6 - 1600*x^7 - 240*x^8)*Log[x])/x^6,x]
```

output
```
-7360*Log[x] - (80*Log[x])/x^5 - (800*Log[x])/x^4 - (3320*Log[x])/x^3 - (7
400*Log[x])/x^2 - (9605*Log[x])/x - 3320*x*Log[x] - 800*x^2*Log[x] - 80*x^
3*Log[x]
```

3.183.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 59 vs. $2(24) = 48$.

Time = 0.43 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.46, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.024$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-80x^8 - 800x^7 - 3320x^6 - 7360x^5 - 9605x^4 - 7400x^3 - 3320x^2 + (-240x^8 - 1600x^7 - 3320x^6 + 9605x^4 + 1}{x^6}$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-\frac{5(x+2)^3 (6x^2 - 5x - 10) (2x+1)^3 \log(x)}{x^6} - \frac{5(16x^8 + 160x^7 + 664x^6 + 1472x^5 + 1921x^4 + 1480x^3 + 664}{x^6}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{80\log(x)}{x^5} - \frac{800\log(x)}{x^4} - 80x^3\log(x) - \frac{3320\log(x)}{x^3} - 800x^2\log(x) - \frac{7400\log(x)}{x^2} - 3320x\log(x) - 7360\log(x) - \frac{9605\log(x)}{x}$$

input
```
Int[(-80 - 800*x - 3320*x^2 - 7400*x^3 - 9605*x^4 - 7360*x^5 - 3320*x^6 -
800*x^7 - 80*x^8 + (400 + 3200*x + 9960*x^2 + 14800*x^3 + 9605*x^4 - 3320*
x^6 - 1600*x^7 - 240*x^8)*Log[x])/x^6,x]
```

output
```
-7360*Log[x] - (80*Log[x])/x^5 - (800*Log[x])/x^4 - (3320*Log[x])/x^3 - (7
400*Log[x])/x^2 - (9605*Log[x])/x - 3320*x*Log[x] - 800*x^2*Log[x] - 80*x^
3*Log[x]
```

3.183.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.183.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.00

method	result
risch	$-\frac{5(16x^8+160x^7+664x^6+1921x^4+1480x^3+664x^2+160x+16)\ln(x)}{x^5}-7360\ln(x)$
default	$-\frac{7400\ln(x)}{x^2}-3320x\ln(x)-\frac{3320\ln(x)}{x^3}-\frac{9605\ln(x)}{x}-7360\ln(x)-80x^3\ln(x)-800x^2\ln(x)-$
parts	$-\frac{7400\ln(x)}{x^2}-3320x\ln(x)-\frac{3320\ln(x)}{x^3}-\frac{9605\ln(x)}{x}-7360\ln(x)-80x^3\ln(x)-800x^2\ln(x)-$
norman	$\frac{-7360x^5\ln(x)-800x\ln(x)-3320x^2\ln(x)-7400x^3\ln(x)-9605x^4\ln(x)-3320x^6\ln(x)-800x^7\ln(x)-80x^8\ln(x)-80\ln(x)}{x^5}$
parallelrisch	$-\frac{80x^8\ln(x)+800x^7\ln(x)+3320x^6\ln(x)+7360x^5\ln(x)+9605x^4\ln(x)+7400x^3\ln(x)+3320x^2\ln(x)+800x\ln(x)+80\ln(x)}{x^5}$

input
```
int(((-240*x^8-1600*x^7-3320*x^6+9605*x^4+14800*x^3+9960*x^2+3200*x+400)*l
n(x)-80*x^8-800*x^7-3320*x^6-7360*x^5-9605*x^4-7400*x^3-3320*x^2-800*x-80)
/x^6,x,method=_RETURNVERBOSE)
```

output
```
-5*(16*x^8+160*x^7+664*x^6+1921*x^4+1480*x^3+664*x^2+160*x+16)/x^5*ln(x)-7
360*ln(x)
```

3.183.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.96

$$\int \frac{-80-800x-3320x^2-7400x^3-9605x^4-7360x^5-3320x^6-800x^7-80x^8+(400+3200x+9960x^2}{x^6}$$
$$=-\frac{5\,(16\,x^8+160\,x^7+664\,x^6+1472\,x^5+1921\,x^4+1480\,x^3+664\,x^2+160\,x+16)\log(x)}{x^5}$$

input
```
integrate(((-240*x^8-1600*x^7-3320*x^6+9605*x^4+14800*x^3+9960*x^2+3200*x+
400)*log(x)-80*x^8-800*x^7-3320*x^6-7360*x^5-9605*x^4-7400*x^3-3320*x^2-80
0*x-80)/x^6,x, algorithm=\
```

output
```
-5*(16*x^8 + 160*x^7 + 664*x^6 + 1472*x^5 + 1921*x^4 + 1480*x^3 + 664*x^2
+ 160*x + 16)*log(x)/x^5
```

3.183.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(20) = 40$.

Time = 0.09 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.00

$$\int \frac{-80 - 800x - 3320x^2 - 7400x^3 - 9605x^4 - 7360x^5 - 3320x^6 - 800x^7 - 80x^8 + (400 + 3200x + 9960x^2}{x^6}$$
$$= -7360\log(x) + \frac{(-80x^8 - 800x^7 - 3320x^6 - 9605x^4 - 7400x^3 - 3320x^2 - 800x - 80)\log(x)}{x^5}$$

input
```
integrate(((-240*x**8-1600*x**7-3320*x**6+9605*x**4+14800*x**3+9960*x**2+3
200*x+400)*ln(x)-80*x**8-800*x**7-3320*x**6-7360*x**5-9605*x**4-7400*x**3-
3320*x**2-800*x-80)/x**6,x)
```

output
```
-7360*log(x) + (-80*x**8 - 800*x**7 - 3320*x**6 - 9605*x**4 - 7400*x**3 -
3320*x**2 - 800*x - 80)*log(x)/x**5
```

3.183.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(24) = 48$.

Time = 0.19 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.46

$$\int \frac{-80 - 800x - 3320x^2 - 7400x^3 - 9605x^4 - 7360x^5 - 3320x^6 - 800x^7 - 80x^8 + (400 + 3200x + 9960x^2}{x^6}$$
$$= -80\,x^3\log(x) - 800\,x^2\log(x) - 3320\,x\log(x) - \frac{9605\,\log(x)}{x} - \frac{7400\,\log(x)}{x^2} - \frac{3320\,\log(x)}{x^3} - \frac{800\,\log(x)}{x^4} - \frac{80\,\log(x)}{x^5} - 7360\,\log(x)$$

input
```
integrate(((-240*x^8-1600*x^7-3320*x^6+9605*x^4+14800*x^3+9960*x^2+3200*x+
400)*log(x)-80*x^8-800*x^7-3320*x^6-7360*x^5-9605*x^4-7400*x^3-3320*x^2-80
0*x-80)/x^6,x, algorithm=\
```

output
```
-80*x^3*log(x) - 800*x^2*log(x) - 3320*x*log(x) - 9605*log(x)/x - 7400*log
(x)/x^2 - 3320*log(x)/x^3 - 800*log(x)/x^4 - 80*log(x)/x^5 - 7360*log(x)
```

3.183.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.96

$$\int \frac{-80-800x-3320x^2-7400x^3-9605x^4-7360x^5-3320x^6-800x^7-80x^8+(400+3200x+9960x^2}{x^6}$$
$$= -5\left(16\,x^3+160\,x^2+664\,x+\frac{1921\,x^4+1480\,x^3+664\,x^2+160\,x+16}{x^5}\right)\log(x) - 7360\,\log(x)$$

input
```
integrate(((-240*x^8-1600*x^7-3320*x^6+9605*x^4+14800*x^3+9960*x^2+3200*x+
400)*log(x)-80*x^8-800*x^7-3320*x^6-7360*x^5-9605*x^4-7400*x^3-3320*x^2-80
0*x-80)/x^6,x, algorithm=\
```

output
```
-5*(16*x^3 + 160*x^2 + 664*x + (1921*x^4 + 1480*x^3 + 664*x^2 + 160*x + 16
)/x^5)*log(x) - 7360*log(x)
```

3.183.9 Mupad [B] (verification not implemented)

Time = 13.20 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.79

$$\int \frac{-80-800x-3320x^2-7400x^3-9605x^4-7360x^5-3320x^6-800x^7-80x^8+(400+3200x+9960x^2}{x^6}$$
$$= -\frac{800\,x^2\,\ln(x)+3320\,x^3\,\ln(x)+7400\,x^4\,\ln(x)+9605\,x^5\,\ln(x)+7360\,x^6\,\ln(x)+3320\,x^7\,\ln(x)+800}{x^6}$$

input
```
int(-(800*x - log(x)*(3200*x + 9960*x^2 + 14800*x^3 + 9605*x^4 - 3320*x^6
- 1600*x^7 - 240*x^8 + 400) + 3320*x^2 + 7400*x^3 + 9605*x^4 + 7360*x^5 +
3320*x^6 + 800*x^7 + 80*x^8 + 80)/x^6,x)
```

output
```
-(800*x^2*log(x) + 3320*x^3*log(x) + 7400*x^4*log(x) + 9605*x^5*log(x) + 7
360*x^6*log(x) + 3320*x^7*log(x) + 800*x^8*log(x) + 80*x^9*log(x) + 80*x*l
og(x))/x^6
```

3.183.

$$\int \frac{-80-800x-3320x^2-7400x^3-9605x^4-7360x^5-3320x^6-800x^7-80x^8+\left(400+3200x+9960x^2+14800x^3+9605x^4-3320x^6-1600x^7-240x^8\right)\log(x}{x^6}$$

3.184 $\int \frac{e^{-2x^2}(4-2x+(-2-x+8x^2-4x^3)\log(x^2)\log(\log(x^2)))}{(-32+48x-24x^2+4x^3)\log(x^2)\log^2(\log(x^2))}\,dx$

3.184.1 Optimal result

Integrand size = 68, antiderivative size = 26

$$\int \frac{e^{-2x^2}(4-2x+(-2-x+8x^2-4x^3)\log(x^2)\log(\log(x^2)))}{(-32+48x-24x^2+4x^3)\log(x^2)\log^2(\log(x^2))}\,dx=\frac{e^{-2x^2}x}{4(2-x)^2\log(\log(x^2))}$$

output
```
1/4*x/exp(x^2)^2/(2-x)^2/ln(ln(x^2))
```

3.184.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{e^{-2x^2}(4-2x+(-2-x+8x^2-4x^3)\log(x^2)\log(\log(x^2)))}{(-32+48x-24x^2+4x^3)\log(x^2)\log^2(\log(x^2))}\,dx=\frac{e^{-2x^2}x}{4(-2+x)^2\log(\log(x^2))}$$

input
```
Integrate[(4 - 2*x + (-2 - x + 8*x^2 - 4*x^3)*Log[x^2]*Log[Log[x^2]])/(E^(
2*x^2)*(-32 + 48*x - 24*x^2 + 4*x^3)*Log[x^2]*Log[Log[x^2]]^2),x]
```

output
```
x/(4*E^(2*x^2)*(-2 + x)^2*Log[Log[x^2]])
```

3.184.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-2x^2}\left(\left(-4x^3+8x^2-x-2\right)\log\left(x^2\right)\log\left(\log\left(x^2\right)\right)-2x+4\right)}{\left(4x^3-24x^2+48x-32\right)\log\left(x^2\right)\log^2\left(\log\left(x^2\right)\right)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{e^{-2x^2}\left(\left(-4x^3+8x^2-x-2\right)\log\left(x^2\right)\log\left(\log\left(x^2\right)\right)-2x+4\right)}{\left(2^{2/3}x-2\ 2^{2/3}\right)^3\log\left(x^2\right)\log^2\left(\log\left(x^2\right)\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{-2x^2}\left(-4x^3+8x^2-x-2\right)}{4(x-2)^3\log\left(\log\left(x^2\right)\right)}-\frac{e^{-2x^2}}{2(x-2)^2\log\left(x^2\right)\log^2\left(\log\left(x^2\right)\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{1}{2}\int \frac{e^{-2x^2}}{(x-2)^2\log\left(x^2\right)\log^2\left(\log\left(x^2\right)\right)}dx-\int \frac{e^{-2x^2}}{\log\left(\log\left(x^2\right)\right)}dx-\int \frac{e^{-2x^2}}{(x-2)^3\log\left(\log\left(x^2\right)\right)}dx-\frac{17}{4}\int \frac{e^{-2x^2}}{(x-2)^2\log\left(\log\left(x^2\right)\right)}dx-4\int \frac{e^{-2x^2}}{(x-2)\log\left(\log\left(x^2\right)\right)}dx$$

input
```
Int[(4 - 2*x + (-2 - x + 8*x^2 - 4*x^3)*Log[x^2]*Log[Log[x^2]])/(E^(2*x^2)
*(-32 + 48*x - 24*x^2 + 4*x^3)*Log[x^2]*Log[Log[x^2]]^2),x]
```

output
```
$Aborted
```

3.184.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.184.4 Maple [A] (verified)

Time = 9.32 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

method	result	size
parallelrisch	$\frac{x\,\mathrm{e}^{-2x^2}}{4\ln(\ln(x^2))(x^2-4x+4)}$	27
risch	$\frac{x\,\mathrm{e}^{-2x^2}}{4(x^2-4x+4)\ln\left(2\ln(x)-\frac{i\pi\ \mathrm{csgn}\left(ix^2\right)\left(-\mathrm{csgn}\left(ix^2\right)+\mathrm{csgn}(ix)\right)^2}{2}\right)}$	56

input
```
int(((-4*x^3+8*x^2-x-2)*ln(x^2)*ln(ln(x^2))+4-2*x)/(4*x^3-24*x^2+48*x-32)/
exp(x^2)^2/ln(x^2)/ln(ln(x^2))^2,x,method=_RETURNVERBOSE)
```

output
```
1/4*x/exp(x^2)^2/ln(ln(x^2))/(x^2-4*x+4)
```

3.184.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{-2x^2}(4-2x+(-2-x+8x^2-4x^3)\log(x^2)\log(\log(x^2)))}{(-32+48x-24x^2+4x^3)\log(x^2)\log^2(\log(x^2))}\,dx = \frac{xe^{(-2\,x^2)}}{4\,(x^2-4\,x+4)\log(\log(x^2))}$$

input
```
integrate(((-4*x^3+8*x^2-x-2)*log(x^2)*log(log(x^2))+4-2*x)/(4*x^3-24*x^2+
48*x-32)/exp(x^2)^2/log(x^2)/log(log(x^2))^2,x, algorithm=\
```

output
```
1/4*x*e^(-2*x^2)/((x^2 - 4*x + 4)*log(log(x^2)))
```

3.184.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\int \frac{e^{-2x^2}(4-2x+(-2-x+8x^2-4x^3)\log(x^2)\log(\log(x^2)))}{(-32+48x-24x^2+4x^3)\log(x^2)\log^2(\log(x^2))}\,dx = \frac{xe^{-2x^2}}{4x^2\log(\log(x^2))-16x\log(\log(x^2))+16\log(\log(x^2))}$$

input
```
integrate(((-4*x**3+8*x**2-x-2)*ln(x**2)*ln(ln(x**2))+4-2*x)/(4*x**3-24*x*
*2+48*x-32)/exp(x**2)**2/ln(x**2)/ln(ln(x**2))**2,x)
```

output
```
x*exp(-2*x**2)/(4*x**2*log(log(x**2)) - 16*x*log(log(x**2)) + 16*log(log(x
**2)))
```

3.184.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.50

$$\int \frac{e^{-2x^2}(4-2x+(-2-x+8x^2-4x^3)\log(x^2)\log(\log(x^2)))}{(-32+48x-24x^2+4x^3)\log(x^2)\log^2(\log(x^2))}\,dx = \frac{xe^{(-2\,x^2)}}{4\,(x^2\log(2)-4\,x\log(2)+(x^2-4\,x+4)\log(\log(x))+4\,\log(2))}$$

input
```
integrate(((-4*x^3+8*x^2-x-2)*log(x^2)*log(log(x^2))+4-2*x)/(4*x^3-24*x^2+
48*x-32)/exp(x^2)^2/log(x^2)/log(log(x^2))^2,x, algorithm=\
```

output
```
1/4*x*e^(-2*x^2)/(x^2*log(2) - 4*x*log(2) + (x^2 - 4*x + 4)*log(log(x)) +
4*log(2))
```

3.184.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{e^{-2x^2}(4-2x+(-2-x+8x^2-4x^3)\log(x^2)\log(\log(x^2)))}{(-32+48x-24x^2+4x^3)\log(x^2)\log^2(\log(x^2))}\,dx = \frac{xe^{(-2\,x^2)}}{4\,(x^2\log(\log(x^2))-4\,x\log(\log(x^2))+4\,\log(\log(x^2)))}$$

input
```
integrate(((-4*x^3+8*x^2-x-2)*log(x^2)*log(log(x^2))+4-2*x)/(4*x^3-24*x^2+
48*x-32)/exp(x^2)^2/log(x^2)/log(log(x^2))^2,x, algorithm=\
```

output
```
1/4*x*e^(-2*x^2)/(x^2*log(log(x^2)) - 4*x*log(log(x^2)) + 4*log(log(x^2)))
```

3.184.9 Mupad [B] (verification not implemented)

Time = 14.42 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{e^{-2x^2}(4-2x+(-2-x+8x^2-4x^3)\log(x^2)\log(\log(x^2)))}{(-32+48x-24x^2+4x^3)\log(x^2)\log^2(\log(x^2))}\,dx=\frac{x\,\mathrm{e}^{-2\,x^2}}{4\,\ln(\ln(x^2))\,(x-2)^2}$$

input
```
int(-(exp(-2*x^2)*(2*x + log(x^2)*log(log(x^2))*(x - 8*x^2 + 4*x^3 + 2) -
4))/(log(x^2)*log(log(x^2))^2*(48*x - 24*x^2 + 4*x^3 - 32)),x)
```

output
```
(x*exp(-2*x^2))/(4*log(log(x^2))*(x - 2)^2)
```

3.185 $\int \frac{-46-117x-72x^2-2x^3+(-46-46x-x^2)\log(x)}{529+46x+x^2}\,dx$

3.185.1 Optimal result

Integrand size = 39, antiderivative size = 17

$$\int \frac{-46-117x-72x^2-2x^3+(-46-46x-x^2)\log(x)}{529+46x+x^2}\,dx = 3-\frac{x(2+x)(x+\log(x))}{23+x}$$

output
```
3-(x+ln(x))*x*(2+x)/(x+23)
```

3.185.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.82

$$\int \frac{-46-117x-72x^2-2x^3+(-46-46x-x^2)\log(x)}{529+46x+x^2}\,dx = 21x-x^2+\frac{483(23-\log(x))}{23+x}+21\log(x)-x\log(x)$$

input
```
Integrate[(-46 - 117*x - 72*x^2 - 2*x^3 + (-46 - 46*x - x^2)*Log[x])/(529
+ 46*x + x^2),x]
```

output
```
21*x - x^2 + (483*(23 - Log[x]))/(23 + x) + 21*Log[x] - x*Log[x]
```

3.185.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.82, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^3-72x^2+\left(-x^2-46x-46\right)\log(x)-117x-46}{x^2+46x+529}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-2x^3-72x^2+\left(-x^2-46x-46\right)\log(x)-117x-46}{(x+23)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2x^3}{(x+23)^2}-\frac{72x^2}{(x+23)^2}-\frac{\left(x^2+46x+46\right)\log(x)}{(x+23)^2}-\frac{117x}{(x+23)^2}-\frac{46}{(x+23)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-x^2+21x+\frac{11109}{x+23}+\frac{21x\log(x)}{x+23}-x\log(x)$$

input
```
Int[(-46 - 117*x - 72*x^2 - 2*x^3 + (-46 - 46*x - x^2)*Log[x])/(529 + 46*x
 + x^2),x]
```

output
```
21*x - x^2 + 11109/(23 + x) - x*Log[x] + (21*x*Log[x])/(23 + x)
```

3.185.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.185.4 Maple [A] (verified)

Time = 0.93 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.76

method	result	size
norman	$\frac{-2x^2-x^3-2x\ln(x)-x^2\ln(x)}{x+23}$	30
parallelrisch	$\frac{-2x^2-x^3-2x\ln(x)-x^2\ln(x)}{x+23}$	30
default	$-x^2+21x+\frac{11109}{x+23}-x\ln(x)+\frac{21\ln(x)x}{x+23}$	32
parts	$-x^2+21x+\frac{11109}{x+23}-x\ln(x)+\frac{21\ln(x)x}{x+23}$	32
risch	$-\frac{(x^2+23x+483)\ln(x)}{x+23}+\frac{-x^3+21x\ln(x)-2x^2+483\ln(x)+483x+11109}{x+23}$	49

input
```
int(((-x^2-46*x-46)*ln(x)-2*x^3-72*x^2-117*x-46)/(x^2+46*x+529),x,method=_
RETURNVERBOSE)
```

output
```
(-2*x^2-x^3-2*x*ln(x)-x^2*ln(x))/(x+23)
```

3.185.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.76

$$\int \frac{-46-117x-72x^2-2x^3+(-46-46x-x^2)\log(x)}{529+46x+x^2}\,dx = -\frac{x^3+2\,x^2+(x^2+2\,x)\log(x)-483\,x-11109}{x+23}$$

input
```
integrate(((-x^2-46*x-46)*log(x)-2*x^3-72*x^2-117*x-46)/(x^2+46*x+529),x,
algorithm=\
```

output
```
-(x^3 + 2*x^2 + (x^2 + 2*x)*log(x) - 483*x - 11109)/(x + 23)
```

3.185.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. $2(14) = 28$.

Time = 0.10 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.88

$$\int \frac{-46 - 117x - 72x^2 - 2x^3 + (-46 - 46x - x^2)\log(x)}{529 + 46x + x^2}\,dx$$
$$= -x^2 + 21x + 21\log(x) + \frac{(-x^2 - 23x - 483)\log(x)}{x + 23} + \frac{11109}{x + 23}$$

input
```
integrate(((-x**2-46*x-46)*ln(x)-2*x**3-72*x**2-117*x-46)/(x**2+46*x+529),
x)
```

output
```
-x**2 + 21*x + 21*log(x) + (-x**2 - 23*x - 483)*log(x)/(x + 23) + 11109/(x
 + 23)
```

3.185.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(17) = 34$.

Time = 0.23 (sec) , antiderivative size = 54, normalized size of antiderivative = 3.18

$$\int \frac{-46 - 117x - 72x^2 - 2x^3 + (-46 - 46x - x^2)\log(x)}{529 + 46x + x^2}\,dx$$
$$= -x^2 + 20\,x + \frac{x^2 - (x^2 + 23\,x + 529)\log(x) + 23\,x}{x + 23} + \frac{46\,\log(x)}{x + 23} + \frac{11109}{x + 23} + 21\,\log(x)$$

input
```
integrate(((-x^2-46*x-46)*log(x)-2*x^3-72*x^2-117*x-46)/(x^2+46*x+529),x,
algorithm=\
```

output
```
-x^2 + 20*x + (x^2 - (x^2 + 23*x + 529)*log(x) + 23*x)/(x + 23) + 46*log(x
)/(x + 23) + 11109/(x + 23) + 21*log(x)
```

3.185.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.94

$$\int \frac{-46-117x-72x^2-2x^3+(-46-46x-x^2)\log(x)}{529+46x+x^2}\,dx$$
$$= -x^2-\left(x+\frac{483}{x+23}\right)\log(x)+21\,x+\frac{11109}{x+23}+21\,\log(x)$$

input
```
integrate((((-x^2-46*x-46)*log(x)-2*x^3-72*x^2-117*x-46)/(x^2+46*x+529),x,
algorithm=\
```

output
```
-x^2 - (x + 483/(x + 23))*log(x) + 21*x + 11109/(x + 23) + 21*log(x)
```

3.185.9 Mupad [B] (verification not implemented)

Time = 14.64 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{-46-117x-72x^2-2x^3+(-46-46x-x^2)\log(x)}{529+46x+x^2}\,dx = -\frac{x\,(x+\ln(x))\,(x+2)}{x+23}$$

input
```
int(-(117*x + log(x)*(46*x + x^2 + 46) + 72*x^2 + 2*x^3 + 46)/(46*x + x^2
+ 529),x)
```

output
```
-(x*(x + log(x))*(x + 2))/(x + 23)
```

3.186 $\int \frac{10+5e^{4-x}x^2}{4x^2+e^2x^2}\,dx$

3.186.1 Optimal result

Integrand size = 30, antiderivative size = 27

$$\int \frac{10+5e^{4-x}x^2}{4x^2+e^2x^2}\,dx = 4-\frac{5\left(7+e^{4-x}+\frac{2}{x}+\log(4)\right)}{4+e^2}$$

output
```
4-5*(2/x+7+2*ln(2)+exp(-x+4))/(4+exp(2))
```

3.186.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{10+5e^{4-x}x^2}{4x^2+e^2x^2}\,dx = -\frac{10+5e^{4-x}x}{4x+e^2x}$$

input
```
Integrate[(10 + 5*E^(4 - x)*x^2)/(4*x^2 + E^2*x^2),x]
```

output
```
-((10 + 5*E^(4 - x)*x)/(4*x + E^2*x))
```

3.186.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {6, 27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5e^{4-x}x^2+10}{e^2x^2+4x^2}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{5e^{4-x}x^2+10}{(4+e^2)\,x^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\int \frac{5(e^{4-x}x^2+2)}{x^2}dx}{4+e^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{5\int \frac{e^{4-x}x^2+2}{x^2}dx}{4+e^2}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{5\int \left(e^{4-x}+\frac{2}{x^2}\right)dx}{4+e^2}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{5\left(-e^{4-x}-\frac{2}{x}\right)}{4+e^2}$$

input
```
Int[(10 + 5*E^(4 - x)*x^2)/(4*x^2 + E^2*x^2),x]
```

output
```
(5*(-E^(4 - x) - 2/x))/(4 + E^2)
```

3.186.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.186.4 Maple [A] (verified)

Time = 0.84 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

method	result	size
parallelrisch	$-\frac{5x\,\mathrm{e}^{-x+4}+10}{(4+\mathrm{e}^{2})x}$	23
derivativedivides	$-\frac{5\,\mathrm{e}^{-x+4}}{4+\mathrm{e}^{2}}-\frac{10}{x(4+\mathrm{e}^{2})}$	27
default	$-\frac{5\,\mathrm{e}^{-x+4}}{4+\mathrm{e}^{2}}-\frac{10}{x(4+\mathrm{e}^{2})}$	27
risch	$-\frac{5\,\mathrm{e}^{-x+4}}{4+\mathrm{e}^{2}}-\frac{10}{x(4+\mathrm{e}^{2})}$	27
parts	$-\frac{5\,\mathrm{e}^{-x+4}}{4+\mathrm{e}^{2}}-\frac{10}{x(4+\mathrm{e}^{2})}$	27
norman	$\frac{-\frac{10}{4+\mathrm{e}^{2}}-\frac{5x\,\mathrm{e}^{-x+4}}{4+\mathrm{e}^{2}}}{x}$	29

input
```
int((5*x^2*exp(-x+4)+10)/(x^2*exp(2)+4*x^2),x,method=_RETURNVERBOSE)
```

output
```
-(5*x*exp(-x+4)+10)/(4+exp(2))/x
```

3.186.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{10+5e^{4-x}x^2}{4x^2+e^2x^2}\,dx = -\frac{5\left(xe^{(-x+4)}+2\right)}{xe^2+4\,x}$$

input
```
integrate((5*x^2*exp(-x+4)+10)/(x^2*exp(2)+4*x^2),x, algorithm=\
```

output
```
-5*(x*e^(-x + 4) + 2)/(x*e^2 + 4*x)
```

3.186.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{10+5e^{4-x}x^2}{4x^2+e^2x^2}\,dx = -\frac{5e^{4-x}}{4+e^2}-\frac{10}{x\,(4+e^2)}$$

input
```
integrate((5*x**2*exp(-x+4)+10)/(x**2*exp(2)+4*x**2),x)
```

output
```
-5*exp(4 - x)/(4 + exp(2)) - 10/(x*(4 + exp(2)))
```

3.186.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{10+5e^{4-x}x^2}{4x^2+e^2x^2}\,dx = -\frac{5\,e^{(-x+4)}}{e^2+4}-\frac{10}{x(e^2+4)}$$

input
```
integrate((5*x^2*exp(-x+4)+10)/(x^2*exp(2)+4*x^2),x, algorithm=\
```

output
```
-5*e^(-x + 4)/(e^2 + 4) - 10/(x*(e^2 + 4))
```

3.186.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.41

$$\int \frac{10+5e^{4-x}x^2}{4x^2+e^2x^2}\,dx = -\frac{5\left((x-4)e^{(-x+4)}+4\,e^{(-x+4)}+2\right)}{(x-4)e^2+4\,x+4\,e^2}$$

input
```
integrate((5*x^2*exp(-x+4)+10)/(x^2*exp(2)+4*x^2),x, algorithm=\
```

output
```
-5*((x - 4)*e^(-x + 4) + 4*e^(-x + 4) + 2)/((x - 4)*e^2 + 4*x + 4*e^2)
```

3.186.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{10+5e^{4-x}x^2}{4x^2+e^2x^2}\,dx = -\frac{5\,x\,\mathrm{e}^{4-x}+10}{x\,\left(\mathrm{e}^2+4\right)}$$

input
```
int((5*x^2*exp(4 - x) + 10)/(x^2*exp(2) + 4*x^2),x)
```

output
```
-(5*x*exp(4 - x) + 10)/(x*(exp(2) + 4))
```

3.187 $\int \frac{4\log(5)+e^x(16-16x)\log^2(5}{1+(544-8x-32x^2)\log(5)+16e^{2x}\log^2(5)+(73984-2176x-8688x^2+1}$

3.187.1 Optimal result

Integrand size = 108, antiderivative size = 29

$$\int \frac{4\log(5)+e^x(16-16x)\log^2(5)+(1088+64x^2)\log^2(5)}{1+(544-8x-32x^2)\log(5)+16e^{2x}\log^2(5)+(73984-2176x-8688x^2+128x^3+256x^4)\log^2(5)+e^x}$$
$$=\frac{x}{4+e^x-x+4(16-x^2)+\frac{1}{4\log(5)}}$$

output
```
x/(-4*x^2+68+1/4/ln(5)-x+exp(x))
```

3.187.2 Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \frac{4\log(5)+e^x(16-16x)\log^2(5)+(1088+64x^2)\log^2(5)}{1+(544-8x-32x^2)\log(5)+16e^{2x}\log^2(5)+(73984-2176x-8688x^2+128x^3+256x^4)\log^2(5)+e^x}$$
$$=\frac{4x\log(5)}{1+272\log(5)+4e^x\log(5)-4x\log(5)-16x^2\log(5)}$$

input
```
Integrate[(4*Log[5] + E^x*(16 - 16*x)*Log[5]^2 + (1088 + 64*x^2)*Log[5]^2)
/(1 + (544 - 8*x - 32*x^2)*Log[5] + 16*E^(2*x)*Log[5]^2 + (73984 - 2176*x
- 8688*x^2 + 128*x^3 + 256*x^4)*Log[5]^2 + E^x*(8*Log[5] + (2176 - 32*x -
128*x^2)*Log[5]^2)),x]
```

output
```
(4*x*Log[5])/(1 + 272*Log[5] + 4*E^x*Log[5] - 4*x*Log[5] - 16*x^2*Log[5])
```

3.187.

$$\int \frac{4\log(5)+e^x(16-16x)\log^2(5)+(1088+64x^2)\log^2(5)}{1+(544-8x-32x^2)\log(5)+16e^{2x}\log^2(5)+(73984-2176x-8688x^2+128x^3+256x^4)\log^2(5)+e^x(8\log(5)+(2176-32x-128x^2)\log^2(5))}\,dx$$

3.187.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(64x^2+1088\right)\log^2(5)+e^x(16-16x)\log^2(5)+4\log(5)}{e^x\left(\left(-128x^2-32x+2176\right)\log^2(5)+8\log(5)\right)+\left(-32x^2-8x+544\right)\log(5)+\left(256x^4+128x^3-8688x^2-217\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{4\log(5)\left(16x^2\log(5)-4e^x(x-1)\log(5)+1+272\log(5)\right)}{\left(-16x^2\log(5)-4x\log(5)+4e^x\log(5)+1+272\log(5)\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$4\log(5)\int \frac{16\log(5)x^2+4e^x(1-x)\log(5)+272\log(5)+1}{\left(-16\log(5)x^2-4\log(5)x+4e^x\log(5)+272\log(5)+1\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$4\log(5)\int \left(\frac{x-1}{16\log(5)x^2+4\log(5)x-4e^x\log(5)-272\log(5)-1}-\frac{x\left(16\log(5)x^2-28\log(5)x-276\log(5)\right.}{\left(16\log(5)x^2+4\log(5)x-4e^x\log(5)-272\log\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$4\log(5)\left(\int \frac{1}{-16\log(5)x^2-4\log(5)x+4e^x\log(5)+272\log(5)+1}dx+(1+276\log(5))\int \frac{}{\left(16\log(5)x^2+4\log(5\right.}\right.$$

input
```
Int[(4*Log[5] + E^x*(16 - 16*x)*Log[5]^2 + (1088 + 64*x^2)*Log[5]^2)/(1 +
(544 - 8*x - 32*x^2)*Log[5] + 16*E^(2*x)*Log[5]^2 + (73984 - 2176*x - 8688
*x^2 + 128*x^3 + 256*x^4)*Log[5]^2 + E^x*(8*Log[5] + (2176 - 32*x - 128*x^
2)*Log[5]^2)),x]
```

output
```
$Aborted
```

3.187.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.187.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

method	result	size
risch	$-\frac{4x\ln(5)}{16x^2\ln(5)+4x\ln(5)-4\,e^x\ln(5)-272\ln(5)-1}$	32
parallelrisch	$-\frac{4x\ln(5)}{16x^2\ln(5)+4x\ln(5)-4\,e^x\ln(5)-272\ln(5)-1}$	32
norman	$\frac{-4\,e^x\ln(5)+16x^2\ln(5)-1-272\ln(5)}{16x^2\ln(5)+4x\ln(5)-4\,e^x\ln(5)-272\ln(5)-1}$	47

input
```
int(((-16*x+16)*ln(5)^2*exp(x)+(64*x^2+1088)*ln(5)^2+4*ln(5))/(16*ln(5)^2*
exp(x)^2+((-128*x^2-32*x+2176)*ln(5)^2+8*ln(5))*exp(x)+(256*x^4+128*x^3-86
88*x^2-2176*x+73984)*ln(5)^2+(-32*x^2-8*x+544)*ln(5)+1),x,method=_RETURNVE
RBOSE)
```

output
```
-4*x*ln(5)/(16*x^2*ln(5)+4*x*ln(5)-4*exp(x)*ln(5)-272*ln(5)-1)
```

3.187.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{4\log(5) + e^x(16-16x)\log^2(5) + (1088+64x^2)\log^2(5)}{1+(544-8x-32x^2)\log(5)+16e^{2x}\log^2(5)+(73984-2176x-8688x^2+128x^3+256x^4)\log^2(5)+e^x}$$
$$= -\frac{4\,x\log(5)}{4\,(4\,x^2+x-68)\log(5)-4\,e^x\log(5)-1}$$

input
```
integrate(((-16*x+16)*log(5)^2*exp(x)+(64*x^2+1088)*log(5)^2+4*log(5))/(16
*log(5)^2*exp(x)^2+((-128*x^2-32*x+2176)*log(5)^2+8*log(5))*exp(x)+(256*x^
4+128*x^3-8688*x^2-2176*x+73984)*log(5)^2+(-32*x^2-8*x+544)*log(5)+1),x, a
lgorithm=\
```

output
```
-4*x*log(5)/(4*(4*x^2 + x - 68)*log(5) - 4*e^x*log(5) - 1)
```

3.187.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24

$$\int \frac{4\log(5) + e^x(16-16x)\log^2(5) + (1088+64x^2)\log^2(5)}{1+(544-8x-32x^2)\log(5)+16e^{2x}\log^2(5)+(73984-2176x-8688x^2+128x^3+256x^4)\log^2(5)+e^x}$$
$$= \frac{4x\log(5)}{-16x^2\log(5)-4x\log(5)+4e^x\log(5)+1+272\log(5)}$$

input
```
integrate(((-16*x+16)*ln(5)**2*exp(x)+(64*x**2+1088)*ln(5)**2+4*ln(5))/(16
*ln(5)**2*exp(x)**2+((-128*x**2-32*x+2176)*ln(5)**2+8*ln(5))*exp(x)+(256*x
**4+128*x**3-8688*x**2-2176*x+73984)*ln(5)**2+(-32*x**2-8*x+544)*ln(5)+1),
x)
```

output
```
4*x*log(5)/(-16*x**2*log(5) - 4*x*log(5) + 4*exp(x)*log(5) + 1 + 272*log(5
))
```

3.187.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{4\log(5)+e^x(16-16x)\log^2(5)+(1088+64x^2)\log^2(5)}{1+(544-8x-32x^2)\log(5)+16e^{2x}\log^2(5)+(73984-2176x-8688x^2+128x^3+256x^4)\log^2(5)+e^x}$$
$$=-\frac{4\,x\log(5)}{16\,x^2\log(5)+4\,x\log(5)-4\,e^x\log(5)-272\,\log(5)-1}$$

input
```
integrate(((-16*x+16)*log(5)^2*exp(x)+(64*x^2+1088)*log(5)^2+4*log(5))/(16
*log(5)^2*exp(x)^2+((-128*x^2-32*x+2176)*log(5)^2+8*log(5))*exp(x)+(256*x^
4+128*x^3-8688*x^2-2176*x+73984)*log(5)^2+(-32*x^2-8*x+544)*log(5)+1),x, a
lgorithm=\
```

output
```
-4*x*log(5)/(16*x^2*log(5) + 4*x*log(5) - 4*e^x*log(5) - 272*log(5) - 1)
```

3.187.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{4\log(5)+e^x(16-16x)\log^2(5)+(1088+64x^2)\log^2(5)}{1+(544-8x-32x^2)\log(5)+16e^{2x}\log^2(5)+(73984-2176x-8688x^2+128x^3+256x^4)\log^2(5)+e^x}$$
$$=-\frac{4\,x\log(5)}{16\,x^2\log(5)+4\,x\log(5)-4\,e^x\log(5)-272\,\log(5)-1}$$

input
```
integrate(((-16*x+16)*log(5)^2*exp(x)+(64*x^2+1088)*log(5)^2+4*log(5))/(16
*log(5)^2*exp(x)^2+((-128*x^2-32*x+2176)*log(5)^2+8*log(5))*exp(x)+(256*x^
4+128*x^3-8688*x^2-2176*x+73984)*log(5)^2+(-32*x^2-8*x+544)*log(5)+1),x, a
lgorithm=\
```

output
```
-4*x*log(5)/(16*x^2*log(5) + 4*x*log(5) - 4*e^x*log(5) - 272*log(5) - 1)
```

3.187.9 Mupad [B] (verification not implemented)

Time = 14.18 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{4\log(5)+e^x(16-16x)\log^2(5)+(1088+64x^2)\log^2(5)}{1+(544-8x-32x^2)\log(5)+16e^{2x}\log^2(5)+(73984-2176x-8688x^2+128x^3+256x^4)\log^2(5)+e^x}$$

$$=\frac{4\,x\,\ln(5)}{272\,\ln(5)-4\,x\,\ln(5)-16\,x^2\,\ln(5)+4\,\mathrm{e}^x\,\ln(5)+1}$$

input
```
int((4*log(5) + log(5)^2*(64*x^2 + 1088) - exp(x)*log(5)^2*(16*x - 16))/(e
xp(x)*(8*log(5) - log(5)^2*(32*x + 128*x^2 - 2176)) + log(5)^2*(128*x^3 -
8688*x^2 - 2176*x + 256*x^4 + 73984) - log(5)*(8*x + 32*x^2 - 544) + 16*ex
p(2*x)*log(5)^2 + 1),x)
```

output
```
(4*x*log(5))/(272*log(5) - 4*x*log(5) - 16*x^2*log(5) + 4*exp(x)*log(5) +
1)
```

3.188 $\int \frac{16x^2+32x^3+24x^4+(32x^2+32x^3)\log(4)+(-16+8x^2)\log^2(4)+e^x(8x^2+8x^3+16x^2\log(4)+(-8+8x)\log^2(4))}{x^2}\,dx$

3.188.1 Optimal result

Integrand size = 78, antiderivative size = 23

$$\int \frac{16x^2+32x^3+24x^4+(32x^2+32x^3)\log(4)+(-16+8x^2)\log^2(4)+e^x(8x^2+8x^3+16x^2\log(4)+(-8+8x)\log^2(4))}{x^2}\,dx = 8\left(x+\frac{e^x+2(1+x)}{x}\right)(x+\log(4))^2$$

output
```
8*(x+2*ln(2))^2*((2*x+2+exp(x))/x+x)
```

3.188.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 47 vs. 2(23) = 46.

Time = 0.23 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.04

$$\int \frac{16x^2+32x^3+24x^4+(32x^2+32x^3)\log(4)+(-16+8x^2)\log^2(4)+e^x(8x^2+8x^3+16x^2\log(4)+(-8+8x)\log^2(4))}{x^2}\,dx = 8\left(x^3+\frac{(2+e^x)\log^2(4)}{x}+2x^2(1+\log(4))+e^x\log(16)+x\left(2+e^x+\log^2(4)+\log(256)\right)\right)$$

input
```
Integrate[(16*x^2 + 32*x^3 + 24*x^4 + (32*x^2 + 32*x^3)*Log[4] + (-16 + 8*
x^2)*Log[4]^2 + E^x*(8*x^2 + 8*x^3 + 16*x^2*Log[4] + (-8 + 8*x)*Log[4]^2))
/x^2,x]
```

3.188. $\int \frac{16x^2+32x^3+24x^4+(32x^2+32x^3)\log(4)+(-16+8x^2)\log^2(4)+e^x(8x^2+8x^3+16x^2\log(4)+(-8+8x)\log^2(4))}{x^2}\,dx$

output
```
8*(x^3 + ((2 + E^x)*Log[4]^2)/x + 2*x^2*(1 + Log[4]) + E^x*Log[16] + x*(2
+ E^x + Log[4]^2 + Log[256]))
```

3.188.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 67 vs. 2(23) = 46.

Time = 0.39 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.91, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.026, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{24x^4+32x^3+16x^2+(8x^2-16)\log^2(4)+e^x(8x^3+8x^2+16x^2\log(4)+(8x-8)\log^2(4))+(32x^3+32x^2)\log(4)}{x^2}$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(\frac{8e^x(x+\log(4))(x^2+x(1+\log(4))-\log(4))}{x^2}+\frac{8(3x^4+4x^3(1+\log(4))+x^2(2+\log^2(4)+\log(256))-2\log^2(4))}{x^2}\right)$$

$$\Big\downarrow \text{ 2009}$$

$$8x^3+16x^2(1+\log(4))+8e^xx-8e^x+8x(2+\log^2(4)+\log(256))+\frac{8e^x\log^2(4)}{x}+\frac{16\log^2(4)}{x}+8e^x(1+\log(16))$$

input
```
Int[(16*x^2 + 32*x^3 + 24*x^4 + (32*x^2 + 32*x^3)*Log[4] + (-16 + 8*x^2)*L
og[4]^2 + E^x*(8*x^2 + 8*x^3 + 16*x^2*Log[4] + (-8 + 8*x)*Log[4]^2))/x^2,x
]
```

output
```
-8*E^x + 8*E^x*x + 8*x^3 + (16*Log[4]^2)/x + (8*E^x*Log[4]^2)/x + 16*x^2*(
1 + Log[4]) + 8*E^x*(1 + Log[16]) + 8*x*(2 + Log[4]^2 + Log[256])
```

3.188.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.188.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. $2(23) = 46$.

Time = 0.13 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.83

method	result
norman	$\frac{(32\ln(2)+16)x^3+\left(32\ln(2)^2+64\ln(2)+16\right)x^2+8x^4+64\ln(2)^2+8\,\mathrm{e}^x x^2+32\ln(2)^2\mathrm{e}^x+32x\ln(2)\mathrm{e}^x}{x}$
risch	$32x\ln(2)^2+32x^2\ln(2)+8x^3+64x\ln(2)+16x^2+16x+\frac{64\ln(2)^2}{x}+\frac{8\left(4\ln(2)^2+4x\ln(2)+x^2\right)\mathrm{e}^x}{x}$
parts	$32x\ln(2)^2+32x^2\ln(2)+8x^3+64x\ln(2)+16x^2+16x+\frac{64\ln(2)^2}{x}+8\,\mathrm{e}^x x+32\,\mathrm{e}^x\ln(2)+$
parallelrisch	$\frac{32x^2\ln(2)^2+32x^3\ln(2)+8x^4+32\ln(2)^2\mathrm{e}^x+64x^2\ln(2)+32x\ln(2)\mathrm{e}^x+16x^3+8\,\mathrm{e}^x x^2+64\ln(2)^2+16x^2}{x}$
default	$8x^3+16x^2+16x+32x\ln(2)^2+32x^2\ln(2)+8\,\mathrm{e}^x x+32\,\mathrm{e}^x\ln(2)+\frac{64\ln(2)^2}{x}-32\ln(2)^2\,(-$

input
```
int(((4*(8*x-8)*ln(2)^2+32*x^2*ln(2)+8*x^3+8*x^2)*exp(x)+4*(8*x^2-16)*ln(2
)^2+2*(32*x^3+32*x^2)*ln(2)+24*x^4+32*x^3+16*x^2)/x^2,x,method=_RETURNVERB
OSE)
```

output
```
((32*ln(2)+16)*x^3+(32*ln(2)^2+64*ln(2)+16)*x^2+8*x^4+64*ln(2)^2+8*exp(x)*
x^2+32*ln(2)^2*exp(x)+32*x*ln(2)*exp(x))/x
```

3.188.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(23) = 46.

Time = 0.25 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.65

$$\int \frac{16x^2+32x^3+24x^4+(32x^2+32x^3)\log(4)+(-16+8x^2)\log^2(4)+e^x(8x^2+8x^3+16x^2\log(4)+(-8+\dots}{x^2}$$
$$= \frac{8\left(x^4+2x^3+4(x^2+2)\log(2)^2+2x^2+\left(x^2+4x\log(2)+4\log(2)^2\right)e^x+4(x^3+2x^2)\log(2)\right)}{x}$$

input
```
integrate(((4*(8*x-8)*log(2)^2+32*x^2*log(2)+8*x^3+8*x^2)*exp(x)+4*(8*x^2-
16)*log(2)^2+2*(32*x^3+32*x^2)*log(2)+24*x^4+32*x^3+16*x^2)/x^2,x, algorit
hm=\
```

output
```
8*(x^4 + 2*x^3 + 4*(x^2 + 2)*log(2)^2 + 2*x^2 + (x^2 + 4*x*log(2) + 4*log(
2)^2)*e^x + 4*(x^3 + 2*x^2)*log(2))/x
```

3.188.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(20) = 40.

Time = 0.10 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.65

$$\int \frac{16x^2+32x^3+24x^4+(32x^2+32x^3)\log(4)+(-16+8x^2)\log^2(4)+e^x(8x^2+8x^3+16x^2\log(4)+(-8+\dots}{x^2}$$
$$= 8x^3+x^2\cdot(16+32\log(2))+x\left(32\log(2)^2+16+64\log(2)\right) + \frac{\left(8x^2+32x\log(2)+32\log(2)^2\right)e^x}{x}+\frac{64\log(2)^2}{x}$$

input
```
integrate(((4*(8*x-8)*ln(2)**2+32*x**2*ln(2)+8*x**3+8*x**2)*exp(x)+4*(8*x*
*2-16)*ln(2)**2+2*(32*x**3+32*x**2)*ln(2)+24*x**4+32*x**3+16*x**2)/x**2,x)
```

output
```
8*x**3 + x**2*(16 + 32*log(2)) + x*(32*log(2)**2 + 16 + 64*log(2)) + (8*x*
*2 + 32*x*log(2) + 32*log(2)**2)*exp(x)/x + 64*log(2)**2/x
```

3.188.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 78, normalized size of antiderivative = 3.39

$$\int \frac{16x^2 + 32x^3 + 24x^4 + (32x^2 + 32x^3)\log(4) + (-16 + 8x^2)\log^2(4) + e^x(8x^2 + 8x^3 + 16x^2\log(4) + (-8 +}{x^2}$$
$$= 8x^3 + 32x^2\log(2) + 32x\log(2)^2 + 32\,\mathrm{Ei}(x)\log(2)^2 - 32\,\Gamma(-1, -x)\log(2)^2 + 16x^2 + 8(x-1)e^x + 64x\log(2) + 32e^x\log(2) + 16x + \frac{64\log(2)^2}{x} + 8e^x$$

input
```
integrate(((4*(8*x-8)*log(2)^2+32*x^2*log(2)+8*x^3+8*x^2)*exp(x)+4*(8*x^2-
16)*log(2)^2+2*(32*x^3+32*x^2)*log(2)+24*x^4+32*x^3+16*x^2)/x^2,x, algorit
hm=\
```

output
```
8*x^3 + 32*x^2*log(2) + 32*x*log(2)^2 + 32*Ei(x)*log(2)^2 - 32*gamma(-1, -
x)*log(2)^2 + 16*x^2 + 8*(x - 1)*e^x + 64*x*log(2) + 32*e^x*log(2) + 16*x
+ 64*log(2)^2/x + 8*e^x
```

3.188.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. 2(23) = 46.

Time = 0.28 (sec) , antiderivative size = 69, normalized size of antiderivative = 3.00

$$\int \frac{16x^2 + 32x^3 + 24x^4 + (32x^2 + 32x^3)\log(4) + (-16 + 8x^2)\log^2(4) + e^x(8x^2 + 8x^3 + 16x^2\log(4) + (-8 +}{x^2}$$
$$= \frac{8(x^4 + 4x^3\log(2) + 4x^2\log(2)^2 + 2x^3 + x^2e^x + 8x^2\log(2) + 4xe^x\log(2) + 4e^x\log(2)^2 + 2x^2 + 8\log}{x}$$

input
```
integrate(((4*(8*x-8)*log(2)^2+32*x^2*log(2)+8*x^3+8*x^2)*exp(x)+4*(8*x^2-
16)*log(2)^2+2*(32*x^3+32*x^2)*log(2)+24*x^4+32*x^3+16*x^2)/x^2,x, algorit
hm=\
```

output
```
8*(x^4 + 4*x^3*log(2) + 4*x^2*log(2)^2 + 2*x^3 + x^2*e^x + 8*x^2*log(2) +
4*x*e^x*log(2) + 4*e^x*log(2)^2 + 2*x^2 + 8*log(2)^2)/x
```

3.188.9 Mupad [B] (verification not implemented)

Time = 13.82 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.57

$$\int \frac{16x^2+32x^3+24x^4+(32x^2+32x^3)\log(4)+(-16+8x^2)\log^2(4)+e^x(8x^2+8x^3+16x^2\log(4)+(-8+
$$

$$= x^2\,(32\,\ln(2)+16)+x\,\left(64\,\ln(2)+8\,e^x+32\,{\ln(2)}^2+16\right) + 32\,e^x\,\ln(2)+\frac{32\,e^x\,{\ln(2)}^2+64\,{\ln(2)}^2}{x}+8\,x^3$$

input
```
int((exp(x)*(4*log(2)^2*(8*x - 8) + 32*x^2*log(2) + 8*x^2 + 8*x^3) + 2*log
(2)*(32*x^2 + 32*x^3) + 4*log(2)^2*(8*x^2 - 16) + 16*x^2 + 32*x^3 + 24*x^4
)/x^2,x)
```

output
```
x^2*(32*log(2) + 16) + x*(64*log(2) + 8*exp(x) + 32*log(2)^2 + 16) + 32*ex
p(x)*log(2) + (32*exp(x)*log(2)^2 + 64*log(2)^2)/x + 8*x^3
```

3.189 $\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}\,dx$

3.189.1 Optimal result

Integrand size = 36, antiderivative size = 16

$$\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}\,dx = 8e^{e^{\frac{5}{4\log^2(x^2)}}}$$

output
```
exp(exp(5/4/ln(x^2)^2)+3*ln(2))
```

3.189.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}\,dx = 8e^{e^{\frac{5}{4\log^2(x^2)}}}$$

input
```
Integrate[(-40*E^(E^(5/(4*Log[x^2]^2)) + 5/(4*Log[x^2]^2)))/(x*Log[x^2]^3)
,x]
```

output
```
8*E^E^(5/(4*Log[x^2]^2))
```

3.189.3 Rubi [A] (warning: unable to verify)

Time = 0.36 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.31, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.139, Rules used = {27, 3039, 7266, 2720, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}dx$$

$$\Big\downarrow \; 27$$

$$-40\int \frac{e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}dx$$

$$\Big\downarrow \; 3039$$

$$-20\int \frac{e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{\log^3(x^2)}d\log(x^2)$$

$$\Big\downarrow \; 7266$$

$$10\int e^{(x^2)^{5/4}}(x^2)^{5/4}d\frac{1}{\log^2(x^2)}$$

$$\Big\downarrow \; 2720$$

$$8\int x^2 d(x^2)^{5/4}$$

$$\Big\downarrow \; 2624$$

$$8x^2$$

input
```
Int[(-40*E^(E^(5/(4*Log[x^2]^2)) + 5/(4*Log[x^2]^2)))/(x*Log[x^2]^3),x]
```

output
```
8*x^2
```

3.189. $\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}dx$

3.189.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

rule 2720
```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ
[{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))
*(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

rule 3039
```
Int[u_, x_Symbol] :> With[{lst = FunctionOfLog[Cancel[x*u], x]}, Simp[1/lst
[[3]]   Subst[Int[lst[[1]], x], x, Log[lst[[2]]]], x] /;  !FalseQ[lst]] /;
NonsumQ[u]
```

rule 7266
```
Int[(u_)*(x_)^(m_.), x_Symbol] :> Simp[1/(m + 1)   Subst[Int[SubstFor[x^(m
+ 1), u, x], x], x, x^(m + 1)], x] /; FreeQ[m, x] && NeQ[m, -1] && Function
OfQ[x^(m + 1), u, x]
```

3.189.4 Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

method	result	size
risch	$8\,\mathrm{e}^{\mathrm{e}^{\frac{5}{4 \ln\left(x^{2}\right)^{2}}}}$	13
derivativedivides	$\mathrm{e}^{\mathrm{e}^{\frac{5}{4 \ln\left(x^{2}\right)^{2}}}+3 \ln\left(2\right)}$	16
default	$\mathrm{e}^{\mathrm{e}^{\frac{5}{4 \ln\left(x^{2}\right)^{2}}}+3 \ln\left(2\right)}$	16
parallelrisch	$\mathrm{e}^{\mathrm{e}^{\frac{5}{4 \ln\left(x^{2}\right)^{2}}}+3 \ln\left(2\right)}$	16

3.189. $\int -\frac{40 e^{e^{\frac{5}{4 \log^2\left(x^2\right)}}+\frac{5}{4 \log^2\left(x^2\right)}}}{x \log^3\left(x^2\right)}\,dx$

input
```
int(-5*exp(5/4/ln(x^2)^2)*exp(exp(5/4/ln(x^2)^2)+3*ln(2))/x/ln(x^2)^3,x,me
thod=_RETURNVERBOSE)
```

output
```
8*exp(exp(5/4/ln(x^2)^2))
```

3.189.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(15) = 30$.

Time = 0.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.94

$$\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}\,dx = e^{\left(\frac{4\,e^{\left(\frac{5}{4\,\log(x^2)^2}\right)}\log(x^2)^2+12\,\log(2)\log(x^2)^2+5}{4\,\log(x^2)^2}-\frac{5}{4\,\log(x^2)^2}\right)}$$

input
```
integrate(-5*exp(5/4/log(x^2)^2)*exp(exp(5/4/log(x^2)^2)+3*log(2))/x/log(x
^2)^3,x, algorithm=\
```

output
```
e^(1/4*(4*e^(5/4/log(x^2)^2)*log(x^2)^2 + 12*log(2)*log(x^2)^2 + 5)/log(x^
2)^2 - 5/4/log(x^2)^2)
```

3.189.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}\,dx = 8e^{e^{\frac{5}{4\log(x^2)^2}}}$$

input
```
integrate(-5*exp(5/4/ln(x**2)**2)*exp(exp(5/4/ln(x**2)**2)+3*ln(2))/x/ln(x
**2)**3,x)
```

output
```
8*exp(exp(5/(4*log(x**2)**2)))
```

3.189.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}\,dx = 8\,e^{\left(e^{\left(\frac{5}{16\,\log(x)^2}\right)}\right)}$$

input
```
integrate(-5*exp(5/4/log(x^2)^2)*exp(exp(5/4/log(x^2)^2)+3*log(2))/x/log(x
^2)^3,x, algorithm=\
```

output
```
8*e^(e^(5/16/log(x)^2))
```

3.189.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(15) = 30.

Time = 0.30 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.44

$$\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}\,dx = 8\,e^{\left(\frac{4\,e^{\left(\frac{5}{4\,\log\left(x^2\right)^2}\right)}\log\left(x^2\right)^2+5}{4\,\log\left(x^2\right)^2}-\frac{5}{4\,\log\left(x^2\right)^2}\right)}$$

input
```
integrate(-5*exp(5/4/log(x^2)^2)*exp(exp(5/4/log(x^2)^2)+3*log(2))/x/log(x
^2)^3,x, algorithm=\
```

output
```
8*e^(1/4*(4*e^(5/4/log(x^2)^2)*log(x^2)^2 + 5)/log(x^2)^2 - 5/4/log(x^2)^2
)
```

3.189.9 Mupad [B] (verification not implemented)

Time = 14.37 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int -\frac{40e^{e^{\frac{5}{4\log^2(x^2)}}+\frac{5}{4\log^2(x^2)}}}{x\log^3(x^2)}\,dx = 8\,\mathrm{e}^{\mathrm{e}^{\frac{5}{4\ln\left(x^2\right)^2}}}$$

input
```
int(-(5*exp(5/(4*log(x^2)^2))*exp(exp(5/(4*log(x^2)^2)) + 3*log(2)))/(x*lo
g(x^2)^3),x)
```

output
```
8*exp(exp(5/(4*log(x^2)^2)))
```

3.189. $$\int -\frac{40e^{e^{\frac{5}{4\log^2\left(x^2\right)}}+\frac{5}{4\log^2\left(x^2\right)}}}{x\log^3(x^2)}\,dx$$

3.190 $\int \frac{e^{33-3e^5+3e^x+96x^2}\left(1+\left(3e^x x+192x^2\right)\log(x)\right)}{x}\,dx$

3.190.1 Optimal result

Integrand size = 40, antiderivative size = 22

$$\int \frac{e^{33-3e^5+3e^x+96x^2}\left(1+\left(3e^x x+192x^2\right)\log(x)\right)}{x}\,dx = e^{3\left(11-e^5+e^x+32x^2\right)}\log(x)$$

output
```
ln(x)*exp(3*exp(x)-3*exp(5)+96*x^2+33)
```

3.190.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^{33-3e^5+3e^x+96x^2}\left(1+\left(3e^x x+192x^2\right)\log(x)\right)}{x}\,dx = e^{33-3e^5+3e^x+96x^2}\log(x)$$

input
```
Integrate[(E^(33 - 3*E^5 + 3*E^x + 96*x^2)*(1 + (3*E^x*x + 192*x^2)*Log[x]
))/x,x]
```

output
```
E^(33 - 3*E^5 + 3*E^x + 96*x^2)*Log[x]
```

3.190.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 48 vs. $2(22) = 44$.

Time = 0.26 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.18, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.025$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{96x^2+3e^x-3e^5+33}\left(\left(192x^2+3e^x x\right)\log(x)+1\right)}{x}dx$$
$$\Big\downarrow \ 2726$$
$$\frac{e^{96x^2+3e^x+3(11-e^5)}\left(64x^2+e^x x\right)\log(x)}{x\left(64x+e^x\right)}$$

input
```
Int[(E^(33 - 3*E^5 + 3*E^x + 96*x^2)*(1 + (3*E^x*x + 192*x^2)*Log[x]))/x,x
]
```

output
```
(E^(3*E^x + 3*(11 - E^5) + 96*x^2)*(E^x*x + 64*x^2)*Log[x])/(x*(E^x + 64*x
))
```

3.190.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.190.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

method	result	size
risch	$\ln(x)\,\mathrm{e}^{3\,\mathrm{e}^{x}-3\,\mathrm{e}^{5}+96x^{2}+33}$	20
parallelrisch	$\ln(x)\,\mathrm{e}^{3\,\mathrm{e}^{x}-3\,\mathrm{e}^{5}+96x^{2}+33}$	20

input
```
int(((3*exp(x)*x+192*x^2)*ln(x)+1)*exp(3*exp(x)-3*exp(5)+96*x^2+33)/x,x,me
thod=_RETURNVERBOSE)
```

output
```
ln(x)*exp(3*exp(x)-3*exp(5)+96*x^2+33)
```

3.190.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{e^{33-3e^5+3e^x+96x^2}(1+(3e^x x+192x^2)\log(x))}{x}\,dx = e^{\left(96\,x^2-3\,e^5+3\,e^x+33\right)}\log\left(x\right)$$

input
```
integrate(((3*exp(x)*x+192*x^2)*log(x)+1)*exp(3*exp(x)-3*exp(5)+96*x^2+33)
/x,x, algorithm=\
```

output
```
e^(96*x^2 - 3*e^5 + 3*e^x + 33)*log(x)
```

3.190.6 Sympy [A] (verification not implemented)

Time = 2.09 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{e^{33-3e^5+3e^x+96x^2}(1+(3e^x x+192x^2)\log(x))}{x}\,dx = e^{96x^2+3e^x-3e^5+33}\log\left(x\right)$$

input
```
integrate(((3*exp(x)*x+192*x**2)*ln(x)+1)*exp(3*exp(x)-3*exp(5)+96*x**2+33
)/x,x)
```

output
```
exp(96*x**2 + 3*exp(x) - 3*exp(5) + 33)*log(x)
```

3.190.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{e^{33-3e^5+3e^x+96x^2}(1+(3e^x x+192x^2)\log(x))}{x}\,dx = e^{\left(96\,x^2-3\,e^5+3\,e^x+33\right)}\log\left(x\right)$$

input
```
integrate(((3*exp(x)*x+192*x^2)*log(x)+1)*exp(3*exp(x)-3*exp(5)+96*x^2+33)
/x,x, algorithm=\
```

output
```
e^(96*x^2 - 3*e^5 + 3*e^x + 33)*log(x)
```

3.190.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{e^{33-3e^5+3e^x+96x^2}(1+(3e^x x+192x^2)\log(x))}{x}\,dx = e^{\left(96\,x^2-3\,e^5+3\,e^x+33\right)}\log\left(x\right)$$

input
```
integrate(((3*exp(x)*x+192*x^2)*log(x)+1)*exp(3*exp(x)-3*exp(5)+96*x^2+33)
/x,x, algorithm=\
```

output
```
e^(96*x^2 - 3*e^5 + 3*e^x + 33)*log(x)
```

3.190.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{33-3e^5+3e^x+96x^2}(1+(3e^x x+192x^2)\log(x))}{x}\,dx = \int \frac{e^{3\,e^x-3\,e^5+96\,x^2+33}\,\left(\ln\left(x\right)\,\left(3\,x\,e^x+192\,x^2\right)+1\right)}{x}\,dx$$

input
```
int((exp(3*exp(x) - 3*exp(5) + 96*x^2 + 33)*(log(x)*(3*x*exp(x) + 192*x^2)
 + 1))/x,x)
```

output
```
int((exp(3*exp(x) - 3*exp(5) + 96*x^2 + 33)*(log(x)*(3*x*exp(x) + 192*x^2)
 + 1))/x, x)
```

3.191 $\int \frac{4+e^4+x+\left(1+e^9\left(-4-e^4-x\right)\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9\left(-4x-e^4x-x^2\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+\left(4+e^4+x\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left(\left(4+e^4+x\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}\,dx$

3.191.1 Optimal result

Integrand size = 121, antiderivative size = 27

$$\int \frac{4+e^4+x+\left(1+e^9\left(-4-e^4-x\right)\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9\left(-4x-e^4x-x^2\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+\left(4+e^4+x\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left(\left(4+e^4+x\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}\,dx = 5+\log\left(-e^9x+\log\left(\left(4+e^4+x\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)\right)$$

output
```
5+ln(ln((x+4+exp(4))*ln(ln(1/4*exp(x))))-x*exp(9))
```

3.191.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{4+e^4+x+\left(1+e^9\left(-4-e^4-x\right)\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9\left(-4x-e^4x-x^2\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+\left(4+e^4+x\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left(\left(4+e^4+x\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}\,dx = \log\left(e^9x-\log\left(\left(4+e^4+x\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)\right)$$

input
```
Integrate[(4 + E^4 + x + (1 + E^9*(-4 - E^4 - x))*Log[E^x/4]*Log[Log[E^x/4
]])/(E^9*(-4*x - E^4*x - x^2)*Log[E^x/4]*Log[Log[E^x/4]] + (4 + E^4 + x)*L
og[E^x/4]*Log[Log[E^x/4]]*Log[(4 + E^4 + x)*Log[Log[E^x/4]]]),x]
```

output
```
Log[E^9*x - Log[(4 + E^4 + x)*Log[Log[E^x/4]]]]
```


$$\int \frac{4+e^4+x+\left(1+e^9\left(-4-e^4-x\right)\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9\left(-4x-e^4x-x^2\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+\left(4+e^4+x\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left(\left(4+e^4+x\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}\,dx$$

3.191.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x+\left(e^9\left(-x-e^4-4\right)+1\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+e^4+4}{e^9\left(-x^2-e^4x-4x\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+\left(x+e^4+4\right)\log\left(\frac{e^x}{4}\right)\log\left(\left(x+e^4+4\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)\log\left(\log\left(\frac{e^x}{4}\right.\right.}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{-x-\left(e^9\left(-x-e^4-4\right)+1\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)-4\left(1+\frac{e^4}{4}\right)}{\left(x+e^4+4\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\left(e^9x-\log\left(\left(x+e^4+4\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)\right)}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{e^9x}{\left(x+e^4+4\right)\left(e^9x-\log\left(\left(x+e^4+4\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)\right)}-\frac{x}{\left(x+e^4+4\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\left(e^9x-\log\left(\left(x+e\right.\right.\right.}\right.$$

$$\Big\downarrow \ 2009$$

$$e^9\int \frac{1}{e^9x-\log\left(\left(x+e^4+4\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}dx-\left(1-4e^9-e^{13}\right)\int \frac{1}{\left(x+e^4+4\right)\left(e^9x-\log\left(\left(x+e^4+4\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)\right)}dx-e^9\left(4+e^4\right)\int \frac{1}{\left(x+e^4+4\right)\left(e^9x-\log\left(\left(x+e^4+4\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)\right)}dx-\int \frac{1}{\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\left(e^9x-\log\left(\left(x+e^4+4\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)\right)}dx$$

input
```
Int[(4 + E^4 + x + (1 + E^9*(-4 - E^4 - x))*Log[E^x/4]*Log[Log[E^x/4]])/(E
^9*(-4*x - E^4*x - x^2)*Log[E^x/4]*Log[Log[E^x/4]] + (4 + E^4 + x)*Log[E^x
/4]*Log[Log[E^x/4]]*Log[(4 + E^4 + x)*Log[Log[E^x/4]]]),x]
```

output
```
$Aborted
```

3.191.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.191.4 Maple [A] (verified)

Time = 111.49 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

method	result	size
parallelrisch	$\ln\left(\left(x\,\mathrm{e}^{9}-\ln\left(\left(x+4+\mathrm{e}^{4}\right)\ln\left(\ln\left(\frac{\mathrm{e}^{x}}{4}\right)\right)\right)\right)\mathrm{e}^{-9}\right)$	27

input
```
int((((-exp(4)-x-4)*exp(9)+1)*ln(1/4*exp(x))*ln(ln(1/4*exp(x)))+x+4+exp(4)
)/((x+4+exp(4))*ln(1/4*exp(x))*ln(ln(1/4*exp(x)))*ln((x+4+exp(4))*ln(ln(1/
4*exp(x))))+(-x*exp(4)-x^2-4*x)*exp(9)*ln(1/4*exp(x))*ln(ln(1/4*exp(x)))),
x,method=_RETURNVERBOSE)
```

output
```
ln((x*exp(9)-ln((x+4+exp(4))*ln(ln(1/4*exp(x)))))/exp(9))
```

3.191.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{4+e^4+x+(1+e^9(-4-e^4-x))\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9\left(-4x-e^4x-x^2\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+\left(4+e^4+x\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left(\left(4+e^4+x\right)\log\left(\log\right.\right.}$$
$$=\log\left(-xe^9+\log\left(\left(x+e^4+4\right)\log\left(x-2\log(2)\right)\right)\right)$$

input
```
integrate((((-exp(4)-x-4)*exp(9)+1)*log(1/4*exp(x))*log(log(1/4*exp(x)))+x
+4+exp(4))/((x+4+exp(4))*log(1/4*exp(x))*log(log(1/4*exp(x)))*log((x+4+exp
(4))*log(log(1/4*exp(x))))+(-x*exp(4)-x^2-4*x)*exp(9)*log(1/4*exp(x))*log(
log(1/4*exp(x)))),x, algorithm=\
```

output
```
log(-x*e^9 + log((x + e^4 + 4)*log(x - 2*log(2))))
```

3.191.6 Sympy [F(-1)]

Timed out.

$$\int \frac{4+e^4+x+(1+e^9(-4-e^4-x))\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9\left(-4x-e^4x-x^2\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+(4+e^4+x)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left((4+e^4+x)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}\,dx$$
$= \text{Timed out}$

input
```
integrate((((-exp(4)-x-4)*exp(9)+1)*ln(1/4*exp(x))*ln(ln(1/4*exp(x)))+x+4+
exp(4))/((x+4+exp(4))*ln(1/4*exp(x))*ln(ln(1/4*exp(x)))*ln((x+4+exp(4))*ln
(ln(1/4*exp(x))))+(-x*exp(4)-x**2-4*x)*exp(9)*ln(1/4*exp(x))*ln(ln(1/4*exp
(x)))),x)
```

output
```
Timed out
```

3.191.7 Maxima [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{4+e^4+x+(1+e^9(-4-e^4-x))\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9\left(-4x-e^4x-x^2\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+(4+e^4+x)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left((4+e^4+x)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}\,dx$$
$= \log\left(-xe^9+\log\left(x+e^4+4\right)+\log\left(\log\left(x-2\log\left(2\right)\right)\right)\right)$

input
```
integrate((((-exp(4)-x-4)*exp(9)+1)*log(1/4*exp(x))*log(log(1/4*exp(x)))+x
+4+exp(4))/((x+4+exp(4))*log(1/4*exp(x))*log(log(1/4*exp(x)))*log((x+4+exp
(4))*log(log(1/4*exp(x))))+(-x*exp(4)-x^2-4*x)*exp(9)*log(1/4*exp(x))*log(
log(1/4*exp(x)))),x, algorithm=\
```

output
```
log(-x*e^9 + log(x + e^4 + 4) + log(log(x - 2*log(2))))
```

3.191.
$\int \frac{4+e^4+x+(1+e^9(-4-e^4-x))\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9(-4x-e^4x-x^2)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+(4+e^4+x)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left((4+e^4+x)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}\,dx$

3.191.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{4+e^4+x+\left(1+e^9\left(-4-e^4-x\right)\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9\left(-4x-e^4x-x^2\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+\left(4+e^4+x\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left(\left(4+e^4+x\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}$$
$$=\log\left(-xe^9+\log\left(x+e^4+4\right)+\log\left(\log\left(x-2\log\left(2\right)\right)\right)\right)$$

input
```
integrate((((-exp(4)-x-4)*exp(9)+1)*log(1/4*exp(x))*log(log(1/4*exp(x)))+x
+4+exp(4))/((x+4+exp(4))*log(1/4*exp(x))*log(log(1/4*exp(x)))*log((x+4+exp
(4))*log(log(1/4*exp(x))))+(-x*exp(4)-x^2-4*x)*exp(9)*log(1/4*exp(x))*log(
log(1/4*exp(x)))),x, algorithm=\
```

output
```
log(-x*e^9 + log(x + e^4 + 4) + log(log(x - 2*log(2))))
```

3.191.9 Mupad [B] (verification not implemented)

Time = 14.21 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{4+e^4+x+\left(1+e^9\left(-4-e^4-x\right)\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)}{e^9\left(-4x-e^4x-x^2\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)+\left(4+e^4+x\right)\log\left(\frac{e^x}{4}\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\log\left(\left(4+e^4+x\right)\log\left(\log\left(\frac{e^x}{4}\right)\right)\right)}$$
$$=\ln\left(\ln\left(\ln\left(x-\ln\left(4\right)\right)\right)\left(x+\mathrm{e}^4+4\right)\right)-x\,\mathrm{e}^9\right)$$

input
```
int((x + exp(4) - log(log(exp(x)/4))*log(exp(x)/4)*(exp(9)*(x + exp(4) + 4
) - 1) + 4)/(log(log(exp(x)/4))*log(log(log(exp(x)/4))*(x + exp(4) + 4))*l
og(exp(x)/4)*(x + exp(4) + 4) - log(log(exp(x)/4))*exp(9)*log(exp(x)/4)*(4
*x + x*exp(4) + x^2)),x)
```

output
```
log(log(log(x - log(4))*(x + exp(4) + 4)) - x*exp(9))
```

3.192 $\int \left(16+3x+6x^2+x^3+\left(-2x-3x^2\right)\log\left(e^{-x}x\right)\right)\,dx$

3.192.1 Optimal result

Integrand size = 31, antiderivative size = 28

$$\int \left(16+3x+6x^2+x^3+\left(-2x-3x^2\right)\log\left(e^{-x}x\right)\right)\,dx=4x\left(4+\left(\frac{1}{4}+\frac{x}{4}\right)x\left(2-\log\left(e^{-x}x\right)\right)\right)$$

output
```
4*(4+(1/4+1/4*x)*x*(2-ln(x/exp(x))))*x
```

3.192.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

$$\begin{aligned}&\int \left(16+3x+6x^2+x^3+\left(-2x-3x^2\right)\log\left(e^{-x}x\right)\right)\,dx\\&=16x+2x^2+2x^3-x^2\log\left(e^{-x}x\right)-x^3\log\left(e^{-x}x\right)\end{aligned}$$

input
```
Integrate[16 + 3*x + 6*x^2 + x^3 + (-2*x - 3*x^2)*Log[x/E^x],x]
```

output
```
16*x + 2*x^2 + 2*x^3 - x^2*Log[x/E^x] - x^3*Log[x/E^x]
```

3.192.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.032$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(x^3+6x^2+\left(-3x^2-2x\right)\log\left(e^{-x}x\right)+3x+16\right)\,dx$$

$$\Big\downarrow \ 2009$$

$$2x^3+x^3\left(-\log\left(e^{-x}x\right)\right)+2x^2-x^2\log\left(e^{-x}x\right)+16x$$

input
```
Int[16 + 3*x + 6*x^2 + x^3 + (-2*x - 3*x^2)*Log[x/E^x],x]
```

output
```
16*x + 2*x^2 + 2*x^3 - x^2*Log[x/E^x] - x^3*Log[x/E^x]
```

3.192.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.192.4 Maple [A] (verified)

Time = 3.33 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

method	result
default	$16x-\ln\left(x\,\mathrm{e}^{-x}\right)x^3-x^2\ln\left(x\,\mathrm{e}^{-x}\right)+2x^2+2x^3$
norman	$16x-\ln\left(x\,\mathrm{e}^{-x}\right)x^3-x^2\ln\left(x\,\mathrm{e}^{-x}\right)+2x^2+2x^3$
parallelrisch	$16x-\ln\left(x\,\mathrm{e}^{-x}\right)x^3-x^2\ln\left(x\,\mathrm{e}^{-x}\right)+2x^2+2x^3$
parts	$16x-\ln\left(x\,\mathrm{e}^{-x}\right)x^3-x^2\ln\left(x\,\mathrm{e}^{-x}\right)+2x^2+2x^3$
risch	$\left(x^3+x^2\right)\ln\left(\mathrm{e}^{x}\right)-x^3\ln\left(x\right)-x^2\ln\left(x\right)+\frac{i\pi\,x^3\,\mathrm{csgn}(ix)\,\mathrm{csgn}\left(i\mathrm{e}^{-x}\right)\,\mathrm{csgn}\left(ix\,\mathrm{e}^{-x}\right)}{2}-\frac{i\pi\,x^3\,\mathrm{csgn}(ix)\,\mathrm{csgn}\left(ix\,\mathrm{e}^{-\right.}}{2}$

input
```
int((-3*x^2-2*x)*ln(x/exp(x))+x^3+6*x^2+3*x+16,x,method=_RETURNVERBOSE)
```

output
```
16*x-ln(x/exp(x))*x^3-x^2*ln(x/exp(x))+2*x^2+2*x^3
```

3.192.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \left(16+3x+6x^2+x^3+\left(-2x-3x^2\right)\log\left(e^{-x}x\right)\right)\,dx$$
$$=2\,x^3+2\,x^2-\left(x^3+x^2\right)\log\left(xe^{(-x)}\right)+16\,x$$

input
```
integrate((-3*x^2-2*x)*log(x/exp(x))+x^3+6*x^2+3*x+16,x, algorithm=\
```

output
```
2*x^3 + 2*x^2 - (x^3 + x^2)*log(x*e^(-x)) + 16*x
```

3.192.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \left(16+3x+6x^2+x^3+\left(-2x-3x^2\right)\log\left(e^{-x}x\right)\right)\,dx$$
$$=2x^3+2x^2+16x+\left(-x^3-x^2\right)\log\left(xe^{-x}\right)$$

input
```
integrate((-3*x**2-2*x)*ln(x/exp(x))+x**3+6*x**2+3*x+16,x)
```

output
```
2*x**3 + 2*x**2 + 16*x + (-x**3 - x**2)*log(x*exp(-x))
```

3.192.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \left(16+3x+6x^2+x^3+\left(-2x-3x^2\right)\log\left(e^{-x}x\right)\right)\,dx$$
$$=2\,x^3+2\,x^2-\left(x^3+x^2\right)\log\left(xe^{(-x)}\right)+16\,x$$

input
```
integrate((-3*x^2-2*x)*log(x/exp(x))+x^3+6*x^2+3*x+16,x, algorithm=\
```

output
```
2*x^3 + 2*x^2 - (x^3 + x^2)*log(x*e^(-x)) + 16*x
```

3.192.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \left(16+3x+6x^2+x^3+\left(-2x-3x^2\right)\log\left(e^{-x}x\right)\right)\,dx$$
$$= x^4 - x^3\log(x) + 3\,x^3 - x^2\log(x) + 2\,x^2 + 16\,x$$

input
```
integrate((-3*x^2-2*x)*log(x/exp(x))+x^3+6*x^2+3*x+16,x, algorithm=\
```

output
```
x^4 - x^3*log(x) + 3*x^3 - x^2*log(x) + 2*x^2 + 16*x
```

3.192.9 Mupad [B] (verification not implemented)

Time = 13.83 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \left(16+3x+6x^2+x^3+\left(-2x-3x^2\right)\log\left(e^{-x}x\right)\right)\,dx$$
$$= 16\,x - x^2\,\ln(x) - x^3\,\ln(x) + 2\,x^2 + 3\,x^3 + x^4$$

input
```
int(3*x - log(x*exp(-x))*(2*x + 3*x^2) + 6*x^2 + x^3 + 16,x)
```

output
```
16*x - x^2*log(x) - x^3*log(x) + 2*x^2 + 3*x^3 + x^4
```

3.193 $\int \frac{e^{-e^x}\left(-4\log\left(\frac{7}{2}\right)-4e^x x\log\left(\frac{7}{2}\right)+e^{4x}\left(16\log\left(\frac{7}{2}\right)+4e^x\log\left(\frac{7}{2}\right)\right)\right)}{e^{8x}-2e^{4x}x+x^2}\,dx$

3.193.1 Optimal result

Integrand size = 66, antiderivative size = 24

$$\int \frac{e^{-e^x}\left(-4\log\left(\frac{7}{2}\right)-4e^x x\log\left(\frac{7}{2}\right)+e^{4x}\left(16\log\left(\frac{7}{2}\right)+4e^x\log\left(\frac{7}{2}\right)\right)\right)}{e^{8x}-2e^{4x}x+x^2}\,dx=\frac{4e^{-e^x}\log\left(\frac{7}{2}\right)}{-e^{4x}+x}$$

output
```
4*ln(7/2)/exp(exp(x))/(x-exp(2*x)^2)
```

3.193.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^{-e^x}\left(-4\log\left(\frac{7}{2}\right)-4e^x x\log\left(\frac{7}{2}\right)+e^{4x}\left(16\log\left(\frac{7}{2}\right)+4e^x\log\left(\frac{7}{2}\right)\right)\right)}{e^{8x}-2e^{4x}x+x^2}\,dx=-\frac{4e^{-e^x}\log\left(\frac{7}{2}\right)}{e^{4x}-x}$$

input
```
Integrate[(-4*Log[7/2] - 4*E^x*x*Log[7/2] + E^(4*x)*(16*Log[7/2] + 4*E^x*L
og[7/2]))/(E^E^x*(E^(8*x) - 2*E^(4*x)*x + x^2)),x]
```

output
```
(-4*Log[7/2])/(E^E^x*(E^(4*x) - x))
```

3.193.3 Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.061$, Rules used = {7292, 27, 25, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-e^x}\left(-4e^x x\log\left(\frac{7}{2}\right)+e^{4x}\left(4e^x\log\left(\frac{7}{2}\right)+16\log\left(\frac{7}{2}\right)\right)-4\log\left(\frac{7}{2}\right)\right)}{x^2-2e^{4x}x+e^{8x}}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{4e^{-e^x}\left(-e^x x+4e^{4x}+e^{5x}-1\right)\log\left(\frac{7}{2}\right)}{\left(e^{4x}-x\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$4\log\left(\frac{7}{2}\right)\int -\frac{e^{-e^x}\left(e^x x-4e^{4x}-e^{5x}+1\right)}{\left(e^{4x}-x\right)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-4\log\left(\frac{7}{2}\right)\int \frac{e^{-e^x}\left(e^x x-4e^{4x}-e^{5x}+1\right)}{\left(e^{4x}-x\right)^2}dx$$

$$\Big\downarrow \text{2726}$$

$$-\frac{4e^{-x-e^x}\left(e^{5x}-e^x x\right)\log\left(\frac{7}{2}\right)}{\left(e^{4x}-x\right)^2}$$

input
```
Int[(-4*Log[7/2] - 4*E^x*x*Log[7/2] + E^(4*x)*(16*Log[7/2] + 4*E^x*Log[7/2
]))/(E^E^x*(E^(8*x) - 2*E^(4*x)*x + x^2)),x]
```

output
```
(-4*E^(-E^x - x)*(E^(5*x) - E^x*x)*Log[7/2])/(E^(4*x) - x)^2
```

3.193.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.193.4 Maple [A] (verified)

Time = 0.71 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

method	result	size
parallelrisch	$\frac{4\ln\left(\frac{7}{2}\right)\mathrm{e}^{-\mathrm{e}^{x}}}{x-\mathrm{e}^{4x}}$	22

input
```
int(((4*ln(7/2)*exp(x)+16*ln(7/2))*exp(2*x)^2-4*x*ln(7/2)*exp(x)-4*ln(7/2)
)/(exp(2*x)^4-2*x*exp(2*x)^2+x^2)/exp(exp(x)),x,method=_RETURNVERBOSE)
```

output
```
4*ln(7/2)/exp(exp(x))/(x-exp(2*x)^2)
```

3.193.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{e^{-e^x}\left(-4\log\left(\frac{7}{2}\right)-4e^xx\log\left(\frac{7}{2}\right)+e^{4x}\left(16\log\left(\frac{7}{2}\right)+4e^x\log\left(\frac{7}{2}\right)\right)\right)}{e^{8x}-2e^{4x}x+x^2}\,dx=\frac{4\,e^{\left(-e^x\right)}\log\left(\frac{7}{2}\right)}{x-e^{(4\,x)}}$$

input
```
integrate(((4*log(7/2)*exp(x)+16*log(7/2))*exp(2*x)^2-4*x*log(7/2)*exp(x)-
4*log(7/2))/(exp(2*x)^4-2*x*exp(2*x)^2+x^2)/exp(exp(x)),x, algorithm=\
```

output
```
4*e^(-e^x)*log(7/2)/(x - e^(4*x))
```

3.193.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{e^{-e^x}\left(-4\log\left(\frac{7}{2}\right)-4e^x x\log\left(\frac{7}{2}\right)+e^{4x}\left(16\log\left(\frac{7}{2}\right)+4e^x\log\left(\frac{7}{2}\right)\right)\right)}{e^{8x}-2e^{4x}x+x^2}\,dx = \frac{\left(-4\log\left(2\right)+4\log\left(7\right)\right)e^{-e^x}}{x-e^{4x}}$$

input
```
integrate(((4*ln(7/2)*exp(x)+16*ln(7/2))*exp(2*x)**2-4*x*ln(7/2)*exp(x)-4*
ln(7/2))/(exp(2*x)**4-2*x*exp(2*x)**2+x**2)/exp(exp(x)),x)
```

output
```
(-4*log(2) + 4*log(7))*exp(-exp(x))/(x - exp(4*x))
```

3.193.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^{-e^x}\left(-4\log\left(\frac{7}{2}\right)-4e^x x\log\left(\frac{7}{2}\right)+e^{4x}\left(16\log\left(\frac{7}{2}\right)+4e^x\log\left(\frac{7}{2}\right)\right)\right)}{e^{8x}-2e^{4x}x+x^2}\,dx = \frac{4\left(\log\left(7\right)-\log\left(2\right)\right)e^{\left(-e^x\right)}}{x-e^{\left(4x\right)}}$$

input
```
integrate(((4*log(7/2)*exp(x)+16*log(7/2))*exp(2*x)^2-4*x*log(7/2)*exp(x)-
4*log(7/2))/(exp(2*x)^4-2*x*exp(2*x)^2+x^2)/exp(exp(x)),x, algorithm=\
```

output
```
4*(log(7) - log(2))*e^(-e^x)/(x - e^(4*x))
```

3.193.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(19) = 38.

Time = 0.29 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{e^{-e^x}\left(-4\log\left(\frac{7}{2}\right)-4e^x x\log\left(\frac{7}{2}\right)+e^{4x}\left(16\log\left(\frac{7}{2}\right)+4e^x\log\left(\frac{7}{2}\right)\right)\right)}{e^{8x}-2e^{4x}x+x^2}\,dx$$
$$=\frac{4\left(e^{(4x)}\log(7)-e^{(4x)}\log(2)\right)}{xe^{(4x+e^x)}-e^{(8x+e^x)}}$$

input
```
integrate(((4*log(7/2)*exp(x)+16*log(7/2))*exp(2*x)^2-4*x*log(7/2)*exp(x)-
4*log(7/2))/(exp(2*x)^4-2*x*exp(2*x)^2+x^2)/exp(exp(x)),x, algorithm=\
```

output
```
4*(e^(4*x)*log(7) - e^(4*x)*log(2))/(x*e^(4*x + e^x) - e^(8*x + e^x))
```

3.193.9 Mupad [B] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{e^{-e^x}\left(-4\log\left(\frac{7}{2}\right)-4e^x x\log\left(\frac{7}{2}\right)+e^{4x}\left(16\log\left(\frac{7}{2}\right)+4e^x\log\left(\frac{7}{2}\right)\right)\right)}{e^{8x}-2e^{4x}x+x^2}\,dx=\frac{4\,\mathrm{e}^{-\mathrm{e}^x}\,\ln\left(\frac{7}{2}\right)}{x-\mathrm{e}^{4\,x}}$$

input
```
int(-(exp(-exp(x))*(4*log(7/2) - exp(4*x)*(16*log(7/2) + 4*exp(x)*log(7/2)
) + 4*x*exp(x)*log(7/2)))/(exp(8*x) - 2*x*exp(4*x) + x^2),x)
```

output
```
(4*exp(-exp(x))*log(7/2))/(x - exp(4*x))
```

3.194 $\int \frac{e^{3x}(2500x^3-4375x^4)+e^{1+x}(2500x^3+625x^4)}{16e^5+16e^{10x}+80e^{4+2x}+160e^{3+4x}+160e^{2+6x}+80e^{1+8x}}\,dx$

3.194.1 Optimal result

Integrand size = 87, antiderivative size = 25

$$\int \frac{e^{3x}(2500x^3-4375x^4)+e^{1+x}(2500x^3+625x^4)}{16e^5+16e^{10x}+80e^{4+2x}+160e^{3+4x}+160e^{2+6x}+80e^{1+8x}}\,dx = e^{e^4}+\frac{625e^xx^4}{16\left(e+e^{2x}\right)^4}$$

output
```
625*exp(x)*x^4/(2*exp(1)+2*exp(x)^2)^4+exp(exp(4))
```

3.194.2 Mathematica [A] (verified)

Time = 1.12 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{e^{3x}(2500x^3-4375x^4)+e^{1+x}(2500x^3+625x^4)}{16e^5+16e^{10x}+80e^{4+2x}+160e^{3+4x}+160e^{2+6x}+80e^{1+8x}}\,dx = \frac{625e^xx^4}{16\left(e+e^{2x}\right)^4}$$

input
```
Integrate[(E^(3*x)*(2500*x^3 - 4375*x^4) + E^(1 + x)*(2500*x^3 + 625*x^4))
/(16*E^5 + 16*E^(10*x) + 80*E^(4 + 2*x) + 160*E^(3 + 4*x) + 160*E^(2 + 6*x
) + 80*E^(1 + 8*x)),x]
```

output
```
(625*E^x*x^4)/(16*(E + E^(2*x))^4)
```

3.194.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{3x}(2500x^3-4375x^4)+e^{x+1}(625x^4+2500x^3)}{16e^{10x}+80e^{2x+4}+160e^{4x+3}+160e^{6x+2}+80e^{8x+1}+16e^5}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{625e^x x^3(e(x+4)-e^{2x}(7x-4))}{16(e^{2x}+e)^5}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{625}{16}\int \frac{e^x x^3(e^{2x}(4-7x)+e(x+4))}{(e+e^{2x})^5}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{625}{16}\int \left(\frac{8e^{x+1}x^4}{(e+e^{2x})^5}-\frac{e^x x^3(7x-4)}{(e+e^{2x})^4}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{625}{16}\left(8\int \frac{e^{x+1}x^4}{(e+e^{2x})^5}dx+\frac{14}{3}\int \frac{e^{x-1}x^3}{(e+e^{2x})^3}dx+\frac{35}{6}\int \frac{e^{x-2}x^3}{(e+e^{2x})^2}dx+\frac{35}{4}\int \frac{e^{x-3}x^3}{e+e^{2x}}dx-2\int \frac{e^{x-1}x^2}{(e+e^{2x})^3}dx-\frac{5}{2}\int\right.$$

input
```
Int[(E^(3*x)*(2500*x^3 - 4375*x^4) + E^(1 + x)*(2500*x^3 + 625*x^4))/(16*E
^5 + 16*E^(10*x) + 80*E^(4 + 2*x) + 160*E^(3 + 4*x) + 160*E^(2 + 6*x) + 80
*E^(1 + 8*x)),x]
```

output
```
$Aborted
```

3.194.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.194.4 Maple [A] (verified)

Time = 0.59 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

method	result	size
risch	$\frac{625x^4 e^x}{16(e^{2x}+e)^4}$	17
parallelrisch	$\frac{625\, e^x x^4}{16(e^{8x}+4\, e\, e^{6x}+6\, e^2 e^{4x}+4\, e^3 e^{2x}+e^4)}$	47

input
```
int(((-4375*x^4+2500*x^3)*exp(x)^3+(625*x^4+2500*x^3)*exp(1)*exp(x))/(16*e
xp(x)^10+80*exp(1)*exp(x)^8+160*exp(1)^2*exp(x)^6+160*exp(1)^3*exp(x)^4+80
*exp(1)^4*exp(x)^2+16*exp(1)^5),x,method=_RETURNVERBOSE)
```

output
```
625/16*x^4*exp(x)/(exp(2*x)+exp(1))^4
```

3.194.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. 2(20) = 40.

Time = 0.26 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.76

$$\int \frac{e^{3x}(2500x^3-4375x^4)+e^{1+x}(2500x^3+625x^4)}{16e^5+16e^{10x}+80e^{4+2x}+160e^{3+4x}+160e^{2+6x}+80e^{1+8x}}\,dx = \frac{625\,x^4 e^{(x+8)}}{16\left(e^{12}+e^{(8\,x+8)}+4\,e^{(6\,x+9)}+6\,e^{(4\,x+10)}+4\,e^{(2\,x+11)}\right)}$$

input
```
integrate(((-4375*x^4+2500*x^3)*exp(x)^3+(625*x^4+2500*x^3)*exp(1)*exp(x))
/(16*exp(x)^10+80*exp(1)*exp(x)^8+160*exp(1)^2*exp(x)^6+160*exp(1)^3*exp(x
)^4+80*exp(1)^4*exp(x)^2+16*exp(1)^5),x, algorithm=\
```

output
```
625/16*x^4*e^(x + 8)/(e^12 + e^(8*x + 8) + 4*e^(6*x + 9) + 6*e^(4*x + 10)
+ 4*e^(2*x + 11))
```

3.194.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \frac{e^{3x}(2500x^3-4375x^4)+e^{1+x}(2500x^3+625x^4)}{16e^5+16e^{10x}+80e^{4+2x}+160e^{3+4x}+160e^{2+6x}+80e^{1+8x}}\,dx = \frac{625x^4e^x}{16e^{8x}+64ee^{6x}+96e^2e^{4x}+64e^3e^{2x}+16e^4}$$

input
```
integrate(((-4375*x**4+2500*x**3)*exp(x)**3+(625*x**4+2500*x**3)*exp(1)*ex
p(x))/(16*exp(x)**10+80*exp(1)*exp(x)**8+160*exp(1)**2*exp(x)**6+160*exp(1
)**3*exp(x)**4+80*exp(1)**4*exp(x)**2+16*exp(1)**5),x)
```

output
```
625*x**4*exp(x)/(16*exp(8*x) + 64*E*exp(6*x) + 96*exp(2)*exp(4*x) + 64*exp
(3)*exp(2*x) + 16*exp(4))
```

3.194.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60

$$\int \frac{e^{3x}(2500x^3-4375x^4)+e^{1+x}(2500x^3+625x^4)}{16e^5+16e^{10x}+80e^{4+2x}+160e^{3+4x}+160e^{2+6x}+80e^{1+8x}}\,dx = \frac{625\,x^4e^x}{16\,(e^4+e^{(8\,x)}+4\,e^{(6\,x+1)}+6\,e^{(4\,x+2)}+4\,e^{(2\,x+3)})}$$

input
```
integrate(((-4375*x^4+2500*x^3)*exp(x)^3+(625*x^4+2500*x^3)*exp(1)*exp(x))
/(16*exp(x)^10+80*exp(1)*exp(x)^8+160*exp(1)^2*exp(x)^6+160*exp(1)^3*exp(x
)^4+80*exp(1)^4*exp(x)^2+16*exp(1)^5),x, algorithm=\
```

output
```
625/16*x^4*e^x/(e^4 + e^(8*x) + 4*e^(6*x + 1) + 6*e^(4*x + 2) + 4*e^(2*x +
 3))
```

3.194.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. 2(20) = 40.

Time = 0.29 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.32

$$\int \frac{e^{3x}(2500x^3-4375x^4)+e^{1+x}(2500x^3+625x^4)}{16e^5+16e^{10x}+80e^{4+2x}+160e^{3+4x}+160e^{2+6x}+80e^{1+8x}}\,dx$$
$$= \frac{625\left((x+1)^4e^{(x+8)}-4(x+1)^3e^{(x+8)}+6(x+1)^2e^{(x+8)}-4(x+1)e^{(x+8)}+e^{(x+8)}\right)}{8\left(e^{12}+e^{(8x+8)}+4e^{(6x+9)}+6e^{(4x+10)}+4e^{(2x+11)}\right)}$$

input
```
integrate(((-4375*x^4+2500*x^3)*exp(x)^3+(625*x^4+2500*x^3)*exp(1)*exp(x))
/(16*exp(x)^10+80*exp(1)*exp(x)^8+160*exp(1)^2*exp(x)^6+160*exp(1)^3*exp(x
)^4+80*exp(1)^4*exp(x)^2+16*exp(1)^5),x, algorithm=\
```

output
```
625/8*((x + 1)^4*e^(x + 8) - 4*(x + 1)^3*e^(x + 8) + 6*(x + 1)^2*e^(x + 8)
 - 4*(x + 1)*e^(x + 8) + e^(x + 8))/(e^12 + e^(8*x + 8) + 4*e^(6*x + 9) +
6*e^(4*x + 10) + 4*e^(2*x + 11))
```

3.194.9 Mupad [B] (verification not implemented)

Time = 13.82 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.76

$$\int \frac{e^{3x}(2500x^3-4375x^4)+e^{1+x}(2500x^3+625x^4)}{16e^5+16e^{10x}+80e^{4+2x}+160e^{3+4x}+160e^{2+6x}+80e^{1+8x}}\,dx$$
$$= \frac{625\,x^4\,\mathrm{e}^x}{16\,\left(\mathrm{e}^{8\,x}+\mathrm{e}^4+4\,\mathrm{e}^{2\,x+3}+6\,\mathrm{e}^{4\,x+2}+4\,\mathrm{e}^{6\,x+1}\right)}$$

input
```
int((exp(3*x)*(2500*x^3 - 4375*x^4) + exp(1)*exp(x)*(2500*x^3 + 625*x^4))/
(16*exp(10*x) + 16*exp(5) + 80*exp(2*x)*exp(4) + 160*exp(4*x)*exp(3) + 160
*exp(6*x)*exp(2) + 80*exp(8*x)*exp(1)),x)
```

output
```
(625*x^4*exp(x))/(16*(exp(8*x) + exp(4) + 4*exp(2*x + 3) + 6*exp(4*x + 2)
+ 4*exp(6*x + 1)))
```

3.195 $\int \frac{400+\log(18)}{x^2}\,dx$

3.195.1 Optimal result

Integrand size = 8, antiderivative size = 12

$$\int \frac{400+\log(18)}{x^2}\,dx = 5+e-\frac{400+\log(18)}{x}$$

output
```
5-(ln(18)+400)/x+exp(1)
```

3.195.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{400+\log(18)}{x^2}\,dx = -\frac{400+\log(18)}{x}$$

input
```
Integrate[(400 + Log[18])/x^2,x]
```

output
```
-((400 + Log[18])/x)
```

3.195.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{400+\log(18)}{x^2} \, dx$$
$$\Big\downarrow \; 15$$
$$-\frac{400+\log(18)}{x}$$

input
```
Int[(400 + Log[18])/x^2,x]
```

output
```
-((400 + Log[18])/x)
```

3.195.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.195.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

method	result	size
gosper	$-\frac{\ln(18)+400}{x}$	10
default	$-\frac{\ln(18)+400}{x}$	10
parallelrisch	$-\frac{\ln(18)+400}{x}$	10
norman	$\frac{-\ln(18)-400}{x}$	11
risch	$-\frac{\ln(2)}{x}-\frac{2\ln(3)}{x}-\frac{400}{x}$	21

input
```
int((ln(18)+400)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-(ln(18)+400)/x
```

3.195.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{400+\log(18)}{x^2}\,dx = -\frac{\log(18)+400}{x}$$

input
```
integrate((log(18)+400)/x^2,x, algorithm=\
```

output
```
-(log(18) + 400)/x
```

3.195.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.58

$$\int \frac{400+\log(18)}{x^2}\,dx = -\frac{\log(18)+400}{x}$$

input
```
integrate((ln(18)+400)/x**2,x)
```

output
```
-(log(18) + 400)/x
```

3.195.7 Maxima [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{400+\log(18)}{x^2}\,dx = -\frac{\log(18)+400}{x}$$

input
```
integrate((log(18)+400)/x^2,x, algorithm=\
```

output
```
-(log(18) + 400)/x
```

3.195.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{400 + \log(18)}{x^2}\,dx = -\frac{\log(18) + 400}{x}$$

input
```
integrate((log(18)+400)/x^2,x, algorithm=\
```

output
```
-(log(18) + 400)/x
```

3.195.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{400 + \log(18)}{x^2}\,dx = -\frac{\ln(18) + 400}{x}$$

input
```
int((log(18) + 400)/x^2,x)
```

output
```
-(log(18) + 400)/x
```

3.196 $\int \frac{1}{4}e^{-x}\left(4e^{2x}+e^x(10x-x^3)+(2x+e^x(20x-4x^3))\right.$

3.196.1 Optimal result

Integrand size = 64, antiderivative size = 28

$$\int \frac{1}{4}e^{-x}\left(4e^{2x}+e^x\left(10x-x^3\right)+\left(2x+e^x\left(20x-4x^3\right)\right)\log(x)+\left(2x-x^2\right)\log^2(x)\right)\,dx$$
$$=e^x+\frac{1}{4}x^2\log(x)\left(10-x^2+e^{-x}\log(x)\right)$$

output
```
exp(x)+1/4*x^2*ln(x)*(ln(x)/exp(x)+10-x^2)
```

3.196.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

$$\int \frac{1}{4}e^{-x}\left(4e^{2x}+e^x\left(10x-x^3\right)+\left(2x+e^x\left(20x-4x^3\right)\right)\log(x)+\left(2x-x^2\right)\log^2(x)\right)\,dx$$
$$=\frac{1}{4}\left(4e^x+10x^2\log(x)-x^4\log(x)+e^{-x}x^2\log^2(x)\right)$$

input
```
Integrate[(4*E^(2*x) + E^x*(10*x - x^3) + (2*x + E^x*(20*x - 4*x^3))*Log[x
] + (2*x - x^2)*Log[x]^2)/(4*E^x),x]
```

output
```
(4*E^x + 10*x^2*Log[x] - x^4*Log[x] + (x^2*Log[x]^2)/E^x)/4
```

3.196.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}e^{-x}\left(e^x\left(10x-x^3\right)+\left(e^x\left(20x-4x^3\right)+2x\right)\log(x)+\left(2x-x^2\right)\log^2(x)+4e^{2x}\right)\,dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{4}\int e^{-x}\left(\left(2x-x^2\right)\log^2(x)+2\left(x+2e^x\left(5x-x^3\right)\right)\log(x)+4e^{2x}+e^x\left(10x-x^3\right)\right)dx$$

$$\Big\downarrow \ 7293$$

$$\frac{1}{4}\int \left(-e^{-x}(x-2)x\log^2(x)-2e^{-x}x\left(2e^xx^2-10e^x-1\right)\log(x)+4e^x-x\left(x^2-10\right)\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{4}\left(-\int e^{-x}x^2\log^2(x)dx+2\int e^{-x}x\log^2(x)dx+2\,\text{ExpIntegralEi}(-x)+x^4(-\log(x))+10x^2\log(x)-2e^{-x}+4e^{x}$$

input
```
Int[(4*E^(2*x) + E^x*(10*x - x^3) + (2*x + E^x*(20*x - 4*x^3))*Log[x] + (2
*x - x^2)*Log[x]^2)/(4*E^x),x]
```

output
```
$Aborted
```

3.196.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.196.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

method	result	size
default	$\frac{\ln(x)^2 e^{-x} x^2}{4} - \frac{x^4 \ln(x)}{4} + \frac{5x^2 \ln(x)}{2} + e^x$	31
parts	$\frac{\ln(x)^2 e^{-x} x^2}{4} - \frac{x^4 \ln(x)}{4} + \frac{5x^2 \ln(x)}{2} + e^x$	31
risch	$\frac{\ln(x)^2 e^{-x} x^2}{4} - \frac{(x^2-5)^2 \ln(x)}{4} + \frac{25 \ln(x)}{4} + e^x$	32
parallelrisch	$\frac{\left(-x^4 e^x \ln(x)+x^2 \ln(x)^2+10x^2 e^x \ln(x)+4\,e^{2x}\right) e^{-x}}{4}$	40

input
```
int(1/4*((-x^2+2*x)*ln(x)^2+((-4*x^3+20*x)*exp(x)+2*x)*ln(x)+4*exp(x)^2+(-
x^3+10*x)*exp(x))/exp(x),x,method=_RETURNVERBOSE)
```

output
```
1/4*ln(x)^2*x^2/exp(x)-1/4*x^4*ln(x)+5/2*x^2*ln(x)+exp(x)
```

3.196.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{1}{4}e^{-x}\left(4e^{2x} + e^x\left(10x - x^3\right) + \left(2x + e^x\left(20x - 4x^3\right)\right)\log(x) + \left(2x - x^2\right)\log^2(x)\right)\,dx$$
$$= \frac{1}{4}\left(x^2 \log\left(x\right)^2 - \left(x^4 - 10\,x^2\right)e^x \log\left(x\right) + 4\,e^{(2\,x)}\right)e^{(-x)}$$

input
```
integrate(1/4*((-x^2+2*x)*log(x)^2+((-4*x^3+20*x)*exp(x)+2*x)*log(x)+4*exp
(x)^2+(-x^3+10*x)*exp(x))/exp(x),x, algorithm=\
```

output
```
1/4*(x^2*log(x)^2 - (x^4 - 10*x^2)*e^x*log(x) + 4*e^(2*x))*e^(-x)
```

3.196.
$\int \frac{1}{4}e^{-x}\left(4e^{2x} + e^x(10x - x^3) + (2x + e^x(20x - 4x^3))\log(x) + (2x - x^2)\log^2(x)\right)\,dx$

3.196.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{1}{4}e^{-x}\left(4e^{2x}+e^x\left(10x-x^3\right)+\left(2x+e^x\left(20x-4x^3\right)\right)\log(x)+\left(2x-x^2\right)\log^2(x)\right)\,dx$$
$$=\frac{x^2e^{-x}\log\left(x\right)^2}{4}+\left(-\frac{x^4}{4}+\frac{5x^2}{2}\right)\log\left(x\right)+e^x$$

input
```
integrate(1/4*((-x**2+2*x)*ln(x)**2+((-4*x**3+20*x)*exp(x)+2*x)*ln(x)+4*ex
p(x)**2+(-x**3+10*x)*exp(x))/exp(x),x)
```

output
```
x**2*exp(-x)*log(x)**2/4 + (-x**4/4 + 5*x**2/2)*log(x) + exp(x)
```

3.196.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{1}{4}e^{-x}\left(4e^{2x}+e^x\left(10x-x^3\right)+\left(2x+e^x\left(20x-4x^3\right)\right)\log(x)+\left(2x-x^2\right)\log^2(x)\right)\,dx$$
$$=-\frac{1}{4}\,x^4\log\left(x\right)+\frac{1}{4}\,x^2e^{(-x)}\log\left(x\right)^2+\frac{5}{2}\,x^2\log\left(x\right)+e^x$$

input
```
integrate(1/4*((-x^2+2*x)*log(x)^2+((-4*x^3+20*x)*exp(x)+2*x)*log(x)+4*exp
(x)^2+(-x^3+10*x)*exp(x))/exp(x),x, algorithm=\
```

output
```
-1/4*x^4*log(x) + 1/4*x^2*e^(-x)*log(x)^2 + 5/2*x^2*log(x) + e^x
```

3.196.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{1}{4}e^{-x}\left(4e^{2x}+e^x\left(10x-x^3\right)+\left(2x+e^x\left(20x-4x^3\right)\right)\log(x)+\left(2x-x^2\right)\log^2(x)\right)\,dx$$
$$=-\frac{1}{4}\,x^4\log\left(x\right)+\frac{1}{4}\,x^2e^{(-x)}\log\left(x\right)^2+\frac{5}{2}\,x^2\log\left(x\right)+e^x$$

input
```
integrate(1/4*((-x^2+2*x)*log(x)^2+((-4*x^3+20*x)*exp(x)+2*x)*log(x)+4*exp
(x)^2+(-x^3+10*x)*exp(x))/exp(x),x, algorithm=\
```

output
```
-1/4*x^4*log(x) + 1/4*x^2*e^(-x)*log(x)^2 + 5/2*x^2*log(x) + e^x
```

3.196.9 Mupad [B] (verification not implemented)

Time = 14.48 (sec) , antiderivative size = 109, normalized size of antiderivative = 3.89

$$\int \frac{1}{4}e^{-x}\left(4e^{2x}+e^x\left(10x-x^3\right)+\left(2x+e^x\left(20x-4x^3\right)\right)\log(x)+\left(2x-x^2\right)\log^2(x)\right)\,dx$$
$$= e^x+\frac{2\,x\,e^{-x}+2\,x^2\,e^{-x}\,\ln(x)+x^3\,e^{-x}\ln(x)^2+2\,x\,e^{-x}\,\ln(x)}{4\,x}$$
$$+\frac{x^2\,(40\,\ln(x)-4\,x^2\,\ln(x)+x^2-20)}{16}+\frac{5\,x^2}{4}-\frac{x^4}{16}-\frac{x\,e^{-x}+x^2\,e^{-x}\,\ln(x)+x\,e^{-x}\,\ln(x)}{2\,x}$$

input
```
int(exp(-x)*(exp(2*x) + (log(x)^2*(2*x - x^2))/4 + (log(x)*(2*x + exp(x)*(
20*x - 4*x^3)))/4 + (exp(x)*(10*x - x^3))/4),x)
```

output
```
exp(x) + (2*x*exp(-x) + 2*x^2*exp(-x)*log(x) + x^3*exp(-x)*log(x)^2 + 2*x*
exp(-x)*log(x))/(4*x) + (x^2*(40*log(x) - 4*x^2*log(x) + x^2 - 20))/16 + (
5*x^2)/4 - x^4/16 - (x*exp(-x) + x^2*exp(-x)*log(x) + x*exp(-x)*log(x))/(2
*x)
```

3.197 $\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log(-2+e^5)\log(x)}{4x\log(-2+e^5)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx$

3.197.1 Optimal result

Integrand size = 63, antiderivative size = 28

$$\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log(-2+e^5)\log(x)}{4x\log(-2+e^5)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx=\frac{1}{4}\log^2\left(4+\frac{3}{4x\log(-2+e^5)\log(x)}\right)$$

output
```
1/4*ln(4+3/4/x/ln(x)/ln(exp(5)-2))^2
```

3.197.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log(-2+e^5)\log(x)}{4x\log(-2+e^5)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx=\frac{1}{4}\log^2\left(4+\frac{3}{4x\log(-2+e^5)\log(x)}\right)$$

input
```
Integrate[((-3 - 3*Log[x])*Log[(3 + 16*x*Log[-2 + E^5]*Log[x])/(4*x*Log[-2
 + E^5]*Log[x])])/(6*x*Log[x] + 32*x^2*Log[-2 + E^5]*Log[x]^2),x]
```

output
```
Log[4 + 3/(4*x*Log[-2 + E^5]*Log[x])]^2/4
```

3.197.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-3\log(x)-3)\log\left(\frac{16x\log(e^5-2)\log(x)+3}{4x\log(e^5-2)\log(x)}\right)}{32x^2\log(e^5-2)\log^2(x)+6x\log(x)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{3(-\log(x)-1)\log\left(\frac{16x\log(e^5-2)\log(x)+3}{4x\log(e^5-2)\log(x)}\right)}{2x\log(x)\left(16x\log(e^5-2)\log(x)+3\right)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{3}{2}\int -\frac{(\log(x)+1)\log\left(\frac{16x\log(-2+e^5)\log(x)+3}{4x\log(-2+e^5)\log(x)}\right)}{x\log(x)\left(16x\log(-2+e^5)\log(x)+3\right)}dx$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{3}{2}\int \frac{(\log(x)+1)\log\left(\frac{16x\log(-2+e^5)\log(x)+3}{4x\log(-2+e^5)\log(x)}\right)}{x\log(x)\left(16x\log(-2+e^5)\log(x)+3\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{3}{2}\int \left(\frac{\log\left(4+\frac{3}{4x\log(-2+e^5)\log(x)}\right)}{x\left(16x\log(-2+e^5)\log(x)+3\right)}+\frac{\log\left(4+\frac{3}{4x\log(-2+e^5)\log(x)}\right)}{x\log(x)\left(16x\log(-2+e^5)\log(x)+3\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{3}{2}\left(\int \frac{\log\left(4+\frac{3}{4x\log(-2+e^5)\log(x)}\right)}{x\left(16x\log(-2+e^5)\log(x)+3\right)}dx+\int \frac{\log\left(4+\frac{3}{4x\log(-2+e^5)\log(x)}\right)}{x\log(x)\left(16x\log(-2+e^5)\log(x)+3\right)}dx\right)$$

input
```
Int[((-3 - 3*Log[x])*Log[(3 + 16*x*Log[-2 + E^5]*Log[x])/(4*x*Log[-2 + E^5
]*Log[x])])/(6*x*Log[x] + 32*x^2*Log[-2 + E^5]*Log[x]^2),x]
```

output
```
$Aborted
```

3.197.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.197.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 88 vs. $2(23) = 46$.

Time = 4.44 (sec) , antiderivative size = 89, normalized size of antiderivative = 3.18

method	result
default	$\frac{3\ln\left(\ln\left(\mathrm{e}^{5}-2\right)\right)\left(\frac{\ln(x)}{3}+\frac{\ln(\ln(x))}{3}-\frac{\ln\left(16x\ln(x)\ln\left(\mathrm{e}^{5}-2\right)+3\right)}{3}\right)}{2}+3\ln\left(2\right)\left(\frac{\ln(x)}{3}+\frac{\ln(\ln(x))}{3}-\frac{\ln(16x\ln(x)\ln(\mathrm{e}^{5}-2)+3)}{3}\right)+$

input
```
int((-3*ln(x)-3)*ln(1/4*(16*x*ln(x)*ln(exp(5)-2)+3)/x/ln(x)/ln(exp(5)-2))/
(32*x^2*ln(x)^2*ln(exp(5)-2)+6*x*ln(x)),x,method=_RETURNVERBOSE)
```

output
```
3/2*ln(ln(exp(5)-2))*(1/3*ln(x)+1/3*ln(ln(x))-1/3*ln(16*x*ln(x)*ln(exp(5)-
2)+3))+3*ln(2)*(1/3*ln(x)+1/3*ln(ln(x))-1/3*ln(16*x*ln(x)*ln(exp(5)-2)+3))
+1/4*ln((16*x*ln(x)*ln(exp(5)-2)+3)/x/ln(x))^2
```

3.197. $\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log\left(-2+e^5\right)\log(x)}{4x\log\left(-2+e^5\right)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx$

3.197.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.18

$$\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log(-2+e^5)\log(x)}{4x\log(-2+e^5)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx=\frac{1}{4}\log\left(\frac{16\,x\log(x)\log(e^5-2)+3}{4\,x\log(x)\log(e^5-2)}\right)^2$$

input
```
integrate((-3*log(x)-3)*log(1/4*(16*x*log(x)*log(exp(5)-2)+3)/x/log(x)/log
(exp(5)-2))/(32*x^2*log(x)^2*log(exp(5)-2)+6*x*log(x)),x, algorithm=\
```

output
```
1/4*log(1/4*(16*x*log(x)*log(e^5 - 2) + 3)/(x*log(x)*log(e^5 - 2)))^2
```

3.197.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log(-2+e^5)\log(x)}{4x\log(-2+e^5)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx=\frac{\log\left(\frac{4x\log(x)\log(-2+e^5)+\frac{3}{4}}{x\log(x)\log(-2+e^5)}\right)^2}{4}$$

input
```
integrate((-3*ln(x)-3)*ln(1/4*(16*x*ln(x)*ln(exp(5)-2)+3)/x/ln(x)/ln(exp(5
)-2))/(32*x**2*ln(x)**2*ln(exp(5)-2)+6*x*ln(x)),x)
```

output
```
log((4*x*log(x)*log(-2 + exp(5)) + 3/4)/(x*log(x)*log(-2 + exp(5))))**2/4
```

3.197.7 Maxima [F]

$$\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log(-2+e^5)\log(x)}{4x\log(-2+e^5)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx$$
$$=\int -\frac{3\left(\log(x)+1\right)\log\left(\frac{16\,x\log(x)\log(e^5-2)+3}{4\,x\log(x)\log(e^5-2)}\right)}{2\left(16\,x^2\log(x)^2\log(e^5-2)+3\,x\log(x)\right)}\,dx$$

input
```
integrate((-3*log(x)-3)*log(1/4*(16*x*log(x)*log(exp(5)-2)+3)/x/log(x)/log
(exp(5)-2))/(32*x^2*log(x)^2*log(exp(5)-2)+6*x*log(x)),x, algorithm=\
```

output
```
-3/2*integrate((log(x) + 1)*log(1/4*(16*x*log(x)*log(e^5 - 2) + 3)/(x*log(
x)*log(e^5 - 2)))/(16*x^2*log(x)^2*log(e^5 - 2) + 3*x*log(x)), x)
```

3.197.8 Giac [F]

$$\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log(-2+e^5)\log(x)}{4x\log(-2+e^5)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx = \int -\frac{3\left(\log(x)+1\right)\log\left(\frac{16\,x\log(x)\log(e^5-2)+3}{4\,x\log(x)\log(e^5-2)}\right)}{2\left(16\,x^2\log(x)^2\log(e^5-2)+3\,x\log(x)\right)}\,dx$$

input
```
integrate((-3*log(x)-3)*log(1/4*(16*x*log(x)*log(exp(5)-2)+3)/x/log(x)/log
(exp(5)-2))/(32*x^2*log(x)^2*log(exp(5)-2)+6*x*log(x)),x, algorithm=\
```

output
```
integrate(-3/2*(log(x) + 1)*log(1/4*(16*x*log(x)*log(e^5 - 2) + 3)/(x*log(
x)*log(e^5 - 2)))/(16*x^2*log(x)^2*log(e^5 - 2) + 3*x*log(x)), x)
```

3.197.9 Mupad [B] (verification not implemented)

Time = 14.53 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{(-3-3\log(x))\log\left(\frac{3+16x\log(-2+e^5)\log(x)}{4x\log(-2+e^5)\log(x)}\right)}{6x\log(x)+32x^2\log(-2+e^5)\log^2(x)}\,dx = \frac{\ln\left(\frac{4\,x\,\ln(e^5-2)\,\ln(x)+\frac{3}{4}}{x\,\ln(e^5-2)\,\ln(x)}\right)^2}{4}$$

input
```
int(-(log((4*x*log(exp(5) - 2)*log(x) + 3/4)/(x*log(exp(5) - 2)*log(x)))*(
3*log(x) + 3))/(6*x*log(x) + 32*x^2*log(exp(5) - 2)*log(x)^2),x)
```

output
```
log((4*x*log(exp(5) - 2)*log(x) + 3/4)/(x*log(exp(5) - 2)*log(x)))^2/4
```

3.198 $\int \frac{-6885-1701x+1593x \cdots}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288 \cdots}$

3.198.1 Optimal result

Integrand size = 271, antiderivative size = 28

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7 \cdots}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x^6 \cdots}$$
$$= \log\left(\log\left(-5+x+\left((-4+x)^2+\frac{x^3(-x+\log(2))}{3+x}\right)^2\right)\right)$$

output
```
ln(ln((x^3/(3+x)*(ln(2)-x)+(x-4)^2)^2-5+x))
```

3.198.2 Mathematica [F]

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7 \cdots}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x^6 \cdots}$$
$$= \int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14 \cdots}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x \cdots}$$

3.198.
$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7+6x^8+(864x^2-96x^3-182x^4+6x^5-34 \cdots}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x^6-4x^7-2x^8)\log(2)+(3x^6+x^7)\log^2(2))\log\left(\frac{2259-789x \cdots}{\cdots}\right.}$$

input
```
Integrate[(-6885 - 1701*x + 1593*x^2 - 867*x^3 - 84*x^4 + 216*x^5 + 2*x^6
+ 14*x^7 + 6*x^8 + (864*x^2 - 96*x^3 - 182*x^4 + 6*x^5 - 34*x^6 - 10*x^7)*
Log[2] + (18*x^5 + 4*x^6)*Log[2]^2)/((6777 - 108*x - 2034*x^2 + 116*x^3 -
84*x^4 - 69*x^5 + 39*x^6 + 5*x^7 + x^8 + x^9 + (288*x^3 + 48*x^4 - 46*x^5
- 4*x^6 - 4*x^7 - 2*x^8)*Log[2] + (3*x^6 + x^7)*Log[2]^2)*Log[(2259 - 789*
x - 415*x^2 + 177*x^3 - 87*x^4 + 6*x^5 + 11*x^6 - 2*x^7 + x^8 + (96*x^3 -
16*x^4 - 10*x^5 + 2*x^6 - 2*x^7)*Log[2] + x^6*Log[2]^2)/(9 + 6*x + x^2)]),
x]
```

output
```
Integrate[(-6885 - 1701*x + 1593*x^2 - 867*x^3 - 84*x^4 + 216*x^5 + 2*x^6
+ 14*x^7 + 6*x^8 + (864*x^2 - 96*x^3 - 182*x^4 + 6*x^5 - 34*x^6 - 10*x^7)*
Log[2] + (18*x^5 + 4*x^6)*Log[2]^2)/((6777 - 108*x - 2034*x^2 + 116*x^3 -
84*x^4 - 69*x^5 + 39*x^6 + 5*x^7 + x^8 + x^9 + (288*x^3 + 48*x^4 - 46*x^5
- 4*x^6 - 4*x^7 - 2*x^8)*Log[2] + (3*x^6 + x^7)*Log[2]^2)*Log[(2259 - 789*
x - 415*x^2 + 177*x^3 - 87*x^4 + 6*x^5 + 11*x^6 - 2*x^7 + x^8 + (96*x^3 -
16*x^4 - 10*x^5 + 2*x^6 - 2*x^7)*Log[2] + x^6*Log[2]^2)/(9 + 6*x + x^2)]),
 x]
```

3.198.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^8+14x^7+2x^6+216x^5-84x^4-867x^3+1593x^2+\left(4x^6+18x\right.}{\left(x^9+x^8+5x^7+39x^6-69x^5-84x^4+116x^3-2034x^2+\left(x^7+3x^6\right)\log^2(2)+\left(-2x^8-4x^7-4x^6-46x^5+4\right.\right.}$$

$$\Big\downarrow \text{ 2463}$$

$$\int \left(\frac{\left(-x^7+5x^6\left(1+\frac{2\log(2)}{5}\right)-26x^5\left(1+\frac{1}{26}\left(\log^2(2)+\log(256)\right)\right)+72x^4\left(1+\frac{1}{72}\log(2)(34+\log(8))\right)-129x^3(1\right.}{729(3+\log(2))^2\left(x^8-2x^7(1+\log(2)\right.}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{\left(x^4\left(\log^2(8)-\log(2)\log(512)\right)+x^3\left(27\log^2(2)-\log(8)\log(512)\right)+729(3+\log(2))^2\right)\left(6x^8-2x^7(\log(32)-\right.}{729(x+3)(3+\log(2))^2\left(x^8-2x^7(1+\log(2))+x^6\left(11+\log^2(2)+\log(4)\right)+x^5(6-10\log(2))-x^4(87+16\log\right.}$$

$$\Big\downarrow \text{ 27}$$

3.198.

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7+6x^8+\left(864x^2-96x^3-182x^4+6x^5-34\right.}{\left(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+\left(288x^3+48x^4-46x^5-4x^6-4x^7-2x^8\right)\log(2)+\left(3x^6+x^7\right)\log^2(2)\right)\log\left(\frac{2259-789x}{\cdots}\right.}$$

$$\int -\frac{\frac{\left(\left(\log^2(8)-\log(2)\log(512)\right)x^4+\left(27\log^2(2)-\log(8)\log(512)\right)x^3+729(3+\log(2))^2\right)\left(-6x^8-2(7-\log(32))x^7-2\left(1-17\log(2)+2\log^2(2)\right)x^6-6(}{(x+3)\left(x^8-2(1+\log(2))x^7+\left(11+\log^2(2)+\log(4)\right)x^6+2(3-5\log(2))x^5-(87+16\log(2))x^4+3(59+32\log(2))x^3-415x^2-789x+2259\right)\log\left(\frac{x^8-}{}\right.}}{729(3+\log(2))^2}$$

$\downarrow$ 25

$$-\frac{\int \frac{\left(\left(\log^2(8)-\log(2)\log(512)\right)x^4+\left(27\log^2(2)-\log(8)\log(512)\right)x^3+729(3+\log(2))^2\right)\left(-6x^8-2(7-\log(32))x^7-2\left(1-17\log(2)+2\log^2(2)\right)x^6-6(}{(x+3)\left(x^8-2(1+\log(2))x^7+\left(11+\log^2(2)+\log(4)\right)x^6+2(3-5\log(2))x^5-(87+16\log(2))x^4+3(59+32\log(2))x^3-415x^2-789x+2259\right)\log\left(\frac{x^8-}{}\right.}}{729(3+\log(2))^2}$$

$\downarrow$ 2006

$$-\frac{\int \frac{\left(\sqrt[4]{\log^2(8)-\log(2)\log(512)}x+3\sqrt{3(3+\log(2))}\right)^4\left(-6x^8-2(7-\log(32))x^7-2\left(1-17\log(2)+2\log^2(2)\right)x^6-6(36+\log(2)+\right.}{(x+3)\left(x^8-2(1+\log(2))x^7+\left(11+\log^2(2)+\log(4)\right)x^6+2(3-5\log(2))x^5-(87+16\log(2))x^4+3(59+32\log(2))x^3-415x^2-789x+2259\right)\log\left(\frac{x^8-}{}\right.}}{729(3+\log(2))^2}$$

$\downarrow$ 2

$$-\frac{\int \frac{729(3+\log(2))^2\left(-6x^8-2(7-\log(32))x^7-2\left(1-17\log(2)+2\log^2(2)\right)x^6-6\left(36+\log(2)+3\log^2(2)\right)x^5+14(6+\right.}{(x+3)\left(x^8-2(1+\log(2))x^7+\left(11+\log^2(2)+\log(4)\right)x^6+2(3-5\log(2))x^5-(87+16\log(2))x^4+3(59+32\log(2))x^3-415x^2-789x+2259\right)\log\left(\frac{x^8-}{}\right.}}{729(3+\log(2))^2}$$

$\downarrow$ 27

$$-\int \frac{-6x^8-2(7-\log(32))x^7-2\left(1-17\log(2)+2\log^2(2)\right)x^6-6(36+\log(}{(x+3)\left(x^8-2(1+\log(2))x^7+\left(11+\log^2(2)+\log(4)\right)x^6+2(3-5\log(2))x^5-(87+16\log(2))x^4+3(59+\right.}$$

$\downarrow$ 7293

3.198.

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7+6x^8+\left(864x^2-96x^3-182x^4+6x^5-34\right.}{\left(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+\left(288x^3+48x^4-46x^5-4x^6-4x^7-2x^8\right)\log(2)+\left(3x^6+x^7\right)\log^2(2)\right)\log\left(\frac{2259-789x}{}\right.}$$

$$-\int \left(\frac{-648\left(1+\frac{1}{9}\log(2)(6+\log(2))\right)x^7+1134\left(1+\frac{1}{567}\left(259\log^2(2)+\frac{18\log^3(2)\log(128)}{\log(4)}+18\log(4096)+\log(2)(7\right.\right.}{} \right.$$

$\downarrow$ 2009

3.198.

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7+6x^8+\left(864x^2-96x^3-182x^4+6x^5-34\right.}{\left(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+\left(288x^3+48x^4-46x^5-4x^6-4x^7-2x^8\right)\log(2)+\left(3x^6+x^7\right)\log^2(2)\right)\log\left(\frac{2259-789x}{}\right.}$$

$$-\frac{2\left(81+9\log^2(2)+\log(18014398509481984)\right)\int \frac{1}{(x+3)\log\left(\frac{x^8-(2+\log(4))x^7+\left(11+\log^2(2)+\log(4)\right)x^6+(6-10\log(2))x^5-(87+16\log(2))x^4\cdots}{(x+3)^2}\right.\cdots}\cdots}{9\left(9+\log^2(2)+\log(64)\right)}$$

$$8\int \frac{\cdots}{\left(-x^8+2(1+\log(2))x^7-11\left(1+\frac{1}{11}\left(\log^2(2)+\log(4)\right)\right)x^6-6\left(1-\frac{5\log(2)}{3}\right)x^5+87\left(1+\frac{16\log(2)}{87}\right)x^4-177\cdots\right.}$$

$$\frac{\left(21303-21656\log(2)+2367\log^2(2)+6885\log(4)+502\log(17592186044416)\right)\int \frac{\cdots}{\left(x^8-2(1+\log(2))x^7+11\left(1+\frac{1}{11}\left(\log^2(2)\cdots\right.\right.\right.}}{\cdots}$$

$$\frac{2\left(33615+46808\log(2)+3735\log^2(2)-891\log(4)-514\log(17592186044416)\right)\int \frac{\cdots}{\left(x^8-2(1+\log(2))x^7+11\left(1+\frac{1}{11}\left(\log^2(2)\cdots\right.\right.\right.}}{\cdots}$$

$$\frac{\left(14337+5049\log^2(2)+864\log^3(2)+1395\log(4)+8\log(2)(1939+108\log(4))-22\log(17592186044416)\right)\int \frac{\cdots}{\left(x^8\cdots\right.}}{\cdots}$$

$$\frac{4\left(7047+367\log^2(2)+144\log^3(2)+12\log(2)(245+24\log(4))+24\log(17592186044416)+\log(4)(999+8\log(1\cdots\right.}{\cdots}$$

$$\frac{2\left(665\log^2(2)-48\log^3(2)-9(135+60\log(4)+135\log(32)-56\log(8192))+\log(2)(1818-192\log(4)-432\log\cdots\right.}{\cdots}$$

$$\frac{2\left(2673+71\log^3(2)+27\log^4(2)+\log(2)(1909-55\log(4))+3\log^2(2)(172+9\log(4))+9\log(4)(16-3\log(32))\cdots\right.}{\cdots}$$

$$\frac{4\log(2)\left(567+729\log(2)+259\log^2(2)+63\log^3(2)+18\log(4096)+14\log(2)\log(8192)\right)\int \frac{\cdots}{\left(x^8-2(1+\log(2))x^7+11(1\cdots\right.}}{\cdots}$$

input
```
Int[(-6885 - 1701*x + 1593*x^2 - 867*x^3 - 84*x^4 + 216*x^5 + 2*x^6 + 14*x
^7 + 6*x^8 + (864*x^2 - 96*x^3 - 182*x^4 + 6*x^5 - 34*x^6 - 10*x^7)*Log[2]
 + (18*x^5 + 4*x^6)*Log[2]^2)/((6777 - 108*x - 2034*x^2 + 116*x^3 - 84*x^4
 - 69*x^5 + 39*x^6 + 5*x^7 + x^8 + x^9 + (288*x^3 + 48*x^4 - 46*x^5 - 4*x^
6 - 4*x^7 - 2*x^8)*Log[2] + (3*x^6 + x^7)*Log[2]^2)*Log[(2259 - 789*x - 41
5*x^2 + 177*x^3 - 87*x^4 + 6*x^5 + 11*x^6 - 2*x^7 + x^8 + (96*x^3 - 16*x^4
 - 10*x^5 + 2*x^6 - 2*x^7)*Log[2] + x^6*Log[2]^2)/(9 + 6*x + x^2)]),x]
```

output
```
$Aborted
```

3.198.

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7+6x^8+\left(864x^2-96x^3-182x^4+6x^5-34\cdots\right.}{\left(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+\left(288x^3+48x^4-46x^5-4x^6-4x^7-2x^8\right)\log(2)+\left(3x^6+x^7\right)\log^2(2)\right)\log\left(\frac{2259-789x\cdots}{\cdots}\right.}$$

3.198.3.1 Defintions of rubi rules used

rule 2
```
Int[(u_.)*((a_.) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[u*a^p, x] /; F
reeQ[{a, b, n, p}, x] && EqQ[b, 0]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2006
```
Int[(u_.)*(Px_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px, x]],
b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^Expon[Px
, x], x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; PolyQ[Px, x] && GtQ[Expon[P
x, x], 1] && NeQ[Coeff[Px, x, 0], 0] &&  !MatchQ[Px, (a_.)*(v_)^Expon[Px, x
] /; FreeQ[a, x] && LinearQ[v, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.198.

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7+6x^8+(864x^2-96x^3-182x^4+6x^5-34}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x^6-4x^7-2x^8)\log(2)+(3x^6+x^7)\log^2(2))\log\left(\frac{2259-789x}{}\right.}$$

3.198.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 88 vs. 2(28) = 56.

Time = 3.97 (sec) , antiderivative size = 89, normalized size of antiderivative = 3.18

method	result
norman	$\ln\left(\ln\left(\frac{x^6\ln(2)^2+(-2x^7+2x^6-10x^5-16x^4+96x^3)\ln(2)+x^8-2x^7+11x^6+6x^5-87x^4+177x^3-415x^2-789x+2259}{x^2+6x+9}\right)\right)$
risch	$\ln\left(\ln\left(\frac{x^6\ln(2)^2+(-2x^7+2x^6-10x^5-16x^4+96x^3)\ln(2)+x^8-2x^7+11x^6+6x^5-87x^4+177x^3-415x^2-789x+2259}{x^2+6x+9}\right)\right)$
parallelrisch	$\ln\left(\ln\left(\frac{x^6\ln(2)^2+(-2x^7+2x^6-10x^5-16x^4+96x^3)\ln(2)+x^8-2x^7+11x^6+6x^5-87x^4+177x^3-415x^2-789x+2259}{x^2+6x+9}\right)\right)$
default	$\ln\left(\ln\left(\frac{x^6\ln(2)^2-2x^7\ln(2)+x^8+2x^6\ln(2)-2x^7-10x^5\ln(2)+11x^6-16x^4\ln(2)+6x^5+96x^3\ln(2)-87x^4+177x^3-415x^2-78}{x^2+6x+9}\right.\right.$

input
```
int(((4*x^6+18*x^5)*ln(2)^2+(-10*x^7-34*x^6+6*x^5-182*x^4-96*x^3+864*x^2)*
ln(2)+6*x^8+14*x^7+2*x^6+216*x^5-84*x^4-867*x^3+1593*x^2-1701*x-6885)/((x^
7+3*x^6)*ln(2)^2+(-2*x^8-4*x^7-4*x^6-46*x^5+48*x^4+288*x^3)*ln(2)+x^9+x^8+
5*x^7+39*x^6-69*x^5-84*x^4+116*x^3-2034*x^2-108*x+6777)/ln((x^6*ln(2)^2+(-
2*x^7+2*x^6-10*x^5-16*x^4+96*x^3)*ln(2)+x^8-2*x^7+11*x^6+6*x^5-87*x^4+177*
x^3-415*x^2-789*x+2259)/(x^2+6*x+9)),x,method=_RETURNVERBOSE)
```

output
```
ln(ln((x^6*ln(2)^2+(-2*x^7+2*x^6-10*x^5-16*x^4+96*x^3)*ln(2)+x^8-2*x^7+11*
x^6+6*x^5-87*x^4+177*x^3-415*x^2-789*x+2259)/(x^2+6*x+9)))
```

3.198.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 87 vs. 2(30) = 60.

Time = 0.26 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.11

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7 \cdots}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x^6 \cdots}$$

$$= \log\left(\log\left(\frac{x^8+x^6\log(2)^2-2x^7+11x^6+6x^5-87x^4+177x^3-415x^2-2(x^7-x^6+5x^5+8x^4-48 \cdots}{x^2+6x+9}\right.\right.$$

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7+6x^8+(864x^2-96x^3-182x^4+6x^5-34 \cdots}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x^6-4x^7-2x^8)\log(2)+(3x^6+x^7)\log^2(2))\log\left(\frac{2259-789x \cdots}{\cdots}\right.}$$

input
```
integrate(((4*x^6+18*x^5)*log(2)^2+(-10*x^7-34*x^6+6*x^5-182*x^4-96*x^3+86
4*x^2)*log(2)+6*x^8+14*x^7+2*x^6+216*x^5-84*x^4-867*x^3+1593*x^2-1701*x-68
85)/((x^7+3*x^6)*log(2)^2+(-2*x^8-4*x^7-4*x^6-46*x^5+48*x^4+288*x^3)*log(2
)+x^9+x^8+5*x^7+39*x^6-69*x^5-84*x^4+116*x^3-2034*x^2-108*x+6777)/log((x^6
*log(2)^2+(-2*x^7+2*x^6-10*x^5-16*x^4+96*x^3)*log(2)+x^8-2*x^7+11*x^6+6*x^
5-87*x^4+177*x^3-415*x^2-789*x+2259)/(x^2+6*x+9)),x, algorithm=\
```

output
```
log(log((x^8 + x^6*log(2)^2 - 2*x^7 + 11*x^6 + 6*x^5 - 87*x^4 + 177*x^3 -
415*x^2 - 2*(x^7 - x^6 + 5*x^5 + 8*x^4 - 48*x^3)*log(2) - 789*x + 2259)/(x
^2 + 6*x + 9)))
```

3.198.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 87 vs. $2(24) = 48$.

Time = 1.57 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.11

$$\int \frac{-6885 - 1701x + 1593x^2 - 867x^3 - 84x^4 + 216x^5 + 2x^6 + 14x^7}{(6777 - 108x - 2034x^2 + 116x^3 - 84x^4 - 69x^5 + 39x^6 + 5x^7 + x^8 + x^9 + (288x^3 + 48x^4 - 46x^5 - 4x^6}$$
$$= \log\left(\log\left(\frac{x^8 - 2x^7 + x^6\log(2)^2 + 11x^6 + 6x^5 - 87x^4 + 177x^3 - 415x^2 - 789x + (-2x^7 + 2x^6 - 10x^5 -}{x^2 + 6x + 9}\right.\right.$$

input
```
integrate(((4*x**6+18*x**5)*ln(2)**2+(-10*x**7-34*x**6+6*x**5-182*x**4-96*
x**3+864*x**2)*ln(2)+6*x**8+14*x**7+2*x**6+216*x**5-84*x**4-867*x**3+1593*
x**2-1701*x-6885)/((x**7+3*x**6)*ln(2)**2+(-2*x**8-4*x**7-4*x**6-46*x**5+4
8*x**4+288*x**3)*ln(2)+x**9+x**8+5*x**7+39*x**6-69*x**5-84*x**4+116*x**3-2
034*x**2-108*x+6777)/ln((x**6*ln(2)**2+(-2*x**7+2*x**6-10*x**5-16*x**4+96*
x**3)*ln(2)+x**8-2*x**7+11*x**6+6*x**5-87*x**4+177*x**3-415*x**2-789*x+225
9)/(x**2+6*x+9)),x)
```

output
```
log(log((x**8 - 2*x**7 + x**6*log(2)**2 + 11*x**6 + 6*x**5 - 87*x**4 + 177
*x**3 - 415*x**2 - 789*x + (-2*x**7 + 2*x**6 - 10*x**5 - 16*x**4 + 96*x**3
)*log(2) + 2259)/(x**2 + 6*x + 9)))
```

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$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7+6x^8+(864x^2-96x^3-182x^4+6x^5-34}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x^6-4x^7-2x^8)\log(2)+(3x^6+x^7)\log^2(2))\log\left(\frac{2259-789x}{}\right.}$$

3.198.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. $2(30) = 60$.

Time = 0.42 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.79

$$\int \frac{-6885 - 1701x + 1593x^2 - 867x^3 - 84x^4 + 216x^5 + 2x^6 + 14x^7}{(6777 - 108x - 2034x^2 + 116x^3 - 84x^4 - 69x^5 + 39x^6 + 5x^7 + x^8 + x^9 + (288x^3 + 48x^4 - 46x^5 - 4x^6}$$

$$= \log \left(\log \left(x^8 - 2\,x^7(\log(2) + 1) + \left(\log(2)^2 + 2\,\log(2) + 11\right)x^6 - 2\,x^5(5\,\log(2) - 3) - x^4(16\,\log(2) + 87) + 3\,x^3(32\,\log(2) + 59) - 415\,x^2 - 789\,x + 2259\right) - 2\,\log(x + 3)\right)$$

input
```
integrate(((4*x^6+18*x^5)*log(2)^2+(-10*x^7-34*x^6+6*x^5-182*x^4-96*x^3+86
4*x^2)*log(2)+6*x^8+14*x^7+2*x^6+216*x^5-84*x^4-867*x^3+1593*x^2-1701*x-68
85)/((x^7+3*x^6)*log(2)^2+(-2*x^8-4*x^7-4*x^6-46*x^5+48*x^4+288*x^3)*log(2
)+x^9+x^8+5*x^7+39*x^6-69*x^5-84*x^4+116*x^3-2034*x^2-108*x+6777)/log((x^6
*log(2)^2+(-2*x^7+2*x^6-10*x^5-16*x^4+96*x^3)*log(2)+x^8-2*x^7+11*x^6+6*x^
5-87*x^4+177*x^3-415*x^2-789*x+2259)/(x^2+6*x+9)),x, algorithm=\
```

output
```
log(log(x^8 - 2*x^7*(log(2) + 1) + (log(2)^2 + 2*log(2) + 11)*x^6 - 2*x^5*
(5*log(2) - 3) - x^4*(16*log(2) + 87) + 3*x^3*(32*log(2) + 59) - 415*x^2 -
 789*x + 2259) - 2*log(x + 3))
```

3.198.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(30) = 60$.

Time = 0.36 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.39

$$\int \frac{-6885 - 1701x + 1593x^2 - 867x^3 - 84x^4 + 216x^5 + 2x^6 + 14x^7}{(6777 - 108x - 2034x^2 + 116x^3 - 84x^4 - 69x^5 + 39x^6 + 5x^7 + x^8 + x^9 + (288x^3 + 48x^4 - 46x^5 - 4x^6}$$

$$= \log \left(-\log \left(x^8 - 2\,x^7\log(2) + x^6\log(2)^2 - 2\,x^7 + 2\,x^6\log(2) + 11\,x^6 - 10\,x^5\log(2) + 6\,x^5 - 16\,x^4\log(2) - 87\,x^4 + 96\,x^3\log(2) + 177\,x^3 - 415\,x^2 - 789\,x + 2259\right) + \log\left(x^2 + 6\,x + 9\right)\right)$$

input
```
integrate(((4*x^6+18*x^5)*log(2)^2+(-10*x^7-34*x^6+6*x^5-182*x^4-96*x^3+86
4*x^2)*log(2)+6*x^8+14*x^7+2*x^6+216*x^5-84*x^4-867*x^3+1593*x^2-1701*x-68
85)/((x^7+3*x^6)*log(2)^2+(-2*x^8-4*x^7-4*x^6-46*x^5+48*x^4+288*x^3)*log(2
)+x^9+x^8+5*x^7+39*x^6-69*x^5-84*x^4+116*x^3-2034*x^2-108*x+6777)/log((x^6
*log(2)^2+(-2*x^7+2*x^6-10*x^5-16*x^4+96*x^3)*log(2)+x^8-2*x^7+11*x^6+6*x^
5-87*x^4+177*x^3-415*x^2-789*x+2259)/(x^2+6*x+9)),x, algorithm=\
```

output
```
log(-log(x^8 - 2*x^7*log(2) + x^6*log(2)^2 - 2*x^7 + 2*x^6*log(2) + 11*x^6
 - 10*x^5*log(2) + 6*x^5 - 16*x^4*log(2) - 87*x^4 + 96*x^3*log(2) + 177*x^
3 - 415*x^2 - 789*x + 2259) + log(x^2 + 6*x + 9))
```

3.198.9 Mupad [B] (verification not implemented)

Time = 16.55 (sec) , antiderivative size = 89, normalized size of antiderivative = 3.18

$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x^6}$$

$$=\ln\left(\ln\left(\frac{x^6\ln(2)^2-789\,x-\ln(2)\,\left(2\,x^7-2\,x^6+10\,x^5+16\,x^4-96\,x^3\right)-415\,x^2+177\,x^3-87\,x^4+6\,x^5}{x^2+6\,x+9}\right.\right.$$

input
```
int((1593*x^2 - log(2)*(96*x^3 - 864*x^2 + 182*x^4 - 6*x^5 + 34*x^6 + 10*x
^7) - 1701*x - 867*x^3 - 84*x^4 + 216*x^5 + 2*x^6 + 14*x^7 + 6*x^8 + log(2
)^2*(18*x^5 + 4*x^6) - 6885)/(log((x^6*log(2)^2 - 789*x - log(2)*(16*x^4 -
 96*x^3 + 10*x^5 - 2*x^6 + 2*x^7) - 415*x^2 + 177*x^3 - 87*x^4 + 6*x^5 + 1
1*x^6 - 2*x^7 + x^8 + 2259)/(6*x + x^2 + 9))*(log(2)^2*(3*x^6 + x^7) - log
(2)*(46*x^5 - 48*x^4 - 288*x^3 + 4*x^6 + 4*x^7 + 2*x^8) - 108*x - 2034*x^2
 + 116*x^3 - 84*x^4 - 69*x^5 + 39*x^6 + 5*x^7 + x^8 + x^9 + 6777)),x)
```

output
```
log(log((x^6*log(2)^2 - 789*x - log(2)*(16*x^4 - 96*x^3 + 10*x^5 - 2*x^6 +
 2*x^7) - 415*x^2 + 177*x^3 - 87*x^4 + 6*x^5 + 11*x^6 - 2*x^7 + x^8 + 2259
)/(6*x + x^2 + 9)))
```

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$$\int \frac{-6885-1701x+1593x^2-867x^3-84x^4+216x^5+2x^6+14x^7+6x^8+(864x^2-96x^3-182x^4+6x^5-34}{(6777-108x-2034x^2+116x^3-84x^4-69x^5+39x^6+5x^7+x^8+x^9+(288x^3+48x^4-46x^5-4x^6-4x^7-2x^8)\log(2)+(3x^6+x^7)\log^2(2))\log\left(\frac{2259-789x}{}\right.}$$

3.199 $\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+\left(-2x+4x^2\log(4\right.}{}$

3.199.1 Optimal result

Integrand size = 170, antiderivative size = 35

$$\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+\left(-2x+4x^2\log(4)\right)\log\left(-x+\left(-1+x^2\right)\log(4)\right)+\frac{e^{2-e^x}\left(2x-\cdots\right.}{\cdots}}{-9x^2+\left(-9x+9x^3\right)\log(4)}$$
$$=\frac{1}{9}\left(\frac{e^{2-e^x}}{x}-\log\left(-x+\left(-1+x^2\right)\log(4)\right)\right)^2$$

output

```
1/3*(exp(-ln(x)-exp(x)+2)-ln(2*(x^2-1)*ln(2)-x))*(1/3*exp(-ln(x)-exp(x)+2)
-1/3*ln(2*(x^2-1)*ln(2)-x))
```

3.199.2 Mathematica [F]

$$\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+\left(-2x+4x^2\log(4)\right)\log\left(-x+\left(-1+x^2\right)\log(4)\right)+\frac{e^{2-e^x}\left(2x-\cdots\right.}{\cdots}}{-9x^2+\left(-9x+9x^3\right)\log(4)}$$
$$=\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+\left(-2x+4x^2\log(4)\right)\log\left(-x+\left(-1+x^2\right)\log(4)\right)+\frac{e^{2-e^x}\left(2x\cdots\right.}{\cdots}}{-9x^2+\left(-9x+9x^3\right)\log(4)}$$

3.199.
$$\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+\left(-2x+4x^2\log(4)\right)\log\left(-x+\left(-1+x^2\right)\log(4)\right)+\frac{e^{2-e^x}\left(2x-4x^2\log(4)+\left(-2x+\left(-2+2x^2\right)\log(4\cdots\right.\right.}{\cdots}}{-9x^2+\left(-9x+9x^3\right)\log(4)}$$

input
```
Integrate[((E^(4 - 2*E^x)*(2*x + (2 - 2*x^2)*Log[4] + E^x*(2*x^2 + (2*x -
2*x^3)*Log[4])))/x^2 + (-2*x + 4*x^2*Log[4])*Log[-x + (-1 + x^2)*Log[4]] +
 (E^(2 - E^x)*(2*x - 4*x^2*Log[4] + (-2*x + (-2 + 2*x^2)*Log[4] + E^x*(-2*
x^2 + (-2*x + 2*x^3)*Log[4]))*Log[-x + (-1 + x^2)*Log[4]]))/x)/(-9*x^2 + (
-9*x + 9*x^3)*Log[4]),x]
```

output
```
Integrate[((E^(4 - 2*E^x)*(2*x + (2 - 2*x^2)*Log[4] + E^x*(2*x^2 + (2*x -
2*x^3)*Log[4])))/x^2 + (-2*x + 4*x^2*Log[4])*Log[-x + (-1 + x^2)*Log[4]] +
 (E^(2 - E^x)*(2*x - 4*x^2*Log[4] + (-2*x + (-2 + 2*x^2)*Log[4] + E^x*(-2*
x^2 + (-2*x + 2*x^3)*Log[4]))*Log[-x + (-1 + x^2)*Log[4]]))/x)/(-9*x^2 + (
-9*x + 9*x^3)*Log[4]), x]
```

3.199.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(4x^2\log(4)-2x\right)\log\left(\left(x^2-1\right)\log(4)-x\right)+\frac{e^{4-2e^x}\left(\left(2-2x^2\right)\log(4)+e^x\left(\left(2x-2x^3\right)\log(4)+2x^2\right)+2x\right)}{x^2}+\frac{e^{2-e^x}\left(-4x^2\log(4)+\right.}{}}{\left(9x^3-9x\right)\log(4)-9x^2}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{\left(4x^2\log(4)-2x\right)\log\left(\left(x^2-1\right)\log(4)-x\right)+\frac{e^{4-2e^x}\left(\left(2-2x^2\right)\log(4)+e^x\left(\left(2x-2x^3\right)\log(4)+2x^2\right)+2x\right)}{x^2}+\frac{e^{2-e^x}\left(-4x^2\log(4)+\right.}{}}{x\left(9x^2\log(4)-9x-9\log(4)\right)}$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{2e^{2-e^x}(x+1)(1-x)\log(4)\log\left(x^2\log(4)-x-\log(4)\right)}{9x^2\left(x^2(-\log(4))+x+\log(4)\right)}+\frac{2(1-x\log(16))\log\left(x^2\log(4)-x-\log(4)\right)}{9\left(x^2(-\log(4))+x+\log(4)\right)}+\frac{2e^2}{9}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2e^{-2e^x}\left(e^{e^x}x^2(x\log(16)-1)+e^{x+2}x\left(x^2\log(4)-x-\log(4)\right)+e^2\left(x^2\log(4)-x-\log(4)\right)\right)\left(e^2-e^{e^x}x\log\left(x^2\log\right.\right.}{9x^3\left(x^2(-\log(4))+x+\log(4)\right)}$$

$$\Big\downarrow \text{27}$$

$$\frac{2}{9}\int -\frac{e^{-2e^x}\left(e^{e^x}(1-x\log(16))x^2+e^{x+2}\left(-\log(4)x^2+x+\log(4)\right)x+e^2\left(-\log(4)x^2+x+\log(4)\right)\right)\left(e^2-e^{e^x}x\log\right.}{x^3\left(-\log(4)x^2+x+\log(4)\right)}$$

3.199.

$$\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+\left(-2x+4x^2\log(4)\right)\log\left(-x+\left(-1+x^2\right)\log(4)\right)+\frac{e^{2-e^x}\left(2x-4x^2\log(4)+\left(-2x+\left(-2+2x^2\right)\log(4\right.\right.}{}}{-9x^2+\left(-9x+9x^3\right)\log(4)}$$

$$\downarrow 25$$

$$-\frac{2}{9}\int \frac{e^{-2e^x}\left(e^{e^x}(1-x\log(16))x^2+e^{x+2}\left(-\log(4)x^2+x+\log(4)\right)x+e^2\left(-\log(4)x^2+x+\log(4)\right)\right)\left(e^2-e^{e^x}x\log\right.}{x^3\left(-\log(4)x^2+x+\log(4)\right)}$$

$$\downarrow 7279$$

$$-\frac{2}{9}\int\left(\frac{e^{x-2e^x+2}\left(e^2-e^{e^x}x\log\left(\log(4)x^2-x-\log(4)\right)\right)}{x^2}-\frac{e^{-2e^x}\left(e^{e^x}\log(16)x^3-e^{e^x}x^2+e^2\log(4)x^2-e^2x-e^2\right.}{x^3\left(\log(4)x^2-x\right.}\right.$$

$$\downarrow 2009$$

$$-\frac{2}{9}\left(\frac{\log(16)\log^2\left(\log(16)x-\sqrt{1+4\log^2(4)}-1\right)}{4\log(4)}+\frac{\log(16)\log^2\left(\log(16)x+\sqrt{1+4\log^2(4)}-1\right)}{4\log(4)}-\frac{\log(16)\log}{}\right.$$

input
```
Int[((E^(4 - 2*E^x)*(2*x + (2 - 2*x^2)*Log[4] + E^x*(2*x^2 + (2*x - 2*x^3)
*Log[4])))/x^2 + (-2*x + 4*x^2*Log[4])*Log[-x + (-1 + x^2)*Log[4]] + (E^(2
 - E^x)*(2*x - 4*x^2*Log[4] + (-2*x + (-2 + 2*x^2)*Log[4] + E^x*(-2*x^2 +
(-2*x + 2*x^3)*Log[4]))*Log[-x + (-1 + x^2)*Log[4]]))/x)/(-9*x^2 + (-9*x +
 9*x^3)*Log[4]),x]
```

output
```
$Aborted
```

3.199.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.199.
$$\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+\left(-2x+4x^2\log(4)\right)\log\left(-x+\left(-1+x^2\right)\log(4)\right)+\frac{e^{2-e^x}\left(2x-4x^2\log(4)+\left(-2x+\left(-2+2x^2\right)\log(4\right.\right.}{}}{-9x^2+\left(-9x+9x^3\right)\log(4)}$$

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.199.4 Maple [A] (verified)

Time = 256.94 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.66

method	result	size
risch	$\frac{\ln\left(2\left(x^{2}-1\right)\ln\left(2\right)-x\right)^{2}}{9}+\frac{{\mathrm e}^{-2\,{\mathrm e}^{x}+4}}{9x^{2}}-\frac{2\ln\left(2\left(x^{2}-1\right)\ln\left(2\right)-x\right){\mathrm e}^{-{\mathrm e}^{x}+2}}{9x}$	58
parallelrisch	$\frac{\frac{4\ln\left(2\right){\mathrm e}^{-2\,{\mathrm e}^{x}+4}}{x^{2}}-8\ln\left(2\right){\mathrm e}^{-\ln\left(x\right)-{\mathrm e}^{x}+2}\ln\left(2x^{2}\ln\left(2\right)-2\ln\left(2\right)-x\right)+4\ln\left(2\right)\ln\left(2x^{2}\ln\left(2\right)-2\ln\left(2\right)-x\right)^{2}}{36\ln\left(2\right)}$	78

input
```
int((((2*(-2*x^3+2*x)*ln(2)+2*x^2)*exp(x)+2*(-2*x^2+2)*ln(2)+2*x)*exp(-ln(
x)-exp(x)+2)^2+(((2*(2*x^3-2*x)*ln(2)-2*x^2)*exp(x)+2*(2*x^2-2)*ln(2)-2*x)
*ln(2*(x^2-1)*ln(2)-x)-8*x^2*ln(2)+2*x)*exp(-ln(x)-exp(x)+2)+(8*x^2*ln(2)-
2*x)*ln(2*(x^2-1)*ln(2)-x))/(2*(9*x^3-9*x)*ln(2)-9*x^2),x,method=_RETURNVE
RBOSE)
```

output
```
1/9*ln(2*(x^2-1)*ln(2)-x)^2+1/9/x^2*exp(-2*exp(x)+4)-2/9/x*ln(2*(x^2-1)*ln
(2)-x)*exp(-exp(x)+2)
```

3.199.

$$\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+\left(-2x+4x^2\log(4)\right)\log\left(-x+\left(-1+x^2\right)\log(4)\right)+\frac{e^{2-e^x}\left(2x-4x^2\log(4)+\left(-2x+\left(-2+2x^2\right)\log(4\right.\right.}{}}{-9x^2+\left(-9x+9x^3\right)\log(4)}$$

3.199.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.69

$$\int \frac{\frac{e^{4-2e^x}\left(2x+(2-2x^2)\log(4)+e^x\left(2x^2+(2x-2x^3)\log(4)\right)\right)}{x^2}+(-2x+4x^2\log(4))\log\left(-x+(-1+x^2)\log(4)\right)+\frac{e^{2-e^x}(2x-4}{}}{-9x^2+(-9x+9x^3)\log(4)}$$
$$=-\frac{2}{9}\,e^{\left(-e^x-\log(x)+2\right)}\log\left(2\left(x^2-1\right)\log(2)-x\right)+\frac{1}{9}\log\left(2\left(x^2-1\right)\log(2)-x\right)^2+\frac{1}{9}\,e^{\left(-2\,e^x-2\,\log(x)+4\right)}$$

input
```
integrate((((2*(-2*x^3+2*x)*log(2)+2*x^2)*exp(x)+2*(-2*x^2+2)*log(2)+2*x)*
exp(-log(x)-exp(x)+2)^2+(((2*(2*x^3-2*x)*log(2)-2*x^2)*exp(x)+2*(2*x^2-2)*
log(2)-2*x)*log(2*(x^2-1)*log(2)-x)-8*x^2*log(2)+2*x)*exp(-log(x)-exp(x)+2
)+(8*x^2*log(2)-2*x)*log(2*(x^2-1)*log(2)-x))/(2*(9*x^3-9*x)*log(2)-9*x^2)
,x, algorithm=\
```

output
```
-2/9*e^(-e^x - log(x) + 2)*log(2*(x^2 - 1)*log(2) - x) + 1/9*log(2*(x^2 -
1)*log(2) - x)^2 + 1/9*e^(-2*e^x - 2*log(x) + 4)
```

3.199.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(26) = 52$.

Time = 0.33 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.66

$$\int \frac{\frac{e^{4-2e^x}\left(2x+(2-2x^2)\log(4)+e^x\left(2x^2+(2x-2x^3)\log(4)\right)\right)}{x^2}+(-2x+4x^2\log(4))\log\left(-x+(-1+x^2)\log(4)\right)+\frac{e^{2-e^x}(2x-4}{}}{-9x^2+(-9x+9x^3)\log(4)}$$
$$=\frac{\log\left(-x+(2x^2-2)\log(2)\right)^2}{9}+\frac{-18x^2e^{2-e^x}\log\left(-x+(2x^2-2)\log(2)\right)+9xe^{4-2e^x}}{81x^3}$$

input
```
integrate((((2*(-2*x**3+2*x)*ln(2)+2*x**2)*exp(x)+2*(-2*x**2+2)*ln(2)+2*x)
*exp(-ln(x)-exp(x)+2)**2+(((2*(2*x**3-2*x)*ln(2)-2*x**2)*exp(x)+2*(2*x**2-
2)*ln(2)-2*x)*ln(2*(x**2-1)*ln(2)-x)-8*x**2*ln(2)+2*x)*exp(-ln(x)-exp(x)+2
)+(8*x**2*ln(2)-2*x)*ln(2*(x**2-1)*ln(2)-x))/(2*(9*x**3-9*x)*ln(2)-9*x**2)
,x)
```

output
```
log(-x + (2*x**2 - 2)*log(2))**2/9 + (-18*x**2*exp(2 - exp(x))*log(-x + (2
*x**2 - 2)*log(2)) + 9*x*exp(4 - 2*exp(x)))/(81*x**3)
```

3.199.

$$\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+(-2x+4x^2\log(4))\log\left(-x+\left(-1+x^2\right)\log(4)\right)+\frac{e^{2-e^x}\left(2x-4x^2\log(4)+\left(-2x+\left(-2+2x^2\right)\log(4\right.\right.}{}}{-9x^2+(-9x+9x^3)\log(4)}$$

3.199.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.74

$$\int \frac{\frac{e^{4-2e^x}(2x+(2-2x^2)\log(4)+e^x(2x^2+(2x-2x^3)\log(4)))}{x^2}+(-2x+4x^2\log(4))\log(-x+(-1+x^2)\log(4))+\frac{e^{2-e^x}(2x-4}{}}{-9x^2+(-9x+9x^3)\log(4)}$$
$$=\frac{x^2\log\left(2x^2\log(2)-x-2\log(2)\right)^2-2xe^{(-e^x+2)}\log\left(2x^2\log(2)-x-2\log(2)\right)+e^{(-2e^x+4)}}{9x^2}$$

input
```
integrate((((2*(-2*x^3+2*x)*log(2)+2*x^2)*exp(x)+2*(-2*x^2+2)*log(2)+2*x)*
exp(-log(x)-exp(x)+2)^2+(((2*(2*x^3-2*x)*log(2)-2*x^2)*exp(x)+2*(2*x^2-2)*
log(2)-2*x)*log(2*(x^2-1)*log(2)-x)-8*x^2*log(2)+2*x)*exp(-log(x)-exp(x)+2
)+(8*x^2*log(2)-2*x)*log(2*(x^2-1)*log(2)-x))/(2*(9*x^3-9*x)*log(2)-9*x^2)
,x, algorithm=\
```

output
```
1/9*(x^2*log(2*x^2*log(2) - x - 2*log(2))^2 - 2*x*e^(-e^x + 2)*log(2*x^2*l
og(2) - x - 2*log(2)) + e^(-2*e^x + 4))/x^2
```

3.199.8 Giac [F]

$$\int \frac{\frac{e^{4-2e^x}(2x+(2-2x^2)\log(4)+e^x(2x^2+(2x-2x^3)\log(4)))}{x^2}+(-2x+4x^2\log(4))\log(-x+(-1+x^2)\log(4))+\frac{e^{2-e^x}(2x-4}{}}{-9x^2+(-9x+9x^3)\log(4)}$$
$$=\int \frac{2\left((4x^2\log(2)+((x^2-2(x^3-x)\log(2))e^x-2(x^2-1)\log(2)+x)\log(2(x^2-1)\log(2)-x)-x\right)e}{}$$

input
```
integrate((((2*(-2*x^3+2*x)*log(2)+2*x^2)*exp(x)+2*(-2*x^2+2)*log(2)+2*x)*
exp(-log(x)-exp(x)+2)^2+(((2*(2*x^3-2*x)*log(2)-2*x^2)*exp(x)+2*(2*x^2-2)*
log(2)-2*x)*log(2*(x^2-1)*log(2)-x)-8*x^2*log(2)+2*x)*exp(-log(x)-exp(x)+2
)+(8*x^2*log(2)-2*x)*log(2*(x^2-1)*log(2)-x))/(2*(9*x^3-9*x)*log(2)-9*x^2)
,x, algorithm=\
```

output
```
integrate(2/9*((4*x^2*log(2) + ((x^2 - 2*(x^3 - x)*log(2))*e^x - 2*(x^2 -
1)*log(2) + x)*log(2*(x^2 - 1)*log(2) - x) - x)*e^(-e^x - log(x) + 2) - ((
x^2 - 2*(x^3 - x)*log(2))*e^x - 2*(x^2 - 1)*log(2) + x)*e^(-2*e^x - 2*log(
x) + 4) - (4*x^2*log(2) - x)*log(2*(x^2 - 1)*log(2) - x))/(x^2 - 2*(x^3 -
x)*log(2)), x)
```


$$\int \frac{\frac{e^{4-2e^x}(2x+(2-2x^2)\log(4)+e^x(2x^2+(2x-2x^3)\log(4)))}{x^2}+(-2x+4x^2\log(4))\log(-x+(-1+x^2)\log(4))+\frac{e^{2-e^x}(2x-4x^2\log(4)+(-2x+(-2+2x^2)\log(4}{}}{-9x^2+(-9x+9x^3)\log(4)}$$

3.199.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\frac{e^{4-2e^x}(2x+(2-2x^2)\log(4)+e^x(2x^2+(2x-2x^3)\log(4)))}{x^2}+(-2x+4x^2\log(4))\log(-x+(-1+x^2)\log(4))+\frac{e^{2-e^x}(2x-4}{}}{-9x^2+(-9x+9x^3)\log(4)}$$

$$=\int \frac{e^{2-\ln(x)-e^x}\left(8x^2\ln(2)-2x+\ln(2\ln(2)(x^2-1)-x)\right)\left(2x+e^x\left(2\ln(2)(2x-2x^3)+2x^2\right)-2\ln(2\right.}{}$$

input
```
int((exp(2 - log(x) - exp(x))*(8*x^2*log(2) - 2*x + log(2*log(2)*(x^2 - 1)
 - x)*(2*x + exp(x)*(2*log(2)*(2*x - 2*x^3) + 2*x^2) - 2*log(2)*(2*x^2 - 2
))) - exp(4 - 2*log(x) - 2*exp(x))*(2*x + exp(x)*(2*log(2)*(2*x - 2*x^3) +
 2*x^2) - 2*log(2)*(2*x^2 - 2)) + log(2*log(2)*(x^2 - 1) - x)*(2*x - 8*x^2
*log(2)))/(2*log(2)*(9*x - 9*x^3) + 9*x^2),x)
```

output
```
int((exp(2 - log(x) - exp(x))*(8*x^2*log(2) - 2*x + log(2*log(2)*(x^2 - 1)
 - x)*(2*x + exp(x)*(2*log(2)*(2*x - 2*x^3) + 2*x^2) - 2*log(2)*(2*x^2 - 2
))) - exp(4 - 2*log(x) - 2*exp(x))*(2*x + exp(x)*(2*log(2)*(2*x - 2*x^3) +
 2*x^2) - 2*log(2)*(2*x^2 - 2)) + log(2*log(2)*(x^2 - 1) - x)*(2*x - 8*x^2
*log(2)))/(2*log(2)*(9*x - 9*x^3) + 9*x^2), x)
```

3.199.

$$\int \frac{\frac{e^{4-2e^x}\left(2x+\left(2-2x^2\right)\log(4)+e^x\left(2x^2+\left(2x-2x^3\right)\log(4)\right)\right)}{x^2}+\left(-2x+4x^2\log(4)\right)\log\left(-x+\left(-1+x^2\right)\log(4)\right)+\frac{e^{2-e^x}\left(2x-4x^2\log(4)+\left(-2x+\left(-2+2x^2\right)\log(4\right.\right.}{}}{-9x^2+(-9x+9x^3)\log(4)}$$

3.200 $\int \frac{-1+5x^2}{x^2} \, dx$

3.200.1 Optimal result

Integrand size = 11, antiderivative size = 13

$$\int \frac{-1+5x^2}{x^2} \, dx = -5 - \frac{2}{e^4} + \frac{1}{x} + 5x$$

output
```
1/x+5*x-5-2/exp(4)
```

3.200.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int \frac{-1+5x^2}{x^2} \, dx = \frac{1}{x} + 5x$$

input
```
Integrate[(-1 + 5*x^2)/x^2,x]
```

output
```
x^(-1) + 5*x
```

3.200.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5x^2-1}{x^2}\,dx$$

$$\Big\downarrow \text{ 244}$$

$$\int \left(5-\frac{1}{x^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$5x+\frac{1}{x}$$

input
```
Int[(-1 + 5*x^2)/x^2,x]
```

output
```
x^(-1) + 5*x
```

3.200.3.1 Defintions of rubi rules used

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.200.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.62

method	result	size
default	$5x+\frac{1}{x}$	8
risch	$5x+\frac{1}{x}$	8
gosper	$\frac{5x^{2}+1}{x}$	12
norman	$\frac{5x^{2}+1}{x}$	12
parallelrisch	$\frac{5x^{2}+1}{x}$	12

input
```
int((5*x^2-1)/x^2,x,method=_RETURNVERBOSE)
```

output
```
5*x+1/x
```

3.200.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{-1+5x^2}{x^2}\,dx=\frac{5\,x^2+1}{x}$$

input
```
integrate((5*x^2-1)/x^2,x, algorithm=\
```

output
```
(5*x^2 + 1)/x
```

3.200.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.38

$$\int \frac{-1+5x^2}{x^2}\,dx=5x+\frac{1}{x}$$

input
```
integrate((5*x**2-1)/x**2,x)
```

output
```
5*x + 1/x
```

3.200.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int \frac{-1+5x^2}{x^2}\,dx = 5\,x + \frac{1}{x}$$

input
```
integrate((5*x^2-1)/x^2,x, algorithm=\
```

output
```
5*x + 1/x
```

3.200.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int \frac{-1+5x^2}{x^2}\,dx = 5\,x + \frac{1}{x}$$

input
```
integrate((5*x^2-1)/x^2,x, algorithm=\
```

output
```
5*x + 1/x
```

3.200.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int \frac{-1+5x^2}{x^2}\,dx = 5\,x + \frac{1}{x}$$

input
```
int((5*x^2 - 1)/x^2,x)
```

output
```
5*x + 1/x
```

3.201 $\int \frac{-150-20x-2x^2}{75x+20x^2+x^3} \, dx$

3.201.1 Optimal result

Integrand size = 25, antiderivative size = 20

$$\int \frac{-150-20x-2x^2}{75x+20x^2+x^3} \, dx = -2\log\left(x+x\left(1+\frac{5-x}{5+x}\right)\right)$$

output
```
-2*ln(x+x*(1+(5-x)/(5+x)))
```

3.201.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-150-20x-2x^2}{75x+20x^2+x^3} \, dx = -2(\log(x)-\log(5+x)+\log(15+x))$$

input
```
Integrate[(-150 - 20*x - 2*x^2)/(75*x + 20*x^2 + x^3),x]
```

output
```
-2*(Log[x] - Log[5 + x] + Log[15 + x])
```

3.201.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2026, 2159, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^2-20x-150}{x^3+20x^2+75x}\,dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{-2x^2-20x-150}{x\left(x^2+20x+75\right)}dx$$

$$\Big\downarrow \text{ 2159}$$

$$\int \left(\frac{2}{x+5}-\frac{2}{x+15}-\frac{2}{x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-2\log(x)+2\log(x+5)-2\log(x+15)$$

input
```
Int[(-150 - 20*x - 2*x^2)/(75*x + 20*x^2 + x^3),x]
```

output
```
-2*Log[x] + 2*Log[5 + x] - 2*Log[15 + x]
```

3.201.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2159
```
Int[(Pq_)*((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p
_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*Pq*(a + b*x + c*x^2)^p, x
], x] /; FreeQ[{a, b, c, d, e, m}, x] && PolyQ[Pq, x] && IGtQ[p, -2]
```

3.201.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

method	result	size
default	$-2\ln(x)+2\ln(5+x)-2\ln(x+15)$	18
norman	$-2\ln(x)+2\ln(5+x)-2\ln(x+15)$	18
risch	$2\ln(5+x)-2\ln(x^2+15x)$	18
parallelrisch	$-2\ln(x)+2\ln(5+x)-2\ln(x+15)$	18

input
```
int((-2*x^2-20*x-150)/(x^3+20*x^2+75*x),x,method=_RETURNVERBOSE)
```

output
```
-2*ln(x)+2*ln(5+x)-2*ln(x+15)
```

3.201.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{-150-20x-2x^2}{75x+20x^2+x^3}\,dx = -2\,\log\left(x^2+15\,x\right)+2\,\log\left(x+5\right)$$

input
```
integrate((-2*x^2-20*x-150)/(x^3+20*x^2+75*x),x, algorithm=\
```

output
```
-2*log(x^2 + 15*x) + 2*log(x + 5)
```

3.201.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-150-20x-2x^2}{75x+20x^2+x^3}\,dx = 2\log\left(x+5\right)-2\log\left(x^2+15x\right)$$

input
```
integrate((-2*x**2-20*x-150)/(x**3+20*x**2+75*x),x)
```

output
```
2*log(x + 5) - 2*log(x**2 + 15*x)
```

3.201.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{-150-20x-2x^2}{75x+20x^2+x^3}\,dx = -2\log(x+15)+2\log(x+5)-2\log(x)$$

input
```
integrate((-2*x^2-20*x-150)/(x^3+20*x^2+75*x),x, algorithm=\
```

output
```
-2*log(x + 15) + 2*log(x + 5) - 2*log(x)
```

3.201.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{-150-20x-2x^2}{75x+20x^2+x^3}\,dx = -2\log(|x+15|)+2\log(|x+5|)-2\log(|x|)$$

input
```
integrate((-2*x^2-20*x-150)/(x^3+20*x^2+75*x),x, algorithm=\
```

output
```
-2*log(abs(x + 15)) + 2*log(abs(x + 5)) - 2*log(abs(x))
```

3.201.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-150-20x-2x^2}{75x+20x^2+x^3}\,dx = 2\ln(x+5)-2\ln(x(x+15))$$

input
```
int(-(20*x + 2*x^2 + 150)/(75*x + 20*x^2 + x^3),x)
```

output
```
2*log(x + 5) - 2*log(x*(x + 15))
```

3.202 $\int \frac{2e^{x^2}x^4-2e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}+\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}\log^2\left(\frac{174}{7}\right)}{x^3}\,dx$

3.202.1 Optimal result

Integrand size = 48, antiderivative size = 20

$$\int \frac{2e^{x^2}x^4-2e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}+\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}\log^2\left(\frac{174}{7}\right)}{x^3}\,dx=e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}}+e^{x^2}$$

output
```
exp(x^2)+exp(exp(ln(174/7)^2/x^2))
```

3.202.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{2e^{x^2}x^4-2e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}+\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}\log^2\left(\frac{174}{7}\right)}{x^3}\,dx=e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}}+e^{x^2}$$

input
```
Integrate[(2*E^x^2*x^4 - 2*E^(E^(Log[174/7]^2/x^2) + Log[174/7]^2/x^2)*Log
[174/7]^2)/x^3,x]
```

output
```
E^E^(Log[174/7]^2/x^2) + E^x^2
```

3.202.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.042, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2e^{x^2}x^4-2\log^2\left(\frac{174}{7}\right)e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}+\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}}{x^3}dx$$

$$\Big\downarrow \ 2010$$

$$\int \left(2e^{x^2}x-\frac{2\log^2\left(\frac{174}{7}\right)e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}+\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}}{x^3}\right)dx$$

$$\Big\downarrow \ 2009$$

$$e^{x^2}+e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}}$$

input
```
Int[(2*E^x^2*x^4 - 2*E^(E^(Log[174/7]^2/x^2) + Log[174/7]^2/x^2)*Log[174/7
]^2)/x^3,x]
```

output
```
E^E^(Log[174/7]^2/x^2) + E^x^2
```

3.202.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.202.4 Maple [A] (verified)

Time = 8.79 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result
parallelrisch	$e^{x^2}+e^{e^{\frac{\ln\left(\frac{174}{7}\right)^2}{x^2}}}$
parts	$e^{x^2}+e^{e^{\frac{\ln\left(\frac{174}{7}\right)^2}{x^2}}}$
risch	$e^{x^2}+e^{e^{\frac{(\ln(2)+\ln(3)+\ln(29)-\ln(7))^2}{x^2}}}$
default	$e^{x^2}+\frac{\ln(7)^2 e^{e^{\frac{\ln(174)^2}{x^2}}174^{-\frac{2\ln(7)}{x^2}}e^{\frac{\ln(7)^2}{x^2}}}}{\ln(174)^2-2\ln(174)\ln(7)+\ln(7)^2}+\frac{\ln(174)^2 e^{e^{\frac{\ln(174)^2}{x^2}}174^{-\frac{2\ln(7)}{x^2}}e^{\frac{\ln(7)^2}{x^2}}}}{\ln(174)^2-2\ln(174)\ln(7)+\ln(7)^2}-\frac{2\ln(174)\ln(7)e^{e^{\frac{\ln(174)^2}{x^2}}174^{-\frac{2\ln(7)}{x^2}}e}}{\ln(174)^2-2\ln(174)\ln(7)+\ln(7}$

input
```
int((-2*ln(174/7)^2*exp(ln(174/7)^2/x^2)*exp(exp(ln(174/7)^2/x^2))+2*x^4*e
xp(x^2))/x^3,x,method=_RETURNVERBOSE)
```

output
```
exp(x^2)+exp(exp(ln(174/7)^2/x^2))
```

3.202.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. 2(15) = 30.

Time = 0.25 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.40

$$\int \frac{2e^{x^2}x^4-2e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}+\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}\log^2\left(\frac{174}{7}\right)}{x^3}\,dx = \left(e^{\left(x^2+\frac{\log\left(\frac{174}{7}\right)^2}{x^2}\right)}+e^{\left(\frac{x^2 e^{\left(\frac{\log\left(\frac{174}{7}\right)^2}{x^2}\right)}+\log\left(\frac{174}{7}\right)^2}{x^2}\right)}\right)e^{\left(-\frac{\log\left(\frac{174}{7}\right)^2}{x^2}\right)}$$

input
```
integrate((-2*log(174/7)^2*exp(log(174/7)^2/x^2)*exp(exp(log(174/7)^2/x^2)
)+2*x^4*exp(x^2))/x^3,x, algorithm=\
```

output
```
(e^(x^2 + log(174/7)^2/x^2) + e^((x^2*e^(log(174/7)^2/x^2) + log(174/7)^2)
/x^2))*e^(-log(174/7)^2/x^2)
```

3.202.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{2e^{x^2}x^4 - 2e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}} + \frac{\log^2\left(\frac{174}{7}\right)}{x^2}} \log^2\left(\frac{174}{7}\right)}{x^3}\,dx = e^{x^2} + e^{e^{\frac{\log\left(\frac{174}{7}\right)^2}{x^2}}}$$

input
```
integrate((-2*ln(174/7)**2*exp(ln(174/7)**2/x**2)*exp(exp(ln(174/7)**2/x**
2))+2*x**4*exp(x**2))/x**3,x)
```

output
```
exp(x**2) + exp(exp(log(174/7)**2/x**2))
```

3.202.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 148 vs. $2(15) = 30$.

Time = 0.35 (sec) , antiderivative size = 148, normalized size of antiderivative = 7.40

$$\int \frac{2e^{x^2}x^4 - 2e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}} + \frac{\log^2\left(\frac{174}{7}\right)}{x^2}} \log^2\left(\frac{174}{7}\right)}{x^3}\,dx$$

$$= \frac{e^{\left(e^{\left(\frac{\log(29)^2}{x^2} - \frac{2\log(29)\log(7)}{x^2} + \frac{\log(7)^2}{x^2} + \frac{2\log(29)\log(3)}{x^2} - \frac{2\log(7)\log(3)}{x^2} + \frac{\log(3)^2}{x^2} + \frac{2\log(29)\log(2)}{x^2} - \frac{2\log(7)\log(2)}{x^2} + \frac{2\log(3)\log(2)}{x^2} + \frac{\log(2)^2}{x^2}}}{\log(29)^2 - 2\log(29)\log(7) + \log(7)^2 + 2(\log(29) - \log(7))\log(3) + \log(3)^2 + 2(\log(29) - \log(7) + \log}$$
$$+ e^{(x^2)}$$

input
```
integrate((-2*log(174/7)^2*exp(log(174/7)^2/x^2)*exp(exp(log(174/7)^2/x^2)
)+2*x^4*exp(x^2))/x^3,x, algorithm=\
```

output
```
e^(e^(log(29)^2/x^2 - 2*log(29)*log(7)/x^2 + log(7)^2/x^2 + 2*log(29)*log(
3)/x^2 - 2*log(7)*log(3)/x^2 + log(3)^2/x^2 + 2*log(29)*log(2)/x^2 - 2*log
(7)*log(2)/x^2 + 2*log(3)*log(2)/x^2 + log(2)^2/x^2))*log(174/7)^2/(log(29
)^2 - 2*log(29)*log(7) + log(7)^2 + 2*(log(29) - log(7))*log(3) + log(3)^2
 + 2*(log(29) - log(7) + log(3))*log(2) + log(2)^2) + e^(x^2)
```

3.202.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(15) = 30$.

Time = 0.38 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.40

$$\int \frac{2e^{x^2}x^4 - 2e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}+\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}\log^2\left(\frac{174}{7}\right)}{x^3}\,dx = \left(e^{\left(x^2+\frac{\log\left(\frac{174}{7}\right)^2}{x^2}\right)} + e^{\left(\frac{x^2e^{\left(\frac{\log\left(\frac{174}{7}\right)^2}{x^2}\right)}+\log\left(\frac{174}{7}\right)^2}{x^2}\right)}\right)e^{\left(-\frac{\log\left(\frac{174}{7}\right)^2}{x^2}\right)}$$

input
```
integrate((-2*log(174/7)^2*exp(log(174/7)^2/x^2)*exp(exp(log(174/7)^2/x^2)
)+2*x^4*exp(x^2))/x^3,x, algorithm=\
```

output
```
(e^(x^2 + log(174/7)^2/x^2) + e^((x^2*e^(log(174/7)^2/x^2) + log(174/7)^2)
/x^2))*e^(-log(174/7)^2/x^2)
```

3.202.9 Mupad [B] (verification not implemented)

Time = 14.78 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

$$\int \frac{2e^{x^2}x^4 - 2e^{e^{\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}+\frac{\log^2\left(\frac{174}{7}\right)}{x^2}}\log^2\left(\frac{174}{7}\right)}{x^3}\,dx = \mathrm{e}^{x^2} + \mathrm{e}^{\frac{\mathrm{e}^{\frac{\ln(7)^2}{x^2}}\,\mathrm{e}^{\frac{\ln(174)^2}{x^2}}}{7^{\frac{2\ln(174)}{x^2}}}}$$

input
```
int((2*x^4*exp(x^2) - 2*exp(log(174/7)^2/x^2)*exp(exp(log(174/7)^2/x^2))*l
og(174/7)^2)/x^3,x)
```

output
```
exp(x^2) + exp((exp(log(7)^2/x^2)*exp(log(174)^2/x^2))/7^((2*log(174))/x^2
))
```

3.203 $\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx$

3.203.1 Optimal result

Integrand size = 62, antiderivative size = 23

$$\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx=e^{\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}$$

output
```
exp(3/1568/x^2/exp(exp(x^2+x+1)+1))
```

3.203.2 Mathematica [A] (verified)

Time = 0.85 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx=e^{\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}$$

input
```
Integrate[(E^(-1 - E^(1 + x + x^2) + (3*E^(-1 - E^(1 + x + x^2)))/(1568*x^
2))*(-6 + E^(1 + x + x^2)*(-3*x - 6*x^2)))/(1568*x^3),x]
```

output
```
E^((3*E^(-1 - E^(1 + x + x^2)))/(1568*x^2))
```

3.203.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{x^2+x+1}(-6x^2-3x)-6\right)\exp\left(-e^{x^2+x+1}+\frac{3e^{-e^{x^2+x+1}-1}}{1568x^2}-1\right)}{1568x^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int -\frac{3\exp\left(-e^{x^2+x+1}-1+\frac{3e^{-1-e^{x^2+x+1}}}{1568x^2}\right)\left(e^{x^2+x+1}(2x^2+x)+2\right)}{x^3}dx}{1568}$$

$$\Big\downarrow \text{27}$$

$$-\frac{3\int \frac{\exp\left(-e^{x^2+x+1}-1+\frac{3e^{-1-e^{x^2+x+1}}}{1568x^2}\right)\left(e^{x^2+x+1}(2x^2+x)+2\right)}{x^3}dx}{1568}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{3\int \left(\frac{\exp\left(x^2+x-e^{x^2+x+1}+\frac{3e^{-1-e^{x^2+x+1}}}{1568x^2}\right)(2x+1)}{x^2}+\frac{2\exp\left(-e^{x^2+x+1}-1+\frac{3e^{-1-e^{x^2+x+1}}}{1568x^2}\right)}{x^3}\right)dx}{1568}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3\left(\int \frac{\exp\left(x^2+x-e^{x^2+x+1}+\frac{3e^{-1-e^{x^2+x+1}}}{1568x^2}\right)}{x^2}dx+2\int \frac{\exp\left(x^2+x-e^{x^2+x+1}+\frac{3e^{-1-e^{x^2+x+1}}}{1568x^2}\right)}{x}dx+2\int \frac{\exp\left(-e^{x^2+x+1}-1+\frac{3e^{-1-e^{x^2+x+1}}}{1568x^2}\right)}{x^3}\right.}{1568}$$

input
```
Int[(E^(-1 - E^(1 + x + x^2) + (3*E^(-1 - E^(1 + x + x^2)))/(1568*x^2))*(-
6 + E^(1 + x + x^2)*(-3*x - 6*x^2)))/(1568*x^3),x]
```

output
```
$Aborted
```

3.203. $\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx$

3.203.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.203.4 Maple [A] (verified)

Time = 0.57 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

method	result	size
risch	$\mathrm{e}^{\frac{3\,\mathrm{e}^{-\mathrm{e}^{x^2+x+1}-1}}{1568x^2}}$	19
parallelrisch	$\mathrm{e}^{\frac{3\,\mathrm{e}^{-\mathrm{e}^{x^2+x+1}-1}}{1568x^2}}$	19

input
```
int(1/1568*((-6*x^2-3*x)*exp(x^2+x+1)-6)*exp(3/1568/x^2/exp(exp(x^2+x+1)+1
))/x^3/exp(exp(x^2+x+1)+1),x,method=_RETURNVERBOSE)
```

output
```
exp(3/1568/x^2*exp(-exp(x^2+x+1)-1))
```

3.203.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. 2(18) = 36.

Time = 0.25 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.04

$$\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx$$
$$= e^{\left(-\frac{1568\,x^2 e^{\left(x^2+x+1\right)}+1568\,x^2-3\,e^{\left(-e^{\left(x^2+x+1\right)}-1\right)}}{1568\,x^2}+e^{\left(x^2+x+1\right)}+1\right)}$$

3.203. $\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx$

input
```
integrate(1/1568*((-6*x^2-3*x)*exp(x^2+x+1)-6)*exp(3/1568/x^2/exp(exp(x^2+
x+1)+1))/x^3/exp(exp(x^2+x+1)+1),x, algorithm=\
```

output
```
e^(-1/1568*(1568*x^2*e^(x^2 + x + 1) + 1568*x^2 - 3*e^(-e^(x^2 + x + 1) -
1))/x^2 + e^(x^2 + x + 1) + 1)
```

3.203.6 Sympy [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx = e^{\frac{3e^{-e^{x^2+x+1}-1}}{1568x^2}}$$

input
```
integrate(1/1568*((-6*x**2-3*x)*exp(x**2+x+1)-6)*exp(3/1568/x**2/exp(exp(x
**2+x+1)+1))/x**3/exp(exp(x**2+x+1)+1),x)
```

output
```
exp(3*exp(-exp(x**2 + x + 1) - 1)/(1568*x**2))
```

3.203.7 Maxima [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx = e^{\left(\frac{3\,e^{\left(-e^{\left(x^2+x+1\right)}-1\right)}}{1568\,x^2}\right)}$$

input
```
integrate(1/1568*((-6*x^2-3*x)*exp(x^2+x+1)-6)*exp(3/1568/x^2/exp(exp(x^2+
x+1)+1))/x^3/exp(exp(x^2+x+1)+1),x, algorithm=\
```

output
```
e^(3/1568*e^(-e^(x^2 + x + 1) - 1)/x^2)
```

3.203.8 Giac [F]

$$\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx$$

$$= \int -\frac{3\left((2x^2+x)e^{(x^2+x+1)}+2\right)e^{\left(\frac{3e^{\left(-e^{(x^2+x+1)}-1\right)}}{1568x^2}-e^{(x^2+x+1)}-1\right)}}{1568x^3}\,dx$$

input
```
integrate(1/1568*((-6*x^2-3*x)*exp(x^2+x+1)-6)*exp(3/1568/x^2/exp(exp(x^2+
x+1)+1))/x^3/exp(exp(x^2+x+1)+1),x, algorithm=\
```

output
```
integrate(-3/1568*((2*x^2 + x)*e^(x^2 + x + 1) + 2)*e^(3/1568*e^(-e^(x^2 +
 x + 1) - 1)/x^2 - e^(x^2 + x + 1) - 1)/x^3, x)
```

3.203.9 Mupad [B] (verification not implemented)

Time = 14.43 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{e^{-1-e^{1+x+x^2}+\frac{3e^{-1-e^{1+x+x^2}}}{1568x^2}}\left(-6+e^{1+x+x^2}(-3x-6x^2)\right)}{1568x^3}\,dx = e^{\frac{3\,e^{-e^{x^2}\,e\,e^x}\,e^{-1}}{1568\,x^2}}$$

input
```
int(-(exp(- exp(x + x^2 + 1) - 1)*exp((3*exp(- exp(x + x^2 + 1) - 1))/(156
8*x^2))*(exp(x + x^2 + 1)*(3*x + 6*x^2) + 6))/(1568*x^3),x)
```

output
```
exp((3*exp(-exp(x^2)*exp(1)*exp(x))*exp(-1))/(1568*x^2))
```

3.204 $\int \frac{-10+74x-32x^2+18x^3-28x^4-70x^5+50x^6}{2x-11x^2+7x^3-23x^4+81x^5-85x^6+25x^7} dx$

3.204.1 Optimal result

Integrand size = 67, antiderivative size = 33

$$\int \frac{-10+74x-32x^2+18x^3-28x^4-70x^5+50x^6}{2x-11x^2+7x^3-23x^4+81x^5-85x^6+25x^7} dx = -\log(x)+\log\left(\frac{1}{3}(-2+x)\left(1-x+\frac{1}{x(x-5x^2)}\right)^2\right)$$

output
```
ln(1/3*(1-x+1/x/(-5*x^2+x))^2*(-2+x))-ln(x)
```

3.204.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.30

$$\int \frac{-10+74x-32x^2+18x^3-28x^4-70x^5+50x^6}{2x-11x^2+7x^3-23x^4+81x^5-85x^6+25x^7} dx = 2\left(-\log(1-5x)+\frac{1}{2}\log(2-x)-\frac{5\log(x)}{2}+\log\left(1+x^2-6x^3+5x^4\right)\right)$$

input
```
Integrate[(-10 + 74*x - 32*x^2 + 18*x^3 - 28*x^4 - 70*x^5 + 50*x^6)/(2*x -
 11*x^2 + 7*x^3 - 23*x^4 + 81*x^5 - 85*x^6 + 25*x^7),x]
```

output
```
2*(-Log[1 - 5*x] + Log[2 - x]/2 - (5*Log[x])/2 + Log[1 + x^2 - 6*x^3 + 5*x
^4])
```

3.204.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.12, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$, Rules used = {2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{50x^6-70x^5-28x^4+18x^3-32x^2+74x-10}{25x^7-85x^6+81x^5-23x^4+7x^3-11x^2+2x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{50x^6-70x^5-28x^4+18x^3-32x^2+74x-10}{x\left(25x^6-85x^5+81x^4-23x^3+7x^2-11x+2\right)}dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{4x\left(10x^2-9x+1\right)}{5x^4-6x^3+x^2+1}+\frac{1}{x-2}-\frac{5}{x}-\frac{10}{5x-1}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\log\left(5x^4-6x^3+x^2+1\right)-2\log(1-5x)+\log(2-x)-5\log(x)$$

input
```
Int[(-10 + 74*x - 32*x^2 + 18*x^3 - 28*x^4 - 70*x^5 + 50*x^6)/(2*x - 11*x^
2 + 7*x^3 - 23*x^4 + 81*x^5 - 85*x^6 + 25*x^7),x]
```

output
```
-2*Log[1 - 5*x] + Log[2 - x] - 5*Log[x] + 2*Log[1 + x^2 - 6*x^3 + 5*x^4]
```

3.204.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.204.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.03

method	result	size
parallelrisch	$-5\ln(x)+\ln(-2+x)-2\ln\left(x-\frac{1}{5}\right)+2\ln\left(x^4-\frac{6}{5}x^3+\frac{1}{5}x^2+\frac{1}{5}\right)$	34
default	$-5\ln(x)+2\ln(5x^4-6x^3+x^2+1)-2\ln(5x-1)+\ln(-2+x)$	36
norman	$-5\ln(x)+2\ln(5x^4-6x^3+x^2+1)-2\ln(5x-1)+\ln(-2+x)$	36
risch	$-5\ln(x)+2\ln(5x^4-6x^3+x^2+1)-2\ln(5x-1)+\ln(-2+x)$	36

input
```
int((50*x^6-70*x^5-28*x^4+18*x^3-32*x^2+74*x-10)/(25*x^7-85*x^6+81*x^5-23*
x^4+7*x^3-11*x^2+2*x),x,method=_RETURNVERBOSE)
```

output
```
-5*ln(x)+ln(-2+x)-2*ln(x-1/5)+2*ln(x^4-6/5*x^3+1/5*x^2+1/5)
```

3.204.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-10+74x-32x^2+18x^3-28x^4-70x^5+50x^6}{2x-11x^2+7x^3-23x^4+81x^5-85x^6+25x^7}\,dx$$
$$=2\log\left(5x^4-6x^3+x^2+1\right)-2\log(5x-1)+\log(x-2)-5\log(x)$$

input
```
integrate((50*x^6-70*x^5-28*x^4+18*x^3-32*x^2+74*x-10)/(25*x^7-85*x^6+81*x
^5-23*x^4+7*x^3-11*x^2+2*x),x, algorithm=\
```

output
```
2*log(5*x^4 - 6*x^3 + x^2 + 1) - 2*log(5*x - 1) + log(x - 2) - 5*log(x)
```

3.204.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

$$\int \frac{-10+74x-32x^2+18x^3-28x^4-70x^5+50x^6}{2x-11x^2+7x^3-23x^4+81x^5-85x^6+25x^7}\,dx$$
$$= -5\log(x)+\log(x-2)-2\log\left(x-\frac{1}{5}\right)+2\log\left(5x^4-6x^3+x^2+1\right)$$

input
```
integrate((50*x**6-70*x**5-28*x**4+18*x**3-32*x**2+74*x-10)/(25*x**7-85*x*
*6+81*x**5-23*x**4+7*x**3-11*x**2+2*x),x)
```

output
```
-5*log(x) + log(x - 2) - 2*log(x - 1/5) + 2*log(5*x**4 - 6*x**3 + x**2 + 1
)
```

3.204.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-10+74x-32x^2+18x^3-28x^4-70x^5+50x^6}{2x-11x^2+7x^3-23x^4+81x^5-85x^6+25x^7}\,dx$$
$$= 2\log\left(5x^4-6x^3+x^2+1\right)-2\log(5x-1)+\log(x-2)-5\log(x)$$

input
```
integrate((50*x^6-70*x^5-28*x^4+18*x^3-32*x^2+74*x-10)/(25*x^7-85*x^6+81*x
^5-23*x^4+7*x^3-11*x^2+2*x),x, algorithm=\
```

output
```
2*log(5*x^4 - 6*x^3 + x^2 + 1) - 2*log(5*x - 1) + log(x - 2) - 5*log(x)
```

3.204.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.15

$$\int \frac{-10+74x-32x^2+18x^3-28x^4-70x^5+50x^6}{2x-11x^2+7x^3-23x^4+81x^5-85x^6+25x^7}\,dx$$
$$= 2\log\left(5x^4-6x^3+x^2+1\right)-2\log(|5x-1|)+\log(|x-2|)-5\log(|x|)$$

input
```
integrate((50*x^6-70*x^5-28*x^4+18*x^3-32*x^2+74*x-10)/(25*x^7-85*x^6+81*x
^5-23*x^4+7*x^3-11*x^2+2*x),x, algorithm=\
```

output
```
2*log(5*x^4 - 6*x^3 + x^2 + 1) - 2*log(abs(5*x - 1)) + log(abs(x - 2)) - 5
*log(abs(x))
```

3.204.9 Mupad [B] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.00

$$\int \frac{-10+74x-32x^2+18x^3-28x^4-70x^5+50x^6}{2x-11x^2+7x^3-23x^4+81x^5-85x^6+25x^7}\,dx$$
$$= 2\,\ln\left(5\,x^4-6\,x^3+x^2+1\right)+\ln\left(x-2\right)-2\,\ln\left(x-\frac{1}{5}\right)-5\,\ln\left(x\right)$$

input
```
int(-(32*x^2 - 74*x - 18*x^3 + 28*x^4 + 70*x^5 - 50*x^6 + 10)/(2*x - 11*x^
2 + 7*x^3 - 23*x^4 + 81*x^5 - 85*x^6 + 25*x^7),x)
```

output
```
2*log(x^2 - 6*x^3 + 5*x^4 + 1) + log(x - 2) - 2*log(x - 1/5) - 5*log(x)
```

3.205 $\int \frac{-1-e^x x^2 \log(2)+(-1+2x-x^2)\log(2)+\log(x)}{x^2\log(2)}\,dx$

3.205.1 Optimal result

Integrand size = 35, antiderivative size = 28

$$\int \frac{-1-e^x x^2 \log(2)+(-1+2x-x^2)\log(2)+\log(x)}{x^2\log(2)}\,dx = 5-e^x+\frac{1}{x}-x-\frac{\log(x)}{x\log(2)}+\log\left(x^2\right)$$

output
```
5-ln(x)/x/ln(2)+1/x-exp(x)+ln(x^2)-x
```

3.205.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{-1-e^x x^2 \log(2)+(-1+2x-x^2)\log(2)+\log(x)}{x^2\log(2)}\,dx = \frac{-e^x\log(2)-x\log(2)-\frac{\log\left(\frac{x}{2}\right)}{x}+\log(4)\log(x)}{\log(2)}$$

input
```
Integrate[(-1 - E^x*x^2*Log[2] + (-1 + 2*x - x^2)*Log[2] + Log[x])/(x^2*Lo
g[2]),x]
```

output
```
(-(E^x*Log[2]) - x*Log[2] - Log[x/2]/x + Log[4]*Log[x])/Log[2]
```

3.205.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.114, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^x x^2 \log (2)+\left(-x^2+2 x-1\right) \log (2)+\log (x)-1}{x^2 \log (2)} \, dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int -\frac{e^x \log (2) x^2-\log (x)+\left(x^2-2 x+1\right) \log (2)+1}{x^2}dx}{\log (2)}$$

$$\Big\downarrow \text{25}$$

$$-\frac{\int \frac{e^x \log (2) x^2-\log (x)+\left(x^2-2 x+1\right) \log (2)+1}{x^2}dx}{\log (2)}$$

$$\Big\downarrow \text{2010}$$

$$-\frac{\int \left(\frac{\log (2) x^2-\log (4) x-\log (x)+\log (2)+1}{x^2}+e^x \log (2)\right)dx}{\log (2)}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{\frac{1}{x}+x \log (2)-\log (4) \log (x)+e^x \log (2)+\frac{\log (x)}{x}-\frac{1+\log (2)}{x}}{\log (2)}$$

input
```
Int[(-1 - E^x*x^2*Log[2] + (-1 + 2*x - x^2)*Log[2] + Log[x])/(x^2*Log[2]),
x]
```

output
```
-((x^(-1) + E^x*Log[2] + x*Log[2] - (1 + Log[2])/x + Log[x]/x - Log[4]*Log
[x])/Log[2])
```

3.205.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.205.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

method	result	size
norman	$\frac{1+2x\ln(x)-x^2-e^x x-\frac{\ln(x)}{\ln(2)}}{x}$	30
risch	$-\frac{\ln(x)}{x\ln(2)}+\frac{2x\ln(x)-x^2-e^x x+1}{x}$	34
parallelrisch	$-\frac{x^2\ln(2)-2x\ln(2)\ln(x)+x\ln(2)e^x-\ln(2)+\ln(x)}{\ln(2)x}$	36
parts	$\frac{-\frac{\ln(x)}{x}-\frac{1}{x}}{\ln(2)}-x+2\ln(x)+\frac{1}{x}+\frac{1}{x\ln(2)}-e^x$	42
default	$\frac{-\frac{\ln(x)}{x}-\frac{1}{x}-x\ln(2)+2\ln(2)\ln(x)+\frac{1+\ln(2)}{x}-e^x\ln(2)}{\ln(2)}$	44

input
```
int((ln(x)-x^2*ln(2)*exp(x)+(-x^2+2*x-1)*ln(2)-1)/x^2/ln(2),x,method=_RETU
RNVERBOSE)
```

output
```
(1+2*x*ln(x)-x^2-exp(x)*x-ln(x)/ln(2))/x
```

3.205.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{-1-e^x x^2 \log(2)+\left(-1+2x-x^2\right)\log(2)+\log(x)}{x^2\log(2)}\,dx = -\frac{xe^x \log(2)+(x^2-1)\log(2)-(2\,x\log(2)-1)\log(x)}{x\log(2)}$$

input
```
integrate((log(x)-x^2*log(2)*exp(x)+(-x^2+2*x-1)*log(2)-1)/x^2/log(2),x, a
lgorithm=\
```

output
```
-(x*e^x*log(2) + (x^2 - 1)*log(2) - (2*x*log(2) - 1)*log(x))/(x*log(2))
```

3.205.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{-1-e^x x^2 \log(2)+\left(-1+2x-x^2\right)\log(2)+\log(x)}{x^2\log(2)}\,dx = -x-e^x+2\log(x)-\frac{\log(x)}{x\log(2)}+\frac{1}{x}$$

input
```
integrate((ln(x)-x**2*ln(2)*exp(x)+(-x**2+2*x-1)*ln(2)-1)/x**2/ln(2),x)
```

output
```
-x - exp(x) + 2*log(x) - log(x)/(x*log(2)) + 1/x
```

3.205.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{-1-e^x x^2 \log(2)+\left(-1+2x-x^2\right)\log(2)+\log(x)}{x^2\log(2)}\,dx = -\frac{x\log(2)+e^x\log(2)-2\log(2)\log(x)-\frac{\log(2)}{x}+\frac{\log(x)}{x}}{\log(2)}$$

input
```
integrate((log(x)-x^2*log(2)*exp(x)+(-x^2+2*x-1)*log(2)-1)/x^2/log(2),x, a
lgorithm=\
```

output
```
-(x*log(2) + e^x*log(2) - 2*log(2)*log(x) - log(2)/x + log(x)/x)/log(2)
```

3.205.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{-1 - e^x x^2 \log(2) + (-1 + 2x - x^2) \log(2) + \log(x)}{x^2 \log(2)} \, dx = -\frac{x^2 \log(2) + xe^x \log(2) - 2x \log(2) \log(x) - \log(2) + \log(x)}{x \log(2)}$$

input
```
integrate((log(x)-x^2*log(2)*exp(x)+(-x^2+2*x-1)*log(2)-1)/x^2/log(2),x, a
lgorithm=\
```

output
```
-(x^2*log(2) + x*e^x*log(2) - 2*x*log(2)*log(x) - log(2) + log(x))/(x*log(
2))
```

3.205.9 Mupad [B] (verification not implemented)

Time = 13.91 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{-1 - e^x x^2 \log(2) + (-1 + 2x - x^2) \log(2) + \log(x)}{x^2 \log(2)} \, dx = 2 \ln(x) - e^x - x + \frac{1}{x} - \frac{\ln(x)}{x \ln(2)}$$

input
```
int(-(log(2)*(x^2 - 2*x + 1) - log(x) + x^2*exp(x)*log(2) + 1)/(x^2*log(2)
),x)
```

output
```
2*log(x) - exp(x) - x + 1/x - log(x)/(x*log(2))
```

3.206 $\int \frac{e^{-3+x^4}(-1+4x^4)}{e^{-6+2x^4}+2e^{-3+x^4}x+x^2}\,dx$

3.206.1 Optimal result

Integrand size = 40, antiderivative size = 19

$$\int \frac{e^{-3+x^4}(-1+4x^4)}{e^{-6+2x^4}+2e^{-3+x^4}x+x^2}\,dx=\frac{x}{x+e^{3-x^4}x^2}$$

output
```
x/(x+x^2/exp(x^4-3))
```

3.206.2 Mathematica [A] (verified)

Time = 1.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{e^{-3+x^4}(-1+4x^4)}{e^{-6+2x^4}+2e^{-3+x^4}x+x^2}\,dx=-\frac{e^3x}{e^{x^4}+e^3x}$$

input
```
Integrate[(E^(-3 + x^4)*(-1 + 4*x^4))/(E^(-6 + 2*x^4) + 2*E^(-3 + x^4)*x +
 x^2),x]
```

output
```
-((E^3*x)/(E^x^4 + E^3*x))
```

3.206.3 Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.075, Rules used = {7292, 7262, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^4-3}(4x^4-1)}{2e^{x^4-3}x+e^{2x^4-6}+x^2}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{e^{x^4+3}(4x^4-1)}{\left(e^{x^4}+e^3x\right)^2}dx$$
$$\Big\downarrow \text{7262}$$
$$e^3\int \frac{1}{\left(e^3+\frac{e^{x^4}}{x}\right)^2}d\frac{e^{x^4}}{x}$$
$$\Big\downarrow \text{17}$$
$$-\frac{e^3}{\frac{e^{x^4}}{x}+e^3}$$

input
```
Int[(E^(-3 + x^4)*(-1 + 4*x^4))/(E^(-6 + 2*x^4) + 2*E^(-3 + x^4)*x + x^2),
x]
```

output
```
-(E^3/(E^3 + E^x^4/x))
```

3.206.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 7262
```
Int[(u_)*((a_.)*(v_)^(p_.) + (b_.)*(w_)^(q_.))^(m_.), x_Symbol] :> With[{c
= Simplify[u/(p*w*D[v, x] - q*v*D[w, x])]}, Simp[c*p   Subst[Int[(b + a*x^p
)^m, x], x, v*w^(m*q + 1)], x] /; FreeQ[c, x]] /; FreeQ[{a, b, m, p, q}, x]
 && EqQ[p + q*(m*p + 1), 0] && IntegerQ[p] && IntegerQ[m]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.206.4 Maple [A] (verified)

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

method	result	size
risch	$-\frac{x}{\mathrm{e}^{x^4-3}+x}$	14
parallelrisch	$-\frac{x}{\mathrm{e}^{x^4-3}+x}$	14
norman	$\frac{\mathrm{e}^{x^4-3}}{\mathrm{e}^{x^4-3}+x}$	18

input
```
int((4*x^4-1)*exp(x^4-3)/(exp(x^4-3)^2+2*x*exp(x^4-3)+x^2),x,method=_RETUR
NVERBOSE)
```

output
```
-x/(exp(x^4-3)+x)
```

3.206.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \frac{e^{-3+x^4}(-1+4x^4)}{e^{-6+2x^4}+2e^{-3+x^4}x+x^2}\,dx = -\frac{x}{x+e^{(x^4-3)}}$$

input
```
integrate((4*x^4-1)*exp(x^4-3)/(exp(x^4-3)^2+2*x*exp(x^4-3)+x^2),x, algori
thm=\
```

output
```
-x/(x + e^(x^4 - 3))
```

3.206.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53

$$\int \frac{e^{-3+x^4}(-1+4x^4)}{e^{-6+2x^4}+2e^{-3+x^4}x+x^2}\,dx=-\frac{x}{x+e^{x^4-3}}$$

input
```
integrate((4*x**4-1)*exp(x**4-3)/(exp(x**4-3)**2+2*x*exp(x**4-3)+x**2),x)
```

output
```
-x/(x + exp(x**4 - 3))
```

3.206.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{e^{-3+x^4}(-1+4x^4)}{e^{-6+2x^4}+2e^{-3+x^4}x+x^2}\,dx=-\frac{xe^3}{xe^3+e^{(x^4)}}$$

input
```
integrate((4*x^4-1)*exp(x^4-3)/(exp(x^4-3)^2+2*x*exp(x^4-3)+x^2),x, algori
thm=\
```

output
```
-x*e^3/(x*e^3 + e^(x^4))
```

3.206.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{e^{-3+x^4}(-1+4x^4)}{e^{-6+2x^4}+2e^{-3+x^4}x+x^2}\,dx=-\frac{xe^3}{xe^3+e^{(x^4)}}$$

input
```
integrate((4*x^4-1)*exp(x^4-3)/(exp(x^4-3)^2+2*x*exp(x^4-3)+x^2),x, algori
thm=\
```

output
```
-x*e^3/(x*e^3 + e^(x^4))
```

3.206.9 Mupad [B] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \frac{e^{-3+x^4}(-1+4x^4)}{e^{-6+2x^4}+2e^{-3+x^4}x+x^2}\,dx = -\frac{x}{x+\mathrm{e}^{x^4-3}}$$

input
```
int((exp(x^4 - 3)*(4*x^4 - 1))/(exp(2*x^4 - 6) + 2*x*exp(x^4 - 3) + x^2),x
)
```

output
```
-x/(x + exp(x^4 - 3))
```

3.207 $\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}(-}{25+10x^2+x^4+(-50-10x^2)\log(5)+}$

3.207.1 Optimal result

Integrand size = 114, antiderivative size = 30

$$\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}\left(-45-6x^2-x^4+(70+10x^2)\log\right.}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}$$
$$=e^{-x+\frac{4}{-\frac{5}{x}-x+\frac{5\log(5)}{x}}}+2x$$

output
```
2*x+exp(4/(5*ln(5)/x-x-5/x)-x)
```

3.207.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}\left(-45-6x^2-x^4+(70+10x^2)\log\right.}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}$$
$$=e^{-x-\frac{4x}{5+x^2-5\log(5)}}+2x$$

input
```
Integrate[(50 + 20*x^2 + 2*x^4 + (-100 - 20*x^2)*Log[5] + 50*Log[5]^2 + E^
((9*x + x^3 - 5*x*Log[5])/(-5 - x^2 + 5*Log[5]))*(-45 - 6*x^2 - x^4 + (70
+ 10*x^2)*Log[5] - 25*Log[5]^2))/(25 + 10*x^2 + x^4 + (-50 - 10*x^2)*Log[5
] + 25*Log[5]^2),x]
```

3.207.

$$\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}(-45-6x^2-x^4+(70+10x^2)\log(5)-25\log^2(5))}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}\,dx$$

output
```
E^(-x - (4*x)/(5 + x^2 - 5*Log[5])) + 2*x
```

3.207.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4+20x^2+\left(-20x^2-100\right)\log(5)+e^{\frac{x^3+9x-5x\log(5)}{-x^2-5+5\log(5)}}\left(-x^4-6x^2+\left(10x^2+70\right)\log(5)-45-25\log^2(5)\right)+50}{x^4+10x^2+\left(-10x^2-50\right)\log(5)+25+25\log^2(5)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{2x^4+20x^2+\left(-20x^2-100\right)\log(5)+e^{\frac{x^3+9x-5x\log(5)}{-x^2-5+5\log(5)}}\left(-x^4-6x^2+\left(10x^2+70\right)\log(5)-45-25\log^2(5)\right)+50(}{x^4+10x^2(1-\log(5))+25(1-\log(5))^2}$$

$$\Big\downarrow \text{ 1380}$$

$$\int \frac{2x^4+20x^2-20\left(x^2+5\right)\log(5)-5^{\frac{5x}{x^2+5-5\log(5)}}e^{-\frac{x^3+9x}{x^2+5(1-\log(5))}}\left(x^4+6x^2-10\left(x^2+7\right)\log(5)+5\left(9+5\log^2(5)\right)\right)}{\left(x^2+5(1-\log(5))\right)^2}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{50\left(1+\log^2(5)\right)}{\left(x^2+5-5\log(5)\right)^2}+\frac{20x^2}{\left(x^2+5-5\log(5)\right)^2}-\frac{20\left(x^2+5\right)\log(5)}{\left(x^2+5-5\log(5)\right)^2}+\frac{2x^4}{\left(x^2+5-5\log(5)\right)^2}+\frac{5^{\frac{5x}{x^2+5-5\log(5)}}e^{-\frac{x}{x^2}}}{}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-\int 5^{\frac{5x}{x^2-5\log(5)+5}}e^{-\frac{x(x^2+9)}{x^2-5\log(5)+5}}dx+2\int\frac{5^{\frac{5x}{x^2-5\log(5)+5}}e^{-\frac{x(x^2+9)}{x^2-5\log(5)+5}}}{\left(\sqrt{5(-1+\log(5))}-x\right)^2}dx+\frac{2\int\frac{5^{\frac{5x}{x^2-5\log(5)+5}-\frac{1}{2}}e^{-\frac{x(x^2+9)}{x^2-5\log(5)+5}}}{\sqrt{5(-1+\log(5))}-x}dx}{\sqrt{\log(5)-1}}-\frac{2\int\frac{5^{\frac{5x}{x^2-5\log(5)+5}+\frac{1}{2}}e^{-\frac{x(x^2+9)}{x^2-5\log(5)+5}}}{\sqrt{5(-1+\log(5))}-x}dx}{5\sqrt{\log(5)-1}}+2\int\frac{5^{\frac{5x}{x^2-5\log(5)+5}}e^{-\frac{x(x^2+9)}{x^2-5\log(5)+5}}}{\left(x+\sqrt{5(-1+\log(5))}\right)^2}dx+\frac{2\int\frac{5^{\frac{5x}{x^2-5\log(5)+5}-\frac{1}{2}}e^{-\frac{x(x^2+9)}{x^2-5\log(5)+5}}}{x+\sqrt{5(-1+\log(5))}}dx}{\sqrt{\log(5)-1}}-\frac{2\int\frac{5^{\frac{5x}{x^2-5\log(5)+5}+\frac{1}{2}}e^{-\frac{x(x^2+9)}{x^2-5\log(5)+5}}}{x+\sqrt{5(-1+\log(5))}}dx}{5\sqrt{\log(5)-1}}+\frac{\sqrt{5}(1+\log^2(5))\operatorname{arctanh}\left(\frac{x}{\sqrt{5(\log(5)-1)}}\right)}{(\log(5)-1)^{3/2}}-\frac{2\sqrt{5}(2-\log(5))\log(5)\operatorname{arctanh}\left(\frac{x}{\sqrt{5(\log(5)-1)}}\right)}{(\log(5)-1)^{3/2}}-3\sqrt{5(\log(5)-1)}\operatorname{arctanh}\left(\frac{x}{\sqrt{5(\log(5)-1)}}\right)-2\sqrt{\frac{5}{\log(5)-1}}\operatorname{arctanh}\left(\frac{x}{\sqrt{5(\log(5)-1)}}\right)+\frac{5x(1+\log^2(5))}{(1-\log(5))(x^2+5(1-\log(5)))}-\frac{10x\log^2(5)}{(1-\log(5))(x^2+5(1-\log(5)))}-\frac{10x}{x^2+5(1-\log(5))}-\frac{x^3}{x^2+5(1-\log(5))}+3x$$

input
```
Int[(50 + 20*x^2 + 2*x^4 + (-100 - 20*x^2)*Log[5] + 50*Log[5]^2 + E^((9*x
+ x^3 - 5*x*x*Log[5])/(-5 - x^2 + 5*Log[5]))*(-45 - 6*x^2 - x^4 + (70 + 10*x
^2)*Log[5] - 25*Log[5]^2))/(25 + 10*x^2 + x^4 + (-50 - 10*x^2)*Log[5] + 25
*Log[5]^2),x]
```

output
```
$Aborted
```

3.207.3.1 Defintions of rubi rules used

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

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$$\int\frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}\left(-45-6x^2-x^4+(70+10x^2)\log(5)-25\log^2(5)\right)}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}dx$$

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.207.4 Maple [A] (verified)

Time = 1.21 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

method	result	size
parallelrisch	$2x+\mathrm{e}^{\frac{-5x\ln(5)+x^3+9x}{5\ln(5)-x^2-5}}$	32
risch	$2x+\mathrm{e}^{-\frac{x\left(-x^2+5\ln(5)-9\right)}{5\ln(5)-x^2-5}}$	33
parts	$2x+\frac{(5\ln(5)-5)\mathrm{e}^{\frac{-5x\ln(5)+x^3+9x}{5\ln(5)-x^2-5}}-x^2\mathrm{e}^{\frac{-5x\ln(5)+x^3+9x}{5\ln(5)-x^2-5}}}{5\ln(5)-x^2-5}$	86
norman	$\frac{(5\ln(5)-5)\mathrm{e}^{\frac{-5x\ln(5)+x^3+9x}{5\ln(5)-x^2-5}}+(10\ln(5)-10)x-2x^3-x^2\mathrm{e}^{\frac{-5x\ln(5)+x^3+9x}{5\ln(5)-x^2-5}}}{5\ln(5)-x^2-5}$	95

input
```
int(((-25*ln(5)^2+(10*x^2+70)*ln(5)-x^4-6*x^2-45)*exp((-5*x*ln(5)+x^3+9*x)
/(5*ln(5)-x^2-5))+50*ln(5)^2+(-20*x^2-100)*ln(5)+2*x^4+20*x^2+50)/(25*ln(5
)^2+(-10*x^2-50)*ln(5)+x^4+10*x^2+25),x,method=_RETURNVERBOSE)
```

output
```
2*x+exp((-5*x*ln(5)+x^3+9*x)/(5*ln(5)-x^2-5))
```

3.207.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}\left(-45-6x^2-x^4+(70+10x^2)\log\right.}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}$$
$$=2\,x+e^{\left(-\frac{x^3-5\,x\log(5)+9\,x}{x^2-5\,\log(5)+5}\right)}$$

input
```
integrate(((-25*log(5)^2+(10*x^2+70)*log(5)-x^4-6*x^2-45)*exp((-5*x*log(5)
+x^3+9*x)/(5*log(5)-x^2-5))+50*log(5)^2+(-20*x^2-100)*log(5)+2*x^4+20*x^2+
50)/(25*log(5)^2+(-10*x^2-50)*log(5)+x^4+10*x^2+25),x, algorithm=\
```

output
```
2*x + e^(-(x^3 - 5*x*log(5) + 9*x)/(x^2 - 5*log(5) + 5))
```

3.207.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}\left(-45-6x^2-x^4+(70+10x^2)\log\right.}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}$$
$$=2x+e^{\frac{x^3-5x\log{(5)}+9x}{-x^2-5+5\log{(5)}}}$$

input
```
integrate(((-25*ln(5)**2+(10*x**2+70)*ln(5)-x**4-6*x**2-45)*exp((-5*x*ln(5
)+x**3+9*x)/(5*ln(5)-x**2-5))+50*ln(5)**2+(-20*x**2-100)*ln(5)+2*x**4+20*x
**2+50)/(25*ln(5)**2+(-10*x**2-50)*ln(5)+x**4+10*x**2+25),x)
```

output
```
2*x + exp((x**3 - 5*x*log(5) + 9*x)/(-x**2 - 5 + 5*log(5)))
```

3.207.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 396 vs. 2(27) = 54.

Time = 0.40 (sec) , antiderivative size = 396, normalized size of antiderivative = 13.20

$$\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}(-45-6x^2-x^4+(70+10x^2)\log(5)-25\log^2(5))}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}$$

$$= -\frac{5}{2}\left(\frac{2x}{x^2(\log(5)-1)-5\log(5)^2+10\log(5)-5}+\frac{\log\left(\frac{x-\sqrt{5\log(5)-5}}{x+\sqrt{5\log(5)-5}}\right)}{\sqrt{5\log(5)-5}(\log(5)-1)}\right)\log(5)^2$$
$$-5\left(\frac{\log\left(\frac{x-\sqrt{5\log(5)-5}}{x+\sqrt{5\log(5)-5}}\right)}{\sqrt{5\log(5)-5}}-\frac{2x}{x^2-5\log(5)+5}\right)\log(5)$$
$$+5\left(\frac{2x}{x^2(\log(5)-1)-5\log(5)^2+10\log(5)-5}+\frac{\log\left(\frac{x-\sqrt{5\log(5)-5}}{x+\sqrt{5\log(5)-5}}\right)}{\sqrt{5\log(5)-5}(\log(5)-1)}\right)\log(5)$$
$$+\frac{15(\log(5)-1)\log\left(\frac{x-\sqrt{5\log(5)-5}}{x+\sqrt{5\log(5)-5}}\right)}{2\sqrt{5\log(5)-5}}+2x-\frac{5x(\log(5)-1)}{x^2-5\log(5)+5}$$
$$+\frac{5\log\left(\frac{x-\sqrt{5\log(5)-5}}{x+\sqrt{5\log(5)-5}}\right)}{\sqrt{5\log(5)-5}}-\frac{5x}{x^2(\log(5)-1)-5\log(5)^2+10\log(5)-5}$$
$$-\frac{10x}{x^2-5\log(5)+5}-\frac{5\log\left(\frac{x-\sqrt{5\log(5)-5}}{x+\sqrt{5\log(5)-5}}\right)}{2\sqrt{5\log(5)-5}(\log(5)-1)}+e^{\left(-x-\frac{4x}{x^2-5\log(5)+5}\right)}$$

input
```
integrate(((-25*log(5)^2+(10*x^2+70)*log(5)-x^4-6*x^2-45)*exp((-5*x*log(5)
+x^3+9*x)/(5*log(5)-x^2-5))+50*log(5)^2+(-20*x^2-100)*log(5)+2*x^4+20*x^2+
50)/(25*log(5)^2+(-10*x^2-50)*log(5)+x^4+10*x^2+25),x, algorithm=\
```

output
```
-5/2*(2*x/(x^2*(log(5) - 1) - 5*log(5)^2 + 10*log(5) - 5) + log((x - sqrt(
5*log(5) - 5))/(x + sqrt(5*log(5) - 5)))/(sqrt(5*log(5) - 5)*(log(5) - 1))
)*log(5)^2 - 5*(log((x - sqrt(5*log(5) - 5))/(x + sqrt(5*log(5) - 5)))/sqr
t(5*log(5) - 5) - 2*x/(x^2 - 5*log(5) + 5))*log(5) + 5*(2*x/(x^2*(log(5) -
 1) - 5*log(5)^2 + 10*log(5) - 5) + log((x - sqrt(5*log(5) - 5))/(x + sqrt
(5*log(5) - 5)))/(sqrt(5*log(5) - 5)*(log(5) - 1)))*log(5) + 15/2*(log(5)
- 1)*log((x - sqrt(5*log(5) - 5))/(x + sqrt(5*log(5) - 5)))/sqrt(5*log(5)
- 5) + 2*x - 5*x*(log(5) - 1)/(x^2 - 5*log(5) + 5) + 5*log((x - sqrt(5*log
(5) - 5))/(x + sqrt(5*log(5) - 5)))/sqrt(5*log(5) - 5) - 5*x/(x^2*(log(5)
- 1) - 5*log(5)^2 + 10*log(5) - 5) - 10*x/(x^2 - 5*log(5) + 5) - 5/2*log((
x - sqrt(5*log(5) - 5))/(x + sqrt(5*log(5) - 5)))/(sqrt(5*log(5) - 5)*(log
(5) - 1)) + e^(-x - 4*x/(x^2 - 5*log(5) + 5))
```

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$$\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}(-45-6x^2-x^4+(70+10x^2)\log(5)-25\log^2(5))}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}\,dx$$

3.207.8 Giac [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}\left(-45-6x^2-x^4+(70+10x^2)\log(5)-25\log^2(5)\right)}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}$$

$$= 2x + e^{\left(-\frac{x^3-5x\log(5)+9x}{x^2-5\log(5)+5}\right)}$$

input
```
integrate((((-25*log(5)^2+(10*x^2+70)*log(5)-x^4-6*x^2-45)*exp((-5*x*log(5)
+x^3+9*x)/(5*log(5)-x^2-5))+50*log(5)^2+(-20*x^2-100)*log(5)+2*x^4+20*x^2+
50)/(25*log(5)^2+(-10*x^2-50)*log(5)+x^4+10*x^2+25),x, algorithm=\
```

output
```
2*x + e^(-(x^3 - 5*x*log(5) + 9*x)/(x^2 - 5*log(5) + 5))
```

3.207.9 Mupad [B] (verification not implemented)

Time = 14.71 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.77

$$\int \frac{50+20x^2+2x^4+(-100-20x^2)\log(5)+50\log^2(5)+e^{\frac{9x+x^3-5x\log(5)}{-5-x^2+5\log(5)}}\left(-45-6x^2-x^4+(70+10x^2)\log(5)-25\log^2(5)\right)}{25+10x^2+x^4+(-50-10x^2)\log(5)+25\log^2(5)}$$

$$= 2x + 5^{\frac{5x}{x^2-5\ln(5)+5}}\,e^{-\frac{9x}{x^2-5\ln(5)+5}}\,e^{-\frac{x^3}{x^2-5\ln(5)+5}}$$

input
```
int((50*log(5)^2 - log(5)*(20*x^2 + 100) - exp(-(9*x - 5*x*log(5) + x^3)/(
x^2 - 5*log(5) + 5))*(25*log(5)^2 - log(5)*(10*x^2 + 70) + 6*x^2 + x^4 + 4
5) + 20*x^2 + 2*x^4 + 50)/(25*log(5)^2 - log(5)*(10*x^2 + 50) + 10*x^2 + x
^4 + 25),x)
```

output
```
2*x + 5^((5*x)/(x^2 - 5*log(5) + 5))*exp(-(9*x)/(x^2 - 5*log(5) + 5))*exp(
-x^3/(x^2 - 5*log(5) + 5))
```

3.208 $\int \frac{1}{256}(-256 + 48x^2 - 24ex^2 + 3e^2x^2 + e^{-5+x}(-32x -$

3.208.1 Optimal result

Integrand size = 64, antiderivative size = 27

$$\int \frac{1}{256}\left(-256 + 48x^2 - 24ex^2 + 3e^2x^2 + e^{-5+x}\left(-32x-16x^2+e^2\left(-2x-x^2\right)+e\left(16x+8x^2\right)\right)\right)\,dx = -x+\frac{1}{256}(4-e)^2x^2\left(-e^{-5+x}+x\right)$$

output
```
1/256*(x-exp(-5+x))*x^2*(4-exp(1))^2-x
```

3.208.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 65 vs. 2(27) = 54.

Time = 0.03 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.41

$$\int \frac{1}{256}\left(-256 + 48x^2 - 24ex^2 + 3e^2x^2 + e^{-5+x}\left(-32x - 16x^2 + e^2\left(-2x - x^2\right) + e\left(16x + 8x^2\right)\right)\right)\,dx = \frac{-256e^5x - 16e^xx^2 + 8e^{1+x}x^2 - e^{2+x}x^2 + 16e^5x^3 - 8e^6x^3 + e^7x^3}{256e^5}$$

input
```
Integrate[(-256 + 48*x^2 - 24*E*x^2 + 3*E^2*x^2 + E^(-5 + x)*(-32*x - 16*x
^2 + E^2*(-2*x - x^2) + E*(16*x + 8*x^2)))/256,x]
```

output
```
(-256*E^5*x - 16*E^x*x^2 + 8*E^(1 + x)*x^2 - E^(2 + x)*x^2 + 16*E^5*x^3 -
8*E^6*x^3 + E^7*x^3)/(256*E^5)
```

3.208.
$\int \frac{1}{256}(-256 + 48x^2 - 24ex^2 + 3e^2x^2 + e^{-5+x}(-32x - 16x^2 + e^2(-2x - x^2) + e(16x + 8x^2)))\,dx$

3.208.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.59, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.062$, Rules used = {6, 6, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{256}\left(3e^2x^2-24ex^2+48x^2+e^{x-5}\left(-16x^2+e^2\left(-x^2-2x\right)+e\left(8x^2+16x\right)-32x\right)-256\right)dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{1}{256}\left(3e^2x^2+(48-24e)x^2+e^{x-5}\left(-16x^2+e^2\left(-x^2-2x\right)+e\left(8x^2+16x\right)-32x\right)-256\right)dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{1}{256}\left(\left(48-24e+3e^2\right)x^2+e^{x-5}\left(-16x^2+e^2\left(-x^2-2x\right)+e\left(8x^2+16x\right)-32x\right)-256\right)dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{256}\int \left(3(4-e)^2x^2-e^{x-5}\left(16x^2+32x+e^2\left(x^2+2x\right)-8e\left(x^2+2x\right)\right)-256\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{256}\left((4-e)^2x^3-16e^{x-5}x^2+(8-e)e^{x-4}x^2-256x\right)$$

input
```
Int[(-256 + 48*x^2 - 24*E*x^2 + 3*E^2*x^2 + E^(-5 + x)*(-32*x - 16*x^2 + E
^2*(-2*x - x^2) + E*(16*x + 8*x^2)))/256,x]
```

output
```
(-256*x - 16*E^(-5 + x)*x^2 + (8 - E)*E^(-4 + x)*x^2 + (4 - E)^2*x^3)/256
```

3.208.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
 + (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.208.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.52

method	result
norman	$\left(\frac{e^2}{256}-\frac{e}{32}+\frac{1}{16}\right)x^3+\left(-\frac{e^2}{256}+\frac{e}{32}-\frac{1}{16}\right)x^2e^{-5+x}-x$
risch	$-\frac{(e^2-8e+16)x^2e^{-5+x}}{256}+\frac{x^3e^2}{256}-\frac{x^3e}{32}+\frac{x^3}{16}-x$
parallelrisch	$-\frac{e^{-5+x}x^2e^2}{256}+\frac{e\,e^{-5+x}x^2}{32}-\frac{x^2e^{-5+x}}{16}+\frac{x^3e^2}{256}-\frac{x^3e}{32}+\frac{x^3}{16}-x$
default	$-x+\frac{35e\,e^{-5+x}}{32}-\frac{5e^{-5+x}(-5+x)}{8}-\frac{25e^{-5+x}}{16}-\frac{e^{-5+x}(-5+x)^2}{16}-\frac{35e^{-5+x}e^2}{256}-\frac{3e^2(e^{-5+x}(-5+x)-e^{-}}{64}$
parts	$-x+\frac{35e\,e^{-5+x}}{32}-\frac{5e^{-5+x}(-5+x)}{8}-\frac{25e^{-5+x}}{16}-\frac{e^{-5+x}(-5+x)^2}{16}-\frac{35e^{-5+x}e^2}{256}-\frac{3e^2(e^{-5+x}(-5+x)-e^{-}}{64}$
derivativedivides	$5-x+\frac{x^3}{16}-\frac{x^3e}{32}+\frac{x^3e^2}{256}+\frac{35e\,e^{-5+x}}{32}-\frac{35e^{-5+x}e^2}{256}-\frac{5e^{-5+x}(-5+x)}{8}-\frac{25e^{-5+x}}{16}-\frac{e^{-5+x}(-5+x)^2}{16}$

input
```
int(1/256*((-x^2-2*x)*exp(1)^2+(8*x^2+16*x)*exp(1)-16*x^2-32*x)*exp(-5+x)+
3/256*x^2*exp(1)^2-3/32*x^2*exp(1)+3/16*x^2-1,x,method=_RETURNVERBOSE)
```

output
```
(1/256*exp(1)^2-1/32*exp(1)+1/16)*x^3+(-1/256*exp(1)^2+1/32*exp(1)-1/16)*x
^2*exp(-5+x)-x
```

3.208.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. 2(23) = 46.

Time = 0.27 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.78

$$\int \frac{1}{256}\left(-256+48x^2-24ex^2+3e^2x^2+e^{-5+x}\left(-32x-16x^2+e^2\left(-2x-x^2\right)+e\left(16x+8x^2\right)\right)\right)\,dx=\frac{1}{256}x^3e^2-\frac{1}{32}x^3e+\frac{1}{16}x^3-\frac{1}{256}\left(x^2e^2-8x^2e+16x^2\right)e^{(x-5)}-x$$

input
```
integrate(1/256*((-x^2-2*x)*exp(1)^2+(8*x^2+16*x)*exp(1)-16*x^2-32*x)*exp(
-5+x)+3/256*x^2*exp(1)^2-3/32*x^2*exp(1)+3/16*x^2-1,x, algorithm=\
```

3.208.
$\int \frac{1}{256}(-256+48x^2-24ex^2+3e^2x^2+e^{-5+x}(-32x-16x^2+e^2(-2x-x^2)+e(16x+8x^2)))\,dx$

output
```
1/256*x^3*e^2 - 1/32*x^3*e + 1/16*x^3 - 1/256*(x^2*e^2 - 8*x^2*e + 16*x^2)
*e^(x - 5) - x
```

3.208.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. $2(20) = 40$.

Time = 0.08 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \frac{1}{256}\left(-256+48x^2-24ex^2+3e^2x^2+e^{-5+x}\left(-32x-16x^2+e^2\left(-2x-x^2\right)+e\left(16x+8x^2\right)\right)\right)\,dx = x^3\left(-\frac{e}{32}+\frac{e^2}{256}+\frac{1}{16}\right)-x+\frac{\left(-16x^2-x^2e^2+8ex^2\right)e^{x-5}}{256}$$

input
```
integrate(1/256*((-x**2-2*x)*exp(1)**2+(8*x**2+16*x)*exp(1)-16*x**2-32*x)*
exp(-5+x)+3/256*x**2*exp(1)**2-3/32*x**2*exp(1)+3/16*x**2-1,x)
```

output
```
x**3*(-E/32 + exp(2)/256 + 1/16) - x + (-16*x**2 - x**2*exp(2) + 8*E*x**2)
*exp(x - 5)/256
```

3.208.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.48

$$\int \frac{1}{256}\left(-256+48x^2-24ex^2+3e^2x^2+e^{-5+x}\left(-32x-16x^2+e^2\left(-2x-x^2\right)+e\left(16x+8x^2\right)\right)\right)\,dx = \frac{1}{256}\,x^3e^2-\frac{1}{32}\,x^3e-\frac{1}{256}\,x^2\left(e^2-8\,e+16\right)e^{(x-5)}+\frac{1}{16}\,x^3-x$$

input
```
integrate(1/256*((-x^2-2*x)*exp(1)^2+(8*x^2+16*x)*exp(1)-16*x^2-32*x)*exp(
-5+x)+3/256*x^2*exp(1)^2-3/32*x^2*exp(1)+3/16*x^2-1,x, algorithm=\
```

output
```
1/256*x^3*e^2 - 1/32*x^3*e - 1/256*x^2*(e^2 - 8*e + 16)*e^(x - 5) + 1/16*x
^3 - x
```

3.208.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(23) = 46$.

Time = 0.28 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.85

$$\int \frac{1}{256}\left(-256+48x^2-24ex^2+3e^2x^2+e^{-5+x}\left(-32x-16x^2+e^2\left(-2x-x^2\right)+e\left(16x+8x^2\right)\right)\right)\,dx=\frac{1}{256}\,x^3e^2-\frac{1}{32}\,x^3e+\frac{1}{16}\,x^3-\frac{1}{256}\,x^2e^{(x-3)}+\frac{1}{32}\,x^2e^{(x-4)}-\frac{1}{16}\,x^2e^{(x-5)}-x$$

input
```
integrate(1/256*((-x^2-2*x)*exp(1)^2+(8*x^2+16*x)*exp(1)-16*x^2-32*x)*exp(
-5+x)+3/256*x^2*exp(1)^2-3/32*x^2*exp(1)+3/16*x^2-1,x, algorithm=\
```

output
```
1/256*x^3*e^2 - 1/32*x^3*e + 1/16*x^3 - 1/256*x^2*e^(x - 3) + 1/32*x^2*e^(
x - 4) - 1/16*x^2*e^(x - 5) - x
```

3.208.9 Mupad [B] (verification not implemented)

Time = 14.36 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{1}{256}\left(-256+48x^2-24ex^2+3e^2x^2+e^{-5+x}\left(-32x-16x^2+e^2\left(-2x-x^2\right)+e\left(16x+8x^2\right)\right)\right)\,dx=\frac{x^3\,{\left(\mathrm{e}-4\right)}^2}{256}-x-\frac{x^2\,\mathrm{e}^{x-5}\,{\left(\mathrm{e}-4\right)}^2}{256}$$

input
```
int((3*x^2*exp(2))/256 - (3*x^2*exp(1))/32 - (exp(x - 5)*(32*x - exp(1)*(1
6*x + 8*x^2) + exp(2)*(2*x + x^2) + 16*x^2))/256 + (3*x^2)/16 - 1,x)
```

output
```
(x^3*(exp(1) - 4)^2)/256 - x - (x^2*exp(x - 5)*(exp(1) - 4)^2)/256
```

3.209 $\int \frac{e^{-2e^4}\left(-10e^{2x}x^2+e^{2x}\left(15x^2+10x^3\right)\log(x)\right)}{\log^3(x)}\,dx$

3.209.1 Optimal result

Integrand size = 42, antiderivative size = 20

$$\int \frac{e^{-2e^4}\left(-10e^{2x}x^2+e^{2x}\left(15x^2+10x^3\right)\log(x)\right)}{\log^3(x)}\,dx=\frac{5e^{-2e^4+2x}x^3}{\log^2(x)}$$

output
```
5*x^3*exp(x)^2/exp(exp(4))^2/ln(x)^2
```

3.209.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{e^{-2e^4}\left(-10e^{2x}x^2+e^{2x}\left(15x^2+10x^3\right)\log(x)\right)}{\log^3(x)}\,dx=\frac{5e^{-2e^4+2x}x^3}{\log^2(x)}$$

input
```
Integrate[(-10*E^(2*x)*x^2 + E^(2*x)*(15*x^2 + 10*x^3)*Log[x])/(E^(2*E^4)*
Log[x]^3),x]
```

output
```
(5*E^(-2*E^4 + 2*x)*x^3)/Log[x]^2
```

3.209.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {27, 27, 7292, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-2e^4}\left(e^{2x}\left(10x^3+15x^2\right)\log(x)-10e^{2x}x^2\right)}{\log^3(x)}dx$$

$$\Big\downarrow \; 27$$

$$e^{-2e^4}\int -\frac{5\left(2e^{2x}x^2-e^{2x}\left(2x^3+3x^2\right)\log(x)\right)}{\log^3(x)}dx$$

$$\Big\downarrow \; 27$$

$$-5e^{-2e^4}\int \frac{2e^{2x}x^2-e^{2x}\left(2x^3+3x^2\right)\log(x)}{\log^3(x)}dx$$

$$\Big\downarrow \; 7292$$

$$-5e^{-2e^4}\int \frac{e^{2x}x^2(-2x\log(x)-3\log(x)+2)}{\log^3(x)}dx$$

$$\Big\downarrow \; 2726$$

$$\frac{5e^{2x-2e^4}x^3}{\log^2(x)}$$

input
```
Int[(-10*E^(2*x)*x^2 + E^(2*x)*(15*x^2 + 10*x^3)*Log[x])/(E^(2*E^4)*Log[x]
^3),x]
```

output
```
(5*E^(-2*E^4 + 2*x)*x^3)/Log[x]^2
```

3.209.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.209.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
risch	$\frac{5x^3 e^{2x-2\,e^4}}{\ln(x)^2}$	19
parallelrisch	$\frac{5x^3 e^{2x} e^{-2\,e^4}}{\ln(x)^2}$	19

input
```
int(((10*x^3+15*x^2)*exp(x)^2*ln(x)-10*exp(x)^2*x^2)/exp(exp(4))^2/ln(x)^3
,x,method=_RETURNVERBOSE)
```

output
```
5*x^3/ln(x)^2*exp(2*x-2*exp(4))
```

3.209.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{e^{-2e^4}(-10e^{2x}x^2 + e^{2x}(15x^2 + 10x^3)\log(x))}{\log^3(x)}\,dx = \frac{5\,x^3 e^{(2\,x-2\,e^4)}}{\log{(x)}^2}$$

input
```
integrate(((10*x^3+15*x^2)*exp(x)^2*log(x)-10*exp(x)^2*x^2)/exp(exp(4))^2/
log(x)^3,x, algorithm=\
```

output
```
5*x^3*e^(2*x - 2*e^4)/log(x)^2
```

3.209.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{e^{-2e^4}\left(-10e^{2x}x^2+e^{2x}\left(15x^2+10x^3\right)\log(x)\right)}{\log^3(x)}\,dx=\frac{5x^3e^{2x}}{e^{2e^4}\log{(x)}^2}$$

input
```
integrate(((10*x**3+15*x**2)*exp(x)**2*ln(x)-10*exp(x)**2*x**2)/exp(exp(4)
)**2/ln(x)**3,x)
```

output
```
5*x**3*exp(2*x)*exp(-2*exp(4))/log(x)**2
```

3.209.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{e^{-2e^4}\left(-10e^{2x}x^2+e^{2x}\left(15x^2+10x^3\right)\log(x)\right)}{\log^3(x)}\,dx=\frac{5\,x^3e^{\left(2\,x-2\,e^4\right)}}{\log{(x)}^2}$$

input
```
integrate(((10*x^3+15*x^2)*exp(x)^2*log(x)-10*exp(x)^2*x^2)/exp(exp(4))^2/
log(x)^3,x, algorithm=\
```

output
```
5*x^3*e^(2*x - 2*e^4)/log(x)^2
```

3.209.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{e^{-2e^4}\left(-10e^{2x}x^2+e^{2x}\left(15x^2+10x^3\right)\log(x)\right)}{\log^3(x)}\,dx=\frac{5\,x^3e^{\left(2\,x-2\,e^4\right)}}{\log{(x)}^2}$$

input
```
integrate(((10*x^3+15*x^2)*exp(x)^2*log(x)-10*exp(x)^2*x^2)/exp(exp(4))^2/
log(x)^3,x, algorithm=\
```

output
```
5*x^3*e^(2*x - 2*e^4)/log(x)^2
```

3.209.9 Mupad [B] (verification not implemented)

Time = 14.48 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{e^{-2e^4}(-10e^{2x}x^2 + e^{2x}(15x^2 + 10x^3)\log(x))}{\log^3(x)}\,dx = \frac{5\,x^3\,\mathrm{e}^{-2\,\mathrm{e}^4}\,\mathrm{e}^{2\,x}}{\ln{(x)}^2}$$

input
```
int(-(exp(-2*exp(4))*(10*x^2*exp(2*x) - exp(2*x)*log(x)*(15*x^2 + 10*x^3))
)/log(x)^3,x)
```

output
```
(5*x^3*exp(-2*exp(4))*exp(2*x))/log(x)^2
```

3.210 $\int \frac{3+e^4+x-\log(5)}{3+e^4+x}\,dx$

3.210.1 Optimal result

Integrand size = 19, antiderivative size = 24

$$\int \frac{3+e^4+x-\log(5)}{3+e^4+x}\,dx = x-\log(5)\left(\log^2(3)+\log\left(1+\frac{1}{4}\left(-1+e^4+x\right)\right)\right)$$

output
```
x-(ln(3)^2+ln(3/4+1/4*exp(4)+1/4*x))*ln(5)
```

3.210.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{3+e^4+x-\log(5)}{3+e^4+x}\,dx = x-\log(5)\log\left(3+e^4+x\right)$$

input
```
Integrate[(3 + E^4 + x - Log[5])/(3 + E^4 + x),x]
```

output
```
x - Log[5]*Log[3 + E^4 + x]
```

3.210.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$, Rules used = {49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x+e^4+3-\log(5)}{x+e^4+3}\,dx$$

$$\Big\downarrow \ 49$$

$$\int \left(1-\frac{\log(5)}{x+e^4+3}\right)dx$$

$$\Big\downarrow \ 2009$$

$$x-\log(5)\log\left(x+e^4+3\right)$$

input
```
Int[(3 + E^4 + x - Log[5])/(3 + E^4 + x),x]
```

output
```
x - Log[5]*Log[3 + E^4 + x]
```

3.210.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.210.4 Maple [A] (verified)

Time = 0.75 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

method	result
default	$x-\ln (5) \ln \left({\mathrm e}^{4}+3+x \right)$
norman	$x-\ln (5) \ln \left({\mathrm e}^{4}+3+x \right)$
risch	$x-\ln (5) \ln \left({\mathrm e}^{4}+3+x \right)$
parallelrisch	$x-\ln (5) \ln \left({\mathrm e}^{4}+3+x \right)$
meijerg	$-\ln (5) \ln \left(1+\frac{x}{{\mathrm e}^{4}+3}\right)+{\mathrm e}^{4} \ln \left(1+\frac{x}{{\mathrm e}^{4}+3}\right)+3 \ln \left(1+\frac{x}{{\mathrm e}^{4}+3}\right)+\left({\mathrm e}^{4}+3\right) \left(\frac{x}{{\mathrm e}^{4}+3}-\ln \left(1+\frac{x}{{\mathrm e}^{4}+3}\right)\right)$

input
```
int((-ln(5)+exp(4)+3+x)/(exp(4)+3+x),x,method=_RETURNVERBOSE)
```

output
```
x-ln(5)*ln(exp(4)+3+x)
```

3.210.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

$$\int \frac{3+e^4+x-\log(5)}{3+e^4+x}\,dx=-\log\left(5\right)\log\left(x+e^{4}+3\right)+x$$

input
```
integrate((-log(5)+exp(4)+3+x)/(exp(4)+3+x),x, algorithm=\
```

output
```
-log(5)*log(x + e^4 + 3) + x
```

3.210.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

$$\int \frac{3+e^4+x-\log(5)}{3+e^4+x}\,dx=x-\log\left(5\right)\log\left(x+3+e^{4}\right)$$

input
```
integrate((-ln(5)+exp(4)+3+x)/(exp(4)+3+x),x)
```

output
```
x - log(5)*log(x + 3 + exp(4))
```

3.210.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

$$\int \frac{3+e^4+x-\log(5)}{3+e^4+x}\,dx=-\log{(5)}\log{\left(x+e^4+3\right)}+x$$

input
```
integrate((-log(5)+exp(4)+3+x)/(exp(4)+3+x),x, algorithm=\
```

output
```
-log(5)*log(x + e^4 + 3) + x
```

3.210.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{3+e^4+x-\log(5)}{3+e^4+x}\,dx=-\log{(5)}\log{\left(\left|x+e^4+3\right|\right)}+x$$

input
```
integrate((-log(5)+exp(4)+3+x)/(exp(4)+3+x),x, algorithm=\
```

output
```
-log(5)*log(abs(x + e^4 + 3)) + x
```

3.210.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

$$\int \frac{3+e^4+x-\log(5)}{3+e^4+x}\,dx=x-\ln{(5)}\,\ln{\left(x+\mathrm{e}^4+3\right)}$$

input
```
int((x + exp(4) - log(5) + 3)/(x + exp(4) + 3),x)
```

output
```
x - log(5)*log(x + exp(4) + 3)
```

3.211 $\int \frac{-96x-x^2+x^3+(5-6x+11x^2-2x^3)\log(-5+x)+x\log(x)}{(-5x+x^2)\log^2(-5+x)}\,dx$

3.211.1 Optimal result

Integrand size = 52, antiderivative size = 19

$$\int \frac{-96x-x^2+x^3+(5-6x+11x^2-2x^3)\log(-5+x)+x\log(x)}{(-5x+x^2)\log^2(-5+x)}\,dx = \frac{96+x-x^2-\log(x)}{\log(-5+x)}$$

output
```
(96-x^2+x-ln(x))/ln(-5+x)
```

3.211.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{-96x-x^2+x^3+(5-6x+11x^2-2x^3)\log(-5+x)+x\log(x)}{(-5x+x^2)\log^2(-5+x)}\,dx = \frac{96+x-x^2-\log(x)}{\log(-5+x)}$$

input
```
Integrate[(-96*x - x^2 + x^3 + (5 - 6*x + 11*x^2 - 2*x^3)*Log[-5 + x] + x*
Log[x])/((-5*x + x^2)*Log[-5 + x]^2),x]
```

output
```
(96 + x - x^2 - Log[x])/Log[-5 + x]
```

3.211.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3-x^2+\left(-2x^3+11x^2-6x+5\right)\log(x-5)-96x+x\log(x)}{\left(x^2-5x\right)\log^2(x-5)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{x^3-x^2+\left(-2x^3+11x^2-6x+5\right)\log(x-5)-96x+x\log(x)}{(x-5)x\log^2(x-5)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x^3-2x^3\log(x-5)-x^2+11x^2\log(x-5)-96x-6x\log(x-5)+5\log(x-5)}{(x-5)x\log^2(x-5)}+\frac{\log(x)}{(x-5)\log^2(x-5)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\text{Subst}\left(\int \frac{\log(x+5)}{x\log^2(x)}dx,x,x-5\right)-\int \frac{1}{x\log(x-5)}dx+\frac{x(5-x)}{\log(x-5)}+\frac{4(5-x)}{\log(x-5)}+\frac{76}{\log(x-5)}$$

input
```
Int[(-96*x - x^2 + x^3 + (5 - 6*x + 11*x^2 - 2*x^3)*Log[-5 + x] + x*Log[x]
)/((-5*x + x^2)*Log[-5 + x]^2),x]
```

output
```
$Aborted
```

3.211.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.211.4 Maple [A] (verified)

Time = 4.75 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

method	result	size
risch	$-\frac{x^2-x+\ln(x)-96}{\ln(-5+x)}$	19
parallelrisch	$-\frac{50x^2-4800-50x+50\ln(x)}{50\ln(-5+x)}$	23

input
```
int((x*ln(x)+(-2*x^3+11*x^2-6*x+5)*ln(-5+x)+x^3-x^2-96*x)/(x^2-5*x)/ln(-5+
x)^2,x,method=_RETURNVERBOSE)
```

output
```
-(x^2-x+ln(x)-96)/ln(-5+x)
```

3.211.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{-96x-x^2+x^3+(5-6x+11x^2-2x^3)\log(-5+x)+x\log(x)}{(-5x+x^2)\log^2(-5+x)}\,dx = -\frac{x^2-x+\log(x)-96}{\log(x-5)}$$

input
```
integrate((x*log(x)+(-2*x^3+11*x^2-6*x+5)*log(-5+x)+x^3-x^2-96*x)/(x^2-5*x
)/log(-5+x)^2,x, algorithm=\
```

output
```
-(x^2 - x + log(x) - 96)/log(x - 5)
```

3.211.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \frac{-96x-x^2+x^3+(5-6x+11x^2-2x^3)\log(-5+x)+x\log(x)}{(-5x+x^2)\log^2(-5+x)}\,dx = \frac{-x^2+x-\log(x)+96}{\log(x-5)}$$

input
```
integrate((x*ln(x)+(-2*x**3+11*x**2-6*x+5)*ln(-5+x)+x**3-x**2-96*x)/(x**2-
5*x)/ln(-5+x)**2,x)
```

output
```
(-x**2 + x - log(x) + 96)/log(x - 5)
```

3.211.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{-96x - x^2 + x^3 + (5 - 6x + 11x^2 - 2x^3)\log(-5 + x) + x\log(x)}{(-5x + x^2)\log^2(-5 + x)}\,dx$$
$$= -\frac{x^2 - x + \log(x) - 96}{\log(x - 5)}$$

input
```
integrate((x*log(x)+(-2*x^3+11*x^2-6*x+5)*log(-5+x)+x^3-x^2-96*x)/(x^2-5*x
)/log(-5+x)^2,x, algorithm=\
```

output
```
-(x^2 - x + log(x) - 96)/log(x - 5)
```

3.211.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{-96x - x^2 + x^3 + (5 - 6x + 11x^2 - 2x^3)\log(-5 + x) + x\log(x)}{(-5x + x^2)\log^2(-5 + x)}\,dx$$
$$= -\frac{x^2 - x + \log(x) - 96}{\log(x - 5)}$$

input
```
integrate((x*log(x)+(-2*x^3+11*x^2-6*x+5)*log(-5+x)+x^3-x^2-96*x)/(x^2-5*x
)/log(-5+x)^2,x, algorithm=\
```

output
```
-(x^2 - x + log(x) - 96)/log(x - 5)
```

3.211.9 Mupad [B] (verification not implemented)

Time = 14.48 (sec) , antiderivative size = 38, normalized size of antiderivative = 2.00

$$\int \frac{-96x-x^2+x^3+(5-6x+11x^2-2x^3)\log(-5+x)+x\log(x)}{(-5x+x^2)\log^2(-5+x)}\,dx$$
$$=\frac{x}{\ln(x-5)}+\frac{96}{\ln(x-5)}-\frac{x^2}{\ln(x-5)}-\frac{\ln(x)}{\ln(x-5)}$$

input
```
int((96*x + log(x - 5)*(6*x - 11*x^2 + 2*x^3 - 5) - x*log(x) + x^2 - x^3)/
(log(x - 5)^2*(5*x - x^2)),x)
```

output
```
x/log(x - 5) + 96/log(x - 5) - x^2/log(x - 5) - log(x)/log(x - 5)
```

3.212 $\int \frac{x+\left(-2ex+2e^{e^{10}}x+2x\log\left(\frac{x}{4}\right)\right)\log\left(-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)\right)}{-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)}\,dx$

3.212.1 Optimal result

Integrand size = 59, antiderivative size = 20

$$\int \frac{x+\left(-2ex+2e^{e^{10}}x+2x\log\left(\frac{x}{4}\right)\right)\log\left(-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)\right)}{-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)}\,dx = x^2\log\left(-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)\right)$$

output
```
ln(ln(1/4*x)+exp(exp(5)^2)-exp(1))*x^2
```

3.212.2 Mathematica [A] (verified)

Time = 1.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{x+\left(-2ex+2e^{e^{10}}x+2x\log\left(\frac{x}{4}\right)\right)\log\left(-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)\right)}{-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)}\,dx = x^2\log\left(-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)\right)$$

input
```
Integrate[(x + (-2*E*x + 2*E^E^10*x + 2*x*Log[x/4])*Log[-E + E^E^10 + Log[
x/4]])/(-E + E^E^10 + Log[x/4]),x]
```

output
```
x^2*Log[-E + E^E^10 + Log[x/4]]
```

3.212.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x+\left(2e^{e^{10}}x-2ex+2x\log\left(\frac{x}{4}\right)\right)\log\left(\log\left(\frac{x}{4}\right)+e^{e^{10}}-e\right)}{\log\left(\frac{x}{4}\right)+e^{e^{10}}-e}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-x-\left(2e^{e^{10}}x-2ex+2x\log\left(\frac{x}{4}\right)\right)\log\left(\log\left(\frac{x}{4}\right)+e^{e^{10}}-e\right)}{e\left(1-e^{e^{10}-1}\right)-\log\left(\frac{x}{4}\right)}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int x\left(2\log\left(\log\left(\frac{x}{4}\right)+e^{e^{10}}-e\right)+\frac{1}{\log\left(\frac{x}{4}\right)+e^{e^{10}}-e}\right)dx$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(2x\log\left(\log\left(\frac{x}{4}\right)-e\left(1-e^{e^{10}-1}\right)\right)+\frac{x}{\log\left(\frac{x}{4}\right)-e\left(1-e^{e^{10}-1}\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2\int x\log\left(\log\left(\frac{x}{4}\right)-e\left(1-e^{-1+e^{10}}\right)\right)dx+16e^{2e-2e^{e^{10}}}\text{ExpIntegralEi}\left(-2\left(-\log\left(\frac{x}{4}\right)-e^{e^{10}}+e\right)\right)$$

input
```
Int[(x + (-2*E*x + 2*E^E^10*x + 2*x*Log[x/4])*Log[-E + E^E^10 + Log[x/4]])
/(-E + E^E^10 + Log[x/4]),x]
```

output
```
$Aborted
```

3.212.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.212.4 Maple [A] (verified)

Time = 1.72 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

method	result
risch	$x^{2} \ln \left(\ln \left(\frac{x}{4}\right)+{\mathrm e}^{{\mathrm e}^{10}}-{\mathrm e}\right)$
norman	$x^{2} \ln \left(\ln \left(\frac{x}{4}\right)+{\mathrm e}^{{\mathrm e}^{10}}-{\mathrm e}\right)$
parallelrisch	$x^{2} \ln \left(\ln \left(\frac{x}{4}\right)+{\mathrm e}^{{\mathrm e}^{10}}-{\mathrm e}\right)$
default	$-{\mathrm e}^{4 \ln \left(2\right)-2 \,{\mathrm e}^{{\mathrm e}^{10}}+2 \,{\mathrm e}} \operatorname{Ei}_{1}\left(-2 \ln \left(x \right)+4 \ln \left(2\right)-2 \,{\mathrm e}^{{\mathrm e}^{10}}+2 \,{\mathrm e}\right)+x^{2} \ln \left(\ln \left(\frac{x}{4}\right)+{\mathrm e}^{{\mathrm e}^{10}}-{\mathrm e}\right)+16 \,{\mathrm e}^{-}$

input
```
int(((2*x*ln(1/4*x)+2*x*exp(exp(5)^2)-2*x*exp(1))*ln(ln(1/4*x)+exp(exp(5)^
2)-exp(1))+x)/(ln(1/4*x)+exp(exp(5)^2)-exp(1)),x,method=_RETURNVERBOSE)
```

output
```
x^2*ln(ln(1/4*x)+exp(exp(10))-exp(1))
```

3.212.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{x+\left(-2 e x+2 e^{e^{10}} x+2 x \log \left(\frac{x}{4}\right)\right) \log \left(-e+e^{e^{10}}+\log \left(\frac{x}{4}\right)\right)}{-e+e^{e^{10}}+\log \left(\frac{x}{4}\right)} \, dx$$
$$= x^{2} \log \left(-e+e^{\left(e^{10}\right)}+\log \left(\frac{1}{4} \, x\right)\right)$$

input
```
integrate(((2*x*log(1/4*x)+2*x*exp(exp(5)^2)-2*x*exp(1))*log(log(1/4*x)+ex
p(exp(5)^2)-exp(1))+x)/(log(1/4*x)+exp(exp(5)^2)-exp(1)),x, algorithm=\
```

output
```
x^2*log(-e + e^(e^10) + log(1/4*x))
```

3.212.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{x+\left(-2ex+2e^{e^{10}}x+2x\log\left(\frac{x}{4}\right)\right)\log\left(-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)\right)}{-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)}\,dx$$
$$= x^2\log\left(\log\left(\frac{x}{4}\right)-e+e^{e^{10}}\right)$$

input
```
integrate(((2*x*ln(1/4*x)+2*x*exp(exp(5)**2)-2*x*exp(1))*ln(ln(1/4*x)+exp(
exp(5)**2)-exp(1))+x)/(ln(1/4*x)+exp(exp(5)**2)-exp(1)),x)
```

output
```
x**2*log(log(x/4) - E + exp(exp(10)))
```

3.212.7 Maxima [F]

$$\int \frac{x+\left(-2ex+2e^{e^{10}}x+2x\log\left(\frac{x}{4}\right)\right)\log\left(-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)\right)}{-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)}\,dx$$
$$= \int \frac{2\left(xe-xe^{\left(e^{10}\right)}-x\log\left(\frac{1}{4}x\right)\right)\log\left(-e+e^{\left(e^{10}\right)}+\log\left(\frac{1}{4}x\right)\right)-x}{e-e^{\left(e^{10}\right)}-\log\left(\frac{1}{4}x\right)}\,dx$$

input
```
integrate(((2*x*log(1/4*x)+2*x*exp(exp(5)^2)-2*x*exp(1))*log(log(1/4*x)+ex
p(exp(5)^2)-exp(1))+x)/(log(1/4*x)+exp(exp(5)^2)-exp(1)),x, algorithm=\
```

output
```
x^2*log(-e + e^(e^10) - 2*log(2) + log(x)) - 16*e^(2*e - 2*e^(e^10))*exp_i
ntegral_e(1, 2*e - 2*e^(e^10) - 2*log(1/4*x)) - integrate(-x/(e - e^(e^10)
 + 2*log(2) - log(x)), x)
```

3.212.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. $2(17) = 34$.

Time = 0.30 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.75

$$\int \frac{x+\left(-2ex+2e^{e^{10}}x+2x\log\left(\frac{x}{4}\right)\right)\log\left(-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)\right)}{-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)}\,dx$$
$$=\frac{1}{2}\,x^2\log\left(\frac{1}{4}\,\pi^2(\mathrm{sgn}(x)-1)^2+\left(e-e^{\left(e^{10}\right)}-\log\left(\frac{1}{4}\,|x|\right)\right)^2\right)$$

input
```
integrate((((2*x*log(1/4*x)+2*x*exp(exp(5)^2)-2*x*exp(1))*log(log(1/4*x)+ex
p(exp(5)^2)-exp(1))+x)/(log(1/4*x)+exp(exp(5)^2)-exp(1)),x, algorithm=\
```

output
```
1/2*x^2*log(1/4*pi^2*(sgn(x) - 1)^2 + (e - e^(e^10) - log(1/4*abs(x)))^2)
```

3.212.9 Mupad [B] (verification not implemented)

Time = 14.48 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{x+\left(-2ex+2e^{e^{10}}x+2x\log\left(\frac{x}{4}\right)\right)\log\left(-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)\right)}{-e+e^{e^{10}}+\log\left(\frac{x}{4}\right)}\,dx = x^2\,\ln\left(\ln\left(\frac{x}{4}\right)-\mathrm{e}+\mathrm{e}^{\mathrm{e}^{10}}\right)$$

input
```
int((x + log(log(x/4) - exp(1) + exp(exp(10)))*(2*x*log(x/4) - 2*x*exp(1)
+ 2*x*exp(exp(10))))/(log(x/4) - exp(1) + exp(exp(10))),x)
```

output
```
x^2*log(log(x/4) - exp(1) + exp(exp(10)))
```

3.213 $\int \left(1-e^x+e^{5+x} (3+3 x)\right) \, dx$

3.213.1 Optimal result

Integrand size = 18, antiderivative size = 20

$$\int \left(1-e^x+e^{5+x} (3+3 x)\right) \, dx=2-e^x+\left(1+3 e^{5+x}\right) x+\log (5)$$

output
```
2+ln(5)+(1+3*exp(5+x))*x-exp(x)
```

3.213.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \left(1-e^x+e^{5+x} (3+3 x)\right) \, dx=-e^x+x+3 e^{5+x} x$$

input
```
Integrate[1 - E^x + E^(5 + x)*(3 + 3*x),x]
```

output
```
-E^x + x + 3*E^(5 + x)*x
```

3.213.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{x+5}(3x+3)-e^x+1\right) \, dx$$

$$\Big\downarrow \text{ 2009}$$

$$x-e^x-3e^{x+5}+3e^{x+5}(x+1)$$

input
```
Int[1 - E^x + E^(5 + x)*(3 + 3*x),x]
```

output
```
-E^x - 3*E^(5 + x) + x + 3*E^(5 + x)*(1 + x)
```

3.213.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.213.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

method	result	size
norman	$x+3x\,\mathrm{e}^{5}\mathrm{e}^{x}-\mathrm{e}^{x}$	14
risch	$3x\,\mathrm{e}^{5+x}+x-\mathrm{e}^{x}$	14
parallelrisch	$3x\,\mathrm{e}^{5+x}+x-\mathrm{e}^{x}$	14
default	$x+3\,\mathrm{e}^{5+x}(5+x)-15\,\mathrm{e}^{5+x}-\mathrm{e}^{x}$	22
parts	$x+3\,\mathrm{e}^{5+x}(5+x)-15\,\mathrm{e}^{5+x}-\mathrm{e}^{x}$	22

input
```
int((3*x+3)*exp(5+x)+1-exp(x),x,method=_RETURNVERBOSE)
```

output
```
x+3*x*exp(5)*exp(x)-exp(x)
```

3.213.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \left(1-e^x+e^{5+x}(3+3x)\right)\,dx = \left(xe^5+\left(3\,xe^5-1\right)e^{(x+5)}\right)e^{(-5)}$$

input
```
integrate((3*x+3)*exp(5+x)+1-exp(x),x, algorithm=\
```

output
```
(x*e^5 + (3*x*e^5 - 1)*e^(x + 5))*e^(-5)
```

3.213.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int \left(1-e^x+e^{5+x}(3+3x)\right)\,dx = x+\left(3xe^5-1\right)e^x$$

input
```
integrate((3*x+3)*exp(5+x)+1-exp(x),x)
```

output
```
x + (3*x*exp(5) - 1)*exp(x)
```

3.213.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int \left(1-e^x+e^{5+x}(3+3x)\right)\,dx = 3\,xe^{(x+5)}+x-e^x$$

input
```
integrate((3*x+3)*exp(5+x)+1-exp(x),x, algorithm=\
```

output
```
3*x*e^(x + 5) + x - e^x
```

3.213.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int \left(1-e^x+e^{5+x}(3+3x)\right)\,dx=3\,xe^{(x+5)}+x-e^x$$

input
```
integrate((3*x+3)*exp(5+x)+1-exp(x),x, algorithm=\
```

output
```
3*x*e^(x + 5) + x - e^x
```

3.213.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int \left(1-e^x+e^{5+x}(3+3x)\right)\,dx=x-\mathrm{e}^x+3\,x\,\mathrm{e}^5\,\mathrm{e}^x$$

input
```
int(exp(x + 5)*(3*x + 3) - exp(x) + 1,x)
```

output
```
x - exp(x) + 3*x*exp(5)*exp(x)
```

3.214 $\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}}{}$

3.214.1 Optimal result

Integrand size = 134, antiderivative size = 24

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x\right.}{x^2}$$

$$= e^{\frac{\left(1+5e^{-x}-e^{x}+\log(2)\right)^2}{x}}$$

output
```
exp(1/x*(ln(2)+5/exp(x)+1-exp(x))^2)
```

3.214.2 Mathematica [F]

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x\right.}{x^2}$$

$$= \int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-1\right.}{x^2}$$

input
```
Integrate[(E^(-2*x + (25 + E^(4*x) + E^(3*x)*(-2 - 2*Log[2]) + E^x*(10 + 1
0*Log[2]) + E^(2*x)*(-9 + 2*Log[2] + Log[2]^2))/(E^(2*x)*x))*(-25 - 50*x +
 E^(4*x)*(-1 + 2*x) + E^x*(-10 - 10*x + (-10 - 10*x)*Log[2]) + E^(3*x)*(2
- 2*x + (2 - 2*x)*Log[2]) + E^(2*x)*(9 - 2*Log[2] - Log[2]^2)))/x^2,x]
```

3.214.

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x+(-10-10x)\log(2))+e}{x^2}$$

output
```
Integrate[(E^(-2*x + (25 + E^(4*x) + E^(3*x)*(-2 - 2*Log[2]) + E^x*(10 + 1
0*Log[2]) + E^(2*x)*(-9 + 2*Log[2] + Log[2]^2))/(E^(2*x)*x))*(-25 - 50*x +
 E^(4*x)*(-1 + 2*x) + E^x*(-10 - 10*x + (-10 - 10*x)*Log[2]) + E^(3*x)*(2
- 2*x + (2 - 2*x)*Log[2]) + E^(2*x)*(9 - 2*Log[2] - Log[2]^2)))/x^2, x]
```

3.214.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-50x+e^{4x}(2x-1)+e^{2x}\left(9-\log^2(2)-2\log(2)\right)+e^x(-10x+(-10x-10)\log(2)-10)+e^{3x}(-2x+(2-2\right.}{x^2}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\left(-2e^{2x}x-10x+e^{2x}-e^x(1+\log(2))-5\right)\left(-e^{2x}+e^x(1+\log(2))+5\right)\exp\left(\frac{e^{-2x}\left(e^{4x}+e^{2x}\left(-9+\log^2(2)+2\log(2)\right)+e^{3}\right.}{x}\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2(x-1)(1+\log(2))\exp\left(x+\frac{e^{-2x}\left(e^{4x}+e^{2x}\left(-9+\log^2(2)+2\log(2)\right)+e^{3x}(-2-2\log(2))+e^x(10+10\log(2))+25\right)}{x}\right)}{x^2}+\frac{(2x-1}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2^{\frac{2e^{-x}\left(e^x+5\right)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2^{\frac{2e^{-x}\left(e^x+5\right)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}\left(e^x+5\right)}{x}}(}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$\Big\downarrow$ 7293

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(}{}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$\Big\downarrow$ 7293

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(}{}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$\Big\downarrow$ 7293

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(}{}\right.$$

3.214.

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^x(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^x(-10-10x+(-10-10x)\log(2))+e^{\right.}{x^2}$$

$$\downarrow \text{7239}$$

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$$\downarrow \text{7293}$$

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(}{}\right.$$

$$\downarrow \text{7239}$$

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$$\downarrow \text{7293}$$

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(}{}\right.$$

$$\downarrow \text{7239}$$

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$$\downarrow \text{7293}$$

3.214.

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^x(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}(-25-50x+e^{4x}(-1+2x)+e^x(-10-10x+(-10-10x)\log(2))+e^{}}{x^2}$$

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(}{}\right.$$

$\downarrow$ 7239

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$\downarrow$ 7293

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(}{}\right.$$

$\downarrow$ 7239

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$\downarrow$ 7293

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(}{}\right.$$

$\downarrow$ 7239

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

3.214.

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^x(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^x(-10-10x+(-10-10x)\log(2))+e^{}\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(\right.$$

$$\Big\downarrow \text{7239}$$

3.214.

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^x(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^x(-10-10x+(-10-10x)\log(2))+e^{\right.}{x^2}$$

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\cdots\right)}{x^2}$$

$\downarrow$ 7293

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(\cdots}{\cdots}\right.$$

$\downarrow$ 7239

$$\int \frac{2^{\frac{2e^{-x}(e^x+5)}{x}}\left(e^{4x}(2x-1)-25(2x+1)-e^{2x}\left(-9+\log^2(2)+\log(4)\right)-e^{3x}(x-1)(2+\log(4))-10e^x(x+1)(1+\cdots\right)}{x^2}$$

$\downarrow$ 7293

$$\int \left(-\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(x-1)(2+\log(4))\exp\left(x+\frac{25e^{-2x}}{x}+\frac{10e^{-x}}{x}+\frac{e^{2x}}{x}-\frac{9\left(1-\frac{\log^2(2)}{9}\right)}{x}-\frac{e^x(2+\log(4))}{x}\right)}{x^2}+\frac{2^{\frac{2e^{-x}(e^x+5)}{x}}(\cdots}{\cdots}\right.$$

input
```
Int[(E^(-2*x + (25 + E^(4*x) + E^(3*x)*(-2 - 2*Log[2]) + E^x*(10 + 10*Log[
2]) + E^(2*x)*(-9 + 2*Log[2] + Log[2]^2))/(E^(2*x)*x))*(-25 - 50*x + E^(4*
x)*(-1 + 2*x) + E^x*(-10 - 10*x + (-10 - 10*x)*Log[2]) + E^(3*x)*(2 - 2*x
+ (2 - 2*x)*Log[2]) + E^(2*x)*(9 - 2*Log[2] - Log[2]^2)))/x^2,x]
```

output
```
$Aborted
```

3.214.

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^x(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^x(-10-10x+(-10-10x)\log(2))+e^{\cdots}\right)}{x^2}$$

3.214.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.214.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(21) = 42$.

Time = 5.95 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.12

method	result	size
parallelrisch	$\mathrm{e}^{\frac{\left(\mathrm{e}^{4x}+(-2\ln(2)-2)\mathrm{e}^{3x}+\left(\ln(2)^{2}+2\ln(2)-9\right)\mathrm{e}^{2x}+(10\ln(2)+10)\mathrm{e}^{x}+25\right)\mathrm{e}^{-2x}}{x}}$	51
risch	$4^{\frac{1}{x}}\left(\frac{1}{4}\right)^{\frac{\mathrm{e}^{x}}{x}} 1024^{\frac{\mathrm{e}^{-x}}{x}} \mathrm{e}^{\frac{10\,\mathrm{e}^{-x}+\ln(2)^{2}+\mathrm{e}^{2x}-2\,\mathrm{e}^{x}-9+25\,\mathrm{e}^{-2x}}{x}}$	56

input
```
int(((-1+2*x)*exp(x)^4+((2-2*x)*ln(2)-2*x+2)*exp(x)^3+(-ln(2)^2-2*ln(2)+9)
*exp(x)^2+((-10*x-10)*ln(2)-10*x-10)*exp(x)-50*x-25)*exp((exp(x)^4+(-2*ln(
2)-2)*exp(x)^3+(ln(2)^2+2*ln(2)-9)*exp(x)^2+(10*ln(2)+10)*exp(x)+25)/x/exp
(x)^2)/exp(x)^2/x^2,x,method=_RETURNVERBOSE)
```

output
```
exp((exp(x)^4+(-2*ln(2)-2)*exp(x)^3+(ln(2)^2+2*ln(2)-9)*exp(x)^2+(10*ln(2)
+10)*exp(x)+25)/x/exp(x)^2)
```

3.214.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(21) = 42.

Time = 0.30 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.58

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x\right.}{x^2}$$

$$= e^{\left(2x-\frac{\left(2(\log(2)+1)e^{(3x)}+\left(2x^2-\log(2)^2-2\log(2)+9\right)e^{(2x)}-10(\log(2)+1)e^{x}-e^{(4x)}-25\right)e^{(-2x)}}{x}\right)}$$

input
```
integrate(((-1+2*x)*exp(x)^4+((2-2*x)*log(2)-2*x+2)*exp(x)^3+(-log(2)^2-2*
log(2)+9)*exp(x)^2+((-10*x-10)*log(2)-10*x-10)*exp(x)-50*x-25)*exp((exp(x)
^4+(-2*log(2)-2)*exp(x)^3+(log(2)^2+2*log(2)-9)*exp(x)^2+(10*log(2)+10)*ex
p(x)+25)/x/exp(x)^2)/exp(x)^2/x^2,x, algorithm=\
```

output
```
e^(2*x - (2*(log(2) + 1)*e^(3*x) + (2*x^2 - log(2)^2 - 2*log(2) + 9)*e^(2*
x) - 10*(log(2) + 1)*e^x - e^(4*x) - 25)*e^(-2*x)/x)
```

3.214.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(17) = 34.

Time = 0.31 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.25

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x\right.}{x^2}$$

$$= e^{\frac{\left(e^{4x}+(-2-2\log(2))e^{3x}+\left(-9+\log(2)^2+2\log(2)\right)e^{2x}+(10\log(2)+10)e^{x}+25\right)e^{-2x}}{x}}$$

input
```
integrate(((-1+2*x)*exp(x)**4+((2-2*x)*ln(2)-2*x+2)*exp(x)**3+(-ln(2)**2-2
*ln(2)+9)*exp(x)**2+((-10*x-10)*ln(2)-10*x-10)*exp(x)-50*x-25)*exp((exp(x)
**4+(-2*ln(2)-2)*exp(x)**3+(ln(2)**2+2*ln(2)-9)*exp(x)**2+(10*ln(2)+10)*ex
p(x)+25)/x/exp(x)**2)/exp(x)**2/x**2,x)
```

output
```
exp((exp(4*x) + (-2 - 2*log(2))*exp(3*x) + (-9 + log(2)**2 + 2*log(2))*exp
(2*x) + (10*log(2) + 10)*exp(x) + 25)*exp(-2*x)/x)
```

3.214.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. $2(21) = 42$.

Time = 0.41 (sec) , antiderivative size = 75, normalized size of antiderivative = 3.12

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x\right.}{x^2}$$

$$= e^{\left(\frac{10\,e^{(-x)}\log(2)}{x}-\frac{2\,e^{x}\log(2)}{x}+\frac{\log(2)^2}{x}+\frac{e^{(2\,x)}}{x}+\frac{10\,e^{(-x)}}{x}+\frac{25\,e^{(-2\,x)}}{x}-\frac{2\,e^{x}}{x}+\frac{2\,\log(2)}{x}-\frac{9}{x}\right)}$$

input
```
integrate(((-1+2*x)*exp(x)^4+((2-2*x)*log(2)-2*x+2)*exp(x)^3+(-log(2)^2-2*
log(2)+9)*exp(x)^2+((-10*x-10)*log(2)-10*x-10)*exp(x)-50*x-25)*exp((exp(x)
^4+(-2*log(2)-2)*exp(x)^3+(log(2)^2+2*log(2)-9)*exp(x)^2+(10*log(2)+10)*ex
p(x)+25)/x/exp(x)^2)/exp(x)^2/x^2,x, algorithm=\
```

output
```
e^(10*e^(-x)*log(2)/x - 2*e^x*log(2)/x + log(2)^2/x + e^(2*x)/x + 10*e^(-x
)/x + 25*e^(-2*x)/x - 2*e^x/x + 2*log(2)/x - 9/x)
```

3.214.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(21) = 42$.

Time = 0.29 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.58

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x\right.}{x^2}$$

$$= e^{\left(\frac{\left(e^{(2\,x)}\log(2)^2-2\,e^{(3\,x)}\log(2)+2\,e^{(2\,x)}\log(2)+10\,e^{x}\log(2)+e^{(4\,x)}-2\,e^{(3\,x)}-9\,e^{(2\,x)}+10\,e^{x}+25\right)e^{(-2\,x)}}{x}\right)}$$

input
```
integrate(((-1+2*x)*exp(x)^4+((2-2*x)*log(2)-2*x+2)*exp(x)^3+(-log(2)^2-2*
log(2)+9)*exp(x)^2+((-10*x-10)*log(2)-10*x-10)*exp(x)-50*x-25)*exp((exp(x)
^4+(-2*log(2)-2)*exp(x)^3+(log(2)^2+2*log(2)-9)*exp(x)^2+(10*log(2)+10)*ex
p(x)+25)/x/exp(x)^2)/exp(x)^2/x^2,x, algorithm=\
```

output
```
e^((e^(2*x)*log(2)^2 - 2*e^(3*x)*log(2) + 2*e^(2*x)*log(2) + 10*e^x*log(2)
 + e^(4*x) - 2*e^(3*x) - 9*e^(2*x) + 10*e^x + 25)*e^(-2*x)/x)
```

3.214.

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x+(-10-10x)\log(2))+e}{x^2}$$

3.214.9 Mupad [B] (verification not implemented)

Time = 14.33 (sec) , antiderivative size = 73, normalized size of antiderivative = 3.04

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x\right.}{x^2}$$

$$=4^{\frac{e^{-x}\left(e^{x}-e^{2x}+5\right)}{x}}\,e^{\frac{\ln(2)^2}{x}}\,e^{-\frac{2e^{x}}{x}}\,e^{-\frac{9}{x}}\,e^{\frac{e^{2x}}{x}}\,e^{\frac{10e^{-x}}{x}}\,e^{\frac{25e^{-2x}}{x}}$$

input
```
int(-(exp((exp(-2*x)*(exp(4*x) + exp(x)*(10*log(2) + 10) + exp(2*x)*(2*log
(2) + log(2)^2 - 9) - exp(3*x)*(2*log(2) + 2) + 25))/x)*exp(-2*x)*(50*x +
exp(x)*(10*x + log(2)*(10*x + 10) + 10) + exp(2*x)*(2*log(2) + log(2)^2 -
9) - exp(4*x)*(2*x - 1) + exp(3*x)*(2*x + log(2)*(2*x - 2) - 2) + 25))/x^2
,x)
```

output
```
4^((exp(-x)*(exp(x) - exp(2*x) + 5))/x)*exp(log(2)^2/x)*exp(-(2*exp(x))/x)
*exp(-9/x)*exp(exp(2*x)/x)*exp((10*exp(-x))/x)*exp((25*exp(-2*x))/x)
```

3.214.

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(25+e^{4x}+e^{3x}(-2-2\log(2))+e^{x}(10+10\log(2))+e^{2x}\left(-9+2\log(2)+\log^2(2)\right)\right)}{x}}\left(-25-50x+e^{4x}(-1+2x)+e^{x}(-10-10x+(-10-10x)\log(2))+e\right.}{x^2}$$

3.215 $\int \frac{1}{3}e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)}\left(2e^{31/5}x+e^{\frac{6}{5}+x}(2x+x^2)\right)\,dx$

3.215.1 Optimal result

Integrand size = 55, antiderivative size = 21

$$\int \frac{1}{3}e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)}\left(2e^{31/5}x+e^{\frac{6}{5}+x}(2x+x^2)\right)\,dx=e^{\frac{1}{3}e^{6/5}(e^5+e^x)x^2}$$

output
```
exp(1/3*(exp(5/2)^2+exp(x))*exp(3/5)^2*x^2)
```

3.215.2 Mathematica [A] (verified)

Time = 0.42 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{1}{3}e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)}\left(2e^{31/5}x+e^{\frac{6}{5}+x}(2x+x^2)\right)\,dx=e^{\frac{1}{3}e^{6/5}(e^5+e^x)x^2}$$

input
```
Integrate[(E^((E^(31/5)*x^2 + E^(6/5 + x)*x^2)/3)*(2*E^(31/5)*x + E^(6/5 +
 x)*(2*x + x^2)))/3,x]
```

output
```
E^((E^(6/5)*(E^5 + E^x)*x^2)/3)
```

3.215.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.036, Rules used = {27, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{3}e^{\frac{1}{3}\left(e^{x+\frac{6}{5}}x^2+e^{31/5}x^2\right)}\left(e^{x+\frac{6}{5}}\left(x^2+2x\right)+2e^{31/5}x\right)dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{3}\int e^{\frac{1}{3}\left(e^{x+\frac{6}{5}}x^2+e^{31/5}x^2\right)}\left(2e^{31/5}x+e^{x+\frac{6}{5}}\left(x^2+2x\right)\right)dx$$

$$\Big\downarrow \ 7257$$

$$e^{\frac{1}{3}\left(e^{x+\frac{6}{5}}x^2+e^{31/5}x^2\right)}$$

input
```
Int[(E^((E^(31/5)*x^2 + E^(6/5 + x)*x^2)/3)*(2*E^(31/5)*x + E^(6/5 + x)*(2
*x + x^2)))/3,x]
```

output
```
E^((E^(31/5)*x^2 + E^(6/5 + x)*x^2)/3)
```

3.215.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.215.4 Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.67

method	result	size
risch	$\mathrm{e}^{\frac{x^{2}\left(\mathrm{e}^{\frac{6}{5}+x}+\mathrm{e}^{\frac{31}{5}}\right)}{3}}$	14
parallelrisch	$\mathrm{e}^{\frac{\left(\mathrm{e}^{5}+\mathrm{e}^{x}\right)\mathrm{e}^{\frac{6}{5}}x^{2}}{3}}$	18
norman	$\mathrm{e}^{\frac{x^{2}\mathrm{e}^{\frac{6}{5}}\mathrm{e}^{x}}{3}+\frac{x^{2}\mathrm{e}^{\frac{6}{5}}\mathrm{e}^{5}}{3}}$	27

input
```
int(1/3*((x^2+2*x)*exp(3/5)^2*exp(x)+2*x*exp(3/5)^2*exp(5/2)^2)*exp(1/3*x^
2*exp(3/5)^2*exp(x)+1/3*x^2*exp(3/5)^2*exp(5/2)^2),x,method=_RETURNVERBOSE
)
```

output
```
exp(1/3*x^2*(exp(6/5+x)+exp(31/5)))
```

3.215.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{1}{3}e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)}\left(2e^{31/5}x+e^{\frac{6}{5}+x}\left(2x+x^2\right)\right)\,dx=e^{\left(\frac{1}{3}\,x^2e^{\frac{31}{5}}+\frac{1}{3}\,x^2e^{\left(x+\frac{6}{5}\right)}\right)}$$

input
```
integrate(1/3*((x^2+2*x)*exp(3/5)^2*exp(x)+2*x*exp(3/5)^2*exp(5/2)^2)*exp(
1/3*x^2*exp(3/5)^2*exp(x)+1/3*x^2*exp(3/5)^2*exp(5/2)^2),x, algorithm=\
```

output
```
e^(1/3*x^2*e^(31/5) + 1/3*x^2*e^(x + 6/5))
```

3.215.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{1}{3}e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)}\left(2e^{31/5}x+e^{\frac{6}{5}+x}\left(2x+x^2\right)\right)\,dx=e^{\frac{x^2e^{\frac{6}{5}}e^x}{3}+\frac{x^2e^{\frac{31}{5}}}{3}}$$

input
```
integrate(1/3*((x**2+2*x)*exp(3/5)**2*exp(x)+2*x*exp(3/5)**2*exp(5/2)**2)*
exp(1/3*x**2*exp(3/5)**2*exp(x)+1/3*x**2*exp(3/5)**2*exp(5/2)**2),x)
```

output
```
exp(x**2*exp(6/5)*exp(x)/3 + x**2*exp(31/5)/3)
```

3.215.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{1}{3}e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)}\left(2e^{31/5}x+e^{\frac{6}{5}+x}\left(2x+x^2\right)\right)\,dx=e^{\left(\frac{1}{3}\,x^2e^{\frac{31}{5}}+\frac{1}{3}\,x^2e^{\left(x+\frac{6}{5}\right)}\right)}$$

input
```
integrate(1/3*((x^2+2*x)*exp(3/5)^2*exp(x)+2*x*exp(3/5)^2*exp(5/2)^2)*exp(
1/3*x^2*exp(3/5)^2*exp(x)+1/3*x^2*exp(3/5)^2*exp(5/2)^2),x, algorithm=\
```

output
```
e^(1/3*x^2*e^(31/5) + 1/3*x^2*e^(x + 6/5))
```

3.215.8 Giac [F]

$$\int \frac{1}{3}e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)}\left(2e^{31/5}x+e^{\frac{6}{5}+x}\left(2x+x^2\right)\right)\,dx=\int \frac{1}{3}\left(2\,xe^{\frac{31}{5}}+\left(x^2+2\,x\right)e^{\left(x+\frac{6}{5}\right)}\right)e^{\left(\frac{1}{3}\,x^2e^{\frac{31}{5}}+\frac{1}{3}\,x^2e^{\left(x+\frac{6}{5}\right)}\right)}\,dx$$

input
```
integrate(1/3*((x^2+2*x)*exp(3/5)^2*exp(x)+2*x*exp(3/5)^2*exp(5/2)^2)*exp(
1/3*x^2*exp(3/5)^2*exp(x)+1/3*x^2*exp(3/5)^2*exp(5/2)^2),x, algorithm=\
```

output
```
integrate(1/3*(2*x*e^(31/5) + (x^2 + 2*x)*e^(x + 6/5))*e^(1/3*x^2*e^(31/5)
 + 1/3*x^2*e^(x + 6/5)), x)
```

3.215.9 Mupad [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{1}{3}e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)}\left(2e^{31/5}x+e^{\frac{6}{5}+x}\left(2x+x^2\right)\right)\,dx=\mathrm{e}^{\frac{x^2\,\mathrm{e}^{x+\frac{6}{5}}}{3}+\frac{x^2\,\mathrm{e}^{31/5}}{3}}$$

input
```
int((exp((x^2*exp(31/5))/3 + (x^2*exp(6/5)*exp(x))/3)*(2*x*exp(31/5) + exp
(6/5)*exp(x)*(2*x + x^2)))/3,x)
```

output
```
exp((x^2*exp(x + 6/5))/3 + (x^2*exp(31/5))/3)
```

3.215. $\int \frac{1}{3} e^{\frac{1}{3}\left(e^{31/5}x^2+e^{\frac{6}{5}+x}x^2\right)} \left(2e^{31/5}x+e^{\frac{6}{5}+x}(2x+x^2)\right)\,dx$

3.216 $\int \frac{90}{e\log(2)}\,dx$

3.216.1 Optimal result

Integrand size = 9, antiderivative size = 12

$$\int \frac{90}{e\log(2)}\,dx = 2 + \frac{90x}{e\log(2)}$$

output
```
90/ln(2)/exp(1)*x+2
```

3.216.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{90}{e\log(2)}\,dx = \frac{90x}{e\log(2)}$$

input
```
Integrate[90/(E*Log[2]),x]
```

output
```
(90*x)/(E*Log[2])
```

3.216.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{90}{e\log(2)}\,dx$$
$$\Big\downarrow \; 24$$
$$\frac{90x}{e\log(2)}$$

input
```
Int[90/(E*Log[2]),x]
```

output
```
(90*x)/(E*Log[2])
```

3.216.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.216.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

method	result	size
risch	$\frac{90\,\mathrm{e}^{-1}x}{\ln(2)}$	10
default	$\frac{90\,\mathrm{e}^{-1}x}{\ln(2)}$	12
norman	$\frac{90\,\mathrm{e}^{-1}x}{\ln(2)}$	12
parallelrisch	$\frac{90\,\mathrm{e}^{-1}x}{\ln(2)}$	12

input
```
int(90/exp(1)/ln(2),x,method=_RETURNVERBOSE)
```

output
```
90/ln(2)*exp(-1)*x
```

3.216.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{90}{e \log(2)}\, dx = \frac{90\, x e^{(-1)}}{\log{(2)}}$$

input
```
integrate(90/exp(1)/log(2),x, algorithm=\
```

output
```
90*x*e^(-1)/log(2)
```

3.216.6 Sympy [A] (verification not implemented)

Time = 0.01 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.67

$$\int \frac{90}{e \log(2)}\, dx = \frac{90x}{e \log{(2)}}$$

input
```
integrate(90/exp(1)/ln(2),x)
```

output
```
90*x*exp(-1)/log(2)
```

3.216.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{90}{e \log(2)}\, dx = \frac{90\, x e^{(-1)}}{\log{(2)}}$$

input
```
integrate(90/exp(1)/log(2),x, algorithm=\
```

output
```
90*x*e^(-1)/log(2)
```

3.216.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{90}{e\log(2)}\,dx = \frac{90\,xe^{(-1)}}{\log{(2)}}$$

input
```
integrate(90/exp(1)/log(2),x, algorithm=\
```

output
```
90*x*e^(-1)/log(2)
```

3.216.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{90}{e\log(2)}\,dx = \frac{90\,x\,\mathrm{e}^{-1}}{\ln{(2)}}$$

input
```
int((90*exp(-1))/log(2),x)
```

output
```
(90*x*exp(-1))/log(2)
```

3.217 $\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}\,dx$

3.217.1 Optimal result

Integrand size = 68, antiderivative size = 25

$$\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}\,dx=\frac{e^x\left(-\frac{1}{2}+2x\right)^2}{\left(-2+\frac{e^2x}{4}\right)^2}$$

output
```
exp(x)*(2*x-1/2)^2/(-2+x/exp(2*ln(2)-2))^2
```

3.217.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}\,dx=\frac{4e^x(1-4x)^2}{(-8+e^2x)^2}$$

input
```
Integrate[(64*E^(-6 + x)*(-14 + 48*x + 32*x^2) + 16*E^(-4 + x)*(2 - 9*x + 
8*x^2 - 16*x^3))/(2048/E^6 - (768*x)/E^4 + (96*x^2)/E^2 - 4*x^3),x]
```

output
```
(4*E^x*(1 - 4*x)^2)/(-8 + E^2*x)^2
```

3.217.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.73 (sec) , antiderivative size = 192, normalized size of antiderivative = 7.68, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.088$, Rules used = {2007, 7292, 27, 27, 2629, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{64e^{x-6}(32x^2+48x-14)+16e^{x-4}(-16x^3+8x^2-9x+2)}{-4x^3+\frac{96x^2}{e^2}-\frac{768x}{e^4}+\frac{2048}{e^6}}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{64e^{x-6}(32x^2+48x-14)+16e^{x-4}(-16x^3+8x^2-9x+2)}{\left(\frac{8\ 2^{2/3}}{e^2}-2^{2/3}x\right)^3}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{16e^{x-6}(1-4x)\left(4e^2x^2-(32+e^2)x-2(28-e^2)\right)}{\left(\frac{8\ 2^{2/3}}{e^2}-2^{2/3}x\right)^3}dx$$

$$\Big\downarrow \text{27}$$

$$16\int -\frac{e^x(1-4x)\left(-4e^2x^2+(32+e^2)x+2(28-e^2)\right)}{4(8-e^2x)^3}dx$$

$$\Big\downarrow \text{27}$$

$$-4\int \frac{e^x(1-4x)\left(-4e^2x^2+(32+e^2)x+2(28-e^2)\right)}{(8-e^2x)^3}dx$$

$$\Big\downarrow \text{2629}$$

$$-4\int \left(-16e^{x-4}+\frac{8e^{x-4}(-32+e^2)}{e^2x-8}+\frac{e^{x-4}(-1024+320e^2-9e^4)}{(e^2x-8)^2}+\frac{2e^{x-2}(-32+e^2)^2}{(e^2x-8)^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-4\left(-e^{\frac{8}{e^2}-8}(1024-320e^2+9e^4)\,\text{ExpIntegralEi}\left(-\frac{8-e^2x}{e^2}\right)+e^{\frac{8}{e^2}-8}(32-e^2)^2\,\text{ExpIntegralEi}\left(-\frac{8-e^2x}{e^2}\right)-8\right.$$

input
```
Int[(64*E^(-6 + x)*(-14 + 48*x + 32*x^2) + 16*E^(-4 + x)*(2 - 9*x + 8*x^2
- 16*x^3))/(2048/E^6 - (768*x)/E^4 + (96*x^2)/E^2 - 4*x^3),x]
```

3.217. $\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}dx$

output
```
-4*(-16*E^(-4 + x) - (E^(-4 + x)*(32 - E^2)^2)/(8 - E^2*x)^2 + (E^(-6 + x)
*(32 - E^2)^2)/(8 - E^2*x) - (E^(-6 + x)*(1024 - 320*E^2 + 9*E^4))/(8 - E^
2*x) - 8*E^(-6 + 8/E^2)*(32 - E^2)*ExpIntegralEi[-((8 - E^2*x)/E^2)] + E^(
-8 + 8/E^2)*(32 - E^2)^2*ExpIntegralEi[-((8 - E^2*x)/E^2)] - E^(-8 + 8/E^2
)*(1024 - 320*E^2 + 9*E^4)*ExpIntegralEi[-((8 - E^2*x)/E^2)])
```

3.217.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2629
```
Int[(F_)^(v_)*(Px_)*((d_.) + (e_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandInte
grand[F^v, Px*(d + e*x)^m, x], x] /; FreeQ[{F, d, e, m}, x] && PolynomialQ[
Px, x] && LinearQ[v, x] &&  !TrueQ[$UseGamma]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.217. $\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}\,dx$

3.217.4 Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.72

method	result
norman	$\frac{(4\,\mathrm{e}^{4}\mathrm{e}^{x}-32x\,\mathrm{e}^{4}\mathrm{e}^{x}+64x^{2}\mathrm{e}^{4}\mathrm{e}^{x})\,\mathrm{e}^{-4}}{(\mathrm{e}^{2}x-8)^{2}}$
gosper	$\frac{4(-1+4x)^{2}\mathrm{e}^{x}\mathrm{e}^{-4}}{64\,\mathrm{e}^{-4}-4x\,\mathrm{e}^{2\ln(2)-2}+x^{2}}$
parallelrisch	$\frac{16\,\mathrm{e}^{-4}\mathrm{e}^{x}-128\,\mathrm{e}^{-4}x\,\mathrm{e}^{x}+256\,\mathrm{e}^{-4}x^{2}\mathrm{e}^{x}}{256\,\mathrm{e}^{-4}-16x\,\mathrm{e}^{2\ln(2)-2}+4x^{2}}$
default	$8\,\mathrm{e}^{-4}\left(-\frac{\mathrm{e}^{x}(-x+8\,\mathrm{e}^{-2}-1)}{2(64\,\mathrm{e}^{-4}-16x\,\mathrm{e}^{-2}+x^{2})}+\frac{\mathrm{e}^{8\,\mathrm{e}^{-2}}\,\mathrm{Ei}_{1}(8\,\mathrm{e}^{-2}-x)}{2}\right)-224\,\mathrm{e}^{-6}\left(-\frac{\mathrm{e}^{x}(-x+8\,\mathrm{e}^{-2}-1)}{2(64\,\mathrm{e}^{-4}-16x\,\mathrm{e}^{-2}+x^{2})}+\frac{\mathrm{e}^{8\,\mathrm{e}^{-2}}\,\mathrm{Ei}_{1}(8\,\mathrm{e}^{}}{2}\right.$

input
```
int(((32*x^2+48*x-14)*exp(x)*exp(2*ln(2)-2)^3+(-16*x^3+8*x^2-9*x+2)*exp(x)
*exp(2*ln(2)-2)^2)/(32*exp(2*ln(2)-2)^3-48*x*exp(2*ln(2)-2)^2+24*x^2*exp(2
*ln(2)-2)-4*x^3),x,method=_RETURNVERBOSE)
```

output
```
(4*exp(2)^2*exp(x)-32*x*exp(2)^2*exp(x)+64*x^2*exp(2)^2*exp(x))/exp(2)^2/(
exp(2)*x-8)^2
```

3.217.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(24) = 48$.

Time = 0.25 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}\,dx = \frac{(16\,x^2-8\,x+1)e^{(x+6\,\log(2)-6)}}{4\,(x^2e^{(2\,\log(2)-2)}-4\,xe^{(4\,\log(2)-4)}+4\,e^{(6\,\log(2)-6)})}$$

input
```
integrate(((32*x^2+48*x-14)*exp(x)*exp(2*log(2)-2)^3+(-16*x^3+8*x^2-9*x+2)
*exp(x)*exp(2*log(2)-2)^2)/(32*exp(2*log(2)-2)^3-48*x*exp(2*log(2)-2)^2+24
*x^2*exp(2*log(2)-2)-4*x^3),x, algorithm=\
```

output
```
1/4*(16*x^2 - 8*x + 1)*e^(x + 6*log(2) - 6)/(x^2*e^(2*log(2) - 2) - 4*x*e^
(4*log(2) - 4) + 4*e^(6*log(2) - 6))
```

3.217.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}\,dx=\frac{(64x^2-32x+4)\,e^x}{x^2e^4-16xe^2+64}$$

input
```
integrate(((32*x**2+48*x-14)*exp(x)*exp(2*ln(2)-2)**3+(-16*x**3+8*x**2-9*x
+2)*exp(x)*exp(2*ln(2)-2)**2)/(32*exp(2*ln(2)-2)**3-48*x*exp(2*ln(2)-2)**2
+24*x**2*exp(2*ln(2)-2)-4*x**3),x)
```

output
```
(64*x**2 - 32*x + 4)*exp(x)/(x**2*exp(4) - 16*x*exp(2) + 64)
```

3.217.7 Maxima [F]

$$\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}\,dx$$
$$=\int -\frac{2\,(16\,x^2+24\,x-7)e^{(x+6\,\log(2)-6)}-(16\,x^3-8\,x^2+9\,x-2)e^{(x+4\,\log(2)-4)}}{4\,(x^3-6\,x^2e^{(2\,\log(2)-2)}+12\,xe^{(4\,\log(2)-4)}-8\,e^{(6\,\log(2)-6)})}\,dx$$

input
```
integrate(((32*x^2+48*x-14)*exp(x)*exp(2*log(2)-2)^3+(-16*x^3+8*x^2-9*x+2)
*exp(x)*exp(2*log(2)-2)^2)/(32*exp(2*log(2)-2)^3-48*x*exp(2*log(2)-2)^2+24
*x^2*exp(2*log(2)-2)-4*x^3),x, algorithm=\
```

output
```
4*(16*x^3*e^2 - 8*x^2*(e^2 + 16) + x*(e^2 + 64))*e^x/(x^3*e^6 - 24*x^2*e^4
 + 192*x*e^2 - 512) - 224*e^(8*e^(-2) - 2)*exp_integral_e(3, -(x*e^2 - 8)*
e^(-2))/(x*e^2 - 8)^2 - 1/4*integrate(128*(8*x*e^2 - 3*e^2 - 64)*e^x/(x^4*
e^8 - 32*x^3*e^6 + 384*x^2*e^4 - 2048*x*e^2 + 4096), x)
```

3.217.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}\,dx = \frac{4\,(16\,x^2e^x-8\,xe^x+e^x)}{x^2e^4-16\,xe^2+64}$$

input
```
integrate((((32*x^2+48*x-14)*exp(x)*exp(2*log(2)-2)^3+(-16*x^3+8*x^2-9*x+2)
*exp(x)*exp(2*log(2)-2)^2)/(32*exp(2*log(2)-2)^3-48*x*exp(2*log(2)-2)^2+24
*x^2*exp(2*log(2)-2)-4*x^3),x, algorithm=\
```

output
```
4*(16*x^2*e^x - 8*x*e^x + e^x)/(x^2*e^4 - 16*x*e^2 + 64)
```

3.217.9 Mupad [B] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{64e^{-6+x}(-14+48x+32x^2)+16e^{-4+x}(2-9x+8x^2-16x^3)}{\frac{2048}{e^6}-\frac{768x}{e^4}+\frac{96x^2}{e^2}-4x^3}\,dx = \frac{4\,\mathrm{e}^x\,{(4\,x-1)}^2}{{(x\,\mathrm{e}^2-8)}^2}$$

input
```
int((exp(6*log(2) - 6)*exp(x)*(48*x + 32*x^2 - 14) - exp(4*log(2) - 4)*exp
(x)*(9*x - 8*x^2 + 16*x^3 - 2))/(32*exp(6*log(2) - 6) - 48*x*exp(4*log(2)
- 4) + 24*x^2*exp(2*log(2) - 2) - 4*x^3),x)
```

output
```
(4*exp(x)*(4*x - 1)^2)/(x*exp(2) - 8)^2
```

3.218 $\int \frac{-32+32x^2+(-32+32x)\log(3)+(16x^3-16x^4)\log(1+x+\log(3))+(24x}{}$

3.218.1 Optimal result

Integrand size = 120, antiderivative size = 28

$$\int \frac{-32+32x^2+(-32+32x)\log(3)+(16x^3-16x^4)\log(1+x+\log(3))+(24x^2-8x^3-32x^4+(24x^2-}{1+x}$$

$$= 4+x^2\left(4-\frac{4}{x}-x^2\log^2(1+x+\log(3))\right)^2$$

output
```
4+x^2*(4-x^2*ln(x+ln(3)+1)^2-4/x)^2
```

3.218.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{-32+32x^2+(-32+32x)\log(3)+(16x^3-16x^4)\log(1+x+\log(3))+(24x^2-8x^3-32x^4+(24x^2-}{1+x}$$

$$= \left(4-4x+x^3\log^2(1+x+\log(3))\right)^2$$

input
```
Integrate[(-32 + 32*x^2 + (-32 + 32*x)*Log[3] + (16*x^3 - 16*x^4)*Log[1 +
x + Log[3]] + (24*x^2 - 8*x^3 - 32*x^4 + (24*x^2 - 32*x^3)*Log[3])*Log[1 +
 x + Log[3]]^2 + 4*x^6*Log[1 + x + Log[3]]^3 + (6*x^5 + 6*x^6 + 6*x^5*Log[
3])*Log[1 + x + Log[3]]^4)/(1 + x + Log[3]),x]
```

output
```
(4 - 4*x + x^3*Log[1 + x + Log[3]]^2)^2
```

3.218.3 Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.033$, Rules used = {7239, 27, 25, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^6\log^3(x+1+\log(3))+32x^2+\left(6x^6+6x^5+6x^5\log(3)\right)\log^4(x+1+\log(3))+\left(16x^3-16x^4\right)\log(x+1+\mathrm{l}}{x+1+\log(}$$

$$\Big\downarrow 7239$$

$$\int \frac{2\left(x^3\log^2(x+1+\log(3))-4x+4\right)\left(2x^3\log(x+1+\log(3))+3x^2(x+1+\log(3))\log^2(x+1+\log(3))-4(x\right.}{x+1+\log(3)}$$

$$\Big\downarrow 27$$

$$2\int -\frac{\left(\log^2(x+\log(3)+1)x^3-4x+4\right)\left(-2\log(x+\log(3)+1)x^3-3(x+\log(3)+1)\log^2(x+\log(3)+1)x^2+4\right.}{x+\log(3)+1}$$

$$\Big\downarrow 25$$

$$-2\int \frac{\left(\log^2(x+\log(3)+1)x^3-4x+4\right)\left(-2\log(x+\log(3)+1)x^3-3(x+\log(3)+1)\log^2(x+\log(3)+1)x^2+4\right.}{x+\log(3)+1}$$

$$\Big\downarrow 7237$$

$$\left(x^3\log^2(x+1+\log(3))-4x+4\right)^2$$

input
```
Int[(-32 + 32*x^2 + (-32 + 32*x)*Log[3] + (16*x^3 - 16*x^4)*Log[1 + x + Lo
g[3]] + (24*x^2 - 8*x^3 - 32*x^4 + (24*x^2 - 32*x^3)*Log[3])*Log[1 + x + L
og[3]]^2 + 4*x^6*Log[1 + x + Log[3]]^3 + (6*x^5 + 6*x^6 + 6*x^5*Log[3])*Lo
g[1 + x + Log[3]]^4)/(1 + x + Log[3]),x]
```

output
```
(4 - 4*x + x^3*Log[1 + x + Log[3]]^2)^2
```

3.218. $\int \frac{-32+32x^2+(-32+32x)\log(3)+\left(16x^3-16x^4\right)\log(1+x+\log(3))+\left(24x^2-8x^3-32x^4+\left(24x^2-32x^3\right)\log(3)\right)\log^2(1+x+\log(3))+4x^6\log^3(1+x+\log}{1+x+\log(3)}$

3.218.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.218.4 Maple [A] (verified)

Time = 0.85 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

method	result
risch	$\ln\left(x+\ln\left(3\right)+1\right)^{4} x^{6}+\left(-8x^{4}+8x^{3}\right)\ln\left(x+\ln\left(3\right)+1\right)^{2}+16x^{2}-32x$
parallelrisch	$\ln\left(x+\ln\left(3\right)+1\right)^{4} x^{6}-8\ln\left(x+\ln\left(3\right)+1\right)^{2} x^{4}+8\ln\left(x+\ln\left(3\right)+1\right)^{2} x^{3}-16\ln\left(3\right)^{2}$
parts	Expression too large to display
derivativedivides	Expression too large to display
default	Expression too large to display

input
```
int(((6*x^5*ln(3)+6*x^6+6*x^5)*ln(x+ln(3)+1)^4+4*x^6*ln(x+ln(3)+1)^3+((-32
*x^3+24*x^2)*ln(3)-32*x^4-8*x^3+24*x^2)*ln(x+ln(3)+1)^2+(-16*x^4+16*x^3)*l
n(x+ln(3)+1)+(32*x-32)*ln(3)+32*x^2-32)/(x+ln(3)+1),x,method=_RETURNVERBOS
E)
```

output
```
ln(x+ln(3)+1)^4*x^6+(-8*x^4+8*x^3)*ln(x+ln(3)+1)^2+16*x^2-32*x
```

3.218.

$\int \frac{-32+32x^2+(-32+32x)\log(3)+(16x^3-16x^4)\log(1+x+\log(3))+(24x^2-8x^3-32x^4+(24x^2-32x^3)\log(3))\log^2(1+x+\log(3))+4x^6\log^3(1+x+\log}{1+x+\log(3)}$

3.218.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

$$\int \frac{-32 + 32x^2 + (-32 + 32x)\log(3) + (16x^3 - 16x^4)\log(1 + x + \log(3)) + (24x^2 - 8x^3 - 32x^4 + (24x^2 -}{1 + x}$$
$$= x^6 \log(x + \log(3) + 1)^4 - 8\left(x^4 - x^3\right)\log(x + \log(3) + 1)^2 + 16x^2 - 32x$$

input
```
integrate(((6*x^5*log(3)+6*x^6+6*x^5)*log(x+log(3)+1)^4+4*x^6*log(x+log(3)
+1)^3+((-32*x^3+24*x^2)*log(3)-32*x^4-8*x^3+24*x^2)*log(x+log(3)+1)^2+(-16
*x^4+16*x^3)*log(x+log(3)+1)+(32*x-32)*log(3)+32*x^2-32)/(x+log(3)+1),x, a
lgorithm=\
```

output
```
x^6*log(x + log(3) + 1)^4 - 8*(x^4 - x^3)*log(x + log(3) + 1)^2 + 16*x^2 -
 32*x
```

3.218.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int \frac{-32 + 32x^2 + (-32 + 32x)\log(3) + (16x^3 - 16x^4)\log(1 + x + \log(3)) + (24x^2 - 8x^3 - 32x^4 + (24x^2 -}{1 + x}$$
$$= x^6 \log(x + 1 + \log(3))^4 + 16x^2 - 32x + \left(-8x^4 + 8x^3\right)\log(x + 1 + \log(3))^2$$

input
```
integrate(((6*x**5*ln(3)+6*x**6+6*x**5)*ln(x+ln(3)+1)**4+4*x**6*ln(x+ln(3)
+1)**3+((-32*x**3+24*x**2)*ln(3)-32*x**4-8*x**3+24*x**2)*ln(x+ln(3)+1)**2+
(-16*x**4+16*x**3)*ln(x+ln(3)+1)+(32*x-32)*ln(3)+32*x**2-32)/(x+ln(3)+1),x
)
```

output
```
x**6*log(x + 1 + log(3))**4 + 16*x**2 - 32*x + (-8*x**4 + 8*x**3)*log(x +
1 + log(3))**2
```

3.218.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 3532 vs. $2(27) = 54$.

Time = 0.32 (sec) , antiderivative size = 3532, normalized size of antiderivative = 126.14

$$\int \frac{-32+32x^2+(-32+32x)\log(3)+(16x^3-16x^4)\log(1+x+\log(3))+(24x^2-8x^3-32x^4+(24x^2-}{1+x}$$
= Too large to display

input
```
integrate(((6*x^5*log(3)+6*x^6+6*x^5)*log(x+log(3)+1)^4+4*x^6*log(x+log(3)
+1)^3+((-32*x^3+24*x^2)*log(3)-32*x^4-8*x^3+24*x^2)*log(x+log(3)+1)^2+(-16
*x^4+16*x^3)*log(x+log(3)+1)+(32*x-32)*log(3)+32*x^2-32)/(x+log(3)+1),x, a
lgorithm=\
```

output
```
1/54*(54*log(x + log(3) + 1)^4 - 36*log(x + log(3) + 1)^3 + 18*log(x + log
(3) + 1)^2 - 6*log(x + log(3) + 1) + 1)*(x + log(3) + 1)^6 + 1/54*(36*log(
x + log(3) + 1)^3 - 18*log(x + log(3) + 1)^2 + 6*log(x + log(3) + 1) - 1)*
(x + log(3) + 1)^6 - 36/3125*(625*(log(3) + 1)*log(x + log(3) + 1)^4 - 500
*(log(3) + 1)*log(x + log(3) + 1)^3 + 300*(log(3) + 1)*log(x + log(3) + 1)
^2 - 120*(log(3) + 1)*log(x + log(3) + 1) + 24*log(3) + 24)*(x + log(3) +
1)^5 - 24/625*(125*(log(3) + 1)*log(x + log(3) + 1)^3 - 75*(log(3) + 1)*lo
g(x + log(3) + 1)^2 + 30*(log(3) + 1)*log(x + log(3) + 1) - 6*log(3) - 6)*
(x + log(3) + 1)^5 + 6/3125*(625*log(x + log(3) + 1)^4 - 500*log(x + log(3
) + 1)^3 + 300*log(x + log(3) + 1)^2 - 120*log(x + log(3) + 1) + 24)*(x +
log(3) + 1)^5 + 6/5*(log(3)^6 + 6*log(3)^5 + 15*log(3)^4 + 20*log(3)^3 + 1
5*log(3)^2 + 6*log(3) + 1)*log(x + log(3) + 1)^5 - 6/5*(log(3)^5 + 5*log(3
)^4 + 10*log(3)^3 + 10*log(3)^2 + 5*log(3) + 1)*log(x + log(3) + 1)^5 + 45
/64*(32*(log(3)^2 + 2*log(3) + 1)*log(x + log(3) + 1)^4 - 32*(log(3)^2 + 2
*log(3) + 1)*log(x + log(3) + 1)^3 + 24*(log(3)^2 + 2*log(3) + 1)*log(x +
log(3) + 1)^2 + 3*log(3)^2 - 12*(log(3)^2 + 2*log(3) + 1)*log(x + log(3) +
 1) + 6*log(3) + 3)*(x + log(3) + 1)^4 - 15/64*(32*(log(3) + 1)*log(x + lo
g(3) + 1)^4 - 32*(log(3) + 1)*log(x + log(3) + 1)^3 + 24*(log(3) + 1)*log(
x + log(3) + 1)^2 - 12*(log(3) + 1)*log(x + log(3) + 1) + 3*log(3) + 3)*(x
 + log(3) + 1)^4 + 15/32*(32*(log(3)^2 + 2*log(3) + 1)*log(x + log(3) +...
```

3.218.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

$$\int \frac{-32+32x^2+(-32+32x)\log(3)+(16x^3-16x^4)\log(1+x+\log(3))+(24x^2-8x^3-32x^4+(24x^2-}{1+x}$$

$$= x^6\log(x+\log(3)+1)^4 - 8(x^4-x^3)\log(x+\log(3)+1)^2 + 16x^2 - 32x$$

input
```
integrate(((6*x^5*log(3)+6*x^6+6*x^5)*log(x+log(3)+1)^4+4*x^6*log(x+log(3)
+1)^3+((-32*x^3+24*x^2)*log(3)-32*x^4-8*x^3+24*x^2)*log(x+log(3)+1)^2+(-16
*x^4+16*x^3)*log(x+log(3)+1)+(32*x-32)*log(3)+32*x^2-32)/(x+log(3)+1),x, a
lgorithm=\
```

output
```
x^6*log(x + log(3) + 1)^4 - 8*(x^4 - x^3)*log(x + log(3) + 1)^2 + 16*x^2 -
 32*x
```

3.218.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-32+32x^2+(-32+32x)\log(3)+(16x^3-16x^4)\log(1+x+\log(3))+(24x^2-8x^3-32x^4+(24x^2-}{1+x}$$

$$= \text{Hanged}$$

input
```
int((log(3)*(32*x - 32) + log(x + log(3) + 1)^2*(log(3)*(24*x^2 - 32*x^3)
+ 24*x^2 - 8*x^3 - 32*x^4) + 4*x^6*log(x + log(3) + 1)^3 + 32*x^2 + log(x
+ log(3) + 1)*(16*x^3 - 16*x^4) + log(x + log(3) + 1)^4*(6*x^5*log(3) + 6*
x^5 + 6*x^6) - 32)/(x + log(3) + 1),x)
```

output
```
\text{Hanged}
```

3.218. $\int \frac{-32+32x^2+(-32+32x)\log(3)+(16x^3-16x^4)\log(1+x+\log(3))+(24x^2-8x^3-32x^4+(24x^2-32x^3)\log(3))\log^2(1+x+\log(3))+4x^6\log^3(1+x+\log}{1+x+\log(3)}$

3.219 $\int \frac{e^2x+32e^4\log(-2x)}{2x+x^2+16e^2x\log^2(-2x)}\,dx$

3.219.1 Optimal result

Integrand size = 37, antiderivative size = 19

$$\int \frac{e^2x+32e^4\log(-2x)}{2x+x^2+16e^2x\log^2(-2x)}\,dx = e^2\log\left(2+x+16e^2\log^2(-2x)\right)$$

output
```
exp(2)*ln(2+16*exp(1)^2*ln(-2*x)^2+x)
```

3.219.2 Mathematica [A] (verified)

Time = 0.55 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int \frac{e^2x+32e^4\log(-2x)}{2x+x^2+16e^2x\log^2(-2x)}\,dx = e^2\log\left(4+2x+32e^2\log^2(-2x)\right)$$

input
```
Integrate[(E^2*x + 32*E^4*Log[-2*x])/(2*x + x^2 + 16*E^2*x*Log[-2*x]^2),x]
```

output
```
E^2*Log[4 + 2*x + 32*E^2*Log[-2*x]^2]
```

3.219.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2x+32e^4\log(-2x)}{x^2+2x+16e^2x\log^2(-2x)}\,dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^2\left(x+32e^2\log(-2x)\right)}{x^2+2x+16e^2x\log^2(-2x)}dx$$

$$\Big\downarrow \text{27}$$

$$e^2\int \frac{x+32e^2\log(-2x)}{x^2+16e^2\log^2(-2x)x+2x}dx$$

$$\Big\downarrow \text{7293}$$

$$e^2\int \left(\frac{32e^2\log(-2x)}{x\left(16e^2\log^2(-2x)+x+2\right)}+\frac{1}{16e^2\log^2(-2x)+x+2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$e^2\left(\int \frac{1}{16e^2\log^2(-2x)+x+2}dx+32e^2\int \frac{\log(-2x)}{x\left(16e^2\log^2(-2x)+x+2\right)}dx\right)$$

input
```
Int[(E^2*x + 32*E^4*Log[-2*x])/(2*x + x^2 + 16*E^2*x*Log[-2*x]^2),x]
```

output
```
$Aborted
```

3.219.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.219.4 Maple [A] (verified)

Time = 1.35 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

method	result	size
risch	$\mathrm{e}^{2} \ln\left(\ln\left(-2x\right)^{2}+\frac{(2+x)\,\mathrm{e}^{-2}}{16}\right)$	19
norman	$\mathrm{e}^{2} \ln\left(2+16\,\mathrm{e}^{2} \ln\left(-2x\right)^{2}+x\right)$	20
parallelrisch	$\mathrm{e}^{2} \ln\left(2+16\,\mathrm{e}^{2} \ln\left(-2x\right)^{2}+x\right)$	20
derivativedivides	$\mathrm{e}^{2} \ln\left(32\,\mathrm{e}^{2} \ln\left(-2x\right)^{2}+2x+4\right)$	22
default	$\mathrm{e}^{2} \ln\left(32\,\mathrm{e}^{2} \ln\left(-2x\right)^{2}+2x+4\right)$	22

input
```
int((32*exp(1)^2*exp(2)*ln(-2*x)+exp(2)*x)/(16*x*exp(1)^2*ln(-2*x)^2+x^2+2
*x),x,method=_RETURNVERBOSE)
```

output
```
exp(2)*ln(ln(-2*x)^2+1/16*(2+x)*exp(-2))
```

3.219.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{e^2x+32e^4\log(-2x)}{2x+x^2+16e^2x\log^2(-2x)}\,dx = e^2\log\left(16\,e^2\log\left(-2\,x\right)^2+x+2\right)$$

input
```
integrate((32*exp(1)^2*exp(2)*log(-2*x)+exp(2)*x)/(16*x*exp(1)^2*log(-2*x)
^2+x^2+2*x),x, algorithm=\
```

output
```
e^2*log(16*e^2*log(-2*x)^2 + x + 2)
```

3.219.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{e^2x+32e^4\log(-2x)}{2x+x^2+16e^2x\log^2(-2x)}\,dx = e^2\log\left(\frac{x+2}{16e^2}+\log(-2x)^2\right)$$

input
```
integrate((32*exp(1)**2*exp(2)*ln(-2*x)+exp(2)*x)/(16*x*exp(1)**2*ln(-2*x)
**2+x**2+2*x),x)
```

output
```
exp(2)*log((x + 2)*exp(-2)/16 + log(-2*x)**2)
```

3.219.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(17) = 34.

Time = 0.32 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.05

$$\int \frac{e^2x+32e^4\log(-2x)}{2x+x^2+16e^2x\log^2(-2x)}\,dx$$
$$= e^2\log\left(\frac{1}{16}\left(16\,e^2\log(2)^2+32\,e^2\log(2)\log(-x)+16\,e^2\log(-x)^2+x+2\right)e^{(-2)}\right)$$

input
```
integrate((32*exp(1)^2*exp(2)*log(-2*x)+exp(2)*x)/(16*x*exp(1)^2*log(-2*x)
^2+x^2+2*x),x, algorithm=\
```

output
```
e^2*log(1/16*(16*e^2*log(2)^2 + 32*e^2*log(2)*log(-x) + 16*e^2*log(-x)^2 +
 x + 2)*e^(-2))
```

3.219.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{e^2x+32e^4\log(-2x)}{2x+x^2+16e^2x\log^2(-2x)}\,dx = e^2\log\left(16\,e^2\log(-2\,x)^2+x+2\right)$$

input
```
integrate((32*exp(1)^2*exp(2)*log(-2*x)+exp(2)*x)/(16*x*exp(1)^2*log(-2*x)
^2+x^2+2*x),x, algorithm=\
```

output
```
e^2*log(16*e^2*log(-2*x)^2 + x + 2)
```

3.219.9 Mupad [B] (verification not implemented)

Time = 14.44 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{e^2x + 32e^4\log(-2x)}{2x + x^2 + 16e^2x\log^2(-2x)}\,dx = \mathrm{e}^2\,\ln\left(16\,\mathrm{e}^2\ln\left(-2\,x\right)^2 + x + 2\right)$$

input
```
int((32*log(-2*x)*exp(4) + x*exp(2))/(2*x + x^2 + 16*x*log(-2*x)^2*exp(2))
,x)
```

output
```
exp(2)*log(x + 16*log(-2*x)^2*exp(2) + 2)
```

3.220 $\int (8-4x-3x^2-3ex^2+2x\log(4)) \, dx$

3.220.1 Optimal result

Integrand size = 21, antiderivative size = 27

$$\int (8-4x-3x^2-3ex^2+2x\log(4)) \, dx = x^2\left(\frac{8}{x}-x+x\left(-e+\frac{-2+\log(4)}{x}\right)\right)$$

output
```
x^2*(8/x+((2*ln(2)-2)/x-exp(1))*x-x)
```

3.220.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int (8-4x-3x^2-3ex^2+2x\log(4)) \, dx = 8x-2x^2-x^3-ex^3+x^2\log(4)$$

input
```
Integrate[8 - 4*x - 3*x^2 - 3*E*x^2 + 2*x*Log[4],x]
```

output
```
8*x - 2*x^2 - x^3 - E*x^3 + x^2*Log[4]
```

3.220.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {6, 6, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-3ex^2-3x^2-4x+2x\log(4)+8\right) \, dx$$

$$\Big\downarrow \ 6$$

$$\int \left(-3ex^2-3x^2+x(2\log(4)-4)+8\right) dx$$

$$\Big\downarrow \ 6$$

$$\int \left((-3-3e)x^2+x(2\log(4)-4)+8\right) dx$$

$$\Big\downarrow \ 2009$$

$$-\left((1+e)x^3\right)-x^2(2-\log(4))+8x$$

input
```
Int[8 - 4*x - 3*x^2 - 3*E*x^2 + 2*x*Log[4],x]
```

output
```
8*x - (1 + E)*x^3 - x^2*(2 - Log[4])
```

3.220.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.220.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

method	result	size
gosper	$-x(x^2\mathrm{e}-2x\ln(2)+x^2+2x-8)$	23
norman	$(-\mathrm{e}-1)\,x^3+(2\ln(2)-2)\,x^2+8x$	25
default	$2x^2\ln(2)-x^3\mathrm{e}-x^3-2x^2+8x$	29
risch	$2x^2\ln(2)-x^3\mathrm{e}-x^3-2x^2+8x$	29
parallelrisch	$2x^2\ln(2)-x^3\mathrm{e}-x^3-2x^2+8x$	29
parts	$2x^2\ln(2)-x^3\mathrm{e}-x^3-2x^2+8x$	29

input
```
int(4*x*ln(2)-3*x^2*exp(1)-3*x^2-4*x+8,x,method=_RETURNVERBOSE)
```

output
```
-x*(x^2*exp(1)-2*x*ln(2)+x^2+2*x-8)
```

3.220.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

$$\int \left(8-4x-3x^2-3ex^2+2x\log(4)\right)\,dx=-x^3e-x^3+2\,x^2\log(2)-2\,x^2+8\,x$$

input
```
integrate(4*x*log(2)-3*x^2*exp(1)-3*x^2-4*x+8,x, algorithm=\
```

output
```
-x^3*e - x^3 + 2*x^2*log(2) - 2*x^2 + 8*x
```

3.220.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \left(8-4x-3x^2-3ex^2+2x\log(4)\right)\,dx=x^3(-e-1)+x^2(-2+2\log(2))+8x$$

input
```
integrate(4*x*ln(2)-3*x**2*exp(1)-3*x**2-4*x+8,x)
```

output
```
x**3*(-E - 1) + x**2*(-2 + 2*log(2)) + 8*x
```

3.220.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

$$\int \left(8-4x-3x^2-3ex^2+2x\log(4)\right)\,dx=-x^3e-x^3+2\,x^2\log\left(2\right)-2\,x^2+8\,x$$

input
```
integrate(4*x*log(2)-3*x^2*exp(1)-3*x^2-4*x+8,x, algorithm=\
```

output
```
-x^3*e - x^3 + 2*x^2*log(2) - 2*x^2 + 8*x
```

3.220.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

$$\int \left(8-4x-3x^2-3ex^2+2x\log(4)\right)\,dx=-x^3e-x^3+2\,x^2\log\left(2\right)-2\,x^2+8\,x$$

input
```
integrate(4*x*log(2)-3*x^2*exp(1)-3*x^2-4*x+8,x, algorithm=\
```

output
```
-x^3*e - x^3 + 2*x^2*log(2) - 2*x^2 + 8*x
```

3.220.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \left(8-4x-3x^2-3ex^2+2x\log(4)\right)\,dx=\left(-\mathrm{e}-1\right)\,x^3+\left(\ln\left(4\right)-2\right)\,x^2+8\,x$$

input
```
int(4*x*log(2) - 4*x - 3*x^2*exp(1) - 3*x^2 + 8,x)
```

output
```
8*x + x^2*(log(4) - 2) - x^3*(exp(1) + 1)
```

3.221 $\int \frac{e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}\left(162+e^{\frac{x}{9}-\frac{e^{x/9}}{-18+\log^2(5)}}-9\log^2(5)\right)}{-162+9\log^2(5)}\,dx$

3.221.1 Optimal result

Integrand size = 67, antiderivative size = 30

$$\int \frac{e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}\left(162+e^{\frac{x}{9}-\frac{e^{x/9}}{-18+\log^2(5)}}-9\log^2(5)\right)}{-162+9\log^2(5)}\,dx=2-e^{e^{\frac{e^{x/9}}{18-\log^2(5)}}+x}+\log(2)$$

output
```
ln(2)-exp(exp(exp(1/9*x)/(18-ln(5)^2))+x)+2
```

3.221.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.83

$$\int \frac{e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}\left(162+e^{\frac{x}{9}-\frac{e^{x/9}}{-18+\log^2(5)}}-9\log^2(5)\right)}{-162+9\log^2(5)}\,dx=-e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}$$

input
```
Integrate[(E^(E^(-(E^(x/9)/(-18 + Log[5]^2))) + x)*(162 + E^(x/9 - E^(x/9)
/(-18 + Log[5]^2)) - 9*Log[5]^2))/(-162 + 9*Log[5]^2),x]
```

output
```
-E^(E^(-(E^(x/9)/(-18 + Log[5]^2))) + x)
```

3.221.3 Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {27, 2720, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+e^{-\frac{e^{x/9}}{\log^2(5)-18}}}\left(e^{\frac{x}{9}-\frac{e^{x/9}}{\log^2(5)-18}}+162-9\log^2(5)\right)}{9\log^2(5)-162}dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{\int e^{x+e^{\frac{e^{x/9}}{18-\log^2(5)}}}\left(e^{\frac{x}{9}+\frac{e^{x/9}}{18-\log^2(5)}}+9\left(18-\log^2(5)\right)\right)dx}{9\left(18-\log^2(5)\right)}$$

$$\Big\downarrow \text{2720}$$

$$-\frac{\int e^{\frac{8x}{9}+e^{\frac{e^{x/9}}{18-\log^2(5)}}}\left(e^{\frac{x}{9}+\frac{e^{x/9}}{18-\log^2(5)}}+9\left(18-\log^2(5)\right)\right)de^{x/9}}{18-\log^2(5)}$$

$$\Big\downarrow \text{2726}$$

$$-e^{x+e^{\frac{e^{x/9}}{18-\log^2(5)}}}$$

input
```
Int[(E^(E^(-(E^(x/9)/(-18 + Log[5]^2))) + x)*(162 + E^(x/9 - E^(x/9)/(-18
+ Log[5]^2)) - 9*Log[5]^2))/(-162 + 9*Log[5]^2),x]
```

output
```
-E^(E^(E^(x/9)/(18 - Log[5]^2)) + x)
```

3.221.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2720
```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ
[{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))
*(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.221.4 Maple [A] (verified)

Time = 0.31 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.70

method	result	size
norman	$-{\mathrm e}^{{\mathrm e}^{-\frac{{\mathrm e}^{\frac{x}{9}}}{\ln\left(5\right)^{2}-18}}+x}$	21
parallelrisch	$\frac{-9 \ln\left(5\right)^{2} {\mathrm e}^{{\mathrm e}^{-\frac{{\mathrm e}^{\frac{x}{9}}}{\ln\left(5\right)^{2}-18}}+x}+162 \,{\mathrm e}^{{\mathrm e}^{-\frac{{\mathrm e}^{\frac{x}{9}}}{\ln\left(5\right)^{2}-18}}+x}}{9 \ln\left(5\right)^{2}-162}$	57
risch	$-\frac{9 \,{\mathrm e}^{{\mathrm e}^{-\frac{{\mathrm e}^{\frac{x}{9}}}{\ln\left(5\right)^{2}-18}}+x} \ln\left(5\right)^{2}}{9 \ln\left(5\right)^{2}-162}+\frac{162 \,{\mathrm e}^{{\mathrm e}^{-\frac{{\mathrm e}^{\frac{x}{9}}}{\ln\left(5\right)^{2}-18}}+x}}{9 \ln\left(5\right)^{2}-162}$	66

input
```
int((exp(1/9*x)*exp(-exp(1/9*x)/(ln(5)^2-18))-9*ln(5)^2+162)*exp(exp(-exp(
1/9*x)/(ln(5)^2-18))+x)/(9*ln(5)^2-162),x,method=_RETURNVERBOSE)
```

output
```
-exp(exp(-exp(1/9*x)/(ln(5)^2-18))+x)
```

3.221.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.40

$$\int \frac{e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}\left(162+e^{\frac{x}{9}-\frac{e^{x/9}}{-18+\log^2(5)}}-9\log^2(5)\right)}{-162+9\log^2(5)}\,dx = -e^{\left(\left(xe^{\left(\frac{1}{9}\,x\right)}+e^{\left(\frac{x\log(5)^2-18\,x-9\,e^{\left(\frac{1}{9}\,x\right)}}{9\,\left(\log(5)^2-18\right)}\right)}\right)e^{\left(-\frac{1}{9}\,x\right)}\right)}$$

input
```
integrate((exp(1/9*x)*exp(-exp(1/9*x)/(log(5)^2-18))-9*log(5)^2+162)*exp(e
xp(-exp(1/9*x)/(log(5)^2-18))+x)/(9*log(5)^2-162),x, algorithm=\
```

output
```
-e^((x*e^(1/9*x) + e^(1/9*(x*log(5)^2 - 18*x - 9*e^(1/9*x))/(log(5)^2 - 18
)))*e^(-1/9*x))
```

3.221.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.63

$$\int \frac{e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}\left(162+e^{\frac{x}{9}-\frac{e^{x/9}}{-18+\log^2(5)}}-9\log^2(5)\right)}{-162+9\log^2(5)}\,dx=-e^{x+e^{-\frac{e^{\frac{x}{9}}}{-18+\log(5)^2}}}$$

input
```
integrate((exp(1/9*x)*exp(-exp(1/9*x)/(ln(5)**2-18))-9*ln(5)**2+162)*exp(e
xp(-exp(1/9*x)/(ln(5)**2-18))+x)/(9*ln(5)**2-162),x)
```

output
```
-exp(x + exp(-exp(x/9)/(-18 + log(5)**2)))
```

3.221.7 Maxima [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \frac{e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}\left(162+e^{\frac{x}{9}-\frac{e^{x/9}}{-18+\log^2(5)}}-9\log^2(5)\right)}{-162+9\log^2(5)}\,dx=-e^{\left(x+e^{\left(-\frac{e^{\left(\frac{1}{9}x\right)}}{\log(5)^2-18}\right)}\right)}$$

input
```
integrate((exp(1/9*x)*exp(-exp(1/9*x)/(log(5)^2-18))-9*log(5)^2+162)*exp(e
xp(-exp(1/9*x)/(log(5)^2-18))+x)/(9*log(5)^2-162),x, algorithm=\
```

output
```
-e^(x + e^(-e^(1/9*x)/(log(5)^2 - 18)))
```

3.221.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \frac{e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}\left(162+e^{\frac{x}{9}-\frac{e^{x/9}}{-18+\log^2(5)}}-9\log^2(5)\right)}{-162+9\log^2(5)}\,dx=-e^{\left(x+e^{\left(-\frac{e^{\left(\frac{1}{9}x\right)}}{\log(5)^2-18}\right)}\right)}$$

input
```
integrate((exp(1/9*x)*exp(-exp(1/9*x)/(log(5)^2-18))-9*log(5)^2+162)*exp(e
xp(-exp(1/9*x)/(log(5)^2-18))+x)/(9*log(5)^2-162),x, algorithm=\
```

output
```
-e^(x + e^(-e^(1/9*x)/(log(5)^2 - 18)))
```

3.221.9 Mupad [B] (verification not implemented)

Time = 15.39 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \frac{e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}\left(162+e^{\frac{x}{9}-\frac{e^{x/9}}{-18+\log^2(5)}}-9\log^2(5)\right)}{-162+9\log^2(5)}\,dx=-e^x\,e^{e^{-\frac{e^{x/9}}{\ln(5)^2-18}}}$$

input
```
int((exp(x + exp(-exp(x/9)/(log(5)^2 - 18)))*(exp(x/9)*exp(-exp(x/9)/(log(
5)^2 - 18)) - 9*log(5)^2 + 162))/(9*log(5)^2 - 162),x)
```

output
```
-exp(x)*exp(exp(-exp(x/9)/(log(5)^2 - 18)))
```

3.221. $\int \frac{e^{e^{-\frac{e^{x/9}}{-18+\log^2(5)}}+x}\left(162+e^{\frac{x}{9}-\frac{e^{x/9}}{-18+\log^2(5)}}-9\log^2(5)\right)}{-162+9\log^2(5)}\,dx$

3.222 $\int \frac{48(i\pi+\log(3))+48(i\pi+\log(3))\log(5x)-15x^2(i\pi+\log(3))^2\log^2(5x)}{512+320x^2(i\pi+\log(3))\log(5x)+50x^4(i\pi+\log(3))^2\log^2(5x)}\,dx$

3.222.1 Optimal result

Integrand size = 89, antiderivative size = 31

$$\int \frac{48(i\pi+\log(3))+48(i\pi+\log(3))\log(5x)-15x^2(i\pi+\log(3))^2\log^2(5x)}{512+320x^2(i\pi+\log(3))\log(5x)+50x^4(i\pi+\log(3))^2\log^2(5x)}\,dx = \frac{3}{2\left(5x+\frac{16}{x(i\pi+\log(3))\log(5x)}\right)}$$

output
```
3/(32/ln(5*x)/x/(ln(3)+I*Pi)+10*x)
```

3.222.2 Mathematica [A] (verified)

Time = 0.42 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.29

$$\int \frac{48(i\pi+\log(3))+48(i\pi+\log(3))\log(5x)-15x^2(i\pi+\log(3))^2\log^2(5x)}{512+320x^2(i\pi+\log(3))\log(5x)+50x^4(i\pi+\log(3))^2\log^2(5x)}\,dx = \frac{3x(\pi-i\log(3))\log(5x)}{2\left(-16i+5x^2(\pi-i\log(3))\log(5x)\right)}$$

input
```
Integrate[(48*(I*Pi + Log[3]) + 48*(I*Pi + Log[3])*Log[5*x] - 15*x^2*(I*Pi
 + Log[3])^2*Log[5*x]^2)/(512 + 320*x^2*(I*Pi + Log[3])*Log[5*x] + 50*x^4*
(I*Pi + Log[3])^2*Log[5*x]^2),x]
```

output
```
(3*x*(Pi - I*Log[3])*Log[5*x])/(2*(-16*I + 5*x^2*(Pi - I*Log[3])*Log[5*x])
)
```

3.222.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-15x^2(\log(3)+i\pi)^2\log^2(5x)+48(\log(3)+i\pi)\log(5x)+48(\log(3)+i\pi)}{50x^4(\log(3)+i\pi)^2\log^2(5x)+320x^2(\log(3)+i\pi)\log(5x)+512}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{15x^2(\log(3)+i\pi)^2\log^2(5x)-48(\log(3)+i\pi)\log(5x)-48(\log(3)+i\pi)}{2\left(16i-5\pi x^2\left(1-\frac{i\log(3)}{\pi}\right)\log(5x)\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int -\frac{3\left(-5x^2(i\pi+\log(3))^2\log^2(5x)+16(i\pi+\log(3))\log(5x)+16(i\pi+\log(3))\right)}{\left(16i-5x^2(\pi-i\log(3))\log(5x)\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{3}{2}\int \frac{-5x^2(i\pi+\log(3))^2\log^2(5x)+16(i\pi+\log(3))\log(5x)+16(i\pi+\log(3))}{\left(16i-5x^2(\pi-i\log(3))\log(5x)\right)^2}dx$$

$$\Big\downarrow \text{7292}$$

$$-\frac{3}{2}\int \frac{(\pi-i\log(3))\left(5\pi x^2\left(1-\frac{i\log(3)}{\pi}\right)\log^2(5x)+16i\log(5x)+16i\right)}{\left(16i-5x^2(\pi-i\log(3))\log(5x)\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{3}{2}(\pi-i\log(3))\int \frac{5x^2(\pi-i\log(3))\log^2(5x)+16i\log(5x)+16i}{\left(16i-5x^2(\pi-i\log(3))\log(5x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{3}{2}(\pi-i\log(3))\int \left(\frac{16\left(5x^2(i\pi+\log(3))-32\right)}{5x^2(\pi-i\log(3))\left(16i-5\pi x^2\left(1-\frac{i\log(3)}{\pi}\right)\log(5x)\right)^2}+\frac{48i}{5x^2(-\pi+i\log(3))\left(16i-5\pi x^2\left(1-\frac{i\log(3)}{\pi}\right.\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3}{2}(\pi-i\log(3))\left(\frac{16(\log(243)+5i\pi)\int \frac{1}{\left(16i-5\pi x^2\left(1-\frac{i\log(3)}{\pi}\right)\log(5x)\right)^2}dx}{5(\pi-i\log(3))}-\frac{512\int \frac{1}{x^2\left(16i-5\pi x^2\left(1-\frac{i\log(3)}{\pi}\right)\log(5x)\right)^2}dx}{5(\pi-i\log(3))}+\frac{48\int \frac{}{x^2}\right.$$

input
```
Int[(48*(I*Pi + Log[3]) + 48*(I*Pi + Log[3])*Log[5*x] - 15*x^2*(I*Pi + Log
[3])^2*Log[5*x]^2)/(512 + 320*x^2*(I*Pi + Log[3])*Log[5*x] + 50*x^4*(I*Pi
+ Log[3])^2*Log[5*x]^2),x]
```

output
```
$Aborted
```

3.222.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.222.4 Maple [A] (verified)

Time = 2.04 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.29

method	result	size
risch	$\frac{3}{10x}+\frac{24i}{5x\left(-5i\ln\left(3\right)x^{2}\ln\left(5x\right)+5\pi\ln\left(5x\right)x^{2}-16i\right)}$	40
derivativedivides	$\frac{15\left(\ln\left(3\right)+i\pi\right)\ln\left(5x\right)x}{2\left(25\ln\left(3\right)\ln\left(5x\right)x^{2}+25i\ln\left(5x\right)\pi\,x^{2}+80\right)}$	41
default	$\frac{15\left(\ln\left(3\right)+i\pi\right)\ln\left(5x\right)x}{2\left(25\ln\left(3\right)\ln\left(5x\right)x^{2}+25i\ln\left(5x\right)\pi\,x^{2}+80\right)}$	41
parallelrisch	$-\frac{-48\pi\ln\left(5x\right)x+48i\ln\left(5x\right)\ln\left(3\right)x}{32\left(-5i\ln\left(3\right)x^{2}\ln\left(5x\right)+5\pi\ln\left(5x\right)x^{2}-16i\right)}$	49

input
```
int((-15*x^2*(ln(3)+I*Pi)^2*ln(5*x)^2+48*(ln(3)+I*Pi)*ln(5*x)+48*ln(3)+48*
I*Pi)/(50*x^4*(ln(3)+I*Pi)^2*ln(5*x)^2+320*x^2*(ln(3)+I*Pi)*ln(5*x)+512),x
,method=_RETURNVERBOSE)
```

output
```
3/10/x+24/5*I/x/(-5*I*ln(3)*x^2*ln(5*x)+5*Pi*ln(5*x)*x^2-16*I)
```

3.222.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.29

$$\int \frac{48(i\pi+\log(3))+48(i\pi+\log(3))\log(5x)-15x^2(i\pi+\log(3))^2\log^2(5x)}{512+320x^2(i\pi+\log(3))\log(5x)+50x^4(i\pi+\log(3))^2\log^2(5x)}\,dx = \frac{3\left(-i\,\pi x-x\log\left(3\right)\right)\log\left(5\,x\right)}{2\left(5\left(-i\,\pi x^2-x^2\log\left(3\right)\right)\log\left(5\,x\right)-16\right)}$$

input
```
integrate((-15*x^2*(log(3)+I*pi)^2*log(5*x)^2+48*(log(3)+I*pi)*log(5*x)+48
*log(3)+48*I*pi)/(50*x^4*(log(3)+I*pi)^2*log(5*x)^2+320*x^2*(log(3)+I*pi)*
log(5*x)+512),x, algorithm=\
```

output
```
3/2*(-I*pi*x - x*log(3))*log(5*x)/(5*(-I*pi*x^2 - x^2*log(3))*log(5*x) - 1
6)
```

3.222.6 Sympy [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(19) = 38.

Time = 6.47 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.74

$$\int \frac{48(i\pi+\log(3))+48(i\pi+\log(3))\log(5x)-15x^2(i\pi+\log(3))^2\log^2(5x)}{512+320x^2(i\pi+\log(3))\log(5x)+50x^4(i\pi+\log(3))^2\log^2(5x)}\,dx = \frac{24}{-25x^3\log\left(3\right)\log\left(5\right)-25i\pi x^3\log\left(5\right)-80x+\left(-25x^3\log\left(3\right)-25i\pi x^3\right)\log\left(x\right)}+\frac{3}{10x}$$

input
```
integrate((-15*x**2*(ln(3)+I*pi)**2*ln(5*x)**2+48*(ln(3)+I*pi)*ln(5*x)+48*
ln(3)+48*I*pi)/(50*x**4*(ln(3)+I*pi)**2*ln(5*x)**2+320*x**2*(ln(3)+I*pi)*l
n(5*x)+512),x)
```

output
```
24/(-25*x**3*log(3)*log(5) - 25*I*pi*x**3*log(5) - 80*x + (-25*x**3*log(3)
 - 25*I*pi*x**3)*log(x)) + 3/(10*x)
```

3.222.7 Maxima [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(27) = 54$.

Time = 0.41 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.90

$$\int \frac{48(i\pi + \log(3)) + 48(i\pi + \log(3))\log(5x) - 15x^2(i\pi + \log(3))^2\log^2(5x)}{512 + 320x^2(i\pi + \log(3))\log(5x) + 50x^4(i\pi + \log(3))^2\log^2(5x)}\,dx = \frac{3\left((\pi - i\log(3))x\log(x) + (\pi\log(5) - i\log(5)\log(3))x\right)}{2\left(5(\pi - i\log(3))x^2\log(x) + 5(\pi\log(5) - i\log(5)\log(3))x^2 - 16i\right)}$$

input
```
integrate((-15*x^2*(log(3)+I*pi)^2*log(5*x)^2+48*(log(3)+I*pi)*log(5*x)+48
*log(3)+48*I*pi)/(50*x^4*(log(3)+I*pi)^2*log(5*x)^2+320*x^2*(log(3)+I*pi)*
log(5*x)+512),x, algorithm=\
```

output
```
3/2*((pi - I*log(3))*x*log(x) + (pi*log(5) - I*log(5)*log(3))*x)/(5*(pi -
I*log(3))*x^2*log(x) + 5*(pi*log(5) - I*log(5)*log(3))*x^2 - 16*I)
```

3.222.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.13

$$\int \frac{48(i\pi + \log(3)) + 48(i\pi + \log(3))\log(5x) - 15x^2(i\pi + \log(3))^2\log^2(5x)}{512 + 320x^2(i\pi + \log(3))\log(5x) + 50x^4(i\pi + \log(3))^2\log^2(5x)}\,dx = -\frac{24}{25i\pi x^3\log(5x) + 25x^3\log(3)\log(5x) + 80x} + \frac{3}{10x}$$

input
```
integrate((-15*x^2*(log(3)+I*pi)^2*log(5*x)^2+48*(log(3)+I*pi)*log(5*x)+48
*log(3)+48*I*pi)/(50*x^4*(log(3)+I*pi)^2*log(5*x)^2+320*x^2*(log(3)+I*pi)*
log(5*x)+512),x, algorithm=\
```

output
```
-24/(25*I*pi*x^3*log(5*x) + 25*x^3*log(3)*log(5*x) + 80*x) + 3/10/x
```

3.222.9 Mupad [F(-1)]

Timed out.

$$\int \frac{48(i\pi + \log(3)) + 48(i\pi + \log(3))\log(5x) - 15x^2(i\pi + \log(3))^2\log^2(5x)}{512 + 320x^2(i\pi + \log(3))\log(5x) + 50x^4(i\pi + \log(3))^2\log^2(5x)}\,dx$$
$$= \int \frac{\Pi\,48\mathrm{i} + 48\,\ln(3) + 48\,\ln(5\,x)\,\left(\ln(3) + \Pi\,1\mathrm{i}\right) - 15\,x^2\ln(5\,x)^2\left(\ln(3) + \Pi\,1\mathrm{i}\right)^2}{50\,x^4\ln(5\,x)^2\left(\ln(3) + \Pi\,1\mathrm{i}\right)^2 + 320\,x^2\,\ln(5\,x)\,\left(\ln(3) + \Pi\,1\mathrm{i}\right) + 512}\,dx$$

input
```
int((Pi*48i + 48*log(3) + 48*log(5*x)*(Pi*1i + log(3)) - 15*x^2*log(5*x)^2
*(Pi*1i + log(3))^2)/(50*x^4*log(5*x)^2*(Pi*1i + log(3))^2 + 320*x^2*log(5
*x)*(Pi*1i + log(3)) + 512),x)
```

output
```
int((Pi*48i + 48*log(3) + 48*log(5*x)*(Pi*1i + log(3)) - 15*x^2*log(5*x)^2
*(Pi*1i + log(3))^2)/(50*x^4*log(5*x)^2*(Pi*1i + log(3))^2 + 320*x^2*log(5
*x)*(Pi*1i + log(3)) + 512), x)
```

3.223 $\int \frac{2-4x}{x^3}\,dx$

3.223.1 Optimal result

Integrand size = 9, antiderivative size = 20

$$\int \frac{2-4x}{x^3}\,dx = 2+3e^{e^e}+\frac{4-\frac{1}{x}}{x}$$

output
```
3*exp(exp(exp(1)))+(4-1/x)/x+2
```

3.223.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.55

$$\int \frac{2-4x}{x^3}\,dx = -\frac{1}{x^2}+\frac{4}{x}$$

input
```
Integrate[(2 - 4*x)/x^3,x]
```

output
```
-x^(-2) + 4/x
```

3.223.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {48}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2-4x}{x^3} \, dx$$
$$\Big\downarrow \; 48$$
$$-\frac{(1-2x)^2}{x^2}$$

input
```
Int[(2 - 4*x)/x^3,x]
```

output
```
-((1 - 2*x)^2/x^2)
```

3.223.3.1 Defintions of rubi rules used

rule 48
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && EqQ[m + n + 2, 0] && NeQ[m, -1]
```

3.223.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

method	result	size
gosper	$\frac{-1+4x}{x^2}$	10
norman	$\frac{-1+4x}{x^2}$	10
risch	$\frac{-1+4x}{x^2}$	10
parallelrisch	$\frac{-1+4x}{x^2}$	10
default	$\frac{4}{x}-\frac{1}{x^2}$	12

input
```
int((-4*x+2)/x^3,x,method=_RETURNVERBOSE)
```

output
```
(-1+4*x)/x^2
```

3.223.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

$$\int \frac{2-4x}{x^3}\,dx = \frac{4\,x-1}{x^2}$$

input
```
integrate((-4*x+2)/x^3,x, algorithm=\
```

output
```
(4*x - 1)/x^2
```

3.223.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{2-4x}{x^3}\,dx = -\frac{1-4x}{x^2}$$

input
```
integrate((-4*x+2)/x**3,x)
```

output
```
-(1 - 4*x)/x**2
```

3.223.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

$$\int \frac{2-4x}{x^3}\,dx = \frac{4\,x-1}{x^2}$$

input
```
integrate((-4*x+2)/x^3,x, algorithm=\
```

output
```
(4*x - 1)/x^2
```

3.223.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

$$\int \frac{2-4x}{x^3}\,dx = \frac{4\,x-1}{x^2}$$

input
```
integrate((-4*x+2)/x^3,x, algorithm=\
```

output
```
(4*x - 1)/x^2
```

3.223.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

$$\int \frac{2-4x}{x^3}\,dx = \frac{4\,x-1}{x^2}$$

input
```
int(-(4*x - 2)/x^3,x)
```

output
```
(4*x - 1)/x^2
```

3.224 $\int \frac{-10+2e^4+2x^4}{x^3} dx$

3.224.1 Optimal result

Integrand size = 16, antiderivative size = 14

$$\int \frac{-10+2e^4+2x^4}{x^3} dx = \frac{5-e^4+x^4}{x^2}$$

output
```
(5+x^4-exp(4))/x^2
```

3.224.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{-10+2e^4+2x^4}{x^3} dx = \frac{5-e^4+x^4}{x^2}$$

input
```
Integrate[(-10 + 2*E^4 + 2*x^4)/x^3,x]
```

output
```
(5 - E^4 + x^4)/x^2
```

3.224.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.07, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4+2e^4-10}{x^3} \, dx$$

$$\Big\downarrow \; 802$$

$$\int \left(\frac{2(e^4-5)}{x^3}+2x\right) dx$$

$$\Big\downarrow \; 2009$$

$$x^2+\frac{5-e^4}{x^2}$$

input
```
Int[(-10 + 2*E^4 + 2*x^4)/x^3,x]
```

output
```
(5 - E^4)/x^2 + x^2
```

3.224.3.1 Defintions of rubi rules used

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.224.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

method	result	size
default	$x^{2}-\frac{{\mathrm e}^{4}-5}{x^{2}}$	14
norman	$\frac{5+x^{4}-{\mathrm e}^{4}}{x^{2}}$	14
gosper	$-\frac{-x^{4}+{\mathrm e}^{4}-5}{x^{2}}$	15
parallelrisch	$-\frac{-x^{4}+{\mathrm e}^{4}-5}{x^{2}}$	15
risch	$x^{2}-\frac{{\mathrm e}^{4}}{x^{2}}+\frac{5}{x^{2}}$	17

input
```
int((2*exp(4)+2*x^4-10)/x^3,x,method=_RETURNVERBOSE)
```

output
```
x^2-(exp(4)-5)/x^2
```

3.224.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{-10+2e^4+2x^4}{x^3}\,dx=\frac{x^4-e^4+5}{x^2}$$

input
```
integrate((2*exp(4)+2*x^4-10)/x^3,x, algorithm=\
```

output
```
(x^4 - e^4 + 5)/x^2
```

3.224.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{-10+2e^4+2x^4}{x^3}\,dx=x^2+\frac{5-e^4}{x^2}$$

input
```
integrate((2*exp(4)+2*x**4-10)/x**3,x)
```

output
```
x**2 + (5 - exp(4))/x**2
```

3.224.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{-10 + 2e^4 + 2x^4}{x^3} \, dx = x^2 - \frac{e^4 - 5}{x^2}$$

input
```
integrate((2*exp(4)+2*x^4-10)/x^3,x, algorithm=\
```

output
```
x^2 - (e^4 - 5)/x^2
```

3.224.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{-10 + 2e^4 + 2x^4}{x^3} \, dx = x^2 - \frac{e^4 - 5}{x^2}$$

input
```
integrate((2*exp(4)+2*x^4-10)/x^3,x, algorithm=\
```

output
```
x^2 - (e^4 - 5)/x^2
```

3.224.9 Mupad [B] (verification not implemented)

Time = 14.23 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{-10 + 2e^4 + 2x^4}{x^3} \, dx = x^2 - \frac{e^4 - 5}{x^2}$$

input
```
int((2*exp(4) + 2*x^4 - 10)/x^3,x)
```

output
```
x^2 - (exp(4) - 5)/x^2
```

3.225 $\int \frac{45+x^2+45\log\left(-\frac{1}{3x}\right)}{x^2}\,dx$

3.225.1 Optimal result

Integrand size = 19, antiderivative size = 16

$$\int \frac{45+x^2+45\log\left(-\frac{1}{3x}\right)}{x^2}\,dx = 4+x-\frac{45\log\left(-\frac{1}{3x}\right)}{x}$$

output
```
-45*ln(-1/3/x)/x+4+x
```

3.225.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{45+x^2+45\log\left(-\frac{1}{3x}\right)}{x^2}\,dx = x-\frac{45\log\left(-\frac{1}{3x}\right)}{x}$$

input
```
Integrate[(45 + x^2 + 45*Log[-1/3*1/x])/x^2,x]
```

output
```
x - (45*Log[-1/3*1/x])/x
```

3.225.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+45\log\left(-\frac{1}{3x}\right)+45}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{x^2+45}{x^2}+\frac{45\log\left(-\frac{1}{3x}\right)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x-\frac{45\log\left(-\frac{1}{3x}\right)}{x}$$

input
```
Int[(45 + x^2 + 45*Log[-1/3*1/x])/x^2,x]
```

output
```
x - (45*Log[-1/3*1/x])/x
```

3.225.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.225.4 Maple [A] (verified)

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

method	result	size
derivativedivides	$x-\frac{45\ln\left(-\frac{1}{3x}\right)}{x}$	14
default	$x-\frac{45\ln\left(-\frac{1}{3x}\right)}{x}$	14
risch	$x-\frac{45\ln\left(-\frac{1}{3x}\right)}{x}$	14
parts	$x-\frac{45\ln\left(-\frac{1}{3x}\right)}{x}$	14
norman	$\frac{x^2-45\ln\left(-\frac{1}{3x}\right)}{x}$	17
parallelrisch	$\frac{x^2-45\ln\left(-\frac{1}{3x}\right)}{x}$	17

input
```
int((45*ln(-1/3/x)+x^2+45)/x^2,x,method=_RETURNVERBOSE)
```

output
```
x-45*ln(-1/3/x)/x
```

3.225.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{45+x^2+45\log\left(-\frac{1}{3x}\right)}{x^2}\,dx=\frac{x^2-45\,\log\left(-\frac{1}{3\,x}\right)}{x}$$

input
```
integrate((45*log(-1/3/x)+x^2+45)/x^2,x, algorithm=\
```

output
```
(x^2 - 45*log(-1/3/x))/x
```

3.225.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{45+x^2+45\log\left(-\frac{1}{3x}\right)}{x^2}\,dx = x - \frac{45\log\left(-\frac{1}{3x}\right)}{x}$$

input
```
integrate((45*ln(-1/3/x)+x**2+45)/x**2,x)
```

output
```
x - 45*log(-1/(3*x))/x
```

3.225.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{45+x^2+45\log\left(-\frac{1}{3x}\right)}{x^2}\,dx = x - \frac{45\,\log\left(-\frac{1}{3\,x}\right)}{x}$$

input
```
integrate((45*log(-1/3/x)+x^2+45)/x^2,x, algorithm=\
```

output
```
x - 45*log(-1/3/x)/x
```

3.225.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{45+x^2+45\log\left(-\frac{1}{3x}\right)}{x^2}\,dx = x - \frac{45\,\log\left(-\frac{1}{3\,x}\right)}{x}$$

input
```
integrate((45*log(-1/3/x)+x^2+45)/x^2,x, algorithm=\
```

output
```
x - 45*log(-1/3/x)/x
```

3.225.9 Mupad [B] (verification not implemented)

Time = 14.43 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{45 + x^2 + 45 \log \left(-\frac{1}{3x}\right)}{x^2} \, dx = x - \frac{45 \ln \left(-\frac{1}{3\,x}\right)}{x}$$

input
```
int((45*log(-1/(3*x)) + x^2 + 45)/x^2,x)
```

output
```
x - (45*log(-1/(3*x)))/x
```

3.226 $\int \frac{40+15x+e^{4e^e}(20x+5x^2)}{e^{8e^e}(4x^3+x^4)+e^{4e^e}(-8x^2-2x^3)\log\left(-\frac{2}{4x^2+x^3}\right)+(4x+x^2)\log^2\left(-\frac{2}{4x^2+x^3}\right)}$

3.226.1 Optimal result

Integrand size = 100, antiderivative size = 28

$$\int \frac{40+15x+e^{4e^e}(20x+5x^2)}{e^{8e^e}(4x^3+x^4)+e^{4e^e}(-8x^2-2x^3)\log\left(-\frac{2}{4x^2+x^3}\right)+(4x+x^2)\log^2\left(-\frac{2}{4x^2+x^3}\right)}\,dx = \frac{5}{-e^{4e^e}x+\log\left(\frac{2}{(-4-x)x^2}\right)}$$

output
```
5/(-x*exp(4*exp(exp(1)))+ln(2/(-4-x)/x^2))
```

3.226.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{40+15x+e^{4e^e}(20x+5x^2)}{e^{8e^e}(4x^3+x^4)+e^{4e^e}(-8x^2-2x^3)\log\left(-\frac{2}{4x^2+x^3}\right)+(4x+x^2)\log^2\left(-\frac{2}{4x^2+x^3}\right)}\,dx = \frac{5}{-e^{4e^e}x+\log\left(-\frac{2}{x^2(4+x)}\right)}$$

input
```
Integrate[(40 + 15*x + E^(4*E^E)*(20*x + 5*x^2))/(E^(8*E^E)*(4*x^3 + x^4)
+ E^(4*E^E)*(-8*x^2 - 2*x^3)*Log[-2/(4*x^2 + x^3)] + (4*x + x^2)*Log[-2/(4
*x^2 + x^3)]^2),x]
```

output
```
5/(-(E^(4*E^E)*x) + Log[-2/(x^2*(4 + x))])
```

3.226.3 Rubi [A] (verified)

Time = 0.77 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.020, Rules used = {7292, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{4e^e}(5x^2+20x)+15x+40}{e^{8e^e}(x^4+4x^3)+(x^2+4x)\log^2\left(-\frac{2}{x^3+4x^2}\right)+e^{4e^e}(-2x^3-8x^2)\log\left(-\frac{2}{x^3+4x^2}\right)}dx$$
$$\Big\downarrow \text{ 7292}$$
$$\int \frac{5e^{4e^e}x^2+5\left(3+4e^{4e^e}\right)x+40}{x(x+4)\left(e^{4e^e}x-\log\left(-\frac{2}{x^2(x+4)}\right)\right)^2}dx$$
$$\Big\downarrow \text{ 7237}$$
$$-\frac{5}{e^{4e^e}x-\log\left(-\frac{2}{x^2(x+4)}\right)}$$

input
```
Int[(40 + 15*x + E^(4*E^E)*(20*x + 5*x^2))/(E^(8*E^E)*(4*x^3 + x^4) + E^(4
*E^E)*(-8*x^2 - 2*x^3)*Log[-2/(4*x^2 + x^3)] + (4*x + x^2)*Log[-2/(4*x^2 +
 x^3)]^2),x]
```

output
```
-5/(E^(4*E^E)*x - Log[-2/(x^2*(4 + x))])
```

3.226.3.1 Defintions of rubi rules used

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.226. $\int \frac{40+15x+e^{4e^e}(20x+5x^2)}{e^{8e^e}(4x^3+x^4)+e^{4e^e}(-8x^2-2x^3)\log\left(-\frac{2}{4x^2+x^3}\right)+(4x+x^2)\log^2\left(-\frac{2}{4x^2+x^3}\right)}dx$

3.226.4 Maple [A] (verified)

Time = 1.83 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

method	result	size
parallelrisch	$-\frac{5}{x\,\mathrm{e}^{4\,\mathrm{e}^{\mathrm{e}}}-\ln\left(-\frac{2}{x^{2}(4+x)}\right)}$	27
norman	$-\frac{5}{x\,\mathrm{e}^{4\,\mathrm{e}^{\mathrm{e}}}-\ln\left(-\frac{2}{x^{3}+4x^{2}}\right)}$	30
risch	$-\frac{5}{x\,\mathrm{e}^{4\,\mathrm{e}^{\mathrm{e}}}-\ln\left(-\frac{2}{x^{3}+4x^{2}}\right)}$	30

input
```
int(((5*x^2+20*x)*exp(4*exp(exp(1)))+15*x+40)/((x^4+4*x^3)*exp(4*exp(exp(1
)))^2+(-2*x^3-8*x^2)*ln(-2/(x^3+4*x^2))*exp(4*exp(exp(1)))+(x^2+4*x)*ln(-2
/(x^3+4*x^2))^2),x,method=_RETURNVERBOSE)
```

output
```
-5/(x*exp(4*exp(exp(1)))-ln(-2/x^2/(4+x)))
```

3.226.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{40+15x+e^{4e^e}(20x+5x^2)}{e^{8e^e}(4x^3+x^4)+e^{4e^e}(-8x^2-2x^3)\log\left(-\frac{2}{4x^2+x^3}\right)+(4x+x^2)\log^2\left(-\frac{2}{4x^2+x^3}\right)}\,dx = -\frac{5}{xe^{\left(4\,e^{e}\right)}-\log\left(-\frac{2}{x^3+4\,x^2}\right)}$$

input
```
integrate(((5*x^2+20*x)*exp(4*exp(exp(1)))+15*x+40)/((x^4+4*x^3)*exp(4*exp
(exp(1)))^2+(-2*x^3-8*x^2)*log(-2/(x^3+4*x^2))*exp(4*exp(exp(1)))+(x^2+4*x
)*log(-2/(x^3+4*x^2))^2),x, algorithm=\
```

output
```
-5/(x*e^(4*e^e) - log(-2/(x^3 + 4*x^2)))
```

3.226.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{40+15x+e^{4e^e}(20x+5x^2)}{e^{8e^e}(4x^3+x^4)+e^{4e^e}(-8x^2-2x^3)\log\left(-\frac{2}{4x^2+x^3}\right)+(4x+x^2)\log^2\left(-\frac{2}{4x^2+x^3}\right)}\,dx = \frac{5}{-xe^{4e^e}+\log\left(-\frac{2}{x^3+4x^2}\right)}$$

input
```
integrate(((5*x**2+20*x)*exp(4*exp(exp(1)))+15*x+40)/((x**4+4*x**3)*exp(4*
exp(exp(1)))**2+(-2*x**3-8*x**2)*ln(-2/(x**3+4*x**2))*exp(4*exp(exp(1)))+(
x**2+4*x)*ln(-2/(x**3+4*x**2))**2),x)
```

output
```
5/(-x*exp(4*exp(E)) + log(-2/(x**3 + 4*x**2)))
```

3.226.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{40+15x+e^{4e^e}(20x+5x^2)}{e^{8e^e}(4x^3+x^4)+e^{4e^e}(-8x^2-2x^3)\log\left(-\frac{2}{4x^2+x^3}\right)+(4x+x^2)\log^2\left(-\frac{2}{4x^2+x^3}\right)}\,dx = -\frac{5}{xe^{(4\,e^e)}-\log(2)+2\,\log(x)+\log(-x-4)}$$

input
```
integrate(((5*x^2+20*x)*exp(4*exp(exp(1)))+15*x+40)/((x^4+4*x^3)*exp(4*exp
(exp(1)))^2+(-2*x^3-8*x^2)*log(-2/(x^3+4*x^2))*exp(4*exp(exp(1)))+(x^2+4*x
)*log(-2/(x^3+4*x^2))^2),x, algorithm=\
```

output
```
-5/(x*e^(4*e^e) - log(2) + 2*log(x) + log(-x - 4))
```

3.226.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{40+15x+e^{4e^e}(20x+5x^2)}{e^{8e^e}(4x^3+x^4)+e^{4e^e}(-8x^2-2x^3)\log\left(-\frac{2}{4x^2+x^3}\right)+(4x+x^2)\log^2\left(-\frac{2}{4x^2+x^3}\right)}\,dx$$
$$= -\frac{5}{xe^{(4\,e^e)}-\log\left(-\frac{2}{x^3+4\,x^2}\right)}$$

input
```
integrate(((5*x^2+20*x)*exp(4*exp(exp(1)))+15*x+40)/((x^4+4*x^3)*exp(4*exp
(exp(1)))^2+(-2*x^3-8*x^2)*log(-2/(x^3+4*x^2))*exp(4*exp(exp(1)))+(x^2+4*x
)*log(-2/(x^3+4*x^2))^2),x, algorithm=\
```

output
```
-5/(x*e^(4*e^e) - log(-2/(x^3 + 4*x^2)))
```

3.226.9 Mupad [B] (verification not implemented)

Time = 15.05 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{40+15x+e^{4e^e}(20x+5x^2)}{e^{8e^e}(4x^3+x^4)+e^{4e^e}(-8x^2-2x^3)\log\left(-\frac{2}{4x^2+x^3}\right)+(4x+x^2)\log^2\left(-\frac{2}{4x^2+x^3}\right)}\,dx$$
$$= \frac{5}{\ln\left(-\frac{2}{x^3+4\,x^2}\right)-x\,\mathrm{e}^{4\,\mathrm{e}^{\mathrm{e}}}}$$

input
```
int((15*x + exp(4*exp(exp(1)))*(20*x + 5*x^2) + 40)/(exp(8*exp(exp(1)))*(4
*x^3 + x^4) + log(-2/(4*x^2 + x^3))^2*(4*x + x^2) - exp(4*exp(exp(1)))*log
(-2/(4*x^2 + x^3))*(8*x^2 + 2*x^3)),x)
```

output
```
5/(log(-2/(4*x^2 + x^3)) - x*exp(4*exp(exp(1))))
```

3.227 $\int \frac{1}{5}e^{4+x^{e^{\frac{1}{5}\left(230+e^5-x\right)}}}x^{-1+e^{\frac{1}{5}\left(230+e^5-x\right)}}\left(5e^{\frac{1}{5}\left(230+e^5-x\right)}-e^{\frac{1}{5}\left(230+e^5-x\right)}x\log(x)\right)dx$

3.227.1 Optimal result

Integrand size = 78, antiderivative size = 21

$$\int \frac{1}{5}e^{4+x^{e^{\frac{1}{5}\left(230+e^5-x\right)}}}x^{-1+e^{\frac{1}{5}\left(230+e^5-x\right)}}\left(5e^{\frac{1}{5}\left(230+e^5-x\right)}-e^{\frac{1}{5}\left(230+e^5-x\right)}x\log(x)\right)\,dx=e^{4+x^{e^{46+\frac{1}{5}\left(e^5-x\right)}}}$$

output
```
exp(exp(exp(1/5*exp(5)-1/5*x+46)*ln(x))+4)
```

3.227.2 Mathematica [A] (verified)

Time = 0.66 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{1}{5}e^{4+x^{e^{\frac{1}{5}\left(230+e^5-x\right)}}}x^{-1+e^{\frac{1}{5}\left(230+e^5-x\right)}}\left(5e^{\frac{1}{5}\left(230+e^5-x\right)}-e^{\frac{1}{5}\left(230+e^5-x\right)}x\log(x)\right)\,dx=e^{4+x^{e^{\frac{1}{5}\left(230+e^5-x\right)}}}$$

input
```
Integrate[(E^(4 + x^E^((230 + E^5 - x)/5))*x^(-1 + E^((230 + E^5 - x)/5))*
(5*E^((230 + E^5 - x)/5) - E^((230 + E^5 - x)/5)*x*Log[x]))/5,x]
```

output
```
E^(4 + x^E^((230 + E^5 - x)/5))
```

3.227.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5} e^{x^{e^{\frac{1}{5}\left(-x+e^5+230\right)}}+4} x^{e^{\frac{1}{5}\left(-x+e^5+230\right)}-1}\left(5 e^{\frac{1}{5}\left(-x+e^5+230\right)}-e^{\frac{1}{5}\left(-x+e^5+230\right)} x \log(x)\right) dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{5}\int e^{x^{e^{\frac{1}{5}\left(-x+e^5+230\right)}}+4} x^{-1+e^{\frac{1}{5}\left(-x+e^5+230\right)}}\left(5 e^{\frac{1}{5}\left(-x+e^5+230\right)}-e^{\frac{1}{5}\left(-x+e^5+230\right)} x \log(x)\right) dx$$

$$\Big\downarrow \; 7292$$

$$\frac{1}{5}\int e^{x^{e^{\frac{1}{5}\left(-x+e^5+230\right)}}-\frac{x}{5}+\frac{e^5}{5}+50} x^{-1+e^{\frac{1}{5}\left(-x+e^5+230\right)}}(5-x\log(x))dx$$

$$\Big\downarrow \; 7292$$

$$\frac{1}{5}\int \exp\left(\frac{1}{5}\left(5x^{e^{-\frac{x}{5}+\frac{e^5}{5}+46}}-x+250\left(1+\frac{e^5}{250}\right)\right)\right) x^{-1+e^{\frac{1}{5}\left(-x+e^5+230\right)}}(5-x\log(x))dx$$

$$\Big\downarrow \; 7293$$

$$\frac{1}{5}\int \left(5\exp\left(\frac{1}{5}\left(5x^{e^{-\frac{x}{5}+\frac{e^5}{5}+46}}-x+250\left(1+\frac{e^5}{250}\right)\right)\right) x^{-1+e^{\frac{1}{5}\left(-x+e^5+230\right)}}-\exp\left(\frac{1}{5}\left(5x^{e^{-\frac{x}{5}+\frac{e^5}{5}+46}}-x+250\left(1+\right.\right.\right.\right.$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{5}\left(\int \frac{\int \exp\left(\frac{1}{5}\left(5x^{e^{-\frac{x}{5}+\frac{e^5}{5}+46}}-x+250\left(1+\frac{e^5}{250}\right)\right)\right) x^{e^{\frac{1}{5}\left(230+e^5\right)-\frac{x}{5}}}dx}{x}dx-\log(x)\int \exp\left(\frac{1}{5}\left(5x^{e^{-\frac{x}{5}+\frac{e^5}{5}+46}}-x+\right.\right.\right.$$

input
```
Int[(E^(4 + x^E^((230 + E^5 - x)/5))*x^(-1 + E^((230 + E^5 - x)/5))*(5*E^(
(230 + E^5 - x)/5) - E^((230 + E^5 - x)/5)*x*Log[x]))/5,x]
```

output
```
$Aborted
```

3.227.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.227.4 Maple [A] (verified)

Time = 0.41 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

method	result	size
risch	$e^{x^{e^{\frac{e^5}{5}-\frac{x}{5}+46}}+4}$	16
parallelrisch	$e^{e^{e^{\frac{e^5}{5}-\frac{x}{5}+46}\ln(x)}+4}$	18

input
```
int(1/5*(-x*exp(1/5*exp(5)-1/5*x+46)*ln(x)+5*exp(1/5*exp(5)-1/5*x+46))*exp
(exp(1/5*exp(5)-1/5*x+46)*ln(x))*exp(exp(exp(1/5*exp(5)-1/5*x+46)*ln(x))+4
)/x,x,method=_RETURNVERBOSE)
```

output
```
exp(x^exp(1/5*exp(5)-1/5*x+46)+4)
```

3.227.5 Fricas [F(-1)]

Timed out.

$$\int \frac{1}{5} e^{4+x^{e^{\frac{1}{5}\left(230+e^5-x\right)}}} x^{-1+e^{\frac{1}{5}\left(230+e^5-x\right)}} \left(5 e^{\frac{1}{5}\left(230+e^5-x\right)}-e^{\frac{1}{5}\left(230+e^5-x\right)} x \log (x)\right) \, dx=\text{Timed out}$$

input
```
integrate(1/5*(-x*exp(1/5*exp(5)-1/5*x+46)*log(x)+5*exp(1/5*exp(5)-1/5*x+4
6))*exp(exp(1/5*exp(5)-1/5*x+46)*log(x))*exp(exp(exp(1/5*exp(5)-1/5*x+46)*
log(x))+4)/x,x, algorithm=\
```

output
```
Timed out
```

3.227.6 Sympy [A] (verification not implemented)

Time = 0.86 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{1}{5} e^{4+x^{e^{\frac{1}{5}\left(230+e^5-x\right)}}} x^{-1+e^{\frac{1}{5}\left(230+e^5-x\right)}} \left(5 e^{\frac{1}{5}\left(230+e^5-x\right)}-e^{\frac{1}{5}\left(230+e^5-x\right)} x \log (x)\right) \, dx$$
$$=e^{e^{e^{-\frac{x}{5}+\frac{e^5}{5}+46} \log (x)}+4}$$

input
```
integrate(1/5*(-x*exp(1/5*exp(5)-1/5*x+46)*ln(x)+5*exp(1/5*exp(5)-1/5*x+46
))*exp(exp(1/5*exp(5)-1/5*x+46)*ln(x))*exp(exp(exp(1/5*exp(5)-1/5*x+46)*ln
(x))+4)/x,x)
```

output
```
exp(exp(exp(-x/5 + exp(5)/5 + 46)*log(x)) + 4)
```

3.227.7 Maxima [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \frac{1}{5} e^{4+x^{e^{\frac{1}{5}\left(230+e^5-x\right)}}} x^{-1+e^{\frac{1}{5}\left(230+e^5-x\right)}} \left(5 e^{\frac{1}{5}\left(230+e^5-x\right)}-e^{\frac{1}{5}\left(230+e^5-x\right)} x \log (x)\right) \, dx$$
$$=e^{\left(x^{e^{\left(-\frac{1}{5} \, x+\frac{1}{5} \, e^{5}+46\right)}}+4\right)}$$

input
```
integrate(1/5*(-x*exp(1/5*exp(5)-1/5*x+46)*log(x)+5*exp(1/5*exp(5)-1/5*x+4
6))*exp(exp(1/5*exp(5)-1/5*x+46)*log(x))*exp(exp(exp(1/5*exp(5)-1/5*x+46)*
log(x))+4)/x,x, algorithm=\
```

output
```
e^(x^e^(-1/5*x + 1/5*e^5 + 46) + 4)
```

3.227.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \frac{1}{5}e^{4+x^{e^{\frac{1}{5}\left(230+e^5-x\right)}}}x^{-1+e^{\frac{1}{5}\left(230+e^5-x\right)}}\left(5e^{\frac{1}{5}\left(230+e^5-x\right)}-e^{\frac{1}{5}\left(230+e^5-x\right)}x\log(x)\right)\,dx = e^{\left(x^{e^{\left(-\frac{1}{5}x+\frac{1}{5}e^5+46\right)}}+4\right)}$$

input
```
integrate(1/5*(-x*exp(1/5*exp(5)-1/5*x+46)*log(x)+5*exp(1/5*exp(5)-1/5*x+4
6))*exp(exp(1/5*exp(5)-1/5*x+46)*log(x))*exp(exp(exp(1/5*exp(5)-1/5*x+46)*
log(x))+4)/x,x, algorithm=\
```

output
```
e^(x^e^(-1/5*x + 1/5*e^5 + 46) + 4)
```


3.227.9 Mupad [B] (verification not implemented)

Time = 14.44 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{1}{5}e^{4+x^{e^{\frac{1}{5}\left(230+e^5-x\right)}}}x^{-1+e^{\frac{1}{5}\left(230+e^5-x\right)}}\left(5e^{\frac{1}{5}\left(230+e^5-x\right)}-e^{\frac{1}{5}\left(230+e^5-x\right)}x\log(x)\right)\,dx = e^4\,e^{x^{e^{\frac{e^5}{5}}\,e^{-\frac{x}{5}}\,e^{46}}}$$

input
```
int((exp(exp(exp(5)/5 - x/5 + 46)*log(x))*exp(exp(exp(exp(5)/5 - x/5 + 46)
*log(x)) + 4)*(5*exp(exp(5)/5 - x/5 + 46) - x*exp(exp(5)/5 - x/5 + 46)*log
(x)))/(5*x),x)
```

output
```
exp(4)*exp(x^(exp(exp(5)/5)*exp(-x/5)*exp(46)))
```

3.228 $\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}}$

3.228.1 Optimal result

Integrand size = 173, antiderivative size = 35

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)} \left(-8x^3+10x^4-3x^5+\left(-6x^2+4x^3\right)\log(5)-x\log^2(5)\right)\,dx=e^{e^{e^2-\frac{1}{16}e^{-2e^5}x^2\left(2x-x^2+\log(5)\right)^2}}$$

output
```
exp(exp(exp(2)-1/16*(2*x+ln(5)-x^2)^2*x^2/exp(exp(5))^2))
```

3.228.2 Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.71

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)} \left(-8x^3+10x^4-3x^5+\left(-6x^2+4x^3\right)\log(5)-x\log^2(5)\right)\,dx=e^{5^{\frac{1}{8}e^{-2e^5}(-2+x)x^3}e^{e^2-\frac{1}{16}e^{-2e^5}x^2\left(4x^2-4x^3+x^4+\log^2(5)\right)}}$$

input
```
Integrate[(E^(-2*E^5 + E^((16*E^(2 + 2*E^5) - 4*x^4 + 4*x^5 - x^6 + (-4*x^
3 + 2*x^4)*Log[5] - x^2*Log[5]^2)/(16*E^(2*E^5))) + (16*E^(2 + 2*E^5) - 4*
x^4 + 4*x^5 - x^6 + (-4*x^3 + 2*x^4)*Log[5] - x^2*Log[5]^2)/(16*E^(2*E^5))
)*(-8*x^3 + 10*x^4 - 3*x^5 + (-6*x^2 + 4*x^3)*Log[5] - x*Log[5]^2))/8,x]
```

3.228.

$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}$

output
```
E^(5^(((-2 + x)*x^3)/(8*E^(2*E^5)))*E^(E^2 - (x^2*(4*x^2 - 4*x^3 + x^4 + L
og[5]^2))/(16*E^(2*E^5))))
```

3.228.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{8}(-3x^5+10x^4-8x^3+(4x^3-6x^2)\log(5)-x\log^2(5))\exp\left(\exp\left(\frac{1}{16}e^{-2e^5}\left(-x^6+4x^5-4x^4-x^2\log^2(5)+\right.\right.\right.$$

$$\Big\downarrow 27$$

$$\frac{1}{8}\int -\exp\left(\frac{1}{16}e^{-2e^5}\left(-x^6+4x^5-4x^4-\log^2(5)x^2-2(2x^3-x^4)\log(5)+16e^{2+2e^5}\right)+5^{-\frac{1}{16}e^{-2e^5}(4x^3-2x^4)}\exp\left(\right.\right.$$

$$\Big\downarrow 25$$

$$-\frac{1}{8}\int \exp\left(\frac{1}{16}e^{-2e^5}\left(-x^6+4x^5-4x^4-\log^2(5)x^2-2(2x^3-x^4)\log(5)+16e^{2+2e^5}\right)+5^{-\frac{1}{8}e^{-2e^5}(2x^3-x^4)}\exp\left(\frac{1}{16}\right.\right.$$

$$\Big\downarrow 7293$$

$$-\frac{1}{8}\int \left(3\exp\left(\frac{1}{16}e^{-2e^5}\left(-x^6+4x^5-4x^4-\log^2(5)x^2-2(2x^3-x^4)\log(5)+16e^{2+2e^5}\right)+5^{-\frac{1}{8}e^{-2e^5}(2x^3-x^4)}\exp\left(\right.\right.\right.$$

$$\Big\downarrow 7239$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}(x^4-4x^3+4x^2+\log^2(5))x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\Big\downarrow 7293$$

$$-\frac{1}{8}\int \left(3\,5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}(x^4-4x^3+4x^2+\log^2(5))x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-\right.\right.\right.$$

$$\Big\downarrow 7239$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}(x^4-4x^3+4x^2+\log^2(5))x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\Big\downarrow 7293$$

$$-\frac{1}{8}\int \left(3\ 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4 -\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{8}\int \left(3\ 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4 -\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{8}\int \left(3\ 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4 -\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{8}\int \left(3\ 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4 -\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{8}\int \left(3\ 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3} \exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4 -\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

3.228.

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right.}$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\downarrow 7293$$

$$-\frac{1}{8}\int\left(3\,5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-\right.\right.\right.$$

$$\downarrow 7239$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\downarrow 7293$$

$$-\frac{1}{8}\int\left(3\,5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-\right.\right.\right.$$

$$\downarrow 7239$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\downarrow 7293$$

$$-\frac{1}{8}\int\left(3\,5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-\right.\right.\right.$$

$$\downarrow 7239$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\downarrow 7293$$

$$-\frac{1}{8}\int\left(3\,5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-\right.\right.\right.$$

$$\downarrow 7239$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\downarrow 7293$$

3.228.

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+(-4x^3+2x^4)\log(5)-x^2\log^2(5)\right.}$$

$$-\frac{1}{8}\int \left(3\,5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{8}\int \left(3\,5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{8}\int \left(3\,5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{8}\int 5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(-\frac{1}{16}e^{-2e^5}\left(x^4-4x^3+4x^2+\log^2(5)\right)x^2+5^{\frac{1}{8}e^{-2e^5}(x-2)x^3}\exp\left(e^2-\frac{1}{16}e^{-2e^5}x^2(x^4-4x\right.\right.$$

input
```
Int[(E^(-2*E^5 + E^((16*E^(2 + 2*E^5) - 4*x^4 + 4*x^5 - x^6 + (-4*x^3 + 2*
x^4)*Log[5] - x^2*Log[5]^2)/(16*E^(2*E^5))) + (16*E^(2 + 2*E^5) - 4*x^4 +
4*x^5 - x^6 + (-4*x^3 + 2*x^4)*Log[5] - x^2*Log[5]^2)/(16*E^(2*E^5)))*(-8*
x^3 + 10*x^4 - 3*x^5 + (-6*x^2 + 4*x^3)*Log[5] - x*Log[5]^2))/8,x]
```

output
```
$Aborted
```

3.228.

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right.}$$

3.228.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.228.4 Maple [A] (verified)

Time = 1.11 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.57

method	result	size
risch	$\mathrm{e}^{\mathrm{e}^{-\frac{\left(x^{6}-2 x^{4} \ln \left(5\right)-4 x^{5}+x^{2} \ln \left(5\right)^{2}+4 x^{3} \ln \left(5\right)+4 x^{4}-16 \,\mathrm{e}^{2 \,\mathrm{e}^{5}+2}\right) \mathrm{e}^{-2 \,\mathrm{e}^{5}}}{16}}}$	55
norman	$\mathrm{e}^{\mathrm{e}^{\frac{\left(16 \,\mathrm{e}^{2} \mathrm{e}^{2 \,\mathrm{e}^{5}}-x^{2} \ln \left(5\right)^{2}+\left(2 x^{4}-4 x^{3}\right) \ln \left(5\right)-x^{6}+4 x^{5}-4 x^{4}\right) \mathrm{e}^{-2 \,\mathrm{e}^{5}}}{16}}}$	58
parallelrisch	$\mathrm{e}^{\mathrm{e}^{\frac{\left(16 \,\mathrm{e}^{2} \mathrm{e}^{2 \,\mathrm{e}^{5}}-x^{2} \ln \left(5\right)^{2}+\left(2 x^{4}-4 x^{3}\right) \ln \left(5\right)-x^{6}+4 x^{5}-4 x^{4}\right) \mathrm{e}^{-2 \,\mathrm{e}^{5}}}{16}}}$	58

input
```
int(1/8*(-x*ln(5)^2+(4*x^3-6*x^2)*ln(5)-3*x^5+10*x^4-8*x^3)*exp(1/16*(16*e
xp(2)*exp(exp(5))^2-x^2*ln(5)^2+(2*x^4-4*x^3)*ln(5)-x^6+4*x^5-4*x^4)/exp(e
xp(5))^2)*exp(exp(1/16*(16*exp(2)*exp(exp(5))^2-x^2*ln(5)^2+(2*x^4-4*x^3)*
ln(5)-x^6+4*x^5-4*x^4)/exp(exp(5))^2))/exp(exp(5))^2,x,method=_RETURNVERBO
SE)
```

output
```
exp(exp(-1/16*(x^6-2*x^4*ln(5)-4*x^5+x^2*ln(5)^2+4*x^3*ln(5)+4*x^4-16*exp(
2*exp(5)+2))*exp(-2*exp(5))))
```

3.228.

$\int \frac{1}{8} e^{-2e^5+e^{\frac{1}{16} e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16} e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+(-4x^3+2x^4)\log(5)-x^2\log^2(5)\right.}$

3.228.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 174 vs. 2(28) = 56.

Time = 0.31 (sec) , antiderivative size = 174, normalized size of antiderivative = 4.97

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5\right.}$$
$$+10x^4-3x^5+\left(-6x^2+4x^3\right)\log(5)-x\log^2(5)\Big)\,dx$$
$$=e^{\left(-\frac{1}{16}\left(x^6-4x^5+4x^4+x^2\log(5)^2+16\left(2e^5-e^2\right)e^{\left(2e^5\right)}-2\left(x^4-2x^3\right)\log(5)-16e^{\left(-\frac{1}{16}\left(x^6-4x^5+4x^4+x^2\log(5)^2-2\left(x^4-2x^3\right)\log(5)-16e^{\left(2e^5+\right.}\right.}\right.\right.}$$

input
```
integrate(1/8*(-x*log(5)^2+(4*x^3-6*x^2)*log(5)-3*x^5+10*x^4-8*x^3)*exp(1/
16*(16*exp(2)*exp(exp(5))^2-x^2*log(5)^2+(2*x^4-4*x^3)*log(5)-x^6+4*x^5-4*
x^4)/exp(exp(5))^2)*exp(exp(1/16*(16*exp(2)*exp(exp(5))^2-x^2*log(5)^2+(2*
x^4-4*x^3)*log(5)-x^6+4*x^5-4*x^4)/exp(exp(5))^2))/exp(exp(5))^2,x, algori
thm=\
```

output
```
e^(-1/16*(x^6 - 4*x^5 + 4*x^4 + x^2*log(5)^2 + 16*(2*e^5 - e^2)*e^(2*e^5)
- 2*(x^4 - 2*x^3)*log(5) - 16*e^(-1/16*(x^6 - 4*x^5 + 4*x^4 + x^2*log(5)^2
 - 2*(x^4 - 2*x^3)*log(5) - 16*e^(2*e^5 + 2))*e^(-2*e^5) + 2*e^5))*e^(-2*e
^5) + 1/16*(x^6 - 4*x^5 + 4*x^4 + x^2*log(5)^2 - 2*(x^4 - 2*x^3)*log(5) -
16*e^(2*e^5 + 2))*e^(-2*e^5) + 2*e^5)
```

3.228.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. 2(29) = 58.

Time = 0.22 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.71

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5\right.}$$
$$+10x^4-3x^5+\left(-6x^2+4x^3\right)\log(5)-x\log^2(5)\Big)\,dx=e^{e^{\frac{-\frac{x^6}{16}+\frac{x^5}{4}-\frac{x^4}{4}-\frac{x^2\log(5)^2}{16}+\frac{\left(2x^4-4x^3\right)\log(5)}{16}+e^2e^{2e^5}}{e^{2e^5}}}}$$

input
```
integrate(1/8*(-x*ln(5)**2+(4*x**3-6*x**2)*ln(5)-3*x**5+10*x**4-8*x**3)*ex
p(1/16*(16*exp(2)*exp(exp(5))**2-x**2*ln(5)**2+(2*x**4-4*x**3)*ln(5)-x**6+
4*x**5-4*x**4)/exp(exp(5))**2)*exp(exp(1/16*(16*exp(2)*exp(exp(5))**2-x**2
*ln(5)**2+(2*x**4-4*x**3)*ln(5)-x**6+4*x**5-4*x**4)/exp(exp(5))**2))/exp(e
xp(5))**2,x)
```

3.228.
$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right.}$$

output
```
exp(exp((-x**6/16 + x**5/4 - x**4/4 - x**2*log(5)**2/16 + (2*x**4 - 4*x**3
)*log(5)/16 + exp(2)*exp(2*exp(5)))*exp(-2*exp(5))))
```

3.228.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(28) = 56$.

Time = 1.83 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.09

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)} \ldots + 10x^4 - 3x^5 + \left(-6x^2 + 4x^3\right)\log(5) - x\log^2(5)\Big)\,dx$$
$$= e^{\left(e^{\left(-\frac{1}{16}x^6e^{\left(-2e^5\right)}+\frac{1}{4}x^5e^{\left(-2e^5\right)}+\frac{1}{8}x^4e^{\left(-2e^5\right)}\log(5)-\frac{1}{4}x^4e^{\left(-2e^5\right)}-\frac{1}{4}x^3e^{\left(-2e^5\right)}\log(5)-\frac{1}{16}x^2e^{\left(-2e^5\right)}\log(5)^2+e^2\right)}\right)}$$

input
```
integrate(1/8*(-x*log(5)^2+(4*x^3-6*x^2)*log(5)-3*x^5+10*x^4-8*x^3)*exp(1/
16*(16*exp(2)*exp(exp(5))^2-x^2*log(5)^2+(2*x^4-4*x^3)*log(5)-x^6+4*x^5-4*
x^4)/exp(exp(5))^2)*exp(exp(1/16*(16*exp(2)*exp(exp(5))^2-x^2*log(5)^2+(2*
x^4-4*x^3)*log(5)-x^6+4*x^5-4*x^4)/exp(exp(5))^2))/exp(exp(5))^2,x, algori
thm=\
```

output
```
e^(e^(-1/16*x^6*e^(-2*e^5) + 1/4*x^5*e^(-2*e^5) + 1/8*x^4*e^(-2*e^5)*log(5
) - 1/4*x^4*e^(-2*e^5) - 1/4*x^3*e^(-2*e^5)*log(5) - 1/16*x^2*e^(-2*e^5)*l
og(5)^2 + e^2))
```

3.228.8 Giac [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.34

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)} \ldots + 10x^4 - 3x^5 + \left(-6x^2 + 4x^3\right)\log(5) - x\log^2(5)\Big)\,dx$$
$$= e^{\left(e^{\left(-\frac{1}{16}\left(x^6-4x^5+4x^4+x^2\log(5)^2-2\left(x^4-2x^3\right)\log(5)\right)e^{\left(-2e^5\right)}+e^2\right)}\right)}$$

input
```
integrate(1/8*(-x*log(5)^2+(4*x^3-6*x^2)*log(5)-3*x^5+10*x^4-8*x^3)*exp(1/
16*(16*exp(2)*exp(exp(5))^2-x^2*log(5)^2+(2*x^4-4*x^3)*log(5)-x^6+4*x^5-4*
x^4)/exp(exp(5))^2)*exp(exp(1/16*(16*exp(2)*exp(exp(5))^2-x^2*log(5)^2+(2*
x^4-4*x^3)*log(5)-x^6+4*x^5-4*x^4)/exp(exp(5))^2))/exp(exp(5))^2,x, algori
thm=\
```

output
```
e^(e^(-1/16*(x^6 - 4*x^5 + 4*x^4 + x^2*log(5)^2 - 2*(x^4 - 2*x^3)*log(5))*
e^(-2*e^5) + e^2))
```

3.228.9 Mupad [B] (verification not implemented)

Time = 15.99 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.14

$$\int \frac{1}{8}e^{-2e^5+e^{\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5)\right)}+\frac{1}{16}e^{-2e^5}\left(16e^{2+2e^5}-4x^4+4x^5-x^6+\left(-4x^3+2x^4\right)\log(5)-x^2\log^2(5\right.}$$
$$+10x^4-3x^5+\left(-6x^2+4x^3\right)\log(5)-x\log^2(5)\Big)\,dx$$
$$=\mathrm{e}^{\frac{\mathrm{e}^{-\frac{x^2\,\mathrm{e}^{-2\,\mathrm{e}^5}\,\ln(5)^2}{16}}\,\mathrm{e}^{-\frac{x^4\,\mathrm{e}^{-2\,\mathrm{e}^5}}{4}}\,\mathrm{e}^{\frac{x^5\,\mathrm{e}^{-2\,\mathrm{e}^5}}{4}}\,\mathrm{e}^{-\frac{x^6\,\mathrm{e}^{-2\,\mathrm{e}^5}}{16}}\,\mathrm{e}^{\mathrm{e}^2}}{5^{\frac{\mathrm{e}^{-2\,\mathrm{e}^5}\,\left(2\,x^3-x^4\right)}{8}}}}$$

input
```
int(-(exp(-2*exp(5))*exp(-exp(-2*exp(5))*((x^2*log(5)^2)/16 + (log(5)*(4*x
^3 - 2*x^4))/16 + x^4/4 - x^5/4 + x^6/16 - exp(2*exp(5))*exp(2))*exp(exp(
-exp(-2*exp(5))*((x^2*log(5)^2)/16 + (log(5)*(4*x^3 - 2*x^4))/16 + x^4/4 -
 x^5/4 + x^6/16 - exp(2*exp(5))*exp(2))))*(log(5)*(6*x^2 - 4*x^3) + x*log(
5)^2 + 8*x^3 - 10*x^4 + 3*x^5))/8,x)
```

output
```
exp((exp(-(x^2*exp(-2*exp(5))*log(5)^2)/16)*exp(-(x^4*exp(-2*exp(5)))/4)*e
xp((x^5*exp(-2*exp(5)))/4)*exp(-(x^6*exp(-2*exp(5)))/16)*exp(exp(2)))/5^((
exp(-2*exp(5))*(2*x^3 - x^4))/8))
```

3.229 $\int \frac{784e^x x+560e^x x\log(\log(12))+156e^x x\log^2(\log(12))+20e^x x\log^3(\log(1$

3.229.1 Optimal result

Integrand size = 120, antiderivative size = 21

$$\int \frac{784e^x x+560e^x x\log(\log(12))+156e^x x\log^2(\log(12))+20e^x x\log^3(\log(12))+e^x x\log^4(\log(12))+\log(4+$$

$$=x\log(2(2+e^x))\left(3+(5+\log(\log(12)))^2\right)^2$$

output
```
x*ln(2*exp(x)+4)*((5+ln(ln(12)))^2+3)^2
```

3.229.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.07 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.90

$$\int \frac{784e^x x+560e^x x\log(\log(12))+156e^x x\log^2(\log(12))+20e^x x\log^3(\log(12))+e^x x\log^4(\log(12))+\log(4+$$

$$=\left(28+10\log(\log(12))+\log^2(\log(12))\right)^2\left(\frac{x^2}{2}+x\log(4)+x\log\left(1+2e^{-x}\right)-\operatorname{PolyLog}\left(2,-2e^{-x}\right)-\operatorname{PolyLog}\left(2,-\frac{e^x}{2}\right)\right)$$

input
```
Integrate[(784*E^x*x + 560*E^x*x*Log[Log[12]] + 156*E^x*x*Log[Log[12]]^2 +
 20*E^x*x*Log[Log[12]]^3 + E^x*x*Log[Log[12]]^4 + Log[4 + 2*E^x]*(1568 + 7
84*E^x + (1120 + 560*E^x)*Log[Log[12]] + (312 + 156*E^x)*Log[Log[12]]^2 +
(40 + 20*E^x)*Log[Log[12]]^3 + (2 + E^x)*Log[Log[12]]^4))/(2 + E^x),x]
```

3.229.
$\int \frac{784e^x x+560e^x x\log(\log(12))+156e^x x\log^2(\log(12))+20e^x x\log^3(\log(12))+e^x x\log^4(\log(12))+\log(4+2e^x)(1568+784e^x+(1120+560e^x)\log(\log(12$ $\overline{2+e^x}$

output
```
(28 + 10*Log[Log[12]] + Log[Log[12]]^2)^2*(x^2/2 + x*Log[4] + x*Log[1 + 2/
E^x] - PolyLog[2, -2/E^x] - PolyLog[2, -1/2*E^x])
```

3.229.3 Rubi [A] (verified)

Time = 0.51 (sec), antiderivative size = 32, normalized size of antiderivative = 1.52, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.067$, Rules used = {6, 6, 6, 6, 7239, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{784e^x x + e^x x \log^4(\log(12)) + 20e^x x \log^3(\log(12)) + 156e^x x \log^2(\log(12)) + \log(2e^x + 4)\left(784e^x + (e^x + 2)\log^4\right.}{}$$

$$\Big\downarrow 6$$

$$\int \frac{e^x x \log^4(\log(12)) + 20e^x x \log^3(\log(12)) + 156e^x x \log^2(\log(12)) + \log(2e^x + 4)\left(784e^x + (e^x + 2)\log^4(\log(12))\right.}{}$$

$$\Big\downarrow 6$$

$$\int \frac{e^x x \log^4(\log(12)) + e^x x\left(20\log^3(\log(12)) + 156\log^2(\log(12))\right) + \log(2e^x + 4)\left(784e^x + (e^x + 2)\log^4(\log(12)) +\right.}{}$$

$$\Big\downarrow 6$$

$$\int \frac{e^x x\left(784 + \log^4(\log(12)) + 560\log(\log(12))\right) + e^x x\left(20\log^3(\log(12)) + 156\log^2(\log(12))\right) + \log(2e^x + 4)\left(784e\right.}{}$$

$$\Big\downarrow 6$$

$$\int \frac{e^x x\left(784 + \log^4(\log(12)) + 20\log^3(\log(12)) + 156\log^2(\log(12)) + 560\log(\log(12))\right) + \log(2e^x + 4)\left(784e^x + (e\right.}{}$$

$$\Big\downarrow 7239$$

$$\int \frac{\left(28 + \log^2(\log(12)) + 10\log(\log(12))\right)^2\left(e^x x + (e^x + 2)\log(2(e^x + 2))\right)}{e^x + 2}dx$$

$$\Big\downarrow 27$$

$$\left(28 + \log^2(\log(12)) + 10\log(\log(12))\right)^2\int \frac{e^x x + (2 + e^x)\log(2(2 + e^x))}{2 + e^x}dx$$

3.229.
$$\int \frac{784e^x x + 560e^x x\log(\log(12)) + 156e^x x\log^2(\log(12)) + 20e^x x\log^3(\log(12)) + e^x x\log^4(\log(12)) + \log(4 + 2e^x)\left(1568 + 784e^x + (1120 + 560e^x)\log(\log(1\right.}{2 + e^x}$$

$$\downarrow 7293$$

$$\left(28+\log^2(\log(12))+10\log(\log(12))\right)^2\int\left(-\frac{2x}{2+e^x}+x+\log\left(2(2+e^x)\right)\right)dx$$

$$\downarrow 2009$$

$$\left(28+\log^2(\log(12))+10\log(\log(12))\right)^2\left(x\log\left(\frac{e^x}{2}+1\right)+x\log(4)\right)$$

input
```
Int[(784*E^x*x + 560*E^x*x*Log[Log[12]] + 156*E^x*x*Log[Log[12]]^2 + 20*E^
x*x*Log[Log[12]]^3 + E^x*x*Log[Log[12]]^4 + Log[4 + 2*E^x]*(1568 + 784*E^x
 + (1120 + 560*E^x)*Log[Log[12]] + (312 + 156*E^x)*Log[Log[12]]^2 + (40 +
20*E^x)*Log[Log[12]]^3 + (2 + E^x)*Log[Log[12]]^4))/(2 + E^x),x]
```

output
```
(x*Log[4] + x*Log[1 + E^x/2])*(28 + 10*Log[Log[12]] + Log[Log[12]]^2)^2
```

3.229.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.229.

$$\int\frac{784e^xx+560e^xx\log(\log(12))+156e^xx\log^2(\log(12))+20e^xx\log^3(\log(12))+e^xx\log^4(\log(12))+\log(4+2e^x)\left(1568+784e^x+(1120+560e^x)\log(\log(1\right.}{2+e^x}$$

3.229.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.71

method	result
norman	$\left(\ln \left(\ln \left(12\right)\right)^{4}+20 \ln \left(\ln \left(12\right)\right)^{3}+156 \ln \left(\ln \left(12\right)\right)^{2}+560 \ln \left(\ln \left(12\right)\right)+784\right) x \ln \left(2 \,\mathrm{e}^{x}+4\right)$
risch	$x \left(\ln \left(\ln \left(3\right)+2 \ln \left(2\right)\right)^{4}+20 \ln \left(\ln \left(3\right)+2 \ln \left(2\right)\right)^{3}+156 \ln \left(\ln \left(3\right)+2 \ln \left(2\right)\right)^{2}+560 \ln \left(\ln \left(3\right.\right.\right.$
parallelrisch	$\ln \left(\ln \left(12\right)\right)^{4} x \ln \left(2 \,\mathrm{e}^{x}+4\right)+20 \ln \left(\ln \left(12\right)\right)^{3} x \ln \left(2 \,\mathrm{e}^{x}+4\right)+156 \ln \left(\ln \left(12\right)\right)^{2} x \ln \left(2 \,\mathrm{e}^{x}+4\right)$
default	$784 x \ln \left(\frac{\mathrm{e}^{x}}{2}+1\right)+\ln \left(\ln \left(12\right)\right)^{4} \left(\operatorname{dilog}\left(\frac{\mathrm{e}^{x}}{2}+1\right)+x \ln \left(\frac{\mathrm{e}^{x}}{2}+1\right)\right)+20 \ln \left(\ln \left(12\right)\right)^{3} \left(\operatorname{dilog}\left(\frac{\mathrm{e}^{x}}{2}\right.\right.$

input
```
int((((exp(x)+2)*ln(ln(12))^4+(20*exp(x)+40)*ln(ln(12))^3+(156*exp(x)+312)
*ln(ln(12))^2+(560*exp(x)+1120)*ln(ln(12))+784*exp(x)+1568)*ln(2*exp(x)+4)
+x*exp(x)*ln(ln(12))^4+20*x*exp(x)*ln(ln(12))^3+156*x*exp(x)*ln(ln(12))^2+
560*x*exp(x)*ln(ln(12))+784*exp(x)*x)/(exp(x)+2),x,method=_RETURNVERBOSE)
```

output
```
(ln(ln(12))^4+20*ln(ln(12))^3+156*ln(ln(12))^2+560*ln(ln(12))+784)*x*ln(2*
exp(x)+4)
```

3.229.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(20) = 40.

Time = 0.29 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.95

$$\int \frac{784e^x x + 560e^x x \log(\log(12)) + 156e^x x \log^2(\log(12)) + 20e^x x \log^3(\log(12)) + e^x x \log^4(\log(12)) + \log(4\cdots}{\cdots}$$

$$= \left(x \log\left(\log\left(12\right)\right)^{4} + 20\, x \log\left(\log\left(12\right)\right)^{3} + 156\, x \log\left(\log\left(12\right)\right)^{2} + 560\, x \log\left(\log\left(12\right)\right) + 784\, x\right) \log\left(2\, e^{x} + 4\right)$$

input
```
integrate((((exp(x)+2)*log(log(12))^4+(20*exp(x)+40)*log(log(12))^3+(156*e
xp(x)+312)*log(log(12))^2+(560*exp(x)+1120)*log(log(12))+784*exp(x)+1568)*
log(2*exp(x)+4)+x*exp(x)*log(log(12))^4+20*x*exp(x)*log(log(12))^3+156*x*e
xp(x)*log(log(12))^2+560*x*exp(x)*log(log(12))+784*exp(x)*x)/(exp(x)+2),x,
 algorithm=\
```

output
```
(x*log(log(12))^4 + 20*x*log(log(12))^3 + 156*x*log(log(12))^2 + 560*x*log
(log(12)) + 784*x)*log(2*e^x + 4)
```

3.229. $\int \frac{784e^x x+560e^x x \log(\log(12))+156e^x x \log^2(\log(12))+20e^x x \log^3(\log(12))+e^x x \log^4(\log(12))+\log(4+2e^x)(1568+784e^x+(1120+560e^x)\log(\log(12\cdots}{2+e^x}$

3.229.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. 2(20) = 40.

Time = 0.12 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.29

$$\int \frac{784e^x x + 560e^x x\log(\log(12)) + 156e^x x\log^2(\log(12)) + 20e^x x\log^3(\log(12)) + e^x x\log^4(\log(12)) + \log(4 +$$

$$= \left(x\log(\log(12))^4 + 20x\log(\log(12))^3 + 156x\log(\log(12))^2 + 560x\log(\log(12)) + 784x\right)\log(2e^x + 4)$$

input
```
integrate((((exp(x)+2)*ln(ln(12))**4+(20*exp(x)+40)*ln(ln(12))**3+(156*exp
(x)+312)*ln(ln(12))**2+(560*exp(x)+1120)*ln(ln(12))+784*exp(x)+1568)*ln(2*
exp(x)+4)+x*exp(x)*ln(ln(12))**4+20*x*exp(x)*ln(ln(12))**3+156*x*exp(x)*ln
(ln(12))**2+560*x*exp(x)*ln(ln(12))+784*exp(x)*x)/(exp(x)+2),x)
```

output
```
(x*log(log(12))**4 + 20*x*log(log(12))**3 + 156*x*log(log(12))**2 + 560*x*
log(log(12)) + 784*x)*log(2*exp(x) + 4)
```

3.229.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 104 vs. 2(20) = 40.

Time = 0.31 (sec) , antiderivative size = 104, normalized size of antiderivative = 4.95

$$\int \frac{784e^x x + 560e^x x\log(\log(12)) + 156e^x x\log^2(\log(12)) + 20e^x x\log^3(\log(12)) + e^x x\log^4(\log(12)) + \log(4 +$$

$$= \left(\log(\log(3) + 2\log(2))^4 + 20\log(\log(3) + 2\log(2))^3 + 156\log(\log(3) + 2\log(2))^2 + 560\log(\log(3)\right.$$
$$+ \left(\log(\log(3) + 2\log(2))^4 + 20\log(\log(3) + 2\log(2))^3 + 156\log(\log(3) + 2\log(2))^2 + 560\log(\log(3\right.$$
$$+ 2)$$

input
```
integrate((((exp(x)+2)*log(log(12))^4+(20*exp(x)+40)*log(log(12))^3+(156*e
xp(x)+312)*log(log(12))^2+(560*exp(x)+1120)*log(log(12))+784*exp(x)+1568)*
log(2*exp(x)+4)+x*exp(x)*log(log(12))^4+20*x*exp(x)*log(log(12))^3+156*x*e
xp(x)*log(log(12))^2+560*x*exp(x)*log(log(12))+784*exp(x)*x)/(exp(x)+2),x,
 algorithm=\
```

output
```
(log(log(3) + 2*log(2))^4 + 20*log(log(3) + 2*log(2))^3 + 156*log(log(3) +
 2*log(2))^2 + 560*log(log(3) + 2*log(2)) + 784)*x*log(2) + (log(log(3) +
2*log(2))^4 + 20*log(log(3) + 2*log(2))^3 + 156*log(log(3) + 2*log(2))^2 +
 560*log(log(3) + 2*log(2)) + 784)*x*log(e^x + 2)
```

3.229.

$$\int \frac{784e^x x+560e^x x\log(\log(12))+156e^x x\log^2(\log(12))+20e^x x\log^3(\log(12))+e^x x\log^4(\log(12))+\log(4+2e^x)(1568+784e^x+(1120+560e^x)\log(\log(12}{2+e^x}$$

3.229.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 100 vs. $2(20) = 40$.

Time = 0.30 (sec) , antiderivative size = 100, normalized size of antiderivative = 4.76

$$\int \frac{784e^x x + 560e^x x\log(\log(12)) + 156e^x x\log^2(\log(12)) + 20e^x x\log^3(\log(12)) + e^x x\log^4(\log(12)) + \log(4 +}{}$$

$$= x\log(2)\log(\log(12))^4 + x\log(e^x+2)\log(\log(12))^4 + 20\,x\log(2)\log(\log(12))^3 + 20\,x\log(e^x+2)\log(\log(12))^3 + 156\,x\log(2)\log(\log(12))^2 + 156\,x\log(e^x+2)\log(\log(12))^2 + 560\,x\log(2)\log(\log(12)) + 560\,x\log(e^x+2)\log(\log(12)) + 784\,x\log(2) + 784\,x\log(e^x+2)$$

input
```
integrate((((exp(x)+2)*log(log(12))^4+(20*exp(x)+40)*log(log(12))^3+(156*e
xp(x)+312)*log(log(12))^2+(560*exp(x)+1120)*log(log(12))+784*exp(x)+1568)*
log(2*exp(x)+4)+x*exp(x)*log(log(12))^4+20*x*exp(x)*log(log(12))^3+156*x*e
xp(x)*log(log(12))^2+560*x*exp(x)*log(log(12))+784*exp(x)*x)/(exp(x)+2),x,
 algorithm=\
```

output
```
x*log(2)*log(log(12))^4 + x*log(e^x + 2)*log(log(12))^4 + 20*x*log(2)*log(
log(12))^3 + 20*x*log(e^x + 2)*log(log(12))^3 + 156*x*log(2)*log(log(12))^
2 + 156*x*log(e^x + 2)*log(log(12))^2 + 560*x*log(2)*log(log(12)) + 560*x*
log(e^x + 2)*log(log(12)) + 784*x*log(2) + 784*x*log(e^x + 2)
```

3.229.9 Mupad [B] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{784e^x x + 560e^x x\log(\log(12)) + 156e^x x\log^2(\log(12)) + 20e^x x\log^3(\log(12)) + e^x x\log^4(\log(12)) + \log(4 +}{}$$

$$= x\left(\ln(2) + \ln\left(e^x+2\right)\right)\left(10\,\ln(\ln(12)) + \ln(\ln(12))^2 + 28\right)^2$$

input
```
int((log(2*exp(x) + 4)*(784*exp(x) + log(log(12))^3*(20*exp(x) + 40) + log
(log(12))^2*(156*exp(x) + 312) + log(log(12))*(560*exp(x) + 1120) + log(lo
g(12))^4*(exp(x) + 2) + 1568) + 784*x*exp(x) + 560*x*exp(x)*log(log(12)) +
 156*x*exp(x)*log(log(12))^2 + 20*x*exp(x)*log(log(12))^3 + x*exp(x)*log(l
og(12))^4)/(exp(x) + 2),x)
```

output
```
x*(log(2) + log(exp(x) + 2))*(10*log(log(12)) + log(log(12))^2 + 28)^2
```

3.229.
$$\int \frac{784e^x x+560e^x x\log(\log(12))+156e^x x\log^2(\log(12))+20e^x x\log^3(\log(12))+e^x x\log^4(\log(12))+\log(4+2e^x)\left(1568+784e^x+(1120+560e^x)\log(\log(12\right.}{2+e^x}$$

3.230 $\int x^3 \, dx$

3.230.1 Optimal result

Integrand size = 3, antiderivative size = 16

$$\int x^3 \, dx = 2 + \frac{1}{4}\left(2 - 729e^2 + x^4\right)$$

output
```
5/2-729/4*exp(1)^2+1/4*x^4
```

3.230.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.44

$$\int x^3 \, dx = \frac{x^4}{4}$$

input
```
Integrate[x^3,x]
```

output
```
x^4/4
```

3.230.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.44, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3\,dx$$

$$\Big\downarrow \text{15}$$

$$\frac{x^4}{4}$$

input
```
Int[x^3,x]
```

output
```
x^4/4
```

3.230.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.230.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.38

method	result	size
gosper	$\frac{x^4}{4}$	6
default	$\frac{x^4}{4}$	6
norman	$\frac{x^4}{4}$	6
risch	$\frac{x^4}{4}$	6
parallelrisch	$\frac{x^4}{4}$	6

input
```
int(x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4
```

3.230.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.31

$$\int x^3\,dx = \frac{1}{4}\,x^4$$

input
```
integrate(x^3,x, algorithm=\
```

output
```
1/4*x^4
```

3.230.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.19

$$\int x^3\,dx = \frac{x^4}{4}$$

input
```
integrate(x**3,x)
```

output
```
x**4/4
```

3.230.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.31

$$\int x^3\,dx = \frac{1}{4}\,x^4$$

input
```
integrate(x^3,x, algorithm=\
```

output
```
1/4*x^4
```

3.230.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.31

$$\int x^3\,dx = \frac{1}{4}\,x^4$$

input
```
integrate(x^3,x, algorithm=\
```

output
```
1/4*x^4
```

3.230.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.31

$$\int x^3\,dx = \frac{x^4}{4}$$

input
```
int(x^3,x)
```

output
```
x^4/4
```

3.231 $\int \frac{\left(-4-2x+e^{4e^{2x}}x\right)^{\frac{1}{x}}\left(-2x+e^{4e^{2x}}(x+8e^{2x}x^2)+\left(4+2x-e^{4e^{2x}}x\right)\log\left(-\right.\right.}{-4x^2-2x^3+e^{4e^{2x}}x^3}$

3.231.1 Optimal result

Integrand size = 108, antiderivative size = 22

$$\int \frac{\left(-4-2x+e^{4e^{2x}}x\right)^{\frac{1}{x}}\left(-2x+e^{4e^{2x}}(x+8e^{2x}x^2)+\left(4+2x-e^{4e^{2x}}x\right)\log\left(-4-2x+e^{4e^{2x}}x\right)\right)}{-4x^2-2x^3+e^{4e^{2x}}x^3}\,dx$$
$$=\left(\left(-2+e^{4e^{2x}}-\frac{4}{x}\right)x\right)^{\frac{1}{x}}$$

output
```
exp(ln((exp(4*exp(2*x))-2-4/x)*x)/x)
```

3.231.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{\left(-4-2x+e^{4e^{2x}}x\right)^{\frac{1}{x}}\left(-2x+e^{4e^{2x}}(x+8e^{2x}x^2)+\left(4+2x-e^{4e^{2x}}x\right)\log\left(-4-2x+e^{4e^{2x}}x\right)\right)}{-4x^2-2x^3+e^{4e^{2x}}x^3}\,dx$$
$$=\left(-4+\left(-2+e^{4e^{2x}}\right)x\right)^{\frac{1}{x}}$$

input
```
Integrate[((-4 - 2*x + E^(4*E^(2*x))*x)^x^(-1)*(-2*x + E^(4*E^(2*x))*(x +
8*E^(2*x)*x^2) + (4 + 2*x - E^(4*E^(2*x))*x)*Log[-4 - 2*x + E^(4*E^(2*x))*
x]))/(-4*x^2 - 2*x^3 + E^(4*E^(2*x))*x^3),x]
```

output
```
(-4 + (-2 + E^(4*E^(2*x)))*x)^x^(-1)
```

3.231.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{4e^{2x}}x-2x-4\right)^{\frac{1}{x}}\left(e^{4e^{2x}}\left(8e^{2x}x^2+x\right)-2x+\left(-e^{4e^{2x}}x+2x+4\right)\log\left(e^{4e^{2x}}x-2x-4\right)\right)}{e^{4e^{2x}}x^3-2x^3-4x^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(8e^{2\left(x+2e^{2x}\right)}\left(e^{4e^{2x}}x-2x-4\right)^{\frac{1}{x}-1}-\frac{\left(e^{4e^{2x}}x-2x-4\right)^{\frac{1}{x}-1}\left(-e^{4e^{2x}}x+2x+e^{4e^{2x}}x\log\left(\left(e^{4e^{2x}}-2\right)x-4\right)-\right.}{x^2}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-4\int \frac{\int \frac{\left(\left(-2+e^{4e^{2x}}\right)x-4\right)^{\frac{1}{x}-1}}{x^2}dx}{x}dx-16\int \frac{\int \frac{\left(\left(-2+e^{4e^{2x}}\right)x-4\right)^{\frac{1}{x}-1}}{x^2}dx}{x\left(e^{4e^{2x}}x-2x-4\right)}dx-32\int \frac{e^{2\left(x+2e^{2x}\right)}x\int \frac{\left(\left(-2+e^{4e^{2x}}\right)x-4\right)^{\frac{1}{x}-1}}{x^2}dx}{e^{4e^{2x}}x-2x-4}dx+4\log\left(-\left(\left(2-e^{4e^{2x}}\right)x\right)-4\right)\int \frac{\left(e^{4e^{2x}}x-2x-4\right)^{\frac{1}{x}-1}}{x^2}dx+8\int e^{2\left(x+2e^{2x}\right)}\left(e^{4e^{2x}}x-2x-4\right)^{\frac{1}{x}-1}dx-2\int \frac{\left(e^{4e^{2x}}x-2x-4\right)^{\frac{1}{x}-1}}{x}dx+\int \frac{e^{4e^{2x}}\left(e^{4e^{2x}}x-2x-4\right)^{\frac{1}{x}-1}}{x}dx-2\int \frac{\int \frac{\left(\left(-2+e^{4e^{2x}}\right)x-4\right)^{\frac{1}{x}-1}}{x}dx}{x}dx-8\int \frac{\int \frac{\left(\left(-2+e^{4e^{2x}}\right)x-4\right)^{\frac{1}{x}-1}}{x}dx}{x\left(e^{4e^{2x}}x-2x-4\right)}dx-16\int \frac{e^{2\left(x+2e^{2x}\right)}x\int \frac{\left(\left(-2+e^{4e^{2x}}\right)x-4\right)^{\frac{1}{x}-1}}{x}dx}{e^{4e^{2x}}x-2x-4}dx+\int \frac{\int \frac{e^{4e^{2x}}\left(\left(-2+e^{4e^{2x}}\right)x-4\right)^{\frac{1}{x}-1}}{x}dx}{x}dx+4\int \frac{\int \frac{e^{4e^{2x}}\left(\left(-2+e^{4e^{2x}}\right)x-4\right)^{\frac{1}{x}-1}}{x}dx}{x\left(e^{4e^{2x}}x-2x-4\right)}dx+8\int \frac{e^{2\left(x+2e^{2x}\right)}x\int \frac{e^{4e^{2x}}\left(\left(-2+e^{4e^{2x}}\right)x-4\right)^{\frac{1}{x}-1}}{x}dx}{e^{4e^{2x}}x-2x-4}dx+2\log\left(-\left(\left(2-e^{4e^{2x}}\right)x\right)-4\right)\int \frac{\left(e^{4e^{2x}}x-2x-4\right)^{\frac{1}{x}-1}}{x}dx-\log\left(-\left(\left(2-e^{4e^{2x}}\right)x\right)-4\right)\int \frac{e^{4e^{2x}}\left(e^{4e^{2x}}x-2x-4\right)^{\frac{1}{x}-1}}{x}dx$$

input
```
Int[((-4 - 2*x + E^(4*E^(2*x))*x)^x^(-1)*(-2*x + E^(4*E^(2*x))*(x + 8*E^(2
*x)*x^2) + (4 + 2*x - E^(4*E^(2*x))*x)*Log[-4 - 2*x + E^(4*E^(2*x))*x]))/(
-4*x^2 - 2*x^3 + E^(4*E^(2*x))*x^3),x]
```

output
```
$Aborted
```

3.231. $\int \frac{\left(-4-2x+e^{4e^{2x}}x\right)^{\frac{1}{x}}\left(-2x+e^{4e^{2x}}\left(x+8e^{2x}x^2\right)+\left(4+2x-e^{4e^{2x}}x\right)\log\left(-4-2x+e^{4e^{2x}}x\right)\right)}{-4x^2-2x^3+e^{4e^{2x}}x^3}\,dx$

3.231.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.231.4 Maple [A] (verified)

Time = 14.79 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

method	result	size
risch	$\left(x\,\mathrm{e}^{4\,\mathrm{e}^{2x}}-2x-4\right)^{\frac{1}{x}}$	19
parallelrisch	$\mathrm{e}^{\frac{\ln\left(x\,\mathrm{e}^{4\,\mathrm{e}^{2x}}-2x-4\right)}{x}}$	21

input
```
int(((-x*exp(4*exp(2*x))+2*x+4)*ln(x*exp(4*exp(2*x))-2*x-4)+(8*exp(2*x)*x^
2+x)*exp(4*exp(2*x))-2*x)*exp(ln(x*exp(4*exp(2*x))-2*x-4)/x)/(x^3*exp(4*ex
p(2*x))-2*x^3-4*x^2),x,method=_RETURNVERBOSE)
```

output
```
(x*exp(4*exp(2*x))-2*x-4)^(1/x)
```

3.231.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{\left(-4-2x+e^{4e^{2x}}x\right)^{\frac{1}{x}}\left(-2x+e^{4e^{2x}}(x+8e^{2x}x^2)+\left(4+2x-e^{4e^{2x}}x\right)\log\left(-4-2x+e^{4e^{2x}}x\right)\right)}{-4x^2-2x^3+e^{4e^{2x}}x^3}\,dx$$
$$=\left(xe^{\left(4\,e^{(2\,x)}\right)}-2\,x-4\right)^{\left(\frac{1}{x}\right)}$$

input
```
integrate(((-x*exp(4*exp(2*x))+2*x+4)*log(x*exp(4*exp(2*x))-2*x-4)+(8*exp(
2*x)*x^2+x)*exp(4*exp(2*x))-2*x)*exp(log(x*exp(4*exp(2*x))-2*x-4)/x)/(x^3*
exp(4*exp(2*x))-2*x^3-4*x^2),x, algorithm=\
```

output
```
(x*e^(4*e^(2*x)) - 2*x - 4)^(1/x)
```

3.231.6 Sympy [F(-1)]

Timed out.

$$\int \frac{\left(-4-2x+e^{4e^{2x}}x\right)^{\frac{1}{x}}\left(-2x+e^{4e^{2x}}(x+8e^{2x}x^2)+\left(4+2x-e^{4e^{2x}}x\right)\log\left(-4-2x+e^{4e^{2x}}x\right)\right)}{-4x^2-2x^3+e^{4e^{2x}}x^3}\,dx$$
$$= \text{Timed out}$$

input
```
integrate(((-x*exp(4*exp(2*x))+2*x+4)*ln(x*exp(4*exp(2*x))-2*x-4)+(8*exp(2
*x)*x**2+x)*exp(4*exp(2*x))-2*x)*exp(ln(x*exp(4*exp(2*x))-2*x-4)/x)/(x**3*
exp(4*exp(2*x))-2*x**3-4*x**2),x)
```

output
```
Timed out
```

3.231.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{\left(-4-2x+e^{4e^{2x}}x\right)^{\frac{1}{x}}\left(-2x+e^{4e^{2x}}(x+8e^{2x}x^2)+\left(4+2x-e^{4e^{2x}}x\right)\log\left(-4-2x+e^{4e^{2x}}x\right)\right)}{-4x^2-2x^3+e^{4e^{2x}}x^3}\,dx$$
$$= \left(xe^{\left(4\,e^{(2\,x)}\right)}-2\,x-4\right)^{\left(\frac{1}{x}\right)}$$

input
```
integrate(((-x*exp(4*exp(2*x))+2*x+4)*log(x*exp(4*exp(2*x))-2*x-4)+(8*exp(
2*x)*x^2+x)*exp(4*exp(2*x))-2*x)*exp(log(x*exp(4*exp(2*x))-2*x-4)/x)/(x^3*
exp(4*exp(2*x))-2*x^3-4*x^2),x, algorithm=\
```

output
```
(x*e^(4*e^(2*x)) - 2*x - 4)^(1/x)
```

3.231.8 Giac [F]

$$\int \frac{\left(-4-2x+e^{4e^{2x}}x\right)^{\frac{1}{x}}\left(-2x+e^{4e^{2x}}(x+8e^{2x}x^2)+\left(4+2x-e^{4e^{2x}}x\right)\log\left(-4-2x+e^{4e^{2x}}x\right)\right)}{-4x^2-2x^3+e^{4e^{2x}}x^3}\,dx$$
$$= \int \frac{\left((8\,x^2e^{(2\,x)}+x)e^{\left(4\,e^{(2\,x)}\right)}-\left(xe^{\left(4\,e^{(2\,x)}\right)}-2\,x-4\right)\log\left(xe^{\left(4\,e^{(2\,x)}\right)}-2\,x-4\right)-2\,x\right)\left(xe^{\left(4\,e^{(2\,x)}\right)}-2\,x-4\right)}{x^3e^{\left(4\,e^{(2\,x)}\right)}-2\,x^3-4\,x^2}$$

input
```
integrate(((-x*exp(4*exp(2*x))+2*x+4)*log(x*exp(4*exp(2*x))-2*x-4)+(8*exp(
2*x)*x^2+x)*exp(4*exp(2*x))-2*x)*exp(log(x*exp(4*exp(2*x))-2*x-4)/x)/(x^3*
exp(4*exp(2*x))-2*x^3-4*x^2),x, algorithm=\
```

output
```
integrate(((8*x^2*e^(2*x) + x)*e^(4*e^(2*x)) - (x*e^(4*e^(2*x)) - 2*x - 4)
*log(x*e^(4*e^(2*x)) - 2*x - 4) - 2*x)*(x*e^(4*e^(2*x)) - 2*x - 4)^(1/x)/(
x^3*e^(4*e^(2*x)) - 2*x^3 - 4*x^2), x)
```

3.231.9 Mupad [B] (verification not implemented)

Time = 13.93 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{\left(-4-2x+e^{4e^{2x}}x\right)^{\frac{1}{x}}\left(-2x+e^{4e^{2x}}(x+8e^{2x}x^2)+\left(4+2x-e^{4e^{2x}}x\right)\log\left(-4-2x+e^{4e^{2x}}x\right)\right)}{-4x^2-2x^3+e^{4e^{2x}}x^3}\,dx$$
$$=\left(x\,\mathrm{e}^{4\,\mathrm{e}^{2\,x}}-2\,x-4\right)^{1/x}$$

input
```
int(-(exp(log(x*exp(4*exp(2*x)) - 2*x - 4)/x)*(exp(4*exp(2*x))*(x + 8*x^2*
exp(2*x)) - 2*x + log(x*exp(4*exp(2*x)) - 2*x - 4)*(2*x - x*exp(4*exp(2*x)
) + 4)))/(4*x^2 - x^3*exp(4*exp(2*x)) + 2*x^3),x)
```

output
```
(x*exp(4*exp(2*x)) - 2*x - 4)^(1/x)
```

3.232 $\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-}{(-4-x}}}{(16+8x+x^2+e}$

3.232.1 Optimal result

Integrand size = 164, antiderivative size = 33

$$\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(\right.}{(16+8x+x^2+e^x\left(-32-16x-2x^2\right)+e^{2x}\left(16\right.}$$

$$=e^{\frac{2x\left(\frac{4}{x}+\frac{2}{\log(x)}\right)}{(1-e^x)(4+x)}}+x$$

output
```
exp(2*(2/ln(x)+4/x)/(1-exp(x))*x/(4+x))+x
```

3.232.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.15

$$\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(\right.}{(16+8x+x^2+e^x\left(-32-16x-2x^2\right)+e^{2x}\left(16\right.}$$

$$=e^{-\frac{8}{(-1+e^x)(4+x)}-\frac{4x}{(-1+e^x)(4+x)\log(x)}}+x$$

input
```
Integrate[((16 + 8*x + x^2 + E^x*(-32 - 16*x - 2*x^2) + E^(2*x)*(16 + 8*x
+ x^2))*Log[x]^2 + E^((-4*x - 8*Log[x])/((-4 - x + E^x*(4 + x))*Log[x]))*(
-16 - 4*x + E^x*(16 + 4*x) + (16 + E^x*(-16 + 16*x + 4*x^2))*Log[x] + (-8
+ E^x*(40 + 8*x))*Log[x]^2))/((16 + 8*x + x^2 + E^x*(-32 - 16*x - 2*x^2) +
 E^(2*x)*(16 + 8*x + x^2))*Log[x]^2),x]
```

3.232.

$$\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(16+4x)+(16+e^x(-16+16x+4x^2))\log(x)+\right.}{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)}$$

output
```
E^(-8/((-1 + E^x)*(4 + x)) - (4*x)/((-1 + E^x)*(4 + x)*Log[x])) + x
```

3.232.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\left(e^x\left(4x^2+16x-16\right)+16\right)\log(x)-4x+e^x(4x+16)+\left(e^x(8x+40)-8\right)\log^2(x)-16\right)\exp\left(\frac{-4x-8\log(x)}{\left(-x+e^x(x+4)-4\right)\log\cdots}\right.}{\left(x^2+e^x\left(-2x^2-16x-32\right)+e^{2x}\left(x^2+8x+16\right)+\cdots\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \left(\frac{4\left(\left(e^x\left(x^2+4x-4\right)+4\right)\log(x)+\left(e^x-1\right)(x+4)+2\left(e^x(x+5)-1\right)\log^2(x)\right)\exp\left(-\frac{4(x+2\log(x))}{\left(e^x-1\right)(x+4)\log(x)}\right)}{\left(e^x-1\right)^2(x+4)^2\log^2(x)}+1\right)$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4\left(e^xx^2\log(x)+e^xx-x+4e^x+2e^xx\log^2(x)+10e^x\log^2(x)-2\log^2(x)+4e^xx\log(x)-4e^x\log(x)+4\log(\cdots\right.}{\left(1-e^x\right)^2(x+4)^2\log^2(x)}\right.$$

$$\Big\downarrow \text{7299}$$

$$\int \left(\frac{4\left(e^xx^2\log(x)+e^xx-x+4e^x+2e^xx\log^2(x)+10e^x\log^2(x)-2\log^2(x)+4e^xx\log(x)-4e^x\log(x)+4\log(\cdots\right.}{\left(1-e^x\right)^2(x+4)^2\log^2(x)}\right.$$

input
```
Int[((16 + 8*x + x^2 + E^x*(-32 - 16*x - 2*x^2) + E^(2*x)*(16 + 8*x + x^2)
)*Log[x]^2 + E^((-4*x - 8*Log[x])/((-4 - x + E^x*(4 + x))*Log[x]))*(-16 -
4*x + E^x*(16 + 4*x) + (16 + E^x*(-16 + 16*x + 4*x^2))*Log[x] + (-8 + E^x*
(40 + 8*x))*Log[x]^2))/((16 + 8*x + x^2 + E^x*(-32 - 16*x - 2*x^2) + E^(2*
x)*(16 + 8*x + x^2))*Log[x]^2),x]
```

output
```
$Aborted
```

3.232.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.232.4 Maple [A] (verified)

Time = 203.39 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.82

method	result	size
risch	$x+\mathrm{e}^{-\frac{4(2\ln(x)+x)}{(4+x)(\mathrm{e}^{x}-1)\ln(x)}}$	27
parallelrisch	$x+\mathrm{e}^{-\frac{4(2\ln(x)+x)}{(\mathrm{e}^{x}x+4\,\mathrm{e}^{x}-x-4)\ln(x)}}-6$	32

input
```
int(((((8*x+40)*exp(x)-8)*ln(x)^2+((4*x^2+16*x-16)*exp(x)+16)*ln(x)+(4*x+1
6)*exp(x)-16-4*x)*exp((-8*ln(x)-4*x)/((4+x)*exp(x)-x-4)/ln(x))+((x^2+8*x+1
6)*exp(x)^2+(-2*x^2-16*x-32)*exp(x)+x^2+8*x+16)*ln(x)^2)/((x^2+8*x+16)*exp
(x)^2+(-2*x^2-16*x-32)*exp(x)+x^2+8*x+16)/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
x+exp(-4*(2*ln(x)+x)/(4+x)/(exp(x)-1)/ln(x))
```

3.232.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.85

$$\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(\right.}{(16+8x+x^2+e^x\left(-32-16x-2x^2\right)+e^{2x}\left(16\right.}$$
$$= x+e^{\left(-\frac{4\,(x+2\,\log(x))}{((x+4)e^x-x-4)\log(x)}\right)}$$

input
```
integrate(((((8*x+40)*exp(x)-8)*log(x)^2+((4*x^2+16*x-16)*exp(x)+16)*log(x
)+(4*x+16)*exp(x)-16-4*x)*exp((-8*log(x)-4*x)/((4+x)*exp(x)-x-4)/log(x))+(
(x^2+8*x+16)*exp(x)^2+(-2*x^2-16*x-32)*exp(x)+x^2+8*x+16)*log(x)^2)/((x^2+
8*x+16)*exp(x)^2+(-2*x^2-16*x-32)*exp(x)+x^2+8*x+16)/log(x)^2,x, algorithm
=\
```

output
```
x + e^(-4*(x + 2*log(x))/(((x + 4)*e^x - x - 4)*log(x)))
```

3.232.6 Sympy [A] (verification not implemented)

Time = 1.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.79

$$\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(\right.}{(16+8x+x^2+e^x\left(-32-16x-2x^2\right)+e^{2x}\left(16\right.}$$
$$= x+e^{\frac{-4x-8\log(x)}{(-x+(x+4)e^x-4)\log(x)}}$$

input
```
integrate(((((8*x+40)*exp(x)-8)*ln(x)**2+((4*x**2+16*x-16)*exp(x)+16)*ln(x
)+(4*x+16)*exp(x)-16-4*x)*exp((-8*ln(x)-4*x)/((4+x)*exp(x)-x-4)/ln(x))+((x
**2+8*x+16)*exp(x)**2+(-2*x**2-16*x-32)*exp(x)+x**2+8*x+16)*ln(x)**2)/((x*
*2+8*x+16)*exp(x)**2+(-2*x**2-16*x-32)*exp(x)+x**2+8*x+16)/ln(x)**2,x)
```

output
```
x + exp((-4*x - 8*log(x))/((-x + (x + 4)*exp(x) - 4)*log(x)))
```

3.232.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. 2(27) = 54.

Time = 0.35 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.48

$$\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(\right.}{(16+8x+x^2+e^x\left(-32-16x-2x^2\right)+e^{2x}\left(16\right.}$$
$$= \left(xe^{\left(\frac{8}{(x+4)e^x-x-4}+\frac{4}{(e^x-1)\log(x)}\right)}+e^{\left(\frac{16}{((x+4)e^x-x-4)\log(x)}\right)}\right)e^{\left(-\frac{8}{(x+4)e^x-x-4}-\frac{4}{(e^x-1)\log(x)}\right)}$$

input
```
integrate(((((8*x+40)*exp(x)-8)*log(x)^2+((4*x^2+16*x-16)*exp(x)+16)*log(x
)+(4*x+16)*exp(x)-16-4*x)*exp((-8*log(x)-4*x)/((4+x)*exp(x)-x-4)/log(x))+(
(x^2+8*x+16)*exp(x)^2+(-2*x^2-16*x-32)*exp(x)+x^2+8*x+16)*log(x)^2)/((x^2+
8*x+16)*exp(x)^2+(-2*x^2-16*x-32)*exp(x)+x^2+8*x+16)/log(x)^2,x, algorithm
=\
```

3.232.

$$\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(16+4x)+(16+e^x\left(-16+16x+4x^2\right))\log(x)+\right.}{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)}$$

output
```
(x*e^(8/((x + 4)*e^x - x - 4) + 4/((e^x - 1)*log(x))) + e^(16/(((x + 4)*e^
x - x - 4)*log(x))))*e^(-8/((x + 4)*e^x - x - 4) - 4/((e^x - 1)*log(x)))
```

3.232.8 Giac [F(-2)]

Exception generated.

$$\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(\right.}{(16+8x+x^2+e^x\left(-32-16x-2x^2\right)+e^{2x}\left(1\right.}$$
= Exception raised: TypeError

input
```
integrate(((((8*x+40)*exp(x)-8)*log(x)^2+((4*x^2+16*x-16)*exp(x)+16)*log(x
)+(4*x+16)*exp(x)-16-4*x)*exp((-8*log(x)-4*x)/((4+x)*exp(x)-x-4)/log(x))+(
(x^2+8*x+16)*exp(x)^2+(-2*x^2-16*x-32)*exp(x)+x^2+8*x+16)*log(x)^2)/((x^2+
8*x+16)*exp(x)^2+(-2*x^2-16*x-32)*exp(x)+x^2+8*x+16)/log(x)^2,x, algorithm
=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:exp(sageVARx)^2=exp(2*sageVARx)exp(
sageVARx)^2=exp(2*sageVARx)exp(sageVARx)^2=exp(2*sageVARx)exp(sageVARx)^2=
exp(2*sag
```

3.232.9 Mupad [B] (verification not implemented)

Time = 14.51 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.79

$$\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(\right.}{(16+8x+x^2+e^x\left(-32-16x-2x^2\right)+e^{2x}\left(1\right.}$$
$$= x + x^{\frac{8}{4\ln(x)-4e^x\ln(x)+x\ln(x)-x e^x\ln(x)}}\,e^{\frac{4x}{4\ln(x)-4e^x\ln(x)+x\ln(x)-x e^x\ln(x)}}$$

input
```
int((log(x)^2*(8*x + exp(2*x)*(8*x + x^2 + 16) - exp(x)*(16*x + 2*x^2 + 32
) + x^2 + 16) + exp((4*x + 8*log(x))/(log(x)*(x - exp(x)*(x + 4) + 4)))*(l
og(x)*(exp(x)*(16*x + 4*x^2 - 16) + 16) - 4*x + exp(x)*(4*x + 16) + log(x)
^2*(exp(x)*(8*x + 40) - 8) - 16))/(log(x)^2*(8*x + exp(2*x)*(8*x + x^2 + 1
6) - exp(x)*(16*x + 2*x^2 + 32) + x^2 + 16)),x)
```

output
```
x + x^(8/(4*log(x) - 4*exp(x)*log(x) + x*log(x) - x*exp(x)*log(x)))*exp((4
*x)/(4*log(x) - 4*exp(x)*log(x) + x*log(x) - x*exp(x)*log(x)))
```

3.232. $\int \frac{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)+e^{\frac{-4x-8\log(x)}{(-4-x+e^x(4+x))\log(x)}}\left(-16-4x+e^x(16+4x)+(16+e^x(-16+16x+4x^2))\log(x)+\right.}{(16+8x+x^2+e^x(-32-16x-2x^2)+e^{2x}(16+8x+x^2))\log^2(x)}$

3.233 $\int \frac{640+45x^2-144e^{x^2}x^4}{90x^3}\,dx$

3.233.1 Optimal result

Integrand size = 24, antiderivative size = 23

$$\int \frac{640+45x^2-144e^{x^2}x^4}{90x^3}\,dx = \frac{1}{2}\left(-\frac{8e^{x^2}}{5}-\frac{64}{9x^2}+\log(x)\right)$$

output
```
1/2*ln(x)-32/9/x^2-4/5*exp(x^2)
```

3.233.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{640+45x^2-144e^{x^2}x^4}{90x^3}\,dx = -\frac{4e^{x^2}}{5}-\frac{32}{9x^2}+\frac{\log(x)}{2}$$

input
```
Integrate[(640 + 45*x^2 - 144*E^x^2*x^4)/(90*x^3),x]
```

output
```
(-4*E^x^2)/5 - 32/(9*x^2) + Log[x]/2
```

3.233.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{45x^2-144e^{x^2}x^4+640}{90x^3}dx$$
$$\Big\downarrow \text{ 27}$$
$$\frac{1}{90}\int \frac{-144e^{x^2}x^4+45x^2+640}{x^3}dx$$
$$\Big\downarrow \text{ 2010}$$
$$\frac{1}{90}\int \left(\frac{5(9x^2+128)}{x^3}-144e^{x^2}x\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$\frac{1}{90}\left(-72e^{x^2}-\frac{320}{x^2}+45\log(x)\right)$$

input
```
Int[(640 + 45*x^2 - 144*E^x^2*x^4)/(90*x^3),x]
```

output
```
(-72*E^x^2 - 320/x^2 + 45*Log[x])/90
```

3.233.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.233.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

method	result	size
default	$\frac{\ln(x)}{2}-\frac{32}{9x^2}-\frac{4\,\mathrm{e}^{x^2}}{5}$	17
risch	$\frac{\ln(x)}{2}-\frac{32}{9x^2}-\frac{4\,\mathrm{e}^{x^2}}{5}$	17
parts	$\frac{\ln(x)}{2}-\frac{32}{9x^2}-\frac{4\,\mathrm{e}^{x^2}}{5}$	17
norman	$\frac{-\frac{32}{9}-\frac{4x^2\mathrm{e}^{x^2}}{5}}{x^2}+\frac{\ln(x)}{2}$	21
parallelrisch	$\frac{45x^2\ln(x)-72x^2\mathrm{e}^{x^2}-320}{90x^2}$	24

input
```
int(1/90*(-144*x^4*exp(x^2)+45*x^2+640)/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/2*ln(x)-32/9/x^2-4/5*exp(x^2)
```

3.233.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{640+45x^2-144e^{x^2}x^4}{90x^3}\,dx=-\frac{72\,x^2e^{(x^2)}-45\,x^2\log{(x)}+320}{90\,x^2}$$

input
```
integrate(1/90*(-144*x^4*exp(x^2)+45*x^2+640)/x^3,x, algorithm=\
```

output
```
-1/90*(72*x^2*e^(x^2) - 45*x^2*log(x) + 320)/x^2
```

3.233.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{640+45x^2-144e^{x^2}x^4}{90x^3}\,dx=-\frac{4e^{x^2}}{5}+\frac{\log{(x)}}{2}-\frac{32}{9x^2}$$

input
```
integrate(1/90*(-144*x**4*exp(x**2)+45*x**2+640)/x**3,x)
```

output
```
-4*exp(x**2)/5 + log(x)/2 - 32/(9*x**2)
```

3.233.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

$$\int \frac{640 + 45x^2 - 144e^{x^2}x^4}{90x^3}\,dx = -\frac{32}{9\,x^2} - \frac{4}{5}\,e^{(x^2)} + \frac{1}{2}\,\log{(x)}$$

input
```
integrate(1/90*(-144*x^4*exp(x^2)+45*x^2+640)/x^3,x, algorithm=\
```

output
```
-32/9/x^2 - 4/5*e^(x^2) + 1/2*log(x)
```

3.233.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{640 + 45x^2 - 144e^{x^2}x^4}{90x^3}\,dx = -\frac{144\,x^2e^{(x^2)} - 45\,x^2\log{(x^2)} + 640}{180\,x^2}$$

input
```
integrate(1/90*(-144*x^4*exp(x^2)+45*x^2+640)/x^3,x, algorithm=\
```

output
```
-1/180*(144*x^2*e^(x^2) - 45*x^2*log(x^2) + 640)/x^2
```

3.233.9 Mupad [B] (verification not implemented)

Time = 13.74 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{640 + 45x^2 - 144e^{x^2}x^4}{90x^3}\,dx = \frac{\ln{(x)}}{2} - \frac{72\,x^2\,\mathrm{e}^{x^2} + 320}{90\,x^2}$$

input
```
int((x^2/2 - (8*x^4*exp(x^2))/5 + 64/9)/x^3,x)
```

output
```
log(x)/2 - (72*x^2*exp(x^2) + 320)/(90*x^2)
```

3.234 $\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-}$

3.234.1 Optimal result

Integrand size = 389, antiderivative size = 34

$$\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-3537x^{10}-486x^{11}-27x^{12}+}$$
$$= \frac{5}{16x^2\left(2-x+\frac{3}{4}(3+x)^2(-e^x+x)-\log(2)\right)^2}$$

output
```
5/16/x^2/(3/4*(x-exp(x))*(3+x)^2+2-ln(2)-x)^2
```

3.234.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 93 vs. 2(34) = 68.

Time = 3.33 (sec) , antiderivative size = 93, normalized size of antiderivative = 2.74

$$\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-3537x^{10}-486x^{11}-27x^{12}+}$$
$$= -\frac{5(29-50x^2-24x^3-3x^4+x(8+\log(16))+\log(1048576))^3}{x^2(-29+50x^2+24x^3+3x^4-20\log(2)-4x(2+\log(2)))^3(8+23x+18x^2+3x^3-3e^x(3+x)^2-\text{lo}}$$

3.234.
$\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-3537x^{10}-486x^{11}-27x^{12}+e^{3x}(19683x^3+39366x^4+32805x^5+14580x^6+364}$

input
```
Integrate[(80 + 460*x + 540*x^2 + 120*x^3 + E^x*(-270 - 630*x - 270*x^2 -
30*x^3) - 40*Log[2])/(-512*x^3 - 4416*x^4 - 16152*x^5 - 32615*x^6 - 39654*
x^7 - 29709*x^8 - 13500*x^9 - 3537*x^10 - 486*x^11 - 27*x^12 + E^(3*x)*(19
683*x^3 + 39366*x^4 + 32805*x^5 + 14580*x^6 + 3645*x^7 + 486*x^8 + 27*x^9)
 + (768*x^3 + 4416*x^4 + 9804*x^5 + 10512*x^6 + 5544*x^7 + 1296*x^8 + 108*
x^9)*Log[2] + (-384*x^3 - 1104*x^4 - 864*x^5 - 144*x^6)*Log[2]^2 + 64*x^3*
Log[2]^3 + E^(2*x)*(-17496*x^3 - 73629*x^4 - 118098*x^5 - 95175*x^6 - 4266
0*x^7 - 10827*x^8 - 1458*x^9 - 81*x^10 + (8748*x^3 + 11664*x^4 + 5832*x^5
+ 1296*x^6 + 108*x^7)*Log[2]) + E^x*(5184*x^3 + 33264*x^4 + 86625*x^5 + 11
8386*x^6 + 92079*x^7 + 41580*x^8 + 10719*x^9 + 1458*x^10 + 81*x^11 + (-518
4*x^3 - 18360*x^4 - 22176*x^5 - 11376*x^6 - 2592*x^7 - 216*x^8)*Log[2] + (
1296*x^3 + 864*x^4 + 144*x^5)*Log[2]^2)),x]
```

output
```
(-5*(29 - 50*x^2 - 24*x^3 - 3*x^4 + x*(8 + Log[16]) + Log[1048576])^3)/(x^
2*(-29 + 50*x^2 + 24*x^3 + 3*x^4 - 20*Log[2] - 4*x*(2 + Log[2]))^3*(8 + 23
*x + 18*x^2 + 3*x^3 - 3*E^x*(3 + x)^2 - Log[16])^2)
```

3.234.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{}{-27x^{12}-486x^{11}-3537x^{10}-13500x^9-29709x^8-39654x^7-32615x^6-16152x^5-4416x^4-512x^3+64x^3 \cdots}$$

$$\Big\downarrow \; 6$$

$$\int \frac{}{-27x^{12}-486x^{11}-3537x^{10}-13500x^9-29709x^8-39654x^7-32615x^6-16152x^5-4416x^4+x^3\left(64\log^3(2) \cdots\right.}$$

$$\Big\downarrow \; 7239$$

$$\int \frac{10\left(-12x^3-54x^2+3e^x\left(x^3+9x^2+21x+9\right)-46x-8\left(1-\frac{\log(2)}{2}\right)\right)}{x^3\left(3x^3+18x^2+23x-3e^x(x+3)^2+8\left(1-\frac{\log(2)}{2}\right)\right)^3}dx$$

$$\Big\downarrow \; 27$$

$$10\int -\frac{12x^3+54x^2+46x-3e^x\left(x^3+9x^2+21x+9\right)-\log(16)+8}{x^3\left(3x^3+18x^2+23x-3e^x(x+3)^2+4(2-\log(2))\right)^3}dx$$

$$\Big\downarrow \; 25$$

3.234.

$$\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-3537x^{10}-486x^{11}-27x^{12}+e^{3x}\left(19683x^3+39366x^4+32805x^5+14580x^6+364 \cdots\right.}$$

$$-10\int \frac{12x^3+54x^2+46x-3e^x\left(x^3+9x^2+21x+9\right)-\log(16)+8}{x^3\left(3x^3+18x^2+23x-3e^x(x+3)^2+4(2-\log(2))\right)^3}dx$$

$$\Big\downarrow \text{7292}$$

$$-10\int \frac{12x^3+54x^2+46x-3e^x\left(x^3+9x^2+21x+9\right)+8\left(1-\frac{\log(2)}{2}\right)}{x^3\left(3x^3+18x^2+23x-3e^x(x+3)^2+4(2-\log(2))\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$-10\int \left(\frac{x^2+6x+3}{x^3(x+3)\left(-3x^3+3e^xx^2-18x^2+18e^xx-23x+27e^x-8\left(1-\frac{\log(2)}{2}\right)\right)^2}+\frac{3x^4+24x^3+5}{x^2(x+3)\left(-3x^3+3e^xx^2\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-10\left(15\int \frac{1}{\left(-3x^3+3e^xx^2-18x^2+18e^xx-23x+27e^x-8\left(1-\frac{\log(2)}{2}\right)\right)^3}dx-\frac{1}{3}(29+20\log(2))\int \frac{}{x^2\left(-3x^3\right.}\right.$$

input
```
Int[(80 + 460*x + 540*x^2 + 120*x^3 + E^x*(-270 - 630*x - 270*x^2 - 30*x^3
) - 40*Log[2])/(-512*x^3 - 4416*x^4 - 16152*x^5 - 32615*x^6 - 39654*x^7 -
29709*x^8 - 13500*x^9 - 3537*x^10 - 486*x^11 - 27*x^12 + E^(3*x)*(19683*x^
3 + 39366*x^4 + 32805*x^5 + 14580*x^6 + 3645*x^7 + 486*x^8 + 27*x^9) + (76
8*x^3 + 4416*x^4 + 9804*x^5 + 10512*x^6 + 5544*x^7 + 1296*x^8 + 108*x^9)*L
og[2] + (-384*x^3 - 1104*x^4 - 864*x^5 - 144*x^6)*Log[2]^2 + 64*x^3*Log[2]
^3 + E^(2*x)*(-17496*x^3 - 73629*x^4 - 118098*x^5 - 95175*x^6 - 42660*x^7
- 10827*x^8 - 1458*x^9 - 81*x^10 + (8748*x^3 + 11664*x^4 + 5832*x^5 + 1296
*x^6 + 108*x^7)*Log[2]) + E^x*(5184*x^3 + 33264*x^4 + 86625*x^5 + 118386*x
^6 + 92079*x^7 + 41580*x^8 + 10719*x^9 + 1458*x^10 + 81*x^11 + (-5184*x^3
- 18360*x^4 - 22176*x^5 - 11376*x^6 - 2592*x^7 - 216*x^8)*Log[2] + (1296*x
^3 + 864*x^4 + 144*x^5)*Log[2]^2)),x]
```

output
```
$Aborted
```

3.234.

$$\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-3537x^{10}-486x^{11}-27x^{12}+e^{3x}\left(19683x^3+39366x^4+32805x^5+14580x^6+364\right.}$$

3.234.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.234.4 Maple [A] (verified)

Time = 1.22 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.26

method	result
risch	$\frac{5}{x^2 (3\,\mathrm{e}^{x} x^2-3x^3+18\,\mathrm{e}^{x} x-18x^2+4\ln(2)+27\,\mathrm{e}^{x}-23x-8)^2}$
parallelrisch	$\frac{}{x^2 \left(64+9\,\mathrm{e}^{2x} x^4+368x+216\,\mathrm{e}^{x}\ln(2)+108\,\mathrm{e}^{2x} x^3+486\,\mathrm{e}^{2x} x^2+972x\,\mathrm{e}^{2x}-216\,\mathrm{e}^{x} x^4-184x\ln(2)-144x^2\ln(2)-24x^3\ln(2)-1848\,\mathrm{e}\right.}$

3.234.

$$\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-3537x^{10}-486x^{11}-27x^{12}+e^{3x}(19683x^3+39366x^4+32805x^5+14580x^6+364}$$

input
```
int(((-30*x^3-270*x^2-630*x-270)*exp(x)-40*ln(2)+120*x^3+540*x^2+460*x+80)
/((27*x^9+486*x^8+3645*x^7+14580*x^6+32805*x^5+39366*x^4+19683*x^3)*exp(x)
^3+((108*x^7+1296*x^6+5832*x^5+11664*x^4+8748*x^3)*ln(2)-81*x^10-1458*x^9-
10827*x^8-42660*x^7-95175*x^6-118098*x^5-73629*x^4-17496*x^3)*exp(x)^2+((1
44*x^5+864*x^4+1296*x^3)*ln(2)^2+(-216*x^8-2592*x^7-11376*x^6-22176*x^5-18
360*x^4-5184*x^3)*ln(2)+81*x^11+1458*x^10+10719*x^9+41580*x^8+92079*x^7+11
8386*x^6+86625*x^5+33264*x^4+5184*x^3)*exp(x)+64*x^3*ln(2)^3+(-144*x^6-864
*x^5-1104*x^4-384*x^3)*ln(2)^2+(108*x^9+1296*x^8+5544*x^7+10512*x^6+9804*x
^5+4416*x^4+768*x^3)*ln(2)-27*x^12-486*x^11-3537*x^10-13500*x^9-29709*x^8-
39654*x^7-32615*x^6-16152*x^5-4416*x^4-512*x^3),x,method=_RETURNVERBOSE)
```

output
```
5/x^2/(3*exp(x)*x^2-3*x^3+18*exp(x)*x-18*x^2+4*ln(2)+27*exp(x)-23*x-8)^2
```

3.234.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 157 vs. $2(29) = 58$.

Time = 0.29 (sec) , antiderivative size = 157, normalized size of antiderivative = 4.62

$$\int \frac{}{-512x^3 - 4416x^4 - 16152x^5 - 32615x^6 - 39654x^7 - 29709x^8 - 13500x^9 - 3537x^{10} - 486x^{11} - 27x^{12} +}$$

$$= \frac{}{9\,x^8 + 108\,x^7 + 462\,x^6 + 876\,x^5 + 817\,x^4 + 16\,x^2\log{(2)}^2 + 368\,x^3 + 64\,x^2 + 9\,(x^6 + 12\,x^5 + 54\,x^4 + 108\,x}$$

input
```
integrate(((-30*x^3-270*x^2-630*x-270)*exp(x)-40*log(2)+120*x^3+540*x^2+46
0*x+80)/((27*x^9+486*x^8+3645*x^7+14580*x^6+32805*x^5+39366*x^4+19683*x^3)
*exp(x)^3+((108*x^7+1296*x^6+5832*x^5+11664*x^4+8748*x^3)*log(2)-81*x^10-1
458*x^9-10827*x^8-42660*x^7-95175*x^6-118098*x^5-73629*x^4-17496*x^3)*exp(
x)^2+((144*x^5+864*x^4+1296*x^3)*log(2)^2+(-216*x^8-2592*x^7-11376*x^6-221
76*x^5-18360*x^4-5184*x^3)*log(2)+81*x^11+1458*x^10+10719*x^9+41580*x^8+92
079*x^7+118386*x^6+86625*x^5+33264*x^4+5184*x^3)*exp(x)+64*x^3*log(2)^3+(-
144*x^6-864*x^5-1104*x^4-384*x^3)*log(2)^2+(108*x^9+1296*x^8+5544*x^7+1051
2*x^6+9804*x^5+4416*x^4+768*x^3)*log(2)-27*x^12-486*x^11-3537*x^10-13500*x
^9-29709*x^8-39654*x^7-32615*x^6-16152*x^5-4416*x^4-512*x^3),x, algorithm=
\
```

output
```
5/(9*x^8 + 108*x^7 + 462*x^6 + 876*x^5 + 817*x^4 + 16*x^2*log(2)^2 + 368*x
^3 + 64*x^2 + 9*(x^6 + 12*x^5 + 54*x^4 + 108*x^3 + 81*x^2)*e^(2*x) - 6*(3*
x^7 + 36*x^6 + 158*x^5 + 308*x^4 + 255*x^3 + 72*x^2 - 4*(x^4 + 6*x^3 + 9*x
^2)*log(2))*e^x - 8*(3*x^5 + 18*x^4 + 23*x^3 + 8*x^2)*log(2))
```

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$$\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-3537x^{10}-486x^{11}-27x^{12}+e^{3x}(19683x^3+39366x^4+32805x^5+14580x^6+364}$$

3.234.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 170 vs. 2(31) = 62.

Time = 0.63 (sec) , antiderivative size = 170, normalized size of antiderivative = 5.00

$$\int \frac{}{-512x^3 - 4416x^4 - 16152x^5 - 32615x^6 - 39654x^7 - 29709x^8 - 13500x^9 - 3537x^{10} - 486x^{11} - 27x^{12} +}$$

$$= \frac{}{9x^8 + 108x^7 + 462x^6 - 24x^5 \log(2) + 876x^5 - 144x^4 \log(2) + 817x^4 - 184x^3 \log(2) + 368x^3 - 64x^2 \log(}$$

input
```
integrate(((-30*x**3-270*x**2-630*x-270)*exp(x)-40*ln(2)+120*x**3+540*x**2
+460*x+80)/((27*x**9+486*x**8+3645*x**7+14580*x**6+32805*x**5+39366*x**4+1
9683*x**3)*exp(x)**3+((108*x**7+1296*x**6+5832*x**5+11664*x**4+8748*x**3)*
ln(2)-81*x**10-1458*x**9-10827*x**8-42660*x**7-95175*x**6-118098*x**5-7362
9*x**4-17496*x**3)*exp(x)**2+((144*x**5+864*x**4+1296*x**3)*ln(2)**2+(-216
*x**8-2592*x**7-11376*x**6-22176*x**5-18360*x**4-5184*x**3)*ln(2)+81*x**11
+1458*x**10+10719*x**9+41580*x**8+92079*x**7+118386*x**6+86625*x**5+33264*
x**4+5184*x**3)*exp(x)+64*x**3*ln(2)**3+(-144*x**6-864*x**5-1104*x**4-384*
x**3)*ln(2)**2+(108*x**9+1296*x**8+5544*x**7+10512*x**6+9804*x**5+4416*x**
4+768*x**3)*ln(2)-27*x**12-486*x**11-3537*x**10-13500*x**9-29709*x**8-3965
4*x**7-32615*x**6-16152*x**5-4416*x**4-512*x**3),x)
```

output
```
5/(9*x**8 + 108*x**7 + 462*x**6 - 24*x**5*log(2) + 876*x**5 - 144*x**4*log
(2) + 817*x**4 - 184*x**3*log(2) + 368*x**3 - 64*x**2*log(2) + 16*x**2*log
(2)**2 + 64*x**2 + (9*x**6 + 108*x**5 + 486*x**4 + 972*x**3 + 729*x**2)*ex
p(2*x) + (-18*x**7 - 216*x**6 - 948*x**5 - 1848*x**4 + 24*x**4*log(2) - 15
30*x**3 + 144*x**3*log(2) - 432*x**2 + 216*x**2*log(2))*exp(x))
```

3.234.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 145 vs. 2(29) = 58.

Time = 1.12 (sec) , antiderivative size = 145, normalized size of antiderivative = 4.26

$$\int \frac{}{-512x^3 - 4416x^4 - 16152x^5 - 32615x^6 - 39654x^7 - 29709x^8 - 13500x^9 - 3537x^{10} - 486x^{11} - 27x^{12} +}$$

$$= \frac{}{9\,x^8 + 108\,x^7 + 462\,x^6 - 12\,x^5(2\,\log(2) - 73) - x^4(144\,\log(2) - 817) - 184\,x^3(\log(2) - 2) + 16\,(\log(2)}$$

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$$\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-3537x^{10}-486x^{11}-27x^{12}+e^{3x}(19683x^3+39366x^4+32805x^5+14580x^6+364}$$

input
```
integrate(((-30*x^3-270*x^2-630*x-270)*exp(x)-40*log(2)+120*x^3+540*x^2+46
0*x+80)/((27*x^9+486*x^8+3645*x^7+14580*x^6+32805*x^5+39366*x^4+19683*x^3)
*exp(x)^3+((108*x^7+1296*x^6+5832*x^5+11664*x^4+8748*x^3)*log(2)-81*x^10-1
458*x^9-10827*x^8-42660*x^7-95175*x^6-118098*x^5-73629*x^4-17496*x^3)*exp(
x)^2+((144*x^5+864*x^4+1296*x^3)*log(2)^2+(-216*x^8-2592*x^7-11376*x^6-221
76*x^5-18360*x^4-5184*x^3)*log(2)+81*x^11+1458*x^10+10719*x^9+41580*x^8+92
079*x^7+118386*x^6+86625*x^5+33264*x^4+5184*x^3)*exp(x)+64*x^3*log(2)^3+(-
144*x^6-864*x^5-1104*x^4-384*x^3)*log(2)^2+(108*x^9+1296*x^8+5544*x^7+1051
2*x^6+9804*x^5+4416*x^4+768*x^3)*log(2)-27*x^12-486*x^11-3537*x^10-13500*x
^9-29709*x^8-39654*x^7-32615*x^6-16152*x^5-4416*x^4-512*x^3),x, algorithm=
\
```

output
```
5/(9*x^8 + 108*x^7 + 462*x^6 - 12*x^5*(2*log(2) - 73) - x^4*(144*log(2) -
817) - 184*x^3*(log(2) - 2) + 16*(log(2)^2 - 4*log(2) + 4)*x^2 + 9*(x^6 +
12*x^5 + 54*x^4 + 108*x^3 + 81*x^2)*e^(2*x) - 6*(3*x^7 + 36*x^6 + 158*x^5
- 4*x^4*(log(2) - 77) - 3*x^3*(8*log(2) - 85) - 36*x^2*(log(2) - 2))*e^x)
```

3.234.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 191 vs. $2(29) = 58$.

Time = 0.64 (sec) , antiderivative size = 191, normalized size of antiderivative = 5.62

$$\int \frac{}{-512x^3 - 4416x^4 - 16152x^5 - 32615x^6 - 39654x^7 - 29709x^8 - 13500x^9 - 3537x^{10} - 486x^{11} - 27x^{12} + \cdots}$$

$$= \frac{}{9\,x^8 - 18\,x^7e^x + 108\,x^7 + 9\,x^6e^{(2\,x)} - 216\,x^6e^x + 462\,x^6 + 108\,x^5e^{(2\,x)} - 948\,x^5e^x - 24\,x^5\log(2) + 24\,x^4e^x \cdots}$$

input
```
integrate(((-30*x^3-270*x^2-630*x-270)*exp(x)-40*log(2)+120*x^3+540*x^2+46
0*x+80)/((27*x^9+486*x^8+3645*x^7+14580*x^6+32805*x^5+39366*x^4+19683*x^3)
*exp(x)^3+((108*x^7+1296*x^6+5832*x^5+11664*x^4+8748*x^3)*log(2)-81*x^10-1
458*x^9-10827*x^8-42660*x^7-95175*x^6-118098*x^5-73629*x^4-17496*x^3)*exp(
x)^2+((144*x^5+864*x^4+1296*x^3)*log(2)^2+(-216*x^8-2592*x^7-11376*x^6-221
76*x^5-18360*x^4-5184*x^3)*log(2)+81*x^11+1458*x^10+10719*x^9+41580*x^8+92
079*x^7+118386*x^6+86625*x^5+33264*x^4+5184*x^3)*exp(x)+64*x^3*log(2)^3+(-
144*x^6-864*x^5-1104*x^4-384*x^3)*log(2)^2+(108*x^9+1296*x^8+5544*x^7+1051
2*x^6+9804*x^5+4416*x^4+768*x^3)*log(2)-27*x^12-486*x^11-3537*x^10-13500*x
^9-29709*x^8-39654*x^7-32615*x^6-16152*x^5-4416*x^4-512*x^3),x, algorithm=
\
```

output
```
5/(9*x^8 - 18*x^7*e^x + 108*x^7 + 9*x^6*e^(2*x) - 216*x^6*e^x + 462*x^6 +
108*x^5*e^(2*x) - 948*x^5*e^x - 24*x^5*log(2) + 24*x^4*e^x*log(2) + 876*x^
5 + 486*x^4*e^(2*x) - 1848*x^4*e^x - 144*x^4*log(2) + 144*x^3*e^x*log(2) +
 817*x^4 + 972*x^3*e^(2*x) - 1530*x^3*e^x - 184*x^3*log(2) + 216*x^2*e^x*l
og(2) + 16*x^2*log(2)^2 + 368*x^3 + 729*x^2*e^(2*x) - 432*x^2*e^x - 64*x^2
*log(2) + 64*x^2)
```

3.234.9 Mupad [F(-1)]

Timed out.

$$\int \frac{}{-512x^3 - 4416x^4 - 16152x^5 - 32615x^6 - 39654x^7 - 29709x^8 - 13500x^9 - 3537x^{10} - 486x^{11} - 27x^{12} +}$$

$$= \int -\frac{}{\ln(2)^2 \left(144\,x^6 + 864\,x^5 + 1104\,x^4 + 384\,x^3\right) - \mathrm{e}^x \left(\ln(2)^2 \left(144\,x^5 + 864\,x^4 + 1296\,x^3\right) - \ln(2) \left(216\,x^8\right.\right.}$$

input
```
int(-(460*x - 40*log(2) + 540*x^2 + 120*x^3 - exp(x)*(630*x + 270*x^2 + 30
*x^3 + 270) + 80)/(log(2)^2*(384*x^3 + 1104*x^4 + 864*x^5 + 144*x^6) - exp
(x)*(log(2)^2*(1296*x^3 + 864*x^4 + 144*x^5) - log(2)*(5184*x^3 + 18360*x^
4 + 22176*x^5 + 11376*x^6 + 2592*x^7 + 216*x^8) + 5184*x^3 + 33264*x^4 + 8
6625*x^5 + 118386*x^6 + 92079*x^7 + 41580*x^8 + 10719*x^9 + 1458*x^10 + 81
*x^11) - 64*x^3*log(2)^3 - exp(3*x)*(19683*x^3 + 39366*x^4 + 32805*x^5 + 1
4580*x^6 + 3645*x^7 + 486*x^8 + 27*x^9) - log(2)*(768*x^3 + 4416*x^4 + 980
4*x^5 + 10512*x^6 + 5544*x^7 + 1296*x^8 + 108*x^9) + 512*x^3 + 4416*x^4 +
16152*x^5 + 32615*x^6 + 39654*x^7 + 29709*x^8 + 13500*x^9 + 3537*x^10 + 48
6*x^11 + 27*x^12 + exp(2*x)*(17496*x^3 - log(2)*(8748*x^3 + 11664*x^4 + 58
32*x^5 + 1296*x^6 + 108*x^7) + 73629*x^4 + 118098*x^5 + 95175*x^6 + 42660*
x^7 + 10827*x^8 + 1458*x^9 + 81*x^10)),x)
```

output
```
int(-(460*x - 40*log(2) + 540*x^2 + 120*x^3 - exp(x)*(630*x + 270*x^2 + 30
*x^3 + 270) + 80)/(log(2)^2*(384*x^3 + 1104*x^4 + 864*x^5 + 144*x^6) - exp
(x)*(log(2)^2*(1296*x^3 + 864*x^4 + 144*x^5) - log(2)*(5184*x^3 + 18360*x^
4 + 22176*x^5 + 11376*x^6 + 2592*x^7 + 216*x^8) + 5184*x^3 + 33264*x^4 + 8
6625*x^5 + 118386*x^6 + 92079*x^7 + 41580*x^8 + 10719*x^9 + 1458*x^10 + 81
*x^11) - 64*x^3*log(2)^3 - exp(3*x)*(19683*x^3 + 39366*x^4 + 32805*x^5 + 1
4580*x^6 + 3645*x^7 + 486*x^8 + 27*x^9) - log(2)*(768*x^3 + 4416*x^4 + 980
4*x^5 + 10512*x^6 + 5544*x^7 + 1296*x^8 + 108*x^9) + 512*x^3 + 4416*x^4 +
16152*x^5 + 32615*x^6 + 39654*x^7 + 29709*x^8 + 13500*x^9 + 3537*x^10 + 48
6*x^11 + 27*x^12 + exp(2*x)*(17496*x^3 - log(2)*(8748*x^3 + 11664*x^4 + 58
32*x^5 + 1296*x^6 + 108*x^7) + 73629*x^4 + 118098*x^5 + 95175*x^6 + 42660*
x^7 + 10827*x^8 + 1458*x^9 + 81*x^10)), x)
```

3.234.

$$\int \frac{}{-512x^3-4416x^4-16152x^5-32615x^6-39654x^7-29709x^8-13500x^9-3537x^{10}-486x^{11}-27x^{12}+e^{3x}(19683x^3+39366x^4+32805x^5+14580x^6+364}$$

3.235 $\int \frac{}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+632}$

3.235.1 Optimal result

Integrand size = 122, antiderivative size = 22

$$\int \frac{1600+4e^4-2240x+480x}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+6320x^6-1120x^7+129x^8-14x}$$

$$=2-\frac{4}{(-7+x)\left(e^4+(20+x^2)^2\right)}$$

output
```
2-4/(-7+x)/(exp(4)+(x^2+20)^2)
```

3.235.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1600+4e^4-2240x+480x}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+6320x^6-1120x^7+129x^8-14x}$$

$$=-\frac{4}{(-7+x)\left(e^4+(20+x^2)^2\right)}$$

input
```
Integrate[(1600 + 4*E^4 - 2240*x + 480*x^2 - 112*x^3 + 20*x^4)/(7840000 -
2240000*x + 1728000*x^2 - 448000*x^3 + 149600*x^4 - 33600*x^5 + 6320*x^6 -
 1120*x^7 + 129*x^8 - 14*x^9 + x^10 + E^8*(49 - 14*x + x^2) + E^4*(39200 -
 11200*x + 4720*x^2 - 1120*x^3 + 178*x^4 - 28*x^5 + 2*x^6)),x]
```

output
```
-4/((-7 + x)*(E^4 + (20 + x^2)^2))
```

3.235.

$$\int \frac{1600+4e^4-2240x+480x^2-112x^3+20x^4}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+6320x^6-1120x^7+129x^8-14x^9+x^{10}+e^8(49-14x+x^2)+e^4(39200-11200x+47}$$

3.235.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 3 vs. order 1 in optimal.

Time = 1.14 (sec) , antiderivative size = 259, normalized size of antiderivative = 11.77, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.016, Rules used = {2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{20x^4-112x^3+480x^2-2240x+}{x^{10}-14x^9+129x^8-1120x^7+6320x^6-33600x^5+149600x^4-448000x^3+1728000x^2+e^8\left(x^2-14x+49\right)}$$

$$\Big\downarrow \text{2462}$$

$$\int \left(-\frac{4\left(x^2+14x+187\right)}{\left(4761+e^4\right)\left(x^4+40x^2+e^4+400\right)}+\frac{16\left(-483x^3+\left(1380+e^4\right)x^2-7\left(1380-e^4\right)x+69\left(400+e^4\right)\right)}{\left(4761+e^4\right)\left(x^4+40x^2+e^4+400\right)^2}+\frac{}{(4}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{\sqrt{2}\left(\sqrt{\sqrt{400+e^4}-20}+187\sqrt{\frac{\sqrt{400+e^4}-20}{400+e^4}}\right)\arctan\left(\frac{2x+\sqrt{2\left(\sqrt{400+e^4}-20\right)}}{\sqrt{2\left(20+\sqrt{400+e^4}\right)}}\right)}{e^2\left(4761+e^4\right)}+\frac{\sqrt{\frac{2}{\left(400+e^4\right)\left(20+\sqrt{400+e^4}\right)}}\left(187+\sqrt{400+e^4}\right)\arctan\left(\frac{2x+\sqrt{2\left(\sqrt{400+e^4}-20\right)}}{\sqrt{2\left(20+\sqrt{400+e^4}\right)}}\right)}{4761+e^4}+\frac{4x\left(x^2+89\right)}{\left(4761+e^4\right)\left(x^4+40x^2+e^4+400\right)}+\frac{28\left(x^2+89\right)}{\left(4761+e^4\right)\left(x^4+40x^2+e^4+400\right)}+\frac{4}{\left(4761+e^4\right)(7-x)}$$

input
```
Int[(1600 + 4*E^4 - 2240*x + 480*x^2 - 112*x^3 + 20*x^4)/(7840000 - 224000
0*x + 1728000*x^2 - 448000*x^3 + 149600*x^4 - 33600*x^5 + 6320*x^6 - 1120*
x^7 + 129*x^8 - 14*x^9 + x^10 + E^8*(49 - 14*x + x^2) + E^4*(39200 - 11200
*x + 4720*x^2 - 1120*x^3 + 178*x^4 - 28*x^5 + 2*x^6)),x]
```

3.235. $\int \frac{1600+4e^4-2240x+480x^2-112x^3+20x^4}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+6320x^6-1120x^7+129x^8-14x^9+x^{10}+e^8(49-14x+x^2)+e^4(39200-11200x+47}$

output
```
4/((4761 + E^4)*(7 - x)) + (28*(89 + x^2))/((4761 + E^4)*(400 + E^4 + 40*x
^2 + x^4)) + (4*x*(89 + x^2))/((4761 + E^4)*(400 + E^4 + 40*x^2 + x^4)) +
(Sqrt[2/((400 + E^4)*(20 + Sqrt[400 + E^4]))]*(187 + Sqrt[400 + E^4])*ArcT
an[(Sqrt[2*(-20 + Sqrt[400 + E^4])] + 2*x)/Sqrt[2*(20 + Sqrt[400 + E^4])]]
)/(4761 + E^4) - (Sqrt[2]*(Sqrt[-20 + Sqrt[400 + E^4]] + 187*Sqrt[(-20 + S
qrt[400 + E^4])/(400 + E^4)])*ArcTan[(Sqrt[2*(-20 + Sqrt[400 + E^4])] + 2*
x)/Sqrt[2*(20 + Sqrt[400 + E^4])]])/(E^2*(4761 + E^4))
```

3.235.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.235.4 Maple [A] (verified)

Time = 0.40 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

method	result	size
norman	$-\frac{4}{(-7+x)(x^4+40x^2+e^4+400)}$	22
gosper	$-\frac{4}{x^5-7x^4+40x^3+x\,e^4-280x^2-7\,e^4+400x-2800}$	36
risch	$-\frac{4}{x^5-7x^4+40x^3+x\,e^4-280x^2-7\,e^4+400x-2800}$	36
parallelrisch	$-\frac{4}{x^5-7x^4+40x^3+x\,e^4-280x^2-7\,e^4+400x-2800}$	36

input
```
int((4*exp(4)+20*x^4-112*x^3+480*x^2-2240*x+1600)/((x^2-14*x+49)*exp(4)^2+
(2*x^6-28*x^5+178*x^4-1120*x^3+4720*x^2-11200*x+39200)*exp(4)+x^10-14*x^9+
129*x^8-1120*x^7+6320*x^6-33600*x^5+149600*x^4-448000*x^3+1728000*x^2-2240
000*x+7840000),x,method=_RETURNVERBOSE)
```

output
```
-4/(-7+x)/(x^4+40*x^2+exp(4)+400)
```

3.235.

$\int \frac{1600+4e^4-2240x+480x^2-112x^3+20x^4}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+6320x^6-1120x^7+129x^8-14x^9+x^{10}+e^8(49-14x+x^2)+e^4(39200-11200x+47$

3.235.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.50

$$\int \frac{1600+4e^4-2240x+480x}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+6320x^6-1120x^7+129x^8-14}$$
$$=-\frac{4}{x^5-7\,x^4+40\,x^3-280\,x^2+(x-7)e^4+400\,x-2800}$$

input
```
integrate((4*exp(4)+20*x^4-112*x^3+480*x^2-2240*x+1600)/((x^2-14*x+49)*exp
(4)^2+(2*x^6-28*x^5+178*x^4-1120*x^3+4720*x^2-11200*x+39200)*exp(4)+x^10-1
4*x^9+129*x^8-1120*x^7+6320*x^6-33600*x^5+149600*x^4-448000*x^3+1728000*x^
2-2240000*x+7840000),x, algorithm=\
```

output
```
-4/(x^5 - 7*x^4 + 40*x^3 - 280*x^2 + (x - 7)*e^4 + 400*x - 2800)
```

3.235.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. 2(15) = 30.

Time = 1.45 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int \frac{1600+4e^4-2240x+480x}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+6320x^6-1120x^7+129x^8-14}$$
$$=-\frac{4}{x^5-7x^4+40x^3-280x^2+x\left(e^4+400\right)-2800-7e^4}$$

input
```
integrate((4*exp(4)+20*x**4-112*x**3+480*x**2-2240*x+1600)/((x**2-14*x+49)
*exp(4)**2+(2*x**6-28*x**5+178*x**4-1120*x**3+4720*x**2-11200*x+39200)*exp
(4)+x**10-14*x**9+129*x**8-1120*x**7+6320*x**6-33600*x**5+149600*x**4-4480
00*x**3+1728000*x**2-2240000*x+7840000),x)
```

output
```
-4/(x**5 - 7*x**4 + 40*x**3 - 280*x**2 + x*(exp(4) + 400) - 2800 - 7*exp(4
))
```

3.235.

$$\int \frac{1600+4e^4-2240x+480x^2-112x^3+20x^4}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+6320x^6-1120x^7+129x^8-14x^9+x^{10}+e^8(49-14x+x^2)+e^4(39200-11200x+47}$$

3.235.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int \frac{1600 + 4e^4 - 2240x + 480x}{7840000 - 2240000x + 1728000x^2 - 448000x^3 + 149600x^4 - 33600x^5 + 6320x^6 - 1120x^7 + 129x^8 - 14x}$$
$$= -\frac{4}{x^5 - 7\,x^4 + 40\,x^3 - 280\,x^2 + x(e^4 + 400) - 7\,e^4 - 2800}$$

input
```
integrate((4*exp(4)+20*x^4-112*x^3+480*x^2-2240*x+1600)/((x^2-14*x+49)*exp
(4)^2+(2*x^6-28*x^5+178*x^4-1120*x^3+4720*x^2-11200*x+39200)*exp(4)+x^10-1
4*x^9+129*x^8-1120*x^7+6320*x^6-33600*x^5+149600*x^4-448000*x^3+1728000*x^
2-2240000*x+7840000),x, algorithm=\
```

output
```
-4/(x^5 - 7*x^4 + 40*x^3 - 280*x^2 + x*(e^4 + 400) - 7*e^4 - 2800)
```

3.235.8 Giac [F(-1)]

Timed out.

$$\int \frac{1600 + 4e^4 - 2240x + 480x}{7840000 - 2240000x + 1728000x^2 - 448000x^3 + 149600x^4 - 33600x^5 + 6320x^6 - 1120x^7 + 129x^8 - 14x}$$
$$= \text{Timed out}$$

input
```
integrate((4*exp(4)+20*x^4-112*x^3+480*x^2-2240*x+1600)/((x^2-14*x+49)*exp
(4)^2+(2*x^6-28*x^5+178*x^4-1120*x^3+4720*x^2-11200*x+39200)*exp(4)+x^10-1
4*x^9+129*x^8-1120*x^7+6320*x^6-33600*x^5+149600*x^4-448000*x^3+1728000*x^
2-2240000*x+7840000),x, algorithm=\
```

output
```
Timed out
```

3.235.9 Mupad [B] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{1600 + 4e^4 - 2240x + 480x}{7840000 - 2240000x + 1728000x^2 - 448000x^3 + 149600x^4 - 33600x^5 + 6320x^6 - 1120x^7 + 129x^8 - 14x}$$

$$= -\frac{4}{(x-7)\,(x^4 + 40\,x^2 + \mathrm{e}^4 + 400)}$$

input
```
int((4*exp(4) - 2240*x + 480*x^2 - 112*x^3 + 20*x^4 + 1600)/(exp(4)*(4720*
x^2 - 11200*x - 1120*x^3 + 178*x^4 - 28*x^5 + 2*x^6 + 39200) - 2240000*x +
 exp(8)*(x^2 - 14*x + 49) + 1728000*x^2 - 448000*x^3 + 149600*x^4 - 33600*
x^5 + 6320*x^6 - 1120*x^7 + 129*x^8 - 14*x^9 + x^10 + 7840000),x)
```

output
```
-4/((x - 7)*(exp(4) + 40*x^2 + x^4 + 400))
```

3.235.

$$\int \frac{1600+4e^4-2240x+480x^2-112x^3+20x^4}{7840000-2240000x+1728000x^2-448000x^3+149600x^4-33600x^5+6320x^6-1120x^7+129x^8-14x^9+x^{10}+e^8(49-14x+x^2)+e^4(39200-11200x+47}$$

3.236 $\int \frac{e^{3+2x+\frac{e^{3+2x}\left(3-4x+x^2\right)}{x\log(2)}}\left(-3+6x-7x^2+2x^3\right)+5x^2\log(2)}{x^2\log(2)}\,dx$

3.236.1 Optimal result

Integrand size = 62, antiderivative size = 28

$$\int \frac{e^{3+2x+\frac{e^{3+2x}\left(3-4x+x^2\right)}{x\log(2)}}\left(-3+6x-7x^2+2x^3\right)+5x^2\log(2)}{x^2\log(2)}\,dx=e^{\frac{e^{3+2x}(3+(-4+x)x)}{x\log(2)}}+5x$$

output
```
5*x+exp((3+(x-4)*x)/x/ln(2)*exp(3+2*x))
```

3.236.2 Mathematica [A] (verified)

Time = 1.44 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{e^{3+2x+\frac{e^{3+2x}\left(3-4x+x^2\right)}{x\log(2)}}\left(-3+6x-7x^2+2x^3\right)+5x^2\log(2)}{x^2\log(2)}\,dx=e^{\frac{e^{3+2x}\left(3-4x+x^2\right)}{x\log(2)}}+5x$$

input
```
Integrate[(E^(3 + 2*x + (E^(3 + 2*x)*(3 - 4*x + x^2))/(x*Log[2]))*(-3 + 6*
x - 7*x^2 + 2*x^3) + 5*x^2*Log[2])/(x^2*Log[2]),x]
```

output
```
E^((E^(3 + 2*x)*(3 - 4*x + x^2))/(x*Log[2])) + 5*x
```

3.236.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x^3-7x^2+6x-3)\exp\left(\frac{e^{2x+3}(x^2-4x+3)}{x\log(2)}+2x+3\right)+5x^2\log(2)}{x^2\log(2)}\,dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int -\frac{\exp\left(2x+3+\frac{e^{2x+3}(x^2-4x+3)}{\log(2)x}\right)(-2x^3+7x^2-6x+3)-5x^2\log(2)}{x^2}dx}{\log(2)}$$

$$\Big\downarrow \ 25$$

$$-\frac{\int \frac{\exp\left(2x+3+\frac{e^{2x+3}(x^2-4x+3)}{\log(2)x}\right)(-2x^3+7x^2-6x+3)-5x^2\log(2)}{x^2}dx}{\log(2)}$$

$$\Big\downarrow \ 2010$$

$$-\frac{\int \left(-\frac{\exp\left(2x+3+\frac{e^{2x+3}(x^2-4x+3)}{\log(2)x}\right)(2x^3-7x^2+6x-3)}{x^2}-5\log(2)\right)dx}{\log(2)}$$

$$\Big\downarrow \ 2009$$

$$-\frac{7\int \exp\left(2x+3+\frac{e^{2x+3}(x^2-4x+3)}{\log(2)x}\right)dx+3\int \frac{\exp\left(2x+3+\frac{e^{2x+3}(x^2-4x+3)}{\log(2)x}\right)}{x^2}dx-6\int \frac{\exp\left(2x+3+\frac{e^{2x+3}(x^2-4x+3)}{\log(2)x}\right)}{x}dx-2\int}{\log(2)}$$

input
```
Int[(E^(3 + 2*x + (E^(3 + 2*x)*(3 - 4*x + x^2))/(x*Log[2]))*(-3 + 6*x - 7*
x^2 + 2*x^3) + 5*x^2*Log[2])/(x^2*Log[2]),x]
```

output
```
$Aborted
```

3.236. $\int \frac{e^{3+2x+\frac{e^{3+2x}(3-4x+x^2)}{x\log(2)}}(-3+6x-7x^2+2x^3)+5x^2\log(2)}{x^2\log(2)}\,dx$

3.236.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.236.4 Maple [A] (verified)

Time = 0.91 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

method	result	size
risch	$5x+{\mathrm e}^{\frac{(-1+x)(-3+x){\mathrm e}^{3+2x}}{x\ln(2)}}$	26
parts	$5x+{\mathrm e}^{\frac{\left(x^{2}-4x+3\right){\mathrm e}^{3+2x}}{x\ln(2)}}$	28
norman	$\frac{x\,{\mathrm e}^{\frac{\left(x^{2}-4x+3\right){\mathrm e}^{3+2x}}{x\ln(2)}}+5x^{2}}{x}$	36
parallelrisch	$\frac{5x\ln(2)+\ln(2){\mathrm e}^{\frac{\left(x^{2}-4x+3\right){\mathrm e}^{3+2x}}{x\ln(2)}}}{\ln(2)}$	38

input
```
int(((2*x^3-7*x^2+6*x-3)*exp(3+2*x)*exp((x^2-4*x+3)*exp(3+2*x)/x/ln(2))+5*
x^2*ln(2))/x^2/ln(2),x,method=_RETURNVERBOSE)
```

output
```
5*x+exp((-1+x)*(-3+x)*exp(3+2*x)/x/ln(2))
```

3.236. $\int \frac{e^{3+2x+\frac{e^{3+2x}\left(3-4x+x^2\right)}{x\log(2)}}\left(-3+6x-7x^2+2x^3\right)+5x^2\log(2)}{x^2\log(2)}\,dx$

3.236.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(26) = 52.

Time = 0.27 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.93

$$\int \frac{e^{3+2x+\frac{e^{3+2x}(3-4x+x^2)}{x\log(2)}}(-3+6x-7x^2+2x^3)+5x^2\log(2)}{x^2\log(2)}\,dx = \left(5\,xe^{(2\,x+3)}+e^{\left(\frac{(x^2-4\,x+3)e^{(2\,x+3)}+(2\,x^2+3\,x)\log(2)}{x\log(2)}\right)}\right)e^{(-2\,x-3)}$$

input
```
integrate(((2*x^3-7*x^2+6*x-3)*exp(3+2*x)*exp((x^2-4*x+3)*exp(3+2*x)/x/log
(2))+5*x^2*log(2))/x^2/log(2),x, algorithm=\
```

output
```
(5*x*e^(2*x + 3) + e^(((x^2 - 4*x + 3)*e^(2*x + 3) + (2*x^2 + 3*x)*log(2))
/(x*log(2))))*e^(-2*x - 3)
```

3.236.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{3+2x+\frac{e^{3+2x}(3-4x+x^2)}{x\log(2)}}(-3+6x-7x^2+2x^3)+5x^2\log(2)}{x^2\log(2)}\,dx = 5x+e^{\frac{(x^2-4x+3)e^{2x+3}}{x\log(2)}}$$

input
```
integrate(((2*x**3-7*x**2+6*x-3)*exp(3+2*x)*exp((x**2-4*x+3)*exp(3+2*x)/x/
ln(2))+5*x**2*ln(2))/x**2/ln(2),x)
```

output
```
5*x + exp((x**2 - 4*x + 3)*exp(2*x + 3)/(x*log(2)))
```

3.236.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(26) = 52$.

Time = 0.44 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.96

$$\int \frac{e^{3+2x+\frac{e^{3+2x}(3-4x+x^2)}{x\log(2)}}(-3+6x-7x^2+2x^3)+5x^2\log(2)}{x^2\log(2)}\,dx = \frac{5\,x\log(2)+e^{\left(\frac{xe^{(2\,x+3)}}{\log(2)}-\frac{4\,e^{(2\,x+3)}}{\log(2)}+\frac{3\,e^{(2\,x+3)}}{x\log(2)}\right)}\log(2)}{\log(2)}$$

input
```
integrate(((2*x^3-7*x^2+6*x-3)*exp(3+2*x)*exp((x^2-4*x+3)*exp(3+2*x)/x/log
(2))+5*x^2*log(2))/x^2/log(2),x, algorithm=\
```

output
```
(5*x*log(2) + e^(x*e^(2*x + 3)/log(2) - 4*e^(2*x + 3)/log(2) + 3*e^(2*x +
3)/(x*log(2)))*log(2))/log(2)
```

3.236.8 Giac [F]

$$\int \frac{e^{3+2x+\frac{e^{3+2x}(3-4x+x^2)}{x\log(2)}}(-3+6x-7x^2+2x^3)+5x^2\log(2)}{x^2\log(2)}\,dx = \int \frac{5\,x^2\log(2)+(2\,x^3-7\,x^2+6\,x-3)e^{\left(2\,x+\frac{(x^2-4\,x+3)e^{(2\,x+3)}}{x\log(2)}+3\right)}}{x^2\log(2)}\,dx$$

input
```
integrate(((2*x^3-7*x^2+6*x-3)*exp(3+2*x)*exp((x^2-4*x+3)*exp(3+2*x)/x/log
(2))+5*x^2*log(2))/x^2/log(2),x, algorithm=\
```

output
```
integrate((5*x^2*log(2) + (2*x^3 - 7*x^2 + 6*x - 3)*e^(2*x + (x^2 - 4*x +
3)*e^(2*x + 3)/(x*log(2)) + 3))/(x^2*log(2)), x)
```

3.236.9 Mupad [B] (verification not implemented)

Time = 14.10 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.68

$$\int \frac{e^{3+2x+\frac{e^{3+2x}(3-4x+x^2)}{x\log(2)}}(-3+6x-7x^2+2x^3)+5x^2\log(2)}{x^2\log(2)}\,dx = 5\,x+\mathrm{e}^{\frac{3\,\mathrm{e}^{2\,x}\,\mathrm{e}^3}{x\,\ln(2)}}\,\mathrm{e}^{-\frac{4\,\mathrm{e}^{2\,x}\,\mathrm{e}^3}{\ln(2)}}\,\mathrm{e}^{\frac{x\,\mathrm{e}^{2\,x}\,\mathrm{e}^3}{\ln(2)}}$$

input
```
int((5*x^2*log(2) + exp((exp(2*x + 3)*(x^2 - 4*x + 3))/(x*log(2)))*exp(2*x
 + 3)*(6*x - 7*x^2 + 2*x^3 - 3))/(x^2*log(2)),x)
```

output
```
5*x + exp((3*exp(2*x)*exp(3))/(x*log(2)))*exp(-(4*exp(2*x)*exp(3))/log(2))
*exp((x*exp(2*x)*exp(3))/log(2))
```

3.237 $\int \frac{e^3(-3x^2-2x^3)+e^3(12+8x)\log^4(2)+(-6x+e^3(-6x^2-2x^3))\log(3+e^3(3x+x^2))}{3+e^3(3x+x^2)}$

3.237.1 Optimal result

Integrand size = 79, antiderivative size = 24

$$\int \frac{e^3(-3x^2-2x^3)+e^3(12+8x)\log^4(2)+(-6x+e^3(-6x^2-2x^3))\log(3+e^3(3x+x^2))}{3+e^3(3x+x^2)}\,dx = (-x^2+4\log^4(2))\log(3+e^3x(3+x))$$

output
```
ln(x*exp(3)*(3+x)+3)*(4*ln(2)^4-x^2)
```

3.237.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{e^3(-3x^2-2x^3)+e^3(12+8x)\log^4(2)+(-6x+e^3(-6x^2-2x^3))\log(3+e^3(3x+x^2))}{3+e^3(3x+x^2)}\,dx = -\left((x^2-4\log^4(2))\log(3+e^3x(3+x))\right)$$

input
```
Integrate[(E^3*(-3*x^2 - 2*x^3) + E^3*(12 + 8*x)*Log[2]^4 + (-6*x + E^3*(-
6*x^2 - 2*x^3))*Log[3 + E^3*(3*x + x^2)])/(3 + E^3*(3*x + x^2)),x]
```

output
```
-((x^2 - 4*Log[2]^4)*Log[3 + E^3*x*(3 + x)])
```

3.237.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 90 vs. $2(24) = 48$.

Time = 0.73 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.75, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.038$, Rules used = {7292, 7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^3(-2x^3-3x^2)+(e^3(-2x^3-6x^2)-6x)\log(e^3(x^2+3x)+3)+e^3(8x+12)\log^4(2)}{e^3(x^2+3x)+3}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^3(-2x^3-3x^2)+(e^3(-2x^3-6x^2)-6x)\log(e^3(x^2+3x)+3)+e^3(8x+12)\log^4(2)}{e^3x^2+3e^3x+3}dx$$

$$\Big\downarrow \text{7279}$$

$$\int \left(-\frac{e^3(2x+3)(x^2-4\log^4(2))}{e^3x^2+3e^3x+3}-2x\log(e^3x^2+3e^3x+3)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{(6-e^3(9-8\log^4(2)))\log(e^3x^2+3e^3x+3)}{2e^3}+x^2(-\log(e^3x^2+3e^3x+3))-\frac{3(2-3e^3)\log(e^3x^2+3e^3x+3)}{2e^3}$$

input
```
Int[(E^3*(-3*x^2 - 2*x^3) + E^3*(12 + 8*x)*Log[2]^4 + (-6*x + E^3*(-6*x^2
- 2*x^3))*Log[3 + E^3*(3*x + x^2)])/(3 + E^3*(3*x + x^2)),x]
```

output
```
(-3*(2 - 3*E^3)*Log[3 + 3*E^3*x + E^3*x^2])/(2*E^3) - x^2*Log[3 + 3*E^3*x
+ E^3*x^2] + ((6 - E^3*(9 - 8*Log[2]^4))*Log[3 + 3*E^3*x + E^3*x^2])/(2*E^
3)
```

3.237.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.237.4 Maple [A] (verified)

Time = 1.28 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

method	result
norman	$4\ln(2)^4 \ln((x^2+3x)\,\mathrm{e}^3+3) - x^2 \ln((x^2+3x)\,\mathrm{e}^3+3)$
risch	$-x^2 \ln((x^2+3x)\,\mathrm{e}^3+3) + 4\ln(2)^4 \ln(x^2\mathrm{e}^3+3x\,\mathrm{e}^3+3)$
default	$-x^2 \ln(x^2\mathrm{e}^3+3x\,\mathrm{e}^3+3) + 4\ln(2)^4 \ln(x^2\mathrm{e}^3+3x\,\mathrm{e}^3+3)$
parallelrisch	$4\ln(2)^4 \ln((x^2\mathrm{e}^3+3x\,\mathrm{e}^3+3)\,\mathrm{e}^{-3}) - x^2 \ln((x^2+3x)\,\mathrm{e}^3+3)$
parts	$\mathrm{e}^3\left(-\mathrm{e}^{-3}(x^2-3x)+\mathrm{e}^{-3}\left(\frac{\left(8\,\mathrm{e}^3\ln(2)^4-9\,\mathrm{e}^3+6\right)\mathrm{e}^{-3}\ln(x^2\mathrm{e}^3+3x\,\mathrm{e}^3+3)}{2}-\frac{2\left(\frac{27\,\mathrm{e}^3}{2}-18\right)\operatorname{arctanh}\left(\frac{2x\,\mathrm{e}^3+3\,\mathrm{e}^3}{\sqrt{-12\,\mathrm{e}^3+9\,\mathrm{e}^6}}\right)}{\sqrt{-12\,\mathrm{e}^3+9\,\mathrm{e}^6}}\right.\right.$

input
```
int((((-2*x^3-6*x^2)*exp(3)-6*x)*ln((x^2+3*x)*exp(3)+3)+(8*x+12)*exp(3)*ln
(2)^4+(-2*x^3-3*x^2)*exp(3))/((x^2+3*x)*exp(3)+3),x,method=_RETURNVERBOSE)
```

output
```
4*ln(2)^4*ln((x^2+3*x)*exp(3)+3)-x^2*ln((x^2+3*x)*exp(3)+3)
```

3.237.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{e^3(-3x^2-2x^3)+e^3(12+8x)\log^4(2)+(-6x+e^3(-6x^2-2x^3))\log(3+e^3(3x+x^2))}{3+e^3(3x+x^2)}\,dx = \left(4\,\log\left(2\right)^4-x^2\right)\log\left(\left(x^2+3\,x\right)e^3+3\right)$$

input
```
integrate((((-2*x^3-6*x^2)*exp(3)-6*x)*log((x^2+3*x)*exp(3)+3)+(8*x+12)*ex
p(3)*log(2)^4+(-2*x^3-3*x^2)*exp(3))/((x^2+3*x)*exp(3)+3),x, algorithm=\
```

output
```
(4*log(2)^4 - x^2)*log((x^2 + 3*x)*e^3 + 3)
```

3.237.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{e^3(-3x^2-2x^3)+e^3(12+8x)\log^4(2)+(-6x+e^3(-6x^2-2x^3))\log(3+e^3(3x+x^2))}{3+e^3(3x+x^2)}\,dx = -x^2\log\left(\left(x^2+3x\right)e^3+3\right)+4\log\left(2\right)^4\log\left(x^2e^3+3xe^3+3\right)$$

input
```
integrate((((-2*x**3-6*x**2)*exp(3)-6*x)*ln((x**2+3*x)*exp(3)+3)+(8*x+12)*
exp(3)*ln(2)**4+(-2*x**3-3*x**2)*exp(3))/((x**2+3*x)*exp(3)+3),x)
```

output
```
-x**2*log((x**2 + 3*x)*exp(3) + 3) + 4*log(2)**4*log(x**2*exp(3) + 3*x*exp
(3) + 3)
```

3.237.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 493 vs. $2(23) = 46$.

Time = 0.36 (sec) , antiderivative size = 493, normalized size of antiderivative = 20.54

$$\int \frac{e^3(-3x^2-2x^3)+e^3(12+8x)\log^4(2)+(-6x+e^3(-6x^2-2x^3))\log(3+e^3(3x+x^2))}{3+e^3(3x+x^2)}\,dx$$
$$= 4\left(e^{(-3)}\log\left(x^2e^3+3\,xe^3+3\right)-\frac{\sqrt{3}e^{\left(-\frac{3}{2}\right)}\log\left(\frac{2\,xe^3-\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}{2\,xe^3+\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}\right)}{\sqrt{3\,e^3-4}}\right)e^3\log(2)^4$$
$$+\frac{4\sqrt{3}e^{\frac{3}{2}}\log(2)^4\log\left(\frac{2\,xe^3-\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}{2\,xe^3+\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}\right)}{\sqrt{3\,e^3-4}}$$
$$-\frac{3}{2}\sqrt{3}\sqrt{3\,e^3-4}e^{\left(-\frac{3}{2}\right)}\log\left(\frac{2\,xe^3-\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}{2\,xe^3+\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}\right)$$
$$-\left(3\left(3\,e^3-1\right)e^{(-6)}\log\left(x^2e^3+3\,xe^3+3\right)-\frac{9\sqrt{3}(e^3-1)e^{\left(-\frac{9}{2}\right)}\log\left(\frac{2\,xe^3-\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}{2\,xe^3+\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}\right)}{\sqrt{3\,e^3-4}}+\left(x^2-6\,x\right)e\right.$$
$$-\frac{3}{2}\left(\frac{\sqrt{3}(3\,e^3-2)e^{\left(-\frac{9}{2}\right)}\log\left(\frac{2\,xe^3-\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}{2\,xe^3+\sqrt{3}\sqrt{3\,e^3-4}e^{\frac{3}{2}}+3\,e^3}\right)}{\sqrt{3\,e^3-4}}+2\,xe^{(-3)}-3\,e^{(-3)}\log\left(x^2e^3+3\,xe^3+3\right)\right)e^3$$
$$+\frac{1}{2}\left(2\,x^2e^3-6\,xe^3-\left(2\,x^2e^3-9\,e^3+6\right)\log\left(x^2e^3+3\,xe^3+3\right)\right)e^{(-3)}$$

input
```
integrate((((-2*x^3-6*x^2)*exp(3)-6*x)*log((x^2+3*x)*exp(3)+3)+(8*x+12)*ex
p(3)*log(2)^4+(-2*x^3-3*x^2)*exp(3))/((x^2+3*x)*exp(3)+3),x, algorithm=\
```

output
```
4*(e^(-3)*log(x^2*e^3 + 3*x*e^3 + 3) - sqrt(3)*e^(-3/2)*log((2*x*e^3 - sqr
t(3)*sqrt(3*e^3 - 4)*e^(3/2) + 3*e^3)/(2*x*e^3 + sqrt(3)*sqrt(3*e^3 - 4)*e
^(3/2) + 3*e^3))/sqrt(3*e^3 - 4))*e^3*log(2)^4 + 4*sqrt(3)*e^(3/2)*log(2)^
4*log((2*x*e^3 - sqrt(3)*sqrt(3*e^3 - 4)*e^(3/2) + 3*e^3)/(2*x*e^3 + sqrt(
3)*sqrt(3*e^3 - 4)*e^(3/2) + 3*e^3))/sqrt(3*e^3 - 4) - 3/2*sqrt(3)*sqrt(3*
e^3 - 4)*e^(-3/2)*log((2*x*e^3 - sqrt(3)*sqrt(3*e^3 - 4)*e^(3/2) + 3*e^3)/
(2*x*e^3 + sqrt(3)*sqrt(3*e^3 - 4)*e^(3/2) + 3*e^3)) - (3*(3*e^3 - 1)*e^(-
6)*log(x^2*e^3 + 3*x*e^3 + 3) - 9*sqrt(3)*(e^3 - 1)*e^(-9/2)*log((2*x*e^3
- sqrt(3)*sqrt(3*e^3 - 4)*e^(3/2) + 3*e^3)/(2*x*e^3 + sqrt(3)*sqrt(3*e^3 -
 4)*e^(3/2) + 3*e^3))/sqrt(3*e^3 - 4) + (x^2 - 6*x)*e^(-3))*e^3 - 3/2*(sqr
t(3)*(3*e^3 - 2)*e^(-9/2)*log((2*x*e^3 - sqrt(3)*sqrt(3*e^3 - 4)*e^(3/2) +
 3*e^3)/(2*x*e^3 + sqrt(3)*sqrt(3*e^3 - 4)*e^(3/2) + 3*e^3))/sqrt(3*e^3 -
4) + 2*x*e^(-3) - 3*e^(-3)*log(x^2*e^3 + 3*x*e^3 + 3))*e^3 + 1/2*(2*x^2*e^
3 - 6*x*e^3 - (2*x^2*e^3 - 9*e^3 + 6)*log(x^2*e^3 + 3*x*e^3 + 3))*e^(-3)
```

3.237. $\int \frac{e^3(-3x^2-2x^3)+e^3(12+8x)\log^4(2)+(-6x+e^3(-6x^2-2x^3))\log(3+e^3(3x+x^2))}{3+e^3(3x+x^2)}\,dx$

3.237.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{e^3(-3x^2-2x^3)+e^3(12+8x)\log^4(2)+(-6x+e^3(-6x^2-2x^3))\log(3+e^3(3x+x^2))}{3+e^3(3x+x^2)}\,dx$$
$$=4\,\log(2)^4\log\left(x^2e^3+3\,xe^3+3\right)-x^2\log\left(x^2e^3+3\,xe^3+3\right)$$

input
```
integrate((((-2*x^3-6*x^2)*exp(3)-6*x)*log((x^2+3*x)*exp(3)+3)+(8*x+12)*ex
p(3)*log(2)^4+(-2*x^3-3*x^2)*exp(3))/((x^2+3*x)*exp(3)+3),x, algorithm=\
```

output
```
4*log(2)^4*log(x^2*e^3 + 3*x*e^3 + 3) - x^2*log(x^2*e^3 + 3*x*e^3 + 3)
```

3.237.9 Mupad [B] (verification not implemented)

Time = 0.57 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{e^3(-3x^2-2x^3)+e^3(12+8x)\log^4(2)+(-6x+e^3(-6x^2-2x^3))\log(3+e^3(3x+x^2))}{3+e^3(3x+x^2)}\,dx$$
$$=\ln\left(\mathrm{e}^3\,x^2+3\,\mathrm{e}^3\,x+3\right)\,\left(4\ln(2)^4-x^2\right)$$

input
```
int(-(exp(3)*(3*x^2 + 2*x^3) + log(exp(3)*(3*x + x^2) + 3)*(6*x + exp(3)*(
6*x^2 + 2*x^3)) - exp(3)*log(2)^4*(8*x + 12))/(exp(3)*(3*x + x^2) + 3),x)
```

output
```
log(3*x*exp(3) + x^2*exp(3) + 3)*(4*log(2)^4 - x^2)
```

3.238 $\int \frac{1}{81}\left(162+e^{-1+4e^{\frac{256x^4}{81}}+5x}\left(405+4096e^{\frac{256x^4}{81}}x^3\right)\right)\,dx$

3.238.1 Optimal result

Integrand size = 41, antiderivative size = 23

$$\int \frac{1}{81}\left(162+e^{-1+4e^{\frac{256x^4}{81}}+5x}\left(405+4096e^{\frac{256x^4}{81}}x^3\right)\right)\,dx=2+e^{-1+4e^{\frac{256x^4}{81}}+5x}+2x$$

output
```
2*x+exp(4*exp(256/81*x^4)+5*x-1)+2
```

3.238.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{1}{81}\left(162+e^{-1+4e^{\frac{256x^4}{81}}+5x}\left(405+4096e^{\frac{256x^4}{81}}x^3\right)\right)\,dx=e^{-1+4e^{\frac{256x^4}{81}}+5x}+2x$$

input
```
Integrate[(162 + E^(-1 + 4*E^((256*x^4)/81) + 5*x)*(405 + 4096*E^((256*x^4
)/81)*x^3))/81,x]
```

output
```
E^(-1 + 4*E^((256*x^4)/81) + 5*x) + 2*x
```

3.238.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{81}\left(e^{4e^{\frac{256x^4}{81}}+5x-1}\left(4096e^{\frac{256x^4}{81}}x^3+405\right)+162\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{81}\int \left(e^{5x+4e^{\frac{256x^4}{81}}-1}\left(4096e^{\frac{256x^4}{81}}x^3+405\right)+162\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{81}\left(81e^{4e^{\frac{256x^4}{81}}+5x-1}+162x\right)$$

input
```
Int[(162 + E^(-1 + 4*E^((256*x^4)/81) + 5*x)*(405 + 4096*E^((256*x^4)/81)*
x^3))/81,x]
```

output
```
(81*E^(-1 + 4*E^((256*x^4)/81) + 5*x) + 162*x)/81
```

3.238.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.238.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

method	result	size
default	$2x+{\rm e}^{4\,{\rm e}^{\frac{256x^4}{81}}+5x-1}$	19
norman	$2x+{\rm e}^{4\,{\rm e}^{\frac{256x^4}{81}}+5x-1}$	19
risch	$2x+{\rm e}^{4\,{\rm e}^{\frac{256x^4}{81}}+5x-1}$	19
parallelrisch	$2x+{\rm e}^{4\,{\rm e}^{\frac{256x^4}{81}}+5x-1}$	19

input
```
int(1/81*(4096*x^3*exp(256/81*x^4)+405)*exp(4*exp(256/81*x^4)+5*x-1)+2,x,m
ethod=_RETURNVERBOSE)
```

output
```
2*x+exp(4*exp(256/81*x^4)+5*x-1)
```

3.238.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{1}{81}\left(162+e^{-1+4e^{\frac{256x^4}{81}}+5x}\left(405+4096e^{\frac{256x^4}{81}}x^3\right)\right)\,dx=2\,x+e^{\left(5\,x+4\,e^{\left(\frac{256}{81}\,x^4\right)}-1\right)}$$

input
```
integrate(1/81*(4096*x^3*exp(256/81*x^4)+405)*exp(4*exp(256/81*x^4)+5*x-1)
+2,x, algorithm=\
```

output
```
2*x + e^(5*x + 4*e^(256/81*x^4) - 1)
```

3.238.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{1}{81}\left(162+e^{-1+4e^{\frac{256x^4}{81}}+5x}\left(405+4096e^{\frac{256x^4}{81}}x^3\right)\right)\,dx=2x+e^{5x+4e^{\frac{256x^4}{81}}-1}$$

input
```
integrate(1/81*(4096*x**3*exp(256/81*x**4)+405)*exp(4*exp(256/81*x**4)+5*x
-1)+2,x)
```

output
```
2*x + exp(5*x + 4*exp(256*x**4/81) - 1)
```

3.238.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{1}{81}\left(162+e^{-1+4e^{\frac{256x^4}{81}}+5x}\left(405+4096e^{\frac{256x^4}{81}}x^3\right)\right)\,dx=2\,x+e^{\left(5\,x+4\,e^{\left(\frac{256}{81}\,x^4\right)}-1\right)}$$

input
```
integrate(1/81*(4096*x^3*exp(256/81*x^4)+405)*exp(4*exp(256/81*x^4)+5*x-1)
+2,x, algorithm=\
```

output
```
2*x + e^(5*x + 4*e^(256/81*x^4) - 1)
```

3.238.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{1}{81}\left(162+e^{-1+4e^{\frac{256x^4}{81}}+5x}\left(405+4096e^{\frac{256x^4}{81}}x^3\right)\right)\,dx=2\,x+e^{\left(5\,x+4\,e^{\left(\frac{256}{81}\,x^4\right)}-1\right)}$$

input
```
integrate(1/81*(4096*x^3*exp(256/81*x^4)+405)*exp(4*exp(256/81*x^4)+5*x-1)
+2,x, algorithm=\
```

output
```
2*x + e^(5*x + 4*e^(256/81*x^4) - 1)
```

3.238.9 Mupad [B] (verification not implemented)

Time = 13.74 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{1}{81}\left(162+e^{-1+4e^{\frac{256x^4}{81}}+5x}\left(405+4096e^{\frac{256x^4}{81}}x^3\right)\right)\,dx=\mathrm{e}^{-1}\,\left(2\,x\,\mathrm{e}+\mathrm{e}^{5\,x}\,\mathrm{e}^{4\,\mathrm{e}^{\frac{256\,x^4}{81}}}\right)$$

input
```
int((exp(5*x + 4*exp((256*x^4)/81) - 1)*(4096*x^3*exp((256*x^4)/81) + 405)
)/81 + 2,x)
```

output
```
exp(-1)*(2*x*exp(1) + exp(5*x)*exp(4*exp((256*x^4)/81)))
```

3.239 $\int \frac{142+2x-216x^2+45x^4}{142x+x^2-72x^3+9x^5}\,dx$

3.239.1 Optimal result

Integrand size = 35, antiderivative size = 19

$$\int \frac{142+2x-216x^2+45x^4}{142x+x^2-72x^3+9x^5}\,dx = \log\left(x\left(2-x-9\left(4-x^2\right)^2\right)\right)$$

output
```
ln((2-x-3*(-x^2+4)*(-3*x^2+12))*x)
```

3.239.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{142+2x-216x^2+45x^4}{142x+x^2-72x^3+9x^5}\,dx = \log(x)+\log\left(142+x-72x^2+9x^4\right)$$

input
```
Integrate[(142 + 2*x - 216*x^2 + 45*x^4)/(142*x + x^2 - 72*x^3 + 9*x^5),x]
```

output
```
Log[x] + Log[142 + x - 72*x^2 + 9*x^4]
```

3.239.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029, Rules used = {2020}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{45x^4-216x^2+2x+142}{9x^5-72x^3+x^2+142x}\,dx$$
$$\Big\downarrow \ 2020$$
$$\log\left(9x^5-72x^3+x^2+142x\right)$$

input
```
Int[(142 + 2*x - 216*x^2 + 45*x^4)/(142*x + x^2 - 72*x^3 + 9*x^5),x]
```

output
```
Log[142*x + x^2 - 72*x^3 + 9*x^5]
```

3.239.3.1 Defintions of rubi rules used

rule 2020
```
Int[(Pp_)/(Qq_), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x]}, Si
mp[Coeff[Pp, x, p]*(Log[RemoveContent[Qq, x]]/(q*Coeff[Qq, x, q])), x] /; E
qQ[p, q - 1] && EqQ[Pp, Simplify[(Coeff[Pp, x, p]/(q*Coeff[Qq, x, q]))*D[Qq
, x]]]] /; PolyQ[Pp, x] && PolyQ[Qq, x]
```

3.239.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

method	result	size
default	$\ln\left(x(9x^4-72x^2+x+142)\right)$	17
derivativedivides	$\ln\left(9x^5-72x^3+x^2+142x\right)$	19
risch	$\ln\left(9x^5-72x^3+x^2+142x\right)$	19
parallelrisch	$\ln\left(x\right)+\ln\left(-2+x\right)+\ln\left(x^3+2x^2-4x-\frac{71}{9}\right)$	22
norman	$\ln\left(x\right)+\ln\left(-2+x\right)+\ln\left(9x^3+18x^2-36x-71\right)$	24

input
```
int((45*x^4-216*x^2+2*x+142)/(9*x^5-72*x^3+x^2+142*x),x,method=_RETURNVERB
OSE)
```

output
```
ln(x*(9*x^4-72*x^2+x+142))
```

3.239.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{142+2x-216x^2+45x^4}{142x+x^2-72x^3+9x^5}\,dx = \log\left(9\,x^5-72\,x^3+x^2+142\,x\right)$$

input
```
integrate((45*x^4-216*x^2+2*x+142)/(9*x^5-72*x^3+x^2+142*x),x, algorithm=\
```

output
```
log(9*x^5 - 72*x^3 + x^2 + 142*x)
```

3.239.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{142+2x-216x^2+45x^4}{142x+x^2-72x^3+9x^5}\,dx = \log\left(9x^5-72x^3+x^2+142x\right)$$

input
```
integrate((45*x**4-216*x**2+2*x+142)/(9*x**5-72*x**3+x**2+142*x),x)
```

output
```
log(9*x**5 - 72*x**3 + x**2 + 142*x)
```

3.239.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{142+2x-216x^2+45x^4}{142x+x^2-72x^3+9x^5}\,dx = \log\left(9\,x^5-72\,x^3+x^2+142\,x\right)$$

input
```
integrate((45*x^4-216*x^2+2*x+142)/(9*x^5-72*x^3+x^2+142*x),x, algorithm=\
```

output
```
log(9*x^5 - 72*x^3 + x^2 + 142*x)
```

3.239.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{142 + 2x - 216x^2 + 45x^4}{142x + x^2 - 72x^3 + 9x^5}\, dx = \log\left(\left|9\,x^5 - 72\,x^3 + x^2 + 142\,x\right|\right)$$

input
```
integrate((45*x^4-216*x^2+2*x+142)/(9*x^5-72*x^3+x^2+142*x),x, algorithm=\
```

output
```
log(abs(9*x^5 - 72*x^3 + x^2 + 142*x))
```

3.239.9 Mupad [B] (verification not implemented)

Time = 13.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{142 + 2x - 216x^2 + 45x^4}{142x + x^2 - 72x^3 + 9x^5}\, dx = \ln\left(x\left(9\,x^4 - 72\,x^2 + x + 142\right)\right)$$

input
```
int((2*x - 216*x^2 + 45*x^4 + 142)/(142*x + x^2 - 72*x^3 + 9*x^5),x)
```

output
```
log(x*(x - 72*x^2 + 9*x^4 + 142))
```

3.240 $\int \frac{1}{18}\left(e^{\frac{5+27x}{9x}}(5-18x)\log(5)-54x\log(5)\right)\,dx$

3.240.1 Optimal result

Integrand size = 32, antiderivative size = 28

$$\int \frac{1}{18}\left(e^{\frac{5+27x}{9x}}(5-18x)\log(5)-54x\log(5)\right)\,dx=\left(3+e^{3+\frac{5}{9x}}\right)x\left(2x-\frac{1}{2}x(4+\log(5))\right)$$

output
```
x*(3+exp(5/9/x+3))*(2*x-1/2*(ln(5)+4)*x)
```

3.240.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{1}{18}\left(e^{\frac{5+27x}{9x}}(5-18x)\log(5)-54x\log(5)\right)\,dx=-\frac{1}{18}\left(27x^2+9e^{3+\frac{5}{9x}}x^2\right)\log(5)$$

input
```
Integrate[(E^((5 + 27*x)/(9*x))*(5 - 18*x)*Log[5] - 54*x*Log[5])/18,x]
```

output
```
-1/18*((27*x^2 + 9*E^(3 + 5/(9*x))*x^2)*Log[5])
```

3.240.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{18}\left(e^{\frac{27x+5}{9x}}(5-18x)\log(5)-54x\log(5)\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{18}\int \left(e^{\frac{27x+5}{9x}}(5-18x)\log(5)-54x\log(5)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{18}\left(-9e^{\frac{5}{9x}+3}x^2\log(5)-27x^2\log(5)\right)$$

input
```
Int[(E^((5 + 27*x)/(9*x))*(5 - 18*x)*Log[5] - 54*x*Log[5])/18,x]
```

output
```
(-27*x^2*Log[5] - 9*E^(3 + 5/(9*x))*x^2*Log[5])/18
```

3.240.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.240.4 Maple [A] (verified)

Time = 0.85 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result	size
default	$-\frac{\ln(5)\mathrm{e}^{\frac{5}{9x}+3}x^2}{2}-\frac{3x^2\ln(5)}{2}$	24
parts	$-\frac{\ln(5)\mathrm{e}^{\frac{5}{9x}+3}x^2}{2}-\frac{3x^2\ln(5)}{2}$	24
norman	$-\frac{3x^2\ln(5)}{2}-\frac{x^2\ln(5)\mathrm{e}^{\frac{27x+5}{9x}}}{2}$	27
risch	$-\frac{3x^2\ln(5)}{2}-\frac{x^2\ln(5)\mathrm{e}^{\frac{27x+5}{9x}}}{2}$	27
parallelrisch	$-\frac{3x^2\ln(5)}{2}-\frac{x^2\ln(5)\mathrm{e}^{\frac{27x+5}{9x}}}{2}$	27
derivativedivides	$-\frac{3x^2\ln(5)}{2}-\frac{25\ln(5)\left(-\frac{9\,\mathrm{e}^{\frac{5}{9x}+3}x}{5}-\mathrm{e}^3\,\mathrm{Ei}_1\left(-\frac{5}{9x}\right)\right)}{162}+\frac{25\ln(5)\left(-\frac{81x^2\mathrm{e}^{\frac{5}{9x}+3}}{50}-\frac{9\,\mathrm{e}^{\frac{5}{9x}+3}x}{10}-\frac{\mathrm{e}^3\,\mathrm{Ei}_1\left(-\frac{5}{9x}\right)}{2}\right)}{81}$	76

input
```
int(1/18*(-18*x+5)*ln(5)*exp(1/9*(27*x+5)/x)-3*x*ln(5),x,method=_RETURNVER
BOSE)
```

output
```
-1/2*ln(5)*exp(5/9/x+3)*x^2-3/2*x^2*ln(5)
```

3.240.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{1}{18}\left(e^{\frac{5+27x}{9x}}(5-18x)\log(5)-54x\log(5)\right)\,dx=-\frac{1}{2}\,x^2e^{\left(\frac{27\,x+5}{9\,x}\right)}\log\left(5\right)-\frac{3}{2}\,x^2\log\left(5\right)$$

input
```
integrate(1/18*(-18*x+5)*log(5)*exp(1/9*(27*x+5)/x)-3*x*log(5),x, algorith
m=\
```

output
```
-1/2*x^2*e^(1/9*(27*x + 5)/x)*log(5) - 3/2*x^2*log(5)
```

3.240.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{1}{18}\left(e^{\frac{5+27x}{9x}}(5-18x)\log(5)-54x\log(5)\right)\,dx=-\frac{x^2e^{\frac{3x+\frac{5}{9}}{x}}\log{(5)}}{2}-\frac{3x^2\log{(5)}}{2}$$

input
```
integrate(1/18*(-18*x+5)*ln(5)*exp(1/9*(27*x+5)/x)-3*x*ln(5),x)
```

output
```
-x**2*exp((3*x + 5/9)/x)*log(5)/2 - 3*x**2*log(5)/2
```

3.240.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{1}{18}\left(e^{\frac{5+27x}{9x}}(5-18x)\log(5)-54x\log(5)\right)\,dx$$
$$=-\frac{3}{2}\,x^2\log{(5)}-\frac{25}{162}\left(e^3\Gamma\left(-1,-\frac{5}{9\,x}\right)+2\,e^3\Gamma\left(-2,-\frac{5}{9\,x}\right)\right)\log{(5)}$$

input
```
integrate(1/18*(-18*x+5)*log(5)*exp(1/9*(27*x+5)/x)-3*x*log(5),x, algorith
m=\
```

output
```
-3/2*x^2*log(5) - 25/162*(e^3*gamma(-1, -5/9/x) + 2*e^3*gamma(-2, -5/9/x))
*log(5)
```

3.240.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(23)=46$.

Time = 0.27 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.71

$$\int \frac{1}{18}\left(e^{\frac{5+27x}{9x}}(5-18x)\log(5)-54x\log(5)\right)\,dx$$
$$=-\frac{3}{2}\,x^2\log{(5)}-\frac{25\,e^{\left(\frac{27\,x+5}{9\,x}\right)}\log{(5)}}{2\left(\frac{(27\,x+5)^2}{x^2}-\frac{54\,(27\,x+5)}{x}+729\right)}$$

input
```
integrate(1/18*(-18*x+5)*log(5)*exp(1/9*(27*x+5)/x)-3*x*log(5),x, algorith
m=\
```

output
```
-3/2*x^2*log(5) - 25/2*e^(1/9*(27*x + 5)/x)*log(5)/((27*x + 5)^2/x^2 - 54*
(27*x + 5)/x + 729)
```

3.240.9 Mupad [B] (verification not implemented)

Time = 13.44 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int \frac{1}{18}\left(e^{\frac{5+27x}{9x}}(5-18x)\log(5)-54x\log(5)\right)\,dx=-\frac{x^2\,\ln(5)\,\left(\mathrm{e}^{\frac{5}{9\,x}+3}+3\right)}{2}$$

input
```
int(- 3*x*log(5) - (exp((3*x + 5/9)/x)*log(5)*(18*x - 5))/18,x)
```

output
```
-(x^2*log(5)*(exp(5/(9*x) + 3) + 3))/2
```

3.241 $\int \frac{-2-4x^2+e^3(-2+4x-4x^2+12x^3)}{e^3(3x^3+6x^5+3x^7)}\,dx$

3.241.1 Optimal result

Integrand size = 48, antiderivative size = 22

$$\int \frac{-2-4x^2+e^3(-2+4x-4x^2+12x^3)}{e^3\left(3x^3+6x^5+3x^7\right)}\,dx = \frac{-4+\frac{1+\frac{1}{e^3}}{x}}{3\left(x+x^3\right)}$$

output
```
1/3*(1/x*(1+exp(-3))-4)/(x^3+x)
```

3.241.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-2-4x^2+e^3(-2+4x-4x^2+12x^3)}{e^3\left(3x^3+6x^5+3x^7\right)}\,dx = \frac{1+e^3-4e^3x}{3e^3\left(x^2+x^4\right)}$$

input
```
Integrate[(-2 - 4*x^2 + E^3*(-2 + 4*x - 4*x^2 + 12*x^3))/(E^3*(3*x^3 + 6*x
^5 + 3*x^7)),x]
```

output
```
(1 + E^3 - 4*E^3*x)/(3*E^3*(x^2 + x^4))
```

3.241.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 57 vs. $2(22) = 44$.

Time = 0.31 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.59, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {27, 27, 2026, 1380, 2336, 27, 2019, 48}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^2+e^3\left(12x^3-4x^2+4x-2\right)-2}{e^3\left(3x^7+6x^5+3x^3\right)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int -\frac{2\left(2x^2+e^3\left(-6x^3+2x^2-2x+1\right)+1\right)}{3\left(x^7+2x^5+x^3\right)}dx}{e^3}$$

$$\Big\downarrow \text{27}$$

$$-\frac{2\int \frac{2x^2+e^3\left(-6x^3+2x^2-2x+1\right)+1}{x^7+2x^5+x^3}dx}{3e^3}$$

$$\Big\downarrow \text{2026}$$

$$-\frac{2\int \frac{2x^2+e^3\left(-6x^3+2x^2-2x+1\right)+1}{x^3\left(x^4+2x^2+1\right)}dx}{3e^3}$$

$$\Big\downarrow \text{1380}$$

$$-\frac{2\int \frac{2x^2+e^3\left(-6x^3+2x^2-2x+1\right)+1}{x^3\left(x^2+1\right)^2}dx}{3e^3}$$

$$\Big\downarrow \text{2336}$$

$$-\frac{2\left(\frac{-4e^3x+e^3+1}{2\left(x^2+1\right)}-\frac{1}{2}\int -\frac{2\left(-2e^3x^3+\left(1+e^3\right)x^2-2e^3x+e^3+1\right)}{x^3\left(x^2+1\right)}dx\right)}{3e^3}$$

$$\Big\downarrow \text{27}$$

$$-\frac{2\left(\int \frac{-2e^3x^3+\left(1+e^3\right)x^2-2e^3x+e^3+1}{x^3\left(x^2+1\right)}dx+\frac{-4e^3x+e^3+1}{2\left(x^2+1\right)}\right)}{3e^3}$$

$$\Big\downarrow \text{2019}$$

$$-\frac{2\left(\int \frac{-2e^3x+e^3+1}{x^3}dx+\frac{-4e^3x+e^3+1}{2\left(x^2+1\right)}\right)}{3e^3}$$

$$\Big\downarrow \text{48}$$

3.241. $\int \frac{-2-4x^2+e^3\left(-2+4x-4x^2+12x^3\right)}{e^3\left(3x^3+6x^5+3x^7\right)}\,dx$

$$-\frac{2\left(\frac{-4e^3x+e^3+1}{2(x^2+1)}-\frac{(-2e^3x+e^3+1)^2}{2(1+e^3)x^2}\right)}{3e^3}$$

input
```
Int[(-2 - 4*x^2 + E^3*(-2 + 4*x - 4*x^2 + 12*x^3))/(E^3*(3*x^3 + 6*x^5 + 3
*x^7)),x]
```

output
```
(-2*(-1/2*(1 + E^3 - 2*E^3*x)^2/((1 + E^3)*x^2) + (1 + E^3 - 4*E^3*x)/(2*(
1 + x^2))))/(3*E^3)
```

3.241.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 48
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && EqQ[m + n + 2, 0] && NeQ[m, -1]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2019
```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

3.241. $\int \frac{-2-4x^2+e^3(-2+4x-4x^2+12x^3)}{e^3(3x^3+6x^5+3x^7)}\,dx$

rule 2336
```
Int[(Pq_)*((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[
{Q = PolynomialQuotient[(c*x)^m*Pq, a + b*x^2, x], f = Coeff[PolynomialRema
inder[(c*x)^m*Pq, a + b*x^2, x], x, 0], g = Coeff[PolynomialRemainder[(c*x)
^m*Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b*f*x)*((a + b*x^2)^(p + 1)/(2*a*
b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   Int[(c*x)^m*(a + b*x^2)^(p + 1)*Ex
pandToSum[(2*a*(p + 1)*Q)/(c*x)^m + (f*(2*p + 3))/(c*x)^m, x], x], x]] /; F
reeQ[{a, b, c}, x] && PolyQ[Pq, x] && LtQ[p, -1] && ILtQ[m, 0]
```

3.241.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

method	result	size
risch	$\frac{{\rm e}^{-3}\left(\frac{1}{3}-\frac{4x\,{\rm e}^{3}}{3}+\frac{{\rm e}^{3}}{3}\right)}{x^{2}\left(x^{2}+1\right)}$	25
norman	$\frac{-\frac{4x}{3}+\frac{\left({\rm e}^{3}+1\right){\rm e}^{-3}}{3}}{x^{2}\left(x^{2}+1\right)}$	26
gosper	$-\frac{\left(4x\,{\rm e}^{3}-{\rm e}^{3}-1\right){\rm e}^{-3}}{3x^{2}\left(x^{2}+1\right)}$	28
parallelrisch	$-\frac{\left(4x\,{\rm e}^{3}-{\rm e}^{3}-1\right){\rm e}^{-3}}{3x^{2}\left(x^{2}+1\right)}$	28
default	$\frac{{\rm e}^{-3}\left(-\frac{-{\rm e}^{3}-1}{x^{2}}-\frac{4\,{\rm e}^{3}}{x}-\frac{2\left(\frac{1}{2}-2x\,{\rm e}^{3}+\frac{{\rm e}^{3}}{2}\right)}{x^{2}+1}\right)}{3}$	46

input
```
int(((12*x^3-4*x^2+4*x-2)*exp(3)-4*x^2-2)/(3*x^7+6*x^5+3*x^3)/exp(3),x,met
hod=_RETURNVERBOSE)
```

output
```
exp(-3)*(1/3-4/3*x*exp(3)+1/3*exp(3))/x^2/(x^2+1)
```

3.241.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{-2-4x^2+e^3(-2+4x-4x^2+12x^3)}{e^3\,(3x^3+6x^5+3x^7)}\,dx = -\frac{((4\,x-1)e^3-1)e^{(-3)}}{3\,(x^4+x^2)}$$

input
```
integrate(((12*x^3-4*x^2+4*x-2)*exp(3)-4*x^2-2)/(3*x^7+6*x^5+3*x^3)/exp(3)
,x, algorithm=\
```

output
```
-1/3*((4*x - 1)*e^3 - 1)*e^(-3)/(x^4 + x^2)
```

3.241.6 Sympy [A] (verification not implemented)

Time = 0.56 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-2-4x^2+e^3(-2+4x-4x^2+12x^3)}{e^3\left(3x^3+6x^5+3x^7\right)}\,dx=\frac{-4xe^3+1+e^3}{3x^4e^3+3x^2e^3}$$

input
```
integrate(((12*x**3-4*x**2+4*x-2)*exp(3)-4*x**2-2)/(3*x**7+6*x**5+3*x**3)/
exp(3),x)
```

output
```
(-4*x*exp(3) + 1 + exp(3))/(3*x**4*exp(3) + 3*x**2*exp(3))
```

3.241.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-2-4x^2+e^3(-2+4x-4x^2+12x^3)}{e^3\left(3x^3+6x^5+3x^7\right)}\,dx=-\frac{(4\,xe^3-e^3-1)e^{(-3)}}{3\left(x^4+x^2\right)}$$

input
```
integrate(((12*x^3-4*x^2+4*x-2)*exp(3)-4*x^2-2)/(3*x^7+6*x^5+3*x^3)/exp(3)
,x, algorithm=\
```

output
```
-1/3*(4*x*e^3 - e^3 - 1)*e^(-3)/(x^4 + x^2)
```

3.241.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. 2(19) = 38.

Time = 0.26 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.82

$$\int \frac{-2-4x^2+e^3(-2+4x-4x^2+12x^3)}{e^3\left(3x^3+6x^5+3x^7\right)}\,dx=\frac{1}{3}\left(\frac{4\,xe^3-e^3-1}{x^2+1}-\frac{4\,xe^3-e^3-1}{x^2}\right)e^{(-3)}$$

input
```
integrate(((12*x^3-4*x^2+4*x-2)*exp(3)-4*x^2-2)/(3*x^7+6*x^5+3*x^3)/exp(3)
,x, algorithm=\
```

output
```
1/3*((4*x*e^3 - e^3 - 1)/(x^2 + 1) - (4*x*e^3 - e^3 - 1)/x^2)*e^(-3)
```

3.241.9 Mupad [B] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-2-4x^2+e^3(-2+4x-4x^2+12x^3)}{e^3\,(3x^3+6x^5+3x^7)}\,dx = \frac{e^3-4\,x\,e^3+1}{3\,e^3\,x^4+3\,e^3\,x^2}$$

input
```
int(-(exp(-3)*(4*x^2 - exp(3)*(4*x - 4*x^2 + 12*x^3 - 2) + 2))/(3*x^3 + 6*
x^5 + 3*x^7),x)
```

output
```
(exp(3) - 4*x*exp(3) + 1)/(3*x^2*exp(3) + 3*x^4*exp(3))
```

3.242 $\int \frac{2e^{-1+2e^{-1+x}+x}x+(-1-9x-2x^2)\log(\log(4))}{x\log(\log(4))}\,dx$

3.242.1 Optimal result

Integrand size = 39, antiderivative size = 28

$$\int \frac{2e^{-1+2e^{-1+x}+x}x+(-1-9x-2x^2)\log(\log(4))}{x\log(\log(4))}\,dx = x-(5+x)^2-\log(x)+\frac{e^{2e^{-1+x}}}{\log(\log(4))}$$

output
```
x-ln(x)+exp(exp(-1+x))^2/ln(2*ln(2))-(5+x)^2
```

3.242.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{2e^{-1+2e^{-1+x}+x}x+(-1-9x-2x^2)\log(\log(4))}{x\log(\log(4))}\,dx = -9x-x^2-\log(x)+\frac{e^{2e^{-1+x}}}{\log(\log(4))}$$

input
```
Integrate[(2*E^(-1 + 2*E^(-1 + x) + x)*x + (-1 - 9*x - 2*x^2)*Log[Log[4]])
/(x*Log[Log[4]]),x]
```

output
```
-9*x - x^2 - Log[x] + E^(2*E^(-1 + x))/Log[Log[4]]
```

3.242.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-2x^2-9x-1)\log(\log(4))+2e^{x+2e^{x-1}-1}x}{x\log(\log(4))}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{\int \frac{2e^{x+2e^{x-1}-1}x-(2x^2+9x+1)\log(\log(4))}{x}dx}{\log(\log(4))}$$
$$\Big\downarrow \text{2010}$$
$$\frac{\int \left(2e^{x+2e^{x-1}-1}-\frac{(2x^2+9x+1)\log(\log(4))}{x}\right)dx}{\log(\log(4))}$$
$$\Big\downarrow \text{2009}$$
$$\frac{x^2(-\log(\log(4)))+e^{2e^{x-1}}-9x\log(\log(4))-\log(\log(4))\log(x)}{\log(\log(4))}$$

input
```
Int[(2*E^(-1 + 2*E^(-1 + x) + x)*x + (-1 - 9*x - 2*x^2)*Log[Log[4]])/(x*Lo
g[Log[4]]),x]
```

output
```
(E^(2*E^(-1 + x)) - 9*x*Log[Log[4]] - x^2*Log[Log[4]] - Log[x]*Log[Log[4]]
)/Log[Log[4]]
```

3.242.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.242.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

method	result	size
parts	$-9x-x^{2}-\ln\left(x\right)+\frac{{\mathrm e}^{2 \,{\mathrm e}^{-1+x}}}{\ln\left(2 \ln\left(2\right)\right)}$	29
norman	$\frac{{\mathrm e}^{2 \,{\mathrm e}^{-1+x}}}{\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)}-9x-x^{2}-\ln\left(x\right)$	30
parallelrisch	$\frac{-9x\ln\left(2\ln\left(2\right)\right)-x^{2}\ln\left(2\ln\left(2\right)\right)+{\mathrm e}^{2 \,{\mathrm e}^{-1+x}}-\ln\left(x\right)\ln\left(2\ln\left(2\right)\right)}{\ln\left(2\ln\left(2\right)\right)}$	44
risch	$-x^{2}-9x-\frac{\ln\left(x\right)\ln\left(2\right)}{\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)}-\frac{\ln\left(x\right)\ln\left(\ln\left(2\right)\right)}{\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)}+\frac{{\mathrm e}^{2 \,{\mathrm e}^{-1+x}}}{\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)}$	55
default	$\frac{-\ln\left(x\right)\ln\left(\ln\left(2\right)\right)-x^{2}\ln\left(2\right)-x^{2}\ln\left(\ln\left(2\right)\right)-\ln\left(2\right)\ln\left(x\right)+{\mathrm e}^{2 \,{\mathrm e}^{-1+x}}-9x\ln\left(2\right)-9x\ln\left(\ln\left(2\right)\right)}{\ln\left(2\ln\left(2\right)\right)}$	57

input
```
int((2*x*exp(-1+x)*exp(exp(-1+x))^2+(-2*x^2-9*x-1)*ln(2*ln(2)))/x/ln(2*ln(
2)),x,method=_RETURNVERBOSE)
```

output
```
-9*x-x^2-ln(x)+exp(exp(-1+x))^2/ln(2*ln(2))
```

3.242.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.93

$$\int \frac{2e^{-1+2e^{-1+x}+x}x+(-1-9x-2x^2)\log(\log(4))}{x\log(\log(4))}\,dx$$
$$=-\frac{\left(\left((x^{2}+9\,x)e^{(x-1)}+e^{(x-1)}\log\left(x\right)\right)\log\left(2\,\log\left(2\right)\right)-e^{\left(x+2\,e^{(x-1)}-1\right)}\right)e^{(-x+1)}}{\log\left(2\,\log\left(2\right)\right)}$$

input
```
integrate((2*x*exp(-1+x)*exp(exp(-1+x))^2+(-2*x^2-9*x-1)*log(2*log(2)))/x/
log(2*log(2)),x, algorithm=\
```

output
```
-(((x^2 + 9*x)*e^(x - 1) + e^(x - 1)*log(x))*log(2*log(2)) - e^(x + 2*e^(x
 - 1) - 1))*e^(-x + 1)/log(2*log(2))
```

3.242.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{2e^{-1+2e^{-1+x}+x}x+(-1-9x-2x^2)\log(\log(4))}{x\log(\log(4))}\,dx$$
$$= -x^2-9x+\frac{e^{2e^{x-1}}}{\log(\log(2))+\log(2)}-\log(x)$$

input
```
integrate((2*x*exp(-1+x)*exp(exp(-1+x))**2+(-2*x**2-9*x-1)*ln(2*ln(2)))/x/
ln(2*ln(2)),x)
```

output
```
-x**2 - 9*x + exp(2*exp(x - 1))/(log(log(2)) + log(2)) - log(x)
```

3.242.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.57

$$\int \frac{2e^{-1+2e^{-1+x}+x}x+(-1-9x-2x^2)\log(\log(4))}{x\log(\log(4))}\,dx$$
$$= -\frac{x^2\log(2\log(2))+9x\log(2\log(2))+\log(x)\log(2\log(2))-e^{(2e^{(x-1)})}}{\log(2\log(2))}$$

input
```
integrate((2*x*exp(-1+x)*exp(exp(-1+x))^2+(-2*x^2-9*x-1)*log(2*log(2)))/x/
log(2*log(2)),x, algorithm=\
```

output
```
-(x^2*log(2*log(2)) + 9*x*log(2*log(2)) + log(x)*log(2*log(2)) - e^(2*e^(x
 - 1)))/log(2*log(2))
```

3.242.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(28) = 56.

Time = 0.27 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.57

$$\int \frac{2e^{-1+2e^{-1+x}+x}x+(-1-9x-2x^2)\log(\log(4))}{x\log(\log(4))}\,dx =$$
$$-\frac{\left(x^2e^x\log(2)+x^2e^x\log(\log(2))+9xe^x\log(2)+e^x\log(2)\log(x)+9xe^x\log(\log(2))+e^x\log(x)\log(\right.}{\log(2\log(2))}$$

input
```
integrate((2*x*exp(-1+x)*exp(exp(-1+x))^2+(-2*x^2-9*x-1)*log(2*log(2)))/x/
log(2*log(2)),x, algorithm=\
```

output
```
-(x^2*e^x*log(2) + x^2*e^x*log(log(2)) + 9*x*e^x*log(2) + e^x*log(2)*log(x
) + 9*x*e^x*log(log(2)) + e^x*log(x)*log(log(2)) - e^(x + 2*e^(x - 1)))*e^
(-x)/log(2*log(2))
```

3.242.9 Mupad [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{2e^{-1+2e^{-1+x}+x}x+(-1-9x-2x^2)\log(\log(4))}{x\log(\log(4))}\,dx=\frac{e^{2\,e^{-1}\,e^{x}}}{\ln(2\,\ln(2))}-\ln(x)-x^2-9\,x$$

input
```
int(-(log(2*log(2))*(9*x + 2*x^2 + 1) - 2*x*exp(2*exp(x - 1))*exp(x - 1))/
(x*log(2*log(2))),x)
```

output
```
exp(2*exp(-1)*exp(x))/log(2*log(2)) - log(x) - x^2 - 9*x
```

3.243 $\int \frac{4+x+e^{\frac{128+e^6(64-8x)+8e^6\log(4+x)}{e^6}}(24+8x)}{4+x}\,dx$

3.243.1 Optimal result

Integrand size = 41, antiderivative size = 25

$$\int \frac{4+x+e^{\frac{128+e^6(64-8x)+8e^6\log(4+x)}{e^6}}(24+8x)}{4+x}\,dx = -e^{4\left(16+2\left(\frac{16}{e^6}-x+\log(4+x)\right)\right)}+x$$

output
```
x-exp(64+128/exp(3)^2-8*x+8*ln(4+x))
```

3.243.2 Mathematica [A] (verified)

Time = 8.14 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{4+x+e^{\frac{128+e^6(64-8x)+8e^6\log(4+x)}{e^6}}(24+8x)}{4+x}\,dx = -e^{-8x}(4+x)\left(-e^{8x}+e^{64+\frac{128}{e^6}}(4+x)^7\right)$$

input
```
Integrate[(4 + x + E^((128 + E^6*(64 - 8*x) + 8*E^6*Log[4 + x])/E^6)*(24 + 
 8*x))/(4 + x),x]
```

output
```
-(((4 + x)*(-E^(8*x) + E^(64 + 128/E^6)*(4 + x)^7))/E^(8*x))
```

3.243.3 Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x+(8x+24)e^{\frac{e^6(64-8x)+8e^6\log(x+4)+128}{e^6}}+4}{x+4}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(8e^{-8x+\frac{128}{e^6}+64}(x+3)(x+4)^7+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x-e^{64\left(1+\frac{2}{e^6}\right)-8x}(x+4)^8$$

input
```
Int[(4 + x + E^((128 + E^6*(64 - 8*x) + 8*E^6*Log[4 + x])/E^6)*(24 + 8*x))
/(4 + x),x]
```

output
```
x - E^(64*(1 + 2/E^6) - 8*x)*(4 + x)^8
```

3.243.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.243.4 Maple [A] (verified)

Time = 0.72 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

method	result
default	$x-\mathrm{e}^{\left(8\,\mathrm{e}^{6} \ln(4+x)+(-8x+64)\mathrm{e}^{6}+128\right)\mathrm{e}^{-6}}$
norman	$x-\mathrm{e}^{\left(8\,\mathrm{e}^{6} \ln(4+x)+(-8x+64)\mathrm{e}^{6}+128\right)\mathrm{e}^{-6}}$
parts	$x-\mathrm{e}^{\left(8\,\mathrm{e}^{6} \ln(4+x)+(-8x+64)\mathrm{e}^{6}+128\right)\mathrm{e}^{-6}}$
parallelrisch	$x-\mathrm{e}^{\left(8\,\mathrm{e}^{6} \ln(4+x)+(-8x+64)\mathrm{e}^{6}+128\right)\mathrm{e}^{-6}}-8$
risch	$x+(-x^{8}-32x^{7}-448x^{6}-3584x^{5}-17920x^{4}-57344x^{3}-114688x^{2}-131072x-65536)$

input
```
int(((8*x+24)*exp((8*exp(3)^2*ln(4+x)+(-8*x+64)*exp(3)^2+128)/exp(3)^2)+4+
x)/(4+x),x,method=_RETURNVERBOSE)
```

output
```
x-exp((8*exp(3)^2*ln(4+x)+(-8*x+64)*exp(3)^2+128)/exp(3)^2)
```

3.243.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{4+x+e^{\frac{128+e^{6}(64-8x)+8e^{6}\log(4+x)}{e^{6}}}(24+8x)}{4+x}\,dx = x-e^{\left(-8\left((x-8)e^{6}-e^{6}\log(x+4)-16\right)e^{(-6)}\right)}$$

input
```
integrate(((8*x+24)*exp((8*exp(3)^2*log(4+x)+(-8*x+64)*exp(3)^2+128)/exp(3
)^2)+4+x)/(4+x),x, algorithm=\
```

output
```
x - e^(-8*((x - 8)*e^6 - e^6*log(x + 4) - 16)*e^(-6))
```

3.243.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 590 vs. 2(17) = 34.

Time = 4.42 (sec) , antiderivative size = 590, normalized size of antiderivative = 23.60

$$\int \frac{4+x+e^{\frac{128+e^6(64-8x)+8e^6\log(4+x)}{e^6}}(24+8x)}{4+x}\,dx$$
$$= x+819200\left(-\frac{xe^{-8x}}{8}-\frac{e^{-8x}}{64}\right)e^{64}e^{\frac{128}{e^6}}+745472\left(-\frac{x^2e^{-8x}}{8}-\frac{xe^{-8x}}{32}-\frac{e^{-8x}}{256}\right)e^{64}e^{\frac{128}{e^6}}$$
$$+387072\left(-\frac{x^3e^{-8x}}{8}-\frac{3x^2e^{-8x}}{64}-\frac{3xe^{-8x}}{256}-\frac{3e^{-8x}}{2048}\right)e^{64}e^{\frac{128}{e^6}}$$
$$+125440\left(-\frac{x^4e^{-8x}}{8}-\frac{x^3e^{-8x}}{16}-\frac{3x^2e^{-8x}}{128}-\frac{3xe^{-8x}}{512}-\frac{3e^{-8x}}{4096}\right)e^{64}e^{\frac{128}{e^6}}$$
$$+25984\left(-\frac{x^5e^{-8x}}{8}-\frac{5x^4e^{-8x}}{64}-\frac{5x^3e^{-8x}}{128}-\frac{15x^2e^{-8x}}{1024}-\frac{15xe^{-8x}}{4096}-\frac{15e^{-8x}}{32768}\right)e^{64}e^{\frac{128}{e^6}}$$
$$+3360\left(-\frac{x^6e^{-8x}}{8}-\frac{3x^5e^{-8x}}{32}-\frac{15x^4e^{-8x}}{256}-\frac{15x^3e^{-8x}}{512}-\frac{45x^2e^{-8x}}{4096}-\frac{45xe^{-8x}}{16384}\right.$$
$$\left.-\frac{45e^{-8x}}{131072}\right)e^{64}e^{\frac{128}{e^6}}+248\left(-\frac{x^7e^{-8x}}{8}-\frac{7x^6e^{-8x}}{64}-\frac{21x^5e^{-8x}}{256}-\frac{105x^4e^{-8x}}{2048}-\frac{105x^3e^{-8x}}{4096}\right.$$
$$\left.-\frac{315x^2e^{-8x}}{32768}-\frac{315xe^{-8x}}{131072}-\frac{315e^{-8x}}{1048576}\right)e^{64}e^{\frac{128}{e^6}}$$
$$+8\left(-\frac{x^8e^{-8x}}{8}-\frac{x^7e^{-8x}}{8}-\frac{7x^6e^{-8x}}{64}-\frac{21x^5e^{-8x}}{256}-\frac{105x^4e^{-8x}}{2048}-\frac{105x^3e^{-8x}}{4096}-\frac{315x^2e^{-8x}}{32768}\right.$$
$$\left.-\frac{315xe^{-8x}}{131072}-\frac{315e^{-8x}}{1048576}\right)e^{64}e^{\frac{128}{e^6}}-49152e^{64}e^{-8x}e^{\frac{128}{e^6}}$$

input
```
integrate(((8*x+24)*exp((8*exp(3)**2*ln(4+x)+(-8*x+64)*exp(3)**2+128)/exp(
3)**2)+4+x)/(4+x),x)
```

3.243. $\int \frac{4+x+e^{\frac{128+e^6(64-8x)+8e^6\log(4+x)}{e^6}}(24+8x)}{4+x}\,dx$

output
```
x + 819200*(-x*exp(-8*x)/8 - exp(-8*x)/64)*exp(64)*exp(128*exp(-6)) + 7454
72*(-x**2*exp(-8*x)/8 - x*exp(-8*x)/32 - exp(-8*x)/256)*exp(64)*exp(128*ex
p(-6)) + 387072*(-x**3*exp(-8*x)/8 - 3*x**2*exp(-8*x)/64 - 3*x*exp(-8*x)/2
56 - 3*exp(-8*x)/2048)*exp(64)*exp(128*exp(-6)) + 125440*(-x**4*exp(-8*x)/
8 - x**3*exp(-8*x)/16 - 3*x**2*exp(-8*x)/128 - 3*x*exp(-8*x)/512 - 3*exp(-
8*x)/4096)*exp(64)*exp(128*exp(-6)) + 25984*(-x**5*exp(-8*x)/8 - 5*x**4*ex
p(-8*x)/64 - 5*x**3*exp(-8*x)/128 - 15*x**2*exp(-8*x)/1024 - 15*x*exp(-8*x
)/4096 - 15*exp(-8*x)/32768)*exp(64)*exp(128*exp(-6)) + 3360*(-x**6*exp(-8
*x)/8 - 3*x**5*exp(-8*x)/32 - 15*x**4*exp(-8*x)/256 - 15*x**3*exp(-8*x)/51
2 - 45*x**2*exp(-8*x)/4096 - 45*x*exp(-8*x)/16384 - 45*exp(-8*x)/131072)*e
xp(64)*exp(128*exp(-6)) + 248*(-x**7*exp(-8*x)/8 - 7*x**6*exp(-8*x)/64 - 2
1*x**5*exp(-8*x)/256 - 105*x**4*exp(-8*x)/2048 - 105*x**3*exp(-8*x)/4096 -
 315*x**2*exp(-8*x)/32768 - 315*x*exp(-8*x)/131072 - 315*exp(-8*x)/1048576
)*exp(64)*exp(128*exp(-6)) + 8*(-x**8*exp(-8*x)/8 - x**7*exp(-8*x)/8 - 7*x
**6*exp(-8*x)/64 - 21*x**5*exp(-8*x)/256 - 105*x**4*exp(-8*x)/2048 - 105*x
**3*exp(-8*x)/4096 - 315*x**2*exp(-8*x)/32768 - 315*x*exp(-8*x)/131072 - 3
15*exp(-8*x)/1048576)*exp(64)*exp(128*exp(-6)) - 49152*exp(64)*exp(-8*x)*e
xp(128*exp(-6))
```

3.243.7 Maxima [F]

$$\int \frac{4+x+e^{\frac{128+e^6(64-8x)+8e^6\log(4+x)}{e^6}}(24+8x)}{4+x}\,dx$$
$$=\int \frac{8\,(x+3)e^{\left(-8\,\left((x-8)e^6-e^6\log(x+4)-16\right)e^{(-6)}\right)}+x+4}{x+4}\,dx$$

input
```
integrate(((8*x+24)*exp((8*exp(3)^2*log(4+x)+(-8*x+64)*exp(3)^2+128)/exp(3
)^2)+4+x)/(4+x),x, algorithm=\
```

output
```
-1572864*e^(64*(e^6 + 2)*e^(-6) + 32)*exp_integral_e(1, 8*x + 32) + x - (x
^9*e^(128*e^(-6) + 64) + 36*x^8*e^(128*e^(-6) + 64) + 576*x^7*e^(128*e^(-6
) + 64) + 5376*x^6*e^(128*e^(-6) + 64) + 32256*x^5*e^(128*e^(-6) + 64) + 1
29024*x^4*e^(128*e^(-6) + 64) + 344064*x^3*e^(128*e^(-6) + 64) + 589824*x^
2*e^(128*e^(-6) + 64) + 589824*x*e^(128*e^(-6) + 64))*e^(-8*x)/(x + 4) + i
ntegrate(262144*(2*x*e^(128*e^(-6) + 64) + 9*e^(128*e^(-6) + 64))*e^(-8*x)
/(x^2 + 8*x + 16), x)
```

3.243.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(20) = 40$.

Time = 0.28 (sec) , antiderivative size = 159, normalized size of antiderivative = 6.36

$$\int \frac{4+x+e^{\frac{128+e^6(64-8x)+8e^6\log(4+x)}{e^6}}(24+8x)}{4+x}\,dx = -x^8e^{\left(64\left(e^6+2\right)e^{(-6)}-8x\right)} - 32x^7e^{\left(64\left(e^6+2\right)e^{(-6)}-8x\right)} - 448x^6e^{\left(64\left(e^6+2\right)e^{(-6)}-8x\right)} - 3584x^5e^{\left(64\left(e^6+2\right)e^{(-6)}-8x\right)} - 17920x^4e^{\left(64\left(e^6+2\right)e^{(-6)}-8x\right)} - 57344x^3e^{\left(64\left(e^6+2\right)e^{(-6)}-8x\right)} - 114688x^2e^{\left(64\left(e^6+2\right)e^{(-6)}-8x\right)} - 131072xe^{\left(64\left(e^6+2\right)e^{(-6)}-8x\right)} + x - 65536e^{\left(64\left(e^6+2\right)e^{(-6)}-8x\right)}$$

input
```
integrate(((8*x+24)*exp((8*exp(3)^2*log(4+x)+(-8*x+64)*exp(3)^2+128)/exp(3
)^2)+4+x)/(4+x),x, algorithm=\
```

output
```
-x^8*e^(64*(e^6 + 2)*e^(-6) - 8*x) - 32*x^7*e^(64*(e^6 + 2)*e^(-6) - 8*x)
- 448*x^6*e^(64*(e^6 + 2)*e^(-6) - 8*x) - 3584*x^5*e^(64*(e^6 + 2)*e^(-6)
- 8*x) - 17920*x^4*e^(64*(e^6 + 2)*e^(-6) - 8*x) - 57344*x^3*e^(64*(e^6 +
2)*e^(-6) - 8*x) - 114688*x^2*e^(64*(e^6 + 2)*e^(-6) - 8*x) - 131072*x*e^(
64*(e^6 + 2)*e^(-6) - 8*x) + x - 65536*e^(64*(e^6 + 2)*e^(-6) - 8*x)
```

3.243.9 Mupad [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 132, normalized size of antiderivative = 5.28

$$\int \frac{4+x+e^{\frac{128+e^6(64-8x)+8e^6\log(4+x)}{e^6}}(24+8x)}{4+x}\,dx = x - 65536\,\mathrm{e}^{128\,\mathrm{e}^{-6}-8\,x+64} - 131072\,x\,\mathrm{e}^{128\,\mathrm{e}^{-6}-8\,x+64} - 114688\,x^2\,\mathrm{e}^{128\,\mathrm{e}^{-6}-8\,x+64} - 57344\,x^3\,\mathrm{e}^{128\,\mathrm{e}^{-6}-8\,x+64} - 17920\,x^4\,\mathrm{e}^{128\,\mathrm{e}^{-6}-8\,x+64} - 3584\,x^5\,\mathrm{e}^{128\,\mathrm{e}^{-6}-8\,x+64} - 448\,x^6\,\mathrm{e}^{128\,\mathrm{e}^{-6}-8\,x+64} - 32\,x^7\,\mathrm{e}^{128\,\mathrm{e}^{-6}-8\,x+64} - x^8\,\mathrm{e}^{128\,\mathrm{e}^{-6}-8\,x+64}$$

input
```
int((x + exp(exp(-6)*(8*log(x + 4)*exp(6) - exp(6)*(8*x - 64) + 128))*(8*x
 + 24) + 4)/(x + 4),x)
```

output
```
x - 65536*exp(128*exp(-6) - 8*x + 64) - 131072*x*exp(128*exp(-6) - 8*x + 6
4) - 114688*x^2*exp(128*exp(-6) - 8*x + 64) - 57344*x^3*exp(128*exp(-6) -
8*x + 64) - 17920*x^4*exp(128*exp(-6) - 8*x + 64) - 3584*x^5*exp(128*exp(-
6) - 8*x + 64) - 448*x^6*exp(128*exp(-6) - 8*x + 64) - 32*x^7*exp(128*exp(
-6) - 8*x + 64) - x^8*exp(128*exp(-6) - 8*x + 64)
```

3.244 $\int \frac{50+e^2(-2-}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4\left(x^3+2x^4+x^5\right)+e^{2e^5}\left(x^3+2x^4+x\right.}$

3.244.1 Optimal result

Integrand size = 165, antiderivative size = 24

$$\int \frac{50+e^2(-2-3x)+e^{e^5}(-2-3x)+72x}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4\left(x^3+2x^4+x^5\right)+e^{2e^5}\left(x^3+2x^4+x^5\right)+e^2\left(-50x^3-98x^4-\right.}$$
$$=\frac{1}{x\left(-25+e^2+e^{e^5}+x\right)\left(x+x^2\right)}$$

output
```
1/x/(exp(2)+exp(exp(5))+x-25)/(x^2+x)
```

3.244.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{50+e^2(-2-3x)+e^{e^5}(-2-3x)+72x}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4\left(x^3+2x^4+x^5\right)+e^{2e^5}\left(x^3+2x^4+x^5\right)+e^2\left(-50x^3-98x^4-\right.}$$
$$=\frac{1}{x^2(1+x)\left(-25+e^2+e^{e^5}+x\right)}$$

input
```
Integrate[(50 + E^2*(-2 - 3*x) + E^E^5*(-2 - 3*x) + 72*x - 4*x^2)/(625*x^3
 + 1200*x^4 + 526*x^5 - 48*x^6 + x^7 + E^4*(x^3 + 2*x^4 + x^5) + E^(2*E^5)
*(x^3 + 2*x^4 + x^5) + E^2*(-50*x^3 - 98*x^4 - 46*x^5 + 2*x^6) + E^E^5*(-5
0*x^3 - 98*x^4 - 46*x^5 + 2*x^6 + E^2*(2*x^3 + 4*x^4 + 2*x^5))),x]
```

output
```
1/(x^2*(1 + x)*(-25 + E^2 + E^E^5 + x))
```

3.244.
$\int \frac{50+e^2(-2-3x)+e^{e^5}(-2-3x)+72x-4x^2}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4(x^3+2x^4+x^5)+e^{2e^5}(x^3+2x^4+x^5)+e^2(-50x^3-98x^4-46x^5+2x^6)+e^{e^5}(-50x^3-98x^4-46x^5+2x^6+e^2(2x^3+}$

3.244.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 132 vs. 2(24) = 48.

Time = 0.70 (sec) , antiderivative size = 132, normalized size of antiderivative = 5.50, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.030, Rules used = {6, 6, 2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^2+72x+e^{e^5}(-3x-2)+e^2(-3x-2)+50}{x^7-48x^6+526x^5+1200x^4+625x^3+e^{2e^5}\left(x^5+2x^4+x^3\right)+e^4\left(x^5+2x^4+x^3\right)+e^2\left(2x^6-46x^5-98x^4-5\right.}$$

$$\Big\downarrow \; 6$$

$$\int \frac{-4x^2+72x+\left(e^2+e^{e^5}\right)(-3x-2)+50}{x^7-48x^6+526x^5+1200x^4+625x^3+e^{2e^5}\left(x^5+2x^4+x^3\right)+e^4\left(x^5+2x^4+x^3\right)+e^2\left(2x^6-46x^5-98x^4-5\right.}$$

$$\Big\downarrow \; 6$$

$$\int \frac{-4x^2+72x+\left(e^2+e^{e^5}\right)(-3x-2)+50}{x^7-48x^6+526x^5+1200x^4+625x^3+\left(e^4+e^{2e^5}\right)\left(x^5+2x^4+x^3\right)+e^2\left(2x^6-46x^5-98x^4-50x^3\right)+e^{e^5}\left(2x\right.}$$

$$\Big\downarrow \; 2026$$

$$\int \frac{-4x^2+72x+\left(e^2+e^{e^5}\right)(-3x-2)+50}{x^3\left(x^4-2\left(24-e^2-e^{e^5}\right)x^3+\left(526-46e^2+e^4-46e^{e^5}+e^{2e^5}+2e^{2+e^5}\right)x^2+2\left(24-e^2-e^{e^5}\right)\left(25-e^2-e^{e^5}\right.\right.}$$

$$\Big\downarrow \; 2462$$

$$\int \left(-\frac{2}{\left(-25+e^2+e^{e^5}\right)x^3}+\frac{-24+e^2+e^{e^5}}{\left(-25+e^2+e^{e^5}\right)^2x^2}-\frac{1}{\left(-26+e^2+e^{e^5}\right)(x+1)^2}+\frac{1}{\left(-26+e^2+e^{e^5}\right)\left(-25+e^2+\right.}\right.$$

$$\Big\downarrow \; 2009$$

$$-\frac{1}{\left(25-e^2-e^{e^5}\right)x^2}+\frac{24-e^2-e^{e^5}}{\left(25-e^2-e^{e^5}\right)^2x}-\frac{1}{\left(26-e^2-e^{e^5}\right)(x+1)}-\frac{1}{\left(25-e^2-e^{e^5}\right)^2\left(26-e^2-e^{e^5}\right)\left(-x-e^{e^5}-e^2+25\right)}$$

3.244.

$$\int \frac{50+e^2(-2-3x)+e^{e^5}(-2-3x)+72x-4x^2}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4(x^3+2x^4+x^5)+e^{2e^5}(x^3+2x^4+x^5)+e^2(-50x^3-98x^4-46x^5+2x^6)+e^{e^5}(-50x^3-98x^4-46x^5+2x^6+e^2(2x^3+}$$

input
```
Int[(50 + E^2*(-2 - 3*x) + E^E^5*(-2 - 3*x) + 72*x - 4*x^2)/(625*x^3 + 120
0*x^4 + 526*x^5 - 48*x^6 + x^7 + E^4*(x^3 + 2*x^4 + x^5) + E^(2*E^5)*(x^3
+ 2*x^4 + x^5) + E^2*(-50*x^3 - 98*x^4 - 46*x^5 + 2*x^6) + E^E^5*(-50*x^3
- 98*x^4 - 46*x^5 + 2*x^6 + E^2*(2*x^3 + 4*x^4 + 2*x^5))),x]
```

output
```
-(1/((25 - E^2 - E^E^5)^2*(26 - E^2 - E^E^5)*(25 - E^2 - E^E^5 - x))) - 1/
((25 - E^2 - E^E^5)*x^2) + (24 - E^2 - E^E^5)/((25 - E^2 - E^E^5)^2*x) - 1
/((26 - E^2 - E^E^5)*(1 + x))
```

3.244.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /; !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] && !BinomialQ[Px, x] && !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.244.

$$\int \frac{50+e^2(-2-3x)+e^{e^5}(-2-3x)+72x-4x^2}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4(x^3+2x^4+x^5)+e^{2e^5}(x^3+2x^4+x^5)+e^2(-50x^3-98x^4-46x^5+2x^6)+e^{e^5}(-50x^3-98x^4-46x^5+2x^6+e^2(2x^3+}$$

3.244.4 Maple [A] (verified)

Time = 4.64 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

method	result	size
norman	$\frac{1}{x^{2}(1+x)\left(\mathrm{e}^{2}+\mathrm{e}^{\mathrm{e}^{5}}+x-25\right)}$	20
gosper	$\frac{1}{x^{2}\left(\mathrm{e}^{2} x+x\,\mathrm{e}^{\mathrm{e}^{5}}+x^{2}+\mathrm{e}^{2}+\mathrm{e}^{\mathrm{e}^{5}}-24x-25\right)}$	29
risch	$\frac{1}{x^{2}\left(\mathrm{e}^{2} x+x\,\mathrm{e}^{\mathrm{e}^{5}}+x^{2}+\mathrm{e}^{2}+\mathrm{e}^{\mathrm{e}^{5}}-24x-25\right)}$	29
parallelrisch	$\frac{1}{x^{2}\left(\mathrm{e}^{2} x+x\,\mathrm{e}^{\mathrm{e}^{5}}+x^{2}+\mathrm{e}^{2}+\mathrm{e}^{\mathrm{e}^{5}}-24x-25\right)}$	29

input
```
int(((-2-3*x)*exp(exp(5))+(-2-3*x)*exp(2)-4*x^2+72*x+50)/((x^5+2*x^4+x^3)*
exp(exp(5))^2+((2*x^5+4*x^4+2*x^3)*exp(2)+2*x^6-46*x^5-98*x^4-50*x^3)*exp(
exp(5))+(x^5+2*x^4+x^3)*exp(2)^2+(2*x^6-46*x^5-98*x^4-50*x^3)*exp(2)+x^7-4
8*x^6+526*x^5+1200*x^4+625*x^3),x,method=_RETURNVERBOSE)
```

output
```
1/x^2/(1+x)/(exp(2)+exp(exp(5))+x-25)
```

3.244.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{50+e^2(-2-3x)+e^{e^5}(-2-3x)+72x}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4\left(x^3+2x^4+x^5\right)+e^{2e^5}\left(x^3+2x^4+x^5\right)+e^2\left(-50x^3-98x^4-\right.}$$
$$=\frac{1}{x^4-24\,x^3-25\,x^2+(x^3+x^2)e^2+(x^3+x^2)e^{(e^5)}}$$

input
```
integrate(((-2-3*x)*exp(exp(5))+(-2-3*x)*exp(2)-4*x^2+72*x+50)/((x^5+2*x^4
+x^3)*exp(exp(5))^2+((2*x^5+4*x^4+2*x^3)*exp(2)+2*x^6-46*x^5-98*x^4-50*x^3
)*exp(exp(5))+(x^5+2*x^4+x^3)*exp(2)^2+(2*x^6-46*x^5-98*x^4-50*x^3)*exp(2)
+x^7-48*x^6+526*x^5+1200*x^4+625*x^3),x, algorithm=\
```

output
```
1/(x^4 - 24*x^3 - 25*x^2 + (x^3 + x^2)*e^2 + (x^3 + x^2)*e^(e^5))
```

3.244.6 Sympy [A] (verification not implemented)

Time = 3.22 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

$$\int \frac{50+e^2(-2-3x)+e^{e^5}(-2-3x)+72x}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4\left(x^3+2x^4+x^5\right)+e^{2e^5}\left(x^3+2x^4+x^5\right)+e^2\left(-50x^3-98x^4-\right.}$$
$$=\frac{1}{x^4+x^3\left(-24+e^2+e^{e^5}\right)+x^2\left(-25+e^2+e^{e^5}\right)}$$

input
```
integrate(((-2-3*x)*exp(exp(5))+(-2-3*x)*exp(2)-4*x**2+72*x+50)/((x**5+2*x
**4+x**3)*exp(exp(5))**2+((2*x**5+4*x**4+2*x**3)*exp(2)+2*x**6-46*x**5-98*
x**4-50*x**3)*exp(exp(5))+(x**5+2*x**4+x**3)*exp(2)**2+(2*x**6-46*x**5-98*
x**4-50*x**3)*exp(2)+x**7-48*x**6+526*x**5+1200*x**4+625*x**3),x)
```

output
```
1/(x**4 + x**3*(-24 + exp(2) + exp(exp(5))) + x**2*(-25 + exp(2) + exp(exp
(5))))
```

3.244.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{50+e^2(-2-3x)+e^{e^5}(-2-3x)+72x}{625x^3+1200x^4+526x^5-48x^6+x^7+e^4\left(x^3+2x^4+x^5\right)+e^{2e^5}\left(x^3+2x^4+x^5\right)+e^2\left(-50x^3-98x^4-\right.}$$
$$=\frac{1}{x^4+x^3(e^2+e^{(e^5)}-24)+x^2(e^2+e^{(e^5)}-25)}$$

input
```
integrate(((-2-3*x)*exp(exp(5))+(-2-3*x)*exp(2)-4*x^2+72*x+50)/((x^5+2*x^4
+x^3)*exp(exp(5))^2+((2*x^5+4*x^4+2*x^3)*exp(2)+2*x^6-46*x^5-98*x^4-50*x^3
)*exp(exp(5))+(x^5+2*x^4+x^3)*exp(2)^2+(2*x^6-46*x^5-98*x^4-50*x^3)*exp(2)
+x^7-48*x^6+526*x^5+1200*x^4+625*x^3),x, algorithm=\
```

output
```
1/(x^4 + x^3*(e^2 + e^(e^5) - 24) + x^2*(e^2 + e^(e^5) - 25))
```

3.244.8 Giac [F]

$$\int \frac{50 + e^2(-2-3x) + e^{e^5}(-2-3x) + 72x}{625x^3 + 1200x^4 + 526x^5 - 48x^6 + x^7 + e^4(x^3+2x^4+x^5) + e^{2e^5}(x^3+2x^4+x^5) + e^2(-50x^3 - 98x^4 -}$$
$$= \int -\frac{4x^2 + (3x+2)e^2 + (3x+2)e^{(e^5)}}{x^7 - 48x^6 + 526x^5 + 1200x^4 + 625x^3 + (x^5+2x^4+x^3)e^4 + 2(x^6 - 23x^5 - 49x^4 - 25x^3)e^2 + (x^5}$$

input
```
integrate((((-2-3*x)*exp(exp(5))+(-2-3*x)*exp(2)-4*x^2+72*x+50)/((x^5+2*x^4
+x^3)*exp(exp(5))^2+((2*x^5+4*x^4+2*x^3)*exp(2)+2*x^6-46*x^5-98*x^4-50*x^3
)*exp(exp(5))+(x^5+2*x^4+x^3)*exp(2)^2+(2*x^6-46*x^5-98*x^4-50*x^3)*exp(2)
+x^7-48*x^6+526*x^5+1200*x^4+625*x^3),x, algorithm=\
```

output
```
undef
```

3.244.9 Mupad [F(-1)]

Timed out.

$$\int \frac{50 + e^2(-2-3x) + e^{e^5}(-2-3x) + 72x}{625x^3 + 1200x^4 + 526x^5 - 48x^6 + x^7 + e^4(x^3+2x^4+x^5) + e^{2e^5}(x^3+2x^4+x^5) + e^2(-50x^3 - 98x^4 -}$$
$$= \text{Hanged}$$

input
```
int(-(exp(exp(5))*(3*x + 2) - 72*x + 4*x^2 + exp(2)*(3*x + 2) - 50)/(exp(4
)*(x^3 + 2*x^4 + x^5) - exp(exp(5))*(50*x^3 - exp(2)*(2*x^3 + 4*x^4 + 2*x^
5) + 98*x^4 + 46*x^5 - 2*x^6) + exp(2*exp(5))*(x^3 + 2*x^4 + x^5) + 625*x^
3 + 1200*x^4 + 526*x^5 - 48*x^6 + x^7 - exp(2)*(50*x^3 + 98*x^4 + 46*x^5 -
 2*x^6)),x)
```

output
```
\text{Hanged}
```

3.245 $\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}(8x^2\log^2(3)-6400\log^3(x))}{x\log^2(3)}\,dx$

3.245.1 Optimal result

Integrand size = 51, antiderivative size = 19

$$\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}(8x^2\log^2(3)-6400\log^3(x))}{x\log^2(3)}\,dx = 4e^{4+x^2-\frac{400\log^4(x)}{\log^2(3)}}$$

output
```
4/exp(400*ln(x)^4/ln(3)^2-x^2-4)
```

3.245.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}(8x^2\log^2(3)-6400\log^3(x))}{x\log^2(3)}\,dx = 4e^{4+x^2-\frac{400\log^4(x)}{\log^2(3)}}$$

input
```
Integrate[(8*x^2*Log[3]^2 - 6400*Log[x]^3)/(E^(((-4 - x^2)*Log[3]^2 + 400*
Log[x]^4)/Log[3]^2)*x*Log[3]^2),x]
```

output
```
4*E^(4 + x^2 - (400*Log[x]^4)/Log[3]^2)
```

3.245.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.37, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {27, 27, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(8x^2\log^2(3)-6400\log^3(x))\exp\left(-\frac{(-x^2-4)\log^2(3)+400\log^4(x)}{\log^2(3)}\right)}{x\log^2(3)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int \frac{8e^{\frac{(x^2+4)\log^2(3)-400\log^4(x)}{\log^2(3)}}(x^2\log^2(3)-800\log^3(x))}{x}dx}{\log^2(3)}$$

$$\Big\downarrow \ 27$$

$$\frac{8\int \frac{e^{\frac{(x^2+4)\log^2(3)-400\log^4(x)}{\log^2(3)}}(x^2\log^2(3)-800\log^3(x))}{x}dx}{\log^2(3)}$$

$$\Big\downarrow \ 7257$$

$$4e^{\frac{(x^2+4)\log^2(3)-400\log^4(x)}{\log^2(3)}}$$

input
```
Int[(8*x^2*Log[3]^2 - 6400*Log[x]^3)/(E^(((-4 - x^2)*Log[3]^2 + 400*Log[x]
^4)/Log[3]^2)*x*Log[3]^2),x]
```

output
```
4*E^(((4 + x^2)*Log[3]^2 - 400*Log[x]^4)/Log[3]^2)
```

3.245.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.245.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.58

method	result	size
risch	$4\,\mathrm{e}^{\frac{-400\ln(x)^4+x^2\ln(3)^2+4\ln(3)^2}{\ln(3)^2}}$	30
parallelrisch	$4\,\mathrm{e}^{-\frac{400\ln(x)^4+\left(-x^2-4\right)\ln(3)^2}{\ln(3)^2}}$	30

input
```
int((-6400*ln(x)^3+8*x^2*ln(3)^2)/x/ln(3)^2/exp((400*ln(x)^4+(-x^2-4)*ln(3
)^2)/ln(3)^2),x,method=_RETURNVERBOSE)
```

output
```
4*exp((-400*ln(x)^4+x^2*ln(3)^2+4*ln(3)^2)/ln(3)^2)
```

3.245.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}\left(8x^2\log^2(3)-6400\log^3(x)\right)}{x\log^2(3)}\,dx = 4\,e^{\left(-\frac{400\,\log(x)^4-\left(x^2+4\right)\,\log(3)^2}{\log(3)^2}\right)}$$

input
```
integrate((-6400*log(x)^3+8*x^2*log(3)^2)/x/log(3)^2/exp((400*log(x)^4+(-x
^2-4)*log(3)^2)/log(3)^2),x, algorithm=\
```

output
```
4*e^(-(400*log(x)^4 - (x^2 + 4)*log(3)^2)/log(3)^2)
```

3.245.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.37

$$\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}\left(8x^2\log^2(3)-6400\log^3(x)\right)}{x\log^2(3)}\,dx = 4e^{-\frac{\left(-x^2-4\right)\log{(3)}^2+400\log{(x)}^4}{\log{(3)}^2}}$$

input
```
integrate((-6400*ln(x)**3+8*x**2*ln(3)**2)/x/ln(3)**2/exp((400*ln(x)**4+(-
x**2-4)*ln(3)**2)/ln(3)**2),x)
```

output
```
4*exp(-((-x**2 - 4)*log(3)**2 + 400*log(x)**4)/log(3)**2)
```

3.245. $\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}\left(8x^2\log^2(3)-6400\log^3(x)\right)}{x\log^2(3)}\,dx$

3.245.7 Maxima [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}(8x^2\log^2(3)-6400\log^3(x))}{x\log^2(3)}\,dx = 4\,e^{\left(x^2-\frac{400\,\log(x)^4}{\log(3)^2}+4\right)}$$

input
```
integrate((-6400*log(x)^3+8*x^2*log(3)^2)/x/log(3)^2/exp((400*log(x)^4+(-x
^2-4)*log(3)^2)/log(3)^2),x, algorithm=\
```

output
```
4*e^(x^2 - 400*log(x)^4/log(3)^2 + 4)
```

3.245.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}(8x^2\log^2(3)-6400\log^3(x))}{x\log^2(3)}\,dx = 4\,e^{\left(x^2-\frac{400\,\log(x)^4}{\log(3)^2}+4\right)}$$

input
```
integrate((-6400*log(x)^3+8*x^2*log(3)^2)/x/log(3)^2/exp((400*log(x)^4+(-x
^2-4)*log(3)^2)/log(3)^2),x, algorithm=\
```

output
```
4*e^(x^2 - 400*log(x)^4/log(3)^2 + 4)
```

3.245.9 Mupad [B] (verification not implemented)

Time = 14.41 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{e^{-\frac{(-4-x^2)\log^2(3)+400\log^4(x)}{\log^2(3)}}(8x^2\log^2(3)-6400\log^3(x))}{x\log^2(3)}\,dx = 4\,\mathrm{e}^{x^2}\,\mathrm{e}^{4}\,\mathrm{e}^{-\frac{400\ln(x)^4}{\ln(3)^2}}$$

input
```
int((exp(-(400*log(x)^4 - log(3)^2*(x^2 + 4))/log(3)^2)*(8*x^2*log(3)^2 -
6400*log(x)^3))/(x*log(3)^2),x)
```

output
```
4*exp(x^2)*exp(4)*exp(-(400*log(x)^4)/log(3)^2)
```

3.246 $\int \frac{-15e^5-20x}{5e^5x+4x^2} \, dx$

3.246.1 Optimal result

Integrand size = 24, antiderivative size = 19

$$\int \frac{-15e^5-20x}{5e^5x+4x^2} \, dx = \log \left(\frac{108}{x^3 \left(-x+5 \left(e^5+x\right)\right)^2}\right)$$

output
```
ln(108/x^3/(5*exp(5)+4*x)^2)
```

3.246.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

$$\int \frac{-15e^5-20x}{5e^5x+4x^2} \, dx = -5\left(\frac{3\log(x)}{5} + \frac{2}{5}\log\left(5e^5+4x\right)\right)$$

input
```
Integrate[(-15*E^5 - 20*x)/(5*E^5*x + 4*x^2),x]
```

output
```
-5*((3*Log[x])/5 + (2*Log[5*E^5 + 4*x])/5)
```

3.246.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {1141, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-20x-15e^5}{4x^2+5e^5x}\,dx$$

$$\Big\downarrow \ 1141$$

$$4\int \left(-\frac{2}{4x+5e^5}-\frac{3}{4x}\right)dx$$

$$\Big\downarrow \ 2009$$

$$4\left(-\frac{3\log(x)}{4}-\frac{1}{2}\log\left(4x+5e^5\right)\right)$$

input
```
Int[(-15*E^5 - 20*x)/(5*E^5*x + 4*x^2),x]
```

output
```
4*((-3*Log[x])/4 - Log[5*E^5 + 4*x]/2)
```

3.246.3.1 Defintions of rubi rules used

rule 1141
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_
Symbol] :> With[{q = Rt[b^2 - 4*a*c, 2]}, Simp[1/c^p   Int[ExpandIntegrand[
(d + e*x)^m*(b/2 - q/2 + c*x)^p*(b/2 + q/2 + c*x)^p, x], x], x] /; EqQ[p, -
1] ||  !FractionalPowerFactorQ[q]] /; FreeQ[{a, b, c, d, e}, x] && ILtQ[p,
0] && IntegerQ[m] && NiceSqrtQ[b^2 - 4*a*c]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.246.4 Maple [A] (verified)

Time = 0.69 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

method	result	size
parallelrisch	$-3\ln\left(x\right)-2\ln\left(\frac{5\,{\mathrm e}^{5}}{4}+x\right)$	15
default	$-3\ln\left(x\right)-2\ln\left(5\,{\mathrm e}^{5}+4x\right)$	17
norman	$-3\ln\left(x\right)-2\ln\left(5\,{\mathrm e}^{5}+4x\right)$	17
risch	$-3\ln\left(x\right)-2\ln\left(5\,{\mathrm e}^{5}+4x\right)$	17
meijerg	$-3\ln\left(x\right)+3\ln\left(5\right)-6\ln\left(2\right)+15-2\ln\left(1+\frac{4x\,{\mathrm e}^{-5}}{5}\right)$	25

input
```
int((-15*exp(5)-20*x)/(5*x*exp(5)+4*x^2),x,method=_RETURNVERBOSE)
```

output
```
-3*ln(x)-2*ln(5/4*exp(5)+x)
```

3.246.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{-15e^5-20x}{5e^5x+4x^2}\,dx=-2\,\log\left(4\,x+5\,e^{5}\right)-3\,\log\left(x\right)$$

input
```
integrate((-15*exp(5)-20*x)/(5*x*exp(5)+4*x^2),x, algorithm=\
```

output
```
-2*log(4*x + 5*e^5) - 3*log(x)
```

3.246.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{-15e^5-20x}{5e^5x+4x^2}\,dx=-3\log\left(x\right)-2\log\left(x+\frac{5e^5}{4}\right)$$

input
```
integrate((-15*exp(5)-20*x)/(5*x*exp(5)+4*x**2),x)
```

output
```
-3*log(x) - 2*log(x + 5*exp(5)/4)
```

3.246.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{-15e^5-20x}{5e^5x+4x^2}\,dx = -2\,\log\left(4\,x+5\,e^5\right)-3\,\log\left(x\right)$$

input
```
integrate((-15*exp(5)-20*x)/(5*x*exp(5)+4*x^2),x, algorithm=\
```

output
```
-2*log(4*x + 5*e^5) - 3*log(x)
```

3.246.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{-15e^5-20x}{5e^5x+4x^2}\,dx = -2\,\log\left(\left|4\,x+5\,e^5\right|\right)-3\,\log\left(\left|x\right|\right)$$

input
```
integrate((-15*exp(5)-20*x)/(5*x*exp(5)+4*x^2),x, algorithm=\
```

output
```
-2*log(abs(4*x + 5*e^5)) - 3*log(abs(x))
```

3.246.9 Mupad [B] (verification not implemented)

Time = 14.56 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \frac{-15e^5-20x}{5e^5x+4x^2}\,dx = -2\,\ln\left(x+\frac{5\,e^5}{4}\right)-3\,\ln\left(x\right)$$

input
```
int(-(20*x + 15*exp(5))/(5*x*exp(5) + 4*x^2),x)
```

output
```
- 2*log(x + (5*exp(5))/4) - 3*log(x)
```

3.247 $\int \frac{20x}{\log(4)}\,dx$

3.247.1 Optimal result

Integrand size = 7, antiderivative size = 9

$$\int \frac{20x}{\log(4)}\,dx=\frac{10x^2}{\log(4)}$$

output
```
5*x^2/ln(2)
```

3.247.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{20x}{\log(4)}\,dx=\frac{10x^2}{\log(4)}$$

input
```
Integrate[(20*x)/Log[4],x]
```

output
```
(10*x^2)/Log[4]
```

3.247.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{20x}{\log(4)} \, dx$$
$$\Big\downarrow \text{ 15}$$
$$\frac{10x^2}{\log(4)}$$

input
```
Int[(20*x)/Log[4],x]
```

output
```
(10*x^2)/Log[4]
```

3.247.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.247.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.11

method	result	size
gosper	$\frac{5x^2}{\ln(2)}$	10
default	$\frac{5x^2}{\ln(2)}$	10
norman	$\frac{5x^2}{\ln(2)}$	10
risch	$\frac{5x^2}{\ln(2)}$	10
parallelrisch	$\frac{5x^2}{\ln(2)}$	10

input
```
int(10*x/ln(2),x,method=_RETURNVERBOSE)
```

output
```
5*x^2/ln(2)
```

3.247.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{20x}{\log(4)}\,dx = \frac{5\,x^2}{\log(2)}$$

input
```
integrate(10*x/log(2),x, algorithm=\
```

output
```
5*x^2/log(2)
```

3.247.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.78

$$\int \frac{20x}{\log(4)}\,dx = \frac{5x^2}{\log(2)}$$

input
```
integrate(10*x/ln(2),x)
```

output
```
5*x**2/log(2)
```

3.247.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{20x}{\log(4)}\,dx = \frac{5\,x^2}{\log(2)}$$

input
```
integrate(10*x/log(2),x, algorithm=\
```

output
```
5*x^2/log(2)
```

3.247.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{20x}{\log(4)}\,dx = \frac{5\,x^2}{\log{(2)}}$$

input
```
integrate(10*x/log(2),x, algorithm=\
```

output
```
5*x^2/log(2)
```

3.247.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{20x}{\log(4)}\,dx = \frac{5\,x^2}{\ln{(2)}}$$

input
```
int((10*x)/log(2),x)
```

output
```
(5*x^2)/log(2)
```

3.248 $\int \frac{-36x^2-2x^5+(-36x+10x^4)\log(5)-20x^3\log^2(5)+20x^2\log^3(5)-10x\,\mathrm{l}}{-x^5+5x^4\log(5)-10x^3\log^2(5)+10x^2\log^3(5)-5x\log^4(5)+\mathrm{l}}$

3.248.1 Optimal result

Integrand size = 99, antiderivative size = 22

$$\int \frac{-36x^2-2x^5+(-36x+10x^4)\log(5)-20x^3\log^2(5)+20x^2\log^3(5)-10x\log^4(5)+2\log^5(5)}{-x^5+5x^4\log(5)-10x^3\log^2(5)+10x^2\log^3(5)-5x\log^4(5)+\log^5(5)}\,dx$$
$$=2\left(8+x-3\left(3+\frac{3x^2}{(x-\log(5))^4}\right)\right)$$

output
```
2*x-2-18*x^2/(-ln(5)+x)^4
```

3.248.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{-36x^2-2x^5+(-36x+10x^4)\log(5)-20x^3\log^2(5)+20x^2\log^3(5)-10x\log^4(5)+2\log^5(5)}{-x^5+5x^4\log(5)-10x^3\log^2(5)+10x^2\log^3(5)-5x\log^4(5)+\log^5(5)}\,dx$$
$$=2\left(x-\frac{9x^2}{(x-\log(5))^4}\right)$$

input
```
Integrate[(-36*x^2 - 2*x^5 + (-36*x + 10*x^4)*Log[5] - 20*x^3*Log[5]^2 + 2
0*x^2*Log[5]^3 - 10*x*Log[5]^4 + 2*Log[5]^5)/(-x^5 + 5*x^4*Log[5] - 10*x^3
*Log[5]^2 + 10*x^2*Log[5]^3 - 5*x*Log[5]^4 + Log[5]^5),x]
```

output
```
2*(x - (9*x^2)/(x - Log[5])^4)
```

3.248.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.82, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.040, Rules used = {6, 2007, 2389, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^5+\left(10x^4-36x\right)\log(5)-20x^3\log^2(5)-36x^2+20x^2\log^3(5)-10x\log^4(5)+2\log^5(5)}{-x^5+5x^4\log(5)-10x^3\log^2(5)+10x^2\log^3(5)-5x\log^4(5)+\log^5(5)}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{-2x^5+\left(10x^4-36x\right)\log(5)-20x^3\log^2(5)+x^2\left(20\log^3(5)-36\right)-10x\log^4(5)+2\log^5(5)}{-x^5+5x^4\log(5)-10x^3\log^2(5)+10x^2\log^3(5)-5x\log^4(5)+\log^5(5)}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{-2x^5+\left(10x^4-36x\right)\log(5)-20x^3\log^2(5)+x^2\left(20\log^3(5)-36\right)-10x\log^4(5)+2\log^5(5)}{(\log(5)-x)^5}dx$$

$$\Big\downarrow \text{ 2389}$$

$$\int \left(\frac{72\log^2(5)}{(x-\log(5))^5}+\frac{36}{(x-\log(5))^3}+\frac{108\log(5)}{(x-\log(5))^4}+2\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2x-\frac{18\log^2(5)}{(x-\log(5))^4}-\frac{18}{(x-\log(5))^2}-\frac{36\log(5)}{(x-\log(5))^3}$$

input
```
Int[(-36*x^2 - 2*x^5 + (-36*x + 10*x^4)*Log[5] - 20*x^3*Log[5]^2 + 20*x^2*
Log[5]^3 - 10*x*Log[5]^4 + 2*Log[5]^5)/(-x^5 + 5*x^4*Log[5] - 10*x^3*Log[5
]^2 + 10*x^2*Log[5]^3 - 5*x*Log[5]^4 + Log[5]^5),x]
```

output
```
2*x - 18/(x - Log[5])^2 - (36*Log[5])/(x - Log[5])^3 - (18*Log[5]^2)/(x -
Log[5])^4
```

3.248.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2389
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

3.248.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. $2(18) = 36$.

Time = 0.22 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.86

method	result	size
default	$2x-\frac{18}{\left(-\ln\left(5\right)+x\right)^{2}}-\frac{36\ln\left(5\right)}{\left(-\ln\left(5\right)+x\right)^{3}}-\frac{18\ln\left(5\right)^{2}}{\left(-\ln\left(5\right)+x\right)^{4}}$	41
risch	$2x-\frac{18x^{2}}{\ln\left(5\right)^{4}-4x\ln\left(5\right)^{3}+6x^{2}\ln\left(5\right)^{2}-4x^{3}\ln\left(5\right)+x^{4}}$	43
norman	$\frac{-20x^{3}\ln\left(5\right)^{2}-30x\ln\left(5\right)^{4}+\left(40\ln\left(5\right)^{3}-18\right)x^{2}+2x^{5}+8\ln\left(5\right)^{5}}{\left(\ln\left(5\right)-x\right)^{4}}$	50
gosper	$\frac{8\ln\left(5\right)^{5}-30x\ln\left(5\right)^{4}+40x^{2}\ln\left(5\right)^{3}-20x^{3}\ln\left(5\right)^{2}+2x^{5}-18x^{2}}{\ln\left(5\right)^{4}-4x\ln\left(5\right)^{3}+6x^{2}\ln\left(5\right)^{2}-4x^{3}\ln\left(5\right)+x^{4}}$	76
parallelrisch	$\frac{8\ln\left(5\right)^{5}-30x\ln\left(5\right)^{4}+40x^{2}\ln\left(5\right)^{3}-20x^{3}\ln\left(5\right)^{2}+2x^{5}-18x^{2}}{\ln\left(5\right)^{4}-4x\ln\left(5\right)^{3}+6x^{2}\ln\left(5\right)^{2}-4x^{3}\ln\left(5\right)+x^{4}}$	77

input
```
int((2*ln(5)^5-10*x*ln(5)^4+20*x^2*ln(5)^3-20*x^3*ln(5)^2+(10*x^4-36*x)*ln
(5)-2*x^5-36*x^2)/(ln(5)^5-5*x*ln(5)^4+10*x^2*ln(5)^3-10*x^3*ln(5)^2+5*x^4
*ln(5)-x^5),x,method=_RETURNVERBOSE)
```

output
```
2*x-18/(-ln(5)+x)^2-36*ln(5)/(-ln(5)+x)^3-18*ln(5)^2/(-ln(5)+x)^4
```

3.248. $\int \frac{-36x^2-2x^5+(-36x+10x^4)\log(5)-20x^3\log^2(5)+20x^2\log^3(5)-10x\log^4(5)+2\log^5(5)}{-x^5+5x^4\log(5)-10x^3\log^2(5)+10x^2\log^3(5)-5x\log^4(5)+\log^5(5)}\,dx$

3.248.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. $2(18) = 36$.

Time = 0.26 (sec) , antiderivative size = 75, normalized size of antiderivative = 3.41

$$\int \frac{-36x^2-2x^5+(-36x+10x^4)\log(5)-20x^3\log^2(5)+20x^2\log^3(5)-10x\log^4(5)+2\log^5(5)}{-x^5+5x^4\log(5)-10x^3\log^2(5)+10x^2\log^3(5)-5x\log^4(5)+\log^5(5)}\,dx$$
$$= \frac{2\left(x^5-4\,x^4\log(5)+6\,x^3\log(5)^2-4\,x^2\log(5)^3+x\log(5)^4-9\,x^2\right)}{x^4-4\,x^3\log(5)+6\,x^2\log(5)^2-4\,x\log(5)^3+\log(5)^4}$$

input
```
integrate((2*log(5)^5-10*x*log(5)^4+20*x^2*log(5)^3-20*x^3*log(5)^2+(10*x^
4-36*x)*log(5)-2*x^5-36*x^2)/(log(5)^5-5*x*log(5)^4+10*x^2*log(5)^3-10*x^3
*log(5)^2+5*x^4*log(5)-x^5),x, algorithm=\
```

output
```
2*(x^5 - 4*x^4*log(5) + 6*x^3*log(5)^2 - 4*x^2*log(5)^3 + x*log(5)^4 - 9*x
^2)/(x^4 - 4*x^3*log(5) + 6*x^2*log(5)^2 - 4*x*log(5)^3 + log(5)^4)
```

3.248.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. $2(15) = 30$.

Time = 0.13 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.91

$$\int \frac{-36x^2-2x^5+(-36x+10x^4)\log(5)-20x^3\log^2(5)+20x^2\log^3(5)-10x\log^4(5)+2\log^5(5)}{-x^5+5x^4\log(5)-10x^3\log^2(5)+10x^2\log^3(5)-5x\log^4(5)+\log^5(5)}\,dx$$
$$= -\frac{18x^2}{x^4-4x^3\log(5)+6x^2\log(5)^2-4x\log(5)^3+\log(5)^4}+2x$$

input
```
integrate((2*ln(5)**5-10*x*ln(5)**4+20*x**2*ln(5)**3-20*x**3*ln(5)**2+(10*
x**4-36*x)*ln(5)-2*x**5-36*x**2)/(ln(5)**5-5*x*ln(5)**4+10*x**2*ln(5)**3-1
0*x**3*ln(5)**2+5*x**4*ln(5)-x**5),x)
```

output
```
-18*x**2/(x**4 - 4*x**3*log(5) + 6*x**2*log(5)**2 - 4*x*log(5)**3 + log(5)
**4) + 2*x
```

3.248.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. $2(18) = 36$.

Time = 0.20 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.91

$$\int \frac{-36x^2 - 2x^5 + (-36x + 10x^4)\log(5) - 20x^3\log^2(5) + 20x^2\log^3(5) - 10x\log^4(5) + 2\log^5(5)}{-x^5 + 5x^4\log(5) - 10x^3\log^2(5) + 10x^2\log^3(5) - 5x\log^4(5) + \log^5(5)}\,dx$$
$$= 2\,x - \frac{18\,x^2}{x^4 - 4\,x^3\log(5) + 6\,x^2\log(5)^2 - 4\,x\log(5)^3 + \log(5)^4}$$

input
```
integrate((2*log(5)^5-10*x*log(5)^4+20*x^2*log(5)^3-20*x^3*log(5)^2+(10*x^
4-36*x)*log(5)-2*x^5-36*x^2)/(log(5)^5-5*x*log(5)^4+10*x^2*log(5)^3-10*x^3
*log(5)^2+5*x^4*log(5)-x^5),x, algorithm=\
```

output
```
2*x - 18*x^2/(x^4 - 4*x^3*log(5) + 6*x^2*log(5)^2 - 4*x*log(5)^3 + log(5)^
4)
```

3.248.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{-36x^2 - 2x^5 + (-36x + 10x^4)\log(5) - 20x^3\log^2(5) + 20x^2\log^3(5) - 10x\log^4(5) + 2\log^5(5)}{-x^5 + 5x^4\log(5) - 10x^3\log^2(5) + 10x^2\log^3(5) - 5x\log^4(5) + \log^5(5)}\,dx$$
$$= 2\,x - \frac{18\,x^2}{(x - \log(5))^4}$$

input
```
integrate((2*log(5)^5-10*x*log(5)^4+20*x^2*log(5)^3-20*x^3*log(5)^2+(10*x^
4-36*x)*log(5)-2*x^5-36*x^2)/(log(5)^5-5*x*log(5)^4+10*x^2*log(5)^3-10*x^3
*log(5)^2+5*x^4*log(5)-x^5),x, algorithm=\
```

output
```
2*x - 18*x^2/(x - log(5))^4
```

3.248.9 Mupad [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{-36x^2 - 2x^5 + (-36x + 10x^4)\log(5) - 20x^3\log^2(5) + 20x^2\log^3(5) - 10x\log^4(5) + 2\log^5(5)}{-x^5 + 5x^4\log(5) - 10x^3\log^2(5) + 10x^2\log^3(5) - 5x\log^4(5) + \log^5(5)}\,dx$$
$$= 2\,x - \frac{18\,x^2}{(x - \ln(5))^4}$$

input
```
int(-(20*x^3*log(5)^2 - 20*x^2*log(5)^3 + log(5)*(36*x - 10*x^4) + 10*x*lo
g(5)^4 - 2*log(5)^5 + 36*x^2 + 2*x^5)/(10*x^2*log(5)^3 - 10*x^3*log(5)^2 -
 5*x*log(5)^4 + 5*x^4*log(5) + log(5)^5 - x^5),x)
```

output
```
2*x - (18*x^2)/(x - log(5))^4
```

3.249 $\int \frac{-54x-10}{108x^3+135x^4+63x^5+13x^6+x^7+e^3(-27x^3-27x^4-9x^5-x^6)+(27x^3+}$

3.249.1 Optimal result

Integrand size = 535, antiderivative size = 27

$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5}{108x^3+135x^4+63x^5+13x^6+x^7+e^3(-27x^3-27x^4-9x^5-x^6)+(27x^3+27x^4+9x^5+x^6)\log(x)-}$$
$$=\frac{x}{(3+x)^2}+\frac{x^2}{(x+\log(4-e^3+x+\log(x)))^2}$$

output
```
x/(3+x)^2+x^2/(x+ln(ln(x)-exp(3)+4+x))^2
```

3.249.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5}{108x^3+135x^4+63x^5+13x^6+x^7+e^3(-27x^3-27x^4-9x^5-x^6)+(27x^3+27x^4+9x^5+x^6)\log(x)-}$$
$$=x\left(\frac{1}{(3+x)^2}+\frac{x}{(x+\log(4-e^3+x+\log(x)))^2}\right)$$

3.249.

$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5+e^3(-3x^3+x^4)+(3x^3-x^4)\log(x)+(216x+306x^2+12}{108x^3+135x^4+63x^5+13x^6+x^7+e^3(-27x^3-27x^4-9x^5-x^6)+(27x^3+27x^4+9x^5+x^6)\log(x)+(324x^2+405x^3+189x^4+39x^5+3x^6+e^3(-81x^2-81}$$

input
```
Integrate[(-54*x - 108*x^2 - 60*x^3 - 21*x^4 - 3*x^5 + E^3*(-3*x^3 + x^4)
+ (3*x^3 - x^4)*Log[x] + (216*x + 306*x^2 + 123*x^3 + 23*x^4 + 2*x^5 + E^3
*(-54*x - 63*x^2 - 15*x^3 - 2*x^4) + (54*x + 63*x^2 + 15*x^3 + 2*x^4)*Log[
x])*Log[4 - E^3 + x + Log[x]] + (36*x - 3*x^2 - 3*x^3 + E^3*(-9*x + 3*x^2)
 + (9*x - 3*x^2)*Log[x])*Log[4 - E^3 + x + Log[x]]^2 + (12 + E^3*(-3 + x)
- x - x^2 + (3 - x)*Log[x])*Log[4 - E^3 + x + Log[x]]^3)/(108*x^3 + 135*x^
4 + 63*x^5 + 13*x^6 + x^7 + E^3*(-27*x^3 - 27*x^4 - 9*x^5 - x^6) + (27*x^3
 + 27*x^4 + 9*x^5 + x^6)*Log[x] + (324*x^2 + 405*x^3 + 189*x^4 + 39*x^5 +
3*x^6 + E^3*(-81*x^2 - 81*x^3 - 27*x^4 - 3*x^5) + (81*x^2 + 81*x^3 + 27*x^
4 + 3*x^5)*Log[x])*Log[4 - E^3 + x + Log[x]] + (324*x + 405*x^2 + 189*x^3
+ 39*x^4 + 3*x^5 + E^3*(-81*x - 81*x^2 - 27*x^3 - 3*x^4) + (81*x + 81*x^2
+ 27*x^3 + 3*x^4)*Log[x])*Log[4 - E^3 + x + Log[x]]^2 + (108 + 135*x + 63*
x^2 + 13*x^3 + x^4 + E^3*(-27 - 27*x - 9*x^2 - x^3) + (27 + 27*x + 9*x^2 +
 x^3)*Log[x])*Log[4 - E^3 + x + Log[x]]^3),x]
```

output
```
x*((3 + x)^(-2) + x/(x + Log[4 - E^3 + x + Log[x]])^2)
```

3.249.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^5-21x^4-60x^3-108x^2+\left(-x^2-x+\right.}{x^7+13x^6+63x^5+135x^4+108x^3+\left(x^4+13x^3+63x^2+e^3\left(-x^3-9x^2-27x-27\right)+\left(x^3+9x^2+27x+27\right.\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{\log(x)\left(-((x-3)x^3)+\left(2x^3+15x^2+63x+54\right)x\log\left(x+\log(x)-e^3+4\right)-(x-3)\log^3\left(x+\log(x)-e^3+\right.\right.}{}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2x\left(-x^2-5\left(1-\frac{e^3}{5}\right)x-x\log(x)-1\right)}{\left(x+\log(x)+4\left(1-\frac{e^3}{4}\right)\right)\left(x+\log\left(x+\log(x)-e^3+4\right)\right)^3}+\frac{3-x}{(x+3)^3}+\frac{2x}{\left(x+\log\left(x+\log(x)-e^3+4\right)\right)^2}\right)$$

$$\Big\downarrow \text{ 2009}$$

$$2\int \frac{x^3}{\left(-x-\log(x)-4\left(1-\frac{e^3}{4}\right)\right)\left(x+\log\left(x+\log(x)-e^3+4\right)\right)^3}dx+$$
$$2\int \frac{x^2\log(x)}{\left(-x-\log(x)-4\left(1-\frac{e^3}{4}\right)\right)\left(x+\log\left(x+\log(x)-e^3+4\right)\right)^3}dx-$$
$$2(5-e^3)\int \frac{x^2}{\left(x+\log(x)+4\left(1-\frac{e^3}{4}\right)\right)\left(x+\log\left(x+\log(x)-e^3+4\right)\right)^3}dx+$$
$$2\int \frac{x}{\left(-x-\log(x)-4\left(1-\frac{e^3}{4}\right)\right)\left(x+\log\left(x+\log(x)-e^3+4\right)\right)^3}dx+$$
$$2\int \frac{x}{\left(x+\log\left(x+\log(x)-e^3+4\right)\right)^2}dx+\frac{x}{(x+3)^2}$$

input
```
Int[(-54*x - 108*x^2 - 60*x^3 - 21*x^4 - 3*x^5 + E^3*(-3*x^3 + x^4) + (3*x
^3 - x^4)*Log[x] + (216*x + 306*x^2 + 123*x^3 + 23*x^4 + 2*x^5 + E^3*(-54*
x - 63*x^2 - 15*x^3 - 2*x^4) + (54*x + 63*x^2 + 15*x^3 + 2*x^4)*Log[x])*Lo
g[4 - E^3 + x + Log[x]] + (36*x - 3*x^2 - 3*x^3 + E^3*(-9*x + 3*x^2) + (9*
x - 3*x^2)*Log[x])*Log[4 - E^3 + x + Log[x]]^2 + (12 + E^3*(-3 + x) - x -
x^2 + (3 - x)*Log[x])*Log[4 - E^3 + x + Log[x]]^3)/(108*x^3 + 135*x^4 + 63
*x^5 + 13*x^6 + x^7 + E^3*(-27*x^3 - 27*x^4 - 9*x^5 - x^6) + (27*x^3 + 27*
x^4 + 9*x^5 + x^6)*Log[x] + (324*x^2 + 405*x^3 + 189*x^4 + 39*x^5 + 3*x^6
+ E^3*(-81*x^2 - 81*x^3 - 27*x^4 - 3*x^5) + (81*x^2 + 81*x^3 + 27*x^4 + 3*
x^5)*Log[x])*Log[4 - E^3 + x + Log[x]] + (324*x + 405*x^2 + 189*x^3 + 39*x
^4 + 3*x^5 + E^3*(-81*x - 81*x^2 - 27*x^3 - 3*x^4) + (81*x + 81*x^2 + 27*x
^3 + 3*x^4)*Log[x])*Log[4 - E^3 + x + Log[x]]^2 + (108 + 135*x + 63*x^2 +
13*x^3 + x^4 + E^3*(-27 - 27*x - 9*x^2 - x^3) + (27 + 27*x + 9*x^2 + x^3)*
Log[x])*Log[4 - E^3 + x + Log[x]]^3),x]
```

output
```
$Aborted
```

3.249.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

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$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5+e^3\left(-3x^3+x^4\right)+\left(3x^3-x^4\right)\log(x)+(216x+306x^2+12}{108x^3+135x^4+63x^5+13x^6+x^7+e^3\left(-27x^3-27x^4-9x^5-x^6\right)+\left(27x^3+27x^4+9x^5+x^6\right)\log(x)+\left(324x^2+405x^3+189x^4+39x^5+3x^6+e^3(-81x^2-81x\right.}$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.249.4 Maple [A] (verified)

Time = 8.85 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

method	result
default	$\frac{x}{(3+x)^2}+\frac{x^2}{(x+\ln(\ln(x)-e^3+4+x))^2}$
risch	$\frac{x}{x^2+6x+9}+\frac{x^2}{(x+\ln(\ln(x)-e^3+4+x))^2}$
parallelrisch	$-\frac{\ln(\ln(x)-e^3+4+x)^2x^2+2\ln(\ln(x)-e^3+4+x)x^3-5x^4-36x^3-45x^2+9\ln(\ln(x)-e^3+4+x)^2+18x\ln}{6\left(x^4+2\ln(\ln(x)-e^3+4+x)x^3+\ln(\ln(x)-e^3+4+x)^2x^2+6x^3+12x^2\ln(\ln(x)-e^3+4+x)+6x\ln(\ln(x)-e^3+4+x)^2+9x^2+18x\ln}$

input
```
int((((-x+3)*ln(x)+exp(3)*(-3+x)-x^2-x+12)*ln(ln(x)-exp(3)+4+x)^3+((-3*x^2
+9*x)*ln(x)+(3*x^2-9*x)*exp(3)-3*x^3-3*x^2+36*x)*ln(ln(x)-exp(3)+4+x)^2+((
2*x^4+15*x^3+63*x^2+54*x)*ln(x)+(-2*x^4-15*x^3-63*x^2-54*x)*exp(3)+2*x^5+2
3*x^4+123*x^3+306*x^2+216*x)*ln(ln(x)-exp(3)+4+x)+(-x^4+3*x^3)*ln(x)+(x^4-
3*x^3)*exp(3)-3*x^5-21*x^4-60*x^3-108*x^2-54*x)/(((x^3+9*x^2+27*x+27)*ln(x
)+(-x^3-9*x^2-27*x-27)*exp(3)+x^4+13*x^3+63*x^2+135*x+108)*ln(ln(x)-exp(3)
+4+x)^3+((3*x^4+27*x^3+81*x^2+81*x)*ln(x)+(-3*x^4-27*x^3-81*x^2-81*x)*exp(
3)+3*x^5+39*x^4+189*x^3+405*x^2+324*x)*ln(ln(x)-exp(3)+4+x)^2+((3*x^5+27*x
^4+81*x^3+81*x^2)*ln(x)+(-3*x^5-27*x^4-81*x^3-81*x^2)*exp(3)+3*x^6+39*x^5+
189*x^4+405*x^3+324*x^2)*ln(ln(x)-exp(3)+4+x)+(x^6+9*x^5+27*x^4+27*x^3)*ln
(x)+(-x^6-9*x^5-27*x^4-27*x^3)*exp(3)+x^7+13*x^6+63*x^5+135*x^4+108*x^3),x
,method=_RETURNVERBOSE)
```

output
```
x/(3+x)^2+x^2/(x+ln(ln(x)-exp(3)+4+x))^2
```

3.249.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 105 vs. 2(26) = 52.

Time = 0.29 (sec) , antiderivative size = 105, normalized size of antiderivative = 3.89

$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5}{108x^3+135x^4+63x^5+13x^6+x^7+e^3\left(-27x^3-27x^4-9x^5-x^6\right)+\left(27x^3+27x^4+9x^5+x^6\right)\log(x)}$$
$$=\frac{x^4+7\,x^3+2\,x^2\log\left(x-e^3+\log\left(x\right)+4\right)+x\log\left(x-e^3+\log\left(x\right)+4\right)^2+9\,x^2}{x^4+6\,x^3+\left(x^2+6\,x+9\right)\log\left(x-e^3+\log\left(x\right)+4\right)^2+9\,x^2+2\left(x^3+6\,x^2+9\,x\right)\log\left(x-e^3+\log\left(x\right)+4\right.}$$

input
```
integrate((((-x+3)*log(x)+exp(3)*(-3+x)-x^2-x+12)*log(log(x)-exp(3)+4+x)^3
+((-3*x^2+9*x)*log(x)+(3*x^2-9*x)*exp(3)-3*x^3-3*x^2+36*x)*log(log(x)-exp(
3)+4+x)^2+((2*x^4+15*x^3+63*x^2+54*x)*log(x)+(-2*x^4-15*x^3-63*x^2-54*x)*e
xp(3)+2*x^5+23*x^4+123*x^3+306*x^2+216*x)*log(log(x)-exp(3)+4+x)+(-x^4+3*x
^3)*log(x)+(x^4-3*x^3)*exp(3)-3*x^5-21*x^4-60*x^3-108*x^2-54*x)/(((x^3+9*x
^2+27*x+27)*log(x)+(-x^3-9*x^2-27*x-27)*exp(3)+x^4+13*x^3+63*x^2+135*x+108
)*log(log(x)-exp(3)+4+x)^3+((3*x^4+27*x^3+81*x^2+81*x)*log(x)+(-3*x^4-27*x
^3-81*x^2-81*x)*exp(3)+3*x^5+39*x^4+189*x^3+405*x^2+324*x)*log(log(x)-exp(
3)+4+x)^2+((3*x^5+27*x^4+81*x^3+81*x^2)*log(x)+(-3*x^5-27*x^4-81*x^3-81*x^
2)*exp(3)+3*x^6+39*x^5+189*x^4+405*x^3+324*x^2)*log(log(x)-exp(3)+4+x)+(x^
6+9*x^5+27*x^4+27*x^3)*log(x)+(-x^6-9*x^5-27*x^4-27*x^3)*exp(3)+x^7+13*x^6
+63*x^5+135*x^4+108*x^3),x, algorithm=\
```

output
```
(x^4 + 7*x^3 + 2*x^2*log(x - e^3 + log(x) + 4) + x*log(x - e^3 + log(x) +
4)^2 + 9*x^2)/(x^4 + 6*x^3 + (x^2 + 6*x + 9)*log(x - e^3 + log(x) + 4)^2 +
 9*x^2 + 2*(x^3 + 6*x^2 + 9*x)*log(x - e^3 + log(x) + 4))
```

3.249.6 Sympy [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5}{108x^3+135x^4+63x^5+13x^6+x^7+e^3\left(-27x^3-27x^4-9x^5-x^6\right)+\left(27x^3+27x^4+9x^5+x^6\right)\log(x)-}$$

$$=\frac{x^2}{x^2+2x\log\left(x+\log\left(x\right)-e^3+4\right)+\log\left(x+\log\left(x\right)-e^3+4\right)^2}+\frac{x}{x^2+6x+9}$$

input
```
integrate((((-x+3)*ln(x)+exp(3)*(-3+x)-x**2-x+12)*ln(ln(x)-exp(3)+4+x)**3+
((-3*x**2+9*x)*ln(x)+(3*x**2-9*x)*exp(3)-3*x**3-3*x**2+36*x)*ln(ln(x)-exp(
3)+4+x)**2+((2*x**4+15*x**3+63*x**2+54*x)*ln(x)+(-2*x**4-15*x**3-63*x**2-5
4*x)*exp(3)+2*x**5+23*x**4+123*x**3+306*x**2+216*x)*ln(ln(x)-exp(3)+4+x)+(
-x**4+3*x**3)*ln(x)+(x**4-3*x**3)*exp(3)-3*x**5-21*x**4-60*x**3-108*x**2-5
4*x)/(((x**3+9*x**2+27*x+27)*ln(x)+(-x**3-9*x**2-27*x-27)*exp(3)+x**4+13*x
**3+63*x**2+135*x+108)*ln(ln(x)-exp(3)+4+x)**3+((3*x**4+27*x**3+81*x**2+81
*x)*ln(x)+(-3*x**4-27*x**3-81*x**2-81*x)*exp(3)+3*x**5+39*x**4+189*x**3+40
5*x**2+324*x)*ln(ln(x)-exp(3)+4+x)**2+((3*x**5+27*x**4+81*x**3+81*x**2)*ln
(x)+(-3*x**5-27*x**4-81*x**3-81*x**2)*exp(3)+3*x**6+39*x**5+189*x**4+405*x
**3+324*x**2)*ln(ln(x)-exp(3)+4+x)+(x**6+9*x**5+27*x**4+27*x**3)*ln(x)+(-x
**6-9*x**5-27*x**4-27*x**3)*exp(3)+x**7+13*x**6+63*x**5+135*x**4+108*x**3)
,x)
```

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$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5+e^3\left(-3x^3+x^4\right)+\left(3x^3-x^4\right)\log(x)+\left(216x+306x^2+12\right.}{108x^3+135x^4+63x^5+13x^6+x^7+e^3(-27x^3-27x^4-9x^5-x^6)+\left(27x^3+27x^4+9x^5+x^6\right)\log(x)+\left(324x^2+405x^3+189x^4+39x^5+3x^6+e^3(-81x^2-81\right.}$$

output
```
x**2/(x**2 + 2*x*log(x + log(x) - exp(3) + 4) + log(x + log(x) - exp(3) +
4)**2) + x/(x**2 + 6*x + 9)
```

3.249.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 105 vs. $2(26) = 52$.

Time = 0.39 (sec) , antiderivative size = 105, normalized size of antiderivative = 3.89

$$\int \frac{-54x - 108x^2 - 60x^3 - 21x^4 - 3x^5}{108x^3 + 135x^4 + 63x^5 + 13x^6 + x^7 + e^3(-27x^3 - 27x^4 - 9x^5 - x^6) + (27x^3 + 27x^4 + 9x^5 + x^6)\log(x)}$$

$$= \frac{x^4 + 7x^3 + 2x^2\log(x - e^3 + \log(x) + 4) + x\log(x - e^3 + \log(x) + 4)^2 + 9x^2}{x^4 + 6x^3 + (x^2 + 6x + 9)\log(x - e^3 + \log(x) + 4)^2 + 9x^2 + 2(x^3 + 6x^2 + 9x)\log(x - e^3 + \log(x) + 4}$$

input
```
integrate((((-x+3)*log(x)+exp(3)*(-3+x)-x^2-x+12)*log(log(x)-exp(3)+4+x)^3
+((-3*x^2+9*x)*log(x)+(3*x^2-9*x)*exp(3)-3*x^3-3*x^2+36*x)*log(log(x)-exp(
3)+4+x)^2+((2*x^4+15*x^3+63*x^2+54*x)*log(x)+(-2*x^4-15*x^3-63*x^2-54*x)*e
xp(3)+2*x^5+23*x^4+123*x^3+306*x^2+216*x)*log(log(x)-exp(3)+4+x)+(-x^4+3*x
^3)*log(x)+(x^4-3*x^3)*exp(3)-3*x^5-21*x^4-60*x^3-108*x^2-54*x)/(((x^3+9*x
^2+27*x+27)*log(x)+(-x^3-9*x^2-27*x-27)*exp(3)+x^4+13*x^3+63*x^2+135*x+108
)*log(log(x)-exp(3)+4+x)^3+((3*x^4+27*x^3+81*x^2+81*x)*log(x)+(-3*x^4-27*x
^3-81*x^2-81*x)*exp(3)+3*x^5+39*x^4+189*x^3+405*x^2+324*x)*log(log(x)-exp(
3)+4+x)^2+((3*x^5+27*x^4+81*x^3+81*x^2)*log(x)+(-3*x^5-27*x^4-81*x^3-81*x^
2)*exp(3)+3*x^6+39*x^5+189*x^4+405*x^3+324*x^2)*log(log(x)-exp(3)+4+x)+(x^
6+9*x^5+27*x^4+27*x^3)*log(x)+(-x^6-9*x^5-27*x^4-27*x^3)*exp(3)+x^7+13*x^6
+63*x^5+135*x^4+108*x^3),x, algorithm=\
```

output
```
(x^4 + 7*x^3 + 2*x^2*log(x - e^3 + log(x) + 4) + x*log(x - e^3 + log(x) +
4)^2 + 9*x^2)/(x^4 + 6*x^3 + (x^2 + 6*x + 9)*log(x - e^3 + log(x) + 4)^2 +
 9*x^2 + 2*(x^3 + 6*x^2 + 9*x)*log(x - e^3 + log(x) + 4))
```

3.249.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 148 vs. 2(26) = 52.

Time = 1.54 (sec) , antiderivative size = 148, normalized size of antiderivative = 5.48

$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5}{108x^3+135x^4+63x^5+13x^6+x^7+e^3(-27x^3-27x^4-9x^5-x^6)+(27x^3+27x^4+9x^5+x^6)\log(x)}$$

$$= \frac{x^4+7x^3+2x^2\log(x-e^3+\log(x)+}{x^4+2x^3\log(x-e^3+\log(x)+4)+x^2\log(x-e^3+\log(x)+4)^2+6x^3+12x^2\log(x-e^3+\log(x)+}$$

input
```
integrate((((-x+3)*log(x)+exp(3)*(-3+x)-x^2-x+12)*log(log(x)-exp(3)+4+x)^3
+((-3*x^2+9*x)*log(x)+(3*x^2-9*x)*exp(3)-3*x^3-3*x^2+36*x)*log(log(x)-exp(
3)+4+x)^2+((2*x^4+15*x^3+63*x^2+54*x)*log(x)+(-2*x^4-15*x^3-63*x^2-54*x)*e
xp(3)+2*x^5+23*x^4+123*x^3+306*x^2+216*x)*log(log(x)-exp(3)+4+x)+(-x^4+3*x
^3)*log(x)+(x^4-3*x^3)*exp(3)-3*x^5-21*x^4-60*x^3-108*x^2-54*x)/(((x^3+9*x
^2+27*x+27)*log(x)+(-x^3-9*x^2-27*x-27)*exp(3)+x^4+13*x^3+63*x^2+135*x+108
)*log(log(x)-exp(3)+4+x)^3+((3*x^4+27*x^3+81*x^2+81*x)*log(x)+(-3*x^4-27*x
^3-81*x^2-81*x)*exp(3)+3*x^5+39*x^4+189*x^3+405*x^2+324*x)*log(log(x)-exp(
3)+4+x)^2+((3*x^5+27*x^4+81*x^3+81*x^2)*log(x)+(-3*x^5-27*x^4-81*x^3-81*x^
2)*exp(3)+3*x^6+39*x^5+189*x^4+405*x^3+324*x^2)*log(log(x)-exp(3)+4+x)+(x^
6+9*x^5+27*x^4+27*x^3)*log(x)+(-x^6-9*x^5-27*x^4-27*x^3)*exp(3)+x^7+13*x^6
+63*x^5+135*x^4+108*x^3),x, algorithm=\
```

output
```
(x^4 + 7*x^3 + 2*x^2*log(x - e^3 + log(x) + 4) + x*log(x - e^3 + log(x) +
4)^2 + 9*x^2)/(x^4 + 2*x^3*log(x - e^3 + log(x) + 4) + x^2*log(x - e^3 + l
og(x) + 4)^2 + 6*x^3 + 12*x^2*log(x - e^3 + log(x) + 4) + 6*x*log(x - e^3
+ log(x) + 4)^2 + 9*x^2 + 18*x*log(x - e^3 + log(x) + 4) + 9*log(x - e^3 +
 log(x) + 4)^2)
```

3.249.9 Mupad [B] (verification not implemented)

Time = 19.36 (sec) , antiderivative size = 1690, normalized size of antiderivative = 62.59

$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5}{108x^3+135x^4+63x^5+13x^6+x^7+e^3(-27x^3-27x^4-9x^5-x^6)+(27x^3+27x^4+9x^5+x^6)\log(x)}$$
= Too large to display

input
```
int(-(54*x - log(x)*(3*x^3 - x^4) + log(x - exp(3) + log(x) + 4)^3*(x + lo
g(x)*(x - 3) - exp(3)*(x - 3) + x^2 - 12) - log(x - exp(3) + log(x) + 4)*(
216*x + log(x)*(54*x + 63*x^2 + 15*x^3 + 2*x^4) - exp(3)*(54*x + 63*x^2 +
15*x^3 + 2*x^4) + 306*x^2 + 123*x^3 + 23*x^4 + 2*x^5) + log(x - exp(3) + l
og(x) + 4)^2*(exp(3)*(9*x - 3*x^2) - 36*x - log(x)*(9*x - 3*x^2) + 3*x^2 +
 3*x^3) + exp(3)*(3*x^3 - x^4) + 108*x^2 + 60*x^3 + 21*x^4 + 3*x^5)/(log(x
)*(27*x^3 + 27*x^4 + 9*x^5 + x^6) + log(x - exp(3) + log(x) + 4)*(log(x)*(
81*x^2 + 81*x^3 + 27*x^4 + 3*x^5) + 324*x^2 + 405*x^3 + 189*x^4 + 39*x^5 +
 3*x^6 - exp(3)*(81*x^2 + 81*x^3 + 27*x^4 + 3*x^5)) + log(x - exp(3) + log
(x) + 4)^2*(324*x + log(x)*(81*x + 81*x^2 + 27*x^3 + 3*x^4) - exp(3)*(81*x
 + 81*x^2 + 27*x^3 + 3*x^4) + 405*x^2 + 189*x^3 + 39*x^4 + 3*x^5) - exp(3)
*(27*x^3 + 27*x^4 + 9*x^5 + x^6) + log(x - exp(3) + log(x) + 4)^3*(135*x -
 exp(3)*(27*x + 9*x^2 + x^3 + 27) + log(x)*(27*x + 9*x^2 + x^3 + 27) + 63*
x^2 + 13*x^3 + x^4 + 108) + 108*x^3 + 135*x^4 + 63*x^5 + 13*x^6 + x^7),x)
```

output
```
((217*x + 30*exp(3) - 4*exp(6) - 94*x*exp(3) + 11*x*exp(6) - 225*x^2*exp(3
) - 182*x^3*exp(3) - 20*x^4*exp(3) + 28*x^2*exp(6) + 14*x^5*exp(3) + 29*x^
3*exp(6) + 4*x^6*exp(3) + 3*x^4*exp(6) - x^2*exp(9) - 2*x^3*exp(9) + 533*x
^2 + 411*x^3 + 40*x^4 - 66*x^5 - 25*x^6 - 2*x^7 - 51)/(6*(x + x^2 - 1)^3)
+ (log(x)*(94*x + 8*exp(3) - 22*x*exp(3) - 56*x^2*exp(3) - 58*x^3*exp(3) -
 6*x^4*exp(3) + 3*x^2*exp(6) + 6*x^3*exp(6) + 225*x^2 + 182*x^3 + 20*x^4 -
 14*x^5 - 4*x^6 - 30))/(6*(x + x^2 - 1)^3) + (log(x)^2*(11*x - 3*x^2*exp(3
) - 6*x^3*exp(3) + 28*x^2 + 29*x^3 + 3*x^4 - 4))/(6*(x + x^2 - 1)^3) + (x^
2*log(x)^3*(2*x + 1))/(6*(x + x^2 - 1)^3))/(log(x)^2 + (5*x - x*exp(3) + x
^2 + 1)^2/x^2 + (2*log(x)*(5*x - x*exp(3) + x^2 + 1))/x) - (log(x)^3/(3*(x
 + x^2 - 1)) + (174*x - 38*exp(3) + 4*exp(6) - 77*x*exp(3) + 13*x*exp(6) -
 x*exp(9) - 56*x^2*exp(3) - 30*x^3*exp(3) - 4*x^4*exp(3) + 6*x^2*exp(6) +
3*x^3*exp(6) + 151*x^2 + 83*x^3 + 18*x^4 + x^5 + 89)/(3*x*(x + x^2 - 1)) +
 (log(x)^2*(13*x - 3*x*exp(3) + 6*x^2 + 3*x^3 + 4))/(3*x*(x + x^2 - 1)) +
(log(x)*(77*x - 8*exp(3) - 26*x*exp(3) + 3*x*exp(6) - 12*x^2*exp(3) - 6*x^
3*exp(3) + 56*x^2 + 30*x^3 + 4*x^4 + 38))/(3*x*(x + x^2 - 1)))/(log(x)^3 +
 (5*x - x*exp(3) + x^2 + 1)^3/x^3 + (3*log(x)^2*(5*x - x*exp(3) + x^2 + 1)
)/x + (3*log(x)*(5*x - x*exp(3) + x^2 + 1)^2)/x^2) - ((x*(188*x + 8*exp(3)
 - 34*x*exp(3) - x*exp(6) - 500*x^2*exp(3) - 1221*x^3*exp(3) - 872*x^4*exp
(3) + 57*x^2*exp(6) - 392*x^5*exp(3) + 173*x^3*exp(6) - 38*x^6*exp(3) +...
```

3.249.

$$\int \frac{-54x-108x^2-60x^3-21x^4-3x^5+e^3\left(-3x^3+x^4\right)+\left(3x^3-x^4\right)\log(x)+\left(216x+306x^2+12\right.}{108x^3+135x^4+63x^5+13x^6+x^7+e^3(-27x^3-27x^4-9x^5-x^6)+(27x^3+27x^4+9x^5+x^6)\log(x)+(324x^2+405x^3+189x^4+39x^5+3x^6+e^3(-81x^2-81x}$$

3.250 $\int (1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}(60$

3.250.1 Optimal result

Integrand size = 103, antiderivative size = 14

$$\int \left(1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}\left(60-8x-12x^2\right)+e^{2x}\left(300-120x-120x^2+24x^3+12x^4\right)+e^x\left(500-600x-300x^2+240x^3+60x^4-24x^5-4x^6\right)\right)\,dx=x+\left(5+e^x-x^2\right)^4$$

output
```
x+(5-x^2+exp(x))^4
```

3.250.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 70 vs. 2(14) = 28.

Time = 0.18 (sec) , antiderivative size = 70, normalized size of antiderivative = 5.00

$$\int \left(1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}\left(60-8x-12x^2\right)+e^{2x}\left(300-120x-120x^2+24x^3+12x^4\right)+e^x\left(500-600x-300x^2+240x^3+60x^4-24x^5-4x^6\right)\right)\,dx=e^{4x}+x-500x^2+150x^4-20x^6+x^8-4e^x\left(-5+x^2\right)^3-\frac{4}{3}e^{3x}\left(-15+3x^2\right)+6e^{2x}\left(25-10x^2+x^4\right)$$

input
```
Integrate[1 + 4*E^(4*x) - 1000*x + 600*x^3 - 120*x^5 + 8*x^7 + E^(3*x)*(60
 - 8*x - 12*x^2) + E^(2*x)*(300 - 120*x - 120*x^2 + 24*x^3 + 12*x^4) + E^x
*(500 - 600*x - 300*x^2 + 240*x^3 + 60*x^4 - 24*x^5 - 4*x^6),x]
```

output
```
E^(4*x) + x - 500*x^2 + 150*x^4 - 20*x^6 + x^8 - 4*E^x*(-5 + x^2)^3 - (4*E
^(3*x)*(-15 + 3*x^2))/3 + 6*E^(2*x)*(25 - 10*x^2 + x^4)
```

3.250.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 98 vs. 2(14) = 28.

Time = 0.53 (sec) , antiderivative size = 98, normalized size of antiderivative = 7.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.010, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(8x^7-120x^5+600x^3+e^{3x}\left(-12x^2-8x+60\right)+e^{2x}\left(12x^4+24x^3-120x^2-120x+300\right)+e^x\left(-4x^6-24x^5\right.\right.$$

$$\Big\downarrow \ 2009$$

$$x^8-4e^xx^6-20x^6+60e^xx^4+6e^{2x}x^4+150x^4-300e^xx^2-60e^{2x}x^2-4e^{3x}x^2-500x^2+x+500e^x+150e^{2x}+20e^{3x}+e^{4x}$$

input
```
Int[1 + 4*E^(4*x) - 1000*x + 600*x^3 - 120*x^5 + 8*x^7 + E^(3*x)*(60 - 8*x
 - 12*x^2) + E^(2*x)*(300 - 120*x - 120*x^2 + 24*x^3 + 12*x^4) + E^x*(500
- 600*x - 300*x^2 + 240*x^3 + 60*x^4 - 24*x^5 - 4*x^6),x]
```

output
```
500*E^x + 150*E^(2*x) + 20*E^(3*x) + E^(4*x) + x - 500*x^2 - 300*E^x*x^2 -
 60*E^(2*x)*x^2 - 4*E^(3*x)*x^2 + 150*x^4 + 60*E^x*x^4 + 6*E^(2*x)*x^4 - 2
0*x^6 - 4*E^x*x^6 + x^8
```

3.250.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.250.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. 2(13) = 26.

Time = 0.18 (sec) , antiderivative size = 74, normalized size of antiderivative = 5.29

method	result
risch	$e^{4x}+(-4x^2+20)e^{3x}+(6x^4-60x^2+150)e^{2x}+(-4x^6+60x^4-300x^2+500)e^x+x^8-$
default	$x^8-4x^6e^x-20x^6+60e^xx^4+6e^{2x}x^4+150x^4-300e^xx^2-4x^2e^{3x}-60e^{2x}x^2-500x^2+5$
parallelrisch	$x^8-4x^6e^x-20x^6+60e^xx^4+6e^{2x}x^4+150x^4-300e^xx^2-4x^2e^{3x}-60e^{2x}x^2-500x^2+5$
parts	$x^8-4x^6e^x-20x^6+60e^xx^4+6e^{2x}x^4+150x^4-300e^xx^2-4x^2e^{3x}-60e^{2x}x^2-500x^2+5$

input
```
int(4*exp(x)^4+(-12*x^2-8*x+60)*exp(x)^3+(12*x^4+24*x^3-120*x^2-120*x+300)
*exp(x)^2+(-4*x^6-24*x^5+60*x^4+240*x^3-300*x^2-600*x+500)*exp(x)+8*x^7-12
0*x^5+600*x^3-1000*x+1,x,method=_RETURNVERBOSE)
```

output
```
exp(x)^4+(-4*x^2+20)*exp(x)^3+(6*x^4-60*x^2+150)*exp(x)^2+(-4*x^6+60*x^4-3
00*x^2+500)*exp(x)+x^8-20*x^6+150*x^4-500*x^2+x
```

3.250.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. 2(13) = 26.

Time = 0.29 (sec) , antiderivative size = 70, normalized size of antiderivative = 5.00

$$\int (1+4e^{4x}-1000x+600x^3-120x^5+8x^7 +e^{3x}(60-8x-12x^2)+e^{2x}(300-120x-120x^2+24x^3+12x^4) +e^x(500-600x-300x^2+240x^3+60x^4-24x^5-4x^6))\,dx = x^8-20\,x^6+150\,x^4-500\,x^2 -4\,(x^2-5)e^{(3\,x)}+6\,(x^4-10\,x^2+25)e^{(2\,x)}-4\,(x^6-15\,x^4+75\,x^2-125)e^x+x+e^{(4\,x)}$$

input
```
integrate(4*exp(x)^4+(-12*x^2-8*x+60)*exp(x)^3+(12*x^4+24*x^3-120*x^2-120*
x+300)*exp(x)^2+(-4*x^6-24*x^5+60*x^4+240*x^3-300*x^2-600*x+500)*exp(x)+8*
x^7-120*x^5+600*x^3-1000*x+1,x, algorithm=\
```

output
```
x^8 - 20*x^6 + 150*x^4 - 500*x^2 - 4*(x^2 - 5)*e^(3*x) + 6*(x^4 - 10*x^2 +
 25)*e^(2*x) - 4*(x^6 - 15*x^4 + 75*x^2 - 125)*e^x + x + e^(4*x)
```

3.250.
$\int (1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}(60-8x-12x^2)+e^{2x}(300-120x-120x^2+24x^3+12$

3.250.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. 2(10) = 20.

Time = 0.09 (sec) , antiderivative size = 73, normalized size of antiderivative = 5.21

$$\int \left(1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}\left(60-8x-12x^2\right)+e^{2x}\left(300-120x-120x^2+24x^3+12x^4\right)+e^x\left(500-600x-300x^2+240x^3+60x^4-24x^5-4x^6\right)\right)\,dx=x^8-20x^6+150x^4-500x^2+x+\left(20-4x^2\right)e^{3x}+\left(6x^4-60x^2+150\right)e^{2x}+\left(-4x^6+60x^4-300x^2+500\right)e^x+e^{4x}$$

input
```
integrate(4*exp(x)**4+(-12*x**2-8*x+60)*exp(x)**3+(12*x**4+24*x**3-120*x**
2-120*x+300)*exp(x)**2+(-4*x**6-24*x**5+60*x**4+240*x**3-300*x**2-600*x+50
0)*exp(x)+8*x**7-120*x**5+600*x**3-1000*x+1,x)
```

output
```
x**8 - 20*x**6 + 150*x**4 - 500*x**2 + x + (20 - 4*x**2)*exp(3*x) + (6*x**
4 - 60*x**2 + 150)*exp(2*x) + (-4*x**6 + 60*x**4 - 300*x**2 + 500)*exp(x)
+ exp(4*x)
```

3.250.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. 2(13) = 26.

Time = 0.20 (sec) , antiderivative size = 70, normalized size of antiderivative = 5.00

$$\int \left(1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}\left(60-8x-12x^2\right)+e^{2x}\left(300-120x-120x^2+24x^3+12x^4\right)+e^x\left(500-600x-300x^2+240x^3+60x^4-24x^5-4x^6\right)\right)\,dx=x^8-20\,x^6+150\,x^4-500\,x^2-4\,\left(x^2-5\right)e^{(3\,x)}+6\,\left(x^4-10\,x^2+25\right)e^{(2\,x)}-4\,\left(x^6-15\,x^4+75\,x^2-125\right)e^x+x+e^{(4\,x)}$$

input
```
integrate(4*exp(x)^4+(-12*x^2-8*x+60)*exp(x)^3+(12*x^4+24*x^3-120*x^2-120*
x+300)*exp(x)^2+(-4*x^6-24*x^5+60*x^4+240*x^3-300*x^2-600*x+500)*exp(x)+8*
x^7-120*x^5+600*x^3-1000*x+1,x, algorithm=\
```

output
```
x^8 - 20*x^6 + 150*x^4 - 500*x^2 - 4*(x^2 - 5)*e^(3*x) + 6*(x^4 - 10*x^2 +
 25)*e^(2*x) - 4*(x^6 - 15*x^4 + 75*x^2 - 125)*e^x + x + e^(4*x)
```

3.250. $\int (1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}(60-8x-12x^2)+e^{2x}(300-120x-120x^2+24x^3+12$

3.250.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. 2(13) = 26.

Time = 0.28 (sec) , antiderivative size = 70, normalized size of antiderivative = 5.00

$$\int (1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}(60-8x-12x^2)+e^{2x}(300-120x-120x^2+24x^3+12x^4)+e^x(500-600x-300x^2+240x^3+60x^4-24x^5-4x^6))\,dx = x^8-20x^6+150x^4-500x^2-4(x^2-5)e^{(3x)}+6(x^4-10x^2+25)e^{(2x)}-4(x^6-15x^4+75x^2-125)e^x+x+e^{(4x)}$$

input
```
integrate(4*exp(x)^4+(-12*x^2-8*x+60)*exp(x)^3+(12*x^4+24*x^3-120*x^2-120*
x+300)*exp(x)^2+(-4*x^6-24*x^5+60*x^4+240*x^3-300*x^2-600*x+500)*exp(x)+8*
x^7-120*x^5+600*x^3-1000*x+1,x, algorithm=\
```

output
```
x^8 - 20*x^6 + 150*x^4 - 500*x^2 - 4*(x^2 - 5)*e^(3*x) + 6*(x^4 - 10*x^2 +
 25)*e^(2*x) - 4*(x^6 - 15*x^4 + 75*x^2 - 125)*e^x + x + e^(4*x)
```

3.250.9 Mupad [B] (verification not implemented)

Time = 14.03 (sec) , antiderivative size = 88, normalized size of antiderivative = 6.29

$$\int (1+4e^{4x}-1000x+600x^3-120x^5+8x^7+e^{3x}(60-8x-12x^2)+e^{2x}(300-120x-120x^2+24x^3+12x^4)+e^x(500-600x-300x^2+240x^3+60x^4-24x^5-4x^6))\,dx = x+150\,e^{2x}+20\,e^{3x}+e^{4x}+500\,e^x-300\,x^2\,e^x+60\,x^4\,e^x-4\,x^6\,e^x-60\,x^2\,e^{2x}-4\,x^2\,e^{3x}+6\,x^4\,e^{2x}-500\,x^2+150\,x^4-20\,x^6+x^8$$

input
```
int(4*exp(4*x) - 1000*x - exp(3*x)*(8*x + 12*x^2 - 60) + exp(2*x)*(24*x^3
- 120*x^2 - 120*x + 12*x^4 + 300) - exp(x)*(600*x + 300*x^2 - 240*x^3 - 60
*x^4 + 24*x^5 + 4*x^6 - 500) + 600*x^3 - 120*x^5 + 8*x^7 + 1,x)
```

output
```
x + 150*exp(2*x) + 20*exp(3*x) + exp(4*x) + 500*exp(x) - 300*x^2*exp(x) +
60*x^4*exp(x) - 4*x^6*exp(x) - 60*x^2*exp(2*x) - 4*x^2*exp(3*x) + 6*x^4*ex
p(2*x) - 500*x^2 + 150*x^4 - 20*x^6 + x^8
```

3.251 $\int -e^x \, dx$

3.251.1 Optimal result

Integrand size = 5, antiderivative size = 5

$$\int -e^x \, dx = -e^x$$

output
```
-exp(x)
```

3.251.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 5, normalized size of antiderivative = 1.00

$$\int -e^x \, dx = -e^x$$

input
```
Integrate[-E^x,x]
```

output
```
-E^x
```

3.251.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 5, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {25, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -e^x\,dx$$
$$\Big\downarrow \text{ 25}$$
$$-\int e^x dx$$
$$\Big\downarrow \text{ 2624}$$
$$-e^x$$

input
```
Int[-E^x,x]
```

output
```
-E^x
```

3.251.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

3.251.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 5, normalized size of antiderivative = 1.00

method	result	size
gosper	$-e^x$	5
lookup	$-e^x$	5
derivativedivides	$-e^x$	5
default	$-e^x$	5
norman	$-e^x$	5
risch	$-e^x$	5
parallelrisch	$-e^x$	5
parts	$-e^x$	5
meijerg	$1-e^x$	7

input
```
int(-exp(x),x,method=_RETURNVERBOSE)
```

output
```
-exp(x)
```

3.251.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.80

$$\int -e^x\,dx = -e^x$$

input
```
integrate(-exp(x),x, algorithm=\
```

output
```
-e^x
```

3.251.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.60

$$\int -e^x\,dx = -e^x$$

input
```
integrate(-exp(x),x)
```

output
```
-exp(x)
```

3.251.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.80

$$\int -e^x \, dx = -e^x$$

input
```
integrate(-exp(x),x, algorithm=\
```

output
```
-e^x
```

3.251.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.80

$$\int -e^x \, dx = -e^x$$

input
```
integrate(-exp(x),x, algorithm=\
```

output
```
-e^x
```

3.251.9 Mupad [B] (verification not implemented)

Time = 0.01 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.80

$$\int -e^x \, dx = -\mathrm{e}^x$$

input
```
int(-exp(x),x)
```

output
```
-exp(x)
```

3.252 $\int \left(21+i\pi+18x+\log\left(\frac{1}{4}(-5+e^2)\right)\right)\,dx$

3.252.1 Optimal result

Integrand size = 20, antiderivative size = 28

$$\int \left(21+i\pi+18x+\log\left(\frac{1}{4}(-5+e^2)\right)\right)\,dx=x\left(i\pi+4(-1+x)+5(5+x)+\log\left(\frac{1}{4}(-5+e^2)\right)\right)$$

output
```
x*(9*x+21+ln(5/4-1/4*exp(2)))
```

3.252.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \left(21+i\pi+18x+\log\left(\frac{1}{4}(-5+e^2)\right)\right)\,dx=21x+i\pi x+9x^2+x\log\left(\frac{1}{4}(-5+e^2)\right)$$

input
```
Integrate[21 + I*Pi + 18*x + Log[(-5 + E^2)/4],x]
```

output
```
21*x + I*Pi*x + 9*x^2 + x*Log[(-5 + E^2)/4]
```

3.252.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.050, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(18x+i\pi+21+\log\left(\frac{1}{4}(e^2-5)\right)\right)dx$$

$$\Big\downarrow \text{17}$$

$$\frac{1}{36}\left(18x+i\pi+21+\log\left(\frac{1}{4}(e^2-5)\right)\right)^2$$

input
```
Int[21 + I*Pi + 18*x + Log[(-5 + E^2)/4],x]
```

output
```
(21 + I*Pi + 18*x + Log[(-5 + E^2)/4])^2/36
```

3.252.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.252.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.64

method	result	size
parallelrisch	$9x^2+\left(\ln\left(\frac{5}{4}-\frac{\mathrm{e}^2}{4}\right)+21\right)x$	18
gosper	$x\ln\left(\frac{5}{4}-\frac{\mathrm{e}^2}{4}\right)+9x^2+21x$	19
default	$x\ln\left(\frac{5}{4}-\frac{\mathrm{e}^2}{4}\right)+9x^2+21x$	19
parts	$x\ln\left(\frac{5}{4}-\frac{\mathrm{e}^2}{4}\right)+9x^2+21x$	19
norman	$(-2\ln(2)+\ln(5-\mathrm{e}^2)+21)x+9x^2$	22
risch	$x\ln(5-\mathrm{e}^2)-2x\ln(2)+9x^2+21x$	24

input
```
int(ln(5/4-1/4*exp(2))+18*x+21,x,method=_RETURNVERBOSE)
```

output
```
9*x^2+(ln(5/4-1/4*exp(2))+21)*x
```

3.252.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.64

$$\int \left(21+i\pi+18x+\log\left(\frac{1}{4}(-5+e^2)\right)\right)\,dx = 9\,x^2+x\log\left(-\frac{1}{4}\,e^2+\frac{5}{4}\right)+21\,x$$

input
```
integrate(log(5/4-1/4*exp(2))+18*x+21,x, algorithm=\
```

output
```
9*x^2 + x*log(-1/4*e^2 + 5/4) + 21*x
```

3.252.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \left(21+i\pi+18x+\log\left(\frac{1}{4}(-5+e^2)\right)\right)\,dx = 9x^2+x\left(\log\left(-\frac{5}{4}+\frac{e^2}{4}\right)+21+i\pi\right)$$

input
```
integrate(ln(5/4-1/4*exp(2))+18*x+21,x)
```

output
```
9*x**2 + x*(log(-5/4 + exp(2)/4) + 21 + I*pi)
```

3.252.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.64

$$\int \left(21+i\pi+18x+\log\left(\frac{1}{4}(-5+e^2)\right)\right)\,dx = 9\,x^2+x\log\left(-\frac{1}{4}\,e^2+\frac{5}{4}\right)+21\,x$$

input
```
integrate(log(5/4-1/4*exp(2))+18*x+21,x, algorithm=\
```

output
```
9*x^2 + x*log(-1/4*e^2 + 5/4) + 21*x
```

3.252.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.64

$$\int \left(21+i\pi+18x+\log\left(\frac{1}{4}(-5+e^2)\right)\right)\,dx=9\,x^2+x\log\left(-\frac{1}{4}\,e^2+\frac{5}{4}\right)+21\,x$$

input
```
integrate(log(5/4-1/4*exp(2))+18*x+21,x, algorithm=\
```

output
```
9*x^2 + x*log(-1/4*e^2 + 5/4) + 21*x
```

3.252.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int \left(21+i\pi+18x+\log\left(\frac{1}{4}(-5+e^2)\right)\right)\,dx=9\,x^2+\left(\ln\left(\frac{5}{4}-\frac{\mathrm{e}^2}{4}\right)+21\right)\,x$$

input
```
int(18*x + log(5/4 - exp(2)/4) + 21,x)
```

output
```
x*(log(5/4 - exp(2)/4) + 21) + 9*x^2
```

3.253 $\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368-\cdots\right.}{81-972e^{10/x}+\cdots}}$

3.253.1 Optimal result

Integrand size = 368, antiderivative size = 30

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-20\cdots\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

output
```
exp(((4-5/(3/5-9/5*exp(5/x)^2))^2-x*exp(1))^2)
```

3.253.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 69 vs. 2(30) = 60.

Time = 0.46 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.30

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-20\cdots\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

3.253.

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-2099\cdots\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

input
```
Integrate[(E^((28561 - 3042*E*x + 81*E^2*x^2 + E^(30/x)*(2426112 - 11664*E
*x - 8748*E^2*x^2) + E^(10/x)*(316368 + 1404*E*x - 972*E^2*x^2) + E^(20/x)
*(1314144 + 50382*E*x + 4374*E^2*x^2) + E^(40/x)*(1679616 - 209952*E*x + 6
561*E^2*x^2))/(81 - 972*E^(10/x) + 4374*E^(20/x) - 8748*E^(30/x) + 6561*E^
(40/x)))*(1014*E*x^2 - 54*E^2*x^3 + E^(50/x)*(-209952*E*x^2 + 13122*E^2*x^
3) + E^(20/x)*(18252000 - 4860*E^2*x^3 + E*(378000*x - 15390*x^2)) + E^(10
/x)*(2197000 + 810*E^2*x^3 + E*(-117000*x - 3510*x^2)) + E^(30/x)*(5054400
0 + 14580*E^2*x^3 + E*(891000*x + 54270*x^2)) + E^(40/x)*(46656000 - 21870
*E^2*x^3 + E*(-2916000*x + 58320*x^2))))/(-27*x^2 + 405*E^(10/x)*x^2 - 243
0*E^(20/x)*x^2 + 7290*E^(30/x)*x^2 - 10935*E^(40/x)*x^2 + 6561*E^(50/x)*x^
2),x]
```

output
```
E^((169 + 936*E^(10/x) + 1296*E^(20/x) - 9*E*x + 54*E^(1 + 10/x)*x - 81*E^
(1 + 20/x)*x)^2/(81*(1 - 3*E^(10/x))^4))
```

3.253.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-54e^2x^3+1014ex^2+e^{50/x}\left(13122e^2x^3-209952ex^2\right)+e^{20/x}\left(-4860e^2x^3+e\left(378000x-15390x^2\right)+1825200\right.}{}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{\left(54e^2x^3-1014ex^2-e^{50/x}\left(13122e^2x^3-209952ex^2\right)-e^{20/x}\left(-4860e^2x^3+e\left(378000x-15390x^2\right)+18252000\right.}{}$$

$$\Big\downarrow \ 27$$

$$\frac{1}{27}\int -\frac{2\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-27e^2x^3+507ex^2-6561e^{50/x}\left(16ex^2-e^2x^3\right)+\right.}{}$$

$$\Big\downarrow \ 27$$

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-209\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

$$-\frac{2}{27}\int \frac{\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-27e^2x^3+507ex^2-6561e^{50/x}\left(16ex^2-e^2x^3\right)+\right.}{}$$

$\downarrow$ 7293

$$-\frac{2}{27}\int\left(\frac{37500\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)(ex-148)}{\left(-1+3e^{10/x}\right)^3x^2}-27\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+}\right.}{}\right.\right.$$

$\downarrow$ 7239

$$-\frac{2}{27}\int\frac{1}{3}\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-\frac{1500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5x^2}+\right.$$

$\downarrow$ 27

$$-\frac{2}{81}\int 3\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(1-3e^{10/x}\right)^5x^2}+\frac{3e(}{}\right.$$

$\downarrow$ 27

$$-\frac{2}{27}\int\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(1-3e^{10/x}\right)^5x^2}+\frac{3e(-}{}\right.$$

$\downarrow$ 7293

$$-\frac{2}{27}\int\left(-\frac{500\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}+\frac{10}{x}\right)\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5x^2}+\frac{3\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-\right.}{}\right.}{}\right.$$

$\downarrow$ 7239

3.253.

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-209\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

$$-\frac{2}{27}\int \frac{\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5}+\frac{3ex\left(108e^{20/x}x-13x+3e^{10/x}(x\right.}{\left(-1+3e^{10/x}\right.}\right.}{x^2}$$

$\downarrow$ 7293

$$-\frac{2}{27}\int \left(\frac{37500\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)(ex-148)}{\left(-1+3e^{10/x}\right)^3x^2}-27\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\right.}{}\right.\right.$$

$\downarrow$ 7239

$$-\frac{2}{27}\int \frac{1}{3}\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-\frac{1500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5x^2}+\right.$$

$\downarrow$ 27

$$-\frac{2}{81}\int 3\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(1-3e^{10/x}\right)^5x^2}+\frac{3e(\right.}{}\right.$$

$\downarrow$ 27

$$-\frac{2}{27}\int \exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(1-3e^{10/x}\right)^5x^2}+\frac{3e(-\right.}{}\right.$$

$\downarrow$ 7293

$$-\frac{2}{27}\int \left(-\frac{500\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}+\frac{10}{x}\right)\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5x^2}+\frac{3\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-\right.}{}\right.}{}\right.$$

$\downarrow$ 7239

$$-\frac{2}{27}\int \frac{\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5}+\frac{3ex\left(108e^{20/x}x-13x+3e^{10/x}(x\right.}{\left(-1+3e^{10/x}\right.}\right.}{x^2}$$

3.253.

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-209\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{2}{27}\int\left(\frac{37500\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)(ex-148)}{\left(-1+3e^{10/x}\right)^3x^2}-27\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\right.}{}\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{2}{27}\int\frac{1}{3}\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-\frac{1500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5x^2}+\right.$$

$$\Big\downarrow \text{27}$$

$$-\frac{2}{81}\int3\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(1-3e^{10/x}\right)^5x^2}+\frac{3e(}{}\right.$$

$$\Big\downarrow \text{27}$$

$$-\frac{2}{27}\int\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(1-3e^{10/x}\right)^5x^2}+\frac{3e(-}{}\right.$$

$$\Big\downarrow \text{7293}$$

$$-\frac{2}{27}\int\left(-\frac{500\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}+\frac{10}{x}\right)\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5x^2}+\frac{3\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-\right.}{}\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{2}{27}\int\frac{\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5}+\frac{3ex\left(108e^{20/x}x-13x+3e^{10/x}(x\right.}{\left(-1+3e^{10/x}\right.}\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

3.253.

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-209\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

$$-\frac{2}{27}\int \left(\frac{37500\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)(ex-148)}{\left(-1+3e^{10/x}\right)^3x^2}-27\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\right.}{}\right.\right.$$

$\downarrow$ 7239

$$-\frac{2}{27}\int \frac{1}{3}\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-\frac{1500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5x^2}+\right.$$

$\downarrow$ 27

$$-\frac{2}{81}\int 3\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(1-3e^{10/x}\right)^5x^2}+\frac{3e(}{}\right.$$

$\downarrow$ 27

$$-\frac{2}{27}\int \exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(1-3e^{10/x}\right)^5x^2}+\frac{3e(-}{}\right.$$

$\downarrow$ 7293

$$-\frac{2}{27}\int \left(-\frac{500\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}+\frac{10}{x}\right)\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5x^2}+\frac{3\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-\right.}{}\right.}{}\right.$$

$\downarrow$ 7239

$$-\frac{2}{27}\int \frac{\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5}+\frac{3ex\left(108e^{20/x}x-13x+3e^{10/x}(x\right.}{\left(-1+3e^{10/x}\right.}\right.}{x^2}$$

$\downarrow$ 7293

3.253.

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-209\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

$$-\frac{2}{27}\int\left(\frac{37500\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)(ex-148)}{\left(-1+3e^{10/x}\right)^3x^2}-27\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{2}{27}\int\frac{1}{3}\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(-\frac{1500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(-1+3e^{10/x}\right)^5x^2}+\right.$$

$$\Big\downarrow \text{27}$$

$$-\frac{2}{81}\int3\exp\left(\frac{\left(54e^{1+\frac{10}{x}}x-81e^{1+\frac{20}{x}}x-9ex+936e^{10/x}+1296e^{20/x}+169\right)^2}{81\left(1-3e^{10/x}\right)^4}\right)\left(\frac{500e^{10/x}\left(13+36e^{10/x}\right)^3}{\left(1-3e^{10/x}\right)^5x^2}+\frac{3e(}{}\right.$$

input
```
Int[(E^((28561 - 3042*E*x + 81*E^2*x^2 + E^(30/x)*(2426112 - 11664*E*x - 8
748*E^2*x^2) + E^(10/x)*(316368 + 1404*E*x - 972*E^2*x^2) + E^(20/x)*(1314
144 + 50382*E*x + 4374*E^2*x^2) + E^(40/x)*(1679616 - 209952*E*x + 6561*E^
2*x^2))/(81 - 972*E^(10/x) + 4374*E^(20/x) - 8748*E^(30/x) + 6561*E^(40/x)
))*(1014*E*x^2 - 54*E^2*x^3 + E^(50/x)*(-209952*E*x^2 + 13122*E^2*x^3) + E
^(20/x)*(18252000 - 4860*E^2*x^3 + E*(378000*x - 15390*x^2)) + E^(10/x)*(2
197000 + 810*E^2*x^3 + E*(-117000*x - 3510*x^2)) + E^(30/x)*(50544000 + 14
580*E^2*x^3 + E*(891000*x + 54270*x^2)) + E^(40/x)*(46656000 - 21870*E^2*x
^3 + E*(-2916000*x + 58320*x^2))))/(-27*x^2 + 405*E^(10/x)*x^2 - 2430*E^(2
0/x)*x^2 + 7290*E^(30/x)*x^2 - 10935*E^(40/x)*x^2 + 6561*E^(50/x)*x^2),x]
```

output
```
$Aborted
```

3.253.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.253.

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-209\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.253.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 185 vs. $2(29) = 58$.

Time = 1.73 (sec) , antiderivative size = 186, normalized size of antiderivative = 6.20

$$e^{\frac{-6561x^2 e^{\frac{40+2x}{x}}+8748x^2 e^{\frac{2x+30}{x}}-4374x^2 e^{\frac{2x+20}{x}}+972x^2 e^{\frac{2x+10}{x}}-81x^2 e^2+209952x\, e^{\frac{40+x}{x}}+11664x\, e^{\frac{30+x}{x}}-50382x\, e^{\frac{20+x}{x}}-1404x\, e^{\frac{x+10}{x}}+3042x\, e-1679616\, e^{4\cdots}}{-6561\, e^{\frac{40}{x}}+8748\, e^{\frac{30}{x}}-4374\, e^{\frac{20}{x}}+972\, e^{\frac{10}{x}}-81}}$$

input
```
int(((13122*x^3*exp(1)^2-209952*x^2*exp(1))*exp(5/x)^10+(-21870*x^3*exp(1)
^2+(58320*x^2-2916000*x)*exp(1)+46656000)*exp(5/x)^8+(14580*x^3*exp(1)^2+(
54270*x^2+891000*x)*exp(1)+50544000)*exp(5/x)^6+(-4860*x^3*exp(1)^2+(-1539
0*x^2+378000*x)*exp(1)+18252000)*exp(5/x)^4+(810*x^3*exp(1)^2+(-3510*x^2-1
17000*x)*exp(1)+2197000)*exp(5/x)^2-54*x^3*exp(1)^2+1014*x^2*exp(1))*exp((
(6561*x^2*exp(1)^2-209952*x*exp(1)+1679616)*exp(5/x)^8+(-8748*x^2*exp(1)^2
-11664*x*exp(1)+2426112)*exp(5/x)^6+(4374*x^2*exp(1)^2+50382*x*exp(1)+1314
144)*exp(5/x)^4+(-972*x^2*exp(1)^2+1404*x*exp(1)+316368)*exp(5/x)^2+81*x^2
*exp(1)^2-3042*x*exp(1)+28561)/(6561*exp(5/x)^8-8748*exp(5/x)^6+4374*exp(5
/x)^4-972*exp(5/x)^2+81))/(6561*x^2*exp(5/x)^10-10935*x^2*exp(5/x)^8+7290*
x^2*exp(5/x)^6-2430*x^2*exp(5/x)^4+405*x^2*exp(5/x)^2-27*x^2),x)
```

output
```
exp(1/81*(-6561*x^2*exp(2*(20+x)/x)+8748*x^2*exp(2*(x+15)/x)-4374*x^2*exp(
2*(x+10)/x)+972*x^2*exp(2/x*(5+x))-81*x^2*exp(2)+209952*x*exp((40+x)/x)+11
664*x*exp((30+x)/x)-50382*x*exp((20+x)/x)-1404*x*exp((x+10)/x)+3042*x*exp(
1)-1679616*exp(40/x)-2426112*exp(30/x)-1314144*exp(20/x)-316368*exp(10/x)-
28561)/(-81*exp(40/x)+108*exp(30/x)-54*exp(20/x)+12*exp(10/x)-1))
```

3.253.

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-209\cdots\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

3.253.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(29) = 58$.

Time = 0.30 (sec) , antiderivative size = 140, normalized size of antiderivative = 4.67

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-20\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

input
```
integrate(((13122*x^3*exp(1)^2-209952*x^2*exp(1))*exp(5/x)^10+(-21870*x^3*
exp(1)^2+(58320*x^2-2916000*x)*exp(1)+46656000)*exp(5/x)^8+(14580*x^3*exp(
1)^2+(54270*x^2+891000*x)*exp(1)+50544000)*exp(5/x)^6+(-4860*x^3*exp(1)^2+
(-15390*x^2+378000*x)*exp(1)+18252000)*exp(5/x)^4+(810*x^3*exp(1)^2+(-3510
*x^2-117000*x)*exp(1)+2197000)*exp(5/x)^2-54*x^3*exp(1)^2+1014*x^2*exp(1))
*exp(((6561*x^2*exp(1)^2-209952*x*exp(1)+1679616)*exp(5/x)^8+(-8748*x^2*ex
p(1)^2-11664*x*exp(1)+2426112)*exp(5/x)^6+(4374*x^2*exp(1)^2+50382*x*exp(1
)+1314144)*exp(5/x)^4+(-972*x^2*exp(1)^2+1404*x*exp(1)+316368)*exp(5/x)^2+
81*x^2*exp(1)^2-3042*x*exp(1)+28561)/(6561*exp(5/x)^8-8748*exp(5/x)^6+4374
*exp(5/x)^4-972*exp(5/x)^2+81))/(6561*x^2*exp(5/x)^10-10935*x^2*exp(5/x)^8
+7290*x^2*exp(5/x)^6-2430*x^2*exp(5/x)^4+405*x^2*exp(5/x)^2-27*x^2),x, alg
orithm=\
```

output
```
e^(1/81*(81*x^2*e^2 - 3042*x*e + 6561*(x^2*e^2 - 32*x*e + 256)*e^(40/x) -
2916*(3*x^2*e^2 + 4*x*e - 832)*e^(30/x) + 162*(27*x^2*e^2 + 311*x*e + 8112
)*e^(20/x) - 36*(27*x^2*e^2 - 39*x*e - 8788)*e^(10/x) + 28561)/(81*e^(40/x
) - 108*e^(30/x) + 54*e^(20/x) - 12*e^(10/x) + 1))
```

3.253.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 134 vs. $2(24) = 48$.

Time = 2.76 (sec) , antiderivative size = 134, normalized size of antiderivative = 4.47

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-20\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

input
```
integrate(((13122*x**3*exp(1)**2-209952*x**2*exp(1))*exp(5/x)**10+(-21870*
x**3*exp(1)**2+(58320*x**2-2916000*x)*exp(1)+46656000)*exp(5/x)**8+(14580*
x**3*exp(1)**2+(54270*x**2+891000*x)*exp(1)+50544000)*exp(5/x)**6+(-4860*x
**3*exp(1)**2+(-15390*x**2+378000*x)*exp(1)+18252000)*exp(5/x)**4+(810*x**
3*exp(1)**2+(-3510*x**2-117000*x)*exp(1)+2197000)*exp(5/x)**2-54*x**3*exp(
1)**2+1014*x**2*exp(1))*exp(((6561*x**2*exp(1)**2-209952*x*exp(1)+1679616)
*exp(5/x)**8+(-8748*x**2*exp(1)**2-11664*x*exp(1)+2426112)*exp(5/x)**6+(43
74*x**2*exp(1)**2+50382*x*exp(1)+1314144)*exp(5/x)**4+(-972*x**2*exp(1)**2
+1404*x*exp(1)+316368)*exp(5/x)**2+81*x**2*exp(1)**2-3042*x*exp(1)+28561)/
(6561*exp(5/x)**8-8748*exp(5/x)**6+4374*exp(5/x)**4-972*exp(5/x)**2+81))/(
6561*x**2*exp(5/x)**10-10935*x**2*exp(5/x)**8+7290*x**2*exp(5/x)**6-2430*x
**2*exp(5/x)**4+405*x**2*exp(5/x)**2-27*x**2),x)
```

output
```
exp((81*x**2*exp(2) - 3042*E*x + (-8748*x**2*exp(2) - 11664*E*x + 2426112)
*exp(30/x) + (-972*x**2*exp(2) + 1404*E*x + 316368)*exp(10/x) + (4374*x**2
*exp(2) + 50382*E*x + 1314144)*exp(20/x) + (6561*x**2*exp(2) - 209952*E*x
+ 1679616)*exp(40/x) + 28561)/(6561*exp(40/x) - 8748*exp(30/x) + 4374*exp(
20/x) - 972*exp(10/x) + 81))
```

3.253.7 Maxima [F(-1)]

Timed out.

$$\int \frac{e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-20\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}}{}$$

input
```
integrate(((13122*x^3*exp(1)^2-209952*x^2*exp(1))*exp(5/x)^10+(-21870*x^3*
exp(1)^2+(58320*x^2-2916000*x)*exp(1)+46656000)*exp(5/x)^8+(14580*x^3*exp(
1)^2+(54270*x^2+891000*x)*exp(1)+50544000)*exp(5/x)^6+(-4860*x^3*exp(1)^2+
(-15390*x^2+378000*x)*exp(1)+18252000)*exp(5/x)^4+(810*x^3*exp(1)^2+(-3510
*x^2-117000*x)*exp(1)+2197000)*exp(5/x)^2-54*x^3*exp(1)^2+1014*x^2*exp(1))
*exp(((6561*x^2*exp(1)^2-209952*x*exp(1)+1679616)*exp(5/x)^8+(-8748*x^2*ex
p(1)^2-11664*x*exp(1)+2426112)*exp(5/x)^6+(4374*x^2*exp(1)^2+50382*x*exp(1
)+1314144)*exp(5/x)^4+(-972*x^2*exp(1)^2+1404*x*exp(1)+316368)*exp(5/x)^2+
81*x^2*exp(1)^2-3042*x*exp(1)+28561)/(6561*exp(5/x)^8-8748*exp(5/x)^6+4374
*exp(5/x)^4-972*exp(5/x)^2+81))/(6561*x^2*exp(5/x)^10-10935*x^2*exp(5/x)^8
+7290*x^2*exp(5/x)^6-2430*x^2*exp(5/x)^4+405*x^2*exp(5/x)^2-27*x^2),x, alg
orithm=\
```

3.253.

$$\int \frac{e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-2099\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}}{}$$

output
```
Timed out
```

3.253.8 Giac [F]

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-20\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

input
```
integrate(((13122*x^3*exp(1)^2-209952*x^2*exp(1))*exp(5/x)^10+(-21870*x^3*
exp(1)^2+(58320*x^2-2916000*x)*exp(1)+46656000)*exp(5/x)^8+(14580*x^3*exp(
1)^2+(54270*x^2+891000*x)*exp(1)+50544000)*exp(5/x)^6+(-4860*x^3*exp(1)^2+
(-15390*x^2+378000*x)*exp(1)+18252000)*exp(5/x)^4+(810*x^3*exp(1)^2+(-3510
*x^2-117000*x)*exp(1)+2197000)*exp(5/x)^2-54*x^3*exp(1)^2+1014*x^2*exp(1))
*exp(((6561*x^2*exp(1)^2-209952*x*exp(1)+1679616)*exp(5/x)^8+(-8748*x^2*ex
p(1)^2-11664*x*exp(1)+2426112)*exp(5/x)^6+(4374*x^2*exp(1)^2+50382*x*exp(1
)+1314144)*exp(5/x)^4+(-972*x^2*exp(1)^2+1404*x*exp(1)+316368)*exp(5/x)^2+
81*x^2*exp(1)^2-3042*x*exp(1)+28561)/(6561*exp(5/x)^8-8748*exp(5/x)^6+4374
*exp(5/x)^4-972*exp(5/x)^2+81))/(6561*x^2*exp(5/x)^10-10935*x^2*exp(5/x)^8
+7290*x^2*exp(5/x)^6-2430*x^2*exp(5/x)^4+405*x^2*exp(5/x)^2-27*x^2),x, alg
orithm=\
```

output
```
integrate(-2/27*(27*x^3*e^2 - 507*x^2*e - 6561*(x^3*e^2 - 16*x^2*e)*e^(50/
x) + 3645*(3*x^3*e^2 - 8*(x^2 - 50*x)*e - 6400)*e^(40/x) - 405*(18*x^3*e^2
 + (67*x^2 + 1100*x)*e + 62400)*e^(30/x) + 135*(18*x^3*e^2 + (57*x^2 - 140
0*x)*e - 67600)*e^(20/x) - 5*(81*x^3*e^2 - 117*(3*x^2 + 100*x)*e + 219700)
*e^(10/x))*e^(1/81*(81*x^2*e^2 - 3042*x*e + 6561*(x^2*e^2 - 32*x*e + 256)*
e^(40/x) - 2916*(3*x^2*e^2 + 4*x*e - 832)*e^(30/x) + 162*(27*x^2*e^2 + 311
*x*e + 8112)*e^(20/x) - 36*(27*x^2*e^2 - 39*x*e - 8788)*e^(10/x) + 28561)/
(81*e^(40/x) - 108*e^(30/x) + 54*e^(20/x) - 12*e^(10/x) + 1))/(243*x^2*e^(
50/x) - 405*x^2*e^(40/x) + 270*x^2*e^(30/x) - 90*x^2*e^(20/x) + 15*x^2*e^(
10/x) - x^2), x)
```

3.253.

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-209\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

3.253.9 Mupad [B] (verification not implemented)

Time = 15.46 (sec) , antiderivative size = 697, normalized size of antiderivative = 23.23

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-20\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

input
```
int((exp((exp(10/x)*(1404*x*exp(1) - 972*x^2*exp(2) + 316368) + exp(20/x)*
(50382*x*exp(1) + 4374*x^2*exp(2) + 1314144) + exp(40/x)*(6561*x^2*exp(2)
- 209952*x*exp(1) + 1679616) - exp(30/x)*(11664*x*exp(1) + 8748*x^2*exp(2)
 - 2426112) - 3042*x*exp(1) + 81*x^2*exp(2) + 28561)/(4374*exp(20/x) - 972
*exp(10/x) - 8748*exp(30/x) + 6561*exp(40/x) + 81))*(exp(10/x)*(810*x^3*ex
p(2) - exp(1)*(117000*x + 3510*x^2) + 2197000) + exp(20/x)*(exp(1)*(378000
*x - 15390*x^2) - 4860*x^3*exp(2) + 18252000) - exp(40/x)*(exp(1)*(2916000
*x - 58320*x^2) + 21870*x^3*exp(2) - 46656000) + exp(30/x)*(exp(1)*(891000
*x + 54270*x^2) + 14580*x^3*exp(2) + 50544000) - exp(50/x)*(209952*x^2*exp
(1) - 13122*x^3*exp(2)) + 1014*x^2*exp(1) - 54*x^3*exp(2)))/(405*x^2*exp(1
0/x) - 2430*x^2*exp(20/x) + 7290*x^2*exp(30/x) - 10935*x^2*exp(40/x) + 656
1*x^2*exp(50/x) - 27*x^2),x)
```

output
```
exp((16224*exp(20/x))/(54*exp(20/x) - 12*exp(10/x) - 108*exp(30/x) + 81*ex
p(40/x) + 1))*exp((20736*exp(40/x))/(54*exp(20/x) - 12*exp(10/x) - 108*exp
(30/x) + 81*exp(40/x) + 1))*exp((29952*exp(30/x))/(54*exp(20/x) - 12*exp(1
0/x) - 108*exp(30/x) + 81*exp(40/x) + 1))*exp((35152*exp(10/x))/(486*exp(2
0/x) - 108*exp(10/x) - 972*exp(30/x) + 729*exp(40/x) + 9))*exp(-(12*x^2*ex
p(2)*exp(10/x))/(54*exp(20/x) - 12*exp(10/x) - 108*exp(30/x) + 81*exp(40/x
) + 1))*exp((54*x^2*exp(2)*exp(20/x))/(54*exp(20/x) - 12*exp(10/x) - 108*e
xp(30/x) + 81*exp(40/x) + 1))*exp((81*x^2*exp(2)*exp(40/x))/(54*exp(20/x)
- 12*exp(10/x) - 108*exp(30/x) + 81*exp(40/x) + 1))*exp(-(108*x^2*exp(2)*e
xp(30/x))/(54*exp(20/x) - 12*exp(10/x) - 108*exp(30/x) + 81*exp(40/x) + 1)
)*exp(-(338*x*exp(1))/(486*exp(20/x) - 108*exp(10/x) - 972*exp(30/x) + 729
*exp(40/x) + 9))*exp(28561/(4374*exp(20/x) - 972*exp(10/x) - 8748*exp(30/x
) + 6561*exp(40/x) + 81))*exp((x^2*exp(2))/(54*exp(20/x) - 12*exp(10/x) -
108*exp(30/x) + 81*exp(40/x) + 1))*exp(-(144*x*exp(1)*exp(30/x))/(54*exp(2
0/x) - 12*exp(10/x) - 108*exp(30/x) + 81*exp(40/x) + 1))*exp((52*x*exp(1)*
exp(10/x))/(162*exp(20/x) - 36*exp(10/x) - 324*exp(30/x) + 243*exp(40/x) +
 3))*exp((622*x*exp(1)*exp(20/x))/(54*exp(20/x) - 12*exp(10/x) - 108*exp(3
0/x) + 81*exp(40/x) + 1))*exp(-(2592*x*exp(1)*exp(40/x))/(54*exp(20/x) - 1
2*exp(10/x) - 108*exp(30/x) + 81*exp(40/x) + 1))
```

3.253.

$$\int e^{\frac{28561-3042ex+81e^2x^2+e^{30/x}\left(2426112-11664ex-8748e^2x^2\right)+e^{10/x}\left(316368+1404ex-972e^2x^2\right)+e^{20/x}\left(1314144+50382ex+4374e^2x^2\right)+e^{40/x}\left(1679616-209\right.}{81-972e^{10/x}+4374e^{20/x}-8748e^{30/x}+6561e^{40/x}}}$$

3.254 $\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2\left(4x^2+\right.\right.\right.}{x^2\log(x)}$

3.254.1 Optimal result

Integrand size = 97, antiderivative size = 27

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2(4x^2+4ex^2)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx = e^{-2+4\left(x+\frac{2x}{e^2}+\frac{x}{e}-\frac{2\log(\log(x))}{x}\right)}$$

output
```
exp(8*x/exp(2)+4*x-8*ln(ln(x))/x+4*x/exp(1)-2)
```

3.254.2 Mathematica [A] (verified)

Time = 0.52 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2(4x^2+4ex^2)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx = e^{-2+\frac{4\left(2+e+e^2\right)x}{e^2}}\log^{-\frac{8}{x}}(x)$$

input
```
Integrate[(E^(-3 + (8*E*x^2 + E^2*(4*x^2 + E*(-2*x + 4*x^2)) - 8*E^3*Log[L
og[x]])/(E^3*x))*(-8*E^3 + (8*E*x^2 + E^2*(4*x^2 + 4*E*x^2))*Log[x] + 8*E^
3*Log[x]*Log[Log[x]]))/(x^2*Log[x]),x]
```

output
```
E^(-2 + (4*(2 + E + E^2)*x)/E^2)/Log[x]^(8/x)
```

3.254.

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2\left(4x^2+4ex^2\right)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx$$

3.254.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\left(8ex^2+e^2\left(4ex^2+4x^2\right)\right)\log(x)+8e^3\log(\log(x))\log(x)-8e^3\right)\exp\left(\frac{8ex^2+e^2\left(4x^2+e\left(4x^2-2x\right)\right)-8e^3\log(\log(x))}{e^3x}-3\right)}{x^2\log(x)}$$

$$\Big\downarrow \ 7239$$

$$\int \frac{e^{\frac{4\left(2+e+e^2\right)x}{e^2}-4}\log^{-\frac{8}{x}-1}(x)\left(4\log(x)\left(\left(2+e+e^2\right)x^2+2e^2\log(\log(x))\right)-8e^2\right)}{x^2}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{4e^{\frac{4\left(2+e+e^2\right)x}{e^2}-4}\left(2\left(1+\frac{1}{2}e(1+e)\right)x^2\log(x)-2e^2\right)\log^{-\frac{8}{x}-1}(x)}{x^2}+\frac{8e^{\frac{4\left(2+e+e^2\right)x}{e^2}-2}\log(\log(x))\log^{-\frac{8}{x}}(x)}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-8\int \frac{e^{\frac{4\left(2+e+e^2\right)x}{e^2}-2}\log^{-1-\frac{8}{x}}(x)}{x^2}dx+8\int \frac{e^{\frac{4\left(2+e+e^2\right)x}{e^2}-2}\log^{-\frac{8}{x}}(x)\log(\log(x))}{x^2}dx+4\left(2+e+e^2\right)\int e^{\frac{4\left(2+e+e^2\right)x}{e^2}-4}\log^{-\frac{8}{x}}(x)dx$$

input
```
Int[(E^(-3 + (8*E*x^2 + E^2*(4*x^2 + E*(-2*x + 4*x^2)) - 8*E^3*Log[Log[x]]
)/(E^3*x))*(-8*E^3 + (8*E*x^2 + E^2*(4*x^2 + 4*E*x^2))*Log[x] + 8*E^3*Log[
x]*Log[Log[x]]))/(x^2*Log[x]),x]
```

output
```
$Aborted
```

3.254.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```


$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2\left(4x^2+4ex^2\right)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}dx$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.254.4 Maple [A] (verified)

Time = 5.67 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

method	result	size
risch	$\ln(x)^{-\frac{8}{x}} \mathrm{e}^{4\,\mathrm{e}^{-1}x+8x\,\mathrm{e}^{-2}+4x-2}$	26
parallelrisch	$\mathrm{e}^{\frac{\left(-8\,\mathrm{e}\,\mathrm{e}^{2}\ln(\ln(x))+\left(\left(4x^{2}-2x\right)\mathrm{e}+4x^{2}\right)\mathrm{e}^{2}+8x^{2}\mathrm{e}\right)\mathrm{e}^{-1}\mathrm{e}^{-2}}{x}}$	52

input
```
int((8*exp(1)*exp(2)*ln(x)*ln(ln(x))+((4*x^2*exp(1)+4*x^2)*exp(2)+8*x^2*ex
p(1))*ln(x)-8*exp(1)*exp(2))*exp((-8*exp(1)*exp(2)*ln(ln(x))+((4*x^2-2*x)*
exp(1)+4*x^2)*exp(2)+8*x^2*exp(1))/x/exp(1)/exp(2))/x^2/exp(1)/exp(2)/ln(x
),x,method=_RETURNVERBOSE)
```

output
```
ln(x)^(-8/x)*exp(4*exp(-1)*x+8*x*exp(-2)+4*x-2)
```

3.254.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.52

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}(-8e^3+(8ex^2+e^2(4x^2+4ex^2))\log(x)+8e^3\log(x)\log(\log(x)))}{x^2\log(x)}\,dx = e^{\left(\frac{\left(4\,x^{2}e+8\,x^{2}+\left(4\,x^{2}-5\,x\right)e^{2}-8\,e^{2}\log(\log(x))\right)e^{(-2)}}{x}+3\right)}$$

input
```
integrate((8*exp(1)*exp(2)*log(x)*log(log(x))+((4*x^2*exp(1)+4*x^2)*exp(2)
+8*x^2*exp(1))*log(x)-8*exp(1)*exp(2))*exp((-8*exp(1)*exp(2)*log(log(x))+(
(4*x^2-2*x)*exp(1)+4*x^2)*exp(2)+8*x^2*exp(1))/x/exp(1)/exp(2))/x^2/exp(1)
/exp(2)/log(x),x, algorithm=\
```

output
```
e^((4*x^2*e + 8*x^2 + (4*x^2 - 5*x)*e^2 - 8*e^2*log(log(x)))*e^(-2)/x + 3)
```

3.254.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2\left(4x^2+4ex^2\right)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx$$
$$= e^{\frac{8ex^2+\left(4x^2+e\left(4x^2-2x\right)\right)e^2-8e^3\log\left(\log\left(x\right)\right)}{xe^3}}$$

input
```
integrate((8*exp(1)*exp(2)*ln(x)*ln(ln(x))+((4*x**2*exp(1)+4*x**2)*exp(2)+
8*x**2*exp(1))*ln(x)-8*exp(1)*exp(2))*exp((-8*exp(1)*exp(2)*ln(ln(x))+((4*
x**2-2*x)*exp(1)+4*x**2)*exp(2)+8*x**2*exp(1))/x/exp(1)/exp(2))/x**2/exp(1
)/exp(2)/ln(x),x)
```

output
```
exp((8*E*x**2 + (4*x**2 + E*(4*x**2 - 2*x))*exp(2) - 8*exp(3)*log(log(x)))
*exp(-3)/x)
```

3.254.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2\left(4x^2+4ex^2\right)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx$$
$$= e^{\left(4\,xe^{(-1)}+8\,xe^{(-2)}+4\,x-\frac{8\,\log(\log(x))}{x}-2\right)}$$

input
```
integrate((8*exp(1)*exp(2)*log(x)*log(log(x))+((4*x^2*exp(1)+4*x^2)*exp(2)
+8*x^2*exp(1))*log(x)-8*exp(1)*exp(2))*exp((-8*exp(1)*exp(2)*log(log(x))+(
(4*x^2-2*x)*exp(1)+4*x^2)*exp(2)+8*x^2*exp(1))/x/exp(1)/exp(2))/x^2/exp(1)
/exp(2)/log(x),x, algorithm=\
```

output
```
e^(4*x*e^(-1) + 8*x*e^(-2) + 4*x - 8*log(log(x))/x - 2)
```

3.254.8 Giac [F]

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2\left(4x^2+4ex^2\right)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx$$

$$=\int \frac{4\left(2e^3\log(x)\log(\log(x))+\left(2x^2e+\left(x^2e+x^2\right)e^2\right)\log(x)-2e^3\right)e^{\left(\frac{2\left(4x^2e+\left(2x^2+\left(2x^2-x\right)e\right)e^2-4e^3\log(\log(x))\right)e^{(-}}{x}\right.}}{x^2\log(x)}$$

input
```
integrate((8*exp(1)*exp(2)*log(x)*log(log(x))+((4*x^2*exp(1)+4*x^2)*exp(2)
+8*x^2*exp(1))*log(x)-8*exp(1)*exp(2))*exp((-8*exp(1)*exp(2)*log(log(x))+(
(4*x^2-2*x)*exp(1)+4*x^2)*exp(2)+8*x^2*exp(1))/x/exp(1)/exp(2))/x^2/exp(1)
/exp(2)/log(x),x, algorithm=\
```

output
```
integrate(4*(2*e^3*log(x)*log(log(x)) + (2*x^2*e + (x^2*e + x^2)*e^2)*log(
x) - 2*e^3)*e^(2*(4*x^2*e + (2*x^2 + (2*x^2 - x)*e)*e^2 - 4*e^3*log(log(x)
))*e^(-3)/x - 3)/(x^2*log(x)), x)
```

3.254.9 Mupad [B] (verification not implemented)

Time = 14.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2\left(4x^2+4ex^2\right)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx$$
$$=\frac{e^{4x}\,e^{-2}\,e^{4x\,e^{-1}}\,e^{8x\,e^{-2}}}{\ln(x)^{8/x}}$$

input
```
int((exp(-3)*exp(-(exp(-3)*(8*log(log(x))*exp(3) + exp(2)*(exp(1)*(2*x - 4
*x^2) - 4*x^2) - 8*x^2*exp(1)))/x)*(log(x)*(8*x^2*exp(1) + exp(2)*(4*x^2*e
xp(1) + 4*x^2)) - 8*exp(3) + 8*log(log(x))*exp(3)*log(x)))/(x^2*log(x)),x)
```

output
```
(exp(4*x)*exp(-2)*exp(4*x*exp(-1))*exp(8*x*exp(-2)))/log(x)^(8/x)
```

3.254.

$$\int \frac{e^{-3+\frac{8ex^2+e^2\left(4x^2+e\left(-2x+4x^2\right)\right)-8e^3\log(\log(x))}{e^3x}}\left(-8e^3+\left(8ex^2+e^2\left(4x^2+4ex^2\right)\right)\log(x)+8e^3\log(x)\log(\log(x))\right)}{x^2\log(x)}\,dx$$

3.255 $\int -\frac{e^{5-\frac{1}{125}e^{1+2\log(5)\log(x)}+2\log(5)\log(x)}\log(5)}{500x}\,dx$

3.255.1 Optimal result

Integrand size = 33, antiderivative size = 23

$$\int -\frac{e^{5-\frac{1}{125}e^{1+2\log(5)\log(x)}+2\log(5)\log(x)}\log(5)}{500x}\,dx = \frac{1}{8}e^{4-e^{1+\log(5)(-3+2\log(x))}}$$

output
```
exp(4-exp(1+(2*ln(x)-3)*ln(5))-3*ln(2))
```

3.255.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int -\frac{e^{5-\frac{1}{125}e^{1+2\log(5)\log(x)}+2\log(5)\log(x)}\log(5)}{500x}\,dx = \frac{1}{8}e^{4-5^{-3+2\log(x)}e}$$

input
```
Integrate[-1/500*(E^(5 - E^(1 + 2*Log[5]*Log[x])/125 + 2*Log[5]*Log[x])*Lo
g[5])/x,x]
```

output
```
E^(4 - 5^(-3 + 2*Log[x])*E)/8
```

3.255.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{\log(5)\exp\left(2\log(5)\log(x)-\frac{1}{125}e^{2\log(5)\log(x)+1}+5\right)}{500x}dx$$

$$\Big\downarrow \ 27$$

$$-\frac{1}{500}\log(5)\int\frac{5^{2\log(x)}e^{5-5^{2\log(x)-3}e}}{x}dx$$

$$\Big\downarrow \ 2704$$

$$-\frac{1}{500}\log(5)\int e^{5-5^{2\log(x)-3}e}x^{-1+2\log(5)}dx$$

$$\Big\downarrow \ 7292$$

$$-\frac{1}{500}\log(5)\int e^{\frac{1}{125}\left(625-5^{2\log(x)}e\right)}x^{-1+2\log(5)}dx$$

$$\Big\downarrow \ 7299$$

$$-\frac{1}{500}\log(5)\int e^{\frac{1}{125}\left(625-5^{2\log(x)}e\right)}x^{-1+2\log(5)}dx$$

input
```
Int[-1/500*(E^(5 - E^(1 + 2*Log[5]*Log[x])/125 + 2*Log[5]*Log[x])*Log[5])/
x,x]
```

output
```
$Aborted
```

3.255.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2704
```
Int[(u_.)*(F_)^((a_.)*(Log[z_]*(b_.) + (v_.))), x_Symbol] :> Int[u*F^(a*v)*
z^(a*b*Log[F]), x] /; FreeQ[{F, a, b}, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.255.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

method	result	size
risch	$\frac{e^{-\frac{x^{2\ln(5)}e}{125}+4}}{8}$	16
derivativedivides	$e^{-e^{2\ln(5)\ln(x)-3\ln(5)+1}-3\ln(2)+4}$	23
default	$e^{-e^{2\ln(5)\ln(x)-3\ln(5)+1}-3\ln(2)+4}$	23
norman	$e^{-e^{2\ln(5)\ln(x)-3\ln(5)+1}-3\ln(2)+4}$	23
parallelrisch	$e^{-e^{2\ln(5)\ln(x)-3\ln(5)+1}-3\ln(2)+4}$	23

input
```
int(-2*ln(5)*exp(2*ln(5)*ln(x)-3*ln(5)+1)*exp(-exp(2*ln(5)*ln(x)-3*ln(5)+1
)-3*ln(2)+4)/x,x,method=_RETURNVERBOSE)
```

output
```
1/8*exp(-1/125*x^(2*ln(5))*exp(1)+4)
```

3.255.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int -\frac{e^{5-\frac{1}{125}e^{1+2\log(5)\log(x)}+2\log(5)\log(x)}\log(5)}{500x}\,dx = e^{\left(-e^{(2\log(5)\log(x)-3\log(5)+1)}-3\log(2)+4\right)}$$

input
```
integrate(-2*log(5)*exp(2*log(5)*log(x)-3*log(5)+1)*exp(-exp(2*log(5)*log(
x)-3*log(5)+1)-3*log(2)+4)/x,x, algorithm=\
```

output
```
e^(-e^(2*log(5)*log(x) - 3*log(5) + 1) - 3*log(2) + 4)
```

3.255.6 Sympy [A] (verification not implemented)

Time = 1.50 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int -\frac{e^{5-\frac{1}{125}e^{1+2\log(5)\log(x)}+2\log(5)\log(x)}\log(5)}{500x}\,dx = \frac{e^4 e^{-\frac{ee^{2\log(5)\log(x)}}{125}}}{8}$$

input
```
integrate(-2*ln(5)*exp(2*ln(5)*ln(x)-3*ln(5)+1)*exp(-exp(2*ln(5)*ln(x)-3*l
n(5)+1)-3*ln(2)+4)/x,x)
```

output
```
exp(4)*exp(-E*exp(2*log(5)*log(x))/125)/8
```

3.255.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

$$\int -\frac{e^{5-\frac{1}{125}e^{1+2\log(5)\log(x)}+2\log(5)\log(x)}\log(5)}{500x}\,dx = \frac{1}{8}\,e^{\left(-\frac{1}{125}\,e^{(2\,\log(5)\log(x)+1)}+4\right)}$$

input
```
integrate(-2*log(5)*exp(2*log(5)*log(x)-3*log(5)+1)*exp(-exp(2*log(5)*log(
x)-3*log(5)+1)-3*log(2)+4)/x,x, algorithm=\
```

output
```
1/8*e^(-1/125*e^(2*log(5)*log(x) + 1) + 4)
```

3.255.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int -\frac{e^{5-\frac{1}{125}e^{1+2\log(5)\log(x)}+2\log(5)\log(x)}\log(5)}{500x}\,dx = \frac{1}{1000}\,e^{\left(-e^{(2\,\log(5)\log(x)-3\,\log(5)+1)}+3\,\log(5)+4\right)}$$

input
```
integrate(-2*log(5)*exp(2*log(5)*log(x)-3*log(5)+1)*exp(-exp(2*log(5)*log(
x)-3*log(5)+1)-3*log(2)+4)/x,x, algorithm=\
```

output
```
1/1000*e^(-e^(2*log(5)*log(x) - 3*log(5) + 1) + 3*log(5) + 4)
```

3.255.9 Mupad [B] (verification not implemented)

Time = 13.90 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int -\frac{e^{5-\frac{1}{125}e^{1+2\log(5)\log(x)}+2\log(5)\log(x)}\log(5)}{500x}\,dx = \frac{e^4\,e^{-\frac{x^2\,\ln(5)\,e}{125}}}{8}$$

input
```
int(-(2*exp(4 - 3*log(2) - exp(2*log(5)*log(x) - 3*log(5) + 1))*exp(2*log(
5)*log(x) - 3*log(5) + 1)*log(5))/x,x)
```

output
```
(exp(4)*exp(-(x^(2*log(5))*exp(1))/125))/8
```

3.256 $\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx$

3.256.1 Optimal result

Integrand size = 54, antiderivative size = 28

$$\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx=\frac{e^{2e^{-x}}}{\log^2\left(\frac{15}{\frac{x}{4}+e^2x}\right)}$$

output
```
exp(1/exp(x))^2/ln(3/(1/5*x*exp(1)^2+1/20*x))^2
```

3.256.2 Mathematica [A] (verified)

Time = 2.08 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx=\frac{e^{2e^{-x}}}{\log^2\left(\frac{60}{x+4e^2x}\right)}$$

input
```
Integrate[(E^(2/E^x - x)*(2*E^x - 2*x*Log[60/(x + 4*E^2*x)]))/(x*Log[60/(x
 + 4*E^2*x)]^3),x]
```

output
```
E^(2/E^x)/Log[60/(x + 4*E^2*x)]^2
```

3.256.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{4e^2x+x}\right)\right)}{x\log^3\left(\frac{60}{4e^2x+x}\right)}dx$$

$$\Big\downarrow \text{ 2894}$$

$$\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{4e^2x+x}\right)\right)}{x\log^3\left(\frac{60}{(1+4e^2)x}\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{2e^{2e^{-x}-x}\left(e^x-x\log\left(\frac{60}{4e^2x+x}\right)\right)}{x\log^3\left(\frac{60}{(1+4e^2)x}\right)}dx$$

$$\Big\downarrow \text{ 27}$$

$$2\int \frac{e^{2e^{-x}-x}\left(e^x-x\log\left(\frac{60}{(1+4e^2)x}\right)\right)}{x\log^3\left(\frac{60}{(1+4e^2)x}\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$2\int \left(\frac{e^{2e^{-x}}}{x\log^3\left(\frac{60}{(1+4e^2)x}\right)}-\frac{e^{2e^{-x}-x}}{\log^2\left(\frac{60}{(1+4e^2)x}\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2\left(\int \frac{e^{2e^{-x}}}{x\log^3\left(\frac{60}{(1+4e^2)x}\right)}dx-\int \frac{e^{2e^{-x}-x}}{\log^2\left(\frac{60}{(1+4e^2)x}\right)}dx\right)$$

input
```
Int[(E^(2/E^x - x)*(2*E^x - 2*x*Log[60/(x + 4*E^2*x)]))/(x*Log[60/(x + 4*E
^2*x)]^3),x]
```

output
```
$Aborted
```

3.256. $\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}dx$

3.256.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2894
```
Int[((a_.) + Log[(c_.)*(v_)^(n_.)]*(b_.))^(p_.)*(u_.), x_Symbol] :> Int[u*(
a + b*Log[c*ExpandToSum[v, x]^n])^p, x] /; FreeQ[{a, b, c, n, p}, x] && Lin
earQ[v, x] &&  !LinearMatchQ[v, x] &&  !(EqQ[n, 1] && MatchQ[c*v, (e_.)*((f
_) + (g_.)*x) /; FreeQ[{e, f, g}, x]])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.256.4 Maple [A] (verified)

Time = 2.61 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

method	result	size
parallelrisch	$\frac{e^{2 e^{-x}}}{\ln\left(\frac{60}{x\left(4 e^{2}+1\right)}\right)^{2}}$	27

input
```
int((-2*x*ln(60/(4*x*exp(1)^2+x))+2*exp(x))*exp(1/exp(x))^2/x/exp(x)/ln(60
/(4*x*exp(1)^2+x))^3,x,method=_RETURNVERBOSE)
```

output
```
exp(1/exp(x))^2/ln(60/x/(4*exp(1)^2+1))^2
```

3.256. $\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx$

3.256.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx=\frac{e^{\left(-\left(xe^x-2\right)e^{(-x)}+x\right)}}{\log\left(\frac{60}{4\,xe^2+x}\right)^2}$$

input
```
integrate((-2*x*log(60/(4*x*exp(1)^2+x))+2*exp(x))*exp(1/exp(x))^2/x/exp(x
)/log(60/(4*x*exp(1)^2+x))^3,x, algorithm=\
```

output
```
e^(-(x*e^x - 2)*e^(-x) + x)/log(60/(4*x*e^2 + x))^2
```

3.256.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx=\frac{e^{2e^{-x}}}{\log\left(\frac{60}{x+4xe^2}\right)^2}$$

input
```
integrate((-2*x*ln(60/(4*x*exp(1)**2+x))+2*exp(x))*exp(1/exp(x))**2/x/exp(
x)/ln(60/(4*x*exp(1)**2+x))**3,x)
```

output
```
exp(2*exp(-x))/log(60/(x + 4*x*exp(2)))**2
```

3.256.7 Maxima [F]

$$\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx=\int -\frac{2\left(x\log\left(\frac{60}{4\,xe^2+x}\right)-e^x\right)e^{\left(-x+2\,e^{(-x)}\right)}}{x\log\left(\frac{60}{4\,xe^2+x}\right)^3}\,dx$$

input
```
integrate((-2*x*log(60/(4*x*exp(1)^2+x))+2*exp(x))*exp(1/exp(x))^2/x/exp(x
)/log(60/(4*x*exp(1)^2+x))^3,x, algorithm=\
```

output
```
-2*integrate((x*log(60/(4*x*e^2 + x)) - e^x)*e^(-x + 2*e^(-x))/(x*log(60/(
4*x*e^2 + x))^3), x)
```

3.256.8 Giac [F]

$$\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx=\int -\frac{2\left(x\log\left(\frac{60}{4\,xe^2+x}\right)-e^x\right)e^{\left(-x+2\,e^{(-x)}\right)}}{x\log\left(\frac{60}{4\,xe^2+x}\right)^3}\,dx$$

input
```
integrate((-2*x*log(60/(4*x*exp(1)^2+x))+2*exp(x))*exp(1/exp(x))^2/x/exp(x
)/log(60/(4*x*exp(1)^2+x))^3,x, algorithm=\
```

output
```
integrate(-2*(x*log(60/(4*x*e^2 + x)) - e^x)*e^(-x + 2*e^(-x))/(x*log(60/(
4*x*e^2 + x))^3), x)
```

3.256.9 Mupad [B] (verification not implemented)

Time = 14.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{e^{2e^{-x}-x}\left(2e^x-2x\log\left(\frac{60}{x+4e^2x}\right)\right)}{x\log^3\left(\frac{60}{x+4e^2x}\right)}\,dx=\frac{\mathrm{e}^{2\,\mathrm{e}^{-x}}}{\ln\left(\frac{60}{x+4\,x\,\mathrm{e}^2}\right)^2}$$

input
```
int((exp(2*exp(-x))*exp(-x)*(2*exp(x) - 2*x*log(60/(x + 4*x*exp(2)))))/(x*
log(60/(x + 4*x*exp(2)))^3),x)
```

output
```
exp(2*exp(-x))/log(60/(x + 4*x*exp(2)))^2
```

3.257 $\int e^{3x+3x^2}(2x+3x^2+6x^3)\,dx$

3.257.1 Optimal result

Integrand size = 26, antiderivative size = 12

$$\int e^{3x+3x^2}\left(2x+3x^2+6x^3\right)\,dx = e^{3x(1+x)}x^2$$

output
```
x^2*exp(x*(3*x+3))
```

3.257.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int e^{3x+3x^2}\left(2x+3x^2+6x^3\right)\,dx = e^{3x(1+x)}x^2$$

input
```
Integrate[E^(3*x + 3*x^2)*(2*x + 3*x^2 + 6*x^3),x]
```

output
```
E^(3*x*(1 + x))*x^2
```

3.257.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 27 vs. $2(12) = 24$.

Time = 0.20 (sec) , antiderivative size = 27, normalized size of antiderivative = 2.25, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {2028, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{3x^2+3x}\left(6x^3+3x^2+2x\right)\,dx$$

$$\Big\downarrow \text{2028}$$

$$\int e^{3x^2+3x}x\left(6x^2+3x+2\right)dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{e^{3x^2+3x}x\left(2x^2+x\right)}{2x+1}$$

input
```
Int[E^(3*x + 3*x^2)*(2*x + 3*x^2 + 6*x^3),x]
```

output
```
(E^(3*x + 3*x^2)*x*(x + 2*x^2))/(1 + 2*x)
```

3.257.3.1 Defintions of rubi rules used

rule 2028
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.) + (c_.)*(x_)^(t_.))^(p_.),
x_Symbol] :> Int[x^(p*r)*(a + b*x^(s - r) + c*x^(t - r))^p*Fx, x] /; FreeQ[
{a, b, c, r, s, t}, x] && IntegerQ[p] && PosQ[s - r] && PosQ[t - r] &&  !(E
qQ[p, 1] && EqQ[u, 1])
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.257.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

method	result
risch	$\mathrm{e}^{3(1+x)x}x^{2}$
gosper	$\mathrm{e}^{3x^{2}+3x}x^{2}$
default	$\mathrm{e}^{3x^{2}+3x}x^{2}$
norman	$\mathrm{e}^{3x^{2}+3x}x^{2}$
parallelrisch	$\mathrm{e}^{3x^{2}+3x}x^{2}$
parts	$-i\sqrt{3}\,\sqrt{\pi}\,\mathrm{e}^{-\frac{3}{4}}\,\mathrm{erf}\left(i\sqrt{3}\,x+\frac{i\sqrt{3}}{2}\right)x^{3}-\frac{i\sqrt{3}\,\sqrt{\pi}\,\mathrm{e}^{-\frac{3}{4}}\,\mathrm{erf}\left(i\sqrt{3}\,x+\frac{i\sqrt{3}}{2}\right)x^{2}}{2}-\frac{i\sqrt{3}\,\sqrt{\pi}\,\mathrm{e}^{-\frac{3}{4}}\,\mathrm{erf}\left(i\sqrt{3}\,x+\frac{i\sqrt{3}}{2}\right)x}{3}-$

input
```
int((6*x^3+3*x^2+2*x)*exp(3*x^2+3*x),x,method=_RETURNVERBOSE)
```

output
```
exp(3*(1+x)*x)*x^2
```

3.257.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int e^{3x+3x^2}\left(2x+3x^2+6x^3\right)\,dx=x^2e^{\left(3\,x^2+3\,x\right)}$$

input
```
integrate((6*x^3+3*x^2+2*x)*exp(3*x^2+3*x),x, algorithm=\
```

output
```
x^2*e^(3*x^2 + 3*x)
```

3.257.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int e^{3x+3x^2}\left(2x+3x^2+6x^3\right)\,dx=x^2e^{3x^2+3x}$$

input
```
integrate((6*x**3+3*x**2+2*x)*exp(3*x**2+3*x),x)
```

output
```
x**2*exp(3*x**2 + 3*x)
```

3.257.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.34 (sec) , antiderivative size = 268, normalized size of antiderivative = 22.33

$$\int e^{3x+3x^2}\left(2x+3x^2+6x^3\right)\,dx$$
$$=\frac{1}{72}\sqrt{3}\left(\frac{36\,(2\,x+1)^3\Gamma\left(\frac{3}{2},-\frac{3}{4}\,(2\,x+1)^2\right)}{\left(-(2\,x+1)^2\right)^{\frac{3}{2}}}-\frac{9\,\sqrt{\pi}(2\,x+1)\left(\operatorname{erf}\left(\frac{1}{2}\,\sqrt{3}\sqrt{-(2\,x+1)^2}\right)-1\right)}{\sqrt{-(2\,x+1)^2}}+18\,\sqrt{3}e^{\left(\frac{3}{4}\,(2\right.}\right.$$
$$-\frac{1}{24}\sqrt{3}\left(\frac{4\,(2\,x+1)^3\Gamma\left(\frac{3}{2},-\frac{3}{4}\,(2\,x+1)^2\right)}{\left(-(2\,x+1)^2\right)^{\frac{3}{2}}}-\frac{3\,\sqrt{\pi}(2\,x+1)\left(\operatorname{erf}\left(\frac{1}{2}\,\sqrt{3}\sqrt{-(2\,x+1)^2}\right)-1\right)}{\sqrt{-(2\,x+1)^2}}+4\,\sqrt{3}e^{\left(\frac{3}{4}\,(2\right.}\right.$$
$$-\frac{1}{18}\sqrt{3}\left(\frac{3\,\sqrt{\pi}(2\,x+1)\left(\operatorname{erf}\left(\frac{1}{2}\,\sqrt{3}\sqrt{-(2\,x+1)^2}\right)-1\right)}{\sqrt{-(2\,x+1)^2}}-2\,\sqrt{3}e^{\left(\frac{3}{4}\,(2\,x+1)^2\right)}\right)e^{\left(-\frac{3}{4}\right)}$$

input
```
integrate((6*x^3+3*x^2+2*x)*exp(3*x^2+3*x),x, algorithm=\
```

output
```
1/72*sqrt(3)*(36*(2*x + 1)^3*gamma(3/2, -3/4*(2*x + 1)^2)/(-(2*x + 1)^2)^(
3/2) - 9*sqrt(pi)*(2*x + 1)*(erf(1/2*sqrt(3)*sqrt(-(2*x + 1)^2)) - 1)/sqrt
(-(2*x + 1)^2) + 18*sqrt(3)*e^(3/4*(2*x + 1)^2) - 8*sqrt(3)*gamma(2, -3/4*
(2*x + 1)^2))*e^(-3/4) - 1/24*sqrt(3)*(4*(2*x + 1)^3*gamma(3/2, -3/4*(2*x
+ 1)^2)/(-(2*x + 1)^2)^(3/2) - 3*sqrt(pi)*(2*x + 1)*(erf(1/2*sqrt(3)*sqrt(
-(2*x + 1)^2)) - 1)/sqrt(-(2*x + 1)^2) + 4*sqrt(3)*e^(3/4*(2*x + 1)^2))*e^
(-3/4) - 1/18*sqrt(3)*(3*sqrt(pi)*(2*x + 1)*(erf(1/2*sqrt(3)*sqrt(-(2*x +
1)^2)) - 1)/sqrt(-(2*x + 1)^2) - 2*sqrt(3)*e^(3/4*(2*x + 1)^2))*e^(-3/4)
```

3.257.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 24 vs. 2(11) = 22.

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 2.00

$$\int e^{3x+3x^2}\left(2x+3x^2+6x^3\right)\,dx=\frac{1}{4}\left((2\,x+1)^2-4\,x-1\right)e^{\left(3\,x^2+3\,x\right)}$$

input
```
integrate((6*x^3+3*x^2+2*x)*exp(3*x^2+3*x),x, algorithm=\
```

output
```
1/4*((2*x + 1)^2 - 4*x - 1)*e^(3*x^2 + 3*x)
```

3.257.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int e^{3x+3x^2}\left(2x+3x^2+6x^3\right)\,dx=x^2\,\mathrm{e}^{3\,x^2+3\,x}$$

input
```
int(exp(3*x + 3*x^2)*(2*x + 3*x^2 + 6*x^3),x)
```

output
```
x^2*exp(3*x + 3*x^2)
```

3.258 $\int \frac{-e^{12}+2e^6x^2-x^4+(e^{12}-2e^6x^2+x^4)\log(x)+(e^{12}(-1-2x)+x^2-x^4-2x^5+e^6(1+2x^2+4x^3))\log^2(x)}{(e^{12}-2e^6x^2+x^4)\log^2(x)}$

3.258.1 Optimal result

Integrand size = 103, antiderivative size = 36

$$\int \frac{-e^{12}+2e^6x^2-x^4+(e^{12}-2e^6x^2+x^4)\log(x)+(e^{12}(-1-2x)+x^2-x^4-2x^5+e^6(1+2x^2+4x^3))\log^2(x)}{(e^{12}-2e^6x^2+x^4)\log^2(x)}$$
$$= -1+x\left(-x+\frac{5-x+\frac{x}{e^6-x^2}}{x}\right)+\frac{x}{\log(x)}$$

output
```
x*((5-x+x/(exp(6)-x^2))/x-x)+x/ln(x)-1
```

3.258.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.81

$$\int \frac{-e^{12}+2e^6x^2-x^4+(e^{12}-2e^6x^2+x^4)\log(x)+(e^{12}(-1-2x)+x^2-x^4-2x^5+e^6(1+2x^2+4x^3))\log^2(x)}{(e^{12}-2e^6x^2+x^4)\log^2(x)}$$
$$= -x-x^2-\frac{x}{-e^6+x^2}+\frac{x}{\log(x)}$$

input
```
Integrate[(-E^12 + 2*E^6*x^2 - x^4 + (E^12 - 2*E^6*x^2 + x^4)*Log[x] + (E^
12*(-1 - 2*x) + x^2 - x^4 - 2*x^5 + E^6*(1 + 2*x^2 + 4*x^3))*Log[x]^2)/((E
^12 - 2*E^6*x^2 + x^4)*Log[x]^2),x]
```

output
```
-x - x^2 - x/(-E^6 + x^2) + x/Log[x]
```

3.258.3 Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.86, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.039, Rules used = {1380, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^4+2e^6x^2+\left(x^4-2e^6x^2+e^{12}\right)\log(x)+\left(-2x^5-x^4+x^2+e^6\left(4x^3+2x^2+1\right)+e^{12}(-2x-1)\right)\log^2(x)-e}{\left(x^4-2e^6x^2+e^{12}\right)\log^2(x)}$$

$$\Big\downarrow 1380$$

$$\int -\frac{x^4-2e^6x^2-\left(x^4-2e^6x^2+e^{12}\right)\log(x)-\left(-2x^5-x^4+x^2+e^6\left(4x^3+2x^2+1\right)-e^{12}(2x+1)\right)\log^2(x)+e^{12}}{\left(e^6-x^2\right)^2\log^2(x)}$$

$$\Big\downarrow 25$$

$$-\int \frac{x^4-2e^6x^2-\left(-2x^5-x^4+x^2-e^{12}(2x+1)+e^6\left(4x^3+2x^2+1\right)\right)\log^2(x)-\left(x^4-2e^6x^2+e^{12}\right)\log(x)+e^{12}}{\left(e^6-x^2\right)^2\log^2(x)}$$

$$\Big\downarrow 7293$$

$$-\int \left(\frac{2x^5+x^4-4e^6x^3-\left(1+2e^6\right)x^2+2e^{12}x-e^6\left(1-e^6\right)}{\left(e^6-x^2\right)^2}-\frac{1}{\log(x)}+\frac{1}{\log^2(x)}\right)dx$$

$$\Big\downarrow 2009$$

$$\frac{x}{e^6-x^2}-\frac{1}{4}(2x+1)^2+\frac{x}{\log(x)}$$

input
```
Int[(-E^12 + 2*E^6*x^2 - x^4 + (E^12 - 2*E^6*x^2 + x^4)*Log[x] + (E^12*(-1
 - 2*x) + x^2 - x^4 - 2*x^5 + E^6*(1 + 2*x^2 + 4*x^3))*Log[x]^2)/((E^12 -
2*E^6*x^2 + x^4)*Log[x]^2),x]
```

output
```
-1/4*(1 + 2*x)^2 + x/(E^6 - x^2) + x/Log[x]
```

3.258.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.258.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.78

method	result	size
default	$\frac{x}{\ln(x)}-x-x^{2}+\frac{x}{e^{6}-x^{2}}$	28
parts	$\frac{x}{\ln(x)}-x-x^{2}+\frac{x}{e^{6}-x^{2}}$	28
risch	$-\frac{x\left(-x^{3}+x\,e^{6}-x^{2}+e^{6}-1\right)}{e^{6}-x^{2}}+\frac{x}{\ln(x)}$	39
norman	$\frac{x\,e^{6}+x^{3}\ln(x)+x^{4}\ln(x)-\ln(x)e^{12}+\left(-e^{6}+1\right)x\ln(x)-x^{3}}{\left(e^{6}-x^{2}\right)\ln(x)}$	56
parallelrisch	$\frac{x^{4}\ln(x)+x^{3}\ln(x)-\ln(x)e^{12}-x\,e^{6}\ln(x)-x^{3}+x\,e^{6}+x\ln(x)}{\ln(x)\left(e^{6}-x^{2}\right)}$	57

input
```
int((((-1-2*x)*exp(6)^2+(4*x^3+2*x^2+1)*exp(6)-2*x^5-x^4+x^2)*ln(x)^2+(exp
(6)^2-2*x^2*exp(6)+x^4)*ln(x)-exp(6)^2+2*x^2*exp(6)-x^4)/(exp(6)^2-2*x^2*e
xp(6)+x^4)/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
x/ln(x)-x-x^2+x/(exp(6)-x^2)
```

3.258. $\int \frac{-e^{12}+2e^{6}x^{2}-x^{4}+\left(e^{12}-2e^{6}x^{2}+x^{4}\right)\log(x)+\left(e^{12}(-1-2x)+x^{2}-x^{4}-2x^{5}+e^{6}\left(1+2x^{2}+4x^{3}\right)\right)\log^{2}(x)}{\left(e^{12}-2e^{6}x^{2}+x^{4}\right)\log^{2}(x)}\,dx$

3.258.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.25

$$\int \frac{-e^{12}+2e^6x^2-x^4+(e^{12}-2e^6x^2+x^4)\log(x)+(e^{12}(-1-2x)+x^2-x^4-2x^5+e^6(1+2x^2+4x^3))\log^2(x)}{(e^{12}-2e^6x^2+x^4)\log^2(x)}$$
$$= \frac{x^3-xe^6-(x^4+x^3-(x^2+x)e^6+x)\log(x)}{(x^2-e^6)\log(x)}$$

input
```
integrate((((-1-2*x)*exp(6)^2+(4*x^3+2*x^2+1)*exp(6)-2*x^5-x^4+x^2)*log(x)
^2+(exp(6)^2-2*x^2*exp(6)+x^4)*log(x)-exp(6)^2+2*x^2*exp(6)-x^4)/(exp(6)^2
-2*x^2*exp(6)+x^4)/log(x)^2,x, algorithm=\
```

output
```
(x^3 - x*e^6 - (x^4 + x^3 - (x^2 + x)*e^6 + x)*log(x))/((x^2 - e^6)*log(x)
)
```

3.258.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.47

$$\int \frac{-e^{12}+2e^6x^2-x^4+(e^{12}-2e^6x^2+x^4)\log(x)+(e^{12}(-1-2x)+x^2-x^4-2x^5+e^6(1+2x^2+4x^3))\log^2(x)}{(e^{12}-2e^6x^2+x^4)\log^2(x)}$$
$$= -x^2-x+\frac{x}{\log(x)}-\frac{x}{x^2-e^6}$$

input
```
integrate((((-1-2*x)*exp(6)**2+(4*x**3+2*x**2+1)*exp(6)-2*x**5-x**4+x**2)*
ln(x)**2+(exp(6)**2-2*x**2*exp(6)+x**4)*ln(x)-exp(6)**2+2*x**2*exp(6)-x**4
)/(exp(6)**2-2*x**2*exp(6)+x**4)/ln(x)**2,x)
```

output
```
-x**2 - x + x/log(x) - x/(x**2 - exp(6))
```

3.258.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.36

$$\int \frac{-e^{12}+2e^6x^2-x^4+(e^{12}-2e^6x^2+x^4)\log(x)+(e^{12}(-1-2x)+x^2-x^4-2x^5+e^6(1+2x^2+4x^3))\log^2(x)}{(e^{12}-2e^6x^2+x^4)\log^2(x)}$$
$$= \frac{x^3-xe^6-(x^4+x^3-x^2e^6-x(e^6-1))\log(x)}{(x^2-e^6)\log(x)}$$

input
```
integrate((((-1-2*x)*exp(6)^2+(4*x^3+2*x^2+1)*exp(6)-2*x^5-x^4+x^2)*log(x)
^2+(exp(6)^2-2*x^2*exp(6)+x^4)*log(x)-exp(6)^2+2*x^2*exp(6)-x^4)/(exp(6)^2
-2*x^2*exp(6)+x^4)/log(x)^2,x, algorithm=\
```

output
```
(x^3 - x*e^6 - (x^4 + x^3 - x^2*e^6 - x*(e^6 - 1))*log(x))/((x^2 - e^6)*lo
g(x))
```

3.258.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.67

$$\int \frac{-e^{12}+2e^6x^2-x^4+(e^{12}-2e^6x^2+x^4)\log(x)+(e^{12}(-1-2x)+x^2-x^4-2x^5+e^6(1+2x^2+4x^3))\log^2(x)}{(e^{12}-2e^6x^2+x^4)\log^2(x)}$$
$$= -\frac{x^4\log(x)+x^3\log(x)-x^2e^6\log(x)-x^3-xe^6\log(x)+xe^6+2x\log(x)}{x^2\log(x)-e^6\log(x)}$$

input
```
integrate((((-1-2*x)*exp(6)^2+(4*x^3+2*x^2+1)*exp(6)-2*x^5-x^4+x^2)*log(x)
^2+(exp(6)^2-2*x^2*exp(6)+x^4)*log(x)-exp(6)^2+2*x^2*exp(6)-x^4)/(exp(6)^2
-2*x^2*exp(6)+x^4)/log(x)^2,x, algorithm=\
```

output
```
-(x^4*log(x) + x^3*log(x) - x^2*e^6*log(x) - x^3 - x*e^6*log(x) + x*e^6 +
2*x*log(x))/(x^2*log(x) - e^6*log(x))
```

3.258.9 Mupad [B] (verification not implemented)

Time = 13.97 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.75

$$\int \frac{-e^{12}+2e^6x^2-x^4+(e^{12}-2e^6x^2+x^4)\log(x)+(e^{12}(-1-2x)+x^2-x^4-2x^5+e^6(1+2x^2+4x^3))\log^2(x)}{(e^{12}-2e^6x^2+x^4)\log^2(x)}$$
$$=\frac{x}{\ln(x)}-x+\frac{x}{e^6-x^2}-x^2$$

input
```
int(-(exp(12) - log(x)*(exp(12) - 2*x^2*exp(6) + x^4) - 2*x^2*exp(6) + log
(x)^2*(x^4 - x^2 - exp(6)*(2*x^2 + 4*x^3 + 1) + 2*x^5 + exp(12)*(2*x + 1))
 + x^4)/(log(x)^2*(exp(12) - 2*x^2*exp(6) + x^4)),x)
```

output
```
x/log(x) - x + x/(exp(6) - x^2) - x^2
```

3.259 $\int \frac{-25e^{-7+x}x+e^{-7+x}(50+75x+25x^2)\log(2+x)+(50+25x)\log^2(2+x)}{(2+x)\log^2(2+x)}$

3.259.1 Optimal result

Integrand size = 53, antiderivative size = 18

$$\int \frac{-25e^{-7+x}x+e^{-7+x}(50+75x+25x^2)\log(2+x)+(50+25x)\log^2(2+x)}{(2+x)\log^2(2+x)}\,dx = 25\left(4+x+\frac{e^{-7+x}x}{\log(2+x)}\right)$$

output
```
25*x/ln(2+x)*exp(-7+x)+25*x+100
```

3.259.2 Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{-25e^{-7+x}x+e^{-7+x}(50+75x+25x^2)\log(2+x)+(50+25x)\log^2(2+x)}{(2+x)\log^2(2+x)}\,dx = \frac{25\left(e^7x+\frac{e^xx}{\log(2+x)}\right)}{e^7}$$

input
```
Integrate[(-25*E^(-7 + x)*x + E^(-7 + x)*(50 + 75*x + 25*x^2)*Log[2 + x] +
 (50 + 25*x)*Log[2 + x]^2)/((2 + x)*Log[2 + x]^2),x]
```

output
```
(25*(E^7*x + (E^x*x)/Log[2 + x]))/E^7
```

3.259.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x-7}\left(25x^2+75x+50\right)\log(x+2)-25e^{x-7}x+(25x+50)\log^2(x+2)}{(x+2)\log^2(x+2)}\,dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{25e^{x-7}\left(x^2\log(x+2)-x+3x\log(x+2)+2\log(x+2)\right)}{(x+2)\log^2(x+2)}+25\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-25\int \frac{e^{x-7}}{\log^2(x+2)}dx+50\int \frac{e^{x-7}}{(x+2)\log^2(x+2)}dx-25\int \frac{e^{x-7}}{\log(x+2)}dx+25\int \frac{e^{x-7}(x+2)}{\log(x+2)}dx+25x$$

input
```
Int[(-25*E^(-7 + x)*x + E^(-7 + x)*(50 + 75*x + 25*x^2)*Log[2 + x] + (50 +
 25*x)*Log[2 + x]^2)/((2 + x)*Log[2 + x]^2),x]
```

output
```
$Aborted
```

3.259.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.259.4 Maple [A] (verified)

Time = 0.69 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

method	result	size
default	$25x+\frac{25x\,\mathrm{e}^{-7+x}}{\ln\left(2+x\right)}$	18
risch	$25x+\frac{25x\,\mathrm{e}^{-7+x}}{\ln\left(2+x\right)}$	18
parts	$25x+\frac{25x\,\mathrm{e}^{-7+x}}{\ln\left(2+x\right)}$	18
norman	$\frac{25x\,\mathrm{e}^{-7+x}+25x\ln\left(2+x\right)}{\ln\left(2+x\right)}$	23
parallelrisch	$-\frac{-100x\ln\left(2+x\right)-100x\,\mathrm{e}^{-7+x}+100\ln\left(2+x\right)}{4\ln\left(2+x\right)}$	30

input
```
int(((25*x+50)*ln(2+x)^2+(25*x^2+75*x+50)*exp(-7+x)*ln(2+x)-25*x*exp(-7+x)
)/(2+x)/ln(2+x)^2,x,method=_RETURNVERBOSE)
```

output
```
25*x+25*x/ln(2+x)*exp(-7+x)
```

3.259.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{-25e^{-7+x}x+e^{-7+x}(50+75x+25x^2)\log(2+x)+(50+25x)\log^2(2+x)}{(2+x)\log^2(2+x)}\,dx = \frac{25\left(xe^{(x-7)}+x\log\left(x+2\right)\right)}{\log\left(x+2\right)}$$

input
```
integrate(((25*x+50)*log(2+x)^2+(25*x^2+75*x+50)*exp(-7+x)*log(2+x)-25*x*e
xp(-7+x))/(2+x)/log(2+x)^2,x, algorithm=\
```

output
```
25*(x*e^(x - 7) + x*log(x + 2))/log(x + 2)
```

3.259.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{-25e^{-7+x}x+e^{-7+x}(50+75x+25x^2)\log(2+x)+(50+25x)\log^2(2+x)}{(2+x)\log^2(2+x)}\,dx$$
$$=\frac{25xe^{x-7}}{\log{(x+2)}}+25x$$

input
```
integrate(((25*x+50)*ln(2+x)**2+(25*x**2+75*x+50)*exp(-7+x)*ln(2+x)-25*x*e
xp(-7+x))/(2+x)/ln(2+x)**2,x)
```

output
```
25*x*exp(x - 7)/log(x + 2) + 25*x
```

3.259.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

$$\int \frac{-25e^{-7+x}x+e^{-7+x}(50+75x+25x^2)\log(2+x)+(50+25x)\log^2(2+x)}{(2+x)\log^2(2+x)}\,dx$$
$$=\frac{25\left(xe^{7}\log{(x+2)}+xe^{x}\right)e^{(-7)}}{\log{(x+2)}}$$

input
```
integrate(((25*x+50)*log(2+x)^2+(25*x^2+75*x+50)*exp(-7+x)*log(2+x)-25*x*e
xp(-7+x))/(2+x)/log(2+x)^2,x, algorithm=\
```

output
```
25*(x*e^7*log(x + 2) + x*e^x)*e^(-7)/log(x + 2)
```

3.259.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

$$\int \frac{-25e^{-7+x}x+e^{-7+x}(50+75x+25x^2)\log(2+x)+(50+25x)\log^2(2+x)}{(2+x)\log^2(2+x)}\,dx$$
$$=\frac{25\left(xe^{7}\log{(x+2)}+xe^{x}\right)e^{(-7)}}{\log{(x+2)}}$$

input
```
integrate(((25*x+50)*log(2+x)^2+(25*x^2+75*x+50)*exp(-7+x)*log(2+x)-25*x*e
xp(-7+x))/(2+x)/log(2+x)^2,x, algorithm=\
```

output
```
25*(x*e^7*log(x + 2) + x*e^x)*e^(-7)/log(x + 2)
```

3.259.9 Mupad [B] (verification not implemented)

Time = 14.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{-25e^{-7+x}x + e^{-7+x}(50 + 75x + 25x^2)\log(2 + x) + (50 + 25x)\log^2(2 + x)}{(2 + x)\log^2(2 + x)}\,dx$$
$$= 25\,x + \frac{25\,x\,\mathrm{e}^{-7}\,\mathrm{e}^{x}}{\ln(x + 2)}$$

input
```
int((log(x + 2)^2*(25*x + 50) - 25*x*exp(x - 7) + log(x + 2)*exp(x - 7)*(7
5*x + 25*x^2 + 50))/(log(x + 2)^2*(x + 2)),x)
```

output
```
25*x + (25*x*exp(-7)*exp(x))/log(x + 2)
```

3.260 $\int \frac{-5+(-10x^2+10x^3)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{(-x+x^2)\log\left(\frac{-1+x}{2x}\right)}\,dx$

3.260.1 Optimal result

Integrand size = 67, antiderivative size = 26

$$\int \frac{-5+(-10x^2+10x^3)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{(-x+x^2)\log\left(\frac{-1+x}{2x}\right)}\,dx = 5\left(x^2+\log^2(x)-\log\left(5\log\left(\frac{-1+x}{2x}\right)\right)\right)$$

output
```
5*ln(x)^2+5*x^2-5*ln(5*ln(1/2*(-1+x)/x))
```

3.260.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{-5+(-10x^2+10x^3)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{(-x+x^2)\log\left(\frac{-1+x}{2x}\right)}\,dx = 5\left(x^2+\log^2(x)-\log\left(\log\left(\frac{-1+x}{2x}\right)\right)\right)$$

input
```
Integrate[(-5 + (-10*x^2 + 10*x^3)*Log[(-1 + x)/(2*x)] + (-10 + 10*x)*Log[
(-1 + x)/(2*x)]*Log[x])/((-x + x^2)*Log[(-1 + x)/(2*x)]),x]
```

output
```
5*(x^2 + Log[x]^2 - Log[Log[(-1 + x)/(2*x)]])
```

3.260.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(10x^3-10x^2)\log\left(\frac{x-1}{2x}\right)+(10x-10)\log(x)\log\left(\frac{x-1}{2x}\right)-5}{(x^2-x)\log\left(\frac{x-1}{2x}\right)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(10x^3-10x^2)\log\left(\frac{x-1}{2x}\right)+(10x-10)\log(x)\log\left(\frac{x-1}{2x}\right)-5}{(x-1)x\log\left(\frac{x-1}{2x}\right)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{5\left(2(x^2+\log(x))-\frac{1}{(x-1)\log\left(\frac{x-1}{2x}\right)}\right)}{x}dx$$

$$\Big\downarrow \text{27}$$

$$5\int \frac{2(x^2+\log(x))+\frac{1}{(1-x)\log\left(-\frac{1-x}{2x}\right)}}{x}dx$$

$$\Big\downarrow \text{2010}$$

$$5\int \left(\frac{-2\log\left(\frac{x-1}{2x}\right)x^3+2\log\left(\frac{x-1}{2x}\right)x^2+1}{(1-x)x\log\left(\frac{1}{2}-\frac{1}{2x}\right)}+\frac{2\log(x)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$5\left(-\int \frac{1}{(x-1)\log\left(\frac{1}{2}-\frac{1}{2x}\right)}dx+\int \frac{1}{x\log\left(\frac{1}{2}-\frac{1}{2x}\right)}dx+x^2+\log^2(x)\right)$$

input
```
Int[(-5 + (-10*x^2 + 10*x^3)*Log[(-1 + x)/(2*x)] + (-10 + 10*x)*Log[(-1 +
x)/(2*x)]*Log[x])/((-x + x^2)*Log[(-1 + x)/(2*x)]),x]
```

output
```
$Aborted
```

3.260.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.260.4 Maple [A] (verified)

Time = 1.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

method	result
parallelrisch	$5x^2+5\ln\left(x\right)^2-5\ln\left(\ln\left(\frac{-1+x}{2x}\right)\right)$
parts	$5x^2+5\ln\left(x\right)^2-5\ln\left(\ln\left(\frac{-1+x}{2x}\right)\right)$
default	$5\ln\left(x\right)^2+5x^2-5\ln\left(\ln\left(2\right)-\ln\left(1-\frac{1}{x}\right)\right)$
risch	$5x^2+5\ln\left(x\right)^2-5\ln\left(\ln\left(-1+x\right)-\frac{i\left(\pi\,\mathrm{csgn}\left(\frac{i(-1+x)}{x}\right)^3-\pi\,\mathrm{csgn}\left(\frac{i(-1+x)}{x}\right)^2\mathrm{csgn}\left(\frac{i}{x}\right)-\pi\,\mathrm{csgn}\left(\frac{i(-1+x)}{x}\right)^2\mathrm{cs}\right.}{}\right.$

input
```
int(((10*x-10)*ln(1/2*(-1+x)/x)*ln(x)+(10*x^3-10*x^2)*ln(1/2*(-1+x)/x)-5)/
(x^2-x)/ln(1/2*(-1+x)/x),x,method=_RETURNVERBOSE)
```

output
```
5*x^2+5*ln(x)^2-5*ln(ln(1/2*(-1+x)/x))
```

3.260. $\int \frac{-5+(-10x^2+10x^3)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{(-x+x^2)\log\left(\frac{-1+x}{2x}\right)}\,dx$

3.260.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{-5+\left(-10x^2+10x^3\right)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{\left(-x+x^2\right)\log\left(\frac{-1+x}{2x}\right)}\,dx$$
$$=5\,x^2+5\,\log\left(x\right)^2-5\,\log\left(\log\left(\frac{x-1}{2\,x}\right)\right)$$

input
```
integrate(((10*x-10)*log(1/2*(-1+x)/x)*log(x)+(10*x^3-10*x^2)*log(1/2*(-1+
x)/x)-5)/(x^2-x)/log(1/2*(-1+x)/x),x, algorithm=\
```

output
```
5*x^2 + 5*log(x)^2 - 5*log(log(1/2*(x - 1)/x))
```

3.260.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{-5+\left(-10x^2+10x^3\right)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{\left(-x+x^2\right)\log\left(\frac{-1+x}{2x}\right)}\,dx$$
$$=5x^2+5\log\left(x\right)^2-5\log\left(\log\left(\frac{\frac{x}{2}-\frac{1}{2}}{x}\right)\right)$$

input
```
integrate(((10*x-10)*ln(1/2*(-1+x)/x)*ln(x)+(10*x**3-10*x**2)*ln(1/2*(-1+x
)/x)-5)/(x**2-x)/ln(1/2*(-1+x)/x),x)
```

output
```
5*x**2 + 5*log(x)**2 - 5*log(log((x/2 - 1/2)/x))
```

3.260.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{-5+\left(-10x^2+10x^3\right)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{\left(-x+x^2\right)\log\left(\frac{-1+x}{2x}\right)}\,dx$$
$$=5\,x^2+5\,\log\left(x\right)^2-5\,\log\left(-\log\left(2\right)+\log\left(x-1\right)-\log\left(x\right)\right)$$

input
```
integrate(((10*x-10)*log(1/2*(-1+x)/x)*log(x)+(10*x^3-10*x^2)*log(1/2*(-1+
x)/x)-5)/(x^2-x)/log(1/2*(-1+x)/x),x, algorithm=\
```

output
```
5*x^2 + 5*log(x)^2 - 5*log(-log(2) + log(x - 1) - log(x))
```

3.260.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{-5+(-10x^2+10x^3)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{(-x+x^2)\log\left(\frac{-1+x}{2x}\right)}\,dx$$
$$= 5\,x^2 + 5\,\log(x)^2 - 5\,\log\left(-\log(2) + \log(x-1) - \log(x)\right)$$

input
```
integrate(((10*x-10)*log(1/2*(-1+x)/x)*log(x)+(10*x^3-10*x^2)*log(1/2*(-1+
x)/x)-5)/(x^2-x)/log(1/2*(-1+x)/x),x, algorithm=\
```

output
```
5*x^2 + 5*log(x)^2 - 5*log(-log(2) + log(x - 1) - log(x))
```

3.260.9 Mupad [B] (verification not implemented)

Time = 14.02 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{-5+(-10x^2+10x^3)\log\left(\frac{-1+x}{2x}\right)+(-10+10x)\log\left(\frac{-1+x}{2x}\right)\log(x)}{(-x+x^2)\log\left(\frac{-1+x}{2x}\right)}\,dx$$
$$= 5\ln(x)^2 - 5\,\ln\left(\ln\left(\frac{\frac{x}{2}-\frac{1}{2}}{x}\right)\right) + 5\,x^2$$

input
```
int((log((x/2 - 1/2)/x)*(10*x^2 - 10*x^3) - log((x/2 - 1/2)/x)*log(x)*(10*
x - 10) + 5)/(log((x/2 - 1/2)/x)*(x - x^2)),x)
```

output
```
5*log(x)^2 - 5*log(log((x/2 - 1/2)/x)) + 5*x^2
```

3.261 $\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-\right.\right.}{1-2e\log(2)+e^2\log^2(2)}$

3.261.1 Optimal result

Integrand size = 122, antiderivative size = 18

$$\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx = e^{\left(x+\frac{x}{\frac{1}{e}-\log(2)}\right)^2}$$

output
```
exp((x/(exp(-1)-ln(2))+x)^2)
```

3.261.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 64 vs. 2(18) = 36.

Time = 1.35 (sec) , antiderivative size = 64, normalized size of antiderivative = 3.56

$$\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx = 2^{-1+\frac{1}{(-1+e\log(2))^2}}e^{\frac{e\log^2(2)(-2+e\log(2))+x^2\left(1+e^2\left(1+\log^2(2)-\log(4)\right)-e(-2+\log(4))\right)}{(-1+e\log(2))^2}}$$

input
```
Integrate[(E^((x^2 + 2*E*x^2 + E^2*x^2 + (-2*E*x^2 - 2*E^2*x^2)*Log[2] + E
^2*x^2*Log[2]^2)/(1 - 2*E*Log[2] + E^2*Log[2]^2))*(2*x + 4*E*x + 2*E^2*x +
 (-4*E*x - 4*E^2*x)*Log[2] + 2*E^2*x*Log[2]^2))/(1 - 2*E*Log[2] + E^2*Log[
2]^2),x]
```

output
```
2^(-1 + (-1 + E*Log[2])^(-2))*E^((E*Log[2]^2*(-2 + E*Log[2]) + x^2*(1 + E^
2*(1 + Log[2]^2 - Log[4]) - E*(-2 + Log[4])))/(-1 + E*Log[2])^2)
```

3.261.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.066$, Rules used = {6, 6, 6, 27, 27, 2725, 27, 2638}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(2e^2x+4ex+2x+2e^2x\log^2(2)+\left(-4e^2x-4ex\right)\log(2)\right)\exp\left(\frac{e^2x^2+2ex^2+x^2+e^2x^2\log^2(2)+\left(-2e^2x^2-2ex^2\right)\log(2)}{1+e^2\log^2(2)-2e\log(2)}\right)}{1+e^2\log^2(2)-2e\log(2)}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{\left((2+4e)x+2e^2x+2e^2x\log^2(2)+\left(-4e^2x-4ex\right)\log(2)\right)\exp\left(\frac{e^2x^2+2ex^2+x^2+e^2x^2\log^2(2)+\left(-2e^2x^2-2ex^2\right)\log(2)}{1+e^2\log^2(2)-2e\log(2)}\right)}{1+e^2\log^2(2)-2e\log(2)}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{\left(\left(2+4e+2e^2\right)x+2e^2x\log^2(2)+\left(-4e^2x-4ex\right)\log(2)\right)\exp\left(\frac{e^2x^2+2ex^2+x^2+e^2x^2\log^2(2)+\left(-2e^2x^2-2ex^2\right)\log(2)}{1+e^2\log^2(2)-2e\log(2)}\right)}{1+e^2\log^2(2)-2e\log(2)}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{\left(x\left(2+4e+2e^2+2e^2\log^2(2)\right)+\left(-4e^2x-4ex\right)\log(2)\right)\exp\left(\frac{e^2x^2+2ex^2+x^2+e^2x^2\log^2(2)+\left(-2e^2x^2-2ex^2\right)\log(2)}{1+e^2\log^2(2)-2e\log(2)}\right)}{1+e^2\log^2(2)-2e\log(2)}dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int 2^{1-\frac{2e^2x^2+2ex^2}{1-2e\log(2)+e^2\log^2(2)}}\exp\left(\frac{e^2\log^2(2)x^2+e^2x^2+2ex^2+x^2}{(1-e\log(2))^2}\right)x(1+e(1-\log(2)))^2dx}{(1-e\log(2))^2}$$

3.261. $\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx$

$$\Big\downarrow \text{27}$$

$$\frac{(1+e(1-\log(2)))^2\int 2^{1-\frac{2\left(e^2x^2+ex^2\right)}{(1-e\log(2))^2}}\exp\left(\frac{e^2\log^2(2)x^2+e^2x^2+2ex^2+x^2}{(1-e\log(2))^2}\right)xdx}{(1-e\log(2))^2}$$

$$\Big\downarrow \text{2725}$$

$$\frac{(1+e(1-\log(2)))^2\int 2\exp\left(\frac{x^2(1+e(1-\log(2)))^2}{(1-e\log(2))^2}\right)xdx}{(1-e\log(2))^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{2(1+e(1-\log(2)))^2\int \exp\left(\frac{x^2(1+e(1-\log(2)))^2}{(1-e\log(2))^2}\right)xdx}{(1-e\log(2))^2}$$

$$\Big\downarrow \text{2638}$$

$$\exp\left(\frac{x^2(1+e(1-\log(2)))^2}{(1-e\log(2))^2}\right)$$

input
```
Int[(E^((x^2 + 2*E*x^2 + E^2*x^2 + (-2*E*x^2 - 2*E^2*x^2)*Log[2] + E^2*x^2
*Log[2]^2)/(1 - 2*E*Log[2] + E^2*Log[2]^2))*(2*x + 4*E*x + 2*E^2*x + (-4*E
*x - 4*E^2*x)*Log[2] + 2*E^2*x*Log[2]^2))/(1 - 2*E*Log[2] + E^2*Log[2]^2),
x]
```

output
```
E^((x^2*(1 + E*(1 - Log[2]))^2)/(1 - E*Log[2])^2)
```

3.261.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2638
```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^(n_))*((e_.) + (f_.)*(x_))^(m_
.), x_Symbol] :> Simp[(e + f*x)^n*(F^(a + b*(c + d*x)^n)/(b*f*n*(c + d*x)^n
*Log[F])), x] /; FreeQ[{F, a, b, c, d, e, f, n}, x] && EqQ[m, n - 1] && EqQ
[d*e - c*f, 0]
```

3.261. $\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx$

rule 2725
```
Int[(u_.)*(F_)^(v_)*(G_)^(w_), x_Symbol] :> With[{z = v*Log[F] + w*Log[G]},
 Int[u*NormalizeIntegrand[E^z, x], x] /; BinomialQ[z, x] || (PolynomialQ[z,
 x] && LeQ[Exponent[z, x], 2])] /; FreeQ[{F, G}, x]
```

3.261.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(16) = 32$.

Time = 1.06 (sec) , antiderivative size = 54, normalized size of antiderivative = 3.00

method	result
risch	$\mathrm{e}^{\frac{x^{2}\left(-\mathrm{e}^{2} \ln(2)^{2}+2 \,\mathrm{e}^{2} \ln(2)-\mathrm{e}^{2}+2 \,\mathrm{e} \ln(2)-2 \,\mathrm{e}-1\right)}{-\mathrm{e}^{2} \ln(2)^{2}+2 \,\mathrm{e} \ln(2)-1}}$
gosper	$\mathrm{e}^{\frac{x^{2}\left(\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e}^{2} \ln(2)+\mathrm{e}^{2}-2 \,\mathrm{e} \ln(2)+2 \,\mathrm{e}+1\right)}{\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e} \ln(2)+1}}$
norman	$\mathrm{e}^{\frac{x^{2} \mathrm{e}^{2} \ln(2)^{2}+\left(-2 x^{2} \mathrm{e}^{2}-2 x^{2} \mathrm{e}\right) \ln(2)+x^{2} \mathrm{e}^{2}+2 x^{2} \mathrm{e}+x^{2}}{\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e} \ln(2)+1}}$
meijerg	$-\frac{\left(2 \,\mathrm{e}^{2} \ln(2)^{2}-4 \,\mathrm{e}^{2} \ln(2)+2 \,\mathrm{e}^{2}-4 \,\mathrm{e} \ln(2)+4 \,\mathrm{e}+2\right) \left(1-\mathrm{e}^{\frac{x^{2}\left(\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e}^{2} \ln(2)+\mathrm{e}^{2}-2 \,\mathrm{e} \ln(2)+2 \,\mathrm{e}+1\right)}{\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e} \ln(2)+1}}\right)}{2 \left(\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e}^{2} \ln(2)+\mathrm{e}^{2}-2 \,\mathrm{e} \ln(2)+2 \,\mathrm{e}+1\right)}$
default	$\frac{\left(2 \,\mathrm{e}^{2} \ln(2)^{2}+\left(-4 \,\mathrm{e}^{2}-4 \,\mathrm{e}\right) \ln(2)+2 \,\mathrm{e}^{2}+4 \,\mathrm{e}+2\right) \mathrm{e}^{\frac{\left(\mathrm{e}^{2} \ln(2)^{2}+\left(-2 \,\mathrm{e}^{2}-2 \,\mathrm{e}\right) \ln(2)+\mathrm{e}^{2}+2 \,\mathrm{e}+1\right) x^{2}}{\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e} \ln(2)+1}}}{2 \,\mathrm{e}^{2} \ln(2)^{2}+2(-2 \,\mathrm{e}^{2}-2 \,\mathrm{e}) \ln(2)+2 \,\mathrm{e}^{2}+4 \,\mathrm{e}+2}$
parallelrisch	$\frac{\mathrm{e}^{2} \ln(2)^{2} \mathrm{e}^{\frac{x^{2}\left(\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e}^{2} \ln(2)+\mathrm{e}^{2}-2 \,\mathrm{e} \ln(2)+2 \,\mathrm{e}+1\right)}{\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e} \ln(2)+1}}-2 \,\mathrm{e} \ln(2) \mathrm{e}^{\frac{x^{2}\left(\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e}^{2} \ln(2)+\mathrm{e}^{2}-2 \,\mathrm{e} \ln(2)+2 \,\mathrm{e}+1\right)}{\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e} \ln(2)+1}}+\mathrm{e}^{\frac{x^{2}\left(\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e}^{2} \ln \right.}{\mathrm{e}^{2} \ln(2)^{2}}}}{\mathrm{e}^{2} \ln(2)^{2}-2 \,\mathrm{e} \ln(2)+1}$
parts	Expression too large to display

input
```
int((2*x*exp(1)^2*ln(2)^2+(-4*x*exp(1)^2-4*x*exp(1))*ln(2)+2*x*exp(1)^2+4*
x*exp(1)+2*x)*exp((x^2*exp(1)^2*ln(2)^2+(-2*x^2*exp(1)^2-2*x^2*exp(1))*ln(
2)+x^2*exp(1)^2+2*x^2*exp(1)+x^2)/(exp(1)^2*ln(2)^2-2*exp(1)*ln(2)+1))/(ex
p(1)^2*ln(2)^2-2*exp(1)*ln(2)+1),x,method=_RETURNVERBOSE)
```

output
```
exp(x^2*(-exp(2)*ln(2)^2+2*exp(2)*ln(2)-exp(2)+2*exp(1)*ln(2)-2*exp(1)-1)/
(-exp(2)*ln(2)^2+2*exp(1)*ln(2)-1))
```

3.261. $$\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx$$

3.261.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(16) = 32$.

Time = 0.29 (sec) , antiderivative size = 63, normalized size of antiderivative = 3.50

$$\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx$$
$$= e^{\left(\frac{x^2e^2\log(2)^2+x^2e^2+2\,x^2e+x^2-2\,\left(x^2e^2+x^2e\right)\log(2)}{e^2\log(2)^2-2\,e\log(2)+1}\right)}$$

input
```
integrate((2*x*exp(1)^2*log(2)^2+(-4*x*exp(1)^2-4*x*exp(1))*log(2)+2*x*exp
(1)^2+4*x*exp(1)+2*x)*exp((x^2*exp(1)^2*log(2)^2+(-2*x^2*exp(1)^2-2*x^2*ex
p(1))*log(2)+x^2*exp(1)^2+2*x^2*exp(1)+x^2)/(exp(1)^2*log(2)^2-2*exp(1)*lo
g(2)+1))/(exp(1)^2*log(2)^2-2*exp(1)*log(2)+1),x, algorithm=\
```

output
```
e^((x^2*e^2*log(2)^2 + x^2*e^2 + 2*x^2*e + x^2 - 2*(x^2*e^2 + x^2*e)*log(2
))/(e^2*log(2)^2 - 2*e*log(2) + 1))
```

3.261.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(14) = 28$.

Time = 0.11 (sec) , antiderivative size = 71, normalized size of antiderivative = 3.94

$$\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx$$
$$= e^{\frac{x^2+x^2e^2\log(2)^2+2ex^2+x^2e^2+\left(-2x^2e^2-2ex^2\right)\log(2)}{-2e\log(2)+1+e^2\log(2)^2}}$$

input
```
integrate((2*x*exp(1)**2*ln(2)**2+(-4*x*exp(1)**2-4*x*exp(1))*ln(2)+2*x*ex
p(1)**2+4*x*exp(1)+2*x)*exp((x**2*exp(1)**2*ln(2)**2+(-2*x**2*exp(1)**2-2*
x**2*exp(1))*ln(2)+x**2*exp(1)**2+2*x**2*exp(1)+x**2)/(exp(1)**2*ln(2)**2-
2*exp(1)*ln(2)+1))/(exp(1)**2*ln(2)**2-2*exp(1)*ln(2)+1),x)
```

output
```
exp((x**2 + x**2*exp(2)*log(2)**2 + 2*E*x**2 + x**2*exp(2) + (-2*x**2*exp(
2) - 2*E*x**2)*log(2))/(-2*E*log(2) + 1 + exp(2)*log(2)**2))
```

3.261.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1721 vs. $2(16) = 32$.

Time = 0.21 (sec) , antiderivative size = 1721, normalized size of antiderivative = 95.61

$$\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+(-2ex^2-2e^2x^2)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}(2x+4ex+2e^2x+(-4ex-4e^2x)\log(2)+2e^2x\log^2(2))}{1-2e\log(2)+e^2\log^2(2)}\,dx$$
$= \text{Too large to display}$

input
```
integrate((2*x*exp(1)^2*log(2)^2+(-4*x*exp(1)^2-4*x*exp(1))*log(2)+2*x*exp
(1)^2+4*x*exp(1)+2*x)*exp((x^2*exp(1)^2*log(2)^2+(-2*x^2*exp(1)^2-2*x^2*ex
p(1))*log(2)+x^2*exp(1)^2+2*x^2*exp(1)+x^2)/(exp(1)^2*log(2)^2-2*exp(1)*lo
g(2)+1))/(exp(1)^2*log(2)^2-2*exp(1)*log(2)+1),x, algorithm=\
```

output
```
(e^(x^2*e^2*log(2)^2/(e^2*log(2)^2 - 2*e*log(2) + 1) - 2*x^2*e^2*log(2)/(e
^2*log(2)^2 - 2*e*log(2) + 1) - 2*x^2*e*log(2)/(e^2*log(2)^2 - 2*e*log(2)
+ 1) + x^2*e^2/(e^2*log(2)^2 - 2*e*log(2) + 1) + 2*x^2*e/(e^2*log(2)^2 - 2
*e*log(2) + 1) + x^2/(e^2*log(2)^2 - 2*e*log(2) + 1) + 2)*log(2)^2/(e^2*lo
g(2)^2/(e^2*log(2)^2 - 2*e*log(2) + 1) - 2*e^2*log(2)/(e^2*log(2)^2 - 2*e*
log(2) + 1) - 2*e*log(2)/(e^2*log(2)^2 - 2*e*log(2) + 1) + e^2/(e^2*log(2)
^2 - 2*e*log(2) + 1) + 2*e/(e^2*log(2)^2 - 2*e*log(2) + 1) + 1/(e^2*log(2)
^2 - 2*e*log(2) + 1)) - 2*e^(x^2*e^2*log(2)^2/(e^2*log(2)^2 - 2*e*log(2) +
 1) - 2*x^2*e^2*log(2)/(e^2*log(2)^2 - 2*e*log(2) + 1) - 2*x^2*e*log(2)/(e
^2*log(2)^2 - 2*e*log(2) + 1) + x^2*e^2/(e^2*log(2)^2 - 2*e*log(2) + 1) +
2*x^2*e/(e^2*log(2)^2 - 2*e*log(2) + 1) + x^2/(e^2*log(2)^2 - 2*e*log(2) +
 1) + 2)*log(2)/(e^2*log(2)^2/(e^2*log(2)^2 - 2*e*log(2) + 1) - 2*e^2*log(
2)/(e^2*log(2)^2 - 2*e*log(2) + 1) - 2*e*log(2)/(e^2*log(2)^2 - 2*e*log(2)
 + 1) + e^2/(e^2*log(2)^2 - 2*e*log(2) + 1) + 2*e/(e^2*log(2)^2 - 2*e*log(
2) + 1) + 1/(e^2*log(2)^2 - 2*e*log(2) + 1)) - 2*e^(x^2*e^2*log(2)^2/(e^2*
log(2)^2 - 2*e*log(2) + 1) - 2*x^2*e^2*log(2)/(e^2*log(2)^2 - 2*e*log(2) +
 1) - 2*x^2*e*log(2)/(e^2*log(2)^2 - 2*e*log(2) + 1) + x^2*e^2/(e^2*log(2)
^2 - 2*e*log(2) + 1) + 2*x^2*e/(e^2*log(2)^2 - 2*e*log(2) + 1) + x^2/(e^2*
log(2)^2 - 2*e*log(2) + 1) + 1)*log(2)/(e^2*log(2)^2/(e^2*log(2)^2 - 2*e*l
og(2) + 1) - 2*e^2*log(2)/(e^2*log(2)^2 - 2*e*log(2) + 1) - 2*e*log(2)/...
```

3.261.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 268 vs. $2(16) = 32$.

Time = 0.57 (sec) , antiderivative size = 268, normalized size of antiderivative = 14.89

$$\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx$$

$$= \frac{\left(e^4\log\left(2\right)^4-2\,e^4\log\left(2\right)^3-4\,e^3\log\left(2\right)^3+e^4\log\left(2\right)^2+6\,e^3\log\left(2\right)^2+6\,e^2\log\left(2\right)^2-2\,e^3\log\left(2\right)-6\,e^2\log}{\left(e^2\log\left(2\right)^2-2\,e^2\log\left(2\right)}$$

input
```
integrate((2*x*exp(1)^2*log(2)^2+(-4*x*exp(1)^2-4*x*exp(1))*log(2)+2*x*exp
(1)^2+4*x*exp(1)+2*x)*exp((x^2*exp(1)^2*log(2)^2+(-2*x^2*exp(1)^2-2*x^2*ex
p(1))*log(2)+x^2*exp(1)^2+2*x^2*exp(1)+x^2)/(exp(1)^2*log(2)^2-2*exp(1)*lo
g(2)+1))/(exp(1)^2*log(2)^2-2*exp(1)*log(2)+1),x, algorithm=\
```

output
```
(e^4*log(2)^4 - 2*e^4*log(2)^3 - 4*e^3*log(2)^3 + e^4*log(2)^2 + 6*e^3*log
(2)^2 + 6*e^2*log(2)^2 - 2*e^3*log(2) - 6*e^2*log(2) - 4*e*log(2) + e^2 +
2*e + 1)*e^(x^2*e^2*log(2)^2/(e^2*log(2)^2 - 2*e*log(2) + 1) - 2*x^2*e^2*l
og(2)/(e^2*log(2)^2 - 2*e*log(2) + 1) - 2*x^2*e*log(2)/(e^2*log(2)^2 - 2*e
*log(2) + 1) + x^2*e^2/(e^2*log(2)^2 - 2*e*log(2) + 1) + 2*x^2*e/(e^2*log(
2)^2 - 2*e*log(2) + 1) + x^2/(e^2*log(2)^2 - 2*e*log(2) + 1))/((e^2*log(2)
^2 - 2*e^2*log(2) - 2*e*log(2) + e^2 + 2*e + 1)*(e^2*log(2)^2 - 2*e*log(2)
 + 1))
```

3.261.9 Mupad [B] (verification not implemented)

Time = 13.69 (sec) , antiderivative size = 133, normalized size of antiderivative = 7.39

$$\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx$$

$$= {\left(\frac{1}{4}\right)}^{\frac{x^2\,\mathrm{e}+x^2\,{\mathrm{e}}^2}{{\mathrm{e}}^2\,{\ln\left(2\right)}^2-2\,\mathrm{e}\,\ln\left(2\right)+1}}\,{\mathrm{e}}^{\frac{x^2}{{\mathrm{e}}^2\,{\ln\left(2\right)}^2-2\,\mathrm{e}\,\ln\left(2\right)+1}}\,{\mathrm{e}}^{\frac{x^2\,{\mathrm{e}}^2\,{\ln\left(2\right)}^2}{{\mathrm{e}}^2\,{\ln\left(2\right)}^2-2\,\mathrm{e}\,\ln\left(2\right)+1}}\,{\mathrm{e}}^{\frac{x^2\,{\mathrm{e}}^2}{{\mathrm{e}}^2\,{\ln\left(2\right)}^2-2\,\mathrm{e}\,\ln\left(2\right)+1}}\,{\mathrm{e}}^{\frac{2\,x^2\,\mathrm{e}}{{\mathrm{e}}^2\,{\ln\left(2\right)}^2-2\,\mathrm{e}\,\ln\left(2\right)+1}}$$

input
```
int((exp((2*x^2*exp(1) - log(2)*(2*x^2*exp(1) + 2*x^2*exp(2)) + x^2*exp(2)
 + x^2 + x^2*exp(2)*log(2)^2)/(exp(2)*log(2)^2 - 2*exp(1)*log(2) + 1))*(2*
x + 4*x*exp(1) + 2*x*exp(2) - log(2)*(4*x*exp(1) + 4*x*exp(2)) + 2*x*exp(2
)*log(2)^2))/(exp(2)*log(2)^2 - 2*exp(1)*log(2) + 1),x)
```

output
```
(1/4)^((x^2*exp(1) + x^2*exp(2))/(exp(2)*log(2)^2 - 2*exp(1)*log(2) + 1))*
exp(x^2/(exp(2)*log(2)^2 - 2*exp(1)*log(2) + 1))*exp((x^2*exp(2)*log(2)^2)
/(exp(2)*log(2)^2 - 2*exp(1)*log(2) + 1))*exp((x^2*exp(2))/(exp(2)*log(2)^
2 - 2*exp(1)*log(2) + 1))*exp((2*x^2*exp(1))/(exp(2)*log(2)^2 - 2*exp(1)*l
og(2) + 1))
```

3.261. $$\int \frac{e^{\frac{x^2+2ex^2+e^2x^2+\left(-2ex^2-2e^2x^2\right)\log(2)+e^2x^2\log^2(2)}{1-2e\log(2)+e^2\log^2(2)}}\left(2x+4ex+2e^2x+\left(-4ex-4e^2x\right)\log(2)+2e^2x\log^2(2)\right)}{1-2e\log(2)+e^2\log^2(2)}\,dx$$

3.262 $\int \frac{240+e^{2-x}(60+60x)+e^x(240-30x+e^{2-x}(60+60x))+(15+15e^x)\log(1$

3.262.1 Optimal result

Integrand size = 72, antiderivative size = 25

$$\int \frac{240+e^{2-x}(60+60x)+e^x(240-30x+e^{2-x}(60+60x))+(15+15e^x)\log(1+2e^x+e^{2x})}{x^2+e^xx^2}\,dx$$
$$=-\frac{15(4(4+e^{2-x})+\log((1+e^x)^2))}{x}$$

output
```
-15*(4*exp(2-x)+16+ln((exp(x)+1)^2))/x
```

3.262.2 Mathematica [A] (verified)

Time = 5.11 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

$$\int \frac{240+e^{2-x}(60+60x)+e^x(240-30x+e^{2-x}(60+60x))+(15+15e^x)\log(1+2e^x+e^{2x})}{x^2+e^xx^2}\,dx$$
$$=\frac{15(2(-8-2e^{2-x}+x)-\log((1+e^x)^2))}{x}$$

input
```
Integrate[(240 + E^(2 - x)*(60 + 60*x) + E^x*(240 - 30*x + E^(2 - x)*(60 +
 60*x)) + (15 + 15*E^x)*Log[1 + 2*E^x + E^(2*x)])/(x^2 + E^x*x^2),x]
```

output
```
(15*(2*(-8 - 2*E^(2 - x) + x) - Log[(1 + E^x)^2]))/x
```

3.262.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2-x}(60x+60)+e^x\left(-30x+e^{2-x}(60x+60)+240\right)+(15e^x+15)\log\left(2e^x+e^{2x}+1\right)+240}{e^x x^2+x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{60e^{2-x}(x+1)}{x^2}-\frac{15\left(2x-\log\left((e^x+1)^2\right)-16\right)}{x^2}+\frac{30}{(e^x+1)x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$30\int \frac{1}{(1+e^x)x}dx+30\int \frac{e^x}{e^x x+x}dx-\frac{60e^{2-x}}{x}-\frac{240}{x}-\frac{15\log\left((e^x+1)^2\right)}{x}-30\log(x)$$

input
```
Int[(240 + E^(2 - x)*(60 + 60*x) + E^x*(240 - 30*x + E^(2 - x)*(60 + 60*x)
) + (15 + 15*E^x)*Log[1 + 2*E^x + E^(2*x)])/(x^2 + E^x*x^2),x]
```

output
```
$Aborted
```

3.262.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.262.4 Maple [A] (verified)

Time = 1.80 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

method	result
parallelrisch	$-\frac{480+120\,\mathrm{e}^{2-x}+30\ln\left(\mathrm{e}^{2x}+2\,\mathrm{e}^{x}+1\right)}{2x}$
norman	$\frac{\left(-15\ln\left(\mathrm{e}^{2x}+2\,\mathrm{e}^{x}+1\right)\mathrm{e}^{x}-60\,\mathrm{e}^{2}-240\,\mathrm{e}^{x}\right)\mathrm{e}^{-x}}{x}$
default	$\frac{\left(\left(-15\ln\left(\left(\mathrm{e}^{x}+1\right)^{2}\right)+30\ln\left(\mathrm{e}^{x}+1\right)-240\right)\mathrm{e}^{x}-30\,\mathrm{e}^{x}\ln\left(\mathrm{e}^{x}+1\right)-60\,\mathrm{e}^{2}\right)\mathrm{e}^{-x}}{x}$
risch	$-\frac{15\left(-i\,\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+1\right)^{2}\right)\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+1\right)\right)^{2}\pi+2i\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+1\right)^{2}\right)^{2}\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+1\right)\right)\pi-i\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+1\right)^{2}\right)^{3}\pi+8\,\mathrm{e}^{2-x}+32+4\ln(\mathrm{e}^{x}+\cdots}{2x}$

input
```
int(((15*exp(x)+15)*ln(exp(x)^2+2*exp(x)+1)+((60*x+60)*exp(2-x)-30*x+240)*
exp(x)+(60*x+60)*exp(2-x)+240)/(exp(x)*x^2+x^2),x,method=_RETURNVERBOSE)
```

output
```
-1/2*(480+120*exp(2-x)+30*ln(exp(x)^2+2*exp(x)+1))/x
```

3.262.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \frac{240+e^{2-x}(60+60x)+e^{x}(240-30x+e^{2-x}(60+60x))+(15+15e^{x})\log\left(1+2e^{x}+e^{2x}\right)}{x^{2}+e^{x}x^{2}}\,dx$$
$$=-\frac{15\left(e^{x}\log\left(e^{(2x)}+2e^{x}+1\right)+4e^{2}+16e^{x}\right)e^{(-x)}}{x}$$

input
```
integrate(((15*exp(x)+15)*log(exp(x)^2+2*exp(x)+1)+((60*x+60)*exp(2-x)-30*
x+240)*exp(x)+(60*x+60)*exp(2-x)+240)/(exp(x)*x^2+x^2),x, algorithm=\
```

output
```
-15*(e^x*log(e^(2*x) + 2*e^x + 1) + 4*e^2 + 16*e^x)*e^(-x)/x
```

3.262.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

$$\int \frac{240+e^{2-x}(60+60x)+e^{x}(240-30x+e^{2-x}(60+60x))+(15+15e^{x})\log\left(1+2e^{x}+e^{2x}\right)}{x^{2}+e^{x}x^{2}}\,dx$$
$$=-\frac{15\log\left(e^{2x}+2e^{x}+1\right)}{x}-\frac{240}{x}-\frac{60e^{2}e^{-x}}{x}$$

input
```
integrate(((15*exp(x)+15)*ln(exp(x)**2+2*exp(x)+1)+((60*x+60)*exp(2-x)-30*
x+240)*exp(x)+(60*x+60)*exp(2-x)+240)/(exp(x)*x**2+x**2),x)
```

output
```
-15*log(exp(2*x) + 2*exp(x) + 1)/x - 240/x - 60*exp(2)*exp(-x)/x
```

3.262.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{240+e^{2-x}(60+60x)+e^x(240-30x+e^{2-x}(60+60x))+(15+15e^x)\log(1+2e^x+e^{2x})}{x^2+e^xx^2}\,dx = -\frac{30\left(2\,e^{(-x+2)}+\log(e^x+1)+8\right)}{x}$$

input
```
integrate(((15*exp(x)+15)*log(exp(x)^2+2*exp(x)+1)+((60*x+60)*exp(2-x)-30*
x+240)*exp(x)+(60*x+60)*exp(2-x)+240)/(exp(x)*x^2+x^2),x, algorithm=\
```

output
```
-30*(2*e^(-x + 2) + log(e^x + 1) + 8)/x
```

3.262.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{240+e^{2-x}(60+60x)+e^x(240-30x+e^{2-x}(60+60x))+(15+15e^x)\log(1+2e^x+e^{2x})}{x^2+e^xx^2}\,dx = -\frac{30\,(e^x\log(e^x+1)+2\,e^2+8\,e^x)e^{(-x)}}{x}$$

input
```
integrate(((15*exp(x)+15)*log(exp(x)^2+2*exp(x)+1)+((60*x+60)*exp(2-x)-30*
x+240)*exp(x)+(60*x+60)*exp(2-x)+240)/(exp(x)*x^2+x^2),x, algorithm=\
```

output
```
-30*(e^x*log(e^x + 1) + 2*e^2 + 8*e^x)*e^(-x)/x
```

3.262.9 Mupad [B] (verification not implemented)

Time = 0.46 (sec) , antiderivative size = 102, normalized size of antiderivative = 4.08

$$\int \frac{240+e^{2-x}(60+60x)+e^x(240-30x+e^{2-x}(60+60x))+(15+15e^x)\log(1+2e^x+e^{2x})}{x^2+e^xx^2}\,dx$$
$$= -\frac{240\,\mathrm{e}^{3\,x}+60\,\mathrm{e}^2+\mathrm{e}^x\,(120\,\mathrm{e}^2+240)+15\,\ln(\mathrm{e}^{2\,x}+2\,\mathrm{e}^x+1)\,\mathrm{e}^x+\mathrm{e}^{2\,x}\,(60\,\mathrm{e}^2+480)+30\,\ln(\mathrm{e}^{2\,x}+2\,\mathrm{e}^x+}{2\,x\,\mathrm{e}^{2\,x}+x\,\mathrm{e}^{3\,x}+x\,\mathrm{e}^x}$$

input
```
int((exp(2 - x)*(60*x + 60) + log(exp(2*x) + 2*exp(x) + 1)*(15*exp(x) + 15
) + exp(x)*(exp(2 - x)*(60*x + 60) - 30*x + 240) + 240)/(x^2*exp(x) + x^2)
,x)
```

output
```
-(240*exp(3*x) + 60*exp(2) + exp(x)*(120*exp(2) + 240) + 15*log(exp(2*x) +
 2*exp(x) + 1)*exp(x) + exp(2*x)*(60*exp(2) + 480) + 30*log(exp(2*x) + 2*e
xp(x) + 1)*exp(2*x) + 15*log(exp(2*x) + 2*exp(x) + 1)*exp(3*x))/(2*x*exp(2
*x) + x*exp(3*x) + x*exp(x))
```

3.263 $\int \frac{1}{3}(1-6x)\,dx$

3.263.1 Optimal result

Integrand size = 9, antiderivative size = 30

$$\int \frac{1}{3}(1-6x)\,dx = 5-x^2+\frac{1}{3}\left(x+\log\left(5+e^2\right)-\log\left(\frac{e^2}{\log(2)}\right)\right)$$

output
```
5+1/3*x-1/3*ln(exp(2)/ln(2))+1/3*ln(exp(2)+5)-x^2
```

3.263.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.37

$$\int \frac{1}{3}(1-6x)\,dx = \frac{x}{3}-x^2$$

input
```
Integrate[(1 - 6*x)/3,x]
```

output
```
x/3 - x^2
```

3.263.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.37, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{3}(1-6x)\,dx$$

$$\Big\downarrow \; 17$$

$$-\frac{1}{36}(1-6x)^2$$

input
```
Int[(1 - 6*x)/3,x]
```

output
```
-1/36*(1 - 6*x)^2
```

3.263.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.263.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.30

method	result	size
gosper	$-\frac{x(-1+3x)}{3}$	9
default	$\frac{1}{3}x-x^2$	10
norman	$\frac{1}{3}x-x^2$	10
risch	$\frac{1}{3}x-x^2$	10
parallelrisch	$\frac{1}{3}x-x^2$	10
parts	$\frac{1}{3}x-x^2$	10

input
```
int(1/3-2*x,x,method=_RETURNVERBOSE)
```

output
```
-1/3*x*(-1+3*x)
```

3.263.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.30

$$\int \frac{1}{3}(1-6x)\,dx = -x^2 + \frac{1}{3}\,x$$

input
```
integrate(1/3-2*x,x, algorithm=\
```

output
```
-x^2 + 1/3*x
```

3.263.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.17

$$\int \frac{1}{3}(1-6x)\,dx = -x^2 + \frac{x}{3}$$

input
```
integrate(1/3-2*x,x)
```

output
```
-x**2 + x/3
```

3.263.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.30

$$\int \frac{1}{3}(1-6x)\,dx = -x^2 + \frac{1}{3}\,x$$

input
```
integrate(1/3-2*x,x, algorithm=\
```

output
```
-x^2 + 1/3*x
```

3.263.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.30

$$\int \frac{1}{3}(1-6x)\,dx = -x^2 + \frac{1}{3}\,x$$

input
```
integrate(1/3-2*x,x, algorithm=\
```

output
```
-x^2 + 1/3*x
```

3.263.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.27

$$\int \frac{1}{3}(1-6x)\,dx = -\frac{x\,(3\,x-1)}{3}$$

input
```
int(1/3 - 2*x,x)
```

output
```
-(x*(3*x - 1))/3
```

3.264 $\int \frac{e^{-2x}(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+45$

3.264.1 Optimal result

Integrand size = 130, antiderivative size = 28

$$\int \frac{e^{-2x}(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2}{1000x^3}$$
$$=25\left(\frac{2}{x(10+x)}+3\left(x-e^{-x}\log(4)\right)\right)^2$$

output
```
5*(3*x-6*ln(2)/exp(x)+2/x/(x+10))*(15*x-30*ln(2)/exp(x)+10/x/(x+10))
```

3.264.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{e^{-2x}(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2}{1000x^3}$$
$$=\frac{25e^{-2x}(e^x(2+30x^2+3x^3)-3x(10+x)\log(4))^2}{x^2(10+x)^2}$$

input
```
Integrate[(E^(2*x)*(-2000 - 400*x - 3000*x^3 + 449700*x^4 + 135000*x^5 + 1
3500*x^6 + 450*x^7) + E^x*(30000*x + 39000*x^2 - 443400*x^3 + 315300*x^4 +
 121500*x^5 + 13050*x^6 + 450*x^7)*Log[4] + (-450000*x^3 - 135000*x^4 - 13
500*x^5 - 450*x^6)*Log[4]^2)/(E^(2*x)*(1000*x^3 + 300*x^4 + 30*x^5 + x^6))
,x]
```

output
```
(25*(E^x*(2 + 30*x^2 + 3*x^3) - 3*x*(10 + x)*Log[4])^2)/(E^(2*x)*x^2*(10 +
 x)^2)
```

3.264.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 77 vs. $2(28) = 56$.

Time = 1.62 (sec) , antiderivative size = 77, normalized size of antiderivative = 2.75, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.031$, Rules used = {2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-2x}\left(\left(-450x^6-13500x^5-135000x^4-450000x^3\right)\log^2(4)+e^{2x}\left(450x^7+13500x^6+135000x^5+449700x^4-\right.\right.}{x^6+30x^5+}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{-2x}\left(\left(-450x^6-13500x^5-135000x^4-450000x^3\right)\log^2(4)+e^{2x}\left(450x^7+13500x^6+135000x^5+449700x^4-\right.\right.}{x^3\left(x^3+30x^2\right.}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{e^{-2x}\left(\left(-450x^6-13500x^5-135000x^4-450000x^3\right)\log^2(4)+e^{2x}\left(450x^7+13500x^6+135000x^5+449700x^4-\right.\right.}{x^3(x}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{50\left(3x^3+30x^2+2\right)\left(3x^4+60x^3+300x^2-4x-20\right)}{x^3(x+10)^3}+\frac{150e^{-x}\left(3x^5+57x^4+240x^3-298x^2+24x+20\right)\log}{x^2(x+10)^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$225x^2+\frac{1}{x^2}+\frac{1501}{5(x+10)}+\frac{1}{(x+10)^2}-\frac{1}{5x}+225e^{-2x}\log^2(4)-450e^{-x}x\log(4)+\frac{30e^{-x}\log(4)}{x+10}-\frac{30e^{-x}\log(4)}{x}$$

$\int \frac{e^{-2x}\left(e^{2x}\left(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7\right)+e^x\left(30000x+39000x^2-443400x^3+315300x^4+121500x^5+13050x^6+45\right.\right.}{1000x^3+300x^4+30x^5+x^6}$

input
```
Int[(E^(2*x)*(-2000 - 400*x - 3000*x^3 + 449700*x^4 + 135000*x^5 + 13500*x
^6 + 450*x^7) + E^x*(30000*x + 39000*x^2 - 443400*x^3 + 315300*x^4 + 12150
0*x^5 + 13050*x^6 + 450*x^7)*Log[4] + (-450000*x^3 - 135000*x^4 - 13500*x^
5 - 450*x^6)*Log[4]^2)/(E^(2*x)*(1000*x^3 + 300*x^4 + 30*x^5 + x^6)),x]
```

output
```
x^(-2) - 1/(5*x) + 225*x^2 + (10 + x)^(-2) + 1501/(5*(10 + x)) - (30*Log[4
])/(E^x*x) - (450*x*Log[4])/E^x + (30*Log[4])/(E^x*(10 + x)) + (225*Log[4]
^2)/E^(2*x)
```

3.264.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.264.

$\int \frac{e^{-2x}\left(e^{2x}\left(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7\right)+e^x\left(30000x+39000x^2-443400x^3+315300x^4+121500x^5+13050x^6+45\right.\right.}{1000x^3+300x^4+30x^5+x^6}$

3.264.4 Maple [A] (verified)

Time = 0.87 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.21

method	result
parts	$900\ln(2)^2 \mathrm{e}^{-2x} + \frac{1}{(x+10)^2} + \frac{1501}{5(x+10)} + \frac{1}{x^2} - \frac{1}{5x} + 225x^2 - \frac{600\ln(2)\mathrm{e}^{-x}}{(x+10)x} - 900\ln(2)\mathrm{e}^{-x}x$
risch	$225x^2 + \frac{300x^3+3000x^2+100}{x^2(x^2+20x+100)} - \frac{300\ln(2)(3x^3+30x^2+2)\mathrm{e}^{-x}}{x(x+10)} + 900\ln(2)^2 \mathrm{e}^{-2x}$
norman	$\frac{(-2247000\,\mathrm{e}^{2x}x^2-449700\,\mathrm{e}^{2x}x^3+100\,\mathrm{e}^{2x}+90000x^2\ln(2)^2+18000x^3\ln(2)^2+900x^4\ln(2)^2+4500x^5\mathrm{e}^{2x}+225\,\mathrm{e}^{2x}x^6-6000x\ln(2}{x^2(x+10)^2}$
parallelrisch	$\frac{(-2247000\,\mathrm{e}^{2x}x^2-449700\,\mathrm{e}^{2x}x^3+100\,\mathrm{e}^{2x}+90000x^2\ln(2)^2+18000x^3\ln(2)^2+900x^4\ln(2)^2+4500x^5\mathrm{e}^{2x}+225\,\mathrm{e}^{2x}x^6-6000x\ln(2}{x^2(x^2+20x+100)}$
default	$\frac{1}{(x+10)^2} + \frac{1501}{5(x+10)} + \frac{1}{x^2} - \frac{1}{5x} + 225x^2 - 1800000\ln(2)^2\left(\frac{\mathrm{e}^{-2x}(2x+19)}{2x^2+40x+200} - 2\,\mathrm{e}^{20}\,\mathrm{Ei}_1(2x+20)\right) -$

input
```
int(((450*x^7+13500*x^6+135000*x^5+449700*x^4-3000*x^3-400*x-2000)*exp(x)^
2+2*(450*x^7+13050*x^6+121500*x^5+315300*x^4-443400*x^3+39000*x^2+30000*x)
*ln(2)*exp(x)+4*(-450*x^6-13500*x^5-135000*x^4-450000*x^3)*ln(2)^2)/(x^6+3
0*x^5+300*x^4+1000*x^3)/exp(x)^2,x,method=_RETURNVERBOSE)
```

output
```
900*ln(2)^2/exp(x)^2+1/(x+10)^2+1501/5/(x+10)+1/x^2-1/5/x+225*x^2-600*ln(2
)*exp(-x)/(x+10)/x-900*ln(2)*exp(-x)*x
```

3.264.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 106 vs. 2(26) = 52.

Time = 0.27 (sec) , antiderivative size = 106, normalized size of antiderivative = 3.79

$$\int \frac{e^{-2x}\left(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2}{1000x^3}$$
$$= -\frac{25\left(12\,(3\,x^5+60\,x^4+300\,x^3+2\,x^2+20\,x)e^x\log(2)-36\,(x^4+20\,x^3+100\,x^2)\log(2)^2-(9\,x^6+180\,x}{x^4+20\,x^3+100\,x^2}$$

input
```
integrate(((450*x^7+13500*x^6+135000*x^5+449700*x^4-3000*x^3-400*x-2000)*e
xp(x)^2+2*(450*x^7+13050*x^6+121500*x^5+315300*x^4-443400*x^3+39000*x^2+30
000*x)*log(2)*exp(x)+4*(-450*x^6-13500*x^5-135000*x^4-450000*x^3)*log(2)^2
)/(x^6+30*x^5+300*x^4+1000*x^3)/exp(x)^2,x, algorithm=\
```

3.264. $\int \frac{e^{-2x}\left(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2-443400x^3+315300x^4+121500x^5+13050x^6+45}{1000x^3+300x^4+30x^5+x^6}$

output
```
-25*(12*(3*x^5 + 60*x^4 + 300*x^3 + 2*x^2 + 20*x)*e^x*log(2) - 36*(x^4 + 2
0*x^3 + 100*x^2)*log(2)^2 - (9*x^6 + 180*x^5 + 900*x^4 + 12*x^3 + 120*x^2
+ 4)*e^(2*x))*e^(-2*x)/(x^4 + 20*x^3 + 100*x^2)
```

3.264.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 87 vs. $2(19) = 38$.

Time = 0.15 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.11

$$\int \frac{e^{-2x}\left(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2\cdots\right.}{1000x^3\cdots}$$

$$= 225x^2 + \frac{300x^3+3000x^2+100}{x^4+20x^3+100x^2} + \frac{\left(900x^2\log(2)^2+9000x\log(2)^2\right)e^{-2x}+\left(-900x^3\log(2)-9000x^2\log(2)-600\log(2)\right)e^{-x}}{x^2+10x}$$

input
```
integrate(((450*x**7+13500*x**6+135000*x**5+449700*x**4-3000*x**3-400*x-20
00)*exp(x)**2+2*(450*x**7+13050*x**6+121500*x**5+315300*x**4-443400*x**3+3
9000*x**2+30000*x)*ln(2)*exp(x)+4*(-450*x**6-13500*x**5-135000*x**4-450000
*x**3)*ln(2)**2)/(x**6+30*x**5+300*x**4+1000*x**3)/exp(x)**2,x)
```

output
```
225*x**2 + (300*x**3 + 3000*x**2 + 100)/(x**4 + 20*x**3 + 100*x**2) + ((90
0*x**2*log(2)**2 + 9000*x*log(2)**2)*exp(-2*x) + (-900*x**3*log(2) - 9000*
x**2*log(2) - 600*log(2))*exp(-x))/(x**2 + 10*x)
```

3.264.7 Maxima [F]

$$\int \frac{e^{-2x}\left(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2\cdots\right.}{1000x^3\cdots}$$

$$= \int \frac{50\left(6\left(3x^7+87x^6+810x^5+2102x^4-2956x^3+260x^2+200x\right)e^x\log(2)-36\left(x^6+30x^5+300x^4\cdots\right.\right.}{x^6+30x^5+300x^4+\cdots}$$

input
```
integrate(((450*x^7+13500*x^6+135000*x^5+449700*x^4-3000*x^3-400*x-2000)*e
xp(x)^2+2*(450*x^7+13050*x^6+121500*x^5+315300*x^4-443400*x^3+39000*x^2+30
000*x)*log(2)*exp(x)+4*(-450*x^6-13500*x^5-135000*x^4-450000*x^3)*log(2)^2
)/(x^6+30*x^5+300*x^4+1000*x^3)/exp(x)^2,x, algorithm=\
```

3.264. $\int \frac{e^{-2x}\left(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2-443400x^3+315300x^4+121500x^5+13050x^6+45\cdots\right.}{1000x^3+300x^4+30x^5+x^6}$

output
```
-2700000*integrate(e^(-2*x)/(x^4 + 40*x^3 + 600*x^2 + 4000*x + 10000), x)*
log(2)^2 + 1800000*e^20*exp_integral_e(3, 2*x + 20)*log(2)^2/(x + 10)^2 +
25*(9*x^7 + 270*x^6 + 2700*x^5 + 9012*x^4 + 240*x^3 + 1200*x^2 - 12*(3*x^6
*log(2) + 90*x^5*log(2) + 900*x^4*log(2) + 3002*x^3*log(2) + 40*x^2*log(2)
 + 200*x*log(2))*e^(-x) + 36*(x^5*log(2)^2 + 30*x^4*log(2)^2 + 300*x^3*log
(2)^2)*e^(-2*x) + 4*x + 40)/(x^5 + 30*x^4 + 300*x^3 + 1000*x^2)
```

3.264.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 137 vs. $2(26) = 52$.

Time = 0.27 (sec) , antiderivative size = 137, normalized size of antiderivative = 4.89

$$\int \frac{e^{-2x}\left(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2\right.}{1000x^3}$$
$$= -\frac{25\left(36\,x^5e^{(-x)}\log(2)-36\,x^4e^{(-2\,x)}\log(2)^2-9\,x^6+720\,x^4e^{(-x)}\log(2)-720\,x^3e^{(-2\,x)}\log(2)^2-180\,x^5\right.}{x^4}$$

input
```
integrate(((450*x^7+13500*x^6+135000*x^5+449700*x^4-3000*x^3-400*x-2000)*e
xp(x)^2+2*(450*x^7+13050*x^6+121500*x^5+315300*x^4-443400*x^3+39000*x^2+30
000*x)*log(2)*exp(x)+4*(-450*x^6-13500*x^5-135000*x^4-450000*x^3)*log(2)^2
)/(x^6+30*x^5+300*x^4+1000*x^3)/exp(x)^2,x, algorithm=\
```

output
```
-25*(36*x^5*e^(-x)*log(2) - 36*x^4*e^(-2*x)*log(2)^2 - 9*x^6 + 720*x^4*e^(
-x)*log(2) - 720*x^3*e^(-2*x)*log(2)^2 - 180*x^5 + 3600*x^3*e^(-x)*log(2)
- 3600*x^2*e^(-2*x)*log(2)^2 - 900*x^4 + 24*x^2*e^(-x)*log(2) - 12*x^3 + 2
40*x*e^(-x)*log(2) - 120*x^2 - 4)/(x^4 + 20*x^3 + 100*x^2)
```

3.264.9 Mupad [B] (verification not implemented)

Time = 14.40 (sec) , antiderivative size = 79, normalized size of antiderivative = 2.82

$$\int \frac{e^{-2x}\left(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2\right.}{1000x^3}$$
$$= \frac{300\,x^3+3000\,x^2+100}{x^4+20\,x^3+100\,x^2}+900\,\mathrm{e}^{-2\,x}\,\ln(2)^2+225\,x^2 - \frac{\mathrm{e}^{-x}\,\left(900\,\ln(2)\,x^3+9000\,\ln(2)\,x^2+600\,\ln(2)\right)}{x^2+10\,x}$$

3.264.
$$\int \frac{e^{-2x}\left(e^{2x}(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7)+e^x(30000x+39000x^2-443400x^3+315300x^4+121500x^5+13050x^6+45\right.}{1000x^3+300x^4+30x^5+x^6}$$

input
```
int((exp(-2*x)*(exp(2*x)*(449700*x^4 - 3000*x^3 - 400*x + 135000*x^5 + 135
00*x^6 + 450*x^7 - 2000) - 4*log(2)^2*(450000*x^3 + 135000*x^4 + 13500*x^5
 + 450*x^6) + 2*exp(x)*log(2)*(30000*x + 39000*x^2 - 443400*x^3 + 315300*x
^4 + 121500*x^5 + 13050*x^6 + 450*x^7)))/(1000*x^3 + 300*x^4 + 30*x^5 + x^
6),x)
```

output
```
(3000*x^2 + 300*x^3 + 100)/(100*x^2 + 20*x^3 + x^4) + 900*exp(-2*x)*log(2)
^2 + 225*x^2 - (exp(-x)*(600*log(2) + 9000*x^2*log(2) + 900*x^3*log(2)))/(
10*x + x^2)
```

3.264.

$$\int \frac{e^{-2x}\left(e^{2x}\left(-2000-400x-3000x^3+449700x^4+135000x^5+13500x^6+450x^7\right)+e^x\left(30000x+39000x^2-443400x^3+315300x^4+121500x^5+13050x^6+45\right.\right.}{1000x^3+300x^4+30x^5+x^6}$$

3.265 $\int \frac{e^6+e^3(5x+x^2)+(-e^6+e^3(-10x-3x^2))\log(x)}{e^6x^2+25x^4+10x^5+x^6+e^3(10x^3+2x^4)}\,dx$

3.265.1 Optimal result

Integrand size = 76, antiderivative size = 17

$$\int \frac{e^6+e^3(5x+x^2)+(-e^6+e^3(-10x-3x^2))\log(x)}{e^6x^2+25x^4+10x^5+x^6+e^3\left(10x^3+2x^4\right)}\,dx=\frac{\log(x)}{x+\frac{x^2(5+x)}{e^3}}$$

output
```
ln(x)/(x+(5+x)*x^2/exp(3))
```

3.265.2 Mathematica [A] (verified)

Time = 0.47 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int \frac{e^6+e^3(5x+x^2)+(-e^6+e^3(-10x-3x^2))\log(x)}{e^6x^2+25x^4+10x^5+x^6+e^3\left(10x^3+2x^4\right)}\,dx=\frac{e^3\log(x)}{x\left(e^3+5x+x^2\right)}$$

input
```
Integrate[(E^6 + E^3*(5*x + x^2) + (-E^6 + E^3*(-10*x - 3*x^2))*Log[x])/(E
^6*x^2 + 25*x^4 + 10*x^5 + x^6 + E^3*(10*x^3 + 2*x^4)),x]
```

output
```
(E^3*Log[x])/(x*(E^3 + 5*x + x^2))
```

3.265.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 4.88 (sec) , antiderivative size = 1467, normalized size of antiderivative = 86.29, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.039, Rules used = {2026, 2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^3(x^2+5x)+(e^3(-3x^2-10x)-e^6)\log(x)+e^6}{x^6+10x^5+25x^4+e^6x^2+e^3(2x^4+10x^3)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^3(x^2+5x)+(e^3(-3x^2-10x)-e^6)\log(x)+e^6}{x^2(x^4+10x^3+(25+2e^3)x^2+10e^3x+e^6)}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{4i(e^3(x^2+5x)+(e^3(-3x^2-10x)-e^6)\log(x)+e^6)}{(4e^3-25)^{3/2}x^2\left(2x+i\sqrt{4e^3-25}+5\right)}+\frac{4i(e^3(x^2+5x)+(e^3(-3x^2-10x)-e^6)\log(x)+e^6)}{(4e^3-25)^{3/2}\left(-2x+i\sqrt{4e^3-25}-5\right)x^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{4e^3\left(25i-2ie^3+5\sqrt{-25+4e^3}\right)\log^2(x)}{(25-4e^3)\left(5i+\sqrt{-25+4e^3}\right)^3}-\frac{4e^3\left(25i-ie^3+5\sqrt{-25+4e^3}\right)\log^2(x)}{(-25+4e^3)^{3/2}\left(5i+\sqrt{-25+4e^3}\right)^2}+$$

$$\frac{4e^3\left(i(25-e^3)-5\sqrt{-25+4e^3}\right)\log^2(x)}{(-25+4e^3)^{3/2}\left(5i-\sqrt{-25+4e^3}\right)^2}+\frac{4e^3\left(25i-2ie^3-5\sqrt{-25+4e^3}\right)\log^2(x)}{(25-4e^3)\left(5i-\sqrt{-25+4e^3}\right)^3}-$$

$$\frac{8e^3\left(25-4e^3+5i\sqrt{-25+4e^3}\right)x\log(x)}{(25-4e^3)\left(5i-\sqrt{-25+4e^3}\right)^3\left(2ix-\sqrt{-25+4e^3}+5i\right)}-$$

$$\frac{8e^3\left(25-4e^3-5i\sqrt{-25+4e^3}\right)x\log(x)}{(25-4e^3)\left(5i+\sqrt{-25+4e^3}\right)^3\left(2ix+\sqrt{-25+4e^3}+5i\right)}-$$

$$\frac{4e^3\left(25i-4ie^3+5\sqrt{-25+4e^3}\right)\log\left(\frac{2x}{5-i\sqrt{-25+4e^3}}+1\right)\log(x)}{(-25+4e^3)^{3/2}\left(5i+\sqrt{-25+4e^3}\right)^2}-$$

$$\frac{8e^3\left(25i-2ie^3+5\sqrt{-25+4e^3}\right)\log\left(\frac{2x}{5-i\sqrt{-25+4e^3}}+1\right)\log(x)}{(25-4e^3)\left(5i+\sqrt{-25+4e^3}\right)^3}+$$

$$\frac{4e^3\left(25i-4ie^3-5\sqrt{-25+4e^3}\right)\log\left(\frac{2x}{5+i\sqrt{-25+4e^3}}+1\right)\log(x)}{(-25+4e^3)^{3/2}\left(5i-\sqrt{-25+4e^3}\right)^2}-$$

$$\frac{8e^3\left(25i-2ie^3-5\sqrt{-25+4e^3}\right)\log\left(\frac{2x}{5+i\sqrt{-25+4e^3}}+1\right)\log(x)}{(25-4e^3)\left(5i-\sqrt{-25+4e^3}\right)^3}+$$

$$\frac{4e^6\log(x)}{(-25+4e^3)^{3/2}\left(5i+\sqrt{-25+4e^3}\right)x}-\frac{4e^6\log(x)}{(25-4e^3)\left(5i+\sqrt{-25+4e^3}\right)^2x}-$$

$$\frac{4e^6\log(x)}{(-25+4e^3)^{3/2}\left(5i-\sqrt{-25+4e^3}\right)x}-\frac{4e^6\log(x)}{(25-4e^3)\left(5i-\sqrt{-25+4e^3}\right)^2x}+$$

$$\frac{4e^3\left(4ie^3-5\left(5i+\sqrt{-25+4e^3}\right)\right)\log(x)}{(25-4e^3)\left(5i+\sqrt{-25+4e^3}\right)^3}-\frac{4e^3\left(25i-4ie^3-5\sqrt{-25+4e^3}\right)\log(x)}{(25-4e^3)\left(5i-\sqrt{-25+4e^3}\right)^3}-$$

$$\frac{4e^3\left(25i-4ie^3+5\sqrt{-25+4e^3}\right)\log\left(2ix+\sqrt{-25+4e^3}+5i\right)}{(25-4e^3)\left(5i+\sqrt{-25+4e^3}\right)^3}+$$

$$\frac{4ie^3\log\left(2ix+\sqrt{-25+4e^3}+5i\right)}{\sqrt{-25+4e^3}\left(5i+\sqrt{-25+4e^3}\right)^2}-$$

$$\frac{4e^3\left(25i-4ie^3+5\sqrt{-25+4e^3}\right)\operatorname{PolyLog}\left(2,-\frac{2x}{5-i\sqrt{-25+4e^3}}\right)}{(-25+4e^3)^{3/2}\left(5i+\sqrt{-25+4e^3}\right)^2}-$$

$$\frac{8e^3\left(25i-2ie^3+5\sqrt{-25+4e^3}\right)\operatorname{PolyLog}\left(2,-\frac{2x}{5-i\sqrt{-25+4e^3}}\right)}{(25-4e^3)\left(5i+\sqrt{-25+4e^3}\right)^3}+$$

$$\frac{4e^3\left(25i-4ie^3-5\sqrt{-25+4e^3}\right)\operatorname{PolyLog}\left(2,-\frac{2x}{5+i\sqrt{-25+4e^3}}\right)}{(-25+4e^3)^{3/2}\left(5i-\sqrt{-25+4e^3}\right)^2}-$$

3.265. $\int \frac{e^6+e^3(5x+x^2)+(-e^6+e^3(-10x-3x^2))\log(x)}{e^6x^4+25x^2+10x^3+x^4+e^3(-10x^3-2x^4)}\,dx$

input
```
Int[(E^6 + E^3*(5*x + x^2) + (-E^6 + E^3*(-10*x - 3*x^2))*Log[x])/(E^6*x^2
 + 25*x^4 + 10*x^5 + x^6 + E^3*(10*x^3 + 2*x^4)),x]
```

output
```
((4*I)*E^3*Log[5*I + Sqrt[-25 + 4*E^3] + (2*I)*x])/(Sqrt[-25 + 4*E^3]*(5*I
 + Sqrt[-25 + 4*E^3])^2) - (4*E^3*(25*I - (4*I)*E^3 + 5*Sqrt[-25 + 4*E^3])
*Log[5*I + Sqrt[-25 + 4*E^3] + (2*I)*x])/((25 - 4*E^3)*(5*I + Sqrt[-25 + 4
*E^3])^3) - (4*E^3*(25*I - (4*I)*E^3 - 5*Sqrt[-25 + 4*E^3])*Log[x])/((25 -
 4*E^3)*(5*I - Sqrt[-25 + 4*E^3])^3) + (4*E^3*((4*I)*E^3 - 5*(5*I + Sqrt[-
25 + 4*E^3]))*Log[x])/((25 - 4*E^3)*(5*I + Sqrt[-25 + 4*E^3])^3) - (4*E^6*
Log[x])/((25 - 4*E^3)*(5*I - Sqrt[-25 + 4*E^3])^2*x) - (4*E^6*Log[x])/((-2
5 + 4*E^3)^(3/2)*(5*I - Sqrt[-25 + 4*E^3])*x) - (4*E^6*Log[x])/((25 - 4*E^
3)*(5*I + Sqrt[-25 + 4*E^3])^2*x) + (4*E^6*Log[x])/((-25 + 4*E^3)^(3/2)*(5
*I + Sqrt[-25 + 4*E^3])*x) - (8*E^3*(25 - 4*E^3 + (5*I)*Sqrt[-25 + 4*E^3])
*x*Log[x])/((25 - 4*E^3)*(5*I - Sqrt[-25 + 4*E^3])^3*(5*I - Sqrt[-25 + 4*E
^3] + (2*I)*x)) - (8*E^3*(25 - 4*E^3 - (5*I)*Sqrt[-25 + 4*E^3])*x*Log[x])/
((25 - 4*E^3)*(5*I + Sqrt[-25 + 4*E^3])^3*(5*I + Sqrt[-25 + 4*E^3] + (2*I)
*x)) + (4*E^3*(25*I - (2*I)*E^3 - 5*Sqrt[-25 + 4*E^3])*Log[x]^2)/((25 - 4*
E^3)*(5*I - Sqrt[-25 + 4*E^3])^3) + (4*E^3*(I*(25 - E^3) - 5*Sqrt[-25 + 4*
E^3])*Log[x]^2)/((-25 + 4*E^3)^(3/2)*(5*I - Sqrt[-25 + 4*E^3])^2) - (4*E^3
*(25*I - I*E^3 + 5*Sqrt[-25 + 4*E^3])*Log[x]^2)/((-25 + 4*E^3)^(3/2)*(5*I
+ Sqrt[-25 + 4*E^3])^2) + (4*E^3*(25*I - (2*I)*E^3 + 5*Sqrt[-25 + 4*E^3])*
Log[x]^2)/((25 - 4*E^3)*(5*I + Sqrt[-25 + 4*E^3])^3) - (8*E^3*(25*I - (2*I
)*E^3 + 5*Sqrt[-25 + 4*E^3])*Log[x]*Log[1 + (2*x)/(5 - I*Sqrt[-25 + 4*E...
```

3.265.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.265. $\int \frac{e^6+e^3(5x+x^2)+(-e^6+e^3(-10x-3x^2))\log(x)}{e^6x^2+25x^4+10x^5+x^6+e^3(10x^3+2x^4)}\,dx$

3.265.4 Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

method	result
norman	$\frac{\ln(x)e^{3}}{x(x^{2}+e^{3}+5x)}$
risch	$\frac{\ln(x)e^{3}}{x(x^{2}+e^{3}+5x)}$
parallelrisch	$\frac{\ln(x)e^{3}}{x(x^{2}+e^{3}+5x)}$
default	$e^{3}\left(-5\,e^{-6}\ln\left(x\right)-\frac{e^{-6}e^{3}}{x}-e^{-6}\left(-\frac{5\ln(x^{2}+e^{3}+5x)}{2}+\frac{2(-\frac{25}{2}+e^{3})\arctan\left(\frac{5+2x}{\sqrt{4\,e^{3}-25}}\right)}{\sqrt{4\,e^{3}-25}}\right)\right)-e^{3}\left(-\frac{e^{-12}(}{}\right.$
parts	$e^{3}\left(-5\,e^{-6}\ln\left(x\right)-\frac{e^{-6}e^{3}}{x}-e^{-6}\left(-\frac{5\ln(x^{2}+e^{3}+5x)}{2}+\frac{2(-\frac{25}{2}+e^{3})\arctan\left(\frac{5+2x}{\sqrt{4\,e^{3}-25}}\right)}{\sqrt{4\,e^{3}-25}}\right)\right)-e^{3}\left(-\frac{e^{-12}(}{}\right.$

input
```
int(((-exp(3)^2+(-3*x^2-10*x)*exp(3))*ln(x)+exp(3)^2+(x^2+5*x)*exp(3))/(x^
2*exp(3)^2+(2*x^4+10*x^3)*exp(3)+x^6+10*x^5+25*x^4),x,method=_RETURNVERBOS
E)
```

output
```
ln(x)*exp(3)/x/(x^2+exp(3)+5*x)
```

3.265.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

$$\int \frac{e^{6}+e^{3}(5x+x^{2})+(-e^{6}+e^{3}(-10x-3x^{2}))\log(x)}{e^{6}x^{2}+25x^{4}+10x^{5}+x^{6}+e^{3}\left(10x^{3}+2x^{4}\right)}\,dx=\frac{e^{3}\log\left(x\right)}{x^{3}+5\,x^{2}+xe^{3}}$$

input
```
integrate(((-exp(3)^2+(-3*x^2-10*x)*exp(3))*log(x)+exp(3)^2+(x^2+5*x)*exp(
3))/(x^2*exp(3)^2+(2*x^4+10*x^3)*exp(3)+x^6+10*x^5+25*x^4),x, algorithm=\
```

output
```
e^3*log(x)/(x^3 + 5*x^2 + x*e^3)
```

3.265.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{e^6 + e^3(5x + x^2) + (-e^6 + e^3(-10x - 3x^2))\log(x)}{e^6x^2 + 25x^4 + 10x^5 + x^6 + e^3(10x^3 + 2x^4)}\,dx = \frac{e^3\log(x)}{x^3 + 5x^2 + xe^3}$$

input
```
integrate(((-exp(3)**2+(-3*x**2-10*x)*exp(3))*ln(x)+exp(3)**2+(x**2+5*x)*e
xp(3))/(x**2*exp(3)**2+(2*x**4+10*x**3)*exp(3)+x**6+10*x**5+25*x**4),x)
```

output
```
exp(3)*log(x)/(x**3 + 5*x**2 + x*exp(3))
```

3.265.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 423 vs. 2(16) = 32.

Time = 1.52 (sec) , antiderivative size = 423, normalized size of antiderivative = 24.88

$$\int \frac{e^6 + e^3(5x + x^2) + (-e^6 + e^3(-10x - 3x^2))\log(x)}{e^6x^2 + 25x^4 + 10x^5 + x^6 + e^3(10x^3 + 2x^4)}\,dx$$
$$= \frac{(2e^3 - 25)\arctan\left(\frac{2x+5}{\sqrt{4e^3-25}}\right)e^{(-3)}}{\sqrt{4e^3 - 25}}$$
$$+ \left(5e^{(-9)}\log\left(x^2 + 5x + e^3\right) - 10e^{(-9)}\log(x) - \frac{2(6e^6 - 150e^3 + 625)\arctan\left(\frac{2x+5}{\sqrt{4e^3-25}}\right)}{(4e^{12} - 25e^9)\sqrt{4e^3 - 25}} - \frac{2x^2(3e}{x^3(4e^9 - 2}\right.$$
$$-\frac{5}{2}\left(e^{(-6)}\log\left(x^2 + 5x + e^3\right) - 2e^{(-6)}\log(x) + \frac{10(6e^3 - 25)\arctan\left(\frac{2x+5}{\sqrt{4e^3-25}}\right)}{(4e^9 - 25e^6)\sqrt{4e^3 - 25}} + \frac{2(5x}{x^2(4e^6 - 25e^3) + 5x}\right.$$
$$+ \left(\frac{2x + 5}{x^2(4e^3 - 25) + 5x(4e^3 - 25) + 4e^6 - 25e^3} + \frac{4\arctan\left(\frac{2x+5}{\sqrt{4e^3-25}}\right)}{(4e^3 - 25)^{\frac{3}{2}}}\right)e^3$$
$$- \frac{5}{2}e^{(-3)}\log\left(x^2 + 5x + e^3\right) + \frac{x^2e^3 + 5xe^3 + (5x^3 + 25x^2 + 5xe^3 + e^6)\log(x) + e^6}{x^3e^3 + 5x^2e^3 + xe^6}$$

input
```
integrate(((-exp(3)^2+(-3*x^2-10*x)*exp(3))*log(x)+exp(3)^2+(x^2+5*x)*exp(
3))/(x^2*exp(3)^2+(2*x^4+10*x^3)*exp(3)+x^6+10*x^5+25*x^4),x, algorithm=\
```

output
```
(2*e^3 - 25)*arctan((2*x + 5)/sqrt(4*e^3 - 25))*e^(-3)/sqrt(4*e^3 - 25) +
(5*e^(-9)*log(x^2 + 5*x + e^3) - 10*e^(-9)*log(x) - 2*(6*e^6 - 150*e^3 + 6
25)*arctan((2*x + 5)/sqrt(4*e^3 - 25))/((4*e^12 - 25*e^9)*sqrt(4*e^3 - 25)
) - (2*x^2*(3*e^3 - 25) + 5*x*(7*e^3 - 50) + 4*e^6 - 25*e^3)/(x^3*(4*e^9 -
 25*e^6) + 5*x^2*(4*e^9 - 25*e^6) + x*(4*e^12 - 25*e^9)))*e^6 - 5/2*(e^(-6
)*log(x^2 + 5*x + e^3) - 2*e^(-6)*log(x) + 10*(6*e^3 - 25)*arctan((2*x + 5
)/sqrt(4*e^3 - 25))/((4*e^9 - 25*e^6)*sqrt(4*e^3 - 25)) + 2*(5*x - 2*e^3 +
 25)/(x^2*(4*e^6 - 25*e^3) + 5*x*(4*e^6 - 25*e^3) + 4*e^9 - 25*e^6))*e^3 +
 ((2*x + 5)/(x^2*(4*e^3 - 25) + 5*x*(4*e^3 - 25) + 4*e^6 - 25*e^3) + 4*arc
tan((2*x + 5)/sqrt(4*e^3 - 25))/(4*e^3 - 25)^(3/2))*e^3 - 5/2*e^(-3)*log(x
^2 + 5*x + e^3) + (x^2*e^3 + 5*x*e^3 + (5*x^3 + 25*x^2 + 5*x*e^3 + e^6)*lo
g(x) + e^6)/(x^3*e^3 + 5*x^2*e^3 + x*e^6)
```

3.265.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

$$\int \frac{e^6+e^3(5x+x^2)+(-e^6+e^3(-10x-3x^2))\log(x)}{e^6x^2+25x^4+10x^5+x^6+e^3\left(10x^3+2x^4\right)}\,dx=\frac{e^3\log\left(x\right)}{x^3+5\,x^2+xe^3}$$

input
```
integrate(((-exp(3)^2+(-3*x^2-10*x)*exp(3))*log(x)+exp(3)^2+(x^2+5*x)*exp(
3))/(x^2*exp(3)^2+(2*x^4+10*x^3)*exp(3)+x^6+10*x^5+25*x^4),x, algorithm=\
```

output
```
e^3*log(x)/(x^3 + 5*x^2 + x*e^3)
```

3.265.9 Mupad [B] (verification not implemented)

Time = 13.75 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{e^6+e^3(5x+x^2)+(-e^6+e^3(-10x-3x^2))\log(x)}{e^6x^2+25x^4+10x^5+x^6+e^3\left(10x^3+2x^4\right)}\,dx=\frac{\mathrm{e}^3\,\ln\left(x\right)}{x\,\left(x^2+5\,x+\mathrm{e}^3\right)}$$

input
```
int((exp(6) - log(x)*(exp(6) + exp(3)*(10*x + 3*x^2)) + exp(3)*(5*x + x^2)
)/(exp(3)*(10*x^3 + 2*x^4) + x^2*exp(6) + 25*x^4 + 10*x^5 + x^6),x)
```

output
```
(exp(3)*log(x))/(x*(5*x + exp(3) + x^2))
```

3.266 $\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10}$

3.266.1 Optimal result

Integrand size = 134, antiderivative size = 30

$$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10x-2x^2)\log(5-x)+(-5}$$
$$=\frac{2e^6(3+x)^2}{e^x+\frac{1}{15}(x-\log(5-x))}$$

output
```
2*exp(6)/(1/15*x-1/15*ln(5-x)+exp(x))*(3+x)^2
```

3.266.2 Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10x-2x^2)\log(5-x)+(-5}$$
$$=-\frac{30e^6(3+x)^2}{-15e^x-x+\log(5-x)}$$

input
```
Integrate[(E^(6 + x)*(6750 + 7650*x + 450*x^2 - 450*x^3) + E^6*(1620 - 90*
x - 120*x^2 + 30*x^3) + E^6*(900 + 120*x - 60*x^2)*Log[5 - x])/(-5*x^2 + x
^3 + E^(2*x)*(-1125 + 225*x) + E^x*(-150*x + 30*x^2) + (E^x*(150 - 30*x) +
 10*x - 2*x^2)*Log[5 - x] + (-5 + x)*Log[5 - x]^2),x]
```

output
```
(-30*E^6*(3 + x)^2)/(-15*E^x - x + Log[5 - x])
```

3.266.
$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)\log(5-x)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10x-2x^2)\log(5-x)+(-5+x)\log^2(5-x)}\,dx$

3.266.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^6(-60x^2+120x+900)\log(5-x)+e^{x+6}(-450x^3+450x^2+7650x+6750)+e^6(30x^3-120x^2-90x+16}{x^3-5x^2+e^x(30x^2-150x)+(-2x^2+10x+e^x(150-30x))\log(5-x)+e^{2x}(225x-1125)+(x-5)\log^2(5}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{30e^6(x+3)\left(-x^2+15e^x(x^2-4x-5)+7x+2(x-5)\log(5-x)-18\right)}{(5-x)(x+15e^x-\log(5-x))^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$30e^6\int -\frac{(x+3)\left(x^2-7x+15e^x(-x^2+4x+5)+2(5-x)\log(5-x)+18\right)}{(5-x)(x+15e^x-\log(5-x))^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-30e^6\int \frac{(x+3)\left(x^2-7x+15e^x(-x^2+4x+5)+2(5-x)\log(5-x)+18\right)}{(5-x)(x+15e^x-\log(5-x))^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-30e^6\int \left(\frac{x^2+4x+3}{x+15e^x-\log(5-x)}-\frac{(x+3)^2\left(x^2-\log(5-x)x-6x+5\log(5-x)+6\right)}{(x-5)(x+15e^x-\log(5-x))^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-30e^6\left(-\int \frac{x^3}{(x+15e^x-\log(5-x))^2}dx-5\int \frac{x^2}{(x+15e^x-\log(5-x))^2}dx+\int \frac{x^2}{x+15e^x-\log(5-x)}dx+\int \frac{}{(}\right.$$

input
```
Int[(E^(6 + x)*(6750 + 7650*x + 450*x^2 - 450*x^3) + E^6*(1620 - 90*x - 12
0*x^2 + 30*x^3) + E^6*(900 + 120*x - 60*x^2)*Log[5 - x])/(-5*x^2 + x^3 + E
^(2*x)*(-1125 + 225*x) + E^x*(-150*x + 30*x^2) + (E^x*(150 - 30*x) + 10*x
- 2*x^2)*Log[5 - x] + (-5 + x)*Log[5 - x]^2),x]
```

output
```
$Aborted
```

3.266.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.266.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

method	result	size
risch	$\frac{30(x^2+6x+9)\mathrm{e}^6}{15\,\mathrm{e}^x-\ln(5-x)+x}$	29
parallelrisch	$\frac{30x^2\mathrm{e}^6+180x\,\mathrm{e}^6+270\,\mathrm{e}^6}{15\,\mathrm{e}^x-\ln(5-x)+x}$	35

input
```
int(((-60*x^2+120*x+900)*exp(6)*ln(5-x)+(-450*x^3+450*x^2+7650*x+6750)*exp
(6)*exp(x)+(30*x^3-120*x^2-90*x+1620)*exp(6))/((-5+x)*ln(5-x)^2+((-30*x+15
0)*exp(x)-2*x^2+10*x)*ln(5-x)+(225*x-1125)*exp(x)^2+(30*x^2-150*x)*exp(x)+
x^3-5*x^2),x,method=_RETURNVERBOSE)
```

output
```
30*(x^2+6*x+9)*exp(6)/(15*exp(x)-ln(5-x)+x)
```

3.266.
$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)\log(5-x)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10x-2x^2)\log(5-x)+(-5+x)\log^2(5-x)}\,dx$

3.266.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.17

$$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10x-2x^2)\log(5-x)+(-5}$$
$$= \frac{30\,(x^2+6\,x+9)e^{12}}{xe^6-e^6\log(-x+5)+15\,e^{(x+6)}}$$

input
```
integrate(((-60*x^2+120*x+900)*exp(6)*log(5-x)+(-450*x^3+450*x^2+7650*x+67
50)*exp(6)*exp(x)+(30*x^3-120*x^2-90*x+1620)*exp(6))/((-5+x)*log(5-x)^2+((
-30*x+150)*exp(x)-2*x^2+10*x)*log(5-x)+(225*x-1125)*exp(x)^2+(30*x^2-150*x
)*exp(x)+x^3-5*x^2),x, algorithm=\
```

output
```
30*(x^2 + 6*x + 9)*e^12/(x*e^6 - e^6*log(-x + 5) + 15*e^(x + 6))
```

3.266.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10x-2x^2)\log(5-x)+(-5}$$
$$= \frac{2x^2e^6+12xe^6+18e^6}{\frac{x}{15}+e^x-\frac{\log(5-x)}{15}}$$

input
```
integrate(((-60*x**2+120*x+900)*exp(6)*ln(5-x)+(-450*x**3+450*x**2+7650*x+
6750)*exp(6)*exp(x)+(30*x**3-120*x**2-90*x+1620)*exp(6))/((-5+x)*ln(5-x)**
2+((-30*x+150)*exp(x)-2*x**2+10*x)*ln(5-x)+(225*x-1125)*exp(x)**2+(30*x**2
-150*x)*exp(x)+x**3-5*x**2),x)
```

output
```
(2*x**2*exp(6) + 12*x*exp(6) + 18*exp(6))/(x/15 + exp(x) - log(5 - x)/15)
```

3.266.

$$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)\log(5-x)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10x-2x^2)\log(5-x)+(-5+x)\log^2(5-x)}\,dx$$

3.266.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

$$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x\left(-150x+30x^2\right)+\left(e^x(150-30x)+10x-2x^2\right)\log(5-x)+(-5}$$
$$=\frac{30\left(x^2e^6+6\,xe^6+9\,e^6\right)}{x+15\,e^x-\log\left(-x+5\right)}$$

input
```
integrate(((-60*x^2+120*x+900)*exp(6)*log(5-x)+(-450*x^3+450*x^2+7650*x+67
50)*exp(6)*exp(x)+(30*x^3-120*x^2-90*x+1620)*exp(6))/((-5+x)*log(5-x)^2+((
-30*x+150)*exp(x)-2*x^2+10*x)*log(5-x)+(225*x-1125)*exp(x)^2+(30*x^2-150*x
)*exp(x)+x^3-5*x^2),x, algorithm=\
```

output
```
30*(x^2*e^6 + 6*x*e^6 + 9*e^6)/(x + 15*e^x - log(-x + 5))
```

3.266.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 628 vs. 2(25) = 50.

Time = 0.29 (sec) , antiderivative size = 628, normalized size of antiderivative = 20.93

$$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x\left(-150x+30x^2\right)+\left(e^x(150-30x)+10x-2x^2\right)\log(5-x)+(-5}$$
$$= \text{Too large to display}$$

input
```
integrate(((-60*x^2+120*x+900)*exp(6)*log(5-x)+(-450*x^3+450*x^2+7650*x+67
50)*exp(6)*exp(x)+(30*x^3-120*x^2-90*x+1620)*exp(6))/((-5+x)*log(5-x)^2+((
-30*x+150)*exp(x)-2*x^2+10*x)*log(5-x)+(225*x-1125)*exp(x)^2+(30*x^2-150*x
)*exp(x)+x^3-5*x^2),x, algorithm=\
```

3.266. $\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)\log(5-x)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x(-150x+30x^2)+(e^x(150-30x)+10x-2x^2)\log(5-x)+(-5+x)\log^2(5-x)}\,dx$

output
```
30*((x - 5)^5*e^(-x + 11) - 2*(x - 5)^4*e^(-x + 11)*log(-x + 5) + (x - 5)^
3*e^(-x + 11)*log(-x + 5)^2 + 15*(x - 5)^4*e^11 + 25*(x - 5)^4*e^(-x + 11)
 - 15*(x - 5)^3*e^11*log(-x + 5) - 41*(x - 5)^3*e^(-x + 11)*log(-x + 5) +
16*(x - 5)^2*e^(-x + 11)*log(-x + 5)^2 + 300*(x - 5)^3*e^11 + 229*(x - 5)^
3*e^(-x + 11) - 240*(x - 5)^2*e^11*log(-x + 5) - 273*(x - 5)^2*e^(-x + 11)
*log(-x + 5) + 64*(x - 5)*e^(-x + 11)*log(-x + 5)^2 + 1935*(x - 5)^2*e^11
+ 917*(x - 5)^2*e^(-x + 11) - 960*(x - 5)*e^11*log(-x + 5) - 592*(x - 5)*e
^(-x + 11)*log(-x + 5) + 4080*(x - 5)*e^11 + 1424*(x - 5)*e^(-x + 11) - 64
*e^(-x + 11)*log(-x + 5) + 960*e^11 + 320*e^(-x + 11))/((x - 5)^4*e^(-x +
5) - 3*(x - 5)^3*e^(-x + 5)*log(-x + 5) + 3*(x - 5)^2*e^(-x + 5)*log(-x +
5)^2 - (x - 5)*e^(-x + 5)*log(-x + 5)^3 + 30*(x - 5)^3*e^5 + 14*(x - 5)^3*
e^(-x + 5) - 60*(x - 5)^2*e^5*log(-x + 5) - 28*(x - 5)^2*e^(-x + 5)*log(-x
 + 5) + 30*(x - 5)*e^5*log(-x + 5)^2 + 14*(x - 5)*e^(-x + 5)*log(-x + 5)^2
 + 270*(x - 5)^2*e^5 + 225*(x - 5)^2*e^(x + 5) + 66*(x - 5)^2*e^(-x + 5) -
 270*(x - 5)*e^5*log(-x + 5) - 225*(x - 5)*e^(x + 5)*log(-x + 5) - 67*(x -
 5)*e^(-x + 5)*log(-x + 5) + e^(-x + 5)*log(-x + 5)^2 + 630*(x - 5)*e^5 +
900*(x - 5)*e^(x + 5) + 110*(x - 5)*e^(-x + 5) - 30*e^5*log(-x + 5) - 10*e
^(-x + 5)*log(-x + 5) + 150*e^5 + 225*e^(x + 5) + 25*e^(-x + 5))
```

3.266.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{6+x}(6750+7650x+450x^2-450x^3)+e^6(1620-90x-120x^2+30x^3)+e^6(900+120x-60x^2)}{-5x^2+x^3+e^{2x}(-1125+225x)+e^x\left(-150x+30x^2\right)+\left(e^x(150-30x)+10x-2x^2\right)\log(5-x)+(-5}$$
$$=\int \frac{e^6\,e^x\,\left(-450\,x^3+450\,x^2+7650\,x+6750\right)-e^6\,\left(-30\,x^3+120\,x^2+90\,x-1620\right)+e^6\,\ln\left(5-x\right)\,\left(-60\,x\right.}{\ln\left(5-x\right)^2\,\left(x-5\right)-e^x\,\left(150\,x-30\,x^2\right)+e^{2\,x}\,\left(225\,x-1125\right)-5\,x^2+x^3-\ln\left(5-x\right)\,\left(e^x\,\left(30\,x-150\right.\right.}$$

input
```
int((exp(6)*exp(x)*(7650*x + 450*x^2 - 450*x^3 + 6750) - exp(6)*(90*x + 12
0*x^2 - 30*x^3 - 1620) + exp(6)*log(5 - x)*(120*x - 60*x^2 + 900))/(log(5
- x)^2*(x - 5) - exp(x)*(150*x - 30*x^2) + exp(2*x)*(225*x - 1125) - 5*x^2
 + x^3 - log(5 - x)*(exp(x)*(30*x - 150) - 10*x + 2*x^2)),x)
```

output
```
int((exp(6)*exp(x)*(7650*x + 450*x^2 - 450*x^3 + 6750) - exp(6)*(90*x + 12
0*x^2 - 30*x^3 - 1620) + exp(6)*log(5 - x)*(120*x - 60*x^2 + 900))/(log(5
- x)^2*(x - 5) - exp(x)*(150*x - 30*x^2) + exp(2*x)*(225*x - 1125) - 5*x^2
 + x^3 - log(5 - x)*(exp(x)*(30*x - 150) - 10*x + 2*x^2)), x)
```

3.267 $\int \frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx$

3.267.1 Optimal result

Integrand size = 43, antiderivative size = 28

$$\int \frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx = -3e^5+x\left(3+x^3\left(-x+\log\left(\frac{4}{x\log(x)}\right)\right)\right)$$

output
```
x*(3+x^3*(ln(4/x/ln(x))-x))-3*exp(5)
```

3.267.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx = 3x-x^5+x^4\log\left(\frac{4}{x\log(x)}\right)$$

input
```
Integrate[(-x^3 + (3 - x^3 - 5*x^4)*Log[x] + 4*x^3*Log[x]*Log[4/(x*Log[x])
])/Log[x],x]
```

output
```
3*x - x^5 + x^4*Log[4/(x*Log[x])]
```

3.267.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.39 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.75, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.047, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^3+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)+\left(-5x^4-x^3+3\right)\log(x)}{\log(x)}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(4x^3\log\left(\frac{4}{x\log(x)}\right)+\frac{-5x^4\log(x)-x^3-x^3\log(x)+3\log(x)}{\log(x)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\text{ExpIntegralEi}(4\log(x))-\log(x)\,\text{ExpIntegralEi}(4\log(x))+(\log(x)+1)\,\text{ExpIntegralEi}(4\log(x))-x^5+x^4\log\left(\frac{4}{x\log(x)}\right)+3x$$

input
```
Int[(-x^3 + (3 - x^3 - 5*x^4)*Log[x] + 4*x^3*Log[x]*Log[4/(x*Log[x])])/Log
[x],x]
```

output
```
3*x - x^5 - ExpIntegralEi[4*Log[x]] - ExpIntegralEi[4*Log[x]]*Log[x] + Exp
IntegralEi[4*Log[x]]*(1 + Log[x]) + x^4*Log[4/(x*Log[x])]
```

3.267.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.267.4 Maple [A] (verified)

Time = 1.39 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result
parallelrisch	$-x^5+x^4\ln\left(\frac{4}{x\ln(x)}\right)+3x$
risch	$-x^4\ln(\ln(x))-x^4\ln(x)+\frac{i\pi x^4\,\mathrm{csgn}\left(\frac{i}{x\ln(x)}\right)^2\mathrm{csgn}\left(\frac{i}{\ln(x)}\right)}{2}+\frac{i\pi x^4\,\mathrm{csgn}\left(\frac{i}{x\ln(x)}\right)^2\mathrm{csgn}\left(\frac{i}{x}\right)}{2}-\frac{i\pi x^4\,\mathrm{csgn}\left(\frac{i}{x\ln}\right.}{}$

input
```
int((4*x^3*ln(x)*ln(4/x/ln(x))+(-5*x^4-x^3+3)*ln(x)-x^3)/ln(x),x,method=_R
ETURNVERBOSE)
```

output
```
-x^5+x^4*ln(4/x/ln(x))+3*x
```

3.267.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int\frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx=-x^5+x^4\log\left(\frac{4}{x\log(x)}\right)+3\,x$$

input
```
integrate((4*x^3*log(x)*log(4/x/log(x))+(-5*x^4-x^3+3)*log(x)-x^3)/log(x),
x, algorithm=\
```

output
```
-x^5 + x^4*log(4/(x*log(x))) + 3*x
```

3.267.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int\frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx=-x^5+x^4\log\left(\frac{4}{x\log(x)}\right)+3x$$

input
```
integrate((4*x**3*ln(x)*ln(4/x/ln(x))+(-5*x**4-x**3+3)*ln(x)-x**3)/ln(x),x
)
```

output
```
-x**5 + x**4*log(4/(x*log(x))) + 3*x
```

3.267.7 Maxima [F]

$$\int \frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx$$
$$=\int \frac{4\,x^3\log\left(x\right)\log\left(\frac{4}{x\log(x)}\right)-x^3-\left(5\,x^4+x^3-3\right)\log\left(x\right)}{\log\left(x\right)}\,dx$$

input
```
integrate((4*x^3*log(x)*log(4/x/log(x))+(-5*x^4-x^3+3)*log(x)-x^3)/log(x),
x, algorithm=\
```

output
```
-x^5 + 1/4*x^4*(8*log(2) + 1) - x^4*log(x) - x^4*log(log(x)) - 1/4*x^4 + 3
*x - Ei(4*log(x)) + integrate(x^3/log(x), x)
```

3.267.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx$$
$$=-x^5+2\,x^4\log\left(2\right)-x^4\log\left(x\right)-x^4\log\left(\log\left(x\right)\right)+3\,x$$

input
```
integrate((4*x^3*log(x)*log(4/x/log(x))+(-5*x^4-x^3+3)*log(x)-x^3)/log(x),
x, algorithm=\
```

output
```
-x^5 + 2*x^4*log(2) - x^4*log(x) - x^4*log(log(x)) + 3*x
```

3.267.9 Mupad [B] (verification not implemented)

Time = 12.81 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx=3\,x+x^4\,\ln\left(\frac{4}{x\,\ln\left(x\right)}\right)-x^5$$

input
```
int(-(log(x)*(x^3 + 5*x^4 - 3) + x^3 - 4*x^3*log(x)*log(4/(x*log(x))))/log
(x),x)
```

output
```
3*x + x^4*log(4/(x*log(x))) - x^5
```

3.267. $\int \frac{-x^3+(3-x^3-5x^4)\log(x)+4x^3\log(x)\log\left(\frac{4}{x\log(x)}\right)}{\log(x)}\,dx$

3.268 $\int \frac{-3+6x+6x^2+e(-1+2x+2x^2)+(3x+ex)\log(2x)}{8x+4x^2+2x\log(2x)}\,dx$

3.268.1 Optimal result

Integrand size = 53, antiderivative size = 27

$$\int \frac{-3+6x+6x^2+e(-1+2x+2x^2)+(3x+ex)\log(2x)}{8x+4x^2+2x\log(2x)}\,dx = \frac{1}{2}\left(6+e^5+(3+e)(x-\log(4+2x+\log(2x)))\right)$$

output
```
3+1/2*exp(5)+1/2*(3+exp(1))*(x-ln(ln(2*x)+2*x+4))
```

3.268.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{-3+6x+6x^2+e(-1+2x+2x^2)+(3x+ex)\log(2x)}{8x+4x^2+2x\log(2x)}\,dx = \frac{1}{2}(3+e)(x-\log(4+2x+\log(2x)))$$

input
```
Integrate[(-3 + 6*x + 6*x^2 + E*(-1 + 2*x + 2*x^2) + (3*x + E*x)*Log[2*x])
/(8*x + 4*x^2 + 2*x*Log[2*x]),x]
```

output
```
((3 + E)*(x - Log[4 + 2*x + Log[2*x]]))/2
```

3.268.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.094, Rules used = {7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^2+e(2x^2+2x-1)+6x+(ex+3x)\log(2x)-3}{4x^2+8x+2x\log(2x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(3+e)\left(2x^2+2x+x\log(2x)-1\right)}{2x(2x+\log(2x)+4)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}(3+e)\int -\frac{-2x^2-\log(2x)x-2x+1}{x(2x+\log(2x)+4)}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{2}(3+e)\int \frac{-2x^2-\log(2x)x-2x+1}{x(2x+\log(2x)+4)}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{2}(3+e)\int \left(\frac{2x+1}{x(2x+\log(2x)+4)}-1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{1}{2}(3+e)(\log(2x+\log(2x)+4)-x)$$

input
```
Int[(-3 + 6*x + 6*x^2 + E*(-1 + 2*x + 2*x^2) + (3*x + E*x)*Log[2*x])/(8*x
+ 4*x^2 + 2*x*Log[2*x]),x]
```

output
```
-1/2*((3 + E)*(-x + Log[4 + 2*x + Log[2*x]]))
```

3.268.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.268.4 Maple [A] (verified)

Time = 1.20 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

method	result	size
derivativedivides	$\frac{(3+\mathrm{e})x}{2}+\frac{(-2\,\mathrm{e}-6)\ln(\ln(2x)+2x+4)}{4}$	27
default	$\frac{(3+\mathrm{e})x}{2}+\frac{(-2\,\mathrm{e}-6)\ln(\ln(2x)+2x+4)}{4}$	27
norman	$\left(\frac{3}{2}+\frac{\mathrm{e}}{2}\right)x+\left(-\frac{3}{2}-\frac{\mathrm{e}}{2}\right)\ln\left(\ln\left(2x\right)+2x+4\right)$	27
risch	$\frac{x\,\mathrm{e}}{2}+\frac{3x}{2}-\frac{3\ln(\ln(2x)+2x+4)}{2}-\frac{\ln(\ln(2x)+2x+4)\mathrm{e}}{2}$	36
parallelrisch	$\frac{x\,\mathrm{e}}{2}+\frac{3x}{2}-\frac{\ln\left(\frac{\ln(2x)}{2}+x+2\right)\mathrm{e}}{2}-\frac{3\ln\left(\frac{\ln(2x)}{2}+x+2\right)}{2}$	36

input
```
int(((x*exp(1)+3*x)*ln(2*x)+(2*x^2+2*x-1)*exp(1)+6*x^2+6*x-3)/(2*x*ln(2*x)
+4*x^2+8*x),x,method=_RETURNVERBOSE)
```

output
```
1/2*(3+exp(1))*x+1/4*(-2*exp(1)-6)*ln(ln(2*x)+2*x+4)
```

3.268.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{-3+6x+6x^2+e(-1+2x+2x^2)+(3x+ex)\log(2x)}{8x+4x^2+2x\log(2x)}\,dx = \frac{1}{2}\,xe - \frac{1}{2}\,(e+3)\log\left(2\,x+\log\left(2\,x\right)+4\right) + \frac{3}{2}\,x$$

input
```
integrate(((x*exp(1)+3*x)*log(2*x)+(2*x^2+2*x-1)*exp(1)+6*x^2+6*x-3)/(2*x*
log(2*x)+4*x^2+8*x),x, algorithm=\
```

output
```
1/2*x*e - 1/2*(e + 3)*log(2*x + log(2*x) + 4) + 3/2*x
```

3.268.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{-3+6x+6x^2+e(-1+2x+2x^2)+(3x+ex)\log(2x)}{8x+4x^2+2x\log(2x)}\,dx = x\left(\frac{e}{2}+\frac{3}{2}\right) - \frac{(e+3)\log\left(2x+\log\left(2x\right)+4\right)}{2}$$

input
```
integrate(((x*exp(1)+3*x)*ln(2*x)+(2*x**2+2*x-1)*exp(1)+6*x**2+6*x-3)/(2*x
*ln(2*x)+4*x**2+8*x),x)
```

output
```
x*(E/2 + 3/2) - (E + 3)*log(2*x + log(2*x) + 4)/2
```

3.268.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{-3+6x+6x^2+e(-1+2x+2x^2)+(3x+ex)\log(2x)}{8x+4x^2+2x\log(2x)}\,dx = \frac{1}{2}\,x(e+3) - \frac{1}{2}\,(e+3)\log\left(2\,x+\log\left(2\right)+\log\left(x\right)+4\right)$$

input
```
integrate(((x*exp(1)+3*x)*log(2*x)+(2*x^2+2*x-1)*exp(1)+6*x^2+6*x-3)/(2*x*
log(2*x)+4*x^2+8*x),x, algorithm=\
```

output
```
1/2*x*(e + 3) - 1/2*(e + 3)*log(2*x + log(2) + log(x) + 4)
```

3.268.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{-3+6x+6x^2+e(-1+2x+2x^2)+(3x+ex)\log(2x)}{8x+4x^2+2x\log(2x)}\,dx$$
$$=\frac{1}{2}\,xe-\frac{1}{2}\,e\log\left(2\,x+\log\left(2\,x\right)+4\right)+\frac{3}{2}\,x-\frac{3}{2}\,\log\left(-2\,x-\log\left(2\,x\right)-4\right)$$

input
```
integrate(((x*exp(1)+3*x)*log(2*x)+(2*x^2+2*x-1)*exp(1)+6*x^2+6*x-3)/(2*x*
log(2*x)+4*x^2+8*x),x, algorithm=\
```

output
```
1/2*x*e - 1/2*e*log(2*x + log(2*x) + 4) + 3/2*x - 3/2*log(-2*x - log(2*x)
- 4)
```

3.268.9 Mupad [B] (verification not implemented)

Time = 13.57 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{-3+6x+6x^2+e(-1+2x+2x^2)+(3x+ex)\log(2x)}{8x+4x^2+2x\log(2x)}\,dx$$
$$=\left(x-\ln\left(2\,x+\ln\left(2\,x\right)+4\right)\right)\,\left(\frac{\mathrm{e}}{2}+\frac{3}{2}\right)$$

input
```
int((6*x + log(2*x)*(3*x + x*exp(1)) + exp(1)*(2*x + 2*x^2 - 1) + 6*x^2 -
3)/(8*x + 2*x*log(2*x) + 4*x^2),x)
```

output
```
(x - log(2*x + log(2*x) + 4))*(exp(1)/2 + 3/2)
```

3.269 $\int \frac{}{-16e^{e^5+x^2}x^2-16e^{x^2}x^3+\left(4e^{e^5+x^2}x^2+4e^{x^2}x^3\right)\log\left(e^{e^5}+x\right)+\left(-16e^{\cdots}\right.}$

3.269.1 Optimal result

Integrand size = 618, antiderivative size = 31

$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^{\cdots}}{-16e^{e^5+x^2}x^2-16e^{x^2}x^3+(4e^{e^5+x^2}x^2+4e^{x^2}x^3)\log(e^{e^5}+x)+(-16e^{e^5}x^2-16x^3+(4e^{e^5}x^2+4x^3)\log(e^{\cdots}}$$
$$=\frac{3}{x\left(2+\log\left(\frac{x}{e^{x^2}+\log\left(-4+\log\left(e^{e^5}+x\right)\right)}\right)\right)}$$

output
```
3/(2+ln(x/(ln(ln(exp(exp(5))+x)-4)+exp(x^2))))/x
```

3.269.

$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+\left(e^{e^5+x^2}(-9+6x^2)+e^{x^2}\cdots\right.}{}$$

3.269.2 Mathematica [A] (verified)

Time = 0.50 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

$$\int \frac{3x + e^{e^5+x^2}(36-24x^2) + e^{x^2}(36x-24x}{-16e^{e^5+x^2}x^2 - 16e^{x^2}x^3 + (4e^{e^5+x^2}x^2 + 4e^{x^2}x^3)\log(e^{e^5}+x) + (-16e^{e^5}x^2 - 16x^3 + (4e^{e^5}x^2 + 4x^3)\log(e^{e}}$$

$$= \frac{3}{x\left(2+\log\left(\frac{x}{e^{x^2}+\log\left(-4+\log\left(e^{e^5}+x\right)\right)}\right)\right)}$$

input
```
Integrate[(3*x + E^(E^5 + x^2)*(36 - 24*x^2) + E^x^2*(36*x - 24*x^3) + (E^
(E^5 + x^2)*(-9 + 6*x^2) + E^x^2*(-9*x + 6*x^3))*Log[E^E^5 + x] + (36*E^E^
5 + 36*x + (-9*E^E^5 - 9*x)*Log[E^E^5 + x])*Log[-4 + Log[E^E^5 + x]] + (12
*E^(E^5 + x^2) + 12*E^x^2*x + (-3*E^(E^5 + x^2) - 3*E^x^2*x)*Log[E^E^5 + x
] + (12*E^E^5 + 12*x + (-3*E^E^5 - 3*x)*Log[E^E^5 + x])*Log[-4 + Log[E^E^5
 + x]])*Log[x/(E^x^2 + Log[-4 + Log[E^E^5 + x]])])/(-16*E^(E^5 + x^2)*x^2
- 16*E^x^2*x^3 + (4*E^(E^5 + x^2)*x^2 + 4*E^x^2*x^3)*Log[E^E^5 + x] + (-16
*E^E^5*x^2 - 16*x^3 + (4*E^E^5*x^2 + 4*x^3)*Log[E^E^5 + x])*Log[-4 + Log[E
^E^5 + x]] + (-16*E^(E^5 + x^2)*x^2 - 16*E^x^2*x^3 + (4*E^(E^5 + x^2)*x^2
+ 4*E^x^2*x^3)*Log[E^E^5 + x] + (-16*E^E^5*x^2 - 16*x^3 + (4*E^E^5*x^2 + 4
*x^3)*Log[E^E^5 + x])*Log[-4 + Log[E^E^5 + x]])*Log[x/(E^x^2 + Log[-4 + Lo
g[E^E^5 + x]])] + (-4*E^(E^5 + x^2)*x^2 - 4*E^x^2*x^3 + (E^(E^5 + x^2)*x^2
 + E^x^2*x^3)*Log[E^E^5 + x] + (-4*E^E^5*x^2 - 4*x^3 + (E^E^5*x^2 + x^3)*L
og[E^E^5 + x])*Log[-4 + Log[E^E^5 + x]])*Log[x/(E^x^2 + Log[-4 + Log[E^E^5
 + x]])]^2),x]
```

output
```
3/(x*(2 + Log[x/(E^x^2 + Log[-4 + Log[E^E^5 + x]])]))
```

3.269.3 Rubi [A] (verified)

Time = 4.05 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.006$, Rules used = {7239, 27, 25, 7238}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

3.269.

$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+\left(e^{e^5+x^2}(-9+6x^2)+e^{x^2}\right.}{}$$

$$\int \frac{e^{x^2+e^5}\left(36-24x^2\right)+\left(12e^{x^2}x+12e^{x^2+e^5}\right.}{-16e^{x^2+e^5}x^2-16e^{x^2}x^3+\left(-4e^{x^2+e^5}x^2-4e^{x^2}x^3+\left(e^{x^2+e^5}x^2+e^{x^2}x^3\right)\log\left(x+e^{e^5}\right)+\left(-4x^3-4e^{e^5}x^2+\left(x^3+\right.\right.\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{3\left(8e^{x^2+e^5}x^2-12e^{x^2}x-12e^{x^2+e^5}-4e^{x^2}x\log\left(\frac{x}{e^{x^2}+\log\left(\log\left(x+e^{e^5}\right)-4\right)}\right)-4e^{x^2+e^5}\log\left(\frac{x}{e^{x^2}+\log\left(\log\left(x+e^{e^5}\right)-4\right)}\right)\right.}{}$$

$$\Big\downarrow \text{27}$$

$$3\int -\frac{-8e^{x^2}x^3-8e^{x^2+e^5}x^2+12e^{x^2}x+4e^{x^2}\log\left(\frac{x}{\log\left(\log\left(x+e^{e^5}\right)-4\right)+e^{x^2}}\right)x+x+12e^{x^2+e^5}+4e^{x^2+e^5}\log\left(\frac{}{\log\left(\log\left(\right.\right.}\right.}{}$$

$$\Big\downarrow \text{25}$$

$$-3\int \frac{-8e^{x^2}x^3-8e^{x^2+e^5}x^2+12e^{x^2}x+4e^{x^2}\log\left(\frac{x}{\log\left(\log\left(x+e^{e^5}\right)-4\right)+e^{x^2}}\right)x+x+12e^{x^2+e^5}+4e^{x^2+e^5}\log\left(\frac{}{\log\left(\log\left(\right.\right.}\right.}{}$$

$$\Big\downarrow \text{7238}$$

$$\frac{3}{x\left(\log\left(\frac{x}{e^{x^2}+\log\left(\log\left(x+e^{e^5}\right)-4\right)}\right)+2\right)}$$

3.269.

$$\int \frac{3x+e^{e^5+x^2}\left(36-24x^2\right)+e^{x^2}\left(36x-24x^3\right)+\left(e^{e^5+x^2}\left(-9+6x^2\right)+e^{x^2}\right.}{}$$

input
```
Int[(3*x + E^(E^5 + x^2)*(36 - 24*x^2) + E^x^2*(36*x - 24*x^3) + (E^(E^5 +
 x^2)*(-9 + 6*x^2) + E^x^2*(-9*x + 6*x^3))*Log[E^E^5 + x] + (36*E^E^5 + 36
*x + (-9*E^E^5 - 9*x)*Log[E^E^5 + x])*Log[-4 + Log[E^E^5 + x]] + (12*E^(E^
5 + x^2) + 12*E^x^2*x + (-3*E^(E^5 + x^2) - 3*E^x^2*x)*Log[E^E^5 + x] + (1
2*E^E^5 + 12*x + (-3*E^E^5 - 3*x)*Log[E^E^5 + x])*Log[-4 + Log[E^E^5 + x]]
)*Log[x/(E^x^2 + Log[-4 + Log[E^E^5 + x]])])/(-16*E^(E^5 + x^2)*x^2 - 16*E
^x^2*x^3 + (4*E^(E^5 + x^2)*x^2 + 4*E^x^2*x^3)*Log[E^E^5 + x] + (-16*E^E^5
*x^2 - 16*x^3 + (4*E^E^5*x^2 + 4*x^3)*Log[E^E^5 + x])*Log[-4 + Log[E^E^5 +
 x]] + (-16*E^(E^5 + x^2)*x^2 - 16*E^x^2*x^3 + (4*E^(E^5 + x^2)*x^2 + 4*E^
x^2*x^3)*Log[E^E^5 + x] + (-16*E^E^5*x^2 - 16*x^3 + (4*E^E^5*x^2 + 4*x^3)*
Log[E^E^5 + x])*Log[-4 + Log[E^E^5 + x]])*Log[x/(E^x^2 + Log[-4 + Log[E^E^
5 + x]])] + (-4*E^(E^5 + x^2)*x^2 - 4*E^x^2*x^3 + (E^(E^5 + x^2)*x^2 + E^x
^2*x^3)*Log[E^E^5 + x] + (-4*E^E^5*x^2 - 4*x^3 + (E^E^5*x^2 + x^3)*Log[E^E
^5 + x])*Log[-4 + Log[E^E^5 + x]])*Log[x/(E^x^2 + Log[-4 + Log[E^E^5 + x]]
)]^2),x]
```

output
```
3/(x*(2 + Log[x/(E^x^2 + Log[-4 + Log[E^E^5 + x]])]))
```

3.269.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7238
```
Int[(u_)*(y_)^(m_.)*(z_)^(n_.), x_Symbol] :> With[{q = DerivativeDivides[y*
z, u*z^(n - m), x]}, Simp[q*y^(m + 1)*(z^(m + 1)/(m + 1)), x] /;  !FalseQ[q
]] /; FreeQ[{m, n}, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```


$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+\left(e^{e^5+x^2}(-9+6x^2)+e^{x^2}\right.}{}$$

3.269.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.26 (sec) , antiderivative size = 185, normalized size of antiderivative = 5.97

$$-\frac{}{x\left(\pi\operatorname{csgn}\left(\frac{i}{\ln\left(\ln\left(\mathrm{e}^{\mathrm{e}^{5}}+x\right)-4\right)+\mathrm{e}^{x^{2}}}\right)\operatorname{csgn}\left(\frac{ix}{\ln\left(\ln\left(\mathrm{e}^{\mathrm{e}^{5}}+x\right)-4\right)+\mathrm{e}^{x^{2}}}\right)^{2}-\pi\operatorname{csgn}\left(\frac{i}{\ln\left(\ln\left(\mathrm{e}^{\mathrm{e}^{5}}+x\right)-4\right)+\mathrm{e}^{x^{2}}}\right)\operatorname{csgn}\left(\frac{}{\ln\left(\ln\left(\mathrm{e}\right.\right.}\right.\right.}$$

input
```
int(((((-3*exp(exp(5))-3*x)*ln(exp(exp(5))+x)+12*exp(exp(5))+12*x)*ln(ln(e
xp(exp(5))+x)-4)+(-3*exp(x^2)*exp(exp(5))-3*exp(x^2)*x)*ln(exp(exp(5))+x)+
12*exp(x^2)*exp(exp(5))+12*exp(x^2)*x)*ln(x/(ln(ln(exp(exp(5))+x)-4)+exp(x
^2)))+((-9*exp(exp(5))-9*x)*ln(exp(exp(5))+x)+36*exp(exp(5))+36*x)*ln(ln(e
xp(exp(5))+x)-4)+((6*x^2-9)*exp(x^2)*exp(exp(5))+(6*x^3-9*x)*exp(x^2))*ln(
exp(exp(5))+x)+(-24*x^2+36)*exp(x^2)*exp(exp(5))+(-24*x^3+36*x)*exp(x^2)+3
*x)/((((x^2*exp(exp(5))+x^3)*ln(exp(exp(5))+x)-4*x^2*exp(exp(5))-4*x^3)*ln
(ln(exp(exp(5))+x)-4)+(x^2*exp(x^2)*exp(exp(5))+x^3*exp(x^2))*ln(exp(exp(5
))+x)-4*x^2*exp(x^2)*exp(exp(5))-4*x^3*exp(x^2))*ln(x/(ln(ln(exp(exp(5))+x
)-4)+exp(x^2)))^2+(((4*x^2*exp(exp(5))+4*x^3)*ln(exp(exp(5))+x)-16*x^2*exp
(exp(5))-16*x^3)*ln(ln(exp(exp(5))+x)-4)+(4*x^2*exp(x^2)*exp(exp(5))+4*x^3
*exp(x^2))*ln(exp(exp(5))+x)-16*x^2*exp(x^2)*exp(exp(5))-16*x^3*exp(x^2))*
ln(x/(ln(ln(exp(exp(5))+x)-4)+exp(x^2)))+((4*x^2*exp(exp(5))+4*x^3)*ln(exp
(exp(5))+x)-16*x^2*exp(exp(5))-16*x^3)*ln(ln(exp(exp(5))+x)-4)+(4*x^2*exp(
x^2)*exp(exp(5))+4*x^3*exp(x^2))*ln(exp(exp(5))+x)-16*x^2*exp(x^2)*exp(exp
(5))-16*x^3*exp(x^2)),x)
```

output
```
-6*I/x/(Pi*csgn(I/(ln(ln(exp(exp(5))+x)-4)+exp(x^2)))*csgn(I*x/(ln(ln(exp(
exp(5))+x)-4)+exp(x^2)))^2-Pi*csgn(I/(ln(ln(exp(exp(5))+x)-4)+exp(x^2)))*c
sgn(I*x/(ln(ln(exp(exp(5))+x)-4)+exp(x^2)))*csgn(I*x)-Pi*csgn(I*x/(ln(ln(e
xp(exp(5))+x)-4)+exp(x^2)))^3+Pi*csgn(I*x/(ln(ln(exp(exp(5))+x)-4)+exp(x^2
)))^2*csgn(I*x)-2*I*ln(x)+2*I*ln(ln(ln(exp(exp(5))+x)-4)+exp(x^2))-4*I)
```

3.269.

$$\int\frac{3x+e^{e^{5}+x^{2}}\left(36-24x^{2}\right)+e^{x^{2}}\left(36x-24x^{3}\right)+\left(e^{e^{5}+x^{2}}\left(-9+6x^{2}\right)+e^{x^{2}}\right.}{}$$

3.269.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.26

$$\int \frac{3x + e^{e^5+x^2}(36-24x^2) + e^{x^2}(36x-24x^3}{-16e^{e^5+x^2}x^2 - 16e^{x^2}x^3 + (4e^{e^5+x^2}x^2 + 4e^{x^2}x^3)\log(e^{e^5}+x) + (-16e^{e^5}x^2 - 16x^3 + (4e^{e^5}x^2 + 4x^3)\log(e^{e}}$$
$$= \frac{3}{x\log\left(\frac{xe^{\left(e^5\right)}}{e^{\left(e^5\right)}\log\left(\log\left(x+e^{\left(e^5\right)}\right)-4\right)+e^{\left(x^2+e^5\right)}}\right)+2x}$$

input
```
integrate(((((-3*exp(exp(5))-3*x)*log(exp(exp(5))+x)+12*exp(exp(5))+12*x)*
log(log(exp(exp(5))+x)-4)+(-3*exp(x^2)*exp(exp(5))-3*exp(x^2)*x)*log(exp(e
xp(5))+x)+12*exp(x^2)*exp(exp(5))+12*exp(x^2)*x)*log(x/(log(log(exp(exp(5)
)+x)-4)+exp(x^2)))+((-9*exp(exp(5))-9*x)*log(exp(exp(5))+x)+36*exp(exp(5))
+36*x)*log(log(exp(exp(5))+x)-4)+((6*x^2-9)*exp(x^2)*exp(exp(5))+(6*x^3-9*
x)*exp(x^2))*log(exp(exp(5))+x)+(-24*x^2+36)*exp(x^2)*exp(exp(5))+(-24*x^3
+36*x)*exp(x^2)+3*x)/((((x^2*exp(exp(5))+x^3)*log(exp(exp(5))+x)-4*x^2*exp
(exp(5))-4*x^3)*log(log(exp(exp(5))+x)-4)+(x^2*exp(x^2)*exp(exp(5))+x^3*ex
p(x^2))*log(exp(exp(5))+x)-4*x^2*exp(x^2)*exp(exp(5))-4*x^3*exp(x^2))*log(
x/(log(log(exp(exp(5))+x)-4)+exp(x^2)))^2+(((4*x^2*exp(exp(5))+4*x^3)*log(
exp(exp(5))+x)-16*x^2*exp(exp(5))-16*x^3)*log(log(exp(exp(5))+x)-4)+(4*x^2
*exp(x^2)*exp(exp(5))+4*x^3*exp(x^2))*log(exp(exp(5))+x)-16*x^2*exp(x^2)*e
xp(exp(5))-16*x^3*exp(x^2))*log(x/(log(log(exp(exp(5))+x)-4)+exp(x^2)))+((
4*x^2*exp(exp(5))+4*x^3)*log(exp(exp(5))+x)-16*x^2*exp(exp(5))-16*x^3)*log
(log(exp(exp(5))+x)-4)+(4*x^2*exp(x^2)*exp(exp(5))+4*x^3*exp(x^2))*log(exp
(exp(5))+x)-16*x^2*exp(x^2)*exp(exp(5))-16*x^3*exp(x^2)),x, algorithm=\
```

output
```
3/(x*log(x*e^(e^5)/(e^(e^5)*log(log(x + e^(e^5)) - 4) + e^(x^2 + e^5))) +
2*x)
```

3.269.

$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+\left(e^{e^5+x^2}(-9+6x^2)+e^{x^2}\right.}{}$$

3.269.6 Sympy [F(-1)]

Timed out.

$$\int \frac{3x + e^{e^5+x^2}(36 - 24x^2) + e^{x^2}(36x - 24x}{-16e^{e^5+x^2}x^2 - 16e^{x^2}x^3 + (4e^{e^5+x^2}x^2 + 4e^{x^2}x^3)\log(e^{e^5} + x) + (-16e^{e^5}x^2 - 16x^3 + (4e^{e^5}x^2 + 4x^3)\log(e^{e}}$$

= Timed out

input
```
integrate(((((-3*exp(exp(5))-3*x)*ln(exp(exp(5))+x)+12*exp(exp(5))+12*x)*l
n(ln(exp(exp(5))+x)-4)+(-3*exp(x**2)*exp(exp(5))-3*exp(x**2)*x)*ln(exp(exp
(5))+x)+12*exp(x**2)*exp(exp(5))+12*exp(x**2)*x)*ln(x/(ln(ln(exp(exp(5))+x
)-4)+exp(x**2)))+((-9*exp(exp(5))-9*x)*ln(exp(exp(5))+x)+36*exp(exp(5))+36
*x)*ln(ln(exp(exp(5))+x)-4)+((6*x**2-9)*exp(x**2)*exp(exp(5))+(6*x**3-9*x)
*exp(x**2))*ln(exp(exp(5))+x)+(-24*x**2+36)*exp(x**2)*exp(exp(5))+(-24*x**
3+36*x)*exp(x**2)+3*x)/((((x**2*exp(exp(5))+x**3)*ln(exp(exp(5))+x)-4*x**2
*exp(exp(5))-4*x**3)*ln(ln(exp(exp(5))+x)-4)+(x**2*exp(x**2)*exp(exp(5))+x
**3*exp(x**2))*ln(exp(exp(5))+x)-4*x**2*exp(x**2)*exp(exp(5))-4*x**3*exp(x
**2))*ln(x/(ln(ln(exp(exp(5))+x)-4)+exp(x**2)))**2+(((4*x**2*exp(exp(5))+4
*x**3)*ln(exp(exp(5))+x)-16*x**2*exp(exp(5))-16*x**3)*ln(ln(exp(exp(5))+x)
-4)+(4*x**2*exp(x**2)*exp(exp(5))+4*x**3*exp(x**2))*ln(exp(exp(5))+x)-16*x
**2*exp(x**2)*exp(exp(5))-16*x**3*exp(x**2))*ln(x/(ln(ln(exp(exp(5))+x)-4)
+exp(x**2)))+((4*x**2*exp(exp(5))+4*x**3)*ln(exp(exp(5))+x)-16*x**2*exp(ex
p(5))-16*x**3)*ln(ln(exp(exp(5))+x)-4)+(4*x**2*exp(x**2)*exp(exp(5))+4*x**
3*exp(x**2))*ln(exp(exp(5))+x)-16*x**2*exp(x**2)*exp(exp(5))-16*x**3*exp(x
**2)),x)
```

output
```
Timed out
```

3.269.7 Maxima [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.97

$$\int \frac{3x + e^{e^5+x^2}(36 - 24x^2) + e^{x^2}(36x - 24x}{-16e^{e^5+x^2}x^2 - 16e^{x^2}x^3 + (4e^{e^5+x^2}x^2 + 4e^{x^2}x^3)\log(e^{e^5} + x) + (-16e^{e^5}x^2 - 16x^3 + (4e^{e^5}x^2 + 4x^3)\log(e^{e}}$$

$$= \frac{3}{x\log(x) - x\log\left(e^{(x^2)} + \log\left(\log\left(x + e^{(e^5)}\right) - 4\right)\right) + 2\,x}$$

3.269.

$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+\left(e^{e^5+x^2}(-9+6x^2)+e^{x^2}\right.}{}$$

input
```
integrate(((((-3*exp(exp(5))-3*x)*log(exp(exp(5))+x)+12*exp(exp(5))+12*x)*
log(log(exp(exp(5))+x)-4)+(-3*exp(x^2)*exp(exp(5))-3*exp(x^2)*x)*log(exp(e
xp(5))+x)+12*exp(x^2)*exp(exp(5))+12*exp(x^2)*x)*log(x/(log(log(exp(exp(5)
)+x)-4)+exp(x^2)))+((-9*exp(exp(5))-9*x)*log(exp(exp(5))+x)+36*exp(exp(5))
+36*x)*log(log(exp(exp(5))+x)-4)+((6*x^2-9)*exp(x^2)*exp(exp(5))+(6*x^3-9*
x)*exp(x^2))*log(exp(exp(5))+x)+(-24*x^2+36)*exp(x^2)*exp(exp(5))+(-24*x^3
+36*x)*exp(x^2)+3*x)/((((x^2*exp(exp(5))+x^3)*log(exp(exp(5))+x)-4*x^2*exp
(exp(5))-4*x^3)*log(log(exp(exp(5))+x)-4)+(x^2*exp(x^2)*exp(exp(5))+x^3*ex
p(x^2))*log(exp(exp(5))+x)-4*x^2*exp(x^2)*exp(exp(5))-4*x^3*exp(x^2))*log(
x/(log(log(exp(exp(5))+x)-4)+exp(x^2)))^2+(((4*x^2*exp(exp(5))+4*x^3)*log(
exp(exp(5))+x)-16*x^2*exp(exp(5))-16*x^3)*log(log(exp(exp(5))+x)-4)+(4*x^2
*exp(x^2)*exp(exp(5))+4*x^3*exp(x^2))*log(exp(exp(5))+x)-16*x^2*exp(x^2)*e
xp(exp(5))-16*x^3*exp(x^2))*log(x/(log(log(exp(exp(5))+x)-4)+exp(x^2)))+((
4*x^2*exp(exp(5))+4*x^3)*log(exp(exp(5))+x)-16*x^2*exp(exp(5))-16*x^3)*log
(log(exp(exp(5))+x)-4)+(4*x^2*exp(x^2)*exp(exp(5))+4*x^3*exp(x^2))*log(exp
(exp(5))+x)-16*x^2*exp(x^2)*exp(exp(5))-16*x^3*exp(x^2)),x, algorithm=\
```

output
```
3/(x*log(x) - x*log(e^(x^2) + log(log(x + e^(e^5)) - 4)) + 2*x)
```

3.269.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1938 vs. $2(28) = 56$.

Time = 24.85 (sec) , antiderivative size = 1938, normalized size of antiderivative = 62.52

$$\int \frac{3x + e^{e^5+x^2}(36-24x^2) + e^{x^2}(36x-24x^3 \cdots}{-16e^{e^5+x^2}x^2 - 16e^{x^2}x^3 + (4e^{e^5+x^2}x^2 + 4e^{x^2}x^3)\log(e^{e^5}+x) + (-16e^{e^5}x^2 - 16x^3 + (4e^{e^5}x^2 + 4x^3)\log(e^{e^5} \cdots}$$

= Too large to display

$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+\left(e^{e^5+x^2}(-9+6x^2)+e^{x^2} \cdots}{\cdots}$$

input
```
integrate(((((-3*exp(exp(5))-3*x)*log(exp(exp(5))+x)+12*exp(exp(5))+12*x)*
log(log(exp(exp(5))+x)-4)+(-3*exp(x^2)*exp(exp(5))-3*exp(x^2)*x)*log(exp(e
xp(5))+x)+12*exp(x^2)*exp(exp(5))+12*exp(x^2)*x)*log(x/(log(log(exp(exp(5)
)+x)-4)+exp(x^2)))+((-9*exp(exp(5))-9*x)*log(exp(exp(5))+x)+36*exp(exp(5))
+36*x)*log(log(exp(exp(5))+x)-4)+((6*x^2-9)*exp(x^2)*exp(exp(5))+(6*x^3-9*
x)*exp(x^2))*log(exp(exp(5))+x)+(-24*x^2+36)*exp(x^2)*exp(exp(5))+(-24*x^3
+36*x)*exp(x^2)+3*x)/((((x^2*exp(exp(5))+x^3)*log(exp(exp(5))+x)-4*x^2*exp
(exp(5))-4*x^3)*log(log(exp(exp(5))+x)-4)+(x^2*exp(x^2)*exp(exp(5))+x^3*ex
p(x^2))*log(exp(exp(5))+x)-4*x^2*exp(x^2)*exp(exp(5))-4*x^3*exp(x^2))*log(
x/(log(log(exp(exp(5))+x)-4)+exp(x^2)))^2+(((4*x^2*exp(exp(5))+4*x^3)*log(
exp(exp(5))+x)-16*x^2*exp(exp(5))-16*x^3)*log(log(exp(exp(5))+x)-4)+(4*x^2
*exp(x^2)*exp(exp(5))+4*x^3*exp(x^2))*log(exp(exp(5))+x)-16*x^2*exp(x^2)*e
xp(exp(5))-16*x^3*exp(x^2))*log(x/(log(log(exp(exp(5))+x)-4)+exp(x^2)))+((
4*x^2*exp(exp(5))+4*x^3)*log(exp(exp(5))+x)-16*x^2*exp(exp(5))-16*x^3)*log
(log(exp(exp(5))+x)-4)+(4*x^2*exp(x^2)*exp(exp(5))+4*x^3*exp(x^2))*log(exp
(exp(5))+x)-16*x^2*exp(x^2)*exp(exp(5))-16*x^3*exp(x^2)),x, algorithm=\
```

output
```
3*(2*x^3*e^(x^2)*log(x + e^(e^5))*log(log(x + e^(e^5)) - 4) + 2*x^3*e^(2*x
^2)*log(x + e^(e^5)) - 8*x^3*e^(x^2)*log(log(x + e^(e^5)) - 4) + 2*x^2*e^(
x^2 + e^5)*log(x + e^(e^5))*log(log(x + e^(e^5)) - 4) - 8*x^3*e^(2*x^2) +
2*x^2*e^(2*x^2 + e^5)*log(x + e^(e^5)) - 8*x^2*e^(x^2 + e^5)*log(log(x + e
^(e^5)) - 4) - 2*x*e^(x^2)*log(x + e^(e^5))*log(log(x + e^(e^5)) - 4) - x*
log(x + e^(e^5))*log(log(x + e^(e^5)) - 4)^2 - e^(e^5)*log(x + e^(e^5))*lo
g(log(x + e^(e^5)) - 4)^2 - 8*x^2*e^(2*x^2 + e^5) - x*e^(2*x^2)*log(x + e^
(e^5)) + 8*x*e^(x^2)*log(log(x + e^(e^5)) - 4) - 2*e^(x^2 + e^5)*log(x + e
^(e^5))*log(log(x + e^(e^5)) - 4) + 4*x*log(log(x + e^(e^5)) - 4)^2 + 4*e^
(e^5)*log(log(x + e^(e^5)) - 4)^2 + 4*x*e^(2*x^2) + x*e^(x^2) - e^(2*x^2 +
 e^5)*log(x + e^(e^5)) + x*log(log(x + e^(e^5)) - 4) + 8*e^(x^2 + e^5)*log
(log(x + e^(e^5)) - 4) + 4*e^(2*x^2 + e^5))/(2*x^4*e^(x^2)*log(x + e^(e^5)
)*log(x)*log(log(x + e^(e^5)) - 4) - 2*x^4*e^(x^2)*log(x + e^(e^5))*log(e^
(x^2) + log(log(x + e^(e^5)) - 4))*log(log(x + e^(e^5)) - 4) + 2*x^4*e^(2*
x^2)*log(x + e^(e^5))*log(x) - 2*x^4*e^(2*x^2)*log(x + e^(e^5))*log(e^(x^2
) + log(log(x + e^(e^5)) - 4)) + 4*x^4*e^(x^2)*log(x + e^(e^5))*log(log(x
+ e^(e^5)) - 4) - 8*x^4*e^(x^2)*log(x)*log(log(x + e^(e^5)) - 4) + 2*x^3*e
^(x^2 + e^5)*log(x + e^(e^5))*log(x)*log(log(x + e^(e^5)) - 4) + 8*x^4*e^(
x^2)*log(e^(x^2) + log(log(x + e^(e^5)) - 4))*log(log(x + e^(e^5)) - 4) -
2*x^3*e^(x^2 + e^5)*log(x + e^(e^5))*log(e^(x^2) + log(log(x + e^(e^5))...
```

3.269.

$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+\left(e^{e^5+x^2}(-9+6x^2)+e^{x^2}\right.}{}$$

3.269.9 Mupad [F(-1)]

Timed out.

$$\int \frac{3x + e^{e^5+x^2}(36 - 24x^2) + e^{x^2}(36x - 24x}{-16e^{e^5+x^2}x^2 - 16e^{x^2}x^3 + (4e^{e^5+x^2}x^2 + 4e^{x^2}x^3)\log(e^{e^5} + x) + (-16e^{e^5}x^2 - 16x^3 + (4e^{e^5}x^2 + 4x^3)\log(e^{e}}$$

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input
```
int(-(3*x + log(x/(exp(x^2) + log(log(x + exp(exp(5))) - 4)))*(12*x*exp(x^
2) - log(x + exp(exp(5)))*(3*x*exp(x^2) + 3*exp(x^2)*exp(exp(5))) + 12*exp
(x^2)*exp(exp(5)) + log(log(x + exp(exp(5))) - 4)*(12*x + 12*exp(exp(5)) -
 log(x + exp(exp(5)))*(3*x + 3*exp(exp(5))))) + exp(x^2)*(36*x - 24*x^3) +
 log(log(x + exp(exp(5))) - 4)*(36*x + 36*exp(exp(5)) - log(x + exp(exp(5)
))*(9*x + 9*exp(exp(5)))) - log(x + exp(exp(5)))*(exp(x^2)*(9*x - 6*x^3) -
 exp(x^2)*exp(exp(5))*(6*x^2 - 9)) - exp(x^2)*exp(exp(5))*(24*x^2 - 36))/(
16*x^3*exp(x^2) - log(x + exp(exp(5)))*(4*x^3*exp(x^2) + 4*x^2*exp(x^2)*ex
p(exp(5))) + log(log(x + exp(exp(5))) - 4)*(16*x^2*exp(exp(5)) - log(x + e
xp(exp(5)))*(4*x^2*exp(exp(5)) + 4*x^3) + 16*x^3) + log(x/(exp(x^2) + log(
log(x + exp(exp(5))) - 4)))*(16*x^3*exp(x^2) - log(x + exp(exp(5)))*(4*x^3
*exp(x^2) + 4*x^2*exp(x^2)*exp(exp(5))) + log(log(x + exp(exp(5))) - 4)*(1
6*x^2*exp(exp(5)) - log(x + exp(exp(5)))*(4*x^2*exp(exp(5)) + 4*x^3) + 16*
x^3) + 16*x^2*exp(x^2)*exp(exp(5))) + log(x/(exp(x^2) + log(log(x + exp(ex
p(5))) - 4)))^2*(4*x^3*exp(x^2) + log(log(x + exp(exp(5))) - 4)*(4*x^2*exp
(exp(5)) - log(x + exp(exp(5)))*(x^2*exp(exp(5)) + x^3) + 4*x^3) - log(x +
 exp(exp(5)))*(x^3*exp(x^2) + x^2*exp(x^2)*exp(exp(5))) + 4*x^2*exp(x^2)*e
xp(exp(5))) + 16*x^2*exp(x^2)*exp(exp(5))),x)
```


$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+\left(e^{e^5+x^2}(-9+6x^2)+e^{x^2}\right.}{}$$

output
```
int(-(3*x + log(x/(exp(x^2) + log(log(x + exp(exp(5))) - 4)))*(12*x*exp(x^
2) - log(x + exp(exp(5)))*(3*x*exp(x^2) + 3*exp(x^2)*exp(exp(5))) + 12*exp
(x^2)*exp(exp(5)) + log(log(x + exp(exp(5))) - 4)*(12*x + 12*exp(exp(5)) -
 log(x + exp(exp(5)))*(3*x + 3*exp(exp(5))))) + exp(x^2)*(36*x - 24*x^3) +
 log(log(x + exp(exp(5))) - 4)*(36*x + 36*exp(exp(5)) - log(x + exp(exp(5)
))*(9*x + 9*exp(exp(5)))) - log(x + exp(exp(5)))*(exp(x^2)*(9*x - 6*x^3) -
 exp(x^2)*exp(exp(5))*(6*x^2 - 9)) - exp(x^2)*exp(exp(5))*(24*x^2 - 36))/(
16*x^3*exp(x^2) - log(x + exp(exp(5)))*(4*x^3*exp(x^2) + 4*x^2*exp(x^2)*ex
p(exp(5))) + log(log(x + exp(exp(5))) - 4)*(16*x^2*exp(exp(5)) - log(x + e
xp(exp(5)))*(4*x^2*exp(exp(5)) + 4*x^3) + 16*x^3) + log(x/(exp(x^2) + log(
log(x + exp(exp(5))) - 4)))*(16*x^3*exp(x^2) - log(x + exp(exp(5)))*(4*x^3
*exp(x^2) + 4*x^2*exp(x^2)*exp(exp(5))) + log(log(x + exp(exp(5))) - 4)*(1
6*x^2*exp(exp(5)) - log(x + exp(exp(5)))*(4*x^2*exp(exp(5)) + 4*x^3) + 16*
x^3) + 16*x^2*exp(x^2)*exp(exp(5))) + log(x/(exp(x^2) + log(log(x + exp(ex
p(5))) - 4)))^2*(4*x^3*exp(x^2) + log(log(x + exp(exp(5))) - 4)*(4*x^2*exp
(exp(5)) - log(x + exp(exp(5)))*(x^2*exp(exp(5)) + x^3) + 4*x^3) - log(x +
 exp(exp(5)))*(x^3*exp(x^2) + x^2*exp(x^2)*exp(exp(5))) + 4*x^2*exp(x^2)*e
xp(exp(5))) + 16*x^2*exp(x^2)*exp(exp(5))), x)
```

3.269.

$$\int \frac{3x+e^{e^5+x^2}(36-24x^2)+e^{x^2}(36x-24x^3)+\left(e^{e^5+x^2}(-9+6x^2)+e^{x^2}\right.}{}$$

3.270 $\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{\cdots}\right.}{-e^8x^2+e^{x^2}x^2-10e^4x^3-\cdots}$

3.270.1 Optimal result

Integrand size = 139, antiderivative size = 33

$$\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^{\cdots}\right.}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}$$
$$=3+\frac{-e^5+x+\log\left(x\left(-e^{x^2}+(e^4+5x)^2\right)\right)}{x}$$

output
```
3+(x-exp(5)+ln(x*((5*x+exp(4))^2-exp(x^2))))/x
```

3.270.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.15

$$\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^{\cdots}\right.}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}$$
$$=-\frac{e^5}{x}+\frac{\log\left(x\left(e^8-e^{x^2}+10e^4x+25x^2\right)\right)}{x}$$

input
```
Integrate[(-E^8 - 20*E^4*x - 75*x^2 + E^5*(-E^8 - 10*E^4*x - 25*x^2) + E^x
^2*(1 + E^5 + 2*x^2) + (E^8 - E^x^2 + 10*E^4*x + 25*x^2)*Log[E^8*x - E^x^2
*x + 10*E^4*x^2 + 25*x^3])/(-(E^8*x^2) + E^x^2*x^2 - 10*E^4*x^3 - 25*x^4),
x]
```

3.270.
$$\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^8x-e^{x^2}x+10e^4x^2+25x^3\right)}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}\,dx$$

output
```
-(E^5/x) + Log[x*(E^8 - E^x^2 + 10*E^4*x + 25*x^2)]/x
```

3.270.3 Rubi [A] (verified)

Time = 1.80 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.39, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.014, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-75x^2+e^5\left(-25x^2-10e^4x-e^8\right)+e^{x^2}\left(2x^2+e^5+1\right)+\left(25x^2-e^{x^2}+10e^4x+e^8\right)\log\left(25x^3+10e^4x^2-e^{x^2}\right.}{-25x^4-10e^4x^3+e^{x^2}x^2-e^8x^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2x^2-\log\left(x\left(25x^2-e^{x^2}+10e^4x+e^8\right)\right)+e^5+1}{x^2}+\frac{2\left(-25x^3-10e^4x^2+\left(25-e^8\right)x+5e^4\right)}{x\left(25x^2-e^{x^2}+10e^4x+e^8\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{\log\left(25x^3+10e^4x^2-e^{x^2}x+e^8x\right)}{x}-\frac{1+e^5}{x}+\frac{1}{x}$$

input
```
Int[(-E^8 - 20*E^4*x - 75*x^2 + E^5*(-E^8 - 10*E^4*x - 25*x^2) + E^x^2*(1
+ E^5 + 2*x^2) + (E^8 - E^x^2 + 10*E^4*x + 25*x^2)*Log[E^8*x - E^x^2*x + 1
0*E^4*x^2 + 25*x^3])/(-(E^8*x^2) + E^x^2*x^2 - 10*E^4*x^3 - 25*x^4),x]
```

output
```
x^(-1) - (1 + E^5)/x + Log[E^8*x - E^x^2*x + 10*E^4*x^2 + 25*x^3]/x
```

3.270.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.270.4 Maple [A] (verified)

Time = 1.18 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

method	result
parallelrisch	$-\frac{e^{5}-\ln\left(x\left(-e^{x^{2}}+e^{8}+10x\,e^{4}+25x^{2}\right)\right)}{x}$
norman	$\frac{-e^{5}+\ln\left(-e^{x^{2}}x+x\,e^{8}+10x^{2}e^{4}+25x^{3}\right)}{x}$
risch	$\frac{\ln\left(-e^{x^{2}}+e^{8}+10x\,e^{4}+25x^{2}\right)}{x}-\frac{-i\pi\,\mathrm{csgn}\left(i\left(-e^{x^{2}}+e^{8}+10x\,e^{4}+25x^{2}\right)\right)\mathrm{csgn}\left(ix\left(-e^{x^{2}}+e^{8}+10x\,e^{4}+25x^{2}\right)\right)^{2}+i\pi\,\mathrm{csgn}\left(i\left(-\right.\right.}{}$

input
```
int(((-exp(x^2)+exp(4)^2+10*x*exp(4)+25*x^2)*ln(-exp(x^2)*x+x*exp(4)^2+10*
x^2*exp(4)+25*x^3)+(exp(5)+2*x^2+1)*exp(x^2)+(-exp(4)^2-10*x*exp(4)-25*x^2
)*exp(5)-exp(4)^2-20*x*exp(4)-75*x^2)/(x^2*exp(x^2)-x^2*exp(4)^2-10*x^3*ex
p(4)-25*x^4),x,method=_RETURNVERBOSE)
```

output
```
-(exp(5)-ln(x*(-exp(x^2)+exp(4)^2+10*x*exp(4)+25*x^2)))/x
```

3.270.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^8\right.}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}$$
$$=-\frac{e^5-\log\left(25\,x^3+10\,x^2e^4+xe^8-xe^{(x^2)}\right)}{x}$$

input
```
integrate(((-exp(x^2)+exp(4)^2+10*x*exp(4)+25*x^2)*log(-exp(x^2)*x+x*exp(4
)^2+10*x^2*exp(4)+25*x^3)+(exp(5)+2*x^2+1)*exp(x^2)+(-exp(4)^2-10*x*exp(4)
-25*x^2)*exp(5)-exp(4)^2-20*x*exp(4)-75*x^2)/(x^2*exp(x^2)-x^2*exp(4)^2-10
*x^3*exp(4)-25*x^4),x, algorithm=\
```

output
```
-(e^5 - log(25*x^3 + 10*x^2*e^4 + x*e^8 - x*e^(x^2)))/x
```

3.270.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^8\right.}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}$$
$$=\frac{\log\left(25x^3+10x^2e^4-xe^{x^2}+xe^8\right)}{x}-\frac{e^5}{x}$$

input
```
integrate(((-exp(x**2)+exp(4)**2+10*x*exp(4)+25*x**2)*ln(-exp(x**2)*x+x*ex
p(4)**2+10*x**2*exp(4)+25*x**3)+(exp(5)+2*x**2+1)*exp(x**2)+(-exp(4)**2-10
*x*exp(4)-25*x**2)*exp(5)-exp(4)**2-20*x*exp(4)-75*x**2)/(x**2*exp(x**2)-x
**2*exp(4)**2-10*x**3*exp(4)-25*x**4),x)
```

output
```
log(25*x**3 + 10*x**2*exp(4) - x*exp(x**2) + x*exp(8))/x - exp(5)/x
```

3.270.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.03

$$\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^8\right.}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}$$
$$=-\frac{e^5-\log\left(25\,x^2+10\,xe^4+e^8-e^{(x^2)}\right)-\log\left(x\right)}{x}$$

input
```
integrate(((-exp(x^2)+exp(4)^2+10*x*exp(4)+25*x^2)*log(-exp(x^2)*x+x*exp(4
)^2+10*x^2*exp(4)+25*x^3)+(exp(5)+2*x^2+1)*exp(x^2)+(-exp(4)^2-10*x*exp(4)
-25*x^2)*exp(5)-exp(4)^2-20*x*exp(4)-75*x^2)/(x^2*exp(x^2)-x^2*exp(4)^2-10
*x^3*exp(4)-25*x^4),x, algorithm=\
```

output
```
-(e^5 - log(25*x^2 + 10*x*e^4 + e^8 - e^(x^2)) - log(x))/x
```

3.270.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^8\right.}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}$$

$$=-\frac{e^5-\log\left(25\,x^3+10\,x^2e^4+xe^8-xe^{(x^2)}\right)}{x}$$

input
```
integrate(((-exp(x^2)+exp(4)^2+10*x*exp(4)+25*x^2)*log(-exp(x^2)*x+x*exp(4
)^2+10*x^2*exp(4)+25*x^3)+(exp(5)+2*x^2+1)*exp(x^2)+(-exp(4)^2-10*x*exp(4)
-25*x^2)*exp(5)-exp(4)^2-20*x*exp(4)-75*x^2)/(x^2*exp(x^2)-x^2*exp(4)^2-10
*x^3*exp(4)-25*x^4),x, algorithm=\
```

output
```
-(e^5 - log(25*x^3 + 10*x^2*e^4 + x*e^8 - x*e^(x^2)))/x
```

3.270.9 Mupad [B] (verification not implemented)

Time = 13.22 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^8\right.}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}$$

$$=-\frac{\mathrm{e}^5-\ln\left(x\,\mathrm{e}^8-x\,\mathrm{e}^{x^2}+10\,x^2\,\mathrm{e}^4+25\,x^3\right)}{x}$$

input
```
int((exp(8) - log(x*exp(8) - x*exp(x^2) + 10*x^2*exp(4) + 25*x^3)*(exp(8)
- exp(x^2) + 10*x*exp(4) + 25*x^2) + 20*x*exp(4) - exp(x^2)*(exp(5) + 2*x^
2 + 1) + 75*x^2 + exp(5)*(exp(8) + 10*x*exp(4) + 25*x^2))/(10*x^3*exp(4) -
 x^2*exp(x^2) + x^2*exp(8) + 25*x^4),x)
```

output
```
-(exp(5) - log(x*exp(8) - x*exp(x^2) + 10*x^2*exp(4) + 25*x^3))/x
```

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$\int \frac{-e^8-20e^4x-75x^2+e^5(-e^8-10e^4x-25x^2)+e^{x^2}(1+e^5+2x^2)+\left(e^8-e^{x^2}+10e^4x+25x^2\right)\log\left(e^8x-e^{x^2}x+10e^4x^2+25x^3\right)}{-e^8x^2+e^{x^2}x^2-10e^4x^3-25x^4}\,dx$

3.271 $\int \frac{-5e^{2x}+e^x(-45+15x+10x^2-3x^3)+e^x(-5+5x}{16x^2+e^{2x}x^2-8x^3+x^4+e^x(8x^2-2x^3)+(8x^2+2e^xx^2-2x^3)\log(x)+x^2}$

3.271.1 Optimal result

Integrand size = 179, antiderivative size = 29

$$\int \frac{-5e^{2x}+e^x(-45+15x+10x^2-3x^3)+e^x(-5+5x+3x^2)\log(x)+e^x(-5+5x}{16x^2+e^{2x}x^2-8x^3+x^4+e^x(8x^2-2x^3)+(8x^2+2e^xx^2-2x^3)\log(x)+x^2\log^2(x)+(8x^2+2e^xx^2-2}$$
$$=\frac{e^x\left(3+\frac{5}{x}\right)}{4+e^x-x+\log(x)+\log(81x^4)}$$

output
```
(3+5/x)/(ln(81*x^4)+4+exp(x)-x+ln(x))*exp(x)
```

3.271.2 Mathematica [A] (verified)

Time = 5.08 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{-5e^{2x}+e^x(-45+15x+10x^2-3x^3)+e^x(-5+5x+3x^2)\log(x)+e^x(-5+5x}{16x^2+e^{2x}x^2-8x^3+x^4+e^x(8x^2-2x^3)+(8x^2+2e^xx^2-2x^3)\log(x)+x^2\log^2(x)+(8x^2+2e^xx^2-2}$$
$$=\frac{e^x(5+3x)}{x(4+e^x-x+\log(x)+\log(81x^4))}$$

input
```
Integrate[(-5*E^(2*x) + E^x*(-45 + 15*x + 10*x^2 - 3*x^3) + E^x*(-5 + 5*x
+ 3*x^2)*Log[x] + E^x*(-5 + 5*x + 3*x^2)*Log[81*x^4])/(16*x^2 + E^(2*x)*x^
2 - 8*x^3 + x^4 + E^x*(8*x^2 - 2*x^3) + (8*x^2 + 2*E^x*x^2 - 2*x^3)*Log[x]
 + x^2*Log[x]^2 + (8*x^2 + 2*E^x*x^2 - 2*x^3 + 2*x^2*Log[x])*Log[81*x^4] +
 x^2*Log[81*x^4]^2),x]
```

output
```
(E^x*(5 + 3*x))/(x*(4 + E^x - x + Log[x] + Log[81*x^4]))
```

3.271.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(3x^2+5x-5\right)\log(x)+e^x\left(3x^2+5x-5\right)\log\left(81x^4\right)+e^x\left(-3x^3+10x^2+15x\right.}{x^4-8x^3+e^{2x}x^2+16x^2+x^2\log^2(x)+x^2\log^2\left(81x^4\right)+e^x\left(8x^2-2x^3\right)+\left(-2x^3+2e^xx^2+8x^2\right)\log(x)+\left(-2\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{e^x\left(-3x^3+10x^2-\left(-3x^2-5x+5\right)\log(x)-\left(-3x^2-5x+5\right)\log\left(81x^4\right)+15x-5e^x-45\right)}{x^2\left(\log\left(81x^4\right)-x+e^x+\log(x)+4\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{5e^x}{x^2\left(-\log\left(x^4\right)+x-e^x-\log(81x)-4\right)}-\frac{e^x(3x+5)\left(-x\log\left(81x^4\right)+x^2-5x-x\log(x)+5\right)}{x^2\left(-\log\left(81x^4\right)+x-e^x-\log(x)-4\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$10\int \frac{e^x}{x\left(x-e^x-\log(x)-\log\left(81x^4\right)-4\right)^2}dx-3\int \frac{e^xx}{\left(x-e^x-\log(x)-\log\left(81x^4\right)-4\right)^2}dx+5\int \frac{e^x\log(x)}{x\left(x-e^x-\log(x)-\log\left(81x^4\right)-4\right)^2}dx+5\int \frac{e^x\log\left(81x^4\right)}{x\left(x-e^x-\log(x)-\log\left(81x^4\right)-4\right)^2}dx+10\int \frac{e^x}{\left(-x+e^x+\log(x)+\log\left(81x^4\right)+4\right)^2}dx+3\int \frac{e^x\log(x)}{\left(-x+e^x+\log(x)+\log\left(81x^4\right)+4\right)^2}dx+3\int \frac{e^x\log\left(81x^4\right)}{\left(-x+e^x+\log(x)+\log\left(81x^4\right)+4\right)^2}dx+5\int \frac{e^x}{x^2\left(x-e^x-\log(81x)-\log\left(x^4\right)-4\right)}dx-25\int \frac{e^x}{x^2\left(x-e^x-\log(x)-\log\left(81x^4\right)-4\right)^2}dx$$

input
```
Int[(-5*E^(2*x) + E^x*(-45 + 15*x + 10*x^2 - 3*x^3) + E^x*(-5 + 5*x + 3*x^
2)*Log[x] + E^x*(-5 + 5*x + 3*x^2)*Log[81*x^4])/(16*x^2 + E^(2*x)*x^2 - 8*
x^3 + x^4 + E^x*(8*x^2 - 2*x^3) + (8*x^2 + 2*E^x*x^2 - 2*x^3)*Log[x] + x^2
*Log[x]^2 + (8*x^2 + 2*E^x*x^2 - 2*x^3 + 2*x^2*Log[x])*Log[81*x^4] + x^2*L
og[81*x^4]^2),x]
```

output
```
$Aborted
```

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$$\int \frac{-5e^{2x}+e^x\left(-45+15x+10x^2-3x^3\right)+e^x\left(-5+5x+3x^2\right)\log(x)+e^x\left(-5+5x+3x^2\right)\log\left(81x^4\right)}{16x^2+e^{2x}x^2-8x^3+x^4+e^x\left(8x^2-2x^3\right)+\left(8x^2+2e^xx^2-2x^3\right)\log(x)+x^2\log^2(x)+\left(8x^2+2e^xx^2-2x^3+2x^2\log(x)\right)\log\left(81x^4\right)+x^2\log^2\left(81x^4\right)}\,dx$$

3.271.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.271.4 Maple [A] (verified)

Time = 1.24 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24

method	result
parallelrisch	$\frac{-3\,e^{x}x-5\,e^{x}}{x(x-e^{x}-\ln(x)-\ln(81x^{4})-4)}$
risch	$-\frac{}{x\left(i\pi\ \mathrm{csgn}(ix^{2})\,\mathrm{csgn}(ix)\,\mathrm{csgn}(ix^{3})-i\pi\ \mathrm{csgn}(ix^{2})\,\mathrm{csgn}(ix^{3})^{2}+i\pi\,\mathrm{csgn}(ix^{2})^{3}-i\pi\ \mathrm{csgn}(ix)\,\mathrm{csgn}(ix^{3})^{2}+i\pi\ \mathrm{csgn}(ix^{2})\,\mathrm{csgn}(ix)^{2}\right.}$

input
```
int(((3*x^2+5*x-5)*exp(x)*ln(81*x^4)+(3*x^2+5*x-5)*exp(x)*ln(x)-5*exp(x)^2
+(-3*x^3+10*x^2+15*x-45)*exp(x))/(x^2*ln(81*x^4)^2+(2*x^2*ln(x)+2*exp(x)*x
^2-2*x^3+8*x^2)*ln(81*x^4)+x^2*ln(x)^2+(2*exp(x)*x^2-2*x^3+8*x^2)*ln(x)+ex
p(x)^2*x^2+(-2*x^3+8*x^2)*exp(x)+x^4-8*x^3+16*x^2),x,method=_RETURNVERBOSE
)
```

output
```
1/x*(-3*exp(x)*x-5*exp(x))/(x-exp(x)-ln(x)-ln(81*x^4)-4)
```

3.271.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

$$\int \frac{-5e^{2x}+e^{x}(-45+15x+10x^{2}-3x^{3})+e^{x}(-5+5x+3x^{2})\log(x)+e^{x}(-5+5x}{16x^{2}+e^{2x}x^{2}-8x^{3}+x^{4}+e^{x}\left(8x^{2}-2x^{3}\right)+\left(8x^{2}+2e^{x}x^{2}-2x^{3}\right)\log(x)+x^{2}\log^{2}(x)+\left(8x^{2}+2e^{x}x^{2}-2\right.}$$
$$=-\frac{(3\,x+5)e^{x}}{x^{2}-xe^{x}-4\,x\log(3)-5\,x\log(x)-4\,x}$$

input
```
integrate(((3*x^2+5*x-5)*exp(x)*log(81*x^4)+(3*x^2+5*x-5)*exp(x)*log(x)-5*
exp(x)^2+(-3*x^3+10*x^2+15*x-45)*exp(x))/(x^2*log(81*x^4)^2+(2*x^2*log(x)+
2*exp(x)*x^2-2*x^3+8*x^2)*log(81*x^4)+x^2*log(x)^2+(2*exp(x)*x^2-2*x^3+8*x
^2)*log(x)+exp(x)^2*x^2+(-2*x^3+8*x^2)*exp(x)+x^4-8*x^3+16*x^2),x, algorit
hm=\
```

output
```
-(3*x + 5)*e^x/(x^2 - x*e^x - 4*x*log(3) - 5*x*log(x) - 4*x)
```

3.271.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(24) = 48.

Time = 0.13 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.10

$$\int \frac{-5e^{2x} + e^x(-45 + 15x + 10x^2 - 3x^3) + e^x(-5 + 5x + 3x^2)\log(x) + e^x(-5 + 5x}{16x^2 + e^{2x}x^2 - 8x^3 + x^4 + e^x(8x^2 - 2x^3) + (8x^2 + 2e^x x^2 - 2x^3)\log(x) + x^2\log^2(x) + (8x^2 + 2e^x x^2 - 2}$$
$$= \frac{3x^2 - 15x\log(x) - 12x\log(3) - 7x - 25\log(x) - 20\log(3) - 20}{-x^2 + xe^x + 5x\log(x) + 4x + 4x\log(3)} + \frac{5}{x}$$

input
```
integrate(((3*x**2+5*x-5)*exp(x)*ln(81*x**4)+(3*x**2+5*x-5)*exp(x)*ln(x)-5
*exp(x)**2+(-3*x**3+10*x**2+15*x-45)*exp(x))/(x**2*ln(81*x**4)**2+(2*x**2*
ln(x)+2*exp(x)*x**2-2*x**3+8*x**2)*ln(81*x**4)+x**2*ln(x)**2+(2*exp(x)*x**
2-2*x**3+8*x**2)*ln(x)+exp(x)**2*x**2+(-2*x**3+8*x**2)*exp(x)+x**4-8*x**3+
16*x**2),x)
```

output
```
(3*x**2 - 15*x*log(x) - 12*x*log(3) - 7*x - 25*log(x) - 20*log(3) - 20)/(-
x**2 + x*exp(x) + 5*x*log(x) + 4*x + 4*x*log(3)) + 5/x
```

3.271.7 Maxima [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.62

$$\int \frac{-5e^{2x} + e^x(-45 + 15x + 10x^2 - 3x^3) + e^x(-5 + 5x + 3x^2)\log(x) + e^x(-5 + 5x}{16x^2 + e^{2x}x^2 - 8x^3 + x^4 + e^x(8x^2 - 2x^3) + (8x^2 + 2e^x x^2 - 2x^3)\log(x) + x^2\log^2(x) + (8x^2 + 2e^x x^2 - 2}$$
$$= -\frac{3x^2 - 12x(\log(3) + 1) - 15x\log(x) + 5e^x}{x^2 - 4x(\log(3) + 1) - xe^x - 5x\log(x)}$$

input
```
integrate(((3*x^2+5*x-5)*exp(x)*log(81*x^4)+(3*x^2+5*x-5)*exp(x)*log(x)-5*
exp(x)^2+(-3*x^3+10*x^2+15*x-45)*exp(x))/(x^2*log(81*x^4)^2+(2*x^2*log(x)+
2*exp(x)*x^2-2*x^3+8*x^2)*log(81*x^4)+x^2*log(x)^2+(2*exp(x)*x^2-2*x^3+8*x
^2)*log(x)+exp(x)^2*x^2+(-2*x^3+8*x^2)*exp(x)+x^4-8*x^3+16*x^2),x, algorit
hm=\
```

output
```
-(3*x^2 - 12*x*(log(3) + 1) - 15*x*log(x) + 5*e^x)/(x^2 - 4*x*(log(3) + 1)
 - x*e^x - 5*x*log(x))
```

3.271.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24

$$\int \frac{-5e^{2x} + e^x(-45 + 15x + 10x^2 - 3x^3) + e^x(-5 + 5x + 3x^2)\log(x) + e^x(-5 + 5x}{16x^2 + e^{2x}x^2 - 8x^3 + x^4 + e^x(8x^2 - 2x^3) + (8x^2 + 2e^x x^2 - 2x^3)\log(x) + x^2\log^2(x) + (8x^2 + 2e^x x^2 - 2}$$
$$= -\frac{3\,xe^x + 5\,e^x}{x^2 - xe^x - 4\,x\log(3) - 5\,x\log(x) - 4\,x}$$

input
```
integrate(((3*x^2+5*x-5)*exp(x)*log(81*x^4)+(3*x^2+5*x-5)*exp(x)*log(x)-5*
exp(x)^2+(-3*x^3+10*x^2+15*x-45)*exp(x))/(x^2*log(81*x^4)^2+(2*x^2*log(x)+
2*exp(x)*x^2-2*x^3+8*x^2)*log(81*x^4)+x^2*log(x)^2+(2*exp(x)*x^2-2*x^3+8*x
^2)*log(x)+exp(x)^2*x^2+(-2*x^3+8*x^2)*exp(x)+x^4-8*x^3+16*x^2),x, algorit
hm=\
```

output
```
-(3*x*e^x + 5*e^x)/(x^2 - x*e^x - 4*x*log(3) - 5*x*log(x) - 4*x)
```

3.271.9 Mupad [B] (verification not implemented)

Time = 12.82 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.69

$$\int \frac{-5e^{2x} + e^x(-45 + 15x + 10x^2 - 3x^3) + e^x(-5 + 5x + 3x^2)\log(x) + e^x(-5 + 5x}{16x^2 + e^{2x}x^2 - 8x^3 + x^4 + e^x(8x^2 - 2x^3) + (8x^2 + 2e^x x^2 - 2x^3)\log(x) + x^2\log^2(x) + (8x^2 + 2e^x x^2 - 2}$$
$$= -\frac{12\,x - 5\,\mathrm{e}^x + 3\,x\,\ln(81\,x^4) + 3\,x\,\ln(x) - 3\,x^2}{x\,(\ln(81\,x^4) - x + \mathrm{e}^x + \ln(x) + 4)}$$

input
```
int((exp(x)*(15*x + 10*x^2 - 3*x^3 - 45) - 5*exp(2*x) + exp(x)*log(81*x^4)
*(5*x + 3*x^2 - 5) + exp(x)*log(x)*(5*x + 3*x^2 - 5))/(exp(x)*(8*x^2 - 2*x
^3) + log(x)*(2*x^2*exp(x) + 8*x^2 - 2*x^3) + x^2*log(81*x^4)^2 + x^2*exp(
2*x) + x^2*log(x)^2 + 16*x^2 - 8*x^3 + x^4 + log(81*x^4)*(2*x^2*exp(x) + 2
*x^2*log(x) + 8*x^2 - 2*x^3)),x)
```

output
```
-(12*x - 5*exp(x) + 3*x*log(81*x^4) + 3*x*log(x) - 3*x^2)/(x*(log(81*x^4)
- x + exp(x) + log(x) + 4))
```

3.271.

$$\int \frac{-5e^{2x}+e^x(-45+15x+10x^2-3x^3)+e^x(-5+5x+3x^2)\log(x)+e^x(-5+5x+3x^2)\log(81x^4)}{16x^2+e^{2x}x^2-8x^3+x^4+e^x(8x^2-2x^3)+(8x^2+2e^xx^2-2x^3)\log(x)+x^2\log^2(x)+(8x^2+2e^xx^2-2x^3+2x^2\log(x))\log(81x^4)+x^2\log^2(81x^4)}\,dx$$

3.272 $\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+}{(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2)}$

3.272.1 Optimal result

Integrand size = 154, antiderivative size = 29

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\,\mathrm{lo}}{(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-}{-15+30x}\right.}$$
$$=x-\log\left(\log\left(3-\frac{e^{2+x}}{3}-x+\frac{x}{5-10x}\right)\right)$$

output
```
x-ln(ln(3-x+x/(-10*x+5)-1/3*exp(2+x)))
```

3.272.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.21

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\,\mathrm{lo}}{(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-}{-15+30x}\right.}$$
$$=x-\log\left(\log\left(\frac{-45+e^{2+x}(5-10x)+102x-30x^2}{-15+30x}\right)\right)$$

3.272.

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-30x^2}{-15+30x}\right)}{(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-30x^2}{-15+30x}\right)}\,dx$$

input
```
Integrate[(-12 + 60*x - 60*x^2 + E^(2 + x)*(-5 + 20*x - 20*x^2) + (-45 + 1
92*x - 234*x^2 + 60*x^3 + E^(2 + x)*(5 - 20*x + 20*x^2))*Log[(-45 + E^(2 +
 x)*(5 - 10*x) + 102*x - 30*x^2)/(-15 + 30*x)])/((-45 + 192*x - 234*x^2 +
60*x^3 + E^(2 + x)*(5 - 20*x + 20*x^2))*Log[(-45 + E^(2 + x)*(5 - 10*x) +
102*x - 30*x^2)/(-15 + 30*x)]),x]
```

output
```
x - Log[Log[(-45 + E^(2 + x)*(5 - 10*x) + 102*x - 30*x^2)/(-15 + 30*x)]]
```

3.272.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-60x^2+e^{x+2}(-20x^2+20x-5)+(60x^3-234x^2+e^{x+2}(20x^2-20x+5)+192x-45)\log\left(\frac{-30x^2+102x+e^{x+2}}{30x-15}\right.}{(60x^3-234x^2+e^{x+2}(20x^2-20x+5)+192x-45)\log\left(\frac{-30x^2+102x+e^{x+2}(5-10x)-45}{30x-15}\right)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{60x^2-e^{x+2}(-20x^2+20x-5)-(60x^3-234x^2+e^{x+2}(20x^2-20x+5)+192x-45)\log\left(\frac{-30x^2+102x+e^{x+2}(5}{30x-15}\right.}{(1-2x)(30x^2+10e^{x+2}x-102x-5e^{x+2}+45)\log\left(\frac{-30x^2+102x+e^{x+2}(5-10x)-45}{30x-15}\right)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{\log\left(\frac{-30x^2+102x+e^{x+2}(5-10x)-45}{30x-15}\right)-1}{\log\left(\frac{-30x^2+102x+e^{x+2}(5-10x)-45}{30x-15}\right)}+\frac{3(20x^3-98x^2+84x-19)}{(2x-1)(30x^2+10e^{x+2}x-102x-5e^{x+2}+45)\log\left(\frac{-30x^2+102x+e^{x+2}}{30x-15}\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\int \frac{1}{\log\left(\frac{-30x^2+102x+e^{x+2}(5-10x)-45}{30x-15}\right)}dx + 60\int \frac{1}{(30x^2+10e^{x+2}x-102x-5e^{x+2}+45)\log\left(\frac{-30x^2+102x+e^{x+2}(5-10x)-45}{30x-15}\right)}dx - 132\int \frac{x}{(30x^2+10e^{x+2}x-102x-5e^{x+2}+45)\log\left(\frac{-30x^2+102x+e^{x+2}(5-10x)-45}{30x-15}\right)}dx + 30\int \frac{x^2}{(30x^2+10e^{x+2}x-102x-5e^{x+2}+45)\log\left(\frac{-30x^2+102x+e^{x+2}(5-10x)-45}{30x-15}\right)}dx + 3\int \frac{1}{(2x-1)(30x^2+10e^{x+2}x-102x-5e^{x+2}+45)\log\left(\frac{-30x^2+102x+e^{x+2}(5-10x)-45}{30x-15}\right)}dx + x$$

input
```
Int[(-12 + 60*x - 60*x^2 + E^(2 + x)*(-5 + 20*x - 20*x^2) + (-45 + 192*x -
 234*x^2 + 60*x^3 + E^(2 + x)*(5 - 20*x + 20*x^2))*Log[(-45 + E^(2 + x)*(5
 - 10*x) + 102*x - 30*x^2)/(-15 + 30*x)])/((-45 + 192*x - 234*x^2 + 60*x^3
 + E^(2 + x)*(5 - 20*x + 20*x^2))*Log[(-45 + E^(2 + x)*(5 - 10*x) + 102*x
- 30*x^2)/(-15 + 30*x)]),x]
```

output
```
$Aborted
```

3.272.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.272.

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-30x^2}{-15+30x}\right)}{(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-30x^2}{-15+30x}\right)}dx$$

3.272.4 Maple [A] (verified)

Time = 0.61 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.21

method	result
norman	$x-\ln\left(\ln\left(\frac{(-10x+5)\mathrm{e}^{2+x}-30x^2+102x-45}{30x-15}\right)\right)$
parallelrisch	$2-\ln\left(\ln\left(\frac{(-10x+5)\mathrm{e}^{2+x}-30x^2+102x-45}{30x-15}\right)\right)+x$
risch	$x-\ln\left(\ln\left(x^2+\left(\frac{\mathrm{e}^{2+x}}{3}-\frac{17}{5}\right)x-\frac{\mathrm{e}^{2+x}}{6}+\frac{3}{2}\right)+\frac{i\left(-2\pi\mathrm{csgn}\left(\frac{i\left(x^2+\left(\frac{\mathrm{e}^{2+x}}{3}-\frac{17}{5}\right)x-\frac{\mathrm{e}^{2+x}}{6}+\frac{3}{2}\right)}{x-\frac{1}{2}}\right)^2-\pi\ \mathrm{csgn}\left(\right.\right.}{}\right.$

input
```
int((((20*x^2-20*x+5)*exp(2+x)+60*x^3-234*x^2+192*x-45)*ln(((-10*x+5)*exp(
2+x)-30*x^2+102*x-45)/(30*x-15))+(-20*x^2+20*x-5)*exp(2+x)-60*x^2+60*x-12)
/((20*x^2-20*x+5)*exp(2+x)+60*x^3-234*x^2+192*x-45)/ln(((-10*x+5)*exp(2+x)
-30*x^2+102*x-45)/(30*x-15)),x,method=_RETURNVERBOSE)
```

output
```
x-ln(ln(((-10*x+5)*exp(2+x)-30*x^2+102*x-45)/(30*x-15)))
```

3.272.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\log\ldots}{(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-\ldots}{-15+30x}\right.}$$
$$=x-\log\left(\log\left(-\frac{30\,x^2+5\,(2\,x-1)e^{(x+2)}-102\,x+45}{15\,(2\,x-1)}\right)\right)$$

input
```
integrate((((20*x^2-20*x+5)*exp(2+x)+60*x^3-234*x^2+192*x-45)*log(((-10*x+
5)*exp(2+x)-30*x^2+102*x-45)/(30*x-15))+(-20*x^2+20*x-5)*exp(2+x)-60*x^2+6
0*x-12)/((20*x^2-20*x+5)*exp(2+x)+60*x^3-234*x^2+192*x-45)/log(((-10*x+5)*
exp(2+x)-30*x^2+102*x-45)/(30*x-15)),x, algorithm=\
```

output
```
x - log(log(-1/15*(30*x^2 + 5*(2*x - 1)*e^(x + 2) - 102*x + 45)/(2*x - 1))
)
```

3.272.

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-30x^2}{-15+30x}\right)}{\ldots}\,dx$$

3.272.6 Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\,\mathrm{lo}}{(-45+192x-234x^2+60x^3+e^{2+x}\,(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-}{-15+30x}\right.}$$

$$= x-\log\left(\log\left(\frac{-30x^2+102x+(5-10x)\,e^{x+2}-45}{30x-15}\right)\right)$$

input
```
integrate((((20*x**2-20*x+5)*exp(2+x)+60*x**3-234*x**2+192*x-45)*ln(((-10*
x+5)*exp(2+x)-30*x**2+102*x-45)/(30*x-15))+(-20*x**2+20*x-5)*exp(2+x)-60*x
**2+60*x-12)/((20*x**2-20*x+5)*exp(2+x)+60*x**3-234*x**2+192*x-45)/ln(((-1
0*x+5)*exp(2+x)-30*x**2+102*x-45)/(30*x-15)),x)
```

output
```
x - log(log((-30*x**2 + 102*x + (5 - 10*x)*exp(x + 2) - 45)/(30*x - 15)))
```

3.272.7 Maxima [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.62

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\,\mathrm{lo}}{(-45+192x-234x^2+60x^3+e^{2+x}\,(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-}{-15+30x}\right.}$$

$$= x-\log\left(-\log(5)-\log(3)+\log\left(-30\,x^2-5\left(2\,xe^2-e^2\right)e^x+102\,x-45\right)-\log(2\,x-1)\right)$$

input
```
integrate((((20*x^2-20*x+5)*exp(2+x)+60*x^3-234*x^2+192*x-45)*log(((-10*x+
5)*exp(2+x)-30*x^2+102*x-45)/(30*x-15))+(-20*x^2+20*x-5)*exp(2+x)-60*x^2+6
0*x-12)/((20*x^2-20*x+5)*exp(2+x)+60*x^3-234*x^2+192*x-45)/log(((-10*x+5)*
exp(2+x)-30*x^2+102*x-45)/(30*x-15)),x, algorithm=\
```

output
```
x - log(-log(5) - log(3) + log(-30*x^2 - 5*(2*x*e^2 - e^2)*e^x + 102*x - 4
5) - log(2*x - 1))
```

3.272.8 Giac [A] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.31

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\,\mathrm{lo}}{(-45+192x-234x^2+60x^3+e^{2+x}\,(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-}{-15+30x}\right.}$$

$$= x - \log\left(\log\left(-\frac{30\,x^2+10\,xe^{(x+2)}-102\,x-5\,e^{(x+2)}+45}{15\,(2\,x-1)}\right)\right)$$

input
```
integrate((((20*x^2-20*x+5)*exp(2+x)+60*x^3-234*x^2+192*x-45)*log(((-10*x+
5)*exp(2+x)-30*x^2+102*x-45)/(30*x-15))+(-20*x^2+20*x-5)*exp(2+x)-60*x^2+6
0*x-12)/((20*x^2-20*x+5)*exp(2+x)+60*x^3-234*x^2+192*x-45)/log(((-10*x+5)*
exp(2+x)-30*x^2+102*x-45)/(30*x-15)),x, algorithm=\
```

output
```
x - log(log(-1/15*(30*x^2 + 10*x*e^(x + 2) - 102*x - 5*e^(x + 2) + 45)/(2*
x - 1)))
```

3.272.9 Mupad [B] (verification not implemented)

Time = 13.82 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.21

$$\int \frac{-12+60x-60x^2+e^{2+x}(-5+20x-20x^2)+(-45+192x-234x^2+60x^3+e^{2+x}(5-20x+20x^2))\,\mathrm{lo}}{(-45+192x-234x^2+60x^3+e^{2+x}\,(5-20x+20x^2))\log\left(\frac{-45+e^{2+x}(5-10x)+102x-}{-15+30x}\right.}$$

$$= x - \ln\left(\ln\left(-\frac{30\,x^2-102\,x+\mathrm{e}^2\,\mathrm{e}^x\,(10\,x-5)+45}{30\,x-15}\right)\right)$$

input
```
int(-(exp(x + 2)*(20*x^2 - 20*x + 5) - 60*x - log(-(exp(x + 2)*(10*x - 5)
- 102*x + 30*x^2 + 45)/(30*x - 15))*(192*x + exp(x + 2)*(20*x^2 - 20*x + 5
) - 234*x^2 + 60*x^3 - 45) + 60*x^2 + 12)/(log(-(exp(x + 2)*(10*x - 5) - 1
02*x + 30*x^2 + 45)/(30*x - 15))*(192*x + exp(x + 2)*(20*x^2 - 20*x + 5) -
 234*x^2 + 60*x^3 - 45)),x)
```

output
```
x - log(log(-(30*x^2 - 102*x + exp(2)*exp(x)*(10*x - 5) + 45)/(30*x - 15))
)
```

3.273 $\int -2e^{4+\sqrt{e}-e^3-x}\,dx$

3.273.1 Optimal result

Integrand size = 19, antiderivative size = 19

$$\int -2e^{4+\sqrt{e}-e^3-x}\,dx = 2e^{4+\sqrt{e}-e^3-x}$$

output
```
2/exp(exp(3)-exp(1/2)+x-4)
```

3.273.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int -2e^{4+\sqrt{e}-e^3-x}\,dx = 2e^{4+\sqrt{e}-e^3-x}$$

input
```
Integrate[-2*E^(4 + Sqrt[E] - E^3 - x),x]
```

output
```
2*E^(4 + Sqrt[E] - E^3 - x)
```

3.273.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$, Rules used = {27, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -2e^{-x-e^3+\sqrt{e}+4}\,dx$$

$$\Big\downarrow \ 27$$

$$-2\int e^{-x-e^3+\sqrt{e}+4}dx$$

$$\Big\downarrow \ 2624$$

$$2e^{-x-e^3+\sqrt{e}+4}$$

input
```
Int[-2*E^(4 + Sqrt[E] - E^3 - x),x]
```

output
```
2*E^(4 + Sqrt[E] - E^3 - x)
```

3.273.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

3.273.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

method	result	size
gosper	$2\,\mathrm{e}^{-\mathrm{e}^{3}+\mathrm{e}^{\frac{1}{2}}-x+4}$	15
derivativedivides	$2\,\mathrm{e}^{-\mathrm{e}^{3}+\mathrm{e}^{\frac{1}{2}}-x+4}$	15
default	$2\,\mathrm{e}^{-\mathrm{e}^{3}+\mathrm{e}^{\frac{1}{2}}-x+4}$	15
norman	$2\,\mathrm{e}^{-\mathrm{e}^{3}+\mathrm{e}^{\frac{1}{2}}-x+4}$	15
risch	$2\,\mathrm{e}^{-\mathrm{e}^{3}+\mathrm{e}^{\frac{1}{2}}-x+4}$	15
parallelrisch	$2\,\mathrm{e}^{-\mathrm{e}^{3}+\mathrm{e}^{\frac{1}{2}}-x+4}$	15

input
```
int(-2/exp(exp(3)-exp(1/2)+x-4),x,method=_RETURNVERBOSE)
```

output
```
2/exp(exp(3)-exp(1/2)+x-4)
```

3.273.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int -2e^{4+\sqrt{e}-e^3-x}\,dx = 2\,e^{\left(-x-e^{3}+e^{\frac{1}{2}}+4\right)}$$

input
```
integrate(-2/exp(exp(3)-exp(1/2)+x-4),x, algorithm=\
```

output
```
2*e^(-x - e^3 + e^(1/2) + 4)
```

3.273.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int -2e^{4+\sqrt{e}-e^3-x}\,dx = 2e^{-x-e^{3}+e^{\frac{1}{2}}+4}$$

input
```
integrate(-2/exp(exp(3)-exp(1/2)+x-4),x)
```

output
```
2*exp(-x - exp(3) + exp(1/2) + 4)
```

3.273.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int -2e^{4+\sqrt{e}-e^3-x}\,dx = 2\,e^{\left(-x-e^3+e^{\frac{1}{2}}+4\right)}$$

input
```
integrate(-2/exp(exp(3)-exp(1/2)+x-4),x, algorithm=\
```

output
```
2*e^(-x - e^3 + e^(1/2) + 4)
```

3.273.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int -2e^{4+\sqrt{e}-e^3-x}\,dx = 2\,e^{\left(-x-e^3+e^{\frac{1}{2}}+4\right)}$$

input
```
integrate(-2/exp(exp(3)-exp(1/2)+x-4),x, algorithm=\
```

output
```
2*e^(-x - e^3 + e^(1/2) + 4)
```

3.273.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int -2e^{4+\sqrt{e}-e^3-x}\,dx = 2\,\mathrm{e}^{-\mathrm{e}^3}\,\mathrm{e}^{-x}\,\mathrm{e}^4\,\mathrm{e}^{\sqrt{\mathrm{e}}}$$

input
```
int(-2*exp(exp(1/2) - x - exp(3) + 4),x)
```

output
```
2*exp(-exp(3))*exp(-x)*exp(4)*exp(exp(1/2))
```

3.274 $\int \frac{4e^4x^3+e^{4+\frac{4}{x^2}}(8-x^2)}{x^2}\,dx$

3.274.1 Optimal result

Integrand size = 30, antiderivative size = 20

$$\int \frac{4e^4x^3+e^{4+\frac{4}{x^2}}(8-x^2)}{x^2}\,dx = 15+e^4x\left(-e^{\frac{4}{x^2}}+2x\right)$$

output
```
15+(2*x-exp(4/x^2))*x*exp(4)
```

3.274.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{4e^4x^3+e^{4+\frac{4}{x^2}}(8-x^2)}{x^2}\,dx = e^4\left(-e^{\frac{4}{x^2}}x+2x^2\right)$$

input
```
Integrate[(4*E^4*x^3 + E^(4 + 4/x^2)*(8 - x^2))/x^2,x]
```

output
```
E^4*(-(E^(4/x^2)*x) + 2*x^2)
```

3.274.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4e^4x^3+e^{\frac{4}{x^2}+4}(8-x^2)}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(4e^4x-\frac{e^{\frac{4}{x^2}+4}(x^2-8)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2e^4x^2-e^{\frac{4}{x^2}+4}x$$

input
```
Int[(4*E^4*x^3 + E^(4 + 4/x^2)*(8 - x^2))/x^2,x]
```

output
```
-(E^(4 + 4/x^2)*x) + 2*E^4*x^2
```

3.274.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.274.4 Maple [A] (verified)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

method	result	size
derivativedivides	$2x^2\mathrm{e}^4 - x\,\mathrm{e}^4\mathrm{e}^{\frac{4}{x^2}}$	20
default	$2x^2\mathrm{e}^4 - x\,\mathrm{e}^4\mathrm{e}^{\frac{4}{x^2}}$	20
parallelrisch	$2x^2\mathrm{e}^4 - x\,\mathrm{e}^4\mathrm{e}^{\frac{4}{x^2}}$	20
parts	$2x^2\mathrm{e}^4 - x\,\mathrm{e}^4\mathrm{e}^{\frac{4}{x^2}}$	20
risch	$2x^2\mathrm{e}^4 - x\,\mathrm{e}^{\frac{4x^2+4}{x^2}}$	23
norman	$\frac{2x^3\mathrm{e}^4 - x^2\mathrm{e}^4\mathrm{e}^{\frac{4}{x^2}}}{x}$	26

input
```
int(((-x^2+8)*exp(4)*exp(4/x^2)+4*x^3*exp(4))/x^2,x,method=_RETURNVERBOSE)
```

output
```
2*x^2*exp(4)-exp(4)*exp(1/x^2)^4*x
```

3.274.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{4e^4x^3 + e^{4+\frac{4}{x^2}}(8-x^2)}{x^2}\,dx = 2\,x^2e^4 - xe^{\left(\frac{4\,(x^2+1)}{x^2}\right)}$$

input
```
integrate(((-x^2+8)*exp(4)*exp(4/x^2)+4*x^3*exp(4))/x^2,x, algorithm=\
```

output
```
2*x^2*e^4 - x*e^(4*(x^2 + 1)/x^2)
```

3.274.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{4e^4x^3 + e^{4+\frac{4}{x^2}}(8-x^2)}{x^2}\,dx = 2x^2e^4 - xe^4e^{\frac{4}{x^2}}$$

input
```
integrate(((-x**2+8)*exp(4)*exp(4/x**2)+4*x**3*exp(4))/x**2,x)
```

output
```
2*x**2*exp(4) - x*exp(4)*exp(4/x**2)
```

3.274.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.80

$$\int \frac{4e^4x^3 + e^{4+\frac{4}{x^2}}(8-x^2)}{x^2}\,dx = -x\sqrt{-\frac{1}{x^2}}e^4\Gamma\left(-\frac{1}{2}, -\frac{4}{x^2}\right) + 2\,x^2e^4 - \frac{2\,\sqrt{\pi}\left(\operatorname{erf}\left(2\,\sqrt{-\frac{1}{x^2}}\right) - 1\right)e^4}{x\sqrt{-\frac{1}{x^2}}}$$

input
```
integrate(((-x^2+8)*exp(4)*exp(4/x^2)+4*x^3*exp(4))/x^2,x, algorithm=\
```

output
```
-x*sqrt(-1/x^2)*e^4*gamma(-1/2, -4/x^2) + 2*x^2*e^4 - 2*sqrt(pi)*(erf(2*sq
rt(-1/x^2)) - 1)*e^4/(x*sqrt(-1/x^2))
```

3.274.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{4e^4x^3 + e^{4+\frac{4}{x^2}}(8-x^2)}{x^2}\,dx = 2\,x^2e^4 - xe^{\left(\frac{4\,(x^2+1)}{x^2}\right)}$$

input
```
integrate(((-x^2+8)*exp(4)*exp(4/x^2)+4*x^3*exp(4))/x^2,x, algorithm=\
```

output
```
2*x^2*e^4 - x*e^(4*(x^2 + 1)/x^2)
```

3.274.9 Mupad [B] (verification not implemented)

Time = 12.44 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{4e^4x^3 + e^{4+\frac{4}{x^2}}(8 - x^2)}{x^2}\,dx = x\,e^4\left(2\,x - e^{\frac{4}{x^2}}\right)$$

input
```
int((4*x^3*exp(4) - exp(4)*exp(4/x^2)*(x^2 - 8))/x^2,x)
```

output
```
x*exp(4)*(2*x - exp(4/x^2))
```

3.275 $\int \frac{-1-4x+6ex^2+e^{1+2x}(2+4x)+e^{1+x}(8x+4x^2)}{-x+2e^{1+2x}x-2x^2+4e^{1+x}x^2+2ex^3}\,dx$

3.275.1 Optimal result

Integrand size = 77, antiderivative size = 24

$$\int \frac{-1-4x+6ex^2+e^{1+2x}(2+4x)+e^{1+x}(8x+4x^2)}{-x+2e^{1+2x}x-2x^2+4e^{1+x}x^2+2ex^3}\,dx = \log\left(x\left(-x+e\left(-\frac{1}{2e}+(e^x+x)^2\right)\right)\right)$$

output
```
ln((((exp(x)+x)^2-1/2/exp(1))/exp(-1)-x)*x)
```

3.275.2 Mathematica [A] (verified)

Time = 2.50 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int \frac{-1-4x+6ex^2+e^{1+2x}(2+4x)+e^{1+x}(8x+4x^2)}{-x+2e^{1+2x}x-2x^2+4e^{1+x}x^2+2ex^3}\,dx = \log(x)+\log\left(1-2e^{1+2x}+2x-4e^{1+x}x-2ex^2\right)$$

input
```
Integrate[(-1 - 4*x + 6*E*x^2 + E^(1 + 2*x)*(2 + 4*x) + E^(1 + x)*(8*x + 4
*x^2))/(-x + 2*E^(1 + 2*x)*x - 2*x^2 + 4*E^(1 + x)*x^2 + 2*E*x^3),x]
```

output
```
Log[x] + Log[1 - 2*E^(1 + 2*x) + 2*x - 4*E^(1 + x)*x - 2*E*x^2]
```

3.275.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.013, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6ex^2+e^{x+1}(4x^2+8x)-4x+e^{2x+1}(4x+2)-1}{2ex^3+4e^{x+1}x^2-2x^2+2e^{2x+1}x-x} \, dx$$

$$\Big\downarrow \ 7235$$

$$\log \left(-2ex^3-4e^{x+1}x^2+2x^2-2e^{2x+1}x+x\right)$$

input
```
Int[(-1 - 4*x + 6*E*x^2 + E^(1 + 2*x)*(2 + 4*x) + E^(1 + x)*(8*x + 4*x^2))
/(-x + 2*E^(1 + 2*x)*x - 2*x^2 + 4*E^(1 + x)*x^2 + 2*E*x^3),x]
```

output
```
Log[x - 2*E^(1 + 2*x)*x + 2*x^2 - 4*E^(1 + x)*x^2 - 2*E*x^3]
```

3.275.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.275.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

method	result	size
risch	$\ln(x)+\ln\left(e^{2x}+2\,e^{x}x+x^{2}-e^{-1}x-\frac{e^{-1}}{2}\right)$	27
norman	$\ln(x)+\ln(2\,e\,e^{2x}+4x\,e\,e^{x}+2x^{2}e-2x-1)$	32
parallelrisch	$\ln(x)+\ln\left(\frac{(2\,e\,e^{2x}+4x\,e\,e^{x}+2x^{2}e-2x-1)e^{-1}}{2}\right)$	38

input
```
int(((4*x+2)*exp(1)*exp(x)^2+(4*x^2+8*x)*exp(1)*exp(x)+6*x^2*exp(1)-4*x-1)
/(2*x*exp(1)*exp(x)^2+4*x^2*exp(1)*exp(x)+2*x^3*exp(1)-2*x^2-x),x,method=_
RETURNVERBOSE)
```

output
```
ln(x)+ln(exp(2*x)+2*exp(x)*x+x^2-exp(-1)*x-1/2*exp(-1))
```

3.275.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.50

$$\int \frac{-1-4x+6ex^2+e^{1+2x}(2+4x)+e^{1+x}(8x+4x^2)}{-x+2e^{1+2x}x-2x^2+4e^{1+x}x^2+2ex^3}\,dx$$
$$= \log\left(2\,x^2e^2-(2\,x+1)e+4\,xe^{(x+2)}+2\,e^{(2\,x+2)}\right)+\log\left(x\right)$$

input
```
integrate(((4*x+2)*exp(1)*exp(x)^2+(4*x^2+8*x)*exp(1)*exp(x)+6*x^2*exp(1)-
4*x-1)/(2*x*exp(1)*exp(x)^2+4*x^2*exp(1)*exp(x)+2*x^3*exp(1)-2*x^2-x),x, a
lgorithm=\
```

output
```
log(2*x^2*e^2 - (2*x + 1)*e + 4*x*e^(x + 2) + 2*e^(2*x + 2)) + log(x)
```

3.275.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{-1-4x+6ex^2+e^{1+2x}(2+4x)+e^{1+x}(8x+4x^2)}{-x+2e^{1+2x}x-2x^2+4e^{1+x}x^2+2ex^3}\,dx$$
$$= \log\left(x\right)+\log\left(2xe^x+\frac{2ex^2-2x-1}{2e}+e^{2x}\right)$$

input
```
integrate(((4*x+2)*exp(1)*exp(x)**2+(4*x**2+8*x)*exp(1)*exp(x)+6*x**2*exp(
1)-4*x-1)/(2*x*exp(1)*exp(x)**2+4*x**2*exp(1)*exp(x)+2*x**3*exp(1)-2*x**2-
x),x)
```

output
```
log(x) + log(2*x*exp(x) + (2*E*x**2 - 2*x - 1)*exp(-1)/2 + exp(2*x))
```

3.275.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

$$\int \frac{-1-4x+6ex^2+e^{1+2x}(2+4x)+e^{1+x}(8x+4x^2)}{-x+2e^{1+2x}x-2x^2+4e^{1+x}x^2+2ex^3}\,dx$$
$$=\log\left(\frac{1}{2}\left(2\,x^2e+4\,xe^{(x+1)}-2\,x+2\,e^{(2\,x+1)}-1\right)e^{(-1)}\right)+\log\left(x\right)$$

input
```
integrate(((4*x+2)*exp(1)*exp(x)^2+(4*x^2+8*x)*exp(1)*exp(x)+6*x^2*exp(1)-
4*x-1)/(2*x*exp(1)*exp(x)^2+4*x^2*exp(1)*exp(x)+2*x^3*exp(1)-2*x^2-x),x, a
lgorithm=\
```

output
```
log(1/2*(2*x^2*e + 4*x*e^(x + 1) - 2*x + 2*e^(2*x + 1) - 1)*e^(-1)) + log(
x)
```

3.275.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. 2(24) = 48.

Time = 0.28 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.38

$$\int \frac{-1-4x+6ex^2+e^{1+2x}(2+4x)+e^{1+x}(8x+4x^2)}{-x+2e^{1+2x}x-2x^2+4e^{1+x}x^2+2ex^3}\,dx$$
$$=\log\left(2\,(x+1)^2e^2-4\,(x+1)e^2-2\,(x+1)e+4\,(x+1)e^{(x+2)}+2\,e^2+e+2\,e^{(2\,x+2)}-4\,e^{(x+2)}\right)+\log\left(x\right)$$

input
```
integrate(((4*x+2)*exp(1)*exp(x)^2+(4*x^2+8*x)*exp(1)*exp(x)+6*x^2*exp(1)-
4*x-1)/(2*x*exp(1)*exp(x)^2+4*x^2*exp(1)*exp(x)+2*x^3*exp(1)-2*x^2-x),x, a
lgorithm=\
```

output
```
log(2*(x + 1)^2*e^2 - 4*(x + 1)*e^2 - 2*(x + 1)*e + 4*(x + 1)*e^(x + 2) +
2*e^2 + e + 2*e^(2*x + 2) - 4*e^(x + 2)) + log(x)
```

3.275.9 Mupad [B] (verification not implemented)

Time = 13.55 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{-1-4x+6ex^2+e^{1+2x}(2+4x)+e^{1+x}(8x+4x^2)}{-x+2e^{1+2x}x-2x^2+4e^{1+x}x^2+2ex^3}\,dx = \ln\left(e^{2x}-\frac{e^{-1}}{2}-x\,e^{-1}+2\,x\,e^{x}+x^2\right)+\ln(x)$$

input
```
int((6*x^2*exp(1) - 4*x + exp(1)*exp(x)*(8*x + 4*x^2) + exp(2*x)*exp(1)*(4
*x + 2) - 1)/(2*x^3*exp(1) - x - 2*x^2 + 2*x*exp(2*x)*exp(1) + 4*x^2*exp(1
)*exp(x)),x)
```

output
```
log(exp(2*x) - exp(-1)/2 - x*exp(-1) + 2*x*exp(x) + x^2) + log(x)
```

3.276 $\int \frac{3-e^x-x}{1+e^x-x} \, dx$

3.276.1 Optimal result

Integrand size = 21, antiderivative size = 16

$$\int \frac{3-e^x-x}{1+e^x-x} \, dx = 1+x-\log \left((-1-e^x+x)^2\right)$$

output
```
x-ln((x-exp(x)-1)^2)+1
```

3.276.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{3-e^x-x}{1+e^x-x} \, dx = x-2\log (1+e^x-x)$$

input
```
Integrate[(3 - E^x - x)/(1 + E^x - x),x]
```

output
```
x - 2*Log[1 + E^x - x]
```

3.276.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x-e^x+3}{-x+e^x+1} \, dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{2(x-2)}{x-e^x-1}-1\right)dx$$

$$\Big\downarrow \ 2009$$

$$4\int \frac{1}{-x+e^x+1}dx+2\int \frac{x}{x-e^x-1}dx-x$$

input
```
Int[(3 - E^x - x)/(1 + E^x - x),x]
```

output
```
$Aborted
```

3.276.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.276.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

method	result	size
norman	$x-2\ln\left(x-{\rm e}^{x}-1\right)$	13
risch	$x-2\ln\left(1+{\rm e}^{x}-x\right)$	13
parallelrisch	$x-2\ln\left(x-{\rm e}^{x}-1\right)$	13

input
```
int((3-x-exp(x))/(1+exp(x)-x),x,method=_RETURNVERBOSE)
```

output
```
x-2*ln(x-exp(x)-1)
```

3.276.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{3-e^x-x}{1+e^x-x}\,dx = x-2\,\log\left(-x+e^x+1\right)$$

input
```
integrate((3-x-exp(x))/(1+exp(x)-x),x, algorithm=\
```

output
```
x - 2*log(-x + e^x + 1)
```

3.276.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int \frac{3-e^x-x}{1+e^x-x}\,dx = x-2\log\left(-x+e^x+1\right)$$

input
```
integrate((3-x-exp(x))/(1+exp(x)-x),x)
```

output
```
x - 2*log(-x + exp(x) + 1)
```

3.276.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{3-e^x-x}{1+e^x-x}\,dx = x-2\,\log\left(-x+e^x+1\right)$$

input
```
integrate((3-x-exp(x))/(1+exp(x)-x),x, algorithm=\
```

output
```
x - 2*log(-x + e^x + 1)
```

3.276.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{3-e^x-x}{1+e^x-x}\,dx = x-2\,\log\left(x-e^x-1\right)$$

input
```
integrate((3-x-exp(x))/(1+exp(x)-x),x, algorithm=\
```

output
```
x - 2*log(x - e^x - 1)
```

3.276.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{3-e^x-x}{1+e^x-x}\,dx = x-2\,\ln\left(x-\mathrm{e}^x-1\right)$$

input
```
int(-(x + exp(x) - 3)/(exp(x) - x + 1),x)
```

output
```
x - 2*log(x - exp(x) - 1)
```

3.277 $\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x}{x^3+2x^2\log(x)+x\log^2(x)}$

3.277.1 Optimal result

Integrand size = 156, antiderivative size = 22

$$\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x x\log^2(x)+e^{e^{4x}}\left(-1296e^{4x}x^2\right.}{x^3+2x^2\log(x)+x\log^2(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log\right.}$$

$$=e^x-\frac{324\log\left(1+e^{e^{4x}}\right)}{x+\log(x)}$$

output
```
exp(x)-324*ln(exp(exp(4*x))+1)/(x+ln(x))
```

3.277.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x x\log^2(x)+e^{e^{4x}}\left(-1296e^{4x}x^2\right.}{x^3+2x^2\log(x)+x\log^2(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log\right.}$$

$$=e^x-\frac{324\log\left(1+e^{e^{4x}}\right)}{x+\log(x)}$$

3.277. $\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x x\log^2(x)+e^{e^{4x}}\left(-1296e^{4x}x^2+e^x x^3+\left(-1296e^{4x}x+2e^x x^2\right)\log(x)+e^x x\log\right.}{x^3+2x^2\log(x)+x\log^2(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log^2(x)\right)}$

input
```
Integrate[(E^x*x^3 + (324 + 324*x + E^E^(4*x)*(324 + 324*x))*Log[1 + E^E^(
4*x)] + 2*E^x*x^2*Log[x] + E^x*x*Log[x]^2 + E^E^(4*x)*(-1296*E^(4*x)*x^2 +
 E^x*x^3 + (-1296*E^(4*x)*x + 2*E^x*x^2)*Log[x] + E^x*x*Log[x]^2))/(x^3 +
2*x^2*Log[x] + x*Log[x]^2 + E^E^(4*x)*(x^3 + 2*x^2*Log[x] + x*Log[x]^2)),x
]
```

output
```
E^x - (324*Log[1 + E^E^(4*x)])/(x + Log[x])
```

3.277.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x^3+2e^x x^2\log(x)+e^{e^{4x}}\left(e^x x^3-1296e^{4x}x^2+\left(2e^x x^2-1296e^{4x}x\right)\log(x)+e^x x\log^2(x)\right)+e^x x\log^2(x)+\left(32\right.}{x^3+2x^2\log(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log^2(x)\right)+x\log^2(x)}$$

$$\Big\downarrow \ 7239$$

$$\int \frac{\frac{324(x+1)\log\left(e^{e^{4x}}+1\right)}{x}-\frac{e^x(x+\log(x))\left(-e^{e^{4x}}x-x+1296e^{3x+e^{4x}}-\left(e^{e^{4x}}+1\right)\log(x)\right)}{e^{e^{4x}}+1}}{(x+\log(x))^2}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(e^x+\frac{324(x+1)\log\left(e^{e^{4x}}+1\right)}{x(x+\log(x))^2}-\frac{1296e^{4x+e^{4x}}}{\left(e^{e^{4x}}+1\right)(x+\log(x))}\right)dx$$

$$\Big\downarrow \ 2009$$

$$324\int \frac{\log\left(1+e^{e^{4x}}\right)}{(x+\log(x))^2}dx+324\int \frac{\log\left(1+e^{e^{4x}}\right)}{x(x+\log(x))^2}dx-1296\int \frac{e^{4x+e^{4x}}}{\left(1+e^{e^{4x}}\right)(x+\log(x))}dx+e^x$$

input
```
Int[(E^x*x^3 + (324 + 324*x + E^E^(4*x)*(324 + 324*x))*Log[1 + E^E^(4*x)]
+ 2*E^x*x^2*Log[x] + E^x*x*Log[x]^2 + E^E^(4*x)*(-1296*E^(4*x)*x^2 + E^x*x
^3 + (-1296*E^(4*x)*x + 2*E^x*x^2)*Log[x] + E^x*x*Log[x]^2))/(x^3 + 2*x^2*
Log[x] + x*Log[x]^2 + E^E^(4*x)*(x^3 + 2*x^2*Log[x] + x*Log[x]^2)),x]
```

output
```
$Aborted
```

3.277.

$$\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x x\log^2(x)+e^{e^{4x}}\left(-1296e^{4x}x^2+e^x x^3+\left(-1296e^{4x}x+2e^x x^2\right)\log(x)+e^x x\log\right.}{x^3+2x^2\log(x)+x\log^2(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log^2(x)\right)}$$

3.277.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.277.4 Maple [A] (verified)

Time = 65.45 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

method	result	size
risch	$e^{x}-\frac{324 \ln\left(e^{e^{4 x}}+1\right)}{x+\ln(x)}$	20
parallelrisch	$\frac{2 e^{x} x+2 e^{x} \ln(x)-648 \ln\left(e^{e^{4 x}}+1\right)}{2 x+2 \ln(x)}$	31

input
```
int((((324*x+324)*exp(exp(4*x))+324*x+324)*ln(exp(exp(4*x))+1)+(x*exp(x)*l
n(x)^2+(-1296*x*exp(4*x)+2*exp(x)*x^2)*ln(x)-1296*x^2*exp(4*x)+exp(x)*x^3)
*exp(exp(4*x))+x*exp(x)*ln(x)^2+2*x^2*exp(x)*ln(x)+exp(x)*x^3)/((x*ln(x)^2
+2*x^2*ln(x)+x^3)*exp(exp(4*x))+x*ln(x)^2+2*x^2*ln(x)+x^3),x,method=_RETUR
NVERBOSE)
```

output
```
exp(x)-324*ln(exp(exp(4*x))+1)/(x+ln(x))
```

3.277.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x x\log^2(x)+e^{e^{4x}}\left(-1296e^{4x}x^2\right.}{x^3+2x^2\log(x)+x\log^2(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log\right.}$$
$$=\frac{xe^x+e^x\log(x)-324\log\left(e^{\left(e^{(4x)}\right)}+1\right)}{x+\log(x)}$$

3.277. $\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x x\log^2(x)+e^{e^{4x}}\left(-1296e^{4x}x^2+e^x x^3+\left(-1296e^{4x}x+2e^x x^2\right)\log(x)+e^x x\log\right.}{x^3+2x^2\log(x)+x\log^2(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log^2(x)\right)}$

input
```
integrate((((324*x+324)*exp(exp(4*x))+324*x+324)*log(exp(exp(4*x))+1)+(x*e
xp(x)*log(x)^2+(-1296*x*exp(4*x)+2*exp(x)*x^2)*log(x)-1296*x^2*exp(4*x)+ex
p(x)*x^3)*exp(exp(4*x))+x*exp(x)*log(x)^2+2*x^2*exp(x)*log(x)+exp(x)*x^3)/
((x*log(x)^2+2*x^2*log(x)+x^3)*exp(exp(4*x))+x*log(x)^2+2*x^2*log(x)+x^3),
x, algorithm=\
```

output
```
(x*e^x + e^x*log(x) - 324*log(e^(e^(4*x)) + 1))/(x + log(x))
```

3.277.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{e^x x^3 + \left(324 + 324x + e^{e^{4x}}(324 + 324x)\right) \log\left(1 + e^{e^{4x}}\right) + 2e^x x^2 \log(x) + e^x x \log^2(x) + e^{e^{4x}} \left(-1296 e^{4x} x^2 \right.}{x^3 + 2x^2 \log(x) + x \log^2(x) + e^{e^{4x}} \left(x^3 + 2x^2 \log(x) + x \log\right.}$$
$= \text{Exception raised: TypeError}$

input
```
integrate((((324*x+324)*exp(exp(4*x))+324*x+324)*ln(exp(exp(4*x))+1)+(x*ex
p(x)*ln(x)**2+(-1296*x*exp(4*x)+2*exp(x)*x**2)*ln(x)-1296*x**2*exp(4*x)+ex
p(x)*x**3)*exp(exp(4*x))+x*exp(x)*ln(x)**2+2*x**2*exp(x)*ln(x)+exp(x)*x**3
)/((x*ln(x)**2+2*x**2*ln(x)+x**3)*exp(exp(4*x))+x*ln(x)**2+2*x**2*ln(x)+x*
*3),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.277.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

$$\int \frac{e^x x^3 + \left(324 + 324x + e^{e^{4x}}(324 + 324x)\right) \log\left(1 + e^{e^{4x}}\right) + 2e^x x^2 \log(x) + e^x x \log^2(x) + e^{e^{4x}} \left(-1296 e^{4x} x^2 \right.}{x^3 + 2x^2 \log(x) + x \log^2(x) + e^{e^{4x}} \left(x^3 + 2x^2 \log(x) + x \log\right.}$$
$$= \frac{(x + \log(x))e^x - 324 \log\left(e^{\left(e^{(4x)}\right)} + 1\right)}{x + \log(x)}$$

$$\int \frac{e^x x^3 + \left(324 + 324x + e^{e^{4x}}(324 + 324x)\right) \log\left(1 + e^{e^{4x}}\right) + 2e^x x^2 \log(x) + e^x x \log^2(x) + e^{e^{4x}} \left(-1296 e^{4x} x^2 + e^x x^3 + \left(-1296 e^{4x} x + 2e^x x^2\right) \log(x) + e^x x \log\right.}{x^3 + 2x^2 \log(x) + x \log^2(x) + e^{e^{4x}} \left(x^3 + 2x^2 \log(x) + x \log^2(x)\right)}$$

input
```
integrate((((324*x+324)*exp(exp(4*x))+324*x+324)*log(exp(exp(4*x))+1)+(x*e
xp(x)*log(x)^2+(-1296*x*exp(4*x)+2*exp(x)*x^2)*log(x)-1296*x^2*exp(4*x)+ex
p(x)*x^3)*exp(exp(4*x))+x*exp(x)*log(x)^2+2*x^2*exp(x)*log(x)+exp(x)*x^3)/
((x*log(x)^2+2*x^2*log(x)+x^3)*exp(exp(4*x))+x*log(x)^2+2*x^2*log(x)+x^3),
x, algorithm=\
```

output
```
((x + log(x))*e^x - 324*log(e^(e^(4*x)) + 1))/(x + log(x))
```

3.277.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.59

$$\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x x\log^2(x)+e^{e^{4x}}\left(-1296e^{4x}x^2\right.}{x^3+2x^2\log(x)+x\log^2(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log\right.}$$
$$=\frac{xe^x+e^x\log(x)-324\log\left(\left(e^{\left(x+e^{(4x)}\right)}+e^x\right)e^{(-x)}\right)}{x+\log(x)}$$

input
```
integrate((((324*x+324)*exp(exp(4*x))+324*x+324)*log(exp(exp(4*x))+1)+(x*e
xp(x)*log(x)^2+(-1296*x*exp(4*x)+2*exp(x)*x^2)*log(x)-1296*x^2*exp(4*x)+ex
p(x)*x^3)*exp(exp(4*x))+x*exp(x)*log(x)^2+2*x^2*exp(x)*log(x)+exp(x)*x^3)/
((x*log(x)^2+2*x^2*log(x)+x^3)*exp(exp(4*x))+x*log(x)^2+2*x^2*log(x)+x^3),
x, algorithm=\
```

output
```
(x*e^x + e^x*log(x) - 324*log((e^(x + e^(4*x)) + e^x)*e^(-x)))/(x + log(x)
)
```

3.277.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x x\log^2(x)+e^{e^{4x}}\left(-1296e^{4x}x^2\right.}{x^3+2x^2\log(x)+x\log^2(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log\right.}$$
$$=\int \frac{x^3\,\mathrm{e}^x+\ln\left(\mathrm{e}^{\mathrm{e}^{4\,x}}+1\right)\,\left(324\,x+\mathrm{e}^{\mathrm{e}^{4\,x}}\,(324\,x+324)+324\right)+\mathrm{e}^{\mathrm{e}^{4\,x}}\,\left(x^3\,\mathrm{e}^x-1296\,x^2\,\mathrm{e}^{4\,x}-\ln(x)\,\left(1296\,x\,\mathrm{e}\right.\right.}{x\ln(x)^2+2\,x^2\,\ln(x)+\mathrm{e}^{\mathrm{e}^{4\,x}}\,\left(x^3+2\,x^2\,\ln(x)+x\ln(\right.}$$

input
```
int((x^3*exp(x) + log(exp(exp(4*x)) + 1)*(324*x + exp(exp(4*x))*(324*x + 3
24) + 324) + exp(exp(4*x))*(x^3*exp(x) - 1296*x^2*exp(4*x) - log(x)*(1296*
x*exp(4*x) - 2*x^2*exp(x)) + x*exp(x)*log(x)^2) + x*exp(x)*log(x)^2 + 2*x^
2*exp(x)*log(x))/(x*log(x)^2 + 2*x^2*log(x) + exp(exp(4*x))*(x*log(x)^2 +
2*x^2*log(x) + x^3) + x^3),x)
```

output
```
int((x^3*exp(x) + log(exp(exp(4*x)) + 1)*(324*x + exp(exp(4*x))*(324*x + 3
24) + 324) + exp(exp(4*x))*(x^3*exp(x) - 1296*x^2*exp(4*x) - log(x)*(1296*
x*exp(4*x) - 2*x^2*exp(x)) + x*exp(x)*log(x)^2) + x*exp(x)*log(x)^2 + 2*x^
2*exp(x)*log(x))/(x*log(x)^2 + 2*x^2*log(x) + exp(exp(4*x))*(x*log(x)^2 +
2*x^2*log(x) + x^3) + x^3), x)
```

3.277.

$$\int \frac{e^x x^3+\left(324+324x+e^{e^{4x}}(324+324x)\right)\log\left(1+e^{e^{4x}}\right)+2e^x x^2\log(x)+e^x x\log^2(x)+e^{e^{4x}}\left(-1296e^{4x}x^2+e^x x^3+\left(-1296e^{4x}x+2e^x x^2\right)\log(x)+e^x x\log\right.}{x^3+2x^2\log(x)+x\log^2(x)+e^{e^{4x}}\left(x^3+2x^2\log(x)+x\log^2(x)\right)}$$

3.278 $\int \frac{2+2x}{x} \, dx$

3.278.1 Optimal result

Integrand size = 9, antiderivative size = 20

$$\int \frac{2+2x}{x} \, dx = \log(2) + \log\left(\frac{4}{25} e^{\frac{2}{5}+2x} x^2\right)$$

output
```
ln(2)+ln(4/25*x^2*exp(1/5+x)^2)
```

3.278.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{2+2x}{x} \, dx = 2x + 2\log(x)$$

input
```
Integrate[(2 + 2*x)/x,x]
```

output
```
2*x + 2*Log[x]
```

3.278.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x+2}{x} \, dx$$

$$\Big\downarrow \; 49$$

$$\int \left(\frac{2}{x}+2\right) dx$$

$$\Big\downarrow \; 2009$$

$$2x+2\log(x)$$

input
```
Int[(2 + 2*x)/x,x]
```

output
```
2*x + 2*Log[x]
```

3.278.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.278.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

method	result	size
default	$2x+2\ln\left(x\right)$	9
norman	$2x+2\ln\left(x\right)$	9
risch	$2x+2\ln\left(x\right)$	9
parallelrisch	$2x+2\ln\left(x\right)$	9

input
```
int((2+2*x)/x,x,method=_RETURNVERBOSE)
```

output
```
2*x+2*ln(x)
```

3.278.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{2+2x}{x}\,dx = 2\,x+2\,\log\left(x\right)$$

input
```
integrate((2+2*x)/x,x, algorithm=\
```

output
```
2*x + 2*log(x)
```

3.278.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.35

$$\int \frac{2+2x}{x}\,dx = 2x+2\log\left(x\right)$$

input
```
integrate((2+2*x)/x,x)
```

output
```
2*x + 2*log(x)
```

3.278.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{2+2x}{x}\,dx = 2\,x + 2\,\log\left(x\right)$$

input
```
integrate((2+2*x)/x,x, algorithm=\
```

output
```
2*x + 2*log(x)
```

3.278.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

$$\int \frac{2+2x}{x}\,dx = 2\,x + 2\,\log\left(|x|\right)$$

input
```
integrate((2+2*x)/x,x, algorithm=\
```

output
```
2*x + 2*log(abs(x))
```

3.278.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{2+2x}{x}\,dx = 2\,x + 2\,\ln\left(x\right)$$

input
```
int((2*x + 2)/x,x)
```

output
```
2*x + 2*log(x)
```

3.279 $\int \frac{32e^{3+2x}x^3+e^3(-18e^2+18ex+6x^3+2x^4)+e^{3+x}(32x^3+8x^4+e(24x-24x^2))}{x^3}$

3.279.1 Optimal result

Integrand size = 69, antiderivative size = 20

$$\int \frac{32e^{3+2x}x^3+e^3(-18e^2+18ex+6x^3+2x^4)+e^{3+x}(32x^3+8x^4+e(24x-24x^2))}{x^3}\,dx = e^3\left(3+4e^x-\frac{3e}{x}+x\right)^2$$

output
```
(x+4*exp(x)+3-3*exp(1)/x)^2*exp(3)
```

3.279.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 54 vs. 2(20) = 40.

Time = 2.19 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.70

$$\int \frac{32e^{3+2x}x^3+e^3(-18e^2+18ex+6x^3+2x^4)+e^{3+x}(32x^3+8x^4+e(24x-24x^2))}{x^3}\,dx = -2e^3\left(-8e^{2x}+e^x\left(-12+\frac{12e}{x}-4x\right)-\frac{9e^2}{2x^2}+\frac{9e}{x}-3x-\frac{x^2}{2}\right)$$

input
```
Integrate[(32*E^(3 + 2*x)*x^3 + E^3*(-18*E^2 + 18*E*x + 6*x^3 + 2*x^4) + E
^(3 + x)*(32*x^3 + 8*x^4 + E*(24*x - 24*x^2)))/x^3,x]
```

output
```
-2*E^3*(-8*E^(2*x) + E^x*(-12 + (12*E)/x - 4*x) - (9*E^2)/(2*x^2) + (9*E)/
x - 3*x - x^2/2)
```

3.279.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 56 vs. $2(20) = 40$.

Time = 0.32 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.80, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.029$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{32e^{2x+3}x^3 + e^3(2x^4 + 6x^3 + 18ex - 18e^2) + e^{x+3}(8x^4 + 32x^3 + e(24x - 24x^2))}{x^3} \, dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-\frac{2e^3(-x^2 - 3x + 3e)(x^2 + 3e)}{x^3} - \frac{8e^{x+3}(-x^3 - 4x^2 + 3ex - 3e)}{x^2} + 32e^{2x+3} \right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^3(-x^2 - 3x + 3e)^2}{x^2} + 24e^{x+3} + 16e^{2x+3} + 8e^{x+3}x - \frac{24e^{x+4}}{x}$$

input
```
Int[(32*E^(3 + 2*x)*x^3 + E^3*(-18*E^2 + 18*E*x + 6*x^3 + 2*x^4) + E^(3 +
x)*(32*x^3 + 8*x^4 + E*(24*x - 24*x^2)))/x^3,x]
```

output
```
24*E^(3 + x) + 16*E^(3 + 2*x) - (24*E^(4 + x))/x + 8*E^(3 + x)*x + (E^3*(3
*E - 3*x - x^2)^2)/x^2
```

3.279.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.279.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. 2(19) = 38.

Time = 0.34 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.85

method	result
risch	$x^2 e^3 + 6x\,e^3 + \frac{9\,e^5 - 18x\,e^4}{x^2} + 16\,e^{3+2x} - \frac{8(-x^2+3\,e-3x)e^{3+x}}{x}$
norman	$\frac{x^4 e^3 + 6x^3 e^3 + 9\,e^2 e^3 - 18x\,e\,e^3 + 24x^2 e^3 e^x + 16x^2 e^3 e^{2x} + 8\,e^x e^3 x^3 - 24\,e^x e^3 x\,e}{x^2}$
parallelrisch	$\frac{x^4 e^3 + 6x^3 e^3 + 9\,e^2 e^3 - 18x\,e\,e^3 + 24x^2 e^3 e^x + 16x^2 e^3 e^{2x} + 8\,e^x e^3 x^3 - 24\,e^x e^3 x\,e}{x^2}$
parts	$16\,e^3 e^{2x} - 2\,e^3\left(-3x - \frac{x^2}{2} - \frac{9\,e^2}{2x^2} + \frac{9\,e}{x}\right) - 8\,e^3\left(-e^x x - 3\,e^x - 3\,e\left(-\frac{e^x}{x} - \mathrm{Ei}_1(-x)\right) - 3\,e\,\mathrm{Ei}_1\right.$
default	$x^2 e^3 + 16\,e^3 e^{2x} + 32\,e^x e^3 + \frac{9\,e^2 e^3}{x^2} - \frac{18\,e\,e^3}{x} + 8\,e^3(e^x x - e^x) + 24\,e\,e^3\left(-\frac{e^x}{x} - \mathrm{Ei}_1(-x)\right) + 24\,e$

input
```
int((32*x^3*exp(3)*exp(x)^2+((-24*x^2+24*x)*exp(1)+8*x^4+32*x^3)*exp(3)*ex
p(x)+(-18*exp(1)^2+18*x*exp(1)+2*x^4+6*x^3)*exp(3))/x^3,x,method=_RETURNVE
RBOSE)
```

output
```
x^2*exp(3)+6*x*exp(3)+(9*exp(5)-18*x*exp(4))/x^2+16*exp(3+2*x)-8/x*(-x^2+3
*exp(1)-3*x)*exp(3+x)
```

3.279.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. 2(19) = 38.

Time = 0.25 (sec) , antiderivative size = 64, normalized size of antiderivative = 3.20

$$\int \frac{32e^{3+2x}x^3 + e^3(-18e^2 + 18ex + 6x^3 + 2x^4) + e^{3+x}(32x^3 + 8x^4 + e(24x - 24x^2))}{x^3}\,dx$$
$$= \frac{(16\,x^2 e^{(2\,x+6)} - 18\,xe^7 + (x^4 + 6\,x^3)e^6 - 8\,(3\,xe^4 - (x^3 + 3\,x^2)e^3)e^{(x+3)} + 9\,e^8)e^{(-3)}}{x^2}$$

input
```
integrate((32*x^3*exp(3)*exp(x)^2+((-24*x^2+24*x)*exp(1)+8*x^4+32*x^3)*exp
(3)*exp(x)+(-18*exp(1)^2+18*x*exp(1)+2*x^4+6*x^3)*exp(3))/x^3,x, algorithm
=\
```

output
```
(16*x^2*e^(2*x + 6) - 18*x*e^7 + (x^4 + 6*x^3)*e^6 - 8*(3*x*e^4 - (x^3 + 3
*x^2)*e^3)*e^(x + 3) + 9*e^8)*e^(-3)/x^2
```

3.279.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. 2(19) = 38.

Time = 0.11 (sec) , antiderivative size = 65, normalized size of antiderivative = 3.25

$$\int \frac{32e^{3+2x}x^3+e^3(-18e^2+18ex+6x^3+2x^4)+e^{3+x}(32x^3+8x^4+e(24x-24x^2))}{x^3}\,dx$$
$$=x^2e^3+6xe^3+\frac{16xe^3e^{2x}+(8x^2e^3+24xe^3-24e^4)\,e^x}{x}+\frac{-18xe^4+9e^5}{x^2}$$

input
```
integrate((32*x**3*exp(3)*exp(x)**2+((-24*x**2+24*x)*exp(1)+8*x**4+32*x**3
)*exp(3)*exp(x)+(-18*exp(1)**2+18*x*exp(1)+2*x**4+6*x**3)*exp(3))/x**3,x)
```

output
```
x**2*exp(3) + 6*x*exp(3) + (16*x*exp(3)*exp(2*x) + (8*x**2*exp(3) + 24*x*e
xp(3) - 24*exp(4))*exp(x))/x + (-18*x*exp(4) + 9*exp(5))/x**2
```

3.279.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 68, normalized size of antiderivative = 3.40

$$\int \frac{32e^{3+2x}x^3+e^3(-18e^2+18ex+6x^3+2x^4)+e^{3+x}(32x^3+8x^4+e(24x-24x^2))}{x^3}\,dx$$
$$=x^2e^3-24\,\mathrm{Ei}(x)\,e^4+6\,xe^3+8\left(xe^3-e^3\right)e^x+24\,e^4\Gamma(-1,-x)-\frac{18\,e^4}{x}+\frac{9\,e^5}{x^2}+16\,e^{(2\,x+3)}+32\,e^{(x+3)}$$

input
```
integrate((32*x^3*exp(3)*exp(x)^2+((-24*x^2+24*x)*exp(1)+8*x^4+32*x^3)*exp
(3)*exp(x)+(-18*exp(1)^2+18*x*exp(1)+2*x^4+6*x^3)*exp(3))/x^3,x, algorithm
=\
```

output
```
x^2*e^3 - 24*Ei(x)*e^4 + 6*x*e^3 + 8*(x*e^3 - e^3)*e^x + 24*e^4*gamma(-1,
-x) - 18*e^4/x + 9*e^5/x^2 + 16*e^(2*x + 3) + 32*e^(x + 3)
```

3.279.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 143 vs. 2(19) = 38.

Time = 0.28 (sec) , antiderivative size = 143, normalized size of antiderivative = 7.15

$$\int \frac{32e^{3+2x}x^3 + e^3(-18e^2 + 18ex + 6x^3 + 2x^4) + e^{3+x}(32x^3 + 8x^4 + e(24x - 24x^2))}{x^3}\,dx$$
$$= \frac{(x+3)^4e^6 - 6\,(x+3)^3e^6 + 8\,(x+3)^3e^{(x+6)} + 9\,(x+3)^2e^6 + 16\,(x+3)^2e^{(2\,x+6)} - 48\,(x+3)^2e^{(x+6)} - 18\,(}{(x+3)^2e^3 - 6\,(}$$

input
```
integrate((32*x^3*exp(3)*exp(x)^2+((-24*x^2+24*x)*exp(1)+8*x^4+32*x^3)*exp
(3)*exp(x)+(-18*exp(1)^2+18*x*exp(1)+2*x^4+6*x^3)*exp(3))/x^3,x, algorithm
=\
```

output
```
((x + 3)^4*e^6 - 6*(x + 3)^3*e^6 + 8*(x + 3)^3*e^(x + 6) + 9*(x + 3)^2*e^6
 + 16*(x + 3)^2*e^(2*x + 6) - 48*(x + 3)^2*e^(x + 6) - 18*(x + 3)*e^7 - 96
*(x + 3)*e^(2*x + 6) - 24*(x + 3)*e^(x + 7) + 72*(x + 3)*e^(x + 6) + 9*e^8
 + 54*e^7 + 144*e^(2*x + 6) + 72*e^(x + 7))/((x + 3)^2*e^3 - 6*(x + 3)*e^3
 + 9*e^3)
```

3.279.9 Mupad [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.80

$$\int \frac{32e^{3+2x}x^3 + e^3(-18e^2 + 18ex + 6x^3 + 2x^4) + e^{3+x}(32x^3 + 8x^4 + e(24x - 24x^2))}{x^3}\,dx$$
$$= \frac{9\,\mathrm{e}^5 - x\,\mathrm{e}^3\,(24\,\mathrm{e}^{x+1} + 18\,\mathrm{e})}{x^2} + x^2\,\mathrm{e}^3 + \mathrm{e}^3\,\left(16\,\mathrm{e}^{2\,x} + 24\,\mathrm{e}^x\right) + x\,\mathrm{e}^3\,(8\,\mathrm{e}^x + 6)$$

input
```
int((exp(3)*(18*x*exp(1) - 18*exp(2) + 6*x^3 + 2*x^4) + exp(3)*exp(x)*(exp
(1)*(24*x - 24*x^2) + 32*x^3 + 8*x^4) + 32*x^3*exp(2*x)*exp(3))/x^3,x)
```

output
```
(9*exp(5) - x*exp(3)*(24*exp(x + 1) + 18*exp(1)))/x^2 + x^2*exp(3) + exp(3
)*(16*exp(2*x) + 24*exp(x)) + x*exp(3)*(8*exp(x) + 6)
```

3.280 $\int \frac{-e^2+20e^{\frac{1}{x}}}{x^2} dx$

3.280.1 Optimal result

Integrand size = 17, antiderivative size = 16

$$\int \frac{-e^2+20e^{\frac{1}{x}}}{x^2} dx = \frac{e^2-20e^{\frac{1}{x}}x}{x}$$

output
```
(exp(2)-20*x*exp(1/x))/x
```

3.280.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{-e^2+20e^{\frac{1}{x}}}{x^2} dx = -20e^{\frac{1}{x}}+\frac{e^2}{x}$$

input
```
Integrate[(-E^2 + 20*E^x^(-1))/x^2,x]
```

output
```
-20*E^x^(-1) + E^2/x
```

3.280.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{20e^{\frac{1}{x}}-e^2}{x^2} \, dx$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(\frac{20e^{\frac{1}{x}}}{x^2}-\frac{e^2}{x^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{e^2}{x}-20e^{\frac{1}{x}}$$

input
```
Int[(-E^2 + 20*E^x^(-1))/x^2,x]
```

output
```
-20*E^x^(-1) + E^2/x
```

3.280.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.280.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

method	result	size
derivativedivides	$-20\,{\mathrm e}^{\frac{1}{x}}+\frac{{\mathrm e}^{2}}{x}$	14
default	$-20\,{\mathrm e}^{\frac{1}{x}}+\frac{{\mathrm e}^{2}}{x}$	14
risch	$-20\,{\mathrm e}^{\frac{1}{x}}+\frac{{\mathrm e}^{2}}{x}$	14
parts	$-20\,{\mathrm e}^{\frac{1}{x}}+\frac{{\mathrm e}^{2}}{x}$	14
norman	$\frac{{\mathrm e}^{2}-20 x\,{\mathrm e}^{\frac{1}{x}}}{x}$	15
parallelrisch	$\frac{{\mathrm e}^{2}-20 x\,{\mathrm e}^{\frac{1}{x}}}{x}$	15

input
```
int((20*exp(1/x)-exp(2))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-20*exp(1/x)+exp(2)/x
```

3.280.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{-e^2+20e^{\frac{1}{x}}}{x^2}\,dx=-\frac{20\,xe^{\frac{1}{x}}-e^2}{x}$$

input
```
integrate((20*exp(1/x)-exp(2))/x^2,x, algorithm=\
```

output
```
-(20*x*e^(1/x) - e^2)/x
```

3.280.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int \frac{-e^2+20e^{\frac{1}{x}}}{x^2}\,dx=-20e^{\frac{1}{x}}+\frac{e^2}{x}$$

input
```
integrate((20*exp(1/x)-exp(2))/x**2,x)
```

output
```
-20*exp(1/x) + exp(2)/x
```

3.280.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-e^2+20e^{\frac{1}{x}}}{x^2}\,dx = \frac{e^2}{x} - 20\,e^{\frac{1}{x}}$$

input
```
integrate((20*exp(1/x)-exp(2))/x^2,x, algorithm=\
```

output
```
e^2/x - 20*e^(1/x)
```

3.280.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-e^2+20e^{\frac{1}{x}}}{x^2}\,dx = \frac{e^2}{x} - 20\,e^{\frac{1}{x}}$$

input
```
integrate((20*exp(1/x)-exp(2))/x^2,x, algorithm=\
```

output
```
e^2/x - 20*e^(1/x)
```

3.280.9 Mupad [B] (verification not implemented)

Time = 12.51 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-e^2+20e^{\frac{1}{x}}}{x^2}\,dx = \frac{\mathrm{e}^2}{x} - 20\,\mathrm{e}^{1/x}$$

input
```
int((20*exp(1/x) - exp(2))/x^2,x)
```

output
```
exp(2)/x - 20*exp(1/x)
```

3.281 $\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-$

3.281.1 Optimal result

Integrand size = 135, antiderivative size = 28

$$\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-2x^4+e^3(52x+36x^2)+(}{-e^3-x+}$$

$$=\left(7-x-5(4+x)+x^2\log\left(-e^3-x+\log(3)\right)\right)^2$$

output
```
(ln(ln(3)-exp(3)-x)*x^2-13-6*x)^2
```

3.281.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-2x^4+e^3(52x+36x^2)+(}{-e^3-x+}$$

$$=\left(-13-6x+x^2\log\left(-e^3-x+\log(3)\right)\right)^2$$

input
```
Integrate[(E^3*(-156 - 72*x) - 156*x - 46*x^2 + 12*x^3 + (156 + 72*x)*Log[
3] + (52*x^2 + 36*x^3 - 2*x^4 + E^3*(52*x + 36*x^2) + (-52*x - 36*x^2)*Log
[3])*Log[-E^3 - x + Log[3]] + (-4*E^3*x^3 - 4*x^4 + 4*x^3*Log[3])*Log[-E^3
 - x + Log[3]]^2)/(-E^3 - x + Log[3]),x]
```

output
```
(-13 - 6*x + x^2*Log[-E^3 - x + Log[3]])^2
```

3.281. $\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-2x^4+e^3(52x+36x^2)+(-52x-36x^2)\log(3))\log(-e^3-x+\log(3))+(-4e^3x^3}{-e^3-x+\log(3)}$

3.281.3 Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.022, Rules used = {7292, 27, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{12x^3-46x^2+\left(-4x^4-4e^3x^3+4x^3\log(3)\right)\log^2\left(-x-e^3+\log(3)\right)+\left(-2x^4+36x^3+52x^2+e^3\left(36x^2+52x\right)\right.}{-x-e^3+\log(3}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{2\left(x^2\left(-\log\left(-x-e^3+\log(3)\right)\right)+6x+13\right)\left(-x^2-2x^2\log\left(-x-e^3+\log(3)\right)+6x-2e^3x\left(1-\frac{\log(3)}{e^3}\right)\log\left(-\right.\right.}{x+e^3-\log(3)}$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{\left(-\log\left(-x+\log(3)-e^3\right)x^2+6x+13\right)\left(-2\log\left(-x+\log(3)-e^3\right)x^2-x^2-2\left(e^3-\log(3)\right)\log\left(-x+\log(3\right.\right.}{x-\log(3)+e^3}$$

$$\Big\downarrow \text{7237}$$

$$\left(x^2\left(-\log\left(-x-e^3+\log(3)\right)\right)+6x+13\right)^2$$

input
```
Int[(E^3*(-156 - 72*x) - 156*x - 46*x^2 + 12*x^3 + (156 + 72*x)*Log[3] + (
52*x^2 + 36*x^3 - 2*x^4 + E^3*(52*x + 36*x^2) + (-52*x - 36*x^2)*Log[3])*L
og[-E^3 - x + Log[3]] + (-4*E^3*x^3 - 4*x^4 + 4*x^3*Log[3])*Log[-E^3 - x +
 Log[3]]^2)/(-E^3 - x + Log[3]),x]
```

output
```
(13 + 6*x - x^2*Log[-E^3 - x + Log[3]])^2
```

3.281.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.281.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(22) = 44$.

Time = 0.74 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.79

method	result
risch	$\ln\left(\ln\left(3\right)-{\mathrm e}^{3}-x\right)^{2} x^{4}+\left(-12 x^{3}-26 x^{2}\right) \ln\left(\ln\left(3\right)-{\mathrm e}^{3}-x\right)+36 x^{2}+156 x$
norman	$\ln\left(\ln\left(3\right)-{\mathrm e}^{3}-x\right)^{2} x^{4}+156 x+36 x^{2}-12 x^{3} \ln\left(\ln\left(3\right)-{\mathrm e}^{3}-x\right)-26 \ln\left(\ln\left(3\right)-{\mathrm e}^{3}-\right.$
parallelrisch	$\ln\left(\ln\left(3\right)-{\mathrm e}^{3}-x\right)^{2} x^{4}-12 x^{3} \ln\left(\ln\left(3\right)-{\mathrm e}^{3}-x\right)-26 \ln\left(\ln\left(3\right)-{\mathrm e}^{3}-x\right) x^{2}-36 \ln(3$
parts	Expression too large to display
derivativedivides	Expression too large to display
default	Expression too large to display

input
```
int(((4*x^3*ln(3)-4*x^3*exp(3)-4*x^4)*ln(ln(3)-exp(3)-x)^2+((-36*x^2-52*x)
*ln(3)+(36*x^2+52*x)*exp(3)-2*x^4+36*x^3+52*x^2)*ln(ln(3)-exp(3)-x)+(72*x+
156)*ln(3)+(-72*x-156)*exp(3)+12*x^3-46*x^2-156*x)/(ln(3)-exp(3)-x),x,meth
od=_RETURNVERBOSE)
```

output
```
ln(ln(3)-exp(3)-x)^2*x^4+(-12*x^3-26*x^2)*ln(ln(3)-exp(3)-x)+36*x^2+156*x
```

3.281.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(22) = 44$.

Time = 0.27 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.79

$$\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-2x^4+e^3(52x+36x^2)+(}{-e^3-x+}$$

$$= x^4 \log\left(-x-e^3+\log(3)\right)^2 + 36\,x^2 - 2\left(6\,x^3+13\,x^2\right)\log\left(-x-e^3+\log(3)\right) + 156\,x$$

input
```
integrate(((4*x^3*log(3)-4*x^3*exp(3)-4*x^4)*log(log(3)-exp(3)-x)^2+((-36*
x^2-52*x)*log(3)+(36*x^2+52*x)*exp(3)-2*x^4+36*x^3+52*x^2)*log(log(3)-exp(
3)-x)+(72*x+156)*log(3)+(-72*x-156)*exp(3)+12*x^3-46*x^2-156*x)/(log(3)-ex
p(3)-x),x, algorithm=\
```

output
```
x^4*log(-x - e^3 + log(3))^2 + 36*x^2 - 2*(6*x^3 + 13*x^2)*log(-x - e^3 +
log(3)) + 156*x
```

3.281.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. $2(19) = 38$.

Time = 0.10 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.57

$$\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-2x^4+e^3(52x+36x^2)+(}{-e^3-x+}$$

$$= x^4 \log\left(-x-e^3+\log(3)\right)^2 + 36x^2 + 156x + \left(-12x^3-26x^2\right)\log\left(-x-e^3+\log(3)\right)$$

input
```
integrate(((4*x**3*ln(3)-4*x**3*exp(3)-4*x**4)*ln(ln(3)-exp(3)-x)**2+((-36
*x**2-52*x)*ln(3)+(36*x**2+52*x)*exp(3)-2*x**4+36*x**3+52*x**2)*ln(ln(3)-e
xp(3)-x)+(72*x+156)*ln(3)+(-72*x-156)*exp(3)+12*x**3-46*x**2-156*x)/(ln(3)
-exp(3)-x),x)
```

output
```
x**4*log(-x - exp(3) + log(3))**2 + 36*x**2 + 156*x + (-12*x**3 - 26*x**2)
*log(-x - exp(3) + log(3))
```

3.281. $\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-2x^4+e^3(52x+36x^2)+(-52x-36x^2)\log(3))\log(-e^3-x+\log(3))+(-4e^3x^3}{-e^3-x+\log(3)}$

3.281.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1942 vs. $2(22) = 44$.

Time = 0.32 (sec) , antiderivative size = 1942, normalized size of antiderivative = 69.36

$$\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-2x^4+e^3(52x+36x^2)+(}{-e^3-x+}$$
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input
```
integrate(((4*x^3*log(3)-4*x^3*exp(3)-4*x^4)*log(log(3)-exp(3)-x)^2+((-36*
x^2-52*x)*log(3)+(36*x^2+52*x)*exp(3)-2*x^4+36*x^3+52*x^2)*log(log(3)-exp(
3)-x)+(72*x+156)*log(3)+(-72*x-156)*exp(3)+12*x^3-46*x^2-156*x)/(log(3)-ex
p(3)-x),x, algorithm=\
```

output
```
1/8*(8*log(-x - e^3 + log(3))^2 - 4*log(-x - e^3 + log(3)) + 1)*(x + e^3 -
 log(3))^4 - 16/27*(9*(e^3 - log(3))*log(-x - e^3 + log(3))^2 - 6*(e^3 - l
og(3))*log(-x - e^3 + log(3)) + 2*e^3 - 2*log(3))*(x + e^3 - log(3))^3 - 1
/8*x^4 + 7/18*x^3*(e^3 - log(3)) - 4/3*(4*e^3*log(3)^3 - log(3)^4 - 6*e^6*
log(3)^2 + 4*e^9*log(3) - e^12)*log(-x - e^3 + log(3))^3 - 6*(2*(2*e^3*log
(3) - log(3)^2 - e^6)*log(-x - e^3 + log(3))^2 + 2*e^3*log(3) - log(3)^2 -
 2*(2*e^3*log(3) - log(3)^2 - e^6)*log(-x - e^3 + log(3)) - e^6)*(x + e^3
- log(3))^2 + 13/12*(2*e^3*log(3) - log(3)^2 - e^6)*x^2 - 9*x^2*(e^3 - log
(3)) + (4*e^3*log(3)^3 - log(3)^4 - 6*e^6*log(3)^2 + 4*e^9*log(3) - e^12)*
log(x + e^3 - log(3))^2 - 18*(3*e^3*log(3)^2 - log(3)^3 - 3*e^6*log(3) + e
^9)*log(x + e^3 - log(3))^2 - 26*(2*e^3*log(3) - log(3)^2 - e^6)*log(x + e
^3 - log(3))^2 - 18*(x^2 - 2*x*(e^3 - log(3)) - 2*(2*e^3*log(3) - log(3)^2
 - e^6)*log(x + e^3 - log(3)))*e^3*log(-x - e^3 + log(3)) + 52*((e^3 - log
(3))*log(x + e^3 - log(3)) - x)*e^3*log(-x - e^3 + log(3)) + 18*(x^2 - 2*x
*(e^3 - log(3)) - 2*(2*e^3*log(3) - log(3)^2 - e^6)*log(x + e^3 - log(3)))
*log(3)*log(-x - e^3 + log(3)) - 52*((e^3 - log(3))*log(x + e^3 - log(3))
- x)*log(3)*log(-x - e^3 + log(3)) - 16*(6*e^3*log(3)^2 - 2*log(3)^3 + (3*
e^3*log(3)^2 - log(3)^3 - 3*e^6*log(3) + e^9)*log(-x - e^3 + log(3))^2 - 6
*e^6*log(3) - 2*(3*e^3*log(3)^2 - log(3)^3 - 3*e^6*log(3) + e^9)*log(-x -
e^3 + log(3)) + 2*e^9)*(x + e^3 - log(3)) + 25/6*(3*e^3*log(3)^2 - log(...
```

3.281.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 746 vs. 2(22) = 44.

Time = 0.30 (sec) , antiderivative size = 746, normalized size of antiderivative = 26.64

$$\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-2x^4+e^3(52x+36x^2)+(}{-e^3-x+}$$

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input
```
integrate(((4*x^3*log(3)-4*x^3*exp(3)-4*x^4)*log(log(3)-exp(3)-x)^2+((-36*
x^2-52*x)*log(3)+(36*x^2+52*x)*exp(3)-2*x^4+36*x^3+52*x^2)*log(log(3)-exp(
3)-x)+(72*x+156)*log(3)+(-72*x-156)*exp(3)+12*x^3-46*x^2-156*x)/(log(3)-ex
p(3)-x),x, algorithm=\
```

output
```
(x + e^3 - log(3))^4*log(-x - e^3 + log(3))^2 - 4*(x + e^3 - log(3))^3*e^3
*log(-x - e^3 + log(3))^2 + 4*(x + e^3 - log(3))^3*log(3)*log(-x - e^3 + l
og(3))^2 - 12*(x + e^3 - log(3))^2*e^3*log(3)*log(-x - e^3 + log(3))^2 + 6
*(x + e^3 - log(3))^2*log(3)^2*log(-x - e^3 + log(3))^2 - 12*(x + e^3 - lo
g(3))*e^3*log(3)^2*log(-x - e^3 + log(3))^2 + 4*(x + e^3 - log(3))*log(3)^
3*log(-x - e^3 + log(3))^2 - 4*e^3*log(3)^3*log(-x - e^3 + log(3))^2 + log
(3)^4*log(-x - e^3 + log(3))^2 + 6*(x + e^3 - log(3))^2*e^6*log(-x - e^3 +
 log(3))^2 + 12*(x + e^3 - log(3))*e^6*log(3)*log(-x - e^3 + log(3))^2 + 6
*e^6*log(3)^2*log(-x - e^3 + log(3))^2 - 12*(x + e^3 - log(3))^3*log(-x -
e^3 + log(3)) + 36*(x + e^3 - log(3))^2*e^3*log(-x - e^3 + log(3)) - 36*(x
 + e^3 - log(3))^2*log(3)*log(-x - e^3 + log(3)) + 72*(x + e^3 - log(3))*e
^3*log(3)*log(-x - e^3 + log(3)) - 36*(x + e^3 - log(3))*log(3)^2*log(-x -
 e^3 + log(3)) + 36*e^3*log(3)^2*log(-x - e^3 + log(3)) - 12*log(3)^3*log(
-x - e^3 + log(3)) - 4*(x + e^3 - log(3))*e^9*log(-x - e^3 + log(3))^2 - 4
*e^9*log(3)*log(-x - e^3 + log(3))^2 - 26*(x + e^3 - log(3))^2*log(-x - e^
3 + log(3)) - 36*(x + e^3 - log(3))*e^6*log(-x - e^3 + log(3)) + 52*(x + e
^3 - log(3))*e^3*log(-x - e^3 + log(3)) - 52*(x + e^3 - log(3))*log(3)*log
(-x - e^3 + log(3)) - 36*e^6*log(3)*log(-x - e^3 + log(3)) + 52*e^3*log(3)
*log(-x - e^3 + log(3)) - 26*log(3)^2*log(-x - e^3 + log(3)) + e^12*log(-x
 - e^3 + log(3))^2 + 36*(x + e^3 - log(3))^2 - 72*(x + e^3 - log(3))*e^...
```

3.281.9 Mupad [B] (verification not implemented)

Time = 45.11 (sec) , antiderivative size = 1018, normalized size of antiderivative = 36.36

$$\int \frac{e^3(-156-72x)-156x-46x^2+12x^3+(156+72x)\log(3)+(52x^2+36x^3-2x^4+e^3(52x+36x^2)+(}{-e^3-x+}$$

= Too large to display

input
```
int((156*x - log(3)*(72*x + 156) + log(log(3) - exp(3) - x)^2*(4*x^3*exp(3
) - 4*x^3*log(3) + 4*x^4) - log(log(3) - exp(3) - x)*(exp(3)*(52*x + 36*x^
2) - log(3)*(52*x + 36*x^2) + 52*x^2 + 36*x^3 - 2*x^4) + 46*x^2 - 12*x^3 +
 exp(3)*(72*x + 156))/(x + exp(3) - log(3)),x)
```

output
```
156*x + x^2*(6*exp(3) - 6*log(3)) + 72*x*exp(3) - 72*x*log(3) + x*(2*exp(9
) - 6*exp(6)*log(3) + (exp(3) - log(729)/6)*(exp(6) - 2*exp(3)*log(3) + (e
xp(3) - log(729)/6)*((7*exp(3))/6 - log(81)/6 - log(729)/12 + 12) + log(3)
^2 - 26) + 6*exp(3)*log(3)^2 - 2*log(3)^3) + log(x + exp(3) - log(3))*(26*
exp(6) - 12*exp(9) - (25*exp(12))/6 - 52*exp(3)*log(3) + 36*exp(6)*log(3)
+ (50*exp(9)*log(3))/3 - 36*exp(3)*log(3)^2 + (50*exp(3)*log(3)^3)/3 - 25*
exp(6)*log(3)^2 + 26*log(3)^2 + 12*log(3)^3 - (25*log(3)^4)/6) + log(x + e
xp(3) - log(3))*(46*exp(6) - 92*exp(3)*log(3) + 46*log(3)^2) - x^2*(exp(6)
/2 - exp(3)*log(3) + ((exp(3) - log(729)/6)*((7*exp(3))/6 - log(81)/6 - lo
g(729)/12 + 12))/2 + log(3)^2/2 - 13) - log(x + exp(3) - log(3))*(156*log(
3) - 72*exp(3)*log(3) + 12*log(3)*log(729)) + ((25*x^3*(exp(3) - log(3))^2
)/36 - x^4*((19*exp(3))/72 - (19*log(3))/72) - (x^5*log(log(3) - exp(3) -
x))/2 - x^2*((37*exp(9))/12 - (37*exp(6)*log(3))/4 + (37*exp(3)*log(3)^2)/
4 - (37*log(3)^3)/12) + log(log(3) - exp(3) - x)*((25*exp(15))/6 - (125*ex
p(12)*log(3))/6 + (125*exp(3)*log(3)^4)/6 - (125*exp(6)*log(3)^3)/3 + (125
*exp(9)*log(3)^2)/3 - (25*log(3)^5)/6) + x^5*log(log(3) - exp(3) - x)^2 +
x^5/8 - log(log(3) - exp(3) - x)^2*(exp(3) - log(3))*(exp(12) - 4*exp(9)*l
og(3) - 4*exp(3)*log(3)^3 + 6*exp(6)*log(3)^2 + log(3)^4) + x*log(log(3) -
 exp(3) - x)*((37*exp(12))/6 - (74*exp(9)*log(3))/3 - (74*exp(3)*log(3)^3)
/3 + 37*exp(6)*log(3)^2 + (37*log(3)^4)/6) + x^2*log(log(3) - exp(3) - ...
```

3.282 $\int \frac{e^{\frac{4-x\log(5+3x)}{\log(5+3x)}}\left(-48+(-20-12x)\log^2(5+3x)\right)}{(5+3x)\log^2(5+3x)}\,dx$

3.282.1 Optimal result

Integrand size = 54, antiderivative size = 18

$$\int \frac{e^{\frac{4-x\log(5+3x)}{\log(5+3x)}}\left(-48+(-20-12x)\log^2(5+3x)\right)}{(5+3x)\log^2(5+3x)}\,dx = 4e^{-x+\frac{4}{\log(5+3x)}}$$

output
```
4*exp(4/ln(5+3*x)-x)
```

3.282.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{4-x\log(5+3x)}{\log(5+3x)}}\left(-48+(-20-12x)\log^2(5+3x)\right)}{(5+3x)\log^2(5+3x)}\,dx = 4e^{-x+\frac{4}{\log(5+3x)}}$$

input
```
Integrate[(E^((4 - x*Log[5 + 3*x])/Log[5 + 3*x])*(-48 + (-20 - 12*x)*Log[5
 + 3*x]^2))/((5 + 3*x)*Log[5 + 3*x]^2),x]
```

output
```
4*E^(-x + 4/Log[5 + 3*x])
```

3.282.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{4-x\log(3x+5)}{\log(3x+5)}}\left((-12x-20)\log^2(3x+5)-48\right)}{(3x+5)\log^2(3x+5)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{48e^{\frac{4-x\log(3x+5)}{\log(3x+5)}}}{(3x+5)\log^2(3x+5)}-4e^{\frac{4-x\log(3x+5)}{\log(3x+5)}}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-48\int \frac{e^{\frac{4-x\log(3x+5)}{\log(3x+5)}}}{(3x+5)\log^2(3x+5)}dx-4\int e^{\frac{4-x\log(3x+5)}{\log(3x+5)}}dx$$

input
```
Int[(E^((4 - x*Log[5 + 3*x])/Log[5 + 3*x])*(-48 + (-20 - 12*x)*Log[5 + 3*x
]^2))/((5 + 3*x)*Log[5 + 3*x]^2),x]
```

output
```
$Aborted
```

3.282.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.282.4 Maple [A] (verified)

Time = 0.77 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33

method	result	size
norman	$4\,\mathrm{e}^{\frac{-x\ln(3x+5)+4}{\ln(3x+5)}}$	24
risch	$4\,\mathrm{e}^{-\frac{x\ln(3x+5)-4}{\ln(3x+5)}}$	24
parallelrisch	$4\,\mathrm{e}^{-\frac{x\ln(3x+5)-4}{\ln(3x+5)}}$	24

input
```
int(((-12*x-20)*ln(3*x+5)^2-48)*exp((-x*ln(3*x+5)+4)/ln(3*x+5))/(3*x+5)/ln
(3*x+5)^2,x,method=_RETURNVERBOSE)
```

output
```
4*exp((-x*ln(3*x+5)+4)/ln(3*x+5))
```

3.282.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

$$\int \frac{e^{\frac{4-x\log(5+3x)}{\log(5+3x)}}\left(-48+(-20-12x)\log^2(5+3x)\right)}{(5+3x)\log^2(5+3x)}\,dx = 4\,e^{\left(-\frac{x\log(3\,x+5)-4}{\log(3\,x+5)}\right)}$$

input
```
integrate((((-12*x-20)*log(3*x+5)^2-48)*exp((-x*log(3*x+5)+4)/log(3*x+5))/(
3*x+5)/log(3*x+5)^2,x, algorithm=\
```

output
```
4*e^(-(x*log(3*x + 5) - 4)/log(3*x + 5))
```

3.282.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{e^{\frac{4-x\log(5+3x)}{\log(5+3x)}}\left(-48+(-20-12x)\log^2(5+3x)\right)}{(5+3x)\log^2(5+3x)}\,dx = 4e^{\frac{-x\log(3x+5)+4}{\log(3x+5)}}$$

input
```
integrate((((-12*x-20)*ln(3*x+5)**2-48)*exp((-x*ln(3*x+5)+4)/ln(3*x+5))/(3*
x+5)/ln(3*x+5)**2,x)
```

output
```
4*exp((-x*log(3*x + 5) + 4)/log(3*x + 5))
```

3.282.7 Maxima [F]

$$\int \frac{e^{\frac{4-x\log(5+3x)}{\log(5+3x)}}\left(-48+(-20-12x)\log^2(5+3x)\right)}{(5+3x)\log^2(5+3x)}\,dx = \int -\frac{4\left((3x+5)\log(3x+5)^2+12\right)e^{\left(-\frac{x\log(3x+5)-4}{\log(3x+5)}\right)}}{(3x+5)\log(3x+5)^2}\,dx$$

input
```
integrate(((-12*x-20)*log(3*x+5)^2-48)*exp((-x*log(3*x+5)+4)/log(3*x+5))/(
3*x+5)/log(3*x+5)^2,x, algorithm=\
```

output
```
4*e^(-x + 4/log(3*x + 5)) - 4*integrate(e^(-x + 4/log(3*x + 5)), x)
```

3.282.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{e^{\frac{4-x\log(5+3x)}{\log(5+3x)}}\left(-48+(-20-12x)\log^2(5+3x)\right)}{(5+3x)\log^2(5+3x)}\,dx = 4\,e^{\left(-x+\frac{4}{\log(3x+5)}\right)}$$

input
```
integrate(((-12*x-20)*log(3*x+5)^2-48)*exp((-x*log(3*x+5)+4)/log(3*x+5))/(
3*x+5)/log(3*x+5)^2,x, algorithm=\
```

output
```
4*e^(-x + 4/log(3*x + 5))
```

3.282.9 Mupad [B] (verification not implemented)

Time = 13.14 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{e^{\frac{4-x\log(5+3x)}{\log(5+3x)}}\left(-48+(-20-12x)\log^2(5+3x)\right)}{(5+3x)\log^2(5+3x)}\,dx = 4\,\mathrm{e}^{-x}\,\mathrm{e}^{\frac{4}{\ln(3x+5)}}$$

input
```
int(-(exp(-(x*log(3*x + 5) - 4)/log(3*x + 5))*(log(3*x + 5)^2*(12*x + 20)
+ 48))/(log(3*x + 5)^2*(3*x + 5)),x)
```

output
```
4*exp(-x)*exp(4/log(3*x + 5))
```

3.282. $\int \frac{e^{\frac{4-x\log(5+3x)}{\log(5+3x)}}\left(-48+(-20-12x)\log^2(5+3x)\right)}{(5+3x)\log^2(5+3x)}\,dx$

3.283 $\int \frac{-1458-162x+e^{2x}(-18+18x)+e^x(-324+144x+18x^2)+e^{2\log^2(x)}(-1$

3.283.1 Optimal result

Integrand size = 83, antiderivative size = 24

$$\int \frac{-1458-162x+e^{2x}(-18+18x)+e^x(-324+144x+18x^2)+e^{2\log^2(x)}(-162+324\log(x))+e^{\log^2(x)}(-9}{x^3}$$
$$=-5+\frac{9\left(e^x+3\left(3+e^{\log^2(x)}\right)+x\right)^2}{x^2}$$

output
```
3*(exp(x)+x+3*exp(ln(x)^2)+9)/x^2*(3*exp(x)+3*x+9*exp(ln(x)^2)+27)-5
```

3.283.2 Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{-1458-162x+e^{2x}(-18+18x)+e^x(-324+144x+18x^2)+e^{2\log^2(x)}(-162+324\log(x))+e^{\log^2(x)}(-9}{x^3}$$
$$=\frac{9\left(9+e^x+3e^{\log^2(x)}\right)\left(9+e^x+3e^{\log^2(x)}+2x\right)}{x^2}$$

input
```
Integrate[(-1458 - 162*x + E^(2*x)*(-18 + 18*x) + E^x*(-324 + 144*x + 18*x
^2) + E^(2*Log[x]^2)*(-162 + 324*Log[x]) + E^Log[x]^2*(-972 - 54*x + E^x*(
-108 + 54*x) + (972 + 108*E^x + 108*x)*Log[x]))/x^3,x]
```

output
```
(9*(9 + E^x + 3*E^Log[x]^2)*(9 + E^x + 3*E^Log[x]^2 + 2*x))/x^2
```

3.283.
$\int \frac{-1458-162x+e^{2x}(-18+18x)+e^x(-324+144x+18x^2)+e^{2\log^2(x)}(-162+324\log(x))+e^{\log^2(x)}(-972-54x+e^x(-108+54x)+(972+108e^x+108x)}{x^3}$

3.283.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 80 vs. $2(24) = 48$.

Time = 0.71 (sec) , antiderivative size = 80, normalized size of antiderivative = 3.33, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.024$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(18x^2+144x-324)-162x+e^{2x}(18x-18)+e^{2\log^2(x)}(324\log(x)-162)+e^{\log^2(x)}(-54x+e^x(54x-108)}{x^3}$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{162e^{2\log^2(x)}(2\log(x)-1)}{x^3}+\frac{54e^{\log^2(x)}(e^x x-x-2e^x+2x\log(x)+2e^x\log(x)+18\log(x)-18)}{x^3}+\frac{18(e^x x^2+\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{9(x+9)^2}{x^2}+\frac{162e^x}{x^2}+\frac{9e^{2x}}{x^2}+\frac{54e^{\log^2(x)}(e^x\log(x)+x\log(x)+9\log(x))}{x^2\log(x)}+\frac{81e^{2\log^2(x)}}{x^2}+\frac{18e^x}{x}$$

input
```
Int[(-1458 - 162*x + E^(2*x)*(-18 + 18*x) + E^x*(-324 + 144*x + 18*x^2) +
E^(2*Log[x]^2)*(-162 + 324*Log[x]) + E^Log[x]^2*(-972 - 54*x + E^x*(-108 +
 54*x) + (972 + 108*E^x + 108*x)*Log[x]))/x^3,x]
```

output
```
(162*E^x)/x^2 + (9*E^(2*x))/x^2 + (81*E^(2*Log[x]^2))/x^2 + (18*E^x)/x + (
9*(9 + x)^2)/x^2 + (54*E^Log[x]^2*(9*Log[x] + E^x*Log[x] + x*Log[x]))/(x^2
*Log[x])
```

3.283.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.283.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.17

method	result	size
risch	$\frac{18\,e^{x}x+9\,e^{2x}+162x+162\,e^{x}+729}{x^{2}}+\frac{81\,e^{2\ln(x)^{2}}}{x^{2}}+\frac{54(x+e^{x}+9)e^{\ln(x)^{2}}}{x^{2}}$	52
parallelrisch	$\frac{729+18\,e^{x}x+54\,e^{\ln(x)^{2}}x+9\,e^{2x}+54\,e^{x}e^{\ln(x)^{2}}+81\,e^{2\ln(x)^{2}}+162x+162\,e^{x}+486\,e^{\ln(x)^{2}}}{x^{2}}$	58

input
```
int(((324*ln(x)-162)*exp(ln(x)^2)^2+((108*exp(x)+108*x+972)*ln(x)+(54*x-10
8)*exp(x)-54*x-972)*exp(ln(x)^2)+(18*x-18)*exp(x)^2+(18*x^2+144*x-324)*exp
(x)-162*x-1458)/x^3,x,method=_RETURNVERBOSE)
```

output
```
9*(2*exp(x)*x+exp(x)^2+18*x+18*exp(x)+81)/x^2+81/x^2*exp(ln(x)^2)^2+54*(x+
exp(x)+9)/x^2*exp(ln(x)^2)
```

3.283.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.75

$$\int \frac{-1458-162x+e^{2x}(-18+18x)+e^{x}(-324+144x+18x^{2})+e^{2\log^{2}(x)}(-162+324\log(x))+e^{\log^{2}(x)}(-9}{x^{3}}$$

$$=\frac{9\left(6\,(x+e^{x}+9)e^{\left(\log(x)^{2}\right)}+2\,(x+9)e^{x}+18\,x+9\,e^{\left(2\,\log(x)^{2}\right)}+e^{(2\,x)}+81\right)}{x^{2}}$$

input
```
integrate(((324*log(x)-162)*exp(log(x)^2)^2+((108*exp(x)+108*x+972)*log(x)
+(54*x-108)*exp(x)-54*x-972)*exp(log(x)^2)+(18*x-18)*exp(x)^2+(18*x^2+144*
x-324)*exp(x)-162*x-1458)/x^3,x, algorithm=\
```

output
```
9*(6*(x + e^x + 9)*e^(log(x)^2) + 2*(x + 9)*e^x + 18*x + 9*e^(2*log(x)^2)
+ e^(2*x) + 81)/x^2
```

3.283.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. 2(24) = 48.

Time = 0.25 (sec) , antiderivative size = 82, normalized size of antiderivative = 3.42

$$\int \frac{-1458 - 162x + e^{2x}(-18 + 18x) + e^x(-324 + 144x + 18x^2) + e^{2\log^2(x)}(-162 + 324\log(x)) + e^{\log^2(x)}(-9}{x^3}$$

$$= -\frac{-162x - 729}{x^2} + \frac{9x^2e^{2x} + \left(18x^3 + 54x^2e^{\log(x)^2} + 162x^2\right)e^x}{x^4} + \frac{81x^2e^{2\log(x)^2} + (54x^3 + 486x^2)\,e^{\log(x)^2}}{x^4}$$

input
```
integrate(((324*ln(x)-162)*exp(ln(x)**2)**2+((108*exp(x)+108*x+972)*ln(x)+
(54*x-108)*exp(x)-54*x-972)*exp(ln(x)**2)+(18*x-18)*exp(x)**2+(18*x**2+144
*x-324)*exp(x)-162*x-1458)/x**3,x)
```

output
```
-(-162*x - 729)/x**2 + (9*x**2*exp(2*x) + (18*x**3 + 54*x**2*exp(log(x)**2
) + 162*x**2)*exp(x))/x**4 + (81*x**2*exp(2*log(x)**2) + (54*x**3 + 486*x*
*2)*exp(log(x)**2))/x**4
```

3.283.7 Maxima [F]

$$\int \frac{-1458 - 162x + e^{2x}(-18 + 18x) + e^x(-324 + 144x + 18x^2) + e^{2\log^2(x)}(-162 + 324\log(x)) + e^{\log^2(x)}(-9}{x^3}$$

$$= \int \frac{18\left(9\,(2\,\log(x) - 1)e^{\left(2\,\log(x)^2\right)} + 3\,((x-2)e^x + 2\,(x + e^x + 9)\log(x) - x - 18)e^{\left(\log(x)^2\right)} + (x-1)e^{(2\,x}\right.}{x^3}$$

input
```
integrate(((324*log(x)-162)*exp(log(x)^2)^2+((108*exp(x)+108*x+972)*log(x)
+(54*x-108)*exp(x)-54*x-972)*exp(log(x)^2)+(18*x-18)*exp(x)^2+(18*x^2+144*
x-324)*exp(x)-162*x-1458)/x^3,x, algorithm=\
```

output
```
81/2*I*sqrt(2)*sqrt(pi)*erf(I*sqrt(2)*log(x) - 1/2*I*sqrt(2))*e^(-1/2) + 2
7*I*sqrt(pi)*erf(I*log(x) - 1/2*I)*e^(-1/4) + 486*I*sqrt(pi)*erf(I*log(x)
- I)*e^(-1) + 162/x + 54*e^(log(x)^2 + x)/x^2 + 729/x^2 + 18*Ei(x) + 144*g
amma(-1, -x) + 36*gamma(-1, -2*x) + 324*gamma(-2, -x) + 72*gamma(-2, -2*x)
 + 18*integrate(6*(x + 9)*e^(log(x)^2)*log(x)/x^3, x) + 324*integrate(e^(2
*log(x)^2)*log(x)/x^3, x)
```

3.283.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(21) = 42$.

Time = 0.26 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.33

$$\int \frac{-1458-162x+e^{2x}(-18+18x)+e^x(-324+144x+18x^2)+e^{2\log^2(x)}(-162+324\log(x))+e^{\log^2(x)}(-9}{x^3}$$
$$= \frac{9\left(6\,xe^{\left(\log(x)^2\right)}+2\,xe^x+18\,x+9\,e^{\left(2\,\log(x)^2\right)}+6\,e^{\left(\log(x)^2+x\right)}+54\,e^{\left(\log(x)^2\right)}+e^{(2\,x)}+18\,e^x+81\right)}{x^2}$$

input
```
integrate(((324*log(x)-162)*exp(log(x)^2)^2+((108*exp(x)+108*x+972)*log(x)
+(54*x-108)*exp(x)-54*x-972)*exp(log(x)^2)+(18*x-18)*exp(x)^2+(18*x^2+144*
x-324)*exp(x)-162*x-1458)/x^3,x, algorithm=\
```

output
```
9*(6*x*e^(log(x)^2) + 2*x*e^x + 18*x + 9*e^(2*log(x)^2) + 6*e^(log(x)^2 +
x) + 54*e^(log(x)^2) + e^(2*x) + 18*e^x + 81)/x^2
```

3.283.9 Mupad [B] (verification not implemented)

Time = 13.15 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.25

$$\int \frac{-1458-162x+e^{2x}(-18+18x)+e^x(-324+144x+18x^2)+e^{2\log^2(x)}(-162+324\log(x))+e^{\log^2(x)}(-9}{x^3}$$
$$= \frac{9\left(3\,\mathrm{e}^{\ln(x)^2}+\mathrm{e}^x+9\right)\left(2\,x+3\,\mathrm{e}^{\ln(x)^2}+\mathrm{e}^x+9\right)}{x^2}$$

input
```
int(-(162*x - exp(2*log(x)^2)*(324*log(x) - 162) + exp(log(x)^2)*(54*x - e
xp(x)*(54*x - 108) - log(x)*(108*x + 108*exp(x) + 972) + 972) - exp(x)*(14
4*x + 18*x^2 - 324) - exp(2*x)*(18*x - 18) + 1458)/x^3,x)
```

output
```
(9*(3*exp(log(x)^2) + exp(x) + 9)*(2*x + 3*exp(log(x)^2) + exp(x) + 9))/x^
2
```

3.283. $\int \frac{-1458-162x+e^{2x}(-18+18x)+e^x(-324+144x+18x^2)+e^{2\log^2(x)}(-162+324\log(x))+e^{\log^2(x)}(-972-54x+e^x(-108+54x)+(972+108e^x+108x)}{x^3}$

3.284 $\int \frac{-9e^{\frac{2+x^3}{x^3}}-9e^{\frac{2(2+x^3)}{x^3}}-10x^2}{12x^4}\,dx$

3.284.1 Optimal result

Integrand size = 40, antiderivative size = 29

$$\int \frac{-9e^{\frac{2+x^3}{x^3}}-9e^{\frac{2(2+x^3)}{x^3}}-10x^2}{12x^4}\,dx=\frac{1}{16}\left(1+e^{\frac{\frac{2}{x^2}+x}{x}}\right)^2+\frac{5}{6x}$$

output
```
4*(1/16*exp((2/x^2+x)/x)+1/16)*(1/4*exp((2/x^2+x)/x)+1/4)+5/6/x
```

3.284.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24

$$\int \frac{-9e^{\frac{2+x^3}{x^3}}-9e^{\frac{2(2+x^3)}{x^3}}-10x^2}{12x^4}\,dx=\frac{1}{12}\left(\frac{3}{2}e^{1+\frac{2}{x^3}}+\frac{3}{4}e^{2+\frac{4}{x^3}}+\frac{10}{x}\right)$$

input
```
Integrate[(-9*E^((2 + x^3)/x^3) - 9*E^((2*(2 + x^3))/x^3) - 10*x^2)/(12*x^
4),x]
```

output
```
((3*E^(1 + 2/x^3))/2 + (3*E^(2 + 4/x^3))/4 + 10/x)/12
```

3.284.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-9e^{\frac{x^3+2}{x^3}}-9e^{\frac{2(x^3+2)}{x^3}}-10x^2}{12x^4}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{12}\int -\frac{10x^2+9e^{\frac{x^3+2}{x^3}}+9e^{\frac{2(x^3+2)}{x^3}}}{x^4}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{12}\int \frac{10x^2+9e^{\frac{x^3+2}{x^3}}+9e^{\frac{2(x^3+2)}{x^3}}}{x^4}dx$$

$$\Big\downarrow \text{2010}$$

$$-\frac{1}{12}\int \left(\frac{10}{x^2}+\frac{9e^{1+\frac{2}{x^3}}}{x^4}+\frac{9e^{2+\frac{4}{x^3}}}{x^4}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{12}\left(\frac{3}{2}e^{\frac{2}{x^3}+1}+\frac{3}{4}e^{\frac{4}{x^3}+2}+\frac{10}{x}\right)$$

input
```
Int[(-9*E^((2 + x^3)/x^3) - 9*E^((2*(2 + x^3))/x^3) - 10*x^2)/(12*x^4),x]
```

output
```
((3*E^(1 + 2/x^3))/2 + (3*E^(2 + 4/x^3))/4 + 10/x)/12
```

3.284. $\int \frac{-9e^{\frac{2+x^3}{x^3}}-9e^{\frac{2(2+x^3)}{x^3}}-10x^2}{12x^4}dx$

3.284.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.284.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

method	result	size
derivativedivides	$\frac{5}{6x}+\frac{e^{\frac{2}{x^3}} e}{8}+\frac{e^{\frac{4}{x^3}} e^2}{16}$	29
default	$\frac{5}{6x}+\frac{e^{\frac{2}{x^3}} e}{8}+\frac{e^{\frac{4}{x^3}} e^2}{16}$	29
risch	$\frac{5}{6x}+\frac{e^{\frac{2x^3+4}{x^3}}}{16}+\frac{e^{\frac{x^3+2}{x^3}}}{8}$	32
parts	$\frac{5}{6x}+\frac{e^{\frac{2x^3+4}{x^3}}}{16}+\frac{e^{\frac{x^3+2}{x^3}}}{8}$	33
norman	$\frac{\frac{5x^2}{6}+\frac{e^{\frac{x^3+2}{x^3}} x^3}{8}+\frac{e^{\frac{2x^3+4}{x^3}} x^3}{16}}{x^3}$	43

input
```
int(1/12*(-9*exp((x^3+2)/x^3)^2-9*exp((x^3+2)/x^3)-10*x^2)/x^4,x,method=_R
ETURNVERBOSE)
```

output
```
5/6/x+1/8*exp(1/x^3)^2*exp(1)+1/16*exp(1/x^3)^4*exp(1)^2
```

3.284. $\int \frac{-9e^{\frac{2+x^3}{x^3}}-9e^{\frac{2(2+x^3)}{x^3}}-10x^2}{12x^4}\,dx$

3.284.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

$$\int \frac{-9e^{\frac{2+x^3}{x^3}} - 9e^{\frac{2\left(2+x^3\right)}{x^3}} - 10x^2}{12x^4}\,dx = \frac{3\,xe^{\left(\frac{2\,\left(x^3+2\right)}{x^3}\right)} + 6\,xe^{\left(\frac{x^3+2}{x^3}\right)} + 40}{48\,x}$$

input
```
integrate(1/12*(-9*exp((x^3+2)/x^3)^2-9*exp((x^3+2)/x^3)-10*x^2)/x^4,x, al
gorithm=\
```

output
```
1/48*(3*x*e^(2*(x^3 + 2)/x^3) + 6*x*e^((x^3 + 2)/x^3) + 40)/x
```

3.284.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int \frac{-9e^{\frac{2+x^3}{x^3}} - 9e^{\frac{2\left(2+x^3\right)}{x^3}} - 10x^2}{12x^4}\,dx = \frac{e^{\frac{2\left(x^3+2\right)}{x^3}}}{16} + \frac{e^{\frac{x^3+2}{x^3}}}{8} + \frac{5}{6x}$$

input
```
integrate(1/12*(-9*exp((x**3+2)/x**3)**2-9*exp((x**3+2)/x**3)-10*x**2)/x**
4,x)
```

output
```
exp(2*(x**3 + 2)/x**3)/16 + exp((x**3 + 2)/x**3)/8 + 5/(6*x)
```

3.284.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{-9e^{\frac{2+x^3}{x^3}} - 9e^{\frac{2\left(2+x^3\right)}{x^3}} - 10x^2}{12x^4}\,dx = \frac{5}{6\,x} + \frac{1}{16}\,e^{\left(\frac{4}{x^3}+2\right)} + \frac{1}{8}\,e^{\left(\frac{2}{x^3}+1\right)}$$

input
```
integrate(1/12*(-9*exp((x^3+2)/x^3)^2-9*exp((x^3+2)/x^3)-10*x^2)/x^4,x, al
gorithm=\
```

output
```
5/6/x + 1/16*e^(4/x^3 + 2) + 1/8*e^(2/x^3 + 1)
```

3.284.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{-9e^{\frac{2+x^3}{x^3}} - 9e^{\frac{2(2+x^3)}{x^3}} - 10x^2}{12x^4} \, dx = \frac{5}{6x} + \frac{1}{16} e^{\left(\frac{4}{x^3}+2\right)} + \frac{1}{8} e^{\left(\frac{2}{x^3}+1\right)}$$

input
```
integrate(1/12*(-9*exp((x^3+2)/x^3)^2-9*exp((x^3+2)/x^3)-10*x^2)/x^4,x, al
gorithm=\
```

output
```
5/6/x + 1/16*e^(4/x^3 + 2) + 1/8*e^(2/x^3 + 1)
```

3.284.9 Mupad [B] (verification not implemented)

Time = 12.46 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{-9e^{\frac{2+x^3}{x^3}} - 9e^{\frac{2(2+x^3)}{x^3}} - 10x^2}{12x^4} \, dx = \frac{e \, e^{\frac{2}{x^3}}}{8} + \frac{e^2 \, e^{\frac{4}{x^3}}}{16} + \frac{5}{6x}$$

input
```
int(-((3*exp((x^3 + 2)/x^3))/4 + (3*exp((2*(x^3 + 2))/x^3))/4 + (5*x^2)/6)
/x^4,x)
```

output
```
(exp(1)*exp(2/x^3))/8 + (exp(2)*exp(4/x^3))/16 + 5/(6*x)
```

3.285 $\int e^{-2x}(150x + 20e^{2x}x - 150x^2 + e^{3x}(1 + 10x + 5x^2))$

3.285.1 Optimal result

Integrand size = 39, antiderivative size = 22

$$\int e^{-2x}\left(150x + 20e^{2x}x - 150x^2 + e^{3x}\left(1 + 10x + 5x^2\right)\right)\,dx = -6 + e^x + 5\left(2 + 15e^{-2x} + e^x\right)x^2$$

output
```
exp(x)-6+5*(15/exp(x)^2+exp(x)+2)*x^2
```

3.285.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int e^{-2x}\left(150x + 20e^{2x}x - 150x^2 + e^{3x}\left(1 + 10x + 5x^2\right)\right)\,dx = 10x^2 + 75e^{-2x}x^2 + e^x\left(1 + 5x^2\right)$$

input
```
Integrate[(150*x + 20*E^(2*x)*x - 150*x^2 + E^(3*x)*(1 + 10*x + 5*x^2))/E^
(2*x),x]
```

output
```
10*x^2 + (75*x^2)/E^(2*x) + E^x*(1 + 5*x^2)
```

3.285.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.051, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-2x}\left(-150x^2+e^{3x}\left(5x^2+10x+1\right)+20e^{2x}x+150x\right)\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-150e^{-2x}x^2+e^{x}\left(5x^2+10x+1\right)+150e^{-2x}x+20x\right)\,dx$$

$$\Big\downarrow \text{ 2009}$$

$$75e^{-2x}x^2+5e^{x}x^2+10x^2+e^{x}$$

input
```
Int[(150*x + 20*E^(2*x)*x - 150*x^2 + E^(3*x)*(1 + 10*x + 5*x^2))/E^(2*x),
x]
```

output
```
E^x + 10*x^2 + (75*x^2)/E^(2*x) + 5*E^x*x^2
```

3.285.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.285.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

method	result	size
default	$5\,\mathrm{e}^{x} x^{2}+75\,\mathrm{e}^{-2 x} x^{2}+10 x^{2}+\mathrm{e}^{x}$	25
parts	$5\,\mathrm{e}^{x} x^{2}+75\,\mathrm{e}^{-2 x} x^{2}+10 x^{2}+\mathrm{e}^{x}$	25
risch	$10 x^{2}+\left(5 x^{2}+1\right) \mathrm{e}^{x}+75\,\mathrm{e}^{-2 x} x^{2}$	26
norman	$\left(\mathrm{e}^{3 x}+75 x^{2}+5 x^{2} \mathrm{e}^{3 x}+10\,\mathrm{e}^{2 x} x^{2}\right) \mathrm{e}^{-2 x}$	34
parallelrisch	$\left(\mathrm{e}^{3 x}+75 x^{2}+5 x^{2} \mathrm{e}^{3 x}+10\,\mathrm{e}^{2 x} x^{2}\right) \mathrm{e}^{-2 x}$	34

input
```
int(((5*x^2+10*x+1)*exp(x)^3+20*x*exp(x)^2-150*x^2+150*x)/exp(x)^2,x,metho
d=_RETURNVERBOSE)
```

output
```
10*x^2+75*x^2/exp(x)^2+5*exp(x)*x^2+exp(x)
```

3.285.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.45

$$\int e^{-2x}\left(150x+20e^{2x}x-150x^2+e^{3x}\left(1+10x+5x^2\right)\right)\,dx = \left(10\,x^{2} e^{\left(2\,x\right)} + 75\,x^{2} + \left(5\,x^{2} + 1\right)e^{\left(3\,x\right)}\right)e^{\left(-2\,x\right)}$$

input
```
integrate(((5*x^2+10*x+1)*exp(x)^3+20*x*exp(x)^2-150*x^2+150*x)/exp(x)^2,x
, algorithm=\
```

output
```
(10*x^2*e^(2*x) + 75*x^2 + (5*x^2 + 1)*e^(3*x))*e^(-2*x)
```

3.285.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int e^{-2x}\left(150x+20e^{2x}x-150x^2+e^{3x}\left(1+10x+5x^2\right)\right)\,dx = 10x^{2} + 75x^{2}e^{-2x} + \left(5x^{2} + 1\right)e^{x}$$

input
```
integrate(((5*x**2+10*x+1)*exp(x)**3+20*x*exp(x)**2-150*x**2+150*x)/exp(x)
**2,x)
```

output
```
10*x**2 + 75*x**2*exp(-2*x) + (5*x**2 + 1)*exp(x)
```

3.285.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(19) = 38$.

Time = 0.20 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.45

$$\int e^{-2x}\left(150x+20e^{2x}x-150x^2+e^{3x}\left(1+10x+5x^2\right)\right)\,dx$$
$$=10\,x^2+\frac{75}{2}\,\left(2\,x^2+2\,x+1\right)e^{(-2\,x)}-\frac{75}{2}\,(2\,x+1)e^{(-2\,x)}$$
$$+5\,\left(x^2-2\,x+2\right)e^x+10\,(x-1)e^x+e^x$$

input
```
integrate(((5*x^2+10*x+1)*exp(x)^3+20*x*exp(x)^2-150*x^2+150*x)/exp(x)^2,x
, algorithm=\
```

output
```
10*x^2 + 75/2*(2*x^2 + 2*x + 1)*e^(-2*x) - 75/2*(2*x + 1)*e^(-2*x) + 5*(x^
2 - 2*x + 2)*e^x + 10*(x - 1)*e^x + e^x
```

3.285.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

$$\int e^{-2x}\left(150x+20e^{2x}x-150x^2+e^{3x}\left(1+10x+5x^2\right)\right)\,dx=75\,x^2e^{(-2\,x)}+10\,x^2+\left(5\,x^2+1\right)e^x$$

input
```
integrate(((5*x^2+10*x+1)*exp(x)^3+20*x*exp(x)^2-150*x^2+150*x)/exp(x)^2,x
, algorithm=\
```

output
```
75*x^2*e^(-2*x) + 10*x^2 + (5*x^2 + 1)*e^x
```

3.285.9 Mupad [B] (verification not implemented)

Time = 13.51 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

$$\int e^{-2x}\left(150x+20e^{2x}x-150x^2+e^{3x}\left(1+10x+5x^2\right)\right)\,dx=75\,x^2\,\mathrm{e}^{-2\,x}+\mathrm{e}^x\,\left(5\,x^2+1\right)+10\,x^2$$

input
```
int(exp(-2*x)*(150*x + exp(3*x)*(10*x + 5*x^2 + 1) + 20*x*exp(2*x) - 150*x
^2),x)
```

output
```
75*x^2*exp(-2*x) + exp(x)*(5*x^2 + 1) + 10*x^2
```

3.286 $\int \frac{e^{-x-e^{-x}\left(-4e^x+e^{2x}+4x\right)}\left(e^x-4x-e^{2x}x+4x^2\right)}{5\log(5)}\,dx$

3.286.1 Optimal result

Integrand size = 55, antiderivative size = 26

$$\int \frac{e^{-x-e^{-x}\left(-4e^x+e^{2x}+4x\right)}\left(e^x-4x-e^{2x}x+4x^2\right)}{5\log(5)}\,dx=\frac{e^{4-e^x-4e^{-x}x}x}{5\log(5)}$$

output
```
1/5*x/exp(4*x/exp(x)+exp(x)-4)/ln(5)
```

3.286.2 Mathematica [A] (verified)

Time = 0.63 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{-x-e^{-x}\left(-4e^x+e^{2x}+4x\right)}\left(e^x-4x-e^{2x}x+4x^2\right)}{5\log(5)}\,dx=\frac{e^{4-e^x-4e^{-x}x}x}{5\log(5)}$$

input
```
Integrate[(E^(-x - (-4*E^x + E^(2*x) + 4*x)/E^x)*(E^x - 4*x - E^(2*x)*x + 
4*x^2))/(5*Log[5]),x]
```

output
```
(E^(4 - E^x - (4*x)/E^x)*x)/(5*Log[5])
```

3.286.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x-e^{-x}\left(4x-4e^x+e^{2x}\right)}\left(4x^2-e^{2x}x-4x+e^x\right)}{5\log(5)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int e^{e^{-x}\left(-4x+4e^x-e^{2x}\right)-x}\left(4x^2-e^{2x}x-4x+e^x\right)dx}{5\log(5)}$$

$$\Big\downarrow \ 7292$$

$$\frac{\int e^{-e^{-x}\left(e^x x+4x-4e^x+e^{2x}\right)}\left(4x^2-e^{2x}x-4x+e^x\right)dx}{5\log(5)}$$

$$\Big\downarrow \ 7293$$

$$\frac{\int \left(4e^{-e^{-x}\left(e^x x+4x-4e^x+e^{2x}\right)}x^2-4e^{-e^{-x}\left(e^x x+4x-4e^x+e^{2x}\right)}x-\exp\left(2x-e^{-x}\left(e^x x+4x-4e^x+e^{2x}\right)\right)x+e^{x-e^{-x}\left(e^x x+\right.}\right.}{5\log(5)}$$

$$\Big\downarrow \ 2009$$

$$\frac{4\int e^{-e^{-x}\left(e^x x+4x-4e^x+e^{2x}\right)}x^2dx+\int e^{-4e^{-x}x-e^x+4}dx-\int e^{-4e^{-x}x+x-e^x+4}xdx-4\int e^{-e^{-x}\left(e^x x+4x-4e^x+e^{2x}\right)}xdx}{5\log(5)}$$

input
```
Int[(E^(-x - (-4*E^x + E^(2*x) + 4*x)/E^x)*(E^x - 4*x - E^(2*x)*x + 4*x^2)
)/(5*Log[5]),x]
```

output
```
$Aborted
```

3.286.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.286.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

method	result	size
norman	$\frac{x\,\mathrm{e}^{-\left(\mathrm{e}^{2x}-4\,\mathrm{e}^{x}+4x\right)\mathrm{e}^{-x}}}{5\ln\left(5\right)}$	28
risch	$\frac{x\,\mathrm{e}^{\left(-\mathrm{e}^{2x}+4\,\mathrm{e}^{x}-4x\right)\mathrm{e}^{-x}}}{5\ln\left(5\right)}$	28
parallelrisch	$\frac{x\,\mathrm{e}^{-\left(\mathrm{e}^{2x}-4\,\mathrm{e}^{x}+4x\right)\mathrm{e}^{-x}}}{5\ln\left(5\right)}$	28

input
```
int(1/5*(-x*exp(x)^2+exp(x)+4*x^2-4*x)/ln(5)/exp(x)/exp((exp(x)^2-4*exp(x)
+4*x)/exp(x)),x,method=_RETURNVERBOSE)
```

output
```
1/5/ln(5)*x/exp((exp(x)^2-4*exp(x)+4*x)/exp(x))
```

3.286.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

$$\int \frac{e^{-x-e^{-x}\left(-4e^x+e^{2x}+4x\right)}\left(e^x-4x-e^{2x}x+4x^2\right)}{5\log(5)}\,dx = \frac{xe^{\left(-\left((x-4)e^x+4\,x+e^{(2\,x)}\right)e^{(-x)}+x\right)}}{5\,\log\left(5\right)}$$

input
```
integrate(1/5*(-x*exp(x)^2+exp(x)+4*x^2-4*x)/log(5)/exp(x)/exp((exp(x)^2-4
*exp(x)+4*x)/exp(x)),x, algorithm=\
```

output
```
1/5*x*e^(-((x - 4)*e^x + 4*x + e^(2*x))*e^(-x) + x)/log(5)
```

3.286.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{e^{-x-e^{-x}\left(-4e^x+e^{2x}+4x\right)}\left(e^x-4x-e^{2x}x+4x^2\right)}{5\log(5)}\,dx=\frac{xe^{-\left(4x+e^{2x}-4e^x\right)e^{-x}}}{5\log\left(5\right)}$$

input
```
integrate(1/5*(-x*exp(x)**2+exp(x)+4*x**2-4*x)/ln(5)/exp(x)/exp((exp(x)**2
-4*exp(x)+4*x)/exp(x)),x)
```

output
```
x*exp(-(4*x + exp(2*x) - 4*exp(x))*exp(-x))/(5*log(5))
```

3.286.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{e^{-x-e^{-x}\left(-4e^x+e^{2x}+4x\right)}\left(e^x-4x-e^{2x}x+4x^2\right)}{5\log(5)}\,dx=\frac{xe^{\left(-4\,xe^{(-x)}-e^x+4\right)}}{5\,\log\left(5\right)}$$

input
```
integrate(1/5*(-x*exp(x)^2+exp(x)+4*x^2-4*x)/log(5)/exp(x)/exp((exp(x)^2-4
*exp(x)+4*x)/exp(x)),x, algorithm=\
```

output
```
1/5*x*e^(-4*x*e^(-x) - e^x + 4)/log(5)
```

3.286.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{e^{-x-e^{-x}\left(-4e^x+e^{2x}+4x\right)}\left(e^x-4x-e^{2x}x+4x^2\right)}{5\log(5)}\,dx=\frac{xe^{\left(-\left(4\,x+e^{(2\,x)}\right)e^{(-x)}+4\right)}}{5\,\log\left(5\right)}$$

input
```
integrate(1/5*(-x*exp(x)^2+exp(x)+4*x^2-4*x)/log(5)/exp(x)/exp((exp(x)^2-4
*exp(x)+4*x)/exp(x)),x, algorithm=\
```

output
```
1/5*x*e^(-(4*x + e^(2*x))*e^(-x) + 4)/log(5)
```

3.286.9 Mupad [B] (verification not implemented)

Time = 12.49 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{e^{-x-e^{-x}\left(-4e^x+e^{2x}+4x\right)}\left(e^x-4x-e^{2x}x+4x^2\right)}{5\log(5)}\,dx=\frac{x\,\mathrm{e}^4\,\mathrm{e}^{-4\,x\,\mathrm{e}^{-x}}\,\mathrm{e}^{-\mathrm{e}^x}}{5\,\ln\left(5\right)}$$

input
```
int(-(exp(-x)*exp(-exp(-x)*(4*x + exp(2*x) - 4*exp(x)))*((4*x)/5 - exp(x)/
5 + (x*exp(2*x))/5 - (4*x^2)/5))/log(5),x)
```

output
```
(x*exp(4)*exp(-4*x*exp(-x))*exp(-exp(x)))/(5*log(5))
```

3.287 $\int \frac{3\ 2^{4x}-4\log(2)}{1+2^{4x}(-5+3x)}\,dx$

3.287.1 Optimal result

Integrand size = 28, antiderivative size = 11

$$\int \frac{3\ 2^{4x}-4\log(2)}{1+2^{4x}(-5+3x)}\,dx = \log\left(-5+2^{-4x}+3x\right)$$

output
```
ln(3*x-5+1/exp(4*x*ln(2)))
```

3.287.2 Mathematica [F]

$$\int \frac{3\ 2^{4x}-4\log(2)}{1+2^{4x}(-5+3x)}\,dx = \int \frac{3\ 2^{4x}-4\log(2)}{1+2^{4x}(-5+3x)}\,dx$$

input
```
Integrate[(3*2^(4*x) - 4*Log[2])/(1 + 2^(4*x)*(-5 + 3*x)),x]
```

output
```
Integrate[(3*2^(4*x) - 4*Log[2])/(1 + 2^(4*x)*(-5 + 3*x)), x]
```

3.287.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3\ 2^{4x}-4\log(2)}{2^{4x}(3x-5)+1}\,dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{3}{3x-5}-\frac{12x\log(2)+3-20\log(2)}{(3x-5)\left(3\ 16^x x-5\ 16^x+1\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-3\int \frac{1}{(3x-5)\left(3\ 16^x x-5\ 16^x+1\right)}dx-\log(16)\int \frac{1}{3\ 16^x x-5\ 16^x+1}dx+\log(5-3x)$$

input
```
Int[(3*2^(4*x) - 4*Log[2])/(1 + 2^(4*x)*(-5 + 3*x)),x]
```

output
```
$Aborted
```

3.287.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.287.4 Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 25, normalized size of antiderivative = 2.27

method	result	size
risch	$\ln(3x-5)-4x\ln(2)+\ln\left(16^x+\frac{1}{3x-5}\right)$	25
parallelrisch	$-4x\ln(2)+\ln\left(e^{4x\ln(2)}x-\frac{5\,e^{4x\ln(2)}}{3}+\frac{1}{3}\right)$	26
norman	$-4x\ln(2)+\ln\left(3\,e^{4x\ln(2)}x-5\,e^{4x\ln(2)}+1\right)$	27

input
```
int((3*exp(4*x*ln(2))-4*ln(2))/((3*x-5)*exp(4*x*ln(2))+1),x,method=_RETURN
VERBOSE)
```

output
```
ln(3*x-5)-4*x*ln(2)+ln(16^x+1/(3*x-5))
```

3.287.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. 2(13) = 26.

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 3.09

$$\int \frac{3\ 2^{4x}-4\log(2)}{1+2^{4x}(-5+3x)}\,dx=-4\,x\log{(2)}+\log{(3\,x-5)}+\log{\left(\frac{2^{4\,x}(3\,x-5)+1}{3\,x-5}\right)}$$

input
```
integrate((3*exp(4*x*log(2))-4*log(2))/((3*x-5)*exp(4*x*log(2))+1),x, algo
rithm=\
```

output
```
-4*x*log(2) + log(3*x - 5) + log((2^(4*x)*(3*x - 5) + 1)/(3*x - 5))
```

3.287.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 29, normalized size of antiderivative = 2.64

$$\int \frac{3\ 2^{4x}-4\log(2)}{1+2^{4x}(-5+3x)}\,dx=-4x\log{(2)}+\log{(3x-5)}+\log{\left(e^{4x\log{(2)}}+\frac{1}{3x-5}\right)}$$

input
```
integrate((3*exp(4*x*ln(2))-4*ln(2))/((3*x-5)*exp(4*x*ln(2))+1),x)
```

output
```
-4*x*log(2) + log(3*x - 5) + log(exp(4*x*log(2)) + 1/(3*x - 5))
```

3.287.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. $2(13) = 26$.

Time = 0.31 (sec) , antiderivative size = 34, normalized size of antiderivative = 3.09

$$\int \frac{3\ 2^{4x}-4\log(2)}{1+2^{4x}(-5+3x)}\,dx = -4\,x\log(2)+\log(3\,x-5)+\log\left(\frac{2^{4\,x}(3\,x-5)+1}{3\,x-5}\right)$$

input
```
integrate((3*exp(4*x*log(2))-4*log(2))/((3*x-5)*exp(4*x*log(2))+1),x, algo
rithm=\
```

output
```
-4*x*log(2) + log(3*x - 5) + log((2^(4*x)*(3*x - 5) + 1)/(3*x - 5))
```

3.287.8 Giac [F]

$$\int \frac{3\ 2^{4x}-4\log(2)}{1+2^{4x}(-5+3x)}\,dx = \int \frac{3\cdot 2^{4\,x}-4\,\log(2)}{2^{4\,x}(3\,x-5)+1}\,dx$$

input
```
integrate((3*exp(4*x*log(2))-4*log(2))/((3*x-5)*exp(4*x*log(2))+1),x, algo
rithm=\
```

output
```
integrate((3*2^(4*x) - 4*log(2))/(2^(4*x)*(3*x - 5) + 1), x)
```

3.287.9 Mupad [B] (verification not implemented)

Time = 12.43 (sec) , antiderivative size = 24, normalized size of antiderivative = 2.18

$$\int \frac{3\ 2^{4x}-4\log(2)}{1+2^{4x}(-5+3x)}\,dx = \ln\left(3\,2^{4\,x}\,x-5\,2^{4\,x}+1\right)-4\,x\,\ln(2)$$

input
```
int(-(4*log(2) - 3*exp(4*x*log(2)))/(exp(4*x*log(2))*(3*x - 5) + 1),x)
```

output
```
log(3*2^(4*x)*x - 5*2^(4*x) + 1) - 4*x*log(2)
```

3.288 $\int \frac{4x^2+e^{\frac{e^{\frac{1}{4}(20-24x-5x\log(x))}}{x}+\frac{1}{4}(20-24x-5x\log(x))}(-4-29x-5x\log(x))}{4x^2}\,dx$

3.288.1 Optimal result

Integrand size = 61, antiderivative size = 24

$$\int \frac{4x^2+e^{\frac{e^{\frac{1}{4}(20-24x-5x\log(x))}}{x}+\frac{1}{4}(20-24x-5x\log(x))}(-4-29x-5x\log(x))}{4x^2}\,dx = e^{\frac{e^{5-x-\frac{5}{4}x(4+\log(x))}}{x}}+x$$

output
```
exp(exp(5-5*x*(1/4*ln(x)+1)-x)/x)+x
```

3.288.2 Mathematica [A] (verified)

Time = 0.77 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{4x^2+e^{\frac{e^{\frac{1}{4}(20-24x-5x\log(x))}}{x}+\frac{1}{4}(20-24x-5x\log(x))}(-4-29x-5x\log(x))}{4x^2}\,dx = e^{e^{5-6x}x^{-1-\frac{5x}{4}}}+x$$

input
```
Integrate[(4*x^2 + E^(E^((20 - 24*x - 5*x*Log[x])/4)/x + (20 - 24*x - 5*x*
Log[x])/4)*(-4 - 29*x - 5*x*Log[x]))/(4*x^2),x]
```

output
```
E^(E^(5 - 6*x)*x^(-1 - (5*x)/4)) + x
```

3.288.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-29x-5x\log(x)-4)\exp\left(\frac{1}{4}(-24x-5x\log(x)+20)+\frac{e^{\frac{1}{4}(-24x-5x\log(x)+20)}}{x}\right)+4x^2}{4x^2}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{4}\int \frac{4x^2-\exp\left(e^{5-6x}x^{-\frac{5x}{4}-1}+\frac{1}{4}(-5\log(x)x-24x+20)\right)(5\log(x)x+29x+4)}{x^2}dx$$
$$\Big\downarrow \text{2010}$$
$$\frac{1}{4}\int \left(4-e^{e^{5-6x}x^{-\frac{5x}{4}-1}-6x+5}x^{-\frac{5x}{4}-2}(5\log(x)x+29x+4)\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{1}{4}\left(-4\int e^{e^{5-6x}x^{-\frac{5x}{4}-1}-6x+5}x^{-\frac{5x}{4}-2}dx-29\int e^{e^{5-6x}x^{-\frac{5x}{4}-1}-6x+5}x^{-\frac{5x}{4}-1}dx+5\int \frac{\int e^{e^{5-6x}x^{-\frac{5x}{4}-1}-6x+5}x^{-\frac{5x}{4}-1}dx}{x}d\right.$$

input
```
Int[(4*x^2 + E^(E^((20 - 24*x - 5*x*Log[x])/4)/x + (20 - 24*x - 5*x*Log[x]
)/4)*(-4 - 29*x - 5*x*Log[x]))/(4*x^2),x]
```

output
```
$Aborted
```

3.288.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.288.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

method	result	size
risch	$x+\mathrm{e}^{\frac{x^{-\frac{5x}{4}}\mathrm{e}^{5-6x}}{x}}$	19
parallelrisch	$x+\mathrm{e}^{\frac{\mathrm{e}^{-\frac{5x\ln(x)}{4}-6x+5}}{x}}$	19

input
```
int(1/4*((-5*x*ln(x)-29*x-4)*exp(-5/4*x*ln(x)-6*x+5)*exp(exp(-5/4*x*ln(x)-
6*x+5)/x)+4*x^2)/x^2,x,method=_RETURNVERBOSE)
```

output
```
x+exp(x^(-5/4*x)*exp(5-6*x)/x)
```

3.288.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(20) = 40.

Time = 0.29 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.54

$$\int \frac{4x^2+e^{\frac{e^{\frac{1}{4}(20-24x-5x\log(x))}}{x}+\frac{1}{4}(20-24x-5x\log(x))}(-4-29x-5x\log(x))}{4x^2}\,dx$$
$$=\left(xe^{\left(-\frac{5}{4}\,x\log(x)-6\,x+5\right)}+e^{\left(-\frac{5\,x^2\log(x)+24\,x^2-20\,x-4\,e^{\left(-\frac{5}{4}\,x\log(x)-6\,x+5\right)}}{4\,x}\right)}\right)e^{\left(\frac{5}{4}\,x\log(x)+6\,x-5\right)}$$

input
```
integrate(1/4*((-5*x*log(x)-29*x-4)*exp(-5/4*x*log(x)-6*x+5)*exp(exp(-5/4*
x*log(x)-6*x+5)/x)+4*x^2)/x^2,x, algorithm=\
```

output
```
(x*e^(-5/4*x*log(x) - 6*x + 5) + e^(-1/4*(5*x^2*log(x) + 24*x^2 - 20*x - 4
*e^(-5/4*x*log(x) - 6*x + 5))/x))*e^(5/4*x*log(x) + 6*x - 5)
```

3.288.6 Sympy [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{4x^2+e^{\frac{e^{\frac{1}{4}(20-24x-5x\log(x))}}{x}+\frac{1}{4}(20-24x-5x\log(x))}(-4-29x-5x\log(x))}{4x^2}\,dx = x+e^{\frac{e^{-\frac{5x\log(x)}{4}-6x+5}}{x}}$$

input
```
integrate(1/4*((-5*x*ln(x)-29*x-4)*exp(-5/4*x*ln(x)-6*x+5)*exp(exp(-5/4*x*
ln(x)-6*x+5)/x)+4*x**2)/x**2,x)
```

output
```
x + exp(exp(-5*x*log(x)/4 - 6*x + 5)/x)
```

3.288.7 Maxima [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.75

$$\int \frac{4x^2+e^{\frac{e^{\frac{1}{4}(20-24x-5x\log(x))}}{x}+\frac{1}{4}(20-24x-5x\log(x))}(-4-29x-5x\log(x))}{4x^2}\,dx$$
$$= x+e^{\left(\frac{e^{\left(-\frac{5}{4}\,x\log(x)-6\,x+5\right)}}{x}\right)}$$

input
```
integrate(1/4*((-5*x*log(x)-29*x-4)*exp(-5/4*x*log(x)-6*x+5)*exp(exp(-5/4*
x*log(x)-6*x+5)/x)+4*x^2)/x^2,x, algorithm=\
```

output
```
x + e^(e^(-5/4*x*log(x) - 6*x + 5)/x)
```

3.288.8 Giac [F]

$$\int \frac{4x^2+e^{\frac{e^{\frac{1}{4}(20-24x-5x\log(x))}}{x}+\frac{1}{4}(20-24x-5x\log(x))}(-4-29x-5x\log(x))}{4x^2}\,dx$$
$$= \int \frac{4\,x^2-(5\,x\log(x)+29\,x+4)e^{\left(-\frac{5}{4}\,x\log(x)-6\,x+\frac{e^{\left(-\frac{5}{4}\,x\log(x)-6\,x+5\right)}}{x}+5\right)}}{4\,x^2}\,dx$$

input
```
integrate(1/4*((-5*x*log(x)-29*x-4)*exp(-5/4*x*log(x)-6*x+5)*exp(exp(-5/4*
x*log(x)-6*x+5)/x)+4*x^2)/x^2,x, algorithm=\
```

output
```
integrate(1/4*(4*x^2 - (5*x*log(x) + 29*x + 4)*e^(-5/4*x*log(x) - 6*x + e^
(-5/4*x*log(x) - 6*x + 5)/x + 5))/x^2, x)
```

3.288.9 Mupad [B] (verification not implemented)

Time = 12.87 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{4x^2 + e^{\frac{e^{\frac{1}{4}(20-24x-5x\log(x))}}{x}+\frac{1}{4}(20-24x-5x\log(x))}(-4-29x-5x\log(x))}{4x^2}\,dx = x + \mathrm{e}^{\frac{\mathrm{e}^{-6\,x}\,\mathrm{e}^5}{x^{\frac{5\,x}{4}}\,x}}$$

input
```
int((x^2 - (exp(5 - (5*x*log(x))/4 - 6*x)*exp(exp(5 - (5*x*log(x))/4 - 6*x
)/x)*(29*x + 5*x*log(x) + 4))/4)/x^2,x)
```

output
```
x + exp((exp(-6*x)*exp(5))/(x^((5*x)/4)*x))
```

3.289 $\int \frac{1}{6}e^{\frac{1}{2}\left(e^x-4e^{\frac{1}{3}\left(4x+6x^2\right)}+e^5x\right)}\left(3e^5+3e^x+e^{\frac{1}{3}(4x+6x^2)}(-16$

3.289.1 Optimal result

Integrand size = 68, antiderivative size = 27

$$\int \frac{1}{6}e^{\frac{1}{2}\left(e^x-4e^{\frac{1}{3}\left(4x+6x^2\right)}+e^5x\right)}\left(3e^5+3e^x+e^{\frac{1}{3}(4x+6x^2)}(-16-48x)\right)\,dx=e^{\frac{1}{2}\left(e^x-4e^{2x\left(\frac{2}{3}+x\right)}+e^5x\right)}$$

output
```
exp(1/4*exp(x)+1/4*x*exp(5)-exp(2*(2/3+x)*x))^2
```

3.289.2 Mathematica [A] (verified)

Time = 1.50 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{1}{6}e^{\frac{1}{2}\left(e^x-4e^{\frac{1}{3}\left(4x+6x^2\right)}+e^5x\right)}\left(3e^5+3e^x+e^{\frac{1}{3}(4x+6x^2)}(-16-48x)\right)\,dx=e^{\frac{1}{2}\left(e^x-4e^{\frac{2}{3}x(2+3x)}+e^5x\right)}$$

input
```
Integrate[(E^((E^x - 4*E^((4*x + 6*x^2)/3) + E^5*x)/2)*(3*E^5 + 3*E^x + E^
((4*x + 6*x^2)/3)*(-16 - 48*x)))/6,x]
```

output
```
E^((E^x - 4*E^((2*x*(2 + 3*x))/3) + E^5*x)/2)
```

3.289.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029, Rules used = {27, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{6}\left(e^{\frac{1}{3}(6x^2+4x)}(-48x-16)+3e^x+3e^5\right)\exp\left(\frac{1}{2}\left(-4e^{\frac{1}{3}(6x^2+4x)}+e^5x+e^x\right)\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{6}\int \exp\left(\frac{1}{2}\left(e^5x+e^x-4e^{\frac{2}{3}(3x^2+2x)}\right)\right)\left(-16e^{\frac{2}{3}(3x^2+2x)}(3x+1)+3e^x+3e^5\right)dx$$

$$\Big\downarrow \text{7257}$$

$$\exp\left(\frac{1}{2}\left(-4e^{\frac{2}{3}(3x^2+2x)}+e^5x+e^x\right)\right)$$

input
```
Int[(E^((E^x - 4*E^((4*x + 6*x^2)/3) + E^5*x)/2)*(3*E^5 + 3*E^x + E^((4*x
+ 6*x^2)/3)*(-16 - 48*x)))/6,x]
```

output
```
E^((E^x - 4*E^((2*(2*x + 3*x^2))/3) + E^5*x)/2)
```

3.289.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.289.4 Maple [A] (verified)

Time = 0.71 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

method	result	size
risch	$\mathrm{e}^{-2\,\mathrm{e}^{\frac{2x(2+3x)}{3}}+\frac{\mathrm{e}^{x}}{2}+\frac{x\,\mathrm{e}^{5}}{2}}$	23
norman	$\mathrm{e}^{-2\,\mathrm{e}^{2x^{2}+\frac{4}{3}x}+\frac{\mathrm{e}^{x}}{2}+\frac{x\,\mathrm{e}^{5}}{2}}$	26
parallelrisch	$\mathrm{e}^{-2\,\mathrm{e}^{2x^{2}+\frac{4}{3}x}+\frac{\mathrm{e}^{x}}{2}+\frac{x\,\mathrm{e}^{5}}{2}}$	26

input
```
int(1/6*((-48*x-16)*exp(2*x^2+4/3*x)+3*exp(x)+3*exp(5))*exp(-exp(2*x^2+4/3
*x)+1/4*exp(x)+1/4*x*exp(5))^2,x,method=_RETURNVERBOSE)
```

output
```
exp(-2*exp(2/3*x*(2+3*x))+1/2*exp(x)+1/2*x*exp(5))
```

3.289.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{1}{6}e^{\frac{1}{2}\left(e^x-4e^{\frac{1}{3}\left(4x+6x^2\right)}+e^5x\right)}\left(3e^5+3e^x+e^{\frac{1}{3}\left(4x+6x^2\right)}(-16-48x)\right)\,dx=e^{\left(\frac{1}{2}\,xe^{5}-2\,e^{\left(2\,x^{2}+\frac{4}{3}\,x\right)}+\frac{1}{2}\,e^{x}\right)}$$

input
```
integrate(1/6*((-48*x-16)*exp(2*x^2+4/3*x)+3*exp(x)+3*exp(5))*exp(-exp(2*x
^2+4/3*x)+1/4*exp(x)+1/4*x*exp(5))^2,x, algorithm=\
```

output
```
e^(1/2*x*e^5 - 2*e^(2*x^2 + 4/3*x) + 1/2*e^x)
```

3.289.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{1}{6}e^{\frac{1}{2}\left(e^x-4e^{\frac{1}{3}\left(4x+6x^2\right)}+e^5x\right)}\left(3e^5+3e^x+e^{\frac{1}{3}\left(4x+6x^2\right)}(-16-48x)\right)\,dx=e^{\frac{xe^{5}}{2}+\frac{e^{x}}{2}-2e^{2x^{2}+\frac{4x}{3}}}$$

input
```
integrate(1/6*((-48*x-16)*exp(2*x**2+4/3*x)+3*exp(x)+3*exp(5))*exp(-exp(2*
x**2+4/3*x)+1/4*exp(x)+1/4*x*exp(5))**2,x)
```

output
```
exp(x*exp(5)/2 + exp(x)/2 - 2*exp(2*x**2 + 4*x/3))
```

3.289.7 Maxima [F]

$$\int \frac{1}{6}e^{\frac{1}{2}\left(e^x-4e^{\frac{1}{3}\left(4x+6x^2\right)}+e^5x\right)}\left(3e^5+3e^x+e^{\frac{1}{3}\left(4x+6x^2\right)}(-16-48x)\right)\,dx$$
$$=\int -\frac{1}{6}\left(16\,(3\,x+1)e^{\left(2\,x^2+\frac{4}{3}\,x\right)}-3\,e^5-3\,e^x\right)e^{\left(\frac{1}{2}\,xe^5-2\,e^{\left(2\,x^2+\frac{4}{3}\,x\right)}+\frac{1}{2}\,e^x\right)}\,dx$$

input
```
integrate(1/6*((-48*x-16)*exp(2*x^2+4/3*x)+3*exp(x)+3*exp(5))*exp(-exp(2*x
^2+4/3*x)+1/4*exp(x)+1/4*x*exp(5))^2,x, algorithm=\
```

output
```
-1/6*integrate((16*(3*x + 1)*e^(2*x^2 + 4/3*x) - 3*e^5 - 3*e^x)*e^(1/2*x*e
^5 - 2*e^(2*x^2 + 4/3*x) + 1/2*e^x), x)
```

3.289.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{1}{6}e^{\frac{1}{2}\left(e^x-4e^{\frac{1}{3}\left(4x+6x^2\right)}+e^5x\right)}\left(3e^5+3e^x+e^{\frac{1}{3}\left(4x+6x^2\right)}(-16-48x)\right)\,dx=e^{\left(\frac{1}{2}\,xe^5-2\,e^{\left(2\,x^2+\frac{4}{3}\,x\right)}+\frac{1}{2}\,e^x\right)}$$

input
```
integrate(1/6*((-48*x-16)*exp(2*x^2+4/3*x)+3*exp(x)+3*exp(5))*exp(-exp(2*x
^2+4/3*x)+1/4*exp(x)+1/4*x*exp(5))^2,x, algorithm=\
```

output
```
e^(1/2*x*e^5 - 2*e^(2*x^2 + 4/3*x) + 1/2*e^x)
```

3.289.9 Mupad [B] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{1}{6}e^{\frac{1}{2}\left(e^x-4e^{\frac{1}{3}\left(4x+6x^2\right)}+e^5x\right)}\left(3e^5+3e^x+e^{\frac{1}{3}\left(4x+6x^2\right)}(-16-48x)\right)\,dx=\mathrm{e}^{-2\,\mathrm{e}^{\frac{4\,x}{3}}\,\mathrm{e}^{2\,x^2}}\,\mathrm{e}^{\frac{\mathrm{e}^x}{2}}\,\mathrm{e}^{\frac{x\,\mathrm{e}^5}{2}}$$

input
```
int((exp(exp(x)/2 - 2*exp((4*x)/3 + 2*x^2) + (x*exp(5))/2)*(3*exp(5) + 3*e
xp(x) - exp((4*x)/3 + 2*x^2)*(48*x + 16)))/6,x)
```

output
```
exp(-2*exp((4*x)/3)*exp(2*x^2))*exp(exp(x)/2)*exp((x*exp(5))/2)
```

3.290 $\int \frac{e^{\frac{3e^{4x}-47x-21x^2-3x^3}{3x^3}}\left(94x+21x^2+e^{4x}(-9+12x)\right)}{3x^4}\,dx$

3.290.1 Optimal result

Integrand size = 57, antiderivative size = 27

$$\int \frac{e^{\frac{3e^{4x}-47x-21x^2-3x^3}{3x^3}}\left(94x+21x^2+e^{4x}(-9+12x)\right)}{3x^4}\,dx = e^{\frac{\frac{1}{3}+\frac{e^{4x}}{x}+x-(4+x)^2}{x^2}}$$

output
```
exp((1/3-(4+x)^2+exp(2*x)^2/x+x)/x^2)
```

3.290.2 Mathematica [A] (verified)

Time = 0.56 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^{\frac{3e^{4x}-47x-21x^2-3x^3}{3x^3}}\left(94x+21x^2+e^{4x}(-9+12x)\right)}{3x^4}\,dx = e^{-1+\frac{e^{4x}}{x^3}-\frac{47}{3x^2}-\frac{7}{x}}$$

input
```
Integrate[(E^((3*E^(4*x) - 47*x - 21*x^2 - 3*x^3)/(3*x^3))*(94*x + 21*x^2
+ E^(4*x)*(-9 + 12*x)))/(3*x^4),x]
```

output
```
E^(-1 + E^(4*x)/x^3 - 47/(3*x^2) - 7/x)
```

3.290.3 Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {27, 25, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-3x^3-21x^2-47x+3e^{4x}}{3x^3}}\left(21x^2+94x+e^{4x}(12x-9)\right)}{3x^4}dx$$
$$\Big\downarrow \textbf{27}$$
$$\frac{1}{3}\int -\frac{e^{\frac{-3x^3-21x^2-47x+3e^{4x}}{3x^3}}\left(-21x^2-94x+3e^{4x}(3-4x)\right)}{x^4}dx$$
$$\Big\downarrow \textbf{25}$$
$$-\frac{1}{3}\int \frac{e^{\frac{-3x^3-21x^2-47x+3e^{4x}}{3x^3}}\left(-21x^2-94x+3e^{4x}(3-4x)\right)}{x^4}dx$$
$$\Big\downarrow \textbf{7257}$$
$$e^{\frac{-3x^3-21x^2-47x+3e^{4x}}{3x^3}}$$

input
```
Int[(E^((3*E^(4*x) - 47*x - 21*x^2 - 3*x^3)/(3*x^3))*(94*x + 21*x^2 + E^(4
*x)*(-9 + 12*x)))/(3*x^4),x]
```

output
```
E^((3*E^(4*x) - 47*x - 21*x^2 - 3*x^3)/(3*x^3))
```

3.290.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.290.4 Maple [A] (verified)

Time = 0.85 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

method	result	size
risch	$\mathrm{e}^{-\frac{-3\,\mathrm{e}^{4x}+3x^3+21x^2+47x}{3x^3}}$	27
norman	$\mathrm{e}^{\frac{3\,\mathrm{e}^{4x}-3x^3-21x^2-47x}{3x^3}}$	29
parallelrisch	$\mathrm{e}^{\frac{3\,\mathrm{e}^{4x}-3x^3-21x^2-47x}{3x^3}}$	29

input
```
int(1/3*((12*x-9)*exp(2*x)^2+21*x^2+94*x)*exp(1/3*(3*exp(2*x)^2-3*x^3-21*x
^2-47*x)/x^3)/x^4,x,method=_RETURNVERBOSE)
```

output
```
exp(-1/3*(-3*exp(4*x)+3*x^3+21*x^2+47*x)/x^3)
```

3.290.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{3e^{4x}-47x-21x^2-3x^3}{3x^3}}(94x+21x^2+e^{4x}(-9+12x))}{3x^4}\,dx = e^{\left(-\frac{3\,x^3+21\,x^2+47\,x-3\,e^{(4\,x)}}{3\,x^3}\right)}$$

input
```
integrate(1/3*((12*x-9)*exp(2*x)^2+21*x^2+94*x)*exp(1/3*(3*exp(2*x)^2-3*x^
3-21*x^2-47*x)/x^3)/x^4,x, algorithm=\
```

output
```
e^(-1/3*(3*x^3 + 21*x^2 + 47*x - 3*e^(4*x))/x^3)
```

3.290.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{e^{\frac{3e^{4x}-47x-21x^2-3x^3}{3x^3}}(94x+21x^2+e^{4x}(-9+12x))}{3x^4}\,dx = e^{\frac{-x^3-7x^2-\frac{47x}{3}+e^{4x}}{x^3}}$$

input
```
integrate(1/3*((12*x-9)*exp(2*x)**2+21*x**2+94*x)*exp(1/3*(3*exp(2*x)**2-3
*x**3-21*x**2-47*x)/x**3)/x**4,x)
```

output
```
exp((-x**3 - 7*x**2 - 47*x/3 + exp(4*x))/x**3)
```

3.290.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{e^{\frac{3e^{4x}-47x-21x^2-3x^3}{3x^3}}(94x+21x^2+e^{4x}(-9+12x))}{3x^4}\,dx = e^{\left(-\frac{7}{x}-\frac{47}{3\,x^2}+\frac{e^{(4\,x)}}{x^3}-1\right)}$$

input
```
integrate(1/3*((12*x-9)*exp(2*x)^2+21*x^2+94*x)*exp(1/3*(3*exp(2*x)^2-3*x^
3-21*x^2-47*x)/x^3)/x^4,x, algorithm=\
```

output
```
e^(-7/x - 47/3/x^2 + e^(4*x)/x^3 - 1)
```

3.290.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{e^{\frac{3e^{4x}-47x-21x^2-3x^3}{3x^3}}(94x+21x^2+e^{4x}(-9+12x))}{3x^4}\,dx = e^{\left(-\frac{7}{x}-\frac{47}{3\,x^2}+\frac{e^{(4\,x)}}{x^3}-1\right)}$$

input
```
integrate(1/3*((12*x-9)*exp(2*x)^2+21*x^2+94*x)*exp(1/3*(3*exp(2*x)^2-3*x^
3-21*x^2-47*x)/x^3)/x^4,x, algorithm=\
```

output
```
e^(-7/x - 47/3/x^2 + e^(4*x)/x^3 - 1)
```

3.290.9 Mupad [B] (verification not implemented)

Time = 12.59 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{3e^{4x}-47x-21x^2-3x^3}{3x^3}}(94x+21x^2+e^{4x}(-9+12x))}{3x^4}\,dx = \mathrm{e}^{-1}\,\mathrm{e}^{-\frac{7}{x}}\,\mathrm{e}^{-\frac{47}{3\,x^2}}\,\mathrm{e}^{\frac{\mathrm{e}^{4\,x}}{x^3}}$$

input
```
int((exp(-((47*x)/3 - exp(4*x) + 7*x^2 + x^3)/x^3)*(94*x + exp(4*x)*(12*x
- 9) + 21*x^2))/(3*x^4),x)
```

output
```
exp(-1)*exp(-7/x)*exp(-47/(3*x^2))*exp(exp(4*x)/x^3)
```

3.291 $\int \frac{-3+\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\,dx$

3.291.1 Optimal result

Integrand size = 54, antiderivative size = 18

$$\int \frac{-3+\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\,dx=25+\frac{x}{\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}$$

output
```
25+x/ln(ln(x^3/(ln(21)+3)))
```

3.291.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{-3+\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\,dx=\frac{x}{\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}$$

input
```
Integrate[(-3 + Log[x^3/(3 + Log[21])]*Log[Log[x^3/(3 + Log[21])]])/(Log[x
^3/(3 + Log[21])]*Log[Log[x^3/(3 + Log[21])]]^2),x]
```

output
```
x/Log[Log[x^3/(3 + Log[21])]]
```

3.291. $\int \frac{-3+\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\,dx$

3.291.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)-3}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{1}{\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}-\frac{3}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{1}{\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}dx-3\int \frac{1}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}dx$$

input
```
Int[(-3 + Log[x^3/(3 + Log[21])]*Log[Log[x^3/(3 + Log[21])]])/(Log[x^3/(3
+ Log[21])]*Log[Log[x^3/(3 + Log[21])]]^2),x]
```

output
```
$Aborted
```

3.291.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.291.4 Maple [A] (verified)

Time = 1.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

method	result	size
norman	$\frac{x}{\ln\left(\ln\left(\frac{x^3}{\ln(21)+3}\right)\right)}$	17
parallelrisch	$\frac{x}{\ln\left(\ln\left(\frac{x^3}{\ln(21)+3}\right)\right)}$	17

input
```
int((ln(x^3/(ln(21)+3))*ln(ln(x^3/(ln(21)+3)))-3)/ln(x^3/(ln(21)+3))/ln(ln
(x^3/(ln(21)+3)))^2,x,method=_RETURNVERBOSE)
```

output
```
x/ln(ln(x^3/(ln(21)+3)))
```

3.291.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{-3+\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\,dx = \frac{x}{\log\left(\log\left(\frac{x^3}{\log(21)+3}\right)\right)}$$

input
```
integrate((log(x^3/(log(21)+3))*log(log(x^3/(log(21)+3)))-3)/log(x^3/(log(
21)+3))/log(log(x^3/(log(21)+3)))^2,x, algorithm=\
```

output
```
x/log(log(x^3/(log(21) + 3)))
```

3.291.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

$$\int \frac{-3+\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\,dx = \frac{x}{\log\left(\log\left(\frac{x^3}{3+\log{(21)}}\right)\right)}$$

input
```
integrate((ln(x**3/(ln(21)+3))*ln(ln(x**3/(ln(21)+3)))-3)/ln(x**3/(ln(21)+
3))/ln(ln(x**3/(ln(21)+3)))**2,x)
```

output
```
x/log(log(x**3/(3 + log(21))))
```

3.291.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{-3+\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\,dx = \frac{x}{\log\left(3\log\left(x\right)-\log\left(\log\left(7\right)+\log\left(3\right)+3\right)\right)}$$

input
```
integrate((log(x^3/(log(21)+3))*log(log(x^3/(log(21)+3)))-3)/log(x^3/(log(
21)+3))/log(log(x^3/(log(21)+3)))^2,x, algorithm=\
```

output
```
x/log(3*log(x) - log(log(7) + log(3) + 3))
```

3.291.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. 2(18) = 36.

Time = 0.28 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.44

$$\int \frac{-3+\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\,dx$$
$$= \frac{x\log\left(x^3\right)-x\log\left(\log\left(21\right)+3\right)}{\log\left(\frac{x^3}{\log(21)+3}\right)\log\left(\log\left(x^3\right)-\log\left(\log\left(21\right)+3\right)\right)}$$

input
```
integrate((log(x^3/(log(21)+3))*log(log(x^3/(log(21)+3)))-3)/log(x^3/(log(
21)+3))/log(log(x^3/(log(21)+3)))^2,x, algorithm=\
```

output
```
(x*log(x^3) - x*log(log(21) + 3))/(log(x^3/(log(21) + 3))*log(log(x^3) - l
og(log(21) + 3)))
```

3.291.9 Mupad [B] (verification not implemented)

Time = 13.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{-3+\log\left(\frac{x^3}{3+\log(21)}\right)\log\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}{\log\left(\frac{x^3}{3+\log(21)}\right)\log^2\left(\log\left(\frac{x^3}{3+\log(21)}\right)\right)}\,dx=\frac{x}{\ln\left(\ln\left(x^3\right)-\ln\left(\ln\left(21\right)+3\right)\right)}$$

input
```
int((log(log(x^3/(log(21) + 3)))*log(x^3/(log(21) + 3)) - 3)/(log(log(x^3/
(log(21) + 3)))^2*log(x^3/(log(21) + 3))),x)
```

output
```
x/log(log(x^3) - log(log(21) + 3))
```

3.292 $\int \frac{-6-4e^{50-2x}+8x^3+e^{25-x}(8x-4x^2)}{-3+e^{50-2x}-3x+2e^{25-x}x^2+x^4}\,dx$

3.292.1 Optimal result

Integrand size = 63, antiderivative size = 23

$$\int \frac{-6-4e^{50-2x}+8x^3+e^{25-x}(8x-4x^2)}{-3+e^{50-2x}-3x+2e^{25-x}x^2+x^4}\,dx = \log\left(\left(3+3x-\left(e^{25-x}+x^2\right)^2\right)^2\right)$$

output
```
ln((3*x+3-(exp(-x+25)+x^2)^2)^2)
```

3.292.2 Mathematica [A] (verified)

Time = 10.62 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.96

$$\int \frac{-6-4e^{50-2x}+8x^3+e^{25-x}(8x-4x^2)}{-3+e^{50-2x}-3x+2e^{25-x}x^2+x^4}\,dx = -4x + 2\log\left(e^{50}-3e^{2x}-3e^{2x}x+2e^{25+x}x^2+e^{2x}x^4\right)$$

input
```
Integrate[(-6 - 4*E^(50 - 2*x) + 8*x^3 + E^(25 - x)*(8*x - 4*x^2))/(-3 + E
^(50 - 2*x) - 3*x + 2*E^(25 - x)*x^2 + x^4),x]
```

output
```
-4*x + 2*Log[E^50 - 3*E^(2*x) - 3*E^(2*x)*x + 2*E^(25 + x)*x^2 + E^(2*x)*x
^4]
```

3.292.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.48, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.016, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^3+e^{25-x}(8x-4x^2)-4e^{50-2x}-6}{x^4+2e^{25-x}x^2-3x+e^{50-2x}-3}\,dx$$

$$\Big\downarrow \text{7235}$$

$$2\log\left(-x^4-2e^{25-x}x^2+3x-e^{50-2x}+3\right)$$

input
```
Int[(-6 - 4*E^(50 - 2*x) + 8*x^3 + E^(25 - x)*(8*x - 4*x^2))/(-3 + E^(50 -
 2*x) - 3*x + 2*E^(25 - x)*x^2 + x^4),x]
```

output
```
2*Log[3 - E^(50 - 2*x) + 3*x - 2*E^(25 - x)*x^2 - x^4]
```

3.292.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.292.4 Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

method	result	size
norman	$2\ln\left(\mathrm{e}^{-2x+50}+2x^2\mathrm{e}^{-x+25}+x^4-3x-3\right)$	31
risch	$-100+2\ln\left(\mathrm{e}^{-2x+50}+2x^2\mathrm{e}^{-x+25}+x^4-3x-3\right)$	31
parallelrisch	$2\ln\left(\mathrm{e}^{-2x+50}+2x^2\mathrm{e}^{-x+25}+x^4-3x-3\right)$	31

input
```
int((-4*exp(-x+25)^2+(-4*x^2+8*x)*exp(-x+25)+8*x^3-6)/(exp(-x+25)^2+2*x^2*
exp(-x+25)+x^4-3*x-3),x,method=_RETURNVERBOSE)
```

output
```
2*ln(exp(-x+25)^2+2*x^2*exp(-x+25)+x^4-3*x-3)
```

3.292.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{-6-4e^{50-2x}+8x^3+e^{25-x}(8x-4x^2)}{-3+e^{50-2x}-3x+2e^{25-x}x^2+x^4}\,dx = 2\,\log\left(x^4+2\,x^2e^{(-x+25)}-3\,x+e^{(-2\,x+50)}-3\right)$$

input
```
integrate((-4*exp(-x+25)^2+(-4*x^2+8*x)*exp(-x+25)+8*x^3-6)/(exp(-x+25)^2+
2*x^2*exp(-x+25)+x^4-3*x-3),x, algorithm=\
```

output
```
2*log(x^4 + 2*x^2*e^(-x + 25) - 3*x + e^(-2*x + 50) - 3)
```

3.292.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{-6-4e^{50-2x}+8x^3+e^{25-x}(8x-4x^2)}{-3+e^{50-2x}-3x+2e^{25-x}x^2+x^4}\,dx = 2\log\left(x^4+2x^2e^{25-x}-3x+e^{50-2x}-3\right)$$

input
```
integrate((-4*exp(-x+25)**2+(-4*x**2+8*x)*exp(-x+25)+8*x**3-6)/(exp(-x+25)
**2+2*x**2*exp(-x+25)+x**4-3*x-3),x)
```

output
```
2*log(x**4 + 2*x**2*exp(25 - x) - 3*x + exp(50 - 2*x) - 3)
```

3.292.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(20) = 40.

Time = 0.33 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.35

$$\begin{aligned}&\int \frac{-6-4e^{50-2x}+8x^3+e^{25-x}(8x-4x^2)}{-3+e^{50-2x}-3x+2e^{25-x}x^2+x^4}\,dx\\&= -4\,x+2\,\log\left(x^4-3\,x-3\right)+2\,\log\left(\frac{2\,x^2e^{(x+25)}+(x^4-3\,x-3)e^{(2\,x)}+e^{50}}{x^4-3\,x-3}\right)\end{aligned}$$

input
```
integrate((-4*exp(-x+25)^2+(-4*x^2+8*x)*exp(-x+25)+8*x^3-6)/(exp(-x+25)^2+
2*x^2*exp(-x+25)+x^4-3*x-3),x, algorithm=\
```

output
```
-4*x + 2*log(x^4 - 3*x - 3) + 2*log((2*x^2*e^(x + 25) + (x^4 - 3*x - 3)*e^
(2*x) + e^50)/(x^4 - 3*x - 3))
```

3.292.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{-6-4e^{50-2x}+8x^3+e^{25-x}(8x-4x^2)}{-3+e^{50-2x}-3x+2e^{25-x}x^2+x^4}\,dx = 2\,\log\left(x^4+2\,x^2e^{(-x+25)}-3\,x+e^{(-2\,x+50)}-3\right)$$

input
```
integrate((-4*exp(-x+25)^2+(-4*x^2+8*x)*exp(-x+25)+8*x^3-6)/(exp(-x+25)^2+
2*x^2*exp(-x+25)+x^4-3*x-3),x, algorithm=\
```

output
```
2*log(x^4 + 2*x^2*e^(-x + 25) - 3*x + e^(-2*x + 50) - 3)
```

3.292.9 Mupad [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{-6-4e^{50-2x}+8x^3+e^{25-x}(8x-4x^2)}{-3+e^{50-2x}-3x+2e^{25-x}x^2+x^4}\,dx = 2\,\ln\left(\mathrm{e}^{50-2\,x}-3\,x+2\,x^2\,\mathrm{e}^{25-x}+x^4-3\right)$$

input
```
int(-(4*exp(50 - 2*x) - exp(25 - x)*(8*x - 4*x^2) - 8*x^3 + 6)/(exp(50 - 2
*x) - 3*x + 2*x^2*exp(25 - x) + x^4 - 3),x)
```

output
```
2*log(exp(50 - 2*x) - 3*x + 2*x^2*exp(25 - x) + x^4 - 3)
```

3.293 $\int \frac{(-6x^3+4x^4)\log(25)+e^{\frac{-1+\log(25)}{x^2\log(25)}}(6-2x+(-6+2x-x^3)\log(25))}{x^3\log(25)}\,dx$

3.293.1 Optimal result

Integrand size = 56, antiderivative size = 24

$$\int \frac{(-6x^3+4x^4)\log(25)+e^{\frac{-1+\log(25)}{x^2\log(25)}}(6-2x+(-6+2x-x^3)\log(25))}{x^3\log(25)}\,dx = (-3+x)\left(-e^{\frac{1-\frac{1}{\log(25)}}{x^2}}+2x\right)$$

output
```
(-3+x)*(2*x-exp(1/x^2*(1-1/2/ln(5))))
```

3.293.2 Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.50

$$\int \frac{(-6x^3+4x^4)\log(25)+e^{\frac{-1+\log(25)}{x^2\log(25)}}(6-2x+(-6+2x-x^3)\log(25))}{x^3\log(25)}\,dx = e^{-\frac{1}{x^2\log(25)}}(-3+x)\left(-e^{\frac{1}{x^2}}+2e^{\frac{1}{x^2\log(25)}}x\right)$$

input
```
Integrate[((-6*x^3 + 4*x^4)*Log[25] + E^((-1 + Log[25])/(x^2*Log[25]))*(6
 - 2*x + (-6 + 2*x - x^3)*Log[25]))/(x^3*Log[25]),x]
```

output
```
((-3 + x)*(-E^x^(-2) + 2*E^(1/(x^2*Log[25]))*x))/E^(1/(x^2*Log[25]))
```

3.293.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 64 vs. $2(24) = 48$.

Time = 0.31 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.67, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(4x^4-6x^3)\log(25)+e^{\frac{\log(25)-1}{x^2\log(25)}}\left((-x^3+2x-6)\log(25)-2x+6\right)}{x^3\log(25)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int -\frac{2(3x^3-2x^4)\log(25)-\left(\frac{25}{e}\right)^{\frac{1}{x^2\log(25)}}(-2x-(x^3-2x+6)\log(25)+6)}{x^3}dx}{\log(25)}$$

$$\Big\downarrow \ 25$$

$$-\frac{\int \frac{2(3x^3-2x^4)\log(25)-\left(\frac{25}{e}\right)^{\frac{1}{x^2\log(25)}}(-2x-(x^3-2x+6)\log(25)+6)}{x^3}dx}{\log(25)}$$

$$\Big\downarrow \ 2010$$

$$-\frac{\int \left(\frac{\left(\frac{25}{e}\right)^{\frac{1}{x^2\log(25)}}(\log(25)x^3+2(1-\log(25))x-6(1-\log(25)))}{x^3}-2(2x-3)\log(25)\right)dx}{\log(25)}$$

$$\Big\downarrow \ 2009$$

$$-\frac{-\frac{\log(25)\left(\frac{25}{e}\right)^{\frac{1}{x^2\log(25)}}(3(1-\log(25))-x(1-\log(25)))}{1-\log(25)}-\frac{1}{2}(3-2x)^2\log(25)}{\log(25)}$$

input
```
Int[((-6*x^3 + 4*x^4)*Log[25] + E^((-1 + Log[25])/(x^2*Log[25]))*(6 - 2*x
+ (-6 + 2*x - x^3)*Log[25]))/(x^3*Log[25]),x]
```

output
```
-((-1/2*((3 - 2*x)^2*Log[25]) - ((25/E)^(1/(x^2*Log[25]))*(3*(1 - Log[25])
 - x*(1 - Log[25]))*Log[25])/(1 - Log[25]))/Log[25])
```

3.293. $\int \frac{(-6x^3+4x^4)\log(25)+e^{\frac{-1+\log(25)}{x^2\log(25)}}(6-2x+(-6+2x-x^3)\log(25))}{x^3\log(25)}dx$

3.293.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.293.4 Maple [A] (verified)

Time = 0.73 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.75

method	result
risch	$2x^{2}-6x+\frac{\left(-2x\ln\left(5\right)+6\ln\left(5\right)\right){\mathrm e}^{\frac{2\ln\left(5\right)-1}{2x^{2}\ln\left(5\right)}}}{2\ln\left(5\right)}$
norman	$\frac{-6x^{3}+2x^{4}+3x^{2}{\mathrm e}^{\frac{2\ln\left(5\right)-1}{2x^{2}\ln\left(5\right)}}-x^{3}{\mathrm e}^{\frac{2\ln\left(5\right)-1}{2x^{2}\ln\left(5\right)}}}{x^{2}}$
parallelrisch	$\frac{4x^{2}\ln\left(5\right)-2\ln\left(5\right){\mathrm e}^{\frac{2\ln\left(5\right)-1}{2x^{2}\ln\left(5\right)}}x-12x\ln\left(5\right)+6\ln\left(5\right){\mathrm e}^{\frac{2\ln\left(5\right)-1}{2x^{2}\ln\left(5\right)}}}{2\ln\left(5\right)}$
parts	$2x^{2}-6x-x\,{\mathrm e}^{\frac{1-\frac{1}{2\ln\left(5\right)}}{x^{2}}}-\frac{3\,{\mathrm e}^{\frac{1-\frac{1}{2\ln\left(5\right)}}{x^{2}}}}{2\ln\left(5\right)\left(1-\frac{1}{2\ln\left(5\right)}\right)}+\frac{3\,{\mathrm e}^{\frac{1-\frac{1}{2\ln\left(5\right)}}{x^{2}}}}{1-\frac{1}{2\ln\left(5\right)}}$
derivativedivides	$-\frac{\frac{2i\sqrt{\pi}\,\operatorname{erf}\left(\frac{i\sqrt{4-\frac{2}{\ln\left(5\right)}}}{2x}\right)}{\sqrt{4-\frac{2}{\ln\left(5\right)}}}-4x^{2}\ln\left(5\right)+12x\ln\left(5\right)+\frac{3\,{\mathrm e}^{\frac{1-\frac{1}{2\ln\left(5\right)}}{x^{2}}}}{1-\frac{1}{2\ln\left(5\right)}}-\frac{4i\ln\left(5\right)\sqrt{\pi}\,\operatorname{erf}\left(\frac{i\sqrt{4-\frac{2}{\ln\left(5\right)}}}{2x}\right)}{\sqrt{4-\frac{2}{\ln\left(5\right)}}}-\frac{6\ln\left(5\right){\mathrm e}^{\frac{1-\frac{1}{2\ln\left(5\right)}}{x^{2}}}}{1-\frac{1}{2\ln\left(5\right)}}-2\ln\left(5\right)}{2\ln\left(5\right)}$
default	$\frac{-\frac{2i\sqrt{\pi}\,\operatorname{erf}\left(\frac{i\sqrt{4-\frac{2}{\ln\left(5\right)}}}{2x}\right)}{\sqrt{4-\frac{2}{\ln\left(5\right)}}}+4x^{2}\ln\left(5\right)-12x\ln\left(5\right)-\frac{3\,{\mathrm e}^{\frac{1-\frac{1}{2\ln\left(5\right)}}{x^{2}}}}{1-\frac{1}{2\ln\left(5\right)}}+\frac{4i\ln\left(5\right)\sqrt{\pi}\,\operatorname{erf}\left(\frac{i\sqrt{4-\frac{2}{\ln\left(5\right)}}}{2x}\right)}{\sqrt{4-\frac{2}{\ln\left(5\right)}}}+\frac{6\ln\left(5\right){\mathrm e}^{\frac{1-\frac{1}{2\ln\left(5\right)}}{x^{2}}}}{1-\frac{1}{2\ln\left(5\right)}}+2\ln\left(5\right)}{2\ln\left(5\right)}$

3.293. $\int \frac{\left(-6x^{3}+4x^{4}\right)\log(25)+e^{\frac{-1+\log(25)}{x^{2}\log(25)}}\left(6-2x+\left(-6+2x-x^{3}\right)\log(25)\right)}{x^{3}\log(25)}\,dx$

input
```
int(1/2*((2*(-x^3+2*x-6)*ln(5)+6-2*x)*exp(1/2*(2*ln(5)-1)/x^2/ln(5))+2*(4*
x^4-6*x^3)*ln(5))/x^3/ln(5),x,method=_RETURNVERBOSE)
```

output
```
2*x^2-6*x+1/2/ln(5)*(-2*x*ln(5)+6*ln(5))*exp(1/2*(2*ln(5)-1)/x^2/ln(5))
```

3.293.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.25

$$\int \frac{(-6x^3+4x^4)\log(25)+e^{\frac{-1+\log(25)}{x^2\log(25)}}(6-2x+(-6+2x-x^3)\log(25))}{x^3\log(25)}\,dx$$
$$= 2\,x^2-(x-3)e^{\left(\frac{2\,\log(5)-1}{2\,x^2\log(5)}\right)}-6\,x$$

input
```
integrate(1/2*((2*(-x^3+2*x-6)*log(5)+6-2*x)*exp(1/2*(2*log(5)-1)/x^2/log(
5))+2*(4*x^4-6*x^3)*log(5))/x^3/log(5),x, algorithm=\
```

output
```
2*x^2 - (x - 3)*e^(1/2*(2*log(5) - 1)/(x^2*log(5))) - 6*x
```

3.293.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{(-6x^3+4x^4)\log(25)+e^{\frac{-1+\log(25)}{x^2\log(25)}}(6-2x+(-6+2x-x^3)\log(25))}{x^3\log(25)}\,dx$$
$$= 2x^2-6x+(3-x)\,e^{\frac{-\frac{1}{2}+\log{(5)}}{x^2\log{(5)}}}$$

input
```
integrate(1/2*((2*(-x**3+2*x-6)*ln(5)+6-2*x)*exp(1/2*(2*ln(5)-1)/x**2/ln(5
))+2*(4*x**4-6*x**3)*ln(5))/x**3/ln(5),x)
```

output
```
2*x**2 - 6*x + (3 - x)*exp((-1/2 + log(5))/(x**2*log(5)))
```

3.293.7 Maxima [F]

$$\int \frac{(-6x^3+4x^4)\log(25)+e^{\frac{-1+\log(25)}{x^2\log(25)}}(6-2x+(-6+2x-x^3)\log(25))}{x^3\log(25)}\,dx = \int -\frac{((x^3-2\,x+6)\log{(5)}+x-3)e^{\left(\frac{2\,\log(5)-1}{2\,x^2\log(5)}\right)}-2\,(2\,x^4-3\,x^3)\log{(5)}}{x^3\log{(5)}}\,dx$$

input
```
integrate(1/2*((2*(-x^3+2*x-6)*log(5)+6-2*x)*exp(1/2*(2*log(5)-1)/x^2/log(
5))+2*(4*x^4-6*x^3)*log(5))/x^3/log(5),x, algorithm=\
```

output
```
(2*x^2*log(5) - 6*x*log(5) - integrate((x^3*log(5) - x*(2*log(5) - 1) + 6*
log(5) - 3)*e^(1/x^2 - 1/2/(x^2*log(5)))/x^3, x))/log(5)
```

3.293.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(22) = 44$.

Time = 0.28 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.46

$$\int \frac{(-6x^3+4x^4)\log(25)+e^{\frac{-1+\log(25)}{x^2\log(25)}}(6-2x+(-6+2x-x^3)\log(25))}{x^3\log(25)}\,dx = \frac{2\,x^2\log{(5)}-xe^{\left(\frac{2\,\log(5)-1}{2\,x^2\log(5)}\right)}\log{(5)}-6\,x\log{(5)}+3\,e^{\left(\frac{2\,\log(5)-1}{2\,x^2\log(5)}\right)}\log{(5)}}{\log{(5)}}$$

input
```
integrate(1/2*((2*(-x^3+2*x-6)*log(5)+6-2*x)*exp(1/2*(2*log(5)-1)/x^2/log(
5))+2*(4*x^4-6*x^3)*log(5))/x^3/log(5),x, algorithm=\
```

output
```
(2*x^2*log(5) - x*e^(1/2*(2*log(5) - 1)/(x^2*log(5)))*log(5) - 6*x*log(5)
+ 3*e^(1/2*(2*log(5) - 1)/(x^2*log(5)))*log(5))/log(5)
```

3.293.9 Mupad [B] (verification not implemented)

Time = 12.69 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.17

$$\int \frac{(-6x^3+4x^4)\log(25)+e^{\frac{-1+\log(25)}{x^2\log(25)}}(6-2x+(-6+2x-x^3)\log(25))}{x^3\log(25)}\,dx$$
$$=\frac{e^{\frac{1}{x^2}-\frac{1}{2\,x^2\,\ln(5)}}\,\ln(125)}{\ln(5)}-x\,e^{\frac{1}{x^2}-\frac{1}{2\,x^2\,\ln(5)}}-6\,x+\frac{x^2\,\ln(25)}{\ln(5)}$$

input
```
int(-(log(5)*(6*x^3 - 4*x^4) + (exp((log(5) - 1/2)/(x^2*log(5)))*(2*x + 2*
log(5)*(x^3 - 2*x + 6) - 6))/2)/(x^3*log(5)),x)
```

output
```
(exp(1/x^2 - 1/(2*x^2*log(5)))*log(125))/log(5) - x*exp(1/x^2 - 1/(2*x^2*l
og(5))) - 6*x + (x^2*log(25))/log(5)
```

3.294 $\int \frac{160+e^{\frac{e^x}{8x}+x}(5-5x)-128x^2-160\log(x)}{32x^2}\,dx$

3.294.1 Optimal result

Integrand size = 38, antiderivative size = 29

$$\int \frac{160+e^{\frac{e^x}{8x}+x}(5-5x)-128x^2-160\log(x)}{32x^2}\,dx = x-5\left(\frac{1}{4}e^{\frac{e^x}{8x}}+x-\frac{\log(x)}{x}\right)$$

output
```
-4*x-5/4*exp(1/16*exp(x)/x)^2+5*ln(x)/x
```

3.294.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{160+e^{\frac{e^x}{8x}+x}(5-5x)-128x^2-160\log(x)}{32x^2}\,dx = -\frac{5}{4}e^{\frac{e^x}{8x}}-4x+\frac{5\log(x)}{x}$$

input
```
Integrate[(160 + E^(E^x/(8*x) + x)*(5 - 5*x) - 128*x^2 - 160*Log[x])/(32*x
^2),x]
```

output
```
(-5*E^(E^x/(8*x)))/4 - 4*x + (5*Log[x])/x
```

3.294.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-128x^2+e^{x+\frac{e^x}{8x}}(5-5x)-160\log(x)+160}{32x^2}\,dx$$
$$\Big\downarrow \text{ 27}$$
$$\frac{1}{32}\int \frac{-128x^2+5e^{x+\frac{e^x}{8x}}(1-x)-160\log(x)+160}{x^2}dx$$
$$\Big\downarrow \text{ 2010}$$
$$\frac{1}{32}\int \left(-\frac{5e^{x+\frac{e^x}{8x}}(x-1)}{x^2}-\frac{32(4x^2+5\log(x)-5)}{x^2}\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$\frac{1}{32}\left(5\int \frac{e^{x+\frac{e^x}{8x}}}{x^2}dx-5\int \frac{e^{x+\frac{e^x}{8x}}}{x}dx-128x+\frac{160\log(x)}{x}\right)$$

input
```
Int[(160 + E^(E^x/(8*x) + x)*(5 - 5*x) - 128*x^2 - 160*Log[x])/(32*x^2),x]
```

output
```
$Aborted
```

3.294.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.294.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

method	result	size
risch	$-4x-\frac{5\,\mathrm{e}^{\frac{\mathrm{e}^x}{8x}}}{4}+\frac{5\ln(x)}{x}$	22
default	$-4x-\frac{5\,\mathrm{e}^{\frac{\mathrm{e}^x}{8x}}}{4}+\frac{5\ln(x)}{x}$	24
parts	$-4x-\frac{5\,\mathrm{e}^{\frac{\mathrm{e}^x}{8x}}}{4}+\frac{5\ln(x)}{x}$	24
parallelrisch	$-\frac{40\,\mathrm{e}^{\frac{\mathrm{e}^x}{8x}}x+128x^2-160\ln(x)}{32x}$	29

input
```
int(1/32*((-5*x+5)*exp(x)*exp(1/16*exp(x)/x)^2-160*ln(x)-128*x^2+160)/x^2,
x,method=_RETURNVERBOSE)
```

output
```
-4*x-5/4*exp(1/8*exp(x)/x)+5*ln(x)/x
```

3.294.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.38

$$\int \frac{160+e^{\frac{e^x}{8x}+x}(5-5x)-128x^2-160\log(x)}{32x^2}\,dx = -\frac{\left(16\,x^2e^x+5\,xe^{\left(\frac{8\,x^2+e^x}{8\,x}\right)}-20\,e^x\log\left(x\right)\right)e^{(-x)}}{4\,x}$$

input
```
integrate(1/32*((-5*x+5)*exp(x)*exp(1/16*exp(x)/x)^2-160*log(x)-128*x^2+16
0)/x^2,x, algorithm=\
```

output
```
-1/4*(16*x^2*e^x + 5*x*e^(1/8*(8*x^2 + e^x)/x) - 20*e^x*log(x))*e^(-x)/x
```

3.294.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{160+e^{\frac{e^x}{8x}+x}(5-5x)-128x^2-160\log(x)}{32x^2}\,dx=-4x-\frac{5e^{\frac{e^x}{8x}}}{4}+\frac{5\log(x)}{x}$$

input
```
integrate(1/32*((-5*x+5)*exp(x)*exp(1/16*exp(x)/x)**2-160*ln(x)-128*x**2+1
60)/x**2,x)
```

output
```
-4*x - 5*exp(exp(x)/(8*x))/4 + 5*log(x)/x
```

3.294.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{160+e^{\frac{e^x}{8x}+x}(5-5x)-128x^2-160\log(x)}{32x^2}\,dx=-4\,x-\frac{5\left(xe^{\left(\frac{e^x}{8\,x}\right)}-4\,\log(x)-4\right)}{4\,x}-\frac{5}{x}$$

input
```
integrate(1/32*((-5*x+5)*exp(x)*exp(1/16*exp(x)/x)^2-160*log(x)-128*x^2+16
0)/x^2,x, algorithm=\
```

output
```
-4*x - 5/4*(x*e^(1/8*e^x/x) - 4*log(x) - 4)/x - 5/x
```

3.294.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.38

$$\int \frac{160+e^{\frac{e^x}{8x}+x}(5-5x)-128x^2-160\log(x)}{32x^2}\,dx=-\frac{\left(16\,x^2e^x+5\,xe^{\left(\frac{8\,x^2+e^x}{8\,x}\right)}-20\,e^x\log(x)\right)e^{(-x)}}{4\,x}$$

input
```
integrate(1/32*((-5*x+5)*exp(x)*exp(1/16*exp(x)/x)^2-160*log(x)-128*x^2+16
0)/x^2,x, algorithm=\
```

output
```
-1/4*(16*x^2*e^x + 5*x*e^(1/8*(8*x^2 + e^x)/x) - 20*e^x*log(x))*e^(-x)/x
```

3.294.9 Mupad [B] (verification not implemented)

Time = 13.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.72

$$\int \frac{160+e^{\frac{e^x}{8x}+x}(5-5x)-128x^2-160\log(x)}{32x^2}\,dx=\frac{5\,\ln(x)}{x}-\frac{5\,\mathrm{e}^{\frac{\mathrm{e}^x}{8\,x}}}{4}-4\,x$$

input
```
int(-(5*log(x) + 4*x^2 + (exp(exp(x)/(8*x))*exp(x)*(5*x - 5))/32 - 5)/x^2,
x)
```

output
```
(5*log(x))/x - (5*exp(exp(x)/(8*x)))/4 - 4*x
```

3.295 $\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e(-4x+2x^2)}\,dx$

3.295.1 Optimal result

Integrand size = 54, antiderivative size = 21

$$\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e\left(-4x+2x^2\right)}\,dx=\frac{\log\left(\frac{e^{-x}}{x^3}\right)}{2-e-x}$$

output
```
ln(exp(-x)/x^3)/(2-x-exp(1))
```

3.295.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e\left(-4x+2x^2\right)}\,dx=-\frac{\log\left(\frac{e^{-x}}{x^3}\right)}{-2+e+x}$$

input
```
Integrate[(-6 + x + x^2 + E*(3 + x) + x*Log[1/(E^x*x^3)])/(4*x + E^2*x - 4
*x^2 + x^3 + E*(-4*x + 2*x^2)),x]
```

output
```
-(Log[1/(E^x*x^3)]/(-2 + E + x))
```

3.295.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 194 vs. 2(21) = 42.

Time = 0.58 (sec) , antiderivative size = 194, normalized size of antiderivative = 9.24, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.093$, Rules used = {6, 2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x\log\left(\frac{e^{-x}}{x^3}\right)+x^2+x+e(x+3)-6}{x^3-4x^2+e\left(2x^2-4x\right)+e^2x+4x}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{x\log\left(\frac{e^{-x}}{x^3}\right)+x^2+x+e(x+3)-6}{x^3-4x^2+e\left(2x^2-4x\right)+\left(4+e^2\right)x}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{x\log\left(\frac{e^{-x}}{x^3}\right)+x^2+x+e(x+3)-6}{x\left(x^2-2(2-e)x+(e-2)^2\right)}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{x\log\left(\frac{e^{-x}}{x^3}\right)+x^2+x+e(x+3)-6}{x(x+e-2)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{\log\left(\frac{e^{-x}}{x^3}\right)}{(x+e-2)^2}+\frac{x}{(x+e-2)^2}+\frac{1}{(x+e-2)^2}+\frac{e(x+3)}{(x+e-2)^2x}-\frac{6}{(x+e-2)^2x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{\log\left(\frac{e^{-x}}{x^3}\right)}{-x-e+2}+\frac{(5-e)e}{(2-e)(-x-e+2)}+\frac{2-e}{-x-e+2}-\frac{6}{(2-e)(-x-e+2)}+\frac{1}{-x-e+2}-\frac{3e\log(-x-e+2)}{(2-e)^2}-\frac{(5-e)\log(-x-e+2)}{2-e}+\frac{6\log(-x-e+2)}{(2-e)^2}+\log(-x-e+2)+\frac{3e\log(x)}{(2-e)^2}+\frac{3\log(x)}{2-e}-\frac{6\log(x)}{(2-e)^2}$$

input
```
Int[(-6 + x + x^2 + E*(3 + x) + x*Log[1/(E^x*x^3)])/(4*x + E^2*x - 4*x^2 +
 x^3 + E*(-4*x + 2*x^2)),x]
```

3.295. $\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e(-4x+2x^2)}dx$

output
```
(2 - E - x)^(-1) - 6/((2 - E)*(2 - E - x)) + (2 - E)/(2 - E - x) + ((5 - E
)*E)/((2 - E)*(2 - E - x)) + Log[2 - E - x] + (6*Log[2 - E - x])/(2 - E)^2
 - ((5 - E)*Log[2 - E - x])/(2 - E) - (3*E*Log[2 - E - x])/(2 - E)^2 + Log
[1/(E^x*x^3)]/(2 - E - x) - (6*Log[x])/(2 - E)^2 + (3*Log[x])/(2 - E) + (3
*E*Log[x])/(2 - E)^2
```

3.295.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.295. $\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e(-4x+2x^2)}\,dx$

3.295.4 Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

method	result
norman	$-\frac{\ln\left(\frac{e^{-x}}{x^3}\right)}{e-2+x}$
parallelrisch	$-\frac{\ln\left(\frac{e^{-x}}{x^3}\right)}{e-2+x}$
risch	$-\frac{\ln(e^{-x})}{e-2+x}+\frac{-i\pi\,\mathrm{csgn}(ix^3)^3+i\pi\,\mathrm{csgn}(ix)\,\mathrm{csgn}(ix^3)^2+i\pi\,\mathrm{csgn}(ix^2)\,\mathrm{csgn}(ix^3)^2-i\pi\,\mathrm{csgn}(ix^2)\,\mathrm{csgn}(ix)\,\mathrm{csgn}(ix^3)-i\pi\,\mathrm{csgn}(}{}$
default	$\frac{-e+2-\ln\left(\frac{e^{-x}}{x^3}\right)-x-3\ln(x)}{e-2+x}-\ln(e-2+x)-\frac{3\ln(x)\left(\ln\left(\frac{e-2-\sqrt{(e)^2-e^2}+x}{e-2-\sqrt{(e)^2-e^2}}\right)-\ln\left(\frac{e-2+\sqrt{(e)^2-e^2}+x}{e-2+\sqrt{(e)^2-e^2}}\right)\right)}{2\sqrt{(e)^2-e^2}}-\frac{3\left(\mathrm{dil}\right.}{}$
parts	$\frac{-e+2-\ln\left(\frac{e^{-x}}{x^3}\right)-x-3\ln(x)}{e-2+x}-\ln(e-2+x)-\frac{3\ln(x)\left(\ln\left(\frac{e-2-\sqrt{(e)^2-e^2}+x}{e-2-\sqrt{(e)^2-e^2}}\right)-\ln\left(\frac{e-2+\sqrt{(e)^2-e^2}+x}{e-2+\sqrt{(e)^2-e^2}}\right)\right)}{2\sqrt{(e)^2-e^2}}-\frac{3\left(\mathrm{dil}\right.}{}$

input
```
int((x*ln(exp(-x)/x^3)+(3+x)*exp(1)+x^2+x-6)/(x*exp(1)^2+(2*x^2-4*x)*exp(1
)+x^3-4*x^2+4*x),x,method=_RETURNVERBOSE)
```

output
```
-ln(exp(-x)/x^3)/(exp(1)-2+x)
```

3.295.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e(-4x+2x^2)}\,dx=-\frac{\log\left(\frac{e^{(-x)}}{x^3}\right)}{x+e-2}$$

input
```
integrate((x*log(exp(-x)/x^3)+(3+x)*exp(1)+x^2+x-6)/(x*exp(1)^2+(2*x^2-4*x
)*exp(1)+x^3-4*x^2+4*x),x, algorithm=\
```

output
```
-log(e^(-x)/x^3)/(x + e - 2)
```

3.295.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e\left(-4x+2x^2\right)}\,dx=-\frac{\log\left(\frac{e^{-x}}{x^3}\right)}{x-2+e}$$

input
```
integrate((x*ln(exp(-x)/x**3)+(3+x)*exp(1)+x**2+x-6)/(x*exp(1)**2+(2*x**2-
4*x)*exp(1)+x**3-4*x**2+4*x),x)
```

output
```
-log(exp(-x)/x**3)/(x - 2 + E)
```

3.295.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 189 vs. 2(18) = 36.

Time = 0.21 (sec) , antiderivative size = 189, normalized size of antiderivative = 9.00

$$\begin{aligned}&\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e\left(-4x+2x^2\right)}\,dx\\&=-3\left(\frac{\log(x+e-2)}{e^2-4e+4}-\frac{\log(x)}{e^2-4e+4}-\frac{1}{x(e-2)+e^2-4e+4}\right)e\\&\quad-\frac{(e-5)\log(x+e-2)}{e-2}+\frac{e-2}{x+e-2}-\frac{e}{x+e-2}+\frac{6\log(x+e-2)}{e^2-4e+4}-\frac{6\log(x)}{e^2-4e+4}\\&\quad-\frac{3\log(x)}{e-2}-\frac{\log\left(\frac{e^{(-x)}}{x^3}\right)}{x+e-2}-\frac{6}{x(e-2)+e^2-4e+4}-\frac{1}{x+e-2}+\log(x+e-2)\end{aligned}$$

input
```
integrate((x*log(exp(-x)/x^3)+(3+x)*exp(1)+x^2+x-6)/(x*exp(1)^2+(2*x^2-4*x
)*exp(1)+x^3-4*x^2+4*x),x, algorithm=\
```

output
```
-3*(log(x + e - 2)/(e^2 - 4*e + 4) - log(x)/(e^2 - 4*e + 4) - 1/(x*(e - 2)
 + e^2 - 4*e + 4))*e - (e - 5)*log(x + e - 2)/(e - 2) + (e - 2)/(x + e - 2
) - e/(x + e - 2) + 6*log(x + e - 2)/(e^2 - 4*e + 4) - 6*log(x)/(e^2 - 4*e
 + 4) - 3*log(x)/(e - 2) - log(e^(-x)/x^3)/(x + e - 2) - 6/(x*(e - 2) + e^
2 - 4*e + 4) - 1/(x + e - 2) + log(x + e - 2)
```

3.295.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e\left(-4x+2x^2\right)}\,dx=-\frac{e-3\,\log\left(x\right)-2}{x+e-2}$$

input
```
integrate((x*log(exp(-x)/x^3)+(3+x)*exp(1)+x^2+x-6)/(x*exp(1)^2+(2*x^2-4*x
)*exp(1)+x^3-4*x^2+4*x),x, algorithm=\
```

output
```
-(e - 3*log(x) - 2)/(x + e - 2)
```

3.295.9 Mupad [B] (verification not implemented)

Time = 13.73 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

$$\int \frac{-6+x+x^2+e(3+x)+x\log\left(\frac{e^{-x}}{x^3}\right)}{4x+e^2x-4x^2+x^3+e\left(-4x+2x^2\right)}\,dx=\frac{x-\ln\left(\frac{1}{x^3}\right)}{x+\mathrm{e}-2}$$

input
```
int((x + exp(1)*(x + 3) + x*log(exp(-x)/x^3) + x^2 - 6)/(4*x - exp(1)*(4*x
 - 2*x^2) + x*exp(2) - 4*x^2 + x^3),x)
```

output
```
(x - log(1/x^3))/(x + exp(1) - 2)
```

3.296 $\int \frac{-520-6x-190\log(x)-5\log^2(x)}{5x^2}\,dx$

3.296.1 Optimal result

Integrand size = 22, antiderivative size = 17

$$\int \frac{-520-6x-190\log(x)-5\log^2(x)}{5x^2}\,dx=\frac{(36+\log(x))\left(4-\frac{6x}{5}+\log(x)\right)}{x}$$

output
```
(36+ln(x))/x*(ln(x)-6/5*x+4)
```

3.296.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.59

$$\int \frac{-520-6x-190\log(x)-5\log^2(x)}{5x^2}\,dx=\frac{144}{x}-\frac{6\log(x)}{5}+\frac{40\log(x)}{x}+\frac{\log^2(x)}{x}$$

input
```
Integrate[(-520 - 6*x - 190*Log[x] - 5*Log[x]^2)/(5*x^2),x]
```

output
```
144/x - (6*Log[x])/5 + (40*Log[x])/x + Log[x]^2/x
```

3.296.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.76, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x-5\log^2(x)-190\log(x)-520}{5x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int -\frac{5\log^2(x)+190\log(x)+6x+520}{x^2}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{5}\int \frac{5\log^2(x)+190\log(x)+6x+520}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$-\frac{1}{5}\int \left(\frac{5\log^2(x)}{x^2}+\frac{190\log(x)}{x^2}+\frac{2(3x+260)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(\frac{720}{x}+\frac{5\log^2(x)}{x}+\frac{200\log(x)}{x}-6\log(x)\right)$$

input
```
Int[(-520 - 6*x - 190*Log[x] - 5*Log[x]^2)/(5*x^2),x]
```

output
```
(720/x - 6*Log[x] + (200*Log[x])/x + (5*Log[x]^2)/x)/5
```

3.296.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.296.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

method	result	size
norman	$\frac{144+\ln(x)^2-\frac{6x\ln(x)}{5}+40\ln(x)}{x}$	20
parallelrisch	$\frac{-6x\ln(x)+720+5\ln(x)^2+200\ln(x)}{5x}$	23
default	$\frac{\ln(x)^2}{x}+\frac{40\ln(x)}{x}+\frac{144}{x}-\frac{6\ln(x)}{5}$	26
parts	$\frac{\ln(x)^2}{x}+\frac{40\ln(x)}{x}+\frac{144}{x}-\frac{6\ln(x)}{5}$	26
risch	$\frac{\ln(x)^2}{x}+\frac{40\ln(x)}{x}-\frac{6(x\ln(x)-120)}{5x}$	28

input
```
int(1/5*(-5*ln(x)^2-190*ln(x)-6*x-520)/x^2,x,method=_RETURNVERBOSE)
```

output
```
(144+ln(x)^2-6/5*x*ln(x)+40*ln(x))/x
```

3.296.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

$$\int \frac{-520-6x-190\log(x)-5\log^2(x)}{5x^2}\,dx = -\frac{2\,(3\,x-100)\log\left(x\right)-5\,\log\left(x\right)^2-720}{5\,x}$$

input
```
integrate(1/5*(-5*log(x)^2-190*log(x)-6*x-520)/x^2,x, algorithm=\
```

output
```
-1/5*(2*(3*x - 100)*log(x) - 5*log(x)^2 - 720)/x
```

3.296.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

$$\int \frac{-520-6x-190\log(x)-5\log^2(x)}{5x^2}\,dx = -\frac{6\log{(x)}}{5}+\frac{\log{(x)}^2}{x}+\frac{40\log{(x)}}{x}+\frac{144}{x}$$

input
```
integrate(1/5*(-5*ln(x)**2-190*ln(x)-6*x-520)/x**2,x)
```

output
```
-6*log(x)/5 + log(x)**2/x + 40*log(x)/x + 144/x
```

3.296.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.82

$$\int \frac{-520-6x-190\log(x)-5\log^2(x)}{5x^2}\,dx = \frac{\log{(x)}^2+2\log{(x)}+2}{x} + \frac{38\log{(x)}}{x}+\frac{142}{x}-\frac{6}{5}\log{(x)}$$

input
```
integrate(1/5*(-5*log(x)^2-190*log(x)-6*x-520)/x^2,x, algorithm=\
```

output
```
(log(x)^2 + 2*log(x) + 2)/x + 38*log(x)/x + 142/x - 6/5*log(x)
```

3.296.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.47

$$\int \frac{-520-6x-190\log(x)-5\log^2(x)}{5x^2}\,dx = \frac{\log{(x)}^2}{x}+\frac{40\log{(x)}}{x}+\frac{144}{x}-\frac{6}{5}\log{(x)}$$

input
```
integrate(1/5*(-5*log(x)^2-190*log(x)-6*x-520)/x^2,x, algorithm=\
```

output
```
log(x)^2/x + 40*log(x)/x + 144/x - 6/5*log(x)
```

3.296.9 Mupad [B] (verification not implemented)

Time = 13.81 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{-520-6x-190\log(x)-5\log^2(x)}{5x^2}\,dx = \frac{\ln(x)^2+40\,\ln(x)+144}{x}-\frac{6\,\ln(x)}{5}$$

input
```
int(-((6*x)/5 + 38*log(x) + log(x)^2 + 104)/x^2,x)
```

output
```
(40*log(x) + log(x)^2 + 144)/x - (6*log(x))/5
```

3.297 $\int \frac{8}{(8x-108x^2)\log\left(\frac{2-27x}{x}\right)+(-2x+27x^2)\log\left(\frac{2-27x}{x}\right)\log\left(\log\left(\frac{2-27x}{x}\right)\right)}$

3.297.1 Optimal result

Integrand size = 56, antiderivative size = 18

$$\int \frac{8}{(8x-108x^2)\log\left(\frac{2-27x}{x}\right)+(-2x+27x^2)\log\left(\frac{2-27x}{x}\right)\log\left(\log\left(\frac{2-27x}{x}\right)\right)}\,dx = 4\log\left(4-\log\left(\log\left(5+2\left(-16+\frac{1}{x}\right)\right)\right)\right)$$

output
```
4*ln(4-ln(ln(-27+2/x)))
```

3.297.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{8}{(8x-108x^2)\log\left(\frac{2-27x}{x}\right)+(-2x+27x^2)\log\left(\frac{2-27x}{x}\right)\log\left(\log\left(\frac{2-27x}{x}\right)\right)}\,dx = 4\log\left(-4+\log\left(\log\left(-27+\frac{2}{x}\right)\right)\right)$$

input
```
Integrate[8/((8*x - 108*x^2)*Log[(2 - 27*x)/x] + (-2*x + 27*x^2)*Log[(2 - 
27*x)/x]*Log[Log[(2 - 27*x)/x]]),x]
```

output
```
4*Log[-4 + Log[Log[-27 + 2/x]]]
```

3.297.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.054, Rules used = {27, 7292, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8}{(8x-108x^2)\log\left(\frac{2-27x}{x}\right)+(27x^2-2x)\log\left(\log\left(\frac{2-27x}{x}\right)\right)\log\left(\frac{2-27x}{x}\right)}dx$$

$$\Big\downarrow \text{27}$$

$$8\int \frac{1}{4(2x-27x^2)\log\left(\frac{2-27x}{x}\right)-(2x-27x^2)\log\left(\frac{2-27x}{x}\right)\log\left(\log\left(\frac{2-27x}{x}\right)\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$8\int \frac{1}{(2-27x)x\log\left(\frac{2}{x}-27\right)\left(4-\log\left(\log\left(\frac{2}{x}-27\right)\right)\right)}dx$$

$$\Big\downarrow \text{7235}$$

$$4\log\left(4-\log\left(\log\left(\frac{2}{x}-27\right)\right)\right)$$

input
```
Int[8/((8*x - 108*x^2)*Log[(2 - 27*x)/x] + (-2*x + 27*x^2)*Log[(2 - 27*x)/
x]*Log[Log[(2 - 27*x)/x]]),x]
```

output
```
4*Log[4 - Log[Log[-27 + 2/x]]]
```

3.297.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.297.4 Maple [A] (verified)

Time = 0.66 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

method	result	size
default	$4\ln\left(\ln\left(\ln\left(\frac{-27x+2}{x}\right)\right)-4\right)$	17
norman	$4\ln\left(\ln\left(\ln\left(\frac{-27x+2}{x}\right)\right)-4\right)$	17
parallelrisch	$4\ln\left(\ln\left(\ln\left(-\frac{27x-2}{x}\right)\right)-4\right)$	18

input
```
int(8/((27*x^2-2*x)*ln((-27*x+2)/x)*ln(ln((-27*x+2)/x))+(-108*x^2+8*x)*ln(
(-27*x+2)/x)),x,method=_RETURNVERBOSE)
```

output
```
4*ln(ln(ln((-27*x+2)/x))-4)
```

3.297.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{8}{(8x-108x^2)\log\left(\frac{2-27x}{x}\right)+(-2x+27x^2)\log\left(\frac{2-27x}{x}\right)\log\left(\log\left(\frac{2-27x}{x}\right)\right)}\,dx = 4\,\log\left(\log\left(\log\left(-\frac{27\,x-2}{x}\right)\right)-4\right)$$

input
```
integrate(8/((27*x^2-2*x)*log((-27*x+2)/x)*log(log((-27*x+2)/x))+(-108*x^2
+8*x)*log((-27*x+2)/x)),x, algorithm=\
```

output
```
4*log(log(log(-(27*x - 2)/x)) - 4)
```

3.297.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{8}{(8x-108x^2)\log\left(\frac{2-27x}{x}\right)+(-2x+27x^2)\log\left(\frac{2-27x}{x}\right)\log\left(\log\left(\frac{2-27x}{x}\right)\right)}\,dx = 4\log\left(\log\left(\log\left(\frac{2-27x}{x}\right)\right)-4\right)$$

input
```
integrate(8/((27*x**2-2*x)*ln((-27*x+2)/x)*ln(ln((-27*x+2)/x))+(-108*x**2+
8*x)*ln((-27*x+2)/x)),x)
```

output
```
4*log(log(log((2 - 27*x)/x)) - 4)
```

3.297.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{8}{(8x-108x^2)\log\left(\frac{2-27x}{x}\right)+(-2x+27x^2)\log\left(\frac{2-27x}{x}\right)\log\left(\log\left(\frac{2-27x}{x}\right)\right)}\,dx = 4\log\left(\log\left(-\log\left(x\right)+\log\left(-27\,x+2\right)\right)-4\right)$$

input
```
integrate(8/((27*x^2-2*x)*log((-27*x+2)/x)*log(log((-27*x+2)/x))+(-108*x^2
+8*x)*log((-27*x+2)/x)),x, algorithm=\
```

output
```
4*log(log(-log(x) + log(-27*x + 2)) - 4)
```

3.297.8 Giac [F]

$$\int \frac{8}{(8x-108x^2)\log\left(\frac{2-27x}{x}\right)+(-2x+27x^2)\log\left(\frac{2-27x}{x}\right)\log\left(\log\left(\frac{2-27x}{x}\right)\right)}\,dx = \int \frac{8}{(27\,x^2-2\,x)\log\left(-\frac{27\,x-2}{x}\right)\log\left(\log\left(-\frac{27\,x-2}{x}\right)\right)-4\,(27\,x^2-2\,x)\log\left(-\frac{27\,x-2}{x}\right)}\,dx$$

input
```
integrate(8/((27*x^2-2*x)*log((-27*x+2)/x)*log(log((-27*x+2)/x))+(-108*x^2
+8*x)*log((-27*x+2)/x)),x, algorithm=\
```

output
```
integrate(8/((27*x^2 - 2*x)*log(-(27*x - 2)/x)*log(log(-(27*x - 2)/x)) - 4
*(27*x^2 - 2*x)*log(-(27*x - 2)/x)), x)
```

3.297.9 Mupad [B] (verification not implemented)

Time = 14.62 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{8}{(8x-108x^2)\log\left(\frac{2-27x}{x}\right)+(-2x+27x^2)\log\left(\frac{2-27x}{x}\right)\log\left(\log\left(\frac{2-27x}{x}\right)\right)}\,dx$$
$$=4\ln\left(\ln\left(\ln\left(\frac{2}{x}-27\right)\right)-4\right)$$

input
```
int(8/(log(-(27*x - 2)/x)*(8*x - 108*x^2) - log(log(-(27*x - 2)/x))*log(-(
27*x - 2)/x)*(2*x - 27*x^2)),x)
```

output
```
4*log(log(log(2/x - 27)) - 4)
```

3.298 $\int \frac{2+(2+4x^3)\log(30x)-2\log(30x)\log(-x\log(30x))}{x^4\log(30x)+x\log(30x)\log(-x\log(30x))}\,dx$

3.298.1 Optimal result

Integrand size = 54, antiderivative size = 19

$$\int \frac{2+(2+4x^3)\log(30x)-2\log(30x)\log(-x\log(30x))}{x^4\log(30x)+x\log(30x)\log(-x\log(30x))}\,dx = \log\left(\left(x^2+\frac{\log(-x\log(30x))}{x}\right)^2\right)$$

output
```
ln((x^2+ln(-x*ln(30*x))/x)^2)
```

3.298.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{2+(2+4x^3)\log(30x)-2\log(30x)\log(-x\log(30x))}{x^4\log(30x)+x\log(30x)\log(-x\log(30x))}\,dx = -2\log(x)+2\log\left(x^3+\log(-x\log(30x))\right)$$

input
```
Integrate[(2 + (2 + 4*x^3)*Log[30*x] - 2*Log[30*x]*Log[-(x*Log[30*x])])/(x
^4*Log[30*x] + x*Log[30*x]*Log[-(x*Log[30*x])]),x]
```

output
```
-2*Log[x] + 2*Log[x^3 + Log[-(x*Log[30*x])]]
```

3.298.3 Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(4x^3+2)\log(30x)-2\log(-x\log(30x))\log(30x)+2}{x^4\log(30x)+x\log(30x)\log(-x\log(30x))}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(4x^3+2)\log(30x)-2\log(-x\log(30x))\log(30x)+2}{x\log(30x)\left(x^3+\log(-x\log(30x))\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2\left(3x^3\log(30x)+\log(30x)+1\right)}{x\log(30x)\left(x^3+\log(-x\log(30x))\right)}-\frac{2}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\log\left(x^3+\log(-x\log(30x))\right)-2\log(x)$$

input
```
Int[(2 + (2 + 4*x^3)*Log[30*x] - 2*Log[30*x]*Log[-(x*Log[30*x])])/(x^4*Log
[30*x] + x*Log[30*x]*Log[-(x*Log[30*x])]),x]
```

output
```
-2*Log[x] + 2*Log[x^3 + Log[-(x*Log[30*x])]]
```

3.298.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.298.4 Maple [A] (verified)

Time = 26.39 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

method	result	size
default	$-2\ln(x)+2\ln(x^3+\ln(-x(\ln(30)+\ln(x))))$	22
parallelrisch	$2\ln(\ln(30x))+2\ln(x^3+\ln(-x\ln(30x)))-2\ln(-x\ln(30x))$	34

input
```
int((-2*ln(30*x)*ln(-x*ln(30*x))+(4*x^3+2)*ln(30*x)+2)/(x*ln(30*x)*ln(-x*l
n(30*x))+x^4*ln(30*x)),x,method=_RETURNVERBOSE)
```

output
```
-2*ln(x)+2*ln(x^3+ln(-x*(ln(30)+ln(x))))
```

3.298.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{2+(2+4x^3)\log(30x)-2\log(30x)\log(-x\log(30x))}{x^4\log(30x)+x\log(30x)\log(-x\log(30x))}\,dx = 2\log\left(x^3+\log\left(-x\log\left(30x\right)\right)\right)-2\log\left(30x\right)$$

input
```
integrate((-2*log(30*x)*log(-x*log(30*x))+(4*x^3+2)*log(30*x)+2)/(x*log(30
*x)*log(-x*log(30*x))+x^4*log(30*x)),x, algorithm=\
```

output
```
2*log(x^3 + log(-x*log(30*x))) - 2*log(30*x)
```

3.298.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{2+(2+4x^3)\log(30x)-2\log(30x)\log(-x\log(30x))}{x^4\log(30x)+x\log(30x)\log(-x\log(30x))}\,dx = -2\log(x)+2\log\left(x^3+\log\left(-x\log\left(30x\right)\right)\right)$$

input
```
integrate((-2*ln(30*x)*ln(-x*ln(30*x))+(4*x**3+2)*ln(30*x)+2)/(x*ln(30*x)*
ln(-x*ln(30*x))+x**4*ln(30*x)),x)
```

output
```
-2*log(x) + 2*log(x**3 + log(-x*log(30*x)))
```

3.298.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.68

$$\int \frac{2+(2+4x^3)\log(30x)-2\log(30x)\log(-x\log(30x))}{x^4\log(30x)+x\log(30x)\log(-x\log(30x))}\,dx$$
$$=2\log\left(x^3+\log(x)+\log(-\log(5)-\log(3)-\log(2)-\log(x))\right)-2\log(x)$$

input
```
integrate((-2*log(30*x)*log(-x*log(30*x))+(4*x^3+2)*log(30*x)+2)/(x*log(30
*x)*log(-x*log(30*x))+x^4*log(30*x)),x, algorithm=\
```

output
```
2*log(x^3 + log(x) + log(-log(5) - log(3) - log(2) - log(x))) - 2*log(x)
```

3.298.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{2+(2+4x^3)\log(30x)-2\log(30x)\log(-x\log(30x))}{x^4\log(30x)+x\log(30x)\log(-x\log(30x))}\,dx$$
$$=2\log\left(x^3+\log(x)+\log(-\log(30)-\log(x))\right)-2\log(x)$$

input
```
integrate((-2*log(30*x)*log(-x*log(30*x))+(4*x^3+2)*log(30*x)+2)/(x*log(30
*x)*log(-x*log(30*x))+x^4*log(30*x)),x, algorithm=\
```

output
```
2*log(x^3 + log(x) + log(-log(30) - log(x))) - 2*log(x)
```

3.298.9 Mupad [B] (verification not implemented)

Time = 13.91 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{2+(2+4x^3)\log(30x)-2\log(30x)\log(-x\log(30x))}{x^4\log(30x)+x\log(30x)\log(-x\log(30x))}\,dx$$
$$=2\ln\left(\ln(-x\ln(30x))+x^3\right)-2\ln(x)$$

input
```
int((log(30*x)*(4*x^3 + 2) - 2*log(30*x)*log(-x*log(30*x)) + 2)/(x^4*log(3
0*x) + x*log(30*x)*log(-x*log(30*x))),x)
```

output
```
2*log(log(-x*log(30*x)) + x^3) - 2*log(x)
```

3.299 $\int \frac{-480+280x-40x^2+15x^3-5x^4+(-80x+40x^2-48x^3-5x^4)\log\left(\frac{80-40}{}\right.}{80x-40x^2+48x^3+5x^4}$

3.299.1 Optimal result

Integrand size = 85, antiderivative size = 23

$$\int \frac{-480+280x-40x^2+15x^3-5x^4+(-80x+40x^2-48x^3-5x^4)\log\left(\frac{80-40x+48x^2+5x^3}{5x^2}\right)}{80x-40x^2+48x^3+5x^4}\,dx = (3-x)\log\left(\frac{43}{5}+\frac{(4-x)^2}{x^2}+x\right)$$

output
```
ln(43/5+1/x^2*(-x+4)^2+x)*(-x+3)
```

3.299.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 3 in optimal.

Time = 0.15 (sec) , antiderivative size = 166, normalized size of antiderivative = 7.22

$$\int \frac{-480+280x-40x^2+15x^3-5x^4+(-80x+40x^2-48x^3-5x^4)\log\left(\frac{80-40x+48x^2+5x^3}{5x^2}\right)}{80x-40x^2+48x^3+5x^4}\,dx = -6\log(x)-x\log\left(\frac{48}{5}+\frac{16}{x^2}-\frac{8}{x}+x\right)-16\text{RootSum}\left[80-40\#1+48\#1^2+5\#1^3\&,\frac{15\log(x-\#1)-5\log(x-\#1)\#1+3\log(x-\#1)\#1^2}{-40+96\#1+15\#1^2}\&\right]+\text{RootSum}\left[80-40\#1+48\#1^2+5\#1^3\&,\frac{120\log(x-\#1)+208\log(x-\#1)\#1+93\log(x-\#1)\#1^2}{-40+96\#1+15\#1^2}\&\right]$$

input
```
Integrate[(-480 + 280*x - 40*x^2 + 15*x^3 - 5*x^4 + (-80*x + 40*x^2 - 48*x
^3 - 5*x^4)*Log[(80 - 40*x + 48*x^2 + 5*x^3)/(5*x^2)])/(80*x - 40*x^2 + 48
*x^3 + 5*x^4),x]
```

output
```
-6*Log[x] - x*Log[48/5 + 16/x^2 - 8/x + x] - 16*RootSum[80 - 40*#1 + 48*#1
^2 + 5*#1^3 & , (15*Log[x - #1] - 5*Log[x - #1]*#1 + 3*Log[x - #1]*#1^2)/(
-40 + 96*#1 + 15*#1^2) & ] + RootSum[80 - 40*#1 + 48*#1^2 + 5*#1^3 & , (12
0*Log[x - #1] + 208*Log[x - #1]*#1 + 93*Log[x - #1]*#1^2)/(-40 + 96*#1 + 1
5*#1^2) & ]
```

3.299.3 Rubi [A] (verified)

Time = 15.45 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.047$, Rules used = {2026, 7293, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-5x^4+15x^3-40x^2+\left(-5x^4-48x^3+40x^2-80x\right)\log\left(\frac{5x^3+48x^2-40x+80}{5x^2}\right)+280x-480}{5x^4+48x^3-40x^2+80x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-5x^4+15x^3-40x^2+\left(-5x^4-48x^3+40x^2-80x\right)\log\left(\frac{5x^3+48x^2-40x+80}{5x^2}\right)+280x-480}{x\left(5x^3+48x^2-40x+80\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\log\left(\frac{16}{x^2}+x-\frac{8}{x}+\frac{48}{5}\right)-\frac{5x^3}{5x^3+48x^2-40x+80}+\frac{15x^2}{5x^3+48x^2-40x+80}-\frac{40x}{5x^3+48x^2-40x+80}+\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \left(-\log\left(\frac{16}{x^2}+x-\frac{8}{x}+\frac{48}{5}\right)-\frac{5\left(x^4-3x^3+8x^2-56x+96\right)}{x\left(5x^3+48x^2-40x+80\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-x\log\left(\frac{16}{x^2}+x-\frac{8}{x}+\frac{48}{5}\right)+3\log\left(5x^3+48x^2-40x+80\right)-6\log(x)$$

input
```
Int[(-480 + 280*x - 40*x^2 + 15*x^3 - 5*x^4 + (-80*x + 40*x^2 - 48*x^3 - 5
*x^4)*Log[(80 - 40*x + 48*x^2 + 5*x^3)/(5*x^2)])/(80*x - 40*x^2 + 48*x^3 +
 5*x^4),x]
```

output
```
-6*Log[x] - x*Log[48/5 + 16/x^2 - 8/x + x] + 3*Log[80 - 40*x + 48*x^2 + 5*
x^3]
```

3.299.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.299.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(21) = 42$.

Time = 0.20 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.09

method	result
risch	$-\ln\left(\frac{5x^3+48x^2-40x+80}{5x^2}\right)x-6\ln\left(x\right)+3\ln\left(5x^3+48x^2-40x+80\right)$
norman	$3\ln\left(\frac{5x^3+48x^2-40x+80}{5x^2}\right)-\ln\left(\frac{5x^3+48x^2-40x+80}{5x^2}\right)x$
parallelrisch	$3\ln\left(\frac{5x^3+48x^2-40x+80}{5x^2}\right)-\ln\left(\frac{5x^3+48x^2-40x+80}{5x^2}\right)x$
default	$-6\ln\left(x\right)-\left(\sum_{\_R=\mathrm{RootOf}\left(5\_Z^3+48\_Z^2-40\_Z+80\right)}\frac{\left(-93\_R^2-208\_R-120\right)\ln\left(x-\_R\right)}{15\_R^2+96\_R-40}\right)-x\ln\left(\frac{5x^3+48x}{}\right.$
parts	$-6\ln\left(x\right)-\left(\sum_{\_R=\mathrm{RootOf}\left(5\_Z^3+48\_Z^2-40\_Z+80\right)}\frac{\left(-93\_R^2-208\_R-120\right)\ln\left(x-\_R\right)}{15\_R^2+96\_R-40}\right)-x\ln\left(\frac{5x^3+48x}{}\right.$

input
```
int(((-5*x^4-48*x^3+40*x^2-80*x)*ln(1/5*(5*x^3+48*x^2-40*x+80)/x^2)-5*x^4+
15*x^3-40*x^2+280*x-480)/(5*x^4+48*x^3-40*x^2+80*x),x,method=_RETURNVERBOS
E)
```

output
```
-ln(1/5*(5*x^3+48*x^2-40*x+80)/x^2)*x-6*ln(x)+3*ln(5*x^3+48*x^2-40*x+80)
```

3.299.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{-480+280x-40x^2+15x^3-5x^4+\left(-80x+40x^2-48x^3-5x^4\right)\log\left(\frac{80-40x+48x^2+5x^3}{5x^2}\right)}{80x-40x^2+48x^3+5x^4}\,dx$$
$$=-(x-3)\log\left(\frac{5\,x^3+48\,x^2-40\,x+80}{5\,x^2}\right)$$

input
```
integrate(((-5*x^4-48*x^3+40*x^2-80*x)*log(1/5*(5*x^3+48*x^2-40*x+80)/x^2)
-5*x^4+15*x^3-40*x^2+280*x-480)/(5*x^4+48*x^3-40*x^2+80*x),x, algorithm=\
```

output
```
-(x - 3)*log(1/5*(5*x^3 + 48*x^2 - 40*x + 80)/x^2)
```

3.299.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. $2(17) = 34$.

Time = 0.10 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.91

$$\int \frac{-480 + 280x - 40x^2 + 15x^3 - 5x^4 + (-80x + 40x^2 - 48x^3 - 5x^4)\log\left(\frac{80-40x+48x^2+5x^3}{5x^2}\right)}{80x - 40x^2 + 48x^3 + 5x^4}\,dx$$
$$= -x\log\left(\frac{x^3 + \frac{48x^2}{5} - 8x + 16}{x^2}\right) - 6\log(x) + 3\log\left(5x^3 + 48x^2 - 40x + 80\right)$$

input
```
integrate(((-5*x**4-48*x**3+40*x**2-80*x)*ln(1/5*(5*x**3+48*x**2-40*x+80)/
x**2)-5*x**4+15*x**3-40*x**2+280*x-480)/(5*x**4+48*x**3-40*x**2+80*x),x)
```

output
```
-x*log((x**3 + 48*x**2/5 - 8*x + 16)/x**2) - 6*log(x) + 3*log(5*x**3 + 48*
x**2 - 40*x + 80)
```

3.299.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

$$\int \frac{-480 + 280x - 40x^2 + 15x^3 - 5x^4 + (-80x + 40x^2 - 48x^3 - 5x^4)\log\left(\frac{80-40x+48x^2+5x^3}{5x^2}\right)}{80x - 40x^2 + 48x^3 + 5x^4}\,dx$$
$$= x\log(5) - (x-3)\log\left(5\,x^3 + 48\,x^2 - 40\,x + 80\right) + 2\,(x-3)\log(x)$$

input
```
integrate(((-5*x^4-48*x^3+40*x^2-80*x)*log(1/5*(5*x^3+48*x^2-40*x+80)/x^2)
-5*x^4+15*x^3-40*x^2+280*x-480)/(5*x^4+48*x^3-40*x^2+80*x),x, algorithm=\
```

output
```
x*log(5) - (x - 3)*log(5*x^3 + 48*x^2 - 40*x + 80) + 2*(x - 3)*log(x)
```

3.299.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(18) = 36$.

Time = 0.31 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.04

$$\int \frac{-480+280x-40x^2+15x^3-5x^4+(-80x+40x^2-48x^3-5x^4)\log\left(\frac{80-40x+48x^2+5x^3}{5x^2}\right)}{80x-40x^2+48x^3+5x^4}\,dx$$
$$= -x\log\left(\frac{5\,x^3+48\,x^2-40\,x+80}{5\,x^2}\right)+3\,\log\left(5\,x^3+48\,x^2-40\,x+80\right)-6\,\log\left(x\right)$$

input
```
integrate(((-5*x^4-48*x^3+40*x^2-80*x)*log(1/5*(5*x^3+48*x^2-40*x+80)/x^2)
-5*x^4+15*x^3-40*x^2+280*x-480)/(5*x^4+48*x^3-40*x^2+80*x),x, algorithm=\
```

output
```
-x*log(1/5*(5*x^3 + 48*x^2 - 40*x + 80)/x^2) + 3*log(5*x^3 + 48*x^2 - 40*x
 + 80) - 6*log(x)
```

3.299.9 Mupad [B] (verification not implemented)

Time = 13.50 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{-480+280x-40x^2+15x^3-5x^4+(-80x+40x^2-48x^3-5x^4)\log\left(\frac{80-40x+48x^2+5x^3}{5x^2}\right)}{80x-40x^2+48x^3+5x^4}\,dx$$
$$= 3\,\ln\left(x^3+\frac{48\,x^2}{5}-8\,x+16\right)-6\,\ln\left(x\right)-x\,\ln\left(\frac{x^3+\frac{48\,x^2}{5}-8\,x+16}{x^2}\right)$$

input
```
int(-(log(((48*x^2)/5 - 8*x + x^3 + 16)/x^2)*(80*x - 40*x^2 + 48*x^3 + 5*x
^4) - 280*x + 40*x^2 - 15*x^3 + 5*x^4 + 480)/(80*x - 40*x^2 + 48*x^3 + 5*x
^4),x)
```

output
```
3*log((48*x^2)/5 - 8*x + x^3 + 16) - 6*log(x) - x*log(((48*x^2)/5 - 8*x +
x^3 + 16)/x^2)
```

3.300 $\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}(-10+10x^2)+(-20+20x^2)\log(15)\right)}{x^2-2x^4+x^6}$

3.300.1 Optimal result

Integrand size = 68, antiderivative size = 34

$$\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}(-10+10x^2)+(-20+20x^2)\log(15)\right)}{x^2-2x^4+x^6}\,dx=\frac{5e^{1-e^{2/x}-\frac{4\log(15)}{x}}}{x\left(-\frac{1}{x}+x\right)}$$

output
```
5*exp(1-4*ln(15)/x-exp(2/x))/x/(x-1/x)
```

3.300.2 Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.09

$$\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}(-10+10x^2)+(-20+20x^2)\log(15)\right)}{x^2-2x^4+x^6}\,dx=\frac{5^{\frac{-4+x}{x}}81^{-1/x}e^{1-e^{2/x}}}{-1+x^2}$$

input
```
Integrate[(E^((x - E^(2/x)*x - 4*Log[15])/x)*(-10*x^3 + E^(2/x)*(-10 + 10*
x^2) + (-20 + 20*x^2)*Log[15]))/(x^2 - 2*x^4 + x^6),x]
```

output
```
(5^((-4 + x)/x)*E^(1 - E^(2/x)))/(81^x^(-1)*(-1 + x^2))
```

3.300.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 129 vs. 2(34) = 68.

Time = 1.32 (sec) , antiderivative size = 129, normalized size of antiderivative = 3.79, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.088$, Rules used = {2026, 1380, 27, 2725, 27, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-e^{2/x}x+x-4\log(15)}{x}}\left(-10x^3+e^{2/x}\left(10x^2-10\right)+\left(20x^2-20\right)\log(15)\right)}{x^6-2x^4+x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{\frac{-e^{2/x}x+x-4\log(15)}{x}}\left(-10x^3+e^{2/x}\left(10x^2-10\right)+\left(20x^2-20\right)\log(15)\right)}{x^2\left(x^4-2x^2+1\right)}dx$$

$$\Big\downarrow \text{1380}$$

$$\int -\frac{2\ 3^{-4/x}5^{1-\frac{4}{x}}e^{\frac{x-e^{2/x}x}{x}}\left(x^3+e^{2/x}\left(1-x^2\right)+2\left(1-x^2\right)\log(15)\right)}{x^2\left(1-x^2\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$-2\int \frac{3^{-4/x}5^{1-\frac{4}{x}}e^{\frac{x-e^{2/x}x}{x}}\left(x^3+e^{2/x}\left(1-x^2\right)+2\left(1-x^2\right)\log(15)\right)}{x^2\left(1-x^2\right)^2}dx$$

$$\Big\downarrow \text{2725}$$

$$-2\int \frac{5e^{\frac{x-e^{2/x}x}{x}+\frac{-4\log(3)-4\log(5)}{x}}\left(x^3+e^{2/x}\left(1-x^2\right)+2\left(1-x^2\right)\log(15)\right)}{x^2\left(1-x^2\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$-10\int \frac{e^{\frac{x-e^{2/x}x}{x}-\frac{4\log(15)}{x}}\left(x^3+e^{2/x}\left(1-x^2\right)+2\left(1-x^2\right)\log(15)\right)}{x^2\left(1-x^2\right)^2}dx$$

$$\Big\downarrow \text{2726}$$

$$-\frac{2\ 3^{-4/x}5^{1-\frac{4}{x}}e^{\frac{x-e^{2/x}x}{x}}\left(e^{2/x}\left(1-x^2\right)+2\left(1-x^2\right)\log(15)\right)}{x^2\left(1-x^2\right)^2\left(-\frac{x-e^{2/x}x}{x^2}+\frac{4\log(15)}{x^2}+\frac{-e^{2/x}+\frac{2e^{2/x}}{x}+1}{x}\right)}$$

3.300. $\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}\left(-10+10x^2\right)+\left(-20+20x^2\right)\log(15)\right)}{x^2-2x^4+x^6}dx$

input
```
Int[(E^((x - E^(2/x)*x - 4*Log[15])/x)*(-10*x^3 + E^(2/x)*(-10 + 10*x^2) +
 (-20 + 20*x^2)*Log[15]))/(x^2 - 2*x^4 + x^6),x]
```

output
```
(-2*5^(1 - 4/x)*E^((x - E^(2/x)*x)/x)*(E^(2/x)*(1 - x^2) + 2*(1 - x^2)*Log
[15]))/(3^(4/x)*x^2*(1 - x^2)^2*((1 - E^(2/x) + (2*E^(2/x))/x)/x - (x - E^
(2/x)*x)/x^2 + (4*Log[15])/x^2))
```

3.300.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2725
```
Int[(u_.)*(F_)^(v_)*(G_)^(w_), x_Symbol] :> With[{z = v*Log[F] + w*Log[G]},
 Int[u*NormalizeIntegrand[E^z, x], x] /; BinomialQ[z, x] || (PolynomialQ[z,
 x] && LeQ[Exponent[z, x], 2])] /; FreeQ[{F, G}, x]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.300. $\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}(-10+10x^2)+(-20+20x^2)\log(15)\right)}{x^2-2x^4+x^6}\,dx$

3.300.4 Maple [A] (verified)

Time = 1.62 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

method	result	size
norman	$\frac{5\,\mathrm{e}^{\frac{-x\,\mathrm{e}^{\frac{2}{x}}-4\ln(15)+x}{x}}}{x^2-1}$	30
risch	$\frac{5\left(\frac{1}{625}\right)^{\frac{1}{x}}\left(\frac{1}{81}\right)^{\frac{1}{x}}\mathrm{e}^{-\mathrm{e}^{\frac{2}{x}}+1}}{x^2-1}$	31
parallelrisch	$\frac{5\,\mathrm{e}^{-\frac{x\,\mathrm{e}^{\frac{2}{x}}+4\ln(15)-x}{x}}}{x^2-1}$	32

input
```
int(((10*x^2-10)*exp(2/x)+(20*x^2-20)*ln(15)-10*x^3)*exp((-x*exp(2/x)-4*ln
(15)+x)/x)/(x^6-2*x^4+x^2),x,method=_RETURNVERBOSE)
```

output
```
5*exp((-x*exp(2/x)-4*ln(15)+x)/x)/(x^2-1)
```

3.300.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}(-10+10x^2)+(-20+20x^2)\log(15)\right)}{x^2-2x^4+x^6}\,dx=\frac{5\,e^{\left(-\frac{xe^{\frac{2}{x}}-x+4\,\log(15)}{x}\right)}}{x^2-1}$$

input
```
integrate(((10*x^2-10)*exp(2/x)+(20*x^2-20)*log(15)-10*x^3)*exp((-x*exp(2/
x)-4*log(15)+x)/x)/(x^6-2*x^4+x^2),x, algorithm=\
```

output
```
5*e^(-(x*e^(2/x) - x + 4*log(15))/x)/(x^2 - 1)
```

3.300.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.65

$$\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}(-10+10x^2)+(-20+20x^2)\log(15)\right)}{x^2-2x^4+x^6}\,dx=\frac{5e^{\frac{-xe^{\frac{2}{x}}+x-4\log{(15)}}{x}}}{x^2-1}$$

input
```
integrate((((10*x**2-10)*exp(2/x)+(20*x**2-20)*ln(15)-10*x**3)*exp((-x*exp(
2/x)-4*ln(15)+x)/x)/(x**6-2*x**4+x**2),x)
```

output
```
5*exp((-x*exp(2/x) + x - 4*log(15))/x)/(x**2 - 1)
```

3.300.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}(-10+10x^2)+(-20+20x^2)\log(15)\right)}{x^2-2x^4+x^6}\,dx=\frac{5\,e^{\left(-\frac{4\log(5)}{x}-\frac{4\log(3)}{x}-e^{\frac{2}{x}}+1\right)}}{x^2-1}$$

input
```
integrate((((10*x^2-10)*exp(2/x)+(20*x^2-20)*log(15)-10*x^3)*exp((-x*exp(2/
x)-4*log(15)+x)/x)/(x^6-2*x^4+x^2),x, algorithm=\
```

output
```
5*e^(-4*log(5)/x - 4*log(3)/x - e^(2/x) + 1)/(x^2 - 1)
```

3.300.8 Giac [F]

$$\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}(-10+10x^2)+(-20+20x^2)\log(15)\right)}{x^2-2x^4+x^6}\,dx=\int -\frac{10\left(x^3-(x^2-1)e^{\frac{2}{x}}-2\,(\right.}{x^6}$$

input
```
integrate((((10*x^2-10)*exp(2/x)+(20*x^2-20)*log(15)-10*x^3)*exp((-x*exp(2/
x)-4*log(15)+x)/x)/(x^6-2*x^4+x^2),x, algorithm=\
```

output
```
integrate(-10*(x^3 - (x^2 - 1)*e^(2/x) - 2*(x^2 - 1)*log(15))*e^(-(x*e^(2/
x) - x + 4*log(15))/x)/(x^6 - 2*x^4 + x^2), x)
```

3.300.9 Mupad [B] (verification not implemented)

Time = 13.55 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{e^{\frac{x-e^{2/x}x-4\log(15)}{x}}\left(-10x^3+e^{2/x}(-10+10x^2)+(-20+20x^2)\log(15)\right)}{x^2-2x^4+x^6}\,dx=\frac{5\,\mathrm{e}^{-\mathrm{e}^{2/x}}\,\mathrm{e}}{15^{4/x}\,(x^2-1)}$$

input
```
int((exp(-(4*log(15) - x + x*exp(2/x))/x)*(log(15)*(20*x^2 - 20) + exp(2/x
)*(10*x^2 - 10) - 10*x^3))/(x^2 - 2*x^4 + x^6),x)
```

output
```
(5*exp(-exp(2/x))*exp(1))/(15^(4/x)*(x^2 - 1))
```

3.301 $\int \frac{-3e+\left(24x-8e^{\frac{2}{3}(4+4x)}x-6x^2\right)\log^2(x)}{3x\log^2(x)}\,dx$

3.301.1 Optimal result

Integrand size = 43, antiderivative size = 30

$$\int \frac{-3e+\left(24x-8e^{\frac{2}{3}(4+4x)}x-6x^2\right)\log^2(x)}{3x\log^2(x)}\,dx=-e^{2+2x+\frac{2(1+x)}{3}}-(-4+x)^2+\frac{e}{\log(x)}$$

output
```
exp(1)/ln(x)-exp(4/3*x+4/3)^2-(x-4)^2
```

3.301.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.93

$$\int \frac{-3e+\left(24x-8e^{\frac{2}{3}(4+4x)}x-6x^2\right)\log^2(x)}{3x\log^2(x)}\,dx=-e^{\frac{8}{3}+\frac{8x}{3}}+8x-x^2+\frac{e}{\log(x)}$$

input
```
Integrate[(-3*E + (24*x - 8*E^((2*(4 + 4*x))/3)*x - 6*x^2)*Log[x]^2)/(3*x*
Log[x]^2),x]
```

output
```
-E^(8/3 + (8*x)/3) + 8*x - x^2 + E/Log[x]
```

3.301.3 Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.093, Rules used = {27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-6x^2-8e^{\frac{2}{3}(4x+4)}x+24x\right)\log^2(x)-3e}{3x\log^2(x)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{3}\int -\frac{3e-2\left(-3x^2-4e^{\frac{8(x+1)}{3}}x+12x\right)\log^2(x)}{x\log^2(x)}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{3}\int \frac{3e-2\left(-3x^2-4e^{\frac{8(x+1)}{3}}x+12x\right)\log^2(x)}{x\log^2(x)}dx$$

$$\Big\downarrow \ 7293$$

$$-\frac{1}{3}\int \left(\frac{3(2x^2\log^2(x)-8x\log^2(x)+e)}{x\log^2(x)}+8e^{\frac{8x}{3}+\frac{8}{3}}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{3}\left(-3x^2+24x-3e^{\frac{8x}{3}+\frac{8}{3}}+\frac{3e}{\log(x)}\right)$$

input
```
Int[(-3*E + (24*x - 8*E^((2*(4 + 4*x))/3)*x - 6*x^2)*Log[x]^2)/(3*x*Log[x]
^2),x]
```

output
```
(-3*E^(8/3 + (8*x)/3) + 24*x - 3*x^2 + (3*E)/Log[x])/3
```

3.301.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.301.4 Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.83

method	result	size
risch	$-x^{2}+8 x -{\mathrm e}^{\frac{8 x}{3}+\frac{8}{3}}+\frac{{\mathrm e}}{\ln \left(x \right)}$	25
default	$-x^{2}+8 x -{\mathrm e}^{\frac{8 x}{3}+\frac{8}{3}}+\frac{{\mathrm e}}{\ln \left(x \right)}$	27
parts	$-x^{2}+8 x -{\mathrm e}^{\frac{8 x}{3}+\frac{8}{3}}+\frac{{\mathrm e}}{\ln \left(x \right)}$	27
parallelrisch	$\frac{-3 x^{2} \ln \left(x \right)-3 \,{\mathrm e}^{\frac{8 x}{3}+\frac{8}{3}} \ln \left(x \right)+24 x \ln \left(x \right)+3 \,{\mathrm e}}{3 \ln \left(x \right)}$	36

input
```
int(1/3*((-8*x*exp(4/3*x+4/3)^2-6*x^2+24*x)*ln(x)^2-3*exp(1))/x/ln(x)^2,x,
method=_RETURNVERBOSE)
```

output
```
-x^2+8*x-exp(8/3*x+8/3)+exp(1)/ln(x)
```

3.301.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{-3e + \left(24x - 8e^{\frac{2}{3}(4+4x)}x - 6x^2\right)\log^2(x)}{3x\log^2(x)}\,dx = -\frac{\left(x^2 - 8\,x + e^{\left(\frac{8}{3}\,x+\frac{8}{3}\right)}\right)\log(x) - e}{\log(x)}$$

input
```
integrate(1/3*((-8*x*exp(4/3*x+4/3)^2-6*x^2+24*x)*log(x)^2-3*exp(1))/x/log
(x)^2,x, algorithm=\
```

output
```
-((x^2 - 8*x + e^(8/3*x + 8/3))*log(x) - e)/log(x)
```

3.301.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.73

$$\int \frac{-3e + \left(24x - 8e^{\frac{2}{3}(4+4x)}x - 6x^2\right)\log^2(x)}{3x\log^2(x)}\,dx = -x^2 + 8x - e^{\frac{8x}{3}+\frac{8}{3}} + \frac{e}{\log(x)}$$

input
```
integrate(1/3*((-8*x*exp(4/3*x+4/3)**2-6*x**2+24*x)*ln(x)**2-3*exp(1))/x/l
n(x)**2,x)
```

output
```
-x**2 + 8*x - exp(8*x/3 + 8/3) + E/log(x)
```

3.301.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{-3e + \left(24x - 8e^{\frac{2}{3}(4+4x)}x - 6x^2\right)\log^2(x)}{3x\log^2(x)}\,dx = -x^2 + 8\,x + \frac{e}{\log(x)} - e^{\left(\frac{8}{3}\,x+\frac{8}{3}\right)}$$

input
```
integrate(1/3*((-8*x*exp(4/3*x+4/3)^2-6*x^2+24*x)*log(x)^2-3*exp(1))/x/log
(x)^2,x, algorithm=\
```

output
```
-x^2 + 8*x + e/log(x) - e^(8/3*x + 8/3)
```

3.301.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int \frac{-3e+\left(24x-8e^{\frac{2}{3}(4+4x)}x-6x^2\right)\log^2(x)}{3x\log^2(x)}\,dx = -\frac{x^2\log(x)-8\,x\log(x)+e^{\left(\frac{8}{3}\,x+\frac{8}{3}\right)}\log(x)-e}{\log(x)}$$

input
```
integrate(1/3*((-8*x*exp(4/3*x+4/3)^2-6*x^2+24*x)*log(x)^2-3*exp(1))/x/log
(x)^2,x, algorithm=\
```

output
```
-(x^2*log(x) - 8*x*log(x) + e^(8/3*x + 8/3)*log(x) - e)/log(x)
```

3.301.9 Mupad [B] (verification not implemented)

Time = 13.57 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{-3e+\left(24x-8e^{\frac{2}{3}(4+4x)}x-6x^2\right)\log^2(x)}{3x\log^2(x)}\,dx = 8\,x-\mathrm{e}^{\frac{8\,x}{3}+\frac{8}{3}}+\frac{\mathrm{e}}{\ln(x)}-x^2$$

input
```
int(-(exp(1) + (log(x)^2*(8*x*exp((8*x)/3 + 8/3) - 24*x + 6*x^2))/3)/(x*lo
g(x)^2),x)
```

output
```
8*x - exp((8*x)/3 + 8/3) + exp(1)/log(x) - x^2
```

3.302 $\int -\frac{2e}{(ex-x^2)\log^2\left(-\frac{54x^2}{e^2-2ex+x^2}\right)}\,dx$

3.302.1 Optimal result

Integrand size = 35, antiderivative size = 17

$$\int -\frac{2e}{(ex-x^2)\log^2\left(-\frac{54x^2}{e^2-2ex+x^2}\right)}\,dx = 2+\frac{1}{\log\left(-\frac{54x^2}{(e-x)^2}\right)}$$

output
```
2+1/ln(-54*x^2/(exp(1)-x)^2)
```

3.302.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int -\frac{2e}{(ex-x^2)\log^2\left(-\frac{54x^2}{e^2-2ex+x^2}\right)}\,dx = \frac{1}{\log\left(-\frac{54x^2}{(e-x)^2}\right)}$$

input
```
Integrate[(-2*E)/((E*x - x^2)*Log[(-54*x^2)/(E^2 - 2*E*x + x^2)]^2),x]
```

output
```
Log[(-54*x^2)/(E - x)^2]^(-1)
```

3.302.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.086, Rules used = {27, 2026, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{2e}{(ex-x^2)\log^2\left(-\frac{54x^2}{x^2-2ex+e^2}\right)}dx$$
$$\Big\downarrow \text{27}$$
$$-2e\int \frac{1}{(ex-x^2)\log^2\left(-\frac{54x^2}{x^2-2ex+e^2}\right)}dx$$
$$\Big\downarrow \text{2026}$$
$$-2e\int \frac{1}{(e-x)x\log^2\left(-\frac{54x^2}{x^2-2ex+e^2}\right)}dx$$
$$\Big\downarrow \text{7237}$$
$$\frac{1}{\log\left(-\frac{54x^2}{x^2-2ex+e^2}\right)}$$

input
```
Int[(-2*E)/((E*x - x^2)*Log[(-54*x^2)/(E^2 - 2*E*x + x^2)]^2),x]
```

output
```
Log[(-54*x^2)/(E^2 - 2*E*x + x^2)]^(-1)
```

3.302.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

3.302.4 Maple [A] (verified)

Time = 0.78 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

method	result	size
risch	$\frac{1}{\ln\left(-\frac{54x^2}{\mathrm{e}^2-2x\,\mathrm{e}+x^2}\right)}$	22
norman	$\frac{1}{\ln\left(-\frac{54x^2}{\mathrm{e}^2-2x\,\mathrm{e}+x^2}\right)}$	24
parallelrisch	$\frac{1}{\ln\left(-\frac{54x^2}{\mathrm{e}^2-2x\,\mathrm{e}+x^2}\right)}$	24
default	$\frac{1}{\ln(54)+\ln\left(\frac{x^2}{-\mathrm{e}^2+2x\,\mathrm{e}-x^2}\right)}$	30

input
```
int(-2*exp(1)/(x*exp(1)-x^2)/ln(-54*x^2/(exp(1)^2-2*x*exp(1)+x^2))^2,x,met
hod=_RETURNVERBOSE)
```

output
```
1/ln(-54*x^2/(exp(2)-2*x*exp(1)+x^2))
```

3.302.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int -\frac{2e}{(ex-x^2)\log^2\left(-\frac{54x^2}{e^2-2ex+x^2}\right)}\,dx = \frac{1}{\log\left(-\frac{54\,x^2}{x^2-2\,xe+e^2}\right)}$$

input
```
integrate(-2*exp(1)/(x*exp(1)-x^2)/log(-54*x^2/(exp(1)^2-2*x*exp(1)+x^2))^
2,x, algorithm=\
```

output
```
1/log(-54*x^2/(x^2 - 2*x*e + e^2))
```

3.302.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

$$\int -\frac{2e}{(ex-x^2)\log^2\left(-\frac{54x^2}{e^2-2ex+x^2}\right)}\,dx=\frac{1}{\log\left(-\frac{54x^2}{x^2-2ex+e^2}\right)}$$

input
```
integrate(-2*exp(1)/(x*exp(1)-x**2)/ln(-54*x**2/(exp(1)**2-2*x*exp(1)+x**2
))**2,x)
```

output
```
1/log(-54*x**2/(x**2 - 2*E*x + exp(2)))
```

3.302.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 2.12

$$\int -\frac{2e}{(ex-x^2)\log^2\left(-\frac{54x^2}{e^2-2ex+x^2}\right)}\,dx$$
$$=\frac{e}{(3i\pi+3\log(3)+\log(2))e-2e\log(x-e)+2e\log(x)}$$

input
```
integrate(-2*exp(1)/(x*exp(1)-x^2)/log(-54*x^2/(exp(1)^2-2*x*exp(1)+x^2))^
2,x, algorithm=\
```

output
```
e/((3*I*pi + 3*log(3) + log(2))*e - 2*e*log(x - e) + 2*e*log(x))
```

3.302.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int -\frac{2e}{(ex-x^2)\log^2\left(-\frac{54x^2}{e^2-2ex+x^2}\right)}\,dx=\frac{1}{\log\left(-\frac{54\,x^2}{x^2-2\,xe+e^2}\right)}$$

input
```
integrate(-2*exp(1)/(x*exp(1)-x^2)/log(-54*x^2/(exp(1)^2-2*x*exp(1)+x^2))^
2,x, algorithm=\
```

output
```
1/log(-54*x^2/(x^2 - 2*x*e + e^2))
```

3.302.9 Mupad [B] (verification not implemented)

Time = 13.12 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int -\frac{2e}{(ex-x^2)\log^2\left(-\frac{54x^2}{e^2-2ex+x^2}\right)}\,dx=\frac{1}{\ln\left(\frac{54\,x^2}{(x-\mathrm{e})^2}\right)+\pi\,1\mathrm{i}}$$

input
```
int(-(2*exp(1))/(log(-(54*x^2)/(exp(2) - 2*x*exp(1) + x^2))^2*(x*exp(1) -
x^2)),x)
```

output
```
1/(pi*1i + log((54*x^2)/(x - exp(1))^2))
```

3.303 $\int \frac{44x+72x^2+48x^3+e^{4x}(-19x-30x^2-24x^3)+e^{8x}(2x+3x^2+3x^3)+(-1}{32x+48x^2+48x^3+e^{4x}(-16x-24x^2-24x^3)}$

3.303.1 Optimal result

Integrand size = 265, antiderivative size = 28

$$\int \frac{44x+72x^2+48x^3+e^{4x}(-19x-30x^2-24x^3)+e^{8x}(2x+3x^2+3x^3)+(-19x-30x^2-24x^3+e^{4x}(4x}{32x+48x^2+48x^3+e^{4x}(-16x-24x^2-24x^3)+e^{8x}(2x+3x^2+3x^3)+}$$
$$=x+\frac{\log(2+3(x+x^2))}{4-e^{4x}-\log(x)}$$

output
```
ln(3*x^2+3*x+2)/(4-exp(2*x)^2-ln(x))+x
```

3.303.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{44x+72x^2+48x^3+e^{4x}(-19x-30x^2-24x^3)+e^{8x}(2x+3x^2+3x^3)+(-19x-30x^2-24x^3+e^{4x}(4x}{32x+48x^2+48x^3+e^{4x}(-16x-24x^2-24x^3)+e^{8x}(2x+3x^2+3x^3)+}$$
$$=x-\frac{\log(2+3x+3x^2)}{-4+e^{4x}+\log(x)}$$

input
```
Integrate[(44*x + 72*x^2 + 48*x^3 + E^(4*x)*(-19*x - 30*x^2 - 24*x^3) + E^
(8*x)*(2*x + 3*x^2 + 3*x^3) + (-19*x - 30*x^2 - 24*x^3 + E^(4*x)*(4*x + 6*
x^2 + 6*x^3))*Log[x] + (2*x + 3*x^2 + 3*x^3)*Log[x]^2 + (2 + 3*x + 3*x^2 +
 E^(4*x)*(8*x + 12*x^2 + 12*x^3))*Log[2 + 3*x + 3*x^2])/(32*x + 48*x^2 + 4
8*x^3 + E^(4*x)*(-16*x - 24*x^2 - 24*x^3) + E^(8*x)*(2*x + 3*x^2 + 3*x^3)
+ (-16*x - 24*x^2 - 24*x^3 + E^(4*x)*(4*x + 6*x^2 + 6*x^3))*Log[x] + (2*x
+ 3*x^2 + 3*x^3)*Log[x]^2),x]
```

output
```
x - Log[2 + 3*x + 3*x^2]/(-4 + E^(4*x) + Log[x])
```

3.303.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{48x^3+72x^2+e^{4x}\left(-24x^3-30x^2-19x\right)+e^{8x}\left(3x^3+3x^2+2x\right)+\left(3x^3+3x^2+2x\right)\log^2(x)+\left(-24x^3-30x^2\right.}{48x^3+48x^2+e^{4x}\left(-24x^3-24x^2-16x\right)+e^{8x}\left(3x^3+3x^2+2x\right)+\left(3x^3+3x^2\right.}$$

$$\Big\downarrow \; 7239$$

$$\int \frac{\left(e^{4x}-4\right)x\left(-12x^2+e^{4x}\left(3x^2+3x+2\right)-18x-11\right)+x\left(3x^2+3x+2\right)\log^2(x)+x\left(-24x^2+e^{4x}\left(6x^2+6x+\right.\right.}{x\left(3x^2+3x+2\right)\left(-e^{4x}-\log(x)+4\right)^2}$$

$$\Big\downarrow \; 7279$$

$$\int \left(-\frac{(-16x+4x\log(x)-1)\log\left(3x^2+3x+2\right)}{x\left(e^{4x}+\log(x)-4\right)^2}+\frac{12x^2\log\left(3x^2+3x+2\right)+12x\log\left(3x^2+3x+2\right)+8\log\left(3x^2\right.}{\left(3x^2+3x+2\right)\left(e^{4x}+\log(x)-4\right)}\right.$$

$$\Big\downarrow \; 2009$$

$$16\int \frac{\log\left(3x^2+3x+2\right)}{\left(\log(x)+e^{4x}-4\right)^2}dx+\int \frac{\log\left(3x^2+3x+2\right)}{x\left(\log(x)+e^{4x}-4\right)^2}dx-4\int \frac{\log(x)\log\left(3x^2+3x+2\right)}{\left(\log(x)+e^{4x}-4\right)^2}dx+4\int \frac{\log\left(3x^2+3x+2\right)}{\log(x)+e^{4x}-4}dx-6i\sqrt{\frac{3}{5}}\int \frac{1}{\left(-6x+i\sqrt{15}-3\right)\left(\log(x)+e^{4x}-4\right)}dx-\frac{6}{5}\left(5+i\sqrt{15}\right)\int \frac{1}{\left(6x-i\sqrt{15}+3\right)\left(\log(x)+e^{4x}-4\right)}dx-\frac{6}{5}\left(5-i\sqrt{15}\right)\int \frac{1}{\left(6x+i\sqrt{15}+3\right)\left(\log(x)+e^{4x}-4\right)}dx-6i\sqrt{\frac{3}{5}}\int \frac{1}{\left(6x+i\sqrt{15}+3\right)\left(\log(x)+e^{4x}-4\right)}dx+x$$

3.303. $\int \frac{44x+72x^2+48x^3+e^{4x}\left(-19x-30x^2-24x^3\right)+e^{8x}\left(2x+3x^2+3x^3\right)+\left(-19x-30x^2-24x^3+e^{4x}\left(4x+6x^2+6x^3\right)\right)\log(x)+\left(2x+3x^2+3x^3\right)\log^2(x)+(2+}{32x+48x^2+48x^3+e^{4x}\left(-16x-24x^2-24x^3\right)+e^{8x}\left(2x+3x^2+3x^3\right)+\left(-16x-24x^2-24x^3+e^{4x}\left(4x+6x^2+6x^3\right)\right)\log(x)+(2}$

input
```
Int[(44*x + 72*x^2 + 48*x^3 + E^(4*x)*(-19*x - 30*x^2 - 24*x^3) + E^(8*x)*
(2*x + 3*x^2 + 3*x^3) + (-19*x - 30*x^2 - 24*x^3 + E^(4*x)*(4*x + 6*x^2 +
6*x^3))*Log[x] + (2*x + 3*x^2 + 3*x^3)*Log[x]^2 + (2 + 3*x + 3*x^2 + E^(4*
x)*(8*x + 12*x^2 + 12*x^3))*Log[2 + 3*x + 3*x^2])/(32*x + 48*x^2 + 48*x^3
+ E^(4*x)*(-16*x - 24*x^2 - 24*x^3) + E^(8*x)*(2*x + 3*x^2 + 3*x^3) + (-16
*x - 24*x^2 - 24*x^3 + E^(4*x)*(4*x + 6*x^2 + 6*x^3))*Log[x] + (2*x + 3*x^
2 + 3*x^3)*Log[x]^2),x]
```

output
```
$Aborted
```

3.303.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.303.4 Maple [A] (verified)

Time = 25.58 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

method	result	size
risch	$-\frac{\ln(3x^2+3x+2)}{e^{4x}+\ln(x)-4}+x$	26
parallelrisch	$-\frac{-168-36x\,e^{4x}-36x\ln(x)+42\,e^{4x}+144x+42\ln(x)+36\ln(3x^2+3x+2)}{36(e^{4x}+\ln(x)-4)}$	59

input
```
int((((12*x^3+12*x^2+8*x)*exp(2*x)^2+3*x^2+3*x+2)*ln(3*x^2+3*x+2)+(3*x^3+3
*x^2+2*x)*ln(x)^2+((6*x^3+6*x^2+4*x)*exp(2*x)^2-24*x^3-30*x^2-19*x)*ln(x)+
(3*x^3+3*x^2+2*x)*exp(2*x)^4+(-24*x^3-30*x^2-19*x)*exp(2*x)^2+48*x^3+72*x^
2+44*x)/((3*x^3+3*x^2+2*x)*ln(x)^2+((6*x^3+6*x^2+4*x)*exp(2*x)^2-24*x^3-24
*x^2-16*x)*ln(x)+(3*x^3+3*x^2+2*x)*exp(2*x)^4+(-24*x^3-24*x^2-16*x)*exp(2*
x)^2+48*x^3+48*x^2+32*x),x,method=_RETURNVERBOSE)
```

3.303.
$\int \frac{44x+72x^2+48x^3+e^{4x}(-19x-30x^2-24x^3)+e^{8x}(2x+3x^2+3x^3)+(-19x-30x^2-24x^3+e^{4x}(4x+6x^2+6x^3))\log(x)+(2x+3x^2+3x^3)\log^2(x)+(2+}{32x+48x^2+48x^3+e^{4x}(-16x-24x^2-24x^3)+e^{8x}(2x+3x^2+3x^3)+(-16x-24x^2-24x^3+e^{4x}(4x+6x^2+6x^3))\log(x)+(2}$

output
```
-1/(exp(4*x)+ln(x)-4)*ln(3*x^2+3*x+2)+x
```

3.303.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.36

$$\int \frac{44x + 72x^2 + 48x^3 + e^{4x}(-19x - 30x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) + (-19x - 30x^2 - 24x^3 + e^{4x}(4x}{32x + 48x^2 + 48x^3 + e^{4x}(-16x - 24x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) +}$$
$$= \frac{xe^{(4x)} + x\log(x) - 4x - \log(3x^2 + 3x + 2)}{e^{(4x)} + \log(x) - 4}$$

input
```
integrate((((12*x^3+12*x^2+8*x)*exp(2*x)^2+3*x^2+3*x+2)*log(3*x^2+3*x+2)+(
3*x^3+3*x^2+2*x)*log(x)^2+((6*x^3+6*x^2+4*x)*exp(2*x)^2-24*x^3-30*x^2-19*x
)*log(x)+(3*x^3+3*x^2+2*x)*exp(2*x)^4+(-24*x^3-30*x^2-19*x)*exp(2*x)^2+48*
x^3+72*x^2+44*x)/((3*x^3+3*x^2+2*x)*log(x)^2+((6*x^3+6*x^2+4*x)*exp(2*x)^2
-24*x^3-24*x^2-16*x)*log(x)+(3*x^3+3*x^2+2*x)*exp(2*x)^4+(-24*x^3-24*x^2-1
6*x)*exp(2*x)^2+48*x^3+48*x^2+32*x),x, algorithm=\
```

output
```
(x*e^(4*x) + x*log(x) - 4*x - log(3*x^2 + 3*x + 2))/(e^(4*x) + log(x) - 4)
```

3.303.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{44x + 72x^2 + 48x^3 + e^{4x}(-19x - 30x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) + (-19x - 30x^2 - 24x^3 + e^{4x}(4x}{32x + 48x^2 + 48x^3 + e^{4x}(-16x - 24x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) +}$$
$$= x - \frac{\log(3x^2 + 3x + 2)}{e^{4x} + \log(x) - 4}$$

input
```
integrate((((12*x**3+12*x**2+8*x)*exp(2*x)**2+3*x**2+3*x+2)*ln(3*x**2+3*x+
2)+(3*x**3+3*x**2+2*x)*ln(x)**2+((6*x**3+6*x**2+4*x)*exp(2*x)**2-24*x**3-3
0*x**2-19*x)*ln(x)+(3*x**3+3*x**2+2*x)*exp(2*x)**4+(-24*x**3-30*x**2-19*x)
*exp(2*x)**2+48*x**3+72*x**2+44*x)/((3*x**3+3*x**2+2*x)*ln(x)**2+((6*x**3+
6*x**2+4*x)*exp(2*x)**2-24*x**3-24*x**2-16*x)*ln(x)+(3*x**3+3*x**2+2*x)*ex
p(2*x)**4+(-24*x**3-24*x**2-16*x)*exp(2*x)**2+48*x**3+48*x**2+32*x),x)
```

output
```
x - log(3*x**2 + 3*x + 2)/(exp(4*x) + log(x) - 4)
```

3.303.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.36

$$\int \frac{44x + 72x^2 + 48x^3 + e^{4x}(-19x - 30x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) + (-19x - 30x^2 - 24x^3 + e^{4x}(4x}{32x + 48x^2 + 48x^3 + e^{4x}(-16x - 24x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) +}$$
$$= \frac{xe^{(4x)} + x\log(x) - 4x - \log(3x^2 + 3x + 2)}{e^{(4x)} + \log(x) - 4}$$

input
```
integrate((((12*x^3+12*x^2+8*x)*exp(2*x)^2+3*x^2+3*x+2)*log(3*x^2+3*x+2)+(
3*x^3+3*x^2+2*x)*log(x)^2+((6*x^3+6*x^2+4*x)*exp(2*x)^2-24*x^3-30*x^2-19*x
)*log(x)+(3*x^3+3*x^2+2*x)*exp(2*x)^4+(-24*x^3-30*x^2-19*x)*exp(2*x)^2+48*
x^3+72*x^2+44*x)/((3*x^3+3*x^2+2*x)*log(x)^2+((6*x^3+6*x^2+4*x)*exp(2*x)^2
-24*x^3-24*x^2-16*x)*log(x)+(3*x^3+3*x^2+2*x)*exp(2*x)^4+(-24*x^3-24*x^2-1
6*x)*exp(2*x)^2+48*x^3+48*x^2+32*x),x, algorithm=\
```

output
```
(x*e^(4*x) + x*log(x) - 4*x - log(3*x^2 + 3*x + 2))/(e^(4*x) + log(x) - 4)
```

3.303.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.36

$$\int \frac{44x + 72x^2 + 48x^3 + e^{4x}(-19x - 30x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) + (-19x - 30x^2 - 24x^3 + e^{4x}(4x}{32x + 48x^2 + 48x^3 + e^{4x}(-16x - 24x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) +}$$
$$= \frac{xe^{(4x)} + x\log(x) - 4x - \log(3x^2 + 3x + 2)}{e^{(4x)} + \log(x) - 4}$$

input
```
integrate((((12*x^3+12*x^2+8*x)*exp(2*x)^2+3*x^2+3*x+2)*log(3*x^2+3*x+2)+(
3*x^3+3*x^2+2*x)*log(x)^2+((6*x^3+6*x^2+4*x)*exp(2*x)^2-24*x^3-30*x^2-19*x
)*log(x)+(3*x^3+3*x^2+2*x)*exp(2*x)^4+(-24*x^3-30*x^2-19*x)*exp(2*x)^2+48*
x^3+72*x^2+44*x)/((3*x^3+3*x^2+2*x)*log(x)^2+((6*x^3+6*x^2+4*x)*exp(2*x)^2
-24*x^3-24*x^2-16*x)*log(x)+(3*x^3+3*x^2+2*x)*exp(2*x)^4+(-24*x^3-24*x^2-1
6*x)*exp(2*x)^2+48*x^3+48*x^2+32*x),x, algorithm=\
```

output
```
(x*e^(4*x) + x*log(x) - 4*x - log(3*x^2 + 3*x + 2))/(e^(4*x) + log(x) - 4)
```

3.303.
$$\int \frac{44x+72x^2+48x^3+e^{4x}(-19x-30x^2-24x^3)+e^{8x}(2x+3x^2+3x^3)+(-19x-30x^2-24x^3+e^{4x}(4x+6x^2+6x^3))\log(x)+(2x+3x^2+3x^3)\log^2(x)+(2+}{32x+48x^2+48x^3+e^{4x}(-16x-24x^2-24x^3)+e^{8x}(2x+3x^2+3x^3)+(-16x-24x^2-24x^3+e^{4x}(4x+6x^2+6x^3))\log(x)+(2}$$

3.303.9 Mupad [B] (verification not implemented)

Time = 12.58 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{44x + 72x^2 + 48x^3 + e^{4x}(-19x - 30x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) + (-19x - 30x^2 - 24x^3 + e^{4x}(4x}{32x + 48x^2 + 48x^3 + e^{4x}(-16x - 24x^2 - 24x^3) + e^{8x}(2x + 3x^2 + 3x^3) +}$$

$$= x - \frac{\ln(3x^2 + 3x + 2)}{e^{4x} + \ln(x) - 4}$$

input

```
int((44*x - log(x)*(19*x - exp(4*x)*(4*x + 6*x^2 + 6*x^3) + 30*x^2 + 24*x^
3) + exp(8*x)*(2*x + 3*x^2 + 3*x^3) - exp(4*x)*(19*x + 30*x^2 + 24*x^3) +
log(x)^2*(2*x + 3*x^2 + 3*x^3) + 72*x^2 + 48*x^3 + log(3*x + 3*x^2 + 2)*(3
*x + exp(4*x)*(8*x + 12*x^2 + 12*x^3) + 3*x^2 + 2))/(32*x - log(x)*(16*x -
 exp(4*x)*(4*x + 6*x^2 + 6*x^3) + 24*x^2 + 24*x^3) + exp(8*x)*(2*x + 3*x^2
 + 3*x^3) - exp(4*x)*(16*x + 24*x^2 + 24*x^3) + log(x)^2*(2*x + 3*x^2 + 3*
x^3) + 48*x^2 + 48*x^3),x)
```

output

```
x - log(3*x + 3*x^2 + 2)/(exp(4*x) + log(x) - 4)
```

3.304 $\int \frac{8-4x+x\log(x^4)}{-4x+x\log(x^4)}\,dx$

3.304.1 Optimal result

Integrand size = 24, antiderivative size = 25

$$\int \frac{8-4x+x\log(x^4)}{-4x+x\log(x^4)}\,dx = x+\frac{x-\frac{x}{e}}{x}+\log\left(\left(4-\log\left(x^4\right)\right)^2\right)$$

output
```
x+1/x*(x-x/exp(1))+ln((4-ln(x^4))^2)
```

3.304.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.52

$$\int \frac{8-4x+x\log(x^4)}{-4x+x\log(x^4)}\,dx = x+2\log\left(4-\log\left(x^4\right)\right)$$

input
```
Integrate[(8 - 4*x + x*Log[x^4])/(-4*x + x*Log[x^4]),x]
```

output
```
x + 2*Log[4 - Log[x^4]]
```

3.304.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.52, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {3041, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x\log(x^4)-4x+8}{x\log(x^4)-4x}dx$$

$$\Big\downarrow \text{3041}$$

$$\int \frac{x\log(x^4)-4x+8}{x(\log(x^4)-4)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{8}{x(\log(x^4)-4)}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\log(4-\log(x^4))+x$$

input
```
Int[(8 - 4*x + x*Log[x^4])/(-4*x + x*Log[x^4]),x]
```

output
```
x + 2*Log[4 - Log[x^4]]
```

3.304.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3041
```
Int[(u_.)*((a_.)*(x_)^(m_.) + Log[(c_.)*(x_)^(n_.)]^(q_.)*(b_.)*(x_)^(r_.))
^(p_.), x_Symbol] :> Int[u*x^(p*r)*(a*x^(m - r) + b*Log[c*x^n]^q)^p, x] /;
FreeQ[{a, b, c, m, n, p, q, r}, x] && IntegerQ[p]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.304.4 Maple [A] (verified)

Time = 1.68 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.48

method	result	size
norman	$x + 2\ln\left(-4 + \ln\left(x^4\right)\right)$	12
risch	$x + 2\ln\left(-4 + \ln\left(x^4\right)\right)$	12
parallelrisch	$x + 2\ln\left(-4 + \ln\left(x^4\right)\right)$	12

input
```
int((x*ln(x^4)-4*x+8)/(x*ln(x^4)-4*x),x,method=_RETURNVERBOSE)
```

output
```
x+2*ln(-4+ln(x^4))
```

3.304.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.44

$$\int \frac{8-4x+x\log\left(x^4\right)}{-4x+x\log\left(x^4\right)}\,dx = x + 2\,\log\left(\log\left(x^4\right) - 4\right)$$

input
```
integrate((x*log(x^4)-4*x+8)/(x*log(x^4)-4*x),x, algorithm=\
```

output
```
x + 2*log(log(x^4) - 4)
```

3.304.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.40

$$\int \frac{8-4x+x\log\left(x^4\right)}{-4x+x\log\left(x^4\right)}\,dx = x + 2\log\left(\log\left(x^4\right) - 4\right)$$

input
```
integrate((x*ln(x**4)-4*x+8)/(x*ln(x**4)-4*x),x)
```

output
```
x + 2*log(log(x**4) - 4)
```

3.304.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.36

$$\int \frac{8-4x+x\log(x^4)}{-4x+x\log(x^4)}\,dx = x+2\,\log(\log(x)-1)$$

input
```
integrate((x*log(x^4)-4*x+8)/(x*log(x^4)-4*x),x, algorithm=\
```

output
```
x + 2*log(log(x) - 1)
```

3.304.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.44

$$\int \frac{8-4x+x\log(x^4)}{-4x+x\log(x^4)}\,dx = x+2\,\log\left(\log\left(x^4\right)-4\right)$$

input
```
integrate((x*log(x^4)-4*x+8)/(x*log(x^4)-4*x),x, algorithm=\
```

output
```
x + 2*log(log(x^4) - 4)
```

3.304.9 Mupad [B] (verification not implemented)

Time = 12.37 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.44

$$\int \frac{8-4x+x\log(x^4)}{-4x+x\log(x^4)}\,dx = x+2\,\ln\left(\ln\left(x^4\right)-4\right)$$

input
```
int(-(x*log(x^4) - 4*x + 8)/(4*x - x*log(x^4)),x)
```

output
```
x + 2*log(log(x^4) - 4)
```

3.305 $\int \frac{1+x-x^2}{-x+x^2} \, dx$

3.305.1 Optimal result

Integrand size = 18, antiderivative size = 16

$$\int \frac{1+x-x^2}{-x+x^2} \, dx = \log \left(\frac{2e^{-x}(1-x)}{x}\right)$$

output
```
ln(2/x/exp(x)*(1-x))
```

3.305.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{1+x-x^2}{-x+x^2} \, dx = -x + \log(1-x) - \log(x)$$

input
```
Integrate[(1 + x - x^2)/(-x + x^2),x]
```

output
```
-x + Log[1 - x] - Log[x]
```

3.305.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {2026, 1195, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2+x+1}{x^2-x}\,dx$$

$$\Big\downarrow \; 2026$$

$$\int \frac{-x^2+x+1}{(x-1)x}dx$$

$$\Big\downarrow \; 1195$$

$$\int \left(-\frac{1}{x}+\frac{1}{x-1}-1\right)dx$$

$$\Big\downarrow \; 2009$$

$$-x+\log(1-x)-\log(x)$$

input
```
Int[(1 + x - x^2)/(-x + x^2),x]
```

output
```
-x + Log[1 - x] - Log[x]
```

3.305.3.1 Defintions of rubi rules used

rule 1195
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_.) + (b_.)*(x
_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(f +
 g*x)^n*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x
] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

3.305.4 Maple [A] (verified)

Time = 0.72 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

method	result	size
default	$-x-\ln(x)+\ln(-1+x)$	13
norman	$-x-\ln(x)+\ln(-1+x)$	13
risch	$-x-\ln(x)+\ln(-1+x)$	13
parallelrisch	$-x-\ln(x)+\ln(-1+x)$	13
meijerg	$-\ln(x)-i\pi-x+\ln(1-x)$	19

input
```
int((-x^2+x+1)/(x^2-x),x,method=_RETURNVERBOSE)
```

output
```
-x-ln(x)+ln(-1+x)
```

3.305.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{1+x-x^2}{-x+x^2}\,dx = -x+\log(x-1)-\log(x)$$

input
```
integrate((-x^2+x+1)/(x^2-x),x, algorithm=\
```

output
```
-x + log(x - 1) - log(x)
```

3.305.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.50

$$\int \frac{1+x-x^2}{-x+x^2}\,dx = -x-\log(x)+\log(x-1)$$

input
```
integrate((-x**2+x+1)/(x**2-x),x)
```

output
```
-x - log(x) + log(x - 1)
```

3.305.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{1+x-x^2}{-x+x^2}\,dx = -x+\log(x-1)-\log(x)$$

input
```
integrate((-x^2+x+1)/(x^2-x),x, algorithm=\
```

output
```
-x + log(x - 1) - log(x)
```

3.305.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{1+x-x^2}{-x+x^2}\,dx = -x+\log(|x-1|)-\log(|x|)$$

input
```
integrate((-x^2+x+1)/(x^2-x),x, algorithm=\
```

output
```
-x + log(abs(x - 1)) - log(abs(x))
```

3.305.9 Mupad [B] (verification not implemented)

Time = 12.77 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{1+x-x^2}{-x+x^2}\,dx = -x-2\,\mathrm{atanh}(2\,x-1)$$

input
```
int(-(x - x^2 + 1)/(x - x^2),x)
```

output
```
- x - 2*atanh(2*x - 1)
```

3.306 $\int \left(-1+e^{2x}(5+2x)+e^{2x+\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)}\left(2+8e^{12}x^3\right.\right.$

3.306.1 Optimal result

Integrand size = 45, antiderivative size = 29

$$\int \left(-1+e^{2x}(5+2x)+e^{2x+\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)}\left(2+8e^{12}x^3\right)\right)\,dx=-x+e^{2x}\left(2+2^{2/5}e^{2e^{12}x^4}+x\right)$$

output
```
(2+x+exp(1/5*ln(2)+x^4*exp(3)^4)^2)*exp(x)^2-x
```

3.306.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \left(-1+e^{2x}(5+2x)+e^{2x+\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)}\left(2+8e^{12}x^3\right)\right)\,dx=2^{2/5}e^{2\left(x+e^{12}x^4\right)}-x+e^{2x}(2+x)$$

input
```
Integrate[-1 + E^(2*x)*(5 + 2*x) + E^(2*x + (2*(5*E^12*x^4 + Log[2]))/5)*(
2 + 8*E^12*x^3),x]
```

output
```
2^(2/5)*E^(2*(x + E^12*x^4)) - x + E^(2*x)*(2 + x)
```

3.306.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.66, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.022, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\left(8e^{12}x^3+2\right)e^{\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)+2x}+e^{2x}(2x+5)-1\right)dx$$
$$\Big\downarrow \text{2009}$$
$$e^{\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)+2x}-x-\frac{e^{2x}}{2}+\frac{1}{2}e^{2x}(2x+5)$$

input
```
Int[-1 + E^(2*x)*(5 + 2*x) + E^(2*x + (2*(5*E^12*x^4 + Log[2]))/5)*(2 + 8*
E^12*x^3),x]
```

output
```
-1/2*E^(2*x) + E^(2*x + (2*(5*E^12*x^4 + Log[2]))/5) - x + (E^(2*x)*(5 + 2
*x))/2
```

3.306.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.306.4 Maple [A] (verified)

Time = 0.81 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

method	result	size
risch	$2^{\frac{2}{5}}{\mathrm e}^{2 x \left(x^{3} {\mathrm e}^{12}+1\right)}+{\mathrm e}^{2 x} \left(2+x \right)-x$	29
default	$-x +x \,{\mathrm e}^{2 x}+2 \,{\mathrm e}^{2 x}+{\mathrm e}^{2 x +\frac{2 \ln \left(2\right)}{5}+2 x^{4} {\mathrm e}^{12}}$	33
parallelrisch	${\mathrm e}^{2 x} {\mathrm e}^{\frac{2 \ln \left(2\right)}{5}+2 x^{4} {\mathrm e}^{12}}+x \,{\mathrm e}^{2 x}+2 \,{\mathrm e}^{2 x}-x$	38

input
```
int((8*x^3*exp(3)^4+2)*exp(x)^2*exp(1/5*ln(2)+x^4*exp(3)^4)^2+(5+2*x)*exp(
x)^2-1,x,method=_RETURNVERBOSE)
```

output
```
2^(2/5)*exp(2*x*(x^3*exp(12)+1))+exp(2*x)*(2+x)-x
```

3.306.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \left(-1+e^{2x}(5+2x)+e^{2x+\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)}\left(2+8e^{12}x^3\right)\right)\,dx = (x+2)e^{(2\,x)}-x+e^{\left(2\,x^4e^{12}+2\,x+\frac{2}{5}\,\log(2)\right)}$$

input
```
integrate((8*x^3*exp(3)^4+2)*exp(x)^2*exp(1/5*log(2)+x^4*exp(3)^4)^2+(5+2*
x)*exp(x)^2-1,x, algorithm=\
```

output
```
(x + 2)*e^(2*x) - x + e^(2*x^4*e^12 + 2*x + 2/5*log(2))
```

3.306.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int \left(-1+e^{2x}(5+2x)+e^{2x+\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)}\left(2+8e^{12}x^3\right)\right)\,dx = -x+(x+2)\,e^{2x}+2^{\frac{2}{5}}e^{2x}e^{2x^4e^{12}}$$

input
```
integrate((8*x**3*exp(3)**4+2)*exp(x)**2*exp(1/5*ln(2)+x**4*exp(3)**4)**2+
(5+2*x)*exp(x)**2-1,x)
```

output
```
-x + (x + 2)*exp(2*x) + 2**(2/5)*exp(2*x)*exp(2*x**4*exp(12))
```

3.306.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.28

$$\int \left(-1+e^{2x}(5+2x)+e^{2x+\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)}\left(2+8e^{12}x^3\right)\right)\,dx = \frac{1}{2}\,(2\,x-1)e^{(2\,x)}-x+e^{\left(2\,x^4e^{12}+2\,x+\frac{2}{5}\,\log(2)\right)}+\frac{5}{2}\,e^{(2\,x)}$$

input
```
integrate((8*x^3*exp(3)^4+2)*exp(x)^2*exp(1/5*log(2)+x^4*exp(3)^4)^2+(5+2*
x)*exp(x)^2-1,x, algorithm=\
```

output
```
1/2*(2*x - 1)*e^(2*x) - x + e^(2*x^4*e^12 + 2*x + 2/5*log(2)) + 5/2*e^(2*x
)
```

3.306.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \left(-1+e^{2x}(5+2x)+e^{2x+\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)}\left(2+8e^{12}x^3\right)\right) dx = (x+2)e^{(2x)}+2^{\frac{2}{5}}e^{\left(2x^4e^{12}+2x\right)}-x$$

input
```
integrate((8*x^3*exp(3)^4+2)*exp(x)^2*exp(1/5*log(2)+x^4*exp(3)^4)^2+(5+2*
x)*exp(x)^2-1,x, algorithm=\
```

output
```
(x + 2)*e^(2*x) + 2^(2/5)*e^(2*x^4*e^12 + 2*x) - x
```

3.306.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \left(-1+e^{2x}(5+2x)+e^{2x+\frac{2}{5}\left(5e^{12}x^4+\log(2)\right)}\left(2+8e^{12}x^3\right)\right) dx$$
$$= 2\,\mathrm{e}^{2\,x}-x+x\,\mathrm{e}^{2\,x}+2^{2/5}\,\mathrm{e}^{2\,\mathrm{e}^{12}\,x^4+2\,x}$$

input
```
int(exp(2*x)*(2*x + 5) + exp((2*log(2))/5 + 2*x^4*exp(12))*exp(2*x)*(8*x^3
*exp(12) + 2) - 1,x)
```

output
```
2*exp(2*x) - x + x*exp(2*x) + 2^(2/5)*exp(2*x + 2*x^4*exp(12))
```

3.307 $\int \frac{3e^{10x^2}-30x+12x^2+18x^3+60e^{10x^2}x^2\log(x)}{x}\,dx$

3.307.1 Optimal result

Integrand size = 41, antiderivative size = 28

$$\int \frac{3e^{10x^2}-30x+12x^2+18x^3+60e^{10x^2}x^2\log(x)}{x}\,dx=3\left(4-(2+2x)\left(5-x^2\right)+e^{10x^2}\log(x)\right)$$

output
```
12-3*(-x^2+5)*(2+2*x)+3*ln(x)*exp(5*x^2)^2
```

3.307.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{3e^{10x^2}-30x+12x^2+18x^3+60e^{10x^2}x^2\log(x)}{x}\,dx=3\left(-10x+2x^2+2x^3+e^{10x^2}\log(x)\right)$$

input
```
Integrate[(3*E^(10*x^2) - 30*x + 12*x^2 + 18*x^3 + 60*E^(10*x^2)*x^2*Log[x
])/x,x]
```

output
```
3*(-10*x + 2*x^2 + 2*x^3 + E^(10*x^2)*Log[x])
```

3.307.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{18x^3+12x^2+3e^{10x^2}+60e^{10x^2}x^2\log(x)-30x}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(6(3x^2+2x-5)+\frac{3e^{10x^2}(20x^2\log(x)+1)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$6x^3+6x^2+3e^{10x^2}\log(x)-30x$$

input
```
Int[(3*E^(10*x^2) - 30*x + 12*x^2 + 18*x^3 + 60*E^(10*x^2)*x^2*Log[x])/x,x
]
```

output
```
-30*x + 6*x^2 + 6*x^3 + 3*E^(10*x^2)*Log[x]
```

3.307.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.307.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

method	result	size
risch	$-30x+3\ln\left(x\right){\mathrm e}^{10x^{2}}+6x^{2}+6x^{3}$	25
default	$-30x+3\ln\left(x\right){\mathrm e}^{10x^{2}}+6x^{2}+6x^{3}$	27
parallelrisch	$-30x+3\ln\left(x\right){\mathrm e}^{10x^{2}}+6x^{2}+6x^{3}$	27
parts	$-30x+3\ln\left(x\right){\mathrm e}^{10x^{2}}+6x^{2}+6x^{3}$	27

input
```
int((60*x^2*exp(5*x^2)^2*ln(x)+3*exp(5*x^2)^2+18*x^3+12*x^2-30*x)/x,x,meth
od=_RETURNVERBOSE)
```

output
```
-30*x+3*ln(x)*exp(10*x^2)+6*x^2+6*x^3
```

3.307.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{3e^{10x^2}-30x+12x^2+18x^3+60e^{10x^2}x^2\log(x)}{x}\,dx=6\,x^{3}+6\,x^{2}+3\,e^{\left(10\,x^{2}\right)}\log\left(x\right)-30\,x$$

input
```
integrate((60*x^2*exp(5*x^2)^2*log(x)+3*exp(5*x^2)^2+18*x^3+12*x^2-30*x)/x
,x, algorithm=\
```

output
```
6*x^3 + 6*x^2 + 3*e^(10*x^2)*log(x) - 30*x
```

3.307.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{3e^{10x^2}-30x+12x^2+18x^3+60e^{10x^2}x^2\log(x)}{x}\,dx=6x^{3}+6x^{2}-30x+3e^{10x^{2}}\log\left(x\right)$$

input
```
integrate((60*x**2*exp(5*x**2)**2*ln(x)+3*exp(5*x**2)**2+18*x**3+12*x**2-3
0*x)/x,x)
```

output
```
6*x**3 + 6*x**2 - 30*x + 3*exp(10*x**2)*log(x)
```

3.307.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{3e^{10x^2} - 30x + 12x^2 + 18x^3 + 60e^{10x^2}x^2 \log(x)}{x} \, dx = 6 \, x^3 + 6 \, x^2 + 3 \, e^{\left(10 \, x^2\right)} \log\left(x\right) - 30 \, x$$

input
```
integrate((60*x^2*exp(5*x^2)^2*log(x)+3*exp(5*x^2)^2+18*x^3+12*x^2-30*x)/x
,x, algorithm=\
```

output
```
6*x^3 + 6*x^2 + 3*e^(10*x^2)*log(x) - 30*x
```

3.307.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{3e^{10x^2} - 30x + 12x^2 + 18x^3 + 60e^{10x^2}x^2 \log(x)}{x} \, dx = 6 \, x^3 + 6 \, x^2 + 3 \, e^{\left(10 \, x^2\right)} \log\left(x\right) - 30 \, x$$

input
```
integrate((60*x^2*exp(5*x^2)^2*log(x)+3*exp(5*x^2)^2+18*x^3+12*x^2-30*x)/x
,x, algorithm=\
```

output
```
6*x^3 + 6*x^2 + 3*e^(10*x^2)*log(x) - 30*x
```

3.307.9 Mupad [B] (verification not implemented)

Time = 13.43 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{3e^{10x^2} - 30x + 12x^2 + 18x^3 + 60e^{10x^2}x^2 \log(x)}{x} \, dx = 6 \, x^2 - 30 \, x + 6 \, x^3 + 3 \, \mathrm{e}^{10 \, x^2} \, \ln\left(x\right)$$

input
```
int((3*exp(10*x^2) - 30*x + 12*x^2 + 18*x^3 + 60*x^2*exp(10*x^2)*log(x))/x
,x)
```

output
```
6*x^2 - 30*x + 6*x^3 + 3*exp(10*x^2)*log(x)
```

3.308 $\int \frac{4e^{1-e+x-x^2}(-1+x-2x^2)}{x^2}\,dx$

3.308.1 Optimal result

Integrand size = 26, antiderivative size = 18

$$\int \frac{4e^{1-e+x-x^2}(-1+x-2x^2)}{x^2}\,dx = \frac{4e^{1-e+x-x^2}}{x}$$

output
```
exp(2*ln(2)-exp(1)-x^2+x+1)/x
```

3.308.2 Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{4e^{1-e+x-x^2}(-1+x-2x^2)}{x^2}\,dx = \frac{4e^{1-e+x-x^2}}{x}$$

input
```
Integrate[(4*E^(1 - E + x - x^2)*(-1 + x - 2*x^2))/x^2,x]
```

output
```
(4*E^(1 - E + x - x^2))/x
```

3.308.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.115$, Rules used = {27, 25, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4e^{-x^2+x-e+1}\left(-2x^2+x-1\right)}{x^2}dx$$
$$\Big\downarrow \text{27}$$
$$4\int -\frac{e^{-x^2+x-e+1}\left(2x^2-x+1\right)}{x^2}dx$$
$$\Big\downarrow \text{25}$$
$$-4\int \frac{e^{-x^2+x-e+1}\left(2x^2-x+1\right)}{x^2}dx$$
$$\Big\downarrow \text{2726}$$
$$\frac{4e^{-x^2+x-e+1}\left(x-2x^2\right)}{(1-2x)x^2}$$

input
```
Int[(4*E^(1 - E + x - x^2)*(-1 + x - 2*x^2))/x^2,x]
```

output
```
(4*E^(1 - E + x - x^2)*(x - 2*x^2))/((1 - 2*x)*x^2)
```

3.308.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.308.4 Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

method	result	size
risch	$\frac{4\,\mathrm{e}^{-\mathrm{e}-x^{2}+x+1}}{x}$	19
gosper	$\frac{\mathrm{e}^{2\ln(2)-\mathrm{e}-x^{2}+x+1}}{x}$	22
norman	$\frac{\mathrm{e}^{2\ln(2)-\mathrm{e}-x^{2}+x+1}}{x}$	22
parallelrisch	$\frac{\mathrm{e}^{2\ln(2)-\mathrm{e}-x^{2}+x+1}}{x}$	22

input
```
int((-2*x^2+x-1)*exp(2*ln(2)-exp(1)-x^2+x+1)/x^2,x,method=_RETURNVERBOSE)
```

output
```
4*exp(-exp(1)-x^2+x+1)/x
```

3.308.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{4e^{1-e+x-x^2}(-1+x-2x^2)}{x^2}\,dx = \frac{e^{(-x^2+x-e+2\log(2)+1)}}{x}$$

input
```
integrate((-2*x^2+x-1)*exp(2*log(2)-exp(1)-x^2+x+1)/x^2,x, algorithm=\
```

output
```
e^(-x^2 + x - e + 2*log(2) + 1)/x
```

3.308.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{4e^{1-e+x-x^2}(-1+x-2x^2)}{x^2}\,dx = \frac{4e^{-x^2+x-e+1}}{x}$$

input
```
integrate((-2*x**2+x-1)*exp(2*ln(2)-exp(1)-x**2+x+1)/x**2,x)
```

output
```
4*exp(-x**2 + x - E + 1)/x
```

3.308.7 Maxima [F]

$$\int \frac{4e^{1-e+x-x^2}(-1+x-2x^2)}{x^2}\,dx = \int -\frac{(2\,x^2-x+1)e^{(-x^2+x-e+2\,\log(2)+1)}}{x^2}\,dx$$

input
```
integrate((-2*x^2+x-1)*exp(2*log(2)-exp(1)-x^2+x+1)/x^2,x, algorithm=\
```

output
```
-4*sqrt(pi)*erf(x - 1/2)*e^(-e + 5/4) + 4*integrate((x*e - e)*e^(-x^2 + x
- e)/x^2, x)
```

3.308.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{4e^{1-e+x-x^2}(-1+x-2x^2)}{x^2}\,dx = \frac{4\,e^{(-x^2+x-e+1)}}{x}$$

input
```
integrate((-2*x^2+x-1)*exp(2*log(2)-exp(1)-x^2+x+1)/x^2,x, algorithm=\
```

output
```
4*e^(-x^2 + x - e + 1)/x
```

3.308.9 Mupad [B] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{4e^{1-e+x-x^2}(-1+x-2x^2)}{x^2}\,dx = \frac{4\,\mathrm{e}^{-\mathrm{e}}\,\mathrm{e}\,\mathrm{e}^{-x^2}\,\mathrm{e}^{x}}{x}$$

input
```
int(-(exp(x - exp(1) + 2*log(2) - x^2 + 1)*(2*x^2 - x + 1))/x^2,x)
```

output
```
(4*exp(-exp(1))*exp(1)*exp(-x^2)*exp(x))/x
```

3.309 $\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+(1+6e^x+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^xx+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+(x+4e^xx+4e^{2x}x)\log(x)}{1+4e^x+4e^{2x}}\right)}\,dx$

3.309.1 Optimal result

Integrand size = 159, antiderivative size = 21

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+(1+6e^x+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^xx+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+(x+4e^xx+4e^{2x}x)\log(x)}{1+4e^x+4e^{2x}}\right)}\,dx$$
$$= 4+\log\left(\log\left(4+\frac{x}{(1+2e^x)^2}+x\log(x)\right)\right)$$

output
```
ln(ln(x*ln(x)+4+x/(1+2*exp(x))^2))+4
```

3.309.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.90

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+(1+6e^x+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^xx+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+(x+4e^xx+4e^{2x}x)\log(x)}{1+4e^x+4e^{2x}}\right)}\,dx$$
$$= \log\left(\log\left(\frac{4+16e^x+16e^{2x}+x+(1+2e^x)^2x\log(x)}{(1+2e^x)^2}\right)\right)$$

3.309.
$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+(1+6e^x+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^xx+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+(x+4e^xx+4e^{2x}x)\log(x)}{1+4e^x+4e^{2x}}\right)}\,dx$$

input
```
Integrate[(2 + 12*E^(2*x) + 8*E^(3*x) + E^x*(8 - 4*x) + (1 + 6*E^x + 12*E^
(2*x) + 8*E^(3*x))*Log[x])/((4 + 48*E^(2*x) + 32*E^(3*x) + x + E^x*(24 + 2
*x) + (x + 6*E^x*x + 12*E^(2*x)*x + 8*E^(3*x)*x)*Log[x])*Log[(4 + 16*E^x +
 16*E^(2*x) + x + (x + 4*E^x*x + 4*E^(2*x)*x)*Log[x])/(1 + 4*E^x + 4*E^(2*
x))]),x]
```

output
```
Log[Log[(4 + 16*E^x + 16*E^(2*x) + x + (1 + 2*E^x)^2*x*Log[x])/(1 + 2*E^x)
^2]]
```

3.309.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(8-4x)+12e^{2x}+8e^{3x}+\left(6e^x+12e^{2x}+8e^{3x}+1\right)\log(x)+2}{\left(x+48e^{2x}+32e^{3x}+e^x(2x+24)+\left(6e^xx+12e^{2x}x+8e^{3x}x+x\right)\log(x)+4\right)\log\left(\frac{x+16e^x+16e^{2x}+\left(4e^xx+4e^{2x}x+x\right)\log(x)+4}{4e^x+4e^{2x}+1}\right)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^x(8-4x)+12e^{2x}+8e^{3x}+\left(6e^x+12e^{2x}+8e^{3x}+1\right)\log(x)+2}{\left(2e^x+1\right)\left(x+16e^x+16e^{2x}+4e^xx\log(x)+4e^{2x}x\log(x)+x\log(x)+4\right)\log\left(\frac{x+16e^x+16e^{2x}+\left(4e^xx+4e^{2x}x+x\right)\log(x)+4}{\left(2e^x+1\right)^2}\right)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{4e^xx^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^xx\log(x)+16x\log(x)+28}{\left(x\log(x)+4\right)\left(x+16e^x+16e^{2x}+4e^xx\log(x)+4e^{2x}x\log(x)+x\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x\left(2e^x+1\right)^2\log(x)+4}{\left(2e^x+1\right)^2}\right)}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+\left(2e^x+1\right)^3\log(x)+2}{\left(2e^x+1\right)\left(16e^x+16e^{2x}+x+x\left(2e^x+1\right)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x\left(2e^x+1\right)^2\log(x)+4}{\left(2e^x+1\right)^2}\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{4e^xx^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^xx\log(x)+16x\log(x)+28}{\left(x\log(x)+4\right)\left(x+16e^x+16e^{2x}+4e^xx\log(x)+4e^{2x}x\log(x)+x\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x\left(2e^x+1\right)^2\log(x)+4}{\left(2e^x+1\right)^2}\right)}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$\downarrow$ 7293

$$\int \left(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)\left(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$\downarrow$ 7293

$$\int \left(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)\left(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$\downarrow$ 7293

$$\int \left(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)\left(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$\downarrow$ 7293

$$\int \left(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)\left(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}\right.$$

$\downarrow$ 7239

3.309.

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+\left(1+6e^x+12e^{2x}+8e^{3x}\right)\log(x)}{\left(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+\left(x+6e^x x+12e^{2x}x+8e^{3x}x\right)\log(x)\right)\log\left(\frac{4+16e^x+16e^{2x}+x+\left(x+4e^x x+4e^{2x}x\right)\log(x)}{1+4e^x+4e^{2x}}\right)}\,dx$$

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$\big\downarrow$ 7293

$$\int \Bigg(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}$$

$\big\downarrow$ 7239

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$\big\downarrow$ 7293

$$\int \Bigg(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}$$

$\big\downarrow$ 7239

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$\big\downarrow$ 7293

$$\int \Bigg(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}$$

$\big\downarrow$ 7239

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$\big\downarrow$ 7293

$$\int \Bigg(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}$$

$\big\downarrow$ 7239

3.309.

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+(1+6e^x+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^x x+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+\left(x+4e^x x+4e^{2x}x\right)\log(x)}{1+4e^x+4e^{2x}}\right)}\,dx$$

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{12e^{2x}+8e^{3x}-4e^x(x-2)+(2e^x+1)^3\log(x)+2}{(2e^x+1)\left(16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4\right)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log(x)+4}{(2e^x+1)^2}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{4e^x x^2\log^2(x)+2x^2\log^2(x)+2x^2\log(x)+9x+64e^x+32e^x x\log(x)+16x\log(x)+28}{(x\log(x)+4)(x+16e^x+16e^{2x}+4e^x x\log(x)+4e^{2x}x\log(x)+x\log(x)+4)\log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2\log}{(2e^x+1)^2}\right.}\right.$$

$$\Big\downarrow \text{7239}$$

3.309.

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+\left(1+6e^x+12e^{2x}+8e^{3x}\right)\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^x x+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+\left(x+4e^x x+4e^{2x}x\right)\log(x)}{1+4e^x+4e^{2x}}\right)}\,dx$$

$$\int \frac{12e^{2x} + 8e^{3x} - 4e^x(x-2) + (2e^x+1)^3 \log(x) + 2}{(2e^x+1)\left(16e^x + 16e^{2x} + x + x(2e^x+1)^2 \log(x) + 4\right) \log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2 \log(x)+4}{(2e^x+1)^2}\right)} dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{4e^x x^2 \log^2(x) + 2x^2 \log^2(x) + 2x^2 \log(x) + 9x + 64e^x + 32e^x x \log(x) + 16x \log(x) + 28}{(x\log(x)+4)\left(x + 16e^x + 16e^{2x} + 4e^x x \log(x) + 4e^{2x} x \log(x) + x\log(x) + 4\right) \log\left(\frac{16e^x+16e^{2x}+x+x(2e^x+1)^2 \log}{(2e^x+1)^2}\right.}\right.$$

input
```
Int[(2 + 12*E^(2*x) + 8*E^(3*x) + E^x*(8 - 4*x) + (1 + 6*E^x + 12*E^(2*x)
+ 8*E^(3*x))*Log[x])/((4 + 48*E^(2*x) + 32*E^(3*x) + x + E^x*(24 + 2*x) +
(x + 6*E^x*x + 12*E^(2*x)*x + 8*E^(3*x)*x)*Log[x])*Log[(4 + 16*E^x + 16*E^
(2*x) + x + (x + 4*E^x*x + 4*E^(2*x)*x)*Log[x])/(1 + 4*E^x + 4*E^(2*x))]),
x]
```

output
```
$Aborted
```

3.309.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.309.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. 2(20) = 40.

Time = 106.69 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.29

3.309.

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+\left(1+6e^x+12e^{2x}+8e^{3x}\right)\log(x)}{\left(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^x x+12e^{2x} x+8e^{3x} x)\log(x)\right)\log\left(\frac{4+16e^x+16e^{2x}+x+\left(x+4e^x x+4e^{2x} x\right)\log(x)}{1+4e^x+4e^{2x}}\right)} dx$$

method	result
parallelrisch	$\ln\left(\ln\left(\frac{(4x\,\mathrm{e}^{2x}+4\,\mathrm{e}^{x}x+x)\ln(x)+16\,\mathrm{e}^{2x}+16\,\mathrm{e}^{x}+4+x}{4\,\mathrm{e}^{2x}+4\,\mathrm{e}^{x}+1}\right)\right)$
risch	$\ln\left(\ln\left(\left(\ln(x)\,\mathrm{e}^{2x}+\mathrm{e}^{x}\ln(x)+\frac{\ln(x)}{4}+\frac{1}{4}\right)x+4\,\mathrm{e}^{2x}+4\,\mathrm{e}^{x}+1\right)-\frac{i\left(\pi\,\mathrm{csgn}\left(\frac{i}{\left(\frac{1}{2}+\mathrm{e}^{x}\right)^{2}}\right)\mathrm{csgn}\left(i\left(\left(\ln\right.\right.\right.\right.}{}\right.$

input
```
int(((8*exp(x)^3+12*exp(x)^2+6*exp(x)+1)*ln(x)+8*exp(x)^3+12*exp(x)^2+(-4*
x+8)*exp(x)+2)/((8*x*exp(x)^3+12*x*exp(x)^2+6*exp(x)*x+x)*ln(x)+32*exp(x)^
3+48*exp(x)^2+(2*x+24)*exp(x)+4+x)/ln(((4*x*exp(x)^2+4*exp(x)*x+x)*ln(x)+1
6*exp(x)^2+16*exp(x)+4+x)/(4*exp(x)^2+4*exp(x)+1)),x,method=_RETURNVERBOSE
)
```

output
```
ln(ln(((4*x*exp(x)^2+4*exp(x)*x+x)*ln(x)+16*exp(x)^2+16*exp(x)+4+x)/(4*exp
(x)^2+4*exp(x)+1)))
```

3.309.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(20) = 40$.

Time = 0.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.24

$$\int \frac{2+12e^{2x}+8e^{3x}+e^{x}(8-4x)+(1+6e^{x}+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^{x}(24+2x)+(x+6e^{x}x+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^{x}+16e^{2x}+x+(x+4e^{x}x+\cdots}{1+4e^{x}+4e^{2x}}\right.}$$
$$=\log\left(\log\left(\frac{\left(4\,xe^{(2\,x)}+4\,xe^{x}+x\right)\log\left(x\right)+x+16\,e^{(2\,x)}+16\,e^{x}+4}{4\,e^{(2\,x)}+4\,e^{x}+1}\right)\right)$$

input
```
integrate(((8*exp(x)^3+12*exp(x)^2+6*exp(x)+1)*log(x)+8*exp(x)^3+12*exp(x)
^2+(-4*x+8)*exp(x)+2)/((8*x*exp(x)^3+12*x*exp(x)^2+6*exp(x)*x+x)*log(x)+32
*exp(x)^3+48*exp(x)^2+(2*x+24)*exp(x)+4+x)/log(((4*x*exp(x)^2+4*exp(x)*x+x
)*log(x)+16*exp(x)^2+16*exp(x)+4+x)/(4*exp(x)^2+4*exp(x)+1)),x, algorithm=
\
```

output
```
log(log(((4*x*e^(2*x) + 4*x*e^x + x)*log(x) + x + 16*e^(2*x) + 16*e^x + 4)
/(4*e^(2*x) + 4*e^x + 1)))
```

3.309.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(20) = 40$.

Time = 3.15 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.43

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+(1+6e^x+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^xx+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+(x+4e^xx+4e^{2x}x)\log(x)}{1+4e^x+4e^{2x}}\right)}$$
$$= \log\left(\log\left(\frac{x+(4xe^{2x}+4xe^x+x)\log(x)+16e^{2x}+16e^x+4}{4e^{2x}+4e^x+1}\right)\right)$$

input
```
integrate(((8*exp(x)**3+12*exp(x)**2+6*exp(x)+1)*ln(x)+8*exp(x)**3+12*exp(
x)**2+(-4*x+8)*exp(x)+2)/((8*x*exp(x)**3+12*x*exp(x)**2+6*exp(x)*x+x)*ln(x
)+32*exp(x)**3+48*exp(x)**2+(2*x+24)*exp(x)+4+x)/ln(((4*x*exp(x)**2+4*exp(
x)*x+x)*ln(x)+16*exp(x)**2+16*exp(x)+4+x)/(4*exp(x)**2+4*exp(x)+1)),x)
```

output
```
log(log((x + (4*x*exp(2*x) + 4*x*exp(x) + x)*log(x) + 16*exp(2*x) + 16*exp
(x) + 4)/(4*exp(2*x) + 4*exp(x) + 1)))
```

3.309.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. $2(20) = 40$.

Time = 7.09 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.00

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+(1+6e^x+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^xx+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+(x+4e^xx+4e^{2x}x)\log(x)}{1+4e^x+4e^{2x}}\right)}$$
$$= \log\left(\log\left((4\,xe^{(2\,x)}+4\,xe^x+x)\log(x)+x+16\,e^{(2\,x)}+16\,e^x+4\right)-2\,\log(2\,e^x+1)\right)$$

input
```
integrate(((8*exp(x)^3+12*exp(x)^2+6*exp(x)+1)*log(x)+8*exp(x)^3+12*exp(x)
^2+(-4*x+8)*exp(x)+2)/((8*x*exp(x)^3+12*x*exp(x)^2+6*exp(x)*x+x)*log(x)+32
*exp(x)^3+48*exp(x)^2+(2*x+24)*exp(x)+4+x)/log(((4*x*exp(x)^2+4*exp(x)*x+x
)*log(x)+16*exp(x)^2+16*exp(x)+4+x)/(4*exp(x)^2+4*exp(x)+1)),x, algorithm=
\
```

output
```
log(log((4*x*e^(2*x) + 4*x*e^x + x)*log(x) + x + 16*e^(2*x) + 16*e^x + 4)
- 2*log(2*e^x + 1))
```

3.309.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(20) = 40$.

Time = 0.42 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.43

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+(1+6e^x+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^xx+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+(x+4e^xx+}{1+4e^x+4e^{2x}}\right.}$$

$$= \log\left(-\log\left(4\,xe^{(2\,x)}\log\left(x\right)+4\,xe^{x}\log\left(x\right)+x\log\left(x\right)+x+16\,e^{(2\,x)}+16\,e^{x}+4\right)\right.$$
$$\left.+\log\left(4\,e^{(2\,x)}+4\,e^{x}+1\right)\right)$$

input
```
integrate(((8*exp(x)^3+12*exp(x)^2+6*exp(x)+1)*log(x)+8*exp(x)^3+12*exp(x)
^2+(-4*x+8)*exp(x)+2)/((8*x*exp(x)^3+12*x*exp(x)^2+6*exp(x)*x+x)*log(x)+32
*exp(x)^3+48*exp(x)^2+(2*x+24)*exp(x)+4+x)/log(((4*x*exp(x)^2+4*exp(x)*x+x
)*log(x)+16*exp(x)^2+16*exp(x)+4+x)/(4*exp(x)^2+4*exp(x)+1)),x, algorithm=
\
```

output
```
log(-log(4*x*e^(2*x)*log(x) + 4*x*e^x*log(x) + x*log(x) + x + 16*e^(2*x) +
 16*e^x + 4) + log(4*e^(2*x) + 4*e^x + 1))
```

3.309.9 Mupad [B] (verification not implemented)

Time = 14.42 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.43

$$\int \frac{2+12e^{2x}+8e^{3x}+e^x(8-4x)+(1+6e^x+12e^{2x}+8e^{3x})\log(x)}{(4+48e^{2x}+32e^{3x}+x+e^x(24+2x)+(x+6e^xx+12e^{2x}x+8e^{3x}x)\log(x))\log\left(\frac{4+16e^x+16e^{2x}+x+(x+4e^xx+}{1+4e^x+4e^{2x}}\right.}$$

$$= \ln\left(\ln\left(x+16\,\mathrm{e}^{2\,x}+16\,\mathrm{e}^{x}+x\,\ln\left(x\right)+4\,x\,\mathrm{e}^{x}\,\ln\left(x\right)+4\,x\,\mathrm{e}^{2\,x}\,\ln\left(x\right)+4\right)-\ln\left(4\,\mathrm{e}^{2\,x}+4\,\mathrm{e}^{x}+1\right)\right)$$

input
```
int((12*exp(2*x) + 8*exp(3*x) + log(x)*(12*exp(2*x) + 8*exp(3*x) + 6*exp(x
) + 1) - exp(x)*(4*x - 8) + 2)/(log((x + 16*exp(2*x) + 16*exp(x) + log(x)*
(x + 4*x*exp(2*x) + 4*x*exp(x)) + 4)/(4*exp(2*x) + 4*exp(x) + 1))*(x + 48*
exp(2*x) + 32*exp(3*x) + exp(x)*(2*x + 24) + log(x)*(x + 12*x*exp(2*x) + 8
*x*exp(3*x) + 6*x*exp(x)) + 4)),x)
```

output
```
log(log(x + 16*exp(2*x) + 16*exp(x) + x*log(x) + 4*x*exp(x)*log(x) + 4*x*e
xp(2*x)*log(x) + 4) - log(4*exp(2*x) + 4*exp(x) + 1))
```

3.310 $\int \frac{(8+2x-2x^2+e(16x+4x^2-4x^3))\log(x)+(-4+8x+e(-4x+8x^2))\log^2 \cdots}{\cdots}$

3.310.1 Optimal result

Integrand size = 170, antiderivative size = 29

$$\int \frac{(8+2x-2x^2+e(16x+4x^2-4x^3))\log(x)+(-4+8x+e(-4x+8x^2))\log^2(x)\log\left(\frac{x+ex^2}{e}\right)+(-8-2 \cdots}{(1+ex)\log \cdots}$$

$$= (4+x-x^2)\left(-4+\frac{2x\log\left(\log\left(\frac{x}{e}+x^2\right)\right)}{\log(x)}\right)$$

output
```
(2*ln(ln(x^2+x/exp(1)))/ln(x)*x-4)*(-x^2+x+4)
```

3.310.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

$$\int \frac{(8+2x-2x^2+e(16x+4x^2-4x^3))\log(x)+(-4+8x+e(-4x+8x^2))\log^2(x)\log\left(\frac{x+ex^2}{e}\right)+(-8-2 \cdots}{(1+ex)\log \cdots}$$

$$= -4x+4x^2-\frac{2x(-4-x+x^2)\log\left(\log\left(x\left(\frac{1}{e}+x\right)\right)\right)}{\log(x)}$$

3.310.
$\int \frac{(8+2x-2x^2+e(16x+4x^2-4x^3))\log(x)+(-4+8x+e(-4x+8x^2))\log^2(x)\log\left(\frac{x+ex^2}{e}\right)+(-8-2x+2x^2+e(-8x-2x^2+2x^3)+(8+4x-6x^2+e(8x+ \cdots}{(1+ex)\log^2(x)\log\left(\frac{x+ex^2}{e}\right)}$

input
```
Integrate[((8 + 2*x - 2*x^2 + E*(16*x + 4*x^2 - 4*x^3))*Log[x] + (-4 + 8*x
 + E*(-4*x + 8*x^2))*Log[x]^2*Log[(x + E*x^2)/E] + (-8 - 2*x + 2*x^2 + E*(
-8*x - 2*x^2 + 2*x^3) + (8 + 4*x - 6*x^2 + E*(8*x + 4*x^2 - 6*x^3))*Log[x]
)*Log[(x + E*x^2)/E]*Log[Log[(x + E*x^2)/E]])/((1 + E*x)*Log[x]^2*Log[(x +
 E*x^2)/E]),x]
```

output
```
-4*x + 4*x^2 - (2*x*(-4 - x + x^2)*Log[Log[x*(E^(-1) + x)]])/Log[x]
```

3.310.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e\left(8x^2-4x\right)+8x-4\right)\log\left(\frac{ex^2+x}{e}\right)\log^2(x)+\left(-2x^2+e\left(-4x^3+4x^2+16x\right)+2x+8\right)\log(x)+\left(2x^2+e\left(2x^3\right.\right.}{(ex+1)\log^2(x)\log}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-\frac{2(ex+1)\left(-x^2+\left(3x^2-2x-4\right)\log(x)+x+4\right)\log\left(\log\left(x\left(x+\frac{1}{e}\right)\right)\right)}{\log^2(x)}-\frac{2(2ex+1)\left(x^2-x-4\right)}{\log(x)\log\left(x\left(x+\frac{1}{e}\right)\right)}+4e(2x-1)x+8x-4}{ex+1}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2\left(-2ex^3-(1-2e)x^2+4ex^2\log(x)\log\left(x\left(x+\frac{1}{e}\right)\right)+(1+8e)x+4\left(1-\frac{e}{2}\right)x\log(x)\log\left(x\left(x+\frac{1}{e}\right)\right)-2\log(x\right.}{(ex+1)\log(x)\log\left(x\left(x+\frac{1}{e}\right)\right)}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$2\int \frac{x^2\log\left(\log\left(x\left(x+\frac{1}{e}\right)\right)\right)}{\log^2(x)}dx-4\int \frac{x^2}{\log(x)\log\left(x\left(x+\frac{1}{e}\right)\right)}dx-6\int \frac{x^2\log\left(\log\left(x\left(x+\frac{1}{e}\right)\right)\right)}{\log(x)}dx-8\int \frac{\log\left(\log\left(x\left(x+\frac{1}{e}\right)\right)\right)}{\log^2(x)}dx-2\int \frac{x\log\left(\log\left(x\left(x+\frac{1}{e}\right)\right)\right)}{\log^2(x)}dx-\frac{2\left(1+e-8e^2\right)\int \frac{1}{\log(x)\log\left(x\left(x+\frac{1}{e}\right)\right)}dx}{e^2}+\frac{2\left(1+e-4e^2\right)\int \frac{1}{(ex+1)\log(x)\log\left(x\left(x+\frac{1}{e}\right)\right)}dx}{e^2}-\frac{2(1+2e)\int \frac{x}{\log(x)(1-\log(x(ex+1)))}dx}{e}+8\int \frac{\log\left(\log\left(x\left(x+\frac{1}{e}\right)\right)\right)}{\log(x)}dx+4\int \frac{x\log\left(\log\left(x\left(x+\frac{1}{e}\right)\right)\right)}{\log(x)}dx+4x^2-4x$$

$$\int \frac{\left(8+2x-2x^2+e\left(16x+4x^2-4x^3\right)\right)\log(x)+\left(-4+8x+e\left(-4x+8x^2\right)\right)\log^2(x)\log\left(\frac{x+ex^2}{e}\right)+\left(-8-2x+2x^2+e\left(-8x-2x^2+2x^3\right)+\left(8+4x-6x^2+e\left(8x+\right.\right.\right.}{(1+ex)\log^2(x)\log\left(\frac{x+ex^2}{e}\right)}$$

input
```
Int[((8 + 2*x - 2*x^2 + E*(16*x + 4*x^2 - 4*x^3))*Log[x] + (-4 + 8*x + E*(
-4*x + 8*x^2))*Log[x]^2*Log[(x + E*x^2)/E] + (-8 - 2*x + 2*x^2 + E*(-8*x -
 2*x^2 + 2*x^3) + (8 + 4*x - 6*x^2 + E*(8*x + 4*x^2 - 6*x^3))*Log[x])*Log[
(x + E*x^2)/E]*Log[Log[(x + E*x^2)/E]])/((1 + E*x)*Log[x]^2*Log[(x + E*x^2
)/E]),x]
```

output
```
$Aborted
```

3.310.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.310.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. $2(30) = 60$.

Time = 54.72 (sec) , antiderivative size = 77, normalized size of antiderivative = 2.66

method	result
parallelrisch	$\frac{-2x^3\ln(\ln((x^2\mathrm{e}+x)\mathrm{e}^{-1}))+4x^2\ln(x)+2\ln(\ln((x^2\mathrm{e}+x)\mathrm{e}^{-1}))x^2-4x\ln(x)+8x\ln(\ln((x^2\mathrm{e}+x)\mathrm{e}^{-1}))}{\ln(x)}$
risch	$-\frac{2x(x^2-x-4)\ln\left(-1+\ln(x)+\ln(x\,\mathrm{e}+1)-\frac{i\pi\,\mathrm{csgn}(ix(x\,\mathrm{e}+1))(-\mathrm{csgn}(ix(x\,\mathrm{e}+1))+\mathrm{csgn}(ix))(-\mathrm{csgn}(ix(x\,\mathrm{e}+1))+\mathrm{csgn}(i(x\,\mathrm{e}+1)))}{2}\right)}{\ln(x)}+4$

input
```
int(((((-6*x^3+4*x^2+8*x)*exp(1)-6*x^2+4*x+8)*ln(x)+(2*x^3-2*x^2-8*x)*exp(
1)+2*x^2-2*x-8)*ln((x^2*exp(1)+x)/exp(1))*ln(ln((x^2*exp(1)+x)/exp(1)))+((
8*x^2-4*x)*exp(1)+8*x-4)*ln(x)^2*ln((x^2*exp(1)+x)/exp(1))+((-4*x^3+4*x^2+
16*x)*exp(1)-2*x^2+2*x+8)*ln(x))/(x*exp(1)+1)/ln(x)^2/ln((x^2*exp(1)+x)/ex
p(1)),x,method=_RETURNVERBOSE)
```

output
```
(-2*x^3*ln(ln((x^2*exp(1)+x)/exp(1)))+4*x^2*ln(x)+2*ln(ln((x^2*exp(1)+x)/e
xp(1)))*x^2-4*x*ln(x)+8*x*ln(ln((x^2*exp(1)+x)/exp(1))))/ln(x)
```

3.310.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.55

$$\int \frac{(8+2x-2x^2+e(16x+4x^2-4x^3))\log(x)+(-4+8x+e(-4x+8x^2))\log^2(x)\log\left(\frac{x+ex^2}{e}\right)+(-8-2}{(1+ex)\log}$$

$$= \frac{2\left(2\left(x^2-x\right)\log\left(x\right)-\left(x^3-x^2-4\,x\right)\log\left(\log\left((x^2e+x)e^{(-1)}\right)\right)\right)}{\log\left(x\right)}$$

input
```
integrate(((((-6*x^3+4*x^2+8*x)*exp(1)-6*x^2+4*x+8)*log(x)+(2*x^3-2*x^2-8*
x)*exp(1)+2*x^2-2*x-8)*log((x^2*exp(1)+x)/exp(1))*log(log((x^2*exp(1)+x)/e
xp(1)))+((8*x^2-4*x)*exp(1)+8*x-4)*log(x)^2*log((x^2*exp(1)+x)/exp(1))+((-
4*x^3+4*x^2+16*x)*exp(1)-2*x^2+2*x+8)*log(x))/(x*exp(1)+1)/log(x)^2/log((x
^2*exp(1)+x)/exp(1)),x, algorithm=\
```

output
```
2*(2*(x^2 - x)*log(x) - (x^3 - x^2 - 4*x)*log(log((x^2*e + x)*e^(-1))))/lo
g(x)
```

3.310.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{(8+2x-2x^2+e(16x+4x^2-4x^3))\log(x)+(-4+8x+e(-4x+8x^2))\log^2(x)\log\left(\frac{x+ex^2}{e}\right)+(-8-2}{(1+ex)\log}$$

= Exception raised: TypeError

input
```
integrate(((((-6*x**3+4*x**2+8*x)*exp(1)-6*x**2+4*x+8)*ln(x)+(2*x**3-2*x**
2-8*x)*exp(1)+2*x**2-2*x-8)*ln((x**2*exp(1)+x)/exp(1))*ln(ln((x**2*exp(1)+
x)/exp(1)))+((8*x**2-4*x)*exp(1)+8*x-4)*ln(x)**2*ln((x**2*exp(1)+x)/exp(1)
)+((-4*x**3+4*x**2+16*x)*exp(1)-2*x**2+2*x+8)*ln(x))/(x*exp(1)+1)/ln(x)**2
/ln((x**2*exp(1)+x)/exp(1)),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.310.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.52

$$\int \frac{(8+2x-2x^2+e(16x+4x^2-4x^3))\log(x)+(-4+8x+e(-4x+8x^2))\log^2(x)\log\left(\frac{x+ex^2}{e}\right)+(-8-2}{(1+ex)\log^2}$$
$$=\frac{2\left(2\left(x^2-x\right)\log\left(x\right)-\left(x^3-x^2-4\,x\right)\log\left(\log\left(xe+1\right)+\log\left(x\right)-1\right)\right)}{\log\left(x\right)}$$

input
```
integrate(((((-6*x^3+4*x^2+8*x)*exp(1)-6*x^2+4*x+8)*log(x)+(2*x^3-2*x^2-8*
x)*exp(1)+2*x^2-2*x-8)*log((x^2*exp(1)+x)/exp(1))*log(log((x^2*exp(1)+x)/e
xp(1)))+((8*x^2-4*x)*exp(1)+8*x-4)*log(x)^2*log((x^2*exp(1)+x)/exp(1))+((-
4*x^3+4*x^2+16*x)*exp(1)-2*x^2+2*x+8)*log(x))/(x*exp(1)+1)/log(x)^2/log((x
^2*exp(1)+x)/exp(1)),x, algorithm=\
```

output
```
2*(2*(x^2 - x)*log(x) - (x^3 - x^2 - 4*x)*log(log(x*e + 1) + log(x) - 1))/
log(x)
```

3.310.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. 2(28) = 56.

Time = 0.51 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.31

$$\int \frac{(8+2x-2x^2+e(16x+4x^2-4x^3))\log(x)+(-4+8x+e(-4x+8x^2))\log^2(x)\log\left(\frac{x+ex^2}{e}\right)+(-8-2}{(1+ex)\log^2}$$
$$=-\frac{2\left(x^3\log\left(\log\left(x^2e+x\right)-1\right)-2\,x^2\log\left(x\right)-x^2\log\left(\log\left(x^2e+x\right)-1\right)+2\,x\log\left(x\right)-4\,x\log\left(\log\left(x^2e+\right.\right.}{\log\left(x\right)}$$

input
```
integrate(((((-6*x^3+4*x^2+8*x)*exp(1)-6*x^2+4*x+8)*log(x)+(2*x^3-2*x^2-8*
x)*exp(1)+2*x^2-2*x-8)*log((x^2*exp(1)+x)/exp(1))*log(log((x^2*exp(1)+x)/e
xp(1)))+((8*x^2-4*x)*exp(1)+8*x-4)*log(x)^2*log((x^2*exp(1)+x)/exp(1))+((-
4*x^3+4*x^2+16*x)*exp(1)-2*x^2+2*x+8)*log(x))/(x*exp(1)+1)/log(x)^2/log((x
^2*exp(1)+x)/exp(1)),x, algorithm=\
```

output
```
-2*(x^3*log(log(x^2*e + x) - 1) - 2*x^2*log(x) - x^2*log(log(x^2*e + x) -
1) + 2*x*log(x) - 4*x*log(log(x^2*e + x) - 1))/log(x)
```

3.310.9 Mupad [B] (verification not implemented)

Time = 14.18 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.90

$$\int \frac{(8+2x-2x^2+e(16x+4x^2-4x^3))\log(x)+(-4+8x+e(-4x+8x^2))\log^2(x)\log\left(\frac{x+ex^2}{e}\right)+(-8-2\cdots}{(1+ex)\log\cdots}$$

$$=4\,x^2-4\,x+\frac{2\,x^2\,\ln\left(\ln\left({\mathrm{e}}^{-1}\,\left(\mathrm{e}\,x^2+x\right)\right)\right)\,\left(x\,\mathrm{e}+1\right)\,\left(-x^2+x+4\right)}{\ln\left(x\right)\,\left(\mathrm{e}\,x^2+x\right)}$$

input
```
int(-(log(log(exp(-1)*(x + x^2*exp(1))))*log(exp(-1)*(x + x^2*exp(1)))*(2*
x - log(x)*(4*x + exp(1)*(8*x + 4*x^2 - 6*x^3) - 6*x^2 + 8) + exp(1)*(8*x
+ 2*x^2 - 2*x^3) - 2*x^2 + 8) - log(x)*(2*x + exp(1)*(16*x + 4*x^2 - 4*x^3
) - 2*x^2 + 8) + log(exp(-1)*(x + x^2*exp(1)))*log(x)^2*(exp(1)*(4*x - 8*x
^2) - 8*x + 4))/(log(exp(-1)*(x + x^2*exp(1)))*log(x)^2*(x*exp(1) + 1)),x)
```

output
```
4*x^2 - 4*x + (2*x^2*log(log(exp(-1)*(x + x^2*exp(1))))*(x*exp(1) + 1)*(x
- x^2 + 4))/(log(x)*(x + x^2*exp(1)))
```

3.311 $\int \frac{-\frac{e^{-4+4x}}{x^4}+\frac{4e^{-3+3x}}{x^2}-17x^2+34x^3-x^4+\frac{e^{-2+2x}\left(-30x+26x^2\right)}{x^2}+\frac{e^{-1+x}\left(-\right.}{}}{-4e^{-3+3x}+\frac{e^{-4+4x}}{x^2}+x^4-2x^5+x^6+\frac{e^{-2+2x}\left(-2x^3+6x^4\right)}{x^2}+\frac{e^{-1+x}\left(4x\right.}{x}}$

3.311.1 Optimal result

Integrand size = 157, antiderivative size = 31

$$\int \frac{-\frac{e^{-4+4x}}{x^4}+\frac{4e^{-3+3x}}{x^2}-17x^2+34x^3-x^4+\frac{e^{-2+2x}\left(-30x+26x^2\right)}{x^2}+\frac{e^{-1+x}\left(-4x^2-28x^3\right)}{x}}{-4e^{-3+3x}+\frac{e^{-4+4x}}{x^2}+x^4-2x^5+x^6+\frac{e^{-2+2x}\left(-2x^3+6x^4\right)}{x^2}+\frac{e^{-1+x}\left(4x^4-4x^5\right)}{x}}\,dx = 1+\frac{1}{x}+4\left(4+\frac{4}{x-\left(-\frac{e^{-1+x}}{x}+x\right)^2}\right)$$

output
```
17+1/x+16/(x-(x-exp(x-ln(x)-1))^2)
```

3.311.2 Mathematica [A] (verified)

Time = 8.79 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.29

$$\int \frac{-\frac{e^{-4+4x}}{x^4}+\frac{4e^{-3+3x}}{x^2}-17x^2+34x^3-x^4+\frac{e^{-2+2x}\left(-30x+26x^2\right)}{x^2}+\frac{e^{-1+x}\left(-4x^2-28x^3\right)}{x}}{-4e^{-3+3x}+\frac{e^{-4+4x}}{x^2}+x^4-2x^5+x^6+\frac{e^{-2+2x}\left(-2x^3+6x^4\right)}{x^2}+\frac{e^{-1+x}\left(4x^4-4x^5\right)}{x}}\,dx = \frac{1}{x}-\frac{16e^2x^2}{e^{2x}-2e^{1+x}x^2+e^2(-1+x)x^3}$$

input
```
Integrate[(-(E^(-4 + 4*x)/x^4) + (4*E^(-3 + 3*x))/x^2 - 17*x^2 + 34*x^3 -
x^4 + (E^(-2 + 2*x)*(-30*x + 26*x^2))/x^2 + (E^(-1 + x)*(-4*x^2 - 28*x^3))
/x)/(-4*E^(-3 + 3*x) + E^(-4 + 4*x)/x^2 + x^4 - 2*x^5 + x^6 + (E^(-2 + 2*x
)*(-2*x^3 + 6*x^4))/x^2 + (E^(-1 + x)*(4*x^4 - 4*x^5))/x),x]
```

output
```
x^(-1) - (16*E^2*x^2)/(E^(2*x) - 2*E^(1 + x)*x^2 + E^2*(-1 + x)*x^3)
```

3.311.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^4-\frac{e^{4x-4}}{x^4}+34x^3-17x^2+\frac{4e^{3x-3}}{x^2}+\frac{e^{2x-2}(26x^2-30x)}{x^2}+\frac{e^{x-1}(-28x^3-4x^2)}{x}}{x^6-2x^5+x^4+\frac{e^{4x-4}}{x^2}+\frac{e^{x-1}(4x^4-4x^5)}{x}+\frac{e^{2x-2}(6x^4-2x^3)}{x^2}-4e^{3x-3}}dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{e^4x^2\left(-x^4-\frac{e^{4x-4}}{x^4}+34x^3-17x^2+\frac{4e^{3x-3}}{x^2}+\frac{e^{2x-2}(26x^2-30x)}{x^2}+\frac{e^{x-1}(-28x^3-4x^2)}{x}\right)}{(e^2x^4-e^2x^3-2e^{x+1}x^2+e^{2x})^2}dx$$

$$\Big\downarrow \; 27$$

$$e^4\int -\frac{x^2\left(x^4-34x^3+17x^2+\frac{4e^{x-1}(7x^3+x^2)}{x}-\frac{4e^{3x-3}}{x^2}+\frac{2e^{2x-2}(15x-13x^2)}{x^2}+\frac{e^{4x-4}}{x^4}\right)}{(e^2x^4-e^2x^3-2e^{x+1}x^2+e^{2x})^2}dx$$

$$\Big\downarrow \; 25$$

$$-e^4\int \frac{x^2\left(x^4-34x^3+17x^2+\frac{4e^{x-1}(7x^3+x^2)}{x}-\frac{4e^{3x-3}}{x^2}+\frac{2e^{2x-2}(15x-13x^2)}{x^2}+\frac{e^{4x-4}}{x^4}\right)}{(e^2x^4-e^2x^3-2e^{x+1}x^2+e^{2x})^2}dx$$

$$\Big\downarrow \; 7293$$

$$-e^4\int \left(\frac{16(2ex^3-6ex^2-2e^xx+3ex+4e^x)x^3}{e(e^2x^4-e^2x^3-2e^{x+1}x^2+e^{2x})^2}-\frac{32(x-1)x}{e^2(e^2x^4-e^2x^3-2e^{x+1}x^2+e^{2x})}+\frac{1}{e^4x^2}\right)dx$$

$$\Big\downarrow \; 2009$$

$$-e^4\left(\frac{64\int \frac{e^xx^3}{(e^2x^4-e^2x^3-2e^{x+1}x^2+e^{2x})^2}dx}{e}+48\int \frac{x^4}{(e^2x^4-e^2x^3-2e^{x+1}x^2+e^{2x})^2}dx-\frac{32\int \frac{e^xx^4}{(e^2x^4-e^2x^3-2e^{x+1}x^2+e^{2x})^2}d}{e}\right.$$

input
```
Int[(-(E^(-4 + 4*x)/x^4) + (4*E^(-3 + 3*x))/x^2 - 17*x^2 + 34*x^3 - x^4 +
(E^(-2 + 2*x)*(-30*x + 26*x^2))/x^2 + (E^(-1 + x)*(-4*x^2 - 28*x^3))/x)/(-
4*E^(-3 + 3*x) + E^(-4 + 4*x)/x^2 + x^4 - 2*x^5 + x^6 + (E^(-2 + 2*x)*(-2*
x^3 + 6*x^4))/x^2 + (E^(-1 + x)*(4*x^4 - 4*x^5))/x),x]
```

output
```
$Aborted
```

3.311.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.311.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

method	result	size
risch	$\frac{1}{x}-\frac{16}{\frac{\mathrm{e}^{-2+2x}}{x^{2}}-2\,\mathrm{e}^{-1+x}+x^{2}-x}$	32
parallelrisch	$\frac{x^{2}-2x\,\mathrm{e}^{x-\ln(x)-1}+\frac{\mathrm{e}^{-2+2x}}{x^{2}}-17x}{x\left(\frac{\mathrm{e}^{-2+2x}}{x^{2}}-2x\,\mathrm{e}^{x-\ln(x)-1}+x^{2}-x\right)}$	63

input
```
int((-exp(x-ln(x)-1)^4+4*x*exp(x-ln(x)-1)^3+(26*x^2-30*x)*exp(x-ln(x)-1)^2
+(-28*x^3-4*x^2)*exp(x-ln(x)-1)-x^4+34*x^3-17*x^2)/(x^2*exp(x-ln(x)-1)^4-4
*x^3*exp(x-ln(x)-1)^3+(6*x^4-2*x^3)*exp(x-ln(x)-1)^2+(-4*x^5+4*x^4)*exp(x-
ln(x)-1)+x^6-2*x^5+x^4),x,method=_RETURNVERBOSE)
```

output
```
1/x-16/(1/x^2*exp(-2+2*x)-2*exp(-1+x)+x^2-x)
```

3.311.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(27) = 54$.

Time = 0.26 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.10

$$\int \frac{-\frac{e^{-4+4x}}{x^4}+\frac{4e^{-3+3x}}{x^2}-17x^2+34x^3-x^4+\frac{e^{-2+2x}(-30x+26x^2)}{x^2}+\frac{e^{-1+x}(-4x^2-28x^3)}{x}}{-4e^{-3+3x}+\frac{e^{-4+4x}}{x^2}+x^4-2x^5+x^6+\frac{e^{-2+2x}(-2x^3+6x^4)}{x^2}+\frac{e^{-1+x}(4x^4-4x^5)}{x}}\,dx = \frac{x^2-2\,xe^{(x-\log(x)-1)}-17\,x+e^{(2\,x-2\,\log(x)-2)}}{x^3-2\,x^2e^{(x-\log(x)-1)}-x^2+xe^{(2\,x-2\,\log(x)-2)}}$$

input
```
integrate((-exp(x-log(x)-1)^4+4*x*exp(x-log(x)-1)^3+(26*x^2-30*x)*exp(x-lo
g(x)-1)^2+(-28*x^3-4*x^2)*exp(x-log(x)-1)-x^4+34*x^3-17*x^2)/(x^2*exp(x-lo
g(x)-1)^4-4*x^3*exp(x-log(x)-1)^3+(6*x^4-2*x^3)*exp(x-log(x)-1)^2+(-4*x^5+
4*x^4)*exp(x-log(x)-1)+x^6-2*x^5+x^4),x, algorithm=\
```

output
```
(x^2 - 2*x*e^(x - log(x) - 1) - 17*x + e^(2*x - 2*log(x) - 2))/(x^3 - 2*x^
2*e^(x - log(x) - 1) - x^2 + x*e^(2*x - 2*log(x) - 2))
```

3.311.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

$$\int \frac{-\frac{e^{-4+4x}}{x^4}+\frac{4e^{-3+3x}}{x^2}-17x^2+34x^3-x^4+\frac{e^{-2+2x}(-30x+26x^2)}{x^2}+\frac{e^{-1+x}(-4x^2-28x^3)}{x}}{-4e^{-3+3x}+\frac{e^{-4+4x}}{x^2}+x^4-2x^5+x^6+\frac{e^{-2+2x}(-2x^3+6x^4)}{x^2}+\frac{e^{-1+x}(4x^4-4x^5)}{x}}\,dx = -\frac{16x^2}{x^4-x^3-2x^2e^{x-1}+e^{2x-2}}+\frac{1}{x}$$

input
```
integrate((-exp(x-ln(x)-1)**4+4*x*exp(x-ln(x)-1)**3+(26*x**2-30*x)*exp(x-l
n(x)-1)**2+(-28*x**3-4*x**2)*exp(x-ln(x)-1)-x**4+34*x**3-17*x**2)/(x**2*ex
p(x-ln(x)-1)**4-4*x**3*exp(x-ln(x)-1)**3+(6*x**4-2*x**3)*exp(x-ln(x)-1)**2
+(-4*x**5+4*x**4)*exp(x-ln(x)-1)+x**6-2*x**5+x**4),x)
```

output
```
-16*x**2/(x**4 - x**3 - 2*x**2*exp(x - 1) + exp(2*x - 2)) + 1/x
```

3.311.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(27) = 54$.

Time = 0.26 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.90

$$\int \frac{-\frac{e^{-4+4x}}{x^4}+\frac{4e^{-3+3x}}{x^2}-17x^2+34x^3-x^4+\frac{e^{-2+2x}(-30x+26x^2)}{x^2}+\frac{e^{-1+x}(-4x^2-28x^3)}{x}}{-4e^{-3+3x}+\frac{e^{-4+4x}}{x^2}+x^4-2x^5+x^6+\frac{e^{-2+2x}(-2x^3+6x^4)}{x^2}+\frac{e^{-1+x}(4x^4-4x^5)}{x}}\,dx = \frac{x^4e^2-17\,x^3e^2-2\,x^2e^{(x+1)}+e^{(2\,x)}}{x^5e^2-x^4e^2-2\,x^3e^{(x+1)}+xe^{(2\,x)}}$$

input
```
integrate((-exp(x-log(x)-1)^4+4*x*exp(x-log(x)-1)^3+(26*x^2-30*x)*exp(x-lo
g(x)-1)^2+(-28*x^3-4*x^2)*exp(x-log(x)-1)-x^4+34*x^3-17*x^2)/(x^2*exp(x-lo
g(x)-1)^4-4*x^3*exp(x-log(x)-1)^3+(6*x^4-2*x^3)*exp(x-log(x)-1)^2+(-4*x^5+
4*x^4)*exp(x-log(x)-1)+x^6-2*x^5+x^4),x, algorithm=\
```

output
```
(x^4*e^2 - 17*x^3*e^2 - 2*x^2*e^(x + 1) + e^(2*x))/(x^5*e^2 - x^4*e^2 - 2*
x^3*e^(x + 1) + x*e^(2*x))
```

3.311.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(27) = 54$.

Time = 0.33 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.90

$$\int \frac{-\frac{e^{-4+4x}}{x^4}+\frac{4e^{-3+3x}}{x^2}-17x^2+34x^3-x^4+\frac{e^{-2+2x}(-30x+26x^2)}{x^2}+\frac{e^{-1+x}(-4x^2-28x^3)}{x}}{-4e^{-3+3x}+\frac{e^{-4+4x}}{x^2}+x^4-2x^5+x^6+\frac{e^{-2+2x}(-2x^3+6x^4)}{x^2}+\frac{e^{-1+x}(4x^4-4x^5)}{x}}\,dx = \frac{x^4e^2-33\,x^3e^2-2\,x^2e^{(x+1)}+e^{(2\,x)}}{x^5e^2-x^4e^2-2\,x^3e^{(x+1)}+xe^{(2\,x)}}$$

input
```
integrate((-exp(x-log(x)-1)^4+4*x*exp(x-log(x)-1)^3+(26*x^2-30*x)*exp(x-lo
g(x)-1)^2+(-28*x^3-4*x^2)*exp(x-log(x)-1)-x^4+34*x^3-17*x^2)/(x^2*exp(x-lo
g(x)-1)^4-4*x^3*exp(x-log(x)-1)^3+(6*x^4-2*x^3)*exp(x-log(x)-1)^2+(-4*x^5+
4*x^4)*exp(x-log(x)-1)+x^6-2*x^5+x^4),x, algorithm=\
```

output
```
(x^4*e^2 - 33*x^3*e^2 - 2*x^2*e^(x + 1) + e^(2*x))/(x^5*e^2 - x^4*e^2 - 2*
x^3*e^(x + 1) + x*e^(2*x))
```

3.311.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-\frac{e^{-4+4x}}{x^4}+\frac{4e^{-3+3x}}{x^2}-17x^2+34x^3-x^4+\frac{e^{-2+2x}(-30x+26x^2)}{x^2}+\frac{e^{-1+x}(-4x^2-28x^3)}{x}}{-4e^{-3+3x}+\frac{e^{-4+4x}}{x^2}+x^4-2x^5+x^6+\frac{e^{-2+2x}(-2x^3+6x^4)}{x^2}+\frac{e^{-1+x}(4x^4-4x^5)}{x}}\,dx = \int -\frac{e^{4x-4\ln(x)-4}+e^{2x-2\ln(x)-2}\left(30x-26x^2\right)+e^{x-\ln(x)-1}\left(28x^3+4x^2\right)-4x\,e^{3x-3\ln(x)-3}+17x^2-34x^3+}{x^2\,e^{4x-4\ln(x)-4}-4x^3\,e^{3x-3\ln(x)-3}-e^{2x-2\ln(x)-2}\left(2x^3-6x^4\right)+e^{x-\ln(x)-1}\left(4x^4-4x^5\right)+x^4-2x^5+}$$

input

```
int(-(exp(4*x - 4*log(x) - 4) + exp(2*x - 2*log(x) - 2)*(30*x - 26*x^2) +
exp(x - log(x) - 1)*(4*x^2 + 28*x^3) - 4*x*exp(3*x - 3*log(x) - 3) + 17*x^
2 - 34*x^3 + x^4)/(x^2*exp(4*x - 4*log(x) - 4) - 4*x^3*exp(3*x - 3*log(x)
- 3) - exp(2*x - 2*log(x) - 2)*(2*x^3 - 6*x^4) + exp(x - log(x) - 1)*(4*x^
4 - 4*x^5) + x^4 - 2*x^5 + x^6),x)
```

output

```
int(-(exp(4*x - 4*log(x) - 4) + exp(2*x - 2*log(x) - 2)*(30*x - 26*x^2) +
exp(x - log(x) - 1)*(4*x^2 + 28*x^3) - 4*x*exp(3*x - 3*log(x) - 3) + 17*x^
2 - 34*x^3 + x^4)/(x^2*exp(4*x - 4*log(x) - 4) - 4*x^3*exp(3*x - 3*log(x)
- 3) - exp(2*x - 2*log(x) - 2)*(2*x^3 - 6*x^4) + exp(x - log(x) - 1)*(4*x^
4 - 4*x^5) + x^4 - 2*x^5 + x^6), x)
```

3.312 $\int \frac{e^x(-1+x)}{e^x x+x^2} dx$

3.312.1 Optimal result

Integrand size = 18, antiderivative size = 10

$$\int \frac{e^x(-1+x)}{e^x x+x^2} dx = \log\left(\frac{e^x+x}{x}\right)$$

output
```
ln(1/x*(exp(x)+x))
```

3.312.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.10

$$\int \frac{e^x(-1+x)}{e^x x+x^2} dx = -\log(x)+\log(e^x+x)$$

input
```
Integrate[(E^x*(-1 + x))/(E^x*x + x^2),x]
```

output
```
-Log[x] + Log[E^x + x]
```

3.312.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(x-1)}{x^2+e^x x} \, dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{e^x}{x+e^x}-\frac{e^x}{x(x+e^x)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\int \frac{e^x}{x+e^x}dx-\int \frac{e^x}{x(x+e^x)}dx$$

input
```
Int[(E^x*(-1 + x))/(E^x*x + x^2),x]
```

output
```
$Aborted
```

3.312.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.312.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.10

method	result	size
norman	$-\ln(x)+\ln(e^x+x)$	11
risch	$-\ln(x)+\ln(e^x+x)$	11
parallelrisch	$-\ln(x)+\ln(e^x+x)$	11

input
```
int((-1+x)*exp(x)/(exp(x)*x+x^2),x,method=_RETURNVERBOSE)
```

output
```
-ln(x)+ln(exp(x)+x)
```

3.312.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{e^x(-1+x)}{e^x x + x^2}\,dx = \log\left(x + e^x\right) - \log\left(x\right)$$

input
```
integrate((-1+x)*exp(x)/(exp(x)*x+x^2),x, algorithm=\
```

output
```
log(x + e^x) - log(x)
```

3.312.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.80

$$\int \frac{e^x(-1+x)}{e^x x + x^2}\,dx = -\log\left(x\right) + \log\left(x + e^x\right)$$

input
```
integrate((-1+x)*exp(x)/(exp(x)*x+x**2),x)
```

output
```
-log(x) + log(x + exp(x))
```

3.312.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{e^x(-1+x)}{e^x x + x^2}\,dx = \log\left(x + e^x\right) - \log\left(x\right)$$

input
```
integrate((-1+x)*exp(x)/(exp(x)*x+x^2),x, algorithm=\
```

output
```
log(x + e^x) - log(x)
```

3.312.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{e^x(-1+x)}{e^x x+x^2} \, dx = \log \left(x+e^x\right)-\log (x)$$

input
```
integrate((-1+x)*exp(x)/(exp(x)*x+x^2),x, algorithm=\
```

output
```
log(x + e^x) - log(x)
```

3.312.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{e^x(-1+x)}{e^x x+x^2} \, dx = \ln \left(x+\mathrm{e}^x\right)-\ln (x)$$

input
```
int((exp(x)*(x - 1))/(x*exp(x) + x^2),x)
```

output
```
log(x + exp(x)) - log(x)
```

3.313 $\int \frac{-32-16x+3x^3+4x^6-x^7}{16x-3x^3+x^7} \, dx$

3.313.1 Optimal result

Integrand size = 35, antiderivative size = 21

$$\int \frac{-32-16x+3x^3+4x^6-x^7}{16x-3x^3+x^7} \, dx = -8+\log \left(e^{-x}\left(3-\frac{16}{x^2}-x^4\right)\right)$$

output
```
ln((3-16/x^2-x^4)/exp(x))-8
```

3.313.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-32-16x+3x^3+4x^6-x^7}{16x-3x^3+x^7} \, dx = -x-2\log(x)+\log\left(16-3x^2+x^6\right)$$

input
```
Integrate[(-32 - 16*x + 3*x^3 + 4*x^6 - x^7)/(16*x - 3*x^3 + x^7),x]
```

output
```
-x - 2*Log[x] + Log[16 - 3*x^2 + x^6]
```

3.313.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.086, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^7+4x^6+3x^3-16x-32}{x^7-3x^3+16x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-x^7+4x^6+3x^3-16x-32}{x(x^6-3x^2+16)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{6x(x^4-1)}{x^6-3x^2+16}-\frac{2}{x}-1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log(x^6-3x^2+16)-x-2\log(x)$$

input
```
Int[(-32 - 16*x + 3*x^3 + 4*x^6 - x^7)/(16*x - 3*x^3 + x^7),x]
```

output
```
-x - 2*Log[x] + Log[16 - 3*x^2 + x^6]
```

3.313.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.313.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

method	result	size
default	$-x+\ln\left(x^{6}-3x^{2}+16\right)-2\ln\left(x\right)$	20
norman	$-x+\ln\left(x^{6}-3x^{2}+16\right)-2\ln\left(x\right)$	20
risch	$-x+\ln\left(x^{6}-3x^{2}+16\right)-2\ln\left(x\right)$	20
parallelrisch	$-x+\ln\left(x^{6}-3x^{2}+16\right)-2\ln\left(x\right)$	20

input
```
int((-x^7+4*x^6+3*x^3-16*x-32)/(x^7-3*x^3+16*x),x,method=_RETURNVERBOSE)
```

output
```
-x+ln(x^6-3*x^2+16)-2*ln(x)
```

3.313.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-32-16x+3x^3+4x^6-x^7}{16x-3x^3+x^7}\,dx=-x+\log\left(x^6-3\,x^2+16\right)-2\,\log\left(x\right)$$

input
```
integrate((-x^7+4*x^6+3*x^3-16*x-32)/(x^7-3*x^3+16*x),x, algorithm=\
```

output
```
-x + log(x^6 - 3*x^2 + 16) - 2*log(x)
```

3.313.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-32-16x+3x^3+4x^6-x^7}{16x-3x^3+x^7}\,dx=-x-2\log\left(x\right)+\log\left(x^6-3x^2+16\right)$$

input
```
integrate((-x**7+4*x**6+3*x**3-16*x-32)/(x**7-3*x**3+16*x),x)
```

output
```
-x - 2*log(x) + log(x**6 - 3*x**2 + 16)
```

3.313.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-32-16x+3x^3+4x^6-x^7}{16x-3x^3+x^7}\,dx = -x+\log\left(x^6-3\,x^2+16\right)-2\,\log\left(x\right)$$

input
```
integrate((-x^7+4*x^6+3*x^3-16*x-32)/(x^7-3*x^3+16*x),x, algorithm=\
```

output
```
-x + log(x^6 - 3*x^2 + 16) - 2*log(x)
```

3.313.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{-32-16x+3x^3+4x^6-x^7}{16x-3x^3+x^7}\,dx = -x+\log\left(x^6-3\,x^2+16\right)-2\,\log\left(|x|\right)$$

input
```
integrate((-x^7+4*x^6+3*x^3-16*x-32)/(x^7-3*x^3+16*x),x, algorithm=\
```

output
```
-x + log(x^6 - 3*x^2 + 16) - 2*log(abs(x))
```

3.313.9 Mupad [B] (verification not implemented)

Time = 13.20 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-32-16x+3x^3+4x^6-x^7}{16x-3x^3+x^7}\,dx = \ln\left(x^6-3\,x^2+16\right)-x-2\,\ln\left(x\right)$$

input
```
int(-(16*x - 3*x^3 - 4*x^6 + x^7 + 32)/(16*x - 3*x^3 + x^7),x)
```

output
```
log(x^6 - 3*x^2 + 16) - x - 2*log(x)
```

3.314 $\int \frac{(60x+36x^2)\log(x)+(30x+18x^2+(20x+72x^2+36x^3)\log(x))\log(x^2)+}{}$

3.314.1 Optimal result

Integrand size = 176, antiderivative size = 27

$$\int \frac{(60x+36x^2)\log(x)+(30x+18x^2+(20x+72x^2+36x^3)\log(x))\log(x^2)+(36x\log(x)+(18x+(42x+}{}$$

$$= \frac{1}{9}x^2\left(5+3\left(x+\log\left(\frac{\log(x)}{x}\right)+\log\left(\log\left(x^2\right)\right)\right)\right)^2$$

output
```
1/9*(3*x+3*ln(ln(x)/x)+3*ln(ln(x^2))+5)^2*x^2
```

3.314.2 Mathematica [A] (verified)

Time = 0.95 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{(60x+36x^2)\log(x)+(30x+18x^2+(20x+72x^2+36x^3)\log(x))\log(x^2)+(36x\log(x)+(18x+(42x+}{}$$

$$= \frac{1}{9}x^2\left(5+3x+3\log\left(\frac{\log(x)}{x}\right)+3\log\left(\log\left(x^2\right)\right)\right)^2$$

3.314.

$$\int \frac{(60x+36x^2)\log(x)+(30x+18x^2+(20x+72x^2+36x^3)\log(x))\log(x^2)+(36x\log(x)+(18x+(42x+54x^2)\log(x))\log(x^2))\log\left(\frac{\log(x)}{x}\right)+18x\log(x)}{9\log}$$

input
```
Integrate[((60*x + 36*x^2)*Log[x] + (30*x + 18*x^2 + (20*x + 72*x^2 + 36*x
^3)*Log[x])*Log[x^2] + (36*x*Log[x] + (18*x + (42*x + 54*x^2)*Log[x])*Log[
x^2])*Log[Log[x]/x] + 18*x*Log[x]*Log[x^2]*Log[Log[x]/x]^2 + (36*x*Log[x]
+ (18*x + (42*x + 54*x^2)*Log[x])*Log[x^2] + 36*x*Log[x]*Log[x^2]*Log[Log[
x]/x])*Log[Log[x^2]] + 18*x*Log[x]*Log[x^2]*Log[Log[x^2]]^2)/(9*Log[x]*Log
[x^2]),x]
```

output
```
(x^2*(5 + 3*x + 3*Log[Log[x]/x] + 3*Log[Log[x^2]])^2)/9
```

3.314.3 Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.023, Rules used = {27, 27, 7239, 7238}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{18x\log(x)\log\left(x^2\right)\log^2\left(\frac{\log(x)}{x}\right)+18x\log(x)\log\left(x^2\right)\log^2\left(\log\left(x^2\right)\right)+\left(\left(\left(54x^2+42x\right)\log(x)+18x\right)\log\left(x^2\right)+\cdots\right.}{\cdots}$$

$$\Big\downarrow 27$$

$$\frac{1}{9}\int \frac{2\left(9x\log(x)\log\left(x^2\right)\log^2\left(\frac{\log(x)}{x}\right)+3\left(6x\log(x)+\left(3x+\left(9x^2+7x\right)\log(x)\right)\log\left(x^2\right)\right)\log\left(\frac{\log(x)}{x}\right)+9x\log(x)\cdots\right.}{\cdots}$$

$$\Big\downarrow 27$$

$$\frac{2}{9}\int \frac{9x\log(x)\log\left(x^2\right)\log^2\left(\frac{\log(x)}{x}\right)+3\left(6x\log(x)+\left(3x+\left(9x^2+7x\right)\log(x)\right)\log\left(x^2\right)\right)\log\left(\frac{\log(x)}{x}\right)+9x\log(x)\log\cdots}{\cdots}$$

$$\Big\downarrow 7239$$

$$\frac{2}{9}\int \frac{x\left(3x+3\log\left(\frac{\log(x)}{x}\right)+3\log\left(\log\left(x^2\right)\right)+5\right)\left(3\log\left(x^2\right)+\log(x)\left(\log\left(x^2\right)\left(6x+3\log\left(\frac{\log(x)}{x}\right)+3\log\left(\log\left(\cdots\right.\right.\right.\right.\right.}{\log(x)\log\left(x^2\right)}$$

$$\Big\downarrow 7238$$

$$\frac{1}{9}x^2\left(3\log\left(\log\left(x^2\right)\right)+3x+3\log\left(\frac{\log(x)}{x}\right)+5\right)^2$$

3.314.

$$\int \frac{\left(60x+36x^2\right)\log(x)+\left(30x+18x^2+\left(20x+72x^2+36x^3\right)\log(x)\right)\log\left(x^2\right)+\left(36x\log(x)+\left(18x+\left(42x+54x^2\right)\log(x)\right)\log\left(x^2\right)\right)\log\left(\frac{\log(x)}{x}\right)+18x\log(x)\cdots}{9\log\cdots}$$

input
```
Int[((60*x + 36*x^2)*Log[x] + (30*x + 18*x^2 + (20*x + 72*x^2 + 36*x^3)*Lo
g[x])*Log[x^2] + (36*x*Log[x] + (18*x + (42*x + 54*x^2)*Log[x])*Log[x^2])*
Log[Log[x]/x] + 18*x*Log[x]*Log[x^2]*Log[Log[x]/x]^2 + (36*x*Log[x] + (18*
x + (42*x + 54*x^2)*Log[x])*Log[x^2] + 36*x*Log[x]*Log[x^2]*Log[Log[x]/x])
*Log[Log[x^2]] + 18*x*Log[x]*Log[x^2]*Log[Log[x^2]]^2)/(9*Log[x]*Log[x^2])
,x]
```

output
```
(x^2*(5 + 3*x + 3*Log[Log[x]/x] + 3*Log[Log[x^2]])^2)/9
```

3.314.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7238
```
Int[(u_)*(y_)^(m_.)*(z_)^(n_.), x_Symbol] :> With[{q = DerivativeDivides[y*
z, u*z^(n - m), x]}, Simp[q*y^(m + 1)*(z^(m + 1)/(m + 1)), x] /;  !FalseQ[q
]] /; FreeQ[{m, n}, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.314.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 99 vs. $2(28) = 56$.

Time = 4.06 (sec) , antiderivative size = 100, normalized size of antiderivative = 3.70

method	result
parallelrisch	$x^2\ln\left(\ln\left(x^2\right)\right)^2+\frac{10x^2\ln(\ln(x^2))}{3}+\frac{10x^2\ln\left(\frac{\ln(x)}{x}\right)}{3}+x^4+\frac{10x^3}{3}+\frac{25x^2}{9}+2\ln\left(\frac{\ln(x)}{x}\right)\ln\left(\ln\left(x^2\right)\right)x^2$ -
risch	Expression too large to display

input
```
int(1/9*(18*x*ln(x)*ln(x^2)*ln(ln(x^2))^2+(36*x*ln(x)*ln(x^2)*ln(ln(x)/x)+
((54*x^2+42*x)*ln(x)+18*x)*ln(x^2)+36*x*ln(x))*ln(ln(x^2))+18*x*ln(x)*ln(x
^2)*ln(ln(x)/x)^2+(((54*x^2+42*x)*ln(x)+18*x)*ln(x^2)+36*x*ln(x))*ln(ln(x)
/x)+((36*x^3+72*x^2+20*x)*ln(x)+18*x^2+30*x)*ln(x^2)+(36*x^2+60*x)*ln(x))/
ln(x)/ln(x^2),x,method=_RETURNVERBOSE)
```

output
```
x^2*ln(ln(x^2))^2+10/3*x^2*ln(ln(x^2))+10/3*x^2*ln(ln(x)/x)+x^4+10/3*x^3+2
5/9*x^2+2*ln(ln(x)/x)*ln(ln(x^2))*x^2+2*x^3*ln(ln(x^2))+2*ln(ln(x)/x)*x^3+
ln(ln(x)/x)^2*x^2
```

3.314.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 115 vs. $2(28) = 56$.

Time = 0.27 (sec) , antiderivative size = 115, normalized size of antiderivative = 4.26

$$\int \frac{(60x + 36x^2)\log(x) + (30x + 18x^2 + (20x + 72x^2 + 36x^3)\log(x))\log(x^2) + (36x\log(x) + (18x + (42x \cdots}{\cdots}$$

$$= x^4 + x^2\log(2)^2 + x^2\log(x)^2 + 4x^2\log\left(\frac{\log(x)}{x}\right)^2 + \frac{10}{3}x^3 + \frac{25}{9}x^2 + \frac{2}{3}(3x^3 + 5x^2)\log(2) + \frac{2}{3}(3x^3 + 3x^2\log(2) + 5x^2)\log(x) + \frac{4}{3}(3x^3 + 3x^2\log(2) + 3x^2\log(x) + 5x^2)\log\left(\frac{\log(x)}{x}\right)$$

input
```
integrate(1/9*(18*x*log(x)*log(x^2)*log(log(x^2))^2+(36*x*log(x)*log(x^2)*
log(log(x)/x)+((54*x^2+42*x)*log(x)+18*x)*log(x^2)+36*x*log(x))*log(log(x^
2))+18*x*log(x)*log(x^2)*log(log(x)/x)^2+(((54*x^2+42*x)*log(x)+18*x)*log(
x^2)+36*x*log(x))*log(log(x)/x)+((36*x^3+72*x^2+20*x)*log(x)+18*x^2+30*x)*
log(x^2)+(36*x^2+60*x)*log(x))/log(x)/log(x^2),x, algorithm=\
```

output
```
x^4 + x^2*log(2)^2 + x^2*log(x)^2 + 4*x^2*log(log(x)/x)^2 + 10/3*x^3 + 25/
9*x^2 + 2/3*(3*x^3 + 5*x^2)*log(2) + 2/3*(3*x^3 + 3*x^2*log(2) + 5*x^2)*lo
g(x) + 4/3*(3*x^3 + 3*x^2*log(2) + 3*x^2*log(x) + 5*x^2)*log(log(x)/x)
```

3.314.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 114 vs. $2(27) = 54$.

Time = 0.44 (sec) , antiderivative size = 114, normalized size of antiderivative = 4.22

$$\int \frac{(60x+36x^2)\log(x)+(30x+18x^2+(20x+72x^2+36x^3)\log(x))\log(x^2)+(36x\log(x)+(18x+(42x\cdots}{\cdots}$$

$$= x^4 + x^3\cdot\left(\frac{10}{3}-2\log(2)\right) + x^2\log(x)^2 + 4x^2\log(2\log(x))^2 + x^2\left(-\frac{10\log(2)}{3}+\log(2)^2+\frac{25}{9}\right) + \left(-2x^3-\frac{10x^2}{3}+2x^2\log(2)\right)\log(x) + \left(4x^3-4x^2\log(x)-4x^2\log(2)+\frac{20x^2}{3}\right)\log(2\log(x))$$

input
```
integrate(1/9*(18*x*ln(x)*ln(x**2)*ln(ln(x**2))**2+(36*x*ln(x)*ln(x**2)*ln
(ln(x)/x)+((54*x**2+42*x)*ln(x)+18*x)*ln(x**2)+36*x*ln(x))*ln(ln(x**2))+18
*x*ln(x)*ln(x**2)*ln(ln(x)/x)**2+(((54*x**2+42*x)*ln(x)+18*x)*ln(x**2)+36*
x*ln(x))*ln(ln(x)/x)+((36*x**3+72*x**2+20*x)*ln(x)+18*x**2+30*x)*ln(x**2)+
(36*x**2+60*x)*ln(x))/ln(x)/ln(x**2),x)
```

output
```
x**4 + x**3*(10/3 - 2*log(2)) + x**2*log(x)**2 + 4*x**2*log(2*log(x))**2 +
 x**2*(-10*log(2)/3 + log(2)**2 + 25/9) + (-2*x**3 - 10*x**2/3 + 2*x**2*lo
g(2))*log(x) + (4*x**3 - 4*x**2*log(x) - 4*x**2*log(2) + 20*x**2/3)*log(2*
log(x))
```

3.314.7 Maxima [F]

$$\int \frac{(60x+36x^2)\log(x)+(30x+18x^2+(20x+72x^2+36x^3)\log(x))\log(x^2)+(36x\log(x)+(18x+(42x\cdots}{\cdots}$$

$$= \int \frac{2\left(9\,x\log(x^2)\log(x)\log\left(\frac{\log(x)}{x}\right)^2+9\,x\log(x^2)\log(x)\log(\log(x^2))^2+(9\,x^2+2\,(9\,x^3+18\,x^2+5\,x)\log\cdots\right.}{\cdots}$$

input
```
integrate(1/9*(18*x*log(x)*log(x^2)*log(log(x^2))^2+(36*x*log(x)*log(x^2)*
log(log(x)/x)+((54*x^2+42*x)*log(x)+18*x)*log(x^2)+36*x*log(x))*log(log(x^
2))+18*x*log(x)*log(x^2)*log(log(x)/x)^2+(((54*x^2+42*x)*log(x)+18*x)*log(
x^2)+36*x*log(x))*log(log(x)/x)+((36*x^3+72*x^2+20*x)*log(x)+18*x^2+30*x)*
log(x^2)+(36*x^2+60*x)*log(x))/log(x)/log(x^2),x, algorithm=\
```

output
```
x^4 + 2/3*x^3*(3*log(2) + 1) + x^2*log(x)^2 + 4*x^2*log(log(x))^2 + 1/3*(3
*log(2)^2 + 10*log(2) + 5)*x^2 + 8/3*x^3 + 10/9*x^2 - 2/3*(3*x^3 + x^2*(3*
log(2) + 5))*log(x) + 4/3*(3*x^3 + x^2*(3*log(2) + 5) - 3*x^2*log(x))*log(
log(x)) + 2*Ei(3*log(x)) + 10/3*Ei(2*log(x)) - 2/9*integrate(3*(3*x^2 + 5*
x)/log(x), x)
```

3.314.8 Giac [F]

$$\int \frac{(60x+36x^2)\log(x)+(30x+18x^2+(20x+72x^2+36x^3)\log(x))\log(x^2)+(36x\log(x)+(18x+(42x-$$

$$=\int \frac{2\left(9\,x\log\left(x^2\right)\log\left(x\right)\log\left(\frac{\log(x)}{x}\right)^2+9\,x\log\left(x^2\right)\log\left(x\right)\log\left(\log\left(x^2\right)\right)^2+\left(9\,x^2+2\left(9\,x^3+18\,x^2+5\,x\right)\mathrm{lo}\right.\right.}{}$$

input
```
integrate(1/9*(18*x*log(x)*log(x^2)*log(log(x^2))^2+(36*x*log(x)*log(x^2)*
log(log(x)/x)+((54*x^2+42*x)*log(x)+18*x)*log(x^2)+36*x*log(x))*log(log(x^
2))+18*x*log(x)*log(x^2)*log(log(x)/x)^2+(((54*x^2+42*x)*log(x)+18*x)*log(
x^2)+36*x*log(x))*log(log(x)/x)+((36*x^3+72*x^2+20*x)*log(x)+18*x^2+30*x)*
log(x^2)+(36*x^2+60*x)*log(x))/log(x)/log(x^2),x, algorithm=\
```

output
```
integrate(2/9*(9*x*log(x^2)*log(x)*log(log(x)/x)^2 + 9*x*log(x^2)*log(x)*l
og(log(x^2))^2 + (9*x^2 + 2*(9*x^3 + 18*x^2 + 5*x)*log(x) + 15*x)*log(x^2)
 + 6*(3*x^2 + 5*x)*log(x) + 3*(((9*x^2 + 7*x)*log(x) + 3*x)*log(x^2) + 6*x
*log(x))*log(log(x)/x) + 3*(6*x*log(x^2)*log(x)*log(log(x)/x) + ((9*x^2 +
7*x)*log(x) + 3*x)*log(x^2) + 6*x*log(x))*log(log(x^2)))/(log(x^2)*log(x))
, x)
```

3.314.9 Mupad [B] (verification not implemented)

Time = 12.79 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.33

$$\int \frac{(60x+36x^2)\log(x)+(30x+18x^2+(20x+72x^2+36x^3)\log(x))\log(x^2)+(36x\log(x)+(18x+(42x-$$

$$=x^2\ln\left(\frac{\ln(x)}{x}\right)^2+\ln\left(\frac{\ln(x)}{x}\right)\left(\frac{6\,x^4+10\,x^3}{3\,x}+2\,x^2\,\ln\left(\ln\left(x^2\right)\right)\right)$$
$$+x^2\ln\left(\ln\left(x^2\right)\right)^2+\frac{25\,x^2}{9}+\frac{10\,x^3}{3}+x^4+\ln\left(\ln\left(x^2\right)\right)\left(2\,x^3+\frac{10\,x^2}{3}\right)$$

input
```
int(((log(log(x^2))*(log(x^2)*(18*x + log(x)*(42*x + 54*x^2)) + 36*x*log(x
) + 36*x*log(x^2)*log(log(x)/x)*log(x)))/9 + (log(log(x)/x)*(log(x^2)*(18*
x + log(x)*(42*x + 54*x^2)) + 36*x*log(x)))/9 + (log(x)*(60*x + 36*x^2))/9
 + (log(x^2)*(30*x + 18*x^2 + log(x)*(20*x + 72*x^2 + 36*x^3)))/9 + 2*x*lo
g(x^2)*log(log(x^2))^2*log(x) + 2*x*log(x^2)*log(log(x)/x)^2*log(x))/(log(
x^2)*log(x)),x)
```

output
```
x^2*log(log(x)/x)^2 + log(log(x)/x)*((10*x^3 + 6*x^4)/(3*x) + 2*x^2*log(lo
g(x^2))) + x^2*log(log(x^2))^2 + (25*x^2)/9 + (10*x^3)/3 + x^4 + log(log(x
^2))*((10*x^2)/3 + 2*x^3)
```

3.314.

$$\int \frac{(60x+36x^2)\log(x)+(30x+18x^2+(20x+72x^2+36x^3)\log(x))\log(x^2)+(36x\log(x)+(18x+(42x+54x^2)\log(x))\log(x^2))\log\left(\frac{\log(x)}{x}\right)+18x\log(x)\,\mathrm{l}}{9\log}$$

3.315 $\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6x-2x^2)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(\right.}{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6}$

3.315.1 Optimal result

Integrand size = 159, antiderivative size = 32

$$\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6x-2x^2)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18-2e^{2x^2}-17x-2x^2+e^{x^2}(12+\right.}{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}\left(-6x-2x^2\right)}$$

$$= x-\frac{1}{4}e^{-1-\frac{2-x}{3-e^{x^2}+x}}x^2$$

output
```
x-exp(-1-(2-x)/(x+3-exp(x^2))+ln(1/4*x^2))
```

3.315.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6x-2x^2)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18-2e^{2x^2}-17x-2x^2+e^{x^2}(12+\right.}{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}\left(-6x-2x^2\right)}$$

$$= x-\frac{1}{4}e^{-1+\frac{2-x}{-3+e^{x^2}-x}}x^2$$

3.315.

$$\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6x-2x^2)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18-2e^{2x^2}-17x-2x^2+e^{x^2}\left(12+5x+4x^2-2x^3\right)\right)}{}$$

input
```
Integrate[(9*x + E^(2*x^2)*x + 6*x^2 + x^3 + E^x^2*(-6*x - 2*x^2) + E^((5
- E^x^2 + (-3 + E^x^2 - x)*Log[x^2/4])/(-3 + E^x^2 - x))*(-18 - 2*E^(2*x^2
) - 17*x - 2*x^2 + E^x^2*(12 + 5*x + 4*x^2 - 2*x^3)))/(9*x + E^(2*x^2)*x +
 6*x^2 + x^3 + E^x^2*(-6*x - 2*x^2)),x]
```

output
```
x - (E^(-1 + (2 - x)/(-3 + E^x^2 - x))*x^2)/4
```

3.315.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-2x^2-2e^{2x^2}+e^{x^2}\left(-2x^3+4x^2+5x+12\right)-17x-18\right)\exp\left(\frac{-e^{x^2}+\left(e^{x^2}-x-3\right)\log\left(\frac{x^2}{4}\right)+5}{e^{x^2}-x-3}\right)+x^3+6x^2+e^{2x^2}}{x^3+6x^2+e^{2x^2}x+e^{x^2}\left(-2x^2-6x\right)+9x}$$

$\big\downarrow$ 7292

$$\int \frac{\left(-2x^2-2e^{2x^2}+e^{x^2}\left(-2x^3+4x^2+5x+12\right)-17x-18\right)\exp\left(\frac{-e^{x^2}+\left(e^{x^2}-x-3\right)\log\left(\frac{x^2}{4}\right)+5}{e^{x^2}-x-3}\right)+x^3+6x^2+e^{2x^2}}{x\left(-e^{x^2}+x+3\right)^2}$$

$\big\downarrow$ 7293

$$\int \left(\frac{x^2}{\left(e^{x^2}-x-3\right)^2}+\frac{6x}{\left(e^{x^2}-x-3\right)^2}-\frac{2e^{x^2}(x+3)}{\left(e^{x^2}-x-3\right)^2}+\frac{e^{2x^2}}{\left(e^{x^2}-x-3\right)^2}+\frac{9}{\left(e^{x^2}-x-3\right)^2}+\frac{e^{-\frac{e^{x^2}-5}{e^{x^2}-x-3}}\left(4e^{x^2}x^2\right.}{}\right.$$

$\big\downarrow$ 2009

$$9\int \frac{1}{\left(-x+e^{x^2}-3\right)^2}dx-6\int \frac{e^{x^2}}{\left(-x+e^{x^2}-3\right)^2}dx+\int \frac{e^{2x^2}}{\left(-x+e^{x^2}-3\right)^2}dx-\frac{1}{2}\int e^{-\frac{-5+e^{x^2}}{-x+e^{x^2}-3}}xdx+6\int \frac{x}{\left(-x+e^{x^2}-3\right)^2}dx-2\int \frac{e^{x^2}x}{\left(-x+e^{x^2}-3\right)^2}dx+\int \frac{x^2}{\left(-x+e^{x^2}-3\right)^2}dx-\frac{1}{2}\int \frac{e^{-\frac{-5+e^{x^2}}{-x+e^{x^2}-3}}x^2}{\left(-x+e^{x^2}-3\right)^2}dx-\frac{1}{4}\int \frac{e^{-\frac{-5+e^{x^2}}{-x+e^{x^2}-3}}x^2}{x-e^{x^2}+3}dx-\frac{1}{2}\int \frac{e^{-\frac{-5+e^{x^2}}{-x+e^{x^2}-3}}x^5}{\left(-x+e^{x^2}-3\right)^2}dx-\frac{1}{2}\int \frac{e^{-\frac{-5+e^{x^2}}{-x+e^{x^2}-3}}x^4}{\left(-x+e^{x^2}-3\right)^2}dx+\frac{1}{2}\int \frac{e^{-\frac{-5+e^{x^2}}{-x+e^{x^2}-3}}x^4}{x-e^{x^2}+3}dx+\frac{13}{4}\int \frac{e^{-\frac{-5+e^{x^2}}{-x+e^{x^2}-3}}x^3}{\left(-x+e^{x^2}-3\right)^2}dx-\int \frac{e^{-\frac{-5+e^{x^2}}{-x+e^{x^2}-3}}x^3}{x-e^{x^2}+3}dx$$

input
```
Int[(9*x + E^(2*x^2)*x + 6*x^2 + x^3 + E^x^2*(-6*x - 2*x^2) + E^((5 - E^x^
2 + (-3 + E^x^2 - x)*Log[x^2/4])/(-3 + E^x^2 - x))*(-18 - 2*E^(2*x^2) - 17
*x - 2*x^2 + E^x^2*(12 + 5*x + 4*x^2 - 2*x^3)))/(9*x + E^(2*x^2)*x + 6*x^2
 + x^3 + E^x^2*(-6*x - 2*x^2)),x]
```

output
```
$Aborted
```

3.315.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.315.4 Maple [A] (verified)

Time = 3.04 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.34

3.315. $\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6x-2x^2)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18-2e^{2x^2}-17x-2x^2+e^{x^2}(12+5x+4x^2-2x^3)\right)}{\ldots}$

method	result
parallelrisch	$-3+x-\mathrm{e}^{\frac{\left(\mathrm{e}^{x^{2}}-3-x\right)\ln\left(\frac{x^{2}}{4}\right)+5-\mathrm{e}^{x^{2}}}{\mathrm{e}^{x^{2}}-3-x}}$
risch	$x-\mathrm{e}^{-\frac{i\pi x\,\mathrm{csgn}\left(ix^{2}\right)^{3}+3i\pi\,\mathrm{csgn}\left(ix^{2}\right)^{3}-i\mathrm{e}^{x^{2}}\pi\,\mathrm{csgn}\left(ix^{2}\right)\mathrm{csgn}(ix)^{2}+2i\mathrm{e}^{x^{2}}\pi\,\mathrm{csgn}\left(ix^{2}\right)^{2}\mathrm{csgn}(ix)-i\mathrm{e}^{x^{2}}\pi\,\mathrm{csgn}\left(ix^{2}\right)^{3}+i\pi x\,\mathrm{csgn}(ix)^{2}\,\mathrm{csgn}}{}}$

input
```
int(((-2*exp(x^2)^2+(-2*x^3+4*x^2+5*x+12)*exp(x^2)-2*x^2-17*x-18)*exp(((ex
p(x^2)-3-x)*ln(1/4*x^2)+5-exp(x^2))/(exp(x^2)-3-x))+x*exp(x^2)^2+(-2*x^2-6
*x)*exp(x^2)+x^3+6*x^2+9*x)/(x*exp(x^2)^2+(-2*x^2-6*x)*exp(x^2)+x^3+6*x^2+
9*x),x,method=_RETURNVERBOSE)
```

output
```
-3+x-exp(((exp(x^2)-3-x)*ln(1/4*x^2)+5-exp(x^2))/(exp(x^2)-3-x))
```

3.315.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.22

$$\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6x-2x^2)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18-2e^{2x^2}-17x-2x^2+e^{x^2}(12+\right.}{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}\left(-6x-2x^2\right)}$$
$$=x-e^{\left(\frac{\left(x-e^{\left(x^2\right)}+3\right)\log\left(\frac{1}{4}x^2\right)+e^{\left(x^2\right)}-5}{x-e^{\left(x^2\right)}+3}\right)}$$

input
```
integrate(((-2*exp(x^2)^2+(-2*x^3+4*x^2+5*x+12)*exp(x^2)-2*x^2-17*x-18)*ex
p(((exp(x^2)-3-x)*log(1/4*x^2)+5-exp(x^2))/(exp(x^2)-3-x))+x*exp(x^2)^2+(-
2*x^2-6*x)*exp(x^2)+x^3+6*x^2+9*x)/(x*exp(x^2)^2+(-2*x^2-6*x)*exp(x^2)+x^3
+6*x^2+9*x),x, algorithm=\
```

output
```
x - e^(((x - e^(x^2) + 3)*log(1/4*x^2) + e^(x^2) - 5)/(x - e^(x^2) + 3))
```

3.315.6 Sympy [A] (verification not implemented)

Time = 0.59 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

$$\int \frac{9x + e^{2x^2}x + 6x^2 + x^3 + e^{x^2}(-6x - 2x^2) + e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18 - 2e^{2x^2} - 17x - 2x^2 + e^{x^2}(12 +$$

$$9x + e^{2x^2}x + 6x^2 + x^3 + e^{x^2}\left(-6x - 2x^2\right)$$

$$= x - e^{\frac{\left(-x+e^{x^2}-3\right)\log\left(\frac{x^2}{4}\right)-e^{x^2}+5}{-x+e^{x^2}-3}}$$

input
```
integrate(((-2*exp(x**2)**2+(-2*x**3+4*x**2+5*x+12)*exp(x**2)-2*x**2-17*x-
18)*exp(((exp(x**2)-3-x)*ln(1/4*x**2)+5-exp(x**2))/(exp(x**2)-3-x))+x*exp(
x**2)**2+(-2*x**2-6*x)*exp(x**2)+x**3+6*x**2+9*x)/(x*exp(x**2)**2+(-2*x**2
-6*x)*exp(x**2)+x**3+6*x**2+9*x),x)
```

output
```
x - exp(((-x + exp(x**2) - 3)*log(x**2/4) - exp(x**2) + 5)/(-x + exp(x**2)
 - 3))
```

3.315.7 Maxima [F]

$$\int \frac{9x + e^{2x^2}x + 6x^2 + x^3 + e^{x^2}(-6x - 2x^2) + e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18 - 2e^{2x^2} - 17x - 2x^2 + e^{x^2}(12 +$$

$$9x + e^{2x^2}x + 6x^2 + x^3 + e^{x^2}\left(-6x - 2x^2\right)$$

$$= \int \frac{x^3 + 6\,x^2 + xe^{(2\,x^2)} - 2\,(x^2 + 3\,x)e^{(x^2)} - \left(2\,x^2 + (2\,x^3 - 4\,x^2 - 5\,x - 12)e^{(x^2)} + 17\,x + 2\,e^{(2\,x^2)} + 18\right)e}{x^3 + 6\,x^2 + xe^{(2\,x^2)} - 2\,(x^2 + 3\,x)e^{(x^2)} + 9\,x}$$

input
```
integrate(((-2*exp(x^2)^2+(-2*x^3+4*x^2+5*x+12)*exp(x^2)-2*x^2-17*x-18)*ex
p(((exp(x^2)-3-x)*log(1/4*x^2)+5-exp(x^2))/(exp(x^2)-3-x))+x*exp(x^2)^2+(-
2*x^2-6*x)*exp(x^2)+x^3+6*x^2+9*x)/(x*exp(x^2)^2+(-2*x^2-6*x)*exp(x^2)+x^3
+6*x^2+9*x),x, algorithm=\
```

output
```
x - integrate(1/4*(2*x^3 + 17*x^2 + 2*x*e^(2*x^2) + (2*x^4 - 4*x^3 - 5*x^2
 - 12*x)*e^(x^2) + 18*x)*e^(e^(x^2)/(x - e^(x^2) + 3) - 5/(x - e^(x^2) + 3
))/(x^2 - 2*(x + 3)*e^(x^2) + 6*x + e^(2*x^2) + 9), x)
```

3.315.

$$\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6x-2x^2)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18-2e^{2x^2}-17x-2x^2+e^{x^2}\left(12+5x+4x^2-2x^3\right)\right)}{}d$$

3.315.8 Giac [A] (verification not implemented)

Time = 1.70 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.03

$$\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6x-2x^2)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18-2e^{2x^2}-17x-2x^2+e^{x^2}(12+\right.}{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}\left(-6x-2x^2\right)}$$

$$=-\frac{1}{4}\,x^2e^{\left(\frac{5\,x-2\,e^{\left(x^2\right)}}{3\,\left(x-e^{\left(x^2\right)}+3\right)}-\frac{5}{3}\right)}+x$$

input
```
integrate(((-2*exp(x^2)^2+(-2*x^3+4*x^2+5*x+12)*exp(x^2)-2*x^2-17*x-18)*ex
p(((exp(x^2)-3-x)*log(1/4*x^2)+5-exp(x^2))/(exp(x^2)-3-x))+x*exp(x^2)^2+(-
2*x^2-6*x)*exp(x^2)+x^3+6*x^2+9*x)/(x*exp(x^2)^2+(-2*x^2-6*x)*exp(x^2)+x^3
+6*x^2+9*x),x, algorithm=\
```

output
```
-1/4*x^2*e^(1/3*(5*x - 2*e^(x^2))/(x - e^(x^2) + 3) - 5/3) + x
```

3.315.9 Mupad [B] (verification not implemented)

Time = 12.94 (sec) , antiderivative size = 145, normalized size of antiderivative = 4.53

$$\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}(-6x-2x^2)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18-2e^{2x^2}-17x-2x^2+e^{x^2}(12+\right.}{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}\left(-6x-2x^2\right)}$$

$$=x-\frac{2^{\frac{2\,\mathrm{e}^{x^2}}{x-\mathrm{e}^{x^2}+3}}\,\mathrm{e}^{-\frac{5}{x-\mathrm{e}^{x^2}+3}}\,\mathrm{e}^{\frac{\mathrm{e}^{x^2}}{x-\mathrm{e}^{x^2}+3}}\,{\left(x^2\right)}^{\frac{3}{x-\mathrm{e}^{x^2}+3}}\,{\left(x^2\right)}^{\frac{x}{x-\mathrm{e}^{x^2}+3}}}{2^{\frac{2\,x}{x-\mathrm{e}^{x^2}+3}}\,2^{\frac{6}{x-\mathrm{e}^{x^2}+3}}\,{\left(x^2\right)}^{\frac{\mathrm{e}^{x^2}}{x-\mathrm{e}^{x^2}+3}}}$$

input
```
int((9*x - exp(x^2)*(6*x + 2*x^2) + x*exp(2*x^2) - exp((exp(x^2) + log(x^2
/4)*(x - exp(x^2) + 3) - 5)/(x - exp(x^2) + 3))*(17*x + 2*exp(2*x^2) - exp
(x^2)*(5*x + 4*x^2 - 2*x^3 + 12) + 2*x^2 + 18) + 6*x^2 + x^3)/(9*x - exp(x
^2)*(6*x + 2*x^2) + x*exp(2*x^2) + 6*x^2 + x^3),x)
```

output
```
x - (2^((2*exp(x^2))/(x - exp(x^2) + 3))*exp(-5/(x - exp(x^2) + 3))*exp(ex
p(x^2)/(x - exp(x^2) + 3))*(x^2)^(3/(x - exp(x^2) + 3))*(x^2)^(x/(x - exp(
x^2) + 3)))/(2^((2*x)/(x - exp(x^2) + 3))*2^(6/(x - exp(x^2) + 3))*(x^2)^(
exp(x^2)/(x - exp(x^2) + 3)))
```

3.315.

$$\int \frac{9x+e^{2x^2}x+6x^2+x^3+e^{x^2}\left(-6x-2x^2\right)+e^{\frac{5-e^{x^2}+\left(-3+e^{x^2}-x\right)\log\left(\frac{x^2}{4}\right)}{-3+e^{x^2}-x}}\left(-18-2e^{2x^2}-17x-2x^2+e^{x^2}\left(12+5x+4x^2-2x^3\right)\right)}{\cdots}$$

3.316 $\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}(-320e^x+240e^x\log(x)-}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}$

3.316.1 Optimal result

Integrand size = 85, antiderivative size = 20

$$\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}(-320e^x+240e^x\log(x)-60e^x\log^2(x)+5e^x\log^3(x))}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}\,dx$$
$$=5+e^{e^x}+e^{\frac{144x}{5(-4+\log(x))^2}}$$

output
```
5+exp(144/5*x/(ln(x)-4)^2)+exp(exp(x))
```

3.316.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.35

$$\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}(-320e^x+240e^x\log(x)-60e^x\log^2(x)+5e^x\log^3(x))}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}\,dx$$
$$=\frac{1}{5}\left(5e^{e^x}+5e^{\frac{144x}{5(-4+\log(x))^2}}\right)$$

input
```
Integrate[(E^((144*x)/(80 - 40*Log[x] + 5*Log[x]^2))*(-864 + 144*Log[x]) +
 E^E^x*(-320*E^x + 240*E^x*Log[x] - 60*E^x*Log[x]^2 + 5*E^x*Log[x]^3))/(-3
20 + 240*Log[x] - 60*Log[x]^2 + 5*Log[x]^3),x]
```

output
```
(5*E^E^x + 5*E^((144*x)/(5*(-4 + Log[x])^2)))/5
```

3.316.3 Rubi [A] (verified)

Time = 1.35 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {7292, 27, 7239, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{144x}{5\log^2(x)-40\log(x)+80}}(144\log(x)-864)+e^{e^x}\left(-320e^x+5e^x\log^3(x)-60e^x\log^2(x)+240e^x\log(x)\right)}{5\log^3(x)-60\log^2(x)+240\log(x)-320}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-e^{\frac{144x}{5\log^2(x)-40\log(x)+80}}(144\log(x)-864)-e^{e^x}\left(-320e^x+5e^x\log^3(x)-60e^x\log^2(x)+240e^x\log(x)\right)}{5(4-\log(x))^3}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{5}\int \frac{144e^{\frac{144x}{5\left(\log^2(x)-8\log(x)+16\right)}}(6-\log(x))+5e^{e^x}\left(-e^x\log^3(x)+12e^x\log^2(x)-48e^x\log(x)+64e^x\right)}{(4-\log(x))^3}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\frac{1}{5}\int \frac{-5e^{x+e^x}(\log(x)-4)^3-144e^{\frac{144x}{5(\log(x)-4)^2}}(\log(x)-6)}{(4-\log(x))^3}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{5}\int \left(\frac{144e^{\frac{144x}{5(\log(x)-4)^2}}(\log(x)-6)}{(\log(x)-4)^3}+5e^{x+e^x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{5}\left(5e^{e^x}+5e^{\frac{144x}{5(4-\log(x))^2}}\right)$$

input
```
Int[(E^((144*x)/(80 - 40*Log[x] + 5*Log[x]^2))*(-864 + 144*Log[x]) + E^E^x
*(-320*E^x + 240*E^x*Log[x] - 60*E^x*Log[x]^2 + 5*E^x*Log[x]^3))/(-320 + 2
40*Log[x] - 60*Log[x]^2 + 5*Log[x]^3),x]
```

output
```
(5*E^E^x + 5*E^((144*x)/(5*(4 - Log[x])^2)))/5
```

3.316. $\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}\left(-320e^x+240e^x\log(x)-60e^x\log^2(x)+5e^x\log^3(x)\right)}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}dx$

3.316.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.316.4 Maple [A] (verified)

Time = 38.68 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

method	result	size
risch	$\mathrm{e}^{\mathrm{e}^{x}}+\mathrm{e}^{\frac{144 x}{5 (\ln (x)-4)^{2}}}$	15
parallelrisch	$\mathrm{e}^{\mathrm{e}^{x}}+\mathrm{e}^{\frac{144 x}{5 \left(\ln (x)^{2}-8 \ln (x)+16\right)}}$	21
parts	$\mathrm{e}^{\mathrm{e}^{x}}+\frac{\ln (x)^{2} \mathrm{e}^{\frac{144 x}{5 \ln (x)^{2}-40 \ln (x)+80}}-8 \ln (x) \mathrm{e}^{\frac{144 x}{5 \ln (x)^{2}-40 \ln (x)+80}}+16 \,\mathrm{e}^{\frac{144 x}{5 \ln (x)^{2}-40 \ln (x)+80}}}{(\ln (x)-4)^{2}}$	78
default	$\frac{-40 \ln (x) \mathrm{e}^{\frac{144 x}{5 \ln (x)^{2}-40 \ln (x)+80}}+5 \ln (x)^{2} \mathrm{e}^{\frac{144 x}{5 \ln (x)^{2}-40 \ln (x)+80}}+80 \,\mathrm{e}^{\frac{144 x}{5 \ln (x)^{2}-40 \ln (x)+80}}}{5 (\ln (x)-4)^{2}}+\mathrm{e}^{\mathrm{e}^{x}}$	80

input
```
int(((5*exp(x)*ln(x)^3-60*exp(x)*ln(x)^2+240*exp(x)*ln(x)-320*exp(x))*exp(
exp(x))+(144*ln(x)-864)*exp(144*x/(5*ln(x)^2-40*ln(x)+80)))/(5*ln(x)^3-60*
ln(x)^2+240*ln(x)-320),x,method=_RETURNVERBOSE)
```

output
```
exp(exp(x))+exp(144/5*x/(ln(x)-4)^2)
```

3.316. $\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}\left(-320e^x+240e^x\log(x)-60e^x\log^2(x)+5e^x\log^3(x)\right)}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}\,dx$

3.316.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}\left(-320e^x+240e^x\log(x)-60e^x\log^2(x)+5e^x\log^3(x)\right)}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}\,dx$$
$$= e^{\left(\frac{144\,x}{5\,\left(\log(x)^2-8\,\log(x)+16\right)}\right)}+e^{\left(e^x\right)}$$

input
```
integrate(((5*exp(x)*log(x)^3-60*exp(x)*log(x)^2+240*exp(x)*log(x)-320*exp
(x))*exp(exp(x))+(144*log(x)-864)*exp(144*x/(5*log(x)^2-40*log(x)+80)))/(5
*log(x)^3-60*log(x)^2+240*log(x)-320),x, algorithm=\
```

output
```
e^(144/5*x/(log(x)^2 - 8*log(x) + 16)) + e^(e^x)
```

3.316.6 Sympy [A] (verification not implemented)

Time = 0.60 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}\left(-320e^x+240e^x\log(x)-60e^x\log^2(x)+5e^x\log^3(x)\right)}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}\,dx$$
$$= e^{\frac{144x}{5\log{(x)}^2-40\log{(x)}+80}}+e^{e^x}$$

input
```
integrate(((5*exp(x)*ln(x)**3-60*exp(x)*ln(x)**2+240*exp(x)*ln(x)-320*exp(
x))*exp(exp(x))+(144*ln(x)-864)*exp(144*x/(5*ln(x)**2-40*ln(x)+80)))/(5*ln
(x)**3-60*ln(x)**2+240*ln(x)-320),x)
```

output
```
exp(144*x/(5*log(x)**2 - 40*log(x) + 80)) + exp(exp(x))
```

3.316.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}\left(-320e^x+240e^x\log(x)-60e^x\log^2(x)+5e^x\log^3(x)\right)}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}\,dx$$
$$= e^{\left(\frac{144\,x}{5\,\left(\log(x)^2-8\,\log(x)+16\right)}\right)}+e^{\left(e^x\right)}$$

input
```
integrate(((5*exp(x)*log(x)^3-60*exp(x)*log(x)^2+240*exp(x)*log(x)-320*exp
(x))*exp(exp(x))+(144*log(x)-864)*exp(144*x/(5*log(x)^2-40*log(x)+80)))/(5
*log(x)^3-60*log(x)^2+240*log(x)-320),x, algorithm=\
```

output
```
e^(144/5*x/(log(x)^2 - 8*log(x) + 16)) + e^(e^x)
```

3.316.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}\left(-320e^x+240e^x\log(x)-60e^x\log^2(x)+5e^x\log^3(x)\right)}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}\,dx$$
$$=e^{\left(\frac{144\,x}{5\,\left(\log(x)^2-8\,\log(x)+16\right)}\right)}+e^{(e^x)}$$

input
```
integrate(((5*exp(x)*log(x)^3-60*exp(x)*log(x)^2+240*exp(x)*log(x)-320*exp
(x))*exp(exp(x))+(144*log(x)-864)*exp(144*x/(5*log(x)^2-40*log(x)+80)))/(5
*log(x)^3-60*log(x)^2+240*log(x)-320),x, algorithm=\
```

output
```
e^(144/5*x/(log(x)^2 - 8*log(x) + 16)) + e^(e^x)
```

3.316.9 Mupad [B] (verification not implemented)

Time = 12.53 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{e^{\frac{144x}{80-40\log(x)+5\log^2(x)}}(-864+144\log(x))+e^{e^x}\left(-320e^x+240e^x\log(x)-60e^x\log^2(x)+5e^x\log^3(x)\right)}{-320+240\log(x)-60\log^2(x)+5\log^3(x)}\,dx$$
$$=\mathrm{e}^{\mathrm{e}^x}+\mathrm{e}^{\frac{144\,x}{5\ln(x)^2-40\,\ln(x)+80}}$$

input
```
int(-(exp(exp(x))*(320*exp(x) - 240*exp(x)*log(x) + 60*exp(x)*log(x)^2 - 5
*exp(x)*log(x)^3) - exp((144*x)/(5*log(x)^2 - 40*log(x) + 80))*(144*log(x)
 - 864))/(240*log(x) - 60*log(x)^2 + 5*log(x)^3 - 320),x)
```

output
```
exp(exp(x)) + exp((144*x)/(5*log(x)^2 - 40*log(x) + 80))
```

3.317 $\int e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)}{x^2}}$

3.317.1 Optimal result

Integrand size = 202, antiderivative size = 27

$$\int e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\left(-50x^3+1290x^4\right.$$
$$=\frac{1}{5}e^{\left(-1+(5-x)^2\left(\frac{e^x}{x}+x\right)\right)^2}$$

output
```
1/5*exp(((exp(x)/x+x)*(5-x)^2-1)^2)
```

3.317.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\left(-50x^3+1290x^4\right.$$
$$=\frac{1}{5}e^{\frac{\left(e^x(-5+x)^2+x\left(-1+25x-10x^2+x^3\right)\right)^2}{x^2}}$$

3.317.
$$\int e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\frac{\left(-50x^3+1290x^4-1506x^5+\right.}{5x^3}$$

input
```
Integrate[(E^((x^2 - 50*x^3 + 645*x^4 - 502*x^5 + 150*x^6 - 20*x^7 + x^8 +
 E^(2*x)*(625 - 500*x + 150*x^2 - 20*x^3 + x^4) + E^x*(-50*x + 1270*x^2 -
1002*x^3 + 300*x^4 - 40*x^5 + 2*x^6))/x^2)*(-50*x^3 + 1290*x^4 - 1506*x^5
+ 600*x^6 - 100*x^7 + 6*x^8 + E^(2*x)*(-1250 + 1750*x - 1000*x^2 + 280*x^3
 - 38*x^4 + 2*x^5) + E^x*(50*x - 50*x^2 + 268*x^3 - 402*x^4 + 180*x^5 - 32
*x^6 + 2*x^7)))/(5*x^3),x]
```

output
```
E^((E^x*(-5 + x)^2 + x*(-1 + 25*x - 10*x^2 + x^3))^2/x^2)/5
```

3.317.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(6x^8-100x^7+600x^6-1506x^5+1290x^4-50x^3+e^{2x}\left(2x^5-38x^4+280x^3-1000x^2+1750x-1250\right)+e^x\left(\right.}{}$$

$\big\downarrow$ 27

$$\frac{1}{5}\int -\frac{2\exp\left(\frac{x^8-20x^7+150x^6-502x^5+645x^4-50x^3+x^2+e^{2x}\left(x^4-20x^3+150x^2-500x+625\right)-2e^x\left(-x^6+20x^5-150x^4+501x^3-635x^2+25x\right)}{x^2}\right.}{}$$

$\big\downarrow$ 27

$$-\frac{2}{5}\int \frac{\exp\left(\frac{x^8-20x^7+150x^6-502x^5+645x^4-50x^3+x^2+e^{2x}\left(x^4-20x^3+150x^2-500x+625\right)-2e^x\left(-x^6+20x^5-150x^4+501x^3-635x^2+25x\right)}{x^2}\right)}{}$$

$\big\downarrow$ 7239

$$-\frac{2}{5}\int \frac{\exp\left(\frac{\left(e^x(x-5)^2+x\left(x^3-10x^2+25x-1\right)\right)^2}{x^2}\right)(5-x)\left(\left(3x^4-35x^3+125x^2-128x+5\right)x^3+e^x\left(x^5-11x^4+35x^3\right.\right.}{x^3}$$

$\big\downarrow$ 7293

$$-\frac{2}{5}\int\left(-\frac{\exp\left(\frac{\left(e^x(x-5)^2+x\left(x^3-10x^2+25x-1\right)\right)^2}{x^2}+2x\right)\left(x^2-4x+5\right)(x-5)^3}{x^3}-\exp\left(\frac{\left(e^x(x-5)^2+x\left(x^3-10x^2+\right.\right.}{x^2}\right.\right.$$

$\big\downarrow$ 2009

3.317.

$$\int \frac{e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\left(-50x^3+1290x^4-1506x^5+\right.}{5x^3}$$

$$-\frac{2}{5}\left(25\int e^{\frac{\left(e^x(x-5)^2+x\left(x^3-10x^2+25x-1\right)\right)^2}{x^2}}dx-134\int e^{\frac{\left(e^x(x-5)^2+x\left(x^3-10x^2+25x-1\right)\right)^2}{x^2}+x}dx-140\int e^{\frac{\left(e^x(x-5)^2+x\left(x^3-10x^2+25\right.\right.}{x^2}}\right.$$

input
```
Int[(E^((x^2 - 50*x^3 + 645*x^4 - 502*x^5 + 150*x^6 - 20*x^7 + x^8 + E^(2*
x)*(625 - 500*x + 150*x^2 - 20*x^3 + x^4) + E^x*(-50*x + 1270*x^2 - 1002*x
^3 + 300*x^4 - 40*x^5 + 2*x^6))/x^2)*(-50*x^3 + 1290*x^4 - 1506*x^5 + 600*
x^6 - 100*x^7 + 6*x^8 + E^(2*x)*(-1250 + 1750*x - 1000*x^2 + 280*x^3 - 38*
x^4 + 2*x^5) + E^x*(50*x - 50*x^2 + 268*x^3 - 402*x^4 + 180*x^5 - 32*x^6 +
 2*x^7)))/(5*x^3),x]
```

output
```
$Aborted
```

3.317.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.317.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. $2(23) = 46$.

Time = 1.69 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.52

3.317.

$$\int \frac{e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\left(-50x^3+1290x^4-1506x^5+\ldots\right)}{5x^3}$$

method	result
parallelrisch	$\frac{e^{\frac{\left(x^4-20x^3+150x^2-500x+625\right)e^{2x}+\left(2x^6-40x^5+300x^4-1002x^3+1270x^2-50x\right)e^x+x^8-20x^7+150x^6-502x^5+645x^4-50x^3+x^2}{x^2}}}{5}$
risch	$\frac{e^{\frac{x^8+2x^6e^x-20x^7-40x^5e^x+150x^6+300\,e^x x^4+e^{2x}x^4-502x^5-1002\,e^x x^3-20\,e^{2x}x^3+645x^4+1270\,e^x x^2+150\,e^{2x}x^2-50x^3-50\,e^x x-500x\,e^{2x}}{x^2}}}{5}$

input
```
int(1/5*((2*x^5-38*x^4+280*x^3-1000*x^2+1750*x-1250)*exp(x)^2+(2*x^7-32*x^
6+180*x^5-402*x^4+268*x^3-50*x^2+50*x)*exp(x)+6*x^8-100*x^7+600*x^6-1506*x
^5+1290*x^4-50*x^3)*exp(((x^4-20*x^3+150*x^2-500*x+625)*exp(x)^2+(2*x^6-40
*x^5+300*x^4-1002*x^3+1270*x^2-50*x)*exp(x)+x^8-20*x^7+150*x^6-502*x^5+645
*x^4-50*x^3+x^2)/x^2)/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/5*exp(((x^4-20*x^3+150*x^2-500*x+625)*exp(x)^2+(2*x^6-40*x^5+300*x^4-100
2*x^3+1270*x^2-50*x)*exp(x)+x^8-20*x^7+150*x^6-502*x^5+645*x^4-50*x^3+x^2)
/x^2)
```

3.317.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. $2(21) = 42$.

Time = 0.27 (sec) , antiderivative size = 93, normalized size of antiderivative = 3.44

$$\int e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\left(-50x^3+1290x^4-\right.$$

$$=\frac{1}{5}\,e^{\left(\frac{x^8-20\,x^7+150\,x^6-502\,x^5+645\,x^4-50\,x^3+x^2+\left(x^4-20\,x^3+150\,x^2-500\,x+625\right)e^{(2\,x)}+2\,\left(x^6-20\,x^5+150\,x^4-501\,x^3+635\,x^2-25\,x\right)e^x}{x^2}\right)}$$

input
```
integrate(1/5*((2*x^5-38*x^4+280*x^3-1000*x^2+1750*x-1250)*exp(x)^2+(2*x^7
-32*x^6+180*x^5-402*x^4+268*x^3-50*x^2+50*x)*exp(x)+6*x^8-100*x^7+600*x^6-
1506*x^5+1290*x^4-50*x^3)*exp(((x^4-20*x^3+150*x^2-500*x+625)*exp(x)^2+(2*
x^6-40*x^5+300*x^4-1002*x^3+1270*x^2-50*x)*exp(x)+x^8-20*x^7+150*x^6-502*x
^5+645*x^4-50*x^3+x^2)/x^2)/x^3,x, algorithm=\
```

output
```
1/5*e^((x^8 - 20*x^7 + 150*x^6 - 502*x^5 + 645*x^4 - 50*x^3 + x^2 + (x^4 -
 20*x^3 + 150*x^2 - 500*x + 625)*e^(2*x) + 2*(x^6 - 20*x^5 + 150*x^4 - 501
*x^3 + 635*x^2 - 25*x)*e^x)/x^2)
```

3.317.

$$\int e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\frac{\left(-50x^3+1290x^4-1506x^5+\right.}{5x^3}$$

3.317.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. $2(17) = 34$.

Time = 0.37 (sec) , antiderivative size = 94, normalized size of antiderivative = 3.48

$$\int e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}(-50x^3+1290x^4$$

$$= \frac{e^{\frac{x^8-20x^7+150x^6-502x^5+645x^4-50x^3+x^2+\left(x^4-20x^3+150x^2-500x+625\right)e^{2x}+\left(2x^6-40x^5+300x^4-1002x^3+1270x^2-50x\right)e^x}{x^2}}}{5}$$

input
```
integrate(1/5*((2*x**5-38*x**4+280*x**3-1000*x**2+1750*x-1250)*exp(x)**2+(
2*x**7-32*x**6+180*x**5-402*x**4+268*x**3-50*x**2+50*x)*exp(x)+6*x**8-100*
x**7+600*x**6-1506*x**5+1290*x**4-50*x**3)*exp(((x**4-20*x**3+150*x**2-500
*x+625)*exp(x)**2+(2*x**6-40*x**5+300*x**4-1002*x**3+1270*x**2-50*x)*exp(x
)+x**8-20*x**7+150*x**6-502*x**5+645*x**4-50*x**3+x**2)/x**2)/x**3,x)
```

output
```
exp((x**8 - 20*x**7 + 150*x**6 - 502*x**5 + 645*x**4 - 50*x**3 + x**2 + (x
**4 - 20*x**3 + 150*x**2 - 500*x + 625)*exp(2*x) + (2*x**6 - 40*x**5 + 300
*x**4 - 1002*x**3 + 1270*x**2 - 50*x)*exp(x))/x**2)/5
```

3.317.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 107 vs. $2(21) = 42$.

Time = 0.70 (sec) , antiderivative size = 107, normalized size of antiderivative = 3.96

$$\int e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}(-50x^3+1290x^4$$

$$= \frac{1}{5}e^{\left(x^6-20\,x^5+2\,x^4e^x+150\,x^4-40\,x^3e^x-502\,x^3+x^2e^{(2\,x)}+300\,x^2e^x+645\,x^2-20\,xe^{(2\,x)}-1002\,xe^x-50\,x-\frac{500\,e^{(2\,x)}}{x}-\frac{50\,e^x}{x}+\frac{625\,e^{(2\,x)}}{x^2}+150\,e^{(2}\right.}$$

input
```
integrate(1/5*((2*x^5-38*x^4+280*x^3-1000*x^2+1750*x-1250)*exp(x)^2+(2*x^7
-32*x^6+180*x^5-402*x^4+268*x^3-50*x^2+50*x)*exp(x)+6*x^8-100*x^7+600*x^6-
1506*x^5+1290*x^4-50*x^3)*exp(((x^4-20*x^3+150*x^2-500*x+625)*exp(x)^2+(2*
x^6-40*x^5+300*x^4-1002*x^3+1270*x^2-50*x)*exp(x)+x^8-20*x^7+150*x^6-502*x
^5+645*x^4-50*x^3+x^2)/x^2)/x^3,x, algorithm=\
```

3.317.

$$\int \frac{e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}(-50x^3+1290x^4-1506x^5+}{5x^3}$$

output
```
1/5*e^(x^6 - 20*x^5 + 2*x^4*e^x + 150*x^4 - 40*x^3*e^x - 502*x^3 + x^2*e^(
2*x) + 300*x^2*e^x + 645*x^2 - 20*x*e^(2*x) - 1002*x*e^x - 50*x - 500*e^(2
*x)/x - 50*e^x/x + 625*e^(2*x)/x^2 + 150*e^(2*x) + 1270*e^x + 1)
```

3.317.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 107 vs. $2(21) = 42$.

Time = 0.63 (sec) , antiderivative size = 107, normalized size of antiderivative = 3.96

$$\int \frac{e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\left(-50x^3+1290x^4 \right.}{}$$

$$= \frac{1}{5}e^{\left(x^6-20x^5+2x^4e^x+150x^4-40x^3e^x-502x^3+x^2e^{(2x)}+300x^2e^x+645x^2-20xe^{(2x)}-1002xe^x-50x-\frac{500e^{(2x)}}{x}-\frac{50e^x}{x}+\frac{625e^{(2x)}}{x^2}+150e^{(2}\right.}$$

input
```
integrate(1/5*((2*x^5-38*x^4+280*x^3-1000*x^2+1750*x-1250)*exp(x)^2+(2*x^7
-32*x^6+180*x^5-402*x^4+268*x^3-50*x^2+50*x)*exp(x)+6*x^8-100*x^7+600*x^6-
1506*x^5+1290*x^4-50*x^3)*exp(((x^4-20*x^3+150*x^2-500*x+625)*exp(x)^2+(2*
x^6-40*x^5+300*x^4-1002*x^3+1270*x^2-50*x)*exp(x)+x^8-20*x^7+150*x^6-502*x
^5+645*x^4-50*x^3+x^2)/x^2)/x^3,x, algorithm=\
```

output
```
1/5*e^(x^6 - 20*x^5 + 2*x^4*e^x + 150*x^4 - 40*x^3*e^x - 502*x^3 + x^2*e^(
2*x) + 300*x^2*e^x + 645*x^2 - 20*x*e^(2*x) - 1002*x*e^x - 50*x - 500*e^(2
*x)/x - 50*e^x/x + 625*e^(2*x)/x^2 + 150*e^(2*x) + 1270*e^x + 1)
```

3.317.9 Mupad [B] (verification not implemented)

Time = 12.55 (sec) , antiderivative size = 123, normalized size of antiderivative = 4.56

$$\int \frac{e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\left(-50x^3+1290x^4 \right.}{}$$

$$= \frac{e^{150\,e^{2\,x}}\,e^{-1002\,x\,e^x}\,e^{-50\,x}\,e^{x^6}\,e\,e^{-20\,x\,e^{2\,x}}\,e^{2\,x^4\,e^x}\,e^{-40\,x^3\,e^x}\,e^{-\frac{50\,e^x}{x}}\,e^{300\,x^2\,e^x}\,e^{-20\,x^5}\,e^{150\,x^4}\,e^{-502\,x^3}\,e^{645\,x^2}\,e^{1270\,e^x}\,e^{x^2\,e^{2\,x}}}{5}$$

3.317.

$$\int \frac{e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\left(-50x^3+1290x^4-1506x^5+\right.}{5x^3}$$

input
```
int((exp((exp(2*x)*(150*x^2 - 500*x - 20*x^3 + x^4 + 625) - exp(x)*(50*x -
 1270*x^2 + 1002*x^3 - 300*x^4 + 40*x^5 - 2*x^6) + x^2 - 50*x^3 + 645*x^4
- 502*x^5 + 150*x^6 - 20*x^7 + x^8)/x^2)*(exp(2*x)*(1750*x - 1000*x^2 + 28
0*x^3 - 38*x^4 + 2*x^5 - 1250) + exp(x)*(50*x - 50*x^2 + 268*x^3 - 402*x^4
 + 180*x^5 - 32*x^6 + 2*x^7) - 50*x^3 + 1290*x^4 - 1506*x^5 + 600*x^6 - 10
0*x^7 + 6*x^8))/(5*x^3),x)
```

output
```
(exp(150*exp(2*x))*exp(-1002*x*exp(x))*exp(-50*x)*exp(x^6)*exp(1)*exp(-20*
x*exp(2*x))*exp(2*x^4*exp(x))*exp(-40*x^3*exp(x))*exp(-(50*exp(x))/x)*exp(
300*x^2*exp(x))*exp(-20*x^5)*exp(150*x^4)*exp(-502*x^3)*exp(645*x^2)*exp(1
270*exp(x))*exp(x^2*exp(2*x))*exp(-(500*exp(2*x))/x)*exp((625*exp(2*x))/x^
2))/5
```

3.317.

$$\int \frac{e^{\frac{x^2-50x^3+645x^4-502x^5+150x^6-20x^7+x^8+e^{2x}\left(625-500x+150x^2-20x^3+x^4\right)+e^x\left(-50x+1270x^2-1002x^3+300x^4-40x^5+2x^6\right)}{x^2}}\left(-50x^3+1290x^4-1506x^5+\right.}{5x^3}$$

3.318 $\int (-2-2e^x-2\log(x))\,dx$

3.318.1 Optimal result

Integrand size = 11, antiderivative size = 16

$$\int (-2-2e^x-2\log(x))\,dx = 2+2(4-e^x-x\log(x))$$

output
```
10-2*x*ln(x)-2*exp(x)
```

3.318.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int (-2-2e^x-2\log(x))\,dx = -2(e^x+x\log(x))$$

input
```
Integrate[-2 - 2*E^x - 2*Log[x],x]
```

output
```
-2*(E^x + x*Log[x])
```

3.318.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.69, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (-2e^x - 2\log(x) - 2)\, dx$$
$$\Big\downarrow \text{2009}$$
$$-2e^x - 2x\log(x)$$

input
```
Int[-2 - 2*E^x - 2*Log[x],x]
```

output
```
-2*E^x - 2*x*Log[x]
```

3.318.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.318.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.69

method	result	size
default	$-2\,\mathrm{e}^{x}-2x\ln\left(x\right)$	11
norman	$-2\,\mathrm{e}^{x}-2x\ln\left(x\right)$	11
risch	$-2\,\mathrm{e}^{x}-2x\ln\left(x\right)$	11
parallelrisch	$-2\,\mathrm{e}^{x}-2x\ln\left(x\right)$	11
parts	$-2\,\mathrm{e}^{x}-2x\ln\left(x\right)$	11

input
```
int(-2*ln(x)-2*exp(x)-2,x,method=_RETURNVERBOSE)
```

output
```
-2*exp(x)-2*x*ln(x)
```

3.318.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int (-2-2e^x-2\log(x))\,dx = -2\,x\log(x)-2\,e^x$$

input
```
integrate(-2*log(x)-2*exp(x)-2,x, algorithm=\
```

output
```
-2*x*log(x) - 2*e^x
```

3.318.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int (-2-2e^x-2\log(x))\,dx = -2x\log(x)-2e^x$$

input
```
integrate(-2*ln(x)-2*exp(x)-2,x)
```

output
```
-2*x*log(x) - 2*exp(x)
```

3.318.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int (-2-2e^x-2\log(x))\,dx = -2\,x\log(x)-2\,e^x$$

input
```
integrate(-2*log(x)-2*exp(x)-2,x, algorithm=\
```

output
```
-2*x*log(x) - 2*e^x
```

3.318.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int (-2 - 2e^x - 2\log(x))\,dx = -2\,x\log(x) - 2\,e^x$$

input
```
integrate(-2*log(x)-2*exp(x)-2,x, algorithm=\
```

output
```
-2*x*log(x) - 2*e^x
```

3.318.9 Mupad [B] (verification not implemented)

Time = 12.24 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int (-2 - 2e^x - 2\log(x))\,dx = -2\,\mathrm{e}^x - 2\,x\,\ln(x)$$

input
```
int(- 2*exp(x) - 2*log(x) - 2,x)
```

output
```
- 2*exp(x) - 2*x*log(x)
```

3.319 $\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3$

3.319.1 Optimal result

Integrand size = 458, antiderivative size = 35

$$\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e$$

$$=\left(-2+\frac{\left(\frac{1}{2}\left(\frac{1}{x}-x\right)-x\right)\log(x)}{x+\log(1-e^3+x)}\right)^2$$

output
```
((1/2/x-3/2*x)/(ln(-exp(3)+x+1)+x)*ln(x)-2)^2
```

3.319.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.54

$$\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e$$

$$=\frac{(-1+3x^2)\log(x)\left((-1+3x^2)\log(x)+8x(x+\log(1-e^3+x))\right)}{4x^2(x+\log(1-e^3+x))^2}$$

3.319.

$\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e^3+x)+(4x+4x^2-12x^3-12x^4+e^3(-4x+12x^3))\log$

input
```
Integrate[(4*x^3 + 4*x^4 - 12*x^5 - 12*x^6 + E^3*(-4*x^3 + 12*x^5) + (8*x^
2 + 8*x^3 - 24*x^4 - 24*x^5 + E^3*(-8*x^2 + 24*x^4))*Log[1 - E^3 + x] + (4
*x + 4*x^2 - 12*x^3 - 12*x^4 + E^3*(-4*x + 12*x^3))*Log[1 - E^3 + x]^2 + L
og[x]^2*(3*x + 2*x^2 - 12*x^3 - 6*x^4 + 9*x^5 + E^3*(-2*x + 6*x^3) + (1 +
x - 9*x^4 - 9*x^5 + E^3*(-1 + 9*x^4))*Log[1 - E^3 + x]) + Log[x]*(-x - x^2
 - 6*x^3 - 2*x^4 + 3*x^5 - 9*x^6 + E^3*(x + 2*x^3 + 9*x^5) + (-1 - x - 10*
x^2 - 6*x^3 - 9*x^4 - 21*x^5 + E^3*(1 + 6*x^2 + 21*x^4))*Log[1 - E^3 + x]
+ (-4*x - 4*x^2 - 12*x^3 - 12*x^4 + E^3*(4*x + 12*x^3))*Log[1 - E^3 + x]^2
))/(-2*x^6 + 2*E^3*x^6 - 2*x^7 + (-6*x^5 + 6*E^3*x^5 - 6*x^6)*Log[1 - E^3
+ x] + (-6*x^4 + 6*E^3*x^4 - 6*x^5)*Log[1 - E^3 + x]^2 + (-2*x^3 + 2*E^3*x
^3 - 2*x^4)*Log[1 - E^3 + x]^3),x]
```

output
```
((-1 + 3*x^2)*Log[x]*((-1 + 3*x^2)*Log[x] + 8*x*(x + Log[1 - E^3 + x])))/(
4*x^2*(x + Log[1 - E^3 + x])^2)
```

3.319.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-12x^6-12x^5+4x^4+4x^3+e^3\left(12x^5-4x^3\right)+\left(-12x^4-12x^3+e^3\left(12x^3-4x\right)+4x^2+4x\right)\log^2\left(x-e^3+1\right)}{}$$

$$\Big\downarrow \ 6$$

$$\int \frac{-12x^6-12x^5+4x^4+4x^3+e^3\left(12x^5-4x^3\right)+\left(-12x^4-12x^3+e^3\left(12x^3-4x\right)+4x^2+4x\right)\log^2\left(x-e^3+1\right)}{}$$

$$\Big\downarrow \ 7239$$

$$\int \frac{\left(\left(3x^2-1\right)\log(x)+4x\left(x+\log\left(x-e^3+1\right)\right)\right)\left(\left(x-e^3+1\right)\left(3x^2-1\right)\left(x+\log\left(x-e^3+1\right)\right)+\log(x)\left(x(-3x\right.\right.}{2x^3\left(x-e^3+1\right)\left(x+\log\left(x-e^3+1\right)\right)^3}$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2}\int \frac{\left(\left(1-3x^2\right)\log(x)-4x\left(x+\log\left(x-e^3+1\right)\right)\right)\left(\left(x-e^3+1\right)\left(1-3x^2\right)\left(x+\log\left(x-e^3+1\right)\right)-\log(x)\left(x(-3\right.\right.}{x^3\left(x-e^3+1\right)\left(x+\log\left(x-e^3+1\right)\right)^3}$$

$$\Big\downarrow \ 7293$$

$$\frac{1}{2}\int\left(-\frac{(-x+e^3-2)\,(3x^2-1)^2\log^2(x)}{(-x+e^3-1)\,x^2\,(x+\log(x-e^3+1))^3}+\frac{(1-3x^2)\left(-3\log(x)x^3+x^3-3(1-e^3)\log(x)x^2+5\left(1-\frac{e^3}{5}\right.\right.}{x^3\,(x-e^3+1)\,(x+\log}\right.$$

$\downarrow$ 7299

$$\frac{1}{2}\int\left(-\frac{(-x+e^3-2)\,(3x^2-1)^2\log^2(x)}{(-x+e^3-1)\,x^2\,(x+\log(x-e^3+1))^3}+\frac{(1-3x^2)\left(-3\log(x)x^3+x^3-3(1-e^3)\log(x)x^2+5\left(1-\frac{e^3}{5}\right.\right.}{x^3\,(x-e^3+1)\,(x+\log}\right.$$

input
```
Int[(4*x^3 + 4*x^4 - 12*x^5 - 12*x^6 + E^3*(-4*x^3 + 12*x^5) + (8*x^2 + 8*
x^3 - 24*x^4 - 24*x^5 + E^3*(-8*x^2 + 24*x^4))*Log[1 - E^3 + x] + (4*x + 4
*x^2 - 12*x^3 - 12*x^4 + E^3*(-4*x + 12*x^3))*Log[1 - E^3 + x]^2 + Log[x]^
2*(3*x + 2*x^2 - 12*x^3 - 6*x^4 + 9*x^5 + E^3*(-2*x + 6*x^3) + (1 + x - 9*
x^4 - 9*x^5 + E^3*(-1 + 9*x^4))*Log[1 - E^3 + x]) + Log[x]*(-x - x^2 - 6*x
^3 - 2*x^4 + 3*x^5 - 9*x^6 + E^3*(x + 2*x^3 + 9*x^5) + (-1 - x - 10*x^2 -
6*x^3 - 9*x^4 - 21*x^5 + E^3*(1 + 6*x^2 + 21*x^4))*Log[1 - E^3 + x] + (-4*
x - 4*x^2 - 12*x^3 - 12*x^4 + E^3*(4*x + 12*x^3))*Log[1 - E^3 + x]^2))/(-2
*x^6 + 2*E^3*x^6 - 2*x^7 + (-6*x^5 + 6*E^3*x^5 - 6*x^6)*Log[1 - E^3 + x] +
 (-6*x^4 + 6*E^3*x^4 - 6*x^5)*Log[1 - E^3 + x]^2 + (-2*x^3 + 2*E^3*x^3 - 2
*x^4)*Log[1 - E^3 + x]^3),x]
```

output
```
$Aborted
```

3.319.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.319.
$$\int\frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e^3+x)+(4x+4x^2-12x^3-12x^4+e^3(-4x+12x^3))\log}{}$$

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.319.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. 2(28) = 56.

Time = 8.87 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.03

method	result	size
risch	$\frac{(9x^4\ln(x)+24x^4+24x^3\ln(-\mathrm{e}^3+x+1)-6x^2\ln(x)-8x^2-8x\ln(-\mathrm{e}^3+x+1)+\ln(x))\ln(x)}{4x^2(\ln(-\mathrm{e}^3+x+1)+x)^2}$	71
parallelrisch	$-\frac{-9x^4\ln(x)^2-24x^4\ln(x)+6x^2\ln(x)^2-\ln(x)^2+8x^2\ln(x)-24\ln(x)\ln(-\mathrm{e}^3+x+1)x^3+8\ln(x)\ln(-\mathrm{e}^3+x+1)x}{4x^2\left(x^2+2x\ln(-\mathrm{e}^3+x+1)+\ln(-\mathrm{e}^3+x+1)^2\right)}$	100

input
```
int(((((9*x^4-1)*exp(3)-9*x^5-9*x^4+x+1)*ln(-exp(3)+x+1)+(6*x^3-2*x)*exp(3
)+9*x^5-6*x^4-12*x^3+2*x^2+3*x)*ln(x)^2+(((12*x^3+4*x)*exp(3)-12*x^4-12*x^
3-4*x^2-4*x)*ln(-exp(3)+x+1)^2+((21*x^4+6*x^2+1)*exp(3)-21*x^5-9*x^4-6*x^3
-10*x^2-x-1)*ln(-exp(3)+x+1)+(9*x^5+2*x^3+x)*exp(3)-9*x^6+3*x^5-2*x^4-6*x^
3-x^2-x)*ln(x)+((12*x^3-4*x)*exp(3)-12*x^4-12*x^3+4*x^2+4*x)*ln(-exp(3)+x+
1)^2+((24*x^4-8*x^2)*exp(3)-24*x^5-24*x^4+8*x^3+8*x^2)*ln(-exp(3)+x+1)+(12
*x^5-4*x^3)*exp(3)-12*x^6-12*x^5+4*x^4+4*x^3)/((2*x^3*exp(3)-2*x^4-2*x^3)*
ln(-exp(3)+x+1)^3+(6*x^4*exp(3)-6*x^5-6*x^4)*ln(-exp(3)+x+1)^2+(6*x^5*exp(
3)-6*x^6-6*x^5)*ln(-exp(3)+x+1)+2*x^6*exp(3)-2*x^7-2*x^6),x,method=_RETURN
VERBOSE)
```

output
```
1/4*(9*x^4*ln(x)+24*x^4+24*x^3*ln(-exp(3)+x+1)-6*x^2*ln(x)-8*x^2-8*x*ln(-e
xp(3)+x+1)+ln(x))/x^2*ln(x)/(ln(-exp(3)+x+1)+x)^2
```

3.319.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 86 vs. 2(30) = 60.

Time = 0.32 (sec) , antiderivative size = 86, normalized size of antiderivative = 2.46

$$\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e}{}$$

$$=\frac{(9\,x^4-6\,x^2+1)\log(x)^2+8\,(3\,x^4-x^2+(3\,x^3-x)\log(x-e^3+1))\log(x)}{4\left(x^4+2\,x^3\log(x-e^3+1)+x^2\log(x-e^3+1)^2\right)}$$

3.319.

$$\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e^3+x)+(4x+4x^2-12x^3-12x^4+e^3(-4x+12x^3))\log}{}$$

input
```
integrate(((((9*x^4-1)*exp(3)-9*x^5-9*x^4+x+1)*log(-exp(3)+x+1)+(6*x^3-2*x
)*exp(3)+9*x^5-6*x^4-12*x^3+2*x^2+3*x)*log(x)^2+(((12*x^3+4*x)*exp(3)-12*x
^4-12*x^3-4*x^2-4*x)*log(-exp(3)+x+1)^2+((21*x^4+6*x^2+1)*exp(3)-21*x^5-9*
x^4-6*x^3-10*x^2-x-1)*log(-exp(3)+x+1)+(9*x^5+2*x^3+x)*exp(3)-9*x^6+3*x^5-
2*x^4-6*x^3-x^2-x)*log(x)+((12*x^3-4*x)*exp(3)-12*x^4-12*x^3+4*x^2+4*x)*lo
g(-exp(3)+x+1)^2+((24*x^4-8*x^2)*exp(3)-24*x^5-24*x^4+8*x^3+8*x^2)*log(-ex
p(3)+x+1)+(12*x^5-4*x^3)*exp(3)-12*x^6-12*x^5+4*x^4+4*x^3)/((2*x^3*exp(3)-
2*x^4-2*x^3)*log(-exp(3)+x+1)^3+(6*x^4*exp(3)-6*x^5-6*x^4)*log(-exp(3)+x+1
)^2+(6*x^5*exp(3)-6*x^6-6*x^5)*log(-exp(3)+x+1)+2*x^6*exp(3)-2*x^7-2*x^6),
x, algorithm=\
```

output
```
1/4*((9*x^4 - 6*x^2 + 1)*log(x)^2 + 8*(3*x^4 - x^2 + (3*x^3 - x)*log(x - e
^3 + 1))*log(x))/(x^4 + 2*x^3*log(x - e^3 + 1) + x^2*log(x - e^3 + 1)^2)
```

3.319.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 99 vs. $2(26) = 52$.

Time = 0.22 (sec) , antiderivative size = 99, normalized size of antiderivative = 2.83

$$\int \frac{4x^3 + 4x^4 - 12x^5 - 12x^6 + e^3(-4x^3 + 12x^5) + (8x^2 + 8x^3 - 24x^4 - 24x^5 + e^3(-8x^2 + 24x^4))\log(1 - e}{}$$

$$= \frac{9x^4\log(x)^2 + 24x^4\log(x) - 6x^2\log(x)^2 - 8x^2\log(x) + (24x^3\log(x) - 8x\log(x))\log(x - e^3 + 1) + \log}{4x^4 + 8x^3\log(x - e^3 + 1) + 4x^2\log(x - e^3 + 1)^2}$$

input
```
integrate(((((9*x**4-1)*exp(3)-9*x**5-9*x**4+x+1)*ln(-exp(3)+x+1)+(6*x**3-
2*x)*exp(3)+9*x**5-6*x**4-12*x**3+2*x**2+3*x)*ln(x)**2+(((12*x**3+4*x)*exp
(3)-12*x**4-12*x**3-4*x**2-4*x)*ln(-exp(3)+x+1)**2+((21*x**4+6*x**2+1)*exp
(3)-21*x**5-9*x**4-6*x**3-10*x**2-x-1)*ln(-exp(3)+x+1)+(9*x**5+2*x**3+x)*e
xp(3)-9*x**6+3*x**5-2*x**4-6*x**3-x**2-x)*ln(x)+((12*x**3-4*x)*exp(3)-12*x
**4-12*x**3+4*x**2+4*x)*ln(-exp(3)+x+1)**2+((24*x**4-8*x**2)*exp(3)-24*x**
5-24*x**4+8*x**3+8*x**2)*ln(-exp(3)+x+1)+(12*x**5-4*x**3)*exp(3)-12*x**6-1
2*x**5+4*x**4+4*x**3)/((2*x**3*exp(3)-2*x**4-2*x**3)*ln(-exp(3)+x+1)**3+(6
*x**4*exp(3)-6*x**5-6*x**4)*ln(-exp(3)+x+1)**2+(6*x**5*exp(3)-6*x**6-6*x**
5)*ln(-exp(3)+x+1)+2*x**6*exp(3)-2*x**7-2*x**6),x)
```

output
```
(9*x**4*log(x)**2 + 24*x**4*log(x) - 6*x**2*log(x)**2 - 8*x**2*log(x) + (2
4*x**3*log(x) - 8*x*log(x))*log(x - exp(3) + 1) + log(x)**2)/(4*x**4 + 8*x
**3*log(x - exp(3) + 1) + 4*x**2*log(x - exp(3) + 1)**2)
```

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$$\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e^3+x)+(4x+4x^2-12x^3-12x^4+e^3(-4x+12x^3))\log}{}$$

3.319.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 89 vs. $2(30) = 60$.

Time = 0.28 (sec) , antiderivative size = 89, normalized size of antiderivative = 2.54

$$\int \frac{4x^3 + 4x^4 - 12x^5 - 12x^6 + e^3(-4x^3 + 12x^5) + (8x^2 + 8x^3 - 24x^4 - 24x^5 + e^3(-8x^2 + 24x^4))\log(1 - e}{}$$

$$= \frac{8\,(3\,x^3 - x)\log(x - e^3 + 1)\log(x) + (9\,x^4 - 6\,x^2 + 1)\log(x)^2 + 8\,(3\,x^4 - x^2)\log(x)}{4\,\left(x^4 + 2\,x^3\log(x - e^3 + 1) + x^2\log(x - e^3 + 1)^2\right)}$$

input
```
integrate(((((9*x^4-1)*exp(3)-9*x^5-9*x^4+x+1)*log(-exp(3)+x+1)+(6*x^3-2*x
)*exp(3)+9*x^5-6*x^4-12*x^3+2*x^2+3*x)*log(x)^2+(((12*x^3+4*x)*exp(3)-12*x
^4-12*x^3-4*x^2-4*x)*log(-exp(3)+x+1)^2+((21*x^4+6*x^2+1)*exp(3)-21*x^5-9*
x^4-6*x^3-10*x^2-x-1)*log(-exp(3)+x+1)+(9*x^5+2*x^3+x)*exp(3)-9*x^6+3*x^5-
2*x^4-6*x^3-x^2-x)*log(x)+((12*x^3-4*x)*exp(3)-12*x^4-12*x^3+4*x^2+4*x)*lo
g(-exp(3)+x+1)^2+((24*x^4-8*x^2)*exp(3)-24*x^5-24*x^4+8*x^3+8*x^2)*log(-ex
p(3)+x+1)+(12*x^5-4*x^3)*exp(3)-12*x^6-12*x^5+4*x^4+4*x^3)/((2*x^3*exp(3)-
2*x^4-2*x^3)*log(-exp(3)+x+1)^3+(6*x^4*exp(3)-6*x^5-6*x^4)*log(-exp(3)+x+1
)^2+(6*x^5*exp(3)-6*x^6-6*x^5)*log(-exp(3)+x+1)+2*x^6*exp(3)-2*x^7-2*x^6),
x, algorithm=\
```

output
```
1/4*(8*(3*x^3 - x)*log(x - e^3 + 1)*log(x) + (9*x^4 - 6*x^2 + 1)*log(x)^2
+ 8*(3*x^4 - x^2)*log(x))/(x^4 + 2*x^3*log(x - e^3 + 1) + x^2*log(x - e^3
+ 1)^2)
```

3.319.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 100 vs. $2(30) = 60$.

Time = 0.43 (sec) , antiderivative size = 100, normalized size of antiderivative = 2.86

$$\int \frac{4x^3 + 4x^4 - 12x^5 - 12x^6 + e^3(-4x^3 + 12x^5) + (8x^2 + 8x^3 - 24x^4 - 24x^5 + e^3(-8x^2 + 24x^4))\log(1 - e}{}$$

$$= \frac{9\,x^4\log(x)^2 + 24\,x^4\log(x) + 24\,x^3\log(x - e^3 + 1)\log(x) - 6\,x^2\log(x)^2 - 8\,x^2\log(x) - 8\,x\log(x - e^3 -}{4\,\left(x^4 + 2\,x^3\log(x - e^3 + 1) + x^2\log(x - e^3 + 1)^2\right)}$$

3.319. $\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e^3+x)+(4x+4x^2-12x^3-12x^4+e^3(-4x+12x^3))\log}{}$

input
```
integrate(((((9*x^4-1)*exp(3)-9*x^5-9*x^4+x+1)*log(-exp(3)+x+1)+(6*x^3-2*x
)*exp(3)+9*x^5-6*x^4-12*x^3+2*x^2+3*x)*log(x)^2+(((12*x^3+4*x)*exp(3)-12*x
^4-12*x^3-4*x^2-4*x)*log(-exp(3)+x+1)^2+((21*x^4+6*x^2+1)*exp(3)-21*x^5-9*
x^4-6*x^3-10*x^2-x-1)*log(-exp(3)+x+1)+(9*x^5+2*x^3+x)*exp(3)-9*x^6+3*x^5-
2*x^4-6*x^3-x^2-x)*log(x)+((12*x^3-4*x)*exp(3)-12*x^4-12*x^3+4*x^2+4*x)*lo
g(-exp(3)+x+1)^2+((24*x^4-8*x^2)*exp(3)-24*x^5-24*x^4+8*x^3+8*x^2)*log(-ex
p(3)+x+1)+(12*x^5-4*x^3)*exp(3)-12*x^6-12*x^5+4*x^4+4*x^3)/((2*x^3*exp(3)-
2*x^4-2*x^3)*log(-exp(3)+x+1)^3+(6*x^4*exp(3)-6*x^5-6*x^4)*log(-exp(3)+x+1
)^2+(6*x^5*exp(3)-6*x^6-6*x^5)*log(-exp(3)+x+1)+2*x^6*exp(3)-2*x^7-2*x^6),
x, algorithm=\
```

output
```
1/4*(9*x^4*log(x)^2 + 24*x^4*log(x) + 24*x^3*log(x - e^3 + 1)*log(x) - 6*x
^2*log(x)^2 - 8*x^2*log(x) - 8*x*log(x - e^3 + 1)*log(x) + log(x)^2)/(x^4
+ 2*x^3*log(x - e^3 + 1) + x^2*log(x - e^3 + 1)^2)
```

3.319.9 Mupad [F(-1)]

Timed out.

$$\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e$$

$$=\int \frac{\ln(x-e^3+1)\,(e^3\,(8\,x^2-24\,x^4)-8\,x^2-8\,x^3+24\,x^4+24\,x^5)+\ln(x)\,\Big(x-e^3\,(9\,x^5+2\,x^3+x)+\ln$$

input
```
int((log(x - exp(3) + 1)*(exp(3)*(8*x^2 - 24*x^4) - 8*x^2 - 8*x^3 + 24*x^4
 + 24*x^5) + log(x)*(x - exp(3)*(x + 2*x^3 + 9*x^5) + log(x - exp(3) + 1)*
(x - exp(3)*(6*x^2 + 21*x^4 + 1) + 10*x^2 + 6*x^3 + 9*x^4 + 21*x^5 + 1) +
log(x - exp(3) + 1)^2*(4*x - exp(3)*(4*x + 12*x^3) + 4*x^2 + 12*x^3 + 12*x
^4) + x^2 + 6*x^3 + 2*x^4 - 3*x^5 + 9*x^6) + exp(3)*(4*x^3 - 12*x^5) + log
(x - exp(3) + 1)^2*(exp(3)*(4*x - 12*x^3) - 4*x - 4*x^2 + 12*x^3 + 12*x^4)
 - 4*x^3 - 4*x^4 + 12*x^5 + 12*x^6 - log(x)^2*(3*x + log(x - exp(3) + 1)*(
x + exp(3)*(9*x^4 - 1) - 9*x^4 - 9*x^5 + 1) - exp(3)*(2*x - 6*x^3) + 2*x^2
 - 12*x^3 - 6*x^4 + 9*x^5))/(log(x - exp(3) + 1)^3*(2*x^3 - 2*x^3*exp(3) +
 2*x^4) + log(x - exp(3) + 1)^2*(6*x^4 - 6*x^4*exp(3) + 6*x^5) - 2*x^6*exp
(3) + log(x - exp(3) + 1)*(6*x^5 - 6*x^5*exp(3) + 6*x^6) + 2*x^6 + 2*x^7),
x)
```

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$$\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e^3+x)+(4x+4x^2-12x^3-12x^4+e^3(-4x+12x^3))\log$$

output
```
int((log(x - exp(3) + 1)*(exp(3)*(8*x^2 - 24*x^4) - 8*x^2 - 8*x^3 + 24*x^4
 + 24*x^5) + log(x)*(x - exp(3)*(x + 2*x^3 + 9*x^5) + log(x - exp(3) + 1)*
(x - exp(3)*(6*x^2 + 21*x^4 + 1) + 10*x^2 + 6*x^3 + 9*x^4 + 21*x^5 + 1) +
log(x - exp(3) + 1)^2*(4*x - exp(3)*(4*x + 12*x^3) + 4*x^2 + 12*x^3 + 12*x
^4) + x^2 + 6*x^3 + 2*x^4 - 3*x^5 + 9*x^6) + exp(3)*(4*x^3 - 12*x^5) + log
(x - exp(3) + 1)^2*(exp(3)*(4*x - 12*x^3) - 4*x - 4*x^2 + 12*x^3 + 12*x^4)
 - 4*x^3 - 4*x^4 + 12*x^5 + 12*x^6 - log(x)^2*(3*x + log(x - exp(3) + 1)*(
x + exp(3)*(9*x^4 - 1) - 9*x^4 - 9*x^5 + 1) - exp(3)*(2*x - 6*x^3) + 2*x^2
 - 12*x^3 - 6*x^4 + 9*x^5))/(log(x - exp(3) + 1)^3*(2*x^3 - 2*x^3*exp(3) +
 2*x^4) + log(x - exp(3) + 1)^2*(6*x^4 - 6*x^4*exp(3) + 6*x^5) - 2*x^6*exp
(3) + log(x - exp(3) + 1)*(6*x^5 - 6*x^5*exp(3) + 6*x^6) + 2*x^6 + 2*x^7),
 x)
```

3.319.

$$\int \frac{4x^3+4x^4-12x^5-12x^6+e^3(-4x^3+12x^5)+(8x^2+8x^3-24x^4-24x^5+e^3(-8x^2+24x^4))\log(1-e^3+x)+(4x+4x^2-12x^3-12x^4+e^3(-4x+12x^3))\log}{}$$

3.320 $\int \frac{x\log\left(\frac{4}{x^2}\right)+(23+x)\log^3\left(\frac{4}{x^2}\right)+\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)}{x^2\log^3\left(\frac{4}{x^2}\right)}\,dx$

3.320.1 Optimal result

Integrand size = 50, antiderivative size = 22

$$\int \frac{x\log\left(\frac{4}{x^2}\right)+(23+x)\log^3\left(\frac{4}{x^2}\right)+\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)}{x^2\log^3\left(\frac{4}{x^2}\right)}\,dx = \frac{2+\left(25+x+\frac{x}{\log^2\left(\frac{4}{x^2}\right)}\right)\log(x)}{x}$$

output
```
(2+ln(x)*(25+x/ln(4/x^2)^2+x))/x
```

3.320.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{x\log\left(\frac{4}{x^2}\right)+(23+x)\log^3\left(\frac{4}{x^2}\right)+\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)}{x^2\log^3\left(\frac{4}{x^2}\right)}\,dx = \frac{2}{x}+\left(1+\frac{25}{x}+\frac{1}{\log^2\left(\frac{4}{x^2}\right)}\right)\log(x)$$

input
```
Integrate[(x*Log[4/x^2] + (23 + x)*Log[4/x^2]^3 + (4*x - 25*Log[4/x^2]^3)*
Log[x])/(x^2*Log[4/x^2]^3),x]
```

output
```
2/x + (1 + 25/x + Log[4/x^2]^(-2))*Log[x]
```

3.320.3 Rubi [A] (verified)

Time = 0.78 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.040, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x+23)\log^3\left(\frac{4}{x^2}\right)+\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)+x\log\left(\frac{4}{x^2}\right)}{x^2\log^3\left(\frac{4}{x^2}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)}{x^2\log^3\left(\frac{4}{x^2}\right)}+\frac{x\log^2\left(\frac{4}{x^2}\right)+23\log^2\left(\frac{4}{x^2}\right)+x}{x^2\log^2\left(\frac{4}{x^2}\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{\log(x)}{\log^2\left(\frac{4}{x^2}\right)}+\frac{2}{x}+\frac{25\log(x)}{x}+\log(x)$$

input
```
Int[(x*Log[4/x^2] + (23 + x)*Log[4/x^2]^3 + (4*x - 25*Log[4/x^2]^3)*Log[x]
)/(x^2*Log[4/x^2]^3),x]
```

output
```
2/x + Log[x] + (25*Log[x])/x + Log[x]/Log[4/x^2]^2
```

3.320.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.320.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(22) = 44.

Time = 2.59 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.50

method	result	size
parallelrisch	$-\frac{-4\ln(x)\ln\left(\frac{4}{x^2}\right)^2 x-100\ln(x)\ln\left(\frac{4}{x^2}\right)^2-4x\ln(x)-8\ln\left(\frac{4}{x^2}\right)^2}{4x\ln\left(\frac{4}{x^2}\right)^2}$	55
risch	$\frac{25\ln(x)}{x}+\frac{x\ln(x)+2}{x}+\frac{4\ln(x)}{\left(-i\pi\ \mathrm{csgn}(ix^2)\,\mathrm{csgn}(ix)^2+2i\pi\ \mathrm{csgn}(ix^2)^2\,\mathrm{csgn}(ix)-i\pi\ \mathrm{csgn}(ix^2)^3-4\ln(2)+4\ln(x)\right)^2}$	83
parts	Expression too large to display	961
default	Expression too large to display	989

input
```
int(((-25*ln(4/x^2)^3+4*x)*ln(x)+(x+23)*ln(4/x^2)^3+x*ln(4/x^2))/x^2/ln(4/
x^2)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4/x*(-4*ln(x)*ln(4/x^2)^2*x-100*ln(x)*ln(4/x^2)^2-4*x*ln(x)-8*ln(4/x^2)
^2)/ln(4/x^2)^2
```

3.320.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(22) = 44.

Time = 0.28 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.50

$$\int \frac{x\log\left(\frac{4}{x^2}\right)+(23+x)\log^3\left(\frac{4}{x^2}\right)+\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)}{x^2\log^3\left(\frac{4}{x^2}\right)}\,dx$$
$$=-\frac{(x+25)\log\left(\frac{4}{x^2}\right)^3-2\,(25\,\log(2)+2)\log\left(\frac{4}{x^2}\right)^2-2\,x\log(2)+x\log\left(\frac{4}{x^2}\right)}{2\,x\log\left(\frac{4}{x^2}\right)^2}$$

input
```
integrate(((-25*log(4/x^2)^3+4*x)*log(x)+(x+23)*log(4/x^2)^3+x*log(4/x^2))
/x^2/log(4/x^2)^3,x, algorithm=\
```

output
```
-1/2*((x + 25)*log(4/x^2)^3 - 2*(25*log(2) + 2)*log(4/x^2)^2 - 2*x*log(2)
+ x*log(4/x^2))/(x*log(4/x^2)^2)
```

3.320.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.68

$$\int \frac{x\log\left(\frac{4}{x^2}\right)+(23+x)\log^3\left(\frac{4}{x^2}\right)+\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)}{x^2\log^3\left(\frac{4}{x^2}\right)}\,dx$$
$$=\log(x)+\frac{\log(x)}{4\log(x)^2-8\log(2)\log(x)+4\log(2)^2}+\frac{25\log(x)}{x}+\frac{2}{x}$$

input
```
integrate(((-25*ln(4/x**2)**3+4*x)*ln(x)+(x+23)*ln(4/x**2)**3+x*ln(4/x**2)
)/x**2/ln(4/x**2)**3,x)
```

output
```
log(x) + log(x)/(4*log(x)**2 - 8*log(2)*log(x) + 4*log(2)**2) + 25*log(x)/
x + 2/x
```

3.320.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{x\log\left(\frac{4}{x^2}\right)+(23+x)\log^3\left(\frac{4}{x^2}\right)+\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)}{x^2\log^3\left(\frac{4}{x^2}\right)}\,dx$$
$$=\frac{25\log(x)}{x}+\frac{2}{x}+\frac{\log(x)}{\log\left(\frac{4}{x^2}\right)^2}+\log(x)$$

input
```
integrate(((-25*log(4/x^2)^3+4*x)*log(x)+(x+23)*log(4/x^2)^3+x*log(4/x^2))
/x^2/log(4/x^2)^3,x, algorithm=\
```

output
```
25*log(x)/x + 2/x + log(x)/log(4/x^2)^2 + log(x)
```

3.320.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

$$\int \frac{x\log\left(\frac{4}{x^2}\right)+(23+x)\log^3\left(\frac{4}{x^2}\right)+\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)}{x^2\log^3\left(\frac{4}{x^2}\right)}\,dx$$
$$=\frac{\log(x)}{4\left(\log(2)^2-2\log(2)\log(x)+\log(x)^2\right)}+\frac{25\log(x)}{x}+\frac{2}{x}+\log(x)$$

input
```
integrate(((-25*log(4/x^2)^3+4*x)*log(x)+(x+23)*log(4/x^2)^3+x*log(4/x^2))
/x^2/log(4/x^2)^3,x, algorithm=\
```

output
```
1/4*log(x)/(log(2)^2 - 2*log(2)*log(x) + log(x)^2) + 25*log(x)/x + 2/x + l
og(x)
```

3.320.9 Mupad [B] (verification not implemented)

Time = 12.67 (sec) , antiderivative size = 74, normalized size of antiderivative = 3.36

$$\int \frac{x\log\left(\frac{4}{x^2}\right)+(23+x)\log^3\left(\frac{4}{x^2}\right)+\left(4x-25\log^3\left(\frac{4}{x^2}\right)\right)\log(x)}{x^2\log^3\left(\frac{4}{x^2}\right)}\,dx$$
$$= \ln(x)-\frac{1}{4\ln\left(\frac{4}{x^2}\right)}+\frac{25\ln(x)}{x}+\frac{\frac{\ln\left(\frac{4}{x^2}\right)}{4}+\ln(x)}{4\ln(x)^2-4\ln(x)\left(\ln\left(\frac{4}{x^2}\right)+2\ln(x)\right)+\left(\ln\left(\frac{4}{x^2}\right)+2\ln(x)\right)^2}+\frac{2}{x}$$

input
```
int((log(4/x^2)^3*(x + 23) + x*log(4/x^2) + log(x)*(4*x - 25*log(4/x^2)^3)
)/(x^2*log(4/x^2)^3),x)
```

output
```
log(x) - 1/(4*log(4/x^2)) + (25*log(x))/x + (log(4/x^2)/4 + log(x))/(4*log
(x)^2 - 4*log(x)*(log(4/x^2) + 2*log(x)) + (log(4/x^2) + 2*log(x))^2) + 2/
x
```

3.321 $\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(}{(x^2}$

3.321.1 Optimal result

Integrand size = 203, antiderivative size = 31

$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x)}{(x^2-x^3+(-x^2+x^3)\log(x}$$
$$=\frac{\frac{e}{x}-\log(x)}{\log\left(-x+x\left(\log(x)+\log^2(-3+3x)\right)\right)}$$

output
```
(exp(1)/x-ln(x))/ln((ln(x)+ln(-3+3*x)^2)*x-x)
```

3.321.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.90

$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x)}{(x^2-x^3+(-x^2+x^3)\log(x}$$
$$=\frac{e-x\log(x)}{x\log\left(x\left(-1+\log^2(3(-1+x))+\log(x)\right)\right)}$$

input
```
Integrate[(E*(1 - x)*Log[x] + (-x + x^2)*Log[x]^2 + (-2*E*x + 2*x^2*Log[x]
)*Log[-3 + 3*x] + (E*(1 - x) + (-x + x^2)*Log[x])*Log[-3 + 3*x]^2 + (E*(-1
 + x) - x + x^2 + (E*(1 - x) + x - x^2)*Log[x] + (E*(1 - x) + x - x^2)*Log
[-3 + 3*x]^2)*Log[-x + x*Log[x] + x*Log[-3 + 3*x]^2])/((x^2 - x^3 + (-x^2
+ x^3)*Log[x] + (-x^2 + x^3)*Log[-3 + 3*x]^2)*Log[-x + x*Log[x] + x*Log[-3
 + 3*x]^2]^2),x]
```

3.321.
$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x))\log^2(-3+3x)+(e(-1+x)-x+x^2+(e(1-x)+x-}{(x^2-x^3+(-x^2+x^3)\log(x)+(-x^2+x^3)\log^2(-3+3x))\log^2(-x+x\log(x)+x\log}$

output
```
(E - x*Log[x])/(x*Log[x*(-1 + Log[3*(-1 + x)]^2 + Log[x])])
```

3.321.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x^2-x)\log^2(x)+((x^2-x)\log(x)+e(1-x))\log^2(3x-3)+(x^2+(-x^2+x+e(1-x))\log^2(3x-3)+(-}{(-x^3+x^2+(x^3-x^2)\log^2(3x-3)+}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(x^2-x)\log^2(x)+((x^2-x)\log(x)+e(1-x))\log^2(3x-3)+(x^2+(-x^2+x+e(1-x))\log^2(3x-3)+(-}{(1-x)x^2\left(-\log^2(3(x-1))-\right.}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-x-e}{x^2\log\left(-x+x\log^2(3(x-1))+x\log(x)\right)}+\frac{(e-x\log(x))\left(-x\log^2(3(x-1))+\log^2(3(x-1))-2x\log(3(x\right.}{(1-x)x^2\left(-\log^2(3(x-1))-\log(x)+1\right)\log^2\left(-x+x\log^2\right.}\right.$$

$$\Big\downarrow \text{7299}$$

$$\int \left(\frac{-x-e}{x^2\log\left(-x+x\log^2(3(x-1))+x\log(x)\right)}+\frac{(e-x\log(x))\left(-x\log^2(3(x-1))+\log^2(3(x-1))-2x\log(3(x\right.}{(1-x)x^2\left(-\log^2(3(x-1))-\log(x)+1\right)\log^2\left(-x+x\log^2\right.}\right.$$

input
```
Int[(E*(1 - x)*Log[x] + (-x + x^2)*Log[x]^2 + (-2*E*x + 2*x^2*Log[x])*Log[
-3 + 3*x] + (E*(1 - x) + (-x + x^2)*Log[x])*Log[-3 + 3*x]^2 + (E*(-1 + x)
- x + x^2 + (E*(1 - x) + x - x^2)*Log[x] + (E*(1 - x) + x - x^2)*Log[-3 +
3*x]^2)*Log[-x + x*Log[x] + x*Log[-3 + 3*x]^2])/((x^2 - x^3 + (-x^2 + x^3)
*Log[x] + (-x^2 + x^3)*Log[-3 + 3*x]^2)*Log[-x + x*Log[x] + x*Log[-3 + 3*x
]^2]^2),x]
```

output
```
$Aborted
```

3.321.

$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x))\log^2(-3+3x)+(e(-1+x)-x+x^2+(e(1-x)+x-}{(x^2-x^3+(-x^2+x^3)\log(x)+(-x^2+x^3)\log^2(-3+3x))\log^2(-x+x\log(x)+x\log}$$

3.321.3.1 Defintions of rubi rules used

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.321.4 Maple [F(-1)]

Timed out.

$$\int \frac{\left(\left((1-x)\,\mathrm{e}-x^2+x\right)\ln\left(-3+3x\right)^2+\left((1-x)\,\mathrm{e}-x^2+x\right)\ln\left(x\right)+\left(-1+x\right)\mathrm{e}+x^2-x\right)\ln\left(x\ln\left(-3+3\right.\right.}{\left(\left(x^3-x^2\right)\ln\left(-3+3x\right)^2+\left(x^3\right.\right.}$$

input
```
int(((((1-x)*exp(1)-x^2+x)*ln(-3+3*x)^2+((1-x)*exp(1)-x^2+x)*ln(x)+(-1+x)*
exp(1)+x^2-x)*ln(x*ln(-3+3*x)^2+x*ln(x)-x)+(ln(x)*(x^2-x)+(1-x)*exp(1))*ln
(-3+3*x)^2+(2*x^2*ln(x)-2*x*exp(1))*ln(-3+3*x)+(x^2-x)*ln(x)^2+(1-x)*exp(1
)*ln(x))/((x^3-x^2)*ln(-3+3*x)^2+(x^3-x^2)*ln(x)-x^3+x^2)/ln(x*ln(-3+3*x)^
2+x*ln(x)-x)^2,x)
```

output
```
int(((((1-x)*exp(1)-x^2+x)*ln(-3+3*x)^2+((1-x)*exp(1)-x^2+x)*ln(x)+(-1+x)*
exp(1)+x^2-x)*ln(x*ln(-3+3*x)^2+x*ln(x)-x)+(ln(x)*(x^2-x)+(1-x)*exp(1))*ln
(-3+3*x)^2+(2*x^2*ln(x)-2*x*exp(1))*ln(-3+3*x)+(x^2-x)*ln(x)^2+(1-x)*exp(1
)*ln(x))/((x^3-x^2)*ln(-3+3*x)^2+(x^3-x^2)*ln(x)-x^3+x^2)/ln(x*ln(-3+3*x)^
2+x*ln(x)-x)^2,x)
```

3.321.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.13

$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x\right.}{(x^2-x^3+(-x^2+x^3)\log(x\right.}$$

$$=-\frac{x\log\left(x\right)-e}{x\log\left(x\log\left(3\,x-3\right)^2+x\log\left(x\right)-x\right)}$$

3.321.
$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x))\log^2(-3+3x)+(e(-1+x)-x+x^2+(e(1-x)+x-}{(x^2-x^3+(-x^2+x^3)\log(x)+(-x^2+x^3)\log^2(-3+3x))\log^2(-x+x\log(x)+x\log}$

input
```
integrate((((((1-x)*exp(1)-x^2+x)*log(-3+3*x)^2+((1-x)*exp(1)-x^2+x)*log(x)
+(-1+x)*exp(1)+x^2-x)*log(x*log(-3+3*x)^2+x*log(x)-x)+(log(x)*(x^2-x)+(1-x
)*exp(1))*log(-3+3*x)^2+(2*x^2*log(x)-2*x*exp(1))*log(-3+3*x)+(x^2-x)*log(
x)^2+(1-x)*exp(1)*log(x))/((x^3-x^2)*log(-3+3*x)^2+(x^3-x^2)*log(x)-x^3+x^
2)/log(x*log(-3+3*x)^2+x*log(x)-x)^2,x, algorithm=\
```

output
```
-(x*log(x) - e)/(x*log(x*log(3*x - 3)^2 + x*log(x) - x))
```

3.321.6 Sympy [A] (verification not implemented)

Time = 0.97 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x)}{(x^2-x^3+(-x^2+x^3)\log(x}$$

$$=\frac{-x\log{(x)}+e}{x\log{\left(x\log{(x)}+x\log{(3x-3)}^2-x\right)}}$$

input
```
integrate(((((1-x)*exp(1)-x**2+x)*ln(-3+3*x)**2+((1-x)*exp(1)-x**2+x)*ln(x
)+(-1+x)*exp(1)+x**2-x)*ln(x*ln(-3+3*x)**2+x*ln(x)-x)+(ln(x)*(x**2-x)+(1-x
)*exp(1))*ln(-3+3*x)**2+(2*x**2*ln(x)-2*x*exp(1))*ln(-3+3*x)+(x**2-x)*ln(x
)**2+(1-x)*exp(1)*ln(x))/((x**3-x**2)*ln(-3+3*x)**2+(x**3-x**2)*ln(x)-x**3
+x**2)/ln(x*ln(-3+3*x)**2+x*ln(x)-x)**2,x)
```

output
```
(-x*log(x) + E)/(x*log(x*log(x) + x*log(3*x - 3)**2 - x))
```

3.321.7 Maxima [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.39

$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x)}{(x^2-x^3+(-x^2+x^3)\log(x}$$

$$=-\frac{x\log{(x)}-e}{x\log{\left(\log{(3)}^2+2\,\log{(3)}\log{(x-1)}+\log{(x-1)}^2+\log{(x)}-1\right)}+x\log{(x)}}$$

3.321.
$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x))\log^2(-3+3x)+(e(-1+x)-x+x^2+(e(1-x)+x-}{(x^2-x^3+(-x^2+x^3)\log(x)+(-x^2+x^3)\log^2(-3+3x))\log^2(-x+x\log(x)+x\log}$$

input
```
integrate(((((1-x)*exp(1)-x^2+x)*log(-3+3*x)^2+((1-x)*exp(1)-x^2+x)*log(x)
+(-1+x)*exp(1)+x^2-x)*log(x*log(-3+3*x)^2+x*log(x)-x)+(log(x)*(x^2-x)+(1-x
)*exp(1))*log(-3+3*x)^2+(2*x^2*log(x)-2*x*exp(1))*log(-3+3*x)+(x^2-x)*log(
x)^2+(1-x)*exp(1)*log(x))/((x^3-x^2)*log(-3+3*x)^2+(x^3-x^2)*log(x)-x^3+x^
2)/log(x*log(-3+3*x)^2+x*log(x)-x)^2,x, algorithm=\
```

output
```
-(x*log(x) - e)/(x*log(log(3)^2 + 2*log(3)*log(x - 1) + log(x - 1)^2 + log
(x) - 1) + x*log(x))
```

3.321.8 Giac [A] (verification not implemented)

Time = 0.63 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.06

$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x)}{(x^2-x^3+(-x^2+x^3)\log(x}$$
$$= -\frac{x\log(x)-e}{x\log\left(\log(3x-3)^2+\log(x)-1\right)+x\log(x)}$$

input
```
integrate(((((1-x)*exp(1)-x^2+x)*log(-3+3*x)^2+((1-x)*exp(1)-x^2+x)*log(x)
+(-1+x)*exp(1)+x^2-x)*log(x*log(-3+3*x)^2+x*log(x)-x)+(log(x)*(x^2-x)+(1-x
)*exp(1))*log(-3+3*x)^2+(2*x^2*log(x)-2*x*exp(1))*log(-3+3*x)+(x^2-x)*log(
x)^2+(1-x)*exp(1)*log(x))/((x^3-x^2)*log(-3+3*x)^2+(x^3-x^2)*log(x)-x^3+x^
2)/log(x*log(-3+3*x)^2+x*log(x)-x)^2,x, algorithm=\
```

output
```
-(x*log(x) - e)/(x*log(log(3*x - 3)^2 + log(x) - 1) + x*log(x))
```

3.321.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x)}{(x^2-x^3+(-x^2+x^3)\log(x}$$
$$= \int \frac{\ln\left(x\ln(3x-3)^2-x+x\ln(x)\right)\left(x+\ln(3x-3)^2\left(e(x-1)-x+x^2\right)-e(x-1)-x^2+\ln(x)\left(e(\right.\right.}{\ln\left(x\ln(3x-3)^2-x+x\ln\right.}$$

3.321. $\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x))\log^2(-3+3x)+(e(-1+x)-x+x^2+(e(1-x)+x-}{(x^2-x^3+(-x^2+x^3)\log(x)+(-x^2+x^3)\log^2(-3+3x))\log^2(-x+x\log(x)+x\log}$

input
```
int((log(x*log(x) - x + x*log(3*x - 3)^2)*(x + log(3*x - 3)^2*(exp(1)*(x -
 1) - x + x^2) - exp(1)*(x - 1) - x^2 + log(x)*(exp(1)*(x - 1) - x + x^2))
 + log(3*x - 3)^2*(log(x)*(x - x^2) + exp(1)*(x - 1)) + log(x)^2*(x - x^2)
 - log(3*x - 3)*(2*x^2*log(x) - 2*x*exp(1)) + exp(1)*log(x)*(x - 1))/(log(
x*log(x) - x + x*log(3*x - 3)^2)^2*(log(x)*(x^2 - x^3) + log(3*x - 3)^2*(x
^2 - x^3) - x^2 + x^3)),x)
```

output
```
int((log(x*log(x) - x + x*log(3*x - 3)^2)*(x + log(3*x - 3)^2*(exp(1)*(x -
 1) - x + x^2) - exp(1)*(x - 1) - x^2 + log(x)*(exp(1)*(x - 1) - x + x^2))
 + log(3*x - 3)^2*(log(x)*(x - x^2) + exp(1)*(x - 1)) + log(x)^2*(x - x^2)
 - log(3*x - 3)*(2*x^2*log(x) - 2*x*exp(1)) + exp(1)*log(x)*(x - 1))/(log(
x*log(x) - x + x*log(3*x - 3)^2)^2*(log(x)*(x^2 - x^3) + log(3*x - 3)^2*(x
^2 - x^3) - x^2 + x^3)), x)
```

3.321.

$$\int \frac{e(1-x)\log(x)+(-x+x^2)\log^2(x)+(-2ex+2x^2\log(x))\log(-3+3x)+(e(1-x)+(-x+x^2)\log(x))\log^2(-3+3x)+(e(-1+x)-x+x^2+(e(1-x)+x-}{(x^2-x^3+(-x^2+x^3)\log(x)+(-x^2+x^3)\log^2(-3+3x))\log^2(-x+x\log(x)+x\log}$$

3.322 $\int \frac{1}{x} dx$

3.322.1 Optimal result

Integrand size = 3, antiderivative size = 2

$$\int \frac{1}{x} dx = \log(x)$$

output
```
ln(x)
```

3.322.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 2, normalized size of antiderivative = 1.00

$$\int \frac{1}{x} dx = \log(x)$$

input
```
Integrate[x^(-1),x]
```

output
```
Log[x]
```

3.322.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 2, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{x} \, dx$$
$$\Big\downarrow \; 14$$
$$\log(x)$$

input
```
Int[x^(-1),x]
```

output
```
Log[x]
```

3.322.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.322.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 3, normalized size of antiderivative = 1.50

method	result	size
default	$\ln(x)$	3
norman	$\ln(x)$	3
risch	$\ln(x)$	3
parallelrisch	$\ln(x)$	3

input
```
int(1/x,x,method=_RETURNVERBOSE)
```

output
```
ln(x)
```

3.322.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 2, normalized size of antiderivative = 1.00

$$\int \frac{1}{x} dx = \log(x)$$

input
```
integrate(1/x,x, algorithm=\
```

output
```
log(x)
```

3.322.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 2, normalized size of antiderivative = 1.00

$$\int \frac{1}{x} dx = \log(x)$$

input
```
integrate(1/x,x)
```

output
```
log(x)
```

3.322.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 2, normalized size of antiderivative = 1.00

$$\int \frac{1}{x} dx = \log(x)$$

input
```
integrate(1/x,x, algorithm=\
```

output
```
log(x)
```

3.322.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 3, normalized size of antiderivative = 1.50

$$\int \frac{1}{x}\,dx = \log\left(|x|\right)$$

input
```
integrate(1/x,x, algorithm=\
```

output
```
log(abs(x))
```

3.322.9 Mupad [B] (verification not implemented)

Time = 0.01 (sec) , antiderivative size = 2, normalized size of antiderivative = 1.00

$$\int \frac{1}{x}\,dx = \ln\left(x\right)$$

input
```
int(1/x,x)
```

output
```
log(x)
```

3.323 $\int \frac{-3x+e^{2x}(4e^5+2x)+e^x(-x+x^2+e^5(4+x))+(24x+e^{2x}(-2e^5+18x)+}{x+2e^xx+e^{2x}x+(-8x-16e^xx}$

3.323.1 Optimal result

Integrand size = 265, antiderivative size = 30

$$\int \frac{-3x+e^{2x}(4e^5+2x)+e^x(-x+x^2+e^5(4+x))+(24x+e^{2x}(-2e^5+18x)+e^x(e^5(-2-4x)+42x-4}{x+2e^xx+e^{2x}x+(-8x-16e^xx-8e^{2x}x)\log(x)+(18x+}$$
$$=-3x+\frac{e^x(e^5+x)}{(1+e^x)(-3+(-2+\log(x))^2)}$$

output
```
-3*x+exp(x)*(exp(5)+x)/((ln(x)-2)^2-3)/(exp(x)+1)
```

3.323.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{-3x+e^{2x}(4e^5+2x)+e^x(-x+x^2+e^5(4+x))+(24x+e^{2x}(-2e^5+18x)+e^x(e^5(-2-4x)+42x-4}{x+2e^xx+e^{2x}x+(-8x-16e^xx-8e^{2x}x)\log(x)+(18x+}$$
$$=-3x+\frac{e^x(e^5+x)}{(1+e^x)(1-4\log(x)+\log^2(x))}$$

input
```
Integrate[(-3*x + E^(2*x)*(4*E^5 + 2*x) + E^x*(-x + x^2 + E^5*(4 + x)) + (
24*x + E^(2*x)*(-2*E^5 + 18*x) + E^x*(E^5*(-2 - 4*x) + 42*x - 4*x^2))*Log[
x] + (-54*x - 53*E^(2*x)*x + E^x*(-107*x + E^5*x + x^2))*Log[x]^2 + (24*x
+ 48*E^x*x + 24*E^(2*x)*x)*Log[x]^3 + (-3*x - 6*E^x*x - 3*E^(2*x)*x)*Log[x
]^4)/(x + 2*E^x*x + E^(2*x)*x + (-8*x - 16*E^x*x - 8*E^(2*x)*x)*Log[x] + (
18*x + 36*E^x*x + 18*E^(2*x)*x)*Log[x]^2 + (-8*x - 16*E^x*x - 8*E^(2*x)*x)
*Log[x]^3 + (x + 2*E^x*x + E^(2*x)*x)*Log[x]^4),x]
```

output
```
-3*x + (E^x*(E^5 + x))/((1 + E^x)*(1 - 4*Log[x] + Log[x]^2))
```

3.323.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(x^2-x+e^5(x+4)\right)+\left(e^x\left(x^2+e^5x-107x\right)-53e^{2x}x-54x\right)\log^2(x)+\left(e^x\left(-4x^2+42x+e^5(-4x-2)\right)+\right.}{2e^xx+e^{2x}x+x+\left(2e^xx+e^{2x}x+x\right)\log^4(x)+\left(-16e^xx-8e^{2x}x-8\right.}$$

$\Big\downarrow$ 7292

$$\int \frac{e^x\left(x^2-x+e^5(x+4)\right)+\left(e^x\left(x^2+e^5x-107x\right)-53e^{2x}x-54x\right)\log^2(x)+\left(e^x\left(-4x^2+42x+e^5(-4x-2)\right)+\right.}{\left(e^x+1\right)^2x\left(\mathrm{l}\right.}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{x^2+x^2\log^2(x)-4x^2\log(x)-5\left(1-\frac{e^5}{5}\right)x-\left(1-e^5\right)x\log^2(x)+6\left(1-\frac{2e^5}{3}\right)x\log(x)+2e^5\log(x)-4e^5}{\left(e^x+1\right)x\left(\log^2(x)-4\log(x)+1\right)^2}-\right.$$

$\Big\downarrow$ 2009

$$-\left(5-e^5\right)\int \frac{1}{(1+e^x)\left(\log^2(x)-4\log(x)+1\right)^2}dx-4e^5\int \frac{1}{(1+e^x)x\left(\log^2(x)-4\log(x)+1\right)^2}dx+\int \frac{x}{(1+e^x)\left(\log^2(x)-4\log(x)+1\right)^2}dx+2\left(3-2e^5\right)\int \frac{\log(x)}{(1+e^x)\left(\log^2(x)-4\log(x)+1\right)^2}dx+2e^5\int \frac{\log(x)}{(1+e^x)x\left(\log^2(x)-4\log(x)+1\right)^2}dx-4\int \frac{x\log(x)}{(1+e^x)\left(\log^2(x)-4\log(x)+1\right)^2}dx-\left(1-e^5\right)\int \frac{\log^2(x)}{(1+e^x)\left(\log^2(x)-4\log(x)+1\right)^2}dx+\int \frac{x\log^2(x)}{(1+e^x)\left(\log^2(x)-4\log(x)+1\right)^2}dx-e^5\int \frac{1}{(1+e^x)^2\left(\log^2(x)-4\log(x)+1\right)}dx-\int \frac{x}{(1+e^x)^2\left(\log^2(x)-4\log(x)+1\right)}dx-\frac{1}{6}\left(2+\sqrt{3}\right)e^{2+\sqrt{3}}\text{ExpIntegralEi}\left(\log(x)-\sqrt{3}-2\right)+\frac{e^{2+\sqrt{3}}\text{ExpIntegralEi}\left(\log(x)-\sqrt{3}-2\right)}{2\sqrt{3}}+\frac{1}{3}e^{2+\sqrt{3}}\text{ExpIntegralEi}\left(\log(x)-\sqrt{3}-2\right)-\frac{1}{6}\left(2-\sqrt{3}\right)e^{2-\sqrt{3}}\text{ExpIntegralEi}\left(\log(x)+\sqrt{3}-2\right)-\frac{e^{2-\sqrt{3}}\text{ExpIntegralEi}\left(\log(x)+\sqrt{3}-2\right)}{2\sqrt{3}}+\frac{1}{3}e^{2-\sqrt{3}}\text{ExpIntegralEi}\left(\log(x)+\sqrt{3}-2\right)-3x+\frac{e^5}{\log^2(x)-4\log(x)+1}-\frac{\left(2-\sqrt{3}\right)x}{6\left(-\log(x)-\sqrt{3}+2\right)}+\frac{x}{3\left(-\log(x)-\sqrt{3}+2\right)}-\frac{\left(2+\sqrt{3}\right)x}{6\left(-\log(x)+\sqrt{3}+2\right)}+\frac{x}{3\left(-\log(x)+\sqrt{3}+2\right)}$$

input
```
Int[(-3*x + E^(2*x)*(4*E^5 + 2*x) + E^x*(-x + x^2 + E^5*(4 + x)) + (24*x +
 E^(2*x)*(-2*E^5 + 18*x) + E^x*(E^5*(-2 - 4*x) + 42*x - 4*x^2))*Log[x] + (
-54*x - 53*E^(2*x)*x + E^x*(-107*x + E^5*x + x^2))*Log[x]^2 + (24*x + 48*E
^x*x + 24*E^(2*x)*x)*Log[x]^3 + (-3*x - 6*E^x*x - 3*E^(2*x)*x)*Log[x]^4)/(
x + 2*E^x*x + E^(2*x)*x + (-8*x - 16*E^x*x - 8*E^(2*x)*x)*Log[x] + (18*x +
 36*E^x*x + 18*E^(2*x)*x)*Log[x]^2 + (-8*x - 16*E^x*x - 8*E^(2*x)*x)*Log[x
]^3 + (x + 2*E^x*x + E^(2*x)*x)*Log[x]^4),x]
```

output
```
$Aborted
```

3.323.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.323.

$$\int \frac{-3x+e^{2x}\left(4e^5+2x\right)+e^x\left(-x+x^2+e^5(4+x)\right)+\left(24x+e^{2x}\left(-2e^5+18x\right)+e^x\left(e^5(-2-4x)+42x-4x^2\right)\right)\log(x)+\left(-54x-53e^{2x}x+e^x\left(-107x+e^5x+x^2\right)\right.}{x+2e^xx+e^{2x}x+\left(-8x-16e^xx-8e^{2x}x\right)\log(x)+\left(18x+36e^xx+18e^{2x}x\right)\log^2(x)+\left(-8x-16e^xx-8e^{2x}x\right)\log}$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.323.4 Maple [A] (verified)

Time = 2.66 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

method	result	size
risch	$-3x+\frac{(e^5+x)e^x}{(e^x+1)\left(\ln(x)^2-4\ln(x)+1\right)}$	30
parallelrisch	$\frac{-3x\,e^x\ln(x)^2-3x\ln(x)^2+12x\,e^x\ln(x)+e^5e^x+12x\ln(x)-2\,e^x x-3x}{(e^x+1)\left(\ln(x)^2-4\ln(x)+1\right)}$	62

input
```
int(((-3*x*exp(x)^2-6*exp(x)*x-3*x)*ln(x)^4+(24*x*exp(x)^2+48*exp(x)*x+24*
x)*ln(x)^3+(-53*x*exp(x)^2+(x*exp(5)+x^2-107*x)*exp(x)-54*x)*ln(x)^2+((-2*
exp(5)+18*x)*exp(x)^2+((-4*x-2)*exp(5)-4*x^2+42*x)*exp(x)+24*x)*ln(x)+(4*e
xp(5)+2*x)*exp(x)^2+((4+x)*exp(5)+x^2-x)*exp(x)-3*x)/((x*exp(x)^2+2*exp(x)
*x+x)*ln(x)^4+(-8*x*exp(x)^2-16*exp(x)*x-8*x)*ln(x)^3+(18*x*exp(x)^2+36*ex
p(x)*x+18*x)*ln(x)^2+(-8*x*exp(x)^2-16*exp(x)*x-8*x)*ln(x)+x*exp(x)^2+2*ex
p(x)*x+x),x,method=_RETURNVERBOSE)
```

output
```
-3*x+(exp(5)+x)*exp(x)/(exp(x)+1)/(ln(x)^2-4*ln(x)+1)
```

3.323.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(27) = 54.

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.07

$$\int \frac{-3x+e^{2x}(4e^5+2x)+e^x(-x+x^2+e^5(4+x))+(24x+e^{2x}(-2e^5+18x)+e^x(e^5(-2-4x)+42x-4}{x+2e^xx+e^{2x}x+(-8x-16e^xx-8e^{2x}x)\log(x)+(18x+3}$$
$$=-\frac{3\,(xe^x+x)\log{(x)}^2+(2\,x-e^5)e^x-12\,(xe^x+x)\log{(x)}+3\,x}{(e^x+1)\log{(x)}^2-4\,(e^x+1)\log{(x)}+e^x+1}$$

input
```
integrate(((-3*x*exp(x)^2-6*exp(x)*x-3*x)*log(x)^4+(24*x*exp(x)^2+48*exp(x
)*x+24*x)*log(x)^3+(-53*x*exp(x)^2+(x*exp(5)+x^2-107*x)*exp(x)-54*x)*log(x
)^2+((-2*exp(5)+18*x)*exp(x)^2+((-4*x-2)*exp(5)-4*x^2+42*x)*exp(x)+24*x)*l
og(x)+(4*exp(5)+2*x)*exp(x)^2+((4+x)*exp(5)+x^2-x)*exp(x)-3*x)/((x*exp(x)^
2+2*exp(x)*x+x)*log(x)^4+(-8*x*exp(x)^2-16*exp(x)*x-8*x)*log(x)^3+(18*x*ex
p(x)^2+36*exp(x)*x+18*x)*log(x)^2+(-8*x*exp(x)^2-16*exp(x)*x-8*x)*log(x)+x
*exp(x)^2+2*exp(x)*x+x),x, algorithm=\
```

output
```
-(3*(x*e^x + x)*log(x)^2 + (2*x - e^5)*e^x - 12*(x*e^x + x)*log(x) + 3*x)/
((e^x + 1)*log(x)^2 - 4*(e^x + 1)*log(x) + e^x + 1)
```

3.323.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(24) = 48$.

Time = 0.16 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.77

$$\int \frac{-3x + e^{2x}(4e^5+2x) + e^x(-x+x^2+e^5(4+x)) + (24x + e^{2x}(-2e^5+18x) + e^x(e^5(-2-4x)+42x-4}{x+2e^xx+e^{2x}x+(-8x-16e^xx-8e^{2x}x)\log(x)+(18x+}$$
$$= -3x + \frac{-x-e^5}{\left(\log(x)^2 - 4\log(x)+1\right)e^x + \log(x)^2 - 4\log(x) + 1} + \frac{x+e^5}{\log(x)^2 - 4\log(x) + 1}$$

input
```
integrate(((-3*x*exp(x)**2-6*exp(x)*x-3*x)*ln(x)**4+(24*x*exp(x)**2+48*exp
(x)*x+24*x)*ln(x)**3+(-53*x*exp(x)**2+(x*exp(5)+x**2-107*x)*exp(x)-54*x)*l
n(x)**2+((-2*exp(5)+18*x)*exp(x)**2+((-4*x-2)*exp(5)-4*x**2+42*x)*exp(x)+2
4*x)*ln(x)+(4*exp(5)+2*x)*exp(x)**2+((4+x)*exp(5)+x**2-x)*exp(x)-3*x)/((x*
exp(x)**2+2*exp(x)*x+x)*ln(x)**4+(-8*x*exp(x)**2-16*exp(x)*x-8*x)*ln(x)**3
+(18*x*exp(x)**2+36*exp(x)*x+18*x)*ln(x)**2+(-8*x*exp(x)**2-16*exp(x)*x-8*
x)*ln(x)+x*exp(x)**2+2*exp(x)*x+x),x)
```

output
```
-3*x + (-x - exp(5))/((log(x)**2 - 4*log(x) + 1)*exp(x) + log(x)**2 - 4*lo
g(x) + 1) + (x + exp(5))/(log(x)**2 - 4*log(x) + 1)
```

3.323.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(27) = 54$.

Time = 0.34 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.20

$$\int \frac{-3x + e^{2x}(4e^5 + 2x) + e^x(-x + x^2 + e^5(4 + x)) + (24x + e^{2x}(-2e^5 + 18x) + e^x(e^5(-2 - 4x) + 42x - 4}{x + 2e^x x + e^{2x}x + (-8x - 16e^x x - 8e^{2x}x)\log(x) + (18x + 3}$$
$$= -\frac{3\,x\log{(x)}^2 + \left(3\,x\log{(x)}^2 - 12\,x\log{(x)} + 2\,x - e^5\right)e^x - 12\,x\log{(x)} + 3\,x}{\left(\log{(x)}^2 - 4\,\log{(x)} + 1\right)e^x + \log{(x)}^2 - 4\,\log{(x)} + 1}$$

input
```
integrate(((-3*x*exp(x)^2-6*exp(x)*x-3*x)*log(x)^4+(24*x*exp(x)^2+48*exp(x
)*x+24*x)*log(x)^3+(-53*x*exp(x)^2+(x*exp(5)+x^2-107*x)*exp(x)-54*x)*log(x
)^2+((-2*exp(5)+18*x)*exp(x)^2+((-4*x-2)*exp(5)-4*x^2+42*x)*exp(x)+24*x)*l
og(x)+(4*exp(5)+2*x)*exp(x)^2+((4+x)*exp(5)+x^2-x)*exp(x)-3*x)/((x*exp(x)^
2+2*exp(x)*x+x)*log(x)^4+(-8*x*exp(x)^2-16*exp(x)*x-8*x)*log(x)^3+(18*x*ex
p(x)^2+36*exp(x)*x+18*x)*log(x)^2+(-8*x*exp(x)^2-16*exp(x)*x-8*x)*log(x)+x
*exp(x)^2+2*exp(x)*x+x),x, algorithm=\
```

output
```
-(3*x*log(x)^2 + (3*x*log(x)^2 - 12*x*log(x) + 2*x - e^5)*e^x - 12*x*log(x
) + 3*x)/((log(x)^2 - 4*log(x) + 1)*e^x + log(x)^2 - 4*log(x) + 1)
```

3.323.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(27) = 54$.

Time = 0.30 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.37

$$\int \frac{-3x + e^{2x}(4e^5 + 2x) + e^x(-x + x^2 + e^5(4 + x)) + (24x + e^{2x}(-2e^5 + 18x) + e^x(e^5(-2 - 4x) + 42x - 4}{x + 2e^x x + e^{2x}x + (-8x - 16e^x x - 8e^{2x}x)\log(x) + (18x + 3}$$
$$= -\frac{3\,xe^x\log{(x)}^2 - 12\,xe^x\log{(x)} + 3\,x\log{(x)}^2 + xe^x - 12\,x\log{(x)} + 3\,x - 2\,e^{(x+5)}}{e^x\log{(x)}^2 - 4\,e^x\log{(x)} + \log{(x)}^2 + e^x - 4\,\log{(x)} + 1}$$

input
```
integrate(((-3*x*exp(x)^2-6*exp(x)*x-3*x)*log(x)^4+(24*x*exp(x)^2+48*exp(x
)*x+24*x)*log(x)^3+(-53*x*exp(x)^2+(x*exp(5)+x^2-107*x)*exp(x)-54*x)*log(x
)^2+((-2*exp(5)+18*x)*exp(x)^2+((-4*x-2)*exp(5)-4*x^2+42*x)*exp(x)+24*x)*l
og(x)+(4*exp(5)+2*x)*exp(x)^2+((4+x)*exp(5)+x^2-x)*exp(x)-3*x)/((x*exp(x)^
2+2*exp(x)*x+x)*log(x)^4+(-8*x*exp(x)^2-16*exp(x)*x-8*x)*log(x)^3+(18*x*ex
p(x)^2+36*exp(x)*x+18*x)*log(x)^2+(-8*x*exp(x)^2-16*exp(x)*x-8*x)*log(x)+x
*exp(x)^2+2*exp(x)*x+x),x, algorithm=\
```

3.323.
$$\int \frac{-3x+e^{2x}(4e^5+2x)+e^x(-x+x^2+e^5(4+x))+(24x+e^{2x}(-2e^5+18x)+e^x(e^5(-2-4x)+42x-4x^2))\log(x)+(-54x-53e^{2x}x+e^x(-107x+e^5x+x^2)}{x+2e^x x+e^{2x}x+(-8x-16e^x x-8e^{2x}x)\log(x)+(18x+36e^x x+18e^{2x}x)\log^2(x)+(-8x-16e^x x-8e^{2x}x)\log}$$

output
```
-(3*x*e^x*log(x)^2 - 12*x*e^x*log(x) + 3*x*log(x)^2 + x*e^x - 12*x*log(x)
+ 3*x - 2*e^(x + 5))/(e^x*log(x)^2 - 4*e^x*log(x) + log(x)^2 + e^x - 4*log
(x) + 1)
```

3.323.9 Mupad [B] (verification not implemented)

Time = 13.61 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.47

$$\int \frac{-3x+e^{2x}(4e^5+2x)+e^x(-x+x^2+e^5(4+x))+(24x+e^{2x}(-2e^5+18x)+e^x(e^5(-2-4x)+42x-4}{x+2e^xx+e^{2x}x+(-8x-16e^xx-8e^{2x}x)\log(x)+(18x+3}$$

$$= \frac{e^{x+5}+e^{2x+5}+x\,e^{2x}+x\,e^x}{(e^x+1)^2\,\left(\ln(x)^2-4\,\ln(x)+1\right)}-3\,x$$

input
```
int((exp(2*x)*(2*x + 4*exp(5)) - log(x)^2*(54*x + 53*x*exp(2*x) - exp(x)*(
x*exp(5) - 107*x + x^2)) - 3*x - log(x)^4*(3*x + 3*x*exp(2*x) + 6*x*exp(x)
) + log(x)^3*(24*x + 24*x*exp(2*x) + 48*x*exp(x)) + log(x)*(24*x + exp(2*x
)*(18*x - 2*exp(5)) - exp(x)*(4*x^2 - 42*x + exp(5)*(4*x + 2))) + exp(x)*(
exp(5)*(x + 4) - x + x^2))/(x + x*exp(2*x) - log(x)*(8*x + 8*x*exp(2*x) +
16*x*exp(x)) + log(x)^4*(x + x*exp(2*x) + 2*x*exp(x)) - log(x)^3*(8*x + 8*
x*exp(2*x) + 16*x*exp(x)) + log(x)^2*(18*x + 18*x*exp(2*x) + 36*x*exp(x))
+ 2*x*exp(x)),x)
```

output
```
(exp(x + 5) + exp(2*x + 5) + x*exp(2*x) + x*exp(x))/((exp(x) + 1)^2*(log(x
)^2 - 4*log(x) + 1)) - 3*x
```

3.323.

$$\int \frac{-3x+e^{2x}(4e^5+2x)+e^x(-x+x^2+e^5(4+x))+(24x+e^{2x}(-2e^5+18x)+e^x(e^5(-2-4x)+42x-4x^2))\log(x)+(-54x-53e^{2x}x+e^x(-107x+e^5x+x^2)}{x+2e^xx+e^{2x}x+(-8x-16e^xx-8e^{2x}x)\log(x)+(18x+36e^xx+18e^{2x}x)\log^2(x)+(-8x-16e^xx-8e^{2x}x)\log}$$

3.324 $\int \frac{1}{9}(-25+18e^{2x})\,dx$

3.324.1 Optimal result

Integrand size = 13, antiderivative size = 12

$$\int \frac{1}{9}\left(-25+18e^{2x}\right)\,dx=-6+e^{2x}-\frac{25x}{9}$$

output
```
-6+exp(2*x)-25/9*x
```

3.324.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \frac{1}{9}\left(-25+18e^{2x}\right)\,dx=e^{2x}-\frac{25x}{9}$$

input
```
Integrate[(-25 + 18*E^(2*x))/9,x]
```

output
```
E^(2*x) - (25*x)/9
```

3.324.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.25, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{9}\left(18e^{2x}-25\right)\,dx$$

$$\Big\downarrow \textbf{27}$$

$$\frac{1}{9}\int \left(-25+18e^{2x}\right)dx$$

$$\Big\downarrow \textbf{2009}$$

$$\frac{1}{9}\left(9e^{2x}-25x\right)$$

input
```
Int[(-25 + 18*E^(2*x))/9,x]
```

output
```
(9*E^(2*x) - 25*x)/9
```

3.324.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.324.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

method	result	size
default	$-\frac{25x}{9}+{\mathrm e}^{2x}$	9
norman	$-\frac{25x}{9}+{\mathrm e}^{2x}$	9
risch	$-\frac{25x}{9}+{\mathrm e}^{2x}$	9
parallelrisch	$-\frac{25x}{9}+{\mathrm e}^{2x}$	9
parts	$-\frac{25x}{9}+{\mathrm e}^{2x}$	9
derivativedivides	${\mathrm e}^{2x}-\frac{25\ln\left({\mathrm e}^{2x}\right)}{18}$	13

input
```
int(2*exp(2*x)-25/9,x,method=_RETURNVERBOSE)
```

output
```
-25/9*x+exp(2*x)
```

3.324.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.67

$$\int \frac{1}{9}\left(-25+18e^{2x}\right)\,dx=-\frac{25}{9}\,x+e^{(2\,x)}$$

input
```
integrate(2*exp(2*x)-25/9,x, algorithm=\
```

output
```
-25/9*x + e^(2*x)
```

3.324.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.67

$$\int \frac{1}{9}\left(-25+18e^{2x}\right)\,dx=-\frac{25x}{9}+e^{2x}$$

input
```
integrate(2*exp(2*x)-25/9,x)
```

output
```
-25*x/9 + exp(2*x)
```

3.324.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.67

$$\int \frac{1}{9}\left(-25+18e^{2x}\right)\,dx = -\frac{25}{9}\,x + e^{(2\,x)}$$

input
```
integrate(2*exp(2*x)-25/9,x, algorithm=\
```

output
```
-25/9*x + e^(2*x)
```

3.324.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.67

$$\int \frac{1}{9}\left(-25+18e^{2x}\right)\,dx = -\frac{25}{9}\,x + e^{(2\,x)}$$

input
```
integrate(2*exp(2*x)-25/9,x, algorithm=\
```

output
```
-25/9*x + e^(2*x)
```

3.324.9 Mupad [B] (verification not implemented)

Time = 12.50 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.67

$$\int \frac{1}{9}\left(-25+18e^{2x}\right)\,dx = \mathrm{e}^{2\,x} - \frac{25\,x}{9}$$

input
```
int(2*exp(2*x) - 25/9,x)
```

output
```
exp(2*x) - (25*x)/9
```

3.325 $\int \left(1-170e^{-1-80x^2}x\right)\,dx$

3.325.1 Optimal result

Integrand size = 14, antiderivative size = 15

$$\int \left(1-170e^{-1-80x^2}x\right)\,dx=\frac{17}{16}e^{-1-80x^2}+x$$

output
```
x+17/16*exp(-80*x^2-1)
```

3.325.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \left(1-170e^{-1-80x^2}x\right)\,dx=\frac{17}{16}e^{-1-80x^2}+x$$

input
```
Integrate[1 - 170*E^(-1 - 80*x^2)*x,x]
```

output
```
(17*E^(-1 - 80*x^2))/16 + x
```

3.325.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(1-170e^{-80x^2-1}x\right)\,dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{17}{16}e^{-80x^2-1}+x$$

input
```
Int[1 - 170*E^(-1 - 80*x^2)*x,x]
```

output
```
(17*E^(-1 - 80*x^2))/16 + x
```

3.325.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.325.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

method	result	size
default	$x+\frac{17\,{\mathrm e}^{-80x^2-1}}{16}$	13
norman	$x+\frac{17\,{\mathrm e}^{-80x^2-1}}{16}$	13
risch	$x+\frac{17\,{\mathrm e}^{-80x^2-1}}{16}$	13
parallelrisch	$x+\frac{17\,{\mathrm e}^{-80x^2-1}}{16}$	13
parts	$x+\frac{17\,{\mathrm e}^{-80x^2-1}}{16}$	13

input
```
int(-170*x*exp(-80*x^2-1)+1,x,method=_RETURNVERBOSE)
```

output
```
x+17/16*exp(-80*x^2-1)
```

3.325.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \left(1-170e^{-1-80x^2}x\right) dx = x+\frac{17}{16}\,e^{\left(-80\,x^2-1\right)}$$

input
```
integrate(-170*x*exp(-80*x^2-1)+1,x, algorithm=\
```

output
```
x + 17/16*e^(-80*x^2 - 1)
```

3.325.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \left(1-170e^{-1-80x^2}x\right) dx = x+\frac{17e^{-80x^2-1}}{16}$$

input
```
integrate(-170*x*exp(-80*x**2-1)+1,x)
```

output
```
x + 17*exp(-80*x**2 - 1)/16
```

3.325.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \left(1-170e^{-1-80x^2}x\right) dx = x+\frac{17}{16}\,e^{\left(-80\,x^2-1\right)}$$

input
```
integrate(-170*x*exp(-80*x^2-1)+1,x, algorithm=\
```

output
```
x + 17/16*e^(-80*x^2 - 1)
```

3.325.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \left(1-170e^{-1-80x^2}x\right)\,dx = x + \frac{17}{16}\,e^{\left(-80\,x^2-1\right)}$$

input
```
integrate(-170*x*exp(-80*x^2-1)+1,x, algorithm=\
```

output
```
x + 17/16*e^(-80*x^2 - 1)
```

3.325.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \left(1-170e^{-1-80x^2}x\right)\,dx = x + \frac{17\,\mathrm{e}^{-1}\,\mathrm{e}^{-80\,x^2}}{16}$$

input
```
int(1 - 170*x*exp(- 80*x^2 - 1),x)
```

output
```
x + (17*exp(-1)*exp(-80*x^2))/16
```

3.326 $\int (2x - 6x^2 + 4x^3 + e^x(8x - 8x^2 - 4x^3) + e^{3x}(12x^2$

3.326.1 Optimal result

Integrand size = 91, antiderivative size = 22

$$\int \left(2x - 6x^2 + 4x^3 + e^x\left(8x - 8x^2 - 4x^3\right) + e^{3x}\left(12x^2 + 12x^3\right) + e^{2x}\left(8x + 14x^2 - 4x^3 - 4x^4\right) + e^{4x}\left(4x^3 + 4x^4\right)\right) dx = \left(-x + x^2 - e^x x(2 + e^x x)\right)^2$$

output
```
(x^2-x-(exp(x)*x+2)*exp(x)*x)^2
```

3.326.2 Mathematica [A] (verified)

Time = 2.84 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \left(2x - 6x^2 + 4x^3 + e^x\left(8x - 8x^2 - 4x^3\right) + e^{3x}\left(12x^2 + 12x^3\right) + e^{2x}\left(8x + 14x^2 - 4x^3 - 4x^4\right) + e^{4x}\left(4x^3 + 4x^4\right)\right) dx = x^2\left(1 + 2e^x - x + e^{2x}x\right)^2$$

input
```
Integrate[2*x - 6*x^2 + 4*x^3 + E^x*(8*x - 8*x^2 - 4*x^3) + E^(3*x)*(12*x^
2 + 12*x^3) + E^(2*x)*(8*x + 14*x^2 - 4*x^3 - 4*x^4) + E^(4*x)*(4*x^3 + 4*
x^4),x]
```

output
```
x^2*(1 + 2*E^x - x + E^(2*x)*x)^2
```

3.326.
$\int (2x - 6x^2 + 4x^3 + e^x(8x - 8x^2 - 4x^3) + e^{3x}(12x^2 + 12x^3) + e^{2x}(8x + 14x^2 - 4x^3 - 4x^4) + e^{4x}(4x^3 + 4x^4$

3.326.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 77 vs. 2(22) = 44.

Time = 0.54 (sec) , antiderivative size = 77, normalized size of antiderivative = 3.50, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.011, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (4x^3-6x^2+e^{4x}(4x^4+4x^3)+e^x(-4x^3-8x^2+8x)+e^{3x}(12x^3+12x^2)+e^{2x}(-4x^4-4x^3+14x^2+8x)+2$$

$$\Big\downarrow \text{2009}$$

$$-2e^{2x}x^4+e^{4x}x^4+x^4-4e^xx^3+2e^{2x}x^3+4e^{3x}x^3-2x^3+4e^xx^2+4e^{2x}x^2+x^2$$

input
```
Int[2*x - 6*x^2 + 4*x^3 + E^x*(8*x - 8*x^2 - 4*x^3) + E^(3*x)*(12*x^2 + 12
*x^3) + E^(2*x)*(8*x + 14*x^2 - 4*x^3 - 4*x^4) + E^(4*x)*(4*x^3 + 4*x^4),x
]
```

output
```
x^2 + 4*E^x*x^2 + 4*E^(2*x)*x^2 - 2*x^3 - 4*E^x*x^3 + 2*E^(2*x)*x^3 + 4*E^
(3*x)*x^3 + x^4 - 2*E^(2*x)*x^4 + E^(4*x)*x^4
```

3.326.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.326.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. 2(20) = 40.

Time = 0.13 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.95

method	result	size
risch	$4x^3e^{3x}+e^{4x}x^4+(-2x^4+2x^3+4x^2)e^{2x}+(-4x^3+4x^2)e^x+x^4-2x^3+x^2$	65
default	$-2e^{2x}x^4+e^{4x}x^4-4e^xx^3+2e^{2x}x^3+4x^3e^{3x}+x^4+4e^xx^2+4e^{2x}x^2-2x^3+x^2$	71
norman	$-2e^{2x}x^4+e^{4x}x^4-4e^xx^3+2e^{2x}x^3+4x^3e^{3x}+x^4+4e^xx^2+4e^{2x}x^2-2x^3+x^2$	71
parallelrisch	$-2e^{2x}x^4+e^{4x}x^4-4e^xx^3+2e^{2x}x^3+4x^3e^{3x}+x^4+4e^xx^2+4e^{2x}x^2-2x^3+x^2$	71
parts	$-2e^{2x}x^4+e^{4x}x^4-4e^xx^3+2e^{2x}x^3+4x^3e^{3x}+x^4+4e^xx^2+4e^{2x}x^2-2x^3+x^2$	71

3.326.
$\int (2x-6x^2+4x^3+e^x(8x-8x^2-4x^3)+e^{3x}(12x^2+12x^3)+e^{2x}(8x+14x^2-4x^3-4x^4)+e^{4x}(4x^3+4x^4$

input
```
int((4*x^4+4*x^3)*exp(x)^4+(12*x^3+12*x^2)*exp(x)^3+(-4*x^4-4*x^3+14*x^2+8
*x)*exp(x)^2+(-4*x^3-8*x^2+8*x)*exp(x)+4*x^3-6*x^2+2*x,x,method=_RETURNVER
BOSE)
```

output
```
4*x^3*exp(x)^3+x^4*exp(x)^4+(-2*x^4+2*x^3+4*x^2)*exp(x)^2+(-4*x^3+4*x^2)*e
xp(x)+x^4-2*x^3+x^2
```

3.326.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(19) = 38.

Time = 0.26 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.82

$$\int \left(2x-6x^2+4x^3+e^x\left(8x-8x^2-4x^3\right)+e^{3x}\left(12x^2+12x^3\right)+e^{2x}\left(8x+14x^2-4x^3-4x^4\right)+e^{4x}\left(4x^3+4x^4\right)\right)\,dx = x^4e^{(4\,x)}+x^4+4\,x^3e^{(3\,x)}-2\,x^3+x^2-2\,\left(x^4-x^3-2\,x^2\right)e^{(2\,x)}-4\,\left(x^3-x^2\right)e^x$$

input
```
integrate((4*x^4+4*x^3)*exp(x)^4+(12*x^3+12*x^2)*exp(x)^3+(-4*x^4-4*x^3+14
*x^2+8*x)*exp(x)^2+(-4*x^3-8*x^2+8*x)*exp(x)+4*x^3-6*x^2+2*x,x, algorithm=
\
```

output
```
x^4*e^(4*x) + x^4 + 4*x^3*e^(3*x) - 2*x^3 + x^2 - 2*(x^4 - x^3 - 2*x^2)*e^
(2*x) - 4*(x^3 - x^2)*e^x
```

3.326.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. 2(17) = 34.

Time = 0.08 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.86

$$\int \left(2x-6x^2+4x^3+e^x\left(8x-8x^2-4x^3\right)+e^{3x}\left(12x^2+12x^3\right)+e^{2x}\left(8x+14x^2-4x^3-4x^4\right)+e^{4x}\left(4x^3+4x^4\right)\right)\,dx = x^4e^{4x}+x^4+4x^3e^{3x}-2x^3+x^2+\left(-4x^3+4x^2\right)e^x+\left(-2x^4+2x^3+4x^2\right)e^{2x}$$

input
```
integrate((4*x**4+4*x**3)*exp(x)**4+(12*x**3+12*x**2)*exp(x)**3+(-4*x**4-4
*x**3+14*x**2+8*x)*exp(x)**2+(-4*x**3-8*x**2+8*x)*exp(x)+4*x**3-6*x**2+2*x
,x)
```

3.326.
$\int (2x-6x^2+4x^3+e^x(8x-8x^2-4x^3)+e^{3x}(12x^2+12x^3)+e^{2x}(8x+14x^2-4x^3-4x^4)+e^{4x}(4x^3+4x^4$

output
```
x**4*exp(4*x) + x**4 + 4*x**3*exp(3*x) - 2*x**3 + x**2 + (-4*x**3 + 4*x**2
)*exp(x) + (-2*x**4 + 2*x**3 + 4*x**2)*exp(2*x)
```

3.326.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(19) = 38$.

Time = 0.18 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.82

$$\int \left(2x - 6x^2 + 4x^3 + e^x(8x - 8x^2 - 4x^3) + e^{3x}(12x^2 + 12x^3) + e^{2x}(8x + 14x^2 - 4x^3 - 4x^4) + e^{4x}(4x^3 + 4x^4)\right) dx = x^4e^{(4x)} + x^4 + 4x^3e^{(3x)} - 2x^3 + x^2 - 2(x^4 - x^3 - 2x^2)e^{(2x)} - 4(x^3 - x^2)e^x$$

input
```
integrate((4*x^4+4*x^3)*exp(x)^4+(12*x^3+12*x^2)*exp(x)^3+(-4*x^4-4*x^3+14
*x^2+8*x)*exp(x)^2+(-4*x^3-8*x^2+8*x)*exp(x)+4*x^3-6*x^2+2*x,x, algorithm=
\
```

output
```
x^4*e^(4*x) + x^4 + 4*x^3*e^(3*x) - 2*x^3 + x^2 - 2*(x^4 - x^3 - 2*x^2)*e^
(2*x) - 4*(x^3 - x^2)*e^x
```

3.326.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(19) = 38$.

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.82

$$\int \left(2x - 6x^2 + 4x^3 + e^x(8x - 8x^2 - 4x^3) + e^{3x}(12x^2 + 12x^3) + e^{2x}(8x + 14x^2 - 4x^3 - 4x^4) + e^{4x}(4x^3 + 4x^4)\right) dx = x^4e^{(4x)} + x^4 + 4x^3e^{(3x)} - 2x^3 + x^2 - 2(x^4 - x^3 - 2x^2)e^{(2x)} - 4(x^3 - x^2)e^x$$

input
```
integrate((4*x^4+4*x^3)*exp(x)^4+(12*x^3+12*x^2)*exp(x)^3+(-4*x^4-4*x^3+14
*x^2+8*x)*exp(x)^2+(-4*x^3-8*x^2+8*x)*exp(x)+4*x^3-6*x^2+2*x,x, algorithm=
\
```

output
```
x^4*e^(4*x) + x^4 + 4*x^3*e^(3*x) - 2*x^3 + x^2 - 2*(x^4 - x^3 - 2*x^2)*e^
(2*x) - 4*(x^3 - x^2)*e^x
```

3.326.
$\int (2x - 6x^2 + 4x^3 + e^x(8x - 8x^2 - 4x^3) + e^{3x}(12x^2 + 12x^3) + e^{2x}(8x + 14x^2 - 4x^3 - 4x^4) + e^{4x}(4x^3 + 4x^4$

3.326.9 Mupad [B] (verification not implemented)

Time = 12.78 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \left(2x - 6x^2 + 4x^3 + e^x\left(8x - 8x^2 - 4x^3\right) + e^{3x}\left(12x^2 + 12x^3\right) + e^{2x}\left(8x + 14x^2 - 4x^3 - 4x^4\right) + e^{4x}\left(4x^3 + 4x^4\right)\right) dx = x^2 \left(2\,\mathrm{e}^x - x + x\,\mathrm{e}^{2\,x} + 1\right)^2$$

input
```
int(2*x + exp(4*x)*(4*x^3 + 4*x^4) + exp(3*x)*(12*x^2 + 12*x^3) + exp(2*x)
*(8*x + 14*x^2 - 4*x^3 - 4*x^4) - 6*x^2 + 4*x^3 - exp(x)*(8*x^2 - 8*x + 4*
x^3),x)
```

output
```
x^2*(2*exp(x) - x + x*exp(2*x) + 1)^2
```

3.327 $\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60\right.\right.}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2}}}$ / $27+405x+1$

3.327.1 Optimal result

Integrand size = 398, antiderivative size = 30

$$\int \frac{e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}(-1188-756x-7452x^2-70}{27+405x+1863x^2+1755x^3-3726x^4+1620x^5-216x^6}$$

$$= e^{-4+4\left(-x+\frac{9}{(-3+(3-e^x)x(-5+2x))^2}\right)}$$

output
```
exp(18/(x*(-exp(x)+3)*(-5+2*x)-3)^2-2*x-2)^2
```

3.327.2 Mathematica [A] (verified)

Time = 0.44 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int \frac{e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}(-1188-756x-7452x^2-70}{27+405x+1863x^2+1755x^3-3726x^4+1620x^5-216x^6}$$

$$= e^{-4-4x+\frac{36}{\left(3-5(-3+e^x)x+2(-3+e^x)x^2\right)^2}}$$

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3+14904x^4-\right.$$

input
```
Integrate[(E^((2*(-198*x - 558*x^2 - 18*x^3 + 288*x^4 - 72*x^5 + E^(2*x)*(
-50*x^2 - 10*x^3 + 32*x^4 - 8*x^5) + E^x*(60*x + 336*x^2 + 36*x^3 - 192*x^
4 + 48*x^5)))/(9 + 90*x + 189*x^2 - 180*x^3 + 36*x^4 + E^x*(-30*x - 138*x^
2 + 120*x^3 - 24*x^4) + E^(2*x)*(25*x^2 - 20*x^3 + 4*x^4)))*(-1188 - 756*x
 - 7452*x^2 - 7020*x^3 + 14904*x^4 - 6480*x^5 + 864*x^6 + E^x*(360 + 612*x
 + 5040*x^2 + 9180*x^3 - 15336*x^4 + 6480*x^5 - 864*x^6) + E^(3*x)*(500*x^
3 - 600*x^4 + 240*x^5 - 32*x^6) + E^(2*x)*(-900*x^2 - 3780*x^3 + 5256*x^4
- 2160*x^5 + 288*x^6)))/(27 + 405*x + 1863*x^2 + 1755*x^3 - 3726*x^4 + 162
0*x^5 - 216*x^6 + E^(2*x)*(225*x^2 + 945*x^3 - 1314*x^4 + 540*x^5 - 72*x^6
) + E^(3*x)*(-125*x^3 + 150*x^4 - 60*x^5 + 8*x^6) + E^x*(-135*x - 1296*x^2
 - 2295*x^3 + 3834*x^4 - 1620*x^5 + 216*x^6)),x]
```

output
```
E^(-4 - 4*x + 36/(3 - 5*(-3 + E^x)*x + 2*(-3 + E^x)*x^2)^2)
```

3.327.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(864x^6 - 6480x^5 + 14904x^4 - 7020x^3 - 7452x^2 + e^{3x}(-32x^6 + 240x^5 - 600x^4 + 500x^3) + e^x(-864x^6 + 6480}{-216x^6 + 1620x^5 - 3726x^4 + 1755x^3 + 1863x^2 + e^{3x}(}$$

$$\Big\downarrow 7239$$

$$\int \frac{4(-e^{3x}x^3(2x-5)^3 + 9e^{2x}(5-2x)^2x^2(2x^2-5x-1) + 27(8x^6-60x^5+138x^4-65x^3-69x^2-7x-11) - 9e}{(2(e^x}$$

$$\Big\downarrow 27$$

$$4\int \frac{\exp\left(-\frac{4x(e^{2x}x(x+1)(5-2x)^2+9(4x^4-16x^3+x^2+31x+11)-6e^x(4x^4-16x^3+3x^2+28x+5))}{(-2(3-e^x)x^2+5(3-e^x)x+3)^2}\right)(e^{3x}(5-2x)^3x^3 - 9e^{2x}(5-2x)^2}{(-2}$$

$$\Big\downarrow 7293$$

$$4\int \left(-\frac{18\exp\left(-\frac{4x(e^{2x}x(x+1)(5-2x)^2+9(4x^4-16x^3+x^2+31x+11)-6e^x(4x^4-16x^3+3x^2+28x+5))}{(-2(3-e^x)x^2+5(3-e^x)x+3)^2}\right)(2x^2-x-5)}{x(2x-5)(2e^xx^2-6x^2-5e^xx+15x+3)^2} - \exp\left(-\frac{4x}{}\right.\right.$$

$$\Big\downarrow 7239$$

3.327. $\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}(-1188-756x-7452x^2-7020x^3+14904x^4$

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{(2\,(-3}$$

$\downarrow$ 7293

$$4\int\left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x}{}\right.\right.$$

$\downarrow$ 7239

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{(2\,(-3}$$

$\downarrow$ 7293

$$4\int\left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x}{}\right.\right.$$

$\downarrow$ 7239

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{(2\,(-3}$$

$\downarrow$ 7293

$$4\int\left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x}{}\right.\right.$$

$\downarrow$ 7239

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{(2\,(-3}$$

$\downarrow$ 7293

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3+14904x^4\right.$$

$$4\int \left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x\cdots}{\cdots}\right.\right.$$

$$\Big\downarrow \ 7239$$

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\cdots\right.}{\left(2\left(-3\cdots\right.\right.}$$

$$\Big\downarrow \ 7293$$

$$4\int \left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x\cdots}{\cdots}\right.\right.$$

$$\Big\downarrow \ 7239$$

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\cdots\right.}{\left(2\left(-3\cdots\right.\right.}$$

$$\Big\downarrow \ 7293$$

$$4\int \left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x\cdots}{\cdots}\right.\right.$$

$$\Big\downarrow \ 7239$$

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\cdots\right.}{\left(2\left(-3\cdots\right.\right.}$$

$$\Big\downarrow \ 7293$$

$$4\int \left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x\cdots}{\cdots}\right.\right.$$

$$\Big\downarrow \ 7239$$

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3+14904x^4\cdots\right.$$

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{(2\,(-3}$$

$$\Big\downarrow \ 7293$$

$$4\int\left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x}{}\right.\right.$$

$$\Big\downarrow \ 7239$$

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{(2\,(-3}$$

$$\Big\downarrow \ 7293$$

$$4\int\left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x}{}\right.\right.$$

$$\Big\downarrow \ 7239$$

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{(2\,(-3}$$

$$\Big\downarrow \ 7293$$

$$4\int\left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x}{}\right.\right.$$

$$\Big\downarrow \ 7239$$

$$4\int \frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{(2\,(-3}$$

$$\Big\downarrow \ 7293$$

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3+14904x^4\right.$$

$$4\int\left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x}{}\right.\right.$$

$$\Big\downarrow \; 7239$$

$$4\int\frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{\left(2\left(-3\right.\right.}$$

$$\Big\downarrow \; 7293$$

$$4\int\left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x}{}\right.\right.$$

$$\Big\downarrow \; 7239$$

$$4\int\frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{\left(2\left(-3\right.\right.}$$

$$\Big\downarrow \; 7293$$

$$4\int\left(-\frac{18\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(2x^2-x-5\right)}{x(2x-5)\left(2e^xx^2-6x^2-5e^xx+15x+3\right)^2}-\exp\left(-\frac{4x}{}\right.\right.$$

$$\Big\downarrow \; 7239$$

$$4\int\frac{\exp\left(-\frac{4x\left(e^{2x}x(x+1)(5-2x)^2+9\left(4x^4-16x^3+x^2+31x+11\right)-6e^x\left(4x^4-16x^3+3x^2+28x+5\right)\right)}{\left(2(-3+e^x)x^2-5(-3+e^x)x+3\right)^2}\right)\left(-e^{3x}x^3(2x-5)^3+9e^{2x}(5-2x)\right.}{\left(2\left(-3\right.\right.}$$

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3+14904x^4\right.$$

input
```
Int[(E^((2*(-198*x - 558*x^2 - 18*x^3 + 288*x^4 - 72*x^5 + E^(2*x)*(-50*x^
2 - 10*x^3 + 32*x^4 - 8*x^5) + E^x*(60*x + 336*x^2 + 36*x^3 - 192*x^4 + 48
*x^5)))/(9 + 90*x + 189*x^2 - 180*x^3 + 36*x^4 + E^x*(-30*x - 138*x^2 + 12
0*x^3 - 24*x^4) + E^(2*x)*(25*x^2 - 20*x^3 + 4*x^4)))*(-1188 - 756*x - 745
2*x^2 - 7020*x^3 + 14904*x^4 - 6480*x^5 + 864*x^6 + E^x*(360 + 612*x + 504
0*x^2 + 9180*x^3 - 15336*x^4 + 6480*x^5 - 864*x^6) + E^(3*x)*(500*x^3 - 60
0*x^4 + 240*x^5 - 32*x^6) + E^(2*x)*(-900*x^2 - 3780*x^3 + 5256*x^4 - 2160
*x^5 + 288*x^6)))/(27 + 405*x + 1863*x^2 + 1755*x^3 - 3726*x^4 + 1620*x^5
- 216*x^6 + E^(2*x)*(225*x^2 + 945*x^3 - 1314*x^4 + 540*x^5 - 72*x^6) + E^
(3*x)*(-125*x^3 + 150*x^4 - 60*x^5 + 8*x^6) + E^x*(-135*x - 1296*x^2 - 229
5*x^3 + 3834*x^4 - 1620*x^5 + 216*x^6)),x]
```

output
```
$Aborted
```

3.327.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.327.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 156 vs. $2(27) = 54$.

Time = 65.12 (sec) , antiderivative size = 157, normalized size of antiderivative = 5.23

method	result	size
parallelrisch	$\mathrm{e}^{\frac{2\left(-8x^{5}+32x^{4}-10x^{3}-50x^{2}\right)\mathrm{e}^{2x}+2\left(48x^{5}-192x^{4}+36x^{3}+336x^{2}+60x\right)\mathrm{e}^{x}-144x^{5}+576x^{4}-36x^{3}-1116x^{2}-396x}{4\,\mathrm{e}^{2x}x^{4}-20\,\mathrm{e}^{2x}x^{3}-24\,\mathrm{e}^{x}x^{4}+25\,\mathrm{e}^{2x}x^{2}+120\,\mathrm{e}^{x}x^{3}+36x^{4}-138\,\mathrm{e}^{x}x^{2}-180x^{3}-30\,\mathrm{e}^{x}x+189x^{2}+90x+9}}$	157

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3+14904x^4-\right.$$

input
```
int(((-32*x^6+240*x^5-600*x^4+500*x^3)*exp(x)^3+(288*x^6-2160*x^5+5256*x^4
-3780*x^3-900*x^2)*exp(x)^2+(-864*x^6+6480*x^5-15336*x^4+9180*x^3+5040*x^2
+612*x+360)*exp(x)+864*x^6-6480*x^5+14904*x^4-7020*x^3-7452*x^2-756*x-1188
)*exp(((-8*x^5+32*x^4-10*x^3-50*x^2)*exp(x)^2+(48*x^5-192*x^4+36*x^3+336*x
^2+60*x)*exp(x)-72*x^5+288*x^4-18*x^3-558*x^2-198*x)/((4*x^4-20*x^3+25*x^2
)*exp(x)^2+(-24*x^4+120*x^3-138*x^2-30*x)*exp(x)+36*x^4-180*x^3+189*x^2+90
*x+9))^2/((8*x^6-60*x^5+150*x^4-125*x^3)*exp(x)^3+(-72*x^6+540*x^5-1314*x^
4+945*x^3+225*x^2)*exp(x)^2+(216*x^6-1620*x^5+3834*x^4-2295*x^3-1296*x^2-1
35*x)*exp(x)-216*x^6+1620*x^5-3726*x^4+1755*x^3+1863*x^2+405*x+27),x,metho
d=_RETURNVERBOSE)
```

output
```
exp(((-8*x^5+32*x^4-10*x^3-50*x^2)*exp(x)^2+(48*x^5-192*x^4+36*x^3+336*x^2
+60*x)*exp(x)-72*x^5+288*x^4-18*x^3-558*x^2-198*x)/(4*exp(x)^2*x^4-20*exp(
x)^2*x^3-24*exp(x)*x^4+25*exp(x)^2*x^2+120*exp(x)*x^3+36*x^4-138*exp(x)*x^
2-180*x^3-30*exp(x)*x+189*x^2+90*x+9))^2
```

3.327.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 147 vs. $2(23) = 46$.

Time = 0.27 (sec) , antiderivative size = 147, normalized size of antiderivative = 4.90

$$\int \frac{e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-70\right.}{27+405x+1863x^2+1755x^3-3726x^4+1620x^5-216x^6}$$
$$= e^{\left(-\frac{4\left(36x^5-144x^4+9x^3+279x^2+\left(4x^5-16x^4+5x^3+25x^2\right)e^{(2x)}-6\left(4x^5-16x^4+3x^3+28x^2+5x\right)e^x+99x\right)}{36x^4-180x^3+189x^2+\left(4x^4-20x^3+25x^2\right)e^{(2x)}-6\left(4x^4-20x^3+23x^2+5x\right)e^x+90x+9}\right)}$$

input
```
integrate(((-32*x^6+240*x^5-600*x^4+500*x^3)*exp(x)^3+(288*x^6-2160*x^5+52
56*x^4-3780*x^3-900*x^2)*exp(x)^2+(-864*x^6+6480*x^5-15336*x^4+9180*x^3+50
40*x^2+612*x+360)*exp(x)+864*x^6-6480*x^5+14904*x^4-7020*x^3-7452*x^2-756*
x-1188)*exp(((-8*x^5+32*x^4-10*x^3-50*x^2)*exp(x)^2+(48*x^5-192*x^4+36*x^3
+336*x^2+60*x)*exp(x)-72*x^5+288*x^4-18*x^3-558*x^2-198*x)/((4*x^4-20*x^3+
25*x^2)*exp(x)^2+(-24*x^4+120*x^3-138*x^2-30*x)*exp(x)+36*x^4-180*x^3+189*
x^2+90*x+9))^2/((8*x^6-60*x^5+150*x^4-125*x^3)*exp(x)^3+(-72*x^6+540*x^5-1
314*x^4+945*x^3+225*x^2)*exp(x)^2+(216*x^6-1620*x^5+3834*x^4-2295*x^3-1296
*x^2-135*x)*exp(x)-216*x^6+1620*x^5-3726*x^4+1755*x^3+1863*x^2+405*x+27),x
, algorithm=\
```

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3+14904x^4-\right.$$

output
```
e^(-4*(36*x^5 - 144*x^4 + 9*x^3 + 279*x^2 + (4*x^5 - 16*x^4 + 5*x^3 + 25*x
^2)*e^(2*x) - 6*(4*x^5 - 16*x^4 + 3*x^3 + 28*x^2 + 5*x)*e^x + 99*x)/(36*x^
4 - 180*x^3 + 189*x^2 + (4*x^4 - 20*x^3 + 25*x^2)*e^(2*x) - 6*(4*x^4 - 20*
x^3 + 23*x^2 + 5*x)*e^x + 90*x + 9))
```

3.327.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 143 vs. $2(22) = 44$.

Time = 3.14 (sec) , antiderivative size = 143, normalized size of antiderivative = 4.77

$$\int \frac{e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-70\right.}{27+405x+1863x^2+1755x^3-3726x^4+1620x^5-216x^6}$$

$$= e^{\frac{2\left(-72x^5+288x^4-18x^3-558x^2-198x+\left(-8x^5+32x^4-10x^3-50x^2\right)e^{2x}+\left(48x^5-192x^4+36x^3+336x^2+60x\right)e^x\right)}{36x^4-180x^3+189x^2+90x+\left(4x^4-20x^3+25x^2\right)e^{2x}+\left(-24x^4+120x^3-138x^2-30x\right)e^x+9}}$$

input
```
integrate(((-32*x**6+240*x**5-600*x**4+500*x**3)*exp(x)**3+(288*x**6-2160*
x**5+5256*x**4-3780*x**3-900*x**2)*exp(x)**2+(-864*x**6+6480*x**5-15336*x*
*4+9180*x**3+5040*x**2+612*x+360)*exp(x)+864*x**6-6480*x**5+14904*x**4-702
0*x**3-7452*x**2-756*x-1188)*exp(((-8*x**5+32*x**4-10*x**3-50*x**2)*exp(x)
**2+(48*x**5-192*x**4+36*x**3+336*x**2+60*x)*exp(x)-72*x**5+288*x**4-18*x*
*3-558*x**2-198*x)/((4*x**4-20*x**3+25*x**2)*exp(x)**2+(-24*x**4+120*x**3-
138*x**2-30*x)*exp(x)+36*x**4-180*x**3+189*x**2+90*x+9))**2/((8*x**6-60*x*
*5+150*x**4-125*x**3)*exp(x)**3+(-72*x**6+540*x**5-1314*x**4+945*x**3+225*
x**2)*exp(x)**2+(216*x**6-1620*x**5+3834*x**4-2295*x**3-1296*x**2-135*x)*e
xp(x)-216*x**6+1620*x**5-3726*x**4+1755*x**3+1863*x**2+405*x+27),x)
```

output
```
exp(2*(-72*x**5 + 288*x**4 - 18*x**3 - 558*x**2 - 198*x + (-8*x**5 + 32*x*
*4 - 10*x**3 - 50*x**2)*exp(2*x) + (48*x**5 - 192*x**4 + 36*x**3 + 336*x**
2 + 60*x)*exp(x))/(36*x**4 - 180*x**3 + 189*x**2 + 90*x + (4*x**4 - 20*x**
3 + 25*x**2)*exp(2*x) + (-24*x**4 + 120*x**3 - 138*x**2 - 30*x)*exp(x) + 9
))
```

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3+14904x^4\right.$$

3.327.7 Maxima [F(-1)]

Timed out.

$$\int \frac{e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}(-1188-756x-7452x^2-70}{27+405x+1863x^2+1755x^3-3726x^4+1620x^5-216x^6}$$
$$= \text{Timed out}$$

input
```
integrate((((-32*x^6+240*x^5-600*x^4+500*x^3)*exp(x)^3+(288*x^6-2160*x^5+52
56*x^4-3780*x^3-900*x^2)*exp(x)^2+(-864*x^6+6480*x^5-15336*x^4+9180*x^3+50
40*x^2+612*x+360)*exp(x)+864*x^6-6480*x^5+14904*x^4-7020*x^3-7452*x^2-756*
x-1188)*exp(((-8*x^5+32*x^4-10*x^3-50*x^2)*exp(x)^2+(48*x^5-192*x^4+36*x^3
+336*x^2+60*x)*exp(x)-72*x^5+288*x^4-18*x^3-558*x^2-198*x)/((4*x^4-20*x^3+
25*x^2)*exp(x)^2+(-24*x^4+120*x^3-138*x^2-30*x)*exp(x)+36*x^4-180*x^3+189*
x^2+90*x+9))^2/((8*x^6-60*x^5+150*x^4-125*x^3)*exp(x)^3+(-72*x^6+540*x^5-1
314*x^4+945*x^3+225*x^2)*exp(x)^2+(216*x^6-1620*x^5+3834*x^4-2295*x^3-1296
*x^2-135*x)*exp(x)-216*x^6+1620*x^5-3726*x^4+1755*x^3+1863*x^2+405*x+27),x
, algorithm=\
```

output
```
Timed out
```

3.327.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 175 vs. $2(23) = 46$.

Time = 24.39 (sec) , antiderivative size = 175, normalized size of antiderivative = 5.83

$$\int \frac{e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}(-1188-756x-7452x^2-70}{27+405x+1863x^2+1755x^3-3726x^4+1620x^5-216x^6}$$
$$= e^{\left(-3\,x-\frac{4\,x^5e^{(2\,x)}-24\,x^5e^x+36\,x^5-4\,x^4e^{(2\,x)}+24\,x^4e^x-36\,x^4-55\,x^3e^{(2\,x)}+342\,x^3e^x-531\,x^3+100\,x^2e^{(2\,x)}-582\,x^2e^x+846\,x^2-120\,xe^x+369\,x}{4\,x^4e^{(2\,x)}-24\,x^4e^x+36\,x^4-20\,x^3e^{(2\,x)}+120\,x^3e^x-180\,x^3+25\,x^2e^{(2\,x)}-138\,x^2e^x+189\,x^2-30\,xe^x+90\,x+9}\right)}$$

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}(-1188-756x-7452x^2-7020x^3+14904x^4-$$

input
```
integrate(((-32*x^6+240*x^5-600*x^4+500*x^3)*exp(x)^3+(288*x^6-2160*x^5+52
56*x^4-3780*x^3-900*x^2)*exp(x)^2+(-864*x^6+6480*x^5-15336*x^4+9180*x^3+50
40*x^2+612*x+360)*exp(x)+864*x^6-6480*x^5+14904*x^4-7020*x^3-7452*x^2-756*
x-1188)*exp(((-8*x^5+32*x^4-10*x^3-50*x^2)*exp(x)^2+(48*x^5-192*x^4+36*x^3
+336*x^2+60*x)*exp(x)-72*x^5+288*x^4-18*x^3-558*x^2-198*x)/((4*x^4-20*x^3+
25*x^2)*exp(x)^2+(-24*x^4+120*x^3-138*x^2-30*x)*exp(x)+36*x^4-180*x^3+189*
x^2+90*x+9))^2/((8*x^6-60*x^5+150*x^4-125*x^3)*exp(x)^3+(-72*x^6+540*x^5-1
314*x^4+945*x^3+225*x^2)*exp(x)^2+(216*x^6-1620*x^5+3834*x^4-2295*x^3-1296
*x^2-135*x)*exp(x)-216*x^6+1620*x^5-3726*x^4+1755*x^3+1863*x^2+405*x+27),x
, algorithm=\
```

output
```
e^(-3*x - (4*x^5*e^(2*x) - 24*x^5*e^x + 36*x^5 - 4*x^4*e^(2*x) + 24*x^4*e^
x - 36*x^4 - 55*x^3*e^(2*x) + 342*x^3*e^x - 531*x^3 + 100*x^2*e^(2*x) - 58
2*x^2*e^x + 846*x^2 - 120*x*e^x + 369*x)/(4*x^4*e^(2*x) - 24*x^4*e^x + 36*
x^4 - 20*x^3*e^(2*x) + 120*x^3*e^x - 180*x^3 + 25*x^2*e^(2*x) - 138*x^2*e^
x + 189*x^2 - 30*x*e^x + 90*x + 9))
```

3.327.9 Mupad [B] (verification not implemented)

Time = 13.98 (sec) , antiderivative size = 1157, normalized size of antiderivative = 38.57

$$\int \frac{e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-70\right.}{27+405x+1863x^2+1755x^3-3726x^4+1620x^5-216x^6}$$

$= \text{Too large to display}$

input
```
int(-(exp(-(2*(198*x - exp(x)*(60*x + 336*x^2 + 36*x^3 - 192*x^4 + 48*x^5)
 + exp(2*x)*(50*x^2 + 10*x^3 - 32*x^4 + 8*x^5) + 558*x^2 + 18*x^3 - 288*x^
4 + 72*x^5))/(90*x - exp(x)*(30*x + 138*x^2 - 120*x^3 + 24*x^4) + exp(2*x)
*(25*x^2 - 20*x^3 + 4*x^4) + 189*x^2 - 180*x^3 + 36*x^4 + 9))*(756*x + exp
(2*x)*(900*x^2 + 3780*x^3 - 5256*x^4 + 2160*x^5 - 288*x^6) - exp(x)*(612*x
 + 5040*x^2 + 9180*x^3 - 15336*x^4 + 6480*x^5 - 864*x^6 + 360) - exp(3*x)*
(500*x^3 - 600*x^4 + 240*x^5 - 32*x^6) + 7452*x^2 + 7020*x^3 - 14904*x^4 +
 6480*x^5 - 864*x^6 + 1188))/(405*x + exp(2*x)*(225*x^2 + 945*x^3 - 1314*x
^4 + 540*x^5 - 72*x^6) - exp(x)*(135*x + 1296*x^2 + 2295*x^3 - 3834*x^4 +
1620*x^5 - 216*x^6) - exp(3*x)*(125*x^3 - 150*x^4 + 60*x^5 - 8*x^6) + 1863
*x^2 + 1755*x^3 - 3726*x^4 + 1620*x^5 - 216*x^6 + 27),x)
```

output
```
exp((72*x^3*exp(x))/(90*x - 138*x^2*exp(x) + 120*x^3*exp(x) - 24*x^4*exp(x
) + 25*x^2*exp(2*x) - 20*x^3*exp(2*x) + 4*x^4*exp(2*x) - 30*x*exp(x) + 189
*x^2 - 180*x^3 + 36*x^4 + 9))*exp((96*x^5*exp(x))/(90*x - 138*x^2*exp(x) +
 120*x^3*exp(x) - 24*x^4*exp(x) + 25*x^2*exp(2*x) - 20*x^3*exp(2*x) + 4*x^
4*exp(2*x) - 30*x*exp(x) + 189*x^2 - 180*x^3 + 36*x^4 + 9))*exp(-(384*x^4*
exp(x))/(90*x - 138*x^2*exp(x) + 120*x^3*exp(x) - 24*x^4*exp(x) + 25*x^2*e
xp(2*x) - 20*x^3*exp(2*x) + 4*x^4*exp(2*x) - 30*x*exp(x) + 189*x^2 - 180*x
^3 + 36*x^4 + 9))*exp((672*x^2*exp(x))/(90*x - 138*x^2*exp(x) + 120*x^3*ex
p(x) - 24*x^4*exp(x) + 25*x^2*exp(2*x) - 20*x^3*exp(2*x) + 4*x^4*exp(2*x)
- 30*x*exp(x) + 189*x^2 - 180*x^3 + 36*x^4 + 9))*exp(-(36*x^3)/(90*x - 138
*x^2*exp(x) + 120*x^3*exp(x) - 24*x^4*exp(x) + 25*x^2*exp(2*x) - 20*x^3*ex
p(2*x) + 4*x^4*exp(2*x) - 30*x*exp(x) + 189*x^2 - 180*x^3 + 36*x^4 + 9))*e
xp(-(144*x^5)/(90*x - 138*x^2*exp(x) + 120*x^3*exp(x) - 24*x^4*exp(x) + 25
*x^2*exp(2*x) - 20*x^3*exp(2*x) + 4*x^4*exp(2*x) - 30*x*exp(x) + 189*x^2 -
 180*x^3 + 36*x^4 + 9))*exp((576*x^4)/(90*x - 138*x^2*exp(x) + 120*x^3*exp
(x) - 24*x^4*exp(x) + 25*x^2*exp(2*x) - 20*x^3*exp(2*x) + 4*x^4*exp(2*x) -
 30*x*exp(x) + 189*x^2 - 180*x^3 + 36*x^4 + 9))*exp(-(1116*x^2)/(90*x - 13
8*x^2*exp(x) + 120*x^3*exp(x) - 24*x^4*exp(x) + 25*x^2*exp(2*x) - 20*x^3*e
xp(2*x) + 4*x^4*exp(2*x) - 30*x*exp(x) + 189*x^2 - 180*x^3 + 36*x^4 + 9))*
exp(-(16*x^5*exp(2*x))/(90*x - 138*x^2*exp(x) + 120*x^3*exp(x) - 24*x^4...
```

3.327.

$$\int e^{\frac{2\left(-198x-558x^2-18x^3+288x^4-72x^5+e^{2x}\left(-50x^2-10x^3+32x^4-8x^5\right)+e^x\left(60x+336x^2+36x^3-192x^4+48x^5\right)\right)}{9+90x+189x^2-180x^3+36x^4+e^x\left(-30x-138x^2+120x^3-24x^4\right)+e^{2x}\left(25x^2-20x^3+4x^4\right)}}\left(-1188-756x-7452x^2-7020x^3+14904x^4-\right.$$

3.328 $\int \frac{3-2x+\log(4)+4e^{16+e^{16+4x}+4x}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}\,dx$

3.328.1 Optimal result

Integrand size = 52, antiderivative size = 39

$$\int \frac{3-2x+\log(4)+4e^{16+e^{16+4x}+4x}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}\,dx = -e^5+e^{e^{4(4+x)}}+\frac{x(3-x+\log(4))}{i\pi+\log(5-\log(3))}$$

output
```
(2*ln(2)+3-x)*x/ln(ln(3)-5)+exp(exp(4*x+16))-exp(5)
```

3.328.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.33

$$\int \frac{3-2x+\log(4)+4e^{16+e^{16+4x}+4x}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}\,dx = \frac{3x-x^2+x\log(4)+e^{e^{4(4+x)}}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}$$

input
```
Integrate[(3 - 2*x + Log[4] + 4*E^(16 + E^(16 + 4*x) + 4*x)*(I*Pi + Log[5
- Log[3]]))/(I*Pi + Log[5 - Log[3]]),x]
```

output
```
(3*x - x^2 + x*Log[4] + E^E^(4*(4 + x))*(I*Pi + Log[5 - Log[3]]))/(I*Pi +
Log[5 - Log[3]])
```

3.328.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.31, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.038, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x+4e^{4x+e^{4x+16}+16}(\log(5-\log(3))+i\pi)+3+\log(4)}{\log(5-\log(3))+i\pi}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \left(-2x+4e^{4x+e^{4x+16}+16}(i\pi+\log(5-\log(3)))+\log(4)+3\right)dx}{\log(5-\log(3))+i\pi}$$

$$\Big\downarrow \text{2009}$$

$$\frac{-x^2+x(3+\log(4))+e^{e^{4x+16}}(\log(5-\log(3))+i\pi)}{\log(5-\log(3))+i\pi}$$

input
```
Int[(3 - 2*x + Log[4] + 4*E^(16 + E^(16 + 4*x) + 4*x)*(I*Pi + Log[5 - Log[
3]]))/(I*Pi + Log[5 - Log[3]]),x]
```

output
```
(-x^2 + x*(3 + Log[4]) + E^E^(16 + 4*x)*(I*Pi + Log[5 - Log[3]]))/(I*Pi +
Log[5 - Log[3]])
```

3.328.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.328.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.79

method	result	size
parts	$\frac{2x\ln(2)-x^2+3x}{\ln(\ln(3)-5)}+\mathrm{e}^{\mathrm{e}^{4x+16}}$	31
default	$\frac{-x^2+3x+\ln(\ln(3)-5)\mathrm{e}^{\mathrm{e}^{4x+16}}+2x\ln(2)}{\ln(\ln(3)-5)}$	36
norman	$\frac{(2\ln(2)+3)x}{\ln(\ln(3)-5)}-\frac{x^2}{\ln(\ln(3)-5)}+\mathrm{e}^{\mathrm{e}^{4x+16}}$	36
parallelrisch	$\frac{-x^2+\ln(\ln(3)-5)\mathrm{e}^{\mathrm{e}^{4x+16}}+x(2\ln(2)+3)}{\ln(\ln(3)-5)}$	36
risch	$-\frac{x^2}{\ln(\ln(3)-5)}+\frac{3x}{\ln(\ln(3)-5)}+\mathrm{e}^{\mathrm{e}^{4x+16}}+\frac{2x\ln(2)}{\ln(\ln(3)-5)}$	43

input
```
int((4*exp(4*x+16)*ln(ln(3)-5)*exp(exp(4*x+16))+2*ln(2)+3-2*x)/ln(ln(3)-5)
,x,method=_RETURNVERBOSE)
```

output
```
1/ln(ln(3)-5)*(2*x*ln(2)-x^2+3*x)+exp(exp(4*x+16))
```

3.328.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.38

$$\int \frac{3-2x+\log(4)+4e^{16+e^{16+4x}+4x}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}\,dx$$
$$=-\frac{\left((x^2-2\,x\log(2)-3\,x)e^{(4\,x+16)}-e^{\left(4\,x+e^{(4\,x+16)}+16\right)}\log(\log(3)-5)\right)e^{(-4\,x-16)}}{\log(\log(3)-5)}$$

input
```
integrate((4*exp(4*x+16)*log(log(3)-5)*exp(exp(4*x+16))+2*log(2)+3-2*x)/lo
g(log(3)-5),x, algorithm=\
```

output
```
-((x^2 - 2*x*log(2) - 3*x)*e^(4*x + 16) - e^(4*x + e^(4*x + 16) + 16)*log(
log(3) - 5))*e^(-4*x - 16)/log(log(3) - 5)
```

3.328.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.05

$$\int \frac{3-2x+\log(4)+4e^{16+e^{16+4x}+4x}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}\,dx$$
$$= -\frac{x^2}{\log(5-\log(3))+i\pi}+\frac{x(2\log(2)+3)}{\log(5-\log(3))+i\pi}+e^{e^{16}e^{4x}}$$

input
```
integrate((4*exp(4*x+16)*ln(ln(3)-5)*exp(exp(4*x+16))+2*ln(2)+3-2*x)/ln(ln
(3)-5),x)
```

output
```
-x**2/(log(5 - log(3)) + I*pi) + x*(2*log(2) + 3)/(log(5 - log(3)) + I*pi)
 + exp(exp(16)*exp(4*x))
```

3.328.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 35, normalized size of antiderivative = 0.90

$$\int \frac{3-2x+\log(4)+4e^{16+e^{16+4x}+4x}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}\,dx$$
$$= -\frac{x^2-2x\log(2)-e^{\left(e^{(4x+16)}\right)}\log(\log(3)-5)-3x}{\log(\log(3)-5)}$$

input
```
integrate((4*exp(4*x+16)*log(log(3)-5)*exp(exp(4*x+16))+2*log(2)+3-2*x)/lo
g(log(3)-5),x, algorithm=\
```

output
```
-(x^2 - 2*x*log(2) - e^(e^(4*x + 16))*log(log(3) - 5) - 3*x)/log(log(3) -
5)
```

3.328.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 0.90

$$\int \frac{3-2x+\log(4)+4e^{16+e^{16+4x}+4x}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}\,dx$$
$$= -\frac{x^2-2\,x\log(2)-e^{\left(e^{(4\,x+16)}\right)}\log(\log(3)-5)-3\,x}{\log(\log(3)-5)}$$

input
```
integrate((4*exp(4*x+16)*log(log(3)-5)*exp(exp(4*x+16))+2*log(2)+3-2*x)/lo
g(log(3)-5),x, algorithm=\
```

output
```
-(x^2 - 2*x*log(2) - e^(e^(4*x + 16))*log(log(3) - 5) - 3*x)/log(log(3) -
5)
```

3.328.9 Mupad [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 35, normalized size of antiderivative = 0.90

$$\int \frac{3-2x+\log(4)+4e^{16+e^{16+4x}+4x}(i\pi+\log(5-\log(3)))}{i\pi+\log(5-\log(3))}\,dx$$
$$= \frac{3\,x+x\,\ln(4)-x^2+\ln(\ln(3)-5)\,\mathrm{e}^{\mathrm{e}^{4\,x}\,\mathrm{e}^{16}}}{\ln(\ln(3)-5)}$$

input
```
int((2*log(2) - 2*x + 4*log(log(3) - 5)*exp(exp(4*x + 16))*exp(4*x + 16) +
 3)/log(log(3) - 5),x)
```

output
```
(3*x + x*log(4) - x^2 + log(log(3) - 5)*exp(exp(4*x)*exp(16)))/log(log(3)
- 5)
```

3.329 $\int \frac{(15x+4x^2+e^x(-6x-x^2))\log(x^2)+(20+4x)\log(2\log(x^2))+x\log(x^2)\log^2(2\log(x^2))}{x\log(x^2)}\,dx$

3.329.1 Optimal result

Integrand size = 66, antiderivative size = 25

$$\int \frac{(15x+4x^2+e^x(-6x-x^2))\log(x^2)+(20+4x)\log(2\log(x^2))+x\log(x^2)\log^2(2\log(x^2))}{x\log(x^2)}\,dx$$
$$=1+(5+x)\left(5-e^x+2x+\log^2\left(2\log\left(x^2\right)\right)\right)$$

output
```
1+(5+x)*(ln(2*ln(x^2))^2+5-exp(x)+2*x)
```

3.329.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{(15x+4x^2+e^x(-6x-x^2))\log(x^2)+(20+4x)\log(2\log(x^2))+x\log(x^2)\log^2(2\log(x^2))}{x\log(x^2)}\,dx$$
$$=-e^x(5+x)+x(15+2x)+(5+x)\log^2\left(2\log\left(x^2\right)\right)$$

input
```
Integrate[((15*x + 4*x^2 + E^x*(-6*x - x^2))*Log[x^2] + (20 + 4*x)*Log[2*L
og[x^2]] + x*Log[x^2]*Log[2*Log[x^2]]^2)/(x*Log[x^2]),x]
```

output
```
-(E^x*(5 + x)) + x*(15 + 2*x) + (5 + x)*Log[2*Log[x^2]]^2
```

3.329.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x\log(x^2)\log^2(2\log(x^2))+(4x+20)\log(2\log(x^2))+(4x^2+e^x(-x^2-6x)+15x)\log(x^2)}{x\log(x^2)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x\log(x^2)\log^2(2\log(x^2))+4x^2\log(x^2)+15x\log(x^2)+4x\log(2\log(x^2))+20\log(2\log(x^2))}{x\log(x^2)}-e^x(x+6\right.$$

$$\Big\downarrow \text{2009}$$

$$\int \log^2(2\log(x^2))dx+4\int \frac{\log(2\log(x^2))}{\log(x^2)}dx+2x^2+5\log^2(2\log(x^2))+15x+e^x-e^x(x+6)$$

input
```
Int[((15*x + 4*x^2 + E^x*(-6*x - x^2))*Log[x^2] + (20 + 4*x)*Log[2*Log[x^2
]] + x*Log[x^2]*Log[2*Log[x^2]]^2)/(x*Log[x^2]),x]
```

output
```
$Aborted
```

3.329.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.329.4 Maple [A] (verified)

Time = 2.50 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.64

method	result
parallelrisch	$x\ln\left(2\ln\left(x^{2}\right)\right)^{2}+2x^{2}-{\mathrm e}^{x} x +5\ln\left(2\ln\left(x^{2}\right)\right)^{2}+15x -5\,{\mathrm e}^{x}$
risch	$\left(5+x \right) \ln\left(4\ln\left(x \right)-i \pi \,\mathrm{csgn}\left(i x^{2}\right) \left(-\mathrm{csgn}\left(i x^{2}\right)+\mathrm{csgn}\left(i x \right)\right)^{2}\right)^{2}+2x^{2}-{\mathrm e}^{x} x +15x -5\,{\mathrm e}^{x}$

input
```
int((x*ln(x^2)*ln(2*ln(x^2))^2+(20+4*x)*ln(2*ln(x^2))+((-x^2-6*x)*exp(x)+4
*x^2+15*x)*ln(x^2))/x/ln(x^2),x,method=_RETURNVERBOSE)
```

output
```
x*ln(2*ln(x^2))^2+2*x^2-exp(x)*x+5*ln(2*ln(x^2))^2+15*x-5*exp(x)
```

3.329.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{(15x+4x^2+e^x(-6x-x^2))\log(x^2)+(20+4x)\log(2\log(x^2))+x\log(x^2)\log^2(2\log(x^2))}{x\log(x^2)}\,dx$$
$$= (x+5)\log\left(2\,\log\left(x^{2}\right)\right)^{2}+2\,x^{2}-(x+5)e^{x}+15\,x$$

input
```
integrate((x*log(x^2)*log(2*log(x^2))^2+(20+4*x)*log(2*log(x^2))+((-x^2-6*
x)*exp(x)+4*x^2+15*x)*log(x^2))/x/log(x^2),x, algorithm=\
```

output
```
(x + 5)*log(2*log(x^2))^2 + 2*x^2 - (x + 5)*e^x + 15*x
```

3.329.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{(15x+4x^2+e^x(-6x-x^2))\log(x^2)+(20+4x)\log(2\log(x^2))+x\log(x^2)\log^2(2\log(x^2))}{x\log(x^2)}\,dx$$
$$= 2x^{2}+15x+(-x-5)\,e^{x}+(x+5)\log\left(2\log\left(x^{2}\right)\right)^{2}$$

input
```
integrate((x*ln(x**2)*ln(2*ln(x**2))**2+(20+4*x)*ln(2*ln(x**2))+((-x**2-6*
x)*exp(x)+4*x**2+15*x)*ln(x**2))/x/ln(x**2),x)
```

output
```
2*x**2 + 15*x + (-x - 5)*exp(x) + (x + 5)*log(2*log(x**2))**2
```

3.329.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. 2(24) = 48.

Time = 0.35 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.00

$$\int \frac{(15x+4x^2+e^x(-6x-x^2))\log(x^2)+(20+4x)\log(2\log(x^2))+x\log(x^2)\log^2(2\log(x^2))}{x\log(x^2)}\,dx$$
$$= 4\,x\log(2)^2+(x+5)\log(\log(x))^2+2\,x^2-(x-1)e^x + 4\,(x\log(2)+5\,\log(2))\log(\log(x))+15\,x-6\,e^x$$

input
```
integrate((x*log(x^2)*log(2*log(x^2))^2+(20+4*x)*log(2*log(x^2))+((-x^2-6*
x)*exp(x)+4*x^2+15*x)*log(x^2))/x/log(x^2),x, algorithm=\
```

output
```
4*x*log(2)^2 + (x + 5)*log(log(x))^2 + 2*x^2 - (x - 1)*e^x + 4*(x*log(2) +
 5*log(2))*log(log(x)) + 15*x - 6*e^x
```

3.329.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60

$$\int \frac{(15x+4x^2+e^x(-6x-x^2))\log(x^2)+(20+4x)\log(2\log(x^2))+x\log(x^2)\log^2(2\log(x^2))}{x\log(x^2)}\,dx$$
$$= x\log\left(2\,\log\left(x^2\right)\right)^2+2\,x^2-xe^x+5\,\log\left(2\,\log\left(x^2\right)\right)^2+15\,x-5\,e^x$$

input
```
integrate((x*log(x^2)*log(2*log(x^2))^2+(20+4*x)*log(2*log(x^2))+((-x^2-6*
x)*exp(x)+4*x^2+15*x)*log(x^2))/x/log(x^2),x, algorithm=\
```

output
```
x*log(2*log(x^2))^2 + 2*x^2 - x*e^x + 5*log(2*log(x^2))^2 + 15*x - 5*e^x
```

3.329.9 Mupad [B] (verification not implemented)

Time = 12.74 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{(15x + 4x^2 + e^x(-6x - x^2)) \log(x^2) + (20 + 4x) \log(2\log(x^2)) + x \log(x^2) \log^2(2\log(x^2))}{x \log(x^2)} \, dx$$
$$= 15\,x - \mathrm{e}^x\,(x+5) + \ln\left(2\,\ln\left(x^2\right)\right)^2\,(x+5) + 2\,x^2$$

input
```
int((log(x^2)*(15*x - exp(x)*(6*x + x^2) + 4*x^2) + log(2*log(x^2))*(4*x +
 20) + x*log(2*log(x^2))^2*log(x^2))/(x*log(x^2)),x)
```

output
```
15*x - exp(x)*(x + 5) + log(2*log(x^2))^2*(x + 5) + 2*x^2
```

3.330 $\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)\right.}{\left(2e^5x+2e^xx\right)\log\left(\frac{e^5+e^x}{x}\right)}$

3.330.1 Optimal result

Integrand size = 118, antiderivative size = 25

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right.\right.\right.}{\left(2e^5x+2e^xx\right)\log\left(\frac{e^5+e^x}{x}\right)}$$
$$=e^{\left(-\frac{1}{4}-\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)^2}$$

output
```
exp((-1/4-ln(2*ln((exp(5)+exp(x))/x)))^2)
```

3.330.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.80

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right.\right.\right.}{\left(2e^5x+2e^xx\right)\log\left(\frac{e^5+e^x}{x}\right)}$$
$$=\sqrt{2}e^{\frac{1}{16}+\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)}\sqrt{\log\left(\frac{e^5+e^x}{x}\right)}$$

input
```
Integrate[(E^((1 + 8*Log[2*Log[(E^5 + E^x)/x]] + 16*Log[2*Log[(E^5 + E^x)/
x]]^2)/16)*(-E^5 + E^x*(-1 + x) + (-4*E^5 + E^x*(-4 + 4*x))*Log[2*Log[(E^5
 + E^x)/x]]))/((2*E^5*x + 2*E^x*x)*Log[(E^5 + E^x)/x]),x]
```

3.330.

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}{\cdots}\,dx$$

output
```
Sqrt[2]*E^(1/16 + Log[2*Log[(E^5 + E^x)/x]]^2)*Sqrt[Log[(E^5 + E^x)/x]]
```

3.330.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 107 vs. 2(25) = 50.

Time = 0.90 (sec) , antiderivative size = 107, normalized size of antiderivative = 4.28, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034, Rules used = {2704, 27, 27, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^x(x-1)+\left(e^x(4x-4)-4e^5\right)\log\left(2\log\left(\frac{e^x+e^5}{x}\right)\right)-e^5\right)\exp\left(\frac{1}{16}\left(16\log^2\left(2\log\left(\frac{e^x+e^5}{x}\right)\right)+8\log\left(2\log\left(\frac{e^x+}{x}\right.\right.\right.\right.}{\left(2e^xx+2e^5x\right)\log\left(\frac{e^x+e^5}{x}\right)}$$

$$\Big\downarrow \text{ 2704}$$

$$\int \frac{\sqrt{2}e^{\frac{1}{16}\left(16\log^2\left(2\log\left(\frac{e^x+e^5}{x}\right)\right)+1\right)}\left(e^x(x-1)+\left(e^x(4x-4)-4e^5\right)\log\left(2\log\left(\frac{e^x+e^5}{x}\right)\right)-e^5\right)}{\left(2e^xx+2e^5x\right)\sqrt{\log\left(\frac{e^x+e^5}{x}\right)}}dx$$

$$\Big\downarrow \text{ 27}$$

$$\sqrt{2}\int -\frac{e^{\frac{1}{16}\left(16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+1\right)}\left(e^x(1-x)+4\left(e^x(1-x)+e^5\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+e^5\right)}{2\left(e^xx+e^5x\right)\sqrt{\log\left(\frac{e^5+e^x}{x}\right)}}dx$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{\int \frac{e^{\frac{1}{16}\left(16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+1\right)}\left(e^x(1-x)+4\left(e^x(1-x)+e^5\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+e^5\right)}{\left(e^xx+e^5x\right)\sqrt{\log\left(\frac{e^5+e^x}{x}\right)}}dx}{\sqrt{2}}$$

$$\Big\downarrow \text{ 2726}$$

$$\frac{\sqrt{2}\left(e^x+e^5\right)\left(e^x(1-x)+e^5\right)e^{\frac{1}{16}\left(16\log^2\left(2\log\left(\frac{e^x+e^5}{x}\right)\right)+1\right)}\sqrt{\log\left(\frac{e^x+e^5}{x}\right)}}{\left(\frac{e^x+e^5}{x^2}-\frac{e^x}{x}\right)x\left(e^xx+e^5x\right)}$$

3.330.

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}{\cdots}dx$$

input
```
Int[(E^((1 + 8*Log[2*Log[(E^5 + E^x)/x]] + 16*Log[2*Log[(E^5 + E^x)/x]]^2)
/16)*(-E^5 + E^x*(-1 + x) + (-4*E^5 + E^x*(-4 + 4*x))*Log[2*Log[(E^5 + E^x
)/x]]))/((2*E^5*x + 2*E^x*x)*Log[(E^5 + E^x)/x]),x]
```

output
```
(Sqrt[2]*E^((1 + 16*Log[2*Log[(E^5 + E^x)/x]]^2)/16)*(E^5 + E^x)*(E^5 + E^
x*(1 - x))*Sqrt[Log[(E^5 + E^x)/x]])/(((E^5 + E^x)/x^2 - E^x/x)*x*(E^5*x +
 E^x*x))
```

3.330.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2704
```
Int[(u_.)*(F_)^((a_.)*(Log[z_]*(b_.) + (v_.))), x_Symbol] :> Int[u*F^(a*v)*
z^(a*b*Log[F]), x] /; FreeQ[{F, a, b}, x]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.330.4 Maple [A] (verified)

Time = 44.64 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

method	result
parallelrisch	$e^{\ln\left(2\ln\left(\frac{e^5+e^x}{x}\right)\right)^2+\frac{\ln\left(2\ln\left(\frac{e^5+e^x}{x}\right)\right)}{2}+\frac{1}{16}}$
risch	$\sqrt{-2\ln(x)+2\ln(e^5+e^x)-i\pi\,\mathrm{csgn}\left(\frac{i(e^5+e^x)}{x}\right)\left(-\mathrm{csgn}\left(\frac{i(e^5+e^x)}{x}\right)+\mathrm{csgn}\left(\frac{i}{x}\right)\right)\left(-\mathrm{csgn}\left(\frac{i(}{}\right.\right.}$

input
```
int((((-4+4*x)*exp(x)-4*exp(5))*ln(2*ln((exp(5)+exp(x))/x))+(-1+x)*exp(x)-
exp(5))*exp(ln(2*ln((exp(5)+exp(x))/x))^2+1/2*ln(2*ln((exp(5)+exp(x))/x))+
1/16)/(2*exp(x)*x+2*x*exp(5))/ln((exp(5)+exp(x))/x),x,method=_RETURNVERBOS
E)
```

output
```
exp(ln(2*ln((exp(5)+exp(x))/x))^2+1/2*ln(2*ln((exp(5)+exp(x))/x))+1/16)
```

3.330.

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}{\cdots}\,dx$$

3.330.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}{\left(2e^5x+2e^xx\right)\log\left(\frac{e^5+e^x}{x}\right)}$$
$$= e^{\left(\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)^2+\frac{1}{2}\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+\frac{1}{16}\right)}$$

input
```
integrate((((-4+4*x)*exp(x)-4*exp(5))*log(2*log((exp(5)+exp(x))/x))+(-1+x)
*exp(x)-exp(5))*exp(log(2*log((exp(5)+exp(x))/x))^2+1/2*log(2*log((exp(5)+
exp(x))/x))+1/16)/(2*exp(x)*x+2*x*exp(5))/log((exp(5)+exp(x))/x),x, algori
thm=\
```

output
```
e^(log(2*log((e^5 + e^x)/x))^2 + 1/2*log(2*log((e^5 + e^x)/x)) + 1/16)
```

3.330.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}{\left(2e^5x+2e^xx\right)\log\left(\frac{e^5+e^x}{x}\right)}$$
$$= \text{Timed out}$$

input
```
integrate((((-4+4*x)*exp(x)-4*exp(5))*ln(2*ln((exp(5)+exp(x))/x))+(-1+x)*e
xp(x)-exp(5))*exp(ln(2*ln((exp(5)+exp(x))/x))**2+1/2*ln(2*ln((exp(5)+exp(x
))/x))+1/16)/(2*exp(x)*x+2*x*exp(5))/ln((exp(5)+exp(x))/x),x)
```

output
```
Timed out
```

3.330.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(22) = 44.

Time = 0.57 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.16

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right.\right.\right.}{\left(2e^5x+2e^xx\right)\log\left(\frac{e^5+e^x}{x}\right)}$$
$$=\sqrt{2}\sqrt{-\log(x)+\log\left(e^5+e^x\right)}e^{\left(\log(2)^2+2\log(2)\log(-\log(x)+\log(e^5+e^x))+\log(-\log(x)+\log(e^5+e^x))^2+\frac{1}{16}\right)}$$

input
```
integrate((((-4+4*x)*exp(x)-4*exp(5))*log(2*log((exp(5)+exp(x))/x))+(-1+x)
*exp(x)-exp(5))*exp(log(2*log((exp(5)+exp(x))/x))^2+1/2*log(2*log((exp(5)+
exp(x))/x))+1/16)/(2*exp(x)*x+2*x*exp(5))/log((exp(5)+exp(x))/x),x, algori
thm=\
```

output
```
sqrt(2)*sqrt(-log(x) + log(e^5 + e^x))*e^(log(2)^2 + 2*log(2)*log(-log(x)
+ log(e^5 + e^x)) + log(-log(x) + log(e^5 + e^x))^2 + 1/16)
```

3.330.8 Giac [F]

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right.\right.}{\left(2e^5x+2e^xx\right)\log\left(\frac{e^5+e^x}{x}\right)}$$
$$=\int \frac{\left((x-1)e^x+4\left((x-1)e^x-e^5\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)-e^5\right)e^{\left(\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)^2+\frac{1}{2}\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+\frac{1}{16}\right)}}{2\left(xe^5+xe^x\right)\log\left(\frac{e^5+e^x}{x}\right)}\,dx$$

input
```
integrate((((-4+4*x)*exp(x)-4*exp(5))*log(2*log((exp(5)+exp(x))/x))+(-1+x)
*exp(x)-exp(5))*exp(log(2*log((exp(5)+exp(x))/x))^2+1/2*log(2*log((exp(5)+
exp(x))/x))+1/16)/(2*exp(x)*x+2*x*exp(5))/log((exp(5)+exp(x))/x),x, algori
thm=\
```

output
```
undef
```

3.330.
$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}{\ldots}\,dx$$

3.330.9 Mupad [B] (verification not implemented)

Time = 13.48 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.56

$$\int \frac{e^{\frac{1}{16}\left(1+8\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)+16\log^2\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}\left(-e^5+e^x(-1+x)+\left(-4e^5+e^x(-4+4x)\right)\log\left(2\log\left(\frac{e^5+e^x}{x}\right)\right)\right)}{\left(2e^5x+2e^xx\right)\log\left(\frac{e^5+e^x}{x}\right)}$$

$$= \mathrm{e}^{1/16}\,\mathrm{e}^{\ln\left(2\,\ln\left(\frac{1}{x}\right)+\ln\left(\left(\mathrm{e}^5+\mathrm{e}^x\right)^2\right)\right)^2}\sqrt{2\,\ln\left(\frac{1}{x}\right)+\ln\left(\left(\mathrm{e}^5+\mathrm{e}^x\right)^2\right)}$$

input
```
int(-(exp(log(2*log((exp(5) + exp(x))/x))/2 + log(2*log((exp(5) + exp(x))/
x))^2 + 1/16)*(exp(5) + log(2*log((exp(5) + exp(x))/x))*(4*exp(5) - exp(x)
*(4*x - 4)) - exp(x)*(x - 1)))/(log((exp(5) + exp(x))/x)*(2*x*exp(5) + 2*x
*exp(x))),x)
```

output
```
exp(1/16)*exp(log(2*log(1/x) + log((exp(5) + exp(x))^2))^2)*(2*log(1/x) +
log((exp(5) + exp(x))^2))^(1/2)
```

3.331 $\int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log \cdots}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4 \cdots}{\cdots}\right.}$

3.331.1 Optimal result

Integrand size = 168, antiderivative size = 29

$$\int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+\cdots}{\log^2\left(\frac{x}{3}\right)}\right)} \cdots$$

$$= \frac{4\log(3)}{\log\left(x^2\left(x+\frac{4}{\log\left(\frac{x}{3}\right)}-\log(x)\right)^2\right)}$$

output
```
4*ln(3)/ln(x^2*(4/ln(1/3*x)-ln(x)+x)^2)
```

3.331.2 Mathematica [F]

$$\int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+\cdots}{\log^2\left(\frac{x}{3}\right)}\right)} \cdots$$

$$= \int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x \cdots}{\log^2\left(\frac{x}{3}\right)}\right)} \cdots$$

3.331.
$$\int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+x^2\log^2\left(\frac{x}{3}\right)\log^2(x)}{\cdots}\right)}\,dx$$

input
```
Integrate[(-32*Log[3] + 32*Log[3]*Log[x/3] + (-8 + 16*x)*Log[3]*Log[x/3]^2
 - 8*Log[3]*Log[x/3]^2*Log[x])/((-4*x*Log[x/3] - x^2*Log[x/3]^2 + x*Log[x/
3]^2*Log[x])*Log[(16*x^2 + 8*x^3*Log[x/3] + x^4*Log[x/3]^2 + (-8*x^2*Log[x
/3] - 2*x^3*Log[x/3]^2)*Log[x] + x^2*Log[x/3]^2*Log[x]^2)/Log[x/3]^2]^2),x
]
```

output
```
Integrate[(-32*Log[3] + 32*Log[3]*Log[x/3] + (-8 + 16*x)*Log[3]*Log[x/3]^2
 - 8*Log[3]*Log[x/3]^2*Log[x])/((-4*x*Log[x/3] - x^2*Log[x/3]^2 + x*Log[x/
3]^2*Log[x])*Log[(16*x^2 + 8*x^3*Log[x/3] + x^4*Log[x/3]^2 + (-8*x^2*Log[x
/3] - 2*x^3*Log[x/3]^2)*Log[x] + x^2*Log[x/3]^2*Log[x]^2)/Log[x/3]^2]^2),
x]
```

3.331.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8\log(3)\log(x)\log^2\left(\frac{x}{3}\right)+(16x-8)\log(3)\log^2\left(\frac{x}{3}\right)+32\log(3)\log\left(\frac{x}{3}\right)-32\log(3)}{\left(-x^2\log^2\left(\frac{x}{3}\right)+x\log(x)\log^2\left(\frac{x}{3}\right)-4x\log\left(\frac{x}{3}\right)\right)\log^2\left(\frac{x^4\log^2\left(\frac{x}{3}\right)+8x^3\log\left(\frac{x}{3}\right)+16x^2+x^2\log^2\left(\frac{x}{3}\right)\log^2(x)+\left(-2x^3\log^2\left(\frac{x}{3}\right)-8x^2}{\log^2\left(\frac{x}{3}\right)}}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{8\log(3)\left((-2x+\log(x)+1)\log^2\left(\frac{x}{3}\right)-4\log(x)+4(1+\log(3))\right)}{x\log\left(\frac{x}{3}\right)\left(\log\left(\frac{x}{3}\right)(x-\log(x))+4\right)\log^2\left(\frac{x^2\left(\log\left(\frac{x}{3}\right)(x-\log(x))+4\right)^2}{\log^2\left(\frac{x}{3}\right)}\right)}dx$$

$$\Big\downarrow \text{27}$$

$$8\log(3)\int \frac{(-2x+\log(x)+1)\log^2\left(\frac{x}{3}\right)-4\log(x)+\log(81)+4}{x\log\left(\frac{x}{3}\right)\left(\log\left(\frac{x}{3}\right)(x-\log(x))+4\right)\log^2\left(\frac{x^2\left(\log\left(\frac{x}{3}\right)(x-\log(x))+4\right)^2}{\log^2\left(\frac{x}{3}\right)}\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$8\log(3)\int \frac{(-2x+\log(x)+1)\log^2\left(\frac{x}{3}\right)-4\log(x)+4(1+\log(3))}{x\log\left(\frac{x}{3}\right)\left(\log\left(\frac{x}{3}\right)(x-\log(x))+4\right)\log^2\left(\frac{x^2\left(\log\left(\frac{x}{3}\right)(x-\log(x))+4\right)^2}{\log^2\left(\frac{x}{3}\right)}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$8\log(3)\int\left(\frac{\log(x)\log\left(\frac{x}{3}\right)}{x\left(x\log\left(\frac{x}{3}\right)-\log(x)\log\left(\frac{x}{3}\right)+4\right)\log^2\left(\frac{x^2\left(\log\left(\frac{x}{3}\right)(x-\log(x))+4\right)^2}{\log^2\left(\frac{x}{3}\right)}\right)}+\frac{\log\left(\frac{x}{3}\right.}{x\left(x\log\left(\frac{x}{3}\right)-\log(x)\log\left(\frac{x}{3}\right)+4\right)}\right.$$

$\downarrow$ 2009

$$8\log(3)\left(4(1+\log(3))\int\frac{1}{x\log\left(\frac{x}{3}\right)\left(x\log\left(\frac{x}{3}\right)-\log(x)\log\left(\frac{x}{3}\right)+4\right)\log^2\left(\frac{x^2\left(\log\left(\frac{x}{3}\right)(x-\log(x))+4\right)^2}{\log^2\left(\frac{x}{3}\right)}\right)}dx-2\int\frac{}{(x\log}\right.$$

input
```
Int[(-32*Log[3] + 32*Log[3]*Log[x/3] + (-8 + 16*x)*Log[3]*Log[x/3]^2 - 8*L
og[3]*Log[x/3]^2*Log[x])/((-4*x*Log[x/3] - x^2*Log[x/3]^2 + x*Log[x/3]^2*L
og[x])*Log[(16*x^2 + 8*x^3*Log[x/3] + x^4*Log[x/3]^2 + (-8*x^2*Log[x/3] -
2*x^3*Log[x/3]^2)*Log[x] + x^2*Log[x/3]^2*Log[x]^2)/Log[x/3]^2]^2),x]
```

output
```
$Aborted
```

3.331.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.331.

$$\int\frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+x^2\log^2\left(\frac{x}{3}\right)\log^2(x)}{\log^2\left(\frac{x}{3}\right)}\right)}dx$$

3.331.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(27) = 54$.

Time = 54.44 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.31

method	result
parallelrisch	$\frac{4\ln(3)}{\ln\left(\frac{x^2\left(\ln(x)^2\ln\left(\frac{x}{3}\right)^2-2x\ln\left(\frac{x}{3}\right)^2\ln(x)+x^2\ln\left(\frac{x}{3}\right)^2-8\ln\left(\frac{x}{3}\right)\ln(x)+8x\ln\left(\frac{x}{3}\right)+16\right)}{\ln\left(\frac{x}{3}\right)^2}\right)}$
default	$\frac{4\ln(3)}{\ln\left(\frac{x^2\left(\ln(x)^4-2\ln(x)^3\ln(3)+\ln(3)^2\ln(x)^2-2x\ln(x)^3+4x\ln(3)\ln(x)^2-2x\ln(x)\ln(3)^2+x^2\ln(x)^2-2x^2\ln(3)\ln(x)+x^2\ln(3)^2-8\ln(x)^2+8\ln\right.}{(\ln(x)-\ln(3))^2}\right.}$
risch	Expression too large to display

input
```
int((-8*ln(3)*ln(1/3*x)^2*ln(x)+(16*x-8)*ln(3)*ln(1/3*x)^2+32*ln(3)*ln(1/3
*x)-32*ln(3))/(x*ln(1/3*x)^2*ln(x)-x^2*ln(1/3*x)^2-4*x*ln(1/3*x))/ln((x^2*
ln(1/3*x)^2*ln(x)^2+(-2*x^3*ln(1/3*x)^2-8*x^2*ln(1/3*x))*ln(x)+x^4*ln(1/3*
x)^2+8*x^3*ln(1/3*x)+16*x^2)/ln(1/3*x)^2)^2,x,method=_RETURNVERBOSE)
```

output
```
4*ln(3)/ln(x^2*(ln(x)^2*ln(1/3*x)^2-2*x*ln(1/3*x)^2*ln(x)+x^2*ln(1/3*x)^2-
8*ln(1/3*x)*ln(x)+8*x*ln(1/3*x)+16)/ln(1/3*x)^2)
```

3.331.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 97 vs. $2(27) = 54$.

Time = 0.26 (sec) , antiderivative size = 97, normalized size of antiderivative = 3.34

$$\int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+}{\log^2\left(\frac{x}{3}\right)}\right.}$$
$$= \frac{4\log(3)}{\log\left(\frac{x^2\log\left(\frac{1}{3}x\right)^4-2\left(x^3-x^2\log(3)\right)\log\left(\frac{1}{3}x\right)^3+\left(x^4-2x^3\log(3)+x^2\log(3)^2-8x^2\right)\log\left(\frac{1}{3}x\right)^2+16x^2+8\left(x^3-x^2\log(3)\right)\log\left(\frac{1}{3}x\right)}{\log\left(\frac{1}{3}x\right)^2}\right)}$$

input
```
integrate((-8*log(3)*log(1/3*x)^2*log(x)+(16*x-8)*log(3)*log(1/3*x)^2+32*l
og(3)*log(1/3*x)-32*log(3))/(x*log(1/3*x)^2*log(x)-x^2*log(1/3*x)^2-4*x*lo
g(1/3*x))/log((x^2*log(1/3*x)^2*log(x)^2+(-2*x^3*log(1/3*x)^2-8*x^2*log(1/
3*x))*log(x)+x^4*log(1/3*x)^2+8*x^3*log(1/3*x)+16*x^2)/log(1/3*x)^2)^2,x,
algorithm=\
```

3.331.

$$\int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+x^2\log^2\left(\frac{x}{3}\right)\log^2(x)}{\log^2(x)}\right)}\,dx$$

output
```
4*log(3)/log((x^2*log(1/3*x)^4 - 2*(x^3 - x^2*log(3))*log(1/3*x)^3 + (x^4
- 2*x^3*log(3) + x^2*log(3)^2 - 8*x^2)*log(1/3*x)^2 + 16*x^2 + 8*(x^3 - x^
2*log(3))*log(1/3*x))/log(1/3*x)^2)
```

3.331.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 90 vs. $2(22) = 44$.

Time = 0.53 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.10

$$\int \frac{-32\log(3) + 32\log(3)\log\left(\frac{x}{3}\right) + (-8+16x)\log(3)\log^2\left(\frac{x}{3}\right) - 8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right) - x^2\log^2\left(\frac{x}{3}\right) + x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+}{\log^2\left(\frac{x}{3}\right)}\right.}$$
$$= \frac{4\log(3)}{\log\left(\frac{x^4(\log(x)-\log(3))^2+8x^3(\log(x)-\log(3))+x^2(\log(x)-\log(3))^2\log(x)^2+16x^2+\left(-2x^3(\log(x)-\log(3))^2-8x^2(\log(x)-\log(3))\right)\log(x)}{(\log(x)-\log(3))^2}\right.}$$

input
```
integrate((-8*ln(3)*ln(1/3*x)**2*ln(x)+(16*x-8)*ln(3)*ln(1/3*x)**2+32*ln(3
)*ln(1/3*x)-32*ln(3))/(x*ln(1/3*x)**2*ln(x)-x**2*ln(1/3*x)**2-4*x*ln(1/3*x
))/ln((x**2*ln(1/3*x)**2*ln(x)**2+(-2*x**3*ln(1/3*x)**2-8*x**2*ln(1/3*x))*
ln(x)+x**4*ln(1/3*x)**2+8*x**3*ln(1/3*x)+16*x**2)/ln(1/3*x)**2)**2,x)
```

output
```
4*log(3)/log((x**4*(log(x) - log(3))**2 + 8*x**3*(log(x) - log(3)) + x**2*
(log(x) - log(3))**2*log(x)**2 + 16*x**2 + (-2*x**3*(log(x) - log(3))**2 -
 8*x**2*(log(x) - log(3)))*log(x))/(log(x) - log(3))**2)
```

3.331.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.31

$$\int \frac{-32\log(3) + 32\log(3)\log\left(\frac{x}{3}\right) + (-8+16x)\log(3)\log^2\left(\frac{x}{3}\right) - 8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right) - x^2\log^2\left(\frac{x}{3}\right) + x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+}{\log^2\left(\frac{x}{3}\right)}\right.}$$
$$= \frac{2\log(3)}{\log\left(x\log(3) - (x+\log(3))\log(x) + \log(x)^2 - 4\right) + \log(x) - \log(-\log(3) + \log(x))}$$

input
```
integrate((-8*log(3)*log(1/3*x)^2*log(x)+(16*x-8)*log(3)*log(1/3*x)^2+32*l
og(3)*log(1/3*x)-32*log(3))/(x*log(1/3*x)^2*log(x)-x^2*log(1/3*x)^2-4*x*lo
g(1/3*x))/log((x^2*log(1/3*x)^2*log(x)^2+(-2*x^3*log(1/3*x)^2-8*x^2*log(1/
3*x))*log(x)+x^4*log(1/3*x)^2+8*x^3*log(1/3*x)+16*x^2)/log(1/3*x)^2)^2,x,
algorithm=\
```

output
```
2*log(3)/(log(x*log(3) - (x + log(3))*log(x) + log(x)^2 - 4) + log(x) - lo
g(-log(3) + log(x)))
```

3.331.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 125 vs. $2(27) = 54$.

Time = 5.08 (sec) , antiderivative size = 125, normalized size of antiderivative = 4.31

$$\int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+}{\log^2\left(\frac{x}{3}\right)}\right.}$$

$$= \frac{}{\log\left(x^2\log\left(3\right)^2-2\,x^2\log\left(3\right)\log\left(x\right)-2\,x\log\left(3\right)^2\log\left(x\right)+x^2\log\left(x\right)^2+4\,x\log\left(3\right)\log\left(x\right)^2+\log\left(3\right)^2\log\left(\right.\right.}$$

input
```
integrate((-8*log(3)*log(1/3*x)^2*log(x)+(16*x-8)*log(3)*log(1/3*x)^2+32*l
og(3)*log(1/3*x)-32*log(3))/(x*log(1/3*x)^2*log(x)-x^2*log(1/3*x)^2-4*x*lo
g(1/3*x))/log((x^2*log(1/3*x)^2*log(x)^2+(-2*x^3*log(1/3*x)^2-8*x^2*log(1/
3*x))*log(x)+x^4*log(1/3*x)^2+8*x^3*log(1/3*x)+16*x^2)/log(1/3*x)^2)^2,x,
algorithm=\
```

output
```
4*log(3)/(log(x^2*log(3)^2 - 2*x^2*log(3)*log(x) - 2*x*log(3)^2*log(x) + x
^2*log(x)^2 + 4*x*log(3)*log(x)^2 + log(3)^2*log(x)^2 - 2*x*log(x)^3 - 2*l
og(3)*log(x)^3 + log(x)^4 - 8*x*log(3) + 8*x*log(x) + 8*log(3)*log(x) - 8*
log(x)^2 + 16) - log(log(3)^2 - 2*log(3)*log(x) + log(x)^2) + 2*log(x))
```

3.331.9 Mupad [B] (verification not implemented)

Time = 13.30 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.69

$$\int \frac{-32\log(3)+32\log(3)\log\left(\frac{x}{3}\right)+(-8+16x)\log(3)\log^2\left(\frac{x}{3}\right)-8\log(3)\log^2\left(\frac{x}{3}\right)\log(x)}{\left(-4x\log\left(\frac{x}{3}\right)-x^2\log^2\left(\frac{x}{3}\right)+x\log^2\left(\frac{x}{3}\right)\log(x)\right)\log^2\left(\frac{16x^2+8x^3\log\left(\frac{x}{3}\right)+x^4\log^2\left(\frac{x}{3}\right)+\left(-8x^2\log\left(\frac{x}{3}\right)-2x^3\log^2\left(\frac{x}{3}\right)\right)\log(x)+}{\log^2\left(\frac{x}{3}\right)}\right.}$$
$$=\frac{4\ln(3)}{\ln\left(\frac{8\,x^3\,\ln\left(\frac{x}{3}\right)+16\,x^2+x^4\ln\left(\frac{x}{3}\right)^2-\ln(x)\left(2\,x^3\ln\left(\frac{x}{3}\right)^2+8\,x^2\,\ln\left(\frac{x}{3}\right)\right)+x^2\ln\left(\frac{x}{3}\right)^2\ln(x)^2}{\ln\left(\frac{x}{3}\right)^2}\right)}$$

input
```
int((32*log(3) - 32*log(x/3)*log(3) + 8*log(x/3)^2*log(3)*log(x) - log(x/3
)^2*log(3)*(16*x - 8))/(log((8*x^3*log(x/3) + 16*x^2 + x^4*log(x/3)^2 - lo
g(x)*(8*x^2*log(x/3) + 2*x^3*log(x/3)^2) + x^2*log(x/3)^2*log(x)^2)/log(x/
3)^2)^2*(4*x*log(x/3) + x^2*log(x/3)^2 - x*log(x/3)^2*log(x))),x)
```

output
```
(4*log(3))/log((8*x^3*log(x/3) + 16*x^2 + x^4*log(x/3)^2 - log(x)*(8*x^2*l
og(x/3) + 2*x^3*log(x/3)^2) + x^2*log(x/3)^2*log(x)^2)/log(x/3)^2)
```

3.332 $\int \frac{e^{\frac{-9+2x\log(3+e^x+4x^2)}{x\log(3+e^x+4x^2)}}(9e^xx+72x^2+(27+9e^x+36x^2)\log(3+e^x+4x^2))}{(3x^2+e^xx^2+4x^4)\log^2(3+e^x+4x^2)}$

3.332.1 Optimal result

Integrand size = 105, antiderivative size = 25

$$\int \frac{e^{\frac{-9+2x\log(3+e^x+4x^2)}{x\log(3+e^x+4x^2)}}(9e^xx+72x^2+(27+9e^x+36x^2)\log(3+e^x+4x^2))}{(3x^2+e^xx^2+4x^4)\log^2(3+e^x+4x^2)}\,dx = e^{\frac{2x-\frac{9}{\log(3+e^x+4x^2)}}{x}}$$

output
```
exp((2*x-9/ln(exp(x)+4*x^2+3))/x)
```

3.332.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{e^{\frac{-9+2x\log(3+e^x+4x^2)}{x\log(3+e^x+4x^2)}}(9e^xx+72x^2+(27+9e^x+36x^2)\log(3+e^x+4x^2))}{(3x^2+e^xx^2+4x^4)\log^2(3+e^x+4x^2)}\,dx = e^{2-\frac{9}{x\log(3+e^x+4x^2)}}$$

input
```
Integrate[(E^((-9 + 2*x*Log[3 + E^x + 4*x^2])/(x*Log[3 + E^x + 4*x^2]))*(9
*E^x*x + 72*x^2 + (27 + 9*E^x + 36*x^2)*Log[3 + E^x + 4*x^2]))/((3*x^2 + E
^x*x^2 + 4*x^4)*Log[3 + E^x + 4*x^2]^2),x]
```

3.332. $\int \frac{e^{\frac{-9+2x\log(3+e^x+4x^2)}{x\log(3+e^x+4x^2)}}(9e^xx+72x^2+(27+9e^x+36x^2)\log(3+e^x+4x^2))}{(3x^2+e^xx^2+4x^4)\log^2(3+e^x+4x^2)}\,dx$

output
```
E^(2 - 9/(x*Log[3 + E^x + 4*x^2]))
```

3.332.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(72x^2+(36x^2+9e^x+27)\log(4x^2+e^x+3)+9e^xx)\exp\left(\frac{2x\log(4x^2+e^x+3)-9}{x\log(4x^2+e^x+3)}\right)}{(4x^4+e^xx^2+3x^2)\log^2(4x^2+e^x+3)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{9(\log(4x^2+e^x+3)+x)\exp\left(\frac{2x\log(4x^2+e^x+3)-9}{x\log(4x^2+e^x+3)}\right)}{x^2\log^2(4x^2+e^x+3)}-\frac{9(4x^2-8x+3)\exp\left(\frac{2x\log(4x^2+e^x+3)-9}{x\log(4x^2+e^x+3)}\right)}{x(4x^2+e^x+3)\log^2(4x^2+e^x+3)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$9\int \frac{\exp\left(\frac{2x\log(4x^2+e^x+3)-9}{x\log(4x^2+e^x+3)}\right)}{x\log^2(4x^2+e^x+3)}dx+72\int \frac{\exp\left(\frac{2x\log(4x^2+e^x+3)-9}{x\log(4x^2+e^x+3)}\right)}{(4x^2+e^x+3)\log^2(4x^2+e^x+3)}dx-27\int \frac{\exp\left(\frac{2x\log(4x^2+e^x+3)-9}{x\log(4x^2+e^x+3)}\right)}{x(4x^2+e^x+3)\log^2(4x^2+e^x+3)}dx-36\int \frac{\exp\left(\frac{2x\log(4x^2+e^x+3)-9}{x\log(4x^2+e^x+3)}\right)x}{(4x^2+e^x+3)\log^2(4x^2+e^x+3)}dx+9\int \frac{\exp\left(\frac{2x\log(4x^2+e^x+3)-9}{x\log(4x^2+e^x+3)}\right)}{x^2\log(4x^2+e^x+3)}dx$$

input
```
Int[(E^((-9 + 2*x*Log[3 + E^x + 4*x^2])/(x*Log[3 + E^x + 4*x^2]))*(9*E^x*x
 + 72*x^2 + (27 + 9*E^x + 36*x^2)*Log[3 + E^x + 4*x^2]))/((3*x^2 + E^x*x^2
 + 4*x^4)*Log[3 + E^x + 4*x^2]^2),x]
```

output
```
$Aborted
```

3.332.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.332.4 Maple [A] (verified)

Time = 34.56 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

method	result	size
risch	$\mathrm{e}^{\frac{2x\ln\left(\mathrm{e}^{x}+4x^{2}+3\right)-9}{x\ln\left(\mathrm{e}^{x}+4x^{2}+3\right)}}$	33
parallelrisch	$\mathrm{e}^{\frac{2x\ln\left(\mathrm{e}^{x}+4x^{2}+3\right)-9}{x\ln\left(\mathrm{e}^{x}+4x^{2}+3\right)}}$	33

input
```
int(((9*exp(x)+36*x^2+27)*ln(exp(x)+4*x^2+3)+9*exp(x)*x+72*x^2)*exp((2*x*l
n(exp(x)+4*x^2+3)-9)/x/ln(exp(x)+4*x^2+3))/(exp(x)*x^2+4*x^4+3*x^2)/ln(exp
(x)+4*x^2+3)^2,x,method=_RETURNVERBOSE)
```

output
```
exp((2*x*ln(exp(x)+4*x^2+3)-9)/x/ln(exp(x)+4*x^2+3))
```

3.332.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \frac{e^{\frac{-9+2x\log\left(3+e^x+4x^2\right)}{x\log\left(3+e^x+4x^2\right)}}\left(9e^xx+72x^2+\left(27+9e^x+36x^2\right)\log\left(3+e^x+4x^2\right)\right)}{\left(3x^2+e^xx^2+4x^4\right)\log^2\left(3+e^x+4x^2\right)}\,dx = e^{\left(\frac{2\,x\log\left(4\,x^2+e^x+3\right)-9}{x\log\left(4\,x^2+e^x+3\right)}\right)}$$

input
```
integrate(((9*exp(x)+36*x^2+27)*log(exp(x)+4*x^2+3)+9*exp(x)*x+72*x^2)*exp
((2*x*log(exp(x)+4*x^2+3)-9)/x/log(exp(x)+4*x^2+3))/(exp(x)*x^2+4*x^4+3*x^
2)/log(exp(x)+4*x^2+3)^2,x, algorithm=\
```

output
```
e^((2*x*log(4*x^2 + e^x + 3) - 9)/(x*log(4*x^2 + e^x + 3)))
```

3.332.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\frac{-9+2x\log(3+e^x+4x^2)}{x\log(3+e^x+4x^2)}}(9e^xx+72x^2+(27+9e^x+36x^2)\log(3+e^x+4x^2))}{(3x^2+e^xx^2+4x^4)\log^2(3+e^x+4x^2)}\,dx=\text{Timed out}$$

input
```
integrate(((9*exp(x)+36*x**2+27)*ln(exp(x)+4*x**2+3)+9*exp(x)*x+72*x**2)*e
xp((2*x*ln(exp(x)+4*x**2+3)-9)/x/ln(exp(x)+4*x**2+3))/(exp(x)*x**2+4*x**4+
3*x**2)/ln(exp(x)+4*x**2+3)**2,x)
```

output
```
Timed out
```

3.332.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{-9+2x\log(3+e^x+4x^2)}{x\log(3+e^x+4x^2)}}(9e^xx+72x^2+(27+9e^x+36x^2)\log(3+e^x+4x^2))}{(3x^2+e^xx^2+4x^4)\log^2(3+e^x+4x^2)}\,dx$$
$$=\text{Exception raised: RuntimeError}$$

input
```
integrate(((9*exp(x)+36*x^2+27)*log(exp(x)+4*x^2+3)+9*exp(x)*x+72*x^2)*exp
((2*x*log(exp(x)+4*x^2+3)-9)/x/log(exp(x)+4*x^2+3))/(exp(x)*x^2+4*x^4+3*x^
2)/log(exp(x)+4*x^2+3)^2,x, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.332.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{e^{\frac{-9+2x\log(3+e^x+4x^2)}{x\log(3+e^x+4x^2)}}(9e^xx+72x^2+(27+9e^x+36x^2)\log(3+e^x+4x^2))}{(3x^2+e^xx^2+4x^4)\log^2(3+e^x+4x^2)}\,dx$$
$$=e^{\left(-\frac{9}{x\log(4x^2+e^x+3)}+2\right)}$$

input
```
integrate(((9*exp(x)+36*x^2+27)*log(exp(x)+4*x^2+3)+9*exp(x)*x+72*x^2)*exp
((2*x*log(exp(x)+4*x^2+3)-9)/x/log(exp(x)+4*x^2+3))/(exp(x)*x^2+4*x^4+3*x^
2)/log(exp(x)+4*x^2+3)^2,x, algorithm=\
```

output
```
e^(-9/(x*log(4*x^2 + e^x + 3)) + 2)
```

3.332.9 Mupad [B] (verification not implemented)

Time = 12.82 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{e^{\frac{-9+2x\log\left(3+e^x+4x^2\right)}{x\log\left(3+e^x+4x^2\right)}}\left(9e^x x+72x^2+\left(27+9e^x+36x^2\right)\log\left(3+e^x+4x^2\right)\right)}{\left(3x^2+e^x x^2+4x^4\right)\log^2\left(3+e^x+4x^2\right)}\,dx$$
$$= \mathrm{e}^2\,\mathrm{e}^{-\frac{9}{x\,\ln\left(\mathrm{e}^x+4\,x^2+3\right)}}$$

input
```
int((exp((2*x*log(exp(x) + 4*x^2 + 3) - 9)/(x*log(exp(x) + 4*x^2 + 3)))*(l
og(exp(x) + 4*x^2 + 3)*(9*exp(x) + 36*x^2 + 27) + 9*x*exp(x) + 72*x^2))/(l
og(exp(x) + 4*x^2 + 3)^2*(x^2*exp(x) + 3*x^2 + 4*x^4)),x)
```

output
```
exp(2)*exp(-9/(x*log(exp(x) + 4*x^2 + 3)))
```

3.333 $\int \frac{-4-6x+7x^2-x^3-x^4+2x^5-x^6}{x^3+2x^4-x^5-2x^6+x^7} dx$

3.333.1 Optimal result

Integrand size = 55, antiderivative size = 31

$$\int \frac{-4-6x+7x^2-x^3-x^4+2x^5-x^6}{x^3+2x^4-x^5-2x^6+x^7} dx = \frac{2}{\left(1+\frac{2-x}{\frac{2}{x}-x}\right)x^2} - \log(x)$$

output
```
2/x^2/((2-x)/(2/x-x)+1)-ln(x)
```

3.333.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{-4-6x+7x^2-x^3-x^4+2x^5-x^6}{x^3+2x^4-x^5-2x^6+x^7} dx = -\frac{2-x^2}{x^2(-1-x+x^2)} - \log(x)$$

input
```
Integrate[(-4 - 6*x + 7*x^2 - x^3 - x^4 + 2*x^5 - x^6)/(x^3 + 2*x^4 - x^5
- 2*x^6 + x^7),x]
```

output
```
-((2 - x^2)/(x^2*(-1 - x + x^2))) - Log[x]
```

3.333.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.055, Rules used = {2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^6+2x^5-x^4-x^3+7x^2-6x-4}{x^7-2x^6-x^5+2x^4+x^3}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-x^6+2x^5-x^4-x^3+7x^2-6x-4}{x^3(x^4-2x^3-x^2+2x+1)}dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(-\frac{4}{x^3}+\frac{4x-7}{(x^2-x-1)^2}-\frac{2}{x^2-x-1}+\frac{2}{x^2}-\frac{1}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{3-2x}{-x^2+x+1}+\frac{2}{x^2}-\frac{2}{x}-\log(x)$$

input
```
Int[(-4 - 6*x + 7*x^2 - x^3 - x^4 + 2*x^5 - x^6)/(x^3 + 2*x^4 - x^5 - 2*x^
6 + x^7),x]
```

output
```
2/x^2 - 2/x + (3 - 2*x)/(1 + x - x^2) - Log[x]
```

3.333.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.333.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81

method	result	size
norman	$\frac{x^2-2}{x^2(x^2-x-1)} - \ln(x)$	25
risch	$\frac{x^2-2}{x^2(x^2-x-1)} - \ln(x)$	25
default	$\frac{2}{x^2} - \frac{2}{x} - \ln(x) - \frac{3-2x}{x^2-x-1}$	33
parallelrisch	$-\frac{x^4\ln(x)+2-x^3\ln(x)-x^2\ln(x)-x^2}{x^2(x^2-x-1)}$	43

input
```
int((-x^6+2*x^5-x^4-x^3+7*x^2-6*x-4)/(x^7-2*x^6-x^5+2*x^4+x^3),x,method=_R
ETURNVERBOSE)
```

output
```
(x^2-2)/x^2/(x^2-x-1)-ln(x)
```

3.333.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.29

$$\int \frac{-4-6x+7x^2-x^3-x^4+2x^5-x^6}{x^3+2x^4-x^5-2x^6+x^7}\,dx = \frac{x^2-(x^4-x^3-x^2)\log(x)-2}{x^4-x^3-x^2}$$

input
```
integrate((-x^6+2*x^5-x^4-x^3+7*x^2-6*x-4)/(x^7-2*x^6-x^5+2*x^4+x^3),x, al
gorithm=\
```

output
```
(x^2 - (x^4 - x^3 - x^2)*log(x) - 2)/(x^4 - x^3 - x^2)
```

3.333.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.61

$$\int \frac{-4-6x+7x^2-x^3-x^4+2x^5-x^6}{x^3+2x^4-x^5-2x^6+x^7}\,dx = -\frac{2-x^2}{x^4-x^3-x^2} - \log(x)$$

input
```
integrate((-x**6+2*x**5-x**4-x**3+7*x**2-6*x-4)/(x**7-2*x**6-x**5+2*x**4+x
**3),x)
```

output
```
-(2 - x**2)/(x**4 - x**3 - x**2) - log(x)
```

3.333.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{-4-6x+7x^2-x^3-x^4+2x^5-x^6}{x^3+2x^4-x^5-2x^6+x^7}\,dx = \frac{x^2-2}{x^4-x^3-x^2} - \log(x)$$

input
```
integrate((-x^6+2*x^5-x^4-x^3+7*x^2-6*x-4)/(x^7-2*x^6-x^5+2*x^4+x^3),x, al
gorithm=\
```

output
```
(x^2 - 2)/(x^4 - x^3 - x^2) - log(x)
```

3.333.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81

$$\int \frac{-4-6x+7x^2-x^3-x^4+2x^5-x^6}{x^3+2x^4-x^5-2x^6+x^7}\,dx = \frac{x^2-2}{(x^2-x-1)x^2} - \log(|x|)$$

input
```
integrate((-x^6+2*x^5-x^4-x^3+7*x^2-6*x-4)/(x^7-2*x^6-x^5+2*x^4+x^3),x, al
gorithm=\
```

output
```
(x^2 - 2)/((x^2 - x - 1)*x^2) - log(abs(x))
```

3.333.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81

$$\int \frac{-4-6x+7x^2-x^3-x^4+2x^5-x^6}{x^3+2x^4-x^5-2x^6+x^7}\,dx = -\ln\left(x\right)-\frac{x^2-2}{x^2\,\left(-x^2+x+1\right)}$$

input
```
int(-(6*x - 7*x^2 + x^3 + x^4 - 2*x^5 + x^6 + 4)/(x^3 + 2*x^4 - x^5 - 2*x^
6 + x^7),x)
```

output
```
- log(x) - (x^2 - 2)/(x^2*(x - x^2 + 1))
```

3.334 $\int \frac{5-5e^x}{(e^x-x)\log(-e^x+x)\log(\log(-e^x+x))}\,dx$

3.334.1 Optimal result

Integrand size = 38, antiderivative size = 16

$$\int \frac{5-5e^x}{(e^x-x)\log(-e^x+x)\log(\log(-e^x+x))}\,dx = 5\log\left(-\frac{10}{\log(\log(-e^x+x))}\right)$$

output
```
5*ln(-10/ln(ln(x-exp(x))))
```

3.334.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{5-5e^x}{(e^x-x)\log(-e^x+x)\log(\log(-e^x+x))}\,dx = -5\log(\log(\log(-e^x+x)))$$

input
```
Integrate[(5 - 5*E^x)/((E^x - x)*Log[-E^x + x]*Log[Log[-E^x + x]]),x]
```

output
```
-5*Log[Log[Log[-E^x + x]]]
```

3.334.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5-5e^x}{(e^x-x)\log(x-e^x)\log(\log(x-e^x))}dx$$
$$\Big\downarrow \text{ 7235}$$
$$-5\log(\log(\log(x-e^x)))$$

input
```
Int[(5 - 5*E^x)/((E^x - x)*Log[-E^x + x]*Log[Log[-E^x + x]]),x]
```

output
```
-5*Log[Log[Log[-E^x + x]]]
```

3.334.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.334.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

method	result	size
risch	$-5\ln(\ln(\ln(x-e^x)))$	12
parallelrisch	$-5\ln(\ln(\ln(x-e^x)))$	12

input
```
int((-5*exp(x)+5)/(exp(x)-x)/ln(x-exp(x))/ln(ln(x-exp(x))),x,method=_RETUR
NVERBOSE)
```

output
```
-5*ln(ln(ln(x-exp(x))))
```

3.334.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.69

$$\int \frac{5-5e^x}{(e^x-x)\log(-e^x+x)\log(\log(-e^x+x))}\,dx = -5\,\log(\log(\log(x-e^x)))$$

input
```
integrate((-5*exp(x)+5)/(exp(x)-x)/log(x-exp(x))/log(log(x-exp(x))),x, alg
orithm=\
```

output
```
-5*log(log(log(x - e^x)))
```

3.334.6 Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{5-5e^x}{(e^x-x)\log(-e^x+x)\log(\log(-e^x+x))}\,dx = -5\log(\log(\log(x-e^x)))$$

input
```
integrate((-5*exp(x)+5)/(exp(x)-x)/ln(x-exp(x))/ln(ln(x-exp(x))),x)
```

output
```
-5*log(log(log(x - exp(x))))
```

3.334.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.69

$$\int \frac{5-5e^x}{(e^x-x)\log(-e^x+x)\log(\log(-e^x+x))}\,dx = -5\,\log(\log(\log(x-e^x)))$$

input
```
integrate((-5*exp(x)+5)/(exp(x)-x)/log(x-exp(x))/log(log(x-exp(x))),x, alg
orithm=\
```

output
```
-5*log(log(log(x - e^x)))
```

3.334.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.69

$$\int \frac{5-5e^x}{(e^x-x)\log(-e^x+x)\log(\log(-e^x+x))}\,dx = -5\log(\log(\log(x-e^x)))$$

input
```
integrate((-5*exp(x)+5)/(exp(x)-x)/log(x-exp(x))/log(log(x-exp(x))),x, alg
orithm=\
```

output
```
-5*log(log(log(x - e^x)))
```

3.334.9 Mupad [B] (verification not implemented)

Time = 13.10 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.69

$$\int \frac{5-5e^x}{(e^x-x)\log(-e^x+x)\log(\log(-e^x+x))}\,dx = -5\ln(\ln(\ln(x-e^x)))$$

input
```
int((5*exp(x) - 5)/(log(x - exp(x))*log(log(x - exp(x)))*(x - exp(x))),x)
```

output
```
-5*log(log(log(x - exp(x))))
```

3.335 $\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2} dx$

3.335.1 Optimal result

Integrand size = 47, antiderivative size = 23

$$\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2} \, dx = (4+x)\left(2-\frac{x}{4(4-e+x)}\right)+\log(\log(5))$$

output
```
(2-x/(16+4*x-4*exp(1)))*(4+x)+ln(ln(5))
```

3.335.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2} \, dx = \frac{1}{4}\left(\frac{(-4+e)e}{-4+e-x}+7(4-e+x)\right)$$

input
```
Integrate[(112 + 8*E^2 + E*(-60 - 14*x) + 56*x + 7*x^2)/(64 + 4*E^2 + E*(-
32 - 8*x) + 32*x + 4*x^2),x]
```

output
```
(((-4 + E)*E)/(-4 + E - x) + 7*(4 - E + x))/4
```

3.335.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.106, Rules used = {2083, 1294, 27, 1107, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{7x^2+56x+e(-14x-60)+8e^2+112}{4x^2+32x+e(-8x-32)+4e^2+64}dx$$

$$\Big\downarrow \text{2083}$$

$$\int \frac{7x^2+14(4-e)x+4(28-15e+2e^2)}{4x^2+8(4-e)x+4(4-e)^2}dx$$

$$\Big\downarrow \text{1294}$$

$$4\int \frac{7x^2+14(4-e)x+4(28-15e+2e^2)}{16(x-e+4)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int \frac{7x^2+14(4-e)x+4(28-15e+2e^2)}{(x-e+4)^2}dx$$

$$\Big\downarrow \text{1107}$$

$$\frac{1}{4}\int \left(7+\frac{(-4+e)e}{(-x+e-4)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(7x+\frac{(4-e)e}{x-e+4}\right)$$

input
```
Int[(112 + 8*E^2 + E*(-60 - 14*x) + 56*x + 7*x^2)/(64 + 4*E^2 + E*(-32 - 8
*x) + 32*x + 4*x^2),x]
```

output
```
(7*x + ((4 - E)*E)/(4 - E + x))/4
```

3.335.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1107
```
Int[((d_.) + (e_.)*(x_))^(m_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_
Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; F
reeQ[{a, b, c, d, e, m}, x] && EqQ[2*c*d - b*e, 0] && IGtQ[p, 0] &&  !(EqQ[
m, 3] && NeQ[p, 1])
```

rule 1294
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.)*((d_.) + (e_.)*(x_) + (f_.)*(x
_)^2)^(q_.), x_Symbol] :> Simp[1/c^p   Int[(b/2 + c*x)^(2*p)*(d + e*x + f*x
^2)^q, x], x] /; FreeQ[{a, b, c, d, e, f, q}, x] && EqQ[b^2 - 4*a*c, 0] &&
IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2083
```
Int[(u_)^(p_.)*(v_)^(q_.), x_Symbol] :> Int[ExpandToSum[u, x]^p*ExpandToSum
[v, x]^q, x] /; FreeQ[{p, q}, x] && QuadraticQ[{u, v}, x] &&  !QuadraticMat
chQ[{u, v}, x]
```

3.335.4 Maple [A] (verified)

Time = 1.41 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

method	result
norman	$\frac{-\frac{7x^2}{4}+2\,\mathrm{e}^2-15\,\mathrm{e}+28}{\mathrm{e}-x-4}$
gosper	$\frac{-7x^2+112+8\,\mathrm{e}^2-60\,\mathrm{e}}{4\,\mathrm{e}-4x-16}$
parallelrisch	$\frac{-7x^2+112+8\,\mathrm{e}^2-60\,\mathrm{e}}{4\,\mathrm{e}-4x-16}$
risch	$\frac{7x}{4}+\frac{\mathrm{e}^2}{4\,\mathrm{e}-4x-16}-\frac{\mathrm{e}}{\mathrm{e}-x-4}$
meijerg	$\frac{28x}{(4-\mathrm{e})^2\left(1+\frac{x}{4-\mathrm{e}}\right)}+\left(-\frac{7\,\mathrm{e}}{2}+14\right)\left(-\frac{x}{(4-\mathrm{e})\left(1+\frac{x}{4-\mathrm{e}}\right)}+\ln\left(1+\frac{x}{4-\mathrm{e}}\right)\right)+\frac{7(4-\mathrm{e})\left(\frac{x\left(6+\frac{3x}{4-\mathrm{e}}\right)}{3(4-\mathrm{e})\left(1+\frac{x}{4-\mathrm{e}}\right)}-2\ln\left(1+\frac{x}{4-\mathrm{e}}\right.\right.}{4}$

3.335. $\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2}\,dx$

input
```
int((8*exp(1)^2+(-14*x-60)*exp(1)+7*x^2+56*x+112)/(4*exp(1)^2+(-8*x-32)*ex
p(1)+4*x^2+32*x+64),x,method=_RETURNVERBOSE)
```

output
```
(-7/4*x^2+2*exp(1)^2-15*exp(1)+28)/(exp(1)-x-4)
```

3.335.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

$$\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2}\,dx=\frac{7\,x^2-(7\,x-4)e+28\,x-e^2}{4\,(x-e+4)}$$

input
```
integrate((8*exp(1)^2+(-14*x-60)*exp(1)+7*x^2+56*x+112)/(4*exp(1)^2+(-8*x-
32)*exp(1)+4*x^2+32*x+64),x, algorithm=\
```

output
```
1/4*(7*x^2 - (7*x - 4)*e + 28*x - e^2)/(x - e + 4)
```

3.335.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2}\,dx=\frac{7x}{4}+\frac{-e^2+4e}{4x-4e+16}$$

input
```
integrate((8*exp(1)**2+(-14*x-60)*exp(1)+7*x**2+56*x+112)/(4*exp(1)**2+(-8
*x-32)*exp(1)+4*x**2+32*x+64),x)
```

output
```
7*x/4 + (-exp(2) + 4*E)/(4*x - 4*E + 16)
```

3.335.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2}\,dx=\frac{7}{4}\,x-\frac{e^2-4\,e}{4\,(x-e+4)}$$

input
```
integrate((8*exp(1)^2+(-14*x-60)*exp(1)+7*x^2+56*x+112)/(4*exp(1)^2+(-8*x-
32)*exp(1)+4*x^2+32*x+64),x, algorithm=\
```

output
```
7/4*x - 1/4*(e^2 - 4*e)/(x - e + 4)
```

3.335.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2}\,dx=\frac{7}{4}\,x-\frac{e^2-4\,e}{4\,(x-e+4)}$$

input
```
integrate((8*exp(1)^2+(-14*x-60)*exp(1)+7*x^2+56*x+112)/(4*exp(1)^2+(-8*x-
32)*exp(1)+4*x^2+32*x+64),x, algorithm=\
```

output
```
7/4*x - 1/4*(e^2 - 4*e)/(x - e + 4)
```

3.335.9 Mupad [B] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{112+8e^2+e(-60-14x)+56x+7x^2}{64+4e^2+e(-32-8x)+32x+4x^2}\,dx=\frac{7\,x}{4}+\frac{\mathrm{e}-\frac{\mathrm{e}^2}{4}}{x-\mathrm{e}+4}$$

input
```
int((56*x + 8*exp(2) + 7*x^2 - exp(1)*(14*x + 60) + 112)/(32*x + 4*exp(2)
+ 4*x^2 - exp(1)*(8*x + 32) + 64),x)
```

output
```
(7*x)/4 + (exp(1) - exp(2)/4)/(x - exp(1) + 4)
```

3.336 $\int \frac{e^x(-4050x-2025x^2+81x^3+(-2025-2106x+81x^2)\log(5))+e^{2+e^x}(e^{...}}{...}$

3.336.1 Optimal result

Integrand size = 326, antiderivative size = 29

$$\int \frac{e^x(-4050x-2025x^2+81x^3+(-2025-2106x+81x^2)\log(5))+e^{2+e^x}(e^{2x}(2700x^2-108x^3+(2700x-\dots}{\dots}$$

$$=\frac{e^x(3-e^{2+e^x})^4x(x+\log(5))}{(25-x)^2}$$

output
```
x*(3-exp(exp(x)+2))^4/(-x+25)^2*exp(x)*(ln(5)+x)
```

3.336.2 Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{e^x(-4050x-2025x^2+81x^3+(-2025-2106x+81x^2)\log(5))+e^{2+e^x}(e^{2x}(2700x^2-108x^3+(2700x-\dots}{\dots}$$

$$=\frac{e^x(-3+e^{2+e^x})^4x(x+\log(5))}{(-25+x)^2}$$

3.336.
$\int \frac{e^x(-4050x-2025x^2+81x^3+(-2025-2106x+81x^2)\log(5))+e^{2+e^x}(e^{2x}(2700x^2-108x^3+(2700x-108x^2)\log(5))+e^x(5400x+2700x^2-108x^3+(\dots}{\dots}$

input
```
Integrate[(E^x*(-4050*x - 2025*x^2 + 81*x^3 + (-2025 - 2106*x + 81*x^2)*Lo
g[5]) + E^(2 + E^x)*(E^(2*x)*(2700*x^2 - 108*x^3 + (2700*x - 108*x^2)*Log[
5]) + E^x*(5400*x + 2700*x^2 - 108*x^3 + (2700 + 2808*x - 108*x^2)*Log[5])
) + E^(6 + 3*E^x)*(E^(2*x)*(900*x^2 - 36*x^3 + (900*x - 36*x^2)*Log[5]) +
E^x*(600*x + 300*x^2 - 12*x^3 + (300 + 312*x - 12*x^2)*Log[5])) + E^(8 + 4
*E^x)*(E^x*(-50*x - 25*x^2 + x^3 + (-25 - 26*x + x^2)*Log[5]) + E^(2*x)*(-
100*x^2 + 4*x^3 + (-100*x + 4*x^2)*Log[5])) + E^(4 + 2*E^x)*(E^x*(-2700*x
- 1350*x^2 + 54*x^3 + (-1350 - 1404*x + 54*x^2)*Log[5]) + E^(2*x)*(-2700*x
^2 + 108*x^3 + (-2700*x + 108*x^2)*Log[5])))/(-15625 + 1875*x - 75*x^2 + x
^3),x]
```

output
```
(E^x*(-3 + E^(2 + E^x))^4*x*(x + Log[5]))/(-25 + x)^2
```

3.336.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(81x^3-2025x^2+\left(81x^2-2106x-2025\right)\log(5)-4050x\right)+e^{e^x+2}\left(e^{2x}\left(-108x^3+2700x^2+\left(2700x-108x^2\right.\right.\right.}{}$$

$\Big\downarrow$ 2007

$$\int \frac{e^x\left(81x^3-2025x^2+\left(81x^2-2106x-2025\right)\log(5)-4050x\right)+e^{e^x+2}\left(e^{2x}\left(-108x^3+2700x^2+\left(2700x-108x^2\right.\right.\right.}{}$$

$\Big\downarrow$ 7239

$$\int \frac{e^x\left(3-e^{e^x+2}\right)^3\left(\left(e^{e^x+2}+4e^{x+e^x+2}-3\right)x^3+\left(e^{e^x+2}+4e^{x+e^x+2}-3\right)x^2(\log(5)-25)-2x\left(50e^{x+e^x+2}\log(5)+\right.\right.}{(25-x)^3}$$

$\Big\downarrow$ 7293

$$\int \left(-\frac{3e^xx^3\left(e^{e^x+2}-3\right)^3}{(x-25)^3}+\frac{e^{x+e^x+2}x^3\left(e^{e^x+2}-3\right)^3}{(x-25)^3}-\frac{3e^xx^2\left(e^{e^x+2}-3\right)^3(\log(5)-25)}{(x-25)^3}+\frac{e^{x+e^x+2}x^2\left(e^{e^x+2}-3\right)^3}{(x-25)^3}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{e^x\left(3-e^{e^x+2}\right)^3\left(\left(e^{e^x+2}+4e^{x+e^x+2}-3\right)x^3+\left(e^{e^x+2}+4e^{x+e^x+2}-3\right)x^2(\log(5)-25)-2x\left(50e^{x+e^x+2}\log(5)+\right.\right.}{(25-x)^3}$$

3.336.
$$\int \frac{e^x\left(-4050x-2025x^2+81x^3+\left(-2025-2106x+81x^2\right)\log(5)\right)+e^{2+e^x}\left(e^{2x}\left(2700x^2-108x^3+\left(2700x-108x^2\right)\log(5)\right)+e^x\left(5400x+2700x^2-108x^3+\right.\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{3e^x x^3 \left(e^{e^x+2}-3\right)^3}{(x-25)^3}+\frac{e^{x+e^x+2} x^3 \left(e^{e^x+2}-3\right)^3}{(x-25)^3}-\frac{3e^x x^2 \left(e^{e^x+2}-3\right)^3 (\log(5)-25)}{(x-25)^3}+\frac{e^{x+e^x+2} x^2 \left(e^{e^x+2}-3\right)^3}{(x-25)^3}\right.$$

$$\Big\downarrow \text{2009}$$

3.336.

$$\int \frac{e^x \left(-4050x-2025x^2+81x^3+\left(-2025-2106x+81x^2\right)\log(5)\right)+e^{2+e^x}\left(e^{2x}\left(2700x^2-108x^3+\left(2700x-108x^2\right)\log(5)\right)+e^x\left(5400x+2700x^2-108x^3+\right.\right.}{}$$

$$
\begin{aligned}
&-2187e^{25}(25+13\log(5))\,\text{ExpIntegralEi}(x-25)-\frac{2025}{2}e^{25}\log(5)\,\text{ExpIntegralEi}(x-25)-\\
&\frac{58887}{2}e^{25}(25-\log(5))\,\text{ExpIntegralEi}(x-25)+\frac{1581525}{2}e^{25}\,\text{ExpIntegralEi}(x-25)+27e^{4+2e^x}+\\
&\frac{1}{4}e^{8+4e^x}+81e^x-108e^{x+e^x+2}-12e^{x+3e^x+6}+108\int e^{2(x+e^x+2)}dx+4\int e^{2(x+2e^x+4)}dx-\\
&300\log(5)\int\frac{e^{3(2+e^x)+x}}{(25-x)^3}dx+27(25-\log(5))\int\frac{e^{2(2+e^x)+x}}{25-x}dx-9(25-\log(5))\int\frac{e^{2(2+e^x)+e^x+x+2}}{25-x}dx+\\
&5400(25+13\log(5))\int\frac{e^{x+e^x+2}}{(x-25)^3}dx+2700\log(5)\int\frac{e^{x+e^x+2}}{(x-25)^3}dx+67500(25-\\
&\log(5))\int\frac{e^{x+e^x+2}}{(x-25)^3}dx-1687500\int\frac{e^{x+e^x+2}}{(x-25)^3}dx-1350(25+13\log(5))\int\frac{e^{x+2e^x+4}}{(x-25)^3}dx-\\
&16875(25-\log(5))\int\frac{e^{x+2e^x+4}}{(x-25)^3}dx+421875\int\frac{e^{x+2e^x+4}}{(x-25)^3}dx-1350(25+13\log(5))\int\frac{e^{2(2+e^x)+x}}{(x-25)^3}dx-\\
&1350\log(5)\int\frac{e^{2(2+e^x)+x}}{(x-25)^3}dx-16875(25-\log(5))\int\frac{e^{2(2+e^x)+x}}{(x-25)^3}dx+421875\int\frac{e^{2(2+e^x)+x}}{(x-25)^3}dx+\\
&450(25+13\log(5))\int\frac{e^{2(2+e^x)+e^x+x+2}}{(x-25)^3}dx+5625(25-\log(5))\int\frac{e^{2(2+e^x)+e^x+x+2}}{(x-25)^3}dx-\\
&140625\int\frac{e^{2(2+e^x)+e^x+x+2}}{(x-25)^3}dx+150(25+13\log(5))\int\frac{e^{3(2+e^x)+x}}{(x-25)^3}dx+1875(25-\\
&\log(5))\int\frac{e^{3(2+e^x)+x}}{(x-25)^3}dx-46875\int\frac{e^{3(2+e^x)+x}}{(x-25)^3}dx-50(25+13\log(5))\int\frac{e^{3(2+e^x)+e^x+x+2}}{(x-25)^3}dx-\\
&625(25-\log(5))\int\frac{e^{3(2+e^x)+e^x+x+2}}{(x-25)^3}dx+15625\int\frac{e^{3(2+e^x)+e^x+x+2}}{(x-25)^3}dx-25\log(5)\int\frac{e^{4(2+e^x)+x}}{(x-25)^3}dx+\\
&216(25+13\log(5))\int\frac{e^{x+e^x+2}}{(x-25)^2}dx+5400(25-\log(5))\int\frac{e^{x+e^x+2}}{(x-25)^2}dx-202500\int\frac{e^{x+e^x+2}}{(x-25)^2}dx+\\
&2700(25+\log(5))\int\frac{e^{2(x+e^x+2)}}{(x-25)^2}dx-54(25+13\log(5))\int\frac{e^{x+2e^x+4}}{(x-25)^2}dx-1350(25-\\
&\log(5))\int\frac{e^{x+2e^x+4}}{(x-25)^2}dx+50625\int\frac{e^{x+2e^x+4}}{(x-25)^2}dx+100(25+\log(5))\int\frac{e^{2(x+2e^x+4)}}{(x-25)^2}dx-54(25+\\
&13\log(5))\int\frac{e^{2(2+e^x)+x}}{(x-25)^2}dx-1350(25-\log(5))\int\frac{e^{2(2+e^x)+x}}{(x-25)^2}dx+50625\int\frac{e^{2(2+e^x)+x}}{(x-25)^2}dx+18(25+\\
&13\log(5))\int\frac{e^{2(2+e^x)+e^x+x+2}}{(x-25)^2}dx+450(25-\log(5))\int\frac{e^{2(2+e^x)+e^x+x+2}}{(x-25)^2}dx-\\
&16875\int\frac{e^{2(2+e^x)+e^x+x+2}}{(x-25)^2}dx+6(25+13\log(5))\int\frac{e^{3(2+e^x)+x}}{(x-25)^2}dx+150(25-\\
&\log(5))\int\frac{e^{3(2+e^x)+x}}{(x-25)^2}dx-5625\int\frac{e^{3(2+e^x)+x}}{(x-25)^2}dx-2(25+13\log(5))\int\frac{e^{3(2+e^x)+e^x+x+2}}{(x-25)^2}dx-50(25-\\
&\log(5))\int\frac{e^{3(2+e^x)+e^x+x+2}}{(x-25)^2}dx+1875\int\frac{e^{3(2+e^x)+e^x+x+2}}{(x-25)^2}dx-2700(25+\log(5))\int\frac{e^{2x+e^x+2}}{(x-25)^2}dx-\\
&900(25+\log(5))\int\frac{e^{2(2+e^x)+e^x+2x+2}}{(x-25)^2}dx+108(25-\log(5))\int\frac{e^{x+e^x+2}}{x-25}dx-8100\int\frac{e^{x+e^x+2}}{x-25}dx+\\
&108(50+\log(5))\int\frac{e^{2(x+e^x+2)}}{x-25}dx-27(25-\log(5))\int\frac{e^{x+2e^x+4}}{x-25}dx+2025\int\frac{e^{x+2e^x+4}}{x-25}dx+4(50+\\
&\log(5))\int\frac{e^{2(x+2e^x+4)}}{x-25}dx+2025\int\frac{e^{2(2+e^x)+x}}{x-25}dx-675\int\frac{e^{2(2+e^x)+e^x+x+2}}{x-25}dx+3(25-\\
&\log(5))\int\frac{e^{3(2+e^x)+x}}{x-25}dx-225\int\frac{e^{3(2+e^x)+x}}{x-25}dx-(25-\log(5))\int\frac{e^{3(2+e^x)+e^x+x+2}}{x-25}dx+
\end{aligned}
$$

$$
\int\frac{e^{3(2+e^x)+e^x+x+2}}{x-25}dx-108(50+\log(5))\int\frac{e^{2x+e^x+2}}{x-25}dx-36(50+\log(5))\int\frac{e^{2(2+e^x)+e^x+2x+2}}{x-25}dx+
$$

3.336: $\int 75^x\left(-4050x-2025x^2+81x^3+(-2025-1006x+81x^2)\log(5)\right)+e^{2+e^x}\left(e^{2x}(2700x\ldots-108x^2)\log(5)\right)+e^x(5400x+2700x^2-108x^3+(\ldots$

$$
\frac{1569375e^x}{\ldots}\quad\frac{1265625e^x}{\ldots}\quad\frac{2187e^x(25+13\log(5))}{\ldots}\quad\frac{2025e^x(25+13\log(5))}{\ldots}\quad\frac{2025e^x\log(5)}{\ldots}
$$

input
```
Int[(E^x*(-4050*x - 2025*x^2 + 81*x^3 + (-2025 - 2106*x + 81*x^2)*Log[5])
+ E^(2 + E^x)*(E^(2*x)*(2700*x^2 - 108*x^3 + (2700*x - 108*x^2)*Log[5]) +
E^x*(5400*x + 2700*x^2 - 108*x^3 + (2700 + 2808*x - 108*x^2)*Log[5])) + E^
(6 + 3*E^x)*(E^(2*x)*(900*x^2 - 36*x^3 + (900*x - 36*x^2)*Log[5]) + E^x*(6
00*x + 300*x^2 - 12*x^3 + (300 + 312*x - 12*x^2)*Log[5])) + E^(8 + 4*E^x)*
(E^x*(-50*x - 25*x^2 + x^3 + (-25 - 26*x + x^2)*Log[5]) + E^(2*x)*(-100*x^
2 + 4*x^3 + (-100*x + 4*x^2)*Log[5])) + E^(4 + 2*E^x)*(E^x*(-2700*x - 1350
*x^2 + 54*x^3 + (-1350 - 1404*x + 54*x^2)*Log[5]) + E^(2*x)*(-2700*x^2 + 1
08*x^3 + (-2700*x + 108*x^2)*Log[5])))/(-15625 + 1875*x - 75*x^2 + x^3),x]
```

output
```
$Aborted
```

3.336.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.336.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 112 vs. $2(26) = 52$.

Time = 2.49 (sec) , antiderivative size = 113, normalized size of antiderivative = 3.90

3.336.
$\int \frac{e^x\left(-4050x-2025x^2+81x^3+\left(-2025-2106x+81x^2\right)\log(5)\right)+e^{2+e^x}\left(e^{2x}\left(2700x^2-108x^3+\left(2700x-108x^2\right)\log(5)\right)+e^x\left(5400x+2700x^2-108x^3+\left(\right.\right.\right.}{}$

method	result
risch	$\frac{81x(\ln(5)+x)e^{x}}{(x-25)^{2}}+\frac{x(\ln(5)+x)e^{x+4\,e^{x}+8}}{x^{2}-50x+625}-\frac{12x(\ln(5)+x)e^{x+3\,e^{x}+6}}{x^{2}-50x+625}+\frac{54x(\ln(5)+x)e^{x+2\,e^{x}+4}}{x^{2}-50x+625}-\frac{108x(\ln(5)+x)e^{e^{x}+2+}}{x^{2}-50x+625}$
parallelrisch	$\frac{\ln(5)e^{x}e^{4\,e^{x}+8}x+e^{x}e^{4\,e^{x}+8}x^{2}-12\ln(5)e^{x}e^{3\,e^{x}+6}x-12\,e^{x}e^{3\,e^{x}+6}x^{2}+54\ln(5)e^{x}e^{2\,e^{x}+4}x+54\,e^{x}e^{2\,e^{x}+4}x^{2}-108\ln(5)e^{x}e^{e^{x}+2}x-}{x^{2}-50x+625}$

input
```
int(((((4*x^2-100*x)*ln(5)+4*x^3-100*x^2)*exp(x)^2+((x^2-26*x-25)*ln(5)+x^
3-25*x^2-50*x)*exp(x))*exp(exp(x)+2)^4+(((-36*x^2+900*x)*ln(5)-36*x^3+900*
x^2)*exp(x)^2+((-12*x^2+312*x+300)*ln(5)-12*x^3+300*x^2+600*x)*exp(x))*exp
(exp(x)+2)^3+(((108*x^2-2700*x)*ln(5)+108*x^3-2700*x^2)*exp(x)^2+((54*x^2-
1404*x-1350)*ln(5)+54*x^3-1350*x^2-2700*x)*exp(x))*exp(exp(x)+2)^2+(((-108
*x^2+2700*x)*ln(5)-108*x^3+2700*x^2)*exp(x)^2+((-108*x^2+2808*x+2700)*ln(5
)-108*x^3+2700*x^2+5400*x)*exp(x))*exp(exp(x)+2)+((81*x^2-2106*x-2025)*ln(
5)+81*x^3-2025*x^2-4050*x)*exp(x))/(x^3-75*x^2+1875*x-15625),x,method=_RET
URNVERBOSE)
```

output
```
81*x*(ln(5)+x)/(x-25)^2*exp(x)+1/(x^2-50*x+625)*x*(ln(5)+x)*exp(x+4*exp(x)
+8)-12/(x^2-50*x+625)*x*(ln(5)+x)*exp(x+3*exp(x)+6)+54/(x^2-50*x+625)*x*(l
n(5)+x)*exp(x+2*exp(x)+4)-108/(x^2-50*x+625)*x*(ln(5)+x)*exp(exp(x)+2+x)
```

3.336.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. 2(22) = 44.

Time = 0.27 (sec) , antiderivative size = 93, normalized size of antiderivative = 3.21

$$\int \frac{e^{x}(-4050x-2025x^{2}+81x^{3}+(-2025-2106x+81x^{2})\log(5))+e^{2+e^{x}}(e^{2x}(2700x^{2}-108x^{3}+(2700x-}{}$$

$$=\frac{(x^{2}+x\log(5))e^{(x+4\,e^{x}+8)}-12\,(x^{2}+x\log(5))e^{(x+3\,e^{x}+6)}+54\,(x^{2}+x\log(5))e^{(x+2\,e^{x}+4)}-108\,(x^{2}+x\log}{x^{2}-50\,x+625}$$

input
```
integrate(((((4*x^2-100*x)*log(5)+4*x^3-100*x^2)*exp(x)^2+((x^2-26*x-25)*l
og(5)+x^3-25*x^2-50*x)*exp(x))*exp(exp(x)+2)^4+(((-36*x^2+900*x)*log(5)-36
*x^3+900*x^2)*exp(x)^2+((-12*x^2+312*x+300)*log(5)-12*x^3+300*x^2+600*x)*e
xp(x))*exp(exp(x)+2)^3+(((108*x^2-2700*x)*log(5)+108*x^3-2700*x^2)*exp(x)^
2+((54*x^2-1404*x-1350)*log(5)+54*x^3-1350*x^2-2700*x)*exp(x))*exp(exp(x)+
2)^2+(((-108*x^2+2700*x)*log(5)-108*x^3+2700*x^2)*exp(x)^2+((-108*x^2+2808
*x+2700)*log(5)-108*x^3+2700*x^2+5400*x)*exp(x))*exp(exp(x)+2)+((81*x^2-21
06*x-2025)*log(5)+81*x^3-2025*x^2-4050*x)*exp(x))/(x^3-75*x^2+1875*x-15625
),x, algorithm=\
```

3.336.
$\int \frac{e^{x}(-4050x-2025x^{2}+81x^{3}+(-2025-2106x+81x^{2})\log(5))+e^{2+e^{x}}(e^{2x}(2700x^{2}-108x^{3}+(2700x-108x^{2})\log(5))+e^{x}(5400x+2700x^{2}-108x^{3}+(}{}$

output
```
((x^2 + x*log(5))*e^(x + 4*e^x + 8) - 12*(x^2 + x*log(5))*e^(x + 3*e^x + 6
) + 54*(x^2 + x*log(5))*e^(x + 2*e^x + 4) - 108*(x^2 + x*log(5))*e^(x + e^
x + 2) + 81*(x^2 + x*log(5))*e^x)/(x^2 - 50*x + 625)
```

3.336.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 654 vs. $2(24) = 48$.

Time = 0.39 (sec) , antiderivative size = 654, normalized size of antiderivative = 22.55

$$\int \frac{e^x(-4050x - 2025x^2 + 81x^3 + (-2025 - 2106x + 81x^2)\log(5)) + e^{2+e^x}(e^{2x}(2700x^2 - 108x^3 + (2700x -$$

= Too large to display

input
```
integrate(((((4*x**2-100*x)*ln(5)+4*x**3-100*x**2)*exp(x)**2+((x**2-26*x-2
5)*ln(5)+x**3-25*x**2-50*x)*exp(x))*exp(exp(x)+2)**4+(((-36*x**2+900*x)*ln
(5)-36*x**3+900*x**2)*exp(x)**2+((-12*x**2+312*x+300)*ln(5)-12*x**3+300*x*
*2+600*x)*exp(x))*exp(exp(x)+2)**3+(((108*x**2-2700*x)*ln(5)+108*x**3-2700
*x**2)*exp(x)**2+((54*x**2-1404*x-1350)*ln(5)+54*x**3-1350*x**2-2700*x)*ex
p(x))*exp(exp(x)+2)**2+(((-108*x**2+2700*x)*ln(5)-108*x**3+2700*x**2)*exp(
x)**2+((-108*x**2+2808*x+2700)*ln(5)-108*x**3+2700*x**2+5400*x)*exp(x))*ex
p(exp(x)+2)+((81*x**2-2106*x-2025)*ln(5)+81*x**3-2025*x**2-4050*x)*exp(x))
/(x**3-75*x**2+1875*x-15625),x)
```

output
```
(81*x**2 + 81*x*log(5))*exp(x)/(x**2 - 50*x + 625) + ((-108*x**8*exp(x) -
108*x**7*exp(x)*log(5) + 16200*x**7*exp(x) - 1012500*x**6*exp(x) + 16200*x
**6*exp(x)*log(5) - 1012500*x**5*exp(x)*log(5) + 33750000*x**5*exp(x) - 63
2812500*x**4*exp(x) + 33750000*x**4*exp(x)*log(5) - 632812500*x**3*exp(x)*
log(5) + 6328125000*x**3*exp(x) - 26367187500*x**2*exp(x) + 6328125000*x**
2*exp(x)*log(5) - 26367187500*x*exp(x)*log(5))*exp(exp(x) + 2) + (-12*x**8
*exp(x) - 12*x**7*exp(x)*log(5) + 1800*x**7*exp(x) - 112500*x**6*exp(x) +
1800*x**6*exp(x)*log(5) - 112500*x**5*exp(x)*log(5) + 3750000*x**5*exp(x)
- 70312500*x**4*exp(x) + 3750000*x**4*exp(x)*log(5) - 70312500*x**3*exp(x)
*log(5) + 703125000*x**3*exp(x) - 2929687500*x**2*exp(x) + 703125000*x**2*
exp(x)*log(5) - 2929687500*x*exp(x)*log(5))*exp(3*exp(x) + 6) + (x**8*exp(
x) - 150*x**7*exp(x) + x**7*exp(x)*log(5) - 150*x**6*exp(x)*log(5) + 9375*
x**6*exp(x) - 312500*x**5*exp(x) + 9375*x**5*exp(x)*log(5) - 312500*x**4*e
xp(x)*log(5) + 5859375*x**4*exp(x) - 58593750*x**3*exp(x) + 5859375*x**3*e
xp(x)*log(5) - 58593750*x**2*exp(x)*log(5) + 244140625*x**2*exp(x) + 24414
0625*x*exp(x)*log(5))*exp(4*exp(x) + 8) + (54*x**8*exp(x) - 8100*x**7*exp(
x) + 54*x**7*exp(x)*log(5) - 8100*x**6*exp(x)*log(5) + 506250*x**6*exp(x)
- 16875000*x**5*exp(x) + 506250*x**5*exp(x)*log(5) - 16875000*x**4*exp(x)*
log(5) + 316406250*x**4*exp(x) - 3164062500*x**3*exp(x) + 316406250*x**3*e
xp(x)*log(5) - 3164062500*x**2*exp(x)*log(5) + 13183593750*x**2*exp(x) ...
```

3.336.7 Maxima [F]

$$\int \frac{e^x(-4050x - 2025x^2 + 81x^3 + (-2025 - 2106x + 81x^2)\log(5)) + e^{2+e^x}(e^{2x}(2700x^2 - 108x^3 + (2700x -$$

$$= \int \frac{81\,(x^3 - 25\,x^2 + (x^2 - 26\,x - 25)\log{(5)} - 50\,x)e^x + \left(4\,(x^3 - 25\,x^2 + (x^2 - 25\,x)\log{(5)})e^{(2\,x)} + (x^3 -\right.}{}$$

input
```
integrate(((((4*x^2-100*x)*log(5)+4*x^3-100*x^2)*exp(x)^2+((x^2-26*x-25)*l
og(5)+x^3-25*x^2-50*x)*exp(x))*exp(exp(x)+2)^4+(((-36*x^2+900*x)*log(5)-36
*x^3+900*x^2)*exp(x)^2+((-12*x^2+312*x+300)*log(5)-12*x^3+300*x^2+600*x)*e
xp(x))*exp(exp(x)+2)^3+(((108*x^2-2700*x)*log(5)+108*x^3-2700*x^2)*exp(x)^
2+((54*x^2-1404*x-1350)*log(5)+54*x^3-1350*x^2-2700*x)*exp(x))*exp(exp(x)+
2)^2+(((-108*x^2+2700*x)*log(5)-108*x^3+2700*x^2)*exp(x)^2+((-108*x^2+2808
*x+2700)*log(5)-108*x^3+2700*x^2+5400*x)*exp(x))*exp(exp(x)+2)+((81*x^2-21
06*x-2025)*log(5)+81*x^3-2025*x^2-4050*x)*exp(x))/(x^3-75*x^2+1875*x-15625
),x, algorithm=\
```


$$\int \frac{e^x(-4050x-2025x^2+81x^3+(-2025-2106x+81x^2)\log(5))+e^{2+e^x}(e^{2x}(2700x^2-108x^3+(2700x-108x^2)\log(5))+e^x(5400x+2700x^2-108x^3+(}{}$$

output
```
2025*integrate(e^x/(x^3 - 75*x^2 + 1875*x - 15625), x)*log(5) + 2025*e^25*
exp_integral_e(3, -x + 25)*log(5)/(x - 25)^2 + ((x^2*e^8 + x*e^8*log(5))*e
^(x + 4*e^x) - 12*(x^2*e^6 + x*e^6*log(5))*e^(x + 3*e^x) + 54*(x^2*e^4 + x
*e^4*log(5))*e^(x + 2*e^x) - 108*(x^2*e^2 + x*e^2*log(5))*e^(x + e^x) + 81
*(x^2 + x*log(5))*e^x)/(x^2 - 50*x + 625)
```

3.336.8 Giac [F]

$$\int \frac{e^x(-4050x - 2025x^2 + 81x^3 + (-2025 - 2106x + 81x^2)\log(5)) + e^{2+e^x}(e^{2x}(2700x^2 - 108x^3 + (2700x -$$

$$= \int \frac{81\,(x^3 - 25\,x^2 + (x^2 - 26\,x - 25)\log(5) - 50\,x)e^x + \left(4\,(x^3 - 25\,x^2 + (x^2 - 25\,x)\log(5))e^{(2\,x)} + (x^3 -\right.}{}$$

input
```
integrate(((((4*x^2-100*x)*log(5)+4*x^3-100*x^2)*exp(x)^2+((x^2-26*x-25)*l
og(5)+x^3-25*x^2-50*x)*exp(x))*exp(exp(x)+2)^4+(((-36*x^2+900*x)*log(5)-36
*x^3+900*x^2)*exp(x)^2+((-12*x^2+312*x+300)*log(5)-12*x^3+300*x^2+600*x)*e
xp(x))*exp(exp(x)+2)^3+(((108*x^2-2700*x)*log(5)+108*x^3-2700*x^2)*exp(x)^
2+((54*x^2-1404*x-1350)*log(5)+54*x^3-1350*x^2-2700*x)*exp(x))*exp(exp(x)+
2)^2+(((-108*x^2+2700*x)*log(5)-108*x^3+2700*x^2)*exp(x)^2+((-108*x^2+2808
*x+2700)*log(5)-108*x^3+2700*x^2+5400*x)*exp(x))*exp(exp(x)+2)+((81*x^2-21
06*x-2025)*log(5)+81*x^3-2025*x^2-4050*x)*exp(x))/(x^3-75*x^2+1875*x-15625
),x, algorithm=\
```

output
```
integrate((81*(x^3 - 25*x^2 + (x^2 - 26*x - 25)*log(5) - 50*x)*e^x + (4*(x
^3 - 25*x^2 + (x^2 - 25*x)*log(5))*e^(2*x) + (x^3 - 25*x^2 + (x^2 - 26*x -
 25)*log(5) - 50*x)*e^x)*e^(4*e^x + 8) - 12*(3*(x^3 - 25*x^2 + (x^2 - 25*x
)*log(5))*e^(2*x) + (x^3 - 25*x^2 + (x^2 - 26*x - 25)*log(5) - 50*x)*e^x)*
e^(3*e^x + 6) + 54*(2*(x^3 - 25*x^2 + (x^2 - 25*x)*log(5))*e^(2*x) + (x^3
- 25*x^2 + (x^2 - 26*x - 25)*log(5) - 50*x)*e^x)*e^(2*e^x + 4) - 108*((x^3
 - 25*x^2 + (x^2 - 25*x)*log(5))*e^(2*x) + (x^3 - 25*x^2 + (x^2 - 26*x - 2
5)*log(5) - 50*x)*e^x)*e^(e^x + 2))/(x^3 - 75*x^2 + 1875*x - 15625), x)
```

3.336.9 Mupad [B] (verification not implemented)

Time = 13.96 (sec) , antiderivative size = 155, normalized size of antiderivative = 5.34

$$\int \frac{e^x(-4050x-2025x^2+81x^3+(-2025-2106x+81x^2)\log(5))+e^{2+e^x}(e^{2x}(2700x^2-108x^3+(2700x-$$

$$= \frac{e^{4\,e^x+8}\,(x^2\,e^x+x\,e^x\,\ln(5))}{x^2-50\,x+625} - \frac{e^{e^x+2}\,(108\,x^2\,e^x+108\,x\,e^x\,\ln(5))}{x^2-50\,x+625} - \frac{e^{3\,e^x+6}\,(12\,x^2\,e^x+12\,x\,e^x\,\ln(5))}{x^2-50\,x+625} + \frac{e^{2\,e^x+4}\,(54\,x^2\,e^x+54\,x\,e^x\,\ln(5))}{x^2-50\,x+625} + \frac{e^x\,(81\,x^2+81\,\ln(5)\,x)}{x^2-50\,x+625}$$

input
```
int(-(exp(x)*(4050*x + log(5)*(2106*x - 81*x^2 + 2025) + 2025*x^2 - 81*x^3
) - exp(exp(x) + 2)*(exp(x)*(5400*x + log(5)*(2808*x - 108*x^2 + 2700) + 2
700*x^2 - 108*x^3) + exp(2*x)*(log(5)*(2700*x - 108*x^2) + 2700*x^2 - 108*
x^3)) + exp(4*exp(x) + 8)*(exp(x)*(50*x + log(5)*(26*x - x^2 + 25) + 25*x^
2 - x^3) + exp(2*x)*(log(5)*(100*x - 4*x^2) + 100*x^2 - 4*x^3)) - exp(3*ex
p(x) + 6)*(exp(x)*(600*x + log(5)*(312*x - 12*x^2 + 300) + 300*x^2 - 12*x^
3) + exp(2*x)*(log(5)*(900*x - 36*x^2) + 900*x^2 - 36*x^3)) + exp(2*exp(x)
 + 4)*(exp(x)*(2700*x + log(5)*(1404*x - 54*x^2 + 1350) + 1350*x^2 - 54*x^
3) + exp(2*x)*(log(5)*(2700*x - 108*x^2) + 2700*x^2 - 108*x^3)))/(1875*x -
 75*x^2 + x^3 - 15625),x)
```

output
```
(exp(4*exp(x) + 8)*(x^2*exp(x) + x*exp(x)*log(5)))/(x^2 - 50*x + 625) - (e
xp(exp(x) + 2)*(108*x^2*exp(x) + 108*x*exp(x)*log(5)))/(x^2 - 50*x + 625)
- (exp(3*exp(x) + 6)*(12*x^2*exp(x) + 12*x*exp(x)*log(5)))/(x^2 - 50*x + 6
25) + (exp(2*exp(x) + 4)*(54*x^2*exp(x) + 54*x*exp(x)*log(5)))/(x^2 - 50*x
 + 625) + (exp(x)*(81*x*log(5) + 81*x^2))/(x^2 - 50*x + 625)
```

3.337 $\int \frac{-64+16e^5x^2+e^{-1-x+x^2}(-x^5+2x^6)}{x^5}\,dx$

3.337.1 Optimal result

Integrand size = 36, antiderivative size = 22

$$\int \frac{-64+16e^5x^2+e^{-1-x+x^2}(-x^5+2x^6)}{x^5}\,dx = 1+e^{-1+(-1+x)x}+\left(e^5-\frac{4}{x^2}\right)^2$$

output
```
(exp(5)-4/x^2)^2+exp(x*(-1+x)-1)+1
```

3.337.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-64+16e^5x^2+e^{-1-x+x^2}(-x^5+2x^6)}{x^5}\,dx = e^{-1-x+x^2}+\frac{16}{x^4}-\frac{8e^5}{x^2}$$

input
```
Integrate[(-64 + 16*E^5*x^2 + E^(-1 - x + x^2)*(-x^5 + 2*x^6))/x^5,x]
```

output
```
E^(-1 - x + x^2) + 16/x^4 - (8*E^5)/x^2
```

3.337.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16e^5x^2+e^{x^2-x-1}\left(2x^6-x^5\right)-64}{x^5}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(e^{x^2-x-1}(2x-1)+\frac{16\left(e^5x^2-4\right)}{x^5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{16}{x^4}+e^{x^2-x-1}-\frac{8e^5}{x^2}$$

input
```
Int[(-64 + 16*E^5*x^2 + E^(-1 - x + x^2)*(-x^5 + 2*x^6))/x^5,x]
```

output
```
E^(-1 - x + x^2) + 16/x^4 - (8*E^5)/x^2
```

3.337.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.337.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

method	result	size
parts	$\mathrm{e}^{x^2-x-1}+\frac{16}{x^4}-\frac{8\,\mathrm{e}^5}{x^2}$	23
risch	$\frac{-8x^2\mathrm{e}^5+16}{x^4}+\mathrm{e}^{x^2-x-1}$	24
norman	$\frac{16+x^4\mathrm{e}^{x^2-x-1}-8x^2\mathrm{e}^5}{x^4}$	27
parallelrisch	$-\frac{-x^4\mathrm{e}^{x^2-x-1}+8x^2\mathrm{e}^5-16}{x^4}$	29
default	$\frac{16}{x^4}-\frac{8\,\mathrm{e}^5}{x^2}+\frac{i\mathrm{e}^{-1}\sqrt{\pi}\,\mathrm{e}^{-\frac{1}{4}}\operatorname{erf}\left(ix-\frac{1}{2}i\right)}{2}+2\,\mathrm{e}^{-1}\left(\frac{\mathrm{e}^{x^2-x}}{2}-\frac{i\sqrt{\pi}\,\mathrm{e}^{-\frac{1}{4}}\operatorname{erf}\left(ix-\frac{1}{2}i\right)}{4}\right)$	63

input
```
int(((2*x^6-x^5)*exp(x^2-x-1)+16*x^2*exp(5)-64)/x^5,x,method=_RETURNVERBOS
E)
```

output
```
exp(x^2-x-1)+16/x^4-8*exp(5)/x^2
```

3.337.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{-64+16e^5x^2+e^{-1-x+x^2}\left(-x^5+2x^6\right)}{x^5}\,dx=\frac{x^4e^{\left(x^2-x-1\right)}-8\,x^2e^5+16}{x^4}$$

input
```
integrate(((2*x^6-x^5)*exp(x^2-x-1)+16*x^2*exp(5)-64)/x^5,x, algorithm=\
```

output
```
(x^4*e^(x^2 - x - 1) - 8*x^2*e^5 + 16)/x^4
```

3.337.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-64+16e^5x^2+e^{-1-x+x^2}\left(-x^5+2x^6\right)}{x^5}\,dx=e^{x^2-x-1}+\frac{-8x^2e^5+16}{x^4}$$

input
```
integrate(((2*x**6-x**5)*exp(x**2-x-1)+16*x**2*exp(5)-64)/x**5,x)
```

output
```
exp(x**2 - x - 1) + (-8*x**2*exp(5) + 16)/x**4
```

3.337.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.24 (sec) , antiderivative size = 79, normalized size of antiderivative = 3.59

$$\int \frac{-64+16e^5x^2+e^{-1-x+x^2}(-x^5+2x^6)}{x^5}\,dx$$
$$= \frac{1}{2}i\sqrt{\pi}\,\mathrm{erf}\left(ix-\frac{1}{2}i\right)e^{\left(-\frac{5}{4}\right)}$$
$$+\frac{1}{2}\left(\frac{\sqrt{\pi}(2x-1)\left(\mathrm{erf}\left(\frac{1}{2}\sqrt{-(2x-1)^2}\right)-1\right)}{\sqrt{-(2x-1)^2}}+2e^{\left(\frac{1}{4}(2x-1)^2\right)}\right)e^{\left(-\frac{5}{4}\right)}-\frac{8e^5}{x^2}+\frac{16}{x^4}$$

input
```
integrate(((2*x^6-x^5)*exp(x^2-x-1)+16*x^2*exp(5)-64)/x^5,x, algorithm=\
```

output
```
1/2*I*sqrt(pi)*erf(I*x - 1/2*I)*e^(-5/4) + 1/2*(sqrt(pi)*(2*x - 1)*(erf(1/
2*sqrt(-(2*x - 1)^2)) - 1)/sqrt(-(2*x - 1)^2) + 2*e^(1/4*(2*x - 1)^2))*e^(
-5/4) - 8*e^5/x^2 + 16/x^4
```

3.337.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int \frac{-64+16e^5x^2+e^{-1-x+x^2}(-x^5+2x^6)}{x^5}\,dx = \frac{\left(x^4e^{(x^2-x)}-8\,x^2e^6+16\,e\right)e^{(-1)}}{x^4}$$

input
```
integrate(((2*x^6-x^5)*exp(x^2-x-1)+16*x^2*exp(5)-64)/x^5,x, algorithm=\
```

output
```
(x^4*e^(x^2 - x) - 8*x^2*e^6 + 16*e)*e^(-1)/x^4
```

3.337.9 Mupad [B] (verification not implemented)

Time = 12.58 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-64+16e^5x^2+e^{-1-x+x^2}\left(-x^5+2x^6\right)}{x^5}\,dx = \mathrm{e}^{x^2-x-1} - \frac{8\,x^2\,\mathrm{e}^5-16}{x^4}$$

input
```
int(-(exp(x^2 - x - 1)*(x^5 - 2*x^6) - 16*x^2*exp(5) + 64)/x^5,x)
```

output
```
exp(x^2 - x - 1) - (8*x^2*exp(5) - 16)/x^4
```

3.338 $\int \frac{4e^{2x}+(e^x(-x+x^2)+e^{2x}(-10x+20x^2))\log(x)+e^{2x}(-8+8x)\log(x)\log(\log(x))}{15x^3\log(x)}\,dx$

3.338.1 Optimal result

Integrand size = 65, antiderivative size = 27

$$\int \frac{4e^{2x}+(e^x(-x+x^2)+e^{2x}(-10x+20x^2))\log(x)+e^{2x}(-8+8x)\log(x)\log(\log(x))}{15x^3\log(x)}\,dx = \frac{e^x\left(2+4e^x\left(5+\frac{2\log(\log(x))}{x}\right)\right)}{30x}$$

output
```
1/30*(4*exp(x)*(5+2*ln(ln(x))/x)+2)/x*exp(x)
```

3.338.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{4e^{2x}+(e^x(-x+x^2)+e^{2x}(-10x+20x^2))\log(x)+e^{2x}(-8+8x)\log(x)\log(\log(x))}{15x^3\log(x)}\,dx = \frac{e^x(x+10e^xx+4e^x\log(\log(x)))}{15x^2}$$

input
```
Integrate[(4*E^(2*x) + (E^x*(-x + x^2) + E^(2*x)*(-10*x + 20*x^2))*Log[x]
+ E^(2*x)*(-8 + 8*x)*Log[x]*Log[Log[x]])/(15*x^3*Log[x]),x]
```

output
```
(E^x*(x + 10*E^x*x + 4*E^x*Log[Log[x]]))/(15*x^2)
```

3.338.3 Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.046, Rules used = {27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(e^x(x^2-x)+e^{2x}(20x^2-10x))\log(x)+4e^{2x}+e^{2x}(8x-8)\log(\log(x))\log(x)}{15x^3\log(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{15}\int \frac{-((10e^{2x}(x-2x^2)+e^x(x-x^2))\log(x))-8e^{2x}(1-x)\log(\log(x))\log(x)+4e^{2x}}{x^3\log(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{15}\int \left(\frac{e^x(x-1)}{x^2}+\frac{2e^{2x}(10\log(x)x^2-5\log(x)x+4\log(x)\log(\log(x))x-4\log(x)\log(\log(x))+2)}{x^3\log(x)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{15}\left(\frac{2e^{2x}(5x^2\log(x)+2x\log(x)\log(\log(x)))}{x^3\log(x)}+\frac{e^x}{x}\right)$$

input
```
Int[(4*E^(2*x) + (E^x*(-x + x^2) + E^(2*x)*(-10*x + 20*x^2))*Log[x] + E^(2
*x)*(-8 + 8*x)*Log[x]*Log[Log[x]])/(15*x^3*Log[x]),x]
```

output
```
(E^x/x + (2*E^(2*x)*(5*x^2*Log[x] + 2*x*Log[x]*Log[Log[x]]))/(x^3*Log[x]))
/15
```

3.338.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.338.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{4\,\mathrm{e}^{2x}\ln(\ln(x))}{15x^2}+\frac{\mathrm{e}^{x}(10\,\mathrm{e}^{x}+1)}{15x}$	27
parallelrisch	$-\frac{-10x\,\mathrm{e}^{2x}-4\,\mathrm{e}^{2x}\ln(\ln(x))-\mathrm{e}^{x}x}{15x^2}$	28

input
```
int(1/15*((8*x-8)*exp(x)^2*ln(x)*ln(ln(x))+((20*x^2-10*x)*exp(x)^2+(x^2-x)
*exp(x))*ln(x)+4*exp(x)^2)/x^3/ln(x),x,method=_RETURNVERBOSE)
```

output
```
4/15/x^2*exp(x)^2*ln(ln(x))+1/15*exp(x)*(10*exp(x)+1)/x
```

3.338.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{4e^{2x}+(e^x(-x+x^2)+e^{2x}(-10x+20x^2))\log(x)+e^{2x}(-8+8x)\log(x)\log(\log(x))}{15x^3\log(x)}\,dx$$
$$=\frac{10\,xe^{(2\,x)}+xe^x+4\,e^{(2\,x)}\log\left(\log\left(x\right)\right)}{15\,x^2}$$

input
```
integrate(1/15*((8*x-8)*exp(x)^2*log(x)*log(log(x))+((20*x^2-10*x)*exp(x)^
2+(x^2-x)*exp(x))*log(x)+4*exp(x)^2)/x^3/log(x),x, algorithm=\
```

output
```
1/15*(10*x*e^(2*x) + x*e^x + 4*e^(2*x)*log(log(x)))/x^2
```

3.338.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{4e^{2x} + (e^x(-x + x^2) + e^{2x}(-10x + 20x^2)) \log(x) + e^{2x}(-8 + 8x) \log(x) \log(\log(x))}{15x^3 \log(x)} \, dx$$
$$= \frac{15x^2e^x + (150x^2 + 60x \log(\log(x))) e^{2x}}{225x^3}$$

input
```
integrate(1/15*((8*x-8)*exp(x)**2*ln(x)*ln(ln(x))+((20*x**2-10*x)*exp(x)**
2+(x**2-x)*exp(x))*ln(x)+4*exp(x)**2)/x**3/ln(x),x)
```

output
```
(15*x**2*exp(x) + (150*x**2 + 60*x*log(log(x)))*exp(2*x))/(225*x**3)
```

3.338.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.29 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{4e^{2x} + (e^x(-x + x^2) + e^{2x}(-10x + 20x^2)) \log(x) + e^{2x}(-8 + 8x) \log(x) \log(\log(x))}{15x^3 \log(x)} \, dx$$
$$= \frac{4\, e^{(2\,x)} \log(\log(x))}{15\, x^2} + \frac{4}{3} \operatorname{Ei}(2\,x) + \frac{1}{15} \operatorname{Ei}(x) - \frac{1}{15} \Gamma(-1, -x) - \frac{4}{3} \Gamma(-1, -2\,x)$$

input
```
integrate(1/15*((8*x-8)*exp(x)^2*log(x)*log(log(x))+((20*x^2-10*x)*exp(x)^
2+(x^2-x)*exp(x))*log(x)+4*exp(x)^2)/x^3/log(x),x, algorithm=\
```

output
```
4/15*e^(2*x)*log(log(x))/x^2 + 4/3*Ei(2*x) + 1/15*Ei(x) - 1/15*gamma(-1, -
x) - 4/3*gamma(-1, -2*x)
```

3.338.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

$$\int \frac{4e^{2x} + (e^x(-x + x^2) + e^{2x}(-10x + 20x^2)) \log(x) + e^{2x}(-8 + 8x) \log(x) \log(\log(x))}{15x^3 \log(x)} \, dx$$
$$= \frac{4\, xe^{(2\,x)} \log(x) + 10\, xe^{(2\,x)} + xe^x + 4\, e^{(2\,x)} \log(\log(x))}{15\, x^2}$$

input
```
integrate(1/15*((8*x-8)*exp(x)^2*log(x)*log(log(x))+((20*x^2-10*x)*exp(x)^
2+(x^2-x)*exp(x))*log(x)+4*exp(x)^2)/x^3/log(x),x, algorithm=\
```

output
```
1/15*(4*x*e^(2*x)*log(x) + 10*x*e^(2*x) + x*e^x + 4*e^(2*x)*log(log(x)))/x
^2
```

3.338.9 Mupad [F(-1)]

Timed out.

$$\int \frac{4e^{2x} + (e^x(-x+x^2) + e^{2x}(-10x+20x^2))\log(x) + e^{2x}(-8+8x)\log(x)\log(\log(x))}{15x^3\log(x)}\,dx$$
$$= \int \frac{\frac{4\,e^{2\,x}}{15} - \frac{\ln(x)\,\left(e^{2\,x}\,\left(10\,x-20\,x^2\right)+e^x\,\left(x-x^2\right)\right)}{15} + \frac{\ln(\ln(x))\,e^{2\,x}\,\ln(x)\,\left(8\,x-8\right)}{15}}{x^3\,\ln\left(x\right)}\,dx$$

input
```
int(((4*exp(2*x))/15 - (log(x)*(exp(2*x)*(10*x - 20*x^2) + exp(x)*(x - x^2
)))/15 + (log(log(x))*exp(2*x)*log(x)*(8*x - 8))/15)/(x^3*log(x)),x)
```

output
```
int(((4*exp(2*x))/15 - (log(x)*(exp(2*x)*(10*x - 20*x^2) + exp(x)*(x - x^2
)))/15 + (log(log(x))*exp(2*x)*log(x)*(8*x - 8))/15)/(x^3*log(x)), x)
```

3.339 $\int \frac{16x-8x^3+(-24x^2-12x^3)\log(x)+(-24x^2-12x^3)\log(2+x)}{2+x}\,dx$

3.339.1 Optimal result

Integrand size = 45, antiderivative size = 19

$$\int \frac{16x-8x^3+(-24x^2-12x^3)\log(x)+(-24x^2-12x^3)\log(2+x)}{2+x}\,dx = 4x^2(1-x\log(x)-x\log(2+x))$$

output
```
4*(1-x*ln(2+x)-x*ln(x))*x^2
```

3.339.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{16x-8x^3+(-24x^2-12x^3)\log(x)+(-24x^2-12x^3)\log(2+x)}{2+x}\,dx = -4\left(-x^2+x^3\log(x)+x^3\log(2+x)\right)$$

input
```
Integrate[(16*x - 8*x^3 + (-24*x^2 - 12*x^3)*Log[x] + (-24*x^2 - 12*x^3)*L
og[2 + x])/(2 + x),x]
```

output
```
-4*(-x^2 + x^3*Log[x] + x^3*Log[2 + x])
```

3.339.3 Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.089, Rules used = {7292, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x^3+\left(-12x^3-24x^2\right)\log(x)+\left(-12x^3-24x^2\right)\log(x+2)+16x}{x+2}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{4x\left(-2x^2-3x^2\log(x)-3x^2\log(x+2)-6x\log(x)-6x\log(x+2)+4\right)}{x+2}dx$$

$$\Big\downarrow \text{27}$$

$$4\int \frac{x\left(-3\log(x)x^2-3\log(x+2)x^2-2x^2-6\log(x)x-6\log(x+2)x+4\right)}{x+2}dx$$

$$\Big\downarrow \text{7293}$$

$$4\int \left(-3\log(x+2)x^2-\frac{\left(3\log(x)x^2+2x^2+6\log(x)x-4\right)x}{x+2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$4\left(x^3(-\log(x))-x^3\log(x+2)+x^2\right)$$

input
```
Int[(16*x - 8*x^3 + (-24*x^2 - 12*x^3)*Log[x] + (-24*x^2 - 12*x^3)*Log[2 +
 x])/(2 + x),x]
```

output
```
4*(x^2 - x^3*Log[x] - x^3*Log[2 + x])
```

3.339.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.339.4 Maple [A] (verified)

Time = 0.87 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

method	result
risch	$-4x^3\ln(x)-4x^3\ln(2+x)+4x^2$
parallelrisch	$-4x^3\ln(x)-4x^3\ln(2+x)+4x^2$
default	$-4x^3\ln(x)-4(2+x)^3\ln(2+x)+4x^2+\frac{176}{3}+24(2+x)^2\ln(2+x)-48(2+x)\ln(2+x$
parts	$-4x^3\ln(x)-4(2+x)^3\ln(2+x)+4x^2+\frac{176}{3}+24(2+x)^2\ln(2+x)-48(2+x)\ln(2+x$

input
```
int(((-12*x^3-24*x^2)*ln(2+x)+(-12*x^3-24*x^2)*ln(x)-8*x^3+16*x)/(2+x),x,m
ethod=_RETURNVERBOSE)
```

output
```
-4*x^3*ln(x)-4*x^3*ln(2+x)+4*x^2
```

3.339.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{16x-8x^3+(-24x^2-12x^3)\log(x)+(-24x^2-12x^3)\log(2+x)}{2+x}\,dx$$
$$=-4\,x^3\log(x+2)-4\,x^3\log(x)+4\,x^2$$

input
```
integrate(((-12*x^3-24*x^2)*log(2+x)+(-12*x^3-24*x^2)*log(x)-8*x^3+16*x)/(
2+x),x, algorithm=\
```

output
```
-4*x^3*log(x + 2) - 4*x^3*log(x) + 4*x^2
```

3.339.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.68

$$\int \frac{16x - 8x^3 + (-24x^2 - 12x^3)\log(x) + (-24x^2 - 12x^3)\log(2+x)}{2+x}\,dx$$
$$= -4x^3 \log(x) + 4x^2 + (-4x^3 - 8)\log(x+2) + 8\log(x+2)$$

input
```
integrate(((-12*x**3-24*x**2)*ln(2+x)+(-12*x**3-24*x**2)*ln(x)-8*x**3+16*x
)/(2+x),x)
```

output
```
-4*x**3*log(x) + 4*x**2 + (-4*x**3 - 8)*log(x + 2) + 8*log(x + 2)
```

3.339.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.58

$$\int \frac{16x - 8x^3 + (-24x^2 - 12x^3)\log(x) + (-24x^2 - 12x^3)\log(2+x)}{2+x}\,dx$$
$$= -4\,x^3 \log(x) + 4\,x^2 - 4\,(x^3 + 8)\log(x+2) + 32\,\log(x+2)$$

input
```
integrate(((-12*x^3-24*x^2)*log(2+x)+(-12*x^3-24*x^2)*log(x)-8*x^3+16*x)/(
2+x),x, algorithm=\
```

output
```
-4*x^3*log(x) + 4*x^2 - 4*(x^3 + 8)*log(x + 2) + 32*log(x + 2)
```

3.339.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{16x - 8x^3 + (-24x^2 - 12x^3)\log(x) + (-24x^2 - 12x^3)\log(2+x)}{2+x}\,dx$$
$$= -4\,x^3 \log(x+2) - 4\,x^3 \log(x) + 4\,x^2$$

input
```
integrate(((-12*x^3-24*x^2)*log(2+x)+(-12*x^3-24*x^2)*log(x)-8*x^3+16*x)/(
2+x),x, algorithm=\
```

output
```
-4*x^3*log(x + 2) - 4*x^3*log(x) + 4*x^2
```

3.339.9 Mupad [B] (verification not implemented)

Time = 13.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{16x-8x^3+(-24x^2-12x^3)\log(x)+(-24x^2-12x^3)\log(2+x)}{2+x}\,dx$$
$$=4\,x^2-4\,x^3\,\ln\left(x+2\right)-4\,x^3\,\ln\left(x\right)$$

input
```
int(-(log(x)*(24*x^2 + 12*x^3) - 16*x + log(x + 2)*(24*x^2 + 12*x^3) + 8*x
^3)/(x + 2),x)
```

output
```
4*x^2 - 4*x^3*log(x + 2) - 4*x^3*log(x)
```

3.340 $\int \frac{x+(24x-5x^2)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}$

3.340.1 Optimal result

Integrand size = 67, antiderivative size = 23

$$\int \frac{x+(24x-5x^2)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}\,dx = \frac{x^2}{e\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}}$$

output
```
x^2/(ln(5/ln(x))-x+4)^(1/3)/exp(1)
```

3.340.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x+(24x-5x^2)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}\,dx = \frac{x^2}{e\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}}$$

input
```
Integrate[(x + (24*x - 5*x^2)*Log[x] + 6*x*Log[x]*Log[5/Log[x]])/((4 - x +
 Log[5/Log[x]])^(1/3)*(E*(12 - 3*x)*Log[x] + 3*E*Log[x]*Log[5/Log[x]])),x]
```

output
```
x^2/(E*(4 - x + Log[5/Log[x]])^(1/3))
```

3.340.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(24x-5x^2)\log(x)+x+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{-x+\log\left(\frac{5}{\log(x)}\right)+4}\left(e(12-3x)\log(x)+3e\log\left(\frac{5}{\log(x)}\right)\log(x)\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{(24x-5x^2)\log(x)+x+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{3e\log(x)\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{4/3}}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\int \frac{6\log(x)\log\left(\frac{5}{\log(x)}\right)x+x+(24x-5x^2)\log(x)}{\log(x)\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{4/3}}dx}{3e}$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{\int \left(\frac{6x\log\left(\frac{5}{\log(x)}\right)}{\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{4/3}}-\frac{x(5x\log(x)-24\log(x)-1)}{\log(x)\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{4/3}}\right)dx}{3e}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{-5\int \frac{x^2}{\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{4/3}}dx+24\int \frac{x}{\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{4/3}}dx+\int \frac{x}{\log(x)\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{4/3}}dx+6\int \frac{x\log\left(\frac{5}{\log(x)}\right)}{\left(-x+\log\left(\frac{5}{\log(x)}\right)\right.}}{3e}$$

input
```
Int[(x + (24*x - 5*x^2)*Log[x] + 6*x*Log[x]*Log[5/Log[x]])/((4 - x + Log[5
/Log[x]])^(1/3)*(E*(12 - 3*x)*Log[x] + 3*E*Log[x]*Log[5/Log[x]])),x]
```

output
```
$Aborted
```

3.340.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.340. $\int \frac{x+(24x-5x^2)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}\,dx$

3.340.4 Maple [F]

$$\int \frac{6x\ln(x)\ln\left(\frac{5}{\ln(x)}\right)+(-5x^2+24x)\ln(x)+x}{\left(3\,\mathrm{e}\ln(x)\ln\left(\frac{5}{\ln(x)}\right)+(-3x+12)\,\mathrm{e}\ln(x)\right)\left(\ln\left(\frac{5}{\ln(x)}\right)-x+4\right)^{\frac{1}{3}}}dx$$

input
```
int((6*x*ln(x)*ln(5/ln(x))+(-5*x^2+24*x)*ln(x)+x)/(3*exp(1)*ln(x)*ln(5/ln(
x))+(-3*x+12)*exp(1)*ln(x))/(ln(5/ln(x))-x+4)^(1/3),x)
```

output
```
int((6*x*ln(x)*ln(5/ln(x))+(-5*x^2+24*x)*ln(x)+x)/(3*exp(1)*ln(x)*ln(5/ln(
x))+(-3*x+12)*exp(1)*ln(x))/(ln(5/ln(x))-x+4)^(1/3),x)
```

3.340.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.70

$$\int \frac{x+(24x-5x^2)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}dx$$
$$=-\frac{x^2\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{\frac{2}{3}}}{(x-4)e-e\log\left(\frac{5}{\log(x)}\right)}$$

input
```
integrate((6*x*log(x)*log(5/log(x))+(-5*x^2+24*x)*log(x)+x)/(3*exp(1)*log(
x)*log(5/log(x))+(-3*x+12)*exp(1)*log(x))/(log(5/log(x))-x+4)^(1/3),x, alg
orithm=\
```

output
```
-x^2*(-x + log(5/log(x)) + 4)^(2/3)/((x - 4)*e - e*log(5/log(x)))
```

3.340.6 Sympy [F(-1)]

Timed out.

$$\int \frac{x+(24x-5x^2)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}\,dx = \text{Timed out}$$

input
```
integrate((6*x*ln(x)*ln(5/ln(x))+(-5*x**2+24*x)*ln(x)+x)/(3*exp(1)*ln(x)*l
n(5/ln(x))+(-3*x+12)*exp(1)*ln(x))/(ln(5/ln(x))-x+4)**(1/3),x)
```

output
```
Timed out
```

3.340.7 Maxima [F]

$$\int \frac{x+(24x-5x^2)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}\,dx$$
$$= \int -\frac{6\,x\log(x)\log\left(\frac{5}{\log(x)}\right)-(5\,x^2-24\,x)\log(x)+x}{3\left((x-4)e\log(x)-e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{\frac{1}{3}}}\,dx$$

input
```
integrate((6*x*log(x)*log(5/log(x))+(-5*x^2+24*x)*log(x)+x)/(3*exp(1)*log(
x)*log(5/log(x))+(-3*x+12)*exp(1)*log(x))/(log(5/log(x))-x+4)^(1/3),x, alg
orithm=\
```

output
```
-1/3*integrate((6*x*log(x)*log(5/log(x)) - (5*x^2 - 24*x)*log(x) + x)/(((x
 - 4)*e*log(x) - e*log(x)*log(5/log(x)))*(-x + log(5/log(x)) + 4)^(1/3)),
x)
```

3.340.8 Giac [F]

$$\int \frac{x+(24x-5x^2)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}\,dx$$
$$=\int -\frac{6\,x\log\left(x\right)\log\left(\frac{5}{\log(x)}\right)-(5\,x^2-24\,x)\log\left(x\right)+x}{3\left((x-4)e\log\left(x\right)-e\log\left(x\right)\log\left(\frac{5}{\log(x)}\right)\right)\left(-x+\log\left(\frac{5}{\log(x)}\right)+4\right)^{\frac{1}{3}}}\,dx$$

input
```
integrate((6*x*log(x)*log(5/log(x))+(-5*x^2+24*x)*log(x)+x)/(3*exp(1)*log(
x)*log(5/log(x))+(-3*x+12)*exp(1)*log(x))/(log(5/log(x))-x+4)^(1/3),x, alg
orithm=\
```

output
```
integrate(-1/3*(6*x*log(x)*log(5/log(x)) - (5*x^2 - 24*x)*log(x) + x)/(((x
 - 4)*e*log(x) - e*log(x)*log(5/log(x)))*(-x + log(5/log(x)) + 4)^(1/3)),
x)
```

3.340.9 Mupad [B] (verification not implemented)

Time = 13.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{x+(24x-5x^2)\log(x)+6x\log(x)\log\left(\frac{5}{\log(x)}\right)}{\sqrt[3]{4-x+\log\left(\frac{5}{\log(x)}\right)}\left(e(12-3x)\log(x)+3e\log(x)\log\left(\frac{5}{\log(x)}\right)\right)}\,dx$$
$$=\frac{x^2\,\mathrm{e}^{-1}}{\left(\ln\left(\frac{5}{\ln(x)}\right)-x+4\right)^{1/3}}$$

input
```
int((x + log(x)*(24*x - 5*x^2) + 6*x*log(5/log(x))*log(x))/((3*log(5/log(x
))*exp(1)*log(x) - exp(1)*log(x)*(3*x - 12))*(log(5/log(x)) - x + 4)^(1/3)
),x)
```

output
```
(x^2*exp(-1))/(log(5/log(x)) - x + 4)^(1/3)
```

3.341 $\int \frac{-6x+9x^2+e^{x^2}(3-3x+9x^2-12x^3-6x^4)+\left(-3x^2+6e^{x^2}x^3\right)\log(x)}{1-4x+2x^2+4x^3+x^4+(2x-4x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx$

3.341.1 Optimal result

Integrand size = 100, antiderivative size = 25

$$\int \frac{-6x+9x^2+e^{x^2}(3-3x+9x^2-12x^3-6x^4)+\left(-3x^2+6e^{x^2}x^3\right)\log(x)}{1-4x+2x^2+4x^3+x^4+(2x-4x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx = \frac{3\left(-e^{x^2}+x\right)}{2-\frac{1}{x}+x-\log(x)}$$

output
```
(-exp(x^2)+x)/(1/3*x-1/3*ln(x)-1/3/x+2/3)
```

3.341.2 Mathematica [A] (verified)

Time = 0.38 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{-6x+9x^2+e^{x^2}(3-3x+9x^2-12x^3-6x^4)+\left(-3x^2+6e^{x^2}x^3\right)\log(x)}{1-4x+2x^2+4x^3+x^4+(2x-4x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx = \frac{3\left(e^{x^2}-x\right)x}{1-2x-x^2+x\log(x)}$$

input
```
Integrate[(-6*x + 9*x^2 + E^x^2*(3 - 3*x + 9*x^2 - 12*x^3 - 6*x^4) + (-3*x
^2 + 6*E^x^2*x^3)*Log[x])/(1 - 4*x + 2*x^2 + 4*x^3 + x^4 + (2*x - 4*x^2 -
2*x^3)*Log[x] + x^2*Log[x]^2),x]
```

output
```
(3*(E^x^2 - x)*x)/(1 - 2*x - x^2 + x*Log[x])
```

3.341.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{9x^2+\left(6e^{x^2}x^3-3x^2\right)\log(x)+e^{x^2}\left(-6x^4-12x^3+9x^2-3x+3\right)-6x}{x^4+4x^3+2x^2+x^2\log^2(x)+\left(-2x^3-4x^2+2x\right)\log(x)-4x+1}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{9x^2+\left(6e^{x^2}x^3-3x^2\right)\log(x)+e^{x^2}\left(-6x^4-12x^3+9x^2-3x+3\right)-6x}{\left(-x^2-2x+x\log(x)+1\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{3x^2\log(x)}{\left(x^2+2x-x\log(x)-1\right)^2}+\frac{9x^2}{\left(x^2+2x-x\log(x)-1\right)^2}-\frac{6x}{\left(x^2+2x-x\log(x)-1\right)^2}-\frac{3e^{x^2}\left(2x^4+4x^3-2x\right.}{\left(x^2+2x-\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$3\int \frac{e^{x^2}}{\left(x^2-\log(x)x+2x-1\right)^2}dx-3\int \frac{x}{\left(x^2-\log(x)x+2x-1\right)^2}dx-3\int \frac{e^{x^2}x}{\left(x^2-\log(x)x+2x-1\right)^2}dx+3\int \frac{x^2}{\left(x^2-\log(x)x+2x-1\right)^2}dx+3\int \frac{e^{x^2}x^2}{\left(x^2-\log(x)x+2x-1\right)^2}dx+3\int \frac{x}{x^2-\log(x)x+2x-1}dx-6\int \frac{e^{x^2}x^2}{x^2-\log(x)x+2x-1}dx-3\int \frac{x^3}{\left(x^2-\log(x)x+2x-1\right)^2}dx$$

input
```
Int[(-6*x + 9*x^2 + E^x^2*(3 - 3*x + 9*x^2 - 12*x^3 - 6*x^4) + (-3*x^2 + 6
*E^x^2*x^3)*Log[x])/(1 - 4*x + 2*x^2 + 4*x^3 + x^4 + (2*x - 4*x^2 - 2*x^3)
*Log[x] + x^2*Log[x]^2),x]
```

output
```
$Aborted
```

3.341. $\int \frac{-6x+9x^2+e^{x^2}\left(3-3x+9x^2-12x^3-6x^4\right)+\left(-3x^2+6e^{x^2}x^3\right)\log(x)}{1-4x+2x^2+4x^3+x^4+\left(2x-4x^2-2x^3\right)\log(x)+x^2\log^2(x)}\,dx$

3.341.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.341.4 Maple [A] (verified)

Time = 11.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

method	result	size
risch	$\frac{3\left(-e^{x^{2}}+x\right)x}{x^{2}-x\ln\left(x\right)+2x-1}$	27
parallelrisch	$\frac{3x^{2}-3\,e^{x^{2}}x}{x^{2}-x\ln\left(x\right)+2x-1}$	30

input
```
int(((6*x^3*exp(x^2)-3*x^2)*ln(x)+(-6*x^4-12*x^3+9*x^2-3*x+3)*exp(x^2)+9*x
^2-6*x)/(x^2*ln(x)^2+(-2*x^3-4*x^2+2*x)*ln(x)+x^4+4*x^3+2*x^2-4*x+1),x,met
hod=_RETURNVERBOSE)
```

output
```
3*(-exp(x^2)+x)*x/(x^2-x*ln(x)+2*x-1)
```

3.341.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{-6x+9x^2+e^{x^2}(3-3x+9x^2-12x^3-6x^4)+\left(-3x^2+6e^{x^2}x^3\right)\log(x)}{1-4x+2x^2+4x^3+x^4+(2x-4x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx$$
$$=\frac{3\left(x^2-xe^{\left(x^2\right)}\right)}{x^2-x\log\left(x\right)+2\,x-1}$$

input
```
integrate(((6*x^3*exp(x^2)-3*x^2)*log(x)+(-6*x^4-12*x^3+9*x^2-3*x+3)*exp(x
^2)+9*x^2-6*x)/(x^2*log(x)^2+(-2*x^3-4*x^2+2*x)*log(x)+x^4+4*x^3+2*x^2-4*x
+1),x, algorithm=\
```

output
```
3*(x^2 - x*e^(x^2))/(x^2 - x*log(x) + 2*x - 1)
```

3.341.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.64

$$\int \frac{-6x+9x^2+e^{x^2}(3-3x+9x^2-12x^3-6x^4)+\left(-3x^2+6e^{x^2}x^3\right)\log(x)}{1-4x+2x^2+4x^3+x^4+(2x-4x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx$$
$$= -\frac{3x^2}{-x^2+x\log(x)-2x+1} - \frac{3xe^{x^2}}{x^2-x\log(x)+2x-1}$$

input
```
integrate(((6*x**3*exp(x**2)-3*x**2)*ln(x)+(-6*x**4-12*x**3+9*x**2-3*x+3)*
exp(x**2)+9*x**2-6*x)/(x**2*ln(x)**2+(-2*x**3-4*x**2+2*x)*ln(x)+x**4+4*x**
3+2*x**2-4*x+1),x)
```

output
```
-3*x**2/(-x**2 + x*log(x) - 2*x + 1) - 3*x*exp(x**2)/(x**2 - x*log(x) + 2*
x - 1)
```

3.341.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{-6x+9x^2+e^{x^2}(3-3x+9x^2-12x^3-6x^4)+\left(-3x^2+6e^{x^2}x^3\right)\log(x)}{1-4x+2x^2+4x^3+x^4+(2x-4x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx$$
$$= \frac{3\left(x^2-xe^{(x^2)}\right)}{x^2-x\log(x)+2x-1}$$

input
```
integrate(((6*x^3*exp(x^2)-3*x^2)*log(x)+(-6*x^4-12*x^3+9*x^2-3*x+3)*exp(x
^2)+9*x^2-6*x)/(x^2*log(x)^2+(-2*x^3-4*x^2+2*x)*log(x)+x^4+4*x^3+2*x^2-4*x
+1),x, algorithm=\
```

output
```
3*(x^2 - x*e^(x^2))/(x^2 - x*log(x) + 2*x - 1)
```

3.341.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{-6x + 9x^2 + e^{x^2}(3 - 3x + 9x^2 - 12x^3 - 6x^4) + \left(-3x^2 + 6e^{x^2}x^3\right)\log(x)}{1 - 4x + 2x^2 + 4x^3 + x^4 + (2x - 4x^2 - 2x^3)\log(x) + x^2\log^2(x)}\,dx$$
$$= \frac{3\left(x^2 - xe^{(x^2)}\right)}{x^2 - x\log(x) + 2x - 1}$$

input
```
integrate(((6*x^3*exp(x^2)-3*x^2)*log(x)+(-6*x^4-12*x^3+9*x^2-3*x+3)*exp(x
^2)+9*x^2-6*x)/(x^2*log(x)^2+(-2*x^3-4*x^2+2*x)*log(x)+x^4+4*x^3+2*x^2-4*x
+1),x, algorithm=\
```

output
```
3*(x^2 - x*e^(x^2))/(x^2 - x*log(x) + 2*x - 1)
```

3.341.9 Mupad [B] (verification not implemented)

Time = 12.48 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{-6x + 9x^2 + e^{x^2}(3 - 3x + 9x^2 - 12x^3 - 6x^4) + \left(-3x^2 + 6e^{x^2}x^3\right)\log(x)}{1 - 4x + 2x^2 + 4x^3 + x^4 + (2x - 4x^2 - 2x^3)\log(x) + x^2\log^2(x)}\,dx$$
$$= \frac{3\,x\left(x - \mathrm{e}^{x^2}\right)}{2\,x - x\,\ln(x) + x^2 - 1}$$

input
```
int(-(6*x - log(x)*(6*x^3*exp(x^2) - 3*x^2) + exp(x^2)*(3*x - 9*x^2 + 12*x
^3 + 6*x^4 - 3) - 9*x^2)/(x^2*log(x)^2 - 4*x + 2*x^2 + 4*x^3 + x^4 - log(x
)*(4*x^2 - 2*x + 2*x^3) + 1),x)
```

output
```
(3*x*(x - exp(x^2)))/(2*x - x*log(x) + x^2 - 1)
```

3.342 $\int \frac{128x^{14}+64x^{15}+8x^{16}+(64x^{14}+288x^{15}+140x^{16}+18x^{17})\log(3x)+(384}{}$

3.342.1 Optimal result

Integrand size = 241, antiderivative size = 22

$$\int \frac{128x^{14}+64x^{15}+8x^{16}+(64x^{14}+288x^{15}+140x^{16}+18x^{17})\log(3x)+(384x^{13}+192x^{14}+24x^{15}+(192}{}$$
$$= x^{12}(4+x)^2\left(x+\log\left(x\log^2(3x)\right)\right)^4$$

output
```
(4+x)^2*x^12*(ln(x*ln(3*x)^2)+x)^4
```

3.342.2 Mathematica [A] (verified)

Time = 5.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{128x^{14}+64x^{15}+8x^{16}+(64x^{14}+288x^{15}+140x^{16}+18x^{17})\log(3x)+(384x^{13}+192x^{14}+24x^{15}+(192}{}$$
$$= x^{12}(4+x)^2\left(x+\log\left(x\log^2(3x)\right)\right)^4$$

input
```
Integrate[(128*x^14 + 64*x^15 + 8*x^16 + (64*x^14 + 288*x^15 + 140*x^16 +
18*x^17)*Log[3*x] + (384*x^13 + 192*x^14 + 24*x^15 + (192*x^13 + 1056*x^14
 + 524*x^15 + 68*x^16)*Log[3*x])*Log[x*Log[3*x]^2] + (384*x^12 + 192*x^13
+ 24*x^14 + (192*x^12 + 1440*x^13 + 732*x^14 + 96*x^15)*Log[3*x])*Log[x*Lo
g[3*x]^2]^2 + (128*x^11 + 64*x^12 + 8*x^13 + (64*x^11 + 864*x^12 + 452*x^1
3 + 60*x^14)*Log[3*x])*Log[x*Log[3*x]^2]^3 + (192*x^11 + 104*x^12 + 14*x^1
3)*Log[3*x]*Log[x*Log[3*x]^2]^4)/Log[3*x],x]
```

3.342.

$$\int \frac{128x^{14}+64x^{15}+8x^{16}+(64x^{14}+288x^{15}+140x^{16}+18x^{17})\log(3x)+(384x^{13}+192x^{14}+24x^{15}+(192x^{13}+1056x^{14}+524x^{15}+68x^{16})\log(3x))\log(x\log}{}$$

output
```
x^12*(4 + x)^2*(x + Log[x*Log[3*x]^2])^4
```

3.342.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^{16} + 64x^{15} + 128x^{14} + \left(14x^{13} + 104x^{12} + 192x^{11}\right)\log(3x)\log^4\left(x\log^2(3x)\right) + \left(18x^{17} + 140x^{16} + 288x^{15} + 6\right.}{}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)+4(x+4)\right)}{\log(3x)}dx$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)} + \frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)} + \frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$$\Big\downarrow \text{7293}$$

3.342.

$$\int \frac{128x^{14}+64x^{15}+8x^{16}+\left(64x^{14}+288x^{15}+140x^{16}+18x^{17}\right)\log(3x)+\left(384x^{13}+192x^{14}+24x^{15}+\left(192x^{13}+1056x^{14}+524x^{15}+68x^{16}\right)\log(3x)\right)\log(x\,\mathrm{lo}}{}$$

$$2\int\left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x}\right.$$

$\big\downarrow$ 7239

$$2\int\frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$\big\downarrow$ 7293

$$2\int\left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x}\right.$$

$\big\downarrow$ 7239

$$2\int\frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$\big\downarrow$ 7293

$$2\int\left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x}\right.$$

$\big\downarrow$ 7239

$$2\int\frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$\big\downarrow$ 7293

$$2\int\left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x}\right.$$

$\big\downarrow$ 7239

$$2\int\frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$\big\downarrow$ 7293

$$2\int\left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x}\right.$$

3.342.

$$\int\frac{128x^{14}+64x^{15}+8x^{16}+\left(64x^{14}+288x^{15}+140x^{16}+18x^{17}\right)\log(3x)+\left(384x^{13}+192x^{14}+24x^{15}+\left(192x^{13}+1056x^{14}+524x^{15}+68x^{16}\right)\log(3x)\right)\log(x\,\mathrm{lo}}{}$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x}\right.$$

$$\Big\downarrow \text{7239}$$

3.342.

$$\int \frac{128x^{14}+64x^{15}+8x^{16}+\left(64x^{14}+288x^{15}+140x^{16}+18x^{17}\right)\log(3x)+\left(384x^{13}+192x^{14}+24x^{15}+\left(192x^{13}+1056x^{14}+524x^{15}+68x^{16}\right)\log(3x)\right)\log(x\,\text{lo}}{}$$

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$\Big\downarrow$ 7293

$$2\int\left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x)}\right.$$

$\Big\downarrow$ 7239

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$\Big\downarrow$ 7293

$$2\int\left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x)}\right.$$

$\Big\downarrow$ 7239

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

$\Big\downarrow$ 7293

$$2\int\left(\frac{(x+4)\left(9\log(3x)x^2+34\log(3x)x+4x+8\log(3x)+16\right)x^{14}}{\log(3x)}+\frac{2(x+4)\left(17\log(3x)x^2+63\log(3x)x+6x\right.}{\log(3x)}\right.$$

$\Big\downarrow$ 7239

$$2\int \frac{x^{11}(x+4)\left(x+\log\left(x\log^2(3x)\right)\right)^3\left(4(x+4)+\log(3x)\left(9x^2+34x+(7x+24)\log\left(x\log^2(3x)\right)+8\right)\right)}{\log(3x)}dx$$

input
```
Int[(128*x^14 + 64*x^15 + 8*x^16 + (64*x^14 + 288*x^15 + 140*x^16 + 18*x^1
7)*Log[3*x] + (384*x^13 + 192*x^14 + 24*x^15 + (192*x^13 + 1056*x^14 + 524
*x^15 + 68*x^16)*Log[3*x])*Log[x*Log[3*x]^2] + (384*x^12 + 192*x^13 + 24*x
^14 + (192*x^12 + 1440*x^13 + 732*x^14 + 96*x^15)*Log[3*x])*Log[x*Log[3*x]
^2]^2 + (128*x^11 + 64*x^12 + 8*x^13 + (64*x^11 + 864*x^12 + 452*x^13 + 60
*x^14)*Log[3*x])*Log[x*Log[3*x]^2]^3 + (192*x^11 + 104*x^12 + 14*x^13)*Log
[3*x]*Log[x*Log[3*x]^2]^4)/Log[3*x],x]
```

3.342.

$$\int \frac{128x^{14}+64x^{15}+8x^{16}+\left(64x^{14}+288x^{15}+140x^{16}+18x^{17}\right)\log(3x)+\left(384x^{13}+192x^{14}+24x^{15}+\left(192x^{13}+1056x^{14}+524x^{15}+68x^{16}\right)\log(3x)\right)\log(x\log}{}$$

output
```
$Aborted
```

3.342.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.342.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 199 vs. $2(22) = 44$.

Time = 8.10 (sec) , antiderivative size = 200, normalized size of antiderivative = 9.09

method	result
parallelrisch	$x^{18}+4\ln\left(x\ln\left(3x\right)^{2}\right)x^{17}+6\ln\left(x\ln\left(3x\right)^{2}\right)^{2}x^{16}+4\ln\left(x\ln\left(3x\right)^{2}\right)^{3}x^{15}+x^{14}\ln\left(x\ln\left(3x\right)^{2}\right)$

input
```
int((((14*x^13+104*x^12+192*x^11)*ln(3*x)*ln(x*ln(3*x)^2)^4+((60*x^14+452*x
^13+864*x^12+64*x^11)*ln(3*x)+8*x^13+64*x^12+128*x^11)*ln(x*ln(3*x)^2)^3+(
(96*x^15+732*x^14+1440*x^13+192*x^12)*ln(3*x)+24*x^14+192*x^13+384*x^12)*l
n(x*ln(3*x)^2)^2+((68*x^16+524*x^15+1056*x^14+192*x^13)*ln(3*x)+24*x^15+19
2*x^14+384*x^13)*ln(x*ln(3*x)^2)+(18*x^17+140*x^16+288*x^15+64*x^14)*ln(3*
x)+8*x^16+64*x^15+128*x^14)/ln(3*x),x,method=_RETURNVERBOSE)
```

output
```
x^18+4*ln(x*ln(3*x)^2)*x^17+6*ln(x*ln(3*x)^2)^2*x^16+4*ln(x*ln(3*x)^2)^3*x
^15+x^14*ln(x*ln(3*x)^2)^4+8*x^17+32*ln(x*ln(3*x)^2)*x^16+48*ln(x*ln(3*x)^
2)^2*x^15+32*ln(x*ln(3*x)^2)^3*x^14+8*ln(x*ln(3*x)^2)^4*x^13+16*x^16+64*ln
(x*ln(3*x)^2)*x^15+96*ln(x*ln(3*x)^2)^2*x^14+64*ln(x*ln(3*x)^2)^3*x^13+16*
ln(x*ln(3*x)^2)^4*x^12
```

3.342.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 119 vs. 2(22) = 44.

Time = 0.27 (sec) , antiderivative size = 119, normalized size of antiderivative = 5.41

$$\int \frac{128x^{14} + 64x^{15} + 8x^{16} + (64x^{14} + 288x^{15} + 140x^{16} + 18x^{17}) \log(3x) + (384x^{13} + 192x^{14} + 24x^{15} + (192x}{}$$

$$= x^{18} + 8\,x^{17} + 16\,x^{16} + \left(x^{14} + 8\,x^{13} + 16\,x^{12}\right) \log\left(x \log\left(3\,x\right)^{2}\right)^{4} + 4\,\left(x^{15} + 8\,x^{14} + 16\,x^{13}\right) \log\left(x \log\left(3\,x\right)^{2}\right)^{3} + 6\,\left(x^{16} + 8\,x^{15} + 16\,x^{14}\right) \log\left(x \log\left(3\,x\right)^{2}\right)^{2} + 4\,\left(x^{17} + 8\,x^{16} + 16\,x^{15}\right) \log\left(x \log\left(3\,x\right)^{2}\right)$$

input
```
integrate(((14*x^13+104*x^12+192*x^11)*log(3*x)*log(x*log(3*x)^2)^4+((60*x
^14+452*x^13+864*x^12+64*x^11)*log(3*x)+8*x^13+64*x^12+128*x^11)*log(x*log
(3*x)^2)^3+((96*x^15+732*x^14+1440*x^13+192*x^12)*log(3*x)+24*x^14+192*x^1
3+384*x^12)*log(x*log(3*x)^2)^2+((68*x^16+524*x^15+1056*x^14+192*x^13)*log
(3*x)+24*x^15+192*x^14+384*x^13)*log(x*log(3*x)^2)+(18*x^17+140*x^16+288*x
^15+64*x^14)*log(3*x)+8*x^16+64*x^15+128*x^14)/log(3*x),x, algorithm=\
```

output
```
x^18 + 8*x^17 + 16*x^16 + (x^14 + 8*x^13 + 16*x^12)*log(x*log(3*x)^2)^4 +
4*(x^15 + 8*x^14 + 16*x^13)*log(x*log(3*x)^2)^3 + 6*(x^16 + 8*x^15 + 16*x^
14)*log(x*log(3*x)^2)^2 + 4*(x^17 + 8*x^16 + 16*x^15)*log(x*log(3*x)^2)
```

3.342.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 117 vs. 2(20) = 40.

Time = 0.43 (sec) , antiderivative size = 117, normalized size of antiderivative = 5.32

$$\int \frac{128x^{14} + 64x^{15} + 8x^{16} + (64x^{14} + 288x^{15} + 140x^{16} + 18x^{17}) \log(3x) + (384x^{13} + 192x^{14} + 24x^{15} + (192x}{}$$

$$= x^{18} + 8x^{17} + 16x^{16} + \left(x^{14} + 8x^{13} + 16x^{12}\right) \log\left(x \log\left(3x\right)^{2}\right)^{4} + \left(4x^{15} + 32x^{14} + 64x^{13}\right) \log\left(x \log\left(3x\right)^{2}\right)^{3} + \left(6x^{16} + 48x^{15} + 96x^{14}\right) \log\left(x \log\left(3x\right)^{2}\right)^{2} + \left(4x^{17} + 32x^{16} + 64x^{15}\right) \log\left(x \log\left(3x\right)^{2}\right)$$

3.342.

$$\int \frac{128x^{14}+64x^{15}+8x^{16}+(64x^{14}+288x^{15}+140x^{16}+18x^{17}) \log(3x)+(384x^{13}+192x^{14}+24x^{15}+(192x^{13}+1056x^{14}+524x^{15}+68x^{16}) \log(3x)) \log(x \log}{}$$

input
```
integrate(((14*x**13+104*x**12+192*x**11)*ln(3*x)*ln(x*ln(3*x)**2)**4+((60
*x**14+452*x**13+864*x**12+64*x**11)*ln(3*x)+8*x**13+64*x**12+128*x**11)*l
n(x*ln(3*x)**2)**3+((96*x**15+732*x**14+1440*x**13+192*x**12)*ln(3*x)+24*x
**14+192*x**13+384*x**12)*ln(x*ln(3*x)**2)**2+((68*x**16+524*x**15+1056*x*
*14+192*x**13)*ln(3*x)+24*x**15+192*x**14+384*x**13)*ln(x*ln(3*x)**2)+(18*
x**17+140*x**16+288*x**15+64*x**14)*ln(3*x)+8*x**16+64*x**15+128*x**14)/ln
(3*x),x)
```

output
```
x**18 + 8*x**17 + 16*x**16 + (x**14 + 8*x**13 + 16*x**12)*log(x*log(3*x)**
2)**4 + (4*x**15 + 32*x**14 + 64*x**13)*log(x*log(3*x)**2)**3 + (6*x**16 +
 48*x**15 + 96*x**14)*log(x*log(3*x)**2)**2 + (4*x**17 + 32*x**16 + 64*x**
15)*log(x*log(3*x)**2)
```

3.342.7 Maxima [F]

$$\int \frac{128x^{14} + 64x^{15} + 8x^{16} + (64x^{14} + 288x^{15} + 140x^{16} + 18x^{17})\log(3x) + (384x^{13} + 192x^{14} + 24x^{15} + (192x^{13}\ldots}{}$$

$$= \int \frac{2\left(4\,x^{16} + 32\,x^{15} + 64\,x^{14} + (7\,x^{13} + 52\,x^{12} + 96\,x^{11})\log\left(x\log\left(3\,x\right)^{2}\right)^{4}\log\left(3\,x\right) + 2\,(2\,x^{13} + 16\,x^{12} + 3\ldots}{}$$

input
```
integrate(((14*x^13+104*x^12+192*x^11)*log(3*x)*log(x*log(3*x)^2)^4+((60*x
^14+452*x^13+864*x^12+64*x^11)*log(3*x)+8*x^13+64*x^12+128*x^11)*log(x*log
(3*x)^2)^3+((96*x^15+732*x^14+1440*x^13+192*x^12)*log(3*x)+24*x^14+192*x^1
3+384*x^12)*log(x*log(3*x)^2)^2+((68*x^16+524*x^15+1056*x^14+192*x^13)*log
(3*x)+24*x^15+192*x^14+384*x^13)*log(x*log(3*x)^2)+(18*x^17+140*x^16+288*x
^15+64*x^14)*log(3*x)+8*x^16+64*x^15+128*x^14)/log(3*x),x, algorithm=\
```

output
```
x^18 + 8*x^17 + 16*x^16 + (x^14 + 8*x^13 + 16*x^12)*log(x)^4 + 16*(x^14 +
8*x^13 + 16*x^12)*log(log(3) + log(x))^4 + 4*(x^15 + 8*x^14 + 16*x^13)*log
(x)^3 + 32*(x^15 + 8*x^14 + 16*x^13 + (x^14 + 8*x^13 + 16*x^12)*log(x))*lo
g(log(3) + log(x))^3 + 6*(x^16 + 8*x^15 + 16*x^14)*log(x)^2 + 24*(x^16 + 8
*x^15 + 16*x^14 + (x^14 + 8*x^13 + 16*x^12)*log(x)^2 + 2*(x^15 + 8*x^14 +
16*x^13)*log(x))*log(log(3) + log(x))^2 + 4*(x^17 + 8*x^16 + 16*x^15)*log(
x) + 8*(x^17 + 8*x^16 + 16*x^15 + (x^14 + 8*x^13 + 16*x^12)*log(x)^3 + 3*(
x^15 + 8*x^14 + 16*x^13)*log(x)^2 + 3*(x^16 + 8*x^15 + 16*x^14)*log(x))*lo
g(log(3) + log(x)) + 8/129140163*Ei(17*log(3*x)) + 64/43046721*Ei(16*log(3
*x)) + 128/14348907*Ei(15*log(3*x)) - 2*integrate(4*(x^16 + 8*x^15 + 16*x^
14)/(log(3) + log(x)), x)
```

3.342.8 Giac [F]

$$\int \frac{128x^{14} + 64x^{15} + 8x^{16} + (64x^{14} + 288x^{15} + 140x^{16} + 18x^{17}) \log(3x) + (384x^{13} + 192x^{14} + 24x^{15} + (192x$$

$$= \int \frac{2\left(4x^{16} + 32x^{15} + 64x^{14} + (7x^{13} + 52x^{12} + 96x^{11}) \log\left(x \log(3x)^2\right)^4 \log(3x) + 2(2x^{13} + 16x^{12} + 3$$

input
```
integrate(((14*x^13+104*x^12+192*x^11)*log(3*x)*log(x*log(3*x)^2)^4+((60*x
^14+452*x^13+864*x^12+64*x^11)*log(3*x)+8*x^13+64*x^12+128*x^11)*log(x*log
(3*x)^2)^3+((96*x^15+732*x^14+1440*x^13+192*x^12)*log(3*x)+24*x^14+192*x^1
3+384*x^12)*log(x*log(3*x)^2)^2+((68*x^16+524*x^15+1056*x^14+192*x^13)*log
(3*x)+24*x^15+192*x^14+384*x^13)*log(x*log(3*x)^2)+(18*x^17+140*x^16+288*x
^15+64*x^14)*log(3*x)+8*x^16+64*x^15+128*x^14)/log(3*x),x, algorithm=\
```

output
```
integrate(2*(4*x^16 + 32*x^15 + 64*x^14 + (7*x^13 + 52*x^12 + 96*x^11)*log
(x*log(3*x)^2)^4*log(3*x) + 2*(2*x^13 + 16*x^12 + 32*x^11 + (15*x^14 + 113
*x^13 + 216*x^12 + 16*x^11)*log(3*x))*log(x*log(3*x)^2)^3 + 6*(2*x^14 + 16
*x^13 + 32*x^12 + (8*x^15 + 61*x^14 + 120*x^13 + 16*x^12)*log(3*x))*log(x*
log(3*x)^2)^2 + 2*(6*x^15 + 48*x^14 + 96*x^13 + (17*x^16 + 131*x^15 + 264*
x^14 + 48*x^13)*log(3*x))*log(x*log(3*x)^2) + (9*x^17 + 70*x^16 + 144*x^15
 + 32*x^14)*log(3*x))/log(3*x), x)
```

3.342.9 Mupad [B] (verification not implemented)

Time = 13.00 (sec) , antiderivative size = 122, normalized size of antiderivative = 5.55

$$\int \frac{128x^{14} + 64x^{15} + 8x^{16} + (64x^{14} + 288x^{15} + 140x^{16} + 18x^{17}) \log(3x) + (384x^{13} + 192x^{14} + 24x^{15} + (192x$$

$$= \ln\left(x \ln(3x)^2\right) \left(4x^{17} + 32x^{16} + 64x^{15}\right) + \ln\left(x \ln(3x)^2\right)^4 \left(x^{14} + 8x^{13} + 16x^{12}\right) + \ln\left(x \ln(3x)^2\right)^3 \left(4x^{15} + 32x^{14} + 64x^{13}\right) + \ln\left(x \ln(3x)^2\right)^2 \left(6x^{16} + 48x^{15} + 96x^{14}\right) + 16x^{16} + 8x^{17} + x^{18}$$

input
```
int((log(x*log(3*x)^2)*(384*x^13 + 192*x^14 + 24*x^15 + log(3*x)*(192*x^13
 + 1056*x^14 + 524*x^15 + 68*x^16)) + log(x*log(3*x)^2)^3*(128*x^11 + 64*x
^12 + 8*x^13 + log(3*x)*(64*x^11 + 864*x^12 + 452*x^13 + 60*x^14)) + log(x
*log(3*x)^2)^2*(384*x^12 + 192*x^13 + 24*x^14 + log(3*x)*(192*x^12 + 1440*
x^13 + 732*x^14 + 96*x^15)) + 128*x^14 + 64*x^15 + 8*x^16 + log(3*x)*(64*x
^14 + 288*x^15 + 140*x^16 + 18*x^17) + log(3*x)*log(x*log(3*x)^2)^4*(192*x
^11 + 104*x^12 + 14*x^13))/log(3*x),x)
```

output
```
log(x*log(3*x)^2)*(64*x^15 + 32*x^16 + 4*x^17) + log(x*log(3*x)^2)^4*(16*x
^12 + 8*x^13 + x^14) + log(x*log(3*x)^2)^3*(64*x^13 + 32*x^14 + 4*x^15) +
log(x*log(3*x)^2)^2*(96*x^14 + 48*x^15 + 6*x^16) + 16*x^16 + 8*x^17 + x^18
```

3.342.

$$\int \frac{128x^{14}+64x^{15}+8x^{16}+\left(64x^{14}+288x^{15}+140x^{16}+18x^{17}\right)\log(3x)+\left(384x^{13}+192x^{14}+24x^{15}+\left(192x^{13}+1056x^{14}+524x^{15}+68x^{16}\right)\log(3x)\right)\log(x\log}{}$$

3.343 $\int \frac{-7x-7\log(3)+(2+9x+4x^2)\log\left(\frac{1+4x}{2+x}\right)}{(2+9x+4x^2)\log^2\left(\frac{1+4x}{2+x}\right)}\,dx$

3.343.1 Optimal result

Integrand size = 58, antiderivative size = 17

$$\int \frac{-7x-7\log(3)+(2+9x+4x^2)\log\left(\frac{1+4x}{2+x}\right)}{(2+9x+4x^2)\log^2\left(\frac{1+4x}{2+x}\right)}\,dx=\frac{x+\log(3)}{\log\left(4-\frac{7}{2+x}\right)}$$

output
```
(ln(3)+x)/ln(-7/(2+x)+4)
```

3.343.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{-7x-7\log(3)+(2+9x+4x^2)\log\left(\frac{1+4x}{2+x}\right)}{(2+9x+4x^2)\log^2\left(\frac{1+4x}{2+x}\right)}\,dx=\frac{x+\log(3)}{\log\left(\frac{1+4x}{2+x}\right)}$$

input
```
Integrate[(-7*x - 7*Log[3] + (2 + 9*x + 4*x^2)*Log[(1 + 4*x)/(2 + x)])/((2
 + 9*x + 4*x^2)*Log[(1 + 4*x)/(2 + x)]^2),x]
```

output
```
(x + Log[3])/Log[(1 + 4*x)/(2 + x)]
```

3.343.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(4x^2+9x+2)\log\left(\frac{4x+1}{x+2}\right)-7x-7\log(3)}{(4x^2+9x+2)\log^2\left(\frac{4x+1}{x+2}\right)}dx$$

$$\Big\downarrow \text{ 7279}$$

$$\int \left(\frac{1}{\log\left(\frac{4x+1}{x+2}\right)}-\frac{7(x+\log(3))}{(x+2)(4x+1)\log^2\left(\frac{4x+1}{x+2}\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\int \frac{1}{\log\left(\frac{4x+1}{x+2}\right)}dx-7\int \frac{x+\log(3)}{(x+2)(4x+1)\log^2\left(\frac{4x+1}{x+2}\right)}dx$$

input
```
Int[(-7*x - 7*Log[3] + (2 + 9*x + 4*x^2)*Log[(1 + 4*x)/(2 + x)])/((2 + 9*x
 + 4*x^2)*Log[(1 + 4*x)/(2 + x)]^2),x]
```

output
```
$Aborted
```

3.343.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.343.4 Maple [A] (verified)

Time = 7.29 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

method	result	size
norman	$\frac{\ln(3)+x}{\ln\left(\frac{1+4x}{2+x}\right)}$	20
risch	$\frac{\ln(3)+x}{\ln\left(\frac{1+4x}{2+x}\right)}$	20
parallelrisch	$\frac{16\ln(3)+16x}{16\ln\left(\frac{1+4x}{2+x}\right)}$	25
derivativedivides	$\frac{2+x}{\ln\left(-\frac{7}{2+x}+4\right)}+\frac{\ln(3)}{\ln\left(-\frac{7}{2+x}+4\right)}-\frac{2}{\ln\left(-\frac{7}{2+x}+4\right)}$	47
default	$\frac{2+x}{\ln\left(-\frac{7}{2+x}+4\right)}+\frac{\ln(3)}{\ln\left(-\frac{7}{2+x}+4\right)}-\frac{2}{\ln\left(-\frac{7}{2+x}+4\right)}$	47
parts	$-\frac{7}{\left(\frac{1+4x}{2+x}-4\right)\ln\left(\frac{1+4x}{2+x}\right)}-\frac{2}{\ln\left(\frac{1+4x}{2+x}\right)}+\frac{\ln(3)}{\ln\left(-\frac{7}{2+x}+4\right)}$	64

input
```
int(((4*x^2+9*x+2)*ln((1+4*x)/(2+x))-7*ln(3)-7*x)/(4*x^2+9*x+2)/ln((1+4*x)
/(2+x))^2,x,method=_RETURNVERBOSE)
```

output
```
(ln(3)+x)/ln((1+4*x)/(2+x))
```

3.343.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{-7x-7\log(3)+(2+9x+4x^2)\log\left(\frac{1+4x}{2+x}\right)}{(2+9x+4x^2)\log^2\left(\frac{1+4x}{2+x}\right)}\,dx=\frac{x+\log(3)}{\log\left(\frac{4x+1}{x+2}\right)}$$

input
```
integrate(((4*x^2+9*x+2)*log((1+4*x)/(2+x))-7*log(3)-7*x)/(4*x^2+9*x+2)/lo
g((1+4*x)/(2+x))^2,x, algorithm=\
```

output
```
(x + log(3))/log((4*x + 1)/(x + 2))
```

3.343.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{-7x-7\log(3)+(2+9x+4x^2)\log\left(\frac{1+4x}{2+x}\right)}{(2+9x+4x^2)\log^2\left(\frac{1+4x}{2+x}\right)}\,dx=\frac{x+\log(3)}{\log\left(\frac{4x+1}{x+2}\right)}$$

input
```
integrate(((4*x**2+9*x+2)*ln((1+4*x)/(2+x))-7*ln(3)-7*x)/(4*x**2+9*x+2)/ln
((1+4*x)/(2+x))**2,x)
```

output
```
(x + log(3))/log((4*x + 1)/(x + 2))
```

3.343.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. 2(17) = 34.

Time = 0.24 (sec) , antiderivative size = 36, normalized size of antiderivative = 2.12

$$\int \frac{-7x-7\log(3)+(2+9x+4x^2)\log\left(\frac{1+4x}{2+x}\right)}{(2+9x+4x^2)\log^2\left(\frac{1+4x}{2+x}\right)}\,dx$$
$$=\frac{x}{\log(4x+1)-\log(x+2)}+\frac{\log(3)}{\log(4x+1)-\log(x+2)}$$

input
```
integrate(((4*x^2+9*x+2)*log((1+4*x)/(2+x))-7*log(3)-7*x)/(4*x^2+9*x+2)/lo
g((1+4*x)/(2+x))^2,x, algorithm=\
```

output
```
x/(log(4*x + 1) - log(x + 2)) + log(3)/(log(4*x + 1) - log(x + 2))
```

3.343.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(17) = 34.

Time = 0.28 (sec) , antiderivative size = 72, normalized size of antiderivative = 4.24

$$\int \frac{-7x-7\log(3)+(2+9x+4x^2)\log\left(\frac{1+4x}{2+x}\right)}{(2+9x+4x^2)\log^2\left(\frac{1+4x}{2+x}\right)}\,dx=\frac{\frac{(4x+1)\log(3)}{x+2}-\frac{2(4x+1)}{x+2}-4\log(3)+1}{\frac{(4x+1)\log\left(\frac{4x+1}{x+2}\right)}{x+2}-4\log\left(\frac{4x+1}{x+2}\right)}$$

input
```
integrate(((4*x^2+9*x+2)*log((1+4*x)/(2+x))-7*log(3)-7*x)/(4*x^2+9*x+2)/lo
g((1+4*x)/(2+x))^2,x, algorithm=\
```

output
```
((4*x + 1)*log(3)/(x + 2) - 2*(4*x + 1)/(x + 2) - 4*log(3) + 1)/((4*x + 1)
*log((4*x + 1)/(x + 2))/(x + 2) - 4*log((4*x + 1)/(x + 2)))
```

3.343.9 Mupad [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{-7x-7\log(3)+(2+9x+4x^2)\log\left(\frac{1+4x}{2+x}\right)}{(2+9x+4x^2)\log^2\left(\frac{1+4x}{2+x}\right)}\,dx=\frac{x+\ln(3)}{\ln\left(\frac{4\,x+1}{x+2}\right)}$$

input
```
int(-(7*x + 7*log(3) - log((4*x + 1)/(x + 2))*(9*x + 4*x^2 + 2))/(log((4*x
 + 1)/(x + 2))^2*(9*x + 4*x^2 + 2)),x)
```

output
```
(x + log(3))/log((4*x + 1)/(x + 2))
```

3.344 $\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4\cdots}}}{}$

3.344.1 Optimal result

Integrand size = 160, antiderivative size = 27

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-\cdots}{-192+112x-20x^2+\cdots}$$
$$= x(4+\log(2))+x^2\log\left(-12+e^{\frac{4x}{4-x}}+x\right)$$

output
```
x^2*ln(exp(4*x/(-x+4))-12+x)+x*(4+ln(2))
```

3.344.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-\cdots}{-192+112x-20x^2+\cdots}$$
$$= x\left(4+\log(2)+x\log\left(-12+e^{-\frac{4x}{-4+x}}+x\right)\right)$$

input
```
Integrate[(-768 + 448*x - 64*x^2 - 4*x^3 + x^4 + (-192 + 112*x - 20*x^2 +
x^3)*Log[2] + (64 - 32*x + 20*x^2 + (16 - 8*x + x^2)*Log[2])/E^((4*x)/(-4
+ x)) + (-384*x + 224*x^2 - 40*x^3 + 2*x^4 + (32*x - 16*x^2 + 2*x^3)/E^((4
*x)/(-4 + x)))*Log[-12 + E^((-4*x)/(-4 + x)) + x])/(-192 + 112*x - 20*x^2
+ x^3 + (16 - 8*x + x^2)/E^((4*x)/(-4 + x))),x]
```

3.344.

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-8x+x^2)\log(2))+\left(-384x+224x^2-40x^3+2x^4+e^{\cdots}\right.}{\cdots}$$

output
```
x*(4 + Log[2] + x*Log[-12 + E^((-4*x)/(-4 + x)) + x])
```

3.344.3 Rubi [A] (verified)

Time = 5.32 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.012$, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4-4x^3-64x^2+e^{-\frac{4x}{x-4}}\left(20x^2+\left(x^2-8x+16\right)\log(2)-32x+64\right)+\left(x^3-20x^2+112x-192\right)\log(2)+\left(2x\right.}{x^3-20x^2+e^{-\frac{4x}{x-4}}\left(x^2-8x+16\right.}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-x^2-2x^2\log\left(x+e^{-\frac{4x}{x-4}}-12\right)+24x\log\left(x+e^{-\frac{4x}{x-4}}-12\right)-4x\left(1+\frac{\log(2)}{4}\right)+48\left(1+\frac{\log(2)}{4}\right)}{12-x}-\frac{}{(x-12)(}\right.$$

$$\Big\downarrow \text{2009}$$

$$x^2\log\left(x+e^{\frac{4x}{4-x}}-12\right)-12x+x(16+\log(2))$$

input
```
Int[(-768 + 448*x - 64*x^2 - 4*x^3 + x^4 + (-192 + 112*x - 20*x^2 + x^3)*L
og[2] + (64 - 32*x + 20*x^2 + (16 - 8*x + x^2)*Log[2])/E^((4*x)/(-4 + x))
+ (-384*x + 224*x^2 - 40*x^3 + 2*x^4 + (32*x - 16*x^2 + 2*x^3)/E^((4*x)/(-
4 + x)))*Log[-12 + E^((-4*x)/(-4 + x)) + x])/(-192 + 112*x - 20*x^2 + x^3
+ (16 - 8*x + x^2)/E^((4*x)/(-4 + x))),x]
```

output
```
-12*x + x*(16 + Log[2]) + x^2*Log[-12 + E^((4*x)/(4 - x)) + x]
```

3.344.

$$\int \frac{-768+448x-64x^2-4x^3+x^4+\left(-192+112x-20x^2+x^3\right)\log(2)+e^{-\frac{4x}{-4+x}}\left(64-32x+20x^2+\left(16-8x+x^2\right)\log(2)\right)+\left(-384x+224x^2-40x^3+2x^4+e^{-}\right.}{}$$

3.344.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.344.4 Maple [A] (verified)

Time = 1.72 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

method	result	size
risch	$\ln\left(\mathrm{e}^{-\frac{4x}{x-4}}+x-12\right)x^2+x\ln(2)+4x$	26
parallelrisch	$\ln\left(\mathrm{e}^{-\frac{4x}{x-4}}+x-12\right)x^2+x\ln(2)+16\ln(2)+4x+64$	31
norman	$\frac{(4+\ln(2))x^2+\ln\left(\mathrm{e}^{-\frac{4x}{x-4}}+x-12\right)x^3-64-4\ln\left(\mathrm{e}^{-\frac{4x}{x-4}}+x-12\right)x^2-16\ln(2)}{x-4}$	56

input
```
int((((2*x^3-16*x^2+32*x)*exp(-4*x/(x-4))+2*x^4-40*x^3+224*x^2-384*x)*ln(e
xp(-4*x/(x-4))+x-12)+((x^2-8*x+16)*ln(2)+20*x^2-32*x+64)*exp(-4*x/(x-4))+(
x^3-20*x^2+112*x-192)*ln(2)+x^4-4*x^3-64*x^2+448*x-768)/((x^2-8*x+16)*exp(
-4*x/(x-4))+x^3-20*x^2+112*x-192),x,method=_RETURNVERBOSE)
```

output
```
ln(exp(-4*x/(x-4))+x-12)*x^2+x*ln(2)+4*x
```

3.344.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-\cdots}{-192+112x-20x^2+\cdots}$$

$$=x^2\log\left(x+e^{\left(-\frac{4x}{x-4}\right)}-12\right)+x\log(2)+4x$$

3.344.

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-8x+x^2)\log(2))+\left(-384x+224x^2-40x^3+2x^4+e^{\cdots}\right.}{\cdots}$$

input
```
integrate((((2*x^3-16*x^2+32*x)*exp(-4*x/(x-4))+2*x^4-40*x^3+224*x^2-384*x
)*log(exp(-4*x/(x-4))+x-12)+((x^2-8*x+16)*log(2)+20*x^2-32*x+64)*exp(-4*x/
(x-4))+(x^3-20*x^2+112*x-192)*log(2)+x^4-4*x^3-64*x^2+448*x-768)/((x^2-8*x
+16)*exp(-4*x/(x-4))+x^3-20*x^2+112*x-192),x, algorithm=\
```

output
```
x^2*log(x + e^(-4*x/(x - 4)) - 12) + x*log(2) + 4*x
```

3.344.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-\cdots}{-192+112x-20x^2+\cdots}$$

$$= x^2\log\left(x-12+e^{-\frac{4x}{x-4}}\right)+x(\log(2)+4)$$

input
```
integrate((((2*x**3-16*x**2+32*x)*exp(-4*x/(x-4))+2*x**4-40*x**3+224*x**2-
384*x)*ln(exp(-4*x/(x-4))+x-12)+((x**2-8*x+16)*ln(2)+20*x**2-32*x+64)*exp(
-4*x/(x-4))+(x**3-20*x**2+112*x-192)*ln(2)+x**4-4*x**3-64*x**2+448*x-768)/
((x**2-8*x+16)*exp(-4*x/(x-4))+x**3-20*x**2+112*x-192),x)
```

output
```
x**2*log(x - 12 + exp(-4*x/(x - 4))) + x*(log(2) + 4)
```

3.344.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(24) = 48.

Time = 0.37 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.30

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-\cdots}{-192+112x-20x^2+\cdots}$$

$$= -\frac{4x^3-x^2(\log(2)+4)+4x(\log(2)-12)-(x^3-4x^2)\log\left((xe^4-12e^4)e^{\left(\frac{16}{x-4}\right)}+1\right)+256}{x-4}$$

3.344.

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-8x+x^2)\log(2))+\left(-384x+224x^2-40x^3+2x^4+e^{-\cdots}\right.}{\cdots}$$

input
```
integrate(((((2*x^3-16*x^2+32*x)*exp(-4*x/(x-4))+2*x^4-40*x^3+224*x^2-384*x
)*log(exp(-4*x/(x-4))+x-12)+((x^2-8*x+16)*log(2)+20*x^2-32*x+64)*exp(-4*x/
(x-4))+(x^3-20*x^2+112*x-192)*log(2)+x^4-4*x^3-64*x^2+448*x-768)/((x^2-8*x
+16)*exp(-4*x/(x-4))+x^3-20*x^2+112*x-192),x, algorithm=\
```

output
```
-(4*x^3 - x^2*(log(2) + 4) + 4*x*(log(2) - 12) - (x^3 - 4*x^2)*log((x*e^4
- 12*e^4)*e^(16/(x - 4)) + 1) + 256)/(x - 4)
```

3.344.8 Giac [A] (verification not implemented)

Time = 0.55 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-\cdots}{-192+112x-20x^2+\cdots}$$

$$= x^2\log\left(x+e^{\left(-\frac{4x}{x-4}\right)}-12\right)+x\log(2)+4x$$

input
```
integrate(((((2*x^3-16*x^2+32*x)*exp(-4*x/(x-4))+2*x^4-40*x^3+224*x^2-384*x
)*log(exp(-4*x/(x-4))+x-12)+((x^2-8*x+16)*log(2)+20*x^2-32*x+64)*exp(-4*x/
(x-4))+(x^3-20*x^2+112*x-192)*log(2)+x^4-4*x^3-64*x^2+448*x-768)/((x^2-8*x
+16)*exp(-4*x/(x-4))+x^3-20*x^2+112*x-192),x, algorithm=\
```

output
```
x^2*log(x + e^(-4*x/(x - 4)) - 12) + x*log(2) + 4*x
```

3.344.9 Mupad [B] (verification not implemented)

Time = 12.85 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.41

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-\cdots}{-192+112x-20x^2+\cdots}$$

$$= x(\ln(2)+4)-\frac{\ln\left(x+e^{-\frac{4x}{x-4}}-12\right)(4x^2-x^3)}{x-4}$$

3.344.

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-8x+x^2)\log(2))+\left(-384x+224x^2-40x^3+2x^4+e^{\cdots}\right.}{\cdots}$$

input
```
int((448*x + log(2)*(112*x - 20*x^2 + x^3 - 192) + exp(-(4*x)/(x - 4))*(20
*x^2 - 32*x + log(2)*(x^2 - 8*x + 16) + 64) + log(x + exp(-(4*x)/(x - 4))
- 12)*(exp(-(4*x)/(x - 4))*(32*x - 16*x^2 + 2*x^3) - 384*x + 224*x^2 - 40*
x^3 + 2*x^4) - 64*x^2 - 4*x^3 + x^4 - 768)/(112*x - 20*x^2 + x^3 + exp(-(4
*x)/(x - 4))*(x^2 - 8*x + 16) - 192),x)
```

output
```
x*(log(2) + 4) - (log(x + exp(-(4*x)/(x - 4)) - 12)*(4*x^2 - x^3))/(x - 4)
```

3.344.

$$\int \frac{-768+448x-64x^2-4x^3+x^4+(-192+112x-20x^2+x^3)\log(2)+e^{-\frac{4x}{-4+x}}(64-32x+20x^2+(16-8x+x^2)\log(2))+\Big(-384x+224x^2-40x^3+2x^4+e^{-}}{}$$

3.345 $\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2\right.\right.}{}$

3.345.1 Optimal result

Integrand size = 166, antiderivative size = 35

$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+\right.}{(-4+2x)\log^2(2-x}$$

$$=\left(-e^{-x+\frac{9\left(2+\frac{2x}{3}\right)}{4\log(2-x)}}+\frac{x}{2}\right)^2$$

output
```
(1/2*x-exp(9/4*(2+2/3*x)/ln(2-x))/exp(x))^2
```

3.345.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.03

$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+\right.}{(-4+2x)\log^2(2-x}$$

$$=\frac{1}{4}e^{-2x}\left(-2e^{\frac{3(3+x)}{2\log(2-x)}}+e^x x\right)^2$$

$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+e^{\frac{9+3x}{2\log(2-x)}}\left(e^x(9x+3x^2)+e^x(6x-3x^2)\log(2-\right.\right.}{(-4+2x)\log^2(2-x)}$$

input
```
Integrate[(E^(2*x)*(-2*x + x^2)*Log[2 - x]^2 + E^((9 + 3*x)/Log[2 - x])*(-
18 - 6*x + (-12 + 6*x)*Log[2 - x] + (8 - 4*x)*Log[2 - x]^2) + E^((9 + 3*x)
/(2*Log[2 - x]))*(E^x*(9*x + 3*x^2) + E^x*(6*x - 3*x^2)*Log[2 - x] + E^x*(
4 - 6*x + 2*x^2)*Log[2 - x]^2))/(E^(2*x)*(-4 + 2*x)*Log[2 - x]^2),x]
```

output
```
(-2*E^((3*(3 + x))/(2*Log[2 - x])) + E^x*x)^2/(4*E^(2*x))
```

3.345.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-2x}\left(e^{2x}\left(x^2-2x\right)\log^2(2-x)+e^{\frac{3x+9}{2\log(2-x)}}\left(e^x\left(3x^2+9x\right)+e^x\left(2x^2-6x+4\right)\log^2(2-x)+e^x\left(6x-3x^2\right)\log(2\right.\right.}{(2x-4)\log^2(2-x)}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{e^{\frac{3x+2x\log(2-x)+9}{2\log(2-x)}-2x}\left(-3x^2-2x^2\log^2(2-x)+3x^2\log(2-x)-9x+6x\log^2(2-x)-4\log^2(2-x)-6x\log(2\right.}{2(2-x)\log^2(2-x)}\right.$$

$\Big\downarrow$ 2009

$$-3\int \frac{e^{\frac{3(x+3)}{\log(2-x)}-2x}}{\log^2(2-x)}dx+\frac{21}{2}\int \frac{e^{\frac{-2\log(2-x)x+3x+9}{2\log(2-x)}}}{\log^2(2-x)}dx-\frac{3}{2}\int \frac{e^{\frac{-2\log(2-x)x+3x+9}{2\log(2-x)}}(2-x)}{\log^2(2-x)}dx-15\int \frac{e^{\frac{3(x+3)}{\log(2-x)}-2x}}{(x-2)\log^2(2-x)}dx+15\int \frac{e^{\frac{-2\log(2-x)x+3x+9}{2\log(2-x)}}}{(x-2)\log^2(2-x)}dx-2\int e^{\frac{3(x+3)}{\log(2-x)}-2x}dx-\int e^{\frac{-2\log(2-x)x+3x+9}{2\log(2-x)}}dx+\int e^{\frac{-2\log(2-x)x+3x+9}{2\log(2-x)}}xdx+3\int \frac{e^{\frac{3(x+3)}{\log(2-x)}-2x}}{\log(2-x)}dx-3\int \frac{e^{\frac{-2\log(2-x)x+3x+9}{2\log(2-x)}}}{\log(2-x)}dx+\frac{3}{2}\int \frac{e^{\frac{-2\log(2-x)x+3x+9}{2\log(2-x)}}(2-x)}{\log(2-x)}dx+\frac{x^2}{4}$$

input
```
Int[(E^(2*x)*(-2*x + x^2)*Log[2 - x]^2 + E^((9 + 3*x)/Log[2 - x])*(-18 - 6
*x + (-12 + 6*x)*Log[2 - x] + (8 - 4*x)*Log[2 - x]^2) + E^((9 + 3*x)/(2*Lo
g[2 - x]))*(E^x*(9*x + 3*x^2) + E^x*(6*x - 3*x^2)*Log[2 - x] + E^x*(4 - 6*
x + 2*x^2)*Log[2 - x]^2))/(E^(2*x)*(-4 + 2*x)*Log[2 - x]^2),x]
```

output
```
$Aborted
```

3.345.

$$\int \frac{e^{-2x}\left(e^{2x}\left(-2x+x^2\right)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+e^{\frac{9+3x}{2\log(2-x)}}\left(e^x\left(9x+3x^2\right)+e^x\left(6x-3x^2\right)\log(2-\right.\right.}{(-4+2x)\log^2(2-x)}$$

3.345.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.345.4 Maple [A] (verified)

Time = 2.79 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.54

method	result	size
parallelrisch	$\frac{\left(2\,\mathrm{e}^{2x} x^2-8\,\mathrm{e}^{x} \mathrm{e}^{\frac{\frac{9}{2}+\frac{3x}{2}}{\ln(2-x)}} x+8\,\mathrm{e}^{\frac{3x+9}{\ln(2-x)}}\right)\mathrm{e}^{-2x}}{8}$	54
risch	$\frac{x^2}{4}+\mathrm{e}^{-\frac{2x\ln(2-x)-3x-9}{\ln(2-x)}}-x\,\mathrm{e}^{-\frac{2x\ln(2-x)-3x-9}{2\ln(2-x)}}$	60

input
```
int((((-4*x+8)*ln(2-x)^2+(6*x-12)*ln(2-x)-6*x-18)*exp(1/2*(3*x+9)/ln(2-x))
^2+((2*x^2-6*x+4)*exp(x)*ln(2-x)^2+(-3*x^2+6*x)*exp(x)*ln(2-x)+(3*x^2+9*x)
*exp(x))*exp(1/2*(3*x+9)/ln(2-x))+(x^2-2*x)*exp(x)^2*ln(2-x)^2)/(2*x-4)/ex
p(x)^2/ln(2-x)^2,x,method=_RETURNVERBOSE)
```

output
```
1/8*(2*exp(x)^2*x^2-8*exp(x)*exp(3/2*(3+x)/ln(2-x))*x+8*exp(3/2*(3+x)/ln(2
-x))^2)/exp(x)^2
```

3.345.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.43

$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+\cdots\right.}{(-4+2x)\log^2(2-x\cdots}$$

$$=\frac{1}{4}\left(x^2e^{(2x)}-4\,xe^{\left(x+\frac{3(x+3)}{2\log(-x+2)}\right)}+4\,e^{\left(\frac{3(x+3)}{\log(-x+2)}\right)}\right)e^{(-2x)}$$

input
```
integrate((((-4*x+8)*log(2-x)^2+(6*x-12)*log(2-x)-6*x-18)*exp(1/2*(3*x+9)/
log(2-x))^2+((2*x^2-6*x+4)*exp(x)*log(2-x)^2+(-3*x^2+6*x)*exp(x)*log(2-x)+
(3*x^2+9*x)*exp(x))*exp(1/2*(3*x+9)/log(2-x))+(x^2-2*x)*exp(x)^2*log(2-x)^
2)/(2*x-4)/exp(x)^2/log(2-x)^2,x, algorithm=\
```

output
```
1/4*(x^2*e^(2*x) - 4*x*e^(x + 3/2*(x + 3)/log(-x + 2)) + 4*e^(3*(x + 3)/lo
g(-x + 2)))*e^(-2*x)
```

3.345.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(22) = 44$.

Time = 0.44 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.31

$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+\right.}{(-4+2x)\log^2(2-x}$$
$$= \frac{x^2}{4} + \left(-xe^{2x}e^{\frac{\frac{3x}{2}+\frac{9}{2}}{\log(2-x)}} + e^x e^{\frac{2\cdot\left(\frac{3x}{2}+\frac{9}{2}\right)}{\log(2-x)}}\right)e^{-3x}$$

input
```
integrate((((-4*x+8)*ln(2-x)**2+(6*x-12)*ln(2-x)-6*x-18)*exp(1/2*(3*x+9)/l
n(2-x))**2+((2*x**2-6*x+4)*exp(x)*ln(2-x)**2+(-3*x**2+6*x)*exp(x)*ln(2-x)+
(3*x**2+9*x)*exp(x))*exp(1/2*(3*x+9)/ln(2-x))+(x**2-2*x)*exp(x)**2*ln(2-x)
**2)/(2*x-4)/exp(x)**2/ln(2-x)**2,x)
```

output
```
x**2/4 + (-x*exp(2*x)*exp((3*x/2 + 9/2)/log(2 - x)) + exp(x)*exp(2*(3*x/2
+ 9/2)/log(2 - x)))*exp(-3*x)
```

3.345.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+\right.}{(-4+2x)\log^2(2-x}$$
$$= \text{Exception raised: RuntimeError}$$

3.345.

$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x))+e^{\frac{9+3x}{2\log(2-x)}}(e^x(9x+3x^2)+e^x(6x-3x^2)\log(2-\right.}{(-4+2x)\log^2(2-x)}$$

input
```
integrate((((-4*x+8)*log(2-x)^2+(6*x-12)*log(2-x)-6*x-18)*exp(1/2*(3*x+9)/
log(2-x))^2+((2*x^2-6*x+4)*exp(x)*log(2-x)^2+(-3*x^2+6*x)*exp(x)*log(2-x)+
(3*x^2+9*x)*exp(x))*exp(1/2*(3*x+9)/log(2-x))+(x^2-2*x)*exp(x)^2*log(2-x)^
2)/(2*x-4)/exp(x)^2/log(2-x)^2,x, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.345.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 122 vs. 2(26) = 52.

Time = 0.33 (sec) , antiderivative size = 122, normalized size of antiderivative = 3.49

$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+\right.}{(-4+2x)\log^2(2-x}$$

$$=\frac{1}{4}(x-2)^2-(x-2)e^{\left(-\frac{2(x-2)\log(-x+2)-3x+4\log(-x+2)-9}{2\log(-x+2)}\right)}+x-2e^{\left(-\frac{2(x-2)\log(-x+2)-3x+4\log(-x+2)-9}{2\log(-x+2)}\right)}+e^{\left(-\frac{2(x-2)\log(-x+2)-3x+4\log(-x+2)-9}{\log(-x+2)}\right)}-2$$

input
```
integrate((((-4*x+8)*log(2-x)^2+(6*x-12)*log(2-x)-6*x-18)*exp(1/2*(3*x+9)/
log(2-x))^2+((2*x^2-6*x+4)*exp(x)*log(2-x)^2+(-3*x^2+6*x)*exp(x)*log(2-x)+
(3*x^2+9*x)*exp(x))*exp(1/2*(3*x+9)/log(2-x))+(x^2-2*x)*exp(x)^2*log(2-x)^
2)/(2*x-4)/exp(x)^2/log(2-x)^2,x, algorithm=\
```

output
```
1/4*(x - 2)^2 - (x - 2)*e^(-1/2*(2*(x - 2)*log(-x + 2) - 3*x + 4*log(-x +
2) - 9)/log(-x + 2)) + x - 2*e^(-1/2*(2*(x - 2)*log(-x + 2) - 3*x + 4*log(
-x + 2) - 9)/log(-x + 2)) + e^(-(2*(x - 2)*log(-x + 2) - 3*x + 4*log(-x +
2) - 9)/log(-x + 2)) - 2
```


$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x))+e^{\frac{9+3x}{2\log(2-x)}}\left(e^x(9x+3x^2)+e^x(6x-3x^2)\log(2-x\right.\right.}{(-4+2x)\log^2(2-x)}$$

3.345.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+\right.}{(-4+2x)\log^2(2-x}$$
$$= -\int \frac{e^{-2x}\left(e^{\frac{2\left(\frac{3x}{2}+\frac{9}{2}\right)}{\ln(2-x)}}\left((4x-8)\ln(2-x)^2+(12-6x)\ln(2-x)+6x+18\right)-e^{\frac{\frac{3x}{2}+\frac{9}{2}}{\ln(2-x)}}\left(e^x\left(2x^2-6x+\right.\right.\right.}{\ln(2-x)^2\ (2x}$$

input
```
int(-(exp(-2*x)*(exp((2*((3*x)/2 + 9/2))/log(2 - x))*(6*x - log(2 - x)*(6*
x - 12) + log(2 - x)^2*(4*x - 8) + 18) - exp(((3*x)/2 + 9/2)/log(2 - x))*(
exp(x)*(9*x + 3*x^2) + exp(x)*log(2 - x)*(6*x - 3*x^2) + exp(x)*log(2 - x)
^2*(2*x^2 - 6*x + 4)) + exp(2*x)*log(2 - x)^2*(2*x - x^2)))/(log(2 - x)^2*
(2*x - 4)),x)
```

output
```
-int((exp(-2*x)*(exp((2*((3*x)/2 + 9/2))/log(2 - x))*(6*x - log(2 - x)*(6*
x - 12) + log(2 - x)^2*(4*x - 8) + 18) - exp(((3*x)/2 + 9/2)/log(2 - x))*(
exp(x)*(9*x + 3*x^2) + exp(x)*log(2 - x)*(6*x - 3*x^2) + exp(x)*log(2 - x)
^2*(2*x^2 - 6*x + 4)) + exp(2*x)*log(2 - x)^2*(2*x - x^2)))/(log(2 - x)^2*
(2*x - 4)), x)
```


$$\int \frac{e^{-2x}\left(e^{2x}(-2x+x^2)\log^2(2-x)+e^{\frac{9+3x}{\log(2-x)}}\left(-18-6x+(-12+6x)\log(2-x)+(8-4x)\log^2(2-x)\right)+e^{\frac{9+3x}{2\log(2-x)}}\left(e^x(9x+3x^2)+e^x(6x-3x^2)\log(2-\right.\right.}{(-4+2x)\log^2(2-x)}$$

3.346 $\int \frac{1}{15}(-4+42x+75x^2+e^4(-4+50x))\,dx$

3.346.1 Optimal result

Integrand size = 23, antiderivative size = 18

$$\int \frac{1}{15}\left(-4+42x+75x^2+e^4(-4+50x)\right)\,dx=\frac{1}{3}x\left(1+e^4+x\right)\left(-\frac{4}{5}+5x\right)$$

output
```
(1/3*exp(4)+1/3*x+1/3)*x*(5*x-4/5)
```

3.346.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78

$$\int \frac{1}{15}\left(-4+42x+75x^2+e^4(-4+50x)\right)\,dx=\frac{1}{15}\left(-4x-4e^4x+21x^2+25e^4x^2+25x^3\right)$$

input
```
Integrate[(-4 + 42*x + 75*x^2 + E^4*(-4 + 50*x))/15,x]
```

output
```
(-4*x - 4*E^4*x + 21*x^2 + 25*E^4*x^2 + 25*x^3)/15
```

3.346.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{15}\left(75x^2+42x+e^4(50x-4)-4\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{15}\int \left(75x^2+42x-2e^4(2-25x)-4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{15}\left(25x^3+21x^2-4x+\frac{1}{25}e^4(2-25x)^2\right)$$

input
```
Int[(-4 + 42*x + 75*x^2 + E^4*(-4 + 50*x))/15,x]
```

output
```
((E^4*(2 - 25*x)^2)/25 - 4*x + 21*x^2 + 25*x^3)/15
```

3.346.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.346.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

method	result	size
gosper	$\frac{x(25x\,e^{4}+25x^{2}-4\,e^{4}+21x-4)}{15}$	23
norman	$\left(-\frac{4\,e^{4}}{15}-\frac{4}{15}\right)x+\left(\frac{5\,e^{4}}{3}+\frac{7}{5}\right)x^{2}+\frac{5x^{3}}{3}$	25
default	$\frac{5x^{2}e^{4}}{3}+\frac{5x^{3}}{3}-\frac{4x\,e^{4}}{15}+\frac{7x^{2}}{5}-\frac{4x}{15}$	27
risch	$\frac{5x^{2}e^{4}}{3}+\frac{5x^{3}}{3}-\frac{4x\,e^{4}}{15}+\frac{7x^{2}}{5}-\frac{4x}{15}$	27
parallelrisch	$\frac{5x^{2}e^{4}}{3}+\frac{5x^{3}}{3}-\frac{4x\,e^{4}}{15}+\frac{7x^{2}}{5}-\frac{4x}{15}$	27
parts	$\frac{5x^{2}e^{4}}{3}+\frac{5x^{3}}{3}-\frac{4x\,e^{4}}{15}+\frac{7x^{2}}{5}-\frac{4x}{15}$	27

input
```
int(1/15*(50*x-4)*exp(4)+5*x^2+14/5*x-4/15,x,method=_RETURNVERBOSE)
```

output
```
1/15*x*(25*x*exp(4)+25*x^2-4*exp(4)+21*x-4)
```

3.346.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 27 vs. 2(13) = 26.

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{1}{15}\left(-4+42x+75x^2+e^4(-4+50x)\right)\,dx=\frac{5}{3}\,x^3+\frac{7}{5}\,x^2+\frac{1}{15}\,(25\,x^2-4\,x)e^4-\frac{4}{15}\,x$$

input
```
integrate(1/15*(50*x-4)*exp(4)+5*x^2+14/5*x-4/15,x, algorithm=\
```

output
```
5/3*x^3 + 7/5*x^2 + 1/15*(25*x^2 - 4*x)*e^4 - 4/15*x
```

3.346.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78

$$\int \frac{1}{15}\left(-4+42x+75x^2+e^4(-4+50x)\right)\,dx = \frac{5x^3}{3}+x^2\cdot\left(\frac{7}{5}+\frac{5e^4}{3}\right)+x\left(-\frac{4e^4}{15}-\frac{4}{15}\right)$$

input
```
integrate(1/15*(50*x-4)*exp(4)+5*x**2+14/5*x-4/15,x)
```

output
```
5*x**3/3 + x**2*(7/5 + 5*exp(4)/3) + x*(-4*exp(4)/15 - 4/15)
```

3.346.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 27 vs. 2(13) = 26.

Time = 0.21 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{1}{15}\left(-4+42x+75x^2+e^4(-4+50x)\right)\,dx = \frac{5}{3}\,x^3+\frac{7}{5}\,x^2+\frac{1}{15}\,(25\,x^2-4\,x)e^4-\frac{4}{15}\,x$$

input
```
integrate(1/15*(50*x-4)*exp(4)+5*x^2+14/5*x-4/15,x, algorithm=\
```

output
```
5/3*x^3 + 7/5*x^2 + 1/15*(25*x^2 - 4*x)*e^4 - 4/15*x
```

3.346.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 27 vs. 2(13) = 26.

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{1}{15}\left(-4+42x+75x^2+e^4(-4+50x)\right)\,dx = \frac{5}{3}\,x^3+\frac{7}{5}\,x^2+\frac{1}{15}\,(25\,x^2-4\,x)e^4-\frac{4}{15}\,x$$

input
```
integrate(1/15*(50*x-4)*exp(4)+5*x^2+14/5*x-4/15,x, algorithm=\
```

output
```
5/3*x^3 + 7/5*x^2 + 1/15*(25*x^2 - 4*x)*e^4 - 4/15*x
```

3.346.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int \frac{1}{15}\left(-4+42x+75x^2+e^4(-4+50x)\right)\,dx=\frac{x\,(25\,x-4)\,\left(x+\mathrm{e}^4+1\right)}{15}$$

input
```
int((14*x)/5 + 5*x^2 + (exp(4)*(50*x - 4))/15 - 4/15,x)
```

output
```
(x*(25*x - 4)*(x + exp(4) + 1))/15
```

3.347 $\int \frac{-12x^3+e^{2x}(24x^2-24x^3)+e^{1-x}x(e^{4x}(-1+x)-x^2-3x^3+e^{2x}(2x+6x^2}{3e^{4x}x-6e^{2x}x^2+3x^3+e^{1-x}x(e^{4x}x-2e^{2x}x^2+x^3)}$

3.347.1 Optimal result

Integrand size = 129, antiderivative size = 31

$$\int \frac{-12x^3+e^{2x}(24x^2-24x^3)+e^{1-x}x(e^{4x}(-1+x)-x^2-3x^3+e^{2x}(2x+6x^2-8x^3))}{3e^{4x}x-6e^{2x}x^2+3x^3+e^{1-x}x\left(e^{4x}x-2e^{2x}x^2+x^3\right)}\,dx = \frac{4x^2}{e^{2x}-x}-\log\left(3+e^{1-x}x\right)$$

output
```
4/(exp(2*x)-x)*x^2-ln(3+exp(1+ln(x)-x))
```

3.347.2 Mathematica [A] (verified)

Time = 3.21 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.97

$$\int \frac{-12x^3+e^{2x}(24x^2-24x^3)+e^{1-x}x(e^{4x}(-1+x)-x^2-3x^3+e^{2x}(2x+6x^2-8x^3))}{3e^{4x}x-6e^{2x}x^2+3x^3+e^{1-x}x\left(e^{4x}x-2e^{2x}x^2+x^3\right)}\,dx = x+\frac{4x^2}{e^{2x}-x}-\log\left(3e^x+ex\right)$$

input
```
Integrate[(-12*x^3 + E^(2*x)*(24*x^2 - 24*x^3) + E^(1 - x)*x*(E^(4*x)*(-1
+ x) - x^2 - 3*x^3 + E^(2*x)*(2*x + 6*x^2 - 8*x^3)))/(3*E^(4*x)*x - 6*E^(2
*x)*x^2 + 3*x^3 + E^(1 - x)*x*(E^(4*x)*x - 2*E^(2*x)*x^2 + x^3)),x]
```

output
```
x + (4*x^2)/(E^(2*x) - x) - Log[3*E^x + E*x]
```

3.347.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-12x^3+e^{1-x}\left(-3x^3-x^2+e^{2x}\left(-8x^3+6x^2+2x\right)+e^{4x}(x-1)\right)x+e^{2x}\left(24x^2-24x^3\right)}{3x^3-6e^{2x}x^2+e^{1-x}\left(x^3-2e^{2x}x^2+e^{4x}x\right)x+3e^{4x}x}\,dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^x\left(-12x^3+e^{1-x}\left(-3x^3-x^2+e^{2x}\left(-8x^3+6x^2+2x\right)+e^{4x}(x-1)\right)x+e^{2x}\left(24x^2-24x^3\right)\right)}{\left(e^{2x}-x\right)^2x\left(ex+3e^x\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{3e^x(x-1)}{x\left(ex+3e^x\right)}-\frac{4e^{2x}x(2x-1)}{\left(e^{2x}-x\right)^2}-\frac{3x+1}{x}+\frac{4e^{2x}}{e^{2x}-x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-4\int \frac{x^2}{\left(e^{2x}-x\right)^2}dx+2\int \frac{1}{e^{2x}-x}dx+4\int \frac{e^{2x}}{e^{2x}-x}dx+2\int \frac{x}{\left(e^{2x}-x\right)^2}dx-8\int \frac{x}{e^{2x}-x}dx+\frac{4x^2}{e^{2x}-x}-\frac{2x}{e^{2x}-x}-3x-\log\left(\frac{3e^x}{x}+e\right)-\log(x)$$

input
```
Int[(-12*x^3 + E^(2*x)*(24*x^2 - 24*x^3) + E^(1 - x)*x*(E^(4*x)*(-1 + x) -
 x^2 - 3*x^3 + E^(2*x)*(2*x + 6*x^2 - 8*x^3)))/(3*E^(4*x)*x - 6*E^(2*x)*x^
2 + 3*x^3 + E^(1 - x)*x*(E^(4*x)*x - 2*E^(2*x)*x^2 + x^3)),x]
```

output
```
$Aborted
```

3.347.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.347.4 Maple [A] (verified)

Time = 1.06 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.94

method	result	size
risch	$x - \frac{4x^2}{x - e^{2x}} - \ln\left(\frac{x\,e}{3} + e^x\right)$	29
parallelrisch	$\frac{-\ln(3+e^{1+\ln(x)-x})x^3+\ln(3+e^{1+\ln(x)-x})x^2e^{2x}-4x^4}{x^2(x-e^{2x})}$	56

input
```
int((((-1+x)*exp(2*x)^2+(-8*x^3+6*x^2+2*x)*exp(2*x)-3*x^3-x^2)*exp(1+ln(x)
-x)+(-24*x^3+24*x^2)*exp(2*x)-12*x^3)/((x*exp(2*x)^2-2*exp(2*x)*x^2+x^3)*e
xp(1+ln(x)-x)+3*x*exp(2*x)^2-6*exp(2*x)*x^2+3*x^3),x,method=_RETURNVERBOSE
)
```

output
```
x-4*x^2/(x-exp(2*x))-ln(1/3*x*exp(1)+exp(x))
```

3.347.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. 2(29) = 58.

Time = 0.27 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.06

$$\int \frac{-12x^3 + e^{2x}(24x^2 - 24x^3) + e^{1-x}x(e^{4x}(-1+x) - x^2 - 3x^3 + e^{2x}(2x + 6x^2 - 8x^3))}{3e^{4x}x - 6e^{2x}x^2 + 3x^3 + e^{1-x}x\left(e^{4x}x - 2e^{2x}x^2 + x^3\right)}\,dx = \frac{4\,xe^{(-2\,x+2\,\log(x)+2)} - \left(xe^2 - e^{(-2\,x+2\,\log(x)+2)}\right)\log\left(e^{(-x+\log(x)+1)} + 3\right)}{xe^2 - e^{(-2\,x+2\,\log(x)+2)}}$$

input
```
integrate((((-1+x)*exp(2*x)^2+(-8*x^3+6*x^2+2*x)*exp(2*x)-3*x^3-x^2)*exp(1
+log(x)-x)+(-24*x^3+24*x^2)*exp(2*x)-12*x^3)/((x*exp(2*x)^2-2*exp(2*x)*x^2
+x^3)*exp(1+log(x)-x)+3*x*exp(2*x)^2-6*exp(2*x)*x^2+3*x^3),x, algorithm=\
```

output
```
(4*x*e^(-2*x + 2*log(x) + 2) - (x*e^2 - e^(-2*x + 2*log(x) + 2))*log(e^(-x
 + log(x) + 1) + 3))/(x*e^2 - e^(-2*x + 2*log(x) + 2))
```

3.347.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.94

$$\int \frac{-12x^3+e^{2x}(24x^2-24x^3)+e^{1-x}x(e^{4x}(-1+x)-x^2-3x^3+e^{2x}(2x+6x^2-8x^3))}{3e^{4x}x-6e^{2x}x^2+3x^3+e^{1-x}x\left(e^{4x}x-2e^{2x}x^2+x^3\right)}\,dx$$
$$=\frac{4x^2}{-x+e^{2x}}+x-\log\left(\frac{ex}{3}+\sqrt{e^{2x}}\right)$$

input
```
integrate((((-1+x)*exp(2*x)**2+(-8*x**3+6*x**2+2*x)*exp(2*x)-3*x**3-x**2)*
exp(1+ln(x)-x)+(-24*x**3+24*x**2)*exp(2*x)-12*x**3)/((x*exp(2*x)**2-2*exp(
2*x)*x**2+x**3)*exp(1+ln(x)-x)+3*x*exp(2*x)**2-6*exp(2*x)*x**2+3*x**3),x)
```

output
```
4*x**2/(-x + exp(2*x)) + x - log(E*x/3 + sqrt(exp(2*x)))
```

3.347.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.16

$$\int \frac{-12x^3+e^{2x}(24x^2-24x^3)+e^{1-x}x(e^{4x}(-1+x)-x^2-3x^3+e^{2x}(2x+6x^2-8x^3))}{3e^{4x}x-6e^{2x}x^2+3x^3+e^{1-x}x\left(e^{4x}x-2e^{2x}x^2+x^3\right)}\,dx$$
$$=-\frac{3\,x^2+xe^{(2\,x)}}{x-e^{(2\,x)}}-\log\left(\frac{1}{3}\,xe+e^x\right)$$

input
```
integrate((((-1+x)*exp(2*x)^2+(-8*x^3+6*x^2+2*x)*exp(2*x)-3*x^3-x^2)*exp(1
+log(x)-x)+(-24*x^3+24*x^2)*exp(2*x)-12*x^3)/((x*exp(2*x)^2-2*exp(2*x)*x^2
+x^3)*exp(1+log(x)-x)+3*x*exp(2*x)^2-6*exp(2*x)*x^2+3*x^3),x, algorithm=\
```

output
```
-(3*x^2 + x*e^(2*x))/(x - e^(2*x)) - log(1/3*x*e + e^x)
```

3.347.8 Giac [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.68

$$\int \frac{-12x^3+e^{2x}(24x^2-24x^3)+e^{1-x}x(e^{4x}(-1+x)-x^2-3x^3+e^{2x}(2x+6x^2-8x^3))}{3e^{4x}x-6e^{2x}x^2+3x^3+e^{1-x}x\left(e^{4x}x-2e^{2x}x^2+x^3\right)}\,dx$$
$$=-\frac{7\,x^2+xe^{(2\,x)}+x\log\left(xe+3\,e^x\right)-e^{(2\,x)}\log\left(xe+3\,e^x\right)}{x-e^{(2\,x)}}$$

input
```
integrate((((-1+x)*exp(2*x)^2+(-8*x^3+6*x^2+2*x)*exp(2*x)-3*x^3-x^2)*exp(1
+log(x)-x)+(-24*x^3+24*x^2)*exp(2*x)-12*x^3)/((x*exp(2*x)^2-2*exp(2*x)*x^2
+x^3)*exp(1+log(x)-x)+3*x*exp(2*x)^2-6*exp(2*x)*x^2+3*x^3),x, algorithm=\
```

output
```
-(7*x^2 + x*e^(2*x) + x*log(x*e + 3*e^x) - e^(2*x)*log(x*e + 3*e^x))/(x -
e^(2*x))
```

3.347.9 Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.61

$$\int \frac{-12x^3+e^{2x}(24x^2-24x^3)+e^{1-x}x(e^{4x}(-1+x)-x^2-3x^3+e^{2x}(2x+6x^2-8x^3))}{3e^{4x}x-6e^{2x}x^2+3x^3+e^{1-x}x\left(e^{4x}x-2e^{2x}x^2+x^3\right)}\,dx$$
$$=-\frac{x\,\mathrm{e}^{2\,x}-\mathrm{e}^{2\,x}\,\ln\left(\mathrm{e}^x+\frac{x\,\mathrm{e}}{3}\right)+x\,\ln\left(\mathrm{e}^x+\frac{x\,\mathrm{e}}{3}\right)+3\,x^2}{x-\mathrm{e}^{2\,x}}$$

input
```
int((exp(log(x) - x + 1)*(exp(2*x)*(2*x + 6*x^2 - 8*x^3) + exp(4*x)*(x - 1
) - x^2 - 3*x^3) + exp(2*x)*(24*x^2 - 24*x^3) - 12*x^3)/(3*x*exp(4*x) - 6*
x^2*exp(2*x) + exp(log(x) - x + 1)*(x*exp(4*x) - 2*x^2*exp(2*x) + x^3) + 3
*x^3),x)
```

output
```
-(x*exp(2*x) - exp(2*x)*log(exp(x) + (x*exp(1))/3) + x*log(exp(x) + (x*exp
(1))/3) + 3*x^2)/(x - exp(2*x))
```

3.348 $\int \left(e^2-2e^{3+x}+2e^{-1+e^{-3+x^2}+x^2}x\right)\,dx$

3.348.1 Optimal result

Integrand size = 28, antiderivative size = 23

$$\int \left(e^2-2e^{3+x}+2e^{-1+e^{-3+x^2}+x^2}x\right)\,dx=e^2\left(5+e^{e^{-3+x^2}}-2e^{1+x}+x\right)$$

output
```
(exp(exp(x^2-3))-exp(ln(2)+x+1)+5+x)*exp(2)
```

3.348.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \left(e^2-2e^{3+x}+2e^{-1+e^{-3+x^2}+x^2}x\right)\,dx=e^{2+e^{-3+x^2}}-2e^{3+x}+e^2x$$

input
```
Integrate[E^2 - 2*E^(3 + x) + 2*E^(-1 + E^(-3 + x^2) + x^2)*x,x]
```

output
```
E^(2 + E^(-3 + x^2)) - 2*E^(3 + x) + E^2*x
```

3.348.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.036$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(2e^{x^2+e^{x^2-3}-1}x-2e^{x+3}+e^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$e^{e^{x^2-3}+2}+e^2x-2e^{x+3}$$

input
```
Int[E^2 - 2*E^(3 + x) + 2*E^(-1 + E^(-3 + x^2) + x^2)*x,x]
```

output
```
E^(2 + E^(-3 + x^2)) - 2*E^(3 + x) + E^2*x
```

3.348.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.348.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

method	result	size
risch	$-2\,\mathrm{e}^{3+x}+\mathrm{e}^{2+\mathrm{e}^{x^2-3}}+\mathrm{e}^2x$	21
default	$-\mathrm{e}^2\mathrm{e}^{\ln(2)+x+1}+\mathrm{e}^2\mathrm{e}^{\mathrm{e}^{x^2-3}}+\mathrm{e}^2x$	26
norman	$-\mathrm{e}^2\mathrm{e}^{\ln(2)+x+1}+\mathrm{e}^2\mathrm{e}^{\mathrm{e}^{x^2-3}}+\mathrm{e}^2x$	26
parallelrisch	$-\mathrm{e}^2\mathrm{e}^{\ln(2)+x+1}+\mathrm{e}^2\mathrm{e}^{\mathrm{e}^{x^2-3}}+\mathrm{e}^2x$	26
parts	$-\mathrm{e}^2\mathrm{e}^{\ln(2)+x+1}+\mathrm{e}^2\mathrm{e}^{\mathrm{e}^{x^2-3}}+\mathrm{e}^2x$	26

input
```
int(2*x*exp(2)*exp(x^2-3)*exp(exp(x^2-3))-exp(2)*exp(ln(2)+x+1)+exp(2),x,m
ethod=_RETURNVERBOSE)
```

output
```
-2*exp(3+x)+exp(2+exp(x^2-3))+exp(2)*x
```

3.348.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.74

$$\int \left(e^2-2e^{3+x}+2e^{-1+e^{-3+x^2}+x^2}x\right)\,dx=\left(xe^{(x^2-1)}-e^{(x^2+x+\log(2))}+e^{\left(x^2+e^{\left(x^2-3\right)}-1\right)}\right)e^{(-x^2+3)}$$

input
```
integrate(2*x*exp(2)*exp(x^2-3)*exp(exp(x^2-3))-exp(2)*exp(log(2)+x+1)+exp
(2),x, algorithm=\
```

output
```
(x*e^(x^2 - 1) - e^(x^2 + x + log(2)) + e^(x^2 + e^(x^2 - 3) - 1))*e^(-x^2
 + 3)
```

3.348.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \left(e^2-2e^{3+x}+2e^{-1+e^{-3+x^2}+x^2}x\right)\,dx=xe^2-2e^2e^{x+1}+e^2e^{e^{x^2-3}}$$

input
```
integrate(2*x*exp(2)*exp(x**2-3)*exp(exp(x**2-3))-exp(2)*exp(ln(2)+x+1)+ex
p(2),x)
```

output
```
x*exp(2) - 2*exp(2)*exp(x + 1) + exp(2)*exp(exp(x**2 - 3))
```

3.348.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \left(e^2-2e^{3+x}+2e^{-1+e^{-3+x^2}+x^2}x\right)\,dx=xe^2-2\,e^{(x+3)}+e^{\left(e^{\left(x^2-3\right)}+2\right)}$$

input
```
integrate(2*x*exp(2)*exp(x^2-3)*exp(exp(x^2-3))-exp(2)*exp(log(2)+x+1)+exp
(2),x, algorithm=\
```

output
```
x*e^2 - 2*e^(x + 3) + e^(e^(x^2 - 3) + 2)
```

3.348.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \left(e^2-2e^{3+x}+2e^{-1+e^{-3+x^2}+x^2}x\right)\,dx=xe^2-e^{(x+\log(2)+3)}+e^{\left(e^{\left(x^2-3\right)}+2\right)}$$

input
```
integrate(2*x*exp(2)*exp(x^2-3)*exp(exp(x^2-3))-exp(2)*exp(log(2)+x+1)+exp
(2),x, algorithm=\
```

output
```
x*e^2 - e^(x + log(2) + 3) + e^(e^(x^2 - 3) + 2)
```

3.348.9 Mupad [B] (verification not implemented)

Time = 13.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \left(e^2-2e^{3+x}+2e^{-1+e^{-3+x^2}+x^2}x\right)\,dx=\mathrm{e}^2\,\mathrm{e}^{\mathrm{e}^{x^2}\,\mathrm{e}^{-3}}+x\,\mathrm{e}^2-2\,\mathrm{e}^3\,\mathrm{e}^x$$

input
```
int(exp(2) - exp(2)*exp(x + log(2) + 1) + 2*x*exp(exp(x^2 - 3))*exp(2)*exp
(x^2 - 3),x)
```

output
```
exp(2)*exp(exp(x^2)*exp(-3)) + x*exp(2) - 2*exp(3)*exp(x)
```

3.349 $\int \left(e^{4e^4+6x-3x^2}(60-60x)+e^{8e^4+12x-6x^2}(12-12x)+\right.$

3.349.1 Optimal result

Integrand size = 54, antiderivative size = 29

$$\int \left(e^{4e^4+6x-3x^2}(60-60x)+e^{8e^4+12x-6x^2}(12-12x)+e^5(1+2x)\right)\,dx = \left(5+e^{4e^4+3(2-x)x}\right)^2+e^5x(1+x)$$

output
```
exp(5)*(1+x)*x+(5+exp(4*exp(4)+3*(2-x)*x))^2
```

3.349.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.48

$$\int \left(e^{4e^4+6x-3x^2}(60-60x)+e^{8e^4+12x-6x^2}(12-12x)+e^5(1+2x)\right)\,dx = e^{8e^4-6(-2+x)x}+10e^{4e^4-3(-2+x)x}+e^5x+e^5x^2$$

input
```
Integrate[E^(4*E^4 + 6*x - 3*x^2)*(60 - 60*x) + E^(8*E^4 + 12*x - 6*x^2)*(
12 - 12*x) + E^5*(1 + 2*x),x]
```

output
```
E^(8*E^4 - 6*(-2 + x)*x) + 10*E^(4*E^4 - 3*(-2 + x)*x) + E^5*x + E^5*x^2
```

3.349.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.69, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.019$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{-3x^2+6x+4e^4}(60-60x)+e^{-6x^2+12x+8e^4}(12-12x)+e^5(2x+1)\right) \, dx$$

$$\Big\downarrow \text{2009}$$

$$e^{-6x^2+12x+8e^4}+10e^{-3x^2+6x+4e^4}+\frac{1}{4}e^5(2x+1)^2$$

input
```
Int[E^(4*E^4 + 6*x - 3*x^2)*(60 - 60*x) + E^(8*E^4 + 12*x - 6*x^2)*(12 - 1
2*x) + E^5*(1 + 2*x),x]
```

output
```
E^(8*E^4 + 12*x - 6*x^2) + 10*E^(4*E^4 + 6*x - 3*x^2) + (E^5*(1 + 2*x)^2)/
4
```

3.349.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.349.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45

method	result
risch	$e^{8\,e^{4}-6x^{2}+12x}+x\,e^{5}+x^{2}e^{5}+10\,e^{4\,e^{4}-3x^{2}+6x}$
norman	$e^{8\,e^{4}-6x^{2}+12x}+x\,e^{5}+x^{2}e^{5}+10\,e^{4\,e^{4}-3x^{2}+6x}$
parallelrisch	$e^{8\,e^{4}-6x^{2}+12x}+x\,e^{5}+x^{2}e^{5}+10\,e^{4\,e^{4}-3x^{2}+6x}$
default	$e^{5}(x^{2}+x)+10\,e^{4\,e^{4}}e^{3}\sqrt{\pi}\,\sqrt{3}\,\operatorname{erf}\left(x\sqrt{3}-\sqrt{3}\right)-60\,e^{4\,e^{4}}\left(-\frac{e^{-3x^{2}+6x}}{6}+\frac{e^{3}\sqrt{\pi}\,\sqrt{3}\,\operatorname{erf}\left(x\sqrt{3}-\sqrt{3}\right)}{6}\right)$ -
parts	$e^{5}(x^{2}+x)+10\,e^{4\,e^{4}}e^{3}\sqrt{\pi}\,\sqrt{3}\,\operatorname{erf}\left(x\sqrt{3}-\sqrt{3}\right)-60\,e^{4\,e^{4}}\left(-\frac{e^{-3x^{2}+6x}}{6}+\frac{e^{3}\sqrt{\pi}\,\sqrt{3}\,\operatorname{erf}\left(x\sqrt{3}-\sqrt{3}\right)}{6}\right)$ -

input
```
int((-12*x+12)*exp(4*exp(4)-3*x^2+6*x)^2+(-60*x+60)*exp(4*exp(4)-3*x^2+6*x
)+(1+2*x)*exp(5),x,method=_RETURNVERBOSE)
```

output
```
exp(8*exp(4)-6*x^2+12*x)+x*exp(5)+x^2*exp(5)+10*exp(4*exp(4)-3*x^2+6*x)
```

3.349.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \left(e^{4e^4+6x-3x^2}(60-60x)+e^{8e^4+12x-6x^2}(12-12x)+e^5(1+2x)\right)\,dx$$
$$=\left(x^2+x\right)e^5+10\,e^{\left(-3\,x^2+6\,x+4\,e^4\right)}+e^{\left(-6\,x^2+12\,x+8\,e^4\right)}$$

input
```
integrate((-12*x+12)*exp(4*exp(4)-3*x^2+6*x)^2+(-60*x+60)*exp(4*exp(4)-3*x
^2+6*x)+(1+2*x)*exp(5),x, algorithm=\
```

output
```
(x^2 + x)*e^5 + 10*e^(-3*x^2 + 6*x + 4*e^4) + e^(-6*x^2 + 12*x + 8*e^4)
```

3.349.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45

$$\int \left(e^{4e^4+6x-3x^2}(60-60x)+e^{8e^4+12x-6x^2}(12-12x)+e^5(1+2x)\right)\,dx$$
$$=x^2e^5+xe^5+e^{-6x^2+12x+8e^4}+10e^{-3x^2+6x+4e^4}$$

input
```
integrate((-12*x+12)*exp(4*exp(4)-3*x**2+6*x)**2+(-60*x+60)*exp(4*exp(4)-3
*x**2+6*x)+(1+2*x)*exp(5),x)
```

output
```
x**2*exp(5) + x*exp(5) + exp(-6*x**2 + 12*x + 8*exp(4)) + 10*exp(-3*x**2 +
 6*x + 4*exp(4))
```

3.349.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \left(e^{4e^4+6x-3x^2}(60-60x)+e^{8e^4+12x-6x^2}(12-12x)+e^5(1+2x)\right)\,dx$$
$$=(x^2+x)e^5+10\,e^{\left(-3\,x^2+6\,x+4\,e^4\right)}+e^{\left(-6\,x^2+12\,x+8\,e^4\right)}$$

input
```
integrate((-12*x+12)*exp(4*exp(4)-3*x^2+6*x)^2+(-60*x+60)*exp(4*exp(4)-3*x
^2+6*x)+(1+2*x)*exp(5),x, algorithm=\
```

output
```
(x^2 + x)*e^5 + 10*e^(-3*x^2 + 6*x + 4*e^4) + e^(-6*x^2 + 12*x + 8*e^4)
```

3.349.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \left(e^{4e^4+6x-3x^2}(60-60x)+e^{8e^4+12x-6x^2}(12-12x)+e^5(1+2x)\right)\,dx$$
$$=(x^2+x)e^5+10\,e^{\left(-3\,x^2+6\,x+4\,e^4\right)}+e^{\left(-6\,x^2+12\,x+8\,e^4\right)}$$

input
```
integrate((-12*x+12)*exp(4*exp(4)-3*x^2+6*x)^2+(-60*x+60)*exp(4*exp(4)-3*x
^2+6*x)+(1+2*x)*exp(5),x, algorithm=\
```

output
```
(x^2 + x)*e^5 + 10*e^(-3*x^2 + 6*x + 4*e^4) + e^(-6*x^2 + 12*x + 8*e^4)
```

3.349.9 Mupad [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.41

$$\int \left(e^{4e^4+6x-3x^2}(60-60x)+e^{8e^4+12x-6x^2}(12-12x)+e^5(1+2x)\right)\,dx$$
$$=10\,\mathrm{e}^{-3\,x^2+6\,x+4\,\mathrm{e}^4}+\mathrm{e}^{-6\,x^2+12\,x+8\,\mathrm{e}^4}+x\,\mathrm{e}^5+x^2\,\mathrm{e}^5$$

input
```
int(exp(5)*(2*x + 1) - exp(6*x + 4*exp(4) - 3*x^2)*(60*x - 60) - exp(12*x
+ 8*exp(4) - 6*x^2)*(12*x - 12),x)
```

output
```
10*exp(6*x + 4*exp(4) - 3*x^2) + exp(12*x + 8*exp(4) - 6*x^2) + x*exp(5) +
 x^2*exp(5)
```

3.350 $\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx$

3.350.1 Optimal result

Integrand size = 65, antiderivative size = 23

$$\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx=\log^2\left(\frac{1}{3+\frac{x}{(25+x)^2(-3x+x^2)}}\right)$$

output
```
ln(1/(3+x/(x^2-3*x)/(x+25)^2))^2
```

3.350.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx
=\log^2\left(\frac{(-3+x)(25+x)^2}{-5624+1425x+141x^2+3x^3}\right)$$

input
```
Integrate[((38 + 6*x)*Log[(-1875 + 475*x + 47*x^2 + x^3)/(-5624 + 1425*x + 
 141*x^2 + 3*x^3)])/(421800 - 230603*x + 15151*x^2 + 4302*x^3 + 207*x^4 + 
3*x^5),x]
```

output
```
Log[((-3 + x)*(25 + x)^2)/(-5624 + 1425*x + 141*x^2 + 3*x^3)]^2
```

3.350.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(6x+38)\log\left(\frac{x^3+47x^2+475x-1875}{3x^3+141x^2+1425x-5624}\right)}{3x^5+207x^4+4302x^3+15151x^2-230603x+421800}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{(6x+38)\log\left(\frac{x^3+47x^2+475x-1875}{3x^3+141x^2+1425x-5624}\right)}{28(x-3)}-\frac{(6x+38)\log\left(\frac{x^3+47x^2+475x-1875}{3x^3+141x^2+1425x-5624}\right)}{28(x+25)}-\frac{3(x+25)(6x+38)\log\left(\frac{x^3...}{3x^3...}\right.}{3x^3+141x^2+1425...}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{(3x+19)\log\left(\frac{(3-x)(x+25)^2}{-3x^3-141x^2-1425x+5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$$\Big\downarrow \text{3008}$$

$$2\int \left(\frac{\log\left(\frac{(3-x)(x+25)^2}{-3x^3-141x^2-1425x+5624}\right)}{x-3}+\frac{2\log\left(\frac{(3-x)(x+25)^2}{-3x^3-141x^2-1425x+5624}\right)}{x+25}-\frac{3\left(3x^2+94x+475\right)\log\left(\frac{(3-x)(x+25)^2}{-3x^3-141x^2-1425x...}\right.}{3x^3+141x^2+1425x-5624}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$$\Big\downarrow \text{3008}$$

$$2\int \left(\frac{\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3\left(3x^2+94x+475\right)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-562...}\right.}{3x^3+141x^2+1425x-5624}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$$\Big\downarrow \text{3008}$$

3.350. $\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}dx$

$$2\int \left(\frac{\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\downarrow$ 7239

$$2\int \frac{(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$\downarrow$ 3008

$$2\int \left(\frac{\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\downarrow$ 7239

$$2\int \frac{(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$\downarrow$ 3008

$$2\int \left(\frac{\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\downarrow$ 7239

$$2\int \frac{(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$\downarrow$ 3008

$$2\int \left(\frac{\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\downarrow$ 7239

$$2\int \frac{(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$\downarrow$ 3008

3.350. $\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx$

$$2\int \left(\frac{\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\downarrow$ 7239

$$2\int \frac{(3x+19)\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$\downarrow$ 3008

$$2\int \left(\frac{\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\downarrow$ 7239

$$2\int \frac{(3x+19)\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$\downarrow$ 3008

$$2\int \left(\frac{\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\downarrow$ 7239

$$2\int \frac{(3x+19)\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$\downarrow$ 3008

$$2\int \left(\frac{\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\downarrow$ 7239

$$2\int \frac{(3x+19)\log \left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)\left(-3x^3-141x^2-1425x+5624\right)}dx$$

$\downarrow$ 3008

3.350. $\int \frac{(38+6x)\log \left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx$

$$2\int\left(\frac{\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\big\downarrow$ 7239

$$2\int\frac{(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)(-3x^3-141x^2-1425x+5624)}dx$$

$\big\downarrow$ 3008

$$2\int\left(\frac{\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\big\downarrow$ 7239

$$2\int\frac{(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)(-3x^3-141x^2-1425x+5624)}dx$$

$\big\downarrow$ 3008

$$2\int\left(\frac{\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

$\big\downarrow$ 7239

$$2\int\frac{(3x+19)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{(3-x)(x+25)(-3x^3-141x^2-1425x+5624)}dx$$

$\big\downarrow$ 3008

$$2\int\left(\frac{\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x-3}+\frac{2\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{x+25}-\frac{3(3x^2+94x+475)\log\left(\frac{(x-3)(x+25)^2}{3x^3+141x^2+1425x-5624}\right)}{3x^3+141x^2+1425x-5624}\right.$$

input
```
Int[((38 + 6*x)*Log[(-1875 + 475*x + 47*x^2 + x^3)/(-5624 + 1425*x + 141*x
^2 + 3*x^3)])/(421800 - 230603*x + 15151*x^2 + 4302*x^3 + 207*x^4 + 3*x^5)
,x]
```

output
```
$Aborted
```

3.350. $\int\frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx$

3.350.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 3008
```
Int[((a_.) + Log[(c_.)*(RFx_)^(p_.)]*(b_.))^(n_.)*(RGx_), x_Symbol] :> With
[{u = ExpandIntegrand[(a + b*Log[c*RFx^p])^n, RGx, x]}, Int[u, x] /; SumQ[u
]] /; FreeQ[{a, b, c, p}, x] && RationalFunctionQ[RFx, x] && RationalFuncti
onQ[RGx, x] && IGtQ[n, 0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.350.4 Maple [A] (verified)

Time = 1.27 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.52

method	result
norman	$\ln\left(\frac{x^3+47x^2+475x-1875}{3x^3+141x^2+1425x-5624}\right)^2$
parts	$-2\ln\left(\frac{x^3+47x^2+475x-1875}{3x^3+141x^2+1425x-5624}\right)\ln\left(3x^3+141x^2+1425x-5624\right)+4\ln\left(x+25\right)\ln\left(\frac{x^3+47x^2+475x-1}{3x^3+141x^2+1425x-}\right.$
default	Expression too large to display
risch	Expression too large to display

input
```
int((6*x+38)*ln((x^3+47*x^2+475*x-1875)/(3*x^3+141*x^2+1425*x-5624))/(3*x^
5+207*x^4+4302*x^3+15151*x^2-230603*x+421800),x,method=_RETURNVERBOSE)
```

output
```
ln((x^3+47*x^2+475*x-1875)/(3*x^3+141*x^2+1425*x-5624))^2
```

3.350.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.48

$$\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx = \log\left(\frac{x^3+47\,x^2+475\,x-1875}{3\,x^3+141\,x^2+1425\,x-5624}\right)^2$$

input
```
integrate((6*x+38)*log((x^3+47*x^2+475*x-1875)/(3*x^3+141*x^2+1425*x-5624)
)/(3*x^5+207*x^4+4302*x^3+15151*x^2-230603*x+421800),x, algorithm=\
```

output
```
log((x^3 + 47*x^2 + 475*x - 1875)/(3*x^3 + 141*x^2 + 1425*x - 5624))^2
```

3.350.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx = \log\left(\frac{x^3+47x^2+475x-1875}{3x^3+141x^2+1425x-5624}\right)^2$$

input
```
integrate((6*x+38)*ln((x**3+47*x**2+475*x-1875)/(3*x**3+141*x**2+1425*x-56
24))/(3*x**5+207*x**4+4302*x**3+15151*x**2-230603*x+421800),x)
```

output
```
log((x**3 + 47*x**2 + 475*x - 1875)/(3*x**3 + 141*x**2 + 1425*x - 5624))**
2
```

3.350.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 139 vs. 2(23) = 46.

Time = 0.24 (sec) , antiderivative size = 139, normalized size of antiderivative = 6.04

$$\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx$$
$$= 2\,(2\,\log(x+25)+\log(x-3))\log\left(3\,x^3+141\,x^2+1425\,x-5624\right)$$
$$-\log\left(3\,x^3+141\,x^2+1425\,x-5624\right)^2-4\,\log(x+25)^2$$
$$-4\,\log(x+25)\log(x-3)-\log(x-3)^2$$
$$-2\left(\log\left(3\,x^3+141\,x^2+1425\,x-5624\right)-2\,\log(x+25)-\log(x-3)\right)\log\left(\frac{x^3+47\,x^2+475\,x-187}{3\,x^3+141\,x^2+1425\,x-56}\right.$$

input
```
integrate((6*x+38)*log((x^3+47*x^2+475*x-1875)/(3*x^3+141*x^2+1425*x-5624)
)/(3*x^5+207*x^4+4302*x^3+15151*x^2-230603*x+421800),x, algorithm=\
```

output
```
2*(2*log(x + 25) + log(x - 3))*log(3*x^3 + 141*x^2 + 1425*x - 5624) - log(
3*x^3 + 141*x^2 + 1425*x - 5624)^2 - 4*log(x + 25)^2 - 4*log(x + 25)*log(x
 - 3) - log(x - 3)^2 - 2*(log(3*x^3 + 141*x^2 + 1425*x - 5624) - 2*log(x +
 25) - log(x - 3))*log((x^3 + 47*x^2 + 475*x - 1875)/(3*x^3 + 141*x^2 + 14
25*x - 5624))
```

3.350.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.48

$$\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx = \log\left(\frac{x^3+47\,x^2+475\,x-1875}{3\,x^3+141\,x^2+1425\,x-5624}\right)^2$$

input
```
integrate((6*x+38)*log((x^3+47*x^2+475*x-1875)/(3*x^3+141*x^2+1425*x-5624)
)/(3*x^5+207*x^4+4302*x^3+15151*x^2-230603*x+421800),x, algorithm=\
```

output
```
log((x^3 + 47*x^2 + 475*x - 1875)/(3*x^3 + 141*x^2 + 1425*x - 5624))^2
```

3.350.9 Mupad [B] (verification not implemented)

Time = 13.89 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{(38+6x)\log\left(\frac{-1875+475x+47x^2+x^3}{-5624+1425x+141x^2+3x^3}\right)}{421800-230603x+15151x^2+4302x^3+207x^4+3x^5}\,dx = \ln\left(\frac{1}{3}-\frac{1}{3\,\left(3\,x^3+141\,x^2+1425\,x-5624\right)}\right)^2$$

input
```
int((log((475*x + 47*x^2 + x^3 - 1875)/(1425*x + 141*x^2 + 3*x^3 - 5624))*
(6*x + 38))/(15151*x^2 - 230603*x + 4302*x^3 + 207*x^4 + 3*x^5 + 421800),x
)
```

output
```
log(1/3 - 1/(3*(1425*x + 141*x^2 + 3*x^3 - 5624)))^2
```

3.351 $\int \left(-4e^{x^4}x^3 + e(2+50x)\right) dx$

3.351.1 Optimal result

Integrand size = 18, antiderivative size = 20

$$\int \left(-4e^{x^4}x^3 + e(2+50x)\right) dx = -e^{x^4} + e\left(5+2x+25x^2\right)$$

output
```
(25*x^2+2*x+5)*exp(1)-exp(x^4)
```

3.351.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \left(-4e^{x^4}x^3 + e(2+50x)\right) dx = 2\left(-\frac{e^{x^4}}{2} + ex + \frac{25ex^2}{2}\right)$$

input
```
Integrate[-4*E^x^4*x^3 + E*(2 + 50*x),x]
```

output
```
2*(-1/2*E^x^4 + E*x + (25*E*x^2)/2)
```

3.351.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e(50x+2)-4e^{x^4}x^3\right)\,dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{25}e(25x+1)^2-e^{x^4}$$

input
```
Int[-4*E^x^4*x^3 + E*(2 + 50*x),x]
```

output
```
-E^x^4 + (E*(1 + 25*x)^2)/25
```

3.351.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.351.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
default	$2\,\mathrm{e}\left(\frac{25}{2}x^2+x\right)-\mathrm{e}^{x^4}$	19
parts	$2\,\mathrm{e}\left(\frac{25}{2}x^2+x\right)-\mathrm{e}^{x^4}$	19
norman	$2x\,\mathrm{e}+25x^2\mathrm{e}-\mathrm{e}^{x^4}$	20
risch	$2x\,\mathrm{e}+25x^2\mathrm{e}-\mathrm{e}^{x^4}$	20
parallelrisch	$2x\,\mathrm{e}+25x^2\mathrm{e}-\mathrm{e}^{x^4}$	20

input
```
int(-4*x^3*exp(x^4)+(50*x+2)*exp(1),x,method=_RETURNVERBOSE)
```

output
```
2*exp(1)*(25/2*x^2+x)-exp(x^4)
```

3.351.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(-4e^{x^4}x^3+e(2+50x)\right)\,dx=\left(25\,x^2+2\,x\right)e-e^{\left(x^4\right)}$$

input
```
integrate(-4*x^3*exp(x^4)+(50*x+2)*exp(1),x, algorithm=\
```

output
```
(25*x^2 + 2*x)*e - e^(x^4)
```

3.351.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(-4e^{x^4}x^3+e(2+50x)\right)\,dx=25ex^2+2ex-e^{x^4}$$

input
```
integrate(-4*x**3*exp(x**4)+(50*x+2)*exp(1),x)
```

output
```
25*E*x**2 + 2*E*x - exp(x**4)
```

3.351.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(-4e^{x^4}x^3+e(2+50x)\right)\,dx=\left(25\,x^2+2\,x\right)e-e^{\left(x^4\right)}$$

input
```
integrate(-4*x^3*exp(x^4)+(50*x+2)*exp(1),x, algorithm=\
```

output
```
(25*x^2 + 2*x)*e - e^(x^4)
```

3.351.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(-4e^{x^4}x^3 + e(2+50x)\right)\,dx = \left(25\,x^2 + 2\,x\right)e - e^{\left(x^4\right)}$$

input
```
integrate(-4*x^3*exp(x^4)+(50*x+2)*exp(1),x, algorithm=\
```

output
```
(25*x^2 + 2*x)*e - e^(x^4)
```

3.351.9 Mupad [B] (verification not implemented)

Time = 12.72 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(-4e^{x^4}x^3 + e(2+50x)\right)\,dx = 2\,x\,\mathrm{e} - \mathrm{e}^{x^4} + 25\,x^2\,\mathrm{e}$$

input
```
int(exp(1)*(50*x + 2) - 4*x^3*exp(x^4),x)
```

output
```
2*x*exp(1) - exp(x^4) + 25*x^2*exp(1)
```

3.352 $\int \frac{-x\log(x)+(5+x+(5+x)\log(x))\log(5+x)+(-5+e^x(-5-x)-x)\log^2(5+x)}{(5+x)\log^2(5+x)}$

3.352.1 Optimal result

Integrand size = 53, antiderivative size = 23

$$\int \frac{-x\log(x)+(5+x+(5+x)\log(x))\log(5+x)+(-5+e^x(-5-x)-x)\log^2(5+x)}{(5+x)\log^2(5+x)}\,dx$$
$$=-4+e^5-e^x-x+\frac{x\log(x)}{\log(5+x)}$$

output
```
-x+ln(x)*x/ln(5+x)-exp(x)+exp(5)-4
```

3.352.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.13 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \frac{-x\log(x)+(5+x+(5+x)\log(x))\log(5+x)+(-5+e^x(-5-x)-x)\log^2(5+x)}{(5+x)\log^2(5+x)}\,dx$$
$$=-e^x-x-\text{ExpIntegralEi}(\log(5+x))+\frac{x\log(x)}{\log(5+x)}+\text{LogIntegral}(5+x)$$

input
```
Integrate[(-(x*Log[x]) + (5 + x + (5 + x)*Log[x])*Log[5 + x] + (-5 + E^x*(
-5 - x) - x)*Log[5 + x]^2)/((5 + x)*Log[5 + x]^2),x]
```

output
```
-E^x - x - ExpIntegralEi[Log[5 + x]] + (x*Log[x])/Log[5 + x] + LogIntegral
[5 + x]
```

3.352.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(e^x(-x-5)-x-5)\log^2(x+5)+(x+(x+5)\log(x)+5)\log(x+5)-x\log(x)}{(x+5)\log^2(x+5)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-x\log^2(x+5)-5\log^2(x+5)+x\log(x+5)+x\log(x)\log(x+5)+5\log(x)\log(x+5)+5\log(x+5)-x\log}{(x+5)\log^2(x+5)}\right.$$

$$\Big\downarrow \text{2009}$$

$$5\text{Subst}\left(\int \frac{\log(x-5)}{x\log^2(x)}dx,x,x+5\right)-\int \frac{\log(x)}{\log^2(x+5)}dx+\int \frac{\log(x)}{\log(x+5)}dx+\text{LogIntegral}(x+5)-x-e^x$$

input
```
Int[(-(x*Log[x]) + (5 + x + (5 + x)*Log[x])*Log[5 + x] + (-5 + E^x*(-5 - x
) - x)*Log[5 + x]^2)/((5 + x)*Log[5 + x]^2),x]
```

output
```
$Aborted
```

3.352.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.352.4 Maple [A] (verified)

Time = 1.60 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

method	result	size
default	$-x+\frac{\ln(x)x}{\ln(5+x)}-\mathrm{e}^{x}$	19
risch	$-x+\frac{\ln(x)x}{\ln(5+x)}-\mathrm{e}^{x}$	19
parts	$-x+\frac{\ln(x)x}{\ln(5+x)}-\mathrm{e}^{x}$	19
parallelrisch	$-\frac{-10x\ln(x)+10x\ln(5+x)+10\,\mathrm{e}^{x}\ln(5+x)-25\ln(5+x)}{10\ln(5+x)}$	36

input
```
int((((-x-5)*exp(x)-x-5)*ln(5+x)^2+(ln(x)*(5+x)+5+x)*ln(5+x)-x*ln(x))/(5+x
)/ln(5+x)^2,x,method=_RETURNVERBOSE)
```

output
```
-x+ln(x)*x/ln(5+x)-exp(x)
```

3.352.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int\frac{-x\log(x)+(5+x+(5+x)\log(x))\log(5+x)+(-5+e^{x}(-5-x)-x)\log^{2}(5+x)}{(5+x)\log^{2}(5+x)}\,dx$$
$$=-\frac{(x+e^{x})\log{(x+5)}-x\log{(x)}}{\log{(x+5)}}$$

input
```
integrate((((-x-5)*exp(x)-x-5)*log(5+x)^2+(log(x)*(5+x)+5+x)*log(5+x)-x*lo
g(x))/(5+x)/log(5+x)^2,x, algorithm=\
```

output
```
-((x + e^x)*log(x + 5) - x*log(x))/log(x + 5)
```

3.352.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.61

$$\int\frac{-x\log(x)+(5+x+(5+x)\log(x))\log(5+x)+(-5+e^{x}(-5-x)-x)\log^{2}(5+x)}{(5+x)\log^{2}(5+x)}\,dx$$
$$=\frac{x\log{(x)}}{\log{(x+5)}}-x-e^{x}$$

input
```
integrate((((-x-5)*exp(x)-x-5)*ln(5+x)**2+(ln(x)*(5+x)+5+x)*ln(5+x)-x*ln(x
))/(5+x)/ln(5+x)**2,x)
```

output
```
x*log(x)/log(x + 5) - x - exp(x)
```

3.352.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{-x\log(x) + (5 + x + (5 + x)\log(x))\log(5 + x) + (-5 + e^x(-5 - x) - x)\log^2(5 + x)}{(5 + x)\log^2(5 + x)}\,dx$$
$$= -\frac{(x + e^x)\log(x + 5) - x\log(x)}{\log(x + 5)}$$

input
```
integrate((((-x-5)*exp(x)-x-5)*log(5+x)^2+(log(x)*(5+x)+5+x)*log(5+x)-x*lo
g(x))/(5+x)/log(5+x)^2,x, algorithm=\
```

output
```
-((x + e^x)*log(x + 5) - x*log(x))/log(x + 5)
```

3.352.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{-x\log(x) + (5 + x + (5 + x)\log(x))\log(5 + x) + (-5 + e^x(-5 - x) - x)\log^2(5 + x)}{(5 + x)\log^2(5 + x)}\,dx$$
$$= -\frac{x\log(x + 5) + e^x\log(x + 5) - x\log(x)}{\log(x + 5)}$$

input
```
integrate((((-x-5)*exp(x)-x-5)*log(5+x)^2+(log(x)*(5+x)+5+x)*log(5+x)-x*lo
g(x))/(5+x)/log(5+x)^2,x, algorithm=\
```

output
```
-(x*log(x + 5) + e^x*log(x + 5) - x*log(x))/log(x + 5)
```

3.352.9 Mupad [B] (verification not implemented)

Time = 12.90 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{-x\log(x)+(5+x+(5+x)\log(x))\log(5+x)+(-5+e^x(-5-x)-x)\log^2(5+x)}{(5+x)\log^2(5+x)}\,dx$$
$$=\frac{x\,\ln(x)}{\ln(x+5)}-e^x-x$$

input
```
int(-(x*log(x) - log(x + 5)*(x + log(x)*(x + 5) + 5) + log(x + 5)^2*(x + e
xp(x)*(x + 5) + 5))/(log(x + 5)^2*(x + 5)),x)
```

output
```
(x*log(x))/log(x + 5) - exp(x) - x
```

3.353 $\int \frac{54+e^{2x}-396x-282x^2-48x^3+e^x\left(-3-81x\right.}{3e^{2x}+27x^2-198x^3+291x^4+264x^5+48x^6+e^8\left(27+18x+3x^2\right)+e^4\left(-54\right.}$

3.353.1 Optimal result

Integrand size = 156, antiderivative size = 33

$$\int \frac{54+e^{2x}-396x-282x^2-48x^3+e^x\left(-3-81x-17x^2+15x^3+4x^4+e^4\right.}{3e^{2x}+27x^2-198x^3+291x^4+264x^5+48x^6+e^8\left(27+18x+3x^2\right)+e^4\left(-54x+180x^2+138x^3+24x^4\right.} = \frac{2+\frac{e^x}{3}}{e^4-x+4x^2+\frac{e^x}{3+x}}$$

output
```
(2+1/3*exp(x))/(4*x^2+exp(4)-x+exp(x)/(3+x))
```

3.353.2 Mathematica [A] (verified)

Time = 8.56 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.82

$$\int \frac{54+e^{2x}-396x-282x^2-48x^3+e^x\left(-3-81x-17x^2+15x^3+4x^4+e^4\right.}{3e^{2x}+27x^2-198x^3+291x^4+264x^5+48x^6+e^8\left(27+18x+3x^2\right)+e^4\left(-54x+180x^2+138x^3+24x^4\right.} = \frac{e^x x-3e^4(3+x)+3(6+5x-11x^2-4x^3)}{3\left(e^x+e^4(3+x)+x\left(-3+11x+4x^2\right)\right)}$$

input
```
Integrate[(54 + E^(2*x) - 396*x - 282*x^2 - 48*x^3 + E^x*(-3 - 81*x - 17*x
^2 + 15*x^3 + 4*x^4 + E^4*(9 + 6*x + x^2)))/(3*E^(2*x) + 27*x^2 - 198*x^3
+ 291*x^4 + 264*x^5 + 48*x^6 + E^8*(27 + 18*x + 3*x^2) + E^4*(-54*x + 180*
x^2 + 138*x^3 + 24*x^4) + E^x*(-18*x + 66*x^2 + 24*x^3 + E^4*(18 + 6*x))),
x]
```

output
```
(E^x*x - 3*E^4*(3 + x) + 3*(6 + 5*x - 11*x^2 - 4*x^3))/(3*(E^x + E^4*(3 +
x) + x*(-3 + 11*x + 4*x^2)))
```

3.353.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-48x^3-282x^2+e^x\left(4x^4+15x^3-17x^2+e^4\left(x^2+6x+9\right)-81x-3\right)-396x+e^{2}}{48x^6+264x^5+291x^4-198x^3+27x^2+e^8\left(3x^2+18x+27\right)+e^x\left(24x^3+66x^2-18x+e^4(6x+18)\right)+e^4\left(24\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^x\left(4x^4+15x^3-17x^2-81x-3\right)+e^{x+4}(x+3)^2-6(8x-1)(x+3)^2+e^{2x}}{3\left(x\left(4x^2+11x-3\right)+e^4(x+3)+e^x\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{3}\int \frac{e^{x+4}(x+3)^2+6(1-8x)(x+3)^2+e^{2x}-e^x\left(-4x^4-15x^3+17x^2+81x+3\right)}{\left(e^4(x+3)+e^x-x\left(-4x^2-11x+3\right)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{3}\int \left(\frac{4x^4+7x^3-\left(39-e^4\right)x^2-\left(75-4e^4\right)x-3\left(1-e^4\right)}{4x^3+11x^2-3\left(1-\frac{e^4}{3}\right)x+e^x+3e^4}+\frac{(x+3)\left(-16x^6-40x^5+123\left(1-\frac{8e^4}{123}\right)x^4+284\right.}{}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{3}\left(9\left(6+e^4-2e^8\right)\int \frac{1}{\left(4x^3+11x^2-3\left(1-\frac{e^4}{3}\right)x+e^x+3e^4\right)^2}dx-3\left(135-85e^4+7e^8\right)\int \frac{}{\left(4x^3+11x^2-3\left(1\right.\right.}\right.$$

input
```
Int[(54 + E^(2*x) - 396*x - 282*x^2 - 48*x^3 + E^x*(-3 - 81*x - 17*x^2 + 1
5*x^3 + 4*x^4 + E^4*(9 + 6*x + x^2)))/(3*E^(2*x) + 27*x^2 - 198*x^3 + 291*
x^4 + 264*x^5 + 48*x^6 + E^8*(27 + 18*x + 3*x^2) + E^4*(-54*x + 180*x^2 +
138*x^3 + 24*x^4) + E^x*(-18*x + 66*x^2 + 24*x^3 + E^4*(18 + 6*x))),x]
```

output
```
$Aborted
```

3.353.

$$\int \frac{54+e^{2x}-396x-282x^2-48x^3+e^x\left(-3-81x-17x^2+15x^3+4x^4+e^4\left(9+6x+x^2\right)\right)}{3e^{2x}+27x^2-198x^3+291x^4+264x^5+48x^6+e^8\left(27+18x+3x^2\right)+e^4\left(-54x+180x^2+138x^3+24x^4\right)+e^x\left(-18x+66x^2+24x^3+e^4(18+6x)\right)}\,dx$$

3.353.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.353.4 Maple [A] (verified)

Time = 0.80 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.73

method	result	size
norman	$\frac{-11x^{2}-4x^{3}+\left(5-{\mathrm e}^{4}\right) x+\frac{{\mathrm e}^{x} x}{3}-3\,{\mathrm e}^{4}+6}{4x^{3}+x\,{\mathrm e}^{4}+11x^{2}+3\,{\mathrm e}^{4}+{\mathrm e}^{x}-3x}$	57
parallelrisch	$\frac{18-12x^{3}-3x\,{\mathrm e}^{4}-33x^{2}+{\mathrm e}^{x} x-9\,{\mathrm e}^{4}+15x}{12x^{3}+3x\,{\mathrm e}^{4}+33x^{2}+9\,{\mathrm e}^{4}+3\,{\mathrm e}^{x}-9x}$	57
risch	$\frac{x}{3}-\frac{4x^{4}+x^{2}{\mathrm e}^{4}+23x^{3}+6x\,{\mathrm e}^{4}+30x^{2}+9\,{\mathrm e}^{4}-15x-18}{3\left(4x^{3}+x\,{\mathrm e}^{4}+11x^{2}+3\,{\mathrm e}^{4}+{\mathrm e}^{x}-3x\right)}$	68

input
```
int((exp(x)^2+((x^2+6*x+9)*exp(4)+4*x^4+15*x^3-17*x^2-81*x-3)*exp(x)-48*x^
3-282*x^2-396*x+54)/(3*exp(x)^2+((18+6*x)*exp(4)+24*x^3+66*x^2-18*x)*exp(x
)+(3*x^2+18*x+27)*exp(4)^2+(24*x^4+138*x^3+180*x^2-54*x)*exp(4)+48*x^6+264
*x^5+291*x^4-198*x^3+27*x^2),x,method=_RETURNVERBOSE)
```

output
```
(-11*x^2-4*x^3+(5-exp(4))*x+1/3*exp(x)*x-3*exp(4)+6)/(4*x^3+x*exp(4)+11*x^
2+3*exp(4)+exp(x)-3*x)
```

3.353.

$$\int \frac{54+e^{2x}-396x-282x^2-48x^3+e^x\left(-3-81x-17x^2+15x^3+4x^4+e^4\left(9+6x+x^2\right)\right)}{3e^{2x}+27x^2-198x^3+291x^4+264x^5+48x^6+e^8\left(27+18x+3x^2\right)+e^4\left(-54x+180x^2+138x^3+24x^4\right)+e^x\left(-18x+66x^2+24x^3+e^4(18+6x)\right)}\,dx$$

3.353.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.61

$$\int \frac{54+e^{2x}-396x-282x^2-48x^3+e^x(-3-81x-17x^2+15x^3+4x^4+e^4}{3e^{2x}+27x^2-198x^3+291x^4+264x^5+48x^6+e^8\left(27+18x+3x^2\right)+e^4\left(-54x+180x^2+138x^3+24x\right.}$$
$$=-\frac{12\,x^3+33\,x^2+3\,(x+3)e^4-xe^x-15\,x-18}{3\,\left(4\,x^3+11\,x^2+(x+3)e^4-3\,x+e^x\right)}$$

input
```
integrate((exp(x)^2+((x^2+6*x+9)*exp(4)+4*x^4+15*x^3-17*x^2-81*x-3)*exp(x)
-48*x^3-282*x^2-396*x+54)/(3*exp(x)^2+((18+6*x)*exp(4)+24*x^3+66*x^2-18*x)
*exp(x)+(3*x^2+18*x+27)*exp(4)^2+(24*x^4+138*x^3+180*x^2-54*x)*exp(4)+48*x
^6+264*x^5+291*x^4-198*x^3+27*x^2),x, algorithm=\
```

output
```
-1/3*(12*x^3 + 33*x^2 + 3*(x + 3)*e^4 - x*e^x - 15*x - 18)/(4*x^3 + 11*x^2
 + (x + 3)*e^4 - 3*x + e^x)
```

3.353.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. 2(22) = 44.

Time = 0.10 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.15

$$\int \frac{54+e^{2x}-396x-282x^2-48x^3+e^x(-3-81x-17x^2+15x^3+4x^4+e^4}{3e^{2x}+27x^2-198x^3+291x^4+264x^5+48x^6+e^8\left(27+18x+3x^2\right)+e^4\left(-54x+180x^2+138x^3+24x\right.}$$
$$=\frac{x}{3}+\frac{-4x^4-23x^3-x^2e^4-30x^2-6xe^4+15x-9e^4+18}{12x^3+33x^2-9x+3xe^4+3e^x+9e^4}$$

input
```
integrate((exp(x)**2+((x**2+6*x+9)*exp(4)+4*x**4+15*x**3-17*x**2-81*x-3)*e
xp(x)-48*x**3-282*x**2-396*x+54)/(3*exp(x)**2+((18+6*x)*exp(4)+24*x**3+66*
x**2-18*x)*exp(x)+(3*x**2+18*x+27)*exp(4)**2+(24*x**4+138*x**3+180*x**2-54
*x)*exp(4)+48*x**6+264*x**5+291*x**4-198*x**3+27*x**2),x)
```

output
```
x/3 + (-4*x**4 - 23*x**3 - x**2*exp(4) - 30*x**2 - 6*x*exp(4) + 15*x - 9*e
xp(4) + 18)/(12*x**3 + 33*x**2 - 9*x + 3*x*exp(4) + 3*exp(x) + 9*exp(4))
```

3.353.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(27) = 54$.

Time = 0.27 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.67

$$\int \frac{54 + e^{2x} - 396x - 282x^2 - 48x^3 + e^x(-3 - 81x - 17x^2 + 15x^3 + 4x^4 + e^4}{3e^{2x} + 27x^2 - 198x^3 + 291x^4 + 264x^5 + 48x^6 + e^8(27 + 18x + 3x^2) + e^4(-54x + 180x^2 + 138x^3 + 24x}$$
$$= -\frac{12\,x^3 + 33\,x^2 + 3\,x(e^4 - 5) - xe^x + 9\,e^4 - 18}{3\,(4\,x^3 + 11\,x^2 + x(e^4 - 3) + 3\,e^4 + e^x)}$$

input
```
integrate((exp(x)^2+((x^2+6*x+9)*exp(4)+4*x^4+15*x^3-17*x^2-81*x-3)*exp(x)
-48*x^3-282*x^2-396*x+54)/(3*exp(x)^2+((18+6*x)*exp(4)+24*x^3+66*x^2-18*x)
*exp(x)+(3*x^2+18*x+27)*exp(4)^2+(24*x^4+138*x^3+180*x^2-54*x)*exp(4)+48*x
^6+264*x^5+291*x^4-198*x^3+27*x^2),x, algorithm=\
```

output
```
-1/3*(12*x^3 + 33*x^2 + 3*x*(e^4 - 5) - x*e^x + 9*e^4 - 18)/(4*x^3 + 11*x^
2 + x*(e^4 - 3) + 3*e^4 + e^x)
```

3.353.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(27) = 54$.

Time = 0.31 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.73

$$\int \frac{54 + e^{2x} - 396x - 282x^2 - 48x^3 + e^x(-3 - 81x - 17x^2 + 15x^3 + 4x^4 + e^4}{3e^{2x} + 27x^2 - 198x^3 + 291x^4 + 264x^5 + 48x^6 + e^8(27 + 18x + 3x^2) + e^4(-54x + 180x^2 + 138x^3 + 24x}$$
$$= -\frac{12\,x^3 + 33\,x^2 + 3\,xe^4 - xe^x - 15\,x + 9\,e^4 - 18}{3\,(4\,x^3 + 11\,x^2 + xe^4 - 3\,x + 3\,e^4 + e^x)}$$

input
```
integrate((exp(x)^2+((x^2+6*x+9)*exp(4)+4*x^4+15*x^3-17*x^2-81*x-3)*exp(x)
-48*x^3-282*x^2-396*x+54)/(3*exp(x)^2+((18+6*x)*exp(4)+24*x^3+66*x^2-18*x)
*exp(x)+(3*x^2+18*x+27)*exp(4)^2+(24*x^4+138*x^3+180*x^2-54*x)*exp(4)+48*x
^6+264*x^5+291*x^4-198*x^3+27*x^2),x, algorithm=\
```

output
```
-1/3*(12*x^3 + 33*x^2 + 3*x*e^4 - x*e^x - 15*x + 9*e^4 - 18)/(4*x^3 + 11*x
^2 + x*e^4 - 3*x + 3*e^4 + e^x)
```

3.353.9 Mupad [F(-1)]

Timed out.

$$\int \frac{54+e^{2x}-396x-282x^2-48x^3+e^x(-3-81x-17x^2+15x^3+4x^4+e^4}{3e^{2x}+27x^2-198x^3+291x^4+264x^5+48x^6+e^8\left(27+18x+3x^2\right)+e^4\left(-54x+180x^2+138x^3+24x^4\right.}$$
$$= -\int \frac{396\,x-\mathrm{e}^{2\,x}+282\,x^2+48\,x^3+\mathrm{e}^x\left(81\,x-\mathrm{e}^4\left(x^2+6\,x+9\right)+17\,x^2-\right.}{3\,\mathrm{e}^{2\,x}+\mathrm{e}^8\left(3\,x^2+18\,x+27\right)+\mathrm{e}^4\left(24\,x^4+138\,x^3+180\,x^2-54\,x\right)+27\,x^2-198\,x^3+291\,x^4+264}$$

input
```
int(-(396*x - exp(2*x) + 282*x^2 + 48*x^3 + exp(x)*(81*x - exp(4)*(6*x + x
^2 + 9) + 17*x^2 - 15*x^3 - 4*x^4 + 3) - 54)/(3*exp(2*x) + exp(8)*(18*x +
3*x^2 + 27) + exp(4)*(180*x^2 - 54*x + 138*x^3 + 24*x^4) + 27*x^2 - 198*x^
3 + 291*x^4 + 264*x^5 + 48*x^6 + exp(x)*(66*x^2 - 18*x + 24*x^3 + exp(4)*(
6*x + 18))),x)
```

output
```
-int((396*x - exp(2*x) + 282*x^2 + 48*x^3 + exp(x)*(81*x - exp(4)*(6*x + x
^2 + 9) + 17*x^2 - 15*x^3 - 4*x^4 + 3) - 54)/(3*exp(2*x) + exp(8)*(18*x +
3*x^2 + 27) + exp(4)*(180*x^2 - 54*x + 138*x^3 + 24*x^4) + 27*x^2 - 198*x^
3 + 291*x^4 + 264*x^5 + 48*x^6 + exp(x)*(66*x^2 - 18*x + 24*x^3 + exp(4)*(
6*x + 18))), x)
```

3.354 $\int \frac{e^{20+4x}(-1-4x)+2x+e^{x^2}(e^{20+4x}(-4-24x)+8x+8x^2)+\left(1-4e^{20+4x}\right.}{1+4e^{x^2}}$

3.354.1 Optimal result

Integrand size = 100, antiderivative size = 30

$$\int \frac{e^{20+4x}(-1-4x)+2x+e^{x^2}(e^{20+4x}(-4-24x)+8x+8x^2)+\left(1-4e^{20+4x}+e^{x^2}(4-16e^{20+4x})\right)\log\left(\frac{1}{5}\right.}{1+4e^{x^2}}$$

$$=2+\left(-e^{4(5+x)}+x\right)\left(x+\log\left(\frac{1}{5}\left(3+12e^{x^2}\right)\right)\right)$$

output
```
(x-exp(20+4*x))*(x+ln(12/5*exp(x^2)+3/5))+2
```

3.354.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{e^{20+4x}(-1-4x)+2x+e^{x^2}(e^{20+4x}(-4-24x)+8x+8x^2)+\left(1-4e^{20+4x}+e^{x^2}(4-16e^{20+4x})\right)\log\left(\frac{1}{5}\right.}{1+4e^{x^2}}$$

$$=-\left(\left(e^{4(5+x)}-x\right)\left(x+\log\left(\frac{3}{5}\left(1+4e^{x^2}\right)\right)\right)\right)$$

input
```
Integrate[(E^(20 + 4*x)*(-1 - 4*x) + 2*x + E^x^2*(E^(20 + 4*x)*(-4 - 24*x)
 + 8*x + 8*x^2) + (1 - 4*E^(20 + 4*x) + E^x^2*(4 - 16*E^(20 + 4*x)))*Log[(
3 + 12*E^x^2)/5])/(1 + 4*E^x^2),x]
```

output
```
-((E^(4*(5 + x)) - x)*(x + Log[(3*(1 + 4*E^x^2))/5]))
```

3.354.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^2}\left(8x^2+8x+e^{4x+20}(-24x-4)\right)+\left(e^{x^2}\left(4-16e^{4x+20}\right)-4e^{4x+20}+1\right)\log\left(\frac{1}{5}\left(12e^{x^2}+3\right)\right)+e^{4x+20}(-4x-}{4e^{x^2}+1}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(2x^2+\frac{2\left(e^{4x+20}-x\right)x}{4e^{x^2}+1}-4e^{4x+20}\log\left(\frac{3}{5}\left(4e^{x^2}+1\right)\right)+\log\left(\frac{3}{5}\left(4e^{x^2}+1\right)\right)-6e^{4x+20}x+2x-e^{4x+20}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\int \frac{e^{4x+20}x}{1+4e^{x^2}}dx+8\int \frac{e^{x^2+4x+20}x}{1+4e^{x^2}}dx-2\int \frac{x^2}{1+4e^{x^2}}dx-8\int \frac{e^{x^2}x^2}{1+4e^{x^2}}dx+\frac{2x^3}{3}+x^2+ x\log\left(\frac{3}{5}\left(4e^{x^2}+1\right)\right)-e^{4x+20}\log\left(\frac{3}{5}\left(4e^{x^2}+1\right)\right)-\frac{3}{2}e^{4x+20}x+\frac{1}{8}e^{4x+20}$$

input
```
Int[(E^(20 + 4*x)*(-1 - 4*x) + 2*x + E^x^2*(E^(20 + 4*x)*(-4 - 24*x) + 8*x
 + 8*x^2) + (1 - 4*E^(20 + 4*x) + E^x^2*(4 - 16*E^(20 + 4*x)))*Log[(3 + 12
*E^x^2)/5])/(1 + 4*E^x^2),x]
```

output
```
$Aborted
```

3.354.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.354.4 Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

method	result	size
risch	$\left(x-\mathrm{e}^{20+4x}\right)\ln\left(\frac{12\,\mathrm{e}^{x^{2}}}{5}+\frac{3}{5}\right)+x^{2}-\mathrm{e}^{20+4x}x$	34
parallelrisch	$-\mathrm{e}^{20+4x}\ln\left(\frac{12\,\mathrm{e}^{x^{2}}}{5}+\frac{3}{5}\right)-\mathrm{e}^{20+4x}x+\ln\left(\frac{12\,\mathrm{e}^{x^{2}}}{5}+\frac{3}{5}\right)x+x^{2}$	42

input
```
int((((-16*exp(20+4*x)+4)*exp(x^2)-4*exp(20+4*x)+1)*ln(12/5*exp(x^2)+3/5)+
((-24*x-4)*exp(20+4*x)+8*x^2+8*x)*exp(x^2)+(-4*x-1)*exp(20+4*x)+2*x)/(4*ex
p(x^2)+1),x,method=_RETURNVERBOSE)
```

output
```
(x-exp(20+4*x))*ln(12/5*exp(x^2)+3/5)+x^2-exp(20+4*x)*x
```

3.354.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

$$\int \frac{e^{20+4x}(-1-4x)+2x+e^{x^2}\left(e^{20+4x}(-4-24x)+8x+8x^2\right)+\left(1-4e^{20+4x}+e^{x^2}\left(4-16e^{20+4x}\right)\right)\log\left(\frac{1}{5}\right.}{1+4e^{x^2}}$$

$$=x^{2}-xe^{(4\,x+20)}+\left(x-e^{(4\,x+20)}\right)\log\left(\frac{12}{5}\,e^{\left(x^{2}\right)}+\frac{3}{5}\right)$$

input
```
integrate((((-16*exp(20+4*x)+4)*exp(x^2)-4*exp(20+4*x)+1)*log(12/5*exp(x^2
)+3/5)+((-24*x-4)*exp(20+4*x)+8*x^2+8*x)*exp(x^2)+(-4*x-1)*exp(20+4*x)+2*x
)/(4*exp(x^2)+1),x, algorithm=\
```

output
```
x^2 - x*e^(4*x + 20) + (x - e^(4*x + 20))*log(12/5*e^(x^2) + 3/5)
```

3.354.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{20+4x}(-1-4x)+2x+e^{x^2}(e^{20+4x}(-4-24x)+8x+8x^2)+\left(1-4e^{20+4x}+e^{x^2}(4-16e^{20+4x})\right)\log\left(\frac{1}{5}\left(\right.\right.}{1+4e^{x^2}}$$
$= \text{Timed out}$

input
```
integrate((((-16*exp(20+4*x)+4)*exp(x**2)-4*exp(20+4*x)+1)*ln(12/5*exp(x**
2)+3/5)+((-24*x-4)*exp(20+4*x)+8*x**2+8*x)*exp(x**2)+(-4*x-1)*exp(20+4*x)+
2*x)/(4*exp(x**2)+1),x)
```

output
```
Timed out
```

3.354.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(24) = 48$.

Time = 0.35 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.27

$$\int \frac{e^{20+4x}(-1-4x)+2x+e^{x^2}(e^{20+4x}(-4-24x)+8x+8x^2)+\left(1-4e^{20+4x}+e^{x^2}(4-16e^{20+4x})\right)\log\left(\frac{1}{5}\left(\right.\right.}{1+4e^{x^2}}$$
$$= x^2 - x(\log(5)-\log(3)) - \left(xe^{20}-(\log(5)-\log(3))e^{20}\right)e^{(4x)} + \left(x-e^{(4x+20)}+1\right)\log\left(4e^{(x^2)}+1\right) - \log\left(4e^{(x^2)}+1\right)$$

input
```
integrate((((-16*exp(20+4*x)+4)*exp(x^2)-4*exp(20+4*x)+1)*log(12/5*exp(x^2
)+3/5)+((-24*x-4)*exp(20+4*x)+8*x^2+8*x)*exp(x^2)+(-4*x-1)*exp(20+4*x)+2*x
)/(4*exp(x^2)+1),x, algorithm=\
```

output
```
x^2 - x*(log(5) - log(3)) - (x*e^20 - (log(5) - log(3))*e^20)*e^(4*x) + (x
 - e^(4*x + 20) + 1)*log(4*e^(x^2) + 1) - log(4*e^(x^2) + 1)
```

3.354.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.37

$$\int \frac{e^{20+4x}(-1-4x)+2x+e^{x^2}(e^{20+4x}(-4-24x)+8x+8x^2)+\left(1-4e^{20+4x}+e^{x^2}(4-16e^{20+4x})\right)\log\left(\frac{1}{5}\left(\right.\right.}{1+4e^{x^2}}$$
$$= x^2 - xe^{(4x+20)} + x\log\left(\frac{12}{5}e^{(x^2)}+\frac{3}{5}\right) - e^{(4x+20)}\log\left(\frac{12}{5}e^{(x^2)}+\frac{3}{5}\right)$$

input
```
integrate((((-16*exp(20+4*x)+4)*exp(x^2)-4*exp(20+4*x)+1)*log(12/5*exp(x^2
)+3/5)+((-24*x-4)*exp(20+4*x)+8*x^2+8*x)*exp(x^2)+(-4*x-1)*exp(20+4*x)+2*x
)/(4*exp(x^2)+1),x, algorithm=\
```

output
```
x^2 - x*e^(4*x + 20) + x*log(12/5*e^(x^2) + 3/5) - e^(4*x + 20)*log(12/5*e
^(x^2) + 3/5)
```

3.354.9 Mupad [B] (verification not implemented)

Time = 12.81 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.73

$$\int \frac{e^{20+4x}(-1-4x)+2x+e^{x^2}(e^{20+4x}(-4-24x)+8x+8x^2)+\left(1-4e^{20+4x}+e^{x^2}(4-16e^{20+4x})\right)\log\left(\frac{1}{5}\left(\right.\right.}{1+4e^{x^2}}$$
$$= \left(x+\ln\left(\frac{12\,\mathrm{e}^{x^2}}{5}+\frac{3}{5}\right)\right)\left(x-\mathrm{e}^{4x+20}\right)$$

input
```
int((2*x - log((12*exp(x^2))/5 + 3/5)*(4*exp(4*x + 20) + exp(x^2)*(16*exp(
4*x + 20) - 4) - 1) - exp(4*x + 20)*(4*x + 1) + exp(x^2)*(8*x - exp(4*x +
20)*(24*x + 4) + 8*x^2))/(4*exp(x^2) + 1),x)
```

output
```
(x + log((12*exp(x^2))/5 + 3/5))*(x - exp(4*x + 20))
```

3.355 $\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx$

3.355.1 Optimal result

Integrand size = 49, antiderivative size = 20

$$\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx=e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}$$

output
```
exp(x*ln(1/4*x^2/(x+9)/ln(2)^2)+x)
```

3.355.2 Mathematica [A] (verified)

Time = 0.74 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx=e^x\left(\frac{x^2}{9+x}\right)^x\log^{-2x}(4)$$

input
```
Integrate[(E^(x + x*Log[x^2/((9 + x)*Log[4]^2)])*(27 + 2*x + (9 + x)*Log[x
^2/((9 + x)*Log[4]^2)]))/(9 + x),x]
```

output
```
(E^x*(x^2/(9 + x))^x)/Log[4]^(2*x)
```

3.355.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.020, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x\log\left(\frac{x^2}{(x+9)\log^2(4)}\right)+x}\left((x+9)\log\left(\frac{x^2}{(x+9)\log^2(4)}\right)+2x+27\right)}{x+9}dx$$

$$\Big\downarrow \text{7257}$$

$$e^x\left(\frac{x^2}{x+9}\right)^x\log^{-2x}(4)$$

input
```
Int[(E^(x + x*Log[x^2/((9 + x)*Log[4]^2)])*(27 + 2*x + (9 + x)*Log[x^2/((9
 + x)*Log[4]^2)]))/(9 + x),x]
```

output
```
(E^x*(x^2/(9 + x))^x)/Log[4]^(2*x)
```

3.355.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.355.4 Maple [A] (verified)

Time = 0.78 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

method	result	size
risch	$\left(\frac{x^2}{4(x+9)\ln(2)^2}\right)^x e^x$	20
norman	$e^{x\ln\left(\frac{x^2}{4(x+9)\ln(2)^2}\right)+x}$	21
parallelrisch	$e^{x\left(\ln\left(\frac{x^2}{4(x+9)\ln(2)^2}\right)+1\right)}$	21

input
```
int(((x+9)*ln(1/4*x^2/(x+9)/ln(2)^2)+2*x+27)*exp(x*ln(1/4*x^2/(x+9)/ln(2)^
2)+x)/(x+9),x,method=_RETURNVERBOSE)
```

output
```
(1/4*x^2/(x+9)/ln(2)^2)^x*exp(x)
```

3.355.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx = e^{\left(x\log\left(\frac{x^2}{4\,(x+9)\log(2)^2}\right)+x\right)}$$

input
```
integrate(((x+9)*log(1/4*x^2/(x+9)/log(2)^2)+2*x+27)*exp(x*log(1/4*x^2/(x+
9)/log(2)^2)+x)/(x+9),x, algorithm=\
```

output
```
e^(x*log(1/4*x^2/((x + 9)*log(2)^2)) + x)
```

3.355.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx = e^{x\log\left(\frac{x^2}{4(x+9)\log(2)^2}\right)+x}$$

input
```
integrate(((x+9)*ln(1/4*x**2/(x+9)/ln(2)**2)+2*x+27)*exp(x*ln(1/4*x**2/(x+
9)/ln(2)**2)+x)/(x+9),x)
```

output
```
exp(x*log(x**2/(4*(x + 9)*log(2)**2)) + x)
```

3.355.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30

$$\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx$$
$$= e^{(-2\,x\log(2)-x\log(x+9)+2\,x\log(x)-2\,x\log(\log(2))+x)}$$

3.355. $\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx$

input
```
integrate(((x+9)*log(1/4*x^2/(x+9)/log(2)^2)+2*x+27)*exp(x*log(1/4*x^2/(x+
9)/log(2)^2)+x)/(x+9),x, algorithm=\
```

output
```
e^(-2*x*log(2) - x*log(x + 9) + 2*x*log(x) - 2*x*log(log(2)) + x)
```

3.355.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30

$$\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx=e^{\left(x\log\left(\frac{x^2}{4\left(x\log(2)^2+9\log(2)^2\right)}\right)+x\right)}$$

input
```
integrate(((x+9)*log(1/4*x^2/(x+9)/log(2)^2)+2*x+27)*exp(x*log(1/4*x^2/(x+
9)/log(2)^2)+x)/(x+9),x, algorithm=\
```

output
```
e^(x*log(1/4*x^2/(x*log(2)^2 + 9*log(2)^2)) + x)
```

3.355.9 Mupad [B] (verification not implemented)

Time = 12.73 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30

$$\int \frac{e^{x+x\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)}\left(27+2x+(9+x)\log\left(\frac{x^2}{(9+x)\log^2(4)}\right)\right)}{9+x}\,dx$$
$$=e^x\left(\frac{1}{4\,x\ln\left(2\right)^2+36\ln\left(2\right)^2}\right)^x\left(x^2\right)^x$$

input
```
int((exp(x + x*log(x^2/(4*log(2)^2*(x + 9))))*(2*x + log(x^2/(4*log(2)^2*(
x + 9)))*(x + 9) + 27))/(x + 9),x)
```

output
```
exp(x)*(1/(4*x*log(2)^2 + 36*log(2)^2))^x*(x^2)^x
```

3.356 $\int \frac{80+36x+(-40+18x)\log(x)-9x\log^2(x)}{9x}\,dx$

3.356.1 Optimal result

Integrand size = 27, antiderivative size = 14

$$\int \frac{80+36x+(-40+18x)\log(x)-9x\log^2(x)}{9x}\,dx = \left(\frac{20}{9}+x\right)(4-\log(x))\log(x)$$

output
```
ln(x)*(-ln(x)+4)*(20/9+x)
```

3.356.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.93

$$\int \frac{80+36x+(-40+18x)\log(x)-9x\log^2(x)}{9x}\,dx = \frac{80\log(x)}{9}+4x\log(x)-\frac{20\log^2(x)}{9}-x\log^2(x)$$

input
```
Integrate[(80 + 36*x + (-40 + 18*x)*Log[x] - 9*x*Log[x]^2)/(9*x),x]
```

output
```
(80*Log[x])/9 + 4*x*Log[x] - (20*Log[x]^2)/9 - x*Log[x]^2
```

3.356.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.93, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{36x - 9x\log^2(x) + (18x - 40)\log(x) + 80}{9x}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{9}\int \frac{-9x\log^2(x) - 2(20 - 9x)\log(x) + 36x + 80}{x}dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{9}\int \left(-9\log^2(x) + \frac{2(9x - 20)\log(x)}{x} + \frac{4(9x + 20)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{9}\left(-9x\log^2(x) - 20\log^2(x) + 36x\log(x) + 80\log(x)\right)$$

input
```
Int[(80 + 36*x + (-40 + 18*x)*Log[x] - 9*x*Log[x]^2)/(9*x),x]
```

output
```
(80*Log[x] + 36*x*Log[x] - 20*Log[x]^2 - 9*x*Log[x]^2)/9
```

3.356.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.356.4 Maple [A] (verified)

Time = 0.82 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.57

method	result	size
risch	$\frac{(-9x-20)\ln(x)^2}{9}+4x\ln(x)+\frac{80\ln(x)}{9}$	22
default	$-x\ln(x)^2+4x\ln(x)-\frac{20\ln(x)^2}{9}+\frac{80\ln(x)}{9}$	24
norman	$-x\ln(x)^2+4x\ln(x)-\frac{20\ln(x)^2}{9}+\frac{80\ln(x)}{9}$	24
parallelrisch	$-x\ln(x)^2+4x\ln(x)-\frac{20\ln(x)^2}{9}+\frac{80\ln(x)}{9}$	24
parts	$-x\ln(x)^2+4x\ln(x)-\frac{20\ln(x)^2}{9}+\frac{80\ln(x)}{9}$	24

input
```
int(1/9*(-9*x*ln(x)^2+(18*x-40)*ln(x)+36*x+80)/x,x,method=_RETURNVERBOSE)
```

output
```
1/9*(-9*x-20)*ln(x)^2+4*x*ln(x)+80/9*ln(x)
```

3.356.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.50

$$\int \frac{80+36x+(-40+18x)\log(x)-9x\log^2(x)}{9x}\,dx = -\frac{1}{9}\,(9\,x+20)\log(x)^2+\frac{4}{9}\,(9\,x+20)\log(x)$$

input
```
integrate(1/9*(-9*x*log(x)^2+(18*x-40)*log(x)+36*x+80)/x,x, algorithm=\
```

output
```
-1/9*(9*x + 20)*log(x)^2 + 4/9*(9*x + 20)*log(x)
```

3.356.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.71

$$\int \frac{80+36x+(-40+18x)\log(x)-9x\log^2(x)}{9x}\,dx = 4x\log(x)+\left(-x-\frac{20}{9}\right)\log(x)^2+\frac{80\log(x)}{9}$$

input
```
integrate(1/9*(-9*x*ln(x)**2+(18*x-40)*ln(x)+36*x+80)/x,x)
```

output
```
4*x*log(x) + (-x - 20/9)*log(x)**2 + 80*log(x)/9
```

3.356.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. 2(13) = 26.

Time = 0.22 (sec) , antiderivative size = 32, normalized size of antiderivative = 2.29

$$\int \frac{80+36x+(-40+18x)\log(x)-9x\log^2(x)}{9x}\,dx = -\left(\log(x)^2-2\log(x)+2\right)x+2x\log(x)-\frac{20}{9}\log(x)^2+2x+\frac{80}{9}\log(x)$$

input
```
integrate(1/9*(-9*x*log(x)^2+(18*x-40)*log(x)+36*x+80)/x,x, algorithm=\
```

output
```
-(log(x)^2 - 2*log(x) + 2)*x + 2*x*log(x) - 20/9*log(x)^2 + 2*x + 80/9*log
(x)
```

3.356.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.50

$$\int \frac{80+36x+(-40+18x)\log(x)-9x\log^2(x)}{9x}\,dx = -\frac{1}{9}(9x+20)\log(x)^2+4x\log(x)+\frac{80}{9}\log(x)$$

input
```
integrate(1/9*(-9*x*log(x)^2+(18*x-40)*log(x)+36*x+80)/x,x, algorithm=\
```

output
```
-1/9*(9*x + 20)*log(x)^2 + 4*x*log(x) + 80/9*log(x)
```

3.356.9 Mupad [B] (verification not implemented)

Time = 12.37 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{80+36x+(-40+18x)\log(x)-9x\log^2(x)}{9x}\,dx=-\frac{\ln(x)\ (9\,x+20)\ (\ln(x)-4)}{9}$$

input
```
int((4*x - x*log(x)^2 + (log(x)*(18*x - 40))/9 + 80/9)/x,x)
```

output
```
-(log(x)*(9*x + 20)*(log(x) - 4))/9
```

3.357 $\int \Big(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (15$

3.357.1 Optimal result

Integrand size = 288, antiderivative size = 19

$$\begin{aligned}&\int \Big(125000+30000x+8e^{4x^2}x+2400x^2+64x^3+\left(150000+24000x+960x^2\right)\log(2)\\&+\left(75000+7200x+96x^2\right)\log^2(2)+(20000+960x)\log^3(2)+(3000+48x)\log^4(2)\\&+240\log^5(2)+8\log^6(2)+e^{3x^2}\left(-8-600x-48x^2-240x\log(2)-24x\log^2(2)\right)\\&+e^{2x^2}\left(600+15048x+2400x^2+96x^3+\left(240+12000x+960x^2\right)\log(2)\right.\\&\left.+\left(24+3600x+96x^2\right)\log^2(2)+480x\log^3(2)+24x\log^4(2)\right)+e^{x^2}\left(-15000-127400x\right.\\&-30096x^2-2400x^3-64x^4+\left(-12000-150960x-24000x^2-960x^3\right)\log(2)\\&+\left(-3600-75096x-7200x^2-96x^3\right)\log^2(2)+\left(-480-20000x-960x^2\right)\log^3(2)\\&\left.+\left(-24-3000x-48x^2\right)\log^4(2)-240x\log^5(2)-8x\log^6(2)\right)\Big)\,dx=\Big(-e^{x^2}+2x\\&\qquad+(5+\log(2))^2\Big)^4\end{aligned}$$

output
```
(2*x+(ln(2)+5)^2-exp(x^2))^4
```

3.357.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \Big(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (150000 + 24000x + 960x^2)\log(2) + (75000 + 7200x + 96x^2)\log^2(2) + (20000 + 960x)\log^3(2) + (3000 + 48x)\log^4(2) + 240\log^5(2) + 8\log^6(2) + e^{3x^2}(-8 - 600x - 48x^2 - 240x\log(2) - 24x\log^2(2)) + e^{2x^2}(600 + 15048x + 2400x^2 + 96x^3 + (240 + 12000x + 960x^2)\log(2) + (24 + 3600x + 96x^2)\log^2(2) + 480x\log^3(2) + 24x\log^4(2)) + e^{x^2}(-15000 - 127400x - 30096x^2 - 2400x^3 - 64x^4 + (-12000 - 150960x - 24000x^2 - 960x^3)\log(2) + (-3600 - 75096x - 7200x^2 - 96x^3)\log^2(2) + (-480 - 20000x - 960x^2)\log^3(2) + (-24 - 3000x - 48x^2)\log^4(2) - 240x\log^5(2) - 8x\log^6(2))\Big)\,dx = \left(-e^{x^2} + 2x + (5 + \log(2))^2\right)^4$$

input
```
Integrate[125000 + 30000*x + 8*E^(4*x^2)*x + 2400*x^2 + 64*x^3 + (150000 +
 24000*x + 960*x^2)*Log[2] + (75000 + 7200*x + 96*x^2)*Log[2]^2 + (20000 +
 960*x)*Log[2]^3 + (3000 + 48*x)*Log[2]^4 + 240*Log[2]^5 + 8*Log[2]^6 + E^
(3*x^2)*(-8 - 600*x - 48*x^2 - 240*x*Log[2] - 24*x*Log[2]^2) + E^(2*x^2)*(
600 + 15048*x + 2400*x^2 + 96*x^3 + (240 + 12000*x + 960*x^2)*Log[2] + (24
 + 3600*x + 96*x^2)*Log[2]^2 + 480*x*Log[2]^3 + 24*x*Log[2]^4) + E^x^2*(-1
5000 - 127400*x - 30096*x^2 - 2400*x^3 - 64*x^4 + (-12000 - 150960*x - 240
00*x^2 - 960*x^3)*Log[2] + (-3600 - 75096*x - 7200*x^2 - 96*x^3)*Log[2]^2
+ (-480 - 20000*x - 960*x^2)*Log[2]^3 + (-24 - 3000*x - 48*x^2)*Log[2]^4 -
 240*x*Log[2]^5 - 8*x*Log[2]^6),x]
```

output
```
(-E^x^2 + 2*x + (5 + Log[2])^2)^4
```

3.357.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.71 (sec) , antiderivative size = 362, normalized size of antiderivative = 19.05, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.003$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

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$\int \Big(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (150000 + 24000x + 960x^2)\log(2) + (75000 + 7200x + 9$

$$\int \left(64x^3 + 2400x^2 + 8e^{4x^2}x + e^{3x^2}\left(-48x^2 - 600x - 24x\log^2(2) - 240x\log(2) - 8\right) + \left(96x^2 + 7200x + 75000\right)\text{lo}\right.$$

$$\Big\downarrow \text{2009}$$

$$-24\sqrt{\pi}\text{erfi}(x) + 12\sqrt{\pi}\left(627 + \log^4(2) + 20\log^3(2) + 150\log^2(2) + 500\log(2)\right)\text{erfi}(x) - 12\sqrt{\pi}(5 + \log(2))^4\text{erfi}(x) + 16x^4 + 800x^3 + 32x^3\log^2(2) + 24e^{2x^2}x^2 + 15000x^2 + 48e^{x^2}x - 8e^{3x^2}x - 12e^{2x^2} + e^{4x^2} + 3600x^2\log^2(2) - 24e^{x^2}x\left(627 + \log^4(2) + 20\log^3(2) + 150\log^2(2) + 500\log(2)\right) - 4e^{x^2}(5 + \log(2))^2\left(637 + \log^4(2) + 20\log^3(2) + 150\log^2(2) + 500\log(2)\right) + 6e^{2x^2}\left(627 + \log^4(2) + 20\log^3(2) + 150\log^2(2) + 500\log(2)\right) - 48e^{x^2}x^2(5 + \log(2))^2 + 24e^{2x^2}x(5 + \log(2))^2 + 48e^{x^2}(5 + \log(2))^2 - 4e^{3x^2}(5 + \log(2))^2 - 32e^{x^2}x^3 + 6(2x + 125)^2\log^4(2) + \frac{40}{3}(6x + 125)^2\log^3(2) + 75000x\log^2(2) + 8x\left(15625 + \log^6(2) + 30\log^5(2)\right) + 40(2x + 25)^3\log(2)$$

input
```
Int[125000 + 30000*x + 8*E^(4*x^2)*x + 2400*x^2 + 64*x^3 + (150000 + 24000
*x + 960*x^2)*Log[2] + (75000 + 7200*x + 96*x^2)*Log[2]^2 + (20000 + 960*x
)*Log[2]^3 + (3000 + 48*x)*Log[2]^4 + 240*Log[2]^5 + 8*Log[2]^6 + E^(3*x^2
)*(-8 - 600*x - 48*x^2 - 240*x*Log[2] - 24*x*Log[2]^2) + E^(2*x^2)*(600 +
15048*x + 2400*x^2 + 96*x^3 + (240 + 12000*x + 960*x^2)*Log[2] + (24 + 360
0*x + 96*x^2)*Log[2]^2 + 480*x*Log[2]^3 + 24*x*Log[2]^4) + E^x^2*(-15000 -
 127400*x - 30096*x^2 - 2400*x^3 - 64*x^4 + (-12000 - 150960*x - 24000*x^2
 - 960*x^3)*Log[2] + (-3600 - 75096*x - 7200*x^2 - 96*x^3)*Log[2]^2 + (-48
0 - 20000*x - 960*x^2)*Log[2]^3 + (-24 - 3000*x - 48*x^2)*Log[2]^4 - 240*x
*Log[2]^5 - 8*x*Log[2]^6),x]
```

output
```
-12*E^(2*x^2) + E^(4*x^2) + 48*E^x^2*x - 8*E^(3*x^2)*x + 15000*x^2 + 24*E^
(2*x^2)*x^2 + 800*x^3 - 32*E^x^2*x^3 + 16*x^4 - 24*Sqrt[Pi]*Erfi[x] + 40*(
25 + 2*x)^3*Log[2] + 75000*x*Log[2]^2 + 3600*x^2*Log[2]^2 + 32*x^3*Log[2]^
2 + (40*(125 + 6*x)^2*Log[2]^3)/3 + 6*(125 + 2*x)^2*Log[2]^4 + 48*E^x^2*(5
 + Log[2])^2 - 4*E^(3*x^2)*(5 + Log[2])^2 + 24*E^(2*x^2)*x*(5 + Log[2])^2
- 48*E^x^2*x^2*(5 + Log[2])^2 - 12*Sqrt[Pi]*Erfi[x]*(5 + Log[2])^4 + 6*E^(
2*x^2)*(627 + 500*Log[2] + 150*Log[2]^2 + 20*Log[2]^3 + Log[2]^4) - 24*E^x
^2*x*(627 + 500*Log[2] + 150*Log[2]^2 + 20*Log[2]^3 + Log[2]^4) + 12*Sqrt[
Pi]*Erfi[x]*(627 + 500*Log[2] + 150*Log[2]^2 + 20*Log[2]^3 + Log[2]^4) - 4
*E^x^2*(5 + Log[2])^2*(637 + 500*Log[2] + 150*Log[2]^2 + 20*Log[2]^3 + Log
[2]^4) + 8*x*(15625 + 30*Log[2]^5 + Log[2]^6)
```

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$$\int \Big(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (150000 + 24000x + 960x^2)\log(2) + (75000 + 7200x + 9$$

3.357.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.357.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 284 vs. $2(18) = 36$.

Time = 0.24 (sec) , antiderivative size = 285, normalized size of antiderivative = 15.00

method	result
norman	$e^{4x^2} + \left(-4\ln(2)^2 - 40\ln(2) - 100\right)e^{3x^2} + \left(32\ln(2)^2 + 320\ln(2) + 800\right)x^3 + \left(6\ln(2)^4 + \right.$
risch	$e^{4x^2} + \left(-4\ln(2)^2 - 40\ln(2) - 8x - 100\right)e^{3x^2} + \left(6\ln(2)^4 + 120\ln(2)^3 + 24x\ln(2)^2 + 900\right.$
default	$125000x - 12000x\ln(2)e^{x^2} + 24e^{2x^2}x^2 - 75000\ln(2)e^{x^2} - 8x\,e^{3x^2} + 8x\ln(2)^6 - 32x^3e^{x^2} -$
parallelrisch	$-12000x\ln(2)e^{x^2} + 24e^{2x^2}x^2 - 75000\ln(2)e^{x^2} + 24x^2\ln(2)^4 + 480x^2\ln(2)^3 - 8x\,e^{3x^2} + 2$
parts	$125000x - 12000x\ln(2)e^{x^2} + 24e^{2x^2}x^2 - 75000\ln(2)e^{x^2} + 24x^2\ln(2)^4 + 480x^2\ln(2)^3 - 8$

input
```
int(8*x*exp(x^2)^4+(-24*x*ln(2)^2-240*x*ln(2)-48*x^2-600*x-8)*exp(x^2)^3+(
24*x*ln(2)^4+480*x*ln(2)^3+(96*x^2+3600*x+24)*ln(2)^2+(960*x^2+12000*x+240
)*ln(2)+96*x^3+2400*x^2+15048*x+600)*exp(x^2)^2+(-8*x*ln(2)^6-240*x*ln(2)^
5+(-48*x^2-3000*x-24)*ln(2)^4+(-960*x^2-20000*x-480)*ln(2)^3+(-96*x^3-7200
*x^2-75096*x-3600)*ln(2)^2+(-960*x^3-24000*x^2-150960*x-12000)*ln(2)-64*x^
4-2400*x^3-30096*x^2-127400*x-15000)*exp(x^2)+8*ln(2)^6+240*ln(2)^5+(48*x+
3000)*ln(2)^4+(960*x+20000)*ln(2)^3+(96*x^2+7200*x+75000)*ln(2)^2+(960*x^2
+24000*x+150000)*ln(2)+64*x^3+2400*x^2+30000*x+125000,x,method=_RETURNVERB
OSE)
```

output
```
exp(x^2)^4+(-4*ln(2)^2-40*ln(2)-100)*exp(x^2)^3+(32*ln(2)^2+320*ln(2)+800)
*x^3+(6*ln(2)^4+120*ln(2)^3+900*ln(2)^2+3000*ln(2)+3750)*exp(x^2)^2+(24*ln
(2)^4+480*ln(2)^3+3600*ln(2)^2+12000*ln(2)+15000)*x^2+(-62500-4*ln(2)^6-12
0*ln(2)^5-1500*ln(2)^4-75000*ln(2)-37500*ln(2)^2-10000*ln(2)^3)*exp(x^2)+(
125000+8*ln(2)^6+240*ln(2)^5+3000*ln(2)^4+150000*ln(2)+75000*ln(2)^2+20000
*ln(2)^3)*x+(-48*ln(2)^2-480*ln(2)-1200)*x^2*exp(x^2)+(24*ln(2)^2+240*ln(2
)+600)*x*exp(x^2)^2+(-24*ln(2)^4-480*ln(2)^3-3600*ln(2)^2-12000*ln(2)-1500
0)*x*exp(x^2)+16*x^4+24*x^2*exp(x^2)^2-32*x^3*exp(x^2)-8*exp(x^2)^3*x
```

3.357.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 257 vs. $2(18) = 36$.

Time = 0.28 (sec) , antiderivative size = 257, normalized size of antiderivative = 13.53

$$\int \left(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + \left(150000 + 24000x + 960x^2\right)\log(2) + \left(75000 + 7200x + 96x^2\right)\log^2(2) + (20000 + 960x)\log^3(2) + (3000 + 48x)\log^4(2) + 240\log^5(2) + 8\log^6(2) + e^{3x^2}\left(-8 - 600x - 48x^2 - 240x\log(2) - 24x\log^2(2)\right) + e^{2x^2}\left(600 + 15048x + 2400x^2 + 96x^3 + \left(240 + 12000x + 960x^2\right)\log(2) + \left(24 + 3600x + 96x^2\right)\log^2(2) + 480x\log^3(2) + 24x\log^4(2)\right) + e^{x^2}\left(-15000 - 127400x - 30096x^2 - 2400x^3 - 64x^4 + \left(-12000 - 150960x - 24000x^2 - 960x^3\right)\log(2) + \left(-3600 - 75096x - 7200x^2 - 96x^3\right)\log^2(2) + \left(-480 - 20000x - 960x^2\right)\log^3(2) + \left(-24 - 3000x - 48x^2\right)\log^4(2) - 240x\log^5(2) - 8x\log^6(2)\right)\right) dx = 8\,x\log(2)^6 + 240\,x\log(2)^5 + 24\left(x^2 + 125\,x\right)\log(2)^4 + 16\,x^4 + 160\left(3\,x^2 + 125\,x\right)\log(2)^3 + 800\,x^3 + 8\left(4\,x^3 + 450\,x^2 + 9375\,x\right)\log(2)^2 + 15000\,x^2 - 4\left(\log(2)^2 + 2\,x + 10\,\log(2) + 25\right)e^{(3\,x^2)} + 6\left(\log(2)^4 + 2\,(2\,x + 75)\log(2)^2 + 20\,\log(2)^3 + 4\,x^2 + 20\,(2\,x + 25)\log(2) + 100\,x + 625\right)e^{(2\,x^2)} - 4\left(\log(2)^6 + 3\,(2\,x + 125)\log(2)^4 + 30\,\log(2)^5 + 20\,(6\,x + 125)\log(2)^3 + 8\,x^3 + 3\left(4\,x^2 + 300\,x + 312\right.\right. + 80\left(4\,x^3 + 150\,x^2 + 1875\,x\right)\log(2) + 125000\,x + e^{(4\,x^2)}$$

input
```
integrate(8*x*exp(x^2)^4+(-24*x*log(2)^2-240*x*log(2)-48*x^2-600*x-8)*exp(
x^2)^3+(24*x*log(2)^4+480*x*log(2)^3+(96*x^2+3600*x+24)*log(2)^2+(960*x^2+
12000*x+240)*log(2)+96*x^3+2400*x^2+15048*x+600)*exp(x^2)^2+(-8*x*log(2)^6
-240*x*log(2)^5+(-48*x^2-3000*x-24)*log(2)^4+(-960*x^2-20000*x-480)*log(2)
^3+(-96*x^3-7200*x^2-75096*x-3600)*log(2)^2+(-960*x^3-24000*x^2-150960*x-1
2000)*log(2)-64*x^4-2400*x^3-30096*x^2-127400*x-15000)*exp(x^2)+8*log(2)^6
+240*log(2)^5+(48*x+3000)*log(2)^4+(960*x+20000)*log(2)^3+(96*x^2+7200*x+7
5000)*log(2)^2+(960*x^2+24000*x+150000)*log(2)+64*x^3+2400*x^2+30000*x+125
000,x, algorithm=\
```

output
```
8*x*log(2)^6 + 240*x*log(2)^5 + 24*(x^2 + 125*x)*log(2)^4 + 16*x^4 + 160*(
3*x^2 + 125*x)*log(2)^3 + 800*x^3 + 8*(4*x^3 + 450*x^2 + 9375*x)*log(2)^2
+ 15000*x^2 - 4*(log(2)^2 + 2*x + 10*log(2) + 25)*e^(3*x^2) + 6*(log(2)^4
+ 2*(2*x + 75)*log(2)^2 + 20*log(2)^3 + 4*x^2 + 20*(2*x + 25)*log(2) + 100
*x + 625)*e^(2*x^2) - 4*(log(2)^6 + 3*(2*x + 125)*log(2)^4 + 30*log(2)^5 +
 20*(6*x + 125)*log(2)^3 + 8*x^3 + 3*(4*x^2 + 300*x + 3125)*log(2)^2 + 300
*x^2 + 30*(4*x^2 + 100*x + 625)*log(2) + 3750*x + 15625)*e^(x^2) + 80*(4*x
^3 + 150*x^2 + 1875*x)*log(2) + 125000*x + e^(4*x^2)
```

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$\int \left(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (150000 + 24000x + 960x^2)\log(2) + (75000 + 7200x + 9\right.$

3.357.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 296 vs. $2(15) = 30$.

Time = 0.21 (sec) , antiderivative size = 296, normalized size of antiderivative = 15.58

$$\int \Big(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (150000 + 24000x + 960x^2)\log(2) + (75000 + 7200x + 96x^2)\log^2(2) + (20000 + 960x)\log^3(2) + (3000 + 48x)\log^4(2) + 240\log^5(2) + 8\log^6(2) + e^{3x^2}(-8 - 600x - 48x^2 - 240x\log(2) - 24x\log^2(2)) + e^{2x^2}(600 + 15048x + 2400x^2 + 96x^3 + (240 + 12000x + 960x^2)\log(2) + (24 + 3600x + 96x^2)\log^2(2) + 480x\log^3(2) + 24x\log^4(2)) + e^{x^2}(-15000 - 127400x - 30096x^2 - 2400x^3 - 64x^4 + (-12000 - 150960x - 24000x^2 - 960x^3)\log(2) + (-3600 - 75096x - 7200x^2 - 96x^3)\log^2(2) + (-480 - 20000x - 960x^2)\log^3(2) + (-24 - 3000x - 48x^2)\log^4(2) - 240x\log^5(2) - 8x\log^6(2))\Big)\,dx = 16x^4 + x^3\cdot\left(32\log(2)^2 + 320\log(2) + 800\right) + x^2\cdot\left(24\log(2)^4 + 480\log(2)^3 + 3600\log(2)^2 + 12000\log(2) + 15000\right) + x\left(8\log(2)^6 + 240\log(2)^5 + 3000\log(2)^4 + 20000\log(2)^3 + 75000\log(2)^2 + 150000\log(2) + 125000\right) + \left(-8x - 100 - 40\log(2) - 4\log(2)^2\right)e^{3x^2} + \left(24x^2 + 24x\log(2)^2 + 240x\log(2) + 600x + 6\log(2)^4 + 120\log(2)^3 + 900\log(2)^2 + 3000\log(2) + 3750\right)e^{2x^2} + \left(-32x^3 - 1200x^2 - 480x^2\log(2) - 48x^2\log(2)^2 - 15000x - 12000x\log(2) - 3600x\log(2)^2 - 480x\log(2)^3 - 24x\log(2)^4 - 62500 - 75000\log(2) - 37500\log(2)^2 - 10000\log(2)^3 - 1500\log(2)^4 - 120\log(2)^5 - 4\log(2)^6\right)e^{x^2} + e^{4x^2}$$

input
```
integrate(8*x*exp(x**2)**4+(-24*x*ln(2)**2-240*x*ln(2)-48*x**2-600*x-8)*ex
p(x**2)**3+(24*x*ln(2)**4+480*x*ln(2)**3+(96*x**2+3600*x+24)*ln(2)**2+(960
*x**2+12000*x+240)*ln(2)+96*x**3+2400*x**2+15048*x+600)*exp(x**2)**2+(-8*x
*ln(2)**6-240*x*ln(2)**5+(-48*x**2-3000*x-24)*ln(2)**4+(-960*x**2-20000*x-
480)*ln(2)**3+(-96*x**3-7200*x**2-75096*x-3600)*ln(2)**2+(-960*x**3-24000*
x**2-150960*x-12000)*ln(2)-64*x**4-2400*x**3-30096*x**2-127400*x-15000)*ex
p(x**2)+8*ln(2)**6+240*ln(2)**5+(48*x+3000)*ln(2)**4+(960*x+20000)*ln(2)**
3+(96*x**2+7200*x+75000)*ln(2)**2+(960*x**2+24000*x+150000)*ln(2)+64*x**3+
2400*x**2+30000*x+125000,x)
```

output
```
16*x**4 + x**3*(32*log(2)**2 + 320*log(2) + 800) + x**2*(24*log(2)**4 + 48
0*log(2)**3 + 3600*log(2)**2 + 12000*log(2) + 15000) + x*(8*log(2)**6 + 24
0*log(2)**5 + 3000*log(2)**4 + 20000*log(2)**3 + 75000*log(2)**2 + 150000*
log(2) + 125000) + (-8*x - 100 - 40*log(2) - 4*log(2)**2)*exp(3*x**2) + (2
4*x**2 + 24*x*log(2)**2 + 240*x*log(2) + 600*x + 6*log(2)**4 + 120*log(2)*
*3 + 900*log(2)**2 + 3000*log(2) + 3750)*exp(2*x**2) + (-32*x**3 - 1200*x*
*2 - 480*x**2*log(2) - 48*x**2*log(2)**2 - 15000*x - 12000*x*log(2) - 3600
*x*log(2)**2 - 480*x*log(2)**3 - 24*x*log(2)**4 - 62500 - 75000*log(2) - 3
7500*log(2)**2 - 10000*log(2)**3 - 1500*log(2)**4 - 120*log(2)**5 - 4*log(
2)**6)*exp(x**2) + exp(4*x**2)
```

3.357.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 259 vs. $2(18) = 36$.

Time = 0.31 (sec) , antiderivative size = 259, normalized size of antiderivative = 13.63

$$\int \Big(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (150000 + 24000x + 960x^2)\log(2) + (75000 + 7200x + 96x^2)\log^2(2) + (20000 + 960x)\log^3(2) + (3000 + 48x)\log^4(2) + 240\log^5(2) + 8\log^6(2) + e^{3x^2}(-8 - 600x - 48x^2 - 240x\log(2) - 24x\log^2(2)) + e^{2x^2}(600 + 15048x + 2400x^2 + 96x^3 + (240 + 12000x + 960x^2)\log(2) + (24 + 3600x + 96x^2)\log^2(2) + 480x\log^3(2) + 24x\log^4(2)) + e^{x^2}(-15000 - 127400x - 30096x^2 - 2400x^3 - 64x^4 + (-12000 - 150960x - 24000x^2 - 960x^3)\log(2) + (-3600 - 75096x - 7200x^2 - 96x^3)\log^2(2) + (-480 - 20000x - 960x^2)\log^3(2) + (-24 - 3000x - 48x^2)\log^4(2) - 240x\log^5(2) - 8x\log^6(2))\Big)\,dx = 8\,x\log(2)^6 + 240\,x\log(2)^5 + 24\,(x^2 + 125\,x)\log(2)^4 + 16\,x^4 + 160\,(3\,x^2 + 125\,x)\log(2)^3 + 800\,x^3 + 8\,(4\,x^3 + 450\,x^2 + 9375\,x)\log(2)^2 + 15000\,x^2 - 4\,(\log(2)^2 + 2\,x + 10\,\log(2) + 25)e^{(3\,x^2)} + 6\,(\log(2)^4 + 20\,\log(2)^3 + 4\,(\log(2)^2 + 10\,\log(2) + 25)x + 4\,x^2 + 150\,\log(2)^2 + 500\,\log(2) + 625)e^{(2} - 4\,(\log(2)^6 + 30\,\log(2)^5 + 375\,\log(2)^4 + 12\,(\log(2)^2 + 10\,\log(2) + 25)x^2 + 8\,x^3 + 2500\,\log(2)^3 + 6\,(l + 80\,(4\,x^3 + 150\,x^2 + 1875\,x)\log(2) + 125000\,x + e^{(4\,x^2)}$$

input
```
integrate(8*x*exp(x^2)^4+(-24*x*log(2)^2-240*x*log(2)-48*x^2-600*x-8)*exp(
x^2)^3+(24*x*log(2)^4+480*x*log(2)^3+(96*x^2+3600*x+24)*log(2)^2+(960*x^2+
12000*x+240)*log(2)+96*x^3+2400*x^2+15048*x+600)*exp(x^2)^2+(-8*x*log(2)^6
-240*x*log(2)^5+(-48*x^2-3000*x-24)*log(2)^4+(-960*x^2-20000*x-480)*log(2)
^3+(-96*x^3-7200*x^2-75096*x-3600)*log(2)^2+(-960*x^3-24000*x^2-150960*x-1
2000)*log(2)-64*x^4-2400*x^3-30096*x^2-127400*x-15000)*exp(x^2)+8*log(2)^6
+240*log(2)^5+(48*x+3000)*log(2)^4+(960*x+20000)*log(2)^3+(96*x^2+7200*x+7
5000)*log(2)^2+(960*x^2+24000*x+150000)*log(2)+64*x^3+2400*x^2+30000*x+125
000,x, algorithm=\
```

output
```
8*x*log(2)^6 + 240*x*log(2)^5 + 24*(x^2 + 125*x)*log(2)^4 + 16*x^4 + 160*(
3*x^2 + 125*x)*log(2)^3 + 800*x^3 + 8*(4*x^3 + 450*x^2 + 9375*x)*log(2)^2
+ 15000*x^2 - 4*(log(2)^2 + 2*x + 10*log(2) + 25)*e^(3*x^2) + 6*(log(2)^4
+ 20*log(2)^3 + 4*(log(2)^2 + 10*log(2) + 25)*x + 4*x^2 + 150*log(2)^2 + 5
00*log(2) + 625)*e^(2*x^2) - 4*(log(2)^6 + 30*log(2)^5 + 375*log(2)^4 + 12
*(log(2)^2 + 10*log(2) + 25)*x^2 + 8*x^3 + 2500*log(2)^3 + 6*(log(2)^4 + 2
0*log(2)^3 + 150*log(2)^2 + 500*log(2) + 625)*x + 9375*log(2)^2 + 18750*lo
g(2) + 15625)*e^(x^2) + 80*(4*x^3 + 150*x^2 + 1875*x)*log(2) + 125000*x +
e^(4*x^2)
```

3.357.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 271 vs. $2(18) = 36$.

$\int \Big(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (150000 + 24000x + 960x^2)\log(2) + (75000 + 7200x + 9$

Time = 0.26 (sec) , antiderivative size = 271, normalized size of antiderivative = 14.26

$$\int \Big(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (150000 + 24000x + 960x^2)\log(2) + (75000 + 7200x + 96x^2)\log^2(2) + (20000 + 960x)\log^3(2) + (3000 + 48x)\log^4(2) + 240\log^5(2) + 8\log^6(2) + e^{3x^2}(-8 - 600x - 48x^2 - 240x\log(2) - 24x\log^2(2)) + e^{2x^2}(600 + 15048x + 2400x^2 + 96x^3 + (240 + 12000x + 960x^2)\log(2) + (24 + 3600x + 96x^2)\log^2(2) + 480x\log^3(2) + 24x\log^4(2)) + e^{x^2}(-15000 - 127400x - 30096x^2 - 2400x^3 - 64x^4 + (-12000 - 150960x - 24000x^2 - 960x^3)\log(2) + (-3600 - 75096x - 7200x^2 - 96x^3)\log^2(2) + (-480 - 20000x - 960x^2)\log^3(2) + (-24 - 3000x - 48x^2)\log^4(2) - 240x\log^5(2) - 8x\log^6(2))\Big)\,dx = 8\,x\log(2)^6 + 240\,x\log(2)^5 + 24\,(x^2 + 125\,x)\log(2)^4 + 16\,x^4 + 160\,(3\,x^2 + 125\,x)\log(2)^3 + 800\,x^3 + 8\,(4\,x^3 + 450\,x^2 + 9375\,x)\log(2)^2 + 15000\,x^2 - 4\,(\log(2)^2 + 2\,x + 10\,\log(2) + 25)e^{(3\,x^2)} + 6\,(\log(2)^4 + 4\,x\log(2)^2 + 20\,\log(2)^3 + 4\,x^2 + 40\,x\log(2) + 150\,\log(2)^2 + 100\,x + 500\,\log(2) + 625)e \ldots - 4\,(\log(2)^6 + 6\,x\log(2)^4 + 30\,\log(2)^5 + 12\,x^2\log(2)^2 + 120\,x\log(2)^3 + 375\,\log(2)^4 + 8\,x^3 + 120\,x^2\log \ldots + 80\,(4\,x^3 + 150\,x^2 + 1875\,x)\log(2) + 125000\,x + e^{(4\,x^2)}$$

input
```
integrate(8*x*exp(x^2)^4+(-24*x*log(2)^2-240*x*log(2)-48*x^2-600*x-8)*exp(
x^2)^3+(24*x*log(2)^4+480*x*log(2)^3+(96*x^2+3600*x+24)*log(2)^2+(960*x^2+
12000*x+240)*log(2)+96*x^3+2400*x^2+15048*x+600)*exp(x^2)^2+(-8*x*log(2)^6
-240*x*log(2)^5+(-48*x^2-3000*x-24)*log(2)^4+(-960*x^2-20000*x-480)*log(2)
^3+(-96*x^3-7200*x^2-75096*x-3600)*log(2)^2+(-960*x^3-24000*x^2-150960*x-1
2000)*log(2)-64*x^4-2400*x^3-30096*x^2-127400*x-15000)*exp(x^2)+8*log(2)^6
+240*log(2)^5+(48*x+3000)*log(2)^4+(960*x+20000)*log(2)^3+(96*x^2+7200*x+7
5000)*log(2)^2+(960*x^2+24000*x+150000)*log(2)+64*x^3+2400*x^2+30000*x+125
000,x, algorithm=\
```

output
```
8*x*log(2)^6 + 240*x*log(2)^5 + 24*(x^2 + 125*x)*log(2)^4 + 16*x^4 + 160*(
3*x^2 + 125*x)*log(2)^3 + 800*x^3 + 8*(4*x^3 + 450*x^2 + 9375*x)*log(2)^2
+ 15000*x^2 - 4*(log(2)^2 + 2*x + 10*log(2) + 25)*e^(3*x^2) + 6*(log(2)^4
+ 4*x*log(2)^2 + 20*log(2)^3 + 4*x^2 + 40*x*log(2) + 150*log(2)^2 + 100*x
+ 500*log(2) + 625)*e^(2*x^2) - 4*(log(2)^6 + 6*x*log(2)^4 + 30*log(2)^5 +
 12*x^2*log(2)^2 + 120*x*log(2)^3 + 375*log(2)^4 + 8*x^3 + 120*x^2*log(2)
+ 900*x*log(2)^2 + 2500*log(2)^3 + 300*x^2 + 3000*x*log(2) + 9375*log(2)^2
 + 3750*x + 18750*log(2) + 15625)*e^(x^2) + 80*(4*x^3 + 150*x^2 + 1875*x)*
log(2) + 125000*x + e^(4*x^2)
```

3.357.

$$\int \Big(125000 + 30000x + 8e^{4x^2}x + 2400x^2 + 64x^3 + (150000 + 24000x + 960x^2)\log(2) + (75000 + 7200x + 9 \ldots$$

3.357.9 Mupad [B] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 231, normalized size of antiderivative = 12.16

$$\int \Big(125000+30000x+8e^{4x^2}x+2400x^2+64x^3+(150000+24000x+960x^2)\log(2)+(75000+7200x+96x^2)\log^2(2)+(20000+960x)\log^3(2)+(3000+48x)\log^4(2)+240\log^5(2)+8\log^6(2)+e^{3x^2}(-8-600x-48x^2-240x\log(2)-24x\log^2(2))+e^{2x^2}(600+15048x+2400x^2+96x^3+(240+12000x+960x^2)\log(2)+(24+3600x+96x^2)\log^2(2)+480x\log^3(2)+24x\log^4(2))+e^{x^2}(-15000-127400x-30096x^2-2400x^3-64x^4+(-12000-150960x-24000x^2-960x^3)\log(2)+(-3600-75096x-7200x^2-96x^3)\log^2(2)+(-480-20000x-960x^2)\log^3(2)+(-24-3000x-48x^2)\log^4(2)-240x\log^5(2)-8x\log^6(2))\Big)\,dx = e^{4x^2}-4e^{3x^2}(\ln(2)+5)^2+6e^{2x^2}(\ln(2)+5)^4+32x^3(\ln(2)+5)^2-8xe^{3x^2}-32x^3e^{x^2}-e^{x^2}(75000\ln(2)+37500\ln(2)^2+10000\ln(2)^3+1500\ln(2)^4+120\ln(2)^5+4\ln(2)^6+62500)+24x^2e^{2x^2}+16x^4+x(150000\ln(2)+75000\ln(2)^2+20000\ln(2)^3+3000\ln(2)^4+240\ln(2)^5+8\ln(2)^6+125000)+x^2(12000\ln(2)+3600\ln(2)^2+480\ln(2)^3+24\ln(2)^4+15000)-24xe^{x^2}(\ln(2)+5)^4+24xe^{2x^2}(\ln(2)+5)^2-48x^2e^{x^2}(\ln(2)+5)^2$$

input
```
int(30000*x - exp(x^2)*(127400*x + log(2)*(150960*x + 24000*x^2 + 960*x^3
+ 12000) + log(2)^4*(3000*x + 48*x^2 + 24) + log(2)^3*(20000*x + 960*x^2 +
 480) + 240*x*log(2)^5 + 8*x*log(2)^6 + log(2)^2*(75096*x + 7200*x^2 + 96*
x^3 + 3600) + 30096*x^2 + 2400*x^3 + 64*x^4 + 15000) + log(2)*(24000*x + 9
60*x^2 + 150000) - exp(3*x^2)*(600*x + 240*x*log(2) + 24*x*log(2)^2 + 48*x
^2 + 8) + log(2)^4*(48*x + 3000) + log(2)^3*(960*x + 20000) + 8*x*exp(4*x^
2) + log(2)^2*(7200*x + 96*x^2 + 75000) + exp(2*x^2)*(15048*x + log(2)*(12
000*x + 960*x^2 + 240) + log(2)^2*(3600*x + 96*x^2 + 24) + 480*x*log(2)^3
+ 24*x*log(2)^4 + 2400*x^2 + 96*x^3 + 600) + 240*log(2)^5 + 8*log(2)^6 + 2
400*x^2 + 64*x^3 + 125000,x)
```

output
```
exp(4*x^2) - 4*exp(3*x^2)*(log(2) + 5)^2 + 6*exp(2*x^2)*(log(2) + 5)^4 + 3
2*x^3*(log(2) + 5)^2 - 8*x*exp(3*x^2) - 32*x^3*exp(x^2) - exp(x^2)*(75000*
log(2) + 37500*log(2)^2 + 10000*log(2)^3 + 1500*log(2)^4 + 120*log(2)^5 +
4*log(2)^6 + 62500) + 24*x^2*exp(2*x^2) + 16*x^4 + x*(150000*log(2) + 7500
0*log(2)^2 + 20000*log(2)^3 + 3000*log(2)^4 + 240*log(2)^5 + 8*log(2)^6 +
125000) + x^2*(12000*log(2) + 3600*log(2)^2 + 480*log(2)^3 + 24*log(2)^4 +
 15000) - 24*x*exp(x^2)*(log(2) + 5)^4 + 24*x*exp(2*x^2)*(log(2) + 5)^2 -
48*x^2*exp(x^2)*(log(2) + 5)^2
```

3.358 $\int \frac{-1030725+20952000x-144180000x^2+350400000x^3-100000000x^4+(\dots}{14641x^5+6050x^5\log(x)+6\dots}$

3.358.1 Optimal result

Integrand size = 63, antiderivative size = 18

$$\int \frac{-1030725+20952000x-144180000x^2+350400000x^3-100000000x^4+(-202500+4050000x-2700\dots}{14641x^5+6050x^5\log(x)+625x^5\log^2(x)}$$

$$=\frac{\left(-20+\frac{3}{x}\right)^4}{\frac{121}{25}+\log(x)}$$

output
```
(3/x-20)^4/(121/25+ln(x))
```

3.358.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{-1030725+20952000x-144180000x^2+350400000x^3-100000000x^4+(-202500+4050000x-2700\dots}{14641x^5+6050x^5\log(x)+625x^5\log^2(x)}$$

$$=\frac{25(-3+20x)^4}{x^4(121+25\log(x))}$$

input
```
Integrate[(-1030725 + 20952000*x - 144180000*x^2 + 350400000*x^3 - 1000000
00*x^4 + (-202500 + 4050000*x - 27000000*x^2 + 60000000*x^3)*Log[x])/(1464
1*x^5 + 6050*x^5*Log[x] + 625*x^5*Log[x]^2),x]
```

output
```
(25*(-3 + 20*x)^4)/(x^4*(121 + 25*Log[x]))
```

3.358. $\int \frac{-1030725+20952000x-144180000x^2+350400000x^3-100000000x^4+(-202500+4050000x-27000000x^2+60000000x^3)\log(x)}{14641x^5+6050x^5\log(x)+625x^5\log^2(x)}\,dx$

3.358.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 65 vs. $2(18) = 36$.

Time = 1.03 (sec) , antiderivative size = 65, normalized size of antiderivative = 3.61, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.079$, Rules used = {7239, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-100000000x^4 + 350400000x^3 - 144180000x^2 + (60000000x^3 - 27000000x^2 + 4050000x - 202500)\log(x) + 2}{14641x^5 + 625x^5\log^2(x) + 6050x^5\log(x)}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{25(3-20x)^3(500x - 300\log(x) - 1527)}{x^5(25\log(x)+121)^2}dx$$

$$\Big\downarrow \text{27}$$

$$25\int -\frac{(3-20x)^3(-500x + 300\log(x) + 1527)}{x^5(25\log(x)+121)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-25\int \frac{(3-20x)^3(-500x + 300\log(x) + 1527)}{x^5(25\log(x)+121)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-25\int \left(\frac{25(20x-3)^4}{x^5(25\log(x)+121)^2} - \frac{12(20x-3)^3}{x^5(25\log(x)+121)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-25\left(-\frac{81}{x^4(25\log(x)+121)} + \frac{2160}{x^3(25\log(x)+121)} - \frac{21600}{x^2(25\log(x)+121)} + \frac{96000}{x(25\log(x)+121)} - \frac{160000}{25\log(x)+121}\right.$$

input
```
Int[(-1030725 + 20952000*x - 144180000*x^2 + 350400000*x^3 - 100000000*x^4
 + (-202500 + 4050000*x - 27000000*x^2 + 60000000*x^3)*Log[x])/(14641*x^5
+ 6050*x^5*Log[x] + 625*x^5*Log[x]^2),x]
```

output
```
-25*(-160000/(121 + 25*Log[x]) - 81/(x^4*(121 + 25*Log[x])) + 2160/(x^3*(1
21 + 25*Log[x])) - 21600/(x^2*(121 + 25*Log[x])) + 96000/(x*(121 + 25*Log[
x])))
```

3.358.
$\int \frac{-1030725+20952000x-144180000x^2+350400000x^3-100000000x^4+(-202500+4050000x-27000000x^2+60000000x^3)\log(x)}{14641x^5+6050x^5\log(x)+625x^5\log^2(x)}dx$

3.358.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.358.4 Maple [A] (verified)

Time = 1.12 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.83

method	result	size
norman	$\frac{4000000x^4-2400000x^3+540000x^2-54000x+2025}{x^4(25\ln(x)+121)}$	33
risch	$\frac{4000000x^4-2400000x^3+540000x^2-54000x+2025}{x^4(25\ln(x)+121)}$	34
parallelrisch	$\frac{100000000x^4-60000000x^3+13500000x^2-1350000x+50625}{25x^4(25\ln(x)+121)}$	34
default	$\frac{4000000}{25\ln(x)+121}+\frac{2025}{x^4(25\ln(x)+121)}-\frac{54000}{x^3(25\ln(x)+121)}+\frac{540000}{x^2(25\ln(x)+121)}-\frac{2400000}{x(25\ln(x)+121)}$	64

input
```
int(((60000000*x^3-27000000*x^2+4050000*x-202500)*ln(x)-100000000*x^4+3504
00000*x^3-144180000*x^2+20952000*x-1030725)/(625*x^5*ln(x)^2+6050*x^5*ln(x
)+14641*x^5),x,method=_RETURNVERBOSE)
```

output
```
(4000000*x^4-2400000*x^3+540000*x^2-54000*x+2025)/x^4/(25*ln(x)+121)
```

3.358.
$$\int \frac{-1030725+20952000x-144180000x^2+350400000x^3-100000000x^4+(-202500+4050000x-27000000x^2+60000000x^3)\log(x)}{14641x^5+6050x^5\log(x)+625x^5\log^2(x)}\,dx$$

3.358.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.06

$$\int \frac{-1030725 + 20952000x - 144180000x^2 + 350400000x^3 - 100000000x^4 + (-202500 + 4050000x - 2700}{14641x^5 + 6050x^5 \log(x) + 625x^5 \log^2(x)}$$
$$= \frac{25\,(160000\,x^4 - 96000\,x^3 + 21600\,x^2 - 2160\,x + 81)}{25\,x^4 \log{(x)} + 121\,x^4}$$

input
```
integrate(((60000000*x^3-27000000*x^2+4050000*x-202500)*log(x)-100000000*x
^4+350400000*x^3-144180000*x^2+20952000*x-1030725)/(625*x^5*log(x)^2+6050*
x^5*log(x)+14641*x^5),x, algorithm=\
```

output
```
25*(160000*x^4 - 96000*x^3 + 21600*x^2 - 2160*x + 81)/(25*x^4*log(x) + 121
*x^4)
```

3.358.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. 2(12) = 24.

Time = 0.06 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78

$$\int \frac{-1030725 + 20952000x - 144180000x^2 + 350400000x^3 - 100000000x^4 + (-202500 + 4050000x - 2700}{14641x^5 + 6050x^5 \log(x) + 625x^5 \log^2(x)}$$
$$= \frac{4000000x^4 - 2400000x^3 + 540000x^2 - 54000x + 2025}{25x^4 \log{(x)} + 121x^4}$$

input
```
integrate(((60000000*x**3-27000000*x**2+4050000*x-202500)*ln(x)-100000000*
x**4+350400000*x**3-144180000*x**2+20952000*x-1030725)/(625*x**5*ln(x)**2+
6050*x**5*ln(x)+14641*x**5),x)
```

output
```
(4000000*x**4 - 2400000*x**3 + 540000*x**2 - 54000*x + 2025)/(25*x**4*log(
x) + 121*x**4)
```

3.358.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.06

$$\int \frac{-1030725 + 20952000x - 144180000x^2 + 350400000x^3 - 100000000x^4 + (-202500 + 4050000x - 2700}{14641x^5 + 6050x^5\log(x) + 625x^5\log^2(x)}$$
$$= \frac{25\,(160000\,x^4 - 96000\,x^3 + 21600\,x^2 - 2160\,x + 81)}{25\,x^4\log(x) + 121\,x^4}$$

input
```
integrate(((60000000*x^3-27000000*x^2+4050000*x-202500)*log(x)-100000000*x
^4+350400000*x^3-144180000*x^2+20952000*x-1030725)/(625*x^5*log(x)^2+6050*
x^5*log(x)+14641*x^5),x, algorithm=\
```

output
```
25*(160000*x^4 - 96000*x^3 + 21600*x^2 - 2160*x + 81)/(25*x^4*log(x) + 121
*x^4)
```

3.358.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.06

$$\int \frac{-1030725 + 20952000x - 144180000x^2 + 350400000x^3 - 100000000x^4 + (-202500 + 4050000x - 2700}{14641x^5 + 6050x^5\log(x) + 625x^5\log^2(x)}$$
$$= \frac{25\,(160000\,x^4 - 96000\,x^3 + 21600\,x^2 - 2160\,x + 81)}{25\,x^4\log(x) + 121\,x^4}$$

input
```
integrate(((60000000*x^3-27000000*x^2+4050000*x-202500)*log(x)-100000000*x
^4+350400000*x^3-144180000*x^2+20952000*x-1030725)/(625*x^5*log(x)^2+6050*
x^5*log(x)+14641*x^5),x, algorithm=\
```

output
```
25*(160000*x^4 - 96000*x^3 + 21600*x^2 - 2160*x + 81)/(25*x^4*log(x) + 121
*x^4)
```

3.358.9 Mupad [B] (verification not implemented)

Time = 12.56 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78

$$\int \frac{-1030725 + 20952000x - 144180000x^2 + 350400000x^3 - 100000000x^4 + (-202500 + 4050000x - 2700}{14641x^5 + 6050x^5\log(x) + 625x^5\log^2(x)}$$
$$= \frac{4000000\,x^4 - 2400000\,x^3 + 540000\,x^2 - 54000\,x + 2025}{x^4\,\left(25\,\ln\left(x\right) + 121\right)}$$

input
```
int((20952000*x - 144180000*x^2 + 350400000*x^3 - 100000000*x^4 + log(x)*(
4050000*x - 27000000*x^2 + 60000000*x^3 - 202500) - 1030725)/(6050*x^5*log
(x) + 625*x^5*log(x)^2 + 14641*x^5),x)
```

output
```
(540000*x^2 - 54000*x - 2400000*x^3 + 4000000*x^4 + 2025)/(x^4*(25*log(x)
+ 121))
```

3.359 $\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9-\right.}{}$

3.359.1 Optimal result

Integrand size = 253, antiderivative size = 32

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+\right.}{}$$

$$=\frac{\left(5+e^{5e^x}\right)^2\log^2\left(3+\frac{1}{3}(2-e^5)\,x\right)}{x^2}$$

output
```
(exp(5*exp(x))+5)^2/x^2*ln(3+1/3*(2-exp(5))*x)^2
```

3.359.

$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+2e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(18+4x-2e^5x+e^x(-\right.}{}$

3.359.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.63 (sec) , antiderivative size = 277, normalized size of antiderivative = 8.66

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+\right.}{}$$

$$= \frac{1}{81}\left(\frac{810e^{5e^x}\log^2\left(3-\frac{1}{3}(-2+e^5)x\right)}{x^2}+\frac{81e^{10e^x}\log^2\left(3-\frac{1}{3}(-2+e^5)x\right)}{x^2}\right.$$
$$+25(-2+e^5)\left(2(-2+e^5)\left(\log(x)-\log\left(9+2x-e^5x\right)\right)+\frac{18\log\left(3-\frac{1}{3}(-2+e^5)x\right)}{x}\right.$$
$$+(-2+e^5)\log^2\left(3-\frac{1}{3}(-2+e^5)x\right)$$
$$\left.-2(-2+e^5)\left(\log(3)\log(x)-\text{PolyLog}\left(2,\frac{1}{9}(-2+e^5)x\right)\right)\right)$$
$$+25\left(2(-2+e^5)^2\log\left(\frac{1}{9}(-2+e^5)x\right)\left(-1+\log\left(3-\frac{1}{3}(-2+e^5)x\right)\right)\right.$$
$$-\frac{(-9+(-2+e^5)x)\log\left(3-\frac{1}{3}(-2+e^5)x\right)\left(-2(-2+e^5)x+(9+(-2+e^5)x)\log\left(3-\frac{1}{3}(-2+e^5)x\right)\right.}{x^2}$$
$$\left.\left.+2(-2+e^5)^2\text{PolyLog}\left(2,1-\frac{1}{9}(-2+e^5)x\right)\right)\right)$$

input
```
Integrate[((-100*x + 50*E^5*x)*Log[(9 + 2*x - E^5*x)/3] + (450 + 100*x - 5
0*E^5*x)*Log[(9 + 2*x - E^5*x)/3]^2 + E^(10*E^x)*((-4*x + 2*E^5*x)*Log[(9
+ 2*x - E^5*x)/3] + (18 + 4*x - 2*E^5*x + E^x*(-90*x - 20*x^2 + 10*E^5*x^2
))*Log[(9 + 2*x - E^5*x)/3]^2) + E^(5*E^x)*((-40*x + 20*E^5*x)*Log[(9 + 2*
x - E^5*x)/3] + (180 + 40*x - 20*E^5*x + E^x*(-450*x - 100*x^2 + 50*E^5*x^
2))*Log[(9 + 2*x - E^5*x)/3]^2))/(-9*x^3 - 2*x^4 + E^5*x^4),x]
```

output
```
((810*E^(5*E^x)*Log[3 - ((-2 + E^5)*x)/3]^2)/x^2 + (81*E^(10*E^x)*Log[3 -
((-2 + E^5)*x)/3]^2)/x^2 + 25*(-2 + E^5)*(2*(-2 + E^5)*(Log[x] - Log[9 + 2
*x - E^5*x]) + (18*Log[3 - ((-2 + E^5)*x)/3])/x + (-2 + E^5)*Log[3 - ((-2
+ E^5)*x)/3]^2 - 2*(-2 + E^5)*(Log[3]*Log[x] - PolyLog[2, ((-2 + E^5)*x)/9
])) + 25*(2*(-2 + E^5)^2*Log[((-2 + E^5)*x)/9]*(-1 + Log[3 - ((-2 + E^5)*x
)/3]) - ((-9 + (-2 + E^5)*x)*Log[3 - ((-2 + E^5)*x)/3]*(-2*(-2 + E^5)*x +
(9 + (-2 + E^5)*x)*Log[3 - ((-2 + E^5)*x)/3]))/x^2 + 2*(-2 + E^5)^2*PolyLo
g[2, 1 - ((-2 + E^5)*x)/9]))/81
```

3.359.

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+2e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(18+4x-2e^5x+e^x\left(-\right.\right.}{}$$

3.359.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{10e^x}\left(\left(e^x\left(10e^5x^2-20x^2-90x\right)-2e^5x+4x+18\right)\log^2\left(\frac{1}{3}\left(-e^5x+2x+9\right)\right)+\left(2e^5x-4x\right)\log\left(\frac{1}{3}\left(-e^5x+2x\right.\right.\right.}{}$$

$$\Big\downarrow 6$$

$$\int \frac{e^{10e^x}\left(\left(e^x\left(10e^5x^2-20x^2-90x\right)-2e^5x+4x+18\right)\log^2\left(\frac{1}{3}\left(-e^5x+2x+9\right)\right)+\left(2e^5x-4x\right)\log\left(\frac{1}{3}\left(-e^5x+2x\right.\right.\right.}{}$$

$$\Big\downarrow 2026$$

$$\int \frac{e^{10e^x}\left(\left(e^x\left(10e^5x^2-20x^2-90x\right)-2e^5x+4x+18\right)\log^2\left(\frac{1}{3}\left(-e^5x+2x+9\right)\right)+\left(2e^5x-4x\right)\log\left(\frac{1}{3}\left(-e^5x+2x\right.\right.\right.}{}$$

$$\Big\downarrow 7239$$

$$\int \frac{2\left(e^{5e^x}+5\right)\log\left(3-\frac{1}{3}\left(e^5-2\right)x\right)\left(-\left(\left(e^5-2\right)\left(e^{5e^x}+5\right)x\right)-\left(5e^{x+5e^x}x-e^{5e^x}-5\right)\left(\left(e^5-2\right)x-9\right)\log\left(3-\frac{1}{3}\right.\right.}{x^3\left(9-\left(e^5-2\right)x\right)}$$

$$\Big\downarrow 27$$

$$2\int \frac{\left(5+e^{5e^x}\right)\log\left(\frac{1}{3}\left(2-e^5\right)x+3\right)\left(\left(2-e^5\right)\left(5+e^{5e^x}\right)x-\left(-5e^{x+5e^x}x+e^{5e^x}+5\right)\left(\left(2-e^5\right)x+9\right)\log\left(\frac{1}{3}\left(2-e\right.\right.\right.}{x^3\left(\left(2-e^5\right)x+9\right)}$$

$$\Big\downarrow 7293$$

$$2\int \left(\frac{\log\left(3-\frac{1}{3}\left(-2+e^5\right)x\right)\left(-2\left(1-\frac{e^5}{2}\right)\log\left(3-\frac{1}{3}\left(-2+e^5\right)x\right)x+2\left(1-\frac{e^5}{2}\right)x-9\log\left(3-\frac{1}{3}\left(-2+e^5\right)x\right)\right)\left(\right.}{x^3\left(\left(2-e^5\right)x+9\right)}\right.$$

$$\Big\downarrow 7299$$

$$2\int \left(\frac{\log\left(3-\frac{1}{3}\left(-2+e^5\right)x\right)\left(-2\left(1-\frac{e^5}{2}\right)\log\left(3-\frac{1}{3}\left(-2+e^5\right)x\right)x+2\left(1-\frac{e^5}{2}\right)x-9\log\left(3-\frac{1}{3}\left(-2+e^5\right)x\right)\right)\left(\right.}{x^3\left(\left(2-e^5\right)x+9\right)}\right.$$

3.359.
$$\int \frac{\left(-100x+50e^5x\right)\log\left(\frac{1}{3}\left(9+2x-e^5x\right)\right)+\left(450+100x-50e^5x\right)\log^2\left(\frac{1}{3}\left(9+2x-e^5x\right)\right)+e^{10e^x}\left(\left(-4x+2e^5x\right)\log\left(\frac{1}{3}\left(9+2x-e^5x\right)\right)+\left(18+4x-2e^5x+e^x\left(-\right.\right.\right.\right.}{}$$

input
```
Int[((-100*x + 50*E^5*x)*Log[(9 + 2*x - E^5*x)/3] + (450 + 100*x - 50*E^5*
x)*Log[(9 + 2*x - E^5*x)/3]^2 + E^(10*E^x)*((-4*x + 2*E^5*x)*Log[(9 + 2*x
- E^5*x)/3] + (18 + 4*x - 2*E^5*x + E^x*(-90*x - 20*x^2 + 10*E^5*x^2))*Log
[(9 + 2*x - E^5*x)/3]^2) + E^(5*E^x)*((-40*x + 20*E^5*x)*Log[(9 + 2*x - E^
5*x)/3] + (180 + 40*x - 20*E^5*x + E^x*(-450*x - 100*x^2 + 50*E^5*x^2))*Lo
g[(9 + 2*x - E^5*x)/3]^2))/(-9*x^3 - 2*x^4 + E^5*x^4),x]
```

output
```
$Aborted
```

3.359.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.359.

$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+2e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(18+4x-2e^5x+e^x(-\cdots}{\cdots}$

3.359.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(27) = 54$.

Time = 10.26 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.00

method	result	size
parallelrisch	$-\frac{-81\ln\left(-\frac{x\,e^{5}}{3}+\frac{2x}{3}+3\right)^{2} e^{10\,e^{x}}-810\ln\left(-\frac{x\,e^{5}}{3}+\frac{2x}{3}+3\right)^{2} e^{5\,e^{x}}-2025\ln\left(-\frac{x\,e^{5}}{3}+\frac{2x}{3}+3\right)^{2}}{81x^{2}}$	64
risch	$\frac{25\ln\left(-\frac{x\,e^{5}}{3}+\frac{2x}{3}+3\right)^{2}}{x^{2}}+\frac{\ln\left(-\frac{x\,e^{5}}{3}+\frac{2x}{3}+3\right)^{2} e^{10\,e^{x}}}{x^{2}}+\frac{10\ln\left(-\frac{x\,e^{5}}{3}+\frac{2x}{3}+3\right)^{2} e^{5\,e^{x}}}{x^{2}}$	67

input
```
int(((((10*x^2*exp(5)-20*x^2-90*x)*exp(x)-2*x*exp(5)+4*x+18)*ln(-1/3*x*exp
(5)+2/3*x+3)^2+(2*x*exp(5)-4*x)*ln(-1/3*x*exp(5)+2/3*x+3))*exp(5*exp(x))^2
+(((50*x^2*exp(5)-100*x^2-450*x)*exp(x)-20*x*exp(5)+40*x+180)*ln(-1/3*x*ex
p(5)+2/3*x+3)^2+(20*x*exp(5)-40*x)*ln(-1/3*x*exp(5)+2/3*x+3))*exp(5*exp(x)
)+(-50*x*exp(5)+100*x+450)*ln(-1/3*x*exp(5)+2/3*x+3)^2+(50*x*exp(5)-100*x)
*ln(-1/3*x*exp(5)+2/3*x+3))/(x^4*exp(5)-2*x^4-9*x^3),x,method=_RETURNVERBO
SE)
```

output
```
-1/81*(-81*ln(-1/3*x*exp(5)+2/3*x+3)^2*exp(5*exp(x))^2-810*ln(-1/3*x*exp(5
)+2/3*x+3)^2*exp(5*exp(x))-2025*ln(-1/3*x*exp(5)+2/3*x+3)^2)/x^2
```

3.359.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(25) = 50$.

Time = 0.27 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.84

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+\right.}{}$$

$$= \frac{e^{(10\,e^{x})}\log\left(-\frac{1}{3}\,xe^{5}+\frac{2}{3}\,x+3\right)^{2}+10\,e^{(5\,e^{x})}\log\left(-\frac{1}{3}\,xe^{5}+\frac{2}{3}\,x+3\right)^{2}+25\,\log\left(-\frac{1}{3}\,xe^{5}+\frac{2}{3}\,x+3\right)^{2}}{x^{2}}$$

input
```
integrate(((((10*x^2*exp(5)-20*x^2-90*x)*exp(x)-2*x*exp(5)+4*x+18)*log(-1/
3*x*exp(5)+2/3*x+3)^2+(2*x*exp(5)-4*x)*log(-1/3*x*exp(5)+2/3*x+3))*exp(5*e
xp(x))^2+(((50*x^2*exp(5)-100*x^2-450*x)*exp(x)-20*x*exp(5)+40*x+180)*log(
-1/3*x*exp(5)+2/3*x+3)^2+(20*x*exp(5)-40*x)*log(-1/3*x*exp(5)+2/3*x+3))*ex
p(5*exp(x))+(-50*x*exp(5)+100*x+450)*log(-1/3*x*exp(5)+2/3*x+3)^2+(50*x*ex
p(5)-100*x)*log(-1/3*x*exp(5)+2/3*x+3))/(x^4*exp(5)-2*x^4-9*x^3),x, algori
thm=\
```

3.359. $\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+2e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(18+4x-2e^5x+e^x(-\right.}{}$

output
```
(e^(10*e^x)*log(-1/3*x*e^5 + 2/3*x + 3)^2 + 10*e^(5*e^x)*log(-1/3*x*e^5 +
2/3*x + 3)^2 + 25*log(-1/3*x*e^5 + 2/3*x + 3)^2)/x^2
```

3.359.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 80 vs. $2(27) = 54$.

Time = 0.29 (sec) , antiderivative size = 80, normalized size of antiderivative = 2.50

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+ \right.}{}$$

$$= \frac{25\log\left(-\frac{xe^5}{3}+\frac{2x}{3}+3\right)^2}{x^2}+\frac{x^2e^{10e^x}\log\left(-\frac{xe^5}{3}+\frac{2x}{3}+3\right)^2+10x^2e^{5e^x}\log\left(-\frac{xe^5}{3}+\frac{2x}{3}+3\right)^2}{x^4}$$

input
```
integrate(((((10*x**2*exp(5)-20*x**2-90*x)*exp(x)-2*x*exp(5)+4*x+18)*ln(-1
/3*x*exp(5)+2/3*x+3)**2+(2*x*exp(5)-4*x)*ln(-1/3*x*exp(5)+2/3*x+3))*exp(5*
exp(x))**2+(((50*x**2*exp(5)-100*x**2-450*x)*exp(x)-20*x*exp(5)+40*x+180)*
ln(-1/3*x*exp(5)+2/3*x+3)**2+(20*x*exp(5)-40*x)*ln(-1/3*x*exp(5)+2/3*x+3))
*exp(5*exp(x))+(-50*x*exp(5)+100*x+450)*ln(-1/3*x*exp(5)+2/3*x+3)**2+(50*x
*exp(5)-100*x)*ln(-1/3*x*exp(5)+2/3*x+3))/(x**4*exp(5)-2*x**4-9*x**3),x)
```

output
```
25*log(-x*exp(5)/3 + 2*x/3 + 3)**2/x**2 + (x**2*exp(10*exp(x))*log(-x*exp(
5)/3 + 2*x/3 + 3)**2 + 10*x**2*exp(5*exp(x))*log(-x*exp(5)/3 + 2*x/3 + 3)*
*2)/x**4
```

3.359.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. $2(25) = 50$.

Time = 0.38 (sec) , antiderivative size = 93, normalized size of antiderivative = 2.91

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+ \right.}{}$$

$$= \frac{e^{(10e^x)}\log(3)^2+10e^{(5e^x)}\log(3)^2+\left(e^{(10e^x)}+10e^{(5e^x)}+25\right)\log\left(-x(e^5-2)+9\right)^2+25\log(3)^2-2\left(e^{(10}\right.}{x^2}$$

3.359.

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+2e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(18+4x-2e^5x+e^x(-\right.}{}$$

input
```
integrate((((((10*x^2*exp(5)-20*x^2-90*x)*exp(x)-2*x*exp(5)+4*x+18)*log(-1/
3*x*exp(5)+2/3*x+3)^2+(2*x*exp(5)-4*x)*log(-1/3*x*exp(5)+2/3*x+3))*exp(5*e
xp(x))^2+(((50*x^2*exp(5)-100*x^2-450*x)*exp(x)-20*x*exp(5)+40*x+180)*log(
-1/3*x*exp(5)+2/3*x+3)^2+(20*x*exp(5)-40*x)*log(-1/3*x*exp(5)+2/3*x+3))*ex
p(5*exp(x))+(-50*x*exp(5)+100*x+450)*log(-1/3*x*exp(5)+2/3*x+3)^2+(50*x*ex
p(5)-100*x)*log(-1/3*x*exp(5)+2/3*x+3))/(x^4*exp(5)-2*x^4-9*x^3),x, algori
thm=\
```

output
```
(e^(10*e^x)*log(3)^2 + 10*e^(5*e^x)*log(3)^2 + (e^(10*e^x) + 10*e^(5*e^x)
+ 25)*log(-x*(e^5 - 2) + 9)^2 + 25*log(3)^2 - 2*(e^(10*e^x)*log(3) + 10*e^
(5*e^x)*log(3) + 25*log(3))*log(-x*(e^5 - 2) + 9))/x^2
```

3.359.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. $2(25) = 50$.

Time = 0.37 (sec) , antiderivative size = 141, normalized size of antiderivative = 4.41

$$\int \frac{(-100x + 50e^5x)\log\left(\frac{1}{3}(9 + 2x - e^5x)\right) + (450 + 100x - 50e^5x)\log^2\left(\frac{1}{3}(9 + 2x - e^5x)\right) + e^{10e^x}\left((-4x + \right.}{}$$

$$= \frac{e^{(10\,e^x)}\log(3)^2 + 10\,e^{(5\,e^x)}\log(3)^2 - 2\,e^{(10\,e^x)}\log(3)\log(-xe^5 + 2\,x + 9) - 20\,e^{(5\,e^x)}\log(3)\log(-xe^5 + 2\,x}{}$$

input
```
integrate((((((10*x^2*exp(5)-20*x^2-90*x)*exp(x)-2*x*exp(5)+4*x+18)*log(-1/
3*x*exp(5)+2/3*x+3)^2+(2*x*exp(5)-4*x)*log(-1/3*x*exp(5)+2/3*x+3))*exp(5*e
xp(x))^2+(((50*x^2*exp(5)-100*x^2-450*x)*exp(x)-20*x*exp(5)+40*x+180)*log(
-1/3*x*exp(5)+2/3*x+3)^2+(20*x*exp(5)-40*x)*log(-1/3*x*exp(5)+2/3*x+3))*ex
p(5*exp(x))+(-50*x*exp(5)+100*x+450)*log(-1/3*x*exp(5)+2/3*x+3)^2+(50*x*ex
p(5)-100*x)*log(-1/3*x*exp(5)+2/3*x+3))/(x^4*exp(5)-2*x^4-9*x^3),x, algori
thm=\
```

output
```
(e^(10*e^x)*log(3)^2 + 10*e^(5*e^x)*log(3)^2 - 2*e^(10*e^x)*log(3)*log(-x*
e^5 + 2*x + 9) - 20*e^(5*e^x)*log(3)*log(-x*e^5 + 2*x + 9) + e^(10*e^x)*lo
g(-x*e^5 + 2*x + 9)^2 + 10*e^(5*e^x)*log(-x*e^5 + 2*x + 9)^2 + 25*log(3)^2
 - 50*log(3)*log(-x*e^5 + 2*x + 9) + 25*log(-x*e^5 + 2*x + 9)^2)/x^2
```

3.359.

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+2e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(18+4x-2e^5x+e^x(-\right.}{}$$

3.359.9 Mupad [B] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.22

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+\right.}{}$$

$$=\ln\left(\frac{2\,x}{3}-\frac{x\,\mathrm{e}^5}{3}+3\right)^2\left(\frac{25}{x^2}+\frac{10\,\mathrm{e}^{5\,\mathrm{e}^x}}{x^2}+\frac{\mathrm{e}^{10\,\mathrm{e}^x}}{x^2}\right)$$

input
```
int(-(log((2*x)/3 - (x*exp(5))/3 + 3)^2*(100*x - 50*x*exp(5) + 450) + exp(
10*exp(x))*(log((2*x)/3 - (x*exp(5))/3 + 3)^2*(4*x - 2*x*exp(5) - exp(x)*(
90*x - 10*x^2*exp(5) + 20*x^2) + 18) - log((2*x)/3 - (x*exp(5))/3 + 3)*(4*
x - 2*x*exp(5))) + exp(5*exp(x))*(log((2*x)/3 - (x*exp(5))/3 + 3)^2*(40*x
- 20*x*exp(5) - exp(x)*(450*x - 50*x^2*exp(5) + 100*x^2) + 180) - log((2*x
)/3 - (x*exp(5))/3 + 3)*(40*x - 20*x*exp(5))) - log((2*x)/3 - (x*exp(5))/3
 + 3)*(100*x - 50*x*exp(5)))/(9*x^3 - x^4*exp(5) + 2*x^4),x)
```

output
```
log((2*x)/3 - (x*exp(5))/3 + 3)^2*(25/x^2 + (10*exp(5*exp(x)))/x^2 + exp(1
0*exp(x))/x^2)
```

3.359.

$$\int \frac{(-100x+50e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(450+100x-50e^5x)\log^2\left(\frac{1}{3}(9+2x-e^5x)\right)+e^{10e^x}\left((-4x+2e^5x)\log\left(\frac{1}{3}(9+2x-e^5x)\right)+(18+4x-2e^5x+e^x(-\right.}{}$$

3.360 $\int \frac{-48x^2+(-40-80x+8x^2)\log(5)}{25x^2-10x^3+x^4+(50x-20x^2+2x^3)\log(5)+(25-10x+x^2)\log^2(5)}\,dx$

3.360.1 Optimal result

Integrand size = 66, antiderivative size = 21

$$\int \frac{-48x^2+(-40-80x+8x^2)\log(5)}{25x^2-10x^3+x^4+(50x-20x^2+2x^3)\log(5)+(25-10x+x^2)\log^2(5)}\,dx = -9+\frac{2x(4+4x)}{(-5+x)(x+\log(5))}$$

output
```
2*(4+4*x)/(-5+x)*x/(ln(5)+x)-9
```

3.360.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

$$\int \frac{-48x^2+(-40-80x+8x^2)\log(5)}{25x^2-10x^3+x^4+(50x-20x^2+2x^3)\log(5)+(25-10x+x^2)\log^2(5)}\,dx = \frac{8(-x(-6+\log(5))+5\log(5))}{(-5+x)(x+\log(5))}$$

input
```
Integrate[(-48*x^2 + (-40 - 80*x + 8*x^2)*Log[5])/(25*x^2 - 10*x^3 + x^4 +
 (50*x - 20*x^2 + 2*x^3)*Log[5] + (25 - 10*x + x^2)*Log[5]^2),x]
```

output
```
(8*(-(x*(-6 + Log[5])) + 5*Log[5]))/((-5 + x)*(x + Log[5]))
```

3.360.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 59 vs. 2(21) = 42.

Time = 0.34 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.81, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.076, Rules used = {2459, 1380, 27, 2345, 24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(8x^2-80x-40)\log(5)-48x^2}{x^4-10x^3+25x^2+(x^2-10x+25)\log^2(5)+(2x^3-20x^2+50x)\log(5)}dx$$

$$\Big\downarrow \text{2459}$$

$$\int \frac{-8(30+\log^2(5)-\log(5))\left(x+\frac{1}{4}(2\log(5)-10)\right)-8(6-\log(5))\left(x+\frac{1}{4}(2\log(5)-10)\right)^2-2(6-\log(5))(5+\text{l}}{\left(x+\frac{1}{4}(2\log(5)-10)\right)^4-\frac{1}{2}(5+\log(5))^2\left(x+\frac{1}{4}(2\log(5)-10)\right)^2+\frac{1}{16}(5+\log(5))^4}$$

$$\Big\downarrow \text{1380}$$

$$\int -\frac{32\left(4(30+\log^2(5)-\log(5))\left(x+\frac{1}{4}(2\log(5)-10)\right)+4(6-\log(5))\left(x+\frac{1}{4}(2\log(5)-10)\right)^2+(6-\log(5))(5\right.}{\left(4\left(x+\frac{1}{4}(2\log(5)-10)\right)^2-(5+\log(5))^2\right)^2}$$

$$\Big\downarrow \text{27}$$

$$-32\int \frac{4(6-\log(5))\left(x+\frac{1}{4}(-10+2\log(5))\right)^2+4(30-\log(5)+\log^2(5))\left(x+\frac{1}{4}(-10+2\log(5))\right)+(6-\log(5))(}{\left(4\left(x+\frac{1}{4}(-10+2\log(5))\right)^2-(5+\log(5))^2\right)^2}$$

$$\Big\downarrow \text{2345}$$

$$-32\left(\frac{\int 0d\left(x+\frac{1}{4}(-10+2\log(5))\right)}{2(5+\log(5))^2}-\frac{2(6-\log(5))\left(x+\frac{1}{4}(2\log(5)-10)\right)+30+\log^2(5)-\log(5)}{2\left(4\left(x+\frac{1}{4}(2\log(5)-10)\right)^2-(5+\log(5))^2\right)}\right)$$

$$\Big\downarrow \text{24}$$

$$\frac{16\left(2(6-\log(5))\left(x+\frac{1}{4}(2\log(5)-10)\right)+30+\log^2(5)-\log(5)\right)}{4\left(x+\frac{1}{4}(2\log(5)-10)\right)^2-(5+\log(5))^2}$$

input
```
Int[(-48*x^2 + (-40 - 80*x + 8*x^2)*Log[5])/(25*x^2 - 10*x^3 + x^4 + (50*x
 - 20*x^2 + 2*x^3)*Log[5] + (25 - 10*x + x^2)*Log[5]^2),x]
```

3.360. $\int \frac{-48x^2+(-40-80x+8x^2)\log(5)}{25x^2-10x^3+x^4+(50x-20x^2+2x^3)\log(5)+(25-10x+x^2)\log^2(5)}dx$

output
```
(16*(30 - Log[5] + Log[5]^2 + 2*(6 - Log[5])*(x + (-10 + 2*Log[5])/4)))/(-
(5 + Log[5])^2 + 4*(x + (-10 + 2*Log[5])/4)^2)
```

3.360.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2345
```
Int[(Pq_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q = PolynomialQuot
ient[Pq, a + b*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x,
 0], g = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b
*f*x)*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   In
t[(a + b*x^2)^(p + 1)*ExpandToSum[2*a*(p + 1)*Q + f*(2*p + 3), x], x], x]]
/; FreeQ[{a, b}, x] && PolyQ[Pq, x] && LtQ[p, -1]
```

rule 2459
```
Int[(Pn_)^(p_.)*(Qx_), x_Symbol] :> With[{S = Coeff[Pn, x, Expon[Pn, x] - 1
]/(Expon[Pn, x]*Coeff[Pn, x, Expon[Pn, x]])}, Subst[Int[ExpandToSum[Pn /. x
 -> x - S, x]^p*ExpandToSum[Qx /. x -> x - S, x], x], x, x + S] /; Binomial
Q[Pn /. x -> x - S, x] || (IntegerQ[Expon[Pn, x]/2] && TrinomialQ[Pn /. x -
> x - S, x])] /; FreeQ[p, x] && PolyQ[Pn, x] && GtQ[Expon[Pn, x], 2] && NeQ
[Coeff[Pn, x, Expon[Pn, x] - 1], 0] && PolyQ[Qx, x] &&  !(MonomialQ[Qx, x]
&& IGtQ[p, 0])
```

3.360. $\int \frac{-48x^2+(-40-80x+8x^2)\log(5)}{25x^2-10x^3+x^4+(50x-20x^2+2x^3)\log(5)+(25-10x+x^2)\log^2(5)}\,dx$

3.360.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

method	result	size
norman	$\frac{(-8\ln(5)+48)x+40\ln(5)}{(-5+x)(\ln(5)+x)}$	26
gosper	$-\frac{8(x\ln(5)-5\ln(5)-6x)}{x\ln(5)+x^2-5\ln(5)-5x}$	32
risch	$\frac{(-8\ln(5)+48)x+40\ln(5)}{x\ln(5)+x^2-5\ln(5)-5x}$	32
parallelrisch	$\frac{-8x\ln(5)+40\ln(5)+48x}{x\ln(5)+x^2-5\ln(5)-5x}$	32
default	$-\frac{8\ln(5)(\ln(5)-1)}{(5+\ln(5))(\ln(5)+x)}+\frac{240}{(5+\ln(5))(-5+x)}$	35

input
```
int(((8*x^2-80*x-40)*ln(5)-48*x^2)/((x^2-10*x+25)*ln(5)^2+(2*x^3-20*x^2+50
*x)*ln(5)+x^4-10*x^3+25*x^2),x,method=_RETURNVERBOSE)
```

output
```
((-8*ln(5)+48)*x+40*ln(5))/(-5+x)/(ln(5)+x)
```

3.360.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{-48x^2+(-40-80x+8x^2)\log(5)}{25x^2-10x^3+x^4+(50x-20x^2+2x^3)\log(5)+(25-10x+x^2)\log^2(5)}\,dx = -\frac{8\left((x-5)\log(5)-6\,x\right)}{x^2+(x-5)\log(5)-5\,x}$$

input
```
integrate(((8*x^2-80*x-40)*log(5)-48*x^2)/((x^2-10*x+25)*log(5)^2+(2*x^3-2
0*x^2+50*x)*log(5)+x^4-10*x^3+25*x^2),x, algorithm=\
```

output
```
-8*((x - 5)*log(5) - 6*x)/(x^2 + (x - 5)*log(5) - 5*x)
```

3.360.6 Sympy [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.38

$$\int \frac{-48x^2 + (-40 - 80x + 8x^2)\log(5)}{25x^2 - 10x^3 + x^4 + (50x - 20x^2 + 2x^3)\log(5) + (25 - 10x + x^2)\log^2(5)}\,dx$$
$$= -\frac{x(-48 + 8\log(5)) - 40\log(5)}{x^2 + x(-5 + \log(5)) - 5\log(5)}$$

input
```
integrate(((8*x**2-80*x-40)*ln(5)-48*x**2)/((x**2-10*x+25)*ln(5)**2+(2*x**
3-20*x**2+50*x)*ln(5)+x**4-10*x**3+25*x**2),x)
```

output
```
-(x*(-48 + 8*log(5)) - 40*log(5))/(x**2 + x*(-5 + log(5)) - 5*log(5))
```

3.360.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.38

$$\int \frac{-48x^2 + (-40 - 80x + 8x^2)\log(5)}{25x^2 - 10x^3 + x^4 + (50x - 20x^2 + 2x^3)\log(5) + (25 - 10x + x^2)\log^2(5)}\,dx$$
$$= -\frac{8\,(x(\log(5) - 6) - 5\,\log(5))}{x^2 + x(\log(5) - 5) - 5\,\log(5)}$$

input
```
integrate(((8*x^2-80*x-40)*log(5)-48*x^2)/((x^2-10*x+25)*log(5)^2+(2*x^3-2
0*x^2+50*x)*log(5)+x^4-10*x^3+25*x^2),x, algorithm=\
```

output
```
-8*(x*(log(5) - 6) - 5*log(5))/(x^2 + x*(log(5) - 5) - 5*log(5))
```

3.360.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.48

$$\int \frac{-48x^2 + (-40 - 80x + 8x^2)\log(5)}{25x^2 - 10x^3 + x^4 + (50x - 20x^2 + 2x^3)\log(5) + (25 - 10x + x^2)\log^2(5)}\,dx$$
$$= -\frac{8\,(x\log(5) - 6\,x - 5\,\log(5))}{x^2 + x\log(5) - 5\,x - 5\,\log(5)}$$

input
```
integrate(((8*x^2-80*x-40)*log(5)-48*x^2)/((x^2-10*x+25)*log(5)^2+(2*x^3-2
0*x^2+50*x)*log(5)+x^4-10*x^3+25*x^2),x, algorithm=\
```

output
```
-8*(x*log(5) - 6*x - 5*log(5))/(x^2 + x*log(5) - 5*x - 5*log(5))
```

3.360.9 Mupad [B] (verification not implemented)

Time = 14.29 (sec) , antiderivative size = 684, normalized size of antiderivative = 32.57

$$\int \frac{-48x^2+(-40-80x+8x^2)\log(5)}{25x^2-10x^3+x^4+(50x-20x^2+2x^3)\log(5)+(25-10x+x^2)\log^2(5)}\,dx$$
$= \text{Too large to display}$

input
```
int(-(log(5)*(80*x - 8*x^2 + 40) + 48*x^2)/(log(5)^2*(x^2 - 10*x + 25) + l
og(5)*(50*x - 20*x^2 + 2*x^3) + 25*x^2 - 10*x^3 + x^4),x)
```

output
```
symsum(log(1843200*x*log(5) - 2880000*root(110592000*log(5) + 33177600*log
(5)^2 - 32440320*log(5)^3 - 16367616*log(5)^4 - 2654208*log(5)^5 - 147456*
log(5)^6 - 92160000, z, k)*log(5) - 2880000*root(110592000*log(5) + 331776
00*log(5)^2 - 32440320*log(5)^3 - 16367616*log(5)^4 - 2654208*log(5)^5 - 1
47456*log(5)^6 - 92160000, z, k)*x - 2304000*log(5) - 1136000*root(1105920
00*log(5) + 33177600*log(5)^2 - 32440320*log(5)^3 - 16367616*log(5)^4 - 26
54208*log(5)^5 - 147456*log(5)^6 - 92160000, z, k)*log(5)^2 - 140800*root(
110592000*log(5) + 33177600*log(5)^2 - 32440320*log(5)^3 - 16367616*log(5)
^4 - 2654208*log(5)^5 - 147456*log(5)^6 - 92160000, z, k)*log(5)^3 + 3840*
root(110592000*log(5) + 33177600*log(5)^2 - 32440320*log(5)^3 - 16367616*l
og(5)^4 - 2654208*log(5)^5 - 147456*log(5)^6 - 92160000, z, k)*log(5)^4 +
5120*root(110592000*log(5) + 33177600*log(5)^2 - 32440320*log(5)^3 - 16367
616*log(5)^4 - 2654208*log(5)^5 - 147456*log(5)^6 - 92160000, z, k)*log(5)
^5 + 640*root(110592000*log(5) + 33177600*log(5)^2 - 32440320*log(5)^3 - 1
6367616*log(5)^4 - 2654208*log(5)^5 - 147456*log(5)^6 - 92160000, z, k)*lo
g(5)^6 - 1904640*x*log(5)^2 + 122880*x*log(5)^3 - 61440*x*log(5)^4 + 39168
00*log(5)^2 - 1858560*log(5)^3 + 261120*log(5)^4 - 15360*log(5)^5 - 115200
0*root(110592000*log(5) + 33177600*log(5)^2 - 32440320*log(5)^3 - 16367616
*log(5)^4 - 2654208*log(5)^5 - 147456*log(5)^6 - 92160000, z, k)*x*log(5)
- 118400*root(110592000*log(5) + 33177600*log(5)^2 - 32440320*log(5)^3 ...
```

3.361 $\int \frac{32-8x+(-8+8x)\log(-1+x)}{-16+24x-9x^2+x^3}\,dx$

3.361.1 Optimal result

Integrand size = 31, antiderivative size = 13

$$\int \frac{32-8x+(-8+8x)\log(-1+x)}{-16+24x-9x^2+x^3}\,dx=\frac{8\log(-1+x)}{4-x}$$

output
```
8*ln(-1+x)/(-x+4)
```

3.361.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 42 vs. 2(13) = 26.

Time = 0.05 (sec) , antiderivative size = 42, normalized size of antiderivative = 3.23

$$\int \frac{32-8x+(-8+8x)\log(-1+x)}{-16+24x-9x^2+x^3}\,dx=\frac{8}{3}\left(2\text{arctanh}\left(\frac{5}{3}-\frac{2x}{3}\right)+\log(1-x)-\log(4-x)-\frac{3\log(-1+x)}{-4+x}\right)$$

input
```
Integrate[(32 - 8*x + (-8 + 8*x)*Log[-1 + x])/(-16 + 24*x - 9*x^2 + x^3),x
]
```

output
```
(8*(2*ArcTanh[5/3 - (2*x)/3] + Log[1 - x] - Log[4 - x] - (3*Log[-1 + x])/(
-4 + x)))/3
```

3.361.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 67 vs. 2(13) = 26.

Time = 0.43 (sec) , antiderivative size = 67, normalized size of antiderivative = 5.15, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.065$, Rules used = {2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x+(8x-8)\log(x-1)+32}{x^3-9x^2+24x-16}\,dx$$
$$\Big\downarrow \text{2463}$$
$$\int \left(-\frac{-8x+(8x-8)\log(x-1)+32}{9(x-4)}+\frac{-8x+(8x-8)\log(x-1)+32}{9(x-1)}+\frac{-8x+(8x-8)\log(x-1)+32}{3(x-4)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{8}{3}\log(1-x)+\frac{8}{3}(1+\log(3))\log(4-x)-\frac{8}{3}\log(3)\log(4-x)-\frac{8}{3}\log(4-x)-\frac{8(1-x)\log(x-1)}{3(4-x)}$$

input
```
Int[(32 - 8*x + (-8 + 8*x)*Log[-1 + x])/(-16 + 24*x - 9*x^2 + x^3),x]
```

output
```
(8*Log[1 - x])/3 - (8*Log[4 - x])/3 - (8*Log[3]*Log[4 - x])/3 + (8*(1 + Lo
g[3])*Log[4 - x])/3 - (8*(1 - x)*Log[-1 + x])/(3*(4 - x))
```

3.361.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.361.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

method	result	size
norman	$-\frac{8\ln(-1+x)}{x-4}$	12
risch	$-\frac{8\ln(-1+x)}{x-4}$	12
parallelrisch	$-\frac{8\ln(-1+x)}{x-4}$	12
derivativedivides	$-\frac{8\ln(-1+x)(-1+x)}{3(x-4)}+\frac{8\ln(-1+x)}{3}$	22
default	$-\frac{8\ln(-1+x)(-1+x)}{3(x-4)}+\frac{8\ln(-1+x)}{3}$	22
parts	$-\frac{8\ln(-1+x)(-1+x)}{3(x-4)}+\frac{8\ln(-1+x)}{3}$	22

input
```
int(((8*x-8)*ln(-1+x)-8*x+32)/(x^3-9*x^2+24*x-16),x,method=_RETURNVERBOSE)
```

output
```
-8*ln(-1+x)/(x-4)
```

3.361.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{32-8x+(-8+8x)\log(-1+x)}{-16+24x-9x^2+x^3}\,dx=-\frac{8\,\log\left(x-1\right)}{x-4}$$

input
```
integrate(((8*x-8)*log(-1+x)-8*x+32)/(x^3-9*x^2+24*x-16),x, algorithm=\
```

output
```
-8*log(x - 1)/(x - 4)
```

3.361.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int \frac{32-8x+(-8+8x)\log(-1+x)}{-16+24x-9x^2+x^3}\,dx=-\frac{8\log\left(x-1\right)}{x-4}$$

input
```
integrate(((8*x-8)*ln(-1+x)-8*x+32)/(x**3-9*x**2+24*x-16),x)
```

output
```
-8*log(x - 1)/(x - 4)
```

3.361.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 33 vs. $2(11) = 22$.

Time = 0.25 (sec) , antiderivative size = 33, normalized size of antiderivative = 2.54

$$\int \frac{32-8x+(-8+8x)\log(-1+x)}{-16+24x-9x^2+x^3}\,dx = -\frac{8\,((4\,x-7)\log{(x-1)}-12)}{9\,(x-4)} - \frac{32}{3\,(x-4)} + \frac{32}{9}\,\log{(x-1)}$$

input
```
integrate(((8*x-8)*log(-1+x)-8*x+32)/(x^3-9*x^2+24*x-16),x, algorithm=\
```

output
```
-8/9*((4*x - 7)*log(x - 1) - 12)/(x - 4) - 32/3/(x - 4) + 32/9*log(x - 1)
```

3.361.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{32-8x+(-8+8x)\log(-1+x)}{-16+24x-9x^2+x^3}\,dx = -\frac{8\,\log{(x-1)}}{x-4}$$

input
```
integrate(((8*x-8)*log(-1+x)-8*x+32)/(x^3-9*x^2+24*x-16),x, algorithm=\
```

output
```
-8*log(x - 1)/(x - 4)
```

3.361.9 Mupad [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{32-8x+(-8+8x)\log(-1+x)}{-16+24x-9x^2+x^3}\,dx=-\frac{8\,\ln(x-1)}{x-4}$$

input
```
int((log(x - 1)*(8*x - 8) - 8*x + 32)/(24*x - 9*x^2 + x^3 - 16),x)
```

output
```
-(8*log(x - 1))/(x - 4)
```

3.362 $\int \frac{x+\frac{11e^2x}{5}+6e^x x}{6x}\,dx$

3.362.1 Optimal result

Integrand size = 23, antiderivative size = 18

$$\int \frac{x+\frac{11e^2x}{5}+6e^x x}{6x}\,dx = e^x+\frac{1}{6}\left(x+\frac{11e^2x}{5}\right)$$

output
```
exp(x)+1/6*x-1/6*exp(ln(-11/5*x)+2)
```

3.362.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{x+\frac{11e^2x}{5}+6e^x x}{6x}\,dx = e^x+\frac{x}{6}+\frac{11e^2x}{30}$$

input
```
Integrate[(x + (11*E^2*x)/5 + 6*E^x*x)/(6*x),x]
```

output
```
E^x + x/6 + (11*E^2*x)/30
```

3.362.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {6, 27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6e^x x + \frac{11e^2 x}{5} + x}{6x} \, dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{6e^x x + \left(1 + \frac{11e^2}{5}\right) x}{6x} dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{6} \int \frac{30e^x x + (5 + 11e^2)\, x}{5x} dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{30} \int \frac{30e^x x + (5 + 11e^2)\, x}{x} dx$$

$$\Big\downarrow \; 2010$$

$$\frac{1}{30} \int \left(30e^x + 5\left(1 + \frac{11e^2}{5}\right)\right) dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{30}\left((5 + 11e^2)\, x + 30e^x\right)$$

input
```
Int[(x + (11*E^2*x)/5 + 6*E^x*x)/(6*x),x]
```

output
```
(30*E^x + (5 + 11*E^2)*x)/30
```

3.362. $\int \frac{x+\frac{11e^2x}{5}+6e^x x}{6x} \, dx$

3.362.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.362.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

method	result	size
norman	$\left(\frac{11\,\mathrm{e}^{2}}{30}+\frac{1}{6}\right) x+\mathrm{e}^{x}$	12
risch	$\frac{11\,\mathrm{e}^{2} x}{30}+\frac{x}{6}+\mathrm{e}^{x}$	12
default	$\mathrm{e}^{x}+\frac{x}{6}-\frac{\mathrm{e}^{\ln\left(-\frac{11 x}{5}\right)+2}}{6}$	16
parts	$\mathrm{e}^{x}+\frac{x}{6}-\frac{\mathrm{e}^{\ln\left(-\frac{11 x}{5}\right)+2}}{6}$	16
parallelrisch	$\frac{x^{3}+6\,\mathrm{e}^{x} x^{2}-\mathrm{e}^{\ln\left(-\frac{11 x}{5}\right)+2} x^{2}}{6 x^{2}}$	29

input
```
int(1/6*(-exp(ln(-11/5*x)+2)+6*exp(x)*x+x)/x,x,method=_RETURNVERBOSE)
```

output
```
(11/30*exp(2)+1/6)*x+exp(x)
```

3.362.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.61

$$\int \frac{x + \frac{11e^2x}{5} + 6e^x x}{6x} \, dx = \frac{11}{30} \, xe^2 + \frac{1}{6} \, x + e^x$$

input
```
integrate(1/6*(-exp(log(-11/5*x)+2)+6*exp(x)*x+x)/x,x, algorithm=\
```

output
```
11/30*x*e^2 + 1/6*x + e^x
```

3.362.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{x + \frac{11e^2x}{5} + 6e^x x}{6x} \, dx = x \left(\frac{1}{6} + \frac{11e^2}{30} \right) + e^x$$

input
```
integrate(1/6*(-exp(ln(-11/5*x)+2)+6*exp(x)*x+x)/x,x)
```

output
```
x*(1/6 + 11*exp(2)/30) + exp(x)
```

3.362.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.61

$$\int \frac{x + \frac{11e^2x}{5} + 6e^x x}{6x} \, dx = \frac{11}{30} \, xe^2 + \frac{1}{6} \, x + e^x$$

input
```
integrate(1/6*(-exp(log(-11/5*x)+2)+6*exp(x)*x+x)/x,x, algorithm=\
```

output
```
11/30*x*e^2 + 1/6*x + e^x
```

3.362.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

$$\int \frac{x + \frac{11e^2x}{5} + 6e^x x}{6x} \, dx = \frac{1}{30} \, x\big(11 \, e^2 + 5\big) + e^x$$

input
```
integrate(1/6*(-exp(log(-11/5*x)+2)+6*exp(x)*x+x)/x,x, algorithm=\
```

output
```
1/30*x*(11*e^2 + 5) + e^x
```

3.362.9 Mupad [B] (verification not implemented)

Time = 12.46 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.61

$$\int \frac{x + \frac{11e^2x}{5} + 6e^x x}{6x} \, dx = \mathrm{e}^x + x \left(\frac{11 \, \mathrm{e}^2}{30} + \frac{1}{6}\right)$$

input
```
int((x/6 - exp(log(-(11*x)/5) + 2)/6 + x*exp(x))/x,x)
```

output
```
exp(x) + x*((11*exp(2))/30 + 1/6)
```

3.363 $\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)}$

3.363.1 Optimal result

Integrand size = 175, antiderivative size = 28

$$\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2}$$

output
```
ln(-x/(5+ln(x))-1/exp(x)+4*x+exp(4/x))
```

3.363.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.93

$$\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2}$$
$$-x-\log(5+\log(x))+\log\left(5-5e^{\frac{4}{x}+x}-19e^xx+\log(x)-e^{\frac{4}{x}+x}\log(x)-4e^xx\log(x)\right)$$

input
```
Integrate[(25*x^2 + E^x*(-100*E^(4/x) + 96*x^2) + (10*x^2 + E^x*(-40*E^(4/
x) + 39*x^2))*Log[x] + (x^2 + E^x*(-4*E^(4/x) + 4*x^2))*Log[x]^2)/(-25*x^2
 + E^x*(25*E^(4/x)*x^2 + 95*x^3) + (-10*x^2 + E^x*(10*E^(4/x)*x^2 + 39*x^3
))*Log[x] + (-x^2 + E^x*(E^(4/x)*x^2 + 4*x^3))*Log[x]^2),x]
```

output
```
-x - Log[5 + Log[x]] + Log[5 - 5*E^(4/x + x) - 19*E^x*x + Log[x] - E^(4/x
+ x)*Log[x] - 4*E^x*x*Log[x]]
```

3.363.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{25x^2+e^x\left(96x^2-100e^{4/x}\right)+\left(x^2+e^x\left(4x^2-4e^{4/x}\right)\right)\log^2(x)+\left(10x^2+e^x\left(39x^2-40e^{4/x}\right)\right)\log(x)}{-25x^2+e^x\left(95x^3+25e^{4/x}x^2\right)+\left(e^x\left(4x^3+e^{4/x}x^2\right)-x^2\right)\log^2(x)+\left(e^x\left(39x^3+10e^{4/x}x^2\right)-10x^2\right)\log(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-25x^2-e^x\left(96x^2-100e^{4/x}\right)-\left(x^2+e^x\left(4x^2-4e^{4/x}\right)\right)\log^2(x)-\left(10x^2+e^x\left(39x^2-40e^{4/x}\right)\right)\log(x)}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-4e^x x\log(x)-e^{x+\frac{4}{x}}\log(x)+\log(x)+5\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$$\Big\downarrow \text{7239}$$

3.363. $\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x)}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2(x)}dx$

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$\big\downarrow$ 7293

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$\big\downarrow$ 7239

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$\big\downarrow$ 7293

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$\big\downarrow$ 7239

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$\big\downarrow$ 7293

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$\big\downarrow$ 7239

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$\big\downarrow$ 7293

3.363. $\displaystyle\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x)}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2(x)}\,dx$

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$\downarrow$ 7239

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$\downarrow$ 7293

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$\downarrow$ 7239

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$\downarrow$ 7293

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$\downarrow$ 7239

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$\downarrow$ 7293

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$\downarrow$ 7239

3.363. $$\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x)}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2(x)}\,dx$$

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$$\Big\downarrow \; 7293$$

3.363. $$\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x)}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2(x)}\,dx$$

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

$\big\downarrow$ 7239

$$\int \frac{-96e^x x^2-25x^2-\left(4e^x x^2+x^2-4e^{x+\frac{4}{x}}\right)\log^2(x)-\left(39e^x x^2+10x^2-40e^{x+\frac{4}{x}}\right)\log(x)+100e^{x+\frac{4}{x}}}{x^2(\log(x)+5)\left(-19e^x x-5e^{x+\frac{4}{x}}-\left(4e^x x+e^{x+\frac{4}{x}}-1\right)\log(x)+5\right)}dx$$

$\big\downarrow$ 7293

$$\int \left(\frac{96x^2+4x^2\log^2(x)+39x^2\log(x)-100e^{4/x}-4e^{4/x}\log^2(x)-40e^{4/x}\log(x)}{x^2(\log(x)+5)\left(19x+5e^{4/x}+4x\log(x)+e^{4/x}\log(x)\right)}+\frac{95x^3+4x^3\log^2(x)+39x^3\log(}{x^2}\right.$$

input
```
Int[(25*x^2 + E^x*(-100*E^(4/x) + 96*x^2) + (10*x^2 + E^x*(-40*E^(4/x) + 3
9*x^2))*Log[x] + (x^2 + E^x*(-4*E^(4/x) + 4*x^2))*Log[x]^2)/(-25*x^2 + E^x
*(25*E^(4/x)*x^2 + 95*x^3) + (-10*x^2 + E^x*(10*E^(4/x)*x^2 + 39*x^3))*Log
[x] + (-x^2 + E^x*(E^(4/x)*x^2 + 4*x^3))*Log[x]^2),x]
```

output
```
$Aborted
```

3.363.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.363. $\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x)}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2(x)}\,dx$

3.363.4 Maple [A] (verified)

Time = 7.58 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.86

method	result	size
parallelrisch	$-\ln(5+\ln(x))+\ln\left(x\,\mathrm{e}^{x}\ln(x)+\frac{\mathrm{e}^{\frac{4}{x}}\ln(x)\mathrm{e}^{x}}{4}+\frac{19\,\mathrm{e}^{x}x}{4}+\frac{5\,\mathrm{e}^{\frac{4}{x}}\mathrm{e}^{x}}{4}-\frac{\ln(x)}{4}-\frac{5}{4}\right)-x$	52
risch	$\ln\left(4x+\mathrm{e}^{\frac{4}{x}}-\mathrm{e}^{-x}\right)+\ln\left(\ln(x)+\frac{19\,\mathrm{e}^{x}x+5\,\mathrm{e}^{\frac{x^2+4}{x}}-5}{4\,\mathrm{e}^{x}x+\mathrm{e}^{\frac{x^2+4}{x}}-1}\right)-\ln(5+\ln(x))$	69

input
```
int((((-4*exp(4/x)+4*x^2)*exp(x)+x^2)*ln(x)^2+((-40*exp(4/x)+39*x^2)*exp(x
)+10*x^2)*ln(x)+(-100*exp(4/x)+96*x^2)*exp(x)+25*x^2)/(((x^2*exp(4/x)+4*x^
3)*exp(x)-x^2)*ln(x)^2+((10*x^2*exp(4/x)+39*x^3)*exp(x)-10*x^2)*ln(x)+(25*
x^2*exp(4/x)+95*x^3)*exp(x)-25*x^2),x,method=_RETURNVERBOSE)
```

output
```
-ln(5+ln(x))+ln(x*exp(x)*ln(x)+1/4*exp(4/x)*ln(x)*exp(x)+19/4*exp(x)*x+5/4
*exp(4/x)*exp(x)-1/4*ln(x)-5/4)-x
```

3.363.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 105 vs. 2(26) = 52.

Time = 0.28 (sec) , antiderivative size = 105, normalized size of antiderivative = 3.75

$$\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x)}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2(x)}$$

$$-x+\log\left(4\,x+e^{\frac{4}{x}}\right)+\log\left(\frac{\left(19\,x+5\,e^{\frac{4}{x}}\right)e^{x}+\left(\left(4\,x+e^{\frac{4}{x}}\right)e^{x}-1\right)\log(x)-5}{\left(4\,x+e^{\frac{4}{x}}\right)e^{x}-1}\right)+\log\left(\frac{\left(4\,x+e^{\frac{4}{x}}\right)e^{x}-1}{4\,x+e^{\frac{4}{x}}}\right)-\mathrm{lo}$$

input
```
integrate((((-4*exp(4/x)+4*x^2)*exp(x)+x^2)*log(x)^2+((-40*exp(4/x)+39*x^2
)*exp(x)+10*x^2)*log(x)+(-100*exp(4/x)+96*x^2)*exp(x)+25*x^2)/(((x^2*exp(4
/x)+4*x^3)*exp(x)-x^2)*log(x)^2+((10*x^2*exp(4/x)+39*x^3)*exp(x)-10*x^2)*l
og(x)+(25*x^2*exp(4/x)+95*x^3)*exp(x)-25*x^2),x, algorithm=\
```

output
```
-x + log(4*x + e^(4/x)) + log(((19*x + 5*e^(4/x))*e^x + ((4*x + e^(4/x))*e
^x - 1)*log(x) - 5)/((4*x + e^(4/x))*e^x - 1)) + log(((4*x + e^(4/x))*e^x
- 1)/(4*x + e^(4/x))) - log(log(x) + 5)
```

3.363.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. 2(20) = 40.

Time = 2.76 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.14

$$\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x)}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2(x)}$$
$$-x+\log\left(\frac{4x\log(x)+19x}{\log(x)+5}+e^{\frac{4}{x}}\right)+\log\left(\frac{-\log(x)-5}{4x\log(x)+19x+e^{\frac{4}{x}}\log(x)+5e^{\frac{4}{x}}}+e^x\right)$$

input
```
integrate((((-4*exp(4/x)+4*x**2)*exp(x)+x**2)*ln(x)**2+((-40*exp(4/x)+39*x
**2)*exp(x)+10*x**2)*ln(x)+(-100*exp(4/x)+96*x**2)*exp(x)+25*x**2)/((((x**2
*exp(4/x)+4*x**3)*exp(x)-x**2)*ln(x)**2+((10*x**2*exp(4/x)+39*x**3)*exp(x)
-10*x**2)*ln(x)+(25*x**2*exp(4/x)+95*x**3)*exp(x)-25*x**2),x)
```

output
```
-x + log((4*x*log(x) + 19*x)/(log(x) + 5) + exp(4/x)) + log((-log(x) - 5)/
(4*x*log(x) + 19*x + exp(4/x)*log(x) + 5*exp(4/x)) + exp(x))
```

3.363.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.54

$$\int \frac{25x^2+e^x\left(-100e^{4/x}+96x^2\right)+\left(10x^2+e^x\left(-40e^{4/x}+39x^2\right)\right)\log(x)+\left(x^2+e^x\left(-4e^{4/x}+4x^2\right)\right)\log^2(x)}{-25x^2+e^x\left(25e^{4/x}x^2+95x^3\right)+\left(-10x^2+e^x\left(10e^{4/x}x^2+39x^3\right)\right)\log(x)+\left(-x^2+e^x\left(e^{4/x}x^2+4x^3\right)\right)\log^2(x)}$$

input
```
integrate((((-4*exp(4/x)+4*x^2)*exp(x)+x^2)*log(x)^2+((-40*exp(4/x)+39*x^2
)*exp(x)+10*x^2)*log(x)+(-100*exp(4/x)+96*x^2)*exp(x)+25*x^2)/((((x^2*exp(4
/x)+4*x^3)*exp(x)-x^2)*log(x)^2+((10*x^2*exp(4/x)+39*x^3)*exp(x)-10*x^2)*l
og(x)+(25*x^2*exp(4/x)+95*x^3)*exp(x)-25*x^2),x, algorithm=\
```

output
```
log(((log(x) + 5)*e^(x + 4/x) + (4*x*log(x) + 19*x)*e^x - log(x) - 5)*e^(-
x)/(log(x) + 5))
```

3.363.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(26) = 52$.

Time = 0.32 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.96

$$\int \frac{25x^2 + e^x\left(-100e^{4/x} + 96x^2\right) + \left(10x^2 + e^x\left(-40e^{4/x} + 39x^2\right)\right)\log(x) + \left(x^2 + e^x\left(-4e^{4/x} + 4x^2\right)\right)\log^2(x}{-25x^2 + e^x\left(25e^{4/x}x^2 + 95x^3\right) + \left(-10x^2 + e^x\left(10e^{4/x}x^2 + 39x^3\right)\right)\log(x) + \left(-x^2 + e^x\left(e^{4/x}x^2 + 4x^3\right)\right)\log^2}$$

$$-x + \log\left(4\,xe^x\log(x) + 19\,xe^x + e^{\left(\frac{x^2+4}{x}\right)}\log(x) + 5\,e^{\left(\frac{x^2+4}{x}\right)} - \log(x) - 5\right) - \log(\log(x) + 5)$$

input
```
integrate((((-4*exp(4/x)+4*x^2)*exp(x)+x^2)*log(x)^2+((-40*exp(4/x)+39*x^2
)*exp(x)+10*x^2)*log(x)+(-100*exp(4/x)+96*x^2)*exp(x)+25*x^2)/(((x^2*exp(4
/x)+4*x^3)*exp(x)-x^2)*log(x)^2+((10*x^2*exp(4/x)+39*x^3)*exp(x)-10*x^2)*l
og(x)+(25*x^2*exp(4/x)+95*x^3)*exp(x)-25*x^2),x, algorithm=\
```

output
```
-x + log(4*x*e^x*log(x) + 19*x*e^x + e^((x^2 + 4)/x)*log(x) + 5*e^((x^2 +
4)/x) - log(x) - 5) - log(log(x) + 5)
```

3.363.9 Mupad [F(-1)]

Timed out.

$$\int \frac{25x^2 + e^x\left(-100e^{4/x} + 96x^2\right) + \left(10x^2 + e^x\left(-40e^{4/x} + 39x^2\right)\right)\log(x) + \left(x^2 + e^x\left(-4e^{4/x} + 4x^2\right)\right)\log^2(x}{-25x^2 + e^x\left(25e^{4/x}x^2 + 95x^3\right) + \left(-10x^2 + e^x\left(10e^{4/x}x^2 + 39x^3\right)\right)\log(x) + \left(-x^2 + e^x\left(e^{4/x}x^2 + 4x^3\right)\right)\log^2}$$

$$-\int \frac{\ln(x)^2\left(e^x\left(4\,e^{4/x} - 4\,x^2\right) - x^2\right) + \ln(x)\left(e^x\left(40\,e^{4/x} - 39\,x^2\right) - 10\,x^2\right) + e^x\left(100\,e^{4/x} - 96\,x^2\right) - 25}{\ln(x)\left(e^x\left(10\,x^2\,e^{4/x} + 39\,x^3\right) - 10\,x^2\right) + e^x\left(25\,x^2\,e^{4/x} + 95\,x^3\right) - 25\,x^2 + \ln(x)^2\left(e^x\left(x^2\,e^{4/x} + 4\,x^3\right) -\right.}$$

input
```
int(-(log(x)^2*(exp(x)*(4*exp(4/x) - 4*x^2) - x^2) + log(x)*(exp(x)*(40*ex
p(4/x) - 39*x^2) - 10*x^2) + exp(x)*(100*exp(4/x) - 96*x^2) - 25*x^2)/(log
(x)*(exp(x)*(10*x^2*exp(4/x) + 39*x^3) - 10*x^2) + exp(x)*(25*x^2*exp(4/x)
 + 95*x^3) - 25*x^2 + log(x)^2*(exp(x)*(x^2*exp(4/x) + 4*x^3) - x^2)),x)
```

output
```
-int((log(x)^2*(exp(x)*(4*exp(4/x) - 4*x^2) - x^2) + log(x)*(exp(x)*(40*ex
p(4/x) - 39*x^2) - 10*x^2) + exp(x)*(100*exp(4/x) - 96*x^2) - 25*x^2)/(log
(x)*(exp(x)*(10*x^2*exp(4/x) + 39*x^3) - 10*x^2) + exp(x)*(25*x^2*exp(4/x)
 + 95*x^3) - 25*x^2 + log(x)^2*(exp(x)*(x^2*exp(4/x) + 4*x^3) - x^2)), x)
```

3.364 $\int \frac{-4x^2-8x^3+(3x^2+4x^3)\log(x)+(16+64x+64x^2)\log^5(x)}{(16+64x+64x^2)\log^5(x)}\,dx$

3.364.1 Optimal result

Integrand size = 57, antiderivative size = 22

$$\int \frac{-4x^2-8x^3+(3x^2+4x^3)\log(x)+(16+64x+64x^2)\log^5(x)}{(16+64x+64x^2)\log^5(x)}\,dx = x+\frac{x}{16\left(\frac{1}{x^2}+\frac{2}{x}\right)\log^4(x)}$$

output
```
x+1/16*x/(2/x+1/x^2)/ln(x)^4
```

3.364.2 Mathematica [A] (verified)

Time = 2.68 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-4x^2-8x^3+(3x^2+4x^3)\log(x)+(16+64x+64x^2)\log^5(x)}{(16+64x+64x^2)\log^5(x)}\,dx = x+\frac{x^3}{16(1+2x)\log^4(x)}$$

input
```
Integrate[(-4*x^2 - 8*x^3 + (3*x^2 + 4*x^3)*Log[x] + (16 + 64*x + 64*x^2)*
Log[x]^5)/((16 + 64*x + 64*x^2)*Log[x]^5),x]
```

output
```
x + x^3/(16*(1 + 2*x)*Log[x]^4)
```

3.364.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x^3-4x^2+\left(64x^2+64x+16\right)\log^5(x)+\left(4x^3+3x^2\right)\log(x)}{\left(64x^2+64x+16\right)\log^5(x)}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{-8x^3-4x^2+\left(64x^2+64x+16\right)\log^5(x)+\left(4x^3+3x^2\right)\log(x)}{(8x+4)^2\log^5(x)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{x^2}{4(2x+1)\log^5(x)}+\frac{(4x+3)x^2}{16(2x+1)^2\log^4(x)}+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{1}{4}\int \frac{x^2}{(2x+1)\log^5(x)}dx+\frac{1}{16}\int \frac{x^2(4x+3)}{(2x+1)^2\log^4(x)}dx+x$$

input
```
Int[(-4*x^2 - 8*x^3 + (3*x^2 + 4*x^3)*Log[x] + (16 + 64*x + 64*x^2)*Log[x]
^5)/((16 + 64*x + 64*x^2)*Log[x]^5),x]
```

output
```
$Aborted
```

3.364.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.364.4 Maple [A] (verified)

Time = 6.73 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

method	result	size
risch	$x+\frac{x^3}{16(1+2x)\ln(x)^4}$	19
norman	$\frac{-\frac{\ln(x)^4}{2}+\frac{x^3}{16}+2x^2\ln(x)^4}{(1+2x)\ln(x)^4}$	34
parallelrisch	$\frac{64x^2\ln(x)^4-16\ln(x)^4+2x^3}{32\ln(x)^4(1+2x)}$	35

input
```
int(((64*x^2+64*x+16)*ln(x)^5+(4*x^3+3*x^2)*ln(x)-8*x^3-4*x^2)/(64*x^2+64*
x+16)/ln(x)^5,x,method=_RETURNVERBOSE)
```

output
```
x+1/16*x^3/(1+2*x)/ln(x)^4
```

3.364.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int \frac{-4x^2-8x^3+(3x^2+4x^3)\log(x)+(16+64x+64x^2)\log^5(x)}{(16+64x+64x^2)\log^5(x)}\,dx$$
$$=\frac{16\,(2\,x^2+x)\log{(x)}^4+x^3}{16\,(2\,x+1)\log{(x)}^4}$$

input
```
integrate(((64*x^2+64*x+16)*log(x)^5+(4*x^3+3*x^2)*log(x)-8*x^3-4*x^2)/(64
*x^2+64*x+16)/log(x)^5,x, algorithm=\
```

output
```
1/16*(16*(2*x^2 + x)*log(x)^4 + x^3)/((2*x + 1)*log(x)^4)
```

3.364.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{-4x^2-8x^3+(3x^2+4x^3)\log(x)+(16+64x+64x^2)\log^5(x)}{(16+64x+64x^2)\log^5(x)}\,dx = \frac{x^3}{(32x+16)\log{(x)}^4}+x$$

input
```
integrate(((64*x**2+64*x+16)*ln(x)**5+(4*x**3+3*x**2)*ln(x)-8*x**3-4*x**2)
/(64*x**2+64*x+16)/ln(x)**5,x)
```

output
```
x**3/((32*x + 16)*log(x)**4) + x
```

3.364.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int \frac{-4x^2-8x^3+(3x^2+4x^3)\log(x)+(16+64x+64x^2)\log^5(x)}{(16+64x+64x^2)\log^5(x)}\,dx$$
$$= \frac{16\,(2\,x^2+x)\log{(x)}^4+x^3}{16\,(2\,x+1)\log{(x)}^4}$$

input
```
integrate(((64*x^2+64*x+16)*log(x)^5+(4*x^3+3*x^2)*log(x)-8*x^3-4*x^2)/(64
*x^2+64*x+16)/log(x)^5,x, algorithm=\
```

output
```
1/16*(16*(2*x^2 + x)*log(x)^4 + x^3)/((2*x + 1)*log(x)^4)
```

3.364.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{-4x^2-8x^3+(3x^2+4x^3)\log(x)+(16+64x+64x^2)\log^5(x)}{(16+64x+64x^2)\log^5(x)}\,dx$$
$$= \frac{x^3}{16\left(2\,x\log{(x)}^4+\log{(x)}^4\right)}+x$$

input
```
integrate(((64*x^2+64*x+16)*log(x)^5+(4*x^3+3*x^2)*log(x)-8*x^3-4*x^2)/(64
*x^2+64*x+16)/log(x)^5,x, algorithm=\
```

output
```
1/16*x^3/(2*x*log(x)^4 + log(x)^4) + x
```

3.364.9 Mupad [B] (verification not implemented)

Time = 14.35 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-4x^2-8x^3+(3x^2+4x^3)\log(x)+(16+64x+64x^2)\log^5(x)}{(16+64x+64x^2)\log^5(x)}\,dx = \frac{x^3}{16\ln(x)^4\,(2\,x+1)}+\frac{x\,(32\,x+16)}{16\,(2\,x+1)}$$

input
```
int((log(x)*(3*x^2 + 4*x^3) + log(x)^5*(64*x + 64*x^2 + 16) - 4*x^2 - 8*x^
3)/(log(x)^5*(64*x + 64*x^2 + 16)),x)
```

output
```
x^3/(16*log(x)^4*(2*x + 1)) + (x*(32*x + 16))/(16*(2*x + 1))
```

3.365 $\int \frac{20+8x+8x\log(x)+e^{14-x}(25x+20x^2+4x^3)\log^2(x)}{(25x+20x^2+4x^3)\log^2(x)}\,dx$

3.365.1 Optimal result

Integrand size = 57, antiderivative size = 24

$$\int \frac{20+8x+8x\log(x)+e^{14-x}(25x+20x^2+4x^3)\log^2(x)}{(25x+20x^2+4x^3)\log^2(x)}\,dx = 14-e^{14-x}-\frac{4}{(5+2x)\log(x)}$$

output
```
14-4/(5+2*x)/ln(x)-exp(-x+14)
```

3.365.2 Mathematica [A] (verified)

Time = 1.78 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{20+8x+8x\log(x)+e^{14-x}(25x+20x^2+4x^3)\log^2(x)}{(25x+20x^2+4x^3)\log^2(x)}\,dx = -e^{14-x}-\frac{4}{(5+2x)\log(x)}$$

input
```
Integrate[(20 + 8*x + 8*x*Log[x] + E^(14 - x)*(25*x + 20*x^2 + 4*x^3)*Log[
x]^2)/((25*x + 20*x^2 + 4*x^3)*Log[x]^2),x]
```

output
```
-E^(14 - x) - 4/((5 + 2*x)*Log[x])
```

3.365.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{14-x} \left(4x^3+20x^2+25x\right) \log^2(x)+8x+8x\log(x)+20}{\left(4x^3+20x^2+25x\right) \log^2(x)} \, dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{e^{14-x} \left(4x^3+20x^2+25x\right) \log^2(x)+8x+8x\log(x)+20}{x \left(4x^2+20x+25\right) \log^2(x)} dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{e^{14-x} \left(4x^3+20x^2+25x\right) \log^2(x)+8x+8x\log(x)+20}{x(2x+5)^2 \log^2(x)} dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(e^{14-x}+\frac{4(2x+2x\log(x)+5)}{x(2x+5)^2 \log^2(x)}\right) dx$$

$$\Big\downarrow \text{ 2009}$$

$$4\int \frac{1}{x(2x+5)\log^2(x)}dx+8\int \frac{1}{(2x+5)^2\log(x)}dx-e^{14-x}$$

input
```
Int[(20 + 8*x + 8*x*Log[x] + E^(14 - x)*(25*x + 20*x^2 + 4*x^3)*Log[x]^2)/
((25*x + 20*x^2 + 4*x^3)*Log[x]^2),x]
```

output
```
$Aborted
```

3.365.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.365.4 Maple [A] (verified)

Time = 5.44 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

method	result	size
risch	$-\mathrm{e}^{-x+14}-\frac{4}{(5+2x)\ln(x)}$	23
parallelrisch	$-\frac{20\,\mathrm{e}^{-x+14}\ln(x)x+40+50\,\mathrm{e}^{-x+14}\ln(x)}{10\ln(x)(5+2x)}$	37

input
```
int(((4*x^3+20*x^2+25*x)*exp(-x+14)*ln(x)^2+8*x*ln(x)+8*x+20)/(4*x^3+20*x^
2+25*x)/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
-exp(-x+14)-4/(5+2*x)/ln(x)
```

3.365.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{20+8x+8x\log(x)+e^{14-x}(25x+20x^2+4x^3)\log^2(x)}{(25x+20x^2+4x^3)\log^2(x)}\,dx = -\frac{(2\,x+5)e^{(-x+14)}\log\left(x\right)+4}{(2\,x+5)\log\left(x\right)}$$

input
```
integrate(((4*x^3+20*x^2+25*x)*exp(-x+14)*log(x)^2+8*x*log(x)+8*x+20)/(4*x
^3+20*x^2+25*x)/log(x)^2,x, algorithm=\
```

output
```
-((2*x + 5)*e^(-x + 14)*log(x) + 4)/((2*x + 5)*log(x))
```

3.365.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{20+8x+8x\log(x)+e^{14-x}(25x+20x^2+4x^3)\log^2(x)}{(25x+20x^2+4x^3)\log^2(x)}\,dx = -e^{14-x}-\frac{4}{(2x+5)\log(x)}$$

input
```
integrate(((4*x**3+20*x**2+25*x)*exp(-x+14)*ln(x)**2+8*x*ln(x)+8*x+20)/(4*
x**3+20*x**2+25*x)/ln(x)**2,x)
```

output
```
-exp(14 - x) - 4/((2*x + 5)*log(x))
```

3.365.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

$$\int \frac{20+8x+8x\log(x)+e^{14-x}(25x+20x^2+4x^3)\log^2(x)}{(25x+20x^2+4x^3)\log^2(x)}\,dx$$
$$= -\frac{((2\,xe^{14}+5\,e^{14})\log(x)+4\,e^x)e^{(-x)}}{(2\,x+5)\log(x)}$$

input
```
integrate(((4*x^3+20*x^2+25*x)*exp(-x+14)*log(x)^2+8*x*log(x)+8*x+20)/(4*x
^3+20*x^2+25*x)/log(x)^2,x, algorithm=\
```

output
```
-((2*x*e^14 + 5*e^14)*log(x) + 4*e^x)*e^(-x)/((2*x + 5)*log(x))
```

3.365.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{20+8x+8x\log(x)+e^{14-x}(25x+20x^2+4x^3)\log^2(x)}{(25x+20x^2+4x^3)\log^2(x)}\,dx$$
$$= -\frac{2\,xe^{(-x+14)}\log(x)+5\,e^{(-x+14)}\log(x)+4}{2\,x\log(x)+5\,\log(x)}$$

input
```
integrate(((4*x^3+20*x^2+25*x)*exp(-x+14)*log(x)^2+8*x*log(x)+8*x+20)/(4*x
^3+20*x^2+25*x)/log(x)^2,x, algorithm=\
```

output
```
-(2*x*e^(-x + 14)*log(x) + 5*e^(-x + 14)*log(x) + 4)/(2*x*log(x) + 5*log(x
))
```

3.365.9 Mupad [B] (verification not implemented)

Time = 14.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.88

$$\int \frac{20+8x+8x\log(x)+e^{14-x}(25x+20x^2+4x^3)\log^2(x)}{(25x+20x^2+4x^3)\log^2(x)}\,dx$$
$$=-\frac{4}{\ln(x)\,(2\,x+5)}-\frac{5\,\mathrm{e}^{14-x}}{2\,x+5}-\frac{2\,x\,\mathrm{e}^{14-x}}{2\,x+5}$$

input
```
int((8*x + 8*x*log(x) + exp(14 - x)*log(x)^2*(25*x + 20*x^2 + 4*x^3) + 20)
/(log(x)^2*(25*x + 20*x^2 + 4*x^3)),x)
```

output
```
- 4/(log(x)*(2*x + 5)) - (5*exp(14 - x))/(2*x + 5) - (2*x*exp(14 - x))/(2*
x + 5)
```

3.366 $\int \frac{16e^4+e^{4+2x}x^2+e^{4+x}(-4+4x)}{-32+16x+e^x(-20x+8x^2)+e^{2x}(-3x^2+x^3)}\,dx$

3.366.1 Optimal result

Integrand size = 64, antiderivative size = 23

$$\int \frac{16e^4+e^{4+2x}x^2+e^{4+x}(-4+4x)}{-32+16x+e^x(-20x+8x^2)+e^{2x}(-3x^2+x^3)}\,dx = e^4\log\left(2-x+\frac{x}{4e^{-x}+x}\right)$$

output
```
ln(2+x/(4/exp(x)+x)-x)*exp(4)
```

3.366.2 Mathematica [A] (verified)

Time = 1.71 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.52

$$\int \frac{16e^4+e^{4+2x}x^2+e^{4+x}(-4+4x)}{-32+16x+e^x(-20x+8x^2)+e^{2x}(-3x^2+x^3)}\,dx = e^4\left(-2\text{arctanh}\left(5-2x+\frac{3e^x x}{2}-\frac{e^x x^2}{2}\right)+\log(-3+x)\right)$$

input
```
Integrate[(16*E^4 + E^(4 + 2*x)*x^2 + E^(4 + x)*(-4 + 4*x))/(-32 + 16*x +
E^x*(-20*x + 8*x^2) + E^(2*x)*(-3*x^2 + x^3)),x]
```

output
```
E^4*(-2*ArcTanh[5 - 2*x + (3*E^x*x)/2 - (E^x*x^2)/2] + Log[-3 + x])
```

3.366.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x+4}x^2+e^{x+4}(4x-4)+16e^4}{e^x\left(8x^2-20x\right)+e^{2x}\left(x^3-3x^2\right)+16x-32}\,dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{e^4\left(-e^{2x}x^2-4e^xx+4e^x-16\right)}{-e^x\left(8x^2-20x\right)-e^{2x}\left(x^3-3x^2\right)-16x+32}dx$$

$$\Big\downarrow \ 27$$

$$e^4\int -\frac{e^{2x}x^2+4e^xx-4e^x+16}{-16x+4e^x\left(5x-2x^2\right)+e^{2x}\left(3x^2-x^3\right)+32}dx$$

$$\Big\downarrow \ 25$$

$$-e^4\int \frac{e^{2x}x^2+4e^xx-4e^x+16}{-16x+4e^x\left(5x-2x^2\right)+e^{2x}\left(3x^2-x^3\right)+32}dx$$

$$\Big\downarrow \ 7293$$

$$-e^4\int \left(-\frac{4(x+1)}{x\left(e^xx+4\right)}+\frac{4\left(x^3-4x^2+2x+6\right)}{(x-3)x\left(e^xx^2-3e^xx+4x-8\right)}+\frac{1}{3-x}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-e^4\left(-4\int \frac{1}{e^xx^2-3e^xx+4x-8}dx+4\int \frac{1}{(x-3)\left(e^xx^2-3e^xx+4x-8\right)}dx-8\int \frac{1}{x\left(e^xx^2-3e^xx+4x-8\right)}dx\right.$$

input
```
Int[(16*E^4 + E^(4 + 2*x)*x^2 + E^(4 + x)*(-4 + 4*x))/(-32 + 16*x + E^x*(-
20*x + 8*x^2) + E^(2*x)*(-3*x^2 + x^3)),x]
```

output
```
$Aborted
```

3.366.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.366.4 Maple [A] (verified)

Time = 0.55 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

method	result	size
norman	$\mathrm{e}^{4} \ln \left(\mathrm{e}^{x} x^{2}-3 \,\mathrm{e}^{x} x +4 x -8\right)-\mathrm{e}^{4} \ln \left(\mathrm{e}^{x} x +4\right)$	33
parallelrisch	$\mathrm{e}^{4} \ln \left(\mathrm{e}^{x} x^{2}-3 \,\mathrm{e}^{x} x +4 x -8\right)-\mathrm{e}^{4} \ln \left(\mathrm{e}^{x} x +4\right)$	33
risch	$\mathrm{e}^{4} \ln \left(-3+x \right)+\mathrm{e}^{4} \ln \left(\mathrm{e}^{x}+\frac{4 x -8}{x \left(-3+x \right)}\right)-\mathrm{e}^{4} \ln \left(\mathrm{e}^{x}+\frac{4}{x}\right)$	42

input
```
int((x^2*exp(4)*exp(x)^2+(-4+4*x)*exp(4)*exp(x)+16*exp(4))/((x^3-3*x^2)*ex
p(x)^2+(8*x^2-20*x)*exp(x)+16*x-32),x,method=_RETURNVERBOSE)
```

output
```
exp(4)*ln(exp(x)*x^2-3*exp(x)*x+4*x-8)-exp(4)*ln(exp(x)*x+4)
```

3.366.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(21) = 42.

Time = 0.26 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.70

$$\int \frac{16e^4+e^{4+2x}x^2+e^{4+x}(-4+4x)}{-32+16x+e^x(-20x+8x^2)+e^{2x}(-3x^2+x^3)}\,dx = e^4\log(x-3)+e^4\log\left(\frac{4(x-2)e^4+(x^2-3x)e^{(x+4)}}{x^2-3x}\right)-e^4\log\left(\frac{xe^{(x+4)}+4e^4}{x}\right)$$

input
```
integrate((x^2*exp(4)*exp(x)^2+(-4+4*x)*exp(4)*exp(x)+16*exp(4))/((x^3-3*x
^2)*exp(x)^2+(8*x^2-20*x)*exp(x)+16*x-32),x, algorithm=\
```

output
```
e^4*log(x - 3) + e^4*log((4*(x - 2)*e^4 + (x^2 - 3*x)*e^(x + 4))/(x^2 - 3*
x)) - e^4*log((x*e^(x + 4) + 4*e^4)/x)
```

3.366.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{16e^4+e^{4+2x}x^2+e^{4+x}(-4+4x)}{-32+16x+e^x(-20x+8x^2)+e^{2x}(-3x^2+x^3)}\,dx = \text{Exception raised: PolynomialError}$$

input
```
integrate((x**2*exp(4)*exp(x)**2+(-4+4*x)*exp(4)*exp(x)+16*exp(4))/((x**3-
3*x**2)*exp(x)**2+(8*x**2-20*x)*exp(x)+16*x-32),x)
```

output
```
Exception raised: PolynomialError >> 1/(x**4 - 6*x**3 + 9*x**2) contains a
n element of the set of generators.
```

3.366.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. 2(21) = 42.

Time = 0.24 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.26

$$\int \frac{16e^4+e^{4+2x}x^2+e^{4+x}(-4+4x)}{-32+16x+e^x(-20x+8x^2)+e^{2x}(-3x^2+x^3)}\,dx = e^4\log(x-3)+e^4\log\left(\frac{(x^2-3x)e^x+4x-8}{x^2-3x}\right)-e^4\log\left(\frac{xe^x+4}{x}\right)$$

input
```
integrate((x^2*exp(4)*exp(x)^2+(-4+4*x)*exp(4)*exp(x)+16*exp(4))/((x^3-3*x
^2)*exp(x)^2+(8*x^2-20*x)*exp(x)+16*x-32),x, algorithm=\
```

output
```
e^4*log(x - 3) + e^4*log(((x^2 - 3*x)*e^x + 4*x - 8)/(x^2 - 3*x)) - e^4*lo
g((x*e^x + 4)/x)
```

3.366.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(21) = 42.

Time = 0.28 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.87

$$\int \frac{16e^4 + e^{4+2x}x^2 + e^{4+x}(-4+4x)}{-32+16x+e^x(-20x+8x^2)+e^{2x}(-3x^2+x^3)}\,dx = e^4 \log\left((x+4)^2e^{(x+4)} + 4(x+4)e^4 - 11(x+4)e^{(x+4)} - 24e^4 + 28e^{(x+4)}\right) - e^4 \log\left((x+4)e^{(x+4)} + 4e^4 - 4e^{(x+4)}\right)$$

input
```
integrate((x^2*exp(4)*exp(x)^2+(-4+4*x)*exp(4)*exp(x)+16*exp(4))/((x^3-3*x
^2)*exp(x)^2+(8*x^2-20*x)*exp(x)+16*x-32),x, algorithm=\
```

output
```
e^4*log((x + 4)^2*e^(x + 4) + 4*(x + 4)*e^4 - 11*(x + 4)*e^(x + 4) - 24*e^
4 + 28*e^(x + 4)) - e^4*log((x + 4)*e^(x + 4) + 4*e^4 - 4*e^(x + 4))
```

3.366.9 Mupad [B] (verification not implemented)

Time = 14.50 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \frac{16e^4 + e^{4+2x}x^2 + e^{4+x}(-4+4x)}{-32+16x+e^x(-20x+8x^2)+e^{2x}(-3x^2+x^3)}\,dx = e^4\left(\ln\left(4x + x^2 e^x - 3x e^x - 8\right) - \ln\left(x e^x + 4\right)\right)$$

input
```
int(-(16*exp(4) + exp(4)*exp(x)*(4*x - 4) + x^2*exp(2*x)*exp(4))/(exp(2*x)
*(3*x^2 - x^3) - 16*x + exp(x)*(20*x - 8*x^2) + 32),x)
```

output
```
exp(4)*(log(4*x + x^2*exp(x) - 3*x*exp(x) - 8) - log(x*exp(x) + 4))
```

3.367 $\int \frac{-64-324x}{15x}\,dx$

3.367.1 Optimal result

Integrand size = 12, antiderivative size = 20

$$\int \frac{-64-324x}{15x}\,dx = -\frac{4}{15}x^2\left(\frac{81}{x}+\frac{16\log(x)}{x^2}\right)$$

output
```
-4/15*(81/x+16*ln(x)/x^2)*x^2
```

3.367.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int \frac{-64-324x}{15x}\,dx = -\frac{4}{15}(81x+16\log(x))$$

input
```
Integrate[(-64 - 324*x)/(15*x),x]
```

output
```
(-4*(81*x + 16*Log[x]))/15
```

3.367.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {27, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-324x-64}{15x}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{15}\int -\frac{4(81x+16)}{x}dx$$
$$\Big\downarrow \text{27}$$
$$-\frac{4}{15}\int \frac{81x+16}{x}dx$$
$$\Big\downarrow \text{49}$$
$$-\frac{4}{15}\int \left(81+\frac{16}{x}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{4}{15}(81x+16\log(x))$$

input
```
Int[(-64 - 324*x)/(15*x),x]
```

output
```
(-4*(81*x + 16*Log[x]))/15
```

3.367.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.367.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

method	result	size
default	$-\frac{108x}{5}-\frac{64\ln(x)}{15}$	9
norman	$-\frac{108x}{5}-\frac{64\ln(x)}{15}$	9
risch	$-\frac{108x}{5}-\frac{64\ln(x)}{15}$	9
parallelrisch	$-\frac{108x}{5}-\frac{64\ln(x)}{15}$	9

input
```
int(1/15*(-324*x-64)/x,x,method=_RETURNVERBOSE)
```

output
```
-108/5*x-64/15*ln(x)
```

3.367.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{-64-324x}{15x}\,dx=-\frac{108}{5}\,x-\frac{64}{15}\,\log{(x)}$$

input
```
integrate(1/15*(-324*x-64)/x,x, algorithm=\
```

output
```
-108/5*x - 64/15*log(x)
```

3.367.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int \frac{-64-324x}{15x}\,dx=-\frac{108x}{5}-\frac{64\log{(x)}}{15}$$

input
```
integrate(1/15*(-324*x-64)/x,x)
```

output
```
-108*x/5 - 64*log(x)/15
```

3.367.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{-64-324x}{15x}\,dx=-\frac{108}{5}\,x-\frac{64}{15}\,\log{(x)}$$

input
```
integrate(1/15*(-324*x-64)/x,x, algorithm=\
```

output
```
-108/5*x - 64/15*log(x)
```

3.367.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

$$\int \frac{-64-324x}{15x}\,dx=-\frac{108}{5}\,x-\frac{64}{15}\,\log{(|x|)}$$

input
```
integrate(1/15*(-324*x-64)/x,x, algorithm=\
```

output
```
-108/5*x - 64/15*log(abs(x))
```

3.367.9 Mupad [B] (verification not implemented)

Time = 14.31 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

$$\int \frac{-64-324x}{15x}\,dx = -\frac{108\,x}{5} - \frac{64\,\ln(x)}{15}$$

input
```
int(-((108*x)/5 + 64/15)/x,x)
```

output
```
- (108*x)/5 - (64*log(x))/15
```

3.368 $\int -\frac{15e^{-3/x}}{x^2}\,dx$

3.368.1 Optimal result

Integrand size = 12, antiderivative size = 9

$$\int -\frac{15e^{-3/x}}{x^2}\,dx = -5e^{-3/x}$$

output
```
-5/exp(3/x)
```

3.368.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int -\frac{15e^{-3/x}}{x^2}\,dx = -5e^{-3/x}$$

input
```
Integrate[-15/(E^(3/x)*x^2),x]
```

output
```
-5/E^(3/x)
```

3.368.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {27, 2638}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{15e^{-3/x}}{x^2}dx$$
$$\Big\downarrow \text{ 27}$$
$$-15\int \frac{e^{-3/x}}{x^2}dx$$
$$\Big\downarrow \text{ 2638}$$
$$-5e^{-3/x}$$

input
```
Int[-15/(E^(3/x)*x^2),x]
```

output
```
-5/E^(3/x)
```

3.368.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2638
```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^(n_))*((e_.) + (f_.)*(x_))^(m_
.), x_Symbol] :> Simp[(e + f*x)^n*(F^(a + b*(c + d*x)^n)/(b*f*n*(c + d*x)^n
*Log[F])), x] /; FreeQ[{F, a, b, c, d, e, f, n}, x] && EqQ[m, n - 1] && EqQ
[d*e - c*f, 0]
```

3.368.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

method	result	size
risch	$-5\,\mathrm{e}^{-\frac{3}{x}}$	9
gosper	$-5\,\mathrm{e}^{-\frac{3}{x}}$	11
derivativedivides	$-5\,\mathrm{e}^{-\frac{3}{x}}$	11
default	$-5\,\mathrm{e}^{-\frac{3}{x}}$	11
norman	$-5\,\mathrm{e}^{-\frac{3}{x}}$	11
meijerg	$5-5\,\mathrm{e}^{-\frac{3}{x}}$	11
parallelrisch	$-5\,\mathrm{e}^{-\frac{3}{x}}$	11

input
```
int(-15/x^2/exp(3/x),x,method=_RETURNVERBOSE)
```

output
```
-5*exp(-3/x)
```

3.368.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.89

$$\int -\frac{15e^{-3/x}}{x^2}\,dx = -5\,e^{\left(-\frac{3}{x}\right)}$$

input
```
integrate(-15/x^2/exp(3/x),x, algorithm=\
```

output
```
-5*e^(-3/x)
```

3.368.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.78

$$\int -\frac{15e^{-3/x}}{x^2}\,dx = -5e^{-\frac{3}{x}}$$

input
```
integrate(-15/x**2/exp(3/x),x)
```

output
```
-5*exp(-3/x)
```

3.368.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.89

$$\int -\frac{15e^{-3/x}}{x^2}\,dx = -5\,e^{\left(-\frac{3}{x}\right)}$$

input
```
integrate(-15/x^2/exp(3/x),x, algorithm=\
```

output
```
-5*e^(-3/x)
```

3.368.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.89

$$\int -\frac{15e^{-3/x}}{x^2}\,dx = -5\,e^{\left(-\frac{3}{x}\right)}$$

input
```
integrate(-15/x^2/exp(3/x),x, algorithm=\
```

output
```
-5*e^(-3/x)
```

3.368.9 Mupad [B] (verification not implemented)

Time = 13.60 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.89

$$\int -\frac{15e^{-3/x}}{x^2}\,dx = -5\,\mathrm{e}^{-\frac{3}{x}}$$

input
```
int(-(15*exp(-3/x))/x^2,x)
```

output
```
-5*exp(-3/x)
```

3.369 $\int \frac{e^{-2x}(-4+14x-8x^2+e(-16+18x-4x^2)+e^{2x}(-4x+5x^2+e(3-6x+2x$

3.369.1 Optimal result

Integrand size = 106, antiderivative size = 34

$$\int \frac{e^{-2x}(-4+14x-8x^2+e(-16+18x-4x^2)+e^{2x}(-4x+5x^2+e(3-6x+2x^2))+(-2+6x-4x^2+e}{-1+x}$$
$$=\left(2e^{-2x}+x\right)\left(-x+x^2+(e-x)(-3+x-\log(1-x))\right)$$

output
```
(2/exp(x)^2+x)*(x^2-x+(x-ln(1-x)-3)*(exp(1)-x))
```

3.369.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06

$$\int \frac{e^{-2x}(-4+14x-8x^2+e(-16+18x-4x^2)+e^{2x}(-4x+5x^2+e(3-6x+2x^2))+(-2+6x-4x^2+e}{-1+x}$$
$$=e^{-2x}\left(2+e^{2x}x\right)\left(e(-3+x)+2x+(-e+x)\log(1-x)\right)$$

input
```
Integrate[(-4 + 14*x - 8*x^2 + E*(-16 + 18*x - 4*x^2) + E^(2*x)*(-4*x + 5*
x^2 + E*(3 - 6*x + 2*x^2)) + (-2 + 6*x - 4*x^2 + E*(-4 + 4*x) + E^(2*x)*(E
*(1 - x) - 2*x + 2*x^2))*Log[1 - x])/(E^(2*x)*(-1 + x)),x]
```

output
```
((2 + E^(2*x)*x)*(E*(-3 + x) + 2*x + (-E + x)*Log[1 - x]))/E^(2*x)
```

3.369.
$$\int \frac{e^{-2x}(-4+14x-8x^2+e(-16+18x-4x^2)+e^{2x}(-4x+5x^2+e(3-6x+2x^2))+(-2+6x-4x^2+e(-4+4x)+e^{2x}(e(1-x)-2x+2x^2))\log(1-x))}{-1+x}\,dx$$

3.369.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 2.52 (sec) , antiderivative size = 167, normalized size of antiderivative = 4.91, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.019, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-2x}\left(-8x^2+e\left(-4x^2+18x-16\right)+e^{2x}\left(5x^2+e\left(2x^2-6x+3\right)-4x\right)+\left(-4x^2+e^{2x}\left(2x^2-2x+e(1-x)\right)+\right.\right.}{x-1}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{8e^{-2x}x^2}{x-1}-\frac{2e^{1-2x}\left(2x^2-9x+8\right)}{x-1}-\frac{4e^{-2x}x^2\log(1-x)}{x-1}+\frac{-5\left(1+\frac{2e}{5}\right)x^2-2x^2\log(1-x)+4\left(1+\frac{3e}{2}\right)x+}{1-x}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{2\,\text{ExpIntegralEi}(2-2x)}{e}-\frac{2\,\text{ExpIntegralEi}(2(1-x))}{e}+\frac{1}{2}(5+2e)x^2-\frac{1}{8}(e-2x)^2-6e^{1-2x}+ 2e^{1-2x}x+4e^{-2x}x-\frac{1}{2}(2-e)x+(1-4e)x+\frac{1}{4}(e-2x)^2\log(1-x)-2e^{1-2x}\log(1-x)+ 2e^{-2x}x\log(1-x)-\frac{1}{4}(2-e)^2\log(1-x)+(1-e)\log(1-x)$$

input
```
Int[(-4 + 14*x - 8*x^2 + E*(-16 + 18*x - 4*x^2) + E^(2*x)*(-4*x + 5*x^2 +
E*(3 - 6*x + 2*x^2)) + (-2 + 6*x - 4*x^2 + E*(-4 + 4*x) + E^(2*x)*(E*(1 -
x) - 2*x + 2*x^2))*Log[1 - x])/(E^(2*x)*(-1 + x)),x]
```

output
```
-6*E^(1 - 2*x) - (E - 2*x)^2/8 + (1 - 4*E)*x - ((2 - E)*x)/2 + 2*E^(1 - 2*
x)*x + (4*x)/E^(2*x) + ((5 + 2*E)*x^2)/2 + (2*ExpIntegralEi[2 - 2*x])/E -
(2*ExpIntegralEi[2*(1 - x)])/E + (1 - E)*Log[1 - x] - ((2 - E)^2*Log[1 - x
])/4 - 2*E^(1 - 2*x)*Log[1 - x] + ((E - 2*x)^2*Log[1 - x])/4 + (2*x*Log[1
- x])/E^(2*x)
```

3.369.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.369.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 84 vs. $2(34) = 68$.

Time = 0.91 (sec) , antiderivative size = 85, normalized size of antiderivative = 2.50

method	result
risch	$-\left(x\,\mathrm{e}^{1+2x}-\mathrm{e}^{2x}x^{2}+2\,\mathrm{e}-2x\right)\mathrm{e}^{-2x}\ln\left(1-x\right)+\left(x^{2}\mathrm{e}^{1+2x}-3x\,\mathrm{e}^{1+2x}+2\,\mathrm{e}^{2x}x^{2}+2x\,\mathrm{e}-6\,\mathrm{e}+\right.$
norman	$\left(\left(2\,\mathrm{e}+4\right)x+\left(\mathrm{e}+2\right)x^{2}\mathrm{e}^{2x}+\ln\left(1-x\right)\mathrm{e}^{2x}x^{2}+2x\ln\left(1-x\right)-2\ln\left(1-x\right)\mathrm{e}-3x\,\mathrm{e}\,\mathrm{e}^{2x}-\ln\right.$
parallelrisch	$\left(\mathrm{e}\,\mathrm{e}^{2x}x^{2}-\ln\left(1-x\right)\mathrm{e}\,\mathrm{e}^{2x}x+\ln\left(1-x\right)\mathrm{e}^{2x}x^{2}-3x\,\mathrm{e}\,\mathrm{e}^{2x}+2\,\mathrm{e}^{2x}x^{2}-7\,\mathrm{e}\,\mathrm{e}^{2x}+2x\,\mathrm{e}-2\ln\left(1-\right.\right.$
default	$\left(\left(2\,\mathrm{e}+4\right)x-2\ln\left(1-x\right)\mathrm{e}+2x\ln\left(1-x\right)-6\,\mathrm{e}\right)\mathrm{e}^{-2x}+\mathrm{e}\left(\left(1-x\right)\ln\left(1-x\right)-1+x\right)-2(1$
parts	$\left(\left(2\,\mathrm{e}+4\right)x-2\ln\left(1-x\right)\mathrm{e}+2x\ln\left(1-x\right)-6\,\mathrm{e}\right)\mathrm{e}^{-2x}+\mathrm{e}\left(\left(1-x\right)\ln\left(1-x\right)-1+x\right)-2(1$

input
```
int(((((1-x)*exp(1)+2*x^2-2*x)*exp(x)^2+(-4+4*x)*exp(1)-4*x^2+6*x-2)*ln(1-
x)+((2*x^2-6*x+3)*exp(1)+5*x^2-4*x)*exp(x)^2+(-4*x^2+18*x-16)*exp(1)-8*x^2
+14*x-4)/(-1+x)/exp(x)^2,x,method=_RETURNVERBOSE)
```

output
```
-(x*exp(1+2*x)-exp(2*x)*x^2+2*exp(1)-2*x)*exp(-2*x)*ln(1-x)+(x^2*exp(1+2*x
)-3*x*exp(1+2*x)+2*exp(2*x)*x^2+2*x*exp(1)-6*exp(1)+4*x)*exp(-2*x)
```

3.369.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.94

$$\int \frac{e^{-2x}(-4+14x-8x^2+e(-16+18x-4x^2)+e^{2x}(-4x+5x^2+e(3-6x+2x^2))+(-2+6x-4x^2+e}{-1+x}$$

$$= \left(2\,(x-3)e+\left(2\,x^2+\left(x^2-3\,x\right)e\right)e^{(2\,x)}+\left(\left(x^2-xe\right)e^{(2\,x)}+2\,x-2\,e\right)\log\left(-x+1\right)+4\,x\right)e^{(-2\,x)}$$

input
```
integrate(((((1-x)*exp(1)+2*x^2-2*x)*exp(x)^2+(-4+4*x)*exp(1)-4*x^2+6*x-2)
*log(1-x)+((2*x^2-6*x+3)*exp(1)+5*x^2-4*x)*exp(x)^2+(-4*x^2+18*x-16)*exp(1
)-8*x^2+14*x-4)/(-1+x)/exp(x)^2,x, algorithm=\
```

output
```
(2*(x - 3)*e + (2*x^2 + (x^2 - 3*x)*e)*e^(2*x) + ((x^2 - x*e)*e^(2*x) + 2*
x - 2*e)*log(-x + 1) + 4*x)*e^(-2*x)
```

3.369.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(26) = 52$.

Time = 0.25 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.94

$$\int \frac{e^{-2x}(-4+14x-8x^2+e(-16+18x-4x^2)+e^{2x}(-4x+5x^2+e(3-6x+2x^2))+(-2+6x-4x^2+e\cdots}{-1+x}$$
$$=x^2\cdot(2+e)-3ex+\left(x^2-ex\right)\log\left(1-x\right)+\left(2x\log\left(1-x\right)+4x+2ex-2e\log\left(1-x\right)-6e\right)e^{-2x}$$

input
```
integrate(((((1-x)*exp(1)+2*x**2-2*x)*exp(x)**2+(-4+4*x)*exp(1)-4*x**2+6*x
-2)*ln(1-x)+((2*x**2-6*x+3)*exp(1)+5*x**2-4*x)*exp(x)**2+(-4*x**2+18*x-16)
*exp(1)-8*x**2+14*x-4)/(-1+x)/exp(x)**2,x)
```

output
```
x**2*(2 + E) - 3*E*x + (x**2 - E*x)*log(1 - x) + (2*x*log(1 - x) + 4*x + 2
*E*x - 2*E*log(1 - x) - 6*E)*exp(-2*x)
```

3.369.7 Maxima [F]

$$\int \frac{e^{-2x}(-4+14x-8x^2+e(-16+18x-4x^2)+e^{2x}(-4x+5x^2+e(3-6x+2x^2))+(-2+6x-4x^2+e\cdots}{-1+x}$$
$$=\int -\frac{(8\,x^2+2\,(2\,x^2-9\,x+8)e-(5\,x^2+(2\,x^2-6\,x+3)e-4\,x)e^{(2\,x)}+\left(4\,x^2-4\,(x-1)e-(2\,x^2-(x\cdots\right.}{x-1}$$

input
```
integrate(((((1-x)*exp(1)+2*x^2-2*x)*exp(x)^2+(-4+4*x)*exp(1)-4*x^2+6*x-2)
*log(1-x)+((2*x^2-6*x+3)*exp(1)+5*x^2-4*x)*exp(x)^2+(-4*x^2+18*x-16)*exp(1
)-8*x^2+14*x-4)/(-1+x)/exp(x)^2,x, algorithm=\
```

output
```
16*e^(-1)*exp_integral_e(1, 2*x - 2) + 4*e^(-2)*exp_integral_e(1, 2*x - 2)
 + (x^3*(e + 2) - 2*x^2*(2*e + 1) + 3*x*e + 2*(x^2*(e + 2) - 2*x*(2*e + 1)
)*e^(-2*x) + (x^3 - x^2*(e + 1) + x*e + 2*(x^2 - x*(e + 1) + e)*e^(-2*x))*
log(-x + 1))/(x - 1) + integrate(2*(2*x*(e + 1) - 5*e - 2)*e^(-2*x)/(x^2 -
 2*x + 1), x)
```

3.369.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 177 vs. $2(35) = 70$.

Time = 0.26 (sec) , antiderivative size = 177, normalized size of antiderivative = 5.21

$$\int \frac{e^{-2x}(-4+14x-8x^2+e(-16+18x-4x^2)+e^{2x}(-4x+5x^2+e(3-6x+2x^2))+(-2+6x-4x^2+e}{-1+x}$$

$$= \left((x-1)^2e^3\log(-x+1)+(x-1)^2e^4+2(x-1)^2e^3-(x-1)e^4\log(-x+1)+2(x-1)e^3\log(-x+1)\right.$$

input
```
integrate(((((1-x)*exp(1)+2*x^2-2*x)*exp(x)^2+(-4+4*x)*exp(1)-4*x^2+6*x-2)
*log(1-x)+((2*x^2-6*x+3)*exp(1)+5*x^2-4*x)*exp(x)^2+(-4*x^2+18*x-16)*exp(1
)-8*x^2+14*x-4)/(-1+x)/exp(x)^2,x, algorithm=\
```

output
```
((x - 1)^2*e^3*log(-x + 1) + (x - 1)^2*e^4 + 2*(x - 1)^2*e^3 - (x - 1)*e^4
*log(-x + 1) + 2*(x - 1)*e^3*log(-x + 1) + 2*(x - 1)*e^(-2*x + 3)*log(-x +
 1) - (x - 1)*e^4 + 4*(x - 1)*e^3 + 2*(x - 1)*e^(-2*x + 4) + 4*(x - 1)*e^(
-2*x + 3) - e^4*log(-x + 1) + e^3*log(-x + 1) - 2*e^(-2*x + 4)*log(-x + 1)
 + 2*e^(-2*x + 3)*log(-x + 1) - 4*e^(-2*x + 4) + 4*e^(-2*x + 3))*e^(-3)
```

3.369.9 Mupad [B] (verification not implemented)

Time = 14.17 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.15

$$\int \frac{e^{-2x}(-4+14x-8x^2+e(-16+18x-4x^2)+e^{2x}(-4x+5x^2+e(3-6x+2x^2))+(-2+6x-4x^2+e}{-1+x}$$

$$= \left(x+2\,\mathrm{e}^{-2\,x}\right)\,\left(2\,x-3\,\mathrm{e}+x\,\mathrm{e}-\mathrm{e}\,\ln\left(1-x\right)+x\,\ln\left(1-x\right)\right)$$

input
```
int(-(exp(-2*x)*(log(1 - x)*(exp(2*x)*(2*x + exp(1)*(x - 1) - 2*x^2) - 6*x
 + 4*x^2 - exp(1)*(4*x - 4) + 2) - 14*x + exp(1)*(4*x^2 - 18*x + 16) - exp
(2*x)*(exp(1)*(2*x^2 - 6*x + 3) - 4*x + 5*x^2) + 8*x^2 + 4))/(x - 1),x)
```

output
```
(x + 2*exp(-2*x))*(2*x - 3*exp(1) + x*exp(1) - exp(1)*log(1 - x) + x*log(1
 - x))
```

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$$\int \frac{e^{-2x}\left(-4+14x-8x^2+e\left(-16+18x-4x^2\right)+e^{2x}\left(-4x+5x^2+e\left(3-6x+2x^2\right)\right)+\left(-2+6x-4x^2+e(-4+4x)+e^{2x}\left(e(1-x)-2x+2x^2\right)\right)\log(1-x)\right)}{-1+x}\,dx$$

3.370 $\int \frac{1}{3}e^{\frac{1}{16}(-9-24e^5-16e^{10})}x^{\frac{2}{3}e^{\frac{1}{16}(-9-24e^5-16e^{10})}x}(2+2\log(x))\,dx$

3.370.1 Optimal result

Integrand size = 53, antiderivative size = 20

$$\int \frac{1}{3}e^{\frac{1}{16}(-9-24e^5-16e^{10})}x^{\frac{2}{3}e^{\frac{1}{16}(-9-24e^5-16e^{10})}x}(2+2\log(x))\,dx = x^{\frac{2}{3}e^{-\left(\frac{3}{4}+e^5\right)^2}x}$$

output
```
exp(1/3*ln(x)*x/exp((exp(5)+3/4)^2))^2
```

3.370.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{3}e^{\frac{1}{16}(-9-24e^5-16e^{10})}x^{\frac{2}{3}e^{\frac{1}{16}(-9-24e^5-16e^{10})}x}(2+2\log(x))\,dx = x^{\frac{2}{3}e^{-\frac{1}{16}\left(3+4e^5\right)^2}x}$$

input
```
Integrate[(E^((-9 - 24*E^5 - 16*E^10)/16)*x^((2*E^((-9 - 24*E^5 - 16*E^10)
/16)*x)/3)*(2 + 2*Log[x]))/3,x]
```

output
```
x^((2*x)/(3*E^((3 + 4*E^5)^2/16)))
```

3.370.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{3}e^{\frac{1}{16}(-9-24e^5-16e^{10})}x^{\frac{2}{3}e^{\frac{1}{16}(-9-24e^5-16e^{10})}x}(2\log(x)+2)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}e^{-\frac{1}{16}(3+4e^5)^2}\int 2x^{\frac{2}{3}e^{-\frac{1}{16}(3+4e^5)^2}x}(\log(x)+1)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{2}{3}e^{-\frac{1}{16}(3+4e^5)^2}\int x^{\frac{2}{3}e^{-\frac{1}{16}(3+4e^5)^2}x}(\log(x)+1)dx$$

$$\Big\downarrow \text{7281}$$

$$2e^{-\frac{1}{16}(3+4e^5)^2}\int x^{\frac{2}{3}e^{-\frac{1}{16}(3+4e^5)^2}x}(\log(x)+1)d\frac{x}{3}$$

$$\Big\downarrow \text{7293}$$

$$2e^{-\frac{1}{16}(3+4e^5)^2}\int \left(\log(x)x^{\frac{2}{3}e^{-\frac{1}{16}(3+4e^5)^2}x}+x^{\frac{2}{3}e^{-\frac{1}{16}(3+4e^5)^2}x}\right)d\frac{x}{3}$$

$$\Big\downarrow \text{2009}$$

$$2e^{-\frac{1}{16}(3+4e^5)^2}\left(\int x^{\frac{2}{3}e^{-\frac{1}{16}(3+4e^5)^2}x}d\frac{x}{3}-\int \frac{3\int x^{\frac{2}{3}e^{-\frac{1}{16}(3+4e^5)^2}x}d\frac{x}{3}}{x}d\frac{x}{3}+\log(x)\int x^{\frac{2}{3}e^{-\frac{1}{16}(3+4e^5)^2}x}d\frac{x}{3}\right)$$

input
```
Int[(E^((-9 - 24*E^5 - 16*E^10)/16)*x^((2*E^((-9 - 24*E^5 - 16*E^10)/16)*x
)/3)*(2 + 2*Log[x]))/3,x]
```

output
```
$Aborted
```

3.370.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7281
```
Int[u_, x_Symbol] :> With[{lst = FunctionOfLinear[u, x]}, Simp[1/lst[[3]]
 Subst[Int[lst[[1]], x], x, lst[[2]] + lst[[3]]*x], x] /;  !FalseQ[lst]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.370.4 Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
risch	$x^{\frac{2 x \,{\mathrm e}^{-{\mathrm e}^{10}-\frac{3 \,{\mathrm e}^{5}}{2}-\frac{9}{16}}}{3}}$	19
default	${\mathrm e}^{x \,{\mathrm e}^{-{\mathrm e}^{10}-\frac{3 \,{\mathrm e}^{5}}{2}-\frac{9}{16}} \ln \left(x^{\frac{2}{3}}\right)}$	22
norman	${\mathrm e}^{x \,{\mathrm e}^{-{\mathrm e}^{10}-\frac{3 \,{\mathrm e}^{5}}{2}-\frac{9}{16}} \ln \left(x^{\frac{2}{3}}\right)}$	22
parallelrisch	${\mathrm e}^{x \,{\mathrm e}^{-{\mathrm e}^{10}-\frac{3 \,{\mathrm e}^{5}}{2}-\frac{9}{16}} \ln \left(x^{\frac{2}{3}}\right)}$	22

input
```
int(1/3*(2*ln(x)+2)*exp(1/3*x*ln(x)/exp(exp(5)^2+3/2*exp(5)+9/16))^2/exp(e
xp(5)^2+3/2*exp(5)+9/16),x,method=_RETURNVERBOSE)
```

output
```
(x^(1/3*x*exp(-exp(10)-3/2*exp(5)-9/16)))^2
```

3.370.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{1}{3} e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)} x^{\frac{2}{3} e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)} x} (2+2\log(x))\,dx = x^{\frac{2}{3}\, x e^{\left(-e^{10}-\frac{3}{2}\, e^5-\frac{9}{16}\right)}}$$

input
```
integrate(1/3*(2*log(x)+2)*exp(1/3*x*log(x)/exp(exp(5)^2+3/2*exp(5)+9/16))
^2/exp(exp(5)^2+3/2*exp(5)+9/16),x, algorithm=\
```

output
```
x^(2/3*x*e^(-e^10 - 3/2*e^5 - 9/16))
```

3.370.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{1}{3} e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)} x^{\frac{2}{3} e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)} x} (2+2\log(x))\,dx = e^{\frac{2x\log(x)}{3e^{\frac{9}{16}+\frac{3e^5}{2}+e^{10}}}}$$

input
```
integrate(1/3*(2*ln(x)+2)*exp(1/3*x*ln(x)/exp(exp(5)**2+3/2*exp(5)+9/16))*
*2/exp(exp(5)**2+3/2*exp(5)+9/16),x)
```

output
```
exp(2*x*exp(-exp(10) - 3*exp(5)/2 - 9/16)*log(x)/3)
```

3.370.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{1}{3} e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)} x^{\frac{2}{3} e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)} x} (2+2\log(x))\,dx = x^{\frac{2}{3}\, x e^{\left(-e^{10}-\frac{3}{2}\, e^5-\frac{9}{16}\right)}}$$

input
```
integrate(1/3*(2*log(x)+2)*exp(1/3*x*log(x)/exp(exp(5)^2+3/2*exp(5)+9/16))
^2/exp(exp(5)^2+3/2*exp(5)+9/16),x, algorithm=\
```

output
```
x^(2/3*x*e^(-e^10 - 3/2*e^5 - 9/16))
```

3.370.8 Giac [A] (verification not implemented)

Time = 0.59 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{1}{3}e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)}x^{\frac{2}{3}e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)}x}(2+2\log(x))\,dx = x^{\frac{2}{3}\,xe^{\left(-e^{10}-\frac{3}{2}\,e^5-\frac{9}{16}\right)}}$$

input
```
integrate(1/3*(2*log(x)+2)*exp(1/3*x*log(x)/exp(exp(5)^2+3/2*exp(5)+9/16))
^2/exp(exp(5)^2+3/2*exp(5)+9/16),x, algorithm=\
```

output
```
x^(2/3*x*e^(-e^10 - 3/2*e^5 - 9/16))
```

3.370.9 Mupad [B] (verification not implemented)

Time = 14.24 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{1}{3}e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)}x^{\frac{2}{3}e^{\frac{1}{16}\left(-9-24e^5-16e^{10}\right)}x}(2+2\log(x))\,dx = x^{\frac{2\,x\,\mathrm{e}^{-\frac{3\,\mathrm{e}^5}{2}-\mathrm{e}^{10}-\frac{9}{16}}}{3}}$$

input
```
int((exp(- (3*exp(5))/2 - exp(10) - 9/16)*exp((2*x*exp(- (3*exp(5))/2 - ex
p(10) - 9/16)*log(x))/3)*(2*log(x) + 2))/3,x)
```

output
```
x^((2*x*exp(- (3*exp(5))/2 - exp(10) - 9/16))/3)
```

3.371 $\int \frac{-x^2+2x^3+e^{\frac{2\left(30-40x^2+x^3+x^2\log(x)\right)}{x}}(-60-78x^2+4x^3+2x^2\log(x))+e}{x^2}$

3.371.1 Optimal result

Integrand size = 107, antiderivative size = 29

$$\int \frac{-x^2+2x^3+e^{\frac{2\left(30-40x^2+x^3+x^2\log(x)\right)}{x}}(-60-78x^2+4x^3+2x^2\log(x))+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}(-60x+2x^2-78}{x^2}$$
$$=-x+\left(e^{\frac{10\left(3-4x^2\right)}{x}+x(x+\log(x))}+x\right)^2$$

output
```
(x+exp(10/x*(-4*x^2+3)+(x+ln(x))*x))^2-x
```

3.371.2 Mathematica [A] (verified)

Time = 1.50 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.72

$$\int \frac{-x^2+2x^3+e^{\frac{2\left(30-40x^2+x^3+x^2\log(x)\right)}{x}}(-60-78x^2+4x^3+2x^2\log(x))+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}(-60x+2x^2-78}{x^2}$$
$$=-x+x^2+e^{\frac{60}{x}-80x+2x^2}x^{2x}+2e^{\frac{30}{x}-40x+x^2}x^{1+x}$$

input
```
Integrate[(-x^2 + 2*x^3 + E^((2*(30 - 40*x^2 + x^3 + x^2*Log[x]))/x)*(-60
- 78*x^2 + 4*x^3 + 2*x^2*Log[x]) + E^((30 - 40*x^2 + x^3 + x^2*Log[x])/x)*
(-60*x + 2*x^2 - 78*x^3 + 4*x^4 + 2*x^3*Log[x]))/x^2,x]
```

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$$\int \frac{-x^2+2x^3+e^{\frac{2\left(30-40x^2+x^3+x^2\log(x)\right)}{x}}(-60-78x^2+4x^3+2x^2\log(x))+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}(-60x+2x^2-78x^3+4x^4+2x^3\log(x))}{x^2}\,dx$$

output
```
-x + x^2 + E^(60/x - 80*x + 2*x^2)*x^(2*x) + 2*E^(30/x - 40*x + x^2)*x^(1
+ x)
```

3.371.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3-x^2+e^{\frac{2\left(x^3-40x^2+x^2\log(x)+30\right)}{x}}\left(4x^3-78x^2+2x^2\log(x)-60\right)+e^{\frac{x^3-40x^2+x^2\log(x)+30}{x}}\left(4x^4-78x^3+2x^3\log(x)\right.}{x^2}$$

$$\Big\downarrow \; 2010$$

$$\int \Bigg(2e^{x^2-40x+\frac{30}{x}}x^{x-1}\left(2x^3-39x^2+x^2\log(x)+x-30\right)+2e^{\frac{2\left(x^3-40x^2+30\right)}{x}}x^{2x-2}\left(2x^3-39x^2+x^2\log(x)-30\right)+2$$

$$\Big\downarrow \; 2009$$

$$-60\int e^{x^2-40x+\frac{30}{x}}x^{x-1}dx-78\int e^{x^2-40x+\frac{30}{x}}x^{x+1}dx+4\int e^{x^2-40x+\frac{30}{x}}x^{x+2}dx-2\int \frac{\int e^{x^2-40x+\frac{30}{x}}x^{x+1}dx}{x}dx+2\log(x)\int e^{x^2-40x+\frac{30}{x}}x^{x+1}dx+2\int e^{x^2-40x+\frac{30}{x}}x^{x}dx-78\int e^{\frac{2\left(x^3-40x^2+30\right)}{x}}x^{2x}dx-60\int e^{\frac{2\left(x^3-40x^2+30\right)}{x}}x^{2x-2}dx+4\int e^{\frac{2\left(x^3-40x^2+30\right)}{x}}x^{2x+1}dx-2\int \frac{\int e^{\frac{2\left(x^3-40x^2+30\right)}{x}}x^{2x}dx}{x}dx+2\log(x)\int e^{\frac{2\left(x^3-40x^2+30\right)}{x}}x^{2x}dx+x^2-x$$

input
```
Int[(-x^2 + 2*x^3 + E^((2*(30 - 40*x^2 + x^3 + x^2*Log[x]))/x)*(-60 - 78*x
^2 + 4*x^3 + 2*x^2*Log[x]) + E^((30 - 40*x^2 + x^3 + x^2*Log[x])/x)*(-60*x
 + 2*x^2 - 78*x^3 + 4*x^4 + 2*x^3*Log[x]))/x^2,x]
```

output
```
$Aborted
```

3.371.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.371.4 Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.76

method	result	size
risch	$x^2+2x^x\mathrm{e}^{\frac{x^3-40x^2+30}{x}}x+x^{2x}\mathrm{e}^{\frac{2x^3-80x^2+60}{x}}-x$	51
default	$-x+2x\,\mathrm{e}^{\frac{x^2\ln(x)+x^3-40x^2+30}{x}}+\mathrm{e}^{\frac{2x^2\ln(x)+2x^3-80x^2+60}{x}}+x^2$	54
parallelrisch	$-x+2x\,\mathrm{e}^{\frac{x^2\ln(x)+x^3-40x^2+30}{x}}+\mathrm{e}^{\frac{2x^2\ln(x)+2x^3-80x^2+60}{x}}+x^2$	55

input
```
int(((2*x^2*ln(x)+4*x^3-78*x^2-60)*exp((x^2*ln(x)+x^3-40*x^2+30)/x)^2+(2*x
^3*ln(x)+4*x^4-78*x^3+2*x^2-60*x)*exp((x^2*ln(x)+x^3-40*x^2+30)/x)+2*x^3-x
^2)/x^2,x,method=_RETURNVERBOSE)
```

output
```
x^2+2*x^x*exp((x^3-40*x^2+30)/x)*x+(x^x)^2*exp(2*(x^3-40*x^2+30)/x)-x
```

3.371.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.83

$$\int \frac{-x^2+2x^3+e^{\frac{2\left(30-40x^2+x^3+x^2\log(x)\right)}{x}}\left(-60-78x^2+4x^3+2x^2\log(x)\right)+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}\left(-60x+2x^2-78\right.}{x^2}$$

$$=x^2+2\,xe^{\left(\frac{x^3+x^2\log(x)-40\,x^2+30}{x}\right)}-x+e^{\left(\frac{2\left(x^3+x^2\log(x)-40\,x^2+30\right)}{x}\right)}$$

input
```
integrate(((2*x^2*log(x)+4*x^3-78*x^2-60)*exp((x^2*log(x)+x^3-40*x^2+30)/x
)^2+(2*x^3*log(x)+4*x^4-78*x^3+2*x^2-60*x)*exp((x^2*log(x)+x^3-40*x^2+30)/
x)+2*x^3-x^2)/x^2,x, algorithm=\
```

output
```
x^2 + 2*x*e^((x^3 + x^2*log(x) - 40*x^2 + 30)/x) - x + e^(2*(x^3 + x^2*log
(x) - 40*x^2 + 30)/x)
```

3.371.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(20) = 40$.

Time = 0.15 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.76

$$\int \frac{-x^2+2x^3+e^{\frac{2(30-40x^2+x^3+x^2\log(x))}{x}}(-60-78x^2+4x^3+2x^2\log(x))+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}(-60x+2x^2-78}{x^2}$$
$$= x^2+2xe^{\frac{x^3+x^2\log(x)-40x^2+30}{x}}-x+e^{\frac{2(x^3+x^2\log(x)-40x^2+30)}{x}}$$

input
```
integrate(((2*x**2*ln(x)+4*x**3-78*x**2-60)*exp((x**2*ln(x)+x**3-40*x**2+3
0)/x)**2+(2*x**3*ln(x)+4*x**4-78*x**3+2*x**2-60*x)*exp((x**2*ln(x)+x**3-40
*x**2+30)/x)+2*x**3-x**2)/x**2,x)
```

output
```
x**2 + 2*x*exp((x**3 + x**2*log(x) - 40*x**2 + 30)/x) - x + exp(2*(x**3 +
x**2*log(x) - 40*x**2 + 30)/x)
```

3.371.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.72

$$\int \frac{-x^2+2x^3+e^{\frac{2(30-40x^2+x^3+x^2\log(x))}{x}}(-60-78x^2+4x^3+2x^2\log(x))+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}(-60x+2x^2-78}{x^2}$$
$$= x^2+\left(2\,xe^{\left(x^2+x\log(x)+40\,x+\frac{30}{x}\right)}+e^{\left(2\,x^2+2\,x\log(x)+\frac{60}{x}\right)}\right)e^{(-80\,x)}-x$$

input
```
integrate(((2*x^2*log(x)+4*x^3-78*x^2-60)*exp((x^2*log(x)+x^3-40*x^2+30)/x
)^2+(2*x^3*log(x)+4*x^4-78*x^3+2*x^2-60*x)*exp((x^2*log(x)+x^3-40*x^2+30)/
x)+2*x^3-x^2)/x^2,x, algorithm=\
```

output
```
x^2 + (2*x*e^(x^2 + x*log(x) + 40*x + 30/x) + e^(2*x^2 + 2*x*log(x) + 60/x
))*e^(-80*x) - x
```

3.371.

$$\int \frac{-x^2+2x^3+e^{\frac{2(30-40x^2+x^3+x^2\log(x))}{x}}(-60-78x^2+4x^3+2x^2\log(x))+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}(-60x+2x^2-78x^3+4x^4+2x^3\log(x))}{x^2}\,dx$$

3.371.8 Giac [F]

$$\int \frac{-x^2+2x^3+e^{\frac{2\left(30-40x^2+x^3+x^2\log(x)\right)}{x}}(-60-78x^2+4x^3+2x^2\log(x))+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}(-60x+2x^2-78\ldots}{x^2}$$

$$=\int \frac{2\,x^3-x^2+2\left(2\,x^3+x^2\log\left(x\right)-39\,x^2-30\right)e^{\left(\frac{2\left(x^3+x^2\log(x)-40\,x^2+30\right)}{x}\right)}+2\left(2\,x^4+x^3\log\left(x\right)-39\,x^3+x^2\ldots}{x^2}$$

input
```
integrate(((2*x^2*log(x)+4*x^3-78*x^2-60)*exp((x^2*log(x)+x^3-40*x^2+30)/x
)^2+(2*x^3*log(x)+4*x^4-78*x^3+2*x^2-60*x)*exp((x^2*log(x)+x^3-40*x^2+30)/
x)+2*x^3-x^2)/x^2,x, algorithm=\
```

output
```
integrate((2*x^3 - x^2 + 2*(2*x^3 + x^2*log(x) - 39*x^2 - 30)*e^(2*(x^3 +
x^2*log(x) - 40*x^2 + 30)/x) + 2*(2*x^4 + x^3*log(x) - 39*x^3 + x^2 - 30*x
)*e^((x^3 + x^2*log(x) - 40*x^2 + 30)/x))/x^2, x)
```

3.371.9 Mupad [B] (verification not implemented)

Time = 13.92 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.62

$$\int \frac{-x^2+2x^3+e^{\frac{2\left(30-40x^2+x^3+x^2\log(x)\right)}{x}}(-60-78x^2+4x^3+2x^2\log(x))+e^{\frac{30-40x^2+x^3+x^2\log(x)}{x}}(-60x+2x^2-78\ldots}{x^2}$$
$$=x^{2\,x}\,\mathrm{e}^{\frac{60}{x}-80\,x+2\,x^2}-x+x^2+2\,x\,x^x\,\mathrm{e}^{\frac{30}{x}-40\,x+x^2}$$

input
```
int((exp((2*(x^2*log(x) - 40*x^2 + x^3 + 30))/x)*(2*x^2*log(x) - 78*x^2 +
4*x^3 - 60) + exp((x^2*log(x) - 40*x^2 + x^3 + 30)/x)*(2*x^3*log(x) - 60*x
 + 2*x^2 - 78*x^3 + 4*x^4) - x^2 + 2*x^3)/x^2,x)
```

output
```
x^(2*x)*exp(60/x - 80*x + 2*x^2) - x + x^2 + 2*x*x^x*exp(30/x - 40*x + x^2
)
```

3.372 $\int \frac{50x+e^{-2e^x+2x}\left(-2e^{2+x}x+e^2(1+2x)\right)}{-400+4e^{2-2e^x+2x}x+100x^2}\,dx$

3.372.1 Optimal result

Integrand size = 59, antiderivative size = 28

$$\int \frac{50x+e^{-2e^x+2x}\left(-2e^{2+x}x+e^2(1+2x)\right)}{-400+4e^{2-2e^x+2x}x+100x^2}\,dx=\frac{1}{4}\log\left(4-x\left(\frac{1}{25}e^{2-2e^x+2x}+x\right)\right)$$

output
```
1/4*ln(4-x*(x+1/25*exp(1)^2*exp(x-exp(x))^2))
```

3.372.2 Mathematica [A] (verified)

Time = 6.10 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{50x+e^{-2e^x+2x}\left(-2e^{2+x}x+e^2(1+2x)\right)}{-400+4e^{2-2e^x+2x}x+100x^2}\,dx=\frac{1}{4}\left(-2e^x+\log\left(e^{2+2x}x+25e^{2e^x}\left(-4+x^2\right)\right)\right)$$

input
```
Integrate[(50*x + E^(-2*E^x + 2*x)*(-2*E^(2 + x)*x + E^2*(1 + 2*x)))/(-400
 + 4*E^(2 - 2*E^x + 2*x)*x + 100*x^2),x]
```

output
```
(-2*E^x + Log[E^(2 + 2*x)*x + 25*E^(2*E^x)*(-4 + x^2)])/4
```

3.372.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.64, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.017, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{50x+e^{2x-2e^x}\left(e^2(2x+1)-2e^{x+2}x\right)}{100x^2+4e^{2x-2e^x+2}x-400}\,dx$$
$$\Big\downarrow \ 7235$$
$$\frac{1}{4}\log\left(-e^{-2e^x}\left(-25e^{2e^x}x^2-e^{2x+2}x+100e^{2e^x}\right)\right)$$

input
```
Int[(50*x + E^(-2*E^x + 2*x)*(-2*E^(2 + x)*x + E^2*(1 + 2*x)))/(-400 + 4*E
^(2 - 2*E^x + 2*x)*x + 100*x^2),x]
```

output
```
Log[-((100*E^(2*E^x) - E^(2 + 2*x)*x - 25*E^(2*E^x)*x^2)/E^(2*E^x))]/4
```

3.372.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.372.4 Maple [A] (verified)

Time = 1.06 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

method	result	size
parallelrisch	$\frac{\ln\left(\frac{x\,e^{2} e^{-2\,e^{x}+2x}}{25}+x^{2}-4\right)}{4}$	25
norman	$\frac{\ln\left(4x\,e^{2} e^{-2\,e^{x}+2x}+100x^{2}-400\right)}{4}$	27
risch	$\frac{\ln(x)}{4}+\frac{\ln\left(e^{-2\,e^{x}+2x}+\frac{25\left(x^{2}-4\right)e^{-2}}{x}\right)}{4}$	31

input
```
int(((-2*x*exp(1)^2*exp(x)+(1+2*x)*exp(1)^2)*exp(x-exp(x))^2+50*x)/(4*x*ex
p(1)^2*exp(x-exp(x))^2+100*x^2-400),x,method=_RETURNVERBOSE)
```

output
```
1/4*ln(1/25*x*exp(1)^2*exp(x-exp(x))^2+x^2-4)
```

3.372.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

$$\int \frac{50x + e^{-2e^x+2x}(-2e^{2+x}x + e^2(1+2x))}{-400 + 4e^{2-2e^x+2x}x + 100x^2}\,dx = \frac{1}{4}\log(x) + \frac{1}{4}\log\left(\frac{25x^2 + xe^{\left(2\left((x+1)e^2 - e^{(x+2)}\right)e^{(-2)}\right)} - 100}{x}\right)$$

input
```
integrate(((-2*x*exp(1)^2*exp(x)+(1+2*x)*exp(1)^2)*exp(x-exp(x))^2+50*x)/(
4*x*exp(1)^2*exp(x-exp(x))^2+100*x^2-400),x, algorithm=\
```

output
```
1/4*log(x) + 1/4*log((25*x^2 + x*e^(2*((x + 1)*e^2 - e^(x + 2))*e^(-2)) -
100)/x)
```

3.372.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{50x + e^{-2e^x+2x}(-2e^{2+x}x + e^2(1+2x))}{-400 + 4e^{2-2e^x+2x}x + 100x^2}\,dx = \frac{\log(x)}{4} + \frac{\log\left(e^{2x-2e^x} + \frac{25x^2-100}{xe^2}\right)}{4}$$

input
```
integrate(((-2*x*exp(1)**2*exp(x)+(1+2*x)*exp(1)**2)*exp(x-exp(x))**2+50*x
)/(4*x*exp(1)**2*exp(x-exp(x))**2+100*x**2-400),x)
```

output
```
log(x)/4 + log(exp(2*x - 2*exp(x)) + (25*x**2 - 100)*exp(-2)/x)/4
```

3.372.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(22) = 44$.

Time = 0.25 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.79

$$\int \frac{50x + e^{-2e^x+2x}(-2e^{2+x}x + e^2(1+2x))}{-400 + 4e^{2-2e^x+2x}x + 100x^2}\,dx = -\frac{1}{2}\,e^x + \frac{1}{4}\,\log(x+2) + \frac{1}{4}\,\log(x-2) + \frac{1}{4}\,\log\left(\frac{xe^{(2\,x+2)} + 25\,(x^2-4)e^{(2\,e^x)}}{25\,(x^2-4)}\right)$$

input
```
integrate((((-2*x*exp(1)^2*exp(x)+(1+2*x)*exp(1)^2)*exp(x-exp(x))^2+50*x)/(
4*x*exp(1)^2*exp(x-exp(x))^2+100*x^2-400),x, algorithm=\
```

output
```
-1/2*e^x + 1/4*log(x + 2) + 1/4*log(x - 2) + 1/4*log(1/25*(x*e^(2*x + 2) +
 25*(x^2 - 4)*e^(2*e^x))/(x^2 - 4))
```

3.372.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{50x + e^{-2e^x+2x}(-2e^{2+x}x + e^2(1+2x))}{-400 + 4e^{2-2e^x+2x}x + 100x^2}\,dx = -\frac{1}{2}\,e^x + \frac{1}{4}\,\log\left(25\,x^2e^{(2\,e^x)} + xe^{(2\,x+2)} - 100\,e^{(2\,e^x)}\right)$$

input
```
integrate((((-2*x*exp(1)^2*exp(x)+(1+2*x)*exp(1)^2)*exp(x-exp(x))^2+50*x)/(
4*x*exp(1)^2*exp(x-exp(x))^2+100*x^2-400),x, algorithm=\
```

output
```
-1/2*e^x + 1/4*log(25*x^2*e^(2*e^x) + x*e^(2*x + 2) - 100*e^(2*e^x))
```

3.372.9 Mupad [B] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{50x + e^{-2e^x+2x}(-2e^{2+x}x + e^2(1+2x))}{-400 + 4e^{2-2e^x+2x}x + 100x^2}\,dx = \frac{\ln\left(x^2 + \frac{x\,e^{2\,x}\,e^2\,e^{-2\,e^x}}{25} - 4\right)}{4}$$

input
```
int((50*x + exp(2*x - 2*exp(x))*(exp(2)*(2*x + 1) - 2*x*exp(2)*exp(x)))/(1
00*x^2 + 4*x*exp(2)*exp(2*x - 2*exp(x)) - 400),x)
```

output
```
log(x^2 + (x*exp(2*x)*exp(2)*exp(-2*exp(x)))/25 - 4)/4
```

3.372. $\int \frac{50x+e^{-2e^x+2x}(-2e^{2+x}x+e^2(1+2x))}{-400+4e^{2-2e^x+2x}x+100x^2}\,dx$

3.373 $\int \frac{120x+44x^2+4x^3+(-20x^2-4x^3)\log(x)+(72-48x\log(x)+8x^2\log^2(x)$

3.373.1 Optimal result

Integrand size = 83, antiderivative size = 23

$$\int \frac{120x+44x^2+4x^3+(-20x^2-4x^3)\log(x)+(72-48x\log(x)+8x^2\log^2(x))\log(5+x)}{45+9x+(-30x-6x^2)\log(x)+(5x^2+x^3)\log^2(x)}\,dx = \frac{4x^2}{3-x\log(x)}+4\log^2(5+x)$$

output
```
4*ln(5+x)^2+4*x^2/(3-x*ln(x))
```

3.373.2 Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{120x+44x^2+4x^3+(-20x^2-4x^3)\log(x)+(72-48x\log(x)+8x^2\log^2(x))\log(5+x)}{45+9x+(-30x-6x^2)\log(x)+(5x^2+x^3)\log^2(x)}\,dx = -\frac{4x^2}{-3+x\log(x)}+4\log^2(5+x)$$

input
```
Integrate[(120*x + 44*x^2 + 4*x^3 + (-20*x^2 - 4*x^3)*Log[x] + (72 - 48*x*
Log[x] + 8*x^2*Log[x]^2)*Log[5 + x])/(45 + 9*x + (-30*x - 6*x^2)*Log[x] +
(5*x^2 + x^3)*Log[x]^2),x]
```

output
```
(-4*x^2)/(-3 + x*Log[x]) + 4*Log[5 + x]^2
```

3.373.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^3+44x^2+\left(8x^2\log^2(x)-48x\log(x)+72\right)\log(x+5)+\left(-4x^3-20x^2\right)\log(x)+120x}{\left(-6x^2-30x\right)\log(x)+\left(x^3+5x^2\right)\log^2(x)+9x+45}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{4x^3+44x^2+\left(8x^2\log^2(x)-48x\log(x)+72\right)\log(x+5)+\left(-4x^3-20x^2\right)\log(x)+120x}{(x+5)(3-x\log(x))^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{4x^3}{(x+5)(x\log(x)-3)^2}-\frac{4x^2\log(x)}{(x\log(x)-3)^2}+\frac{44x^2}{(x+5)(x\log(x)-3)^2}+\frac{120x}{(x+5)(x\log(x)-3)^2}+\frac{8\log(x+5)}{x+5}\right)$$

$$\Big\downarrow \text{ 2009}$$

$$4\int \frac{x^2}{(x\log(x)-3)^2}dx+12\int \frac{x}{(x\log(x)-3)^2}dx-4\int \frac{x}{x\log(x)-3}dx+4\log^2(x+5)$$

input
```
Int[(120*x + 44*x^2 + 4*x^3 + (-20*x^2 - 4*x^3)*Log[x] + (72 - 48*x*Log[x]
 + 8*x^2*Log[x]^2)*Log[5 + x])/(45 + 9*x + (-30*x - 6*x^2)*Log[x] + (5*x^2
 + x^3)*Log[x]^2),x]
```

output
```
$Aborted
```

3.373.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.373.4 Maple [A] (verified)

Time = 1.36 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

method	result	size
default	$4\ln\left(5+x\right)^{2}-\frac{4x^{2}}{x\ln\left(x\right)-3}$	23
risch	$4\ln\left(5+x\right)^{2}-\frac{4x^{2}}{x\ln\left(x\right)-3}$	23
parallelrisch	$-\frac{-1200\ln\left(5+x\right)^{2}\ln\left(x\right)x+1200x^{2}+3600\ln\left(5+x\right)^{2}}{300\left(x\ln\left(x\right)-3\right)}$	36

input
```
int(((8*x^2*ln(x)^2-48*x*ln(x)+72)*ln(5+x)+(-4*x^3-20*x^2)*ln(x)+4*x^3+44*
x^2+120*x)/((x^3+5*x^2)*ln(x)^2+(-6*x^2-30*x)*ln(x)+9*x+45),x,method=_RETU
RNVERBOSE)
```

output
```
4*ln(5+x)^2-4*x^2/(x*ln(x)-3)
```

3.373.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{120x+44x^2+4x^3+(-20x^2-4x^3)\log(x)+\left(72-48x\log(x)+8x^2\log^2(x)\right)\log(5+x)}{45+9x+(-30x-6x^2)\log(x)+(5x^2+x^3)\log^2(x)}\,dx$$
$$=\frac{4\left(\left(x\log\left(x\right)-3\right)\log\left(x+5\right)^{2}-x^{2}\right)}{x\log\left(x\right)-3}$$

input
```
integrate(((8*x^2*log(x)^2-48*x*log(x)+72)*log(5+x)+(-4*x^3-20*x^2)*log(x)
+4*x^3+44*x^2+120*x)/((x^3+5*x^2)*log(x)^2+(-6*x^2-30*x)*log(x)+9*x+45),x,
 algorithm=\
```

output
```
4*((x*log(x) - 3)*log(x + 5)^2 - x^2)/(x*log(x) - 3)
```

3.373.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{120x+44x^2+4x^3+(-20x^2-4x^3)\log(x)+(72-48x\log(x)+8x^2\log^2(x))\log(5+x)}{45+9x+(-30x-6x^2)\log(x)+(5x^2+x^3)\log^2(x)}\,dx$$
$$=-\frac{4x^2}{x\log(x)-3}+4\log(x+5)^2$$

input
```
integrate(((8*x**2*ln(x)**2-48*x*ln(x)+72)*ln(5+x)+(-4*x**3-20*x**2)*ln(x)
+4*x**3+44*x**2+120*x)/((x**3+5*x**2)*ln(x)**2+(-6*x**2-30*x)*ln(x)+9*x+45
),x)
```

output
```
-4*x**2/(x*log(x) - 3) + 4*log(x + 5)**2
```

3.373.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{120x+44x^2+4x^3+(-20x^2-4x^3)\log(x)+(72-48x\log(x)+8x^2\log^2(x))\log(5+x)}{45+9x+(-30x-6x^2)\log(x)+(5x^2+x^3)\log^2(x)}\,dx$$
$$=\frac{4\left((x\log(x)-3)\log(x+5)^2-x^2\right)}{x\log(x)-3}$$

input
```
integrate(((8*x^2*log(x)^2-48*x*log(x)+72)*log(5+x)+(-4*x^3-20*x^2)*log(x)
+4*x^3+44*x^2+120*x)/((x^3+5*x^2)*log(x)^2+(-6*x^2-30*x)*log(x)+9*x+45),x,
 algorithm=\
```

output
```
4*((x*log(x) - 3)*log(x + 5)^2 - x^2)/(x*log(x) - 3)
```

3.373.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{120x+44x^2+4x^3+(-20x^2-4x^3)\log(x)+(72-48x\log(x)+8x^2\log^2(x))\log(5+x)}{45+9x+(-30x-6x^2)\log(x)+(5x^2+x^3)\log^2(x)}\,dx$$
$$=4\,\log\left(x+5\right)^2-\frac{4\,x^2}{x\log\left(x\right)-3}$$

input
```
integrate(((8*x^2*log(x)^2-48*x*log(x)+72)*log(5+x)+(-4*x^3-20*x^2)*log(x)
+4*x^3+44*x^2+120*x)/((x^3+5*x^2)*log(x)^2+(-6*x^2-30*x)*log(x)+9*x+45),x,
 algorithm=\
```

output
```
4*log(x + 5)^2 - 4*x^2/(x*log(x) - 3)
```

3.373.9 Mupad [B] (verification not implemented)

Time = 14.04 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{120x+44x^2+4x^3+(-20x^2-4x^3)\log(x)+(72-48x\log(x)+8x^2\log^2(x))\log(5+x)}{45+9x+(-30x-6x^2)\log(x)+(5x^2+x^3)\log^2(x)}\,dx$$
$$=4\ln\left(x+5\right)^2-\frac{4\,x^2}{x\,\ln\left(x\right)-3}$$

input
```
int((120*x - log(x)*(20*x^2 + 4*x^3) + log(x + 5)*(8*x^2*log(x)^2 - 48*x*l
og(x) + 72) + 44*x^2 + 4*x^3)/(9*x + log(x)^2*(5*x^2 + x^3) - log(x)*(30*x
 + 6*x^2) + 45),x)
```

output
```
4*log(x + 5)^2 - (4*x^2)/(x*log(x) - 3)
```

3.374 $\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx$

3.374.1 Optimal result

Integrand size = 50, antiderivative size = 22

$$\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx=\frac{\log(5)}{2+\log\left(e^{\frac{2e^8}{(2+4x)^2}}\right)}$$

output
```
ln(5)/(ln(exp(exp(4)^2/(4*x+2)^2)^2)+2)
```

3.374.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx = -\frac{e^8\log(5)}{2(e^8+4(1+2x)^2)}$$

input
```
Integrate[(E^8*(8 + 16*x)*Log[5])/(16 + E^16 + 128*x + 384*x^2 + 512*x^3 +
 256*x^4 + E^8*(8 + 32*x + 32*x^2)),x]
```

output
```
-1/2*(E^8*Log[5])/(E^8 + 4*(1 + 2*x)^2)
```

3.374.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.140, Rules used = {27, 27, 2459, 27, 1380, 27, 241}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^8(16x+8)\log(5)}{256x^4+512x^3+384x^2+e^8\left(32x^2+32x+8\right)+128x+e^{16}+16}dx$$

$$\Big\downarrow \; 27$$

$$e^8\log(5)\int \frac{8(2x+1)}{256x^4+512x^3+384x^2+128x+8e^8\left(4x^2+4x+1\right)+e^{16}+16}dx$$

$$\Big\downarrow \; 27$$

$$8e^8\log(5)\int \frac{2x+1}{256x^4+512x^3+384x^2+128x+8e^8\left(4x^2+4x+1\right)+e^{16}+16}dx$$

$$\Big\downarrow \; 2459$$

$$8e^8\log(5)\int \frac{2\left(x+\frac{1}{2}\right)}{256\left(x+\frac{1}{2}\right)^4+32e^8\left(x+\frac{1}{2}\right)^2+e^{16}}d\left(x+\frac{1}{2}\right)$$

$$\Big\downarrow \; 27$$

$$16e^8\log(5)\int \frac{x+\frac{1}{2}}{256\left(x+\frac{1}{2}\right)^4+32e^8\left(x+\frac{1}{2}\right)^2+e^{16}}d\left(x+\frac{1}{2}\right)$$

$$\Big\downarrow \; 1380$$

$$4096e^8\log(5)\int \frac{x+\frac{1}{2}}{256\left(16\left(x+\frac{1}{2}\right)^2+e^8\right)^2}d\left(x+\frac{1}{2}\right)$$

$$\Big\downarrow \; 27$$

$$16e^8\log(5)\int \frac{x+\frac{1}{2}}{\left(16\left(x+\frac{1}{2}\right)^2+e^8\right)^2}d\left(x+\frac{1}{2}\right)$$

$$\Big\downarrow \; 241$$

$$-\frac{e^8\log(5)}{2\left(16\left(x+\frac{1}{2}\right)^2+e^8\right)}$$

3.374. $\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx$

input
```
Int[(E^8*(8 + 16*x)*Log[5])/(16 + E^16 + 128*x + 384*x^2 + 512*x^3 + 256*x
^4 + E^8*(8 + 32*x + 32*x^2)),x]
```

output
```
-1/2*(E^8*Log[5])/(E^8 + 16*(1/2 + x)^2)
```

3.374.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2459
```
Int[(Pn_)^(p_.)*(Qx_), x_Symbol] :> With[{S = Coeff[Pn, x, Expon[Pn, x] - 1
]/(Expon[Pn, x]*Coeff[Pn, x, Expon[Pn, x]])}, Subst[Int[ExpandToSum[Pn /. x
 -> x - S, x]^p*ExpandToSum[Qx /. x -> x - S, x], x], x, x + S] /; Binomial
Q[Pn /. x -> x - S, x] || (IntegerQ[Expon[Pn, x]/2] && TrinomialQ[Pn /. x -
> x - S, x])] /; FreeQ[p, x] && PolyQ[Pn, x] && GtQ[Expon[Pn, x], 2] && NeQ
[Coeff[Pn, x, Expon[Pn, x] - 1], 0] && PolyQ[Qx, x] &&  !(MonomialQ[Qx, x]
&& IGtQ[p, 0])
```

3.374.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

method	result	size
risch	$-\frac{e^{8} \ln(5)}{2(e^{8}+16x^{2}+16x+4)}$	21
gosper	$-\frac{e^{8} \ln(5)}{2(e^{8}+16x^{2}+16x+4)}$	25
norman	$-\frac{e^{8} \ln(5)}{2(e^{8}+16x^{2}+16x+4)}$	25
parallelrisch	$-\frac{e^{8} \ln(5)}{2(e^{8}+16x^{2}+16x+4)}$	25

input
```
int((16*x+8)*exp(4)^2*ln(5)/(exp(4)^4+(32*x^2+32*x+8)*exp(4)^2+256*x^4+512
*x^3+384*x^2+128*x+16),x,method=_RETURNVERBOSE)
```

output
```
-1/2*exp(8)*ln(5)/(exp(8)+16*x^2+16*x+4)
```

3.374.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx = -\frac{e^8\log(5)}{2\,(16\,x^2+16\,x+e^8+4)}$$

input
```
integrate((16*x+8)*exp(4)^2*log(5)/(exp(4)^4+(32*x^2+32*x+8)*exp(4)^2+256*
x^4+512*x^3+384*x^2+128*x+16),x, algorithm=\
```

output
```
-1/2*e^8*log(5)/(16*x^2 + 16*x + e^8 + 4)
```

3.374.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx = -\frac{e^8\log(5)}{32x^2+32x+8+2e^8}$$

input
```
integrate((16*x+8)*exp(4)**2*ln(5)/(exp(4)**4+(32*x**2+32*x+8)*exp(4)**2+2
56*x**4+512*x**3+384*x**2+128*x+16),x)
```

output
```
-exp(8)*log(5)/(32*x**2 + 32*x + 8 + 2*exp(8))
```

3.374.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx = -\frac{e^8\log(5)}{2\,(16\,x^2+16\,x+e^8+4)}$$

input
```
integrate((16*x+8)*exp(4)^2*log(5)/(exp(4)^4+(32*x^2+32*x+8)*exp(4)^2+256*
x^4+512*x^3+384*x^2+128*x+16),x, algorithm=\
```

output
```
-1/2*e^8*log(5)/(16*x^2 + 16*x + e^8 + 4)
```

3.374.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx = -\frac{e^8\log(5)}{2\,(16\,x^2+16\,x+e^8+4)}$$

input
```
integrate((16*x+8)*exp(4)^2*log(5)/(exp(4)^4+(32*x^2+32*x+8)*exp(4)^2+256*
x^4+512*x^3+384*x^2+128*x+16),x, algorithm=\
```

output
```
-1/2*e^8*log(5)/(16*x^2 + 16*x + e^8 + 4)
```

3.374.9 Mupad [B] (verification not implemented)

Time = 13.31 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx = -\frac{\mathrm{e}^8\,\ln(5)}{2\,(16\,x^2+16\,x+\mathrm{e}^8+4)}$$

input
```
int((exp(8)*log(5)*(16*x + 8))/(128*x + exp(16) + exp(8)*(32*x + 32*x^2 +
8) + 384*x^2 + 512*x^3 + 256*x^4 + 16),x)
```

output
```
-(exp(8)*log(5))/(2*(16*x + exp(8) + 16*x^2 + 4))
```

3.374. $\int \frac{e^8(8+16x)\log(5)}{16+e^{16}+128x+384x^2+512x^3+256x^4+e^8(8+32x+32x^2)}\,dx$

3.375 $\int \frac{-48-470x-378x^2+30x^3+50x^4+(-48-16x+216x^2-240x^3}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-}$

3.375.1 Optimal result

Integrand size = 91, antiderivative size = 28

$$\int \frac{-48-470x-378x^2+30x^3+50x^4+(-48-16x+216x^2-240x^3-200x^4)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}$$
$$= \frac{x\log(x)}{4(-3+x)^2\left(1+\frac{1}{8}x(9+5x)^2\right)}$$

output
```
1/4*ln(x)*x/(-3+x)^2/(1/8*x*(5*x+9)^2+1)
```

3.375.2 Mathematica [A] (verified)

Time = 0.38 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{-48-470x-378x^2+30x^3+50x^4+(-48-16x+216x^2-240x^3-200x^4)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}$$
$$= \frac{2x\log(x)}{(-3+x)^2(8+81x+90x^2+25x^3)}$$

input
```
Integrate[(-48 - 470*x - 378*x^2 + 30*x^3 + 50*x^4 + (-48 - 16*x + 216*x^2
 - 240*x^3 - 200*x^4)*Log[x])/(-1728 - 33264*x - 181611*x^2 - 200033*x^3 +
 5697*x^4 + 79731*x^5 + 10255*x^6 - 11475*x^7 - 1125*x^8 + 625*x^9),x]
```

output
```
(2*x*Log[x])/((-3 + x)^2*(8 + 81*x + 90*x^2 + 25*x^3))
```

3.375.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{50x^4+30x^3-378x^2+\left(-200x^4-240x^3+216x^2-16x-48\right)\log(x)-470x-48}{625x^9-1125x^8-11475x^7+10255x^6+79731x^5+5697x^4-200033x^3-181611x^2-33264x-1728}\,dx$$

$$\Big\downarrow \text{ 2463}$$

$$\int \left(\frac{246573\left(50x^4+30x^3-378x^2+\left(-200x^4-240x^3+216x^2-16x-48\right)\log(x)-470x-48\right)}{567647723776(x-3)}+\frac{\left(-6164325x^2\right.}{}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3\left(25x^3+90x^2+81x+8\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{30x^3}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{378x^2}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{470x}{(x-3)^3\left(25x^3+90x^2+81x+8\right)}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3\left(25x^3+90x^2+81x+8\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{30x^3}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{378x^2}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{470x}{(x-3)^3\left(25x^3+90x^2+81x+8\right)}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3\left(25x^3+90x^2+81x+8\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{30x^3}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{378x^2}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{470x}{(x-3)^3\left(25x^3+90x^2+81x+8\right)}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3\left(25x^3+90x^2+81x+8\right)^2}dx$$

$\big\downarrow$ 7293

$$\int \left(\frac{30x^3}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{378x^2}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{470x}{(x-3)^3\left(25x^3+90x^2+81x+8\right)}\right.$$

$\big\downarrow$ 7239

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3\left(25x^3+90x^2+81x+8\right)^2}dx$$

$\big\downarrow$ 7293

$$\int \left(\frac{30x^3}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{378x^2}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{470x}{(x-3)^3\left(25x^3+90x^2+81x+8\right)}\right.$$

$\big\downarrow$ 7239

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3\left(25x^3+90x^2+81x+8\right)^2}dx$$

$\big\downarrow$ 7293

$$\int \left(\frac{30x^3}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{378x^2}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{470x}{(x-3)^3\left(25x^3+90x^2+81x+8\right)}\right.$$

$\big\downarrow$ 7239

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3\left(25x^3+90x^2+81x+8\right)^2}dx$$

$\big\downarrow$ 7293

$$\int \left(\frac{30x^3}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{378x^2}{(x-3)^3\left(25x^3+90x^2+81x+8\right)^2}-\frac{470x}{(x-3)^3\left(25x^3+90x^2+81x+8\right)}\right.$$

$\big\downarrow$ 7239

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3\left(25x^3+90x^2+81x+8\right)^2}dx$$

$\big\downarrow$ 7293

3.375. $\int \frac{-48-470x-378x^2+30x^3+50x^4+\left(-48-16x+216x^2-240x^3-200x^4\right)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}\,dx$

$$\int \left(\frac{30x^3}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{378x^2}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{470x}{(x-3)^3 (25x^3+90x^2+81x+8)}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3 (25x^3+90x^2+81x+8)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{30x^3}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{378x^2}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{470x}{(x-3)^3 (25x^3+90x^2+81x+8)}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3 (25x^3+90x^2+81x+8)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{30x^3}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{378x^2}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{470x}{(x-3)^3 (25x^3+90x^2+81x+8)}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3 (25x^3+90x^2+81x+8)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{30x^3}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{378x^2}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{470x}{(x-3)^3 (25x^3+90x^2+81x+8)}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8\left(25x^4+30x^3-27x^2+2x+6\right)\log(x)+470x+48}{(3-x)^3 (25x^3+90x^2+81x+8)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{30x^3}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{378x^2}{(x-3)^3 (25x^3+90x^2+81x+8)^2} - \frac{470x}{(x-3)^3 (25x^3+90x^2+81x+8)}\right.$$

$$\Big\downarrow \text{7239}$$

3.375. $\int \frac{-48-470x-378x^2+30x^3+50x^4+\left(-48-16x+216x^2-240x^3-200x^4\right)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}\,dx$

$$\int \frac{-50x^4-30x^3+378x^2+8(25x^4+30x^3-27x^2+2x+6)\log(x)+470x+48}{(3-x)^3(25x^3+90x^2+81x+8)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{30x^3}{(x-3)^3(25x^3+90x^2+81x+8)^2}-\frac{378x^2}{(x-3)^3(25x^3+90x^2+81x+8)^2}-\frac{470x}{(x-3)^3(25x^3+90x^2+81x+8)}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8(25x^4+30x^3-27x^2+2x+6)\log(x)+470x+48}{(3-x)^3(25x^3+90x^2+81x+8)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{30x^3}{(x-3)^3(25x^3+90x^2+81x+8)^2}-\frac{378x^2}{(x-3)^3(25x^3+90x^2+81x+8)^2}-\frac{470x}{(x-3)^3(25x^3+90x^2+81x+8)}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-50x^4-30x^3+378x^2+8(25x^4+30x^3-27x^2+2x+6)\log(x)+470x+48}{(3-x)^3(25x^3+90x^2+81x+8)^2}dx$$

input
```
Int[(-48 - 470*x - 378*x^2 + 30*x^3 + 50*x^4 + (-48 - 16*x + 216*x^2 - 240
*x^3 - 200*x^4)*Log[x])/(-1728 - 33264*x - 181611*x^2 - 200033*x^3 + 5697*
x^4 + 79731*x^5 + 10255*x^6 - 11475*x^7 - 1125*x^8 + 625*x^9),x]
```

output
```
$Aborted
```

3.375.3.1 Defintions of rubi rules used

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.375. $\int \frac{-48-470x-378x^2+30x^3+50x^4+(-48-16x+216x^2-240x^3-200x^4)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}\,dx$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.375.4 Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

method	result
norman	$\frac{2x\ln(x)}{(25x^3+90x^2+81x+8)(-3+x)^2}$
risch	$\frac{2x\ln(x)}{25x^5-60x^4-234x^3+332x^2+681x+72}$
parallelrisch	$\frac{2x\ln(x)}{25x^5-60x^4-234x^3+332x^2+681x+72}$
default	$\frac{\left(\sum_{\_R=\mathrm{RootOf}\left(25\_Z^3+90\_Z^2+81\_Z+8\right)}\frac{\left(4050\_R^2+21305\_R+41232\right)\ln\left(x-\_R\right)}{25\_R^2+60\_R+27}\right)}{565068}-\frac{\ln(x)x(-6+x)}{2604(-3+x)^2}+\frac{\left(\sum_{\_R=\mathrm{RootOf}\left(\right.}\right.}{}$
parts	$\frac{\left(\sum_{\_R=\mathrm{RootOf}\left(25\_Z^3+90\_Z^2+81\_Z+8\right)}\frac{\left(4050\_R^2+21305\_R+41232\right)\ln\left(x-\_R\right)}{25\_R^2+60\_R+27}\right)}{565068}-\frac{\ln(x)x(-6+x)}{2604(-3+x)^2}+\frac{\left(\sum_{\_R=\mathrm{RootOf}\left(\right.}\right.}{}$

input
```
int(((-200*x^4-240*x^3+216*x^2-16*x-48)*ln(x)+50*x^4+30*x^3-378*x^2-470*x-
48)/(625*x^9-1125*x^8-11475*x^7+10255*x^6+79731*x^5+5697*x^4-200033*x^3-18
1611*x^2-33264*x-1728),x,method=_RETURNVERBOSE)
```

output
```
2*x*ln(x)/(25*x^3+90*x^2+81*x+8)/(-3+x)^2
```

3.375.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{-48-470x-378x^2+30x^3+50x^4+(-48-16x+216x^2-240x^3-200x^4)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}\,dx$$
$$=\frac{2\,x\log{(x)}}{25\,x^5-60\,x^4-234\,x^3+332\,x^2+681\,x+72}$$

input
```
integrate(((-200*x^4-240*x^3+216*x^2-16*x-48)*log(x)+50*x^4+30*x^3-378*x^2
-470*x-48)/(625*x^9-1125*x^8-11475*x^7+10255*x^6+79731*x^5+5697*x^4-200033
*x^3-181611*x^2-33264*x-1728),x, algorithm=\
```

output
```
2*x*log(x)/(25*x^5 - 60*x^4 - 234*x^3 + 332*x^2 + 681*x + 72)
```

3.375.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{-48-470x-378x^2+30x^3+50x^4+(-48-16x+216x^2-240x^3-200x^4)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}\,dx = \frac{2x\log(x)}{25x^5-60x^4-234x^3+332x^2+681x+72}$$

input
```
integrate(((-200*x**4-240*x**3+216*x**2-16*x-48)*ln(x)+50*x**4+30*x**3-378
*x**2-470*x-48)/(625*x**9-1125*x**8-11475*x**7+10255*x**6+79731*x**5+5697*
x**4-200033*x**3-181611*x**2-33264*x-1728),x)
```

output
```
2*x*log(x)/(25*x**5 - 60*x**4 - 234*x**3 + 332*x**2 + 681*x + 72)
```

3.375.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{-48-470x-378x^2+30x^3+50x^4+(-48-16x+216x^2-240x^3-200x^4)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}\,dx = \frac{2\,x\log(x)}{25\,x^5-60\,x^4-234\,x^3+332\,x^2+681\,x+72}$$

input
```
integrate(((-200*x^4-240*x^3+216*x^2-16*x-48)*log(x)+50*x^4+30*x^3-378*x^2
-470*x-48)/(625*x^9-1125*x^8-11475*x^7+10255*x^6+79731*x^5+5697*x^4-200033
*x^3-181611*x^2-33264*x-1728),x, algorithm=\
```

output
```
2*x*log(x)/(25*x^5 - 60*x^4 - 234*x^3 + 332*x^2 + 681*x + 72)
```

3.375.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(23) = 46$.

Time = 0.27 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.79

$$\int \frac{-48-470x-378x^2+30x^3+50x^4+(-48-16x+216x^2-240x^3-200x^4)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}$$
$$= \frac{1}{188356}\left(\frac{6725\,x^2+28110\,x-1296}{25\,x^3+90\,x^2+81\,x+8}-\frac{269\,x-1458}{x^2-6\,x+9}\right)\log(x)$$

input

```
integrate((((-200*x^4-240*x^3+216*x^2-16*x-48)*log(x)+50*x^4+30*x^3-378*x^2
-470*x-48)/(625*x^9-1125*x^8-11475*x^7+10255*x^6+79731*x^5+5697*x^4-200033
*x^3-181611*x^2-33264*x-1728),x, algorithm=\
```

output

```
1/188356*((6725*x^2 + 28110*x - 1296)/(25*x^3 + 90*x^2 + 81*x + 8) - (269*
x - 1458)/(x^2 - 6*x + 9))*log(x)
```

3.375.9 Mupad [B] (verification not implemented)

Time = 13.65 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{-48-470x-378x^2+30x^3+50x^4+(-48-16x+216x^2-240x^3-200x^4)\log(x)}{-1728-33264x-181611x^2-200033x^3+5697x^4+79731x^5+10255x^6-11475x^7-1125x^8+625x^9}$$
$$= \frac{2\,x\,\ln(x)}{25\,\left(x^5-\frac{12\,x^4}{5}-\frac{234\,x^3}{25}+\frac{332\,x^2}{25}+\frac{681\,x}{25}+\frac{72}{25}\right)}$$

input

```
int((470*x + log(x)*(16*x - 216*x^2 + 240*x^3 + 200*x^4 + 48) + 378*x^2 -
30*x^3 - 50*x^4 + 48)/(33264*x + 181611*x^2 + 200033*x^3 - 5697*x^4 - 7973
1*x^5 - 10255*x^6 + 11475*x^7 + 1125*x^8 - 625*x^9 + 1728),x)
```

output

```
(2*x*log(x))/(25*((681*x)/25 + (332*x^2)/25 - (234*x^3)/25 - (12*x^4)/5 +
x^5 + 72/25))
```

3.376 $\int \frac{-9025-190x-x^2+(190x+2x^2)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}$

3.376.1 Optimal result

Integrand size = 56, antiderivative size = 20

$$\int \frac{-9025-190x-x^2+(190x+2x^2)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}\,dx = \frac{\left(19+\frac{x}{5}-\log^2(x)\right)^2}{\log(x)}$$

output
```
(19-ln(x)^2+1/5*x)^2/ln(x)
```

3.376.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 42 vs. 2(20) = 40.

Time = 0.07 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.10

$$\int \frac{-9025-190x-x^2+(190x+2x^2)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}\,dx = \frac{361}{\log(x)}+\frac{38x}{5\log(x)}+\frac{x^2}{25\log(x)}-38\log(x)-\frac{2}{5}x\log(x)+\log^3(x)$$

input
```
Integrate[(-9025 - 190*x - x^2 + (190*x + 2*x^2)*Log[x] + (-950 - 10*x)*Lo
g[x]^2 - 10*x*Log[x]^3 + 75*Log[x]^4)/(25*x*Log[x]^2),x]
```

output
```
361/Log[x] + (38*x)/(5*Log[x]) + x^2/(25*Log[x]) - 38*Log[x] - (2*x*Log[x]
)/5 + Log[x]^3
```

3.376.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 41 vs. $2(20) = 40$.

Time = 0.46 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2+(2x^2+190x)\log(x)-190x+75\log^4(x)-10x\log^3(x)+(-10x-950)\log^2(x)-9025}{25x\log^2(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{25}\int -\frac{-75\log^4(x)+10x\log^3(x)+10(x+95)\log^2(x)-2(x^2+95x)\log(x)+x^2+190x+9025}{x\log^2(x)}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{25}\int \frac{-75\log^4(x)+10x\log^3(x)+10(x+95)\log^2(x)-2(x^2+95x)\log(x)+x^2+190x+9025}{x\log^2(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{25}\int \left(\frac{(x+95)^2}{x\log^2(x)}+\frac{10(x+95)}{x}-\frac{2(x+95)}{\log(x)}-\frac{75\log^2(x)}{x}+10\log(x)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{25}\left(\frac{x^2}{\log(x)}+25\log^3(x)-10x\log(x)-950\log(x)+\frac{190x}{\log(x)}+\frac{9025}{\log(x)}\right)$$

input
```
Int[(-9025 - 190*x - x^2 + (190*x + 2*x^2)*Log[x] + (-950 - 10*x)*Log[x]^2
 - 10*x*Log[x]^3 + 75*Log[x]^4)/(25*x*Log[x]^2),x]
```

output
```
(9025/Log[x] + (190*x)/Log[x] + x^2/Log[x] - 950*Log[x] - 10*x*Log[x] + 25
*Log[x]^3)/25
```

3.376. $\int \frac{-9025-190x-x^2+(190x+2x^2)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}dx$

3.376.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.376.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

method	result	size
risch	$\ln\left(x\right)^{3}-\frac{2x\ln\left(x\right)}{5}-38\ln\left(x\right)+\frac{x^{2}+190x+9025}{25\ln\left(x\right)}$	29
norman	$\frac{361+\ln\left(x\right)^{4}-38\ln\left(x\right)^{2}+\frac{38x}{5}+\frac{x^{2}}{25}-\frac{2x\ln\left(x\right)^{2}}{5}}{\ln\left(x\right)}$	33
parallelrisch	$\frac{25\ln\left(x\right)^{4}-10x\ln\left(x\right)^{2}+x^{2}-950\ln\left(x\right)^{2}+9025+190x}{25\ln\left(x\right)}$	34
default	$\ln\left(x\right)^{3}-\frac{2x\ln\left(x\right)}{5}-38\ln\left(x\right)+\frac{x^{2}}{25\ln\left(x\right)}+\frac{38x}{5\ln\left(x\right)}+\frac{361}{\ln\left(x\right)}$	37
parts	$\ln\left(x\right)^{3}-\frac{2x\ln\left(x\right)}{5}-38\ln\left(x\right)+\frac{x^{2}}{25\ln\left(x\right)}+\frac{38x}{5\ln\left(x\right)}+\frac{361}{\ln\left(x\right)}$	37

input
```
int(1/25*(75*ln(x)^4-10*x*ln(x)^3+(-10*x-950)*ln(x)^2+(2*x^2+190*x)*ln(x)-
x^2-190*x-9025)/x/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
ln(x)^3-2/5*x*ln(x)-38*ln(x)+1/25*(x^2+190*x+9025)/ln(x)
```

3.376.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{-9025-190x-x^2+(190x+2x^2)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}\,dx$$
$$=\frac{25\,\log(x)^4-10\,(x+95)\log(x)^2+x^2+190\,x+9025}{25\,\log(x)}$$

input
```
integrate(1/25*(75*log(x)^4-10*x*log(x)^3+(-10*x-950)*log(x)^2+(2*x^2+190*
x)*log(x)-x^2-190*x-9025)/x/log(x)^2,x, algorithm=\
```

output
```
1/25*(25*log(x)^4 - 10*(x + 95)*log(x)^2 + x^2 + 190*x + 9025)/log(x)
```

3.376.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. $2(14) = 28$.

Time = 0.06 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.55

$$\int \frac{-9025-190x-x^2+(190x+2x^2)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}\,dx$$
$$=-\frac{2x\log(x)}{5}+\frac{x^2+190x+9025}{25\log(x)}+\log(x)^3-38\log(x)$$

input
```
integrate(1/25*(75*ln(x)**4-10*x*ln(x)**3+(-10*x-950)*ln(x)**2+(2*x**2+190
*x)*ln(x)-x**2-190*x-9025)/x/ln(x)**2,x)
```

output
```
-2*x*log(x)/5 + (x**2 + 190*x + 9025)/(25*log(x)) + log(x)**3 - 38*log(x)
```

3.376.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.24 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.40

$$\int \frac{-9025-190x-x^2+(190x+2x^2)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}\,dx$$
$$=\log(x)^3-\frac{2}{5}\,x\log(x)+\frac{361}{\log(x)}+\frac{2}{25}\,\mathrm{Ei}(2\,\log(x))+\frac{38}{5}\,\mathrm{Ei}(\log(x))$$
$$-\frac{38}{5}\,\Gamma(-1,-\log(x))-\frac{2}{25}\,\Gamma(-1,-2\,\log(x))-38\,\log(x)$$

input
```
integrate(1/25*(75*log(x)^4-10*x*log(x)^3+(-10*x-950)*log(x)^2+(2*x^2+190*
x)*log(x)-x^2-190*x-9025)/x/log(x)^2,x, algorithm=\
```

output
```
log(x)^3 - 2/5*x*log(x) + 361/log(x) + 2/25*Ei(2*log(x)) + 38/5*Ei(log(x))
 - 38/5*gamma(-1, -log(x)) - 2/25*gamma(-1, -2*log(x)) - 38*log(x)
```

3.376.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.40

$$\int \frac{-9025-190x-x^2+(190x+2x^2)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}\,dx$$
$$=\log(x)^3-\frac{2}{5}\,x\log(x)+\frac{x^2+190\,x+9025}{25\,\log(x)}-38\,\log(x)$$

input
```
integrate(1/25*(75*log(x)^4-10*x*log(x)^3+(-10*x-950)*log(x)^2+(2*x^2+190*
x)*log(x)-x^2-190*x-9025)/x/log(x)^2,x, algorithm=\
```

output
```
log(x)^3 - 2/5*x*log(x) + 1/25*(x^2 + 190*x + 9025)/log(x) - 38*log(x)
```

3.376.9 Mupad [B] (verification not implemented)

Time = 13.47 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{-9025-190x-x^2+(190x+2x^2)\log(x)+(-950-10x)\log^2(x)-10x\log^3(x)+75\log^4(x)}{25x\log^2(x)}\,dx$$
$$=\frac{\left(-5\ln(x)^2+x+95\right)^2}{25\,\ln(x)}$$

input
```
int(-((38*x)/5 + (2*x*log(x)^3)/5 - 3*log(x)^4 - (log(x)*(190*x + 2*x^2))/
25 + x^2/25 + (log(x)^2*(10*x + 950))/25 + 361)/(x*log(x)^2),x)
```

output
```
(x - 5*log(x)^2 + 95)^2/(25*log(x))
```

3.377 $\int \frac{1}{4}((3-10x+(3-2x)\log(3))\log(4)+(-4-4\log$

3.377.1 Optimal result

Integrand size = 43, antiderivative size = 28

$$\int \frac{1}{4}\left((3-10x+(3-2x)\log(3))\log(4)+(-4-4\log(3))\log(4)\log(x)+(1+\log(3))\log(4)\log^2(x)\right)\,dx=x\log(4)\left(-x+\frac{1}{4}(1+\log(3))\left(-x+(3-\log(x))^2\right)\right)$$

output
```
2*x*ln(2)*(1/4*((3-ln(x))^2-x)*(ln(3)+1)-x)
```

3.377.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.54

$$\int \frac{1}{4}\left((3-10x+(3-2x)\log(3))\log(4)+(-4-4\log(3))\log(4)\log(x)+(1+\log(3))\log(4)\log^2(x)\right)\,dx=\frac{1}{4}\log(4)\left(-\frac{1}{2}x^2(10+\log(9))+x(9+\log(19683))-6x(1+\log(3))\log(x)+x(1+\log(3))\log^2(x)\right)$$

input
```
Integrate[((3 - 10*x + (3 - 2*x)*Log[3])*Log[4] + (-4 - 4*Log[3])*Log[4]*L
og[x] + (1 + Log[3])*Log[4]*Log[x]^2)/4,x]
```

output
```
(Log[4]*(-1/2*(x^2*(10 + Log[9])) + x*(9 + Log[19683]) - 6*x*(1 + Log[3])*
Log[x] + x*(1 + Log[3])*Log[x]^2))/4
```

3.377.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 64 vs. 2(28) = 56.

Time = 0.21 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.29, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.047, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}\left((1+\log(3))\log(4)\log^2(x)+(-4-4\log(3))\log(4)\log(x)+\log(4)(-10x+(3-2x)\log(3)+3)\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int \left((1+\log(3))\log(4)\log^2(x)-4(1+\log(3))\log(4)\log(x)+(\log(3)(3-2x)-10x+3)\log(4)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(x(1+\log(3))\log(4)\log^2(x)-\frac{\log(4)(-10x+(3-2x)\log(3)+3)^2}{2(10+\log(9))}-6x(1+\log(3))\log(4)\log(x)+6x(1+\log$$

input
```
Int[((3 - 10*x + (3 - 2*x)*Log[3])*Log[4] + (-4 - 4*Log[3])*Log[4]*Log[x]
+ (1 + Log[3])*Log[4]*Log[x]^2)/4,x]
```

output
```
(6*x*(1 + Log[3])*Log[4] - ((3 - 10*x + (3 - 2*x)*Log[3])^2*Log[4])/(2*(10
 + Log[9])) - 6*x*(1 + Log[3])*Log[4]*Log[x] + x*(1 + Log[3])*Log[4]*Log[x
]^2)/4
```

3.377.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.377.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(27) = 54.

Time = 0.15 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.21

method	result
norman	$\left(-\frac{\ln(2)\ln(3)}{2}-\frac{5\ln(2)}{2}\right)x^{2}+\left(\frac{9\ln(2)\ln(3)}{2}+\frac{9\ln(2)}{2}\right)x+\left(-3\ln\left(2\right)\ln\left(3\right)-3\ln\left(2\right)\right)x\ln\left(x\right)+\left(\ln\right.$
parts	$-\frac{\ln(2)\left(x^{2}\ln(3)-3x\ln(3)+5x^{2}-3x\right)}{2}-2(\ln\left(3\right)+1)\ln\left(2\right)\left(x\ln\left(x\right)-x\right)+\frac{(\ln(3)+1)\ln(2)\left(x\ln(x)^{2}-2x\ln(x)+\right.}{2}$
risch	$\frac{\ln(2)x\ln(x)^{2}\ln(3)}{2}+\frac{\ln(2)x\ln(x)^{2}}{2}-3\ln\left(2\right)x\ln\left(x\right)\ln\left(3\right)-3x\ln\left(2\right)\ln\left(x\right)+\frac{9x\ln(2)\ln(3)}{2}+\frac{9x\ln(2)}{2}-$
parallelrisch	$\frac{\ln(2)x\ln(x)^{2}\ln(3)}{2}+\frac{\ln(2)x\ln(x)^{2}}{2}-3\ln\left(2\right)x\ln\left(x\right)\ln\left(3\right)-3x\ln\left(2\right)\ln\left(x\right)+\frac{9x\ln(2)\ln(3)}{2}+\frac{9x\ln(2)}{2}-$
default	$\frac{\ln(2)\left(-x^{2}\ln(3)+3x\ln(3)-5x^{2}+3x\right)}{2}+2(-\ln\left(3\right)-1)\ln\left(2\right)\left(x\ln\left(x\right)-x\right)+\frac{(\ln(3)+1)\ln(2)\left(x\ln(x)^{2}-2x\ln(x\right.}{2}$

input
```
int(1/2*(ln(3)+1)*ln(2)*ln(x)^2+1/2*(-4*ln(3)-4)*ln(2)*ln(x)+1/2*((3-2*x)*
ln(3)-10*x+3)*ln(2),x,method=_RETURNVERBOSE)
```

output
```
(-1/2*ln(2)*ln(3)-5/2*ln(2))*x^2+(9/2*ln(2)*ln(3)+9/2*ln(2))*x+(-3*ln(2)*l
n(3)-3*ln(2))*x*ln(x)+(1/2*ln(2)*ln(3)+1/2*ln(2))*x*ln(x)^2
```

3.377.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. 2(24) = 48.

Time = 0.24 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.11

$$\begin{aligned}&\int\frac{1}{4}\big((3-10x+(3-2x)\log(3))\log(4)+(-4-4\log(3))\log(4)\log(x)\\&+(1+\log(3))\log(4)\log^{2}(x)\big)\,dx=-\frac{1}{2}\left(x^{2}-9\,x\right)\log\left(3\right)\log\left(2\right)\\&\quad+\frac{1}{2}\left(x\log\left(3\right)\log\left(2\right)+x\log\left(2\right)\right)\log\left(x\right)^{2}\\&\quad-\frac{1}{2}\left(5\,x^{2}-9\,x\right)\log\left(2\right)-3\left(x\log\left(3\right)\log\left(2\right)+x\log\left(2\right)\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(1/2*(log(3)+1)*log(2)*log(x)^2+1/2*(-4*log(3)-4)*log(2)*log(x)+1
/2*((3-2*x)*log(3)-10*x+3)*log(2),x, algorithm=\
```

output
```
-1/2*(x^2 - 9*x)*log(3)*log(2) + 1/2*(x*log(3)*log(2) + x*log(2))*log(x)^2
 - 1/2*(5*x^2 - 9*x)*log(2) - 3*(x*log(3)*log(2) + x*log(2))*log(x)
```

3.377.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. $2(24) = 48$.

Time = 0.10 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.93

$$\int \frac{1}{4}((3-10x+(3-2x)\log(3))\log(4)+(-4-4\log(3))\log(4)\log(x)+(1+\log(3))\log(4)\log^2(x))\ dx = x^2\left(-\frac{5\log(2)}{2}-\frac{\log(2)\log(3)}{2}\right)+x\left(\frac{9\log(2)}{2}+\frac{9\log(2)\log(3)}{2}\right)+\left(\frac{x\log(2)}{2}+\frac{x\log(2)\log(3)}{2}\right)\log(x)^2+(-3x\log(2)\log(3)-3x\log(2))\log(x)$$

input
```
integrate(1/2*(ln(3)+1)*ln(2)*ln(x)**2+1/2*(-4*ln(3)-4)*ln(2)*ln(x)+1/2*((
3-2*x)*ln(3)-10*x+3)*ln(2),x)
```

output
```
x**2*(-5*log(2)/2 - log(2)*log(3)/2) + x*(9*log(2)/2 + 9*log(2)*log(3)/2)
+ (x*log(2)/2 + x*log(2)*log(3)/2)*log(x)**2 + (-3*x*log(2)*log(3) - 3*x*l
og(2))*log(x)
```

3.377.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(24) = 48$.

Time = 0.21 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.11

$$\int \frac{1}{4}((3-10x+(3-2x)\log(3))\log(4)+(-4-4\log(3))\log(4)\log(x)+(1+\log(3))\log(4)\log^2(x))\ dx = \frac{1}{2}\left(\log(x)^2-2\log(x)+2\right)x(\log(3)+1)\log(2)-2(x\log(x)-x)(\log(3)+1)\log(2)-\frac{1}{2}\left(5x^2+\left(x^2-3x\right)\log(3)-3x\right)\log(2)$$

input
```
integrate(1/2*(log(3)+1)*log(2)*log(x)^2+1/2*(-4*log(3)-4)*log(2)*log(x)+1
/2*((3-2*x)*log(3)-10*x+3)*log(2),x, algorithm=\
```

output
```
1/2*(log(x)^2 - 2*log(x) + 2)*x*(log(3) + 1)*log(2) - 2*(x*log(x) - x)*(lo
g(3) + 1)*log(2) - 1/2*(5*x^2 + (x^2 - 3*x)*log(3) - 3*x)*log(2)
```

3.377.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(24) = 48$.

Time = 0.26 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.25

$$\int \frac{1}{4}((3-10x+(3-2x)\log(3))\log(4)+(-4-4\log(3))\log(4)\log(x)+(1+\log(3))\log(4)\log^2(x))\,dx = \frac{1}{2}\left(x\log\left(x\right)^2-2\,x\log\left(x\right)+2\,x\right)(\log\left(3\right)+1)\log\left(2\right)-2\left(x\log\left(x\right)-x\right)(\log\left(3\right)+1)\log\left(2\right)-\frac{1}{2}\left(5\,x^2+\left(x^2-3\,x\right)\log\left(3\right)-3\,x\right)\log\left(2\right)$$

input
```
integrate(1/2*(log(3)+1)*log(2)*log(x)^2+1/2*(-4*log(3)-4)*log(2)*log(x)+1
/2*((3-2*x)*log(3)-10*x+3)*log(2),x, algorithm=\
```

output
```
1/2*(x*log(x)^2 - 2*x*log(x) + 2*x)*(log(3) + 1)*log(2) - 2*(x*log(x) - x)
*(log(3) + 1)*log(2) - 1/2*(5*x^2 + (x^2 - 3*x)*log(3) - 3*x)*log(2)
```

3.377.9 Mupad [B] (verification not implemented)

Time = 13.73 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.96

$$\int \frac{1}{4}((3-10x+(3-2x)\log(3))\log(4)+(-4-4\log(3))\log(4)\log(x)+(1+\log(3))\log(4)\log^2(x))\,dx = x\left(\frac{9\,\ln\left(2\right)\,\left(\ln\left(3\right)+1\right)}{2}-\frac{\ln\left(x\right)\,\left(6\,\ln\left(2\right)+6\,\ln\left(2\right)\,\ln\left(3\right)\right)}{2}+\frac{\ln\left(2\right)\,{\ln\left(x\right)}^2\,\left(\ln\left(3\right)+1\right)}{2}\right)-x^2\left(\frac{\ln\left(32\right)}{2}+\frac{\ln\left(2\right)\,\ln\left(3\right)}{2}\right)$$

input
```
int((log(2)*log(x)^2*(log(3) + 1))/2 - (log(2)*log(x)*(4*log(3) + 4))/2 -
(log(2)*(10*x + log(3)*(2*x - 3) - 3))/2,x)
```

output
```
x*((9*log(2)*(log(3) + 1))/2 - (log(x)*(6*log(2) + 6*log(2)*log(3)))/2 + (
log(2)*log(x)^2*(log(3) + 1))/2) - x^2*(log(32)/2 + (log(2)*log(3))/2)
```

3.378 $\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right.}$

3.378.1 Optimal result

Integrand size = 149, antiderivative size = 25

$$\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx = \frac{\log\left(\log\left(7-e^{-\frac{1}{x}+\frac{6+x}{9}}\right)\right)}{x}$$

output
```
ln(ln(7-exp(2/3-1/x+1/9*x)))/x
```

3.378.2 Mathematica [A] (verified)

Time = 1.73 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx = \frac{\log\left(\log\left(7-e^{\frac{2}{3}-\frac{1}{x}+\frac{x}{9}}\right)\right)}{x}$$

3.378. $\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx$

input
```
Integrate[(E^((-9 + 6*x + x^2)/(9*x))*(9 + x^2) + (63*x - 9*E^((-9 + 6*x +
 x^2)/(9*x))*x)*Log[7 - E^((-9 + 6*x + x^2)/(9*x))]*Log[Log[7 - E^((-9 + 6
*x + x^2)/(9*x))]])/((-63*x^3 + 9*E^((-9 + 6*x + x^2)/(9*x))*x^3)*Log[7 -
E^((-9 + 6*x + x^2)/(9*x))]),x]
```

output
```
Log[Log[7 - E^(2/3 - x^(-1) + x/9)]]/x
```

3.378.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{x^2+6x-9}{9x}}\left(x^2+9\right)+\left(63x-9e^{\frac{x^2+6x-9}{9x}}x\right)\log\left(7-e^{\frac{x^2+6x-9}{9x}}\right)\log\left(\log\left(7-e^{\frac{x^2+6x-9}{9x}}\right)\right)}{\left(9e^{\frac{x^2+6x-9}{9x}}x^3-63x^3\right)\log\left(7-e^{\frac{x^2+6x-9}{9x}}\right)}dx$$

$$\Big\downarrow \ 7239$$

$$\int \left(\frac{e^{\frac{x}{9}+\frac{2}{3}}\left(x^2+9\right)}{9\left(e^{\frac{x+6}{9}}-7e^{\frac{1}{x}}\right)x^3\log\left(7-e^{\frac{1}{9}\left(x-\frac{9}{x}+6\right)}\right)}-\frac{\log\left(\log\left(7-e^{\frac{1}{9}\left(x-\frac{9}{x}+6\right)}\right)\right)}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\int \frac{e^{\frac{x}{9}+\frac{2}{3}}}{\left(e^{\frac{x}{9}+\frac{2}{3}}-7e^{\frac{1}{x}}\right)x^3\log\left(7-e^{\frac{1}{9}\left(x+6-\frac{9}{x}\right)}\right)}dx-\int \frac{\log\left(\log\left(7-e^{\frac{1}{9}\left(x+6-\frac{9}{x}\right)}\right)\right)}{x^2}dx+\frac{1}{9}\int \frac{e^{\frac{x}{9}+\frac{2}{3}}}{\left(e^{\frac{x}{9}+\frac{2}{3}}-7e^{\frac{1}{x}}\right)x\log\left(7-e^{\frac{1}{9}\left(x+6-\frac{9}{x}\right)}\right)}dx$$

input
```
Int[(E^((-9 + 6*x + x^2)/(9*x))*(9 + x^2) + (63*x - 9*E^((-9 + 6*x + x^2)/
(9*x))*x)*Log[7 - E^((-9 + 6*x + x^2)/(9*x))]*Log[Log[7 - E^((-9 + 6*x + x
^2)/(9*x))]])/((-63*x^3 + 9*E^((-9 + 6*x + x^2)/(9*x))*x^3)*Log[7 - E^((-9
 + 6*x + x^2)/(9*x))]),x]
```

output
```
$Aborted
```

3.378. $\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}dx$

3.378.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.378.4 Maple [A] (verified)

Time = 1.88 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{\ln\left(\ln\left(-{\mathrm e}^{\frac{x^{2}+6x-9}{9x}}+7\right)\right)}{x}$	25
parallelrisch	$\frac{\ln\left(\ln\left(-{\mathrm e}^{\frac{x^{2}+6x-9}{9x}}+7\right)\right)}{x}$	25

input
```
int(((-9*x*exp(1/9*(x^2+6*x-9)/x)+63*x)*ln(-exp(1/9*(x^2+6*x-9)/x)+7)*ln(l
n(-exp(1/9*(x^2+6*x-9)/x)+7))+(x^2+9)*exp(1/9*(x^2+6*x-9)/x))/(9*x^3*exp(1
/9*(x^2+6*x-9)/x)-63*x^3)/ln(-exp(1/9*(x^2+6*x-9)/x)+7),x,method=_RETURNVE
RBOSE)
```

output
```
1/x*ln(ln(-exp(1/9*(x^2+6*x-9)/x)+7))
```

3.378.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx$$
$$=\frac{\log\left(\log\left(-e^{\left(\frac{x^2+6\,x-9}{9\,x}\right)}+7\right)\right)}{x}$$

input
```
integrate(((-9*x*exp(1/9*(x^2+6*x-9)/x)+63*x)*log(-exp(1/9*(x^2+6*x-9)/x)+
7)*log(log(-exp(1/9*(x^2+6*x-9)/x)+7))+(x^2+9)*exp(1/9*(x^2+6*x-9)/x))/(9*
x^3*exp(1/9*(x^2+6*x-9)/x)-63*x^3)/log(-exp(1/9*(x^2+6*x-9)/x)+7),x, algor
ithm=\
```

output
```
log(log(-e^(1/9*(x^2 + 6*x - 9)/x) + 7))/x
```

3.378.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx$$
$$=\frac{\log\left(\log\left(7-e^{\frac{\frac{x^2}{9}+\frac{2x}{3}-1}{x}}\right)\right)}{x}$$

input
```
integrate(((-9*x*exp(1/9*(x**2+6*x-9)/x)+63*x)*ln(-exp(1/9*(x**2+6*x-9)/x)
+7)*ln(ln(-exp(1/9*(x**2+6*x-9)/x)+7))+(x**2+9)*exp(1/9*(x**2+6*x-9)/x))/(
9*x**3*exp(1/9*(x**2+6*x-9)/x)-63*x**3)/ln(-exp(1/9*(x**2+6*x-9)/x)+7),x)
```

output
```
log(log(7 - exp((x**2/9 + 2*x/3 - 1)/x)))/x
```

3.378.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

$$\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx$$
$$=\frac{\log\left(x\log\left(-e^{\left(\frac{1}{9}x+\frac{2}{3}\right)}+7e^{\frac{1}{x}}\right)-1\right)-\log\left(x\right)}{x}$$

input
```
integrate(((-9*x*exp(1/9*(x^2+6*x-9)/x)+63*x)*log(-exp(1/9*(x^2+6*x-9)/x)+
7)*log(log(-exp(1/9*(x^2+6*x-9)/x)+7))+(x^2+9)*exp(1/9*(x^2+6*x-9)/x))/(9*
x^3*exp(1/9*(x^2+6*x-9)/x)-63*x^3)/log(-exp(1/9*(x^2+6*x-9)/x)+7),x, algor
ithm=\
```

output
```
(log(x*log(-e^(1/9*x + 2/3) + 7*e^(1/x)) - 1) - log(x))/x
```

3.378.8 Giac [F]

$$\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx$$
$$=\int -\frac{9\left(xe^{\left(\frac{x^2+6\,x-9}{9\,x}\right)}-7\,x\right)\log\left(-e^{\left(\frac{x^2+6\,x-9}{9\,x}\right)}+7\right)\log\left(\log\left(-e^{\left(\frac{x^2+6\,x-9}{9\,x}\right)}+7\right)\right)-(x^2+9)e^{\left(\frac{x^2+6\,x-9}{9\,x}\right)}}{9\left(x^3e^{\left(\frac{x^2+6\,x-9}{9\,x}\right)}-7\,x^3\right)\log\left(-e^{\left(\frac{x^2+6\,x-9}{9\,x}\right)}+7\right)}\,dx$$

input
```
integrate(((-9*x*exp(1/9*(x^2+6*x-9)/x)+63*x)*log(-exp(1/9*(x^2+6*x-9)/x)+
7)*log(log(-exp(1/9*(x^2+6*x-9)/x)+7))+(x^2+9)*exp(1/9*(x^2+6*x-9)/x))/(9*
x^3*exp(1/9*(x^2+6*x-9)/x)-63*x^3)/log(-exp(1/9*(x^2+6*x-9)/x)+7),x, algor
ithm=\
```

output
```
integrate(-1/9*(9*(x*e^(1/9*(x^2 + 6*x - 9)/x) - 7*x)*log(-e^(1/9*(x^2 + 6
*x - 9)/x) + 7)*log(log(-e^(1/9*(x^2 + 6*x - 9)/x) + 7)) - (x^2 + 9)*e^(1/
9*(x^2 + 6*x - 9)/x))/((x^3*e^(1/9*(x^2 + 6*x - 9)/x) - 7*x^3)*log(-e^(1/9
*(x^2 + 6*x - 9)/x) + 7)), x)
```

3.378.9 Mupad [B] (verification not implemented)

Time = 14.58 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx$$
$$=\frac{\ln\left(\ln\left(7-\mathrm{e}^{x/9}\,\mathrm{e}^{2/3}\,\mathrm{e}^{-\frac{1}{x}}\right)\right)}{x}$$

input
```
int((exp(((2*x)/3 + x^2/9 - 1)/x)*(x^2 + 9) + log(7 - exp(((2*x)/3 + x^2/9
 - 1)/x))*log(log(7 - exp(((2*x)/3 + x^2/9 - 1)/x)))*(63*x - 9*x*exp(((2*x
)/3 + x^2/9 - 1)/x)))/(log(7 - exp(((2*x)/3 + x^2/9 - 1)/x))*(9*x^3*exp(((
2*x)/3 + x^2/9 - 1)/x) - 63*x^3)),x)
```

output
```
log(log(7 - exp(x/9)*exp(2/3)*exp(-1/x)))/x
```

3.378. $$\int \frac{e^{\frac{-9+6x+x^2}{9x}}(9+x^2)+\left(63x-9e^{\frac{-9+6x+x^2}{9x}}x\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\log\left(\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)\right)}{\left(-63x^3+9e^{\frac{-9+6x+x^2}{9x}}x^3\right)\log\left(7-e^{\frac{-9+6x+x^2}{9x}}\right)}\,dx$$

3.379 $\int \frac{2+4x}{e^2(5x^2+10x^3+5x^4)}\,dx$

3.379.1 Optimal result

Integrand size = 27, antiderivative size = 21

$$\int \frac{2+4x}{e^2\left(5x^2+10x^3+5x^4\right)}\,dx=\frac{2x}{5e^2\left(x-x\left(1+x+x^2\right)\right)}$$

output
```
2*x/exp(2)/(5*x-5*x*(x^2+x+1))
```

3.379.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{2+4x}{e^2\left(5x^2+10x^3+5x^4\right)}\,dx=\frac{2\left(-\frac{1}{x}+\frac{1}{1+x}\right)}{5e^2}$$

input
```
Integrate[(2 + 4*x)/(E^2*(5*x^2 + 10*x^3 + 5*x^4)),x]
```

output
```
(2*(-x^(-1) + (1 + x)^(-1)))/(5*E^2)
```

3.379.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185, Rules used = {27, 27, 1979, 1184, 83}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x+2}{e^2 (5x^4+10x^3+5x^2)} \, dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\int \frac{2(2x+1)}{5(x^4+2x^3+x^2)}dx}{e^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{2\int \frac{2x+1}{x^4+2x^3+x^2}dx}{5e^2}$$

$$\Big\downarrow \text{ 1979}$$

$$\frac{2\int \frac{2x+1}{x^2(x^2+2x+1)}dx}{5e^2}$$

$$\Big\downarrow \text{ 1184}$$

$$\frac{2\int \frac{2x+1}{x^2(x+1)^2}dx}{5e^2}$$

$$\Big\downarrow \text{ 83}$$

$$-\frac{2}{5e^2x(x+1)}$$

input
```
Int[(2 + 4*x)/(E^2*(5*x^2 + 10*x^3 + 5*x^4)),x]
```

output
```
-2/(5*E^2*x*(1 + x))
```

3.379.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 83
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] /; FreeQ[{a, b, c, d, e, f, n, p}, x] && NeQ[n + p + 2, 0] && EqQ[a*d*f
*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)), 0]
```

rule 1184
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_) + (b_.)*(x_
) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/c^p   Int[(d + e*x)^m*(f + g*x
)^n*(b/2 + c*x)^(2*p), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x] && E
qQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 1979
```
Int[((c_.)*(x_)^(j_.) + (b_.)*(x_)^(n_.) + (a_.)*(x_)^(q_.))^(p_.)*((A_) +
(B_.)*(x_)^(r_.)), x_Symbol] :> Int[x^(p*q)*(A + B*x^(n - q))*(a + b*x^(n -
 q) + c*x^(2*(n - q)))^p, x] /; FreeQ[{a, b, c, A, B, n, q}, x] && EqQ[r, n
 - q] && EqQ[j, 2*n - q] && IntegerQ[p] && PosQ[n - q]
```

3.379.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.62

method	result	size
risch	$-\frac{2\,e^{-2}}{5x(1+x)}$	13
gosper	$-\frac{2\,e^{-2}}{5x(1+x)}$	15
norman	$-\frac{2\,e^{-2}}{5x(1+x)}$	15
parallelrisch	$-\frac{2\,e^{-2}}{5x(1+x)}$	15
default	$\frac{2\,e^{-2}\left(-\frac{1}{x}+\frac{1}{1+x}\right)}{5}$	18

input
```
int((4*x+2)/(5*x^4+10*x^3+5*x^2)/exp(2),x,method=_RETURNVERBOSE)
```

output
```
-2/5/x*exp(-2)/(1+x)
```

3.379.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.52

$$\int \frac{2+4x}{e^2(5x^2+10x^3+5x^4)}\,dx = -\frac{2\,e^{(-2)}}{5\,(x^2+x)}$$

input
```
integrate((4*x+2)/(5*x^4+10*x^3+5*x^2)/exp(2),x, algorithm=\
```

output
```
-2/5*e^(-2)/(x^2 + x)
```

3.379.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{2+4x}{e^2(5x^2+10x^3+5x^4)}\,dx = -\frac{2}{5x^2e^2+5xe^2}$$

input
```
integrate((4*x+2)/(5*x**4+10*x**3+5*x**2)/exp(2),x)
```

output
```
-2/(5*x**2*exp(2) + 5*x*exp(2))
```

3.379.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.52

$$\int \frac{2+4x}{e^2(5x^2+10x^3+5x^4)}\,dx = -\frac{2\,e^{(-2)}}{5\,(x^2+x)}$$

input
```
integrate((4*x+2)/(5*x^4+10*x^3+5*x^2)/exp(2),x, algorithm=\
```

output
```
-2/5*e^(-2)/(x^2 + x)
```

3.379.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.52

$$\int \frac{2+4x}{e^2(5x^2+10x^3+5x^4)}\,dx = -\frac{2\,e^{(-2)}}{5\,(x^2+x)}$$

input
```
integrate((4*x+2)/(5*x^4+10*x^3+5*x^2)/exp(2),x, algorithm=\
```

output
```
-2/5*e^(-2)/(x^2 + x)
```

3.379.9 Mupad [B] (verification not implemented)

Time = 14.49 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.57

$$\int \frac{2+4x}{e^2(5x^2+10x^3+5x^4)}\,dx = -\frac{2\,\mathrm{e}^{-2}}{5\,x\,(x+1)}$$

input
```
int((exp(-2)*(4*x + 2))/(5*x^2 + 10*x^3 + 5*x^4),x)
```

output
```
-(2*exp(-2))/(5*x*(x + 1))
```

3.380 $\int \frac{-15+30x+45\log(5)}{e^2}\,dx$

3.380.1 Optimal result

Integrand size = 13, antiderivative size = 13

$$\int \frac{-15+30x+45\log(5)}{e^2}\,dx=\frac{15x(-1+x+3\log(5))}{e^2}$$

output
```
3*x/exp(2)*(15*ln(5)+5*x-5)
```

3.380.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

$$\int \frac{-15+30x+45\log(5)}{e^2}\,dx=\frac{15(-x+x^2+x\log(125))}{e^2}$$

input
```
Integrate[(-15 + 30*x + 45*Log[5])/E^2,x]
```

output
```
(15*(-x + x^2 + x*Log[125]))/E^2
```

3.380.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.38, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{30x-15+45\log(5)}{e^2}\,dx$$

$$\Big\downarrow \; 17$$

$$\frac{15(-2x+1-3\log(5))^2}{4e^2}$$

input
```
Int[(-15 + 30*x + 45*Log[5])/E^2,x]
```

output
```
(15*(1 - 2*x - 3*Log[5])^2)/(4*E^2)
```

3.380.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.380.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.15

method	result	size
gosper	$15x(x+3\ln(5)-1)\,\mathrm{e}^{-2}$	15
default	$15\,\mathrm{e}^{-2}(3x\ln(5)+x^2-x)$	19
parallelrisch	$\mathrm{e}^{-2}(15x^2+(45\ln(5)-15)\,x)$	20
risch	$45\ln(5)\,\mathrm{e}^{-2}x+15\,\mathrm{e}^{-2}x^2-15x\,\mathrm{e}^{-2}$	21
norman	$15\,\mathrm{e}^{-2}x^2+15(3\ln(5)-1)\,\mathrm{e}^{-2}x$	24

input
```
int((45*ln(5)+30*x-15)/exp(2),x,method=_RETURNVERBOSE)
```

output
```
15*x*(x+3*ln(5)-1)/exp(2)
```

3.380.5 Fricas [A] (verification not implemented)

Time = 0.50 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

$$\int \frac{-15+30x+45\log(5)}{e^2}\,dx = 15\left(x^2+3\,x\log(5)-x\right)e^{(-2)}$$

input
```
integrate((45*log(5)+30*x-15)/exp(2),x, algorithm=\
```

output
```
15*(x^2 + 3*x*log(5) - x)*e^(-2)
```

3.380.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.46

$$\int \frac{-15+30x+45\log(5)}{e^2}\,dx = \frac{15x^2}{e^2}+\frac{x(-15+45\log(5))}{e^2}$$

input
```
integrate((45*ln(5)+30*x-15)/exp(2),x)
```

output
```
15*x**2*exp(-2) + x*(-15 + 45*log(5))*exp(-2)
```

3.380.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

$$\int \frac{-15+30x+45\log(5)}{e^2}\,dx = 15\left(x^2+3\,x\log(5)-x\right)e^{(-2)}$$

input
```
integrate((45*log(5)+30*x-15)/exp(2),x, algorithm=\
```

output
```
15*(x^2 + 3*x*log(5) - x)*e^(-2)
```

3.380.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

$$\int \frac{-15+30x+45\log(5)}{e^2}\,dx = 15\left(x^2+3\,x\log\left(5\right)-x\right)e^{(-2)}$$

input
```
integrate((45*log(5)+30*x-15)/exp(2),x, algorithm=\
```

output
```
15*(x^2 + 3*x*log(5) - x)*e^(-2)
```

3.380.9 Mupad [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.15

$$\int \frac{-15+30x+45\log(5)}{e^2}\,dx = \frac{\mathrm{e}^{-2}\left(30\,x+45\,\ln\left(5\right)-15\right)^2}{60}$$

input
```
int(exp(-2)*(30*x + 45*log(5) - 15),x)
```

output
```
(exp(-2)*(30*x + 45*log(5) - 15)^2)/60
```

3.381 $\int \frac{1}{25}(25 - 1350x - 1000e^4x - 300e^8x - 40e^{12}x - 2e$

3.381.1 Optimal result

Integrand size = 38, antiderivative size = 22

$$\int \frac{1}{25}\left(25 - 1350x - 1000e^4x - 300e^8x - 40e^{12}x - 2e^{16}x - 75x^2\right)\,dx = 4 + x - x^2\left(2 + \frac{1}{25}\left(5 + e^4\right)^4 + x\right)$$

output
```
4+x-x^2*(1/25*(5+exp(4))^4+2+x)
```

3.381.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int \frac{1}{25}\left(25 - 1350x - 1000e^4x - 300e^8x - 40e^{12}x - 2e^{16}x - 75x^2\right)\,dx = x - \frac{1}{25}\left(675 + 500e^4 + 150e^8 + 20e^{12} + e^{16}\right)x^2 - x^3$$

input
```
Integrate[(25 - 1350*x - 1000*E^4*x - 300*E^8*x - 40*E^12*x - 2*E^16*x - 7
5*x^2)/25,x]
```

output
```
x - ((675 + 500*E^4 + 150*E^8 + 20*E^12 + E^16)*x^2)/25 - x^3
```

3.381.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.73, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {6, 6, 6, 6, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{25}\left(-75x^2-2e^{16}x-40e^{12}x-300e^8x-1000e^4x-1350x+25\right)dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{1}{25}\left(-75x^2+\left(-1350-1000e^4\right)x-2e^{16}x-40e^{12}x-300e^8x+25\right)dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{1}{25}\left(-75x^2+\left(-300e^8-40e^{12}\right)x+\left(-1350-1000e^4\right)x-2e^{16}x+25\right)dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{1}{25}\left(-75x^2+\left(-1350-1000e^4-2e^{16}\right)x+\left(-300e^8-40e^{12}\right)x+25\right)dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{1}{25}\left(-75x^2+\left(-1350-1000e^4-300e^8-40e^{12}-2e^{16}\right)x+25\right)dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{25}\int \left(-75x^2-2\left(675+500e^4+150e^8+20e^{12}+e^{16}\right)x+25\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{25}\left(-25x^3-\left(675+500e^4+150e^8+20e^{12}+e^{16}\right)x^2+25x\right)$$

input
```
Int[(25 - 1350*x - 1000*E^4*x - 300*E^8*x - 40*E^12*x - 2*E^16*x - 75*x^2)
/25,x]
```

output
```
(25*x - (675 + 500*E^4 + 150*E^8 + 20*E^12 + E^16)*x^2 - 25*x^3)/25
```

3.381.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.381.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

method	result	size
norman	$x+\left(-\frac{e^{16}}{25}-\frac{4\,e^{12}}{5}-6\,e^{8}-20\,e^{4}-27\right)x^{2}-x^{3}$	36
gosper	$-\frac{x\left(x\,e^{16}+20x\,e^{12}+150x\,e^{8}+500x\,e^{4}+25x^{2}+675x-25\right)}{25}$	39
default	$-\frac{x^{2}e^{16}}{25}-\frac{4x^{2}e^{12}}{5}-6x^{2}e^{8}-20x^{2}e^{4}-x^{3}-27x^{2}+x$	47
risch	$-\frac{x^{2}e^{16}}{25}-\frac{4x^{2}e^{12}}{5}-6x^{2}e^{8}-20x^{2}e^{4}-x^{3}-27x^{2}+x$	47
parallelrisch	$-\frac{x^{2}e^{16}}{25}-\frac{4x^{2}e^{12}}{5}-6x^{2}e^{8}-20x^{2}e^{4}-x^{3}-27x^{2}+x$	47
parts	$-\frac{x^{2}e^{16}}{25}-\frac{4x^{2}e^{12}}{5}-6x^{2}e^{8}-20x^{2}e^{4}-x^{3}-27x^{2}+x$	47

input
```
int(-2/25*x*exp(4)^4-8/5*x*exp(4)^3-12*x*exp(4)^2-40*x*exp(4)-3*x^2-54*x+1
,x,method=_RETURNVERBOSE)
```

output
```
x+(-1/25*exp(4)^4-4/5*exp(4)^3-6*exp(4)^2-20*exp(4)-27)*x^2-x^3
```

3.381.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. 2(19) = 38.

Time = 0.43 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.82

$$\int \frac{1}{25}\left(25-1350x-1000e^4x-300e^8x-40e^{12}x-2e^{16}x-75x^2\right)\,dx$$
$$=-x^3-\frac{1}{25}\,x^2e^{16}-\frac{4}{5}\,x^2e^{12}-6\,x^2e^8-20\,x^2e^4-27\,x^2+x$$

input
```
integrate(-2/25*x*exp(4)^4-8/5*x*exp(4)^3-12*x*exp(4)^2-40*x*exp(4)-3*x^2-
54*x+1,x, algorithm=\
```

output
```
-x^3 - 1/25*x^2*e^16 - 4/5*x^2*e^12 - 6*x^2*e^8 - 20*x^2*e^4 - 27*x^2 + x
```

3.381.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.45

$$\int \frac{1}{25}\left(25-1350x-1000e^4x-300e^8x-40e^{12}x-2e^{16}x-75x^2\right)\,dx$$
$$=-x^3+x^2\left(-\frac{e^{16}}{25}-\frac{4e^{12}}{5}-6e^8-20e^4-27\right)+x$$

input
```
integrate(-2/25*x*exp(4)**4-8/5*x*exp(4)**3-12*x*exp(4)**2-40*x*exp(4)-3*x
**2-54*x+1,x)
```

output
```
-x**3 + x**2*(-exp(16)/25 - 4*exp(12)/5 - 6*exp(8) - 20*exp(4) - 27) + x
```

3.381.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. 2(19) = 38.

Time = 0.21 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.82

$$\int \frac{1}{25}\left(25-1350x-1000e^4x-300e^8x-40e^{12}x-2e^{16}x-75x^2\right)\,dx$$
$$=-x^3-\frac{1}{25}\,x^2e^{16}-\frac{4}{5}\,x^2e^{12}-6\,x^2e^8-20\,x^2e^4-27\,x^2+x$$

input
```
integrate(-2/25*x*exp(4)^4-8/5*x*exp(4)^3-12*x*exp(4)^2-40*x*exp(4)-3*x^2-
54*x+1,x, algorithm=\
```

output
```
-x^3 - 1/25*x^2*e^16 - 4/5*x^2*e^12 - 6*x^2*e^8 - 20*x^2*e^4 - 27*x^2 + x
```

3.381.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. $2(19) = 38$.

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.82

$$\int \frac{1}{25}\left(25 - 1350x - 1000e^4x - 300e^8x - 40e^{12}x - 2e^{16}x - 75x^2\right) dx$$
$$= -x^3 - \frac{1}{25}x^2e^{16} - \frac{4}{5}x^2e^{12} - 6x^2e^8 - 20x^2e^4 - 27x^2 + x$$

input
```
integrate(-2/25*x*exp(4)^4-8/5*x*exp(4)^3-12*x*exp(4)^2-40*x*exp(4)-3*x^2-
54*x+1,x, algorithm=\
```

output
```
-x^3 - 1/25*x^2*e^16 - 4/5*x^2*e^12 - 6*x^2*e^8 - 20*x^2*e^4 - 27*x^2 + x
```

3.381.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int \frac{1}{25}\left(25 - 1350x - 1000e^4x - 300e^8x - 40e^{12}x - 2e^{16}x - 75x^2\right) dx$$
$$= -x^3 + \left(-20\,\mathrm{e}^4 - 6\,\mathrm{e}^8 - \frac{4\,\mathrm{e}^{12}}{5} - \frac{\mathrm{e}^{16}}{25} - 27\right)x^2 + x$$

input
```
int(1 - 40*x*exp(4) - 12*x*exp(8) - (8*x*exp(12))/5 - (2*x*exp(16))/25 - 3
*x^2 - 54*x,x)
```

output
```
x - x^2*(20*exp(4) + 6*exp(8) + (4*exp(12))/5 + exp(16)/25 + 27) - x^3
```

3.382 $\int \left(20x^3+9e^{10-2e^x-2x}(10x-10x^2-10e^x x^2)+3e^{5-e^x-x}(30x^2-10x^3-10e^x x^3)\right) dx$

3.382.1 Optimal result

Integrand size = 70, antiderivative size = 25

$$\int \left(20x^3+9e^{10-2e^x-2x}\left(10x-10x^2-10e^x x^2\right)+3e^{5-e^x-x}\left(30x^2-10x^3-10e^x x^3\right)\right) dx = 5\left(-3e^{5-e^x-x}x-x^2\right)^2$$

output
```
5*(-x^2-x*exp(-exp(x)+ln(3)-x+5))^2
```

3.382.2 Mathematica [A] (verified)

Time = 0.95 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

$$\int \left(20x^3+9e^{10-2e^x-2x}\left(10x-10x^2-10e^x x^2\right)+3e^{5-e^x-x}\left(30x^2-10x^3-10e^x x^3\right)\right) dx = 5e^{-2(e^x+x)}x^2\left(3e^5+e^{e^x+x}x\right)^2$$

input
```
Integrate[20*x^3 + 9*E^(10 - 2*E^x - 2*x)*(10*x - 10*x^2 - 10*E^x*x^2) + 3
*E^(5 - E^x - x)*(30*x^2 - 10*x^3 - 10*E^x*x^3),x]
```

output
```
(5*x^2*(3*E^5 + E^(E^x + x)*x)^2)/E^(2*(E^x + x))
```

3.382.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 70 vs. $2(25) = 50$.

Time = 0.26 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.80, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.014$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(20x^3 + 9e^{-2x-2e^x+10}\left(-10e^x x^2 - 10x^2 + 10x\right) + 3e^{-x-e^x+5}\left(-10e^x x^3 - 10x^3 + 30x^2\right)\right) dx$$

$$\Big\downarrow \text{2009}$$

$$5x^4 + \frac{30e^{-x-e^x+5}\left(e^x x^3 + x^3\right)}{e^x+1} + \frac{45e^{-2x-2e^x+10}\left(e^x x^2 + x^2\right)}{e^x+1}$$

input
```
Int[20*x^3 + 9*E^(10 - 2*E^x - 2*x)*(10*x - 10*x^2 - 10*E^x*x^2) + 3*E^(5
- E^x - x)*(30*x^2 - 10*x^3 - 10*E^x*x^3),x]
```

output
```
5*x^4 + (45*E^(10 - 2*E^x - 2*x)*(x^2 + E^x*x^2))/(1 + E^x) + (30*E^(5 - E
^x - x)*(x^3 + E^x*x^3))/(1 + E^x)
```

3.382.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.382.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.48

method	result	size
risch	$45\,\mathrm{e}^{-2\,\mathrm{e}^{x}+10-2x} x^2 + 30\,\mathrm{e}^{-\mathrm{e}^{x}+5-x} x^3 + 5x^4$	37
default	$45\,\mathrm{e}^{-2\,\mathrm{e}^{x}+10-2x} x^2 + 10\,\mathrm{e}^{-\mathrm{e}^{x}+\ln(3)-x+5} x^3 + 5x^4$	43
norman	$45\,\mathrm{e}^{-2\,\mathrm{e}^{x}+10-2x} x^2 + 10\,\mathrm{e}^{-\mathrm{e}^{x}+\ln(3)-x+5} x^3 + 5x^4$	43
parallelrisch	$45\,\mathrm{e}^{-2\,\mathrm{e}^{x}+10-2x} x^2 + 10\,\mathrm{e}^{-\mathrm{e}^{x}+\ln(3)-x+5} x^3 + 5x^4$	43

input
```
int((-10*exp(x)*x^2-10*x^2+10*x)*exp(-exp(x)+ln(3)-x+5)^2+(-10*exp(x)*x^3-
10*x^3+30*x^2)*exp(-exp(x)+ln(3)-x+5)+20*x^3,x,method=_RETURNVERBOSE)
```

output
```
45*exp(-2*exp(x)+10-2*x)*x^2+30*exp(-exp(x)+5-x)*x^3+5*x^4
```

3.382.5 Fricas [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.68

$$\int \left(20x^3 + 9e^{10-2e^x-2x}\left(10x - 10x^2 - 10e^x x^2\right) + 3e^{5-e^x-x}\left(30x^2 - 10x^3 - 10e^x x^3\right)\right) dx$$
$$= 5\,x^4 + 10\,x^3 e^{\left(-x-e^x+\log(3)+5\right)} + 5\,x^2 e^{\left(-2\,x-2\,e^x+2\,\log(3)+10\right)}$$

input
```
integrate((-10*exp(x)*x^2-10*x^2+10*x)*exp(-exp(x)+log(3)-x+5)^2+(-10*exp(
x)*x^3-10*x^3+30*x^2)*exp(-exp(x)+log(3)-x+5)+20*x^3,x, algorithm=\
```

output
```
5*x^4 + 10*x^3*e^(-x - e^x + log(3) + 5) + 5*x^2*e^(-2*x - 2*e^x + 2*log(3
) + 10)
```

3.382.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

$$\int \left(20x^3 + 9e^{10-2e^x-2x}\left(10x - 10x^2 - 10e^x x^2\right) + 3e^{5-e^x-x}\left(30x^2 - 10x^3 - 10e^x x^3\right)\right) dx$$
$$= 5x^4 + 30x^3 e^{-x-e^x+5} + 45x^2 e^{-2x-2e^x+10}$$

input
```
integrate((-10*exp(x)*x**2-10*x**2+10*x)*exp(-exp(x)+ln(3)-x+5)**2+(-10*ex
p(x)*x**3-10*x**3+30*x**2)*exp(-exp(x)+ln(3)-x+5)+20*x**3,x)
```

output
```
5*x**4 + 30*x**3*exp(-x - exp(x) + 5) + 45*x**2*exp(-2*x - 2*exp(x) + 10)
```

3.382.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \left(20x^3+9e^{10-2e^x-2x}\left(10x-10x^2-10e^xx^2\right)+3e^{5-e^x-x}\left(30x^2-10x^3-10e^xx^3\right)\right)\,dx$$
$$=5\,x^4+30\,x^3e^{(-x-e^x+5)}+45\,x^2e^{(-2\,x-2\,e^x+10)}$$

input
```
integrate((-10*exp(x)*x^2-10*x^2+10*x)*exp(-exp(x)+log(3)-x+5)^2+(-10*exp(
x)*x^3-10*x^3+30*x^2)*exp(-exp(x)+log(3)-x+5)+20*x^3,x, algorithm=\
```

output
```
5*x^4 + 30*x^3*e^(-x - e^x + 5) + 45*x^2*e^(-2*x - 2*e^x + 10)
```

3.382.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \left(20x^3+9e^{10-2e^x-2x}\left(10x-10x^2-10e^xx^2\right)+3e^{5-e^x-x}\left(30x^2-10x^3-10e^xx^3\right)\right)\,dx$$
$$=5\,x^4+30\,x^3e^{(-x-e^x+5)}+45\,x^2e^{(-2\,x-2\,e^x+10)}$$

input
```
integrate((-10*exp(x)*x^2-10*x^2+10*x)*exp(-exp(x)+log(3)-x+5)^2+(-10*exp(
x)*x^3-10*x^3+30*x^2)*exp(-exp(x)+log(3)-x+5)+20*x^3,x, algorithm=\
```

output
```
5*x^4 + 30*x^3*e^(-x - e^x + 5) + 45*x^2*e^(-2*x - 2*e^x + 10)
```

3.382.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \left(20x^3+9e^{10-2e^x-2x}\left(10x-10x^2-10e^xx^2\right)+3e^{5-e^x-x}\left(30x^2-10x^3-10e^xx^3\right)\right)\,dx$$
$$=5\,x^2\,\mathrm{e}^{-2\,x-2\,\mathrm{e}^x}\,\left(3\,\mathrm{e}^5+x\,\mathrm{e}^{x+\mathrm{e}^x}\right)^2$$

input
```
int(20*x^3 - exp(log(3) - x - exp(x) + 5)*(10*x^3*exp(x) - 30*x^2 + 10*x^3
) - exp(2*log(3) - 2*x - 2*exp(x) + 10)*(10*x^2*exp(x) - 10*x + 10*x^2),x)
```

output
```
5*x^2*exp(- 2*x - 2*exp(x))*(3*exp(5) + x*exp(x + exp(x)))^2
```

3.383 $\int \frac{e^2+\left(-2x-8x^2+6x^3+e^x(2x+ex)+e\left(-x-4x^2+3x^3\right)\right)\log^2(x)}{x\log^2(x)}\,dx$

3.383.1 Optimal result

Integrand size = 58, antiderivative size = 28

$$\int \frac{e^2+(-2x-8x^2+6x^3+e^x(2x+ex)+e(-x-4x^2+3x^3))\log^2(x)}{x\log^2(x)}\,dx = (2+e)\left(e^x-x+(-2+x)x^2\right)-\frac{e^2}{\log(x)}$$

output
```
(exp(1)+2)*(exp(x)-x+(-2+x)*x^2)-exp(2)/ln(x)
```

3.383.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{e^2+(-2x-8x^2+6x^3+e^x(2x+ex)+e(-x-4x^2+3x^3))\log^2(x)}{x\log^2(x)}\,dx = (2+e)\left(e^x+x\left(-1-2x+x^2\right)\right)-\frac{e^2}{\log(x)}$$

input
```
Integrate[(E^2 + (-2*x - 8*x^2 + 6*x^3 + E^x*(2*x + E*x) + E*(-x - 4*x^2 +
 3*x^3))*Log[x]^2)/(x*Log[x]^2),x]
```

output
```
(2 + E)*(E^x + x*(-1 - 2*x + x^2)) - E^2/Log[x]
```

3.383.3 Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.36, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.034$, Rules used = {7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(6x^3 - 8x^2 + e(3x^3 - 4x^2 - x) - 2x + e^x(ex + 2x))\log^2(x) + e^2}{x\log^2(x)}\,dx$$

$$\Big\downarrow \text{7239}$$

$$\int \left((2+e)\left(3x^2 - 4x + e^x - 1\right) + \frac{e^2}{x\log^2(x)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$(2+e)x^3 - 2(2+e)x^2 - (2+e)x + (2+e)e^x - \frac{e^2}{\log(x)}$$

input
```
Int[(E^2 + (-2*x - 8*x^2 + 6*x^3 + E^x*(2*x + E*x) + E*(-x - 4*x^2 + 3*x^3
))*Log[x]^2)/(x*Log[x]^2),x]
```

output
```
E^x*(2 + E) - (2 + E)*x - 2*(2 + E)*x^2 + (2 + E)*x^3 - E^2/Log[x]
```

3.383.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.383.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.71

method	result	size
default	$-2x+\left(\mathrm{e}+2\right) \mathrm{e}^{x}-\frac{\mathrm{e}^{2}}{\ln \left(x \right)}-4x^{2}+2x^{3}-2x^{2} \mathrm{e}+x^{3} \mathrm{e}-x \,\mathrm{e}$	48
parts	$-2x+\left(\mathrm{e}+2\right) \mathrm{e}^{x}-\frac{\mathrm{e}^{2}}{\ln \left(x \right)}-4x^{2}+2x^{3}-2x^{2} \mathrm{e}+x^{3} \mathrm{e}-x \,\mathrm{e}$	48
risch	$x^{3} \mathrm{e}-2x^{2} \mathrm{e}+2x^{3}-x \,\mathrm{e}+\mathrm{e}^{1+x}-4x^{2}-2x+2 \,\mathrm{e}^{x}-\frac{\mathrm{e}^{2}}{\ln \left(x \right)}$	49
parallelrisch	$-\frac{-x^{3} \mathrm{e} \ln \left(x \right)+2x^{2} \mathrm{e} \ln \left(x \right)-2x^{3} \ln \left(x \right)+x \,\mathrm{e} \ln \left(x \right)-\ln \left(x \right) \mathrm{e}^{x} \mathrm{e}+4x^{2} \ln \left(x \right)+2x \ln \left(x \right)-2 \,\mathrm{e}^{x} \ln \left(x \right)+\mathrm{e}^{2}}{\ln \left(x \right)}$	67

input
```
int((((x*exp(1)+2*x)*exp(x)+(3*x^3-4*x^2-x)*exp(1)+6*x^3-8*x^2-2*x)*ln(x)^
2+exp(2))/x/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
-2*x+(exp(1)+2)*exp(x)-exp(2)/ln(x)-4*x^2+2*x^3-2*x^2*exp(1)+x^3*exp(1)-x*
exp(1)
```

3.383.5 Fricas [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.75

$$\int \frac{e^2+\left(-2x-8x^2+6x^3+e^x(2x+ex)+e\left(-x-4x^2+3x^3\right)\right)\log^2(x)}{x\log^2(x)}\,dx = \frac{{\left(2\,x^{3} - 4\,x^{2} + {\left(x^{3} - 2\,x^{2} - x\right)}e + {\left(e + 2\right)}e^{x} - 2\,x\right)} \log\left(x\right) - e^{2}}{\log\left(x\right)}$$

input
```
integrate((((x*exp(1)+2*x)*exp(x)+(3*x^3-4*x^2-x)*exp(1)+6*x^3-8*x^2-2*x)*
log(x)^2+exp(2))/x/log(x)^2,x, algorithm=\
```

output
```
((2*x^3 - 4*x^2 + (x^3 - 2*x^2 - x)*e + (e + 2)*e^x - 2*x)*log(x) - e^2)/l
og(x)
```

3.383.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{e^2+(-2x-8x^2+6x^3+e^x(2x+ex)+e(-x-4x^2+3x^3))\log^2(x)}{x\log^2(x)}\,dx$$
$$= x^3\cdot(2+e)+x^2(-2e-4)+x(-e-2)+(2+e)\,e^x-\frac{e^2}{\log(x)}$$

input
```
integrate((((x*exp(1)+2*x)*exp(x)+(3*x**3-4*x**2-x)*exp(1)+6*x**3-8*x**2-2
*x)*ln(x)**2+exp(2))/x/ln(x)**2,x)
```

output
```
x**3*(2 + E) + x**2*(-2*E - 4) + x*(-E - 2) + (2 + E)*exp(x) - exp(2)/log(
x)
```

3.383.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.71

$$\int \frac{e^2+(-2x-8x^2+6x^3+e^x(2x+ex)+e(-x-4x^2+3x^3))\log^2(x)}{x\log^2(x)}\,dx$$
$$= x^3e+2\,x^3-2\,x^2e-4\,x^2-xe-2\,x-\frac{e^2}{\log(x)}+e^{(x+1)}+2\,e^x$$

input
```
integrate((((x*exp(1)+2*x)*exp(x)+(3*x^3-4*x^2-x)*exp(1)+6*x^3-8*x^2-2*x)*
log(x)^2+exp(2))/x/log(x)^2,x, algorithm=\
```

output
```
x^3*e + 2*x^3 - 2*x^2*e - 4*x^2 - x*e - 2*x - e^2/log(x) + e^(x + 1) + 2*e
^x
```

3.383.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(27) = 54$.

Time = 0.28 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.36

$$\int \frac{e^2+(-2x-8x^2+6x^3+e^x(2x+ex)+e(-x-4x^2+3x^3))\log^2(x)}{x\log^2(x)}\,dx$$
$$= \frac{x^3e\log(x)+2\,x^3\log(x)-2\,x^2e\log(x)-4\,x^2\log(x)-xe\log(x)-2\,x\log(x)+e^{(x+1)}\log(x)+2\,e^x\log(}{\log(x)}$$

input
```
integrate((((x*exp(1)+2*x)*exp(x)+(3*x^3-4*x^2-x)*exp(1)+6*x^3-8*x^2-2*x)*
log(x)^2+exp(2))/x/log(x)^2,x, algorithm=\
```

output
```
(x^3*e*log(x) + 2*x^3*log(x) - 2*x^2*e*log(x) - 4*x^2*log(x) - x*e*log(x)
- 2*x*log(x) + e^(x + 1)*log(x) + 2*e^x*log(x) - e^2)/log(x)
```

3.383.9 Mupad [B] (verification not implemented)

Time = 13.97 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{e^2+(-2x-8x^2+6x^3+e^x(2x+ex)+e(-x-4x^2+3x^3))\log^2(x)}{x\log^2(x)}\,dx$$
$$= \mathrm{e}^x\,(\mathrm{e}+2)-\frac{\mathrm{e}^2}{\ln(x)}-x^2\,(2\,\mathrm{e}+4)-x\,(\mathrm{e}+2)+x^3\,(\mathrm{e}+2)$$

input
```
int((exp(2) - log(x)^2*(2*x + exp(1)*(x + 4*x^2 - 3*x^3) - exp(x)*(2*x + x
*exp(1)) + 8*x^2 - 6*x^3))/(x*log(x)^2),x)
```

output
```
exp(x)*(exp(1) + 2) - exp(2)/log(x) - x^2*(2*exp(1) + 4) - x*(exp(1) + 2)
+ x^3*(exp(1) + 2)
```

3.384 $\int \frac{-1+7x^2-2x^4-x\log\left(2e^{\frac{1+x^2}{x}}\right)}{3x^3}\,dx$

3.384.1 Optimal result

Integrand size = 36, antiderivative size = 32

$$\int \frac{-1+7x^2-2x^4-x\log\left(2e^{\frac{1+x^2}{x}}\right)}{3x^3}\,dx=-2+\frac{1}{3}\left(-x^2+\frac{x+\log\left(2e^{\frac{1}{x}+x}\right)}{x}\right)+\log\left(x^2\right)$$

output
```
ln(x^2)-1/3*x^2+1/3*(ln(2*exp(x+1/x))+x)/x-2
```

3.384.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.91

$$\int \frac{-1+7x^2-2x^4-x\log\left(2e^{\frac{1+x^2}{x}}\right)}{3x^3}\,dx=-\frac{x^2}{3}+\frac{\log\left(2e^{\frac{1}{x}+x}\right)}{3x}+2\log(x)$$

input
```
Integrate[(-1 + 7*x^2 - 2*x^4 - x*Log[2*E^((1 + x^2)/x)])/(3*x^3),x]
```

output
```
-1/3*x^2 + Log[2*E^(x^(-1) + x)]/(3*x) + 2*Log[x]
```

3.384.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.88, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^4+7x^2-x\log\left(2e^{\frac{x^2+1}{x}}\right)-1}{3x^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\int -\frac{2x^4-7x^2+\log\left(2e^{\frac{x^2+1}{x}}\right)x+1}{x^3}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{3}\int \frac{2x^4-7x^2+\log\left(2e^{\frac{x^2+1}{x}}\right)x+1}{x^3}dx$$

$$\Big\downarrow \text{2010}$$

$$-\frac{1}{3}\int \left(\frac{2x^4-7x^2+1}{x^3}+\frac{\log\left(2e^{x+\frac{1}{x}}\right)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(-x^2+6\log(x)+\frac{\log\left(2e^{x+\frac{1}{x}}\right)}{x}\right)$$

input
```
Int[(-1 + 7*x^2 - 2*x^4 - x*Log[2*E^((1 + x^2)/x)])/(3*x^3),x]
```

output
```
(-x^2 + Log[2*E^(x^(-1) + x)]/x + 6*Log[x])/3
```

3.384.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.384.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.91

method	result	size
default	$\frac{\ln\left(2\,\mathrm{e}^{\frac{x^{2}+1}{x}}\right)}{3x}+2\ln\left(x\right)-\frac{x^{2}}{3}$	29
parts	$\frac{\ln\left(2\,\mathrm{e}^{\frac{x^{2}+1}{x}}\right)}{3x}+2\ln\left(x\right)-\frac{x^{2}}{3}$	29
parallelrisch	$\frac{-x^{4}+6x^{2}\ln(x)+x\ln\left(2\,\mathrm{e}^{\frac{x^{2}+1}{x}}\right)}{3x^{2}}$	34
risch	$\frac{\ln\left(\mathrm{e}^{\frac{x^{2}+1}{x}}\right)}{3x}+\frac{-2x^{3}+12x\ln(x)+2\ln(2)}{6x}$	38
norman	$\frac{-\frac{2x^{3}\ln\left(2\,\mathrm{e}^{\frac{x^{2}+1}{x}}\right)}{3}-\frac{x\ln\left(2\,\mathrm{e}^{\frac{x^{2}+1}{x}}\right)}{3}+\frac{x^{2}\ln\left(2\,\mathrm{e}^{\frac{x^{2}+1}{x}}\right)^{2}}{3}+\frac{1}{3}}{x^{2}}+2\ln\left(x\right)$	66

input
```
int(1/3*(-x*ln(2*exp(1/x*(x^2+1)))-2*x^4+7*x^2-1)/x^3,x,method=_RETURNVERB
OSE)
```

output
```
1/3*ln(2*exp(1/x*(x^2+1)))/x+2*ln(x)-1/3*x^2
```

3.384. $\int\frac{-1+7x^{2}-2x^{4}-x\log\left(2e^{\frac{1+x^{2}}{x}}\right)}{3x^{3}}\,dx$

3.384.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.69

$$\int \frac{-1+7x^2-2x^4-x\log\left(2e^{\frac{1+x^2}{x}}\right)}{3x^3}\,dx = -\frac{x^4-6\,x^2\log\left(x\right)-x\log\left(2\right)-1}{3\,x^2}$$

input
```
integrate(1/3*(-x*log(2*exp(1/x*(x^2+1)))-2*x^4+7*x^2-1)/x^3,x, algorithm=
\
```

output
```
-1/3*(x^4 - 6*x^2*log(x) - x*log(2) - 1)/x^2
```

3.384.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.69

$$\int \frac{-1+7x^2-2x^4-x\log\left(2e^{\frac{1+x^2}{x}}\right)}{3x^3}\,dx = -\frac{x^2}{3}+2\log\left(x\right)-\frac{-x\log\left(2\right)-1}{3x^2}$$

input
```
integrate(1/3*(-x*ln(2*exp(1/x*(x**2+1)))-2*x**4+7*x**2-1)/x**3,x)
```

output
```
-x**2/3 + 2*log(x) - (-x*log(2) - 1)/(3*x**2)
```

3.384.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94

$$\int \frac{-1+7x^2-2x^4-x\log\left(2e^{\frac{1+x^2}{x}}\right)}{3x^3}\,dx = -\frac{1}{3}\,x^2+\frac{\log\left(2\,e^{\left(x+\frac{1}{x}\right)}\right)}{3\,x}-\frac{1}{6}\,\log\left(x^2\right)+\frac{7}{3}\,\log\left(x\right)$$

input
```
integrate(1/3*(-x*log(2*exp(1/x*(x^2+1)))-2*x^4+7*x^2-1)/x^3,x, algorithm=
\
```

output
```
-1/3*x^2 + 1/3*log(2*e^(x + 1/x))/x - 1/6*log(x^2) + 7/3*log(x)
```

3.384.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.69

$$\int \frac{-1+7x^2-2x^4-x\log\left(2e^{\frac{1+x^2}{x}}\right)}{3x^3}\,dx = -\frac{1}{3}\,x^2+\frac{x\log(2)+1}{3\,x^2}+2\,\log(|x|)$$

input
```
integrate(1/3*(-x*log(2*exp(1/x*(x^2+1)))-2*x^4+7*x^2-1)/x^3,x, algorithm=
\
```

output
```
-1/3*x^2 + 1/3*(x*log(2) + 1)/x^2 + 2*log(abs(x))
```

3.384.9 Mupad [B] (verification not implemented)

Time = 14.23 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.66

$$\int \frac{-1+7x^2-2x^4-x\log\left(2e^{\frac{1+x^2}{x}}\right)}{3x^3}\,dx = 2\,\ln(x)-\frac{x^2}{3}+\frac{\frac{x\,\ln(2)}{3}+\frac{1}{3}}{x^2}$$

input
```
int(-((x*log(2*exp((x^2 + 1)/x)))/3 - (7*x^2)/3 + (2*x^4)/3 + 1/3)/x^3,x)
```

output
```
2*log(x) - x^2/3 + ((x*log(2))/3 + 1/3)/x^2
```

3.385 $\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+(512-256x+32$

3.385.1 Optimal result

Integrand size = 73, antiderivative size = 27

$$\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+(512-256x+32x^2)\log(x)\right)}{16x^3-8x^4+x^5}\,dx = -5+\frac{e^{4+2e^{\frac{1}{4-x}}+16\log^2(x)}}{x^2}$$

output
```
exp(4*ln(x)^2)^4/x^2*exp(exp(1/(-x+4))+2)^2-5
```

3.385.2 Mathematica [A] (verified)

Time = 3.18 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+(512-256x+32x^2)\log(x)\right)}{16x^3-8x^4+x^5}\,dx = \frac{e^{2\left(2+e^{\frac{1}{4-x}}+8\log^2(x)\right)}}{x^2}$$

input
```
Integrate[(E^(4 + 2/E^(-4 + x)^(-1) + 16*Log[x]^2)*(-32 + 16*x + (2*x)/E^(
-4 + x)^(-1) - 2*x^2 + (512 - 256*x + 32*x^2)*Log[x]))/(16*x^3 - 8*x^4 + x
^5),x]
```

3.385. $\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+(512-256x+32x^2)\log(x)\right)}{16x^3-8x^4+x^5}\,dx$

output
```
E^(2*(2 + E^(4 - x)^(-1) + 8*Log[x]^2))/x^2
```

3.385.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 86 vs. 2(27) = 54.

Time = 1.08 (sec) , antiderivative size = 86, normalized size of antiderivative = 3.19, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.027, Rules used = {2026, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2e^{-\frac{1}{x-4}}+16\log^2(x)+4}\left(-2x^2+\left(32x^2-256x+512\right)\log(x)+2e^{-\frac{1}{x-4}}x+16x-32\right)}{x^5-8x^4+16x^3}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{2e^{-\frac{1}{x-4}}+16\log^2(x)+4}\left(-2x^2+\left(32x^2-256x+512\right)\log(x)+2e^{-\frac{1}{x-4}}x+16x-32\right)}{x^3\left(x^2-8x+16\right)}dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{e^{2e^{\frac{1}{4-x}}+16\log^2(x)+4}\left(16\left(x^2-8x+16\right)\log(x)+e^{\frac{1}{4-x}}x\right)}{x^3\left(x^2-8x+16\right)\left(\frac{e^{\frac{1}{4-x}}}{(4-x)^2}+\frac{16\log(x)}{x}\right)}$$

input
```
Int[(E^(4 + 2/E^(-4 + x)^(-1) + 16*Log[x]^2)*(-32 + 16*x + (2*x)/E^(-4 + x
)^(-1) - 2*x^2 + (512 - 256*x + 32*x^2)*Log[x]))/(16*x^3 - 8*x^4 + x^5),x]
```

output
```
(E^(4 + 2*E^(4 - x)^(-1) + 16*Log[x]^2)*(E^(4 - x)^(-1)*x + 16*(16 - 8*x +
 x^2)*Log[x]))/(x^3*(16 - 8*x + x^2)*(E^(4 - x)^(-1)/(4 - x)^2 + (16*Log[x
])/x))
```

3.385. $\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+\left(512-256x+32x^2\right)\log(x)\right)}{16x^3-8x^4+x^5}\,dx$

3.385.3.1 Defintions of rubi rules used

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.385.4 Maple [A] (verified)

Time = 190.47 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

method	result	size
risch	$\frac{e^{2 e^{-\frac{1}{x-4}}+4+16 \ln(x)^2}}{x^2}$	24
parallelrisch	$\frac{e^{16 \ln(x)^2} e^{2 e^{-\frac{1}{x-4}}+4}}{x^2}$	27

input
```
int(((32*x^2-256*x+512)*ln(x)+2*x*exp(-1/(x-4))-2*x^2+16*x-32)*exp(exp(-1/
(x-4))+2)^2*exp(4*ln(x)^2)^4/(x^5-8*x^4+16*x^3),x,method=_RETURNVERBOSE)
```

output
```
1/x^2*exp(2*exp(-1/(x-4))+4+16*ln(x)^2)
```

3.385.5 Fricas [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+(512-256x+32x^2)\log(x)\right)}{16x^3-8x^4+x^5}\,dx = \frac{e^{\left(16\,\log(x)^2+2\,e^{\left(-\frac{1}{x-4}\right)}+4\right)}}{x^2}$$

input
```
integrate(((32*x^2-256*x+512)*log(x)+2*x*exp(-1/(x-4))-2*x^2+16*x-32)*exp(
exp(-1/(x-4))+2)^2*exp(4*log(x)^2)^4/(x^5-8*x^4+16*x^3),x, algorithm=\
```

output
```
e^(16*log(x)^2 + 2*e^(-1/(x - 4)) + 4)/x^2
```

3.385.6 Sympy [A] (verification not implemented)

Time = 0.54 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+(512-256x+32x^2)\log(x)\right)}{16x^3-8x^4+x^5}\,dx = \frac{e^{4+2e^{-\frac{1}{x-4}}}e^{16\log(x)^2}}{x^2}$$

input
```
integrate(((32*x**2-256*x+512)*ln(x)+2*x*exp(-1/(x-4))-2*x**2+16*x-32)*exp
(exp(-1/(x-4))+2)**2*exp(4*ln(x)**2)**4/(x**5-8*x**4+16*x**3),x)
```

output
```
exp(4 + 2*exp(-1/(x - 4)))*exp(16*log(x)**2)/x**2
```

3.385.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+(512-256x+32x^2)\log(x)\right)}{16x^3-8x^4+x^5}\,dx = \frac{e^{\left(16\,\log(x)^2+2\,e^{\left(-\frac{1}{x-4}\right)}+4\right)}}{x^2}$$

input
```
integrate(((32*x^2-256*x+512)*log(x)+2*x*exp(-1/(x-4))-2*x^2+16*x-32)*exp(
exp(-1/(x-4))+2)^2*exp(4*log(x)^2)^4/(x^5-8*x^4+16*x^3),x, algorithm=\
```

output
```
e^(16*log(x)^2 + 2*e^(-1/(x - 4)) + 4)/x^2
```

3.385.8 Giac [F]

$$\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+(512-256x+32x^2)\log(x)\right)}{16x^3-8x^4+x^5}\,dx = \int -\frac{2\left(x^2-xe^{\left(-\frac{1}{x-4}\right)}-16\,(x^2-8\,x+16)\log(x)-8\,x+16\right)e^{\left(16\,\log(x)^2+2\,e^{\left(-\frac{1}{x-4}\right)}+4\right)}}{x^5-8\,x^4+16\,x^3}\,dx$$

input
```
integrate(((32*x^2-256*x+512)*log(x)+2*x*exp(-1/(x-4))-2*x^2+16*x-32)*exp(
exp(-1/(x-4))+2)^2*exp(4*log(x)^2)^4/(x^5-8*x^4+16*x^3),x, algorithm=\
```

output
```
integrate(-2*(x^2 - x*e^(-1/(x - 4)) - 16*(x^2 - 8*x + 16)*log(x) - 8*x +
16)*e^(16*log(x)^2 + 2*e^(-1/(x - 4)) + 4)/(x^5 - 8*x^4 + 16*x^3), x)
```

3.385.9 Mupad [B] (verification not implemented)

Time = 14.45 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{e^{4+2e^{-\frac{1}{-4+x}}+16\log^2(x)}\left(-32+16x+2e^{-\frac{1}{-4+x}}x-2x^2+(512-256x+32x^2)\log(x)\right)}{16x^3-8x^4+x^5}\,dx = \frac{e^{16\ln(x)^2}\,e^4\,e^{2\,e^{-\frac{1}{x-4}}}}{x^2}$$

input
```
int((exp(16*log(x)^2)*exp(2*exp(-1/(x - 4)) + 4)*(16*x + log(x)*(32*x^2 -
256*x + 512) + 2*x*exp(-1/(x - 4)) - 2*x^2 - 32))/(16*x^3 - 8*x^4 + x^5),x
)
```

output
```
(exp(16*log(x)^2)*exp(4)*exp(2*exp(-1/(x - 4))))/x^2
```

3.386 $\int \frac{-4x^4+2x^5+\left(16x+8x^2+e^8\left(4x+2x^2\right)+e^4\left(16x+8x^2\right)\right)\log(5)+\left(4x^3-2\right.}{-x^3+x^4+}$

3.386.1 Optimal result

Integrand size = 144, antiderivative size = 23

$$\int \frac{-4x^4+2x^5+\left(16x+8x^2+e^8(4x+2x^2)+e^4(16x+8x^2)\right)\log(5)+\left(4x^3-2x^4+\left(-16+e^4(-16-8x)\right.\right.}{-x^3+x^4+(4x+4e^4x+e^8x)\log(5)}$$
$$=\left(-x+\log\left(-1+x+\frac{(2+e^4)^2\log(5)}{x^2}\right)\right)^2$$

output
```
(ln(ln(5)/x^2*(2+exp(4))^2+x-1)-x)^2
```

3.386.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \frac{-4x^4+2x^5+\left(16x+8x^2+e^8(4x+2x^2)+e^4(16x+8x^2)\right)\log(5)+\left(4x^3-2x^4+\left(-16+e^4(-16-8x)\right.\right.}{-x^3+x^4+(4x+4e^4x+e^8x)\log(5)}$$
$$=\left(x-\log\left(\frac{-x^2+x^3+(2+e^4)^2\log(5)}{x^2}\right)\right)^2$$

$$\int \frac{-4x^4+2x^5+\left(16x+8x^2+e^8\left(4x+2x^2\right)+e^4\left(16x+8x^2\right)\right)\log(5)+\left(4x^3-2x^4+\left(-16+e^4(-16-8x)+e^8(-4-2x)-8x\right)\log(5)\right)\log\left(\frac{-x^2+x^3+\left(4+4e^4+e^8\right.}{x^2}\right.}{}$$

input
```
Integrate[(-4*x^4 + 2*x^5 + (16*x + 8*x^2 + E^8*(4*x + 2*x^2) + E^4*(16*x
+ 8*x^2))*Log[5] + (4*x^3 - 2*x^4 + (-16 + E^4*(-16 - 8*x) + E^8*(-4 - 2*x
) - 8*x)*Log[5])*Log[(-x^2 + x^3 + (4 + 4*E^4 + E^8)*Log[5])/x^2])/(-x^3 +
 x^4 + (4*x + 4*E^4*x + E^8*x)*Log[5]),x]
```

output
```
(x - Log[(-x^2 + x^3 + (2 + E^4)^2*Log[5])/x^2])^2
```

3.386.3 Rubi [A] (verified)

Time = 0.92 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.028, Rules used = {2026, 7292, 27, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^5-4x^4+\left(8x^2+e^8\left(2x^2+4x\right)+e^4\left(8x^2+16x\right)+16x\right)\log(5)+\left(-2x^4+4x^3+\left(e^4(-8x-16)+e^8(-2x-\right.\right.}{x^4-x^3+\left(e^8x+4e^4x+4x\right)\log(5)}$$

$\Big\downarrow$ 2026

$$\int \frac{2x^5-4x^4+\left(8x^2+e^8\left(2x^2+4x\right)+e^4\left(8x^2+16x\right)+16x\right)\log(5)+\left(-2x^4+4x^3+\left(e^4(-8x-16)+e^8(-2x-\right.\right.}{x\left(x^3-x^2+\left(2+e^4\right)^2\log(5)\right)}$$

$\Big\downarrow$ 7292

$$\int \frac{2\left(-x^4+2x^3-\left(2+e^4\right)^2x\log(5)-2\left(2+e^4\right)^2\log(5)\right)\left(x-\log\left(\frac{x^3-x^2+\left(2+e^4\right)^2\log(5)}{x^2}\right)\right)}{x\left(-x^3+x^2-\left(2+e^4\right)^2\log(5)\right)}dx$$

$\Big\downarrow$ 27

$$2\int \frac{\left(-x^4+2x^3-\left(2+e^4\right)^2\log(5)x-2\left(2+e^4\right)^2\log(5)\right)\left(x-\log\left(-\frac{-x^3+x^2-\left(2+e^4\right)^2\log(5)}{x^2}\right)\right)}{x\left(-x^3+x^2-\left(2+e^4\right)^2\log(5)\right)}dx$$

$\Big\downarrow$ 7237

$$\left(x-\log\left(-\frac{-x^3+x^2-\left(2+e^4\right)^2\log(5)}{x^2}\right)\right)^2$$

3.386.

$$\int \frac{-4x^4+2x^5+\left(16x+8x^2+e^8\left(4x+2x^2\right)+e^4\left(16x+8x^2\right)\right)\log(5)+\left(4x^3-2x^4+\left(-16+e^4(-16-8x)+e^8(-4-2x)-8x\right)\log(5)\right)\log\left(\frac{-x^2+x^3+\left(4+4e^4+e^8\right.}{x^2}\right.}{}$$

input
```
Int[(-4*x^4 + 2*x^5 + (16*x + 8*x^2 + E^8*(4*x + 2*x^2) + E^4*(16*x + 8*x^
2))*Log[5] + (4*x^3 - 2*x^4 + (-16 + E^4*(-16 - 8*x) + E^8*(-4 - 2*x) - 8*
x)*Log[5])*Log[(-x^2 + x^3 + (4 + 4*E^4 + E^8)*Log[5])/x^2])/(-x^3 + x^4 +
 (4*x + 4*E^4*x + E^8*x)*Log[5]),x]
```

output
```
(x - Log[-((x^2 - x^3 - (2 + E^4)^2*Log[5])/x^2)])^2
```

3.386.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.386.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(22) = 44$.

Time = 1.59 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.78

method	result	size
norman	$x^2+\ln\left(\frac{\left(e^8+4\,e^4+4\right)\ln(5)+x^3-x^2}{x^2}\right)^2-2x\ln\left(\frac{\left(e^8+4\,e^4+4\right)\ln(5)+x^3-x^2}{x^2}\right)$	64
parallelrisch	$-1+x^2-2x\ln\left(\frac{\left(e^8+4\,e^4+4\right)\ln(5)+x^3-x^2}{x^2}\right)+\ln\left(\frac{\left(e^8+4\,e^4+4\right)\ln(5)+x^3-x^2}{x^2}\right)^2$	65
default	Expression too large to display	1484
parts	Expression too large to display	1484
risch	Expression too large to display	3064

3.386.

$$\int \frac{-4x^4+2x^5+\left(16x+8x^2+e^8\left(4x+2x^2\right)+e^4\left(16x+8x^2\right)\right)\log(5)+\left(4x^3-2x^4+\left(-16+e^4(-16-8x)+e^8(-4-2x)-8x\right)\log(5)\right)\log\left(\frac{-x^2+x^3+\left(4+4e^4+e^8\right.}{x^2}\right.}{\ldots}$$

input
```
int(((((-2*x-4)*exp(4)^2+(-8*x-16)*exp(4)-8*x-16)*ln(5)-2*x^4+4*x^3)*ln(((
exp(4)^2+4*exp(4)+4)*ln(5)+x^3-x^2)/x^2)+((2*x^2+4*x)*exp(4)^2+(8*x^2+16*x
)*exp(4)+8*x^2+16*x)*ln(5)+2*x^5-4*x^4)/((x*exp(4)^2+4*x*exp(4)+4*x)*ln(5)
+x^4-x^3),x,method=_RETURNVERBOSE)
```

output
```
x^2+ln(((exp(4)^2+4*exp(4)+4)*ln(5)+x^3-x^2)/x^2)^2-2*x*ln(((exp(4)^2+4*ex
p(4)+4)*ln(5)+x^3-x^2)/x^2)
```

3.386.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(22) = 44$.

Time = 0.35 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.57

$$\int \frac{-4x^4 + 2x^5 + (16x + 8x^2 + e^8(4x + 2x^2) + e^4(16x + 8x^2))\log(5) + (4x^3 - 2x^4 + (-16 + e^4(-16 - 8x)}{-x^3 + x^4 + (4x + 4e^4x + e^8x)\log(5)}$$
$$= x^2 - 2\,x\log\left(\frac{x^3 - x^2 + (e^8 + 4\,e^4 + 4)\log(5)}{x^2}\right) + \log\left(\frac{x^3 - x^2 + (e^8 + 4\,e^4 + 4)\log(5)}{x^2}\right)^2$$

input
```
integrate(((((-2*x-4)*exp(4)^2+(-8*x-16)*exp(4)-8*x-16)*log(5)-2*x^4+4*x^3
)*log(((exp(4)^2+4*exp(4)+4)*log(5)+x^3-x^2)/x^2)+((2*x^2+4*x)*exp(4)^2+(8
*x^2+16*x)*exp(4)+8*x^2+16*x)*log(5)+2*x^5-4*x^4)/((x*exp(4)^2+4*x*exp(4)+
4*x)*log(5)+x^4-x^3),x, algorithm=\
```

output
```
x^2 - 2*x*log((x^3 - x^2 + (e^8 + 4*e^4 + 4)*log(5))/x^2) + log((x^3 - x^2
 + (e^8 + 4*e^4 + 4)*log(5))/x^2)^2
```

3.386.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(20) = 40$.

Time = 0.13 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.52

$$\int \frac{-4x^4 + 2x^5 + (16x + 8x^2 + e^8(4x + 2x^2) + e^4(16x + 8x^2))\log(5) + (4x^3 - 2x^4 + (-16 + e^4(-16 - 8x)}{-x^3 + x^4 + (4x + 4e^4x + e^8x)\log(5)}$$
$$= x^2 - 2x\log\left(\frac{x^3 - x^2 + (4 + 4e^4 + e^8)\log(5)}{x^2}\right) + \log\left(\frac{x^3 - x^2 + (4 + 4e^4 + e^8)\log(5)}{x^2}\right)^2$$

3.386.

$$\int \frac{-4x^4+2x^5+(16x+8x^2+e^8(4x+2x^2)+e^4(16x+8x^2))\log(5)+(4x^3-2x^4+(-16+e^4(-16-8x)+e^8(-4-2x)-8x)\log(5))\log\left(\frac{-x^2+x^3+(4+4e^4+e^8}{x^2}\right.}{}$$

input
```
integrate((((((-2*x-4)*exp(4)**2+(-8*x-16)*exp(4)-8*x-16)*ln(5)-2*x**4+4*x**
*3)*ln(((exp(4)**2+4*exp(4)+4)*ln(5)+x**3-x**2)/x**2)+((2*x**2+4*x)*exp(4)
**2+(8*x**2+16*x)*exp(4)+8*x**2+16*x)*ln(5)+2*x**5-4*x**4)/((x*exp(4)**2+4
*x*exp(4)+4*x)*ln(5)+x**4-x**3),x)
```

output
```
x**2 - 2*x*log((x**3 - x**2 + (4 + 4*exp(4) + exp(8))*log(5))/x**2) + log(
(x**3 - x**2 + (4 + 4*exp(4) + exp(8))*log(5))/x**2)**2
```

3.386.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(22) = 44$.

Time = 0.30 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.91

$$\int \frac{-4x^4 + 2x^5 + (16x + 8x^2 + e^8(4x + 2x^2) + e^4(16x + 8x^2))\log(5) + (4x^3 - 2x^4 + (-16 + e^4(-16 - 8x)}{-x^3 + x^4 + (4x + 4e^4x + e^8x)\log(5)}$$
$$= x^2 - 2\left(x + 2\,\log\left(x\right)\right)\log\left(x^3 - x^2 + \left(e^8 + 4\,e^4 + 4\right)\log\left(5\right)\right) + \log\left(x^3 - x^2 + \left(e^8 + 4\,e^4 + 4\right)\log\left(5\right)\right)^2 + 4\,x\log\left(x\right) + 4\,\log\left(x\right)^2$$

input
```
integrate((((((-2*x-4)*exp(4)^2+(-8*x-16)*exp(4)-8*x-16)*log(5)-2*x^4+4*x^3
)*log(((exp(4)^2+4*exp(4)+4)*log(5)+x^3-x^2)/x^2)+((2*x^2+4*x)*exp(4)^2+(8
*x^2+16*x)*exp(4)+8*x^2+16*x)*log(5)+2*x^5-4*x^4)/((x*exp(4)^2+4*x*exp(4)+
4*x)*log(5)+x^4-x^3),x, algorithm=\
```

output
```
x^2 - 2*(x + 2*log(x))*log(x^3 - x^2 + (e^8 + 4*e^4 + 4)*log(5)) + log(x^3
 - x^2 + (e^8 + 4*e^4 + 4)*log(5))^2 + 4*x*log(x) + 4*log(x)^2
```

3.386.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(22) = 44$.

Time = 0.37 (sec) , antiderivative size = 72, normalized size of antiderivative = 3.13

$$\int \frac{-4x^4 + 2x^5 + (16x + 8x^2 + e^8(4x + 2x^2) + e^4(16x + 8x^2))\log(5) + (4x^3 - 2x^4 + (-16 + e^4(-16 - 8x)}{-x^3 + x^4 + (4x + 4e^4x + e^8x)\log(5)}$$
$$= x^2 - 2\,x\log\left(x^3 - x^2 + e^8\log\left(5\right) + 4\,e^4\log\left(5\right) + 4\,\log\left(5\right)\right) + 4\,x\log\left(x\right) - 4\,\log\left(x^3 - x^2 + e^8\log\left(5\right) + 4\,e^4\log\left(5\right) + 4\,\log\left(5\right)\right)\log\left(x\right) + 4\,\log\left(x\right)^2$$

3.386.

$$\int \frac{-4x^4+2x^5+(16x+8x^2+e^8(4x+2x^2)+e^4(16x+8x^2))\log(5)+(4x^3-2x^4+(-16+e^4(-16-8x)+e^8(-4-2x)-8x)\log(5))\log\left(\frac{-x^2+x^3+(4+4e^4+e^8}{x^2}\right.}{}$$

input
```
integrate(((((-2*x-4)*exp(4)^2+(-8*x-16)*exp(4)-8*x-16)*log(5)-2*x^4+4*x^3
)*log(((exp(4)^2+4*exp(4)+4)*log(5)+x^3-x^2)/x^2)+((2*x^2+4*x)*exp(4)^2+(8
*x^2+16*x)*exp(4)+8*x^2+16*x)*log(5)+2*x^5-4*x^4)/((x*exp(4)^2+4*x*exp(4)+
4*x)*log(5)+x^4-x^3),x, algorithm=\
```

output
```
x^2 - 2*x*log(x^3 - x^2 + e^8*log(5) + 4*e^4*log(5) + 4*log(5)) + 4*x*log(
x) - 4*log(x^3 - x^2 + e^8*log(5) + 4*e^4*log(5) + 4*log(5))*log(x) + 4*lo
g(x)^2
```

3.386.9 Mupad [B] (verification not implemented)

Time = 15.14 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{-4x^4 + 2x^5 + (16x + 8x^2 + e^8(4x + 2x^2) + e^4(16x + 8x^2))\log(5) + (4x^3 - 2x^4 + (-16 + e^4(-16 - 8x)}{-x^3 + x^4 + (4x + 4e^4x + e^8x)\log(5)}$$
$$= \left(x - \ln\left(\frac{x^3 - x^2 + \ln(5)\,(4\,e^4 + e^8 + 4)}{x^2}\right)\right)^2$$

input
```
int(-(log((log(5)*(4*exp(4) + exp(8) + 4) - x^2 + x^3)/x^2)*(2*x^4 - 4*x^3
 + log(5)*(8*x + exp(8)*(2*x + 4) + exp(4)*(8*x + 16) + 16)) - log(5)*(16*
x + exp(8)*(4*x + 2*x^2) + exp(4)*(16*x + 8*x^2) + 8*x^2) + 4*x^4 - 2*x^5)
/(log(5)*(4*x + 4*x*exp(4) + x*exp(8)) - x^3 + x^4),x)
```

output
```
(x - log((log(5)*(4*exp(4) + exp(8) + 4) - x^2 + x^3)/x^2))^2
```

3.387 $\int \frac{e^{-e^4}\left(-e^3x^3+e^{10}(-1+3x)+4e^{10}\log(x)\right)}{x^5}\,dx$

3.387.1 Optimal result

Integrand size = 36, antiderivative size = 27

$$\int \frac{e^{-e^4}\left(-e^3x^3+e^{10}(-1+3x)+4e^{10}\log(x)\right)}{x^5}\,dx=\frac{e^{-e^4}\left(e^3-\frac{e^{10}(x+\log(x))}{x^3}\right)}{x}$$

output
```
(exp(3)-exp(5)^2/x^3*(x+ln(x)))/x/exp(exp(4))
```

3.387.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int \frac{e^{-e^4}\left(-e^3x^3+e^{10}(-1+3x)+4e^{10}\log(x)\right)}{x^5}\,dx=-e^{3-e^4}\left(\frac{e^7}{x^3}-\frac{1}{x}+\frac{e^7\log(x)}{x^4}\right)$$

input
```
Integrate[(-(E^3*x^3) + E^10*(-1 + 3*x) + 4*E^10*Log[x])/(E^E^4*x^5),x]
```

output
```
-(E^(3 - E^4)*(E^7/x^3 - x^(-1) + (E^7*Log[x])/x^4))
```

3.387.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-e^4}\left(-e^3x^3+e^{10}(3x-1)+4e^{10}\log(x)\right)}{x^5}dx$$

$$\Big\downarrow \text{27}$$

$$e^{-e^4}\int -\frac{e^3x^3+e^{10}(1-3x)-4e^{10}\log(x)}{x^5}dx$$

$$\Big\downarrow \text{25}$$

$$-e^{-e^4}\int \frac{e^3x^3+e^{10}(1-3x)-4e^{10}\log(x)}{x^5}dx$$

$$\Big\downarrow \text{2010}$$

$$-e^{-e^4}\int \left(-\frac{e^3\left(-x^3+3e^7x-e^7\right)}{x^5}-\frac{4e^{10}\log(x)}{x^5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-e^{-e^4}\left(\frac{e^{10}\log(x)}{x^4}+\frac{e^{10}}{x^3}-\frac{e^3}{x}\right)$$

input
```
Int[(-(E^3*x^3) + E^10*(-1 + 3*x) + 4*E^10*Log[x])/(E^E^4*x^5),x]
```

output
```
-((E^10/x^3 - E^3/x + (E^10*Log[x])/x^4)/E^E^4)
```

3.387.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.387.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

method	result	size
parallelrisch	$-\frac{\mathrm{e}^{-\mathrm{e}^{4}} \left(-x^{3} \mathrm{e}^{3}+x \,\mathrm{e}^{10}+\mathrm{e}^{10} \ln \left(x \right)\right)}{x^{4}}$	32
risch	$-\frac{\ln \left(x \right) \mathrm{e}^{-\mathrm{e}^{4}+10}}{x^{4}}-\frac{\left(\mathrm{e}^{7}-x^{2}\right) \mathrm{e}^{3-\mathrm{e}^{4}}}{x^{3}}$	36
norman	$\frac{\mathrm{e}^{-\mathrm{e}^{4}} \mathrm{e}^{3} x^{3}-\mathrm{e}^{-\mathrm{e}^{4}} \mathrm{e}^{10} x -\mathrm{e}^{-\mathrm{e}^{4}} \mathrm{e}^{10} \ln \left(x \right)}{x^{4}}$	42
default	$\mathrm{e}^{-\mathrm{e}^{4}} \left(\frac{\mathrm{e}^{3}}{x}+4 \,\mathrm{e}^{10} \left(-\frac{\ln \left(x \right)}{4 x^{4}}-\frac{1}{16 x^{4}}\right)-\frac{\mathrm{e}^{10}}{x^{3}}+\frac{\mathrm{e}^{10}}{4 x^{4}}\right)$	51
parts	$\mathrm{e}^{-\mathrm{e}^{4}} \left(\frac{\mathrm{e}^{10}}{4 x^{4}}-\frac{\mathrm{e}^{10}}{x^{3}}+\frac{\mathrm{e}^{3}}{x}\right)+4 \,\mathrm{e}^{-\mathrm{e}^{4}} \mathrm{e}^{10} \left(-\frac{\ln \left(x \right)}{4 x^{4}}-\frac{1}{16 x^{4}}\right)$	53

input
```
int((4*exp(5)^2*ln(x)+(-1+3*x)*exp(5)^2-x^3*exp(3))/x^5/exp(exp(4)),x,meth
od=_RETURNVERBOSE)
```

output
```
-1/exp(exp(4))/x^4*(-x^3*exp(3)+x*exp(5)^2+exp(5)^2*ln(x))
```

3.387.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{e^{-e^4}(-e^3x^3+e^{10}(-1+3x)+4e^{10}\log(x))}{x^5}\,dx = \frac{(x^3e^3-xe^{10}-e^{10}\log(x))e^{(-e^4)}}{x^4}$$

input
```
integrate((4*exp(5)^2*log(x)+(-1+3*x)*exp(5)^2-x^3*exp(3))/x^5/exp(exp(4))
,x, algorithm=\
```

output
```
(x^3*e^3 - x*e^10 - e^10*log(x))*e^(-e^4)/x^4
```

3.387.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{e^{-e^4}(-e^3x^3+e^{10}(-1+3x)+4e^{10}\log(x))}{x^5}\,dx=-\frac{-x^2e^3+e^{10}}{x^3e^{e^4}}-\frac{e^{10}\log{(x)}}{x^4e^{e^4}}$$

input
```
integrate((4*exp(5)**2*ln(x)+(-1+3*x)*exp(5)**2-x**3*exp(3))/x**5/exp(exp(
4)),x)
```

output
```
-(-x**2*exp(3) + exp(10))*exp(-exp(4))/x**3 - exp(10)*exp(-exp(4))*log(x)/
x**4
```

3.387.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.59

$$\int \frac{e^{-e^4}(-e^3x^3+e^{10}(-1+3x)+4e^{10}\log(x))}{x^5}\,dx$$
$$=-\frac{1}{4}\left(\left(\frac{4\,\log{(x)}}{x^4}+\frac{1}{x^4}\right)e^{10}-\frac{4\,e^3}{x}+\frac{4\,e^{10}}{x^3}-\frac{e^{10}}{x^4}\right)e^{\left(-e^4\right)}$$

input
```
integrate((4*exp(5)^2*log(x)+(-1+3*x)*exp(5)^2-x^3*exp(3))/x^5/exp(exp(4))
,x, algorithm=\
```

output
```
-1/4*((4*log(x)/x^4 + 1/x^4)*e^10 - 4*e^3/x + 4*e^10/x^3 - e^10/x^4)*e^(-e
^4)
```

3.387.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{e^{-e^4}(-e^3x^3+e^{10}(-1+3x)+4e^{10}\log(x))}{x^5}\,dx=\frac{(x^3e^3-xe^{10}-e^{10}\log{(x)})e^{\left(-e^4\right)}}{x^4}$$

input
```
integrate((4*exp(5)^2*log(x)+(-1+3*x)*exp(5)^2-x^3*exp(3))/x^5/exp(exp(4))
,x, algorithm=\
```

output
```
(x^3*e^3 - x*e^10 - e^10*log(x))*e^(-e^4)/x^4
```

3.387.9 Mupad [B] (verification not implemented)

Time = 13.84 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{e^{-e^4}(-e^3x^3+e^{10}(-1+3x)+4e^{10}\log(x))}{x^5}\,dx=-\frac{x\,\mathrm{e}^{10-\mathrm{e}^4}-x^3\,\mathrm{e}^{3-\mathrm{e}^4}+\mathrm{e}^{10-\mathrm{e}^4}\,\ln(x)}{x^4}$$

input
```
int((exp(-exp(4))*(4*exp(10)*log(x) - x^3*exp(3) + exp(10)*(3*x - 1)))/x^5
,x)
```

output
```
-(x*exp(10 - exp(4)) - x^3*exp(3 - exp(4)) + exp(10 - exp(4))*log(x))/x^4
```

3.388 $\int \frac{e^{\frac{e}{\log\left(\frac{3+e^{8+x}}{e^8}\right)}}\left(e^{8+x}(-24e-e^3x)+(3e^2+e^{10+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)\right)}{(3+e^{8+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)}\,dx$

3.388.1 Optimal result

Integrand size = 85, antiderivative size = 24

$$\int \frac{e^{\frac{e}{\log\left(\frac{3+e^{8+x}}{e^8}\right)}}\left(e^{8+x}(-24e-e^3x)+(3e^2+e^{10+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)\right)}{(3+e^{8+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)}\,dx=e^{\frac{e}{\log\left(\frac{3}{e^8}+e^x\right)}}(24+e^2x)$$

output
```
(24+exp(2)*x)*exp(exp(1)/ln(exp(x)+3/exp(4)^2))
```

3.388.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{e}{\log\left(\frac{3+e^{8+x}}{e^8}\right)}}\left(e^{8+x}(-24e-e^3x)+(3e^2+e^{10+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)\right)}{(3+e^{8+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)}\,dx$$
$$=e^{\frac{e}{-8+\log(3+e^{8+x})}}(24+e^2x)$$

input
```
Integrate[(E^(E/Log[(3 + E^(8 + x))/E^8])*(E^(8 + x)*(-24*E - E^3*x) + (3*
E^2 + E^(10 + x))*Log[(3 + E^(8 + x))/E^8]^2))/((3 + E^(8 + x))*Log[(3 + E
^(8 + x))/E^8]^2),x]
```

output
```
E^(E/(-8 + Log[3 + E^(8 + x)]))*(24 + E^2*x)
```

3.388.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.012$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{e}{\log\left(\frac{e^{x+8}+3}{e^8}\right)}}\left(e^{x+8}(-e^3x-24e)+(e^{x+10}+3e^2)\log^2\left(\frac{e^{x+8}+3}{e^8}\right)\right)}{(e^{x+8}+3)\log^2\left(\frac{e^{x+8}+3}{e^8}\right)}dx$$

$$\Big\downarrow \text{2726}$$

$$(e^2x+24)\, e^{\frac{e}{\log\left(\frac{e^{x+8}+3}{e^8}\right)}}$$

input
```
Int[(E^(E/Log[(3 + E^(8 + x))/E^8])*(E^(8 + x)*(-24*E - E^3*x) + (3*E^2 +
E^(10 + x))*Log[(3 + E^(8 + x))/E^8]^2))/((3 + E^(8 + x))*Log[(3 + E^(8 +
x))/E^8]^2),x]
```

output
```
E^(E/Log[(3 + E^(8 + x))/E^8])*(24 + E^2*x)
```

3.388. $\int \frac{e^{\frac{e}{\log\left(\frac{3+e^{8+x}}{e^8}\right)}}\left(e^{8+x}(-24e-e^3x)+(3e^2+e^{10+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)\right)}{(3+e^{8+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)}dx$

3.388.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.388.4 Maple [A] (verified)

Time = 4.40 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

method	result	size
risch	$\left(24+\mathrm{e}^{2} x\right) \mathrm{e}^{\frac{\mathrm{e}}{\ln \left(\left(\mathrm{e}^{x+8}+3\right) \mathrm{e}^{-8}\right)}}$	24
parallelrisch	$\mathrm{e}^{2} \mathrm{e}^{\frac{\mathrm{e}}{\ln \left(\left(\mathrm{e}^{8} \mathrm{e}^{x}+3\right) \mathrm{e}^{-8}\right)}} x+24 \,\mathrm{e}^{\frac{\mathrm{e}}{\ln \left(\left(\mathrm{e}^{8} \mathrm{e}^{x}+3\right) \mathrm{e}^{-8}\right)}}$	50

input
```
int(((exp(2)*exp(4)^2*exp(x)+3*exp(2))*ln((exp(4)^2*exp(x)+3)/exp(4)^2)^2+
(-x*exp(1)*exp(2)-24*exp(1))*exp(4)^2*exp(x))*exp(exp(1)/ln((exp(4)^2*exp(
x)+3)/exp(4)^2))/(exp(4)^2*exp(x)+3)/ln((exp(4)^2*exp(x)+3)/exp(4)^2)^2,x,
method=_RETURNVERBOSE)
```

output
```
(24+exp(2)*x)*exp(exp(1)/ln((exp(x+8)+3)*exp(-8)))
```

3.388.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{e^{\frac{e}{\log \left(\frac{3+e^{8+x}}{e^8}\right)}} \left(e^{8+x}(-24e-e^3x)+\left(3e^2+e^{10+x}\right)\log^2\left(\frac{3+e^{8+x}}{e^8}\right)\right)}{\left(3+e^{8+x}\right)\log^2\left(\frac{3+e^{8+x}}{e^8}\right)}\,dx$$
$$= \left(xe^2+24\right)e^{\left(\frac{e}{\log\left(\left(3\,e^2+e^{(x+10)}\right)e^{(-10)}\right)}\right)}$$

input
```
integrate(((exp(2)*exp(4)^2*exp(x)+3*exp(2))*log((exp(4)^2*exp(x)+3)/exp(4
)^2)^2+(-x*exp(1)*exp(2)-24*exp(1))*exp(4)^2*exp(x))*exp(exp(1)/log((exp(4
)^2*exp(x)+3)/exp(4)^2))/(exp(4)^2*exp(x)+3)/log((exp(4)^2*exp(x)+3)/exp(4
)^2)^2,x, algorithm=\
```

output
```
(x*e^2 + 24)*e^(e/log((3*e^2 + e^(x + 10))*e^(-10)))
```

3.388.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\frac{e}{\log\left(\frac{3+e^{8+x}}{e^8}\right)}}\left(e^{8+x}(-24e-e^3x)+(3e^2+e^{10+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)\right)}{(3+e^{8+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)}\,dx=\text{Timed out}$$

input
```
integrate(((exp(2)*exp(4)**2*exp(x)+3*exp(2))*ln((exp(4)**2*exp(x)+3)/exp(
4)**2)**2+(-x*exp(1)*exp(2)-24*exp(1))*exp(4)**2*exp(x))*exp(exp(1)/ln((ex
p(4)**2*exp(x)+3)/exp(4)**2))/(exp(4)**2*exp(x)+3)/ln((exp(4)**2*exp(x)+3)
/exp(4)**2)**2,x)
```

output
```
Timed out
```

3.388.7 Maxima [F]

$$\int \frac{e^{\frac{e}{\log\left(\frac{3+e^{8+x}}{e^8}\right)}}\left(e^{8+x}(-24e-e^3x)+(3e^2+e^{10+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)\right)}{(3+e^{8+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)}\,dx$$
$$=\int \frac{\left(\left(3\,e^2+e^{(x+10)}\right)\log\left(\left(e^{(x+8)}+3\right)e^{(-8)}\right)^2-\left(xe^3+24\,e\right)e^{(x+8)}\right)e^{\left(\frac{e}{\log\left(\left(e^{(x+8)}+3\right)e^{(-8)}\right)}\right)}}{\left(e^{(x+8)}+3\right)\log\left(\left(e^{(x+8)}+3\right)e^{(-8)}\right)^2}\,dx$$

input
```
integrate(((exp(2)*exp(4)^2*exp(x)+3*exp(2))*log((exp(4)^2*exp(x)+3)/exp(4
)^2)^2+(-x*exp(1)*exp(2)-24*exp(1))*exp(4)^2*exp(x))*exp(exp(1)/log((exp(4
)^2*exp(x)+3)/exp(4)^2))/(exp(4)^2*exp(x)+3)/log((exp(4)^2*exp(x)+3)/exp(4
)^2)^2,x, algorithm=\
```

output
```
x*e^(e/(log(e^(x + 8) + 3) - 8) + 2) + 24*e^(e/(log(e^(x + 8) + 3) - 8)) +
 integrate(e^(e/(log(e^(x + 8) + 3) - 8) + 2), x)
```

3.388.8 Giac [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{e}{\log\left(\frac{3+e^{8+x}}{e^8}\right)}}\left(e^{8+x}(-24e-e^3x)+(3e^2+e^{10+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)\right)}{(3+e^{8+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)}\,dx$$
$$= \text{Exception raised: TypeError}$$

input
```
integrate(((exp(2)*exp(4)^2*exp(x)+3*exp(2))*log((exp(4)^2*exp(x)+3)/exp(4
)^2)^2+(-x*exp(1)*exp(2)-24*exp(1))*exp(4)^2*exp(x))*exp(exp(1)/log((exp(4
)^2*exp(x)+3)/exp(4)^2))/(exp(4)^2*exp(x)+3)/log((exp(4)^2*exp(x)+3)/exp(4
)^2)^2,x, algorithm=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:Unable to divide, perhaps due to ro
unding error%%%{1,[1,17,9,10,0,80,1]%%%}+%%%{21,[1,17,9,9,0,72,1]%%%}+%%%{
189,[1,17
```

3.388.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{\frac{e}{\log\left(\frac{3+e^{8+x}}{e^8}\right)}}\left(e^{8+x}(-24e-e^3x)+(3e^2+e^{10+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)\right)}{(3+e^{8+x})\log^2\left(\frac{3+e^{8+x}}{e^8}\right)}\,dx$$
$$= \int \frac{e^{\frac{e}{\ln\left(e^{-8}\left(e^8 e^x+3\right)\right)}}\left(\ln\left(e^{-8}\left(e^8 e^x+3\right)\right)^2\left(e^{x+10}+3e^2\right)-e^{x+8}\left(24e+x e^3\right)\right)}{\ln\left(e^{-8}\left(e^8 e^x+3\right)\right)^2\left(e^{x+8}+3\right)}\,dx$$

input
```
int((exp(exp(1)/log(exp(-8)*(exp(8)*exp(x) + 3)))*(log(exp(-8)*(exp(8)*exp
(x) + 3))^2*(3*exp(2) + exp(10)*exp(x)) - exp(8)*exp(x)*(24*exp(1) + x*exp
(3))))/(log(exp(-8)*(exp(8)*exp(x) + 3))^2*(exp(8)*exp(x) + 3)),x)
```

output
```
int((exp(exp(1)/log(exp(-8)*(exp(8)*exp(x) + 3)))*(log(exp(-8)*(exp(8)*exp
(x) + 3))^2*(exp(x + 10) + 3*exp(2)) - exp(x + 8)*(24*exp(1) + x*exp(3))))
/(log(exp(-8)*(exp(8)*exp(x) + 3))^2*(exp(x + 8) + 3)), x)
```

3.389 $\int \frac{-5196890+1036324\log(3)}{19431075+30540x+12x^2+(-7772430-6108x)\log(3)+777243\log^2(3)}$

3.389.1 Optimal result

Integrand size = 33, antiderivative size = 21

$$\int \frac{-5196890+1036324\log(3)}{19431075+30540x+12x^2+(-7772430-6108x)\log(3)+777243\log^2(3)}\,dx = \frac{5-\frac{4x}{3}}{5+\frac{2x}{509}-\log(3)}$$

output
```
(5-4/3*x)/(5-ln(3)+2/509*x)
```

3.389.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int \frac{-5196890+1036324\log(3)}{19431075+30540x+12x^2+(-7772430-6108x)\log(3)+777243\log^2(3)}\,dx = -\frac{509(-5105+1018\log(3))}{3(2x-509(-5+\log(3)))}$$

input
```
Integrate[(-5196890 + 1036324*Log[3])/(19431075 + 30540*x + 12*x^2 + (-777
2430 - 6108*x)*Log[3] + 777243*Log[3]^2),x]
```

output
```
(-509*(-5105 + 1018*Log[3]))/(3*(2*x - 509*(-5 + Log[3])))
```

3.389.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121, Rules used = {27, 2080, 1077, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1036324\log(3)-5196890}{12x^2+30540x+(-6108x-7772430)\log(3)+19431075+777243\log^2(3)}dx$$

$$\Big\downarrow \text{27}$$

$$-1018(5105-1018\log(3))\int \frac{1}{12x^2+30540x+777243\left(25+\log^2(3)\right)-3054(2x+2545)\log(3)}dx$$

$$\Big\downarrow \text{2080}$$

$$-1018(5105-1018\log(3))\int \frac{1}{12x^2+6108(5-\log(3))x+777243(5-\log(3))^2}dx$$

$$\Big\downarrow \text{1077}$$

$$-12216(5105-1018\log(3))\int \frac{1}{(12x+3054(5-\log(3)))^2}dx$$

$$\Big\downarrow \text{17}$$

$$\frac{509(5105-1018\log(3))}{3(2x+509(5-\log(3)))}$$

input
```
Int[(-5196890 + 1036324*Log[3])/(19431075 + 30540*x + 12*x^2 + (-7772430 -
 6108*x)*Log[3] + 777243*Log[3]^2),x]
```

output
```
(509*(5105 - 1018*Log[3]))/(3*(2*x + 509*(5 - Log[3])))
```

3.389.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1077
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/c^p   Int
[(b/2 + c*x)^(2*p), x], x] /; FreeQ[{a, b, c}, x] && EqQ[b^2 - 4*a*c, 0] &&
 IntegerQ[p]
```

rule 2080
```
Int[(u_)^(p_), x_Symbol] :> Int[ExpandToSum[u, x]^p, x] /; FreeQ[p, x] && Q
uadraticQ[u, x] &&  !QuadraticMatchQ[u, x]
```

3.389.4 Maple [A] (verified)

Time = 1.10 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

method	result	size
norman	$\frac{-\frac{2598445}{3}+\frac{518162\ln(3)}{3}}{509\ln(3)-2x-2545}$	19
gosper	$\frac{-\frac{2598445}{3}+\frac{518162\ln(3)}{3}}{509\ln(3)-2x-2545}$	20
default	$-\frac{1036324\ln(3)-5196890}{6(-509\ln(3)+2x+2545)}$	20
parallelrisch	$\frac{1036324\ln(3)-5196890}{3054\ln(3)-12x-15270}$	20
risch	$\frac{1018\ln(3)}{3\left(\ln(3)-\frac{2x}{509}-5\right)}-\frac{5105}{3\left(\ln(3)-\frac{2x}{509}-5\right)}$	26
meijerg	$-\frac{5105x}{3\left(-\frac{509\ln(3)}{2}+\frac{2545}{2}\right)(5-\ln(3))\left(1+\frac{2x}{509(5-\ln(3))}\right)}+\frac{1018\ln(3)x}{3\left(-\frac{509\ln(3)}{2}+\frac{2545}{2}\right)(5-\ln(3))\left(1+\frac{2x}{509(5-\ln(3))}\right)}$	72

input
```
int((1036324*ln(3)-5196890)/(777243*ln(3)^2+(-6108*x-7772430)*ln(3)+12*x^2
+30540*x+19431075),x,method=_RETURNVERBOSE)
```

output
```
(-2598445/3+518162/3*ln(3))/(509*ln(3)-2*x-2545)
```

3.389.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-5196890+1036324\log(3)}{19431075+30540x+12x^2+(-7772430-6108x)\log(3)+777243\log^2(3)}\,dx$$
$$=-\frac{509\,(1018\,\log(3)-5105)}{3\,(2\,x-509\,\log(3)+2545)}$$

input
```
integrate((1036324*log(3)-5196890)/(777243*log(3)^2+(-6108*x-7772430)*log(
3)+12*x^2+30540*x+19431075),x, algorithm=\
```

output
```
-509/3*(1018*log(3) - 5105)/(2*x - 509*log(3) + 2545)
```

3.389.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-5196890 + 1036324\log(3)}{19431075 + 30540x + 12x^2 + (-7772430 - 6108x)\log(3) + 777243\log^2(3)}\,dx$$
$$= -\frac{-5196890 + 1036324\log{(3)}}{12x - 3054\log{(3)} + 15270}$$

input
```
integrate((1036324*ln(3)-5196890)/(777243*ln(3)**2+(-6108*x-7772430)*ln(3)
+12*x**2+30540*x+19431075),x)
```

output
```
-(-5196890 + 1036324*log(3))/(12*x - 3054*log(3) + 15270)
```

3.389.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-5196890 + 1036324\log(3)}{19431075 + 30540x + 12x^2 + (-7772430 - 6108x)\log(3) + 777243\log^2(3)}\,dx$$
$$= -\frac{509\,(1018\,\log{(3)} - 5105)}{3\,(2\,x - 509\,\log{(3)} + 2545)}$$

input
```
integrate((1036324*log(3)-5196890)/(777243*log(3)^2+(-6108*x-7772430)*log(
3)+12*x^2+30540*x+19431075),x, algorithm=\
```

output
```
-509/3*(1018*log(3) - 5105)/(2*x - 509*log(3) + 2545)
```

3.389.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-5196890+1036324\log(3)}{19431075+30540x+12x^2+(-7772430-6108x)\log(3)+777243\log^2(3)}\,dx$$
$$=-\frac{509\,(1018\,\log{(3)}-5105)}{3\,(2\,x-509\,\log{(3)}+2545)}$$

input
```
integrate((1036324*log(3)-5196890)/(777243*log(3)^2+(-6108*x-7772430)*log(
3)+12*x^2+30540*x+19431075),x, algorithm=\
```

output
```
-509/3*(1018*log(3) - 5105)/(2*x - 509*log(3) + 2545)
```

3.389.9 Mupad [B] (verification not implemented)

Time = 15.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-5196890+1036324\log(3)}{19431075+30540x+12x^2+(-7772430-6108x)\log(3)+777243\log^2(3)}\,dx$$
$$=-\frac{\frac{518162\,\ln(3)}{3}-\frac{2598445}{3}}{2\,x-509\,\ln{(3)}+2545}$$

input
```
int((1036324*log(3) - 5196890)/(30540*x - log(3)*(6108*x + 7772430) + 7772
43*log(3)^2 + 12*x^2 + 19431075),x)
```

output
```
-((518162*log(3))/3 - 2598445/3)/(2*x - 509*log(3) + 2545)
```

3.390 $\int \frac{}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log}$

3.390.1 Optimal result

Integrand size = 204, antiderivative size = 25

$$\int \frac{}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x}$$

$$=\log\left(\log(2)+\log\left(9+\left(\frac{1}{1-\frac{2x}{5}}+\frac{\log(x)}{2}\right)^2\right)\right)$$

output
```
ln(ln(2)+ln(9+(1/2*ln(x)+1/(-2/5*x+1))^2))
```

3.390.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.76

$$\int \frac{}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x}$$

$$=\log\left(\log(2)+\log\left(\frac{2(125-90x+18x^2)}{(5-2x)^2}+\frac{5\log(x)}{5-2x}+\frac{\log^2(x)}{4}\right)\right)$$

3.390.

$$\int \frac{-500-80x^2+(-250+}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x^2-60x^3+8x^4)\log(2)\log^2(x)+(-5000x+5600x^2-}$$

input
```
Integrate[(-500 - 80*x^2 + (-250 + 100*x - 40*x^2 + 16*x^3)*Log[x])/((-500
0*x + 5600*x^2 - 2160*x^3 + 288*x^4)*Log[2] + (-500*x + 400*x^2 - 80*x^3)*
Log[2]*Log[x] + (-125*x + 150*x^2 - 60*x^3 + 8*x^4)*Log[2]*Log[x]^2 + (-50
00*x + 5600*x^2 - 2160*x^3 + 288*x^4 + (-500*x + 400*x^2 - 80*x^3)*Log[x]
+ (-125*x + 150*x^2 - 60*x^3 + 8*x^4)*Log[x]^2)*Log[(1000 - 720*x + 144*x^
2 + (100 - 40*x)*Log[x] + (25 - 20*x + 4*x^2)*Log[x]^2)/(100 - 80*x + 16*x
^2)]),x]
```

output
```
Log[Log[2] + Log[(2*(125 - 90*x + 18*x^2))/(5 - 2*x)^2 + (5*Log[x])/(5 - 2
*x) + Log[x]^2/4]]
```

3.390.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{}{(-80x^3+400x^2-500x)\log(2)\log(x)+(8x^4-60x^3+150x^2-125x)\log(2)\log^2(x)+(288x^4-2160x^3+560}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2(4x^2+25)(10-(2x-5)\log(x))}{(5-2x)x(8(18x^2-90x+125)+(5-2x)^2\log^2(x)-20(2x-5)\log(x))\left(\log\left(\frac{2(18x^2-90x+125)}{(5-2x)^2}+\frac{\log^2(x)}{4}+\frac{5\log}{5-}\right.\right.}$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{(4x^2+25)((5-2x)\log(x)+10)}{(5-2x)x((5-2x)^2\log^2(x)+20(5-2x)\log(x)+8(18x^2-90x+125))\left(\log\left(\frac{\log^2(x)}{4}+\frac{5\log(x)}{5-2x}+\frac{2(18x^2-90x-}{(5-2x)^2}\right.\right.}$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(-\frac{5(2x\log(x)-5\log(x)-10)}{x(4\log^2(x)x^2+144x^2-20\log^2(x)x-40\log(x)x-720x+25\log^2(x)+100\log(x)+1000)\left(\log\left(\frac{\log^2(x)}{4}\right.\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$2\left(-20\int \frac{1}{(4\log^2(x)x^2+144x^2-20\log^2(x)x-40\log(x)x-720x+25\log^2(x)+100\log(x)+1000)\left(\log\left(\frac{\log^2(x)}{4}\right.\right.}\right.$$

3.390.

$$\int \frac{-500-80x^2+(-250+}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x^2-60x^3+8x^4)\log(2)\log^2(x)+(-5000x+5600x^2-}$$

input
```
Int[(-500 - 80*x^2 + (-250 + 100*x - 40*x^2 + 16*x^3)*Log[x])/((-5000*x +
5600*x^2 - 2160*x^3 + 288*x^4)*Log[2] + (-500*x + 400*x^2 - 80*x^3)*Log[2]
*Log[x] + (-125*x + 150*x^2 - 60*x^3 + 8*x^4)*Log[2]*Log[x]^2 + (-5000*x +
 5600*x^2 - 2160*x^3 + 288*x^4 + (-500*x + 400*x^2 - 80*x^3)*Log[x] + (-12
5*x + 150*x^2 - 60*x^3 + 8*x^4)*Log[x]^2)*Log[(1000 - 720*x + 144*x^2 + (1
00 - 40*x)*Log[x] + (25 - 20*x + 4*x^2)*Log[x]^2)/(100 - 80*x + 16*x^2)]),
x]
```

output
```
$Aborted
```

3.390.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.390.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. $2(21) = 42$.

Time = 41.24 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

method	result
parallelrisch	$\ln\left(\ln(2)+\ln\left(\frac{(4x^2-20x+25)\ln(x)^2+(-40x+100)\ln(x)+144x^2-720x+1000}{16x^2-80x+100}\right)\right)$
default	$\ln\left(\ln\left(\left(x^2-5x+\frac{25}{4}\right)\ln(x)^2+(-10x+25)\ln(x)+36x^2-180x+250\right)-\frac{i\left(\pi\ \mathrm{csgn}\left(\frac{i}{\left(x-\frac{5}{2}\right)^2}\right.\right.}{}\right.$
risch	$\ln\left(\ln\left(\left(\ln(x)^2+36\right)x^2+\left(-5\ln(x)^2-10\ln(x)-180\right)x+\frac{25\ln(x)^2}{4}+25\ln(x)+250\right)-\right.$

input
```
int(((16*x^3-40*x^2+100*x-250)*ln(x)-80*x^2-500)/(((8*x^4-60*x^3+150*x^2-1
25*x)*ln(x)^2+(-80*x^3+400*x^2-500*x)*ln(x)+288*x^4-2160*x^3+5600*x^2-5000
*x)*ln(((4*x^2-20*x+25)*ln(x)^2+(-40*x+100)*ln(x)+144*x^2-720*x+1000)/(16*
x^2-80*x+100))+(8*x^4-60*x^3+150*x^2-125*x)*ln(2)*ln(x)^2+(-80*x^3+400*x^2
-500*x)*ln(2)*ln(x)+(288*x^4-2160*x^3+5600*x^2-5000*x)*ln(2)),x,method=_RE
TURNVERBOSE)
```

output
```
ln(ln(2)+ln(1/4/(4*x^2-20*x+25)*((4*x^2-20*x+25)*ln(x)^2+(-40*x+100)*ln(x)
+144*x^2-720*x+1000)))
```

3.390.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(25) = 50.

Time = 0.32 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x^2}$$

$$= \log\left(\log(2) + \log\left(\frac{(4x^2-20x+25)\log(x)^2+144x^2-20(2x-5)\log(x)-720x+1000}{4(4x^2-20x+25)}\right)\right)$$

3.390.

$$\int \frac{-500-80x^2+(-250+}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x^2-60x^3+8x^4)\log(2)\log^2(x)+(-5000x+5600x^2-}$$

input
```
integrate(((16*x^3-40*x^2+100*x-250)*log(x)-80*x^2-500)/((((8*x^4-60*x^3+15
0*x^2-125*x)*log(x)^2+(-80*x^3+400*x^2-500*x)*log(x)+288*x^4-2160*x^3+5600
*x^2-5000*x)*log(((4*x^2-20*x+25)*log(x)^2+(-40*x+100)*log(x)+144*x^2-720*
x+1000)/(16*x^2-80*x+100))+(8*x^4-60*x^3+150*x^2-125*x)*log(2)*log(x)^2+(-
80*x^3+400*x^2-500*x)*log(2)*log(x)+(288*x^4-2160*x^3+5600*x^2-5000*x)*log
(2)),x, algorithm=\
```

output
```
log(log(2) + log(1/4*((4*x^2 - 20*x + 25)*log(x)^2 + 144*x^2 - 20*(2*x - 5
)*log(x) - 720*x + 1000)/(4*x^2 - 20*x + 25)))
```

3.390.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(22) = 44$.

Time = 1.24 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \frac{}{(-5000x + 5600x^2 - 2160x^3 + 288x^4)\log(2) + (-500x + 400x^2 - 80x^3)\log(2)\log(x) + (-125x + 150x^2}$$

$$= \log\left(\log\left(\frac{144x^2 - 720x + (100 - 40x)\log(x) + (4x^2 - 20x + 25)\log(x)^2 + 1000}{16x^2 - 80x + 100}\right) + \log(2)\right)$$

input
```
integrate(((16*x**3-40*x**2+100*x-250)*ln(x)-80*x**2-500)/((((8*x**4-60*x**
3+150*x**2-125*x)*ln(x)**2+(-80*x**3+400*x**2-500*x)*ln(x)+288*x**4-2160*x
**3+5600*x**2-5000*x)*ln(((4*x**2-20*x+25)*ln(x)**2+(-40*x+100)*ln(x)+144*
x**2-720*x+1000)/(16*x**2-80*x+100))+(8*x**4-60*x**3+150*x**2-125*x)*ln(2)
*ln(x)**2+(-80*x**3+400*x**2-500*x)*ln(2)*ln(x)+(288*x**4-2160*x**3+5600*x
**2-5000*x)*ln(2)),x)
```

output
```
log(log((144*x**2 - 720*x + (100 - 40*x)*log(x) + (4*x**2 - 20*x + 25)*log
(x)**2 + 1000)/(16*x**2 - 80*x + 100)) + log(2))
```

3.390.7 Maxima [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \frac{}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x^2}$$

$$= \log\left(-\log(2) + \log\left(\left(4x^2-20x+25\right)\log(x)^2+144x^2-20(2x-5)\log(x)-720x+1000\right) - 2\log(2x-5)\right)$$

input
```
integrate(((16*x^3-40*x^2+100*x-250)*log(x)-80*x^2-500)/(((8*x^4-60*x^3+15
0*x^2-125*x)*log(x)^2+(-80*x^3+400*x^2-500*x)*log(x)+288*x^4-2160*x^3+5600
*x^2-5000*x)*log(((4*x^2-20*x+25)*log(x)^2+(-40*x+100)*log(x)+144*x^2-720*
x+1000)/(16*x^2-80*x+100))+(8*x^4-60*x^3+150*x^2-125*x)*log(2)*log(x)^2+(-
80*x^3+400*x^2-500*x)*log(2)*log(x)+(288*x^4-2160*x^3+5600*x^2-5000*x)*log
(2)),x, algorithm=\
```

output
```
log(-log(2) + log((4*x^2 - 20*x + 25)*log(x)^2 + 144*x^2 - 20*(2*x - 5)*lo
g(x) - 720*x + 1000) - 2*log(2*x - 5))
```

3.390.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(25) = 50.

Time = 0.90 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.44

$$\int \frac{}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x^2}$$

$$= \log\left(-\log(2) + \log\left(4x^2\log(x)^2-20x\log(x)^2+144x^2-40x\log(x)+25\log(x)^2-720x+100\log(x)+1000\right) - \log\left(4x^2-20x+25\right)\right)$$

input
```
integrate(((16*x^3-40*x^2+100*x-250)*log(x)-80*x^2-500)/(((8*x^4-60*x^3+15
0*x^2-125*x)*log(x)^2+(-80*x^3+400*x^2-500*x)*log(x)+288*x^4-2160*x^3+5600
*x^2-5000*x)*log(((4*x^2-20*x+25)*log(x)^2+(-40*x+100)*log(x)+144*x^2-720*
x+1000)/(16*x^2-80*x+100))+(8*x^4-60*x^3+150*x^2-125*x)*log(2)*log(x)^2+(-
80*x^3+400*x^2-500*x)*log(2)*log(x)+(288*x^4-2160*x^3+5600*x^2-5000*x)*log
(2)),x, algorithm=\
```

3.390.

$$\int \frac{-500-80x^2+(-250+}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x^2-60x^3+8x^4)\log(2)\log^2(x)+(-5000x+5600x^2-}$$

output
```
log(-log(2) + log(4*x^2*log(x)^2 - 20*x*log(x)^2 + 144*x^2 - 40*x*log(x) +
 25*log(x)^2 - 720*x + 100*log(x) + 1000) - log(4*x^2 - 20*x + 25))
```

3.390.9 Mupad [B] (verification not implemented)

Time = 15.31 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.00

$$\int \frac{}{(-5000x + 5600x^2 - 2160x^3 + 288x^4)\log(2) + (-500x + 400x^2 - 80x^3)\log(2)\log(x) + (-125x + 150x^2 \cdots}$$

$$= \ln\left(\ln\left(\frac{2\left(\ln(x)^2\left(4x^2 - 20x + 25\right) - 720x - \ln(x)\left(40x - 100\right) + 144x^2 + 1000\right)}{16x^2 - 80x + 100}\right)\right)$$

input
```
int((80*x^2 - log(x)*(100*x - 40*x^2 + 16*x^3 - 250) + 500)/(log((log(x)^2
*(4*x^2 - 20*x + 25) - 720*x - log(x)*(40*x - 100) + 144*x^2 + 1000)/(16*x
^2 - 80*x + 100))*(5000*x + log(x)^2*(125*x - 150*x^2 + 60*x^3 - 8*x^4) -
5600*x^2 + 2160*x^3 - 288*x^4 + log(x)*(500*x - 400*x^2 + 80*x^3)) + log(2
)*(5000*x - 5600*x^2 + 2160*x^3 - 288*x^4) + log(2)*log(x)*(500*x - 400*x^
2 + 80*x^3) + log(2)*log(x)^2*(125*x - 150*x^2 + 60*x^3 - 8*x^4)),x)
```

output
```
log(log((2*(log(x)^2*(4*x^2 - 20*x + 25) - 720*x - log(x)*(40*x - 100) + 1
44*x^2 + 1000))/(16*x^2 - 80*x + 100)))
```

3.390. $\int \frac{-500 - 80x^2 + (-250 + \cdots}{(-5000x+5600x^2-2160x^3+288x^4)\log(2)+(-500x+400x^2-80x^3)\log(2)\log(x)+(-125x+150x^2-60x^3+8x^4)\log(2)\log^2(x)+(-5000x+5600x^2 \cdots}$

3.391 $\int \frac{1}{8}e^{2x}(729x + 1053x^2 - 184x^3 - 280x^4 + 16x^5 + 16x^6) \, dx$

3.391.1 Optimal result

Integrand size = 38, antiderivative size = 21

$$\int \frac{1}{8}e^{2x}\left(729x + 1053x^2 - 184x^3 - 280x^4 + 16x^5 + 16x^6\right) \, dx = e^{2x}x^2\left(\frac{27}{4} + x - x^2\right)^2$$

output
```
(27/4+x-x^2)^2*exp(x)^2*x^2
```

3.391.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{1}{8}e^{2x}\left(729x + 1053x^2 - 184x^3 - 280x^4 + 16x^5 + 16x^6\right) \, dx = \frac{1}{16}e^{2x}x^2\left(27 + 4x - 4x^2\right)^2$$

input
```
Integrate[(E^(2*x)*(729*x + 1053*x^2 - 184*x^3 - 280*x^4 + 16*x^5 + 16*x^6
))/8,x]
```

output
```
(E^(2*x)*x^2*(27 + 4*x - 4*x^2)^2)/16
```

3.391.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 57 vs. 2(21) = 42.

Time = 0.40 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.71, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.079$, Rules used = {27, 2626, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{8}e^{2x}\left(16x^6+16x^5-280x^4-184x^3+1053x^2+729x\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{8}\int e^{2x}\left(16x^6+16x^5-280x^4-184x^3+1053x^2+729x\right)dx$$

$$\Big\downarrow \text{2626}$$

$$\frac{1}{8}\int \left(16e^{2x}x^6+16e^{2x}x^5-280e^{2x}x^4-184e^{2x}x^3+1053e^{2x}x^2+729e^{2x}x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{8}\left(8e^{2x}x^6-16e^{2x}x^5-100e^{2x}x^4+108e^{2x}x^3+\frac{729}{2}e^{2x}x^2\right)$$

input
```
Int[(E^(2*x)*(729*x + 1053*x^2 - 184*x^3 - 280*x^4 + 16*x^5 + 16*x^6))/8,x
]
```

output
```
((729*E^(2*x)*x^2)/2 + 108*E^(2*x)*x^3 - 100*E^(2*x)*x^4 - 16*E^(2*x)*x^5
+ 8*E^(2*x)*x^6)/8
```

3.391.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2626
```
Int[(F_)^(v_)*(Px_), x_Symbol] :> Int[ExpandIntegrand[F^v, Px, x], x] /; Fr
eeQ[F, x] && PolynomialQ[Px, x] && LinearQ[v, x] &&  !TrueQ[$UseGamma]
```

3.391.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

method	result
gosper	$\frac{x^2(4x^2-4x-27)^2 e^{2x}}{16}$
risch	$\frac{(8x^6-16x^5-100x^4+108x^3+\frac{729}{2}x^2)e^{2x}}{8}$
default	$-2x^5 e^{2x}-\frac{25 e^{2x} x^4}{2}+\frac{27 e^{2x} x^3}{2}+\frac{729 e^{2x} x^2}{16}+e^{2x} x^6$
norman	$-2x^5 e^{2x}-\frac{25 e^{2x} x^4}{2}+\frac{27 e^{2x} x^3}{2}+\frac{729 e^{2x} x^2}{16}+e^{2x} x^6$
parallelrisch	$-2x^5 e^{2x}-\frac{25 e^{2x} x^4}{2}+\frac{27 e^{2x} x^3}{2}+\frac{729 e^{2x} x^2}{16}+e^{2x} x^6$
meijerg	$\frac{(448x^6-1344x^5+3360x^4-6720x^3+10080x^2-10080x+5040)e^{2x}}{448}-\frac{(-192x^5+480x^4-960x^3+1440x^2-1440x+720)e^{2x}}{192}-$

input
```
int(1/8*(16*x^6+16*x^5-280*x^4-184*x^3+1053*x^2+729*x)*exp(x)^2,x,method=_
RETURNVERBOSE)
```

output
```
1/16*x^2*(4*x^2-4*x-27)^2*exp(x)^2
```

3.391.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.52

$$\int \frac{1}{8}e^{2x}\left(729x+1053x^2-184x^3-280x^4+16x^5+16x^6\right)\,dx$$
$$=\frac{1}{16}\left(16\,x^6-32\,x^5-200\,x^4+216\,x^3+729\,x^2\right)e^{(2\,x)}$$

input
```
integrate(1/8*(16*x^6+16*x^5-280*x^4-184*x^3+1053*x^2+729*x)*exp(x)^2,x, a
lgorithm=\
```

output
```
1/16*(16*x^6 - 32*x^5 - 200*x^4 + 216*x^3 + 729*x^2)*e^(2*x)
```

3.391.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.48

$$\int \frac{1}{8}e^{2x}\left(729x + 1053x^2 - 184x^3 - 280x^4 + 16x^5 + 16x^6\right)\,dx = \frac{\left(16x^6 - 32x^5 - 200x^4 + 216x^3 + 729x^2\right)e^{2x}}{16}$$

input
```
integrate(1/8*(16*x**6+16*x**5-280*x**4-184*x**3+1053*x**2+729*x)*exp(x)**
2,x)
```

output
```
(16*x**6 - 32*x**5 - 200*x**4 + 216*x**3 + 729*x**2)*exp(2*x)/16
```

3.391.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 142 vs. 2(21) = 42.

Time = 0.22 (sec) , antiderivative size = 142, normalized size of antiderivative = 6.76

$$\begin{aligned}\int \frac{1}{8}e^{2x}\left(729x + 1053x^2 - 184x^3 - 280x^4 + 16x^5 + 16x^6\right)\,dx &= \frac{1}{4}\left(4\,x^6 - 12\,x^5 + 30\,x^4 - 60\,x^3 + 90\,x^2 - 90\,x + 45\right)e^{(2\,x)} \\ &+ \frac{1}{4}\left(4\,x^5 - 10\,x^4 + 20\,x^3 - 30\,x^2 + 30\,x - 15\right)e^{(2\,x)} \\ &- \frac{35}{4}\left(2\,x^4 - 4\,x^3 + 6\,x^2 - 6\,x + 3\right)e^{(2\,x)} - \frac{23}{8}\left(4\,x^3 - 6\,x^2 + 6\,x - 3\right)e^{(2\,x)} \\ &+ \frac{1053}{32}\left(2\,x^2 - 2\,x + 1\right)e^{(2\,x)} + \frac{729}{32}\left(2\,x - 1\right)e^{(2\,x)}\end{aligned}$$

input
```
integrate(1/8*(16*x^6+16*x^5-280*x^4-184*x^3+1053*x^2+729*x)*exp(x)^2,x, a
lgorithm=\
```

output
```
1/4*(4*x^6 - 12*x^5 + 30*x^4 - 60*x^3 + 90*x^2 - 90*x + 45)*e^(2*x) + 1/4*
(4*x^5 - 10*x^4 + 20*x^3 - 30*x^2 + 30*x - 15)*e^(2*x) - 35/4*(2*x^4 - 4*x
^3 + 6*x^2 - 6*x + 3)*e^(2*x) - 23/8*(4*x^3 - 6*x^2 + 6*x - 3)*e^(2*x) + 1
053/32*(2*x^2 - 2*x + 1)*e^(2*x) + 729/32*(2*x - 1)*e^(2*x)
```

3.391.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.52

$$\int \frac{1}{8}e^{2x}\left(729x+1053x^2-184x^3-280x^4+16x^5+16x^6\right)\,dx = \frac{1}{16}\left(16\,x^6-32\,x^5-200\,x^4+216\,x^3+729\,x^2\right)e^{(2\,x)}$$

input
```
integrate(1/8*(16*x^6+16*x^5-280*x^4-184*x^3+1053*x^2+729*x)*exp(x)^2,x, a
lgorithm=\
```

output
```
1/16*(16*x^6 - 32*x^5 - 200*x^4 + 216*x^3 + 729*x^2)*e^(2*x)
```

3.391.9 Mupad [B] (verification not implemented)

Time = 14.41 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{1}{8}e^{2x}\left(729x+1053x^2-184x^3-280x^4+16x^5+16x^6\right)\,dx = \frac{x^2\,e^{2\,x}\,{\left(-4\,x^2+4\,x+27\right)}^2}{16}$$

input
```
int((exp(2*x)*(729*x + 1053*x^2 - 184*x^3 - 280*x^4 + 16*x^5 + 16*x^6))/8,
x)
```

output
```
(x^2*exp(2*x)*(4*x - 4*x^2 + 27)^2)/16
```

3.392 $\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(49x+154x^2+121x^3)+\left(98x+308x^2+2\right.}{196x+616x^2+484x^3+e^{\frac{2}{7x+11x^2}}(49x+154x^2+121x^3)}$

3.392.1 Optimal result

Integrand size = 163, antiderivative size = 21

$$\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(49x+154x^2+121x^3)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(7+71x+15\right.}{196x+616x^2+484x^3+e^{\frac{2}{7x+11x^2}}(49x+154x^2+121x^3)+e^{\frac{1}{7x+11x^2}}(196x+616x^2+48}$$
$$=\frac{x\log(x)}{2+e^{\frac{1}{x(7+11x)}}}$$

output
```
ln(x)/(2+exp(1/x/(11*x+7)))*x
```

3.392.2 Mathematica [A] (verified)

Time = 0.69 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(49x+154x^2+121x^3)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(7+71x+15\right.}{196x+616x^2+484x^3+e^{\frac{2}{7x+11x^2}}(49x+154x^2+121x^3)+e^{\frac{1}{7x+11x^2}}(196x+616x^2+48}$$
$$=\frac{x\log(x)}{2+e^{\frac{1}{7x+11x^2}}}$$

3.392.

$$\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(49x+154x^2+121x^3)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(7+71x+154x^2+121x^3)\right)\log(x)}{\cdots}\,dx$$

input
```
Integrate[(98*x + 308*x^2 + 242*x^3 + E^(7*x + 11*x^2)^(-1)*(49*x + 154*x^
2 + 121*x^3) + (98*x + 308*x^2 + 242*x^3 + E^(7*x + 11*x^2)^(-1)*(7 + 71*x
 + 154*x^2 + 121*x^3))*Log[x])/(196*x + 616*x^2 + 484*x^3 + E^(2/(7*x + 11
*x^2))*(49*x + 154*x^2 + 121*x^3) + E^(7*x + 11*x^2)^(-1)*(196*x + 616*x^2
 + 484*x^3)),x]
```

output
```
(x*Log[x])/(2 + E^(7*x + 11*x^2)^(-1))
```

3.392.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{242x^3+308x^2+e^{\frac{1}{11x^2+7x}}\left(121x^3+154x^2+49x\right)+\left(242x^3+308x^2+e^{\frac{1}{11x^2+7x}}\left(121x^3+154x^2+71x+7\right)+98\right.}{484x^3+616x^2+e^{\frac{2}{11x^2+7x}}\left(121x^3+154x^2+49x\right)+e^{\frac{1}{11x^2+7x}}\left(484x^3+616x^2+196x\right)+196x}$$

$\Big\downarrow$ 7239

$$\int \frac{e^{\frac{1}{11x^2+7x}}+\frac{e^{\frac{1}{11x^2+7x}}\left(121x^3+154x^2+71x+7\right)\log(x)}{x(11x+7)^2}+2\log(x)+2}{\left(e^{\frac{1}{11x^2+7x}}+2\right)^2}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{121x^3+121x^3\log(x)+154x^2+154x^2\log(x)+49x+71x\log(x)+7\log(x)}{\left(e^{\frac{1}{11x^2+7x}}+2\right)x(11x+7)^2}-\frac{2(22x+7)\log(x)}{\left(e^{\frac{1}{11x^2+7x}}+2\right)^2x(11x+7)^2}\right)$$

$\Big\downarrow$ 2009

$$\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}\left(49x+154x^2+121x^3\right)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}\left(7+71x+154x^2+121x^3\right)\right)\log(x)}{\cdots}dx$$

$$\int \frac{1}{2+e^{\frac{1}{11x^2+7x}}}dx-\int \frac{\int \frac{1}{2+e^{\frac{1}{11x^2+7x}}}dx}{x}dx+\frac{2}{7}\int \frac{\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)^2x}dx}{x}dx+$$
$$22\int \frac{\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)^2(11x+7)^2}dx}{x}dx-11\int \frac{\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)(11x+7)^2}dx}{x}dx-$$
$$\frac{22}{7}\int \frac{\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)^2(11x+7)}dx}{x}dx+\frac{11}{7}\int \frac{\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)(11x+7)}dx}{x}dx-\frac{1}{7}\int \frac{\int \frac{1}{e^{\frac{1}{11x^2+7x}}x+2x}dx}{x}dx+$$
$$\log(x)\int \frac{1}{2+e^{\frac{1}{11x^2+7x}}}dx-\frac{2}{7}\log(x)\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)^2x}dx+\frac{1}{7}\log(x)\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)x}dx-$$
$$22\log(x)\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)^2(11x+7)^2}dx+11\log(x)\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)(11x+7)^2}dx+$$
$$\frac{22}{7}\log(x)\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)^2(11x+7)}dx-\frac{11}{7}\log(x)\int \frac{1}{\left(2+e^{\frac{1}{11x^2+7x}}\right)(11x+7)}dx$$

input
```
Int[(98*x + 308*x^2 + 242*x^3 + E^(7*x + 11*x^2)^(-1)*(49*x + 154*x^2 + 12
1*x^3) + (98*x + 308*x^2 + 242*x^3 + E^(7*x + 11*x^2)^(-1)*(7 + 71*x + 154
*x^2 + 121*x^3))*Log[x])/(196*x + 616*x^2 + 484*x^3 + E^(2/(7*x + 11*x^2))
*(49*x + 154*x^2 + 121*x^3) + E^(7*x + 11*x^2)^(-1)*(196*x + 616*x^2 + 484
*x^3)),x]
```

output
```
$Aborted
```

3.392.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.392.

$$\int 98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}\left(49x+154x^2+121x^3\right)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}\left(7+71x+154x^2+121x^3\right)\right)\log(x)\, dx$$

3.392.4 Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{\ln(x)x}{2+e^{\frac{1}{x(11x+7)}}}$	21
parallelrisch	$\frac{\ln(x)x}{2+e^{\frac{1}{x(11x+7)}}}$	21

input
```
int((((121*x^3+154*x^2+71*x+7)*exp(1/(11*x^2+7*x))+242*x^3+308*x^2+98*x)*l
n(x)+(121*x^3+154*x^2+49*x)*exp(1/(11*x^2+7*x))+242*x^3+308*x^2+98*x)/((12
1*x^3+154*x^2+49*x)*exp(1/(11*x^2+7*x))^2+(484*x^3+616*x^2+196*x)*exp(1/(1
1*x^2+7*x))+484*x^3+616*x^2+196*x),x,method=_RETURNVERBOSE)
```

output
```
ln(x)/(2+exp(1/x/(11*x+7)))*x
```

3.392.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{98x + 308x^2 + 242x^3 + e^{\frac{1}{7x+11x^2}}(49x + 154x^2 + 121x^3) + \left(98x + 308x^2 + 242x^3 + e^{\frac{1}{7x+11x^2}}(7 + 71x + 15\right.}{196x + 616x^2 + 484x^3 + e^{\frac{2}{7x+11x^2}}(49x + 154x^2 + 121x^3) + e^{\frac{1}{7x+11x^2}}(196x + 616x^2 + 48}$$
$$= \frac{x\log(x)}{e^{\left(\frac{1}{11x^2+7x}\right)} + 2}$$

input
```
integrate((((121*x^3+154*x^2+71*x+7)*exp(1/(11*x^2+7*x))+242*x^3+308*x^2+9
8*x)*log(x)+(121*x^3+154*x^2+49*x)*exp(1/(11*x^2+7*x))+242*x^3+308*x^2+98*
x)/((121*x^3+154*x^2+49*x)*exp(1/(11*x^2+7*x))^2+(484*x^3+616*x^2+196*x)*e
xp(1/(11*x^2+7*x))+484*x^3+616*x^2+196*x),x, algorithm=\
```

output
```
x*log(x)/(e^(1/(11*x^2 + 7*x)) + 2)
```

3.392.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(49x+154x^2+121x^3)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(7+71x+15\right.}{196x+616x^2+484x^3+e^{\frac{2}{7x+11x^2}}(49x+154x^2+121x^3)+e^{\frac{1}{7x+11x^2}}(196x+616x^2+48}$$
$$=\frac{x\log(x)}{e^{\frac{1}{11x^2+7x}}+2}$$

input
```
integrate((((121*x**3+154*x**2+71*x+7)*exp(1/(11*x**2+7*x))+242*x**3+308*x
**2+98*x)*ln(x)+(121*x**3+154*x**2+49*x)*exp(1/(11*x**2+7*x))+242*x**3+308
*x**2+98*x)/((121*x**3+154*x**2+49*x)*exp(1/(11*x**2+7*x))**2+(484*x**3+61
6*x**2+196*x)*exp(1/(11*x**2+7*x))+484*x**3+616*x**2+196*x),x)
```

output
```
x*log(x)/(exp(1/(11*x**2 + 7*x)) + 2)
```

3.392.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.67

$$\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(49x+154x^2+121x^3)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(7+71x+15\right.}{196x+616x^2+484x^3+e^{\frac{2}{7x+11x^2}}(49x+154x^2+121x^3)+e^{\frac{1}{7x+11x^2}}(196x+616x^2+48}$$
$$=\frac{xe^{\left(\frac{11}{7(11x+7)}\right)}\log(x)}{2e^{\left(\frac{11}{7(11x+7)}\right)}+e^{\left(\frac{1}{7x}\right)}}$$

input
```
integrate((((121*x^3+154*x^2+71*x+7)*exp(1/(11*x^2+7*x))+242*x^3+308*x^2+9
8*x)*log(x)+(121*x^3+154*x^2+49*x)*exp(1/(11*x^2+7*x))+242*x^3+308*x^2+98*
x)/((121*x^3+154*x^2+49*x)*exp(1/(11*x^2+7*x))^2+(484*x^3+616*x^2+196*x)*e
xp(1/(11*x^2+7*x))+484*x^3+616*x^2+196*x),x, algorithm=\
```

output
```
x*e^(11/7/(11*x + 7))*log(x)/(2*e^(11/7/(11*x + 7)) + e^(1/7/x))
```

3.392.

$$\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(49x+154x^2+121x^3)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(7+71x+154x^2+121x^3)\right)\log(x)}{\ldots}\,dx$$

3.392.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(49x+154x^2+121x^3)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(7+71x+15\right.}{196x+616x^2+484x^3+e^{\frac{2}{7x+11x^2}}(49x+154x^2+121x^3)+e^{\frac{1}{7x+11x^2}}(196x+616x^2+48}$$
$$=\frac{x\log(x)}{e^{\left(\frac{1}{11x^2+7x}\right)}+2}$$

input
```
integrate((((121*x^3+154*x^2+71*x+7)*exp(1/(11*x^2+7*x))+242*x^3+308*x^2+9
8*x)*log(x)+(121*x^3+154*x^2+49*x)*exp(1/(11*x^2+7*x))+242*x^3+308*x^2+98*
x)/((121*x^3+154*x^2+49*x)*exp(1/(11*x^2+7*x))^2+(484*x^3+616*x^2+196*x)*e
xp(1/(11*x^2+7*x))+484*x^3+616*x^2+196*x),x, algorithm=\
```

output
```
x*log(x)/(e^(1/(11*x^2 + 7*x)) + 2)
```

3.392.9 Mupad [B] (verification not implemented)

Time = 14.29 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(49x+154x^2+121x^3)+\left(98x+308x^2+242x^3+e^{\frac{1}{7x+11x^2}}(7+71x+15\right.}{196x+616x^2+484x^3+e^{\frac{2}{7x+11x^2}}(49x+154x^2+121x^3)+e^{\frac{1}{7x+11x^2}}(196x+616x^2+48}$$
$$=\frac{x\ln(x)}{e^{\frac{1}{11x^2+7x}}+2}$$

input
```
int((98*x + log(x)*(98*x + exp(1/(7*x + 11*x^2))*(71*x + 154*x^2 + 121*x^3
 + 7) + 308*x^2 + 242*x^3) + exp(1/(7*x + 11*x^2))*(49*x + 154*x^2 + 121*x
^3) + 308*x^2 + 242*x^3)/(196*x + exp(1/(7*x + 11*x^2))*(196*x + 616*x^2 +
 484*x^3) + exp(2/(7*x + 11*x^2))*(49*x + 154*x^2 + 121*x^3) + 616*x^2 + 4
84*x^3),x)
```

output
```
(x*log(x))/(exp(1/(7*x + 11*x^2)) + 2)
```

3.393 $\int \frac{6\log(5)+e^x(-27-18x\,\mathrm{lo}\ldots}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+\ldots}{\ldots}\right.\ldots}$

3.393.1 Optimal result

Integrand size = 122, antiderivative size = 30

$$\int \frac{6\log(5)+e^x\left(-27-18x\log(5)-3x^2\log^2(5)\right)}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\log^2\left(\mathrm{log}\ldots\right.}$$

$$=e^4+\frac{3}{\log\left(\log\left(10+e^x+\frac{2}{x\left(\frac{3}{x}+\log(5)\right)}\right)\right)}$$

output
```
exp(2)^2+3/ln(ln(exp(x)+10+2/x/(3/x+ln(5))))
```

3.393.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{6\log(5)+e^x\left(-27-18x\log(5)-3x^2\log^2(5)\right)}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\log^2\left(\mathrm{log}\ldots\right.}$$

$$=\frac{3}{\log\left(\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\right)}$$

input
```
Integrate[(6*Log[5] + E^x*(-27 - 18*x*Log[5] - 3*x^2*Log[5]^2))/((96 + 62*
x*Log[5] + 10*x^2*Log[5]^2 + E^x*(9 + 6*x*Log[5] + x^2*Log[5]^2))*Log[(32
+ 10*x*Log[5] + E^x*(3 + x*Log[5]))/(3 + x*Log[5])]*Log[Log[(32 + 10*x*Log
[5] + E^x*(3 + x*Log[5]))/(3 + x*Log[5])]]^2),x]
```

output
```
3/Log[Log[(32 + 10*x*Log[5] + E^x*(3 + x*Log[5]))/(3 + x*Log[5])]]
```

3.393.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(-3x^2\log^2(5)-18x\log(5)-27\right)+6\log(5)}{\left(10x^2\log^2(5)+e^x\left(x^2\log^2(5)+6x\log(5)+9\right)+62x\log(5)+96\right)\log\left(\frac{10x\log(5)+e^x(x\log(5)+3)+32}{x\log(5)+3}\right)\log^2\left(\log\left(\frac{10x}{}\right.\right.}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^x\left(-3x^2\log^2(5)-18x\log(5)-27\right)+6\log(5)}{(x\log(5)+3)\left(3e^x+e^xx\log(5)+10x\log(5)+32\right)\log\left(\frac{10x\log(5)+e^x(x\log(5)+3)+32}{x\log(5)+3}\right)\log^2\left(\log\left(\frac{10x\log(5)+e^x(x\log(5)}{x\log(5)+3}\right.\right.}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{6\left(5x^2\log^2(5)+31x\log(5)+48+\log(5)\right)}{(x\log(5)+3)\left(3e^x+e^xx\log(5)+10x\log(5)+32\right)\log\left(\frac{10x\log(5)+e^x(x\log(5)+3)+32}{x\log(5)+3}\right)\log^2\left(\log\left(\frac{10x\log(5)+e^x(x\log}{x\log(5)+}\right.\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-3\int \frac{1}{\log\left(\frac{10\log(5)x+e^x(\log(5)x+3)+32}{\log(5)x+3}\right)\log^2\left(\log\left(\frac{10\log(5)x+e^x(\log(5)x+3)+32}{\log(5)x+3}\right)\right)}dx+$$

$$96\int \frac{1}{\left(e^x\log(5)x+10\log(5)x+3e^x+32\right)\log\left(\frac{10\log(5)x+e^x(\log(5)x+3)+32}{\log(5)x+3}\right)\log^2\left(\log\left(\frac{10\log(5)x+e^x(\log(5)x+3)+32}{\log(5)x+3}\right)\right)}dx$$

$$30\log(5)\int \frac{x}{\left(e^x\log(5)x+10\log(5)x+3e^x+32\right)\log\left(\frac{10\log(5)x+e^x(\log(5)x+3)+32}{\log(5)x+3}\right)\log^2\left(\log\left(\frac{10\log(5)x+e^x(\log(5)x+3)+3}{\log(5)x+3}\right.\right.}$$

$$6\log(5)\int \frac{1}{(\log(5)x+3)\left(e^x\log(5)x+10\log(5)x+3e^x+32\right)\log\left(\frac{10\log(5)x+e^x(\log(5)x+3)+32}{\log(5)x+3}\right)\log^2\left(\log\left(\frac{10\log(5)x+e}{\log}\right.\right.}$$

input
```
Int[(6*Log[5] + E^x*(-27 - 18*x*Log[5] - 3*x^2*Log[5]^2))/((96 + 62*x*Log[
5] + 10*x^2*Log[5]^2 + E^x*(9 + 6*x*Log[5] + x^2*Log[5]^2))*Log[(32 + 10*x
*Log[5] + E^x*(3 + x*Log[5]))/(3 + x*Log[5])]*Log[Log[(32 + 10*x*Log[5] +
E^x*(3 + x*Log[5]))/(3 + x*Log[5])]]^2),x]
```

output
```
$Aborted
```

3.393.

$$\int \frac{6\log(5)+e^x\left(-27-18x\log(5)-3x^2\log^2(5)\right)}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\log^2\left(\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\right)}dx$$

3.393.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.393.4 Maple [A] (verified)

Time = 97.02 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

method	result
parallelrisch	$\frac{3}{\ln\left(\ln\left(\frac{x\,\mathrm{e}^{x}\ln(5)+10x\ln(5)+3\,\mathrm{e}^{x}+32}{x\ln(5)+3}\right)\right)}$
risch	$\frac{3}{\ln\left(-\ln(x\ln(5)+3)+\ln(\ln(5)(\mathrm{e}^{x}+10)x+3\,\mathrm{e}^{x}+32)-\frac{i\pi\ \mathrm{csgn}\left(\frac{i(\ln(5)(\mathrm{e}^{x}+10)x+3\,\mathrm{e}^{x}+32)}{x\ln(5)+3}\right)\left(-\mathrm{csgn}\left(\frac{i(\ln(5)(\mathrm{e}^{x}+10)x+3\,\mathrm{e}^{x}+32)}{x\ln(5)+3}\right)+\mathrm{csgn}\right.}{}\right.}$

input
```
int(((-3*x^2*ln(5)^2-18*x*ln(5)-27)*exp(x)+6*ln(5))/((x^2*ln(5)^2+6*x*ln(5
)+9)*exp(x)+10*x^2*ln(5)^2+62*x*ln(5)+96)/ln(((x*ln(5)+3)*exp(x)+10*x*ln(5
)+32)/(x*ln(5)+3))/ln(ln(((x*ln(5)+3)*exp(x)+10*x*ln(5)+32)/(x*ln(5)+3)))^
2,x,method=_RETURNVERBOSE)
```

output
```
3/ln(ln((x*exp(x)*ln(5)+10*x*ln(5)+3*exp(x)+32)/(x*ln(5)+3)))
```

3.393.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int \frac{6\log(5)+e^x\left(-27-18x\log(5)-3x^2\log^2(5)\right)}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\log^2\left(\log\right.}$$
$$=\frac{3}{\log\left(\log\left(\frac{(x\log(5)+3)e^x+10\,x\log(5)+32}{x\log(5)+3}\right)\right)}$$

input
```
integrate(((-3*x^2*log(5)^2-18*x*log(5)-27)*exp(x)+6*log(5))/((x^2*log(5)^
2+6*x*log(5)+9)*exp(x)+10*x^2*log(5)^2+62*x*log(5)+96)/log(((x*log(5)+3)*e
xp(x)+10*x*log(5)+32)/(x*log(5)+3))/log(log(((x*log(5)+3)*exp(x)+10*x*log(
5)+32)/(x*log(5)+3)))^2,x, algorithm=\
```

output
```
3/log(log(((x*log(5) + 3)*e^x + 10*x*log(5) + 32)/(x*log(5) + 3)))
```

3.393.6 Sympy [A] (verification not implemented)

Time = 3.05 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{6\log(5)+e^x\left(-27-18x\log(5)-3x^2\log^2(5)\right)}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\log^2\left(\log \cdots\right.}$$
$$= \frac{3}{\log\left(\log\left(\frac{10x\log(5)+(x\log(5)+3)e^x+32}{x\log(5)+3}\right)\right)}$$

input
```
integrate(((-3*x**2*ln(5)**2-18*x*ln(5)-27)*exp(x)+6*ln(5))/((x**2*ln(5)**
2+6*x*ln(5)+9)*exp(x)+10*x**2*ln(5)**2+62*x*ln(5)+96)/ln(((x*ln(5)+3)*exp(
x)+10*x*ln(5)+32)/(x*ln(5)+3))/ln(ln(((x*ln(5)+3)*exp(x)+10*x*ln(5)+32)/(x
*ln(5)+3)))**2,x)
```

output
```
3/log(log((10*x*log(5) + (x*log(5) + 3)*exp(x) + 32)/(x*log(5) + 3)))
```

3.393.7 Maxima [A] (verification not implemented)

Time = 0.65 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{6\log(5)+e^x\left(-27-18x\log(5)-3x^2\log^2(5)\right)}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\log^2\left(\log \cdots\right.}$$
$$= \frac{3}{\log\left(\log\left((x\log(5)+3)e^x+10\,x\log(5)+32\right)-\log\left(x\log(5)+3\right)\right)}$$

input
```
integrate(((-3*x^2*log(5)^2-18*x*log(5)-27)*exp(x)+6*log(5))/((x^2*log(5)^
2+6*x*log(5)+9)*exp(x)+10*x^2*log(5)^2+62*x*log(5)+96)/log(((x*log(5)+3)*e
xp(x)+10*x*log(5)+32)/(x*log(5)+3))/log(log(((x*log(5)+3)*exp(x)+10*x*log(
5)+32)/(x*log(5)+3)))^2,x, algorithm=\
```

output
```
3/log(log((x*log(5) + 3)*e^x + 10*x*log(5) + 32) - log(x*log(5) + 3))
```

3.393.8 Giac [A] (verification not implemented)

Time = 0.47 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

$$\int \frac{6\log(5)+e^x\left(-27-18x\log(5)-3x^2\log^2(5)\right)}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\log^2\left(\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\right)}\,dx$$
$$=\frac{3}{\log\left(\log\left(xe^x\log(5)+10\,x\log(5)+3\,e^x+32\right)-\log\left(x\log(5)+3\right)\right)}$$

input
```
integrate(((-3*x^2*log(5)^2-18*x*log(5)-27)*exp(x)+6*log(5))/((x^2*log(5)^
2+6*x*log(5)+9)*exp(x)+10*x^2*log(5)^2+62*x*log(5)+96)/log(((x*log(5)+3)*e
xp(x)+10*x*log(5)+32)/(x*log(5)+3))/log(log(((x*log(5)+3)*exp(x)+10*x*log(
5)+32)/(x*log(5)+3)))^2,x, algorithm=\
```

output
```
3/log(log(x*e^x*log(5) + 10*x*log(5) + 3*e^x + 32) - log(x*log(5) + 3))
```

3.393.9 Mupad [B] (verification not implemented)

Time = 15.61 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int \frac{6\log(5)+e^x\left(-27-18x\log(5)-3x^2\log^2(5)\right)}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\log^2\left(\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\right)}\,dx$$
$$=\frac{3}{\ln\left(\ln\left(\frac{10\,x\,\ln(5)+e^x\,\left(x\,\ln(5)+3\right)+32}{x\,\ln(5)+3}\right)\right)}$$

input
```
int((6*log(5) - exp(x)*(3*x^2*log(5)^2 + 18*x*log(5) + 27))/(log((10*x*log
(5) + exp(x)*(x*log(5) + 3) + 32)/(x*log(5) + 3))*log(log((10*x*log(5) + e
xp(x)*(x*log(5) + 3) + 32)/(x*log(5) + 3)))^2*(10*x^2*log(5)^2 + 62*x*log(
5) + exp(x)*(x^2*log(5)^2 + 6*x*log(5) + 9) + 96)),x)
```

output
```
3/log(log((10*x*log(5) + exp(x)*(x*log(5) + 3) + 32)/(x*log(5) + 3)))
```

3.393. $\int \frac{6\log(5)+e^x\left(-27-18x\log(5)-3x^2\log^2(5)\right)}{\left(96+62x\log(5)+10x^2\log^2(5)+e^x\left(9+6x\log(5)+x^2\log^2(5)\right)\right)\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\log^2\left(\log\left(\frac{32+10x\log(5)+e^x(3+x\log(5))}{3+x\log(5)}\right)\right)}\,dx$

3.394 $\int \frac{1+2x}{(x+x^2)\log^2(4)}\,dx$

3.394.1 Optimal result

Integrand size = 17, antiderivative size = 13

$$\int \frac{1+2x}{(x+x^2)\log^2(4)}\,dx=\frac{\log(12(x+x^2))}{\log^2(4)}$$

output
```
1/4*ln(12*x^2+12*x)/ln(2)^2
```

3.394.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{1+2x}{(x+x^2)\log^2(4)}\,dx=\frac{\log(x)+\log(1+x)}{\log^2(4)}$$

input
```
Integrate[(1 + 2*x)/((x + x^2)*Log[4]^2),x]
```

output
```
(Log[x] + Log[1 + x])/Log[4]^2
```

3.394.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$, Rules used = {27, 1103}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x+1}{(x^2+x)\log^2(4)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int \frac{2x+1}{x^2+x}dx}{\log^2(4)}$$

$$\Big\downarrow \ 1103$$

$$\frac{\log(x^2+x)}{\log^2(4)}$$

input
```
Int[(1 + 2*x)/((x + x^2)*Log[4]^2),x]
```

output
```
Log[x + x^2]/Log[4]^2
```

3.394.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1103
```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[d*(Log[RemoveContent[a + b*x + c*x^2, x]]/b), x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

3.394.4 Maple [A] (verified)

Time = 0.79 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

method	result	size
derivativedivides	$\frac{\ln(x^2+x)}{4\ln(2)^2}$	13
default	$\frac{\ln((1+x)x)}{4\ln(2)^2}$	13
risch	$\frac{\ln(x^2+x)}{4\ln(2)^2}$	13
parallelrisch	$\frac{\ln(x)+\ln(1+x)}{4\ln(2)^2}$	14
norman	$\frac{\ln(x)}{4\ln(2)^2}+\frac{\ln(1+x)}{4\ln(2)^2}$	20
meijerg	$\frac{\ln(x)-\ln(1+x)}{4\ln(2)^2}+\frac{\ln(1+x)}{2\ln(2)^2}$	27

input
```
int(1/4*(1+2*x)/(x^2+x)/ln(2)^2,x,method=_RETURNVERBOSE)
```

output
```
1/4/ln(2)^2*ln(x^2+x)
```

3.394.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{1+2x}{(x+x^2)\log^2(4)}\,dx = \frac{\log(x^2+x)}{4\log(2)^2}$$

input
```
integrate(1/4*(1+2*x)/(x^2+x)/log(2)^2,x, algorithm=\
```

output
```
1/4*log(x^2 + x)/log(2)^2
```

3.394.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{1+2x}{(x+x^2)\log^2(4)}\,dx = \frac{\log(x^2+x)}{4\log(2)^2}$$

input
```
integrate(1/4*(1+2*x)/(x**2+x)/ln(2)**2,x)
```

output
```
log(x**2 + x)/(4*log(2)**2)
```

3.394.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{1+2x}{(x+x^2)\log^2(4)}\,dx = \frac{\log(x^2+x)}{4\,\log(2)^2}$$

input
```
integrate(1/4*(1+2*x)/(x^2+x)/log(2)^2,x, algorithm=\
```

output
```
1/4*log(x^2 + x)/log(2)^2
```

3.394.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int \frac{1+2x}{(x+x^2)\log^2(4)}\,dx = \frac{\log(|x^2+x|)}{4\,\log(2)^2}$$

input
```
integrate(1/4*(1+2*x)/(x^2+x)/log(2)^2,x, algorithm=\
```

output
```
1/4*log(abs(x^2 + x))/log(2)^2
```

3.394.9 Mupad [B] (verification not implemented)

Time = 14.76 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{1+2x}{(x+x^2)\log^2(4)}\,dx = \frac{\ln\left(x\,(x+1)\right)}{4\ln\left(2\right)^2}$$

input
```
int((x/2 + 1/4)/(log(2)^2*(x + x^2)),x)
```

output
```
log(x*(x + 1))/(4*log(2)^2)
```

3.395 $\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx$

3.395.1 Optimal result

Integrand size = 89, antiderivative size = 23

$$\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx=4e^{-\frac{8}{\left(4+e^{\frac{x^2}{5}}\right)x}}x$$

output
```
4*exp(-4/(4+exp(1/5*x^2))/x)^2*x
```

3.395.2 Mathematica [A] (verified)

Time = 1.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx=4e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}x$$

input
```
Integrate[(640 + 320*x + 20*E^((2*x^2)/5)*x + E^(x^2/5)*(160 + 160*x + 64*
x^2))/(E^(8/(4*x + E^(x^2/5)*x))*(80*x + 40*E^(x^2/5)*x + 5*E^((2*x^2)/5)*
x)),x]
```

output
```
(4*x)/E^(8/(4*x + E^(x^2/5)*x))
```

3.395. $\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx$

3.395.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}\left(20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(64x^2+160x+160)+320x+640\right)}{40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x+80x}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}\left(20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(64x^2+160x+160)+320x+640\right)}{5\left(e^{\frac{x^2}{5}}+4\right)^2x}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int \frac{4e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}\left(5e^{\frac{2x^2}{5}}x+80x+8e^{\frac{x^2}{5}}(2x^2+5x+5)+160\right)}{\left(4+e^{\frac{x^2}{5}}\right)^2x}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{4}{5}\int \frac{e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}\left(5e^{\frac{2x^2}{5}}x+80x+8e^{\frac{x^2}{5}}(2x^2+5x+5)+160\right)}{\left(4+e^{\frac{x^2}{5}}\right)^2x}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{4}{5}\int \left(-\frac{64e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}x}{\left(4+e^{\frac{x^2}{5}}\right)^2}+5e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}+\frac{8e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}(2x^2+5)}{\left(4+e^{\frac{x^2}{5}}\right)x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{4}{5}\left(5\int e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}dx+40\int \frac{e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}}{\left(4+e^{\frac{x^2}{5}}\right)x}dx-64\int \frac{e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}x}{\left(4+e^{\frac{x^2}{5}}\right)^2}dx+16\int \frac{e^{-\frac{8}{e^{\frac{x^2}{5}}x+4x}}x}{4+e^{\frac{x^2}{5}}}dx\right)$$

input
```
Int[(640 + 320*x + 20*E^((2*x^2)/5)*x + E^(x^2/5)*(160 + 160*x + 64*x^2))/
(E^(8/(4*x + E^(x^2/5)*x))*(80*x + 40*E^(x^2/5)*x + 5*E^((2*x^2)/5)*x)),x]
```

output
```
$Aborted
```

3.395. $\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}dx$

3.395.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.395.4 Maple [A] (verified)

Time = 1.12 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

method	result	size
risch	$4x\,\mathrm{e}^{-\frac{8}{\left(4+\mathrm{e}^{\frac{x^2}{5}}\right)x}}$	20
parallelrisch	$4x\,\mathrm{e}^{-\frac{8}{\left(4+\mathrm{e}^{\frac{x^2}{5}}\right)x}}$	22
norman	$\frac{16x\,\mathrm{e}^{-\frac{8}{x\,\mathrm{e}^{\frac{x^2}{5}}+4x}}+4x\,\mathrm{e}^{\frac{x^2}{5}}\mathrm{e}^{-\frac{8}{x\,\mathrm{e}^{\frac{x^2}{5}}+4x}}}{4+\mathrm{e}^{\frac{x^2}{5}}}$	63

input
```
int((20*x*exp(1/5*x^2)^2+(64*x^2+160*x+160)*exp(1/5*x^2)+320*x+640)*exp(-4
/(x*exp(1/5*x^2)+4*x))^2/(5*x*exp(1/5*x^2)^2+40*x*exp(1/5*x^2)+80*x),x,met
hod=_RETURNVERBOSE)
```

output
```
4*x*exp(-8/(4+exp(1/5*x^2))/x)
```

3.395. $\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}\left(160+160x+64x^2\right)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx$

3.395.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx=4\,xe^{\left(-\frac{8}{xe^{\left(\frac{1}{5}\,x^2\right)}+4\,x}\right)}$$

input
```
integrate((20*x*exp(1/5*x^2)^2+(64*x^2+160*x+160)*exp(1/5*x^2)+320*x+640)*
exp(-4/(x*exp(1/5*x^2)+4*x))^2/(5*x*exp(1/5*x^2)^2+40*x*exp(1/5*x^2)+80*x)
,x, algorithm=\
```

output
```
4*x*e^(-8/(x*e^(1/5*x^2) + 4*x))
```

3.395.6 Sympy [A] (verification not implemented)

Time = 11.77 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx=4xe^{-\frac{8}{xe^{\frac{x^2}{5}}+4x}}$$

input
```
integrate((20*x*exp(1/5*x**2)**2+(64*x**2+160*x+160)*exp(1/5*x**2)+320*x+6
40)*exp(-4/(x*exp(1/5*x**2)+4*x))**2/(5*x*exp(1/5*x**2)**2+40*x*exp(1/5*x*
*2)+80*x),x)
```

output
```
4*x*exp(-8/(x*exp(x**2/5) + 4*x))
```

3.395.7 Maxima [F]

$$\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx$$

$$=\int \frac{4\left(5\,xe^{\left(\frac{2}{5}\,x^2\right)}+8\,(2\,x^2+5\,x+5)e^{\left(\frac{1}{5}\,x^2\right)}+80\,x+160\right)e^{\left(-\frac{8}{xe^{\left(\frac{1}{5}\,x^2\right)}+4\,x}\right)}}{5\left(xe^{\left(\frac{2}{5}\,x^2\right)}+8\,xe^{\left(\frac{1}{5}\,x^2\right)}+16\,x\right)}\,dx$$

input
```
integrate((20*x*exp(1/5*x^2)^2+(64*x^2+160*x+160)*exp(1/5*x^2)+320*x+640)*
exp(-4/(x*exp(1/5*x^2)+4*x))^2/(5*x*exp(1/5*x^2)^2+40*x*exp(1/5*x^2)+80*x)
,x, algorithm=\
```

output
```
4/5*integrate((5*x*e^(2/5*x^2) + 8*(2*x^2 + 5*x + 5)*e^(1/5*x^2) + 80*x +
160)*e^(-8/(x*e^(1/5*x^2) + 4*x))/(x*e^(2/5*x^2) + 8*x*e^(1/5*x^2) + 16*x)
, x)
```

3.395.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx=4\,xe^{\left(-\frac{8}{xe^{\left(\frac{1}{5}x^2\right)}+4\,x}\right)}$$

input
```
integrate((20*x*exp(1/5*x^2)^2+(64*x^2+160*x+160)*exp(1/5*x^2)+320*x+640)*
exp(-4/(x*exp(1/5*x^2)+4*x))^2/(5*x*exp(1/5*x^2)^2+40*x*exp(1/5*x^2)+80*x)
,x, algorithm=\
```

output
```
4*x*e^(-8/(x*e^(1/5*x^2) + 4*x))
```

3.395.9 Mupad [B] (verification not implemented)

Time = 14.72 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx=4\,x\,\mathrm{e}^{-\frac{8}{4\,x+x\,\mathrm{e}^{\frac{x^2}{5}}}}$$

input
```
int((exp(-8/(4*x + x*exp(x^2/5)))*(320*x + exp(x^2/5)*(160*x + 64*x^2 + 16
0) + 20*x*exp((2*x^2)/5) + 640))/(80*x + 40*x*exp(x^2/5) + 5*x*exp((2*x^2)
/5)),x)
```

output
```
4*x*exp(-8/(4*x + x*exp(x^2/5)))
```

3.395. $\int \frac{e^{-\frac{8}{4x+e^{\frac{x^2}{5}}x}}\left(640+320x+20e^{\frac{2x^2}{5}}x+e^{\frac{x^2}{5}}(160+160x+64x^2)\right)}{80x+40e^{\frac{x^2}{5}}x+5e^{\frac{2x^2}{5}}x}\,dx$

3.396 $\int (-6 + 2x + 6x^2 \log(16)) \, dx$

3.396.1 Optimal result

Integrand size = 12, antiderivative size = 16

$$\int (-6 + 2x + 6x^2 \log(16)) \, dx = 5 + (3 - x)^2 + 2x^3 \log(16)$$

output
```
5+8*x^3*ln(2)+(-x+3)^2
```

3.396.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int (-6 + 2x + 6x^2 \log(16)) \, dx = -6x + x^2 + 2x^3 \log(16)$$

input
```
Integrate[-6 + 2*x + 6*x^2*Log[16],x]
```

output
```
-6*x + x^2 + 2*x^3*Log[16]
```

3.396.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(6x^2\log(16)+2x-6\right) \, dx$$
$$\Big\downarrow \text{2009}$$
$$2x^3\log(16)+x^2-6x$$

input
```
Int[-6 + 2*x + 6*x^2*Log[16],x]
```

output
```
-6*x + x^2 + 2*x^3*Log[16]
```

3.396.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.396.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

method	result	size
gosper	$x(8x^2\ln(2)+x-6)$	13
default	$8x^3\ln(2)+x^2-6x$	15
norman	$8x^3\ln(2)+x^2-6x$	15
risch	$8x^3\ln(2)+x^2-6x$	15
parallelrisch	$8x^3\ln(2)+x^2-6x$	15
parts	$8x^3\ln(2)+x^2-6x$	15

input
```
int(24*x^2*ln(2)+2*x-6,x,method=_RETURNVERBOSE)
```

output
```
x*(8*x^2*ln(2)+x-6)
```

3.396.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \left(-6+2x+6x^2\log(16)\right)\,dx = 8\,x^3\log\left(2\right)+x^2-6\,x$$

input
```
integrate(24*x^2*log(2)+2*x-6,x, algorithm=\
```

output
```
8*x^3*log(2) + x^2 - 6*x
```

3.396.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \left(-6+2x+6x^2\log(16)\right)\,dx = 8x^3\log\left(2\right)+x^2-6x$$

input
```
integrate(24*x**2*ln(2)+2*x-6,x)
```

output
```
8*x**3*log(2) + x**2 - 6*x
```

3.396.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \left(-6+2x+6x^2\log(16)\right)\,dx = 8\,x^3\log\left(2\right)+x^2-6\,x$$

input
```
integrate(24*x^2*log(2)+2*x-6,x, algorithm=\
```

output
```
8*x^3*log(2) + x^2 - 6*x
```

3.396.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \left(-6+2x+6x^2\log(16)\right)\,dx = 8\,x^3\log\left(2\right)+x^2-6\,x$$

input
```
integrate(24*x^2*log(2)+2*x-6,x, algorithm=\
```

output
```
8*x^3*log(2) + x^2 - 6*x
```

3.396.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \left(-6+2x+6x^2\log(16)\right)\,dx = x\left(8\,\ln\left(2\right)\,x^2+x-6\right)$$

input
```
int(2*x + 24*x^2*log(2) - 6,x)
```

output
```
x*(x + 8*x^2*log(2) - 6)
```

3.397 $\int \frac{-16e^{\frac{16}{\log(x)}}+(-3365x+149462x^2-2478498x^3+19518724x^4)\log^2(x)+}{}$

3.397.1 Optimal result

Integrand size = 140, antiderivative size = 22

$$\int \frac{-16e^{\frac{16}{\log(x)}}+(-3365x+149462x^2-2478498x^3+19518724x^4)\log^2(x)+e^{\frac{12}{\log(x)}}(96-2256x+188x\log^2(}{}$$

$$=x+\left(5+x+\left(-2+e^{\frac{4}{\log(x)}}+47x\right)^2\right)^2$$

output
```
(5+x+(exp(4/ln(x))+47*x-2)^2)^2+x
```

3.397.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(22) = 44.

Time = 0.42 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.95

$$\int \frac{-16e^{\frac{16}{\log(x)}}+(-3365x+149462x^2-2478498x^3+19518724x^4)\log^2(x)+e^{\frac{12}{\log(x)}}(96-2256x+188x\log^2(}{}$$

$$=e^{\frac{16}{\log(x)}}-e^{\frac{12}{\log(x)}}(8-188x)-3365x+74731x^2-826166x^3+4879681x^4$$
$$-e^{\frac{8}{\log(x)}}(-34-2x(-563+6627x))-e^{\frac{4}{\log(x)}}\left(72-4x\left(797-13207x+103823x^2\right)\right)$$

input
```
Integrate[(-16*E^(16/Log[x]) + (-3365*x + 149462*x^2 - 2478498*x^3 + 19518
724*x^4)*Log[x]^2 + E^(12/Log[x])*(96 - 2256*x + 188*x*Log[x]^2) + E^(8/Lo
g[x])*(-272 + 9008*x - 106032*x^2 + (-1126*x + 26508*x^2)*Log[x]^2) + E^(4
/Log[x])*(288 - 12752*x + 211312*x^2 - 1661168*x^3 + (3188*x - 105656*x^2
+ 1245876*x^3)*Log[x]^2))/(x*Log[x]^2),x]
```

output
```
E^(16/Log[x]) - E^(12/Log[x])*(8 - 188*x) - 3365*x + 74731*x^2 - 826166*x^
3 + 4879681*x^4 - E^(8/Log[x])*(-34 - 2*x*(-563 + 6627*x)) - E^(4/Log[x])*
(72 - 4*x*(797 - 13207*x + 103823*x^2))
```

3.397.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 87 vs. $2(22) = 44$.

Time = 1.49 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.95, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.014$, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{8}{\log(x)}}\left(-106032x^2+\left(26508x^2-1126x\right)\log^2(x)+9008x-272\right)+e^{\frac{4}{\log(x)}}\left(-1661168x^3+211312x^2+\left(1245876\right.\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(19518724x^3-2478498x^2+\frac{2e^{\frac{8}{\log(x)}}\left(-53016x^2+13254x^2\log^2(x)+4504x-563x\log^2(x)-136\right)}{x\log^2(x)}+\frac{4e^{\frac{4}{\log(x)}}\left(\right.}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$4879681x^4-826166x^3+74731x^2+2\left(6627x^2-563x+17\right)e^{\frac{8}{\log(x)}}-4\left(-103823x^3+13207x^2-797x+18\right)e^{\frac{4}{\log(x)}}-3365x+e^{\frac{16}{\log(x)}}-4(2-47x)e^{\frac{12}{\log(x)}}$$

input
```
Int[(-16*E^(16/Log[x]) + (-3365*x + 149462*x^2 - 2478498*x^3 + 19518724*x^
4)*Log[x]^2 + E^(12/Log[x])*(96 - 2256*x + 188*x*Log[x]^2) + E^(8/Log[x])*
(-272 + 9008*x - 106032*x^2 + (-1126*x + 26508*x^2)*Log[x]^2) + E^(4/Log[x
])*(288 - 12752*x + 211312*x^2 - 1661168*x^3 + (3188*x - 105656*x^2 + 1245
876*x^3)*Log[x]^2))/(x*Log[x]^2),x]
```


$$\int \frac{-16e^{\frac{16}{\log(x)}}+\left(-3365x+149462x^2-2478498x^3+19518724x^4\right)\log^2(x)+e^{\frac{12}{\log(x)}}\left(96-2256x+188x\log^2(x)\right)+e^{\frac{8}{\log(x)}}\left(-272+9008x-106032x^2+(-1\right.}{x\log^2(x)}$$

output
```
E^(16/Log[x]) - 4*E^(12/Log[x])*(2 - 47*x) - 3365*x + 74731*x^2 - 826166*x
^3 + 4879681*x^4 + 2*E^(8/Log[x])*(17 - 563*x + 6627*x^2) - 4*E^(4/Log[x])
*(18 - 797*x + 13207*x^2 - 103823*x^3)
```

3.397.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.397.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 80 vs. 2(21) = 42.

Time = 0.40 (sec) , antiderivative size = 81, normalized size of antiderivative = 3.68

method	result
risch	$4879681x^4 + e^{\frac{16}{\ln(x)}} - 826166x^3 + 74731x^2 - 3365x + (-8 + 188x)\, e^{\frac{12}{\ln(x)}} + (13254x^2 - 1126$
parallelrisch	$415292\, e^{\frac{4}{\ln(x)}} x^3 + 4879681x^4 - 52828\, e^{\frac{4}{\ln(x)}} x^2 + 13254\, e^{\frac{8}{\ln(x)}} x^2 - 826166x^3 + 3188\, e^{\frac{4}{\ln(x)}} x + 1$

input
```
int((-16*exp(4/ln(x))^4+(188*x*ln(x)^2-2256*x+96)*exp(4/ln(x))^3+((26508*x
^2-1126*x)*ln(x)^2-106032*x^2+9008*x-272)*exp(4/ln(x))^2+((1245876*x^3-105
656*x^2+3188*x)*ln(x)^2-1661168*x^3+211312*x^2-12752*x+288)*exp(4/ln(x))+(
19518724*x^4-2478498*x^3+149462*x^2-3365*x)*ln(x)^2)/x/ln(x)^2,x,method=_R
ETURNVERBOSE)
```

output
```
4879681*x^4+exp(16/ln(x))-826166*x^3+74731*x^2-3365*x+(-8+188*x)*exp(12/ln
(x))+(13254*x^2-1126*x+34)*exp(8/ln(x))+(415292*x^3-52828*x^2+3188*x-72)*e
xp(4/ln(x))
```

3.397.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. 2(21) = 42.

Time = 0.34 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.77

$$\int \frac{-16e^{\frac{16}{\log(x)}} + (-3365x + 149462x^2 - 2478498x^3 + 19518724x^4)\log^2(x) + e^{\frac{12}{\log(x)}}\left(96 - 2256x + 188x\log^2(\right.}{}$$

$$= 4879681\,x^4 - 826166\,x^3 + 74731\,x^2 + 4\,(47\,x - 2)e^{\frac{12}{\log(x)}} + 2\,\left(6627\,x^2 - 563\,x + 17\right)e^{\frac{8}{\log(x)}} + 4\,\left(103823\,x^3 - 13207\,x^2 + 797\,x - 18\right)e^{\frac{4}{\log(x)}} - 3365\,x + e^{\frac{16}{\log(x)}}$$

input
```
integrate((-16*exp(4/log(x))^4+(188*x*log(x)^2-2256*x+96)*exp(4/log(x))^3+
((26508*x^2-1126*x)*log(x)^2-106032*x^2+9008*x-272)*exp(4/log(x))^2+((1245
876*x^3-105656*x^2+3188*x)*log(x)^2-1661168*x^3+211312*x^2-12752*x+288)*ex
p(4/log(x))+(19518724*x^4-2478498*x^3+149462*x^2-3365*x)*log(x)^2)/x/log(x
)^2,x, algorithm=\
```

output
```
4879681*x^4 - 826166*x^3 + 74731*x^2 + 4*(47*x - 2)*e^(12/log(x)) + 2*(662
7*x^2 - 563*x + 17)*e^(8/log(x)) + 4*(103823*x^3 - 13207*x^2 + 797*x - 18)
*e^(4/log(x)) - 3365*x + e^(16/log(x))
```

3.397.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. 2(19) = 38.

Time = 2.11 (sec) , antiderivative size = 75, normalized size of antiderivative = 3.41

$$\int \frac{-16e^{\frac{16}{\log(x)}} + (-3365x + 149462x^2 - 2478498x^3 + 19518724x^4)\log^2(x) + e^{\frac{12}{\log(x)}}\left(96 - 2256x + 188x\log^2(\right.}{}$$

$$= 4879681x^4 - 826166x^3 + 74731x^2 - 3365x + (188x - 8)\,e^{\frac{12}{\log(x)}} + \left(13254x^2 - 1126x + 34\right)e^{\frac{8}{\log(x)}} + \left(415292x^3 - 52828x^2 + 3188x - 72\right)e^{\frac{4}{\log(x)}} + e^{\frac{16}{\log(x)}}$$

input
```
integrate((-16*exp(4/ln(x))**4+(188*x*ln(x)**2-2256*x+96)*exp(4/ln(x))**3+
((26508*x**2-1126*x)*ln(x)**2-106032*x**2+9008*x-272)*exp(4/ln(x))**2+((12
45876*x**3-105656*x**2+3188*x)*ln(x)**2-1661168*x**3+211312*x**2-12752*x+2
88)*exp(4/ln(x))+(19518724*x**4-2478498*x**3+149462*x**2-3365*x)*ln(x)**2)
/x/ln(x)**2,x)
```

3.397.

$$\int \frac{-16e^{\frac{16}{\log(x)}}+(-3365x+149462x^2-2478498x^3+19518724x^4)\log^2(x)+e^{\frac{12}{\log(x)}}\left(96-2256x+188x\log^2(x)\right)+e^{\frac{8}{\log(x)}}\left(-272+9008x-106032x^2+(-1\right.}{x\log^2(x)}$$

output
```
4879681*x**4 - 826166*x**3 + 74731*x**2 - 3365*x + (188*x - 8)*exp(12/log(
x)) + (13254*x**2 - 1126*x + 34)*exp(8/log(x)) + (415292*x**3 - 52828*x**2
 + 3188*x - 72)*exp(4/log(x)) + exp(16/log(x))
```

3.397.7 Maxima [F]

$$\int \frac{-16e^{\frac{16}{\log(x)}} + (-3365x + 149462x^2 - 2478498x^3 + 19518724x^4)\log^2(x) + e^{\frac{12}{\log(x)}}\left(96 - 2256x + 188x\log^2(\right.}{}$$

$$= \int \frac{\left(19518724\,x^4 - 2478498\,x^3 + 149462\,x^2 - 3365\,x\right)\log(x)^2 + 4\left(47\,x\log(x)^2 - 564\,x + 24\right)e^{\frac{12}{\log(x)}} + 2\,((}{}$$

input
```
integrate((-16*exp(4/log(x))^4+(188*x*log(x)^2-2256*x+96)*exp(4/log(x))^3+
((26508*x^2-1126*x)*log(x)^2-106032*x^2+9008*x-272)*exp(4/log(x))^2+((1245
876*x^3-105656*x^2+3188*x)*log(x)^2-1661168*x^3+211312*x^2-12752*x+288)*ex
p(4/log(x))+(19518724*x^4-2478498*x^3+149462*x^2-3365*x)*log(x)^2)/x/log(x
)^2,x, algorithm=\
```

output
```
4879681*x^4 - 826166*x^3 + 74731*x^2 - 3365*x + e^(16/log(x)) + integrate(
4*(47*x*log(x)^2 - 564*x + 24)*e^(12/log(x))/(x*log(x)^2), x) + integrate(
2*((13254*x^2 - 563*x)*log(x)^2 - 53016*x^2 + 4504*x - 136)*e^(8/log(x))/(
x*log(x)^2), x) + integrate(-4*(415292*x^3 - (311469*x^3 - 26414*x^2 + 797
*x)*log(x)^2 - 52828*x^2 + 3188*x - 72)*e^(4/log(x))/(x*log(x)^2), x)
```

3.397.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 119 vs. $2(21) = 42$.

Time = 0.26 (sec) , antiderivative size = 119, normalized size of antiderivative = 5.41

$$\int \frac{-16e^{\frac{16}{\log(x)}} + (-3365x + 149462x^2 - 2478498x^3 + 19518724x^4)\log^2(x) + e^{\frac{12}{\log(x)}}\left(96 - 2256x + 188x\log^2(\right.}{}$$

$$= 4879681\,x^4 + 415292\,x^3e^{\frac{4}{\log(x)}} - 826166\,x^3 + 13254\,x^2e^{\frac{8}{\log(x)}} - 52828\,x^2e^{\frac{4}{\log(x)}} + 74731\,x^2 + 188\,xe^{\frac{12}{\log(x)}} - 1126\,xe^{\frac{8}{\log(x)}} + 3188\,xe^{\frac{4}{\log(x)}} - 3365\,x + e^{\frac{16}{\log(x)}} - 8\,e^{\frac{12}{\log(x)}} + 34\,e^{\frac{8}{\log(x)}} - 72\,e^{\frac{4}{\log(x)}}$$

input
```
integrate((-16*exp(4/log(x))^4+(188*x*log(x)^2-2256*x+96)*exp(4/log(x))^3+
((26508*x^2-1126*x)*log(x)^2-106032*x^2+9008*x-272)*exp(4/log(x))^2+((1245
876*x^3-105656*x^2+3188*x)*log(x)^2-1661168*x^3+211312*x^2-12752*x+288)*ex
p(4/log(x))+(19518724*x^4-2478498*x^3+149462*x^2-3365*x)*log(x)^2)/x/log(x
)^2,x, algorithm=\
```

output
```
4879681*x^4 + 415292*x^3*e^(4/log(x)) - 826166*x^3 + 13254*x^2*e^(8/log(x)
) - 52828*x^2*e^(4/log(x)) + 74731*x^2 + 188*x*e^(12/log(x)) - 1126*x*e^(8
/log(x)) + 3188*x*e^(4/log(x)) - 3365*x + e^(16/log(x)) - 8*e^(12/log(x))
+ 34*e^(8/log(x)) - 72*e^(4/log(x))
```

3.397.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-16e^{\frac{16}{\log(x)}} + (-3365x + 149462x^2 - 2478498x^3 + 19518724x^4)\log^2(x) + e^{\frac{12}{\log(x)}}\left(96 - 2256x + 188x\log^2(\right.}{}$$
$$= -\int \frac{16\,\mathrm{e}^{\frac{16}{\ln(x)}} - \mathrm{e}^{\frac{4}{\ln(x)}}\left(\ln(x)^2\left(1245876\,x^3 - 105656\,x^2 + 3188\,x\right) - 12752\,x + 211312\,x^2 - 1661168\,x^3 + 2\right.}{}$$

input
```
int(-(16*exp(16/log(x)) - exp(4/log(x))*(log(x)^2*(3188*x - 105656*x^2 + 1
245876*x^3) - 12752*x + 211312*x^2 - 1661168*x^3 + 288) + log(x)^2*(3365*x
 - 149462*x^2 + 2478498*x^3 - 19518724*x^4) - exp(12/log(x))*(188*x*log(x)
^2 - 2256*x + 96) + exp(8/log(x))*(log(x)^2*(1126*x - 26508*x^2) - 9008*x
+ 106032*x^2 + 272))/(x*log(x)^2),x)
```

output
```
-int((16*exp(16/log(x)) - exp(4/log(x))*(log(x)^2*(3188*x - 105656*x^2 + 1
245876*x^3) - 12752*x + 211312*x^2 - 1661168*x^3 + 288) + log(x)^2*(3365*x
 - 149462*x^2 + 2478498*x^3 - 19518724*x^4) - exp(12/log(x))*(188*x*log(x)
^2 - 2256*x + 96) + exp(8/log(x))*(log(x)^2*(1126*x - 26508*x^2) - 9008*x
+ 106032*x^2 + 272))/(x*log(x)^2), x)
```

3.398 $\int 6e^{e^3(20+8e)}\,dx$

3.398.1 Optimal result

Integrand size = 13, antiderivative size = 18

$$\int 6e^{e^3(20+8e)}\,dx = 3+6e^{\left(8+\frac{20}{e}\right)e^4}x$$

output
```
6*x*exp((8+20/exp(1))*exp(4))+3
```

3.398.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int 6e^{e^3(20+8e)}\,dx = 6e^{e^3(20+8e)}x$$

input
```
Integrate[6*E^(E^3*(20 + 8*E)),x]
```

output
```
6*E^(E^3*(20 + 8*E))*x
```

3.398.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int 6e^{e^3(20+8e)}\,dx$$

$$\Big\downarrow \; 24$$

$$6e^{4e^3(5+2e)}x$$

input
```
Int[6*E^(E^3*(20 + 8*E)),x]
```

output
```
6*E^(4*E^3*(5 + 2*E))*x
```

3.398.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.398.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

method	result	size
risch	$6x\,\mathrm{e}^{8\,\mathrm{e}^{4}+20\,\mathrm{e}^{3}}$	14
default	$6x\,\mathrm{e}^{(8\,\mathrm{e}+20)\mathrm{e}^{4}\mathrm{e}^{-1}}$	18
parallelrisch	$6x\,\mathrm{e}^{(8\,\mathrm{e}+20)\mathrm{e}^{4}\mathrm{e}^{-1}}$	18
norman	$6\,\mathrm{e}^{8\,\mathrm{e}^{4}}\mathrm{e}^{20\,\mathrm{e}^{3}}x$	19

input
```
int(6*exp((8*exp(1)+20)*exp(4)/exp(1)),x,method=_RETURNVERBOSE)
```

output
```
6*x*exp(8*exp(4)+20*exp(3))
```

3.398.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int 6e^{e^3(20+8e)}\,dx = 6\,xe^{\left(8\,e^4+20\,e^3\right)}$$

input
```
integrate(6*exp((8*exp(1)+20)*exp(4)/exp(1)),x, algorithm=\
```

output
```
6*x*e^(8*e^4 + 20*e^3)
```

3.398.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int 6e^{e^3(20+8e)}\,dx = 6xe^{(20+8e)e^3}$$

input
```
integrate(6*exp((8*exp(1)+20)*exp(4)/exp(1)),x)
```

output
```
6*x*exp((20 + 8*E)*exp(3))
```

3.398.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int 6e^{e^3(20+8e)}\,dx = 6\,xe^{\left(4\,(2\,e+5)e^3\right)}$$

input
```
integrate(6*exp((8*exp(1)+20)*exp(4)/exp(1)),x, algorithm=\
```

output
```
6*x*e^(4*(2*e + 5)*e^3)
```

3.398.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int 6e^{e^3(20+8e)}\,dx = 6\,xe^{\left(4\,(2\,e+5)e^3\right)}$$

input
```
integrate(6*exp((8*exp(1)+20)*exp(4)/exp(1)),x, algorithm=\
```

output
```
6*x*e^(4*(2*e + 5)*e^3)
```

3.398.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int 6e^{e^3(20+8e)}\,dx = 6\,x\,\mathrm{e}^{\mathrm{e}^3\,(8\,\mathrm{e}+20)}$$

input
```
int(6*exp(exp(3)*(8*exp(1) + 20)),x)
```

output
```
6*x*exp(exp(3)*(8*exp(1) + 20))
```

3.399 $\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+(10x^2-20x^3+30x^4-40x^5)\log(x)+(5x-10x^2+15x^3-20x^4)\log^2(x)}{5x^3+10x^2\log(x)+5x\log^2(x)}\,dx$

3.399.1 Optimal result

Integrand size = 96, antiderivative size = 26

$$\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+(10x^2-20x^3+30x^4-40x^5)\log(x)+(5x-10x^2+15x^3-20x^4)\log^2(x)}{5x^3+10x^2\log(x)+5x\log^2(x)}\,dx$$
$$= -3+x-x^2+x^3-x^4-\frac{2}{5(x+\log(x))}$$

output
```
x^3-3-x^2-2/(5*x+5*ln(x))-x^4+x
```

3.399.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+(10x^2-20x^3+30x^4-40x^5)\log(x)+(5x-10x^2+15x^3-20x^4)\log^2(x)}{5x^3+10x^2\log(x)+5x\log^2(x)}\,dx$$
$$= \frac{1}{5}\left(5x-5x^2+5x^3-5x^4-\frac{2}{x+\log(x)}\right)$$

input
```
Integrate[(2 + 2*x + 5*x^3 - 10*x^4 + 15*x^5 - 20*x^6 + (10*x^2 - 20*x^3 +
 30*x^4 - 40*x^5)*Log[x] + (5*x - 10*x^2 + 15*x^3 - 20*x^4)*Log[x]^2)/(5*x
^3 + 10*x^2*Log[x] + 5*x*Log[x]^2),x]
```

output
```
(5*x - 5*x^2 + 5*x^3 - 5*x^4 - 2/(x + Log[x]))/5
```

3.399.3 Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.042, Rules used = {7292, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-20x^6+15x^5-10x^4+5x^3+\left(-20x^4+15x^3-10x^2+5x\right)\log^2(x)+\left(-40x^5+30x^4-20x^3+10x^2\right)\log(x)+}{5x^3+10x^2\log(x)+5x\log^2(x)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-20x^6+15x^5-10x^4+5x^3+\left(-20x^4+15x^3-10x^2+5x\right)\log^2(x)+\left(-40x^5+30x^4-20x^3+10x^2\right)\log(x)+}{5x(x+\log(x))^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int \frac{-20x^6+15x^5-10x^4+5x^3+2x+5\left(-4x^4+3x^3-2x^2+x\right)\log^2(x)+10\left(-4x^5+3x^4-2x^3+x^2\right)\log(x)-}{x(x+\log(x))^2}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{5}\int \left(\frac{2(x+1)}{x(x+\log(x))^2}-5\left(4x^3-3x^2+2x-1\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(-5x^4+5x^3-5x^2+5x-\frac{2}{x+\log(x)}\right)$$

input
```
Int[(2 + 2*x + 5*x^3 - 10*x^4 + 15*x^5 - 20*x^6 + (10*x^2 - 20*x^3 + 30*x^
4 - 40*x^5)*Log[x] + (5*x - 10*x^2 + 15*x^3 - 20*x^4)*Log[x]^2)/(5*x^3 + 1
0*x^2*Log[x] + 5*x*Log[x]^2),x]
```

output
```
(5*x - 5*x^2 + 5*x^3 - 5*x^4 - 2/(x + Log[x]))/5
```

3.399. $\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+\left(10x^2-20x^3+30x^4-40x^5\right)\log(x)+\left(5x-10x^2+15x^3-20x^4\right)\log^2(x)}{5x^3+10x^2\log(x)+5x\log^2(x)}\,dx$

3.399.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.399.4 Maple [A] (verified)

Time = 1.05 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

method	result	size
risch	$-x^4+x^3-x^2+x-\frac{2}{5(x+\ln(x))}$	24
norman	$\frac{-\frac{2}{5}+x^2+x^4+x^3\ln(x)+x\ln(x)-x^3-x^5-x^2\ln(x)-x^4\ln(x)}{x+\ln(x)}$	50
default	$-\frac{2-5x^2+5x^3-5x^4+5x^5-5x\ln(x)+5x^2\ln(x)-5x^3\ln(x)+5x^4\ln(x)}{5(x+\ln(x))}$	57
parallelrisch	$\frac{-5x^5-5x^4\ln(x)+5x^4+5x^3\ln(x)-5x^3-5x^2\ln(x)+5x^2+5x\ln(x)-2}{5x+5\ln(x)}$	57

input
```
int(((-20*x^4+15*x^3-10*x^2+5*x)*ln(x)^2+(-40*x^5+30*x^4-20*x^3+10*x^2)*ln
(x)-20*x^6+15*x^5-10*x^4+5*x^3+2*x+2)/(5*x*ln(x)^2+10*x^2*ln(x)+5*x^3),x,m
ethod=_RETURNVERBOSE)
```

output
```
-x^4+x^3-x^2+x-2/5/(x+ln(x))
```

3.399. $\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+(10x^2-20x^3+30x^4-40x^5)\log(x)+(5x-10x^2+15x^3-20x^4)\log^2(x)}{5x^3+10x^2\log(x)+5x\log^2(x)}\,dx$

3.399.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(24) = 48.

Time = 0.27 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.88

$$\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+(10x^2-20x^3+30x^4-40x^5)\log(x)+(5x-10x^2+15x^3-20x^4)\log^2(x)}{5x^3+10x^2\log(x)+5x\log^2(x)}$$
$$= -\frac{5\,x^5-5\,x^4+5\,x^3-5\,x^2+5\,(x^4-x^3+x^2-x)\log{(x)}+2}{5\,(x+\log{(x)})}$$

input
```
integrate(((-20*x^4+15*x^3-10*x^2+5*x)*log(x)^2+(-40*x^5+30*x^4-20*x^3+10*
x^2)*log(x)-20*x^6+15*x^5-10*x^4+5*x^3+2*x+2)/(5*x*log(x)^2+10*x^2*log(x)+
5*x^3),x, algorithm=\
```

output
```
-1/5*(5*x^5 - 5*x^4 + 5*x^3 - 5*x^2 + 5*(x^4 - x^3 + x^2 - x)*log(x) + 2)/
(x + log(x))
```

3.399.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+(10x^2-20x^3+30x^4-40x^5)\log(x)+(5x-10x^2+15x^3-20x^4)}{5x^3+10x^2\log(x)+5x\log^2(x)}$$
$$= -x^4+x^3-x^2+x-\frac{2}{5x+5\log{(x)}}$$

input
```
integrate(((-20*x**4+15*x**3-10*x**2+5*x)*ln(x)**2+(-40*x**5+30*x**4-20*x*
*3+10*x**2)*ln(x)-20*x**6+15*x**5-10*x**4+5*x**3+2*x+2)/(5*x*ln(x)**2+10*x
**2*ln(x)+5*x**3),x)
```

output
```
-x**4 + x**3 - x**2 + x - 2/(5*x + 5*log(x))
```

3.399.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(24) = 48.

Time = 0.23 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.88

$$\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+(10x^2-20x^3+30x^4-40x^5)\log(x)+(5x-10x^2+15x^3-20x^4)}{5x^3+10x^2\log(x)+5x\log^2(x)}$$
$$= -\frac{5\,x^5-5\,x^4+5\,x^3-5\,x^2+5\,(x^4-x^3+x^2-x)\log\left(x\right)+2}{5\,(x+\log\left(x\right))}$$

input
```
integrate(((-20*x^4+15*x^3-10*x^2+5*x)*log(x)^2+(-40*x^5+30*x^4-20*x^3+10*
x^2)*log(x)-20*x^6+15*x^5-10*x^4+5*x^3+2*x+2)/(5*x*log(x)^2+10*x^2*log(x)+
5*x^3),x, algorithm=\
```

output
```
-1/5*(5*x^5 - 5*x^4 + 5*x^3 - 5*x^2 + 5*(x^4 - x^3 + x^2 - x)*log(x) + 2)/
(x + log(x))
```

3.399.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+(10x^2-20x^3+30x^4-40x^5)\log(x)+(5x-10x^2+15x^3-20x^4)}{5x^3+10x^2\log(x)+5x\log^2(x)}$$
$$= -x^4+x^3-x^2+x-\frac{2}{5\,(x+\log\left(x\right))}$$

input
```
integrate(((-20*x^4+15*x^3-10*x^2+5*x)*log(x)^2+(-40*x^5+30*x^4-20*x^3+10*
x^2)*log(x)-20*x^6+15*x^5-10*x^4+5*x^3+2*x+2)/(5*x*log(x)^2+10*x^2*log(x)+
5*x^3),x, algorithm=\
```

output
```
-x^4 + x^3 - x^2 + x - 2/5/(x + log(x))
```

3.399.9 Mupad [B] (verification not implemented)

Time = 15.83 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{2+2x+5x^3-10x^4+15x^5-20x^6+(10x^2-20x^3+30x^4-40x^5)\log(x)+(5x-10x^2+15x^3-20x^4)\log^2(x)}{5x^3+10x^2\log(x)+5x\log^2(x)}$$

$$=x-\frac{2}{5\,(x+\ln(x))}-x^2+x^3-x^4$$

input
```
int((2*x + log(x)^2*(5*x - 10*x^2 + 15*x^3 - 20*x^4) + log(x)*(10*x^2 - 20
*x^3 + 30*x^4 - 40*x^5) + 5*x^3 - 10*x^4 + 15*x^5 - 20*x^6 + 2)/(5*x*log(x
)^2 + 10*x^2*log(x) + 5*x^3),x)
```

output
```
x - 2/(5*(x + log(x))) - x^2 + x^3 - x^4
```

3.400 $\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2\right.}{-3125-1250x^2-125x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right.}{25-10e^x x+e^{2x}x^2}}}$

3.400.1 Optimal result

Integrand size = 497, antiderivative size = 37

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+\right.}{-3125-1250x^2-125x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-125+75e^x x-15e^{2x}x^2+e^{3x}\right.}$$
$$=2x-\frac{x}{5+e^{\frac{(5-x)^2x^4}{(5-e^x x)^2}}+x^2}$$

output
```
2*x-x/(exp(x^4*(5-x)^2/(5-exp(x)*x)^2)+x^2+5)
```

3.400.2 Mathematica [A] (verified)

Time = 1.00 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.81

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+\right.}{-3125-1250x^2-125x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-125+75e^x x-15e^{2x}x^2+e^{3x}\right.}$$
$$=x\left(2-\frac{e^{\frac{10x^5}{(-5+e^x x)^2}}}{e^{\frac{x^4\left(25+x^2\right)}{(-5+e^x x)^2}}+e^{\frac{10x^5}{(-5+e^x x)^2}}\left(5+x^2\right)}\right)$$

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\right.}{}$$

input
```
Integrate[(-5625 - 2625*x^2 - 250*x^4 + E^((2*(25*x^4 - 10*x^5 + x^6))/(25
 - 10*E^x*x + E^(2*x)*x^2))*(-250 + 150*E^x*x - 30*E^(2*x)*x^2 + 2*E^(3*x)
*x^3) + E^x*(3375*x + 1575*x^3 + 150*x^5) + E^(2*x)*(-675*x^2 - 315*x^4 -
30*x^6) + E^(3*x)*(45*x^3 + 21*x^5 + 2*x^7) + E^((25*x^4 - 10*x^5 + x^6)/(
25 - 10*E^x*x + E^(2*x)*x^2))*(-2375 - 500*x^2 - 500*x^4 + 250*x^5 - 30*x^
6 + E^(2*x)*(-285*x^2 - 60*x^4) + E^(3*x)*(19*x^3 + 4*x^5) + E^x*(1425*x +
 300*x^3 + 50*x^5 - 80*x^6 + 24*x^7 - 2*x^8)))/(-3125 - 1250*x^2 - 125*x^4
 + E^((2*(25*x^4 - 10*x^5 + x^6))/(25 - 10*E^x*x + E^(2*x)*x^2))*(-125 + 7
5*E^x*x - 15*E^(2*x)*x^2 + E^(3*x)*x^3) + E^x*(1875*x + 750*x^3 + 75*x^5)
+ E^(2*x)*(-375*x^2 - 150*x^4 - 15*x^6) + E^(3*x)*(25*x^3 + 10*x^5 + x^7)
+ E^((25*x^4 - 10*x^5 + x^6)/(25 - 10*E^x*x + E^(2*x)*x^2))*(-1250 - 250*x
^2 + E^x*(750*x + 150*x^3) + E^(2*x)*(-150*x^2 - 30*x^4) + E^(3*x)*(10*x^3
 + 2*x^5))),x]
```

output
```
x*(2 - E^((10*x^5)/(-5 + E^x*x)^2)/(E^((x^4*(25 + x^2))/(-5 + E^x*x)^2) +
E^((10*x^5)/(-5 + E^x*x)^2)*(5 + x^2)))
```

3.400.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(2e^{3x}x^3-30e^{2x}x^2+150e^xx-250\right)\exp\left(\frac{2(x^6-10x^5+25x^4)}{e^{2x}x^2-10e^xx+25}\right)-250x^4-2625x^2+e^x\left(150x^5+1575x^3+3375x\right)}{\left(e^{3x}x^3-15e^{2x}x^2+75e^xx-125\right)\exp\left(\frac{2(x^6-10x^5+25x^4)}{e^{2x}x^2-10e^xx+25}\right)-125x^4-1250x^2+e}$$

$\Big\downarrow$ 7239

$$\int \frac{e^{\frac{20x^5}{(e^xx-5)^2}}\left(250x^4-2e^{\frac{2(x-5)^2x^4}{(e^xx-5)^2}}\left(e^xx-5\right)^3+2625x^2+15e^{2x}\left(2x^4+21x^2+45\right)x^2-75e^x\left(2x^4+21x^2+45\right)x-\right.}{}$$

$\Big\downarrow$ 7293

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^xx+e^{2x}x^2}}\left(-250+150e^xx-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\right.}{}$$

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\right.\right.}{}$$

$\downarrow$ 7293

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\right.\right.}{}$$

$\downarrow$ 7293

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\right.$$

$\downarrow$ 7239

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\right.}{}$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}(4x^2+19\cdots\right.}{\cdots}$$

$$\Big\downarrow \text{ 7293}$$

$$\int\left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\cdots\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}(4x^2+19\cdots\right.}{\cdots}$$

$$\Big\downarrow \text{ 7293}$$

$$\int\left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\cdots\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}(4x^2+19\cdots\right.}{\cdots}$$

$$\Big\downarrow \text{ 7293}$$

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2(25x^4-10x^5+x^6)}{25-10e^x x+e^{2x}x^2}}(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3)+e^x(3375x+1575x^3+150x^5)+e^{2x}(-675x^2-315x^4-30x^6)+e^{3x}(\cdots}{\cdots}$$

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4\left(x^2+25\right)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4\left(x^2+25\right)}{(e^x x-5)^2}}\right)^2}\cdots\right.$$

$$\Big\downarrow \ 7239$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\cdots\right.\right.}{\cdots}$$

$$\Big\downarrow \ 7293$$

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4\left(x^2+25\right)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4\left(x^2+25\right)}{(e^x x-5)^2}}\right)^2}\cdots\right.$$

$$\Big\downarrow \ 7239$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\cdots\right.\right.}{\cdots}$$

$$\Big\downarrow \ 7293$$

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4\left(x^2+25\right)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4\left(x^2+25\right)}{(e^x x-5)^2}}\right)^2}\cdots\right.$$

$$\Big\downarrow \ 7239$$

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\cdots\right.}{\cdots}$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\cdots\right.\right.}{\cdots}$$

$$\Big\downarrow \; 7293$$

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\cdots\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\cdots\right.\right.}{\cdots}$$

$$\Big\downarrow \; 7293$$

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\cdots\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\cdots\right.\right.}{\cdots}$$

$$\Big\downarrow \; 7293$$

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\cdots\right.}{\cdots}$$

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\cdots$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\cdots\right.\right.}{\cdots}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\cdots$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}}\left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x+250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}}-2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3+30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2+15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\cdots\right.\right.}{\cdots}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}+\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\cdots$$

$$\Big\downarrow \text{ 7239}$$

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\cdots\right.}{\cdots}$$

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}} \left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x + 250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}} - 2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3 + 30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2 + 15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\right.\right.}{}$$

$\downarrow$ 7293

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2} + \frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\right.$$

$\downarrow$ 7239

$$\int \frac{e^{\frac{20x^5}{(e^x x-5)^2}} \left(-150e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+x}x + 250e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}} - 2e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+3x}x^3 + 30e^{\frac{2(x-5)^2x^4}{(e^x x-5)^2}+2x}x^2 + 15e^{\frac{(x-5)^2x^4}{(e^x x-5)^2}+2x}\left(4x^2+19\right.\right.}{}$$

$\downarrow$ 7293

$$\int \left(-\frac{2e^{\frac{20x^5}{(e^x x-5)^2}+\frac{(x-5)^2x^4}{(e^x x-5)^2}+x}x^8}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2} + \frac{2e^{\frac{20x^5}{(e^x x-5)^2}+3x}x^7}{(e^x x-5)^3\left(e^{\frac{10x^5}{(e^x x-5)^2}}x^2+5e^{\frac{10x^5}{(e^x x-5)^2}}+e^{\frac{x^4(x^2+25)}{(e^x x-5)^2}}\right)^2}\right.$$

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2(25x^4-10x^5+x^6)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\right.}{}$$

input
```
Int[(-5625 - 2625*x^2 - 250*x^4 + E^((2*(25*x^4 - 10*x^5 + x^6))/(25 - 10*
E^x*x + E^(2*x)*x^2))*(-250 + 150*E^x*x - 30*E^(2*x)*x^2 + 2*E^(3*x)*x^3)
+ E^x*(3375*x + 1575*x^3 + 150*x^5) + E^(2*x)*(-675*x^2 - 315*x^4 - 30*x^6
) + E^(3*x)*(45*x^3 + 21*x^5 + 2*x^7) + E^((25*x^4 - 10*x^5 + x^6)/(25 - 1
0*E^x*x + E^(2*x)*x^2))*(-2375 - 500*x^2 - 500*x^4 + 250*x^5 - 30*x^6 + E^
(2*x)*(-285*x^2 - 60*x^4) + E^(3*x)*(19*x^3 + 4*x^5) + E^x*(1425*x + 300*x
^3 + 50*x^5 - 80*x^6 + 24*x^7 - 2*x^8)))/(-3125 - 1250*x^2 - 125*x^4 + E^(
(2*(25*x^4 - 10*x^5 + x^6))/(25 - 10*E^x*x + E^(2*x)*x^2))*(-125 + 75*E^x*
x - 15*E^(2*x)*x^2 + E^(3*x)*x^3) + E^x*(1875*x + 750*x^3 + 75*x^5) + E^(2
*x)*(-375*x^2 - 150*x^4 - 15*x^6) + E^(3*x)*(25*x^3 + 10*x^5 + x^7) + E^((
25*x^4 - 10*x^5 + x^6)/(25 - 10*E^x*x + E^(2*x)*x^2))*(-1250 - 250*x^2 + E
^x*(750*x + 150*x^3) + E^(2*x)*(-150*x^2 - 30*x^4) + E^(3*x)*(10*x^3 + 2*x
^5))),x]
```

output
```
$Aborted
```

3.400.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.400.4 Maple [A] (verified)

Time = 40.39 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.19

method	result	size
risch	$2x-\frac{x}{x^{2}+{\mathrm e}^{-\frac{x^{4} \left(-5+x \right)^{2}}{-{\mathrm e}^{2 x} x^{2}+10 \,{\mathrm e}^{x} x -25}}+5}$	44
parallelrisch	$\frac{37500 x^{3}+37500 \,{\mathrm e}^{\frac{x^{4} \left(x^{2}-10 x +25\right)}{{\mathrm e}^{2 x} x^{2}-10 \,{\mathrm e}^{x} x +25}} x +168750 x}{18750 x^{2}+18750 \,{\mathrm e}^{\frac{x^{4} \left(x^{2}-10 x +25\right)}{{\mathrm e}^{2 x} x^{2}-10 \,{\mathrm e}^{x} x +25}}+93750}$	82

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\right.}{}$$

input
```
int(((2*x^3*exp(x)^3-30*exp(x)^2*x^2+150*exp(x)*x-250)*exp((x^6-10*x^5+25*
x^4)/(exp(x)^2*x^2-10*exp(x)*x+25))^2+((4*x^5+19*x^3)*exp(x)^3+(-60*x^4-28
5*x^2)*exp(x)^2+(-2*x^8+24*x^7-80*x^6+50*x^5+300*x^3+1425*x)*exp(x)-30*x^6
+250*x^5-500*x^4-500*x^2-2375)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*x^2-10*ex
p(x)*x+25))+(2*x^7+21*x^5+45*x^3)*exp(x)^3+(-30*x^6-315*x^4-675*x^2)*exp(x
)^2+(150*x^5+1575*x^3+3375*x)*exp(x)-250*x^4-2625*x^2-5625)/((x^3*exp(x)^3
-15*exp(x)^2*x^2+75*exp(x)*x-125)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*x^2-10
*exp(x)*x+25))^2+((2*x^5+10*x^3)*exp(x)^3+(-30*x^4-150*x^2)*exp(x)^2+(150*
x^3+750*x)*exp(x)-250*x^2-1250)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*x^2-10*e
xp(x)*x+25))+(x^7+10*x^5+25*x^3)*exp(x)^3+(-15*x^6-150*x^4-375*x^2)*exp(x)
^2+(75*x^5+750*x^3+1875*x)*exp(x)-125*x^4-1250*x^2-3125),x,method=_RETURNV
ERBOSE)
```

output
```
2*x-x/(x^2+exp(-x^4*(-5+x)^2/(-exp(2*x)*x^2+10*exp(x)*x-25))+5)
```

3.400.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 86 vs. $2(32) = 64$.

Time = 0.26 (sec) , antiderivative size = 86, normalized size of antiderivative = 2.32

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^xx+e^{2x}x^2}}\left(-250+150e^xx-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+\right.}{-3125-1250x^2-125x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^xx+e^{2x}x^2}}\left(-125+75e^xx-15e^{2x}x^2+e^{3x}x\right.}$$
$$= \frac{2\,x^3+2\,xe^{\left(\frac{x^6-10\,x^5+25\,x^4}{x^2e^{(2\,x)}-10\,xe^x+25}\right)}+9\,x}{x^2+e^{\left(\frac{x^6-10\,x^5+25\,x^4}{x^2e^{(2\,x)}-10\,xe^x+25}\right)}+5}$$

input
```
integrate(((2*x^3*exp(x)^3-30*exp(x)^2*x^2+150*exp(x)*x-250)*exp((x^6-10*x
^5+25*x^4)/(exp(x)^2*x^2-10*exp(x)*x+25))^2+((4*x^5+19*x^3)*exp(x)^3+(-60*
x^4-285*x^2)*exp(x)^2+(-2*x^8+24*x^7-80*x^6+50*x^5+300*x^3+1425*x)*exp(x)-
30*x^6+250*x^5-500*x^4-500*x^2-2375)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*x^2
-10*exp(x)*x+25))+(2*x^7+21*x^5+45*x^3)*exp(x)^3+(-30*x^6-315*x^4-675*x^2)
*exp(x)^2+(150*x^5+1575*x^3+3375*x)*exp(x)-250*x^4-2625*x^2-5625)/((x^3*ex
p(x)^3-15*exp(x)^2*x^2+75*exp(x)*x-125)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*
x^2-10*exp(x)*x+25))^2+((2*x^5+10*x^3)*exp(x)^3+(-30*x^4-150*x^2)*exp(x)^2
+(150*x^3+750*x)*exp(x)-250*x^2-1250)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*x^
2-10*exp(x)*x+25))+(x^7+10*x^5+25*x^3)*exp(x)^3+(-15*x^6-150*x^4-375*x^2)*
exp(x)^2+(75*x^5+750*x^3+1875*x)*exp(x)-125*x^4-1250*x^2-3125),x, algorith
m=\
```

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^xx+e^{2x}x^2}}\left(-250+150e^xx-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\right.}{}$$

output
```
(2*x^3 + 2*x*e^((x^6 - 10*x^5 + 25*x^4)/(x^2*e^(2*x) - 10*x*e^x + 25)) + 9
*x)/(x^2 + e^((x^6 - 10*x^5 + 25*x^4)/(x^2*e^(2*x) - 10*x*e^x + 25)) + 5)
```

3.400.6 Sympy [A] (verification not implemented)

Time = 0.78 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.11

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2(25x^4-10x^5+x^6)}{25-10e^x x+e^{2x}x^2}}(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3)+e^x(3375x+1575x^3+\ldots}{-3125-1250x^2-125x^4+e^{\frac{2(25x^4-10x^5+x^6)}{25-10e^x x+e^{2x}x^2}}(-125+75e^x x-15e^{2x}x^2+e^{3x}x\ldots}$$
$$= 2x - \frac{x}{x^2+e^{\frac{x^6-10x^5+25x^4}{x^2e^{2x}-10xe^x+25}}+5}$$

input
```
integrate(((2*x**3*exp(x)**3-30*exp(x)**2*x**2+150*exp(x)*x-250)*exp((x**6
-10*x**5+25*x**4)/(exp(x)**2*x**2-10*exp(x)*x+25))**2+((4*x**5+19*x**3)*ex
p(x)**3+(-60*x**4-285*x**2)*exp(x)**2+(-2*x**8+24*x**7-80*x**6+50*x**5+300
*x**3+1425*x)*exp(x)-30*x**6+250*x**5-500*x**4-500*x**2-2375)*exp((x**6-10
*x**5+25*x**4)/(exp(x)**2*x**2-10*exp(x)*x+25))+(2*x**7+21*x**5+45*x**3)*e
xp(x)**3+(-30*x**6-315*x**4-675*x**2)*exp(x)**2+(150*x**5+1575*x**3+3375*x
)*exp(x)-250*x**4-2625*x**2-5625)/((x**3*exp(x)**3-15*exp(x)**2*x**2+75*ex
p(x)*x-125)*exp((x**6-10*x**5+25*x**4)/(exp(x)**2*x**2-10*exp(x)*x+25))**2
+((2*x**5+10*x**3)*exp(x)**3+(-30*x**4-150*x**2)*exp(x)**2+(150*x**3+750*x
)*exp(x)-250*x**2-1250)*exp((x**6-10*x**5+25*x**4)/(exp(x)**2*x**2-10*exp(
x)*x+25))+(x**7+10*x**5+25*x**3)*exp(x)**3+(-15*x**6-150*x**4-375*x**2)*ex
p(x)**2+(75*x**5+750*x**3+1875*x)*exp(x)-125*x**4-1250*x**2-3125),x)
```

output
```
2*x - x/(x**2 + exp((x**6 - 10*x**5 + 25*x**4)/(x**2*exp(2*x) - 10*x*exp(x
) + 25)) + 5)
```

3.400.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 474 vs. 2(32) = 64.

Time = 2.45 (sec) , antiderivative size = 474, normalized size of antiderivative = 12.81

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2(25x^4-10x^5+x^6)}{25-10e^x x+e^{2x}x^2}}(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3)+e^x(3375x+1575x^3+\ldots}{-3125-1250x^2-125x^4+e^{\frac{2(25x^4-10x^5+x^6)}{25-10e^x x+e^{2x}x^2}}(-125+75e^x x-15e^{2x}x^2+e^{3x}x\ldots}$$
$$= \text{Too large to display}$$

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2(25x^4-10x^5+x^6)}{25-10e^x x+e^{2x}x^2}}(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3)+e^x(3375x+1575x^3+150x^5)+e^{2x}(-675x^2-315x^4-30x^6)+e^{3x}(\ldots}{\ldots}$$

input
```
integrate(((2*x^3*exp(x)^3-30*exp(x)^2*x^2+150*exp(x)*x-250)*exp((x^6-10*x
^5+25*x^4)/(exp(x)^2*x^2-10*exp(x)*x+25))^2+((4*x^5+19*x^3)*exp(x)^3+(-60*
x^4-285*x^2)*exp(x)^2+(-2*x^8+24*x^7-80*x^6+50*x^5+300*x^3+1425*x)*exp(x)-
30*x^6+250*x^5-500*x^4-500*x^2-2375)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*x^2
-10*exp(x)*x+25))+(2*x^7+21*x^5+45*x^3)*exp(x)^3+(-30*x^6-315*x^4-675*x^2)
*exp(x)^2+(150*x^5+1575*x^3+3375*x)*exp(x)-250*x^4-2625*x^2-5625)/((x^3*ex
p(x)^3-15*exp(x)^2*x^2+75*exp(x)*x-125)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*
x^2-10*exp(x)*x+25))^2+((2*x^5+10*x^3)*exp(x)^3+(-30*x^4-150*x^2)*exp(x)^2
+(150*x^3+750*x)*exp(x)-250*x^2-1250)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*x^
2-10*exp(x)*x+25))+(x^7+10*x^5+25*x^3)*exp(x)^3+(-15*x^6-150*x^4-375*x^2)*
exp(x)^2+(75*x^5+750*x^3+1875*x)*exp(x)-125*x^4-1250*x^2-3125),x, algorith
m=\
```

output
```
(2*x*e^(x^4*e^(-2*x) + 10*x^3*e^(-3*x) + 25*x^2*e^(-2*x) + 75*x^2*e^(-4*x)
 + 250*x*e^(-3*x) + 500*x*e^(-5*x) + 15625/(x^2*e^(8*x) - 10*x*e^(7*x) + 2
5*e^(6*x)) + 15625/(x^2*e^(6*x) - 10*x*e^(5*x) + 25*e^(4*x)) + 18750/(x*e^
(7*x) - 5*e^(6*x)) + 12500/(x*e^(5*x) - 5*e^(4*x)) + 1875*e^(-4*x) + 3125*
e^(-6*x)) + (2*x^3 + 9*x)*e^(10*x^3*e^(-2*x) + 100*x^2*e^(-3*x) + 750*x*e^
(-4*x) + 31250/(x^2*e^(7*x) - 10*x*e^(6*x) + 25*e^(5*x)) + 31250/(x*e^(6*x
) - 5*e^(5*x)) + 5000*e^(-5*x)))/((x^2 + 5)*e^(10*x^3*e^(-2*x) + 100*x^2*e
^(-3*x) + 750*x*e^(-4*x) + 31250/(x^2*e^(7*x) - 10*x*e^(6*x) + 25*e^(5*x))
 + 31250/(x*e^(6*x) - 5*e^(5*x)) + 5000*e^(-5*x)) + e^(x^4*e^(-2*x) + 10*x
^3*e^(-3*x) + 25*x^2*e^(-2*x) + 75*x^2*e^(-4*x) + 250*x*e^(-3*x) + 500*x*e
^(-5*x) + 15625/(x^2*e^(8*x) - 10*x*e^(7*x) + 25*e^(6*x)) + 15625/(x^2*e^(
6*x) - 10*x*e^(5*x) + 25*e^(4*x)) + 18750/(x*e^(7*x) - 5*e^(6*x)) + 12500/
(x*e^(5*x) - 5*e^(4*x)) + 1875*e^(-4*x) + 3125*e^(-6*x)))
```

3.400.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 86 vs. $2(32) = 64$.

Time = 7.36 (sec) , antiderivative size = 86, normalized size of antiderivative = 2.32

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+\right.}{-3125-1250x^2-125x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-125+75e^x x-15e^{2x}x^2+e^{3x}x\right.}$$
$$= \frac{2\,x^3+2\,xe^{\left(\frac{x^6-10\,x^5+25\,x^4}{x^2e^{(2\,x)}-10\,xe^x+25}\right)}+9\,x}{x^2+e^{\left(\frac{x^6-10\,x^5+25\,x^4}{x^2e^{(2\,x)}-10\,xe^x+25}\right)}+5}$$

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\right.}{}$$

input
```
integrate(((2*x^3*exp(x)^3-30*exp(x)^2*x^2+150*exp(x)*x-250)*exp((x^6-10*x
^5+25*x^4)/(exp(x)^2*x^2-10*exp(x)*x+25))^2+((4*x^5+19*x^3)*exp(x)^3+(-60*
x^4-285*x^2)*exp(x)^2+(-2*x^8+24*x^7-80*x^6+50*x^5+300*x^3+1425*x)*exp(x)-
30*x^6+250*x^5-500*x^4-500*x^2-2375)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*x^2
-10*exp(x)*x+25))+(2*x^7+21*x^5+45*x^3)*exp(x)^3+(-30*x^6-315*x^4-675*x^2)
*exp(x)^2+(150*x^5+1575*x^3+3375*x)*exp(x)-250*x^4-2625*x^2-5625)/((x^3*ex
p(x)^3-15*exp(x)^2*x^2+75*exp(x)*x-125)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*
x^2-10*exp(x)*x+25))^2+((2*x^5+10*x^3)*exp(x)^3+(-30*x^4-150*x^2)*exp(x)^2
+(150*x^3+750*x)*exp(x)-250*x^2-1250)*exp((x^6-10*x^5+25*x^4)/(exp(x)^2*x^
2-10*exp(x)*x+25))+(x^7+10*x^5+25*x^3)*exp(x)^3+(-15*x^6-150*x^4-375*x^2)*
exp(x)^2+(75*x^5+750*x^3+1875*x)*exp(x)-125*x^4-1250*x^2-3125),x, algorith
m=\
```

output
```
(2*x^3 + 2*x*e^((x^6 - 10*x^5 + 25*x^4)/(x^2*e^(2*x) - 10*x*e^x + 25)) + 9
*x)/(x^2 + e^((x^6 - 10*x^5 + 25*x^4)/(x^2*e^(2*x) - 10*x*e^x + 25)) + 5)
```

3.400.9 Mupad [B] (verification not implemented)

Time = 16.97 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.24

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^xx+e^{2x}x^2}}\left(-250+150e^xx-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+\right.}{-3125-1250x^2-125x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^xx+e^{2x}x^2}}\left(-125+75e^xx-15e^{2x}x^2+e^{3x}x\right.}$$
$$= 2\,x-\frac{x}{x^2+\mathrm{e}^{\frac{x^6}{x^2\,\mathrm{e}^{2\,x}-10\,x\,\mathrm{e}^x+25}}\,\mathrm{e}^{-\frac{10\,x^5}{x^2\,\mathrm{e}^{2\,x}-10\,x\,\mathrm{e}^x+25}}\,\mathrm{e}^{\frac{25\,x^4}{x^2\,\mathrm{e}^{2\,x}-10\,x\,\mathrm{e}^x+25}}+5}$$

input
```
int((exp((25*x^4 - 10*x^5 + x^6)/(x^2*exp(2*x) - 10*x*exp(x) + 25))*(exp(2
*x)*(285*x^2 + 60*x^4) - exp(3*x)*(19*x^3 + 4*x^5) - exp(x)*(1425*x + 300*
x^3 + 50*x^5 - 80*x^6 + 24*x^7 - 2*x^8) + 500*x^2 + 500*x^4 - 250*x^5 + 30
*x^6 + 2375) - exp(3*x)*(45*x^3 + 21*x^5 + 2*x^7) + exp(2*x)*(675*x^2 + 31
5*x^4 + 30*x^6) + exp((2*(25*x^4 - 10*x^5 + x^6))/(x^2*exp(2*x) - 10*x*exp
(x) + 25))*(30*x^2*exp(2*x) - 2*x^3*exp(3*x) - 150*x*exp(x) + 250) + 2625*
x^2 + 250*x^4 - exp(x)*(3375*x + 1575*x^3 + 150*x^5) + 5625)/(exp(2*x)*(37
5*x^2 + 150*x^4 + 15*x^6) - exp(3*x)*(25*x^3 + 10*x^5 + x^7) + exp((2*(25*
x^4 - 10*x^5 + x^6))/(x^2*exp(2*x) - 10*x*exp(x) + 25))*(15*x^2*exp(2*x) -
 x^3*exp(3*x) - 75*x*exp(x) + 125) + exp((25*x^4 - 10*x^5 + x^6)/(x^2*exp(
2*x) - 10*x*exp(x) + 25))*(exp(2*x)*(150*x^2 + 30*x^4) - exp(3*x)*(10*x^3
+ 2*x^5) - exp(x)*(750*x + 150*x^3) + 250*x^2 + 1250) + 1250*x^2 + 125*x^4
 - exp(x)*(1875*x + 750*x^3 + 75*x^5) + 3125),x)
```

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^xx+e^{2x}x^2}}\left(-250+150e^xx-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\right.}{}$$

output
```
2*x - x/(x^2 + exp(x^6/(x^2*exp(2*x) - 10*x*exp(x) + 25))*exp(-(10*x^5)/(x
^2*exp(2*x) - 10*x*exp(x) + 25))*exp((25*x^4)/(x^2*exp(2*x) - 10*x*exp(x)
+ 25)) + 5)
```

3.400.

$$\int \frac{-5625-2625x^2-250x^4+e^{\frac{2\left(25x^4-10x^5+x^6\right)}{25-10e^x x+e^{2x}x^2}}\left(-250+150e^x x-30e^{2x}x^2+2e^{3x}x^3\right)+e^x\left(3375x+1575x^3+150x^5\right)+e^{2x}\left(-675x^2-315x^4-30x^6\right)+e^{3x}\left(\right.}{}$$

3.401 $\int \left(e^{5x}(1+5x)+e^x(-1-x)\log(4)\right)\,dx$

3.401.1 Optimal result

Integrand size = 23, antiderivative size = 20

$$\int \left(e^{5x}(1+5x)+e^x(-1-x)\log(4)\right)\,dx=x\left(e^{5x}+\frac{3}{x}-e^x\log(4)\right)$$

output
```
(exp(5*x)-2*exp(x)*ln(2)+3/x)*x
```

3.401.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \left(e^{5x}(1+5x)+e^x(-1-x)\log(4)\right)\,dx=e^{5x}x-e^x x\log(4)$$

input
```
Integrate[E^(5*x)*(1 + 5*x) + E^x*(-1 - x)*Log[4],x]
```

output
```
E^(5*x)*x - E^x*x*Log[4]
```

3.401.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 40, normalized size of antiderivative = 2.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{5x}(5x+1)+e^x(-x-1)\log(4)\right)\,dx$$

$$\Big\downarrow \; 2009$$

$$-\frac{e^{5x}}{5}+\frac{1}{5}e^{5x}(5x+1)-e^x(x+1)\log(4)+e^x\log(4)$$

input
```
Int[E^(5*x)*(1 + 5*x) + E^x*(-1 - x)*Log[4],x]
```

output
```
-1/5*E^(5*x) + (E^(5*x)*(1 + 5*x))/5 + E^x*Log[4] - E^x*(1 + x)*Log[4]
```

3.401.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.401.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

method	result	size
default	$x\,\mathrm{e}^{5x}-2x\ln\left(2\right)\mathrm{e}^{x}$	15
norman	$x\,\mathrm{e}^{5x}-2x\ln\left(2\right)\mathrm{e}^{x}$	15
risch	$x\,\mathrm{e}^{5x}-2x\ln\left(2\right)\mathrm{e}^{x}$	15
parallelrisch	$x\,\mathrm{e}^{5x}-2x\ln\left(2\right)\mathrm{e}^{x}$	15
parts	$x\,\mathrm{e}^{5x}-2x\ln\left(2\right)\mathrm{e}^{x}$	15
meijerg	$\frac{\mathrm{e}^{5x}}{5}-\frac{(2-10x)\mathrm{e}^{5x}}{10}+2(1-\mathrm{e}^{x})\ln\left(2\right)-2\ln\left(2\right)\left(1-\frac{(2-2x)\mathrm{e}^{x}}{2}\right)$	44

input
```
int((1+5*x)*exp(5*x)+2*(-1-x)*ln(2)*exp(x),x,method=_RETURNVERBOSE)
```

output
```
x*exp(5*x)-2*x*ln(2)*exp(x)
```

3.401.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \left(e^{5x}(1+5x)+e^x(-1-x)\log(4)\right)\,dx=-2\,xe^x\log{(2)}+xe^{(5\,x)}$$

input
```
integrate((1+5*x)*exp(5*x)+2*(-1-x)*log(2)*exp(x),x, algorithm=\
```

output
```
-2*x*e^x*log(2) + x*e^(5*x)
```

3.401.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \left(e^{5x}(1+5x)+e^x(-1-x)\log(4)\right)\,dx=xe^{5x}-2xe^x\log{(2)}$$

input
```
integrate((1+5*x)*exp(5*x)+2*(-1-x)*ln(2)*exp(x),x)
```

output
```
x*exp(5*x) - 2*x*exp(x)*log(2)
```

3.401.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \left(e^{5x}(1+5x)+e^x(-1-x)\log(4)\right)\,dx=xe^{(5\,x)}-2\left((x-1)e^x+e^x\right)\log{(2)}$$

input
```
integrate((1+5*x)*exp(5*x)+2*(-1-x)*log(2)*exp(x),x, algorithm=\
```

output
```
x*e^(5*x) - 2*((x - 1)*e^x + e^x)*log(2)
```

3.401.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \left(e^{5x}(1+5x)+e^x(-1-x)\log(4)\right)\,dx=-2\,xe^x\log{(2)}+xe^{(5\,x)}$$

input
```
integrate((1+5*x)*exp(5*x)+2*(-1-x)*log(2)*exp(x),x, algorithm=\
```

output
```
-2*x*e^x*log(2) + x*e^(5*x)
```

3.401.9 Mupad [B] (verification not implemented)

Time = 14.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int \left(e^{5x}(1+5x)+e^x(-1-x)\log(4)\right)\,dx=x\,\mathrm{e}^x\,\left(\mathrm{e}^{4\,x}-2\,\ln{(2)}\right)$$

input
```
int(exp(5*x)*(5*x + 1) - 2*exp(x)*log(2)*(x + 1),x)
```

output
```
x*exp(x)*(exp(4*x) - 2*log(2))
```

3.402 $\int \frac{2e^{5/2}x^2+e^{5/4}(2x+2x^2)+\left(2+4x+2x^2+e^{5/4}(2x+4x^2)\right)\log(x)+(2x+$

$e^{5/2}x$

3.402.1 Optimal result

Integrand size = 77, antiderivative size = 15

$$\int \frac{2e^{5/2}x^2+e^{5/4}(2x+2x^2)+\left(2+4x+2x^2+e^{5/4}(2x+4x^2)\right)\log(x)+(2x+2x^2)\log^2(x)}{e^{5/2}x}\,dx=\Big(x+\frac{(1+$$

output
```
((1+x)*ln(x)/exp(5/4)+x)^2
```

3.402.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47

$$\int \frac{2e^{5/2}x^2+e^{5/4}(2x+2x^2)+\left(2+4x+2x^2+e^{5/4}(2x+4x^2)\right)\log(x)+(2x+2x^2)\log^2(x)}{e^{5/2}x}\,dx=\frac{(e^{5/4}x+($$

input
```
Integrate[(2*E^(5/2)*x^2 + E^(5/4)*(2*x + 2*x^2) + (2 + 4*x + 2*x^2 + E^(5
/4)*(2*x + 4*x^2))*Log[x] + (2*x + 2*x^2)*Log[x]^2)/(E^(5/2)*x),x]
```

output
```
(E^(5/4)*x + (1 + x)*Log[x])^2/E^(5/2)
```

3.402.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 138 vs. $2(15) = 30$.

Time = 0.32 (sec) , antiderivative size = 138, normalized size of antiderivative = 9.20, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.052$, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2e^{5/2}x^2 + e^{5/4}(2x^2+2x) + (2x^2+2x)\log^2(x) + (2x^2 + e^{5/4}(4x^2+2x) + 4x + 2)\log(x)}{e^{5/2}x} \, dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \frac{2(e^{5/2}x^2+(x^2+x)\log^2(x)+e^{5/4}(x^2+x)+(x^2+2x+e^{5/4}(2x^2+x)+1)\log(x))}{x}dx}{e^{5/2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{2\int \frac{e^{5/2}x^2+(x^2+x)\log^2(x)+e^{5/4}(x^2+x)+(x^2+2x+e^{5/4}(2x^2+x)+1)\log(x)}{x}dx}{e^{5/2}}$$

$$\Big\downarrow \text{2010}$$

$$\frac{2\int \left((x+1)\log^2(x) + \frac{((1+2e^{5/4})x^2+(2+e^{5/4})x+1)\log(x)}{x} + e^{5/4}(1+e^{5/4})x + e^{5/4}\right)dx}{e^{5/2}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{2\left(-\frac{1}{4}(1+2e^{5/4})x^2 + \frac{1}{2}e^{5/4}(1+e^{5/4})x^2 + \frac{x^2}{4} + \frac{1}{2}x^2\log^2(x) + \frac{1}{2}(1+2e^{5/4})x^2\log(x) - \frac{1}{2}x^2\log(x) - (2+e^{5/4})x\right.}{e^{5/2}}$$

input
```
Int[(2*E^(5/2)*x^2 + E^(5/4)*(2*x + 2*x^2) + (2 + 4*x + 2*x^2 + E^(5/4)*(2
*x + 4*x^2))*Log[x] + (2*x + 2*x^2)*Log[x]^2)/(E^(5/2)*x),x]
```

output
```
(2*(2*x + E^(5/4)*x - (2 + E^(5/4))*x + x^2/4 + (E^(5/4)*(1 + E^(5/4))*x^2
)/2 - ((1 + 2*E^(5/4))*x^2)/4 - 2*x*Log[x] + (2 + E^(5/4))*x*Log[x] - (x^2
*Log[x])/2 + ((1 + 2*E^(5/4))*x^2*Log[x])/2 + Log[x]^2/2 + x*Log[x]^2 + (x
^2*Log[x]^2)/2))/E^(5/2)
```

3.402.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.402.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 29 vs. 2(14) = 28.

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 2.00

method	result
risch	$e^{-\frac{5}{2}}(x^2+2x+1)\ln(x)^2+2\,e^{-\frac{5}{4}}(1+x)\,x\ln(x)+x^2$
parallelrisch	$e^{-\frac{5}{2}}\left(x^2e^{\frac{5}{2}}+2\ln(x)\,e^{\frac{5}{4}}x^2+x^2\ln(x)^2+2\ln(x)\,e^{\frac{5}{4}}x+2x\ln(x)^2+\ln(x)^2\right)$
norman	$\left(e^{-\frac{5}{4}}\ln(x)^2+e^{\frac{5}{4}}x^2+e^{-\frac{5}{4}}x^2\ln(x)^2+2x\ln(x)+2x^2\ln(x)+2\,e^{-\frac{5}{4}}x\ln(x)^2\right)e^{-\frac{5}{4}}$
default	$e^{-\frac{5}{2}}\left(x^2\ln(x)^2+4\,e^{\frac{5}{4}}\left(\frac{x^2\ln(x)}{2}-\frac{x^2}{4}\right)+x^2e^{\frac{5}{2}}+2x\ln(x)^2+2\,e^{\frac{5}{4}}(x\ln(x)-x)+e^{\frac{5}{4}}x^2+2x\,e^{\frac{5}{4}}$
parts	$2\,e^{-\frac{5}{4}}\left(\frac{e^{\frac{5}{4}}x^2}{2}+\frac{x^2}{2}+x\right)+2\,e^{-\frac{5}{2}}\left(\frac{x^2\ln(x)^2}{2}-\frac{x^2\ln(x)}{2}+\frac{x^2}{4}+x\ln(x)^2-2x\ln(x)+2x\right)+2\,e^{-\frac{5}{2}}($

input
```
int(((2*x^2+2*x)*ln(x)^2+((4*x^2+2*x)*exp(5/4)+2*x^2+4*x+2)*ln(x)+2*x^2*ex
p(5/4)^2+(2*x^2+2*x)*exp(5/4))/x/exp(5/4)^2,x,method=_RETURNVERBOSE)
```

output
```
exp(-5/2)*(x^2+2*x+1)*ln(x)^2+2*exp(-5/4)*(1+x)*x*ln(x)+x^2
```

3.402.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. $2(12) = 24$.

Time = 0.25 (sec) , antiderivative size = 34, normalized size of antiderivative = 2.27

$$\int \frac{2e^{5/2}x^2 + e^{5/4}(2x + 2x^2) + \left(2 + 4x + 2x^2 + e^{5/4}(2x + 4x^2)\right)\log(x) + (2x + 2x^2)\log^2(x)}{e^{5/2}x}\,dx = \left(x^2e^{\frac{5}{2}} + 2\right.$$

input
```
integrate((((2*x^2+2*x)*log(x)^2+((4*x^2+2*x)*exp(5/4)+2*x^2+4*x+2)*log(x)+
2*x^2*exp(5/4)^2+(2*x^2+2*x)*exp(5/4))/x/exp(5/4)^2,x, algorithm=\
```

output
```
(x^2*e^(5/2) + 2*(x^2 + x)*e^(5/4)*log(x) + (x^2 + 2*x + 1)*log(x)^2)*e^(-
5/2)
```

3.402.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(14) = 28$.

Time = 0.12 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.47

$$\int \frac{2e^{5/2}x^2 + e^{5/4}(2x + 2x^2) + \left(2 + 4x + 2x^2 + e^{5/4}(2x + 4x^2)\right)\log(x) + (2x + 2x^2)\log^2(x)}{e^{5/2}x}\,dx = x^2 + \frac{(2x^2 + 2x)\log(x)}{e^{\frac{5}{4}}} + \frac{(x^2 + 2x + 1)\log(x)^2}{e^{\frac{5}{2}}}$$

input
```
integrate((((2*x**2+2*x)*ln(x)**2+((4*x**2+2*x)*exp(5/4)+2*x**2+4*x+2)*ln(x
)+2*x**2*exp(5/4)**2+(2*x**2+2*x)*exp(5/4))/x/exp(5/4)**2,x)
```

output
```
x**2 + (2*x**2 + 2*x)*exp(-5/4)*log(x) + (x**2 + 2*x + 1)*exp(-5/2)*log(x)
**2
```

3.402.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 108 vs. 2(12) = 24.

Time = 0.19 (sec) , antiderivative size = 108, normalized size of antiderivative = 7.20

$$\int \frac{2e^{5/2}x^2 + e^{5/4}(2x + 2x^2) + \left(2 + 4x + 2x^2 + e^{5/4}(2x + 4x^2)\right)\log(x) + (2x + 2x^2)\log^2(x)}{e^{5/2}x}\,dx = \frac{1}{2}\left(\left(2\log\right.\right.$$

input
```
integrate((((2*x^2+2*x)*log(x)^2+((4*x^2+2*x)*exp(5/4)+2*x^2+4*x+2)*log(x)+
2*x^2*exp(5/4)^2+(2*x^2+2*x)*exp(5/4))/x/exp(5/4)^2,x, algorithm=\
```

output
```
1/2*((2*log(x)^2 - 2*log(x) + 1)*x^2 + 2*x^2*e^(5/2) + 2*x^2*e^(5/4) + 2*x
^2*log(x) + 4*(log(x)^2 - 2*log(x) + 2)*x - x^2 + 2*(2*x^2*log(x) - x^2)*e
^(5/4) + 4*(x*log(x) - x)*e^(5/4) + 4*x*e^(5/4) + 8*x*log(x) + 2*log(x)^2
- 8*x)*e^(-5/2)
```

3.402.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(12) = 24.

Time = 0.26 (sec) , antiderivative size = 45, normalized size of antiderivative = 3.00

$$\int \frac{2e^{5/2}x^2 + e^{5/4}(2x + 2x^2) + \left(2 + 4x + 2x^2 + e^{5/4}(2x + 4x^2)\right)\log(x) + (2x + 2x^2)\log^2(x)}{e^{5/2}x}\,dx = \left(2\,x^2 e^{\frac{5}{4}}\log\right.$$

input
```
integrate((((2*x^2+2*x)*log(x)^2+((4*x^2+2*x)*exp(5/4)+2*x^2+4*x+2)*log(x)+
2*x^2*exp(5/4)^2+(2*x^2+2*x)*exp(5/4))/x/exp(5/4)^2,x, algorithm=\
```

output
```
(2*x^2*e^(5/4)*log(x) + x^2*log(x)^2 + x^2*e^(5/2) + 2*x*e^(5/4)*log(x) +
2*x*log(x)^2 + log(x)^2)*e^(-5/2)
```

3.402.9 Mupad [B] (verification not implemented)

Time = 14.64 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \frac{2e^{5/2}x^2+e^{5/4}(2x+2x^2)+\left(2+4x+2x^2+e^{5/4}(2x+4x^2)\right)\log(x)+(2x+2x^2)\log^2(x)}{e^{5/2}x}\,dx = \mathrm{e}^{-\frac{5}{2}}\left(\ln(x)\right.$$

input
```
int((exp(-5/2)*(log(x)^2*(2*x + 2*x^2) + exp(5/4)*(2*x + 2*x^2) + 2*x^2*ex
p(5/2) + log(x)*(4*x + exp(5/4)*(2*x + 4*x^2) + 2*x^2 + 2)))/x,x)
```

output
```
exp(-5/2)*(log(x) + x*exp(5/4) + x*log(x))^2
```

3.403 $\int \frac{e^{5+\frac{e^5}{-3-x-x^2+\log(5)}}(1+2x)}{9+6x+7x^2+2x^3+x^4+(-6-2x-2x^2)\log(5)+\log^2(5)}\,dx$

3.403.1 Optimal result

Integrand size = 65, antiderivative size = 20

$$\int \frac{e^{5+\frac{e^5}{-3-x-x^2+\log(5)}}(1+2x)}{9+6x+7x^2+2x^3+x^4+(-6-2x-2x^2)\log(5)+\log^2(5)}\,dx=e^{\frac{e^5}{-3-x-x^2+\log(5)}}$$

output
```
exp(exp(5)/(ln(5)-x^2-x-3))
```

3.403.2 Mathematica [A] (verified)

Time = 0.94 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{e^{5+\frac{e^5}{-3-x-x^2+\log(5)}}(1+2x)}{9+6x+7x^2+2x^3+x^4+(-6-2x-2x^2)\log(5)+\log^2(5)}\,dx=e^{-\frac{e^5}{3+x+x^2-\log(5)}}$$

input
```
Integrate[(E^(5 + E^5/(-3 - x - x^2 + Log[5]))*(1 + 2*x))/(9 + 6*x + 7*x^2
 + 2*x^3 + x^4 + (-6 - 2*x - 2*x^2)*Log[5] + Log[5]^2),x]
```

output
```
E^(-(E^5/(3 + x + x^2 - Log[5])))
```

3.403.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x+1)e^{\frac{e^5}{-x^2-x-3+\log(5)}+5}}{x^4+2x^3+7x^2+(-2x^2-2x-6)\log(5)+6x+9+\log^2(5)}dx$$

$\Big\downarrow$ 2463

$$\int \left(-\frac{4(2x+1)e^{\frac{e^5}{-x^2-x-3+\log(5)}+5}}{(11-\log(625))\left(-2x-1+i\sqrt{11-\log(625)}\right)^2}-\frac{4(2x+1)e^{\frac{e^5}{-x^2-x-3+\log(5)}+5}}{(11-\log(625))\left(2x+1+i\sqrt{11-\log(625)}\right)^2}+\frac{}{(11-}\right.$$

$\Big\downarrow$ 2009

$$\frac{4i\int \frac{e^{5+\frac{e^5}{-x^2-x+\log(5)-3}}}{\left(2x+i\sqrt{11-\log(625)}+1\right)^2}dx}{\sqrt{11-\log(625)}}-\frac{4\int \frac{e^{5+\frac{e^5}{-x^2-x+\log(5)-3}}}{2x+i\sqrt{11-\log(625)}+1}dx}{11-\log(625)}-\frac{4i\int \frac{e^{5+\frac{e^5}{-x^2-x+\log(5)-3}}}{-2ix+\sqrt{11-\log(625)}-i}dx}{11-\log(625)}+\frac{4i\int \frac{e^{5+\frac{e^5}{-x^2-x+\log(5)-3}}}{\left(2ix+\sqrt{11-\log(625)}+i\right)^2}dx}{\sqrt{11-\log(625)}}$$

input
```
Int[(E^(5 + E^5/(-3 - x - x^2 + Log[5]))*(1 + 2*x))/(9 + 6*x + 7*x^2 + 2*x
^3 + x^4 + (-6 - 2*x - 2*x^2)*Log[5] + Log[5]^2),x]
```

output
```
$Aborted
```

3.403.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.403.4 Maple [A] (verified)

Time = 0.71 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

method	result	size
default	$e^{-\frac{e^5}{-\ln(5)+x^2+x+3}}$	18
gosper	$e^{\frac{e^5}{\ln(5)-x^2-x-3}}$	19
risch	$e^{\frac{e^5}{\ln(5)-x^2-x-3}}$	19
parallelrisch	$e^{\frac{e^5}{\ln(5)-x^2-x-3}}$	19
norman	$\frac{(\ln(5)-3)e^{\frac{e^5}{\ln(5)-x^2-x-3}}-x\,e^{\frac{e^5}{\ln(5)-x^2-x-3}}-x^2 e^{\frac{e^5}{\ln(5)-x^2-x-3}}}{\ln(5)-x^2-x-3}$	84

input
```
int((1+2*x)*exp(5)*exp(exp(5)/(ln(5)-x^2-x-3))/(ln(5)^2+(-2*x^2-2*x-6)*ln(
5)+x^4+2*x^3+7*x^2+6*x+9),x,method=_RETURNVERBOSE)
```

output
```
exp(-exp(5)/(-ln(5)+x^2+x+3))
```

3.403.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.70

$$\int \frac{e^{5+\frac{e^5}{-3-x-x^2+\log(5)}}(1+2x)}{9+6x+7x^2+2x^3+x^4+(-6-2x-2x^2)\log(5)+\log^2(5)}\,dx = e^{\left(\frac{5\,x^2+5\,x-e^5-5\,\log(5)+15}{x^2+x-\log(5)+3}-5\right)}$$

input
```
integrate((1+2*x)*exp(5)*exp(exp(5)/(log(5)-x^2-x-3))/(log(5)^2+(-2*x^2-2*
x-6)*log(5)+x^4+2*x^3+7*x^2+6*x+9),x, algorithm=\
```

output
```
e^((5*x^2 + 5*x - e^5 - 5*log(5) + 15)/(x^2 + x - log(5) + 3) - 5)
```

3.403.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{e^{5+\frac{e^5}{-3-x-x^2+\log(5)}}(1+2x)}{9+6x+7x^2+2x^3+x^4+(-6-2x-2x^2)\log(5)+\log^2(5)}\,dx = e^{\frac{e^5}{-x^2-x-3+\log(5)}}$$

input
```
integrate((1+2*x)*exp(5)*exp(exp(5)/(ln(5)-x**2-x-3))/(ln(5)**2+(-2*x**2-2
*x-6)*ln(5)+x**4+2*x**3+7*x**2+6*x+9),x)
```

output
```
exp(exp(5)/(-x**2 - x - 3 + log(5)))
```

3.403.7 Maxima [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{e^{5+\frac{e^5}{-3-x-x^2+\log(5)}}(1+2x)}{9+6x+7x^2+2x^3+x^4+(-6-2x-2x^2)\log(5)+\log^2(5)}\,dx = e^{\left(-\frac{e^5}{x^2+x-\log(5)+3}\right)}$$

input
```
integrate((1+2*x)*exp(5)*exp(exp(5)/(log(5)-x^2-x-3))/(log(5)^2+(-2*x^2-2*
x-6)*log(5)+x^4+2*x^3+7*x^2+6*x+9),x, algorithm=\
```

output
```
e^(-e^5/(x^2 + x - log(5) + 3))
```

3.403.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. $2(17) = 34$.

Time = 0.26 (sec) , antiderivative size = 81, normalized size of antiderivative = 4.05

$$\int \frac{e^{5+\frac{e^5}{-3-x-x^2+\log(5)}}(1+2x)}{9+6x+7x^2+2x^3+x^4+(-6-2x-2x^2)\log(5)+\log^2(5)}\,dx$$
$$= e^{\left(\frac{5x^2}{x^2+x-\log(5)+3}+\frac{5x}{x^2+x-\log(5)+3}-\frac{e^5}{x^2+x-\log(5)+3}-\frac{5\log(5)}{x^2+x-\log(5)+3}+\frac{15}{x^2+x-\log(5)+3}-5\right)}$$

input
```
integrate((1+2*x)*exp(5)*exp(exp(5)/(log(5)-x^2-x-3))/(log(5)^2+(-2*x^2-2*
x-6)*log(5)+x^4+2*x^3+7*x^2+6*x+9),x, algorithm=\
```

output
```
e^(5*x^2/(x^2 + x - log(5) + 3) + 5*x/(x^2 + x - log(5) + 3) - e^5/(x^2 +
x - log(5) + 3) - 5*log(5)/(x^2 + x - log(5) + 3) + 15/(x^2 + x - log(5) +
 3) - 5)
```

3.403.9 Mupad [B] (verification not implemented)

Time = 15.96 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{e^{5+\frac{e^5}{-3-x-x^2+\log(5)}}(1+2x)}{9+6x+7x^2+2x^3+x^4+(-6-2x-2x^2)\log(5)+\log^2(5)}\,dx = \mathrm{e}^{-\frac{\mathrm{e}^5}{x^2+x-\ln(5)+3}}$$

input
```
int((exp(-exp(5)/(x - log(5) + x^2 + 3))*exp(5)*(2*x + 1))/(6*x - log(5)*(
2*x + 2*x^2 + 6) + log(5)^2 + 7*x^2 + 2*x^3 + x^4 + 9),x)
```

output
```
exp(-exp(5)/(x - log(5) + x^2 + 3))
```

3.404 $\int \frac{-96+32x+x^2}{-3x^2+x^3}\,dx$

3.404.1 Optimal result

Integrand size = 20, antiderivative size = 12

$$\int \frac{-96+32x+x^2}{-3x^2+x^3}\,dx=-\frac{32}{x}+\log(3-x)$$

output
```
ln(-x+3)-32/x
```

3.404.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{-96+32x+x^2}{-3x^2+x^3}\,dx=-\frac{32}{x}+\log(3-x)$$

input
```
Integrate[(-96 + 32*x + x^2)/(-3*x^2 + x^3),x]
```

output
```
-32/x + Log[3 - x]
```

3.404.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.150, Rules used = {2026, 1195, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+32x-96}{x^3-3x^2}dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{x^2+32x-96}{(x-3)x^2}dx$$
$$\Big\downarrow \text{1195}$$
$$\int \left(\frac{32}{x^2}+\frac{1}{x-3}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\log(3-x)-\frac{32}{x}$$

input
```
Int[(-96 + 32*x + x^2)/(-3*x^2 + x^3),x]
```

output
```
-32/x + Log[3 - x]
```

3.404.3.1 Defintions of rubi rules used

rule 1195
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_.) + (b_.)*(x
_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(f +
 g*x)^n*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x
] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

3.404.4 Maple [A] (verified)

Time = 1.08 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

method	result	size
default	$-\frac{32}{x}+\ln\left(-3+x\right)$	11
norman	$-\frac{32}{x}+\ln\left(-3+x\right)$	11
risch	$-\frac{32}{x}+\ln\left(-3+x\right)$	11
meijerg	$-\frac{32}{x}+\ln\left(1-\frac{x}{3}\right)$	13
parallelrisch	$\frac{\ln(-3+x)x-32}{x}$	13

input
```
int((x^2+32*x-96)/(x^3-3*x^2),x,method=_RETURNVERBOSE)
```

output
```
-32/x+ln(-3+x)
```

3.404.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{-96+32x+x^2}{-3x^2+x^3}\,dx=\frac{x\log\left(x-3\right)-32}{x}$$

input
```
integrate((x^2+32*x-96)/(x^3-3*x^2),x, algorithm=\
```

output
```
(x*log(x - 3) - 32)/x
```

3.404.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.58

$$\int \frac{-96+32x+x^2}{-3x^2+x^3}\,dx = \log(x-3) - \frac{32}{x}$$

input
```
integrate((x**2+32*x-96)/(x**3-3*x**2),x)
```

output
```
log(x - 3) - 32/x
```

3.404.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{-96+32x+x^2}{-3x^2+x^3}\,dx = -\frac{32}{x} + \log(x-3)$$

input
```
integrate((x^2+32*x-96)/(x^3-3*x^2),x, algorithm=\
```

output
```
-32/x + log(x - 3)
```

3.404.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \frac{-96+32x+x^2}{-3x^2+x^3}\,dx = -\frac{32}{x} + \log(|x-3|)$$

input
```
integrate((x^2+32*x-96)/(x^3-3*x^2),x, algorithm=\
```

output
```
-32/x + log(abs(x - 3))
```

3.404.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{-96+32x+x^2}{-3x^2+x^3}\,dx=\ln(x-3)-\frac{32}{x}$$

input
```
int(-(32*x + x^2 - 96)/(3*x^2 - x^3),x)
```

output
```
log(x - 3) - 32/x
```

3.405 $\int \frac{74919334050x+2360474820x^2+27882962x^3+146352x^4+288x^5+e^{\frac{x}{193545+3049x+12x^2}}(149838668100+4721723820x+55765924x^2+292656x^3+576x^4)}{37459667025+1180237410x+13941481x^2+73176x^3+144x^4}dx$

3.405.1 Optimal result

Integrand size = 84, antiderivative size = 24

$$\int \frac{74919334050x+2360474820x^2+27882962x^3+146352x^4+288x^5+e^{\frac{x}{193545+3049x+12x^2}}(149838668100+4721723820x+55765924x^2+292656x^3+576x^4)}{37459667025+1180237410x+13941481x^2+73176x^3+144x^4}\,dx$$
$$= x\left(4e^{\frac{x}{-3+3(-254-2x)^2+x}}+x\right)$$

output
```
x*(x+4*exp(x/(x+3*(-254-2*x)^2-3)))
```

3.405.2 Mathematica [A] (verified)

Time = 0.53 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{74919334050x+2360474820x^2+27882962x^3+146352x^4+288x^5+e^{\frac{x}{193545+3049x+12x^2}}(149838668100+4721723820x+55765924x^2+292656x^3+576x^4)}{37459667025+1180237410x+13941481x^2+73176x^3+144x^4}\,dx$$
$$= 4e^{\frac{x}{193545+3049x+12x^2}}x+x^2$$

input
```
Integrate[(74919334050*x + 2360474820*x^2 + 27882962*x^3 + 146352*x^4 + 28
8*x^5 + E^(x/(193545 + 3049*x + 12*x^2))*(149838668100 + 4721723820*x + 55
765924*x^2 + 292656*x^3 + 576*x^4))/(37459667025 + 1180237410*x + 13941481
*x^2 + 73176*x^3 + 144*x^4),x]
```

output
```
4*E^(x/(193545 + 3049*x + 12*x^2))*x + x^2
```

3.405.

$\int \frac{74919334050x+2360474820x^2+27882962x^3+146352x^4+288x^5+e^{\frac{x}{193545+3049x+12x^2}}(149838668100+4721723820x+55765924x^2+292656x^3+57}{37459667025+1180237410x+13941481x^2+73176x^3+144x^4}$

3.405.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{288x^5+146352x^4+27882962x^3+2360474820x^2+e^{\frac{x}{12x^2+3049x+193545}}\left(576x^4+292656x^3+55765924x^2+4721\right.}{144x^4+73176x^3+13941481x^2+1180237410x+37459667025}$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{72\left(288x^5+146352x^4+27882962x^3+2360474820x^2+e^{\frac{x}{12x^2+3049x+193545}}\left(576x^4+292656x^3+55765924x^2+\right.\right.}{493039(3x+391)}\right.$$

$$\Big\downarrow \text{2009}$$

$$4\int e^{\frac{x}{12x^2+3049x+193545}}dx+\frac{611524}{79}\int \frac{e^{\frac{x}{12x^2+3049x+193545}}}{(3x+391)^2}dx-\frac{1564}{79}\int \frac{e^{\frac{x}{12x^2+3049x+193545}}}{3x+391}dx-\frac{980100}{79}\int \frac{e^{\frac{x}{12x^2+3049x+193545}}}{(4x+495)^2}dx+\frac{1980}{79}\int \frac{e^{\frac{x}{12x^2+3049x+193545}}}{4x+495}dx+x^2$$

input
```
Int[(74919334050*x + 2360474820*x^2 + 27882962*x^3 + 146352*x^4 + 288*x^5
+ E^(x/(193545 + 3049*x + 12*x^2))*(149838668100 + 4721723820*x + 55765924
*x^2 + 292656*x^3 + 576*x^4))/(37459667025 + 1180237410*x + 13941481*x^2 +
 73176*x^3 + 144*x^4),x]
```

output
```
$Aborted
```

3.405.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.405.4 Maple [A] (verified)

Time = 0.57 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

method	result
parallelrisch	$x^2+4\,\mathrm{e}^{\frac{x}{12x^2+3049x+193545}}x-\frac{10844761}{24}$
risch	$x^2+4\,\mathrm{e}^{\frac{x}{(3x+391)(4x+495)}}x$
parts	$x^2+\frac{774180\,\mathrm{e}^{\frac{x}{12x^2+3049x+193545}}x+12196\,\mathrm{e}^{\frac{x}{12x^2+3049x+193545}}x^2+48\,\mathrm{e}^{\frac{x}{12x^2+3049x+193545}}x^3}{12x^2+3049x+193545}$
norman	$\frac{-\frac{196706235x}{4}+3049x^3+12x^4+774180\,\mathrm{e}^{\frac{x}{12x^2+3049x+193545}}x+12196\,\mathrm{e}^{\frac{x}{12x^2+3049x+193545}}x^2+48\,\mathrm{e}^{\frac{x}{12x^2+3049x+193545}}x^3-12486}{12x^2+3049x+193545}$

input
```
int(((576*x^4+292656*x^3+55765924*x^2+4721723820*x+149838668100)*exp(x/(12
*x^2+3049*x+193545))+288*x^5+146352*x^4+27882962*x^3+2360474820*x^2+749193
34050*x)/(144*x^4+73176*x^3+13941481*x^2+1180237410*x+37459667025),x,metho
d=_RETURNVERBOSE)
```

output
```
x^2+4*exp(x/(12*x^2+3049*x+193545))*x-10844761/24
```

3.405.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{74919334050x+2360474820x^2+27882962x^3+146352x^4+288x^5+e^{\frac{x}{193545+3049x+12x^2}}(149838668100+4}{37459667025+1180237410x+13941481x^2+73176x^3+14}$$
$$=x^2+4\,xe^{\left(\frac{x}{12\,x^2+3049\,x+193545}\right)}$$

input
```
integrate(((576*x^4+292656*x^3+55765924*x^2+4721723820*x+149838668100)*exp
(x/(12*x^2+3049*x+193545))+288*x^5+146352*x^4+27882962*x^3+2360474820*x^2+
74919334050*x)/(144*x^4+73176*x^3+13941481*x^2+1180237410*x+37459667025),x
, algorithm=\
```

output
```
x^2 + 4*x*e^(x/(12*x^2 + 3049*x + 193545))
```

3.405.

$\int \frac{74919334050x+2360474820x^2+27882962x^3+146352x^4+288x^5+e^{\frac{x}{193545+3049x+12x^2}}(149838668100+4721723820x+55765924x^2+292656x^3+57}{37459667025+1180237410x+13941481x^2+73176x^3+144x^4}$

3.405.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{74919334050x + 2360474820x^2 + 27882962x^3 + 146352x^4 + 288x^5 + e^{\frac{x}{193545+3049x+12x^2}}(149838668100 + 4}{37459667025 + 1180237410x + 13941481x^2 + 73176x^3 + 14}$$
$$= x^2 + 4xe^{\frac{x}{12x^2+3049x+193545}}$$

input
```
integrate(((576*x**4+292656*x**3+55765924*x**2+4721723820*x+149838668100)*
exp(x/(12*x**2+3049*x+193545))+288*x**5+146352*x**4+27882962*x**3+23604748
20*x**2+74919334050*x)/(144*x**4+73176*x**3+13941481*x**2+1180237410*x+374
59667025),x)
```

output
```
x**2 + 4*x*exp(x/(12*x**2 + 3049*x + 193545))
```

3.405.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 122 vs. 2(21) = 42.

Time = 0.36 (sec) , antiderivative size = 122, normalized size of antiderivative = 5.08

$$\int \frac{74919334050x + 2360474820x^2 + 27882962x^3 + 146352x^4 + 288x^5 + e^{\frac{x}{193545+3049x+12x^2}}(149838668100 + 4}{37459667025 + 1180237410x + 13941481x^2 + 73176x^3 + 14}$$
$$= x^2 + 4\,xe^{\left(-\frac{495}{79\,(4\,x+495)} + \frac{391}{79\,(3\,x+391)}\right)} + \frac{16579595834289949\,x + 2099267057378616345}{449352\,(12\,x^2 + 3049\,x + 193545)}$$
$$- \frac{3049\,(10846402941841\,x + 1374257227948605)}{224676\,(12\,x^2 + 3049\,x + 193545)}$$
$$+ \frac{13941481\,(7100453269\,x + 900239922945)}{449352\,(12\,x^2 + 3049\,x + 193545)}$$
$$- \frac{196706235\,(4651321\,x + 590118705)}{6241\,(12\,x^2 + 3049\,x + 193545)} + \frac{74919334050\,(3049\,x + 387090)}{6241\,(12\,x^2 + 3049\,x + 193545)}$$

input
```
integrate(((576*x^4+292656*x^3+55765924*x^2+4721723820*x+149838668100)*exp
(x/(12*x^2+3049*x+193545))+288*x^5+146352*x^4+27882962*x^3+2360474820*x^2+
74919334050*x)/(144*x^4+73176*x^3+13941481*x^2+1180237410*x+37459667025),x
, algorithm=\
```

3.405.

$$\int \frac{74919334050x+2360474820x^2+27882962x^3+146352x^4+288x^5+e^{\frac{x}{193545+3049x+12x^2}}(149838668100+4721723820x+55765924x^2+292656x^3+57}{37459667025+1180237410x+13941481x^2+73176x^3+144x^4}$$

output
```
x^2 + 4*x*e^(-495/79/(4*x + 495) + 391/79/(3*x + 391)) + 1/449352*(1657959
5834289949*x + 20992670573786163445)/(12*x^2 + 3049*x + 193545) - 3049/2246
76*(10846402941841*x + 1374257227948605)/(12*x^2 + 3049*x + 193545) + 1394
1481/449352*(7100453269*x + 900239922945)/(12*x^2 + 3049*x + 193545) - 196
706235/6241*(4651321*x + 590118705)/(12*x^2 + 3049*x + 193545) + 749193340
50/6241*(3049*x + 387090)/(12*x^2 + 3049*x + 193545)
```

3.405.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{74919334050x + 2360474820x^2 + 27882962x^3 + 146352x^4 + 288x^5 + e^{\frac{x}{193545+3049x+12x^2}}(149838668100 + 4\ldots}{37459667025 + 1180237410x + 13941481x^2 + 73176x^3 + 14\ldots}$$
$$= x^2 + 4\,xe^{\left(\frac{x}{12\,x^2+3049\,x+193545}\right)}$$

input
```
integrate(((576*x^4+292656*x^3+55765924*x^2+4721723820*x+149838668100)*exp
(x/(12*x^2+3049*x+193545))+288*x^5+146352*x^4+27882962*x^3+2360474820*x^2+
74919334050*x)/(144*x^4+73176*x^3+13941481*x^2+1180237410*x+37459667025),x
, algorithm=\
```

output
```
x^2 + 4*x*e^(x/(12*x^2 + 3049*x + 193545))
```

3.405.9 Mupad [B] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{74919334050x + 2360474820x^2 + 27882962x^3 + 146352x^4 + 288x^5 + e^{\frac{x}{193545+3049x+12x^2}}(149838668100 + 4\ldots}{37459667025 + 1180237410x + 13941481x^2 + 73176x^3 + 14\ldots}$$
$$= x^2 + 4\,x\,\mathrm{e}^{\frac{x}{12\,x^2+3049\,x+193545}}$$

input
```
int((74919334050*x + exp(x/(3049*x + 12*x^2 + 193545))*(4721723820*x + 557
65924*x^2 + 292656*x^3 + 576*x^4 + 149838668100) + 2360474820*x^2 + 278829
62*x^3 + 146352*x^4 + 288*x^5)/(1180237410*x + 13941481*x^2 + 73176*x^3 +
144*x^4 + 37459667025),x)
```

output
```
x^2 + 4*x*exp(x/(3049*x + 12*x^2 + 193545))
```

3.405.

$$\int \frac{74919334050x+2360474820x^2+27882962x^3+146352x^4+288x^5+e^{\frac{x}{193545+3049x+12x^2}}(149838668100+4721723820x+55765924x^2+292656x^3+57\ldots}{37459667025+1180237410x+13941481x^2+73176x^3+144x^4}$$

3.406 $\int \frac{}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(}$

3.406.1 Optimal result

Integrand size = 220, antiderivative size = 35

$$\int \frac{-600-390x+}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(-400x-160x^2+20x^3+}$$
$$=\frac{5}{\frac{2x}{3}-\frac{5}{3}\left(4+\log\left(\frac{x^2}{x-\frac{1}{x^2(2+x)^2}}\right)\right)}$$

output
```
5/(2/3*x-5/3*ln(x^2/(x-1/x^2/(2+x)^2))-20/3)
```

3.406.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.09

$$\int \frac{-600-390x+}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(-400x-160x^2+20x^3+}$$
$$=-\frac{15}{20-2x+5\log\left(\frac{x^4(2+x)^2}{-1+4x^3+4x^4+x^5}\right)}$$

3.406.

$$\int \frac{-600-390x+30x^2+600x^3+660x^4+90x^5-105x^6-30x^7}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(-400x-160x^2+20x^3+1600x^4+2240x^5+960x^6+80x^7-20x^8)\log\left(\frac{4x^4+4x}{-1+4x^3+}\right.}$$

input
```
Integrate[(-600 - 390*x + 30*x^2 + 600*x^3 + 660*x^4 + 90*x^5 - 105*x^6 -
30*x^7)/(-800*x - 240*x^2 + 72*x^3 + 3196*x^4 + 4160*x^5 + 1472*x^6 - 32*x
^7 - 56*x^8 + 4*x^9 + (-400*x - 160*x^2 + 20*x^3 + 1600*x^4 + 2240*x^5 + 9
60*x^6 + 80*x^7 - 20*x^8)*Log[(4*x^4 + 4*x^5 + x^6)/(-1 + 4*x^3 + 4*x^4 +
x^5)] + (-50*x - 25*x^2 + 200*x^4 + 300*x^5 + 150*x^6 + 25*x^7)*Log[(4*x^4
 + 4*x^5 + x^6)/(-1 + 4*x^3 + 4*x^4 + x^5)]^2),x]
```

output
```
-15/(20 - 2*x + 5*Log[(x^4*(2 + x)^2)/(-1 + 4*x^3 + 4*x^4 + x^5)])
```

3.406.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-30x^7-105x^6+90x^5 -}{4x^9-56x^8-32x^7+1472x^6+4160x^5+3196x^4+72x^3-240x^2+(25x^7+150x^6+300x^5+200x^4-25x^2-}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{15\left(2x^7+7x^6-6x^5-44x^4-40x^3-2x^2+26x+40\right)}{x\left(-x^6-6x^5-12x^4-8x^3+x+2\right)\left(5\log\left(\frac{x^4(x+2)^2}{x^5+4x^4+4x^3-1}\right)-2x+20\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$15\int \frac{2x^7+7x^6-6x^5-44x^4-40x^3-2x^2+26x+40}{x\left(-x^6-6x^5-12x^4-8x^3+x+2\right)\left(-2x+5\log\left(-\frac{x^4(x+2)^2}{-x^5-4x^4-4x^3+1}\right)+20\right)^2}dx$$

$$\Big\downarrow \text{2463}$$

$$15\int \left(\frac{2x^7+7x^6-6x^5-44x^4-40x^3-2x^2+26x+40}{x(x+2)\left(-2x+5\log\left(-\frac{x^4(x+2)^2}{-x^5-4x^4-4x^3+1}\right)+20\right)^2}-\frac{x^2(x+2)\left(2x^7+7x^6-6x^5-44x^4-40x^3-2x^2+2\right.}{\left(x^5+4x^4+4x^3-1\right)\left(-2x+5\log\left(-\frac{x^4(x+2)^2}{-x^5-4x^4-4x^3+1}\right.\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$15\left(-2\int \frac{1}{\left(2x-5\log\left(\frac{x^4(x+2)^2}{x^5+4x^4+4x^3-1}\right)-20\right)^2}dx+20\int \frac{1}{x\left(2x-5\log\left(\frac{x^4(x+2)^2}{x^5+4x^4+4x^3-1}\right)-20\right)^2}dx+10\int \frac{}{(x+2)}\right.$$

input
```
Int[(-600 - 390*x + 30*x^2 + 600*x^3 + 660*x^4 + 90*x^5 - 105*x^6 - 30*x^7
)/(-800*x - 240*x^2 + 72*x^3 + 3196*x^4 + 4160*x^5 + 1472*x^6 - 32*x^7 - 5
6*x^8 + 4*x^9 + (-400*x - 160*x^2 + 20*x^3 + 1600*x^4 + 2240*x^5 + 960*x^6
 + 80*x^7 - 20*x^8)*Log[(4*x^4 + 4*x^5 + x^6)/(-1 + 4*x^3 + 4*x^4 + x^5)]
+ (-50*x - 25*x^2 + 200*x^4 + 300*x^5 + 150*x^6 + 25*x^7)*Log[(4*x^4 + 4*x
^5 + x^6)/(-1 + 4*x^3 + 4*x^4 + x^5)]^2),x]
```

output
```
$Aborted
```

3.406.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.406.4 Maple [A] (verified)

Time = 2.11 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.20

method	result	size
parallelrisch	$\frac{15}{2x-5\ln\left(\frac{x^{4}\left(x^{2}+4x+4\right)}{x^{5}+4x^{4}+4x^{3}-1}\right)-20}$	42
risch	$\frac{15}{-20+2x-5\ln\left(\frac{x^{6}+4x^{5}+4x^{4}}{x^{5}+4x^{4}+4x^{3}-1}\right)}$	45

input
```
int((-30*x^7-105*x^6+90*x^5+660*x^4+600*x^3+30*x^2-390*x-600)/((25*x^7+150
*x^6+300*x^5+200*x^4-25*x^2-50*x)*ln((x^6+4*x^5+4*x^4)/(x^5+4*x^4+4*x^3-1)
)^2+(-20*x^8+80*x^7+960*x^6+2240*x^5+1600*x^4+20*x^3-160*x^2-400*x)*ln((x^
6+4*x^5+4*x^4)/(x^5+4*x^4+4*x^3-1))+4*x^9-56*x^8-32*x^7+1472*x^6+4160*x^5+
3196*x^4+72*x^3-240*x^2-800*x),x,method=_RETURNVERBOSE)
```

output
```
15/(2*x-5*ln(x^4*(x^2+4*x+4)/(x^5+4*x^4+4*x^3-1))-20)
```

3.406.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.26

$$\int \frac{-600-390x+\ldots}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(-400x-160x^2+20x^3+\ldots}$$
$$= \frac{15}{2\,x-5\,\log\left(\frac{x^6+4\,x^5+4\,x^4}{x^5+4\,x^4+4\,x^3-1}\right)-20}$$

input
```
integrate((-30*x^7-105*x^6+90*x^5+660*x^4+600*x^3+30*x^2-390*x-600)/((25*x
^7+150*x^6+300*x^5+200*x^4-25*x^2-50*x)*log((x^6+4*x^5+4*x^4)/(x^5+4*x^4+4
*x^3-1))^2+(-20*x^8+80*x^7+960*x^6+2240*x^5+1600*x^4+20*x^3-160*x^2-400*x)
*log((x^6+4*x^5+4*x^4)/(x^5+4*x^4+4*x^3-1))+4*x^9-56*x^8-32*x^7+1472*x^6+4
160*x^5+3196*x^4+72*x^3-240*x^2-800*x),x, algorithm=\
```

output
```
15/(2*x - 5*log((x^6 + 4*x^5 + 4*x^4)/(x^5 + 4*x^4 + 4*x^3 - 1)) - 20)
```

3.406.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.11

$$\int \frac{-600-390x+\ldots}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(-400x-160x^2+20x^3+\ldots}$$
$$= -\frac{3}{-\frac{2x}{5}+\log\left(\frac{x^6+4x^5+4x^4}{x^5+4x^4+4x^3-1}\right)+4}$$

$$\int \frac{-600-390x+30x^2+600x^3+660x^4+90x^5-105x^6-30x^7}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(-400x-160x^2+20x^3+1600x^4+2240x^5+960x^6+80x^7-20x^8)\log\left(\frac{4x^4+4x\ldots}{-1+4x^3+\ldots}\right.}$$

input
```
integrate((-30*x**7-105*x**6+90*x**5+660*x**4+600*x**3+30*x**2-390*x-600)/
((25*x**7+150*x**6+300*x**5+200*x**4-25*x**2-50*x)*ln((x**6+4*x**5+4*x**4)
/(x**5+4*x**4+4*x**3-1))**2+(-20*x**8+80*x**7+960*x**6+2240*x**5+1600*x**4
+20*x**3-160*x**2-400*x)*ln((x**6+4*x**5+4*x**4)/(x**5+4*x**4+4*x**3-1))+4
*x**9-56*x**8-32*x**7+1472*x**6+4160*x**5+3196*x**4+72*x**3-240*x**2-800*x
),x)
```

output
```
-3/(-2*x/5 + log((x**6 + 4*x**5 + 4*x**4)/(x**5 + 4*x**4 + 4*x**3 - 1)) +
4)
```

3.406.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.06

$$\int \frac{-600 - 390x + \cdots}{-800x - 240x^2 + 72x^3 + 3196x^4 + 4160x^5 + 1472x^6 - 32x^7 - 56x^8 + 4x^9 + (-400x - 160x^2 + 20x^3 + \cdots}$$
$$= \frac{15}{2\,x + 5\,\log\left(x^5 + 4\,x^4 + 4\,x^3 - 1\right) - 10\,\log\left(x + 2\right) - 20\,\log\left(x\right) - 20}$$

input
```
integrate((-30*x^7-105*x^6+90*x^5+660*x^4+600*x^3+30*x^2-390*x-600)/((25*x
^7+150*x^6+300*x^5+200*x^4-25*x^2-50*x)*log((x^6+4*x^5+4*x^4)/(x^5+4*x^4+4
*x^3-1))^2+(-20*x^8+80*x^7+960*x^6+2240*x^5+1600*x^4+20*x^3-160*x^2-400*x)
*log((x^6+4*x^5+4*x^4)/(x^5+4*x^4+4*x^3-1))+4*x^9-56*x^8-32*x^7+1472*x^6+4
160*x^5+3196*x^4+72*x^3-240*x^2-800*x),x, algorithm=\
```

output
```
15/(2*x + 5*log(x^5 + 4*x^4 + 4*x^3 - 1) - 10*log(x + 2) - 20*log(x) - 20)
```

3.406.8 Giac [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.26

$$\int \frac{-600 - 390x + \cdots}{-800x - 240x^2 + 72x^3 + 3196x^4 + 4160x^5 + 1472x^6 - 32x^7 - 56x^8 + 4x^9 + (-400x - 160x^2 + 20x^3 + \cdots}$$
$$= \frac{15}{2\,x - 5\,\log\left(\frac{x^6 + 4\,x^5 + 4\,x^4}{x^5 + 4\,x^4 + 4\,x^3 - 1}\right) - 20}$$

3.406.

$$\int \frac{-600-390x+30x^2+600x^3+660x^4+90x^5-105x^6-30x^7}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(-400x-160x^2+20x^3+1600x^4+2240x^5+960x^6+80x^7-20x^8)\log\left(\frac{4x^4+4x \cdots}{-1+4x^3+\cdots}\right.}$$

input
```
integrate((-30*x^7-105*x^6+90*x^5+660*x^4+600*x^3+30*x^2-390*x-600)/((25*x
^7+150*x^6+300*x^5+200*x^4-25*x^2-50*x)*log((x^6+4*x^5+4*x^4)/(x^5+4*x^4+4
*x^3-1))^2+(-20*x^8+80*x^7+960*x^6+2240*x^5+1600*x^4+20*x^3-160*x^2-400*x)
*log((x^6+4*x^5+4*x^4)/(x^5+4*x^4+4*x^3-1))+4*x^9-56*x^8-32*x^7+1472*x^6+4
160*x^5+3196*x^4+72*x^3-240*x^2-800*x),x, algorithm=\
```

output
```
15/(2*x - 5*log((x^6 + 4*x^5 + 4*x^4)/(x^5 + 4*x^4 + 4*x^3 - 1)) - 20)
```

3.406.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-600-390x+}{-800x-240x^2+72x^3+3196x^4+4160x^5+1472x^6-32x^7-56x^8+4x^9+(-400x-160x^2+20x^3+}$$

$$= \int -\frac{30\,x^7+105\,x}{\ln\left(\frac{x^6+4\,x^5+4\,x^4}{x^5+4\,x^4+4\,x^3-1}\right)^2\left(25\,x^7+150\,x^6+300\,x^5+200\,x^4-25\,x^2-50\,x\right)-800\,x+\ln\left(\frac{x^6+4\,x^5+4\,x^4}{x^5+4\,x^4+4\,x^3-1}\right)\left(-20\right.}$$

input
```
int(-(390*x - 30*x^2 - 600*x^3 - 660*x^4 - 90*x^5 + 105*x^6 + 30*x^7 + 600
)/(log((4*x^4 + 4*x^5 + x^6)/(4*x^3 + 4*x^4 + x^5 - 1))^2*(200*x^4 - 25*x^
2 - 50*x + 300*x^5 + 150*x^6 + 25*x^7) - 800*x + log((4*x^4 + 4*x^5 + x^6)
/(4*x^3 + 4*x^4 + x^5 - 1))*(20*x^3 - 160*x^2 - 400*x + 1600*x^4 + 2240*x^
5 + 960*x^6 + 80*x^7 - 20*x^8) - 240*x^2 + 72*x^3 + 3196*x^4 + 4160*x^5 +
1472*x^6 - 32*x^7 - 56*x^8 + 4*x^9),x)
```

output
```
int(-(390*x - 30*x^2 - 600*x^3 - 660*x^4 - 90*x^5 + 105*x^6 + 30*x^7 + 600
)/(log((4*x^4 + 4*x^5 + x^6)/(4*x^3 + 4*x^4 + x^5 - 1))^2*(200*x^4 - 25*x^
2 - 50*x + 300*x^5 + 150*x^6 + 25*x^7) - 800*x + log((4*x^4 + 4*x^5 + x^6)
/(4*x^3 + 4*x^4 + x^5 - 1))*(20*x^3 - 160*x^2 - 400*x + 1600*x^4 + 2240*x^
5 + 960*x^6 + 80*x^7 - 20*x^8) - 240*x^2 + 72*x^3 + 3196*x^4 + 4160*x^5 +
1472*x^6 - 32*x^7 - 56*x^8 + 4*x^9), x)
```

3.407 $\int \left(2-15 e^{3 x}+e^{260+e^4-32 x+x^2} (-32+2 x)\right) \, dx$

3.407.1 Optimal result

Integrand size = 28, antiderivative size = 26

$$\int \left(2-15 e^{3 x}+e^{260+e^4-32 x+x^2} (-32+2 x)\right) \, dx=8+e^{4+e^4+(16-x)^2}-5 e^{3 x}+2 x$$

output
```
2*x+8+exp(exp(4)+4+(16-x)^2)-5*exp(3*x)
```

3.407.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \left(2-15 e^{3 x}+e^{260+e^4-32 x+x^2} (-32+2 x)\right) \, dx=-5 e^{3 x}+e^{260+e^4-32 x+x^2}+2 x$$

input
```
Integrate[2 - 15*E^(3*x) + E^(260 + E^4 - 32*x + x^2)*(-32 + 2*x),x]
```

output
```
-5*E^(3*x) + E^(260 + E^4 - 32*x + x^2) + 2*x
```

3.407.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.036$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{x^2-32x+e^4+260}(2x-32)-15e^{3x}+2\right)\,dx$$

$$\Big\downarrow \; 2009$$

$$e^{x^2-32x+e^4+260}+2x-5e^{3x}$$

input
```
Int[2 - 15*E^(3*x) + E^(260 + E^4 - 32*x + x^2)*(-32 + 2*x),x]
```

output
```
-5*E^(3*x) + E^(260 + E^4 - 32*x + x^2) + 2*x
```

3.407.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.407.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

method	result
norman	$2x-5\,\mathrm{e}^{3x}+\mathrm{e}^{\mathrm{e}^4+x^2-32x+260}$
risch	$2x-5\,\mathrm{e}^{3x}+\mathrm{e}^{\mathrm{e}^4+x^2-32x+260}$
parallelrisch	$2x-5\,\mathrm{e}^{3x}+\mathrm{e}^{\mathrm{e}^4+x^2-32x+260}$
default	$2x+2\,\mathrm{e}^{\mathrm{e}^4}\mathrm{e}^{260}\left(\frac{\mathrm{e}^{x^2-32x}}{2}-8i\sqrt{\pi}\,\mathrm{e}^{-256}\operatorname{erf}(ix-16i)\right)+16i\mathrm{e}^{\mathrm{e}^4}\mathrm{e}^{260}\sqrt{\pi}\,\mathrm{e}^{-256}\operatorname{erf}(ix-16i)-5\,\mathrm{e}$
parts	$2x+2\,\mathrm{e}^{\mathrm{e}^4}\mathrm{e}^{260}\left(\frac{\mathrm{e}^{x^2-32x}}{2}-8i\sqrt{\pi}\,\mathrm{e}^{-256}\operatorname{erf}(ix-16i)\right)+16i\mathrm{e}^{\mathrm{e}^4}\mathrm{e}^{260}\sqrt{\pi}\,\mathrm{e}^{-256}\operatorname{erf}(ix-16i)-5\,\mathrm{e}$

input
```
int((2*x-32)*exp(exp(4)+x^2-32*x+260)-15*exp(3*x)+2,x,method=_RETURNVERBOS
E)
```

output
```
2*x-5*exp(3*x)+exp(exp(4)+x^2-32*x+260)
```

3.407.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \left(2-15e^{3x}+e^{260+e^4-32x+x^2}(-32+2x)\right)\,dx = 2\,x+e^{\left(x^2-32\,x+e^4+260\right)}-5\,e^{(3\,x)}$$

input
```
integrate((2*x-32)*exp(exp(4)+x^2-32*x+260)-15*exp(3*x)+2,x, algorithm=\
```

output
```
2*x + e^(x^2 - 32*x + e^4 + 260) - 5*e^(3*x)
```

3.407.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \left(2-15e^{3x}+e^{260+e^4-32x+x^2}(-32+2x)\right)\,dx = 2x-5e^{3x}+e^{x^2-32x+e^4+260}$$

input
```
integrate((2*x-32)*exp(exp(4)+x**2-32*x+260)-15*exp(3*x)+2,x)
```

output
```
2*x - 5*exp(3*x) + exp(x**2 - 32*x + exp(4) + 260)
```

3.407.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \left(2-15e^{3x}+e^{260+e^4-32x+x^2}(-32+2x)\right)\,dx = 2\,x+e^{\left(x^2-32\,x+e^4+260\right)}-5\,e^{(3\,x)}$$

input
```
integrate((2*x-32)*exp(exp(4)+x^2-32*x+260)-15*exp(3*x)+2,x, algorithm=\
```

output
```
2*x + e^(x^2 - 32*x + e^4 + 260) - 5*e^(3*x)
```

3.407.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \left(2-15e^{3x}+e^{260+e^4-32x+x^2}(-32+2x)\right)\,dx=2\,x+e^{\left(x^2-32\,x+e^4+260\right)}-5\,e^{(3\,x)}$$

input
```
integrate((2*x-32)*exp(exp(4)+x^2-32*x+260)-15*exp(3*x)+2,x, algorithm=\
```

output
```
2*x + e^(x^2 - 32*x + e^4 + 260) - 5*e^(3*x)
```

3.407.9 Mupad [B] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \left(2-15e^{3x}+e^{260+e^4-32x+x^2}(-32+2x)\right)\,dx=2\,x-5\,\mathrm{e}^{3\,x}+\mathrm{e}^{-32\,x}\,\mathrm{e}^{x^2}\,\mathrm{e}^{260}\,\mathrm{e}^{\mathrm{e}^4}$$

input
```
int(exp(exp(4) - 32*x + x^2 + 260)*(2*x - 32) - 15*exp(3*x) + 2,x)
```

output
```
2*x - 5*exp(3*x) + exp(-32*x)*exp(x^2)*exp(260)*exp(exp(4))
```

3.408 $\int \frac{}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+}$

3.408.1 Optimal result

Integrand size = 312, antiderivative size = 21

$$\int \frac{}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+(2048x-12544x^2+2764}$$
$$=\frac{5}{(-4+(-8+x)(-x+\log(2)))^2+\log(x)}$$

output
```
5/(((-8+x)*(ln(2)-x)-4)^2+ln(x))
```

3.408.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 113 vs. 2(21) = 42.

Time = 5.48 (sec) , antiderivative size = 113, normalized size of antiderivative = 5.38

$$\int \frac{}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+(2048x-12544x^2+2764}$$
$$= -\frac{5\left(-1-4x^4+6x^3(8+\log(2))-2x^2\left(72+32\log(2)+\log^2(2)\right)+8x\left(8+17\log\right.\right.}{\left(1+4x^4-6x^3(8+\log(2))-2x(8+\log(2))(4+\log(256))+2x^2\left(72+\log^2(2)+2\log(65536)\right)\right)\left((4+\right.}$$

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$\int \frac{}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+(2048x-12544x^2+27648x^3-25792x^4+9344x^5-1584x^6+128x^7-4x^8)\log(}$

input
```
Integrate[(-5 + 320*x - 720*x^2 + 240*x^3 - 20*x^4 + (680*x - 320*x^2 + 30
*x^3)*Log[2] + (80*x - 10*x^2)*Log[2]^2)/(256*x - 2048*x^2 + 6400*x^3 - 97
28*x^4 + 7264*x^5 - 2432*x^6 + 400*x^7 - 32*x^8 + x^9 + (2048*x - 12544*x^
2 + 27648*x^3 - 25792*x^4 + 9344*x^5 - 1584*x^6 + 128*x^7 - 4*x^8)*Log[2]
+ (6144*x - 26112*x^2 + 33888*x^3 - 13440*x^4 + 2352*x^5 - 192*x^6 + 6*x^7
)*Log[2]^2 + (8192*x - 19456*x^2 + 8576*x^3 - 1552*x^4 + 128*x^5 - 4*x^6)*
Log[2]^3 + (4096*x - 2048*x^2 + 384*x^3 - 32*x^4 + x^5)*Log[2]^4 + (32*x -
 128*x^2 + 144*x^3 - 32*x^4 + 2*x^5 + (128*x - 272*x^2 + 64*x^3 - 4*x^4)*L
og[2] + (128*x - 32*x^2 + 2*x^3)*Log[2]^2)*Log[x] + x*Log[x]^2),x]
```

output
```
(-5*(-1 - 4*x^4 + 6*x^3*(8 + Log[2]) - 2*x^2*(72 + 32*Log[2] + Log[2]^2) +
 8*x*(8 + 17*Log[2] + 2*Log[2]^2)))/((1 + 4*x^4 - 6*x^3*(8 + Log[2]) - 2*x
*(8 + Log[2])*(4 + Log[256]) + 2*x^2*(72 + Log[2]^2 + 2*Log[65536]))*((4 +
 x^2 - x*(8 + Log[2]) + Log[256])^2 + Log[x]))
```

3.408.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{}{x^9-32x^8+400x^7-2432x^6+7264x^5-9728x^4+6400x^3-2048x^2+(x^5-32x^4+384x^3-2048x^2+4096x)}$$

$\Big\downarrow$ 7239

$$\int \frac{5\left(-4x^4+6x^3(8+\log(2))-2x^2\left(72+\log^2(2)+32\log(2)\right)+8x(8+\log(2))(1+2\log(2))-1\right)}{x\left(\left(x^2-x(8+\log(2))+4+\log(256)\right)^2+\log(x)\right)^2}dx$$

$\Big\downarrow$ 27

$$5\int -\frac{4x^4-6(8+\log(2))x^3+2\left(72+32\log(2)+\log^2(2)\right)x^2-8(8+\log(2))(1+\log(4))x+1}{x\left(\left(x^2-(8+\log(2))x+\log(256)+4\right)^2+\log(x)\right)^2}dx$$

$\Big\downarrow$ 25

$$-5\int \frac{4x^4-6(8+\log(2))x^3+2\left(72+32\log(2)+\log^2(2)\right)x^2-8(8+\log(2))(1+\log(4))x+1}{x\left(\left(x^2-(8+\log(2))x+\log(256)+4\right)^2+\log(x)\right)^2}dx$$

$\Big\downarrow$ 7293

$$\int \frac{}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+(2048x-12544x^2+27648x^3-25792x^4+9344x^5-1584x^6+128x^7-4x^8)\log(}$$

$$-5\int\left(\frac{4x^3}{\left(x^4-16\left(1+\frac{\log(2)}{8}\right)x^3+72\left(1+\frac{1}{72}\log(2)(32+\log(2))\right)x^2-64\left(1+\frac{1}{8}\log(2)\left(1+\frac{(8+\log(2))\log(256)}{\log(16)}\right)\right)x\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-5\left(2\left(72+\log^2(2)+32\log(2)\right)\int\frac{x}{\left(x^4-16\left(1+\frac{\log(2)}{8}\right)x^3+72\left(1+\frac{1}{72}\log(2)(32+\log(2))\right)x^2-64\left(1+\frac{1}{8}\log(\right.\right.}\right.$$

input
```
Int[(-5 + 320*x - 720*x^2 + 240*x^3 - 20*x^4 + (680*x - 320*x^2 + 30*x^3)*
Log[2] + (80*x - 10*x^2)*Log[2]^2)/(256*x - 2048*x^2 + 6400*x^3 - 9728*x^4
 + 7264*x^5 - 2432*x^6 + 400*x^7 - 32*x^8 + x^9 + (2048*x - 12544*x^2 + 27
648*x^3 - 25792*x^4 + 9344*x^5 - 1584*x^6 + 128*x^7 - 4*x^8)*Log[2] + (614
4*x - 26112*x^2 + 33888*x^3 - 13440*x^4 + 2352*x^5 - 192*x^6 + 6*x^7)*Log[
2]^2 + (8192*x - 19456*x^2 + 8576*x^3 - 1552*x^4 + 128*x^5 - 4*x^6)*Log[2]
^3 + (4096*x - 2048*x^2 + 384*x^3 - 32*x^4 + x^5)*Log[2]^4 + (32*x - 128*x
^2 + 144*x^3 - 32*x^4 + 2*x^5 + (128*x - 272*x^2 + 64*x^3 - 4*x^4)*Log[2]
+ (128*x - 32*x^2 + 2*x^3)*Log[2]^2)*Log[x] + x*Log[x]^2),x]
```

output
```
$Aborted
```

3.408.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

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$$\int\frac{}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+(2048x-12544x^2+27648x^3-25792x^4+9344x^5-1584x^6+128x^7-4x^8)\log(}$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.408.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(21) = 42$.

Time = 3.84 (sec) , antiderivative size = 69, normalized size of antiderivative = 3.29

method	result	size
default	$\frac{5}{x^2\ln(2)^2-2x^3\ln(2)+x^4-16x\ln(2)^2+32x^2\ln(2)-16x^3+64\ln(2)^2-136x\ln(2)+72x^2+\ln(x)+64\ln(2)-64x+16}$	69
risch	$\frac{5}{x^2\ln(2)^2-2x^3\ln(2)+x^4-16x\ln(2)^2+32x^2\ln(2)-16x^3+64\ln(2)^2-136x\ln(2)+72x^2+\ln(x)+64\ln(2)-64x+16}$	69
parallelrisch	$\frac{5}{x^2\ln(2)^2-2x^3\ln(2)+x^4-16x\ln(2)^2+32x^2\ln(2)-16x^3+64\ln(2)^2-136x\ln(2)+72x^2+\ln(x)+64\ln(2)-64x+16}$	69

input
```
int(((-10*x^2+80*x)*ln(2)^2+(30*x^3-320*x^2+680*x)*ln(2)-20*x^4+240*x^3-72
0*x^2+320*x-5)/(x*ln(x)^2+((2*x^3-32*x^2+128*x)*ln(2)^2+(-4*x^4+64*x^3-272
*x^2+128*x)*ln(2)+2*x^5-32*x^4+144*x^3-128*x^2+32*x)*ln(x)+(x^5-32*x^4+384
*x^3-2048*x^2+4096*x)*ln(2)^4+(-4*x^6+128*x^5-1552*x^4+8576*x^3-19456*x^2+
8192*x)*ln(2)^3+(6*x^7-192*x^6+2352*x^5-13440*x^4+33888*x^3-26112*x^2+6144
*x)*ln(2)^2+(-4*x^8+128*x^7-1584*x^6+9344*x^5-25792*x^4+27648*x^3-12544*x^
2+2048*x)*ln(2)+x^9-32*x^8+400*x^7-2432*x^6+7264*x^5-9728*x^4+6400*x^3-204
8*x^2+256*x),x,method=_RETURNVERBOSE)
```

output
```
5/(x^2*ln(2)^2-2*x^3*ln(2)+x^4-16*x*ln(2)^2+32*x^2*ln(2)-16*x^3+64*ln(2)^2
-136*x*ln(2)+72*x^2+ln(x)+64*ln(2)-64*x+16)
```

3.408.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(21) = 42$.

Time = 0.27 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.57

$$\int \frac{}{256x - 2048x^2 + 6400x^3 - 9728x^4 + 7264x^5 - 2432x^6 + 400x^7 - 32x^8 + x^9 + (2048x - 12544x^2 + 2764}$$

$$= \frac{5}{x^4 - 16\,x^3 + (x^2 - 16\,x + 64)\log(2)^2 + 72\,x^2 - 2\,(x^3 - 16\,x^2 + 68\,x - 32)\log(2) - 64\,x + \log(x) + 16}$$

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$$\int \frac{}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+(2048x-12544x^2+27648x^3-25792x^4+9344x^5-1584x^6+128x^7-4x^8)\log(}$$

input
```
integrate(((-10*x^2+80*x)*log(2)^2+(30*x^3-320*x^2+680*x)*log(2)-20*x^4+24
0*x^3-720*x^2+320*x-5)/(x*log(x)^2+((2*x^3-32*x^2+128*x)*log(2)^2+(-4*x^4+
64*x^3-272*x^2+128*x)*log(2)+2*x^5-32*x^4+144*x^3-128*x^2+32*x)*log(x)+(x^
5-32*x^4+384*x^3-2048*x^2+4096*x)*log(2)^4+(-4*x^6+128*x^5-1552*x^4+8576*x
^3-19456*x^2+8192*x)*log(2)^3+(6*x^7-192*x^6+2352*x^5-13440*x^4+33888*x^3-
26112*x^2+6144*x)*log(2)^2+(-4*x^8+128*x^7-1584*x^6+9344*x^5-25792*x^4+276
48*x^3-12544*x^2+2048*x)*log(2)+x^9-32*x^8+400*x^7-2432*x^6+7264*x^5-9728*
x^4+6400*x^3-2048*x^2+256*x),x, algorithm=\
```

output
```
5/(x^4 - 16*x^3 + (x^2 - 16*x + 64)*log(2)^2 + 72*x^2 - 2*(x^3 - 16*x^2 +
68*x - 32)*log(2) - 64*x + log(x) + 16)
```

3.408.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. $2(15) = 30$.

Time = 0.15 (sec) , antiderivative size = 75, normalized size of antiderivative = 3.57

$$\int \frac{}{256x - 2048x^2 + 6400x^3 - 9728x^4 + 7264x^5 - 2432x^6 + 400x^7 - 32x^8 + x^9 + (2048x - 12544x^2 + 2764}$$

$$= \frac{5}{x^4 - 16x^3 - 2x^3\log(2) + x^2\log(2)^2 + 32x^2\log(2) + 72x^2 - 136x\log(2) - 64x - 16x\log(2)^2 + \log(x) +}$$

input
```
integrate(((-10*x**2+80*x)*ln(2)**2+(30*x**3-320*x**2+680*x)*ln(2)-20*x**4
+240*x**3-720*x**2+320*x-5)/(x*ln(x)**2+((2*x**3-32*x**2+128*x)*ln(2)**2+(
-4*x**4+64*x**3-272*x**2+128*x)*ln(2)+2*x**5-32*x**4+144*x**3-128*x**2+32*
x)*ln(x)+(x**5-32*x**4+384*x**3-2048*x**2+4096*x)*ln(2)**4+(-4*x**6+128*x*
*5-1552*x**4+8576*x**3-19456*x**2+8192*x)*ln(2)**3+(6*x**7-192*x**6+2352*x
**5-13440*x**4+33888*x**3-26112*x**2+6144*x)*ln(2)**2+(-4*x**8+128*x**7-15
84*x**6+9344*x**5-25792*x**4+27648*x**3-12544*x**2+2048*x)*ln(2)+x**9-32*x
**8+400*x**7-2432*x**6+7264*x**5-9728*x**4+6400*x**3-2048*x**2+256*x),x)
```

output
```
5/(x**4 - 16*x**3 - 2*x**3*log(2) + x**2*log(2)**2 + 32*x**2*log(2) + 72*x
**2 - 136*x*log(2) - 64*x - 16*x*log(2)**2 + log(x) + 16 + 64*log(2)**2 +
64*log(2))
```

3.408.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(21) = 42$.

Time = 0.33 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.81

$$\int \frac{}{256x - 2048x^2 + 6400x^3 - 9728x^4 + 7264x^5 - 2432x^6 + 400x^7 - 32x^8 + x^9 + (2048x - 12544x^2 + 2764}$$

$$= \frac{5}{x^4 - 2x^3(\log(2) + 8) + (\log(2)^2 + 32\log(2) + 72)x^2 - 8(2\log(2)^2 + 17\log(2) + 8)x + 64\log(2)^2 + 6}$$

input
```
integrate(((-10*x^2+80*x)*log(2)^2+(30*x^3-320*x^2+680*x)*log(2)-20*x^4+24
0*x^3-720*x^2+320*x-5)/(x*log(x)^2+((2*x^3-32*x^2+128*x)*log(2)^2+(-4*x^4+
64*x^3-272*x^2+128*x)*log(2)+2*x^5-32*x^4+144*x^3-128*x^2+32*x)*log(x)+(x^
5-32*x^4+384*x^3-2048*x^2+4096*x)*log(2)^4+(-4*x^6+128*x^5-1552*x^4+8576*x
^3-19456*x^2+8192*x)*log(2)^3+(6*x^7-192*x^6+2352*x^5-13440*x^4+33888*x^3-
26112*x^2+6144*x)*log(2)^2+(-4*x^8+128*x^7-1584*x^6+9344*x^5-25792*x^4+276
48*x^3-12544*x^2+2048*x)*log(2)+x^9-32*x^8+400*x^7-2432*x^6+7264*x^5-9728*
x^4+6400*x^3-2048*x^2+256*x),x, algorithm=\
```

output
```
5/(x^4 - 2*x^3*(log(2) + 8) + (log(2)^2 + 32*log(2) + 72)*x^2 - 8*(2*log(2
)^2 + 17*log(2) + 8)*x + 64*log(2)^2 + 64*log(2) + log(x) + 16)
```

3.408.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(21) = 42$.

Time = 0.30 (sec) , antiderivative size = 68, normalized size of antiderivative = 3.24

$$\int \frac{}{256x - 2048x^2 + 6400x^3 - 9728x^4 + 7264x^5 - 2432x^6 + 400x^7 - 32x^8 + x^9 + (2048x - 12544x^2 + 2764}$$

$$= \frac{5}{x^4 - 2x^3\log(2) + x^2\log(2)^2 - 16x^3 + 32x^2\log(2) - 16x\log(2)^2 + 72x^2 - 136x\log(2) + 64\log(2)^2 -}$$

input
```
integrate(((-10*x^2+80*x)*log(2)^2+(30*x^3-320*x^2+680*x)*log(2)-20*x^4+24
0*x^3-720*x^2+320*x-5)/(x*log(x)^2+((2*x^3-32*x^2+128*x)*log(2)^2+(-4*x^4+
64*x^3-272*x^2+128*x)*log(2)+2*x^5-32*x^4+144*x^3-128*x^2+32*x)*log(x)+(x^
5-32*x^4+384*x^3-2048*x^2+4096*x)*log(2)^4+(-4*x^6+128*x^5-1552*x^4+8576*x
^3-19456*x^2+8192*x)*log(2)^3+(6*x^7-192*x^6+2352*x^5-13440*x^4+33888*x^3-
26112*x^2+6144*x)*log(2)^2+(-4*x^8+128*x^7-1584*x^6+9344*x^5-25792*x^4+276
48*x^3-12544*x^2+2048*x)*log(2)+x^9-32*x^8+400*x^7-2432*x^6+7264*x^5-9728*
x^4+6400*x^3-2048*x^2+256*x),x, algorithm=\
```

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$$\int \frac{}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+(2048x-12544x^2+27648x^3-25792x^4+9344x^5-1584x^6+128x^7-4x^8)\log(}$$

output
```
5/(x^4 - 2*x^3*log(2) + x^2*log(2)^2 - 16*x^3 + 32*x^2*log(2) - 16*x*log(2
)^2 + 72*x^2 - 136*x*log(2) + 64*log(2)^2 - 64*x + 64*log(2) + log(x) + 16
)
```

3.408.9 Mupad [F(-1)]

Timed out.

$$\int \frac{}{256x - 2048x^2 + 6400x^3 - 9728x^4 + 7264x^5 - 2432x^6 + 400x^7 - 32x^8 + x^9 + (2048x - 12544x^2 + 2764}$$

$$= \int \frac{}{256\,x + x\ln\left(x\right)^2 + \ln\left(2\right)^3\ \left(-4\,x^6 + 128\,x^5 - 1552\,x^4 + 8576\,x^3 - 19456\,x^2 + 8192\,x\right) + \ln\left(2\right)\ \left(-4\,x^8 +}$$

input
```
int((320*x + log(2)*(680*x - 320*x^2 + 30*x^3) + log(2)^2*(80*x - 10*x^2)
- 720*x^2 + 240*x^3 - 20*x^4 - 5)/(256*x + x*log(x)^2 + log(2)^3*(8192*x -
 19456*x^2 + 8576*x^3 - 1552*x^4 + 128*x^5 - 4*x^6) + log(2)*(2048*x - 125
44*x^2 + 27648*x^3 - 25792*x^4 + 9344*x^5 - 1584*x^6 + 128*x^7 - 4*x^8) +
log(2)^2*(6144*x - 26112*x^2 + 33888*x^3 - 13440*x^4 + 2352*x^5 - 192*x^6
+ 6*x^7) + log(x)*(32*x + log(2)*(128*x - 272*x^2 + 64*x^3 - 4*x^4) + log(
2)^2*(128*x - 32*x^2 + 2*x^3) - 128*x^2 + 144*x^3 - 32*x^4 + 2*x^5) - 2048
*x^2 + 6400*x^3 - 9728*x^4 + 7264*x^5 - 2432*x^6 + 400*x^7 - 32*x^8 + x^9
+ log(2)^4*(4096*x - 2048*x^2 + 384*x^3 - 32*x^4 + x^5)),x)
```

output
```
int((320*x + log(2)*(680*x - 320*x^2 + 30*x^3) + log(2)^2*(80*x - 10*x^2)
- 720*x^2 + 240*x^3 - 20*x^4 - 5)/(256*x + x*log(x)^2 + log(2)^3*(8192*x -
 19456*x^2 + 8576*x^3 - 1552*x^4 + 128*x^5 - 4*x^6) + log(2)*(2048*x - 125
44*x^2 + 27648*x^3 - 25792*x^4 + 9344*x^5 - 1584*x^6 + 128*x^7 - 4*x^8) +
log(2)^2*(6144*x - 26112*x^2 + 33888*x^3 - 13440*x^4 + 2352*x^5 - 192*x^6
+ 6*x^7) + log(x)*(32*x + log(2)*(128*x - 272*x^2 + 64*x^3 - 4*x^4) + log(
2)^2*(128*x - 32*x^2 + 2*x^3) - 128*x^2 + 144*x^3 - 32*x^4 + 2*x^5) - 2048
*x^2 + 6400*x^3 - 9728*x^4 + 7264*x^5 - 2432*x^6 + 400*x^7 - 32*x^8 + x^9
+ log(2)^4*(4096*x - 2048*x^2 + 384*x^3 - 32*x^4 + x^5)), x)
```

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$\int \frac{}{256x-2048x^2+6400x^3-9728x^4+7264x^5-2432x^6+400x^7-32x^8+x^9+(2048x-12544x^2+27648x^3-25792x^4+9344x^5-1584x^6+128x^7-4x^8)\log(}$

3.409 $\int \frac{e^{2x+e^{x^2}x^2-4x^3}\left(-5+10x-60x^3+e^{x^2}(10x^2+10x^4)\right)}{x^2}\,dx$

3.409.1 Optimal result

Integrand size = 51, antiderivative size = 30

$$\int \frac{e^{2x+e^{x^2}x^2-4x^3}\left(-5+10x-60x^3+e^{x^2}(10x^2+10x^4)\right)}{x^2}\,dx=\frac{5e^{-x\left(1+x\left(-e^{x^2}-\frac{3}{x}+4x\right)\right)}}{x}$$

output
```
5/exp((x*(4*x-exp(x^2)-3/x)+1)*x)/x
```

3.409.2 Mathematica [A] (verified)

Time = 0.52 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.77

$$\int \frac{e^{2x+e^{x^2}x^2-4x^3}\left(-5+10x-60x^3+e^{x^2}(10x^2+10x^4)\right)}{x^2}\,dx=\frac{5e^{x\left(2+e^{x^2}x-4x^2\right)}}{x}$$

input
```
Integrate[(E^(2*x + E^x^2*x^2 - 4*x^3)*(-5 + 10*x - 60*x^3 + E^x^2*(10*x^2
 + 10*x^4)))/x^2,x]
```

output
```
(5*E^(x*(2 + E^x^2*x - 4*x^2)))/x
```

3.409.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 70 vs. $2(30) = 60$.

Time = 0.38 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.33, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.020$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-4x^3+e^{x^2}x^2+2x}\left(-60x^3+e^{x^2}\left(10x^4+10x^2\right)+10x-5\right)}{x^2}\,dx$$
$$\Big\downarrow \text{2726}$$
$$\frac{5e^{-4x^3+e^{x^2}x^2+2x}\left(-6x^3+e^{x^2}\left(x^4+x^2\right)+x\right)}{x^2\left(-6x^2+e^{x^2}x+e^{x^2}x^3+1\right)}$$

input
```
Int[(E^(2*x + E^x^2*x^2 - 4*x^3)*(-5 + 10*x - 60*x^3 + E^x^2*(10*x^2 + 10*
x^4)))/x^2,x]
```

output
```
(5*E^(2*x + E^x^2*x^2 - 4*x^3)*(x - 6*x^3 + E^x^2*(x^2 + x^4)))/(x^2*(1 +
E^x^2*x - 6*x^2 + E^x^2*x^3))
```

3.409.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.409.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

method	result	size
risch	$\frac{5\,\mathrm{e}^{-x\left(-\mathrm{e}^{x^2}x+4x^2-2\right)}}{x}$	24
norman	$\frac{5\,\mathrm{e}^{x^2\mathrm{e}^{x^2}-4x^3+2x}}{x}$	27
parallelrisch	$\frac{5\,\mathrm{e}^{x^2\mathrm{e}^{x^2}-4x^3+2x}}{x}$	27

input
```
int((((10*x^4+10*x^2)*exp(x^2)-60*x^3+10*x-5)/x^2/exp(-x^2*exp(x^2)+4*x^3-2
*x),x,method=_RETURNVERBOSE)
```

output
```
5/x*exp(-x*(-exp(x^2)*x+4*x^2-2))
```

3.409.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.77

$$\int \frac{e^{2x+e^{x^2}x^2-4x^3}\left(-5+10x-60x^3+e^{x^2}(10x^2+10x^4)\right)}{x^2}\,dx=\frac{5\,e^{\left(-4\,x^3+x^2e^{\left(x^2\right)}+2\,x\right)}}{x}$$

input
```
integrate((((10*x^4+10*x^2)*exp(x^2)-60*x^3+10*x-5)/x^2/exp(-x^2*exp(x^2)+4
*x^3-2*x),x, algorithm=\
```

output
```
5*e^(-4*x^3 + x^2*e^(x^2) + 2*x)/x
```

3.409.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \frac{e^{2x+e^{x^2}x^2-4x^3}\left(-5+10x-60x^3+e^{x^2}(10x^2+10x^4)\right)}{x^2}\,dx=\frac{5e^{-4x^3+x^2e^{x^2}+2x}}{x}$$

input
```
integrate((((10*x**4+10*x**2)*exp(x**2)-60*x**3+10*x-5)/x**2/exp(-x**2*exp(
x**2)+4*x**3-2*x),x)
```

output
```
5*exp(-4*x**3 + x**2*exp(x**2) + 2*x)/x
```

3.409.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.77

$$\int \frac{e^{2x+e^{x^2}x^2-4x^3}\left(-5+10x-60x^3+e^{x^2}(10x^2+10x^4)\right)}{x^2}\,dx=\frac{5\,e^{\left(-4\,x^3+x^2e^{\left(x^2\right)}+2\,x\right)}}{x}$$

input
```
integrate(((10*x^4+10*x^2)*exp(x^2)-60*x^3+10*x-5)/x^2/exp(-x^2*exp(x^2)+4
*x^3-2*x),x, algorithm=\
```

output
```
5*e^(-4*x^3 + x^2*e^(x^2) + 2*x)/x
```

3.409.8 Giac [F]

$$\int \frac{e^{2x+e^{x^2}x^2-4x^3}\left(-5+10x-60x^3+e^{x^2}(10x^2+10x^4)\right)}{x^2}\,dx$$
$$=\int -\frac{5\left(12\,x^3-2\,(x^4+x^2)e^{\left(x^2\right)}-2\,x+1\right)e^{\left(-4\,x^3+x^2e^{\left(x^2\right)}+2\,x\right)}}{x^2}\,dx$$

input
```
integrate(((10*x^4+10*x^2)*exp(x^2)-60*x^3+10*x-5)/x^2/exp(-x^2*exp(x^2)+4
*x^3-2*x),x, algorithm=\
```

output
```
integrate(-5*(12*x^3 - 2*(x^4 + x^2)*e^(x^2) - 2*x + 1)*e^(-4*x^3 + x^2*e^
(x^2) + 2*x)/x^2, x)
```

3.409.9 Mupad [B] (verification not implemented)

Time = 15.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{e^{2x+e^{x^2}x^2-4x^3}\left(-5+10x-60x^3+e^{x^2}(10x^2+10x^4)\right)}{x^2}\,dx=\frac{5\,e^{2\,x}\,e^{-4\,x^3}\,e^{x^2\,e^{x^2}}}{x}$$

input
```
int((exp(2*x + x^2*exp(x^2) - 4*x^3)*(10*x + exp(x^2)*(10*x^2 + 10*x^4) -
60*x^3 - 5))/x^2,x)
```

output
```
(5*exp(2*x)*exp(-4*x^3)*exp(x^2*exp(x^2)))/x
```

3.410 $\int \frac{-4x^2+2e^{1+x}x^2-2x^4+\left(4x^2+6x^4+e^{1+x}\left(-2x^2-2x^3\right)\right)\log(x)+\left(4-2x^2\right.}{6x^2\log^2(x)}$

3.410.1 Optimal result

Integrand size = 96, antiderivative size = 33

$$\int \frac{-4x^2+2e^{1+x}x^2-2x^4+\left(4x^2+6x^4+e^{1+x}\left(-2x^2-2x^3\right)\right)\log(x)+\left(4-2x^2+2x^3+e^{1+x}\left(-2+2x-x^2\right.\right.}{6x^2\log^2(x)}$$

$$=\frac{1}{3}\left(-\frac{-2+e^{1+x}}{x}+x\right)\left(-1+\frac{x}{2}+\frac{x^2}{\log(x)}\right)$$

output
```
(x-(exp(1+x)-2)/x)*(1/3*x^2/ln(x)-1/3+1/6*x)
```

3.410.2 Mathematica [A] (verified)

Time = 0.45 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.48

$$\int \frac{-4x^2+2e^{1+x}x^2-2x^4+\left(4x^2+6x^4+e^{1+x}\left(-2x^2-2x^3\right)\right)\log(x)+\left(4-2x^2+2x^3+e^{1+x}\left(-2+2x-x^2\right.\right.}{6x^2\log^2(x)}$$

$$=\frac{1}{6}\left(e^x\left(-e+\frac{2e}{x}\right)-\frac{4}{x}-2x+x^2+\frac{2x(2-e^{1+x}+x^2)}{\log(x)}\right)$$

input
```
Integrate[(-4*x^2 + 2*E^(1 + x)*x^2 - 2*x^4 + (4*x^2 + 6*x^4 + E^(1 + x)*(
-2*x^2 - 2*x^3))*Log[x] + (4 - 2*x^2 + 2*x^3 + E^(1 + x)*(-2 + 2*x - x^2))
*Log[x]^2)/(6*x^2*Log[x]^2),x]
```

output
```
(E^x*(-E + (2*E)/x) - 4/x - 2*x + x^2 + (2*x*(2 - E^(1 + x) + x^2))/Log[x]
)/6
```

3.410.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 69 vs. $2(33) = 66$.

Time = 1.16 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.09, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^4+2e^{x+1}x^2-4x^2+\left(2x^3-2x^2+e^{x+1}\left(-x^2+2x-2\right)+4\right)\log^2(x)+\left(6x^4+4x^2+e^{x+1}\left(-2x^3-2x^2\right)\right)\log}{6x^2\log^2(x)}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{6}\int -\frac{2x^4-2e^{x+1}x^2+4x^2-\left(2x^3-2x^2-e^{x+1}\left(x^2-2x+2\right)+4\right)\log^2(x)-2\left(3x^4+2x^2-e^{x+1}\left(x^3+x^2\right)\right)\log(}{x^2\log^2(x)}$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{1}{6}\int \frac{2x^4-2e^{x+1}x^2+4x^2-\left(2x^3-2x^2-e^{x+1}\left(x^2-2x+2\right)+4\right)\log^2(x)-2\left(3x^4+2x^2-e^{x+1}\left(x^3+x^2\right)\right)\log(}{x^2\log^2(x)}$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{1}{6}\int \left(\frac{e^{x+1}\left(2\log(x)x^3+\log^2(x)x^2+2\log(x)x^2-2x^2-2\log^2(x)x+2\log^2(x)\right)}{x^2\log^2(x)}-\frac{2\left(3\log(x)x^4-x^4+\log^2(x)\right.}{}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{6}\left(\frac{2x^3}{\log(x)}+x^2-\frac{e^{x+1}\left(2x^3\log(x)+x^2\log^2(x)-2x\log^2(x)\right)}{x^2\log^2(x)}-2x-\frac{4}{x}+\frac{4x}{\log(x)}\right)$$

input
```
Int[(-4*x^2 + 2*E^(1 + x)*x^2 - 2*x^4 + (4*x^2 + 6*x^4 + E^(1 + x)*(-2*x^2
 - 2*x^3))*Log[x] + (4 - 2*x^2 + 2*x^3 + E^(1 + x)*(-2 + 2*x - x^2))*Log[x
]^2)/(6*x^2*Log[x]^2),x]
```

output
```
(-4/x - 2*x + x^2 + (4*x)/Log[x] + (2*x^3)/Log[x] - (E^(1 + x)*(2*x^3*Log[
x] - 2*x*Log[x]^2 + x^2*Log[x]^2))/(x^2*Log[x]^2))/6
```

3.410.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.410.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.45

method	result	size
risch	$\frac{x^3-2x^2-x\,\mathrm{e}^{1+x}+2\,\mathrm{e}^{1+x}-4}{6x}+\frac{x\left(x^2-\mathrm{e}^{1+x}+2\right)}{3\ln\left(x\right)}$	48
parallelrisch	$-\frac{-x^3\ln\left(x\right)-2x^4+x\,\mathrm{e}^{1+x}\ln\left(x\right)+2x^2\ln\left(x\right)+2x^2\mathrm{e}^{1+x}-2\ln\left(x\right)\mathrm{e}^{1+x}-4x^2+4\ln\left(x\right)}{6\ln\left(x\right)x}$	64

input
```
int(1/6*(((-x^2+2*x-2)*exp(1+x)+2*x^3-2*x^2+4)*ln(x)^2+((-2*x^3-2*x^2)*exp
(1+x)+6*x^4+4*x^2)*ln(x)+2*x^2*exp(1+x)-2*x^4-4*x^2)/x^2/ln(x)^2,x,method=
_RETURNVERBOSE)
```

output
```
1/6*(x^3-2*x^2-x*exp(1+x)+2*exp(1+x)-4)/x+1/3*x*(x^2-exp(1+x)+2)/ln(x)
```

3.410.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.55

$$\int \frac{-4x^2+2e^{1+x}x^2-2x^4+(4x^2+6x^4+e^{1+x}(-2x^2-2x^3))\log(x)+(4-2x^2+2x^3+e^{1+x}(-2+2x-x^2}{6x^2\log^2(x)}$$

$$=\frac{2\,x^4-2\,x^2e^{(x+1)}+4\,x^2+\left(x^3-2\,x^2-(x-2)e^{(x+1)}-4\right)\log\left(x\right)}{6\,x\log\left(x\right)}$$

input
```
integrate(1/6*(((-x^2+2*x-2)*exp(1+x)+2*x^3-2*x^2+4)*log(x)^2+((-2*x^3-2*x
^2)*exp(1+x)+6*x^4+4*x^2)*log(x)+2*x^2*exp(1+x)-2*x^4-4*x^2)/x^2/log(x)^2,
x, algorithm=\
```

output
```
1/6*(2*x^4 - 2*x^2*e^(x + 1) + 4*x^2 + (x^3 - 2*x^2 - (x - 2)*e^(x + 1) -
4)*log(x))/(x*log(x))
```

3.410.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(24) = 48$.

Time = 0.13 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.55

$$\int \frac{-4x^2 + 2e^{1+x}x^2 - 2x^4 + (4x^2 + 6x^4 + e^{1+x}(-2x^2 - 2x^3))\log(x) + (4 - 2x^2 + 2x^3 + e^{1+x}(-2 + 2x - x^2 ...}{6x^2\log^2(x)}$$
$$= \frac{x^2}{6} - \frac{x}{3} + \frac{x^3 + 2x}{3\log(x)} + \frac{(-2x^2 - x\log(x) + 2\log(x))e^{x+1}}{6x\log(x)} - \frac{2}{3x}$$

input
```
integrate(1/6*(((-x**2+2*x-2)*exp(1+x)+2*x**3-2*x**2+4)*ln(x)**2+((-2*x**3
-2*x**2)*exp(1+x)+6*x**4+4*x**2)*ln(x)+2*x**2*exp(1+x)-2*x**4-4*x**2)/x**2
/ln(x)**2,x)
```

output
```
x**2/6 - x/3 + (x**3 + 2*x)/(3*log(x)) + (-2*x**2 - x*log(x) + 2*log(x))*e
xp(x + 1)/(6*x*log(x)) - 2/(3*x)
```

3.410.7 Maxima [F]

$$\int \frac{-4x^2 + 2e^{1+x}x^2 - 2x^4 + (4x^2 + 6x^4 + e^{1+x}(-2x^2 - 2x^3))\log(x) + (4 - 2x^2 + 2x^3 + e^{1+x}(-2 + 2x - x^2 ...}{6x^2\log^2(x)}$$
$$= \int -\frac{2\,x^4 - 2\,x^2e^{(x+1)} - \left(2\,x^3 - 2\,x^2 - (x^2 - 2\,x + 2)e^{(x+1)} + 4\right)\log(x)^2 + 4\,x^2 - 2\left(3\,x^4 + 2\,x^2 - (x^3 + x ...}{6\,x^2\log(x)^2}$$

input
```
integrate(1/6*(((-x^2+2*x-2)*exp(1+x)+2*x^3-2*x^2+4)*log(x)^2+((-2*x^3-2*x
^2)*exp(1+x)+6*x^4+4*x^2)*log(x)+2*x^2*exp(1+x)-2*x^4-4*x^2)/x^2/log(x)^2,
x, algorithm=\
```

output
```
1/6*x^2 + 1/3*Ei(x)*e - 1/3*e*gamma(-1, -x) - 1/3*x - 1/3*x*e^(x + 1)/log(
x) - 2/3/x - 1/6*e^(x + 1) - 2/3*gamma(-1, -log(x)) - gamma(-1, -3*log(x))
 + 1/6*integrate(2*(3*x^2 + 2)/log(x), x)
```

3.410.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(27) = 54$.

Time = 0.28 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.91

$$\int \frac{-4x^2 + 2e^{1+x}x^2 - 2x^4 + (4x^2 + 6x^4 + e^{1+x}(-2x^2 - 2x^3))\log(x) + (4 - 2x^2 + 2x^3 + e^{1+x}(-2 + 2x - x^2}{6x^2\log^2(x)}$$
$$= \frac{2\,x^4 + x^3\log(x) - 2\,x^2e^{(x+1)} - 2\,x^2\log(x) - xe^{(x+1)}\log(x) + 4\,x^2 + 2\,e^{(x+1)}\log(x) - 4\,\log(x)}{6\,x\log(x)}$$

input
```
integrate(1/6*((((-x^2+2*x-2)*exp(1+x)+2*x^3-2*x^2+4)*log(x)^2+((-2*x^3-2*x
^2)*exp(1+x)+6*x^4+4*x^2)*log(x)+2*x^2*exp(1+x)-2*x^4-4*x^2)/x^2/log(x)^2,
x, algorithm=\
```

output
```
1/6*(2*x^4 + x^3*log(x) - 2*x^2*e^(x + 1) - 2*x^2*log(x) - x*e^(x + 1)*log
(x) + 4*x^2 + 2*e^(x + 1)*log(x) - 4*log(x))/(x*log(x))
```

3.410.9 Mupad [B] (verification not implemented)

Time = 14.45 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.70

$$\int \frac{-4x^2 + 2e^{1+x}x^2 - 2x^4 + (4x^2 + 6x^4 + e^{1+x}(-2x^2 - 2x^3))\log(x) + (4 - 2x^2 + 2x^3 + e^{1+x}(-2 + 2x - x^2}{6x^2\log^2(x)}$$
$$= \frac{2\,x}{3\,\ln(x)} - \frac{e^{x+1}}{6} - \frac{x}{3} + \frac{e^{x+1}}{3\,x} + \frac{x^3}{3\,\ln(x)} - \frac{2}{3\,x} + \frac{x^2}{6} - \frac{x\,e^{x+1}}{3\,\ln(x)}$$

input
```
int(-((log(x)^2*(exp(x + 1)*(x^2 - 2*x + 2) + 2*x^2 - 2*x^3 - 4))/6 - (x^2
*exp(x + 1))/3 - (log(x)*(4*x^2 - exp(x + 1)*(2*x^2 + 2*x^3) + 6*x^4))/6 +
 (2*x^2)/3 + x^4/3)/(x^2*log(x)^2),x)
```

output
```
(2*x)/(3*log(x)) - exp(x + 1)/6 - x/3 + exp(x + 1)/(3*x) + x^3/(3*log(x))
- 2/(3*x) + x^2/6 - (x*exp(x + 1))/(3*log(x))
```

3.411 $\int \frac{176+124x+20x^2+e^x(-88-62x-10x^2)+(88+256x+134x^2+20x^3+e^x}{(176x+124x^2+2}$

3.411.1 Optimal result

Integrand size = 188, antiderivative size = 35

$$\int \frac{176+124x+20x^2+e^x(-88-62x-10x^2)+(88+256x+134x^2+20x^3+e^x(-44-216x-129x^2-}{(176x+124x^2+20x^3+e^x(-176x-124x^2-20}$$

$$=x+\frac{\log\left(\left(x+\frac{x+\left(-\frac{3}{5}+x\right)x}{4+x}\right)\log\left(x^2\right)\right)}{2-e^x}$$

output
```
x+ln((x+(x*(x-3/5)+x)/(4+x))*ln(x^2))/(-exp(x)+2)
```

3.411.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.89

$$\int \frac{176+124x+20x^2+e^x(-88-62x-10x^2)+(88+256x+134x^2+20x^3+e^x(-44-216x-129x^2-}{(176x+124x^2+20x^3+e^x(-176x-124x^2-20}$$

$$=x-\frac{\log\left(\frac{2x(11+5x)\log(x^2)}{5(4+x)}\right)}{-2+e^x}$$

3.411.

$$\int \frac{176+124x+20x^2+e^x(-88-62x-10x^2)+(88+256x+134x^2+20x^3+e^x(-44-216x-129x^2-20x^3)+e^{2x}(44x+31x^2+5x^3))\log(x^2)+e^x(44x+31x^}{}$$

input
```
Integrate[(176 + 124*x + 20*x^2 + E^x*(-88 - 62*x - 10*x^2) + (88 + 256*x
+ 134*x^2 + 20*x^3 + E^x*(-44 - 216*x - 129*x^2 - 20*x^3) + E^(2*x)*(44*x
+ 31*x^2 + 5*x^3))*Log[x^2] + E^x*(44*x + 31*x^2 + 5*x^3)*Log[x^2]*Log[((2
2*x + 10*x^2)*Log[x^2])/(20 + 5*x)])/((176*x + 124*x^2 + 20*x^3 + E^x*(-17
6*x - 124*x^2 - 20*x^3) + E^(2*x)*(44*x + 31*x^2 + 5*x^3))*Log[x^2]),x]
```

output
```
x - Log[(2*x*(11 + 5*x)*Log[x^2])/(5*(4 + x))]/(-2 + E^x)
```

3.411.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{20x^2+e^x\left(-10x^2-62x-88\right)+\left(20x^3+134x^2+e^x\left(-20x^3-129x^2-216x-44\right)+e^{2x}\left(5x^3+31x^2+44x\right)+\right.}{\left(20x^3+124x^2+e^x\left(-20x^3-124x^2-176x\right)+e^{2x}\left(5\right.\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\frac{4-2e^x}{\log(x^2)}+e^x x\log\left(\frac{2x(5x+11)\log(x^2)}{5(x+4)}\right)+\frac{(e^x-2)\left(5(e^x-2)x^3+(31e^x-67)x^2+4(11e^x-32)x-44\right)}{5x^2+31x+44}}{(2-e^x)^2 x}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2\log\left(\frac{2x(5x+11)\log(x^2)}{5(x+4)}\right)}{(e^x-2)^2}+\frac{-10x^2-5x^2\log\left(x^2\right)+31x^2\log\left(x^2\right)\log\left(\frac{2x(5x+11)\log(x^2)}{5(x+4)}\right)-40x\log\left(x^2\right)+44x\,\mathrm{l}}{(e^x-2)\,x(x}\right.$$

$$\Big\downarrow \text{7299}$$

$$\int \left(\frac{2\log\left(\frac{2x(5x+11)\log(x^2)}{5(x+4)}\right)}{(e^x-2)^2}+\frac{-10x^2-5x^2\log\left(x^2\right)+31x^2\log\left(x^2\right)\log\left(\frac{2x(5x+11)\log(x^2)}{5(x+4)}\right)-40x\log\left(x^2\right)+44x\,\mathrm{l}}{(e^x-2)\,x(x}\right.$$

input
```
Int[(176 + 124*x + 20*x^2 + E^x*(-88 - 62*x - 10*x^2) + (88 + 256*x + 134*
x^2 + 20*x^3 + E^x*(-44 - 216*x - 129*x^2 - 20*x^3) + E^(2*x)*(44*x + 31*x
^2 + 5*x^3))*Log[x^2] + E^x*(44*x + 31*x^2 + 5*x^3)*Log[x^2]*Log[((22*x +
10*x^2)*Log[x^2])/(20 + 5*x)])/((176*x + 124*x^2 + 20*x^3 + E^x*(-176*x -
124*x^2 - 20*x^3) + E^(2*x)*(44*x + 31*x^2 + 5*x^3))*Log[x^2]),x]
```

3.411.

$$\int \frac{176+124x+20x^2+e^x\left(-88-62x-10x^2\right)+\left(88+256x+134x^2+20x^3+e^x\left(-44-216x-129x^2-20x^3\right)+e^{2x}\left(44x+31x^2+5x^3\right)\right)\log\left(x^2\right)+e^x\left(44x+31x\right.}{}$$

output
```
$Aborted
```

3.411.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.411.4 Maple [A] (verified)

Time = 27.39 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.31

method	result	size
parallelrisch	$-\frac{-3872-2728\,\mathrm{e}^{x} x+5456 x+1936\,\mathrm{e}^{x}+2728 \ln\left(\frac{\left(10 x^{2}+22 x\right) \ln\left(x^{2}\right)}{20+5 x}\right)}{2728\left(\mathrm{e}^{x}-2\right)}$	46
risch	Expression too large to display	1674

input
```
int(((5*x^3+31*x^2+44*x)*exp(x)*ln(x^2)*ln((10*x^2+22*x)*ln(x^2)/(20+5*x))
+((5*x^3+31*x^2+44*x)*exp(x)^2+(-20*x^3-129*x^2-216*x-44)*exp(x)+20*x^3+13
4*x^2+256*x+88)*ln(x^2)+(-10*x^2-62*x-88)*exp(x)+20*x^2+124*x+176)/((5*x^3
+31*x^2+44*x)*exp(x)^2+(-20*x^3-124*x^2-176*x)*exp(x)+20*x^3+124*x^2+176*x
)/ln(x^2),x,method=_RETURNVERBOSE)
```

output
```
-1/2728*(-3872-2728*exp(x)*x+5456*x+1936*exp(x)+2728*ln(1/5/(4+x)*(10*x^2+
22*x)*ln(x^2)))/(exp(x)-2)
```

3.411.

$$\int \frac{176+124x+20x^2+e^x\left(-88-62x-10x^2\right)+\left(88+256x+134x^2+20x^3+e^x\left(-44-216x-129x^2-20x^3\right)+e^{2x}\left(44x+31x^2+5x^3\right)\right)\log\left(x^2\right)+e^x\left(44x+31x^2\right.}{}$$

3.411.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.09

$$\int \frac{176 + 124x + 20x^2 + e^x(-88 - 62x - 10x^2) + (88 + 256x + 134x^2 + 20x^3 + e^x(-44 - 216x - 129x^2 -}{(176x + 124x^2 + 20x^3 + e^x(-176x - 124x^2 - 20}$$
$$= \frac{xe^x - 2x - \log\left(\frac{2(5x^2+11x)\log(x^2)}{5(x+4)}\right)}{e^x - 2}$$

input
```
integrate(((5*x^3+31*x^2+44*x)*exp(x)*log(x^2)*log((10*x^2+22*x)*log(x^2)/
(20+5*x))+((5*x^3+31*x^2+44*x)*exp(x)^2+(-20*x^3-129*x^2-216*x-44)*exp(x)+
20*x^3+134*x^2+256*x+88)*log(x^2)+(-10*x^2-62*x-88)*exp(x)+20*x^2+124*x+17
6)/((5*x^3+31*x^2+44*x)*exp(x)^2+(-20*x^3-124*x^2-176*x)*exp(x)+20*x^3+124
*x^2+176*x)/log(x^2),x, algorithm=\
```

output
```
(x*e^x - 2*x - log(2/5*(5*x^2 + 11*x)*log(x^2)/(x + 4)))/(e^x - 2)
```

3.411.6 Sympy [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.74

$$\int \frac{176 + 124x + 20x^2 + e^x(-88 - 62x - 10x^2) + (88 + 256x + 134x^2 + 20x^3 + e^x(-44 - 216x - 129x^2 -}{(176x + 124x^2 + 20x^3 + e^x(-176x - 124x^2 - 20}$$
$$= x - \frac{\log\left(\frac{(10x^2+22x)\log(x^2)}{5x+20}\right)}{e^x - 2}$$

input
```
integrate(((5*x**3+31*x**2+44*x)*exp(x)*ln(x**2)*ln((10*x**2+22*x)*ln(x**2
)/(20+5*x))+((5*x**3+31*x**2+44*x)*exp(x)**2+(-20*x**3-129*x**2-216*x-44)*
exp(x)+20*x**3+134*x**2+256*x+88)*ln(x**2)+(-10*x**2-62*x-88)*exp(x)+20*x*
*2+124*x+176)/((5*x**3+31*x**2+44*x)*exp(x)**2+(-20*x**3-124*x**2-176*x)*e
xp(x)+20*x**3+124*x**2+176*x)/ln(x**2),x)
```

output
```
x - log((10*x**2 + 22*x)*log(x**2)/(5*x + 20))/(exp(x) - 2)
```

3.411.

$$\int \frac{176+124x+20x^2+e^x(-88-62x-10x^2)+(88+256x+134x^2+20x^3+e^x(-44-216x-129x^2-20x^3)+e^{2x}(44x+31x^2+5x^3))\log(x^2)+e^x(44x+31x^2}{}$$

3.411.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.20

$$\int \frac{176 + 124x + 20x^2 + e^x(-88 - 62x - 10x^2) + (88 + 256x + 134x^2 + 20x^3 + e^x(-44 - 216x - 129x^2 -}{(176x + 124x^2 + 20x^3 + e^x(-176x - 124x^2 - 20}$$
$$= \frac{xe^x - 2x + \log(5) - 2\log(2) - \log(5x + 11) + \log(x + 4) - \log(x) - \log(\log(x))}{e^x - 2}$$

input
```
integrate(((5*x^3+31*x^2+44*x)*exp(x)*log(x^2)*log((10*x^2+22*x)*log(x^2)/
(20+5*x))+((5*x^3+31*x^2+44*x)*exp(x)^2+(-20*x^3-129*x^2-216*x-44)*exp(x)+
20*x^3+134*x^2+256*x+88)*log(x^2)+(-10*x^2-62*x-88)*exp(x)+20*x^2+124*x+17
6)/((5*x^3+31*x^2+44*x)*exp(x)^2+(-20*x^3-124*x^2-176*x)*exp(x)+20*x^3+124
*x^2+176*x)/log(x^2),x, algorithm=\
```

output
```
(x*e^x - 2*x + log(5) - 2*log(2) - log(5*x + 11) + log(x + 4) - log(x) - l
og(log(x)))/(e^x - 2)
```

3.411.8 Giac [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.20

$$\int \frac{176 + 124x + 20x^2 + e^x(-88 - 62x - 10x^2) + (88 + 256x + 134x^2 + 20x^3 + e^x(-44 - 216x - 129x^2 -}{(176x + 124x^2 + 20x^3 + e^x(-176x - 124x^2 - 20}$$
$$= \frac{xe^x - 2x - \log(10x\log(x^2) + 22\log(x^2)) + \log(5x + 20) - \log(x)}{e^x - 2}$$

input
```
integrate(((5*x^3+31*x^2+44*x)*exp(x)*log(x^2)*log((10*x^2+22*x)*log(x^2)/
(20+5*x))+((5*x^3+31*x^2+44*x)*exp(x)^2+(-20*x^3-129*x^2-216*x-44)*exp(x)+
20*x^3+134*x^2+256*x+88)*log(x^2)+(-10*x^2-62*x-88)*exp(x)+20*x^2+124*x+17
6)/((5*x^3+31*x^2+44*x)*exp(x)^2+(-20*x^3-124*x^2-176*x)*exp(x)+20*x^3+124
*x^2+176*x)/log(x^2),x, algorithm=\
```

output
```
(x*e^x - 2*x - log(10*x*log(x^2) + 22*log(x^2)) + log(5*x + 20) - log(x))/
(e^x - 2)
```

3.411.

$$\int \frac{176+124x+20x^2+e^x(-88-62x-10x^2)+(88+256x+134x^2+20x^3+e^x(-44-216x-129x^2-20x^3)+e^{2x}(44x+31x^2+5x^3))\log(x^2)+e^x(44x+31x}{}$$

3.411.9 Mupad [B] (verification not implemented)

Time = 14.10 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.91

$$\int \frac{176+124x+20x^2+e^x(-88-62x-10x^2)+(88+256x+134x^2+20x^3+e^x(-44-216x-129x^2-}{(176x+124x^2+20x^3+e^x(-176x-124x^2-20}$$

$$= x - \frac{\ln\left(\frac{\ln(x^2)\,(10\,x^2+22\,x)}{5\,x+20}\right)}{e^x-2}$$

input
```
int((124*x + log(x^2)*(256*x + exp(2*x)*(44*x + 31*x^2 + 5*x^3) + 134*x^2
+ 20*x^3 - exp(x)*(216*x + 129*x^2 + 20*x^3 + 44) + 88) - exp(x)*(62*x + 1
0*x^2 + 88) + 20*x^2 + log((log(x^2)*(22*x + 10*x^2))/(5*x + 20))*log(x^2)
*exp(x)*(44*x + 31*x^2 + 5*x^3) + 176)/(log(x^2)*(176*x + exp(2*x)*(44*x +
 31*x^2 + 5*x^3) + 124*x^2 + 20*x^3 - exp(x)*(176*x + 124*x^2 + 20*x^3))),
x)
```

output
```
x - log((log(x^2)*(22*x + 10*x^2))/(5*x + 20))/(exp(x) - 2)
```

3.411.

$$\int \frac{176+124x+20x^2+e^x(-88-62x-10x^2)+(88+256x+134x^2+20x^3+e^x(-44-216x-129x^2-20x^3)+e^{2x}(44x+31x^2+5x^3))\log(x^2)+e^x(44x+31x}{}$$

3.412 $\int \frac{1}{2}(2+e^x)\,dx$

3.412.1 Optimal result

Integrand size = 9, antiderivative size = 12

$$\int \frac{1}{2}(2+e^x)\,dx = e^4+\frac{e^x}{2}+x$$

output
```
1/2*exp(x)+exp(4)+x
```

3.412.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \frac{1}{2}(2+e^x)\,dx = \frac{1}{2}(e^x+2x)$$

input
```
Integrate[(2 + E^x)/2,x]
```

output
```
(E^x + 2*x)/2
```

3.412.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}(e^x+2)\,dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{2}\int (2+e^x)\,dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{2}(2x+e^x)$$

input
```
Int[(2 + E^x)/2,x]
```

output
```
(E^x + 2*x)/2
```

3.412.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.412.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.58

method	result	size
default	$\frac{e^x}{2}+x$	7
norman	$\frac{e^x}{2}+x$	7
risch	$\frac{e^x}{2}+x$	7
parallelrisch	$\frac{e^x}{2}+x$	7
parts	$\frac{e^x}{2}+x$	7
derivativedivides	$\frac{e^x}{2}+\ln\left(e^x\right)$	9

input
```
int(1/2*exp(x)+1,x,method=_RETURNVERBOSE)
```

output
```
1/2*exp(x)+x
```

3.412.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.50

$$\int \frac{1}{2}(2+e^x)\,dx = x + \frac{1}{2}\,e^x$$

input
```
integrate(1/2*exp(x)+1,x, algorithm=\
```

output
```
x + 1/2*e^x
```

3.412.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.42

$$\int \frac{1}{2}(2+e^x)\,dx = x + \frac{e^x}{2}$$

input
```
integrate(1/2*exp(x)+1,x)
```

output
```
x + exp(x)/2
```

3.412.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.50

$$\int \frac{1}{2}(2+e^x)\,dx = x + \frac{1}{2}\,e^x$$

input
```
integrate(1/2*exp(x)+1,x, algorithm=\
```

output
```
x + 1/2*e^x
```

3.412.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.50

$$\int \frac{1}{2}(2+e^x)\,dx = x + \frac{1}{2}\,e^x$$

input
```
integrate(1/2*exp(x)+1,x, algorithm=\
```

output
```
x + 1/2*e^x
```

3.412.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.50

$$\int \frac{1}{2}(2+e^x)\,dx = x + \frac{e^x}{2}$$

input
```
int(exp(x)/2 + 1,x)
```

output
```
x + exp(x)/2
```

3.413 $\int \frac{-100e^{48}x\log(x)}{-8e^{144}x^6+\left(24e^{96+x}x^5+12e^{96}x^4\log(3)\right)\log(x)+\left(-24e^{48+2x}x^4-24e^{4}\right.}$

3.413.1 Optimal result

Integrand size = 152, antiderivative size = 27

$$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-10}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+\left(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3)\right)\log}$$
$$=\frac{25}{\left(-\log(3)+2x\left(-e^x+\frac{e^{48}x}{\log(x)}\right)\right)^2}$$

output
```
25/(2*x*(exp(48)/ln(x)*x-exp(x))-ln(3))^2
```

3.413.2 Mathematica [A] (verified)

Time = 0.75 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-10}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+\left(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3)\right)\log}$$
$$=\frac{25\log^2(x)}{\left(-2e^{48}x^2+(2e^xx+\log(3))\log(x)\right)^2}$$

input
```
Integrate[(-100*E^48*x*Log[x] + 200*E^48*x*Log[x]^2 + E^x*(-100 - 100*x)*L
og[x]^3)/(-8*E^144*x^6 + (24*E^(96 + x)*x^5 + 12*E^96*x^4*Log[3])*Log[x] +
 (-24*E^(48 + 2*x)*x^4 - 24*E^(48 + x)*x^3*Log[3] - 6*E^48*x^2*Log[3]^2)*L
og[x]^2 + (8*E^(3*x)*x^3 + 12*E^(2*x)*x^2*Log[3] + 6*E^x*x*Log[3]^2 + Log[
3]^3)*Log[x]^3),x]
```

3.413.
$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-100x)\log^3(x)}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+\left(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3)\right)\log^2(x)+\left(8e^{3x}x^3+12e^{2x}x^2\log(3)+6e^xx\log^2\right.}$

output
```
(25*Log[x]^2)/(-2*E^48*x^2 + (2*E^x*x + Log[3])*Log[x])^2
```

3.413.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(-100x-100)\log^3(x)+200e^{48}x\log^2(x)-100e^{48}x\,\mathrm{l}}{-8e^{144}x^6+\left(24e^{x+96}x^5+12e^{96}x^4\log(3)\right)\log(x)+\left(8e^{3x}x^3+12e^{2x}x^2\log(3)+6e^xx\log^2(3)+\log^3(3)\right)\log^3(x)}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{100\log(x)\left(e^{48}x+e^x(x+1)\log^2(x)-2e^{48}x\log(x)\right)}{\left(2e^{48}x^2-(2e^xx+\log(3))\log(x)\right)^3}dx$$

$$\Big\downarrow \text{27}$$

$$100\int \frac{\log(x)\left(e^x(x+1)\log^2(x)-2e^{48}x\log(x)+e^{48}x\right)}{\left(2e^{48}x^2-(2e^xx+\log(3))\log(x)\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$100\int \left(\frac{\log(x)\left(2e^{48}\log(x)x^3-2e^{48}\log(x)x^2+2e^{48}x^2-\log(3)\log^2(x)x-\log(3)\log^2(x)\right)}{2x\left(2e^{48}x^2-2e^x\log(x)x-\log(3)\log(x)\right)^3}-\frac{(x+1}{2x\left(2e^{48}x^2-2e^x\log\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$100\left(-\frac{1}{2}\log(3)\int \frac{\log^3(x)}{x\left(2e^{48}x^2-2e^x\log(x)x-\log(3)\log(x)\right)^3}dx+\frac{1}{2}\log(3)\int \frac{\log^3(x)}{\left(-2e^{48}x^2+2e^x\log(x)x+\log(3)\log(\right.}\right.$$

input
```
Int[(-100*E^48*x*Log[x] + 200*E^48*x*Log[x]^2 + E^x*(-100 - 100*x)*Log[x]^
3)/(-8*E^144*x^6 + (24*E^(96 + x)*x^5 + 12*E^96*x^4*Log[3])*Log[x] + (-24*
E^(48 + 2*x)*x^4 - 24*E^(48 + x)*x^3*Log[3] - 6*E^48*x^2*Log[3]^2)*Log[x]^
2 + (8*E^(3*x)*x^3 + 12*E^(2*x)*x^2*Log[3] + 6*E^x*x*Log[3]^2 + Log[3]^3)*
Log[x]^3),x]
```

output
```
$Aborted
```

3.413.
$$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-100x)\log^3(x)}{-8e^{144}x^6+\left(24e^{96+x}x^5+12e^{96}x^4\log(3)\right)\log(x)+\left(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3)\right)\log^2(x)+\left(8e^{3x}x^3+12e^{2x}x^2\log(3)+6e^xx\log^2\right.}$$

3.413.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.413.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(25) = 50$.

Time = 4.59 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.74

method	result	size
parallelrisch	$\frac{25\ln(x)^2}{4x^4 e^{96}-8x^3 e^{48}\ln(x) e^{x}+4\,e^{2x}\ln(x)^2 x^2-4x^2\ln(3) e^{48}\ln(x)+4x\ln(3) e^{x}\ln(x)^2+\ln(3)^2\ln(x)^2}$	74
risch	$\frac{25}{(2\,e^{x} x+\ln(3))^2}+\frac{100\left(-e^{48} x^2+2x\,e^{x}\ln(x)+\ln(3)\ln(x)\right) e^{48} x^2}{\left(4\,e^{2x} x^2+4x\ln(3) e^{x}+\ln(3)^2\right)(2x\,e^{x}\ln(x)-2\,e^{48} x^2+\ln(3)\ln(x))^2}$	86

input
```
int(((-100*x-100)*exp(x)*ln(x)^3+200*x*exp(48)*ln(x)^2-100*x*exp(48)*ln(x)
)/((8*x^3*exp(x)^3+12*x^2*ln(3)*exp(x)^2+6*x*ln(3)^2*exp(x)+ln(3)^3)*ln(x)
^3+(-24*x^4*exp(48)*exp(x)^2-24*x^3*exp(48)*ln(3)*exp(x)-6*x^2*exp(48)*ln(
3)^2)*ln(x)^2+(24*x^5*exp(48)^2*exp(x)+12*x^4*exp(48)^2*ln(3))*ln(x)-8*x^6
*exp(48)^3),x,method=_RETURNVERBOSE)
```

output
```
25*ln(x)^2/(4*x^4*exp(48)^2-8*x^3*exp(48)*ln(x)*exp(x)+4*x^2*exp(x)^2*ln(x
)^2-4*x^2*ln(3)*exp(48)*ln(x)+4*x*ln(3)*exp(x)*ln(x)^2+ln(3)^2*ln(x)^2)
```

3.413.

$$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^{x}(-100-100x)\log^3(x)}{-8e^{144}x^6+\left(24e^{96+x}x^5+12e^{96}x^4\log(3)\right)\log(x)+\left(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3)\right)\log^2(x)+\left(8e^{3x}x^3+12e^{2x}x^2\log(3)+6e^{x}x\log^2\right.}$$

3.413.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. 2(25) = 50.

Time = 0.28 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.70

$$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-10}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+\left(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3)\right)\log}$$
$$=\frac{25\,e^{192}\log\left(x\right)^2}{4\,x^4e^{288}+\left(4\,x^2e^{(2\,x+192)}+4\,xe^{(x+192)}\log\left(3\right)+e^{192}\log\left(3\right)^2\right)\log\left(x\right)^2-4\left(2\,x^3e^{(x+240)}+x^2e^{240}\log\left(3\right)\right)\log}$$

input
```
integrate(((-100*x-100)*exp(x)*log(x)^3+200*x*exp(48)*log(x)^2-100*x*exp(4
8)*log(x))/((8*x^3*exp(x)^3+12*x^2*log(3)*exp(x)^2+6*x*log(3)^2*exp(x)+log
(3)^3)*log(x)^3+(-24*x^4*exp(48)*exp(x)^2-24*x^3*exp(48)*log(3)*exp(x)-6*x
^2*exp(48)*log(3)^2)*log(x)^2+(24*x^5*exp(48)^2*exp(x)+12*x^4*exp(48)^2*lo
g(3))*log(x)-8*x^6*exp(48)^3),x, algorithm=\
```

output
```
25*e^192*log(x)^2/(4*x^4*e^288 + (4*x^2*e^(2*x + 192) + 4*x*e^(x + 192)*lo
g(3) + e^192*log(3)^2)*log(x)^2 - 4*(2*x^3*e^(x + 240) + x^2*e^240*log(3))
*log(x))
```

3.413.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. 2(20) = 40.

Time = 0.19 (sec) , antiderivative size = 82, normalized size of antiderivative = 3.04

$$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-10}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+\left(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3)\right)\log}$$
$$=\frac{25\log\left(x\right)^2}{4x^4e^{96}+4x^2e^{2x}\log\left(x\right)^2-4x^2e^{48}\log\left(3\right)\log\left(x\right)+\left(-8x^3e^{48}\log\left(x\right)+4x\log\left(3\right)\log\left(x\right)^2\right)e^x+\log\left(3\right)^2\log(}$$

input
```
integrate(((-100*x-100)*exp(x)*ln(x)**3+200*x*exp(48)*ln(x)**2-100*x*exp(4
8)*ln(x))/((8*x**3*exp(x)**3+12*x**2*ln(3)*exp(x)**2+6*x*ln(3)**2*exp(x)+l
n(3)**3)*ln(x)**3+(-24*x**4*exp(48)*exp(x)**2-24*x**3*exp(48)*ln(3)*exp(x)
-6*x**2*exp(48)*ln(3)**2)*ln(x)**2+(24*x**5*exp(48)**2*exp(x)+12*x**4*exp(
48)**2*ln(3))*ln(x)-8*x**6*exp(48)**3),x)
```

output
```
25*log(x)**2/(4*x**4*exp(96) + 4*x**2*exp(2*x)*log(x)**2 - 4*x**2*exp(48)*
log(3)*log(x) + (-8*x**3*exp(48)*log(x) + 4*x*log(3)*log(x)**2)*exp(x) + l
og(3)**2*log(x)**2)
```

3.413.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(25) = 50.

Time = 0.69 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.67

$$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-10}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3))\log}$$
$$=\frac{25\,\log(x)^2}{4\,x^4e^{96}-4\,x^2e^{48}\log(3)\log(x)+4\,x^2e^{(2\,x)}\log(x)^2+\log(3)^2\log(x)^2-4\left(2\,x^3e^{48}\log(x)-x\log(3)\log(x\right.}$$

input
```
integrate(((-100*x-100)*exp(x)*log(x)^3+200*x*exp(48)*log(x)^2-100*x*exp(4
8)*log(x))/((8*x^3*exp(x)^3+12*x^2*log(3)*exp(x)^2+6*x*log(3)^2*exp(x)+log
(3)^3)*log(x)^3+(-24*x^4*exp(48)*exp(x)^2-24*x^3*exp(48)*log(3)*exp(x)-6*x
^2*exp(48)*log(3)^2)*log(x)^2+(24*x^5*exp(48)^2*exp(x)+12*x^4*exp(48)^2*lo
g(3))*log(x)-8*x^6*exp(48)^3),x, algorithm=\
```

output
```
25*log(x)^2/(4*x^4*e^96 - 4*x^2*e^48*log(3)*log(x) + 4*x^2*e^(2*x)*log(x)^
2 + log(3)^2*log(x)^2 - 4*(2*x^3*e^48*log(x) - x*log(3)*log(x)^2)*e^x)
```

3.413.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. 2(25) = 50.

Time = 19.15 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.63

$$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-10}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3))\log}$$
$$=\frac{25\,\log(x)^2}{4\,x^4e^{96}-8\,x^3e^{(x+48)}\log(x)-4\,x^2e^{48}\log(3)\log(x)+4\,x^2e^{(2\,x)}\log(x)^2+4\,xe^x\log(3)\log(x)^2+\log(3)^2\log}$$

input
```
integrate(((-100*x-100)*exp(x)*log(x)^3+200*x*exp(48)*log(x)^2-100*x*exp(4
8)*log(x))/((8*x^3*exp(x)^3+12*x^2*log(3)*exp(x)^2+6*x*log(3)^2*exp(x)+log
(3)^3)*log(x)^3+(-24*x^4*exp(48)*exp(x)^2-24*x^3*exp(48)*log(3)*exp(x)-6*x
^2*exp(48)*log(3)^2)*log(x)^2+(24*x^5*exp(48)^2*exp(x)+12*x^4*exp(48)^2*lo
g(3))*log(x)-8*x^6*exp(48)^3),x, algorithm=\
```

output
```
25*log(x)^2/(4*x^4*e^96 - 8*x^3*e^(x + 48)*log(x) - 4*x^2*e^48*log(3)*log(
x) + 4*x^2*e^(2*x)*log(x)^2 + 4*x*e^x*log(3)*log(x)^2 + log(3)^2*log(x)^2)
```

3.413. $\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-100x)\log^3(x)}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3))\log^2(x)+(8e^{3x}x^3+12e^{2x}x^2\log(3)+6e^xx\log^2}$

3.413.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-100e^{48}x\log(x)+200e^{48}x\log^2(x)+e^x(-100-10}{-8e^{144}x^6+(24e^{96+x}x^5+12e^{96}x^4\log(3))\log(x)+(-24e^{48+2x}x^4-24e^{48+x}x^3\log(3)-6e^{48}x^2\log^2(3))\log}$$
$$=\int -\frac{e^x(100x+100)\ln(x)^3-200xe^{48}\ln(x)^2+10}{\ln(x)(12x^4e^{96}\ln(3)+24x^5e^{96}e^x)-\ln(x)^2(6x^2e^{48}\ln(3)^2+24x^4e^{2x}e^{48}+24x^3e^{48}e^x\ln(3))-8}$$

input
```
int(-(100*x*exp(48)*log(x) - 200*x*exp(48)*log(x)^2 + exp(x)*log(x)^3*(100
*x + 100))/(log(x)*(12*x^4*exp(96)*log(3) + 24*x^5*exp(96)*exp(x)) - log(x
)^2*(6*x^2*exp(48)*log(3)^2 + 24*x^4*exp(2*x)*exp(48) + 24*x^3*exp(48)*exp
(x)*log(3)) - 8*x^6*exp(144) + log(x)^3*(8*x^3*exp(3*x) + log(3)^3 + 6*x*e
xp(x)*log(3)^2 + 12*x^2*exp(2*x)*log(3))),x)
```

output
```
int(-(100*x*exp(48)*log(x) - 200*x*exp(48)*log(x)^2 + exp(x)*log(x)^3*(100
*x + 100))/(log(x)*(12*x^4*exp(96)*log(3) + 24*x^5*exp(96)*exp(x)) - log(x
)^2*(6*x^2*exp(48)*log(3)^2 + 24*x^4*exp(2*x)*exp(48) + 24*x^3*exp(48)*exp
(x)*log(3)) - 8*x^6*exp(144) + log(x)^3*(8*x^3*exp(3*x) + log(3)^3 + 6*x*e
xp(x)*log(3)^2 + 12*x^2*exp(2*x)*log(3))), x)
```

3.414 $\int \frac{}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}(2048x^2-1024x^3+128x^4)+(-2048x^2}$

3.414.1 Optimal result

Integrand size = 180, antiderivative size = 31

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}(32-1}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}(2048x^2-1024x^3+128x^4)+(-2048x^2+1024x^3-128x^4)\log(16)+(}$$
$$=\frac{1}{16x\left(2-4\left(e^{\frac{x}{x+\frac{x}{-5+x}}}+\log(16)\right)\right)}$$

output
```
1/16/x/(2-4*exp(x/(x+x/(-5+x)))-16*ln(2))
```

3.414.2 Mathematica [A] (verified)

Time = 5.17 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}(32-1}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}(2048x^2-1024x^3+128x^4)+(-2048x^2+1024x^3-128x^4)\log(16)+(}$$
$$=-\frac{e^{\frac{1}{-4+x}}}{32x\left(2e+e^{\frac{1}{-4+x}}(-1+\log(256))\right)}$$

input
```
Integrate[(-16 + 8*x - x^2 + E^((-5 + x)/(-4 + x))*(32 - 14*x + 2*x^2) + (
32 - 16*x + 2*x^2)*Log[16])/(512*x^2 - 256*x^3 + 32*x^4 + E^((2*(-5 + x))/
(-4 + x))*(2048*x^2 - 1024*x^3 + 128*x^4) + (-2048*x^2 + 1024*x^3 - 128*x^
4)*Log[16] + (2048*x^2 - 1024*x^3 + 128*x^4)*Log[16]^2 + E^((-5 + x)/(-4 +
 x))*(-2048*x^2 + 1024*x^3 - 128*x^4 + (4096*x^2 - 2048*x^3 + 256*x^4)*Log
[16])),x]
```

output
```
-1/32*E^(-4 + x)^(-1)/(x*(2*E + E^(-4 + x)^(-1)*(-1 + Log[256])))
```

3.414.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2+e^{\frac{x-5}{x-4}}\left(2x^2-14x+32\right)+\left(2x^2\right.}{32x^4-256x^3+512x^2+e^{\frac{2(x-5)}{x-4}}\left(128x^4-1024x^3+2048x^2\right)+\left(128x^4-1024x^3+2048x^2\right)\log^2(16)+e^{\frac{x-5}{x-4}}\left(-1\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{2e^{\frac{x+5}{x-4}}\left(x^2-7x+16\right)+e^{\frac{10}{x-4}}(x-4)^2(\log(256)-1)}{32(4-x)^2x^2\left(2e^{\frac{x}{x-4}}+e^{\frac{5}{x-4}}(\log(256)-1)\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{32}\int \frac{2e^{-\frac{x+5}{4-x}}\left(x^2-7x+16\right)-e^{-\frac{10}{4-x}}(4-x)^2(1-\log(256))}{(4-x)^2x^2\left(2e^{-\frac{x}{4-x}}-e^{-\frac{5}{4-x}}(1-\log(256))\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{32}\int\left(\frac{2e^{\frac{x}{x-4}}\left(x^2-9x+16\right)}{(4-x)^2x^2\left(2e^{\frac{x}{x-4}}-e^{\frac{5}{x-4}}(1-\log(256))\right)(1-\log(256))}+\frac{1}{x^2(-1+\log(256))}+\frac{}{(4-x)^2x\left(2e^{\frac{x}{x-4}}-e^{\frac{5}{x-4}}\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{32}\left(\frac{2\int\frac{e^{\frac{x}{x-4}}}{x^2\left(2e^{\frac{x}{x-4}}-e^{\frac{5}{x-4}}(1-\log(256))\right)}dx}{1-\log(256)}+\frac{\int\frac{e^{\frac{2x}{x-4}}}{(4-x)^2\left(2e^{\frac{x}{x-4}}-e^{\frac{5}{x-4}}(1-\log(256))\right)^2}dx}{1-\log(256)}+\frac{\int\frac{e^{\frac{2x}{x-4}}}{(4-x)\left(2e^{\frac{x}{x-4}}-e^{\frac{5}{x-4}}(1-\log(256))\right)^2}d}{4(1-\log(256))}\right.$$

3.414.

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}\left(32-14x+2x^2\right)+\left(32-16x+2x^2\right)\log(16)}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}\left(2048x^2-1024x^3+128x^4\right)+\left(-2048x^2+1024x^3-128x^4\right)\log(16)+\left(2048x^2-1024x^3+128x^4\right)\log^2(16)+e^{\frac{-5+x}{-4+x}}\left(-20\right.}$$

input
```
Int[(-16 + 8*x - x^2 + E^((-5 + x)/(-4 + x))*(32 - 14*x + 2*x^2) + (32 - 1
6*x + 2*x^2)*Log[16])/(512*x^2 - 256*x^3 + 32*x^4 + E^((2*(-5 + x))/(-4 +
x))*(2048*x^2 - 1024*x^3 + 128*x^4) + (-2048*x^2 + 1024*x^3 - 128*x^4)*Log
[16] + (2048*x^2 - 1024*x^3 + 128*x^4)*Log[16]^2 + E^((-5 + x)/(-4 + x))*(
-2048*x^2 + 1024*x^3 - 128*x^4 + (4096*x^2 - 2048*x^3 + 256*x^4)*Log[16]))
,x]
```

output
```
$Aborted
```

3.414.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.414.4 Maple [A] (verified)

Time = 2.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

method	result	size
risch	$-\frac{1}{32x\left(-1+2\,{\mathrm e}^{\frac{-5+x}{x-4}}+8\ln\left(2\right)\right)}$	26
parallelrisch	$-\frac{1}{32x\left(-1+2\,{\mathrm e}^{\frac{-5+x}{x-4}}+8\ln\left(2\right)\right)}$	26
norman	$\frac{\frac{1}{8}-\frac{x}{32}}{x\left(x-4\right)\left(-1+2\,{\mathrm e}^{\frac{-5+x}{x-4}}+8\ln\left(2\right)\right)}$	35

3.414.

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}\left(32-14x+2x^2\right)+\left(32-16x+2x^2\right)\log(16)}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}\left(2048x^2-1024x^3+128x^4\right)+\left(-2048x^2+1024x^3-128x^4\right)\log(16)+\left(2048x^2-1024x^3+128x^4\right)\log^2(16)+e^{\frac{-5+x}{-4+x}}\left(-20\ldots\right.}$$

input
```
int(((2*x^2-14*x+32)*exp((-5+x)/(x-4))+4*(2*x^2-16*x+32)*ln(2)-x^2+8*x-16)
/((128*x^4-1024*x^3+2048*x^2)*exp((-5+x)/(x-4))^2+(4*(256*x^4-2048*x^3+409
6*x^2)*ln(2)-128*x^4+1024*x^3-2048*x^2)*exp((-5+x)/(x-4))+16*(128*x^4-1024
*x^3+2048*x^2)*ln(2)^2+4*(-128*x^4+1024*x^3-2048*x^2)*ln(2)+32*x^4-256*x^3
+512*x^2),x,method=_RETURNVERBOSE)
```

output
```
-1/32/x/(-1+2*exp((-5+x)/(x-4))+8*ln(2))
```

3.414.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}(32-1}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}\left(2048x^2-1024x^3+128x^4\right)+\left(-2048x^2+1024x^3-128x^4\right)\log(16)+(}$$
$$=-\frac{1}{32\left(2\,xe^{\left(\frac{x-5}{x-4}\right)}+8\,x\log\left(2\right)-x\right)}$$

input
```
integrate(((2*x^2-14*x+32)*exp((-5+x)/(x-4))+4*(2*x^2-16*x+32)*log(2)-x^2+
8*x-16)/((128*x^4-1024*x^3+2048*x^2)*exp((-5+x)/(x-4))^2+(4*(256*x^4-2048*
x^3+4096*x^2)*log(2)-128*x^4+1024*x^3-2048*x^2)*exp((-5+x)/(x-4))+16*(128*
x^4-1024*x^3+2048*x^2)*log(2)^2+4*(-128*x^4+1024*x^3-2048*x^2)*log(2)+32*x
^4-256*x^3+512*x^2),x, algorithm=\
```

output
```
-1/32/(2*x*e^((x - 5)/(x - 4)) + 8*x*log(2) - x)
```

3.414.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.77

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}(32-1}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}\left(2048x^2-1024x^3+128x^4\right)+\left(-2048x^2+1024x^3-128x^4\right)\log(16)+(}$$
$$=-\frac{1}{64xe^{\frac{x-5}{x-4}}-32x+256x\log\left(2\right)}$$

input
```
integrate(((2*x**2-14*x+32)*exp((-5+x)/(x-4))+4*(2*x**2-16*x+32)*ln(2)-x**
2+8*x-16)/((128*x**4-1024*x**3+2048*x**2)*exp((-5+x)/(x-4))**2+(4*(256*x**
4-2048*x**3+4096*x**2)*ln(2)-128*x**4+1024*x**3-2048*x**2)*exp((-5+x)/(x-4
))+16*(128*x**4-1024*x**3+2048*x**2)*ln(2)**2+4*(-128*x**4+1024*x**3-2048*
x**2)*ln(2)+32*x**4-256*x**3+512*x**2),x)
```

output
```
-1/(64*x*exp((x - 5)/(x - 4)) - 32*x + 256*x*log(2))
```

3.414.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.97

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}(32-1}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}(2048x^2-1024x^3+128x^4)+(-2048x^2+1024x^3-128x^4)\log(16)+(}$$
$$= -\frac{e^{\left(\frac{1}{x-4}\right)}}{32\left(x(8\log(2)-1)e^{\left(\frac{1}{x-4}\right)}+2xe\right)}$$

input
```
integrate(((2*x^2-14*x+32)*exp((-5+x)/(x-4))+4*(2*x^2-16*x+32)*log(2)-x^2+
8*x-16)/((128*x^4-1024*x^3+2048*x^2)*exp((-5+x)/(x-4))^2+(4*(256*x^4-2048*
x^3+4096*x^2)*log(2)-128*x^4+1024*x^3-2048*x^2)*exp((-5+x)/(x-4))+16*(128*
x^4-1024*x^3+2048*x^2)*log(2)^2+4*(-128*x^4+1024*x^3-2048*x^2)*log(2)+32*x
^4-256*x^3+512*x^2),x, algorithm=\
```

output
```
-1/32*e^(1/(x - 4))/(x*(8*log(2) - 1)*e^(1/(x - 4)) + 2*x*e)
```

3.414.8 Giac [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}(32-1}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}(2048x^2-1024x^3+128x^4)+(-2048x^2+1024x^3-128x^4)\log(16)+(}$$
$$= -\frac{1}{32\left(2xe^{\left(-\frac{x}{4(x-4)}+\frac{5}{4}\right)}+8x\log(2)-x\right)}$$

3.414.

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}(32-14x+2x^2)+(32-16x+2x^2)\log(16)}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}(2048x^2-1024x^3+128x^4)+(-2048x^2+1024x^3-128x^4)\log(16)+(2048x^2-1024x^3+128x^4)\log^2(16)+e^{\frac{-5+x}{-4+x}}(-20}$$

input
```
integrate(((2*x^2-14*x+32)*exp((-5+x)/(x-4))+4*(2*x^2-16*x+32)*log(2)-x^2+
8*x-16)/((128*x^4-1024*x^3+2048*x^2)*exp((-5+x)/(x-4))^2+(4*(256*x^4-2048*
x^3+4096*x^2)*log(2)-128*x^4+1024*x^3-2048*x^2)*exp((-5+x)/(x-4))+16*(128*
x^4-1024*x^3+2048*x^2)*log(2)^2+4*(-128*x^4+1024*x^3-2048*x^2)*log(2)+32*x
^4-256*x^3+512*x^2),x, algorithm=\
```

output
```
-1/32/(2*x*e^(-1/4*x/(x - 4) + 5/4) + 8*x*log(2) - x)
```

3.414.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-16+8x-x^2+e^{\frac{-5+x}{-4+x}}(32-1}{512x^2-256x^3+32x^4+e^{\frac{2(-5+x)}{-4+x}}(2048x^2-1024x^3+128x^4)+(-2048x^2+1024x^3-128x^4)\log(16)+(}$$
$$=\int \frac{8x+4\ln(2)(2x^2-16x}{e^{\frac{x-5}{x-4}}(4\ln(2)(256x^4-2048x^3+4096x^2)-2048x^2+1024x^3-128x^4)+16\ln(2)^2(128x^4-1024}$$

input
```
int((8*x + 4*log(2)*(2*x^2 - 16*x + 32) + exp((x - 5)/(x - 4))*(2*x^2 - 14
*x + 32) - x^2 - 16)/(exp((x - 5)/(x - 4))*(4*log(2)*(4096*x^2 - 2048*x^3
+ 256*x^4) - 2048*x^2 + 1024*x^3 - 128*x^4) + 16*log(2)^2*(2048*x^2 - 1024
*x^3 + 128*x^4) + exp((2*(x - 5))/(x - 4))*(2048*x^2 - 1024*x^3 + 128*x^4)
 - 4*log(2)*(2048*x^2 - 1024*x^3 + 128*x^4) + 512*x^2 - 256*x^3 + 32*x^4),
x)
```

output
```
int((8*x + 4*log(2)*(2*x^2 - 16*x + 32) + exp((x - 5)/(x - 4))*(2*x^2 - 14
*x + 32) - x^2 - 16)/(exp((x - 5)/(x - 4))*(4*log(2)*(4096*x^2 - 2048*x^3
+ 256*x^4) - 2048*x^2 + 1024*x^3 - 128*x^4) + 16*log(2)^2*(2048*x^2 - 1024
*x^3 + 128*x^4) + exp((2*(x - 5))/(x - 4))*(2048*x^2 - 1024*x^3 + 128*x^4)
 - 4*log(2)*(2048*x^2 - 1024*x^3 + 128*x^4) + 512*x^2 - 256*x^3 + 32*x^4),
 x)
```

3.415 $\int \frac{-16x^2-16x^3+16x^4+e^x\left(4x-4x^3+4x^4\right)+e^{e^2}\left(-16\right.}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}\left(e^{2x}-8e^xx+16x^2\right)+e^{e^2}\left(-2e^{2x}x+16e^xx^2-3\right.}$

3.415.1 Optimal result

Integrand size = 252, antiderivative size = 31

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4\ldots}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}\left(e^{2x}-8e^xx+16x^2\right)+e^{e^2}\left(-2e^{2x}x+16e^xx^2-32x^3\right)+\left(2e^{2x}x-16e^xx^2+3\ldots\right.} = \frac{4x(1+x)}{\left(4-\frac{e^x}{x}\right)\left(-e^{e^2}+x+\log(x)\right)}$$

output
```
4*x*(1+x)/(x+ln(x)-exp(exp(2)))/(4-exp(x)/x)
```

3.415.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4\ldots}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}\left(e^{2x}-8e^xx+16x^2\right)+e^{e^2}\left(-2e^{2x}x+16e^xx^2-32x^3\right)+\left(2e^{2x}x-16e^xx^2+3\ldots\right.} = \frac{4x^2(1+x)}{(-e^x+4x)\left(-e^{e^2}+x+\log(x)\right)}$$

3.415.
$$\int \frac{-16x^2-16x^3+16x^4+e^x\left(4x-4x^3+4x^4\right)+e^{e^2}\left(-16x^2-32x^3+e^x\left(8x+8x^2-4x^3\right)\right)+\left(16x^2+32x^3+e^x\left(-8x-8x^2+4x^3\right)\right)\log(x)\ldots}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}\left(e^{2x}-8e^xx+16x^2\right)+e^{e^2}\left(-2e^{2x}x+16e^xx^2-32x^3\right)+\left(2e^{2x}x-16e^xx^2+32x^3+e^{e^2}\left(-2e^{2x}+16e^xx-32x^2\right)\right)\log(x)+\left(e^{2x}-8\ldots\right.}$$

input
```
Integrate[(-16*x^2 - 16*x^3 + 16*x^4 + E^x*(4*x - 4*x^3 + 4*x^4) + E^E^2*(
-16*x^2 - 32*x^3 + E^x*(8*x + 8*x^2 - 4*x^3)) + (16*x^2 + 32*x^3 + E^x*(-8
*x - 8*x^2 + 4*x^3))*Log[x])/(E^(2*x)*x^2 - 8*E^x*x^3 + 16*x^4 + E^(2*E^2)
*(E^(2*x) - 8*E^x*x + 16*x^2) + E^E^2*(-2*E^(2*x)*x + 16*E^x*x^2 - 32*x^3)
 + (2*E^(2*x)*x - 16*E^x*x^2 + 32*x^3 + E^E^2*(-2*E^(2*x) + 16*E^x*x - 32*
x^2))*Log[x] + (E^(2*x) - 8*E^x*x + 16*x^2)*Log[x]^2),x]
```

output
```
(4*x^2*(1 + x))/((-E^x + 4*x)*(-E^E^2 + x + Log[x]))
```

3.415.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16x^4-16x^3-16x^2+e^x\left(4x^4-4x^3+4x\right)+e^{e^2}\left(-32x^3-16x^2+e^x\left(-4x^3+8x^2+8x\right)\right)}{16x^4-8e^xx^3+e^{2x}x^2+e^{2e^2}\left(16x^2-8e^xx+e^{2x}\right)+\left(16x^2-8e^xx+e^{2x}\right)\log^2(x)+e^{e^2}\left(-32x^3+16e^xx^2-2e^{2x}\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{4x\left(e^{x+e^2}\left(-x^2+2x+2\right)+4x\left(x^2-x-1\right)+\left(e^x\left(x^2-2x-2\right)+4x(2x+1)\right)\log(x)+e^x\left(x^3-x^2+1\right)-4e^{e^2}\right.}{\left(e^x-4x\right)^2\left(-x-\log(x)+e^{e^2}\right)^2}$$

$$\Big\downarrow \text{27}$$

$$4\int -\frac{x\left(4e^{e^2}x(2x+1)+4x\left(-x^2+x+1\right)-e^{x+e^2}\left(-x^2+2x+2\right)-e^x\left(x^3-x^2+1\right)-\left(4x(2x+1)-e^x\left(-x^2+\right.\right.\right.}{\left(e^x-4x\right)^2\left(-x-\log(x)+e^{e^2}\right)^2}$$

$$\Big\downarrow \text{25}$$

$$-4\int \frac{x\left(4e^{e^2}x(2x+1)+4x\left(-x^2+x+1\right)-e^{x+e^2}\left(-x^2+2x+2\right)-e^x\left(x^3-x^2+1\right)-\left(4x(2x+1)-e^x\left(-x^2+\right.\right.\right.}{\left(e^x-4x\right)^2\left(-x-\log(x)+e^{e^2}\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{x\left(-x^3-\log(x)x^2+\left(1+e^{e^2}\right)x^2+2\log(x)x-2e^{e^2}x+2\log(x)-2e^{e^2}-1\right)}{\left(e^x-4x\right)\left(-x-\log(x)+e^{e^2}\right)^2}-\frac{4x^2\left(x^2-1\right)}{\left(e^x-4x\right)^2\left(x+\log(x)-\right.}\right.$$

$$\Big\downarrow \text{2009}$$

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$$\int \frac{-16x^2-16x^3+16x^4+e^x\left(4x-4x^3+4x^4\right)+e^{e^2}\left(-16x^2-32x^3+e^x\left(8x+8x^2-4x^3\right)\right)+\left(16x^2+32x^3+e^x\left(-8x-8x^2+4x^3\right)\right)\log(x)}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}\left(e^{2x}-8e^xx+16x^2\right)+e^{e^2}\left(-2e^{2x}x+16e^xx^2-32x^3\right)+\left(2e^{2x}x-16e^xx^2+32x^3+e^{e^2}\left(-2e^{2x}+16e^xx-32x^2\right)\right)\log(x)+\left(e^{2x}-\right.}$$

$$-4\left(-\int \frac{x^4}{(e^x-4x)\left(x+\log(x)-e^{e^2}\right)^2}dx-4\int \frac{x^4}{(e^x-4x)^2\left(x+\log(x)-e^{e^2}\right)}dx+\left(1+e^{e^2}\right)\int \frac{x}{(e^x-4x)\,(-x-$$

input
```
Int[(-16*x^2 - 16*x^3 + 16*x^4 + E^x*(4*x - 4*x^3 + 4*x^4) + E^E^2*(-16*x^
2 - 32*x^3 + E^x*(8*x + 8*x^2 - 4*x^3)) + (16*x^2 + 32*x^3 + E^x*(-8*x - 8
*x^2 + 4*x^3))*Log[x])/(E^(2*x)*x^2 - 8*E^x*x^3 + 16*x^4 + E^(2*E^2)*(E^(2
*x) - 8*E^x*x + 16*x^2) + E^E^2*(-2*E^(2*x)*x + 16*E^x*x^2 - 32*x^3) + (2*
E^(2*x)*x - 16*E^x*x^2 + 32*x^3 + E^E^2*(-2*E^(2*x) + 16*E^x*x - 32*x^2))*
Log[x] + (E^(2*x) - 8*E^x*x + 16*x^2)*Log[x]^2),x]
```

output
```
$Aborted
```

3.415.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

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$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4x^3))+(16x^2+32x^3+e^x(-8x-8x^2+4x^3))\log(x)}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}(e^{2x}-8e^xx+16x^2)+e^{e^2}(-2e^{2x}x+16e^xx^2-32x^3)+\left(2e^{2x}x-16e^xx^2+32x^3+e^{e^2}(-2e^{2x}+16e^xx-32x^2)\right)\log(x)+(e^{2x}-}$$

3.415.4 Maple [A] (verified)

Time = 1.90 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

method	result	size
risch	$-\frac{4x^2(1+x)}{(4x-e^x)\left(e^{e^2}-x-\ln(x)\right)}$	32
parallelrisch	$-\frac{4x^3+4x^2}{e^x\ln(x)-4x\ln(x)-e^x e^{e^2}+e^x x+4x\,e^{e^2}-4x^2}$	49

input
```
int((((4*x^3-8*x^2-8*x)*exp(x)+32*x^3+16*x^2)*ln(x)+((-4*x^3+8*x^2+8*x)*ex
p(x)-32*x^3-16*x^2)*exp(exp(2))+(4*x^4-4*x^3+4*x)*exp(x)+16*x^4-16*x^3-16*
x^2)/((exp(x)^2-8*exp(x)*x+16*x^2)*ln(x)^2+((-2*exp(x)^2+16*exp(x)*x-32*x^
2)*exp(exp(2))+2*x*exp(x)^2-16*exp(x)*x^2+32*x^3)*ln(x)+(exp(x)^2-8*exp(x)
*x+16*x^2)*exp(exp(2))^2+(-2*x*exp(x)^2+16*exp(x)*x^2-32*x^3)*exp(exp(2))+
exp(x)^2*x^2-8*exp(x)*x^3+16*x^4),x,method=_RETURNVERBOSE)
```

output
```
-4*x^2*(1+x)/(4*x-exp(x))/(exp(exp(2))-x-ln(x))
```

3.415.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.48

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4}{e^{2x}x^2-8e^x x^3+16x^4+e^{2e^2}\left(e^{2x}-8e^x x+16x^2\right)+e^{e^2}\left(-2e^{2x}x+16e^x x^2-32x^3\right)+\left(2e^{2x}x-16e^x x^2+3\right.}$$
$$=\frac{4\,(x^3+x^2)}{4\,x^2-xe^x-(4\,x-e^x)e^{(e^2)}+(4\,x-e^x)\log{(x)}}$$

input
```
integrate((((4*x^3-8*x^2-8*x)*exp(x)+32*x^3+16*x^2)*log(x)+((-4*x^3+8*x^2+
8*x)*exp(x)-32*x^3-16*x^2)*exp(exp(2))+(4*x^4-4*x^3+4*x)*exp(x)+16*x^4-16*
x^3-16*x^2)/((exp(x)^2-8*exp(x)*x+16*x^2)*log(x)^2+((-2*exp(x)^2+16*exp(x)
*x-32*x^2)*exp(exp(2))+2*x*exp(x)^2-16*exp(x)*x^2+32*x^3)*log(x)+(exp(x)^2
-8*exp(x)*x+16*x^2)*exp(exp(2))^2+(-2*x*exp(x)^2+16*exp(x)*x^2-32*x^3)*exp
(exp(2))+exp(x)^2*x^2-8*exp(x)*x^3+16*x^4),x, algorithm=\
```

output
```
4*(x^3 + x^2)/(4*x^2 - x*e^x - (4*x - e^x)*e^(e^2) + (4*x - e^x)*log(x))
```

3.415.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.42

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4x^3))+\ldots}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}(e^{2x}-8e^xx+16x^2)+e^{e^2}(-2e^{2x}x+16e^xx^2-32x^3)+(2e^{2x}x-16e^xx^2+3\ldots}$$
$$= \frac{-4x^3-4x^2}{-4x^2-4x\log(x)+4xe^{e^2}+(x+\log(x)-e^{e^2})e^x}$$

input
```
integrate((((4*x**3-8*x**2-8*x)*exp(x)+32*x**3+16*x**2)*ln(x)+((-4*x**3+8*
x**2+8*x)*exp(x)-32*x**3-16*x**2)*exp(exp(2))+(4*x**4-4*x**3+4*x)*exp(x)+1
6*x**4-16*x**3-16*x**2)/((exp(x)**2-8*exp(x)*x+16*x**2)*ln(x)**2+((-2*exp(
x)**2+16*exp(x)*x-32*x**2)*exp(exp(2))+2*x*exp(x)**2-16*exp(x)*x**2+32*x**
3)*ln(x)+(exp(x)**2-8*exp(x)*x+16*x**2)*exp(exp(2))**2+(-2*x*exp(x)**2+16*
exp(x)*x**2-32*x**3)*exp(exp(2))+exp(x)**2*x**2-8*exp(x)*x**3+16*x**4),x)
```

output
```
(-4*x**3 - 4*x**2)/(-4*x**2 - 4*x*log(x) + 4*x*exp(exp(2)) + (x + log(x) -
 exp(exp(2)))*exp(x))
```

3.415.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.32

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4x^3))+\ldots}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}(e^{2x}-8e^xx+16x^2)+e^{e^2}(-2e^{2x}x+16e^xx^2-32x^3)+(2e^{2x}x-16e^xx^2+3\ldots}$$
$$= \frac{4(x^3+x^2)}{4x^2-(x-e^{(e^2)}+\log(x))e^x-4xe^{(e^2)}+4x\log(x)}$$

input
```
integrate((((4*x^3-8*x^2-8*x)*exp(x)+32*x^3+16*x^2)*log(x)+((-4*x^3+8*x^2+
8*x)*exp(x)-32*x^3-16*x^2)*exp(exp(2))+(4*x^4-4*x^3+4*x)*exp(x)+16*x^4-16*
x^3-16*x^2)/((exp(x)^2-8*exp(x)*x+16*x^2)*log(x)^2+((-2*exp(x)^2+16*exp(x)
*x-32*x^2)*exp(exp(2))+2*x*exp(x)^2-16*exp(x)*x^2+32*x^3)*log(x)+(exp(x)^2
-8*exp(x)*x+16*x^2)*exp(exp(2))^2+(-2*x*exp(x)^2+16*exp(x)*x^2-32*x^3)*exp
(exp(2))+exp(x)^2*x^2-8*exp(x)*x^3+16*x^4),x, algorithm=\
```

output
```
4*(x^3 + x^2)/(4*x^2 - (x - e^(e^2) + log(x))*e^x - 4*x*e^(e^2) + 4*x*log(
x))
```

3.415.

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4x^3))+(16x^2+32x^3+e^x(-8x-8x^2+4x^3))\log(x)}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}(e^{2x}-8e^xx+16x^2)+e^{e^2}(-2e^{2x}x+16e^xx^2-32x^3)+\left(2e^{2x}x-16e^xx^2+32x^3+e^{e^2}(-2e^{2x}+16e^xx-32x^2)\right)\log(x)+(e^{2x}-\ldots}$$

3.415.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.42

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4x}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}(e^{2x}-8e^xx+16x^2)+e^{e^2}(-2e^{2x}x+16e^xx^2-32x^3)+(2e^{2x}x-16e^xx^2+3}$$
$$= \frac{4(x^3+x^2)}{4x^2-xe^x-4xe^{(e^2)}+4x\log(x)-e^x\log(x)+e^{(x+e^2)}}$$

input
```
integrate((((4*x^3-8*x^2-8*x)*exp(x)+32*x^3+16*x^2)*log(x)+((-4*x^3+8*x^2+
8*x)*exp(x)-32*x^3-16*x^2)*exp(exp(2))+(4*x^4-4*x^3+4*x)*exp(x)+16*x^4-16*
x^3-16*x^2)/((exp(x)^2-8*exp(x)*x+16*x^2)*log(x)^2+((-2*exp(x)^2+16*exp(x)
*x-32*x^2)*exp(exp(2))+2*x*exp(x)^2-16*exp(x)*x^2+32*x^3)*log(x)+(exp(x)^2
-8*exp(x)*x+16*x^2)*exp(exp(2))^2+(-2*x*exp(x)^2+16*exp(x)*x^2-32*x^3)*exp
(exp(2))+exp(x)^2*x^2-8*exp(x)*x^3+16*x^4),x, algorithm=\
```

output
```
4*(x^3 + x^2)/(4*x^2 - x*e^x - 4*x*e^(e^2) + 4*x*log(x) - e^x*log(x) + e^(
x + e^2))
```

3.415.9 Mupad [B] (verification not implemented)

Time = 14.66 (sec) , antiderivative size = 110, normalized size of antiderivative = 3.55

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4x}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}(e^{2x}-8e^xx+16x^2)+e^{e^2}(-2e^{2x}x+16e^xx^2-32x^3)+(2e^{2x}x-16e^xx^2+3}$$
$$= \frac{4x^2\left(4x-2e^{x+e^2}-e^x+2e^{e^2}e^x-x^2e^x-2xe^{x+e^2}-2xe^x+8x^2+4x^3+x^2e^{x+e^2}+2xe^{e^2}e^x-x^2e^{e^2}\right.}{(4x-e^x)^2(x+1)(x-e^{e^2}+\ln(x))}$$

input
```
int(-(16*x^2 + 16*x^3 - 16*x^4 + exp(exp(2))*(16*x^2 + 32*x^3 - exp(x)*(8*
x + 8*x^2 - 4*x^3)) - exp(x)*(4*x - 4*x^3 + 4*x^4) - log(x)*(16*x^2 + 32*x
^3 - exp(x)*(8*x + 8*x^2 - 4*x^3)))/(exp(2*exp(2))*(exp(2*x) - 8*x*exp(x)
+ 16*x^2) - 8*x^3*exp(x) - log(x)*(exp(exp(2))*(2*exp(2*x) - 16*x*exp(x) +
 32*x^2) - 2*x*exp(2*x) + 16*x^2*exp(x) - 32*x^3) + log(x)^2*(exp(2*x) - 8
*x*exp(x) + 16*x^2) + x^2*exp(2*x) + 16*x^4 - exp(exp(2))*(2*x*exp(2*x) -
16*x^2*exp(x) + 32*x^3)),x)
```

3.415.

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4x^3))+(16x^2+32x^3+e^x(-8x-8x^2+4x^3))\log(x)}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}(e^{2x}-8e^xx+16x^2)+e^{e^2}(-2e^{2x}x+16e^xx^2-32x^3)+\left(2e^{2x}x-16e^xx^2+32x^3+e^{e^2}(-2e^{2x}+16e^xx-32x^2)\right)\log(x)+(e^{2x}-8}$$

output
```
(4*x^2*(4*x - 2*exp(x + exp(2)) - exp(x) + 2*exp(exp(2))*exp(x) - x^2*exp(
x) - 2*x*exp(x + exp(2)) - 2*x*exp(x) + 8*x^2 + 4*x^3 + x^2*exp(x + exp(2)
) + 2*x*exp(exp(2))*exp(x) - x^2*exp(exp(2))*exp(x)))/((4*x - exp(x))^2*(x
 + 1)*(x - exp(exp(2)) + log(x)))
```

3.415.

$$\int \frac{-16x^2-16x^3+16x^4+e^x(4x-4x^3+4x^4)+e^{e^2}(-16x^2-32x^3+e^x(8x+8x^2-4x^3))+(16x^2+32x^3+e^x(-8x-8x^2+4x^3))\log(x)}{e^{2x}x^2-8e^xx^3+16x^4+e^{2e^2}(e^{2x}-8e^xx+16x^2)+e^{e^2}(-2e^{2x}x+16e^xx^2-32x^3)+\left(2e^{2x}x-16e^xx^2+32x^3+e^{e^2}(-2e^{2x}+16e^xx-32x^2)\right)\log(x)+(e^{2x}-}$$

3.416 $\int \frac{-128x-256x^2-128x^3+(128x+384x^2+256x^3)\log(x^2)+(512x+1536x^2+1024x^3)\log^2(x^2)}{\log^2(x^2)}$

3.416.1 Optimal result

Integrand size = 61, antiderivative size = 22

$$\int \frac{-128x-256x^2-128x^3+(128x+384x^2+256x^3)\log(x^2)+(512x+1536x^2+1024x^3)\log^2(x^2)}{\log^2(x^2)}\,dx = 256x^2(1+x)^2\left(1+\frac{1}{4\log(x^2)}\right)$$

output
```
256*(1+x)^2*x^2*(1+1/4/ln(x^2))
```

3.416.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-128x-256x^2-128x^3+(128x+384x^2+256x^3)\log(x^2)+(512x+1536x^2+1024x^3)\log^2(x^2)}{\log^2(x^2)}\,dx = \frac{64x^2(1+x)^2(1+4\log(x^2))}{\log(x^2)}$$

input
```
Integrate[(-128*x - 256*x^2 - 128*x^3 + (128*x + 384*x^2 + 256*x^3)*Log[x^
2] + (512*x + 1536*x^2 + 1024*x^3)*Log[x^2]^2)/Log[x^2]^2,x]
```

output
```
(64*x^2*(1 + x)^2*(1 + 4*Log[x^2]))/Log[x^2]
```

3.416.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 55 vs. $2(22) = 44$.

Time = 0.61 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.50, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.082$, Rules used = {7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-128x^3-256x^2+(1024x^3+1536x^2+512x)\log^2(x^2)+(256x^3+384x^2+128x)\log(x^2)-128x}{\log^2(x^2)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{128x(x+1)\left(8x\log^2(x^2)+4\log^2(x^2)+2x\log(x^2)+\log(x^2)-x-1\right)}{\log^2(x^2)}dx$$

$$\Big\downarrow \text{27}$$

$$128\int -\frac{x(x+1)\left(-8x\log^2(x^2)-4\log^2(x^2)-2x\log(x^2)-\log(x^2)+x+1\right)}{\log^2(x^2)}dx$$

$$\Big\downarrow \text{25}$$

$$-128\int \frac{x(x+1)\left(-8x\log^2(x^2)-4\log^2(x^2)-2x\log(x^2)-\log(x^2)+x+1\right)}{\log^2(x^2)}dx$$

$$\Big\downarrow \text{7293}$$

$$-128\int \left(\frac{x(x+1)^2}{\log^2(x^2)}-4x(2x^2+3x+1)-\frac{x(2x^2+3x+1)}{\log(x^2)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-128\left(-2x^4-4x^3-2x^2-\frac{x^2}{2\log(x^2)}-\frac{x^4}{2\log(x^2)}-\frac{x^3}{\log(x^2)}\right)$$

input
```
Int[(-128*x - 256*x^2 - 128*x^3 + (128*x + 384*x^2 + 256*x^3)*Log[x^2] + (
512*x + 1536*x^2 + 1024*x^3)*Log[x^2]^2)/Log[x^2]^2,x]
```

output
```
-128*(-2*x^2 - 4*x^3 - 2*x^4 - x^2/(2*Log[x^2]) - x^3/Log[x^2] - x^4/(2*Lo
g[x^2]))
```

3.416.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.416.4 Maple [A] (verified)

Time = 2.12 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

method	result	size
risch	$256x^4 + 512x^3 + 256x^2 + \frac{64x^2(x^2+2x+1)}{\ln(x^2)}$	36
norman	$\frac{64x^2+128x^3+64x^4+256x^2\ln(x^2)+512x^3\ln(x^2)+256x^4\ln(x^2)}{\ln(x^2)}$	51
parallelrisch	$\frac{512x^4\ln(x^2)+128x^4+1024x^3\ln(x^2)+256x^3+512x^2\ln(x^2)+128x^2}{2\ln(x^2)}$	52

input
```
int(((1024*x^3+1536*x^2+512*x)*ln(x^2)^2+(256*x^3+384*x^2+128*x)*ln(x^2)-1
28*x^3-256*x^2-128*x)/ln(x^2)^2,x,method=_RETURNVERBOSE)
```

output
```
256*x^4+512*x^3+256*x^2+64*x^2*(x^2+2*x+1)/ln(x^2)
```

3.416.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 38 vs. 2(18) = 36.

Time = 0.25 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.73

$$\int \frac{-128x-256x^2-128x^3+(128x+384x^2+256x^3)\log(x^2)+(512x+1536x^2+1024x^3)\log^2(x^2)}{\log^2(x^2)}\,dx = \frac{64\left(x^4+2x^3+x^2+4\left(x^4+2x^3+x^2\right)\log(x^2)\right)}{\log(x^2)}$$

input
```
integrate((((1024*x^3+1536*x^2+512*x)*log(x^2)^2+(256*x^3+384*x^2+128*x)*lo
g(x^2)-128*x^3-256*x^2-128*x)/log(x^2)^2,x, algorithm=\
```

output
```
64*(x^4 + 2*x^3 + x^2 + 4*(x^4 + 2*x^3 + x^2)*log(x^2))/log(x^2)
```

3.416.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int \frac{-128x-256x^2-128x^3+(128x+384x^2+256x^3)\log(x^2)+(512x+1536x^2+1024x^3)\log^2(x^2)}{\log^2(x^2)}\,dx = 256x^4+512x^3+256x^2+\frac{64x^4+128x^3+64x^2}{\log(x^2)}$$

input
```
integrate((((1024*x**3+1536*x**2+512*x)*ln(x**2)**2+(256*x**3+384*x**2+128*
x)*ln(x**2)-128*x**3-256*x**2-128*x)/ln(x**2)**2,x)
```

output
```
256*x**4 + 512*x**3 + 256*x**2 + (64*x**4 + 128*x**3 + 64*x**2)/log(x**2)
```

3.416.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int \frac{-128x-256x^2-128x^3+(128x+384x^2+256x^3)\log(x^2)+(512x+1536x^2+1024x^3)\log^2(x^2)}{\log^2(x^2)}\,dx = 256\,x^4+512\,x^3+256\,x^2+\frac{32\left(x^4+2\,x^3+x^2\right)}{\log(x)}$$

input
```
integrate(((1024*x^3+1536*x^2+512*x)*log(x^2)^2+(256*x^3+384*x^2+128*x)*lo
g(x^2)-128*x^3-256*x^2-128*x)/log(x^2)^2,x, algorithm=\
```

output
```
256*x^4 + 512*x^3 + 256*x^2 + 32*(x^4 + 2*x^3 + x^2)/log(x)
```

3.416.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

$$\int \frac{-128x-256x^2-128x^3+(128x+384x^2+256x^3)\log(x^2)+(512x+1536x^2+1024x^3)\log^2(x^2)}{\log^2(x^2)}\,dx$$
$$=256\,x^4+512\,x^3+256\,x^2+\frac{64\,(x^4+2\,x^3+x^2)}{\log(x^2)}$$

input
```
integrate(((1024*x^3+1536*x^2+512*x)*log(x^2)^2+(256*x^3+384*x^2+128*x)*lo
g(x^2)-128*x^3-256*x^2-128*x)/log(x^2)^2,x, algorithm=\
```

output
```
256*x^4 + 512*x^3 + 256*x^2 + 64*(x^4 + 2*x^3 + x^2)/log(x^2)
```

3.416.9 Mupad [B] (verification not implemented)

Time = 14.22 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-128x-256x^2-128x^3+(128x+384x^2+256x^3)\log(x^2)+(512x+1536x^2+1024x^3)\log^2(x^2)}{\log^2(x^2)}\,dx$$
$$=256\,x^2\,(x+1)^2+\frac{64\,x^2\,(x+1)^2}{\ln(x^2)}$$

input
```
int(-(128*x - log(x^2)*(128*x + 384*x^2 + 256*x^3) - log(x^2)^2*(512*x + 1
536*x^2 + 1024*x^3) + 256*x^2 + 128*x^3)/log(x^2)^2,x)
```

output
```
256*x^2*(x + 1)^2 + (64*x^2*(x + 1)^2)/log(x^2)
```

3.417 $\int \frac{4+12x^3+2x^4-4x^3\log(x)}{x^3}\,dx$

3.417.1 Optimal result

Integrand size = 23, antiderivative size = 20

$$\int \frac{4+12x^3+2x^4-4x^3\log(x)}{x^3}\,dx=-1+e-\frac{2}{x^2}+x^2+\log(3)-4x(-4+\log(x))$$

output
```
exp(1)-4*(ln(x)-4)*x+ln(3)-1+x^2-2/x^2
```

3.417.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{4+12x^3+2x^4-4x^3\log(x)}{x^3}\,dx=-\frac{2}{x^2}+16x+x^2-4x\log(x)$$

input
```
Integrate[(4 + 12*x^3 + 2*x^4 - 4*x^3*Log[x])/x^3,x]
```

output
```
-2/x^2 + 16*x + x^2 - 4*x*Log[x]
```

3.417.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4+12x^3-4x^3\log(x)+4}{x^3}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2(x^4+6x^3+2)}{x^3}-4\log(x)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^2-\frac{2}{x^2}+16x-4x\log(x)$$

input
```
Int[(4 + 12*x^3 + 2*x^4 - 4*x^3*Log[x])/x^3,x]
```

output
```
-2/x^2 + 16*x + x^2 - 4*x*Log[x]
```

3.417.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.417.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

method	result	size
default	$-4x\ln(x)+16x+x^2-\frac{2}{x^2}$	18
parts	$-4x\ln(x)+16x+x^2-\frac{2}{x^2}$	18
risch	$-4x\ln(x)+\frac{x^4+16x^3-2}{x^2}$	21
norman	$\frac{-2+x^4+16x^3-4x^3\ln(x)}{x^2}$	22
parallelrisch	$\frac{-2+x^4+16x^3-4x^3\ln(x)}{x^2}$	22

input
```
int((-4*x^3*ln(x)+2*x^4+12*x^3+4)/x^3,x,method=_RETURNVERBOSE)
```

output
```
-4*x*ln(x)+16*x+x^2-2/x^2
```

3.417.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{4+12x^3+2x^4-4x^3\log(x)}{x^3}\,dx=\frac{x^4-4\,x^3\log(x)+16\,x^3-2}{x^2}$$

input
```
integrate((-4*x^3*log(x)+2*x^4+12*x^3+4)/x^3,x, algorithm=\
```

output
```
(x^4 - 4*x^3*log(x) + 16*x^3 - 2)/x^2
```

3.417.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{4+12x^3+2x^4-4x^3\log(x)}{x^3}\,dx=x^2-4x\log(x)+16x-\frac{2}{x^2}$$

input
```
integrate((-4*x**3*ln(x)+2*x**4+12*x**3+4)/x**3,x)
```

output
```
x**2 - 4*x*log(x) + 16*x - 2/x**2
```

3.417.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{4 + 12x^3 + 2x^4 - 4x^3 \log(x)}{x^3} \, dx = x^2 - 4\, x \log(x) + 16\, x - \frac{2}{x^2}$$

input
```
integrate((-4*x^3*log(x)+2*x^4+12*x^3+4)/x^3,x, algorithm=\
```

output
```
x^2 - 4*x*log(x) + 16*x - 2/x^2
```

3.417.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{4 + 12x^3 + 2x^4 - 4x^3 \log(x)}{x^3} \, dx = x^2 - 4\, x \log(x) + 16\, x - \frac{2}{x^2}$$

input
```
integrate((-4*x^3*log(x)+2*x^4+12*x^3+4)/x^3,x, algorithm=\
```

output
```
x^2 - 4*x*log(x) + 16*x - 2/x^2
```

3.417.9 Mupad [B] (verification not implemented)

Time = 14.48 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{4 + 12x^3 + 2x^4 - 4x^3 \log(x)}{x^3} \, dx = x^2 - \frac{2}{x^2} - x\,(4\,\ln(x) - 16)$$

input
```
int((12*x^3 - 4*x^3*log(x) + 2*x^4 + 4)/x^3,x)
```

output
```
x^2 - 2/x^2 - x*(4*log(x) - 16)
```

3.418 $\int \frac{1}{2} e^{-x} (31 - 18x + x^2) \, dx$

3.418.1 Optimal result

Integrand size = 17, antiderivative size = 26

$$\int \frac{1}{2} e^{-x} (31 - 18x + x^2) \, dx = \left(3e^{-x} + \frac{1}{2} e^{-x} (9 - x)\right) (-1 + x)$$

output
```
(-1+x)*(1/2*(9-x)/exp(x)+3/exp(x))
```

3.418.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.73

$$\int \frac{1}{2} e^{-x} (31 - 18x + x^2) \, dx = \frac{1}{2} e^{-x} (-15 + 16x - x^2)$$

input
```
Integrate[(31 - 18*x + x^2)/(2*E^x),x]
```

output
```
(-15 + 16*x - x^2)/(2*E^x)
```

3.418.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {27, 2626, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}e^{-x}\left(x^2-18x+31\right)\,dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2}\int e^{-x}\left(x^2-18x+31\right)dx$$

$$\Big\downarrow \ 2626$$

$$\frac{1}{2}\int \left(e^{-x}x^2-18e^{-x}x+31e^{-x}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{2}\left(-e^{-x}x^2+16e^{-x}x-15e^{-x}\right)$$

input
```
Int[(31 - 18*x + x^2)/(2*E^x),x]
```

output
```
(-15/E^x + (16*x)/E^x - x^2/E^x)/2
```

3.418.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2626
```
Int[(F_)^(v_)*(Px_), x_Symbol] :> Int[ExpandIntegrand[F^v, Px, x], x] /; Fr
eeQ[F, x] && PolynomialQ[Px, x] && LinearQ[v, x] &&  !TrueQ[$UseGamma]
```

3.418.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.58

method	result	size
gosper	$-\frac{(x^2-16x+15)\,\mathrm{e}^{-x}}{2}$	15
norman	$\left(-\frac{15}{2}+8x-\frac{1}{2}x^2\right)\mathrm{e}^{-x}$	16
risch	$\frac{(-x^2+16x-15)\,\mathrm{e}^{-x}}{2}$	17
parallelrisch	$\frac{(-x^2+16x-15)\,\mathrm{e}^{-x}}{2}$	17
default	$-\frac{x^2\mathrm{e}^{-x}}{2}+8x\,\mathrm{e}^{-x}-\frac{15\,\mathrm{e}^{-x}}{2}$	24
meijerg	$\frac{15}{2}-\frac{31\,\mathrm{e}^{-x}}{2}-\frac{(3x^2+6x+6)\,\mathrm{e}^{-x}}{6}+\frac{9(2+2x)\,\mathrm{e}^{-x}}{2}$	36

input
```
int(1/2*(x^2-18*x+31)/exp(x),x,method=_RETURNVERBOSE)
```

output
```
-1/2*(x^2-16*x+15)/exp(x)
```

3.418.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.54

$$\int \frac{1}{2}e^{-x}\left(31-18x+x^2\right)\,dx = -\frac{1}{2}\left(x^2-16\,x+15\right)e^{(-x)}$$

input
```
integrate(1/2*(x^2-18*x+31)/exp(x),x, algorithm=\
```

output
```
-1/2*(x^2 - 16*x + 15)*e^(-x)
```

3.418.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.46

$$\int \frac{1}{2}e^{-x}\left(31-18x+x^2\right)\,dx = \frac{(-x^2+16x-15)\,e^{-x}}{2}$$

input
```
integrate(1/2*(x**2-18*x+31)/exp(x),x)
```

output
```
(-x**2 + 16*x - 15)*exp(-x)/2
```

3.418.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

$$\int \frac{1}{2}e^{-x}\left(31-18x+x^2\right)\,dx = -\frac{1}{2}\left(x^2+2x+2\right)e^{(-x)}+9(x+1)e^{(-x)}-\frac{31}{2}e^{(-x)}$$

input
```
integrate(1/2*(x^2-18*x+31)/exp(x),x, algorithm=\
```

output
```
-1/2*(x^2 + 2*x + 2)*e^(-x) + 9*(x + 1)*e^(-x) - 31/2*e^(-x)
```

3.418.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.54

$$\int \frac{1}{2}e^{-x}\left(31-18x+x^2\right)\,dx = -\frac{1}{2}\left(x^2-16x+15\right)e^{(-x)}$$

input
```
integrate(1/2*(x^2-18*x+31)/exp(x),x, algorithm=\
```

output
```
-1/2*(x^2 - 16*x + 15)*e^(-x)
```

3.418.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.46

$$\int \frac{1}{2}e^{-x}\left(31-18x+x^2\right)\,dx = -\frac{e^{-x}(x-1)(x-15)}{2}$$

input
```
int(exp(-x)*(x^2/2 - 9*x + 31/2),x)
```

output
```
-(exp(-x)*(x - 1)*(x - 15))/2
```

3.419 $\int (48x + 3x^2 + e^x(3x^2 + x^3)) \, dx$

3.419.1 Optimal result

Integrand size = 22, antiderivative size = 12

$$\int (48x + 3x^2 + e^x(3x^2 + x^3)) \, dx = x^2(24 + x + e^x x)$$

output
```
x^2*(24+x+exp(x)*x)
```

3.419.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int (48x + 3x^2 + e^x(3x^2 + x^3)) \, dx = x^2(24 + x + e^x x)$$

input
```
Integrate[48*x + 3*x^2 + E^x*(3*x^2 + x^3),x]
```

output
```
x^2*(24 + x + E^x*x)
```

3.419.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.33, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(3x^2 + e^x\left(x^3 + 3x^2\right) + 48x\right) dx$$

$$\Big\downarrow \text{2009}$$

$$e^x x^3 + x^3 + 24x^2$$

input
```
Int[48*x + 3*x^2 + E^x*(3*x^2 + x^3),x]
```

output
```
24*x^2 + x^3 + E^x*x^3
```

3.419.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.419.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.33

method	result	size
default	$\mathrm{e}^x x^3 + 24x^2 + x^3$	16
norman	$\mathrm{e}^x x^3 + 24x^2 + x^3$	16
risch	$\mathrm{e}^x x^3 + 24x^2 + x^3$	16
parallelrisch	$\mathrm{e}^x x^3 + 24x^2 + x^3$	16
parts	$\mathrm{e}^x x^3 + 24x^2 + x^3$	16

input
```
int((x^3+3*x^2)*exp(x)+3*x^2+48*x,x,method=_RETURNVERBOSE)
```

output
```
exp(x)*x^3+24*x^2+x^3
```

3.419.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.25

$$\int \left(48x+3x^2+e^x\left(3x^2+x^3\right)\right)\,dx=x^3e^x+x^3+24\,x^2$$

input
```
integrate((x^3+3*x^2)*exp(x)+3*x^2+48*x,x, algorithm=\
```

output
```
x^3*e^x + x^3 + 24*x^2
```

3.419.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \left(48x+3x^2+e^x\left(3x^2+x^3\right)\right)\,dx=x^3e^x+x^3+24x^2$$

input
```
integrate((x**3+3*x**2)*exp(x)+3*x**2+48*x,x)
```

output
```
x**3*exp(x) + x**3 + 24*x**2
```

3.419.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.25

$$\int \left(48x+3x^2+e^x\left(3x^2+x^3\right)\right)\,dx=x^3e^x+x^3+24\,x^2$$

input
```
integrate((x^3+3*x^2)*exp(x)+3*x^2+48*x,x, algorithm=\
```

output
```
x^3*e^x + x^3 + 24*x^2
```

3.419.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.25

$$\int \left(48x + 3x^2 + e^x \left(3x^2 + x^3\right)\right) \, dx = x^3 e^x + x^3 + 24 \, x^2$$

input
```
integrate((x^3+3*x^2)*exp(x)+3*x^2+48*x,x, algorithm=\
```

output
```
x^3*e^x + x^3 + 24*x^2
```

3.419.9 Mupad [B] (verification not implemented)

Time = 14.87 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \left(48x + 3x^2 + e^x \left(3x^2 + x^3\right)\right) \, dx = x^2 \left(x + x \, e^x + 24\right)$$

input
```
int(48*x + exp(x)*(3*x^2 + x^3) + 3*x^2,x)
```

output
```
x^2*(x + x*exp(x) + 24)
```

3.420 $\int \frac{24e^{2x}+(e^x(-120-24e^5)+24e^{2x}x)\log\left(\frac{2}{x}\right)+e^x(-120x-24e^5x)\log^2\left(\cdots\right.}{\left(12e^{2x}x\log\left(\frac{2}{x}\right)+e^x(-120x-2\cdots\right.}$

3.420.1 Optimal result

Integrand size = 304, antiderivative size = 31

$$\int \frac{24e^{2x}+(e^x(-120-24e^5)+24e^{2x}x)\log\left(\frac{2}{x}\right)+e^x(-120x-24e^5x)\log^2\left(\frac{2}{x}\right)+\left(12e^{3x}x\log\left(\frac{2}{x}\right)+e^{2x}(-12\cdots\right.}{\left(12e^{2x}x\log\left(\frac{2}{x}\right)+e^x\left(-120x-24e^5x\right)\log^2\left(\frac{2}{x}\right)+\left(299x+120e^5\cdots\right.\right.}$$
$$= e^x+\log\left(\log\left(1-12\left(-5-e^5+\frac{e^x}{\log\left(\frac{2}{x}\right)}\right)^2\right)\right)$$

output
```
ln(ln(1-6*(exp(x)/ln(2/x)-exp(5)-5)*(2*exp(x)/ln(2/x)-2*exp(5)-10)))+exp(x
)
```

3.420.

$$\int \frac{24e^{2x}+(e^x(-120-24e^5)+24e^{2x}x)\log\left(\frac{2}{x}\right)+e^x(-120x-24e^5x)\log^2\left(\frac{2}{x}\right)+\left(12e^{3x}x\log\left(\frac{2}{x}\right)+e^{2x}(-120x-24e^5x)\log^2\left(\frac{2}{x}\right)+e^x(299x+120e^5x+12e^1\cdots\right.}{\cdots}$$

3.420.2 Mathematica [A] (verified)

Time = 0.41 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.65

$$\int \frac{24e^{2x} + (e^x(-120 - 24e^5) + 24e^{2x}x)\log\left(\frac{2}{x}\right) + e^x(-120x - 24e^5x)\log^2\left(\frac{2}{x}\right) + \left(12e^{3x}x\log\left(\frac{2}{x}\right) + e^{2x}(-120}{\left(12e^{2x}x\log\left(\frac{2}{x}\right) + e^x\left(-120x - 24e^5x\right)\log^2\left(\frac{2}{x}\right) + (299x + 120e^5}$$
$$= e^x + \log\left(\log\left(-299 - 120e^5 - 12e^{10} - \frac{12e^{2x}}{\log^2\left(\frac{2}{x}\right)} + \frac{24e^x(5+e^5)}{\log\left(\frac{2}{x}\right)}\right)\right)$$

input
```
Integrate[(24*E^(2*x) + (E^x*(-120 - 24*E^5) + 24*E^(2*x)*x)*Log[2/x] + E^
x*(-120*x - 24*E^5*x)*Log[2/x]^2 + (12*E^(3*x)*x*Log[2/x] + E^(2*x)*(-120*
x - 24*E^5*x)*Log[2/x]^2 + E^x*(299*x + 120*E^5*x + 12*E^10*x)*Log[2/x]^3)
*Log[(-12*E^(2*x) + E^x*(120 + 24*E^5)*Log[2/x] + (-299 - 120*E^5 - 12*E^1
0)*Log[2/x]^2)/Log[2/x]^2])/((12*E^(2*x)*x*Log[2/x] + E^x*(-120*x - 24*E^5
*x)*Log[2/x]^2 + (299*x + 120*E^5*x + 12*E^10*x)*Log[2/x]^3)*Log[(-12*E^(2
*x) + E^x*(120 + 24*E^5)*Log[2/x] + (-299 - 120*E^5 - 12*E^10)*Log[2/x]^2)
/Log[2/x]^2]),x]
```

output
```
E^x + Log[Log[-299 - 120*E^5 - 12*E^10 - (12*E^(2*x))/Log[2/x]^2 + (24*E^x
*(5 + E^5))/Log[2/x]]]
```

3.420.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{24e^{2x} + e^x\left(-24e^5x - 120x\right)\log^2\left(\frac{2}{x}\right) + \left(e^x\left(12e^{10}x + 120e^5x + 299x\right)\log^3\left(\frac{2}{x}\right) + e^{2x}\left(-24e^5x - 120x\right)\log^2\left(\frac{2}{x}\right)}{\left(\left(12e^{10}x + 120e^5x + 299x\right)\log^3\left(\frac{2}{x}\right) + e^x\left(-24e^5x - 120x\right)\log^2\left(\frac{2}{x}\right) +}$$

$$\Big\downarrow \; 7293$$

$$\int \left(e^x + \frac{2\left(x\log\left(\frac{2}{x}\right) + 1\right)}{x\log\left(\frac{2}{x}\right)\log\left(-\frac{12e^{2x}}{\log^2\left(\frac{2}{x}\right)} + \frac{24(5+e^5)e^x}{\log\left(\frac{2}{x}\right)} - 299\left(1 + \frac{12}{299}e^5\left(10+e^5\right)\right)\right)} + \frac{2\left(60\right.}{x\left(12e^{2x} + 299\left(1 + \frac{12}{299}e^5\left(10+e^5\right)\right.\right.}$$

$$\Big\downarrow \; 2009$$

$$\int \frac{24e^{2x}+\left(e^x\left(-120-24e^5\right)+24e^{2x}x\right)\log\left(\frac{2}{x}\right)+e^x\left(-120x-24e^5x\right)\log^2\left(\frac{2}{x}\right)+\left(12e^{3x}x\log\left(\frac{2}{x}\right)+e^{2x}\left(-120x-24e^5x\right)\log^2\left(\frac{2}{x}\right)+e^x\left(299x+120e^5x+12e^1\right.\right.}{}$$

$$2\int \frac{1}{\log\left(-299\left(1+\frac{12}{299}e^5\left(10+e^5\right)\right)+\frac{24e^x\left(5+e^5\right)}{\log\left(\frac{2}{x}\right)}-\frac{12e^{2x}}{\log^2\left(\frac{2}{x}\right)}\right)}dx+$$
$$2\int \frac{1}{x\log\left(\frac{2}{x}\right)\log\left(-299\left(1+\frac{12}{299}e^5\left(10+e^5\right)\right)+\frac{24e^x\left(5+e^5\right)}{\log\left(\frac{2}{x}\right)}-\frac{12e^{2x}}{\log^2\left(\frac{2}{x}\right)}\right)}dx+$$
$$24\left(5+e^5\right)\int \frac{e^x}{x\left(299\left(1+\frac{12}{299}e^5\left(10+e^5\right)\right)\log^2\left(\frac{2}{x}\right)-120e^x\left(1+\frac{e^5}{5}\right)\log\left(\frac{2}{x}\right)+12e^{2x}\right)\log\left(-299\left(1+\frac{12}{299}e^5\left(10+\right.\right.\right.}$$
$$24\left(5+e^5\right)\int \frac{e^x\log\left(\frac{2}{x}\right)}{\left(299\left(1+\frac{12}{299}e^5\left(10+e^5\right)\right)\log^2\left(\frac{2}{x}\right)-120e^x\left(1+\frac{e^5}{5}\right)\log\left(\frac{2}{x}\right)+12e^{2x}\right)\log\left(-299\left(1+\frac{12}{299}e^5\left(10+e\right.\right.\right.}$$
$$2\left(299+120e^5+12e^{10}\right)\int \frac{\log\left(\frac{2}{x}\right)}{x\left(299\left(1+\frac{12}{299}e^5\left(10+e^5\right)\right)\log^2\left(\frac{2}{x}\right)-120e^x\left(1+\frac{e^5}{5}\right)\log\left(\frac{2}{x}\right)+12e^{2x}\right)\log\left(-299\left(1-\right.\right.}$$
$$2\left(299+120e^5+12e^{10}\right)\int \frac{\log^2\left(\frac{2}{x}\right)}{\left(299\left(1+\frac{12}{299}e^5\left(10+e^5\right)\right)\log^2\left(\frac{2}{x}\right)-120e^x\left(1+\frac{e^5}{5}\right)\log\left(\frac{2}{x}\right)+12e^{2x}\right)\log\left(-299\left(1+\right.\right.}$$
$$e^x$$

input
```
Int[(24*E^(2*x) + (E^x*(-120 - 24*E^5) + 24*E^(2*x)*x)*Log[2/x] + E^x*(-12
0*x - 24*E^5*x)*Log[2/x]^2 + (12*E^(3*x)*x*Log[2/x] + E^(2*x)*(-120*x - 24
*E^5*x)*Log[2/x]^2 + E^x*(299*x + 120*E^5*x + 12*E^10*x)*Log[2/x]^3)*Log[(
-12*E^(2*x) + E^x*(120 + 24*E^5)*Log[2/x] + (-299 - 120*E^5 - 12*E^10)*Log
[2/x]^2)/Log[2/x]^2])/((12*E^(2*x)*x*Log[2/x] + E^x*(-120*x - 24*E^5*x)*Lo
g[2/x]^2 + (299*x + 120*E^5*x + 12*E^10*x)*Log[2/x]^3)*Log[(-12*E^(2*x) +
E^x*(120 + 24*E^5)*Log[2/x] + (-299 - 120*E^5 - 12*E^10)*Log[2/x]^2)/Log[2
/x]^2]),x]
```

output
```
$Aborted
```

3.420.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.420.

$$\int \frac{24e^{2x}+\left(e^x\left(-120-24e^5\right)+24e^{2x}x\right)\log\left(\frac{2}{x}\right)+e^x\left(-120x-24e^5x\right)\log^2\left(\frac{2}{x}\right)+\left(12e^{3x}x\log\left(\frac{2}{x}\right)+e^{2x}\left(-120x-24e^5x\right)\log^2\left(\frac{2}{x}\right)+e^x\left(299x+120e^5x+12e^{1}\right.\right.}{}$$

3.420.4 Maple [A] (verified)

Time = 116.99 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.87

method	result	size
parallelrisch	$\ln\left(\ln\left(\frac{(-12\,e^{10}-120\,e^{5}-299)\ln\left(\frac{2}{x}\right)^{2}+(24\,e^{5}+120)\,e^{x}\ln\left(\frac{2}{x}\right)-12\,e^{2x}}{\ln\left(\frac{2}{x}\right)^{2}}\right)\right)+e^{x}$	58
risch	Expression too large to display	1083

input
```
int((((12*x*exp(5)^2+120*x*exp(5)+299*x)*exp(x)*ln(2/x)^3+(-24*x*exp(5)-12
0*x)*exp(x)^2*ln(2/x)^2+12*x*exp(x)^3*ln(2/x))*ln(((-12*exp(5)^2-120*exp(5
)-299)*ln(2/x)^2+(24*exp(5)+120)*exp(x)*ln(2/x)-12*exp(x)^2)/ln(2/x)^2)+(-
24*x*exp(5)-120*x)*exp(x)*ln(2/x)^2+(24*x*exp(x)^2+(-24*exp(5)-120)*exp(x)
)*ln(2/x)+24*exp(x)^2)/((12*x*exp(5)^2+120*x*exp(5)+299*x)*ln(2/x)^3+(-24*
x*exp(5)-120*x)*exp(x)*ln(2/x)^2+12*x*exp(x)^2*ln(2/x))/ln(((-12*exp(5)^2-
120*exp(5)-299)*ln(2/x)^2+(24*exp(5)+120)*exp(x)*ln(2/x)-12*exp(x)^2)/ln(2
/x)^2),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(((-12*exp(5)^2-120*exp(5)-299)*ln(2/x)^2+(24*exp(5)+120)*exp(x)*ln(2
/x)-12*exp(x)^2)/ln(2/x)^2))+exp(x)
```

3.420.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.77

$$\int \frac{24e^{2x}+\left(e^{x}(-120-24e^{5})+24e^{2x}x\right)\log\left(\frac{2}{x}\right)+e^{x}(-120x-24e^{5}x)\log^{2}\left(\frac{2}{x}\right)+\left(12e^{3x}x\log\left(\frac{2}{x}\right)+e^{2x}(-120\cdots\right.}{\left(12e^{2x}x\log\left(\frac{2}{x}\right)+e^{x}\left(-120x-24e^{5}x\right)\log^{2}\left(\frac{2}{x}\right)+(299x+120e^{5}\cdots\right.}$$

$$=e^{x}+\log\left(\log\left(\frac{24\,(e^{5}+5)e^{x}\log\left(\frac{2}{x}\right)-(12\,e^{10}+120\,e^{5}+299)\log\left(\frac{2}{x}\right)^{2}-12\,e^{(2\,x)}}{\log\left(\frac{2}{x}\right)^{2}}\right)\right)$$

input
```
integrate((((12*x*exp(5)^2+120*x*exp(5)+299*x)*exp(x)*log(2/x)^3+(-24*x*ex
p(5)-120*x)*exp(x)^2*log(2/x)^2+12*x*exp(x)^3*log(2/x))*log(((-12*exp(5)^2
-120*exp(5)-299)*log(2/x)^2+(24*exp(5)+120)*exp(x)*log(2/x)-12*exp(x)^2)/l
og(2/x)^2)+(-24*x*exp(5)-120*x)*exp(x)*log(2/x)^2+(24*x*exp(x)^2+(-24*exp(
5)-120)*exp(x))*log(2/x)+24*exp(x)^2)/((12*x*exp(5)^2+120*x*exp(5)+299*x)*
log(2/x)^3+(-24*x*exp(5)-120*x)*exp(x)*log(2/x)^2+12*x*exp(x)^2*log(2/x))/
log(((-12*exp(5)^2-120*exp(5)-299)*log(2/x)^2+(24*exp(5)+120)*exp(x)*log(2
/x)-12*exp(x)^2)/log(2/x)^2),x, algorithm=\
```

3.420.

$$\int \frac{24e^{2x}+\left(e^{x}\left(-120-24e^{5}\right)+24e^{2x}x\right)\log\left(\frac{2}{x}\right)+e^{x}\left(-120x-24e^{5}x\right)\log^{2}\left(\frac{2}{x}\right)+\left(12e^{3x}x\log\left(\frac{2}{x}\right)+e^{2x}\left(-120x-24e^{5}x\right)\log^{2}\left(\frac{2}{x}\right)+e^{x}\left(299x+120e^{5}x+12e^{1}\cdots\right.\right.}{\cdots}$$

output
```
e^x + log(log((24*(e^5 + 5)*e^x*log(2/x) - (12*e^10 + 120*e^5 + 299)*log(2
/x)^2 - 12*e^(2*x))/log(2/x)^2))
```

3.420.6 Sympy [A] (verification not implemented)

Time = 3.30 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.74

$$\int \frac{24e^{2x} + (e^x(-120 - 24e^5) + 24e^{2x}x)\log\left(\frac{2}{x}\right) + e^x(-120x - 24e^5x)\log^2\left(\frac{2}{x}\right) + \left(12e^{3x}x\log\left(\frac{2}{x}\right) + e^{2x}(-120\right.}{\left(12e^{2x}x\log\left(\frac{2}{x}\right) + e^x\left(-120x - 24e^5x\right)\log^2\left(\frac{2}{x}\right) + (299x + 120e^5\right.}$$

$$= e^x + \log\left(\log\left(\frac{-12e^{2x} + (120 + 24e^5)\,e^x\log\left(\frac{2}{x}\right) + (-12e^{10} - 120e^5 - 299)\log\left(\frac{2}{x}\right)^2}{\log\left(\frac{2}{x}\right)^2}\right)\right)$$

input
```
integrate((((12*x*exp(5)**2+120*x*exp(5)+299*x)*exp(x)*ln(2/x)**3+(-24*x*e
xp(5)-120*x)*exp(x)**2*ln(2/x)**2+12*x*exp(x)**3*ln(2/x))*ln(((-12*exp(5)*
*2-120*exp(5)-299)*ln(2/x)**2+(24*exp(5)+120)*exp(x)*ln(2/x)-12*exp(x)**2)
/ln(2/x)**2)+(-24*x*exp(5)-120*x)*exp(x)*ln(2/x)**2+(24*x*exp(x)**2+(-24*e
xp(5)-120)*exp(x))*ln(2/x)+24*exp(x)**2)/((12*x*exp(5)**2+120*x*exp(5)+299
*x)*ln(2/x)**3+(-24*x*exp(5)-120*x)*exp(x)*ln(2/x)**2+12*x*exp(x)**2*ln(2/
x))/ln(((-12*exp(5)**2-120*exp(5)-299)*ln(2/x)**2+(24*exp(5)+120)*exp(x)*l
n(2/x)-12*exp(x)**2)/ln(2/x)**2),x)
```

output
```
exp(x) + log(log((-12*exp(2*x) + (120 + 24*exp(5))*exp(x)*log(2/x) + (-12*
exp(10) - 120*exp(5) - 299)*log(2/x)**2)/log(2/x)**2))
```

3.420.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 92 vs. $2(28) = 56$.

Time = 0.44 (sec) , antiderivative size = 92, normalized size of antiderivative = 2.97

$$\int \frac{24e^{2x} + (e^x(-120 - 24e^5) + 24e^{2x}x)\log\left(\frac{2}{x}\right) + e^x(-120x - 24e^5x)\log^2\left(\frac{2}{x}\right) + \left(12e^{3x}x\log\left(\frac{2}{x}\right) + e^{2x}(-120\right.}{\left(12e^{2x}x\log\left(\frac{2}{x}\right) + e^x\left(-120x - 24e^5x\right)\log^2\left(\frac{2}{x}\right) + (299x + 120e^5\right.}$$

$$= e^x + \log\Big(\log\big(24\,(e^5 + 5)e^x\log(2) - \left(12\,e^{10} + 120\,e^5 + 299\right)\log(2)^2 - \left(12\,e^{10} + 120\,e^5 + 299\right)\log(x)^2 - 2\left(12\,(e^5 + 5)e^x - \left(12\,e^{10} + 120\,e^5 + 299\right)\log(2)\right)\log(x) - 12\,e^{(2\,x)}\big) - 2\,\log(-\log(2) + \log(x))\Big)$$

3.420.

$$\int \frac{24e^{2x}+(e^x(-120-24e^5)+24e^{2x}x)\log(\frac{2}{x})+e^x(-120x-24e^5x)\log^2(\frac{2}{x})+(12e^{3x}x\log(\frac{2}{x})+e^{2x}(-120x-24e^5x)\log^2(\frac{2}{x})+e^x(299x+120e^5x+12e^1\right.}{}$$

input
```
integrate((((12*x*exp(5)^2+120*x*exp(5)+299*x)*exp(x)*log(2/x)^3+(-24*x*ex
p(5)-120*x)*exp(x)^2*log(2/x)^2+12*x*exp(x)^3*log(2/x))*log(((-12*exp(5)^2
-120*exp(5)-299)*log(2/x)^2+(24*exp(5)+120)*exp(x)*log(2/x)-12*exp(x)^2)/l
og(2/x)^2)+(-24*x*exp(5)-120*x)*exp(x)*log(2/x)^2+(24*x*exp(x)^2+(-24*exp(
5)-120)*exp(x))*log(2/x)+24*exp(x)^2)/((12*x*exp(5)^2+120*x*exp(5)+299*x)*
log(2/x)^3+(-24*x*exp(5)-120*x)*exp(x)*log(2/x)^2+12*x*exp(x)^2*log(2/x))/
log(((-12*exp(5)^2-120*exp(5)-299)*log(2/x)^2+(24*exp(5)+120)*exp(x)*log(2
/x)-12*exp(x)^2)/log(2/x)^2),x, algorithm=\
```

output
```
e^x + log(log(24*(e^5 + 5)*e^x*log(2) - (12*e^10 + 120*e^5 + 299)*log(2)^2
 - (12*e^10 + 120*e^5 + 299)*log(x)^2 - 2*(12*(e^5 + 5)*e^x - (12*e^10 + 1
20*e^5 + 299)*log(2))*log(x) - 12*e^(2*x)) - 2*log(-log(2) + log(x)))
```

3.420.8 Giac [F(-1)]

Timed out.

$$\int \frac{24e^{2x} + \left(e^x(-120 - 24e^5) + 24e^{2x}x\right)\log\left(\frac{2}{x}\right) + e^x(-120x - 24e^5x)\log^2\left(\frac{2}{x}\right) + \left(12e^{3x}x\log\left(\frac{2}{x}\right) + e^{2x}(-120\right.}{\left(12e^{2x}x\log\left(\frac{2}{x}\right) + e^x\left(-120x - 24e^5x\right)\log^2\left(\frac{2}{x}\right) + (299x + 120e^5\right.}$$

$= \text{Timed out}$

input
```
integrate((((12*x*exp(5)^2+120*x*exp(5)+299*x)*exp(x)*log(2/x)^3+(-24*x*ex
p(5)-120*x)*exp(x)^2*log(2/x)^2+12*x*exp(x)^3*log(2/x))*log(((-12*exp(5)^2
-120*exp(5)-299)*log(2/x)^2+(24*exp(5)+120)*exp(x)*log(2/x)-12*exp(x)^2)/l
og(2/x)^2)+(-24*x*exp(5)-120*x)*exp(x)*log(2/x)^2+(24*x*exp(x)^2+(-24*exp(
5)-120)*exp(x))*log(2/x)+24*exp(x)^2)/((12*x*exp(5)^2+120*x*exp(5)+299*x)*
log(2/x)^3+(-24*x*exp(5)-120*x)*exp(x)*log(2/x)^2+12*x*exp(x)^2*log(2/x))/
log(((-12*exp(5)^2-120*exp(5)-299)*log(2/x)^2+(24*exp(5)+120)*exp(x)*log(2
/x)-12*exp(x)^2)/log(2/x)^2),x, algorithm=\
```

output
```
Timed out
```

3.420.9 Mupad [B] (verification not implemented)

Time = 15.60 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.84

$$\int \frac{24e^{2x} + (e^x(-120 - 24e^5) + 24e^{2x}x)\log\left(\frac{2}{x}\right) + e^x(-120x - 24e^5x)\log^2\left(\frac{2}{x}\right) + \left(12e^{3x}x\log\left(\frac{2}{x}\right) + e^{2x}(-120\right.}{\left(12e^{2x}x\log\left(\frac{2}{x}\right) + e^x\left(-120x - 24e^5x\right)\log^2\left(\frac{2}{x}\right) + (299x + 120e^5\right.}$$

$$= \ln\left(\ln\left(-\frac{(120\,e^5 + 12\,e^{10} + 299)\,\ln\left(\frac{2}{x}\right)^2 - e^x\,(24\,e^5 + 120)\,\ln\left(\frac{2}{x}\right) + 12\,e^{2\,x}}{\ln\left(\frac{2}{x}\right)^2}\right)\right) + e^x$$

input
```
int((24*exp(2*x) + log(-(12*exp(2*x) + log(2/x)^2*(120*exp(5) + 12*exp(10)
 + 299) - exp(x)*log(2/x)*(24*exp(5) + 120))/log(2/x)^2)*(12*x*exp(3*x)*lo
g(2/x) - exp(2*x)*log(2/x)^2*(120*x + 24*x*exp(5)) + exp(x)*log(2/x)^3*(29
9*x + 120*x*exp(5) + 12*x*exp(10))) + log(2/x)*(24*x*exp(2*x) - exp(x)*(24
*exp(5) + 120)) - exp(x)*log(2/x)^2*(120*x + 24*x*exp(5)))/(log(-(12*exp(2
*x) + log(2/x)^2*(120*exp(5) + 12*exp(10) + 299) - exp(x)*log(2/x)*(24*exp
(5) + 120))/log(2/x)^2)*(log(2/x)^3*(299*x + 120*x*exp(5) + 12*x*exp(10))
- exp(x)*log(2/x)^2*(120*x + 24*x*exp(5)) + 12*x*exp(2*x)*log(2/x))),x)
```

output
```
log(log(-(12*exp(2*x) + log(2/x)^2*(120*exp(5) + 12*exp(10) + 299) - exp(x
)*log(2/x)*(24*exp(5) + 120))/log(2/x)^2)) + exp(x)
```


$$\int \frac{24e^{2x}+(e^x(-120-24e^5)+24e^{2x}x)\log\left(\frac{2}{x}\right)+e^x(-120x-24e^5x)\log^2\left(\frac{2}{x}\right)+\left(12e^{3x}x\log\left(\frac{2}{x}\right)+e^{2x}(-120x-24e^5x)\log^2\left(\frac{2}{x}\right)+e^x(299x+120e^5x+12e^1\right.}{}$$

3.421 $\int (26 + 54x + 6x^2 + 4x^3 + e^4(2 + 4x) + e^{2x}(2x + 2x$

3.421.1 Optimal result

Integrand size = 67, antiderivative size = 20

$$\int \left(26 + 54x + 6x^2 + 4x^3 + e^4(2 + 4x) + e^{2x}(2x + 2x^2) + e^x(26 + 30x + 8x^2 + 2x^3 + e^4(2 + 2x))\right) dx = \left(-3 + e^4 + x + x\left(e^x + \frac{16}{x} + x\right)\right)^2$$

output
```
(x*(16/x+exp(x)+x)+x+exp(4)-3)^2
```

3.421.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \left(26 + 54x + 6x^2 + 4x^3 + e^4(2 + 4x) + e^{2x}(2x + 2x^2) + e^x(26 + 30x + 8x^2 + 2x^3 + e^4(2 + 2x))\right) dx = \left(13 + e^4 + x + e^x x + x^2\right)^2$$

input
```
Integrate[26 + 54*x + 6*x^2 + 4*x^3 + E^4*(2 + 4*x) + E^(2*x)*(2*x + 2*x^2
) + E^x*(26 + 30*x + 8*x^2 + 2*x^3 + E^4*(2 + 2*x)),x]
```

output
```
(13 + E^4 + x + E^x*x + x^2)^2
```

3.421.
$\int (26 + 54x + 6x^2 + 4x^3 + e^4(2 + 4x) + e^{2x}(2x + 2x^2) + e^x(26 + 30x + 8x^2 + 2x^3 + e^4(2 + 2x)))\, dx$

3.421.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 79 vs. 2(20) = 40.

Time = 0.31 (sec) , antiderivative size = 79, normalized size of antiderivative = 3.95, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.015$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(4x^3+6x^2+e^{2x}\left(2x^2+2x\right)+e^x\left(2x^3+8x^2+30x+e^4(2x+2)+26\right)+54x+e^4(4x+2)+26\right)\,dx$$

$$\Big\downarrow \text{2009}$$

$$x^4+2e^xx^3+2x^3+2e^xx^2+e^{2x}x^2+27x^2+26e^xx+26x-2e^{x+4}+\frac{1}{2}e^4(2x+1)^2+2e^{x+4}(x+1)$$

input
```
Int[26 + 54*x + 6*x^2 + 4*x^3 + E^4*(2 + 4*x) + E^(2*x)*(2*x + 2*x^2) + E^
x*(26 + 30*x + 8*x^2 + 2*x^3 + E^4*(2 + 2*x)),x]
```

output
```
-2*E^(4 + x) + 26*x + 26*E^x*x + 27*x^2 + 2*E^x*x^2 + E^(2*x)*x^2 + 2*x^3
+ 2*E^x*x^3 + x^4 + 2*E^(4 + x)*(1 + x) + (E^4*(1 + 2*x)^2)/2
```

3.421.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.421.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. 2(18) = 36.

Time = 0.17 (sec) , antiderivative size = 60, normalized size of antiderivative = 3.00

method	result
norman	$x^4+(2\,e^4+26)\,x+(2\,e^4+27)\,x^2+e^{2x}x^2+(2\,e^4+26)\,x\,e^x+2x^3+2\,e^xx^2+2\,e^xx^3$
risch	$e^{2x}x^2+(2x^3+2x\,e^4+2x^2+26x)\,e^x+2x^2e^4+2x\,e^4+x^4+2x^3+27x^2+26x$
parallelrisch	$2\,e^xx^3+x^4+2x\,e^4e^x+2x^2e^4+2\,e^xx^2+e^{2x}x^2+2x^3+2x\,e^4+26\,e^xx+27x^2+26x$
default	$26x+2(x^2+x)\,e^4+2\,e^4e^x+26\,e^xx+2\,e^xx^2+2\,e^xx^3+2\,e^4(e^xx-e^x)+e^{2x}x^2+27x^2+2x$
parts	$26x+2\,e^4e^x+26\,e^xx+2\,e^xx^2+2\,e^xx^3+2\,e^4(e^xx-e^x)+e^{2x}x^2+27x^2+2x^3+x^4+2x^2e$

3.421. $\int \left(26+54x+6x^2+4x^3+e^4(2+4x)+e^{2x}(2x+2x^2)+e^x(26+30x+8x^2+2x^3+e^4(2+2x))\right)\,dx$

input
```
int((2*x^2+2*x)*exp(x)^2+((2+2*x)*exp(4)+2*x^3+8*x^2+30*x+26)*exp(x)+(4*x+
2)*exp(4)+4*x^3+6*x^2+54*x+26,x,method=_RETURNVERBOSE)
```

output
```
x^4+(2*exp(4)+26)*x+(2*exp(4)+27)*x^2+exp(x)^2*x^2+(2*exp(4)+26)*x*exp(x)+
2*x^3+2*exp(x)*x^2+2*exp(x)*x^3
```

3.421.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. $2(18) = 36$.

Time = 0.25 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.60

$$\int \left(26 + 54x + 6x^2 + 4x^3 + e^4(2 + 4x) + e^{2x}\left(2x + 2x^2\right) + e^x\left(26 + 30x + 8x^2 + 2x^3 + e^4(2 + 2x)\right)\right) dx = x^4 + 2\,x^3 + x^2e^{(2\,x)} + 27\,x^2 + 2\,\left(x^2 + x\right)e^4 + 2\,\left(x^3 + x^2 + xe^4 + 13\,x\right)e^x + 26\,x$$

input
```
integrate((2*x^2+2*x)*exp(x)^2+((2+2*x)*exp(4)+2*x^3+8*x^2+30*x+26)*exp(x)
+(4*x+2)*exp(4)+4*x^3+6*x^2+54*x+26,x, algorithm=\
```

output
```
x^4 + 2*x^3 + x^2*e^(2*x) + 27*x^2 + 2*(x^2 + x)*e^4 + 2*(x^3 + x^2 + x*e^
4 + 13*x)*e^x + 26*x
```

3.421.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(17) = 34$.

Time = 0.07 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.90

$$\int \left(26 + 54x + 6x^2 + 4x^3 + e^4(2 + 4x) + e^{2x}\left(2x + 2x^2\right) + e^x\left(26 + 30x + 8x^2 + 2x^3 + e^4(2 + 2x)\right)\right) dx = x^4 + 2x^3 + x^2e^{2x} + x^2 \cdot \left(27 + 2e^4\right) + x\left(26 + 2e^4\right) + \left(2x^3 + 2x^2 + 26x + 2xe^4\right)e^x$$

input
```
integrate((2*x**2+2*x)*exp(x)**2+((2+2*x)*exp(4)+2*x**3+8*x**2+30*x+26)*ex
p(x)+(4*x+2)*exp(4)+4*x**3+6*x**2+54*x+26,x)
```

output
```
x**4 + 2*x**3 + x**2*exp(2*x) + x**2*(27 + 2*exp(4)) + x*(26 + 2*exp(4)) +
 (2*x**3 + 2*x**2 + 26*x + 2*x*exp(4))*exp(x)
```

3.421.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(18) = 36$.

Time = 0.21 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.55

$$\int \left(26+54x+6x^2+4x^3+e^4(2+4x)+e^{2x}\left(2x+2x^2\right)+e^x\left(26+30x+8x^2+2x^3+e^4(2+2x)\right)\right)\,dx = x^4+2\,x^3+x^2e^{(2\,x)}+27\,x^2+2\,\left(x^2+x\right)e^4+2\,\left(x^3+x^2+x\left(e^4+13\right)\right)e^x+26\,x$$

input
```
integrate((2*x^2+2*x)*exp(x)^2+((2+2*x)*exp(4)+2*x^3+8*x^2+30*x+26)*exp(x)
+(4*x+2)*exp(4)+4*x^3+6*x^2+54*x+26,x, algorithm=\
```

output
```
x^4 + 2*x^3 + x^2*e^(2*x) + 27*x^2 + 2*(x^2 + x)*e^4 + 2*(x^3 + x^2 + x*(e
^4 + 13))*e^x + 26*x
```

3.421.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(18) = 36$.

Time = 0.27 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.75

$$\int \left(26+54x+6x^2+4x^3+e^4(2+4x)+e^{2x}\left(2x+2x^2\right)+e^x\left(26+30x+8x^2+2x^3+e^4(2+2x)\right)\right)\,dx = x^4+2\,x^3+x^2e^{(2\,x)}+27\,x^2+2\,\left(x^2+x\right)e^4+2\,xe^{(x+4)}+2\,\left(x^3+x^2+13\,x\right)e^x+26\,x$$

input
```
integrate((2*x^2+2*x)*exp(x)^2+((2+2*x)*exp(4)+2*x^3+8*x^2+30*x+26)*exp(x)
+(4*x+2)*exp(4)+4*x^3+6*x^2+54*x+26,x, algorithm=\
```

output
```
x^4 + 2*x^3 + x^2*e^(2*x) + 27*x^2 + 2*(x^2 + x)*e^4 + 2*x*e^(x + 4) + 2*(
x^3 + x^2 + 13*x)*e^x + 26*x
```

3.421.9 Mupad [B] (verification not implemented)

Time = 13.74 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \left(26+54x+6x^2+4x^3+e^4(2+4x)+e^{2x}\left(2x+2x^2\right)+e^x\left(26+30x+8x^2+2x^3+e^4(2+2x)\right)\right)\,dx=x\,(x+\mathrm{e}^x+1)\,\left(x+2\,\mathrm{e}^4+x\,\mathrm{e}^x+x^2+26\right)$$

input
```
int(54*x + exp(2*x)*(2*x + 2*x^2) + 6*x^2 + 4*x^3 + exp(x)*(30*x + 8*x^2 +
 2*x^3 + exp(4)*(2*x + 2) + 26) + exp(4)*(4*x + 2) + 26,x)
```

output
```
x*(x + exp(x) + 1)*(x + 2*exp(4) + x*exp(x) + x^2 + 26)
```

3.422 $\int \frac{2x^2+8x^3+8x^4+e^x(-2-8x-8x^2)+(e^x(-2-4x)+2x+4x^2)\log\left(-\frac{4e^x x}{e^x-x}\right)}{(e^x x^3-x^4)\log^3\left(-\frac{4e^x x}{e^x-x}\right)}$

3.422.1 Optimal result

Integrand size = 99, antiderivative size = 26

$$\int \frac{2x^2+8x^3+8x^4+e^x(-2-8x-8x^2)+(e^x(-2-4x)+2x+4x^2)\log\left(-\frac{4e^x x}{e^x-x}\right)}{(e^x x^3-x^4)\log^3\left(-\frac{4e^x x}{e^x-x}\right)}\,dx = \frac{\left(2+\frac{1}{x}\right)^2}{\log^2\left(\frac{4e^x x}{-e^x+x}\right)}$$

output
```
(2+1/x)^2/ln(4*x*exp(x)/(x-exp(x)))^2
```

3.422.2 Mathematica [A] (verified)

Time = 0.61 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{2x^2+8x^3+8x^4+e^x(-2-8x-8x^2)+(e^x(-2-4x)+2x+4x^2)\log\left(-\frac{4e^x x}{e^x-x}\right)}{(e^x x^3-x^4)\log^3\left(-\frac{4e^x x}{e^x-x}\right)}\,dx = \frac{(1+2x)^2}{x^2\log^2\left(-\frac{4e^x x}{e^x-x}\right)}$$

input
```
Integrate[(2*x^2 + 8*x^3 + 8*x^4 + E^x*(-2 - 8*x - 8*x^2) + (E^x*(-2 - 4*x
) + 2*x + 4*x^2)*Log[(-4*E^x*x)/(E^x - x)])/((E^x*x^3 - x^4)*Log[(-4*E^x*x
)/(E^x - x)]^3),x]
```

output
```
(1 + 2*x)^2/(x^2*Log[(-4*E^x*x)/(E^x - x)]^2)
```

3.422.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^4+8x^3+2x^2+e^x(-8x^2-8x-2)+(4x^2+2x+e^x(-4x-2))\log\left(-\frac{4e^xx}{e^x-x}\right)}{(e^xx^3-x^4)\log^3\left(-\frac{4e^xx}{e^x-x}\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{2(2x+1)\left(2x^3+x^2-2e^xx-e^x+x\log\left(-\frac{4e^xx}{e^x-x}\right)-e^x\log\left(-\frac{4e^xx}{e^x-x}\right)\right)}{(e^xx^3-x^4)\log^3\left(-\frac{4e^xx}{e^x-x}\right)}dx$$

$$\Big\downarrow \text{ 27}$$

$$2\int -\frac{(2x+1)\left(-2x^3-x^2+2e^xx-\log\left(-\frac{4e^xx}{e^x-x}\right)x+e^x+e^x\log\left(-\frac{4e^xx}{e^x-x}\right)\right)}{(e^xx^3-x^4)\log^3\left(-\frac{4e^xx}{e^x-x}\right)}dx$$

$$\Big\downarrow \text{ 25}$$

$$-2\int \frac{(2x+1)\left(-2x^3-x^2+2e^xx-\log\left(-\frac{4e^xx}{e^x-x}\right)x+e^x+e^x\log\left(-\frac{4e^xx}{e^x-x}\right)\right)}{(e^xx^3-x^4)\log^3\left(-\frac{4e^xx}{e^x-x}\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-2\int \left(\frac{(2x+1)\left(2x+\log\left(-\frac{4e^xx}{e^x-x}\right)+1\right)}{x^3\log^3\left(-\frac{4e^xx}{e^x-x}\right)}-\frac{(x-1)(2x+1)^2}{(e^x-x)x^2\log^3\left(-\frac{4e^xx}{e^x-x}\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-2\left(\int \frac{1}{x^3\log^3\left(-\frac{4e^xx}{e^x-x}\right)}dx+\int \frac{1}{x^3\log^2\left(-\frac{4e^xx}{e^x-x}\right)}dx+4\int \frac{1}{x^2\log^3\left(-\frac{4e^xx}{e^x-x}\right)}dx+\int \frac{1}{(e^x-x)x^2\log^3\left(-\frac{4e^xx}{e^x-x}\right)}dx\right.$$

input
```
Int[(2*x^2 + 8*x^3 + 8*x^4 + E^x*(-2 - 8*x - 8*x^2) + (E^x*(-2 - 4*x) + 2*
x + 4*x^2)*Log[(-4*E^x*x)/(E^x - x)])/((E^x*x^3 - x^4)*Log[(-4*E^x*x)/(E^x
 - x)]^3),x]
```

output
```
$Aborted
```

3.422.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.422.4 Maple [A] (verified)

Time = 0.52 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

method	result
parallelrisch	$\frac{8x^2+8x+2}{2x^2\ln\left(-\frac{4x\,e^x}{e^x-x}\right)^2}$
risch	$-\frac{}{x^2\left(-\pi\ \mathrm{csgn}\left(\frac{i}{e^x-x}\right)\mathrm{csgn}\left(\frac{ie^x}{e^x-x}\right)^2-\pi\ \mathrm{csgn}\left(\frac{i}{e^x-x}\right)\mathrm{csgn}\left(\frac{ie^x}{e^x-x}\right)\mathrm{csgn}(ie^x)+\pi\ \mathrm{csgn}\left(\frac{ie^x}{e^x-x}\right)^3+\pi\ \mathrm{csgn}\left(\frac{ie^x}{e^x-x}\right)^2\mathrm{csgn}(ie^x)-\right.}$

input
```
int((((-4*x-2)*exp(x)+4*x^2+2*x)*ln(-4*x*exp(x)/(exp(x)-x))+(-8*x^2-8*x-2)
*exp(x)+8*x^4+8*x^3+2*x^2)/(exp(x)*x^3-x^4)/ln(-4*x*exp(x)/(exp(x)-x))^3,x
,method=_RETURNVERBOSE)
```

output
```
1/2*(8*x^2+8*x+2)/x^2/ln(-4*x*exp(x)/(exp(x)-x))^2
```

3.422. $$\int \frac{2x^2+8x^3+8x^4+e^x\left(-2-8x-8x^2\right)+\left(e^x(-2-4x)+2x+4x^2\right)\log\left(-\frac{4e^xx}{e^x-x}\right)}{\left(e^xx^3-x^4\right)\log^3\left(-\frac{4e^xx}{e^x-x}\right)}\,dx$$

3.422.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

$$\int \frac{2x^2+8x^3+8x^4+e^x(-2-8x-8x^2)+(e^x(-2-4x)+2x+4x^2)\log\left(-\frac{4e^xx}{e^x-x}\right)}{(e^xx^3-x^4)\log^3\left(-\frac{4e^xx}{e^x-x}\right)}\,dx$$
$$=\frac{4\,x^2+4\,x+1}{x^2\log\left(\frac{4\,xe^x}{x-e^x}\right)^2}$$

input
```
integrate((((-4*x-2)*exp(x)+4*x^2+2*x)*log(-4*x*exp(x)/(exp(x)-x))+(-8*x^2
-8*x-2)*exp(x)+8*x^4+8*x^3+2*x^2)/(exp(x)*x^3-x^4)/log(-4*x*exp(x)/(exp(x)
-x))^3,x, algorithm=\
```

output
```
(4*x^2 + 4*x + 1)/(x^2*log(4*x*e^x/(x - e^x))^2)
```

3.422.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{2x^2+8x^3+8x^4+e^x(-2-8x-8x^2)+(e^x(-2-4x)+2x+4x^2)\log\left(-\frac{4e^xx}{e^x-x}\right)}{(e^xx^3-x^4)\log^3\left(-\frac{4e^xx}{e^x-x}\right)}\,dx$$
$$=\frac{4x^2+4x+1}{x^2\log\left(-\frac{4xe^x}{-x+e^x}\right)^2}$$

input
```
integrate((((-4*x-2)*exp(x)+4*x**2+2*x)*ln(-4*x*exp(x)/(exp(x)-x))+(-8*x**
2-8*x-2)*exp(x)+8*x**4+8*x**3+2*x**2)/(exp(x)*x**3-x**4)/ln(-4*x*exp(x)/(e
xp(x)-x))**3,x)
```

output
```
(4*x**2 + 4*x + 1)/(x**2*log(-4*x*exp(x)/(-x + exp(x)))**2)
```

3.422.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(24) = 48$.

Time = 0.37 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.65

$$\int \frac{2x^2 + 8x^3 + 8x^4 + e^x(-2 - 8x - 8x^2) + (e^x(-2 - 4x) + 2x + 4x^2)\log\left(-\frac{4e^x x}{e^x - x}\right)}{(e^x x^3 - x^4)\log^3\left(-\frac{4e^x x}{e^x - x}\right)}\,dx$$
$$= \frac{4\,x^2 + 4\,x + 1}{x^4 + 4\,x^3\log(2) + 4\,x^2\log(2)^2 + x^2\log(x - e^x)^2 + x^2\log(x)^2 - 2\,(x^3 + 2\,x^2\log(2) + x^2\log(x))\log(x -}$$

input
```
integrate((((-4*x-2)*exp(x)+4*x^2+2*x)*log(-4*x*exp(x)/(exp(x)-x))+(-8*x^2
-8*x-2)*exp(x)+8*x^4+8*x^3+2*x^2)/(exp(x)*x^3-x^4)/log(-4*x*exp(x)/(exp(x)
-x))^3,x, algorithm=\
```

output
```
(4*x^2 + 4*x + 1)/(x^4 + 4*x^3*log(2) + 4*x^2*log(2)^2 + x^2*log(x - e^x)^
2 + x^2*log(x)^2 - 2*(x^3 + 2*x^2*log(2) + x^2*log(x))*log(x - e^x) + 2*(x
^3 + 2*x^2*log(2))*log(x))
```

3.422.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. $2(24) = 48$.

Time = 0.35 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.00

$$\int \frac{2x^2 + 8x^3 + 8x^4 + e^x(-2 - 8x - 8x^2) + (e^x(-2 - 4x) + 2x + 4x^2)\log\left(-\frac{4e^x x}{e^x - x}\right)}{(e^x x^3 - x^4)\log^3\left(-\frac{4e^x x}{e^x - x}\right)}\,dx$$
$$= \frac{4\,x^2 + 4\,x + 1}{x^4 + 2\,x^3\log\left(\frac{4\,x}{x - e^x}\right) + x^2\log\left(\frac{4\,x}{x - e^x}\right)^2}$$

input
```
integrate((((-4*x-2)*exp(x)+4*x^2+2*x)*log(-4*x*exp(x)/(exp(x)-x))+(-8*x^2
-8*x-2)*exp(x)+8*x^4+8*x^3+2*x^2)/(exp(x)*x^3-x^4)/log(-4*x*exp(x)/(exp(x)
-x))^3,x, algorithm=\
```

output
```
(4*x^2 + 4*x + 1)/(x^4 + 2*x^3*log(4*x/(x - e^x)) + x^2*log(4*x/(x - e^x))
^2)
```

3.422.9 Mupad [B] (verification not implemented)

Time = 14.45 (sec) , antiderivative size = 377, normalized size of antiderivative = 14.50

$$\int \frac{2x^2+8x^3+8x^4+e^x(-2-8x-8x^2)+(e^x(-2-4x)+2x+4x^2)\log\left(-\frac{4e^xx}{e^x-x}\right)}{(e^xx^3-x^4)\log^3\left(-\frac{4e^xx}{e^x-x}\right)}\,dx$$
$$= \frac{\frac{(x-e^x)(2x+1)}{x^2(e^x-x^2)}+\frac{\ln\left(\frac{4xe^x}{x-e^x}\right)(x-e^x)(2e^{2x}+2xe^{2x}-5x^2e^x-7x^3e^x+2x^4e^x-xe^x+3x^3+4x^4)}{x^2(e^x-x^2)^3}}{\ln\left(\frac{4xe^x}{x-e^x}\right)} + \frac{\frac{(2x+1)^2}{x^2}-\frac{\ln\left(\frac{4xe^x}{x-e^x}\right)(x-e^x)(2x+1)}{x^2(e^x-x^2)}}{\ln\left(\frac{4xe^x}{x-e^x}\right)^2}+\frac{2x+2}{x^2}+\frac{-4x^6+18x^5-23x^4+4x^3+3x^2+2x}{(2x-x^2)(e^{2x}-2x^2e^x+x^4)} - \frac{2x^4-5x^3+x^2-x+6}{(2x-x^2)(e^x-x^2)}-\frac{2x^8-11x^7+20x^6-11x^5-4x^4+4x^3}{(2x-x^2)(e^{3x}+3x^4e^x-3x^2e^{2x}-x^6)}$$

input
```
int((log((4*x*exp(x))/(x - exp(x)))*(2*x - exp(x)*(4*x + 2) + 4*x^2) - exp
(x)*(8*x + 8*x^2 + 2) + 2*x^2 + 8*x^3 + 8*x^4)/(log((4*x*exp(x))/(x - exp(
x)))^3*(x^3*exp(x) - x^4)),x)
```

output
```
(((x - exp(x))*(2*x + 1))/(x^2*(exp(x) - x^2)) + (log((4*x*exp(x))/(x - ex
p(x)))*(x - exp(x))*(2*exp(2*x) + 2*x*exp(2*x) - 5*x^2*exp(x) - 7*x^3*exp(
x) + 2*x^4*exp(x) - x*exp(x) + 3*x^3 + 4*x^4))/(x^2*(exp(x) - x^2)^3))/log
((4*x*exp(x))/(x - exp(x))) + ((2*x + 1)^2/x^2 - (log((4*x*exp(x))/(x - ex
p(x)))*(x - exp(x))*(2*x + 1))/(x^2*(exp(x) - x^2)))/log((4*x*exp(x))/(x -
 exp(x)))^2 + (2*x + 2)/x^2 + (2*x + 3*x^2 + 4*x^3 - 23*x^4 + 18*x^5 - 4*x
^6)/((2*x - x^2)*(exp(2*x) - 2*x^2*exp(x) + x^4)) - (x^2 - x - 5*x^3 + 2*x
^4 + 6)/((2*x - x^2)*(exp(x) - x^2)) - (4*x^3 - 4*x^4 - 11*x^5 + 20*x^6 -
11*x^7 + 2*x^8)/((2*x - x^2)*(exp(3*x) + 3*x^4*exp(x) - 3*x^2*exp(2*x) - x
^6))
```

3.423 $\int \frac{1}{5}\left(-81+5e^2+22x\right)\,dx$

3.423.1 Optimal result

Integrand size = 14, antiderivative size = 20

$$\int \frac{1}{5}\left(-81+5e^2+22x\right)\,dx = x\left(e^2+x-\frac{3}{5}(3(9-x)+x)\right)$$

output
```
x*(exp(2)-81/5+11/5*x)
```

3.423.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{1}{5}\left(-81+5e^2+22x\right)\,dx = -\frac{81x}{5}+e^2x+\frac{11x^2}{5}$$

input
```
Integrate[(-81 + 5*E^2 + 22*x)/5,x]
```

output
```
(-81*x)/5 + E^2*x + (11*x^2)/5
```

3.423.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5}\left(22x+5e^2-81\right)\,dx$$

$$\Big\downarrow \; 17$$

$$\frac{1}{220}\left(-22x-5e^2+81\right)^2$$

input
```
Int[(-81 + 5*E^2 + 22*x)/5,x]
```

output
```
(81 - 5*E^2 - 22*x)^2/220
```

3.423.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.423.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

method	result	size
gosper	$\frac{x\left(11x+5\,\mathrm{e}^{2}-81\right)}{5}$	13
norman	$\left(\mathrm{e}^{2}-\frac{81}{5}\right)x+\frac{11x^{2}}{5}$	13
parallelrisch	$\left(\mathrm{e}^{2}-\frac{81}{5}\right)x+\frac{11x^{2}}{5}$	13
default	$\mathrm{e}^{2}x+\frac{11x^{2}}{5}-\frac{81x}{5}$	14
risch	$\mathrm{e}^{2}x+\frac{11x^{2}}{5}-\frac{81x}{5}$	14
parts	$\mathrm{e}^{2}x+\frac{11x^{2}}{5}-\frac{81x}{5}$	14

input
```
int(exp(2)+22/5*x-81/5,x,method=_RETURNVERBOSE)
```

output
```
1/5*x*(11*x+5*exp(2)-81)
```

3.423.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int \frac{1}{5}\left(-81+5e^2+22x\right)\,dx=\frac{11}{5}\,x^2+xe^2-\frac{81}{5}\,x$$

input
```
integrate(exp(2)+22/5*x-81/5,x, algorithm=\
```

output
```
11/5*x^2 + x*e^2 - 81/5*x
```

3.423.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{1}{5}\left(-81+5e^2+22x\right)\,dx=\frac{11x^2}{5}+x\left(-\frac{81}{5}+e^2\right)$$

input
```
integrate(exp(2)+22/5*x-81/5,x)
```

output
```
11*x**2/5 + x*(-81/5 + exp(2))
```

3.423.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int \frac{1}{5}\left(-81+5e^2+22x\right)\,dx=\frac{11}{5}\,x^2+xe^2-\frac{81}{5}\,x$$

input
```
integrate(exp(2)+22/5*x-81/5,x, algorithm=\
```

output
```
11/5*x^2 + x*e^2 - 81/5*x
```

3.423.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int \frac{1}{5}\left(-81+5e^2+22x\right)\,dx = \frac{11}{5}\,x^2 + xe^2 - \frac{81}{5}\,x$$

input
```
integrate(exp(2)+22/5*x-81/5,x, algorithm=\
```

output
```
11/5*x^2 + x*e^2 - 81/5*x
```

3.423.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int \frac{1}{5}\left(-81+5e^2+22x\right)\,dx = \frac{11\,x^2}{5} + \left(\mathrm{e}^2 - \frac{81}{5}\right)\,x$$

input
```
int((22*x)/5 + exp(2) - 81/5,x)
```

output
```
x*(exp(2) - 81/5) + (11*x^2)/5
```

3.424 $\int \left(15+\sqrt[25]{e}+2x\right) dx$

3.424.1 Optimal result

Integrand size = 10, antiderivative size = 12

$$\int \left(15+\sqrt[25]{e}+2x\right) dx=(2+x)\left(13+\sqrt[25]{e}+x\right)$$

output
```
(2+x)*(13+x+exp(1/25))
```

3.424.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \left(15+\sqrt[25]{e}+2x\right) dx=15x+\sqrt[25]{e}x+x^2$$

input
```
Integrate[15 + E^(1/25) + 2*x,x]
```

output
```
15*x + E^(1/25)*x + x^2
```

3.424.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.33, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(2x+\sqrt[25]{e}+15\right)\,dx$$
$$\Big\downarrow \; 17$$
$$\frac{1}{4}\left(2x+\sqrt[25]{e}+15\right)^2$$

input
```
Int[15 + E^(1/25) + 2*x,x]
```

output
```
(15 + E^(1/25) + 2*x)^2/4
```

3.424.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.424.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

method	result	size
norman	$x^2+\left(\mathrm{e}^{\frac{1}{25}}+15\right)x$	11
parallelrisch	$x^2+\left(\mathrm{e}^{\frac{1}{25}}+15\right)x$	11
gosper	$x\,\mathrm{e}^{\frac{1}{25}}+x^2+15x$	12
default	$x\,\mathrm{e}^{\frac{1}{25}}+x^2+15x$	12
risch	$x\,\mathrm{e}^{\frac{1}{25}}+x^2+15x$	12
parts	$x\,\mathrm{e}^{\frac{1}{25}}+x^2+15x$	12

input
```
int(exp(1/25)+2*x+15,x,method=_RETURNVERBOSE)
```

output
```
x^2+(exp(1/25)+15)*x
```

3.424.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \left(15+\sqrt[25]{e}+2x\right)\,dx=x^2+xe^{\frac{1}{25}}+15\,x$$

input
```
integrate(exp(1/25)+2*x+15,x, algorithm=\
```

output
```
x^2 + x*e^(1/25) + 15*x
```

3.424.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \left(15+\sqrt[25]{e}+2x\right)\,dx=x^2+x\left(e^{\frac{1}{25}}+15\right)$$

input
```
integrate(exp(1/25)+2*x+15,x)
```

output
```
x**2 + x*(exp(1/25) + 15)
```

3.424.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \left(15+\sqrt[25]{e}+2x\right)\,dx=x^2+xe^{\frac{1}{25}}+15\,x$$

input
```
integrate(exp(1/25)+2*x+15,x, algorithm=\
```

output
```
x^2 + x*e^(1/25) + 15*x
```

3.424.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \left(15+\sqrt[25]{e}+2x\right)\,dx=x^2+xe^{\frac{1}{25}}+15\,x$$

input
```
integrate(exp(1/25)+2*x+15,x, algorithm=\
```

output
```
x^2 + x*e^(1/25) + 15*x
```

3.424.9 Mupad [B] (verification not implemented)

Time = 13.94 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \left(15+\sqrt[25]{e}+2x\right)\,dx=x^2+\left(\mathrm{e}^{1/25}+15\right)\,x$$

input
```
int(2*x + exp(1/25) + 15,x)
```

output
```
x*(exp(1/25) + 15) + x^2
```

3.425 $\int \frac{140+70x-77x^2+35x^3+77x^4+21x^5+e^x(28x+28x^2+7x^3)+(-56x^2-5$

3.425.1 Optimal result

Integrand size = 79, antiderivative size = 29

$$\int \frac{140+70x-77x^2+35x^3+77x^4+21x^5+e^x(28x+28x^2+7x^3)+(-56x^2-56x^3-14x^4)\log(5x)}{4x+4x^2+x^3}\,dx = 7\left(e^x+(5-x^2)\left(-x-\frac{2}{2+x}+\log(5x)\right)\right)$$

output
```
7*exp(x)+7*(-x^2+5)*(ln(5*x)-2/(2+x)-x)
```

3.425.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \frac{140+70x-77x^2+35x^3+77x^4+21x^5+e^x(28x+28x^2+7x^3)+(-56x^2-56x^3-14x^4)\log(5x)}{4x+4x^2+x^3}\,dx = 7\left(e^x-3x+x^3-\frac{2}{2+x}+5\log(x)-x^2\log(5x)\right)$$

input
```
Integrate[(140 + 70*x - 77*x^2 + 35*x^3 + 77*x^4 + 21*x^5 + E^x*(28*x + 28
*x^2 + 7*x^3) + (-56*x^2 - 56*x^3 - 14*x^4)*Log[5*x])/(4*x + 4*x^2 + x^3),
x]
```

output
```
7*(E^x - 3*x + x^3 - 2/(2 + x) + 5*Log[x] - x^2*Log[5*x])
```

3.425.3 Rubi [A] (verified)

Time = 0.76 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.051, Rules used = {2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{21x^5+77x^4+35x^3-77x^2+e^x(7x^3+28x^2+28x)+(-14x^4-56x^3-56x^2)\log(5x)+70x+140}{x^3+4x^2+4x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{21x^5+77x^4+35x^3-77x^2+e^x(7x^3+28x^2+28x)+(-14x^4-56x^3-56x^2)\log(5x)+70x+140}{x(x^2+4x+4)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{21x^5+77x^4+35x^3-77x^2+e^x(7x^3+28x^2+28x)+(-14x^4-56x^3-56x^2)\log(5x)+70x+140}{x(x+2)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{21x^4}{(x+2)^2}+\frac{77x^3}{(x+2)^2}+\frac{35x^2}{(x+2)^2}-\frac{77x}{(x+2)^2}+7e^x+\frac{70}{(x+2)^2}+\frac{140}{(x+2)^2x}-14x\log(5x)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$7x^3-7x^2\log(5x)-21x+7e^x-\frac{14}{x+2}+35\log(x)$$

input
```
Int[(140 + 70*x - 77*x^2 + 35*x^3 + 77*x^4 + 21*x^5 + E^x*(28*x + 28*x^2 +
 7*x^3) + (-56*x^2 - 56*x^3 - 14*x^4)*Log[5*x])/(4*x + 4*x^2 + x^3),x]
```

output
```
7*E^x - 21*x + 7*x^3 - 14/(2 + x) + 35*Log[x] - 7*x^2*Log[5*x]
```

3.425.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.425.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

method	result	size
default	$-7x^2\ln(5x)+7x^3-21x+35\ln(x)-\frac{14}{2+x}+7\,\mathrm{e}^x$	34
parts	$-7x^2\ln(5x)+7x^3-21x+35\ln(x)-\frac{14}{2+x}+7\,\mathrm{e}^x$	34
risch	$-7x^2\ln(5x)+\frac{7x^4+14x^3+35x\ln(x)-21x^2+7\,\mathrm{e}^x x+70\ln(x)-42x+14\,\mathrm{e}^x-14}{2+x}$	53
parallelrisch	$-\frac{-14x^4+14x^3\ln(5x)-140-28x^3+28x^2\ln(5x)-70x\ln(x)+42x^2-14\,\mathrm{e}^x x-140\ln(x)-28\,\mathrm{e}^x}{2(2+x)}$	61

input
```
int(((-14*x^4-56*x^3-56*x^2)*ln(5*x)+(7*x^3+28*x^2+28*x)*exp(x)+21*x^5+77*
x^4+35*x^3-77*x^2+70*x+140)/(x^3+4*x^2+4*x),x,method=_RETURNVERBOSE)
```

output
```
-7*x^2*ln(5*x)+7*x^3-21*x+35*ln(x)-14/(2+x)+7*exp(x)
```

3.425.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.72

$$\int \frac{140+70x-77x^2+35x^3+77x^4+21x^5+e^x(28x+28x^2+7x^3)+(-56x^2-56x^3-14x^4)\log(5x)}{4x+4x^2+x^3}\,dx = \frac{7\,(x^4+2\,x^3-3\,x^2+(x+2)e^x-(x^3+2\,x^2-5\,x-10)\log(5\,x)-6\,x-2)}{x+2}$$

input
```
integrate(((-14*x^4-56*x^3-56*x^2)*log(5*x)+(7*x^3+28*x^2+28*x)*exp(x)+21*
x^5+77*x^4+35*x^3-77*x^2+70*x+140)/(x^3+4*x^2+4*x),x, algorithm=\
```

output
```
7*(x^4 + 2*x^3 - 3*x^2 + (x + 2)*e^x - (x^3 + 2*x^2 - 5*x - 10)*log(5*x) -
 6*x - 2)/(x + 2)
```

3.425.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \frac{140+70x-77x^2+35x^3+77x^4+21x^5+e^x(28x+28x^2+7x^3)+(-56x^2-56x^3-14x^4)\log(5x)}{4x+4x^2+x^3}\,dx = 7x^3-7x^2\log{(5x)}-21x+7e^x+35\log{(x)}-\frac{14}{x+2}$$

input
```
integrate(((-14*x**4-56*x**3-56*x**2)*ln(5*x)+(7*x**3+28*x**2+28*x)*exp(x)
+21*x**5+77*x**4+35*x**3-77*x**2+70*x+140)/(x**3+4*x**2+4*x),x)
```

output
```
7*x**3 - 7*x**2*log(5*x) - 21*x + 7*exp(x) + 35*log(x) - 14/(x + 2)
```

3.425.7 Maxima [F]

$$\int \frac{140+70x-77x^2+35x^3+77x^4+21x^5+e^x(28x+28x^2+7x^3)+(-56x^2-56x^3-14x^4)\log(5x)}{4x+4x^2+x^3}\,dx = \int \frac{7\,(3\,x^5+11\,x^4+5\,x^3-11\,x^2+(x^3+4\,x^2+4\,x)e^x-2\,(x^4+4\,x^3+4\,x^2)\log(5\,x)+10\,x+20)}{x^3+4\,x^2+4\,x}\,dx$$

input
```
integrate((((-14*x^4-56*x^3-56*x^2)*log(5*x)+(7*x^3+28*x^2+28*x)*exp(x)+21*
x^5+77*x^4+35*x^3-77*x^2+70*x+140)/(x^3+4*x^2+4*x),x, algorithm=\
```

output
```
7*x^3 - 7/2*x^2*(2*log(5) - 1) - 7*x^2*log(x) - 7/2*x^2 - 21*x - 28*e^(-2)
*exp_integral_e(2, -x - 2)/(x + 2) - 14/(x + 2) + 7*integrate((x^2 + 4*x)*
e^x/(x^2 + 4*x + 4), x) + 35*log(x)
```

3.425.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(27) = 54$.

Time = 0.28 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.07

$$\int \frac{140 + 70x - 77x^2 + 35x^3 + 77x^4 + 21x^5 + e^x(28x + 28x^2 + 7x^3) + (-56x^2 - 56x^3 - 14x^4)\log(5x)}{4x + 4x^2 + x^3}\,dx$$
$$= \frac{7\left(x^4 - x^3\log\left(5x\right) + 2x^3 - 2x^2\log\left(5x\right) - 3x^2 + xe^x + 5x\log\left(x\right) - 6x + 2e^x + 10\log\left(x\right) - 2\right)}{x + 2}$$

input
```
integrate((((-14*x^4-56*x^3-56*x^2)*log(5*x)+(7*x^3+28*x^2+28*x)*exp(x)+21*
x^5+77*x^4+35*x^3-77*x^2+70*x+140)/(x^3+4*x^2+4*x),x, algorithm=\
```

output
```
7*(x^4 - x^3*log(5*x) + 2*x^3 - 2*x^2*log(5*x) - 3*x^2 + x*e^x + 5*x*log(x
) - 6*x + 2*e^x + 10*log(x) - 2)/(x + 2)
```

3.425.9 Mupad [B] (verification not implemented)

Time = 13.85 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.31

$$\int \frac{140 + 70x - 77x^2 + 35x^3 + 77x^4 + 21x^5 + e^x(28x + 28x^2 + 7x^3) + (-56x^2 - 56x^3 - 14x^4)\log(5x)}{4x + 4x^2 + x^3}\,dx$$
$$= 7\,\mathrm{e}^x - 21\,x + 35\,\ln\left(x\right) - 7\,x^2\,\ln\left(x\right) - \frac{14}{x + 2} - 7\,x^2\,\ln\left(5\right) + 7\,x^3$$

input
```
int((70*x - log(5*x)*(56*x^2 + 56*x^3 + 14*x^4) - 77*x^2 + 35*x^3 + 77*x^4
 + 21*x^5 + exp(x)*(28*x + 28*x^2 + 7*x^3) + 140)/(4*x + 4*x^2 + x^3),x)
```

output
```
7*exp(x) - 21*x + 35*log(x) - 7*x^2*log(x) - 14/(x + 2) - 7*x^2*log(5) + 7
*x^3
```

3.426 $\int \frac{-37-16x-2x^2+e^5(-16-8x-x^2)}{16+8x+x^2} \, dx$

3.426.1 Optimal result

Integrand size = 35, antiderivative size = 17

$$\int \frac{-37-16x-2x^2+e^5(-16-8x-x^2)}{16+8x+x^2} \, dx = 2-\left(2+e^5\right)x+\frac{5}{4+x}$$

output
```
5/(4+x)+2-x*(exp(5)+2)
```

3.426.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \frac{-37-16x-2x^2+e^5(-16-8x-x^2)}{16+8x+x^2} \, dx = \frac{5}{4+x}-\left(2+e^5\right)(4+x)$$

input
```
Integrate[(-37 - 16*x - 2*x^2 + E^5*(-16 - 8*x - x^2))/(16 + 8*x + x^2),x]
```

output
```
5/(4 + x) - (2 + E^5)*(4 + x)
```

3.426.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.114$, Rules used = {2007, 2081, 1107, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^2+e^5\left(-x^2-8x-16\right)-16x-37}{x^2+8x+16}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-2x^2+e^5\left(-x^2-8x-16\right)-16x-37}{(x+4)^2}dx$$

$$\Big\downarrow \text{2081}$$

$$\int \frac{-\left(\left(2+e^5\right)x^2\right)-8\left(2+e^5\right)x-16e^5-37}{(x+4)^2}dx$$

$$\Big\downarrow \text{1107}$$

$$\int \left(-\frac{5}{(x+4)^2}-e^5-2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{5}{x+4}-\left(2+e^5\right)x$$

input
```
Int[(-37 - 16*x - 2*x^2 + E^5*(-16 - 8*x - x^2))/(16 + 8*x + x^2),x]
```

output
```
-((2 + E^5)*x) + 5/(4 + x)
```

3.426.3.1 Defintions of rubi rules used

rule 1107
```
Int[((d_.) + (e_.)*(x_))^(m_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_
Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; F
reeQ[{a, b, c, d, e, m}, x] && EqQ[2*c*d - b*e, 0] && IGtQ[p, 0] &&  !(EqQ[
m, 3] && NeQ[p, 1])
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2081
```
Int[(u_)^(m_.)*(v_)^(p_.), x_Symbol] :> Int[ExpandToSum[u, x]^m*ExpandToSum
[v, x]^p, x] /; FreeQ[{m, p}, x] && LinearQ[u, x] && QuadraticQ[v, x] &&  !
(LinearMatchQ[u, x] && QuadraticMatchQ[v, x])
```

3.426.4 Maple [A] (verified)

Time = 1.92 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

method	result
default	$-x\,{\mathrm e}^{5}-2x+\frac{5}{4+x}$
risch	$-x\,{\mathrm e}^{5}-2x+\frac{5}{4+x}$
norman	$\frac{\left(-{\mathrm e}^{5}-2\right)x^{2}+37+16\,{\mathrm e}^{5}}{4+x}$
gosper	$-\frac{x^{2}{\mathrm e}^{5}+2x^{2}-16\,{\mathrm e}^{5}-37}{4+x}$
parallelrisch	$-\frac{x^{2}{\mathrm e}^{5}+2x^{2}-16\,{\mathrm e}^{5}-37}{4+x}$
meijerg	$-\frac{37x}{16\left(1+\frac{x}{4}\right)}+4\left(-{\mathrm e}^{5}-2\right)\left(\frac{x\left(6+\frac{3x}{4}\right)}{3x+12}-2\ln\left(1+\frac{x}{4}\right)\right)+4\left(-2\,{\mathrm e}^{5}-4\right)\left(-\frac{x}{4\left(1+\frac{x}{4}\right)}+\ln\left(1+\frac{x}{4}\right)\right)-$

input
```
int(((-x^2-8*x-16)*exp(5)-2*x^2-16*x-37)/(x^2+8*x+16),x,method=_RETURNVERB
OSE)
```

output
```
-x*exp(5)-2*x+5/(4+x)
```

3.426. $\int \frac{-37-16x-2x^2+e^5\left(-16-8x-x^2\right)}{16+8x+x^2}\,dx$

3.426.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.59

$$\int \frac{-37-16x-2x^2+e^5(-16-8x-x^2)}{16+8x+x^2}\,dx = -\frac{2\,x^2+(x^2+4\,x)e^5+8\,x-5}{x+4}$$

input
```
integrate(((-x^2-8*x-16)*exp(5)-2*x^2-16*x-37)/(x^2+8*x+16),x, algorithm=\
```

output
```
-(2*x^2 + (x^2 + 4*x)*e^5 + 8*x - 5)/(x + 4)
```

3.426.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \frac{-37-16x-2x^2+e^5(-16-8x-x^2)}{16+8x+x^2}\,dx = -x(2+e^5)+\frac{5}{x+4}$$

input
```
integrate(((-x**2-8*x-16)*exp(5)-2*x**2-16*x-37)/(x**2+8*x+16),x)
```

output
```
-x*(2 + exp(5)) + 5/(x + 4)
```

3.426.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{-37-16x-2x^2+e^5(-16-8x-x^2)}{16+8x+x^2}\,dx = -x(e^5+2)+\frac{5}{x+4}$$

input
```
integrate(((-x^2-8*x-16)*exp(5)-2*x^2-16*x-37)/(x^2+8*x+16),x, algorithm=\
```

output
```
-x*(e^5 + 2) + 5/(x + 4)
```

3.426.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{-37-16x-2x^2+e^5(-16-8x-x^2)}{16+8x+x^2}\,dx = -xe^5-2\,x+\frac{5}{x+4}$$

input
```
integrate(((-x^2-8*x-16)*exp(5)-2*x^2-16*x-37)/(x^2+8*x+16),x, algorithm=\
```

output
```
-x*e^5 - 2*x + 5/(x + 4)
```

3.426.9 Mupad [B] (verification not implemented)

Time = 13.29 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{-37-16x-2x^2+e^5(-16-8x-x^2)}{16+8x+x^2}\,dx = \frac{5}{x+4}-x\left(\mathrm{e}^5+2\right)$$

input
```
int(-(16*x + exp(5)*(8*x + x^2 + 16) + 2*x^2 + 37)/(8*x + x^2 + 16),x)
```

output
```
5/(x + 4) - x*(exp(5) + 2)
```

3.427 $\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log\left(\frac{3}{x}\right)}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log\left(\frac{3}{x}\right)+(81x^2-18x^4+x^6)\log^2\left(\frac{3}{x}\right)}$

3.427.1 Optimal result

Integrand size = 108, antiderivative size = 30

$$\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log\left(\frac{3}{x}\right)}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log\left(\frac{3}{x}\right)+(81x^2-18x^4+x^6)\log^2\left(\frac{3}{x}\right)}\,dx = -\frac{(6+x)\log(5)}{(-3+x)x(3+x)\left(x+\log\left(\frac{3}{x}\right)\right)}$$

output
```
-(6+x)/(-3+x)/(ln(3/x)+x)/(3+x)/x*ln(5)
```

3.427.2 Mathematica [A] (verified)

Time = 0.68 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.93

$$\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log\left(\frac{3}{x}\right)}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log\left(\frac{3}{x}\right)+(81x^2-18x^4+x^6)\log^2\left(\frac{3}{x}\right)}\,dx = \frac{(-6-x)\log(5)}{x(-9+x^2)\left(x+\log\left(\frac{3}{x}\right)\right)}$$

input
```
Integrate[((54 - 99*x - 15*x^2 + 23*x^3 + 3*x^4)*Log[5] + (-54 + 18*x^2 +
2*x^3)*Log[5]*Log[3/x])/(81*x^4 - 18*x^6 + x^8 + (162*x^3 - 36*x^5 + 2*x^7
)*Log[3/x] + (81*x^2 - 18*x^4 + x^6)*Log[3/x]^2),x]
```

output
```
((-6 - x)*Log[5])/(x*(-9 + x^2)*(x + Log[3/x]))
```

3.427.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x^3+18x^2-54)\log(5)\log\left(\frac{3}{x}\right)+(3x^4+23x^3-15x^2-99x+54)\log(5)}{x^8-18x^6+81x^4+(2x^7-36x^5+162x^3)\log\left(\frac{3}{x}\right)+(x^6-18x^4+81x^2)\log^2\left(\frac{3}{x}\right)}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{\log(5)\left(3x^4+23x^3-15x^2+2(x^3+9x^2-27)\log\left(\frac{3}{x}\right)-99x+54\right)}{x^2(9-x^2)^2\left(x+\log\left(\frac{3}{x}\right)\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\log(5)\int \frac{3x^4+23x^3-15x^2-99x-2(-x^3-9x^2+27)\log\left(\frac{3}{x}\right)+54}{x^2(9-x^2)^2\left(x+\log\left(\frac{3}{x}\right)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\log(5)\int \left(\frac{x^2+5x-6}{x^2(x^2-9)\left(x+\log\left(\frac{3}{x}\right)\right)^2}+\frac{2(x^3+9x^2-27)}{x^2(x^2-9)^2\left(x+\log\left(\frac{3}{x}\right)\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\log(5)\left(\frac{2}{3}\int \frac{1}{x^2\left(x+\log\left(\frac{3}{x}\right)\right)^2}dx-\frac{2}{3}\int \frac{1}{x^2\left(x+\log\left(\frac{3}{x}\right)\right)}dx+\frac{1}{3}\int \frac{1}{(x-3)\left(x+\log\left(\frac{3}{x}\right)\right)^2}dx-\frac{5}{9}\int \frac{1}{x\left(x+\log\left(\frac{3}{x}\right)\right.}\right.$$

input
```
Int[((54 - 99*x - 15*x^2 + 23*x^3 + 3*x^4)*Log[5] + (-54 + 18*x^2 + 2*x^3)
*Log[5]*Log[3/x])/(81*x^4 - 18*x^6 + x^8 + (162*x^3 - 36*x^5 + 2*x^7)*Log[
3/x] + (81*x^2 - 18*x^4 + x^6)*Log[3/x]^2),x]
```

output
```
$Aborted
```

3.427.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.427.4 Maple [A] (verified)

Time = 2.10 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.93

method	result	size
risch	$-\frac{\ln(5)(6+x)}{(x^2-9)x(\ln(\frac{3}{x})+x)}$	28
derivativedivides	$\frac{\ln(5)\left(\frac{162}{x^4}+\frac{27}{x^3}\right)}{9\left(\frac{9}{x^2}-1\right)\left(\frac{3\ln(\frac{3}{x})}{x}+3\right)}$	40
default	$\frac{\ln(5)\left(\frac{162}{x^4}+\frac{27}{x^3}\right)}{9\left(\frac{9}{x^2}-1\right)\left(\frac{3\ln(\frac{3}{x})}{x}+3\right)}$	40
parallelrisch	$-\frac{x\ln(5)+6\ln(5)}{x(x^2\ln(\frac{3}{x})+x^3-9\ln(\frac{3}{x})-9x)}$	42

input
```
int(((2*x^3+18*x^2-54)*ln(5)*ln(3/x)+(3*x^4+23*x^3-15*x^2-99*x+54)*ln(5))/
((x^6-18*x^4+81*x^2)*ln(3/x)^2+(2*x^7-36*x^5+162*x^3)*ln(3/x)+x^8-18*x^6+8
1*x^4),x,method=_RETURNVERBOSE)
```

output
```
-ln(5)*(6+x)/(x^2-9)/x/(ln(3/x)+x)
```

3.427. $\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log(\frac{3}{x})}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log(\frac{3}{x})+(81x^2-18x^4+x^6)\log^2(\frac{3}{x})}\,dx$

3.427.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log\left(\frac{3}{x}\right)}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log\left(\frac{3}{x}\right)+(81x^2-18x^4+x^6)\log^2\left(\frac{3}{x}\right)}\,dx$$
$$=-\frac{(x+6)\log(5)}{x^4-9\,x^2+(x^3-9\,x)\log\left(\frac{3}{x}\right)}$$

input
```
integrate(((2*x^3+18*x^2-54)*log(5)*log(3/x)+(3*x^4+23*x^3-15*x^2-99*x+54)
*log(5))/((x^6-18*x^4+81*x^2)*log(3/x)^2+(2*x^7-36*x^5+162*x^3)*log(3/x)+x
^8-18*x^6+81*x^4),x, algorithm=\
```

output
```
-(x + 6)*log(5)/(x^4 - 9*x^2 + (x^3 - 9*x)*log(3/x))
```

3.427.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log\left(\frac{3}{x}\right)}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log\left(\frac{3}{x}\right)+(81x^2-18x^4+x^6)\log^2\left(\frac{3}{x}\right)}\,dx$$
$$=\frac{-x\log(5)-6\log(5)}{x^4-9x^2+(x^3-9x)\log\left(\frac{3}{x}\right)}$$

input
```
integrate(((2*x**3+18*x**2-54)*ln(5)*ln(3/x)+(3*x**4+23*x**3-15*x**2-99*x+
54)*ln(5))/((x**6-18*x**4+81*x**2)*ln(3/x)**2+(2*x**7-36*x**5+162*x**3)*ln
(3/x)+x**8-18*x**6+81*x**4),x)
```

output
```
(-x*log(5) - 6*log(5))/(x**4 - 9*x**2 + (x**3 - 9*x)*log(3/x))
```

3.427.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.47

$$\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log\left(\frac{3}{x}\right)}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log\left(\frac{3}{x}\right)+(81x^2-18x^4+x^6)\log^2\left(\frac{3}{x}\right)}\,dx$$
$$=-\frac{x\log(5)+6\log(5)}{x^4+x^3\log(3)-9x^2-9x\log(3)-(x^3-9x)\log(x)}$$

input
```
integrate((((2*x^3+18*x^2-54)*log(5)*log(3/x)+(3*x^4+23*x^3-15*x^2-99*x+54)
*log(5))/((x^6-18*x^4+81*x^2)*log(3/x)^2+(2*x^7-36*x^5+162*x^3)*log(3/x)+x
^8-18*x^6+81*x^4),x, algorithm=\
```

output
```
-(x*log(5) + 6*log(5))/(x^4 + x^3*log(3) - 9*x^2 - 9*x*log(3) - (x^3 - 9*x
)*log(x))
```

3.427.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.53

$$\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log\left(\frac{3}{x}\right)}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log\left(\frac{3}{x}\right)+(81x^2-18x^4+x^6)\log^2\left(\frac{3}{x}\right)}\,dx$$
$$=-\frac{\frac{\log(5)}{x^3}+\frac{6\log(5)}{x^4}}{\frac{\log\left(\frac{3}{x}\right)}{x}-\frac{9}{x^2}-\frac{9\log\left(\frac{3}{x}\right)}{x^3}+1}$$

input
```
integrate((((2*x^3+18*x^2-54)*log(5)*log(3/x)+(3*x^4+23*x^3-15*x^2-99*x+54)
*log(5))/((x^6-18*x^4+81*x^2)*log(3/x)^2+(2*x^7-36*x^5+162*x^3)*log(3/x)+x
^8-18*x^6+81*x^4),x, algorithm=\
```

output
```
-(log(5)/x^3 + 6*log(5)/x^4)/(log(3/x)/x - 9/x^2 - 9*log(3/x)/x^3 + 1)
```

3.427.9 Mupad [B] (verification not implemented)

Time = 14.39 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{(54-99x-15x^2+23x^3+3x^4)\log(5)+(-54+18x^2+2x^3)\log(5)\log\left(\frac{3}{x}\right)}{81x^4-18x^6+x^8+(162x^3-36x^5+2x^7)\log\left(\frac{3}{x}\right)+(81x^2-18x^4+x^6)\log^2\left(\frac{3}{x}\right)}\,dx = -\frac{\ln(5)\,(x+6)}{x\,(x^2-9)\,\left(x+\ln\left(\frac{3}{x}\right)\right)}$$

input

```
int((log(5)*(23*x^3 - 15*x^2 - 99*x + 3*x^4 + 54) + log(5)*log(3/x)*(18*x^
2 + 2*x^3 - 54))/(log(3/x)*(162*x^3 - 36*x^5 + 2*x^7) + log(3/x)^2*(81*x^2
 - 18*x^4 + x^6) + 81*x^4 - 18*x^6 + x^8),x)
```

output

```
-(log(5)*(x + 6))/(x*(x^2 - 9)*(x + log(3/x)))
```

3.428 $\int \frac{8x^2+9x^3+6x^4+2x^5+(120x+4x^2-50x^3-29x^4-4x^5)\log(x)+(-300-}{2x^4+(-20x^3-4x^4)\log(x)+(50x^2+20x^3+}$

3.428.1 Optimal result

Integrand size = 122, antiderivative size = 33

$$\int \frac{8x^2+9x^3+6x^4+2x^5+(120x+4x^2-50x^3-29x^4-4x^5)\log(x)+(-300-120x+88x^2+90x^3+24}{2x^4+(-20x^3-4x^4)\log(x)+(50x^2+20x^3+2x^4)\log^2(x)}$$
$$=\frac{(4+x)\left(3-x\left(-x+\frac{x}{-x+(5+x)\log(x)}\right)\right)}{2x}$$

output
```
1/2*(4+x)*(3-(x/(ln(x)*(5+x)-x)-x)*x)/x
```

3.428.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

$$\int \frac{8x^2+9x^3+6x^4+2x^5+(120x+4x^2-50x^3-29x^4-4x^5)\log(x)+(-300-120x+88x^2+90x^3+24}{2x^4+(-20x^3-4x^4)\log(x)+(50x^2+20x^3+2x^4)\log^2(x)}$$
$$=\frac{1}{2}\left(\frac{12}{x}+4x+x^2-\frac{x(4+x)}{-x+5\log(x)+x\log(x)}\right)$$

input
```
Integrate[(8*x^2 + 9*x^3 + 6*x^4 + 2*x^5 + (120*x + 4*x^2 - 50*x^3 - 29*x^
4 - 4*x^5)*Log[x] + (-300 - 120*x + 88*x^2 + 90*x^3 + 24*x^4 + 2*x^5)*Log[
x]^2)/(2*x^4 + (-20*x^3 - 4*x^4)*Log[x] + (50*x^2 + 20*x^3 + 2*x^4)*Log[x]
^2),x]
```

output
```
(12/x + 4*x + x^2 - (x*(4 + x))/(-x + 5*Log[x] + x*Log[x]))/2
```

3.428.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^5+6x^4+9x^3+8x^2+\left(2x^5+24x^4+90x^3+88x^2-120x-300\right)\log^2(x)+\left(-4x^5-29x^4-50x^3+4x^2+1\right.}{2x^4+\left(-4x^4-20x^3\right)\log(x)+\left(2x^4+20x^3+50x^2\right)\log^2(x)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{2x^5+6x^4+9x^3+8x^2+\left(2x^5+24x^4+90x^3+88x^2-120x-300\right)\log^2(x)+\left(-4x^5-29x^4-50x^3+4x^2+1\right.}{2x^2(x+x(-\log(x))-5\log(x))^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int \frac{2x^5+6x^4+9x^3+8x^2-2\left(-x^5-12x^4-45x^3-44x^2+60x+150\right)\log^2(x)+\left(-4x^5-29x^4-50x^3+4x^2\right.}{x^2(-\log(x)x+x-5\log(x))^2}$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{2}\int \left(\frac{-x^2-10x-20}{(x+5)(\log(x)x-x+5\log(x))}+\frac{2\left(x^3+2x^2-6\right)}{x^2}+\frac{x^3+9x^2+45x+100}{(x+5)(\log(x)x-x+5\log(x))^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{2}\left(\int \frac{x^2}{(\log(x)x-x+5\log(x))^2}dx+25\int \frac{1}{(\log(x)x-x+5\log(x))^2}dx+4\int \frac{x}{(\log(x)x-x+5\log(x))^2}dx-25\int\right.$$

input
```
Int[(8*x^2 + 9*x^3 + 6*x^4 + 2*x^5 + (120*x + 4*x^2 - 50*x^3 - 29*x^4 - 4*
x^5)*Log[x] + (-300 - 120*x + 88*x^2 + 90*x^3 + 24*x^4 + 2*x^5)*Log[x]^2)/
(2*x^4 + (-20*x^3 - 4*x^4)*Log[x] + (50*x^2 + 20*x^3 + 2*x^4)*Log[x]^2),x]
```

output
```
$Aborted
```

3.428. $\int \frac{8x^2+9x^3+6x^4+2x^5+\left(120x+4x^2-50x^3-29x^4-4x^5\right)\log(x)+\left(-300-120x+88x^2+90x^3+24x^4+2x^5\right)\log^2(x)}{2x^4+\left(-20x^3-4x^4\right)\log(x)+\left(50x^2+20x^3+2x^4\right)\log^2(x)}\,dx$

3.428.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.428.4 Maple [A] (verified)

Time = 1.10 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.12

method	result	size
risch	$\frac{x^3+4x^2+12}{2x}-\frac{(4+x)x}{2(x\ln(x)+5\ln(x)-x)}$	37
default	$\frac{16x^2+x^4\ln(x)-88x\ln(x)+60\ln(x)-5x^3-x^4+9x^3\ln(x)-12x}{2x(x\ln(x)+5\ln(x)-x)}$	61
norman	$\frac{8x^2-44x\ln(x)-6x-\frac{5x^3}{2}-\frac{x^4}{2}+\frac{9x^3\ln(x)}{2}+\frac{x^4\ln(x)}{2}+30\ln(x)}{x(x\ln(x)+5\ln(x)-x)}$	61
parallelrisch	$\frac{16x^2+x^4\ln(x)-88x\ln(x)+60\ln(x)-5x^3-x^4+9x^3\ln(x)-12x}{2x(x\ln(x)+5\ln(x)-x)}$	61

input
```
int(((2*x^5+24*x^4+90*x^3+88*x^2-120*x-300)*ln(x)^2+(-4*x^5-29*x^4-50*x^3+
4*x^2+120*x)*ln(x)+2*x^5+6*x^4+9*x^3+8*x^2)/((2*x^4+20*x^3+50*x^2)*ln(x)^2
+(-4*x^4-20*x^3)*ln(x)+2*x^4),x,method=_RETURNVERBOSE)
```

output
```
1/2*(x^3+4*x^2+12)/x-1/2*(4+x)*x/(x*ln(x)+5*ln(x)-x)
```


$$\int \frac{8x^2+9x^3+6x^4+2x^5+(120x+4x^2-50x^3-29x^4-4x^5)\log(x)+(-300-120x+88x^2+90x^3+24x^4+2x^5)\log^2(x)}{2x^4+(-20x^3-4x^4)\log(x)+(50x^2+20x^3+2x^4)\log^2(x)}\,dx$$

3.428.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.76

$$\int \frac{8x^2+9x^3+6x^4+2x^5+(120x+4x^2-50x^3-29x^4-4x^5)\log(x)+(-300-120x+88x^2+90x^3+24}{2x^4+(-20x^3-4x^4)\log(x)+(50x^2+20x^3+2x^4)\log^2(x)}$$
$$=\frac{x^4+5\,x^3+4\,x^2-(x^4+9\,x^3+20\,x^2+12\,x+60)\log(x)+12\,x}{2\,(x^2-(x^2+5\,x)\log(x))}$$

input
```
integrate(((2*x^5+24*x^4+90*x^3+88*x^2-120*x-300)*log(x)^2+(-4*x^5-29*x^4-
50*x^3+4*x^2+120*x)*log(x)+2*x^5+6*x^4+9*x^3+8*x^2)/((2*x^4+20*x^3+50*x^2)
*log(x)^2+(-4*x^4-20*x^3)*log(x)+2*x^4),x, algorithm=\
```

output
```
1/2*(x^4 + 5*x^3 + 4*x^2 - (x^4 + 9*x^3 + 20*x^2 + 12*x + 60)*log(x) + 12*
x)/(x^2 - (x^2 + 5*x)*log(x))
```

3.428.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.94

$$\int \frac{8x^2+9x^3+6x^4+2x^5+(120x+4x^2-50x^3-29x^4-4x^5)\log(x)+(-300-120x+88x^2+90x^3+24}{2x^4+(-20x^3-4x^4)\log(x)+(50x^2+20x^3+2x^4)\log^2(x)}$$
$$=\frac{x^2}{2}+2x+\frac{-x^2-4x}{-2x+(2x+10)\log(x)}+\frac{6}{x}$$

input
```
integrate(((2*x**5+24*x**4+90*x**3+88*x**2-120*x-300)*ln(x)**2+(-4*x**5-29
*x**4-50*x**3+4*x**2+120*x)*ln(x)+2*x**5+6*x**4+9*x**3+8*x**2)/((2*x**4+20
*x**3+50*x**2)*ln(x)**2+(-4*x**4-20*x**3)*ln(x)+2*x**4),x)
```

output
```
x**2/2 + 2*x + (-x**2 - 4*x)/(-2*x + (2*x + 10)*log(x)) + 6/x
```

3.428.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.76

$$\int \frac{8x^2 + 9x^3 + 6x^4 + 2x^5 + (120x + 4x^2 - 50x^3 - 29x^4 - 4x^5)\log(x) + (-300 - 120x + 88x^2 + 90x^3 + 24}{2x^4 + (-20x^3 - 4x^4)\log(x) + (50x^2 + 20x^3 + 2x^4)\log^2(x)}$$
$$= \frac{x^4 + 5\,x^3 + 4\,x^2 - (x^4 + 9\,x^3 + 20\,x^2 + 12\,x + 60)\log(x) + 12\,x}{2\,(x^2 - (x^2 + 5\,x)\log(x))}$$

input
```
integrate(((2*x^5+24*x^4+90*x^3+88*x^2-120*x-300)*log(x)^2+(-4*x^5-29*x^4-
50*x^3+4*x^2+120*x)*log(x)+2*x^5+6*x^4+9*x^3+8*x^2)/((2*x^4+20*x^3+50*x^2)
*log(x)^2+(-4*x^4-20*x^3)*log(x)+2*x^4),x, algorithm=\
```

output
```
1/2*(x^4 + 5*x^3 + 4*x^2 - (x^4 + 9*x^3 + 20*x^2 + 12*x + 60)*log(x) + 12*
x)/(x^2 - (x^2 + 5*x)*log(x))
```

3.428.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.12

$$\int \frac{8x^2 + 9x^3 + 6x^4 + 2x^5 + (120x + 4x^2 - 50x^3 - 29x^4 - 4x^5)\log(x) + (-300 - 120x + 88x^2 + 90x^3 + 24}{2x^4 + (-20x^3 - 4x^4)\log(x) + (50x^2 + 20x^3 + 2x^4)\log^2(x)}$$
$$= \frac{1}{2}\,x^2 + 2\,x - \frac{x^2 + 4\,x}{2\,(x\log(x) - x + 5\,\log(x))} + \frac{6}{x}$$

input
```
integrate(((2*x^5+24*x^4+90*x^3+88*x^2-120*x-300)*log(x)^2+(-4*x^5-29*x^4-
50*x^3+4*x^2+120*x)*log(x)+2*x^5+6*x^4+9*x^3+8*x^2)/((2*x^4+20*x^3+50*x^2)
*log(x)^2+(-4*x^4-20*x^3)*log(x)+2*x^4),x, algorithm=\
```

output
```
1/2*x^2 + 2*x - 1/2*(x^2 + 4*x)/(x*log(x) - x + 5*log(x)) + 6/x
```

3.428. $\int \frac{8x^2+9x^3+6x^4+2x^5+(120x+4x^2-50x^3-29x^4-4x^5)\log(x)+(-300-120x+88x^2+90x^3+24x^4+2x^5)\log^2(x)}{2x^4+(-20x^3-4x^4)\log(x)+(50x^2+20x^3+2x^4)\log^2(x)}\,dx$

3.428.9 Mupad [B] (verification not implemented)

Time = 14.09 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.82

$$\int \frac{8x^2+9x^3+6x^4+2x^5+(120x+4x^2-50x^3-29x^4-4x^5)\log(x)+(-300-120x+88x^2+90x^3+24}{2x^4+(-20x^3-4x^4)\log(x)+(50x^2+20x^3+2x^4)\log^2(x)}$$
$$=2\,x+\frac{6}{x}+\frac{x^2}{2}+\frac{x^5+9\,x^4+45\,x^3+100\,x^2}{2\,\left(x-\ln\left(x\right)\,\left(x+5\right)\right)\,\left(x^3+5\,x^2+25\,x\right)}$$

input
```
int((log(x)^2*(88*x^2 - 120*x + 90*x^3 + 24*x^4 + 2*x^5 - 300) - log(x)*(5
0*x^3 - 4*x^2 - 120*x + 29*x^4 + 4*x^5) + 8*x^2 + 9*x^3 + 6*x^4 + 2*x^5)/(
log(x)^2*(50*x^2 + 20*x^3 + 2*x^4) - log(x)*(20*x^3 + 4*x^4) + 2*x^4),x)
```

output
```
2*x + 6/x + x^2/2 + (100*x^2 + 45*x^3 + 9*x^4 + x^5)/(2*(x - log(x)*(x + 5
))*(25*x + 5*x^2 + x^3))
```

3.429 $\int \frac{-768-30x-12\log(4)}{x^3}\,dx$

3.429.1 Optimal result

Integrand size = 13, antiderivative size = 17

$$\int \frac{-768-30x-12\log(4)}{x^3}\,dx = 2+\frac{6\left(5+\frac{64+\log(4)}{x}\right)}{x}$$

output
```
6*((2*ln(2)+64)/x+5)/x+2
```

3.429.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

$$\int \frac{-768-30x-12\log(4)}{x^3}\,dx = \frac{3(128+10x+\log(16))}{x^2}$$

input
```
Integrate[(-768 - 30*x - 12*Log[4])/x^3,x]
```

output
```
(3*(128 + 10*x + Log[16]))/x^2
```

3.429.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.47, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {48}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-30x-768-12\log(4)}{x^3}\,dx$$
$$\Big\downarrow \text{48}$$
$$\frac{3(5x+2(64+\log(4)))^2}{2x^2(64+\log(4))}$$

input
```
Int[(-768 - 30*x - 12*Log[4])/x^3,x]
```

output
```
(3*(5*x + 2*(64 + Log[4]))^2)/(2*x^2*(64 + Log[4]))
```

3.429.3.1 Defintions of rubi rules used

rule 48
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && EqQ[m + n + 2, 0] && NeQ[m, -1]
```

3.429.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

method	result	size
norman	$\frac{30x+12\ln(2)+384}{x^2}$	14
risch	$\frac{30x+12\ln(2)+384}{x^2}$	14
parallelrisch	$\frac{30x+12\ln(2)+384}{x^2}$	14
gosper	$\frac{30x+12\ln(2)+384}{x^2}$	15
default	$\frac{30}{x}-\frac{3(-4\ln(2)-128)}{x^2}$	18

input
```
int((-24*ln(2)-30*x-768)/x^3,x,method=_RETURNVERBOSE)
```

output
```
(30*x+12*ln(2)+384)/x^2
```

3.429.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{-768-30x-12\log(4)}{x^3}\,dx = \frac{6\,(5\,x+2\,\log(2)+64)}{x^2}$$

input
```
integrate((-24*log(2)-30*x-768)/x^3,x, algorithm=\
```

output
```
6*(5*x + 2*log(2) + 64)/x^2
```

3.429.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{-768-30x-12\log(4)}{x^3}\,dx = -\frac{-30x-384-12\log(2)}{x^2}$$

input
```
integrate((-24*ln(2)-30*x-768)/x**3,x)
```

output
```
-(-30*x - 384 - 12*log(2))/x**2
```

3.429.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{-768-30x-12\log(4)}{x^3}\,dx = \frac{6\,(5\,x+2\,\log(2)+64)}{x^2}$$

input
```
integrate((-24*log(2)-30*x-768)/x^3,x, algorithm=\
```

output
```
6*(5*x + 2*log(2) + 64)/x^2
```

3.429.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{-768-30x-12\log(4)}{x^3}\,dx = \frac{6\,(5\,x+2\,\log{(2)}+64)}{x^2}$$

input
```
integrate((-24*log(2)-30*x-768)/x^3,x, algorithm=\
```

output
```
6*(5*x + 2*log(2) + 64)/x^2
```

3.429.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{-768-30x-12\log(4)}{x^3}\,dx = \frac{30\,x+12\,\ln{(2)}+384}{x^2}$$

input
```
int(-(30*x + 24*log(2) + 768)/x^3,x)
```

output
```
(30*x + 12*log(2) + 384)/x^2
```

3.430 $\int \frac{-10e^x x^2+25x^3-2e^{2x}x^3+\left(9325x^2-750e^{2x}x^2+e^x\left(-1250x-10x^3\right)\right) \log(x)$

3.430.1 Optimal result

Integrand size = 141, antiderivative size = 28

$$\int \frac{-10e^x x^2+25x^3-2e^{2x}x^3+\left(9325x^2-750e^{2x}x^2+e^x\left(-1250x-10x^3\right)\right)\log(x)+\left(1171875x-93750e^{2x}x\right.}{25x^3+9375x^2\log(x)+11718}$$

$$=-1+x-\frac{1}{25}\left(e^x+\frac{x}{25+\frac{x}{5\log(x)}}\right)^2$$

output
```
x-1/5*(x/(25+1/5*x/ln(x))+exp(x))*(1/5*x/(25+1/5*x/ln(x))+1/5*exp(x))-1
```

3.430.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 59 vs. 2(28) = 56.

Time = 0.16 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.11

$$\int \frac{-10e^x x^2+25x^3-2e^{2x}x^3+\left(9325x^2-750e^{2x}x^2+e^x\left(-1250x-10x^3\right)\right)\log(x)+\left(1171875x-93750e^{2x}x\right.}{25x^3+9375x^2\log(x)+11718}$$

$$=\frac{-625e^{2x}+15625x-50e^x x-x^2-\frac{x^4}{(x+125\log(x))^2}+\frac{2x^2(25e^x+x)}{x+125\log(x)}}{15625}$$

3.430.

$\int \frac{-10e^x x^2+25x^3-2e^{2x}x^3+\left(9325x^2-750e^{2x}x^2+e^x\left(-1250x-10x^3\right)\right)\log(x)+\left(1171875x-93750e^{2x}x+e^x\left(-1250x-2500x^2\right)\right)\log^2(x)+\left(48828125-\right.}{25x^3+9375x^2\log(x)+1171875x\log^2(x)+48828125\log^3(x)}$

input
```
Integrate[(-10*E^x*x^2 + 25*x^3 - 2*E^(2*x)*x^3 + (9325*x^2 - 750*E^(2*x)*
x^2 + E^x*(-1250*x - 10*x^3))*Log[x] + (1171875*x - 93750*E^(2*x)*x + E^x*
(-1250*x - 2500*x^2))*Log[x]^2 + (48828125 - 3906250*E^(2*x) + E^x*(-15625
0 - 156250*x) - 6250*x)*Log[x]^3)/(25*x^3 + 9375*x^2*Log[x] + 1171875*x*Lo
g[x]^2 + 48828125*Log[x]^3),x]
```

output
```
(-625*E^(2*x) + 15625*x - 50*E^x*x - x^2 - x^4/(x + 125*Log[x])^2 + (2*x^2
*(25*E^x + x))/(x + 125*Log[x]))/15625
```

3.430.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2e^{2x}x^3+25x^3-10e^xx^2+\left(e^x\left(-2500x^2-1250x\right)-93750e^{2x}x+1171875x\right)\log^2(x)+\left(e^x\left(-10x^3-1250x\right)\right.}{25x^3+9375x^2\log(x)+48828125\,\mathrm{lo}}$$

$\downarrow$ 7292

$$\int \frac{-2e^{2x}x^3+25x^3-10e^xx^2+\left(e^x\left(-2500x^2-1250x\right)-93750e^{2x}x+1171875x\right)\log^2(x)+\left(e^x\left(-10x^3-1250x\right)\right.}{25(x+125\log}$$

$\downarrow$ 27

$$\frac{1}{25}\int -\frac{2e^{2x}x^3-25x^3+10e^xx^2-3125\left(-2x-1250e^{2x}-50e^x(x+1)+15625\right)\log^3(x)-625\left(-150e^{2x}x+1875x\right.}{(x+125\log(x))^3}$$

$\downarrow$ 25

$$-\frac{1}{25}\int \frac{2e^{2x}x^3-25x^3+10e^xx^2-3125\left(-2x-1250e^{2x}-50e^x(x+1)+15625\right)\log^3(x)-625\left(-150e^{2x}x+1875x\right.}{(x+125\log(x))^3}$$

$\downarrow$ 7293

$$-\frac{1}{25}\int \left(-\frac{25x^3}{(x+125\log(x))^3}-\frac{9325\log(x)x^2}{(x+125\log(x))^3}+\frac{6250\log^3(x)x}{(x+125\log(x))^3}-\frac{1171875\log^2(x)x}{(x+125\log(x))^3}+2e^{2x}+\frac{10e^x(\log(x)}{}\right.$$

$\downarrow$ 2009

$$\frac{1}{25}\left(\frac{2}{625}\int \frac{x^4}{(x+125\log(x))^3}dx+\frac{2}{5}\int \frac{x^3}{(x+125\log(x))^3}dx-\frac{6}{625}\int \frac{x^3}{(x+125\log(x))^2}dx-\frac{2}{5}\int \frac{x^2}{(x+125\log(x)}\right.$$

3.430. $\int \frac{-10e^xx^2+25x^3-2e^{2x}x^3+\left(9325x^2-750e^{2x}x^2+e^x\left(-1250x-10x^3\right)\right)\log(x)+\left(1171875x-93750e^{2x}x+e^x\left(-1250x-2500x^2\right)\right)\log^2(x)+\left(48828125-\right.}{25x^3+9375x^2\log(x)+1171875x\log^2(x)+48828125\log^3(x)}$

input
```
Int[(-10*E^x*x^2 + 25*x^3 - 2*E^(2*x)*x^3 + (9325*x^2 - 750*E^(2*x)*x^2 +
E^x*(-1250*x - 10*x^3))*Log[x] + (1171875*x - 93750*E^(2*x)*x + E^x*(-1250
*x - 2500*x^2))*Log[x]^2 + (48828125 - 3906250*E^(2*x) + E^x*(-156250 - 15
6250*x) - 6250*x)*Log[x]^3)/(25*x^3 + 9375*x^2*Log[x] + 1171875*x*Log[x]^2
 + 48828125*Log[x]^3),x]
```

output
```
$Aborted
```

3.430.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.430.4 Maple [A] (verified)

Time = 2.75 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.86

method	result
risch	$-\frac{x^{2}}{15625}+x-\frac{{\mathrm e}^{2 x}}{25}-\frac{2\,{\mathrm e}^{x} x}{625}+\frac{\left(x^{2}+50\,{\mathrm e}^{x} x+250 x \ln\left(x\right)+6250\,{\mathrm e}^{x} \ln\left(x\right)\right) x^{2}}{15625 \left(125 \ln\left(x\right)+x\right)^{2}}$
parallelrisch	$\frac{-6250 x^{2} \ln\left(x\right)^{2}-2500 x^{2} {\mathrm e}^{x} \ln\left(x\right)-250\,{\mathrm e}^{2 x} x^{2}-312500 x\,{\mathrm e}^{x} \ln\left(x\right)^{2}-62500 \ln\left(x\right) {\mathrm e}^{2 x} x-3906250 \ln\left(x\right)^{2} {\mathrm e}^{2 x}+6250 x^{3}+1562500 x^{2} \ln}{6250 x^{2}+1562500 x \ln\left(x\right)+97656250 \ln\left(x\right)^{2}}$

input
```
int(((-3906250*exp(x)^2+(-156250*x-156250)*exp(x)-6250*x+48828125)*ln(x)^3
+(-93750*x*exp(x)^2+(-2500*x^2-1250*x)*exp(x)+1171875*x)*ln(x)^2+(-750*exp
(x)^2*x^2+(-10*x^3-1250*x)*exp(x)+9325*x^2)*ln(x)-2*exp(x)^2*x^3-10*exp(x)
*x^2+25*x^3)/(48828125*ln(x)^3+1171875*x*ln(x)^2+9375*x^2*ln(x)+25*x^3),x,
method=_RETURNVERBOSE)
```

output
```
-1/15625*x^2+x-1/25*exp(2*x)-2/625*exp(x)*x+1/15625*(x^2+50*exp(x)*x+250*x
*ln(x)+6250*exp(x)*ln(x))*x^2/(125*ln(x)+x)^2
```

3.430.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. $2(23) = 46$.

Time = 0.30 (sec) , antiderivative size = 81, normalized size of antiderivative = 2.89

$$\int \frac{-10e^x x^2 + 25x^3 - 2e^{2x}x^3 + (9325x^2 - 750e^{2x}x^2 + e^x(-1250x - 10x^3))\log(x) + (1171875x - 93750e^{2x}x}{25x^3 + 9375x^2\log(x) + 11718}$$
$$= \frac{25\,x^3 - x^2e^{(2\,x)} - 25\left(x^2 + 50\,xe^x - 15625\,x + 625\,e^{(2\,x)}\right)\log(x)^2 - 10\left(x^2e^x - 625\,x^2 + 25\,xe^{(2\,x)}\right)\log(x)}{25\left(x^2 + 250\,x\log(x) + 15625\,\log(x)^2\right)}$$

input
```
integrate(((-3906250*exp(x)^2+(-156250*x-156250)*exp(x)-6250*x+48828125)*l
og(x)^3+(-93750*x*exp(x)^2+(-2500*x^2-1250*x)*exp(x)+1171875*x)*log(x)^2+(
-750*exp(x)^2*x^2+(-10*x^3-1250*x)*exp(x)+9325*x^2)*log(x)-2*exp(x)^2*x^3-
10*exp(x)*x^2+25*x^3)/(48828125*log(x)^3+1171875*x*log(x)^2+9375*x^2*log(x
)+25*x^3),x, algorithm=\
```

output
```
1/25*(25*x^3 - x^2*e^(2*x) - 25*(x^2 + 50*x*e^x - 15625*x + 625*e^(2*x))*l
og(x)^2 - 10*(x^2*e^x - 625*x^2 + 25*x*e^(2*x))*log(x))/(x^2 + 250*x*log(x
) + 15625*log(x)^2)
```

3.430.
$$\int \frac{-10e^x x^2+25x^3-2e^{2x}x^3+\left(9325x^2-750e^{2x}x^2+e^x\left(-1250x-10x^3\right)\right)\log(x)+\left(1171875x-93750e^{2x}x+e^x\left(-1250x-2500x^2\right)\right)\log^2(x)+\left(48828125-\right.}{25x^3+9375x^2\log(x)+1171875x\log^2(x)+48828125\log^3(x)}$$

3.430.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. $2(17) = 34$.

Time = 0.16 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.50

$$\int \frac{-10e^x x^2 + 25x^3 - 2e^{2x}x^3 + (9325x^2 - 750e^{2x}x^2 + e^x(-1250x - 10x^3))\log(x) + (1171875x - 93750e^{2x}x}{25x^3 + 9375x^2\log(x) + 11718}$$

$$= -\frac{x^2}{15625} + x + \frac{x^4 + 250x^3\log(x)}{15625x^2 + 3906250x\log(x) + 244140625\log(x)^2} + \frac{-50xe^x\log(x) + (-5x - 625\log(x))e^{2x}}{125x + 15625\log(x)}$$

input
```
integrate(((-3906250*exp(x)**2+(-156250*x-156250)*exp(x)-6250*x+48828125)*
ln(x)**3+(-93750*x*exp(x)**2+(-2500*x**2-1250*x)*exp(x)+1171875*x)*ln(x)**
2+(-750*exp(x)**2*x**2+(-10*x**3-1250*x)*exp(x)+9325*x**2)*ln(x)-2*exp(x)*
*2*x**3-10*exp(x)*x**2+25*x**3)/(48828125*ln(x)**3+1171875*x*ln(x)**2+9375
*x**2*ln(x)+25*x**3),x)
```

output
```
-x**2/15625 + x + (x**4 + 250*x**3*log(x))/(15625*x**2 + 3906250*x*log(x)
+ 244140625*log(x)**2) + (-50*x*exp(x)*log(x) + (-5*x - 625*log(x))*exp(2*
x))/(125*x + 15625*log(x))
```

3.430.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 84 vs. $2(23) = 46$.

Time = 0.24 (sec) , antiderivative size = 84, normalized size of antiderivative = 3.00

$$\int \frac{-10e^x x^2 + 25x^3 - 2e^{2x}x^3 + (9325x^2 - 750e^{2x}x^2 + e^x(-1250x - 10x^3))\log(x) + (1171875x - 93750e^{2x}x}{25x^3 + 9375x^2\log(x) + 11718}$$

$$= \frac{25\,x^3 + 6250\,x^2\log(x) - 25\,(x^2 - 15625\,x)\log(x)^2 - \left(x^2 + 250\,x\log(x) + 15625\,\log(x)^2\right)e^{(2\,x)} - 10\,(x^2}{25\,\left(x^2 + 250\,x\log(x) + 15625\,\log(x)^2\right)}$$

input
```
integrate(((-3906250*exp(x)^2+(-156250*x-156250)*exp(x)-6250*x+48828125)*l
og(x)^3+(-93750*x*exp(x)^2+(-2500*x^2-1250*x)*exp(x)+1171875*x)*log(x)^2+(
-750*exp(x)^2*x^2+(-10*x^3-1250*x)*exp(x)+9325*x^2)*log(x)-2*exp(x)^2*x^3-
10*exp(x)*x^2+25*x^3)/(48828125*log(x)^3+1171875*x*log(x)^2+9375*x^2*log(x
)+25*x^3),x, algorithm=\
```

3.430. $\int \frac{-10e^x x^2+25x^3-2e^{2x}x^3+(9325x^2-750e^{2x}x^2+e^x(-1250x-10x^3))\log(x)+(1171875x-93750e^{2x}x+e^x(-1250x-2500x^2))\log^2(x)+(48828125-}{25x^3+9375x^2\log(x)+1171875x\log^2(x)+48828125\log^3(x)}$

output
```
1/25*(25*x^3 + 6250*x^2*log(x) - 25*(x^2 - 15625*x)*log(x)^2 - (x^2 + 250*
x*log(x) + 15625*log(x)^2)*e^(2*x) - 10*(x^2*log(x) + 125*x*log(x)^2)*e^x)
/(x^2 + 250*x*log(x) + 15625*log(x)^2)
```

3.430.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. $2(23) = 46$.

Time = 0.29 (sec) , antiderivative size = 93, normalized size of antiderivative = 3.32

$$\int \frac{-10e^xx^2+25x^3-2e^{2x}x^3+(9325x^2-750e^{2x}x^2+e^x(-1250x-10x^3))\log(x)+(1171875x-93750e^{2x}x}{25x^3+9375x^2\log(x)+11718}$$
$$= -\frac{10\,x^2e^x\log(x)+25\,x^2\log(x)^2+1250\,xe^x\log(x)^2-25\,x^3+x^2e^{(2\,x)}-6250\,x^2\log(x)+250\,xe^{(2\,x)}\log(}{25\left(x^2+250\,x\log(x)+15625\,\log(x)^2\right)}$$

input
```
integrate(((-3906250*exp(x)^2+(-156250*x-156250)*exp(x)-6250*x+48828125)*l
og(x)^3+(-93750*x*exp(x)^2+(-2500*x^2-1250*x)*exp(x)+1171875*x)*log(x)^2+(
-750*exp(x)^2*x^2+(-10*x^3-1250*x)*exp(x)+9325*x^2)*log(x)-2*exp(x)^2*x^3-
10*exp(x)*x^2+25*x^3)/(48828125*log(x)^3+1171875*x*log(x)^2+9375*x^2*log(x
)+25*x^3),x, algorithm=\
```

output
```
-1/25*(10*x^2*e^x*log(x) + 25*x^2*log(x)^2 + 1250*x*e^x*log(x)^2 - 25*x^3
+ x^2*e^(2*x) - 6250*x^2*log(x) + 250*x*e^(2*x)*log(x) - 390625*x*log(x)^2
 + 15625*e^(2*x)*log(x)^2)/(x^2 + 250*x*log(x) + 15625*log(x)^2)
```

3.430.9 Mupad [B] (verification not implemented)

Time = 15.13 (sec) , antiderivative size = 547, normalized size of antiderivative = 19.54

$$\int \frac{-10e^x x^2+25x^3-2e^{2x}x^3+(9325x^2-750e^{2x}x^2+e^x(-1250x-10x^3))\log(x)+(1171875x-93750e^{2x}x}{25x^3+9375x^2\log(x)+11718}$$

$$= \frac{24\,x}{25}-\frac{\mathrm{e}^{2\,x}}{25}+9\,\ln\left(x\right)+\ln\left(x\right)\left(\mathrm{e}^x\left(\frac{\frac{x^5}{5}+\frac{129\,x^4}{5}+\frac{627\,x^3}{5}+1534525\,x^2+335175000\,x+17969531250}{x^3+375\,x^2+46875\,x+1953125}-\frac{1534425\,x^2+335175000\,x+17969531250}{x^3+375\,x^2+46875\,x+1953125}\right)+\frac{\frac{24\,x^4}{125}+72\,x^3+9000\,x^2+375000\,x}{x^3+375\,x^2+46875\,x+1953125}-\frac{\frac{18\,x^4}{125}+72\,x^3+12375\,x^2+796875\,x+17578125}{x^3+375\,x^2+46875\,x+1953125}\right)-\frac{62500\,x+5859375}{x^3+375\,x^2+46875\,x+1953125}-\frac{\frac{x\,\left(25\,x^3\,\mathrm{e}^x-3125\,x^2\,\mathrm{e}^x+25\,x^4\,\mathrm{e}^x+x^4\right)}{15625\,\left(x+125\right)}+\frac{x\,\ln(x)\,\left(75\,x^2\,\mathrm{e}^x+50\,x^3\,\mathrm{e}^x-3125\,x\,\mathrm{e}^x-125\,x^2+3\,x^3\right)}{125\,\left(x+125\right)}+\frac{x\ln(x)^2\,\left(25\,x^2\,\mathrm{e}^x+50\,x\,\mathrm{e}^x+3\,x^2\right)}{x+125}}{x^2+250\,x\,\ln\left(x\right)+15625\ln\left(x\right)^2}-\frac{\frac{x\,\left(406250\,x^3\,\mathrm{e}^x-390625\,x^2\,\mathrm{e}^x+21950\,x^4\,\mathrm{e}^x+3250\,x^5\,\mathrm{e}^x+25\,x^6\,\mathrm{e}^x-48828125\,x\,\mathrm{e}^x-1953125\,x^2+31250\,x^3+1000\,x^4+4\,x^5\right)}{15625\,\left(x+125\right)^3}+\frac{x\ln(x)^2\,\left(15675}{x}+\frac{x^2}{3125}+\frac{\mathrm{e}^x\,\left(\frac{x^6}{625}+\frac{131\,x^5}{625}+\frac{1129\,x^4}{625}+\frac{256\,x^3}{5}-50\,x^2-6250\,x\right)}{x^3+375\,x^2+46875\,x+1953125}$$

input
```
int(-(10*x^2*exp(x) + 2*x^3*exp(2*x) + log(x)^2*(93750*x*exp(2*x) - 117187
5*x + exp(x)*(1250*x + 2500*x^2)) - 25*x^3 + log(x)^3*(6250*x + 3906250*ex
p(2*x) + exp(x)*(156250*x + 156250) - 48828125) + log(x)*(750*x^2*exp(2*x)
 + exp(x)*(1250*x + 10*x^3) - 9325*x^2))/(1171875*x*log(x)^2 + 9375*x^2*lo
g(x) + 48828125*log(x)^3 + 25*x^3),x)
```

output
```
(24*x)/25 - exp(2*x)/25 + 9*log(x) + log(x)*(exp(x)*((335175000*x + 153452
5*x^2 + (627*x^3)/5 + (129*x^4)/5 + x^5/5 + 17969531250)/(46875*x + 375*x^
2 + x^3 + 1953125) - (335175000*x + 1534425*x^2 + 17969531250)/(46875*x +
375*x^2 + x^3 + 1953125)) + (375000*x + 9000*x^2 + 72*x^3 + (24*x^4)/125)/
(46875*x + 375*x^2 + x^3 + 1953125) - (796875*x + 12375*x^2 + 72*x^3 + (18
*x^4)/125 + 17578125)/(46875*x + 375*x^2 + x^3 + 1953125)) - (62500*x + 58
59375)/(46875*x + 375*x^2 + x^3 + 1953125) - ((x*(25*x^3*exp(x) - 3125*x^2
*exp(x) + 25*x^4*exp(x) + x^4))/(15625*(x + 125)) + (x*log(x)*(75*x^2*exp(
x) + 50*x^3*exp(x) - 3125*x*exp(x) - 125*x^2 + 3*x^3))/(125*(x + 125)) + (
x*log(x)^2*(25*x^2*exp(x) + 50*x*exp(x) + 3*x^2))/(x + 125))/(15625*log(x)
^2 + 250*x*log(x) + x^2) - ((x*(406250*x^3*exp(x) - 390625*x^2*exp(x) + 21
950*x^4*exp(x) + 3250*x^5*exp(x) + 25*x^6*exp(x) - 48828125*x*exp(x) - 195
3125*x^2 + 31250*x^3 + 1000*x^4 + 4*x^5))/(15625*(x + 125)^3) + (x*log(x)^
2*(15675*x^2*exp(x) + 3225*x^3*exp(x) + 25*x^4*exp(x) + 12500*x*exp(x) + 1
125*x^2 + 6*x^3))/(x + 125)^3 + (x*log(x)*(428125*x^2*exp(x) + 37650*x^3*e
xp(x) + 6475*x^4*exp(x) + 50*x^5*exp(x) + 781250*x*exp(x) + 46875*x^2 + 20
00*x^3 + 9*x^4))/(125*(x + 125)^3))/(x + 125*log(x)) + x^2/3125 + (exp(x)*
((256*x^3)/5 - 50*x^2 - 6250*x + (1129*x^4)/625 + (131*x^5)/625 + x^6/625)
)/(46875*x + 375*x^2 + x^3 + 1953125)
```

3.430.

$$\int \frac{-10e^x x^2+25x^3-2e^{2x}x^3+\left(9325x^2-750e^{2x}x^2+e^x\left(-1250x-10x^3\right)\right)\log(x)+\left(1171875x-93750e^{2x}x+e^x\left(-1250x-2500x^2\right)\right)\log^2(x)+\left(48828125-\right.}{25x^3+9375x^2\log(x)+1171875x\log^2(x)+48828125\log^3(x)}$$

3.431 $\int \frac{3+6x^2+e^x x^2+\left(12x^2+e^x\left(2x^2+x^3\right)\right)\log(x)}{x}\,dx$

3.431.1 Optimal result

Integrand size = 40, antiderivative size = 16

$$\int \frac{3+6x^2+e^x x^2+\left(12x^2+e^x\left(2x^2+x^3\right)\right)\log(x)}{x}\,dx=\left(6+e^x+\frac{3}{x^2}\right)x^2\log(x)$$

output
```
(6+exp(x)+3/x^2)*x^2*ln(x)
```

3.431.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{3+6x^2+e^x x^2+\left(12x^2+e^x\left(2x^2+x^3\right)\right)\log(x)}{x}\,dx=\left(3+\left(6+e^x\right)x^2\right)\log(x)$$

input
```
Integrate[(3 + 6*x^2 + E^x*x^2 + (12*x^2 + E^x*(2*x^2 + x^3))*Log[x])/x,x]
```

output
```
(3 + (6 + E^x)*x^2)*Log[x]
```

3.431.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.31, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.050, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x^2+6x^2+\left(12x^2+e^x\left(x^3+2x^2\right)\right)\log(x)+3}{x}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{3\left(2x^2+4x^2\log(x)+1\right)}{x}+e^x x(x\log(x)+2\log(x)+1)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$e^x x^2\log(x)+6x^2\log(x)+3\log(x)$$

input
```
Int[(3 + 6*x^2 + E^x*x^2 + (12*x^2 + E^x*(2*x^2 + x^3))*Log[x])/x,x]
```

output
```
3*Log[x] + 6*x^2*Log[x] + E^x*x^2*Log[x]
```

3.431.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.431.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.31

method	result	size
default	$x^2 e^x \ln(x) + 6x^2 \ln(x) + 3\ln(x)$	21
norman	$x^2 e^x \ln(x) + 6x^2 \ln(x) + 3\ln(x)$	21
risch	$(e^x x^2 + 6x^2)\ln(x) + 3\ln(x)$	21
parallelrisch	$x^2 e^x \ln(x) + 6x^2 \ln(x) + 3\ln(x)$	21
parts	$x^2 e^x \ln(x) + 6x^2 \ln(x) + 3\ln(x)$	21

input
```
int((((x^3+2*x^2)*exp(x)+12*x^2)*ln(x)+exp(x)*x^2+6*x^2+3)/x,x,method=_RET
URNVERBOSE)
```

output
```
x^2*exp(x)*ln(x)+6*x^2*ln(x)+3*ln(x)
```

3.431.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{3+6x^2+e^x x^2+(12x^2+e^x(2x^2+x^3))\log(x)}{x}\,dx = \left(x^2 e^x + 6\,x^2 + 3\right)\log(x)$$

input
```
integrate((((x^3+2*x^2)*exp(x)+12*x^2)*log(x)+exp(x)*x^2+6*x^2+3)/x,x, alg
orithm=\
```

output
```
(x^2*e^x + 6*x^2 + 3)*log(x)
```

3.431.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.38

$$\int \frac{3+6x^2+e^x x^2+(12x^2+e^x(2x^2+x^3))\log(x)}{x}\,dx = x^2 e^x \log(x) + 6x^2 \log(x) + 3\log(x)$$

input
```
integrate((((x**3+2*x**2)*exp(x)+12*x**2)*ln(x)+exp(x)*x**2+6*x**2+3)/x,x)
```

output
```
x**2*exp(x)*log(x) + 6*x**2*log(x) + 3*log(x)
```

3.431.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. $2(15) = 30$.

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 2.00

$$\int \frac{3+6x^2+e^x x^2+(12x^2+e^x(2x^2+x^3))\log(x)}{x}\,dx$$
$$= 6\,x^2\log(x)+\left(x^2\log(x)-x+1\right)e^x+(x-1)e^x+3\,\log(x)$$

input
```
integrate((((x^3+2*x^2)*exp(x)+12*x^2)*log(x)+exp(x)*x^2+6*x^2+3)/x,x, alg
orithm=\
```

output
```
6*x^2*log(x) + (x^2*log(x) - x + 1)*e^x + (x - 1)*e^x + 3*log(x)
```

3.431.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.25

$$\int \frac{3+6x^2+e^x x^2+(12x^2+e^x(2x^2+x^3))\log(x)}{x}\,dx = x^2e^x\log(x)+6\,x^2\log(x)+3\,\log(x)$$

input
```
integrate((((x^3+2*x^2)*exp(x)+12*x^2)*log(x)+exp(x)*x^2+6*x^2+3)/x,x, alg
orithm=\
```

output
```
x^2*e^x*log(x) + 6*x^2*log(x) + 3*log(x)
```

3.431.9 Mupad [B] (verification not implemented)

Time = 14.57 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{3+6x^2+e^x x^2+(12x^2+e^x(2x^2+x^3))\log(x)}{x}\,dx = \ln(x)\,\left(x^2\,\mathrm{e}^x+6\,x^2+3\right)$$

input
```
int((x^2*exp(x) + log(x)*(exp(x)*(2*x^2 + x^3) + 12*x^2) + 6*x^2 + 3)/x,x)
```

output
```
log(x)*(x^2*exp(x) + 6*x^2 + 3)
```

3.432 $\int \frac{25+50x+(75x^2+150x^3)\log(4)+(-36e^8x^3+75x^4+90e^4x^4+96x^5)\log^2(4)+\cdots}{25+75x^2\log(4)+75x^4\log^2(4)+25x^6\log^3(4)}$

3.432.1 Optimal result

Integrand size = 105, antiderivative size = 33

$$\int \frac{25+50x+(75x^2+150x^3)\log(4)+(-36e^8x^3+75x^4+90e^4x^4+96x^5)\log^2(4)+(25x^6+18e^4x^6+32x^7\cdots}{25+75x^2\log(4)+75x^4\log^2(4)+25x^6\log^3(4)}$$
$$=x+x^2-\frac{9x^2(-e^4+x)^2}{25\left(x+\frac{1}{x\log(4)}\right)^2}$$

output
```
x+x^2-9/25*x^2*(x-exp(4))^2/(x+1/2/x/ln(2))^2
```

3.432.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 84 vs. 2(33) = 66.

Time = 0.07 (sec) , antiderivative size = 84, normalized size of antiderivative = 2.55

$$\int \frac{25+50x+(75x^2+150x^3)\log(4)+(-36e^8x^3+75x^4+90e^4x^4+96x^5)\log^2(4)+(25x^6+18e^4x^6+32x^7\cdots}{25+75x^2\log(4)+75x^4\log^2(4)+25x^6\log^3(4)}$$
$$=\frac{1}{25}\left((25+18e^4)\,x+16x^2-\frac{9(-1+e^8\log(4)-2e^4x\log(4))}{\log(4)\,(1+x^2\log(4))^2}+\frac{9(-3+2e^8\log(4)-4e^4x\log(4))}{\log(4)\,(1+x^2\log(4))}\right)$$

input
```
Integrate[(25 + 50*x + (75*x^2 + 150*x^3)*Log[4] + (-36*E^8*x^3 + 75*x^4 +
 90*E^4*x^4 + 96*x^5)*Log[4]^2 + (25*x^6 + 18*E^4*x^6 + 32*x^7)*Log[4]^3)/
(25 + 75*x^2*Log[4] + 75*x^4*Log[4]^2 + 25*x^6*Log[4]^3),x]
```

output
```
((25 + 18*E^4)*x + 16*x^2 - (9*(-1 + E^8*Log[4] - 2*E^4*x*Log[4]))/(Log[4]
*(1 + x^2*Log[4])^2) + (9*(-3 + 2*E^8*Log[4] - 4*E^4*x*Log[4]))/(Log[4]*(1
 + x^2*Log[4])))/25
```

3.432.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 90 vs. $2(33) = 66$.

Time $= 0.56$ (sec) , antiderivative size $= 90$, normalized size of antiderivative $= 2.73$, number of steps used $= 7$, number of rules used $= 7$, $\frac{\text{number of rules}}{\text{integrand size}} = 0.067$, Rules used $= \{2070, 2345, 27, 2345, 27, 2019, 17\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(32x^7+18e^4x^6+25x^6)\log^3(4)+(150x^3+75x^2)\log(4)+(96x^5+90e^4x^4+75x^4-36e^8x^3)\log^2(4)+50x+2}{25x^6\log^3(4)+75x^4\log^2(4)+75x^2\log(4)+25}$$

$$\Big\downarrow \text{2070}$$

$$\int \frac{(32x^7+18e^4x^6+25x^6)\log^3(4)+(150x^3+75x^2)\log(4)+(96x^5+90e^4x^4+75x^4-36e^8x^3)\log^2(4)+50x+2}{(5^{2/3}x^2\log(4)+5^{2/3})^3}$$

$$\Big\downarrow \text{2345}$$

$$\frac{\frac{9(2e^4x\log(4)+1-e^8\log(4))}{25\log(4)\,(x^2\log(4)+1)^2}-\int -\frac{4(32\log^2(4)x^5+(25+18e^4)\log^2(4)x^4+64\log(4)x^3+2(25+36e^4)\log(4)x^2+2(43-18e^8\log(4))x-18e^4+25)}{5\sqrt[3]{5}(\log(4)x^2+1)^2}dx}{4\,5^{2/3}}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{25}\int \frac{32\log^2(4)x^5+(25+18e^4)\log^2(4)x^4+64\log(4)x^3+2(25+36e^4)\log(4)x^2+2(43-18e^8\log(4))x-18e^4}{(\log(4)x^2+1)^2}$$
$$\frac{9(2e^4x\log(4)+1-e^8\log(4))}{25\log(4)\,(x^2\log(4)+1)^2}$$

$$\Big\downarrow \text{2345}$$

$$\frac{1}{25}\left(-\frac{1}{2}\int -\frac{2\left(32\log(4)x^3+\left(25+18e^4\right)\log(4)x^2+32x+18e^4+25\right)}{\log(4)x^2+1}dx-\frac{9\left(4e^4x\log(4)+3-2e^8\log(4)\right)}{\log(4)\left(x^2\log(4)+1\right)}\right)+\frac{9\left(2e^4x\log(4)+1-e^8\log(4)\right)}{25\log(4)\left(x^2\log(4)+1\right)^2}$$

$$\Big\downarrow \; 27$$

$$\frac{1}{25}\left(\int \frac{32\log(4)x^3+\left(25+18e^4\right)\log(4)x^2+32x+18e^4+25}{\log(4)x^2+1}dx-\frac{9\left(4e^4x\log(4)+3-2e^8\log(4)\right)}{\log(4)\left(x^2\log(4)+1\right)}\right)+\frac{9\left(2e^4x\log(4)+1-e^8\log(4)\right)}{25\log(4)\left(x^2\log(4)+1\right)^2}$$

$$\Big\downarrow \; 2019$$

$$\frac{1}{25}\left(\int \left(32x+18e^4+25\right)dx-\frac{9\left(4e^4x\log(4)+3-2e^8\log(4)\right)}{\log(4)\left(x^2\log(4)+1\right)}\right)+\frac{9\left(2e^4x\log(4)+1-e^8\log(4)\right)}{25\log(4)\left(x^2\log(4)+1\right)^2}$$

$$\Big\downarrow \; 17$$

$$\frac{9\left(2e^4x\log(4)+1-e^8\log(4)\right)}{25\log(4)\left(x^2\log(4)+1\right)^2}+\frac{1}{25}\left(\frac{1}{64}\left(32x+18e^4+25\right)^2-\frac{9\left(4e^4x\log(4)+3-2e^8\log(4)\right)}{\log(4)\left(x^2\log(4)+1\right)}\right)$$

input
```
Int[(25 + 50*x + (75*x^2 + 150*x^3)*Log[4] + (-36*E^8*x^3 + 75*x^4 + 90*E^
4*x^4 + 96*x^5)*Log[4]^2 + (25*x^6 + 18*E^4*x^6 + 32*x^7)*Log[4]^3)/(25 +
75*x^2*Log[4] + 75*x^4*Log[4]^2 + 25*x^6*Log[4]^3),x]
```

output
```
(9*(1 - E^8*Log[4] + 2*E^4*x*Log[4]))/(25*Log[4]*(1 + x^2*Log[4])^2) + ((2
5 + 18*E^4 + 32*x)^2/64 - (9*(3 - 2*E^8*Log[4] + 4*E^4*x*Log[4]))/(Log[4]*
(1 + x^2*Log[4])))/25
```

3.432.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

3.432. $\int \frac{25+50x+\left(75x^2+150x^3\right)\log(4)+\left(-36e^8x^3+75x^4+90e^4x^4+96x^5\right)\log^2(4)+\left(25x^6+18e^4x^6+32x^7\right)\log^3(4)}{25+75x^2\log(4)+75x^4\log^2(4)+25x^6\log^3(4)}dx$

rule 2019
```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

rule 2070
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x^2, 0], Expon[Px
, x^2]], b = Rt[Coeff[Px, x^2, Expon[Px, x^2]], Expon[Px, x^2]]}, Int[u*(a
+ b*x^2)^(Expon[Px, x^2]*p), x] /; EqQ[Px, (a + b*x^2)^Expon[Px, x^2]]] /;
IntegerQ[p] && PolyQ[Px, x^2] && GtQ[Expon[Px, x^2], 1] && NeQ[Coeff[Px, x^
2, 0], 0]
```

rule 2345
```
Int[(Pq_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q = PolynomialQuot
ient[Pq, a + b*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x,
 0], g = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b
*f*x)*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   In
t[(a + b*x^2)^(p + 1)*ExpandToSum[2*a*(p + 1)*Q + f*(2*p + 3), x], x], x]]
/; FreeQ[{a, b}, x] && PolyQ[Pq, x] && LtQ[p, -1]
```

3.432.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(31) = 62$.

Time = 0.26 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.00

method	result	size
default	$\frac{16x^2}{25}+\frac{18x\,e^4}{25}+x+\frac{-\frac{72x^3 e^4 \ln(2)}{25}+\frac{72\left(\frac{e^8 \ln(2)}{2}-\frac{3}{8}\right)x^2}{25}-\frac{18x\,e^4}{25}+\frac{9\left(e^8 \ln(2)-1\right)}{25\ln(2)}}{\left(2x^2 \ln(2)+1\right)^2}$	66
norman	$\frac{x+x^2+\left(\frac{72\,e^4 \ln(2)^2}{25}+4\ln(2)^2\right)x^5+\left(-\frac{36\,e^8 \ln(2)^2}{25}+4\ln(2)\right)x^4+4x^3\ln(2)+\frac{64x^6 \ln(2)^2}{25}}{\left(2x^2\ln(2)+1\right)^2}$	72
risch	$\frac{18x\,e^4}{25}+\frac{16x^2}{25}+x+\frac{-\frac{18x^3 e^4 \ln(2)}{25}+\frac{\left(9\,e^8 \ln(2)-\frac{27}{4}\right)x^2}{25}-\frac{9x\,e^4}{50}+\frac{\frac{9\,e^8 \ln(2)}{100}-\frac{9}{100}}{\ln(2)}}{x^4\ln(2)^2+x^2\ln(2)+\frac{1}{4}}$	73
gosper	$-\frac{x\left(36\,e^8 \ln(2)^2 x^3-72\,e^4 \ln(2)^2 x^4-64x^5 \ln(2)^2-100x^4 \ln(2)^2-100x^3 \ln(2)-100x^2 \ln(2)-25x-25\right)}{25\left(4x^4 \ln(2)^2+4x^2 \ln(2)+1\right)}$	85
parallelrisch	$-\frac{36\,e^8 \ln(2)^2 x^4-72\,e^4 \ln(2)^2 x^5-64x^6 \ln(2)^2-100x^5 \ln(2)^2-100x^4 \ln(2)-100x^3 \ln(2)-25x^2-25x}{25\left(4x^4 \ln(2)^2+4x^2 \ln(2)+1\right)}$	88

3.432. $\int \frac{25+50x+(75x^2+150x^3)\log(4)+(-36e^8x^3+75x^4+90e^4x^4+96x^5)\log^2(4)+(25x^6+18e^4x^6+32x^7)\log^3(4)}{25+75x^2\log(4)+75x^4\log^2(4)+25x^6\log^3(4)}\,dx$

input
```
int((8*(18*x^6*exp(4)+32*x^7+25*x^6)*ln(2)^3+4*(-36*x^3*exp(4)^2+90*x^4*ex
p(4)+96*x^5+75*x^4)*ln(2)^2+2*(150*x^3+75*x^2)*ln(2)+50*x+25)/(200*x^6*ln(
2)^3+300*x^4*ln(2)^2+150*x^2*ln(2)+25),x,method=_RETURNVERBOSE)
```

output
```
16/25*x^2+18/25*x*exp(4)+x+72/25*(-x^3*exp(4)*ln(2)+(1/2*exp(8)*ln(2)-3/8)
*x^2-1/4*x*exp(4)+1/8/ln(2)*(exp(8)*ln(2)-1))/(2*x^2*ln(2)+1)^2
```

3.432.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 92 vs. $2(32) = 64$.

Time = 0.38 (sec) , antiderivative size = 92, normalized size of antiderivative = 2.79

$$\int \frac{25 + 50x + (75x^2 + 150x^3)\log(4) + (-36e^8x^3 + 75x^4 + 90e^4x^4 + 96x^5)\log^2(4) + (25x^6 + 18e^4x^6 + 32x^7}{25 + 75x^2\log(4) + 75x^4\log^2(4) + 25x^6\log^3(4)}$$
$$= \frac{4\left(16\,x^6 + 18\,x^5e^4 + 25\,x^5\right)\log\left(2\right)^3 + 4\left(16\,x^4 + 25\,x^3 + 9\,x^2e^8\right)\log\left(2\right)^2 - \left(11\,x^2 - 25\,x - 9\,e^8\right)\log\left(2\right) - 9}{25\left(4\,x^4\log\left(2\right)^3 + 4\,x^2\log\left(2\right)^2 + \log\left(2\right)\right)}$$

input
```
integrate((8*(18*x^6*exp(4)+32*x^7+25*x^6)*log(2)^3+4*(-36*x^3*exp(4)^2+90
*x^4*exp(4)+96*x^5+75*x^4)*log(2)^2+2*(150*x^3+75*x^2)*log(2)+50*x+25)/(20
0*x^6*log(2)^3+300*x^4*log(2)^2+150*x^2*log(2)+25),x, algorithm=\
```

output
```
1/25*(4*(16*x^6 + 18*x^5*e^4 + 25*x^5)*log(2)^3 + 4*(16*x^4 + 25*x^3 + 9*x
^2*e^8)*log(2)^2 - (11*x^2 - 25*x - 9*e^8)*log(2) - 9)/(4*x^4*log(2)^3 + 4
*x^2*log(2)^2 + log(2))
```

3.432.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. $2(29) = 58$.

Time = 0.91 (sec) , antiderivative size = 94, normalized size of antiderivative = 2.85

$$\int \frac{25 + 50x + (75x^2 + 150x^3)\log(4) + (-36e^8x^3 + 75x^4 + 90e^4x^4 + 96x^5)\log^2(4) + (25x^6 + 18e^4x^6 + 32x^7}{25 + 75x^2\log(4) + 75x^4\log^2(4) + 25x^6\log^3(4)}$$
$$= \frac{16x^2}{25} + x\left(1 + \frac{18e^4}{25}\right) + \frac{-72x^3e^4\log\left(2\right)^2 + x^2\left(-27\log\left(2\right) + 36e^8\log\left(2\right)^2\right) - 18xe^4\log\left(2\right) - 9 + 9e^8\log\left(2\right)}{100x^4\log\left(2\right)^3 + 100x^2\log\left(2\right)^2 + 25\log\left(2\right)}$$

input
```
integrate((8*(18*x**6*exp(4)+32*x**7+25*x**6)*ln(2)**3+4*(-36*x**3*exp(4)*
*2+90*x**4*exp(4)+96*x**5+75*x**4)*ln(2)**2+2*(150*x**3+75*x**2)*ln(2)+50*
x+25)/(200*x**6*ln(2)**3+300*x**4*ln(2)**2+150*x**2*ln(2)+25),x)
```

output
```
16*x**2/25 + x*(1 + 18*exp(4)/25) + (-72*x**3*exp(4)*log(2)**2 + x**2*(-27
*log(2) + 36*exp(8)*log(2)**2) - 18*x*exp(4)*log(2) - 9 + 9*exp(8)*log(2))
/(100*x**4*log(2)**3 + 100*x**2*log(2)**2 + 25*log(2))
```

3.432.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 84 vs. 2(32) = 64.

Time = 0.19 (sec) , antiderivative size = 84, normalized size of antiderivative = 2.55

$$\int \frac{25+50x+(75x^2+150x^3)\log(4)+(-36e^8x^3+75x^4+90e^4x^4+96x^5)\log^2(4)+(25x^6+18e^4x^6+32x^7}{25+75x^2\log(4)+75x^4\log^2(4)+25x^6\log^3(4)}$$
$$= \frac{16}{25}x^2 + \frac{1}{25}x(18e^4+25) - \frac{9\left(8x^3e^4\log(2)^2 - (4e^8\log(2)^2 - 3\log(2))x^2 + 2xe^4\log(2) - e^8\log(2) + 1\right)}{25\left(4x^4\log(2)^3 + 4x^2\log(2)^2 + \log(2)\right)}$$

input
```
integrate((8*(18*x^6*exp(4)+32*x^7+25*x^6)*log(2)^3+4*(-36*x^3*exp(4)^2+90
*x^4*exp(4)+96*x^5+75*x^4)*log(2)^2+2*(150*x^3+75*x^2)*log(2)+50*x+25)/(20
0*x^6*log(2)^3+300*x^4*log(2)^2+150*x^2*log(2)+25),x, algorithm=\
```

output
```
16/25*x^2 + 1/25*x*(18*e^4 + 25) - 9/25*(8*x^3*e^4*log(2)^2 - (4*e^8*log(2
)^2 - 3*log(2))*x^2 + 2*x*e^4*log(2) - e^8*log(2) + 1)/(4*x^4*log(2)^3 + 4
*x^2*log(2)^2 + log(2))
```

3.432.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. 2(32) = 64.

Time = 0.27 (sec) , antiderivative size = 94, normalized size of antiderivative = 2.85

$$\int \frac{25+50x+(75x^2+150x^3)\log(4)+(-36e^8x^3+75x^4+90e^4x^4+96x^5)\log^2(4)+(25x^6+18e^4x^6+32x^7)\log^3(4)}{25+75x^2\log(4)+75x^4\log^2(4)+25x^6\log^3(4)}$$
$$= -\frac{9\left(8\,x^3e^4\log(2)^2-4\,x^2e^8\log(2)^2+3\,x^2\log(2)+2\,xe^4\log(2)-e^8\log(2)+1\right)}{25\left(2\,x^2\log(2)+1\right)^2\log(2)} + \frac{16\,x^2\log(2)^6+18\,xe^4\log(2)^6+25\,x\log(2)^6}{25\,\log(2)^6}$$

input
```
integrate((8*(18*x^6*exp(4)+32*x^7+25*x^6)*log(2)^3+4*(-36*x^3*exp(4)^2+90
*x^4*exp(4)+96*x^5+75*x^4)*log(2)^2+2*(150*x^3+75*x^2)*log(2)+50*x+25)/(20
0*x^6*log(2)^3+300*x^4*log(2)^2+150*x^2*log(2)+25),x, algorithm=\
```

output
```
-9/25*(8*x^3*e^4*log(2)^2 - 4*x^2*e^8*log(2)^2 + 3*x^2*log(2) + 2*x*e^4*lo
g(2) - e^8*log(2) + 1)/((2*x^2*log(2) + 1)^2*log(2)) + 1/25*(16*x^2*log(2)
^6 + 18*x*e^4*log(2)^6 + 25*x*log(2)^6)/log(2)^6
```

3.432.9 Mupad [B] (verification not implemented)

Time = 14.30 (sec) , antiderivative size = 77, normalized size of antiderivative = 2.33

$$\int \frac{25+50x+(75x^2+150x^3)\log(4)+(-36e^8x^3+75x^4+90e^4x^4+96x^5)\log^2(4)+(25x^6+18e^4x^6+32x^7)\log^3(4)}{25+75x^2\log(4)+75x^4\log^2(4)+25x^6\log^3(4)}$$
$$= \frac{16\,x^2}{25} - \frac{72\,\mathrm{e}^4\,\ln(2)\,x^3+\left(27-36\,\mathrm{e}^8\,\ln(2)\right)\,x^2+18\,\mathrm{e}^4\,x-\frac{9\,\left(\mathrm{e}^8\,\ln(2)-1\right)}{\ln(2)}}{100\ln(2)^2\,x^4+100\,\ln(2)\,x^2+25} + x\left(\frac{18\,\mathrm{e}^4}{25}+1\right)$$

input
```
int((50*x + 4*log(2)^2*(90*x^4*exp(4) - 36*x^3*exp(8) + 75*x^4 + 96*x^5) +
 8*log(2)^3*(18*x^6*exp(4) + 25*x^6 + 32*x^7) + 2*log(2)*(75*x^2 + 150*x^3
) + 25)/(300*x^4*log(2)^2 + 200*x^6*log(2)^3 + 150*x^2*log(2) + 25),x)
```

output
```
(16*x^2)/25 - (18*x*exp(4) - (9*(exp(8)*log(2) - 1))/log(2) - x^2*(36*exp(
8)*log(2) - 27) + 72*x^3*exp(4)*log(2))/(100*x^4*log(2)^2 + 100*x^2*log(2)
 + 25) + x*((18*exp(4))/25 + 1)
```

3.433 $\int \frac{-18+9x+e^x x+6x\log(x)}{x}\,dx$

3.433.1 Optimal result

Integrand size = 19, antiderivative size = 18

$$\int \frac{-18+9x+e^x x+6x\log(x)}{x}\,dx = e^x+3\left(-\frac{4}{9}+x+2(-3+x)\log(x)\right)$$

output
```
6*ln(x)*(-3+x)-4/3+3*x+exp(x)
```

3.433.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{-18+9x+e^x x+6x\log(x)}{x}\,dx = e^x+3x-18\log(x)+6x\log(x)$$

input
```
Integrate[(-18 + 9*x + E^x*x + 6*x*Log[x])/x,x]
```

output
```
E^x + 3*x - 18*Log[x] + 6*x*Log[x]
```

3.433.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x+9x+6x\log(x)-18}{x}\,dx$$

$$\Big\downarrow \ 2010$$

$$\int \left(e^x+\frac{3(3x+2x\log(x)-6)}{x}\right)dx$$

$$\Big\downarrow \ 2009$$

$$3x+e^x+6x\log(x)-18\log(x)$$

input
```
Int[(-18 + 9*x + E^x*x + 6*x*Log[x])/x,x]
```

output
```
E^x + 3*x - 18*Log[x] + 6*x*Log[x]
```

3.433.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.433.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

method	result	size
default	$3x - 18\ln(x) + 6x\ln(x) + e^{x}$	16
norman	$3x - 18\ln(x) + 6x\ln(x) + e^{x}$	16
risch	$3x - 18\ln(x) + 6x\ln(x) + e^{x}$	16
parallelrisch	$3x - 18\ln(x) + 6x\ln(x) + e^{x}$	16
parts	$3x - 18\ln(x) + 6x\ln(x) + e^{x}$	16

input
```
int((6*x*ln(x)+exp(x)*x+9*x-18)/x,x,method=_RETURNVERBOSE)
```

output
```
3*x-18*ln(x)+6*x*ln(x)+exp(x)
```

3.433.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int \frac{-18 + 9x + e^{x}x + 6x\log(x)}{x}\,dx = 6\,(x-3)\log(x) + 3\,x + e^{x}$$

input
```
integrate((6*x*log(x)+exp(x)*x+9*x-18)/x,x, algorithm=\
```

output
```
6*(x - 3)*log(x) + 3*x + e^x
```

3.433.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{-18 + 9x + e^{x}x + 6x\log(x)}{x}\,dx = 6x\log(x) + 3x + e^{x} - 18\log(x)$$

input
```
integrate((6*x*ln(x)+exp(x)*x+9*x-18)/x,x)
```

output
```
6*x*log(x) + 3*x + exp(x) - 18*log(x)
```

3.433.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{-18+9x+e^x x+6x\log(x)}{x}\,dx = 6\,x\log{(x)}+3\,x+e^x-18\,\log{(x)}$$

input
```
integrate((6*x*log(x)+exp(x)*x+9*x-18)/x,x, algorithm=\
```

output
```
6*x*log(x) + 3*x + e^x - 18*log(x)
```

3.433.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{-18+9x+e^x x+6x\log(x)}{x}\,dx = 6\,x\log{(x)}+3\,x+e^x-18\,\log{(x)}$$

input
```
integrate((6*x*log(x)+exp(x)*x+9*x-18)/x,x, algorithm=\
```

output
```
6*x*log(x) + 3*x + e^x - 18*log(x)
```

3.433.9 Mupad [B] (verification not implemented)

Time = 13.61 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{-18+9x+e^x x+6x\log(x)}{x}\,dx = 3\,x+\mathrm{e}^x-18\,\ln{(x)}+6\,x\,\ln{(x)}$$

input
```
int((9*x + x*exp(x) + 6*x*log(x) - 18)/x,x)
```

output
```
3*x + exp(x) - 18*log(x) + 6*x*log(x)
```

3.434 $\int \frac{-8e+e^{5-x}(-27+36x)}{-24e+27e^{5-x}x}\,dx$

3.434.1 Optimal result

Integrand size = 34, antiderivative size = 25

$$\int \frac{-8e+e^{5-x}(-27+36x)}{-24e+27e^{5-x}x}\,dx=\frac{x}{3}-\log\left(-\frac{4}{9}+\frac{1}{2}e^{4-x}x\right)$$

output
```
1/3*x-ln(1/2*exp(5-x)/exp(1)*x-4/9)
```

3.434.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-8e+e^{5-x}(-27+36x)}{-24e+27e^{5-x}x}\,dx=\frac{1}{3}\left(4x-3\log\left(8e^x-9e^4x\right)\right)$$

input
```
Integrate[(-8*E + E^(5 - x)*(-27 + 36*x))/(-24*E + 27*E^(5 - x)*x),x]
```

output
```
(4*x - 3*Log[8*E^x - 9*E^4*x])/3
```

3.434.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{5-x}(36x-27)-8e}{27e^{5-x}x-24e}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{9e^4(x-1)}{9e^4x-8e^x}+\frac{1}{3}\right)dx$$

$$\Big\downarrow \ 2009$$

$$9e^4\int \frac{1}{8e^x-9e^4x}dx+9e^4\int \frac{x}{9e^4x-8e^x}dx+\frac{x}{3}$$

input
```
Int[(-8*E + E^(5 - x)*(-27 + 36*x))/(-24*E + 27*E^(5 - x)*x),x]
```

output
```
$Aborted
```

3.434.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.434.4 Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

method	result	size
parallelrisch	$\frac{x}{3}-\ln\left(x\,\mathrm{e}^{5-x}-\frac{8\,\mathrm{e}}{9}\right)$	21
norman	$\frac{x}{3}-\ln\left(-27x\,\mathrm{e}^{5-x}+24\,\mathrm{e}\right)$	22
risch	$\frac{x}{3}-\ln\left(x\right)+5-\ln\left(\mathrm{e}^{5-x}-\frac{8\,\mathrm{e}}{9x}\right)$	27

input
```
int(((36*x-27)*exp(5-x)-8*exp(1))/(27*x*exp(5-x)-24*exp(1)),x,method=_RETU
RNVERBOSE)
```

output
```
1/3*x-ln(x*exp(5-x)-8/9*exp(1))
```

3.434.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{-8e+e^{5-x}(-27+36x)}{-24e+27e^{5-x}x}\,dx=\frac{1}{3}\,x-\log\left(x\right)-\log\left(\frac{9\,xe^{(-x+5)}-8\,e}{x}\right)$$

input
```
integrate(((36*x-27)*exp(5-x)-8*exp(1))/(27*x*exp(5-x)-24*exp(1)),x, algor
ithm=\
```

output
```
1/3*x - log(x) - log((9*x*e^(-x + 5) - 8*e)/x)
```

3.434.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{-8e+e^{5-x}(-27+36x)}{-24e+27e^{5-x}x}\,dx=\frac{x}{3}-\log\left(x\right)-\log\left(e^{5-x}-\frac{8e}{9x}\right)$$

input
```
integrate(((36*x-27)*exp(5-x)-8*exp(1))/(27*x*exp(5-x)-24*exp(1)),x)
```

output
```
x/3 - log(x) - log(exp(5 - x) - 8*E/(9*x))
```

3.434.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{-8e+e^{5-x}(-27+36x)}{-24e+27e^{5-x}x}\,dx=\frac{4}{3}\,x-\log\left(-\frac{9}{8}\,xe^{4}+e^{x}\right)$$

input
```
integrate(((36*x-27)*exp(5-x)-8*exp(1))/(27*x*exp(5-x)-24*exp(1)),x, algor
ithm=\
```

output
```
4/3*x - log(-9/8*x*e^4 + e^x)
```

3.434.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \frac{-8e+e^{5-x}(-27+36x)}{-24e+27e^{5-x}x}\,dx = \frac{1}{3}\,x - \log\left(-9\,(x-5)e^{(-x+5)} + 8\,e - 45\,e^{(-x+5)}\right) - \frac{5}{3}$$

input
```
integrate(((36*x-27)*exp(5-x)-8*exp(1))/(27*x*exp(5-x)-24*exp(1)),x, algor
ithm=\
```

output
```
1/3*x - log(-9*(x - 5)*e^(-x + 5) + 8*e - 45*e^(-x + 5)) - 5/3
```

3.434.9 Mupad [B] (verification not implemented)

Time = 14.68 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{-8e+e^{5-x}(-27+36x)}{-24e+27e^{5-x}x}\,dx = \frac{x}{3} - \ln\left(9\,x\,\mathrm{e}^{5-x} - 8\,\mathrm{e}\right)$$

input
```
int((8*exp(1) - exp(5 - x)*(36*x - 27))/(24*exp(1) - 27*x*exp(5 - x)),x)
```

output
```
x/3 - log(9*x*exp(5 - x) - 8*exp(1))
```

3.435 $\int \frac{-4x^2-10x^3-3x^4+(4x+10x^2+3x^3)\log(5)+\log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x^2-2x\log(5)+\log^2(5)}$

3.435.1 Optimal result

Integrand size = 68, antiderivative size = 25

$$\int \frac{-4x^2-10x^3-3x^4+(4x+10x^2+3x^3)\log(5)+\log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x^2-2x\log(5)+\log^2(5)}\,dx = \frac{x\log\left(e^{6+x+x(3+x(5+x))}\right)}{-x+\log(5)}$$

output
```
x/(ln(5)-x)*ln(exp(3)^2*exp(x+((5+x)*x+3)*x))
```

3.435.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60

$$\int \frac{-4x^2-10x^3-3x^4+(4x+10x^2+3x^3)\log(5)+\log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x^2-2x\log(5)+\log^2(5)}\,dx = -x(4+5x+x^2)-\frac{\log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x-\log(5)}$$

input
```
Integrate[(-4*x^2 - 10*x^3 - 3*x^4 + (4*x + 10*x^2 + 3*x^3)*Log[5] + Log[5
]*Log[E^(6 + 4*x + 5*x^2 + x^3)])/(x^2 - 2*x*Log[5] + Log[5]^2),x]
```

output
```
-(x*(4 + 5*x + x^2)) - (Log[5]*Log[E^(6 + 4*x + 5*x^2 + x^3)])/(x - Log[5]
)
```

3.435.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 234 vs. $2(25) = 50$.

Time = 0.72 (sec) , antiderivative size = 234, normalized size of antiderivative = 9.36, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$, Rules used = {7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^4-10x^3-4x^2+\log(5)\log\left(e^{x^3+5x^2+4x+6}\right)+\left(3x^3+10x^2+4x\right)\log(5)}{x^2-2x\log(5)+\log^2(5)}dx$$

$$\Big\downarrow \text{7277}$$

$$4\int -\frac{3x^4+10x^3+4x^2-\log(5)\log\left(e^{x^3+5x^2+4x+6}\right)-\left(3x^3+10x^2+4x\right)\log(5)}{4(x-\log(5))^2}dx$$

$$\Big\downarrow \text{27}$$

$$-\int \frac{3x^4+10x^3+4x^2-\log(5)\log\left(e^{x^3+5x^2+4x+6}\right)-\left(3x^3+10x^2+4x\right)\log(5)}{(x-\log(5))^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\int \left(\frac{3x^4}{(x-\log(5))^2}+\frac{10x^3}{(x-\log(5))^2}+\frac{4x^2}{(x-\log(5))^2}-\frac{\left(3x^2+10x+4\right)\log(5)x}{(x-\log(5))^2}-\frac{\log(5)\log\left(e^{x^3+5x^2+4x+6}\right)}{(x-\log(5))^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-x^3-5x^2-\frac{3}{2}x^2\log(25)+3x^2\log(5)-\frac{\log(5)\log\left(e^{x^3+5x^2+4x+6}\right)}{x-\log(5)}-4x+\frac{3\log^4(5)}{x-\log(5)}-12\log^3(5)\log(x-\log(5))+\frac{10\log^3(5)}{x-\log(5)}-9x\log^2(5)+\log(5)\left(4+3\log^2(5)+10\log(5)\right)\log(x-\log(5))-30\log^2(5)\log(x-\log(5))-\frac{\log^2(5)\left(4+3\log^2(5)+10\log(5)\right)}{x-\log(5)}+\frac{4\log^2(5)}{x-\log(5)}+x\log(5)(10+\log(125))+2x\log(5)(5+\log(125))-10x\log(25)-4\log(25)\log(x-\log(5))+\log(5)(2+\log(5))(2+9\log(5))\log(x-\log(5))$$

3.435. $\int \frac{-4x^2-10x^3-3x^4+\left(4x+10x^2+3x^3\right)\log(5)+\log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x^2-2x\log(5)+\log^2(5)}dx$

input
```
Int[(-4*x^2 - 10*x^3 - 3*x^4 + (4*x + 10*x^2 + 3*x^3)*Log[5] + Log[5]*Log[
E^(6 + 4*x + 5*x^2 + x^3)])/(x^2 - 2*x*Log[5] + Log[5]^2),x]
```

output
```
-4*x - 5*x^2 - x^3 + 3*x^2*Log[5] - 9*x*Log[5]^2 + (4*Log[5]^2)/(x - Log[5
]) + (10*Log[5]^3)/(x - Log[5]) + (3*Log[5]^4)/(x - Log[5]) - (Log[5]^2*(4
 + 10*Log[5] + 3*Log[5]^2))/(x - Log[5]) - 10*x*Log[25] - (3*x^2*Log[25])/
2 + 2*x*Log[5]*(5 + Log[125]) + x*Log[5]*(10 + Log[125]) - (Log[5]*Log[E^(
6 + 4*x + 5*x^2 + x^3)])/(x - Log[5]) - 30*Log[5]^2*Log[x - Log[5]] - 12*L
og[5]^3*Log[x - Log[5]] + Log[5]*(2 + Log[5])*(2 + 9*Log[5])*Log[x - Log[5
]] + Log[5]*(4 + 10*Log[5] + 3*Log[5]^2)*Log[x - Log[5]] - 4*Log[25]*Log[x
 - Log[5]]
```

3.435.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.435. $\int \frac{-4x^2-10x^3-3x^4+(4x+10x^2+3x^3)\log(5)+\log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x^2-2x\log(5)+\log^2(5)}\,dx$

3.435.4 Maple [A] (verified)

Time = 1.38 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

method	result
norman	$\frac{x\ln\left(\mathrm{e}^{6}\mathrm{e}^{x^{3}+5x^{2}+4x}\right)}{\ln(5)-x}$
parallelrisch	$\frac{-x^{3}\ln(5)+x^{4}-5x^{2}\ln(5)+5x^{3}-4\ln(5)^{2}+\ln(5)\ln\left(\mathrm{e}^{6}\mathrm{e}^{x^{3}+5x^{2}+4x}\right)+4x^{2}}{\ln(5)-x}$
risch	$\frac{\ln(5)\ln\left(\mathrm{e}^{x(1+x)(4+x)}\right)}{\ln(5)-x}-\frac{-2x^{3}\ln(5)+2x^{4}-10x^{2}\ln(5)+10x^{3}-8x\ln(5)+8x^{2}+12\ln(5)}{2(-\ln(5)+x)}$
default	$-3x\ln(5)^{2}-\frac{3x^{2}\ln(5)}{2}-x^{3}-10x\ln(5)-5x^{2}-4x-\left(3\ln(5)^{2}+10\ln(5)+4\right)\ln(5)\ln(-\mathrm{l}$
parts	$-3x\ln(5)^{2}-\frac{3x^{2}\ln(5)}{2}-x^{3}-10x\ln(5)-5x^{2}-4x-\left(3\ln(5)^{2}+10\ln(5)+4\right)\ln(5)\ln(-\mathrm{l}$

input
```
int((ln(5)*ln(exp(3)^2*exp(x^3+5*x^2+4*x))+(3*x^3+10*x^2+4*x)*ln(5)-3*x^4-
10*x^3-4*x^2)/(ln(5)^2-2*x*ln(5)+x^2),x,method=_RETURNVERBOSE)
```

output
```
x*ln(exp(3)^2*exp(x^3+5*x^2+4*x))/(ln(5)-x)
```

3.435.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. 2(25) = 50.

Time = 0.30 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.28

$$\int\frac{-4x^{2}-10x^{3}-3x^{4}+(4x+10x^{2}+3x^{3})\log(5)+\log(5)\log\left(e^{6+4x+5x^{2}+x^{3}}\right)}{x^{2}-2x\log(5)+\log^{2}(5)}\,dx$$
$$=-\frac{x^{4}-(x-5)\log(5)^{3}+\log(5)^{4}+5x^{3}-(5x-4)\log(5)^{2}+4x^{2}-2(2x-3)\log(5)}{x-\log(5)}$$

input
```
integrate((log(5)*log(exp(3)^2*exp(x^3+5*x^2+4*x))+(3*x^3+10*x^2+4*x)*log(
5)-3*x^4-10*x^3-4*x^2)/(log(5)^2-2*x*log(5)+x^2),x, algorithm=\
```

output
```
-(x^4 - (x - 5)*log(5)^3 + log(5)^4 + 5*x^3 - (5*x - 4)*log(5)^2 + 4*x^2 -
 2*(2*x - 3)*log(5))/(x - log(5))
```

3.435.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(22) = 44$.

Time = 0.15 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.16

$$\int \frac{-4x^2 - 10x^3 - 3x^4 + (4x + 10x^2 + 3x^3)\log(5) + \log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x^2 - 2x\log(5) + \log^2(5)}\,dx$$
$$= -x^3 - x^2(\log(5) + 5) - x\left(\log(5)^2 + 4 + 5\log(5)\right) - \frac{\log(5)^4 + 6\log(5) + 4\log(5)^2 + 5\log(5)^3}{x - \log(5)}$$

input
```
integrate((ln(5)*ln(exp(3)**2*exp(x**3+5*x**2+4*x))+(3*x**3+10*x**2+4*x)*l
n(5)-3*x**4-10*x**3-4*x**2)/(ln(5)**2-2*x*ln(5)+x**2),x)
```

output
```
-x**3 - x**2*(log(5) + 5) - x*(log(5)**2 + 4 + 5*log(5)) - (log(5)**4 + 6*
log(5) + 4*log(5)**2 + 5*log(5)**3)/(x - log(5))
```

3.435.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(25) = 50$.

Time = 0.20 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.36

$$\int \frac{-4x^2 - 10x^3 - 3x^4 + (4x + 10x^2 + 3x^3)\log(5) + \log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x^2 - 2x\log(5) + \log^2(5)}\,dx$$
$$= -x^3 - x^2(\log(5) + 5) - \left(\log(5)^2 + 5\log(5) + 4\right)x - \frac{\log(5)^4 + 5\log(5)^3 + 4\log(5)^2 + 6\log(5)}{x - \log(5)}$$

input
```
integrate((log(5)*log(exp(3)^2*exp(x^3+5*x^2+4*x))+(3*x^3+10*x^2+4*x)*log(
5)-3*x^4-10*x^3-4*x^2)/(log(5)^2-2*x*log(5)+x^2),x, algorithm=\
```

output
```
-x^3 - x^2*(log(5) + 5) - (log(5)^2 + 5*log(5) + 4)*x - (log(5)^4 + 5*log(
5)^3 + 4*log(5)^2 + 6*log(5))/(x - log(5))
```

3.435.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. $2(25) = 50$.

Time = 0.27 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.56

$$\int \frac{-4x^2 - 10x^3 - 3x^4 + (4x + 10x^2 + 3x^3)\log(5) + \log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x^2 - 2x\log(5) + \log^2(5)}\,dx$$
$$= -x^3 - x^2\log(5) - x\log(5)^2 - 5x^2 - 5x\log(5) - 4x - \frac{\log(5)^4 + 5\log(5)^3 + 4\log(5)^2 + 6\log(5)}{x - \log(5)}$$

input
```
integrate((log(5)*log(exp(3)^2*exp(x^3+5*x^2+4*x))+(3*x^3+10*x^2+4*x)*log(
5)-3*x^4-10*x^3-4*x^2)/(log(5)^2-2*x*log(5)+x^2),x, algorithm=\
```

output
```
-x^3 - x^2*log(5) - x*log(5)^2 - 5*x^2 - 5*x*log(5) - 4*x - (log(5)^4 + 5*
log(5)^3 + 4*log(5)^2 + 6*log(5))/(x - log(5))
```

3.435.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 79, normalized size of antiderivative = 3.16

$$\int \frac{-4x^2 - 10x^3 - 3x^4 + (4x + 10x^2 + 3x^3)\log(5) + \log(5)\log\left(e^{6+4x+5x^2+x^3}\right)}{x^2 - 2x\log(5) + \log^2(5)}\,dx$$
$$= x\left(15\ln(5) - 2\ln(5)\left(6\ln(5) - \ln(625) + 10\right) + 3\ln(5)^2 - 4\right) - \frac{6\ln(5) + \ln(5)\ln(625) + 5\ln(5)^3 + \ln(5)^4}{x - \ln(5)} - x^3 - x^2\left(3\ln(5) - \frac{\ln(625)}{2} + 5\right)$$

input
```
int(-(4*x^2 - log(5)*log(exp(6)*exp(4*x + 5*x^2 + x^3)) - log(5)*(4*x + 10
*x^2 + 3*x^3) + 10*x^3 + 3*x^4)/(log(5)^2 - 2*x*log(5) + x^2),x)
```

output
```
x*(15*log(5) - 2*log(5)*(6*log(5) - log(625) + 10) + 3*log(5)^2 - 4) - (6*
log(5) + log(5)*log(625) + 5*log(5)^3 + log(5)^4)/(x - log(5)) - x^3 - x^2
*(3*log(5) - log(625)/2 + 5)
```

3.436 $\int \frac{e^{-5+8x-3x^2-e^{10}\left(2x-x^2\right)}\left(-3+24x-18x^2+e^{10}\left(-6x+6x^2\right)+\left(24-18x+e^{10}(-6+6x)\right)\log(3)\right)}{x^2+2x\log(3)+\log^2(3)}$

3.436.1 Optimal result

Integrand size = 82, antiderivative size = 25

$$\int \frac{e^{-5+8x-3x^2-e^{10}(2x-x^2)}(-3+24x-18x^2+e^{10}(-6x+6x^2)+(24-18x+e^{10}(-6+6x))\log(3))}{x^2+2x\log(3)+\log^2(3)}\,dx$$
$$=\frac{3e^{-5+(-4+e^{10})(-2+x)x+x^2}}{x+\log(3)}$$

output
```
3/(ln(3)+x)/exp(5-(-2+x)*(exp(5)^2-4)*x-x^2)
```

3.436.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 85 vs. 2(25) = 50.

Time = 0.24 (sec) , antiderivative size = 85, normalized size of antiderivative = 3.40

$$\int \frac{e^{-5+8x-3x^2-e^{10}(2x-x^2)}(-3+24x-18x^2+e^{10}(-6x+6x^2)+(24-18x+e^{10}(-6+6x))\log(3))}{x^2+2x\log(3)+\log^2(3)}\,dx$$
$$=\frac{3e^{-5+8x+e^{10}(-2+x)x-3x^2}(2(-3+e^{10})x^2+8\log(3)+x(8-6\log(3)+e^{10}(-2+\log(9)))-e^{10}\log(9))}{(8+e^{10}(-2+x)-6x+e^{10}x)(x+\log(3))^2}$$

input
```
Integrate[(E^(-5 + 8*x - 3*x^2 - E^10*(2*x - x^2))*(-3 + 24*x - 18*x^2 + E
^10*(-6*x + 6*x^2) + (24 - 18*x + E^10*(-6 + 6*x))*Log[3]))/(x^2 + 2*x*Log
[3] + Log[3]^2),x]
```

output
```
(3*E^(-5 + 8*x + E^10*(-2 + x)*x - 3*x^2)*(2*(-3 + E^10)*x^2 + 8*Log[3] +
x*(8 - 6*Log[3] + E^10*(-2 + Log[9])) - E^10*Log[9]))/((8 + E^10*(-2 + x)
- 6*x + E^10*x)*(x + Log[3])^2)
```

3.436.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 90 vs. $2(25) = 50$.

Time = 0.55 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.60, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.024$, Rules used = {2007, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-3x^2-e^{10}(2x-x^2)+8x-5}\left(-18x^2+e^{10}\left(6x^2-6x\right)+24x+\left(-18x+e^{10}(6x-6)+24\right)\log(3)-3\right)}{x^2+2x\log(3)+\log^2(3)}\,dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{e^{-3x^2-e^{10}(2x-x^2)+8x-5}\left(-18x^2+e^{10}\left(6x^2-6x\right)+24x+\left(-18x+e^{10}(6x-6)+24\right)\log(3)-3\right)}{(x+\log(3))^2}dx$$

$$\Big\downarrow \text{ 2726}$$

$$\frac{3e^{-3x^2-e^{10}(2x-x^2)+8x-5}\left(-3x^2-e^{10}\left(x-x^2\right)+4x+\left(-e^{10}(1-x)-3x+4\right)\log(3)\right)}{\left(-e^{10}(1-x)-3x+4\right)(x+\log(3))^2}$$

input
```
Int[(E^(-5 + 8*x - 3*x^2 - E^10*(2*x - x^2))*(-3 + 24*x - 18*x^2 + E^10*(-
6*x + 6*x^2) + (24 - 18*x + E^10*(-6 + 6*x))*Log[3]))/(x^2 + 2*x*Log[3] +
Log[3]^2),x]
```

output
```
(3*E^(-5 + 8*x - 3*x^2 - E^10*(2*x - x^2))*(4*x - 3*x^2 - E^10*(x - x^2) +
 (4 - E^10*(1 - x) - 3*x)*Log[3]))/((4 - E^10*(1 - x) - 3*x)*(x + Log[3])^
2)
```

3.436.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.436.4 Maple [A] (verified)

Time = 1.19 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

method	result	size
risch	$\frac{3\,\mathrm{e}^{x^{2}\mathrm{e}^{10}-2x\,\mathrm{e}^{10}-3x^{2}+8x-5}}{\ln(3)+x}$	31
norman	$\frac{3\,\mathrm{e}^{-\left(-x^{2}+2x\right)\mathrm{e}^{10}-3x^{2}+8x-5}}{\ln(3)+x}$	36
parallelrisch	$\frac{3\,\mathrm{e}^{-\left(-x^{2}+2x\right)\mathrm{e}^{10}-3x^{2}+8x-5}}{\ln(3)+x}$	36
gosper	$\frac{3\,\mathrm{e}^{x^{2}\mathrm{e}^{10}-2x\,\mathrm{e}^{10}-3x^{2}+8x-5}}{\ln(3)+x}$	38

input
```
int((((6*x-6)*exp(5)^2-18*x+24)*ln(3)+(6*x^2-6*x)*exp(5)^2-18*x^2+24*x-3)/
(ln(3)^2+2*x*ln(3)+x^2)/exp((-x^2+2*x)*exp(5)^2+3*x^2-8*x+5),x,method=_RET
URNVERBOSE)
```

output
```
3/(ln(3)+x)*exp(x^2*exp(10)-2*x*exp(10)-3*x^2+8*x-5)
```

3.436.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{e^{-5+8x-3x^2-e^{10}(2x-x^2)}(-3+24x-18x^2+e^{10}(-6x+6x^2)+(24-18x+e^{10}(-6+6x))\log(3))}{x^2+2x\log(3)+\log^2(3)}\,dx$$
$$=\frac{3\,e^{\left(-3\,x^2+\left(x^2-2\,x\right)e^{10}+8\,x-5\right)}}{x+\log(3)}$$

input
```
integrate((((6*x-6)*exp(5)^2-18*x+24)*log(3)+(6*x^2-6*x)*exp(5)^2-18*x^2+2
4*x-3)/(log(3)^2+2*x*log(3)+x^2)/exp((-x^2+2*x)*exp(5)^2+3*x^2-8*x+5),x, a
lgorithm=\
```

output
```
3*e^(-3*x^2 + (x^2 - 2*x)*e^10 + 8*x - 5)/(x + log(3))
```

3.436.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{e^{-5+8x-3x^2-e^{10}(2x-x^2)}(-3+24x-18x^2+e^{10}(-6x+6x^2)+(24-18x+e^{10}(-6+6x))\log(3))}{x^2+2x\log(3)+\log^2(3)}\,dx = \frac{3e^{-3x^2+8x-(-x^2+2x)e^{10}-5}}{x+\log(3)}$$

input
```
integrate((((6*x-6)*exp(5)**2-18*x+24)*ln(3)+(6*x**2-6*x)*exp(5)**2-18*x**
2+24*x-3)/(ln(3)**2+2*x*ln(3)+x**2)/exp((-x**2+2*x)*exp(5)**2+3*x**2-8*x+5
),x)
```

output
```
3*exp(-3*x**2 + 8*x - (-x**2 + 2*x)*exp(10) - 5)/(x + log(3))
```

3.436.7 Maxima [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.40

$$\int \frac{e^{-5+8x-3x^2-e^{10}(2x-x^2)}(-3+24x-18x^2+e^{10}(-6x+6x^2)+(24-18x+e^{10}(-6+6x))\log(3))}{x^2+2x\log(3)+\log^2(3)}\,dx = \frac{3\,e^{\left(x^2e^{10}-3\,x^2-2\,xe^{10}+8\,x\right)}}{xe^5+e^5\log(3)}$$

input
```
integrate((((6*x-6)*exp(5)^2-18*x+24)*log(3)+(6*x^2-6*x)*exp(5)^2-18*x^2+2
4*x-3)/(log(3)^2+2*x*log(3)+x^2)/exp((-x^2+2*x)*exp(5)^2+3*x^2-8*x+5),x, a
lgorithm=\
```

output
```
3*e^(x^2*e^10 - 3*x^2 - 2*x*e^10 + 8*x)/(x*e^5 + e^5*log(3))
```

3.436.8 Giac [F]

$$\int \frac{e^{-5+8x-3x^2-e^{10}(2x-x^2)}(-3+24x-18x^2+e^{10}(-6x+6x^2)+(24-18x+e^{10}(-6+6x))\log(3))}{x^2+2x\log(3)+\log^2(3)}\,dx$$
$$=\int -\frac{3\left(6\,x^2-2\,(x^2-x)e^{10}-2\left((x-1)e^{10}-3\,x+4\right)\log(3)-8\,x+1\right)e^{\left(-3\,x^2+(x^2-2\,x)e^{10}+8\,x-5\right)}}{x^2+2\,x\log(3)+\log(3)^2}\,dx$$

input
```
integrate((((6*x-6)*exp(5)^2-18*x+24)*log(3)+(6*x^2-6*x)*exp(5)^2-18*x^2+2
4*x-3)/(log(3)^2+2*x*log(3)+x^2)/exp((-x^2+2*x)*exp(5)^2+3*x^2-8*x+5),x, a
lgorithm=\
```

output
```
integrate(-3*(6*x^2 - 2*(x^2 - x)*e^10 - 2*((x - 1)*e^10 - 3*x + 4)*log(3)
 - 8*x + 1)*e^(-3*x^2 + (x^2 - 2*x)*e^10 + 8*x - 5)/(x^2 + 2*x*log(3) + lo
g(3)^2), x)
```

3.436.9 Mupad [B] (verification not implemented)

Time = 15.09 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{e^{-5+8x-3x^2-e^{10}(2x-x^2)}(-3+24x-18x^2+e^{10}(-6x+6x^2)+(24-18x+e^{10}(-6+6x))\log(3))}{x^2+2x\log(3)+\log^2(3)}\,dx$$
$$=\frac{3\,e^{x^2\,e^{10}}\,e^{8\,x}\,e^{-5}\,e^{-3\,x^2}\,e^{-2\,x\,e^{10}}}{x+\ln(3)}$$

input
```
int(-(exp(8*x - exp(10)*(2*x - x^2) - 3*x^2 - 5)*(exp(10)*(6*x - 6*x^2) -
24*x + 18*x^2 - log(3)*(exp(10)*(6*x - 6) - 18*x + 24) + 3))/(2*x*log(3) +
 log(3)^2 + x^2),x)
```

output
```
(3*exp(x^2*exp(10))*exp(8*x)*exp(-5)*exp(-3*x^2)*exp(-2*x*exp(10)))/(x + l
og(3))
```

3.437 $\int (1682x + 2e^4x + 1044x^2 + 144x^3 + e^2(-116x - 36$

3.437.1 Optimal result

Integrand size = 33, antiderivative size = 19

$$\int \left(1682x + 2e^4x + 1044x^2 + 144x^3 + e^2\left(-116x - 36x^2\right)\right) dx = 2 + \left(x - x\left(e^2 + x - 7(4 + x)\right)\right)^2$$

output
```
2+(x-x*(-6*x-28+exp(2)))^2
```

3.437.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \left(1682x + 2e^4x + 1044x^2 + 144x^3 + e^2\left(-116x - 36x^2\right)\right) dx = \left(-29 + e^2 - 6x\right)^2 x^2$$

input
```
Integrate[1682*x + 2*E^4*x + 1044*x^2 + 144*x^3 + E^2*(-116*x - 36*x^2),x]
```

output
```
(-29 + E^2 - 6*x)^2*x^2
```

3.437.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.89, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.061, Rules used = {6, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(144x^3+1044x^2+e^2\left(-36x^2-116x\right)+2e^4x+1682x\right)\,dx$$

$$\Big\downarrow \ 6$$

$$\int \left(144x^3+1044x^2+e^2\left(-36x^2-116x\right)+\left(1682+2e^4\right)x\right)dx$$

$$\Big\downarrow \ 2009$$

$$36x^4-12e^2x^3+348x^3+\left(841+e^4\right)x^2-58e^2x^2$$

input
```
Int[1682*x + 2*E^4*x + 1044*x^2 + 144*x^3 + E^2*(-116*x - 36*x^2),x]
```

output
```
-58*E^2*x^2 + (841 + E^4)*x^2 + 348*x^3 - 12*E^2*x^3 + 36*x^4
```

3.437.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.437.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

method	result	size
gosper	$x^2(e^2-6x-29)^2$	14
default	$36x^4+\frac{2(-18\,e^2+522)x^3}{3}+(e^2-29)^2 x^2$	28
norman	$(-12\,e^2+348)\,x^3+(e^4-58\,e^2+841)\,x^2+36x^4$	31
risch	$x^2e^4-12x^3e^2-58x^2e^2+36x^4+348x^3+841x^2$	37
parallelrisch	$x^2e^4-12x^3e^2-58x^2e^2+36x^4+348x^3+841x^2$	39
parts	$x^2e^4-12x^3e^2-58x^2e^2+36x^4+348x^3+841x^2$	39

input
```
int(2*x*exp(2)^2+(-36*x^2-116*x)*exp(2)+144*x^3+1044*x^2+1682*x,x,method=_
RETURNVERBOSE)
```

output
```
x^2*(exp(2)-6*x-29)^2
```

3.437.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(17) = 34$.

Time = 0.31 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.95

$$\int \left(1682x+2e^4x+1044x^2+144x^3+e^2\left(-116x-36x^2\right)\right)\,dx$$
$$=36\,x^4+348\,x^3+x^2e^4+841\,x^2-2\left(6\,x^3+29\,x^2\right)e^2$$

input
```
integrate(2*x*exp(2)^2+(-36*x^2-116*x)*exp(2)+144*x^3+1044*x^2+1682*x,x, a
lgorithm=\
```

output
```
36*x^4 + 348*x^3 + x^2*e^4 + 841*x^2 - 2*(6*x^3 + 29*x^2)*e^2
```

3.437.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \left(1682x+2e^4x+1044x^2+144x^3+e^2\left(-116x-36x^2\right)\right)\,dx$$
$$=36x^4+x^3\cdot\left(348-12e^2\right)+x^2\left(-58e^2+e^4+841\right)$$

input
```
integrate(2*x*exp(2)**2+(-36*x**2-116*x)*exp(2)+144*x**3+1044*x**2+1682*x,
x)
```

output
```
36*x**4 + x**3*(348 - 12*exp(2)) + x**2*(-58*exp(2) + exp(4) + 841)
```

3.437.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(17) = 34$.

Time = 0.19 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.95

$$\int \left(1682x + 2e^4x + 1044x^2 + 144x^3 + e^2\left(-116x - 36x^2\right)\right) \, dx$$
$$= 36\,x^4 + 348\,x^3 + x^2e^4 + 841\,x^2 - 2\,\left(6\,x^3 + 29\,x^2\right)e^2$$

input
```
integrate(2*x*exp(2)^2+(-36*x^2-116*x)*exp(2)+144*x^3+1044*x^2+1682*x,x, a
lgorithm=\
```

output
```
36*x^4 + 348*x^3 + x^2*e^4 + 841*x^2 - 2*(6*x^3 + 29*x^2)*e^2
```

3.437.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(17) = 34$.

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.95

$$\int \left(1682x + 2e^4x + 1044x^2 + 144x^3 + e^2\left(-116x - 36x^2\right)\right) \, dx$$
$$= 36\,x^4 + 348\,x^3 + x^2e^4 + 841\,x^2 - 2\,\left(6\,x^3 + 29\,x^2\right)e^2$$

input
```
integrate(2*x*exp(2)^2+(-36*x^2-116*x)*exp(2)+144*x^3+1044*x^2+1682*x,x, a
lgorithm=\
```

output
```
36*x^4 + 348*x^3 + x^2*e^4 + 841*x^2 - 2*(6*x^3 + 29*x^2)*e^2
```

3.437.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \left(1682x + 2e^4x + 1044x^2 + 144x^3 + e^2\left(-116x - 36x^2\right)\right) dx = x^2 \left(6\,x - \mathrm{e}^2 + 29\right)^2$$

input
```
int(1682*x - exp(2)*(116*x + 36*x^2) + 2*x*exp(4) + 1044*x^2 + 144*x^3,x)
```

output
```
x^2*(6*x - exp(2) + 29)^2
```

3.438 $\int \frac{1+e^x(-3-x)}{16+8x+x^2} \, dx$

3.438.1 Optimal result

Integrand size = 22, antiderivative size = 13

$$\int \frac{1+e^x(-3-x)}{16+8x+x^2} \, dx = \frac{-1-e^x}{4+x}$$

output
```
(-exp(x)-1)/(4+x)
```

3.438.2 Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{1+e^x(-3-x)}{16+8x+x^2} \, dx = -\frac{1+e^x}{4+x}$$

input
```
Integrate[(1 + E^x*(-3 - x))/(16 + 8*x + x^2),x]
```

output
```
-((1 + E^x)/(4 + x))
```

3.438.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.38, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(-x-3)+1}{x^2+8x+16} \, dx$$
$$\Big\downarrow \text{2007}$$
$$\int \frac{e^x(-x-3)+1}{(x+4)^2}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{1}{(x+4)^2}-\frac{e^x(x+3)}{(x+4)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{e^x}{x+4}-\frac{1}{x+4}$$

input
```
Int[(1 + E^x*(-3 - x))/(16 + 8*x + x^2),x]
```

output
```
-(4 + x)^(-1) - E^x/(4 + x)
```

3.438.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.438.4 Maple [A] (verified)

Time = 1.42 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

method	result	size
norman	$\frac{-e^x-1}{4+x}$	13
parallelrisch	$\frac{-e^x-1}{4+x}$	13
default	$-\frac{1}{4+x}-\frac{e^x}{4+x}$	18
risch	$-\frac{1}{4+x}-\frac{e^x}{4+x}$	18
parts	$-\frac{1}{4+x}-\frac{e^x}{4+x}$	18

input
```
int(((-3-x)*exp(x)+1)/(x^2+8*x+16),x,method=_RETURNVERBOSE)
```

output
```
(-exp(x)-1)/(4+x)
```

3.438.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{1+e^x(-3-x)}{16+8x+x^2}\,dx=-\frac{e^x+1}{x+4}$$

input
```
integrate(((-3-x)*exp(x)+1)/(x^2+8*x+16),x, algorithm=\
```

output
```
-(e^x + 1)/(x + 4)
```

3.438.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{1+e^x(-3-x)}{16+8x+x^2}\,dx=-\frac{e^x}{x+4}-\frac{1}{x+4}$$

input
```
integrate(((-3-x)*exp(x)+1)/(x**2+8*x+16),x)
```

output
```
-exp(x)/(x + 4) - 1/(x + 4)
```

3.438.7 Maxima [F]

$$\int \frac{1+e^x(-3-x)}{16+8x+x^2}\,dx=\int -\frac{(x+3)e^x-1}{x^2+8\,x+16}\,dx$$

input
```
integrate(((-3-x)*exp(x)+1)/(x^2+8*x+16),x, algorithm=\
```

output
```
-x*e^x/(x^2 + 8*x + 16) + 3*e^(-4)*exp_integral_e(2, -x - 4)/(x + 4) - 1/(
x + 4) - integrate((x - 4)*e^x/(x^3 + 12*x^2 + 48*x + 64), x)
```

3.438.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{1+e^x(-3-x)}{16+8x+x^2}\,dx=-\frac{e^x+1}{x+4}$$

input
```
integrate(((-3-x)*exp(x)+1)/(x^2+8*x+16),x, algorithm=\
```

output
```
-(e^x + 1)/(x + 4)
```

3.438.9 Mupad [B] (verification not implemented)

Time = 14.83 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{1+e^x(-3-x)}{16+8x+x^2}\,dx=-\frac{e^x+1}{x+4}$$

input
```
int(-(exp(x)*(x + 3) - 1)/(8*x + x^2 + 16),x)
```

output
```
-(exp(x) + 1)/(x + 4)
```

3.439 $\int \frac{-18e^2+18x^2+4x^3-24x^5+27x^7}{18x^2} dx$

3.439.1 Optimal result

Integrand size = 33, antiderivative size = 31

$$\int \frac{-18e^2+18x^2+4x^3-24x^5+27x^7}{18x^2} dx = 7+\frac{e^2(1-x)}{x}+x+\frac{1}{4}x^2\left(-\frac{2}{3}+x^2\right)^2$$

output
```
x+7+1/4*x^2*(x^2-2/3)^2+exp(2)/x*(1-x)
```

3.439.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.97

$$\int \frac{-18e^2+18x^2+4x^3-24x^5+27x^7}{18x^2} dx = \frac{e^2}{x}+x+\frac{x^2}{9}-\frac{x^4}{3}+\frac{x^6}{4}$$

input
```
Integrate[(-18*E^2 + 18*x^2 + 4*x^3 - 24*x^5 + 27*x^7)/(18*x^2),x]
```

output
```
E^2/x + x + x^2/9 - x^4/3 + x^6/4
```

3.439.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{27x^7-24x^5+4x^3+18x^2-18e^2}{18x^2}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{18}\int -\frac{-27x^7+24x^5-4x^3-18x^2+18e^2}{x^2}dx$$
$$\Big\downarrow \text{25}$$
$$-\frac{1}{18}\int \frac{-27x^7+24x^5-4x^3-18x^2+18e^2}{x^2}dx$$
$$\Big\downarrow \text{2010}$$
$$-\frac{1}{18}\int \left(-27x^5+24x^3-4x-18+\frac{18e^2}{x^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{1}{18}\left(\frac{9x^6}{2}-6x^4+2x^2+18x+\frac{18e^2}{x}\right)$$

input
```
Int[(-18*E^2 + 18*x^2 + 4*x^3 - 24*x^5 + 27*x^7)/(18*x^2),x]
```

output
```
((18*E^2)/x + 18*x + 2*x^2 - 6*x^4 + (9*x^6)/2)/18
```

3.439.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.439.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.77

method	result	size
default	$\frac{x^{6}}{4}-\frac{x^{4}}{3}+\frac{x^{2}}{9}+x+\frac{{\mathrm e}^{2}}{x}$	24
risch	$\frac{x^{6}}{4}-\frac{x^{4}}{3}+\frac{x^{2}}{9}+x+\frac{{\mathrm e}^{2}}{x}$	24
norman	$\frac{x^{2}+\frac{x^{3}}{9}-\frac{x^{5}}{3}+\frac{x^{7}}{4}+{\mathrm e}^{2}}{x}$	26
gosper	$\frac{9 x^{7}-12 x^{5}+4 x^{3}+36 x^{2}+36 \,{\mathrm e}^{2}}{36 x}$	31
parallelrisch	$\frac{9 x^{7}-12 x^{5}+4 x^{3}+36 x^{2}+36 \,{\mathrm e}^{2}}{36 x}$	31

input
```
int(1/18*(-18*exp(2)+27*x^7-24*x^5+4*x^3+18*x^2)/x^2,x,method=_RETURNVERBO
SE)
```

output
```
1/4*x^6-1/3*x^4+1/9*x^2+x+exp(2)/x
```

3.439.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.97

$$\int \frac{-18e^2+18x^2+4x^3-24x^5+27x^7}{18x^2}\,dx=\frac{9\,x^{7}-12\,x^{5}+4\,x^{3}+36\,x^{2}+36\,e^{2}}{36\,x}$$

input
```
integrate(1/18*(-18*exp(2)+27*x^7-24*x^5+4*x^3+18*x^2)/x^2,x, algorithm=\
```

output
```
1/36*(9*x^7 - 12*x^5 + 4*x^3 + 36*x^2 + 36*e^2)/x
```

3.439.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.65

$$\int \frac{-18e^2+18x^2+4x^3-24x^5+27x^7}{18x^2}\,dx=\frac{x^6}{4}-\frac{x^4}{3}+\frac{x^2}{9}+x+\frac{e^2}{x}$$

input
```
integrate(1/18*(-18*exp(2)+27*x**7-24*x**5+4*x**3+18*x**2)/x**2,x)
```

output
```
x**6/4 - x**4/3 + x**2/9 + x + exp(2)/x
```

3.439.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.74

$$\int \frac{-18e^2+18x^2+4x^3-24x^5+27x^7}{18x^2}\,dx=\frac{1}{4}\,x^6-\frac{1}{3}\,x^4+\frac{1}{9}\,x^2+x+\frac{e^2}{x}$$

input
```
integrate(1/18*(-18*exp(2)+27*x^7-24*x^5+4*x^3+18*x^2)/x^2,x, algorithm=\
```

output
```
1/4*x^6 - 1/3*x^4 + 1/9*x^2 + x + e^2/x
```

3.439.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.74

$$\int \frac{-18e^2+18x^2+4x^3-24x^5+27x^7}{18x^2}\,dx=\frac{1}{4}\,x^6-\frac{1}{3}\,x^4+\frac{1}{9}\,x^2+x+\frac{e^2}{x}$$

input
```
integrate(1/18*(-18*exp(2)+27*x^7-24*x^5+4*x^3+18*x^2)/x^2,x, algorithm=\
```

output
```
1/4*x^6 - 1/3*x^4 + 1/9*x^2 + x + e^2/x
```

3.439.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.74

$$\int \frac{-18e^2 + 18x^2 + 4x^3 - 24x^5 + 27x^7}{18x^2} \, dx = x + \frac{e^2}{x} + \frac{x^2}{9} - \frac{x^4}{3} + \frac{x^6}{4}$$

input
```
int((x^2 - exp(2) + (2*x^3)/9 - (4*x^5)/3 + (3*x^7)/2)/x^2,x)
```

output
```
x + exp(2)/x + x^2/9 - x^4/3 + x^6/4
```

3.440 $\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16}{}$

3.440.1 Optimal result

Integrand size = 319, antiderivative size = 31

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16}{}$$

$$= x\left(4-\log^2\left(-2+x-x(5+3x)+\frac{8}{x(x+\log(x))}\right)\right)$$

output
```
(4-ln(x-2-x*(5+3*x)+8/(x+ln(x))/x)^2)*x
```

3.440.2 Mathematica [F]

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16}{}$$

$$= \int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-1}{}$$

3.440.

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16-32x-8x^4-12x^5+(-16-16x^3-24x^4)\log(x)+(-8}{}$$

input
```
Integrate[(-32*x + 8*x^3 + 16*x^4 + 12*x^5 + (-32 + 16*x^2 + 32*x^3 + 24*x
^4)*Log[x] + (8*x + 16*x^2 + 12*x^3)*Log[x]^2 + (-16 - 32*x - 8*x^4 - 12*x
^5 + (-16 - 16*x^3 - 24*x^4)*Log[x] + (-8*x^2 - 12*x^3)*Log[x]^2)*Log[(8 -
 2*x^2 - 4*x^3 - 3*x^4 + (-2*x - 4*x^2 - 3*x^3)*Log[x])/(x^2 + x*Log[x])]
+ (8*x - 2*x^3 - 4*x^4 - 3*x^5 + (8 - 4*x^2 - 8*x^3 - 6*x^4)*Log[x] + (-2*
x - 4*x^2 - 3*x^3)*Log[x]^2)*Log[(8 - 2*x^2 - 4*x^3 - 3*x^4 + (-2*x - 4*x^
2 - 3*x^3)*Log[x])/(x^2 + x*Log[x])]^2)/(-8*x + 2*x^3 + 4*x^4 + 3*x^5 + (-
8 + 4*x^2 + 8*x^3 + 6*x^4)*Log[x] + (2*x + 4*x^2 + 3*x^3)*Log[x]^2),x]
```

output
```
Integrate[(-32*x + 8*x^3 + 16*x^4 + 12*x^5 + (-32 + 16*x^2 + 32*x^3 + 24*x
^4)*Log[x] + (8*x + 16*x^2 + 12*x^3)*Log[x]^2 + (-16 - 32*x - 8*x^4 - 12*x
^5 + (-16 - 16*x^3 - 24*x^4)*Log[x] + (-8*x^2 - 12*x^3)*Log[x]^2)*Log[(8 -
 2*x^2 - 4*x^3 - 3*x^4 + (-2*x - 4*x^2 - 3*x^3)*Log[x])/(x^2 + x*Log[x])]
+ (8*x - 2*x^3 - 4*x^4 - 3*x^5 + (8 - 4*x^2 - 8*x^3 - 6*x^4)*Log[x] + (-2*
x - 4*x^2 - 3*x^3)*Log[x]^2)*Log[(8 - 2*x^2 - 4*x^3 - 3*x^4 + (-2*x - 4*x^
2 - 3*x^3)*Log[x])/(x^2 + x*Log[x])]^2)/(-8*x + 2*x^3 + 4*x^4 + 3*x^5 + (-
8 + 4*x^2 + 8*x^3 + 6*x^4)*Log[x] + (2*x + 4*x^2 + 3*x^3)*Log[x]^2), x]
```

3.440.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{12x^5+16x^4+8x^3+\left(12x^3+16x^2+8x\right)\log^2(x)+\left(24x^4+32x^3+16x^2-32\right)\log(x)+\left(-3x^5-4x^4-2x^3+\right.}{}$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{4\left(3x^2+4x+2\right)x\log^2(x)}{(x+\log(x))\left(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8\right)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+\left(3x^2\right.}{x(x+\log}\right.\right.$$

$$\Big\downarrow \ 7239$$

$$\int \frac{-12x^5-16x^4-8x^3-4\left(3x^2+4x+2\right)x\log^2(x)+(x+\log(x))\left(3x^4+4x^3+2x^2+\left(3x^2+4x+2\right)x\log(x)-\right.}{}$$

$$\Big\downarrow \ 7293$$

$$\int \frac{-32x+8x^3+16x^4+12x^5+\left(-32+16x^2+32x^3+24x^4\right)\log(x)+\left(8x+16x^2+12x^3\right)\log^2(x)+\left(-16-32x-8x^4-12x^5+\left(-16-16x^3-24x^4\right)\log(x)+\left(-8\right.\right.}{}$$

$$\int \left(\frac{4(3x^2+4x+2)\,x\log^2(x)}{(x+\log(x))\,(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)} - \log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\mathrm{lo}}\right.\right.$$

$\big\downarrow$ 7239

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)\,x\log^2(x)+(x+\log(x))\,(3x^4+4x^3+2x^2+(3x^2+4x+2)\,x\log(x)-}{}$$

$\big\downarrow$ 7293

$$\int \left(\frac{4(3x^2+4x+2)\,x\log^2(x)}{(x+\log(x))\,(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)} - \log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\mathrm{lo}}\right.\right.$$

$\big\downarrow$ 7239

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)\,x\log^2(x)+(x+\log(x))\,(3x^4+4x^3+2x^2+(3x^2+4x+2)\,x\log(x)-}{}$$

$\big\downarrow$ 7293

$$\int \left(\frac{4(3x^2+4x+2)\,x\log^2(x)}{(x+\log(x))\,(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)} - \log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\mathrm{lo}}\right.\right.$$

$\big\downarrow$ 7239

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)\,x\log^2(x)+(x+\log(x))\,(3x^4+4x^3+2x^2+(3x^2+4x+2)\,x\log(x)-}{}$$

$\big\downarrow$ 7293

$$\int \left(\frac{4(3x^2+4x+2)\,x\log^2(x)}{(x+\log(x))\,(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)} - \log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\mathrm{lo}}\right.\right.$$

$\big\downarrow$ 7239

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)\,x\log^2(x)+(x+\log(x))\,(3x^4+4x^3+2x^2+(3x^2+4x+2)\,x\log(x)-}{}$$

3.440.

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16-32x-8x^4-12x^5+(-16-16x^3-24x^4)\log(x)+(-8}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4(3x^2+4x+2)x\log^2(x)}{(x+\log(x))(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\log}\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)x\log^2(x)+(x+\log(x))(3x^4+4x^3+2x^2+(3x^2+4x+2)x\log(x)-}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4(3x^2+4x+2)x\log^2(x)}{(x+\log(x))(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\log}\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)x\log^2(x)+(x+\log(x))(3x^4+4x^3+2x^2+(3x^2+4x+2)x\log(x)-}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4(3x^2+4x+2)x\log^2(x)}{(x+\log(x))(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\log}\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)x\log^2(x)+(x+\log(x))(3x^4+4x^3+2x^2+(3x^2+4x+2)x\log(x)-}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4(3x^2+4x+2)x\log^2(x)}{(x+\log(x))(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\log}\right.\right.$$

$$\Big\downarrow \text{7239}$$

3.440.

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16-32x-8x^4-12x^5+(-16-16x^3-24x^4)\log(x)+(-8}{}$$

$$\int \frac{-12x^5-16x^4-8x^3-4\left(3x^2+4x+2\right)x\log^2(x)+(x+\log(x))\left(3x^4+4x^3+2x^2+\left(3x^2+4x+2\right)x\log(x)-\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4\left(3x^2+4x+2\right)x\log^2(x)}{(x+\log(x))\left(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8\right)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+\left(3x^2\right.}{x(x+\text{lo}}\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-12x^5-16x^4-8x^3-4\left(3x^2+4x+2\right)x\log^2(x)+(x+\log(x))\left(3x^4+4x^3+2x^2+\left(3x^2+4x+2\right)x\log(x)-\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4\left(3x^2+4x+2\right)x\log^2(x)}{(x+\log(x))\left(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8\right)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+\left(3x^2\right.}{x(x+\text{lo}}\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-12x^5-16x^4-8x^3-4\left(3x^2+4x+2\right)x\log^2(x)+(x+\log(x))\left(3x^4+4x^3+2x^2+\left(3x^2+4x+2\right)x\log(x)-\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4\left(3x^2+4x+2\right)x\log^2(x)}{(x+\log(x))\left(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8\right)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+\left(3x^2\right.}{x(x+\text{lo}}\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-12x^5-16x^4-8x^3-4\left(3x^2+4x+2\right)x\log^2(x)+(x+\log(x))\left(3x^4+4x^3+2x^2+\left(3x^2+4x+2\right)x\log(x)-\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4\left(3x^2+4x+2\right)x\log^2(x)}{(x+\log(x))\left(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8\right)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+\left(3x^2\right.}{x(x+\text{lo}}\right.\right.$$

3.440.

$$\int \frac{-32x+8x^3+16x^4+12x^5+\left(-32+16x^2+32x^3+24x^4\right)\log(x)+\left(8x+16x^2+12x^3\right)\log^2(x)+\left(-16-32x-8x^4-12x^5+\left(-16-16x^3-24x^4\right)\log(x)+\left(-8\right.\right.}{}$$

$\downarrow$ 7239

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)\,x\log^2(x)+(x+\log(x))\,(3x^4+4x^3+2x^2+(3x^2+4x+2)\,x\log(x)-}{}$$

$\downarrow$ 7293

$$\int \left(\frac{4(3x^2+4x+2)\,x\log^2(x)}{(x+\log(x))\,(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\mathrm{lo}}\right.\right.$$

$\downarrow$ 7239

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)\,x\log^2(x)+(x+\log(x))\,(3x^4+4x^3+2x^2+(3x^2+4x+2)\,x\log(x)-}{}$$

$\downarrow$ 7293

$$\int \left(\frac{4(3x^2+4x+2)\,x\log^2(x)}{(x+\log(x))\,(3x^4+4x^3+3x^3\log(x)+2x^2+4x^2\log(x)+2x\log(x)-8)}-\log^2\left(-\frac{3x^4+4x^3+2x^2+(3x^2}{x(x+\mathrm{lo}}\right.\right.$$

$\downarrow$ 7239

$$\int \frac{-12x^5-16x^4-8x^3-4(3x^2+4x+2)\,x\log^2(x)+(x+\log(x))\,(3x^4+4x^3+2x^2+(3x^2+4x+2)\,x\log(x)-}{}$$

input
```
Int[(-32*x + 8*x^3 + 16*x^4 + 12*x^5 + (-32 + 16*x^2 + 32*x^3 + 24*x^4)*Lo
g[x] + (8*x + 16*x^2 + 12*x^3)*Log[x]^2 + (-16 - 32*x - 8*x^4 - 12*x^5 + (
-16 - 16*x^3 - 24*x^4)*Log[x] + (-8*x^2 - 12*x^3)*Log[x]^2)*Log[(8 - 2*x^2
 - 4*x^3 - 3*x^4 + (-2*x - 4*x^2 - 3*x^3)*Log[x])/(x^2 + x*Log[x])] + (8*x
 - 2*x^3 - 4*x^4 - 3*x^5 + (8 - 4*x^2 - 8*x^3 - 6*x^4)*Log[x] + (-2*x - 4*
x^2 - 3*x^3)*Log[x]^2)*Log[(8 - 2*x^2 - 4*x^3 - 3*x^4 + (-2*x - 4*x^2 - 3*
x^3)*Log[x])/(x^2 + x*Log[x])]^2)/(-8*x + 2*x^3 + 4*x^4 + 3*x^5 + (-8 + 4*
x^2 + 8*x^3 + 6*x^4)*Log[x] + (2*x + 4*x^2 + 3*x^3)*Log[x]^2),x]
```

output
```
$Aborted
```

3.440.

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16-32x-8x^4-12x^5+(-16-16x^3-24x^4)\log(x)+(-8}{}$$

3.440.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.440.4 Maple [A] (verified)

Time = 12.65 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.77

method	result	size
parallelrisch	$-\ln\left(\frac{(-3x^3-4x^2-2x)\ln(x)-3x^4-4x^3-2x^2+8}{(x+\ln(x))x}\right)^2 x+4x$	55
risch	Expression too large to display	7087

input
```
int((((-3*x^3-4*x^2-2*x)*ln(x)^2+(-6*x^4-8*x^3-4*x^2+8)*ln(x)-3*x^5-4*x^4-
2*x^3+8*x)*ln(((-3*x^3-4*x^2-2*x)*ln(x)-3*x^4-4*x^3-2*x^2+8)/(x*ln(x)+x^2)
)^2+((-12*x^3-8*x^2)*ln(x)^2+(-24*x^4-16*x^3-16)*ln(x)-12*x^5-8*x^4-32*x-1
6)*ln(((-3*x^3-4*x^2-2*x)*ln(x)-3*x^4-4*x^3-2*x^2+8)/(x*ln(x)+x^2))+(12*x^
3+16*x^2+8*x)*ln(x)^2+(24*x^4+32*x^3+16*x^2-32)*ln(x)+12*x^5+16*x^4+8*x^3-
32*x)/((3*x^3+4*x^2+2*x)*ln(x)^2+(6*x^4+8*x^3+4*x^2-8)*ln(x)+3*x^5+4*x^4+2
*x^3-8*x),x,method=_RETURNVERBOSE)
```

output
```
-ln(((-3*x^3-4*x^2-2*x)*ln(x)-3*x^4-4*x^3-2*x^2+8)/(x+ln(x))/x)^2*x+4*x
```

3.440.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.81

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16 \cdots}{\cdots}$$

$$= -x\log\left(-\frac{3\,x^4+4\,x^3+2\,x^2+(3\,x^3+4\,x^2+2\,x)\log(x)-8}{x^2+x\log(x)}\right)^2+4\,x$$

3.440.

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16-32x-8x^4-12x^5+(-16-16x^3-24x^4)\log(x)+(-8 \cdots}{\cdots}$$

input
```
integrate((((-3*x^3-4*x^2-2*x)*log(x)^2+(-6*x^4-8*x^3-4*x^2+8)*log(x)-3*x^
5-4*x^4-2*x^3+8*x)*log(((-3*x^3-4*x^2-2*x)*log(x)-3*x^4-4*x^3-2*x^2+8)/(x*
log(x)+x^2))^2+((-12*x^3-8*x^2)*log(x)^2+(-24*x^4-16*x^3-16)*log(x)-12*x^5
-8*x^4-32*x-16)*log(((-3*x^3-4*x^2-2*x)*log(x)-3*x^4-4*x^3-2*x^2+8)/(x*log
(x)+x^2))+(12*x^3+16*x^2+8*x)*log(x)^2+(24*x^4+32*x^3+16*x^2-32)*log(x)+12
*x^5+16*x^4+8*x^3-32*x)/((3*x^3+4*x^2+2*x)*log(x)^2+(6*x^4+8*x^3+4*x^2-8)*
log(x)+3*x^5+4*x^4+2*x^3-8*x),x, algorithm=\
```

output
```
-x*log(-(3*x^4 + 4*x^3 + 2*x^2 + (3*x^3 + 4*x^2 + 2*x)*log(x) - 8)/(x^2 +
x*log(x)))^2 + 4*x
```

3.440.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. 2(24) = 48.

Time = 0.49 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.65

$$\int \frac{-32x + 8x^3 + 16x^4 + 12x^5 + (-32 + 16x^2 + 32x^3 + 24x^4)\log(x) + (8x + 16x^2 + 12x^3)\log^2(x) + (-16 \cdots}{\cdots}$$

$$= -x\log\left(\frac{-3x^4 - 4x^3 - 2x^2 + (-3x^3 - 4x^2 - 2x)\log(x) + 8}{x^2 + x\log(x)}\right)^2 + 4x$$

input
```
integrate((((-3*x**3-4*x**2-2*x)*ln(x)**2+(-6*x**4-8*x**3-4*x**2+8)*ln(x)-
3*x**5-4*x**4-2*x**3+8*x)*ln(((-3*x**3-4*x**2-2*x)*ln(x)-3*x**4-4*x**3-2*x
**2+8)/(x*ln(x)+x**2))**2+((-12*x**3-8*x**2)*ln(x)**2+(-24*x**4-16*x**3-16
)*ln(x)-12*x**5-8*x**4-32*x-16)*ln(((-3*x**3-4*x**2-2*x)*ln(x)-3*x**4-4*x*
*3-2*x**2+8)/(x*ln(x)+x**2))+(12*x**3+16*x**2+8*x)*ln(x)**2+(24*x**4+32*x*
*3+16*x**2-32)*ln(x)+12*x**5+16*x**4+8*x**3-32*x)/((3*x**3+4*x**2+2*x)*ln(
x)**2+(6*x**4+8*x**3+4*x**2-8)*ln(x)+3*x**5+4*x**4+2*x**3-8*x),x)
```

output
```
-x*log((-3*x**4 - 4*x**3 - 2*x**2 + (-3*x**3 - 4*x**2 - 2*x)*log(x) + 8)/(
x**2 + x*log(x)))**2 + 4*x
```

3.440.

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16-32x-8x^4-12x^5+(-16-16x^3-24x^4)\log(x)+(-8 \cdots}{\cdots}$$

3.440.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 122 vs. 2(30) = 60.

Time = 0.26 (sec) , antiderivative size = 122, normalized size of antiderivative = 3.94

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16}{}$$

$$\begin{aligned}&=-x\log\left(-3\,x^4-4\,x^3-2\,x^2-\left(3\,x^3+4\,x^2+2\,x\right)\log\left(x\right)+8\right)^2\\&\quad-x\log\left(x+\log\left(x\right)\right)^2-2\,x\log\left(x+\log\left(x\right)\right)\log\left(x\right)-x\log\left(x\right)^2\\&\quad+2\left(x\log\left(x+\log\left(x\right)\right)+x\log\left(x\right)\right)\log\left(-3\,x^4-4\,x^3-2\,x^2-\left(3\,x^3+4\,x^2+2\,x\right)\log\left(x\right)+8\right)\\&\quad+4\,x\end{aligned}$$

input
```
integrate((((-3*x^3-4*x^2-2*x)*log(x)^2+(-6*x^4-8*x^3-4*x^2+8)*log(x)-3*x^
5-4*x^4-2*x^3+8*x)*log(((-3*x^3-4*x^2-2*x)*log(x)-3*x^4-4*x^3-2*x^2+8)/(x*
log(x)+x^2))^2+((-12*x^3-8*x^2)*log(x)^2+(-24*x^4-16*x^3-16)*log(x)-12*x^5
-8*x^4-32*x-16)*log(((-3*x^3-4*x^2-2*x)*log(x)-3*x^4-4*x^3-2*x^2+8)/(x*log
(x)+x^2))+(12*x^3+16*x^2+8*x)*log(x)^2+(24*x^4+32*x^3+16*x^2-32)*log(x)+12
*x^5+16*x^4+8*x^3-32*x)/((3*x^3+4*x^2+2*x)*log(x)^2+(6*x^4+8*x^3+4*x^2-8)*
log(x)+3*x^5+4*x^4+2*x^3-8*x),x, algorithm=\
```

output
```
-x*log(-3*x^4 - 4*x^3 - 2*x^2 - (3*x^3 + 4*x^2 + 2*x)*log(x) + 8)^2 - x*lo
g(x + log(x))^2 - 2*x*log(x + log(x))*log(x) - x*log(x)^2 + 2*(x*log(x + l
og(x)) + x*log(x))*log(-3*x^4 - 4*x^3 - 2*x^2 - (3*x^3 + 4*x^2 + 2*x)*log(
x) + 8) + 4*x
```

3.440.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 124 vs. 2(30) = 60.

Time = 2.61 (sec) , antiderivative size = 124, normalized size of antiderivative = 4.00

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16}{}$$

$$\begin{aligned}&=-x\log\left(-3\,x^4-3\,x^3\log\left(x\right)-4\,x^3-4\,x^2\log\left(x\right)-2\,x^2-2\,x\log\left(x\right)+8\right)^2-x\log\left(x+\log\left(x\right)\right)^2\\&\quad-2\,x\log\left(x+\log\left(x\right)\right)\log\left(x\right)-x\log\left(x\right)^2+2\left(x\log\left(x+\log\left(x\right)\right)+x\log\left(x\right)\right)\log\left(-3\,x^4\right.\\&\qquad\left.-3\,x^3\log\left(x\right)-4\,x^3-4\,x^2\log\left(x\right)-2\,x^2-2\,x\log\left(x\right)+8\right)+4\,x\end{aligned}$$

3.440.

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16-32x-8x^4-12x^5+(-16-16x^3-24x^4)\log(x)+(-8}{}$$

input
```
integrate((((-3*x^3-4*x^2-2*x)*log(x)^2+(-6*x^4-8*x^3-4*x^2+8)*log(x)-3*x^
5-4*x^4-2*x^3+8*x)*log(((-3*x^3-4*x^2-2*x)*log(x)-3*x^4-4*x^3-2*x^2+8)/(x*
log(x)+x^2))^2+((-12*x^3-8*x^2)*log(x)^2+(-24*x^4-16*x^3-16)*log(x)-12*x^5
-8*x^4-32*x-16)*log(((-3*x^3-4*x^2-2*x)*log(x)-3*x^4-4*x^3-2*x^2+8)/(x*log
(x)+x^2))+(12*x^3+16*x^2+8*x)*log(x)^2+(24*x^4+32*x^3+16*x^2-32)*log(x)+12
*x^5+16*x^4+8*x^3-32*x)/((3*x^3+4*x^2+2*x)*log(x)^2+(6*x^4+8*x^3+4*x^2-8)*
log(x)+3*x^5+4*x^4+2*x^3-8*x),x, algorithm=\
```

output
```
-x*log(-3*x^4 - 3*x^3*log(x) - 4*x^3 - 4*x^2*log(x) - 2*x^2 - 2*x*log(x) +
 8)^2 - x*log(x + log(x))^2 - 2*x*log(x + log(x))*log(x) - x*log(x)^2 + 2*
(x*log(x + log(x)) + x*log(x))*log(-3*x^4 - 3*x^3*log(x) - 4*x^3 - 4*x^2*l
og(x) - 2*x^2 - 2*x*log(x) + 8) + 4*x
```

3.440.9 Mupad [B] (verification not implemented)

Time = 14.81 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.74

$$\int \frac{-32x + 8x^3 + 16x^4 + 12x^5 + (-32 + 16x^2 + 32x^3 + 24x^4)\log(x) + (8x + 16x^2 + 12x^3)\log^2(x) + (-16}{}$$

$$= -x\left(\ln\left(-\frac{2\,x^2 + 4\,x^3 + 3\,x^4 + \ln(x)\,(3\,x^3 + 4\,x^2 + 2\,x) - 8}{x\,\ln(x) + x^2}\right)^2 - 4\right)$$

input
```
int((log(x)^2*(8*x + 16*x^2 + 12*x^3) - log(-(2*x^2 + 4*x^3 + 3*x^4 + log(
x)*(2*x + 4*x^2 + 3*x^3) - 8)/(x*log(x) + x^2))^2*(log(x)^2*(2*x + 4*x^2 +
 3*x^3) - 8*x + log(x)*(4*x^2 + 8*x^3 + 6*x^4 - 8) + 2*x^3 + 4*x^4 + 3*x^5
) - 32*x + log(x)*(16*x^2 + 32*x^3 + 24*x^4 - 32) - log(-(2*x^2 + 4*x^3 +
3*x^4 + log(x)*(2*x + 4*x^2 + 3*x^3) - 8)/(x*log(x) + x^2))*(32*x + log(x)
*(16*x^3 + 24*x^4 + 16) + log(x)^2*(8*x^2 + 12*x^3) + 8*x^4 + 12*x^5 + 16)
 + 8*x^3 + 16*x^4 + 12*x^5)/(log(x)^2*(2*x + 4*x^2 + 3*x^3) - 8*x + log(x)
*(4*x^2 + 8*x^3 + 6*x^4 - 8) + 2*x^3 + 4*x^4 + 3*x^5),x)
```

output
```
-x*(log(-(2*x^2 + 4*x^3 + 3*x^4 + log(x)*(2*x + 4*x^2 + 3*x^3) - 8)/(x*log
(x) + x^2))^2 - 4)
```

3.440.

$$\int \frac{-32x+8x^3+16x^4+12x^5+(-32+16x^2+32x^3+24x^4)\log(x)+(8x+16x^2+12x^3)\log^2(x)+(-16-32x-8x^4-12x^5+(-16-16x^3-24x^4)\log(x)+(-8}{}$$

3.441 $\int -\frac{8\log^2(2)}{x}\,dx$

3.441.1 Optimal result

Integrand size = 9, antiderivative size = 15

$$\int -\frac{8\log^2(2)}{x}\,dx = -3+4\log^2(2)\log\left(\frac{\log(3)}{x^2}\right)$$

output
```
4*ln(2)^2*ln(1/x^2*ln(3))-3
```

3.441.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int -\frac{8\log^2(2)}{x}\,dx = -8\log^2(2)\log(x)$$

input
```
Integrate[(-8*Log[2]^2)/x,x]
```

output
```
-8*Log[2]^2*Log[x]
```

3.441.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{8\log^2(2)}{x} \, dx$$

$$\Big\downarrow \; 14$$

$$-8\log^2(2)\log(x)$$

input
```
Int[(-8*Log[2]^2)/x,x]
```

output
```
-8*Log[2]^2*Log[x]
```

3.441.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.441.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.60

method	result	size
default	$-8\ln(x)\ln(2)^2$	9
norman	$-8\ln(x)\ln(2)^2$	9
risch	$-8\ln(x)\ln(2)^2$	9
parallelrisch	$-8\ln(x)\ln(2)^2$	9

input
```
int(-8*ln(2)^2/x,x,method=_RETURNVERBOSE)
```

output
```
-8*ln(x)*ln(2)^2
```

3.441.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int -\frac{8\log^2(2)}{x}\,dx = -8\,\log{(2)}^2\log{(x)}$$

input
```
integrate(-8*log(2)^2/x,x, algorithm=\
```

output
```
-8*log(2)^2*log(x)
```

3.441.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.67

$$\int -\frac{8\log^2(2)}{x}\,dx = -8\log{(2)}^2\log{(x)}$$

input
```
integrate(-8*ln(2)**2/x,x)
```

output
```
-8*log(2)**2*log(x)
```

3.441.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int -\frac{8\log^2(2)}{x}\,dx = -8\,\log{(2)}^2\log{(x)}$$

input
```
integrate(-8*log(2)^2/x,x, algorithm=\
```

output
```
-8*log(2)^2*log(x)
```

3.441.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.60

$$\int -\frac{8\log^2(2)}{x}\,dx = -8\,\log{(2)}^2\log{(|x|)}$$

input
```
integrate(-8*log(2)^2/x,x, algorithm=\
```

output
```
-8*log(2)^2*log(abs(x))
```

3.441.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int -\frac{8\log^2(2)}{x}\,dx = -8\ln{(2)}^2\,\ln{(x)}$$

input
```
int(-(8*log(2)^2)/x,x)
```

output
```
-8*log(2)^2*log(x)
```

3.442 $\int \frac{\left(-6+2e^{3+e^{3+x}+x}\right)\log\left(-6+e^{e^{3+x}}-3x\right)}{-6+e^{e^{3+x}}-3x}\,dx$

3.442.1 Optimal result

Integrand size = 42, antiderivative size = 15

$$\int \frac{\left(-6+2e^{3+e^{3+x}+x}\right)\log\left(-6+e^{e^{3+x}}-3x\right)}{-6+e^{e^{3+x}}-3x}\,dx=\log^2\left(-6+e^{e^{3+x}}-3x\right)$$

output
```
ln(exp(exp(3+x))-3*x-6)^2
```

3.442.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{\left(-6+2e^{3+e^{3+x}+x}\right)\log\left(-6+e^{e^{3+x}}-3x\right)}{-6+e^{e^{3+x}}-3x}\,dx=\log^2\left(-6+e^{e^{3+x}}-3x\right)$$

input
```
Integrate[((-6 + 2*E^(3 + E^(3 + x) + x))*Log[-6 + E^E^(3 + x) - 3*x])/(-6
 + E^E^(3 + x) - 3*x),x]
```

output
```
Log[-6 + E^E^(3 + x) - 3*x]^2
```

3.442.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.024$, Rules used = {7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(2e^{x+e^{x+3}+3}-6\right)\log\left(-3x+e^{e^{x+3}}-6\right)}{-3x+e^{e^{x+3}}-6}\,dx$$

$$\Big\downarrow \text{7237}$$

$$\log^2\left(-3x+e^{e^{x+3}}-6\right)$$

input
```
Int[((-6 + 2*E^(3 + E^(3 + x) + x))*Log[-6 + E^E^(3 + x) - 3*x])/(-6 + E^E
^(3 + x) - 3*x),x]
```

output
```
Log[-6 + E^E^(3 + x) - 3*x]^2
```

3.442.3.1 Defintions of rubi rules used

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

3.442.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

method	result	size
default	$\ln\left(\mathrm{e}^{\mathrm{e}^{3+x}}-3x-6\right)^{2}$	14
norman	$\ln\left(\mathrm{e}^{\mathrm{e}^{3+x}}-3x-6\right)^{2}$	14
risch	$\ln\left(\mathrm{e}^{\mathrm{e}^{3+x}}-3x-6\right)^{2}$	14
parallelrisch	$\ln\left(\mathrm{e}^{\mathrm{e}^{3+x}}-3x-6\right)^{2}$	14

input
```
int((2*exp(3+x)*exp(exp(3+x))-6)*ln(exp(exp(3+x))-3*x-6)/(exp(exp(3+x))-3*
x-6),x,method=_RETURNVERBOSE)
```

output
```
ln(exp(exp(3+x))-3*x-6)^2
```

3.442.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. $2(13) = 26$.

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 2.07

$$\int \frac{\left(-6+2e^{3+e^{3+x}+x}\right)\log\left(-6+e^{e^{3+x}}-3x\right)}{-6+e^{e^{3+x}}-3x}\,dx = \log\left(-\left(3\,(x+2)e^{(x+3)}-e^{\left(x+e^{(x+3)}+3\right)}\right)e^{(-x-3)}\right)^2$$

input
```
integrate((2*exp(3+x)*exp(exp(3+x))-6)*log(exp(exp(3+x))-3*x-6)/(exp(exp(3
+x))-3*x-6),x, algorithm=\
```

output
```
log(-(3*(x + 2)*e^(x + 3) - e^(x + e^(x + 3) + 3))*e^(-x - 3))^2
```

3.442.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{\left(-6+2e^{3+e^{3+x}+x}\right)\log\left(-6+e^{e^{3+x}}-3x\right)}{-6+e^{e^{3+x}}-3x}\,dx = \log\left(-3x+e^{e^{x+3}}-6\right)^2$$

input
```
integrate((2*exp(3+x)*exp(exp(3+x))-6)*ln(exp(exp(3+x))-3*x-6)/(exp(exp(3+
x))-3*x-6),x)
```

output
```
log(-3*x + exp(exp(x + 3)) - 6)**2
```

3.442.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. $2(13) = 26$.

Time = 0.22 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.93

$$\int \frac{\left(-6+2e^{3+e^{3+x}+x}\right)\log\left(-6+e^{e^{3+x}}-3x\right)}{-6+e^{e^{3+x}}-3x}\,dx = -\log\left(3\,x-e^{\left(e^{(x+3)}\right)}+6\right)^2+2\,\log\left(3\,x-e^{\left(e^{(x+3)}\right)}+6\right)\log\left(-3\,x+e^{\left(e^{(x+3)}\right)}-6\right)$$

input
```
integrate((2*exp(3+x)*exp(exp(3+x))-6)*log(exp(exp(3+x))-3*x-6)/(exp(exp(3
+x))-3*x-6),x, algorithm=\
```

output
```
-log(3*x - e^(e^(x + 3)) + 6)^2 + 2*log(3*x - e^(e^(x + 3)) + 6)*log(-3*x
+ e^(e^(x + 3)) - 6)
```

3.442.8 Giac [F]

$$\int \frac{\left(-6+2e^{3+e^{3+x}+x}\right)\log\left(-6+e^{e^{3+x}}-3x\right)}{-6+e^{e^{3+x}}-3x}\,dx = \int -\frac{2\left(e^{\left(x+e^{(x+3)}+3\right)}-3\right)\log\left(-3\,x+e^{\left(e^{(x+3)}\right)}-6\right)}{3\,x-e^{\left(e^{(x+3)}\right)}+6}\,dx$$

input
```
integrate((2*exp(3+x)*exp(exp(3+x))-6)*log(exp(exp(3+x))-3*x-6)/(exp(exp(3
+x))-3*x-6),x, algorithm=\
```

output
```
integrate(-2*(e^(x + e^(x + 3) + 3) - 3)*log(-3*x + e^(e^(x + 3)) - 6)/(3*
x - e^(e^(x + 3)) + 6), x)
```

3.442.9 Mupad [B] (verification not implemented)

Time = 13.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{\left(-6+2e^{3+e^{3+x}+x}\right)\log\left(-6+e^{e^{3+x}}-3x\right)}{-6+e^{e^{3+x}}-3x}\,dx=\ln\left(\mathrm{e}^{\mathrm{e}^{3}\,\mathrm{e}^{x}}-3\,x-6\right)^{2}$$

input
```
int(-(log(exp(exp(x + 3)) - 3*x - 6)*(2*exp(x + 3)*exp(exp(x + 3)) - 6))/(
3*x - exp(exp(x + 3)) + 6),x)
```

output
```
log(exp(exp(3)*exp(x)) - 3*x - 6)^2
```

3.443 $\int \frac{100x^2+100x^3+25x^4+e^{e^{\frac{3+200x+100x^2}{50x+25x^2}}+\frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2+100x^3+25x^4}\,dx$

3.443.1 Optimal result

Integrand size = 90, antiderivative size = 22

$$\int \frac{100x^2+100x^3+25x^4+e^{e^{\frac{3+200x+100x^2}{50x+25x^2}}+\frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2+100x^3+25x^4}\,dx = -e^{e^{4+\frac{3}{25x(2+x)}}}+x$$

output
```
x-exp(exp(4+3/25/x/(2+x)))
```

3.443.2 Mathematica [A] (verified)

Time = 3.41 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.45

$$\int \frac{100x^2+100x^3+25x^4+e^{e^{\frac{3+200x+100x^2}{50x+25x^2}}+\frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2+100x^3+25x^4}\,dx = \frac{1}{25}\left(-25e^{e^{4+\frac{3}{50x}-\frac{3}{50(2+x)}}}+25x\right)$$

input
```
Integrate[(100*x^2 + 100*x^3 + 25*x^4 + E^(E^((3 + 200*x + 100*x^2)/(50*x
+ 25*x^2)) + (3 + 200*x + 100*x^2)/(50*x + 25*x^2))*(6 + 6*x))/(100*x^2 +
100*x^3 + 25*x^4),x]
```

output
```
(-25*E^E^(4 + 3/(50*x) - 3/(50*(2 + x))) + 25*x)/25
```

3.443.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(6x+6)\exp\left(\frac{100x^2+200x+3}{25x^2+50x}+e^{\frac{100x^2+200x+3}{25x^2+50x}}\right)+25x^4+100x^3+100x^2}{25x^4+100x^3+100x^2}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{(6x+6)\exp\left(\frac{100x^2+200x+3}{25x^2+50x}+e^{\frac{100x^2+200x+3}{25x^2+50x}}\right)+25x^4+100x^3+100x^2}{x^2\left(25x^2+100x+100\right)}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{(6x+6)\exp\left(\frac{100x^2+200x+3}{25x^2+50x}+e^{\frac{100x^2+200x+3}{25x^2+50x}}\right)+25x^4+100x^3+100x^2}{x^2(5x+10)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{6(x+1)\exp\left(\frac{25x^2\exp\left(\frac{100x^2}{25x^2+50x}+\frac{200x}{25x^2+50x}+\frac{3}{25x^2+50x}\right)+50x\exp\left(\frac{100x^2}{25x^2+50x}+\frac{200x}{25x^2+50x}+\frac{3}{25x^2+50x}\right)+100x^2+200x+3}{25x(x+2)}\right)}{25x^2(x+2)^2}+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{3}{50}\int \frac{\exp\left(\frac{25\exp\left(\frac{100x^2}{25x^2+50x}+\frac{200x}{25x^2+50x}+\frac{3}{25x^2+50x}\right)x^2+100x^2+50\exp\left(\frac{100x^2}{25x^2+50x}+\frac{200x}{25x^2+50x}+\frac{3}{25x^2+50x}\right)x+200x+3}{25x(x+2)}\right)}{x^2}dx-$$
$$\frac{3}{50}\int \frac{\exp\left(\frac{25\exp\left(\frac{100x^2}{25x^2+50x}+\frac{200x}{25x^2+50x}+\frac{3}{25x^2+50x}\right)x^2+100x^2+50\exp\left(\frac{100x^2}{25x^2+50x}+\frac{200x}{25x^2+50x}+\frac{3}{25x^2+50x}\right)x+200x+3}{25x(x+2)}\right)}{\frac{(x+2)^2}{x}}dx+$$

input
```
Int[(100*x^2 + 100*x^3 + 25*x^4 + E^(E^((3 + 200*x + 100*x^2)/(50*x + 25*x
^2)) + (3 + 200*x + 100*x^2)/(50*x + 25*x^2))*(6 + 6*x))/(100*x^2 + 100*x^
3 + 25*x^4),x]
```

output
```
$Aborted
```

3.443. $\int \frac{100x^2+100x^3+25x^4+e^{e^{\frac{3+200x+100x^2}{50x+25x^2}}+\frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2+100x^3+25x^4}\,dx$

3.443.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.443.4 Maple [A] (verified)

Time = 1.64 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

method	result	size
risch	$x-\mathrm{e}^{\mathrm{e}^{\frac{100x^2+200x+3}{25x(2+x)}}}$	27
parallelrisch	$x-\mathrm{e}^{\mathrm{e}^{\frac{100x^2+200x+3}{25x(2+x)}}}-3$	28
parts	$x+\frac{-2x\,\mathrm{e}^{\mathrm{e}^{\frac{100x^2+200x+3}{25x^2+50x}}}-x^2\mathrm{e}^{\mathrm{e}^{\frac{100x^2+200x+3}{25x^2+50x}}}}{x(2+x)}$	69
norman	$\frac{x^3-4x-2x\,\mathrm{e}^{\mathrm{e}^{\frac{100x^2+200x+3}{25x^2+50x}}}-x^2\mathrm{e}^{\mathrm{e}^{\frac{100x^2+200x+3}{25x^2+50x}}}}{x(2+x)}$	73

input
```
int(((6+6*x)*exp((100*x^2+200*x+3)/(25*x^2+50*x))*exp(exp((100*x^2+200*x+3
)/(25*x^2+50*x)))+25*x^4+100*x^3+100*x^2)/(25*x^4+100*x^3+100*x^2),x,metho
d=_RETURNVERBOSE)
```

output
```
x-exp(exp(1/25*(100*x^2+200*x+3)/x/(2+x)))
```

3.443. $\int \frac{100x^2+100x^3+25x^4+e^{e^{\frac{3+200x+100x^2}{50x+25x^2}}+\frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2+100x^3+25x^4}\,dx$

3.443.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 103 vs. $2(18) = 36$.

Time = 0.26 (sec) , antiderivative size = 103, normalized size of antiderivative = 4.68

$$\int \frac{100x^2+100x^3+25x^4+e^{e^{\frac{3+200x+100x^2}{50x+25x^2}}+\frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2+100x^3+25x^4}\,dx = \left(xe^{\left(\frac{100\,x^2+200\,x+3}{25\,(x^2+2\,x)}\right)} - e^{\left(\frac{100\,x^2+25\,(x^2+2\,x)e^{\left(\frac{100\,x^2+200\,x+3}{25\,(x^2+2\,x)}\right)}+200\,x+3}{25\,(x^2+2\,x)}\right)}\right)e^{\left(-\frac{100\,x^2+200\,x+3}{25\,(x^2+2\,x)}\right)}$$

input
```
integrate(((6+6*x)*exp((100*x^2+200*x+3)/(25*x^2+50*x))*exp(exp((100*x^2+2
00*x+3)/(25*x^2+50*x)))+25*x^4+100*x^3+100*x^2)/(25*x^4+100*x^3+100*x^2),x
, algorithm=\
```

output
```
(x*e^(1/25*(100*x^2 + 200*x + 3)/(x^2 + 2*x)) - e^(1/25*(100*x^2 + 25*(x^2
 + 2*x)*e^(1/25*(100*x^2 + 200*x + 3)/(x^2 + 2*x)) + 200*x + 3)/(x^2 + 2*x
)))*e^(-1/25*(100*x^2 + 200*x + 3)/(x^2 + 2*x))
```

3.443.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{100x^2+100x^3+25x^4+e^{e^{\frac{3+200x+100x^2}{50x+25x^2}}+\frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2+100x^3+25x^4}\,dx = x - e^{e^{\frac{100x^2+200x+3}{25x^2+50x}}}$$

input
```
integrate(((6+6*x)*exp((100*x**2+200*x+3)/(25*x**2+50*x))*exp(exp((100*x**
2+200*x+3)/(25*x**2+50*x)))+25*x**4+100*x**3+100*x**2)/(25*x**4+100*x**3+1
00*x**2),x)
```

output
```
x - exp(exp((100*x**2 + 200*x + 3)/(25*x**2 + 50*x)))
```

3.443.7 Maxima [F]

$$\int \frac{100x^2+100x^3+25x^4+e^{e^{\frac{3+200x+100x^2}{50x+25x^2}}+\frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2+100x^3+25x^4}\,dx = \int \frac{25\,x^4+100\,x^3+100\,x^2+6\,(x+1)e^{\left(\frac{100\,x^2+200\,x+3}{25\,(x^2+2\,x)}+e^{\left(\frac{100\,x^2+200\,x+3}{25\,(x^2+2\,x)}\right)}\right)}}{25\,(x^4+4\,x^3+4\,x^2)}\,dx$$

input
```
integrate(((6+6*x)*exp((100*x^2+200*x+3)/(25*x^2+50*x))*exp(exp((100*x^2+2
00*x+3)/(25*x^2+50*x)))+25*x^4+100*x^3+100*x^2)/(25*x^4+100*x^3+100*x^2),x
, algorithm=\
```

output
```
x + 1/25*integrate(6*(x*e^4 + e^4)*e^(-3/50/(x + 2) + 3/50/x + e^(-3/50/(x
 + 2) + 3/50/x + 4))/(x^4 + 4*x^3 + 4*x^2), x)
```

3.443.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 124 vs. 2(18) = 36.

Time = 0.65 (sec) , antiderivative size = 124, normalized size of antiderivative = 5.64

$$\int \frac{100x^2+100x^3+25x^4+e^{e^{\frac{3+200x+100x^2}{50x+25x^2}}+\frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2+100x^3+25x^4}\,dx = \left(xe^{\left(\frac{100\,x^2+200\,x+3}{25\,(x^2+2\,x)}\right)} - e^{\left(\frac{25\,x^2e^{\left(\frac{100\,x^2+200\,x+3}{25\,(x^2+2\,x)}\right)}+100\,x^2+50\,xe^{\left(\frac{100\,x^2+200\,x+3}{25\,(x^2+2\,x)}\right)}+200\,x+3}{25\,(x^2+2\,x)}\right)}\right)e^{\left(-\frac{100\,x^2+200\,x+3}{25\,(x^2+2\,x)}\right)}$$

input
```
integrate(((6+6*x)*exp((100*x^2+200*x+3)/(25*x^2+50*x))*exp(exp((100*x^2+2
00*x+3)/(25*x^2+50*x)))+25*x^4+100*x^3+100*x^2)/(25*x^4+100*x^3+100*x^2),x
, algorithm=\
```

output
```
(x*e^(1/25*(100*x^2 + 200*x + 3)/(x^2 + 2*x)) - e^(1/25*(25*x^2*e^(1/25*(1
00*x^2 + 200*x + 3)/(x^2 + 2*x)) + 100*x^2 + 50*x*e^(1/25*(100*x^2 + 200*x
 + 3)/(x^2 + 2*x)) + 200*x + 3)/(x^2 + 2*x)))*e^(-1/25*(100*x^2 + 200*x +
3)/(x^2 + 2*x))
```

3.443.9 Mupad [B] (verification not implemented)

Time = 14.05 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.68

$$\int \frac{100x^2 + 100x^3 + 25x^4 + e^{e^{\frac{3+200x+100x^2}{50x+25x^2}} + \frac{3+200x+100x^2}{50x+25x^2}}(6+6x)}{100x^2 + 100x^3 + 25x^4}\,dx = x - \mathrm{e}^{\mathrm{e}^{\frac{4x}{x+2}}\,\mathrm{e}^{\frac{3}{25x^2+50x}}\,\mathrm{e}^{\frac{8}{x+2}}}$$

input
```
int((100*x^2 + 100*x^3 + 25*x^4 + exp(exp((200*x + 100*x^2 + 3)/(50*x + 25
*x^2)))*exp((200*x + 100*x^2 + 3)/(50*x + 25*x^2))*(6*x + 6))/(100*x^2 + 1
00*x^3 + 25*x^4),x)
```

output
```
x - exp(exp((4*x)/(x + 2))*exp(3/(50*x + 25*x^2))*exp(8/(x + 2)))
```

3.444 $\int \frac{-972-231x+3x^2+e^{3e^3}(-3x+3x^2}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}(-72x+20x^2+2x^3)+\Big(-28}$

3.444.1 Optimal result

Integrand size = 143, antiderivative size = 33

$$\int \frac{-972-231x+3x^2+e^{3e^3}(-3x+3x^2)+(216+24x)\log(x)-12}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}(-72x+20x^2+2x^3)+(-288+152x-12x^2-2x^3+e}$$
$$=2-\frac{3x}{4-x-\frac{\left(5+e^{3e^3}\right)x}{9+x-\log(x)}}$$

output
```
2-3*x/(4-x-x/(x+9-ln(x))*(5+exp(3*exp(3))))
```

3.444.2 Mathematica [A] (verified)

Time = 0.58 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.36

$$\int \frac{-972-231x+3x^2+e^{3e^3}(-3x+3x^2)+(216+24x)\log(x)-12}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}(-72x+20x^2+2x^3)+(-288+152x-12x^2-2x^3+e}$$
$$=\frac{3\left(36-\left(1+e^{3e^3}\right)x-4\log(x)\right)}{-36+(10+e^{3e^3})x+x^2-(-4+x)\log(x)}$$

input
```
Integrate[(-972 - 231*x + 3*x^2 + E^(3*E^3)*(-3*x + 3*x^2) + (216 + 24*x)*
Log[x] - 12*Log[x]^2)/(1296 - 720*x + 28*x^2 + E^(6*E^3)*x^2 + 20*x^3 + x^
4 + E^(3*E^3)*(-72*x + 20*x^2 + 2*x^3) + (-288 + 152*x - 12*x^2 - 2*x^3 +
E^(3*E^3)*(8*x - 2*x^2))*Log[x] + (16 - 8*x + x^2)*Log[x]^2),x]
```

3.444.

$$\int \frac{-972-231x+3x^2+e^{3e^3}(-3x+3x^2)+(216+24x)\log(x)-12\log^2(x)}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}(-72x+20x^2+2x^3)+\left(-288+152x-12x^2-2x^3+e^{3e^3}(8x-2x^2)\right)\log(x)+(16-8x+x^2)\log^2(x)}\,dx$$

output
```
(3*(36 - (1 + E^(3*E^3))*x - 4*Log[x]))/(-36 + (10 + E^(3*E^3))*x + x^2 -
(-4 + x)*Log[x])
```

3.444.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^2 + e^{3e^3}(3x^2-3x) - 231x - 12\log^2(x) + (24x+216)\log(x) - 972}{x^4 + 20x^3 + e^{6e^3}x^2 + 28x^2 + (x^2-8x+16)\log^2(x) + e^{3e^3}(2x^3+20x^2-72x) + (-2x^3-12x^2+e^{3e^3}(8x-2x$$

$$\Big\downarrow 6$$

$$\int \frac{3x^2 + e^{3e^3}(3x^2-3x) - 231x - 12\log^2(x) + (24x+216)\log(x) - 972}{x^4 + 20x^3 + (28+e^{6e^3})x^2 + (x^2-8x+16)\log^2(x) + e^{3e^3}(2x^3+20x^2-72x) + (-2x^3-12x^2+e^{3e^3}(8x-2x$$

$$\Big\downarrow 7239$$

$$\int \frac{3\left(\left(1+e^{3e^3}\right)x^2 - \left(77+e^{3e^3}\right)x - 4\log^2(x) + 8(x+9)\log(x) - 324\right)}{\left(-x^2-\left(10+e^{3e^3}\right)x + (x-4)\log(x) + 36\right)^2}dx$$

$$\Big\downarrow 27$$

$$3\int -\frac{-\left(\left(1+e^{3e^3}\right)x^2\right) + \left(77+e^{3e^3}\right)x + 4\log^2(x) - 8(x+9)\log(x) + 324}{\left(-x^2-\left(10+e^{3e^3}\right)x - (4-x)\log(x) + 36\right)^2}dx$$

$$\Big\downarrow 25$$

$$-3\int \frac{-\left(\left(1+e^{3e^3}\right)x^2\right) + \left(77+e^{3e^3}\right)x + 4\log^2(x) - 8(x+9)\log(x) + 324}{\left(-x^2-\left(10+e^{3e^3}\right)x - (4-x)\log(x) + 36\right)^2}dx$$

$$\Big\downarrow 7293$$

$$-3\int \left(\frac{8\left(5+e^{3e^3}\right)x}{(4-x)^2\left(-x^2+\log(x)x - 10\left(1+\frac{e^{3e^3}}{10}\right)x - 4\log(x) + 36\right)} + \frac{\left(5+e^{3e^3}\right)\left(-x^3+9x^2-4\left(1-e^{3e}\right.\right.}{(4-x)^2\left(-x^2+\log(x)x - 10\left(1+\frac{e^{3e^3}}{10}\right)\right.}\right.$$

$$\Big\downarrow 2009$$

$$-3\left(4\left(5+e^{3e^3}\right)^2\int \frac{1}{\left(-x^2+\log(x)x - 10\left(1+\frac{e^{3e^3}}{10}\right)x - 4\log(x) + 36\right)^2}dx + 64\left(5+e^{3e^3}\right)^2\int \frac{}{(4-x)^2\left(-x^2+\right.}\right.$$

3.444. $\int \frac{-972-231x+3x^2+e^{3e^3}(-3x+3x^2)+(216+24x)\log(x)-12\log^2(x)}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}(-72x+20x^2+2x^3)+\left(-288+152x-12x^2-2x^3+e^{3e^3}(8x-2x^2)\right)\log(x)+(16-8x+x^2)\log^2(x)}\,dx$

input
```
Int[(-972 - 231*x + 3*x^2 + E^(3*E^3)*(-3*x + 3*x^2) + (216 + 24*x)*Log[x]
 - 12*Log[x]^2)/(1296 - 720*x + 28*x^2 + E^(6*E^3)*x^2 + 20*x^3 + x^4 + E^
(3*E^3)*(-72*x + 20*x^2 + 2*x^3) + (-288 + 152*x - 12*x^2 - 2*x^3 + E^(3*E
^3)*(8*x - 2*x^2))*Log[x] + (16 - 8*x + x^2)*Log[x]^2),x]
```

output
```
$Aborted
```

3.444.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.444.

$$\int \frac{-972-231x+3x^2+e^{3e^3}\left(-3x+3x^2\right)+(216+24x)\log(x)-12\log^2(x)}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}\left(-72x+20x^2+2x^3\right)+\left(-288+152x-12x^2-2x^3+e^{3e^3}\left(8x-2x^2\right)\right)\log(x)+\left(16-8x+x^2\right)\log^2(x)}\,dx$$

3.444.4 Maple [A] (verified)

Time = 1.75 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.33

method	result	size
default	$-\frac{3\left(4\ln(x)+\left(e^{3\,e^{3}}+1\right)x-36\right)}{e^{3\,e^{3}}x+x^{2}-x\ln(x)+10x+4\ln(x)-36}$	44
norman	$\frac{-12\ln(x)+\left(-3\,e^{3\,e^{3}}-3\right)x+108}{e^{3\,e^{3}}x+x^{2}-x\ln(x)+10x+4\ln(x)-36}$	45
parallelrisch	$\frac{108-3\,e^{3\,e^{3}}x-3x-12\ln(x)}{e^{3\,e^{3}}x+x^{2}-x\ln(x)+10x+4\ln(x)-36}$	45
risch	$\frac{12}{x-4}-\frac{3\left(5+e^{3\,e^{3}}\right)x^{2}}{(x-4)\left(e^{3\,e^{3}}x+x^{2}-x\ln(x)+10x+4\ln(x)-36\right)}$	52

input
```
int((-12*ln(x)^2+(24*x+216)*ln(x)+(3*x^2-3*x)*exp(3*exp(3))+3*x^2-231*x-97
2)/((x^2-8*x+16)*ln(x)^2+((-2*x^2+8*x)*exp(3*exp(3))-2*x^3-12*x^2+152*x-28
8)*ln(x)+x^2*exp(3*exp(3))^2+(2*x^3+20*x^2-72*x)*exp(3*exp(3))+x^4+20*x^3+
28*x^2-720*x+1296),x,method=_RETURNVERBOSE)
```

output
```
-3*(4*ln(x)+(exp(exp(3))^3+1)*x-36)/(exp(exp(3))^3*x+x^2-x*ln(x)+10*x+4*ln
(x)-36)
```

3.444.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.21

$$\int \frac{-972-231x+3x^2+e^{3e^3}(-3x+3x^2)+(216+24x)\log(x)-12}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}\left(-72x+20x^2+2x^3\right)+\left(-288+152x-12x^2-2x^3+\right.}$$
$$=-\frac{3\left(xe^{(3\,e^{3})}+x+4\,\log(x)-36\right)}{x^{2}+xe^{(3\,e^{3})}-(x-4)\log(x)+10\,x-36}$$

input
```
integrate((-12*log(x)^2+(24*x+216)*log(x)+(3*x^2-3*x)*exp(3*exp(3))+3*x^2-
231*x-972)/((x^2-8*x+16)*log(x)^2+((-2*x^2+8*x)*exp(3*exp(3))-2*x^3-12*x^2
+152*x-288)*log(x)+x^2*exp(3*exp(3))^2+(2*x^3+20*x^2-72*x)*exp(3*exp(3))+x
^4+20*x^3+28*x^2-720*x+1296),x, algorithm=\
```

output
```
-3*(x*e^(3*e^3) + x + 4*log(x) - 36)/(x^2 + x*e^(3*e^3) - (x - 4)*log(x) +
 10*x - 36)
```

3.444.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(24) = 48$.

Time = 0.18 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.00

$$\int \frac{-972 - 231x + 3x^2 + e^{3e^3}(-3x + 3x^2) + (216 + 24x)\log(x) - 12}{1296 - 720x + 28x^2 + e^{6e^3}x^2 + 20x^3 + x^4 + e^{3e^3}(-72x + 20x^2 + 2x^3) + (-288 + 152x - 12x^2 - 2x^3 + e}$$
$$= \frac{15x^2 + 3x^2e^{3e^3}}{-x^3 - x^2e^{3e^3} - 6x^2 + 76x + 4xe^{3e^3} + (x^2 - 8x + 16)\log(x) - 144} + \frac{12}{x - 4}$$

input
```
integrate((-12*ln(x)**2+(24*x+216)*ln(x)+(3*x**2-3*x)*exp(3*exp(3))+3*x**2
-231*x-972)/((x**2-8*x+16)*ln(x)**2+((-2*x**2+8*x)*exp(3*exp(3))-2*x**3-12
*x**2+152*x-288)*ln(x)+x**2*exp(3*exp(3))**2+(2*x**3+20*x**2-72*x)*exp(3*e
xp(3))+x**4+20*x**3+28*x**2-720*x+1296),x)
```

output
```
(15*x**2 + 3*x**2*exp(3*exp(3)))/(-x**3 - x**2*exp(3*exp(3)) - 6*x**2 + 76
*x + 4*x*exp(3*exp(3)) + (x**2 - 8*x + 16)*log(x) - 144) + 12/(x - 4)
```

3.444.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.21

$$\int \frac{-972 - 231x + 3x^2 + e^{3e^3}(-3x + 3x^2) + (216 + 24x)\log(x) - 12}{1296 - 720x + 28x^2 + e^{6e^3}x^2 + 20x^3 + x^4 + e^{3e^3}(-72x + 20x^2 + 2x^3) + (-288 + 152x - 12x^2 - 2x^3 + e}$$
$$= -\frac{3\left(x\left(e^{(3e^3)} + 1\right) + 4\log(x) - 36\right)}{x^2 + x(e^{(3e^3)} + 10) - (x - 4)\log(x) - 36}$$

input
```
integrate((-12*log(x)^2+(24*x+216)*log(x)+(3*x^2-3*x)*exp(3*exp(3))+3*x^2-
231*x-972)/((x^2-8*x+16)*log(x)^2+((-2*x^2+8*x)*exp(3*exp(3))-2*x^3-12*x^2
+152*x-288)*log(x)+x^2*exp(3*exp(3))^2+(2*x^3+20*x^2-72*x)*exp(3*exp(3))+x
^4+20*x^3+28*x^2-720*x+1296),x, algorithm=\
```

output
```
-3*(x*(e^(3*e^3) + 1) + 4*log(x) - 36)/(x^2 + x*(e^(3*e^3) + 10) - (x - 4)
*log(x) - 36)
```

3.444.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.27

$$\int \frac{-972-231x+3x^2+e^{3e^3}(-3x+3x^2)+(216+24x)\log(x)-12\log^2(x)}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}(-72x+20x^2+2x^3)+(-288+152x-12x^2-2x^3+e^{3e^3}(8x-2x^2))\log(x)+(16-8x+x^2)\log^2(x)}\,dx$$
$$=-\frac{3\left(xe^{(3e^3)}+x+4\log(x)-36\right)}{x^2+xe^{(3e^3)}-x\log(x)+10x+4\log(x)-36}$$

input
```
integrate((-12*log(x)^2+(24*x+216)*log(x)+(3*x^2-3*x)*exp(3*exp(3))+3*x^2-
231*x-972)/((x^2-8*x+16)*log(x)^2+((-2*x^2+8*x)*exp(3*exp(3))-2*x^3-12*x^2
+152*x-288)*log(x)+x^2*exp(3*exp(3))^2+(2*x^3+20*x^2-72*x)*exp(3*exp(3))+x
^4+20*x^3+28*x^2-720*x+1296),x, algorithm=\
```

output
```
-3*(x*e^(3*e^3) + x + 4*log(x) - 36)/(x^2 + x*e^(3*e^3) - x*log(x) + 10*x
+ 4*log(x) - 36)
```

3.444.9 Mupad [B] (verification not implemented)

Time = 15.87 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.36

$$\int \frac{-972-231x+3x^2+e^{3e^3}(-3x+3x^2)+(216+24x)\log(x)-12\log^2(x)}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}(-72x+20x^2+2x^3)+(-288+152x-12x^2-2x^3+e^{3e^3}(8x-2x^2))\log(x)+(16-8x+x^2)\log^2(x)}\,dx$$
$$=-\frac{12\ln(x)+x\left(3e^{3e^3}+3\right)-108}{10x+4\ln(x)+xe^{3e^3}-x\ln(x)+x^2-36}$$

input
```
int(-(231*x + 12*log(x)^2 - log(x)*(24*x + 216) - 3*x^2 + exp(3*exp(3))*(3
*x - 3*x^2) + 972)/(exp(3*exp(3))*(20*x^2 - 72*x + 2*x^3) - 720*x + x^2*ex
p(6*exp(3)) + log(x)^2*(x^2 - 8*x + 16) + 28*x^2 + 20*x^3 + x^4 - log(x)*(
12*x^2 - 152*x + 2*x^3 - exp(3*exp(3))*(8*x - 2*x^2) + 288) + 1296),x)
```

output
```
-(12*log(x) + x*(3*exp(3*exp(3)) + 3) - 108)/(10*x + 4*log(x) + x*exp(3*ex
p(3)) - x*log(x) + x^2 - 36)
```

3.444. $\int \frac{-972-231x+3x^2+e^{3e^3}(-3x+3x^2)+(216+24x)\log(x)-12\log^2(x)}{1296-720x+28x^2+e^{6e^3}x^2+20x^3+x^4+e^{3e^3}(-72x+20x^2+2x^3)+\left(-288+152x-12x^2-2x^3+e^{3e^3}(8x-2x^2)\right)\log(x)+(16-8x+x^2)\log^2(x)}\,dx$

3.445 $\int \frac{7938+17406x-36774x^2+22422x^3-6186x^4+906x^5-82x^6+2x^7+(-48}{-243x+405x^2-270x^3+90x}$

3.445.1 Optimal result

Integrand size = 98, antiderivative size = 21

$$\int \frac{7938+17406x-36774x^2+22422x^3-6186x^4+906x^5-82x^6+2x^7+(-486-1188x+1926x^2-960}{-243x+405x^2-270x^3+90x^4-15x^5+x^6}$$
$$=\left(-3\left(3-\frac{2}{3-x}\right)^2+x+\log(x)\right)^2$$

output
```
(x+ln(x)-3*(3-2/(-x+3))^2)^2
```

3.445.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 66 vs. 2(21) = 42.

Time = 0.11 (sec) , antiderivative size = 66, normalized size of antiderivative = 3.14

$$\int \frac{7938+17406x-36774x^2+22422x^3-6186x^4+906x^5-82x^6+2x^7+(-486-1188x+1926x^2-960}{-243x+405x^2-270x^3+90x^4-15x^5+x^6}$$
$$=\frac{-31608+31266x-7551x^2-1320x^3+702x^4-66x^5+x^6+2(-3+x)^2(-147+135x-33x^2+x^3)\log}{(-3+x)^4}$$

input
```
Integrate[(7938 + 17406*x - 36774*x^2 + 22422*x^3 - 6186*x^4 + 906*x^5 - 8
2*x^6 + 2*x^7 + (-486 - 1188*x + 1926*x^2 - 960*x^3 + 222*x^4 - 28*x^5 + 2
*x^6)*Log[x])/(-243*x + 405*x^2 - 270*x^3 + 90*x^4 - 15*x^5 + x^6),x]
```

output
```
(-31608 + 31266*x - 7551*x^2 - 1320*x^3 + 702*x^4 - 66*x^5 + x^6 + 2*(-3 +
 x)^2*(-147 + 135*x - 33*x^2 + x^3)*Log[x] + (-3 + x)^4*Log[x]^2)/(-3 + x)
^4
```

3.445.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 89 vs. $2(21) = 42$.

Time = 1.19 (sec) , antiderivative size = 89, normalized size of antiderivative = 4.24, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {2026, 2007, 7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^7-82x^6+906x^5-6186x^4+22422x^3-36774x^2+\left(2x^6-28x^5+222x^4-960x^3+1926x^2-1188x-486\right)}{x^6-15x^5+90x^4-270x^3+405x^2-243x}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{2x^7-82x^6+906x^5-6186x^4+22422x^3-36774x^2+\left(2x^6-28x^5+222x^4-960x^3+1926x^2-1188x-486\right)}{x\left(x^5-15x^4+90x^3-270x^2+405x-243\right)}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{2x^7-82x^6+906x^5-6186x^4+22422x^3-36774x^2+\left(2x^6-28x^5+222x^4-960x^3+1926x^2-1188x-486\right)}{(x-3)^5x}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{2\left(-x^4+8x^3-54x^2+84x+27\right)\left(x^3-33x^2+x^2\log(x)+135x-6x\log(x)+9\log(x)-147\right)}{(3-x)^5x}dx$$

$$\Big\downarrow \text{27}$$

$$2\int -\frac{\left(-x^4+8x^3-54x^2+84x+27\right)\left(-x^3-\log(x)x^2+33x^2+6\log(x)x-135x-9\log(x)+147\right)}{(3-x)^5x}dx$$

$$\Big\downarrow \text{25}$$

$$-2\int \frac{\left(-x^4+8x^3-54x^2+84x+27\right)\left(-x^3-\log(x)x^2+33x^2+6\log(x)x-135x-9\log(x)+147\right)}{(3-x)^5x}dx$$

3.445. $\int \frac{7938+17406x-36774x^2+22422x^3-6186x^4+906x^5-82x^6+2x^7+\left(-486-1188x+1926x^2-960x^3+222x^4-28x^5+2x^6\right)\log(x)}{-243x+405x^2-270x^3+90x^4-15x^5+x^6}\,dx$

$$\Big\downarrow \text{7293}$$

$$-2\int\left(-\frac{(x^4-8x^3+54x^2-84x-27)\,x^2}{(x-3)^5}+\frac{33(x^4-8x^3+54x^2-84x-27)\,x}{(x-3)^5}-\frac{135(x^4-8x^3+54x^2-84x-\right.$$

$$\Big\downarrow \text{2009}$$

$$-2\left(-\frac{x^2}{2}+27x+\frac{852}{3-x}-\frac{936}{(3-x)^2}+\frac{432}{(3-x)^3}-\frac{72}{(3-x)^4}-\frac{\log^2(x)}{2}-\frac{12x\log(x)}{3-x}-x\log(x)+\frac{12\log(x)}{(3-x)^2}+15\,\mathrm{l}\right.$$

input
```
Int[(7938 + 17406*x - 36774*x^2 + 22422*x^3 - 6186*x^4 + 906*x^5 - 82*x^6
+ 2*x^7 + (-486 - 1188*x + 1926*x^2 - 960*x^3 + 222*x^4 - 28*x^5 + 2*x^6)*
Log[x])/(-243*x + 405*x^2 - 270*x^3 + 90*x^4 - 15*x^5 + x^6),x]
```

output
```
-2*(-72/(3 - x)^4 + 432/(3 - x)^3 - 936/(3 - x)^2 + 852/(3 - x) + 27*x - x
^2/2 + 15*Log[x] + (12*Log[x])/(3 - x)^2 - x*Log[x] - (12*x*Log[x])/(3 - x
) - Log[x]^2/2)
```

3.445.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

3.445.
$$\int \frac{7938+17406x-36774x^2+22422x^3-6186x^4+906x^5-82x^6+2x^7+(-486-1188x+1926x^2-960x^3+222x^4-28x^5+2x^6)\log(x)}{-243x+405x^2-270x^3+90x^4-15x^5+x^6}\,dx$$

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.445.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(21) = 42$.

Time = 0.26 (sec) , antiderivative size = 72, normalized size of antiderivative = 3.43

method	result
default	$x^2 - 54x - \frac{98\ln(x)}{3} + \frac{144}{(-3+x)^4} + \frac{864}{(-3+x)^3} + \frac{1872}{(-3+x)^2} + \frac{1704}{-3+x} + 2x\ln(x) + \frac{8\ln(x)x(-6+x)}{3(-3+x)^2} + \ln(x)^2$
parts	$x^2 - 54x - \frac{98\ln(x)}{3} + \frac{144}{(-3+x)^4} + \frac{864}{(-3+x)^3} + \frac{1872}{(-3+x)^2} + \frac{1704}{-3+x} + 2x\ln(x) + \frac{8\ln(x)x(-6+x)}{3(-3+x)^2} + \ln(x)^2$
risch	$\ln(x)^2 + \frac{2(x^3-6x^2-27x+96)\ln(x)}{x^2-6x+9} - \frac{-x^6+54x^4\ln(x)+66x^5-648x^3\ln(x)-702x^4+2916x^2\ln(x)+1320x^3-5832x\ln(x)}{(x^2-6x+9)^2}$
norman	$\frac{x^6+x^4\ln(x)^2-45459x^2-2646\ln(x)+7104x^3+107082x-2508x^2\ln(x)-78x^4\ln(x)+684x^3\ln(x)+4194x\ln(x)-66x^5+81\ln(x)^2}{(-3+x)^4}$
parallelrisch	$\frac{x^6+x^4\ln(x)^2-45459x^2-2646\ln(x)+7104x^3+107082x-2508x^2\ln(x)-78x^4\ln(x)+684x^3\ln(x)+4194x\ln(x)-66x^5+81\ln(x)^2}{x^4-12x^3+54x^2-108x+81}$

input
```
int(((2*x^6-28*x^5+222*x^4-960*x^3+1926*x^2-1188*x-486)*ln(x)+2*x^7-82*x^6
+906*x^5-6186*x^4+22422*x^3-36774*x^2+17406*x+7938)/(x^6-15*x^5+90*x^4-270
*x^3+405*x^2-243*x),x,method=_RETURNVERBOSE)
```

output
```
x^2-54*x-98/3*ln(x)+144/(-3+x)^4+864/(-3+x)^3+1872/(-3+x)^2+1704/(-3+x)+2*
x*ln(x)+8/3*ln(x)*x*(-6+x)/(-3+x)^2+ln(x)^2-24*ln(x)*x/(-3+x)
```

3.445.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 99 vs. $2(23) = 46$.

Time = 0.25 (sec) , antiderivative size = 99, normalized size of antiderivative = 4.71

$$\int \frac{7938 + 17406x - 36774x^2 + 22422x^3 - 6186x^4 + 906x^5 - 82x^6 + 2x^7 + (-486 - 1188x + 1926x^2 - 960}{-243x + 405x^2 - 270x^3 + 90x^4 - 15x^5 + x^6}$$
$$= \frac{x^6 - 66x^5 + 702x^4 - 1320x^3 + (x^4 - 12x^3 + 54x^2 - 108x + 81)\log(x)^2 - 7551x^2 + 2(x^5 - 39x^4 + 34}{x^4 - 12x^3 + 54x^2 - 108x + 81}$$

input
```
integrate(((2*x^6-28*x^5+222*x^4-960*x^3+1926*x^2-1188*x-486)*log(x)+2*x^7
-82*x^6+906*x^5-6186*x^4+22422*x^3-36774*x^2+17406*x+7938)/(x^6-15*x^5+90*
x^4-270*x^3+405*x^2-243*x),x, algorithm=\
```

output
```
(x^6 - 66*x^5 + 702*x^4 - 1320*x^3 + (x^4 - 12*x^3 + 54*x^2 - 108*x + 81)*
log(x)^2 - 7551*x^2 + 2*(x^5 - 39*x^4 + 342*x^3 - 1254*x^2 + 2097*x - 1323
)*log(x) + 31266*x - 31608)/(x^4 - 12*x^3 + 54*x^2 - 108*x + 81)
```

3.445.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. $2(15) = 30$.

Time = 0.16 (sec) , antiderivative size = 76, normalized size of antiderivative = 3.62

$$\int \frac{7938 + 17406x - 36774x^2 + 22422x^3 - 6186x^4 + 906x^5 - 82x^6 + 2x^7 + (-486 - 1188x + 1926x^2 - 960}{-243x + 405x^2 - 270x^3 + 90x^4 - 15x^5 + x^6}$$
$$= x^2 - 54x + \frac{1704x^3 - 13464x^2 + 35640x - 31608}{x^4 - 12x^3 + 54x^2 - 108x + 81} + \log(x)^2 - 54\log(x) + \frac{(2x^3 - 12x^2 - 54x + 192)\log(x)}{x^2 - 6x + 9}$$

input
```
integrate(((2*x**6-28*x**5+222*x**4-960*x**3+1926*x**2-1188*x-486)*ln(x)+2
*x**7-82*x**6+906*x**5-6186*x**4+22422*x**3-36774*x**2+17406*x+7938)/(x**6
-15*x**5+90*x**4-270*x**3+405*x**2-243*x),x)
```

output
```
x**2 - 54*x + (1704*x**3 - 13464*x**2 + 35640*x - 31608)/(x**4 - 12*x**3 +
 54*x**2 - 108*x + 81) + log(x)**2 - 54*log(x) + (2*x**3 - 12*x**2 - 54*x
+ 192)*log(x)/(x**2 - 6*x + 9)
```

3.445.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 336 vs. $2(23) = 46$.

Time = 0.25 (sec) , antiderivative size = 336, normalized size of antiderivative = 16.00

$$\int \frac{7938 + 17406x - 36774x^2 + 22422x^3 - 6186x^4 + 906x^5 - 82x^6 + 2x^7 + (-486 - 1188x + 1926x^2 - 960}{-243x + 405x^2 - 270x^3 + 90x^4 - 15x^5 + x^6}$$
$$= x^2 - 52x - \frac{27(80x^3 - 630x^2 + 1692x - 1539)}{2(x^4 - 12x^3 + 54x^2 - 108x + 81)} + \frac{369(40x^3 - 300x^2 + 780x - 693)}{2(x^4 - 12x^3 + 54x^2 - 108x + 81)} - \frac{1359(16x^3 - 108x^2 + 264x - 225)}{2(x^4 - 12x^3 + 54x^2 - 108x + 81)} + \frac{3093(4x^3 - 18x^2 + 36x - 27)}{2(x^4 - 12x^3 + 54x^2 - 108x + 81)} + \frac{49(4x^3 - 42x^2 + 156x - 225)}{2(x^4 - 12x^3 + 54x^2 - 108x + 81)} - \frac{11211(2x^2 - 4x + 3)}{2(x^4 - 12x^3 + 54x^2 - 108x + 81)} - \frac{6x^3 - 3(x^2 - 6x + 9)\log(x)^2 - 36x^2 - 2(3x^3 - 50x^2 + 111x)\log(x) + 78x - 72}{3(x^2 - 6x + 9)} + \frac{6129(4x - 3)}{2(x^4 - 12x^3 + 54x^2 - 108x + 81)} - \frac{8703}{2(x^4 - 12x^3 + 54x^2 - 108x + 81)} - \frac{98}{3}\log(x)$$

input
```
integrate(((2*x^6-28*x^5+222*x^4-960*x^3+1926*x^2-1188*x-486)*log(x)+2*x^7
-82*x^6+906*x^5-6186*x^4+22422*x^3-36774*x^2+17406*x+7938)/(x^6-15*x^5+90*
x^4-270*x^3+405*x^2-243*x),x, algorithm=\
```

output
```
x^2 - 52*x - 27/2*(80*x^3 - 630*x^2 + 1692*x - 1539)/(x^4 - 12*x^3 + 54*x^
2 - 108*x + 81) + 369/2*(40*x^3 - 300*x^2 + 780*x - 693)/(x^4 - 12*x^3 + 5
4*x^2 - 108*x + 81) - 1359/2*(16*x^3 - 108*x^2 + 264*x - 225)/(x^4 - 12*x^
3 + 54*x^2 - 108*x + 81) + 3093/2*(4*x^3 - 18*x^2 + 36*x - 27)/(x^4 - 12*x
^3 + 54*x^2 - 108*x + 81) + 49/2*(4*x^3 - 42*x^2 + 156*x - 225)/(x^4 - 12*
x^3 + 54*x^2 - 108*x + 81) - 11211/2*(2*x^2 - 4*x + 3)/(x^4 - 12*x^3 + 54*
x^2 - 108*x + 81) - 1/3*(6*x^3 - 3*(x^2 - 6*x + 9)*log(x)^2 - 36*x^2 - 2*(
3*x^3 - 50*x^2 + 111*x)*log(x) + 78*x - 72)/(x^2 - 6*x + 9) + 6129/2*(4*x
- 3)/(x^4 - 12*x^3 + 54*x^2 - 108*x + 81) - 8703/2/(x^4 - 12*x^3 + 54*x^2
- 108*x + 81) - 98/3*log(x)
```

3.445.8 Giac [F]

$$\int \frac{7938 + 17406x - 36774x^2 + 22422x^3 - 6186x^4 + 906x^5 - 82x^6 + 2x^7 + (-486 - 1188x + 1926x^2 - 960}{-243x + 405x^2 - 270x^3 + 90x^4 - 15x^5 + x^6}$$
$$= \int \frac{2(x^7 - 41x^6 + 453x^5 - 3093x^4 + 11211x^3 - 18387x^2 + (x^6 - 14x^5 + 111x^4 - 480x^3 + 963x^2 - 59}{x^6 - 15x^5 + 90x^4 - 270x^3 + 405x^2 - 243x}$$

input
```
integrate(((2*x^6-28*x^5+222*x^4-960*x^3+1926*x^2-1188*x-486)*log(x)+2*x^7
-82*x^6+906*x^5-6186*x^4+22422*x^3-36774*x^2+17406*x+7938)/(x^6-15*x^5+90*
x^4-270*x^3+405*x^2-243*x),x, algorithm=\
```

output
```
integrate(2*(x^7 - 41*x^6 + 453*x^5 - 3093*x^4 + 11211*x^3 - 18387*x^2 + (
x^6 - 14*x^5 + 111*x^4 - 480*x^3 + 963*x^2 - 594*x - 243)*log(x) + 8703*x
+ 3969)/(x^6 - 15*x^5 + 90*x^4 - 270*x^3 + 405*x^2 - 243*x), x)
```

3.445.9 Mupad [B] (verification not implemented)

Time = 15.13 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.95

$$\int \frac{7938 + 17406x - 36774x^2 + 22422x^3 - 6186x^4 + 906x^5 - 82x^6 + 2x^7 + (-486 - 1188x + 1926x^2 - 960}{-243x + 405x^2 - 270x^3 + 90x^4 - 15x^5 + x^6}$$

$$= \ln(x)^2 - 54\ln(x) - \frac{x(1800\ln(x) - 35640) - 1728\ln(x) + x^3(72\ln(x) - 1704) - x^2(624\ln(x) - 13464) + 31608}{(x-3)^4} + x(2\ln(x) - 54) + x^2$$

input
```
int(-(17406*x - log(x)*(1188*x - 1926*x^2 + 960*x^3 - 222*x^4 + 28*x^5 - 2
*x^6 + 486) - 36774*x^2 + 22422*x^3 - 6186*x^4 + 906*x^5 - 82*x^6 + 2*x^7
+ 7938)/(243*x - 405*x^2 + 270*x^3 - 90*x^4 + 15*x^5 - x^6),x)
```

output
```
log(x)^2 - 54*log(x) - (x*(1800*log(x) - 35640) - 1728*log(x) + x^3*(72*lo
g(x) - 1704) - x^2*(624*log(x) - 13464) + 31608)/(x - 3)^4 + x*(2*log(x) -
 54) + x^2
```

3.446 $\int \frac{112-288x+144x^2-24}{49-434x+1465x^2-2400x^3+2040x^4-696x^5-600x^6+864x^7-288x^8+1}$

3.446.1 Optimal result

Integrand size = 103, antiderivative size = 30

$$\int \frac{112-288x+144x^2-240x^4-12\log(x)}{49-434x+1465x^2-2400x^3+2040x^4-696x^5-600x^6+864x^7-288x^8+144x^{10}+(42x-186x^2+2}$$
$$=\frac{4}{7-x\left(4+3\left((3-2x)^2-4x^4-\log(x)\right)\right)}$$

output
```
4/(7-x*(4+3*(3-2*x)^2-3*ln(x)-12*x^4))
```

3.446.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{112-288x+144x^2-240x^4-12\log(x)}{49-434x+1465x^2-2400x^3+2040x^4-696x^5-600x^6+864x^7-288x^8+144x^{10}+(42x-186x^2+2}$$
$$=\frac{4}{7-31x+36x^2-12x^3+12x^5+3x\log(x)}$$

input
```
Integrate[(112 - 288*x + 144*x^2 - 240*x^4 - 12*Log[x])/(49 - 434*x + 1465
*x^2 - 2400*x^3 + 2040*x^4 - 696*x^5 - 600*x^6 + 864*x^7 - 288*x^8 + 144*x
^10 + (42*x - 186*x^2 + 216*x^3 - 72*x^4 + 72*x^6)*Log[x] + 9*x^2*Log[x]^2
),x]
```

output
```
4/(7 - 31*x + 36*x^2 - 12*x^3 + 12*x^5 + 3*x*Log[x])
```

3.446.3 Rubi [A] (verified)

Time = 0.60 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029, Rules used = {7239, 27, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-240x^4+144x^2-288x-12\log(x)+112}{144x^{10}-288x^8+864x^7-600x^6-696x^5+2040x^4-2400x^3+1465x^2+9x^2\log^2(x)+(72x^6-72x^4+216x^3}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{4(-60x^4+36x^2-72x-3\log(x)+28)}{(12x^5-12x^3+36x^2-31x+3x\log(x)+7)^2}dx$$

$$\Big\downarrow \text{27}$$

$$4\int \frac{-60x^4+36x^2-72x-3\log(x)+28}{(12x^5-12x^3+36x^2+3\log(x)x-31x+7)^2}dx$$

$$\Big\downarrow \text{7237}$$

$$\frac{4}{12x^5-12x^3+36x^2-31x+3x\log(x)+7}$$

input
```
Int[(112 - 288*x + 144*x^2 - 240*x^4 - 12*Log[x])/(49 - 434*x + 1465*x^2 -
 2400*x^3 + 2040*x^4 - 696*x^5 - 600*x^6 + 864*x^7 - 288*x^8 + 144*x^10 +
(42*x - 186*x^2 + 216*x^3 - 72*x^4 + 72*x^6)*Log[x] + 9*x^2*Log[x]^2),x]
```

output
```
4/(7 - 31*x + 36*x^2 - 12*x^3 + 12*x^5 + 3*x*Log[x])
```

3.446.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.446.4 Maple [A] (verified)

Time = 2.12 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

method	result	size
default	$\frac{4}{12x^5-12x^3+3x\ln(x)+36x^2-31x+7}$	30
risch	$\frac{4}{12x^5-12x^3+3x\ln(x)+36x^2-31x+7}$	30
parallelrisch	$\frac{4}{12x^5-12x^3+3x\ln(x)+36x^2-31x+7}$	30

input
```
int((-12*ln(x)-240*x^4+144*x^2-288*x+112)/(9*x^2*ln(x)^2+(72*x^6-72*x^4+21
6*x^3-186*x^2+42*x)*ln(x)+144*x^10-288*x^8+864*x^7-600*x^6-696*x^5+2040*x^
4-2400*x^3+1465*x^2-434*x+49),x,method=_RETURNVERBOSE)
```

output
```
4/(12*x^5-12*x^3+3*x*ln(x)+36*x^2-31*x+7)
```

3.446.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{112-288x+144x^2-240x^4-12\log(x)}{49-434x+1465x^2-2400x^3+2040x^4-696x^5-600x^6+864x^7-288x^8+144x^{10}+(42x-186x^2+2}$$
$$= \frac{4}{12\,x^5-12\,x^3+36\,x^2+3\,x\log\left(x\right)-31\,x+7}$$

input
```
integrate((-12*log(x)-240*x^4+144*x^2-288*x+112)/(9*x^2*log(x)^2+(72*x^6-7
2*x^4+216*x^3-186*x^2+42*x)*log(x)+144*x^10-288*x^8+864*x^7-600*x^6-696*x^
5+2040*x^4-2400*x^3+1465*x^2-434*x+49),x, algorithm=\
```

output
```
4/(12*x^5 - 12*x^3 + 36*x^2 + 3*x*log(x) - 31*x + 7)
```

3.446.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{112-288x+144x^2-240x^4-12\log(x)}{49-434x+1465x^2-2400x^3+2040x^4-696x^5-600x^6+864x^7-288x^8+144x^{10}+(42x-186x^2+2}$$
$$=\frac{4}{12x^5-12x^3+36x^2+3x\log{(x)}-31x+7}$$

input
```
integrate((-12*ln(x)-240*x**4+144*x**2-288*x+112)/(9*x**2*ln(x)**2+(72*x**
6-72*x**4+216*x**3-186*x**2+42*x)*ln(x)+144*x**10-288*x**8+864*x**7-600*x*
*6-696*x**5+2040*x**4-2400*x**3+1465*x**2-434*x+49),x)
```

output
```
4/(12*x**5 - 12*x**3 + 36*x**2 + 3*x*log(x) - 31*x + 7)
```

3.446.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{112-288x+144x^2-240x^4-12\log(x)}{49-434x+1465x^2-2400x^3+2040x^4-696x^5-600x^6+864x^7-288x^8+144x^{10}+(42x-186x^2+2}$$
$$=\frac{4}{12\,x^5-12\,x^3+36\,x^2+3\,x\log{(x)}-31\,x+7}$$

input
```
integrate((-12*log(x)-240*x^4+144*x^2-288*x+112)/(9*x^2*log(x)^2+(72*x^6-7
2*x^4+216*x^3-186*x^2+42*x)*log(x)+144*x^10-288*x^8+864*x^7-600*x^6-696*x^
5+2040*x^4-2400*x^3+1465*x^2-434*x+49),x, algorithm=\
```

output
```
4/(12*x^5 - 12*x^3 + 36*x^2 + 3*x*log(x) - 31*x + 7)
```

3.446.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{112-288x+144x^2-240x^4-12\log(x)}{49-434x+1465x^2-2400x^3+2040x^4-696x^5-600x^6+864x^7-288x^8+144x^{10}+(42x-186x^2+2}$$
$$=\frac{4}{12\,x^5-12\,x^3+36\,x^2+3\,x\log{(x)}-31\,x+7}$$

input
```
integrate((-12*log(x)-240*x^4+144*x^2-288*x+112)/(9*x^2*log(x)^2+(72*x^6-7
2*x^4+216*x^3-186*x^2+42*x)*log(x)+144*x^10-288*x^8+864*x^7-600*x^6-696*x^
5+2040*x^4-2400*x^3+1465*x^2-434*x+49),x, algorithm=\
```

output
```
4/(12*x^5 - 12*x^3 + 36*x^2 + 3*x*log(x) - 31*x + 7)
```

3.446.9 Mupad [B] (verification not implemented)

Time = 14.98 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{112-288x+144x^2-240x^4-12\log(x)}{49-434x+1465x^2-2400x^3+2040x^4-696x^5-600x^6+864x^7-288x^8+144x^{10}+(42x-186x^2+2}$$
$$= \frac{4}{x\,(3\,\ln(x)-31)+36\,x^2-12\,x^3+12\,x^5+7}$$

input
```
int(-(288*x + 12*log(x) - 144*x^2 + 240*x^4 - 112)/(log(x)*(42*x - 186*x^2
 + 216*x^3 - 72*x^4 + 72*x^6) - 434*x + 9*x^2*log(x)^2 + 1465*x^2 - 2400*x
^3 + 2040*x^4 - 696*x^5 - 600*x^6 + 864*x^7 - 288*x^8 + 144*x^10 + 49),x)
```

output
```
4/(x*(3*log(x) - 31) + 36*x^2 - 12*x^3 + 12*x^5 + 7)
```

3.447 $\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e\right.}{}$

3.447.1 Optimal result

Integrand size = 243, antiderivative size = 33

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1}{(-50x^2+25x^3+150x^4}$$

$$=\frac{e^{\frac{1}{5}/x}+x}{\log\left(\frac{3+\frac{2}{x}}{5+\log(-1+2x)}\right)}$$

output
```
(exp(1/5/x)+x)/ln((3+2/x)/(ln(-1+2*x)+5))
```

3.447.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1}{(-50x^2+25x^3+150x^4}$$

$$=\frac{e^{\frac{1}{5}/x}+x}{\log\left(\frac{2+3x}{5x+x\log(-1+2x)}\right)}$$

3.447.

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1+2x)+\left(-50x^2+25x^3+150x^4+e^{\frac{1}{5}/x}(10-5x\right.}{}$$

input
```
Integrate[(-50*x^2 + 120*x^3 + 30*x^4 + E^(1/(5*x))*(-50*x + 120*x^2 + 30*
x^3) + (-10*x^2 + 20*x^3 + E^(1/(5*x))*(-10*x + 20*x^2))*Log[-1 + 2*x] + (
-50*x^2 + 25*x^3 + 150*x^4 + E^(1/(5*x))*(10 - 5*x - 30*x^2) + (-10*x^2 +
5*x^3 + 30*x^4 + E^(1/(5*x))*(2 - x - 6*x^2))*Log[-1 + 2*x])*Log[(2 + 3*x)
/(5*x + x*Log[-1 + 2*x])])/((-50*x^2 + 25*x^3 + 150*x^4 + (-10*x^2 + 5*x^3
 + 30*x^4)*Log[-1 + 2*x])*Log[(2 + 3*x)/(5*x + x*Log[-1 + 2*x])]^2),x]
```

output
```
(E^(1/(5*x)) + x)/Log[(2 + 3*x)/(5*x + x*Log[-1 + 2*x])]
```

3.447.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{30x^4+120x^3-50x^2+e^{\frac{1}{5}/x}(30x^3+120x^2-50x)+\left(20x^3-10x^2+e^{\frac{1}{5}/x}(20x^2-10x)\right)\log(2x-1)+\left(150x\right.}{(150x^4+25x^3-50x^2+(30x^4+}$$

$\downarrow$ 7292

$$\int \frac{-30x^4-120x^3+50x^2-e^{\frac{1}{5}/x}(30x^3+120x^2-50x)-\left(20x^3-10x^2+e^{\frac{1}{5}/x}(20x^2-10x)\right)\log(2x-1)-\left(15\right.}{5x^2(-6x^2-x+2)(}$$

$\downarrow$ 27

$$\frac{1}{5}\int \frac{-30x^4-120x^3+50x^2+10e^{\frac{1}{5}/x}(-3x^3-12x^2+5x)+10\left(-2x^3+x^2+e^{\frac{1}{5}/x}(x-2x^2)\right)\log(2x-1)+\left(-1\right.}{x^2(-6x^2-x+2)}$$

$\downarrow$ 7279

$$\frac{1}{5}\int \left(\frac{30\log(2x-1)x^2}{(2x-1)(3x+2)(\log(2x-1)+5)\log\left(\frac{3x+2}{\log(2x-1)x+5x}\right)}+\frac{150x^2}{(2x-1)(3x+2)(\log(2x-1)+5)\log\left(\frac{3x+2}{\log(2x-1)x+}\right.}\right.$$

$\downarrow$ 7239

$$\frac{1}{5}\int \frac{-10x\left(x+e^{\frac{1}{5}/x}\right)(3x^2+12x-5)+5\left(e^{\frac{1}{5}/x}-5x^2\right)(6x^2+x-2)\log\left(\frac{3x+2}{\log(2x-1)x+5x}\right)-(2x-1)\log(2x-1}{(1-2x)x^2(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+}{\log(2x-1}\right.}$$

3.447.

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1+2x)+\left(-50x^2+25x^3+150x^4+e^{\frac{1}{5}/x}(10-5x\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{5}\int \left(\frac{10(3x^2+12x-5)}{(2x-1)(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+2}{\log(2x-1)x+5x}\right)}+\frac{e^{\frac{1}{5}/x}\left(30x^3+20\log(2x-1)x^2-6\log(2x-1)\log\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\frac{1}{5}\int \frac{-10x\left(x+e^{\frac{1}{5}/x}\right)(3x^2+12x-5)+5\left(e^{\frac{1}{5}/x}-5x^2\right)(6x^2+x-2)\log\left(\frac{3x+2}{\log(2x-1)x+5x}\right)-(2x-1)\log(2x-1}{(1-2x)x^2(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+}{\log(2x-1}\right.}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{5}\int \left(\frac{10(3x^2+12x-5)}{(2x-1)(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+2}{\log(2x-1)x+5x}\right)}+\frac{e^{\frac{1}{5}/x}\left(30x^3+20\log(2x-1)x^2-6\log(2x-1)\log\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\frac{1}{5}\int \frac{-10x\left(x+e^{\frac{1}{5}/x}\right)(3x^2+12x-5)+5\left(e^{\frac{1}{5}/x}-5x^2\right)(6x^2+x-2)\log\left(\frac{3x+2}{\log(2x-1)x+5x}\right)-(2x-1)\log(2x-1}{(1-2x)x^2(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+}{\log(2x-1}\right.}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{5}\int \left(\frac{10(3x^2+12x-5)}{(2x-1)(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+2}{\log(2x-1)x+5x}\right)}+\frac{e^{\frac{1}{5}/x}\left(30x^3+20\log(2x-1)x^2-6\log(2x-1)\log\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\frac{1}{5}\int \frac{-10x\left(x+e^{\frac{1}{5}/x}\right)(3x^2+12x-5)+5\left(e^{\frac{1}{5}/x}-5x^2\right)(6x^2+x-2)\log\left(\frac{3x+2}{\log(2x-1)x+5x}\right)-(2x-1)\log(2x-1}{(1-2x)x^2(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+}{\log(2x-1}\right.}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{5}\int \left(\frac{10(3x^2+12x-5)}{(2x-1)(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+2}{\log(2x-1)x+5x}\right)}+\frac{e^{\frac{1}{5}/x}\left(30x^3+20\log(2x-1)x^2-6\log(2x-1)\log\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

3.447.

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1+2x)+\left(-50x^2+25x^3+150x^4+e^{\frac{1}{5}/x}(10-5x\right.}{}$$

$$\frac{1}{5}\int \frac{-10x\left(x+e^{\frac{1}{5}/x}\right)(3x^2+12x-5)+5\left(e^{\frac{1}{5}/x}-5x^2\right)(6x^2+x-2)\log\left(\frac{3x+2}{\log(2x-1)x+5x}\right)-(2x-1)\log(2x-1}{(1-2x)x^2(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+}{\log(2x-1}\right.}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{5}\int \left(\frac{10(3x^2+12x-5)}{(2x-1)(3x+2)(\log(2x-1)+5)\log^2\left(\frac{3x+2}{\log(2x-1)x+5x}\right)}+\frac{e^{\frac{1}{5}/x}\left(30x^3+20\log(2x-1)x^2-6\log(2x-1)\log\right.}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(5\int \frac{1}{(\log(2x-1)+5)\log^2\left(\frac{3x+2}{\log(2x-1)x+5x}\right)}dx+5\int \frac{1}{(2x-1)(\log(2x-1)+5)\log^2\left(\frac{3x+2}{\log(2x-1)x+5x}\right)}dx+50\int\right.$$

input
```
Int[(-50*x^2 + 120*x^3 + 30*x^4 + E^(1/(5*x))*(-50*x + 120*x^2 + 30*x^3) +
 (-10*x^2 + 20*x^3 + E^(1/(5*x))*(-10*x + 20*x^2))*Log[-1 + 2*x] + (-50*x^
2 + 25*x^3 + 150*x^4 + E^(1/(5*x))*(10 - 5*x - 30*x^2) + (-10*x^2 + 5*x^3
+ 30*x^4 + E^(1/(5*x))*(2 - x - 6*x^2))*Log[-1 + 2*x])*Log[(2 + 3*x)/(5*x
+ x*Log[-1 + 2*x])])/((-50*x^2 + 25*x^3 + 150*x^4 + (-10*x^2 + 5*x^3 + 30*
x^4)*Log[-1 + 2*x])*Log[(2 + 3*x)/(5*x + x*Log[-1 + 2*x])]^2),x]
```

output
```
$Aborted
```

3.447.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.447.

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1+2x)+\left(-50x^2+25x^3+150x^4+e^{\frac{1}{5}/x}(10-5x\right.}{}$$

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.447.4 Maple [A] (verified)

Time = 46.29 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.12

method	result
parallelrisch	$\frac{13500x+13500\,\mathrm{e}^{\frac{1}{5x}}}{13500\ln\left(\frac{2+3x}{x(\ln(-1+2x)+5)}\right)}$
risch	$\frac{}{2\ln(3)-2\ln(x)+2\ln\left(\frac{2}{3}+x\right)-2\ln(\ln(-1+2x)+5)+i\pi\,\mathrm{csgn}\left(\frac{i}{\ln(-1+2x)+5}\right)\mathrm{csgn}\left(\frac{i\left(\frac{2}{3}+x\right)}{\ln(-1+2x)+5}\right)^2+i\pi\,\mathrm{csgn}\left(i\left(\frac{2}{3}+x\right)\right)\mathrm{csgn}\left(\frac{}{\ln(}\right.}$

input
```
int(((((-6*x^2-x+2)*exp(1/5/x)+30*x^4+5*x^3-10*x^2)*ln(-1+2*x)+(-30*x^2-5*
x+10)*exp(1/5/x)+150*x^4+25*x^3-50*x^2)*ln((2+3*x)/(x*ln(-1+2*x)+5*x))+((2
0*x^2-10*x)*exp(1/5/x)+20*x^3-10*x^2)*ln(-1+2*x)+(30*x^3+120*x^2-50*x)*exp
(1/5/x)+30*x^4+120*x^3-50*x^2)/((30*x^4+5*x^3-10*x^2)*ln(-1+2*x)+150*x^4+2
5*x^3-50*x^2)/ln((2+3*x)/(x*ln(-1+2*x)+5*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/13500*(13500*x+13500*exp(1/5/x))/ln((2+3*x)/x/(ln(-1+2*x)+5))
```


$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1+2x)+\left(-50x^2+25x^3+150x^4+e^{\frac{1}{5}/x}(10-5x\right.}{(-50x^2+25x^3+150x^4+(-10x^2+5x^3+30x^4)\log(-1+2x))\log^2(}$$

3.447.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1}{(-50x^2+25x^3+150x^4}$$

$$=\frac{x+e^{\left(\frac{1}{5x}\right)}}{\log\left(\frac{3x+2}{x\log(2x-1)+5x}\right)}$$

input
```
integrate(((((-6*x^2-x+2)*exp(1/5/x)+30*x^4+5*x^3-10*x^2)*log(-1+2*x)+(-30
*x^2-5*x+10)*exp(1/5/x)+150*x^4+25*x^3-50*x^2)*log((2+3*x)/(x*log(-1+2*x)+
5*x))+((20*x^2-10*x)*exp(1/5/x)+20*x^3-10*x^2)*log(-1+2*x)+(30*x^3+120*x^2
-50*x)*exp(1/5/x)+30*x^4+120*x^3-50*x^2)/((30*x^4+5*x^3-10*x^2)*log(-1+2*x
)+150*x^4+25*x^3-50*x^2)/log((2+3*x)/(x*log(-1+2*x)+5*x))^2,x, algorithm=\
```

output
```
(x + e^(1/5/x))/log((3*x + 2)/(x*log(2*x - 1) + 5*x))
```

3.447.6 Sympy [A] (verification not implemented)

Time = 0.81 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.33

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1}{(-50x^2+25x^3+150x^4}$$

$$=\frac{x}{\log\left(\frac{3x+2}{x\log(2x-1)+5x}\right)}+\frac{e^{\frac{1}{5x}}}{\log\left(\frac{3x+2}{x\log(2x-1)+5x}\right)}$$

input
```
integrate(((((-6*x**2-x+2)*exp(1/5/x)+30*x**4+5*x**3-10*x**2)*ln(-1+2*x)+(
-30*x**2-5*x+10)*exp(1/5/x)+150*x**4+25*x**3-50*x**2)*ln((2+3*x)/(x*ln(-1+
2*x)+5*x))+((20*x**2-10*x)*exp(1/5/x)+20*x**3-10*x**2)*ln(-1+2*x)+(30*x**3
+120*x**2-50*x)*exp(1/5/x)+30*x**4+120*x**3-50*x**2)/((30*x**4+5*x**3-10*x
**2)*ln(-1+2*x)+150*x**4+25*x**3-50*x**2)/ln((2+3*x)/(x*ln(-1+2*x)+5*x))**
2,x)
```

output
```
x/log((3*x + 2)/(x*log(2*x - 1) + 5*x)) + exp(1/(5*x))/log((3*x + 2)/(x*lo
g(2*x - 1) + 5*x))
```

3.447.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.00

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1}{(-50x^2+25x^3+150x^4}$$

$$= \frac{x+e^{\left(\frac{1}{5x}\right)}}{\log\left(3x+2\right)-\log\left(x\right)-\log\left(\log\left(2x-1\right)+5\right)}$$

input
```
integrate(((((-6*x^2-x+2)*exp(1/5/x)+30*x^4+5*x^3-10*x^2)*log(-1+2*x)+(-30
*x^2-5*x+10)*exp(1/5/x)+150*x^4+25*x^3-50*x^2)*log((2+3*x)/(x*log(-1+2*x)+
5*x))+((20*x^2-10*x)*exp(1/5/x)+20*x^3-10*x^2)*log(-1+2*x)+(30*x^3+120*x^2
-50*x)*exp(1/5/x)+30*x^4+120*x^3-50*x^2)/((30*x^4+5*x^3-10*x^2)*log(-1+2*x
)+150*x^4+25*x^3-50*x^2)/log((2+3*x)/(x*log(-1+2*x)+5*x))^2,x, algorithm=\
```

output
```
(x + e^(1/5/x))/(log(3*x + 2) - log(x) - log(log(2*x - 1) + 5))
```

3.447.8 Giac [A] (verification not implemented)

Time = 0.66 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.03

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1}{(-50x^2+25x^3+150x^4}$$

$$= -\frac{x+e^{\left(\frac{1}{5x}\right)}}{\log\left(x\log\left(2x-1\right)+5x\right)-\log\left(3x+2\right)}$$

input
```
integrate(((((-6*x^2-x+2)*exp(1/5/x)+30*x^4+5*x^3-10*x^2)*log(-1+2*x)+(-30
*x^2-5*x+10)*exp(1/5/x)+150*x^4+25*x^3-50*x^2)*log((2+3*x)/(x*log(-1+2*x)+
5*x))+((20*x^2-10*x)*exp(1/5/x)+20*x^3-10*x^2)*log(-1+2*x)+(30*x^3+120*x^2
-50*x)*exp(1/5/x)+30*x^4+120*x^3-50*x^2)/((30*x^4+5*x^3-10*x^2)*log(-1+2*x
)+150*x^4+25*x^3-50*x^2)/log((2+3*x)/(x*log(-1+2*x)+5*x))^2,x, algorithm=\
```

output
```
-(x + e^(1/5/x))/(log(x*log(2*x - 1) + 5*x) - log(3*x + 2))
```

3.447.

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1+2x)+\left(-50x^2+25x^3+150x^4+e^{\frac{1}{5}/x}(10-5x}{}$$

3.447.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1}{(-50x^2+25x^3+150x^4}$$

$$= \int -\frac{\ln(2x-1)\left(e^{\frac{1}{5x}}(10x-20x^2)+10x^2-20x^3\right)-e^{\frac{1}{5x}}(30x^3+120x^2-50x)+50x^2-120x^3-30x}{\ln\left(\frac{3x+2}{5x+x\ln(2x-1)}\right)^2(\ln(2}$$

input
```
int(-(log(2*x - 1)*(exp(1/(5*x))*(10*x - 20*x^2) + 10*x^2 - 20*x^3) - exp(
1/(5*x))*(120*x^2 - 50*x + 30*x^3) + 50*x^2 - 120*x^3 - 30*x^4 + log((3*x
+ 2)/(5*x + x*log(2*x - 1)))*(log(2*x - 1)*(exp(1/(5*x))*(x + 6*x^2 - 2) +
 10*x^2 - 5*x^3 - 30*x^4) + exp(1/(5*x))*(5*x + 30*x^2 - 10) + 50*x^2 - 25
*x^3 - 150*x^4))/(log((3*x + 2)/(5*x + x*log(2*x - 1)))^2*(log(2*x - 1)*(5
*x^3 - 10*x^2 + 30*x^4) - 50*x^2 + 25*x^3 + 150*x^4)),x)
```

output
```
int(-(log(2*x - 1)*(exp(1/(5*x))*(10*x - 20*x^2) + 10*x^2 - 20*x^3) - exp(
1/(5*x))*(120*x^2 - 50*x + 30*x^3) + 50*x^2 - 120*x^3 - 30*x^4 + log((3*x
+ 2)/(5*x + x*log(2*x - 1)))*(log(2*x - 1)*(exp(1/(5*x))*(x + 6*x^2 - 2) +
 10*x^2 - 5*x^3 - 30*x^4) + exp(1/(5*x))*(5*x + 30*x^2 - 10) + 50*x^2 - 25
*x^3 - 150*x^4))/(log((3*x + 2)/(5*x + x*log(2*x - 1)))^2*(log(2*x - 1)*(5
*x^3 - 10*x^2 + 30*x^4) - 50*x^2 + 25*x^3 + 150*x^4)), x)
```


$$\int \frac{-50x^2+120x^3+30x^4+e^{\frac{1}{5}/x}(-50x+120x^2+30x^3)+\left(-10x^2+20x^3+e^{\frac{1}{5}/x}(-10x+20x^2)\right)\log(-1+2x)+\left(-50x^2+25x^3+150x^4+e^{\frac{1}{5}/x}(10-5x\right.}{}$$

3.448 $\int \frac{(-3e^6+e^3(-5-2x))\log(4)+(-3e^6+e^3(-5-2x))\log(\log(4\log(2)))}{25x^2+9e^6x^2+10x^3+x^4+e^3(30x^2+6x^3)}\,dx$

3.448.1 Optimal result

Integrand size = 81, antiderivative size = 24

$$\int \frac{(-3e^6+e^3(-5-2x))\log(4)+(-3e^6+e^3(-5-2x))\log(\log(4\log(2)))}{25x^2+9e^6x^2+10x^3+x^4+e^3(30x^2+6x^3)}\,dx = \frac{\log(4)+\log(\log(4\log(2)))}{x\left(3+\frac{5+x}{e^3}\right)}$$

output
```
1/x*(ln(ln(4*ln(2)))+2*ln(2))/((5+x)/exp(3)+3)
```

3.448.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{(-3e^6+e^3(-5-2x))\log(4)+(-3e^6+e^3(-5-2x))\log(\log(4\log(2)))}{25x^2+9e^6x^2+10x^3+x^4+e^3(30x^2+6x^3)}\,dx = \frac{e^3\log(4\log(\log(16)))}{x(5+3e^3+x)}$$

input
```
Integrate[((-3*E^6 + E^3*(-5 - 2*x))*Log[4] + (-3*E^6 + E^3*(-5 - 2*x))*Lo
g[Log[4*Log[2]]])/(25*x^2 + 9*E^6*x^2 + 10*x^3 + x^4 + E^3*(30*x^2 + 6*x^3
)),x]
```

output
```
(E^3*Log[4*Log[Log[16]]])/(x*(5 + 3*E^3 + x))
```

3.448.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.099, Rules used = {6, 6, 27, 25, 2026, 2007, 205, 83}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^3(-2x-5)-3e^6\right)\log(\log(4\log(2)))+\left(e^3(-2x-5)-3e^6\right)\log(4)}{x^4+10x^3+9e^6x^2+25x^2+e^3\left(6x^3+30x^2\right)}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{\left(e^3(-2x-5)-3e^6\right)\log(\log(4\log(2)))+\left(e^3(-2x-5)-3e^6\right)\log(4)}{x^4+10x^3+\left(25+9e^6\right)x^2+e^3\left(6x^3+30x^2\right)}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{\left(e^3(-2x-5)-3e^6\right)\left(\log(4)+\log(\log(4\log(2)))\right)}{x^4+10x^3+\left(25+9e^6\right)x^2+e^3\left(6x^3+30x^2\right)}dx$$

$$\Big\downarrow \; 27$$

$$\log(4\log(\log(16)))\int -\frac{e^3(2x+5)+3e^6}{x^4+10x^3+\left(25+9e^6\right)x^2+6e^3\left(x^3+5x^2\right)}dx$$

$$\Big\downarrow \; 25$$

$$-\log(4\log(\log(16)))\int \frac{e^3(2x+5)+3e^6}{x^4+10x^3+\left(25+9e^6\right)x^2+6e^3\left(x^3+5x^2\right)}dx$$

$$\Big\downarrow \; 2026$$

$$-\log(4\log(\log(16)))\int \frac{e^3(2x+5)+3e^6}{x^2\left(x^2+2\left(5+3e^3\right)x+\left(5+3e^3\right)^2\right)}dx$$

$$\Big\downarrow \; 2007$$

$$-\log(4\log(\log(16)))\int \frac{e^3(2x+5)+3e^6}{x^2\left(x+3e^3+5\right)^2}dx$$

$$\Big\downarrow \; 205$$

$$-\log(4\log(\log(16)))\int \frac{2e^3x+e^3\left(5+3e^3\right)}{x^2\left(x+3e^3+5\right)^2}dx$$

$$\Big\downarrow \; 83$$

$$\frac{e^3\log(4\log(\log(16)))}{x\left(x+3e^3+5\right)}$$

3.448. $\int \frac{\left(-3e^6+e^3(-5-2x)\right)\log(4)+\left(-3e^6+e^3(-5-2x)\right)\log(\log(4\log(2)))}{25x^2+9e^6x^2+10x^3+x^4+e^3\left(30x^2+6x^3\right)}dx$

input
```
Int[((-3*E^6 + E^3*(-5 - 2*x))*Log[4] + (-3*E^6 + E^3*(-5 - 2*x))*Log[Log[
4*Log[2]]])/(25*x^2 + 9*E^6*x^2 + 10*x^3 + x^4 + E^3*(30*x^2 + 6*x^3)),x]
```

output
```
(E^3*Log[4*Log[Log[16]]])/(x*(5 + 3*E^3 + x))
```

3.448.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 83
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] /; FreeQ[{a, b, c, d, e, f, n, p}, x] && NeQ[n + p + 2, 0] && EqQ[a*d*f
*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)), 0]
```

rule 205
```
Int[(u_)^(m_.)*(v_)^(n_.)*(w_)^(p_.), x_Symbol] :> Int[ExpandToSum[u, x]^m*
ExpandToSum[v, x]^n*ExpandToSum[w, x]^p, x] /; FreeQ[{m, n, p}, x] && Linea
rQ[{u, v, w}, x] && !LinearMatchQ[{u, v, w}, x]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

3.448. $\int \frac{\left(-3e^6+e^3(-5-2x)\right)\log(4)+\left(-3e^6+e^3(-5-2x)\right)\log(\log(4\log(2)))}{25x^2+9e^6x^2+10x^3+x^4+e^3(30x^2+6x^3)}\,dx$

3.448.4 Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

method	result	size
gosper	$\frac{e^{3}(\ln(\ln(4\ln(2)))+2\ln(2))}{x(5+3\,e^{3}+x)}$	27
parallelrisch	$\frac{2\,e^{3}\ln(2)+e^{3}\ln(\ln(4\ln(2)))}{x(5+3\,e^{3}+x)}$	30
norman	$\frac{2\,e^{3}\ln(2)+e^{3}\ln(2\ln(2)+\ln(\ln(2)))}{x(5+3\,e^{3}+x)}$	33
risch	$\frac{2\,e^{3}\ln(2)+e^{3}\ln(2\ln(2)+\ln(\ln(2)))}{x(5+3\,e^{3}+x)}$	35

input
```
int(((-3*exp(3)^2+(-2*x-5)*exp(3))*ln(ln(4*ln(2)))+2*(-3*exp(3)^2+(-2*x-5)
*exp(3))*ln(2))/(9*x^2*exp(3)^2+(6*x^3+30*x^2)*exp(3)+x^4+10*x^3+25*x^2),x
,method=_RETURNVERBOSE)
```

output
```
exp(3)*(ln(ln(4*ln(2)))+2*ln(2))/x/(5+3*exp(3)+x)
```

3.448.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

$$\int \frac{(-3e^6+e^3(-5-2x))\log(4)+(-3e^6+e^3(-5-2x))\log(\log(4\log(2)))}{25x^2+9e^6x^2+10x^3+x^4+e^3(30x^2+6x^3)}\,dx = \frac{2\,e^3\log(2)+e^3\log(\log(4\,\log(2)))}{x^2+3\,xe^3+5\,x}$$

input
```
integrate(((-3*exp(3)^2+(-2*x-5)*exp(3))*log(log(4*log(2)))+2*(-3*exp(3)^2
+(-2*x-5)*exp(3))*log(2))/(9*x^2*exp(3)^2+(6*x^3+30*x^2)*exp(3)+x^4+10*x^3
+25*x^2),x, algorithm=\
```

output
```
(2*e^3*log(2) + e^3*log(log(4*log(2))))/(x^2 + 3*x*e^3 + 5*x)
```

3.448.6 Sympy [A] (verification not implemented)

Time = 0.62 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{(-3e^6+e^3(-5-2x))\log(4)+(-3e^6+e^3(-5-2x))\log(\log(4\log(2)))}{25x^2+9e^6x^2+10x^3+x^4+e^3(30x^2+6x^3)}\,dx$$
$$=-\frac{-2e^3\log(2)-e^3\log(\log(\log(2))+2\log(2))}{x^2+x(5+3e^3)}$$

input
```
integrate(((-3*exp(3)**2+(-2*x-5)*exp(3))*ln(ln(4*ln(2)))+2*(-3*exp(3)**2+
(-2*x-5)*exp(3))*ln(2))/(9*x**2*exp(3)**2+(6*x**3+30*x**2)*exp(3)+x**4+10*
x**3+25*x**2),x)
```

output
```
-(-2*exp(3)*log(2) - exp(3)*log(log(log(2)) + 2*log(2)))/(x**2 + x*(5 + 3*
exp(3)))
```

3.448.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

$$\int \frac{(-3e^6+e^3(-5-2x))\log(4)+(-3e^6+e^3(-5-2x))\log(\log(4\log(2)))}{25x^2+9e^6x^2+10x^3+x^4+e^3(30x^2+6x^3)}\,dx$$
$$=\frac{2\,e^3\log(2)+e^3\log(\log(4\,\log(2)))}{x^2+x(3\,e^3+5)}$$

input
```
integrate(((-3*exp(3)^2+(-2*x-5)*exp(3))*log(log(4*log(2)))+2*(-3*exp(3)^2
+(-2*x-5)*exp(3))*log(2))/(9*x^2*exp(3)^2+(6*x^3+30*x^2)*exp(3)+x^4+10*x^3
+25*x^2),x, algorithm=\
```

output
```
(2*e^3*log(2) + e^3*log(log(4*log(2))))/(x^2 + x*(3*e^3 + 5))
```

3.448.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 79 vs. 2(25) = 50.

Time = 0.26 (sec) , antiderivative size = 79, normalized size of antiderivative = 3.29

$$\int \frac{(-3e^6 + e^3(-5-2x))\log(4) + (-3e^6 + e^3(-5-2x))\log(\log(4\log(2)))}{25x^2 + 9e^6x^2 + 10x^3 + x^4 + e^3(30x^2 + 6x^3)}\,dx$$
$$= \frac{4\,e^6\log(2)^2 + 4\,e^6\log(2)\log(\log(4\,\log(2))) + e^6\log(\log(4\,\log(2)))^2}{2\,(3\,xe^6 + (x^2+5\,x)e^3)\log(2) + (3\,xe^6 + (x^2+5\,x)e^3)\log(\log(4\,\log(2)))}$$

input
```
integrate(((-3*exp(3)^2+(-2*x-5)*exp(3))*log(log(4*log(2)))+2*(-3*exp(3)^2
+(-2*x-5)*exp(3))*log(2))/(9*x^2*exp(3)^2+(6*x^3+30*x^2)*exp(3)+x^4+10*x^3
+25*x^2),x, algorithm=\
```

output
```
(4*e^6*log(2)^2 + 4*e^6*log(2)*log(log(4*log(2))) + e^6*log(log(4*log(2)))
^2)/(2*(3*x*e^6 + (x^2 + 5*x)*e^3)*log(2) + (3*x*e^6 + (x^2 + 5*x)*e^3)*lo
g(log(4*log(2))))
```

3.448.9 Mupad [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{(-3e^6 + e^3(-5-2x))\log(4) + (-3e^6 + e^3(-5-2x))\log(\log(4\log(2)))}{25x^2 + 9e^6x^2 + 10x^3 + x^4 + e^3(30x^2 + 6x^3)}\,dx$$
$$= \frac{e^3\,\ln(4\,\ln(\ln(16)))}{x^2 + (3\,e^3 + 5)\,x}$$

input
```
int(-(log(log(4*log(2)))*(3*exp(6) + exp(3)*(2*x + 5)) + 2*log(2)*(3*exp(6
) + exp(3)*(2*x + 5)))/(exp(3)*(30*x^2 + 6*x^3) + 9*x^2*exp(6) + 25*x^2 +
10*x^3 + x^4),x)
```

output
```
(exp(3)*log(4*log(log(16))))/(x^2 + x*(3*exp(3) + 5))
```

3.449 $\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)}\cdots\right.}{\cdots}$

3.449.1 Optimal result

Integrand size = 161, antiderivative size = 36

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+\cdots\right.\right.}{4+x}$$

$$=2+e^{3-e^{3-e^{x^2(-x+\log(4+x))^2}-x}-x}$$

output
```
2+exp(3-exp(3-exp(x^2*(ln(4+x)-x)^2)-x)-x)
```

3.449.2 Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.19

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+\cdots\right.\right.}{4+x}$$

$$=e^{3-e^{3-x-e^{x^4+x^2\log^2(4+x)}(4+x)^{-2x^3}}-x}$$

input
```
Integrate[(E^(3 - E^(3 - E^(x^4 - 2*x^3*Log[4 + x] + x^2*Log[4 + x]^2) - x
) - x)*(-4 - x + E^(3 - E^(x^4 - 2*x^3*Log[4 + x] + x^2*Log[4 + x]^2) - x)
*(4 + x + E^(x^4 - 2*x^3*Log[4 + x] + x^2*Log[4 + x]^2)*(14*x^3 + 4*x^4 +
(-22*x^2 - 6*x^3)*Log[4 + x] + (8*x + 2*x^2)*Log[4 + x]^2))))/(4 + x),x]
```

3.449.

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}\left(14x^3+4x^4+(-22\cdots\right.\right.\right.}{4+\cdots}$$

output
```
E^(3 - E^(3 - x - E^(x^4 + x^2*Log[4 + x]^2)/(4 + x)^(2*x^3)) - x)
```

3.449.3 Rubi [A] (verified)

Time = 4.70 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.19, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.006$, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\exp\left(-\exp\left(-e^{x^4-2x^3\log(x+4)+x^2\log^2(x+4)}-x+3\right)-x+3\right)\left(\left(e^{x^4-2x^3\log(x+4)+x^2\log^2(x+4)}\left(4x^4+14x^3+\left(2x^2\right.\right.\right.\right.}{x+}$$

$$\Big\downarrow \text{7257}$$

$$\exp\left(-\exp\left((x+4)^{-2x^3}\left(-e^{x^4+x^2\log^2(x+4)}\right)-x+3\right)-x+3\right)$$

input
```
Int[(E^(3 - E^(3 - E^(x^4 - 2*x^3*Log[4 + x] + x^2*Log[4 + x]^2) - x) - x)
*(-4 - x + E^(3 - E^(x^4 - 2*x^3*Log[4 + x] + x^2*Log[4 + x]^2) - x)*(4 +
x + E^(x^4 - 2*x^3*Log[4 + x] + x^2*Log[4 + x]^2)*(14*x^3 + 4*x^4 + (-22*x
^2 - 6*x^3)*Log[4 + x] + (8*x + 2*x^2)*Log[4 + x]^2))))/(4 + x),x]
```

output
```
E^(3 - E^(3 - x - E^(x^4 + x^2*Log[4 + x]^2)/(4 + x)^(2*x^3)) - x)
```

3.449.

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}\left(14x^3+4x^4+\left(-22\right.\right.\right.\right.}{4+}$$

3.449.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.449.4 Maple [A] (verified)

Time = 4.73 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.14

method	result	size
risch	$e^{-e^{-(4+x)^{-2x^3} e^{x^2\left(\ln(4+x)^2+x^2\right)}+3-x}+3-x}$	41
parallelrisch	$e^{-e^{-e^{x^2 \ln(4+x)^2-2x^3 \ln(4+x)+x^4}+3-x}+3-x}$	41

input
```
int((((((2*x^2+8*x)*ln(4+x)^2+(-6*x^3-22*x^2)*ln(4+x)+4*x^4+14*x^3)*exp(x^2
*ln(4+x)^2-2*x^3*ln(4+x)+x^4)+4+x)*exp(-exp(x^2*ln(4+x)^2-2*x^3*ln(4+x)+x^
4)+3-x)-x-4)*exp(-exp(-exp(x^2*ln(4+x)^2-2*x^3*ln(4+x)+x^4)+3-x)+3-x)/(4+x
),x,method=_RETURNVERBOSE)
```

output
```
exp(-exp(-(4+x)^(-2*x^3)*exp(x^2*(ln(4+x)^2+x^2))+3-x)+3-x)
```

3.449.5 Fricas [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.11

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+\right.\right.}{4+x}$$

$$= e^{\left(-x-e^{\left(-x-e^{\left(x^4-2\,x^3\log(x+4)+x^2\log(x+4)^2\right)}+3\right)}+3\right)}$$

input
```
integrate((((((2*x^2+8*x)*log(4+x)^2+(-6*x^3-22*x^2)*log(4+x)+4*x^4+14*x^3)
*exp(x^2*log(4+x)^2-2*x^3*log(4+x)+x^4)+4+x)*exp(-exp(x^2*log(4+x)^2-2*x^3
*log(4+x)+x^4)+3-x)-x-4)*exp(-exp(-exp(x^2*log(4+x)^2-2*x^3*log(4+x)+x^4)+
3-x)+3-x)/(4+x),x, algorithm=\
```

output
```
e^(-x - e^(-x - e^(x^4 - 2*x^3*log(x + 4) + x^2*log(x + 4)^2) + 3) + 3)
```

3.449.

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}\left(14x^3+4x^4+(-22\right.\right.\right.}{}$$

3.449.6 Sympy [A] (verification not implemented)

Time = 166.79 (sec) , antiderivative size = 34, normalized size of antiderivative = 0.94

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}\right.\right.}{4+x}$$

$$= e^{-x-e^{-x-e^{x^4-2x^3\log{(x+4)}+x^2\log{(x+4)}^2}+3}+3}$$

input
```
integrate(((((2*x**2+8*x)*ln(4+x)**2+(-6*x**3-22*x**2)*ln(4+x)+4*x**4+14*x
**3)*exp(x**2*ln(4+x)**2-2*x**3*ln(4+x)+x**4)+4+x)*exp(-exp(x**2*ln(4+x)**
2-2*x**3*ln(4+x)+x**4)+3-x)-x-4)*exp(-exp(-exp(x**2*ln(4+x)**2-2*x**3*ln(4
+x)+x**4)+3-x)+3-x)/(4+x),x)
```

output
```
exp(-x - exp(-x - exp(x**4 - 2*x**3*log(x + 4) + x**2*log(x + 4)**2) + 3)
+ 3)
```

3.449.7 Maxima [A] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.11

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}\right.\right.}{4+x}$$

$$= e^{\left(-x-e^{\left(-x-e^{\left(x^4-2\,x^3\log(x+4)+x^2\log(x+4)^2\right)}+3\right)}+3\right)}$$

input
```
integrate(((((2*x^2+8*x)*log(4+x)^2+(-6*x^3-22*x^2)*log(4+x)+4*x^4+14*x^3)
*exp(x^2*log(4+x)^2-2*x^3*log(4+x)+x^4)+4+x)*exp(-exp(x^2*log(4+x)^2-2*x^3
*log(4+x)+x^4)+3-x)-x-4)*exp(-exp(-exp(x^2*log(4+x)^2-2*x^3*log(4+x)+x^4)+
3-x)+3-x)/(4+x),x, algorithm=\
```

output
```
e^(-x - e^(-x - e^(x^4 - 2*x^3*log(x + 4) + x^2*log(x + 4)^2) + 3) + 3)
```

3.449.

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}\left(14x^3+4x^4+(-22\right.\right.\right.}{4+}$$

3.449.8 Giac [A] (verification not implemented)

Time = 23.50 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.11

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}\right.\right.}{4+x}$$

$$=e^{\left(-x-e^{\left(-x-e^{\left(x^4-2\,x^3\log(x+4)+x^2\log(x+4)^2\right)}+3\right)}+3\right)}$$

input
```
integrate(((((2*x^2+8*x)*log(4+x)^2+(-6*x^3-22*x^2)*log(4+x)+4*x^4+14*x^3)
*exp(x^2*log(4+x)^2-2*x^3*log(4+x)+x^4)+4+x)*exp(-exp(x^2*log(4+x)^2-2*x^3
*log(4+x)+x^4)+3-x)-x-4)*exp(-exp(-exp(x^2*log(4+x)^2-2*x^3*log(4+x)+x^4)+
3-x)+3-x)/(4+x),x, algorithm=\
```

output
```
e^(-x - e^(-x - e^(x^4 - 2*x^3*log(x + 4) + x^2*log(x + 4)^2) + 3) + 3)
```

3.449.9 Mupad [B] (verification not implemented)

Time = 14.80 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.25

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}\right.\right.}{4+x}$$

$$=\mathrm{e}^{-\mathrm{e}^{-x}\,\mathrm{e}^{3}\,\mathrm{e}^{-\frac{\mathrm{e}^{x^4}\,\mathrm{e}^{x^2\ln(x+4)^2}}{(x+4)^{2\,x^3}}}}\,\mathrm{e}^{-x}\,\mathrm{e}^{3}$$

input
```
int(-(exp(3 - exp(3 - exp(x^4 - 2*x^3*log(x + 4) + x^2*log(x + 4)^2) - x)
- x)*(x - exp(3 - exp(x^4 - 2*x^3*log(x + 4) + x^2*log(x + 4)^2) - x)*(x +
 exp(x^4 - 2*x^3*log(x + 4) + x^2*log(x + 4)^2)*(log(x + 4)^2*(8*x + 2*x^2
) - log(x + 4)*(22*x^2 + 6*x^3) + 14*x^3 + 4*x^4) + 4) + 4))/(x + 4),x)
```

output
```
exp(-exp(-x)*exp(3)*exp(-(exp(x^4)*exp(x^2*log(x + 4)^2))/(x + 4)^(2*x^3))
)*exp(-x)*exp(3)
```

3.449.

$$\int \frac{e^{3-e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}-x}\left(-4-x+e^{3-e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}-x}\left(4+x+e^{x^4-2x^3\log(4+x)+x^2\log^2(4+x)}\left(14x^3+4x^4+(-22\right.\right.\right.}{4+x}$$

3.450 $\int \frac{2+2x^2+e^{e^x}(1+e^x x\log(x))}{x}\,dx$

3.450.1 Optimal result

Integrand size = 26, antiderivative size = 15

$$\int \frac{2+2x^2+e^{e^x}(1+e^x x\log(x))}{x}\,dx = -3+x^2+\left(2+e^{e^x}\right)\log(x)$$

output
```
(2+exp(exp(x)))*ln(x)+x^2-3
```

3.450.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \frac{2+2x^2+e^{e^x}(1+e^x x\log(x))}{x}\,dx = x^2+2\log(x)+e^{e^x}\log(x)$$

input
```
Integrate[(2 + 2*x^2 + E^E^x*(1 + E^x*x*Log[x]))/x,x]
```

output
```
x^2 + 2*Log[x] + E^E^x*Log[x]
```

3.450.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+e^{e^x}(e^x x\log(x)+1)+2}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2x^2+e^{e^x}+2}{x}+e^{x+e^x}\log(x)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^2+e^{e^x}\log(x)+2\log(x)$$

input
```
Int[(2 + 2*x^2 + E^E^x*(1 + E^x*x*Log[x]))/x,x]
```

output
```
x^2 + 2*Log[x] + E^E^x*Log[x]
```

3.450.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.450.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result	size
risch	$2\ln(x)+x^2+\ln(x)\,\mathrm{e}^{\mathrm{e}^x}$	15
parallelrisch	$2\ln(x)+x^2+\ln(x)\,\mathrm{e}^{\mathrm{e}^x}$	15

input
```
int(((x*exp(x)*ln(x)+1)*exp(exp(x))+2*x^2+2)/x,x,method=_RETURNVERBOSE)
```

output
```
2*ln(x)+x^2+ln(x)*exp(exp(x))
```

3.450.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{2+2x^2+e^{e^x}(1+e^x x\log(x))}{x}\,dx = x^2+e^{(e^x)}\log(x)+2\log(x)$$

input
```
integrate(((x*exp(x)*log(x)+1)*exp(exp(x))+2*x^2+2)/x,x, algorithm=\
```

output
```
x^2 + e^(e^x)*log(x) + 2*log(x)
```

3.450.6 Sympy [A] (verification not implemented)

Time = 1.61 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{2+2x^2+e^{e^x}(1+e^x x\log(x))}{x}\,dx = x^2+e^{e^x}\log(x)+2\log(x)$$

input
```
integrate(((x*exp(x)*ln(x)+1)*exp(exp(x))+2*x**2+2)/x,x)
```

output
```
x**2 + exp(exp(x))*log(x) + 2*log(x)
```

3.450.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{2+2x^2+e^{e^x}(1+e^x x\log(x))}{x}\,dx = x^2 + e^{(e^x)}\log(x) + 2\log(x)$$

input
```
integrate(((x*exp(x)*log(x)+1)*exp(exp(x))+2*x^2+2)/x,x, algorithm=\
```

output
```
x^2 + e^(e^x)*log(x) + 2*log(x)
```

3.450.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.73

$$\int \frac{2+2x^2+e^{e^x}(1+e^x x\log(x))}{x}\,dx = \left(x^2e^x + e^{(x+e^x)}\log(x) + 2\,e^x\log(x)\right)e^{(-x)}$$

input
```
integrate(((x*exp(x)*log(x)+1)*exp(exp(x))+2*x^2+2)/x,x, algorithm=\
```

output
```
(x^2*e^x + e^(x + e^x)*log(x) + 2*e^x*log(x))*e^(-x)
```

3.450.9 Mupad [B] (verification not implemented)

Time = 13.89 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{2+2x^2+e^{e^x}(1+e^x x\log(x))}{x}\,dx = 2\,\ln(x) + \mathrm{e}^{\mathrm{e}^x}\,\ln(x) + x^2$$

input
```
int((exp(exp(x))*(x*exp(x)*log(x) + 1) + 2*x^2 + 2)/x,x)
```

output
```
2*log(x) + exp(exp(x))*log(x) + x^2
```

3.451 $\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}(-2x}{}$

3.451.1 Optimal result

Integrand size = 571, antiderivative size = 28

$$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}(-2x^2-2x^3+54x^4+18x^5)+\cdots}{-729x^3-e^{15}x^3-729x^4-\cdots}$$

$$=2-\left(x+\frac{x}{(9+e^5+3x)(-x+\log(x))}\right)^2$$

output
```
2-(x+x/(ln(x)-x)/(9+exp(5)+3*x))^2
```

3.451.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.64

$$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}(-2x^2-2x^3+54x^4+18x^5)+\cdots}{-729x^3-e^{15}x^3-729x^4-\cdots}$$

$$=-x^2\left(1+\frac{1}{(9+e^5+3x)^2(x-\log(x))^2}+\frac{2}{(9+e^5+3x)(-x+\log(x))}\right)$$

input
```
Integrate[(18*x - 156*x^2 - 276*x^3 + 1386*x^4 + 2*E^15*x^4 + 1458*x^5 + 4
86*x^6 + 54*x^7 + E^10*(-2*x^2 - 2*x^3 + 54*x^4 + 18*x^5) + E^5*(2*x - 36*
x^2 - 48*x^3 + 480*x^4 + 324*x^5 + 54*x^6) + (144*x + 594*x^2 - 4140*x^3 -
 6*E^15*x^3 - 4356*x^4 - 1458*x^5 - 162*x^6 + E^10*(2*x + 6*x^2 - 162*x^3
- 54*x^4) + E^5*(34*x + 120*x^2 - 1434*x^3 - 972*x^4 - 162*x^5))*Log[x] +
(-324*x + 4212*x^2 + 6*E^15*x^2 + 4356*x^3 + 1458*x^4 + 162*x^5 + E^10*(-4
*x + 162*x^2 + 54*x^3) + E^5*(-72*x + 1440*x^2 + 972*x^3 + 162*x^4))*Log[x
]^2 + (-1458*x - 2*E^15*x - 1458*x^2 - 486*x^3 - 54*x^4 + E^10*(-54*x - 18
*x^2) + E^5*(-486*x - 324*x^2 - 54*x^3))*Log[x]^3)/(-729*x^3 - E^15*x^3 -
729*x^4 - 243*x^5 - 27*x^6 + E^10*(-27*x^3 - 9*x^4) + E^5*(-243*x^3 - 162*
x^4 - 27*x^5) + (2187*x^2 + 3*E^15*x^2 + 2187*x^3 + 729*x^4 + 81*x^5 + E^1
0*(81*x^2 + 27*x^3) + E^5*(729*x^2 + 486*x^3 + 81*x^4))*Log[x] + (-2187*x
- 3*E^15*x - 2187*x^2 - 729*x^3 - 81*x^4 + E^10*(-81*x - 27*x^2) + E^5*(-7
29*x - 486*x^2 - 81*x^3))*Log[x]^2 + (729 + E^15 + 729*x + 243*x^2 + 27*x^
3 + E^10*(27 + 9*x) + E^5*(243 + 162*x + 27*x^2))*Log[x]^3),x]
```

output
```
-(x^2*(1 + 1/((9 + E^5 + 3*x)^2*(x - Log[x])^2) + 2/((9 + E^5 + 3*x)*(-x +
 Log[x]))))
```

3.451.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{54x^7+486x^6+1458x^5+2e^{15}x^4+1386x^4-276x^3-156x^2+\left(-54x^4-486x^3-1458x^2+e^{10}\left(-18x^2-54x\right)}{-27x^6-243x^5-729x^4-e^{15}x^3}$$

$$\Big\downarrow \text{6}$$

$$\int \frac{54x^7+486x^6+1458x^5+2e^{15}x^4+1386x^4-276x^3-156x^2+\left(-54x^4-486x^3-1458x^2+e^{10}\left(-18x^2-54x\right)}{-27x^6-243x^5-729x^4+(-729}$$

$$\Big\downarrow \text{6}$$

$$\int \frac{54x^7+486x^6+1458x^5+\left(1386+2e^{15}\right)x^4-276x^3-156x^2+\left(-54x^4-486x^3-1458x^2+e^{10}\left(-18x^2-54x\right)}{-27x^6-243x^5-729x^4+(-729}$$

$$\Big\downarrow \text{7239}$$

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$$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}\left(-2x^2-2x^3+54x^4+18x^5\right)+e^5\left(2x-36x^2-48x^3+480x^4+324x^5+54x^6\right)+(144x-}{-729x^3-e^{15}x^3-729x^4-243x^5-27x^6+e^{10}\left(-27x^3-9x^4\right)+e^5\left(-243x^3-1\right.}$$

$$\int \frac{2x\left(-e^{15}x^3-e^{10}\left(9x^3+27x^2-x-1\right)x-\left(e^{10}\left(27x^2+81x-2\right)+9e^5\left(9x^3+54x^2+80x-4\right)+9\left(9x^4+81x^3\right.\right.\right.}{}$$

$$\Big\downarrow \; 27$$

$$2\int -\frac{x\left(e^{15}x^3-e^{10}\left(-9x^3-27x^2+x+1\right)x-\left(3x+e^5+9\right)^3\log^3(x)+\left(3e^{15}x-e^{10}\left(-27x^2-81x+2\right)-9e^5\left(-\right.\right.\right.}{}$$

$$\Big\downarrow \; 25$$

$$-2\int \frac{x\left(e^{15}x^3-e^{10}\left(-9x^3-27x^2+x+1\right)x-\left(3x+e^5+9\right)^3\log^3(x)+\left(3e^{15}x-e^{10}\left(-27x^2-81x+2\right)-9e^5\left(-\right.\right.\right.}{}$$

$$\Big\downarrow \; 7293$$

$$-2\int \left(-\frac{\left(3x+2e^5+18\right)x}{\left(3x+e^5+9\right)^2\left(x-\log(x)\right)}+\frac{\left(9x^3+3\left(15+2e^5\right)x^2+\left(27+12e^5+e^{10}\right)x-e^{10}-17e^5-72\right)x}{\left(3x+e^5+9\right)^3\left(x-\log(x)\right)^2}-\frac{}{(3x}\right.$$

$$\Big\downarrow \; 2009$$

$$-2\left(-\frac{1}{9}\int \frac{1}{\left(x-\log(x)\right)^3}dx-\frac{1}{9}\left(108+21e^5+e^{10}\right)\int \frac{1}{\left(3x+e^5+9\right)^2\left(x-\log(x)\right)^3}dx+\frac{1}{9}\left(21+2e^5\right)\int \frac{}{(3x+e^5}\right.$$

input
```
Int[(18*x - 156*x^2 - 276*x^3 + 1386*x^4 + 2*E^15*x^4 + 1458*x^5 + 486*x^6
 + 54*x^7 + E^10*(-2*x^2 - 2*x^3 + 54*x^4 + 18*x^5) + E^5*(2*x - 36*x^2 -
48*x^3 + 480*x^4 + 324*x^5 + 54*x^6) + (144*x + 594*x^2 - 4140*x^3 - 6*E^1
5*x^3 - 4356*x^4 - 1458*x^5 - 162*x^6 + E^10*(2*x + 6*x^2 - 162*x^3 - 54*x
^4) + E^5*(34*x + 120*x^2 - 1434*x^3 - 972*x^4 - 162*x^5))*Log[x] + (-324*
x + 4212*x^2 + 6*E^15*x^2 + 4356*x^3 + 1458*x^4 + 162*x^5 + E^10*(-4*x + 1
62*x^2 + 54*x^3) + E^5*(-72*x + 1440*x^2 + 972*x^3 + 162*x^4))*Log[x]^2 +
(-1458*x - 2*E^15*x - 1458*x^2 - 486*x^3 - 54*x^4 + E^10*(-54*x - 18*x^2)
+ E^5*(-486*x - 324*x^2 - 54*x^3))*Log[x]^3)/(-729*x^3 - E^15*x^3 - 729*x^
4 - 243*x^5 - 27*x^6 + E^10*(-27*x^3 - 9*x^4) + E^5*(-243*x^3 - 162*x^4 -
27*x^5) + (2187*x^2 + 3*E^15*x^2 + 2187*x^3 + 729*x^4 + 81*x^5 + E^10*(81*
x^2 + 27*x^3) + E^5*(729*x^2 + 486*x^3 + 81*x^4))*Log[x] + (-2187*x - 3*E^
15*x - 2187*x^2 - 729*x^3 - 81*x^4 + E^10*(-81*x - 27*x^2) + E^5*(-729*x -
 486*x^2 - 81*x^3))*Log[x]^2 + (729 + E^15 + 729*x + 243*x^2 + 27*x^3 + E^
10*(27 + 9*x) + E^5*(243 + 162*x + 27*x^2))*Log[x]^3),x]
```

3.451.

$$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}\left(-2x^2-2x^3+54x^4+18x^5\right)+e^5\left(2x-36x^2-48x^3+480x^4+324x^5+54x^6\right)+(144x-}{-729x^3-e^{15}x^3-729x^4-243x^5-27x^6+e^{10}\left(-27x^3-9x^4\right)+e^5\left(-243x^3-1\right.}$$

output
```
$Aborted
```

3.451.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.451.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(27) = 54$.

Time = 7.48 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.07

method	result
risch	$-x^2 + \frac{\left(2x\,\mathrm{e}^5 - 2\,\mathrm{e}^5 \ln(x) + 6x^2 - 6x \ln(x) + 18x - 18 \ln(x) - 1\right) x^2}{\left(9 + \mathrm{e}^5 + 3x\right)^2 \left(x - \ln(x)\right)^2}$
default	$-x^2 - \frac{2\,\mathrm{e}^{10} \ln(x)^2 - 4 \ln(x) \mathrm{e}^{10+\ln(x)} + 2\,\mathrm{e}^{2\ln(x)+10} + 12 \ln(x)^2 \mathrm{e}^{5+\ln(x)} - 18 \ln(x) \mathrm{e}^{2\ln(x)+5} + 6\,\mathrm{e}^{3\ln(x)+5} + 18x^2 \ln(x)^2 - 18x^3 \mathrm{l}}{3\left(\mathrm{e}^5 \ln(x) - \mathrm{e}^{5+\ln(x)} + 3x \mathrm{l}\right.}$
parallelrisch	$\frac{-2934x^2\mathrm{e}^5 \ln(x) + x^2\mathrm{e}^{20} + 162x^5 \ln(x) - 81x^4 \ln(x)^2 + 2916x^2\mathrm{e}^5 - 54x^5\mathrm{e}^5 + 4374x \ln(x)^2 + 972x^4 \ln(x) - 13122x \ln(x) + 1476x^3\mathrm{e}^5 -}{}$

3.451.
$$\int \frac{18x - 156x^2 - 276x^3 + 1386x^4 + 2e^{15}x^4 + 1458x^5 + 486x^6 + 54x^7 + e^{10}\left(-2x^2 - 2x^3 + 54x^4 + 18x^5\right) + e^5\left(2x - 36x^2 - 48x^3 + 480x^4 + 324x^5 + 54x^6\right) + (144x-}{-729x^3 - e^{15}x^3 - 729x^4 - 243x^5 - 27x^6 + e^{10}(-27x^3 - 9x^4) + e^5(-243x^3 - 1}$$

input
```
int(((-2*x*exp(5)^3+(-18*x^2-54*x)*exp(5)^2+(-54*x^3-324*x^2-486*x)*exp(5)
-54*x^4-486*x^3-1458*x^2-1458*x)*ln(x)^3+(6*x^2*exp(5)^3+(54*x^3+162*x^2-4
*x)*exp(5)^2+(162*x^4+972*x^3+1440*x^2-72*x)*exp(5)+162*x^5+1458*x^4+4356*
x^3+4212*x^2-324*x)*ln(x)^2+(-6*x^3*exp(5)^3+(-54*x^4-162*x^3+6*x^2+2*x)*e
xp(5)^2+(-162*x^5-972*x^4-1434*x^3+120*x^2+34*x)*exp(5)-162*x^6-1458*x^5-4
356*x^4-4140*x^3+594*x^2+144*x)*ln(x)+2*x^4*exp(5)^3+(18*x^5+54*x^4-2*x^3-
2*x^2)*exp(5)^2+(54*x^6+324*x^5+480*x^4-48*x^3-36*x^2+2*x)*exp(5)+54*x^7+4
86*x^6+1458*x^5+1386*x^4-276*x^3-156*x^2+18*x)/((exp(5)^3+(9*x+27)*exp(5)^
2+(27*x^2+162*x+243)*exp(5)+27*x^3+243*x^2+729*x+729)*ln(x)^3+(-3*x*exp(5)
^3+(-27*x^2-81*x)*exp(5)^2+(-81*x^3-486*x^2-729*x)*exp(5)-81*x^4-729*x^3-2
187*x^2-2187*x)*ln(x)^2+(3*x^2*exp(5)^3+(27*x^3+81*x^2)*exp(5)^2+(81*x^4+4
86*x^3+729*x^2)*exp(5)+81*x^5+729*x^4+2187*x^3+2187*x^2)*ln(x)-x^3*exp(5)^
3+(-9*x^4-27*x^3)*exp(5)^2+(-27*x^5-162*x^4-243*x^3)*exp(5)-27*x^6-243*x^5
-729*x^4-729*x^3),x,method=_RETURNVERBOSE)
```

output
```
-x^2+(2*x*exp(5)-2*exp(5)*ln(x)+6*x^2-6*x*ln(x)+18*x-18*ln(x)-1)*x^2/(9+ex
p(5)+3*x)^2/(x-ln(x))^2
```

3.451.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 236 vs. $2(28) = 56$.

Time = 0.33 (sec) , antiderivative size = 236, normalized size of antiderivative = 8.43

$$\int \frac{18x - 156x^2 - 276x^3 + 1386x^4 + 2e^{15}x^4 + 1458x^5 + 486x^6 + 54x^7 + e^{10}(-2x^2 - 2x^3 + 54x^4 + 18x^5) + \cdots}{-729x^3 - e^{15}x^3 - 729x^4 - \cdots}$$
$$= -\frac{9x^6 + 54x^5 + x^4e^{10} + 75x^4 - 18x^3 + (9x^4 + 54x^3 + x^2e^{10} + 81x^2 + 6(x^3 + 3x^2)e^5)\log(x)^2 + x^2 + \cdots}{9x^4 + 54x^3 + x^2e^{10} + (9x^2 + 6(x+3)e^5 + 54x + e^{10} + 81)\log(x)^2 + 81x^2 + \cdots}$$

input
```
integrate(((-2*x*exp(5)^3+(-18*x^2-54*x)*exp(5)^2+(-54*x^3-324*x^2-486*x)*
exp(5)-54*x^4-486*x^3-1458*x^2-1458*x)*log(x)^3+(6*x^2*exp(5)^3+(54*x^3+16
2*x^2-4*x)*exp(5)^2+(162*x^4+972*x^3+1440*x^2-72*x)*exp(5)+162*x^5+1458*x^
4+4356*x^3+4212*x^2-324*x)*log(x)^2+(-6*x^3*exp(5)^3+(-54*x^4-162*x^3+6*x^
2+2*x)*exp(5)^2+(-162*x^5-972*x^4-1434*x^3+120*x^2+34*x)*exp(5)-162*x^6-14
58*x^5-4356*x^4-4140*x^3+594*x^2+144*x)*log(x)+2*x^4*exp(5)^3+(18*x^5+54*x
^4-2*x^3-2*x^2)*exp(5)^2+(54*x^6+324*x^5+480*x^4-48*x^3-36*x^2+2*x)*exp(5)
+54*x^7+486*x^6+1458*x^5+1386*x^4-276*x^3-156*x^2+18*x)/((exp(5)^3+(9*x+27
)*exp(5)^2+(27*x^2+162*x+243)*exp(5)+27*x^3+243*x^2+729*x+729)*log(x)^3+(-
3*x*exp(5)^3+(-27*x^2-81*x)*exp(5)^2+(-81*x^3-486*x^2-729*x)*exp(5)-81*x^4
-729*x^3-2187*x^2-2187*x)*log(x)^2+(3*x^2*exp(5)^3+(27*x^3+81*x^2)*exp(5)^
2+(81*x^4+486*x^3+729*x^2)*exp(5)+81*x^5+729*x^4+2187*x^3+2187*x^2)*log(x)
-x^3*exp(5)^3+(-9*x^4-27*x^3)*exp(5)^2+(-27*x^5-162*x^4-243*x^3)*exp(5)-27
*x^6-243*x^5-729*x^4-729*x^3),x, algorithm=\
```

output
```
-(9*x^6 + 54*x^5 + x^4*e^10 + 75*x^4 - 18*x^3 + (9*x^4 + 54*x^3 + x^2*e^10
 + 81*x^2 + 6*(x^3 + 3*x^2)*e^5)*log(x)^2 + x^2 + 2*(3*x^5 + 9*x^4 - x^3)*
e^5 - 2*(9*x^5 + 54*x^4 + x^3*e^10 + 78*x^3 - 9*x^2 + (6*x^4 + 18*x^3 - x^
2)*e^5)*log(x))/(9*x^4 + 54*x^3 + x^2*e^10 + (9*x^2 + 6*(x + 3)*e^5 + 54*x
 + e^10 + 81)*log(x)^2 + 81*x^2 + 6*(x^3 + 3*x^2)*e^5 - 2*(9*x^3 + 54*x^2
+ x*e^10 + 6*(x^2 + 3*x)*e^5 + 81*x)*log(x))
```

3.451.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 158 vs. $2(19) = 38$.

Time = 0.25 (sec) , antiderivative size = 158, normalized size of antiderivative = 5.64

$$\int \frac{18x - 156x^2 - 276x^3 + 1386x^4 + 2e^{15}x^4 + 1458x^5 + 486x^6 + 54x^7 + e^{10}(-2x^2 - 2x^3 + 54x^4 + 18x^5) + \cdots}{-729x^3 - e^{15}x^3 - 729x^4 - \cdots}$$

$$= -x^2 + \frac{6x^4 + 18x^3 + 2x^3e^5 - x^2 + (-6x^3 - 2x^2e^5 - 18x^2)\log \cdots}{9x^4 + 54x^3 + 6x^3e^5 + 81x^2 + 18x^2e^5 + x^2e^{10} + (9x^2 + 54x + 6xe^5 + 81 + 18e^5 + e^{10})\log(x)^2 + (-18x \cdots}$$

$$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}(-2x^2-2x^3+54x^4+18x^5)+e^5(2x-36x^2-48x^3+480x^4+324x^5+54x^6)+(144x \cdots}{-729x^3-e^{15}x^3-729x^4-243x^5-27x^6+e^{10}(-27x^3-9x^4)+e^5(-243x^3-1 \cdots}$$

input
```
integrate(((-2*x*exp(5)**3+(-18*x**2-54*x)*exp(5)**2+(-54*x**3-324*x**2-48
6*x)*exp(5)-54*x**4-486*x**3-1458*x**2-1458*x)*ln(x)**3+(6*x**2*exp(5)**3+
(54*x**3+162*x**2-4*x)*exp(5)**2+(162*x**4+972*x**3+1440*x**2-72*x)*exp(5)
+162*x**5+1458*x**4+4356*x**3+4212*x**2-324*x)*ln(x)**2+(-6*x**3*exp(5)**3
+(-54*x**4-162*x**3+6*x**2+2*x)*exp(5)**2+(-162*x**5-972*x**4-1434*x**3+12
0*x**2+34*x)*exp(5)-162*x**6-1458*x**5-4356*x**4-4140*x**3+594*x**2+144*x)
*ln(x)+2*x**4*exp(5)**3+(18*x**5+54*x**4-2*x**3-2*x**2)*exp(5)**2+(54*x**6
+324*x**5+480*x**4-48*x**3-36*x**2+2*x)*exp(5)+54*x**7+486*x**6+1458*x**5+
1386*x**4-276*x**3-156*x**2+18*x)/((exp(5)**3+(9*x+27)*exp(5)**2+(27*x**2+
162*x+243)*exp(5)+27*x**3+243*x**2+729*x+729)*ln(x)**3+(-3*x*exp(5)**3+(-2
7*x**2-81*x)*exp(5)**2+(-81*x**3-486*x**2-729*x)*exp(5)-81*x**4-729*x**3-2
187*x**2-2187*x)*ln(x)**2+(3*x**2*exp(5)**3+(27*x**3+81*x**2)*exp(5)**2+(8
1*x**4+486*x**3+729*x**2)*exp(5)+81*x**5+729*x**4+2187*x**3+2187*x**2)*ln(
x)-x**3*exp(5)**3+(-9*x**4-27*x**3)*exp(5)**2+(-27*x**5-162*x**4-243*x**3)
*exp(5)-27*x**6-243*x**5-729*x**4-729*x**3),x)
```

output
```
-x**2 + (6*x**4 + 18*x**3 + 2*x**3*exp(5) - x**2 + (-6*x**3 - 2*x**2*exp(5
) - 18*x**2)*log(x))/(9*x**4 + 54*x**3 + 6*x**3*exp(5) + 81*x**2 + 18*x**2
*exp(5) + x**2*exp(10) + (9*x**2 + 54*x + 6*x*exp(5) + 81 + 18*exp(5) + ex
p(10))*log(x)**2 + (-18*x**3 - 12*x**2*exp(5) - 108*x**2 - 2*x*exp(10) - 3
6*x*exp(5) - 162*x)*log(x))
```

3.451.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 196 vs. $2(28) = 56$.

Time = 0.35 (sec) , antiderivative size = 196, normalized size of antiderivative = 7.00

$$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}(-2x^2-2x^3+54x^4+18x^5)+\cdots}{-729x^3-e^{15}x^3-729x^4-\cdots}$$
$$= -\frac{9\,x^6+6\,x^5(e^5+9)+x^4(e^{10}+18\,e^5+75)-2\,x^3(e^5+9)+(9\,x^4+6\,x^3(e^5+9)+x^2(e^{10}+18\,e^5+81))\cdots}{9\,x^4+6\,x^3(e^5+9)+x^2(e^{10}+18\,e^5+81)+(9\,x^2+6\,x(e^5+9)+e^{10}+18\,e^5+81)\cdots}$$

$$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}(-2x^2-2x^3+54x^4+18x^5)+e^5(2x-36x^2-48x^3+480x^4+324x^5+54x^6)+(144x-\cdots}{-729x^3-e^{15}x^3-729x^4-243x^5-27x^6+e^{10}(-27x^3-9x^4)+e^5(-243x^3-1\cdots}$$

input
```
integrate(((-2*x*exp(5)^3+(-18*x^2-54*x)*exp(5)^2+(-54*x^3-324*x^2-486*x)*
exp(5)-54*x^4-486*x^3-1458*x^2-1458*x)*log(x)^3+(6*x^2*exp(5)^3+(54*x^3+16
2*x^2-4*x)*exp(5)^2+(162*x^4+972*x^3+1440*x^2-72*x)*exp(5)+162*x^5+1458*x^
4+4356*x^3+4212*x^2-324*x)*log(x)^2+(-6*x^3*exp(5)^3+(-54*x^4-162*x^3+6*x^
2+2*x)*exp(5)^2+(-162*x^5-972*x^4-1434*x^3+120*x^2+34*x)*exp(5)-162*x^6-14
58*x^5-4356*x^4-4140*x^3+594*x^2+144*x)*log(x)+2*x^4*exp(5)^3+(18*x^5+54*x
^4-2*x^3-2*x^2)*exp(5)^2+(54*x^6+324*x^5+480*x^4-48*x^3-36*x^2+2*x)*exp(5)
+54*x^7+486*x^6+1458*x^5+1386*x^4-276*x^3-156*x^2+18*x)/((exp(5)^3+(9*x+27
)*exp(5)^2+(27*x^2+162*x+243)*exp(5)+27*x^3+243*x^2+729*x+729)*log(x)^3+(-
3*x*exp(5)^3+(-27*x^2-81*x)*exp(5)^2+(-81*x^3-486*x^2-729*x)*exp(5)-81*x^4
-729*x^3-2187*x^2-2187*x)*log(x)^2+(3*x^2*exp(5)^3+(27*x^3+81*x^2)*exp(5)^
2+(81*x^4+486*x^3+729*x^2)*exp(5)+81*x^5+729*x^4+2187*x^3+2187*x^2)*log(x)
-x^3*exp(5)^3+(-9*x^4-27*x^3)*exp(5)^2+(-27*x^5-162*x^4-243*x^3)*exp(5)-27
*x^6-243*x^5-729*x^4-729*x^3),x, algorithm=\
```

output
```
-(9*x^6 + 6*x^5*(e^5 + 9) + x^4*(e^10 + 18*e^5 + 75) - 2*x^3*(e^5 + 9) + (
9*x^4 + 6*x^3*(e^5 + 9) + x^2*(e^10 + 18*e^5 + 81))*log(x)^2 + x^2 - 2*(9*
x^5 + 6*x^4*(e^5 + 9) + x^3*(e^10 + 18*e^5 + 78) - x^2*(e^5 + 9))*log(x))/
(9*x^4 + 6*x^3*(e^5 + 9) + x^2*(e^10 + 18*e^5 + 81) + (9*x^2 + 6*x*(e^5 +
9) + e^10 + 18*e^5 + 81)*log(x)^2 - 2*(9*x^3 + 6*x^2*(e^5 + 9) + x*(e^10 +
 18*e^5 + 81))*log(x))
```

3.451.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 302 vs. $2(28) = 56$.

Time = 0.42 (sec) , antiderivative size = 302, normalized size of antiderivative = 10.79

$$\int \frac{18x - 156x^2 - 276x^3 + 1386x^4 + 2e^{15}x^4 + 1458x^5 + 486x^6 + 54x^7 + e^{10}(-2x^2 - 2x^3 + 54x^4 + 18x^5) + \cdots}{-729x^3 - e^{15}x^3 - 729x^4 - \cdots}$$
$$= -\frac{9\,x^6 + 6\,x^5e^5 - 18\,x^5\log(x) - 12\,x^4e^5\log(x) + 9\,x^4\log(x)^2 + 6\,x^3e^5\log(x)^2 + 54\,x^5 + x^4e^{10} + 18\,x^4e^5 \cdots}{9\,x^4 + 6\,x^3e^5 - 18\,x^3\log(x) - 12\,x^2e^5\log(x) + 9\,x^2\log(x)^2 + 6\,xe^5\log \cdots}$$

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$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}(-2x^2-2x^3+54x^4+18x^5)+e^5(2x-36x^2-48x^3+480x^4+324x^5+54x^6)+(144x \cdots}{-729x^3-e^{15}x^3-729x^4-243x^5-27x^6+e^{10}(-27x^3-9x^4)+e^5(-243x^3-1 \cdots}$

input
```
integrate(((-2*x*exp(5)^3+(-18*x^2-54*x)*exp(5)^2+(-54*x^3-324*x^2-486*x)*
exp(5)-54*x^4-486*x^3-1458*x^2-1458*x)*log(x)^3+(6*x^2*exp(5)^3+(54*x^3+16
2*x^2-4*x)*exp(5)^2+(162*x^4+972*x^3+1440*x^2-72*x)*exp(5)+162*x^5+1458*x^
4+4356*x^3+4212*x^2-324*x)*log(x)^2+(-6*x^3*exp(5)^3+(-54*x^4-162*x^3+6*x^
2+2*x)*exp(5)^2+(-162*x^5-972*x^4-1434*x^3+120*x^2+34*x)*exp(5)-162*x^6-14
58*x^5-4356*x^4-4140*x^3+594*x^2+144*x)*log(x)+2*x^4*exp(5)^3+(18*x^5+54*x
^4-2*x^3-2*x^2)*exp(5)^2+(54*x^6+324*x^5+480*x^4-48*x^3-36*x^2+2*x)*exp(5)
+54*x^7+486*x^6+1458*x^5+1386*x^4-276*x^3-156*x^2+18*x)/((exp(5)^3+(9*x+27
)*exp(5)^2+(27*x^2+162*x+243)*exp(5)+27*x^3+243*x^2+729*x+729)*log(x)^3+(-
3*x*exp(5)^3+(-27*x^2-81*x)*exp(5)^2+(-81*x^3-486*x^2-729*x)*exp(5)-81*x^4
-729*x^3-2187*x^2-2187*x)*log(x)^2+(3*x^2*exp(5)^3+(27*x^3+81*x^2)*exp(5)^
2+(81*x^4+486*x^3+729*x^2)*exp(5)+81*x^5+729*x^4+2187*x^3+2187*x^2)*log(x)
-x^3*exp(5)^3+(-9*x^4-27*x^3)*exp(5)^2+(-27*x^5-162*x^4-243*x^3)*exp(5)-27
*x^6-243*x^5-729*x^4-729*x^3),x, algorithm=\
```

output
```
-(9*x^6 + 6*x^5*e^5 - 18*x^5*log(x) - 12*x^4*e^5*log(x) + 9*x^4*log(x)^2 +
 6*x^3*e^5*log(x)^2 + 54*x^5 + x^4*e^10 + 18*x^4*e^5 - 108*x^4*log(x) - 2*
x^3*e^10*log(x) - 36*x^3*e^5*log(x) + 54*x^3*log(x)^2 + x^2*e^10*log(x)^2
+ 18*x^2*e^5*log(x)^2 + 75*x^4 - 2*x^3*e^5 - 156*x^3*log(x) + 2*x^2*e^5*lo
g(x) + 81*x^2*log(x)^2 - 18*x^3 + 18*x^2*log(x) + x^2)/(9*x^4 + 6*x^3*e^5
- 18*x^3*log(x) - 12*x^2*e^5*log(x) + 9*x^2*log(x)^2 + 6*x*e^5*log(x)^2 +
54*x^3 + x^2*e^10 + 18*x^2*e^5 - 108*x^2*log(x) - 2*x*e^10*log(x) - 36*x*e
^5*log(x) + 54*x*log(x)^2 + e^10*log(x)^2 + 18*e^5*log(x)^2 + 81*x^2 - 162
*x*log(x) + 81*log(x)^2)
```

3.451.9 Mupad [F(-1)]

Timed out.

$$\int \frac{18x - 156x^2 - 276x^3 + 1386x^4 + 2e^{15}x^4 + 1458x^5 + 486x^6 + 54x^7 + e^{10}(-2x^2 - 2x^3 + 54x^4 + 18x^5) +}{-729x^3 - e^{15}x^3 - 729x^4 -}$$

$$= \int -\frac{18\,x + \mathrm{e}^5\,(54\,x^6 + 324\,x^5 + 480\,x^4 - 48\,x^3 - 36\,x^2 + 2\,x) - \ln(x)^3\,(1458\,x + \mathrm{e}^{10}\,(18\,x^2 + 54\,x) + 2\,x\,\mathrm{e}^{15}}{\ln(x)^2\,(2187\,x + \mathrm{e}^{10}}$$

$$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}(-2x^2-2x^3+54x^4+18x^5)+e^5(2x-36x^2-48x^3+480x^4+324x^5+54x^6)+(144x-}{-729x^3-e^{15}x^3-729x^4-243x^5-27x^6+e^{10}(-27x^3-9x^4)+e^5(-243x^3-1}$$

input
```
int(-(18*x + exp(5)*(2*x - 36*x^2 - 48*x^3 + 480*x^4 + 324*x^5 + 54*x^6) -
 log(x)^3*(1458*x + exp(10)*(54*x + 18*x^2) + 2*x*exp(15) + exp(5)*(486*x
+ 324*x^2 + 54*x^3) + 1458*x^2 + 486*x^3 + 54*x^4) + log(x)^2*(exp(10)*(16
2*x^2 - 4*x + 54*x^3) - 324*x + 6*x^2*exp(15) + exp(5)*(1440*x^2 - 72*x +
972*x^3 + 162*x^4) + 4212*x^2 + 4356*x^3 + 1458*x^4 + 162*x^5) + 2*x^4*exp
(15) - log(x)*(6*x^3*exp(15) - 144*x - exp(10)*(2*x + 6*x^2 - 162*x^3 - 54
*x^4) + exp(5)*(1434*x^3 - 120*x^2 - 34*x + 972*x^4 + 162*x^5) - 594*x^2 +
 4140*x^3 + 4356*x^4 + 1458*x^5 + 162*x^6) - 156*x^2 - 276*x^3 + 1386*x^4
+ 1458*x^5 + 486*x^6 + 54*x^7 - exp(10)*(2*x^2 + 2*x^3 - 54*x^4 - 18*x^5))
/(log(x)^2*(2187*x + exp(10)*(81*x + 27*x^2) + 3*x*exp(15) + exp(5)*(729*x
 + 486*x^2 + 81*x^3) + 2187*x^2 + 729*x^3 + 81*x^4) - log(x)*(exp(10)*(81*
x^2 + 27*x^3) + 3*x^2*exp(15) + exp(5)*(729*x^2 + 486*x^3 + 81*x^4) + 2187
*x^2 + 2187*x^3 + 729*x^4 + 81*x^5) + exp(10)*(27*x^3 + 9*x^4) + x^3*exp(1
5) + exp(5)*(243*x^3 + 162*x^4 + 27*x^5) + 729*x^3 + 729*x^4 + 243*x^5 + 2
7*x^6 - log(x)^3*(729*x + exp(15) + exp(5)*(162*x + 27*x^2 + 243) + 243*x^
2 + 27*x^3 + exp(10)*(9*x + 27) + 729)),x)
```

output
```
int(-(18*x + exp(5)*(2*x - 36*x^2 - 48*x^3 + 480*x^4 + 324*x^5 + 54*x^6) -
 log(x)^3*(1458*x + exp(10)*(54*x + 18*x^2) + 2*x*exp(15) + exp(5)*(486*x
+ 324*x^2 + 54*x^3) + 1458*x^2 + 486*x^3 + 54*x^4) + log(x)^2*(exp(10)*(16
2*x^2 - 4*x + 54*x^3) - 324*x + 6*x^2*exp(15) + exp(5)*(1440*x^2 - 72*x +
972*x^3 + 162*x^4) + 4212*x^2 + 4356*x^3 + 1458*x^4 + 162*x^5) + 2*x^4*exp
(15) - log(x)*(6*x^3*exp(15) - 144*x - exp(10)*(2*x + 6*x^2 - 162*x^3 - 54
*x^4) + exp(5)*(1434*x^3 - 120*x^2 - 34*x + 972*x^4 + 162*x^5) - 594*x^2 +
 4140*x^3 + 4356*x^4 + 1458*x^5 + 162*x^6) - 156*x^2 - 276*x^3 + 1386*x^4
+ 1458*x^5 + 486*x^6 + 54*x^7 - exp(10)*(2*x^2 + 2*x^3 - 54*x^4 - 18*x^5))
/(log(x)^2*(2187*x + exp(10)*(81*x + 27*x^2) + 3*x*exp(15) + exp(5)*(729*x
 + 486*x^2 + 81*x^3) + 2187*x^2 + 729*x^3 + 81*x^4) - log(x)*(exp(10)*(81*
x^2 + 27*x^3) + 3*x^2*exp(15) + exp(5)*(729*x^2 + 486*x^3 + 81*x^4) + 2187
*x^2 + 2187*x^3 + 729*x^4 + 81*x^5) + exp(10)*(27*x^3 + 9*x^4) + x^3*exp(1
5) + exp(5)*(243*x^3 + 162*x^4 + 27*x^5) + 729*x^3 + 729*x^4 + 243*x^5 + 2
7*x^6 - log(x)^3*(729*x + exp(15) + exp(5)*(162*x + 27*x^2 + 243) + 243*x^
2 + 27*x^3 + exp(10)*(9*x + 27) + 729)), x)
```

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$$\int \frac{18x-156x^2-276x^3+1386x^4+2e^{15}x^4+1458x^5+486x^6+54x^7+e^{10}(-2x^2-2x^3+54x^4+18x^5)+e^5(2x-36x^2-48x^3+480x^4+324x^5+54x^6)+(144x-}{-729x^3-e^{15}x^3-729x^4-243x^5-27x^6+e^{10}(-27x^3-9x^4)+e^5(-243x^3-1}$$

3.452 $\int \frac{e^{2x}+4x^2+\left(2e^{2x}x+2x^2\right)\log(x)+\left(-3x^2-6x^2\log(x)\right)\log\left(x^2\right)}{x}\,dx$

3.452.1 Optimal result

Integrand size = 50, antiderivative size = 23

$$\int \frac{e^{2x}+4x^2+\left(2e^{2x}x+2x^2\right)\log(x)+\left(-3x^2-6x^2\log(x)\right)\log\left(x^2\right)}{x}\,dx = \log(x)\left(e^{2x}+4x^2-3x^2\log\left(x^2\right)\right)$$

output
```
(exp(2*x)-3*x^2*ln(x^2)+4*x^2)*ln(x)
```

3.452.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{e^{2x}+4x^2+\left(2e^{2x}x+2x^2\right)\log(x)+\left(-3x^2-6x^2\log(x)\right)\log\left(x^2\right)}{x}\,dx = \log(x)\left(e^{2x}+4x^2-3x^2\log\left(x^2\right)\right)$$

input
```
Integrate[(E^(2*x) + 4*x^2 + (2*E^(2*x)*x + 2*x^2)*Log[x] + (-3*x^2 - 6*x^
2*Log[x])*Log[x^2])/x,x]
```

output
```
Log[x]*(E^(2*x) + 4*x^2 - 3*x^2*Log[x^2])
```

3.452.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.74, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.040, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^2+\left(2x^2+2e^{2x}x\right)\log(x)+\left(-3x^2-6x^2\log(x)\right)\log\left(x^2\right)+e^{2x}}{x}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{e^{2x}(2x\log(x)+1)}{x}-x\left(6\log\left(x^2\right)\log(x)+3\log\left(x^2\right)-2\log(x)-4\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-2x^2+3x^2\log(x)+x^2(\log(x)+2)-3x^2\log(x)\log\left(x^2\right)+e^{2x}\log(x)$$

input
```
Int[(E^(2*x) + 4*x^2 + (2*E^(2*x)*x + 2*x^2)*Log[x] + (-3*x^2 - 6*x^2*Log[
x])*Log[x^2])/x,x]
```

output
```
-2*x^2 + E^(2*x)*Log[x] + 3*x^2*Log[x] + x^2*(2 + Log[x]) - 3*x^2*Log[x]*L
og[x^2]
```

3.452.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.452.4 Maple [A] (verified)

Time = 1.19 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

method	result
parallelrisch	$-3\ln(x)\ln(x^2)x^2+4x^2\ln(x)+\ln(x)e^{2x}$
default	$7x^2\ln(x)-6(\ln(x^2)-2\ln(x))\left(\frac{x^2\ln(x)}{2}-\frac{x^2}{4}\right)-6x^2\ln(x)^2+\ln(x)e^{2x}-\frac{3x^2\ln(x^2)}{2}$
parts	$7x^2\ln(x)-6(\ln(x^2)-2\ln(x))\left(\frac{x^2\ln(x)}{2}-\frac{x^2}{4}\right)-6x^2\ln(x)^2+\ln(x)e^{2x}-\frac{3x^2\ln(x^2)}{2}$
risch	$-6x^2\ln(x)^2+\left(\frac{3i\pi x^2\,\mathrm{csgn}(ix)^2\,\mathrm{csgn}(ix^2)}{2}-3i\pi x^2\,\mathrm{csgn}(ix)\,\mathrm{csgn}(ix^2)^2+\frac{3i\pi x^2\,\mathrm{csgn}(ix^2)^3}{2}+4x^2+\right.$

input
```
int(((-6*x^2*ln(x)-3*x^2)*ln(x^2)+(2*x*exp(2*x)+2*x^2)*ln(x)+exp(2*x)+4*x^
2)/x,x,method=_RETURNVERBOSE)
```

output
```
-3*ln(x)*ln(x^2)*x^2+4*x^2*ln(x)+ln(x)*exp(2*x)
```

3.452.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{e^{2x}+4x^2+(2e^{2x}x+2x^2)\log(x)+(-3x^2-6x^2\log(x))\log(x^2)}{x}\,dx = -6\,x^2\log(x)^2+\left(4\,x^2+e^{(2\,x)}\right)\log(x)$$

input
```
integrate(((-6*x^2*log(x)-3*x^2)*log(x^2)+(2*x*exp(2*x)+2*x^2)*log(x)+exp(
2*x)+4*x^2)/x,x, algorithm=\
```

output
```
-6*x^2*log(x)^2 + (4*x^2 + e^(2*x))*log(x)
```

3.452.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{e^{2x} + 4x^2 + (2e^{2x}x + 2x^2)\log(x) + (-3x^2 - 6x^2\log(x))\log(x^2)}{x}\,dx = -6x^2\log(x)^2 + 4x^2\log(x) + e^{2x}\log(x)$$

input
```
integrate(((-6*x**2*ln(x)-3*x**2)*ln(x**2)+(2*x*exp(2*x)+2*x**2)*ln(x)+exp
(2*x)+4*x**2)/x,x)
```

output
```
-6*x**2*log(x)**2 + 4*x**2*log(x) + exp(2*x)*log(x)
```

3.452.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{e^{2x} + 4x^2 + (2e^{2x}x + 2x^2)\log(x) + (-3x^2 - 6x^2\log(x))\log(x^2)}{x}\,dx = -\frac{3}{2}x^2\log(x^2) + 4x^2\log(x) - 3(x^2\log(x^2) - x^2)\log(x) + e^{(2x)}\log(x)$$

input
```
integrate(((-6*x^2*log(x)-3*x^2)*log(x^2)+(2*x*exp(2*x)+2*x^2)*log(x)+exp(
2*x)+4*x^2)/x,x, algorithm=\
```

output
```
-3/2*x^2*log(x^2) + 4*x^2*log(x) - 3*(x^2*log(x^2) - x^2)*log(x) + e^(2*x)
*log(x)
```

3.452.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{e^{2x} + 4x^2 + (2e^{2x}x + 2x^2)\log(x) + (-3x^2 - 6x^2\log(x))\log(x^2)}{x}\,dx = -6x^2\log(x)^2 + 4x^2\log(x) + e^{(2x)}\log(x)$$

input
```
integrate(((-6*x^2*log(x)-3*x^2)*log(x^2)+(2*x*exp(2*x)+2*x^2)*log(x)+exp(
2*x)+4*x^2)/x,x, algorithm=\
```

output
```
-6*x^2*log(x)^2 + 4*x^2*log(x) + e^(2*x)*log(x)
```

3.452.9 Mupad [B] (verification not implemented)

Time = 15.59 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{e^{2x}+4x^2+(2e^{2x}x+2x^2)\log(x)+(-3x^2-6x^2\log(x))\log(x^2)}{x}\,dx$$
$$=\ln(x)\,\left(\mathrm{e}^{2\,x}-3\,x^2\,\ln\left(x^2\right)+4\,x^2\right)$$

input
```
int((exp(2*x) - log(x^2)*(6*x^2*log(x) + 3*x^2) + 4*x^2 + log(x)*(2*x*exp(
2*x) + 2*x^2))/x,x)
```

output
```
log(x)*(exp(2*x) - 3*x^2*log(x^2) + 4*x^2)
```

3.453 $\int \frac{-x^9+6x^{14}+e^{\frac{1-2x^5+x^{10}}{x^8}}(8-6x^5-2x^{10})}{x^9}\,dx$

3.453.1 Optimal result

Integrand size = 44, antiderivative size = 21

$$\int \frac{-x^9+6x^{14}+e^{\frac{1-2x^5+x^{10}}{x^8}}(8-6x^5-2x^{10})}{x^9}\,dx=3-e^{\left(-\frac{1}{x^4}+x\right)^2}-x+x^6$$

output
```
3-x+x^6-exp((x-1/x^4)^2)
```

3.453.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{-x^9+6x^{14}+e^{\frac{1-2x^5+x^{10}}{x^8}}(8-6x^5-2x^{10})}{x^9}\,dx=-e^{\frac{1}{x^8}-\frac{2}{x^3}+x^2}-x+x^6$$

input
```
Integrate[(-x^9 + 6*x^14 + E^((1 - 2*x^5 + x^10)/x^8)*(8 - 6*x^5 - 2*x^10)
)/x^9,x]
```

output
```
-E^(x^(-8) - 2/x^3 + x^2) - x + x^6
```

3.453.3 Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^{14}-x^9+e^{\frac{x^{10}-2x^5+1}{x^8}}\left(-2x^{10}-6x^5+8\right)}{x^9}dx$$

$$\Big\downarrow \; 2010$$

$$\int \left(6x^5-\frac{2e^{\frac{\left(x^5-1\right)^2}{x^8}}(x-1)\left(x^4+x^3+x^2+x+1\right)\left(x^5+4\right)}{x^9}-1\right)dx$$

$$\Big\downarrow \; 2009$$

$$x^6-e^{\frac{\left(1-x^5\right)^2}{x^8}}-x$$

input
```
Int[(-x^9 + 6*x^14 + E^((1 - 2*x^5 + x^10)/x^8)*(8 - 6*x^5 - 2*x^10))/x^9,
x]
```

output
```
-E^((1 - x^5)^2/x^8) - x + x^6
```

3.453.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.453.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

method	result	size
parallelrisch	$x^{6}-x-\mathrm{e}^{\frac{x^{10}-2x^{5}+1}{x^{8}}}$	25
parts	$x^{6}-x-\mathrm{e}^{\frac{x^{10}-2x^{5}+1}{x^{8}}}$	25
norman	$\frac{x^{14}-x^{9}-\mathrm{e}^{\frac{x^{10}-2x^{5}+1}{x^{8}}}x^{8}}{x^{8}}$	34
risch	$x^{6}-x-\mathrm{e}^{\frac{(-1+x)^{2}\left(x^{4}+x^{3}+x^{2}+x+1\right)^{2}}{x^{8}}}$	34

input
```
int(((-2*x^10-6*x^5+8)*exp((x^10-2*x^5+1)/x^8)+6*x^14-x^9)/x^9,x,method=_R
ETURNVERBOSE)
```

output
```
x^6-x-exp((x^10-2*x^5+1)/x^8)
```

3.453.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{-x^9+6x^{14}+e^{\frac{1-2x^5+x^{10}}{x^8}}(8-6x^5-2x^{10})}{x^9}\,dx=x^6-x-e^{\left(\frac{x^{10}-2\,x^5+1}{x^8}\right)}$$

input
```
integrate(((-2*x^10-6*x^5+8)*exp((x^10-2*x^5+1)/x^8)+6*x^14-x^9)/x^9,x, al
gorithm=\
```

output
```
x^6 - x - e^((x^10 - 2*x^5 + 1)/x^8)
```

3.453.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-x^9+6x^{14}+e^{\frac{1-2x^5+x^{10}}{x^8}}(8-6x^5-2x^{10})}{x^9}\,dx=x^6-x-e^{\frac{x^{10}-2x^5+1}{x^8}}$$

input
```
integrate(((-2*x**10-6*x**5+8)*exp((x**10-2*x**5+1)/x**8)+6*x**14-x**9)/x*
*9,x)
```

output
```
x**6 - x - exp((x**10 - 2*x**5 + 1)/x**8)
```

3.453.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int \frac{-x^9+6x^{14}+e^{\frac{1-2x^5+x^{10}}{x^8}}(8-6x^5-2x^{10})}{x^9}\,dx = x^6-x-e^{\left(x^2-\frac{2}{x^3}+\frac{1}{x^8}\right)}$$

input
```
integrate(((-2*x^10-6*x^5+8)*exp((x^10-2*x^5+1)/x^8)+6*x^14-x^9)/x^9,x, al
gorithm=\
```

output
```
x^6 - x - e^(x^2 - 2/x^3 + 1/x^8)
```

3.453.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{-x^9+6x^{14}+e^{\frac{1-2x^5+x^{10}}{x^8}}(8-6x^5-2x^{10})}{x^9}\,dx = x^6-x-e^{\left(\frac{x^{10}-2\,x^5+1}{x^8}\right)}$$

input
```
integrate(((-2*x^10-6*x^5+8)*exp((x^10-2*x^5+1)/x^8)+6*x^14-x^9)/x^9,x, al
gorithm=\
```

output
```
x^6 - x - e^((x^10 - 2*x^5 + 1)/x^8)
```

3.453.9 Mupad [B] (verification not implemented)

Time = 15.31 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{-x^9+6x^{14}+e^{\frac{1-2x^5+x^{10}}{x^8}}(8-6x^5-2x^{10})}{x^9}\,dx = x^6-x-\mathrm{e}^{x^2}\,\mathrm{e}^{\frac{1}{x^8}}\,\mathrm{e}^{-\frac{2}{x^3}}$$

input
```
int(-(exp((x^10 - 2*x^5 + 1)/x^8)*(6*x^5 + 2*x^10 - 8) + x^9 - 6*x^14)/x^9
,x)
```

output
```
x^6 - x - exp(x^2)*exp(1/x^8)*exp(-2/x^3)
```

3.454 $\int e^{-6-x-x^2}\left(2e^{6+x+x^2}x+(2+7x+2x^2)\log(\log(5))\right)$

3.454.1 Optimal result

Integrand size = 39, antiderivative size = 24

$$\int e^{-6-x-x^2}\left(2e^{6+x+x^2}x+(2+7x+2x^2)\log(\log(5))\right)\,dx=x^2-e^{-6-x-x^2}(3+x)\log(\log(5))$$

output
```
x^2-(3+x)/exp(x^2+6)/exp(x)*ln(ln(5))
```

3.454.2 Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

$$\int e^{-6-x-x^2}\left(2e^{6+x+x^2}x+(2+7x+2x^2)\log(\log(5))\right)\,dx=x^2+e^{-x-x^2}\left(-\frac{3}{e^6}-\frac{x}{e^6}\right)\log(\log(5))$$

input
```
Integrate[E^(-6 - x - x^2)*(2*E^(6 + x + x^2)*x + (2 + 7*x + 2*x^2)*Log[Lo
g[5]]),x]
```

output
```
x^2 + E^(-x - x^2)*(-3/E^6 - x/E^6)*Log[Log[5]]
```

3.454.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.051$, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-x^2-x-6}\left(2e^{x^2+x+6}x+\left(2x^2+7x+2\right)\log(\log(5))\right)\,dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(e^{-x^2-x-6}\left(2x^2+7x+2\right)\log(\log(5))+2x\right)dx$$

$$\Big\downarrow \; 2009$$

$$x^2-e^{-x^2-x-6}x\log(\log(5))-3e^{-x^2-x-6}\log(\log(5))$$

input
```
Int[E^(-6 - x - x^2)*(2*E^(6 + x + x^2)*x + (2 + 7*x + 2*x^2)*Log[Log[5]])
,x]
```

output
```
x^2 - 3*E^(-6 - x - x^2)*Log[Log[5]] - E^(-6 - x - x^2)*x*Log[Log[5]]
```

3.454.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.454.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

method	result
risch	$x^2 - \ln(\ln(5))(3+x)\,\mathrm{e}^{-x^2-x-6}$
norman	$\left(x^2 \mathrm{e}^x \mathrm{e}^{x^2+6} - x\ln(\ln(5)) - 3\ln(\ln(5))\right)\mathrm{e}^{-x}\mathrm{e}^{-x^2-6}$
parallelrisch	$\left(x^2 \mathrm{e}^x \mathrm{e}^{x^2+6} - x\ln(\ln(5)) - 3\ln(\ln(5))\right)\mathrm{e}^{-x}\mathrm{e}^{-x^2-6}$
parts	$-3\,\mathrm{e}^{-6}\ln(\ln(5))\,\mathrm{e}^{-x^2-x} - \mathrm{e}^{-6}\ln(\ln(5))\,x\,\mathrm{e}^{-x^2-x} + x^2$
default	$x^2 + \mathrm{e}^{-6}\ln(\ln(5))\sqrt{\pi}\,\mathrm{e}^{\frac{1}{4}}\,\mathrm{erf}\left(\frac{1}{2}+x\right) + 7\,\mathrm{e}^{-6}\ln(\ln(5))\left(-\frac{\mathrm{e}^{-x^2-x}}{2} - \frac{\sqrt{\pi}\,\mathrm{e}^{\frac{1}{4}}\,\mathrm{erf}\left(\frac{1}{2}+x\right)}{4}\right) + 2\,\mathrm{e}^{-6}\,\mathrm{l}$

input
```
int(((2*x^2+7*x+2)*ln(ln(5))+2*x*exp(x)*exp(x^2+6))/exp(x)/exp(x^2+6),x,me
thod=_RETURNVERBOSE)
```

output
```
x^2-ln(ln(5))*(3+x)*exp(-x^2-x-6)
```

3.454.5 Fricas [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int e^{-6-x-x^2}\left(2e^{6+x+x^2}x + (2+7x+2x^2)\log(\log(5))\right)\,dx$$
$$= \left(x^2 e^{(x^2+x+6)} - (x+3)\log(\log(5))\right)e^{(-x^2-x-6)}$$

input
```
integrate(((2*x^2+7*x+2)*log(log(5))+2*x*exp(x)*exp(x^2+6))/exp(x)/exp(x^2
+6),x, algorithm=\
```

output
```
(x^2*e^(x^2 + x + 6) - (x + 3)*log(log(5)))*e^(-x^2 - x - 6)
```

3.454.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int e^{-6-x-x^2}\left(2e^{6+x+x^2}x+\left(2+7x+2x^2\right)\log(\log(5))\right)\,dx$$
$$=x^2+\left(-x\log\left(\log\left(5\right)\right)-3\log\left(\log\left(5\right)\right)\right)e^{-x}e^{-x^2-6}$$

input
```
integrate(((2*x**2+7*x+2)*ln(ln(5))+2*x*exp(x)*exp(x**2+6))/exp(x)/exp(x**
2+6),x)
```

output
```
x**2 + (-x*log(log(5)) - 3*log(log(5)))*exp(-x)*exp(-x**2 - 6)
```

3.454.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.26 (sec) , antiderivative size = 152, normalized size of antiderivative = 6.33

$$\int e^{-6-x-x^2}\left(2e^{6+x+x^2}x+\left(2+7x+2x^2\right)\log(\log(5))\right)\,dx=\sqrt{\pi}\,\mathrm{erf}\left(x+\frac{1}{2}\right)e^{\left(-\frac{23}{4}\right)}\log\left(\log\left(5\right)\right)$$
$$-\frac{1}{4}i\left(-\frac{4i\left(2x+1\right)^3\Gamma\left(\frac{3}{2},\frac{1}{4}\left(2x+1\right)^2\right)}{\left(\left(2x+1\right)^2\right)^{\frac{3}{2}}}+\frac{i\sqrt{\pi}(2x+1)\left(\mathrm{erf}\left(\frac{1}{2}\sqrt{\left(2x+1\right)^2}\right)-1\right)}{\sqrt{\left(2x+1\right)^2}}+4ie^{\left(-\frac{1}{4}\left(2x+1\right)^2\right)}\right)e$$
$$-\frac{7}{4}i\left(-\frac{i\sqrt{\pi}(2x+1)\left(\mathrm{erf}\left(\frac{1}{2}\sqrt{\left(2x+1\right)^2}\right)-1\right)}{\sqrt{\left(2x+1\right)^2}}-2ie^{\left(-\frac{1}{4}\left(2x+1\right)^2\right)}\right)e^{\left(-\frac{23}{4}\right)}\log\left(\log\left(5\right)\right)$$
$$+x^2$$

input
```
integrate(((2*x^2+7*x+2)*log(log(5))+2*x*exp(x)*exp(x^2+6))/exp(x)/exp(x^2
+6),x, algorithm=\
```

output
```
sqrt(pi)*erf(x + 1/2)*e^(-23/4)*log(log(5)) - 1/4*I*(-4*I*(2*x + 1)^3*gamm
a(3/2, 1/4*(2*x + 1)^2)/((2*x + 1)^2)^(3/2) + I*sqrt(pi)*(2*x + 1)*(erf(1/
2*sqrt((2*x + 1)^2)) - 1)/sqrt((2*x + 1)^2) + 4*I*e^(-1/4*(2*x + 1)^2))*e^
(-23/4)*log(log(5)) - 7/4*I*(-I*sqrt(pi)*(2*x + 1)*(erf(1/2*sqrt((2*x + 1)
^2)) - 1)/sqrt((2*x + 1)^2) - 2*I*e^(-1/4*(2*x + 1)^2))*e^(-23/4)*log(log(
5)) + x^2
```

3.454.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int e^{-6-x-x^2}\left(2e^{6+x+x^2}x+\left(2+7x+2x^2\right)\log(\log(5))\right)\,dx$$
$$=x^2-\frac{1}{2}\left((2\,x+1)\log\left(\log\left(5\right)\right)+5\,\log\left(\log\left(5\right)\right)\right)e^{\left(-x^2-x-6\right)}$$

input
```
integrate((((2*x^2+7*x+2)*log(log(5))+2*x*exp(x)*exp(x^2+6))/exp(x)/exp(x^2
+6),x, algorithm=\
```

output
```
x^2 - 1/2*((2*x + 1)*log(log(5)) + 5*log(log(5)))*e^(-x^2 - x - 6)
```

3.454.9 Mupad [B] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int e^{-6-x-x^2}\left(2e^{6+x+x^2}x+\left(2+7x+2x^2\right)\log(\log(5))\right)\,dx$$
$$=x^2-3\,\mathrm{e}^{-x}\,\mathrm{e}^{-6}\,\mathrm{e}^{-x^2}\,\ln\left(\ln\left(5\right)\right)-x\,\mathrm{e}^{-x}\,\mathrm{e}^{-6}\,\mathrm{e}^{-x^2}\,\ln\left(\ln\left(5\right)\right)$$

input
```
int(exp(-x)*exp(- x^2 - 6)*(log(log(5))*(7*x + 2*x^2 + 2) + 2*x*exp(x^2 +
6)*exp(x)),x)
```

output
```
x^2 - 3*exp(-x)*exp(-6)*exp(-x^2)*log(log(5)) - x*exp(-x)*exp(-6)*exp(-x^2
)*log(log(5))
```

3.455 $\int \frac{-48x+16e^5x+(6-2x)\log^2(5)+48x\log(x)}{e^{10}x-2e^5x^2+x^3+(6e^5x-6x^2)\log(x)+9x\log^2(x)}\,dx$

3.455.1 Optimal result

Integrand size = 67, antiderivative size = 25

$$\int \frac{-48x+16e^5x+(6-2x)\log^2(5)+48x\log(x)}{e^{10}x-2e^5x^2+x^3+(6e^5x-6x^2)\log(x)+9x\log^2(x)}\,dx=\frac{2(8x-\log^2(5))}{e^5-x+3\log(x)}$$

output
```
2*(8*x-ln(5)^2)/(3*ln(x)+exp(5)-x)
```

3.455.2 Mathematica [A] (verified)

Time = 0.73 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{-48x+16e^5x+(6-2x)\log^2(5)+48x\log(x)}{e^{10}x-2e^5x^2+x^3+(6e^5x-6x^2)\log(x)+9x\log^2(x)}\,dx=\frac{2(8x-\log^2(5))}{e^5-x+3\log(x)}$$

input
```
Integrate[(-48*x + 16*E^5*x + (6 - 2*x)*Log[5]^2 + 48*x*Log[x])/(E^10*x -
2*E^5*x^2 + x^3 + (6*E^5*x - 6*x^2)*Log[x] + 9*x*Log[x]^2),x]
```

output
```
(2*(8*x - Log[5]^2))/(E^5 - x + 3*Log[x])
```

3.455.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16e^5x-48x+(6-2x)\log^2(5)+48x\log(x)}{x^3-2e^5x^2+(6e^5x-6x^2)\log(x)+e^{10}x+9x\log^2(x)}\,dx$$
$$\Big\downarrow \ 6$$
$$\int \frac{(16e^5-48)\,x+(6-2x)\log^2(5)+48x\log(x)}{x^3-2e^5x^2+(6e^5x-6x^2)\log(x)+e^{10}x+9x\log^2(x)}dx$$
$$\Big\downarrow \ 7292$$
$$\int \frac{(16e^5-48)\,x+(6-2x)\log^2(5)+48x\log(x)}{x\,(-x+3\log(x)+e^5)^2}dx$$
$$\Big\downarrow \ 7293$$
$$\int \left(\frac{2(x-3)\,(8x-\log^2(5))}{x\,(x-3\log(x)-e^5)^2}+\frac{16}{-x+3\log(x)+e^5}\right)dx$$
$$\Big\downarrow \ 2009$$
$$6\log^2(5)\int \frac{1}{x\,(x-3\log(x)-e^5)^2}dx-2(24+\log^2(5))\int \frac{1}{(-x+3\log(x)+e^5)^2}dx+16\int \frac{x}{(-x+3\log(x)+e^5)^2}dx+16\int \frac{1}{-x+3\log(x)+e^5}dx$$

input
```
Int[(-48*x + 16*E^5*x + (6 - 2*x)*Log[5]^2 + 48*x*Log[x])/(E^10*x - 2*E^5*
x^2 + x^3 + (6*E^5*x - 6*x^2)*Log[x] + 9*x*Log[x]^2),x]
```

output
```
$Aborted
```

3.455.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.455.4 Maple [A] (verified)

Time = 2.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

method	result	size
risch	$-\frac{2\left(\ln(5)^{2}-8x\right)}{3\ln(x)+\mathrm{e}^{5}-x}$	23
parallelrisch	$\frac{-6\ln(5)^{2}+48x}{9\ln(x)+3\,\mathrm{e}^{5}-3x}$	25
norman	$\frac{48\ln(x)-2\ln(5)^{2}+16\,\mathrm{e}^{5}}{3\ln(x)+\mathrm{e}^{5}-x}$	29
default	$\frac{16x}{3\ln(x)+\mathrm{e}^{5}-x}-\frac{2\ln(5)^{2}}{3\ln(x)+\mathrm{e}^{5}-x}$	35

input
```
int((48*x*ln(x)+(6-2*x)*ln(5)^2+16*x*exp(5)-48*x)/(9*x*ln(x)^2+(6*x*exp(5)
-6*x^2)*ln(x)+x*exp(5)^2-2*x^2*exp(5)+x^3),x,method=_RETURNVERBOSE)
```

output
```
-2*(ln(5)^2-8*x)/(3*ln(x)+exp(5)-x)
```

3.455.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{-48x+16e^5x+(6-2x)\log^2(5)+48x\log(x)}{e^{10}x-2e^5x^2+x^3+(6e^5x-6x^2)\log(x)+9x\log^2(x)}\,dx=\frac{2\left(\log\left(5\right)^2-8\,x\right)}{x-e^5-3\,\log\left(x\right)}$$

input
```
integrate((48*x*log(x)+(6-2*x)*log(5)^2+16*x*exp(5)-48*x)/(9*x*log(x)^2+(6
*x*exp(5)-6*x^2)*log(x)+x*exp(5)^2-2*x^2*exp(5)+x^3),x, algorithm=\
```

output
```
2*(log(5)^2 - 8*x)/(x - e^5 - 3*log(x))
```

3.455.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{-48x + 16e^5x + (6 - 2x)\log^2(5) + 48x\log(x)}{e^{10}x - 2e^5x^2 + x^3 + (6e^5x - 6x^2)\log(x) + 9x\log^2(x)}\,dx = \frac{16x - 2\log{(5)}^2}{-x + 3\log{(x)} + e^5}$$

input
```
integrate((48*x*ln(x)+(6-2*x)*ln(5)**2+16*x*exp(5)-48*x)/(9*x*ln(x)**2+(6*
x*exp(5)-6*x**2)*ln(x)+x*exp(5)**2-2*x**2*exp(5)+x**3),x)
```

output
```
(16*x - 2*log(5)**2)/(-x + 3*log(x) + exp(5))
```

3.455.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{-48x + 16e^5x + (6 - 2x)\log^2(5) + 48x\log(x)}{e^{10}x - 2e^5x^2 + x^3 + (6e^5x - 6x^2)\log(x) + 9x\log^2(x)}\,dx = \frac{2\left(\log{(5)}^2 - 8\,x\right)}{x - e^5 - 3\,\log{(x)}}$$

input
```
integrate((48*x*log(x)+(6-2*x)*log(5)^2+16*x*exp(5)-48*x)/(9*x*log(x)^2+(6
*x*exp(5)-6*x^2)*log(x)+x*exp(5)^2-2*x^2*exp(5)+x^3),x, algorithm=\
```

output
```
2*(log(5)^2 - 8*x)/(x - e^5 - 3*log(x))
```

3.455.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{-48x + 16e^5x + (6 - 2x)\log^2(5) + 48x\log(x)}{e^{10}x - 2e^5x^2 + x^3 + (6e^5x - 6x^2)\log(x) + 9x\log^2(x)}\,dx = \frac{2\left(\log{(5)}^2 - 8\,x\right)}{x - e^5 - 3\,\log{(x)}}$$

input
```
integrate((48*x*log(x)+(6-2*x)*log(5)^2+16*x*exp(5)-48*x)/(9*x*log(x)^2+(6
*x*exp(5)-6*x^2)*log(x)+x*exp(5)^2-2*x^2*exp(5)+x^3),x, algorithm=\
```

output
```
2*(log(5)^2 - 8*x)/(x - e^5 - 3*log(x))
```

3.455.9 Mupad [B] (verification not implemented)

Time = 14.06 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.88

$$\int \frac{-48x+16e^5x+(6-2x)\log^2(5)+48x\log(x)}{e^{10}x-2e^5x^2+x^3+(6e^5x-6x^2)\log(x)+9x\log^2(x)}\,dx$$
$$=\frac{2\,\mathrm{e}^{-5}\left(8\,x\,\mathrm{e}^5-x\ln\left(5\right)^2\right)+6\,\mathrm{e}^{-5}\ln\left(5\right)^2\left(\frac{x}{3}-\frac{\mathrm{e}^5}{3}\right)}{\mathrm{e}^5-x+3\,\ln\left(x\right)}$$

input
```
int(-(48*x - 16*x*exp(5) + log(5)^2*(2*x - 6) - 48*x*log(x))/(log(x)*(6*x*
exp(5) - 6*x^2) + 9*x*log(x)^2 + x*exp(10) - 2*x^2*exp(5) + x^3),x)
```

output
```
(2*exp(-5)*(8*x*exp(5) - x*log(5)^2) + 6*exp(-5)*log(5)^2*(x/3 - exp(5)/3)
)/(exp(5) - x + 3*log(x))
```

3.456 $\int \frac{8-4x-4\log(4)}{4-4\log(4)+\log^2(4)+(4x-2x\log(4))\log(x)+x^2\log^2(x)}\,dx$

3.456.1 Optimal result

Integrand size = 42, antiderivative size = 17

$$\int \frac{8-4x-4\log(4)}{4-4\log(4)+\log^2(4)+(4x-2x\log(4))\log(x)+x^2\log^2(x)}\,dx = 1+\frac{4x}{2-\log(4)+x\log(x)}$$

output
```
1+4*x/(2+x*ln(x)-2*ln(2))
```

3.456.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{8-4x-4\log(4)}{4-4\log(4)+\log^2(4)+(4x-2x\log(4))\log(x)+x^2\log^2(x)}\,dx = \frac{4x}{2-\log(4)+x\log(x)}$$

input
```
Integrate[(8 - 4*x - 4*Log[4])/(4 - 4*Log[4] + Log[4]^2 + (4*x - 2*x*Log[4
])*Log[x] + x^2*Log[x]^2),x]
```

output
```
(4*x)/(2 - Log[4] + x*Log[x])
```

3.456.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x+8-4\log(4)}{x^2\log^2(x)+(4x-2x\log(4))\log(x)+4+\log^2(4)-4\log(4)}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{-4x+8-4\log(4)}{(x\log(x)+2(1-\log(2)))^2}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{4(2-\log(4))}{(x\log(x)+2(1-\log(2)))^2}-\frac{4x}{(x\log(x)+2(1-\log(2)))^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$4(2-\log(4))\int \frac{1}{(x\log(x)+2(1-\log(2)))^2}dx-4\int \frac{x}{(x\log(x)+2(1-\log(2)))^2}dx$$

input
```
Int[(8 - 4*x - 4*Log[4])/(4 - 4*Log[4] + Log[4]^2 + (4*x - 2*x*Log[4])*Log
[x] + x^2*Log[x]^2),x]
```

output
```
$Aborted
```

3.456.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.456.4 Maple [A] (verified)

Time = 1.46 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

method	result	size
default	$-\frac{4x}{-x\ln(x)+2\ln(2)-2}$	17
norman	$-\frac{4x}{-x\ln(x)+2\ln(2)-2}$	17
risch	$-\frac{4x}{-x\ln(x)+2\ln(2)-2}$	17
parallelrisch	$-\frac{4x}{-x\ln(x)+2\ln(2)-2}$	17

input
```
int((-8*ln(2)-4*x+8)/(x^2*ln(x)^2+(-4*x*ln(2)+4*x)*ln(x)+4*ln(2)^2-8*ln(2)
+4),x,method=_RETURNVERBOSE)
```

output
```
-4*x/(-x*ln(x)+2*ln(2)-2)
```

3.456.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{8-4x-4\log(4)}{4-4\log(4)+\log^2(4)+(4x-2x\log(4))\log(x)+x^2\log^2(x)}\,dx = \frac{4\,x}{x\log{(x)}-2\,\log{(2)}+2}$$

input
```
integrate((-8*log(2)-4*x+8)/(x^2*log(x)^2+(-4*x*log(2)+4*x)*log(x)+4*log(2
)^2-8*log(2)+4),x, algorithm=\
```

output
```
4*x/(x*log(x) - 2*log(2) + 2)
```

3.456.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{8-4x-4\log(4)}{4-4\log(4)+\log^2(4)+(4x-2x\log(4))\log(x)+x^2\log^2(x)}\,dx = \frac{4x}{x\log{(x)}-2\log{(2)}+2}$$

input
```
integrate((-8*ln(2)-4*x+8)/(x**2*ln(x)**2+(-4*x*ln(2)+4*x)*ln(x)+4*ln(2)**
2-8*ln(2)+4),x)
```

output
```
4*x/(x*log(x) - 2*log(2) + 2)
```

3.456.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{8-4x-4\log(4)}{4-4\log(4)+\log^2(4)+(4x-2x\log(4))\log(x)+x^2\log^2(x)}\,dx = \frac{4\,x}{x\log{(x)}-2\,\log{(2)}+2}$$

input
```
integrate((-8*log(2)-4*x+8)/(x^2*log(x)^2+(-4*x*log(2)+4*x)*log(x)+4*log(2
)^2-8*log(2)+4),x, algorithm=\
```

output
```
4*x/(x*log(x) - 2*log(2) + 2)
```

3.456.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{8-4x-4\log(4)}{4-4\log(4)+\log^2(4)+(4x-2x\log(4))\log(x)+x^2\log^2(x)}\,dx = \frac{4\,x}{x\log{(x)}-2\,\log{(2)}+2}$$

input
```
integrate((-8*log(2)-4*x+8)/(x^2*log(x)^2+(-4*x*log(2)+4*x)*log(x)+4*log(2
)^2-8*log(2)+4),x, algorithm=\
```

output
```
4*x/(x*log(x) - 2*log(2) + 2)
```

3.456.9 Mupad [B] (verification not implemented)

Time = 14.23 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{8-4x-4\log(4)}{4-4\log(4)+\log^2(4)+(4x-2x\log(4))\log(x)+x^2\log^2(x)}\,dx = \frac{4\,x}{x\,\ln{(x)}-\ln{(4)}+2}$$

input
```
int(-(4*x + 8*log(2) - 8)/(x^2*log(x)^2 - 8*log(2) + log(x)*(4*x - 4*x*log
(2)) + 4*log(2)^2 + 4),x)
```

output
```
(4*x)/(x*log(x) - log(4) + 2)
```

3.457 $\int \frac{e^5(-2100+2370x+160x^2)}{33075x^3-49770x^4+16203x^5+1896x^6+48x^7}\,dx$

3.457.1 Optimal result

Integrand size = 42, antiderivative size = 22

$$\int \frac{e^5(-2100+2370x+160x^2)}{33075x^3-49770x^4+16203x^5+1896x^6+48x^7}\,dx = -\frac{10e^5}{3x^2(21+x)(-5+4x)}$$

output
```
-10/3*exp(5)/(x+21)/(-5+4*x)/x^2
```

3.457.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

$$\int \frac{e^5(-2100+2370x+160x^2)}{33075x^3-49770x^4+16203x^5+1896x^6+48x^7}\,dx = \frac{10e^5}{3\,(105x^2-79x^3-4x^4)}$$

input
```
Integrate[(E^5*(-2100 + 2370*x + 160*x^2))/(33075*x^3 - 49770*x^4 + 16203*
x^5 + 1896*x^6 + 48*x^7),x]
```

output
```
(10*E^5)/(3*(105*x^2 - 79*x^3 - 4*x^4))
```

3.457.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.91, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.119$, Rules used = {27, 27, 2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^5(160x^2+2370x-2100)}{48x^7+1896x^6+16203x^5-49770x^4+33075x^3}dx$$
$$\Big\downarrow \textbf{27}$$
$$e^5\int -\frac{10(-16x^2-237x+210)}{3(16x^7+632x^6+5401x^5-16590x^4+11025x^3)}dx$$
$$\Big\downarrow \textbf{27}$$
$$-\frac{10}{3}e^5\int \frac{-16x^2-237x+210}{16x^7+632x^6+5401x^5-16590x^4+11025x^3}dx$$
$$\Big\downarrow \textbf{2026}$$
$$-\frac{10}{3}e^5\int \frac{-16x^2-237x+210}{x^3(16x^4+632x^3+5401x^2-16590x+11025)}dx$$
$$\Big\downarrow \textbf{2462}$$
$$-\frac{10}{3}e^5\int \left(\frac{1}{39249(x+21)^2}-\frac{256}{2225(4x-5)^2}+\frac{79}{11025x^2}+\frac{2}{105x^3}\right)dx$$
$$\Big\downarrow \textbf{2009}$$
$$-\frac{10}{3}e^5\left(-\frac{1}{105x^2}-\frac{79}{11025x}-\frac{1}{39249(x+21)}-\frac{64}{2225(5-4x)}\right)$$

input
```
Int[(E^5*(-2100 + 2370*x + 160*x^2))/(33075*x^3 - 49770*x^4 + 16203*x^5 +
1896*x^6 + 48*x^7),x]
```

output
```
(-10*E^5*(-64/(2225*(5 - 4*x)) - 1/(105*x^2) - 79/(11025*x) - 1/(39249*(21
 + x))))/3
```

3.457.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.457.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

method	result	size
gosper	$-\frac{10\,\mathrm{e}^{5}}{3x^{2}\left(4x^{2}+79x-105\right)}$	20
norman	$-\frac{10\,\mathrm{e}^{5}}{3x^{2}\left(4x^{2}+79x-105\right)}$	20
risch	$-\frac{10\,\mathrm{e}^{5}}{3x^{2}\left(4x^{2}+79x-105\right)}$	20
parallelrisch	$-\frac{10\,\mathrm{e}^{5}}{3x^{2}\left(4x^{2}+79x-105\right)}$	20
default	$\frac{10\,\mathrm{e}^{5}\left(\frac{1}{39249x+824229}+\frac{1}{105x^{2}}+\frac{79}{11025x}-\frac{64}{2225(-5+4x)}\right)}{3}$	32

input
```
int((160*x^2+2370*x-2100)*exp(5)/(48*x^7+1896*x^6+16203*x^5-49770*x^4+3307
5*x^3),x,method=_RETURNVERBOSE)
```

output
```
-10/3/x^2*exp(5)/(4*x^2+79*x-105)
```

3.457.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^5(-2100+2370x+160x^2)}{33075x^3-49770x^4+16203x^5+1896x^6+48x^7}\,dx = -\frac{10\,e^5}{3\,(4\,x^4+79\,x^3-105\,x^2)}$$

input
```
integrate((160*x^2+2370*x-2100)*exp(5)/(48*x^7+1896*x^6+16203*x^5-49770*x^
4+33075*x^3),x, algorithm=\
```

output
```
-10/3*e^5/(4*x^4 + 79*x^3 - 105*x^2)
```

3.457.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{e^5(-2100+2370x+160x^2)}{33075x^3-49770x^4+16203x^5+1896x^6+48x^7}\,dx = -\frac{10e^5}{12x^4+237x^3-315x^2}$$

input
```
integrate((160*x**2+2370*x-2100)*exp(5)/(48*x**7+1896*x**6+16203*x**5-4977
0*x**4+33075*x**3),x)
```

output
```
-10*exp(5)/(12*x**4 + 237*x**3 - 315*x**2)
```

3.457.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^5(-2100+2370x+160x^2)}{33075x^3-49770x^4+16203x^5+1896x^6+48x^7}\,dx = -\frac{10\,e^5}{3\,(4\,x^4+79\,x^3-105\,x^2)}$$

input
```
integrate((160*x^2+2370*x-2100)*exp(5)/(48*x^7+1896*x^6+16203*x^5-49770*x^
4+33075*x^3),x, algorithm=\
```

output
```
-10/3*e^5/(4*x^4 + 79*x^3 - 105*x^2)
```

3.457.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.50

$$\int \frac{e^5(-2100+2370x+160x^2)}{33075x^3-49770x^4+16203x^5+1896x^6+48x^7}\,dx = -\frac{2}{6615}\left(\frac{316\,x+6661}{4\,x^2+79\,x-105}-\frac{79\,x+105}{x^2}\right)e^5$$

input
```
integrate((160*x^2+2370*x-2100)*exp(5)/(48*x^7+1896*x^6+16203*x^5-49770*x^
4+33075*x^3),x, algorithm=\
```

output
```
-2/6615*((316*x + 6661)/(4*x^2 + 79*x - 105) - (79*x + 105)/x^2)*e^5
```

3.457.9 Mupad [B] (verification not implemented)

Time = 14.56 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^5(-2100+2370x+160x^2)}{33075x^3-49770x^4+16203x^5+1896x^6+48x^7}\,dx = -\frac{10\,\mathrm{e}^5}{12\,x^4+237\,x^3-315\,x^2}$$

input
```
int((exp(5)*(2370*x + 160*x^2 - 2100))/(33075*x^3 - 49770*x^4 + 16203*x^5
+ 1896*x^6 + 48*x^7),x)
```

output
```
-(10*exp(5))/(237*x^3 - 315*x^2 + 12*x^4)
```

3.458 $\int \frac{-5\log(256)+5\log(256)\log(x)+(-14+10x+5\log(4))\log^2(x)}{5\log^2(x)}\,dx$

3.458.1 Optimal result

Integrand size = 33, antiderivative size = 16

$$\int \frac{-5\log(256)+5\log(256)\log(x)+(-14+10x+5\log(4))\log^2(x)}{5\log^2(x)}\,dx = x\left(-\frac{14}{5}+x+\log(4)+\frac{\log(256)}{\log(x)}\right)$$

output
```
(8*ln(2)/ln(x)+x+2*ln(2)-14/5)*x
```

3.458.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.31

$$\int \frac{-5\log(256)+5\log(256)\log(x)+(-14+10x+5\log(4))\log^2(x)}{5\log^2(x)}\,dx = -\frac{14x}{5}+x^2+x\log(4)+\frac{x\log(256)}{\log(x)}$$

input
```
Integrate[(-5*Log[256] + 5*Log[256]*Log[x] + (-14 + 10*x + 5*Log[4])*Log[x
]^2)/(5*Log[x]^2),x]
```

output
```
(-14*x)/5 + x^2 + x*Log[4] + (x*Log[256])/Log[x]
```

3.458.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.75, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121, Rules used = {27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(10x-14+5\log(4))\log^2(x)+5\log(256)\log(x)-5\log(256)}{5\log^2(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int -\frac{(-10x-5\log(4)+14)\log^2(x)-5\log(256)\log(x)+5\log(256)}{\log^2(x)}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{5}\int \frac{(-10x-5\log(4)+14)\log^2(x)-5\log(256)\log(x)+5\log(256)}{\log^2(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{5}\int \left(-10x-\frac{5\log(256)}{\log(x)}+\frac{5\log(256)}{\log^2(x)}+14\left(1-\frac{5\log(2)}{7}\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(5x^2+\frac{5x\log(256)}{\log(x)}-2x(7-5\log(2))\right)$$

input
```
Int[(-5*Log[256] + 5*Log[256]*Log[x] + (-14 + 10*x + 5*Log[4])*Log[x]^2)/(
5*Log[x]^2),x]
```

output
```
(5*x^2 - 2*x*(7 - 5*Log[2]) + (5*x*Log[256])/Log[x])/5
```

3.458.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.458.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.38

method	result	size
risch	$2x\ln(2)+x^2-\frac{14x}{5}+\frac{8x\ln(2)}{\ln(x)}$	22
norman	$\frac{x^2\ln(x)+(2\ln(2)-\frac{14}{5})x\ln(x)+8x\ln(2)}{\ln(x)}$	28
parallelrisch	$\frac{10x\ln(2)\ln(x)+5x^2\ln(x)+40x\ln(2)-14x\ln(x)}{5\ln(x)}$	32
default	$2x\ln(2)+x^2-\frac{14x}{5}-8\ln(2)\operatorname{Ei}_1(-\ln(x))-8\ln(2)\left(-\frac{x}{\ln(x)}-\operatorname{Ei}_1(-\ln(x))\right)$	43
parts	$2x\ln(2)+x^2-\frac{14x}{5}-8\ln(2)\operatorname{Ei}_1(-\ln(x))-8\ln(2)\left(-\frac{x}{\ln(x)}-\operatorname{Ei}_1(-\ln(x))\right)$	43

input
```
int(1/5*((10*ln(2)+10*x-14)*ln(x)^2+40*ln(2)*ln(x)-40*ln(2))/ln(x)^2,x,met
hod=_RETURNVERBOSE)
```

output
```
2*x*ln(2)+x^2-14/5*x+8*x*ln(2)/ln(x)
```

3.458.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.81

$$\int \frac{-5\log(256)+5\log(256)\log(x)+(-14+10x+5\log(4))\log^2(x)}{5\log^2(x)}\,dx = \frac{40\,x\log(2)+(5\,x^2+10\,x\log(2)-14\,x)\log(x)}{5\,\log(x)}$$

input
```
integrate(1/5*((10*log(2)+10*x-14)*log(x)^2+40*log(2)*log(x)-40*log(2))/lo
g(x)^2,x, algorithm=\
```

output
```
1/5*(40*x*log(2) + (5*x^2 + 10*x*log(2) - 14*x)*log(x))/log(x)
```

3.458.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.38

$$\int \frac{-5\log(256)+5\log(256)\log(x)+(-14+10x+5\log(4))\log^2(x)}{5\log^2(x)}\,dx = x^2+x\left(-\frac{14}{5}+2\log(2)\right)+\frac{8x\log(2)}{\log(x)}$$

input
```
integrate(1/5*((10*ln(2)+10*x-14)*ln(x)**2+40*ln(2)*ln(x)-40*ln(2))/ln(x)*
*2,x)
```

output
```
x**2 + x*(-14/5 + 2*log(2)) + 8*x*log(2)/log(x)
```

3.458.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.81

$$\int \frac{-5\log(256)+5\log(256)\log(x)+(-14+10x+5\log(4))\log^2(x)}{5\log^2(x)}\,dx = x^2+2\,x\log(2)+8\,\mathrm{Ei}(\log(x))\log(2)-8\,\Gamma(-1,-\log(x))\log(2)-\frac{14}{5}\,x$$

input
```
integrate(1/5*((10*log(2)+10*x-14)*log(x)^2+40*log(2)*log(x)-40*log(2))/lo
g(x)^2,x, algorithm=\
```

output
```
x^2 + 2*x*log(2) + 8*Ei(log(x))*log(2) - 8*gamma(-1, -log(x))*log(2) - 14/
5*x
```

3.458.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.31

$$\int \frac{-5\log(256)+5\log(256)\log(x)+(-14+10x+5\log(4))\log^2(x)}{5\log^2(x)}\,dx$$
$$= x^2+2\,x\log(2)-\frac{14}{5}\,x+\frac{8\,x\log(2)}{\log(x)}$$

input
```
integrate(1/5*((10*log(2)+10*x-14)*log(x)^2+40*log(2)*log(x)-40*log(2))/lo
g(x)^2,x, algorithm=\
```

output
```
x^2 + 2*x*log(2) - 14/5*x + 8*x*log(2)/log(x)
```

3.458.9 Mupad [B] (verification not implemented)

Time = 14.49 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.38

$$\int \frac{-5\log(256)+5\log(256)\log(x)+(-14+10x+5\log(4))\log^2(x)}{5\log^2(x)}\,dx$$
$$= \frac{x\,(5\,x+10\,\ln(2)-14)}{5}+\frac{8\,x\,\ln(2)}{\ln(x)}$$

input
```
int(((log(x)^2*(10*x + 10*log(2) - 14))/5 - 8*log(2) + 8*log(2)*log(x))/lo
g(x)^2,x)
```

output
```
(x*(5*x + 10*log(2) - 14))/5 + (8*x*log(2))/log(x)
```

3.459 $\int \frac{175-45x-663x^2+61x^3+54x^4-8x^5+(-175+70x-7x^2)\log(x)}{50x^2-20x^3+2x^4} dx$

3.459.1 Optimal result

Integrand size = 57, antiderivative size = 32

$$\int \frac{175-45x-663x^2+61x^3+54x^4-8x^5+(-175+70x-7x^2)\log(x)}{50x^2-20x^3+2x^4} dx = 4+x-\frac{x}{5-x}+(14+2x)\left(-x+\frac{\log(x)}{4x}\right)$$

output
```
4+x+(14+2*x)*(1/4*ln(x)/x-x)-x/(5-x)
```

3.459.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \frac{175-45x-663x^2+61x^3+54x^4-8x^5+(-175+70x-7x^2)\log(x)}{50x^2-20x^3+2x^4} dx = \frac{1}{2}\left(-\frac{10}{5-x}-26x-4x^2+\log(x)+\frac{7\log(x)}{x}\right)$$

input
```
Integrate[(175 - 45*x - 663*x^2 + 61*x^3 + 54*x^4 - 8*x^5 + (-175 + 70*x -
 7*x^2)*Log[x])/(50*x^2 - 20*x^3 + 2*x^4),x]
```

output
```
(-10/(5 - x) - 26*x - 4*x^2 + Log[x] + (7*Log[x])/x)/2
```

3.459.3 Rubi [A] (verified)

Time = 0.69 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.088, Rules used = {2026, 7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x^5+54x^4+61x^3-663x^2+\left(-7x^2+70x-175\right)\log(x)-45x+175}{2x^4-20x^3+50x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-8x^5+54x^4+61x^3-663x^2+\left(-7x^2+70x-175\right)\log(x)-45x+175}{x^2\left(2x^2-20x+50\right)}dx$$

$$\Big\downarrow \text{7277}$$

$$8\int \frac{-8x^5+54x^4+61x^3-663x^2-45x-7\left(x^2-10x+25\right)\log(x)+175}{16(5-x)^2x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int \frac{-8x^5+54x^4+61x^3-663x^2-45x-7\left(x^2-10x+25\right)\log(x)+175}{(5-x)^2x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{2}\int \left(-\frac{8x^3}{(x-5)^2}+\frac{54x^2}{(x-5)^2}+\frac{61x}{(x-5)^2}-\frac{663}{(x-5)^2}-\frac{45}{(x-5)^2x}-\frac{7\log(x)}{x^2}+\frac{175}{(x-5)^2x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(-4x^2-26x-\frac{10}{5-x}+\log(x)+\frac{7\log(x)}{x}\right)$$

input
```
Int[(175 - 45*x - 663*x^2 + 61*x^3 + 54*x^4 - 8*x^5 + (-175 + 70*x - 7*x^2
)*Log[x])/(50*x^2 - 20*x^3 + 2*x^4),x]
```

output
```
(-10/(5 - x) - 26*x - 4*x^2 + Log[x] + (7*Log[x])/x)/2
```

3.459.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.459.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.88

method	result	size
default	$\frac{7\ln(x)}{2x}-2x^2-13x+\frac{\ln(x)}{2}+\frac{5}{-5+x}$	28
parts	$\frac{7\ln(x)}{2x}-2x^2-13x+\frac{\ln(x)}{2}+\frac{5}{-5+x}$	28
norman	$\frac{330x+x\ln(x)+\frac{x^2\ln(x)}{2}-3x^3-2x^4-\frac{35\ln(x)}{2}}{(-5+x)x}$	39
risch	$\frac{7\ln(x)}{2x}+\frac{-4x^3+x\ln(x)-6x^2-5\ln(x)+130x+10}{2x-10}$	39
parallelrisch	$\frac{-4x^4-6x^3+x^2\ln(x)+2x\ln(x)+660x-35\ln(x)}{2x(-5+x)}$	40

input
```
int(((-7*x^2+70*x-175)*ln(x)-8*x^5+54*x^4+61*x^3-663*x^2-45*x+175)/(2*x^4-
20*x^3+50*x^2),x,method=_RETURNVERBOSE)
```

output
```
7/2*ln(x)/x-2*x^2-13*x+1/2*ln(x)+5/(-5+x)
```

3.459.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.31

$$\int \frac{175-45x-663x^2+61x^3+54x^4-8x^5+(-175+70x-7x^2)\log(x)}{50x^2-20x^3+2x^4}\,dx$$
$$= -\frac{4\,x^4+6\,x^3-130\,x^2-(x^2+2\,x-35)\log(x)-10\,x}{2\,(x^2-5\,x)}$$

input
```
integrate((((-7*x^2+70*x-175)*log(x)-8*x^5+54*x^4+61*x^3-663*x^2-45*x+175)/
(2*x^4-20*x^3+50*x^2),x, algorithm=\
```

output
```
-1/2*(4*x^4 + 6*x^3 - 130*x^2 - (x^2 + 2*x - 35)*log(x) - 10*x)/(x^2 - 5*x
)
```

3.459.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{175-45x-663x^2+61x^3+54x^4-8x^5+(-175+70x-7x^2)\log(x)}{50x^2-20x^3+2x^4}\,dx$$
$$= -2x^2-13x+\frac{\log(x)}{2}+\frac{5}{x-5}+\frac{7\log(x)}{2x}$$

input
```
integrate(((-7*x**2+70*x-175)*ln(x)-8*x**5+54*x**4+61*x**3-663*x**2-45*x+1
75)/(2*x**4-20*x**3+50*x**2),x)
```

output
```
-2*x**2 - 13*x + log(x)/2 + 5/(x - 5) + 7*log(x)/(2*x)
```

3.459.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.41

$$\int \frac{175-45x-663x^2+61x^3+54x^4-8x^5+(-175+70x-7x^2)\log(x)}{50x^2-20x^3+2x^4}\,dx$$
$$=-2\,x^2-13\,x-\frac{7\,(2\,x-5)}{2\,(x^2-5\,x)}+\frac{7\,(\log(x)+1)}{2\,x}+\frac{17}{2\,(x-5)}+\frac{1}{2}\,\log(x)$$

input
```
integrate(((-7*x^2+70*x-175)*log(x)-8*x^5+54*x^4+61*x^3-663*x^2-45*x+175)/
(2*x^4-20*x^3+50*x^2),x, algorithm=\
```

output
```
-2*x^2 - 13*x - 7/2*(2*x - 5)/(x^2 - 5*x) + 7/2*(log(x) + 1)/x + 17/2/(x -
 5) + 1/2*log(x)
```

3.459.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.84

$$\int \frac{175-45x-663x^2+61x^3+54x^4-8x^5+(-175+70x-7x^2)\log(x)}{50x^2-20x^3+2x^4}\,dx$$
$$=-2\,x^2-13\,x+\frac{7\,\log(x)}{2\,x}+\frac{5}{x-5}+\frac{1}{2}\,\log(x)$$

input
```
integrate(((-7*x^2+70*x-175)*log(x)-8*x^5+54*x^4+61*x^3-663*x^2-45*x+175)/
(2*x^4-20*x^3+50*x^2),x, algorithm=\
```

output
```
-2*x^2 - 13*x + 7/2*log(x)/x + 5/(x - 5) + 1/2*log(x)
```

3.459.9 Mupad [B] (verification not implemented)

Time = 14.42 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.16

$$\int \frac{175-45x-663x^2+61x^3+54x^4-8x^5+(-175+70x-7x^2)\log(x)}{50x^2-20x^3+2x^4}\,dx$$
$$=\frac{\ln(x)}{2}-13\,x-2\,x^2-\frac{\frac{35\,\ln(x)}{2}-x\,\left(\frac{7\,\ln(x)}{2}+5\right)}{x\,(x-5)}$$

input
```
int(-(45*x + log(x)*(7*x^2 - 70*x + 175) + 663*x^2 - 61*x^3 - 54*x^4 + 8*x
^5 - 175)/(50*x^2 - 20*x^3 + 2*x^4),x)
```

output
```
log(x)/2 - 13*x - 2*x^2 - ((35*log(x))/2 - x*((7*log(x))/2 + 5))/(x*(x - 5
))
```

3.459. $\int \frac{175-45x-663x^2+61x^3+54x^4-8x^5+(-175+70x-7x^2)\log(x)}{50x^2-20x^3+2x^4}\,dx$

3.460 $\int \frac{e^{2x}(-4+4x)+e^{\frac{e^x+4x}{2x}}\left(e^{3x}(1-x)+e^{2x}\left(2x-4x^2\right)\right)}{2x^3}\,dx$

3.460.1 Optimal result

Integrand size = 63, antiderivative size = 35

$$\int \frac{e^{2x}(-4+4x)+e^{\frac{e^x+4x}{2x}}\left(e^{3x}(1-x)+e^{2x}(2x-4x^2)\right)}{2x^3}\,dx = 1-\frac{e^{2+\frac{e^x}{2x}+2x}-\frac{e^{2x}}{x}}{x}$$

output
```
1-(exp(x)^2*exp(1/2*exp(x)/x+2)-exp(x)^2/x)/x
```

3.460.2 Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.80

$$\int \frac{e^{2x}(-4+4x)+e^{\frac{e^x+4x}{2x}}\left(e^{3x}(1-x)+e^{2x}(2x-4x^2)\right)}{2x^3}\,dx = -\frac{e^{2x}\left(-1+e^{2+\frac{e^x}{2x}}x\right)}{x^2}$$

input
```
Integrate[(E^(2*x)*(-4 + 4*x) + E^((E^x + 4*x)/(2*x))*(E^(3*x)*(1 - x) + E
^(2*x)*(2*x - 4*x^2)))/(2*x^3),x]
```

output
```
-((E^(2*x)*(-1 + E^(2 + E^x/(2*x))*x))/x^2)
```

3.460.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{4x+e^x}{2x}}\left(e^{2x}(2x-4x^2)+e^{3x}(1-x)\right)+e^{2x}(4x-4)}{2x^3}\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int -\frac{4e^{2x}(1-x)-e^{\frac{4x+e^x}{2x}}\left(e^{3x}(1-x)+2e^{2x}(x-2x^2)\right)}{x^3}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{2}\int \frac{4e^{2x}(1-x)-e^{\frac{4x+e^x}{2x}}\left(e^{3x}(1-x)+2e^{2x}(x-2x^2)\right)}{x^3}dx$$

$$\Big\downarrow \text{2010}$$

$$-\frac{1}{2}\int \left(\frac{e^{3x+2+\frac{e^x}{2x}}(x-1)}{x^3}+\frac{2e^{2x}\left(2e^{2+\frac{e^x}{2x}}x^2-e^{2+\frac{e^x}{2x}}x-2x+2\right)}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(\int \frac{e^{3x+2+\frac{e^x}{2x}}}{x^3}dx-\int \frac{e^{3x+2+\frac{e^x}{2x}}}{x^2}dx+2\int \frac{e^{\frac{4x^2+4x+e^x}{2x}}}{x^2}dx-4\int \frac{e^{\frac{4x^2+4x+e^x}{2x}}}{x}dx+\frac{2e^{2x}}{x^2}\right)$$

input
```
Int[(E^(2*x)*(-4 + 4*x) + E^((E^x + 4*x)/(2*x))*(E^(3*x)*(1 - x) + E^(2*x)
*(2*x - 4*x^2)))/(2*x^3),x]
```

output
```
$Aborted
```

3.460.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.460.4 Maple [A] (verified)

Time = 0.29 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.91

method	result	size
risch	$\frac{e^{2x}}{x^2}-\frac{e^{\frac{4x^2+e^x+4x}{2x}}}{x}$	32
parallelrisch	$\frac{-2\,e^{\frac{4x+e^x}{2x}}\,e^{2x}x+2\,e^{2x}}{2x^2}$	32

input
```
int(1/2*(((1-x)*exp(x)^3+(-4*x^2+2*x)*exp(x)^2)*exp(1/2*(4*x+exp(x))/x)+(-
4+4*x)*exp(x)^2)/x^3,x,method=_RETURNVERBOSE)
```

output
```
exp(2*x)/x^2-1/x*exp(1/2*(4*x^2+exp(x)+4*x)/x)
```

3.460.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.86

$$\int \frac{e^{2x}(-4+4x)+e^{\frac{e^x+4x}{2x}}\left(e^{3x}(1-x)+e^{2x}(2x-4x^2)\right)}{2x^3}\,dx=-\frac{xe^{\left(2\,x+\frac{4\,x+e^x}{2\,x}\right)}-e^{(2\,x)}}{x^2}$$

input
```
integrate(1/2*(((1-x)*exp(x)^3+(-4*x^2+2*x)*exp(x)^2)*exp(1/2*(4*x+exp(x))
/x)+(-4+4*x)*exp(x)^2)/x^3,x, algorithm=\
```

output
```
-(x*e^(2*x + 1/2*(4*x + e^x)/x) - e^(2*x))/x^2
```

3.460.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.74

$$\int \frac{e^{2x}(-4+4x)+e^{\frac{e^x+4x}{2x}}\left(e^{3x}(1-x)+e^{2x}(2x-4x^2)\right)}{2x^3}\,dx=-\frac{e^{2x}e^{\frac{2x+\frac{e^x}{2}}{x}}}{x}+\frac{e^{2x}}{x^2}$$

input
```
integrate(1/2*(((1-x)*exp(x)**3+(-4*x**2+2*x)*exp(x)**2)*exp(1/2*(4*x+exp(
x))/x)+(-4+4*x)*exp(x)**2)/x**3,x)
```

output
```
-exp(2*x)*exp((2*x + exp(x)/2)/x)/x + exp(2*x)/x**2
```

3.460.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.29 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.94

$$\int \frac{e^{2x}(-4+4x)+e^{\frac{e^x+4x}{2x}}\left(e^{3x}(1-x)+e^{2x}(2x-4x^2)\right)}{2x^3}\,dx$$
$$=-\frac{e^{\left(2\,x+\frac{e^x}{2\,x}+2\right)}}{x}+4\,\Gamma(-1,-2\,x)+8\,\Gamma(-2,-2\,x)$$

input
```
integrate(1/2*(((1-x)*exp(x)^3+(-4*x^2+2*x)*exp(x)^2)*exp(1/2*(4*x+exp(x))
/x)+(-4+4*x)*exp(x)^2)/x^3,x, algorithm=\
```

output
```
-e^(2*x + 1/2*e^x/x + 2)/x + 4*gamma(-1, -2*x) + 8*gamma(-2, -2*x)
```

3.460.8 Giac [F]

$$\int \frac{e^{2x}(-4+4x)+e^{\frac{e^x+4x}{2x}}\left(e^{3x}(1-x)+e^{2x}(2x-4x^2)\right)}{2x^3}\,dx$$
$$=\int \frac{4\,(x-1)e^{(2\,x)}-\left((x-1)e^{(3\,x)}+2\,(2\,x^2-x)e^{(2\,x)}\right)e^{\left(\frac{4\,x+e^x}{2\,x}\right)}}{2\,x^3}\,dx$$

input
```
integrate(1/2*(((1-x)*exp(x)^3+(-4*x^2+2*x)*exp(x)^2)*exp(1/2*(4*x+exp(x))
/x)+(-4+4*x)*exp(x)^2)/x^3,x, algorithm=\
```

output
```
integrate(1/2*(4*(x - 1)*e^(2*x) - ((x - 1)*e^(3*x) + 2*(2*x^2 - x)*e^(2*x
))*e^(1/2*(4*x + e^x)/x))/x^3, x)
```

3.460.9 Mupad [B] (verification not implemented)

Time = 15.55 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.71

$$\int \frac{e^{2x}(-4+4x)+e^{\frac{e^x+4x}{2x}}\left(e^{3x}(1-x)+e^{2x}(2x-4x^2)\right)}{2x^3}\,dx=\frac{e^{2\,x}-x\,e^{2\,x+\frac{e^x}{2\,x}+2}}{x^2}$$

input
```
int(((exp((2*x + exp(x)/2)/x)*(exp(2*x)*(2*x - 4*x^2) - exp(3*x)*(x - 1)))
/2 + (exp(2*x)*(4*x - 4))/2)/x^3,x)
```

output
```
(exp(2*x) - x*exp(2*x + exp(x)/(2*x) + 2))/x^2
```

3.461 $\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x\right.}{}$

3.461.1 Optimal result

Integrand size = 400, antiderivative size = 31

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x\right.}{-36e^{\frac{1}{9}\left(e^{x/\right.}}$$

output

```
(ln(2-ln(x-exp((x-1/3*exp(1/4*x))^2)))+x)*x
```

3.461.2 Mathematica [A] (verified)

Time = 1.02 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.68

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x\right.}{-36e^{\frac{1}{9}\left(e^{x/\right.}}$$

3.461.

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x-36x^2\right)\log\left(-e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\right.}{}$$

input
```
Integrate[(-18*x + 72*x^2 + E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9)*(-72*x +
 E^(x/2)*x + 36*x^2 + E^(x/4)*(-12*x - 3*x^2)) + (36*E^((E^(x/2) - 6*E^(x/
4)*x + 9*x^2)/9)*x - 36*x^2)*Log[-E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) +
x] + (-36*E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) + 36*x + (18*E^((E^(x/2) -
 6*E^(x/4)*x + 9*x^2)/9) - 18*x)*Log[-E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9
) + x])*Log[2 - Log[-E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) + x]])/(-36*E^(
(E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) + 36*x + (18*E^((E^(x/2) - 6*E^(x/4)*x
+ 9*x^2)/9) - 18*x)*Log[-E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) + x]),x]
```

output
```
(18*x^2 + 18*x*Log[2 - Log[-E^(E^(x/2)/9 - (2*E^(x/4)*x)/3 + x^2) + x]])/1
8
```

3.461.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{72x^2 + e^{\frac{1}{9}(9x^2-6e^{x/4}x+e^{x/2})}\left(36x^2 + e^{x/4}\left(-3x^2-12x\right) + e^{x/2}x - 72x\right) + \left(36e^{\frac{1}{9}(9x^2-6e^{x/4}x+e^{x/2})}x - 36x^2\right)\log\left(x \ldots\right.}{-36e^{\frac{1}{9}(9x^2-6e^{x/4}x \ldots}}$$

$\Big\downarrow$ 7292

$$\int \frac{e^{\frac{2}{3}e^{x/4}x}\left(-72x^2 - e^{\frac{1}{9}(9x^2-6e^{x/4}x+e^{x/2})}\left(36x^2 + e^{x/4}\left(-3x^2-12x\right) + e^{x/2}x - 72x\right) - \left(36e^{\frac{1}{9}(9x^2-6e^{x/4}x+e^{x/2})}x - 36 \ldots\right.\right.}{\ldots}$$

$\Big\downarrow$ 27

$$\frac{1}{18}\int \frac{e^{\frac{2}{3}e^{x/4}x}\left(-72x^2 + 18x + e^{\frac{1}{9}(9x^2-6e^{x/4}x+e^{x/2})}\left(-36x^2 - e^{x/2}x + 72x + 3e^{x/4}\left(x^2+4x\right)\right) - 36\left(e^{\frac{1}{9}(9x^2-6e^{x/4}x+e^{x \ldots}}\right.\right.}{\ldots}$$

$\Big\downarrow$ 7293

$$\frac{1}{18}\int \left(\frac{e^{\frac{2}{3}e^{x/4}x}x(3e^{x/4}x^2 - 36x^2 + 12e^{x/4}x - e^{x/2}x + 18)}{\left(e^{\frac{2}{3}e^{x/4}x}x - e^{x^2+\frac{e^{x/2}}{9}}\right)\left(\log\left(x - e^{\frac{1}{9}(e^{x/4}-3x)^2}\right) - 2\right)} + \frac{-3e^{x/4}x^2 + 36x^2 - 12e^{x/4}x + e^{x/2}x + 36\log\left(x - \ldots\right.}{\ldots}\right.$$

$\Big\downarrow$ 7299

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x-36x^2\right)\log\left(-e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)} \ldots\right.}{\ldots}$$

$$\frac{1}{18}\int\left(\frac{e^{\frac{2}{3}e^{x/4}x}x\left(3e^{x/4}x^2-36x^2+12e^{x/4}x-e^{x/2}x+18\right)}{\left(e^{\frac{2}{3}e^{x/4}x}x-e^{x^2+\frac{e^{x/2}}{9}}\right)\left(\log\left(x-e^{\frac{1}{9}\left(e^{x/4}-3x\right)^2}\right)-2\right)}+\frac{-3e^{x/4}x^2+36x^2-12e^{x/4}x+e^{x/2}x+36\log\left(x-\right.}{}\right.$$

input
```
Int[(-18*x + 72*x^2 + E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9)*(-72*x + E^(x/
2)*x + 36*x^2 + E^(x/4)*(-12*x - 3*x^2)) + (36*E^((E^(x/2) - 6*E^(x/4)*x +
 9*x^2)/9)*x - 36*x^2)*Log[-E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) + x] + (
-36*E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) + 36*x + (18*E^((E^(x/2) - 6*E^(
x/4)*x + 9*x^2)/9) - 18*x)*Log[-E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) + x]
)*Log[2 - Log[-E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) + x]])/(-36*E^((E^(x/
2) - 6*E^(x/4)*x + 9*x^2)/9) + 36*x + (18*E^((E^(x/2) - 6*E^(x/4)*x + 9*x^
2)/9) - 18*x)*Log[-E^((E^(x/2) - 6*E^(x/4)*x + 9*x^2)/9) + x]),x]
```

output
```
$Aborted
```

3.461.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.461.

$$\int\frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x-36x^2\right)\log\left(-e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\right.}{}$$

3.461.4 Maple [A] (verified)

Time = 7.09 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.13

method	result	size
risch	$x^2+\ln\left(-\ln\left(-\mathrm{e}^{\frac{\mathrm{e}^{\frac{x}{2}}}{9}-\frac{2x\,\mathrm{e}^{\frac{x}{4}}}{3}+x^2}+x\right)+2\right)x$	35
parallelrisch	$x^2+\ln\left(-\ln\left(-\mathrm{e}^{\frac{\mathrm{e}^{\frac{x}{2}}}{9}-\frac{2x\,\mathrm{e}^{\frac{x}{4}}}{3}+x^2}+x\right)+2\right)x$	37

input
```
int((((18*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-18*x)*ln(-exp(1/9*exp
(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)-36*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x
)+x^2)+36*x)*ln(-ln(-exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)+2)+(36*
x*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-36*x^2)*ln(-exp(1/9*exp(1/4*x
)^2-2/3*x*exp(1/4*x)+x^2)+x)+(x*exp(1/4*x)^2+(-3*x^2-12*x)*exp(1/4*x)+36*x
^2-72*x)*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+72*x^2-18*x)/((18*exp(
1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-18*x)*ln(-exp(1/9*exp(1/4*x)^2-2/3*
x*exp(1/4*x)+x^2)+x)-36*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+36*x),x
,method=_RETURNVERBOSE)
```

output
```
x^2+ln(-ln(-exp(1/9*exp(1/2*x)-2/3*x*exp(1/4*x)+x^2)+x)+2)*x
```

3.461.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x\right.}{-36e^{\frac{1}{9}\left(e^{x/\right.}}$$

$$+x\log\left(-\log\left(x-e^{\left(x^2-\frac{2}{3}\,xe^{\left(\frac{1}{4}\,x\right)}+\frac{1}{9}\,e^{\left(\frac{1}{2}\,x\right)}\right)}\right)+2\right)$$

3.461.

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x-36x^2\right)\log\left(-e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\right.}{}$$

input
```
integrate((((18*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-18*x)*log(-exp(
1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)-36*exp(1/9*exp(1/4*x)^2-2/3*x*ex
p(1/4*x)+x^2)+36*x)*log(-log(-exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x
)+2)+(36*x*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-36*x^2)*log(-exp(1/9
*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)+(x*exp(1/4*x)^2+(-3*x^2-12*x)*exp(1
/4*x)+36*x^2-72*x)*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+72*x^2-18*x)
/((18*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-18*x)*log(-exp(1/9*exp(1/
4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)-36*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x
^2)+36*x),x, algorithm=\
```

output
```
x^2 + x*log(-log(x - e^(x^2 - 2/3*x*e^(1/4*x) + 1/9*e^(1/2*x))) + 2)
```

3.461.6 Sympy [F(-1)]

Timed out.

$$\int \frac{-18x + 72x^2 + e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x + e^{x/2}x + 36x^2 + e^{x/4}(-12x - 3x^2)\right) + \left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x \cdots}{-36e^{\frac{1}{9}\left(e^{x/\cdots}\right.}}$$

input
```
integrate((((18*exp(1/9*exp(1/4*x)**2-2/3*x*exp(1/4*x)+x**2)-18*x)*ln(-exp
(1/9*exp(1/4*x)**2-2/3*x*exp(1/4*x)+x**2)+x)-36*exp(1/9*exp(1/4*x)**2-2/3*
x*exp(1/4*x)+x**2)+36*x)*ln(-ln(-exp(1/9*exp(1/4*x)**2-2/3*x*exp(1/4*x)+x*
*2)+x)+2)+(36*x*exp(1/9*exp(1/4*x)**2-2/3*x*exp(1/4*x)+x**2)-36*x**2)*ln(-
exp(1/9*exp(1/4*x)**2-2/3*x*exp(1/4*x)+x**2)+x)+(x*exp(1/4*x)**2+(-3*x**2-
12*x)*exp(1/4*x)+36*x**2-72*x)*exp(1/9*exp(1/4*x)**2-2/3*x*exp(1/4*x)+x**2
)+72*x**2-18*x)/((18*exp(1/9*exp(1/4*x)**2-2/3*x*exp(1/4*x)+x**2)-18*x)*ln
(-exp(1/9*exp(1/4*x)**2-2/3*x*exp(1/4*x)+x**2)+x)-36*exp(1/9*exp(1/4*x)**2
-2/3*x*exp(1/4*x)+x**2)+36*x),x)
```

output
```
Timed out
```

3.461.7 Maxima [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.55

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x-\right.}{-36e^{\frac{1}{9}\left(e^{x/\right.}}$$

$$-x\log(3)+x\log\left(2\,xe^{\left(\frac{1}{4}\,x\right)}-3\,\log\left(xe^{\left(\frac{2}{3}\,xe^{\left(\frac{1}{4}\,x\right)}\right)}-e^{\left(x^2+\frac{1}{9}\,e^{\left(\frac{1}{2}\,x\right)}\right)}\right)+6\right)$$

input
```
integrate((((18*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-18*x)*log(-exp(
1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)-36*exp(1/9*exp(1/4*x)^2-2/3*x*ex
p(1/4*x)+x^2)+36*x)*log(-log(-exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x
)+2)+(36*x*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-36*x^2)*log(-exp(1/9
*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)+(x*exp(1/4*x)^2+(-3*x^2-12*x)*exp(1
/4*x)+36*x^2-72*x)*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+72*x^2-18*x)
/((18*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-18*x)*log(-exp(1/9*exp(1/
4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)-36*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x
^2)+36*x),x, algorithm=\
```

output
```
x^2 - x*log(3) + x*log(2*x*e^(1/4*x) - 3*log(x*e^(2/3*x*e^(1/4*x)) - e^(x^
2 + 1/9*e^(1/2*x))) + 6)
```

3.461.8 Giac [F]

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x-\right.}{-36e^{\frac{1}{9}\left(e^{x/\right.}}$$

3.461.

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x-36x^2\right)\log\left(-e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\right.}{}$$

input
```
integrate((((18*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-18*x)*log(-exp(
1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)-36*exp(1/9*exp(1/4*x)^2-2/3*x*ex
p(1/4*x)+x^2)+36*x)*log(-log(-exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x
)+2)+(36*x*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-36*x^2)*log(-exp(1/9
*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)+(x*exp(1/4*x)^2+(-3*x^2-12*x)*exp(1
/4*x)+36*x^2-72*x)*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)+72*x^2-18*x)
/((18*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x^2)-18*x)*log(-exp(1/9*exp(1/
4*x)^2-2/3*x*exp(1/4*x)+x^2)+x)-36*exp(1/9*exp(1/4*x)^2-2/3*x*exp(1/4*x)+x
^2)+36*x),x, algorithm=\
```

output
```
integrate(-1/18*(72*x^2 + (36*x^2 + x*e^(1/2*x) - 3*(x^2 + 4*x)*e^(1/4*x)
- 72*x)*e^(x^2 - 2/3*x*e^(1/4*x) + 1/9*e^(1/2*x)) - 36*(x^2 - x*e^(x^2 - 2
/3*x*e^(1/4*x) + 1/9*e^(1/2*x)))*log(x - e^(x^2 - 2/3*x*e^(1/4*x) + 1/9*e^
(1/2*x))) - 18*((x - e^(x^2 - 2/3*x*e^(1/4*x) + 1/9*e^(1/2*x)))*log(x - e^
(x^2 - 2/3*x*e^(1/4*x) + 1/9*e^(1/2*x))) - 2*x + 2*e^(x^2 - 2/3*x*e^(1/4*x
) + 1/9*e^(1/2*x)))*log(-log(x - e^(x^2 - 2/3*x*e^(1/4*x) + 1/9*e^(1/2*x))
) + 2) - 18*x)/((x - e^(x^2 - 2/3*x*e^(1/4*x) + 1/9*e^(1/2*x)))*log(x - e^
(x^2 - 2/3*x*e^(1/4*x) + 1/9*e^(1/2*x))) - 2*x + 2*e^(x^2 - 2/3*x*e^(1/4*x
) + 1/9*e^(1/2*x))), x)
```

3.461.9 Mupad [B] (verification not implemented)

Time = 16.46 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.06

$$\int \frac{-18x + 72x^2 + e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x + e^{x/2}x + 36x^2 + e^{x/4}(-12x - 3x^2)\right) + \left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x \cdots\right.}{-36e^{\frac{1}{9}\left(e^{x/\cdots\right.}}$$

input
```
int((18*x - log(x - exp(exp(x/2)/9 - (2*x*exp(x/4))/3 + x^2))*(36*x*exp(ex
p(x/2)/9 - (2*x*exp(x/4))/3 + x^2) - 36*x^2) + exp(exp(x/2)/9 - (2*x*exp(x
/4))/3 + x^2)*(72*x + exp(x/4)*(12*x + 3*x^2) - x*exp(x/2) - 36*x^2) + log
(2 - log(x - exp(exp(x/2)/9 - (2*x*exp(x/4))/3 + x^2)))*(36*exp(exp(x/2)/9
 - (2*x*exp(x/4))/3 + x^2) - 36*x + log(x - exp(exp(x/2)/9 - (2*x*exp(x/4)
)/3 + x^2))*(18*x - 18*exp(exp(x/2)/9 - (2*x*exp(x/4))/3 + x^2))) - 72*x^2
)/(36*exp(exp(x/2)/9 - (2*x*exp(x/4))/3 + x^2) - 36*x + log(x - exp(exp(x/
2)/9 - (2*x*exp(x/4))/3 + x^2))*(18*x - 18*exp(exp(x/2)/9 - (2*x*exp(x/4))
/3 + x^2))),x)
```

output
```
x*(x + log(2 - log(x - exp(exp(x/2)/9)*exp(x^2)*exp(-(2*x*exp(x/4))/3))))
```

3.461.

$$\int \frac{-18x+72x^2+e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\left(-72x+e^{x/2}x+36x^2+e^{x/4}(-12x-3x^2)\right)+\left(36e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}x-36x^2\right)\log\left(-e^{\frac{1}{9}\left(e^{x/2}-6e^{x/4}x+9x^2\right)}\cdots\right.}{\cdots}$$

3.462 $\int \frac{}{-49x+28x^2-4x^3+\left(49-28x+4x^2\right)\log(2)+(-4x+4\log(2))\log^2(x)+(}$

3.462.1 Optimal result

Integrand size = 161, antiderivative size = 23

$$\int \frac{8x-9\log(2)+(-2}{-49x+28x^2-4x^3+(49-28x+4x^2)\log(2)+(-4x+4\log(2))\log^2(x)+(-14x+4x^2+(14-4x)\log} = -\frac{x}{7-2x-2\log(x)+\log(-2(-x+\log(2)))}$$

output
```
-x/(ln(-2*ln(2)+2*x)-2*ln(x)-2*x+7)
```

3.462.2 Mathematica [F]

$$\int \frac{8x-9\log(2)+(-2}{-49x+28x^2-4x^3+(49-28x+4x^2)\log(2)+(-4x+4\log(2))\log^2(x)+(-14x+4x^2+(14-4x)\log} = \int \frac{8x-9\log(2)+(}{-49x+28x^2-4x^3+(49-28x+4x^2)\log(2)+(-4x+4\log(2))\log^2(x)+(-14x+4x^2+(14-4x)}$$

input
```
Integrate[(8*x - 9*Log[2] + (-2*x + 2*Log[2])*Log[x] + (x - Log[2])*Log[2*
x - 2*Log[2]])/(-49*x + 28*x^2 - 4*x^3 + (49 - 28*x + 4*x^2)*Log[2] + (-4*
x + 4*Log[2])*Log[x]^2 + (-14*x + 4*x^2 + (14 - 4*x)*Log[2])*Log[2*x - 2*L
og[2]] + (-x + Log[2])*Log[2*x - 2*Log[2]]^2 + Log[x]*(28*x - 8*x^2 + (-28
 + 8*x)*Log[2] + (4*x - 4*Log[2])*Log[2*x - 2*Log[2]])),x]
```

output
```
Integrate[(8*x - 9*Log[2] + (-2*x + 2*Log[2])*Log[x] + (x - Log[2])*Log[2*
x - 2*Log[2]])/(-49*x + 28*x^2 - 4*x^3 + (49 - 28*x + 4*x^2)*Log[2] + (-4*
x + 4*Log[2])*Log[x]^2 + (-14*x + 4*x^2 + (14 - 4*x)*Log[2])*Log[2*x - 2*L
og[2]] + (-x + Log[2])*Log[2*x - 2*Log[2]]^2 + Log[x]*(28*x - 8*x^2 + (-28
 + 8*x)*Log[2] + (4*x - 4*Log[2])*Log[2*x - 2*Log[2]])), x]
```

3.462.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x+(2\log(2)-2x)\log(x)-}{-4x^3+28x^2+(4x^2-14x+(14-4x)\log(2))\log(2x-2\log(2))+\log(x)\left(-8x^2+28x+(4x-4\log(2))\log(2\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-8x+2(x-\log(2))\log(x)+(\log(2)-x)\log(2x-\log(4))+\log(512)}{(x-\log(2))(-2x-2\log(x)+\log(2x-\log(4))+7)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-2x^2-x(1-\log(4))+\log(4)}{(x-\log(2))(-2x-2\log(x)+\log(2x-\log(4))+7)^2}+\frac{1}{2x+2\log(x)-\log(2x-\log(4))-7}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\int \frac{1}{(2x+2\log(x)-\log(2x-\log(4))-7)^2}dx-2\int \frac{x}{(2x+2\log(x)-\log(2x-\log(4))-7)^2}dx+\log(2)\int \frac{1}{(x-\log(2))(2x+2\log(x)-\log(2x-\log(4))-7)^2}dx+\int \frac{1}{2x+2\log(x)-\log(2x-\log(4))-7}dx$$

input
```
Int[(8*x - 9*Log[2] + (-2*x + 2*Log[2])*Log[x] + (x - Log[2])*Log[2*x - 2*
Log[2]])/(-49*x + 28*x^2 - 4*x^3 + (49 - 28*x + 4*x^2)*Log[2] + (-4*x + 4*
Log[2])*Log[x]^2 + (-14*x + 4*x^2 + (14 - 4*x)*Log[2])*Log[2*x - 2*Log[2]]
 + (-x + Log[2])*Log[2*x - 2*Log[2]]^2 + Log[x]*(28*x - 8*x^2 + (-28 + 8*x
)*Log[2] + (4*x - 4*Log[2])*Log[2*x - 2*Log[2]])),x]
```

output
```
$Aborted
```

3.462.

$$\int \frac{8x-9\log(2)+(-2x+2\log(2))\log(x)+(x-\log(2))\log(2x-2\log(2))}{-49x+28x^2-4x^3+(49-28x+4x^2)\log(2)+(-4x+4\log(2))\log^2(x)+(-14x+4x^2+(14-4x)\log(2))\log(2x-2\log(2))+(-x+\log(2))\log^2(2x-2\log(}$$

3.462.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.462.4 Maple [A] (verified)

Time = 1.58 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

method	result	size
default	$-\frac{x}{\ln(2)-2x+\ln(x-\ln(2))-2\ln(x)+7}$	24
risch	$\frac{x}{2\ln(x)-\ln(-2\ln(2)+2x)+2x-7}$	25
parallelrisch	$\frac{x}{2\ln(x)-\ln(-2\ln(2)+2x)+2x-7}$	25

input
```
int(((2*ln(2)-2*x)*ln(x)+(x-ln(2))*ln(-2*ln(2)+2*x)-9*ln(2)+8*x)/((4*ln(2)
-4*x)*ln(x)^2+((-4*ln(2)+4*x)*ln(-2*ln(2)+2*x)+(8*x-28)*ln(2)-8*x^2+28*x)*
ln(x)+(ln(2)-x)*ln(-2*ln(2)+2*x)^2+((-4*x+14)*ln(2)+4*x^2-14*x)*ln(-2*ln(2
)+2*x)+(4*x^2-28*x+49)*ln(2)-4*x^3+28*x^2-49*x),x,method=_RETURNVERBOSE)
```

output
```
-x/(ln(2)-2*x+ln(x-ln(2))-2*ln(x)+7)
```

3.462.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{8x-9\log(2)+(-2 \cdots}{-49x+28x^2-4x^3+(49-28x+4x^2)\log(2)+(-4x+4\log(2))\log^2(x)+(-14x+4x^2+(14-4x)\log \cdots}$$
$$=\frac{x}{2\,x-\log\left(2\,x-2\,\log\left(2\right)\right)+2\,\log\left(x\right)-7}$$

input
```
integrate(((2*log(2)-2*x)*log(x)+(x-log(2))*log(-2*log(2)+2*x)-9*log(2)+8*
x)/((4*log(2)-4*x)*log(x)^2+((-4*log(2)+4*x)*log(-2*log(2)+2*x)+(8*x-28)*l
og(2)-8*x^2+28*x)*log(x)+(log(2)-x)*log(-2*log(2)+2*x)^2+((-4*x+14)*log(2)
+4*x^2-14*x)*log(-2*log(2)+2*x)+(4*x^2-28*x+49)*log(2)-4*x^3+28*x^2-49*x),
x, algorithm=\
```

output
```
x/(2*x - log(2*x - 2*log(2)) + 2*log(x) - 7)
```

3.462.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{8x - 9\log(2) + (-2}{-49x + 28x^2 - 4x^3 + (49 - 28x + 4x^2)\log(2) + (-4x + 4\log(2))\log^2(x) + (-14x + 4x^2 + (14 - 4x)\log}$$
$$= -\frac{x}{-2x - 2\log{(x)} + \log{(2x - 2\log{(2)})} + 7}$$

input
```
integrate(((2*ln(2)-2*x)*ln(x)+(x-ln(2))*ln(-2*ln(2)+2*x)-9*ln(2)+8*x)/((4
*ln(2)-4*x)*ln(x)**2+((-4*ln(2)+4*x)*ln(-2*ln(2)+2*x)+(8*x-28)*ln(2)-8*x**
2+28*x)*ln(x)+(ln(2)-x)*ln(-2*ln(2)+2*x)**2+((-4*x+14)*ln(2)+4*x**2-14*x)*
ln(-2*ln(2)+2*x)+(4*x**2-28*x+49)*ln(2)-4*x**3+28*x**2-49*x),x)
```

output
```
-x/(-2*x - 2*log(x) + log(2*x - 2*log(2)) + 7)
```

3.462.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{8x - 9\log(2) + (-2}{-49x + 28x^2 - 4x^3 + (49 - 28x + 4x^2)\log(2) + (-4x + 4\log(2))\log^2(x) + (-14x + 4x^2 + (14 - 4x)\log}$$
$$= \frac{x}{2x - \log{(2)} - \log{(x - \log{(2)})} + 2\log{(x)} - 7}$$

input
```
integrate(((2*log(2)-2*x)*log(x)+(x-log(2))*log(-2*log(2)+2*x)-9*log(2)+8*
x)/((4*log(2)-4*x)*log(x)^2+((-4*log(2)+4*x)*log(-2*log(2)+2*x)+(8*x-28)*l
og(2)-8*x^2+28*x)*log(x)+(log(2)-x)*log(-2*log(2)+2*x)^2+((-4*x+14)*log(2)
+4*x^2-14*x)*log(-2*log(2)+2*x)+(4*x^2-28*x+49)*log(2)-4*x^3+28*x^2-49*x),
x, algorithm=\
```

3.462.

$$\int \frac{8x-9\log(2)+(-2x+2\log(2))\log(x)+(x-\log(2))\log(2x-2\log(2))}{-49x+28x^2-4x^3+(49-28x+4x^2)\log(2)+(-4x+4\log(2))\log^2(x)+(-14x+4x^2+(14-4x)\log(2))\log(2x-2\log(2))+(-x+\log(2))\log^2(2x-2\log(}$$

output
```
x/(2*x - log(2) - log(x - log(2)) + 2*log(x) - 7)
```

3.462.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{8x - 9\log(2) + (-2}{-49x + 28x^2 - 4x^3 + (49 - 28x + 4x^2)\log(2) + (-4x + 4\log(2))\log^2(x) + (-14x + 4x^2 + (14 - 4x)\log}$$
$$= \frac{x}{2\,x - \log(2) - \log(x - \log(2)) + 2\,\log(x) - 7}$$

input
```
integrate(((2*log(2)-2*x)*log(x)+(x-log(2))*log(-2*log(2)+2*x)-9*log(2)+8*
x)/((4*log(2)-4*x)*log(x)^2+((-4*log(2)+4*x)*log(-2*log(2)+2*x)+(8*x-28)*l
og(2)-8*x^2+28*x)*log(x)+(log(2)-x)*log(-2*log(2)+2*x)^2+((-4*x+14)*log(2)
+4*x^2-14*x)*log(-2*log(2)+2*x)+(4*x^2-28*x+49)*log(2)-4*x^3+28*x^2-49*x),
x, algorithm=\
```

output
```
x/(2*x - log(2) - log(x - log(2)) + 2*log(x) - 7)
```

3.462.9 Mupad [F(-1)]

Timed out.

$$\int \frac{8x - 9\log(2) + (-2}{-49x + 28x^2 - 4x^3 + (49 - 28x + 4x^2)\log(2) + (-4x + 4\log(2))\log^2(x) + (-14x + 4x^2 + (14 - 4x)\log}$$
$$= \int -\frac{8\,x - 9\,\ln(2) - \ln(}{49\,x - \ln(2)\,(4\,x^2 - 28\,x + 49) + \ln(2\,x - 2\,\ln(2))\,(14\,x + \ln(2)\,(4\,x - 14) - 4\,x^2) - \ln(x)\,(28\,x + \ln}$$

input
```
int(-(8*x - 9*log(2) - log(x)*(2*x - 2*log(2)) + log(2*x - 2*log(2))*(x -
log(2)))/(49*x - log(2)*(4*x^2 - 28*x + 49) + log(2*x - 2*log(2))*(14*x +
log(2)*(4*x - 14) - 4*x^2) - log(x)*(28*x + log(2)*(8*x - 28) + log(2*x -
2*log(2))*(4*x - 4*log(2)) - 8*x^2) + log(x)^2*(4*x - 4*log(2)) + log(2*x
- 2*log(2))^2*(x - log(2)) - 28*x^2 + 4*x^3),x)
```

3.462. $\int \frac{8x-9\log(2)+(-2x+2\log(2))\log(x)+(x-\log(2))\log(2x-2\log(2))}{-49x+28x^2-4x^3+(49-28x+4x^2)\log(2)+(-4x+4\log(2))\log^2(x)+(-14x+4x^2+(14-4x)\log(2))\log(2x-2\log(2))+(-x+\log(2))\log^2(2x-2\log(}$

output
```
int(-(8*x - 9*log(2) - log(x)*(2*x - 2*log(2)) + log(2*x - 2*log(2))*(x -
log(2)))/(49*x - log(2)*(4*x^2 - 28*x + 49) + log(2*x - 2*log(2))*(14*x +
log(2)*(4*x - 14) - 4*x^2) - log(x)*(28*x + log(2)*(8*x - 28) + log(2*x -
2*log(2))*(4*x - 4*log(2)) - 8*x^2) + log(x)^2*(4*x - 4*log(2)) + log(2*x
- 2*log(2))^2*(x - log(2)) - 28*x^2 + 4*x^3), x)
```

3.462.

$$\int \frac{8x-9\log(2)+(-2x+2\log(2))\log(x)+(x-\log(2))\log(2x-2\log(2))}{-49x+28x^2-4x^3+(49-28x+4x^2)\log(2)+(-4x+4\log(2))\log^2(x)+(-14x+4x^2+(14-4x)\log(2))\log(2x-2\log(2))+(-x+\log(2))\log^2(2x-2\log($$

3.463 $\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500}{-5625}$

3.463.1 Optimal result

Integrand size = 85, antiderivative size = 25

$$\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500+37500x-15100x^2+100x^3}{-5625+5775x-151x^2+x^3}$$
$$=\frac{4(3-x)x(1+\log(2))\log(-1+x)}{3-\frac{x}{25}}$$

output
```
4*(-x+3)*x*ln(-1+x)*(1+ln(2))/(3-1/25*x)
```

3.463.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 53 vs. 2(25) = 50.

Time = 0.07 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500+37500x-15100x^2+100x^3}{-5625+5775x-151x^2+x^3}$$
$$=\frac{100}{37}(1+\log(2))\left(5400\text{arctanh}\left(\frac{1}{37}(-38+x)\right)+\log(1-x)+2700\log(75-x)+\frac{199800\log(-1+x)}{-75+x}+37(-1+x)\log(-1+x)\right)$$

input
```
Integrate[(22500*x - 7800*x^2 + 100*x^3 + (22500*x - 7800*x^2 + 100*x^3)*L
og[2] + (-22500 + 37500*x - 15100*x^2 + 100*x^3 + (-22500 + 37500*x - 1510
0*x^2 + 100*x^3)*Log[2])*Log[-1 + x])/(-5625 + 5775*x - 151*x^2 + x^3),x]
```

3.463.

$$\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500+37500x-15100x^2+100x^3+(-22500+37500x-15100x^2+100x^3)\log(2))\log}{-5625+5775x-151x^2+x^3}$$

output
```
(100*(1 + Log[2])*(5400*ArcTanh[(-38 + x)/37] + Log[1 - x] + 2700*Log[75 -
 x] + (199800*Log[-1 + x])/(-75 + x) + 37*(-1 + x)*Log[-1 + x]))/37
```

3.463.3 Rubi [A] (verified)

Time = 0.80 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.80, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.024, Rules used = {2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{100x^3-7800x^2+\left(100x^3-15100x^2+\left(100x^3-15100x^2+37500x-22500\right)\log(2)+37500x-22500\right)\log(x}{x^3-151x^2+5775x-5625}$$

$$\Big\downarrow \text{2463}$$

$$\int \left(-\frac{100x^3-7800x^2+\left(100x^3-15100x^2+\left(100x^3-15100x^2+37500x-22500\right)\log(2)+37500x-22500\right)\log}{5476(x-75)}\right.$$

$$\Big\downarrow \text{2009}$$

$$7300(1+\log(2))\log(1-x)-100(1-x)(1+\log(2))\log(x-1)-\frac{540000(1+\log(2))\log(x-1)}{75-x}$$

input
```
Int[(22500*x - 7800*x^2 + 100*x^3 + (22500*x - 7800*x^2 + 100*x^3)*Log[2]
+ (-22500 + 37500*x - 15100*x^2 + 100*x^3 + (-22500 + 37500*x - 15100*x^2
+ 100*x^3)*Log[2])*Log[-1 + x])/(-5625 + 5775*x - 151*x^2 + x^3),x]
```

output
```
7300*(1 + Log[2])*Log[1 - x] - 100*(1 - x)*(1 + Log[2])*Log[-1 + x] - (540
000*(1 + Log[2])*Log[-1 + x])/(75 - x)
```

3.463.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.463.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

method	result
norman	$\frac{(100\ln(2)+100)x^2\ln(-1+x)+(-300-300\ln(2))x\ln(-1+x)}{x-75}$
parallelrisch	$\frac{100\ln(2)\ln(-1+x)x^2-300\ln(2)\ln(-1+x)x+100\ln(-1+x)x^2-300\ln(-1+x)x}{x-75}$
risch	$\frac{100(x^2\ln(2)-75x\ln(2)+x^2+5400\ln(2)-75x+5400)\ln(-1+x)}{x-75}+7200\ln(2)\ln(-1+x)+7200\ln(-1$
derivativedivides	$100\ln(2)\left((-1+x)\ln(-1+x)+\frac{2700\ln(-1+x)(-1+x)}{37(x-75)}+\frac{\ln(-1+x)}{37}\right)+100(-1+x)\ln(-1$
default	$100\ln(2)\left((-1+x)\ln(-1+x)+\frac{2700\ln(-1+x)(-1+x)}{37(x-75)}+\frac{\ln(-1+x)}{37}\right)+100(-1+x)\ln(-1$
parts	$100(1+\ln(2))\left(x+\frac{\ln(-1+x)}{37}+\frac{2700\ln(x-75)}{37}\right)+100(-1+x)\ln(-1+x)-100x+100$

input
```
int((((100*x^3-15100*x^2+37500*x-22500)*ln(2)+100*x^3-15100*x^2+37500*x-22
500)*ln(-1+x)+(100*x^3-7800*x^2+22500*x)*ln(2)+100*x^3-7800*x^2+22500*x)/(
x^3-151*x^2+5775*x-5625),x,method=_RETURNVERBOSE)
```

output
```
((100*ln(2)+100)*x^2*ln(-1+x)+(-300-300*ln(2))*x*ln(-1+x))/(x-75)
```

3.463.
$\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500+37500x-15100x^2+100x^3+(-22500+37500x-15100x^2+100x^3)\log(2))\log}{-5625+5775x-151x^2+x^3}$

3.463.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500+37500x-15100x^2+100x^3}{-5625+5775x-151x^2+x^3}$$
$$=\frac{100\left(x^2+\left(x^2-3\,x\right)\log\left(2\right)-3\,x\right)\log\left(x-1\right)}{x-75}$$

input
```
integrate((((100*x^3-15100*x^2+37500*x-22500)*log(2)+100*x^3-15100*x^2+375
00*x-22500)*log(-1+x)+(100*x^3-7800*x^2+22500*x)*log(2)+100*x^3-7800*x^2+2
2500*x)/(x^3-151*x^2+5775*x-5625),x, algorithm=\
```

output
```
100*(x^2 + (x^2 - 3*x)*log(2) - 3*x)*log(x - 1)/(x - 75)
```

3.463.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(20) = 40.

Time = 0.13 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500+37500x-15100x^2+100x^3}{-5625+5775x-151x^2+x^3}$$
$$=(7200\log\left(2\right)+7200)\log\left(x-1\right)$$
$$+\frac{(100x^2\log\left(2\right)+100x^2-7500x-7500x\log\left(2\right)+540000\log\left(2\right)+540000)\log\left(x-1\right)}{x-75}$$

input
```
integrate((((100*x**3-15100*x**2+37500*x-22500)*ln(2)+100*x**3-15100*x**2+
37500*x-22500)*ln(-1+x)+(100*x**3-7800*x**2+22500*x)*ln(2)+100*x**3-7800*x
**2+22500*x)/(x**3-151*x**2+5775*x-5625),x)
```

output
```
(7200*log(2) + 7200)*log(x - 1) + (100*x**2*log(2) + 100*x**2 - 7500*x - 7
500*x*log(2) + 540000*log(2) + 540000)*log(x - 1)/(x - 75)
```

3.463.
$\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500+37500x-15100x^2+100x^3+(-22500+37500x-15100x^2+100x^3)\log(2))\log}{-5625+5775x-151x^2+x^3}$

3.463.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{22500x - 7800x^2 + 100x^3 + (22500x - 7800x^2 + 100x^3)\log(2) + (-22500 + 37500x - 15100x^2 + 100x^3}{-5625 + 5775x - 151x^2 + x^3}$$
$$= \frac{100\left(x^2(\log(2)+1) - 3x(\log(2)+1)\right)\log(x-1)}{x-75}$$

input
```
integrate((((100*x^3-15100*x^2+37500*x-22500)*log(2)+100*x^3-15100*x^2+375
00*x-22500)*log(-1+x)+(100*x^3-7800*x^2+22500*x)*log(2)+100*x^3-7800*x^2+2
2500*x)/(x^3-151*x^2+5775*x-5625),x, algorithm=\
```

output
```
100*(x^2*(log(2) + 1) - 3*x*(log(2) + 1))*log(x - 1)/(x - 75)
```

3.463.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.40

$$\int \frac{22500x - 7800x^2 + 100x^3 + (22500x - 7800x^2 + 100x^3)\log(2) + (-22500 + 37500x - 15100x^2 + 100x^3}{-5625 + 5775x - 151x^2 + x^3}$$
$$= 100\left(x(\log(2)+1) + \frac{5400(\log(2)+1)}{x-75}\right)\log(x-1) + 7200(\log(2)+1)\log(x-1)$$

input
```
integrate((((100*x^3-15100*x^2+37500*x-22500)*log(2)+100*x^3-15100*x^2+375
00*x-22500)*log(-1+x)+(100*x^3-7800*x^2+22500*x)*log(2)+100*x^3-7800*x^2+2
2500*x)/(x^3-151*x^2+5775*x-5625),x, algorithm=\
```

output
```
100*(x*(log(2) + 1) + 5400*(log(2) + 1)/(x - 75))*log(x - 1) + 7200*(log(2
) + 1)*log(x - 1)
```

3.463.9 Mupad [B] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{22500x - 7800x^2 + 100x^3 + (22500x - 7800x^2 + 100x^3)\log(2) + (-22500 + 37500x - 15100x^2 + 100x^3}{-5625 + 5775x - 151x^2 + x^3}$$
$$= \frac{100\,x\,\ln(x-1)\,(\ln(2)+1)\,(x-3)}{x-75}$$

input
```
int((22500*x + log(2)*(22500*x - 7800*x^2 + 100*x^3) + log(x - 1)*(37500*x
 + log(2)*(37500*x - 15100*x^2 + 100*x^3 - 22500) - 15100*x^2 + 100*x^3 -
22500) - 7800*x^2 + 100*x^3)/(5775*x - 151*x^2 + x^3 - 5625),x)
```

output
```
(100*x*log(x - 1)*(log(2) + 1)*(x - 3))/(x - 75)
```

3.463.
$$\int \frac{22500x-7800x^2+100x^3+(22500x-7800x^2+100x^3)\log(2)+(-22500+37500x-15100x^2+100x^3+(-22500+37500x-15100x^2+100x^3)\log(2))\,\text{lo}}{-5625+5775x-151x^2+x^3}$$

3.464 $\int \frac{224e^{10+2x}+e^{5+x}(40-56x+32x^2-4x^3)}{25x^2-10x^3+x^4+e^{10+2x}(4096-512x+16x^2)+e^{5+x}(640x-168x^2+8x^3)} dx$

3.464.1 Optimal result

Integrand size = 86, antiderivative size = 28

$$\int \frac{224e^{10+2x}+e^{5+x}(40-56x+32x^2-4x^3)}{25x^2-10x^3+x^4+e^{10+2x}(4096-512x+16x^2)+e^{5+x}(640x-168x^2+8x^3)} dx = \frac{-2+x}{16-x+\frac{1}{4}e^{-5-x}(5-x)x}$$

output
```
(-2+x)/(16-x+1/4*x/exp(x)/exp(5)*(5-x))
```

3.464.2 Mathematica [A] (verified)

Time = 4.03 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{224e^{10+2x}+e^{5+x}(40-56x+32x^2-4x^3)}{25x^2-10x^3+x^4+e^{10+2x}(4096-512x+16x^2)+e^{5+x}(640x-168x^2+8x^3)} dx = \frac{-56e^{5+x}+(-5+x)x}{4e^{5+x}(-16+x)+(-5+x)x}$$

input
```
Integrate[(224*E^(10 + 2*x) + E^(5 + x)*(40 - 56*x + 32*x^2 - 4*x^3))/(25*
x^2 - 10*x^3 + x^4 + E^(10 + 2*x)*(4096 - 512*x + 16*x^2) + E^(5 + x)*(640
*x - 168*x^2 + 8*x^3)),x]
```

output
```
(-56*E^(5 + x) + (-5 + x)*x)/(4*E^(5 + x)*(-16 + x) + (-5 + x)*x)
```

3.464.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+5}(-4x^3+32x^2-56x+40)+224e^{2x+10}}{x^4-10x^3+25x^2+e^{2x+10}(16x^2-512x+4096)+e^{x+5}(8x^3-168x^2+640x)}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{4e^{x+5}(-x^3+8x^2-14x+56e^{x+5}+10)}{(4e^{x+5}(x-16)+(x-5)x)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$4\int \frac{e^{x+5}(-x^3+8x^2-14x+56e^{x+5}+10)}{(4e^{x+5}(16-x)+(5-x)x)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$4\int \left(\frac{14e^{x+5}}{(x-16)(x^2+4e^{x+5}x-5x-64e^{x+5})}-\frac{e^{x+5}(x^4-24x^3+156x^2-304x+160)}{(x-16)(x^2+4e^{x+5}x-5x-64e^{x+5})^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$4\left(-144\int \frac{e^{x+5}}{(x^2+4e^{x+5}x-5x-64e^{x+5})^2}dx-2464\int \frac{e^{x+5}}{(x-16)(x^2+4e^{x+5}x-5x-64e^{x+5})^2}dx-28\int \frac{}{(x^2+4}\right.$$

input
```
Int[(224*E^(10 + 2*x) + E^(5 + x)*(40 - 56*x + 32*x^2 - 4*x^3))/(25*x^2 -
10*x^3 + x^4 + E^(10 + 2*x)*(4096 - 512*x + 16*x^2) + E^(5 + x)*(640*x - 1
68*x^2 + 8*x^3)),x]
```

output
```
$Aborted
```

3.464.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.464.4 Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.36

method	result	size
norman	$\frac{8\,\mathrm{e}^{5}\mathrm{e}^{x}-4x\,\mathrm{e}^{5}\mathrm{e}^{x}}{4x\,\mathrm{e}^{5}\mathrm{e}^{x}-64\,\mathrm{e}^{5}\mathrm{e}^{x}+x^{2}-5x}$	38
parallelrisch	$\frac{8\,\mathrm{e}^{5}\mathrm{e}^{x}-4x\,\mathrm{e}^{5}\mathrm{e}^{x}}{4x\,\mathrm{e}^{5}\mathrm{e}^{x}-64\,\mathrm{e}^{5}\mathrm{e}^{x}+x^{2}-5x}$	38
risch	$-\frac{14}{x-16}+\frac{(x^{2}-7x+10)x}{(x-16)(4x\,\mathrm{e}^{5+x}-64\,\mathrm{e}^{5+x}+x^{2}-5x)}$	46

input
```
int((224*exp(5)^2*exp(x)^2+(-4*x^3+32*x^2-56*x+40)*exp(5)*exp(x))/((16*x^2
-512*x+4096)*exp(5)^2*exp(x)^2+(8*x^3-168*x^2+640*x)*exp(5)*exp(x)+x^4-10*
x^3+25*x^2),x,method=_RETURNVERBOSE)
```

output
```
(8*exp(5)*exp(x)-4*x*exp(5)*exp(x))/(4*x*exp(5)*exp(x)-64*exp(5)*exp(x)+x^
2-5*x)
```

3.464.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{224e^{10+2x}+e^{5+x}(40-56x+32x^2-4x^3)}{25x^2-10x^3+x^4+e^{10+2x}\left(4096-512x+16x^2\right)+e^{5+x}\left(640x-168x^2+8x^3\right)}\,dx = \frac{x^{2}-5\,x-56\,e^{(x+5)}}{x^{2}+4\,(x-16)e^{(x+5)}-5\,x}$$

input
```
integrate((224*exp(5)^2*exp(x)^2+(-4*x^3+32*x^2-56*x+40)*exp(5)*exp(x))/((
16*x^2-512*x+4096)*exp(5)^2*exp(x)^2+(8*x^3-168*x^2+640*x)*exp(5)*exp(x)+x
^4-10*x^3+25*x^2),x, algorithm=\
```

output
```
(x^2 - 5*x - 56*e^(x + 5))/(x^2 + 4*(x - 16)*e^(x + 5) - 5*x)
```

3.464.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. 2(19) = 38.

Time = 0.17 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.82

$$\int \frac{224e^{10+2x}+e^{5+x}(40-56x+32x^2-4x^3)}{25x^2-10x^3+x^4+e^{10+2x}(4096-512x+16x^2)+e^{5+x}(640x-168x^2+8x^3)}\,dx$$
$$= \frac{x^3-7x^2+10x}{x^3-21x^2+80x+(4x^2e^5-128xe^5+1024e^5)\,e^x}-\frac{14}{x-16}$$

input
```
integrate((224*exp(5)**2*exp(x)**2+(-4*x**3+32*x**2-56*x+40)*exp(5)*exp(x)
)/((16*x**2-512*x+4096)*exp(5)**2*exp(x)**2+(8*x**3-168*x**2+640*x)*exp(5)
*exp(x)+x**4-10*x**3+25*x**2),x)
```

output
```
(x**3 - 7*x**2 + 10*x)/(x**3 - 21*x**2 + 80*x + (4*x**2*exp(5) - 128*x*exp
(5) + 1024*exp(5))*exp(x)) - 14/(x - 16)
```

3.464.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{224e^{10+2x}+e^{5+x}(40-56x+32x^2-4x^3)}{25x^2-10x^3+x^4+e^{10+2x}(4096-512x+16x^2)+e^{5+x}(640x-168x^2+8x^3)}\,dx$$
$$= \frac{x^2-5\,x-56\,e^{(x+5)}}{x^2+4\,(xe^5-16\,e^5)e^x-5\,x}$$

input
```
integrate((224*exp(5)^2*exp(x)^2+(-4*x^3+32*x^2-56*x+40)*exp(5)*exp(x))/((
16*x^2-512*x+4096)*exp(5)^2*exp(x)^2+(8*x^3-168*x^2+640*x)*exp(5)*exp(x)+x
^4-10*x^3+25*x^2),x, algorithm=\
```

output
```
(x^2 - 5*x - 56*e^(x + 5))/(x^2 + 4*(x*e^5 - 16*e^5)*e^x - 5*x)
```

3.464.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{224e^{10+2x} + e^{5+x}(40 - 56x + 32x^2 - 4x^3)}{25x^2 - 10x^3 + x^4 + e^{10+2x}(4096 - 512x + 16x^2) + e^{5+x}(640x - 168x^2 + 8x^3)} dx$$
$$= \frac{x^2 - 5x - 56e^{(x+5)}}{x^2 + 4xe^{(x+5)} - 5x - 64e^{(x+5)}}$$

input
```
integrate((224*exp(5)^2*exp(x)^2+(-4*x^3+32*x^2-56*x+40)*exp(5)*exp(x))/((
16*x^2-512*x+4096)*exp(5)^2*exp(x)^2+(8*x^3-168*x^2+640*x)*exp(5)*exp(x)+x
^4-10*x^3+25*x^2),x, algorithm=\
```

output
```
(x^2 - 5*x - 56*e^(x + 5))/(x^2 + 4*x*e^(x + 5) - 5*x - 64*e^(x + 5))
```

3.464.9 Mupad [F(-1)]

Timed out.

$$\int \frac{224e^{10+2x} + e^{5+x}(40 - 56x + 32x^2 - 4x^3)}{25x^2 - 10x^3 + x^4 + e^{10+2x}(4096 - 512x + 16x^2) + e^{5+x}(640x - 168x^2 + 8x^3)} dx$$
$$= \int \frac{224e^{2x+10} - e^{x+5}(4x^3 - 32x^2 + 56x - 40)}{e^{x+5}(8x^3 - 168x^2 + 640x) + e^{2x+10}(16x^2 - 512x + 4096) + 25x^2 - 10x^3 + x^4} dx$$

input
```
int((224*exp(2*x)*exp(10) - exp(5)*exp(x)*(56*x - 32*x^2 + 4*x^3 - 40))/(2
5*x^2 - 10*x^3 + x^4 + exp(5)*exp(x)*(640*x - 168*x^2 + 8*x^3) + exp(2*x)*
exp(10)*(16*x^2 - 512*x + 4096)),x)
```

output
```
int((224*exp(2*x + 10) - exp(x + 5)*(56*x - 32*x^2 + 4*x^3 - 40))/(exp(x +
 5)*(640*x - 168*x^2 + 8*x^3) + exp(2*x + 10)*(16*x^2 - 512*x + 4096) + 25
*x^2 - 10*x^3 + x^4), x)
```

3.465 $\int \frac{-4+10e-5x}{8e-4x}\,dx$

3.465.1 Optimal result

Integrand size = 18, antiderivative size = 15

$$\int \frac{-4+10e-5x}{8e-4x}\,dx = -\frac{3}{10}+\frac{5x}{4}+\log(-2e+x)$$

output
```
5/4*x+ln(-2*exp(1)+x)-3/10
```

3.465.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33

$$\int \frac{-4+10e-5x}{8e-4x}\,dx = -\frac{5}{16}(8e-4x)+\log(8e-4x)$$

input
```
Integrate[(-4 + 10*E - 5*x)/(8*E - 4*x),x]
```

output
```
(-5*(8*E - 4*x))/16 + Log[8*E - 4*x]
```

3.465.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-5x+10e-4}{8e-4x}\,dx$$

$$\Big\downarrow \ 49$$

$$\int \left(\frac{1}{x-2e}+\frac{5}{4}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{5x}{4}+\log(2e-x)$$

input
```
Int[(-4 + 10*E - 5*x)/(8*E - 4*x),x]
```

output
```
(5*x)/4 + Log[2*E - x]
```

3.465.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.465.4 Maple [A] (verified)

Time = 0.74 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

method	result	size
default	$\frac{5x}{4}+\ln\left(-2\,\mathrm{e}+x\right)$	12
risch	$\frac{5x}{4}+\ln\left(-2\,\mathrm{e}+x\right)$	12
parallelrisch	$\frac{5x}{4}+\ln\left(-2\,\mathrm{e}+x\right)$	12
norman	$\frac{5x}{4}+\ln\left(8\,\mathrm{e}-4x\right)$	14
meijerg	$-\frac{5\,\mathrm{e}\ln\left(1-\frac{\mathrm{e}^{-1}x}{2}\right)}{2}+\ln\left(1-\frac{\mathrm{e}^{-1}x}{2}\right)-\frac{5\,\mathrm{e}\left(-\frac{\mathrm{e}^{-1}x}{2}-\ln\left(1-\frac{\mathrm{e}^{-1}x}{2}\right)\right)}{2}$	42

input
```
int((10*exp(1)-5*x-4)/(8*exp(1)-4*x),x,method=_RETURNVERBOSE)
```

output
```
5/4*x+ln(-2*exp(1)+x)
```

3.465.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.73

$$\int \frac{-4+10e-5x}{8e-4x}\,dx=\frac{5}{4}\,x+\log\left(x-2\,e\right)$$

input
```
integrate((10*exp(1)-5*x-4)/(8*exp(1)-4*x),x, algorithm=\
```

output
```
5/4*x + log(x - 2*e)
```

3.465.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \frac{-4+10e-5x}{8e-4x}\,dx=\frac{5x}{4}+\log\left(x-2e\right)$$

input
```
integrate((10*exp(1)-5*x-4)/(8*exp(1)-4*x),x)
```

output
```
5*x/4 + log(x - 2*E)
```

3.465.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.73

$$\int \frac{-4+10e-5x}{8e-4x}\,dx = \frac{5}{4}\,x + \log\left(x-2\,e\right)$$

input
```
integrate((10*exp(1)-5*x-4)/(8*exp(1)-4*x),x, algorithm=\
```

output
```
5/4*x + log(x - 2*e)
```

3.465.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \frac{-4+10e-5x}{8e-4x}\,dx = \frac{5}{4}\,x + \log\left(|x-2\,e|\right)$$

input
```
integrate((10*exp(1)-5*x-4)/(8*exp(1)-4*x),x, algorithm=\
```

output
```
5/4*x + log(abs(x - 2*e))
```

3.465.9 Mupad [B] (verification not implemented)

Time = 14.83 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.73

$$\int \frac{-4+10e-5x}{8e-4x}\,dx = \frac{5\,x}{4} + \ln\left(x-2\,\mathrm{e}\right)$$

input
```
int((5*x - 10*exp(1) + 4)/(4*x - 8*exp(1)),x)
```

output
```
(5*x)/4 + log(x - 2*exp(1))
```

3.466 $\int \frac{10x-2x^2-10x\log(x)+\left(\left(10x-2x^2\right)\log(x)+\left(450-180x+18x^2\right)\log^2(x\ldots}{\left(\left(5x-x^2\right)\ldots}$

3.466.1 Optimal result

Integrand size = 180, antiderivative size = 28

$$\int \frac{10x-2x^2-10x\log(x)+\left(\left(10x-2x^2\right)\log(x)+\left(450-180x+18x^2\right)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left(\left(6\ldots\right.\right.}{\left(\left(5x-x^2\right)\log(x)+\left(225-90x+9x^2\right)\mathrm{lo}\ldots\right.}$$

$$=x+(2+3x)^2+\frac{2x}{\log\left(-9+\frac{x}{(-5+x)\log(x)}\right)}$$

output
```
2*x/ln(x/ln(x)/(-5+x)-9)+(2+3*x)^2+x
```

3.466.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{10x-2x^2-10x\log(x)+\left(\left(10x-2x^2\right)\log(x)+\left(450-180x+18x^2\right)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left(\left(6\ldots\right.\right.}{\left(\left(5x-x^2\right)\log(x)+\left(225-90x+9x^2\right)\mathrm{lo}\ldots\right.}$$

$$=13x+9x^2+\frac{2x}{\log\left(-9+\frac{x}{(-5+x)\log(x)}\right)}$$

3.466.
$\int \frac{10x-2x^2-10x\log(x)+\left(\left(10x-2x^2\right)\log(x)+\left(450-180x+18x^2\right)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left(\left(65x+77x^2-18x^3\right)\log(x)+\left(2925+2880x-1503\ldots\right.\right.}{\left(\left(5x-x^2\right)\log(x)+\left(225-90x+9x^2\right)\log^2(x)\right)\log^2\left(\frac{x+(45-9x)\log(x)}{\ldots}\right)}$

input
```
Integrate[(10*x - 2*x^2 - 10*x*Log[x] + ((10*x - 2*x^2)*Log[x] + (450 - 18
0*x + 18*x^2)*Log[x]^2)*Log[(x + (45 - 9*x)*Log[x])/((-5 + x)*Log[x])] + (
(65*x + 77*x^2 - 18*x^3)*Log[x] + (2925 + 2880*x - 1503*x^2 + 162*x^3)*Log
[x]^2)*Log[(x + (45 - 9*x)*Log[x])/((-5 + x)*Log[x])]^2)/(((5*x - x^2)*Log
[x] + (225 - 90*x + 9*x^2)*Log[x]^2)*Log[(x + (45 - 9*x)*Log[x])/((-5 + x)
*Log[x])]^2),x]
```

output
```
13*x + 9*x^2 + (2*x)/Log[-9 + x/((-5 + x)*Log[x])]
```

3.466.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^2+\left(\left(18x^2-180x+450\right)\log^2(x)+\left(10x-2x^2\right)\log(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(x-5)\log(x)}\right)+\left(\left(162x^3-1503x^2+2880\right.\right.}{\left(\left(9x^2-90x+225\right)\log^2(x)+\left(5x-x^2\right)\log(\right.}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-2x^2+\left(\left(18x^2-180x+450\right)\log^2(x)+\left(10x-2x^2\right)\log(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(x-5)\log(x)}\right)+\left(\left(162x^3-1503x^2+2880\right.\right.}{(5-x)\log(x)(x-9x\log(x)+45\log(x))}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(18x-\frac{2x(x+5\log(x)-5)}{(x-5)\log(x)(-x+9x\log(x)-45\log(x))\log^2\left(\frac{x}{(x-5)\log(x)}-9\right)}+\frac{2}{\log\left(\frac{x}{(x-5)\log(x)}-9\right)}+13\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-10\int \frac{1}{(9\log(x)x-x-45\log(x))\log^2\left(\frac{x}{(x-5)\log(x)}-9\right)}dx-50\int \frac{1}{(x-5)(9\log(x)x-x-45\log(x))\log^2\left(\frac{x}{(x-5)\log(x)}-9\right)}dx-2\int \frac{x}{\log(x)(9\log(x)x-x-45\log(x))\log^2\left(\frac{x}{(x-5)\log(x)}-9\right)}dx+2\int \frac{1}{\log\left(\frac{x}{(x-5)\log(x)}-9\right)}dx+9x^2+13x$$

3.466. $\int \frac{10x-2x^2-10x\log(x)+\left(\left(10x-2x^2\right)\log(x)+\left(450-180x+18x^2\right)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left(\left(65x+77x^2-18x^3\right)\log(x)+(2925+2880x-1503\right.}{\left(\left(5x-x^2\right)\log(x)+\left(225-90x+9x^2\right)\log^2(x)\right)\log^2\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)}$

input
```
Int[(10*x - 2*x^2 - 10*x*Log[x] + ((10*x - 2*x^2)*Log[x] + (450 - 180*x +
18*x^2)*Log[x]^2)*Log[(x + (45 - 9*x)*Log[x])/((-5 + x)*Log[x])] + ((65*x
+ 77*x^2 - 18*x^3)*Log[x] + (2925 + 2880*x - 1503*x^2 + 162*x^3)*Log[x]^2)
*Log[(x + (45 - 9*x)*Log[x])/((-5 + x)*Log[x])]^2)/(((5*x - x^2)*Log[x] +
(225 - 90*x + 9*x^2)*Log[x]^2)*Log[(x + (45 - 9*x)*Log[x])/((-5 + x)*Log[x
])]^2),x]
```

output
```
$Aborted
```

3.466.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.466.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 102 vs. $2(28) = 56$.

Time = 4.06 (sec) , antiderivative size = 103, normalized size of antiderivative = 3.68

method	result
parallelrisch	$\frac{14580 \ln\left(\frac{(-9x+45)\ln(x)+x}{\ln(x)(-5+x)}\right)x^{2}+21060 \ln\left(\frac{(-9x+45)\ln(x)+x}{\ln(x)(-5+x)}\right)x+3240x-206550 \ln\left(\frac{(-9x+45)\ln(x)+x}{\ln(x)(-5+x)}\right)}{1620 \ln\left(\frac{(-9x+45)\ln(x)+x}{\ln(x)(-5+x)}\right)}$
risch	$9x^{2}+13x-\frac{}{-2\pi \operatorname{csgn}\left(\frac{i\left(\left(\ln(x)-\frac{1}{9}\right)x-5\ln(x)\right)}{\ln(x)(-5+x)}\right)^{2}+\pi \operatorname{csgn}\left(i\left(\left(\ln(x)-\frac{1}{9}\right)x-5\ln(x)\right)\right)\operatorname{csgn}\left(\frac{i\left(\left(\ln(x)-\frac{1}{9}\right)x-5\ln(x)\right)}{-5+x}\right)^{2}-\pi \ c}$

input
```
int((((162*x^3-1503*x^2+2880*x+2925)*ln(x)^2+(-18*x^3+77*x^2+65*x)*ln(x))*
ln(((-9*x+45)*ln(x)+x)/ln(x)/(-5+x))^2+((18*x^2-180*x+450)*ln(x)^2+(-2*x^2
+10*x)*ln(x))*ln(((-9*x+45)*ln(x)+x)/ln(x)/(-5+x))-10*x*ln(x)-2*x^2+10*x)/
((9*x^2-90*x+225)*ln(x)^2+(-x^2+5*x)*ln(x))/ln(((-9*x+45)*ln(x)+x)/ln(x)/(
-5+x))^2,x,method=_RETURNVERBOSE)
```

3.466.

$$\int \frac{10x-2x^{2}-10x\log(x)+\left(\left(10x-2x^{2}\right)\log(x)+\left(450-180x+18x^{2}\right)\log^{2}(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left(\left(65x+77x^{2}-18x^{3}\right)\log(x)+\left(2925+2880x-1503\right.\right.}{\left(\left(5x-x^{2}\right)\log(x)+\left(225-90x+9x^{2}\right)\log^{2}(x)\right)\log^{2}\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)}$$

output
```
1/1620*(14580*ln(((-9*x+45)*ln(x)+x)/ln(x)/(-5+x))*x^2+21060*ln(((-9*x+45)
*ln(x)+x)/ln(x)/(-5+x))*x+3240*x-206550*ln(((-9*x+45)*ln(x)+x)/ln(x)/(-5+x
)))/ln(((-9*x+45)*ln(x)+x)/ln(x)/(-5+x))
```

3.466.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(28) = 56$.

Time = 0.29 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.25

$$\int \frac{10x - 2x^2 - 10x\log(x) + \left((10x - 2x^2)\log(x) + (450 - 180x + 18x^2)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right) + ((6}{((5x - x^2)\log(x) + (225 - 90x + 9x^2)\log}$$

$$= \frac{(9x^2 + 13x)\log\left(-\frac{9(x-5)\log(x)-x}{(x-5)\log(x)}\right) + 2x}{\log\left(-\frac{9(x-5)\log(x)-x}{(x-5)\log(x)}\right)}$$

input
```
integrate((((162*x^3-1503*x^2+2880*x+2925)*log(x)^2+(-18*x^3+77*x^2+65*x)*
log(x))*log(((-9*x+45)*log(x)+x)/log(x)/(-5+x))^2+((18*x^2-180*x+450)*log(
x)^2+(-2*x^2+10*x)*log(x))*log(((-9*x+45)*log(x)+x)/log(x)/(-5+x))-10*x*lo
g(x)-2*x^2+10*x)/((9*x^2-90*x+225)*log(x)^2+(-x^2+5*x)*log(x))/log(((-9*x+
45)*log(x)+x)/log(x)/(-5+x))^2,x, algorithm=\
```

output
```
((9*x^2 + 13*x)*log(-(9*(x - 5)*log(x) - x)/((x - 5)*log(x))) + 2*x)/log(-
(9*(x - 5)*log(x) - x)/((x - 5)*log(x)))
```

3.466.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{10x - 2x^2 - 10x\log(x) + \left((10x - 2x^2)\log(x) + (450 - 180x + 18x^2)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right) + ((6}{((5x - x^2)\log(x) + (225 - 90x + 9x^2)\log}$$

$$= 9x^2 + 13x + \frac{2x}{\log\left(\frac{x+(45-9x)\log(x)}{(x-5)\log(x)}\right)}$$

3.466.

$$\int \frac{10x-2x^2-10x\log(x)+\left((10x-2x^2)\log(x)+(450-180x+18x^2)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left((65x+77x^2-18x^3)\log(x)+(2925+2880x-1503}{\left((5x-x^2)\log(x)+(225-90x+9x^2)\log^2(x)\right)\log^2\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)}$$

input
```
integrate((((162*x**3-1503*x**2+2880*x+2925)*ln(x)**2+(-18*x**3+77*x**2+65
*x)*ln(x))*ln(((-9*x+45)*ln(x)+x)/ln(x)/(-5+x))**2+((18*x**2-180*x+450)*ln
(x)**2+(-2*x**2+10*x)*ln(x))*ln(((-9*x+45)*ln(x)+x)/ln(x)/(-5+x))-10*x*ln(
x)-2*x**2+10*x)/((9*x**2-90*x+225)*ln(x)**2+(-x**2+5*x)*ln(x))/ln(((-9*x+4
5)*ln(x)+x)/ln(x)/(-5+x))**2,x)
```

output
```
9*x**2 + 13*x + 2*x/log((x + (45 - 9*x)*log(x))/((x - 5)*log(x)))
```

3.466.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. $2(28) = 56$.

Time = 0.27 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.79

$$\int \frac{10x - 2x^2 - 10x\log(x) + \left((10x - 2x^2)\log(x) + (450 - 180x + 18x^2)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right) + ((6}{((5x - x^2)\log(x) + (225 - 90x + 9x^2)\log}$$

$$= \frac{(9\,x^2 + 13\,x)\log\left(-9\,(x-5)\log\left(x\right) + x\right) - (9\,x^2 + 13\,x)\log\left(x-5\right) - (9\,x^2 + 13\,x)\log\left(\log\left(x\right)\right) + 2\,x}{\log\left(-9\,(x-5)\log\left(x\right) + x\right) - \log\left(x-5\right) - \log\left(\log\left(x\right)\right)}$$

input
```
integrate((((162*x^3-1503*x^2+2880*x+2925)*log(x)^2+(-18*x^3+77*x^2+65*x)*
log(x))*log(((-9*x+45)*log(x)+x)/log(x)/(-5+x))^2+((18*x^2-180*x+450)*log(
x)^2+(-2*x^2+10*x)*log(x))*log(((-9*x+45)*log(x)+x)/log(x)/(-5+x))-10*x*lo
g(x)-2*x^2+10*x)/((9*x^2-90*x+225)*log(x)^2+(-x^2+5*x)*log(x))/log(((-9*x+
45)*log(x)+x)/log(x)/(-5+x))^2,x, algorithm=\
```

output
```
((9*x^2 + 13*x)*log(-9*(x - 5)*log(x) + x) - (9*x^2 + 13*x)*log(x - 5) - (
9*x^2 + 13*x)*log(log(x)) + 2*x)/(log(-9*(x - 5)*log(x) + x) - log(x - 5)
- log(log(x)))
```

3.466.8 Giac [A] (verification not implemented)

Time = 0.57 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

$$\int \frac{10x - 2x^2 - 10x\log(x) + \left((10x - 2x^2)\log(x) + (450 - 180x + 18x^2)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right) + ((6}{((5x - x^2)\log(x) + (225 - 90x + 9x^2)\log}$$

$$= 9\,x^2 + 13\,x - \frac{2\,x}{\log\left(x\log\left(x\right) - 5\,\log\left(x\right)\right) - \log\left(-9\,x\log\left(x\right) + x + 45\,\log\left(x\right)\right)}$$

3.466.

$$\int \frac{10x-2x^2-10x\log(x)+\left((10x-2x^2)\log(x)+(450-180x+18x^2)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left((65x+77x^2-18x^3)\log(x)+(2925+2880x-1503}{\left((5x-x^2)\log(x)+(225-90x+9x^2)\log^2(x)\right)\log^2\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)}$$

input
```
integrate((((162*x^3-1503*x^2+2880*x+2925)*log(x)^2+(-18*x^3+77*x^2+65*x)*
log(x))*log(((-9*x+45)*log(x)+x)/log(x)/(-5+x))^2+((18*x^2-180*x+450)*log(
x)^2+(-2*x^2+10*x)*log(x))*log(((-9*x+45)*log(x)+x)/log(x)/(-5+x))-10*x*lo
g(x)-2*x^2+10*x)/((9*x^2-90*x+225)*log(x)^2+(-x^2+5*x)*log(x))/log(((-9*x+
45)*log(x)+x)/log(x)/(-5+x))^2,x, algorithm=\
```

output
```
9*x^2 + 13*x - 2*x/(log(x*log(x) - 5*log(x)) - log(-9*x*log(x) + x + 45*lo
g(x)))
```

3.466.9 Mupad [B] (verification not implemented)

Time = 16.19 (sec) , antiderivative size = 184, normalized size of antiderivative = 6.57

$$\int \frac{10x-2x^2-10x\log(x)+\left(\left(10x-2x^2\right)\log(x)+\left(450-180x+18x^2\right)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left(\left(6\right.\right.}{\left(\left(5x-x^2\right)\log(x)+\left(225-90x+9x^2\right)\mathrm{l}\right.}$$

$$= 451\,x+90\,\ln\left(x\right)+\frac{14000}{x+5}-\frac{\frac{2\,{\left(x-5\right)}^2\,\left(27\,x^3-305\,x^2+1075\,x-1125\right)}{25\,\left(x+5\right)}+\frac{2\,x\,\ln\left(x\right)\,\left(36\,x^3-525\,x^2+2600\,x-4375\right)}{5\,\left(x+5\right)}}{x+5\,\ln\left(x\right)-5}+\frac{2\,x+\frac{2\,\ln\left(\frac{x-\ln\left(x\right)\,\left(9\,x-45\right)}{\ln\left(x\right)\,\left(x-5\right)}\right)\,\ln\left(x\right)\,\left(x-5\right)\,\left(x+45\,\ln\left(x\right)-9\,x\,\ln\left(x\right)\right)}{x+5\,\ln\left(x\right)-5}}{\ln\left(\frac{x-\ln\left(x\right)\,\left(9\,x-45\right)}{\ln\left(x\right)\,\left(x-5\right)}\right)}-\ln\left(x\right)\,\left(36\,x-\frac{18\,x^2}{5}\right)-37\,x^2+\frac{54\,x^3}{25}$$

input
```
int((10*x + log((x - log(x)*(9*x - 45))/(log(x)*(x - 5)))*(log(x)^2*(18*x^
2 - 180*x + 450) + log(x)*(10*x - 2*x^2)) - 10*x*log(x) - 2*x^2 + log((x -
 log(x)*(9*x - 45))/(log(x)*(x - 5)))^2*(log(x)^2*(2880*x - 1503*x^2 + 162
*x^3 + 2925) + log(x)*(65*x + 77*x^2 - 18*x^3)))/(log((x - log(x)*(9*x - 4
5))/(log(x)*(x - 5)))^2*(log(x)^2*(9*x^2 - 90*x + 225) + log(x)*(5*x - x^2
))),x)
```

output
```
451*x + 90*log(x) + 14000/(x + 5) - ((2*(x - 5)^2*(1075*x - 305*x^2 + 27*x
^3 - 1125))/(25*(x + 5)) + (2*x*log(x)*(2600*x - 525*x^2 + 36*x^3 - 4375))
/(5*(x + 5)))/(x + 5*log(x) - 5) + (2*x + (2*log((x - log(x)*(9*x - 45))/(
log(x)*(x - 5)))*log(x)*(x - 5)*(x + 45*log(x) - 9*x*log(x)))/(x + 5*log(x
) - 5))/log((x - log(x)*(9*x - 45))/(log(x)*(x - 5))) - log(x)*(36*x - (18
*x^2)/5) - 37*x^2 + (54*x^3)/25
```

3.466.

$$\int \frac{10x-2x^2-10x\log(x)+\left(\left(10x-2x^2\right)\log(x)+\left(450-180x+18x^2\right)\log^2(x)\right)\log\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)+\left(\left(65x+77x^2-18x^3\right)\log(x)+\left(2925+2880x-1503\right.\right.}{\left(\left(5x-x^2\right)\log(x)+\left(225-90x+9x^2\right)\log^2(x)\right)\log^2\left(\frac{x+(45-9x)\log(x)}{(-5+x)\log(x)}\right)}$$

3.467 $\int \frac{e^{4e^{2x}+x^2}(16+32x^2-2x^3-2e^5x^3+e^{2x}(128x-8x^2-8e^5x^2))}{256-32x+x^2+e^{10}x^2+e^5(-32x+2x^2)}\,dx$

3.467.1 Optimal result

Integrand size = 87, antiderivative size = 28

$$\int \frac{e^{4e^{2x}+x^2}(16+32x^2-2x^3-2e^5x^3+e^{2x}(128x-8x^2-8e^5x^2))}{256-32x+x^2+e^{10}x^2+e^5(-32x+2x^2)}\,dx=\frac{e^{4e^{2x}+x^2}x}{16-x-e^5x}$$

output
```
x/(16-x*exp(5)-x)*exp(4*exp(x)^2+x^2)
```

3.467.2 Mathematica [A] (verified)

Time = 1.05 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^{4e^{2x}+x^2}(16+32x^2-2x^3-2e^5x^3+e^{2x}(128x-8x^2-8e^5x^2))}{256-32x+x^2+e^{10}x^2+e^5(-32x+2x^2)}\,dx=-\frac{e^{4e^{2x}+x^2}x}{-16+x+e^5x}$$

input
```
Integrate[(E^(4*E^(2*x) + x^2)*(16 + 32*x^2 - 2*x^3 - 2*E^5*x^3 + E^(2*x)*
(128*x - 8*x^2 - 8*E^5*x^2)))/(256 - 32*x + x^2 + E^10*x^2 + E^5*(-32*x +
2*x^2)),x]
```

output
```
-((E^(4*E^(2*x) + x^2)*x)/(-16 + x + E^5*x))
```

3.467.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 95 vs. 2(28) = 56.

Time = 0.45 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.39, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.034$, Rules used = {6, 6, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^2+4e^{2x}}\left(-2e^5x^3-2x^3+32x^2+e^{2x}\left(-8e^5x^2-8x^2+128x\right)+16\right)}{e^{10}x^2+x^2+e^5\left(2x^2-32x\right)-32x+256}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{e^{x^2+4e^{2x}}\left(-2e^5x^3-2x^3+32x^2+e^{2x}\left(-8e^5x^2-8x^2+128x\right)+16\right)}{\left(1+e^{10}\right)x^2+e^5\left(2x^2-32x\right)-32x+256}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{e^{x^2+4e^{2x}}\left(\left(-2-2e^5\right)x^3+32x^2+e^{2x}\left(-8e^5x^2-8x^2+128x\right)+16\right)}{\left(1+e^{10}\right)x^2+e^5\left(2x^2-32x\right)-32x+256}dx$$

$$\Big\downarrow \ 2726$$

$$\frac{e^{x^2+4e^{2x}}\left(-\left(\left(1+e^5\right)x^3\right)+16x^2+4e^{2x}\left(-e^5x^2-x^2+16x\right)\right)}{\left(x+4e^{2x}\right)\left(\left(1+e^{10}\right)x^2-2e^5\left(16x-x^2\right)-32x+256\right)}$$

input
```
Int[(E^(4*E^(2*x) + x^2)*(16 + 32*x^2 - 2*x^3 - 2*E^5*x^3 + E^(2*x)*(128*x
 - 8*x^2 - 8*E^5*x^2)))/(256 - 32*x + x^2 + E^10*x^2 + E^5*(-32*x + 2*x^2)
),x]
```

output
```
(E^(4*E^(2*x) + x^2)*(16*x^2 - (1 + E^5)*x^3 + 4*E^(2*x)*(16*x - x^2 - E^5
*x^2)))/((4*E^(2*x) + x)*(256 - 32*x + (1 + E^10)*x^2 - 2*E^5*(16*x - x^2)
))
```

3.467.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.467.4 Maple [A] (verified)

Time = 1.55 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result	size
norman	$-\frac{x\,{\mathrm e}^{4\,{\mathrm e}^{2 x}+x^{2}}}{x\,{\mathrm e}^{5}+x-16}$	24
risch	$-\frac{x\,{\mathrm e}^{4\,{\mathrm e}^{2 x}+x^{2}}}{x\,{\mathrm e}^{5}+x-16}$	24
parallelrisch	$-\frac{x\,{\mathrm e}^{4\,{\mathrm e}^{2 x}+x^{2}}}{x\,{\mathrm e}^{5}+x-16}$	24

input
```
int(((-8*x^2*exp(5)-8*x^2+128*x)*exp(x)^2-2*x^3*exp(5)-2*x^3+32*x^2+16)*ex
p(4*exp(x)^2+x^2)/(x^2*exp(5)^2+(2*x^2-32*x)*exp(5)+x^2-32*x+256),x,method
=_RETURNVERBOSE)
```

output
```
-x*exp(4*exp(x)^2+x^2)/(x*exp(5)+x-16)
```

3.467.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{e^{4e^{2x}+x^2}(16+32x^2-2x^3-2e^5x^3+e^{2x}(128x-8x^2-8e^5x^2))}{256-32x+x^2+e^{10}x^2+e^5(-32x+2x^2)}\,dx=-\frac{xe^{\left(x^2+4\,e^{(2\,x)}\right)}}{xe^5+x-16}$$

input
```
integrate(((-8*x^2*exp(5)-8*x^2+128*x)*exp(x)^2-2*x^3*exp(5)-2*x^3+32*x^2+
16)*exp(4*exp(x)^2+x^2)/(x^2*exp(5)^2+(2*x^2-32*x)*exp(5)+x^2-32*x+256),x,
 algorithm=\
```

output
```
-x*e^(x^2 + 4*e^(2*x))/(x*e^5 + x - 16)
```

3.467.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{e^{4e^{2x}+x^2}(16+32x^2-2x^3-2e^5x^3+e^{2x}(128x-8x^2-8e^5x^2))}{256-32x+x^2+e^{10}x^2+e^5(-32x+2x^2)}\,dx=-\frac{xe^{x^2+4e^{2x}}}{x+xe^5-16}$$

input
```
integrate(((-8*x**2*exp(5)-8*x**2+128*x)*exp(x)**2-2*x**3*exp(5)-2*x**3+32
*x**2+16)*exp(4*exp(x)**2+x**2)/(x**2*exp(5)**2+(2*x**2-32*x)*exp(5)+x**2-
32*x+256),x)
```

output
```
-x*exp(x**2 + 4*exp(2*x))/(x + x*exp(5) - 16)
```

3.467.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{4e^{2x}+x^2}(16+32x^2-2x^3-2e^5x^3+e^{2x}(128x-8x^2-8e^5x^2))}{256-32x+x^2+e^{10}x^2+e^5(-32x+2x^2)}\,dx=-\frac{xe^{\left(x^2+4\,e^{(2\,x)}\right)}}{x(e^5+1)-16}$$

input
```
integrate(((-8*x^2*exp(5)-8*x^2+128*x)*exp(x)^2-2*x^3*exp(5)-2*x^3+32*x^2+
16)*exp(4*exp(x)^2+x^2)/(x^2*exp(5)^2+(2*x^2-32*x)*exp(5)+x^2-32*x+256),x,
 algorithm=\
```

output
```
-x*e^(x^2 + 4*e^(2*x))/(x*(e^5 + 1) - 16)
```

3.467.8 Giac [F]

$$\int \frac{e^{4e^{2x}+x^2}(16+32x^2-2x^3-2e^5x^3+e^{2x}(128x-8x^2-8e^5x^2))}{256-32x+x^2+e^{10}x^2+e^5(-32x+2x^2)}\,dx$$
$$=\int -\frac{2\left(x^3e^5+x^3-16\,x^2+4\left(x^2e^5+x^2-16\,x\right)e^{(2\,x)}-8\right)e^{\left(x^2+4\,e^{(2\,x)}\right)}}{x^2e^{10}+x^2+2\left(x^2-16\,x\right)e^5-32\,x+256}\,dx$$

input
```
integrate(((-8*x^2*exp(5)-8*x^2+128*x)*exp(x)^2-2*x^3*exp(5)-2*x^3+32*x^2+
16)*exp(4*exp(x)^2+x^2)/(x^2*exp(5)^2+(2*x^2-32*x)*exp(5)+x^2-32*x+256),x,
 algorithm=\
```

output
```
integrate(-2*(x^3*e^5 + x^3 - 16*x^2 + 4*(x^2*e^5 + x^2 - 16*x)*e^(2*x) -
8)*e^(x^2 + 4*e^(2*x))/(x^2*e^10 + x^2 + 2*(x^2 - 16*x)*e^5 - 32*x + 256),
 x)
```

3.467.9 Mupad [B] (verification not implemented)

Time = 15.58 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{e^{4e^{2x}+x^2}(16+32x^2-2x^3-2e^5x^3+e^{2x}(128x-8x^2-8e^5x^2))}{256-32x+x^2+e^{10}x^2+e^5\left(-32x+2x^2\right)}\,dx=-\frac{x\,\mathrm{e}^{4\,\mathrm{e}^{2\,x}+x^2}}{\left(x-\frac{16}{\mathrm{e}^5+1}\right)\,\left(\mathrm{e}^5+1\right)}$$

input
```
int(-(exp(4*exp(2*x) + x^2)*(2*x^3*exp(5) + exp(2*x)*(8*x^2*exp(5) - 128*x
 + 8*x^2) - 32*x^2 + 2*x^3 - 16))/(x^2*exp(10) - exp(5)*(32*x - 2*x^2) - 3
2*x + x^2 + 256),x)
```

output
```
-(x*exp(4*exp(2*x) + x^2))/((x - 16/(exp(5) + 1))*(exp(5) + 1))
```

3.468 $\int \frac{36x^2+(12-36x+12x^2)\log(4)+(8-6x+x^2)\log^2(4)}{36x^2+(-36x+12x^2)\log(4)+(9-6x+x^2)\log^2(4)}\,dx$

3.468.1 Optimal result

Integrand size = 66, antiderivative size = 21

$$\int \frac{36x^2+(12-36x+12x^2)\log(4)+(8-6x+x^2)\log^2(4)}{36x^2+(-36x+12x^2)\log(4)+(9-6x+x^2)\log^2(4)}\,dx = x-\frac{2-x}{-3+x+\frac{6x}{\log(4)}}$$

output
```
x-(2-x)/(x-3+3*x/ln(2))
```

3.468.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33

$$\int \frac{36x^2+(12-36x+12x^2)\log(4)+(8-6x+x^2)\log^2(4)}{36x^2+(-36x+12x^2)\log(4)+(9-6x+x^2)\log^2(4)}\,dx = x+\frac{(-12+\log(4))\log(4)}{(6+\log(4))(-3\log(4)+x(6+\log(4)))}$$

input
```
Integrate[(36*x^2 + (12 - 36*x + 12*x^2)*Log[4] + (8 - 6*x + x^2)*Log[4]^2
)/(36*x^2 + (-36*x + 12*x^2)*Log[4] + (9 - 6*x + x^2)*Log[4]^2),x]
```

output
```
x + ((-12 + Log[4])*Log[4])/((6 + Log[4])*(-3*Log[4] + x*(6 + Log[4])))
```

3.468.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.81, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2083, 1294, 25, 27, 1107, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{36x^2+(x^2-6x+8)\log^2(4)+(12x^2-36x+12)\log(4)}{36x^2+(x^2-6x+9)\log^2(4)+(12x^2-36x)\log(4)}dx$$

$$\Big\downarrow \text{2083}$$

$$\int \frac{x^2(6+\log(4))^2-6x\log(4)(6+\log(4))+4\log(4)(3+\log(16))}{x^2(6+\log(4))^2-6x\log(4)(6+\log(4))+9\log^2(4)}dx$$

$$\Big\downarrow \text{1294}$$

$$(6+\log(4))^2\int -\frac{-(6+\log(4))^2x^2+6\log(4)(6+\log(4))x-4\log(4)(3+\log(16))}{(6+\log(4))^2(3\log(4)-x(6+\log(4)))^2}dx$$

$$\Big\downarrow \text{25}$$

$$-(6+\log(4))^2\int \frac{-(6+\log(4))^2x^2+6\log(4)(6+\log(4))x-4\log(4)(3+\log(16))}{(6+\log(4))^2(x(6+\log(4))-\log(64))^2}dx$$

$$\Big\downarrow \text{27}$$

$$-\int \frac{-(6+\log(4))^2x^2+6\log(4)(6+\log(4))x-4\log(4)(3+\log(16))}{(x(6+\log(4))-\log(64))^2}dx$$

$$\Big\downarrow \text{1107}$$

$$-\int \left(\frac{-\log^2(64)-2\log(4)(6-\log(1024))}{(x(6+\log(4))-\log(64))^2}-1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x-\frac{\log^2(64)+2\log(4)(6-\log(1024))}{(6+\log(4))(x(6+\log(4))-\log(64))}$$

input
```
Int[(36*x^2 + (12 - 36*x + 12*x^2)*Log[4] + (8 - 6*x + x^2)*Log[4]^2)/(36*
x^2 + (-36*x + 12*x^2)*Log[4] + (9 - 6*x + x^2)*Log[4]^2),x]
```

output
```
x - (Log[64]^2 + 2*Log[4]*(6 - Log[1024]))/((6 + Log[4])*(x*(6 + Log[4]) -
 Log[64]))
```

3.468. $\int \frac{36x^2+(12-36x+12x^2)\log(4)+(8-6x+x^2)\log^2(4)}{36x^2+(-36x+12x^2)\log(4)+(9-6x+x^2)\log^2(4)}dx$

3.468.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1107
```
Int[((d_.) + (e_.)*(x_))^(m_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_
Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; F
reeQ[{a, b, c, d, e, m}, x] && EqQ[2*c*d - b*e, 0] && IGtQ[p, 0] &&  !(EqQ[
m, 3] && NeQ[p, 1])
```

rule 1294
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.)*((d_.) + (e_.)*(x_) + (f_.)*(x
_)^2)^(q_.), x_Symbol] :> Simp[1/c^p   Int[(b/2 + c*x)^(2*p)*(d + e*x + f*x
^2)^q, x], x] /; FreeQ[{a, b, c, d, e, f, q}, x] && EqQ[b^2 - 4*a*c, 0] &&
IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2083
```
Int[(u_)^(p_.)*(v_)^(q_.), x_Symbol] :> Int[ExpandToSum[u, x]^p*ExpandToSum
[v, x]^q, x] /; FreeQ[{p, q}, x] && QuadraticQ[{u, v}, x] &&  !QuadraticMat
chQ[{u, v}, x]
```

3.468.4 Maple [A] (verified)

Time = 1.38 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.43

3.468. $\int \frac{36x^2+(12-36x+12x^2)\log(4)+(8-6x+x^2)\log^2(4)}{36x^2+(-36x+12x^2)\log(4)+(9-6x+x^2)\log^2(4)}\,dx$

method	result
default	$x+\frac{\ln(2)(\ln(2)-6)}{(3+\ln(2))(x\ln(2)-3\ln(2)+3x)}$
gosper	$\frac{x(3x\ln(2)-8\ln(2)+9x-6)}{3x\ln(2)-9\ln(2)+9x}$
norman	$\frac{(3+\ln(2))x^2+\left(-\frac{8\ln(2)}{3}-2\right)x}{x\ln(2)-3\ln(2)+3x}$
parallelrisch	$\frac{3x^2\ln(2)^2-8x\ln(2)^2+9x^2\ln(2)-6x\ln(2)}{3\ln(2)(x\ln(2)-3\ln(2)+3x)}$
risch	$x+\frac{\ln(2)^2}{(3+\ln(2))(x\ln(2)-3\ln(2)+3x)}-\frac{6\ln(2)}{(3+\ln(2))(x\ln(2)-3\ln(2)+3x)}$
meijerg	$-\frac{3\ln(2)\left(-\frac{x(3+\ln(2))\left(-\frac{x(3+\ln(2))}{\ln(2)}+6\right)}{9\ln(2)\left(1-\frac{x(3+\ln(2))}{3\ln(2)}\right)}-2\ln\left(1-\frac{x(3+\ln(2))}{3\ln(2)}\right)\right)}{3+\ln(2)}+\frac{9\left(-\frac{8\ln(2)^2}{3}-8\ln(2)\right)\left(\frac{x(3+\ln(2))}{3\ln(2)\left(1-\frac{x(3+\ln(2))}{3\ln(2)}\right)}+\ln(1-x(\right.}{4\ln(2)^2+24\ln(2)+36}$

input
```
int((4*(x^2-6*x+8)*ln(2)^2+2*(12*x^2-36*x+12)*ln(2)+36*x^2)/(4*(x^2-6*x+9)
*ln(2)^2+2*(12*x^2-36*x)*ln(2)+36*x^2),x,method=_RETURNVERBOSE)
```

output
```
x+ln(2)*(ln(2)-6)/(3+ln(2))/(x*ln(2)-3*ln(2)+3*x)
```

3.468.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(18) = 36$.

Time = 0.29 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.71

$$\int \frac{36x^2+(12-36x+12x^2)\log(4)+(8-6x+x^2)\log^2(4)}{36x^2+(-36x+12x^2)\log(4)+(9-6x+x^2)\log^2(4)}\,dx = \frac{(x^2-3\,x+1)\log(2)^2+9\,x^2+3\,(2\,x^2-3\,x-2)\log(2)}{(x-3)\log(2)^2+3\,(2\,x-3)\log(2)+9\,x}$$

input
```
integrate((4*(x^2-6*x+8)*log(2)^2+2*(12*x^2-36*x+12)*log(2)+36*x^2)/(4*(x^
2-6*x+9)*log(2)^2+2*(12*x^2-36*x)*log(2)+36*x^2),x, algorithm=\
```

output
```
((x^2 - 3*x + 1)*log(2)^2 + 9*x^2 + 3*(2*x^2 - 3*x - 2)*log(2))/((x - 3)*l
og(2)^2 + 3*(2*x - 3)*log(2) + 9*x)
```

3.468.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. 2(14) = 28.

Time = 0.17 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.71

$$\int \frac{36x^2+(12-36x+12x^2)\log(4)+(8-6x+x^2)\log^2(4)}{36x^2+(-36x+12x^2)\log(4)+(9-6x+x^2)\log^2(4)}\,dx$$
$$= x+\frac{-6\log{(2)}+\log{(2)}^2}{x\left(\log{(2)}^2+6\log{(2)}+9\right)-9\log{(2)}-3\log{(2)}^2}$$

input
```
integrate((4*(x**2-6*x+8)*ln(2)**2+2*(12*x**2-36*x+12)*ln(2)+36*x**2)/(4*(
x**2-6*x+9)*ln(2)**2+2*(12*x**2-36*x)*ln(2)+36*x**2),x)
```

output
```
x + (-6*log(2) + log(2)**2)/(x*(log(2)**2 + 6*log(2) + 9) - 9*log(2) - 3*l
og(2)**2)
```

3.468.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. 2(18) = 36.

Time = 0.19 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.76

$$\int \frac{36x^2+(12-36x+12x^2)\log(4)+(8-6x+x^2)\log^2(4)}{36x^2+(-36x+12x^2)\log(4)+(9-6x+x^2)\log^2(4)}\,dx$$
$$= x+\frac{\log{(2)}^2-6\,\log{(2)}}{\left(\log{(2)}^2+6\,\log{(2)}+9\right)x-3\,\log{(2)}^2-9\,\log{(2)}}$$

input
```
integrate((4*(x^2-6*x+8)*log(2)^2+2*(12*x^2-36*x+12)*log(2)+36*x^2)/(4*(x^
2-6*x+9)*log(2)^2+2*(12*x^2-36*x)*log(2)+36*x^2),x, algorithm=\
```

output
```
x + (log(2)^2 - 6*log(2))/((log(2)^2 + 6*log(2) + 9)*x - 3*log(2)^2 - 9*lo
g(2))
```

3.468.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(18) = 36$.

Time = 0.27 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.81

$$\int \frac{36x^2 + (12 - 36x + 12x^2)\log(4) + (8 - 6x + x^2)\log^2(4)}{36x^2 + (-36x + 12x^2)\log(4) + (9 - 6x + x^2)\log^2(4)}\,dx = \frac{x\log(2)^2 + 6\,x\log(2) + 9\,x}{\log(2)^2 + 6\,\log(2) + 9} + \frac{\log(2)^2 - 6\,\log(2)}{(x\log(2) + 3\,x - 3\,\log(2))(\log(2) + 3)}$$

input
```
integrate((4*(x^2-6*x+8)*log(2)^2+2*(12*x^2-36*x+12)*log(2)+36*x^2)/(4*(x^
2-6*x+9)*log(2)^2+2*(12*x^2-36*x)*log(2)+36*x^2),x, algorithm=\
```

output
```
(x*log(2)^2 + 6*x*log(2) + 9*x)/(log(2)^2 + 6*log(2) + 9) + (log(2)^2 - 6*
log(2))/((x*log(2) + 3*x - 3*log(2))*(log(2) + 3))
```

3.468.9 Mupad [B] (verification not implemented)

Time = 14.74 (sec) , antiderivative size = 112, normalized size of antiderivative = 5.33

$$\int \frac{36x^2 + (12 - 36x + 12x^2)\log(4) + (8 - 6x + x^2)\log^2(4)}{36x^2 + (-36x + 12x^2)\log(4) + (9 - 6x + x^2)\log^2(4)}\,dx = x - \frac{\operatorname{atan}\left(\frac{\frac{\left(18\,\ln(2)+6\ln(2)^2\right)\left(\ln(64)-\ln(2)^2\right)}{6\,\ln(2)\,\sqrt{\ln(64)-6\,\ln(2)}} - \frac{x\left(\ln(64)-\ln(2)^2\right)\left(2\,\ln(64)+2\ln(2)^2+18\right)}{6\,\ln(2)\,\sqrt{\ln(64)-6\,\ln(2)}}}{\ln(64)-\ln(2)^2}\right)\left(\ln(64) - \ln(2)^2\right)}{3\,\ln(2)\,\sqrt{\ln(64) - 6\,\ln(2)}}$$

input
```
int((2*log(2)*(12*x^2 - 36*x + 12) + 4*log(2)^2*(x^2 - 6*x + 8) + 36*x^2)/
(4*log(2)^2*(x^2 - 6*x + 9) - 2*log(2)*(36*x - 12*x^2) + 36*x^2),x)
```

output
```
x - (atan((((18*log(2) + 6*log(2)^2)*(log(64) - log(2)^2))/(6*log(2)*(log(
64) - 6*log(2))^(1/2)) - (x*(log(64) - log(2)^2)*(2*log(64) + 2*log(2)^2 +
 18))/(6*log(2)*(log(64) - 6*log(2))^(1/2)))/(log(64) - log(2)^2))*(log(64
) - log(2)^2))/(3*log(2)*(log(64) - 6*log(2))^(1/2))
```

3.469 $\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(-2e^{8-2x}+2e^{4-x}\right)\log\left(\frac{4}{e^4}\right)\right)$

3.469.1 Optimal result

Integrand size = 49, antiderivative size = 23

$$\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(-2e^{8-2x}+2e^{4-x}\right)\log\left(\frac{4}{e^4}\right)\right)\,dx=\frac{1}{3}\left(-1+e^{4-x}\right)^2\left(3+\log\left(\frac{4}{e^4}\right)\right)$$

output
```
1/3*(ln(4/exp(4))+3)*(-1+exp(-x+4))^2
```

3.469.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(-2e^{8-2x}+2e^{4-x}\right)\log\left(\frac{4}{e^4}\right)\right)\,dx=\frac{2}{3}\left(\frac{1}{2}e^{8-2x}-e^{4-x}\right)(-1+\log(4))$$

input
```
Integrate[(-6*E^(8 - 2*x) + 6*E^(4 - x) + (-2*E^(8 - 2*x) + 2*E^(4 - x))*L
og[4/E^4])/3,x]
```

output
```
(2*(E^(8 - 2*x)/2 - E^(4 - x))*(-1 + Log[4]))/3
```

3.469.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 53 vs. $2(23) = 46$.

Time = 0.19 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.30, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.041$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(2e^{4-x}-2e^{8-2x}\right)\log\left(\frac{4}{e^4}\right)\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\int \left(2(4-\log(4))\left(e^{8-2x}-e^{4-x}\right)-6e^{8-2x}+6e^{4-x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(3e^{8-2x}-6e^{4-x}-e^{8-2x}(4-\log(4))+2e^{4-x}(4-\log(4))\right)$$

input
```
Int[(-6*E^(8 - 2*x) + 6*E^(4 - x) + (-2*E^(8 - 2*x) + 2*E^(4 - x))*Log[4/E
^4])/3,x]
```

output
```
(3*E^(8 - 2*x) - 6*E^(4 - x) - E^(8 - 2*x)*(4 - Log[4]) + 2*E^(4 - x)*(4 -
 Log[4]))/3
```

3.469.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.469.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

method	result	size
norman	$\left(-\frac{4\ln(2)}{3}+\frac{2}{3}\right)\mathrm{e}^{-x+4}+\left(\frac{2\ln(2)}{3}-\frac{1}{3}\right)\mathrm{e}^{-2x+8}$	30
derivativedivides	$-\frac{(2\ln(4\,\mathrm{e}^{-4})+6)\left(-\frac{\mathrm{e}^{-2x+8}}{2}+\mathrm{e}^{-x+4}\right)}{3}$	31
risch	$\frac{2\,\mathrm{e}^{-2x+8}\ln(2)}{3}-\frac{\mathrm{e}^{-2x+8}}{3}-\frac{4\,\mathrm{e}^{-x+4}\ln(2)}{3}+\frac{2\,\mathrm{e}^{-x+4}}{3}$	38
parts	$-\frac{\left(-\frac{2\ln\left(4\,\mathrm{e}^{-4}\right)}{3}-2\right)\mathrm{e}^{-2x+8}}{2}-\left(\frac{2\ln(4\,\mathrm{e}^{-4})}{3}+2\right)\mathrm{e}^{-x+4}$	42
default	$\frac{2\ln(4\,\mathrm{e}^{-4})\left(\frac{\mathrm{e}^{-2x+8}}{2}-\mathrm{e}^{-x+4}\right)}{3}+\mathrm{e}^{-2x+8}-2\,\mathrm{e}^{-x+4}$	46
parallelrisch	$\frac{\mathrm{e}^{-2x+8}\ln(4\,\mathrm{e}^{-4})}{3}+\mathrm{e}^{-2x+8}-\frac{2\,\mathrm{e}^{-x+4}\ln(4\,\mathrm{e}^{-4})}{3}-2\,\mathrm{e}^{-x+4}$	50
meijerg	$-\frac{\mathrm{e}^{-2x+2x\,\mathrm{e}^{8}}(\ln(4\,\mathrm{e}^{-4})+3)\left(1-\mathrm{e}^{-2x\,\mathrm{e}^{8}}\right)}{3}+\left(\frac{2\,\mathrm{e}^{4}\ln(4\,\mathrm{e}^{-4})}{3}+2\,\mathrm{e}^{4}\right)(1-\mathrm{e}^{-x})$	54

input
```
int(1/3*(-2*exp(-x+4)^2+2*exp(-x+4))*ln(4/exp(4))-2*exp(-x+4)^2+2*exp(-x+4
),x,method=_RETURNVERBOSE)
```

output
```
(-4/3*ln(2)+2/3)*exp(-x+4)+(2/3*ln(2)-1/3)*exp(-x+4)^2
```

3.469.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(-2e^{8-2x}+2e^{4-x}\right)\log\left(\frac{4}{e^4}\right)\right)\,dx$$
$$=-\frac{2}{3}\,(2\,\log\left(2\right)-1)e^{(-x+4)}+\frac{1}{3}\,(2\,\log\left(2\right)-1)e^{(-2\,x+8)}$$

input
```
integrate(1/3*(-2*exp(-x+4)^2+2*exp(-x+4))*log(4/exp(4))-2*exp(-x+4)^2+2*e
xp(-x+4),x, algorithm=\
```

output
```
-2/3*(2*log(2) - 1)*e^(-x + 4) + 1/3*(2*log(2) - 1)*e^(-2*x + 8)
```

3.469.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(-2e^{8-2x}+2e^{4-x}\right)\log\left(\frac{4}{e^4}\right)\right)\,dx = \frac{(6-12\log(2))\,e^{4-x}}{9}+\frac{(-3+6\log(2))\,e^{8-2x}}{9}$$

input
```
integrate(1/3*(-2*exp(-x+4)**2+2*exp(-x+4))*ln(4/exp(4))-2*exp(-x+4)**2+2*
exp(-x+4),x)
```

output
```
(6 - 12*log(2))*exp(4 - x)/9 + (-3 + 6*log(2))*exp(8 - 2*x)/9
```

3.469.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(19) = 38.

Time = 0.20 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.70

$$\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(-2e^{8-2x}+2e^{4-x}\right)\log\left(\frac{4}{e^4}\right)\right)\,dx = -\frac{1}{3}\left(2\,e^{(-x+4)}-e^{(-2\,x+8)}\right)\log\left(4\,e^{(-4)}\right)-2\,e^{(-x+4)}+e^{(-2\,x+8)}$$

input
```
integrate(1/3*(-2*exp(-x+4)^2+2*exp(-x+4))*log(4/exp(4))-2*exp(-x+4)^2+2*e
xp(-x+4),x, algorithm=\
```

output
```
-1/3*(2*e^(-x + 4) - e^(-2*x + 8))*log(4*e^(-4)) - 2*e^(-x + 4) + e^(-2*x
+ 8)
```

3.469.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(19) = 38.

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.70

$$\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(-2e^{8-2x}+2e^{4-x}\right)\log\left(\frac{4}{e^4}\right)\right)\,dx = -\frac{1}{3}\left(2\,e^{(-x+4)}-e^{(-2\,x+8)}\right)\log\left(4\,e^{(-4)}\right)-2\,e^{(-x+4)}+e^{(-2\,x+8)}$$

input
```
integrate(1/3*(-2*exp(-x+4)^2+2*exp(-x+4))*log(4/exp(4))-2*exp(-x+4)^2+2*e
xp(-x+4),x, algorithm=\
```

output
```
-1/3*(2*e^(-x + 4) - e^(-2*x + 8))*log(4*e^(-4)) - 2*e^(-x + 4) + e^(-2*x
+ 8)
```

3.469.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{1}{3}\left(-6e^{8-2x}+6e^{4-x}+\left(-2e^{8-2x}+2e^{4-x}\right)\log\left(\frac{4}{e^4}\right)\right)\,dx$$
$$=\mathrm{e}^{8-2\,x}\left(\frac{\ln(4)}{3}-\frac{1}{3}\right)-\mathrm{e}^{4-x}\left(\frac{\ln(16)}{3}-\frac{2}{3}\right)$$

input
```
int(2*exp(4 - x) - 2*exp(8 - 2*x) + (log(4*exp(-4))*(2*exp(4 - x) - 2*exp(
8 - 2*x)))/3,x)
```

output
```
exp(8 - 2*x)*(log(4)/3 - 1/3) - exp(4 - x)*(log(16)/3 - 2/3)
```

3.470 $\int \frac{-4\log^2(5)\log(x^2)+2\log^2(5)\log^2(x^2)+(-34+3x)\log^4(x^2)}{x^3\log^4(5)+(-34x^3+2x^4)\log^2(5)\log^2(x^2)+(289x^3-34x^4+x^5)\log^4(x^2)}$

3.470.1 Optimal result

Integrand size = 90, antiderivative size = 23

$$\int \frac{-4\log^2(5)\log(x^2)+2\log^2(5)\log^2(x^2)+(-34+3x)\log^4(x^2)}{x^3\log^4(5)+(-34x^3+2x^4)\log^2(5)\log^2(x^2)+(289x^3-34x^4+x^5)\log^4(x^2)}\,dx = \frac{1}{x^2\left(17-x-\frac{\log^2(5)}{\log^2(x^2)}\right)}$$

output
```
1/x^2/(17-ln(5)^2/ln(x^2)^2-x)
```

3.470.2 Mathematica [A] (verified)

Time = 0.55 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{-4\log^2(5)\log(x^2)+2\log^2(5)\log^2(x^2)+(-34+3x)\log^4(x^2)}{x^3\log^4(5)+(-34x^3+2x^4)\log^2(5)\log^2(x^2)+(289x^3-34x^4+x^5)\log^4(x^2)}\,dx = -\frac{\log^2(x^2)}{x^2(\log^2(5)+(-17+x)\log^2(x^2))}$$

input
```
Integrate[(-4*Log[5]^2*Log[x^2] + 2*Log[5]^2*Log[x^2]^2 + (-34 + 3*x)*Log[
x^2]^4)/(x^3*Log[5]^4 + (-34*x^3 + 2*x^4)*Log[5]^2*Log[x^2]^2 + (289*x^3 -
 34*x^4 + x^5)*Log[x^2]^4),x]
```

output
```
-(Log[x^2]^2/(x^2*(Log[5]^2 + (-17 + x)*Log[x^2]^2)))
```

3.470.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(3x-34)\log^4(x^2)+2\log^2(5)\log^2(x^2)-4\log^2(5)\log(x^2)}{x^3\log^4(5)+(2x^4-34x^3)\log^2(5)\log^2(x^2)+(x^5-34x^4+289x^3)\log^4(x^2)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(3x-34)\log^4(x^2)+2\log^2(5)\log^2(x^2)-4\log^2(5)\log(x^2)}{x^3\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{3x-34}{(x-17)^2x^3}-\frac{2(2x-17)\log^2(5)}{(x-17)^2x^3\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)}-\frac{\log^2(5)\left(4x^2\log(x^2)-136x\log(x^2)+11\right.}{(x-17)^2x^3\left(x\log^2(x^2)-17\log^2\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2}{289}\log^2(5)\int \frac{1}{(x-17)^2\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)}dx+\frac{2\log^2(5)\int \frac{1}{(x-17)\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)}dx}{4913}-\frac{2\log^2(5)\int \frac{1}{x\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)}dx}{4913}+\frac{1}{289}\log^4(5)\int \frac{1}{(x-17)^2\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)^2}dx-\frac{2\log^4(5)\int \frac{1}{(x-17)\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)^2}dx}{4913}+\frac{1}{289}\log^4(5)\int \frac{1}{x^2\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)^2}dx+\frac{2\log^4(5)\int \frac{1}{x\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)^2}dx}{4913}-4\log^2(5)\int \frac{\log(x^2)}{x^3\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)^2}dx+\frac{2}{17}\log^2(5)\int \frac{1}{x^3\left(x\log^2(x^2)-17\log^2(x^2)+\log^2(5)\right)}dx+\frac{1}{(17-x)x^2}$$

input
```
Int[(-4*Log[5]^2*Log[x^2] + 2*Log[5]^2*Log[x^2]^2 + (-34 + 3*x)*Log[x^2]^4
)/(x^3*Log[5]^4 + (-34*x^3 + 2*x^4)*Log[5]^2*Log[x^2]^2 + (289*x^3 - 34*x^
4 + x^5)*Log[x^2]^4),x]
```

output
```
$Aborted
```

3.470. $\int \frac{-4\log^2(5)\log(x^2)+2\log^2(5)\log^2(x^2)+(-34+3x)\log^4(x^2)}{x^3\log^4(5)+(-34x^3+2x^4)\log^2(5)\log^2(x^2)+(289x^3-34x^4+x^5)\log^4(x^2)}dx$

3.470.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.470.4 Maple [A] (verified)

Time = 1.43 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.52

method	result	size
parallelrisch	$-\frac{\ln\left(x^{2}\right)^{2}}{x^{2} \left(x \ln\left(x^{2}\right)^{2}-17 \ln\left(x^{2}\right)^{2}+\ln\left(5\right)^{2}\right)}$	35
risch	$-\frac{1}{x^{2} \left(x -17\right)}+\frac{\ln\left(5\right)^{2}}{x^{2} \left(x -17\right) \left(x \ln\left(x^{2}\right)^{2}-17 \ln\left(x^{2}\right)^{2}+\ln\left(5\right)^{2}\right)}$	48

input
```
int(((3*x-34)*ln(x^2)^4+2*ln(5)^2*ln(x^2)^2-4*ln(5)^2*ln(x^2))/((x^5-34*x^
4+289*x^3)*ln(x^2)^4+(2*x^4-34*x^3)*ln(5)^2*ln(x^2)^2+x^3*ln(5)^4),x,metho
d=_RETURNVERBOSE)
```

output
```
-1/x^2*ln(x^2)^2/(x*ln(x^2)^2-17*ln(x^2)^2+ln(5)^2)
```

3.470.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.52

$$\int \frac{-4 \log^2(5) \log\left(x^2\right)+2 \log^2(5) \log^2\left(x^2\right)+(-34+3 x) \log^4\left(x^2\right)}{x^3 \log^4(5)+\left(-34 x^3+2 x^4\right) \log^2(5) \log^2\left(x^2\right)+\left(289 x^3-34 x^4+x^5\right) \log^4\left(x^2\right)}\, dx = -\frac{\log\left(x^{2}\right)^{2}}{x^{2} \log\left(5\right)^{2} + \left(x^{3} - 17 \, x^{2}\right) \log\left(x^{2}\right)^{2}}$$

input
```
integrate(((3*x-34)*log(x^2)^4+2*log(5)^2*log(x^2)^2-4*log(5)^2*log(x^2))/
((x^5-34*x^4+289*x^3)*log(x^2)^4+(2*x^4-34*x^3)*log(5)^2*log(x^2)^2+x^3*lo
g(5)^4),x, algorithm=\
```

output
```
-log(x^2)^2/(x^2*log(5)^2 + (x^3 - 17*x^2)*log(x^2)^2)
```

3.470.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(19) = 38$.

Time = 0.13 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.30

$$\int \frac{-4\log^2(5)\log(x^2) + 2\log^2(5)\log^2(x^2) + (-34+3x)\log^4(x^2)}{x^3\log^4(5) + (-34x^3+2x^4)\log^2(5)\log^2(x^2) + (289x^3-34x^4+x^5)\log^4(x^2)}\,dx = \frac{\log(5)^2}{x^3\log(5)^2 - 17x^2\log(5)^2 + (x^4-34x^3+289x^2)\log(x^2)^2} - \frac{1}{x^3-17x^2}$$

input
```
integrate(((3*x-34)*ln(x**2)**4+2*ln(5)**2*ln(x**2)**2-4*ln(5)**2*ln(x**2)
)/((x**5-34*x**4+289*x**3)*ln(x**2)**4+(2*x**4-34*x**3)*ln(5)**2*ln(x**2)*
*2+x**3*ln(5)**4),x)
```

output
```
log(5)**2/(x**3*log(5)**2 - 17*x**2*log(5)**2 + (x**4 - 34*x**3 + 289*x**2
)*log(x**2)**2) - 1/(x**3 - 17*x**2)
```

3.470.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{-4\log^2(5)\log(x^2) + 2\log^2(5)\log^2(x^2) + (-34+3x)\log^4(x^2)}{x^3\log^4(5) + (-34x^3+2x^4)\log^2(5)\log^2(x^2) + (289x^3-34x^4+x^5)\log^4(x^2)}\,dx = -\frac{4\log(x)^2}{x^2\log(5)^2 + 4(x^3-17x^2)\log(x)^2}$$

input
```
integrate(((3*x-34)*log(x^2)^4+2*log(5)^2*log(x^2)^2-4*log(5)^2*log(x^2))/
((x^5-34*x^4+289*x^3)*log(x^2)^4+(2*x^4-34*x^3)*log(5)^2*log(x^2)^2+x^3*lo
g(5)^4),x, algorithm=\
```

output
```
-4*log(x)^2/(x^2*log(5)^2 + 4*(x^3 - 17*x^2)*log(x)^2)
```

3.470.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(21) = 42$.

Time = 0.40 (sec) , antiderivative size = 73, normalized size of antiderivative = 3.17

$$\int \frac{-4\log^2(5)\log(x^2) + 2\log^2(5)\log^2(x^2) + (-34+3x)\log^4(x^2)}{x^3\log^4(5) + (-34x^3+2x^4)\log^2(5)\log^2(x^2) + (289x^3-34x^4+x^5)\log^4(x^2)}\,dx$$
$$= \frac{\log(5)^2}{x^4\log(x^2)^2 + x^3\log(5)^2 - 34\,x^3\log(x^2)^2 - 17\,x^2\log(5)^2 + 289\,x^2\log(x^2)^2} - \frac{1}{289\,(x-17)} + \frac{x+17}{289\,x^2}$$

input
```
integrate(((3*x-34)*log(x^2)^4+2*log(5)^2*log(x^2)^2-4*log(5)^2*log(x^2))/
((x^5-34*x^4+289*x^3)*log(x^2)^4+(2*x^4-34*x^3)*log(5)^2*log(x^2)^2+x^3*lo
g(5)^4),x, algorithm=\
```

output
```
log(5)^2/(x^4*log(x^2)^2 + x^3*log(5)^2 - 34*x^3*log(x^2)^2 - 17*x^2*log(5
)^2 + 289*x^2*log(x^2)^2) - 1/289/(x - 17) + 1/289*(x + 17)/x^2
```

3.470.9 Mupad [B] (verification not implemented)

Time = 14.80 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.48

$$\int \frac{-4\log^2(5)\log(x^2) + 2\log^2(5)\log^2(x^2) + (-34+3x)\log^4(x^2)}{x^3\log^4(5) + (-34x^3+2x^4)\log^2(5)\log^2(x^2) + (289x^3-34x^4+x^5)\log^4(x^2)}\,dx$$
$$= -\frac{\ln(x^2)^2}{x^2\,\left(x\ln(x^2)^2 - 17\ln(x^2)^2 + \ln(5)^2\right)}$$

input
```
int((log(x^2)^4*(3*x - 34) - 4*log(x^2)*log(5)^2 + 2*log(x^2)^2*log(5)^2)/
(x^3*log(5)^4 + log(x^2)^4*(289*x^3 - 34*x^4 + x^5) - log(x^2)^2*log(5)^2*
(34*x^3 - 2*x^4)),x)
```

output
```
-log(x^2)^2/(x^2*(x*log(x^2)^2 - 17*log(x^2)^2 + log(5)^2))
```

3.471 $\int \frac{14x+36x^2+28x^3+6x^4+(16}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{}{256x^2}\right.}$

3.471.1 Optimal result

Integrand size = 226, antiderivative size = 32

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\right.}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7}\right.}$$
$$=\frac{x}{-2+\log\left(\frac{e^4}{x^2(1+x^2)(x-(4+x)^2)^2}\right)}$$

output
```
x/(ln(exp(4)/(x-(4+x)^2)^2/x^2/(x^2+1))-2)
```

3.471.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.88

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\right.}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7}\right.}$$
$$=\frac{x}{2+\log\left(\frac{1}{x^2(1+x^2)(16+7x+x^2)^2}\right)}$$

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$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{\cdots}\right)+(16+7x+17x^2+7x^3+x^4)\log^2\left(\right.}$$

input
```
Integrate[(14*x + 36*x^2 + 28*x^3 + 6*x^4 + (16 + 7*x + 17*x^2 + 7*x^3 + x
^4)*Log[E^4/(256*x^2 + 224*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x^7 + x^8
)])/(64 + 28*x + 68*x^2 + 28*x^3 + 4*x^4 + (-64 - 28*x - 68*x^2 - 28*x^3 -
 4*x^4)*Log[E^4/(256*x^2 + 224*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x^7 +
 x^8)] + (16 + 7*x + 17*x^2 + 7*x^3 + x^4)*Log[E^4/(256*x^2 + 224*x^3 + 33
7*x^4 + 238*x^5 + 82*x^6 + 14*x^7 + x^8)]^2),x]
```

output
```
x/(2 + Log[1/(x^2*(1 + x^2)*(16 + 7*x + x^2)^2)])
```

3.471.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^4+28x^3+36x^2+\left(x^4+7x^3+17x^2+7x+16\right)\log\left(\frac{}{x^8+14x^7+82x}\right.}{4x^4+28x^3+68x^2+\left(x^4+7x^3+17x^2+7x+16\right)\log^2\left(\frac{e^4}{x^8+14x^7+82x^6+238x^5+337x^4+224x^3+256x^2}\right)+\left(-4x^4-28x\right.}$$

$\Big\downarrow$ 7239

$$\int \frac{2\left(5x^4+28x^3+52x^2+21x+32\right)+\left(x^4+7x^3+17x^2+7x+16\right)\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)}{\left(x^4+7x^3+17x^2+7x+16\right)\left(\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)+2\right)^2}dx$$

$\Big\downarrow$ 2463

$$\int \left(\frac{(15-7x)\left(2\left(5x^4+28x^3+52x^2+21x+32\right)+\left(x^4+7x^3+17x^2+7x+16\right)\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)\right)}{274\left(x^2+1\right)\left(\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)+2\right)^2}+\right.$$

$\Big\downarrow$ 2009

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$$\int \frac{14x+36x^2+28x^3+6x^4+\left(16+7x+17x^2+7x^3+x^4\right)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)}{64+28x+68x^2+28x^3+4x^4+\left(-64-28x-68x^2-28x^3-4x^4\right)\log\left(\frac{e^4}{}\right)+\left(16+7x+17x^2+7x^3+x^4\right)\log^2\left(\right.}$$

$$8\int \frac{1}{\left(\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)+2\right)^2}dx - \frac{128i\int \frac{1}{\left(-2x+i\sqrt{15}-7\right)\left(\log\left(\frac{1}{x^2\left(x^2+1\right)\left(x^2+7x+16\right)^2}\right)+2\right)^2}dx}{\sqrt{15}} - i\int \frac{1}{(i-x)\left(\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)+2\right)^2}dx - i\int \frac{1}{(x+i)\left(\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)+2\right)^2}dx - \frac{14}{15}\left(15+7i\sqrt{15}\right)\int \frac{1}{\left(2x-i\sqrt{15}+7\right)\left(\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)+2\right)^2}dx - \frac{14}{15}\left(15-7i\sqrt{15}\right)\int \frac{1}{\left(2x+i\sqrt{15}+7\right)\left(\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)+2\right)^2}dx - \frac{128i\int \frac{1}{\left(2x+i\sqrt{15}+7\right)\left(\log\left(\frac{1}{x^2\left(x^2+1\right)\left(x^2+7x+16\right)^2}\right)+2\right)^2}dx}{\sqrt{15}} + \int \frac{1}{\log\left(\frac{1}{x^2(x^2+1)(x^2+7x+16)^2}\right)+2}dx$$

input
```
Int[(14*x + 36*x^2 + 28*x^3 + 6*x^4 + (16 + 7*x + 17*x^2 + 7*x^3 + x^4)*Lo
g[E^4/(256*x^2 + 224*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x^7 + x^8)])/(6
4 + 28*x + 68*x^2 + 28*x^3 + 4*x^4 + (-64 - 28*x - 68*x^2 - 28*x^3 - 4*x^4
)*Log[E^4/(256*x^2 + 224*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x^7 + x^8)]
 + (16 + 7*x + 17*x^2 + 7*x^3 + x^4)*Log[E^4/(256*x^2 + 224*x^3 + 337*x^4
+ 238*x^5 + 82*x^6 + 14*x^7 + x^8)]^2),x]
```

output
```
$Aborted
```

3.471.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

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$$\int \frac{14x+36x^2+28x^3+6x^4+\left(16+7x+17x^2+7x^3+x^4\right)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)}{64+28x+68x^2+28x^3+4x^4+\left(-64-28x-68x^2-28x^3-4x^4\right)\log\left(\frac{e^4}{\cdots}\right)+\left(16+7x+17x^2+7x^3+x^4\right)\log^2\left(\cdots\right)}$$

3.471.4 Maple [A] (verified)

Time = 3.83 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.38

method	result	size
parallelrisch	$\frac{x}{\ln\left(\frac{e^4}{x^2(x^6+14x^5+82x^4+238x^3+337x^2+224x+256)}\right)-2}$	44
norman	$\frac{x}{\ln\left(\frac{e^4}{x^8+14x^7+82x^6+238x^5+337x^4+224x^3+256x^2}\right)-2}$	47
risch	$\frac{x}{\ln\left(\frac{e^4}{x^8+14x^7+82x^6+238x^5+337x^4+224x^3+256x^2}\right)-2}$	47

input
```
int(((x^4+7*x^3+17*x^2+7*x+16)*ln(exp(4)/(x^8+14*x^7+82*x^6+238*x^5+337*x^
4+224*x^3+256*x^2))+6*x^4+28*x^3+36*x^2+14*x)/((x^4+7*x^3+17*x^2+7*x+16)*l
n(exp(4)/(x^8+14*x^7+82*x^6+238*x^5+337*x^4+224*x^3+256*x^2))^2+(-4*x^4-28
*x^3-68*x^2-28*x-64)*ln(exp(4)/(x^8+14*x^7+82*x^6+238*x^5+337*x^4+224*x^3+
256*x^2))+4*x^4+28*x^3+68*x^2+28*x+64),x,method=_RETURNVERBOSE)
```

output
```
x/(ln(exp(4)/x^2/(x^6+14*x^5+82*x^4+238*x^3+337*x^2+224*x+256))-2)
```

3.471.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.44

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\ldots\right.}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7\ldots}\right.}$$
$$= \frac{x}{\log\left(\frac{e^4}{x^8+14x^7+82x^6+238x^5+337x^4+224x^3+256x^2}\right)-2}$$

input
```
integrate(((x^4+7*x^3+17*x^2+7*x+16)*log(exp(4)/(x^8+14*x^7+82*x^6+238*x^5
+337*x^4+224*x^3+256*x^2))+6*x^4+28*x^3+36*x^2+14*x)/((x^4+7*x^3+17*x^2+7*
x+16)*log(exp(4)/(x^8+14*x^7+82*x^6+238*x^5+337*x^4+224*x^3+256*x^2))^2+(-
4*x^4-28*x^3-68*x^2-28*x-64)*log(exp(4)/(x^8+14*x^7+82*x^6+238*x^5+337*x^4
+224*x^3+256*x^2))+4*x^4+28*x^3+68*x^2+28*x+64),x, algorithm=\
```

output
```
x/(log(e^4/(x^8 + 14*x^7 + 82*x^6 + 238*x^5 + 337*x^4 + 224*x^3 + 256*x^2)
) - 2)
```

3.471.

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{\ldots}\right)+(16+7x+17x^2+7x^3+x^4)\log^2\left(\ldots\right.}$$

3.471.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.28

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)+\cdots}$$

$$=\frac{x}{\log\left(\frac{e^4}{x^8+14x^7+82x^6+238x^5+337x^4+224x^3+256x^2}\right)-2}$$

input
```
integrate((((x**4+7*x**3+17*x**2+7*x+16)*ln(exp(4)/(x**8+14*x**7+82*x**6+23
8*x**5+337*x**4+224*x**3+256*x**2))+6*x**4+28*x**3+36*x**2+14*x)/((x**4+7*
x**3+17*x**2+7*x+16)*ln(exp(4)/(x**8+14*x**7+82*x**6+238*x**5+337*x**4+224
*x**3+256*x**2))**2+(-4*x**4-28*x**3-68*x**2-28*x-64)*ln(exp(4)/(x**8+14*x
**7+82*x**6+238*x**5+337*x**4+224*x**3+256*x**2))+4*x**4+28*x**3+68*x**2+2
8*x+64),x)
```

output
```
x/(log(exp(4)/(x**8 + 14*x**7 + 82*x**6 + 238*x**5 + 337*x**4 + 224*x**3 +
 256*x**2)) - 2)
```

3.471.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.88

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)+\cdots}$$

$$=-\frac{x}{2\log\left(x^2+7x+16\right)+\log\left(x^2+1\right)+2\log\left(x\right)-2}$$

input
```
integrate((((x^4+7*x^3+17*x^2+7*x+16)*log(exp(4)/(x^8+14*x^7+82*x^6+238*x^5
+337*x^4+224*x^3+256*x^2))+6*x^4+28*x^3+36*x^2+14*x)/((x^4+7*x^3+17*x^2+7*
x+16)*log(exp(4)/(x^8+14*x^7+82*x^6+238*x^5+337*x^4+224*x^3+256*x^2))^2+(-
4*x^4-28*x^3-68*x^2-28*x-64)*log(exp(4)/(x^8+14*x^7+82*x^6+238*x^5+337*x^4
+224*x^3+256*x^2))+4*x^4+28*x^3+68*x^2+28*x+64),x, algorithm=\
```

output
```
-x/(2*log(x^2 + 7*x + 16) + log(x^2 + 1) + 2*log(x) - 2)
```

3.471.

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)+(16+7x+17x^2+7x^3+x^4)\log^2\left(\cdots\right)}$$

3.471.8 Giac [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.31

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\right.}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7}\right.}$$
$$=-\frac{x}{\log\left(x^8+14\,x^7+82\,x^6+238\,x^5+337\,x^4+224\,x^3+256\,x^2\right)-2}$$

input
```
integrate(((x^4+7*x^3+17*x^2+7*x+16)*log(exp(4)/(x^8+14*x^7+82*x^6+238*x^5
+337*x^4+224*x^3+256*x^2))+6*x^4+28*x^3+36*x^2+14*x)/((x^4+7*x^3+17*x^2+7*
x+16)*log(exp(4)/(x^8+14*x^7+82*x^6+238*x^5+337*x^4+224*x^3+256*x^2))^2+(-
4*x^4-28*x^3-68*x^2-28*x-64)*log(exp(4)/(x^8+14*x^7+82*x^6+238*x^5+337*x^4
+224*x^3+256*x^2))+4*x^4+28*x^3+68*x^2+28*x+64),x, algorithm=\
```

output
```
-x/(log(x^8 + 14*x^7 + 82*x^6 + 238*x^5 + 337*x^4 + 224*x^3 + 256*x^2) - 2
)
```

3.471.9 Mupad [B] (verification not implemented)

Time = 16.21 (sec) , antiderivative size = 164, normalized size of antiderivative = 5.12

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\right.}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7}\right.}$$
$$=\frac{7\ln\left(x^8+14\,x^7+82\,x^6+238\,x^5+337\,x^4+224\,x^3+256\,x^2\right)}{32\,\left(\ln\left(x^8+14\,x^7+82\,x^6+238\,x^5+337\,x^4+224\,x^3+256\,x^2\right)-2\right)}$$
$$-\frac{7}{16\,\left(\ln\left(x^8+14\,x^7+82\,x^6+238\,x^5+337\,x^4+224\,x^3+256\,x^2\right)-2\right)}$$
$$-\frac{x}{\ln\left(x^8+14\,x^7+82\,x^6+238\,x^5+337\,x^4+224\,x^3+256\,x^2\right)-2}$$

input
```
int((14*x + 36*x^2 + 28*x^3 + 6*x^4 + log(exp(4)/(256*x^2 + 224*x^3 + 337*
x^4 + 238*x^5 + 82*x^6 + 14*x^7 + x^8))*(7*x + 17*x^2 + 7*x^3 + x^4 + 16))
/(28*x - log(exp(4)/(256*x^2 + 224*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x
^7 + x^8))*(28*x + 68*x^2 + 28*x^3 + 4*x^4 + 64) + log(exp(4)/(256*x^2 + 2
24*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x^7 + x^8))^2*(7*x + 17*x^2 + 7*x
^3 + x^4 + 16) + 68*x^2 + 28*x^3 + 4*x^4 + 64),x)
```

output
```
(7*log(256*x^2 + 224*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x^7 + x^8))/(32
*(log(256*x^2 + 224*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x^7 + x^8) - 2))
 - 7/(16*(log(256*x^2 + 224*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x^7 + x^
8) - 2)) - x/(log(256*x^2 + 224*x^3 + 337*x^4 + 238*x^5 + 82*x^6 + 14*x^7
+ x^8) - 2)
```

3.471.

$$\int \frac{14x+36x^2+28x^3+6x^4+(16+7x+17x^2+7x^3+x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)}{64+28x+68x^2+28x^3+4x^4+(-64-28x-68x^2-28x^3-4x^4)\log\left(\frac{e^4}{256x^2+224x^3+337x^4+238x^5+82x^6+14x^7+x^8}\right)+(16+7x+17x^2+7x^3+x^4)\log^2\left(\cdots\right.}$$

3.472

$$\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}$$

3.472.1 Optimal result

Integrand size = 108, antiderivative size = 28

$$\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx = \left(16+\log\left(-4+\frac{1+e^3-e^{\frac{e^3}{15}}}{x}+x\right)\right)^2$$

output
```
(16+ln(-4+(1+exp(3)-exp(1/15*exp(3)))/x+x))^2
```

3.472.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.43 (sec) , antiderivative size = 949, normalized size of antiderivative = 33.89

$$\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx = \text{Too large to display}$$

---

input
```
Integrate[(32 + 32*E^3 - 32*E^(E^3/15) - 32*x^2 + (2 + 2*E^3 - 2*E^(E^3/15
) - 2*x^2)*Log[(1 + E^3 - E^(E^3/15) - 4*x + x^2)/x])/(-x - E^3*x + E^(E^3
/15)*x + 4*x^2 - x^3),x]
```

output
```
2*(Log[(2*I + Sqrt[-3 + E^3 - E^(E^3/15)] - I*x)/(2*I + Sqrt[-3 + E^3 - E^
(E^3/15)])]*Log[x] + Log[(-2*I + Sqrt[-3 + E^3 - E^(E^3/15)] + I*x)/(-2*I
+ Sqrt[-3 + E^3 - E^(E^3/15)])]*Log[x] - Log[x]^2/2 - Log[(2*I + Sqrt[-3 +
 E^3 - E^(E^3/15)] - I*x)/(2*Sqrt[-3 + E^3 - E^(E^3/15)])]*Log[2*(-2 - I*S
qrt[-3 + E^3 - E^(E^3/15)] + x)] + Log[(2*x)/(4 + (2*I)*Sqrt[-3 + E^3 - E^
(E^3/15)])]*Log[2*(-2 - I*Sqrt[-3 + E^3 - E^(E^3/15)] + x)] - Log[2*(-2 -
I*Sqrt[-3 + E^3 - E^(E^3/15)] + x)]^2/2 - Log[(-2*I + Sqrt[-3 + E^3 - E^(E
^3/15)] + I*x)/(2*Sqrt[-3 + E^3 - E^(E^3/15)])]*Log[2*(-2 + I*Sqrt[-3 + E^
3 - E^(E^3/15)] + x)] + Log[(I*x)/(2*I + Sqrt[-3 + E^3 - E^(E^3/15)])]*Log
[2*(-2 + I*Sqrt[-3 + E^3 - E^(E^3/15)] + x)] - Log[2*(-2 + I*Sqrt[-3 + E^3
 - E^(E^3/15)] + x)]^2/2 - Log[x]*(16 + Log[(1 + E^3 - E^(E^3/15) - 4*x +
x^2)/x]) + Log[2*(-2 - I*Sqrt[-3 + E^3 - E^(E^3/15)] + x)]*(16 + Log[(1 +
E^3 - E^(E^3/15) - 4*x + x^2)/x]) + Log[2*(-2 + I*Sqrt[-3 + E^3 - E^(E^3/1
5)] + x)]*(16 + Log[(1 + E^3 - E^(E^3/15) - 4*x + x^2)/x]) - PolyLog[2, (2
*I + Sqrt[-3 + E^3 - E^(E^3/15)] - I*x)/(2*Sqrt[-3 + E^3 - E^(E^3/15)])] +
 PolyLog[2, (2*I + Sqrt[-3 + E^3 - E^(E^3/15)] - I*x)/(2*I + Sqrt[-3 + E^3
 - E^(E^3/15)])] - PolyLog[2, (-2*I + Sqrt[-3 + E^3 - E^(E^3/15)] + I*x)/(
2*Sqrt[-3 + E^3 - E^(E^3/15)])] + PolyLog[2, (-2*I + Sqrt[-3 + E^3 - E^(E^
3/15)] + I*x)/(-2*I + Sqrt[-3 + E^3 - E^(E^3/15)])] + PolyLog[2, x/(2 + I*
Sqrt[-3 + E^3 - E^(E^3/15)])] + PolyLog[2, (I*x)/(2*I + Sqrt[-3 + E^3 -...
```

3.472.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 2.96 (sec) , antiderivative size = 902, normalized size of antiderivative = 32.21, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.046$, Rules used = {6, 6, 2026, 7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-32x^2+\left(-2x^2-2e^{\frac{e^3}{15}}+2e^3+2\right)\log\left(\frac{x^2-4x-e^{\frac{e^3}{15}}+e^3+1}{x}\right)-32e^{\frac{e^3}{15}}+32e^3+32}{-x^3+4x^2+e^{\frac{e^3}{15}}x-e^3x-x}dx$$
$$\Big\downarrow 6$$

3.472. $\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx$

$$\int \frac{-32x^2+\left(-2x^2-2e^{\frac{e^3}{15}}+2e^3+2\right)\log\left(\frac{x^2-4x-e^{\frac{e^3}{15}}+e^3+1}{x}\right)-32e^{\frac{e^3}{15}}+32e^3+32}{-x^3+4x^2+(-1-e^3)\,x+e^{\frac{e^3}{15}}x}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{-32x^2+\left(-2x^2-2e^{\frac{e^3}{15}}+2e^3+2\right)\log\left(\frac{x^2-4x-e^{\frac{e^3}{15}}+e^3+1}{x}\right)-32e^{\frac{e^3}{15}}+32e^3+32}{-x^3+4x^2+\left(-1-e^3+e^{\frac{e^3}{15}}\right)x}dx$$

$$\Big\downarrow \; 2026$$

$$\int \frac{-32x^2+\left(-2x^2-2e^{\frac{e^3}{15}}+2e^3+2\right)\log\left(\frac{x^2-4x-e^{\frac{e^3}{15}}+e^3+1}{x}\right)-32e^{\frac{e^3}{15}}+32e^3+32}{x\left(-x^2+4x+e^{\frac{e^3}{15}}-e^3-1\right)}dx$$

$$\Big\downarrow \; 7279$$

$$\int \left(\frac{32\left(x^2+e^{\frac{e^3}{15}}-e^3-1\right)}{x\left(x^2-4x-e^{\frac{e^3}{15}}+e^3+1\right)}+\frac{2\left(x^2+e^{\frac{e^3}{15}}-e^3-1\right)\log\left(x+\frac{1+e^3-e^{\frac{e^3}{15}}}{x}-4\right)}{x\left(x^2-4x-e^{\frac{e^3}{15}}+e^3+1\right)}\right)dx$$

$$\Big\downarrow \; 2009$$

3.472. $$\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx$$

$$-\log^2\left(-2\left(-x-i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}+2\right)\right)-\log^2\left(-2\left(-x+i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}+2\right)\right)-\log^2(x)-32\log(x)-2\log(x)\log\left(x-4+\frac{1+e^3-e^{\frac{e^3}{15}}}{x}\right)-2\log\left(-\frac{i\left(-x+i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}+2\right)}{2\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)\log\left(2x-2\left(2-i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}\right)\right)+2\log\left(\frac{x}{2-i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)\log\left(2x-2\left(2-i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}\right)\right)+2\log\left(x-4+\frac{1+e^3-e^{\frac{e^3}{15}}}{x}\right)\log\left(2x-2\left(2-i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}\right)\right)-2\log\left(\frac{i\left(-x-i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}+2\right)}{2\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)\log\left(2x-2\left(2+i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}\right)\right)+2\log\left(\frac{x}{2+i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)\log\left(2x-2\left(2+i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}\right)\right)+2\log\left(x-4+\frac{1+e^3-e^{\frac{e^3}{15}}}{x}\right)\log\left(2x-2\left(2+i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}\right)\right)+2\log(x)\log\left(1-\frac{x}{2-i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)+2\log(x)\log\left(1-\frac{x}{2+i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)+32\log\left(x^2-4x-e^{\frac{e^3}{15}}+e^3+1\right)-2\,\mathrm{PolyLog}\left(2,-\frac{-ix-\sqrt{-3+e^3-e^{\frac{e^3}{15}}}+2i}{2\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)-2\,\mathrm{PolyLog}\left(2,\frac{-ix+\sqrt{-3+e^3-e^{\frac{e^3}{15}}}+2i}{2\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)+2\,\mathrm{PolyLog}\left(2,\frac{x}{2-i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)+2\,\mathrm{PolyLog}\left(2,\frac{x}{2+i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)+2\,\mathrm{PolyLog}\left(2,1-\frac{x}{2-i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)+2\,\mathrm{PolyLog}\left(2,1-\frac{x}{2+i\sqrt{-3+e^3-e^{\frac{e^3}{15}}}}\right)$$

3.472. $$\int\frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx$$

input
```
Int[(32 + 32*E^3 - 32*E^(E^3/15) - 32*x^2 + (2 + 2*E^3 - 2*E^(E^3/15) - 2*
x^2)*Log[(1 + E^3 - E^(E^3/15) - 4*x + x^2)/x])/(-x - E^3*x + E^(E^3/15)*x
 + 4*x^2 - x^3),x]
```

output
```
-Log[-2*(2 - I*Sqrt[-3 + E^3 - E^(E^3/15)] - x)]^2 - Log[-2*(2 + I*Sqrt[-3
 + E^3 - E^(E^3/15)] - x)]^2 - 32*Log[x] - Log[x]^2 - 2*Log[x]*Log[-4 + (1
 + E^3 - E^(E^3/15))/x + x] - 2*Log[((-1/2*I)*(2 + I*Sqrt[-3 + E^3 - E^(E^
3/15)] - x))/Sqrt[-3 + E^3 - E^(E^3/15)]]*Log[-2*(2 - I*Sqrt[-3 + E^3 - E^
(E^3/15)]) + 2*x] + 2*Log[x/(2 - I*Sqrt[-3 + E^3 - E^(E^3/15)])]*Log[-2*(2
 - I*Sqrt[-3 + E^3 - E^(E^3/15)]) + 2*x] + 2*Log[-4 + (1 + E^3 - E^(E^3/15
))/x + x]*Log[-2*(2 - I*Sqrt[-3 + E^3 - E^(E^3/15)]) + 2*x] - 2*Log[((I/2)
*(2 - I*Sqrt[-3 + E^3 - E^(E^3/15)] - x))/Sqrt[-3 + E^3 - E^(E^3/15)]]*Log
[-2*(2 + I*Sqrt[-3 + E^3 - E^(E^3/15)]) + 2*x] + 2*Log[x/(2 + I*Sqrt[-3 +
E^3 - E^(E^3/15)])]*Log[-2*(2 + I*Sqrt[-3 + E^3 - E^(E^3/15)]) + 2*x] + 2*
Log[-4 + (1 + E^3 - E^(E^3/15))/x + x]*Log[-2*(2 + I*Sqrt[-3 + E^3 - E^(E^
3/15)]) + 2*x] + 2*Log[x]*Log[1 - x/(2 - I*Sqrt[-3 + E^3 - E^(E^3/15)])] +
 2*Log[x]*Log[1 - x/(2 + I*Sqrt[-3 + E^3 - E^(E^3/15)])] + 32*Log[1 + E^3
- E^(E^3/15) - 4*x + x^2] - 2*PolyLog[2, -1/2*(2*I - Sqrt[-3 + E^3 - E^(E^
3/15)] - I*x)/Sqrt[-3 + E^3 - E^(E^3/15)]] - 2*PolyLog[2, (2*I + Sqrt[-3 +
 E^3 - E^(E^3/15)] - I*x)/(2*Sqrt[-3 + E^3 - E^(E^3/15)])] + 2*PolyLog[2,
x/(2 - I*Sqrt[-3 + E^3 - E^(E^3/15)])] + 2*PolyLog[2, x/(2 + I*Sqrt[-3 + E
^3 - E^(E^3/15)])] + 2*PolyLog[2, 1 - x/(2 - I*Sqrt[-3 + E^3 - E^(E^3/15)]
)] + 2*PolyLog[2, 1 - x/(2 + I*Sqrt[-3 + E^3 - E^(E^3/15)])]
```

3.472.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

3.472. $\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx$

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.472.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(23) = 46$.

Time = 0.49 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.79

method	result	size
default	$-32\ln(x)+32\ln\left(-\mathrm{e}^{\frac{\mathrm{e}^3}{15}}+\mathrm{e}^3+x^2-4x+1\right)+\ln\left(\frac{-\mathrm{e}^{\frac{\mathrm{e}^3}{15}}+\mathrm{e}^3+x^2-4x+1}{x}\right)^2$	50
norman	$\ln\left(\frac{-\mathrm{e}^{\frac{\mathrm{e}^3}{15}}+\mathrm{e}^3+x^2-4x+1}{x}\right)^2+32\ln\left(\frac{-\mathrm{e}^{\frac{\mathrm{e}^3}{15}}+\mathrm{e}^3+x^2-4x+1}{x}\right)$	50
risch	$-32\ln(x)+32\ln\left(-\mathrm{e}^{\frac{\mathrm{e}^3}{15}}+\mathrm{e}^3+x^2-4x+1\right)+\ln\left(\frac{-\mathrm{e}^{\frac{\mathrm{e}^3}{15}}+\mathrm{e}^3+x^2-4x+1}{x}\right)^2$	50
parts	$-32\ln(x)+32\ln\left(-\mathrm{e}^{\frac{\mathrm{e}^3}{15}}+\mathrm{e}^3+x^2-4x+1\right)+\ln\left(\frac{-\mathrm{e}^{\frac{\mathrm{e}^3}{15}}+\mathrm{e}^3+x^2-4x+1}{x}\right)^2$	50

input
```
int(((-2*exp(1/15*exp(3))+2*exp(3)-2*x^2+2)*ln((-exp(1/15*exp(3))+exp(3)+x
^2-4*x+1)/x)-32*exp(1/15*exp(3))+32*exp(3)-32*x^2+32)/(x*exp(1/15*exp(3))-
x*exp(3)-x^3+4*x^2-x),x,method=_RETURNVERBOSE)
```

output
```
-32*ln(x)+32*ln(-exp(exp(3))^(1/15)+exp(3)+x^2-4*x+1)+ln((-exp(exp(3))^(1/
15)+exp(3)+x^2-4*x+1)/x)^2
```

3.472.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(23) = 46$.

Time = 0.27 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.75

$$\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx$$
$$=\log\left(\frac{x^2-4\,x+e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1}{x}\right)^2+32\,\log\left(\frac{x^2-4\,x+e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1}{x}\right)$$

input
```
integrate(((-2*exp(1/15*exp(3))+2*exp(3)-2*x^2+2)*log((-exp(1/15*exp(3))+e
xp(3)+x^2-4*x+1)/x)-32*exp(1/15*exp(3))+32*exp(3)-32*x^2+32)/(x*exp(1/15*e
xp(3))-x*exp(3)-x^3+4*x^2-x),x, algorithm=\
```

output
```
log((x^2 - 4*x + e^3 - e^(1/15*e^3) + 1)/x)^2 + 32*log((x^2 - 4*x + e^3 -
e^(1/15*e^3) + 1)/x)
```

3.472.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(20) = 40$.

Time = 3.88 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.75

$$\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx = -32\log(x)+\log\left(\frac{x^2-4x-e^{\frac{e^3}{15}}+1+e^3}{x}\right)^2+32\log\left(x^2-4x-e^{\frac{e^3}{15}}+1+e^3\right)$$

input
```
integrate(((-2*exp(1/15*exp(3))+2*exp(3)-2*x**2+2)*ln((-exp(1/15*exp(3))+e
xp(3)+x**2-4*x+1)/x)-32*exp(1/15*exp(3))+32*exp(3)-32*x**2+32)/(x*exp(1/15
*exp(3))-x*exp(3)-x**3+4*x**2-x),x)
```

output
```
-32*log(x) + log((x**2 - 4*x - exp(exp(3)/15) + 1 + exp(3))/x)**2 + 32*log
(x**2 - 4*x - exp(exp(3)/15) + 1 + exp(3))
```

3.472.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 399 vs. 2(23) = 46.

Time = 2.91 (sec) , antiderivative size = 399, normalized size of antiderivative = 14.25

$$\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx$$

$$= 16\left(\frac{\log\left(x^2-4\,x+e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1\right)}{e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1}-\frac{2\,\log\left(x\right)}{e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1}-\frac{4\,\arctan\left(\frac{x-2}{\sqrt{e^3-e^{\left(\frac{1}{15}\,e^3\right)}-3}}\right)}{\left(e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1\right)\sqrt{e^3-e^{\left(\frac{1}{15}\,e^3\right)}-3}}\right)e^3$$
$$-16\left(\frac{\log\left(x^2-4\,x+e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1\right)}{e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1}-\frac{2\,\log\left(x\right)}{e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1}-\frac{4\,\arctan\left(\frac{x-2}{\sqrt{e^3-e^{\left(\frac{1}{15}\,e^3\right)}-3}}\right)}{\left(e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1\right)\sqrt{e^3-e^{\left(\frac{1}{15}\,e^3\right)}-3}}\right)e^{\left(\frac{1}{15}\,e^3\right)}$$
$$+\log\left(x^2-4\,x+e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1\right)^2-2\,\log\left(x^2-4\,x+e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1\right)\log\left(x\right)+\log\left(x\right)^2$$
$$+\frac{64\,\arctan\left(\frac{x-2}{\sqrt{e^3-e^{\left(\frac{1}{15}\,e^3\right)}-3}}\right)}{\sqrt{e^3-e^{\left(\frac{1}{15}\,e^3\right)}-3}}+\frac{16\,\log\left(x^2-4\,x+e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1\right)}{e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1}-\frac{32\,\log\left(x\right)}{e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1}$$
$$-\frac{64\,\arctan\left(\frac{x-2}{\sqrt{e^3-e^{\left(\frac{1}{15}\,e^3\right)}-3}}\right)}{\left(e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1\right)\sqrt{e^3-e^{\left(\frac{1}{15}\,e^3\right)}-3}}+16\,\log\left(x^2-4\,x+e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1\right)$$

input
```
integrate(((-2*exp(1/15*exp(3))+2*exp(3)-2*x^2+2)*log((-exp(1/15*exp(3))+e
xp(3)+x^2-4*x+1)/x)-32*exp(1/15*exp(3))+32*exp(3)-32*x^2+32)/(x*exp(1/15*e
xp(3))-x*exp(3)-x^3+4*x^2-x),x, algorithm=\
```

output
```
16*(log(x^2 - 4*x + e^3 - e^(1/15*e^3) + 1)/(e^3 - e^(1/15*e^3) + 1) - 2*l
og(x)/(e^3 - e^(1/15*e^3) + 1) - 4*arctan((x - 2)/sqrt(e^3 - e^(1/15*e^3)
- 3))/((e^3 - e^(1/15*e^3) + 1)*sqrt(e^3 - e^(1/15*e^3) - 3)))*e^3 - 16*(l
og(x^2 - 4*x + e^3 - e^(1/15*e^3) + 1)/(e^3 - e^(1/15*e^3) + 1) - 2*log(x)
/(e^3 - e^(1/15*e^3) + 1) - 4*arctan((x - 2)/sqrt(e^3 - e^(1/15*e^3) - 3))
/((e^3 - e^(1/15*e^3) + 1)*sqrt(e^3 - e^(1/15*e^3) - 3)))*e^(1/15*e^3) + l
og(x^2 - 4*x + e^3 - e^(1/15*e^3) + 1)^2 - 2*log(x^2 - 4*x + e^3 - e^(1/15
*e^3) + 1)*log(x) + log(x)^2 + 64*arctan((x - 2)/sqrt(e^3 - e^(1/15*e^3) -
 3))/sqrt(e^3 - e^(1/15*e^3) - 3) + 16*log(x^2 - 4*x + e^3 - e^(1/15*e^3)
+ 1)/(e^3 - e^(1/15*e^3) + 1) - 32*log(x)/(e^3 - e^(1/15*e^3) + 1) - 64*ar
ctan((x - 2)/sqrt(e^3 - e^(1/15*e^3) - 3))/((e^3 - e^(1/15*e^3) + 1)*sqrt(
e^3 - e^(1/15*e^3) - 3)) + 16*log(x^2 - 4*x + e^3 - e^(1/15*e^3) + 1)
```

3.472.8 Giac [F]

$$\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx$$
$$=\int \frac{2\left(16\,x^2+\left(x^2-e^3+e^{\left(\frac{1}{15}\,e^3\right)}-1\right)\log\left(\frac{x^2-4\,x+e^3-e^{\left(\frac{1}{15}\,e^3\right)}+1}{x}\right)-16\,e^3+16\,e^{\left(\frac{1}{15}\,e^3\right)}-16\right)}{x^3-4\,x^2+xe^3-xe^{\left(\frac{1}{15}\,e^3\right)}+x}\,dx$$

input
```
integrate(((-2*exp(1/15*exp(3))+2*exp(3)-2*x^2+2)*log((-exp(1/15*exp(3))+e
xp(3)+x^2-4*x+1)/x)-32*exp(1/15*exp(3))+32*exp(3)-32*x^2+32)/(x*exp(1/15*e
xp(3))-x*exp(3)-x^3+4*x^2-x),x, algorithm=\
```

output
```
integrate(2*(16*x^2 + (x^2 - e^3 + e^(1/15*e^3) - 1)*log((x^2 - 4*x + e^3
- e^(1/15*e^3) + 1)/x) - 16*e^3 + 16*e^(1/15*e^3) - 16)/(x^3 - 4*x^2 + x*e
^3 - x*e^(1/15*e^3) + x), x)
```

3.472.9 Mupad [B] (verification not implemented)

Time = 37.89 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.75

$$\int \frac{32+32e^3-32e^{\frac{e^3}{15}}-32x^2+\left(2+2e^3-2e^{\frac{e^3}{15}}-2x^2\right)\log\left(\frac{1+e^3-e^{\frac{e^3}{15}}-4x+x^2}{x}\right)}{-x-e^3x+e^{\frac{e^3}{15}}x+4x^2-x^3}\,dx$$
$$=\ln\left(\frac{x^2-4\,x+\mathrm{e}^3-\left(\mathrm{e}^{\mathrm{e}^3}\right)^{1/15}+1}{x}\right)^2+32\,\ln\left(x^2-4\,x-\mathrm{e}^{\frac{\mathrm{e}^3}{15}}+\mathrm{e}^3+1\right)-32\,\ln\left(x\right)$$

input
```
int((32*exp(exp(3)/15) - 32*exp(3) + 32*x^2 + log((exp(3) - exp(exp(3)/15)
 - 4*x + x^2 + 1)/x)*(2*exp(exp(3)/15) - 2*exp(3) + 2*x^2 - 2) - 32)/(x -
x*exp(exp(3)/15) + x*exp(3) - 4*x^2 + x^3),x)
```

output
```
32*log(exp(3) - exp(exp(3)/15) - 4*x + x^2 + 1) - 32*log(x) + log((exp(3)
- 4*x - exp(exp(3))^(1/15) + x^2 + 1)/x)^2
```

3.473 $\int \frac{1}{5}(4-5e^x-60x^2)\,dx$

3.473.1 Optimal result

Integrand size = 16, antiderivative size = 22

$$\int \frac{1}{5}(4-5e^x-60x^2)\,dx = 11-e^2-e^x-4x\left(-\frac{1}{5}+x^2\right)$$

output
```
11-exp(x)-4*x*(x^2-1/5)-exp(2)
```

3.473.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{1}{5}(4-5e^x-60x^2)\,dx = -e^x+\frac{4x}{5}-4x^3$$

input
```
Integrate[(4 - 5*E^x - 60*x^2)/5,x]
```

output
```
-E^x + (4*x)/5 - 4*x^3
```

3.473.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5}\left(-60x^2-5e^x+4\right)dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{5}\int \left(-60x^2-5e^x+4\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{5}\left(-20x^3+4x-5e^x\right)$$

input
```
Int[(4 - 5*E^x - 60*x^2)/5,x]
```

output
```
(-5*E^x + 4*x - 20*x^3)/5
```

3.473.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.473.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

method	result	size
default	$-4x^3+\frac{4x}{5}-e^x$	14
norman	$-4x^3+\frac{4x}{5}-e^x$	14
risch	$-4x^3+\frac{4x}{5}-e^x$	14
parallelrisch	$-4x^3+\frac{4x}{5}-e^x$	14
parts	$-4x^3+\frac{4x}{5}-e^x$	14

input
```
int(-exp(x)-12*x^2+4/5,x,method=_RETURNVERBOSE)
```

output
```
-4*x^3+4/5*x-exp(x)
```

3.473.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.59

$$\int \frac{1}{5}\left(4-5e^x-60x^2\right)\,dx=-4\,x^3+\frac{4}{5}\,x-e^x$$

input
```
integrate(-exp(x)-12*x^2+4/5,x, algorithm=\
```

output
```
-4*x^3 + 4/5*x - e^x
```

3.473.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.55

$$\int \frac{1}{5}\left(4-5e^x-60x^2\right)\,dx=-4x^3+\frac{4x}{5}-e^x$$

input
```
integrate(-exp(x)-12*x**2+4/5,x)
```

output
```
-4*x**3 + 4*x/5 - exp(x)
```

3.473.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.59

$$\int \frac{1}{5}(4-5e^x-60x^2)\, dx = -4\,x^3+\frac{4}{5}\,x-e^x$$

input
```
integrate(-exp(x)-12*x^2+4/5,x, algorithm=\
```

output
```
-4*x^3 + 4/5*x - e^x
```

3.473.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.59

$$\int \frac{1}{5}(4-5e^x-60x^2)\, dx = -4\,x^3+\frac{4}{5}\,x-e^x$$

input
```
integrate(-exp(x)-12*x^2+4/5,x, algorithm=\
```

output
```
-4*x^3 + 4/5*x - e^x
```

3.473.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.59

$$\int \frac{1}{5}(4-5e^x-60x^2)\, dx = \frac{4\,x}{5}-\mathrm{e}^x-4\,x^3$$

input
```
int(4/5 - 12*x^2 - exp(x),x)
```

output
```
(4*x)/5 - exp(x) - 4*x^3
```

3.474 $\int \frac{-45+50x^3-45e^{1+x}x^3+90\log(x)}{x^3}\,dx$

3.474.1 Optimal result

Integrand size = 25, antiderivative size = 27

$$\int \frac{-45+50x^3-45e^{1+x}x^3+90\log(x)}{x^3}\,dx=5\left(x+9\left(e^{e^2}-e^{1+x}+x-\frac{\log(x)}{x^2}\right)\right)$$

output
```
45*exp(exp(2))-45*ln(x)/x^2+50*x-45*exp(1+x)
```

3.474.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67

$$\int \frac{-45+50x^3-45e^{1+x}x^3+90\log(x)}{x^3}\,dx=-45e^{1+x}+50x-\frac{45\log(x)}{x^2}$$

input
```
Integrate[(-45 + 50*x^3 - 45*E^(1 + x)*x^3 + 90*Log[x])/x^3,x]
```

output
```
-45*E^(1 + x) + 50*x - (45*Log[x])/x^2
```

3.474.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-45e^{x+1}x^3+50x^3+90\log(x)-45}{x^3}\,dx$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(\frac{5\left(10x^3+18\log(x)-9\right)}{x^3}-45e^{x+1}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{45\log(x)}{x^2}+50x-45e^{x+1}$$

input
```
Int[(-45 + 50*x^3 - 45*E^(1 + x)*x^3 + 90*Log[x])/x^3,x]
```

output
```
-45*E^(1 + x) + 50*x - (45*Log[x])/x^2
```

3.474.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.474.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67

method	result	size
default	$50x-\frac{45\ln(x)}{x^2}-45\,\mathrm{e}^{1+x}$	18
risch	$50x-\frac{45\ln(x)}{x^2}-45\,\mathrm{e}^{1+x}$	18
parts	$50x-\frac{45\ln(x)}{x^2}-45\,\mathrm{e}^{1+x}$	18
norman	$\frac{50x^3-45x^2\mathrm{e}^{1+x}-45\ln(x)}{x^2}$	24
parallelrisch	$-\frac{-50x^3+45x^2\mathrm{e}^{1+x}+45\ln(x)}{x^2}$	25

input
```
int((90*ln(x)-45*x^3*exp(1+x)+50*x^3-45)/x^3,x,method=_RETURNVERBOSE)
```

output
```
50*x-45*ln(x)/x^2-45*exp(1+x)
```

3.474.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{-45+50x^3-45e^{1+x}x^3+90\log(x)}{x^3}\,dx=\frac{5\left(10\,x^3-9\,x^2e^{(x+1)}-9\,\log\left(x\right)\right)}{x^2}$$

input
```
integrate((90*log(x)-45*x^3*exp(1+x)+50*x^3-45)/x^3,x, algorithm=\
```

output
```
5*(10*x^3 - 9*x^2*e^(x + 1) - 9*log(x))/x^2
```

3.474.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{-45+50x^3-45e^{1+x}x^3+90\log(x)}{x^3}\,dx=50x-45e^{x+1}-\frac{45\log\left(x\right)}{x^2}$$

input
```
integrate((90*ln(x)-45*x**3*exp(1+x)+50*x**3-45)/x**3,x)
```

output
```
50*x - 45*exp(x + 1) - 45*log(x)/x**2
```

3.474.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{-45+50x^3-45e^{1+x}x^3+90\log(x)}{x^3}\,dx = 50\,x - \frac{45\,\log\left(x\right)}{x^2} - 45\,e^{(x+1)}$$

input
```
integrate((90*log(x)-45*x^3*exp(1+x)+50*x^3-45)/x^3,x, algorithm=\
```

output
```
50*x - 45*log(x)/x^2 - 45*e^(x + 1)
```

3.474.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{-45+50x^3-45e^{1+x}x^3+90\log(x)}{x^3}\,dx = \frac{5\left(10\,x^3 - 9\,x^2e^{(x+1)} - 9\,\log\left(x\right)\right)}{x^2}$$

input
```
integrate((90*log(x)-45*x^3*exp(1+x)+50*x^3-45)/x^3,x, algorithm=\
```

output
```
5*(10*x^3 - 9*x^2*e^(x + 1) - 9*log(x))/x^2
```

3.474.9 Mupad [B] (verification not implemented)

Time = 15.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{-45+50x^3-45e^{1+x}x^3+90\log(x)}{x^3}\,dx = 50\,x - \frac{45\,\ln\left(x\right)}{x^2} - 45\,\mathrm{e}\,\mathrm{e}^x$$

input
```
int((90*log(x) - 45*x^3*exp(x + 1) + 50*x^3 - 45)/x^3,x)
```

output
```
50*x - (45*log(x))/x^2 - 45*exp(1)*exp(x)
```

3.475 $\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log\left(4+x^2\right)}\left(-8-26x^2-4x^3-6x^4+\left(-16x-4x^3\right)\right.}{4+x^2}$

3.475.1 Optimal result

Integrand size = 71, antiderivative size = 25

$$\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log(4+x^2)}(-8-26x^2-4x^3-6x^4+(-16x-4x^3)\log(4+x^2))}{4+x^2}\,dx$$
$$= -e^{2x+2x^2(x+\log(4+x^2))}+4x$$

output
```
4*x-exp(x^2*(ln(x^2+4)+x)+x)^2
```

3.475.2 Mathematica [A] (verified)

Time = 0.47 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log(4+x^2)}(-8-26x^2-4x^3-6x^4+(-16x-4x^3)\log(4+x^2))}{4+x^2}\,dx$$
$$= 4x-e^{2(x+x^3)}\left(4+x^2\right)^{2x^2}$$

input
```
Integrate[(16 + 4*x^2 + E^(2*x + 2*x^3 + 2*x^2*Log[4 + x^2])*(-8 - 26*x^2
- 4*x^3 - 6*x^4 + (-16*x - 4*x^3)*Log[4 + x^2]))/(4 + x^2),x]
```

output
```
4*x - E^(2*(x + x^3))*(4 + x^2)^(2*x^2)
```

3.475.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 51 vs. 2(25) = 50.

Time = 0.75 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.04, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$, Rules used = {7276, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^2+e^{2x^3+2x^2\log(x^2+4)+2x}\left(-6x^4-4x^3-26x^2+\left(-4x^3-16x\right)\log\left(x^2+4\right)-8\right)+16}{x^2+4}\,dx$$

$$\Big\downarrow \text{7276}$$

$$\int \left(4-2e^{2x^3+2x}\left(x^2+4\right)^{2x^2-1}\left(3x^4+2x^3+13x^2+8x\log\left(x^2+4\right)+2x^3\log\left(x^2+4\right)+4\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$4x-\frac{e^{2x^3+2x}\left(x^2+4\right)^{2x^2-1}\left(3x^4+13x^2+4\right)}{3x^2+1}$$

input
```
Int[(16 + 4*x^2 + E^(2*x + 2*x^3 + 2*x^2*Log[4 + x^2])*(-8 - 26*x^2 - 4*x^
3 - 6*x^4 + (-16*x - 4*x^3)*Log[4 + x^2]))/(4 + x^2),x]
```

output
```
4*x - (E^(2*x + 2*x^3)*(4 + x^2)^(-1 + 2*x^2)*(4 + 13*x^2 + 3*x^4))/(1 + 3
*x^2)
```

3.475.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.475.4 Maple [A] (verified)

Time = 0.94 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

method	result	size
parallelrisch	$4x - \mathrm{e}^{2x^2 \ln(x^2+4)+2x^3+2x}$	25
risch	$-(x^2+4)^{2x^2} \mathrm{e}^{2x(x^2+1)} + 4x$	27
default	$4x - \mathrm{e}^{2x^2 \ln(x^2+4)+2x^3+2x}$	28

input
```
int((((-4*x^3-16*x)*ln(x^2+4)-6*x^4-4*x^3-26*x^2-8)*exp(x^2*ln(x^2+4)+x^3+
x)^2+4*x^2+16)/(x^2+4),x,method=_RETURNVERBOSE)
```

output
```
-exp(x^2*ln(x^2+4)+x^3+x)^2+4*x
```

3.475.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log(4+x^2)}(-8-26x^2-4x^3-6x^4+(-16x-4x^3)\log(4+x^2))}{4+x^2}\,dx = 4\,x - e^{\left(2\,x^3+2\,x^2\log\left(x^2+4\right)+2\,x\right)}$$

input
```
integrate((((-4*x^3-16*x)*log(x^2+4)-6*x^4-4*x^3-26*x^2-8)*exp(x^2*log(x^2
+4)+x^3+x)^2+4*x^2+16)/(x^2+4),x, algorithm=\
```

output
```
4*x - e^(2*x^3 + 2*x^2*log(x^2 + 4) + 2*x)
```

3.475.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log(4+x^2)}(-8-26x^2-4x^3-6x^4+(-16x-4x^3)\log(4+x^2))}{4+x^2}\,dx = 4x - e^{2x^3+2x^2\log{\left(x^2+4\right)}+2x}$$

input
```
integrate((((-4*x**3-16*x)*ln(x**2+4)-6*x**4-4*x**3-26*x**2-8)*exp(x**2*ln
(x**2+4)+x**3+x)**2+4*x**2+16)/(x**2+4),x)
```

output
```
4*x - exp(2*x**3 + 2*x**2*log(x**2 + 4) + 2*x)
```

3.475.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log(4+x^2)}(-8-26x^2-4x^3-6x^4+(-16x-4x^3)\log(4+x^2))}{4+x^2}\,dx = 4\,x-e^{\left(2\,x^3+2\,x^2\log\left(x^2+4\right)+2\,x\right)}$$

input
```
integrate((((-4*x^3-16*x)*log(x^2+4)-6*x^4-4*x^3-26*x^2-8)*exp(x^2*log(x^2
+4)+x^3+x)^2+4*x^2+16)/(x^2+4),x, algorithm=\
```

output
```
4*x - e^(2*x^3 + 2*x^2*log(x^2 + 4) + 2*x)
```

3.475.8 Giac [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log(4+x^2)}(-8-26x^2-4x^3-6x^4+(-16x-4x^3)\log(4+x^2))}{4+x^2}\,dx = 4\,x-e^{\left(2\,x^3+2\,x^2\log\left(x^2+4\right)+2\,x\right)}$$

input
```
integrate((((-4*x^3-16*x)*log(x^2+4)-6*x^4-4*x^3-26*x^2-8)*exp(x^2*log(x^2
+4)+x^3+x)^2+4*x^2+16)/(x^2+4),x, algorithm=\
```

output
```
4*x - e^(2*x^3 + 2*x^2*log(x^2 + 4) + 2*x)
```

3.475.9 Mupad [B] (verification not implemented)

Time = 14.87 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log(4+x^2)}(-8-26x^2-4x^3-6x^4+(-16x-4x^3)\log(4+x^2))}{4+x^2}\,dx = 4\,x-\mathrm{e}^{2\,x^3+2\,x}\,{\left(x^2+4\right)}^{2\,x^2}$$

input
```
int((4*x^2 - exp(2*x + 2*x^3 + 2*x^2*log(x^2 + 4))*(log(x^2 + 4)*(16*x + 4
*x^3) + 26*x^2 + 4*x^3 + 6*x^4 + 8) + 16)/(x^2 + 4),x)
```

output
```
4*x - exp(2*x + 2*x^3)*(x^2 + 4)^(2*x^2)
```

3.475. $\int \frac{16+4x^2+e^{2x+2x^3+2x^2\log(4+x^2)}(-8-26x^2-4x^3-6x^4+(-16x-4x^3)\log(4+x^2))}{4+x^2}\,dx$

3.476 $\int \frac{x-7x^2+x^3+(-7+x)\log\left(-\frac{12}{-7+x}\right)}{-7x^2+x^3}\,dx$

3.476.1 Optimal result

Integrand size = 34, antiderivative size = 20

$$\int \frac{x-7x^2+x^3+(-7+x)\log\left(-\frac{12}{-7+x}\right)}{-7x^2+x^3}\,dx = x+\frac{x-\log\left(\frac{12}{7-x}\right)}{x}$$

output
```
(x-ln(12/(-x+7)))/x+x
```

3.476.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{x-7x^2+x^3+(-7+x)\log\left(-\frac{12}{-7+x}\right)}{-7x^2+x^3}\,dx = x-\frac{\log\left(-\frac{12}{-7+x}\right)}{x}$$

input
```
Integrate[(x - 7*x^2 + x^3 + (-7 + x)*Log[-12/(-7 + x)])/(-7*x^2 + x^3),x]
```

output
```
x - Log[-12/(-7 + x)]/x
```

3.476.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.088, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3-7x^2+x+(x-7)\log\left(-\frac{12}{x-7}\right)}{x^3-7x^2}dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{x^3-7x^2+x+(x-7)\log\left(-\frac{12}{x-7}\right)}{(x-7)x^2}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{x^2-7x+1}{(x-7)x}+\frac{\log\left(-\frac{12}{x-7}\right)}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$x-\frac{\log\left(\frac{12}{7-x}\right)}{x}$$

input
```
Int[(x - 7*x^2 + x^3 + (-7 + x)*Log[-12/(-7 + x)])/(-7*x^2 + x^3),x]
```

output
```
x - Log[12/(7 - x)]/x
```

3.476.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.476.4 Maple [A] (verified)

Time = 0.83 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result	size
risch	$-\frac{\ln\left(-\frac{12}{-7+x}\right)}{x}+x$	16
norman	$\frac{x^{2}-\ln\left(-\frac{12}{-7+x}\right)}{x}$	19
parallelrisch	$\frac{x^{2}+14x-\ln\left(-\frac{12}{-7+x}\right)}{x}$	22
derivativedivides	$\frac{12\ln\left(-\frac{12}{-7+x}\right)}{(-7+x)\left(-12-\frac{84}{-7+x}\right)}-7+x$	30
default	$\frac{12\ln\left(-\frac{12}{-7+x}\right)}{(-7+x)\left(-12-\frac{84}{-7+x}\right)}-7+x$	30
parts	$\frac{\ln\left(-12-\frac{84}{-7+x}\right)}{7}+\frac{12\ln\left(-\frac{12}{-7+x}\right)}{(-7+x)\left(-12-\frac{84}{-7+x}\right)}+x-\frac{\ln(x)}{7}+\frac{\ln(-7+x)}{7}$	51

input
```
int(((-7+x)*ln(-12/(-7+x))+x^3-7*x^2+x)/(x^3-7*x^2),x,method=_RETURNVERBOS
E)
```

output
```
-1/x*ln(-12/(-7+x))+x
```

3.476.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{x-7x^2+x^3+(-7+x)\log\left(-\frac{12}{-7+x}\right)}{-7x^2+x^3}\,dx=\frac{x^2-\log\left(-\frac{12}{x-7}\right)}{x}$$

input
```
integrate(((-7+x)*log(-12/(-7+x))+x^3-7*x^2+x)/(x^3-7*x^2),x, algorithm=\
```

output
```
(x^2 - log(-12/(x - 7)))/x
```

3.476.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int \frac{x-7x^2+x^3+(-7+x)\log\left(-\frac{12}{-7+x}\right)}{-7x^2+x^3}\,dx = x-\frac{\log\left(-\frac{12}{x-7}\right)}{x}$$

input
```
integrate(((-7+x)*ln(-12/(-7+x))+x**3-7*x**2+x)/(x**3-7*x**2),x)
```

output
```
x - log(-12/(x - 7))/x
```

3.476.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{x-7x^2+x^3+(-7+x)\log\left(-\frac{12}{-7+x}\right)}{-7x^2+x^3}\,dx = \frac{x^2-\log(3)-2\log(2)+\log(-x+7)}{x}$$

input
```
integrate(((-7+x)*log(-12/(-7+x))+x^3-7*x^2+x)/(x^3-7*x^2),x, algorithm=\
```

output
```
(x^2 - log(3) - 2*log(2) + log(-x + 7))/x
```

3.476.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.70

$$\int \frac{x-7x^2+x^3+(-7+x)\log\left(-\frac{12}{-7+x}\right)}{-7x^2+x^3}\,dx = x+\frac{\log\left(-\frac{12}{x-7}\right)}{7\left(\frac{7}{x-7}+1\right)}-\frac{1}{7}\log\left(-\frac{12}{x-7}\right)-7$$

input
```
integrate(((-7+x)*log(-12/(-7+x))+x^3-7*x^2+x)/(x^3-7*x^2),x, algorithm=\
```

output
```
x + 1/7*log(-12/(x - 7))/(7/(x - 7) + 1) - 1/7*log(-12/(x - 7)) - 7
```

3.476.9 Mupad [B] (verification not implemented)

Time = 14.80 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{x-7x^2+x^3+(-7+x)\log\left(-\frac{12}{-7+x}\right)}{-7x^2+x^3}\,dx = x-\frac{\ln\left(-\frac{12}{x-7}\right)}{x}$$

input
```
int(-(x + log(-12/(x - 7))*(x - 7) - 7*x^2 + x^3)/(7*x^2 - x^3),x)
```

output
```
x - log(-12/(x - 7))/x
```

3.477 $\int \frac{2-e^{-1+x}-e^x+\left(e^{-1+x}x+e^x x\right)\log(x)-x\log^2(x)}{\left(2x-e^{-1+x}x-e^x x\right)\log(x)+\left(4x+x^2\right)\log^2(x)}\,dx$

3.477.1 Optimal result

Integrand size = 74, antiderivative size = 27

$$\int \frac{2-e^{-1+x}-e^x+\left(e^{-1+x}x+e^x x\right)\log(x)-x\log^2(x)}{\left(2x-e^{-1+x}x-e^x x\right)\log(x)+\left(4x+x^2\right)\log^2(x)}\,dx=\log\left(-\frac{2}{4+x+\frac{2-e^{-1+x}-e^x}{\log(x)}}\right)$$

output
```
ln(-2/((-exp(x)-exp(-1+x)+2)/ln(x)+4+x))
```

3.477.2 Mathematica [A] (verified)

Time = 3.82 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{2-e^{-1+x}-e^x+\left(e^{-1+x}x+e^x x\right)\log(x)-x\log^2(x)}{\left(2x-e^{-1+x}x-e^x x\right)\log(x)+\left(4x+x^2\right)\log^2(x)}\,dx$$
$$=\log(\log(x))-\log\left(-2e+e^x+e^{1+x}-4e\log(x)-ex\log(x)\right)$$

input
```
Integrate[(2 - E^(-1 + x) - E^x + (E^(-1 + x)*x + E^x*x)*Log[x] - x*Log[x]
^2)/((2*x - E^(-1 + x)*x - E^x*x)*Log[x] + (4*x + x^2)*Log[x]^2),x]
```

output
```
Log[Log[x]] - Log[-2*E + E^x + E^(1 + x) - 4*E*Log[x] - E*x*Log[x]]
```

3.477.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^{x-1}-e^x-x\log^2(x)+\left(e^{x-1}x+e^xx\right)\log(x)+2}{(x^2+4x)\log^2(x)+(-e^{x-1}x-e^xx+2x)\log(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e\left(-(1+e)e^{x-1}-x\log^2(x)+\left(e^{x-1}x+e^xx\right)\log(x)+2\right)}{x\log(x)\left(-(1+e)e^x+ex\log(x)+4e\log(x)+2e\right)}dx$$

$$\Big\downarrow \text{27}$$

$$e\int \frac{-x\log^2(x)+\left(e^{x-1}x+e^xx\right)\log(x)-e^{x-1}(1+e)+2}{x\log(x)\left(ex\log(x)+4e\log(x)-e^x(1+e)+2e\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$e\int \left(\frac{1-x\log(x)}{ex\log(x)}+\frac{\log(x)x^2+3\log(x)x+x-4}{x\left(ex\log(x)+4e\log(x)-e^x(1+e)+2e\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$e\left(4\int \frac{1}{x\left(-ex\log(x)-4e\log(x)+e^x(1+e)-2e\right)}dx+\int \frac{1}{ex\log(x)+4e\log(x)-e^x(1+e)+2e}dx+3\int \frac{}{ex\log}\right.$$

input
```
Int[(2 - E^(-1 + x) - E^x + (E^(-1 + x)*x + E^x*x)*Log[x] - x*Log[x]^2)/((
2*x - E^(-1 + x)*x - E^x*x)*Log[x] + (4*x + x^2)*Log[x]^2),x]
```

output
```
$Aborted
```

3.477.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.477.4 Maple [A] (verified)

Time = 1.01 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

method	result	size
parallelrisch	$\ln(\ln(x)) - \ln(x\ln(x) + 4\ln(x) - e^{x} - e^{-1+x} + 2)$	28
risch	$-\ln(4+x) + \ln(\ln(x)) - \ln\left(\ln(x) - \frac{e^{-1+x}+e^{x}-2}{4+x}\right)$	32
norman	$-\ln(x\,e\ln(x) - e\,e^{x} + 4\,e\ln(x) + 2\,e - e^{x}) + \ln(\ln(x))$	35

input
```
int((-x*ln(x)^2+(exp(x)*x+x*exp(-1+x))*ln(x)-exp(x)-exp(-1+x)+2)/((x^2+4*x
)*ln(x)^2+(-exp(x)*x-x*exp(-1+x)+2*x)*ln(x)),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(x))-ln(x*ln(x)+4*ln(x)-exp(x)-exp(-1+x)+2)
```

3.477.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.48

$$\int \frac{2-e^{-1+x}-e^{x}+(e^{-1+x}x+e^{x}x)\log(x)-x\log^2(x)}{(2x-e^{-1+x}x-e^{x}x)\log(x)+(4x+x^2)\log^2(x)}\,dx = -\log(x+4) - \log\left(\frac{(x+4)e\log(x)-(e+1)e^{x}+2\,e}{x+4}\right) + \log(\log(x))$$

input
```
integrate((-x*log(x)^2+(exp(x)*x+x*exp(-1+x))*log(x)-exp(x)-exp(-1+x)+2)/(
(x^2+4*x)*log(x)^2+(-exp(x)*x-x*exp(-1+x)+2*x)*log(x)),x, algorithm=\
```

output
```
-log(x + 4) - log(((x + 4)*e*log(x) - (e + 1)*e^x + 2*e)/(x + 4)) + log(lo
g(x))
```

3.477.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{2-e^{-1+x}-e^x+\left(e^{-1+x}x+e^xx\right)\log(x)-x\log^2(x)}{\left(2x-e^{-1+x}x-e^xx\right)\log(x)+\left(4x+x^2\right)\log^2(x)}\,dx = -\log\left(\frac{-ex\log(x)-4e\log(x)-2e}{1+e}+e^x\right)+\log(\log(x))$$

input
```
integrate((-x*ln(x)**2+(exp(x)*x+x*exp(-1+x))*ln(x)-exp(x)-exp(-1+x)+2)/((
x**2+4*x)*ln(x)**2+(-exp(x)*x-x*exp(-1+x)+2*x)*ln(x)),x)
```

output
```
-log((-E*x*log(x) - 4*E*log(x) - 2*E)/(1 + E) + exp(x)) + log(log(x))
```

3.477.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44

$$\int \frac{2-e^{-1+x}-e^x+\left(e^{-1+x}x+e^xx\right)\log(x)-x\log^2(x)}{\left(2x-e^{-1+x}x-e^xx\right)\log(x)+\left(4x+x^2\right)\log^2(x)}\,dx = -\log\left(\frac{(e+1)e^x-(xe+4e)\log(x)-2e}{e+1}\right)+\log(\log(x))$$

input
```
integrate((-x*log(x)^2+(exp(x)*x+x*exp(-1+x))*log(x)-exp(x)-exp(-1+x)+2)/(
(x^2+4*x)*log(x)^2+(-exp(x)*x-x*exp(-1+x)+2*x)*log(x)),x, algorithm=\
```

output
```
-log(((e + 1)*e^x - (x*e + 4*e)*log(x) - 2*e)/(e + 1)) + log(log(x))
```

3.477.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{2-e^{-1+x}-e^x+\left(e^{-1+x}x+e^xx\right)\log(x)-x\log^2(x)}{\left(2x-e^{-1+x}x-e^xx\right)\log(x)+\left(4x+x^2\right)\log^2(x)}\,dx = -\log\left(xe\log(x)+4e\log(x)+2e-e^{(x+1)}-e^x\right)+\log(\log(x))$$

input
```
integrate((-x*log(x)^2+(exp(x)*x+x*exp(-1+x))*log(x)-exp(x)-exp(-1+x)+2)/(
(x^2+4*x)*log(x)^2+(-exp(x)*x-x*exp(-1+x)+2*x)*log(x)),x, algorithm=\
```

output
```
-log(x*e*log(x) + 4*e*log(x) + 2*e - e^(x + 1) - e^x) + log(log(x))
```

3.477.9 Mupad [F(-1)]

Timed out.

$$\int \frac{2-e^{-1+x}-e^x+\left(e^{-1+x}x+e^x x\right)\log(x)-x\log^2(x)}{\left(2x-e^{-1+x}x-e^x x\right)\log(x)+\left(4x+x^2\right)\log^2(x)}\,dx$$
$$=-\int -\frac{x\ln(x)^2+\left(-x\,e^{x-1}-x\,e^x\right)\ln(x)+e^{x-1}+e^x-2}{\ln(x)\,\left(x\,e^{x-1}-2\,x+x\,e^x\right)-\ln(x)^2\,\left(x^2+4\,x\right)}\,dx$$

input
```
int((exp(x - 1) + exp(x) + x*log(x)^2 - log(x)*(x*exp(x - 1) + x*exp(x)) -
 2)/(log(x)*(x*exp(x - 1) - 2*x + x*exp(x)) - log(x)^2*(4*x + x^2)),x)
```

output
```
-int(-(exp(x - 1) + exp(x) + x*log(x)^2 - log(x)*(x*exp(x - 1) + x*exp(x))
 - 2)/(log(x)*(x*exp(x - 1) - 2*x + x*exp(x)) - log(x)^2*(4*x + x^2)), x)
```

3.478 $\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}\left(11+3e^4+3x\right)}\left(24x+16x^2+4x^3\right)}{9+6x+x^2}\,dx$

3.478.1 Optimal result

Integrand size = 54, antiderivative size = 26

$$\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}\left(11+3e^4+3x\right)}\left(24x+16x^2+4x^3\right)}{9+6x+x^2}\,dx=\frac{x\left(5-4x\left(-e^{\frac{11}{3}+e^4+x}+x\right)\right)}{3+x}$$

output
```
x/(3+x)*(5-4*(x-exp(exp(4)+x+11/3))*x)
```

3.478.2 Mathematica [A] (verified)

Time = 0.47 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}\left(11+3e^4+3x\right)}\left(24x+16x^2+4x^3\right)}{9+6x+x^2}\,dx=\frac{93+36x+4e^{\frac{11}{3}+e^4+x}x^2-4x^3}{3+x}$$

input
```
Integrate[(15 - 36*x^2 - 8*x^3 + E^((11 + 3*E^4 + 3*x)/3)*(24*x + 16*x^2 + 
 4*x^3))/(9 + 6*x + x^2),x]
```

output
```
(93 + 36*x + 4*E^(11/3 + E^4 + x)*x^2 - 4*x^3)/(3 + x)
```

3.478.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 73 vs. 2(26) = 52.

Time = 0.60 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.81, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x^3-36x^2+e^{\frac{1}{3}\left(3x+3e^4+11\right)}\left(4x^3+16x^2+24x\right)+15}{x^2+6x+9}dx$$
$$\Big\downarrow \text{2007}$$
$$\int \frac{-8x^3-36x^2+e^{\frac{1}{3}\left(3x+3e^4+11\right)}\left(4x^3+16x^2+24x\right)+15}{(x+3)^2}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{4e^{x+e^4+\frac{11}{3}}x\left(x^2+4x+6\right)}{(x+3)^2}+\frac{-8x^3-36x^2+15}{(x+3)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-4x^2+4e^{x+\frac{1}{3}\left(11+3e^4\right)}x+12x-12e^{x+\frac{1}{3}\left(11+3e^4\right)}+\frac{36e^{x+\frac{1}{3}\left(11+3e^4\right)}}{x+3}+\frac{93}{x+3}$$

input
```
Int[(15 - 36*x^2 - 8*x^3 + E^((11 + 3*E^4 + 3*x)/3)*(24*x + 16*x^2 + 4*x^3
))/(9 + 6*x + x^2),x]
```

output
```
-12*E^((11 + 3*E^4)/3 + x) + 12*x + 4*E^((11 + 3*E^4)/3 + x)*x - 4*x^2 + 9
3/(3 + x) + (36*E^((11 + 3*E^4)/3 + x))/(3 + x)
```

3.478.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.478.4 Maple [A] (verified)

Time = 2.14 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

method	result
norman	$\frac{-4x^3+4\,e^{e^4+x+\frac{11}{3}}x^2-15}{3+x}$
parallelrisch	$-\frac{4x^3-4\,e^{e^4+x+\frac{11}{3}}x^2+15}{3+x}$
risch	$-4x^2+12x+\frac{93}{3+x}+\frac{4x^2e^{e^4+x+\frac{11}{3}}}{3+x}$
parts	$-4x^2+12x+\frac{93}{3+x}-\frac{1892\,e^{e^4+x+\frac{11}{3}}}{9(-3x-9)}+\frac{1892\,e^{e^4+\frac{2}{3}}\,\mathrm{Ei}_1(-3-x)}{27}+\frac{68\,e^{e^4+x+\frac{11}{3}}(2+3\,e^4)}{-3x-9}-612\Big(\frac{5}{27}+$
derivativedivides	Expression too large to display
default	Expression too large to display

input
```
int(((4*x^3+16*x^2+24*x)*exp(exp(4)+x+11/3)-8*x^3-36*x^2+15)/(x^2+6*x+9),x
,method=_RETURNVERBOSE)
```

output
```
(-4*x^3+4*exp(exp(4)+x+11/3)*x^2-15)/(3+x)
```

3.478.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}(11+3e^4+3x)}(24x+16x^2+4x^3)}{9+6x+x^2}\,dx = -\frac{4\,x^3-4\,x^2e^{\left(x+e^4+\frac{11}{3}\right)}-36\,x-93}{x+3}$$

input
```
integrate(((4*x^3+16*x^2+24*x)*exp(exp(4)+x+11/3)-8*x^3-36*x^2+15)/(x^2+6*
x+9),x, algorithm=\
```

output
```
-(4*x^3 - 4*x^2*e^(x + e^4 + 11/3) - 36*x - 93)/(x + 3)
```

3.478.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}(11+3e^4+3x)}(24x+16x^2+4x^3)}{9+6x+x^2}\,dx = -4x^2+\frac{4x^2e^{x+\frac{11}{3}+e^4}}{x+3}+12x+\frac{93}{x+3}$$

input
```
integrate(((4*x**3+16*x**2+24*x)*exp(exp(4)+x+11/3)-8*x**3-36*x**2+15)/(x*
*2+6*x+9),x)
```

output
```
-4*x**2 + 4*x**2*exp(x + 11/3 + exp(4))/(x + 3) + 12*x + 93/(x + 3)
```

3.478.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}(11+3e^4+3x)}(24x+16x^2+4x^3)}{9+6x+x^2}\,dx = -4\,x^2+\frac{4\,x^2e^{\left(x+e^4+\frac{11}{3}\right)}}{x+3}+12\,x+\frac{93}{x+3}$$

input
```
integrate(((4*x^3+16*x^2+24*x)*exp(exp(4)+x+11/3)-8*x^3-36*x^2+15)/(x^2+6*
x+9),x, algorithm=\
```

output
```
-4*x^2 + 4*x^2*e^(x + e^4 + 11/3)/(x + 3) + 12*x + 93/(x + 3)
```

3.478.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}(11+3e^4+3x)}(24x+16x^2+4x^3)}{9+6x+x^2}\,dx = -\frac{4\,x^3-4\,x^2e^{\left(x+e^4+\frac{11}{3}\right)}-36\,x-93}{x+3}$$

input
```
integrate(((4*x^3+16*x^2+24*x)*exp(exp(4)+x+11/3)-8*x^3-36*x^2+15)/(x^2+6*
x+9),x, algorithm=\
```

output
```
-(4*x^3 - 4*x^2*e^(x + e^4 + 11/3) - 36*x - 93)/(x + 3)
```

3.478. $\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}\left(11+3e^4+3x\right)}(24x+16x^2+4x^3)}{9+6x+x^2}\,dx$

3.478.9 Mupad [B] (verification not implemented)

Time = 14.43 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{15-36x^2-8x^3+e^{\frac{1}{3}(11+3e^4+3x)}(24x+16x^2+4x^3)}{9+6x+x^2}\,dx=\frac{x\left(4\,x\,\mathrm{e}^{x+\mathrm{e}^4+\frac{11}{3}}-4\,x^2+5\right)}{x+3}$$

input
```
int((exp(x + exp(4) + 11/3)*(24*x + 16*x^2 + 4*x^3) - 36*x^2 - 8*x^3 + 15)
/(6*x + x^2 + 9),x)
```

output
```
(x*(4*x*exp(x + exp(4) + 11/3) - 4*x^2 + 5))/(x + 3)
```

3.479 $\int \frac{\log(2)-\log(2)\log(5)}{x\log(64)}\,dx$

3.479.1 Optimal result

Integrand size = 17, antiderivative size = 17

$$\int \frac{\log(2)-\log(2)\log(5)}{x\log(64)}\,dx=\frac{\log(2)(-1+\log(5))\log\left(\frac{15}{x}\right)}{\log(64)}$$

output
```
1/6*ln(15/x)*(ln(5)-1)
```

3.479.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{\log(2)-\log(2)\log(5)}{x\log(64)}\,dx=-\frac{\log(2)(-1+\log(5))\log(x)}{\log(64)}$$

input
```
Integrate[(Log[2] - Log[2]*Log[5])/(x*Log[64]),x]
```

output
```
-((Log[2]*(-1 + Log[5])*Log[x])/Log[64])
```

3.479.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$, Rules used = {14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(2)-\log(2)\log(5)}{x\log(64)}\,dx$$
$$\Big\downarrow \ 14$$
$$\frac{\log(2)(1-\log(5))\log(x)}{\log(64)}$$

input
```
Int[(Log[2] - Log[2]*Log[5])/(x*Log[64]),x]
```

output
```
(Log[2]*(1 - Log[5])*Log[x])/Log[64]
```

3.479.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.479.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

method	result	size
norman	$\left(-\frac{\ln(5)}{6}+\frac{1}{6}\right)\ln\left(x\right)$	10
risch	$-\frac{\ln(5)\ln(x)}{6}+\frac{\ln(x)}{6}$	12
default	$\frac{(-\ln(2)\ln(5)+\ln(2))\ln(x)}{6\ln(2)}$	18
parallelrisch	$\frac{(-\ln(2)\ln(5)+\ln(2))\ln(x)}{6\ln(2)}$	18

input
```
int(1/6*(-ln(2)*ln(5)+ln(2))/x/ln(2),x,method=_RETURNVERBOSE)
```

output
```
(-1/6*ln(5)+1/6)*ln(x)
```

3.479.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.47

$$\int \frac{\log(2) - \log(2)\log(5)}{x\log(64)}\,dx = -\frac{1}{6}\left(\log\left(5\right) - 1\right)\log\left(x\right)$$

input
```
integrate(1/6*(-log(2)*log(5)+log(2))/x/log(2),x, algorithm=\
```

output
```
-1/6*(log(5) - 1)*log(x)
```

3.479.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \frac{\log(2) - \log(2)\log(5)}{x\log(64)}\,dx = \left(\frac{1}{6} - \frac{\log\left(5\right)}{6}\right)\log\left(x\right)$$

input
```
integrate(1/6*(-ln(2)*ln(5)+ln(2))/x/ln(2),x)
```

output
```
(1/6 - log(5)/6)*log(x)
```

3.479.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \frac{\log(2) - \log(2)\log(5)}{x\log(64)}\,dx = -\frac{\left(\log\left(5\right)\log\left(2\right) - \log\left(2\right)\right)\log\left(x\right)}{6\,\log\left(2\right)}$$

input
```
integrate(1/6*(-log(2)*log(5)+log(2))/x/log(2),x, algorithm=\
```

output
```
-1/6*(log(5)*log(2) - log(2))*log(x)/log(2)
```

3.479.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{\log(2) - \log(2)\log(5)}{x\log(64)}\,dx = -\frac{(\log(5)\log(2) - \log(2))\log(|x|)}{6\log(2)}$$

input
```
integrate(1/6*(-log(2)*log(5)+log(2))/x/log(2),x, algorithm=\
```

output
```
-1/6*(log(5)*log(2) - log(2))*log(abs(x))/log(2)
```

3.479.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \frac{\log(2) - \log(2)\log(5)}{x\log(64)}\,dx = -\ln(x)\left(\frac{\ln(5)}{6} - \frac{1}{6}\right)$$

input
```
int((log(2)/6 - (log(2)*log(5))/6)/(x*log(2)),x)
```

output
```
-log(x)*(log(5)/6 - 1/6)
```

3.480 $\int \frac{-2e^{1+x}x+e^{5+2x}(-1+x+x^2)+(-e^{1+x}x^2+e^{5+2x}(-x+x^2))\log(x^2+e$

3.480.1 Optimal result

Integrand size = 90, antiderivative size = 24

$$\int \frac{-2e^{1+x}x+e^{5+2x}(-1+x+x^2)+(-e^{1+x}x^2+e^{5+2x}(-x+x^2))\log(x^2+e^{4+x}(x-x^2))}{-x^2+e^{4+x}(-x+x^2)}\,dx = e^{1+x}\log\left(x^2+e^{4+x}(x-x^2)\right)$$

output
```
exp(1+x)*ln((-x^2+x)*exp(4+x)+x^2)
```

3.480.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{-2e^{1+x}x+e^{5+2x}(-1+x+x^2)+(-e^{1+x}x^2+e^{5+2x}(-x+x^2))\log(x^2+e^{4+x}(x-x^2))}{-x^2+e^{4+x}(-x+x^2)}\,dx = e^{1+x}\log\left(x\left(-e^{4+x}(-1+x)+x\right)\right)$$

input
```
Integrate[(-2*E^(1 + x)*x + E^(5 + 2*x)*(-1 + x + x^2) + (-(E^(1 + x)*x^2)
 + E^(5 + 2*x)*(-x + x^2))*Log[x^2 + E^(4 + x)*(x - x^2)])/(-x^2 + E^(4 +
x)*(-x + x^2)),x]
```

output
```
E^(1 + x)*Log[x*(-(E^(4 + x)*(-1 + x)) + x)]
```

3.480.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x+5}(x^2+x-1)+\left(e^{2x+5}(x^2-x)-e^{x+1}x^2\right)\log\left(x^2+e^{x+4}(x-x^2)\right)-2e^{x+1}x}{e^{x+4}(x^2-x)-x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x(x^2-x+1)}{e^3(x-1)^2(e^{x+4}x-x-e^{x+4})}+\frac{x^2-x+1}{e^3(x-1)^2}+\frac{e^{x+1}\left(x^2+x^2\log\left(x\left(x-e^{x+4}(x-1)\right)\right)+x-x\log\left(x\left(x-e^{x\cdot}\right.\right.\right.}{(x-1)x}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{\int \frac{1}{e^{x+4}x-x-e^{x+4}}dx}{e^3}+\frac{\int \frac{1}{(x-1)^2(e^{x+4}x-x-e^{x+4})}dx}{e^3}+\frac{2\int \frac{1}{(x-1)(e^{x+4}x-x-e^{x+4})}dx}{e^3}-\int \frac{e^{x+1}}{(x-1)(e^{x+4}x-x-e^{x+4})}dx+\frac{\int \frac{x}{e^{x+4}x-x-e^{x+4}}dx}{e^3}-\int \frac{e^{x+1}x}{e^{x+4}x-x-e^{x+4}}dx+e^{x+1}\log\left(x^2+e^{x+4}(1-x)x\right)+\frac{x}{e^3}+\frac{1}{e^3(1-x)}+\frac{\log(1-x)}{e^3}$$

input
```
Int[(-2*E^(1 + x)*x + E^(5 + 2*x)*(-1 + x + x^2) + (-(E^(1 + x)*x^2) + E^(
5 + 2*x)*(-x + x^2))*Log[x^2 + E^(4 + x)*(x - x^2)])/(-x^2 + E^(4 + x)*(-x
 + x^2)),x]
```

output
```
$Aborted
```

3.480.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.480.4 Maple [A] (verified)

Time = 1.67 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

method	result
parallelrisch	$\mathrm{e}^{1+x} \ln\left(\left(-x^{2}+x\right) \mathrm{e}^{4+x}+x^{2}\right)$
norman	$\mathrm{e}^{1+x} \ln\left(\left(-x^{2}+x\right) \mathrm{e}^{1+x} \mathrm{e}^{3}+x^{2}\right)$
risch	$\mathrm{e}^{1+x} \ln\left(x\,\mathrm{e}^{4+x}-\mathrm{e}^{4+x}-x\right)+\ln\left(x\right) \mathrm{e}^{1+x}-i\pi \operatorname{csgn}\left(ix\left(x\,\mathrm{e}^{4+x}-\mathrm{e}^{4+x}-x\right)\right)^{2} \mathrm{e}^{1+x}+\frac{i\pi\ \operatorname{csgn}(i(x\,\mathrm{e}}{}$

input
```
int((((x^2-x)*exp(1+x)*exp(4+x)-x^2*exp(1+x))*ln((-x^2+x)*exp(4+x)+x^2)+(x
^2+x-1)*exp(1+x)*exp(4+x)-2*x*exp(1+x))/((x^2-x)*exp(4+x)-x^2),x,method=_R
ETURNVERBOSE)
```

output
```
exp(1+x)*ln((-x^2+x)*exp(4+x)+x^2)
```

3.480.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{-2e^{1+x}x+e^{5+2x}(-1+x+x^2)+(-e^{1+x}x^2+e^{5+2x}(-x+x^2))\log\left(x^2+e^{4+x}(x-x^2)\right)}{-x^2+e^{4+x}\left(-x+x^2\right)}\,dx$$
$$= e^{(x+1)}\log\left(x^2-\left(x^2-x\right)e^{(x+4)}\right)$$

input
```
integrate((((x^2-x)*exp(1+x)*exp(4+x)-x^2*exp(1+x))*log((-x^2+x)*exp(4+x)+
x^2)+(x^2+x-1)*exp(1+x)*exp(4+x)-2*x*exp(1+x))/((x^2-x)*exp(4+x)-x^2),x, a
lgorithm=\
```

output
```
e^(x + 1)*log(x^2 - (x^2 - x)*e^(x + 4))
```

3.480.6 Sympy [F(-1)]

Timed out.

$$\int \frac{-2e^{1+x}x+e^{5+2x}(-1+x+x^2)+(-e^{1+x}x^2+e^{5+2x}(-x+x^2))\log\left(x^2+e^{4+x}(x-x^2)\right)}{-x^2+e^{4+x}\left(-x+x^2\right)}\,dx$$
$$= \text{Timed out}$$

input
```
integrate((((x**2-x)*exp(1+x)*exp(4+x)-x**2*exp(1+x))*ln((-x**2+x)*exp(4+x
)+x**2)+(x**2+x-1)*exp(1+x)*exp(4+x)-2*x*exp(1+x))/((x**2-x)*exp(4+x)-x**2
),x)
```

output
```
Timed out
```

3.480.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{-2e^{1+x}x + e^{5+2x}(-1+x+x^2) + (-e^{1+x}x^2 + e^{5+2x}(-x+x^2))\log(x^2+e^{4+x}(x-x^2))}{-x^2+e^{4+x}(-x+x^2)}\,dx$$
$$= e^{(x+1)}\log\left(-\left(xe^4-e^4\right)e^x+x\right)+e^{(x+1)}\log(x)$$

input
```
integrate((((x^2-x)*exp(1+x)*exp(4+x)-x^2*exp(1+x))*log((-x^2+x)*exp(4+x)+
x^2)+(x^2+x-1)*exp(1+x)*exp(4+x)-2*x*exp(1+x))/((x^2-x)*exp(4+x)-x^2),x, a
lgorithm=\
```

output
```
e^(x + 1)*log(-(x*e^4 - e^4)*e^x + x) + e^(x + 1)*log(x)
```

3.480.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{-2e^{1+x}x + e^{5+2x}(-1+x+x^2) + (-e^{1+x}x^2 + e^{5+2x}(-x+x^2))\log(x^2+e^{4+x}(x-x^2))}{-x^2+e^{4+x}(-x+x^2)}\,dx$$
$$= \left(e^{(x+4)}\log\left((x+4)e^{(x+4)}-x-5\,e^{(x+4)}\right)+e^{(x+4)}\log(-x)\right)e^{(-3)}$$

input
```
integrate((((x^2-x)*exp(1+x)*exp(4+x)-x^2*exp(1+x))*log((-x^2+x)*exp(4+x)+
x^2)+(x^2+x-1)*exp(1+x)*exp(4+x)-2*x*exp(1+x))/((x^2-x)*exp(4+x)-x^2),x, a
lgorithm=\
```

output
```
(e^(x + 4)*log((x + 4)*e^(x + 4) - x - 5*e^(x + 4)) + e^(x + 4)*log(-x))*e
^(-3)
```

3.480.9 Mupad [B] (verification not implemented)

Time = 14.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-2e^{1+x}x+e^{5+2x}(-1+x+x^2)+(-e^{1+x}x^2+e^{5+2x}(-x+x^2))\log(x^2+e^{4+x}(x-x^2))}{-x^2+e^{4+x}(-x+x^2)}\,dx$$
$$=\ln\left(x^2+\mathrm{e}^4\,\mathrm{e}^x\left(x-x^2\right)\right)\,\mathrm{e}^{x+1}$$

input
```
int((2*x*exp(x + 1) + log(exp(x + 4)*(x - x^2) + x^2)*(x^2*exp(x + 1) + ex
p(x + 1)*exp(x + 4)*(x - x^2)) - exp(x + 1)*exp(x + 4)*(x + x^2 - 1))/(exp
(x + 4)*(x - x^2) + x^2),x)
```

output
```
log(x^2 + exp(4)*exp(x)*(x - x^2))*exp(x + 1)
```

3.481 $\int \frac{20x+4x^2+e^4(-60x^2-144x^3-24x^4)+72x^2\log(4)+(44x^2+8x^3)\log(x)}{e^4}$

3.481.1 Optimal result

Integrand size = 160, antiderivative size = 31

$$\int \frac{20x+4x^2+e^4(-60x^2-144x^3-24x^4)+72x^2\log(4)+(44x^2+8x^3)\log(x)+(10+2x+e^4(-30x-72}{e^4(-15x^2-3x^3)+9x\log(4)+(5x}$$
$$=\left(2x+\log\left(-3+\frac{(5+x)(3e^4x-\log(x))}{3\log(4)}\right)\right)^2$$

output
```
(2*x+ln(1/2*(5+x)/ln(2)*(x*exp(4)-1/3*ln(x))-3))^2
```

3.481.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 71 vs. 2(31) = 62.

Time = 0.08 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.29

$$\int \frac{20x+4x^2+e^4(-60x^2-144x^3-24x^4)+72x^2\log(4)+(44x^2+8x^3)\log(x)+(10+2x+e^4(-30x-72}{e^4(-15x^2-3x^3)+9x\log(4)+(5x}$$
$$=-2\left(-2x^2-2x\log\left(\frac{3e^4x(5+x)-9\log(4)-(5+x)\log(x)}{\log(64)}\right)-\frac{1}{2}\log^2\left(\frac{3e^4x(5+x)-9\log(4)-(5+x)\log(x)}{\log(64)}\right)\right)$$

3.481.

$$\int \frac{20x+4x^2+e^4(-60x^2-144x^3-24x^4)+72x^2\log(4)+(44x^2+8x^3)\log(x)+(10+2x+e^4(-30x-72x^2-12x^3)+36x\log(4)+(22x+4x^2)\log(x))\log\left(\frac{e^4}{}\right.}{}$$

input
```
Integrate[(20*x + 4*x^2 + E^4*(-60*x^2 - 144*x^3 - 24*x^4) + 72*x^2*Log[4]
 + (44*x^2 + 8*x^3)*Log[x] + (10 + 2*x + E^4*(-30*x - 72*x^2 - 12*x^3) + 3
6*x*Log[4] + (22*x + 4*x^2)*Log[x])*Log[(E^4*(15*x + 3*x^2) - 9*Log[4] + (
-5 - x)*Log[x])/(3*Log[4])])/(E^4*(-15*x^2 - 3*x^3) + 9*x*Log[4] + (5*x +
x^2)*Log[x]),x]
```

output
```
-2*(-2*x^2 - 2*x*Log[(3*E^4*x*(5 + x) - 9*Log[4] - (5 + x)*Log[x])/Log[64]
] - Log[(3*E^4*x*(5 + x) - 9*Log[4] - (5 + x)*Log[x])/Log[64]]^2/2)
```

3.481.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^2 + 72x^2\log(4) + (8x^3 + 44x^2)\log(x) + ((4x^2 + 22x)\log(x) + e^4(-12x^3 - 72x^2 - 30x) + 2x + 36x\log(4) -}{(x^2 + 5x)\log(x) + e^4(-3x^3 - 15x^2) + 9}$$

$$\Big\downarrow 6$$

$$\int \frac{x^2(4 + 72\log(4)) + (8x^3 + 44x^2)\log(x) + ((4x^2 + 22x)\log(x) + e^4(-12x^3 - 72x^2 - 30x) + 2x + 36x\log(4) +}{(x^2 + 5x)\log(x) + e^4(-3x^3 - 15x^2) + 9}$$

$$\Big\downarrow 7292$$

$$\int \frac{2(-6e^4x^3 - 36e^4x^2 + 2x^2\log(x) + 11x\log(x) + x(1 - 15e^4 + 18\log(4)) + 5)\left(-2x - \log\left(\frac{3e^4x(x+5) - (x+5)\log(x}{\log(64)}\right.\right.}{-(x^2 + 5x)\log(x) - e^4(-3x^3 - 15x^2) - 9x\log(4)}$$

$$\Big\downarrow 27$$

$$2\int -\frac{(-6e^4x^3 + 2\log(x)x^2 - 36e^4x^2 + 11\log(x)x + (1 - 15e^4 + 18\log(4))x + 5)\left(2x + \log\left(\frac{3e^4x(x+5) - \log(x)(x+5}{\log(64)}\right.\right.}{-9\log(4)x + 3e^4(x^3 + 5x^2) - (x^2 + 5x)\log(x)}$$

$$\Big\downarrow 25$$

$$-2\int \frac{(-6e^4x^3 + 2\log(x)x^2 - 36e^4x^2 + 11\log(x)x + (1 - 15e^4 + 18\log(4))x + 5)\left(2x + \log\left(\frac{3e^4x(x+5) - \log(x)(x+5}{\log(64)}\right.\right.}{-9\log(4)x + 3e^4(x^3 + 5x^2) - (x^2 + 5x)\log(x)}$$

$$\Big\downarrow 7293$$

3.481.

$$\int \frac{20x+4x^2+e^4(-60x^2-144x^3-24x^4)+72x^2\log(4)+(44x^2+8x^3)\log(x)+(10+2x+e^4(-30x-72x^2-12x^3)+36x\log(4)+(22x+4x^2)\log(x))\log\left(\frac{e^4}{-}\right.}{}$$

$$-2\int \left(\frac{\log\left(\frac{3e^4x(x+5)-\log(x)(x+5)-9\log(4)}{\log(64)}\right)\left(-6e^4x^3+2\log(x)x^2-36e^4x^2+11\log(x)x+\left(1-15e^4+18\log(4)\right)x\right.}{x\left(3e^4x^2-\log(x)x+15e^4x-5\log(x)-9\log(4)\right)}\right.$$

$\downarrow$ 2009

$$-2\left(2(5-9\log(4))\int \frac{1}{3e^4x^2-\log(x)x+15e^4x-5\log(x)-9\log(4)}dx+2\left(1-15e^4\right)\int \frac{x}{3e^4x^2-\log(x)x+15e^4\right.$$

input
```
Int[(20*x + 4*x^2 + E^4*(-60*x^2 - 144*x^3 - 24*x^4) + 72*x^2*Log[4] + (44
*x^2 + 8*x^3)*Log[x] + (10 + 2*x + E^4*(-30*x - 72*x^2 - 12*x^3) + 36*x*Lo
g[4] + (22*x + 4*x^2)*Log[x])*Log[(E^4*(15*x + 3*x^2) - 9*Log[4] + (-5 - x
)*Log[x])/(3*Log[4])])/(E^4*(-15*x^2 - 3*x^3) + 9*x*Log[4] + (5*x + x^2)*L
og[x]),x]
```

output
```
$Aborted
```

3.481.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.481.

$$\int \frac{20x+4x^2+e^4\left(-60x^2-144x^3-24x^4\right)+72x^2\log(4)+\left(44x^2+8x^3\right)\log(x)+\left(10+2x+e^4\left(-30x-72x^2-12x^3\right)+36x\log(4)+\left(22x+4x^2\right)\log(x)\right)\log\left(\right.}{}$$

3.481.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. 2(27) = 54.

Time = 7.77 (sec) , antiderivative size = 77, normalized size of antiderivative = 2.48

method	result
parallelrisch	$-100+4x^{2}+4\ln\left(\frac{(-x-5)\ln(x)-18\ln(2)+(3x^{2}+15x)e^{4}}{6\ln(2)}\right)x+\ln\left(\frac{(-x-5)\ln(x)-18\ln(2)+(3x^{2}+15x)e^{4}}{6\ln(2)}\right)^{2}$

input
```
int((((4*x^2+22*x)*ln(x)+72*x*ln(2)+(-12*x^3-72*x^2-30*x)*exp(4)+2*x+10)*l
n(1/6*((-x-5)*ln(x)-18*ln(2)+(3*x^2+15*x)*exp(4))/ln(2))+(8*x^3+44*x^2)*ln
(x)+144*x^2*ln(2)+(-24*x^4-144*x^3-60*x^2)*exp(4)+4*x^2+20*x)/((x^2+5*x)*l
n(x)+18*x*ln(2)+(-3*x^3-15*x^2)*exp(4)),x,method=_RETURNVERBOSE)
```

output
```
-100+4*x^2+4*ln(1/6*((-x-5)*ln(x)-18*ln(2)+(3*x^2+15*x)*exp(4))/ln(2))*x+l
n(1/6*((-x-5)*ln(x)-18*ln(2)+(3*x^2+15*x)*exp(4))/ln(2))^2
```

3.481.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. 2(28) = 56.

Time = 0.26 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.29

$$\int \frac{20x+4x^{2}+e^{4}(-60x^{2}-144x^{3}-24x^{4})+72x^{2}\log(4)+(44x^{2}+8x^{3})\log(x)+(10+2x+e^{4}(-30x-72\cdots}{e^{4}(-15x^{2}-3x^{3})+9x\log(4)+(5x\cdots}$$
$$=4x^{2}+4x\log\left(\frac{3(x^{2}+5x)e^{4}-(x+5)\log(x)-18\log(2)}{6\log(2)}\right)+\log\left(\frac{3(x^{2}+5x)e^{4}-(x+5)\log(x)-18\log(2)}{6\log(2)}\right)^{2}$$

input
```
integrate((((4*x^2+22*x)*log(x)+72*x*log(2)+(-12*x^3-72*x^2-30*x)*exp(4)+2
*x+10)*log(1/6*((-x-5)*log(x)-18*log(2)+(3*x^2+15*x)*exp(4))/log(2))+(8*x^
3+44*x^2)*log(x)+144*x^2*log(2)+(-24*x^4-144*x^3-60*x^2)*exp(4)+4*x^2+20*x
)/((x^2+5*x)*log(x)+18*x*log(2)+(-3*x^3-15*x^2)*exp(4)),x, algorithm=\
```

output
```
4*x^2 + 4*x*log(1/6*(3*(x^2 + 5*x)*e^4 - (x + 5)*log(x) - 18*log(2))/log(2
)) + log(1/6*(3*(x^2 + 5*x)*e^4 - (x + 5)*log(x) - 18*log(2))/log(2))^2
```

3.481.

$$\int \frac{20x+4x^{2}+e^{4}(-60x^{2}-144x^{3}-24x^{4})+72x^{2}\log(4)+(44x^{2}+8x^{3})\log(x)+(10+2x+e^{4}(-30x-72x^{2}-12x^{3})+36x\log(4)+(22x+4x^{2})\log(x))\log\left(\frac{e^{4}\cdots}{\cdots}\right.}{\cdots}$$

3.481.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. $2(27) = 54$.

Time = 0.33 (sec) , antiderivative size = 76, normalized size of antiderivative = 2.45

$$\int \frac{20x + 4x^2 + e^4(-60x^2 - 144x^3 - 24x^4) + 72x^2\log(4) + (44x^2 + 8x^3)\log(x) + (10 + 2x + e^4(-30x - 72}{e^4(-15x^2 - 3x^3) + 9x\log(4) + (5x}$$

$$= 4x^2 + 4x\log\left(\frac{\frac{(-x-5)\log(x)}{6} + \frac{(3x^2+15x)e^4}{6} - 3\log(2)}{\log(2)}\right) + \log\left(\frac{\frac{(-x-5)\log(x)}{6} + \frac{(3x^2+15x)e^4}{6} - 3\log(2)}{\log(2)}\right)^2$$

input
```
integrate((((4*x**2+22*x)*ln(x)+72*x*ln(2)+(-12*x**3-72*x**2-30*x)*exp(4)+
2*x+10)*ln(1/6*((-x-5)*ln(x)-18*ln(2)+(3*x**2+15*x)*exp(4))/ln(2))+(8*x**3
+44*x**2)*ln(x)+144*x**2*ln(2)+(-24*x**4-144*x**3-60*x**2)*exp(4)+4*x**2+2
0*x)/((x**2+5*x)*ln(x)+18*x*ln(2)+(-3*x**3-15*x**2)*exp(4)),x)
```

output
```
4*x**2 + 4*x*log(((-x - 5)*log(x)/6 + (3*x**2 + 15*x)*exp(4)/6 - 3*log(2))
/log(2)) + log(((-x - 5)*log(x)/6 + (3*x**2 + 15*x)*exp(4)/6 - 3*log(2))/l
og(2))**2
```

3.481.7 Maxima [F]

$$\int \frac{20x + 4x^2 + e^4(-60x^2 - 144x^3 - 24x^4) + 72x^2\log(4) + (44x^2 + 8x^3)\log(x) + (10 + 2x + e^4(-30x - 72}{e^4(-15x^2 - 3x^3) + 9x\log(4) + (5x}$$

$$= \int -\frac{2\left(72\,x^2\log(2) + 2\,x^2 - 6\,(2\,x^4 + 12\,x^3 + 5\,x^2)e^4 + 2\,(2\,x^3 + 11\,x^2)\log(x) - (3\,(2\,x^3 + 12\,x^2 + 5\,x)e\right.}{3\,(x^3 + 5\,x^2)e^4 - 18\,x\log(2)}$$

input
```
integrate((((4*x^2+22*x)*log(x)+72*x*log(2)+(-12*x^3-72*x^2-30*x)*exp(4)+2
*x+10)*log(1/6*((-x-5)*log(x)-18*log(2)+(3*x^2+15*x)*exp(4))/log(2))+(8*x^
3+44*x^2)*log(x)+144*x^2*log(2)+(-24*x^4-144*x^3-60*x^2)*exp(4)+4*x^2+20*x
)/((x^2+5*x)*log(x)+18*x*log(2)+(-3*x^3-15*x^2)*exp(4)),x, algorithm=\
```

3.481.

$$\int \frac{20x+4x^2+e^4(-60x^2-144x^3-24x^4)+72x^2\log(4)+(44x^2+8x^3)\log(x)+(10+2x+e^4(-30x-72x^2-12x^3)+36x\log(4)+(22x+4x^2)\log(x))\log\left(\frac{e}{-}\right.}{}$$

output
```
-2*integrate((72*x^2*log(2) + 2*x^2 - 6*(2*x^4 + 12*x^3 + 5*x^2)*e^4 + 2*(
2*x^3 + 11*x^2)*log(x) - (3*(2*x^3 + 12*x^2 + 5*x)*e^4 - 36*x*log(2) - (2*
x^2 + 11*x)*log(x) - x - 5)*log(1/6*(3*(x^2 + 5*x)*e^4 - (x + 5)*log(x) -
18*log(2))/log(2)) + 10*x)/(3*(x^3 + 5*x^2)*e^4 - 18*x*log(2) - (x^2 + 5*x
)*log(x)), x)
```

3.481.8 Giac [F]

$$\int \frac{20x + 4x^2 + e^4(-60x^2 - 144x^3 - 24x^4) + 72x^2\log(4) + (44x^2 + 8x^3)\log(x) + (10 + 2x + e^4(-30x - 72}{e^4(-15x^2 - 3x^3) + 9x\log(4) + (5x}$$

$$= \int -\frac{2\left(72\,x^2\log(2) + 2\,x^2 - 6\,(2\,x^4 + 12\,x^3 + 5\,x^2)e^4 + 2\,(2\,x^3 + 11\,x^2)\log(x) - (3\,(2\,x^3 + 12\,x^2 + 5\,x)e^4}{3\,(x^3 + 5\,x^2)e^4 - 18\,x\log(2)}$$

input
```
integrate((((4*x^2+22*x)*log(x)+72*x*log(2)+(-12*x^3-72*x^2-30*x)*exp(4)+2
*x+10)*log(1/6*((-x-5)*log(x)-18*log(2)+(3*x^2+15*x)*exp(4))/log(2))+(8*x^
3+44*x^2)*log(x)+144*x^2*log(2)+(-24*x^4-144*x^3-60*x^2)*exp(4)+4*x^2+20*x
)/((x^2+5*x)*log(x)+18*x*log(2)+(-3*x^3-15*x^2)*exp(4)),x, algorithm=\
```

output
```
integrate(-2*(72*x^2*log(2) + 2*x^2 - 6*(2*x^4 + 12*x^3 + 5*x^2)*e^4 + 2*(
2*x^3 + 11*x^2)*log(x) - (3*(2*x^3 + 12*x^2 + 5*x)*e^4 - 36*x*log(2) - (2*
x^2 + 11*x)*log(x) - x - 5)*log(1/6*(3*(x^2 + 5*x)*e^4 - (x + 5)*log(x) -
18*log(2))/log(2)) + 10*x)/(3*(x^3 + 5*x^2)*e^4 - 18*x*log(2) - (x^2 + 5*x
)*log(x)), x)
```

3.481.9 Mupad [B] (verification not implemented)

Time = 16.16 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.23

$$\int \frac{20x + 4x^2 + e^4(-60x^2 - 144x^3 - 24x^4) + 72x^2\log(4) + (44x^2 + 8x^3)\log(x) + (10 + 2x + e^4(-30x - 72}{e^4(-15x^2 - 3x^3) + 9x\log(4) + (5x}$$

$$= \left(2\,x + \ln\left(-\frac{3\,\ln(2) + \frac{\ln(x)\,(x+5)}{6} - \frac{e^4\,(3\,x^2+15\,x)}{6}}{\ln(2)}\right)\right)^2$$

3.481.

$$\int \frac{20x+4x^2+e^4(-60x^2-144x^3-24x^4)+72x^2\log(4)+(44x^2+8x^3)\log(x)+(10+2x+e^4(-30x-72x^2-12x^3)+36x\log(4)+(22x+4x^2)\log(x))\log\Big(}{}$$

input
```
int((20*x + log(-(3*log(2) + (log(x)*(x + 5))/6 - (exp(4)*(15*x + 3*x^2))/
6)/log(2))*(2*x + 72*x*log(2) - exp(4)*(30*x + 72*x^2 + 12*x^3) + log(x)*(
22*x + 4*x^2) + 10) + log(x)*(44*x^2 + 8*x^3) + 144*x^2*log(2) - exp(4)*(6
0*x^2 + 144*x^3 + 24*x^4) + 4*x^2)/(18*x*log(2) + log(x)*(5*x + x^2) - exp
(4)*(15*x^2 + 3*x^3)),x)
```

output
```
(2*x + log(-(3*log(2) + (log(x)*(x + 5))/6 - (exp(4)*(15*x + 3*x^2))/6)/lo
g(2)))^2
```

3.481.

$$\int \frac{20x+4x^2+e^4\left(-60x^2-144x^3-24x^4\right)+72x^2\log(4)+\left(44x^2+8x^3\right)\log(x)+\left(10+2x+e^4\left(-30x-72x^2-12x^3\right)+36x\log(4)+\left(22x+4x^2\right)\log(x)\right)\log\left(\frac{e^4}{-}\right.}{}$$

3.482 $\int \frac{-1-x-\frac{e^x x}{4}}{e^2x+\frac{1}{16}e^{2x}x+2ex^2+x^3+(2ex+2x^2)\log(x)+x\log^2(x)+\frac{e^x(2ex^2+2x^3+2x^2\log(x))}{4x}}\,dx$

3.482.1 Optimal result

Integrand size = 89, antiderivative size = 14

$$\int \frac{-1-x-\frac{e^x x}{4}}{e^2x+\frac{1}{16}e^{2x}x+2ex^2+x^3+(2ex+2x^2)\log(x)+x\log^2(x)+\frac{e^x(2ex^2+2x^3+2x^2\log(x))}{4x}}\,dx = \frac{1}{e+\frac{e^x}{4}+x+\log(x)}$$

output
```
1/(ln(x)+x*exp(-ln(4*x)+x)+x+exp(1))
```

3.482.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.29

$$\int \frac{-1-x-\frac{e^x x}{4}}{e^2x+\frac{1}{16}e^{2x}x+2ex^2+x^3+(2ex+2x^2)\log(x)+x\log^2(x)+\frac{e^x(2ex^2+2x^3+2x^2\log(x))}{4x}}\,dx = \frac{4}{4e+e^x+4x+4\log(x)}$$

input
```
Integrate[(-1 - x - (E^x*x)/4)/(E^2*x + (E^(2*x)*x)/16 + 2*E*x^2 + x^3 + (
2*E*x + 2*x^2)*Log[x] + x*Log[x]^2 + (E^x*(2*E*x^2 + 2*x^3 + 2*x^2*Log[x])
)/(4*x)),x]
```

output
```
4/(4*E + E^x + 4*x + 4*Log[x])
```

3.482.3 Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.29, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {7239, 27, 25, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-\frac{e^x x}{4}-x-1}{x^3+2ex^2+(2x^2+2ex)\log(x)+\frac{e^x(2x^3+2ex^2+2x^2\log(x))}{4x}+\frac{1}{16}e^{2x}x+e^2x+x\log^2(x)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{4(-((e^x+4)x)-4)}{x(4x+e^x+4\log(x)+4e)^2}dx$$

$$\Big\downarrow \text{27}$$

$$4\int -\frac{(4+e^x)x+4}{x(4x+e^x+4\log(x)+4e)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-4\int \frac{(4+e^x)x+4}{x(4x+e^x+4\log(x)+4e)^2}dx$$

$$\Big\downarrow \text{7237}$$

$$\frac{4}{4x+e^x+4\log(x)+4e}$$

input
```
Int[(-1 - x - (E^x*x)/4)/(E^2*x + (E^(2*x)*x)/16 + 2*E*x^2 + x^3 + (2*E*x
+ 2*x^2)*Log[x] + x*Log[x]^2 + (E^x*(2*E*x^2 + 2*x^3 + 2*x^2*Log[x]))/(4*x
)),x]
```

output
```
4/(4*E + E^x + 4*x + 4*Log[x])
```

3.482.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.482.4 Maple [A] (verified)

Time = 3.08 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

method	result	size
risch	$\frac{1}{\frac{\mathrm{e}^{x}}{4}+\mathrm{e}+x+\ln(x)}$	13
parallelrisch	$\frac{1}{\ln(x)+x\,\mathrm{e}^{-\ln(4x)+x}+x+\mathrm{e}}$	20

input
```
int((-x^2*exp(-ln(4*x)+x)-x-1)/(x^3*exp(-ln(4*x)+x)^2+(2*x^2*ln(x)+2*x^2*e
xp(1)+2*x^3)*exp(-ln(4*x)+x)+x*ln(x)^2+(2*x*exp(1)+2*x^2)*ln(x)+x*exp(1)^2
+2*x^2*exp(1)+x^3),x,method=_RETURNVERBOSE)
```

output
```
1/(1/4*exp(x)+exp(1)+x+ln(x))
```

3.482.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.50

$$\int \frac{-1-x-\frac{e^x x}{4}}{e^2x+\frac{1}{16}e^{2x}x+2ex^2+x^3+(2ex+2x^2)\log(x)+x\log^2(x)+\frac{e^x(2ex^2+2x^3+2x^2\log(x))}{4x}}\,dx = \frac{1}{xe^{(x-2\log(2)-\log(x))}+x+e+\log(x)}$$

input
```
integrate((-x^2*exp(-log(4*x)+x)-x-1)/(x^3*exp(-log(4*x)+x)^2+(2*x^2*log(x
)+2*x^2*exp(1)+2*x^3)*exp(-log(4*x)+x)+x*log(x)^2+(2*x*exp(1)+2*x^2)*log(x
)+x*exp(1)^2+2*x^2*exp(1)+x^3),x, algorithm=\
```

output
```
1/(x*e^(x - 2*log(2) - log(x)) + x + e + log(x))
```

3.482.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.21

$$\int \frac{-1-x-\frac{e^x x}{4}}{e^2x+\frac{1}{16}e^{2x}x+2ex^2+x^3+(2ex+2x^2)\log(x)+x\log^2(x)+\frac{e^x(2ex^2+2x^3+2x^2\log(x))}{4x}}\,dx = \frac{4}{4x+e^x+4\log(x)+4e}$$

input
```
integrate((-x**2*exp(-ln(4*x)+x)-x-1)/(x**3*exp(-ln(4*x)+x)**2+(2*x**2*ln(
x)+2*x**2*exp(1)+2*x**3)*exp(-ln(4*x)+x)+x*ln(x)**2+(2*x*exp(1)+2*x**2)*ln
(x)+x*exp(1)**2+2*x**2*exp(1)+x**3),x)
```

output
```
4/(4*x + exp(x) + 4*log(x) + 4*E)
```

3.482.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.29

$$\int \frac{-1-x-\frac{e^x x}{4}}{e^2 x+\frac{1}{16}e^{2x}x+2ex^2+x^3+(2ex+2x^2)\log(x)+x\log^2(x)+\frac{e^x(2ex^2+2x^3+2x^2\log(x))}{4x}}\,dx = \frac{4}{4\,x+4\,e+e^x+4\,\log\left(x\right)}$$

input
```
integrate((-x^2*exp(-log(4*x)+x)-x-1)/(x^3*exp(-log(4*x)+x)^2+(2*x^2*log(x
)+2*x^2*exp(1)+2*x^3)*exp(-log(4*x)+x)+x*log(x)^2+(2*x*exp(1)+2*x^2)*log(x
)+x*exp(1)^2+2*x^2*exp(1)+x^3),x, algorithm=\
```

output
```
4/(4*x + 4*e + e^x + 4*log(x))
```

3.482.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.29

$$\int \frac{-1-x-\frac{e^x x}{4}}{e^2 x+\frac{1}{16}e^{2x}x+2ex^2+x^3+(2ex+2x^2)\log(x)+x\log^2(x)+\frac{e^x(2ex^2+2x^3+2x^2\log(x))}{4x}}\,dx = \frac{4}{4\,x+4\,e+e^x+4\,\log\left(x\right)}$$

input
```
integrate((-x^2*exp(-log(4*x)+x)-x-1)/(x^3*exp(-log(4*x)+x)^2+(2*x^2*log(x
)+2*x^2*exp(1)+2*x^3)*exp(-log(4*x)+x)+x*log(x)^2+(2*x*exp(1)+2*x^2)*log(x
)+x*exp(1)^2+2*x^2*exp(1)+x^3),x, algorithm=\
```

output
```
4/(4*x + 4*e + e^x + 4*log(x))
```

3.482.9 Mupad [B] (verification not implemented)

Time = 16.73 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.29

$$\int \frac{-1-x-\frac{e^x x}{4}}{e^2 x+\frac{1}{16} e^{2 x} x+2 e x^2+x^3+\left(2 e x+2 x^2\right) \log (x)+x \log ^2(x)+\frac{e^x\left(2 e x^2+2 x^3+2 x^2 \log (x)\right)}{4 x}} \, dx = \frac{4}{4\,x+4\,\mathrm{e}+\mathrm{e}^x+4\,\ln\left(x\right)}$$

input
```
int(-(x + x^2*exp(x - log(4*x)) + 1)/(log(x)*(2*x*exp(1) + 2*x^2) + x*log(
x)^2 + x*exp(2) + x^3*exp(2*x - 2*log(4*x)) + exp(x - log(4*x))*(2*x^2*log
(x) + 2*x^2*exp(1) + 2*x^3) + 2*x^2*exp(1) + x^3),x)
```

output
```
4/(4*x + 4*exp(1) + exp(x) + 4*log(x))
```

3.483 $\int \frac{-16-8x^2\log(x)+(-8x^2\log(x)-32\log(x)\log(\log(x)))\log\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}{(9x^7\log(x)+36x^5\log(x)\log(\log(x)))\log^3\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}$

3.483.1 Optimal result

Integrand size = 76, antiderivative size = 21

$$\int \frac{-16-8x^2\log(x)+(-8x^2\log(x)-32\log(x)\log(\log(x)))\log\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}{(9x^7\log(x)+36x^5\log(x)\log(\log(x)))\log^3\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}\,dx = \frac{2}{9x^4\log^2\left(\frac{x^2}{4}+\log(\log(x))\right)}$$

output
```
2/9/x^4/ln(ln(ln(x))+1/4*x^2)^2
```

3.483.2 Mathematica [A] (verified)

Time = 0.39 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{-16-8x^2\log(x)+(-8x^2\log(x)-32\log(x)\log(\log(x)))\log\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}{(9x^7\log(x)+36x^5\log(x)\log(\log(x)))\log^3\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}\,dx = \frac{2}{9x^4\log^2\left(\frac{x^2}{4}+\log(\log(x))\right)}$$

input
```
Integrate[(-16 - 8*x^2*Log[x] + (-8*x^2*Log[x] - 32*Log[x]*Log[Log[x]])*Lo
g[(x^2 + 4*Log[Log[x]])/4])/((9*x^7*Log[x] + 36*x^5*Log[x]*Log[Log[x]])*Lo
g[(x^2 + 4*Log[Log[x]])/4]^3),x]
```

output
```
2/(9*x^4*Log[x^2/4 + Log[Log[x]]]^2)
```

3.483.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x^2\log(x)+\left(-8x^2\log(x)-32\log(x)\log(\log(x))\right)\log\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)-16}{\left(9x^7\log(x)+36x^5\log(x)\log(\log(x))\right)\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-8x^2\log(x)+\left(-8x^2\log(x)-32\log(x)\log(\log(x))\right)\log\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)-16}{9x^5\log(x)\left(x^2+4\log(\log(x))\right)\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{9}\int -\frac{8\left(\log(x)x^2+\left(\log(x)x^2+4\log(x)\log(\log(x))\right)\log\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)+2\right)}{x^5\log(x)\left(x^2+4\log(\log(x))\right)\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{8}{9}\int \frac{\log(x)x^2+\left(\log(x)x^2+4\log(x)\log(\log(x))\right)\log\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)+2}{x^5\log(x)\left(x^2+4\log(\log(x))\right)\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{8}{9}\int \left(\frac{\log(x)x^2+2}{x^5\log(x)\left(x^2+4\log(\log(x))\right)\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}+\frac{1}{x^5\log^2\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{8}{9}\left(2\int \frac{1}{x^5\log(x)\left(x^2+4\log(\log(x))\right)\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}dx+\int \frac{1}{x^5\log^2\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}dx+\right.$$

input
```
Int[(-16 - 8*x^2*Log[x] + (-8*x^2*Log[x] - 32*Log[x]*Log[Log[x]])*Log[(x^2
 + 4*Log[Log[x]])/4])/((9*x^7*Log[x] + 36*x^5*Log[x]*Log[Log[x]])*Log[(x^2
 + 4*Log[Log[x]])/4]^3),x]
```

output
```
$Aborted
```

3.483. $\int \frac{-16-8x^2\log(x)+\left(-8x^2\log(x)-32\log(x)\log(\log(x))\right)\log\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}{\left(9x^7\log(x)+36x^5\log(x)\log(\log(x))\right)\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}dx$

3.483.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.483.4 Maple [A] (verified)

Time = 37.67 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

method	result
risch	$\frac{2}{9x^4 \ln\left(\ln(\ln(x))+\frac{x^2}{4}\right)^2}$
parallelrisch	$\frac{2}{9x^4 \ln\left(\ln(\ln(x))+\frac{x^2}{4}\right)^2}$
default	$-\frac{2\ln(x)\left(-x^6\ln(x)^2+12\ln(2)x^4\ln(x)-6x^4\ln\left(x^2+4\ln(\ln(x))\right)\ln(x)+48\ln(2)x^2\ln(\ln(x))\ln(x)+2x^4\ln(2)-4x^4\ln(x)-24x^2 \right.}{}$

input
```
int(((-32*ln(x)*ln(ln(x))-8*x^2*ln(x))*ln(ln(ln(x))+1/4*x^2)-8*x^2*ln(x)-1
6)/(36*x^5*ln(x)*ln(ln(x))+9*x^7*ln(x))/ln(ln(ln(x))+1/4*x^2)^3,x,method=_
RETURNVERBOSE)
```

output
```
2/9/x^4/ln(ln(ln(x))+1/4*x^2)^2
```

3.483. $\int \frac{-16-8x^2\log(x)+\left(-8x^2\log(x)-32\log(x)\log(\log(x))\right)\log\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}{\left(9x^7\log(x)+36x^5\log(x)\log(\log(x))\right)\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}\,dx$

3.483.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-16-8x^2\log(x)+(-8x^2\log(x)-32\log(x)\log(\log(x)))\log\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}{(9x^7\log(x)+36x^5\log(x)\log(\log(x)))\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}\,dx = \frac{2}{9\,x^4\log\left(\frac{1}{4}\,x^2+\log\left(\log\left(x\right)\right)\right)^2}$$

input
```
integrate(((-32*log(x)*log(log(x))-8*x^2*log(x))*log(log(log(x))+1/4*x^2)-
8*x^2*log(x)-16)/(36*x^5*log(x)*log(log(x))+9*x^7*log(x))/log(log(log(x))+
1/4*x^2)^3,x, algorithm=\
```

output
```
2/9/(x^4*log(1/4*x^2 + log(log(x)))^2)
```

3.483.6 Sympy [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-16-8x^2\log(x)+(-8x^2\log(x)-32\log(x)\log(\log(x)))\log\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}{(9x^7\log(x)+36x^5\log(x)\log(\log(x)))\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}\,dx = \frac{2}{9x^4\log\left(\frac{x^2}{4}+\log\left(\log\left(x\right)\right)\right)^2}$$

input
```
integrate(((-32*ln(x)*ln(ln(x))-8*x**2*ln(x))*ln(ln(ln(x))+1/4*x**2)-8*x**
2*ln(x)-16)/(36*x**5*ln(x)*ln(ln(x))+9*x**7*ln(x))/ln(ln(ln(x))+1/4*x**2)*
*3,x)
```

output
```
2/(9*x**4*log(x**2/4 + log(log(x)))**2)
```

3.483.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(17) = 34$.

Time = 0.33 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.24

$$\int \frac{-16-8x^2\log(x)+(-8x^2\log(x)-32\log(x)\log(\log(x)))\log\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}{(9x^7\log(x)+36x^5\log(x)\log(\log(x)))\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}\,dx$$
$$= \frac{2}{9\left(4\,x^4\log\left(2\right)^2-4\,x^4\log\left(2\right)\log\left(x^2+4\,\log\left(\log\left(x\right)\right)\right)+x^4\log\left(x^2+4\,\log\left(\log\left(x\right)\right)\right)^2\right)}$$

input
```
integrate(((-32*log(x)*log(log(x))-8*x^2*log(x))*log(log(log(x))+1/4*x^2)-
8*x^2*log(x)-16)/(36*x^5*log(x)*log(log(x))+9*x^7*log(x))/log(log(log(x))+
1/4*x^2)^3,x, algorithm=\
```

output
```
2/9/(4*x^4*log(2)^2 - 4*x^4*log(2)*log(x^2 + 4*log(log(x))) + x^4*log(x^2
+ 4*log(log(x)))^2)
```

3.483.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 104 vs. $2(17) = 34$.

Time = 0.32 (sec) , antiderivative size = 104, normalized size of antiderivative = 4.95

$$\int \frac{-16-8x^2\log(x)+(-8x^2\log(x)-32\log(x)\log(\log(x)))\log\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}{(9x^7\log(x)+36x^5\log(x)\log(\log(x)))\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}\,dx$$
$$= \frac{2\left(x^2\log\left(x\right)+2\right)}{9\left(4\,x^6\log\left(2\right)^2\log\left(x\right)-4\,x^6\log\left(2\right)\log\left(x^2+4\,\log\left(\log\left(x\right)\right)\right)\log\left(x\right)+x^6\log\left(x^2+4\,\log\left(\log\left(x\right)\right)\right)^2\log\left(x\right)\right.}$$

input
```
integrate(((-32*log(x)*log(log(x))-8*x^2*log(x))*log(log(log(x))+1/4*x^2)-
8*x^2*log(x)-16)/(36*x^5*log(x)*log(log(x))+9*x^7*log(x))/log(log(log(x))+
1/4*x^2)^3,x, algorithm=\
```

output
```
2/9*(x^2*log(x) + 2)/(4*x^6*log(2)^2*log(x) - 4*x^6*log(2)*log(x^2 + 4*log
(log(x)))*log(x) + x^6*log(x^2 + 4*log(log(x)))^2*log(x) + 8*x^4*log(2)^2
- 8*x^4*log(2)*log(x^2 + 4*log(log(x))) + 2*x^4*log(x^2 + 4*log(log(x)))^2
)
```

3.483.9 Mupad [B] (verification not implemented)

Time = 15.96 (sec) , antiderivative size = 519, normalized size of antiderivative = 24.71

$$\int \frac{-16-8x^2\log(x)+\left(-8x^2\log(x)-32\log(x)\log(\log(x))\right)\log\left(\frac{1}{4}(x^2+4\log(\log(x)))\right)}{\left(9x^7\log(x)+36x^5\log(x)\log(\log(x))\right)\log^3\left(\frac{1}{4}\left(x^2+4\log(\log(x))\right)\right)}\,dx$$
$$= \text{Too large to display}$$

input
```
int(-(8*x^2*log(x) + log(log(log(x)) + x^2/4)*(8*x^2*log(x) + 32*log(log(x
))*log(x)) + 16)/(log(log(log(x)) + x^2/4)^3*(9*x^7*log(x) + 36*x^5*log(lo
g(x))*log(x))),x)
```

output
```
4/(9*x^4) - ((2*log(x)*(4*log(log(x)) + x^2))/(9*x^4*(x^2*log(x) + 2)) - (
2*log(log(log(x)) + x^2/4)*log(x)*(4*log(log(x)) + x^2)*(4*log(log(x)) - 2
*x^4*log(x)^2 - 16*log(log(x))*log(x) + x^2 - 12*x^2*log(log(x))*log(x)^2
+ 4))/(9*x^4*(x^2*log(x) + 2)^3))/log(log(log(x)) + x^2/4) + (2/(9*x^4) +
(2*log(log(log(x)) + x^2/4)*log(x)*(4*log(log(x)) + x^2))/(9*x^4*(x^2*log(
x) + 2)))/log(log(log(x)) + x^2/4)^2 - (log(log(x))*(log(x)*(x^2*((16*(x^2
 - 20))/(9*x^6) + 416/(9*x^6)) - 64/(9*x^4)) - (40*log(x)^3)/9 - (32*(x^2
- 4))/(9*x^6) + (32*(x^2 - 20))/(9*x^6) - (32*log(x)^2)/(9*x^2) + 512/(9*x
^6)))/(12*x^2*log(x) + 6*x^4*log(x)^2 + x^6*log(x)^3 + 8) - (log(log(x))^2
*(log(x)*(x^2*((32*(x^2 - 20))/(9*x^8) + 896/(9*x^8)) - 256/(9*x^6)) - (64
*(x^2 - 4))/(9*x^8) + (64*(x^2 - 20))/(9*x^8) - (32*log(x)^3)/(3*x^2) - (1
28*log(x)^2)/(9*x^4) + 1024/(9*x^8)))/(12*x^2*log(x) + 6*x^4*log(x)^2 + x^
6*log(x)^3 + 8) + (8*(x^2 - 4))/(3*x^3*(4*x - x^3)*(x^2*log(x) + 2)) - (4*
(16*x - 8*x^3 + x^5))/(9*x^4*(4*x - x^3)*(12*x^2*log(x) + 6*x^4*log(x)^2 +
 x^6*log(x)^3 + 8)) + (2*(x^4 - 24*x^2 + 80))/(9*x^3*(4*x - x^3)*(4*x^2*lo
g(x) + x^4*log(x)^2 + 4))
```

3.484 $\int \frac{e^{-2-\frac{-4x+e^2x\log(x^2)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+(-20+e^2(10-2x)+4x)\log\left(\frac{25}{2}\right)\right.}{(-5+x)\log^2(5-x)}$

3.484.1 Optimal result

Integrand size = 94, antiderivative size = 28

$$\int \frac{e^{-2-\frac{-4x+e^2x\log(x^2)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+(-20+e^2(10-2x)+4x)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5\right.}{(-5+x)\log^2(5-x)}$$

$$=\frac{e^{-x\left(-\frac{4}{e^2}+\log(x^2)\right)}\log\left(\frac{25}{2}\right)}{\log(5-x)}$$

output
```
ln(25/2)/exp(x*(ln(x^2)-4/exp(2)))/ln(5-x)
```

3.484.2 Mathematica [A] (verified)

Time = 0.45 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{e^{-2-\frac{-4x+e^2x\log(x^2)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+(-20+e^2(10-2x)+4x)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5\right.}{(-5+x)\log^2(5-x)}$$

$$=\frac{e^{\frac{4x}{e^2}}(x^2)^{-x}\log\left(\frac{25}{2}\right)}{\log(5-x)}$$

input
```
Integrate[(E^(-2 - (-4*x + E^2*x*Log[x^2])/E^2)*(-(E^2*Log[25/2]) + (-20 +
 E^2*(10 - 2*x) + 4*x)*Log[25/2]*Log[5 - x] + E^2*(5 - x)*Log[25/2]*Log[5
- x]*Log[x^2]))/((-5 + x)*Log[5 - x]^2),x]
```


$$\int \frac{e^{-2-\frac{-4x+e^2x\log(x^2)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+(-20+e^2(10-2x)+4x)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5-x)\log(x^2)\right)}{(-5+x)\log^2(5-x)}\,dx$$

output
```
(E^((4*x)/E^2)*Log[25/2])/((x^2)^x*Log[5 - x])
```

3.484.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 104 vs. 2(28) = 56.

Time = 0.53 (sec) , antiderivative size = 104, normalized size of antiderivative = 3.71, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.011, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-\frac{e^2x\log\left(x^2\right)-4x}{e^2}-2}\left(e^2(5-x)\log\left(\frac{25}{2}\right)\log\left(x^2\right)\log(5-x)+\left(e^2(10-2x)+4x-20\right)\log\left(\frac{25}{2}\right)\log(5-x)-e^2\log\left(\right.\right.}{(x-5)\log^2(5-x)}$$

$$\Big\downarrow \text{2726}$$

$$\frac{e^{\frac{4x}{e^2}}\left(x^2\right)^{-x}\left(2\left(-e^2(5-x)-2x+10\right)\log\left(\frac{25}{2}\right)\log(5-x)-e^2(5-x)\log\left(\frac{25}{2}\right)\log(5-x)\log\left(x^2\right)\right)}{(5-x)\log^2(5-x)\left(2\left(2-e^2\right)-e^2\log\left(x^2\right)\right)}$$

input
```
Int[(E^(-2 - (-4*x + E^2*x*Log[x^2])/E^2)*(-(E^2*Log[25/2]) + (-20 + E^2*(
10 - 2*x) + 4*x)*Log[25/2]*Log[5 - x] + E^2*(5 - x)*Log[25/2]*Log[5 - x]*L
og[x^2]))/((-5 + x)*Log[5 - x]^2),x]
```

output
```
(E^((4*x)/E^2)*(2*(10 - E^2*(5 - x) - 2*x)*Log[25/2]*Log[5 - x] - E^2*(5 -
 x)*Log[25/2]*Log[5 - x]*Log[x^2]))/((5 - x)*(x^2)^x*Log[5 - x]^2*(2*(2 -
E^2) - E^2*Log[x^2]))
```

3.484.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.484.4 Maple [A] (verified)

Time = 4.48 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

method	result	size
parallelrisch	$\frac{\ln\left(\frac{25}{2}\right)\mathrm{e}^{-x\left(\mathrm{e}^{2}\ln\left(x^{2}\right)-4\right)\mathrm{e}^{-2}}}{\ln(5-x)}$	30
risch	$-\frac{(-2\ln(5)+\ln(2))\mathrm{e}^{-\frac{x\left(-i\mathrm{e}^{2}\pi\,\mathrm{csgn}\left(ix^{2}\right)^{3}+2i\mathrm{e}^{2}\pi\,\mathrm{csgn}\left(ix^{2}\right)^{2}\mathrm{csgn}(ix)-i\mathrm{e}^{2}\pi\,\mathrm{csgn}\left(ix^{2}\right)\mathrm{csgn}(ix)^{2}+4\,\mathrm{e}^{2}\ln(x)-8\right)\mathrm{e}^{-2}}{2}}}{\ln(5-x)}$	87

input
```
int(((5-x)*exp(2)*ln(25/2)*ln(5-x)*ln(x^2)+((-2*x+10)*exp(2)+4*x-20)*ln(25
/2)*ln(5-x)-exp(2)*ln(25/2))/(-5+x)/exp(2)/ln(5-x)^2/exp((x*exp(2)*ln(x^2)
-4*x)/exp(2)),x,method=_RETURNVERBOSE)
```

output
```
ln(25/2)/ln(5-x)/exp(x*(exp(2)*ln(x^2)-4)/exp(2))
```

3.484.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{e^{-2-\frac{-4x+e^2x\log\left(x^2\right)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+\left(-20+e^2(10-2x)+4x\right)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5\right.}{(-5+x)\log^2(5-x)}$$
$$=\frac{e^{\left(-\left(xe^2\log\left(x^2\right)-4\,x+2\,e^2\right)e^{(-2)}+2\right)}\log\left(\frac{25}{2}\right)}{\log\left(-x+5\right)}$$

input
```
integrate(((5-x)*exp(2)*log(25/2)*log(5-x)*log(x^2)+((-2*x+10)*exp(2)+4*x-
20)*log(25/2)*log(5-x)-exp(2)*log(25/2))/(-5+x)/exp(2)/log(5-x)^2/exp((x*e
xp(2)*log(x^2)-4*x)/exp(2)),x, algorithm=\
```

output
```
e^(-(x*e^2*log(x^2) - 4*x + 2*e^2)*e^(-2) + 2)*log(25/2)/log(-x + 5)
```

3.484. $\int \frac{e^{-2-\frac{-4x+e^2x\log\left(x^2\right)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+\left(-20+e^2(10-2x)+4x\right)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5-x)\log\left(x^2\right)\right)}{(-5+x)\log^2(5-x)}\,dx$

3.484.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{e^{-2-\frac{-4x+e^2x\log\left(x^2\right)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+\left(-20+e^2(10-2x)+4x\right)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5}{(-5+x)\log^2(5-x)}$$
$$=\frac{\left(-\log\left(2\right)+2\log\left(5\right)\right)e^{-\frac{xe^2\log\left(x^2\right)-4x}{e^2}}}{\log\left(5-x\right)}$$

input
```
integrate(((5-x)*exp(2)*ln(25/2)*ln(5-x)*ln(x**2)+((-2*x+10)*exp(2)+4*x-20
)*ln(25/2)*ln(5-x)-exp(2)*ln(25/2))/(-5+x)/exp(2)/ln(5-x)**2/exp((x*exp(2)
*ln(x**2)-4*x)/exp(2)),x)
```

output
```
(-log(2) + 2*log(5))*exp(-(x*exp(2)*log(x**2) - 4*x)*exp(-2))/log(5 - x)
```

3.484.7 Maxima [A] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{e^{-2-\frac{-4x+e^2x\log\left(x^2\right)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+\left(-20+e^2(10-2x)+4x\right)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5}{(-5+x)\log^2(5-x)}$$
$$=\frac{(2\log\left(5\right)-\log\left(2\right))e^{\left(4\,xe^{(-2)}-2\,x\log\left(x\right)\right)}}{\log\left(-x+5\right)}$$

input
```
integrate(((5-x)*exp(2)*log(25/2)*log(5-x)*log(x^2)+((-2*x+10)*exp(2)+4*x-
20)*log(25/2)*log(5-x)-exp(2)*log(25/2))/(-5+x)/exp(2)/log(5-x)^2/exp((x*e
xp(2)*log(x^2)-4*x)/exp(2)),x, algorithm=\
```

output
```
(2*log(5) - log(2))*e^(4*x*e^(-2) - 2*x*log(x))/log(-x + 5)
```

3.484.

$$\int \frac{e^{-2-\frac{-4x+e^2x\log\left(x^2\right)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+\left(-20+e^2(10-2x)+4x\right)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5-x)\log\left(x^2\right)\right)}{(-5+x)\log^2(5-x)}\,dx$$

3.484.8 Giac [F(-2)]

Exception generated.

$$\int \frac{e^{-2-\frac{-4x+e^2x\log(x^2)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+(-20+e^2(10-2x)+4x)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5\right.}{(-5+x)\log^2(5-x)}$$

= Exception raised: TypeError

input
```
integrate(((5-x)*exp(2)*log(25/2)*log(5-x)*log(x^2)+((-2*x+10)*exp(2)+4*x-
20)*log(25/2)*log(5-x)-exp(2)*log(25/2))/(-5+x)/exp(2)/log(5-x)^2/exp((x*e
xp(2)*log(x^2)-4*x)/exp(2)),x, algorithm=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:Unable to divide, perhaps due to ro
unding error%%%{-4,[0,0,5,4,1,0]%%%}+%%%{4,[0,0,5,4,0,1]%%%}+%%%{1,[0,0,4,
5,1,0]%%%
```

3.484.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-2-\frac{-4x+e^2x\log(x^2)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+(-20+e^2(10-2x)+4x)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5\right.}{(-5+x)\log^2(5-x)}$$

$$= \int -\frac{e^{-2}\,e^{e^{-2}\,(4\,x-x\,\ln(x^2)\,e^2)}\,\left(e^2\,\ln\left(\frac{25}{2}\right)+\ln\left(\frac{25}{2}\right)\,\ln(5-x)\,\left(e^2\,(2\,x-10)-4\,x+20\right)+\ln(x^2)\,e^2\,\ln\left(\frac{25}{2}\right)\,\ln\left(\right.\right.}{\ln(5-x)^2\,(x-5)}$$

input
```
int(-(exp(-2)*exp(exp(-2)*(4*x - x*log(x^2)*exp(2)))*(exp(2)*log(25/2) + l
og(25/2)*log(5 - x)*(exp(2)*(2*x - 10) - 4*x + 20) + log(x^2)*exp(2)*log(2
5/2)*log(5 - x)*(x - 5)))/(log(5 - x)^2*(x - 5)),x)
```

output
```
int(-(exp(-2)*exp(exp(-2)*(4*x - x*log(x^2)*exp(2)))*(exp(2)*log(25/2) + l
og(25/2)*log(5 - x)*(exp(2)*(2*x - 10) - 4*x + 20) + log(x^2)*exp(2)*log(2
5/2)*log(5 - x)*(x - 5)))/(log(5 - x)^2*(x - 5)), x)
```

3.484. $\int \frac{e^{-2-\frac{-4x+e^2x\log(x^2)}{e^2}}\left(-e^2\log\left(\frac{25}{2}\right)+(-20+e^2(10-2x)+4x)\log\left(\frac{25}{2}\right)\log(5-x)+e^2(5-x)\log\left(\frac{25}{2}\right)\log(5-x)\log(x^2)\right)}{(-5+x)\log^2(5-x)}\,dx$

3.485 $\int \frac{-2e^{4x}+e^{4x}(-4+8x)\log(x)}{3x^3\log^2(x)}\,dx$

3.485.1 Optimal result

Integrand size = 32, antiderivative size = 16

$$\int \frac{-2e^{4x}+e^{4x}(-4+8x)\log(x)}{3x^3\log^2(x)}\,dx = \frac{2e^{4x}}{3x^2\log(x)}$$

output
```
2/3*exp(4*x)/ln(x)/x^2
```

3.485.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{-2e^{4x}+e^{4x}(-4+8x)\log(x)}{3x^3\log^2(x)}\,dx = \frac{2e^{4x}}{3x^2\log(x)}$$

input
```
Integrate[(-2*E^(4*x) + E^(4*x)*(-4 + 8*x)*Log[x])/(3*x^3*Log[x]^2),x]
```

output
```
(2*E^(4*x))/(3*x^2*Log[x])
```

3.485.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {27, 27, 7292, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{4x}(8x-4)\log(x)-2e^{4x}}{3x^3\log^2(x)}\,dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{3}\int -\frac{2\left(2e^{4x}(1-2x)\log(x)+e^{4x}\right)}{x^3\log^2(x)}dx$$

$$\Big\downarrow \; 27$$

$$-\frac{2}{3}\int \frac{2e^{4x}(1-2x)\log(x)+e^{4x}}{x^3\log^2(x)}dx$$

$$\Big\downarrow \; 7292$$

$$-\frac{2}{3}\int \frac{e^{4x}(-4x\log(x)+2\log(x)+1)}{x^3\log^2(x)}dx$$

$$\Big\downarrow \; 2726$$

$$\frac{2e^{4x}}{3x^2\log(x)}$$

input
```
Int[(-2*E^(4*x) + E^(4*x)*(-4 + 8*x)*Log[x])/(3*x^3*Log[x]^2),x]
```

output
```
(2*E^(4*x))/(3*x^2*Log[x])
```

3.485.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.485.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

method	result	size
risch	$\frac{2\,\mathrm{e}^{4x}}{3\ln(x)x^2}$	14
parallelrisch	$\frac{2\,\mathrm{e}^{4x}}{3\ln(x)x^2}$	14

input
```
int(1/3*((8*x-4)*exp(4*x)*ln(x)-2*exp(4*x))/x^3/ln(x)^2,x,method=_RETURNVE
RBOSE)
```

output
```
2/3*exp(4*x)/ln(x)/x^2
```

3.485.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-2e^{4x}+e^{4x}(-4+8x)\log(x)}{3x^3\log^2(x)}\,dx=\frac{2\,e^{(4\,x)}}{3\,x^2\log{(x)}}$$

input
```
integrate(1/3*((8*x-4)*exp(4*x)*log(x)-2*exp(4*x))/x^3/log(x)^2,x, algorit
hm=\
```

output
```
2/3*e^(4*x)/(x^2*log(x))
```

3.485.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{-2e^{4x}+e^{4x}(-4+8x)\log(x)}{3x^3\log^2(x)}\,dx=\frac{2e^{4x}}{3x^2\log{(x)}}$$

input
```
integrate(1/3*((8*x-4)*exp(4*x)*ln(x)-2*exp(4*x))/x**3/ln(x)**2,x)
```

output
```
2*exp(4*x)/(3*x**2*log(x))
```

3.485.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-2e^{4x}+e^{4x}(-4+8x)\log(x)}{3x^3\log^2(x)}\,dx=\frac{2\,e^{(4\,x)}}{3\,x^2\log{(x)}}$$

input
```
integrate(1/3*((8*x-4)*exp(4*x)*log(x)-2*exp(4*x))/x^3/log(x)^2,x, algorit
hm=\
```

output
```
2/3*e^(4*x)/(x^2*log(x))
```

3.485.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-2e^{4x}+e^{4x}(-4+8x)\log(x)}{3x^3\log^2(x)}\,dx=\frac{2\,e^{(4\,x)}}{3\,x^2\log{(x)}}$$

input
```
integrate(1/3*((8*x-4)*exp(4*x)*log(x)-2*exp(4*x))/x^3/log(x)^2,x, algorit
hm=\
```

output
```
2/3*e^(4*x)/(x^2*log(x))
```

3.485.9 Mupad [B] (verification not implemented)

Time = 14.71 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-2e^{4x} + e^{4x}(-4+8x)\log(x)}{3x^3\log^2(x)}\,dx = \frac{2\,\mathrm{e}^{4\,x}}{3\,x^2\,\ln(x)}$$

input
```
int(-((2*exp(4*x))/3 - (exp(4*x)*log(x)*(8*x - 4))/3)/(x^3*log(x)^2),x)
```

output
```
(2*exp(4*x))/(3*x^2*log(x))
```

3.486 $\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+\left(18-12x+2x^2\right)\log(4)+(-\right.}{9x-6x^2+}$

3.486.1 Optimal result

Integrand size = 152, antiderivative size = 26

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+\left(18-12x+2x^2\right)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-3\right.}{9x-6x^2+x^3+\left(-6x+2x^2\right)\log(4)+x}$$
$$=e^{-2+\frac{3}{x}}\left(e^{\frac{2}{-3+x+\log(4)}}-x\right)x$$

output
```
exp(3/x-2)*x*(exp(2/(2*ln(2)+x-3))-x)
```

3.486.2 Mathematica [F]

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+\left(18-12x+2x^2\right)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-3\right.}{9x-6x^2+x^3+\left(-6x+2x^2\right)\log(4)+x}$$
$$=\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+\left(18-12x+2x^2\right)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-\right.}{9x-6x^2+x^3+\left(-6x+2x^2\right)\log(4)+}$$

input
```
Integrate[(E^((3 - 2*x)/x + 2/(-3 + x + Log[4]))*(-27 + 27*x - 11*x^2 + x^
3 + (18 - 12*x + 2*x^2)*Log[4] + (-3 + x)*Log[4]^2) + E^((3 - 2*x)/x)*(27*
x - 36*x^2 + 15*x^3 - 2*x^4 + (-18*x + 18*x^2 - 4*x^3)*Log[4] + (3*x - 2*x
^2)*Log[4]^2))/(9*x - 6*x^2 + x^3 + (-6*x + 2*x^2)*Log[4] + x*Log[4]^2),x]
```

3.486.
$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+\left(18-12x+2x^2\right)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-36x^2+15x^3-2x^4+\left(-18x+18x^2-4x^3\right)\log(4\right.}{9x-6x^2+x^3+\left(-6x+2x^2\right)\log(4)+x\log^2(4)}$

output
```
Integrate[(E^((3 - 2*x)/x + 2/(-3 + x + Log[4]))*(-27 + 27*x - 11*x^2 + x^
3 + (18 - 12*x + 2*x^2)*Log[4] + (-3 + x)*Log[4]^2) + E^((3 - 2*x)/x)*(27*
x - 36*x^2 + 15*x^3 - 2*x^4 + (-18*x + 18*x^2 - 4*x^3)*Log[4] + (3*x - 2*x
^2)*Log[4]^2))/(9*x - 6*x^2 + x^3 + (-6*x + 2*x^2)*Log[4] + x*Log[4]^2), x
]
```

3.486.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{x-3+\log(4)}}\left(x^3-11x^2+\left(2x^2-12x+18\right)\log(4)+27x+(x-3)\log^2(4)-27\right)+e^{\frac{3-2x}{x}}\left(-2x^4+15x^3-3\right.}{x^3-6x^2+\left(2x^2-6x\right)\log(4)+9x+x\log^2(4)}$$

$\big\downarrow$ 6

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{x-3+\log(4)}}\left(x^3-11x^2+\left(2x^2-12x+18\right)\log(4)+27x+(x-3)\log^2(4)-27\right)+e^{\frac{3-2x}{x}}\left(-2x^4+15x^3-3\right.}{x^3-6x^2+\left(2x^2-6x\right)\log(4)+x\left(9+\log^2(4)\right)}$$

$\big\downarrow$ 2026

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{x-3+\log(4)}}\left(x^3-11x^2+\left(2x^2-12x+18\right)\log(4)+27x+(x-3)\log^2(4)-27\right)+e^{\frac{3-2x}{x}}\left(-2x^4+15x^3-3\right.}{x\left(x^2-2x(3-\log(4))+(\log(4)-3)^2\right)}$$

$\big\downarrow$ 2007

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{x-3+\log(4)}}\left(x^3-11x^2+\left(2x^2-12x+18\right)\log(4)+27x+(x-3)\log^2(4)-27\right)+e^{\frac{3-2x}{x}}\left(-2x^4+15x^3-3\right.}{x(x-3+\log(4))^2}$$

$\big\downarrow$ 7239

$$\int e^{\frac{3}{x}-2}\left(\frac{e^{\frac{2}{x-3+\log(4)}}\left(x^3+x^2(\log(16)-11)+x\left(27+\log^2(4)-12\log(4)\right)-3(\log(4)-3)^2\right)}{x(x-3+\log(4))^2}-2x+3\right)dx$$

$\big\downarrow$ 7293

$$\int \left(\frac{e^{\frac{3}{x}+\frac{2}{x-3+\log(4)}-2}\left(x^3-x^2(11-\log(16))+x(3-\log(4))(9-\log(4))-3(3-\log(4))^2\right)}{x(-x+3-\log(4))^2}-2e^{\frac{3}{x}-2}x+3e^{\frac{3}{x}-2}\right)dx$$

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+\left(18-12x+2x^2\right)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-36x^2+15x^3-2x^4+\left(-18x+18x^2-4x^3\right)\log(4)\right.}{9x-6x^2+x^3+\left(-6x+2x^2\right)\log(4)+x\log^2(4)}$$

$$\Big\downarrow \text{2009}$$

$$\int e^{\frac{2}{x+\log(4)-3}-2+\frac{3}{x}}dx-3\int \frac{e^{\frac{2}{x+\log(4)-3}-2+\frac{3}{x}}}{x}dx-(6-\log(16))\int \frac{e^{\frac{2}{x+\log(4)-3}-2+\frac{3}{x}}}{(x+\log(4)-3)^2}dx-2\int \frac{e^{\frac{2}{x+\log(4)-3}-2+\frac{3}{x}}}{x+\log(4)-3}dx-e^{\frac{3}{x}-2}x^2$$

input
```
Int[(E^((3 - 2*x)/x + 2/(-3 + x + Log[4]))*(-27 + 27*x - 11*x^2 + x^3 + (1
8 - 12*x + 2*x^2)*Log[4] + (-3 + x)*Log[4]^2) + E^((3 - 2*x)/x)*(27*x - 36
*x^2 + 15*x^3 - 2*x^4 + (-18*x + 18*x^2 - 4*x^3)*Log[4] + (3*x - 2*x^2)*Lo
g[4]^2))/(9*x - 6*x^2 + x^3 + (-6*x + 2*x^2)*Log[4] + x*Log[4]^2),x]
```

output
```
$Aborted
```

3.486.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.486.

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+\left(18-12x+2x^2\right)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-36x^2+15x^3-2x^4+\left(-18x+18x^2-4x^3\right)\log(4)\right.}{9x-6x^2+x^3+\left(-6x+2x^2\right)\log(4)+x\log^2(4)}$$

3.486.4 Maple [A] (verified)

Time = 2.98 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.65

method	result	size
parallelrisch	$-{\mathrm e}^{-\frac{-3+2 x}{x}} x^{2}+x \,{\mathrm e}^{-\frac{-3+2 x}{x}} {\mathrm e}^{\frac{2}{2 \ln \left(2\right)+x -3}}$	43
risch	$-{\mathrm e}^{-\frac{-3+2 x}{x}} x^{2}+{\mathrm e}^{-\frac{4 x \ln \left(2\right)+2 x^{2}-6 \ln \left(2\right)-11 x +9}{x \left(2 \ln \left(2\right)+x -3\right)}} x$	54
norman	$\frac{x^{2} {\mathrm e}^{\frac{3-2 x}{x}} {\mathrm e}^{\frac{2}{2 \ln \left(2\right)+x -3}}+\left(3-2 \ln \left(2\right)\right) x^{2} {\mathrm e}^{\frac{3-2 x}{x}}+\left(2 \ln \left(2\right)-3\right) x \,{\mathrm e}^{\frac{3-2 x}{x}} {\mathrm e}^{\frac{2}{2 \ln \left(2\right)+x -3}}-x^{3} {\mathrm e}^{\frac{3-2 x}{x}}}{2 \ln \left(2\right)+x -3}$	103

input
```
int(((4*(-3+x)*ln(2)^2+2*(2*x^2-12*x+18)*ln(2)+x^3-11*x^2+27*x-27)*exp((3-
2*x)/x)*exp(2/(2*ln(2)+x-3))+(4*(-2*x^2+3*x)*ln(2)^2+2*(-4*x^3+18*x^2-18*x
)*ln(2)-2*x^4+15*x^3-36*x^2+27*x)*exp((3-2*x)/x))/(4*x*ln(2)^2+2*(2*x^2-6*
x)*ln(2)+x^3-6*x^2+9*x),x,method=_RETURNVERBOSE)
```

output
```
-exp(-(-3+2*x)/x)*x^2+x*exp(-(-3+2*x)/x)*exp(2/(2*ln(2)+x-3))
```

3.486.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(27) = 54.

Time = 0.26 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.12

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+(18-12x+2x^2)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-3\right.}{9x-6x^2+x^3+(-6x+2x^2)\log(4)+x}$$
$$= -x^2e^{\left(-\frac{2x-3}{x}\right)}+xe^{\left(-\frac{2x^2+2(2x-3)\log(2)-11x+9}{x^2+2x\log(2)-3x}\right)}$$

input
```
integrate(((4*(-3+x)*log(2)^2+2*(2*x^2-12*x+18)*log(2)+x^3-11*x^2+27*x-27)
*exp((3-2*x)/x)*exp(2/(2*log(2)+x-3))+(4*(-2*x^2+3*x)*log(2)^2+2*(-4*x^3+1
8*x^2-18*x)*log(2)-2*x^4+15*x^3-36*x^2+27*x)*exp((3-2*x)/x))/(4*x*log(2)^2
+2*(2*x^2-6*x)*log(2)+x^3-6*x^2+9*x),x, algorithm=\
```

output
```
-x^2*e^(-(2*x - 3)/x) + x*e^(-(2*x^2 + 2*(2*x - 3)*log(2) - 11*x + 9)/(x^2
 + 2*x*log(2) - 3*x))
```


$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+(18-12x+2x^2)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-36x^2+15x^3-2x^4+(-18x+18x^2-4x^3)\log(4\right.}{9x-6x^2+x^3+(-6x+2x^2)\log(4)+x\log^2(4)}$$

3.486.6 Sympy [A] (verification not implemented)

Time = 1.20 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+(18-12x+2x^2)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-3\right.}{9x-6x^2+x^3+(-6x+2x^2)\log(4)+x}$$
$$= -x^2e^{\frac{3-2x}{x}}+xe^{\frac{3-2x}{x}}e^{\frac{2}{x-3+2\log(2)}}$$

input
```
integrate(((4*(-3+x)*ln(2)**2+2*(2*x**2-12*x+18)*ln(2)+x**3-11*x**2+27*x-2
7)*exp((3-2*x)/x)*exp(2/(2*ln(2)+x-3))+(4*(-2*x**2+3*x)*ln(2)**2+2*(-4*x**
3+18*x**2-18*x)*ln(2)-2*x**4+15*x**3-36*x**2+27*x)*exp((3-2*x)/x))/(4*x*ln
(2)**2+2*(2*x**2-6*x)*ln(2)+x**3-6*x**2+9*x),x)
```

output
```
-x**2*exp((3 - 2*x)/x) + x*exp((3 - 2*x)/x)*exp(2/(x - 3 + 2*log(2)))
```

3.486.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+(18-12x+2x^2)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-3\right.}{9x-6x^2+x^3+(-6x+2x^2)\log(4)+x}$$
$$= -\left(x^2e^{\frac{3}{x}}-xe^{\left(\frac{2}{x+2\log(2)-3}+\frac{3}{x}\right)}\right)e^{(-2)}$$

input
```
integrate(((4*(-3+x)*log(2)^2+2*(2*x^2-12*x+18)*log(2)+x^3-11*x^2+27*x-27)
*exp((3-2*x)/x)*exp(2/(2*log(2)+x-3))+(4*(-2*x^2+3*x)*log(2)^2+2*(-4*x^3+1
8*x^2-18*x)*log(2)-2*x^4+15*x^3-36*x^2+27*x)*exp((3-2*x)/x))/(4*x*log(2)^2
+2*(2*x^2-6*x)*log(2)+x^3-6*x^2+9*x),x, algorithm=\
```

output
```
-(x^2*e^(3/x) - x*e^(2/(x + 2*log(2) - 3) + 3/x))*e^(-2)
```

3.486.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(27) = 54.

Time = 0.51 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.12

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+(18-12x+2x^2)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}(27x-3}{9x-6x^2+x^3+(-6x+2x^2)\log(4)+x}$$

$$=-x^2e^{\left(-\frac{2x-3}{x}\right)}+xe^{\left(-\frac{2x^2+4x\log(2)-11x-6\log(2)+9}{x^2+2x\log(2)-3x}\right)}$$

input
```
integrate(((4*(-3+x)*log(2)^2+2*(2*x^2-12*x+18)*log(2)+x^3-11*x^2+27*x-27)
*exp((3-2*x)/x)*exp(2/(2*log(2)+x-3))+(4*(-2*x^2+3*x)*log(2)^2+2*(-4*x^3+1
8*x^2-18*x)*log(2)-2*x^4+15*x^3-36*x^2+27*x)*exp((3-2*x)/x))/(4*x*log(2)^2
+2*(2*x^2-6*x)*log(2)+x^3-6*x^2+9*x),x, algorithm=\
```

output
```
-x^2*e^(-(2*x - 3)/x) + x*e^(-(2*x^2 + 4*x*log(2) - 11*x - 6*log(2) + 9)/(
x^2 + 2*x*log(2) - 3*x))
```

3.486.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+(18-12x+2x^2)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}(27x-3}{9x-6x^2+x^3+(-6x+2x^2)\log(4)+x}$$

= Hanged

input
```
int((exp(-(2*x - 3)/x)*(27*x - 2*log(2)*(18*x - 18*x^2 + 4*x^3) + 4*log(2)
^2*(3*x - 2*x^2) - 36*x^2 + 15*x^3 - 2*x^4) + exp(2/(x + 2*log(2) - 3))*ex
p(-(2*x - 3)/x)*(27*x + 4*log(2)^2*(x - 3) + 2*log(2)*(2*x^2 - 12*x + 18)
- 11*x^2 + x^3 - 27))/(9*x - 2*log(2)*(6*x - 2*x^2) + 4*x*log(2)^2 - 6*x^2
 + x^3),x)
```

output
```
\text{Hanged}
```

3.486. $\int \frac{e^{\frac{3-2x}{x}+\frac{2}{-3+x+\log(4)}}\left(-27+27x-11x^2+x^3+(18-12x+2x^2)\log(4)+(-3+x)\log^2(4)\right)+e^{\frac{3-2x}{x}}\left(27x-36x^2+15x^3-2x^4+(-18x+18x^2-4x^3)\log(4)\right.}{9x-6x^2+x^3+(-6x+2x^2)\log(4)+x\log^2(4)}$

3.487 $\int \frac{3+3x+2x^2}{x} dx$

3.487.1 Optimal result

Integrand size = 14, antiderivative size = 13

$$\int \frac{3+3x+2x^2}{x} dx = x^2 + 3(-2+x+\log(2x))$$

output
```
x^2+3*x+3*ln(2*x)-6
```

3.487.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{3+3x+2x^2}{x} dx = 3x + x^2 + 3\log(x)$$

input
```
Integrate[(3 + 3*x + 2*x^2)/x,x]
```

output
```
3*x + x^2 + 3*Log[x]
```

3.487.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+3x+3}{x}\,dx$$

$$\Big\downarrow \text{1140}$$

$$\int \left(2x+\frac{3}{x}+3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^2+3x+3\log(x)$$

input
```
Int[(3 + 3*x + 2*x^2)/x,x]
```

output
```
3*x + x^2 + 3*Log[x]
```

3.487.3.1 Defintions of rubi rules used

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.487.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

method	result	size
default	$3x + x^2 + 3\ln(x)$	12
norman	$3x + x^2 + 3\ln(x)$	12
risch	$3x + x^2 + 3\ln(x)$	12
parallelrisch	$3x + x^2 + 3\ln(x)$	12

input
```
int((2*x^2+3*x+3)/x,x,method=_RETURNVERBOSE)
```

output
```
3*x+x^2+3*ln(x)
```

3.487.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{3 + 3x + 2x^2}{x}\,dx = x^2 + 3\,x + 3\,\log(x)$$

input
```
integrate((2*x^2+3*x+3)/x,x, algorithm=\
```

output
```
x^2 + 3*x + 3*log(x)
```

3.487.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int \frac{3 + 3x + 2x^2}{x}\,dx = x^2 + 3x + 3\log(x)$$

input
```
integrate((2*x**2+3*x+3)/x,x)
```

output
```
x**2 + 3*x + 3*log(x)
```

3.487.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{3+3x+2x^2}{x}\,dx = x^2 + 3\,x + 3\,\log\left(x\right)$$

input
```
integrate((2*x^2+3*x+3)/x,x, algorithm=\
```

output
```
x^2 + 3*x + 3*log(x)
```

3.487.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{3+3x+2x^2}{x}\,dx = x^2 + 3\,x + 3\,\log\left(|x|\right)$$

input
```
integrate((2*x^2+3*x+3)/x,x, algorithm=\
```

output
```
x^2 + 3*x + 3*log(abs(x))
```

3.487.9 Mupad [B] (verification not implemented)

Time = 13.96 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{3+3x+2x^2}{x}\,dx = 3\,x + 3\,\ln\left(x\right) + x^2$$

input
```
int((3*x + 2*x^2 + 3)/x,x)
```

output
```
3*x + 3*log(x) + x^2
```

3.488 $\int \frac{175+25e^{-25+15x}+375e^{-25+15x}x\log(x)}{x}\,dx$

3.488.1 Optimal result

Integrand size = 27, antiderivative size = 15

$$\int \frac{175+25e^{-25+15x}+375e^{-25+15x}x\log(x)}{x}\,dx = 25\left(7+e^{5(-5+3x)}\right)\log(x)$$

output
```
25*(7+exp(15*x-25))*ln(x)
```

3.488.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.40

$$\int \frac{175+25e^{-25+15x}+375e^{-25+15x}x\log(x)}{x}\,dx = \frac{25(7e^{25}\log(x)+e^{15x}\log(x))}{e^{25}}$$

input
```
Integrate[(175 + 25*E^(-25 + 15*x) + 375*E^(-25 + 15*x)*x*Log[x])/x,x]
```

output
```
(25*(7*E^25*Log[x] + E^(15*x)*Log[x]))/E^25
```

3.488.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{25e^{15x-25}+375e^{15x-25}x\log(x)+175}{x}\,dx$$

$$\Big\downarrow \ 2010$$

$$\int \left(\frac{175}{x}+\frac{25e^{15x-25}(15x\log(x)+1)}{x}\right)dx$$

$$\Big\downarrow \ 2009$$

$$25e^{15x-25}\log(x)+175\log(x)$$

input
```
Int[(175 + 25*E^(-25 + 15*x) + 375*E^(-25 + 15*x)*x*Log[x])/x,x]
```

output
```
175*Log[x] + 25*E^(-25 + 15*x)*Log[x]
```

3.488.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.488.4 Maple [A] (verified)

Time = 0.59 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

method	result	size
default	$25\,\mathrm{e}^{15x-25}\ln\left(x\right)+175\ln\left(x\right)$	16
norman	$25\,\mathrm{e}^{15x-25}\ln\left(x\right)+175\ln\left(x\right)$	16
risch	$25\,\mathrm{e}^{15x-25}\ln\left(x\right)+175\ln\left(x\right)$	16
parallelrisch	$25\,\mathrm{e}^{15x-25}\ln\left(x\right)+175\ln\left(x\right)$	16
parts	$25\,\mathrm{e}^{15x-25}\ln\left(x\right)+175\ln\left(x\right)$	16

input
```
int((375*x*exp(15*x-25)*ln(x)+25*exp(15*x-25)+175)/x,x,method=_RETURNVERBO
SE)
```

output
```
25*exp(15*x-25)*ln(x)+175*ln(x)
```

3.488.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \frac{175+25e^{-25+15x}+375e^{-25+15x}x\log(x)}{x}\,dx=25\left(e^{(15\,x-25)}+7\right)\log\left(x\right)$$

input
```
integrate((375*x*exp(15*x-25)*log(x)+25*exp(15*x-25)+175)/x,x, algorithm=\
```

output
```
25*(e^(15*x - 25) + 7)*log(x)
```

3.488.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{175+25e^{-25+15x}+375e^{-25+15x}x\log(x)}{x}\,dx=25e^{15x-25}\log\left(x\right)+175\log\left(x\right)$$

input
```
integrate((375*x*exp(15*x-25)*ln(x)+25*exp(15*x-25)+175)/x,x)
```

output
```
25*exp(15*x - 25)*log(x) + 175*log(x)
```

3.488.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{175 + 25e^{-25+15x} + 375e^{-25+15x}x\log(x)}{x}\,dx = 25\,e^{(15\,x-25)}\log(x) + 175\,\log(x)$$

input
```
integrate((375*x*exp(15*x-25)*log(x)+25*exp(15*x-25)+175)/x,x, algorithm=\
```

output
```
25*e^(15*x - 25)*log(x) + 175*log(x)
```

3.488.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int \frac{175 + 25e^{-25+15x} + 375e^{-25+15x}x\log(x)}{x}\,dx = 25\left(7\,e^{25}\log(x) + e^{(15\,x)}\log(x)\right)e^{(-25)}$$

input
```
integrate((375*x*exp(15*x-25)*log(x)+25*exp(15*x-25)+175)/x,x, algorithm=\
```

output
```
25*(7*e^25*log(x) + e^(15*x)*log(x))*e^(-25)
```

3.488.9 Mupad [B] (verification not implemented)

Time = 14.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{175 + 25e^{-25+15x} + 375e^{-25+15x}x\log(x)}{x}\,dx = 25\,\mathrm{e}^{-25}\,\ln(x)\,\left(\mathrm{e}^{15\,x} + 7\,\mathrm{e}^{25}\right)$$

input
```
int((25*exp(15*x - 25) + 375*x*exp(15*x - 25)*log(x) + 175)/x,x)
```

output
```
25*exp(-25)*log(x)*(exp(15*x) + 7*exp(25))
```

3.489 $\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+(}{6e^{4-2x}x^2+5e^{5-x}x^3+}$

3.489.1 Optimal result

Integrand size = 352, antiderivative size = 35

$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+(e^{-2-2x}(-18+18e^3)-3x^2+3}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-}}$$
$$=\frac{3(-x+\log(x))}{x\left(-e^3+\log\left(x+\frac{x}{2+e^{1+x}x}\right)\right)}$$

output
```
3*(ln(x)-x)/(ln(x/(2+x/exp(-1-x))+x)-exp(3))/x
```

3.489.2 Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.20

$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+(e^{-2-2x}(-18+18e^3)-3x^2+3}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-}}$$
$$=\frac{3(-x+\log(x))}{x\left(-e^3+\log\left(\frac{x(3+e^{1+x}x)}{2+e^{1+x}x}\right)\right)}$$

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$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+(e^{-2-2x}(-18+18e^3)-3x^2+3e^3x^2+e^{-1-x}(-12x+15e^3x+3x^2))\log(x)+(1}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-x}x^3-2e^3x^4)\log\left(\frac{3e^{-1-x}x+x^2}{\cdots}\right)+(6e^{-2-2x}x^2}$$

input
```
Integrate[(-3*E^3*x^2 + 3*x^3 + E^(-2 - 2*x)*(-18*E^3 + 18*x) + E^(-1 - x)
*(-15*E^3*x + 12*x^2 - 3*x^3) + (E^(-2 - 2*x)*(-18 + 18*E^3) - 3*x^2 + 3*E
^3*x^2 + E^(-1 - x)*(-12*x + 15*E^3*x + 3*x^2))*Log[x] + (18*E^(-2 - 2*x)
+ 15*E^(-1 - x)*x + 3*x^2 + (-18*E^(-2 - 2*x) - 15*E^(-1 - x)*x - 3*x^2)*L
og[x])*Log[(3*E^(-1 - x)*x + x^2)/(2*E^(-1 - x) + x)])/(6*E^(4 - 2*x)*x^2
+ 5*E^(5 - x)*x^3 + E^6*x^4 + (-12*E^(1 - 2*x)*x^2 - 10*E^(2 - x)*x^3 - 2*
E^3*x^4)*Log[(3*E^(-1 - x)*x + x^2)/(2*E^(-1 - x) + x)] + (6*E^(-2 - 2*x)*
x^2 + 5*E^(-1 - x)*x^3 + x^4)*Log[(3*E^(-1 - x)*x + x^2)/(2*E^(-1 - x) + x
)]^2),x]
```

output
```
(3*(-x + Log[x]))/(x*(-E^3 + Log[(x*(3 + E^(1 + x)*x))/(2 + E^(1 + x)*x)])
)
```

3.489.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^3-3e^3x^2+\left(3e^3x^2-3x^2+e^{-x-1}\left(3x^2+15e^3x-12x\right)+\left(18e^3-18\right)e^{-2x-2}\right)\log(x)+\left(3x^2+\left(-3x^2-15e\right.\right.}{e^6x^4+5e^{5-x}x^3+6e^{4-2x}x^2+\left(x^4+5e^{-x-1}x^3+6e^{-2x-2}x^2\right.}$$

$$\Big\downarrow \; 7292$$

$$\int \frac{e^{2x+2}\left(3x^3-3e^3x^2+\left(3e^3x^2-3x^2+e^{-x-1}\left(3x^2+15e^3x-12x\right)+\left(18e^3-18\right)e^{-2x-2}\right)\log(x)+\left(3x^2+\left(-3x\right.\right.\right.}{x^2\left(e^{2x+2}x^2+\right.}$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{3\left(x-\left(1-e^3\right)\log(x)-\log(x)\log\left(\frac{x\left(e^{x+1}x+3\right)}{e^{x+1}x+2}\right)+\log\left(\frac{x\left(e^{x+1}x+3\right)}{e^{x+1}x+2}\right)-e^3\right)}{x^2\left(e^3-\log\left(\frac{x\left(e^{x+1}x+3\right)}{e^{x+1}x+2}\right)\right)^2}-\frac{e^{x+1}(x+1)(x-\log(x))}{2x\left(e^3-\log\left(\frac{x\left(e^{x+1}x+3\right)}{e^{x+1}x+2}\right)\right)^2}+\right.$$

$$\Big\downarrow \; 2009$$

$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}\left(-18e^3+18x\right)+e^{-1-x}\left(-15e^3x+12x^2-3x^3\right)+\left(e^{-2-2x}\left(-18+18e^3\right)-3x^2+3e^3x^2+e^{-1-x}\left(-12x+15e^3x+3x^2\right)\right)\log(x)+(1}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+\left(-12e^{1-2x}x^2-10e^{2-x}x^3-2e^3x^4\right)\log\left(\frac{3e^{-1-x}x+x^2}{\cdots}\right)+\left(6e^{-2-2x}x^2\right.}$$

$$-\frac{1}{2}\int \frac{e^{x+1}}{\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx+3\int \frac{1}{x\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx-\frac{1}{2}\int \frac{e^{x+1}x}{\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx+\frac{3}{2}\int \frac{e^{2x+2}x}{(e^{x+1}x+2)\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx+\frac{3}{2}\int \frac{e^{2x+2}x^2}{(e^{x+1}x+2)\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx-\int \frac{e^{2x+2}x}{(e^{x+1}x+3)\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx-\int \frac{e^{2x+2}x^2}{(e^{x+1}x+3)\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx+\frac{1}{2}\int \frac{e^{x+1}\log(x)}{\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx-3\int \frac{\log(x)}{x^2\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx+\frac{1}{2}\int \frac{e^{x+1}\log(x)}{x\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx-\frac{3}{2}\int \frac{e^{2x+2}\log(x)}{(e^{x+1}x+2)\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx-\frac{3}{2}\int \frac{e^{2x+2}x\log(x)}{(e^{x+1}x+2)\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx+\int \frac{e^{2x+2}\log(x)}{(e^{x+1}x+3)\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx+\int \frac{e^{2x+2}x\log(x)}{(e^{x+1}x+3)\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)^2}dx-3\int \frac{1}{x^2\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)}dx+3\int \frac{\log(x)}{x^2\left(e^3-\log\left(\frac{x(e^{x+1}x+3)}{e^{x+1}x+2}\right)\right)}dx$$

input
```
Int[(-3*E^3*x^2 + 3*x^3 + E^(-2 - 2*x)*(-18*E^3 + 18*x) + E^(-1 - x)*(-15*
E^3*x + 12*x^2 - 3*x^3) + (E^(-2 - 2*x)*(-18 + 18*E^3) - 3*x^2 + 3*E^3*x^2
 + E^(-1 - x)*(-12*x + 15*E^3*x + 3*x^2))*Log[x] + (18*E^(-2 - 2*x) + 15*E
^(-1 - x)*x + 3*x^2 + (-18*E^(-2 - 2*x) - 15*E^(-1 - x)*x - 3*x^2)*Log[x])
*Log[(3*E^(-1 - x)*x + x^2)/(2*E^(-1 - x) + x)])/(6*E^(4 - 2*x)*x^2 + 5*E^
(5 - x)*x^3 + E^6*x^4 + (-12*E^(1 - 2*x)*x^2 - 10*E^(2 - x)*x^3 - 2*E^3*x^
4)*Log[(3*E^(-1 - x)*x + x^2)/(2*E^(-1 - x) + x)] + (6*E^(-2 - 2*x)*x^2 +
5*E^(-1 - x)*x^3 + x^4)*Log[(3*E^(-1 - x)*x + x^2)/(2*E^(-1 - x) + x)]^2),
x]
```

output
```
$Aborted
```

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$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+(e^{-2-2x}(-18+18e^3)-3x^2+3e^3x^2+e^{-1-x}(-12x+15e^3x+3x^2))\log(x)+(1\cdots}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-x}x^3-2e^3x^4)\log\left(\frac{3e^{-1-x}x+x^2}{\cdots}\right)+(6e^{-2-2x}x^2\cdots}$$

3.489.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.489.4 Maple [A] (verified)

Time = 46.30 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.31

method	result
parallelrisch	$-\frac{3\ln(x)-3x}{x\left(e^{3}-\ln\left(\frac{x\left(3\,e^{-1-x}+x\right)}{2\,e^{-1-x}+x}\right)\right)}$
risch	$-\frac{\ldots}{x\left(-i\pi\,\operatorname{csgn}\left(\frac{i}{2\,e^{-1-x}+x}\right)\operatorname{csgn}\left(i\left(3\,e^{-1-x}+x\right)\right)\operatorname{csgn}\left(\frac{i\left(3\,e^{-1-x}+x\right)}{2\,e^{-1-x}+x}\right)+i\pi\,\operatorname{csgn}\left(\frac{i}{2\,e^{-1-x}+x}\right)\operatorname{csgn}\left(\frac{i\left(3\,e^{-1-x}+x\right)}{2\,e^{-1-x}+x}\right)^{2}+i\pi\,\mathrm{c}\ldots\right.}$

input
```
int((((-18*exp(-1-x)^2-15*x*exp(-1-x)-3*x^2)*ln(x)+18*exp(-1-x)^2+15*x*exp
(-1-x)+3*x^2)*ln((3*x*exp(-1-x)+x^2)/(2*exp(-1-x)+x))+((18*exp(3)-18)*exp(
-1-x)^2+(15*x*exp(3)+3*x^2-12*x)*exp(-1-x)+3*x^2*exp(3)-3*x^2)*ln(x)+(-18*
exp(3)+18*x)*exp(-1-x)^2+(-15*x*exp(3)-3*x^3+12*x^2)*exp(-1-x)-3*x^2*exp(3
)+3*x^3)/((6*x^2*exp(-1-x)^2+5*x^3*exp(-1-x)+x^4)*ln((3*x*exp(-1-x)+x^2)/(
2*exp(-1-x)+x))^2+(-12*x^2*exp(3)*exp(-1-x)^2-10*x^3*exp(3)*exp(-1-x)-2*x^
4*exp(3))*ln((3*x*exp(-1-x)+x^2)/(2*exp(-1-x)+x))+6*x^2*exp(3)^2*exp(-1-x)
^2+5*x^3*exp(3)^2*exp(-1-x)+x^4*exp(3)^2),x,method=_RETURNVERBOSE)
```

output
```
-1/x*(3*ln(x)-3*x)/(exp(3)-ln(x*(3*exp(-1-x)+x)/(2*exp(-1-x)+x)))
```

3.489.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.46

$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+\left(e^{-2-2x}(-18+18e^3)-3x^2+3e\right.}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-}}$$
$$=\frac{3\,(x-\log(x))}{xe^3-x\log\left(\frac{x^2e^6+3\,xe^{(-x+5)}}{xe^6+2\,e^{(-x+5)}}\right)}$$

input
```
integrate((((-18*exp(-1-x)^2-15*x*exp(-1-x)-3*x^2)*log(x)+18*exp(-1-x)^2+1
5*x*exp(-1-x)+3*x^2)*log((3*x*exp(-1-x)+x^2)/(2*exp(-1-x)+x))+((18*exp(3)-
18)*exp(-1-x)^2+(15*x*exp(3)+3*x^2-12*x)*exp(-1-x)+3*x^2*exp(3)-3*x^2)*log
(x)+(-18*exp(3)+18*x)*exp(-1-x)^2+(-15*x*exp(3)-3*x^3+12*x^2)*exp(-1-x)-3*
x^2*exp(3)+3*x^3)/((6*x^2*exp(-1-x)^2+5*x^3*exp(-1-x)+x^4)*log((3*x*exp(-1
-x)+x^2)/(2*exp(-1-x)+x))^2+(-12*x^2*exp(3)*exp(-1-x)^2-10*x^3*exp(3)*exp(
-1-x)-2*x^4*exp(3))*log((3*x*exp(-1-x)+x^2)/(2*exp(-1-x)+x))+6*x^2*exp(3)^
2*exp(-1-x)^2+5*x^3*exp(3)^2*exp(-1-x)+x^4*exp(3)^2),x, algorithm=\
```

output
```
3*(x - log(x))/(x*e^3 - x*log((x^2*e^6 + 3*x*e^(-x + 5))/(x*e^6 + 2*e^(-x
+ 5))))
```

3.489.6 Sympy [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.11

$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+\left(e^{-2-2x}(-18+18e^3)-3x^2+3e\right.}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-}}$$
$$=\frac{-3x+3\log(x)}{x\log\left(\frac{x^2+3xe^{-x-1}}{x+2e^{-x-1}}\right)-xe^3}$$

input
```
integrate((((-18*exp(-1-x)**2-15*x*exp(-1-x)-3*x**2)*ln(x)+18*exp(-1-x)**2
+15*x*exp(-1-x)+3*x**2)*ln((3*x*exp(-1-x)+x**2)/(2*exp(-1-x)+x))+((18*exp(
3)-18)*exp(-1-x)**2+(15*x*exp(3)+3*x**2-12*x)*exp(-1-x)+3*x**2*exp(3)-3*x*
*2)*ln(x)+(-18*exp(3)+18*x)*exp(-1-x)**2+(-15*x*exp(3)-3*x**3+12*x**2)*exp
(-1-x)-3*x**2*exp(3)+3*x**3)/((6*x**2*exp(-1-x)**2+5*x**3*exp(-1-x)+x**4)*
ln((3*x*exp(-1-x)+x**2)/(2*exp(-1-x)+x))**2+(-12*x**2*exp(3)*exp(-1-x)**2-
10*x**3*exp(3)*exp(-1-x)-2*x**4*exp(3))*ln((3*x*exp(-1-x)+x**2)/(2*exp(-1-
x)+x))+6*x**2*exp(3)**2*exp(-1-x)**2+5*x**3*exp(3)**2*exp(-1-x)+x**4*exp(3
)**2),x)
```

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$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+\left(e^{-2-2x}(-18+18e^3)-3x^2+3e^3x^2+e^{-1-x}(-12x+15e^3x+3x^2)\right)\log(x)+(1}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-x}x^3-2e^3x^4)\log\left(\frac{3e^{-1-x}x+x^2}{\cdots}\right)+(6e^{-2-2x}x^2}$$

output
```
(-3*x + 3*log(x))/(x*log((x**2 + 3*x*exp(-x - 1))/(x + 2*exp(-x - 1))) - x
*exp(3))
```

3.489.7 Maxima [A] (verification not implemented)

Time = 0.69 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.23

$$\int \frac{-3e^3x^2 + 3x^3 + e^{-2-2x}(-18e^3 + 18x) + e^{-1-x}(-15e^3x + 12x^2 - 3x^3) + (e^{-2-2x}(-18 + 18e^3) - 3x^2 + 3}{6e^{4-2x}x^2 + 5e^{5-x}x^3 + e^6x^4 + (-12e^{1-2x}x^2 - 10e^{2-}}$$
$$= \frac{3(x - \log(x))}{xe^3 - x\log(xe^{(x+1)} + 3) + x\log(xe^{(x+1)} + 2) - x\log(x)}$$

input
```
integrate((((-18*exp(-1-x)^2-15*x*exp(-1-x)-3*x^2)*log(x)+18*exp(-1-x)^2+1
5*x*exp(-1-x)+3*x^2)*log((3*x*exp(-1-x)+x^2)/(2*exp(-1-x)+x))+((18*exp(3)-
18)*exp(-1-x)^2+(15*x*exp(3)+3*x^2-12*x)*exp(-1-x)+3*x^2*exp(3)-3*x^2)*log
(x)+(-18*exp(3)+18*x)*exp(-1-x)^2+(-15*x*exp(3)-3*x^3+12*x^2)*exp(-1-x)-3*
x^2*exp(3)+3*x^3)/((6*x^2*exp(-1-x)^2+5*x^3*exp(-1-x)+x^4)*log((3*x*exp(-1
-x)+x^2)/(2*exp(-1-x)+x))^2+(-12*x^2*exp(3)*exp(-1-x)^2-10*x^3*exp(3)*exp(
-1-x)-2*x^4*exp(3))*log((3*x*exp(-1-x)+x^2)/(2*exp(-1-x)+x))+6*x^2*exp(3)^
2*exp(-1-x)^2+5*x^3*exp(3)^2*exp(-1-x)+x^4*exp(3)^2),x, algorithm=\
```

output
```
3*(x - log(x))/(x*e^3 - x*log(x*e^(x + 1) + 3) + x*log(x*e^(x + 1) + 2) -
x*log(x))
```

3.489.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1129 vs. 2(33) = 66.

Time = 3.21 (sec) , antiderivative size = 1129, normalized size of antiderivative = 32.26

$$\int \frac{-3e^3x^2 + 3x^3 + e^{-2-2x}(-18e^3 + 18x) + e^{-1-x}(-15e^3x + 12x^2 - 3x^3) + (e^{-2-2x}(-18 + 18e^3) - 3x^2 + 3}{6e^{4-2x}x^2 + 5e^{5-x}x^3 + e^6x^4 + (-12e^{1-2x}x^2 - 10e^{2-}}$$
= Too large to display

input
```
integrate((((-18*exp(-1-x)^2-15*x*exp(-1-x)-3*x^2)*log(x)+18*exp(-1-x)^2+1
5*x*exp(-1-x)+3*x^2)*log((3*x*exp(-1-x)+x^2)/(2*exp(-1-x)+x))+((18*exp(3)-
18)*exp(-1-x)^2+(15*x*exp(3)+3*x^2-12*x)*exp(-1-x)+3*x^2*exp(3)-3*x^2)*log
(x)+(-18*exp(3)+18*x)*exp(-1-x)^2+(-15*x*exp(3)-3*x^3+12*x^2)*exp(-1-x)-3*
x^2*exp(3)+3*x^3)/((6*x^2*exp(-1-x)^2+5*x^3*exp(-1-x)+x^4)*log((3*x*exp(-1
-x)+x^2)/(2*exp(-1-x)+x))^2+(-12*x^2*exp(3)*exp(-1-x)^2-10*x^3*exp(3)*exp(
-1-x)-2*x^4*exp(3))*log((3*x*exp(-1-x)+x^2)/(2*exp(-1-x)+x))+6*x^2*exp(3)^
2*exp(-1-x)^2+5*x^3*exp(3)^2*exp(-1-x)+x^4*exp(3)^2),x, algorithm=\
```

output
```
3/2*(pi^2*sgn(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5))*sgn(x) + pi^2*sgn(-(x -
 5)*e^6 - 5*e^6 - 3*e^(-x + 5))*sgn(x) - pi^2*sgn(-(x - 5)*e^6 - 5*e^6 - 2
*e^(-x + 5)) - pi^2*sgn(-(x - 5)*e^6 - 5*e^6 - 3*e^(-x + 5)) + 4*(x - 5)*e
^3 + 4*(x - 5)*log(abs(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5))) - 4*(x - 5)*l
og(abs(-(x - 5)*e^6 - 5*e^6 - 3*e^(-x + 5))) - 4*(x - 5)*log(abs(x)) - 4*e
^3*log(abs(x)) - 4*log(abs(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5)))*log(abs(x
)) + 4*log(abs(-(x - 5)*e^6 - 5*e^6 - 3*e^(-x + 5)))*log(abs(x)) + 4*log(a
bs(x))^2 + 20*e^3 + 20*log(abs(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5))) - 20*
log(abs(-(x - 5)*e^6 - 5*e^6 - 3*e^(-x + 5))) - 20*log(abs(x)))/(pi^2*(x -
 5)*sgn(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5))*sgn(-(x - 5)*e^6 - 5*e^6 - 3*
e^(-x + 5)) + pi^2*(x - 5)*sgn(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5))*sgn(x)
 + pi^2*(x - 5)*sgn(-(x - 5)*e^6 - 5*e^6 - 3*e^(-x + 5))*sgn(x) + pi^2*(x
- 5)*sgn(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5)) + pi^2*(x - 5)*sgn(-(x - 5)*
e^6 - 5*e^6 - 3*e^(-x + 5)) + 5*pi^2*sgn(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x +
5))*sgn(-(x - 5)*e^6 - 5*e^6 - 3*e^(-x + 5)) + pi^2*(x - 5)*sgn(x) + 5*pi^
2*sgn(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5))*sgn(x) + 5*pi^2*sgn(-(x - 5)*e^
6 - 5*e^6 - 3*e^(-x + 5))*sgn(x) + 2*pi^2*(x - 5) + 4*(x - 5)*e^3*log(abs(
-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5))) + 2*(x - 5)*log(abs(-(x - 5)*e^6 - 5
*e^6 - 2*e^(-x + 5)))^2 - 4*(x - 5)*e^3*log(abs(-(x - 5)*e^6 - 5*e^6 - 3*e
^(-x + 5))) - 4*(x - 5)*log(abs(-(x - 5)*e^6 - 5*e^6 - 2*e^(-x + 5)))*l...
```

3.489.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+(e^{-2-2x}(-18+18e^3)-3x^2+3\cdots}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-\cdots}}$$

$$=\int \frac{\ln(x)\left(\mathrm{e}^{-2x-2}\left(18\,\mathrm{e}^3-18\right)+3\,x^2\,\mathrm{e}^3+\mathrm{e}^{-x-1}\left(15\,x\,\mathrm{e}^3-12\,x+3\,x^2\right)-3\,x^2\right)-\mathrm{e}^{-x-1}\left(3\,x^3-12\,x^2+15\,\mathrm{e}\cdots\right.}{\ln\left(\frac{3\,x\,\mathrm{e}^{-x-1}+x^2}{x+2\,\mathrm{e}^{-x-1}}\right)^2\left(5\,x^3\,\mathrm{e}^{-x-1}+6\,x^2\,\mathrm{e}^{-2\,x-2}+x^4\right)+\cdots}$$

3.489.

$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}(-18e^3+18x)+e^{-1-x}(-15e^3x+12x^2-3x^3)+(e^{-2-2x}(-18+18e^3)-3x^2+3e^3x^2+e^{-1-x}(-12x+15e^3x+3x^2))\log(x)+(1\cdots}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+(-12e^{1-2x}x^2-10e^{2-x}x^3-2e^3x^4)\log\left(\frac{3e^{-1-x}x+x^2}{\cdots}\right)+(6e^{-2-2x}x^2\cdots}$$

input
```
int((log(x)*(exp(- 2*x - 2)*(18*exp(3) - 18) + 3*x^2*exp(3) + exp(- x - 1)
*(15*x*exp(3) - 12*x + 3*x^2) - 3*x^2) - exp(- x - 1)*(15*x*exp(3) - 12*x^
2 + 3*x^3) + log((3*x*exp(- x - 1) + x^2)/(x + 2*exp(- x - 1)))*(18*exp(-
2*x - 2) - log(x)*(18*exp(- 2*x - 2) + 15*x*exp(- x - 1) + 3*x^2) + 15*x*e
xp(- x - 1) + 3*x^2) - 3*x^2*exp(3) + 3*x^3 + exp(- 2*x - 2)*(18*x - 18*ex
p(3)))/(log((3*x*exp(- x - 1) + x^2)/(x + 2*exp(- x - 1)))^2*(5*x^3*exp(-
x - 1) + 6*x^2*exp(- 2*x - 2) + x^4) - log((3*x*exp(- x - 1) + x^2)/(x + 2
*exp(- x - 1)))*(2*x^4*exp(3) + 10*x^3*exp(3)*exp(- x - 1) + 12*x^2*exp(3)
*exp(- 2*x - 2)) + x^4*exp(6) + 5*x^3*exp(6)*exp(- x - 1) + 6*x^2*exp(6)*e
xp(- 2*x - 2)),x)
```

output
```
int((log(x)*(exp(- 2*x - 2)*(18*exp(3) - 18) + 3*x^2*exp(3) + exp(- x - 1)
*(15*x*exp(3) - 12*x + 3*x^2) - 3*x^2) - exp(- x - 1)*(15*x*exp(3) - 12*x^
2 + 3*x^3) + log((3*x*exp(- x - 1) + x^2)/(x + 2*exp(- x - 1)))*(18*exp(-
2*x - 2) - log(x)*(18*exp(- 2*x - 2) + 15*x*exp(- x - 1) + 3*x^2) + 15*x*e
xp(- x - 1) + 3*x^2) - 3*x^2*exp(3) + 3*x^3 + exp(- 2*x - 2)*(18*x - 18*ex
p(3)))/(log((3*x*exp(- x - 1) + x^2)/(x + 2*exp(- x - 1)))^2*(5*x^3*exp(-
x - 1) + 6*x^2*exp(- 2*x - 2) + x^4) + x^4*exp(6) - log((3*x*exp(- x - 1)
+ x^2)/(x + 2*exp(- x - 1)))*(2*x^4*exp(3) + 12*x^2*exp(1 - 2*x) + 10*x^3*
exp(2 - x)) + 6*x^2*exp(4 - 2*x) + 5*x^3*exp(5 - x)), x)
```

3.489.

$$\int \frac{-3e^3x^2+3x^3+e^{-2-2x}\left(-18e^3+18x\right)+e^{-1-x}\left(-15e^3x+12x^2-3x^3\right)+\left(e^{-2-2x}\left(-18+18e^3\right)-3x^2+3e^3x^2+e^{-1-x}\left(-12x+15e^3x+3x^2\right)\right)\log(x)+(1\ldots}{6e^{4-2x}x^2+5e^{5-x}x^3+e^6x^4+\left(-12e^{1-2x}x^2-10e^{2-x}x^3-2e^3x^4\right)\log\left(\frac{3e^{-1-x}x+x^2}{\ldots}\right)+\left(6e^{-2-2x}x^2\ldots\right.}$$

3.490 $\int e^{15/4}(10x - 15x^2)\, dx$

3.490.1 Optimal result

Integrand size = 15, antiderivative size = 20

$$\int e^{15/4}\left(10x - 15x^2\right)\, dx = 5e^{15/4}x\left(x - x^2\right) - \log(4)$$

output
```
5*(-x^2+x)*x*exp(15/4)-2*ln(2)
```

3.490.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int e^{15/4}\left(10x - 15x^2\right)\, dx = -5e^{15/4}\left(-x^2 + x^3\right)$$

input
```
Integrate[E^(15/4)*(10*x - 15*x^2),x]
```

output
```
-5*E^(15/4)*(-x^2 + x^3)
```

3.490.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{15/4}(10x-15x^2)\,dx$$

$$\Big\downarrow \; 27$$

$$e^{15/4}\int (10x-15x^2)\,dx$$

$$\Big\downarrow \; 2009$$

$$e^{15/4}(5x^2-5x^3)$$

input
```
Int[E^(15/4)*(10*x - 15*x^2),x]
```

output
```
E^(15/4)*(5*x^2 - 5*x^3)
```

3.490.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.490.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.55

method	result	size
gosper	$-5\,\mathrm{e}^{\frac{15}{4}} x^{2} (-1+x)$	11
default	$5\,\mathrm{e}^{\frac{15}{4}} (-x^{3}+x^{2})$	14
parallelrisch	$\mathrm{e}^{\frac{15}{4}} (-5x^{3}+5x^{2})$	15
norman	$5\,\mathrm{e}^{\frac{15}{4}} x^{2}-5\,\mathrm{e}^{\frac{15}{4}} x^{3}$	16
risch	$5\,\mathrm{e}^{\frac{15}{4}} x^{2}-5\,\mathrm{e}^{\frac{15}{4}} x^{3}$	16

input
```
int((-15*x^2+10*x)*exp(15/4),x,method=_RETURNVERBOSE)
```

output
```
-5*exp(15/4)*x^2*(-1+x)
```

3.490.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int e^{15/4}\left(10x-15x^2\right)\,dx=-5\left(x^3-x^2\right)e^{\frac{15}{4}}$$

input
```
integrate((-15*x^2+10*x)*exp(15/4),x, algorithm=\
```

output
```
-5*(x^3 - x^2)*e^(15/4)
```

3.490.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int e^{15/4}\left(10x-15x^2\right)\,dx=-5x^3e^{\frac{15}{4}}+5x^2e^{\frac{15}{4}}$$

input
```
integrate((-15*x**2+10*x)*exp(15/4),x)
```

output
```
-5*x**3*exp(15/4) + 5*x**2*exp(15/4)
```

3.490.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int e^{15/4}(10x-15x^2)\ dx=-5\left(x^3-x^2\right)e^{\frac{15}{4}}$$

input
```
integrate((-15*x^2+10*x)*exp(15/4),x, algorithm=\
```

output
```
-5*(x^3 - x^2)*e^(15/4)
```

3.490.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int e^{15/4}(10x-15x^2)\ dx=-5\left(x^3-x^2\right)e^{\frac{15}{4}}$$

input
```
integrate((-15*x^2+10*x)*exp(15/4),x, algorithm=\
```

output
```
-5*(x^3 - x^2)*e^(15/4)
```

3.490.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int e^{15/4}(10x-15x^2)\ dx=-5\,x^2\,\mathrm{e}^{15/4}\,(x-1)$$

input
```
int(exp(15/4)*(10*x - 15*x^2),x)
```

output
```
-5*x^2*exp(15/4)*(x - 1)
```

3.491 $\int \frac{1}{9}\left(9+9e^{\frac{1}{9}(36x^2+16x^5)}+\left(9+e^{\frac{1}{9}(36x^2+16x^5)}(9+72x^2\right.\right.$

3.491.1 Optimal result

Integrand size = 60, antiderivative size = 22

$$\int \frac{1}{9}\left(9+9e^{\frac{1}{9}(36x^2+16x^5)}+\left(9+e^{\frac{1}{9}(36x^2+16x^5)}(9+72x^2+80x^5)\right)\log(x)\right)\,dx = 1+\left(1+e^{4x\left(x+\frac{4x^4}{9}\right)}\right)x\log(x)$$

output
```
1+ln(x)*(exp(4*(4/9*x^4+x)*x)+1)*x
```

3.491.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{1}{9}\left(9+9e^{\frac{1}{9}(36x^2+16x^5)}+\left(9+e^{\frac{1}{9}(36x^2+16x^5)}(9+72x^2+80x^5)\right)\log(x)\right)\,dx = \left(1+e^{4x^2+\frac{16x^5}{9}}\right)x\log(x)$$

input
```
Integrate[(9 + 9*E^((36*x^2 + 16*x^5)/9) + (9 + E^((36*x^2 + 16*x^5)/9)*(9
 + 72*x^2 + 80*x^5))*Log[x])/9,x]
```

output
```
(1 + E^(4*x^2 + (16*x^5)/9))*x*Log[x]
```

3.491.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 53 vs. $2(22) = 44$.

Time = 0.27 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.41, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.033$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{9}\left(9e^{\frac{1}{9}(16x^5+36x^2)} + \left(e^{\frac{1}{9}(16x^5+36x^2)}(80x^5 + 72x^2 + 9) + 9\right)\log(x) + 9\right) dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{9}\int \left(\left(e^{\frac{4}{9}(4x^5+9x^2)}(80x^5 + 72x^2 + 9) + 9\right)\log(x) + 9e^{\frac{4}{9}(4x^5+9x^2)} + 9\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{9}\left(\frac{9e^{\frac{4}{9}(4x^5+9x^2)}(10x^5 + 9x^2)\log(x)}{10x^4 + 9x} + 9x\log(x)\right)$$

input
```
Int[(9 + 9*E^((36*x^2 + 16*x^5)/9) + (9 + E^((36*x^2 + 16*x^5)/9)*(9 + 72*
x^2 + 80*x^5))*Log[x])/9,x]
```

output
```
(9*x*Log[x] + (9*E^((4*(9*x^2 + 4*x^5))/9)*(9*x^2 + 10*x^5)*Log[x])/(9*x +
 10*x^4))/9
```

3.491.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.491.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

method	result	size
risch	$x\left(\mathrm{e}^{\frac{4x^2\left(4x^3+9\right)}{9}}+1\right)\ln\left(x\right)$	20
parallelrisch	$x\ln\left(x\right)\mathrm{e}^{\frac{16}{9}x^5+4x^2}+x\ln\left(x\right)$	22

input
```
int(1/9*((80*x^5+72*x^2+9)*exp(16/9*x^5+4*x^2)+9)*ln(x)+exp(16/9*x^5+4*x^2
)+1,x,method=_RETURNVERBOSE)
```

output
```
x*(exp(4/9*x^2*(4*x^3+9))+1)*ln(x)
```

3.491.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{1}{9}\left(9+9e^{\frac{1}{9}(36x^2+16x^5)}+\left(9+e^{\frac{1}{9}(36x^2+16x^5)}\left(9+72x^2+80x^5\right)\right)\log(x)\right)\,dx$$
$$=\left(xe^{\left(\frac{16}{9}x^5+4x^2\right)}+x\right)\log\left(x\right)$$

input
```
integrate(1/9*((80*x^5+72*x^2+9)*exp(16/9*x^5+4*x^2)+9)*log(x)+exp(16/9*x^
5+4*x^2)+1,x, algorithm=\
```

output
```
(x*e^(16/9*x^5 + 4*x^2) + x)*log(x)
```

3.491.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{9}\left(9+9e^{\frac{1}{9}(36x^2+16x^5)}+\left(9+e^{\frac{1}{9}(36x^2+16x^5)}\left(9+72x^2+80x^5\right)\right)\log(x)\right)\,dx$$
$$=xe^{\frac{16x^5}{9}+4x^2}\log\left(x\right)+x\log\left(x\right)$$

input
```
integrate(1/9*((80*x**5+72*x**2+9)*exp(16/9*x**5+4*x**2)+9)*ln(x)+exp(16/9
*x**5+4*x**2)+1,x)
```

output
```
x*exp(16*x**5/9 + 4*x**2)*log(x) + x*log(x)
```

3.491.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{1}{9}\left(9+9e^{\frac{1}{9}(36x^2+16x^5)}+\left(9+e^{\frac{1}{9}(36x^2+16x^5)}(9+72x^2+80x^5)\right)\log(x)\right)\,dx$$
$$= xe^{\left(\frac{16}{9}x^5+4x^2\right)}\log(x)+x\log(x)$$

input
```
integrate(1/9*((80*x^5+72*x^2+9)*exp(16/9*x^5+4*x^2)+9)*log(x)+exp(16/9*x^
5+4*x^2)+1,x, algorithm=\
```

output
```
x*e^(16/9*x^5 + 4*x^2)*log(x) + x*log(x)
```

3.491.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{1}{9}\left(9+9e^{\frac{1}{9}(36x^2+16x^5)}+\left(9+e^{\frac{1}{9}(36x^2+16x^5)}(9+72x^2+80x^5)\right)\log(x)\right)\,dx$$
$$= \left(xe^{\left(\frac{16}{9}x^5+4x^2\right)}+x\right)\log(x)$$

input
```
integrate(1/9*((80*x^5+72*x^2+9)*exp(16/9*x^5+4*x^2)+9)*log(x)+exp(16/9*x^
5+4*x^2)+1,x, algorithm=\
```

output
```
(x*e^(16/9*x^5 + 4*x^2) + x)*log(x)
```

3.491.9 Mupad [F(-1)]

Timed out.

$$\int \frac{1}{9}\left(9+9e^{\frac{1}{9}\left(36x^2+16x^5\right)}+\left(9+e^{\frac{1}{9}\left(36x^2+16x^5\right)}\left(9+72x^2+80x^5\right)\right)\log(x)\right)\,dx$$
$$=\int e^{\frac{16\,x^5}{9}+4\,x^2}+\frac{\ln\left(x\right)\,\left(e^{\frac{16\,x^5}{9}+4\,x^2}\,\left(80\,x^5+72\,x^2+9\right)+9\right)}{9}+1\,dx$$

input
```
int(exp(4*x^2 + (16*x^5)/9) + (log(x)*(exp(4*x^2 + (16*x^5)/9)*(72*x^2 + 8
0*x^5 + 9) + 9))/9 + 1,x)
```

output
```
int(exp(4*x^2 + (16*x^5)/9) + (log(x)*(exp(4*x^2 + (16*x^5)/9)*(72*x^2 + 8
0*x^5 + 9) + 9))/9 + 1, x)
```

3.492 $\int \frac{e^x(-105+25x+25x^2-25x^3)+e^x(105+55x+25x^2)\log(x)-105e^x\log^2}{25x^4-210x^2\log(x)+441\log^2(x)}$

3.492.1 Optimal result

Integrand size = 67, antiderivative size = 27

$$\int \frac{e^x(-105+25x+25x^2-25x^3)+e^x(105+55x+25x^2)\log(x)-105e^x\log^2(x)}{25x^4-210x^2\log(x)+441\log^2(x)}\,dx = \frac{e^x}{-x+\frac{-\frac{21}{5}+x}{1-\frac{x}{\log(x)}}}$$

output
```
exp(x)/((x-21/5)/(1-x/ln(x))-x)
```

3.492.2 Mathematica [A] (verified)

Time = 0.59 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{e^x(-105+25x+25x^2-25x^3)+e^x(105+55x+25x^2)\log(x)-105e^x\log^2(x)}{25x^4-210x^2\log(x)+441\log^2(x)}\,dx = -\frac{5e^x(x-\log(x))}{5x^2-21\log(x)}$$

input
```
Integrate[(E^x*(-105 + 25*x + 25*x^2 - 25*x^3) + E^x*(105 + 55*x + 25*x^2)
*Log[x] - 105*E^x*Log[x]^2)/(25*x^4 - 210*x^2*Log[x] + 441*Log[x]^2),x]
```

output
```
(-5*E^x*(x - Log[x]))/(5*x^2 - 21*Log[x])
```

3.492.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x (25x^2+55x+105) \log(x) + e^x (-25x^3+25x^2+25x-105) - 105e^x \log^2(x)}{25x^4-210x^2\log(x)+441\log^2(x)} \, dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{5e^x (-5x^3+5x^2+5x^2\log(x)+5x-21\log^2(x)+11x\log(x)+21\log(x)-21)}{(5x^2-21\log(x))^2} dx$$

$$\Big\downarrow \; 27$$

$$5\int -\frac{e^x (5x^3-5\log(x)x^2-5x^2-11\log(x)x-5x+21\log^2(x)-21\log(x)+21)}{(5x^2-21\log(x))^2} dx$$

$$\Big\downarrow \; 25$$

$$-5\int \frac{e^x (5x^3-5\log(x)x^2-5x^2-11\log(x)x-5x+21\log^2(x)-21\log(x)+21)}{(5x^2-21\log(x))^2} dx$$

$$\Big\downarrow \; 7293$$

$$-5\int \left(\frac{e^x (-5x^2+11x+21)}{21(5x^2-21\log(x))} + \frac{e^x}{21} + \frac{e^x (50x^3-210x^2-105x+441)}{21(5x^2-21\log(x))^2}\right) dx$$

$$\Big\downarrow \; 2009$$

$$-5\left(21\int \frac{e^x}{(5x^2-21\log(x))^2} dx - 5\int \frac{e^x x}{(5x^2-21\log(x))^2} dx - 10\int \frac{e^x x^2}{(5x^2-21\log(x))^2} dx + \int \frac{e^x}{5x^2-21\log(x)} dx\right.$$

input
```
Int[(E^x*(-105 + 25*x + 25*x^2 - 25*x^3) + E^x*(105 + 55*x + 25*x^2)*Log[x
] - 105*E^x*Log[x]^2)/(25*x^4 - 210*x^2*Log[x] + 441*Log[x]^2),x]
```

output
```
$Aborted
```

3.492.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.492.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

method	result	size
parallelrisch	$\frac{-105\,\mathrm{e}^{x} x+105\,\mathrm{e}^{x} \ln\left(x\right)}{105 x^{2}-441 \ln\left(x\right)}$	27
risch	$-\frac{5\,\mathrm{e}^{x}}{21}+\frac{5\left(5x-21\right) x\,\mathrm{e}^{x}}{21\left(5x^{2}-21 \ln\left(x\right)\right)}$	28

input
```
int((-105*exp(x)*ln(x)^2+(25*x^2+55*x+105)*exp(x)*ln(x)+(-25*x^3+25*x^2+25
*x-105)*exp(x))/(441*ln(x)^2-210*x^2*ln(x)+25*x^4),x,method=_RETURNVERBOSE
)
```

output
```
1/21*(-105*exp(x)*x+105*exp(x)*ln(x))/(5*x^2-21*ln(x))
```

3.492.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^x(-105+25x+25x^2-25x^3)+e^x(105+55x+25x^2)\log(x)-105e^x\log^2(x)}{25x^4-210x^2\log(x)+441\log^2(x)}\,dx$$
$$= -\frac{5\left(xe^x - e^x\log\left(x\right)\right)}{5\,x^2 - 21\,\log\left(x\right)}$$

input
```
integrate((-105*exp(x)*log(x)^2+(25*x^2+55*x+105)*exp(x)*log(x)+(-25*x^3+2
5*x^2+25*x-105)*exp(x))/(441*log(x)^2-210*x^2*log(x)+25*x^4),x, algorithm=
\
```

output
```
-5*(x*e^x - e^x*log(x))/(5*x^2 - 21*log(x))
```

3.492.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{e^x(-105+25x+25x^2-25x^3)+e^x(105+55x+25x^2)\log(x)-105e^x\log^2(x)}{25x^4-210x^2\log(x)+441\log^2(x)}\,dx$$
$$= \frac{\left(-5x+5\log\left(x\right)\right)e^x}{5x^2-21\log\left(x\right)}$$

input
```
integrate((-105*exp(x)*ln(x)**2+(25*x**2+55*x+105)*exp(x)*ln(x)+(-25*x**3+
25*x**2+25*x-105)*exp(x))/(441*ln(x)**2-210*x**2*ln(x)+25*x**4),x)
```

output
```
(-5*x + 5*log(x))*exp(x)/(5*x**2 - 21*log(x))
```

3.492.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{e^x(-105+25x+25x^2-25x^3)+e^x(105+55x+25x^2)\log(x)-105e^x\log^2(x)}{25x^4-210x^2\log(x)+441\log^2(x)}\,dx$$
$$= -\frac{5\left(x-\log\left(x\right)\right)e^x}{5\,x^2-21\,\log\left(x\right)}$$

input
```
integrate((-105*exp(x)*log(x)^2+(25*x^2+55*x+105)*exp(x)*log(x)+(-25*x^3+2
5*x^2+25*x-105)*exp(x))/(441*log(x)^2-210*x^2*log(x)+25*x^4),x, algorithm=
\
```

output
```
-5*(x - log(x))*e^x/(5*x^2 - 21*log(x))
```

3.492.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^x(-105+25x+25x^2-25x^3)+e^x(105+55x+25x^2)\log(x)-105e^x\log^2(x)}{25x^4-210x^2\log(x)+441\log^2(x)}\,dx$$
$$= -\frac{5\left(xe^x-e^x\log\left(x\right)\right)}{5\,x^2-21\,\log\left(x\right)}$$

input
```
integrate((-105*exp(x)*log(x)^2+(25*x^2+55*x+105)*exp(x)*log(x)+(-25*x^3+2
5*x^2+25*x-105)*exp(x))/(441*log(x)^2-210*x^2*log(x)+25*x^4),x, algorithm=
\
```

output
```
-5*(x*e^x - e^x*log(x))/(5*x^2 - 21*log(x))
```

3.492.9 Mupad [B] (verification not implemented)

Time = 15.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{e^x(-105+25x+25x^2-25x^3)+e^x(105+55x+25x^2)\log(x)-105e^x\log^2(x)}{25x^4-210x^2\log(x)+441\log^2(x)}\,dx$$
$$= \frac{5\,\mathrm{e}^x\,\left(x-\ln\left(x\right)\right)}{21\,\ln\left(x\right)-5\,x^2}$$

input
```
int((exp(x)*(25*x + 25*x^2 - 25*x^3 - 105) - 105*exp(x)*log(x)^2 + exp(x)*
log(x)*(55*x + 25*x^2 + 105))/(441*log(x)^2 - 210*x^2*log(x) + 25*x^4),x)
```

output
```
(5*exp(x)*(x - log(x)))/(21*log(x) - 5*x^2)
```

3.493 $\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)\right.\right.}{x^2}$

3.493.1 Optimal result

Integrand size = 126, antiderivative size = 31

$$\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^x x^2)+e^x(\right.\right.}{x^2}$$

$$=3+e^{1-\left(5+e^{\frac{8e^{-x}}{x}}-x\right)^2}-\log(x)$$

output
```
3-ln(x)+exp(1-(exp(4/exp(x)/x)^2-x+5)^2)
```

3.493.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.55

$$\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^x x^2)+e^x(\right.\right.}{x^2}$$

$$=e^{-24-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(-5+x)+10x-x^2}-\log(x)$$

input
```
Integrate[(-(E^x*x) + E^(-24 - E^(16/(E^x*x)) + 10*x - x^2 + E^(8/(E^x*x))
*(-10 + 2*x))*(E^(16/(E^x*x))*(16 + 16*x) + E^(8/(E^x*x))*(80 + 64*x - 16*
x^2 + 2*E^x*x^2) + E^x*(10*x^2 - 2*x^3)))/(E^x*x^2),x]
```

3.493.

$$\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^x x^2)+e^x(10x^2-2x^3)\right)\right)}{} dx$$

output
```
E^(-24 - E^(16/(E^x*x)) + 2*E^(8/(E^x*x))*(-5 + x) + 10*x - x^2) - Log[x]
```

3.493.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(\left(e^{\frac{8e^{-x}}{x}}\left(2e^x x^2-16x^2+64x+80\right)+e^x\left(10x^2-2x^3\right)+e^{\frac{16e^{-x}}{x}}(16x+16)\right)\exp\left(-x^2+10x-e^{\frac{16e^{-x}}{x}}+e^{\frac{8}{}}\right.}{x^2}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2\left(-x+e^{\frac{8e^{-x}}{x}}+5\right)\left(e^x x^2+8e^{\frac{8e^{-x}}{x}}x+8e^{\frac{8e^{-x}}{x}}\right)\exp\left(-x^2+9x-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(x-5)-24\right)}{x^2}-\frac{1}{x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-16\int \exp\left(-x^2+9x-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(x-5)-24+\frac{8e^{-x}}{x}\right)dx+10\int \exp\left(-x^2+10x-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(x-5)-24\right)dx+2\int \exp\left(-x^2+10x-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(x-5)-24+\frac{8e^{-x}}{x}\right)dx+80\int \frac{\exp\left(-x^2+9x-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(x-5)-24+\frac{8e^{-x}}{x}\right)}{x^2}dx+16\int \frac{\exp\left(-x^2+9x-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(x-5)-24+\frac{16e^{-x}}{x}\right)}{x^2}dx+64\int \frac{\exp\left(-x^2+9x-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(x-5)-24+\frac{8e^{-x}}{x}\right)}{x}dx+16\int \frac{\exp\left(-x^2+9x-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(x-5)-24+\frac{16e^{-x}}{x}\right)}{x}dx-2\int \exp\left(-x^2+10x-e^{\frac{16e^{-x}}{x}}+2e^{\frac{8e^{-x}}{x}}(x-5)-24\right)xdx-\log(x)$$

3.493.

$$\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}\left(80+64x-16x^2+2e^x x^2\right)+e^x\left(10x^2-2x^3\right)\right)\right)}{} dx$$

input
```
Int[(-(E^x*x) + E^(-24 - E^(16/(E^x*x)) + 10*x - x^2 + E^(8/(E^x*x))*(-10
+ 2*x))*(E^(16/(E^x*x))*(16 + 16*x) + E^(8/(E^x*x))*(80 + 64*x - 16*x^2 +
2*E^x*x^2) + E^x*(10*x^2 - 2*x^3)))/(E^x*x^2),x]
```

output
```
$Aborted
```

3.493.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.493.4 Maple [A] (verified)

Time = 1.16 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.58

method	result	size
parallelrisch	$-\ln\left(x\right)+{\mathrm e}^{-{\mathrm e}^{\frac{16\,{\mathrm e}^{-x}}{x}}+\left(2x-10\right){\mathrm e}^{\frac{8\,{\mathrm e}^{-x}}{x}}-x^{2}+10x-24}$	49
risch	$-\ln\left(x\right)+{\mathrm e}^{2\,{\mathrm e}^{\frac{8\,{\mathrm e}^{-x}}{x}}x-x^{2}-10\,{\mathrm e}^{\frac{8\,{\mathrm e}^{-x}}{x}}-{\mathrm e}^{\frac{16\,{\mathrm e}^{-x}}{x}}+10x-24}$	54

input
```
int((((16*x+16)*exp(4/exp(x)/x)^4+(2*exp(x)*x^2-16*x^2+64*x+80)*exp(4/exp(
x)/x)^2+(-2*x^3+10*x^2)*exp(x))*exp(-exp(4/exp(x)/x)^4+(2*x-10)*exp(4/exp(
x)/x)^2-x^2+10*x-24)-exp(x)*x)/exp(x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-ln(x)+exp(-exp(4/exp(x)/x)^4+(2*x-10)*exp(4/exp(x)/x)^2-x^2+10*x-24)
```

3.493.

$$\int \frac{e^{-x}\left(-e^{x}x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^{2}+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}\left(80+64x-16x^{2}+2e^{x}x^{2}\right)+e^{x}\left(10x^{2}-2x^{3}\right)\right)\right)}{\cdots}\,dx$$

3.493.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.39

$$\int \frac{e^{-x}\left(-e^{x}x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^{x}x^2)+e^{x}(\right.\right.}{x^2}$$

$$= e^{\left(-x^2+2\,(x-5)e^{\left(\frac{8\,e^{(-x)}}{x}\right)}+10\,x-e^{\left(\frac{16\,e^{(-x)}}{x}\right)}-24\right)}-\log(x)$$

input
```
integrate(((((16*x+16)*exp(4/exp(x)/x)^4+(2*exp(x)*x^2-16*x^2+64*x+80)*exp(
4/exp(x)/x)^2+(-2*x^3+10*x^2)*exp(x))*exp(-exp(4/exp(x)/x)^4+(2*x-10)*exp(
4/exp(x)/x)^2-x^2+10*x-24)-exp(x)*x)/exp(x)/x^2,x, algorithm=\
```

output
```
e^(-x^2 + 2*(x - 5)*e^(8*e^(-x)/x) + 10*x - e^(16*e^(-x)/x) - 24) - log(x)
```

3.493.6 Sympy [A] (verification not implemented)

Time = 1.88 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{e^{-x}\left(-e^{x}x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^{x}x^2)+e^{x}(\right.\right.}{x^2}$$

$$= e^{-x^2+10x+(2x-10)e^{\frac{8e^{-x}}{x}}-e^{\frac{16e^{-x}}{x}}-24}-\log(x)$$

input
```
integrate(((((16*x+16)*exp(4/exp(x)/x)**4+(2*exp(x)*x**2-16*x**2+64*x+80)*e
xp(4/exp(x)/x)**2+(-2*x**3+10*x**2)*exp(x))*exp(-exp(4/exp(x)/x)**4+(2*x-1
0)*exp(4/exp(x)/x)**2-x**2+10*x-24)-exp(x)*x)/exp(x)/x**2,x)
```

output
```
exp(-x**2 + 10*x + (2*x - 10)*exp(8*exp(-x)/x) - exp(16*exp(-x)/x) - 24) -
 log(x)
```

3.493.

$$\int \frac{e^{-x}\left(-e^{x}x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^{x}x^2)+e^{x}(10x^2-2x^3)\right)\right)}{} dx$$

3.493.7 Maxima [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.71

$$\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^x x^2)+e^x\left(\right.\right.\right.}{x^2}$$

$$= e^{\left(-x^2+2\,xe^{\left(\frac{8\,e^{(-x)}}{x}\right)}+10\,x-e^{\left(\frac{16\,e^{(-x)}}{x}\right)}-10\,e^{\left(\frac{8\,e^{(-x)}}{x}\right)}-24\right)}-\log\left(x\right)$$

input
```
integrate((((16*x+16)*exp(4/exp(x)/x)^4+(2*exp(x)*x^2-16*x^2+64*x+80)*exp(
4/exp(x)/x)^2+(-2*x^3+10*x^2)*exp(x))*exp(-exp(4/exp(x)/x)^4+(2*x-10)*exp(
4/exp(x)/x)^2-x^2+10*x-24)-exp(x)*x)/exp(x)/x^2,x, algorithm=\
```

output
```
e^(-x^2 + 2*x*e^(8*e^(-x)/x) + 10*x - e^(16*e^(-x)/x) - 10*e^(8*e^(-x)/x)
- 24) - log(x)
```

3.493.8 Giac [F]

$$\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^x x^2)+e^x\left(\right.\right.\right.}{x^2}$$

$$=\int -\frac{\left(2\left((x^3-5\,x^2)e^x-8\,(x+1)e^{\left(\frac{16\,e^{(-x)}}{x}\right)}-(x^2e^x-8\,x^2+32\,x+40)e^{\left(\frac{8\,e^{(-x)}}{x}\right)}\right)e^{\left(-x^2+2\,(x-5)e^{\left(\frac{8\,e^{(-x)}}{x}\right)}\right.}}{x^2}$$

input
```
integrate((((16*x+16)*exp(4/exp(x)/x)^4+(2*exp(x)*x^2-16*x^2+64*x+80)*exp(
4/exp(x)/x)^2+(-2*x^3+10*x^2)*exp(x))*exp(-exp(4/exp(x)/x)^4+(2*x-10)*exp(
4/exp(x)/x)^2-x^2+10*x-24)-exp(x)*x)/exp(x)/x^2,x, algorithm=\
```

output
```
integrate(-(2*((x^3 - 5*x^2)*e^x - 8*(x + 1)*e^(16*e^(-x)/x) - (x^2*e^x -
8*x^2 + 32*x + 40)*e^(8*e^(-x)/x))*e^(-x^2 + 2*(x - 5)*e^(8*e^(-x)/x) + 10
*x - e^(16*e^(-x)/x) - 24) + x*e^x)*e^(-x)/x^2, x)
```

3.493.

$$\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^x x^2)+e^x\left(10x^2-2x^3\right)\right)\right)}{} dx$$

3.493.9 Mupad [B] (verification not implemented)

Time = 14.81 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.87

$$\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^x x^2)+e^x(10x^2-2x^3)\right)\right)}{x^2}\,dx$$
$$= e^{2\,x\,e^{\frac{8\,e^{-x}}{x}}}\,e^{10\,x}\,e^{-24}\,e^{-x^2}\,e^{-e^{\frac{16\,e^{-x}}{x}}}\,e^{-10\,e^{\frac{8\,e^{-x}}{x}}}-\ln(x)$$

input
```
int((exp(-x)*(exp(10*x - exp((16*exp(-x))/x) + exp((8*exp(-x))/x)*(2*x - 1
0) - x^2 - 24)*(exp(x)*(10*x^2 - 2*x^3) + exp((16*exp(-x))/x)*(16*x + 16)
+ exp((8*exp(-x))/x)*(64*x + 2*x^2*exp(x) - 16*x^2 + 80)) - x*exp(x)))/x^2
,x)
```

output
```
exp(2*x*exp((8*exp(-x))/x))*exp(10*x)*exp(-24)*exp(-x^2)*exp(-exp((16*exp(
-x))/x))*exp(-10*exp((8*exp(-x))/x)) - log(x)
```

3.493.

$$\int \frac{e^{-x}\left(-e^x x+e^{-24-e^{\frac{16e^{-x}}{x}}+10x-x^2+e^{\frac{8e^{-x}}{x}}(-10+2x)}\left(e^{\frac{16e^{-x}}{x}}(16+16x)+e^{\frac{8e^{-x}}{x}}(80+64x-16x^2+2e^x x^2)+e^x(10x^2-2x^3)\right)\right)}{x^2}\,dx$$

3.494 $\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log(x^2)+(-4+x)\log^2(x^2)}{(-4+x)\log^2(x^2)}\,dx$

3.494.1 Optimal result

Integrand size = 48, antiderivative size = 14

$$\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log(x^2)+(-4+x)\log^2(x^2)}{(-4+x)\log^2(x^2)}\,dx = x+\frac{x\log(-4+x)}{\log(x^2)}$$

output
```
x*ln(x-4)/ln(x^2)+x
```

3.494.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log(x^2)+(-4+x)\log^2(x^2)}{(-4+x)\log^2(x^2)}\,dx = x+\frac{x\log(-4+x)}{\log(x^2)}$$

input
```
Integrate[((8 - 2*x)*Log[-4 + x] + (x + (-4 + x)*Log[-4 + x])*Log[x^2] + (
-4 + x)*Log[x^2]^2)/((-4 + x)*Log[x^2]^2),x]
```

output
```
x + (x*Log[-4 + x])/Log[x^2]
```

3.494.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x-4)\log^2(x^2)+(x+(x-4)\log(x-4))\log(x^2)+(8-2x)\log(x-4)}{(x-4)\log^2(x^2)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2\log(x-4)}{\log^2(x^2)}+\frac{x+x\log(x-4)-4\log(x-4)}{(x-4)\log(x^2)}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-2\int \frac{\log(x-4)}{\log^2(x^2)}dx+\int \frac{x}{(x-4)\log(x^2)}dx+\int \frac{\log(x-4)}{\log(x^2)}dx+x$$

input
```
Int[((8 - 2*x)*Log[-4 + x] + (x + (-4 + x)*Log[-4 + x])*Log[x^2] + (-4 + x
)*Log[x^2]^2)/((-4 + x)*Log[x^2]^2),x]
```

output
```
$Aborted
```

3.494.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.494.4 Maple [A] (verified)

Time = 1.53 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.50

method	result	size
norman	$\frac{x\ln(x^2)+x\ln(x-4)}{\ln(x^2)}$	21
parallelrisch	$\frac{2x\ln(x^2)+2x\ln(x-4)+16\ln(x^2)}{2\ln(x^2)}$	30
risch	$\frac{2ix\ln(x-4)}{\pi\,\mathrm{csgn}(ix)^2\,\mathrm{csgn}(ix^2)-2\pi\,\mathrm{csgn}(ix)\,\mathrm{csgn}(ix^2)^2+\pi\,\mathrm{csgn}(ix^2)^3+4i\ln(x)}+x$	63

input
```
int(((x-4)*ln(x^2)^2+((x-4)*ln(x-4)+x)*ln(x^2)+(-2*x+8)*ln(x-4))/(x-4)/ln(
x^2)^2,x,method=_RETURNVERBOSE)
```

output
```
(x*ln(x^2)+x*ln(x-4))/ln(x^2)
```

3.494.5 Fricas [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.43

$$\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log(x^2)+(-4+x)\log^2(x^2)}{(-4+x)\log^2(x^2)}\,dx = \frac{x\log(x^2)+x\log(x-4)}{\log(x^2)}$$

input
```
integrate(((x-4)*log(x^2)^2+((x-4)*log(x-4)+x)*log(x^2)+(-2*x+8)*log(x-4))
/(x-4)/log(x^2)^2,x, algorithm=\
```

output
```
(x*log(x^2) + x*log(x - 4))/log(x^2)
```

3.494.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.86

$$\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log(x^2)+(-4+x)\log^2(x^2)}{(-4+x)\log^2(x^2)}\,dx = x+\frac{x\log(x-4)}{\log(x^2)}$$

input
```
integrate(((x-4)*ln(x**2)**2+((x-4)*ln(x-4)+x)*ln(x**2)+(-2*x+8)*ln(x-4))/
(x-4)/ln(x**2)**2,x)
```

output
```
x + x*log(x - 4)/log(x**2)
```

3.494.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.29

$$\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log\left(x^2\right)+(-4+x)\log^2\left(x^2\right)}{(-4+x)\log^2\left(x^2\right)}\,dx$$
$$=\frac{x\log\left(x-4\right)+2\,x\log\left(x\right)}{2\,\log\left(x\right)}$$

input
```
integrate(((x-4)*log(x^2)^2+((x-4)*log(x-4)+x)*log(x^2)+(-2*x+8)*log(x-4))
/(x-4)/log(x^2)^2,x, algorithm=\
```

output
```
1/2*(x*log(x - 4) + 2*x*log(x))/log(x)
```

3.494.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log\left(x^2\right)+(-4+x)\log^2\left(x^2\right)}{(-4+x)\log^2\left(x^2\right)}\,dx$$
$$=x+\frac{x\log\left(x-4\right)}{\log\left(x^2\right)}$$

input
```
integrate(((x-4)*log(x^2)^2+((x-4)*log(x-4)+x)*log(x^2)+(-2*x+8)*log(x-4))
/(x-4)/log(x^2)^2,x, algorithm=\
```

output
```
x + x*log(x - 4)/log(x^2)
```

3.494.9 Mupad [B] (verification not implemented)

Time = 14.61 (sec) , antiderivative size = 60, normalized size of antiderivative = 4.29

$$\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log\left(x^2\right)+(-4+x)\log^2\left(x^2\right)}{(-4+x)\log^2\left(x^2\right)}\,dx$$
$$=\frac{3\,x}{2}+\frac{x\,\ln\left(x-4\right)}{2}+\frac{8}{x-4}+\frac{x\,\ln\left(x-4\right)-\frac{x\,\ln\left(x^2\right)\,\left(x-4\,\ln\left(x-4\right)+x\,\ln\left(x-4\right)\right)}{2\,\left(x-4\right)}}{\ln\left(x^2\right)}$$

input
```
int((log(x^2)^2*(x - 4) - log(x - 4)*(2*x - 8) + log(x^2)*(x + log(x - 4)*
(x - 4)))/(log(x^2)^2*(x - 4)),x)
```

output
```
(3*x)/2 + (x*log(x - 4))/2 + 8/(x - 4) + (x*log(x - 4) - (x*log(x^2)*(x -
4*log(x - 4) + x*log(x - 4)))/(2*(x - 4)))/log(x^2)
```

3.494. $\int \frac{(8-2x)\log(-4+x)+(x+(-4+x)\log(-4+x))\log(x^2)+(-4+x)\log^2(x^2)}{(-4+x)\log^2(x^2)}\,dx$

3.495 $\int \frac{-256+16x^4+15e^{\frac{5x^3}{2}}x^5+e^{\frac{5x^3}{4}}(32x+8x^3-120x^4+30x^6)}{2x^3}\,dx$

3.495.1 Optimal result

Integrand size = 57, antiderivative size = 20

$$\int \frac{-256+16x^4+15e^{\frac{5x^3}{2}}x^5+e^{\frac{5x^3}{4}}(32x+8x^3-120x^4+30x^6)}{2x^3}\,dx=\left(e^{\frac{5x^3}{4}}-\frac{8}{x}+2x\right)^2$$

output
```
(exp(5/4*x^3)-8/x+2*x)^2
```

3.495.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 46 vs. 2(20) = 40.

Time = 0.40 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.30

$$\int \frac{-256+16x^4+15e^{\frac{5x^3}{2}}x^5+e^{\frac{5x^3}{4}}(32x+8x^3-120x^4+30x^6)}{2x^3}\,dx$$
$$=e^{\frac{5x^3}{2}}+\frac{64}{x^2}-\frac{16e^{\frac{5x^3}{4}}}{x}+4e^{\frac{5x^3}{4}}x+4x^2$$

input
```
Integrate[(-256 + 16*x^4 + 15*E^((5*x^3)/2)*x^5 + E^((5*x^3)/4)*(32*x + 8*
x^3 - 120*x^4 + 30*x^6))/(2*x^3),x]
```

output
```
E^((5*x^3)/2) + 64/x^2 - (16*E^((5*x^3)/4))/x + 4*E^((5*x^3)/4)*x + 4*x^2
```

3.495.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 51 vs. 2(20) = 40.

Time = 0.27 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.55, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.070, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16x^4+15e^{\frac{5x^3}{2}}x^5+e^{\frac{5x^3}{4}}\left(30x^6-120x^4+8x^3+32x\right)-256}{2x^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int -\frac{-15e^{\frac{5x^3}{2}}x^5-16x^4-2e^{\frac{5x^3}{4}}\left(15x^6-60x^4+4x^3+16x\right)+256}{x^3}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{2}\int \frac{-15e^{\frac{5x^3}{2}}x^5-16x^4-2e^{\frac{5x^3}{4}}\left(15x^6-60x^4+4x^3+16x\right)+256}{x^3}dx$$

$$\Big\downarrow \text{2010}$$

$$-\frac{1}{2}\int \left(-15e^{\frac{5x^3}{2}}x^2-\frac{2e^{\frac{5x^3}{4}}\left(15x^5-60x^3+4x^2+16\right)}{x^2}-\frac{16\left(x^4-16\right)}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(2e^{\frac{5x^3}{2}}+8x^2+\frac{128}{x^2}-\frac{8e^{\frac{5x^3}{4}}\left(4x^3-x^5\right)}{x^4}\right)$$

input
```
Int[(-256 + 16*x^4 + 15*E^((5*x^3)/2)*x^5 + E^((5*x^3)/4)*(32*x + 8*x^3 -
120*x^4 + 30*x^6))/(2*x^3),x]
```

output
```
(2*E^((5*x^3)/2) + 128/x^2 + 8*x^2 - (8*E^((5*x^3)/4)*(4*x^3 - x^5))/x^4)/
2
```

3.495.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.495.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.70

method	result	size
risch	$4x^2+\frac{64}{x^2}+e^{\frac{5x^3}{2}}+\frac{4(x^2-4)e^{\frac{5x^3}{4}}}{x}$	34
norman	$\frac{4\,e^{\frac{5x^3}{4}}x^3+4x^4+x^2e^{\frac{5x^3}{2}}-16\,e^{\frac{5x^3}{4}}x+64}{x^2}$	44
parts	$\frac{4x^2e^{\frac{5x^3}{4}}-16\,e^{\frac{5x^3}{4}}}{x}+e^{\frac{5x^3}{2}}+4x^2+\frac{64}{x^2}$	44
parallelrisch	$\frac{8x^4+8\,e^{\frac{5x^3}{4}}x^3+2x^2e^{\frac{5x^3}{2}}+128-32\,e^{\frac{5x^3}{4}}x}{2x^2}$	46

input
```
int(1/2*(15*x^5*exp(5/4*x^3)^2+(30*x^6-120*x^4+8*x^3+32*x)*exp(5/4*x^3)+16
*x^4-256)/x^3,x,method=_RETURNVERBOSE)
```

output
```
4*x^2+64/x^2+exp(5/2*x^3)+4*(x^2-4)/x*exp(5/4*x^3)
```

3.495.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. $2(17) = 34$.

Time = 0.24 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

$$\int \frac{-256+16x^4+15e^{\frac{5x^3}{2}}x^5+e^{\frac{5x^3}{4}}(32x+8x^3-120x^4+30x^6)}{2x^3}\,dx = \frac{4\,x^4+x^2e^{\left(\frac{5}{2}\,x^3\right)}+4\,(x^3-4\,x)e^{\left(\frac{5}{4}\,x^3\right)}+64}{x^2}$$

input
```
integrate(1/2*(15*x^5*exp(5/4*x^3)^2+(30*x^6-120*x^4+8*x^3+32*x)*exp(5/4*x
^3)+16*x^4-256)/x^3,x, algorithm=\
```

output
```
(4*x^4 + x^2*e^(5/2*x^3) + 4*(x^3 - 4*x)*e^(5/4*x^3) + 64)/x^2
```

3.495.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. $2(15) = 30$.

Time = 0.08 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

$$\int \frac{-256+16x^4+15e^{\frac{5x^3}{2}}x^5+e^{\frac{5x^3}{4}}(32x+8x^3-120x^4+30x^6)}{2x^3}\,dx = 4x^2+\frac{xe^{\frac{5x^3}{2}}+(4x^2-16)\,e^{\frac{5x^3}{4}}}{x}+\frac{64}{x^2}$$

input
```
integrate(1/2*(15*x**5*exp(5/4*x**3)**2+(30*x**6-120*x**4+8*x**3+32*x)*exp
(5/4*x**3)+16*x**4-256)/x**3,x)
```

output
```
4*x**2 + (x*exp(5*x**3/2) + (4*x**2 - 16)*exp(5*x**3/4))/x + 64/x**2
```

3.495.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.25 (sec) , antiderivative size = 103, normalized size of antiderivative = 5.15

$$\int \frac{-256 + 16x^4 + 15e^{\frac{5x^3}{2}}x^5 + e^{\frac{5x^3}{4}}(32x + 8x^3 - 120x^4 + 30x^6)}{2x^3} dx$$
$$= -\frac{16\left(\frac{5}{4}\right)^{\frac{2}{3}} x^4\Gamma\left(\frac{4}{3}, -\frac{5}{4}x^3\right)}{5\left(-x^3\right)^{\frac{4}{3}}} + \frac{16\left(\frac{5}{4}\right)^{\frac{1}{3}} x^2\Gamma\left(\frac{2}{3}, -\frac{5}{4}x^3\right)}{\left(-x^3\right)^{\frac{2}{3}}} - \frac{16\left(\frac{5}{4}\right)^{\frac{2}{3}} x\Gamma\left(\frac{1}{3}, -\frac{5}{4}x^3\right)}{15\left(-x^3\right)^{\frac{1}{3}}} + 4x^2 - \frac{16\left(\frac{5}{4}\right)^{\frac{1}{3}}\left(-x^3\right)^{\frac{1}{3}}\Gamma\left(-\frac{1}{3}, -\frac{5}{4}x^3\right)}{3x} + \frac{64}{x^2} + e^{\left(\frac{5}{2}x^3\right)}$$

input
```
integrate(1/2*(15*x^5*exp(5/4*x^3)^2+(30*x^6-120*x^4+8*x^3+32*x)*exp(5/4*x
^3)+16*x^4-256)/x^3,x, algorithm=\
```

output
```
-16/5*(5/4)^(2/3)*x^4*gamma(4/3, -5/4*x^3)/(-x^3)^(4/3) + 16*(5/4)^(1/3)*x
^2*gamma(2/3, -5/4*x^3)/(-x^3)^(2/3) - 16/15*(5/4)^(2/3)*x*gamma(1/3, -5/4
*x^3)/(-x^3)^(1/3) + 4*x^2 - 16/3*(5/4)^(1/3)*(-x^3)^(1/3)*gamma(-1/3, -5/
4*x^3)/x + 64/x^2 + e^(5/2*x^3)
```

3.495.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(17) = 34.

Time = 0.28 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.05

$$\int \frac{-256 + 16x^4 + 15e^{\frac{5x^3}{2}}x^5 + e^{\frac{5x^3}{4}}(32x + 8x^3 - 120x^4 + 30x^6)}{2x^3} dx$$
$$= \frac{4x^4 + 4x^3e^{\left(\frac{5}{4}x^3\right)} + x^2e^{\left(\frac{5}{2}x^3\right)} - 16xe^{\left(\frac{5}{4}x^3\right)} + 64}{x^2}$$

input
```
integrate(1/2*(15*x^5*exp(5/4*x^3)^2+(30*x^6-120*x^4+8*x^3+32*x)*exp(5/4*x
^3)+16*x^4-256)/x^3,x, algorithm=\
```

output
```
(4*x^4 + 4*x^3*e^(5/4*x^3) + x^2*e^(5/2*x^3) - 16*x*e^(5/4*x^3) + 64)/x^2
```

3.495.9 Mupad [B] (verification not implemented)

Time = 14.17 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.85

$$\int \frac{-256+16x^4+15e^{\frac{5x^3}{2}}x^5+e^{\frac{5x^3}{4}}\left(32x+8x^3-120x^4+30x^6\right)}{2x^3}\,dx$$
$$=\mathrm{e}^{\frac{5\,x^3}{2}}-\frac{16\,x\,\mathrm{e}^{\frac{5\,x^3}{4}}-64}{x^2}+4\,x\,\mathrm{e}^{\frac{5\,x^3}{4}}+4\,x^2$$

input
```
int(((15*x^5*exp((5*x^3)/2))/2 + (exp((5*x^3)/4)*(32*x + 8*x^3 - 120*x^4 +
 30*x^6))/2 + 8*x^4 - 128)/x^3,x)
```

output
```
exp((5*x^3)/2) - (16*x*exp((5*x^3)/4) - 64)/x^2 + 4*x*exp((5*x^3)/4) + 4*x
^2
```

3.496 $\int \frac{e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}(18-24x-15x^2)-\log(\log(5))}{\log(\log(5))}\,dx$

3.496.1 Optimal result

Integrand size = 46, antiderivative size = 30

$$\int \frac{e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}(18-24x-15x^2)-\log(\log(5))}{\log(\log(5))}\,dx = e^{\frac{(5-x-x^2)(-5+x+4(3+x))}{\log(\log(5))}}-x$$

output
```
exp((-x^2-x+5)*(5*x+7)/ln(ln(5)))-x
```

3.496.2 Mathematica [A] (verified)

Time = 0.76 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}(18-24x-15x^2)-\log(\log(5))}{\log(\log(5))}\,dx = e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}-x$$

input
```
Integrate[(E^((35 + 18*x - 12*x^2 - 5*x^3)/Log[Log[5]])*(18 - 24*x - 15*x^
2) - Log[Log[5]])/Log[Log[5]],x]
```

output
```
E^((35 + 18*x - 12*x^2 - 5*x^3)/Log[Log[5]]) - x
```

3.496.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.33, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-15x^2-24x+18)\, e^{\frac{-5x^3-12x^2+18x+35}{\log(\log(5))}}-\log(\log(5))}{\log(\log(5))}dx$$
$$\Big\downarrow \ 27$$
$$\frac{\int \left(3e^{\frac{-5x^3-12x^2+18x+35}{\log(\log(5))}}(-5x^2-8x+6)-\log(\log(5))\right)dx}{\log(\log(5))}$$
$$\Big\downarrow \ 2009$$
$$\frac{\log(\log(5))e^{\frac{-5x^3-12x^2+18x+35}{\log(\log(5))}}-x\log(\log(5))}{\log(\log(5))}$$

input
```
Int[(E^((35 + 18*x - 12*x^2 - 5*x^3)/Log[Log[5]])*(18 - 24*x - 15*x^2) - L
og[Log[5]])/Log[Log[5]],x]
```

output
```
(E^((35 + 18*x - 12*x^2 - 5*x^3)/Log[Log[5]])*Log[Log[5]] - x*Log[Log[5]])
/Log[Log[5]]
```

3.496.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.496.4 Maple [A] (verified)

Time = 0.55 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

method	result	size
risch	$-x+\mathrm{e}^{-\frac{(5x+7)\left(x^2+x-5\right)}{\ln(\ln(5))}}$	24
norman	$-x+\mathrm{e}^{\frac{-5x^3-12x^2+18x+35}{\ln(\ln(5))}}$	27
parts	$-x+\mathrm{e}^{\frac{-5x^3-12x^2+18x+35}{\ln(\ln(5))}}$	27
default	$\frac{\ln(\ln(5))\mathrm{e}^{\frac{-5x^3-12x^2+18x+35}{\ln(\ln(5))}}-x\ln(\ln(5))}{\ln(\ln(5))}$	40
parallelrisch	$\frac{\mathrm{e}^{-\frac{5x^3+12x^2-18x-35}{\ln(\ln(5))}}\ln(\ln(5))-x\ln(\ln(5))}{\ln(\ln(5))}$	41

input
```
int(((-15*x^2-24*x+18)*exp((-5*x^3-12*x^2+18*x+35)/ln(ln(5)))-ln(ln(5)))/l
n(ln(5)),x,method=_RETURNVERBOSE)
```

output
```
-x+exp(-(5*x+7)*(x^2+x-5)/ln(ln(5)))
```

3.496.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}(18-24x-15x^2)-\log(\log(5))}{\log(\log(5))}\,dx=-x+e^{\left(-\frac{5\,x^3+12\,x^2-18\,x-35}{\log(\log(5))}\right)}$$

input
```
integrate(((-15*x^2-24*x+18)*exp((-5*x^3-12*x^2+18*x+35)/log(log(5)))-log(
log(5)))/log(log(5)),x, algorithm=\
```

output
```
-x + e^(-(5*x^3 + 12*x^2 - 18*x - 35)/log(log(5)))
```

3.496.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.73

$$\int \frac{e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}(18-24x-15x^2)-\log(\log(5))}{\log(\log(5))}\,dx = -x+e^{\frac{-5x^3-12x^2+18x+35}{\log(\log(5))}}$$

input
```
integrate(((-15*x**2-24*x+18)*exp((-5*x**3-12*x**2+18*x+35)/ln(ln(5)))-ln(
ln(5)))/ln(ln(5)),x)
```

output
```
-x + exp((-5*x**3 - 12*x**2 + 18*x + 35)/log(log(5)))
```

3.496.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(23) = 46.

Time = 0.38 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.83

$$\int \frac{e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}(18-24x-15x^2)-\log(\log(5))}{\log(\log(5))}\,dx$$
$$= -\frac{x\log(\log(5)) - e^{\left(-\frac{5x^3}{\log(\log(5))}-\frac{12x^2}{\log(\log(5))}+\frac{18x}{\log(\log(5))}+\frac{35}{\log(\log(5))}\right)}\log(\log(5))}{\log(\log(5))}$$

input
```
integrate(((-15*x^2-24*x+18)*exp((-5*x^3-12*x^2+18*x+35)/log(log(5)))-log(
log(5)))/log(log(5)),x, algorithm=\
```

output
```
-(x*log(log(5)) - e^(-5*x^3/log(log(5)) - 12*x^2/log(log(5)) + 18*x/log(lo
g(5)) + 35/log(log(5)))*log(log(5)))/log(log(5))
```

3.496.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(23) = 46.

Time = 0.28 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.83

$$\int \frac{e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}(18-24x-15x^2)-\log(\log(5))}{\log(\log(5))}\,dx$$
$$= -\frac{x\log(\log(5)) - e^{\left(-\frac{5x^3}{\log(\log(5))}-\frac{12x^2}{\log(\log(5))}+\frac{18x}{\log(\log(5))}+\frac{35}{\log(\log(5))}\right)}\log(\log(5))}{\log(\log(5))}$$

input
```
integrate(((-15*x^2-24*x+18)*exp((-5*x^3-12*x^2+18*x+35)/log(log(5)))-log(
log(5)))/log(log(5)),x, algorithm=\
```

output
```
-(x*log(log(5)) - e^(-5*x^3/log(log(5)) - 12*x^2/log(log(5)) + 18*x/log(lo
g(5)) + 35/log(log(5)))*log(log(5)))/log(log(5))
```

3.496.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.47

$$\int \frac{e^{\frac{35+18x-12x^2-5x^3}{\log(\log(5))}}(18-24x-15x^2)-\log(\log(5))}{\log(\log(5))}\,dx = e^{\frac{18\,x}{\ln(\ln(5))}}\,e^{-\frac{5\,x^3}{\ln(\ln(5))}}\,e^{-\frac{12\,x^2}{\ln(\ln(5))}}\,e^{\frac{35}{\ln(\ln(5))}}-x$$

input
```
int(-(log(log(5)) + exp((18*x - 12*x^2 - 5*x^3 + 35)/log(log(5)))*(24*x +
15*x^2 - 18))/log(log(5)),x)
```

output
```
exp((18*x)/log(log(5)))*exp(-(5*x^3)/log(log(5)))*exp(-(12*x^2)/log(log(5)
))*exp(35/log(log(5))) - x
```

3.497 $\int \frac{144e^{34}}{16x^2+e^{16}(-24e^2x-24x^2)+e^{32}(9e^4+18e^2x+9x^2)}\,dx$

3.497.1 Optimal result

Integrand size = 50, antiderivative size = 18

$$\int \frac{144e^{34}}{16x^2+e^{16}\left(-24e^2x-24x^2\right)+e^{32}\left(9e^4+18e^2x+9x^2\right)}\,dx=\frac{16x}{e^2+x-\frac{4x}{3e^{16}}}$$

output
```
16*x/(exp(2)+x-4/3*x/exp(16))
```

3.497.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.72

$$\int \frac{144e^{34}}{16x^2+e^{16}\left(-24e^2x-24x^2\right)+e^{32}\left(9e^4+18e^2x+9x^2\right)}\,dx =-\frac{144e^{34}}{\left(-4+3e^{16}\right)\left(3e^{18}-4x+3e^{16}x\right)}$$

input
```
Integrate[(144*E^34)/(16*x^2 + E^16*(-24*E^2*x - 24*x^2) + E^32*(9*E^4 + 1
8*E^2*x + 9*x^2)),x]
```

output
```
(-144*E^34)/((-4 + 3*E^16)*(3*E^18 - 4*x + 3*E^16*x))
```

3.497.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.060, Rules used = {27, 2007, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{144e^{34}}{16x^2+e^{16}\left(-24x^2-24e^2x\right)+e^{32}\left(9x^2+18e^2x+9e^4\right)}dx$$

$$\Big\downarrow \ 27$$

$$144e^{34}\int \frac{1}{16x^2-24e^{16}\left(x^2+e^2x\right)+9e^{32}\left(x^2+2e^2x+e^4\right)}dx$$

$$\Big\downarrow \ 2007$$

$$144e^{34}\int \frac{1}{\left(\left(-4+3e^{16}\right)x+3e^{18}\right)^2}dx$$

$$\Big\downarrow \ 17$$

$$\frac{144e^{34}}{\left(4-3e^{16}\right)\left(3e^{18}-\left(4-3e^{16}\right)x\right)}$$

input
```
Int[(144*E^34)/(16*x^2 + E^16*(-24*E^2*x - 24*x^2) + E^32*(9*E^4 + 18*E^2*
x + 9*x^2)),x]
```

output
```
(144*E^34)/((4 - 3*E^16)*(3*E^18 - (4 - 3*E^16)*x))
```

3.497.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

3.497.4 Maple [A] (verified)

Time = 1.30 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

method	result	size
norman	$\frac{48\,\mathrm{e}^{16} x}{3\,\mathrm{e}^{16} \mathrm{e}^{2}+3 x\,\mathrm{e}^{16}-4 x}$	23
risch	$-\frac{48\,\mathrm{e}^{34}}{\left(3\,\mathrm{e}^{16}-4\right) \left(\mathrm{e}^{18}+x\,\mathrm{e}^{16}-\frac{4 x}{3}\right)}$	25
gosper	$-\frac{144\,\mathrm{e}^{32} \mathrm{e}^{2}}{\left(3\,\mathrm{e}^{16} \mathrm{e}^{2}+3 x\,\mathrm{e}^{16}-4 x\right) \left(3\,\mathrm{e}^{16}-4\right)}$	34
parallelrisch	$-\frac{144\,\mathrm{e}^{32} \mathrm{e}^{2}}{\left(3\,\mathrm{e}^{16} \mathrm{e}^{2}+3 x\,\mathrm{e}^{16}-4 x\right) \left(3\,\mathrm{e}^{16}-4\right)}$	34
meijerg	$\frac{16\,\mathrm{e}^{-2} \left(3\,\mathrm{e}^{16}-4\right)^{2} x}{\left(9\,\mathrm{e}^{32}-24\,\mathrm{e}^{16}+16\right) \left(1+\frac{x\,\mathrm{e}^{-18} \left(3\,\mathrm{e}^{16}-4\right)}{3}\right)}$	41

input
```
int(144*exp(2)*exp(16)^2/((9*exp(2)^2+18*exp(2)*x+9*x^2)*exp(16)^2+(-24*ex
p(2)*x-24*x^2)*exp(16)+16*x^2),x,method=_RETURNVERBOSE)
```

output
```
48*exp(16)*x/(3*exp(16)*exp(2)+3*x*exp(16)-4*x)
```

3.497.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.56

$$\int \frac{144e^{34}}{16x^2+e^{16}\left(-24e^2x-24x^2\right)+e^{32}\left(9e^4+18e^2x+9x^2\right)}\,dx = -\frac{144\,e^{34}}{9\,xe^{32}-24\,xe^{16}+16\,x+9\,e^{34}-12\,e^{18}}$$

input
```
integrate(144*exp(2)*exp(16)^2/((9*exp(2)^2+18*exp(2)*x+9*x^2)*exp(16)^2+(
-24*exp(2)*x-24*x^2)*exp(16)+16*x^2),x, algorithm=\
```

output
```
-144*e^34/(9*x*e^32 - 24*x*e^16 + 16*x + 9*e^34 - 12*e^18)
```

3.497.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.61

$$\int \frac{144e^{34}}{16x^2+e^{16}\left(-24e^2x-24x^2\right)+e^{32}\left(9e^4+18e^2x+9x^2\right)}\,dx = -\frac{144e^{34}}{x\left(-24e^{16}+16+9e^{32}\right)-12e^{18}+9e^{34}}$$

input
```
integrate(144*exp(2)*exp(16)**2/((9*exp(2)**2+18*exp(2)*x+9*x**2)*exp(16)*
*2+(-24*exp(2)*x-24*x**2)*exp(16)+16*x**2),x)
```

output
```
-144*exp(34)/(x*(-24*exp(16) + 16 + 9*exp(32)) - 12*exp(18) + 9*exp(34))
```

3.497.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{144e^{34}}{16x^2+e^{16}\left(-24e^2x-24x^2\right)+e^{32}\left(9e^4+18e^2x+9x^2\right)}\,dx = -\frac{144\,e^{34}}{x(9\,e^{32}-24\,e^{16}+16)+9\,e^{34}-12\,e^{18}}$$

input
```
integrate(144*exp(2)*exp(16)^2/((9*exp(2)^2+18*exp(2)*x+9*x^2)*exp(16)^2+(
-24*exp(2)*x-24*x^2)*exp(16)+16*x^2),x, algorithm=\
```

output
```
-144*e^34/(x*(9*e^32 - 24*e^16 + 16) + 9*e^34 - 12*e^18)
```

3.497.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{144e^{34}}{16x^2+e^{16}\left(-24e^2x-24x^2\right)+e^{32}\left(9e^4+18e^2x+9x^2\right)}\,dx = -\frac{144\,e^{34}}{(3\,xe^{16}-4\,x+3\,e^{18})(3\,e^{16}-4)}$$

input
```
integrate(144*exp(2)*exp(16)^2/((9*exp(2)^2+18*exp(2)*x+9*x^2)*exp(16)^2+(
-24*exp(2)*x-24*x^2)*exp(16)+16*x^2),x, algorithm=\
```

output
```
-144*e^34/((3*x*e^16 - 4*x + 3*e^18)*(3*e^16 - 4))
```

3.497.9 Mupad [B] (verification not implemented)

Time = 14.01 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{144e^{34}}{16x^2 + e^{16}\left(-24e^2x - 24x^2\right) + e^{32}\left(9e^4 + 18e^2x + 9x^2\right)}\,dx = -\frac{144\,\mathrm{e}^{34}}{\left(3\,\mathrm{e}^{18} + x\,\left(3\,\mathrm{e}^{16} - 4\right)\right)\,\left(3\,\mathrm{e}^{16} - 4\right)}$$

input
```
int((144*exp(34))/(exp(32)*(9*exp(4) + 18*x*exp(2) + 9*x^2) - exp(16)*(24*
x*exp(2) + 24*x^2) + 16*x^2),x)
```

output
```
-(144*exp(34))/((3*exp(18) + x*(3*exp(16) - 4))*(3*exp(16) - 4))
```

3.498 $\int \frac{(16x+16x^2+e^{2x}(-x-x^2))\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\mathrm{lo}}{(8x+8x^2)\log\left(-\frac{1}{x+}\right.}$

3.498.1 Optimal result

Integrand size = 120, antiderivative size = 28

$$\int \frac{(16x+16x^2+e^{2x}(-x-x^2))\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)(e^x(-9-18x)+e^{\cdots}}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}$$

$$=2x-\frac{1}{16}\left(-e^x+\log^9\left(-\frac{1}{x+x^2}\right)\right)^2$$

output
```
2*x-1/4*(ln(-1/(x^2+x))^9-exp(x))*(1/4*ln(-1/(x^2+x))^9-1/4*exp(x))
```

3.498.2 Mathematica [A] (verified)

Time = 0.49 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.89

$$\int \frac{(16x+16x^2+e^{2x}(-x-x^2))\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)(e^x(-9-18x)+e^{\cdots}}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}$$

$$=\frac{1}{8}e^x\log^9\left(-\frac{1}{x+x^2}\right)+\frac{1}{8}\left(-\frac{e^{2x}}{2}+16x-\frac{1}{2}\log^{18}\left(-\frac{1}{x+x^2}\right)\right)$$

input
```
Integrate[((16*x + 16*x^2 + E^(2*x)*(-x - x^2))*Log[-(x + x^2)^(-1)] + (9
+ 18*x)*Log[-(x + x^2)^(-1)]^18 + Log[-(x + x^2)^(-1)]^9*(E^x*(-9 - 18*x)
+ E^x*(x + x^2)*Log[-(x + x^2)^(-1)]))/((8*x + 8*x^2)*Log[-(x + x^2)^(-1)]
),x]
```

3.498. $\int \frac{(16x+16x^2+e^{2x}(-x-x^2))\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^x(x+x^2)\log\left(-\frac{1}{x+x^2}\right)\right)}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}\,dx$

output
```
(E^x*Log[-(x + x^2)^(-1)]^9)/8 + (-1/2*E^(2*x) + 16*x - Log[-(x + x^2)^(-1
)]^18/2)/8
```

3.498.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(18x+9)\log^{18}\left(-\frac{1}{x^2+x}\right)+\left(e^x\left(x^2+x\right)\log\left(-\frac{1}{x^2+x}\right)+e^x(-18x-9)\right)\log^9\left(-\frac{1}{x^2+x}\right)+\left(16x^2+e^{2x}\left(-x^2-x\right)\right.}{\left(8x^2+8x\right)\log\left(-\frac{1}{x^2+x}\right)}$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{(18x+9)\log^{18}\left(-\frac{1}{x^2+x}\right)+\left(e^x\left(x^2+x\right)\log\left(-\frac{1}{x^2+x}\right)+e^x(-18x-9)\right)\log^9\left(-\frac{1}{x^2+x}\right)+\left(16x^2+e^{2x}\left(-x^2-x\right)\right.}{x(8x+8)\log\left(-\frac{1}{x^2+x}\right)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{(18x+9)\log^{18}\left(-\frac{1}{x^2+x}\right)+\left(e^x\left(x^2+x\right)\log\left(-\frac{1}{x^2+x}\right)+e^x(-18x-9)\right)\log^9\left(-\frac{1}{x^2+x}\right)+\left(16x^2+e^{2x}\left(-x^2-x\right)\right.}{x(8x+8)\log\left(-\frac{1}{x(x+1)}\right)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{16x^2+18x\log^{17}\left(-\frac{1}{x^2+x}\right)+9\log^{17}\left(-\frac{1}{x^2+x}\right)+16x}{8x(x+1)}+\frac{e^x\left(x^2\log\left(-\frac{1}{x^2+x}\right)+x\log\left(-\frac{1}{x^2+x}\right)-18x-9\right)\log^8}{8x(x+1)}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{9}{8}\int \frac{\log^{17}\left(-\frac{1}{x(x+1)}\right)}{x}dx+\frac{9}{8}\int \frac{\log^{17}\left(-\frac{1}{x(x+1)}\right)}{x+1}dx+\frac{1}{8}\int e^x\log^9\left(-\frac{1}{x(x+1)}\right)dx+\frac{9}{8}\int \frac{e^x\log^8\left(-\frac{1}{x(x+1)}\right)}{-x-1}dx-\frac{9}{8}\int \frac{e^x\log^8\left(-\frac{1}{x(x+1)}\right)}{x}dx+2x-\frac{e^{2x}}{16}$$

input
```
Int[((16*x + 16*x^2 + E^(2*x)*(-x - x^2))*Log[-(x + x^2)^(-1)] + (9 + 18*x
)*Log[-(x + x^2)^(-1)]^18 + Log[-(x + x^2)^(-1)]^9*(E^x*(-9 - 18*x) + E^x*
(x + x^2)*Log[-(x + x^2)^(-1)]))/((8*x + 8*x^2)*Log[-(x + x^2)^(-1)]),x]
```

3.498.

$$\int \frac{\left(16x+16x^2+e^{2x}\left(-x-x^2\right)\right)\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^x\left(x+x^2\right)\log\left(-\frac{1}{x+x^2}\right)\right)}{\left(8x+8x^2\right)\log\left(-\frac{1}{x+x^2}\right)}\,dx$$

output
```
$Aborted
```

3.498.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.498.4 Maple [F(-1)]

Timed out.

$$\int \frac{(18x+9)\ln\left(-\frac{1}{x^2+x}\right)^{18}+\left(\left(x^2+x\right)e^x\ln\left(-\frac{1}{x^2+x}\right)+\left(-18x-9\right)e^x\right)\ln\left(-\frac{1}{x^2+x}\right)^9+\left(\left(-x^2-x\right)e^{2x}+16x^2\right.}{\left(8x^2+8x\right)\ln\left(-\frac{1}{x^2+x}\right)}$$

input
```
int(((18*x+9)*ln(-1/(x^2+x))^18+((x^2+x)*exp(x)*ln(-1/(x^2+x))+(-18*x-9)*e
xp(x))*ln(-1/(x^2+x))^9+((-x^2-x)*exp(x)^2+16*x^2+16*x)*ln(-1/(x^2+x)))/(8
*x^2+8*x)/ln(-1/(x^2+x)),x)
```

output
```
int(((18*x+9)*ln(-1/(x^2+x))^18+((x^2+x)*exp(x)*ln(-1/(x^2+x))+(-18*x-9)*e
xp(x))*ln(-1/(x^2+x))^9+((-x^2-x)*exp(x)^2+16*x^2+16*x)*ln(-1/(x^2+x)))/(8
*x^2+8*x)/ln(-1/(x^2+x)),x)
```

3.498.

$$\int \frac{(16x+16x^2+e^{2x}(-x-x^2))\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^x\left(x+x^2\right)\log\left(-\frac{1}{x+x^2}\right)\right)}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}\,dx$$

3.498.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

$$\int \frac{\left(16x+16x^2+e^{2x}(-x-x^2)\right)\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^x\right.}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}$$

$$= -\frac{1}{16}\log\left(-\frac{1}{x^2+x}\right)^{18} + \frac{1}{8}e^x\log\left(-\frac{1}{x^2+x}\right)^9 + 2\,x - \frac{1}{16}\,e^{(2\,x)}$$

input
```
integrate((((18*x+9)*log(-1/(x^2+x))^18+((x^2+x)*exp(x)*log(-1/(x^2+x))+(-1
8*x-9)*exp(x))*log(-1/(x^2+x))^9+((-x^2-x)*exp(x)^2+16*x^2+16*x)*log(-1/(x
^2+x)))/(8*x^2+8*x)/log(-1/(x^2+x)),x, algorithm=\
```

output
```
-1/16*log(-1/(x^2 + x))^18 + 1/8*e^x*log(-1/(x^2 + x))^9 + 2*x - 1/16*e^(2
*x)
```

3.498.6 Sympy [A] (verification not implemented)

Time = 5.94 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

$$\int \frac{\left(16x+16x^2+e^{2x}(-x-x^2)\right)\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^x\right.}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}$$

$$= 2x - \frac{e^{2x}}{16} + \frac{e^x\log\left(-\frac{1}{x^2+x}\right)^9}{8} - \frac{\log\left(-\frac{1}{x^2+x}\right)^{18}}{16}$$

input
```
integrate((((18*x+9)*ln(-1/(x**2+x))**18+((x**2+x)*exp(x)*ln(-1/(x**2+x))+(
-18*x-9)*exp(x))*ln(-1/(x**2+x))**9+((-x**2-x)*exp(x)**2+16*x**2+16*x)*ln(
-1/(x**2+x)))/(8*x**2+8*x)/ln(-1/(x**2+x)),x)
```

output
```
2*x - exp(2*x)/16 + exp(x)*log(-1/(x**2 + x))**9/8 - log(-1/(x**2 + x))**1
8/16
```

3.498.7 Maxima [F]

$$\int \frac{(16x+16x^2+e^{2x}(-x-x^2))\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^x\right.}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}$$

$$=\int \frac{9\,(2\,x+1)\log\left(-\frac{1}{x^2+x}\right)^{18}+\left((x^2+x)e^x\log\left(-\frac{1}{x^2+x}\right)-9\,(2\,x+1)e^x\right)\log\left(-\frac{1}{x^2+x}\right)^9+\left(16\,x^2-(x^2+x)\right.}{8\,(x^2+x)\log\left(-\frac{1}{x^2+x}\right)}$$

input
```
integrate(((18*x+9)*log(-1/(x^2+x))^18+((x^2+x)*exp(x)*log(-1/(x^2+x))+(-1
8*x-9)*exp(x))*log(-1/(x^2+x))^9+((-x^2-x)*exp(x)^2+16*x^2+16*x)*log(-1/(x
^2+x)))/(8*x^2+8*x)/log(-1/(x^2+x)),x, algorithm=\
```

output
```
-1/16*log(x)^18 - 21879/8*log(x)^8*log(-x - 1)^10 - 1989*log(x)^7*log(-x -
 1)^11 - 4641/4*log(x)^6*log(-x - 1)^12 - 1071/2*log(x)^5*log(-x - 1)^13 -
 765/4*log(x)^4*log(-x - 1)^14 - 51*log(x)^3*log(-x - 1)^15 - 153/16*log(x
)^2*log(-x - 1)^16 - 9/8*log(x)*log(-x - 1)^17 - 1/16*log(-x - 1)^18 - 1/8
*e^x*log(x)^9 - 1/8*(24310*log(x)^9 + e^x)*log(-x - 1)^9 - 9/8*(2431*log(x
)^10 + e^x*log(x))*log(-x - 1)^8 - 9/2*(442*log(x)^11 + e^x*log(x)^2)*log(
-x - 1)^7 - 21/4*(221*log(x)^12 + 2*e^x*log(x)^3)*log(-x - 1)^6 - 63/4*(34
*log(x)^13 + e^x*log(x)^4)*log(-x - 1)^5 - 9/4*(85*log(x)^14 + 7*e^x*log(x
)^5)*log(-x - 1)^4 - 3/2*(34*log(x)^15 + 7*e^x*log(x)^6)*log(-x - 1)^3 - 9
/16*(17*log(x)^16 + 8*e^x*log(x)^7)*log(-x - 1)^2 + 1/8*e^(-2)*exp_integra
l_e(1, -2*x - 2) - 9/8*(log(x)^17 + e^x*log(x)^8)*log(-x - 1) + 2*x - 1/8*
integrate(x*e^(2*x)/(x + 1), x)
```

3.498.8 Giac [F(-1)]

Timed out.

$$\int \frac{(16x+16x^2+e^{2x}(-x-x^2))\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^x\right.}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}$$

$= \text{Timed out}$

input
```
integrate(((18*x+9)*log(-1/(x^2+x))^18+((x^2+x)*exp(x)*log(-1/(x^2+x))+(-1
8*x-9)*exp(x))*log(-1/(x^2+x))^9+((-x^2-x)*exp(x)^2+16*x^2+16*x)*log(-1/(x
^2+x)))/(8*x^2+8*x)/log(-1/(x^2+x)),x, algorithm=\
```

output
```
Timed out
```

3.498.9 Mupad [B] (verification not implemented)

Time = 14.46 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

$$\int \frac{\left(16x+16x^2+e^{2x}(-x-x^2)\right)\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^{x}\right.}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}$$

$$=-\frac{\ln\left(-\frac{1}{x^2+x}\right)^{18}}{16}+\frac{e^x\ln\left(-\frac{1}{x^2+x}\right)^9}{8}+2\,x-\frac{e^{2\,x}}{16}$$

input
```
int((log(-1/(x + x^2))^18*(18*x + 9) - log(-1/(x + x^2))^9*(exp(x)*(18*x +
 9) - exp(x)*log(-1/(x + x^2))*(x + x^2)) + log(-1/(x + x^2))*(16*x - exp(
2*x)*(x + x^2) + 16*x^2))/(log(-1/(x + x^2))*(8*x + 8*x^2)),x)
```

output
```
2*x - exp(2*x)/16 - log(-1/(x + x^2))^18/16 + (exp(x)*log(-1/(x + x^2))^9)
/8
```

3.498.
$$\int \frac{\left(16x+16x^2+e^{2x}(-x-x^2)\right)\log\left(-\frac{1}{x+x^2}\right)+(9+18x)\log^{18}\left(-\frac{1}{x+x^2}\right)+\log^9\left(-\frac{1}{x+x^2}\right)\left(e^x(-9-18x)+e^x(x+x^2)\log\left(-\frac{1}{x+x^2}\right)\right)}{(8x+8x^2)\log\left(-\frac{1}{x+x^2}\right)}\,dx$$

3.499 $\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx$

3.499.1 Optimal result

Integrand size = 79, antiderivative size = 26

$$\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx = \frac{\frac{5}{4}+x}{\frac{2x^2}{3}+\log\left(-1+\frac{x}{1+x}\right)}$$

output
```
(x+5/4)/(ln(x/(1+x)-1)+2/3*x^2)
```

3.499.2 Mathematica [A] (verified)

Time = 0.63 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx = \frac{3(5+4x)}{4\left(2x^2+3\log\left(-\frac{1}{1+x}\right)\right)}$$

input
```
Integrate[(45 - 24*x - 84*x^2 - 24*x^3 + (36 + 36*x)*Log[-(1 + x)^(-1)])/(
16*x^4 + 16*x^5 + (48*x^2 + 48*x^3)*Log[-(1 + x)^(-1)] + (36 + 36*x)*Log[-
(1 + x)^(-1)]^2),x]
```

output
```
(3*(5 + 4*x))/(4*(2*x^2 + 3*Log[-(1 + x)^(-1)]))
```

3.499.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-24x^3-84x^2-24x+(36x+36)\log\left(-\frac{1}{x+1}\right)+45}{16x^5+16x^4+(48x^3+48x^2)\log\left(-\frac{1}{x+1}\right)+(36x+36)\log^2\left(-\frac{1}{x+1}\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-24x^3-84x^2-24x+(36x+36)\log\left(-\frac{1}{x+1}\right)+45}{4(x+1)\left(2x^2+3\log\left(-\frac{1}{x+1}\right)\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{4}\int \frac{3\left(-8x^3-28x^2-8x+12(x+1)\log\left(-\frac{1}{x+1}\right)+15\right)}{(x+1)\left(2x^2+3\log\left(-\frac{1}{x+1}\right)\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{3}{4}\int \frac{-8x^3-28x^2-8x+12(x+1)\log\left(-\frac{1}{x+1}\right)+15}{(x+1)\left(2x^2+3\log\left(-\frac{1}{x+1}\right)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{3}{4}\int \left(\frac{-16x^3-36x^2-8x+15}{(x+1)\left(2x^2+3\log\left(-\frac{1}{x+1}\right)\right)^2}+\frac{4}{2x^2+3\log\left(-\frac{1}{x+1}\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{3}{4}\left(12\int \frac{1}{\left(2x^2+3\log\left(-\frac{1}{x+1}\right)\right)^2}dx-20\int \frac{x}{\left(2x^2+3\log\left(-\frac{1}{x+1}\right)\right)^2}dx-16\int \frac{x^2}{\left(2x^2+3\log\left(-\frac{1}{x+1}\right)\right)^2}dx+3\int\right.$$

input
```
Int[(45 - 24*x - 84*x^2 - 24*x^3 + (36 + 36*x)*Log[-(1 + x)^(-1)])/(16*x^4
 + 16*x^5 + (48*x^2 + 48*x^3)*Log[-(1 + x)^(-1)] + (36 + 36*x)*Log[-(1 + x
)^(-1)]^2),x]
```

3.499. $\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx$

output
```
$Aborted
```

3.499.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.499.4 Maple [A] (verified)

Time = 1.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

method	result	size
norman	$\frac{\frac{15}{4}+3x}{2x^{2}+3\ln\left(-\frac{1}{1+x}\right)}$	25
risch	$\frac{\frac{15}{4}+3x}{2x^{2}+3\ln\left(-\frac{1}{1+x}\right)}$	26
parallelrisch	$\frac{45+36x}{24x^{2}+36\ln\left(-\frac{1}{1+x}\right)}$	26
derivativedivides	$\frac{\frac{3}{4(1+x)^{2}}+\frac{3}{1+x}}{\frac{3\ln\left(-\frac{1}{1+x}\right)}{(1+x)^{2}}+\frac{2}{(1+x)^{2}}-\frac{4}{1+x}+2}$	49
default	$\frac{\frac{3}{4(1+x)^{2}}+\frac{3}{1+x}}{\frac{3\ln\left(-\frac{1}{1+x}\right)}{(1+x)^{2}}+\frac{2}{(1+x)^{2}}-\frac{4}{1+x}+2}$	49

input
```
int(((36*x+36)*ln(-1/(1+x))-24*x^3-84*x^2-24*x+45)/((36*x+36)*ln(-1/(1+x))
^2+(48*x^3+48*x^2)*ln(-1/(1+x))+16*x^5+16*x^4),x,method=_RETURNVERBOSE)
```

3.499. $\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx$

output
```
(15/4+3*x)/(2*x^2+3*ln(-1/(1+x)))
```

3.499.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx = \frac{3\,(4\,x+5)}{4\,\left(2\,x^2+3\,\log\left(-\frac{1}{x+1}\right)\right)}$$

input
```
integrate(((36*x+36)*log(-1/(1+x))-24*x^3-84*x^2-24*x+45)/((36*x+36)*log(-
1/(1+x))^2+(48*x^3+48*x^2)*log(-1/(1+x))+16*x^5+16*x^4),x, algorithm=\
```

output
```
3/4*(4*x + 5)/(2*x^2 + 3*log(-1/(x + 1)))
```

3.499.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.73

$$\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx = \frac{12x+15}{8x^2+12\log\left(-\frac{1}{x+1}\right)}$$

input
```
integrate(((36*x+36)*ln(-1/(1+x))-24*x**3-84*x**2-24*x+45)/((36*x+36)*ln(-
1/(1+x))**2+(48*x**3+48*x**2)*ln(-1/(1+x))+16*x**5+16*x**4),x)
```

output
```
(12*x + 15)/(8*x**2 + 12*log(-1/(x + 1)))
```

3.499.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx = \frac{3\,(4\,x+5)}{4\,(2\,x^2-3\,\log\left(-x-1\right))}$$

input
```
integrate(((36*x+36)*log(-1/(1+x))-24*x^3-84*x^2-24*x+45)/((36*x+36)*log(-
1/(1+x))^2+(48*x^3+48*x^2)*log(-1/(1+x))+16*x^5+16*x^4),x, algorithm=\
```

output
```
3/4*(4*x + 5)/(2*x^2 - 3*log(-x - 1))
```

3.499.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.85

$$\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx = -\frac{3\left(\frac{4}{x+1}+\frac{1}{(x+1)^2}\right)}{4\left(\frac{4}{x+1}-\frac{3\,\log\left(-\frac{1}{x+1}\right)}{(x+1)^2}-\frac{2}{(x+1)^2}-2\right)}$$

input
```
integrate(((36*x+36)*log(-1/(1+x))-24*x^3-84*x^2-24*x+45)/((36*x+36)*log(-
1/(1+x))^2+(48*x^3+48*x^2)*log(-1/(1+x))+16*x^5+16*x^4),x, algorithm=\
```

output
```
-3/4*(4/(x + 1) + 1/(x + 1)^2)/(4/(x + 1) - 3*log(-1/(x + 1))/(x + 1)^2 -
2/(x + 1)^2 - 2)
```

3.499.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{45-24x-84x^2-24x^3+(36+36x)\log\left(-\frac{1}{1+x}\right)}{16x^4+16x^5+(48x^2+48x^3)\log\left(-\frac{1}{1+x}\right)+(36+36x)\log^2\left(-\frac{1}{1+x}\right)}\,dx = \frac{3\,(4\,x+5)}{4\,\left(3\,\ln\left(-\frac{1}{x+1}\right)+2\,x^2\right)}$$

input
```
int(-(24*x - log(-1/(x + 1))*(36*x + 36) + 84*x^2 + 24*x^3 - 45)/(log(-1/(
x + 1))*(48*x^2 + 48*x^3) + 16*x^4 + 16*x^5 + log(-1/(x + 1))^2*(36*x + 36
)),x)
```

output
```
(3*(4*x + 5))/(4*(3*log(-1/(x + 1)) + 2*x^2))
```

3.500 $\int \left(4+e^{-16-4e^{3x}+4x}\left(4-12e^{3x}\right)+6x\right)\,dx$

3.500.1 Optimal result

Integrand size = 29, antiderivative size = 30

$$\int \left(4+e^{-16-4e^{3x}+4x}\left(4-12e^{3x}\right)+6x\right)\,dx=e^{4\left(-4-e^{3x}+x\right)}+x+\frac{x+3x(x+x^2)}{x}$$

output
```
exp(-4*exp(3*x)+4*x-16)+x+(3*x*(x^2+x)+x)/x
```

3.500.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.14 (sec) , antiderivative size = 81, normalized size of antiderivative = 2.70

$$\int \left(4+e^{-16-4e^{3x}+4x}\left(4-12e^{3x}\right)+6x\right)\,dx=4x+3x^2-\frac{e^{-16-2x}\left(e^{3x}\right)^{2/3}\Gamma\left(\frac{4}{3},4e^{3x}\right)}{3\ 2^{2/3}}+\frac{e^{-16-2x}\left(e^{3x}\right)^{2/3}\Gamma\left(\frac{7}{3},4e^{3x}\right)}{4\ 2^{2/3}}$$

input
```
Integrate[4 + E^(-16 - 4*E^(3*x) + 4*x)*(4 - 12*E^(3*x)) + 6*x,x]
```

output
```
4*x + 3*x^2 - (E^(-16 - 2*x)*(E^(3*x))^(2/3)*Gamma[4/3, 4*E^(3*x)])/(3*2^(
2/3)) + (E^(-16 - 2*x)*(E^(3*x))^(2/3)*Gamma[7/3, 4*E^(3*x)])/(4*2^(2/3))
```

3.500.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.29 (sec) , antiderivative size = 81, normalized size of antiderivative = 2.70, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{4x-4e^{3x}-16}(4-12e^{3x})+6x+4\right) dx$$

$$\Big\downarrow \text{2009}$$

$$3x^2+4x-\frac{e^{4x-16}\Gamma\left(\frac{4}{3},4e^{3x}\right)}{3\ 2^{2/3}\left(e^{3x}\right)^{4/3}}+\frac{e^{7x-16}\Gamma\left(\frac{7}{3},4e^{3x}\right)}{4\ 2^{2/3}\left(e^{3x}\right)^{7/3}}$$

input
```
Int[4 + E^(-16 - 4*E^(3*x) + 4*x)*(4 - 12*E^(3*x)) + 6*x,x]
```

output
```
4*x + 3*x^2 - (E^(-16 + 4*x)*Gamma[4/3, 4*E^(3*x)])/(3*2^(2/3)*(E^(3*x))^(
4/3)) + (E^(-16 + 7*x)*Gamma[7/3, 4*E^(3*x)])/(4*2^(2/3)*(E^(3*x))^(7/3))
```

3.500.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.500.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.73

method	result	size
default	$4x+{\mathrm e}^{-4\,{\mathrm e}^{3x}+4x-16}+3x^{2}$	22
norman	$4x+{\mathrm e}^{-4\,{\mathrm e}^{3x}+4x-16}+3x^{2}$	22
risch	$4x+{\mathrm e}^{-4\,{\mathrm e}^{3x}+4x-16}+3x^{2}$	22
parallelrisch	$4x+{\mathrm e}^{-4\,{\mathrm e}^{3x}+4x-16}+3x^{2}$	22

input
```
int((-12*exp(3*x)+4)*exp(-4*exp(3*x)+4*x-16)+6*x+4,x,method=_RETURNVERBOSE
)
```

output
```
4*x+exp(-4*exp(3*x)+4*x-16)+3*x^2
```

3.500.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.70

$$\int \left(4+e^{-16-4e^{3x}+4x}\left(4-12e^{3x}\right)+6x\right)\,dx=3\,x^2+4\,x+e^{\left(4\,x-4\,e^{\left(3\,x\right)}-16\right)}$$

input
```
integrate((-12*exp(3*x)+4)*exp(-4*exp(3*x)+4*x-16)+6*x+4,x, algorithm=\
```

output
```
3*x^2 + 4*x + e^(4*x - 4*e^(3*x) - 16)
```

3.500.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \left(4+e^{-16-4e^{3x}+4x}\left(4-12e^{3x}\right)+6x\right)\,dx=3x^2+4x+e^{4x-4e^{3x}-16}$$

input
```
integrate((-12*exp(3*x)+4)*exp(-4*exp(3*x)+4*x-16)+6*x+4,x)
```

output
```
3*x**2 + 4*x + exp(4*x - 4*exp(3*x) - 16)
```

3.500.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.70

$$\int \left(4+e^{-16-4e^{3x}+4x}\left(4-12e^{3x}\right)+6x\right)\,dx=3\,x^2+4\,x+e^{\left(4\,x-4\,e^{\left(3\,x\right)}-16\right)}$$

input
```
integrate((-12*exp(3*x)+4)*exp(-4*exp(3*x)+4*x-16)+6*x+4,x, algorithm=\
```

output
```
3*x^2 + 4*x + e^(4*x - 4*e^(3*x) - 16)
```

3.500.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.70

$$\int \left(4+e^{-16-4e^{3x}+4x}\left(4-12e^{3x}\right)+6x\right)\,dx = 3\,x^2+4\,x+e^{\left(4\,x-4\,e^{\left(3\,x\right)}-16\right)}$$

input
```
integrate((-12*exp(3*x)+4)*exp(-4*exp(3*x)+4*x-16)+6*x+4,x, algorithm=\
```

output
```
3*x^2 + 4*x + e^(4*x - 4*e^(3*x) - 16)
```

3.500.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.77

$$\int \left(4+e^{-16-4e^{3x}+4x}\left(4-12e^{3x}\right)+6x\right)\,dx = 4\,x+3\,x^2+\mathrm{e}^{-4\,\mathrm{e}^{3\,x}}\,\mathrm{e}^{4\,x}\,\mathrm{e}^{-16}$$

input
```
int(6*x - exp(4*x - 4*exp(3*x) - 16)*(12*exp(3*x) - 4) + 4,x)
```

output
```
4*x + 3*x^2 + exp(-4*exp(3*x))*exp(4*x)*exp(-16)
```

3.501 $\int \frac{2-2x^4-4\log(4)+(2+50x^4)\log^2(4)}{x^3}\,dx$

3.501.1 Optimal result

Integrand size = 27, antiderivative size = 27

$$\int \frac{2-2x^4-4\log(4)+(2+50x^4)\log^2(4)}{x^3}\,dx = 4+25x^2\log^2(4)-\frac{(-1-x^2+\log(4))^2}{x^2}$$

output
```
4-(2*ln(2)-x^2-1)^2/x^2+100*x^2*ln(2)^2
```

3.501.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{2-2x^4-4\log(4)+(2+50x^4)\log^2(4)}{x^3}\,dx = -x^2-\frac{(-1+\log(4))^2}{x^2}+25x^2\log^2(4)$$

input
```
Integrate[(2 - 2*x^4 - 4*Log[4] + (2 + 50*x^4)*Log[4]^2)/x^3,x]
```

output
```
-x^2 - (-1 + Log[4])^2/x^2 + 25*x^2*Log[4]^2
```

3.501.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^4+(50x^4+2)\log^2(4)+2-4\log(4)}{x^3}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2(\log(4)-1)^2}{x^3}+2x(25\log^2(4)-1)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-(x^2(1-25\log^2(4)))-\frac{(1-\log(4))^2}{x^2}$$

input
```
Int[(2 - 2*x^4 - 4*Log[4] + (2 + 50*x^4)*Log[4]^2)/x^3,x]
```

output
```
-((1 - Log[4])^2/x^2) - x^2*(1 - 25*Log[4]^2)
```

3.501.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.501.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

method	result	size
norman	$\frac{\left(100 \ln \left(2\right)^{2}-1\right) x^{4}-4 \ln \left(2\right)^{2}+4 \ln \left(2\right)-1}{x^{2}}$	29
gosper	$\frac{100 x^{4} \ln \left(2\right)^{2}-x^{4}-4 \ln \left(2\right)^{2}+4 \ln \left(2\right)-1}{x^{2}}$	31
default	$\left(100 \ln \left(2\right)^{2}-1\right) x^{2}-\frac{4 \ln \left(2\right)^{2}-4 \ln \left(2\right)+1}{x^{2}}$	31
parallelrisch	$\frac{100 x^{4} \ln \left(2\right)^{2}-x^{4}-4 \ln \left(2\right)^{2}+4 \ln \left(2\right)-1}{x^{2}}$	31
risch	$100 x^{2} \ln \left(2\right)^{2}-x^{2}-\frac{4 \ln \left(2\right)^{2}}{x^{2}}+\frac{4 \ln \left(2\right)}{x^{2}}-\frac{1}{x^{2}}$	37

input
```
int((4*(50*x^4+2)*ln(2)^2-8*ln(2)-2*x^4+2)/x^3,x,method=_RETURNVERBOSE)
```

output
```
((100*ln(2)^2-1)*x^4-4*ln(2)^2+4*ln(2)-1)/x^2
```

3.501.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{2-2x^4-4\log(4)+(2+50x^4)\log^2(4)}{x^3}\,dx = -\frac{x^{4} - 4\,{\left(25\,x^{4} - 1\right)} \log\left(2\right)^{2} - 4\,\log\left(2\right) + 1}{x^{2}}$$

input
```
integrate((4*(50*x^4+2)*log(2)^2-8*log(2)-2*x^4+2)/x^3,x, algorithm=\
```

output
```
-(x^4 - 4*(25*x^4 - 1)*log(2)^2 - 4*log(2) + 1)/x^2
```

3.501.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{2-2x^4-4\log(4)+(2+50x^4)\log^2(4)}{x^3}\,dx = -x^{2}\cdot\left(1-100\log\left(2\right)^{2}\right) - \frac{-4\log\left(2\right)+1+4\log\left(2\right)^{2}}{x^{2}}$$

input
```
integrate((4*(50*x**4+2)*ln(2)**2-8*ln(2)-2*x**4+2)/x**3,x)
```

output
```
-x**2*(1 - 100*log(2)**2) - (-4*log(2) + 1 + 4*log(2)**2)/x**2
```

3.501.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{2-2x^4-4\log(4)+(2+50x^4)\log^2(4)}{x^3}\,dx$$
$$=\left(100\,\log\left(2\right)^2-1\right)x^2-\frac{4\,\log\left(2\right)^2-4\,\log\left(2\right)+1}{x^2}$$

input
```
integrate((4*(50*x^4+2)*log(2)^2-8*log(2)-2*x^4+2)/x^3,x, algorithm=\
```

output
```
(100*log(2)^2 - 1)*x^2 - (4*log(2)^2 - 4*log(2) + 1)/x^2
```

3.501.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{2-2x^4-4\log(4)+(2+50x^4)\log^2(4)}{x^3}\,dx$$
$$=100\,x^2\log\left(2\right)^2-x^2-\frac{4\,\log\left(2\right)^2-4\,\log\left(2\right)+1}{x^2}$$

input
```
integrate((4*(50*x^4+2)*log(2)^2-8*log(2)-2*x^4+2)/x^3,x, algorithm=\
```

output
```
100*x^2*log(2)^2 - x^2 - (4*log(2)^2 - 4*log(2) + 1)/x^2
```

3.501.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{2-2x^4-4\log(4)+(2+50x^4)\log^2(4)}{x^3}\,dx = x^2\left(100\ln(2)^2-1\right)-\frac{4\ln(2)^2-\ln(16)+1}{x^2}$$

input
```
int(-(8*log(2) - 4*log(2)^2*(50*x^4 + 2) + 2*x^4 - 2)/x^3,x)
```

output
```
x^2*(100*log(2)^2 - 1) - (4*log(2)^2 - log(16) + 1)/x^2
```

3.502 $\int \frac{5832-3420x+668x^2-58x^3+2x^4+(-738x+206x^2-27x^3+x^4)\log\left(\frac{1}{x^2}\right)}{(2916x-1710x^2+334x^3-29x^4+x^5)\log\left(\frac{1}{x^2}\right)}$

3.502.1 Optimal result

Integrand size = 73, antiderivative size = 26

$$\int \frac{5832-3420x+668x^2-58x^3+2x^4+(-738x+206x^2-27x^3+x^4)\log\left(\frac{1}{x^2}\right)}{(2916x-1710x^2+334x^3-29x^4+x^5)\log\left(\frac{1}{x^2}\right)}\,dx = \log\left(\frac{-4+x+\frac{x(1+2x)}{(-9+x)^2}}{4\log\left(\frac{1}{x^2}\right)}\right)$$

output
```
ln(1/4*((1+2*x)/(x-9)^2*x+x-4)/ln(1/x^2))
```

3.502.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{5832-3420x+668x^2-58x^3+2x^4+(-738x+206x^2-27x^3+x^4)\log\left(\frac{1}{x^2}\right)}{(2916x-1710x^2+334x^3-29x^4+x^5)\log\left(\frac{1}{x^2}\right)}\,dx = -2\log(9-x)+\log\left(324-154x+20x^2-x^3\right)-\log\left(\log\left(\frac{1}{x^2}\right)\right)$$

input
```
Integrate[(5832 - 3420*x + 668*x^2 - 58*x^3 + 2*x^4 + (-738*x + 206*x^2 -
27*x^3 + x^4)*Log[x^(-2)])/((2916*x - 1710*x^2 + 334*x^3 - 29*x^4 + x^5)*L
og[x^(-2)]),x]
```

output
```
-2*Log[9 - x] + Log[324 - 154*x + 20*x^2 - x^3] - Log[Log[x^(-2)]]
```

3.502.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4-58x^3+668x^2+(x^4-27x^3+206x^2-738x)\log\left(\frac{1}{x^2}\right)-3420x+5832}{(x^5-29x^4+334x^3-1710x^2+2916x)\log\left(\frac{1}{x^2}\right)}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{2x^4-58x^3+668x^2+(x^4-27x^3+206x^2-738x)\log\left(\frac{1}{x^2}\right)-3420x+5832}{x(x^4-29x^3+334x^2-1710x+2916)\log\left(\frac{1}{x^2}\right)}dx$$

$$\Big\downarrow \text{ 2463}$$

$$\int \left(\frac{2x^4-58x^3+668x^2+(x^4-27x^3+206x^2-738x)\log\left(\frac{1}{x^2}\right)-3420x+5832}{171(x-9)x\log\left(\frac{1}{x^2}\right)}+\frac{(-x^2+11x-55)(2x^4-58x\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{2}{171}\int \frac{x^3-20x^2+154x-495}{x\log\left(\frac{1}{x^2}\right)}dx+\frac{2}{171}\int \frac{x^3-20x^2+154x-324}{x\log\left(\frac{1}{x^2}\right)}dx+\log\left(-x^3+20x^2-154x+324\right)-2\log(9-x)$$

input
```
Int[(5832 - 3420*x + 668*x^2 - 58*x^3 + 2*x^4 + (-738*x + 206*x^2 - 27*x^3
 + x^4)*Log[x^(-2)])/((2916*x - 1710*x^2 + 334*x^3 - 29*x^4 + x^5)*Log[x^(
-2)]),x]
```

output
```
$Aborted
```

3.502.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /; !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] && !BinomialQ[Px, x] && !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.502.4 Maple [A] (verified)

Time = 0.77 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

method	result	size
norman	$-\ln\left(\ln\left(\frac{1}{x^2}\right)\right)-2\ln\left(x-9\right)+\ln\left(x^3-20x^2+154x-324\right)$	29
risch	$-\ln\left(\ln\left(\frac{1}{x^2}\right)\right)-2\ln\left(x-9\right)+\ln\left(x^3-20x^2+154x-324\right)$	29
parallelrisch	$-\ln\left(\ln\left(\frac{1}{x^2}\right)\right)-2\ln\left(x-9\right)+\ln\left(x^3-20x^2+154x-324\right)$	29
parts	$-\ln\left(\ln\left(\frac{1}{x^2}\right)\right)-2\ln\left(x-9\right)+\ln\left(x^3-20x^2+154x-324\right)$	29
derivativedivides	$-\ln\left(\ln\left(\frac{1}{x^2}\right)\right)-\ln\left(\frac{1}{x}\right)+\ln\left(\frac{324}{x^3}-\frac{154}{x^2}+\frac{20}{x}-1\right)-2\ln\left(\frac{9}{x}-1\right)$	43
default	$-\ln\left(\ln\left(\frac{1}{x^2}\right)\right)-\ln\left(\frac{1}{x}\right)+\ln\left(\frac{324}{x^3}-\frac{154}{x^2}+\frac{20}{x}-1\right)-2\ln\left(\frac{9}{x}-1\right)$	43

input
```
int(((x^4-27*x^3+206*x^2-738*x)*ln(1/x^2)+2*x^4-58*x^3+668*x^2-3420*x+5832
)/(x^5-29*x^4+334*x^3-1710*x^2+2916*x)/ln(1/x^2),x,method=_RETURNVERBOSE)
```

output
```
-ln(ln(1/x^2))-2*ln(x-9)+ln(x^3-20*x^2+154*x-324)
```

3.502.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{5832-3420x+668x^2-58x^3+2x^4+(-738x+206x^2-27x^3+x^4)\log\left(\frac{1}{x^2}\right)}{(2916x-1710x^2+334x^3-29x^4+x^5)\log\left(\frac{1}{x^2}\right)}\,dx$$
$$=\log\left(x^3-20\,x^2+154\,x-324\right)-2\,\log\left(x-9\right)-\log\left(\log\left(\frac{1}{x^2}\right)\right)$$

input
```
integrate((((x^4-27*x^3+206*x^2-738*x)*log(1/x^2)+2*x^4-58*x^3+668*x^2-3420
*x+5832)/(x^5-29*x^4+334*x^3-1710*x^2+2916*x)/log(1/x^2),x, algorithm=\
```

output
```
log(x^3 - 20*x^2 + 154*x - 324) - 2*log(x - 9) - log(log(x^(-2)))
```

3.502.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{5832-3420x+668x^2-58x^3+2x^4+(-738x+206x^2-27x^3+x^4)\log\left(\frac{1}{x^2}\right)}{(2916x-1710x^2+334x^3-29x^4+x^5)\log\left(\frac{1}{x^2}\right)}\,dx$$
$$=-2\log\left(x-9\right)+\log\left(x^3-20x^2+154x-324\right)-\log\left(\log\left(\frac{1}{x^2}\right)\right)$$

input
```
integrate(((x**4-27*x**3+206*x**2-738*x)*ln(1/x**2)+2*x**4-58*x**3+668*x**
2-3420*x+5832)/(x**5-29*x**4+334*x**3-1710*x**2+2916*x)/ln(1/x**2),x)
```

output
```
-2*log(x - 9) + log(x**3 - 20*x**2 + 154*x - 324) - log(log(x**(-2)))
```

3.502.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{5832-3420x+668x^2-58x^3+2x^4+(-738x+206x^2-27x^3+x^4)\log\left(\frac{1}{x^2}\right)}{(2916x-1710x^2+334x^3-29x^4+x^5)\log\left(\frac{1}{x^2}\right)}\,dx$$
$$=\log\left(x^3-20\,x^2+154\,x-324\right)-2\,\log\left(x-9\right)-\log\left(\log\left(x\right)\right)$$

input
```
integrate(((x^4-27*x^3+206*x^2-738*x)*log(1/x^2)+2*x^4-58*x^3+668*x^2-3420
*x+5832)/(x^5-29*x^4+334*x^3-1710*x^2+2916*x)/log(1/x^2),x, algorithm=\
```

output
```
log(x^3 - 20*x^2 + 154*x - 324) - 2*log(x - 9) - log(log(x))
```

3.502.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{5832-3420x+668x^2-58x^3+2x^4+(-738x+206x^2-27x^3+x^4)\log\left(\frac{1}{x^2}\right)}{(2916x-1710x^2+334x^3-29x^4+x^5)\log\left(\frac{1}{x^2}\right)}\,dx$$
$$= \log\left(x^3-20\,x^2+154\,x-324\right)-2\,\log\left(x-9\right)-\log\left(\log\left(x^2\right)\right)$$

input
```
integrate(((x^4-27*x^3+206*x^2-738*x)*log(1/x^2)+2*x^4-58*x^3+668*x^2-3420
*x+5832)/(x^5-29*x^4+334*x^3-1710*x^2+2916*x)/log(1/x^2),x, algorithm=\
```

output
```
log(x^3 - 20*x^2 + 154*x - 324) - 2*log(x - 9) - log(log(x^2))
```

3.502.9 Mupad [B] (verification not implemented)

Time = 13.65 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{5832-3420x+668x^2-58x^3+2x^4+(-738x+206x^2-27x^3+x^4)\log\left(\frac{1}{x^2}\right)}{(2916x-1710x^2+334x^3-29x^4+x^5)\log\left(\frac{1}{x^2}\right)}\,dx$$
$$= \ln\left(x^3-20\,x^2+154\,x-324\right)-\ln\left(\ln\left(\frac{1}{x^2}\right)\right)-2\,\ln\left(x-9\right)$$

input
```
int(-(3420*x + log(1/x^2)*(738*x - 206*x^2 + 27*x^3 - x^4) - 668*x^2 + 58*
x^3 - 2*x^4 - 5832)/(log(1/x^2)*(2916*x - 1710*x^2 + 334*x^3 - 29*x^4 + x^
5)),x)
```

output
```
log(154*x - 20*x^2 + x^3 - 324) - log(log(1/x^2)) - 2*log(x - 9)
```

3.503 $\int \frac{32-16x+e^5(12x^2-8x}{-32+16x+e^5(32x^2-16x^3)+e^{10}(-8x^4+4x^5)+(e^5(16x-8x^2)+e^{10}(-}$

3.503.1 Optimal result

Integrand size = 123, antiderivative size = 32

$$\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5\left(32x^2-16x^3\right)+e^{10}\left(-8x^4+4x^5\right)+\left(e^5\left(16x-8x^2\right)+e^{10}\left(-8x^3+4x^4\right)\right)\log\left(\frac{2-x}{2}\right)+e^{10}}$$
$$=\frac{x^2}{-x+\frac{1}{4}e^5x^2\left(2x+\log\left(1-\frac{x}{2}\right)\right)}$$

output
```
1/(1/4*x^2*exp(5)*(ln(1-1/2*x)+2*x)-x)*x^2
```

3.503.2 Mathematica [A] (verified)

Time = 0.80 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.88

$$\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5\left(32x^2-16x^3\right)+e^{10}\left(-8x^4+4x^5\right)+\left(e^5\left(16x-8x^2\right)+e^{10}\left(-8x^3+4x^4\right)\right)\log\left(\frac{2-x}{2}\right)+e^{10}}$$
$$=\frac{4x}{-4+2e^5x^2+e^5x\log\left(1-\frac{x}{2}\right)}$$

input
```
Integrate[(32 - 16*x + E^5*(12*x^2 - 8*x^3))/(-32 + 16*x + E^5*(32*x^2 - 1
6*x^3) + E^10*(-8*x^4 + 4*x^5) + (E^5*(16*x - 8*x^2) + E^10*(-8*x^3 + 4*x^
4))*Log[(2 - x)/2] + E^10*(-2*x^2 + x^3)*Log[(2 - x)/2]^2),x]
```

output
```
(4*x)/(-4 + 2*E^5*x^2 + E^5*x*Log[1 - x/2])
```

3.503.
$$\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5(32x^2-16x^3)+e^{10}(-8x^4+4x^5)+(e^5(16x-8x^2)+e^{10}(-8x^3+4x^4))\log\left(\frac{2-x}{2}\right)+e^{10}(-2x^2+x^3)\log^2\left(\frac{2-x}{2}\right)}\,dx$$

3.503.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^5(12x^2-8x^3)-16x+32}{e^{10}(4x^5-8x^4)+e^5(32x^2-16x^3)+e^{10}(x^3-2x^2)\log^2\left(\frac{2-x}{2}\right)+\left(e^5(16x-8x^2)+e^{10}(4x^4-8x^3)\right)\log\left(\frac{2-x}{2}\right)+$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{4(2e^5x^3-3e^5x^2+4x-8)}{(2-x)\left(-2e^5x^2-e^5x\log\left(1-\frac{x}{2}\right)+4\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$4\int -\frac{-2e^5x^3+3e^5x^2-4x+8}{(2-x)\left(-2e^5x^2-e^5\log\left(1-\frac{x}{2}\right)x+4\right)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-4\int \frac{-2e^5x^3+3e^5x^2-4x+8}{(2-x)\left(-2e^5x^2-e^5\log\left(1-\frac{x}{2}\right)x+4\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{2e^5x^2}{\left(2e^5x^2+e^5\log\left(1-\frac{x}{2}\right)x-4\right)^2}+\frac{e^5x}{\left(2e^5x^2+e^5\log\left(1-\frac{x}{2}\right)x-4\right)^2}+\frac{4e^5}{(x-2)\left(2e^5x^2+e^5\log\left(1-\frac{x}{2}\right)x-4\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-4\left(2(2+e^5)\int \frac{1}{\left(2e^5x^2+e^5\log\left(1-\frac{x}{2}\right)x-4\right)^2}dx+4e^5\int \frac{1}{(x-2)\left(2e^5x^2+e^5\log\left(1-\frac{x}{2}\right)x-4\right)^2}dx+e^5\int \frac{}{(2}\right.$$

input
```
Int[(32 - 16*x + E^5*(12*x^2 - 8*x^3))/(-32 + 16*x + E^5*(32*x^2 - 16*x^3)
 + E^10*(-8*x^4 + 4*x^5) + (E^5*(16*x - 8*x^2) + E^10*(-8*x^3 + 4*x^4))*Lo
g[(2 - x)/2] + E^10*(-2*x^2 + x^3)*Log[(2 - x)/2]^2),x]
```

output
```
$Aborted
```

3.503.

$$\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5(32x^2-16x^3)+e^{10}(-8x^4+4x^5)+\left(e^5(16x-8x^2)+e^{10}(-8x^3+4x^4)\right)\log\left(\frac{2-x}{2}\right)+e^{10}(-2x^2+x^3)\log^2\left(\frac{2-x}{2}\right)}\,dx$$

3.503.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.503.4 Maple [A] (verified)

Time = 2.96 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.78

method	result
norman	$\frac{4x}{e^{5} \ln\left(1-\frac{x}{2}\right) x+2x^{2} e^{5}-4}$
risch	$\frac{4x}{e^{5} \ln\left(1-\frac{x}{2}\right) x+2x^{2} e^{5}-4}$
derivativedivides	$-\frac{2x}{e^{5} \ln\left(1-\frac{x}{2}\right)\left(1-\frac{x}{2}\right)-4 e^{5}\left(1-\frac{x}{2}\right)^{2}-e^{5} \ln\left(1-\frac{x}{2}\right)+8 e^{5}\left(1-\frac{x}{2}\right)-4 e^{5}+2}$
default	$-\frac{2x}{e^{5} \ln\left(1-\frac{x}{2}\right)\left(1-\frac{x}{2}\right)-4 e^{5}\left(1-\frac{x}{2}\right)^{2}-e^{5} \ln\left(1-\frac{x}{2}\right)+8 e^{5}\left(1-\frac{x}{2}\right)-4 e^{5}+2}$
parallelrisch	$\frac{256+64 e^{5} \ln(-2+x)+256x-128x^{2} e^{5}-64 e^{5} \ln\left(1-\frac{x}{2}\right)x+16x e^{10} \ln\left(1-\frac{x}{2}\right)^{2}+32x^{2} e^{10} \ln\left(1-\frac{x}{2}\right)-64 e^{5} \ln\left(1-\frac{x}{2}\right)-16 e^{10} \ln}{64 e^{5} \ln\left(1-\frac{x}{2}\right)x+128x^{2} e^{5}-256}$

input
```
int(((-8*x^3+12*x^2)*exp(5)-16*x+32)/((x^3-2*x^2)*exp(5)^2*ln(1-1/2*x)^2+(
(4*x^4-8*x^3)*exp(5)^2+(-8*x^2+16*x)*exp(5))*ln(1-1/2*x)+(4*x^5-8*x^4)*exp
(5)^2+(-16*x^3+32*x^2)*exp(5)+16*x-32),x,method=_RETURNVERBOSE)
```

output
```
4*x/(exp(5)*ln(1-1/2*x)*x+2*x^2*exp(5)-4)
```

3.503.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.75

$$\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5(32x^2-16x^3)+e^{10}(-8x^4+4x^5)+(e^5(16x-8x^2)+e^{10}(-8x^3+4x^4))\log\left(\frac{2-x}{2}\right)+e^{10}}$$
$$=\frac{4\,x}{2\,x^2e^5+xe^5\log\left(-\frac{1}{2}\,x+1\right)-4}$$

input
```
integrate(((-8*x^3+12*x^2)*exp(5)-16*x+32)/((x^3-2*x^2)*exp(5)^2*log(1-1/2
*x)^2+((4*x^4-8*x^3)*exp(5)^2+(-8*x^2+16*x)*exp(5))*log(1-1/2*x)+(4*x^5-8*
x^4)*exp(5)^2+(-16*x^3+32*x^2)*exp(5)+16*x-32),x, algorithm=\
```

output
```
4*x/(2*x^2*e^5 + x*e^5*log(-1/2*x + 1) - 4)
```

3.503.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.75

$$\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5(32x^2-16x^3)+e^{10}(-8x^4+4x^5)+(e^5(16x-8x^2)+e^{10}(-8x^3+4x^4))\log\left(\frac{2-x}{2}\right)+e^{10}}$$
$$=\frac{4x}{2x^2e^5+xe^5\log\left(1-\frac{x}{2}\right)-4}$$

input
```
integrate(((-8*x**3+12*x**2)*exp(5)-16*x+32)/((x**3-2*x**2)*exp(5)**2*ln(1
-1/2*x)**2+((4*x**4-8*x**3)*exp(5)**2+(-8*x**2+16*x)*exp(5))*ln(1-1/2*x)+(
4*x**5-8*x**4)*exp(5)**2+(-16*x**3+32*x**2)*exp(5)+16*x-32),x)
```

output
```
4*x/(2*x**2*exp(5) + x*exp(5)*log(1 - x/2) - 4)
```

3.503.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5(32x^2-16x^3)+e^{10}(-8x^4+4x^5)+(e^5(16x-8x^2)+e^{10}(-8x^3+4x^4))\log\left(\frac{2-x}{2}\right)+e^{10}}$$
$$=\frac{4\,x}{2\,x^2e^5-xe^5\log(2)+xe^5\log(-x+2)-4}$$

input
```
integrate(((-8*x^3+12*x^2)*exp(5)-16*x+32)/((x^3-2*x^2)*exp(5)^2*log(1-1/2
*x)^2+((4*x^4-8*x^3)*exp(5)^2+(-8*x^2+16*x)*exp(5))*log(1-1/2*x)+(4*x^5-8*
x^4)*exp(5)^2+(-16*x^3+32*x^2)*exp(5)+16*x-32),x, algorithm=\
```

output
```
4*x/(2*x^2*e^5 - x*e^5*log(2) + x*e^5*log(-x + 2) - 4)
```

3.503.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.53

$$\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5(32x^2-16x^3)+e^{10}(-8x^4+4x^5)+(e^5(16x-8x^2)+e^{10}(-8x^3+4x^4))\log\left(\frac{2-x}{2}\right)+e^{10}}$$
$$=\frac{4\,x}{2\,(x-2)^2e^5+(x-2)e^5\log\left(-\frac{1}{2}\,x+1\right)+8\,(x-2)e^5+2\,e^5\log\left(-\frac{1}{2}\,x+1\right)+8\,e^5-4}$$

input
```
integrate(((-8*x^3+12*x^2)*exp(5)-16*x+32)/((x^3-2*x^2)*exp(5)^2*log(1-1/2
*x)^2+((4*x^4-8*x^3)*exp(5)^2+(-8*x^2+16*x)*exp(5))*log(1-1/2*x)+(4*x^5-8*
x^4)*exp(5)^2+(-16*x^3+32*x^2)*exp(5)+16*x-32),x, algorithm=\
```

output
```
4*x/(2*(x - 2)^2*e^5 + (x - 2)*e^5*log(-1/2*x + 1) + 8*(x - 2)*e^5 + 2*e^5
*log(-1/2*x + 1) + 8*e^5 - 4)
```

3.503.9 Mupad [F(-1)]

Timed out.

$$\int \frac{32-16x+e^5(12x^2-8x^3)}{-32+16x+e^5(32x^2-16x^3)+e^{10}(-8x^4+4x^5)+(e^5(16x-8x^2)+e^{10}(-8x^3+4x^4))\log\left(\frac{2-x}{2}\right)+e^{10}$$

$$=\int \frac{e^5(12x^2-8x^3)-16x+32}{-e^{10}(2x^2-x^3)\ln\left(1-\frac{x}{2}\right)^2+(e^5(16x-8x^2)-e^{10}(8x^3-4x^4))\ln\left(1-\frac{x}{2}\right)+16x-e^{10}(8x^4-4$$

input
```
int((exp(5)*(12*x^2 - 8*x^3) - 16*x + 32)/(16*x + log(1 - x/2)*(exp(5)*(16
*x - 8*x^2) - exp(10)*(8*x^3 - 4*x^4)) - exp(10)*(8*x^4 - 4*x^5) + exp(5)*
(32*x^2 - 16*x^3) - exp(10)*log(1 - x/2)^2*(2*x^2 - x^3) - 32),x)
```

output
```
int((exp(5)*(12*x^2 - 8*x^3) - 16*x + 32)/(16*x + log(1 - x/2)*(exp(5)*(16
*x - 8*x^2) - exp(10)*(8*x^3 - 4*x^4)) - exp(10)*(8*x^4 - 4*x^5) + exp(5)*
(32*x^2 - 16*x^3) - exp(10)*log(1 - x/2)^2*(2*x^2 - x^3) - 32), x)
```

3.504 $\int \frac{96x^3-192x^3\log(x^2)+(8+e^x)\log^2(x^2)}{\log^2(x^2)}\,dx$

3.504.1 Optimal result

Integrand size = 34, antiderivative size = 24

$$\int \frac{96x^3-192x^3\log(x^2)+(8+e^x)\log^2(x^2)}{\log^2(x^2)}\,dx = 4+e^x-x+3x\left(3-\frac{16x^3}{\log(x^2)}\right)$$

output
```
4-x+exp(x)+3*(3-16*x^3/ln(x^2))*x
```

3.504.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.75

$$\int \frac{96x^3-192x^3\log(x^2)+(8+e^x)\log^2(x^2)}{\log^2(x^2)}\,dx = e^x+8x-\frac{48x^4}{\log(x^2)}$$

input
```
Integrate[(96*x^3 - 192*x^3*Log[x^2] + (8 + E^x)*Log[x^2]^2)/Log[x^2]^2,x]
```

output
```
E^x + 8*x - (48*x^4)/Log[x^2]
```

3.504.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.75, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{96x^3 + (e^x + 8)\log^2(x^2) - 192x^3\log(x^2)}{\log^2(x^2)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(e^x - \frac{8(-12x^3 - \log^2(x^2) + 24x^3\log(x^2))}{\log^2(x^2)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{48x^4}{\log(x^2)} + 8x + e^x$$

input
```
Int[(96*x^3 - 192*x^3*Log[x^2] + (8 + E^x)*Log[x^2]^2)/Log[x^2]^2,x]
```

output
```
E^x + 8*x - (48*x^4)/Log[x^2]
```

3.504.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.504.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.75

method	result	size
default	$8x - \frac{48x^4}{\ln(x^2)} + \mathrm{e}^x$	18
parts	$8x - \frac{48x^4}{\ln(x^2)} + \mathrm{e}^x$	18
parallelrisch	$-\frac{48x^4 - 8x\ln(x^2) - \mathrm{e}^x \ln(x^2)}{\ln(x^2)}$	30
risch	$8x + \mathrm{e}^x - \frac{96ix^4}{\pi\,\mathrm{csgn}(ix)^2\,\mathrm{csgn}(ix^2) - 2\pi\,\mathrm{csgn}(ix)\,\mathrm{csgn}(ix^2)^2 + \pi\,\mathrm{csgn}(ix^2)^3 + 4i\ln(x)}$	65

input
```
int(((exp(x)+8)*ln(x^2)^2-192*x^3*ln(x^2)+96*x^3)/ln(x^2)^2,x,method=_RETU
RNVERBOSE)
```

output
```
8*x-48*x^4/ln(x^2)+exp(x)
```

3.504.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{96x^3 - 192x^3\log(x^2) + (8 + e^x)\log^2(x^2)}{\log^2(x^2)}\,dx = -\frac{48\,x^4 - (8\,x + e^x)\log(x^2)}{\log(x^2)}$$

input
```
integrate(((exp(x)+8)*log(x^2)^2-192*x^3*log(x^2)+96*x^3)/log(x^2)^2,x, al
gorithm=\
```

output
```
-(48*x^4 - (8*x + e^x)*log(x^2))/log(x^2)
```

3.504.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{96x^3 - 192x^3\log(x^2) + (8 + e^x)\log^2(x^2)}{\log^2(x^2)}\,dx = -\frac{48x^4}{\log(x^2)} + 8x + e^x$$

input
```
integrate(((exp(x)+8)*ln(x**2)**2-192*x**3*ln(x**2)+96*x**3)/ln(x**2)**2,x
)
```

output
```
-48*x**4/log(x**2) + 8*x + exp(x)
```

3.504.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{96x^3 - 192x^3 \log(x^2) + (8 + e^x) \log^2(x^2)}{\log^2(x^2)} dx = -\frac{24x^4}{\log(x)} + 8x + e^x$$

input
```
integrate(((exp(x)+8)*log(x^2)^2-192*x^3*log(x^2)+96*x^3)/log(x^2)^2,x, al
gorithm=\
```

output
```
-24*x^4/log(x) + 8*x + e^x
```

3.504.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{96x^3 - 192x^3 \log(x^2) + (8 + e^x) \log^2(x^2)}{\log^2(x^2)} dx = -\frac{48x^4 - 8x \log(x^2) - e^x \log(x^2)}{\log(x^2)}$$

input
```
integrate(((exp(x)+8)*log(x^2)^2-192*x^3*log(x^2)+96*x^3)/log(x^2)^2,x, al
gorithm=\
```

output
```
-(48*x^4 - 8*x*log(x^2) - e^x*log(x^2))/log(x^2)
```

3.504.9 Mupad [B] (verification not implemented)

Time = 14.81 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{96x^3 - 192x^3 \log(x^2) + (8 + e^x) \log^2(x^2)}{\log^2(x^2)} dx = 8x + e^x - \frac{48x^4}{\ln(x^2)}$$

input
```
int((log(x^2)^2*(exp(x) + 8) - 192*x^3*log(x^2) + 96*x^3)/log(x^2)^2,x)
```

output
```
8*x + exp(x) - (48*x^4)/log(x^2)
```

3.505

$$\int \frac{-e^x x+e^x x\log(x)-e^x x\log^2(x)+e^{e^{-x}x^2}\left(e^x+\left(-2x^2+x^3\right)\log(x)\right)+\left(-\right.}{\left(e^{x+e^{-x}x^2}\log(x)-\right.}$$

3.505.1 Optimal result

Integrand size = 212, antiderivative size = 33

$$\int \frac{-e^x x+e^x x\log(x)-e^x x\log^2(x)+e^{e^{-x}x^2}\left(e^x+\left(-2x^2+x^3\right)\log(x)\right)+\left(-e^{x+e^{-x}x^2}\log(x)+e^x x\log(x)-\right.}{\left(e^{x+e^{-x}x^2}\log(x)-e^x x\log(x)+e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x}}{}\right.}$$

$$= -2 - x\log\left(\log\left(\frac{1}{5}\left(x+\frac{e^{e^{-x}x^2}-x}{\log(x)}\right)\right)\right)$$

output
```
-ln(ln(1/5*x+1/5*(exp(x^2/exp(x))-x)/ln(x)))*x-2
```

3.505.2 Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{-e^x x+e^x x\log(x)-e^x x\log^2(x)+e^{e^{-x}x^2}\left(e^x+\left(-2x^2+x^3\right)\log(x)\right)+\left(-e^{x+e^{-x}x^2}\log(x)+e^x x\log(x)-\right.}{\left(e^{x+e^{-x}x^2}\log(x)-e^x x\log(x)+e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x}}{}\right.}$$

$$= -x\log\left(\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\right)$$

3.505.

$$\int \frac{-e^x x+e^x x\log(x)-e^x x\log^2(x)+e^{e^{-x}x^2}\left(e^x+\left(-2x^2+x^3\right)\log(x)\right)+\left(-e^{x+e^{-x}x^2}\log(x)+e^x x\log(x)-e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\left(\right.}{}$$

input
```
Integrate[(-(E^x*x) + E^x*x*Log[x] - E^x*x*Log[x]^2 + E^(x^2/E^x)*(E^x + (
-2*x^2 + x^3)*Log[x]) + (-(E^(x + x^2/E^x)*Log[x]) + E^x*x*Log[x] - E^x*x*
Log[x]^2)*Log[(E^(x^2/E^x) - x + x*Log[x])/(5*Log[x])]*Log[Log[(E^(x^2/E^x
) - x + x*Log[x])/(5*Log[x])]])/((E^(x + x^2/E^x)*Log[x] - E^x*x*Log[x] +
E^x*x*Log[x]^2)*Log[(E^(x^2/E^x) - x + x*Log[x])/(5*Log[x])]),x]
```

output
```
-(x*Log[Log[(E^(x^2/E^x) - x + x*Log[x])/(5*Log[x])]])
```

3.505.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-e^{e^{-x}x^2+x}\log(x)-e^x x\log^2(x)+e^x x\log(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\left(\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\right)+e^{e^{-x}x^2}(\ldots}{\left(e^{e^{-x}x^2+x}\log(x)+e^x x\log^2(x)-e^x x\log(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+\ldots}{5\log(x\ldots}\right.}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{-x}\left(\left(-e^{e^{-x}x^2+x}\log(x)-e^x x\log^2(x)+e^x x\log(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\left(\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\right)+e\ldots\right.}{\log(x)\left(e^{e^{-x}x^2}-x+x\log(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(\ldots}{5\log(x)}\right.}$$

$$\Big\downarrow \text{ 7293}$$

$$\int\left(-\frac{e^{-x}x\left(-x^3+x^3\log(x)+2x^2-2x^2\log(x)+e^x\log(x)\right)}{\left(e^{e^{-x}x^2}-x+x\log(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)}-\frac{e^{-x}\left(x^3(-\log(x))+2x^2\log(x)+e^x\log(x)\log\left(\ldots\right.\right.}{\log(x)\log\left(\ldots\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\int \frac{-e^x x+e^x x\log(x)-e^x x\log^2(x)+e^{e^{-x}x^2}\left(e^x+\left(-2x^2+x^3\right)\log(x)\right)+\left(-e^{x+e^{-x}x^2}\log(x)+e^x x\log(x)-e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\ldots}{\ldots}$$

$$-2\int \frac{e^{-x}x^2}{\log\left(\frac{\log(x)x-x+e^{e^{-x}x^2}}{5\log(x)}\right)}dx+\int \frac{1}{\log(x)\log\left(\frac{\log(x)x-x+e^{e^{-x}x^2}}{5\log(x)}\right)}dx-\int \frac{x\log(x)}{\left(\log(x)x-x+e^{e^{-x}x^2}\right)\log\left(\frac{\log(x)x-x+e^{e^{-x}x^2}}{5\log(x)}\right)}dx-\int \log\left(\log\left(\frac{\log(x)x-x+e^{e^{-x}x^2}}{5\log(x)}\right)\right)dx+\int \frac{e^{-x}x^4}{\left(\log(x)x-x+e^{e^{-x}x^2}\right)\log\left(\frac{\log(x)x-x+e^{e^{-x}x^2}}{5\log(x)}\right)}dx-\int \frac{e^{-x}x^4\log(x)}{\left(\log(x)x-x+e^{e^{-x}x^2}\right)\log\left(\frac{\log(x)x-x+e^{e^{-x}x^2}}{5\log(x)}\right)}dx+\int \frac{e^{-x}x^3}{\log\left(\frac{\log(x)x-x+e^{e^{-x}x^2}}{5\log(x)}\right)}dx-2\int \frac{e^{-x}x^3}{\left(\log(x)x-x+e^{e^{-x}x^2}\right)\log\left(\frac{\log(x)x-x+e^{e^{-x}x^2}}{5\log(x)}\right)}dx+2\int \frac{e^{-x}x^3\log(x)}{\left(\log(x)x-x+e^{e^{-x}x^2}\right)\log\left(\frac{\log(x)x-x+e^{e^{-x}x^2}}{5\log(x)}\right)}dx$$

input
```
Int[(-(E^x*x) + E^x*x*Log[x] - E^x*x*Log[x]^2 + E^(x^2/E^x)*(E^x + (-2*x^2
 + x^3)*Log[x]) + (-(E^(x + x^2/E^x)*Log[x]) + E^x*x*Log[x] - E^x*x*Log[x]
^2)*Log[(E^(x^2/E^x) - x + x*Log[x])/(5*Log[x])]*Log[Log[(E^(x^2/E^x) - x
+ x*Log[x])/(5*Log[x])]])/((E^(x + x^2/E^x)*Log[x] - E^x*x*Log[x] + E^x*x*
Log[x]^2)*Log[(E^(x^2/E^x) - x + x*Log[x])/(5*Log[x])]),x]
```

output
```
$Aborted
```

3.505.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.505.

$$\int \frac{-e^x x+e^x x\log(x)-e^x x\log^2(x)+e^{e^{-x}x^2}\left(e^x+\left(-2x^2+x^3\right)\log(x)\right)+\left(-e^{x+e^{-x}x^2}\log(x)+e^x x\log(x)-e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\left(\right.}{}$$

3.505.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.09 (sec) , antiderivative size = 142, normalized size of antiderivative = 4.30

$$-x\ln\left(-\ln(5)-\ln(\ln(x))+\ln\left((\ln(x)-1)x+e^{x^2e^{-x}}\right)-\frac{i\pi\ \mathrm{csgn}\left(\frac{i\left((\ln(x)-1)x+e^{x^2e^{-x}}\right)}{\ln(x)}\right)\left(-\mathrm{csgn}\left(\frac{i((\ln(x}{}\right.\right.}{}\right.$$

input
```
int(((-exp(x)*ln(x)*exp(x^2/exp(x))-x*exp(x)*ln(x)^2+x*exp(x)*ln(x))*ln(1/
5*(exp(x^2/exp(x))+x*ln(x)-x)/ln(x))*ln(ln(1/5*(exp(x^2/exp(x))+x*ln(x)-x)
/ln(x)))+((x^3-2*x^2)*ln(x)+exp(x))*exp(x^2/exp(x))-x*exp(x)*ln(x)^2+x*exp
(x)*ln(x)-exp(x)*x)/(exp(x)*ln(x)*exp(x^2/exp(x))+x*exp(x)*ln(x)^2-x*exp(x
)*ln(x))/ln(1/5*(exp(x^2/exp(x))+x*ln(x)-x)/ln(x)),x)
```

output
```
-x*ln(-ln(5)-ln(ln(x))+ln((ln(x)-1)*x+exp(x^2*exp(-x)))-1/2*I*Pi*csgn(I/ln
(x)*((ln(x)-1)*x+exp(x^2*exp(-x))))*(-csgn(I/ln(x)*((ln(x)-1)*x+exp(x^2*ex
p(-x))))+csgn(I/ln(x)))*(-csgn(I/ln(x)*((ln(x)-1)*x+exp(x^2*exp(-x))))+csg
n(I*((ln(x)-1)*x+exp(x^2*exp(-x))))))
```

3.505.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.24

$$\int \frac{-e^x x+e^x x\log(x)-e^x x\log^2(x)+e^{e^{-x}x^2}\left(e^x+\left(-2x^2+x^3\right)\log(x)\right)+\left(-e^{x+e^{-x}x^2}\log(x)+e^x x\log(x)-\right.}{\left(e^{x+e^{-x}x^2}\log(x)-e^x x\log(x)+e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x}}{}\right.}$$

$$=-x\log\left(\log\left(\frac{\left(xe^x\log(x)-xe^x+e^{\left((x^2+xe^x)e^{(-x)}\right)}\right)e^{(-x)}}{5\log(x)}\right)\right)$$

input
```
integrate(((-exp(x)*log(x)*exp(x^2/exp(x))-x*exp(x)*log(x)^2+x*exp(x)*log(
x))*log(1/5*(exp(x^2/exp(x))+x*log(x)-x)/log(x))*log(log(1/5*(exp(x^2/exp(
x))+x*log(x)-x)/log(x)))+((x^3-2*x^2)*log(x)+exp(x))*exp(x^2/exp(x))-x*exp
(x)*log(x)^2+x*exp(x)*log(x)-exp(x)*x)/(exp(x)*log(x)*exp(x^2/exp(x))+x*ex
p(x)*log(x)^2-x*exp(x)*log(x))/log(1/5*(exp(x^2/exp(x))+x*log(x)-x)/log(x)
),x, algorithm=\
```

3.505.

$$\int \frac{-e^x x+e^x x\log(x)-e^x x\log^2(x)+e^{e^{-x}x^2}\left(e^x+\left(-2x^2+x^3\right)\log(x)\right)+\left(-e^{x+e^{-x}x^2}\log(x)+e^x x\log(x)-e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\left(\right.}{}$$

output
```
-x*log(log(1/5*(x*e^x*log(x) - x*e^x + e^((x^2 + x*e^x)*e^(-x)))*e^(-x)/lo
g(x)))
```

3.505.6 Sympy [F(-1)]

Timed out.

$$\int \frac{-e^x x + e^x x \log(x) - e^x x \log^2(x) + e^{e^{-x}x^2}(e^x + (-2x^2 + x^3)\log(x)) + \left(-e^{x+e^{-x}x^2}\log(x) + e^x x \log(x) - e^x x \log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\left(\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\right)}{\left(e^{x+e^{-x}x^2}\log(x) - e^x x\log(x) + e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)}$$

$= \text{Timed out}$

input
```
integrate(((-exp(x)*ln(x)*exp(x**2/exp(x))-x*exp(x)*ln(x)**2+x*exp(x)*ln(x
))*ln(1/5*(exp(x**2/exp(x))+x*ln(x)-x)/ln(x))*ln(ln(1/5*(exp(x**2/exp(x))+
x*ln(x)-x)/ln(x)))+((x**3-2*x**2)*ln(x)+exp(x))*exp(x**2/exp(x))-x*exp(x)*
ln(x)**2+x*exp(x)*ln(x)-exp(x)*x)/(exp(x)*ln(x)*exp(x**2/exp(x))+x*exp(x)*
ln(x)**2-x*exp(x)*ln(x))/ln(1/5*(exp(x**2/exp(x))+x*ln(x)-x)/ln(x)),x)
```

output
```
Timed out
```

3.505.7 Maxima [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{-e^x x + e^x x \log(x) - e^x x \log^2(x) + e^{e^{-x}x^2}(e^x + (-2x^2 + x^3)\log(x)) + \left(-e^{x+e^{-x}x^2}\log(x) + e^x x \log(x) - e^x x \log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\left(\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\right)}{\left(e^{x+e^{-x}x^2}\log(x) - e^x x\log(x) + e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)}$$

$$= -x\log\left(-\log(5) + \log\left(x\log(x) - x + e^{\left(x^2e^{(-x)}\right)}\right) - \log(\log(x))\right)$$

input
```
integrate(((-exp(x)*log(x)*exp(x^2/exp(x))-x*exp(x)*log(x)^2+x*exp(x)*log(
x))*log(1/5*(exp(x^2/exp(x))+x*log(x)-x)/log(x))*log(log(1/5*(exp(x^2/exp(
x))+x*log(x)-x)/log(x)))+((x^3-2*x^2)*log(x)+exp(x))*exp(x^2/exp(x))-x*exp
(x)*log(x)^2+x*exp(x)*log(x)-exp(x)*x)/(exp(x)*log(x)*exp(x^2/exp(x))+x*ex
p(x)*log(x)^2-x*exp(x)*log(x))/log(1/5*(exp(x^2/exp(x))+x*log(x)-x)/log(x)
),x, algorithm=\
```

output
```
-x*log(-log(5) + log(x*log(x) - x + e^(x^2*e^(-x))) - log(log(x)))
```

3.505.

$$\int \frac{-e^x x + e^x x \log(x) - e^x x \log^2(x) + e^{e^{-x}x^2}(e^x + (-2x^2 + x^3)\log(x)) + \left(-e^{x+e^{-x}x^2}\log(x) + e^x x \log(x) - e^x x \log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\left(\ldots\right)}{\ldots}$$

3.505.8 Giac [F]

$$\int \frac{-e^x x + e^x x \log(x) - e^x x \log^2(x) + e^{e^{-x}x^2}(e^x + (-2x^2 + x^3)\log(x)) + \left(-e^{x+e^{-x}x^2}\log(x) + e^x x \log(x) - e^x x \log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2} - x + x\log(x)}{5\log(x)}\right)\log\left(\log\left(\frac{e^{e^{-x}x^2} - x + x\log(x)}{5\log(x)}\right)\right)}{\left(e^{x+e^{-x}x^2}\log(x) - e^x x \log(x) + e^x x \log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2} - x + x\log(x)}{5\log(x)}\right)}$$

$$= \int -\frac{xe^x \log(x)^2 - xe^x \log(x) + \left(xe^x \log(x)^2 - xe^x \log(x) + e^{\left(x^2e^{(-x)}+x\right)}\log(x)\right)\log\left(\frac{x\log(x) - x + e^{\left(x^2e^{(-x)}\right)}}{5\log(x)}\right) \cdots}{\left(xe^x \log(x)^2 - xe^x \log(x) + e^{\left(x^2e^{(-x)}+x\right)}\log(x)\right) \cdots}$$

input
```
integrate(((-exp(x)*log(x)*exp(x^2/exp(x))-x*exp(x)*log(x)^2+x*exp(x)*log(
x))*log(1/5*(exp(x^2/exp(x))+x*log(x)-x)/log(x))*log(log(1/5*(exp(x^2/exp(
x))+x*log(x)-x)/log(x)))+((x^3-2*x^2)*log(x)+exp(x))*exp(x^2/exp(x))-x*exp
(x)*log(x)^2+x*exp(x)*log(x)-exp(x)*x)/(exp(x)*log(x)*exp(x^2/exp(x))+x*ex
p(x)*log(x)^2-x*exp(x)*log(x))/log(1/5*(exp(x^2/exp(x))+x*log(x)-x)/log(x)
),x, algorithm=\
```

output
```
integrate(-(x*e^x*log(x)^2 - x*e^x*log(x) + (x*e^x*log(x)^2 - x*e^x*log(x)
 + e^(x^2*e^(-x) + x)*log(x))*log(1/5*(x*log(x) - x + e^(x^2*e^(-x)))/log(
x))*log(log(1/5*(x*log(x) - x + e^(x^2*e^(-x)))/log(x))) - ((x^3 - 2*x^2)*
log(x) + e^x)*e^(x^2*e^(-x)) + x*e^x)/((x*e^x*log(x)^2 - x*e^x*log(x) + e^
(x^2*e^(-x) + x)*log(x))*log(1/5*(x*log(x) - x + e^(x^2*e^(-x)))/log(x))),
 x)
```

3.505.9 Mupad [B] (verification not implemented)

Time = 15.88 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.85

$$\int \frac{-e^x x + e^x x \log(x) - e^x x \log^2(x) + e^{e^{-x}x^2}(e^x + (-2x^2 + x^3)\log(x)) + \left(-e^{x+e^{-x}x^2}\log(x) + e^x x \log(x) - e^x x \log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2} - x + x\log(x)}{5\log(x)}\right)\log\left(\log\left(\frac{e^{e^{-x}x^2} - x + x\log(x)}{5\log(x)}\right)\right)}{\left(e^{x+e^{-x}x^2}\log(x) - e^x x \log(x) + e^x x \log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2} - x + x\log(x)}{5\log(x)}\right)}$$

$$= -x\ln\left(\ln\left(\frac{e^{x^2\,e^{-x}} - x + x\,\ln(x)}{5\,\ln(x)}\right)\right)$$

input
```
int(-(x*exp(x) - exp(x^2*exp(-x))*(exp(x) - log(x)*(2*x^2 - x^3)) + log((e
xp(x^2*exp(-x))/5 - x/5 + (x*log(x))/5)/log(x))*log(log((exp(x^2*exp(-x))/
5 - x/5 + (x*log(x))/5)/log(x)))*(x*exp(x)*log(x)^2 - x*exp(x)*log(x) + ex
p(x^2*exp(-x))*exp(x)*log(x)) - x*exp(x)*log(x) + x*exp(x)*log(x)^2)/(log(
(exp(x^2*exp(-x))/5 - x/5 + (x*log(x))/5)/log(x))*(x*exp(x)*log(x)^2 - x*e
xp(x)*log(x) + exp(x^2*exp(-x))*exp(x)*log(x))),x)
```

output
```
-x*log(log((exp(x^2*exp(-x)) - x + x*log(x))/(5*log(x))))
```

3.505.

$$-e^x x+e^x x\log(x)-e^x x\log^2(x)+e^{e^{-x}x^2}\left(e^x+\left(-2x^2+x^3\right)\log(x)\right)+\left(-e^{x+e^{-x}x^2}\log(x)+e^x x\log(x)-e^x x\log^2(x)\right)\log\left(\frac{e^{e^{-x}x^2}-x+x\log(x)}{5\log(x)}\right)\log\left(\right.$$

3.506 $\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+\right.}{-1+e^{4-x}x}$

3.506.1 Optimal result

Integrand size = 101, antiderivative size = 30

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{-1+e^{4-x}x}$$
$$=\frac{x-x^2\log\left(1-\frac{e^{-4+x}}{x}\right)\log(e^x x)}{x}$$

output
```
(x-x^2*ln(1-1/exp(-x+4)/x)*ln(exp(x)*x))/x
```

3.506.2 Mathematica [A] (verified)

Time = 0.80 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.73

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{-1+e^{4-x}x}$$
$$=-x\log\left(1-\frac{e^{-4+x}}{x}\right)\log(e^x x)$$

input
```
Integrate[((1 + x + E^(4 - x)*(-x - x^2))*Log[(E^(-4 + x)*(-1 + E^(4 - x)*
x))/x] + Log[E^x*x]*(-1 + x + (1 - E^(4 - x)*x)*Log[(E^(-4 + x)*(-1 + E^(4
 - x)*x))/x]))/(-1 + E^(4 - x)*x),x]
```

3.506.

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{\ldots}\,dx$$

output
```
-(x*Log[1 - E^(-4 + x)/x]*Log[E^x*x])
```

3.506.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{4-x}(-x^2-x)+x+1\right)\log\left(\frac{e^{x-4}(e^{4-x}x-1)}{x}\right)+\log(e^x x)\left(x+(1-e^{4-x}x)\log\left(\frac{e^{x-4}(e^{4-x}x-1)}{x}\right)-1\right)}{e^{4-x}x-1}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-x\log\left(1-\frac{e^{x-4}}{x}\right)-\log(e^x x)\log\left(1-\frac{e^{x-4}}{x}\right)-\log\left(1-\frac{e^{x-4}}{x}\right)-x\log(e^x x)+\frac{e^4(x-1)x\log(e^x x)}{e^4x-e^x}+\log\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-e^4\int\int\frac{x^2}{e^4x-e^x}dxdx-e^4\int\frac{\int\frac{x^2}{e^4x-e^x}dx}{x}dx+e^4\log(e^x x)\int\frac{x^2}{e^4x-e^x}dx-\frac{1}{2}\int\frac{e^x}{e^x-e^4x}dx-\frac{1}{2}\int\frac{e^x}{x(e^4x-e^x)}dx+\int\int\frac{e^x}{e^x-e^4x}dxdx+\int\frac{\int\frac{e^x}{e^x-e^4x}dx}{x}dx+e^4\int\int\frac{x}{e^4x-e^x}dxdx+e^4\int\frac{\int\frac{x}{e^4x-e^x}dx}{x}dx+\int\int\frac{e^x x}{e^4x-e^x}dxdx+\int\frac{\int\frac{e^x x}{e^4x-e^x}dx}{x}dx-\log(e^x x)\int\frac{e^x}{e^x-e^4x}dx-e^4\log(e^x x)\int\frac{x}{e^4x-e^x}dx-\log(e^x x)\int\frac{e^x x}{e^4x-e^x}dx+\frac{x^3}{6}+\frac{x^2}{4}-\frac{1}{2}x^2\log\left(1-\frac{e^{x-4}}{x}\right)-\frac{1}{2}x^2\log(e^x x)-\frac{1}{2}(x+1)^2-x\log\left(1-\frac{e^{x-4}}{x}\right)-x\log\left(1-\frac{e^{x-4}}{x}\right)\log(e^x x)+x\log(e^x x)+\frac{1}{2}(x+1)^2\log\left(1-\frac{e^{x-4}}{x}\right)$$

input
```
Int[((1 + x + E^(4 - x)*(-x - x^2))*Log[(E^(-4 + x)*(-1 + E^(4 - x)*x))/x]
 + Log[E^x*x]*(-1 + x + (1 - E^(4 - x)*x)*Log[(E^(-4 + x)*(-1 + E^(4 - x)*
x))/x]))/(-1 + E^(4 - x)*x),x]
```

output
```
$Aborted
```

3.506.

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{\ldots} dx$$

3.506.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.506.4 Maple [A] (verified)

Time = 2.65 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

method	result	size
parallelrisch	$-\ln\left(\frac{(x\,\mathrm{e}^{-x+4}-1)\,\mathrm{e}^{x-4}}{x}\right)x\ln\left(\mathrm{e}^{x}x\right)$	32
risch	Expression too large to display	1357

input
```
int((((-x*exp(-x+4)+1)*ln((x*exp(-x+4)-1)/x/exp(-x+4))+x-1)*ln(exp(x)*x)+(
(-x^2-x)*exp(-x+4)+x+1)*ln((x*exp(-x+4)-1)/x/exp(-x+4)))/(x*exp(-x+4)-1),x
,method=_RETURNVERBOSE)
```

output
```
-ln((x*exp(-x+4)-1)/x/exp(-x+4))*x*ln(exp(x)*x)
```

3.506.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{-1+e^{4-x}x}$$

$$= -x\log(xe^x)\log\left(\frac{(xe^4-e^x)e^{(-4)}}{x}\right)$$

input
```
integrate((((-x*exp(-x+4)+1)*log((x*exp(-x+4)-1)/x/exp(-x+4))+x-1)*log(exp
(x)*x)+((-x^2-x)*exp(-x+4)+x+1)*log((x*exp(-x+4)-1)/x/exp(-x+4)))/(x*exp(-
x+4)-1),x, algorithm=\
```

output
```
-x*log(x*e^x)*log((x*e^4 - e^x)*e^(-4)/x)
```

3.506.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{-1+e^{4-x}x}$$
$= \text{Timed out}$

input
```
integrate((((-x*exp(-x+4)+1)*ln((x*exp(-x+4)-1)/x/exp(-x+4))+x-1)*ln(exp(x
)*x)+((-x**2-x)*exp(-x+4)+x+1)*ln((x*exp(-x+4)-1)/x/exp(-x+4)))/(x*exp(-x+
4)-1),x)
```

output
```
Timed out
```

3.506.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.40

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{-1+e^{4-x}x}$$
$= x\log(x)^2+4x^2-\left(x^2+x\log(x)\right)\log\left(xe^4-e^x\right)+\left(x^2+4x\right)\log(x)$

input
```
integrate((((-x*exp(-x+4)+1)*log((x*exp(-x+4)-1)/x/exp(-x+4))+x-1)*log(exp
(x)*x)+((-x^2-x)*exp(-x+4)+x+1)*log((x*exp(-x+4)-1)/x/exp(-x+4)))/(x*exp(-
x+4)-1),x, algorithm=\
```

output
```
x*log(x)^2 + 4*x^2 - (x^2 + x*log(x))*log(x*e^4 - e^x) + (x^2 + 4*x)*log(x
)
```

3.506.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.77

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{-1+e^{4-x}x}$$
$= -x^2\log\left(xe^4-e^x\right)+x^2\log(x)-x\log\left(xe^4-e^x\right)\log(x)+x\log(x)^2+4x^2+4x\log(x)$

3.506.

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{} dx$$

input
```
integrate((((-x*exp(-x+4)+1)*log((x*exp(-x+4)-1)/x/exp(-x+4))+x-1)*log(exp
(x)*x)+((-x^2-x)*exp(-x+4)+x+1)*log((x*exp(-x+4)-1)/x/exp(-x+4)))/(x*exp(-
x+4)-1),x, algorithm=\
```

output
```
-x^2*log(x*e^4 - e^x) + x^2*log(x) - x*log(x*e^4 - e^x)*log(x) + x*log(x)^
2 + 4*x^2 + 4*x*log(x)
```

3.506.9 Mupad [B] (verification not implemented)

Time = 15.37 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \frac{(1+x+e^{4-x}(-x-x^2))\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)+\log(e^x x)\left(-1+x+(1-e^{4-x}x)\log\left(\frac{e^{-4+x}(-1+e^{4-x}x)}{x}\right)\right)}{-1+e^{4-x}x}$$

$$= -x\ln\left(\frac{x-\mathrm{e}^{-4}\,\mathrm{e}^{x}}{x}\right)(x+\ln(x))$$

input
```
int((log((exp(x - 4)*(x*exp(4 - x) - 1))/x)*(x - exp(4 - x)*(x + x^2) + 1)
 - log(x*exp(x))*(log((exp(x - 4)*(x*exp(4 - x) - 1))/x)*(x*exp(4 - x) - 1
) - x + 1))/(x*exp(4 - x) - 1),x)
```

output
```
-x*log((x - exp(-4)*exp(x))/x)*(x + log(x))
```

3.507 $\int \frac{-8-32e^{x^2}x}{256+4e^{2x^2}-32x+x^2+e^{x^2}(-64+4x)}\,dx$

3.507.1 Optimal result

Integrand size = 41, antiderivative size = 16

$$\int \frac{-8-32e^{x^2}x}{256+4e^{2x^2}-32x+x^2+e^{x^2}(-64+4x)}\,dx = \frac{4}{-8+e^{x^2}+\frac{x}{2}}$$

output
```
4/(-8+1/2*x+exp(x^2))
```

3.507.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{-8-32e^{x^2}x}{256+4e^{2x^2}-32x+x^2+e^{x^2}(-64+4x)}\,dx = \frac{8}{-16+2e^{x^2}+x}$$

input
```
Integrate[(-8 - 32*E^x^2*x)/(256 + 4*E^(2*x^2) - 32*x + x^2 + E^x^2*(-64 +
 4*x)),x]
```

output
```
8/(-16 + 2*E^x^2 + x)
```

3.507.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.098, Rules used = {7292, 27, 25, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-32e^{x^2}x-8}{x^2+4e^{2x^2}+e^{x^2}(4x-64)-32x+256}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{8\left(-4e^{x^2}x-1\right)}{\left(-2e^{x^2}-x+16\right)^2}dx$$
$$\Big\downarrow \text{27}$$
$$8\int -\frac{4e^{x^2}x+1}{\left(-x-2e^{x^2}+16\right)^2}dx$$
$$\Big\downarrow \text{25}$$
$$-8\int \frac{4e^{x^2}x+1}{\left(-x-2e^{x^2}+16\right)^2}dx$$
$$\Big\downarrow \text{7237}$$
$$-\frac{8}{-2e^{x^2}-x+16}$$

input
```
Int[(-8 - 32*E^x^2*x)/(256 + 4*E^(2*x^2) - 32*x + x^2 + E^x^2*(-64 + 4*x))
,x]
```

output
```
-8/(16 - 2*E^x^2 - x)
```

3.507.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.507.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

method	result	size
norman	$\frac{8}{-16+2\,{\rm e}^{x^{2}}+x}$	14
risch	$\frac{8}{-16+2\,{\rm e}^{x^{2}}+x}$	14
parallelrisch	$\frac{8}{-16+2\,{\rm e}^{x^{2}}+x}$	14

input
```
int((-32*exp(x^2)*x-8)/(4*exp(x^2)^2+(4*x-64)*exp(x^2)+x^2-32*x+256),x,met
hod=_RETURNVERBOSE)
```

output
```
8/(-16+2*exp(x^2)+x)
```

3.507.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-8-32e^{x^2}x}{256+4e^{2x^2}-32x+x^2+e^{x^2}(-64+4x)}\,dx = \frac{8}{x+2\,e^{(x^2)}-16}$$

input
```
integrate((-32*exp(x^2)*x-8)/(4*exp(x^2)^2+(4*x-64)*exp(x^2)+x^2-32*x+256)
,x, algorithm=\
```

output
```
8/(x + 2*e^(x^2) - 16)
```

3.507.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int \frac{-8-32e^{x^2}x}{256+4e^{2x^2}-32x+x^2+e^{x^2}(-64+4x)}\,dx = \frac{4}{\frac{x}{2}+e^{x^2}-8}$$

input
```
integrate((-32*exp(x**2)*x-8)/(4*exp(x**2)**2+(4*x-64)*exp(x**2)+x**2-32*x
+256),x)
```

output
```
4/(x/2 + exp(x**2) - 8)
```

3.507.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-8-32e^{x^2}x}{256+4e^{2x^2}-32x+x^2+e^{x^2}(-64+4x)}\,dx = \frac{8}{x+2\,e^{(x^2)}-16}$$

input
```
integrate((-32*exp(x^2)*x-8)/(4*exp(x^2)^2+(4*x-64)*exp(x^2)+x^2-32*x+256)
,x, algorithm=\
```

output
```
8/(x + 2*e^(x^2) - 16)
```

3.507.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-8-32e^{x^2}x}{256+4e^{2x^2}-32x+x^2+e^{x^2}(-64+4x)}\,dx=\frac{8}{x+2\,e^{(x^2)}-16}$$

input
```
integrate((-32*exp(x^2)*x-8)/(4*exp(x^2)^2+(4*x-64)*exp(x^2)+x^2-32*x+256)
,x, algorithm=\
```

output
```
8/(x + 2*e^(x^2) - 16)
```

3.507.9 Mupad [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-8-32e^{x^2}x}{256+4e^{2x^2}-32x+x^2+e^{x^2}(-64+4x)}\,dx=\frac{8}{x+2\,\mathrm{e}^{x^2}-16}$$

input
```
int(-(32*x*exp(x^2) + 8)/(4*exp(2*x^2) - 32*x + exp(x^2)*(4*x - 64) + x^2
+ 256),x)
```

output
```
8/(x + 2*exp(x^2) - 16)
```

3.508 $\int \frac{\left(4x+25\ 2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}\left(-20-5\ 2^{5+8x}x\log(2)\right)\right)\log\left(\frac{1}{25}\left(\right.\right.}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\right.}$

3.508.1 Optimal result

Integrand size = 114, antiderivative size = 24

$$\int \frac{\left(4x+25\ 2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}\left(-20-5\ 2^{5+8x}x\log(2)\right)\right)\log\left(\frac{1}{25}\left(100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log\right.\right.}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)}$$
$$=\log^2\left(4+\left(-e^{2^{8x}}+\frac{x}{5}\right)^2+\log(2)\right)$$

output
```
ln((1/5*x-exp(exp(8*x*ln(2))))^2+4+ln(2))^2
```

3.508.2 Mathematica [F]

$$\int \frac{\left(4x+25\ 2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}\left(-20-5\ 2^{5+8x}x\log(2)\right)\right)\log\left(\frac{1}{25}\left(100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log\right.\right.}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)}$$
$$=\int \frac{\left(4x+25\ 2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}\left(-20-5\ 2^{5+8x}x\log(2)\right)\right)\log\left(\frac{1}{25}\left(100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+2\right.\right.}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)}$$

input
```
Integrate[((4*x + 25*2^(5 + 8*x)*E^2^(1 + 8*x)*Log[2] + E^2^(8*x)*(-20 - 5
*2^(5 + 8*x)*x*Log[2]))*Log[(100 + 25*E^2^(1 + 8*x) - 10*E^2^(8*x)*x + x^2
 + 25*Log[2])/25])/(100 + 25*E^2^(1 + 8*x) - 10*E^2^(8*x)*x + x^2 + 25*Log
[2]),x]
```

output
```
Integrate[((4*x + 25*2^(5 + 8*x)*E^2^(1 + 8*x)*Log[2] + E^2^(8*x)*(-20 - 5
*2^(5 + 8*x)*x*Log[2]))*Log[(100 + 25*E^2^(1 + 8*x) - 10*E^2^(8*x)*x + x^2
 + 25*Log[2])/25])/(100 + 25*E^2^(1 + 8*x) - 10*E^2^(8*x)*x + x^2 + 25*Log
[2]), x]
```

3.508.3 Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.58, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.009, Rules used = {7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(4x+e^{2^{8x}}\left(-5\ 2^{8x+5}x\log(2)-20\right)+25\ 2^{8x+5}e^{2^{8x+1}}\log(2)\right)\log\left(\frac{1}{25}\left(x^2-10e^{2^{8x}}x+25e^{2^{8x+1}}+100+25\log(2\right.\right.}{x^2-10e^{2^{8x}}x+25e^{2^{8x+1}}+100+25\log(2)}$$

$$\Big\downarrow \text{7237}$$

$$\log^2\left(\frac{1}{25}\left(x^2-10e^{2^{8x}}x+25e^{2^{8x+1}}+25(4+\log(2))\right)\right)$$

input
```
Int[((4*x + 25*2^(5 + 8*x)*E^2^(1 + 8*x)*Log[2] + E^2^(8*x)*(-20 - 5*2^(5
+ 8*x)*x*Log[2]))*Log[(100 + 25*E^2^(1 + 8*x) - 10*E^2^(8*x)*x + x^2 + 25*
Log[2])/25])/(100 + 25*E^2^(1 + 8*x) - 10*E^2^(8*x)*x + x^2 + 25*Log[2]),x
]
```

output
```
Log[(25*E^2^(1 + 8*x) - 10*E^2^(8*x)*x + x^2 + 25*(4 + Log[2]))/25]^2
```

3.508.3.1 Defintions of rubi rules used

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

3.508.4 Maple [A] (verified)

Time = 3.81 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

method	result	size
risch	$\ln\left(\mathrm{e}^{2\,256^{x}}-\frac{2x\,\mathrm{e}^{256^{x}}}{5}+\ln\left(2\right)+\frac{x^{2}}{25}+4\right)^{2}$	26
parallelrisch	$\ln\left(\mathrm{e}^{2\,\mathrm{e}^{8x\ln(2)}}-\frac{2x\,\mathrm{e}^{\mathrm{e}^{8x\ln(2)}}}{5}+\ln\left(2\right)+\frac{x^{2}}{25}+4\right)^{2}$	32

input
```
int((800*ln(2)*exp(8*x*ln(2))*exp(exp(8*x*ln(2)))^2+(-160*x*ln(2)*exp(8*x*
ln(2))-20)*exp(exp(8*x*ln(2)))+4*x)*ln(exp(exp(8*x*ln(2)))^2-2/5*x*exp(exp
(8*x*ln(2)))+ln(2)+1/25*x^2+4)/(25*exp(exp(8*x*ln(2)))^2-10*x*exp(exp(8*x*
ln(2)))+25*ln(2)+x^2+100),x,method=_RETURNVERBOSE)
```

output
```
ln(exp(2*256^x)-2/5*x*exp(256^x)+ln(2)+1/25*x^2+4)^2
```

3.508.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{\left(4x+25\;2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}\left(-20-5\;2^{5+8x}x\log(2)\right)\right)\log\left(\frac{1}{25}\left(100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^{2}+25\,\mathrm{l}\right.\right.}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^{2}+25\log(2)}$$
$$=\log\left(\frac{1}{25}\,x^{2}-\frac{2}{5}\,xe^{\left(2^{8\,x}\right)}+e^{\left(2\cdot2^{8\,x}\right)}+\log\left(2\right)+4\right)^{2}$$

input
```
integrate((800*log(2)*exp(8*x*log(2))*exp(exp(8*x*log(2)))^2+(-160*x*log(2
)*exp(8*x*log(2))-20)*exp(exp(8*x*log(2)))+4*x)*log(exp(exp(8*x*log(2)))^2
-2/5*x*exp(exp(8*x*log(2)))+log(2)+1/25*x^2+4)/(25*exp(exp(8*x*log(2)))^2-
10*x*exp(exp(8*x*log(2)))+25*log(2)+x^2+100),x, algorithm=\
```

output
```
log(1/25*x^2 - 2/5*x*e^(2^(8*x)) + e^(2*2^(8*x)) + log(2) + 4)^2
```

3.508.6 Sympy [A] (verification not implemented)

Time = 1.13 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{\left(4x+25\ 2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}\left(-20-5\ 2^{5+8x}x\log(2)\right)\right)\log\left(\frac{1}{25}\left(100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)\right)\right)}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)}$$

$$=\log\left(\frac{x^2}{25}-\frac{2xe^{e^{8x\log(2)}}}{5}+e^{2e^{8x\log(2)}}+\log(2)+4\right)^2$$

input
```
integrate((800*ln(2)*exp(8*x*ln(2))*exp(exp(8*x*ln(2)))**2+(-160*x*ln(2)*e
xp(8*x*ln(2))-20)*exp(exp(8*x*ln(2)))+4*x)*ln(exp(exp(8*x*ln(2)))**2-2/5*x
*exp(exp(8*x*ln(2)))+ln(2)+1/25*x**2+4)/(25*exp(exp(8*x*ln(2)))**2-10*x*ex
p(exp(8*x*ln(2)))+25*ln(2)+x**2+100),x)
```

output
```
log(x**2/25 - 2*x*exp(exp(8*x*log(2)))/5 + exp(2*exp(8*x*log(2))) + log(2)
 + 4)**2
```

3.508.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 92 vs. 2(21) = 42.

Time = 0.37 (sec) , antiderivative size = 92, normalized size of antiderivative = 3.83

$$\int \frac{\left(4x+25\ 2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}\left(-20-5\ 2^{5+8x}x\log(2)\right)\right)\log\left(\frac{1}{25}\left(100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)\right)\right)}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)}$$

$$=-\log\left(x^2-10\,xe^{\left(2^{8\,x}\right)}+25\,e^{\left(2\cdot 2^{8\,x}\right)}+25\,\log(2)+100\right)^2+2\,\log\left(x^2-10\,xe^{\left(2^{8\,x}\right)}+25\,e^{\left(2\cdot 2^{8\,x}\right)}+25\,\log(2)+100\right)\log\left(\frac{1}{25}\,x^2-\frac{2}{5}\,xe^{\left(2^{8\,x}\right)}+e^{\left(2^{8\,x+1}\right)}+\log(2)+4\right)$$

input
```
integrate((800*log(2)*exp(8*x*log(2))*exp(exp(8*x*log(2)))^2+(-160*x*log(2
)*exp(8*x*log(2))-20)*exp(exp(8*x*log(2)))+4*x)*log(exp(exp(8*x*log(2)))^2
-2/5*x*exp(exp(8*x*log(2)))+log(2)+1/25*x^2+4)/(25*exp(exp(8*x*log(2)))^2-
10*x*exp(exp(8*x*log(2)))+25*log(2)+x^2+100),x, algorithm=\
```

output
```
-log(x^2 - 10*x*e^(2^(8*x)) + 25*e^(2*2^(8*x)) + 25*log(2) + 100)^2 + 2*lo
g(x^2 - 10*x*e^(2^(8*x)) + 25*e^(2*2^(8*x)) + 25*log(2) + 100)*log(1/25*x^
2 - 2/5*x*e^(2^(8*x)) + e^(2^(8*x + 1)) + log(2) + 4)
```

3.508.8 Giac [F]

$$\int \frac{\left(4x+25\ 2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}\left(-20-5\ 2^{5+8x}x\log(2)\right)\right)\log\left(\frac{1}{25}\left(100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)\right)\right)}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)}$$
$$=\int \frac{4\left(200\cdot 2^{8x}e^{(2\cdot 2^{8x})}\log(2)-5\left(8\cdot 2^{8x}x\log(2)+1\right)e^{(2^{8x})}+x\right)\log\left(\frac{1}{25}x^2-\frac{2}{5}xe^{(2^{8x})}+e^{(2\cdot 2^{8x})}+\log(2)\right)}{x^2-10\,xe^{(2^{8x})}+25\,e^{(2\cdot 2^{8x})}+25\,\log(2)+100}$$

input
```
integrate((800*log(2)*exp(8*x*log(2))*exp(exp(8*x*log(2)))^2+(-160*x*log(2
)*exp(8*x*log(2))-20)*exp(exp(8*x*log(2)))+4*x)*log(exp(exp(8*x*log(2)))^2
-2/5*x*exp(exp(8*x*log(2)))+log(2)+1/25*x^2+4)/(25*exp(exp(8*x*log(2)))^2-
10*x*exp(exp(8*x*log(2)))+25*log(2)+x^2+100),x, algorithm=\
```

output
```
integrate(4*(200*2^(8*x)*e^(2*2^(8*x))*log(2) - 5*(8*2^(8*x)*x*log(2) + 1)
*e^(2^(8*x)) + x)*log(1/25*x^2 - 2/5*x*e^(2^(8*x)) + e^(2*2^(8*x)) + log(2
) + 4)/(x^2 - 10*x*e^(2^(8*x)) + 25*e^(2*2^(8*x)) + 25*log(2) + 100), x)
```

3.508.9 Mupad [B] (verification not implemented)

Time = 14.86 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{\left(4x+25\ 2^{5+8x}e^{2^{1+8x}}\log(2)+e^{2^{8x}}\left(-20-5\ 2^{5+8x}x\log(2)\right)\right)\log\left(\frac{1}{25}\left(100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)\right)\right)}{100+25e^{2^{1+8x}}-10e^{2^{8x}}x+x^2+25\log(2)}$$
$$=\ln\left(\ln(2)+\mathrm{e}^{2\,2^{8\,x}}-\frac{2\,x\,\mathrm{e}^{2^{8\,x}}}{5}+\frac{x^2}{25}+4\right)^2$$

input
```
int((log(log(2) + exp(2*exp(8*x*log(2))) + x^2/25 - (2*x*exp(exp(8*x*log(2
))))/5 + 4)*(4*x - exp(exp(8*x*log(2)))*(160*x*exp(8*x*log(2))*log(2) + 20
) + 800*exp(2*exp(8*x*log(2)))*exp(8*x*log(2))*log(2)))/(25*log(2) + 25*ex
p(2*exp(8*x*log(2))) + x^2 - 10*x*exp(exp(8*x*log(2))) + 100),x)
```

output
```
log(log(2) + exp(2*2^(8*x)) - (2*x*exp(2^(8*x)))/5 + x^2/25 + 4)^2
```

3.509 $\int \frac{-5775+1520x-28975x^2+7700x^3-500x^4+(5775-1500x+100x^2)\log(}{5929x^2-1540x^3+100x^4}$

3.509.1 Optimal result

Integrand size = 52, antiderivative size = 28

$$\int \frac{-5775+1520x-28975x^2+7700x^3-500x^4+(5775-1500x+100x^2)\log(x)}{5929x^2-1540x^3+100x^4}\,dx = \frac{5x^2+\log(x)}{\frac{2}{5\left(2-\frac{15}{x}\right)}-x}$$

output
```
(5*x^2+ln(x))/(2/(10-75/x)-x)
```

3.509.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

$$\int \frac{-5775+1520x-28975x^2+7700x^3-500x^4+(5775-1500x+100x^2)\log(x)}{5929x^2-1540x^3+100x^4}\,dx = -5\left(-\frac{77}{5(77-10x)}+x-\frac{4\log(x)}{77(77-10x)}+\frac{15\log(x)}{77x}\right)$$

input
```
Integrate[(-5775 + 1520*x - 28975*x^2 + 7700*x^3 - 500*x^4 + (5775 - 1500*
x + 100*x^2)*Log[x])/(5929*x^2 - 1540*x^3 + 100*x^4),x]
```

output
```
-5*(-77/(5*(77 - 10*x)) + x - (4*Log[x])/(77*(77 - 10*x)) + (15*Log[x])/(7
7*x))
```

3.509.3 Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.57, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.096, Rules used = {2026, 7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-500x^4+7700x^3-28975x^2+(100x^2-1500x+5775)\log(x)+1520x-5775}{100x^4-1540x^3+5929x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-500x^4+7700x^3-28975x^2+(100x^2-1500x+5775)\log(x)+1520x-5775}{x^2(100x^2-1540x+5929)}dx$$

$$\Big\downarrow \text{7277}$$

$$400\int -\frac{100x^4-1540x^3+5795x^2-304x-5(4x^2-60x+231)\log(x)+1155}{80(77-10x)^2x^2}dx$$

$$\Big\downarrow \text{27}$$

$$-5\int \frac{100x^4-1540x^3+5795x^2-304x-5(4x^2-60x+231)\log(x)+1155}{(77-10x)^2x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-5\int \left(\frac{100x^2}{(10x-77)^2}-\frac{1540x}{(10x-77)^2}+\frac{5795}{(10x-77)^2}-\frac{304}{(10x-77)^2x}-\frac{5(4x^2-60x+231)\log(x)}{(10x-77)^2x^2}+\frac{1155}{(10x-77)^2x^2}$$

$$\Big\downarrow \text{2009}$$

$$-5\left(x-\frac{77}{5(77-10x)}-\frac{40x\log(x)}{5929(77-10x)}-\frac{4\log(x)}{5929}+\frac{15\log(x)}{77x}\right)$$

input
```
Int[(-5775 + 1520*x - 28975*x^2 + 7700*x^3 - 500*x^4 + (5775 - 1500*x + 10
0*x^2)*Log[x])/(5929*x^2 - 1540*x^3 + 100*x^4),x]
```

output
```
-5*(-77/(5*(77 - 10*x)) + x - (4*Log[x])/5929 + (15*Log[x])/(77*x) - (40*x
*Log[x])/(5929*(77 - 10*x)))
```

3.509.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.509.4 Maple [A] (verified)

Time = 0.59 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

method	result	size
norman	$\frac{\frac{5775x}{2}-10x\ln(x)-50x^3+75\ln(x)}{x(10x-77)}$	30
parallelrisch	$\frac{-500x^3-100x\ln(x)+28875x+750\ln(x)}{10x(10x-77)}$	31
default	$-5x-\frac{77}{10x-77}+\frac{20\ln(x)}{5929}-\frac{200\ln(x)x}{5929(10x-77)}-\frac{75\ln(x)}{77x}$	37
parts	$-5x-\frac{77}{10x-77}+\frac{20\ln(x)}{5929}-\frac{200\ln(x)x}{5929(10x-77)}-\frac{75\ln(x)}{77x}$	37
risch	$-\frac{5(2x-15)\ln(x)}{x(10x-77)}-\frac{50x^2-385x+77}{10x-77}$	40

input
```
int(((100*x^2-1500*x+5775)*ln(x)-500*x^4+7700*x^3-28975*x^2+1520*x-5775)/(
100*x^4-1540*x^3+5929*x^2),x,method=_RETURNVERBOSE)
```

output
```
(5775/2*x-10*x*ln(x)-50*x^3+75*ln(x))/x/(10*x-77)
```

3.509.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{-5775+1520x-28975x^2+7700x^3-500x^4+(5775-1500x+100x^2)\log(x)}{5929x^2-1540x^3+100x^4}\,dx$$
$$= -\frac{50\,x^3-385\,x^2+5\,(2\,x-15)\log{(x)}+77\,x}{10\,x^2-77\,x}$$

input
```
integrate(((100*x^2-1500*x+5775)*log(x)-500*x^4+7700*x^3-28975*x^2+1520*x-
5775)/(100*x^4-1540*x^3+5929*x^2),x, algorithm=\
```

output
```
-(50*x^3 - 385*x^2 + 5*(2*x - 15)*log(x) + 77*x)/(10*x^2 - 77*x)
```

3.509.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{-5775+1520x-28975x^2+7700x^3-500x^4+(5775-1500x+100x^2)\log(x)}{5929x^2-1540x^3+100x^4}\,dx$$
$$= -5x+\frac{(75-10x)\log{(x)}}{10x^2-77x}-\frac{77}{10x-77}$$

input
```
integrate(((100*x**2-1500*x+5775)*ln(x)-500*x**4+7700*x**3-28975*x**2+1520
*x-5775)/(100*x**4-1540*x**3+5929*x**2),x)
```

output
```
-5*x + (75 - 10*x)*log(x)/(10*x**2 - 77*x) - 77/(10*x - 77)
```

3.509.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(27) = 54.

Time = 0.23 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.36

$$\int \frac{-5775+1520x-28975x^2+7700x^3-500x^4+(5775-1500x+100x^2)\log(x)}{5929x^2-1540x^3+100x^4}\,dx$$
$$= -5\,x - \frac{25\,((8\,x^2+2310\,x-17787)\log(x)+2310\,x-17787)}{5929\,(10\,x^2-77\,x)} + \frac{75\,(20\,x-77)}{77\,(10\,x^2-77\,x)} - \frac{6679}{77\,(10\,x-77)} + \frac{20}{5929}\log(x)$$

input
```
integrate(((100*x^2-1500*x+5775)*log(x)-500*x^4+7700*x^3-28975*x^2+1520*x-
5775)/(100*x^4-1540*x^3+5929*x^2),x, algorithm=\
```

output
```
-5*x - 25/5929*((8*x^2 + 2310*x - 17787)*log(x) + 2310*x - 17787)/(10*x^2
- 77*x) + 75/77*(20*x - 77)/(10*x^2 - 77*x) - 6679/77/(10*x - 77) + 20/592
9*log(x)
```

3.509.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{-5775+1520x-28975x^2+7700x^3-500x^4+(5775-1500x+100x^2)\log(x)}{5929x^2-1540x^3+100x^4}\,dx$$
$$= -\frac{5}{77}\left(\frac{4}{10\,x-77}+\frac{15}{x}\right)\log(x) - 5\,x - \frac{77}{10\,x-77}$$

input
```
integrate(((100*x^2-1500*x+5775)*log(x)-500*x^4+7700*x^3-28975*x^2+1520*x-
5775)/(100*x^4-1540*x^3+5929*x^2),x, algorithm=\
```

output
```
-5/77*(4/(10*x - 77) + 15/x)*log(x) - 5*x - 77/(10*x - 77)
```

3.509.9 Mupad [B] (verification not implemented)

Time = 14.32 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{-5775+1520x-28975x^2+7700x^3-500x^4+(5775-1500x+100x^2)\log(x)}{5929x^2-1540x^3+100x^4}\,dx$$
$$=-\frac{5\,(2\,x-15)\,\left(\ln\left(x\right)+5\,x^2\right)}{x\,\left(10\,x-77\right)}$$

input
```
int((1520*x + log(x)*(100*x^2 - 1500*x + 5775) - 28975*x^2 + 7700*x^3 - 50
0*x^4 - 5775)/(5929*x^2 - 1540*x^3 + 100*x^4),x)
```

output
```
-(5*(2*x - 15)*(log(x) + 5*x^2))/(x*(10*x - 77))
```

3.510 $\int \frac{1}{2}(-36+45x-18\log(4)-18\log(x^2-e^4x^2))\,dx$

3.510.1 Optimal result

Integrand size = 28, antiderivative size = 28

$$\int \frac{1}{2}\left(-36+45x-18\log(4)-18\log\left(x^2-e^4x^2\right)\right)\,dx=9x^2\left(\frac{5}{4}-\frac{\log(4)+\log\left(x(x-e^4x)\right)}{x}\right)$$

output
```
9*(5/4-(2*ln(2)+ln((-x*exp(4)+x)*x))/x)*x^2
```

3.510.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{1}{2}\left(-36+45x-18\log(4)-18\log\left(x^2-e^4x^2\right)\right)\,dx=\frac{45x^2}{4}-9x\log(4)-9x\log\left(\left(1-e^4\right)x^2\right)$$

input
```
Integrate[(-36 + 45*x - 18*Log[4] - 18*Log[x^2 - E^4*x^2])/2,x]
```

output
```
(45*x^2)/4 - 9*x*Log[4] - 9*x*Log[(1 - E^4)*x^2]
```

3.510.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}\left(-18\log\left(x^2-e^4x^2\right)+45x-36-18\log(4)\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int \left(45x-18\log\left(x^2-e^4x^2\right)-18(2+\log(4))\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(\frac{45x^2}{2}-18x\log\left(\left(1-e^4\right)x^2\right)+36x-18x(2+\log(4))\right)$$

input
```
Int[(-36 + 45*x - 18*Log[4] - 18*Log[x^2 - E^4*x^2])/2,x]
```

output
```
(36*x + (45*x^2)/2 - 18*x*(2 + Log[4]) - 18*x*Log[(1 - E^4)*x^2])/2
```

3.510.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.510.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

method	result	size
default	$\frac{45x^2}{4}-18x\ln(2)-9\ln(-x^2e^4+x^2)x$	27
norman	$\frac{45x^2}{4}-18x\ln(2)-9\ln(-x^2e^4+x^2)x$	27
risch	$\frac{45x^2}{4}-18x\ln(2)-9\ln(-x^2e^4+x^2)x$	27
parts	$\frac{45x^2}{4}-18x\ln(2)-9\ln(-x^2e^4+x^2)x$	27
parallelrisch	$\frac{45x^2}{4}-9\ln(-x^2(e^4-1))x+18x+(-18-18\ln(2))x$	31

input
```
int(-9*ln(-x^2*exp(4)+x^2)-18*ln(2)+45/2*x-18,x,method=_RETURNVERBOSE)
```

output
```
45/4*x^2-18*x*ln(2)-9*ln(-x^2*exp(4)+x^2)*x
```

3.510.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{1}{2}(-36+45x-18\log(4)-18\log(x^2-e^4x^2))\,dx = \frac{45}{4}x^2-18x\log(2)-9x\log(-x^2e^4+x^2)$$

input
```
integrate(-9*log(-x^2*exp(4)+x^2)-18*log(2)+45/2*x-18,x, algorithm=\
```

output
```
45/4*x^2 - 18*x*log(2) - 9*x*log(-x^2*e^4 + x^2)
```

3.510.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{1}{2}(-36+45x-18\log(4)-18\log(x^2-e^4x^2))\,dx = \frac{45x^2}{4}-9x\log(-x^2e^4+x^2)-18x\log(2)$$

input
```
integrate(-9*ln(-x**2*exp(4)+x**2)-18*ln(2)+45/2*x-18,x)
```

output
```
45*x**2/4 - 9*x*log(-x**2*exp(4) + x**2) - 18*x*log(2)
```

3.510.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{1}{2}\left(-36+45x-18\log(4)-18\log\left(x^2-e^4x^2\right)\right)\,dx$$
$$=\frac{45}{4}\,x^2-18\,x\log\left(2\right)-9\,x\log\left(-x^2e^4+x^2\right)$$

input
```
integrate(-9*log(-x^2*exp(4)+x^2)-18*log(2)+45/2*x-18,x, algorithm=\
```

output
```
45/4*x^2 - 18*x*log(2) - 9*x*log(-x^2*e^4 + x^2)
```

3.510.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{1}{2}\left(-36+45x-18\log(4)-18\log\left(x^2-e^4x^2\right)\right)\,dx$$
$$=\frac{45}{4}\,x^2-18\,x\log\left(2\right)-9\,x\log\left(-x^2e^4+x^2\right)$$

input
```
integrate(-9*log(-x^2*exp(4)+x^2)-18*log(2)+45/2*x-18,x, algorithm=\
```

output
```
45/4*x^2 - 18*x*log(2) - 9*x*log(-x^2*e^4 + x^2)
```

3.510.9 Mupad [B] (verification not implemented)

Time = 14.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{1}{2}\left(-36+45x-18\log(4)-18\log\left(x^2-e^4x^2\right)\right)\,dx=-\frac{9\,x\,\left(4\,\ln\left(x^2-x^2\,\mathrm{e}^4\right)-5\,x+\ln\left(256\right)\right)}{4}$$

input
```
int((45*x)/2 - 9*log(x^2 - x^2*exp(4)) - 18*log(2) - 18,x)
```

output
```
-(9*x*(4*log(x^2 - x^2*exp(4)) - 5*x + log(256)))/4
```

3.511 $\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)}$

3.511.1 Optimal result

Integrand size = 197, antiderivative size = 30

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^x(400x^2+200x^4+25x^6)}\left(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-400x^3)+e^{3x}(400x+600x^2+600x^3+450x^4)+e^{2x}(-1200x^2-800x^3-500x^4-200x^5)+e^x(800x+400x^2+800x^3+200x^4+150x^5+25x^6)\right)dx=e^{-3-x+x\left(1+25e^xx\left(4+(-e^x+x)^2\right)^2\right)}$$

output
```
exp(x*(5*(4+(x-exp(x))^2)*(20+5*(x-exp(x))^2)*exp(x)*x+1)-3-x)
```

3.511.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 71 vs. 2(30) = 60.

Time = 0.15 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.37

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^x(400x^2+200x^4+25x^6)}\left(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-400x^3)+e^{3x}(400x+600x^2+600x^3+450x^4)+e^{2x}(-1200x^2-800x^3-500x^4-200x^5)+e^x(800x+400x^2+800x^3+200x^4+150x^5+25x^6)\right)dx=e^{-3+25e^{5x}x^2-100e^{4x}x^3-100e^{2x}x^3(4+x^2)+25e^xx^2(4+x^2)^2+50e^{3x}x^2(4+3x^2)}$$

input
```
Integrate[E^(-3 + 25*E^(5*x)*x^2 - 100*E^(4*x)*x^3 + E^(3*x)*(200*x^2 + 15
0*x^4) + E^(2*x)*(-400*x^3 - 100*x^5) + E^x*(400*x^2 + 200*x^4 + 25*x^6))*
(E^(5*x)*(50*x + 125*x^2) + E^(4*x)*(-300*x^2 - 400*x^3) + E^(3*x)*(400*x
+ 600*x^2 + 600*x^3 + 450*x^4) + E^(2*x)*(-1200*x^2 - 800*x^3 - 500*x^4 -
200*x^5) + E^x*(800*x + 400*x^2 + 800*x^3 + 200*x^4 + 150*x^5 + 25*x^6)),x
]
```

output
```
E^(-3 + 25*E^(5*x)*x^2 - 100*E^(4*x)*x^3 - 100*E^(2*x)*x^3*(4 + x^2) + 25*
E^x*x^2*(4 + x^2)^2 + 50*E^(3*x)*x^2*(4 + 3*x^2))
```

3.511.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{5x}\left(125x^2+50x\right)+e^{4x}\left(-400x^3-300x^2\right)+e^{3x}\left(450x^4+600x^3+600x^2+400x\right)+e^{2x}\left(-200x^5-500x^4-8\right.\right.$$

$$\Big\downarrow \ 7293$$

$$\int \left(-100(4x+3)x^2\exp\left(-100e^{4x}x^3+25e^{5x}x^2+e^{2x}\left(-100x^5-400x^3\right)+e^{3x}\left(150x^4+200x^2\right)+e^{x}\left(25x^6+200x^4\right.\right.\right.$$

$$\Big\downarrow \ 7239$$

$$\int 25x\left(x^5+6x^4+8x^3+32x^2-4e^{x}\left(2x^3+5x^2+8x+12\right)x+2e^{2x}\left(9x^3+12x^2+12x+8\right)-4e^{3x}(4x+3)x+16\right.$$

$$\Big\downarrow \ 27$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \ 7293$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x\right.$$

$$\Big\downarrow \ 7239$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^{x}\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x$$

$$\Big\downarrow \text{7239}$$

3.511.

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^{x}(400x^2+200x^4+25x^6)}\left(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-\right.$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x\right.$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x\right.$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x\right.$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x\right.$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x\right.$$

3.511.

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}\left(200x^2+150x^4\right)+e^{2x}\left(-400x^3-100x^5\right)+e^x\left(400x^2+200x^4+25x^6\right)}\left(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-\right.$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x\right.$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x\right.$$

$$\Big\downarrow \text{7239}$$

$$25\int \exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+x-3\right)x\left(x^5+6x\right.$$

$$\Big\downarrow \text{7293}$$

$$25\int \left(-4\exp\left(-100e^{4x}x^3-100e^{2x}\left(x^2+4\right)x^3+25e^{5x}x^2+25e^x\left(x^2+4\right)^2x^2+50e^{3x}\left(3x^2+4\right)x^2+4x-3\right)(4x\right.$$

input
```
Int[E^(-3 + 25*E^(5*x)*x^2 - 100*E^(4*x)*x^3 + E^(3*x)*(200*x^2 + 150*x^4)
 + E^(2*x)*(-400*x^3 - 100*x^5) + E^x*(400*x^2 + 200*x^4 + 25*x^6))*(E^(5*
x)*(50*x + 125*x^2) + E^(4*x)*(-300*x^2 - 400*x^3) + E^(3*x)*(400*x + 600*
x^2 + 600*x^3 + 450*x^4) + E^(2*x)*(-1200*x^2 - 800*x^3 - 500*x^4 - 200*x^
5) + E^x*(800*x + 400*x^2 + 800*x^3 + 200*x^4 + 150*x^5 + 25*x^6)),x]
```

output
```
$Aborted
```

3.511.

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}\left(200x^2+150x^4\right)+e^{2x}\left(-400x^3-100x^5\right)+e^x\left(400x^2+200x^4+25x^6\right)}\left(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-\right.$$

3.511.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.511.4 Maple [A] (verified)

Time = 0.63 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.43

method	result	size
parallelrisch	$e^{25x^2 e^{5x}-100x^3 e^{4x}+(150x^4+200x^2)e^{3x}+(-100x^5-400x^3)e^{2x}+(25x^6+200x^4+400x^2)e^{x}-3}$	73
risch	$e^{25x^6 e^{x}-100x^5 e^{2x}+200\, e^{x} x^4+150\, e^{3x} x^4-100x^3 e^{4x}-400\, e^{2x} x^3+400\, e^{x} x^2+25x^2 e^{5x}+200x^2 e^{3x}-3}$	79

input
```
int(((125*x^2+50*x)*exp(x)^5+(-400*x^3-300*x^2)*exp(x)^4+(450*x^4+600*x^3+
600*x^2+400*x)*exp(x)^3+(-200*x^5-500*x^4-800*x^3-1200*x^2)*exp(x)^2+(25*x
^6+150*x^5+200*x^4+800*x^3+400*x^2+800*x)*exp(x))*exp(25*x^2*exp(x)^5-100*
x^3*exp(x)^4+(150*x^4+200*x^2)*exp(x)^3+(-100*x^5-400*x^3)*exp(x)^2+(25*x^
6+200*x^4+400*x^2)*exp(x)-3),x,method=_RETURNVERBOSE)
```

output
```
exp(25*x^2*exp(x)^5-100*x^3*exp(x)^4+(150*x^4+200*x^2)*exp(x)^3+(-100*x^5-
400*x^3)*exp(x)^2+(25*x^6+200*x^4+400*x^2)*exp(x)-3)
```

3.511. $\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^{x}(400x^2+200x^4+25x^6)}(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-$

3.511.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(27) = 54$.

Time = 0.24 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.37

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^x(400x^2+200x^4+25x^6)}\left(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-400x^3)+e^{3x}(400x+600x^2+600x^3+450x^4)+e^{2x}(-1200x^2-800x^3-500x^4-200x^5)+e^x(800x+400x^2+800x^3+200x^4+150x^5+25x^6)\right)dx = e^{\left(-100\,x^3e^{(4\,x)}+25\,x^2e^{(5\,x)}+50\,(3\,x^4+4\,x^2)e^{(3\,x)}-100\,(x^5+4\,x^3)e^{(2\,x)}+25\,(x^6+8\,x^4+16\,x^2)e^x-3\right)}$$

input
```
integrate(((125*x^2+50*x)*exp(x)^5+(-400*x^3-300*x^2)*exp(x)^4+(450*x^4+60
0*x^3+600*x^2+400*x)*exp(x)^3+(-200*x^5-500*x^4-800*x^3-1200*x^2)*exp(x)^2
+(25*x^6+150*x^5+200*x^4+800*x^3+400*x^2+800*x)*exp(x))*exp(25*x^2*exp(x)^
5-100*x^3*exp(x)^4+(150*x^4+200*x^2)*exp(x)^3+(-100*x^5-400*x^3)*exp(x)^2+
(25*x^6+200*x^4+400*x^2)*exp(x)-3),x, algorithm=\
```

output
```
e^(-100*x^3*e^(4*x) + 25*x^2*e^(5*x) + 50*(3*x^4 + 4*x^2)*e^(3*x) - 100*(x
^5 + 4*x^3)*e^(2*x) + 25*(x^6 + 8*x^4 + 16*x^2)*e^x - 3)
```

3.511.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(24) = 48$.

Time = 0.39 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.43

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^x(400x^2+200x^4+25x^6)}\left(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-400x^3)+e^{3x}(400x+600x^2+600x^3+450x^4)+e^{2x}(-1200x^2-800x^3-500x^4-200x^5)+e^x(800x+400x^2+800x^3+200x^4+150x^5+25x^6)\right)dx = e^{-100x^3e^{4x}+25x^2e^{5x}+(150x^4+200x^2)e^{3x}+(-100x^5-400x^3)e^{2x}+(25x^6+200x^4+400x^2)e^x-3}$$

input
```
integrate(((125*x**2+50*x)*exp(x)**5+(-400*x**3-300*x**2)*exp(x)**4+(450*x
**4+600*x**3+600*x**2+400*x)*exp(x)**3+(-200*x**5-500*x**4-800*x**3-1200*x
**2)*exp(x)**2+(25*x**6+150*x**5+200*x**4+800*x**3+400*x**2+800*x)*exp(x))
*exp(25*x**2*exp(x)**5-100*x**3*exp(x)**4+(150*x**4+200*x**2)*exp(x)**3+(-
100*x**5-400*x**3)*exp(x)**2+(25*x**6+200*x**4+400*x**2)*exp(x)-3),x)
```

output
```
exp(-100*x**3*exp(4*x) + 25*x**2*exp(5*x) + (150*x**4 + 200*x**2)*exp(3*x)
 + (-100*x**5 - 400*x**3)*exp(2*x) + (25*x**6 + 200*x**4 + 400*x**2)*exp(x
) - 3)
```

3.511.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. 2(27) = 54.

Time = 0.61 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.60

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^x(400x^2+200x^4+25x^6)}\left(e^{5x}\left(50x+125x^2\right)+e^{4x}\left(-300x^2-400x^3\right)+e^{3x}\left(400x+600x^2+600x^3+450x^4\right)+e^{2x}\left(-1200x^2-800x^3-500x^4-200x^5\right)+e^x\left(800x+400x^2+800x^3+200x^4+150x^5+25x^6\right)\right)\,dx = e^{\left(25\,x^6e^x-100\,x^5e^{(2\,x)}+150\,x^4e^{(3\,x)}+200\,x^4e^x-100\,x^3e^{(4\,x)}-400\,x^3e^{(2\,x)}+25\,x^2e^{(5\,x)}+200\,x^2e^{(3\,x)}+400\,x^2e^x-3\right)}$$

input
```
integrate(((125*x^2+50*x)*exp(x)^5+(-400*x^3-300*x^2)*exp(x)^4+(450*x^4+60
0*x^3+600*x^2+400*x)*exp(x)^3+(-200*x^5-500*x^4-800*x^3-1200*x^2)*exp(x)^2
+(25*x^6+150*x^5+200*x^4+800*x^3+400*x^2+800*x)*exp(x))*exp(25*x^2*exp(x)^
5-100*x^3*exp(x)^4+(150*x^4+200*x^2)*exp(x)^3+(-100*x^5-400*x^3)*exp(x)^2+
(25*x^6+200*x^4+400*x^2)*exp(x)-3),x, algorithm=\
```

output
```
e^(25*x^6*e^x - 100*x^5*e^(2*x) + 150*x^4*e^(3*x) + 200*x^4*e^x - 100*x^3*
e^(4*x) - 400*x^3*e^(2*x) + 25*x^2*e^(5*x) + 200*x^2*e^(3*x) + 400*x^2*e^x
 - 3)
```

3.511.8 Giac [F]

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^x(400x^2+200x^4+25x^6)}\left(e^{5x}\left(50x+125x^2\right)+e^{4x}\left(-300x^2-400x^3\right)+e^{3x}\left(400x+600x^2+600x^3+450x^4\right)+e^{2x}\left(-1200x^2-800x^3-500x^4-200x^5\right)+e^x\left(800x+400x^2+800x^3+200x^4+150x^5+25x^6\right)\right)\,dx = \int 25\,\left(\left(5\,x^2+2\,x\right)e^{(5\,x)}-4\,\left(4\,x^3+3\,x^2\right)e^{(4\,x)}+2\,\left(9\,x^4+12\,x^3+12\,x^2+8\,x\right)e^{(3\,x)}-4\,\left(2\,x^5+5\,x^4+8\,x^3\right.$$

3.511. $\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^x(400x^2+200x^4+25x^6)}\left(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-\right.$

input
```
integrate(((125*x^2+50*x)*exp(x)^5+(-400*x^3-300*x^2)*exp(x)^4+(450*x^4+60
0*x^3+600*x^2+400*x)*exp(x)^3+(-200*x^5-500*x^4-800*x^3-1200*x^2)*exp(x)^2
+(25*x^6+150*x^5+200*x^4+800*x^3+400*x^2+800*x)*exp(x))*exp(25*x^2*exp(x)^
5-100*x^3*exp(x)^4+(150*x^4+200*x^2)*exp(x)^3+(-100*x^5-400*x^3)*exp(x)^2+
(25*x^6+200*x^4+400*x^2)*exp(x)-3),x, algorithm=\
```

output
```
integrate(25*((5*x^2 + 2*x)*e^(5*x) - 4*(4*x^3 + 3*x^2)*e^(4*x) + 2*(9*x^4
 + 12*x^3 + 12*x^2 + 8*x)*e^(3*x) - 4*(2*x^5 + 5*x^4 + 8*x^3 + 12*x^2)*e^(
2*x) + (x^6 + 6*x^5 + 8*x^4 + 32*x^3 + 16*x^2 + 32*x)*e^x)*e^(-100*x^3*e^(
4*x) + 25*x^2*e^(5*x) + 50*(3*x^4 + 4*x^2)*e^(3*x) - 100*(x^5 + 4*x^3)*e^(
2*x) + 25*(x^6 + 8*x^4 + 16*x^2)*e^x - 3), x)
```

3.511.9 Mupad [B] (verification not implemented)

Time = 15.22 (sec) , antiderivative size = 87, normalized size of antiderivative = 2.90

$$\int e^{-3+25e^{5x}x^2-100e^{4x}x^3+e^{3x}(200x^2+150x^4)+e^{2x}(-400x^3-100x^5)+e^x(400x^2+200x^4+25x^6)}\left(e^{5x}(50x+125x^2)+e^{4x}(-300x^2-400x^3)+e^{3x}(400x+600x^2+600x^3+450x^4)+e^{2x}(-1200x^2-800x^3-500x^4-200x^5)+e^x(800x+400x^2+800x^3+200x^4+150x^5+25x^6)\right)dx = e^{-3}\,e^{25x^6e^x}\,e^{200x^4e^x}\,e^{400x^2e^x}\,e^{25x^2e^{5x}}\,e^{-100x^3e^{4x}}\,e^{-100x^5e^{2x}}\,e^{150x^4e^{3x}}\,e^{200x^2e^{3x}}\,e^{-400x^3e^{2x}}$$

input
```
int(exp(exp(x)*(400*x^2 + 200*x^4 + 25*x^6) + exp(3*x)*(200*x^2 + 150*x^4)
 - exp(2*x)*(400*x^3 + 100*x^5) + 25*x^2*exp(5*x) - 100*x^3*exp(4*x) - 3)*
(exp(5*x)*(50*x + 125*x^2) - exp(4*x)*(300*x^2 + 400*x^3) + exp(3*x)*(400*
x + 600*x^2 + 600*x^3 + 450*x^4) + exp(x)*(800*x + 400*x^2 + 800*x^3 + 200
*x^4 + 150*x^5 + 25*x^6) - exp(2*x)*(1200*x^2 + 800*x^3 + 500*x^4 + 200*x^
5)),x)
```

output
```
exp(-3)*exp(25*x^6*exp(x))*exp(200*x^4*exp(x))*exp(400*x^2*exp(x))*exp(25*
x^2*exp(5*x))*exp(-100*x^3*exp(4*x))*exp(-100*x^5*exp(2*x))*exp(150*x^4*ex
p(3*x))*exp(200*x^2*exp(3*x))*exp(-400*x^3*exp(2*x))
```

3.512 $\int \frac{-5\log(x)+(1+x)\log^2(x)+\left(-20-4x\log^2(x)\right)\log^3\left(\frac{-5+(1+x)\log(x)}{\log(x)}\right)}{-5x\log(x)+\left(x+x^2\right)\log^2(x)}\,dx$

3.512.1 Optimal result

Integrand size = 58, antiderivative size = 28

$$\int \frac{-5\log(x)+(1+x)\log^2(x)+\left(-20-4x\log^2(x)\right)\log^3\left(\frac{-5+(1+x)\log(x)}{\log(x)}\right)}{-5x\log(x)+(x+x^2)\log^2(x)}\,dx = 2\left(-3+\frac{1}{2e}\right)+\log(x)-\log^4\left(1+x-\frac{5}{\log(x)}\right)$$

output
```
exp(-1)-6+ln(x)-ln(x-5/ln(x)+1)^4
```

3.512.2 Mathematica [A] (verified)

Time = 0.42 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int \frac{-5\log(x)+(1+x)\log^2(x)+\left(-20-4x\log^2(x)\right)\log^3\left(\frac{-5+(1+x)\log(x)}{\log(x)}\right)}{-5x\log(x)+(x+x^2)\log^2(x)}\,dx = \log(x)-\log^4\left(1+x-\frac{5}{\log(x)}\right)$$

input
```
Integrate[(-5*Log[x] + (1 + x)*Log[x]^2 + (-20 - 4*x*Log[x]^2)*Log[(-5 + (
1 + x)*Log[x])/Log[x]]^3)/(-5*x*Log[x] + (x + x^2)*Log[x]^2),x]
```

output
```
Log[x] - Log[1 + x - 5/Log[x]]^4
```

3.512.3 Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.052, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x+1)\log^2(x)+\left(-4x\log^2(x)-20\right)\log^3\left(\frac{(x+1)\log(x)-5}{\log(x)}\right)-5\log(x)}{\left(x^2+x\right)\log^2(x)-5x\log(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-(x+1)\log^2(x)-\left(\left(-4x\log^2(x)-20\right)\log^3\left(\frac{(x+1)\log(x)-5}{\log(x)}\right)\right)+5\log(x)}{x\log(x)(-x\log(x)-\log(x)+5)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{1}{x}-\frac{4\left(x\log^2(x)+5\right)\log^3\left(x-\frac{5}{\log(x)}+1\right)}{x\log(x)(x\log(x)+\log(x)-5)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log(x)-\log^4\left(x-\frac{5}{\log(x)}+1\right)$$

input
```
Int[(-5*Log[x] + (1 + x)*Log[x]^2 + (-20 - 4*x*Log[x]^2)*Log[(-5 + (1 + x)
*Log[x])/Log[x]]^3)/(-5*x*Log[x] + (x + x^2)*Log[x]^2),x]
```

output
```
Log[x] - Log[1 + x - 5/Log[x]]^4
```

3.512.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.512.4 Maple [A] (verified)

Time = 3.06 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

method	result	size
default	$\ln(x)-\ln\left(\frac{x\ln(x)+\ln(x)-5}{\ln(x)}\right)^4$	22

input
```
int(((-4*x*ln(x)^2-20)*ln((ln(x)*(1+x)-5)/ln(x))^3+(1+x)*ln(x)^2-5*ln(x))/
((x^2+x)*ln(x)^2-5*x*ln(x)),x,method=_RETURNVERBOSE)
```

output
```
ln(x)-ln((x*ln(x)+ln(x)-5)/ln(x))^4
```

3.512.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{-5\log(x)+(1+x)\log^2(x)+\left(-20-4x\log^2(x)\right)\log^3\left(\frac{-5+(1+x)\log(x)}{\log(x)}\right)}{-5x\log(x)+(x+x^2)\log^2(x)}\,dx$$
$$=-\log\left(\frac{(x+1)\log(x)-5}{\log(x)}\right)^4+\log(x)$$

input
```
integrate(((-4*x*log(x)^2-20)*log((log(x)*(1+x)-5)/log(x))^3+(1+x)*log(x)^
2-5*log(x))/((x^2+x)*log(x)^2-5*x*log(x)),x, algorithm=\
```

output
```
-log(((x + 1)*log(x) - 5)/log(x))^4 + log(x)
```

3.512.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int \frac{-5\log(x)+(1+x)\log^2(x)+\left(-20-4x\log^2(x)\right)\log^3\left(\frac{-5+(1+x)\log(x)}{\log(x)}\right)}{-5x\log(x)+(x+x^2)\log^2(x)}\,dx$$
$$=\log(x)-\log\left(\frac{(x+1)\log(x)-5}{\log(x)}\right)^4$$

input
```
integrate(((-4*x*ln(x)**2-20)*ln((ln(x)*(1+x)-5)/ln(x))**3+(1+x)*ln(x)**2-
5*ln(x))/((x**2+x)*ln(x)**2-5*x*ln(x)),x)
```

output
```
log(x) - log(((x + 1)*log(x) - 5)/log(x))**4
```

3.512.7 Maxima [F]

$$\int \frac{-5\log(x)+(1+x)\log^2(x)+\left(-20-4x\log^2(x)\right)\log^3\left(\frac{-5+(1+x)\log(x)}{\log(x)}\right)}{-5x\log(x)+(x+x^2)\log^2(x)}\,dx$$
$$=\int -\frac{4\left(x\log(x)^2+5\right)\log\left(\frac{(x+1)\log(x)-5}{\log(x)}\right)^3-(x+1)\log(x)^2+5\log(x)}{(x^2+x)\log(x)^2-5\,x\log(x)}\,dx$$

input
```
integrate(((-4*x*log(x)^2-20)*log((log(x)*(1+x)-5)/log(x))^3+(1+x)*log(x)^
2-5*log(x))/((x^2+x)*log(x)^2-5*x*log(x)),x, algorithm=\
```

output
```
-integrate((4*(x*log(x)^2 + 5)*log(((x + 1)*log(x) - 5)/log(x))^3 - (x + 1
)*log(x)^2 + 5*log(x))/((x^2 + x)*log(x)^2 - 5*x*log(x)), x)
```

3.512.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(20) = 40$.

Time = 0.43 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.57

$$\int \frac{-5\log(x) + (1+x)\log^2(x) + \left(-20 - 4x\log^2(x)\right)\log^3\left(\frac{-5+(1+x)\log(x)}{\log(x)}\right)}{-5x\log(x) + (x+x^2)\log^2(x)}\,dx$$
$$= -4\left(\log\left(x\log\left(x\right) + \log\left(x\right) - 5\right) - \log\left(\log\left(x\right)\right)\right)\log\left(x\log\left(x\right) + \log\left(x\right) - 5\right)^3$$
$$- 6\,\log\left(x\log\left(x\right) + \log\left(x\right) - 5\right)^2\log\left(\log\left(x\right)\right)^2$$
$$+ 4\,\log\left(x\log\left(x\right) + \log\left(x\right) - 5\right)\log\left(\log\left(x\right)\right)^3 - \log\left(\log\left(x\right)\right)^4 + \log\left(x\right)$$

input
```
integrate(((-4*x*log(x)^2-20)*log((log(x)*(1+x)-5)/log(x))^3+(1+x)*log(x)^
2-5*log(x))/((x^2+x)*log(x)^2-5*x*log(x)),x, algorithm=\
```

output
```
-4*(log(x*log(x) + log(x) - 5) - log(log(x)))*log(x*log(x) + log(x) - 5)^3
 - 6*log(x*log(x) + log(x) - 5)^2*log(log(x))^2 + 4*log(x*log(x) + log(x)
- 5)*log(log(x))^3 - log(log(x))^4 + log(x)
```

3.512.9 Mupad [B] (verification not implemented)

Time = 15.20 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{-5\log(x) + (1+x)\log^2(x) + \left(-20 - 4x\log^2(x)\right)\log^3\left(\frac{-5+(1+x)\log(x)}{\log(x)}\right)}{-5x\log(x) + (x+x^2)\log^2(x)}\,dx$$
$$= \ln\left(x\right) - \ln\left(\frac{\ln\left(x\right)\,\left(x+1\right) - 5}{\ln\left(x\right)}\right)^4$$

input
```
int(-(5*log(x) - log(x)^2*(x + 1) + log((log(x)*(x + 1) - 5)/log(x))^3*(4*
x*log(x)^2 + 20))/(log(x)^2*(x + x^2) - 5*x*log(x)),x)
```

output
```
log(x) - log((log(x)*(x + 1) - 5)/log(x))^4
```

3.513 $\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2\right.}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\right.}$

3.513.1 Optimal result

Integrand size = 112, antiderivative size = 33

$$\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right) \mathrm{l}}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}$$
$$=\frac{\left(x-(x-\log(2))^2\log^2(2)\right)\log\left(\log\left(\log\left(\frac{x}{1+x}\right)\right)\right)}{10x}$$

output
```
1/10*(x-ln(2)^2*(x-ln(2))^2)/x*ln(ln(ln(x/(1+x))))
```

3.513.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.24

$$\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right) \mathrm{l}}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}$$
$$=-\frac{\left(x^2\log^2(2)+\log^4(2)-x\left(1+2\log^3(2)\right)\right)\log\left(\log\left(\log\left(\frac{x}{1+x}\right)\right)\right)}{10x}$$

input
```
Integrate[(x - x^2*Log[2]^2 + 2*x*Log[2]^3 - Log[2]^4 + ((-x^2 - x^3)*Log[
2]^2 + (1 + x)*Log[2]^4)*Log[x/(1 + x)]*Log[Log[x/(1 + x)]]*Log[Log[Log[x/
(1 + x)]]])/((10*x^2 + 10*x^3)*Log[x/(1 + x)]*Log[Log[x/(1 + x)]]),x]
```

3.513.
$$\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)\log\left(\log\left(\log\left(\frac{x}{1+x}\right)\right)\right)}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}\,dx$$

output
```
-1/10*((x^2*Log[2]^2 + Log[2]^4 - x*(1 + 2*Log[2]^3))*Log[Log[Log[x/(1 + x
)]]])/x
```

3.513.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2\left(-\log^2(2)\right)+\left(\left(-x^3-x^2\right)\log^2(2)+(x+1)\log^4(2)\right)\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)\log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)+x \cdots}{\left(10x^3+10x^2\right)\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)}$$

$\Big\downarrow$ 6

$$\int \frac{x^2\left(-\log^2(2)\right)+\left(\left(-x^3-x^2\right)\log^2(2)+(x+1)\log^4(2)\right)\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)\log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)+x(\cdots}{\left(10x^3+10x^2\right)\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)}$$

$\Big\downarrow$ 2026

$$\int \frac{x^2\left(-\log^2(2)\right)+\left(\left(-x^3-x^2\right)\log^2(2)+(x+1)\log^4(2)\right)\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)\log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)+x(\cdots}{x^2(10x+10)\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{x^2\left(-\log^2(2)\right)+x\left(1+2\log^3(2)\right)-\log^4(2)}{10x^2(x+1)\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)}-\frac{\log^2(2)(x-\log(2))(x+\log(2))\log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)}{10x^2}\right)dx$$

$\Big\downarrow$ 2009

$$-\frac{1}{10}\log^4(2)\int \frac{1}{x^2\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)}dx+\frac{1}{10}\log^4(2)\int \frac{\log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)}{x^2}dx-\frac{1}{10}\log^2(2)\int \log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)dx+\frac{1}{10}\left(1+\log^4(2)+2\log^3(2)\right)\int \frac{1}{x\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)}dx-\frac{1}{10}\left(1+\log^4(2)+2\log^3(2)+\log^2(2)\right)\int \frac{1}{(x+1)\log\left(\frac{x}{x+1}\right)\log\left(\log\left(\frac{x}{x+1}\right)\right)}dx$$

input
```
Int[(x - x^2*Log[2]^2 + 2*x*Log[2]^3 - Log[2]^4 + ((-x^2 - x^3)*Log[2]^2 +
 (1 + x)*Log[2]^4)*Log[x/(1 + x)]*Log[Log[x/(1 + x)]]*Log[Log[Log[x/(1 + x
)]]])/((10*x^2 + 10*x^3)*Log[x/(1 + x)]*Log[Log[x/(1 + x)]]),x]
```

output
```
$Aborted
```

3.513.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.513.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. $2(31) = 62$.

Time = 46.39 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.12

method	result	size
parallelrisch	$-\frac{\ln(2)^4\ln\left(\ln\left(\ln\left(\frac{x}{1+x}\right)\right)\right)-2\ln(2)^3x\ln\left(\ln\left(\ln\left(\frac{x}{1+x}\right)\right)\right)+\ln(2)^2x^2\ln\left(\ln\left(\ln\left(\frac{x}{1+x}\right)\right)\right)-x\ln\left(\ln\left(\ln\left(\frac{x}{1+x}\right)\right)\right)}{10x}$	70

input
```
int((((1+x)*ln(2)^4+(-x^3-x^2)*ln(2)^2)*ln(x/(1+x))*ln(ln(x/(1+x)))*ln(ln(
ln(x/(1+x))))-ln(2)^4+2*x*ln(2)^3-x^2*ln(2)^2+x)/(10*x^3+10*x^2)/ln(x/(1+x
))/ln(ln(x/(1+x))),x,method=_RETURNVERBOSE)
```


$$\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left((-x^2-x^3)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)\log\left(\log\left(\log\left(\frac{x}{1+x}\right)\right)\right)}{(10x^2+10x^3)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}\,dx$$

output
```
-1/10*(ln(2)^4*ln(ln(ln(x/(1+x))))-2*ln(2)^3*x*ln(ln(ln(x/(1+x))))+ln(2)^2
*x^2*ln(ln(ln(x/(1+x))))-x*ln(ln(ln(x/(1+x)))))/x
```

3.513.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.15

$$\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}$$
$$= -\frac{\left(x^2\log(2)^2-2\,x\log(2)^3+\log(2)^4-x\right)\log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)}{10\,x}$$

input
```
integrate((((1+x)*log(2)^4+(-x^3-x^2)*log(2)^2)*log(x/(1+x))*log(log(x/(1+
x)))*log(log(log(x/(1+x))))-log(2)^4+2*x*log(2)^3-x^2*log(2)^2+x)/(10*x^3+
10*x^2)/log(x/(1+x))/log(log(x/(1+x))),x, algorithm=\
```

output
```
-1/10*(x^2*log(2)^2 - 2*x*log(2)^3 + log(2)^4 - x)*log(log(log(x/(x + 1)))
)/x
```

3.513.6 Sympy [A] (verification not implemented)

Time = 0.50 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.45

$$\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}$$
$$= \frac{\left(2\log(2)^3+1\right)\log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)}{10} + \frac{\left(-x^2\log(2)^2-\log(2)^4\right)\log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)}{10x}$$

input
```
integrate((((1+x)*ln(2)**4+(-x**3-x**2)*ln(2)**2)*ln(x/(1+x))*ln(ln(x/(1+x
)))*ln(ln(ln(x/(1+x))))-ln(2)**4+2*x*ln(2)**3-x**2*ln(2)**2+x)/(10*x**3+10
*x**2)/ln(x/(1+x))/ln(ln(x/(1+x))),x)
```

output
```
(2*log(2)**3 + 1)*log(log(log(x/(x + 1))))/10 + (-x**2*log(2)**2 - log(2)*
*4)*log(log(log(x/(x + 1))))/(10*x)
```

3.513.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.21

$$\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)\mathrm{l}}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}$$
$$= -\frac{\left(x^2\log\left(2\right)^2+\log\left(2\right)^4-\left(2\log\left(2\right)^3+1\right)x\right)\log\left(\log\left(-\log\left(x+1\right)+\log\left(x\right)\right)\right)}{10\,x}$$

input
```
integrate((((1+x)*log(2)^4+(-x^3-x^2)*log(2)^2)*log(x/(1+x))*log(log(x/(1+
x)))*log(log(log(x/(1+x))))-log(2)^4+2*x*log(2)^3-x^2*log(2)^2+x)/(10*x^3+
10*x^2)/log(x/(1+x))/log(log(x/(1+x))),x, algorithm=\
```

output
```
-1/10*(x^2*log(2)^2 + log(2)^4 - (2*log(2)^3 + 1)*x)*log(log(-log(x + 1) +
 log(x)))/x
```

3.513.8 Giac [A] (verification not implemented)

Time = 0.51 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.48

$$\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)\mathrm{l}}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}$$
$$= \frac{1}{10}\left(2\log\left(2\right)^3+1\right)\log\left(\log\left(-\log\left(x+1\right)+\log\left(x\right)\right)\right) - \frac{1}{10}\left(x\log\left(2\right)^2+\frac{\log\left(2\right)^4}{x}\right)\log\left(\log\left(\log\left(\frac{x}{x+1}\right)\right)\right)$$

input
```
integrate((((1+x)*log(2)^4+(-x^3-x^2)*log(2)^2)*log(x/(1+x))*log(log(x/(1+
x)))*log(log(log(x/(1+x))))-log(2)^4+2*x*log(2)^3-x^2*log(2)^2+x)/(10*x^3+
10*x^2)/log(x/(1+x))/log(log(x/(1+x))),x, algorithm=\
```

output
```
1/10*(2*log(2)^3 + 1)*log(log(-log(x + 1) + log(x))) - 1/10*(x*log(2)^2 +
log(2)^4/x)*log(log(log(x/(x + 1))))
```

3.513.9 Mupad [B] (verification not implemented)

Time = 16.33 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.18

$$\int \frac{x-x^2\log^2(2)+2x\log^3(2)-\log^4(2)+\left(\left(-x^2-x^3\right)\log^2(2)+(1+x)\log^4(2)\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)\log\left(\log\left(\log\left(\frac{x}{1+x}\right)\right)\right)}{\left(10x^2+10x^3\right)\log\left(\frac{x}{1+x}\right)\log\left(\log\left(\frac{x}{1+x}\right)\right)}$$
$$=\frac{\ln\left(\ln\left(\ln\left(\frac{x}{x+1}\right)\right)\right)\left(x-x^2\ln(2)^2+2\,x\ln(2)^3-\ln(2)^4\right)}{10\,x}$$

input
```
int((x - x^2*log(2)^2 + 2*x*log(2)^3 - log(2)^4 + log(log(log(x/(x + 1))))
*log(x/(x + 1))*log(log(x/(x + 1)))*(log(2)^4*(x + 1) - log(2)^2*(x^2 + x^
3)))/(log(x/(x + 1))*log(log(x/(x + 1)))*(10*x^2 + 10*x^3)),x)
```

output
```
(log(log(log(x/(x + 1))))*(x - x^2*log(2)^2 + 2*x*log(2)^3 - log(2)^4))/(1
0*x)
```

3.514 $\int \frac{x^2+e^{2-x}(x^2+x^3)-x^2\log(x)+e^{e^{5-x}}(1+e^{7-2x}x+e^{2-x}(3+x)+(-3-e$

$-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}(-e^{2-x}x+x\log(x))$

3.514.1 Optimal result

Integrand size = 120, antiderivative size = 34

$$\int \frac{x^2+e^{2-x}(x^2+x^3)-x^2\log(x)+e^{e^{5-x}}\left(1+e^{7-2x}x+e^{2-x}(3+x)+(-3-e^{5-x}x)\log(x)\right)}{-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}\left(-e^{2-x}x+x\log(x)\right)}\,dx = 1+\log\left(\frac{\left(\frac{e^{e^{5-x}}}{x}+x\right)\left(e^{2-x}-\log(x)\right)}{x^2}\right)$$

output
```
1+ln((exp(2-x)-ln(x))*(x+exp(exp(5-x))/x)/x^2)
```

3.514.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00

$$\int \frac{x^2+e^{2-x}(x^2+x^3)-x^2\log(x)+e^{e^{5-x}}\left(1+e^{7-2x}x+e^{2-x}(3+x)+(-3-e^{5-x}x)\log(x)\right)}{-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}\left(-e^{2-x}x+x\log(x)\right)}\,dx = -x-3\log(x)+\log\left(e^{e^{5-x}}+x^2\right)+\log\left(e^2-e^x\log(x)\right)$$

input
```
Integrate[(x^2 + E^(2 - x)*(x^2 + x^3) - x^2*Log[x] + E^E^(5 - x)*(1 + E^(
7 - 2*x)*x + E^(2 - x)*(3 + x) + (-3 - E^(5 - x)*x)*Log[x]))/(-(E^(2 - x)*
x^3) + x^3*Log[x] + E^E^(5 - x)*(-(E^(2 - x)*x) + x*Log[x])),x]
```

output
```
-x - 3*Log[x] + Log[E^E^(5 - x) + x^2] + Log[E^2 - E^x*Log[x]]
```

3.514.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+x^2(-\log(x))+e^{2-x}\left(x^3+x^2\right)+e^{e^{5-x}}\left(e^{7-2x}x+e^{2-x}(x+3)+\left(-e^{5-x}x-3\right)\log(x)+1\right)}{-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}\left(x\log(x)-e^{2-x}x\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^x\left(-x^2+x^2\log(x)-e^{2-x}\left(x^3+x^2\right)-e^{e^{5-x}}\left(e^{7-2x}x+e^{2-x}(x+3)+\left(-e^{5-x}x-3\right)\log(x)+1\right)\right)}{x\left(x^2+e^{e^{5-x}}\right)\left(e^2-e^x\log(x)\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{e^{-x+e^{5-x}+5}}{x^2+e^{e^{5-x}}}-\frac{x^3+x^2+e^{e^{5-x}}x+3e^{e^{5-x}}}{x\left(x^2+e^{e^{5-x}}\right)}-\frac{e^x(x\log(x)+1)}{x\left(e^2-e^x\log(x)\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\int \frac{e^{-x+e^{5-x}+5}}{x^2+e^{e^{5-x}}}dx+2\int \frac{x}{x^2+e^{e^{5-x}}}dx-x-3\log(x)+\log\left(e^2-e^x\log(x)\right)$$

input
```
Int[(x^2 + E^(2 - x)*(x^2 + x^3) - x^2*Log[x] + E^E^(5 - x)*(1 + E^(7 - 2*
x)*x + E^(2 - x)*(3 + x) + (-3 - E^(5 - x)*x)*Log[x]))/(-(E^(2 - x)*x^3) +
 x^3*Log[x] + E^E^(5 - x)*(-(E^(2 - x)*x) + x*Log[x])),x]
```

output
```
$Aborted
```

3.514.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.514.4 Maple [A] (verified)

Time = 1.42 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

method	result	size
risch	$-3\ln(x)+\ln\left(-\mathrm{e}^{2-x}+\ln(x)\right)+\ln\left(x^{2}+\mathrm{e}^{\mathrm{e}^{5-x}}\right)$	30
parallelrisch	$-3\ln(x)+\ln\left(-\mathrm{e}^{2-x}+\ln(x)\right)+\ln\left(x^{2}+\mathrm{e}^{\mathrm{e}^{5-x}}\right)$	30

input
```
int((((-x*exp(5-x)-3)*ln(x)+x*exp(2-x)*exp(5-x)+(3+x)*exp(2-x)+1)*exp(exp(
5-x))-x^2*ln(x)+(x^3+x^2)*exp(2-x)+x^2)/((x*ln(x)-x*exp(2-x))*exp(exp(5-x)
)+x^3*ln(x)-x^3*exp(2-x)),x,method=_RETURNVERBOSE)
```

output
```
-3*ln(x)+ln(-exp(2-x)+ln(x))+ln(x^2+exp(exp(5-x)))
```

3.514.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.94

$$\int \frac{x^2+e^{2-x}(x^2+x^3)-x^2\log(x)+e^{e^{5-x}}(1+e^{7-2x}x+e^{2-x}(3+x)+(-3-e^{5-x}x)\log(x))}{-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}\left(-e^{2-x}x+x\log(x)\right)}\,dx$$
$$=\log\left(x^{2}+e^{\left(e^{(-x+5)}\right)}\right)+\log\left(e^{3}\log(x)-e^{(-x+5)}\right)-3\,\log(x)$$

input
```
integrate((((-x*exp(5-x)-3)*log(x)+x*exp(2-x)*exp(5-x)+(3+x)*exp(2-x)+1)*e
xp(exp(5-x))-x^2*log(x)+(x^3+x^2)*exp(2-x)+x^2)/((x*log(x)-x*exp(2-x))*exp
(exp(5-x))+x^3*log(x)-x^3*exp(2-x)),x, algorithm=\
```

output
```
log(x^2 + e^(e^(-x + 5))) + log(e^3*log(x) - e^(-x + 5)) - 3*log(x)
```

3.514.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{x^2+e^{2-x}(x^2+x^3)-x^2\log(x)+e^{e^{5-x}}(1+e^{7-2x}x+e^{2-x}(3+x)+(-3-e^{5-x}x)\log(x))}{-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}\left(-e^{2-x}x+x\log(x)\right)}\,dx$$
$$=-3\log(x)+\log\left(x^2+e^{e^3e^{2-x}}\right)+\log\left(e^{2-x}-\log(x)\right)$$

input
```
integrate((((-x*exp(5-x)-3)*ln(x)+x*exp(2-x)*exp(5-x)+(3+x)*exp(2-x)+1)*ex
p(exp(5-x))-x**2*ln(x)+(x**3+x**2)*exp(2-x)+x**2)/((x*ln(x)-x*exp(2-x))*ex
p(exp(5-x))+x**3*ln(x)-x**3*exp(2-x)),x)
```

output
```
-3*log(x) + log(x**2 + exp(exp(3)*exp(2 - x))) + log(exp(2 - x) - log(x))
```

3.514.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.15

$$\int \frac{x^2+e^{2-x}(x^2+x^3)-x^2\log(x)+e^{e^{5-x}}(1+e^{7-2x}x+e^{2-x}(3+x)+(-3-e^{5-x}x)\log(x))}{-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}\left(-e^{2-x}x+x\log(x)\right)}\,dx$$
$$=-x+\log\left(x^2+e^{\left(e^{(-x+5)}\right)}\right)-3\,\log(x)+\log\left(\frac{e^x\log(x)-e^2}{\log(x)}\right)+\log(\log(x))$$

input
```
integrate((((-x*exp(5-x)-3)*log(x)+x*exp(2-x)*exp(5-x)+(3+x)*exp(2-x)+1)*e
xp(exp(5-x))-x^2*log(x)+(x^3+x^2)*exp(2-x)+x^2)/((x*log(x)-x*exp(2-x))*exp
(exp(5-x))+x^3*log(x)-x^3*exp(2-x)),x, algorithm=\
```

output
```
-x + log(x^2 + e^(e^(-x + 5))) - 3*log(x) + log((e^x*log(x) - e^2)/log(x))
 + log(log(x))
```

3.514.8 Giac [F]

$$\int \frac{x^2+e^{2-x}(x^2+x^3)-x^2\log(x)+e^{e^{5-x}}(1+e^{7-2x}x+e^{2-x}(3+x)+(-3-e^{5-x}x)\log(x))}{-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}\left(-e^{2-x}x+x\log(x)\right)}\,dx$$
$$=\int \frac{x^2\log(x)-x^2-(x^3+x^2)e^{(-x+2)}-\left((x+3)e^{(-x+2)}+xe^{(-2x+7)}-\left(xe^{(-x+5)}+3\right)\log(x)+1\right)e^{\left(e^{(-x+5)}\right)}}{x^3e^{(-x+2)}-x^3\log(x)+(xe^{(-x+2)}-x\log(x))e^{\left(e^{(-x+5)}\right)}}$$

input
```
integrate((((-x*exp(5-x)-3)*log(x)+x*exp(2-x)*exp(5-x)+(3+x)*exp(2-x)+1)*e
xp(exp(5-x))-x^2*log(x)+(x^3+x^2)*exp(2-x)+x^2)/((x*log(x)-x*exp(2-x))*exp
(exp(5-x))+x^3*log(x)-x^3*exp(2-x)),x, algorithm=\
```

output
```
integrate((x^2*log(x) - x^2 - (x^3 + x^2)*e^(-x + 2) - ((x + 3)*e^(-x + 2)
 + x*e^(-2*x + 7) - (x*e^(-x + 5) + 3)*log(x) + 1)*e^(e^(-x + 5)))/(x^3*e^
(-x + 2) - x^3*log(x) + (x*e^(-x + 2) - x*log(x))*e^(e^(-x + 5))), x)
```

3.514.9 Mupad [B] (verification not implemented)

Time = 15.18 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

$$\int \frac{x^2+e^{2-x}(x^2+x^3)-x^2\log(x)+e^{e^{5-x}}(1+e^{7-2x}x+e^{2-x}(3+x)+(-3-e^{5-x}x)\log(x))}{-e^{2-x}x^3+x^3\log(x)+e^{e^{5-x}}\left(-e^{2-x}x+x\log(x)\right)}\,dx$$
$$=\ln\left(\left(\ln(x)-\mathrm{e}^{-x}\,\mathrm{e}^2\right)\,\left(\mathrm{e}^{\mathrm{e}^{-x}\,\mathrm{e}^5}+x^2\right)\right)-3\,\ln(x)$$

input
```
int(-(exp(2 - x)*(x^2 + x^3) - x^2*log(x) + exp(exp(5 - x))*(exp(2 - x)*(x
 + 3) - log(x)*(x*exp(5 - x) + 3) + x*exp(2 - x)*exp(5 - x) + 1) + x^2)/(x
^3*exp(2 - x) - x^3*log(x) + exp(exp(5 - x))*(x*exp(2 - x) - x*log(x))),x)
```

output
```
log((log(x) - exp(-x)*exp(2))*(exp(exp(-x)*exp(5)) + x^2)) - 3*log(x)
```

3.515 $\int \frac{3x^2+3x^3-x^4+e^{e^5}(-3-3x-6x^3-6x^4+2x^5)+e^{2e^5}(6x+3x^2+3x^4+3x^5}{-4x^2-x^3+x^4+e^{e^5}(3x+8x^3+2x^4-2x^5)+e^{2e^5}(-3x^2-4x^4-x^5+x^6}$

3.515.1 Optimal result

Integrand size = 143, antiderivative size = 32

$$\int \frac{3x^2+3x^3-x^4+e^{e^5}(-3-3x-6x^3-6x^4+2x^5)+e^{2e^5}(6x+3x^2+3x^4+3x^5-x^6)}{-4x^2-x^3+x^4+e^{e^5}(3x+8x^3+2x^4-2x^5)+e^{2e^5}(-3x^2-4x^4-x^5+x^6)}\,dx = -x+\log\left(4+x-x^2-\frac{3}{e^{-e^5}x-x^2}\right)$$

output
```
ln(4+x-3/(x/exp(exp(5))-x^2)-x^2)-x
```

3.515.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 70 vs. 2(32) = 64.

Time = 0.09 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.19

$$\int \frac{3x^2+3x^3-x^4+e^{e^5}(-3-3x-6x^3-6x^4+2x^5)+e^{2e^5}(6x+3x^2+3x^4+3x^5-x^6)}{-4x^2-x^3+x^4+e^{e^5}(3x+8x^3+2x^4-2x^5)+e^{2e^5}(-3x^2-4x^4-x^5+x^6)}\,dx = -x-\log(x)-\log\left(1-e^{e^5}x\right)+\log\left(-3e^{e^5}+4x+x^2-4e^{e^5}x^2-x^3-e^{e^5}x^3+e^{e^5}x^4\right)$$

input
```
Integrate[(3*x^2 + 3*x^3 - x^4 + E^E^5*(-3 - 3*x - 6*x^3 - 6*x^4 + 2*x^5)
+ E^(2*E^5)*(6*x + 3*x^2 + 3*x^4 + 3*x^5 - x^6))/(-4*x^2 - x^3 + x^4 + E^E
^5*(3*x + 8*x^3 + 2*x^4 - 2*x^5) + E^(2*E^5)*(-3*x^2 - 4*x^4 - x^5 + x^6))
,x]
```

output
```
-x - Log[x] - Log[1 - E^E^5*x] + Log[-3*E^E^5 + 4*x + x^2 - 4*E^E^5*x^2 -
x^3 - E^E^5*x^3 + E^E^5*x^4]
```

3.515.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 68 vs. $2(32) = 64$.

Time = 0.75 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.12, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.021$, Rules used = {2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^4+3x^3+3x^2+e^{e^5}(2x^5-6x^4-6x^3-3x-3)+e^{2e^5}(-x^6+3x^5+3x^4+3x^2+6x)}{x^4-x^3-4x^2+e^{e^5}(-2x^5+2x^4+8x^3+3x)+e^{2e^5}(x^6-x^5-4x^4-3x^2)}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{-x^4+3x^3+3x^2+e^{e^5}(2x^5-6x^4-6x^3-3x-3)+e^{2e^5}(-x^6+3x^5+3x^4+3x^2+6x)}{x\left(e^{2e^5}x^5-e^{e^5}\left(2+e^{e^5}\right)x^4+\left(1+2e^{e^5}-4e^{2e^5}\right)x^3-\left(1-8e^{e^5}\right)x^2-\left(4+3e^{2e^5}\right)x+3e^{e^5}\right)}dx$$

$$\Big\downarrow \text{ 2462}$$

$$\int \left(\frac{-4e^{e^5}x^3+3\left(1+e^{e^5}\right)x^2-2\left(1-4e^{e^5}\right)x-4}{-e^{e^5}x^4+\left(1+e^{e^5}\right)x^3-\left(1-4e^{e^5}\right)x^2-4x+3e^{e^5}}-\frac{1}{x}-\frac{e^{e^5}}{e^{e^5}x-1}-1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\log\left(-e^{e^5}x^4+\left(1+e^{e^5}\right)x^3-\left(1-4e^{e^5}\right)x^2-4x+3e^{e^5}\right)-x-\log(x)-\log\left(1-e^{e^5}x\right)$$

input
```
Int[(3*x^2 + 3*x^3 - x^4 + E^E^5*(-3 - 3*x - 6*x^3 - 6*x^4 + 2*x^5) + E^(2
*E^5)*(6*x + 3*x^2 + 3*x^4 + 3*x^5 - x^6))/(-4*x^2 - x^3 + x^4 + E^E^5*(3*
x + 8*x^3 + 2*x^4 - 2*x^5) + E^(2*E^5)*(-3*x^2 - 4*x^4 - x^5 + x^6)),x]
```

output
```
-x - Log[x] - Log[1 - E^E^5*x] + Log[3*E^E^5 - 4*x - (1 - 4*E^E^5)*x^2 + (
1 + E^E^5)*x^3 - E^E^5*x^4]
```

3.515. $\int \frac{3x^2+3x^3-x^4+e^{e^5}(-3-3x-6x^3-6x^4+2x^5)+e^{2e^5}(6x+3x^2+3x^4+3x^5-x^6)}{-4x^2-x^3+x^4+e^{e^5}(3x+8x^3+2x^4-2x^5)+e^{2e^5}(-3x^2-4x^4-x^5+x^6)}dx$

3.515.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.515.4 Maple [A] (verified)

Time = 0.92 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.75

method	result
risch	$-x-\ln\left(-x^{2}\mathrm{e}^{\mathrm{e}^{5}}+x\right)+\ln\left(-\mathrm{e}^{\mathrm{e}^{5}}x^{4}+\left(\mathrm{e}^{\mathrm{e}^{5}}+1\right)x^{3}+\left(4\,\mathrm{e}^{\mathrm{e}^{5}}-1\right)x^{2}-4x+3\,\mathrm{e}^{\mathrm{e}^{5}}\right)$
norman	$-x-\ln\left(x\right)-\ln\left(x\,\mathrm{e}^{\mathrm{e}^{5}}-1\right)+\ln\left(\mathrm{e}^{\mathrm{e}^{5}}x^{4}-\mathrm{e}^{\mathrm{e}^{5}}x^{3}-4x^{2}\mathrm{e}^{\mathrm{e}^{5}}-x^{3}+x^{2}-3\,\mathrm{e}^{\mathrm{e}^{5}}+4x\right)$
parallelrisch	$-x-\ln\left(x\right)-\ln\left(\left(x\,\mathrm{e}^{\mathrm{e}^{5}}-1\right)\mathrm{e}^{-\mathrm{e}^{5}}\right)+\ln\left(\left(\mathrm{e}^{\mathrm{e}^{5}}x^{4}-\mathrm{e}^{\mathrm{e}^{5}}x^{3}-4x^{2}\mathrm{e}^{\mathrm{e}^{5}}-x^{3}+x^{2}-3\,\mathrm{e}^{\mathrm{e}^{5}}+4x\right)\right.$
default	$-x-\ln\left(x\right)+\left(\sum_{\_R=\operatorname{RootOf}\left(\mathrm{e}^{2\,\mathrm{e}^{5}}\_Z^{5}+\left(-\mathrm{e}^{2\,\mathrm{e}^{5}}-2\,\mathrm{e}^{\mathrm{e}^{5}}\right)\_Z^{4}+\left(-4\,\mathrm{e}^{2\,\mathrm{e}^{5}}+2\,\mathrm{e}^{\mathrm{e}^{5}}+1\right)\_Z^{3}+\left(8\,\mathrm{e}^{\mathrm{e}^{5}}-1\right)\_Z^{2}+\left(-3\,\mathrm{e}^{2\,\mathrm{e}^{5}}-\right.\right.}\right.$

input
```
int(((-x^6+3*x^5+3*x^4+3*x^2+6*x)*exp(exp(5))^2+(2*x^5-6*x^4-6*x^3-3*x-3)*
exp(exp(5))-x^4+3*x^3+3*x^2)/((x^6-x^5-4*x^4-3*x^2)*exp(exp(5))^2+(-2*x^5+
2*x^4+8*x^3+3*x)*exp(exp(5))+x^4-x^3-4*x^2),x,method=_RETURNVERBOSE)
```

output
```
-x-ln(-x^2*exp(exp(5))+x)+ln(-exp(exp(5))*x^4+(exp(exp(5))+1)*x^3+(4*exp(e
xp(5))-1)*x^2-4*x+3*exp(exp(5)))
```

3.515.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.56

$$\int \frac{3x^2+3x^3-x^4+e^{e^5}(-3-3x-6x^3-6x^4+2x^5)+e^{2e^5}(6x+3x^2+3x^4+3x^5-x^6)}{-4x^2-x^3+x^4+e^{e^5}(3x+8x^3+2x^4-2x^5)+e^{2e^5}(-3x^2-4x^4-x^5+x^6)}\,dx$$
$$= -x+\log\left(-x^3+x^2+\left(x^4-x^3-4\,x^2-3\right)e^{\left(e^5\right)}+4\,x\right)-\log\left(x^2e^{\left(e^5\right)}-x\right)$$

input
```
integrate(((-x^6+3*x^5+3*x^4+3*x^2+6*x)*exp(exp(5))^2+(2*x^5-6*x^4-6*x^3-3
*x-3)*exp(exp(5))-x^4+3*x^3+3*x^2)/((x^6-x^5-4*x^4-3*x^2)*exp(exp(5))^2+(-
2*x^5+2*x^4+8*x^3+3*x)*exp(exp(5))+x^4-x^3-4*x^2),x, algorithm=\
```

output
```
-x + log(-x^3 + x^2 + (x^4 - x^3 - 4*x^2 - 3)*e^(e^5) + 4*x) - log(x^2*e^(
e^5) - x)
```

3.515.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(20) = 40.

Time = 4.51 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.91

$$\int \frac{3x^2+3x^3-x^4+e^{e^5}(-3-3x-6x^3-6x^4+2x^5)+e^{2e^5}(6x+3x^2+3x^4+3x^5-x^6)}{-4x^2-x^3+x^4+e^{e^5}(3x+8x^3+2x^4-2x^5)+e^{2e^5}(-3x^2-4x^4-x^5+x^6)}\,dx$$
$$= -x-\log\left(x^2-\frac{x}{e^{e^5}}\right)+\log\left(x^4+\frac{x^3\left(-e^{e^5}-1\right)}{e^{e^5}}+\frac{x^2\cdot\left(1-4e^{e^5}\right)}{e^{e^5}}+\frac{4x}{e^{e^5}}-3\right)$$

input
```
integrate(((-x**6+3*x**5+3*x**4+3*x**2+6*x)*exp(exp(5))**2+(2*x**5-6*x**4-
6*x**3-3*x-3)*exp(exp(5))-x**4+3*x**3+3*x**2)/((x**6-x**5-4*x**4-3*x**2)*e
xp(exp(5))**2+(-2*x**5+2*x**4+8*x**3+3*x)*exp(exp(5))+x**4-x**3-4*x**2),x)
```

output
```
-x - log(x**2 - x*exp(-exp(5))) + log(x**4 + x**3*(-exp(exp(5)) - 1)*exp(-
exp(5)) + x**2*(1 - 4*exp(exp(5)))*exp(-exp(5)) + 4*x*exp(-exp(5)) - 3)
```

3.515.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.78

$$\int \frac{3x^2+3x^3-x^4+e^{e^5}(-3-3x-6x^3-6x^4+2x^5)+e^{2e^5}(6x+3x^2+3x^4+3x^5-x^6)}{-4x^2-x^3+x^4+e^{e^5}(3x+8x^3+2x^4-2x^5)+e^{2e^5}(-3x^2-4x^4-x^5+x^6)}\,dx$$
$$= -x+\log\left(x^4e^{\left(e^5\right)}-x^3\left(e^{\left(e^5\right)}+1\right)-x^2\left(4\,e^{\left(e^5\right)}-1\right)+4\,x-3\,e^{\left(e^5\right)}\right) - \log\left(xe^{\left(e^5\right)}-1\right)-\log\left(x\right)$$

input
```
integrate(((-x^6+3*x^5+3*x^4+3*x^2+6*x)*exp(exp(5))^2+(2*x^5-6*x^4-6*x^3-3
*x-3)*exp(exp(5))-x^4+3*x^3+3*x^2)/((x^6-x^5-4*x^4-3*x^2)*exp(exp(5))^2+(-
2*x^5+2*x^4+8*x^3+3*x)*exp(exp(5))+x^4-x^3-4*x^2),x, algorithm=\
```

output
```
-x + log(x^4*e^(e^5) - x^3*(e^(e^5) + 1) - x^2*(4*e^(e^5) - 1) + 4*x - 3*e
^(e^5)) - log(x*e^(e^5) - 1) - log(x)
```

3.515.8 Giac [F(-2)]

Exception generated.

$$\int \frac{3x^2+3x^3-x^4+e^{e^5}(-3-3x-6x^3-6x^4+2x^5)+e^{2e^5}(6x+3x^2+3x^4+3x^5-x^6)}{-4x^2-x^3+x^4+e^{e^5}(3x+8x^3+2x^4-2x^5)+e^{2e^5}(-3x^2-4x^4-x^5+x^6)}\,dx$$
$$= \text{Exception raised: TypeError}$$

input
```
integrate(((-x^6+3*x^5+3*x^4+3*x^2+6*x)*exp(exp(5))^2+(2*x^5-6*x^4-6*x^3-3
*x-3)*exp(exp(5))-x^4+3*x^3+3*x^2)/((x^6-x^5-4*x^4-3*x^2)*exp(exp(5))^2+(-
2*x^5+2*x^4+8*x^3+3*x)*exp(exp(5))+x^4-x^3-4*x^2),x, algorithm=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:Francis algorithm failure for[undef
,0.0,undef,undef,undef,undef]proot error [undef,0.0,undef,undef,undef,unde
f]proot e
```

3.515.9 Mupad [B] (verification not implemented)

Time = 15.55 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.94

$$\int \frac{3x^2+3x^3-x^4+e^{e^5}(-3-3x-6x^3-6x^4+2x^5)+e^{2e^5}(6x+3x^2+3x^4+3x^5-x^6)}{-4x^2-x^3+x^4+e^{e^5}(3x+8x^3+2x^4-2x^5)+e^{2e^5}(-3x^2-4x^4-x^5+x^6)}\,dx$$
$$=\ln\left(4\,x\,\mathrm{e}^{-\mathrm{e}^5}+x^2\,\mathrm{e}^{-\mathrm{e}^5}-x^3\,\mathrm{e}^{-\mathrm{e}^5}-4\,x^2-x^3+x^4-3\right)-\ln\left(x^2-x\,\mathrm{e}^{-\mathrm{e}^5}\right)-x$$

input
```
int(-(exp(2*exp(5))*(6*x + 3*x^2 + 3*x^4 + 3*x^5 - x^6) - exp(exp(5))*(3*x
 + 6*x^3 + 6*x^4 - 2*x^5 + 3) + 3*x^2 + 3*x^3 - x^4)/(exp(2*exp(5))*(3*x^2
 + 4*x^4 + x^5 - x^6) - exp(exp(5))*(3*x + 8*x^3 + 2*x^4 - 2*x^5) + 4*x^2
+ x^3 - x^4),x)
```

output
```
log(4*x*exp(-exp(5)) + x^2*exp(-exp(5)) - x^3*exp(-exp(5)) - 4*x^2 - x^3 +
 x^4 - 3) - log(x^2 - x*exp(-exp(5))) - x
```

3.516 $\int \frac{1}{4}e^{-13-6e^{\frac{3x}{e^3}}}\left(-e^3+e^{\frac{3x}{e^3}}(-18+18x)\right)\,dx$

3.516.1 Optimal result

Integrand size = 38, antiderivative size = 23

$$\int \frac{1}{4}e^{-13-6e^{\frac{3x}{e^3}}}\left(-e^3+e^{\frac{3x}{e^3}}(-18+18x)\right)\,dx=\frac{1}{4}e^{-10-6e^{\frac{3x}{e^3}}}(1-x)$$

output
```
1/4*(1-x)/exp(3*exp(3*x/exp(3))+5)^2
```

3.516.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{1}{4}e^{-13-6e^{\frac{3x}{e^3}}}\left(-e^3+e^{\frac{3x}{e^3}}(-18+18x)\right)\,dx=-\frac{1}{4}e^{-10-6e^{\frac{3x}{e^3}}}(-1+x)$$

input
```
Integrate[(E^(-13 - 6*E^((3*x)/E^3))*(-E^3 + E^((3*x)/E^3)*(-18 + 18*x)))/
4,x]
```

output
```
-1/4*(E^(-10 - 6*E^((3*x)/E^3))*(-1 + x))
```

3.516.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.079, Rules used = {27, 25, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}e^{-6e^{\frac{3x}{e^3}}-13}\left(e^{\frac{3x}{e^3}}(18x-18)-e^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int -e^{-13-6e^{\frac{3x}{e^3}}}\left(18e^{\frac{3x}{e^3}}(1-x)+e^3\right)dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{4}\int e^{-13-6e^{\frac{3x}{e^3}}}\left(18e^{\frac{3x}{e^3}}(1-x)+e^3\right)dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{1}{4}e^{-6e^{\frac{3x}{e^3}}-10}(1-x)$$

input
```
Int[(E^(-13 - 6*E^((3*x)/E^3))*(-E^3 + E^((3*x)/E^3)*(-18 + 18*x)))/4,x]
```

output
```
(E^(-10 - 6*E^((3*x)/E^3))*(1 - x))/4
```

3.516.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.516.4 Maple [A] (verified)

Time = 1.00 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

method	result	size
risch	$-\frac{(-1+x)\mathrm{e}^{-6\,\mathrm{e}^{3\,\mathrm{e}^{-3}x}-10}}{4}$	17
norman	$\left(\frac{1}{4}-\frac{x}{4}\right)\mathrm{e}^{-6\,\mathrm{e}^{3\,\mathrm{e}^{-3}x}-10}$	22
parallelrisch	$-\frac{\mathrm{e}^{-3}\left(x\,\mathrm{e}^{3}-\mathrm{e}^{3}\right)\mathrm{e}^{-6\,\mathrm{e}^{3\,\mathrm{e}^{-3}x}-10}}{4}$	31

input
```
int(1/4*((18*x-18)*exp(3*x/exp(3))-exp(3))/exp(3)/exp(3*exp(3*x/exp(3))+5)
^2,x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-1+x)*exp(-6*exp(3*exp(-3)*x)-10)
```

3.516.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

$$\int \frac{1}{4}e^{-13-6e^{\frac{3x}{e^3}}}\left(-e^3+e^{\frac{3x}{e^3}}(-18+18x)\right)\,dx=-\frac{1}{4}\,(x-1)e^{\left(-6\,e^{\left(3\,xe^{(-3)}\right)}-10\right)}$$

input
```
integrate(1/4*((18*x-18)*exp(3*x/exp(3))-exp(3))/exp(3)/exp(3*exp(3*x/exp(
3))+5)^2,x, algorithm=\
```

output
```
-1/4*(x - 1)*e^(-6*e^(3*x*e^(-3)) - 10)
```

3.516.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{1}{4}e^{-13-6e^{\frac{3x}{e^3}}}\left(-e^3+e^{\frac{3x}{e^3}}(-18+18x)\right)\,dx=\frac{(1-x)\,e^{-6e^{\frac{3x}{e^3}}-10}}{4}$$

input
```
integrate(1/4*((18*x-18)*exp(3*x/exp(3))-exp(3))/exp(3)/exp(3*exp(3*x/exp(
3))+5)**2,x)
```

output
```
(1 - x)*exp(-6*exp(3*x*exp(-3)) - 10)/4
```

3.516.7 Maxima [F]

$$\int \frac{1}{4} e^{-13-6e^{\frac{3x}{e^3}}} \left(-e^3 + e^{\frac{3x}{e^3}}(-18+18x)\right) dx = \int \frac{1}{4} \left(18(x-1)e^{\left(3xe^{(-3)}\right)} - e^3\right) e^{\left(-6e^{\left(3xe^{(-3)}\right)}-13\right)} dx$$

input
```
integrate(1/4*((18*x-18)*exp(3*x/exp(3))-exp(3))/exp(3)/exp(3*exp(3*x/exp(
3))+5)^2,x, algorithm=\
```

output
```
-1/12*Ei(-6*e^(3*x*e^(-3)))*e^(-7) - 1/4*x*e^(-6*e^(3*x*e^(-3)) - 10) + 1/
4*e^(-6*e^(3*x*e^(-3)) - 10) + 1/4*integrate(e^(-6*e^(3*x*e^(-3)) - 10), x
)
```

3.516.8 Giac [F]

$$\int \frac{1}{4} e^{-13-6e^{\frac{3x}{e^3}}} \left(-e^3 + e^{\frac{3x}{e^3}}(-18+18x)\right) dx = \int \frac{1}{4} \left(18(x-1)e^{\left(3xe^{(-3)}\right)} - e^3\right) e^{\left(-6e^{\left(3xe^{(-3)}\right)}-13\right)} dx$$

input
```
integrate(1/4*((18*x-18)*exp(3*x/exp(3))-exp(3))/exp(3)/exp(3*exp(3*x/exp(
3))+5)^2,x, algorithm=\
```

output
```
integrate(1/4*(18*(x - 1)*e^(3*x*e^(-3)) - e^3)*e^(-6*e^(3*x*e^(-3)) - 13)
, x)
```

3.516.9 Mupad [B] (verification not implemented)

Time = 13.87 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

$$\int \frac{1}{4}e^{-13-6e^{\frac{3x}{e^3}}}\left(-e^3+e^{\frac{3x}{e^3}}(-18+18x)\right)\,dx=-\frac{e^{-10}\,e^{-6\,e^{3\,x\,e^{-3}}}\,(x-1)}{4}$$

input
```
int(-exp(-3)*exp(- 6*exp(3*x*exp(-3)) - 10)*(exp(3)/4 - (exp(3*x*exp(-3))*
(18*x - 18))/4),x)
```

output
```
-(exp(-10)*exp(-6*exp(3*x*exp(-3)))*(x - 1))/4
```

3.517 $\int \frac{e^{-e^{14}+e^x}(-1+e^x x)}{3e^{-e^{14}+e^x}x+3x^2}\,dx$

3.517.1 Optimal result

Integrand size = 41, antiderivative size = 26

$$\int \frac{e^{-e^{14}+e^x}(-1+e^x x)}{3e^{-e^{14}+e^x}x+3x^2}\,dx = \frac{1}{3}\log\left(\frac{-e^{-e^{14}+e^x}-x}{x}\right)$$

output
```
1/3*ln((-x-exp(exp(x)-exp(14)))/x)
```

3.517.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{e^{-e^{14}+e^x}(-1+e^x x)}{3e^{-e^{14}+e^x}x+3x^2}\,dx = \frac{1}{3}\left(-\log(x)+\log\left(e^{e^x}+e^{e^{14}}x\right)\right)$$

input
```
Integrate[(E^(-E^14 + E^x)*(-1 + E^x*x))/(3*E^(-E^14 + E^x)*x + 3*x^2),x]
```

output
```
(-Log[x] + Log[E^E^x + E^E^14*x])/3
```

3.517.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^x-e^{14}}(e^x x-1)}{3x^2+3e^{e^x-e^{14}}x}\,dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{e^{x+e^x}}{3\left(e^{e^{14}}x+e^{e^x}\right)}-\frac{e^{e^x}}{3x\left(e^{e^{14}}x+e^{e^x}\right)}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{3}\int \frac{e^{x+e^x}}{e^{e^{14}}x+e^{e^x}}dx-\frac{1}{3}\int \frac{e^{e^x}}{x\left(e^{e^{14}}x+e^{e^x}\right)}dx$$

input
```
Int[(E^(-E^14 + E^x)*(-1 + E^x*x))/(3*E^(-E^14 + E^x)*x + 3*x^2),x]
```

output
```
$Aborted
```

3.517.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.517.4 Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.73

method	result	size
norman	$-\frac{\ln(x)}{3}+\frac{\ln\left(e^{e^x-e^{14}}+x\right)}{3}$	19
parallelrisch	$-\frac{\ln(x)}{3}+\frac{\ln\left(e^{e^x-e^{14}}+x\right)}{3}$	19
risch	$-\frac{\ln(x)}{3}+\frac{e^{14}}{3}+\frac{\ln\left(e^{e^x-e^{14}}+x\right)}{3}$	23

input
```
int((exp(x)*x-1)*exp(exp(x)-exp(14))/(3*x*exp(exp(x)-exp(14))+3*x^2),x,met
hod=_RETURNVERBOSE)
```

output
```
-1/3*ln(x)+1/3*ln(exp(exp(x)-exp(14))+x)
```

3.517.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.69

$$\int \frac{e^{-e^{14}+e^x}(-1+e^x x)}{3e^{-e^{14}+e^x}x+3x^2}\,dx = \frac{1}{3}\log\left(x+e^{(-e^{14}+e^x)}\right)-\frac{1}{3}\log(x)$$

input
```
integrate((exp(x)*x-1)*exp(exp(x)-exp(14))/(3*x*exp(exp(x)-exp(14))+3*x^2)
,x, algorithm=\
```

output
```
1/3*log(x + e^(-e^14 + e^x)) - 1/3*log(x)
```

3.517.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

$$\int \frac{e^{-e^{14}+e^x}(-1+e^x x)}{3e^{-e^{14}+e^x}x+3x^2}\,dx = -\frac{\log(x)}{3}+\frac{\log\left(x+e^{e^x-e^{14}}\right)}{3}$$

input
```
integrate((exp(x)*x-1)*exp(exp(x)-exp(14))/(3*x*exp(exp(x)-exp(14))+3*x**2
),x)
```

output
```
-log(x)/3 + log(x + exp(exp(x) - exp(14)))/3
```

3.517.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

$$\int \frac{e^{-e^{14}+e^x}(-1+e^x x)}{3e^{-e^{14}+e^x}x+3x^2}\,dx = \frac{1}{3}\log\left(xe^{\left(e^{14}\right)}+e^{\left(e^x\right)}\right)-\frac{1}{3}\log\left(x\right)$$

input
```
integrate((exp(x)*x-1)*exp(exp(x)-exp(14))/(3*x*exp(exp(x)-exp(14))+3*x^2)
,x, algorithm=\
```

output
```
1/3*log(x*e^(e^14) + e^(e^x)) - 1/3*log(x)
```

3.517.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{e^{-e^{14}+e^x}(-1+e^x x)}{3e^{-e^{14}+e^x}x+3x^2}\,dx = -\frac{1}{3}x+\frac{1}{3}\log\left(xe^x+e^{\left(x-e^{14}+e^x\right)}\right)-\frac{1}{3}\log\left(x\right)$$

input
```
integrate((exp(x)*x-1)*exp(exp(x)-exp(14))/(3*x*exp(exp(x)-exp(14))+3*x^2)
,x, algorithm=\
```

output
```
-1/3*x + 1/3*log(x*e^x + e^(x - e^14 + e^x)) - 1/3*log(x)
```

3.517.9 Mupad [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.73

$$\int \frac{e^{-e^{14}+e^x}(-1+e^x x)}{3e^{-e^{14}+e^x}x+3x^2}\,dx = \frac{\ln\left(x+\mathrm{e}^{-e^{14}}\,\mathrm{e}^{e^x}\right)}{3}-\frac{\ln\left(x\right)}{3}$$

input
```
int((exp(exp(x) - exp(14))*(x*exp(x) - 1))/(3*x*exp(exp(x) - exp(14)) + 3*
x^2),x)
```

output
```
log(x + exp(-exp(14))*exp(exp(x)))/3 - log(x)/3
```

3.518 $\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+(18-60x^2+39}{}$

3.518.1 Optimal result

Integrand size = 355, antiderivative size = 30

$$\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+(18-60x^2+390x^3-29400x^4-44100x^5}{}$$

$$=\left(2x+x^2+\frac{3}{5x\left(-7+\log^2(5)-\log(4x)\right)}\right)^2$$

output
```
(2*x+3/5/(ln(5)^2-7-ln(4*x))/x+x^2)^2
```

3.518.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 62 vs. 2(30) = 60.

Time = 0.13 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.07

$$\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+(18-60x^2+390x^3-29400x^4-44100x^5}{}$$

$$=\frac{2}{25}\left(50x^2+50x^3+\frac{25x^4}{2}+\frac{9}{2x^2\left(7-\log^2(5)+\log(4x)\right)^2}-\frac{15(2+x)}{7-\log^2(5)+\log(4x)}\right)$$

3.518. $\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+(18-60x^2+390x^3-29400x^4-44100x^5-14700x^6)\log^2(5)+(-30x^3+4200x^4+6300x^5+21}{}$

input
```
Integrate[(-144 + 420*x^2 - 1260*x^3 + 68600*x^4 + 102900*x^5 + 34300*x^6
+ (18 - 60*x^2 + 390*x^3 - 29400*x^4 - 44100*x^5 - 14700*x^6)*Log[5]^2 + (
-30*x^3 + 4200*x^4 + 6300*x^5 + 2100*x^6)*Log[5]^4 + (-200*x^4 - 300*x^5 -
 100*x^6)*Log[5]^6 + (-18 + 60*x^2 - 390*x^3 + 29400*x^4 + 44100*x^5 + 147
00*x^6 + (60*x^3 - 8400*x^4 - 12600*x^5 - 4200*x^6)*Log[5]^2 + (600*x^4 +
900*x^5 + 300*x^6)*Log[5]^4)*Log[4*x] + (-30*x^3 + 4200*x^4 + 6300*x^5 + 2
100*x^6 + (-600*x^4 - 900*x^5 - 300*x^6)*Log[5]^2)*Log[4*x]^2 + (200*x^4 +
 300*x^5 + 100*x^6)*Log[4*x]^3)/(8575*x^3 - 3675*x^3*Log[5]^2 + 525*x^3*Lo
g[5]^4 - 25*x^3*Log[5]^6 + (3675*x^3 - 1050*x^3*Log[5]^2 + 75*x^3*Log[5]^4
)*Log[4*x] + (525*x^3 - 75*x^3*Log[5]^2)*Log[4*x]^2 + 25*x^3*Log[4*x]^3),x
]
```

output
```
(2*(50*x^2 + 50*x^3 + (25*x^4)/2 + 9/(2*x^2*(7 - Log[5]^2 + Log[4*x])^2) -
 (15*(2 + x))/(7 - Log[5]^2 + Log[4*x])))/25
```

3.518.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{34300x^6+102900x^5+68600x^4-1260x^3+420x^2+\left(-100x^6-300x^5-200x^4\right)\log^6(5)+\left(100x^6+300x^5+2\right.}{}$$

$$\Big\downarrow 6$$

$$\int \frac{34300x^6+102900x^5+68600x^4-1260x^3+420x^2+\left(-100x^6-300x^5-200x^4\right)\log^6(5)+\left(100x^6+300x^5+2\right.}{}$$

$$\Big\downarrow 6$$

$$\int \frac{34300x^6+102900x^5+68600x^4-1260x^3+420x^2+\left(-100x^6-300x^5-200x^4\right)\log^6(5)+\left(100x^6+300x^5+2\right.}{}$$

$$\Big\downarrow 6$$

$$\int \frac{34300x^6+102900x^5+68600x^4-1260x^3+420x^2+\left(-100x^6-300x^5-200x^4\right)\log^6(5)+\left(100x^6+300x^5+2\right.}{}$$

$$\Big\downarrow 7292$$

$$\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+\left(18-60x^2+390x^3-29400x^4-44100x^5-14700x^6\right)\log^2(5)+\left(-30x^3+4200x^4+6300x^5+21\right.}{}$$

$$\int \frac{34300x^6+102900x^5+68600x^4-1260x^3+420x^2+\left(-100x^6-300x^5-200x^4\right)\log^6(5)+\left(100x^6+300x^5+2\right.}{}$$

$$\Big\downarrow 27$$

$$\frac{1}{25}\int -\frac{2\left(-17150x^6-51450x^5-34300x^4+630x^3-210x^2-50\left(x^6+3x^5+2x^4\right)\log^3(4x)+15\left(-70x^6-210x^5\right.}{}$$

$$\Big\downarrow 27$$

$$-\frac{2}{25}\int \frac{-17150x^6-51450x^5-34300x^4+630x^3-210x^2-50\left(x^6+3x^5+2x^4\right)\log^3(4x)+15\left(-70x^6-210x^5-\right.}{}$$

$$\Big\downarrow 7292$$

$$-\frac{2}{25}\int \frac{-17150x^6-51450x^5-34300x^4+630x^3-210x^2-50\left(x^6+3x^5+2x^4\right)\log^3(4x)+15\left(-70x^6-210x^5-\right.}{}$$

$$\Big\downarrow 7293$$

$$-\frac{2}{25}\int \left(-50x\left(x^2+3x+2\right)+\frac{15}{\log(4x)+7\left(1-\frac{\log^2(5)}{7}\right)}+\frac{3\left(-5x^3-10x^2+3\right)}{x^3\left(\log(4x)+7\left(1-\frac{\log^2(5)}{7}\right)\right)^2}+\frac{9}{x^3\left(\log(4x)+7\left(1\right.\right.}\right.$$

$$\Big\downarrow 2009$$

$$-\frac{2}{25}\left(3\int \frac{-5x^3-10x^2+3}{x^3\left(\log(4x)+7\left(1-\frac{\log^2(5)}{7}\right)\right)^2}dx+288e^{14-2\log^2(5)}\,\text{ExpIntegralEi}\left(-2\left(\log(4x)-\log^2(5)+7\right)\right)+\frac{15}{4}e\right.$$

3.518.

$$\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+\left(18-60x^2+390x^3-29400x^4-44100x^5-14700x^6\right)\log^2(5)+\left(-30x^3+4200x^4+6300x^5+21\right.}{}$$

input
```
Int[(-144 + 420*x^2 - 1260*x^3 + 68600*x^4 + 102900*x^5 + 34300*x^6 + (18
- 60*x^2 + 390*x^3 - 29400*x^4 - 44100*x^5 - 14700*x^6)*Log[5]^2 + (-30*x^
3 + 4200*x^4 + 6300*x^5 + 2100*x^6)*Log[5]^4 + (-200*x^4 - 300*x^5 - 100*x
^6)*Log[5]^6 + (-18 + 60*x^2 - 390*x^3 + 29400*x^4 + 44100*x^5 + 14700*x^6
 + (60*x^3 - 8400*x^4 - 12600*x^5 - 4200*x^6)*Log[5]^2 + (600*x^4 + 900*x^
5 + 300*x^6)*Log[5]^4)*Log[4*x] + (-30*x^3 + 4200*x^4 + 6300*x^5 + 2100*x^
6 + (-600*x^4 - 900*x^5 - 300*x^6)*Log[5]^2)*Log[4*x]^2 + (200*x^4 + 300*x
^5 + 100*x^6)*Log[4*x]^3)/(8575*x^3 - 3675*x^3*Log[5]^2 + 525*x^3*Log[5]^4
 - 25*x^3*Log[5]^6 + (3675*x^3 - 1050*x^3*Log[5]^2 + 75*x^3*Log[5]^4)*Log[
4*x] + (525*x^3 - 75*x^3*Log[5]^2)*Log[4*x]^2 + 25*x^3*Log[4*x]^3),x]
```

output
```
$Aborted
```

3.518.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.518.

$\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+\left(18-60x^2+390x^3-29400x^4-44100x^5-14700x^6\right)\log^2(5)+\left(-30x^3+4200x^4+6300x^5+21\right.}{}$

3.518.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. 2(28) = 56.

Time = 3.32 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.73

method	result
risch	$x^4+4x^3+4x^2+\frac{\frac{6x^3\ln(5)^2}{5}+\frac{12x^2\ln(5)^2}{5}-\frac{6x^3\ln(4x)}{5}-\frac{42x^3}{5}-\frac{12x^2\ln(4x)}{5}-\frac{84x^2}{5}+\frac{9}{25}}{x^2\left(\ln(5)^2-7-\ln(4x)\right)^2}$
parallelrisch	$-\frac{-9+60x^2\ln(4x)+30x^3\ln(4x)+1400x^5\ln(5)^2-100x^4\ln(5)^4-30x^3\ln(5)^2-100x^4\ln(4x)^2-1400x^4\ln(4x)-60x^2\ln(5)}{}$
derivativedivides	$-\frac{18\ln(5)^4}{25x^2\left(\ln(5)^4-2\ln(5)^2\ln(4x)-14\ln(5)^2+\ln(4x)^2+14\ln(4x)+49\right)}+\frac{117\ln(5)^2}{25x^2\left(\ln(5)^4-2\ln(5)^2\ln(4x)-14\ln(5)^2+\ln(4x\right.}$
default	$-\frac{18\ln(5)^4}{25x^2\left(\ln(5)^4-2\ln(5)^2\ln(4x)-14\ln(5)^2+\ln(4x)^2+14\ln(4x)+49\right)}+\frac{117\ln(5)^2}{25x^2\left(\ln(5)^4-2\ln(5)^2\ln(4x)-14\ln(5)^2+\ln(4x\right.}$

input
```
int(((100*x^6+300*x^5+200*x^4)*ln(4*x)^3+((-300*x^6-900*x^5-600*x^4)*ln(5)
^2+2100*x^6+6300*x^5+4200*x^4-30*x^3)*ln(4*x)^2+((300*x^6+900*x^5+600*x^4)
*ln(5)^4+(-4200*x^6-12600*x^5-8400*x^4+60*x^3)*ln(5)^2+14700*x^6+44100*x^5
+29400*x^4-390*x^3+60*x^2-18)*ln(4*x)+(-100*x^6-300*x^5-200*x^4)*ln(5)^6+(
2100*x^6+6300*x^5+4200*x^4-30*x^3)*ln(5)^4+(-14700*x^6-44100*x^5-29400*x^4
+390*x^3-60*x^2+18)*ln(5)^2+34300*x^6+102900*x^5+68600*x^4-1260*x^3+420*x^
2-144)/(25*x^3*ln(4*x)^3+(-75*x^3*ln(5)^2+525*x^3)*ln(4*x)^2+(75*x^3*ln(5)
^4-1050*x^3*ln(5)^2+3675*x^3)*ln(4*x)-25*x^3*ln(5)^6+525*x^3*ln(5)^4-3675*
x^3*ln(5)^2+8575*x^3),x,method=_RETURNVERBOSE)
```

output
```
x^4+4*x^3+4*x^2+3/25*(10*x^3*ln(5)^2+20*x^2*ln(5)^2-10*x^3*ln(4*x)-70*x^3-
20*x^2*ln(4*x)-140*x^2+3)/x^2/(ln(5)^2-7-ln(4*x))^2
```

3.518.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 210 vs. 2(32) = 64.

Time = 0.25 (sec) , antiderivative size = 210, normalized size of antiderivative = 7.00

$$\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+(18-60x^2+390x^3-29400x^4-44100x^5}{}$$

$$=\frac{1225\,x^6+4900\,x^5+25\left(x^6+4\,x^5+4\,x^4\right)\log\left(5\right)^4+4900\,x^4-210\,x^3-10\left(35\,x^6+140\,x^5+140\,x^4-3\,x^3\right.}{25\left(x^2\log\left(5\right)^4-14\,x^2\right.}$$

3.518.

$$\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+(18-60x^2+390x^3-29400x^4-44100x^5-14700x^6)\log^2(5)+(-30x^3+4200x^4+6300x^5+21}{}$$

input
```
integrate(((100*x^6+300*x^5+200*x^4)*log(4*x)^3+((-300*x^6-900*x^5-600*x^4
)*log(5)^2+2100*x^6+6300*x^5+4200*x^4-30*x^3)*log(4*x)^2+((300*x^6+900*x^5
+600*x^4)*log(5)^4+(-4200*x^6-12600*x^5-8400*x^4+60*x^3)*log(5)^2+14700*x^
6+44100*x^5+29400*x^4-390*x^3+60*x^2-18)*log(4*x)+(-100*x^6-300*x^5-200*x^
4)*log(5)^6+(2100*x^6+6300*x^5+4200*x^4-30*x^3)*log(5)^4+(-14700*x^6-44100
*x^5-29400*x^4+390*x^3-60*x^2+18)*log(5)^2+34300*x^6+102900*x^5+68600*x^4-
1260*x^3+420*x^2-144)/(25*x^3*log(4*x)^3+(-75*x^3*log(5)^2+525*x^3)*log(4*
x)^2+(75*x^3*log(5)^4-1050*x^3*log(5)^2+3675*x^3)*log(4*x)-25*x^3*log(5)^6
+525*x^3*log(5)^4-3675*x^3*log(5)^2+8575*x^3),x, algorithm=\
```

output
```
1/25*(1225*x^6 + 4900*x^5 + 25*(x^6 + 4*x^5 + 4*x^4)*log(5)^4 + 4900*x^4 -
 210*x^3 - 10*(35*x^6 + 140*x^5 + 140*x^4 - 3*x^3 - 6*x^2)*log(5)^2 + 25*(
x^6 + 4*x^5 + 4*x^4)*log(4*x)^2 - 420*x^2 + 10*(35*x^6 + 140*x^5 + 140*x^4
 - 3*x^3 - 5*(x^6 + 4*x^5 + 4*x^4)*log(5)^2 - 6*x^2)*log(4*x) + 9)/(x^2*lo
g(5)^4 - 14*x^2*log(5)^2 + x^2*log(4*x)^2 + 49*x^2 - 2*(x^2*log(5)^2 - 7*x
^2)*log(4*x))
```

3.518.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 119 vs. 2(24) = 48.

Time = 0.25 (sec) , antiderivative size = 119, normalized size of antiderivative = 3.97

$$\int \frac{-144 + 420x^2 - 1260x^3 + 68600x^4 + 102900x^5 + 34300x^6 + (18 - 60x^2 + 390x^3 - 29400x^4 - 44100x^5 \cdots}{\cdots}$$

$$= x^4 + 4x^3 + 4x^2 + \frac{-210x^3 + 30x^3 \log(5)^2 - 420x^2 + 60x^2 \log(5)^2 + (-30x^3 - 60x^2) \log(4x) + 9}{25x^2 \log(4x)^2 - 350x^2 \log(5)^2 + 25x^2 \log(5)^4 + 1225x^2 + (-50x^2 \log(5)^2 + 350x^2) \log(4x)}$$

input
```
integrate(((100*x**6+300*x**5+200*x**4)*ln(4*x)**3+((-300*x**6-900*x**5-60
0*x**4)*ln(5)**2+2100*x**6+6300*x**5+4200*x**4-30*x**3)*ln(4*x)**2+((300*x
**6+900*x**5+600*x**4)*ln(5)**4+(-4200*x**6-12600*x**5-8400*x**4+60*x**3)*
ln(5)**2+14700*x**6+44100*x**5+29400*x**4-390*x**3+60*x**2-18)*ln(4*x)+(-1
00*x**6-300*x**5-200*x**4)*ln(5)**6+(2100*x**6+6300*x**5+4200*x**4-30*x**3
)*ln(5)**4+(-14700*x**6-44100*x**5-29400*x**4+390*x**3-60*x**2+18)*ln(5)**
2+34300*x**6+102900*x**5+68600*x**4-1260*x**3+420*x**2-144)/(25*x**3*ln(4*
x)**3+(-75*x**3*ln(5)**2+525*x**3)*ln(4*x)**2+(75*x**3*ln(5)**4-1050*x**3*
ln(5)**2+3675*x**3)*ln(4*x)-25*x**3*ln(5)**6+525*x**3*ln(5)**4-3675*x**3*l
n(5)**2+8575*x**3),x)
```

output
```
x**4 + 4*x**3 + 4*x**2 + (-210*x**3 + 30*x**3*log(5)**2 - 420*x**2 + 60*x*
*2*log(5)**2 + (-30*x**3 - 60*x**2)*log(4*x) + 9)/(25*x**2*log(4*x)**2 - 3
50*x**2*log(5)**2 + 25*x**2*log(5)**4 + 1225*x**2 + (-50*x**2*log(5)**2 +
350*x**2)*log(4*x))
```

3.518.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 275 vs. $2(32) = 64$.

Time = 0.36 (sec) , antiderivative size = 275, normalized size of antiderivative = 9.17

$$\int \frac{-144 + 420x^2 - 1260x^3 + 68600x^4 + 102900x^5 + 34300x^6 + (18 - 60x^2 + 390x^3 - 29400x^4 - 44100x^5}{} = -\frac{25\left(\log(5)^4 - 14\log(5)^2 - 4\left(\log(5)^2 - 7\right)\log(2) + 4\log(2)^2 + 49\right)x^6 + 100\left(\log(5)^4 - 14\log(5)^2 -\right.}{}$$

input
```
integrate(((100*x^6+300*x^5+200*x^4)*log(4*x)^3+((-300*x^6-900*x^5-600*x^4
)*log(5)^2+2100*x^6+6300*x^5+4200*x^4-30*x^3)*log(4*x)^2+((300*x^6+900*x^5
+600*x^4)*log(5)^4+(-4200*x^6-12600*x^5-8400*x^4+60*x^3)*log(5)^2+14700*x^
6+44100*x^5+29400*x^4-390*x^3+60*x^2-18)*log(4*x)+(-100*x^6-300*x^5-200*x^
4)*log(5)^6+(2100*x^6+6300*x^5+4200*x^4-30*x^3)*log(5)^4+(-14700*x^6-44100
*x^5-29400*x^4+390*x^3-60*x^2+18)*log(5)^2+34300*x^6+102900*x^5+68600*x^4-
1260*x^3+420*x^2-144)/(25*x^3*log(4*x)^3+(-75*x^3*log(5)^2+525*x^3)*log(4*
x)^2+(75*x^3*log(5)^4-1050*x^3*log(5)^2+3675*x^3)*log(4*x)-25*x^3*log(5)^6
+525*x^3*log(5)^4-3675*x^3*log(5)^2+8575*x^3),x, algorithm=\
```

output
```
-1/25*(25*(log(5)^4 - 14*log(5)^2 - 4*(log(5)^2 - 7)*log(2) + 4*log(2)^2 +
 49)*x^6 + 100*(log(5)^4 - 14*log(5)^2 - 4*(log(5)^2 - 7)*log(2) + 4*log(2
)^2 + 49)*x^5 + 100*(log(5)^4 - 14*log(5)^2 - 4*(log(5)^2 - 7)*log(2) + 4*
log(2)^2 + 49)*x^4 + 30*(log(5)^2 - 2*log(2) - 7)*x^3 + 60*(log(5)^2 - 2*l
og(2) - 7)*x^2 + 25*(x^6 + 4*x^5 + 4*x^4)*log(x)^2 - 10*(5*(log(5)^2 - 2*l
og(2) - 7)*x^6 + 20*(log(5)^2 - 2*log(2) - 7)*x^5 + 20*(log(5)^2 - 2*log(2
) - 7)*x^4 + 3*x^3 + 6*x^2)*log(x) + 9)/(2*(log(5)^2 - 2*log(2) - 7)*x^2*l
og(x) - x^2*log(x)^2 - (log(5)^4 - 14*log(5)^2 - 4*(log(5)^2 - 7)*log(2) +
 4*log(2)^2 + 49)*x^2)
```

3.518.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 121 vs. $2(32) = 64$.

Time = 0.33 (sec) , antiderivative size = 121, normalized size of antiderivative = 4.03

$$\int \frac{-144 + 420x^2 - 1260x^3 + 68600x^4 + 102900x^5 + 34300x^6 + (18 - 60x^2 + 390x^3 - 29400x^4 - 44100x^5}{}$$

$$= x^4 + 4x^3 + 4x^2 + \frac{3\left(10x^3\log(5)^2 + 20x^2\log(5)^2 - 10x^3\log(4x) - 70x^3 - 20x^2\log(4x) - 140x^2 + 3\right)}{25\left(x^2\log(5)^4 - 2x^2\log(5)^2\log(4x) - 14x^2\log(5)^2 + x^2\log(4x)^2 + 14x^2\log(4x) + 49x^2\right)}$$

input
```
integrate(((100*x^6+300*x^5+200*x^4)*log(4*x)^3+((-300*x^6-900*x^5-600*x^4
)*log(5)^2+2100*x^6+6300*x^5+4200*x^4-30*x^3)*log(4*x)^2+((300*x^6+900*x^5
+600*x^4)*log(5)^4+(-4200*x^6-12600*x^5-8400*x^4+60*x^3)*log(5)^2+14700*x^
6+44100*x^5+29400*x^4-390*x^3+60*x^2-18)*log(4*x)+(-100*x^6-300*x^5-200*x^
4)*log(5)^6+(2100*x^6+6300*x^5+4200*x^4-30*x^3)*log(5)^4+(-14700*x^6-44100
*x^5-29400*x^4+390*x^3-60*x^2+18)*log(5)^2+34300*x^6+102900*x^5+68600*x^4-
1260*x^3+420*x^2-144)/(25*x^3*log(4*x)^3+(-75*x^3*log(5)^2+525*x^3)*log(4*
x)^2+(75*x^3*log(5)^4-1050*x^3*log(5)^2+3675*x^3)*log(4*x)-25*x^3*log(5)^6
+525*x^3*log(5)^4-3675*x^3*log(5)^2+8575*x^3),x, algorithm=\
```

output
```
x^4 + 4*x^3 + 4*x^2 + 3/25*(10*x^3*log(5)^2 + 20*x^2*log(5)^2 - 10*x^3*log
(4*x) - 70*x^3 - 20*x^2*log(4*x) - 140*x^2 + 3)/(x^2*log(5)^4 - 2*x^2*log(
5)^2*log(4*x) - 14*x^2*log(5)^2 + x^2*log(4*x)^2 + 14*x^2*log(4*x) + 49*x^
2)
```

3.518.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-144 + 420x^2 - 1260x^3 + 68600x^4 + 102900x^5 + 34300x^6 + (18 - 60x^2 + 390x^3 - 29400x^4 - 44100x^5}{}$$

$$= \int \frac{\ln(4x)^3(100x^6 + 300x^5 + 200x^4) - \ln(5)^6(100x^6 + 300x^5 + 200x^4) + \ln(5)^4(2100x^6 + 6300x^5 +}{}$$

input
```
int((log(4*x)^3*(200*x^4 + 300*x^5 + 100*x^6) - log(5)^6*(200*x^4 + 300*x^
5 + 100*x^6) + log(5)^4*(4200*x^4 - 30*x^3 + 6300*x^5 + 2100*x^6) + log(4*
x)^2*(4200*x^4 - 30*x^3 - log(5)^2*(600*x^4 + 900*x^5 + 300*x^6) + 6300*x^
5 + 2100*x^6) - log(5)^2*(60*x^2 - 390*x^3 + 29400*x^4 + 44100*x^5 + 14700
*x^6 - 18) + log(4*x)*(log(5)^4*(600*x^4 + 900*x^5 + 300*x^6) - log(5)^2*(
8400*x^4 - 60*x^3 + 12600*x^5 + 4200*x^6) + 60*x^2 - 390*x^3 + 29400*x^4 +
 44100*x^5 + 14700*x^6 - 18) + 420*x^2 - 1260*x^3 + 68600*x^4 + 102900*x^5
 + 34300*x^6 - 144)/(525*x^3*log(5)^4 - 3675*x^3*log(5)^2 - 25*x^3*log(5)^
6 + log(4*x)*(75*x^3*log(5)^4 - 1050*x^3*log(5)^2 + 3675*x^3) - log(4*x)^2
*(75*x^3*log(5)^2 - 525*x^3) + 8575*x^3 + 25*x^3*log(4*x)^3),x)
```

output
```
int((log(4*x)^3*(200*x^4 + 300*x^5 + 100*x^6) - log(5)^6*(200*x^4 + 300*x^
5 + 100*x^6) + log(5)^4*(4200*x^4 - 30*x^3 + 6300*x^5 + 2100*x^6) + log(4*
x)^2*(4200*x^4 - 30*x^3 - log(5)^2*(600*x^4 + 900*x^5 + 300*x^6) + 6300*x^
5 + 2100*x^6) - log(5)^2*(60*x^2 - 390*x^3 + 29400*x^4 + 44100*x^5 + 14700
*x^6 - 18) + log(4*x)*(log(5)^4*(600*x^4 + 900*x^5 + 300*x^6) - log(5)^2*(
8400*x^4 - 60*x^3 + 12600*x^5 + 4200*x^6) + 60*x^2 - 390*x^3 + 29400*x^4 +
 44100*x^5 + 14700*x^6 - 18) + 420*x^2 - 1260*x^3 + 68600*x^4 + 102900*x^5
 + 34300*x^6 - 144)/(525*x^3*log(5)^4 - 3675*x^3*log(5)^2 - 25*x^3*log(5)^
6 + log(4*x)*(75*x^3*log(5)^4 - 1050*x^3*log(5)^2 + 3675*x^3) - log(4*x)^2
*(75*x^3*log(5)^2 - 525*x^3) + 8575*x^3 + 25*x^3*log(4*x)^3), x)
```

3.518.

$$\int \frac{-144+420x^2-1260x^3+68600x^4+102900x^5+34300x^6+\left(18-60x^2+390x^3-29400x^4-44100x^5-14700x^6\right)\log^2(5)+\left(-30x^3+4200x^4+6300x^5+21\right.}{}$$

3.519 $\int (1-4e^3-e^3\log(x))\,dx$

3.519.1 Optimal result

Integrand size = 14, antiderivative size = 15

$$\int (1-4e^3-e^3\log(x))\,dx=-9+x(1-e^3(3+\log(x)))$$

output
```
(1-exp(3)*(3+ln(x)))*x-9
```

3.519.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int (1-4e^3-e^3\log(x))\,dx=x-3e^3x-e^3x\log(x)$$

input
```
Integrate[1 - 4*E^3 - E^3*Log[x],x]
```

output
```
x - 3*E^3*x - E^3*x*Log[x]
```

3.519.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.53, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-e^3 \log(x) - 4e^3 + 1\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\left(1-4e^3\right)x + e^3 x - e^3 x \log(x)$$

input
```
Int[1 - 4*E^3 - E^3*Log[x],x]
```

output
```
E^3*x + (1 - 4*E^3)*x - E^3*x*Log[x]
```

3.519.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.519.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result	size
risch	$-x\,\mathrm{e}^{3} \ln \left(x \right)-3 x \,\mathrm{e}^{3}+x$	15
norman	$\left(1-3 \,\mathrm{e}^{3}\right) x -x \,\mathrm{e}^{3} \ln \left(x \right)$	17
default	$x -\mathrm{e}^{3} \left(x \ln \left(x \right)-x \right)-4 x \,\mathrm{e}^{3}$	20
parts	$x -\mathrm{e}^{3} \left(x \ln \left(x \right)-x \right)-4 x \,\mathrm{e}^{3}$	20
parallelrisch	$-\mathrm{e}^{3} \left(x \ln \left(x \right)-x \right)+\left(-4 \,\mathrm{e}^{3}+1\right) x$	22

input
```
int(-ln(x)*exp(3)-4*exp(3)+1,x,method=_RETURNVERBOSE)
```

output
```
-x*exp(3)*ln(x)-3*x*exp(3)+x
```

3.519.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \left(1-4e^3-e^3\log(x)\right)\,dx = -xe^3\log\left(x\right)-3\,xe^3+x$$

input
```
integrate(-log(x)*exp(3)-4*exp(3)+1,x, algorithm=\
```

output
```
-x*e^3*log(x) - 3*x*e^3 + x
```

3.519.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \left(1-4e^3-e^3\log(x)\right)\,dx = -xe^3\log\left(x\right)+x\left(1-3e^3\right)$$

input
```
integrate(-ln(x)*exp(3)-4*exp(3)+1,x)
```

output
```
-x*exp(3)*log(x) + x*(1 - 3*exp(3))
```

3.519.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.27

$$\int \left(1-4e^3-e^3\log(x)\right)\,dx = -(x\log\left(x\right)-x)e^3-4\,xe^3+x$$

input
```
integrate(-log(x)*exp(3)-4*exp(3)+1,x, algorithm=\
```

output
```
-(x*log(x) - x)*e^3 - 4*x*e^3 + x
```

3.519.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.27

$$\int \left(1-4e^3-e^3\log(x)\right)\,dx=-(x\log\left(x\right)-x)e^3-4\,xe^3+x$$

input
```
integrate(-log(x)*exp(3)-4*exp(3)+1,x, algorithm=\
```

output
```
-(x*log(x) - x)*e^3 - 4*x*e^3 + x
```

3.519.9 Mupad [B] (verification not implemented)

Time = 13.98 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \left(1-4e^3-e^3\log(x)\right)\,dx=-x\left(3\,\mathrm{e}^3+\mathrm{e}^3\,\ln\left(x\right)-1\right)$$

input
```
int(1 - exp(3)*log(x) - 4*exp(3),x)
```

output
```
-x*(3*exp(3) + exp(3)*log(x) - 1)
```

3.520 $\int e^{-5+x}\,dx$

3.520.1 Optimal result

Integrand size = 5, antiderivative size = 5

$$\int e^{-5+x}\,dx = e^{-5+x}$$

output
```
exp(-5+x)
```

3.520.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 5, normalized size of antiderivative = 1.00

$$\int e^{-5+x}\,dx = e^{-5+x}$$

input
```
Integrate[E^(-5 + x),x]
```

output
```
E^(-5 + x)
```

3.520.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 5, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{x-5}\,dx$$

$$\Big\downarrow \; 2624$$

$$e^{x-5}$$

input
```
Int[E^(-5 + x),x]
```

output
```
E^(-5 + x)
```

3.520.3.1 Defintions of rubi rules used

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

3.520.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 5, normalized size of antiderivative = 1.00

method	result	size
gosper	e^{-5+x}	5
derivativedivides	e^{-5+x}	5
default	e^{-5+x}	5
norman	e^{-5+x}	5
risch	e^{-5+x}	5
parallelrisch	e^{-5+x}	5
meijerg	$-\mathrm{e}^{-5}(1-\mathrm{e}^{x})$	11

input
```
int(exp(-5+x),x,method=_RETURNVERBOSE)
```

output
```
exp(-5+x)
```

3.520.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.80

$$\int e^{-5+x}\,dx = e^{(x-5)}$$

input
```
integrate(exp(-5+x),x, algorithm=\
```

output
```
e^(x - 5)
```

3.520.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.60

$$\int e^{-5+x}\,dx = e^{x-5}$$

input
```
integrate(exp(-5+x),x)
```

output
```
exp(x - 5)
```

3.520.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.80

$$\int e^{-5+x}\,dx = e^{(x-5)}$$

input
```
integrate(exp(-5+x),x, algorithm=\
```

output
```
e^(x - 5)
```

3.520.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.80

$$\int e^{-5+x}\,dx = e^{(x-5)}$$

input
```
integrate(exp(-5+x),x, algorithm=\
```

output
```
e^(x - 5)
```

3.520.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 5, normalized size of antiderivative = 1.00

$$\int e^{-5+x}\,dx = \mathrm{e}^{-5}\,\mathrm{e}^{x}$$

input
```
int(exp(x - 5),x)
```

output
```
exp(-5)*exp(x)
```

3.521 $\int \frac{-640e^5x-80x^3}{9+30x^4+6400e^{10}x^4+25x^8+e^5(480x^2+800x^6)+(6+160e^5x^2+10x^4)\log(2)+\log^2(2)}\,dx$

3.521.1 Optimal result

Integrand size = 72, antiderivative size = 23

$$\int \frac{-640e^5x-80x^3}{9+30x^4+6400e^{10}x^4+25x^8+e^5(480x^2+800x^6)+(6+160e^5x^2+10x^4)\log(2)+\log^2(2)}\,dx = \frac{4}{3+5x^3\left(\frac{16e^5}{x}+x\right)+\log(2)}$$

output
```
4/(3+5*x^3*(x+16*exp(5)/x)+ln(2))
```

3.521.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{-640e^5x-80x^3}{9+30x^4+6400e^{10}x^4+25x^8+e^5(480x^2+800x^6)+(6+160e^5x^2+10x^4)\log(2)+\log^2(2)}\,dx = \frac{4}{3+80e^5x^2+5x^4+\log(2)}$$

input
```
Integrate[(-640*E^5*x - 80*x^3)/(9 + 30*x^4 + 6400*E^10*x^4 + 25*x^8 + E^5
*(480*x^2 + 800*x^6) + (6 + 160*E^5*x^2 + 10*x^4)*Log[2] + Log[2]^2),x]
```

output
```
4/(3 + 80*E^5*x^2 + 5*x^4 + Log[2])
```

3.521.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 89 vs. $2(23) = 46$.

Time = 0.59 (sec) , antiderivative size = 89, normalized size of antiderivative = 3.87, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {6, 2027, 2460, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-80x^3-640e^5x}{25x^8+6400e^{10}x^4+30x^4+e^5(800x^6+480x^2)+(10x^4+160e^5x^2+6)\log(2)+9+\log^2(2)}dx$$

$$\Big\downarrow \text{6}$$

$$\int \frac{-80x^3-640e^5x}{25x^8+(30+6400e^{10})x^4+e^5(800x^6+480x^2)+(10x^4+160e^5x^2+6)\log(2)+9+\log^2(2)}dx$$

$$\Big\downarrow \text{2027}$$

$$\int \frac{x(-80x^2-640e^5)}{25x^8+(30+6400e^{10})x^4+e^5(800x^6+480x^2)+(10x^4+160e^5x^2+6)\log(2)+9+\log^2(2)}dx$$

$$\Big\downarrow \text{2460}$$

$$\int \left(-\frac{640e^5x}{(5x^4+80e^5x^2+3+\log(2))^2}-\frac{80x^3}{(5x^4+80e^5x^2+3+\log(2))^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{4(40e^5x^2+3+\log(2))}{(3-320e^{10}+\log(2))(5x^4+80e^5x^2+3+\log(2))}-\frac{160e^5(x^2+8e^5)}{(3-320e^{10}+\log(2))(5x^4+80e^5x^2+3+\log(2))}$$

input
```
Int[(-640*E^5*x - 80*x^3)/(9 + 30*x^4 + 6400*E^10*x^4 + 25*x^8 + E^5*(480*
x^2 + 800*x^6) + (6 + 160*E^5*x^2 + 10*x^4)*Log[2] + Log[2]^2),x]
```

output
```
(-160*E^5*(8*E^5 + x^2))/((3 - 320*E^10 + Log[2])*(3 + 80*E^5*x^2 + 5*x^4
+ Log[2])) + (4*(3 + 40*E^5*x^2 + Log[2]))/((3 - 320*E^10 + Log[2])*(3 + 8
0*E^5*x^2 + 5*x^4 + Log[2]))
```

3.521.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2027
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.))^(p_.), x_Symbol] :> Int[x^
(p*r)*(a + b*x^(s - r))^p*Fx, x] /; FreeQ[{a, b, r, s}, x] && IntegerQ[p] &
& PosQ[s - r] &&  !(EqQ[p, 1] && EqQ[u, 1])
```

rule 2460
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px /. x -> Sqrt[x]]},
Int[ExpandIntegrand[u*(Qx /. x -> x^2)^p, x], x] /;  !SumQ[NonfreeFactors[Q
x, x]]] /; PolyQ[Px, x^2] && GtQ[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&
 !TrinomialQ[Px, x] && ILtQ[p, 0] && RationalFunctionQ[u, x]
```

3.521.4 Maple [A] (verified)

Time = 0.73 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

method	result
gosper	$\frac{4}{5x^4+80x^2e^5+\ln(2)+3}$
norman	$\frac{4}{5x^4+80x^2e^5+\ln(2)+3}$
parallelrisch	$\frac{4}{5x^4+80x^2e^5+\ln(2)+3}$
risch	$\frac{1}{\frac{5x^4}{4}+20x^2e^5+\frac{\ln(2)}{4}+\frac{3}{4}}$
default	$2\left(\sum_{\_R=\mathrm{RootOf}\left(25\_Z^4+800\_Z^3e^5+(10\ln(2)+6400\,e^{10}+30)\_Z^2+(160\,e^5\ln(2)+480\,e^5)\_Z+\ln(2)^2+6\ln(2)+9\right)} \overline{5\_R^3+1}\right.$

input
```
int((-640*x*exp(5)-80*x^3)/(ln(2)^2+(160*x^2*exp(5)+10*x^4+6)*ln(2)+6400*x
^4*exp(5)^2+(800*x^6+480*x^2)*exp(5)+25*x^8+30*x^4+9),x,method=_RETURNVERB
OSE)
```

output
```
4/(5*x^4+80*x^2*exp(5)+ln(2)+3)
```

3.521.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{-640e^5x-80x^3}{9+30x^4+6400e^{10}x^4+25x^8+e^5(480x^2+800x^6)+(6+160e^5x^2+10x^4)\log(2)+\log^2(2)}\,dx = \frac{4}{5\,x^4+80\,x^2e^5+\log(2)+3}$$

input
```
integrate((-640*x*exp(5)-80*x^3)/(log(2)^2+(160*x^2*exp(5)+10*x^4+6)*log(2
)+6400*x^4*exp(5)^2+(800*x^6+480*x^2)*exp(5)+25*x^8+30*x^4+9),x, algorithm
=\
```

output
```
4/(5*x^4 + 80*x^2*e^5 + log(2) + 3)
```

3.521.6 Sympy [A] (verification not implemented)

Time = 0.80 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{-640e^5x-80x^3}{9+30x^4+6400e^{10}x^4+25x^8+e^5(480x^2+800x^6)+(6+160e^5x^2+10x^4)\log(2)+\log^2(2)}\,dx = \frac{4}{5x^4+80x^2e^5+\log(2)+3}$$

input
```
integrate((-640*x*exp(5)-80*x**3)/(ln(2)**2+(160*x**2*exp(5)+10*x**4+6)*ln
(2)+6400*x**4*exp(5)**2+(800*x**6+480*x**2)*exp(5)+25*x**8+30*x**4+9),x)
```

output
```
4/(5*x**4 + 80*x**2*exp(5) + log(2) + 3)
```

3.521.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{-640e^5x-80x^3}{9+30x^4+6400e^{10}x^4+25x^8+e^5(480x^2+800x^6)+(6+160e^5x^2+10x^4)\log(2)+\log^2(2)}\,dx = \frac{4}{5\,x^4+80\,x^2e^5+\log(2)+3}$$

input
```
integrate((-640*x*exp(5)-80*x^3)/(log(2)^2+(160*x^2*exp(5)+10*x^4+6)*log(2
)+6400*x^4*exp(5)^2+(800*x^6+480*x^2)*exp(5)+25*x^8+30*x^4+9),x, algorithm
=\
```

output
```
4/(5*x^4 + 80*x^2*e^5 + log(2) + 3)
```

3.521.8 Giac [A] (verification not implemented)

Time = 1.23 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{-640e^5x-80x^3}{9+30x^4+6400e^{10}x^4+25x^8+e^5(480x^2+800x^6)+(6+160e^5x^2+10x^4)\log(2)+\log^2(2)}\,dx = \frac{4}{5\,x^4+80\,x^2e^5+\log(2)+3}$$

input
```
integrate((-640*x*exp(5)-80*x^3)/(log(2)^2+(160*x^2*exp(5)+10*x^4+6)*log(2
)+6400*x^4*exp(5)^2+(800*x^6+480*x^2)*exp(5)+25*x^8+30*x^4+9),x, algorithm
=\
```

output
```
4/(5*x^4 + 80*x^2*e^5 + log(2) + 3)
```

3.521.9 Mupad [B] (verification not implemented)

Time = 16.28 (sec) , antiderivative size = 1, normalized size of antiderivative = 0.04

$$\int \frac{-640e^5x-80x^3}{9+30x^4+6400e^{10}x^4+25x^8+e^5(480x^2+800x^6)+(6+160e^5x^2+10x^4)\log(2)+\log^2(2)}\,dx = 0$$

input
```
int(-(640*x*exp(5) + 80*x^3)/(exp(5)*(480*x^2 + 800*x^6) + 6400*x^4*exp(10
) + log(2)^2 + 30*x^4 + 25*x^8 + log(2)*(160*x^2*exp(5) + 10*x^4 + 6) + 9)
,x)
```

output
```
0
```

3.522 $\int \frac{x^2+e^{\frac{-2+2x+x^2}{x}}(-2-x^2)}{10x^2}\,dx$

3.522.1 Optimal result

Integrand size = 33, antiderivative size = 18

$$\int \frac{x^2+e^{\frac{-2+2x+x^2}{x}}(-2-x^2)}{10x^2}\,dx = \frac{1}{10}\left(-e^{2-\frac{2}{x}+x}+x\right)$$

output
```
1/10*x-1/10*exp(2+x-2/x)
```

3.522.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{x^2+e^{\frac{-2+2x+x^2}{x}}(-2-x^2)}{10x^2}\,dx = \frac{1}{10}\left(-e^{2-\frac{2}{x}+x}+x\right)$$

input
```
Integrate[(x^2 + E^((-2 + 2*x + x^2)/x)*(-2 - x^2))/(10*x^2),x]
```

output
```
(-E^(2 - 2/x + x) + x)/10
```

3.522.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+e^{\frac{x^2+2x-2}{x}}\left(-x^2-2\right)}{10x^2}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{10}\int \frac{x^2-e^{-\frac{-x^2-2x+2}{x}}\left(x^2+2\right)}{x^2}dx$$
$$\Big\downarrow \text{2010}$$
$$\frac{1}{10}\int \left(1-\frac{e^{x+2-\frac{2}{x}}\left(x^2+2\right)}{x^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{1}{10}\left(x-e^{x-\frac{2}{x}+2}\right)$$

input
```
Int[(x^2 + E^((-2 + 2*x + x^2)/x)*(-2 - x^2))/(10*x^2),x]
```

output
```
(-E^(2 - 2/x + x) + x)/10
```

3.522.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.522.4 Maple [A] (verified)

Time = 0.72 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

method	result	size
risch	$\frac{x}{10}-\frac{\mathrm{e}^{\frac{x^2+2x-2}{x}}}{10}$	20
parallelrisch	$\frac{x}{10}-\frac{\mathrm{e}^{\frac{x^2+2x-2}{x}}}{10}$	20
parts	$\frac{x}{10}-\frac{\mathrm{e}^{\frac{x^2+2x-2}{x}}}{10}$	20
norman	$\frac{\frac{x^2}{10}-\frac{x\,\mathrm{e}^{\frac{x^2+2x-2}{x}}}{10}}{x}$	27

input
```
int(1/10*((-x^2-2)*exp((x^2+2*x-2)/x)+x^2)/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/10*x-1/10*exp((x^2+2*x-2)/x)
```

3.522.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{x^2+e^{\frac{-2+2x+x^2}{x}}(-2-x^2)}{10x^2}\,dx = \frac{1}{10}\,x-\frac{1}{10}\,e^{\left(\frac{x^2+2\,x-2}{x}\right)}$$

input
```
integrate(1/10*((-x^2-2)*exp((x^2+2*x-2)/x)+x^2)/x^2,x, algorithm=\
```

output
```
1/10*x - 1/10*e^((x^2 + 2*x - 2)/x)
```

3.522.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{x^2+e^{\frac{-2+2x+x^2}{x}}(-2-x^2)}{10x^2}\,dx = \frac{x}{10}-\frac{e^{\frac{x^2+2x-2}{x}}}{10}$$

input
```
integrate(1/10*((-x**2-2)*exp((x**2+2*x-2)/x)+x**2)/x**2,x)
```

output
```
x/10 - exp((x**2 + 2*x - 2)/x)/10
```

3.522.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{x^2+e^{\frac{-2+2x+x^2}{x}}(-2-x^2)}{10x^2}\,dx=\frac{1}{10}\,x-\frac{1}{10}\,e^{\left(x-\frac{2}{x}+2\right)}$$

input
```
integrate(1/10*((-x^2-2)*exp((x^2+2*x-2)/x)+x^2)/x^2,x, algorithm=\
```

output
```
1/10*x - 1/10*e^(x - 2/x + 2)
```

3.522.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{x^2+e^{\frac{-2+2x+x^2}{x}}(-2-x^2)}{10x^2}\,dx=\frac{1}{10}\,x-\frac{1}{10}\,e^{\left(\frac{x^2+2\,x-2}{x}\right)}$$

input
```
integrate(1/10*((-x^2-2)*exp((x^2+2*x-2)/x)+x^2)/x^2,x, algorithm=\
```

output
```
1/10*x - 1/10*e^((x^2 + 2*x - 2)/x)
```

3.522.9 Mupad [B] (verification not implemented)

Time = 14.41 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{x^2+e^{\frac{-2+2x+x^2}{x}}(-2-x^2)}{10x^2}\,dx=\frac{x}{10}-\frac{\mathrm{e}^2\,\mathrm{e}^{-\frac{2}{x}}\,\mathrm{e}^x}{10}$$

input
```
int(-((exp((2*x + x^2 - 2)/x)*(x^2 + 2))/10 - x^2/10)/x^2,x)
```

output
```
x/10 - (exp(2)*exp(-2/x)*exp(x))/10
```

3.523

$$\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}\left(3x^2+2x^3\right)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}\left(-10x^3-2x^3\log(3)\right)}\,dx$$

3.523.1 Optimal result

Integrand size = 108, antiderivative size = 27

$$\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}\left(3x^2+2x^3\right)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}\left(-10x^3-2x^3\log(3)\right)}\,dx=e^{\frac{2}{5}+\frac{\log(5)}{5-e^{-2+2x}x^3+\log(3)}}$$

output
```
exp(2/5+ln(5)/(ln(3)-x^3*exp(-1+x)^2+5))
```

3.523.2 Mathematica [A] (verified)

Time = 0.49 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}\left(3x^2+2x^3\right)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}\left(-10x^3-2x^3\log(3)\right)}\,dx$$
$$=5^{\frac{e^2}{-e^{2x}x^3+e^2(5+\log(3))}}e^{2/5}$$

input
```
Integrate[(E^(-2 + 2*x + (-10 + 2*E^(-2 + 2*x)*x^3 - 2*Log[3] - 5*Log[5])/
(-25 + 5*E^(-2 + 2*x)*x^3 - 5*Log[3]))*(3*x^2 + 2*x^3)*Log[5])/(25 + E^(-4
 + 4*x)*x^6 + 10*Log[3] + Log[3]^2 + E^(-2 + 2*x)*(-10*x^3 - 2*x^3*Log[3])
),x]
```

output
```
5^(E^2/(-(E^(2*x)*x^3) + E^2*(5 + Log[3])))*E^(2/5)
```

3.523.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x^3+3x^2)\log(5)\exp\left(\frac{2e^{2x-2}x^3-10-5\log(5)-2\log(3)}{5e^{2x-2}x^3-25-5\log(3)}+2x-2\right)}{e^{4x-4}x^6+e^{2x-2}(-10x^3-2x^3\log(3))+25+\log^2(3)+10\log(3)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\log(5)\int \frac{\exp\left(2x+\frac{-2e^{2x-2}x^3+\log(28125)+10}{5(-e^{2x-2}x^3+\log(3)+5)}-2\right)(2x^3+3x^2)}{e^{4x-4}x^6-2e^{2x-2}(\log(3)x^3+5x^3)+(5+\log(3))^2}dx$$

$$\Big\downarrow \text{ 2027}$$

$$\log(5)\int \frac{\exp\left(2x+\frac{-2e^{2x-2}x^3+\log(28125)+10}{5(-e^{2x-2}x^3+\log(3)+5)}-2\right)x^2(2x+3)}{e^{4x-4}x^6-2e^{2x-2}(\log(3)x^3+5x^3)+(5+\log(3))^2}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\log(5)\int \frac{\exp\left(2x+\frac{-2e^{2x-2}x^3+\log(28125)+10}{5(-e^{2x-2}x^3+\log(3)+5)}+2\right)x^2(2x+3)}{\left(e^{2x}x^3-5e^2\left(1+\frac{\log(3)}{5}\right)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\log(5)\int \left(\frac{2\exp\left(2x+\frac{-2e^{2x-2}x^3+\log(28125)+10}{5(-e^{2x-2}x^3+\log(3)+5)}+2\right)x^3}{\left(e^{2x}x^3-5e^2\left(1+\frac{\log(3)}{5}\right)\right)^2}+\frac{3\exp\left(2x+\frac{-2e^{2x-2}x^3+\log(28125)+10}{5(-e^{2x-2}x^3+\log(3)+5)}+2\right)x^2}{\left(e^{2x}x^3-5e^2\left(1+\frac{\log(3)}{5}\right)\right)^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\log(5)\left(2\int \frac{\exp\left(2x+\frac{-2e^{2x-2}x^3+\log(28125)+10}{5(-e^{2x-2}x^3+\log(3)+5)}+2\right)x^3}{\left(e^{2x}x^3-5e^2\left(1+\frac{\log(3)}{5}\right)\right)^2}dx+3\int \frac{\exp\left(2x+\frac{-2e^{2x-2}x^3+\log(28125)+10}{5(-e^{2x-2}x^3+\log(3)+5)}+2\right)x^2}{\left(e^{2x}x^3-5e^2\left(1+\frac{\log(3)}{5}\right)\right)^2}dx\right)$$

input
```
Int[(E^(-2 + 2*x + (-10 + 2*E^(-2 + 2*x)*x^3 - 2*Log[3] - 5*Log[5])/(-25 +
 5*E^(-2 + 2*x)*x^3 - 5*Log[3]))*(3*x^2 + 2*x^3)*Log[5])/(25 + E^(-4 + 4*x
)*x^6 + 10*Log[3] + Log[3]^2 + E^(-2 + 2*x)*(-10*x^3 - 2*x^3*Log[3])),x]
```

output
```
$Aborted
```

3.523. $\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}(3x^2+2x^3)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}(-10x^3-2x^3\log(3))}dx$

3.523.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2027
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.))^(p_.), x_Symbol] :> Int[x^
(p*r)*(a + b*x^(s - r))^p*Fx, x] /; FreeQ[{a, b, r, s}, x] && IntegerQ[p] &
& PosQ[s - r] &&  !(EqQ[p, 1] && EqQ[u, 1])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.523.4 Maple [A] (verified)

Time = 160.30 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56

method	result	size
risch	$\mathrm{e}^{\frac{-2x^{3}\mathrm{e}^{-2+2x}+5\ln(5)+2\ln(3)+10}{-5x^{3}\mathrm{e}^{-2+2x}+5\ln(3)+25}}$	42
parallelrisch	$\mathrm{e}^{\frac{-2x^{3}\mathrm{e}^{-2+2x}+5\ln(5)+2\ln(3)+10}{-5x^{3}\mathrm{e}^{-2+2x}+5\ln(3)+25}}$	42

input
```
int((2*x^3+3*x^2)*ln(5)*exp(-1+x)^2*exp((2*x^3*exp(-1+x)^2-5*ln(5)-2*ln(3)
-10)/(5*x^3*exp(-1+x)^2-5*ln(3)-25))/(x^6*exp(-1+x)^4+(-2*x^3*ln(3)-10*x^3
)*exp(-1+x)^2+ln(3)^2+10*ln(3)+25),x,method=_RETURNVERBOSE)
```

output
```
exp(1/5*(-2*x^3*exp(-2+2*x)+5*ln(5)+2*ln(3)+10)/(-x^3*exp(-2+2*x)+ln(3)+5)
)
```

3.523. $\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}\left(3x^2+2x^3\right)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}\left(-10x^3-2x^3\log(3)\right)}\,dx$

3.523.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(25) = 50$.

Time = 0.26 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.33

$$\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}(3x^2+2x^3)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}(-10x^3-2x^3\log(3))}\,dx$$
$$= e^{\left(-2\,x+\frac{2\,\left(5\,x^4-4\,x^3\right)e^{(2\,x-2)}-2\,(5\,x-4)\log(3)-50\,x-5\,\log(5)+40}{5\,\left(x^3e^{(2\,x-2)}-\log(3)-5\right)}+2\right)}$$

input
```
integrate((2*x^3+3*x^2)*log(5)*exp(-1+x)^2*exp((2*x^3*exp(-1+x)^2-5*log(5)
-2*log(3)-10)/(5*x^3*exp(-1+x)^2-5*log(3)-25))/(x^6*exp(-1+x)^4+(-2*x^3*lo
g(3)-10*x^3)*exp(-1+x)^2+log(3)^2+10*log(3)+25),x, algorithm=\
```

output
```
e^(-2*x + 1/5*(2*(5*x^4 - 4*x^3)*e^(2*x - 2) - 2*(5*x - 4)*log(3) - 50*x -
 5*log(5) + 40)/(x^3*e^(2*x - 2) - log(3) - 5) + 2)
```

3.523.6 Sympy [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56

$$\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}(3x^2+2x^3)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}(-10x^3-2x^3\log(3))}\,dx$$
$$= e^{\frac{2x^3e^{2x-2}-10-5\log(5)-2\log(3)}{5x^3e^{2x-2}-25-5\log(3)}}$$

input
```
integrate((2*x**3+3*x**2)*ln(5)*exp(-1+x)**2*exp((2*x**3*exp(-1+x)**2-5*ln
(5)-2*ln(3)-10)/(5*x**3*exp(-1+x)**2-5*ln(3)-25))/(x**6*exp(-1+x)**4+(-2*x
**3*ln(3)-10*x**3)*exp(-1+x)**2+ln(3)**2+10*ln(3)+25),x)
```

output
```
exp((2*x**3*exp(2*x - 2) - 10 - 5*log(5) - 2*log(3))/(5*x**3*exp(2*x - 2)
- 25 - 5*log(3)))
```

3.523.7 Maxima [A] (verification not implemented)

Time = 0.57 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}(3x^2+2x^3)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}(-10x^3-2x^3\log(3))}\,dx$$
$$= e^{\left(-\frac{e^2\log(5)}{x^3e^{(2x)}-e^2\log(3)-5e^2}+\frac{2}{5}\right)}$$

input
```
integrate((2*x^3+3*x^2)*log(5)*exp(-1+x)^2*exp((2*x^3*exp(-1+x)^2-5*log(5)
-2*log(3)-10)/(5*x^3*exp(-1+x)^2-5*log(3)-25))/(x^6*exp(-1+x)^4+(-2*x^3*lo
g(3)-10*x^3)*exp(-1+x)^2+log(3)^2+10*log(3)+25),x, algorithm=\
```

output
```
e^(-e^2*log(5)/(x^3*e^(2*x) - e^2*log(3) - 5*e^2) + 2/5)
```

3.523.8 Giac [F]

$$\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}(3x^2+2x^3)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}(-10x^3-2x^3\log(3))}\,dx$$
$$= \int \frac{(2x^3+3x^2)e^{\left(2x+\frac{2x^3e^{(2x-2)}-5\log(5)-2\log(3)-10}{5\left(x^3e^{(2x-2)}-\log(3)-5\right)}-2\right)}\log(5)}{x^6e^{(4x-4)}-2(x^3\log(3)+5x^3)e^{(2x-2)}+\log(3)^2+10\log(3)+25}\,dx$$

input
```
integrate((2*x^3+3*x^2)*log(5)*exp(-1+x)^2*exp((2*x^3*exp(-1+x)^2-5*log(5)
-2*log(3)-10)/(5*x^3*exp(-1+x)^2-5*log(3)-25))/(x^6*exp(-1+x)^4+(-2*x^3*lo
g(3)-10*x^3)*exp(-1+x)^2+log(3)^2+10*log(3)+25),x, algorithm=\
```

output
```
integrate((2*x^3 + 3*x^2)*e^(2*x + 1/5*(2*x^3*e^(2*x - 2) - 5*log(5) - 2*l
og(3) - 10)/(x^3*e^(2*x - 2) - log(3) - 5) - 2)*log(5)/(x^6*e^(4*x - 4) -
2*(x^3*log(3) + 5*x^3)*e^(2*x - 2) + log(3)^2 + 10*log(3) + 25), x)
```

3.523.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-2+2x+\frac{-10+2e^{-2+2x}x^3-2\log(3)-5\log(5)}{-25+5e^{-2+2x}x^3-5\log(3)}}(3x^2+2x^3)\log(5)}{25+e^{-4+4x}x^6+10\log(3)+\log^2(3)+e^{-2+2x}(-10x^3-2x^3\log(3))}\,dx$$
$$=\int \frac{e^{2x-2}\,e^{\frac{2\ln(3)+5\ln(5)-2x^3e^{2x-2}+10}{5\ln(3)-5x^3e^{2x-2}+25}}\ln(5)\,(2x^3+3x^2)}{10\ln(3)-e^{2x-2}\,(2x^3\ln(3)+10x^3)+\ln(3)^2+x^6e^{4x-4}+25}\,dx$$

input
```
int((exp(2*x - 2)*exp((2*log(3) + 5*log(5) - 2*x^3*exp(2*x - 2) + 10)/(5*l
og(3) - 5*x^3*exp(2*x - 2) + 25))*log(5)*(3*x^2 + 2*x^3))/(10*log(3) - exp
(2*x - 2)*(2*x^3*log(3) + 10*x^3) + log(3)^2 + x^6*exp(4*x - 4) + 25),x)
```

output
```
int((exp(2*x - 2)*exp((2*log(3) + 5*log(5) - 2*x^3*exp(2*x - 2) + 10)/(5*l
og(3) - 5*x^3*exp(2*x - 2) + 25))*log(5)*(3*x^2 + 2*x^3))/(10*log(3) - exp
(2*x - 2)*(2*x^3*log(3) + 10*x^3) + log(3)^2 + x^6*exp(4*x - 4) + 25), x)
```

3.524 $\int \frac{-2x^3+(-2500x+2x^3)\log\left(\frac{1}{125}(-1250+x^2)\right)}{(-1250+x^2)\log^2\left(\frac{1}{125}(-1250+x^2)\right)}\,dx$

3.524.1 Optimal result

Integrand size = 46, antiderivative size = 20

$$\int \frac{-2x^3+(-2500x+2x^3)\log\left(\frac{1}{125}(-1250+x^2)\right)}{(-1250+x^2)\log^2\left(\frac{1}{125}(-1250+x^2)\right)}\,dx=\frac{x^2}{\log\left(-15+5\left(1+\frac{x^2}{625}\right)\right)}$$

output
```
x^2/ln(1/125*x^2-10)
```

3.524.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{-2x^3+(-2500x+2x^3)\log\left(\frac{1}{125}(-1250+x^2)\right)}{(-1250+x^2)\log^2\left(\frac{1}{125}(-1250+x^2)\right)}\,dx=\frac{x^2}{\log\left(-10+\frac{x^2}{125}\right)}$$

input
```
Integrate[(-2*x^3 + (-2500*x + 2*x^3)*Log[(-1250 + x^2)/125])/((-1250 + x^
2)*Log[(-1250 + x^2)/125]^2),x]
```

output
```
x^2/Log[-10 + x^2/125]
```

3.524.3 Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {7276, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x^3-2500x)\log\left(\frac{1}{125}(x^2-1250)\right)-2x^3}{(x^2-1250)\log^2\left(\frac{1}{125}(x^2-1250)\right)}dx$$
$$\Big\downarrow \text{7276}$$
$$\int \left(\frac{2x}{\log\left(\frac{x^2}{125}-10\right)}-\frac{2x^3}{(x^2-1250)\log^2\left(\frac{x^2}{125}-10\right)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{1250}{\log\left(\frac{x^2}{125}-10\right)}-\frac{1250-x^2}{\log\left(\frac{x^2}{125}-10\right)}$$

input
```
Int[(-2*x^3 + (-2500*x + 2*x^3)*Log[(-1250 + x^2)/125])/((-1250 + x^2)*Log
[(-1250 + x^2)/125]^2),x]
```

output
```
1250/Log[-10 + x^2/125] - (1250 - x^2)/Log[-10 + x^2/125]
```

3.524.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.524.4 Maple [A] (verified)

Time = 1.86 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

method	result
norman	$\frac{x^2}{\ln\left(\frac{x^2}{125}-10\right)}$
risch	$\frac{x^2}{\ln\left(\frac{x^2}{125}-10\right)}$
parallelrisch	$\frac{x^2}{\ln\left(\frac{x^2}{125}-10\right)}$
default	$\frac{x^2-1250}{-3\ln(5)+\ln(x^2-1250)}-\frac{1250}{3\ln(5)-\ln(x^2-1250)}$
parts	$-125\ \mathrm{Ei}_1\left(-\ln\left(\frac{x^2}{125}-10\right)\right)+\frac{x^2-1250}{-3\ln(5)+\ln(x^2-1250)}+125\ \mathrm{Ei}_1\left(3\ln\left(5\right)-\ln\left(x^2-1250\right)\right)-\frac{}{3\ln}$

input
```
int(((2*x^3-2500*x)*ln(1/125*x^2-10)-2*x^3)/(x^2-1250)/ln(1/125*x^2-10)^2,
x,method=_RETURNVERBOSE)
```

output
```
x^2/ln(1/125*x^2-10)
```

3.524.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-2x^3+(-2500x+2x^3)\log\left(\frac{1}{125}(-1250+x^2)\right)}{(-1250+x^2)\log^2\left(\frac{1}{125}\left(-1250+x^2\right)\right)}\,dx=\frac{x^2}{\log\left(\frac{1}{125}\,x^2-10\right)}$$

input
```
integrate(((2*x^3-2500*x)*log(1/125*x^2-10)-2*x^3)/(x^2-1250)/log(1/125*x^
2-10)^2,x, algorithm=\
```

output
```
x^2/log(1/125*x^2 - 10)
```

3.524.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int \frac{-2x^3+(-2500x+2x^3)\log\left(\frac{1}{125}(-1250+x^2)\right)}{(-1250+x^2)\log^2\left(\frac{1}{125}(-1250+x^2)\right)}\,dx=\frac{x^2}{\log\left(\frac{x^2}{125}-10\right)}$$

input
```
integrate(((2*x**3-2500*x)*ln(1/125*x**2-10)-2*x**3)/(x**2-1250)/ln(1/125*
x**2-10)**2,x)
```

output
```
x**2/log(x**2/125 - 10)
```

3.524.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{-2x^3+(-2500x+2x^3)\log\left(\frac{1}{125}(-1250+x^2)\right)}{(-1250+x^2)\log^2\left(\frac{1}{125}(-1250+x^2)\right)}\,dx=-\frac{x^2}{3\log(5)-\log(x^2-1250)}$$

input
```
integrate(((2*x^3-2500*x)*log(1/125*x^2-10)-2*x^3)/(x^2-1250)/log(1/125*x^
2-10)^2,x, algorithm=\
```

output
```
-x^2/(3*log(5) - log(x^2 - 1250))
```

3.524.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-2x^3+(-2500x+2x^3)\log\left(\frac{1}{125}(-1250+x^2)\right)}{(-1250+x^2)\log^2\left(\frac{1}{125}(-1250+x^2)\right)}\,dx=\frac{x^2}{\log\left(\frac{1}{125}x^2-10\right)}$$

input
```
integrate(((2*x^3-2500*x)*log(1/125*x^2-10)-2*x^3)/(x^2-1250)/log(1/125*x^
2-10)^2,x, algorithm=\
```

output
```
x^2/log(1/125*x^2 - 10)
```

3.524.9 Mupad [B] (verification not implemented)

Time = 15.42 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-2x^3 + (-2500x + 2x^3) \log\left(\frac{1}{125}(-1250 + x^2)\right)}{(-1250 + x^2) \log^2\left(\frac{1}{125}(-1250 + x^2)\right)} \, dx = \frac{x^2}{\ln\left(\frac{x^2}{125} - 10\right)}$$

input
```
int(-(log(x^2/125 - 10)*(2500*x - 2*x^3) + 2*x^3)/(log(x^2/125 - 10)^2*(x^
2 - 1250)),x)
```

output
```
x^2/log(x^2/125 - 10)
```

3.525 $\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx$

3.525.1 Optimal result

Integrand size = 44, antiderivative size = 13

$$\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx = e^{5+\frac{1}{-2x+x^2}}$$

output
```
exp(5+1/(x^2-2*x))
```

3.525.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.54

$$\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx = e^{5+\frac{1}{2(-2+x)}-\frac{1}{2x}}$$

input
```
Integrate[(E^((1 - 10*x + 5*x^2)/(-2*x + x^2))*(2 - 2*x))/(4*x^2 - 4*x^3 +
 x^4),x]
```

output
```
E^(5 + 1/(2*(-2 + x)) - 1/(2*x))
```

3.525.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{5x^2-10x+1}{x^2-2x}}(2-2x)}{x^4-4x^3+4x^2}\,dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{e^{\frac{5x^2-10x+1}{x^2-2x}}(2-2x)}{x^2\left(x^2-4x+4\right)}dx$$
$$\Big\downarrow \text{7277}$$
$$4\int \frac{e^{-\frac{5x^2-10x+1}{2x-x^2}}(1-x)}{2(2-x)^2x^2}dx$$
$$\Big\downarrow \text{27}$$
$$2\int \frac{e^{-\frac{5x^2-10x+1}{2x-x^2}}(1-x)}{(2-x)^2x^2}dx$$
$$\Big\downarrow \text{7292}$$
$$2\int \frac{e^{-\frac{5x^2-10x+1}{(2-x)x}}(1-x)}{(2-x)^2x^2}dx$$
$$\Big\downarrow \text{7293}$$
$$2\int \left(\frac{e^{-\frac{5x^2-10x+1}{(2-x)x}}}{4x^2}-\frac{e^{-\frac{5x^2-10x+1}{(2-x)x}}}{4(x-2)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$2\left(\frac{1}{4}\int \frac{e^{-\frac{5x^2-10x+1}{(2-x)x}}}{x^2}dx-\frac{1}{4}\int \frac{e^{-\frac{5x^2-10x+1}{(2-x)x}}}{(x-2)^2}dx\right)$$

input
```
Int[(E^((1 - 10*x + 5*x^2)/(-2*x + x^2))*(2 - 2*x))/(4*x^2 - 4*x^3 + x^4),
x]
```

output
```
$Aborted
```

3.525. $\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx$

3.525.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.525.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.62

method	result	size
gosper	${\mathrm e}^{\frac{5 x^{2}-10 x +1}{\left(-2+x \right) x}}$	21
risch	${\mathrm e}^{\frac{5 x^{2}-10 x +1}{\left(-2+x \right) x}}$	21
parallelrisch	${\mathrm e}^{\frac{5 x^{2}-10 x +1}{\left(-2+x \right) x}}$	21
norman	$\frac{x^{2} {\mathrm e}^{\frac{5 x^{2}-10 x +1}{x^{2}-2 x}}-2 x \,{\mathrm e}^{\frac{5 x^{2}-10 x +1}{x^{2}-2 x}}}{\left(-2+x \right) x}$	60

3.525. $\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx$

input
```
int((2-2*x)*exp((5*x^2-10*x+1)/(x^2-2*x))/(x^4-4*x^3+4*x^2),x,method=_RETU
RNVERBOSE)
```

output
```
exp((5*x^2-10*x+1)/(-2+x)/x)
```

3.525.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.62

$$\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx = e^{\left(\frac{5\,x^2-10\,x+1}{x^2-2\,x}\right)}$$

input
```
integrate((2-2*x)*exp((5*x^2-10*x+1)/(x^2-2*x))/(x^4-4*x^3+4*x^2),x, algor
ithm=\
```

output
```
e^((5*x^2 - 10*x + 1)/(x^2 - 2*x))
```

3.525.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.31

$$\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx = e^{\frac{5x^2-10x+1}{x^2-2x}}$$

input
```
integrate((2-2*x)*exp((5*x**2-10*x+1)/(x**2-2*x))/(x**4-4*x**3+4*x**2),x)
```

output
```
exp((5*x**2 - 10*x + 1)/(x**2 - 2*x))
```

3.525.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.15

$$\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx = e^{\left(\frac{1}{2(x-2)}-\frac{1}{2x}+5\right)}$$

input
```
integrate((2-2*x)*exp((5*x^2-10*x+1)/(x^2-2*x))/(x^4-4*x^3+4*x^2),x, algor
ithm=\
```

output
```
e^(1/2/(x - 2) - 1/2/x + 5)
```

3.525.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. 2(12) = 24.

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.85

$$\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx = e^{\left(\frac{5x^2}{x^2-2x}-\frac{10x}{x^2-2x}+\frac{1}{x^2-2x}\right)}$$

input
```
integrate((2-2*x)*exp((5*x^2-10*x+1)/(x^2-2*x))/(x^4-4*x^3+4*x^2),x, algor
ithm=\
```

output
```
e^(5*x^2/(x^2 - 2*x) - 10*x/(x^2 - 2*x) + 1/(x^2 - 2*x))
```

3.525.9 Mupad [B] (verification not implemented)

Time = 14.06 (sec) , antiderivative size = 32, normalized size of antiderivative = 2.46

$$\int \frac{e^{\frac{1-10x+5x^2}{-2x+x^2}}(2-2x)}{4x^2-4x^3+x^4}\,dx = e^{\frac{5x}{x-2}}\,e^{-\frac{1}{2x-x^2}}\,e^{-\frac{10}{x-2}}$$

input
```
int(-(exp(-(5*x^2 - 10*x + 1)/(2*x - x^2))*(2*x - 2))/(4*x^2 - 4*x^3 + x^4
),x)
```

output
```
exp((5*x)/(x - 2))*exp(-1/(2*x - x^2))*exp(-10/(x - 2))
```

3.526 $\int -\frac{4e^3}{x^2}\,dx$

3.526.1 Optimal result

Integrand size = 8, antiderivative size = 13

$$\int -\frac{4e^3}{x^2}\,dx = e^3\left(\frac{4}{x} + \log(\log(2))\right)$$

output
```
exp(3)*(4/x+ln(ln(2)))
```

3.526.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.62

$$\int -\frac{4e^3}{x^2}\,dx = \frac{4e^3}{x}$$

input
```
Integrate[(-4*E^3)/x^2,x]
```

output
```
(4*E^3)/x
```

3.526.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.62, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{4e^3}{x^2}\,dx$$

$$\Big\downarrow \text{ 15}$$

$$\frac{4e^3}{x}$$

input
```
Int[(-4*E^3)/x^2,x]
```

output
```
(4*E^3)/x
```

3.526.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.526.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.62

method	result	size
gosper	$\frac{4\,{\mathrm e}^{3}}{x}$	8
default	$\frac{4\,{\mathrm e}^{3}}{x}$	8
norman	$\frac{4\,{\mathrm e}^{3}}{x}$	8
risch	$\frac{4\,{\mathrm e}^{3}}{x}$	8
parallelrisch	$\frac{4\,{\mathrm e}^{3}}{x}$	8

input
```
int(-4*exp(3)/x^2,x,method=_RETURNVERBOSE)
```

output
```
4*exp(3)/x
```

3.526.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int -\frac{4e^3}{x^2}\,dx = \frac{4\,e^3}{x}$$

input
```
integrate(-4*exp(3)/x^2,x, algorithm=\
```

output
```
4*e^3/x
```

3.526.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.38

$$\int -\frac{4e^3}{x^2}\,dx = \frac{4e^3}{x}$$

input
```
integrate(-4*exp(3)/x**2,x)
```

output
```
4*exp(3)/x
```

3.526.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int -\frac{4e^3}{x^2}\,dx = \frac{4\,e^3}{x}$$

input
```
integrate(-4*exp(3)/x^2,x, algorithm=\
```

output
```
4*e^3/x
```

3.526.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int -\frac{4e^3}{x^2}\,dx = \frac{4\,e^3}{x}$$

input
```
integrate(-4*exp(3)/x^2,x, algorithm=\
```

output
```
4*e^3/x
```

3.526.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int -\frac{4e^3}{x^2}\,dx = \frac{4\,\mathrm{e}^3}{x}$$

input
```
int(-(4*exp(3))/x^2,x)
```

output
```
(4*exp(3))/x
```

3.527 $\int \frac{25+14x^2+(-75-14x^2)\log(x)}{-9e^e x^4+(25x+14x^3)\log(x)}\,dx$

3.527.1 Optimal result

Integrand size = 41, antiderivative size = 26

$$\int \frac{25+14x^2+(-75-14x^2)\log(x)}{-9e^e x^4+(25x+14x^3)\log(x)}\,dx = \log\left(3e^e+\frac{\left(-5+\frac{1}{3}\left(1-\frac{25}{x^2}\right)\right)\log(x)}{x}\right)$$

output
```
ln(ln(x)*(-14/3-25/3/x^2)/x+3*exp(exp(1)))
```

3.527.2 Mathematica [A] (verified)

Time = 0.45 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{25+14x^2+(-75-14x^2)\log(x)}{-9e^e x^4+(25x+14x^3)\log(x)}\,dx = -3\log(x)+\log\left(9e^e x^3-\left(25+14x^2\right)\log(x)\right)$$

input
```
Integrate[(25 + 14*x^2 + (-75 - 14*x^2)*Log[x])/(-9*E^E*x^4 + (25*x + 14*x
^3)*Log[x]),x]
```

output
```
-3*Log[x] + Log[9*E^E*x^3 - (25 + 14*x^2)*Log[x]]
```

3.527.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{14x^2+(-14x^2-75)\log(x)+25}{(14x^3+25x)\log(x)-9e^e x^4}\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{-14x^2-75}{x(14x^2+25)}+\frac{126e^e x^5-196x^4+675e^e x^3-700x^2-625}{x(14x^2+25)(9e^e x^3-14x^2\log(x)-25\log(x))}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{225}{7}e^e\int \frac{1}{9e^e x^3-14\log(x)x^2-25\log(x)}dx-25\int \frac{1}{x(9e^e x^3-14\log(x)x^2-25\log(x))}dx-14\int \frac{x}{9e^e x^3-14\log(x)x^2-25\log(x)}dx+9e^e\int \frac{x^2}{9e^e x^3-14\log(x)x^2-25\log(x)}dx-\frac{1125}{14}ie^e\int \frac{1}{(5i-\sqrt{14}x)(9e^e x^3-14\log(x)x^2-25\log(x))}dx-\frac{1125}{14}ie^e\int \frac{1}{(\sqrt{14}x+5i)(9e^e x^3-14\log(x)x^2-25\log(x))}dx+\log(14x^2+25)-3\log(x)$$

input
```
Int[(25 + 14*x^2 + (-75 - 14*x^2)*Log[x])/(-9*E^E*x^4 + (25*x + 14*x^3)*Lo
g[x]),x]
```

output
```
$Aborted
```

3.527.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.527.4 Maple [A] (verified)

Time = 1.74 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

method	result	size
default	$-3\ln(x)+\ln(9x^3 e^{e}-14x^2\ln(x)-25\ln(x))$	27
norman	$-3\ln(x)+\ln(9x^3 e^{e}-14x^2\ln(x)-25\ln(x))$	27
parallelrisch	$\ln\left(\frac{(9x^3 e^{e}-14x^2\ln(x)-25\ln(x))e^{-e}}{9}\right)-3\ln(x)$	34
risch	$-3\ln(x)+\ln(14x^2+25)+\ln\left(\ln(x)-\frac{9x^3 e^{e}}{14x^2+25}\right)$	35

input
```
int(((-14*x^2-75)*ln(x)+14*x^2+25)/((14*x^3+25*x)*ln(x)-9*x^4*exp(exp(1)))
,x,method=_RETURNVERBOSE)
```

output
```
-3*ln(x)+ln(9*x^3*exp(exp(1))-14*x^2*ln(x)-25*ln(x))
```

3.527.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(21) = 42.

Time = 0.24 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.73

$$\int \frac{25+14x^2+(-75-14x^2)\log(x)}{-9e^e x^4+(25x+14x^3)\log(x)}\,dx = \log\left(14\,x^2+25\right)-3\,\log(x) + \log\left(-\frac{9\,x^3 e^e-(14\,x^2+25)\log(x)}{14\,x^2+25}\right)$$

input
```
integrate(((-14*x^2-75)*log(x)+14*x^2+25)/((14*x^3+25*x)*log(x)-9*x^4*exp(
exp(1))),x, algorithm=\
```

output
```
log(14*x^2 + 25) - 3*log(x) + log(-(9*x^3*e^e - (14*x^2 + 25)*log(x))/(14*
x^2 + 25))
```

3.527.6 Sympy [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int \frac{25+14x^2+(-75-14x^2)\log(x)}{-9e^e x^4+(25x+14x^3)\log(x)}\,dx = -3\log(x)+\log(14x^2+25) + \log\left(-\frac{9x^3e^e}{14x^2+25}+\log(x)\right)$$

input
```
integrate(((-14*x**2-75)*ln(x)+14*x**2+25)/((14*x**3+25*x)*ln(x)-9*x**4*ex
p(exp(1))),x)
```

output
```
-3*log(x) + log(14*x**2 + 25) + log(-9*x**3*exp(E)/(14*x**2 + 25) + log(x)
)
```

3.527.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(21) = 42.

Time = 0.25 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.73

$$\int \frac{25+14x^2+(-75-14x^2)\log(x)}{-9e^e x^4+(25x+14x^3)\log(x)}\,dx = \log(14x^2+25)-3\log(x) + \log\left(-\frac{9x^3e^e-(14x^2+25)\log(x)}{14x^2+25}\right)$$

input
```
integrate(((-14*x^2-75)*log(x)+14*x^2+25)/((14*x^3+25*x)*log(x)-9*x^4*exp(
exp(1))),x, algorithm=\
```

output
```
log(14*x^2 + 25) - 3*log(x) + log(-(9*x^3*e^e - (14*x^2 + 25)*log(x))/(14*
x^2 + 25))
```

3.527.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{25+14x^2+(-75-14x^2)\log(x)}{-9e^e x^4+(25x+14x^3)\log(x)}\,dx = \log\left(-9\,x^3e^e+14\,x^2\log\left(x\right)+25\,\log\left(x\right)\right)-3\,\log\left(x\right)$$

input
```
integrate((((-14*x^2-75)*log(x)+14*x^2+25)/((14*x^3+25*x)*log(x)-9*x^4*exp(
exp(1))),x, algorithm=\
```

output
```
log(-9*x^3*e^e + 14*x^2*log(x) + 25*log(x)) - 3*log(x)
```

3.527.9 Mupad [B] (verification not implemented)

Time = 14.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{25+14x^2+(-75-14x^2)\log(x)}{-9e^e x^4+(25x+14x^3)\log(x)}\,dx = \ln\left(9\,x^3\,\mathrm{e}^{\mathrm{e}}-25\,\ln\left(x\right)-14\,x^2\,\ln\left(x\right)\right)-3\,\ln\left(x\right)$$

input
```
int(-(14*x^2 - log(x)*(14*x^2 + 75) + 25)/(9*x^4*exp(exp(1)) - log(x)*(25*
x + 14*x^3)),x)
```

output
```
log(9*x^3*exp(exp(1)) - 25*log(x) - 14*x^2*log(x)) - 3*log(x)
```

3.528 $\int \frac{e^{\frac{225+9x+45e^{5+x}x-5x^2}{5x}}(-45-x^2+9e^{5+x}x^2)}{x^2}\,dx$

3.528.1 Optimal result

Integrand size = 48, antiderivative size = 25

$$\int \frac{e^{\frac{225+9x+45e^{5+x}x-5x^2}{5x}}\left(-45-x^2+9e^{5+x}x^2\right)}{x^2}\,dx = e^{-x+\frac{9\left(5+\frac{x}{5}+e^{5+x}x\right)}{x}}$$

output
```
exp(9*(5+1/5*x+x*exp(5+x))/x-x)
```

3.528.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{e^{\frac{225+9x+45e^{5+x}x-5x^2}{5x}}\left(-45-x^2+9e^{5+x}x^2\right)}{x^2}\,dx = e^{\frac{9}{5}+9e^{5+x}+\frac{45}{x}-x}$$

input
```
Integrate[(E^((225 + 9*x + 45*E^(5 + x)*x - 5*x^2)/(5*x))*(-45 - x^2 + 9*E
^(5 + x)*x^2))/x^2,x]
```

output
```
E^(9/5 + 9*E^(5 + x) + 45/x - x)
```

3.528.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.021, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-5x^2+45e^{x+5}x+9x+225}{5x}}\left(9e^{x+5}x^2-x^2-45\right)}{x^2}\,dx$$

$$\Big\downarrow \ 7257$$

$$e^{\frac{-5x^2+45e^{x+5}x+9x+225}{5x}}$$

input
```
Int[(E^((225 + 9*x + 45*E^(5 + x)*x - 5*x^2)/(5*x))*(-45 - x^2 + 9*E^(5 +
x)*x^2))/x^2,x]
```

output
```
E^((225 + 9*x + 45*E^(5 + x)*x - 5*x^2)/(5*x))
```

3.528.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.528.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

method	result	size
derivativedivides	$\mathrm{e}^{\frac{45x\,\mathrm{e}^{5+x}-5x^2+9x+225}{5x}}$	24
default	$\mathrm{e}^{\frac{45x\,\mathrm{e}^{5+x}-5x^2+9x+225}{5x}}$	24
norman	$\mathrm{e}^{\frac{45x\,\mathrm{e}^{5+x}-5x^2+9x+225}{5x}}$	24
risch	$\mathrm{e}^{-\frac{-45x\,\mathrm{e}^{5+x}+5x^2-9x-225}{5x}}$	24
parallelrisch	$\mathrm{e}^{\frac{45x\,\mathrm{e}^{5+x}-5x^2+9x+225}{5x}}$	24

input
```
int((9*x^2*exp(5+x)-x^2-45)*exp(1/5*(45*x*exp(5+x)-5*x^2+9*x+225)/x)/x^2,x
,method=_RETURNVERBOSE)
```

output
```
exp(1/5*(45*x*exp(5+x)-5*x^2+9*x+225)/x)
```

3.528.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{225+9x+45e^{5+x}x-5x^2}{5x}}(-45-x^2+9e^{5+x}x^2)}{x^2}\,dx = e^{\left(-\frac{5\,x^2-45\,xe^{(x+5)}-9\,x-225}{5\,x}\right)}$$

input
```
integrate((9*x^2*exp(5+x)-x^2-45)*exp(1/5*(45*x*exp(5+x)-5*x^2+9*x+225)/x)
/x^2,x, algorithm=\
```

output
```
e^(-1/5*(5*x^2 - 45*x*e^(x + 5) - 9*x - 225)/x)
```

3.528.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{e^{\frac{225+9x+45e^{5+x}x-5x^2}{5x}}(-45-x^2+9e^{5+x}x^2)}{x^2}\,dx = e^{\frac{-x^2+9xe^{x+5}+\frac{9x}{5}+45}{x}}$$

input
```
integrate((9*x**2*exp(5+x)-x**2-45)*exp(1/5*(45*x*exp(5+x)-5*x**2+9*x+225)
/x)/x**2,x)
```

output
```
exp((-x**2 + 9*x*exp(x + 5) + 9*x/5 + 45)/x)
```

3.528.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

$$\int \frac{e^{\frac{225+9x+45e^{5+x}x-5x^2}{5x}}(-45-x^2+9e^{5+x}x^2)}{x^2}\,dx = e^{\left(-x+\frac{45}{x}+9\,e^{(x+5)}+\frac{9}{5}\right)}$$

input
```
integrate((9*x^2*exp(5+x)-x^2-45)*exp(1/5*(45*x*exp(5+x)-5*x^2+9*x+225)/x)
/x^2,x, algorithm=\
```

output
```
e^(-x + 45/x + 9*e^(x + 5) + 9/5)
```

3.528.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

$$\int \frac{e^{\frac{225+9x+45e^{5+x}x-5x^2}{5x}}(-45-x^2+9e^{5+x}x^2)}{x^2}\,dx = e^{\left(-x+\frac{45}{x}+9\,e^{(x+5)}+\frac{9}{5}\right)}$$

input
```
integrate((9*x^2*exp(5+x)-x^2-45)*exp(1/5*(45*x*exp(5+x)-5*x^2+9*x+225)/x)
/x^2,x, algorithm=\
```

output
```
e^(-x + 45/x + 9*e^(x + 5) + 9/5)
```

3.528.9 Mupad [B] (verification not implemented)

Time = 13.82 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{e^{\frac{225+9x+45e^{5+x}x-5x^2}{5x}}(-45-x^2+9e^{5+x}x^2)}{x^2}\,dx = \mathrm{e}^{9\,\mathrm{e}^5\,\mathrm{e}^x}\,\mathrm{e}^{-x}\,\mathrm{e}^{9/5}\,\mathrm{e}^{45/x}$$

input
```
int(-(exp(((9*x)/5 + 9*x*exp(x + 5) - x^2 + 45)/x)*(x^2 - 9*x^2*exp(x + 5)
 + 45))/x^2,x)
```

output
```
exp(9*exp(5)*exp(x))*exp(-x)*exp(9/5)*exp(45/x)
```

3.529 $\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log\right.}{-4x^3+4x^4+\left(-x^2+5\right.}$

3.529.1 Optimal result

Integrand size = 127, antiderivative size = 29

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\right.\right.}{-4x^3+4x^4+(-x^2+5x^3)\log(x)+x^2\log^2(x)}$$
$$=-3+e^{\frac{3\left(5+x-\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)\right)}{x}}$$

output
```
exp(3*(x+5-ln((-1+ln(x)+x)/(4*x+ln(x))))/x)-3
```

3.529.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\right.\right.}{-4x^3+4x^4+(-x^2+5x^3)\log(x)+x^2\log^2(x)}$$
$$=e^{3+\frac{15}{x}}\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)^{-3/x}$$

3.529.

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\log(x)+3\log^2(x)\right)\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)\right)}{\ldots} dx$$

input
```
Integrate[(E^((15 + 3*x - 3*Log[(-1 + x + Log[x])/(4*x + Log[x])])/x)*(-3
+ 39*x - 60*x^2 + (15 - 66*x)*Log[x] - 15*Log[x]^2 + (-12*x + 12*x^2 + (-3
 + 15*x)*Log[x] + 3*Log[x]^2)*Log[(-1 + x + Log[x])/(4*x + Log[x])]))/(-4*
x^3 + 4*x^4 + (-x^2 + 5*x^3)*Log[x] + x^2*Log[x]^2),x]
```

output
```
E^(3 + 15/x)/((-1 + x + Log[x])/(4*x + Log[x]))^(3/x)
```

3.529.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{3x-3\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)+15}{x}}\left(-60x^2+\left(12x^2-12x+3\log^2(x)+(15x-3)\log(x)\right)\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)+39x-15\log^2(\right.}{4x^4-4x^3+x^2\log^2(x)+(5x^3-x^2)\log(x)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{\frac{3\left(x-\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)+5\right)}{x}}\left(60x^2-\left(12x^2-12x+3\log^2(x)+(15x-3)\log(x)\right)\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)-39x+15\log^2(x\right.}{-4x^4+4x^3-x^2\log^2(x)-(5x^3-x^2)\log(x)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{15e^{\frac{3\left(x-\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)+5\right)}{x}}\log^2(x)}{x^2(x+\log(x)-1)(4x+\log(x))}-\frac{3(22x-5)e^{\frac{3\left(x-\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)+5\right)}{x}}\log(x)}{x^2(x+\log(x)-1)(4x+\log(x))}+\frac{3e^{\frac{3\left(x-\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)+5\right)}{x}}\log\left(\right.}{x^2}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{3e^{\frac{15}{x}+3}\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}\left(-20x^2+13x+\log^2(x)\left(\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)-5\right)+4(x-1)x\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)+\log(x)\right.}{x^2(-x-\log(x)+1)^2}$$

$$\Big\downarrow \text{ 27}$$

$$3\int -\frac{e^{3+\frac{15}{x}}\left(-\frac{-x-\log(x)+1}{4x+\log(x)}\right)^{1-\frac{3}{x}}\left(20x^2+4(1-x)\log\left(-\frac{-x-\log(x)+1}{4x+\log(x)}\right)x-13x+\log^2(x)\left(5-\log\left(-\frac{-x-\log(x)+1}{4x+\log(x)}\right)\right.\right.}{x^2(-x-\log(x)+1)^2}$$

$$\Big\downarrow \text{ 25}$$

3.529.

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\log(x)+3\log^2(x)\right)\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)\right)}{\ }\,d$$

$$-3\int \frac{e^{3+\frac{15}{x}}\left(-\frac{-x-\log(x)+1}{4x+\log(x)}\right)^{1-\frac{3}{x}}\left(20x^2+4(1-x)\log\left(-\frac{-x-\log(x)+1}{4x+\log(x)}\right)x-13x+\log^2(x)\left(5-\log\left(-\frac{-x-\log(x)+1}{4x+\log(x)}\right)\right.\right.}{x^2(-x-\log(x)+1)^2}$$

$$\Big\downarrow \text{7293}$$

$$-3\int\left(-\frac{e^{3+\frac{15}{x}}(4x+\log(x))\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)\left(-\frac{-x-\log(x)+1}{4x+\log(x)}\right)^{1-\frac{3}{x}}}{x^2(x+\log(x)-1)}+\frac{20e^{3+\frac{15}{x}}\left(-\frac{-x-\log(x)+1}{4x+\log(x)}\right)^{1-\frac{3}{x}}}{(x+\log(x)-1)^2}+\frac{5e^{3+\frac{15}{x}}\log^2(}{x^2(x}\right.$$

$$\Big\downarrow \text{7239}$$

$$-3\int \frac{e^{3+\frac{15}{x}}\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}\left(20x^2-4(x-1)\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)x-13x-\log^2(x)\left(\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)-5\right)-\log(x\right.}{x^2(-x-\log(x)+1)^2}$$

$$\Big\downarrow \text{7293}$$

$$-3\int\left(-\frac{e^{3+\frac{15}{x}}(4x+\log(x))\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}}{x^2(x+\log(x)-1)}+\frac{20e^{3+\frac{15}{x}}\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}}{(x+\log(x)-1)^2}+\frac{5e^{3+\frac{15}{x}}\log^2(x)\left(\frac{x+}{4x}\right.}{x^2(x+\log(x}\right.$$

$$\Big\downarrow \text{7239}$$

$$-3\int \frac{e^{3+\frac{15}{x}}\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}\left(20x^2-4(x-1)\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)x-13x-\log^2(x)\left(\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)-5\right)-\log(x\right.}{x^2(-x-\log(x)+1)^2}$$

$$\Big\downarrow \text{7293}$$

$$-3\int\left(-\frac{e^{3+\frac{15}{x}}(4x+\log(x))\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}}{x^2(x+\log(x)-1)}+\frac{20e^{3+\frac{15}{x}}\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}}{(x+\log(x)-1)^2}+\frac{5e^{3+\frac{15}{x}}\log^2(x)\left(\frac{x+}{4x}\right.}{x^2(x+\log(x}\right.$$

$$\Big\downarrow \text{2009}$$

$$-3\left(5\int\frac{e^{3+\frac{15}{x}}\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}}{x^2}dx+\int\frac{e^{3+\frac{15}{x}}\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}}{x^2(x+\log(x)-1)^2}dx+5\int\frac{e^{3+\frac{15}{x}}\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)^{1-\frac{3}{x}}}{x^2(x+\log(x)-1)}dx-\int\frac{e^{3+\frac{15}{x}}\left(\frac{x+}{4x}\right.}{}\right.$$

3.529.

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\log(x)+3\log^2(x)\right)\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)\right)}{}dx$$

input
```
Int[(E^((15 + 3*x - 3*Log[(-1 + x + Log[x])/(4*x + Log[x])])/x)*(-3 + 39*x
 - 60*x^2 + (15 - 66*x)*Log[x] - 15*Log[x]^2 + (-12*x + 12*x^2 + (-3 + 15*
x)*Log[x] + 3*Log[x]^2)*Log[(-1 + x + Log[x])/(4*x + Log[x])]))/(-4*x^3 +
4*x^4 + (-x^2 + 5*x^3)*Log[x] + x^2*Log[x]^2),x]
```

output
```
$Aborted
```

3.529.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.529.

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\log(x)+3\log^2(x)\right)\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)\right)}{\ldots}\,dx$$

3.529.4 Maple [A] (verified)

Time = 4.52 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

method	result
parallelrisch	$e^{-\frac{3\left(\ln\left(\frac{-1+\ln(x)+x}{4x+\ln(x)}\right)-5-x\right)}{x}}$
risch	$\left(x+\frac{\ln(x)}{4}\right)^{\frac{3}{x}}\left(-1+\ln\left(x\right)+x\right)^{-\frac{3}{x}}64^{\frac{1}{x}}e^{\frac{\frac{3i\,\mathrm{csgn}\left(\frac{i(-1+\ln(x)+x)}{x+\frac{\ln(x)}{4}}\right)^{3}\pi}{2}-\frac{3i\,\mathrm{csgn}\left(\frac{i(-1+\ln(x)+x)}{x+\frac{\ln(x)}{4}}\right)^{2}\mathrm{csgn}\left(\frac{i}{x+\frac{\ln(x)}{4}}\right)\pi}{2}-}{}}$

input
```
int(((3*ln(x)^2+(15*x-3)*ln(x)+12*x^2-12*x)*ln((-1+ln(x)+x)/(4*x+ln(x)))-1
5*ln(x)^2+(-66*x+15)*ln(x)-60*x^2+39*x-3)*exp((-3*ln((-1+ln(x)+x)/(4*x+ln(
x)))+15+3*x)/x)/(x^2*ln(x)^2+(5*x^3-x^2)*ln(x)+4*x^4-4*x^3),x,method=_RETU
RNVERBOSE)
```

output
```
exp(-3*(ln((-1+ln(x)+x)/(4*x+ln(x)))-5-x)/x)
```

3.529.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\right.\right.}{-4x^3+4x^4+(-x^2+5x^3)\log(x)+x^2\log^2(x)}$$

$$= e^{\left(\frac{3\left(x-\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)+5\right)}{x}\right)}$$

input
```
integrate((((3*log(x)^2+(15*x-3)*log(x)+12*x^2-12*x)*log((-1+log(x)+x)/(4*x
+log(x)))-15*log(x)^2+(-66*x+15)*log(x)-60*x^2+39*x-3)*exp((-3*log((-1+log
(x)+x)/(4*x+log(x)))+15+3*x)/x)/(x^2*log(x)^2+(5*x^3-x^2)*log(x)+4*x^4-4*x
^3),x, algorithm=\
```

output
```
e^(3*(x - log((x + log(x) - 1)/(4*x + log(x))) + 5)/x)
```


$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\log(x)+3\log^2(x)\right)\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)\right)}{} dx$$

3.529.6 Sympy [A] (verification not implemented)

Time = 1.49 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\right.\right.}{-4x^3+4x^4+(-x^2+5x^3)\log(x)+x^2\log^2(x)}$$
$$= e^{\frac{3x-3\log\left(\frac{x+\log(x)-1}{4x+\log(x)}\right)+15}{x}}$$

input
```
integrate(((3*ln(x)**2+(15*x-3)*ln(x)+12*x**2-12*x)*ln((-1+ln(x)+x)/(4*x+l
n(x)))-15*ln(x)**2+(-66*x+15)*ln(x)-60*x**2+39*x-3)*exp((-3*ln((-1+ln(x)+x
)/(4*x+ln(x)))+15+3*x)/x)/(x**2*ln(x)**2+(5*x**3-x**2)*ln(x)+4*x**4-4*x**3
),x)
```

output
```
exp((3*x - 3*log((x + log(x) - 1)/(4*x + log(x))) + 15)/x)
```

3.529.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\right.\right.}{-4x^3+4x^4+(-x^2+5x^3)\log(x)+x^2\log^2(x)}$$
$$= e^{\left(\frac{3\log(4x+\log(x))}{x}-\frac{3\log(x+\log(x)-1)}{x}+\frac{15}{x}+3\right)}$$

input
```
integrate(((3*log(x)^2+(15*x-3)*log(x)+12*x^2-12*x)*log((-1+log(x)+x)/(4*x
+log(x)))-15*log(x)^2+(-66*x+15)*log(x)-60*x^2+39*x-3)*exp((-3*log((-1+log
(x)+x)/(4*x+log(x)))+15+3*x)/x)/(x^2*log(x)^2+(5*x^3-x^2)*log(x)+4*x^4-4*x
^3),x, algorithm=\
```

output
```
e^(3*log(4*x + log(x))/x - 3*log(x + log(x) - 1)/x + 15/x + 3)
```

3.529.

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\log(x)+3\log^2(x)\right)\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)\right)}{}dx$$

3.529.8 Giac [A] (verification not implemented)

Time = 2.73 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.59

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\right.\right.}{-4x^3+4x^4+(-x^2+5x^3)\log(x)+x^2\log^2(x)}$$

$$= e^{\left(-\frac{3\log\left(\frac{x}{4x+\log(x)}+\frac{\log(x)}{4x+\log(x)}-\frac{1}{4x+\log(x)}\right)}{x}+\frac{15}{x}+3\right)}$$

input
```
integrate(((3*log(x)^2+(15*x-3)*log(x)+12*x^2-12*x)*log((-1+log(x)+x)/(4*x
+log(x)))-15*log(x)^2+(-66*x+15)*log(x)-60*x^2+39*x-3)*exp((-3*log((-1+log
(x)+x)/(4*x+log(x)))+15+3*x)/x)/(x^2*log(x)^2+(5*x^3-x^2)*log(x)+4*x^4-4*x
^3),x, algorithm=\
```

output
```
e^(-3*log(x/(4*x + log(x)) + log(x)/(4*x + log(x)) - 1/(4*x + log(x)))/x +
 15/x + 3)
```

3.529.9 Mupad [B] (verification not implemented)

Time = 15.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{e^{\frac{15+3x-3\log\left(\frac{-1+x+\log(x)}{4x+\log(x)}\right)}{x}}\left(-3+39x-60x^2+(15-66x)\log(x)-15\log^2(x)+\left(-12x+12x^2+(-3+15x)\right.\right.}{-4x^3+4x^4+(-x^2+5x^3)\log(x)+x^2\log^2(x)}$$

$$= \frac{e^3\,e^{15/x}}{\left(\frac{x+\ln(x)-1}{4\,x+\ln(x)}\right)^{3/x}}$$

input
```
int(-(exp((3*x - 3*log((x + log(x) - 1)/(4*x + log(x))) + 15)/x)*(15*log(x
)^2 - 39*x + log(x)*(66*x - 15) + 60*x^2 - log((x + log(x) - 1)/(4*x + log
(x)))*(3*log(x)^2 - 12*x + log(x)*(15*x - 3) + 12*x^2) + 3))/(x^2*log(x)^2
 - log(x)*(x^2 - 5*x^3) - 4*x^3 + 4*x^4),x)
```

output
```
(exp(3)*exp(15/x))/((x + log(x) - 1)/(4*x + log(x)))^(3/x)
```

3.530 $\int \frac{-1+44x-40x^2-6x^3+2x^4}{x}\,dx$

3.530.1 Optimal result

Integrand size = 24, antiderivative size = 19

$$\int \frac{-1+44x-40x^2-6x^3+2x^4}{x}\,dx = \frac{1}{2}\left(-22-2x+x^2\right)^2-\log(x)$$

output
```
1/2*(x^2-2*x-22)^2-ln(x)
```

3.530.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.32

$$\int \frac{-1+44x-40x^2-6x^3+2x^4}{x}\,dx = 44x-20x^2-2x^3+\frac{x^4}{2}-\log(x)$$

input
```
Integrate[(-1 + 44*x - 40*x^2 - 6*x^3 + 2*x^4)/x,x]
```

output
```
44*x - 20*x^2 - 2*x^3 + x^4/2 - Log[x]
```

3.530.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.32, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4-6x^3-40x^2+44x-1}{x} \, dx$$
$$\Big\downarrow \text{2010}$$
$$\int \left(2x^3-6x^2-40x-\frac{1}{x}+44\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{x^4}{2}-2x^3-20x^2+44x-\log(x)$$

input
```
Int[(-1 + 44*x - 40*x^2 - 6*x^3 + 2*x^4)/x,x]
```

output
```
44*x - 20*x^2 - 2*x^3 + x^4/2 - Log[x]
```

3.530.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.530.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

method	result	size
default	$\frac{x^4}{2} - 2x^3 - 20x^2 + 44x - \ln(x)$	24
norman	$\frac{x^4}{2} - 2x^3 - 20x^2 + 44x - \ln(x)$	24
parallelrisch	$\frac{x^4}{2} - 2x^3 - 20x^2 + 44x - \ln(x)$	24
risch	$\frac{x^4}{2} - 2x^3 - 20x^2 + 44x + 242 - \ln(x)$	25

input
```
int((2*x^4-6*x^3-40*x^2+44*x-1)/x,x,method=_RETURNVERBOSE)
```

output
```
1/2*x^4-2*x^3-20*x^2+44*x-ln(x)
```

3.530.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

$$\int \frac{-1 + 44x - 40x^2 - 6x^3 + 2x^4}{x} \, dx = \frac{1}{2} x^4 - 2 x^3 - 20 x^2 + 44 x - \log(x)$$

input
```
integrate((2*x^4-6*x^3-40*x^2+44*x-1)/x,x, algorithm=\
```

output
```
1/2*x^4 - 2*x^3 - 20*x^2 + 44*x - log(x)
```

3.530.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{-1 + 44x - 40x^2 - 6x^3 + 2x^4}{x} \, dx = \frac{x^4}{2} - 2x^3 - 20x^2 + 44x - \log(x)$$

input
```
integrate((2*x**4-6*x**3-40*x**2+44*x-1)/x,x)
```

output
```
x**4/2 - 2*x**3 - 20*x**2 + 44*x - log(x)
```

3.530.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

$$\int \frac{-1+44x-40x^2-6x^3+2x^4}{x}\,dx = \frac{1}{2}\,x^4-2\,x^3-20\,x^2+44\,x-\log{(x)}$$

input
```
integrate((2*x^4-6*x^3-40*x^2+44*x-1)/x,x, algorithm=\
```

output
```
1/2*x^4 - 2*x^3 - 20*x^2 + 44*x - log(x)
```

3.530.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{-1+44x-40x^2-6x^3+2x^4}{x}\,dx = \frac{1}{2}\,x^4-2\,x^3-20\,x^2+44\,x-\log{(|x|)}$$

input
```
integrate((2*x^4-6*x^3-40*x^2+44*x-1)/x,x, algorithm=\
```

output
```
1/2*x^4 - 2*x^3 - 20*x^2 + 44*x - log(abs(x))
```

3.530.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

$$\int \frac{-1+44x-40x^2-6x^3+2x^4}{x}\,dx = 44\,x-\ln{(x)}-20\,x^2-2\,x^3+\frac{x^4}{2}$$

input
```
int(-(40*x^2 - 44*x + 6*x^3 - 2*x^4 + 1)/x,x)
```

output
```
44*x - log(x) - 20*x^2 - 2*x^3 + x^4/2
```

3.531 $\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+(-6\log(x)+(2-3x^2)\log^2(x))\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}$

3.531.1 Optimal result

Integrand size = 84, antiderivative size = 20

$$\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+\left(-6\log(x)+(2-3x^2)\log^2(x)\right)\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}\,dx = \frac{1+\log\left(-\frac{2}{3}+x^2+\frac{2}{\log(x)}\right)}{x}$$

output
```
(ln(-2/3+2/ln(x)+x^2)+1)/x
```

3.531.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+\left(-6\log(x)+(2-3x^2)\log^2(x)\right)\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}\,dx = \frac{1}{x}+\frac{\log\left(-\frac{2}{3}+x^2+\frac{2}{\log(x)}\right)}{x}$$

input
```
Integrate[(-6 - 6*Log[x] + (2 + 3*x^2)*Log[x]^2 + (-6*Log[x] + (2 - 3*x^2)
*Log[x]^2)*Log[(6 + (-2 + 3*x^2)*Log[x])/(3*Log[x])])/(6*x^2*Log[x] + (-2*
x^2 + 3*x^4)*Log[x]^2),x]
```

3.531. $\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+(-6\log(x)+(2-3x^2)\log^2(x))\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}\,dx$

output
```
x^(-1) + Log[-2/3 + x^2 + 2/Log[x]]/x
```

3.531.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(3x^2+2)\log^2(x)+((2-3x^2)\log^2(x)-6\log(x))\log\left(\frac{(3x^2-2)\log(x)+6}{3\log(x)}\right)-6\log(x)-6}{6x^2\log(x)+(3x^4-2x^2)\log^2(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(3x^2+2)\log^2(x)+((2-3x^2)\log^2(x)-6\log(x))\log\left(\frac{(3x^2-2)\log(x)+6}{3\log(x)}\right)-6\log(x)-6}{x^2\log(x)(3x^2\log(x)-2\log(x)+6)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{3x^2\log^2(x)+2\log^2(x)-6\log(x)-6}{x^2\log(x)(3x^2\log(x)-2\log(x)+6)}-\frac{\log\left(x^2+\frac{2}{\log(x)}-\frac{2}{3}\right)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$3\int \frac{1}{3\log(x)x^2-2\log(x)+6}dx-2\int \frac{1}{x^2(3\log(x)x^2-2\log(x)+6)}dx+9\sqrt{2}\int \frac{1}{(\sqrt{2}-\sqrt{3}x)(3\log(x)x^2-2\log(x)+6)}dx+9\sqrt{2}\int \frac{1}{(\sqrt{3}x+\sqrt{2})(3\log(x)x^2-2\log(x)+6)}dx-\int \frac{\log\left(x^2+\frac{2}{\log(x)}-\frac{2}{3}\right)}{x^2}dx-\sqrt{6}\text{arctanh}\left(\sqrt{\frac{3}{2}}x\right)-\text{ExpIntegralEi}(-\log(x))+\frac{1}{x}$$

input
```
Int[(-6 - 6*Log[x] + (2 + 3*x^2)*Log[x]^2 + (-6*Log[x] + (2 - 3*x^2)*Log[x
]^2)*Log[(6 + (-2 + 3*x^2)*Log[x])/(3*Log[x])])/(6*x^2*Log[x] + (-2*x^2 +
3*x^4)*Log[x]^2),x]
```

output
```
$Aborted
```

3.531. $\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+(-6\log(x)+(2-3x^2)\log^2(x))\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}dx$

3.531.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.531.4 Maple [A] (verified)

Time = 4.05 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.50

method	result
parallelrisch	$\frac{24+24\ln\left(\frac{3x^2\ln(x)-2\ln(x)+6}{3\ln(x)}\right)}{24x}$
risch	$\frac{\ln\left(x^2\ln(x)-\frac{2\ln(x)}{3}+2\right)}{x}-\frac{-i\pi\,\mathrm{csgn}\left(i\left(x^2\ln(x)-\frac{2\ln(x)}{3}+2\right)\right)\mathrm{csgn}\left(\frac{i\left(x^2\ln(x)-\frac{2\ln(x)}{3}+2\right)}{\ln(x)}\right)^2+i\pi\,\mathrm{csgn}\left(i\left(x^2\ln(x)-\frac{2\ln(x)}{3}\right.\right.}{}$

input
```
int((((-3*x^2+2)*ln(x)^2-6*ln(x))*ln(1/3*((3*x^2-2)*ln(x)+6)/ln(x))+(3*x^2
+2)*ln(x)^2-6*ln(x)-6)/((3*x^4-2*x^2)*ln(x)^2+6*x^2*ln(x)),x,method=_RETUR
NVERBOSE)
```

output
```
1/24*(24+24*ln(1/3*(3*x^2*ln(x)-2*ln(x)+6)/ln(x)))/x
```

3.531.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.25

$$\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+\left(-6\log(x)+(2-3x^2)\log^2(x)\right)\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}\,dx$$
$$=\frac{\log\left(\frac{(3\,x^2-2)\log(x)+6}{3\,\log(x)}\right)+1}{x}$$

input
```
integrate((((-3*x^2+2)*log(x)^2-6*log(x))*log(1/3*((3*x^2-2)*log(x)+6)/log
(x))+(3*x^2+2)*log(x)^2-6*log(x)-6)/((3*x^4-2*x^2)*log(x)^2+6*x^2*log(x)),
x, algorithm=\
```

output
```
(log(1/3*((3*x^2 - 2)*log(x) + 6)/log(x)) + 1)/x
```

3.531.6 Sympy [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+\left(-6\log(x)+(2-3x^2)\log^2(x)\right)\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}\,dx$$
$$=\frac{\log\left(\frac{\frac{(3x^2-2)\log(x)}{3}+2}{\log(x)}\right)}{x}+\frac{1}{x}$$

input
```
integrate((((-3*x**2+2)*ln(x)**2-6*ln(x))*ln(1/3*((3*x**2-2)*ln(x)+6)/ln(x
))+(3*x**2+2)*ln(x)**2-6*ln(x)-6)/((3*x**4-2*x**2)*ln(x)**2+6*x**2*ln(x)),
x)
```

output
```
log(((3*x**2 - 2)*log(x)/3 + 2)/log(x))/x + 1/x
```

3.531.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.35

$$\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+\left(-6\log(x)+(2-3x^2)\log^2(x)\right)\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}\,dx$$
$$=-\frac{\log(3)-\log\left((3x^2-2)\log(x)+6\right)+\log(\log(x))-1}{x}$$

input
```
integrate((((-3*x^2+2)*log(x)^2-6*log(x))*log(1/3*((3*x^2-2)*log(x)+6)/log
(x))+(3*x^2+2)*log(x)^2-6*log(x)-6)/((3*x^4-2*x^2)*log(x)^2+6*x^2*log(x)),
x, algorithm=\
```

output
```
-(log(3) - log((3*x^2 - 2)*log(x) + 6) + log(log(x)) - 1)/x
```

3.531.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.60

$$\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+\left(-6\log(x)+(2-3x^2)\log^2(x)\right)\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}\,dx$$
$$=\frac{\log\left(3\,x^2\log\left(x\right)-2\,\log\left(x\right)+6\right)}{x}-\frac{\log\left(3\,\log\left(x\right)\right)}{x}+\frac{1}{x}$$

input
```
integrate((((-3*x^2+2)*log(x)^2-6*log(x))*log(1/3*((3*x^2-2)*log(x)+6)/log
(x))+(3*x^2+2)*log(x)^2-6*log(x)-6)/((3*x^4-2*x^2)*log(x)^2+6*x^2*log(x)),
x, algorithm=\
```

output
```
log(3*x^2*log(x) - 2*log(x) + 6)/x - log(3*log(x))/x + 1/x
```

3.531.9 Mupad [B] (verification not implemented)

Time = 17.06 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.25

$$\int \frac{-6-6\log(x)+(2+3x^2)\log^2(x)+\left(-6\log(x)+(2-3x^2)\log^2(x)\right)\log\left(\frac{6+(-2+3x^2)\log(x)}{3\log(x)}\right)}{6x^2\log(x)+(-2x^2+3x^4)\log^2(x)}\,dx$$
$$=\frac{\ln\left(\frac{\frac{\ln(x)\,\left(3\,x^2-2\right)}{3}+2}{\ln(x)}\right)+1}{x}$$

input
```
int(-(6*log(x) - log(x)^2*(3*x^2 + 2) + log(((log(x)*(3*x^2 - 2))/3 + 2)/l
og(x))*(6*log(x) + log(x)^2*(3*x^2 - 2)) + 6)/(6*x^2*log(x) - log(x)^2*(2*
x^2 - 3*x^4)),x)
```

output
```
(log(((log(x)*(3*x^2 - 2))/3 + 2)/log(x)) + 1)/x
```

3.532 $\int \frac{-2x^6+e^x(-216x^3+54x^5)+(e^{3x}(-46656+11664x^2)+e^{2x}(-216x^3-2$

3.532.1 Optimal result

Integrand size = 243, antiderivative size = 27

$$\int \frac{-2x^6+e^x(-216x^3+54x^5)+(e^{3x}(-46656+11664x^2)+e^{2x}(-216x^3-216x^4-54x^5+54x^6)+e^x(2x^6$$

$$=\left(\frac{27\left(-\frac{4}{x}+x\right)}{x}-\frac{x}{e^x+\log(\log(x))}\right)^2$$

output
```
(27*(x-4/x)/x-x/(ln(ln(x))+exp(x)))^2
```

3.532.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.78

$$\int \frac{-2x^6+e^x(-216x^3+54x^5)+(e^{3x}(-46656+11664x^2)+e^{2x}(-216x^3-216x^4-54x^5+54x^6)+e^x(2x^6$$

$$=2\left(\frac{5832}{x^4}-\frac{2916}{x^2}+\frac{x^2}{2\left(e^x+\log(\log(x))\right)^2}-\frac{27(-4+x^2)}{x\left(e^x+\log(\log(x))\right)}\right)$$

input
```
Integrate[(-2*x^6 + E^x*(-216*x^3 + 54*x^5) + (E^(3*x)*(-46656 + 11664*x^2
) + E^(2*x)*(-216*x^3 - 216*x^4 - 54*x^5 + 54*x^6) + E^x*(2*x^6 - 2*x^7))*
Log[x] + (-216*x^3 + 54*x^5 + (2*x^6 + E^(2*x)*(-139968 + 34992*x^2) + E^x
*(-432*x^3 - 216*x^4 - 108*x^5 + 54*x^6))*Log[x])*Log[Log[x]] + (-216*x^3
- 54*x^5 + E^x*(-139968 + 34992*x^2))*Log[x]*Log[Log[x]]^2 + (-46656 + 116
64*x^2)*Log[x]*Log[Log[x]]^3)/(E^(3*x)*x^5*Log[x] + 3*E^(2*x)*x^5*Log[x]*L
og[Log[x]] + 3*E^x*x^5*Log[x]*Log[Log[x]]^2 + x^5*Log[x]*Log[Log[x]]^3),x]
```

output
```
2*(5832/x^4 - 2916/x^2 + x^2/(2*(E^x + Log[Log[x]])^2) - (27*(-4 + x^2))/(
x*(E^x + Log[Log[x]])))
```

3.532.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^6+\left(11664x^2-46656\right)\log(x)\log^3(\log(x))+e^x\left(54x^5-216x^3\right)+\left(-54x^5-216x^3+e^x\left(34992x^2-139968\right.\right.}{}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{2\left(x^3-27e^x\left(x^2-4\right)-27\left(x^2-4\right)\log(\log(x))\right)\left(-x^3-\log(x)\left(e^x\left((x-1)x^3+216e^x\right)+\left(432e^x-x^3\right)\log(\log(\right.\right.}{x^5\log(x)\left(e^x+\log(\log(x))\right)^3}$$

$$\Big\downarrow \text{ 27}$$

$$2\int -\frac{\left(x^3+27e^x\left(4-x^2\right)+27\left(4-x^2\right)\log(\log(x))\right)\left(x^3+\log(x)\left(216\log^2(\log(x))+\left(432e^x-x^3\right)\log(\log(x))+e\right.\right.}{x^5\log(x)\left(\log(\log(x))+e^x\right)^3}$$

$$\Big\downarrow \text{ 25}$$

$$-2\int \frac{\left(x^3+27e^x\left(4-x^2\right)+27\left(4-x^2\right)\log(\log(x))\right)\left(x^3+\log(x)\left(216\log^2(\log(x))+\left(432e^x-x^3\right)\log(\log(x))+e\right.\right.}{x^5\log(x)\left(\log(\log(x))+e^x\right)^3}$$

$$\Big\downarrow \text{ 7293}$$

$$-2\int \left(-\frac{5832(x-2)(x+2)}{x^5}-\frac{x(x\log(x)\log(\log(x))-1)}{\log(x)\left(\log(\log(x))+e^x\right)^3}+\frac{\log(x)x^4-\log(x)x^3+27\log(x)\log(\log(x))x^3-27}{x^2\log(x)\left(\log(\log(x))\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-2\left(-\int \frac{x^2 \log(\log(x))}{(\log(\log(x)) + e^x)^3}dx + \int \frac{x^2}{(\log(\log(x)) + e^x)^2}dx + 108\int \frac{1}{x^2\log(x)\,(\log(\log(x)) + e^x)^2}dx + 108\int \frac{}{x^2 (}\right.$$

input
```
Int[(-2*x^6 + E^x*(-216*x^3 + 54*x^5) + (E^(3*x)*(-46656 + 11664*x^2) + E^
(2*x)*(-216*x^3 - 216*x^4 - 54*x^5 + 54*x^6) + E^x*(2*x^6 - 2*x^7))*Log[x]
 + (-216*x^3 + 54*x^5 + (2*x^6 + E^(2*x)*(-139968 + 34992*x^2) + E^x*(-432
*x^3 - 216*x^4 - 108*x^5 + 54*x^6))*Log[x])*Log[Log[x]] + (-216*x^3 - 54*x
^5 + E^x*(-139968 + 34992*x^2))*Log[x]*Log[Log[x]]^2 + (-46656 + 11664*x^2
)*Log[x]*Log[Log[x]]^3)/(E^(3*x)*x^5*Log[x] + 3*E^(2*x)*x^5*Log[x]*Log[Log
[x]] + 3*E^x*x^5*Log[x]*Log[Log[x]]^2 + x^5*Log[x]*Log[Log[x]]^3),x]
```

output
```
$Aborted
```

3.532.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.532.
$$\int \frac{-2x^6+e^x(-216x^3+54x^5)+(e^{3x}(-46656+11664x^2)+e^{2x}(-216x^3-216x^4-54x^5+54x^6)+e^x(2x^6-2x^7))\log(x)+(-216x^3+54x^5+(2x^6+e^{2x}(-1}{e^{3x}x^5\log(x)+3e^{2x}x^5\log(x)}$$

3.532.4 Maple [A] (verified)

Time = 17.84 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.93

method	result
risch	$-\frac{5832(x^2-2)}{x^4}+\frac{x^3-54\,\mathrm{e}^x x^2-54x^2\ln(\ln(x))+216\,\mathrm{e}^x+216\ln(\ln(x))}{(\ln(\ln(x))+\mathrm{e}^x)^2 x}$
parallelrisch	$-\frac{23328\,\mathrm{e}^x\ln(\ln(x))x^2+11664\,\mathrm{e}^{2x}x^2-432\,\mathrm{e}^x x^3+11664x^2\ln(\ln(x))^2-46656\,\mathrm{e}^x\ln(\ln(x))+108x^5\mathrm{e}^x-23328\ln(\ln(x))^2-2x^6-23}{2x^4\left(\mathrm{e}^{2x}+2\,\mathrm{e}^x\ln(\ln(x))+\ln(\ln(x))^2\right)}$

input
```
int(((11664*x^2-46656)*ln(x)*ln(ln(x))^3+((34992*x^2-139968)*exp(x)-54*x^5
-216*x^3)*ln(x)*ln(ln(x))^2+(((34992*x^2-139968)*exp(x)^2+(54*x^6-108*x^5-
216*x^4-432*x^3)*exp(x)+2*x^6)*ln(x)+54*x^5-216*x^3)*ln(ln(x))+((11664*x^2
-46656)*exp(x)^3+(54*x^6-54*x^5-216*x^4-216*x^3)*exp(x)^2+(-2*x^7+2*x^6)*e
xp(x))*ln(x)+(54*x^5-216*x^3)*exp(x)-2*x^6)/(x^5*ln(x)*ln(ln(x))^3+3*x^5*e
xp(x)*ln(x)*ln(ln(x))^2+3*x^5*exp(x)^2*ln(x)*ln(ln(x))+x^5*exp(x)^3*ln(x))
,x,method=_RETURNVERBOSE)
```

output
```
-5832*(x^2-2)/x^4+(x^3-54*exp(x)*x^2-54*x^2*ln(ln(x))+216*exp(x)+216*ln(ln
(x)))/(ln(ln(x))+exp(x))^2/x
```

3.532.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. 2(26) = 52.

Time = 0.27 (sec) , antiderivative size = 94, normalized size of antiderivative = 3.48

$$\int \frac{-2x^6+e^x(-216x^3+54x^5)+(e^{3x}(-46656+11664x^2)+e^{2x}(-216x^3-216x^4-54x^5+54x^6)+e^x(2x^6}{}$$

$$=\frac{x^6-5832\,(x^2-2)\log\left(\log\left(x\right)\right)^2-5832\,(x^2-2)e^{(2\,x)}-54\,(x^5-4\,x^3)e^x-54\,(x^5-4\,x^3+216\,(x^2-2)e^x)}{2\,x^4e^x\log\left(\log\left(x\right)\right)+x^4\log\left(\log\left(x\right)\right)^2+x^4e^{(2\,x)}}$$

input
```
integrate(((11664*x^2-46656)*log(x)*log(log(x))^3+((34992*x^2-139968)*exp(
x)-54*x^5-216*x^3)*log(x)*log(log(x))^2+(((34992*x^2-139968)*exp(x)^2+(54*
x^6-108*x^5-216*x^4-432*x^3)*exp(x)+2*x^6)*log(x)+54*x^5-216*x^3)*log(log(
x))+((11664*x^2-46656)*exp(x)^3+(54*x^6-54*x^5-216*x^4-216*x^3)*exp(x)^2+(
-2*x^7+2*x^6)*exp(x))*log(x)+(54*x^5-216*x^3)*exp(x)-2*x^6)/(x^5*log(x)*lo
g(log(x))^3+3*x^5*exp(x)*log(x)*log(log(x))^2+3*x^5*exp(x)^2*log(x)*log(lo
g(x))+x^5*exp(x)^3*log(x)),x, algorithm=\
```

output
```
(x^6 - 5832*(x^2 - 2)*log(log(x))^2 - 5832*(x^2 - 2)*e^(2*x) - 54*(x^5 - 4
*x^3)*e^x - 54*(x^5 - 4*x^3 + 216*(x^2 - 2)*e^x)*log(log(x)))/(2*x^4*e^x*l
og(log(x)) + x^4*log(log(x))^2 + x^4*e^(2*x))
```

3.532.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(19) = 38.

Time = 0.20 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.44

$$\int \frac{-2x^6 + e^x(-216x^3 + 54x^5) + (e^{3x}(-46656 + 11664x^2) + e^{2x}(-216x^3 - 216x^4 - 54x^5 + 54x^6) + e^x(2x^6$$

$$= \frac{x^3 - 54x^2 \log(\log(x)) + (216 - 54x^2)e^x + 216\log(\log(x))}{xe^{2x} + 2xe^x \log(\log(x)) + x\log(\log(x))^2} + \frac{11664 - 5832x^2}{x^4}$$

input
```
integrate(((11664*x**2-46656)*ln(x)*ln(ln(x))**3+((34992*x**2-139968)*exp(
x)-54*x**5-216*x**3)*ln(x)*ln(ln(x))**2+(((34992*x**2-139968)*exp(x)**2+(5
4*x**6-108*x**5-216*x**4-432*x**3)*exp(x)+2*x**6)*ln(x)+54*x**5-216*x**3)*
ln(ln(x))+((11664*x**2-46656)*exp(x)**3+(54*x**6-54*x**5-216*x**4-216*x**3
)*exp(x)**2+(-2*x**7+2*x**6)*exp(x))*ln(x)+(54*x**5-216*x**3)*exp(x)-2*x**
6)/(x**5*ln(x)*ln(ln(x))**3+3*x**5*exp(x)*ln(x)*ln(ln(x))**2+3*x**5*exp(x)
**2*ln(x)*ln(ln(x))+x**5*exp(x)**3*ln(x)),x)
```

output
```
(x**3 - 54*x**2*log(log(x)) + (216 - 54*x**2)*exp(x) + 216*log(log(x)))/(x
*exp(2*x) + 2*x*exp(x)*log(log(x)) + x*log(log(x))**2) + (11664 - 5832*x**
2)/x**4
```

3.532.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. 2(26) = 52.

Time = 0.31 (sec) , antiderivative size = 94, normalized size of antiderivative = 3.48

$$\int \frac{-2x^6 + e^x(-216x^3 + 54x^5) + (e^{3x}(-46656 + 11664x^2) + e^{2x}(-216x^3 - 216x^4 - 54x^5 + 54x^6) + e^x(2x^6$$

$$= \frac{x^6 - 5832\,(x^2 - 2)\log(\log(x))^2 - 5832\,(x^2 - 2)e^{(2\,x)} - 54\,(x^5 - 4\,x^3)e^x - 54\,(x^5 - 4\,x^3 + 216\,(x^2 - 2)e^x}{2\,x^4 e^x \log(\log(x)) + x^4\log(\log(x))^2 + x^4 e^{(2\,x)}}$$

3.532.
$$\int \frac{-2x^6+e^x(-216x^3+54x^5)+(e^{3x}(-46656+11664x^2)+e^{2x}(-216x^3-216x^4-54x^5+54x^6)+e^x(2x^6-2x^7))\log(x)+(-216x^3+54x^5+(2x^6+e^{2x}(-1}{e^{3x}x^5\log(x)+3e^{2x}x^5\log(x)}$$

input
```
integrate(((11664*x^2-46656)*log(x)*log(log(x))^3+((34992*x^2-139968)*exp(
x)-54*x^5-216*x^3)*log(x)*log(log(x))^2+(((34992*x^2-139968)*exp(x)^2+(54*
x^6-108*x^5-216*x^4-432*x^3)*exp(x)+2*x^6)*log(x)+54*x^5-216*x^3)*log(log(
x))+((11664*x^2-46656)*exp(x)^3+(54*x^6-54*x^5-216*x^4-216*x^3)*exp(x)^2+(
-2*x^7+2*x^6)*exp(x))*log(x)+(54*x^5-216*x^3)*exp(x)-2*x^6)/(x^5*log(x)*lo
g(log(x))^3+3*x^5*exp(x)*log(x)*log(log(x))^2+3*x^5*exp(x)^2*log(x)*log(lo
g(x))+x^5*exp(x)^3*log(x)),x, algorithm=\
```

output
```
(x^6 - 5832*(x^2 - 2)*log(log(x))^2 - 5832*(x^2 - 2)*e^(2*x) - 54*(x^5 - 4
*x^3)*e^x - 54*(x^5 - 4*x^3 + 216*(x^2 - 2)*e^x)*log(log(x)))/(2*x^4*e^x*l
og(log(x)) + x^4*log(log(x))^2 + x^4*e^(2*x))
```

3.532.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 114 vs. $2(26) = 52$.

Time = 0.45 (sec) , antiderivative size = 114, normalized size of antiderivative = 4.22

$$\int \frac{-2x^6 + e^x(-216x^3 + 54x^5) + (e^{3x}(-46656 + 11664x^2) + e^{2x}(-216x^3 - 216x^4 - 54x^5 + 54x^6) + e^x(2x^6 \cdots}{\cdots}$$

$$= \frac{x^6 - 54\,x^5e^x - 54\,x^5\log(\log(x)) + 216\,x^3e^x + 216\,x^3\log(\log(x)) - 11664\,x^2e^x\log(\log(x)) - 5832\,x^2\log \cdots}{2\,x^4e^x\log(\log(x)) + x^4\log(\log(\cdots}$$

input
```
integrate(((11664*x^2-46656)*log(x)*log(log(x))^3+((34992*x^2-139968)*exp(
x)-54*x^5-216*x^3)*log(x)*log(log(x))^2+(((34992*x^2-139968)*exp(x)^2+(54*
x^6-108*x^5-216*x^4-432*x^3)*exp(x)+2*x^6)*log(x)+54*x^5-216*x^3)*log(log(
x))+((11664*x^2-46656)*exp(x)^3+(54*x^6-54*x^5-216*x^4-216*x^3)*exp(x)^2+(
-2*x^7+2*x^6)*exp(x))*log(x)+(54*x^5-216*x^3)*exp(x)-2*x^6)/(x^5*log(x)*lo
g(log(x))^3+3*x^5*exp(x)*log(x)*log(log(x))^2+3*x^5*exp(x)^2*log(x)*log(lo
g(x))+x^5*exp(x)^3*log(x)),x, algorithm=\
```

output
```
(x^6 - 54*x^5*e^x - 54*x^5*log(log(x)) + 216*x^3*e^x + 216*x^3*log(log(x))
 - 11664*x^2*e^x*log(log(x)) - 5832*x^2*log(log(x))^2 - 5832*x^2*e^(2*x) +
 23328*e^x*log(log(x)) + 11664*log(log(x))^2 + 11664*e^(2*x))/(2*x^4*e^x*l
og(log(x)) + x^4*log(log(x))^2 + x^4*e^(2*x))
```

3.532.

$$\int \frac{-2x^6+e^x(-216x^3+54x^5)+(e^{3x}(-46656+11664x^2)+e^{2x}(-216x^3-216x^4-54x^5+54x^6)+e^x(2x^6-2x^7))\log(x)+(-216x^3+54x^5+(2x^6+e^{2x}(-\cdots}{e^{3x}x^5\log(x)+3e^{2x}x^5\log(x)\cdots}$$

3.532.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-2x^6 + e^x(-216x^3 + 54x^5) + (e^{3x}(-46656 + 11664x^2) + e^{2x}(-216x^3 - 216x^4 - 54x^5 + 54x^6) + e^x(2x^6$$

$$= \int \frac{\ln(\ln(x))\,(\ln(x)\,(e^{2x}\,(34992\,x^2 - 139968) - e^x\,(-54\,x^6 + 108\,x^5 + 216\,x^4 + 432\,x^3) + 2\,x^6) - 216\,x^3$$

input
```
int((log(log(x))*(log(x)*(exp(2*x)*(34992*x^2 - 139968) - exp(x)*(432*x^3
+ 216*x^4 + 108*x^5 - 54*x^6) + 2*x^6) - 216*x^3 + 54*x^5) - exp(x)*(216*x
^3 - 54*x^5) + log(x)*(exp(x)*(2*x^6 - 2*x^7) + exp(3*x)*(11664*x^2 - 4665
6) - exp(2*x)*(216*x^3 + 216*x^4 + 54*x^5 - 54*x^6)) - 2*x^6 + log(log(x))
^3*log(x)*(11664*x^2 - 46656) - log(log(x))^2*log(x)*(216*x^3 - exp(x)*(34
992*x^2 - 139968) + 54*x^5))/(x^5*exp(3*x)*log(x) + x^5*log(log(x))^3*log(
x) + 3*x^5*log(log(x))*exp(2*x)*log(x) + 3*x^5*log(log(x))^2*exp(x)*log(x)
),x)
```

output
```
int((log(log(x))*(log(x)*(exp(2*x)*(34992*x^2 - 139968) - exp(x)*(432*x^3
+ 216*x^4 + 108*x^5 - 54*x^6) + 2*x^6) - 216*x^3 + 54*x^5) - exp(x)*(216*x
^3 - 54*x^5) + log(x)*(exp(x)*(2*x^6 - 2*x^7) + exp(3*x)*(11664*x^2 - 4665
6) - exp(2*x)*(216*x^3 + 216*x^4 + 54*x^5 - 54*x^6)) - 2*x^6 + log(log(x))
^3*log(x)*(11664*x^2 - 46656) - log(log(x))^2*log(x)*(216*x^3 - exp(x)*(34
992*x^2 - 139968) + 54*x^5))/(x^5*exp(3*x)*log(x) + x^5*log(log(x))^3*log(
x) + 3*x^5*log(log(x))*exp(2*x)*log(x) + 3*x^5*log(log(x))^2*exp(x)*log(x)
), x)
```

3.532. $\int \frac{-2x^6+e^x(-216x^3+54x^5)+(e^{3x}(-46656+11664x^2)+e^{2x}(-216x^3-216x^4-54x^5+54x^6)+e^x(2x^6-2x^7))\log(x)+(-216x^3+54x^5+(2x^6+e^{2x}(-}{e^{3x}x^5\log(x)+3e^{2x}x^5\log(x)}$

3.533 $\int \frac{12+22x^2-2x^3+e^{e^{-4+x}}(-x^2+2x^3+e^{-4+x}(-x^3+x^4))}{-12x-9x^2+22x^3-x^4+e^{e^{-4+x}}(-x^3+x^4)}\,dx$

3.533.1 Optimal result

Integrand size = 85, antiderivative size = 31

$$\int \frac{12+22x^2-2x^3+e^{e^{-4+x}}(-x^2+2x^3+e^{-4+x}(-x^3+x^4))}{-12x-9x^2+22x^3-x^4+e^{e^{-4+x}}(-x^3+x^4)}\,dx = \log(1-x)+\log\left(6+3\left(5+\frac{4}{x}\right)-x+e^{e^{-4+x}}x\right)$$

output
```
ln(1-x)+ln(21+12/x-x+x*exp(exp(x-4)))
```

3.533.2 Mathematica [A] (verified)

Time = 0.83 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.55

$$\int \frac{12+22x^2-2x^3+e^{e^{-4+x}}(-x^2+2x^3+e^{-4+x}(-x^3+x^4))}{-12x-9x^2+22x^3-x^4+e^{e^{-4+x}}(-x^3+x^4)}\,dx = \frac{e^4\log(1-x)-e^4\log(x)+e^4\log\left(12+21x-x^2+e^{e^{-4+x}}x^2\right)}{e^4}$$

input
```
Integrate[(12 + 22*x^2 - 2*x^3 + E^E^(-4 + x)*(-x^2 + 2*x^3 + E^(-4 + x)*(
-x^3 + x^4)))/(-12*x - 9*x^2 + 22*x^3 - x^4 + E^E^(-4 + x)*(-x^3 + x^4)),x
]
```

output
```
(E^4*Log[1 - x] - E^4*Log[x] + E^4*Log[12 + 21*x - x^2 + E^E^(-4 + x)*x^2]
)/E^4
```

3.533.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^3+22x^2+e^{e^{x-4}}\left(2x^3-x^2+e^{x-4}\left(x^4-x^3\right)\right)+12}{-x^4+22x^3-9x^2+e^{e^{x-4}}\left(x^4-x^3\right)-12x}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{2x^3-22x^2-e^{e^{x-4}}\left(2x^3-x^2+e^{x-4}\left(x^4-x^3\right)\right)-12}{(1-x)x\left(e^{e^{x-4}}x^2-x^2+21x+12\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{e^{x+e^{x-4}-4}x^2}{e^{e^{x-4}}x^2-x^2+21x+12}+\frac{2e^{e^{x-4}}x^2}{(x-1)\left(e^{e^{x-4}}x^2-x^2+21x+12\right)}-\frac{2x^2}{(x-1)\left(e^{e^{x-4}}x^2-x^2+21x+12\right)}-\frac{}{(x-}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$20\int \frac{1}{e^{e^{x-4}}x^2-x^2+21x+12}dx+\int \frac{e^{e^{x-4}}}{e^{e^{x-4}}x^2-x^2+21x+12}dx+32\int \frac{1}{(x-1)\left(e^{e^{x-4}}x^2-x^2+21x+12\right)}dx+\int \frac{e^{e^{x-4}}}{(x-1)\left(e^{e^{x-4}}x^2-x^2+21x+12\right)}dx-12\int \frac{1}{x\left(e^{e^{x-4}}x^2-x^2+21x+12\right)}dx-2\int \frac{x}{e^{e^{x-4}}x^2-x^2+21x+12}dx+2\int \frac{e^{e^{x-4}}x}{e^{e^{x-4}}x^2-x^2+21x+12}dx+\int \frac{e^{x+e^{x-4}-4}x^2}{e^{e^{x-4}}x^2-x^2+21x+12}dx$$

input
```
Int[(12 + 22*x^2 - 2*x^3 + E^E^(-4 + x)*(-x^2 + 2*x^3 + E^(-4 + x)*(-x^3 +
 x^4)))/(-12*x - 9*x^2 + 22*x^3 - x^4 + E^E^(-4 + x)*(-x^3 + x^4)),x]
```

output
```
$Aborted
```

3.533.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.533.4 Maple [A] (verified)

Time = 0.76 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.97

method	result	size
norman	$-\ln(x)+\ln(-1+x)+\ln\left(\mathrm{e}^{\mathrm{e}^{x-4}}x^{2}-x^{2}+21x+12\right)$	30
risch	$\ln(x^{2}-x)+\ln\left(\mathrm{e}^{\mathrm{e}^{x-4}}-\frac{x^{2}-21x-12}{x^{2}}\right)$	30
parallelrisch	$-\ln(x)+\ln(-1+x)+\ln\left(\mathrm{e}^{\mathrm{e}^{x-4}}x^{2}-x^{2}+21x+12\right)$	30

input
```
int((((x^4-x^3)*exp(x-4)+2*x^3-x^2)*exp(exp(x-4))-2*x^3+22*x^2+12)/((x^4-x
^3)*exp(exp(x-4))-x^4+22*x^3-9*x^2-12*x),x,method=_RETURNVERBOSE)
```

output
```
-ln(x)+ln(-1+x)+ln(exp(exp(x-4))*x^2-x^2+21*x+12)
```

3.533.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.06

$$\int \frac{12+22x^2-2x^3+e^{e^{-4+x}}(-x^2+2x^3+e^{-4+x}(-x^3+x^4))}{-12x-9x^2+22x^3-x^4+e^{e^{-4+x}}(-x^3+x^4)}\,dx = \log\left(x^2-x\right)+\log\left(\frac{x^2e^{\left(e^{(x-4)}\right)}-x^2+21\,x+12}{x^2}\right)$$

input
```
integrate(((((x^4-x^3)*exp(x-4)+2*x^3-x^2)*exp(exp(x-4))-2*x^3+22*x^2+12)/(
(x^4-x^3)*exp(exp(x-4))-x^4+22*x^3-9*x^2-12*x),x, algorithm=\
```

output
```
log(x^2 - x) + log((x^2*e^(e^(x - 4)) - x^2 + 21*x + 12)/x^2)
```

3.533.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{12+22x^2-2x^3+e^{e^{-4+x}}(-x^2+2x^3+e^{-4+x}(-x^3+x^4))}{-12x-9x^2+22x^3-x^4+e^{e^{-4+x}}(-x^3+x^4)}\,dx = \log\left(x^2-x\right)+\log\left(e^{e^{x-4}}+\frac{-x^2+21x+12}{x^2}\right)$$

input
```
integrate(((((x**4-x**3)*exp(x-4)+2*x**3-x**2)*exp(exp(x-4))-2*x**3+22*x**2
+12)/((x**4-x**3)*exp(exp(x-4))-x**4+22*x**3-9*x**2-12*x),x)
```

output
```
log(x**2 - x) + log(exp(exp(x - 4)) + (-x**2 + 21*x + 12)/x**2)
```

3.533.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

$$\int \frac{12+22x^2-2x^3+e^{e^{-4+x}}(-x^2+2x^3+e^{-4+x}(-x^3+x^4))}{-12x-9x^2+22x^3-x^4+e^{e^{-4+x}}(-x^3+x^4)}\,dx = \log\left(x-1\right)+\log\left(x\right)+\log\left(\frac{x^2e^{\left(e^{(x-4)}\right)}-x^2+21\,x+12}{x^2}\right)$$

input
```
integrate(((((x^4-x^3)*exp(x-4)+2*x^3-x^2)*exp(exp(x-4))-2*x^3+22*x^2+12)/(
(x^4-x^3)*exp(exp(x-4))-x^4+22*x^3-9*x^2-12*x),x, algorithm=\
```

output
```
log(x - 1) + log(x) + log((x^2*e^(e^(x - 4)) - x^2 + 21*x + 12)/x^2)
```

3.533.8 Giac [F]

$$\int \frac{12+22x^2-2x^3+e^{e^{-4+x}}(-x^2+2x^3+e^{-4+x}(-x^3+x^4))}{-12x-9x^2+22x^3-x^4+e^{e^{-4+x}}(-x^3+x^4)}\,dx$$
$$=\int \frac{2\,x^3-22\,x^2-\left(2\,x^3-x^2+(x^4-x^3)e^{(x-4)}\right)e^{\left(e^{(x-4)}\right)}-12}{x^4-22\,x^3+9\,x^2-(x^4-x^3)e^{\left(e^{(x-4)}\right)}+12\,x}\,dx$$

input
```
integrate((((x^4-x^3)*exp(x-4)+2*x^3-x^2)*exp(exp(x-4))-2*x^3+22*x^2+12)/(
(x^4-x^3)*exp(exp(x-4))-x^4+22*x^3-9*x^2-12*x),x, algorithm=\
```

output
```
integrate((2*x^3 - 22*x^2 - (2*x^3 - x^2 + (x^4 - x^3)*e^(x - 4))*e^(e^(x
- 4)) - 12)/(x^4 - 22*x^3 + 9*x^2 - (x^4 - x^3)*e^(e^(x - 4)) + 12*x), x)
```

3.533.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

$$\int \frac{12+22x^2-2x^3+e^{e^{-4+x}}(-x^2+2x^3+e^{-4+x}(-x^3+x^4))}{-12x-9x^2+22x^3-x^4+e^{e^{-4+x}}(-x^3+x^4)}\,dx$$
$$=\ln\left(x\,(x-1)\right)+\ln\left(\frac{21\,x-x^2+x^2\,\mathrm{e}^{\mathrm{e}^{x-4}}+12}{x^2}\right)$$

input
```
int((exp(exp(x - 4))*(exp(x - 4)*(x^3 - x^4) + x^2 - 2*x^3) - 22*x^2 + 2*x
^3 - 12)/(12*x + exp(exp(x - 4))*(x^3 - x^4) + 9*x^2 - 22*x^3 + x^4),x)
```

output
```
log(x*(x - 1)) + log((21*x - x^2 + x^2*exp(exp(x - 4)) + 12)/x^2)
```

3.534 $\int \frac{e^{-2x}\left(32e^xx^4+(-x^9+e^x(-160x^4+32x^5))\log(x))\log\left(\frac{3}{\log(x)}\right)+(5x^9-\right.}{128\log(x)}$

3.534.1 Optimal result

Integrand size = 76, antiderivative size = 23

$$\int \frac{e^{-2x}\left(32e^xx^4+(-x^9+e^x(-160x^4+32x^5))\log(x))\log\left(\frac{3}{\log(x)}\right)+(5x^9-x^{10})\log(x)\log^2\left(\frac{3}{\log(x)}\right)\right)}{128\log(x)}\,dx$$
$$=\left(-2+\frac{1}{16}e^{-x}x^5\log\left(\frac{3}{\log(x)}\right)\right)^2$$

output
```
(1/16*x^5*ln(3/ln(x))/exp(x)-2)^2
```

3.534.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.57

$$\int \frac{e^{-2x}\left(32e^xx^4+(-x^9+e^x(-160x^4+32x^5))\log(x))\log\left(\frac{3}{\log(x)}\right)+(5x^9-x^{10})\log(x)\log^2\left(\frac{3}{\log(x)}\right)\right)}{128\log(x)}\,dx$$
$$=\frac{1}{256}e^{-2x}x^5\log\left(\frac{3}{\log(x)}\right)\left(-64e^x+x^5\log\left(\frac{3}{\log(x)}\right)\right)$$

input
```
Integrate[(32*E^x*x^4 + (-x^9 + E^x*(-160*x^4 + 32*x^5)*Log[x])*Log[3/Log[
x]] + (5*x^9 - x^10)*Log[x]*Log[3/Log[x]]^2)/(128*E^(2*x)*Log[x]),x]
```

output
```
(x^5*Log[3/Log[x]]*(-64*E^x + x^5*Log[3/Log[x]]))/(256*E^(2*x))
```

3.534.3 Rubi [A] (verified)

Time = 1.25 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.87, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {27, 7239, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-2x}\left(32e^x x^4+\left(5x^9-x^{10}\right)\log(x)\log^2\left(\frac{3}{\log(x)}\right)+\left(e^x\left(32x^5-160x^4\right)\log(x)-x^9\right)\log\left(\frac{3}{\log(x)}\right)\right)}{128\log(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{128}\int \frac{e^{-2x}\left(32e^x x^4+\left(5x^9-x^{10}\right)\log(x)\log^2\left(\frac{3}{\log(x)}\right)-\left(x^9+32e^x\left(5x^4-x^5\right)\log(x)\right)\log\left(\frac{3}{\log(x)}\right)\right)}{\log(x)}dx$$

$$\Big\downarrow \text{7239}$$

$$\frac{1}{128}\int \frac{e^{-2x}x^4\left(32e^x-x^5\log\left(\frac{3}{\log(x)}\right)\right)\left((x-5)\log(x)\log\left(\frac{3}{\log(x)}\right)+1\right)}{\log(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{128}\int \left(\frac{32e^{-x}x^4\left(x\log(x)\log\left(\frac{3}{\log(x)}\right)-5\log(x)\log\left(\frac{3}{\log(x)}\right)+1\right)}{\log(x)}-\frac{e^{-2x}x^9\log\left(\frac{3}{\log(x)}\right)\left(x\log(x)\log\left(\frac{3}{\log(x)}\right)-\right.}{\log(x)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{128}\left(\frac{1}{2}e^{-2x}x^{10}\log^2\left(\frac{3}{\log(x)}\right)-32e^{-x}x^5\log\left(\frac{3}{\log(x)}\right)\right)$$

input
```
Int[(32*E^x*x^4 + (-x^9 + E^x*(-160*x^4 + 32*x^5)*Log[x])*Log[3/Log[x]] +
(5*x^9 - x^10)*Log[x]*Log[3/Log[x]]^2)/(128*E^(2*x)*Log[x]),x]
```

output
```
((-32*x^5*Log[3/Log[x]])/E^x + (x^10*Log[3/Log[x]]^2)/(2*E^(2*x)))/128
```

3.534.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.534.4 Maple [A] (verified)

Time = 4.70 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.57

method	result	size
parallelrisch	$-\frac{\left(-\ln\left(\frac{3}{\ln(x)}\right)^{2} x^{10}+64\ln\left(\frac{3}{\ln(x)}\right)e^{x} x^{5}\right)e^{-2x}}{256}$	36
risch	$\frac{x^{10} e^{-2x} \ln(\ln(x))^{2}}{256}-\frac{x^{5}\left(2x^{5}\ln(3)-64\,e^{x}\right)e^{-2x}\ln(\ln(x))}{256}+\frac{x^{5}\left(4x^{5}\ln(3)^{2}-256\ln(3)e^{x}\right)e^{-2x}}{1024}$	65

input
```
int(1/128*((-x^10+5*x^9)*ln(x)*ln(3/ln(x))^2+((32*x^5-160*x^4)*exp(x)*ln(x
)-x^9)*ln(3/ln(x))+32*exp(x)*x^4)/exp(x)^2/ln(x),x,method=_RETURNVERBOSE)
```

output
```
-1/256*(-ln(3/ln(x))^2*x^10+64*ln(3/ln(x))*exp(x)*x^5)/exp(x)^2
```

3.534.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.48

$$\int \frac{e^{-2x}\left(32e^x x^4+(-x^9+e^x(-160x^4+32x^5)\log(x))\log\left(\frac{3}{\log(x)}\right)+(5x^9-x^{10})\log(x)\log^2\left(\frac{3}{\log(x)}\right)\right)}{128\log(x)}\,dx$$
$$=\frac{1}{256}\left(x^{10}\log\left(\frac{3}{\log(x)}\right)^2-64\,x^5e^x\log\left(\frac{3}{\log(x)}\right)\right)e^{(-2\,x)}$$

input
```
integrate(1/128*((-x^10+5*x^9)*log(x)*log(3/log(x))^2+((32*x^5-160*x^4)*ex
p(x)*log(x)-x^9)*log(3/log(x))+32*exp(x)*x^4)/exp(x)^2/log(x),x, algorithm
=\
```

output
```
1/256*(x^10*log(3/log(x))^2 - 64*x^5*e^x*log(3/log(x)))*e^(-2*x)
```

3.534.6 Sympy [A] (verification not implemented)

Time = 49.16 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{e^{-2x}\left(32e^x x^4+(-x^9+e^x(-160x^4+32x^5)\log(x))\log\left(\frac{3}{\log(x)}\right)+(5x^9-x^{10})\log(x)\log^2\left(\frac{3}{\log(x)}\right)\right)}{128\log(x)}\,dx$$
$$=\frac{x^{10}e^{-2x}\log\left(\frac{3}{\log(x)}\right)^2}{256}-\frac{x^5e^{-x}\log\left(\frac{3}{\log(x)}\right)}{4}$$

input
```
integrate(1/128*((-x**10+5*x**9)*ln(x)*ln(3/ln(x))**2+((32*x**5-160*x**4)*
exp(x)*ln(x)-x**9)*ln(3/ln(x))+32*exp(x)*x**4)/exp(x)**2/ln(x),x)
```

output
```
x**10*exp(-2*x)*log(3/log(x))**2/256 - x**5*exp(-x)*log(3/log(x))/4
```

3.534.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. 2(21) = 42.

Time = 0.33 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.78

$$\int \frac{e^{-2x}\left(32e^xx^4+(-x^9+e^x(-160x^4+32x^5)\log(x))\log\left(\frac{3}{\log(x)}\right)+(5x^9-x^{10})\log(x)\log^2\left(\frac{3}{\log(x)}\right)\right)}{128\log(x)}\,dx$$
$$=\frac{1}{256}\,x^{10}e^{(-2\,x)}\log{(3)}^2+\frac{1}{256}\,x^{10}e^{(-2\,x)}\log{(\log{(x)})}^2 - \frac{1}{4}\,x^5e^{(-x)}\log{(3)}-\frac{1}{128}\left(x^{10}e^{(-2\,x)}\log{(3)}-32\,x^5e^{(-x)}\right)\log{(\log{(x)})}$$

input
```
integrate(1/128*((-x^10+5*x^9)*log(x)*log(3/log(x))^2+((32*x^5-160*x^4)*ex
p(x)*log(x)-x^9)*log(3/log(x))+32*exp(x)*x^4)/exp(x)^2/log(x),x, algorithm
=\
```

output
```
1/256*x^10*e^(-2*x)*log(3)^2 + 1/256*x^10*e^(-2*x)*log(log(x))^2 - 1/4*x^5
*e^(-x)*log(3) - 1/128*(x^10*e^(-2*x)*log(3) - 32*x^5*e^(-x))*log(log(x))
```

3.534.8 Giac [F]

$$\int \frac{e^{-2x}\left(32e^xx^4+(-x^9+e^x(-160x^4+32x^5)\log(x))\log\left(\frac{3}{\log(x)}\right)+(5x^9-x^{10})\log(x)\log^2\left(\frac{3}{\log(x)}\right)\right)}{128\log(x)}\,dx$$
$$=\int \frac{\left(32\,x^4e^x-(x^{10}-5\,x^9)\log{(x)}\log\left(\frac{3}{\log(x)}\right)^2-(x^9-32\,(x^5-5\,x^4)e^x\log{(x)})\log\left(\frac{3}{\log(x)}\right)\right)e^{(-2\,x)}}{128\,\log{(x)}}\,dx$$

input
```
integrate(1/128*((-x^10+5*x^9)*log(x)*log(3/log(x))^2+((32*x^5-160*x^4)*ex
p(x)*log(x)-x^9)*log(3/log(x))+32*exp(x)*x^4)/exp(x)^2/log(x),x, algorithm
=\
```

output
```
integrate(1/128*(32*x^4*e^x - (x^10 - 5*x^9)*log(x)*log(3/log(x))^2 - (x^9
 - 32*(x^5 - 5*x^4)*e^x*log(x))*log(3/log(x)))*e^(-2*x)/log(x), x)
```

3.534.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-2x}\left(32e^xx^4+\left(-x^9+e^x\left(-160x^4+32x^5\right)\log(x)\right)\log\left(\frac{3}{\log(x)}\right)+\left(5x^9-x^{10}\right)\log(x)\log^2\left(\frac{3}{\log(x)}\right)\right)}{128\log(x)}\,dx$$
$$=\int \frac{\mathrm{e}^{-2\,x}\,\left(\frac{x^4\,\mathrm{e}^x}{4}-\frac{\ln\left(\frac{3}{\ln(x)}\right)\,\left(x^9+\mathrm{e}^x\,\ln(x)\,\left(160\,x^4-32\,x^5\right)\right)}{128}+\frac{{\ln\left(\frac{3}{\ln(x)}\right)}^2\,\ln(x)\,\left(5\,x^9-x^{10}\right)}{128}\right)}{\ln\left(x\right)}\,dx$$

input
```
int((exp(-2*x)*((x^4*exp(x))/4 - (log(3/log(x))*(x^9 + exp(x)*log(x)*(160*
x^4 - 32*x^5)))/128 + (log(3/log(x))^2*log(x)*(5*x^9 - x^10))/128))/log(x)
,x)
```

output
```
int((exp(-2*x)*((x^4*exp(x))/4 - (log(3/log(x))*(x^9 + exp(x)*log(x)*(160*
x^4 - 32*x^5)))/128 + (log(3/log(x))^2*log(x)*(5*x^9 - x^10))/128))/log(x)
, x)
```

3.535 $\int \frac{e^{-1+x}(-32+32x)}{e^{2x}-2e^x x+x^2}\,dx$

3.535.1 Optimal result

Integrand size = 28, antiderivative size = 20

$$\int \frac{e^{-1+x}(-32+32x)}{e^{2x}-2e^x x+x^2}\,dx = 2\left(11-\frac{16e^{-1+x}}{e^x-x}\right)$$

output
```
22-32/(exp(x)-x)*exp(-1+x)
```

3.535.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{e^{-1+x}(-32+32x)}{e^{2x}-2e^x x+x^2}\,dx = -\frac{32x}{e\,(e^x-x)}$$

input
```
Integrate[(E^(-1 + x)*(-32 + 32*x))/(E^(2*x) - 2*E^x*x + x^2),x]
```

output
```
(-32*x)/(E*(E^x - x))
```

3.535.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.107, Rules used = {7292, 7262, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x-1}(32x-32)}{x^2-2e^x x+e^{2x}}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{x-1}(32x-32)}{(e^x-x)^2}dx$$

$$\Big\downarrow \text{7262}$$

$$\frac{32\int \frac{1}{\left(\frac{e^x}{x}-1\right)^2}d\frac{e^x}{x}}{e}$$

$$\Big\downarrow \text{17}$$

$$\frac{32}{e\left(1-\frac{e^x}{x}\right)}$$

input
```
Int[(E^(-1 + x)*(-32 + 32*x))/(E^(2*x) - 2*E^x*x + x^2),x]
```

output
```
32/(E*(1 - E^x/x))
```

3.535.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 7262
```
Int[(u_)*((a_.)*(v_)^(p_.) + (b_.)*(w_)^(q_.))^(m_.), x_Symbol] :> With[{c
= Simplify[u/(p*w*D[v, x] - q*v*D[w, x])]}, Simp[c*p   Subst[Int[(b + a*x^p
)^m, x], x, v*w^(m*q + 1)], x] /; FreeQ[c, x]] /; FreeQ[{a, b, m, p, q}, x]
 && EqQ[p + q*(m*p + 1), 0] && IntegerQ[p] && IntegerQ[m]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.535.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

method	result	size
risch	$\frac{32\,\mathrm{e}^{-1}x}{x-\mathrm{e}^{x}}$	14
parallelrisch	$\frac{32\,\mathrm{e}^{-1+x}}{x-\mathrm{e}^{x}}$	15
norman	$\frac{32\,\mathrm{e}^{-1}\mathrm{e}^{x}}{x-\mathrm{e}^{x}}$	17

input
```
int((32*x-32)*exp(-1+x)/(exp(x)^2-2*exp(x)*x+x^2),x,method=_RETURNVERBOSE)
```

output
```
32*exp(-1)*x/(x-exp(x))
```

3.535.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{e^{-1+x}(-32+32x)}{e^{2x}-2e^{x}x+x^{2}}\,dx=\frac{32\,x}{xe-e^{(x+1)}}$$

input
```
integrate((32*x-32)*exp(-1+x)/(exp(x)^2-2*exp(x)*x+x^2),x, algorithm=\
```

output
```
32*x/(x*e - e^(x + 1))
```

3.535.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{e^{-1+x}(-32+32x)}{e^{2x}-2e^{x}x+x^{2}}\,dx=-\frac{32x}{-ex+ee^{x}}$$

input
```
integrate((32*x-32)*exp(-1+x)/(exp(x)**2-2*exp(x)*x+x**2),x)
```

output
```
-32*x/(-E*x + E*exp(x))
```

3.535.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{e^{-1+x}(-32+32x)}{e^{2x}-2e^x x+x^2}\,dx=\frac{32\,x}{xe-e^{(x+1)}}$$

input
```
integrate((32*x-32)*exp(-1+x)/(exp(x)^2-2*exp(x)*x+x^2),x, algorithm=\
```

output
```
32*x/(x*e - e^(x + 1))
```

3.535.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{e^{-1+x}(-32+32x)}{e^{2x}-2e^x x+x^2}\,dx=\frac{32\,x}{xe-e^{(x+1)}}$$

input
```
integrate((32*x-32)*exp(-1+x)/(exp(x)^2-2*exp(x)*x+x^2),x, algorithm=\
```

output
```
32*x/(x*e - e^(x + 1))
```

3.535.9 Mupad [B] (verification not implemented)

Time = 17.32 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{e^{-1+x}(-32+32x)}{e^{2x}-2e^x x+x^2}\,dx=-\frac{32\,x}{\mathrm{e}^{x+1}-x\,\mathrm{e}}$$

input
```
int((exp(x - 1)*(32*x - 32))/(exp(2*x) - 2*x*exp(x) + x^2),x)
```

output
```
-(32*x)/(exp(x + 1) - x*exp(1))
```

3.536 $\int \frac{16x^2+4x^4+4x\log(5)+e^{8e}\left(16x^2+8x^4+x^6+\left(8x+2x^3\right)\log(5)+\log^2(5)\right)+\left(-8x^4+4x\log(5)\right)\log(x)\log(\log(x))}{\left(16x^3+8x^5+x^7+\left(8x^2+2x^4\right)\log(5)+x\log^2(5)\right)\log(x)}\,dx$

3.536.1 Optimal result

Integrand size = 110, antiderivative size = 25

$$\int \frac{16x^2+4x^4+4x\log(5)+e^{8e}\left(16x^2+8x^4+x^6+\left(8x+2x^3\right)\log(5)+\log^2(5)\right)+\left(-8x^4+4x\log(5)\right)\log(x)\log(\log(x))}{\left(16x^3+8x^5+x^7+\left(8x^2+2x^4\right)\log(5)+x\log^2(5)\right)\log(x)}\,dx = \left(e^{8e}+\frac{4}{4+x^2+\frac{\log(5)}{x}}\right)\log(\log(x))$$

output
```
ln(ln(x))*(exp(exp(1+2*ln(2)))^2+4/(x^2+ln(5)/x+4))
```

3.536.2 Mathematica [A] (verified)

Time = 5.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{16x^2+4x^4+4x\log(5)+e^{8e}\left(16x^2+8x^4+x^6+\left(8x+2x^3\right)\log(5)+\log^2(5)\right)+\left(-8x^4+4x\log(5)\right)\log(x)\log(\log(x))}{\left(16x^3+8x^5+x^7+\left(8x^2+2x^4\right)\log(5)+x\log^2(5)\right)\log(x)}\,dx = \left(e^{8e}+\frac{4x}{4x+x^3+\log(5)}\right)\log(\log(x))$$

input
```
Integrate[(16*x^2 + 4*x^4 + 4*x*Log[5] + E^(8*E)*(16*x^2 + 8*x^4 + x^6 + (
8*x + 2*x^3)*Log[5] + Log[5]^2) + (-8*x^4 + 4*x*Log[5])*Log[x]*Log[Log[x]]
)/((16*x^3 + 8*x^5 + x^7 + (8*x^2 + 2*x^4)*Log[5] + x*Log[5]^2)*Log[x]),x]
```

output
```
(E^(8*E) + (4*x)/(4*x + x^3 + Log[5]))*Log[Log[x]]
```

3.536.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^4 + (4x\log(5) - 8x^4)\log(x)\log(\log(x)) + 16x^2 + e^{8e}(x^6 + 8x^4 + (2x^3 + 8x)\log(5) + 16x^2 + \log^2(5)) + 4x\,\mathrm{l}}{(x^7 + 8x^5 + 16x^3 + (2x^4 + 8x^2)\log(5) + x\log^2(5))\log(x)}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{4x^4 + (4x\log(5) - 8x^4)\log(x)\log(\log(x)) + 16x^2 + e^{8e}(x^6 + 8x^4 + (2x^3 + 8x)\log(5) + 16x^2 + \log^2(5)) + 4x\,\mathrm{l}}{x(x^6 + 8x^4 + 2x^3\log(5) + 16x^2 + 8x\log(5) + \log^2(5))\log(x)}$$

$$\Big\downarrow \text{2463}$$

$$\int \frac{4x^4 + (4x\log(5) - 8x^4)\log(x)\log(\log(x)) + 16x^2 + e^{8e}(x^6 + 8x^4 + (2x^3 + 8x)\log(5) + 16x^2 + \log^2(5)) + 4x\,\mathrm{l}}{x(x^3 + 4x + \log(5))^2\log(x)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{8e}x^3 + 4(1 + e^{8e})x + e^{8e}\log(5)}{x(x^3 + 4x + \log(5))\log(x)} - \frac{4(2x^3 - \log(5))\log(\log(x))}{(x^3 + 4x + \log(5))^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{e^{8e}x^3 + 4(1 + e^{8e})x + e^{8e}\log(5)}{x(x^3 + 4x + \log(5))\log(x)}dx + 4\log(125)\int \frac{\log(\log(x))}{(x^3 + 4x + \log(5))^2}dx + 32\int \frac{x\log(\log(x))}{(x^3 + 4x + \log(5))^2}dx - 8\int \frac{\log(\log(x))}{x^3 + 4x + \log(5)}dx$$

input
```
Int[(16*x^2 + 4*x^4 + 4*x*Log[5] + E^(8*E)*(16*x^2 + 8*x^4 + x^6 + (8*x +
2*x^3)*Log[5] + Log[5]^2) + (-8*x^4 + 4*x*Log[5])*Log[x]*Log[Log[x]])/((16
*x^3 + 8*x^5 + x^7 + (8*x^2 + 2*x^4)*Log[5] + x*Log[5]^2)*Log[x]),x]
```

output
```
$Aborted
```

3.536. $\int \frac{16x^2+4x^4+4x\log(5)+e^{8e}(16x^2+8x^4+x^6+(8x+2x^3)\log(5)+\log^2(5))+(-8x^4+4x\log(5))\log(x)\log(\log(x))}{(16x^3+8x^5+x^7+(8x^2+2x^4)\log(5)+x\log^2(5))\log(x)}dx$

3.536.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.536.4 Maple [A] (verified)

Time = 61.59 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

method	result	size
risch	$\frac{4x\ln(\ln(x))}{x^3+\ln(5)+4x}+\mathrm{e}^{8\,\mathrm{e}}\ln\left(\ln\left(x\right)\right)$	28
parallelrisch	$\frac{\mathrm{e}^{8\,\mathrm{e}}x^3\ln(\ln(x))+\ln(5)\mathrm{e}^{8\,\mathrm{e}}\ln(\ln(x))+4\,\mathrm{e}^{8\,\mathrm{e}}x\ln(\ln(x))+4x\ln(\ln(x))}{x^3+\ln(5)+4x}$	69

input
```
int(((4*x*ln(5)-8*x^4)*ln(x)*ln(ln(x))+(ln(5)^2+(2*x^3+8*x)*ln(5)+x^6+8*x^
4+16*x^2)*exp(exp(1+2*ln(2)))^2+4*x*ln(5)+4*x^4+16*x^2)/(x*ln(5)^2+(2*x^4+
8*x^2)*ln(5)+x^7+8*x^5+16*x^3)/ln(x),x,method=_RETURNVERBOSE)
```

output
```
4*x/(x^3+ln(5)+4*x)*ln(ln(x))+exp(8*exp(1))*ln(ln(x))
```

3.536.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.56

$$\int \frac{16x^2 + 4x^4 + 4x\log(5) + e^{8e}\left(16x^2 + 8x^4 + x^6 + (8x + 2x^3)\log(5) + \log^2(5)\right) + (-8x^4 + 4x\log(5))\log(x)\log(\log(x))}{(16x^3 + 8x^5 + x^7 + (8x^2 + 2x^4)\log(5) + x\log^2(5))\log(x)}\,dx$$
$$= \frac{\left((x^3 + 4\,x + \log(5))e^{\left(2\,e^{(2\,\log(2)+1)}\right)} + 4\,x\right)\log(\log(x))}{x^3 + 4\,x + \log(5)}$$

input
```
integrate(((4*x*log(5)-8*x^4)*log(x)*log(log(x))+(log(5)^2+(2*x^3+8*x)*log
(5)+x^6+8*x^4+16*x^2)*exp(exp(1+2*log(2)))^2+4*x*log(5)+4*x^4+16*x^2)/(x*l
og(5)^2+(2*x^4+8*x^2)*log(5)+x^7+8*x^5+16*x^3)/log(x),x, algorithm=\
```

output
```
((x^3 + 4*x + log(5))*e^(2*e^(2*log(2) + 1)) + 4*x)*log(log(x))/(x^3 + 4*x
 + log(5))
```

3.536.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{16x^2 + 4x^4 + 4x\log(5) + e^{8e}\left(16x^2 + 8x^4 + x^6 + (8x + 2x^3)\log(5) + \log^2(5)\right) + (-8x^4 + 4x\log(5))\log(x)\log(\log(x))}{(16x^3 + 8x^5 + x^7 + (8x^2 + 2x^4)\log(5) + x\log^2(5))\log(x)}\,dx$$
$$= \frac{4x\log(\log(x))}{x^3 + 4x + \log(5)} + e^{8e}\log(\log(x))$$

input
```
integrate(((4*x*ln(5)-8*x**4)*ln(x)*ln(ln(x))+(ln(5)**2+(2*x**3+8*x)*ln(5)
+x**6+8*x**4+16*x**2)*exp(exp(1+2*ln(2)))**2+4*x*ln(5)+4*x**4+16*x**2)/(x*
ln(5)**2+(2*x**4+8*x**2)*ln(5)+x**7+8*x**5+16*x**3)/ln(x),x)
```

output
```
4*x*log(log(x))/(x**3 + 4*x + log(5)) + exp(8*E)*log(log(x))
```

3.536.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.72

$$\int \frac{16x^2+4x^4+4x\log(5)+e^{8e}\left(16x^2+8x^4+x^6+(8x+2x^3)\log(5)+\log^2(5)\right)+(-8x^4+4x\log(5))\log(x}{\left(16x^3+8x^5+x^7+(8x^2+2x^4)\log(5)+x\log^2(5)\right)\log(x)}$$
$$=\frac{\left(x^3e^{(8\,e)}+4\,x\left(e^{(8\,e)}+1\right)+e^{(8\,e)}\log\left(5\right)\right)\log\left(\log\left(x\right)\right)}{x^3+4\,x+\log\left(5\right)}$$

input
```
integrate(((4*x*log(5)-8*x^4)*log(x)*log(log(x))+(log(5)^2+(2*x^3+8*x)*log
(5)+x^6+8*x^4+16*x^2)*exp(exp(1+2*log(2)))^2+4*x*log(5)+4*x^4+16*x^2)/(x*l
og(5)^2+(2*x^4+8*x^2)*log(5)+x^7+8*x^5+16*x^3)/log(x),x, algorithm=\
```

output
```
(x^3*e^(8*e) + 4*x*(e^(8*e) + 1) + e^(8*e)*log(5))*log(log(x))/(x^3 + 4*x
+ log(5))
```

3.536.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{16x^2+4x^4+4x\log(5)+e^{8e}\left(16x^2+8x^4+x^6+(8x+2x^3)\log(5)+\log^2(5)\right)+(-8x^4+4x\log(5))\log(x}{\left(16x^3+8x^5+x^7+(8x^2+2x^4)\log(5)+x\log^2(5)\right)\log(x)}$$
$$=\frac{x^3e^{(8\,e)}\log\left(\log\left(x\right)\right)+4\,xe^{(8\,e)}\log\left(\log\left(x\right)\right)+e^{(8\,e)}\log\left(5\right)\log\left(\log\left(x\right)\right)+4\,x\log\left(\log\left(x\right)\right)}{x^3+4\,x+\log\left(5\right)}$$

input
```
integrate(((4*x*log(5)-8*x^4)*log(x)*log(log(x))+(log(5)^2+(2*x^3+8*x)*log
(5)+x^6+8*x^4+16*x^2)*exp(exp(1+2*log(2)))^2+4*x*log(5)+4*x^4+16*x^2)/(x*l
og(5)^2+(2*x^4+8*x^2)*log(5)+x^7+8*x^5+16*x^3)/log(x),x, algorithm=\
```

output
```
(x^3*e^(8*e)*log(log(x)) + 4*x*e^(8*e)*log(log(x)) + e^(8*e)*log(5)*log(lo
g(x)) + 4*x*log(log(x)))/(x^3 + 4*x + log(5))
```

3.536.9 Mupad [F(-1)]

Timed out.

$$\int \frac{16x^2+4x^4+4x\log(5)+e^{8e}\left(16x^2+8x^4+x^6+(8x+2x^3)\log(5)+\log^2(5)\right)+\left(-8x^4+4x\log(5)\right)\log(x)\log(\log(x))}{\left(16x^3+8x^5+x^7+(8x^2+2x^4)\log(5)+x\log^2(5)\right)\log(x)}$$

$$=\int \frac{4\,x\,\ln(5)+\mathrm{e}^{2\,\mathrm{e}^{2\,\ln(2)+1}}\,\left(\ln(5)\,\left(2\,x^3+8\,x\right)+\ln(5)^2+16\,x^2+8\,x^4+x^6\right)+16\,x^2+4\,x^4+\ln(\ln(x))\,\ln(}{\ln(x)\,\left(\ln(5)\,\left(2\,x^4+8\,x^2\right)+x\ln(5)^2+16\,x^3+8\,x^5+x^7\right)}$$

input

```
int((4*x*log(5) + exp(2*exp(2*log(2) + 1))*(log(5)*(8*x + 2*x^3) + log(5)^
2 + 16*x^2 + 8*x^4 + x^6) + 16*x^2 + 4*x^4 + log(log(x))*log(x)*(4*x*log(5
) - 8*x^4))/(log(x)*(log(5)*(8*x^2 + 2*x^4) + x*log(5)^2 + 16*x^3 + 8*x^5
+ x^7)),x)
```

output

```
int((4*x*log(5) + exp(2*exp(2*log(2) + 1))*(log(5)*(8*x + 2*x^3) + log(5)^
2 + 16*x^2 + 8*x^4 + x^6) + 16*x^2 + 4*x^4 + log(log(x))*log(x)*(4*x*log(5
) - 8*x^4))/(log(x)*(log(5)*(8*x^2 + 2*x^4) + x*log(5)^2 + 16*x^3 + 8*x^5
+ x^7)), x)
```

3.537 $\int \frac{-13+e^4(52-32x)+8x+e^{2e^x}\left(-1+4e^4+e^x\left(6-2x+e^4(-24+8x)\right)\right)+e^{e^x}}{e^4}$

3.537.1 Optimal result

Integrand size = 99, antiderivative size = 32

$$\int \frac{-13+e^4(52-32x)+8x+e^{2e^x}(-1+4e^4+e^x(6-2x+e^4(-24+8x)))+e^{e^x}(10-4x+e^4(-40+16x}{e^4}$$

$$=\left(4-\frac{1}{e^4}\right)(-3+x)\left(-3+\left(2-e^{e^x}-x\right)^2-x^2\right)$$

output
```
(-3+x)*((-exp(exp(x))+2-x)^2-x^2-3)*(4-exp(-4))
```

3.537.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.47

$$\int \frac{-13+e^4(52-32x)+8x+e^{2e^x}(-1+4e^4+e^x(6-2x+e^4(-24+8x)))+e^{e^x}(10-4x+e^4(-40+16x}{e^4}$$

$$=\frac{(-1+4e^4)\left(e^{2e^x}(-3+x)+13x-4x^2+e^{e^x}(12-10x+2x^2)\right)}{e^4}$$

input
```
Integrate[(-13 + E^4*(52 - 32*x) + 8*x + E^(2*E^x)*(-1 + 4*E^4 + E^x*(6 -
2*x + E^4*(-24 + 8*x))) + E^E^x*(10 - 4*x + E^4*(-40 + 16*x) + E^x*(-12 +
10*x - 2*x^2 + E^4*(48 - 40*x + 8*x^2))))/E^4,x]
```

output
```
((-1 + 4*E^4)*(E^(2*E^x)*(-3 + x) + 13*x - 4*x^2 + E^E^x*(12 - 10*x + 2*x^
2)))/E^4
```

3.537.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 78 vs. $2(32) = 64$.

Time = 0.25 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.44, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.020$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^x}\left(e^x\left(-2x^2+e^4\left(8x^2-40x+48\right)+10x-12\right)-4x+e^4(16x-40)+10\right)+e^4(52-32x)+8x+e^{2e^x}\left(e^x\left(-2\right.\right.}{e^4}$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \left(-e^{2e^x}\left(-2e^x\left(-4e^4(3-x)-x+3\right)-4e^4+1\right)+4e^4(13-8x)+8x+2e^{e^x}\left(-4e^4(5-2x)-2x-e^x\left(x^2-5x-\right.\right.\right.}{e^4}$$

$$\Big\downarrow \text{2009}$$

$$\frac{4x^2-2e^{e^x}\left(x^2-4e^4\left(x^2-5x+6\right)-5x+6\right)-\frac{1}{4}e^4(13-8x)^2+e^{2e^x}\left(-4e^4(3-x)-x+3\right)-13x}{e^4}$$

input
```
Int[(-13 + E^4*(52 - 32*x) + 8*x + E^(2*E^x)*(-1 + 4*E^4 + E^x*(6 - 2*x +
E^4*(-24 + 8*x))) + E^E^x*(10 - 4*x + E^4*(-40 + 16*x) + E^x*(-12 + 10*x -
 2*x^2 + E^4*(48 - 40*x + 8*x^2))))/E^4,x]
```

output
```
(-1/4*(E^4*(13 - 8*x)^2) + E^(2*E^x)*(3 - 4*E^4*(3 - x) - x) - 13*x + 4*x^
2 - 2*E^E^x*(6 - 5*x + x^2 - 4*E^4*(6 - 5*x + x^2)))/E^4
```

3.537.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.537.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. 2(29) = 58.

Time = 0.65 (sec) , antiderivative size = 84, normalized size of antiderivative = 2.62

method	result
risch	$-16\,\mathrm{e}^{4}\mathrm{e}^{-4}x^{2}+52\,\mathrm{e}^{4}\mathrm{e}^{-4}x+4\,\mathrm{e}^{-4}x^{2}-13x\,\mathrm{e}^{-4}+\left(4x\,\mathrm{e}^{4}-12\,\mathrm{e}^{4}-x+3\right)\mathrm{e}^{-4+2\,\mathrm{e}^{x}}+\left(8x^{2}\mathrm{e}^{4}-\right.$
default	$\mathrm{e}^{-4}\left(-13x+4\,\mathrm{e}^{4}\left(-4x^{2}+13x\right)+\left(-12\,\mathrm{e}^{4}+3\right)\mathrm{e}^{2\,\mathrm{e}^{x}}+\left(4\,\mathrm{e}^{4}-1\right)x\,\mathrm{e}^{2\,\mathrm{e}^{x}}+\left(48\,\mathrm{e}^{4}-12\right)\mathrm{e}^{\mathrm{e}^{x}}+(\right.$
parallelrisch	$\mathrm{e}^{-4}\left(8\,\mathrm{e}^{\mathrm{e}^{x}}x^{2}\mathrm{e}^{4}+4x\,\mathrm{e}^{2\,\mathrm{e}^{x}}\mathrm{e}^{4}-16x^{2}\mathrm{e}^{4}-40\,\mathrm{e}^{4}\mathrm{e}^{\mathrm{e}^{x}}x-12\,\mathrm{e}^{4}\mathrm{e}^{2\,\mathrm{e}^{x}}-2\,\mathrm{e}^{\mathrm{e}^{x}}x^{2}-\mathrm{e}^{2\,\mathrm{e}^{x}}x+52x\,\mathrm{e}^{4}+48\right.$
norman	$\left(4\,\mathrm{e}^{4}-1\right)\mathrm{e}^{-4}x\,\mathrm{e}^{2\,\mathrm{e}^{x}}+13\left(4\,\mathrm{e}^{4}-1\right)\mathrm{e}^{-4}x-4\left(4\,\mathrm{e}^{4}-1\right)\mathrm{e}^{-4}x^{2}+12\left(4\,\mathrm{e}^{4}-1\right)\mathrm{e}^{-4}\mathrm{e}^{\mathrm{e}^{x}}-3(4\,\mathrm{e}^{4}-$

input
```
int(((((8*x-24)*exp(4)+6-2*x)*exp(x)+4*exp(4)-1)*exp(exp(x))^2+(((8*x^2-40
*x+48)*exp(4)-2*x^2+10*x-12)*exp(x)+(16*x-40)*exp(4)+10-4*x)*exp(exp(x))+(
-32*x+52)*exp(4)+8*x-13)/exp(4),x,method=_RETURNVERBOSE)
```

output
```
-16*exp(4)*exp(-4)*x^2+52*exp(4)*exp(-4)*x+4*exp(-4)*x^2-13*x*exp(-4)+(4*x
*exp(4)-12*exp(4)-x+3)*exp(-4+2*exp(x))+(8*x^2*exp(4)-40*x*exp(4)-2*x^2+48
*exp(4)+10*x-12)*exp(exp(x)-4)
```

3.537.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. 2(24) = 48.

Time = 0.25 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.12

$$\int \frac{-13+e^4(52-32x)+8x+e^{2e^x}(-1+4e^4+e^x(6-2x+e^4(-24+8x)))+e^{e^x}(10-4x+e^4(-40+16x}{e^4}$$

$$=\left(4\,x^2-4\left(4\,x^2-13\,x\right)e^4+\left(4\,(x-3)e^4-x+3\right)e^{(2\,e^x)}-2\left(x^2-4\left(x^2-5\,x+6\right)e^4-5\,x+6\right)e^{(e^x)}-13\,x\right.$$

input
```
integrate(((((8*x-24)*exp(4)+6-2*x)*exp(x)+4*exp(4)-1)*exp(exp(x))^2+(((8*
x^2-40*x+48)*exp(4)-2*x^2+10*x-12)*exp(x)+(16*x-40)*exp(4)+10-4*x)*exp(exp
(x))+(-32*x+52)*exp(4)+8*x-13)/exp(4),x, algorithm=\
```

output
```
(4*x^2 - 4*(4*x^2 - 13*x)*e^4 + (4*(x - 3)*e^4 - x + 3)*e^(2*e^x) - 2*(x^2
 - 4*(x^2 - 5*x + 6)*e^4 - 5*x + 6)*e^(e^x) - 13*x)*e^(-4)
```

3.537.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 102 vs. $2(24) = 48$.

Time = 0.26 (sec) , antiderivative size = 102, normalized size of antiderivative = 3.19

$$\int \frac{-13 + e^4(52-32x) + 8x + e^{2e^x}(-1+4e^4+e^x(6-2x+e^4(-24+8x))) + e^{e^x}(10-4x+e^4(-40+16x}{e^4}$$

$$= \frac{x^2\cdot(4-16e^4)}{e^4} + \frac{x(-13+52e^4)}{e^4} + \frac{(-xe^4+4xe^8-12e^8+3e^4)\,e^{2e^x} + (-2x^2e^4+8x^2e^8-40xe^8+10xe^4-12e^4+48e^8)\,e^{e^x}}{e^8}$$

input
```
integrate(((((8*x-24)*exp(4)+6-2*x)*exp(x)+4*exp(4)-1)*exp(exp(x))**2+(((8
*x**2-40*x+48)*exp(4)-2*x**2+10*x-12)*exp(x)+(16*x-40)*exp(4)+10-4*x)*exp(
exp(x))+(-32*x+52)*exp(4)+8*x-13)/exp(4),x)
```

output
```
x**2*(4 - 16*exp(4))*exp(-4) + x*(-13 + 52*exp(4))*exp(-4) + ((-x*exp(4) +
 4*x*exp(8) - 12*exp(8) + 3*exp(4))*exp(2*exp(x)) + (-2*x**2*exp(4) + 8*x*
*2*exp(8) - 40*x*exp(8) + 10*x*exp(4) - 12*exp(4) + 48*exp(8))*exp(exp(x))
)*exp(-8)
```

3.537.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. $2(24) = 48$.

Time = 0.21 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.34

$$\int \frac{-13 + e^4(52-32x) + 8x + e^{2e^x}(-1+4e^4+e^x(6-2x+e^4(-24+8x))) + e^{e^x}(10-4x+e^4(-40+16x}{e^4}$$

$$= \left(4\,x^2 - 4\left(4\,x^2 - 13\,x\right)e^4 + \left(x\left(4\,e^4-1\right) - 12\,e^4 + 3\right)e^{\left(2\,e^x\right)} + 2\left(x^2\left(4\,e^4-1\right) - 5\,x\left(4\,e^4-1\right) + 24\,e^4 - 6\right)$$

input
```
integrate(((((8*x-24)*exp(4)+6-2*x)*exp(x)+4*exp(4)-1)*exp(exp(x))^2+(((8*
x^2-40*x+48)*exp(4)-2*x^2+10*x-12)*exp(x)+(16*x-40)*exp(4)+10-4*x)*exp(exp
(x))+(-32*x+52)*exp(4)+8*x-13)/exp(4),x, algorithm=\
```

output
```
(4*x^2 - 4*(4*x^2 - 13*x)*e^4 + (x*(4*e^4 - 1) - 12*e^4 + 3)*e^(2*e^x) + 2
*(x^2*(4*e^4 - 1) - 5*x*(4*e^4 - 1) + 24*e^4 - 6)*e^(e^x) - 13*x)*e^(-4)
```

3.537.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 119 vs. $2(24) = 48$.

Time = 0.26 (sec) , antiderivative size = 119, normalized size of antiderivative = 3.72

$$\int \frac{-13+e^4(52-32x)+8x+e^{2e^x}(-1+4e^4+e^x(6-2x+e^4(-24+8x)))+e^{e^x}(10-4x+e^4(-40+16x$$

$$= \left(4x^2-4\left(4x^2-13x\right)e^4+2\left(4x^2e^{(x+e^x+4)}-x^2e^{(x+e^x)}-20xe^{(x+e^x+4)}+5xe^{(x+e^x)}+24e^{(x+e^x+4)}-6e^{(x+$$

input
```
integrate(((((8*x-24)*exp(4)+6-2*x)*exp(x)+4*exp(4)-1)*exp(exp(x))^2+(((8*
x^2-40*x+48)*exp(4)-2*x^2+10*x-12)*exp(x)+(16*x-40)*exp(4)+10-4*x)*exp(exp
(x))+(-32*x+52)*exp(4)+8*x-13)/exp(4),x, algorithm=\
```

output
```
(4*x^2 - 4*(4*x^2 - 13*x)*e^4 + 2*(4*x^2*e^(x + e^x + 4) - x^2*e^(x + e^x)
 - 20*x*e^(x + e^x + 4) + 5*x*e^(x + e^x) + 24*e^(x + e^x + 4) - 6*e^(x +
e^x))*e^(-x) - x*e^(2*e^x) + 4*x*e^(2*e^x + 4) - 13*x + 3*e^(2*e^x) - 12*e
^(2*e^x + 4))*e^(-4)
```

3.537.9 Mupad [B] (verification not implemented)

Time = 15.80 (sec) , antiderivative size = 89, normalized size of antiderivative = 2.78

$$\int \frac{-13+e^4(52-32x)+8x+e^{2e^x}(-1+4e^4+e^x(6-2x+e^4(-24+8x)))+e^{e^x}(10-4x+e^4(-40+16x$$

$$= e^{e^x}\left(e^{-4}\left(8e^4-2\right)x^2-e^{-4}\left(40e^4-10\right)x+e^{-4}\left(48e^4-12\right)\right) - e^{2e^x}\left(e^{-4}\left(12e^4-3\right)-xe^{-4}\left(4e^4-1\right)\right)+xe^{-4}\left(52e^4-13\right)-\frac{x^2e^{-4}\left(32e^4-8\right)}{2}$$

input
```
int(exp(-4)*(8*x + exp(2*exp(x))*(4*exp(4) + exp(x)*(exp(4)*(8*x - 24) - 2
*x + 6) - 1) + exp(exp(x))*(exp(x)*(10*x + exp(4)*(8*x^2 - 40*x + 48) - 2*
x^2 - 12) - 4*x + exp(4)*(16*x - 40) + 10) - exp(4)*(32*x - 52) - 13),x)
```

output
```
exp(exp(x))*(exp(-4)*(48*exp(4) - 12) - x*exp(-4)*(40*exp(4) - 10) + x^2*e
xp(-4)*(8*exp(4) - 2)) - exp(2*exp(x))*(exp(-4)*(12*exp(4) - 3) - x*exp(-4
)*(4*exp(4) - 1)) + x*exp(-4)*(52*exp(4) - 13) - (x^2*exp(-4)*(32*exp(4) -
 8))/2
```

3.537.
$$\int \frac{-13+e^4(52-32x)+8x+e^{2e^x}(-1+4e^4+e^x(6-2x+e^4(-24+8x)))+e^{e^x}(10-4x+e^4(-40+16x)+e^x(-12+10x-2x^2+e^4(48-40x+8x^2)))}{e^4}\,dx$$

3.538 $\int \frac{953694x+1262196x^2+694960x^3+196000x^4+28000x^5+1600x^6+(-33$

3.538.1 Optimal result

Integrand size = 123, antiderivative size = 28

$$\int \frac{953694x + 1262196x^2 + 694960x^3 + 196000x^4 + 28000x^5 + 1600x^6 + (-33614x - 48020x^2 - 27440x^3 -}{16807 + 24010x + 13720x^2}$$

$$= e^4 + x^2\left(\left(5 + \frac{16}{(7+2x)^2}\right)^2 - \log^2(x)\right)$$

output
```
x^2*((5+16/(2*x+7)^2)^2-ln(x)^2)+exp(4)
```

3.538.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

$$\int \frac{953694x + 1262196x^2 + 694960x^3 + 196000x^4 + 28000x^5 + 1600x^6 + (-33614x - 48020x^2 - 27440x^3 -}{16807 + 24010x + 13720x^2}$$

$$= 25x^2 - \frac{8(12005 + 13720x + 4868x^2 + 560x^3)}{(7+2x)^4} - x^2\log^2(x)$$

input
```
Integrate[(953694*x + 1262196*x^2 + 694960*x^3 + 196000*x^4 + 28000*x^5 +
1600*x^6 + (-33614*x - 48020*x^2 - 27440*x^3 - 7840*x^4 - 1120*x^5 - 64*x^
6)*Log[x] + (-33614*x - 48020*x^2 - 27440*x^3 - 7840*x^4 - 1120*x^5 - 64*x
^6)*Log[x]^2)/(16807 + 24010*x + 13720*x^2 + 3920*x^3 + 560*x^4 + 32*x^5),
x]
```

output
```
25*x^2 - (8*(12005 + 13720*x + 4868*x^2 + 560*x^3))/(7 + 2*x)^4 - x^2*Log[
x]^2
```

3.538.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 77 vs. 2(28) = 56.

Time = 0.74 (sec) , antiderivative size = 77, normalized size of antiderivative = 2.75, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.041, Rules used = {2007, 7239, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1600x^6+28000x^5+196000x^4+694960x^3+1262196x^2+(-64x^6-1120x^5-7840x^4-27440x^3-48020x^2-}{32x^5+560x^4+3920x^3+13720x}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{1600x^6+28000x^5+196000x^4+694960x^3+1262196x^2+(-64x^6-1120x^5-7840x^4-27440x^3-48020x^2-}{(2x+7)^5}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2x\left(800x^5+14000x^4+98000x^3+347480x^2+631098x-(2x+7)^5\log^2(x)-(2x+7)^5\log(x)+476847\right)}{(2x+7)^5}dx$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{x\left(800x^5+14000x^4+98000x^3+347480x^2+631098x-(2x+7)^5\log^2(x)-(2x+7)^5\log(x)+476847\right)}{(2x+7)^5}dx$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{800x^6}{(2x+7)^5}+\frac{14000x^5}{(2x+7)^5}+\frac{98000x^4}{(2x+7)^5}+\frac{347480x^3}{(2x+7)^5}+\frac{631098x^2}{(2x+7)^5}-\log^2(x)x-\log(x)x+\frac{476847x}{(2x+7)^5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\left(\frac{12410x^4}{(2x+7)^4}+\frac{25x^2}{2}-\frac{1}{2}x^2\log^2(x)+\frac{42875}{2(2x+7)}-\frac{908087}{4(2x+7)^2}+\frac{2127419}{2(2x+7)^3}-\frac{14885661}{8(2x+7)^4}\right)$$

3.538.
$$\int \frac{953694x+1262196x^2+694960x^3+196000x^4+28000x^5+1600x^6+(-33614x-48020x^2-27440x^3-7840x^4-1120x^5-64x^6)\log(x)+(-33614x-480}{16807+24010x+13720x^2+3920x^3+560x^4+32x^5}$$

input
```
Int[(953694*x + 1262196*x^2 + 694960*x^3 + 196000*x^4 + 28000*x^5 + 1600*x
^6 + (-33614*x - 48020*x^2 - 27440*x^3 - 7840*x^4 - 1120*x^5 - 64*x^6)*Log
[x] + (-33614*x - 48020*x^2 - 27440*x^3 - 7840*x^4 - 1120*x^5 - 64*x^6)*Lo
g[x]^2)/(16807 + 24010*x + 13720*x^2 + 3920*x^3 + 560*x^4 + 32*x^5),x]
```

output
```
2*((25*x^2)/2 - 14885661/(8*(7 + 2*x)^4) + (12410*x^4)/(7 + 2*x)^4 + 21274
19/(2*(7 + 2*x)^3) - 908087/(4*(7 + 2*x)^2) + 42875/(2*(7 + 2*x)) - (x^2*L
og[x]^2)/2)
```

3.538.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.538.
$$\int \frac{953694x+1262196x^2+694960x^3+196000x^4+28000x^5+1600x^6+\left(-33614x-48020x^2-27440x^3-7840x^4-1120x^5-64x^6\right)\log(x)+\left(-33614x-480\right.}{16807+24010x+13720x^2+3920x^3+560x^4+32x^5}$$

3.538.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.86

method	result
default	$-x^{2} \ln \left(x \right)^{2}+25 x^{2}+\frac{2024}{\left(2 x +7\right)^{2}}-\frac{896}{\left(2 x +7\right)^{3}}-\frac{560}{2 x +7}+\frac{3136}{\left(2 x +7\right)^{4}}$
parts	$-x^{2} \ln \left(x \right)^{2}+25 x^{2}+\frac{2024}{\left(2 x +7\right)^{2}}-\frac{896}{\left(2 x +7\right)^{3}}-\frac{560}{2 x +7}+\frac{3136}{\left(2 x +7\right)^{4}}$
risch	$-x^{2} \ln \left(x \right)^{2}+\frac{400 x^{6}+5600 x^{5}+29400 x^{4}+64120 x^{3}+21081 x^{2}-109760 x -96040}{16 x^{4}+224 x^{3}+1176 x^{2}+2744 x +2401}$
norman	$\frac{-5151860 x -2139819 x^{2}-347480 x^{3}+5600 x^{5}+400 x^{6}-2401 x^{2} \ln \left(x \right)^{2}-2744 x^{3} \ln \left(x \right)^{2}-1176 x^{4} \ln \left(x \right)^{2}-224 x^{5} \ln \left(x \right)^{2}-16 x^{6} \ln \left(x \right)}{\left(2 x +7\right)^{4}}$
parallelrisch	$\frac{-72126040-82429760 x -256 x^{6} \ln \left(x \right)^{2}-18816 x^{4} \ln \left(x \right)^{2}-3584 x^{5} \ln \left(x \right)^{2}-43904 x^{3} \ln \left(x \right)^{2}-38416 x^{2} \ln \left(x \right)^{2}+6400 x^{6}+89600 x^{5}-}{256 x^{4}+3584 x^{3}+18816 x^{2}+43904 x +38416}$

input
```
int(((-64*x^6-1120*x^5-7840*x^4-27440*x^3-48020*x^2-33614*x)*ln(x)^2+(-64*
x^6-1120*x^5-7840*x^4-27440*x^3-48020*x^2-33614*x)*ln(x)+1600*x^6+28000*x^
5+196000*x^4+694960*x^3+1262196*x^2+953694*x)/(32*x^5+560*x^4+3920*x^3+137
20*x^2+24010*x+16807),x,method=_RETURNVERBOSE)
```

output
```
-x^2*ln(x)^2+25*x^2+2024/(2*x+7)^2-896/(2*x+7)^3-560/(2*x+7)+3136/(2*x+7)^
4
```

3.538.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 85 vs. 2(27) = 54.

Time = 0.24 (sec) , antiderivative size = 85, normalized size of antiderivative = 3.04

$$\int \frac{953694x + 1262196x^2 + 694960x^3 + 196000x^4 + 28000x^5 + 1600x^6 + (-33614x - 48020x^2 - 27440x^3 -}{16807 + 24010x + 13720x^2}$$
$$= \frac{400\,x^6 + 5600\,x^5 + 29400\,x^4 + 64120\,x^3 - (16\,x^6 + 224\,x^5 + 1176\,x^4 + 2744\,x^3 + 2401\,x^2)\log(x)^2 + 2108}{16\,x^4 + 224\,x^3 + 1176\,x^2 + 2744\,x + 2401}$$

input
```
integrate(((-64*x^6-1120*x^5-7840*x^4-27440*x^3-48020*x^2-33614*x)*log(x)^
2+(-64*x^6-1120*x^5-7840*x^4-27440*x^3-48020*x^2-33614*x)*log(x)+1600*x^6+
28000*x^5+196000*x^4+694960*x^3+1262196*x^2+953694*x)/(32*x^5+560*x^4+3920
*x^3+13720*x^2+24010*x+16807),x, algorithm=\
```

3.538.
$\int \frac{953694x+1262196x^2+694960x^3+196000x^4+28000x^5+1600x^6+(-33614x-48020x^2-27440x^3-7840x^4-1120x^5-64x^6)\log(x)+(-33614x-480}{16807+24010x+13720x^2+3920x^3+560x^4+32x^5}$

output
```
(400*x^6 + 5600*x^5 + 29400*x^4 + 64120*x^3 - (16*x^6 + 224*x^5 + 1176*x^4
 + 2744*x^3 + 2401*x^2)*log(x)^2 + 21081*x^2 - 109760*x - 96040)/(16*x^4 +
 224*x^3 + 1176*x^2 + 2744*x + 2401)
```

3.538.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(22) = 44$.

Time = 0.15 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.75

$$\int \frac{953694x + 1262196x^2 + 694960x^3 + 196000x^4 + 28000x^5 + 1600x^6 + (-33614x - 48020x^2 - 27440x^3 -}{16807 + 24010x + 13720x^2}$$
$$= -x^2 \log{(x)}^2 + 25x^2 + \frac{-4480x^3 - 38944x^2 - 109760x - 96040}{16x^4 + 224x^3 + 1176x^2 + 2744x + 2401}$$

input
```
integrate(((-64*x**6-1120*x**5-7840*x**4-27440*x**3-48020*x**2-33614*x)*ln
(x)**2+(-64*x**6-1120*x**5-7840*x**4-27440*x**3-48020*x**2-33614*x)*ln(x)+
1600*x**6+28000*x**5+196000*x**4+694960*x**3+1262196*x**2+953694*x)/(32*x*
*5+560*x**4+3920*x**3+13720*x**2+24010*x+16807),x)
```

output
```
-x**2*log(x)**2 + 25*x**2 + (-4480*x**3 - 38944*x**2 - 109760*x - 96040)/(
16*x**4 + 224*x**3 + 1176*x**2 + 2744*x + 2401)
```

3.538.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 515 vs. $2(27) = 54$.

Time = 0.27 (sec) , antiderivative size = 515, normalized size of antiderivative = 18.39

$$\int \frac{953694x + 1262196x^2 + 694960x^3 + 196000x^4 + 28000x^5 + 1600x^6 + (-33614x - 48020x^2 - 27440x^3 -}{16807 + 24010x + 13720x^2}$$
$$= \text{Too large to display}$$

input
```
integrate(((-64*x^6-1120*x^5-7840*x^4-27440*x^3-48020*x^2-33614*x)*log(x)^
2+(-64*x^6-1120*x^5-7840*x^4-27440*x^3-48020*x^2-33614*x)*log(x)+1600*x^6+
28000*x^5+196000*x^4+694960*x^3+1262196*x^2+953694*x)/(32*x^5+560*x^4+3920
*x^3+13720*x^2+24010*x+16807),x, algorithm=\
```

3.538.
$$\int \frac{953694x+1262196x^2+694960x^3+196000x^4+28000x^5+1600x^6+(-33614x-48020x^2-27440x^3-7840x^4-1120x^5-64x^6)\log(x)+(-33614x-480}{16807+24010x+13720x^2+3920x^3+560x^4+32x^5}$$

output
```
25*x^2 + 1715/4*(32*x^3 + 168*x^2 + 392*x + 343)*log(x)/(16*x^4 + 224*x^3
+ 1176*x^2 + 2744*x + 2401) + 12005/24*(24*x^2 + 56*x + 49)*log(x)/(16*x^4
 + 224*x^3 + 1176*x^2 + 2744*x + 2401) + 16807/24*(8*x + 7)*log(x)/(16*x^4
 + 224*x^3 + 1176*x^2 + 2744*x + 2401) - 1/8*(76832*x^3 + 8*(16*x^6 + 224*
x^5 + 1176*x^4 + 2744*x^3 + 2401*x^2)*log(x)^2 + 701092*x^2 - 392*(24*x^4
+ 56*x^3 + 49*x^2)*log(x) + 2151296*x + 2235331)/(16*x^4 + 224*x^3 + 1176*
x^2 + 2744*x + 2401) - 42875/24*(960*x^3 + 8400*x^2 + 25480*x + 26411)/(16
*x^4 + 224*x^3 + 1176*x^2 + 2744*x + 2401) + 8575/8*(640*x^3 + 5880*x^2 +
18424*x + 19551)/(16*x^4 + 224*x^3 + 1176*x^2 + 2744*x + 2401) + 42875/12*
(384*x^3 + 3024*x^2 + 8624*x + 8575)/(16*x^4 + 224*x^3 + 1176*x^2 + 2744*x
 + 2401) - 43435/4*(32*x^3 + 168*x^2 + 392*x + 343)/(16*x^4 + 224*x^3 + 11
76*x^2 + 2744*x + 2401) + 1715/24*(72*x^2 + 378*x + 539)/(8*x^3 + 84*x^2 +
 294*x + 343) - 105183/8*(24*x^2 + 56*x + 49)/(16*x^4 + 224*x^3 + 1176*x^2
 + 2744*x + 2401) - 343/48*(8*x^2 + 70*x + 49)/(8*x^3 + 84*x^2 + 294*x + 3
43) - 1715/48*(8*x^2 - 14*x - 49)/(8*x^3 + 84*x^2 + 294*x + 343) - 158949/
8*(8*x + 7)/(16*x^4 + 224*x^3 + 1176*x^2 + 2744*x + 2401) - 147/2*log(x)
```

3.538.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.93

$$\int \frac{953694x + 1262196x^2 + 694960x^3 + 196000x^4 + 28000x^5 + 1600x^6 + (-33614x - 48020x^2 - 27440x^3 -}{16807 + 24010x + 13720x^2}$$

$$= -x^2 \log(x)^2 + 25\,x^2 - \frac{8\,(560\,x^3 + 4868\,x^2 + 13720\,x + 12005)}{16\,x^4 + 224\,x^3 + 1176\,x^2 + 2744\,x + 2401}$$

input
```
integrate(((-64*x^6-1120*x^5-7840*x^4-27440*x^3-48020*x^2-33614*x)*log(x)^
2+(-64*x^6-1120*x^5-7840*x^4-27440*x^3-48020*x^2-33614*x)*log(x)+1600*x^6+
28000*x^5+196000*x^4+694960*x^3+1262196*x^2+953694*x)/(32*x^5+560*x^4+3920
*x^3+13720*x^2+24010*x+16807),x, algorithm=\
```

output
```
-x^2*log(x)^2 + 25*x^2 - 8*(560*x^3 + 4868*x^2 + 13720*x + 12005)/(16*x^4
+ 224*x^3 + 1176*x^2 + 2744*x + 2401)
```

3.538.9 Mupad [B] (verification not implemented)

Time = 15.84 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.86

$$\int \frac{953694x + 1262196x^2 + 694960x^3 + 196000x^4 + 28000x^5 + 1600x^6 + (-33614x - 48020x^2 - 27440x^3 -}{16807 + 24010x + 13720x^2}$$

$$= 25\,x^2 - x^2\ln(x)^2 - \frac{280\,x^3 + 2434\,x^2 + 6860\,x + \frac{12005}{2}}{x^4 + 14\,x^3 + \frac{147\,x^2}{2} + \frac{343\,x}{2} + \frac{2401}{16}}$$

input
```
int((953694*x - log(x)*(33614*x + 48020*x^2 + 27440*x^3 + 7840*x^4 + 1120*
x^5 + 64*x^6) + 1262196*x^2 + 694960*x^3 + 196000*x^4 + 28000*x^5 + 1600*x
^6 - log(x)^2*(33614*x + 48020*x^2 + 27440*x^3 + 7840*x^4 + 1120*x^5 + 64*
x^6))/(24010*x + 13720*x^2 + 3920*x^3 + 560*x^4 + 32*x^5 + 16807),x)
```

output
```
25*x^2 - x^2*log(x)^2 - (6860*x + 2434*x^2 + 280*x^3 + 12005/2)/((343*x)/2
 + (147*x^2)/2 + 14*x^3 + x^4 + 2401/16)
```

3.538.
$\int \frac{953694x+1262196x^2+694960x^3+196000x^4+28000x^5+1600x^6+(-33614x-48020x^2-27440x^3-7840x^4-1120x^5-64x^6)\log(x)+(-33614x-480}{16807+24010x+13720x^2+3920x^3+560x^4+32x^5}$

3.539 $\int \frac{-20e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)+e^{\frac{1}{10}(11x+10\log(3x))}(30+30x+(60+12}{90-120e^{\frac{1}{10}(11x+10\log(3x))}x\log(x)+40e^{\frac{1}{5}(11x+10\log(3x))}x^2\,\mathrm{l}}$

3.539.1 Optimal result

Integrand size = 112, antiderivative size = 26

$$\int \frac{-20e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)+e^{\frac{1}{10}(11x+10\log(3x))}(30+30x+(60+123x+33x^2)\log(x))}{90-120e^{\frac{1}{10}(11x+10\log(3x))}x\log(x)+40e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)}\,dx = \frac{x(1+x)}{-2x+\frac{e^{-11x/10}}{x\log(x)}}$$

output
```
x*(1+x)/(3/ln(x)/exp(ln(3*x)+11/10*x)-2*x)
```

3.539.2 Mathematica [A] (verified)

Time = 2.06 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{-20e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)+e^{\frac{1}{10}(11x+10\log(3x))}(30+30x+(60+123x+33x^2)\log(x))}{90-120e^{\frac{1}{10}(11x+10\log(3x))}x\log(x)+40e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)}\,dx = \frac{1}{10}\left(-5x-\frac{5(1+x)}{-1+2e^{11x/10}x^2\log(x)}\right)$$

input
```
Integrate[(-20*E^((11*x + 10*Log[3*x])/5)*x^2*Log[x]^2 + E^((11*x + 10*Log
[3*x])/10)*(30 + 30*x + (60 + 123*x + 33*x^2)*Log[x]))/(90 - 120*E^((11*x
+ 10*Log[3*x])/10)*x*Log[x] + 40*E^((11*x + 10*Log[3*x])/5)*x^2*Log[x]^2),
x]
```

output
```
(-5*x - (5*(1 + x))/(-1 + 2*E^((11*x)/10)*x^2*Log[x]))/10
```

3.539.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{1}{10}(11x+10\log(3x))}\left(\left(33x^2+123x+60\right)\log(x)+30x+30\right)-20x^2e^{\frac{1}{5}(11x+10\log(3x))}\log^2(x)}{40x^2e^{\frac{1}{5}(11x+10\log(3x))}\log^2(x)-120xe^{\frac{1}{10}(11x+10\log(3x))}\log(x)+90}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{e^{11x/10}x\left(-20e^{11x/10}x^3\log^2(x)+\left(11x^2+41x+20\right)\log(x)+10(x+1)\right)}{10\left(1-2e^{11x/10}x^2\log(x)\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{10}\int \frac{e^{11x/10}x\left(-20e^{11x/10}\log^2(x)x^3+10(x+1)+\left(11x^2+41x+20\right)\log(x)\right)}{\left(1-2e^{11x/10}x^2\log(x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{10}\int \left(\frac{e^{11x/10}x(x+1)(11x\log(x)+20\log(x)+10)}{\left(2e^{11x/10}x^2\log(x)-1\right)^2}-\frac{10e^{11x/10}x^2\log(x)}{2e^{11x/10}x^2\log(x)-1}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{10}\left(10\int \frac{e^{11x/10}x^2}{\left(2e^{11x/10}x^2\log(x)-1\right)^2}dx+20\int \frac{e^{11x/10}x^2\log(x)}{\left(2e^{11x/10}x^2\log(x)-1\right)^2}dx-5\int \frac{1}{2e^{11x/10}x^2\log(x)-1}dx+11\int \right.$$

input
```
Int[(-20*E^((11*x + 10*Log[3*x])/5)*x^2*Log[x]^2 + E^((11*x + 10*Log[3*x])
/10)*(30 + 30*x + (60 + 123*x + 33*x^2)*Log[x]))/(90 - 120*E^((11*x + 10*L
og[3*x])/10)*x*Log[x] + 40*E^((11*x + 10*Log[3*x])/5)*x^2*Log[x]^2),x]
```

output
```
$Aborted
```

3.539.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.539.4 Maple [A] (verified)

Time = 0.85 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

method	result	size
risch	$-\frac{x}{2}-\frac{3(1+x)}{2\left(6\ln(x)\mathrm{e}^{\frac{11x}{10}}x^{2}-3\right)}$	25
parallelrisch	$-\frac{360+240x^{2}\ln(x)\mathrm{e}^{\ln(3x)+\frac{11x}{10}}}{240\left(2x\ln(x)\mathrm{e}^{\ln(3x)+\frac{11x}{10}}-3\right)}$	39

input
```
int((-20*x^2*ln(x)^2*exp(ln(3*x)+11/10*x)^2+((33*x^2+123*x+60)*ln(x)+30*x+
30)*exp(ln(3*x)+11/10*x))/(40*x^2*ln(x)^2*exp(ln(3*x)+11/10*x)^2-120*x*ln(
x)*exp(ln(3*x)+11/10*x)+90),x,method=_RETURNVERBOSE)
```

output
```
-1/2*x-3/2*(1+x)/(6*ln(x)*exp(11/10*x)*x^2-3)
```

3.539.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.46

$$\int \frac{-20e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)+e^{\frac{1}{10}(11x+10\log(3x))}(30+30x+(60+123x+33x^2)\log(x))}{90-120e^{\frac{1}{10}(11x+10\log(3x))}x\log(x)+40e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)}\,dx$$
$$= -\frac{2\,x^2e^{\left(\frac{11}{10}\,x+\log(3)+\log(x)\right)}\log\left(x\right)+3}{2\left(2\,xe^{\left(\frac{11}{10}\,x+\log(3)+\log(x)\right)}\log\left(x\right)-3\right)}$$

input
```
integrate((-20*x^2*log(x)^2*exp(log(3*x)+11/10*x)^2+((33*x^2+123*x+60)*log
(x)+30*x+30)*exp(log(3*x)+11/10*x))/(40*x^2*log(x)^2*exp(log(3*x)+11/10*x)
^2-120*x*log(x)*exp(log(3*x)+11/10*x)+90),x, algorithm=\
```

output
```
-1/2*(2*x^2*e^(11/10*x + log(3) + log(x))*log(x) + 3)/(2*x*e^(11/10*x + lo
g(3) + log(x))*log(x) - 3)
```

3.539.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{-20e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)+e^{\frac{1}{10}(11x+10\log(3x))}(30+30x+(60+123x+33x^2)\log(x))}{90-120e^{\frac{1}{10}(11x+10\log(3x))}x\log(x)+40e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)}\,dx$$
$$= -\frac{x}{2}+\frac{-x-1}{4x^2e^{\frac{11x}{10}}\log\left(x\right)-2}$$

input
```
integrate((-20*x**2*ln(x)**2*exp(ln(3*x)+11/10*x)**2+((33*x**2+123*x+60)*l
n(x)+30*x+30)*exp(ln(3*x)+11/10*x))/(40*x**2*ln(x)**2*exp(ln(3*x)+11/10*x)
**2-120*x*ln(x)*exp(ln(3*x)+11/10*x)+90),x)
```

output
```
-x/2 + (-x - 1)/(4*x**2*exp(11*x/10)*log(x) - 2)
```

3.539.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

$$\int \frac{-20e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)+e^{\frac{1}{10}(11x+10\log(3x))}(30+30x+(60+123x+33x^2)\log(x))}{90-120e^{\frac{1}{10}(11x+10\log(3x))}x\log(x)+40e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)}\,dx$$
$$= -\frac{2x^3e^{\left(\frac{11}{10}x\right)}\log(x)+1}{2\left(2x^2e^{\left(\frac{11}{10}x\right)}\log(x)-1\right)}$$

input
```
integrate((-20*x^2*log(x)^2*exp(log(3*x)+11/10*x)^2+((33*x^2+123*x+60)*log
(x)+30*x+30)*exp(log(3*x)+11/10*x))/(40*x^2*log(x)^2*exp(log(3*x)+11/10*x)
^2-120*x*log(x)*exp(log(3*x)+11/10*x)+90),x, algorithm=\
```

output
```
-1/2*(2*x^3*e^(11/10*x)*log(x) + 1)/(2*x^2*e^(11/10*x)*log(x) - 1)
```

3.539.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

$$\int \frac{-20e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)+e^{\frac{1}{10}(11x+10\log(3x))}(30+30x+(60+123x+33x^2)\log(x))}{90-120e^{\frac{1}{10}(11x+10\log(3x))}x\log(x)+40e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)}\,dx$$
$$= -\frac{2x^3e^{\left(\frac{11}{10}x\right)}\log(x)+1}{2\left(2x^2e^{\left(\frac{11}{10}x\right)}\log(x)-1\right)}$$

input
```
integrate((-20*x^2*log(x)^2*exp(log(3*x)+11/10*x)^2+((33*x^2+123*x+60)*log
(x)+30*x+30)*exp(log(3*x)+11/10*x))/(40*x^2*log(x)^2*exp(log(3*x)+11/10*x)
^2-120*x*log(x)*exp(log(3*x)+11/10*x)+90),x, algorithm=\
```

output
```
-1/2*(2*x^3*e^(11/10*x)*log(x) + 1)/(2*x^2*e^(11/10*x)*log(x) - 1)
```

3.539.9 Mupad [B] (verification not implemented)

Time = 16.41 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{-20e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)+e^{\frac{1}{10}(11x+10\log(3x))}(30+30x+(60+123x+33x^2)\log(x))}{90-120e^{\frac{1}{10}(11x+10\log(3x))}x\log(x)+40e^{\frac{1}{5}(11x+10\log(3x))}x^2\log^2(x)}\,dx$$
$$=-\frac{x}{2}-\frac{\frac{x}{2}+\frac{1}{2}}{2\,x^2\,\mathrm{e}^{\frac{11\,x}{10}}\,\ln(x)-1}$$

input
```
int((exp((11*x)/10 + log(3*x))*(30*x + log(x)*(123*x + 33*x^2 + 60) + 30)
- 20*x^2*exp((11*x)/5 + 2*log(3*x))*log(x)^2)/(40*x^2*exp((11*x)/5 + 2*log
(3*x))*log(x)^2 - 120*x*exp((11*x)/10 + log(3*x))*log(x) + 90),x)
```

output
```
- x/2 - (x/2 + 1/2)/(2*x^2*exp((11*x)/10)*log(x) - 1)
```

3.540 $\int \frac{e^{4x-2x^2}+16x^2+4\log(5)+e^{2x-x^2}(-8x+(-2+2x)\log(5))}{e^{4x-2x^2}-8e^{2x-x^2}x+16x^2}\,dx$

3.540.1 Optimal result

Integrand size = 79, antiderivative size = 24

$$\int \frac{e^{4x-2x^2}+16x^2+4\log(5)+e^{2x-x^2}(-8x+(-2+2x)\log(5))}{e^{4x-2x^2}-8e^{2x-x^2}x+16x^2}\,dx = x+\frac{\log(5)}{e^{-x+(3-x)x}-4x}$$

output
```
x+ln(5)/(exp(x*(-x+3)-x)-4*x)
```

3.540.2 Mathematica [A] (verified)

Time = 1.30 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{e^{4x-2x^2}+16x^2+4\log(5)+e^{2x-x^2}(-8x+(-2+2x)\log(5))}{e^{4x-2x^2}-8e^{2x-x^2}x+16x^2}\,dx = \frac{e^{2x}x+e^{x^2}(-4x^2+\log(5))}{e^{2x}-4e^{x^2}x}$$

input
```
Integrate[(E^(4*x - 2*x^2) + 16*x^2 + 4*Log[5] + E^(2*x - x^2)*(-8*x + (-2
 + 2*x)*Log[5]))/(E^(4*x - 2*x^2) - 8*E^(2*x - x^2)*x + 16*x^2),x]
```

output
```
(E^(2*x)*x + E^x^2*(-4*x^2 + Log[5]))/(E^(2*x) - 4*E^x^2*x)
```

3.540.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16x^2+e^{4x-2x^2}+e^{2x-x^2}((2x-2)\log(5)-8x)+4\log(5)}{16x^2-8e^{2x-x^2}x+e^{4x-2x^2}}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{2x^2}\left(16x^2+e^{4x-2x^2}+e^{2x-x^2}((2x-2)\log(5)-8x)+4\log(5)\right)}{\left(e^{2x}-4e^{x^2}x\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(2e^{x^2-2x}(x-1)\log(5)-\frac{8e^{2x^2}x(x-1)\log(5)}{4e^{x(x+2)}x-e^{4x}}+\frac{4e^{2x^2}(2x^2-2x+1)\log(5)}{\left(e^{2x}-4e^{x^2}x\right)^2}+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$4\log(5)\int \frac{e^{2x^2}}{\left(e^{2x}-4e^{x^2}x\right)^2}dx-8\log(5)\int \frac{e^{2x^2}x}{\left(4e^{x^2}x-e^{2x}\right)^2}dx+8\log(5)\int \frac{e^{2x^2}x^2}{\left(4e^{x^2}x-e^{2x}\right)^2}dx+8\log(5)\int \frac{e^{2x^2}x}{4e^{x(x+2)}x-e^{4x}}dx-8\log(5)\int \frac{e^{2x^2}x^2}{4e^{x(x+2)}x-e^{4x}}dx+e^{x^2-2x}\log(5)+x$$

input
```
Int[(E^(4*x - 2*x^2) + 16*x^2 + 4*Log[5] + E^(2*x - x^2)*(-8*x + (-2 + 2*x
)*Log[5]))/(E^(4*x - 2*x^2) - 8*E^(2*x - x^2)*x + 16*x^2),x]
```

output
```
$Aborted
```

3.540.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.540.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

method	result	size
risch	$x-\frac{\ln(5)}{4x-\mathrm{e}^{-(-2+x)x}}$	22
parallelrisch	$-\frac{-4x^2+x\,\mathrm{e}^{-x^2+2x}+\ln(5)}{4x-\mathrm{e}^{-x^2+2x}}$	41
norman	$\frac{4x^2-x\,\mathrm{e}^{-x^2+2x}-\ln(5)}{4x-\mathrm{e}^{-x^2+2x}}$	43

input
```
int((exp(-x^2+2*x)^2+((-2+2*x)*ln(5)-8*x)*exp(-x^2+2*x)+4*ln(5)+16*x^2)/(e
xp(-x^2+2*x)^2-8*x*exp(-x^2+2*x)+16*x^2),x,method=_RETURNVERBOSE)
```

output
```
x-ln(5)/(4*x-exp(-(-2+x)*x))
```

3.540.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.75

$$\int \frac{e^{4x-2x^2}+16x^2+4\log(5)+e^{2x-x^2}(-8x+(-2+2x)\log(5))}{e^{4x-2x^2}-8e^{2x-x^2}x+16x^2}\,dx = \frac{4\,x^2-xe^{(-x^2+2\,x)}-\log(5)}{4\,x-e^{(-x^2+2\,x)}}$$

input
```
integrate((exp(-x^2+2*x)^2+((-2+2*x)*log(5)-8*x)*exp(-x^2+2*x)+4*log(5)+16
*x^2)/(exp(-x^2+2*x)^2-8*x*exp(-x^2+2*x)+16*x^2),x, algorithm=\
```

output
```
(4*x^2 - x*e^(-x^2 + 2*x) - log(5))/(4*x - e^(-x^2 + 2*x))
```

3.540.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{e^{4x-2x^2}+16x^2+4\log(5)+e^{2x-x^2}(-8x+(-2+2x)\log(5))}{e^{4x-2x^2}-8e^{2x-x^2}x+16x^2}\,dx = x+\frac{\log(5)}{-4x+e^{-x^2+2x}}$$

input
```
integrate((exp(-x**2+2*x)**2+((-2+2*x)*ln(5)-8*x)*exp(-x**2+2*x)+4*ln(5)+1
6*x**2)/(exp(-x**2+2*x)**2-8*x*exp(-x**2+2*x)+16*x**2),x)
```

output
```
x + log(5)/(-4*x + exp(-x**2 + 2*x))
```

3.540.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{e^{4x-2x^2}+16x^2+4\log(5)+e^{2x-x^2}(-8x+(-2+2x)\log(5))}{e^{4x-2x^2}-8e^{2x-x^2}x+16x^2}\,dx = \frac{(4\,x^2-\log{(5)})e^{(x^2)}-xe^{(2\,x)}}{4\,xe^{(x^2)}-e^{(2\,x)}}$$

input
```
integrate((exp(-x^2+2*x)^2+((-2+2*x)*log(5)-8*x)*exp(-x^2+2*x)+4*log(5)+16
*x^2)/(exp(-x^2+2*x)^2-8*x*exp(-x^2+2*x)+16*x^2),x, algorithm=\
```

output
```
((4*x^2 - log(5))*e^(x^2) - x*e^(2*x))/(4*x*e^(x^2) - e^(2*x))
```

3.540.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.75

$$\int \frac{e^{4x-2x^2}+16x^2+4\log(5)+e^{2x-x^2}(-8x+(-2+2x)\log(5))}{e^{4x-2x^2}-8e^{2x-x^2}x+16x^2}\,dx = \frac{4\,x^2-xe^{(-x^2+2\,x)}-\log{(5)}}{4\,x-e^{(-x^2+2\,x)}}$$

input
```
integrate((exp(-x^2+2*x)^2+((-2+2*x)*log(5)-8*x)*exp(-x^2+2*x)+4*log(5)+16
*x^2)/(exp(-x^2+2*x)^2-8*x*exp(-x^2+2*x)+16*x^2),x, algorithm=\
```

output
```
(4*x^2 - x*e^(-x^2 + 2*x) - log(5))/(4*x - e^(-x^2 + 2*x))
```

3.540.9 Mupad [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^{4x-2x^2}+16x^2+4\log(5)+e^{2x-x^2}(-8x+(-2+2x)\log(5))}{e^{4x-2x^2}-8e^{2x-x^2}x+16x^2}\,dx = x-\frac{\ln(5)}{4\,x-\mathrm{e}^{2\,x-x^2}}$$

input
```
int((4*log(5) + exp(4*x - 2*x^2) - exp(2*x - x^2)*(8*x - log(5)*(2*x - 2))
 + 16*x^2)/(exp(4*x - 2*x^2) - 8*x*exp(2*x - x^2) + 16*x^2),x)
```

output
```
x - log(5)/(4*x - exp(2*x - x^2))
```

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$$\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+\left(246x+120x^2+123x^3+\ldots\right.\right.}{\left(20+10x^2\right)\log^2\left(\frac{2+x^2}{x}\right)}$$

3.541.1 Optimal result

Integrand size = 120, antiderivative size = 27

$$\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+\left(246x+120x^2+123x^3+60x^4\right)\log\left(\frac{2+x^2}{x}\right)+(20+10\ldots\right.}{\left(20+10x^2\right)\log^2\left(\frac{2+x^2}{x}\right)}$$

$$=e^{\frac{3\left(x+\left(\frac{1}{10}+x\right)(3+x)\right)}{\log\left(\frac{2}{x}+x\right)}}x$$

output
```
x*exp(3/ln(x+2/x)*(x+(3+x)*(1/10+x)))
```

3.541.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

$$\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+\left(246x+120x^2+123x^3+60x^4\right)\log\left(\frac{2+x^2}{x}\right)+(20+10\ldots\right.}{\left(20+10x^2\right)\log^2\left(\frac{2+x^2}{x}\right)}$$

$$=e^{\frac{3\left(3+41x+10x^2\right)}{10\log\left(\frac{2}{x}+x\right)}}x$$

$$\int e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+\left(246x+120x^2+123x^3+60x^4\right)\log\left(\frac{2+x^2}{x}\right)+\left(20+10x^2\right)\log^2\left(\frac{2+x^2}{x}\right)\right) \ldots$$

input
```
Integrate[(E^((9 + 123*x + 30*x^2)/(10*Log[(2 + x^2)/x]))*(18 + 246*x + 51
*x^2 - 123*x^3 - 30*x^4 + (246*x + 120*x^2 + 123*x^3 + 60*x^4)*Log[(2 + x^
2)/x] + (20 + 10*x^2)*Log[(2 + x^2)/x]^2))/((20 + 10*x^2)*Log[(2 + x^2)/x]
^2),x]
```

output
```
E^((3*(3 + 41*x + 10*x^2))/(10*Log[2/x + x]))*x
```

3.541.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 164 vs. $2(27) = 54$.

Time = 1.12 (sec) , antiderivative size = 164, normalized size of antiderivative = 6.07, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.008$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{30x^2+123x+9}{10\log\left(\frac{x^2+2}{x}\right)}}\left(-30x^4-123x^3+51x^2+\left(10x^2+20\right)\log^2\left(\frac{x^2+2}{x}\right)+\left(60x^4+123x^3+120x^2+246x\right)\log\left(\frac{x^2+2}{x}\right)\right.}{\left(10x^2+20\right)\log^2\left(\frac{x^2+2}{x}\right)}$$

$$\Big\downarrow \text{2726}$$

$$-\frac{e^{\frac{3\left(10x^2+41x+3\right)}{10\log\left(\frac{x^2+2}{x}\right)}}\left(-10x^4-41x^3+17x^2+\left(20x^4+41x^3+40x^2+82x\right)\log\left(\frac{x^2+2}{x}\right)+82x+6\right)}{\left(x^2+2\right)\left(\frac{x\left(10x^2+41x+3\right)\left(2-\frac{x^2+2}{x^2}\right)}{\left(x^2+2\right)\log^2\left(\frac{x^2+2}{x}\right)}-\frac{20x+41}{\log\left(\frac{x^2+2}{x}\right)}\right)\log^2\left(\frac{x^2+2}{x}\right)}$$

input
```
Int[(E^((9 + 123*x + 30*x^2)/(10*Log[(2 + x^2)/x]))*(18 + 246*x + 51*x^2 -
 123*x^3 - 30*x^4 + (246*x + 120*x^2 + 123*x^3 + 60*x^4)*Log[(2 + x^2)/x]
+ (20 + 10*x^2)*Log[(2 + x^2)/x]^2))/((20 + 10*x^2)*Log[(2 + x^2)/x]^2),x]
```

output
```
-((E^((3*(3 + 41*x + 10*x^2))/(10*Log[(2 + x^2)/x]))*(6 + 82*x + 17*x^2 -
41*x^3 - 10*x^4 + (82*x + 40*x^2 + 41*x^3 + 20*x^4)*Log[(2 + x^2)/x]))/((2
 + x^2)*((x*(3 + 41*x + 10*x^2)*(2 - (2 + x^2)/x^2))/((2 + x^2)*Log[(2 + x
^2)/x]^2) - (41 + 20*x)/Log[(2 + x^2)/x])*Log[(2 + x^2)/x]^2))
```

3.541.

$$\int e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+\left(246x+120x^2+123x^3+60x^4\right)\log\left(\frac{2+x^2}{x}\right)+\left(20+10x^2\right)\log^2\left(\frac{2+x^2}{x}\right)\right)$$

3.541.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.541.4 Maple [A] (verified)

Time = 1.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

method	result	size
risch	$e^{\frac{3x^2+\frac{123}{10}x+\frac{9}{10}}{\ln\left(\frac{x^2+2}{x}\right)}} x$	28
parallelrisch	$e^{\frac{3x^2+\frac{123}{10}x+\frac{9}{10}}{\ln\left(\frac{x^2+2}{x}\right)}} x$	28

input
```
int(((10*x^2+20)*ln((x^2+2)/x)^2+(60*x^4+123*x^3+120*x^2+246*x)*ln((x^2+2)
/x)-30*x^4-123*x^3+51*x^2+246*x+18)*exp(1/10*(30*x^2+123*x+9)/ln((x^2+2)/x
))/(10*x^2+20)/ln((x^2+2)/x)^2,x,method=_RETURNVERBOSE)
```

output
```
exp(3/10*(10*x^2+41*x+3)/ln((x^2+2)/x))*x
```

3.541.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+(246x+120x^2+123x^3+60x^4)\log\left(\frac{2+x^2}{x}\right)+(20+10\right.}{(20+10x^2)\log^2\left(\frac{2+x^2}{x}\right)}$$

$$= xe^{\left(\frac{3\,(10\,x^2+41\,x+3)}{10\,\log\left(\frac{x^2+2}{x}\right)}\right)}$$

input
```
integrate(((10*x^2+20)*log((x^2+2)/x)^2+(60*x^4+123*x^3+120*x^2+246*x)*log
((x^2+2)/x)-30*x^4-123*x^3+51*x^2+246*x+18)*exp(1/10*(30*x^2+123*x+9)/log(
(x^2+2)/x))/(10*x^2+20)/log((x^2+2)/x)^2,x, algorithm=\
```

output
```
x*e^(3/10*(10*x^2 + 41*x + 3)/log((x^2 + 2)/x))
```

3.541.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+(246x+120x^2+123x^3+60x^4)\log\left(\frac{2+x^2}{x}\right)+(20+10\right.}{(20+10x^2)\log^2\left(\frac{2+x^2}{x}\right)}$$
= Exception raised: TypeError

input
```
integrate((((10*x**2+20)*ln((x**2+2)/x)**2+(60*x**4+123*x**3+120*x**2+246*x
)*ln((x**2+2)/x)-30*x**4-123*x**3+51*x**2+246*x+18)*exp(1/10*(30*x**2+123*
x+9)/ln((x**2+2)/x))/(10*x**2+20)/ln((x**2+2)/x)**2,x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.541.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+(246x+120x^2+123x^3+60x^4)\log\left(\frac{2+x^2}{x}\right)+(20+10\right.}{(20+10x^2)\log^2\left(\frac{2+x^2}{x}\right)}$$
= Exception raised: RuntimeError

input
```
integrate((((10*x^2+20)*log((x^2+2)/x)^2+(60*x^4+123*x^3+120*x^2+246*x)*log
((x^2+2)/x)-30*x^4-123*x^3+51*x^2+246*x+18)*exp(1/10*(30*x^2+123*x+9)/log(
(x^2+2)/x))/(10*x^2+20)/log((x^2+2)/x)^2,x, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is un
defined.
```

3.541.8 Giac [F]

$$\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+(246x+120x^2+123x^3+60x^4)\log\left(\frac{2+x^2}{x}\right)+(20+10\right.}{(20+10x^2)\log^2\left(\frac{2+x^2}{x}\right)}$$

$$=\int -\frac{\left(30\,x^4+123\,x^3-10\,(x^2+2)\log\left(\frac{x^2+2}{x}\right)^2-51\,x^2-3\,(20\,x^4+41\,x^3+40\,x^2+82\,x)\log\left(\frac{x^2+2}{x}\right)-24\right.}{10\,(x^2+2)\log\left(\frac{x^2+2}{x}\right)^2}$$

input
```
integrate(((10*x^2+20)*log((x^2+2)/x)^2+(60*x^4+123*x^3+120*x^2+246*x)*log
((x^2+2)/x)-30*x^4-123*x^3+51*x^2+246*x+18)*exp(1/10*(30*x^2+123*x+9)/log(
(x^2+2)/x))/(10*x^2+20)/log((x^2+2)/x)^2,x, algorithm=\
```

output
```
integrate(-1/10*(30*x^4 + 123*x^3 - 10*(x^2 + 2)*log((x^2 + 2)/x)^2 - 51*x
^2 - 3*(20*x^4 + 41*x^3 + 40*x^2 + 82*x)*log((x^2 + 2)/x) - 246*x - 18)*e^
(3/10*(10*x^2 + 41*x + 3)/log((x^2 + 2)/x))/((x^2 + 2)*log((x^2 + 2)/x)^2)
, x)
```

3.541.9 Mupad [B] (verification not implemented)

Time = 15.67 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.30

$$\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+(246x+120x^2+123x^3+60x^4)\log\left(\frac{2+x^2}{x}\right)+(20+10\right.}{(20+10x^2)\log^2\left(\frac{2+x^2}{x}\right)}$$
$$=x\,\mathrm{e}^{\frac{3\,x^2}{\ln\left(\frac{1}{x}\right)+\ln\left(x^2+2\right)}}\,\mathrm{e}^{\frac{9}{10\,\left(\ln\left(\frac{1}{x}\right)+\ln\left(x^2+2\right)\right)}}\,\mathrm{e}^{\frac{123\,x}{10\,\left(\ln\left(\frac{1}{x}\right)+\ln\left(x^2+2\right)\right)}}$$

input
```
int((exp(((123*x)/10 + 3*x^2 + 9/10)/log((x^2 + 2)/x))*(246*x + log((x^2 +
 2)/x)*(246*x + 120*x^2 + 123*x^3 + 60*x^4) + log((x^2 + 2)/x)^2*(10*x^2 +
 20) + 51*x^2 - 123*x^3 - 30*x^4 + 18))/(log((x^2 + 2)/x)^2*(10*x^2 + 20))
,x)
```

output
```
x*exp((3*x^2)/(log(1/x) + log(x^2 + 2)))*exp(9/(10*(log(1/x) + log(x^2 + 2
))))*exp((123*x)/(10*(log(1/x) + log(x^2 + 2))))
```

3.541.

$$\int \frac{e^{\frac{9+123x+30x^2}{10\log\left(\frac{2+x^2}{x}\right)}}\left(18+246x+51x^2-123x^3-30x^4+(246x+120x^2+123x^3+60x^4)\log\left(\frac{2+x^2}{x}\right)+(20+10x^2)\log^2\left(\frac{2+x^2}{x}\right)\right)}{\ldots}\,d$$

3.542 $\int \frac{-8-3e^{10}x^3+e^{10+x}x^3}{4x-e^{15}x^3+e^{10+x}x^3+e^{10}(4x^3-3x^4)}\,dx$

3.542.1 Optimal result

Integrand size = 58, antiderivative size = 22

$$\int \frac{-8-3e^{10}x^3+e^{10+x}x^3}{4x-e^{15}x^3+e^{10+x}x^3+e^{10}(4x^3-3x^4)}\,dx=\log\left(-4+e^5-e^x-\frac{4}{e^{10}x^2}+3x\right)$$

output
```
ln(exp(5)+3*x-4-exp(x)-4/x^2/exp(5)^2)
```

3.542.2 Mathematica [A] (verified)

Time = 5.12 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.68

$$\int \frac{-8-3e^{10}x^3+e^{10+x}x^3}{4x-e^{15}x^3+e^{10+x}x^3+e^{10}(4x^3-3x^4)}\,dx=-2\log(x)+\log\left(4-e^{15}x^2+e^{10+x}x^2+e^{10}(4-3x)x^2\right)$$

input
```
Integrate[(-8 - 3*E^10*x^3 + E^(10 + x)*x^3)/(4*x - E^15*x^3 + E^(10 + x)*
x^3 + E^10*(4*x^3 - 3*x^4)),x]
```

output
```
-2*Log[x] + Log[4 - E^15*x^2 + E^(10 + x)*x^2 + E^10*(4 - 3*x)*x^2]
```

3.542.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+10}x^3-3e^{10}x^3-8}{e^{x+10}x^3-e^{15}x^3+e^{10}\left(4x^3-3x^4\right)+4x}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{3e^{10}x^4-e^{10}\left(7-e^5\right)x^3-4x-8}{x\left(-3e^{10}x^3+e^{x+10}x^2+4e^{10}\left(1-\frac{e^5}{4}\right)x^2+4\right)}+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-e^{10}\left(7-e^5\right)\int \frac{x^2}{-3e^{10}x^3+e^{x+10}x^2+4e^{10}\left(1-\frac{e^5}{4}\right)x^2+4}dx+ 3e^{10}\int \frac{x^3}{-3e^{10}x^3+e^{x+10}x^2+4e^{10}\left(1-\frac{e^5}{4}\right)x^2+4}dx+ 4\int \frac{1}{3e^{10}x^3-e^{x+10}x^2-4e^{10}\left(1-\frac{e^5}{4}\right)x^2-4}dx+ 8\int \frac{1}{x\left(3e^{10}x^3-e^{x+10}x^2-4e^{10}\left(1-\frac{e^5}{4}\right)x^2-4\right)}dx+x$$

input
```
Int[(-8 - 3*E^10*x^3 + E^(10 + x)*x^3)/(4*x - E^15*x^3 + E^(10 + x)*x^3 +
E^10*(4*x^3 - 3*x^4)),x]
```

output
```
$Aborted
```

3.542.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.542.4 Maple [A] (verified)

Time = 0.92 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

method	result	size
risch	$\ln\left(\frac{-3x^3-x^2\mathrm{e}^5+4x^2+\mathrm{e}^x x^2+4\,\mathrm{e}^{-10}}{x^2}\right)$	34
norman	$-2\ln(x)+\ln\left(x^2\mathrm{e}^{15}-\mathrm{e}^x\mathrm{e}^{10}x^2+3x^3\mathrm{e}^{10}-4x^2\mathrm{e}^{10}-4\right)$	46
parallelrisch	$-2\ln(x)+\ln\left(\frac{(x^2\mathrm{e}^{15}-\mathrm{e}^x\mathrm{e}^{10}x^2+3x^3\mathrm{e}^{10}-4x^2\mathrm{e}^{10}-4)\mathrm{e}^{-10}}{3}\right)$	52

input
```
int((x^3*exp(5)^2*exp(x)-3*x^3*exp(5)^2-8)/(x^3*exp(5)^2*exp(x)-x^3*exp(5)
^3+(-3*x^4+4*x^3)*exp(5)^2+4*x),x,method=_RETURNVERBOSE)
```

output
```
ln((-3*x^3-x^2*exp(5)+4*x^2+exp(x)*x^2+4*exp(-10))/x^2)
```

3.542.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.68

$$\int \frac{-8-3e^{10}x^3+e^{10+x}x^3}{4x-e^{15}x^3+e^{10+x}x^3+e^{10}(4x^3-3x^4)}\,dx = \log\left(-\frac{x^2e^{15}-x^2e^{(x+10)}+(3\,x^3-4\,x^2)e^{10}-4}{x^2}\right)$$

input
```
integrate((x^3*exp(5)^2*exp(x)-3*x^3*exp(5)^2-8)/(x^3*exp(5)^2*exp(x)-x^3*
exp(5)^3+(-3*x^4+4*x^3)*exp(5)^2+4*x),x, algorithm=\
```

output
```
log(-(x^2*e^15 - x^2*e^(x + 10) + (3*x^3 - 4*x^2)*e^10 - 4)/x^2)
```

3.542.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

$$\int \frac{-8-3e^{10}x^3+e^{10+x}x^3}{4x-e^{15}x^3+e^{10+x}x^3+e^{10}(4x^3-3x^4)}\,dx = \log\left(e^x+\frac{-3x^3e^{10}-x^2e^{15}+4x^2e^{10}+4}{x^2e^{10}}\right)$$

input
```
integrate((x**3*exp(5)**2*exp(x)-3*x**3*exp(5)**2-8)/(x**3*exp(5)**2*exp(x
)-x**3*exp(5)**3+(-3*x**4+4*x**3)*exp(5)**2+4*x),x)
```

output
```
log(exp(x) + (-3*x**3*exp(10) - x**2*exp(15) + 4*x**2*exp(10) + 4)*exp(-10
)/x**2)
```

3.542.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.68

$$\int \frac{-8-3e^{10}x^3+e^{10+x}x^3}{4x-e^{15}x^3+e^{10+x}x^3+e^{10}\left(4x^3-3x^4\right)}\,dx = \log\left(-\frac{\left(3\,x^3e^{10}+x^2\left(e^{15}-4\,e^{10}\right)-x^2e^{(x+10)}-4\right)e^{(-10)}}{x^2}\right)$$

input
```
integrate((x^3*exp(5)^2*exp(x)-3*x^3*exp(5)^2-8)/(x^3*exp(5)^2*exp(x)-x^3*
exp(5)^3+(-3*x^4+4*x^3)*exp(5)^2+4*x),x, algorithm=\
```

output
```
log(-(3*x^3*e^10 + x^2*(e^15 - 4*e^10) - x^2*e^(x + 10) - 4)*e^(-10)/x^2)
```

3.542.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.68

$$\int \frac{-8-3e^{10}x^3+e^{10+x}x^3}{4x-e^{15}x^3+e^{10+x}x^3+e^{10}\left(4x^3-3x^4\right)}\,dx = \log\left(-3\,x^3e^{10}-x^2e^{15}+4\,x^2e^{10}+x^2e^{(x+10)}+4\right) - 2\,\log\left(x\right)$$

input
```
integrate((x^3*exp(5)^2*exp(x)-3*x^3*exp(5)^2-8)/(x^3*exp(5)^2*exp(x)-x^3*
exp(5)^3+(-3*x^4+4*x^3)*exp(5)^2+4*x),x, algorithm=\
```

output
```
log(-3*x^3*e^10 - x^2*e^15 + 4*x^2*e^10 + x^2*e^(x + 10) + 4) - 2*log(x)
```

3.542.9 Mupad [B] (verification not implemented)

Time = 15.03 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.50

$$\int \frac{-8-3e^{10}x^3+e^{10+x}x^3}{4x-e^{15}x^3+e^{10+x}x^3+e^{10}\left(4x^3-3x^4\right)}\,dx = \ln\left(\frac{x^2\,\mathrm{e}^5}{3}-\frac{x^2\,\mathrm{e}^x}{3}-\frac{4\,\mathrm{e}^{-10}}{3}-\frac{4\,x^2}{3}+x^3\right) - 2\,\ln\left(x\right)$$

input
```
int(-(3*x^3*exp(10) - x^3*exp(10)*exp(x) + 8)/(4*x + exp(10)*(4*x^3 - 3*x^
4) - x^3*exp(15) + x^3*exp(10)*exp(x)),x)
```

output
```
log((x^2*exp(5))/3 - (x^2*exp(x))/3 - (4*exp(-10))/3 - (4*x^2)/3 + x^3) -
2*log(x)
```

3.543 $\int \frac{1}{10}e^{2-2e^x}\left(4+20e^{-2+2e^x}x-8e^xx-2\log(6x)+(-1$

3.543.1 Optimal result

Integrand size = 54, antiderivative size = 26

$$\int \frac{1}{10}e^{2-2e^x}\left(4+20e^{-2+2e^x}x-8e^xx-2\log(6x)+(-1+2e^xx)\log^2(6x)\right)\,dx$$
$$=x^2-\frac{1}{10}e^{2-2e^x}x\left(-4+\log^2(6x)\right)$$

output
```
x^2-1/2*x/exp(-1+exp(x))^2*(1/5*ln(6*x)^2-4/5)
```

3.543.2 Mathematica [A] (verified)

Time = 1.99 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.54

$$\int \frac{1}{10}e^{2-2e^x}\left(4+20e^{-2+2e^x}x-8e^xx-2\log(6x)+(-1+2e^xx)\log^2(6x)\right)\,dx$$
$$=\frac{1}{10}\left(4e^{2-2e^x}x+10x^2-e^{2-2e^x}x\log^2(6x)\right)$$

input
```
Integrate[(E^(2 - 2*E^x)*(4 + 20*E^(-2 + 2*E^x)*x - 8*E^x*x - 2*Log[6*x] +
 (-1 + 2*E^x*x)*Log[6*x]^2))/10,x]
```

output
```
(4*E^(2 - 2*E^x)*x + 10*x^2 - E^(2 - 2*E^x)*x*Log[6*x]^2)/10
```

3.543.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{10}e^{2-2e^x}\left(20e^{2e^x-2}x-8e^xx+(2e^xx-1)\log^2(6x)-2\log(6x)+4\right)\,dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{10}\int e^{2-2e^x}\left(-\left((1-2e^xx)\log^2(6x)\right)-2\log(6x)+20e^{-2+2e^x}x-8e^xx+4\right)dx$$

$$\Big\downarrow \; 7292$$

$$\frac{1}{10}\int e^{-2(-1+e^x)}\left(-\left((1-2e^xx)\log^2(6x)\right)-2\log(6x)+20e^{-2+2e^x}x-8e^xx+4\right)dx$$

$$\Big\downarrow \; 7293$$

$$\frac{1}{10}\int \left(e^{-2(-1+e^x)}(2e^xx-1)\log^2(6x)-2e^{-2(-1+e^x)}\log(6x)+4e^{-2(-1+e^x)}-8e^{x-2(-1+e^x)}x+20x\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{10}\left(2e^2\int \frac{\text{ExpIntegralEi}\left(-2e^x\right)}{x}dx-8\int e^{x-2(-1+e^x)}xdx-\int e^{-2(-1+e^x)}\log^2(6x)dx+2\int e^{x-2(-1+e^x)}x\log^2(6x\right.$$

input
```
Int[(E^(2 - 2*E^x)*(4 + 20*E^(-2 + 2*E^x)*x - 8*E^x*x - 2*Log[6*x] + (-1 +
 2*E^x*x)*Log[6*x]^2))/10,x]
```

output
```
$Aborted
```

3.543.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.543.4 Maple [A] (verified)

Time = 0.88 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

method	result	size
risch	$x^2+\frac{\left(-x\ln(6x)^2+4x\right)\mathrm{e}^{-2\,\mathrm{e}^x+2}}{10}$	27
parallelrisch	$-\frac{\left(-10\,\mathrm{e}^{2\,\mathrm{e}^x-2}x^2+x\ln(6x)^2-4x\right)\mathrm{e}^{-2\,\mathrm{e}^x+2}}{10}$	34

input
```
int(1/10*(20*x*exp(exp(x)-1)^2+(2*exp(x)*x-1)*ln(6*x)^2-2*ln(6*x)-8*exp(x)
*x+4)/exp(exp(x)-1)^2,x,method=_RETURNVERBOSE)
```

output
```
x^2+1/10*(-x*ln(6*x)^2+4*x)*exp(-2*exp(x)+2)
```

3.543.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int \frac{1}{10}e^{2-2e^x}\left(4+20e^{-2+2e^x}x-8e^xx-2\log(6x)+(-1+2e^xx)\log^2(6x)\right)\,dx$$
$$=\frac{1}{10}\left(10\,x^2e^{(2\,e^x-2)}-x\log\left(6\,x\right)^2+4\,x\right)e^{(-2\,e^x+2)}$$

input
```
integrate(1/10*(20*x*exp(exp(x)-1)^2+(2*exp(x)*x-1)*log(6*x)^2-2*log(6*x)-
8*exp(x)*x+4)/exp(exp(x)-1)^2,x, algorithm=\
```

output
```
1/10*(10*x^2*e^(2*e^x - 2) - x*log(6*x)^2 + 4*x)*e^(-2*e^x + 2)
```

3.543.6 Sympy [A] (verification not implemented)

Time = 6.24 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{10}e^{2-2e^x}\left(4+20e^{-2+2e^x}x-8e^x x-2\log(6x)+(-1+2e^x x)\log^2(6x)\right)\,dx = x^2+\frac{\left(-x\log{(6x)}^2+4x\right)e^{2-2e^x}}{10}$$

input
```
integrate(1/10*(20*x*exp(exp(x)-1)**2+(2*exp(x)*x-1)*ln(6*x)**2-2*ln(6*x)-
8*exp(x)*x+4)/exp(exp(x)-1)**2,x)
```

output
```
x**2 + (-x*log(6*x)**2 + 4*x)*exp(2 - 2*exp(x))/10
```

3.543.7 Maxima [F]

$$\int \frac{1}{10}e^{2-2e^x}\left(4+20e^{-2+2e^x}x-8e^x x-2\log(6x)+(-1+2e^x x)\log^2(6x)\right)\,dx = \int \frac{1}{10}\left((2\,xe^x-1)\log{(6\,x)}^2-8\,xe^x+20\,xe^{(2\,e^x-2)}-2\,\log{(6\,x)}+4\right)e^{(-2\,e^x+2)}\,dx$$

input
```
integrate(1/10*(20*x*exp(exp(x)-1)^2+(2*exp(x)*x-1)*log(6*x)^2-2*log(6*x)-
8*exp(x)*x+4)/exp(exp(x)-1)^2,x, algorithm=\
```

output
```
x^2 + 2/5*Ei(-2*e^x)*e^2 - 1/10*(2*x*(log(3) + log(2))*e^2*log(x) + x*e^2*
log(x)^2 + (log(3)^2 + 2*log(3)*log(2) + log(2)^2 - 4)*x*e^2)*e^(-2*e^x) -
 2/5*integrate(e^(-2*e^x + 2), x)
```

3.543.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. 2(22) = 44.

Time = 0.29 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.62

$$\int \frac{1}{10}e^{2-2e^x}\left(4+20e^{-2+2e^x}x-8e^x x-2\log(6x)+(-1+2e^x x)\log^2(6x)\right)\,dx = -\frac{1}{10}\left(xe^{(x-2\,e^x+2)}\log{(6)}^2+2\,xe^{(x-2\,e^x+2)}\log{(6)}\log{(x)}+xe^{(x-2\,e^x+2)}\log{(x)}^2-10\,x^2e^x-4\,xe^{(x-2\,e^x+2)}\right)e$$

input
```
integrate(1/10*(20*x*exp(exp(x)-1)^2+(2*exp(x)*x-1)*log(6*x)^2-2*log(6*x)-
8*exp(x)*x+4)/exp(exp(x)-1)^2,x, algorithm=\
```

output
```
-1/10*(x*e^(x - 2*e^x + 2)*log(6)^2 + 2*x*e^(x - 2*e^x + 2)*log(6)*log(x)
+ x*e^(x - 2*e^x + 2)*log(x)^2 - 10*x^2*e^x - 4*x*e^(x - 2*e^x + 2))*e^(-x
)
```

3.543.9 Mupad [B] (verification not implemented)

Time = 14.65 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{1}{10}e^{2-2e^x}\left(4+20e^{-2+2e^x}x-8e^xx-2\log(6x)+(-1+2e^xx)\log^2(6x)\right)\,dx$$
$$=\mathrm{e}^{2-2\,\mathrm{e}^x}\left(\frac{2\,x}{5}-\frac{x\ln\left(6\,x\right)^2}{10}\right)+x^2$$

input
```
int(exp(2 - 2*exp(x))*((log(6*x)^2*(2*x*exp(x) - 1))/10 - log(6*x)/5 - (4*
x*exp(x))/5 + 2*x*exp(2*exp(x) - 2) + 2/5),x)
```

output
```
exp(2 - 2*exp(x))*((2*x)/5 - (x*log(6*x)^2)/10) + x^2
```

3.544 $\int \frac{e^{\frac{2e^{\frac{5e^5}{x}}-x^2+2\log(2x)}{x}}\left(e^{\frac{5e^5}{x}}(-10e^5-2x)+2x-x^3-2x\log(2x)\right)}{x^3}\,dx$

3.544.1 Optimal result

Integrand size = 70, antiderivative size = 26

$$\int \frac{e^{\frac{2e^{\frac{5e^5}{x}}-x^2+2\log(2x)}{x}}\left(e^{\frac{5e^5}{x}}(-10e^5-2x)+2x-x^3-2x\log(2x)\right)}{x^3}\,dx=e^{x\left(-1+\frac{2\left(e^{\frac{5e^5}{x}}+\log(2x)\right)}{x^2}\right)}$$

output
```
exp((2*(exp(5*exp(5)/x)+ln(2*x))/x^2-1)*x)
```

3.544.2 Mathematica [A] (verified)

Time = 4.03 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int \frac{e^{\frac{2e^{\frac{5e^5}{x}}-x^2+2\log(2x)}{x}}\left(e^{\frac{5e^5}{x}}(-10e^5-2x)+2x-x^3-2x\log(2x)\right)}{x^3}\,dx=4^{\frac{1}{x}}e^{\frac{2e^{\frac{5e^5}{x}}}{x}-x}x^{2/x}$$

input
```
Integrate[(E^((2*E^((5*E^5)/x) - x^2 + 2*Log[2*x])/x)*(E^((5*E^5)/x)*(-10*
E^5 - 2*x) + 2*x - x^3 - 2*x*Log[2*x]))/x^3,x]
```

output
```
4^x^(-1)*E^((2*E^((5*E^5)/x))/x - x)*x^(2/x)
```

3.544.3 Rubi [A] (verified)

Time = 0.97 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.50, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.014$, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-x^2+2e^{\frac{5e^5}{x}}+2\log(2x)}{x}}\left(-x^3+2x+e^{\frac{5e^5}{x}}\left(-2x-10e^5\right)-2x\log(2x)\right)}{x^3}dx$$

$$\Big\downarrow \text{7257}$$

$$2^{2/x}e^{\frac{2e^{\frac{5e^5}{x}}-x^2}{x}}x^{2/x}$$

input
```
Int[(E^((2*E^((5*E^5)/x) - x^2 + 2*Log[2*x])/x)*(E^((5*E^5)/x)*(-10*E^5 -
2*x) + 2*x - x^3 - 2*x*Log[2*x]))/x^3,x]
```

output
```
2^(2/x)*E^((2*E^((5*E^5)/x) - x^2)/x)*x^(2/x)
```

3.544.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.544.4 Maple [A] (verified)

Time = 4.20 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

method	result	size
risch	$e^{\frac{2\ln(2x)+2\,e^{\frac{5\,e^5}{x}}-x^2}{x}}$	28
parallelrisch	$e^{\frac{2\ln(2x)+2\,e^{\frac{5\,e^5}{x}}-x^2}{x}}$	28

input
```
int((-2*x*ln(2*x)+(-10*exp(5)-2*x)*exp(5*exp(5)/x)-x^3+2*x)*exp((2*ln(2*x)
+2*exp(5*exp(5)/x)-x^2)/x)/x^3,x,method=_RETURNVERBOSE)
```

output
```
exp((2*ln(2*x)+2*exp(5*exp(5)/x)-x^2)/x)
```

3.544.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{2e^{\frac{5e^5}{x}}-x^2+2\log(2x)}{x}}\left(e^{\frac{5e^5}{x}}(-10e^5-2x)+2x-x^3-2x\log(2x)\right)}{x^3}\,dx=e^{\left(-\frac{x^2-2\,e^{\left(\frac{5\,e^5}{x}\right)}-2\,\log(2\,x)}{x}\right)}$$

input
```
integrate((-2*x*log(2*x)+(-10*exp(5)-2*x)*exp(5*exp(5)/x)-x^3+2*x)*exp((2*
log(2*x)+2*exp(5*exp(5)/x)-x^2)/x)/x^3,x, algorithm=\
```

output
```
e^(-(x^2 - 2*e^(5*e^5/x) - 2*log(2*x))/x)
```

3.544.6 Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{e^{\frac{2e^{\frac{5e^5}{x}}-x^2+2\log(2x)}{x}}\left(e^{\frac{5e^5}{x}}(-10e^5-2x)+2x-x^3-2x\log(2x)\right)}{x^3}\,dx=e^{\frac{-x^2+2e^{\frac{5e^5}{x}}+2\log(2x)}{x}}$$

input
```
integrate((-2*x*ln(2*x)+(-10*exp(5)-2*x)*exp(5*exp(5)/x)-x**3+2*x)*exp((2*
ln(2*x)+2*exp(5*exp(5)/x)-x**2)/x)/x**3,x)
```

output
```
exp((-x**2 + 2*exp(5*exp(5)/x) + 2*log(2*x))/x)
```

3.544.7 Maxima [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{e^{\frac{2e^{\frac{5e^5}{x}}-x^2+2\log(2x)}{x}}\left(e^{\frac{5e^5}{x}}(-10e^5-2x)+2x-x^3-2x\log(2x)\right)}{x^3}\,dx = e^{\left(-x+\frac{2\,e^{\left(\frac{5\,e^5}{x}\right)}}{x}+\frac{2\,\log(2)}{x}+\frac{2\,\log(x)}{x}\right)}$$

input
```
integrate((-2*x*log(2*x)+(-10*exp(5)-2*x)*exp(5*exp(5)/x)-x^3+2*x)*exp((2*
log(2*x)+2*exp(5*exp(5)/x)-x^2)/x)/x^3,x, algorithm=\
```

output
```
e^(-x + 2*e^(5*e^5/x)/x + 2*log(2)/x + 2*log(x)/x)
```

3.544.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{2e^{\frac{5e^5}{x}}-x^2+2\log(2x)}{x}}\left(e^{\frac{5e^5}{x}}(-10e^5-2x)+2x-x^3-2x\log(2x)\right)}{x^3}\,dx = e^{\left(-\frac{x^2-2\,e^{\left(\frac{5\,e^5}{x}\right)}-2\,\log(2\,x)}{x}\right)}$$

input
```
integrate((-2*x*log(2*x)+(-10*exp(5)-2*x)*exp(5*exp(5)/x)-x^3+2*x)*exp((2*
log(2*x)+2*exp(5*exp(5)/x)-x^2)/x)/x^3,x, algorithm=\
```

output
```
e^(-(x^2 - 2*e^(5*e^5/x) - 2*log(2*x))/x)
```

3.544.9 Mupad [B] (verification not implemented)

Time = 14.41 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.27

$$\int \frac{e^{\frac{2e^{\frac{5e^5}{x}}-x^2+2\log(2x)}{x}}\left(e^{\frac{5e^5}{x}}(-10e^5-2x)+2x-x^3-2x\log(2x)\right)}{x^3}\,dx = 2^{2/x}\,x^{2/x}\,\mathrm{e}^{-x}\,\mathrm{e}^{\frac{2\,\mathrm{e}^{\frac{5\,\mathrm{e}^5}{x}}}{x}}$$

input
```
int(-(exp((2*exp((5*exp(5))/x) + 2*log(2*x) - x^2)/x)*(2*x*log(2*x) - 2*x
+ exp((5*exp(5))/x)*(2*x + 10*exp(5)) + x^3))/x^3,x)
```

output
```
2^(2/x)*x^(2/x)*exp(-x)*exp((2*exp((5*exp(5))/x))/x)
```

3.545 $\int \frac{e^x(-256+256x-255x^2+256x^3)}{x^2} dx$

3.545.1 Optimal result

Integrand size = 22, antiderivative size = 23

$$\int \frac{e^x(-256+256x-255x^2+256x^3)}{x^2} dx = 25 - \frac{e^x(-256(1-x)^2-x)}{x}$$

output
```
25-(-x-16*(1-x)*(-16*x+16))*exp(x)/x
```

3.545.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.61

$$\int \frac{e^x(-256+256x-255x^2+256x^3)}{x^2} dx = e^x\left(-511+\frac{256}{x}+256x\right)$$

input
```
Integrate[(E^x*(-256 + 256*x - 255*x^2 + 256*x^3))/x^2,x]
```

output
```
E^x*(-511 + 256/x + 256*x)
```

3.545.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2629, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x (256x^3 - 255x^2 + 256x - 256)}{x^2} \, dx$$

$$\Big\downarrow \text{2629}$$

$$\int \left(-\frac{256e^x}{x^2} + 256e^x x - 255e^x + \frac{256e^x}{x}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$256e^x x - 511e^x + \frac{256e^x}{x}$$

input
```
Int[(E^x*(-256 + 256*x - 255*x^2 + 256*x^3))/x^2,x]
```

output
```
-511*E^x + (256*E^x)/x + 256*E^x*x
```

3.545.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2629
```
Int[(F_)^(v_)*(Px_)*((d_.) + (e_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandInte
grand[F^v, Px*(d + e*x)^m, x], x] /; FreeQ[{F, d, e, m}, x] && PolynomialQ[
Px, x] && LinearQ[v, x] &&  !TrueQ[$UseGamma]
```

3.545.4 Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

method	result	size
gosper	$\frac{(256x^2-511x+256)\,\mathrm{e}^x}{x}$	17
risch	$\frac{(256x^2-511x+256)\,\mathrm{e}^x}{x}$	17
default	$\frac{256\,\mathrm{e}^x}{x}+256\,\mathrm{e}^x x-511\,\mathrm{e}^x$	18
norman	$\frac{-511\,\mathrm{e}^x x+256\,\mathrm{e}^x x^2+256\,\mathrm{e}^x}{x}$	22
parallelrisch	$\frac{-511\,\mathrm{e}^x x+256\,\mathrm{e}^x x^2+256\,\mathrm{e}^x}{x}$	22
meijerg	$767-128(2-2x)\,\mathrm{e}^x-255\,\mathrm{e}^x+\frac{256}{x}-\frac{128(2+2x)}{x}+\frac{256\,\mathrm{e}^x}{x}$	38

input
```
int((256*x^3-255*x^2+256*x-256)*exp(x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/x*(256*x^2-511*x+256)*exp(x)
```

3.545.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

$$\int \frac{e^x(-256+256x-255x^2+256x^3)}{x^2}\,dx = \frac{(256\,x^2-511\,x+256)e^x}{x}$$

input
```
integrate((256*x^3-255*x^2+256*x-256)*exp(x)/x^2,x, algorithm=\
```

output
```
(256*x^2 - 511*x + 256)*e^x/x
```

3.545.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.61

$$\int \frac{e^x(-256+256x-255x^2+256x^3)}{x^2}\,dx = \frac{(256x^2-511x+256)\,e^x}{x}$$

input
```
integrate((256*x**3-255*x**2+256*x-256)*exp(x)/x**2,x)
```

output
```
(256*x**2 - 511*x + 256)*exp(x)/x
```

3.545.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{e^x(-256+256x-255x^2+256x^3)}{x^2}\,dx = 256\,(x-1)e^x + 256\,\mathrm{Ei}(x) - 255\,e^x - 256\,\Gamma(-1,-x)$$

input
```
integrate((256*x^3-255*x^2+256*x-256)*exp(x)/x^2,x, algorithm=\
```

output
```
256*(x - 1)*e^x + 256*Ei(x) - 255*e^x - 256*gamma(-1, -x)
```

3.545.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{e^x(-256+256x-255x^2+256x^3)}{x^2}\,dx = \frac{256\,x^2e^x - 511\,xe^x + 256\,e^x}{x}$$

input
```
integrate((256*x^3-255*x^2+256*x-256)*exp(x)/x^2,x, algorithm=\
```

output
```
(256*x^2*e^x - 511*x*e^x + 256*e^x)/x
```

3.545.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

$$\int \frac{e^x(-256+256x-255x^2+256x^3)}{x^2}\,dx = \frac{\mathrm{e}^x\,(256\,x^2 - 511\,x + 256)}{x}$$

input
```
int((exp(x)*(256*x - 255*x^2 + 256*x^3 - 256))/x^2,x)
```

output
```
(exp(x)*(256*x^2 - 511*x + 256))/x
```

3.546 $\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(1}{-320+64x+e^9(-5+x)x^3+e^6x^2(-60+12x)+e^3x(-240+48x)+e^{16+8e}}$

3.546.1 Optimal result

Integrand size = 149, antiderivative size = 21

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(144x^3+18e^3x^4\right)}{-320+64x+e^9(-5+x)x^3+e^6x^2(-60+12x)+e^3x(-240+48x)+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(576+432e^3x+108\right.}$$

$$=\log\left(-5+9e^{\frac{x^4}{\left(4+e^3x\right)^2}}+x\right)$$

output
```
ln(9*exp(x^4/(exp(3+ln(x))+4)^2)-5+x)
```

3.546.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 57 vs. $2(21)=42$.

Time = 0.13 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.71

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(144x^3+18e^3x^4\right)}{-320+64x+e^9(-5+x)x^3+e^6x^2(-60+12x)+e^3x(-240+48x)+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(576+432e^3x+108\right.}$$

$$=\log\left(5-9e^{\frac{48}{e^{12}}-\frac{8x}{e^9}+\frac{x^2}{e^6}+\frac{256}{e^{12}\left(4+e^3x\right)^2}-\frac{256}{e^{12}\left(4+e^3x\right)}}-x\right)$$

3.546.

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(144x^3+18e^3x^4\right)}{\ldots}\,dx$$

input
```
Integrate[(64 + 48*E^3*x + 12*E^6*x^2 + E^9*x^3 + E^(x^4/(16 + 8*E^3*x + E
^6*x^2))*(144*x^3 + 18*E^3*x^4))/(-320 + 64*x + E^9*(-5 + x)*x^3 + E^6*x^2
*(-60 + 12*x) + E^3*x*(-240 + 48*x) + E^(x^4/(16 + 8*E^3*x + E^6*x^2))*(57
6 + 432*E^3*x + 108*E^6*x^2 + 9*E^9*x^3)),x]
```

output
```
Log[5 - 9*E^(48/E^12 - (8*x)/E^9 + x^2/E^6 + 256/(E^12*(4 + E^3*x)^2) - 25
6/(E^12*(4 + E^3*x))) - x]
```

3.546.3 Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.013$, Rules used = {7292, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^9x^3+12e^6x^2+e^{\frac{x^4}{e^6x^2+8e^3x+16}}\left(18e^3x^4+144x^3\right)+48e^3x+64}{e^9(x-5)x^3+e^6(12x-60)x^2+e^{\frac{x^4}{e^6x^2+8e^3x+16}}\left(9e^9x^3+108e^6x^2+432e^3x+576\right)+e^3(48x-240)x+64x-320}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-e^9x^3-12e^6x^2-e^{\frac{x^4}{e^6x^2+8e^3x+16}}\left(18e^3x^4+144x^3\right)-48e^3x-64}{\left(-9e^{\frac{x^4}{\left(e^3x+4\right)^2}}-x+5\right)\left(e^3x+4\right)^3}dx$$

$$\Big\downarrow \text{7235}$$

$$\log\left(-9e^{\frac{x^4}{\left(e^3x+4\right)^2}}-x+5\right)$$

input
```
Int[(64 + 48*E^3*x + 12*E^6*x^2 + E^9*x^3 + E^(x^4/(16 + 8*E^3*x + E^6*x^2
))*(144*x^3 + 18*E^3*x^4))/(-320 + 64*x + E^9*(-5 + x)*x^3 + E^6*x^2*(-60
+ 12*x) + E^3*x*(-240 + 48*x) + E^(x^4/(16 + 8*E^3*x + E^6*x^2))*(576 + 43
2*E^3*x + 108*E^6*x^2 + 9*E^9*x^3)),x]
```

output
```
Log[5 - 9*E^(x^4/(4 + E^3*x)^2) - x]
```

3.546.

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(144x^3+18e^3x^4\right)}{\cdots}dx$$

3.546.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.546.4 Maple [A] (verified)

Time = 20.81 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.38

method	result	size
norman	$\ln\left(x+9\,\mathrm{e}^{\frac{x^4}{x^2\mathrm{e}^6+8x\,\mathrm{e}^3+16}}-5\right)$	29
parallelrisch	$\ln\left(9\,\mathrm{e}^{\frac{x^4}{x^2\mathrm{e}^6+8\,\mathrm{e}^{3+\ln(x)}+16}}+x-5\right)$	30
risch	$\mathrm{e}^3\mathrm{e}^{-9}x^2-8x\,\mathrm{e}^{-9}+\frac{(-256x-768\,\mathrm{e}^{-3})\mathrm{e}^{-9}}{x^2\mathrm{e}^6+8x\,\mathrm{e}^3+16}-\frac{x^4}{x^2\mathrm{e}^6+8x\,\mathrm{e}^3+16}+\ln\left(\mathrm{e}^{\frac{x^4}{x^2\mathrm{e}^6+8x\,\mathrm{e}^3+16}}-\frac{5}{9}+\frac{x}{9}\right)$	87

input
```
int(((18*x^3*exp(3+ln(x))+144*x^3)*exp(x^4/(exp(3+ln(x))^2+8*exp(3+ln(x))+
16))+exp(3+ln(x))^3+12*exp(3+ln(x))^2+48*exp(3+ln(x))+64)/((9*exp(3+ln(x))
^3+108*exp(3+ln(x))^2+432*exp(3+ln(x))+576)*exp(x^4/(exp(3+ln(x))^2+8*exp(
3+ln(x))+16))+(-5+x)*exp(3+ln(x))^3+(12*x-60)*exp(3+ln(x))^2+(48*x-240)*ex
p(3+ln(x))+64*x-320),x,method=_RETURNVERBOSE)
```

output
```
ln(x+9*exp(x^4/(x^2*exp(3)^2+8*x*exp(3)+16))-5)
```

3.546.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(144x^3+18e^3x^4\right)}{-320+64x+e^9(-5+x)x^3+e^6x^2(-60+12x)+e^3x(-240+48x)+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(576+432e^3x+108\right.}$$
$$=\log\left(x+9\,e^{\left(\frac{x^4}{x^2e^6+8\,xe^3+16}\right)}-5\right)$$

3.546.

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(144x^3+18e^3x^4\right)}{\cdots}\,dx$$

input
```
integrate(((18*x^3*exp(3+log(x))+144*x^3)*exp(x^4/(exp(3+log(x))^2+8*exp(3
+log(x))+16))+exp(3+log(x))^3+12*exp(3+log(x))^2+48*exp(3+log(x))+64)/((9*
exp(3+log(x))^3+108*exp(3+log(x))^2+432*exp(3+log(x))+576)*exp(x^4/(exp(3+
log(x))^2+8*exp(3+log(x))+16))+(-5+x)*exp(3+log(x))^3+(12*x-60)*exp(3+log(
x))^2+(48*x-240)*exp(3+log(x))+64*x-320),x, algorithm=\
```

output
```
log(x + 9*e^(x^4/(x^2*e^6 + 8*x*e^3 + 16)) - 5)
```

3.546.6 Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(144x^3+18e^3x^4)}{-320+64x+e^9(-5+x)x^3+e^6x^2(-60+12x)+e^3x(-240+48x)+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(576+432e^3x+108}$$
$$=\log\left(\frac{x}{9}+e^{\frac{x^4}{x^2e^6+8xe^3+16}}-\frac{5}{9}\right)$$

input
```
integrate(((18*x**3*exp(3+ln(x))+144*x**3)*exp(x**4/(exp(3+ln(x))**2+8*exp
(3+ln(x))+16))+exp(3+ln(x))**3+12*exp(3+ln(x))**2+48*exp(3+ln(x))+64)/((9*
exp(3+ln(x))**3+108*exp(3+ln(x))**2+432*exp(3+ln(x))+576)*exp(x**4/(exp(3+
ln(x))**2+8*exp(3+ln(x))+16))+(-5+x)*exp(3+ln(x))**3+(12*x-60)*exp(3+ln(x)
)**2+(48*x-240)*exp(3+ln(x))+64*x-320),x)
```

output
```
log(x/9 + exp(x**4/(x**2*exp(6) + 8*x*exp(3) + 16)) - 5/9)
```

3.546.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 108 vs. $2(20) = 40$.

Time = 0.26 (sec) , antiderivative size = 108, normalized size of antiderivative = 5.14

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(144x^3+18e^3x^4)}{-320+64x+e^9(-5+x)x^3+e^6x^2(-60+12x)+e^3x(-240+48x)+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(576+432e^3x+108}$$
$$=\frac{x^3e^9-4\,x^2e^6-32\,xe^3-256}{xe^{15}+4\,e^{12}}$$
$$+\log\left(\frac{1}{9}\left((x-5)e^{\left(8\,xe^{(-9)}+\frac{256}{xe^{15}+4\,e^{12}}\right)}+9\,e^{\left(x^2e^{(-6)}+\frac{256}{x^2e^{18}+8\,xe^{15}+16\,e^{12}}+48\,e^{(-12)}\right)}\right)e^{\left(-x^2e^{(-6)}-48\,e^{(-12)}\right)}\right)$$

3.546.

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(144x^3+18e^3x^4)}{\cdots}\,dx$$

input
```
integrate(((18*x^3*exp(3+log(x))+144*x^3)*exp(x^4/(exp(3+log(x))^2+8*exp(3
+log(x))+16))+exp(3+log(x))^3+12*exp(3+log(x))^2+48*exp(3+log(x))+64)/((9*
exp(3+log(x))^3+108*exp(3+log(x))^2+432*exp(3+log(x))+576)*exp(x^4/(exp(3+
log(x))^2+8*exp(3+log(x))+16))+(-5+x)*exp(3+log(x))^3+(12*x-60)*exp(3+log(
x))^2+(48*x-240)*exp(3+log(x))+64*x-320),x, algorithm=\
```

output
```
(x^3*e^9 - 4*x^2*e^6 - 32*x*e^3 - 256)/(x*e^15 + 4*e^12) + log(1/9*((x - 5
)*e^(8*x*e^(-9) + 256/(x*e^15 + 4*e^12)) + 9*e^(x^2*e^(-6) + 256/(x^2*e^18
 + 8*x*e^15 + 16*e^12) + 48*e^(-12)))*e^(-x^2*e^(-6) - 48*e^(-12)))
```

3.546.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(144x^3+18e^3x^4)}{-320+64x+e^9(-5+x)x^3+e^6x^2(-60+12x)+e^3x(-240+48x)+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(576+432e^3x+108$$

$$= \log\left(x+9\,e^{\left(\frac{x^4}{x^2e^6+8\,xe^3+16}\right)}-5\right)$$

input
```
integrate(((18*x^3*exp(3+log(x))+144*x^3)*exp(x^4/(exp(3+log(x))^2+8*exp(3
+log(x))+16))+exp(3+log(x))^3+12*exp(3+log(x))^2+48*exp(3+log(x))+64)/((9*
exp(3+log(x))^3+108*exp(3+log(x))^2+432*exp(3+log(x))+576)*exp(x^4/(exp(3+
log(x))^2+8*exp(3+log(x))+16))+(-5+x)*exp(3+log(x))^3+(12*x-60)*exp(3+log(
x))^2+(48*x-240)*exp(3+log(x))+64*x-320),x, algorithm=\
```

output
```
log(x + 9*e^(x^4/(x^2*e^6 + 8*x*e^3 + 16)) - 5)
```

3.546.9 Mupad [B] (verification not implemented)

Time = 14.67 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(144x^3+18e^3x^4)}{-320+64x+e^9(-5+x)x^3+e^6x^2(-60+12x)+e^3x(-240+48x)+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(576+432e^3x+108$$

$$= \ln\left(x+9\,\mathrm{e}^{\frac{x^4}{{\left(x\,\mathrm{e}^3+4\right)}^2}}-5\right)$$

3.546.

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}(144x^3+18e^3x^4)}{\ldots}\,dx$$

input
```
int((12*exp(2*log(x) + 6) + exp(3*log(x) + 9) + 48*exp(log(x) + 3) + exp(x
^4/(exp(2*log(x) + 6) + 8*exp(log(x) + 3) + 16))*(144*x^3 + 18*x^3*exp(log
(x) + 3)) + 64)/(64*x + exp(x^4/(exp(2*log(x) + 6) + 8*exp(log(x) + 3) + 1
6))*(108*exp(2*log(x) + 6) + 9*exp(3*log(x) + 9) + 432*exp(log(x) + 3) + 5
76) + exp(3*log(x) + 9)*(x - 5) + exp(log(x) + 3)*(48*x - 240) + exp(2*log
(x) + 6)*(12*x - 60) - 320),x)
```

output
```
log(x + 9*exp(x^4/(x*exp(3) + 4)^2) - 5)
```

3.546.

$$\int \frac{64+48e^3x+12e^6x^2+e^9x^3+e^{\frac{x^4}{16+8e^3x+e^6x^2}}\left(144x^3+18e^3x^4\right)}{} dx$$

3.547 $\int \frac{x^2+4x^3+e^3\left(-21x-8x^2\right)\left(x+4x^2\right)+(5+20x)\log(5)}{x^2+4x^3}\,dx$

3.547.1 Optimal result

Integrand size = 49, antiderivative size = 27

$$\int \frac{x^2+4x^3+e^3\left(-21x-8x^2\right)\left(x+4x^2\right)+(5+20x)\log(5)}{x^2+4x^3}\,dx = \frac{(5+x)\left(x-4e^3\left(\frac{x}{4}+x^2\right)-\log(5)\right)}{x}$$

output
```
(x-ln(5)-exp(ln(4*x^2+x)+3))/x*(5+x)
```

3.547.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{x^2+4x^3+e^3\left(-21x-8x^2\right)\left(x+4x^2\right)+(5+20x)\log(5)}{x^2+4x^3}\,dx = x-21e^3x-4e^3x^2-\frac{5\log(5)}{x}$$

input
```
Integrate[(x^2 + 4*x^3 + E^3*(-21*x - 8*x^2)*(x + 4*x^2) + (5 + 20*x)*Log[
5])/(x^2 + 4*x^3),x]
```

output
```
x - 21*E^3*x - 4*E^3*x^2 - (5*Log[5])/x
```

3.547.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.082, Rules used = {2026, 2019, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^3+x^2+e^3(-8x^2-21x)(4x^2+x)+(20x+5)\log(5)}{4x^3+x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{4x^3+x^2+e^3(-8x^2-21x)(4x^2+x)+(20x+5)\log(5)}{x^2(4x+1)}dx$$

$$\Big\downarrow \text{2019}$$

$$\int \frac{-8e^3x^3+(1-21e^3)x^2+5\log(5)}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{5\log(5)}{x^2}-8e^3x-21e^3+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-4e^3x^2+(1-21e^3)x-\frac{5\log(5)}{x}$$

input
```
Int[(x^2 + 4*x^3 + E^3*(-21*x - 8*x^2)*(x + 4*x^2) + (5 + 20*x)*Log[5])/(x
^2 + 4*x^3),x]
```

output
```
(1 - 21*E^3)*x - 4*E^3*x^2 - (5*Log[5])/x
```

3.547.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2019
```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

3.547.4 Maple [A] (verified)

Time = 1.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

method	result
risch	$-4x^2\mathrm{e}^3-21x\,\mathrm{e}^3+x-\frac{5\ln(5)}{x}$
norman	$\frac{(-21\,\mathrm{e}^3+1)x^2-4x^3\mathrm{e}^3-5\ln(5)}{x}$
default	$x-\frac{5\ln(5)}{x}-\frac{256x^4\mathrm{e}^{\ln(4x^2+x)+3}+1408x^3\mathrm{e}^{\ln(4x^2+x)+3}-84\,\mathrm{e}^{\ln(4x^2+x)+3}x}{16x^2(1+4x)^2}$
parts	$x-\frac{5\ln(5)}{x}-\frac{256x^4\mathrm{e}^{\ln(4x^2+x)+3}+1408x^3\mathrm{e}^{\ln(4x^2+x)+3}-84\,\mathrm{e}^{\ln(4x^2+x)+3}x}{16x^2(1+4x)^2}$
parallelrisch	$-\frac{-256x^5+256x^4\mathrm{e}^{\ln(4x^2+x)+3}+1280x^3\ln(5)+1408x^3\mathrm{e}^{\ln(4x^2+x)+3}+640x^2\ln(5)+48x^3+80x\ln(5)+8x^2-84\,\mathrm{e}^{\ln(4x^2+x)+3}x}{16x^2(1+4x)^2}$

input
```
int(((-8*x^2-21*x)*exp(ln(4*x^2+x)+3)+(20*x+5)*ln(5)+4*x^3+x^2)/(4*x^3+x^2
),x,method=_RETURNVERBOSE)
```

output
```
-4*x^2*exp(3)-21*x*exp(3)+x-5*ln(5)/x
```

3.547.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{x^2+4x^3+e^3(-21x-8x^2)\,(x+4x^2)+(5+20x)\log(5)}{x^2+4x^3}\,dx = \frac{x^2-(4\,x^3+21\,x^2)e^3-5\,\log(5)}{x}$$

input
```
integrate(((-8*x^2-21*x)*exp(log(4*x^2+x)+3)+(20*x+5)*log(5)+4*x^3+x^2)/(4
*x^3+x^2),x, algorithm=\
```

output
```
(x^2 - (4*x^3 + 21*x^2)*e^3 - 5*log(5))/x
```

3.547.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{x^2+4x^3+e^3(-21x-8x^2)(x+4x^2)+(5+20x)\log(5)}{x^2+4x^3}\,dx$$
$$= -4x^2e^3 - x(-1+21e^3) - \frac{5\log(5)}{x}$$

input
```
integrate(((-8*x**2-21*x)*exp(ln(4*x**2+x)+3)+(20*x+5)*ln(5)+4*x**3+x**2)/
(4*x**3+x**2),x)
```

output
```
-4*x**2*exp(3) - x*(-1 + 21*exp(3)) - 5*log(5)/x
```

3.547.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{x^2+4x^3+e^3(-21x-8x^2)(x+4x^2)+(5+20x)\log(5)}{x^2+4x^3}\,dx$$
$$= -4\,x^2e^3 - x(21\,e^3-1) - \frac{5\,\log(5)}{x}$$

input
```
integrate(((-8*x^2-21*x)*exp(log(4*x^2+x)+3)+(20*x+5)*log(5)+4*x^3+x^2)/(4
*x^3+x^2),x, algorithm=\
```

output
```
-4*x^2*e^3 - x*(21*e^3 - 1) - 5*log(5)/x
```

3.547.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{x^2+4x^3+e^3(-21x-8x^2)(x+4x^2)+(5+20x)\log(5)}{x^2+4x^3}\,dx$$
$$= -4\,x^2e^3 - 21\,xe^3 + x - \frac{5\,\log(5)}{x}$$

input
```
integrate(((-8*x^2-21*x)*exp(log(4*x^2+x)+3)+(20*x+5)*log(5)+4*x^3+x^2)/(4
*x^3+x^2),x, algorithm=\
```

output
```
-4*x^2*e^3 - 21*x*e^3 + x - 5*log(5)/x
```

3.547.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{x^2+4x^3+e^3(-21x-8x^2)(x+4x^2)+(5+20x)\log(5)}{x^2+4x^3}\,dx$$
$$= -4\,x^2\,\mathrm{e}^3 - \frac{5\,\ln(5)}{x} - x\,\left(21\,\mathrm{e}^3-1\right)$$

input
```
int((log(5)*(20*x + 5) - exp(log(x + 4*x^2) + 3)*(21*x + 8*x^2) + x^2 + 4*
x^3)/(x^2 + 4*x^3),x)
```

output
```
- 4*x^2*exp(3) - (5*log(5))/x - x*(21*exp(3) - 1)
```

3.548 $\int \frac{-e^2+(-2e^2-e^{50}x)\log(x)}{e^2x\log(x)}\,dx$

3.548.1 Optimal result

Integrand size = 32, antiderivative size = 20

$$\int \frac{-e^2+(-2e^2-e^{50}x)\log(x)}{e^2x\log(x)}\,dx = \log\left(\frac{3e^{-e^{48}x}}{2x^2\log(x)}\right)$$

output
```
ln(3/2/ln(x)/x^2/exp(exp(25)^2*x/exp(2)))
```

3.548.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{-e^2+(-2e^2-e^{50}x)\log(x)}{e^2x\log(x)}\,dx = -e^{48}x - 2\log(x) - \log(\log(x))$$

input
```
Integrate[(-E^2 + (-2*E^2 - E^50*x)*Log[x])/(E^2*x*Log[x]),x]
```

output
```
-(E^48*x) - 2*Log[x] - Log[Log[x]]
```

3.548.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$, Rules used = {27, 25, 7292, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-e^{50}x-2e^2)\log(x)-e^2}{e^2x\log(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int -\frac{e^2(e^{48}x+2)\log(x)+e^2}{x\log(x)}dx}{e^2}$$

$$\Big\downarrow \text{25}$$

$$-\frac{\int \frac{e^2(e^{48}x+2)\log(x)+e^2}{x\log(x)}dx}{e^2}$$

$$\Big\downarrow \text{7292}$$

$$-\frac{\int \frac{e^2(e^{48}x\log(x)+2\log(x)+1)}{x\log(x)}dx}{e^2}$$

$$\Big\downarrow \text{27}$$

$$-\int \frac{e^{48}x\log(x)+2\log(x)+1}{x\log(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$-\int \left(\frac{e^{48}x+2}{x}+\frac{1}{x\log(x)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-e^{48}x-2\log(x)-\log(\log(x))$$

input
```
Int[(-E^2 + (-2*E^2 - E^50*x)*Log[x])/(E^2*x*Log[x]),x]
```

output
```
-(E^48*x) - 2*Log[x] - Log[Log[x]]
```

3.548.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.548.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result	size
risch	$-\mathrm{e}^{48}x-2\ln\left(x\right)-\ln\left(\ln\left(x\right)\right)$	16
parts	$-\ln\left(\ln\left(x\right)\right)-2\ln\left(x\right)-\mathrm{e}^{-2}x\,\mathrm{e}^{50}$	20
norman	$-\ln\left(\ln\left(x\right)\right)-2\ln\left(x\right)-\mathrm{e}^{-2}x\,\mathrm{e}^{50}$	22
default	$\mathrm{e}^{-2}\left(-x\,\mathrm{e}^{50}-2\,\mathrm{e}^{2}\ln\left(x\right)-\mathrm{e}^{2}\ln\left(\ln\left(x\right)\right)\right)$	27
parallelrisch	$\mathrm{e}^{-2}\left(-x\,\mathrm{e}^{50}-2\,\mathrm{e}^{2}\ln\left(x\right)-\mathrm{e}^{2}\ln\left(\ln\left(x\right)\right)\right)$	27

input
```
int(((-x*exp(25)^2-2*exp(2))*ln(x)-exp(2))/x/exp(2)/ln(x),x,method=_RETURN
VERBOSE)
```

output
```
-exp(48)*x-2*ln(x)-ln(ln(x))
```

3.548.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-e^2+(-2e^2-e^{50}x)\log(x)}{e^2x\log(x)}\,dx = -xe^{48} - 2\,\log{(x)} - \log{(\log{(x)})}$$

input
```
integrate(((-x*exp(25)^2-2*exp(2))*log(x)-exp(2))/x/exp(2)/log(x),x, algor
ithm=\
```

output
```
-x*e^48 - 2*log(x) - log(log(x))
```

3.548.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-e^2+(-2e^2-e^{50}x)\log(x)}{e^2x\log(x)}\,dx = -xe^{48} - 2\log{(x)} - \log{(\log{(x)})}$$

input
```
integrate(((-x*exp(25)**2-2*exp(2))*ln(x)-exp(2))/x/exp(2)/ln(x),x)
```

output
```
-x*exp(48) - 2*log(x) - log(log(x))
```

3.548.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{-e^2+(-2e^2-e^{50}x)\log(x)}{e^2x\log(x)}\,dx = -\left(xe^{50} + 2\,e^2\log{(x)} + e^2\log{(\log{(x)})}\right)e^{(-2)}$$

input
```
integrate(((-x*exp(25)^2-2*exp(2))*log(x)-exp(2))/x/exp(2)/log(x),x, algor
ithm=\
```

output
```
-(x*e^50 + 2*e^2*log(x) + e^2*log(log(x)))*e^(-2)
```

3.548.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{-e^2 + (-2e^2 - e^{50}x)\log(x)}{e^2 x \log(x)}\, dx = -\left(xe^{50} + 2\,e^2\log\left(x\right) + e^2\log\left(\log\left(x\right)\right)\right)e^{(-2)}$$

input
```
integrate((((-x*exp(25)^2-2*exp(2))*log(x)-exp(2))/x/exp(2)/log(x),x, algor
ithm=\
```

output
```
-(x*e^50 + 2*e^2*log(x) + e^2*log(log(x)))*e^(-2)
```

3.548.9 Mupad [B] (verification not implemented)

Time = 14.71 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-e^2 + (-2e^2 - e^{50}x)\log(x)}{e^2 x \log(x)}\, dx = -\ln\left(\ln\left(x\right)\right) - 2\,\ln\left(x\right) - x\,\mathrm{e}^{48}$$

input
```
int(-(exp(-2)*(exp(2) + log(x)*(2*exp(2) + x*exp(50))))/(x*log(x)),x)
```

output
```
- log(log(x)) - 2*log(x) - x*exp(48)
```

3.549 $\int \frac{-25-50e^x-25x}{16x-8x^2+x^3+e^x(16-8x+x^2)+(-8x+2x^2+e^x(-8+2x))\log(e^x+x)+}$

3.549.1 Optimal result

Integrand size = 76, antiderivative size = 13

$$\int \frac{-25-50e^x-25x}{16x-8x^2+x^3+e^x(16-8x+x^2)+(-8x+2x^2+e^x(-8+2x))\log(e^x+x)+(e^x+x)\log^2(e^x+x)}\,dx$$
$$=\frac{25}{-4+x+\log(e^x+x)}$$

output
```
25/(ln(exp(x)+x)-4+x)
```

3.549.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int \frac{-25-50e^x-25x}{16x-8x^2+x^3+e^x(16-8x+x^2)+(-8x+2x^2+e^x(-8+2x))\log(e^x+x)+(e^x+x)\log^2(e^x+x)}\,dx$$
$$=\frac{25}{-4+x+\log(e^x+x)}$$

input
```
Integrate[(-25 - 50*E^x - 25*x)/(16*x - 8*x^2 + x^3 + E^x*(16 - 8*x + x^2)
 + (-8*x + 2*x^2 + E^x*(-8 + 2*x))*Log[E^x + x] + (E^x + x)*Log[E^x + x]^2
),x]
```

output
```
25/(-4 + x + Log[E^x + x])
```

3.549.3 Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.31, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {7239, 27, 25, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-25x-50e^x-25}{x^3-8x^2+e^x\left(x^2-8x+16\right)+\left(2x^2-8x+e^x(2x-8)\right)\log\left(x+e^x\right)+16x+\left(x+e^x\right)\log^2\left(x+e^x\right)}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{25(-x-2e^x-1)}{\left(x+e^x\right)\left(-x-\log\left(x+e^x\right)+4\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$25\int -\frac{x+2e^x+1}{\left(x+e^x\right)\left(-x-\log\left(x+e^x\right)+4\right)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-25\int \frac{x+2e^x+1}{\left(x+e^x\right)\left(-x-\log\left(x+e^x\right)+4\right)^2}dx$$

$$\Big\downarrow \text{ 7237}$$

$$-\frac{25}{-x-\log\left(x+e^x\right)+4}$$

input
```
Int[(-25 - 50*E^x - 25*x)/(16*x - 8*x^2 + x^3 + E^x*(16 - 8*x + x^2) + (-8
*x + 2*x^2 + E^x*(-8 + 2*x))*Log[E^x + x] + (E^x + x)*Log[E^x + x]^2),x]
```

output
```
-25/(4 - x - Log[E^x + x])
```

3.549.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.549.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{25}{\ln(e^x+x)-4+x}$	13
parallelrisch	$\frac{25}{\ln(e^x+x)-4+x}$	13

input
```
int((-50*exp(x)-25*x-25)/((exp(x)+x)*ln(exp(x)+x)^2+((2*x-8)*exp(x)+2*x^2-
8*x)*ln(exp(x)+x)+(x^2-8*x+16)*exp(x)+x^3-8*x^2+16*x),x,method=_RETURNVERB
OSE)
```

output
```
25/(ln(exp(x)+x)-4+x)
```

3.549.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{-25-50e^x-25x}{16x-8x^2+x^3+e^x(16-8x+x^2)+(-8x+2x^2+e^x(-8+2x))\log(e^x+x)+(e^x+x)\log^2(e^x+x)}\,dx = \frac{25}{x+\log(x+e^x)-4}$$

input
```
integrate((-50*exp(x)-25*x-25)/((exp(x)+x)*log(exp(x)+x)^2+((2*x-8)*exp(x)
+2*x^2-8*x)*log(exp(x)+x)+(x^2-8*x+16)*exp(x)+x^3-8*x^2+16*x),x, algorithm
=\
```

output
```
25/(x + log(x + e^x) - 4)
```

3.549.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int \frac{-25-50e^x-25x}{16x-8x^2+x^3+e^x(16-8x+x^2)+(-8x+2x^2+e^x(-8+2x))\log(e^x+x)+(e^x+x)\log^2(e^x+x)}\,dx = \frac{25}{x+\log(x+e^x)-4}$$

input
```
integrate((-50*exp(x)-25*x-25)/((exp(x)+x)*ln(exp(x)+x)**2+((2*x-8)*exp(x)
+2*x**2-8*x)*ln(exp(x)+x)+(x**2-8*x+16)*exp(x)+x**3-8*x**2+16*x),x)
```

output
```
25/(x + log(x + exp(x)) - 4)
```

3.549.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{-25-50e^x-25x}{16x-8x^2+x^3+e^x(16-8x+x^2)+(-8x+2x^2+e^x(-8+2x))\log(e^x+x)+(e^x+x)\log^2(e^x+x)}\,dx = \frac{25}{x+\log(x+e^x)-4}$$

input
```
integrate((-50*exp(x)-25*x-25)/((exp(x)+x)*log(exp(x)+x)^2+((2*x-8)*exp(x)
+2*x^2-8*x)*log(exp(x)+x)+(x^2-8*x+16)*exp(x)+x^3-8*x^2+16*x),x, algorithm
=\
```

output
```
25/(x + log(x + e^x) - 4)
```

3.549.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{-25-50e^x-25x}{16x-8x^2+x^3+e^x(16-8x+x^2)+(-8x+2x^2+e^x(-8+2x))\log(e^x+x)+(e^x+x)\log^2(e^x+x)}\,dx = \frac{25}{x+\log(x+e^x)-4}$$

input
```
integrate((-50*exp(x)-25*x-25)/((exp(x)+x)*log(exp(x)+x)^2+((2*x-8)*exp(x)
+2*x^2-8*x)*log(exp(x)+x)+(x^2-8*x+16)*exp(x)+x^3-8*x^2+16*x),x, algorithm
=\
```

output
```
25/(x + log(x + e^x) - 4)
```

3.549.9 Mupad [B] (verification not implemented)

Time = 15.30 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{-25-50e^x-25x}{16x-8x^2+x^3+e^x(16-8x+x^2)+(-8x+2x^2+e^x(-8+2x))\log(e^x+x)+(e^x+x)\log^2(e^x+x)}\,dx = \frac{25}{x+\ln(x+e^x)-4}$$

input
```
int(-(25*x + 50*exp(x) + 25)/(16*x + exp(x)*(x^2 - 8*x + 16) + log(x + exp
(x))*(exp(x)*(2*x - 8) - 8*x + 2*x^2) + log(x + exp(x))^2*(x + exp(x)) - 8
*x^2 + x^3),x)
```

output
```
25/(x + log(x + exp(x)) - 4)
```

3.550 $\int \frac{-1+e^{-10+2e^x-2x}(-16+8x-x^2)+e^{-5+e^x-x}(2+e^x(-8+2x))}{1+e^{-5+e^x-x}(8-2x)+e^{-10+2e^x-2x}(16-8x+x^2)}\,dx$

3.550.1 Optimal result

Integrand size = 89, antiderivative size = 28

$$\int \frac{-1+e^{-10+2e^x-2x}(-16+8x-x^2)+e^{-5+e^x-x}(2+e^x(-8+2x))}{1+e^{-5+e^x-x}(8-2x)+e^{-10+2e^x-2x}(16-8x+x^2)}\,dx = 3+\frac{4}{2+2e^{-5+e^x-x}(4-x)}-x$$

output
```
4/(2*exp(exp(x)-5-x)*(-x+4)+2)+3-x
```

3.550.2 Mathematica [A] (verified)

Time = 2.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{-1+e^{-10+2e^x-2x}(-16+8x-x^2)+e^{-5+e^x-x}(2+e^x(-8+2x))}{1+e^{-5+e^x-x}(8-2x)+e^{-10+2e^x-2x}(16-8x+x^2)}\,dx = -\frac{2e^{5+x}}{-e^{5+x}+e^{e^x}(-4+x)}-x$$

input
```
Integrate[(-1 + E^(-10 + 2*E^x - 2*x)*(-16 + 8*x - x^2) + E^(-5 + E^x - x)
*(2 + E^x*(-8 + 2*x)))/(1 + E^(-5 + E^x - x)*(8 - 2*x) + E^(-10 + 2*E^x -
2*x)*(16 - 8*x + x^2)),x]
```

output
```
(-2*E^(5 + x))/(-E^(5 + x) + E^E^x*(-4 + x)) - x
```

3.550.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-2x+2e^x-10}(-x^2+8x-16)+e^{-x+e^x-5}(e^x(2x-8)+2)-1}{e^{-2x+2e^x-10}(x^2-8x+16)+e^{-x+e^x-5}(8-2x)+1}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{2x+10}\left(e^{-2x+2e^x-10}(-x^2+8x-16)+e^{-x+e^x-5}(e^x(2x-8)+2)-1\right)}{\left(-e^{e^x}x+4e^{e^x}+e^{x+5}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2e^{2x+5}\left(-e^{e^x}x^2+8e^{e^x}x+e^5x-16e^{e^x}-5e^5\right)}{(x-4)\left(-e^{e^x}x+4e^{e^x}+e^{x+5}\right)^2}-\frac{2e^{2x-e^x+10}(x-5)}{(x-4)^2\left(e^{e^x}x-4e^{e^x}-e^{x+5}\right)}-\frac{2e^{x-e^x+5}(x-5)}{(x-4)^2}-1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\int \frac{e^{x-e^x+5}}{(x-4)^2}dx-2\int \frac{e^{x-e^x+5}}{x-4}dx+10\int \frac{e^{2x+10}}{(x-4)\left(-e^{e^x}x+4e^{e^x}+e^{x+5}\right)^2}dx-2\int \frac{e^{2x+10}}{\left(e^{e^x}x-4e^{e^x}-e^{x+5}\right)^2}dx-8\int \frac{e^{2x+e^x+5}}{\left(e^{e^x}x-4e^{e^x}-e^{x+5}\right)^2}dx-8\int \frac{e^{2x+10}}{(x-4)\left(e^{e^x}x-4e^{e^x}-e^{x+5}\right)^2}dx+2\int \frac{e^{2x+e^x+5}x}{\left(e^{e^x}x-4e^{e^x}-e^{x+5}\right)^2}dx+2\int \frac{e^{2x-e^x+10}}{(x-4)^2\left(e^{e^x}x-4e^{e^x}-e^{x+5}\right)}dx-2\int \frac{e^{2x-e^x+10}}{(x-4)\left(e^{e^x}x-4e^{e^x}-e^{x+5}\right)}dx-x$$

input
```
Int[(-1 + E^(-10 + 2*E^x - 2*x)*(-16 + 8*x - x^2) + E^(-5 + E^x - x)*(2 +
E^x*(-8 + 2*x)))/(1 + E^(-5 + E^x - x)*(8 - 2*x) + E^(-10 + 2*E^x - 2*x)*(
16 - 8*x + x^2)),x]
```

output
```
$Aborted
```

3.550.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.550.4 Maple [A] (verified)

Time = 0.97 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

method	result	size
risch	$-x-\frac{2}{{\mathrm e}^{{\mathrm e}^{x}-5-x} x-4 \,{\mathrm e}^{{\mathrm e}^{x}-5-x}-1}$	31
norman	$\frac{x+16 \,{\mathrm e}^{{\mathrm e}^{x}-5-x}-x^{2} {\mathrm e}^{{\mathrm e}^{x}-5-x}+2}{{\mathrm e}^{{\mathrm e}^{x}-5-x} x-4 \,{\mathrm e}^{{\mathrm e}^{x}-5-x}-1}$	52
parallelrisch	$-\frac{x^{2} {\mathrm e}^{{\mathrm e}^{x}-5-x}-2-x-16 \,{\mathrm e}^{{\mathrm e}^{x}-5-x}}{{\mathrm e}^{{\mathrm e}^{x}-5-x} x-4 \,{\mathrm e}^{{\mathrm e}^{x}-5-x}-1}$	54

input
```
int(((-x^2+8*x-16)*exp(exp(x)-5-x)^2+((2*x-8)*exp(x)+2)*exp(exp(x)-5-x)-1)
/((x^2-8*x+16)*exp(exp(x)-5-x)^2+(-2*x+8)*exp(exp(x)-5-x)+1),x,method=_RET
URNVERBOSE)
```

output
```
-x-2/(exp(exp(x)-5-x)*x-4*exp(exp(x)-5-x)-1)
```

3.550.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

$$\int \frac{-1+e^{-10+2 e^x-2 x} \left(-16+8 x-x^2\right)+e^{-5+e^x-x} (2+e^x (-8+2 x))}{1+e^{-5+e^x-x} (8-2 x)+e^{-10+2 e^x-2 x} \left(16-8 x+x^2\right)} \, dx = -\frac{{\left(x^{2} - 4 \, x\right)} e^{\left(-x + e^{x} - 5\right)} - x + 2}{{\left(x - 4\right)} e^{\left(-x + e^{x} - 5\right)} - 1}$$

input
```
integrate(((-x^2+8*x-16)*exp(exp(x)-5-x)^2+((2*x-8)*exp(x)+2)*exp(exp(x)-5
-x)-1)/((x^2-8*x+16)*exp(exp(x)-5-x)^2+(-2*x+8)*exp(exp(x)-5-x)+1),x, algo
rithm=\
```

output
```
-((x^2 - 4*x)*e^(-x + e^x - 5) - x + 2)/((x - 4)*e^(-x + e^x - 5) - 1)
```

3.550.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int \frac{-1+e^{-10+2e^x-2x}(-16+8x-x^2)+e^{-5+e^x-x}(2+e^x(-8+2x))}{1+e^{-5+e^x-x}(8-2x)+e^{-10+2e^x-2x}\,(16-8x+x^2)}\,dx = -x-\frac{2}{(x-4)\,e^{-x+e^x-5}-1}$$

input
```
integrate(((-x**2+8*x-16)*exp(exp(x)-5-x)**2+((2*x-8)*exp(x)+2)*exp(exp(x)
-5-x)-1)/((x**2-8*x+16)*exp(exp(x)-5-x)**2+(-2*x+8)*exp(exp(x)-5-x)+1),x)
```

output
```
-x - 2/((x - 4)*exp(-x + exp(x) - 5) - 1)
```

3.550.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{-1+e^{-10+2e^x-2x}(-16+8x-x^2)+e^{-5+e^x-x}(2+e^x(-8+2x))}{1+e^{-5+e^x-x}(8-2x)+e^{-10+2e^x-2x}\,(16-8x+x^2)}\,dx = \frac{(xe^5-2\,e^5)e^x-(x^2-4\,x)e^{(e^x)}}{(x-4)e^{(e^x)}-e^{(x+5)}}$$

input
```
integrate(((-x^2+8*x-16)*exp(exp(x)-5-x)^2+((2*x-8)*exp(x)+2)*exp(exp(x)-5
-x)-1)/((x^2-8*x+16)*exp(exp(x)-5-x)^2+(-2*x+8)*exp(exp(x)-5-x)+1),x, algo
rithm=\
```

output
```
((x*e^5 - 2*e^5)*e^x - (x^2 - 4*x)*e^(e^x))/((x - 4)*e^(e^x) - e^(x + 5))
```

3.550.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1136 vs. $2(23) = 46$.

Time = 0.32 (sec) , antiderivative size = 1136, normalized size of antiderivative = 40.57

$$\int \frac{-1+e^{-10+2e^x-2x}(-16+8x-x^2)+e^{-5+e^x-x}(2+e^x(-8+2x))}{1+e^{-5+e^x-x}(8-2x)+e^{-10+2e^x-2x}(16-8x+x^2)}\,dx = \text{Too large to display}$$

input
```
integrate(((-x^2+8*x-16)*exp(exp(x)-5-x)^2+((2*x-8)*exp(x)+2)*exp(exp(x)-5
-x)-1)/((x^2-8*x+16)*exp(exp(x)-5-x)^2+(-2*x+8)*exp(exp(x)-5-x)+1),x, algo
rithm=\
```

output
```
-(x^6*e^(1/2*x + 4*e^x) - x^6*e^(-1/2*x + 4*e^x) - 4*x^5*e^(3/2*x + 3*e^x
+ 5) - 20*x^5*e^(1/2*x + 4*e^x) + 4*x^5*e^(1/2*x + 3*e^x + 5) + 21*x^5*e^(
-1/2*x + 4*e^x) + 6*x^4*e^(5/2*x + 2*e^x + 10) + 66*x^4*e^(3/2*x + 3*e^x +
 5) - 6*x^4*e^(3/2*x + 2*e^x + 10) + 160*x^4*e^(1/2*x + 4*e^x) - 70*x^4*e^
(1/2*x + 3*e^x + 5) - 176*x^4*e^(-1/2*x + 4*e^x) - 4*x^3*e^(7/2*x + e^x +
15) - 78*x^3*e^(5/2*x + 2*e^x + 10) + 4*x^3*e^(5/2*x + e^x + 15) - 416*x^3
*e^(3/2*x + 3*e^x + 5) + 84*x^3*e^(3/2*x + 2*e^x + 10) - 640*x^3*e^(1/2*x
+ 4*e^x) + 466*x^3*e^(1/2*x + 3*e^x + 5) + 736*x^3*e^(-1/2*x + 4*e^x) + x^
2*e^(9/2*x + 20) + 38*x^2*e^(7/2*x + e^x + 15) - x^2*e^(7/2*x + 20) + 360*
x^2*e^(5/2*x + 2*e^x + 10) - 42*x^2*e^(5/2*x + e^x + 15) + 1216*x^2*e^(3/2
*x + 3*e^x + 5) - 414*x^2*e^(3/2*x + 2*e^x + 10) + 1280*x^2*e^(1/2*x + 4*e
^x) - 1432*x^2*e^(1/2*x + 3*e^x + 5) - 1536*x^2*e^(-1/2*x + 4*e^x) - 6*x*e
^(9/2*x + 20) - 112*x*e^(7/2*x + e^x + 15) + 7*x*e^(7/2*x + 20) - 672*x*e^
(5/2*x + 2*e^x + 10) + 134*x*e^(5/2*x + e^x + 15) - 1536*x*e^(3/2*x + 3*e^
x + 5) + 816*x*e^(3/2*x + 2*e^x + 10) - 1024*x*e^(1/2*x + 4*e^x) + 1888*x*
e^(1/2*x + 3*e^x + 5) + 1280*x*e^(-1/2*x + 4*e^x) + 8*e^(9/2*x + 20) + 96*
e^(7/2*x + e^x + 15) - 10*e^(7/2*x + 20) + 384*e^(5/2*x + 2*e^x + 10) - 12
0*e^(5/2*x + e^x + 15) + 512*e^(3/2*x + 3*e^x + 5) - 480*e^(3/2*x + 2*e^x
+ 10) - 640*e^(1/2*x + 3*e^x + 5))/(x^5*e^(1/2*x + 4*e^x) - x^5*e^(-1/2*x
+ 4*e^x) - 4*x^4*e^(3/2*x + 3*e^x + 5) - 20*x^4*e^(1/2*x + 4*e^x) + 4*x...
```

3.550.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-1+e^{-10+2e^x-2x}(-16+8x-x^2)+e^{-5+e^x-x}(2+e^x(-8+2x))}{1+e^{-5+e^x-x}(8-2x)+e^{-10+2e^x-2x}(16-8x+x^2)}\,dx$$
$$=\int -\frac{e^{2\,e^x-2\,x-10}\,(x^2-8\,x+16)-e^{e^x-x-5}\,(e^x\,(2\,x-8)+2)+1}{e^{2\,e^x-2\,x-10}\,(x^2-8\,x+16)-e^{e^x-x-5}\,(2\,x-8)+1}\,dx$$

input
```
int(-(exp(2*exp(x) - 2*x - 10)*(x^2 - 8*x + 16) - exp(exp(x) - x - 5)*(exp
(x)*(2*x - 8) + 2) + 1)/(exp(2*exp(x) - 2*x - 10)*(x^2 - 8*x + 16) - exp(e
xp(x) - x - 5)*(2*x - 8) + 1),x)
```

output
```
int(-(exp(2*exp(x) - 2*x - 10)*(x^2 - 8*x + 16) - exp(exp(x) - x - 5)*(exp
(x)*(2*x - 8) + 2) + 1)/(exp(2*exp(x) - 2*x - 10)*(x^2 - 8*x + 16) - exp(e
xp(x) - x - 5)*(2*x - 8) + 1), x)
```

3.551 $\int \frac{20x^2-20x^3+5x^4+e(-20+20x-5x^2)+e^{2e^4-2x+\left(-e^4+x\right)\log^4(x)}\left(3x^2-\right.}{20x^2-20x^3}$

3.551.1 Optimal result

Integrand size = 125, antiderivative size = 34

$$\int \frac{20x^2-20x^3+5x^4+e(-20+20x-5x^2)+e^{2e^4-2x+(-e^4+x)\log^4(x)}\left(3x^2-2x^3+(-8x^2+4x^3+e^4(8x-4\right.}{20x^2-20x^3+5x^4}$$
$$=-\frac{e^{(-e^4+x)(-2+\log^4(x))}}{5(2-x)}+\frac{e}{x}+x$$

output
```
exp(1)/x+x-exp((x-exp(4))*(ln(x)^4-2))/(-5*x+10)
```

3.551.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.09

$$\int \frac{20x^2-20x^3+5x^4+e(-20+20x-5x^2)+e^{2e^4-2x+(-e^4+x)\log^4(x)}\left(3x^2-2x^3+(-8x^2+4x^3+e^4(8x-4\right.}{20x^2-20x^3+5x^4}$$
$$=\frac{1}{5}\left(\frac{e^{-((e^4-x)(-2+\log^4(x)))}}{-2+x}+\frac{5e}{x}+5x\right)$$

input
```
Integrate[(20*x^2 - 20*x^3 + 5*x^4 + E*(-20 + 20*x - 5*x^2) + E^(2*E^4 - 2
*x + (-E^4 + x)*Log[x]^4)*(3*x^2 - 2*x^3 + (-8*x^2 + 4*x^3 + E^4*(8*x - 4*
x^2))*Log[x]^3 + (-2*x^2 + x^3)*Log[x]^4))/(20*x^2 - 20*x^3 + 5*x^4),x]
```

output
```
(1/(E^((E^4 - x)*(-2 + Log[x]^4))*(-2 + x)) + (5*E)/x + 5*x)/5
```

3.551.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5x^4-20x^3+20x^2+e\left(-5x^2+20x-20\right)+e^{-2x+\left(x-e^4\right)\log^4(x)+2e^4}\left(-2x^3+3x^2+\left(x^3-2x^2\right)\log^4(x)+\left(4x^3-\right.\right.}{5x^4-20x^3+20x^2}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{5x^4-20x^3+20x^2+e\left(-5x^2+20x-20\right)+e^{-2x+\left(x-e^4\right)\log^4(x)+2e^4}\left(-2x^3+3x^2+\left(x^3-2x^2\right)\log^4(x)+\left(4x^3-\right.\right.}{x^2\left(5x^2-20x+20\right)}$$

$$\Big\downarrow \text{7277}$$

$$20\int \frac{5x^4-20x^3+20x^2-5e\left(x^2-4x+4\right)+e^{-\left(\left(e^4-x\right)\log^4(x)\right)-2x+2e^4}\left(-\left(\left(2x^2-x^3\right)\log^4(x)\right)-4\left(-x^3+2x^2-e^{\right.\right.}}{100(2-x)^2x^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int \frac{5x^4-20x^3+20x^2-5e\left(x^2-4x+4\right)+e^{-\left(\left(e^4-x\right)\log^4(x)\right)-2x+2e^4}\left(-\left(\left(2x^2-x^3\right)\log^4(x)\right)-4\left(-x^3+2x^2-e^4\right.\right.}{(2-x)^2x^2}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{5}\int \left(\frac{e^{-\left(\left(e^4-x\right)\left(\log^4(x)-2\right)\right)}\left(x^2\log^4(x)-2x\log^4(x)+4x^2\log^3(x)-8\left(1+\frac{e^4}{2}\right)x\log^3(x)+8e^4\log^3(x)-2x^2+3x\right.}{(2-x)^2x}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(-\int \frac{e^{-\left(\left(e^4-x\right)\left(\log^4(x)-2\right)\right)}}{(x-2)^2}dx-2\int \frac{e^{-\left(\left(e^4-x\right)\left(\log^4(x)-2\right)\right)}}{x-2}dx+\int \frac{e^{-\left(\left(e^4-x\right)\left(\log^4(x)-2\right)\right)}\log^4(x)}{x-2}dx+2\left(2-e^4\right)\int\right.$$

input
```
Int[(20*x^2 - 20*x^3 + 5*x^4 + E*(-20 + 20*x - 5*x^2) + E^(2*E^4 - 2*x + (
-E^4 + x)*Log[x]^4)*(3*x^2 - 2*x^3 + (-8*x^2 + 4*x^3 + E^4*(8*x - 4*x^2))*
Log[x]^3 + (-2*x^2 + x^3)*Log[x]^4))/(20*x^2 - 20*x^3 + 5*x^4),x]
```

output
```
$Aborted
```

3.551.

$$\int \frac{20x^2-20x^3+5x^4+e(-20+20x-5x^2)+e^{2e^4-2x+\left(-e^4+x\right)\log^4(x)}\left(3x^2-2x^3+\left(-8x^2+4x^3+e^4\left(8x-4x^2\right)\right)\log^3(x)+\left(-2x^2+x^3\right)\log^4(x)\right)}{20x^2-20x^3+5x^4}\,dx$$

3.551.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.551.4 Maple [A] (verified)

Time = 3.54 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

method	result	size
risch	$x+\frac{\mathrm{e}}{x}+\frac{\mathrm{e}^{-\left(\ln(x)^{4}-2\right)\left(\mathrm{e}^{4}-x\right)}}{5x-10}$	31
parallelrisch	$\frac{5x^{3}+5x\,\mathrm{e}+\mathrm{e}^{\left(x-\mathrm{e}^{4}\right)\ln(x)^{4}+2\,\mathrm{e}^{4}-2x}x-10\,\mathrm{e}-20x}{5x(-2+x)}$	51

input
```
int((((x^3-2*x^2)*ln(x)^4+((-4*x^2+8*x)*exp(4)+4*x^3-8*x^2)*ln(x)^3-2*x^3+
3*x^2)*exp((x-exp(4))*ln(x)^4+2*exp(4)-2*x)+(-5*x^2+20*x-20)*exp(1)+5*x^4-
20*x^3+20*x^2)/(5*x^4-20*x^3+20*x^2),x,method=_RETURNVERBOSE)
```

output
```
x+exp(1)/x+1/5/(-2+x)*exp(-(ln(x)^4-2)*(exp(4)-x))
```

3.551.

$$\int \frac{20x^2-20x^3+5x^4+e\left(-20+20x-5x^2\right)+e^{2e^4-2x+\left(-e^4+x\right)\log^4(x)}\left(3x^2-2x^3+\left(-8x^2+4x^3+e^4\left(8x-4x^2\right)\right)\log^3(x)+\left(-2x^2+x^3\right)\log^4(x)\right)}{20x^2-20x^3+5x^4}\,dx$$

3.551.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.50

$$\int \frac{20x^2-20x^3+5x^4+e(-20+20x-5x^2)+e^{2e^4-2x+(-e^4+x)\log^4(x)}(3x^2-2x^3+(-8x^2+4x^3+e^4(8x-4}{20x^2-20x^3+5x^4}$$
$$=\frac{5\,x^3-10\,x^2+5\,(x-2)e+xe^{\left((x-e^4)\log(x)^4-2\,x+2\,e^4\right)}}{5\,(x^2-2\,x)}$$

input
```
integrate((((x^3-2*x^2)*log(x)^4+((-4*x^2+8*x)*exp(4)+4*x^3-8*x^2)*log(x)^
3-2*x^3+3*x^2)*exp((x-exp(4))*log(x)^4+2*exp(4)-2*x)+(-5*x^2+20*x-20)*exp(
1)+5*x^4-20*x^3+20*x^2)/(5*x^4-20*x^3+20*x^2),x, algorithm=\
```

output
```
1/5*(5*x^3 - 10*x^2 + 5*(x - 2)*e + x*e^((x - e^4)*log(x)^4 - 2*x + 2*e^4)
)/(x^2 - 2*x)
```

3.551.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int \frac{20x^2-20x^3+5x^4+e(-20+20x-5x^2)+e^{2e^4-2x+(-e^4+x)\log^4(x)}(3x^2-2x^3+(-8x^2+4x^3+e^4(8x-4}{20x^2-20x^3+5x^4}$$
$$=x+\frac{e^{-2x+(x-e^4)\log{(x)}^4+2e^4}}{5x-10}+\frac{e}{x}$$

input
```
integrate((((x**3-2*x**2)*ln(x)**4+((-4*x**2+8*x)*exp(4)+4*x**3-8*x**2)*ln
(x)**3-2*x**3+3*x**2)*exp((x-exp(4))*ln(x)**4+2*exp(4)-2*x)+(-5*x**2+20*x-
20)*exp(1)+5*x**4-20*x**3+20*x**2)/(5*x**4-20*x**3+20*x**2),x)
```

output
```
x + exp(-2*x + (x - exp(4))*log(x)**4 + 2*exp(4))/(5*x - 10) + E/x
```

3.551.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 86 vs. $2(29) = 58$.

Time = 0.41 (sec) , antiderivative size = 86, normalized size of antiderivative = 2.53

$$\int \frac{20x^2 - 20x^3 + 5x^4 + e(-20 + 20x - 5x^2) + e^{2e^4 - 2x + (-e^4 + x)\log^4(x)}(3x^2 - 2x^3 + (-8x^2 + 4x^3 + e^4(8x - 4}{20x^2 - 20x^3 + 5x^4}$$

$$= \left(\frac{2(x-1)}{x^2 - 2x} + \log(x-2) - \log(x)\right)e - \left(\frac{2}{x-2} + \log(x-2) - \log(x)\right)e$$
$$+ x + \frac{e}{x-2} + \frac{e^{\left(x\log(x)^4 - e^4\log(x)^4 - 2x + 2e^4\right)}}{5(x-2)}$$

input
```
integrate((((x^3-2*x^2)*log(x)^4+((-4*x^2+8*x)*exp(4)+4*x^3-8*x^2)*log(x)^
3-2*x^3+3*x^2)*exp((x-exp(4))*log(x)^4+2*exp(4)-2*x)+(-5*x^2+20*x-20)*exp(
1)+5*x^4-20*x^3+20*x^2)/(5*x^4-20*x^3+20*x^2),x, algorithm=\
```

output
```
(2*(x - 1)/(x^2 - 2*x) + log(x - 2) - log(x))*e - (2/(x - 2) + log(x - 2)
- log(x))*e + x + e/(x - 2) + 1/5*e^(x*log(x)^4 - e^4*log(x)^4 - 2*x + 2*e
^4)/(x - 2)
```

3.551.8 Giac [F]

$$\int \frac{20x^2 - 20x^3 + 5x^4 + e(-20 + 20x - 5x^2) + e^{2e^4 - 2x + (-e^4 + x)\log^4(x)}(3x^2 - 2x^3 + (-8x^2 + 4x^3 + e^4(8x - 4}{20x^2 - 20x^3 + 5x^4}$$

$$= \int \frac{5x^4 - 20x^3 + 20x^2 - 5(x^2 - 4x + 4)e + ((x^3 - 2x^2)\log(x)^4 + 4(x^3 - 2x^2 - (x^2 - 2x)e^4)\log(x)^3 -}{5(x^4 - 4x^3 + 4x^2)}$$

input
```
integrate((((x^3-2*x^2)*log(x)^4+((-4*x^2+8*x)*exp(4)+4*x^3-8*x^2)*log(x)^
3-2*x^3+3*x^2)*exp((x-exp(4))*log(x)^4+2*exp(4)-2*x)+(-5*x^2+20*x-20)*exp(
1)+5*x^4-20*x^3+20*x^2)/(5*x^4-20*x^3+20*x^2),x, algorithm=\
```

output
```
integrate(1/5*(5*x^4 - 20*x^3 + 20*x^2 - 5*(x^2 - 4*x + 4)*e + ((x^3 - 2*x
^2)*log(x)^4 + 4*(x^3 - 2*x^2 - (x^2 - 2*x)*e^4)*log(x)^3 - 2*x^3 + 3*x^2)
*e^((x - e^4)*log(x)^4 - 2*x + 2*e^4))/(x^4 - 4*x^3 + 4*x^2), x)
```

3.551.9 Mupad [B] (verification not implemented)

Time = 15.02 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.21

$$\int \frac{20x^2-20x^3+5x^4+e(-20+20x-5x^2)+e^{2e^4-2x+(-e^4+x)\log^4(x)}(3x^2-2x^3+(-8x^2+4x^3+e^4(8x-4x^2))\log^3(x)+(-2x^2+x^3)\log^4(x))}{20x^2-20x^3+5x^4}\,dx$$

$$= x+\frac{\mathrm{e}}{x}+\frac{\mathrm{e}^{2\,\mathrm{e}^4}\,\mathrm{e}^{-2\,x}\,\mathrm{e}^{-\mathrm{e}^4\ln(x)^4}\,\mathrm{e}^{x\ln(x)^4}}{5\,(x-2)}$$

input
```
int(-(exp(1)*(5*x^2 - 20*x + 20) - 20*x^2 + 20*x^3 - 5*x^4 + exp(2*exp(4)
- 2*x + log(x)^4*(x - exp(4)))*(log(x)^4*(2*x^2 - x^3) - log(x)^3*(exp(4)*
(8*x - 4*x^2) - 8*x^2 + 4*x^3) - 3*x^2 + 2*x^3))/(20*x^2 - 20*x^3 + 5*x^4)
,x)
```

output
```
x + exp(1)/x + (exp(2*exp(4))*exp(-2*x)*exp(-exp(4)*log(x)^4)*exp(x*log(x)
^4))/(5*(x - 2))
```

3.551.

$$\int \frac{20x^2-20x^3+5x^4+e(-20+20x-5x^2)+e^{2e^4-2x+\left(-e^4+x\right)\log^4(x)}(3x^2-2x^3+(-8x^2+4x^3+e^4(8x-4x^2))\log^3(x)+(-2x^2+x^3)\log^4(x))}{20x^2-20x^3+5x^4}\,dx$$

3.552 $\int \left(512x - 640x^3 + 400x^4 - 90x^5 + 7x^6 + e^{10+2e^{40}}(2x$

3.552.1 Optimal result

Integrand size = 70, antiderivative size = 23

$$\int \left(512x - 640x^3 + 400x^4 - 90x^5 + 7x^6 + e^{10+2e^{40}}(2x + 3x^2) + e^{5+e^{40}}(64x + 48x^2 - 56x^3 + 10x^4)\right) dx = \left(e^{5+e^{40}} + (-4+x)^2\right)^2 (x^2 + x^3)$$

output
```
(x^3+x^2)*((x-4)^2+exp(exp(20)^2+5))^2
```

3.552.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \left(512x - 640x^3 + 400x^4 - 90x^5 + 7x^6 + e^{10+2e^{40}}(2x + 3x^2) + e^{5+e^{40}}(64x + 48x^2 - 56x^3 + 10x^4)\right) dx = \left(e^{5+e^{40}} + (-4+x)^2\right)^2 x^2(1+x)$$

input
```
Integrate[512*x - 640*x^3 + 400*x^4 - 90*x^5 + 7*x^6 + E^(10 + 2*E^40)*(2*
x + 3*x^2) + E^(5 + E^40)*(64*x + 48*x^2 - 56*x^3 + 10*x^4),x]
```

output
```
(E^(5 + E^40) + (-4 + x)^2)^2*x^2*(1 + x)
```

3.552.
$\int \left(512x - 640x^3 + 400x^4 - 90x^5 + 7x^6 + e^{10+2e^{40}}(2x + 3x^2) + e^{5+e^{40}}(64x + 48x^2 - 56x^3 + 10x^4)\right) dx$

3.552.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 98 vs. 2(23) = 46.

Time = 0.24 (sec) , antiderivative size = 98, normalized size of antiderivative = 4.26, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.014, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(7x^6-90x^5+400x^4-640x^3+e^{10+2e^{40}}\left(3x^2+2x\right)+e^{5+e^{40}}\left(10x^4-56x^3+48x^2+64x\right)+512x\right)\,dx$$

$$\Big\downarrow \text{2009}$$

$$x^7-15x^6+2e^{5+e^{40}}x^5+80x^5-14e^{5+e^{40}}x^4-160x^4+e^{2\left(5+e^{40}\right)}x^3+16e^{5+e^{40}}x^3+e^{2\left(5+e^{40}\right)}x^2+32e^{5+e^{40}}x^2+256x^2$$

input
```
Int[512*x - 640*x^3 + 400*x^4 - 90*x^5 + 7*x^6 + E^(10 + 2*E^40)*(2*x + 3*
x^2) + E^(5 + E^40)*(64*x + 48*x^2 - 56*x^3 + 10*x^4),x]
```

output
```
256*x^2 + 32*E^(5 + E^40)*x^2 + E^(2*(5 + E^40))*x^2 + 16*E^(5 + E^40)*x^3
 + E^(2*(5 + E^40))*x^3 - 160*x^4 - 14*E^(5 + E^40)*x^4 + 80*x^5 + 2*E^(5
+ E^40)*x^5 - 15*x^6 + x^7
```

3.552.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.552.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 86 vs. 2(23) = 46.

Time = 0.40 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.78

method	result
risch	$x^3 e^{2\,e^{40}+10}+x^2 e^{2\,e^{40}+10}+2x^5 e^{e^{40}+5}-14x^4 e^{e^{40}+5}+16x^3 e^{e^{40}+5}+32x^2 e^{e^{40}+5}+x^7-15x^6+8$
gosper	$x^2\Big(x^5+2x^3 e^{e^{40}+5}-15x^4+e^{2\,e^{40}+10}x-14x^2 e^{e^{40}+5}+80x^3+e^{2\,e^{40}+10}+16\,e^{e^{40}+5}x-160x^2$
norman	$x^7+\left(-14\,e^{e^{40}}e^5-160\right)x^4+\left(2\,e^{e^{40}}e^5+80\right)x^5+\left(e^{2\,e^{40}}e^{10}+16\,e^{e^{40}}e^5\right)x^3+\Big(e^{2\,e^{40}}e^{10}+3$
parallelrisch	$x^3 e^{2\,e^{40}+10}+x^2 e^{2\,e^{40}+10}+2x^5 e^{e^{40}+5}-14x^4 e^{e^{40}+5}+16x^3 e^{e^{40}+5}+32x^2 e^{e^{40}+5}+x^7-15x^6+8$
parts	$x^3 e^{2\,e^{40}+10}+x^2 e^{2\,e^{40}+10}+2x^5 e^{e^{40}+5}-14x^4 e^{e^{40}+5}+16x^3 e^{e^{40}+5}+32x^2 e^{e^{40}+5}+x^7-15x^6+8$
default	$x^7-15x^6+\frac{\left(10\,e^{e^{40}+5}+400\right)x^5}{5}+\frac{\left(-56\,e^{e^{40}+5}-640\right)x^4}{4}+\frac{\left(-16\,e^{e^{40}+5}-256+\left(3\,e^{e^{40}+5}+16\right)\left(e^{e^{40}+5}+16\right)\right)x^3}{3}+$

input
```
int((3*x^2+2*x)*exp(exp(20)^2+5)^2+(10*x^4-56*x^3+48*x^2+64*x)*exp(exp(20)
^2+5)+7*x^6-90*x^5+400*x^4-640*x^3+512*x,x,method=_RETURNVERBOSE)
```

output
```
x^3*exp(2*exp(40)+10)+x^2*exp(2*exp(40)+10)+2*x^5*exp(exp(40)+5)-14*x^4*ex
p(exp(40)+5)+16*x^3*exp(exp(40)+5)+32*x^2*exp(exp(40)+5)+x^7-15*x^6+80*x^5
-160*x^4+256*x^2
```

3.552.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(21) = 42$.

Time = 0.25 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.83

$$\int \Big(512x-640x^3+400x^4-90x^5+7x^6+e^{10+2e^{40}}(2x+3x^2) + e^{5+e^{40}}(64x+48x^2-56x^3+10x^4)\Big)\,dx = x^7-15\,x^6+80\,x^5-160\,x^4 + 256\,x^2+(x^3+x^2)e^{(2\,e^{40}+10)}+2\,(x^5-7\,x^4+8\,x^3+16\,x^2)e^{(e^{40}+5)}$$

input
```
integrate((3*x^2+2*x)*exp(exp(20)^2+5)^2+(10*x^4-56*x^3+48*x^2+64*x)*exp(e
xp(20)^2+5)+7*x^6-90*x^5+400*x^4-640*x^3+512*x,x, algorithm=\
```

output
```
x^7 - 15*x^6 + 80*x^5 - 160*x^4 + 256*x^2 + (x^3 + x^2)*e^(2*e^40 + 10) +
2*(x^5 - 7*x^4 + 8*x^3 + 16*x^2)*e^(e^40 + 5)
```

3.552.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 88 vs. $2(19) = 38$.

Time = 0.05 (sec) , antiderivative size = 88, normalized size of antiderivative = 3.83

$$\int \left(512x - 640x^3 + 400x^4 - 90x^5 + 7x^6 + e^{10+2e^{40}}(2x + 3x^2) + e^{5+e^{40}}(64x + 48x^2 - 56x^3 + 10x^4)\right) dx = x^7 - 15x^6 + x^5 \cdot \left(80 + 2e^5e^{e^{40}}\right) + x^4\left(-160 - 14e^5e^{e^{40}}\right) + x^3\left(e^{10}e^{2e^{40}} + 16e^5e^{e^{40}}\right) + x^2 \cdot \left(256 + e^{10}e^{2e^{40}} + 32e^5e^{e^{40}}\right)$$

input
```
integrate((3*x**2+2*x)*exp(exp(20)**2+5)**2+(10*x**4-56*x**3+48*x**2+64*x)
*exp(exp(20)**2+5)+7*x**6-90*x**5+400*x**4-640*x**3+512*x,x)
```

output
```
x**7 - 15*x**6 + x**5*(80 + 2*exp(5)*exp(exp(40))) + x**4*(-160 - 14*exp(5
)*exp(exp(40))) + x**3*(exp(10)*exp(2*exp(40)) + 16*exp(5)*exp(exp(40))) +
 x**2*(256 + exp(10)*exp(2*exp(40)) + 32*exp(5)*exp(exp(40)))
```

3.552.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(21) = 42$.

Time = 0.20 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.83

$$\int \left(512x - 640x^3 + 400x^4 - 90x^5 + 7x^6 + e^{10+2e^{40}}(2x + 3x^2) + e^{5+e^{40}}(64x + 48x^2 - 56x^3 + 10x^4)\right) dx = x^7 - 15\,x^6 + 80\,x^5 - 160\,x^4 + 256\,x^2 + (x^3 + x^2)e^{(2\,e^{40}+10)} + 2\,(x^5 - 7\,x^4 + 8\,x^3 + 16\,x^2)e^{(e^{40}+5)}$$

input
```
integrate((3*x^2+2*x)*exp(exp(20)^2+5)^2+(10*x^4-56*x^3+48*x^2+64*x)*exp(e
xp(20)^2+5)+7*x^6-90*x^5+400*x^4-640*x^3+512*x,x, algorithm=\
```

output
```
x^7 - 15*x^6 + 80*x^5 - 160*x^4 + 256*x^2 + (x^3 + x^2)*e^(2*e^40 + 10) +
2*(x^5 - 7*x^4 + 8*x^3 + 16*x^2)*e^(e^40 + 5)
```

3.552.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(21) = 42$.

Time = 0.26 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.83

$$\int \left(512x-640x^3+400x^4-90x^5+7x^6+e^{10+2e^{40}}\left(2x+3x^2\right)+e^{5+e^{40}}\left(64x+48x^2-56x^3+10x^4\right)\right)\,dx = x^7-15\,x^6+80\,x^5-160\,x^4+256\,x^2+\left(x^3+x^2\right)e^{\left(2\,e^{40}+10\right)}+2\,\left(x^5-7\,x^4+8\,x^3+16\,x^2\right)e^{\left(e^{40}+5\right)}$$

input
```
integrate((3*x^2+2*x)*exp(exp(20)^2+5)^2+(10*x^4-56*x^3+48*x^2+64*x)*exp(e
xp(20)^2+5)+7*x^6-90*x^5+400*x^4-640*x^3+512*x,x, algorithm=\
```

output
```
x^7 - 15*x^6 + 80*x^5 - 160*x^4 + 256*x^2 + (x^3 + x^2)*e^(2*e^40 + 10) +
2*(x^5 - 7*x^4 + 8*x^3 + 16*x^2)*e^(e^40 + 5)
```

3.552.9 Mupad [B] (verification not implemented)

Time = 15.28 (sec) , antiderivative size = 75, normalized size of antiderivative = 3.26

$$\int \left(512x-640x^3+400x^4-90x^5+7x^6+e^{10+2e^{40}}\left(2x+3x^2\right)+e^{5+e^{40}}\left(64x+48x^2-56x^3+10x^4\right)\right)\,dx = x^7-15\,x^6+\left(2\,\mathrm{e}^{\mathrm{e}^{40}+5}+80\right)\,x^5+\left(-14\,\mathrm{e}^{\mathrm{e}^{40}+5}-160\right)\,x^4+\left(16\,\mathrm{e}^{\mathrm{e}^{40}+5}+\mathrm{e}^{2\,\mathrm{e}^{40}+10}\right)\,x^3+\left(32\,\mathrm{e}^{\mathrm{e}^{40}+5}+\mathrm{e}^{2\,\mathrm{e}^{40}+10}+256\right)\,x^2$$

input
```
int(512*x + exp(2*exp(40) + 10)*(2*x + 3*x^2) + exp(exp(40) + 5)*(64*x + 4
8*x^2 - 56*x^3 + 10*x^4) - 640*x^3 + 400*x^4 - 90*x^5 + 7*x^6,x)
```

output
```
x^5*(2*exp(exp(40) + 5) + 80) - x^4*(14*exp(exp(40) + 5) + 160) + x^3*(16*
exp(exp(40) + 5) + exp(2*exp(40) + 10)) + x^2*(32*exp(exp(40) + 5) + exp(2
*exp(40) + 10) + 256) - 15*x^6 + x^7
```

3.553 $\int \frac{1}{2}(2e + x) \, dx$

3.553.1 Optimal result

Integrand size = 9, antiderivative size = 11

$$\int \frac{1}{2}(2e + x) \, dx = \left(-e - \frac{x}{2}\right)^2$$

output
```
(-exp(1)-1/2*x)^2
```

3.553.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.00

$$\int \frac{1}{2}(2e + x) \, dx = ex + \frac{x^2}{4}$$

input
```
Integrate[(2*E + x)/2,x]
```

output
```
E*x + x^2/4
```

3.553.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}(x+2e)\,dx$$

$$\Big\downarrow \; 17$$

$$\frac{1}{4}(x+2e)^2$$

input
```
Int[(2*E + x)/2,x]
```

output
```
(2*E + x)^2/4
```

3.553.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.553.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

method	result	size
gosper	$\frac{x(x+4\,\mathrm{e})}{4}$	10
default	$\frac{x^2}{4}+x\,\mathrm{e}$	11
norman	$\frac{x^2}{4}+x\,\mathrm{e}$	11
risch	$\frac{x^2}{4}+x\,\mathrm{e}$	11
parallelrisch	$\frac{x^2}{4}+x\,\mathrm{e}$	11
parts	$\frac{x^2}{4}+x\,\mathrm{e}$	11

input
```
int(exp(1)+1/2*x,x,method=_RETURNVERBOSE)
```

output
```
1/4*x*(x+4*exp(1))
```

3.553.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

$$\int \frac{1}{2}(2e+x)\,dx = \frac{1}{4}\,x^2 + xe$$

input
```
integrate(exp(1)+1/2*x,x, algorithm=\
```

output
```
1/4*x^2 + x*e
```

3.553.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.73

$$\int \frac{1}{2}(2e+x)\,dx = \frac{x^2}{4} + ex$$

input
```
integrate(exp(1)+1/2*x,x)
```

output
```
x**2/4 + E*x
```

3.553.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

$$\int \frac{1}{2}(2e+x)\,dx = \frac{1}{4}\,x^2 + xe$$

input
```
integrate(exp(1)+1/2*x,x, algorithm=\
```

output
```
1/4*x^2 + x*e
```

3.553.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

$$\int \frac{1}{2}(2e+x)\,dx = \frac{1}{4}\,x^2 + xe$$

input
```
integrate(exp(1)+1/2*x,x, algorithm=\
```

output
```
1/4*x^2 + x*e
```

3.553.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.82

$$\int \frac{1}{2}(2e+x)\,dx = \frac{x\,(x+4\,\mathrm{e})}{4}$$

input
```
int(x/2 + exp(1),x)
```

output
```
(x*(x + 4*exp(1)))/4
```

3.554 $\int \frac{4-x+8x\log\left(8e^{-x/4}x\right)+\left(-1-2x^2+2x^3+2x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}{4x\log\left(8e^{-x/4}x\right)+\left(x^3+x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}\,d$

3.554.1 Optimal result

Integrand size = 90, antiderivative size = 29

$$\int \frac{4-x+8x\log\left(8e^{-x/4}x\right)+\left(-1-2x^2+2x^3+2x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}{4x\log\left(8e^{-x/4}x\right)+\left(x^3+x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}\,dx=3+2x-\log\left(x^2+\log(x)+\frac{4}{\log\left(8e^{-x/4}x\right)}\right)$$

output
```
2*x-ln(ln(x)+4/ln(8*x/exp(1/4*x))+x^2)+3
```

3.554.2 Mathematica [F]

$$\int \frac{4-x+8x\log\left(8e^{-x/4}x\right)+\left(-1-2x^2+2x^3+2x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}{4x\log\left(8e^{-x/4}x\right)+\left(x^3+x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}\,dx=\int \frac{4-x+8x\log\left(8e^{-x/4}x\right.}{4x\log\left(8e^{-x}\right.}$$

input
```
Integrate[(4 - x + 8*x*Log[(8*x)/E^(x/4)] + (-1 - 2*x^2 + 2*x^3 + 2*x*Log[
x])*Log[(8*x)/E^(x/4)]^2)/(4*x*Log[(8*x)/E^(x/4)] + (x^3 + x*Log[x])*Log[(
8*x)/E^(x/4)]^2),x]
```

output
```
Integrate[(4 - x + 8*x*Log[(8*x)/E^(x/4)] + (-1 - 2*x^2 + 2*x^3 + 2*x*Log[
x])*Log[(8*x)/E^(x/4)]^2)/(4*x*Log[(8*x)/E^(x/4)] + (x^3 + x*Log[x])*Log[(
8*x)/E^(x/4)]^2), x]
```

3.554.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x^3-2x^2+2x\log(x)-1)\log^2\left(8e^{-x/4}x\right)-x+8x\log\left(8e^{-x/4}x\right)+4}{(x^3+x\log(x))\log^2\left(8e^{-x/4}x\right)+4x\log\left(8e^{-x/4}x\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2x^3-2x^2+2x\log(x)-1}{x(x^2+\log(x))}+\frac{x^5-4x^4+2x^3\log(x)+32x^2-8x^2\log(x)+x\log^2(x)-4\log^2(x)+16}{4x(x^2+\log(x))\left(x^2\log\left(8e^{-x/4}x\right)+\log(x)\log\left(8e^{-x/4}x\right)+4\right)}+\frac{}{4x\,\mathrm{lo}}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\int \frac{\log^2(x)}{(x^2+\log(x))\left(\log\left(8e^{-x/4}x\right)x^2+\log(x)\log\left(8e^{-x/4}x\right)+4\right)}dx-\int \frac{\log^2(x)}{x(x^2+\log(x))\left(\log\left(8e^{-x/4}x\right)x^2+\log(x)\log\left(8e^{-x/4}x\right)+4\right)}dx+4\int \frac{1}{x(x^2+\log(x))\left(\log\left(8e^{-x/4}x\right)x^2+\log(x)\log\left(8e^{-x/4}x\right)+4\right)}dx+8\int \frac{x}{(x^2+\log(x))\left(\log\left(8e^{-x/4}x\right)x^2+\log(x)\log\left(8e^{-x/4}x\right)+4\right)}dx-2\int \frac{x\log(x)}{(x^2+\log(x))\left(\log\left(8e^{-x/4}x\right)x^2+\log(x)\log\left(8e^{-x/4}x\right)+4\right)}dx+\frac{1}{2}\int \frac{x^2\log(x)}{(x^2+\log(x))\left(\log\left(8e^{-x/4}x\right)x^2+\log(x)\log\left(8e^{-x/4}x\right)+4\right)}dx+\frac{1}{4}\int \frac{x^4}{(x^2+\log(x))\left(\log\left(8e^{-x/4}x\right)x^2+\log(x)\log\left(8e^{-x/4}x\right)+4\right)}dx-\int \frac{x^3}{(x^2+\log(x))\left(\log\left(8e^{-x/4}x\right)x^2+\log(x)\log\left(8e^{-x/4}x\right)+4\right)}dx-\log\left(x^2+\log(x)\right)+2x+\log\left(\log\left(8e^{-x/4}x\right)\right)$$

input
```
Int[(4 - x + 8*x*Log[(8*x)/E^(x/4)] + (-1 - 2*x^2 + 2*x^3 + 2*x*Log[x])*Lo
g[(8*x)/E^(x/4)]^2)/(4*x*Log[(8*x)/E^(x/4)] + (x^3 + x*Log[x])*Log[(8*x)/E
^(x/4)]^2),x]
```

output
```
$Aborted
```

3.554.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.554.4 Maple [A] (verified)

Time = 1.80 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.66

method	result
parallelrisch	$2x+\ln\left(\ln\left(8x\,\mathrm{e}^{-\frac{x}{4}}\right)\right)-\ln\left(\ln\left(8x\,\mathrm{e}^{-\frac{x}{4}}\right)x^2+\ln\left(x\right)\ln\left(8x\,\mathrm{e}^{-\frac{x}{4}}\right)+4\right)$
risch	$2x-\ln\left(\ln\left(x\right)+x^2\right)+\ln\left(\ln\left(\mathrm{e}^{\frac{x}{4}}\right)+\frac{i\left(-\pi\,\mathrm{csgn}\left(i\mathrm{e}^{-\frac{x}{4}}\right)\mathrm{csgn}\left(ix\,\mathrm{e}^{-\frac{x}{4}}\right)^2+\pi\,\mathrm{csgn}\left(i\mathrm{e}^{-\frac{x}{4}}\right)\mathrm{csgn}\left(ix\,\mathrm{e}^{-\frac{x}{4}}\right)\mathrm{csgn}(i\right.}{2}\right.$

input
```
int(((2*x*ln(x)+2*x^3-2*x^2-1)*ln(8*x/exp(1/4*x))^2+8*x*ln(8*x/exp(1/4*x))
-x+4)/((x*ln(x)+x^3)*ln(8*x/exp(1/4*x))^2+4*x*ln(8*x/exp(1/4*x))),x,method
=_RETURNVERBOSE)
```

output
```
2*x+ln(ln(8*x/exp(1/4*x)))-ln(ln(8*x/exp(1/4*x))*x^2+ln(8*x/exp(1/4*x))*ln
(x)+4)
```

3.554.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(26) = 52$.

Time = 0.27 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.93

$$\int \frac{4-x+8x\log\left(8e^{-x/4}x\right)+\left(-1-2x^2+2x^3+2x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}{4x\log\left(8e^{-x/4}x\right)+\left(x^3+x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}\,dx=2\,x$$
$$-\log\left(-x^3+12\,x^2\log\left(2\right)+\left(4\,x^2-x+12\,\log\left(2\right)\right)\log\left(x\right)+4\,\log\left(x\right)^2+16\right)+\log\left(-x+12\,\log\left(2\right)+4\,\log\left(x\right)\right)$$

input
```
integrate(((2*x*log(x)+2*x^3-2*x^2-1)*log(8*x/exp(1/4*x))^2+8*x*log(8*x/ex
p(1/4*x))-x+4)/((x*log(x)+x^3)*log(8*x/exp(1/4*x))^2+4*x*log(8*x/exp(1/4*x
))),x, algorithm=\
```

output
```
2*x - log(-x^3 + 12*x^2*log(2) + (4*x^2 - x + 12*log(2))*log(x) + 4*log(x)
^2 + 16) + log(-x + 12*log(2) + 4*log(x))
```

3.554.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(24) = 48$.

Time = 0.73 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.83

$$\int \frac{4-x+8x\log\left(8e^{-x/4}x\right)+\left(-1-2x^2+2x^3+2x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}{4x\log\left(8e^{-x/4}x\right)+\left(x^3+x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}\,dx = 2x + \log\left(-\frac{x}{4}+\log(x)+3\log(2)\right) - \log\left(-\frac{x^3}{4}+3x^2\log(2)+\left(x^2-\frac{x}{4}+3\log(2)\right)\log(x)+\log(x)^2+4\right)$$

input
```
integrate(((2*x*ln(x)+2*x**3-2*x**2-1)*ln(8*x/exp(1/4*x))**2+8*x*ln(8*x/ex
p(1/4*x))-x+4)/((x*ln(x)+x**3)*ln(8*x/exp(1/4*x))**2+4*x*ln(8*x/exp(1/4*x)
)),x)
```

output
```
2*x + log(-x/4 + log(x) + 3*log(2)) - log(-x**3/4 + 3*x**2*log(2) + (x**2
- x/4 + 3*log(2))*log(x) + log(x)**2 + 4)
```

3.554.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(26) = 52$.

Time = 0.34 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.83

$$\int \frac{4-x+8x\log\left(8e^{-x/4}x\right)+\left(-1-2x^2+2x^3+2x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}{4x\log\left(8e^{-x/4}x\right)+\left(x^3+x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}\,dx = 2\,x - \log\left(-\frac{1}{4}\,x^3+3\,x^2\log(2)+\frac{1}{4}\left(4\,x^2-x+12\,\log(2)\right)\log(x)+\log(x)^2+4\right)+\log\left(-\frac{1}{4}\,x+3\,\log(2)+\log(x)\right)$$

input
```
integrate(((2*x*log(x)+2*x^3-2*x^2-1)*log(8*x/exp(1/4*x))^2+8*x*log(8*x/ex
p(1/4*x))-x+4)/((x*log(x)+x^3)*log(8*x/exp(1/4*x))^2+4*x*log(8*x/exp(1/4*x
))),x, algorithm=\
```

output
```
2*x - log(-1/4*x^3 + 3*x^2*log(2) + 1/4*(4*x^2 - x + 12*log(2))*log(x) + l
og(x)^2 + 4) + log(-1/4*x + 3*log(2) + log(x))
```

3.554.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(26) = 52.

Time = 0.31 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.00

$$\int \frac{4-x+8x\log\left(8e^{-x/4}x\right)+\left(-1-2x^2+2x^3+2x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}{4x\log\left(8e^{-x/4}x\right)+\left(x^3+x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}\,dx = 2\,x$$
$$-\log\left(-x^3+12\,x^2\log\left(2\right)+4\,x^2\log\left(x\right)-x\log\left(x\right)+12\,\log\left(2\right)\log\left(x\right)+4\,\log\left(x\right)^2+16\right)+\log\left(-x+12\,\log\left(2\right)+\right.$$

input
```
integrate(((2*x*log(x)+2*x^3-2*x^2-1)*log(8*x/exp(1/4*x))^2+8*x*log(8*x/ex
p(1/4*x))-x+4)/((x*log(x)+x^3)*log(8*x/exp(1/4*x))^2+4*x*log(8*x/exp(1/4*x
))),x, algorithm=\
```

output
```
2*x - log(-x^3 + 12*x^2*log(2) + 4*x^2*log(x) - x*log(x) + 12*log(2)*log(x
) + 4*log(x)^2 + 16) + log(-x + 12*log(2) + 4*log(x))
```

3.554.9 Mupad [B] (verification not implemented)

Time = 17.60 (sec) , antiderivative size = 491, normalized size of antiderivative = 16.93

$$\int \frac{4-x+8x\log\left(8e^{-x/4}x\right)+\left(-1-2x^2+2x^3+2x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}{4x\log\left(8e^{-x/4}x\right)+\left(x^3+x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}\,dx = \text{Too large to display}$$

input
```
int((8*x*log(8*x*exp(-x/4)) - x + log(8*x*exp(-x/4))^2*(2*x*log(x) - 2*x^2
 + 2*x^3 - 1) + 4)/(log(8*x*exp(-x/4))^2*(x*log(x) + x^3) + 4*x*log(8*x*ex
p(-x/4))),x)
```

output
```
2*x - log((16*x + 4*x*log(x)^2 - 17*x^2*log(x) + 4*x^3*log(x) - 16*log(x)^
2 - 48*x^2*log(2) + 12*x^3*log(2) - 48*log(2)*log(x) + 4*x*log(x) + 4*x^3
- x^4 + 12*x*log(2)*log(x) - 64)/x) + log(x*(x - 4)) - log(9*x^3*log(2)^2
- 36*x^2*log(2)^2 - 8*x + 3*x*log(2) + (9*x*log(2)^2)/2 + (45*x^2*log(2))/
4 + 3*x^3*log(2) + (45*x^4*log(2))/2 - 6*x^5*log(2) - 18*log(2)^2 + (515*x
^2)/8 - (287*x^3)/32 + 30*x^4 - (23*x^5)/16 - (7*x^6)/2 + x^7 + 32) + log(
1/x^2) + log(32*x - 384*log(2) - 128*log(x) - (261*x^2*log(2)^2)/2 + 432*x
^2*log(2)^3 - 72*x^3*log(2)^2 - 108*x^3*log(2)^3 - 261*x^4*log(2)^2 + 72*x
^5*log(2)^2 + 72*log(2)^2*log(x) - (515*x^2*log(x))/2 + (287*x^3*log(x))/8
 - 120*x^4*log(x) + (23*x^5*log(x))/4 + 14*x^6*log(x) - 4*x^7*log(x) + 96*
x*log(2) - 54*x*log(2)^2 - (1539*x^2*log(2))/2 - 54*x*log(2)^3 + (951*x^3*
log(2))/8 - 357*x^4*log(2) + (159*x^5*log(2))/4 + 36*x^6*log(2) - 12*x^7*l
og(2) + 32*x*log(x) + 216*log(2)^3 - 8*x^2 + (515*x^3)/8 - (287*x^4)/32 +
30*x^5 - (23*x^6)/16 - (7*x^7)/2 + x^8 - 12*x*log(2)*log(x) - 18*x*log(2)^
2*log(x) - 45*x^2*log(2)*log(x) - 12*x^3*log(2)*log(x) - 90*x^4*log(2)*log
(x) + 24*x^5*log(2)*log(x) + 144*x^2*log(2)^2*log(x) - 36*x^3*log(2)^2*log
(x))
```

3.554. $\int \frac{4-x+8x\log\left(8e^{-x/4}x\right)+\left(-1-2x^2+2x^3+2x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}{4x\log\left(8e^{-x/4}x\right)+\left(x^3+x\log(x)\right)\log^2\left(8e^{-x/4}x\right)}\,dx$

3.555 $\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}(-100-40x-129x^2-50x^3-5x^4+(25+10x)$

3.555.1 Optimal result

Integrand size = 80, antiderivative size = 34

$$\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}\left(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4)\right)}{3375x^2+1350x^3+135x^4}\,dx = -5+\frac{1}{3}e^{\frac{\frac{4}{5}+x-x^2-\frac{\log(4)}{5+x}}{9x}}$$

output
```
1/3*exp(1/9/x*(x-x^2-2*ln(2)/(5+x)+4/5))-5
```

3.555.2 Mathematica [A] (verified)

Time = 2.88 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.24

$$\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}\left(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4)\right)}{3375x^2+1350x^3+135x^4}\,dx = \frac{2^{-1-\frac{2}{9x(5+x)}}e^{\frac{1}{45}\left(5+\frac{4}{x}-5x\right)}\log(4)}{3\log(2)}$$

input
```
Integrate[(E^((20 + 29*x - 20*x^2 - 5*x^3 - 5*Log[4])/(225*x + 45*x^2))*(-
100 - 40*x - 129*x^2 - 50*x^3 - 5*x^4 + (25 + 10*x)*Log[4]))/(3375*x^2 + 1
350*x^3 + 135*x^4),x]
```

output
```
(2^(-1 - 2/(9*x*(5 + x)))*E^((5 + 4/x - 5*x)/45)*Log[4])/(3*Log[2])
```

3.555.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-5x^4-50x^3-129x^2-40x+(10x+25)\log(4)-100)\exp\left(\frac{-5x^3-20x^2+29x+20-5\log(4)}{45x^2+225x}\right)}{135x^4+1350x^3+3375x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(-5x^4-50x^3-129x^2-40x+(10x+25)\log(4)-100)\exp\left(\frac{-5x^3-20x^2+29x+20-5\log(4)}{45x^2+225x}\right)}{x^2(135x^2+1350x+3375)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{(-5x^4-50x^3-129x^2-40x+(10x+25)\log(4)-100)\exp\left(\frac{-5x^3-20x^2+29x+20-5\log(4)}{45x^2+225x}\right)}{x^2\left(3\sqrt{15}x+15\sqrt{15}\right)^2}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(-5x^4-50x^3-129x^2-10x(4-\log(4))-25(4-\log(4)))\exp\left(\frac{-5x^3-20x^2+29x+5(4-\log(4))}{x(45x+225)}\right)}{x^2\left(3\sqrt{15}x+15\sqrt{15}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{1}{27}\exp\left(\frac{-5x^3-20x^2+29x+5(4-\log(4))}{x(45x+225)}\right)-\frac{\log(4)\exp\left(\frac{-5x^3-20x^2+29x+5(4-\log(4))}{x(45x+225)}\right)}{135(x+5)^2}+\frac{(\log(4)-4)\exp}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{1}{27}\int \exp\left(\frac{-5x^3-20x^2+29x+5(4-\log(4))}{x(45x+225)}\right)dx-\frac{1}{135}(4-\log(4))\int \frac{\exp\left(\frac{-5x^3-20x^2+29x+5(4-\log(4))}{x(45x+225)}\right)}{x^2}dx-\frac{1}{135}\log(4)\int \frac{\exp\left(\frac{-5x^3-20x^2+29x+5(4-\log(4))}{x(45x+225)}\right)}{(x+5)^2}dx$$

input
```
Int[(E^((20 + 29*x - 20*x^2 - 5*x^3 - 5*Log[4])/(225*x + 45*x^2))*(-100 -
40*x - 129*x^2 - 50*x^3 - 5*x^4 + (25 + 10*x)*Log[4]))/(3375*x^2 + 1350*x^
3 + 135*x^4),x]
```

3.555. $\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4))}{3375x^2+1350x^3+135x^4}dx$

output
```
$Aborted
```

3.555.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.555.4 Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

method	result	size
risch	$\frac{2^{-\frac{2}{9(5+x)x}} {\mathrm e}^{-\frac{5 x^{2}-5 x -4}{45 x}}}{3}$	31
gosper	$\frac{{\mathrm e}^{-\frac{5 x^{3}+20 x^{2}+10 \ln \left(2\right)-29 x -20}{45 \left(5+x \right) x}}}{3}$	33
parallelrisch	$\frac{{\mathrm e}^{-\frac{5 x^{3}+20 x^{2}+10 \ln \left(2\right)-29 x -20}{45 \left(5+x \right) x}}}{3}$	33
norman	$\frac{\frac{5 x \,{\mathrm e}^{\frac{-10 \ln \left(2\right)-5 x^{3}-20 x^{2}+29 x +20}{45 x^{2}+225 x}}}{3}+\frac{x^{2} {\mathrm e}^{\frac{-10 \ln \left(2\right)-5 x^{3}-20 x^{2}+29 x +20}{45 x^{2}+225 x}}}{3}}{\left(5+x \right) x}$	83

3.555. $\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}\left(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4)\right)}{3375x^2+1350x^3+135x^4}\,dx$

input
```
int((2*(10*x+25)*ln(2)-5*x^4-50*x^3-129*x^2-40*x-100)*exp((-10*ln(2)-5*x^3
-20*x^2+29*x+20)/(45*x^2+225*x))/(135*x^4+1350*x^3+3375*x^2),x,method=_RET
URNVERBOSE)
```

output
```
1/3*2^(-2/9/(5+x)/x)*exp(-1/45*(5*x^2-5*x-4)/x)
```

3.555.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.97

$$\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4))}{3375x^2+1350x^3+135x^4}\,dx$$
$$=\frac{1}{3}\,e^{\left(-\frac{5\,x^3+20\,x^2-29\,x+10\,\log(2)-20}{45\,\left(x^2+5\,x\right)}\right)}$$

input
```
integrate((2*(10*x+25)*log(2)-5*x^4-50*x^3-129*x^2-40*x-100)*exp((-10*log(
2)-5*x^3-20*x^2+29*x+20)/(45*x^2+225*x))/(135*x^4+1350*x^3+3375*x^2),x, al
gorithm=\
```

output
```
1/3*e^(-1/45*(5*x^3 + 20*x^2 - 29*x + 10*log(2) - 20)/(x^2 + 5*x))
```

3.555.6 Sympy [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4))}{3375x^2+1350x^3+135x^4}\,dx$$
$$=\frac{e^{\frac{-5x^3-20x^2+29x-10\log(2)+20}{45x^2+225x}}}{3}$$

input
```
integrate((2*(10*x+25)*ln(2)-5*x**4-50*x**3-129*x**2-40*x-100)*exp((-10*ln
(2)-5*x**3-20*x**2+29*x+20)/(45*x**2+225*x))/(135*x**4+1350*x**3+3375*x**2
),x)
```

output
```
exp((-5*x**3 - 20*x**2 + 29*x - 10*log(2) + 20)/(45*x**2 + 225*x))/3
```

3.555.7 Maxima [A] (verification not implemented)

Time = 0.51 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4))}{3375x^2+1350x^3+135x^4}\,dx$$
$$=\frac{1}{3}e^{\left(-\frac{1}{9}x+\frac{2\log(2)}{45(x+5)}-\frac{2\log(2)}{45x}+\frac{4}{45x}+\frac{1}{9}\right)}$$

input
```
integrate((2*(10*x+25)*log(2)-5*x^4-50*x^3-129*x^2-40*x-100)*exp((-10*log(
2)-5*x^3-20*x^2+29*x+20)/(45*x^2+225*x))/(135*x^4+1350*x^3+3375*x^2),x, al
gorithm=\
```

output
```
1/3*e^(-1/9*x + 2/45*log(2)/(x + 5) - 2/45*log(2)/x + 4/45/x + 1/9)
```

3.555.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. 2(29) = 58.

Time = 0.28 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.00

$$\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4))}{3375x^2+1350x^3+135x^4}\,dx$$
$$=\frac{1}{3}e^{\left(-\frac{x^3}{9(x^2+5x)}-\frac{4x^2}{9(x^2+5x)}+\frac{29x}{45(x^2+5x)}-\frac{2\log(2)}{9(x^2+5x)}+\frac{4}{9(x^2+5x)}\right)}$$

input
```
integrate((2*(10*x+25)*log(2)-5*x^4-50*x^3-129*x^2-40*x-100)*exp((-10*log(
2)-5*x^3-20*x^2+29*x+20)/(45*x^2+225*x))/(135*x^4+1350*x^3+3375*x^2),x, al
gorithm=\
```

output
```
1/3*e^(-1/9*x^3/(x^2 + 5*x) - 4/9*x^2/(x^2 + 5*x) + 29/45*x/(x^2 + 5*x) -
2/9*log(2)/(x^2 + 5*x) + 4/9/(x^2 + 5*x))
```

3.555.9 Mupad [B] (verification not implemented)

Time = 14.01 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.41

$$\int \frac{e^{\frac{20+29x-20x^2-5x^3-5\log(4)}{225x+45x^2}}\left(-100-40x-129x^2-50x^3-5x^4+(25+10x)\log(4)\right)}{3375x^2+1350x^3+135x^4}\,dx$$
$$=\frac{e^{\frac{29\,x}{45\,x^2+225\,x}}\,e^{-\frac{5\,x^3}{45\,x^2+225\,x}}\,e^{-\frac{20\,x^2}{45\,x^2+225\,x}}\,e^{\frac{20}{45\,x^2+225\,x}}}{3\,2^{\frac{10}{45\,x^2+225\,x}}}$$

input
```
int(-(exp(-(10*log(2) - 29*x + 20*x^2 + 5*x^3 - 20)/(225*x + 45*x^2))*(40*
x - 2*log(2)*(10*x + 25) + 129*x^2 + 50*x^3 + 5*x^4 + 100))/(3375*x^2 + 13
50*x^3 + 135*x^4),x)
```

output
```
(exp((29*x)/(225*x + 45*x^2))*exp(-(5*x^3)/(225*x + 45*x^2))*exp(-(20*x^2)
/(225*x + 45*x^2))*exp(20/(225*x + 45*x^2)))/(3*2^(10/(225*x + 45*x^2)))
```

3.556 $\int \frac{126-153x-18x^2}{e(64+160x+160x^2+80x^3+20x^4+2x^5)}\,dx$

3.556.1 Optimal result

Integrand size = 41, antiderivative size = 16

$$\int \frac{126-153x-18x^2}{e\left(64+160x+160x^2+80x^3+20x^4+2x^5\right)}\,dx=\frac{9x(7+x)}{2e(2+x)^4}$$

output
```
9/2/(2+x)^4/exp(1)*x*(x+7)
```

3.556.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{126-153x-18x^2}{e\left(64+160x+160x^2+80x^3+20x^4+2x^5\right)}\,dx=\frac{9x(7+x)}{2e(2+x)^4}$$

input
```
Integrate[(126 - 153*x - 18*x^2)/(E*(64 + 160*x + 160*x^2 + 80*x^3 + 20*x^
4 + 2*x^5)),x]
```

output
```
(9*x*(7 + x))/(2*E*(2 + x)^4)
```

3.556.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.69, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.122, Rules used = {27, 27, 2007, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-18x^2-153x+126}{e(2x^5+20x^4+80x^3+160x^2+160x+64)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \frac{9(-2x^2-17x+14)}{2(x^5+10x^4+40x^3+80x^2+80x+32)}dx}{e}$$

$$\Big\downarrow \text{27}$$

$$\frac{9\int \frac{-2x^2-17x+14}{x^5+10x^4+40x^3+80x^2+80x+32}dx}{2e}$$

$$\Big\downarrow \text{2007}$$

$$\frac{9\int \frac{-2x^2-17x+14}{(x+2)^5}dx}{2e}$$

$$\Big\downarrow \text{1140}$$

$$\frac{9\int \left(-\frac{2}{(x+2)^3}-\frac{9}{(x+2)^4}+\frac{40}{(x+2)^5}\right)dx}{2e}$$

$$\Big\downarrow \text{2009}$$

$$\frac{9\left(\frac{1}{(x+2)^2}+\frac{3}{(x+2)^3}-\frac{10}{(x+2)^4}\right)}{2e}$$

input
```
Int[(126 - 153*x - 18*x^2)/(E*(64 + 160*x + 160*x^2 + 80*x^3 + 20*x^4 + 2*
x^5)),x]
```

output
```
(9*(-10/(2 + x)^4 + 3/(2 + x)^3 + (2 + x)^(-2)))/(2*E)
```

3.556.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.556.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.50

method	result	size
norman	$\frac{\frac{9x^2 e^{-1}}{2}+\frac{63 e^{-1} x}{2}}{(2+x)^4}$	24
default	$\frac{9 e^{-1}\left(-\frac{10}{(2+x)^4}+\frac{3}{(2+x)^3}+\frac{1}{(2+x)^2}\right)}{2}$	27
gosper	$\frac{9(x+7)x e^{-1}}{2(x^4+8x^3+24x^2+32x+16)}$	31
risch	$\frac{e^{-1}\left(\frac{9}{2}x^2+\frac{63}{2}x\right)}{x^4+8x^3+24x^2+32x+16}$	33
parallelrisch	$\frac{e^{-1}(9x^2+63x)}{2x^4+16x^3+48x^2+64x+32}$	36

input
```
int((-18*x^2-153*x+126)/(2*x^5+20*x^4+80*x^3+160*x^2+160*x+64)/exp(1),x,me
thod=_RETURNVERBOSE)
```

output
```
(9/2*x^2/exp(1)+63/2*x/exp(1))/(2+x)^4
```

3.556.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. $2(13) = 26$.

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.94

$$\int \frac{126-153x-18x^2}{e(64+160x+160x^2+80x^3+20x^4+2x^5)}\,dx = \frac{9\,(x^2+7\,x)e^{(-1)}}{2\,(x^4+8\,x^3+24\,x^2+32\,x+16)}$$

input
```
integrate((-18*x^2-153*x+126)/(2*x^5+20*x^4+80*x^3+160*x^2+160*x+64)/exp(1
),x, algorithm=\
```

output
```
9/2*(x^2 + 7*x)*e^(-1)/(x^4 + 8*x^3 + 24*x^2 + 32*x + 16)
```

3.556.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(15) = 30$.

Time = 0.17 (sec) , antiderivative size = 48, normalized size of antiderivative = 3.00

$$\int \frac{126-153x-18x^2}{e(64+160x+160x^2+80x^3+20x^4+2x^5)}\,dx = -\frac{-9x^2-63x}{2ex^4+16ex^3+48ex^2+64ex+32e}$$

input
```
integrate((-18*x**2-153*x+126)/(2*x**5+20*x**4+80*x**3+160*x**2+160*x+64)/
exp(1),x)
```

output
```
-(-9*x**2 - 63*x)/(2*E*x**4 + 16*E*x**3 + 48*E*x**2 + 64*E*x + 32*E)
```

3.556.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. $2(13) = 26$.

Time = 0.22 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.94

$$\int \frac{126-153x-18x^2}{e(64+160x+160x^2+80x^3+20x^4+2x^5)}\,dx = \frac{9\,(x^2+7\,x)e^{(-1)}}{2\,(x^4+8\,x^3+24\,x^2+32\,x+16)}$$

input
```
integrate((-18*x^2-153*x+126)/(2*x^5+20*x^4+80*x^3+160*x^2+160*x+64)/exp(1
),x, algorithm=\
```

output
```
9/2*(x^2 + 7*x)*e^(-1)/(x^4 + 8*x^3 + 24*x^2 + 32*x + 16)
```

3.556.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{126-153x-18x^2}{e(64+160x+160x^2+80x^3+20x^4+2x^5)}\,dx = \frac{9\,(x^2+7\,x)e^{(-1)}}{2\,(x+2)^4}$$

input
```
integrate((-18*x^2-153*x+126)/(2*x^5+20*x^4+80*x^3+160*x^2+160*x+64)/exp(1
),x, algorithm=\
```

output
```
9/2*(x^2 + 7*x)*e^(-1)/(x + 2)^4
```

3.556.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.75

$$\int \frac{126-153x-18x^2}{e(64+160x+160x^2+80x^3+20x^4+2x^5)}\,dx = \frac{9\,\mathrm{e}^{-1}}{2\,(x+2)^2}+\frac{27\,\mathrm{e}^{-1}}{2\,(x+2)^3}-\frac{45\,\mathrm{e}^{-1}}{(x+2)^4}$$

input
```
int(-(exp(-1)*(153*x + 18*x^2 - 126))/(160*x + 160*x^2 + 80*x^3 + 20*x^4 +
 2*x^5 + 64),x)
```

output
```
(9*exp(-1))/(2*(x + 2)^2) + (27*exp(-1))/(2*(x + 2)^3) - (45*exp(-1))/(x +
 2)^4
```

3.557 $\int e^{-3+2x+e^{e^4}x^2}\left(-3-6x-6e^{e^4}x^2\right)\,dx$

3.557.1 Optimal result

Integrand size = 32, antiderivative size = 20

$$\int e^{-3+2x+e^{e^4}x^2}\left(-3-6x-6e^{e^4}x^2\right)\,dx=3-3e^{-3+x\left(2+e^{e^4}x\right)}x$$

output
```
3-3*exp(x*(x*exp(exp(4))+2))/exp(3-ln(x))
```

3.557.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int e^{-3+2x+e^{e^4}x^2}\left(-3-6x-6e^{e^4}x^2\right)\,dx=-3e^{-3+2x+e^{e^4}x^2}x$$

input
```
Integrate[E^(-3 + 2*x + E^E^4*x^2)*(-3 - 6*x - 6*E^E^4*x^2),x]
```

output
```
-3*E^(-3 + 2*x + E^E^4*x^2)*x
```

3.557.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 40, normalized size of antiderivative = 2.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.031$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{e^{e^4}x^2+2x-3}\left(-6e^{e^4}x^2-6x-3\right)dx$$

$$\Big\downarrow \text{2726}$$

$$-\frac{3e^{e^{e^4}x^2+2x-3}\left(e^{e^4}x^2+x\right)}{e^{e^4}x+1}$$

input
```
Int[E^(-3 + 2*x + E^E^4*x^2)*(-3 - 6*x - 6*E^E^4*x^2),x]
```

output
```
(-3*E^(-3 + 2*x + E^E^4*x^2)*(x + E^E^4*x^2))/(1 + E^E^4*x)
```

3.557.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.557.4 Maple [A] (verified)

Time = 0.37 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

method	result
risch	$-3x\,\mathrm{e}^{x^2\mathrm{e}^{\mathrm{e}^4}+2x-3}$
norman	$-3x\,\mathrm{e}^{-3}\mathrm{e}^{x^2\mathrm{e}^{\mathrm{e}^4}+2x}$
gosper	$-3x\,\mathrm{e}^{-3}\mathrm{e}^{x^2\mathrm{e}^{\mathrm{e}^4}+2x}$
parallelrisch	$-3x\,\mathrm{e}^{-3}\mathrm{e}^{x^2\mathrm{e}^{\mathrm{e}^4}+2x}$
default	$\frac{3i\mathrm{e}^{-3}\sqrt{\pi}\,\mathrm{e}^{-\mathrm{e}^{-\mathrm{e}^4}}\mathrm{e}^{-\frac{\mathrm{e}^4}{2}}\operatorname{erf}\left(i\mathrm{e}^{\frac{\mathrm{e}^4}{2}}x+i\mathrm{e}^{-\frac{\mathrm{e}^4}{2}}\right)}{2}-6\,\mathrm{e}^{-3}\left(\frac{\mathrm{e}^{-\mathrm{e}^4}\mathrm{e}^{x^2\mathrm{e}^{\mathrm{e}^4}+2x}}{2}+\frac{i\mathrm{e}^{-\mathrm{e}^4}\sqrt{\pi}\,\mathrm{e}^{-\mathrm{e}^{-\mathrm{e}^4}}\mathrm{e}^{-\frac{\mathrm{e}^4}{2}}\operatorname{erf}\left(i\mathrm{e}^{\frac{\mathrm{e}^4}{2}}x+i\mathrm{e}^{-\frac{\mathrm{e}^4}{2}}\right)}{2}\right)$

input
```
int((-6*x^2*exp(exp(4))-6*x-3)*exp(x^2*exp(exp(4))+2*x)/x/exp(3-ln(x)),x,m
ethod=_RETURNVERBOSE)
```

output
```
-3*x*exp(x^2*exp(exp(4))+2*x-3)
```

3.557.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int e^{-3+2x+e^{e^4}x^2}\left(-3-6x-6e^{e^4}x^2\right)\,dx=-3\,e^{\left(x^2e^{\left(e^4\right)}+2\,x+\log(x)-3\right)}$$

input
```
integrate((-6*x^2*exp(exp(4))-6*x-3)*exp(x^2*exp(exp(4))+2*x)/x/exp(3-log(
x)),x, algorithm=\
```

output
```
-3*e^(x^2*e^(e^4) + 2*x + log(x) - 3)
```

3.557.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int e^{-3+2x+e^{e^4}x^2}\left(-3-6x-6e^{e^4}x^2\right)\,dx=-\frac{3xe^{x^2e^{e^4}+2x}}{e^3}$$

input
```
integrate((-6*x**2*exp(exp(4))-6*x-3)*exp(x**2*exp(exp(4))+2*x)/x/exp(3-ln
(x)),x)
```

output
```
-3*x*exp(-3)*exp(x**2*exp(exp(4)) + 2*x)
```

3.557.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.36 (sec) , antiderivative size = 285, normalized size of antiderivative = 14.25

$$\int e^{-3+2x+e^{e^4}x^2}\left(-3-6x-6e^{e^4}x^2\right)\,dx$$
$$=3\left(\frac{\left(xe^{\left(e^4\right)}+1\right)^3e^{\left(-\frac{5}{2}e^4\right)}\Gamma\left(\frac{3}{2},-\left(xe^{\left(e^4\right)}+1\right)^2e^{\left(-e^4\right)}\right)}{\left(-\left(xe^{\left(e^4\right)}+1\right)^2e^{\left(-e^4\right)}\right)^{\frac{3}{2}}}-\frac{\sqrt{\pi}\left(xe^{\left(e^4\right)}+1\right)\left(\operatorname{erf}\left(\sqrt{-\left(xe^{\left(e^4\right)}+1\right)^2e^{\left(-e^4\right)}}\right)-\right.}{\sqrt{-\left(xe^{\left(e^4\right)}+1\right)^2e^{\left(-e^4\right)}}}\right.$$
$$+3\left(\frac{\sqrt{\pi}\left(xe^{\left(e^4\right)}+1\right)\left(\operatorname{erf}\left(\sqrt{-\left(xe^{\left(e^4\right)}+1\right)^2e^{\left(-e^4\right)}}\right)-1\right)e^{\left(-\frac{3}{2}e^4\right)}}{\sqrt{-\left(xe^{\left(e^4\right)}+1\right)^2e^{\left(-e^4\right)}}}-e^{\left(\left(xe^{\left(e^4\right)}+1\right)^2e^{\left(-e^4\right)}-\frac{1}{2}e^4\right)}\right)e^{\left(-\frac{1}{2}e^4-e^{\left(\right.}\right.}$$
$$-\frac{3\sqrt{\pi}\operatorname{erf}\left(x\sqrt{-e^{\left(e^4\right)}}-\frac{1}{\sqrt{-e^{\left(e^4\right)}}}\right)e^{\left(-e^{\left(-e^4\right)}-3\right)}}{2\sqrt{-e^{\left(e^4\right)}}}$$

input
```
integrate((-6*x^2*exp(exp(4))-6*x-3)*exp(x^2*exp(exp(4))+2*x)/x/exp(3-log(
x)),x, algorithm=\
```

output
```
3*((x*e^(e^4) + 1)^3*e^(-5/2*e^4)*gamma(3/2, -(x*e^(e^4) + 1)^2*e^(-e^4))/
(-(x*e^(e^4) + 1)^2*e^(-e^4))^(3/2) - sqrt(pi)*(x*e^(e^4) + 1)*(erf(sqrt(-
(x*e^(e^4) + 1)^2*e^(-e^4))) - 1)*e^(-5/2*e^4)/sqrt(-(x*e^(e^4) + 1)^2*e^(
-e^4)) + 2*e^((x*e^(e^4) + 1)^2*e^(-e^4) - 3/2*e^4))*e^(1/2*e^4 - e^(-e^4)
 - 3) + 3*(sqrt(pi)*(x*e^(e^4) + 1)*(erf(sqrt(-(x*e^(e^4) + 1)^2*e^(-e^4))
) - 1)*e^(-3/2*e^4)/sqrt(-(x*e^(e^4) + 1)^2*e^(-e^4)) - e^((x*e^(e^4) + 1)
^2*e^(-e^4) - 1/2*e^4))*e^(-1/2*e^4 - e^(-e^4) - 3) - 3/2*sqrt(pi)*erf(x*s
qrt(-e^(e^4)) - 1/sqrt(-e^(e^4)))*e^(-e^(-e^4) - 3)/sqrt(-e^(e^4))
```

3.557.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int e^{-3+2x+e^{e^4}x^2}\left(-3-6x-6e^{e^4}x^2\right)\,dx=-3\,e^{\left(x^2e^{\left(e^4\right)}+2\,x+\log\left(x\right)-3\right)}$$

input
```
integrate((-6*x^2*exp(exp(4))-6*x-3)*exp(x^2*exp(exp(4))+2*x)/x/exp(3-log(
x)),x, algorithm=\
```

output
```
-3*e^(x^2*e^(e^4) + 2*x + log(x) - 3)
```

3.557.9 Mupad [B] (verification not implemented)

Time = 12.61 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int e^{-3+2x+e^{e^4}x^2}\left(-3-6x-6e^{e^4}x^2\right)\,dx=-3\,x\,\mathrm{e}^{2\,x}\,\mathrm{e}^{-3}\,\mathrm{e}^{x^2\,\mathrm{e}^{\mathrm{e}^4}}$$

input
```
int(-(exp(2*x + x^2*exp(exp(4)))*exp(log(x) - 3)*(6*x + 6*x^2*exp(exp(4))
+ 3))/x,x)
```

output
```
-3*x*exp(2*x)*exp(-3)*exp(x^2*exp(exp(4)))
```

3.558 $\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4}{128x-160x^2\log^2(4)+50x^3\log}$

3.558.1 Optimal result

Integrand size = 92, antiderivative size = 22

$$\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+\left((-160-80x)\log^2(4)+100x\log^4(4)\right)\log\left(x^2\right)-25}{128x-160x^2\log^2(4)+50x^3\log^4(4)}$$

$$=\frac{5\left(x+\log\left(x^2\right)\right)^2}{10x-\frac{16}{\log^2(4)}}$$

output
```
5/(10*x-4/ln(2)^2)*(ln(x^2)+x)^2
```

3.558.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 60 vs. 2(22) = 44.

Time = 0.16 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.73

$$\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+\left((-160-80x)\log^2(4)+100x\log^4(4)\right)\log\left(x^2\right)-25}{128x-160x^2\log^2(4)+50x^3\log^4(4)}$$

$$=\frac{64-40x\log^2(4)+25x^2\log^4(4)+50x\log^4(4)\log\left(x^2\right)+25\log^4(4)\log^2\left(x^2\right)}{10\log^2(4)\left(-8+5x\log^2(4)\right)}$$

input
```
Integrate[((-160*x - 80*x^2)*Log[4]^2 + (100*x^2 + 25*x^3)*Log[4]^4 + ((-1
60 - 80*x)*Log[4]^2 + 100*x*Log[4]^4)*Log[x^2] - 25*x*Log[4]^4*Log[x^2]^2)
/(128*x - 160*x^2*Log[4]^2 + 50*x^3*Log[4]^4),x]
```

3.558.
$\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25x\log^4(4)\log^2(x^2)}{128x-160x^2\log^2(4)+50x^3\log^4(4)}\,dx$

output
```
(64 - 40*x*Log[4]^2 + 25*x^2*Log[4]^4 + 50*x*Log[4]^4*Log[x^2] + 25*Log[4]
^4*Log[x^2]^2)/(10*Log[4]^2*(-8 + 5*x*Log[4]^2))
```

3.558.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 91 vs. $2(22) = 44$.

Time = 1.32 (sec) , antiderivative size = 91, normalized size of antiderivative = 4.14, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.076$, Rules used = {2026, 7277, 27, 7292, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-80x^2-160x)\log^2(4)-25x\log^4(4)\log^2(x^2)+(100x\log^4(4)+(-80x-160)\log^2(4))\log(x^2)+(25x^3+10}{50x^3\log^4(4)-160x^2\log^2(4)+128x}$$

$$\Big\downarrow \ 2026$$

$$\int \frac{(-80x^2-160x)\log^2(4)-25x\log^4(4)\log^2(x^2)+(100x\log^4(4)+(-80x-160)\log^2(4))\log(x^2)+(25x^3+10}{x(50x^2\log^4(4)-160x\log^2(4)+128)}$$

$$\Big\downarrow \ 7277$$

$$200\log^4(4)\int -\frac{5x\log^4(4)\log^2(x^2)+4(4(x+2)\log^2(4)-5x\log^4(4))\log(x^2)-5(x^3+4x^2)\log^4(4)+16(x^2+2}{80x\log^4(4)(8-5x\log^2(4))^2}$$

$$\Big\downarrow \ 27$$

$$-\frac{5}{2}\int \frac{5x\log^4(4)\log^2(x^2)+4(4(x+2)\log^2(4)-5x\log^4(4))\log(x^2)-5(x^3+4x^2)\log^4(4)+16(x^2+2x)\log^2(4}{x(8-5x\log^2(4))^2}$$

$$\Big\downarrow \ 7292$$

$$-\frac{5}{2}\int \frac{\log^2(4)(x+\log(x^2))\left(-5\log^2(4)x^2+5\log^2(4)\log(x^2)x+16\left(1-\frac{5\log^2(4)}{4}\right)x+32\right)}{x(8-5x\log^2(4))^2}dx$$

$$\Big\downarrow \ 27$$

$$-\frac{5}{2}\log^2(4)\int \frac{(x+\log(x^2))(-5\log^2(4)x^2+5\log^2(4)\log(x^2)x+4(4-5\log^2(4))x+32)}{x(8-5x\log^2(4))^2}dx$$

$$\Big\downarrow \ 7293$$

$$-\frac{5}{2}\log^2(4)\int\left(\frac{5\log^2(4)\log^2(x^2)}{(5x\log^2(4)-8)^2}+\frac{4((4-5\log^2(4))x+8)\log(x^2)}{x(8-5x\log^2(4))^2}+\frac{-5\log^2(4)x^2+4(4-5\log^2(4))x+32}{(8-5x\log^2(4))^2}\right)$$

$$\Big\downarrow \text{2009}$$

$$-\frac{5}{2}\log^2(4)\left(\frac{5x\log^2(4)\log^2(x^2)}{8(8-5x\log^2(4))}+\frac{1}{8}\log^2(x^2)+\frac{2x\log(x^2)}{8-5x\log^2(4)}-\frac{x}{5\log^2(4)}+\frac{64}{25\log^4(4)(8-5x\log^2(4))}\right)$$

input
```
Int[((-160*x - 80*x^2)*Log[4]^2 + (100*x^2 + 25*x^3)*Log[4]^4 + ((-160 - 8
0*x)*Log[4]^2 + 100*x*Log[4]^4)*Log[x^2] - 25*x*Log[4]^4*Log[x^2]^2)/(128*
x - 160*x^2*Log[4]^2 + 50*x^3*Log[4]^4),x]
```

output
```
(-5*Log[4]^2*(-1/5*x/Log[4]^2 + 64/(25*Log[4]^4*(8 - 5*x*Log[4]^2)) + (2*x
*Log[x^2])/(8 - 5*x*Log[4]^2) + Log[x^2]^2/8 + (5*x*Log[4]^2*Log[x^2]^2)/(
8*(8 - 5*x*Log[4]^2))))/2
```

3.558.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.558.

$$\int\frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25x\log^4(4)\log^2(x^2)}{128x-160x^2\log^2(4)+50x^3\log^4(4)}\,dx$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.558.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(22) = 44$.

Time = 0.57 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.09

method	result	size
norman	$\frac{5\ln(2)^2 \ln(x^2) x+\frac{5x^2 \ln(2)^2}{2}+\frac{5\ln(2)^2 \ln(x^2)^2}{2}}{5x\ln(2)^2-2}$	46
parallelrisch	$\frac{10x^2 \ln(2)^2+20\ln(2)^2 \ln(x^2) x+10\ln(2)^2 \ln(x^2)^2}{20x\ln(2)^2-8}$	47
risch	$\frac{5\ln(2)^2 \ln(x^2)^2}{2(5x\ln(2)^2-2)}+\frac{2\ln(x^2)}{5x\ln(2)^2-2}+\frac{100\ln(2)^4 \ln(-x)x+25x^2\ln(2)^4-40\ln(-x)\ln(2)^2-10x\ln(2)^2+4}{10\ln(2)^2(5x\ln(2)^2-2)}$	98

input
```
int((-400*x*ln(2)^4*ln(x^2)^2+(1600*x*ln(2)^4+4*(-80*x-160)*ln(2)^2)*ln(x^
2)+16*(25*x^3+100*x^2)*ln(2)^4+4*(-80*x^2-160*x)*ln(2)^2)/(800*x^3*ln(2)^4
-640*x^2*ln(2)^2+128*x),x,method=_RETURNVERBOSE)
```

output
```
(5*ln(2)^2*ln(x^2)*x+5/2*x^2*ln(2)^2+5/2*ln(2)^2*ln(x^2)^2)/(5*x*ln(2)^2-2
)
```

3.558.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(22) = 44$.

Time = 0.26 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.68

$$\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25}{128x-160x^2\log^2(4)+50x^3\log^4(4)}$$
$$= \frac{25\,x^2\log(2)^4+50\,x\log(2)^4\log(x^2)+25\,\log(2)^4\log(x^2)^2-10\,x\log(2)^2+4}{10\,(5\,x\log(2)^4-2\,\log(2)^2)}$$

input
```
integrate((-400*x*log(2)^4*log(x^2)^2+(1600*x*log(2)^4+4*(-80*x-160)*log(2
)^2)*log(x^2)+16*(25*x^3+100*x^2)*log(2)^4+4*(-80*x^2-160*x)*log(2)^2)/(80
0*x^3*log(2)^4-640*x^2*log(2)^2+128*x),x, algorithm=\
```

output
```
1/10*(25*x^2*log(2)^4 + 50*x*log(2)^4*log(x^2) + 25*log(2)^4*log(x^2)^2 -
10*x*log(2)^2 + 4)/(5*x*log(2)^4 - 2*log(2)^2)
```

3.558.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(19) = 38$.

Time = 0.32 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.95

$$\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25x\log^4(4)\log^2(x^2)}{128x-160x^2\log^2(4)+50x^3\log^4(4)}$$
$$= \frac{x}{2}+2\log(x)+\frac{2}{25x\log(2)^4-10\log(2)^2}+\frac{5\log(2)^2\log(x^2)^2}{10x\log(2)^2-4}+\frac{2\log(x^2)}{5x\log(2)^2-2}$$

input
```
integrate((-400*x*ln(2)**4*ln(x**2)**2+(1600*x*ln(2)**4+4*(-80*x-160)*ln(2
)**2)*ln(x**2)+16*(25*x**3+100*x**2)*ln(2)**4+4*(-80*x**2-160*x)*ln(2)**2)
/(800*x**3*ln(2)**4-640*x**2*ln(2)**2+128*x),x)
```

output
```
x/2 + 2*log(x) + 2/(25*x*log(2)**4 - 10*log(2)**2) + 5*log(2)**2*log(x**2)
**2/(10*x*log(2)**2 - 4) + 2*log(x**2)/(5*x*log(2)**2 - 2)
```

3.558.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 197 vs. $2(22) = 44$.

Time = 0.36 (sec) , antiderivative size = 197, normalized size of antiderivative = 8.95

$$\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25x\log^4(4)\log^2(x^2)}{128x-160x^2\log^2(4)+50x^3\log^4(4)}$$
$$= -\frac{1}{10}\left(\frac{4}{5\,x\log(2)^8-2\,\log(2)^6}-\frac{5\,x}{\log(2)^4}-\frac{4\,\log\left(5\,x\log(2)^2-2\right)}{\log(2)^6}\right)\log(2)^4$$
$$-2\left(\frac{2}{5\,x\log(2)^6-2\,\log(2)^4}-\frac{\log\left(5\,x\log(2)^2-2\right)}{\log(2)^4}\right)\log(2)^4$$
$$+\frac{2}{5}\left(\frac{2}{5\,x\log(2)^6-2\,\log(2)^4}-\frac{\log\left(5\,x\log(2)^2-2\right)}{\log(2)^4}\right)\log(2)^2+\frac{4\,\log(2)^2}{5\,x\log(2)^4-2\,\log(2)^2}$$
$$+\frac{2\left(5\,\log(2)^2\log(x)^2+2\,\log(x)\right)}{5\,x\log(2)^2-2}-2\,\log\left(5\,x\log(2)^2-2\right)+2\,\log(x)$$

input
```
integrate((-400*x*log(2)^4*log(x^2)^2+(1600*x*log(2)^4+4*(-80*x-160)*log(2
)^2)*log(x^2)+16*(25*x^3+100*x^2)*log(2)^4+4*(-80*x^2-160*x)*log(2)^2)/(80
0*x^3*log(2)^4-640*x^2*log(2)^2+128*x),x, algorithm=\
```

output
```
-1/10*(4/(5*x*log(2)^8 - 2*log(2)^6) - 5*x/log(2)^4 - 4*log(5*x*log(2)^2 -
 2)/log(2)^6)*log(2)^4 - 2*(2/(5*x*log(2)^6 - 2*log(2)^4) - log(5*x*log(2)
^2 - 2)/log(2)^4)*log(2)^4 + 2/5*(2/(5*x*log(2)^6 - 2*log(2)^4) - log(5*x*
log(2)^2 - 2)/log(2)^4)*log(2)^2 + 4*log(2)^2/(5*x*log(2)^4 - 2*log(2)^2)
+ 2*(5*log(2)^2*log(x)^2 + 2*log(x))/(5*x*log(2)^2 - 2) - 2*log(5*x*log(2)
^2 - 2) + 2*log(x)
```

3.558.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(22) = 44.

Time = 0.27 (sec) , antiderivative size = 66, normalized size of antiderivative = 3.00

$$\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25}{128x-160x^2\log^2(4)+50x^3\log^4(4)}$$

$$= \frac{5\log(2)^2\log(x^2)^2}{2\left(5x\log(2)^2-2\right)}+\frac{1}{2}x+\frac{2\log(x^2)}{5x\log(2)^2-2}+\frac{2}{5\left(5x\log(2)^4-2\log(2)^2\right)}+2\log(x)$$

input
```
integrate((-400*x*log(2)^4*log(x^2)^2+(1600*x*log(2)^4+4*(-80*x-160)*log(2
)^2)*log(x^2)+16*(25*x^3+100*x^2)*log(2)^4+4*(-80*x^2-160*x)*log(2)^2)/(80
0*x^3*log(2)^4-640*x^2*log(2)^2+128*x),x, algorithm=\
```

output
```
5/2*log(2)^2*log(x^2)^2/(5*x*log(2)^2 - 2) + 1/2*x + 2*log(x^2)/(5*x*log(2
)^2 - 2) + 2/5/(5*x*log(2)^4 - 2*log(2)^2) + 2*log(x)
```

3.558.9 Mupad [B] (verification not implemented)

Time = 13.10 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.95

$$\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25}{128x-160x^2\log^2(4)+50x^3\log^4(4)}$$

$$= \frac{x}{2}+2\ln(x)+\frac{2\ln(x^2)}{5x\ln(2)^2-2}+\frac{2}{5\ln(2)^2\left(5x\ln(2)^2-2\right)}+\frac{5\ln(x^2)^2\ln(2)^2}{2\left(5x\ln(2)^2-2\right)}$$

3.558. $\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25x\log^4(4)\log^2(x^2)}{128x-160x^2\log^2(4)+50x^3\log^4(4)}\,dx$

input
```
int(-(log(x^2)*(4*log(2)^2*(80*x + 160) - 1600*x*log(2)^4) + 4*log(2)^2*(1
60*x + 80*x^2) - 16*log(2)^4*(100*x^2 + 25*x^3) + 400*x*log(x^2)^2*log(2)^
4)/(128*x - 640*x^2*log(2)^2 + 800*x^3*log(2)^4),x)
```

output
```
x/2 + 2*log(x) + (2*log(x^2))/(5*x*log(2)^2 - 2) + 2/(5*log(2)^2*(5*x*log(
2)^2 - 2)) + (5*log(x^2)^2*log(2)^2)/(2*(5*x*log(2)^2 - 2))
```

3.558.

$$\int \frac{(-160x-80x^2)\log^2(4)+(100x^2+25x^3)\log^4(4)+((-160-80x)\log^2(4)+100x\log^4(4))\log(x^2)-25x\log^4(4)\log^2(x^2)}{128x-160x^2\log^2(4)+50x^3\log^4(4)}\,dx$$

3.559 $\int \frac{50-2x^2-2\log(5)}{625+50x^2+x^4+(-50-2x^2)\log(5)+\log^2(5)}\,dx$

3.559.1 Optimal result

Integrand size = 38, antiderivative size = 14

$$\int \frac{50-2x^2-2\log(5)}{625+50x^2+x^4+(-50-2x^2)\log(5)+\log^2(5)}\,dx=\frac{2x}{25+x^2-\log(5)}$$

output
```
4*x/(50+2*x^2-2*ln(5))
```

3.559.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{50-2x^2-2\log(5)}{625+50x^2+x^4+(-50-2x^2)\log(5)+\log^2(5)}\,dx=\frac{2x}{25+x^2-\log(5)}$$

input
```
Integrate[(50 - 2*x^2 - 2*Log[5])/(625 + 50*x^2 + x^4 + (-50 - 2*x^2)*Log[
5] + Log[5]^2),x]
```

output
```
(2*x)/(25 + x^2 - Log[5])
```

3.559.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2087, 1380, 27, 297}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^2+50-2\log(5)}{x^4+50x^2+(-2x^2-50)\log(5)+625+\log^2(5)}\,dx$$

$$\Big\downarrow \text{2087}$$

$$\int \frac{2(25-\log(5))-2x^2}{x^4+2x^2(25-\log(5))+(\log(5)-25)^2}dx$$

$$\Big\downarrow \text{1380}$$

$$\int \frac{2\left(-x^2+25-\log(5)\right)}{\left(x^2+25-\log(5)\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{-x^2-\log(5)+25}{\left(x^2-\log(5)+25\right)^2}dx$$

$$\Big\downarrow \text{297}$$

$$\frac{2x}{x^2+25-\log(5)}$$

input
```
Int[(50 - 2*x^2 - 2*Log[5])/(625 + 50*x^2 + x^4 + (-50 - 2*x^2)*Log[5] + L
og[5]^2),x]
```

output
```
(2*x)/(25 + x^2 - Log[5])
```

3.559.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 297
```
Int[((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_Symbol] :> Simp[c*
x*((a + b*x^2)^(p + 1)/a), x] /; FreeQ[{a, b, c, d, p}, x] && NeQ[b*c - a*d
, 0] && EqQ[a*d - b*c*(2*p + 3), 0]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2087
```
Int[(u_)^(q_.)*(v_)^(p_.), x_Symbol] :> Int[ExpandToSum[u, x]^q*ExpandToSum
[v, x]^p, x] /; FreeQ[{p, q}, x] && BinomialQ[u, x] && TrinomialQ[v, x] &&
 !(BinomialMatchQ[u, x] && TrinomialMatchQ[v, x])
```

3.559.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.07

method	result	size
gosper	$-\frac{2x}{-x^2+\ln(5)-25}$	15
default	$-\frac{2x}{-x^2+\ln(5)-25}$	15
norman	$-\frac{2x}{-x^2+\ln(5)-25}$	15
risch	$-\frac{2x}{-x^2+\ln(5)-25}$	15
parallelrisch	$-\frac{2x}{-x^2+\ln(5)-25}$	15

input
```
int((-2*ln(5)-2*x^2+50)/(ln(5)^2+(-2*x^2-50)*ln(5)+x^4+50*x^2+625),x,metho
d=_RETURNVERBOSE)
```

output
```
-2*x/(-x^2+ln(5)-25)
```

3.559.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{50-2x^2-2\log(5)}{625+50x^2+x^4+(-50-2x^2)\log(5)+\log^2(5)}\,dx = \frac{2\,x}{x^2-\log(5)+25}$$

input
```
integrate((-2*log(5)-2*x^2+50)/(log(5)^2+(-2*x^2-50)*log(5)+x^4+50*x^2+625
),x, algorithm=\
```

output
```
2*x/(x^2 - log(5) + 25)
```

3.559.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{50-2x^2-2\log(5)}{625+50x^2+x^4+(-50-2x^2)\log(5)+\log^2(5)}\,dx = \frac{2x}{x^2-\log(5)+25}$$

input
```
integrate((-2*ln(5)-2*x**2+50)/(ln(5)**2+(-2*x**2-50)*ln(5)+x**4+50*x**2+6
25),x)
```

output
```
2*x/(x**2 - log(5) + 25)
```

3.559.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{50-2x^2-2\log(5)}{625+50x^2+x^4+(-50-2x^2)\log(5)+\log^2(5)}\,dx = \frac{2\,x}{x^2-\log(5)+25}$$

input
```
integrate((-2*log(5)-2*x^2+50)/(log(5)^2+(-2*x^2-50)*log(5)+x^4+50*x^2+625
),x, algorithm=\
```

output
```
2*x/(x^2 - log(5) + 25)
```

3.559.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{50-2x^2-2\log(5)}{625+50x^2+x^4+(-50-2x^2)\log(5)+\log^2(5)}\,dx=\frac{2\,x}{x^2-\log(5)+25}$$

input
```
integrate((-2*log(5)-2*x^2+50)/(log(5)^2+(-2*x^2-50)*log(5)+x^4+50*x^2+625
),x, algorithm=\
```

output
```
2*x/(x^2 - log(5) + 25)
```

3.559.9 Mupad [B] (verification not implemented)

Time = 17.70 (sec) , antiderivative size = 1, normalized size of antiderivative = 0.07

$$\int \frac{50-2x^2-2\log(5)}{625+50x^2+x^4+(-50-2x^2)\log(5)+\log^2(5)}\,dx=0$$

input
```
int(-(2*log(5) + 2*x^2 - 50)/(log(5)^2 - log(5)*(2*x^2 + 50) + 50*x^2 + x^
4 + 625),x)
```

output
```
0
```

3.560 $\int \frac{64+5e^{\frac{8+x}{4}}+64x}{4e^{\frac{8+x}{4}}+64x}\,dx$

3.560.1 Optimal result

Integrand size = 34, antiderivative size = 19

$$\int \frac{64+5e^{\frac{8+x}{4}}+64x}{4e^{\frac{8+x}{4}}+64x}\,dx=-\frac{1}{2}+x+\log\left(e^{2+\frac{x}{4}}+16x\right)$$

output
```
ln(exp(2+1/4*x)+16*x)+x-1/2
```

3.560.2 Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{64+5e^{\frac{8+x}{4}}+64x}{4e^{\frac{8+x}{4}}+64x}\,dx=x+\log\left(e^{2+\frac{x}{4}}+16x\right)$$

input
```
Integrate[(64 + 5*E^((8 + x)/4) + 64*x)/(4*E^((8 + x)/4) + 64*x),x]
```

output
```
x + Log[E^(2 + x/4) + 16*x]
```

3.560.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{64x+5e^{\frac{x+8}{4}}+64}{64x+4e^{\frac{x+8}{4}}}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{64x+5e^{\frac{x+8}{4}}+64}{4\left(16x+e^{\frac{x}{4}+2}\right)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int \frac{64x+5e^{\frac{x+8}{4}}+64}{16x+e^{\frac{x}{4}+2}}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{4}\int \left(5-\frac{16(x-4)}{16x+e^{\frac{x}{4}+2}}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(64\int \frac{1}{16x+e^{\frac{x}{4}+2}}dx-16\int \frac{x}{16x+e^{\frac{x}{4}+2}}dx+5x\right)$$

input
```
Int[(64 + 5*E^((8 + x)/4) + 64*x)/(4*E^((8 + x)/4) + 64*x),x]
```

output
```
$Aborted
```

3.560.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.560.4 Maple [A] (verified)

Time = 0.92 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

method	result	size
parallelrisch	$x+\ln\left(\frac{\mathrm{e}^{2+\frac{x}{4}}}{16}+x\right)$	14
risch	$x-2+\ln\left(\mathrm{e}^{2+\frac{x}{4}}+16x\right)$	15
norman	$x+\ln\left(4\,\mathrm{e}^{2+\frac{x}{4}}+64x\right)$	16

input
```
int((5*exp(2+1/4*x)+64*x+64)/(4*exp(2+1/4*x)+64*x),x,method=_RETURNVERBOSE
)
```

output
```
x+ln(1/16*exp(2+1/4*x)+x)
```

3.560.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \frac{64+5e^{\frac{8+x}{4}}+64x}{4e^{\frac{8+x}{4}}+64x}\,dx=x+\log\left(16\,x+e^{\left(\frac{1}{4}\,x+2\right)}\right)$$

input
```
integrate((5*exp(2+1/4*x)+64*x+64)/(4*exp(2+1/4*x)+64*x),x, algorithm=\
```

output
```
x + log(16*x + e^(1/4*x + 2))
```

3.560.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{64+5e^{\frac{8+x}{4}}+64x}{4e^{\frac{8+x}{4}}+64x}\,dx = x+\log\left(16x+e^{\frac{x}{4}+2}\right)$$

input
```
integrate((5*exp(2+1/4*x)+64*x+64)/(4*exp(2+1/4*x)+64*x),x)
```

output
```
x + log(16*x + exp(x/4 + 2))
```

3.560.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{64+5e^{\frac{8+x}{4}}+64x}{4e^{\frac{8+x}{4}}+64x}\,dx = x+\log\left(\left(16\,x+e^{\left(\frac{1}{4}\,x+2\right)}\right)e^{(-2)}\right)$$

input
```
integrate((5*exp(2+1/4*x)+64*x+64)/(4*exp(2+1/4*x)+64*x),x, algorithm=\
```

output
```
x + log((16*x + e^(1/4*x + 2))*e^(-2))
```

3.560.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \frac{64+5e^{\frac{8+x}{4}}+64x}{4e^{\frac{8+x}{4}}+64x}\,dx = x+\log\left(16\,x+e^{\left(\frac{1}{4}\,x+2\right)}\right)$$

input
```
integrate((5*exp(2+1/4*x)+64*x+64)/(4*exp(2+1/4*x)+64*x),x, algorithm=\
```

output
```
x + log(16*x + e^(1/4*x + 2))
```

3.560.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \frac{64+5e^{\frac{8+x}{4}}+64x}{4e^{\frac{8+x}{4}}+64x}\,dx = x+\ln\left(16\,x+\mathrm{e}^{\frac{x}{4}+2}\right)$$

input
```
int((64*x + 5*exp(x/4 + 2) + 64)/(64*x + 4*exp(x/4 + 2)),x)
```

output
```
x + log(16*x + exp(x/4 + 2))
```

3.561 $\int \frac{e^{4x}\left(16120x^4+e\left(-1690x-3380x^2\right)\right)}{169e^2-1612ex^2+3844x^4}\,dx$

3.561.1 Optimal result

Integrand size = 42, antiderivative size = 27

$$\int \frac{e^{4x}(16120x^4+e(-1690x-3380x^2))}{169e^2-1612ex^2+3844x^4}\,dx=\frac{e^{4x}x}{x-\frac{e+\frac{3x^2}{13}}{5x}}$$

output
```
exp(4*x)*x/(x-1/5*(exp(1)+3/13*x^2)/x)
```

3.561.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{e^{4x}(16120x^4+e(-1690x-3380x^2))}{169e^2-1612ex^2+3844x^4}\,dx=\frac{130e^{4x}x^2}{-26e+124x^2}$$

input
```
Integrate[(E^(4*x)*(16120*x^4 + E*(-1690*x - 3380*x^2)))/(169*E^2 - 1612*E
*x^2 + 3844*x^4),x]
```

output
```
(130*E^(4*x)*x^2)/(-26*E + 124*x^2)
```

3.561.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {1380, 27, 7292, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{4x}\left(16120x^4+e\left(-3380x^2-1690x\right)\right)}{3844x^4-1612ex^2+169e^2}dx$$

$$\Big\downarrow \text{1380}$$

$$3844\int \frac{65e^{4x}\left(124x^4-13e\left(2x^2+x\right)\right)}{1922\left(13e-62x^2\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$130\int \frac{e^{4x}\left(124x^4-13e\left(2x^2+x\right)\right)}{\left(13e-62x^2\right)^2}dx$$

$$\Big\downarrow \text{7292}$$

$$130\int \frac{e^{4x}x\left(124x^3-26ex-13e\right)}{\left(13e-62x^2\right)^2}dx$$

$$\Big\downarrow \text{2726}$$

$$-\frac{65e^{4x}x\left(13ex-62x^3\right)}{\left(13e-62x^2\right)^2}$$

input
```
Int[(E^(4*x)*(16120*x^4 + E*(-1690*x - 3380*x^2)))/(169*E^2 - 1612*E*x^2 +
 3844*x^4),x]
```

output
```
(-65*E^(4*x)*x*(13*E*x - 62*x^3))/(13*E - 62*x^2)^2
```

3.561.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.561.4 Maple [A] (verified)

Time = 0.55 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

method	result
gosper	$-\frac{65\,e^{4x} x^{2}}{-62 x^{2}+13\,e}$
norman	$-\frac{65\,e^{4x} x^{2}}{-62 x^{2}+13\,e}$
parallelrisch	$-\frac{65\,e^{4x} x^{2}}{-62 x^{2}+13\,e}$
derivativedivides	$\frac{65\,e^{4x}}{62}+\frac{6760\,e^{4x} e x}{31(-496 x^{2}+104\,e)}-\frac{65\,e\sqrt{806}\left(2\sqrt{806}\,e^{\frac{1}{2}}\,e^{-\frac{2\sqrt{806}\,e^{\frac{1}{2}}}{31}}\,\mathrm{Ei}_{1}\left(-4x-\frac{2\sqrt{806}\,e^{\frac{1}{2}}}{31}\right)+2\sqrt{806}\,e^{\frac{1}{2}}\,e^{\frac{2\sqrt{806}\,e^{\frac{1}{2}}}{31}}\,\mathrm{Ei}_{1}\left(\cdots\right.\right.}{\cdots}$
default	$\frac{65\,e^{4x}}{62}+\frac{6760\,e^{4x} e x}{31(-496 x^{2}+104\,e)}-\frac{65\,e\sqrt{806}\left(2\sqrt{806}\,e^{\frac{1}{2}}\,e^{-\frac{2\sqrt{806}\,e^{\frac{1}{2}}}{31}}\,\mathrm{Ei}_{1}\left(-4x-\frac{2\sqrt{806}\,e^{\frac{1}{2}}}{31}\right)+2\sqrt{806}\,e^{\frac{1}{2}}\,e^{\frac{2\sqrt{806}\,e^{\frac{1}{2}}}{31}}\,\mathrm{Ei}_{1}\left(\cdots\right.\right.}{\cdots}$

input
```
int(((-3380*x^2-1690*x)*exp(1)+16120*x^4)*exp(4*x)/(169*exp(1)^2-1612*x^2*
exp(1)+3844*x^4),x,method=_RETURNVERBOSE)
```

3.561. $\int \frac{e^{4x}\left(16120x^4+e\left(-1690x-3380x^2\right)\right)}{169e^2-1612ex^2+3844x^4}\,dx$

output
```
-65*exp(4*x)*x^2/(-62*x^2+13*exp(1))
```

3.561.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{e^{4x}(16120x^4 + e(-1690x - 3380x^2))}{169e^2 - 1612ex^2 + 3844x^4}\,dx = \frac{65\,x^2 e^{(4\,x)}}{62\,x^2 - 13\,e}$$

input
```
integrate(((-3380*x^2-1690*x)*exp(1)+16120*x^4)*exp(4*x)/(169*exp(1)^2-161
2*x^2*exp(1)+3844*x^4),x, algorithm=\
```

output
```
65*x^2*e^(4*x)/(62*x^2 - 13*e)
```

3.561.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.70

$$\int \frac{e^{4x}(16120x^4 + e(-1690x - 3380x^2))}{169e^2 - 1612ex^2 + 3844x^4}\,dx = \frac{65x^2e^{4x}}{62x^2 - 13e}$$

input
```
integrate(((-3380*x**2-1690*x)*exp(1)+16120*x**4)*exp(4*x)/(169*exp(1)**2-
1612*x**2*exp(1)+3844*x**4),x)
```

output
```
65*x**2*exp(4*x)/(62*x**2 - 13*E)
```

3.561.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{e^{4x}(16120x^4 + e(-1690x - 3380x^2))}{169e^2 - 1612ex^2 + 3844x^4}\,dx = \frac{65\,x^2 e^{(4\,x)}}{62\,x^2 - 13\,e}$$

input
```
integrate(((-3380*x^2-1690*x)*exp(1)+16120*x^4)*exp(4*x)/(169*exp(1)^2-161
2*x^2*exp(1)+3844*x^4),x, algorithm=\
```

output
```
65*x^2*e^(4*x)/(62*x^2 - 13*e)
```

3.561.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{e^{4x}(16120x^4 + e(-1690x - 3380x^2))}{169e^2 - 1612ex^2 + 3844x^4}\,dx = \frac{65\left(62\,x^2e^{(4\,x)} + 13\,e^{(4\,x+1)}\right)}{62\,(62\,x^2 - 13\,e)}$$

input
```
integrate(((-3380*x^2-1690*x)*exp(1)+16120*x^4)*exp(4*x)/(169*exp(1)^2-161
2*x^2*exp(1)+3844*x^4),x, algorithm=\
```

output
```
65/62*(62*x^2*e^(4*x) + 13*e^(4*x + 1))/(62*x^2 - 13*e)
```

3.561.9 Mupad [B] (verification not implemented)

Time = 14.07 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{e^{4x}(16120x^4 + e(-1690x - 3380x^2))}{169e^2 - 1612ex^2 + 3844x^4}\,dx = -\frac{65\,x^2\,\mathrm{e}^{4\,x}}{62\,\left(\frac{13\,\mathrm{e}}{62} - x^2\right)}$$

input
```
int(-(exp(4*x)*(exp(1)*(1690*x + 3380*x^2) - 16120*x^4))/(169*exp(2) - 161
2*x^2*exp(1) + 3844*x^4),x)
```

output
```
-(65*x^2*exp(4*x))/(62*((13*exp(1))/62 - x^2))
```

3.562 $\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4}\ldots}{\ldots}$

3.562.1 Optimal result

Integrand size = 213, antiderivative size = 31

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}\left(2+e^{4+3x}(25+25\log(3))+e^x(10\ldots\right.}{\ldots}$$

$$=x+\left(5+e^{e^x}\right)\left(25-\log\left(1-\frac{x}{2+e^{2+x}}+\log(3)\right)\right)$$

output
```
x+(25-ln(1-x/(exp(2+x)+2)+ln(3)))*(exp(exp(x))+5)
```

3.562.2 Mathematica [F]

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}\left(2+e^{4+3x}(25+25\log(3))+e^x(10\ldots\right.}{\ldots}$$

$$=\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}\left(2+e^{4+3x}(25+25\log(3))+e^x(\ldots\right.}{\ldots}$$

3.562.

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}\left(2+e^{4+3x}(25+25\log(3))+e^x(100-50x+100\log(3))+e^{2+x}(1-x+e^x(100-25x+1\ldots\right.}{4-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}\ldots}$$

input
```
Integrate[(14 - 2*x + 4*Log[3] + E^(4 + 2*x)*(1 + Log[3]) + E^(2 + x)*(9 -
 6*x + 4*Log[3]) + E^E^x*(2 + E^(4 + 3*x)*(25 + 25*Log[3]) + E^x*(100 - 50
*x + 100*Log[3]) + E^(2 + x)*(1 - x + E^x*(100 - 25*x + 100*Log[3]))) + E^
E^x*(E^(2 + 2*x)*(-4 + x - 4*Log[3]) + E^x*(-4 + 2*x - 4*Log[3]) + E^(4 +
3*x)*(-1 - Log[3]))*Log[(2 - x + 2*Log[3] + E^(2 + x)*(1 + Log[3]))/(2 + E
^(2 + x))])/(4 - 2*x + 4*Log[3] + E^(4 + 2*x)*(1 + Log[3]) + E^(2 + x)*(4
- x + 4*Log[3])),x]
```

output
```
Integrate[(14 - 2*x + 4*Log[3] + E^(4 + 2*x)*(1 + Log[3]) + E^(2 + x)*(9 -
 6*x + 4*Log[3]) + E^E^x*(2 + E^(4 + 3*x)*(25 + 25*Log[3]) + E^x*(100 - 50
*x + 100*Log[3]) + E^(2 + x)*(1 - x + E^x*(100 - 25*x + 100*Log[3]))) + E^
E^x*(E^(2 + 2*x)*(-4 + x - 4*Log[3]) + E^x*(-4 + 2*x - 4*Log[3]) + E^(4 +
3*x)*(-1 - Log[3]))*Log[(2 - x + 2*Log[3] + E^(2 + x)*(1 + Log[3]))/(2 + E
^(2 + x))])/(4 - 2*x + 4*Log[3] + E^(4 + 2*x)*(1 + Log[3]) + E^(2 + x)*(4
- x + 4*Log[3])), x]
```

3.562.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x+e^{x+2}(-6x+9+4\log(3))+e^{e^x}\left(e^x(-50x+100+100\log(3))+e^{x+2}(-x+e^x(-25x+100+100\log(3)\right.}{}$$

$\Big\downarrow$ 7292

$$\int \frac{2x-e^{x+2}(-6x+9+4\log(3))-e^{e^x}\left(e^x(-50x+100+100\log(3))+e^{x+2}(-x+e^x(-25x+100+100\log(3))\right.}{}$$

$\Big\downarrow$ 7293

$$\int \left(-\frac{2\left(e^{e^x}+5\right)}{e^{x+2}+2}+\frac{\left(e^{e^x}+5\right)(x-3-\log(9))}{x-e^{x+2}(1+\log(3))-2(1+\log(3))}-e^{x+e^x}\left(\log\left(\frac{-x+e^{x+2}(1+\log(3))+2+\log(9)}{e^{x+2}+2}\right)-\right.\right.$$

$\Big\downarrow$ 2009

3.562.

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}\left(2+e^{4+3x}(25+25\log(3))+e^x(100-50x+100\log(3))+e^{2+x}(1-x+e^x(100-25x+1\right.}{4-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}}$$

$$(3+\log(9))\int \frac{e^{e^x}}{x-e^{x+2}(1+\log(3))-2(1+\log(3))}dx+$$
$$5\int \frac{x}{x-e^{x+2}(1+\log(3))-2(1+\log(3))}dx+\int \frac{e^{e^x}x}{x-e^{x+2}(1+\log(3))-2(1+\log(3))}dx+5(3+$$
$$\log(9))\int \frac{1}{-x+e^{x+2}(1+\log(3))+2(1+\log(3))}dx+(3+$$
$$\log(9))\int \frac{e^{e^x}}{-x+e^{x+2}(1+\log(3))+2(1+\log(3))}dx+$$
$$\int \frac{e^{e^x}x}{-x+e^{x+2}(1+\log(3))+2(1+\log(3))}dx-4x+25e^{e^x}+5\log\left(e^{x+2}+2\right)-$$
$$e^{e^x}\log\left(\frac{-x+e^{x+2}(1+\log(3))+2+\log(9)}{e^{x+2}+2}\right)$$

input
```
Int[(14 - 2*x + 4*Log[3] + E^(4 + 2*x)*(1 + Log[3]) + E^(2 + x)*(9 - 6*x +
 4*Log[3]) + E^E^x*(2 + E^(4 + 3*x)*(25 + 25*Log[3]) + E^x*(100 - 50*x + 1
00*Log[3]) + E^(2 + x)*(1 - x + E^x*(100 - 25*x + 100*Log[3]))) + E^E^x*(E
^(2 + 2*x)*(-4 + x - 4*Log[3]) + E^x*(-4 + 2*x - 4*Log[3]) + E^(4 + 3*x)*(
-1 - Log[3]))*Log[(2 - x + 2*Log[3] + E^(2 + x)*(1 + Log[3]))/(2 + E^(2 +
x))])/(4 - 2*x + 4*Log[3] + E^(4 + 2*x)*(1 + Log[3]) + E^(2 + x)*(4 - x +
4*Log[3])),x]
```

output
```
$Aborted
```

3.562.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.562.

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}\left(2+e^{4+3x}(25+25\log(3))+e^x(100-50x+100\log(3))+e^{2+x}(1-x+e^x(100-25x+10\cdots\right.}{4-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}\cdots}$$

3.562.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. $2(28) = 56$.

Time = 68.30 (sec) , antiderivative size = 76, normalized size of antiderivative = 2.45

method	result
parallelrisch	$12-\mathrm{e}^{\mathrm{e}^{x}} \ln \left(\frac{(\ln(3)+1)\mathrm{e}^{2+x}+2\ln(3)+2-x}{\mathrm{e}^{2+x}+2}\right)+12\ln\left(3\right)+x+25\,\mathrm{e}^{\mathrm{e}^{x}}-5\ln\left(\frac{(\ln(3)+1)\mathrm{e}^{2+x}+2\ln(3)+2-x}{\mathrm{e}^{2+x}+2}\right)$
risch	$-\mathrm{e}^{\mathrm{e}^{x}} \ln\left(\mathrm{e}^{2+x}\ln\left(3\right)+2\ln\left(3\right)+\mathrm{e}^{2+x}-x+2\right)+\mathrm{e}^{\mathrm{e}^{x}}\ln\left(\mathrm{e}^{2+x}+2\right)+x+5\ln\left(\mathrm{e}^{x}+2\,\mathrm{e}^{-2}\right)-5\,\mathrm{l}$

input
```
int((((-ln(3)-1)*exp(x)*exp(2+x)^2+(-4*ln(3)+x-4)*exp(x)*exp(2+x)+(-4*ln(3
)+2*x-4)*exp(x))*exp(exp(x))*ln(((ln(3)+1)*exp(2+x)+2*ln(3)+2-x)/(exp(2+x)
+2))+((25*ln(3)+25)*exp(x)*exp(2+x)^2+((100*ln(3)-25*x+100)*exp(x)-x+1)*ex
p(2+x)+(100*ln(3)-50*x+100)*exp(x)+2)*exp(exp(x))+(ln(3)+1)*exp(2+x)^2+(4*
ln(3)-6*x+9)*exp(2+x)+4*ln(3)-2*x+14)/((ln(3)+1)*exp(2+x)^2+(4*ln(3)-x+4)*
exp(2+x)+4*ln(3)+4-2*x),x,method=_RETURNVERBOSE)
```

output
```
12-exp(exp(x))*ln(((ln(3)+1)*exp(2+x)+2*ln(3)+2-x)/(exp(2+x)+2))+12*ln(3)+
x+25*exp(exp(x))-5*ln(((ln(3)+1)*exp(2+x)+2*ln(3)+2-x)/(exp(2+x)+2))
```

3.562.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.35

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4+3x}(25+25\log(3))+e^x(1\ldots}{\ldots}$$

$$= -\left(e^{\left(e^{x}\right)}+5\right)\log\left(\frac{(\log(3)+1)e^{(x+2)}-x+2\log(3)+2}{e^{(x+2)}+2}\right)+x+25\,e^{\left(e^{x}\right)}$$

input
```
integrate((((-log(3)-1)*exp(x)*exp(2+x)^2+(-4*log(3)+x-4)*exp(x)*exp(2+x)+
(-4*log(3)+2*x-4)*exp(x))*exp(exp(x))*log(((log(3)+1)*exp(2+x)+2*log(3)+2-
x)/(exp(2+x)+2))+((25*log(3)+25)*exp(x)*exp(2+x)^2+((100*log(3)-25*x+100)*
exp(x)-x+1)*exp(2+x)+(100*log(3)-50*x+100)*exp(x)+2)*exp(exp(x))+(log(3)+1
)*exp(2+x)^2+(4*log(3)-6*x+9)*exp(2+x)+4*log(3)-2*x+14)/((log(3)+1)*exp(2+
x)^2+(4*log(3)-x+4)*exp(2+x)+4*log(3)+4-2*x),x, algorithm=\
```

3.562.

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4+3x}(25+25\log(3))+e^x(100-50x+100\log(3))+e^{2+x}(1-x+e^x(100-25x+1\ldots}{4-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}\ldots}$$

output
```
-(e^(e^x) + 5)*log(((log(3) + 1)*e^(x + 2) - x + 2*log(3) + 2)/(e^(x + 2)
+ 2)) + x + 25*e^(e^x)
```

3.562.6 Sympy [F(-1)]

Timed out.

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4+3x}(25+25\log(3))+e^x(10}{}$$

$= \text{Timed out}$

input
```
integrate((((-ln(3)-1)*exp(x)*exp(2+x)**2+(-4*ln(3)+x-4)*exp(x)*exp(2+x)+(
-4*ln(3)+2*x-4)*exp(x))*exp(exp(x))*ln(((ln(3)+1)*exp(2+x)+2*ln(3)+2-x)/(e
xp(2+x)+2))+((25*ln(3)+25)*exp(x)*exp(2+x)**2+((100*ln(3)-25*x+100)*exp(x)
-x+1)*exp(2+x)+(100*ln(3)-50*x+100)*exp(x)+2)*exp(exp(x))+(ln(3)+1)*exp(2+
x)**2+(4*ln(3)-6*x+9)*exp(2+x)+4*ln(3)-2*x+14)/((ln(3)+1)*exp(2+x)**2+(4*l
n(3)-x+4)*exp(2+x)+4*ln(3)+4-2*x),x)
```

output
```
Timed out
```

3.562.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.55

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4+3x}(25+25\log(3))+e^x(10}{}$$

$$= -\left(e^{(e^x)}+5\right)\log\left(\left(e^2\log(3)+e^2\right)e^x-x+2\log(3)+2\right) + \left(e^{(e^x)}+5\right)\log\left(e^{(x+2)}+2\right)+x+25\,e^{(e^x)}$$

input
```
integrate((((-log(3)-1)*exp(x)*exp(2+x)^2+(-4*log(3)+x-4)*exp(x)*exp(2+x)+
(-4*log(3)+2*x-4)*exp(x))*exp(exp(x))*log(((log(3)+1)*exp(2+x)+2*log(3)+2-
x)/(exp(2+x)+2))+((25*log(3)+25)*exp(x)*exp(2+x)^2+((100*log(3)-25*x+100)*
exp(x)-x+1)*exp(2+x)+(100*log(3)-50*x+100)*exp(x)+2)*exp(exp(x))+(log(3)+1
)*exp(2+x)^2+(4*log(3)-6*x+9)*exp(2+x)+4*log(3)-2*x+14)/((log(3)+1)*exp(2+
x)^2+(4*log(3)-x+4)*exp(2+x)+4*log(3)+4-2*x),x, algorithm=\
```

output
```
-(e^(e^x) + 5)*log((e^2*log(3) + e^2)*e^x - x + 2*log(3) + 2) + (e^(e^x) +
 5)*log(e^(x + 2) + 2) + x + 25*e^(e^x)
```

3.562.

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4+3x}(25+25\log(3))+e^x(100-50x+100\log(3))+e^{2+x}(1-x+e^x(100-25x+10}{4-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}}$$

3.562.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 97 vs. $2(27) = 54$.

Time = 0.46 (sec) , antiderivative size = 97, normalized size of antiderivative = 3.13

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4+3x}(25+25\log(3))+e^x(10$$

$$= \left(xe^x - e^{(x+e^x)}\log\left(e^{(x+2)}\log(3) - x + e^{(x+2)} + 2\log(3) + 2\right) - 5e^x\log\left(-e^{(x+2)}\log(3) + x - e^{(x+2)} - 2\right.$$

input
```
integrate((((-log(3)-1)*exp(x)*exp(2+x)^2+(-4*log(3)+x-4)*exp(x)*exp(2+x)+
(-4*log(3)+2*x-4)*exp(x))*exp(exp(x))*log(((log(3)+1)*exp(2+x)+2*log(3)+2-
x)/(exp(2+x)+2))+((25*log(3)+25)*exp(x)*exp(2+x)^2+((100*log(3)-25*x+100)*
exp(x)-x+1)*exp(2+x)+(100*log(3)-50*x+100)*exp(x)+2)*exp(exp(x))+(log(3)+1
)*exp(2+x)^2+(4*log(3)-6*x+9)*exp(2+x)+4*log(3)-2*x+14)/((log(3)+1)*exp(2+
x)^2+(4*log(3)-x+4)*exp(2+x)+4*log(3)+4-2*x),x, algorithm=\
```

output
```
(x*e^x - e^(x + e^x)*log(e^(x + 2)*log(3) - x + e^(x + 2) + 2*log(3) + 2)
- 5*e^x*log(-e^(x + 2)*log(3) + x - e^(x + 2) - 2*log(3) - 2) + e^(x + e^x
)*log(e^(x + 2) + 2) + 5*e^x*log(-e^(x + 2) - 2) + 25*e^(x + e^x))*e^(-x)
```

3.562.9 Mupad [F(-1)]

Timed out.

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4+3x}(25+25\log(3))+e^x(10$$

$$= \int \frac{4\ln(3) - 2x + e^{e^x}\left(e^{x+2}\left(e^x(100\ln(3) - 25x + 100) - x + 1\right) + e^{3x+4}(25\ln(3) + 25) + e^x(100\ln(3$$

input
```
int((4*log(3) - 2*x + exp(exp(x))*(exp(x + 2)*(exp(x)*(100*log(3) - 25*x +
 100) - x + 1) + exp(x)*(100*log(3) - 50*x + 100) + exp(2*x + 4)*exp(x)*(2
5*log(3) + 25) + 2) + exp(x + 2)*(4*log(3) - 6*x + 9) + exp(2*x + 4)*(log(
3) + 1) - log((2*log(3) - x + exp(x + 2)*(log(3) + 1) + 2)/(exp(x + 2) + 2
))*exp(exp(x))*(exp(x)*(4*log(3) - 2*x + 4) + exp(x + 2)*exp(x)*(4*log(3)
- x + 4) + exp(2*x + 4)*exp(x)*(log(3) + 1)) + 14)/(4*log(3) - 2*x + exp(x
 + 2)*(4*log(3) - x + 4) + exp(2*x + 4)*(log(3) + 1) + 4),x)
```

3.562.

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}(2+e^{4+3x}(25+25\log(3))+e^x(100-50x+100\log(3))+e^{2+x}(1-x+e^x(100-25x+10}{4-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}}$$

output
```
int((4*log(3) - 2*x + exp(exp(x))*(exp(x + 2)*(exp(x)*(100*log(3) - 25*x +
 100) - x + 1) + exp(3*x + 4)*(25*log(3) + 25) + exp(x)*(100*log(3) - 50*x
 + 100) + 2) + exp(x + 2)*(4*log(3) - 6*x + 9) + exp(2*x + 4)*(log(3) + 1)
 - log((2*log(3) - x + exp(x + 2)*(log(3) + 1) + 2)/(exp(x + 2) + 2))*exp(
exp(x))*(exp(x)*(4*log(3) - 2*x + 4) + exp(3*x + 4)*(log(3) + 1) + exp(2*x
 + 2)*(4*log(3) - x + 4)) + 14)/(4*log(3) - 2*x + exp(x + 2)*(4*log(3) - x
 + 4) + exp(2*x + 4)*(log(3) + 1) + 4), x)
```

3.562.

$$\int \frac{14-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}(9-6x+4\log(3))+e^{e^x}\left(2+e^{4+3x}(25+25\log(3))+e^x(100-50x+100\log(3))+e^{2+x}(1-x+e^x(100-25x+1\cdots\right.}{4-2x+4\log(3)+e^{4+2x}(1+\log(3))+e^{2+x}\cdots}$$

3.563 $\int \frac{-25x^4+60x^5-21x^6+2x^7+\left(120x^2-264x^3+48x^4\right)\log(3)+(-144+288}{\left(25x^4-10x^5+x^6+\left(-120x^2+24x^3\right)\log(3)+}$

3.563.1 Optimal result

Integrand size = 109, antiderivative size = 38

$$\int \frac{-25x^4+60x^5-21x^6+2x^7+\left(120x^2-264x^3+48x^4\right)\log(3)+(-144+288x)\log^2(3)+\left(16x^4\log(3)-\right.}{\left(25x^4-10x^5+x^6+\left(-120x^2+24x^3\right)\log(3)+144\log^2(3)\right)\log(5)}$$
$$=\frac{4}{-\frac{3}{x^2}+\frac{5-x}{4\log(3)}}-\frac{-5+x-x^2}{\log(5)}$$

output
```
4/(1/4*(5-x)/ln(3)-3/x^2)-(-x^2+x-5)/ln(5)
```

3.563.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 90 vs. 2(38) = 76.

Time = 0.06 (sec) , antiderivative size = 90, normalized size of antiderivative = 2.37

$$\int \frac{-25x^4+60x^5-21x^6+2x^7+\left(120x^2-264x^3+48x^4\right)\log(3)+(-144+288x)\log^2(3)+\left(16x^4\log(3)-\right.}{\left(25x^4-10x^5+x^6+\left(-120x^2+24x^3\right)\log(3)+144\log^2(3)\right)\log(5)}$$
$$=\frac{x\left(x^3(750-486\log(3))+12(125-81\log(3))\log(3)+5x^2(-125+81\log(3))+x^4(-125+81\log(3))-4\right.}{\left(-5x^2+x^3+12\log(3)\right)(-125+81\log(3))\log(5)}$$

input
```
Integrate[(-25*x^4 + 60*x^5 - 21*x^6 + 2*x^7 + (120*x^2 - 264*x^3 + 48*x^4
)*Log[3] + (-144 + 288*x)*Log[3]^2 + (16*x^4*Log[3] - 384*x*Log[3]^2)*Log[
5])/((25*x^4 - 10*x^5 + x^6 + (-120*x^2 + 24*x^3)*Log[3] + 144*Log[3]^2)*L
og[5]),x]
```

3.563.
$$\int \frac{-25x^4+60x^5-21x^6+2x^7+\left(120x^2-264x^3+48x^4\right)\log(3)+(-144+288x)\log^2(3)+\left(16x^4\log(3)-384x\log^2(3)\right)\log(5)}{\left(25x^4-10x^5+x^6+\left(-120x^2+24x^3\right)\log(3)+144\log^2(3)\right)\log(5)}\,dx$$

output
```
(x*(x^3*(750 - 486*Log[3]) + 12*(125 - 81*Log[3])*Log[3] + 5*x^2*(-125 + 8
1*Log[3]) + x^4*(-125 + 81*Log[3]) - 4*x*Log[3]*(375 - 500*Log[5] + 81*Log
[3]*(-3 + Log[625]))))/((-5*x^2 + x^3 + 12*Log[3])*(-125 + 81*Log[3])*Log[
5])
```

3.563.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^7-21x^6+60x^5-25x^4+\log(5)\left(16x^4\log(3)-384x\log^2(3)\right)+\left(48x^4-264x^3+120x^2\right)\log(3)+(288x-1}{\log(5)\left(x^6-10x^5+25x^4+\left(24x^3-120x^2\right)\log(3)+144\log^2(3)\right)}$$

$$\Big\downarrow \; 27$$

$$\frac{\int -\frac{-2x^7+21x^6-60x^5+25x^4-16\left(x^4\log(3)-24x\log^2(3)\right)\log(5)+144(1-2x)\log^2(3)-24\left(2x^4-11x^3+5x^2\right)\log(3)}{x^6-10x^5+25x^4+144\log^2(3)-24\left(5x^2-x^3\right)\log(3)}dx}{\log(5)}$$

$$\Big\downarrow \; 25$$

$$-\frac{\int \frac{-2x^7+21x^6-60x^5+25x^4-16\left(x^4\log(3)-24x\log^2(3)\right)\log(5)+144(1-2x)\log^2(3)-24\left(2x^4-11x^3+5x^2\right)\log(3)}{x^6-10x^5+25x^4+144\log^2(3)-24\left(5x^2-x^3\right)\log(3)}dx}{\log(5)}$$

$$\Big\downarrow \; 2462$$

$$-\frac{\int \left(-2x+\frac{16\log(3)\left(-25x^2+36\log(3)x+60\log(3)\right)\log(5)}{\left(x^3-5x^2+12\log(3)\right)^2}-\frac{16(x+5)\log(3)\log(5)}{x^3-5x^2+12\log(3)}+1\right)dx}{\log(5)}$$

$$\Big\downarrow \; 7299$$

$$-\frac{\int \left(-2x+\frac{16\log(3)\left(-25x^2+36\log(3)x+60\log(3)\right)\log(5)}{\left(x^3-5x^2+12\log(3)\right)^2}-\frac{16(x+5)\log(3)\log(5)}{x^3-5x^2+12\log(3)}+1\right)dx}{\log(5)}$$

input
```
Int[(-25*x^4 + 60*x^5 - 21*x^6 + 2*x^7 + (120*x^2 - 264*x^3 + 48*x^4)*Log[
3] + (-144 + 288*x)*Log[3]^2 + (16*x^4*Log[3] - 384*x*Log[3]^2)*Log[5])/((
25*x^4 - 10*x^5 + x^6 + (-120*x^2 + 24*x^3)*Log[3] + 144*Log[3]^2)*Log[5])
,x]
```

output
```
$Aborted
```

3.563.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.563.4 Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.97

method	result	size
default	$\frac{-x+x^2-\frac{4\ln(3)\ln(5)x^2}{3\left(\frac{x^3}{12}-\frac{5x^2}{12}+\ln(3)\right)}}{\ln(5)}$	37
risch	$-\frac{x}{\ln(5)}+\frac{x^2}{\ln(5)}-\frac{4\ln(3)x^2}{3\left(\frac{x^3}{12}-\frac{5x^2}{12}+\ln(3)\right)}$	39
gosper	$-\frac{-x^5+16x^2\ln(3)\ln(5)+6x^4-12x^2\ln(3)+12x\ln(3)-25x^2+60\ln(3)}{\ln(5)(x^3-5x^2+12\ln(3))}$	63
parallelrisch	$-\frac{-x^5+16x^2\ln(3)\ln(5)+6x^4-12x^2\ln(3)+12x\ln(3)-25x^2+60\ln(3)}{\ln(5)(x^3-5x^2+12\ln(3))}$	63
norman	$\frac{-\frac{(16\ln(3)\ln(5)-12\ln(3)-25)x^2}{\ln(5)}+\frac{x^5}{\ln(5)}-\frac{6x^4}{\ln(5)}-\frac{12\ln(3)x}{\ln(5)}-\frac{60\ln(3)}{\ln(5)}}{x^3-5x^2+12\ln(3)}$	73

input
```
int(((-384*x*ln(3)^2+16*x^4*ln(3))*ln(5)+(288*x-144)*ln(3)^2+(48*x^4-264*x
^3+120*x^2)*ln(3)+2*x^7-21*x^6+60*x^5-25*x^4)/(144*ln(3)^2+(24*x^3-120*x^2
)*ln(3)+x^6-10*x^5+25*x^4)/ln(5),x,method=_RETURNVERBOSE)
```

output
```
1/ln(5)*(-x+x^2-4/3*ln(3)*ln(5)*x^2/(1/12*x^3-5/12*x^2+ln(3)))
```

3.563.
$$\int \frac{-25x^4+60x^5-21x^6+2x^7+(120x^2-264x^3+48x^4)\log(3)+(-144+288x)\log^2(3)+(16x^4\log(3)-384x\log^2(3))\log(5)}{(25x^4-10x^5+x^6+(-120x^2+24x^3)\log(3)+144\log^2(3))\log(5)}\,dx$$

3.563.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.42

$$\int \frac{-25x^4+60x^5-21x^6+2x^7+(120x^2-264x^3+48x^4)\log(3)+(-144+288x)\log^2(3)+\left(16x^4\log(3)-\right.}{\left(25x^4-10x^5+x^6+(-120x^2+24x^3)\log(3)+144\log^2(3)\right)\log(5)}$$
$$=\frac{x^5-6\,x^4-16\,x^2\log(5)\log(3)+5\,x^3+12\,(x^2-x)\log(3)}{(x^3-5\,x^2+12\,\log(3))\log(5)}$$

input
```
integrate((((-384*x*log(3)^2+16*x^4*log(3))*log(5)+(288*x-144)*log(3)^2+(48
*x^4-264*x^3+120*x^2)*log(3)+2*x^7-21*x^6+60*x^5-25*x^4)/(144*log(3)^2+(24
*x^3-120*x^2)*log(3)+x^6-10*x^5+25*x^4)/log(5),x, algorithm=\
```

output
```
(x^5 - 6*x^4 - 16*x^2*log(5)*log(3) + 5*x^3 + 12*(x^2 - x)*log(3))/((x^3 -
 5*x^2 + 12*log(3))*log(5))
```

3.563.6 Sympy [A] (verification not implemented)

Time = 0.57 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.84

$$\int \frac{-25x^4+60x^5-21x^6+2x^7+(120x^2-264x^3+48x^4)\log(3)+(-144+288x)\log^2(3)+\left(16x^4\log(3)-\right.}{\left(25x^4-10x^5+x^6+(-120x^2+24x^3)\log(3)+144\log^2(3)\right)\log(5)}$$
$$=\frac{x^2}{\log(5)}-\frac{16x^2\log(3)}{x^3-5x^2+12\log(3)}-\frac{x}{\log(5)}$$

input
```
integrate((((-384*x*ln(3)**2+16*x**4*ln(3))*ln(5)+(288*x-144)*ln(3)**2+(48*
x**4-264*x**3+120*x**2)*ln(3)+2*x**7-21*x**6+60*x**5-25*x**4)/(144*ln(3)**
2+(24*x**3-120*x**2)*ln(3)+x**6-10*x**5+25*x**4)/ln(5),x)
```

output
```
x**2/log(5) - 16*x**2*log(3)/(x**3 - 5*x**2 + 12*log(3)) - x/log(5)
```

3.563.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.97

$$\int \frac{-25x^4 + 60x^5 - 21x^6 + 2x^7 + (120x^2 - 264x^3 + 48x^4)\log(3) + (-144 + 288x)\log^2(3) + (16x^4\log(3) - }{(25x^4 - 10x^5 + x^6 + (-120x^2 + 24x^3)\log(3) + 144\log^2(3))\log(5)}$$

$$= -\frac{\frac{16\,x^2\log(5)\log(3)}{x^3-5\,x^2+12\,\log(3)} - x^2 + x}{\log(5)}$$

input
```
integrate(((-384*x*log(3)^2+16*x^4*log(3))*log(5)+(288*x-144)*log(3)^2+(48
*x^4-264*x^3+120*x^2)*log(3)+2*x^7-21*x^6+60*x^5-25*x^4)/(144*log(3)^2+(24
*x^3-120*x^2)*log(3)+x^6-10*x^5+25*x^4)/log(5),x, algorithm=\
```

output
```
-(16*x^2*log(5)*log(3)/(x^3 - 5*x^2 + 12*log(3)) - x^2 + x)/log(5)
```

3.563.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.97

$$\int \frac{-25x^4 + 60x^5 - 21x^6 + 2x^7 + (120x^2 - 264x^3 + 48x^4)\log(3) + (-144 + 288x)\log^2(3) + (16x^4\log(3) - }{(25x^4 - 10x^5 + x^6 + (-120x^2 + 24x^3)\log(3) + 144\log^2(3))\log(5)}$$

$$= -\frac{\frac{16\,x^2\log(5)\log(3)}{x^3-5\,x^2+12\,\log(3)} - x^2 + x}{\log(5)}$$

input
```
integrate(((-384*x*log(3)^2+16*x^4*log(3))*log(5)+(288*x-144)*log(3)^2+(48
*x^4-264*x^3+120*x^2)*log(3)+2*x^7-21*x^6+60*x^5-25*x^4)/(144*log(3)^2+(24
*x^3-120*x^2)*log(3)+x^6-10*x^5+25*x^4)/log(5),x, algorithm=\
```

output
```
-(16*x^2*log(5)*log(3)/(x^3 - 5*x^2 + 12*log(3)) - x^2 + x)/log(5)
```

3.563.9 Mupad [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.00

$$\int \frac{-25x^4+60x^5-21x^6+2x^7+(120x^2-264x^3+48x^4)\log(3)+(-144+288x)\log^2(3)+\left(16x^4\log(3)-\right.}{\left(25x^4-10x^5+x^6+(-120x^2+24x^3)\log(3)+144\log^2(3)\right)\log(5)}$$

$$=\frac{x^2}{\ln(5)}-\frac{x}{\ln(5)}-\frac{16\,x^2\,\ln(3)}{x^3-5\,x^2+12\,\ln(3)}$$

input
```
int((log(3)^2*(288*x - 144) - log(5)*(384*x*log(3)^2 - 16*x^4*log(3)) + lo
g(3)*(120*x^2 - 264*x^3 + 48*x^4) - 25*x^4 + 60*x^5 - 21*x^6 + 2*x^7)/(log
(5)*(144*log(3)^2 - log(3)*(120*x^2 - 24*x^3) + 25*x^4 - 10*x^5 + x^6)),x)
```

output
```
x^2/log(5) - x/log(5) - (16*x^2*log(3))/(12*log(3) - 5*x^2 + x^3)
```

3.564 $\int \frac{-10+2e^3-2x+e^x\left(-50+e^3(10-10x)+35x+10x^2\right)+e^x\left(10-7x-2x^2+\right.}{e^x\left(25x-5e^3x+5x^2\right)+e^x\left(-5x+e^3x-x^2\right)\log(x)+(}$

3.564.1 Optimal result

Integrand size = 172, antiderivative size = 28

$$\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(}{e^x\left(25x-5e^3x+5x^2\right)+e^x\left(-5x+e^3x-x^2\right)\log(x)+\left(25x-5e^3x+5x^2+(-5x\right.}$$
$$=\log\left(\frac{\left(e^x+\log(5-\log(x))\right)^2}{\left(-5+e^3-x\right)x^2}\right)$$

output
```
ln(1/x^2/(exp(3)-5-x)*(exp(x)+ln(5-ln(x)))^2)
```

3.564.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(}{e^x\left(25x-5e^3x+5x^2\right)+e^x\left(-5x+e^3x-x^2\right)\log(x)+\left(25x-5e^3x+5x^2+(-5x\right.}$$
$$=-2\log(x)-\log\left(5-e^3+x\right)+2\log\left(e^x+\log(5-\log(x))\right)$$

input
```
Integrate[(-10 + 2*E^3 - 2*x + E^x*(-50 + E^3*(10 - 10*x) + 35*x + 10*x^2)
 + E^x*(10 - 7*x - 2*x^2 + E^3*(-2 + 2*x))*Log[x] + (-50 + 10*E^3 - 15*x +
 (10 - 2*E^3 + 3*x)*Log[x])*Log[5 - Log[x]])/(E^x*(25*x - 5*E^3*x + 5*x^2)
 + E^x*(-5*x + E^3*x - x^2)*Log[x] + (25*x - 5*E^3*x + 5*x^2 + (-5*x + E^3
*x - x^2)*Log[x])*Log[5 - Log[x]]),x]
```

output
```
-2*Log[x] - Log[5 - E^3 + x] + 2*Log[E^x + Log[5 - Log[x]]]
```

3.564.
$\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(-50+10e^3-15x+(10-2e^3+3x)\log(x))\log(5-\log(x)}{e^x(25x-5e^3x+5x^2)+e^x(-5x+e^3x-x^2)\log(x)+(25x-5e^3x+5x^2+(-5x+e^3x-x^2)\log(x))\log(5-\log(x))}$

3.564.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(10x^2+35x+e^3(10-10x)-50\right)+e^x\left(-2x^2-7x+e^3(2x-2)+10\right)\log(x)-2x+\left(-15x+\left(3x-2e^3+\right.\right.}{e^x\left(5x^2-5e^3x+25x\right)+e^x\left(-x^2+e^3x-5x\right)\log(x)+\left(5x^2+\left(-x^2+e^3x-5x\right)\log(x)-\right.}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^x\left(10x^2+35x+e^3(10-10x)-50\right)+e^x\left(-2x^2-7x+e^3(2x-2)+10\right)\log(x)-2x+\left(-15x+\left(3x-2e^3+\right.\right.}{x\left(x-e^3+5\right)(5-\log(x))\left(e^x+\log(5-\log(x))\right)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2x^2+\left(7-2e^3\right)x-2\left(5-e^3\right)}{x\left(x-e^3+5\right)}-\frac{2(-5x\log(5-\log(x))+x\log(x)\log(5-\log(x))-1)}{x(\log(x)-5)\left(e^x+\log(5-\log(x))\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2\int \frac{1}{x(\log(x)-5)\left(\log(5-\log(x))+e^x\right)}dx+10\int \frac{\log(5-\log(x))}{(\log(x)-5)\left(\log(5-\log(x))+e^x\right)}dx-2\int \frac{\log(x)\log(5-\log(x))}{(\log(x)-5)\left(\log(5-\log(x))+e^x\right)}dx+2x-2\log(x)-\log\left(x-e^3+5\right)$$

input
```
Int[(-10 + 2*E^3 - 2*x + E^x*(-50 + E^3*(10 - 10*x) + 35*x + 10*x^2) + E^x
*(10 - 7*x - 2*x^2 + E^3*(-2 + 2*x))*Log[x] + (-50 + 10*E^3 - 15*x + (10 -
 2*E^3 + 3*x)*Log[x])*Log[5 - Log[x]])/(E^x*(25*x - 5*E^3*x + 5*x^2) + E^x
*(-5*x + E^3*x - x^2)*Log[x] + (25*x - 5*E^3*x + 5*x^2 + (-5*x + E^3*x - x
^2)*Log[x])*Log[5 - Log[x]]),x]
```

output
```
$Aborted
```

3.564.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.564.4 Maple [A] (verified)

Time = 5.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

method	result	size
risch	$-2\ln(x)-\ln(-e^3+x+5)+2\ln(e^x+\ln(5-\ln(x)))$	29
parallelrisch	$-20+2\ln(e^x+\ln(5-\ln(x)))-\ln(-e^3+x+5)-2\ln(x)$	30

input
```
int((((-2*exp(3)+3*x+10)*ln(x)+10*exp(3)-15*x-50)*ln(5-ln(x))+((-2+2*x)*ex
p(3)-2*x^2-7*x+10)*exp(x)*ln(x)+((-10*x+10)*exp(3)+10*x^2+35*x-50)*exp(x)+
2*exp(3)-2*x-10)/(((x*exp(3)-x^2-5*x)*ln(x)-5*x*exp(3)+5*x^2+25*x)*ln(5-ln
(x))+(x*exp(3)-x^2-5*x)*exp(x)*ln(x)+(-5*x*exp(3)+5*x^2+25*x)*exp(x)),x,me
thod=_RETURNVERBOSE)
```

output
```
-2*ln(x)-ln(-exp(3)+x+5)+2*ln(exp(x)+ln(5-ln(x)))
```

3.564.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(-}{e^x(25x-5e^3x+5x^2)+e^x(-5x+e^3x-x^2)\log(x)+(25x-5e^3x+5x^2+(-5x}$$
$$=-\log\left(x-e^3+5\right)-2\log(x)+2\log\left(e^x+\log(-\log(x)+5)\right)$$

input
```
integrate((((-2*exp(3)+3*x+10)*log(x)+10*exp(3)-15*x-50)*log(5-log(x))+((-
2+2*x)*exp(3)-2*x^2-7*x+10)*exp(x)*log(x)+((-10*x+10)*exp(3)+10*x^2+35*x-5
0)*exp(x)+2*exp(3)-2*x-10)/(((x*exp(3)-x^2-5*x)*log(x)-5*x*exp(3)+5*x^2+25
*x)*log(5-log(x))+(x*exp(3)-x^2-5*x)*exp(x)*log(x)+(-5*x*exp(3)+5*x^2+25*x
)*exp(x)),x, algorithm=\
```

output
```
-log(x - e^3 + 5) - 2*log(x) + 2*log(e^x + log(-log(x) + 5))
```

3.564.6 Sympy [A] (verification not implemented)

Time = 0.56 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(-}{e^x\left(25x-5e^3x+5x^2\right)+e^x\left(-5x+e^3x-x^2\right)\log(x)+\left(25x-5e^3x+5x^2+(-5x\right.}$$
$$= -2\log{(x)} + 2\log{(e^x + \log{(5-\log{(x)})})} - \log{\left(x-e^3+5\right)}$$

input
```
integrate((((-2*exp(3)+3*x+10)*ln(x)+10*exp(3)-15*x-50)*ln(5-ln(x))+((-2+2
*x)*exp(3)-2*x**2-7*x+10)*exp(x)*ln(x)+((-10*x+10)*exp(3)+10*x**2+35*x-50)
*exp(x)+2*exp(3)-2*x-10)/((((x*exp(3)-x**2-5*x)*ln(x)-5*x*exp(3)+5*x**2+25*
x)*ln(5-ln(x))+(x*exp(3)-x**2-5*x)*exp(x)*ln(x)+(-5*x*exp(3)+5*x**2+25*x)*
exp(x)),x)
```

output
```
-2*log(x) + 2*log(exp(x) + log(5 - log(x))) - log(x - exp(3) + 5)
```

3.564.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(-}{e^x\left(25x-5e^3x+5x^2\right)+e^x\left(-5x+e^3x-x^2\right)\log(x)+\left(25x-5e^3x+5x^2+(-5x\right.}$$
$$= -\log\left(x-e^3+5\right) - 2\,\log\left(x\right) + 2\,\log\left(e^x+\log\left(-\log\left(x\right)+5\right)\right)$$

input
```
integrate((((-2*exp(3)+3*x+10)*log(x)+10*exp(3)-15*x-50)*log(5-log(x))+((-
2+2*x)*exp(3)-2*x^2-7*x+10)*exp(x)*log(x)+((-10*x+10)*exp(3)+10*x^2+35*x-5
0)*exp(x)+2*exp(3)-2*x-10)/((((x*exp(3)-x^2-5*x)*log(x)-5*x*exp(3)+5*x^2+25
*x)*log(5-log(x))+(x*exp(3)-x^2-5*x)*exp(x)*log(x)+(-5*x*exp(3)+5*x^2+25*x
)*exp(x)),x, algorithm=\
```

output
```
-log(x - e^3 + 5) - 2*log(x) + 2*log(e^x + log(-log(x) + 5))
```

3.564.

$$\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(-50+10e^3-15x+(10-2e^3+3x)\log(x))\log(5-\log(x))}{e^x(25x-5e^3x+5x^2)+e^x(-5x+e^3x-x^2)\log(x)+(25x-5e^3x+5x^2+(-5x+e^3x-x^2)\log(x))\log(5-\log(x))}$$

3.564.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(\cdot}{e^x(25x-5e^3x+5x^2)+e^x(-5x+e^3x-x^2)\log(x)+(25x-5e^3x+5x^2+(-5x}$$
$$=-\log\left(x-e^3+5\right)-2\log\left(x\right)+2\log\left(e^x+\log\left(-\log\left(x\right)+5\right)\right)$$

input
```
integrate((((-2*exp(3)+3*x+10)*log(x)+10*exp(3)-15*x-50)*log(5-log(x))+((-
2+2*x)*exp(3)-2*x^2-7*x+10)*exp(x)*log(x)+((-10*x+10)*exp(3)+10*x^2+35*x-5
0)*exp(x)+2*exp(3)-2*x-10)/(((x*exp(3)-x^2-5*x)*log(x)-5*x*exp(3)+5*x^2+25
*x)*log(5-log(x))+(x*exp(3)-x^2-5*x)*exp(x)*log(x)+(-5*x*exp(3)+5*x^2+25*x
)*exp(x)),x, algorithm=\
```

output
```
-log(x - e^3 + 5) - 2*log(x) + 2*log(e^x + log(-log(x) + 5))
```

3.564.9 Mupad [B] (verification not implemented)

Time = 13.67 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{-10+2e^3-2x+e^x(-50+e^3(10-10x)+35x+10x^2)+e^x(10-7x-2x^2+e^3(-2+2x))\log(x)+(\cdot}{e^x(25x-5e^3x+5x^2)+e^x(-5x+e^3x-x^2)\log(x)+(25x-5e^3x+5x^2+(-5x}$$
$$=2\ln\left(\ln\left(5-\ln\left(x\right)\right)+e^x\right)-\ln\left(x-e^3+5\right)-2\ln\left(x\right)$$

input
```
int(-(2*x - 2*exp(3) - exp(x)*(35*x + 10*x^2 - exp(3)*(10*x - 10) - 50) +
log(5 - log(x))*(15*x - 10*exp(3) - log(x)*(3*x - 2*exp(3) + 10) + 50) + e
xp(x)*log(x)*(7*x + 2*x^2 - exp(3)*(2*x - 2) - 10) + 10)/(log(5 - log(x))*
(25*x - 5*x*exp(3) - log(x)*(5*x - x*exp(3) + x^2) + 5*x^2) + exp(x)*(25*x
 - 5*x*exp(3) + 5*x^2) - exp(x)*log(x)*(5*x - x*exp(3) + x^2)),x)
```

output
```
2*log(log(5 - log(x)) + exp(x)) - log(x - exp(3) + 5) - 2*log(x)
```

3.565 $\int -\frac{1}{x} \, dx$

3.565.1 Optimal result

Integrand size = 5, antiderivative size = 16

$$\int -\frac{1}{x} \, dx = -1 + \log\left(\frac{e^5(-2 - \log(2))}{x}\right)$$

output
```
ln(1/x*exp(5)*(-2-ln(2)))-1
```

3.565.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.25

$$\int -\frac{1}{x} \, dx = -\log(x)$$

input
```
Integrate[-x^(-1),x]
```

output
```
-Log[x]
```

3.565.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.25, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{1}{x} \, dx$$
$$\Big\downarrow \; 14$$
$$-\log(x)$$

input
```
Int[-x^(-1),x]
```

output
```
-Log[x]
```

3.565.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.565.4 Maple [A] (verified)

Time = 0.43 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.31

method	result	size
default	$-\ln(x)$	5
norman	$-\ln(x)$	5
risch	$-\ln(x)$	5
parallelrisch	$-\ln(x)$	5

input
```
int(-1/x,x,method=_RETURNVERBOSE)
```

output
```
-ln(x)
```

3.565.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.25

$$\int -\frac{1}{x}\,dx = -\log\left(x\right)$$

input
```
integrate(-1/x,x, algorithm=\
```

output
```
-log(x)
```

3.565.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.19

$$\int -\frac{1}{x}\,dx = -\log\left(x\right)$$

input
```
integrate(-1/x,x)
```

output
```
-log(x)
```

3.565.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.25

$$\int -\frac{1}{x}\,dx = -\log\left(x\right)$$

input
```
integrate(-1/x,x, algorithm=\
```

output
```
-log(x)
```

3.565.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.31

$$\int -\frac{1}{x}\,dx = -\log\left(|x|\right)$$

input
```
integrate(-1/x,x, algorithm=\
```

output
```
-log(abs(x))
```

3.565.9 Mupad [B] (verification not implemented)

Time = 0.01 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.25

$$\int -\frac{1}{x}\,dx = -\ln\left(x\right)$$

input
```
int(-1/x,x)
```

output
```
-log(x)
```

3.566 $\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(\right.}{\left(25x+10e^x\right.}$

3.566.1 Optimal result

Integrand size = 138, antiderivative size = 30

$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x(1-\right.}{\left(25x+10e^x x+e^{2x}x\right)\log\left(25x^2\right)\log^2\left(\log\left(25\right.\right.}$$

$$=\left(-5+e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\right)\log(2)$$

output
```
(exp((ln(x)-x)/(exp(x)+5)/ln(ln(25*x^2)))-5)*ln(2)
```

3.566.2 Mathematica [F]

$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x(1-\right.}{\left(25x+10e^x x+e^{2x}x\right)\log\left(25x^2\right)\log^2\left(\log\left(25\right.\right.}$$

$$=\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x(1\right.}{\left(25x+10e^x x+e^{2x}x\right)\log\left(25x^2\right)\log^2\left(\log\left(2\right.\right.}$$

input
```
Integrate[(E^((-x + Log[x])/((5 + E^x)*Log[Log[25*x^2]]))*(10*x*Log[2] + 2
*E^x*x*Log[2] + (-10*Log[2] - 2*E^x*Log[2])*Log[x] + ((5 - 5*x)*Log[2] + E
^x*(1 - x + x^2)*Log[2] - E^x*x*Log[2]*Log[x])*Log[25*x^2]*Log[Log[25*x^2]
]))/((25*x + 10*E^x*x + E^(2*x)*x)*Log[25*x^2]*Log[Log[25*x^2]]^2),x]
```

output
```
Integrate[(E^((-x + Log[x])/((5 + E^x)*Log[Log[25*x^2]]))*(10*x*Log[2] + 2
*E^x*x*Log[2] + (-10*Log[2] - 2*E^x*Log[2])*Log[x] + ((5 - 5*x)*Log[2] + E
^x*(1 - x + x^2)*Log[2] - E^x*x*Log[2]*Log[x])*Log[25*x^2]*Log[Log[25*x^2]
]))/((25*x + 10*E^x*x + E^(2*x)*x)*Log[25*x^2]*Log[Log[25*x^2]]^2), x]
```

3.566.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{\log(x)-x}{(e^x+5)\log(\log(25x^2))}}\left(\left(e^x\left(x^2-x+1\right)\log(2)+(5-5x)\log(2)-e^x x\log(2)\log(x)\right)\log\left(25x^2\right)\log\left(\log\left(25x^2\right)\right)+2\right.}{(10e^x x+e^{2x}x+25x)\log\left(25x^2\right)\log^2\left(\log\left(25x^2\right)\right)}$$

$\Big\downarrow$ 7292

$$\int \frac{e^{\frac{\log(x)-x}{(e^x+5)\log(\log(25x^2))}}\left(\left(e^x\left(x^2-x+1\right)\log(2)+(5-5x)\log(2)-e^x x\log(2)\log(x)\right)\log\left(25x^2\right)\log\left(\log\left(25x^2\right)\right)+2\right.}{(e^x+5)^2 x\log\left(25x^2\right)\log^2\left(\log\left(25x^2\right)\right)}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{\log(2)e^{\frac{\log(x)-x}{(e^x+5)\log(\log(25x^2))}}\left(x^2\log\left(25x^2\right)\log\left(\log\left(25x^2\right)\right)-x\log(x)\log\left(25x^2\right)\log\left(\log\left(25x^2\right)\right)-x\log\left(25x^2\right)\log\right.}{(e^x+5)x\log\left(25x^2\right)\log^2\left(\log\left(25x^2\right)\right)}\right.$$

$\Big\downarrow$ 7293

$$\int \left(\frac{\log(2)e^{-\frac{x}{(e^x+5)\log(\log(25x^2))}}x^{\frac{1}{(e^x+5)\log(\log(25x^2))}-1}\left(x^2\log\left(25x^2\right)\log\left(\log\left(25x^2\right)\right)-x\log(x)\log\left(25x^2\right)\log\left(\log(2\right.\right.}{(e^x+5)\log\left(25x^2\right)\log^2\left(\log(25\right.}\right.$$

$\Big\downarrow$ 7299

$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log(\log(25x^2))}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+\left((5-5x)\log(2)+e^x\left(1-x+x^2\right)\log(2)-e^x x\log(2)\log(x)\right)\log(25\right.}{}$$

$$\int \left(\frac{\log(2)e^{-\frac{x}{(e^x+5)\log\left(\log\left(25x^2\right)\right)}} x^{\frac{1}{(e^x+5)\log\left(\log\left(25x^2\right)\right)}-1} \left(x^2 \log\left(25x^2\right) \log\left(\log\left(25x^2\right)\right) - x\log(x)\log\left(25x^2\right)\log\left(\log\left(2\right.\right.\right.}{(e^x+5)\log\left(25x^2\right)\log^2\left(\log\left(25\right.\right.}\right.$$

input
```
Int[(E^((-x + Log[x])/((5 + E^x)*Log[Log[25*x^2]]))*(10*x*Log[2] + 2*E^x*x
*Log[2] + (-10*Log[2] - 2*E^x*Log[2])*Log[x] + ((5 - 5*x)*Log[2] + E^x*(1
- x + x^2)*Log[2] - E^x*x*Log[2]*Log[x])*Log[25*x^2]*Log[Log[25*x^2]]))/((
25*x + 10*E^x*x + E^(2*x)*x)*Log[25*x^2]*Log[Log[25*x^2]]^2),x]
```

output
```
$Aborted
```

3.566.3.1 Defintions of rubi rules used

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.566.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.84 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.93

$$\ln(2)\,\mathrm{e}^{\frac{\ln(x)-x}{(\mathrm{e}^x+5)\ln\left(2\ln(x)+2\ln(5)-\frac{i\pi\ \mathrm{csgn}\left(ix^2\right)\left(-\mathrm{csgn}\left(ix^2\right)+\mathrm{csgn}(ix)\right)^2}{2}\right)}}$$

input
```
int(((-x*ln(2)*exp(x)*ln(x)+(x^2-x+1)*ln(2)*exp(x)+(-5*x+5)*ln(2))*ln(25*x
^2)*ln(ln(25*x^2))+(-2*exp(x)*ln(2)-10*ln(2))*ln(x)+2*x*ln(2)*exp(x)+10*x*
ln(2))*exp((ln(x)-x)/(exp(x)+5)/ln(ln(25*x^2)))/(x*exp(x)^2+10*exp(x)*x+25
*x)/ln(25*x^2)/ln(ln(25*x^2))^2,x)
```


$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+\left((5-5x)\log(2)+e^x\left(1-x+x^2\right)\log(2)-e^x x\log(2)\log(x)\right)\log(25x\right.}{(25x+10e^x x+e^{2x}x)\log(25x^2)\log^2(\log(25x^2))}$$

output
```
ln(2)*exp((ln(x)-x)/(exp(x)+5)/ln(2*ln(x)+2*ln(5)-1/2*I*Pi*csgn(I*x^2)*(-c
sgn(I*x^2)+csgn(I*x))^2))
```

3.566.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x(1-\right.}{(25x+10e^x x+e^{2x}x)\log\left(25x^2\right)\log^2\left(\log\left(25x\right.\right.}$$
$$= e^{\left(-\frac{x-\log(x)}{(e^x+5)\log(2\log(5)+2\log(x))}\right)}\log(2)$$

input
```
integrate(((-x*log(2)*exp(x)*log(x)+(x^2-x+1)*log(2)*exp(x)+(-5*x+5)*log(2
))*log(25*x^2)*log(log(25*x^2))+(-2*exp(x)*log(2)-10*log(2))*log(x)+2*x*lo
g(2)*exp(x)+10*x*log(2))*exp((log(x)-x)/(exp(x)+5)/log(log(25*x^2)))/(x*ex
p(x)^2+10*exp(x)*x+25*x)/log(25*x^2)/log(log(25*x^2))^2,x, algorithm=\
```

output
```
e^(-(x - log(x))/((e^x + 5)*log(2*log(5) + 2*log(x))))*log(2)
```

3.566.6 Sympy [A] (verification not implemented)

Time = 33.34 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x(1-\right.}{(25x+10e^x x+e^{2x}x)\log\left(25x^2\right)\log^2\left(\log\left(25x\right.\right.}$$
$$= e^{\frac{-x+\log(x)}{(e^x+5)\log(2\log(x)+\log(25))}}\log(2)$$

input
```
integrate(((-x*ln(2)*exp(x)*ln(x)+(x**2-x+1)*ln(2)*exp(x)+(-5*x+5)*ln(2))*
ln(25*x**2)*ln(ln(25*x**2))+(-2*exp(x)*ln(2)-10*ln(2))*ln(x)+2*x*ln(2)*exp
(x)+10*x*ln(2))*exp((ln(x)-x)/(exp(x)+5)/ln(ln(25*x**2)))/(x*exp(x)**2+10*
exp(x)*x+25*x)/ln(25*x**2)/ln(ln(25*x**2))**2,x)
```

output
```
exp((-x + log(x))/((exp(x) + 5)*log(2*log(x) + log(25))))*log(2)
```

3.566.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x(1-\right.}{(25x+10e^x x+e^{2x}x)\log\left(25x^2\right)\log^2\left(\log\left(25x\right.\right.}$$

= Exception raised: RuntimeError

input
```
integrate((((-x*log(2)*exp(x)*log(x)+(x^2-x+1)*log(2)*exp(x)+(-5*x+5)*log(2
))*log(25*x^2)*log(log(25*x^2))+(-2*exp(x)*log(2)-10*log(2))*log(x)+2*x*lo
g(2)*exp(x)+10*x*log(2))*exp((log(x)-x)/(exp(x)+5)/log(log(25*x^2)))/(x*ex
p(x)^2+10*exp(x)*x+25*x)/log(25*x^2)/log(log(25*x^2))^2,x, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.566.8 Giac [F]

$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x(1-\right.}{(25x+10e^x x+e^{2x}x)\log\left(25x^2\right)\log^2\left(\log\left(25x\right.\right.}$$

$$= \int \frac{\left(2\,xe^x\log\left(2\right)-\left(xe^x\log\left(2\right)\log\left(x\right)-\left(x^2-x+1\right)e^x\log\left(2\right)+5\left(x-1\right)\log\left(2\right)\right)\log\left(25\,x^2\right)\log\left(\log\left(25\,x\right.\right.}{\left(xe^{(2\,x)}+10\,xe^x+25\,x\right)\log\left(25\,x^2\right)\log\left(\mathrm{lo}\right.}$$

input
```
integrate((((-x*log(2)*exp(x)*log(x)+(x^2-x+1)*log(2)*exp(x)+(-5*x+5)*log(2
))*log(25*x^2)*log(log(25*x^2))+(-2*exp(x)*log(2)-10*log(2))*log(x)+2*x*lo
g(2)*exp(x)+10*x*log(2))*exp((log(x)-x)/(exp(x)+5)/log(log(25*x^2)))/(x*ex
p(x)^2+10*exp(x)*x+25*x)/log(25*x^2)/log(log(25*x^2))^2,x, algorithm=\
```

output
```
undef
```


$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log\left(\log\left(25x^2\right)\right)}}\left(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x\left(1-x+x^2\right)\log(2)-e^x x\log(2)\log(x))\log(25x\right.}{}$$

3.566.9 Mupad [B] (verification not implemented)

Time = 14.08 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.77

$$\int \frac{e^{\frac{-x+\log(x)}{(5+e^x)\log(\log(25x^2))}}(10x\log(2)+2e^x x\log(2)+(-10\log(2)-2e^x\log(2))\log(x)+((5-5x)\log(2)+e^x(1-\ldots}{(25x+10e^x x+e^{2x}x)\log(25x^2)\log^2(\log(25x\ldots}$$
$$= x^{\frac{1}{5\ln(\ln(25x^2))+\ln(\ln(25x^2))e^x}}\,\mathrm{e}^{-\frac{x}{5\ln(\ln(25x^2))+\ln(\ln(25x^2))e^x}}\,\ln(2)$$

input
```
int(-(exp(-(x - log(x))/(log(log(25*x^2))*(exp(x) + 5)))*(log(x)*(10*log(2
) + 2*exp(x)*log(2)) - 10*x*log(2) - 2*x*exp(x)*log(2) + log(log(25*x^2))*
log(25*x^2)*(log(2)*(5*x - 5) - exp(x)*log(2)*(x^2 - x + 1) + x*exp(x)*log
(2)*log(x))))/(log(log(25*x^2))^2*log(25*x^2)*(25*x + x*exp(2*x) + 10*x*ex
p(x))),x)
```

output
```
x^(1/(5*log(log(25*x^2)) + log(log(25*x^2))*exp(x)))*exp(-x/(5*log(log(25*
x^2)) + log(log(25*x^2))*exp(x)))*log(2)
```

3.567 $\int \frac{-96+48x-6x^2+e^2(-160+16x-8x^2)}{e^2(16000-3200x-920x^2+76x^3+22x^4+x^5)}\,dx$

3.567.1 Optimal result

Integrand size = 53, antiderivative size = 20

$$\int \frac{-96+48x-6x^2+e^2(-160+16x-8x^2)}{e^2(16000-3200x-920x^2+76x^3+22x^4+x^5)}\,dx=\frac{\frac{3}{e^2}+\frac{4x}{-4+x}}{(10+x)^2}$$

output
```
(4*x/(x-4)+3/exp(2))/(x+10)^2
```

3.567.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.25

$$\int \frac{-96+48x-6x^2+e^2(-160+16x-8x^2)}{e^2(16000-3200x-920x^2+76x^3+22x^4+x^5)}\,dx=\frac{-12+(3+4e^2)\,x}{e^2(-4+x)(10+x)^2}$$

input
```
Integrate[(-96 + 48*x - 6*x^2 + E^2*(-160 + 16*x - 8*x^2))/(E^2*(16000 - 3
200*x - 920*x^2 + 76*x^3 + 22*x^4 + x^5)),x]
```

output
```
(-12 + (3 + 4*E^2)*x)/(E^2*(-4 + x)*(10 + x)^2)
```

3.567.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 48 vs. $2(20) = 40$.

Time = 0.25 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.40, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.075$, Rules used = {27, 27, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x^2+e^2\left(-8x^2+16x-160\right)+48x-96}{e^2\left(x^5+22x^4+76x^3-920x^2-3200x+16000\right)} \, dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int -\frac{2\left(3x^2-24x+4e^2\left(x^2-2x+20\right)+48\right)}{x^5+22x^4+76x^3-920x^2-3200x+16000}dx}{e^2}$$

$$\Big\downarrow \text{27}$$

$$-\frac{2\int \frac{3x^2-24x+4e^2\left(x^2-2x+20\right)+48}{x^5+22x^4+76x^3-920x^2-3200x+16000}dx}{e^2}$$

$$\Big\downarrow \text{2462}$$

$$-\frac{2\int \left(-\frac{2e^2}{49(x+10)^2}+\frac{21+20e^2}{7(x+10)^3}+\frac{2e^2}{49(x-4)^2}\right)dx}{e^2}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2\left(\frac{2e^2}{49(x+10)}-\frac{21+20e^2}{14(x+10)^2}+\frac{2e^2}{49(4-x)}\right)}{e^2}$$

input
```
Int[(-96 + 48*x - 6*x^2 + E^2*(-160 + 16*x - 8*x^2))/(E^2*(16000 - 3200*x
- 920*x^2 + 76*x^3 + 22*x^4 + x^5)),x]
```

output
```
(-2*((2*E^2)/(49*(4 - x)) - (21 + 20*E^2)/(14*(10 + x)^2) + (2*E^2)/(49*(1
0 + x))))/E^2
```

3.567.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.567.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

method	result	size
risch	$\frac{e^{-2}\left(-12+\left(4\,e^{2}+3\right)x\right)}{x^{3}+16x^{2}+20x-400}$	29
gosper	$\frac{\left(4\,e^{2}x+3x-12\right)e^{-2}}{x^{3}+16x^{2}+20x-400}$	31
norman	$\frac{\left(4\,e^{2}+3\right)e^{-2}x-12\,e^{-2}}{\left(x-4\right)\left(x+10\right)^{2}}$	31
parallelrisch	$\frac{\left(4\,e^{2}x+3x-12\right)e^{-2}}{x^{3}+16x^{2}+20x-400}$	31
default	$e^{-2}\left(\frac{4\,e^{2}}{49\left(x-4\right)}-\frac{-\frac{20\,e^{2}}{7}-3}{\left(x+10\right)^{2}}-\frac{4\,e^{2}}{49\left(x+10\right)}\right)$	38

input
```
int(((-8*x^2+16*x-160)*exp(2)-6*x^2+48*x-96)/(x^5+22*x^4+76*x^3-920*x^2-32
00*x+16000)/exp(2),x,method=_RETURNVERBOSE)
```

output
```
exp(-2)*(-12+(4*exp(2)+3)*x)/(x^3+16*x^2+20*x-400)
```

3.567.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.40

$$\int \frac{-96+48x-6x^2+e^2(-160+16x-8x^2)}{e^2\,(16000-3200x-920x^2+76x^3+22x^4+x^5)}\,dx = \frac{(4\,xe^2+3\,x-12)e^{(-2)}}{x^3+16\,x^2+20\,x-400}$$

input
```
integrate(((-8*x^2+16*x-160)*exp(2)-6*x^2+48*x-96)/(x^5+22*x^4+76*x^3-920*
x^2-3200*x+16000)/exp(2),x, algorithm=\
```

output
```
(4*x*e^2 + 3*x - 12)*e^(-2)/(x^3 + 16*x^2 + 20*x - 400)
```

3.567.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(15) = 30.

Time = 0.46 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.95

$$\int \frac{-96+48x-6x^2+e^2(-160+16x-8x^2)}{e^2\,(16000-3200x-920x^2+76x^3+22x^4+x^5)}\,dx = -\frac{x(-4e^2-3)+12}{x^3e^2+16x^2e^2+20xe^2-400e^2}$$

input
```
integrate(((-8*x**2+16*x-160)*exp(2)-6*x**2+48*x-96)/(x**5+22*x**4+76*x**3
-920*x**2-3200*x+16000)/exp(2),x)
```

output
```
-(x*(-4*exp(2) - 3) + 12)/(x**3*exp(2) + 16*x**2*exp(2) + 20*x*exp(2) - 40
0*exp(2))
```

3.567.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.40

$$\int \frac{-96+48x-6x^2+e^2(-160+16x-8x^2)}{e^2\,(16000-3200x-920x^2+76x^3+22x^4+x^5)}\,dx = \frac{(x(4\,e^2+3)-12)e^{(-2)}}{x^3+16\,x^2+20\,x-400}$$

input
```
integrate(((-8*x^2+16*x-160)*exp(2)-6*x^2+48*x-96)/(x^5+22*x^4+76*x^3-920*
x^2-3200*x+16000)/exp(2),x, algorithm=\
```

output
```
(x*(4*e^2 + 3) - 12)*e^(-2)/(x^3 + 16*x^2 + 20*x - 400)
```

3.567.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.60

$$\int \frac{-96+48x-6x^2+e^2(-160+16x-8x^2)}{e^2(16000-3200x-920x^2+76x^3+22x^4+x^5)}\,dx = \frac{1}{49}\left(\frac{4\,e^2}{x-4}-\frac{4\,xe^2-100\,e^2-147}{(x+10)^2}\right)e^{(-2)}$$

input
```
integrate((((-8*x^2+16*x-160)*exp(2)-6*x^2+48*x-96)/(x^5+22*x^4+76*x^3-920*
x^2-3200*x+16000)/exp(2),x, algorithm=\
```

output
```
1/49*(4*e^2/(x - 4) - (4*x*e^2 - 100*e^2 - 147)/(x + 10)^2)*e^(-2)
```

3.567.9 Mupad [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.70

$$\int \frac{-96+48x-6x^2+e^2(-160+16x-8x^2)}{e^2(16000-3200x-920x^2+76x^3+22x^4+x^5)}\,dx = \frac{4}{49\,(x-4)}-\frac{4}{49\,(x+10)}+\frac{\mathrm{e}^{-2}\,(20\,\mathrm{e}^2+21)}{7\,(x+10)^2}$$

input
```
int(-(exp(-2)*(exp(2)*(8*x^2 - 16*x + 160) - 48*x + 6*x^2 + 96))/(76*x^3 -
 920*x^2 - 3200*x + 22*x^4 + x^5 + 16000),x)
```

output
```
4/(49*(x - 4)) - 4/(49*(x + 10)) + (exp(-2)*(20*exp(2) + 21))/(7*(x + 10)^
2)
```

3.568 $\int \frac{-132e^5+9000x+180x^2}{900x^4+e^{10}(9+6x+x^2)+e^5(-180x^2-60x^3)}\,dx$

3.568.1 Optimal result

Integrand size = 50, antiderivative size = 22

$$\int \frac{-132e^5+9000x+180x^2}{900x^4+e^{10}\left(9+6x+x^2\right)+e^5\left(-180x^2-60x^3\right)}\,dx=\frac{25+x}{-5x^2+\frac{1}{6}e^5(3+x)}$$

output
```
(x+25)/(1/6*(3+x)*exp(5)-5*x^2)
```

3.568.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-132e^5+9000x+180x^2}{900x^4+e^{10}\left(9+6x+x^2\right)+e^5\left(-180x^2-60x^3\right)}\,dx=\frac{6(25+x)}{-30x^2+e^5(3+x)}$$

input
```
Integrate[(-132*E^5 + 9000*x + 180*x^2)/(900*x^4 + E^10*(9 + 6*x + x^2) +
E^5*(-180*x^2 - 60*x^3)),x]
```

output
```
(6*(25 + x))/(-30*x^2 + E^5*(3 + x))
```

3.568.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.95, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2459, 1380, 27, 2345, 24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{180x^2+9000x-132e^5}{900x^4+e^{10}\left(x^2+6x+9\right)+e^5\left(-60x^3-180x^2\right)}dx$$

$$\Big\downarrow \text{2459}$$

$$\int \frac{180\left(x-\frac{e^5}{60}\right)^2+6\left(1500+e^5\right)\left(x-\frac{e^5}{60}\right)+\frac{1}{20}e^5\left(360+e^5\right)}{900\left(x-\frac{e^5}{60}\right)^4-\frac{1}{2}e^5\left(360+e^5\right)\left(x-\frac{e^5}{60}\right)^2+\frac{e^{10}\left(360+e^5\right)^2}{14400}}d\left(x-\frac{e^5}{60}\right)$$

$$\Big\downarrow \text{1380}$$

$$900\int \frac{4\left(3600\left(x-\frac{e^5}{60}\right)^2+120\left(1500+e^5\right)\left(x-\frac{e^5}{60}\right)+e^5\left(360+e^5\right)\right)}{5\left(e^5\left(360+e^5\right)-3600\left(x-\frac{e^5}{60}\right)^2\right)^2}d\left(x-\frac{e^5}{60}\right)$$

$$\Big\downarrow \text{27}$$

$$720\int \frac{3600\left(x-\frac{e^5}{60}\right)^2+120\left(1500+e^5\right)\left(x-\frac{e^5}{60}\right)+e^5\left(360+e^5\right)}{\left(e^5\left(360+e^5\right)-3600\left(x-\frac{e^5}{60}\right)^2\right)^2}d\left(x-\frac{e^5}{60}\right)$$

$$\Big\downarrow \text{2345}$$

$$720\left(\frac{60\left(x-\frac{e^5}{60}\right)+e^5+1500}{60\left(e^5\left(360+e^5\right)-3600\left(x-\frac{e^5}{60}\right)^2\right)}-\frac{\int 0d\left(x-\frac{e^5}{60}\right)}{2e^5\left(360+e^5\right)}\right)$$

$$\Big\downarrow \text{24}$$

$$\frac{12\left(60\left(x-\frac{e^5}{60}\right)+e^5+1500\right)}{e^5\left(360+e^5\right)-3600\left(x-\frac{e^5}{60}\right)^2}$$

input
```
Int[(-132*E^5 + 9000*x + 180*x^2)/(900*x^4 + E^10*(9 + 6*x + x^2) + E^5*(-
180*x^2 - 60*x^3)),x]
```

output
```
(12*(1500 + E^5 + 60*(-1/60*E^5 + x)))/(E^5*(360 + E^5) - 3600*(-1/60*E^5
+ x)^2)
```

3.568.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2345
```
Int[(Pq_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q = PolynomialQuot
ient[Pq, a + b*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x,
 0], g = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b
*f*x)*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   In
t[(a + b*x^2)^(p + 1)*ExpandToSum[2*a*(p + 1)*Q + f*(2*p + 3), x], x], x]]
/; FreeQ[{a, b}, x] && PolyQ[Pq, x] && LtQ[p, -1]
```

rule 2459
```
Int[(Pn_)^(p_.)*(Qx_), x_Symbol] :> With[{S = Coeff[Pn, x, Expon[Pn, x] - 1
]/(Expon[Pn, x]*Coeff[Pn, x, Expon[Pn, x]])}, Subst[Int[ExpandToSum[Pn /. x
 -> x - S, x]^p*ExpandToSum[Qx /. x -> x - S, x], x], x, x + S] /; Binomial
Q[Pn /. x -> x - S, x] || (IntegerQ[Expon[Pn, x]/2] && TrinomialQ[Pn /. x -
> x - S, x])] /; FreeQ[p, x] && PolyQ[Pn, x] && GtQ[Expon[Pn, x], 2] && NeQ
[Coeff[Pn, x, Expon[Pn, x] - 1], 0] && PolyQ[Qx, x] &&  !(MonomialQ[Qx, x]
&& IGtQ[p, 0])
```

3.568. $\int \frac{-132e^5+9000x+180x^2}{900x^4+e^{10}(9+6x+x^2)+e^5(-180x^2-60x^3)}\,dx$

3.568.4 Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

method	result
gosper	$\frac{6x+150}{x\,\mathrm{e}^{5}-30x^{2}+3\,\mathrm{e}^{5}}$
norman	$\frac{6x+150}{x\,\mathrm{e}^{5}-30x^{2}+3\,\mathrm{e}^{5}}$
risch	$\frac{6x+150}{x\,\mathrm{e}^{5}-30x^{2}+3\,\mathrm{e}^{5}}$
parallelrisch	$-\frac{-4500-180x}{30(x\,\mathrm{e}^{5}-30x^{2}+3\,\mathrm{e}^{5})}$
default	$-6\left(\sum_{\_R=\mathrm{RootOf}(900\_Z^{4}-60\_Z^{3}\mathrm{e}^{5}+(-180\,\mathrm{e}^{5}+\mathrm{e}^{10})\_Z^{2}+6\_Z\,\mathrm{e}^{10}+9\,\mathrm{e}^{10})}\frac{\left(-11\,\mathrm{e}^{5}+15\_R^{2}+750\_R\right)\ln\left(x-\_R\right.}{-\_R\,\mathrm{e}^{10}+90\_R^{2}\mathrm{e}^{5}-1800\_R^{3}-3\,\mathrm{e}^{10}+180}\right.$

input
```
int((-132*exp(5)+180*x^2+9000*x)/((x^2+6*x+9)*exp(5)^2+(-60*x^3-180*x^2)*e
xp(5)+900*x^4),x,method=_RETURNVERBOSE)
```

output
```
6*(x+25)/(x*exp(5)-30*x^2+3*exp(5))
```

3.568.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-132e^{5}+9000x+180x^{2}}{900x^{4}+e^{10}\left(9+6x+x^{2}\right)+e^{5}\left(-180x^{2}-60x^{3}\right)}\,dx=-\frac{6\,(x+25)}{30\,x^{2}-(x+3)e^{5}}$$

input
```
integrate((-132*exp(5)+180*x^2+9000*x)/((x^2+6*x+9)*exp(5)^2+(-60*x^3-180*
x^2)*exp(5)+900*x^4),x, algorithm=\
```

output
```
-6*(x + 25)/(30*x^2 - (x + 3)*e^5)
```

3.568.6 Sympy [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-132e^5 + 9000x + 180x^2}{900x^4 + e^{10}(9 + 6x + x^2) + e^5(-180x^2 - 60x^3)}\,dx = \frac{-6x - 150}{30x^2 - xe^5 - 3e^5}$$

input
```
integrate((-132*exp(5)+180*x**2+9000*x)/((x**2+6*x+9)*exp(5)**2+(-60*x**3-
180*x**2)*exp(5)+900*x**4),x)
```

output
```
(-6*x - 150)/(30*x**2 - x*exp(5) - 3*exp(5))
```

3.568.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{-132e^5 + 9000x + 180x^2}{900x^4 + e^{10}(9 + 6x + x^2) + e^5(-180x^2 - 60x^3)}\,dx = -\frac{6(x + 25)}{30x^2 - xe^5 - 3e^5}$$

input
```
integrate((-132*exp(5)+180*x^2+9000*x)/((x^2+6*x+9)*exp(5)^2+(-60*x^3-180*
x^2)*exp(5)+900*x^4),x, algorithm=\
```

output
```
-6*(x + 25)/(30*x^2 - x*e^5 - 3*e^5)
```

3.568.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{-132e^5 + 9000x + 180x^2}{900x^4 + e^{10}(9 + 6x + x^2) + e^5(-180x^2 - 60x^3)}\,dx = -\frac{6(x + 25)}{30x^2 - xe^5 - 3e^5}$$

input
```
integrate((-132*exp(5)+180*x^2+9000*x)/((x^2+6*x+9)*exp(5)^2+(-60*x^3-180*
x^2)*exp(5)+900*x^4),x, algorithm=\
```

output
```
-6*(x + 25)/(30*x^2 - x*e^5 - 3*e^5)
```

3.568.9 Mupad [B] (verification not implemented)

Time = 13.70 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{-132e^5+9000x+180x^2}{900x^4+e^{10}(9+6x+x^2)+e^5(-180x^2-60x^3)}\,dx=\frac{6\,x+150}{-30\,x^2+\mathrm{e}^5\,x+3\,\mathrm{e}^5}$$

input
```
int((9000*x - 132*exp(5) + 180*x^2)/(exp(10)*(6*x + x^2 + 9) - exp(5)*(180
*x^2 + 60*x^3) + 900*x^4),x)
```

output
```
(6*x + 150)/(3*exp(5) + x*exp(5) - 30*x^2)
```

3.569 $\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}(-6-12x^2+18\log(x^2))}{x^7}\,dx$

3.569.1 Optimal result

Integrand size = 35, antiderivative size = 17

$$\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}\left(-6-12x^2+18\log\left(x^2\right)\right)}{x^7}\,dx = e^{\frac{3\left(x^2-\log\left(x^2\right)\right)}{x^6}}$$

output
```
exp(3*(x^2-ln(x^2))/x^6)
```

3.569.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}\left(-6-12x^2+18\log\left(x^2\right)\right)}{x^7}\,dx = e^{\frac{3}{x^4}}\left(x^2\right)^{-\frac{3}{x^6}}$$

input
```
Integrate[(E^((3*x^2 - 3*Log[x^2])/x^6)*(-6 - 12*x^2 + 18*Log[x^2]))/x^7,x
]
```

output
```
E^(3/x^4)/(x^2)^(3/x^6)
```

3.569.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}\left(-12x^2+18\log\left(x^2\right)-6\right)}{x^7}\,dx$$

$$\Big\downarrow \ 7257$$

$$e^{\frac{3}{x^4}}\left(x^2\right)^{-\frac{3}{x^6}}$$

input
```
Int[(E^((3*x^2 - 3*Log[x^2])/x^6)*(-6 - 12*x^2 + 18*Log[x^2]))/x^7,x]
```

output
```
E^(3/x^4)/(x^2)^(3/x^6)
```

3.569.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.569.4 Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

method	result	size
risch	$\left(x^2\right)^{-\frac{3}{x^6}} \mathrm{e}^{\frac{3}{x^4}}$	17
parallelrisch	$\mathrm{e}^{-\frac{3\left(\ln\left(x^2\right)-x^2\right)}{x^6}}$	17
default	$\mathrm{e}^{\frac{-3\ln\left(x^2\right)+3x^2}{x^6}}$	18

input
```
int((18*ln(x^2)-12*x^2-6)*exp((-3*ln(x^2)+3*x^2)/x^6)/x^7,x,method=_RETURN
VERBOSE)
```

output
```
(x^2)^(-3/x^6)*exp(3/x^4)
```

3.569.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}(-6-12x^2+18\log(x^2))}{x^7}\,dx = e^{\left(\frac{3\left(x^2-\log(x^2)\right)}{x^6}\right)}$$

input
```
integrate((18*log(x^2)-12*x^2-6)*exp((-3*log(x^2)+3*x^2)/x^6)/x^7,x, algor
ithm=\
```

output
```
e^(3*(x^2 - log(x^2))/x^6)
```

3.569.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}(-6-12x^2+18\log(x^2))}{x^7}\,dx = e^{\frac{3x^2-3\log(x^2)}{x^6}}$$

input
```
integrate((18*ln(x**2)-12*x**2-6)*exp((-3*ln(x**2)+3*x**2)/x**6)/x**7,x)
```

output
```
exp((3*x**2 - 3*log(x**2))/x**6)
```

3.569.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}(-6-12x^2+18\log(x^2))}{x^7}\,dx = e^{\left(\frac{3}{x^4}-\frac{6\log(x)}{x^6}\right)}$$

input
```
integrate((18*log(x^2)-12*x^2-6)*exp((-3*log(x^2)+3*x^2)/x^6)/x^7,x, algor
ithm=\
```

output
```
e^(3/x^4 - 6*log(x)/x^6)
```

3.569.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}\left(-6-12x^2+18\log\left(x^2\right)\right)}{x^7}\,dx = e^{\left(\frac{3}{x^4}-\frac{3\log(x^2)}{x^6}\right)}$$

input
```
integrate((18*log(x^2)-12*x^2-6)*exp((-3*log(x^2)+3*x^2)/x^6)/x^7,x, algor
ithm=\
```

output
```
e^(3/x^4 - 3*log(x^2)/x^6)
```

3.569.9 Mupad [B] (verification not implemented)

Time = 14.01 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \frac{e^{\frac{3x^2-3\log(x^2)}{x^6}}\left(-6-12x^2+18\log\left(x^2\right)\right)}{x^7}\,dx = \frac{e^{\frac{3}{x^4}}}{(x^2)^{\frac{3}{x^6}}}$$

input
```
int(-(exp(-(3*log(x^2) - 3*x^2)/x^6)*(12*x^2 - 18*log(x^2) + 6))/x^7,x)
```

output
```
exp(3/x^4)/(x^2)^(3/x^6)
```

3.570 $\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^xx^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4)))}$

3.570.1 Optimal result

Integrand size = 117, antiderivative size = 26

$$\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^xx^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4)))}\,dx = 1+\frac{x^2}{e^{-3-e^x+x}+\log(\log(2x\log(4)))}$$

output
```
x^2/(exp(-exp(x)+x-3)+ln(ln(4*x*ln(2))))+1
```

3.570.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^xx^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4)))}\,dx = \frac{e^{3+e^x}x^2}{e^x+e^{3+e^x}\log(\log(x\log(16)))}$$

input
```
Integrate[(-x + E^(-3 - E^x + x)*(2*x - x^2 + E^x*x^2)*Log[2*x*Log[4]] + 2
*x*Log[2*x*Log[4]]*Log[Log[2*x*Log[4]]])/(E^(-6 - 2*E^x + 2*x)*Log[2*x*Log
[4]] + 2*E^(-3 - E^x + x)*Log[2*x*Log[4]]*Log[Log[2*x*Log[4]]] + Log[2*x*L
og[4]]*Log[Log[2*x*Log[4]]]^2),x]
```

output
```
(E^(3 + E^x)*x^2)/(E^x + E^(3 + E^x)*Log[Log[x*Log[16]]])
```

3.570.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x-e^x-3}\left(e^x x^2-x^2+2x\right)\log(2x\log(4))-x+2x\log(2x\log(4))\log(\log(2x\log(4)))}{\log(2x\log(4))\log^2(\log(2x\log(4)))+2e^{x-e^x-3}\log(2x\log(4))\log(\log(2x\log(4)))+e^{2x-2e^x-6}\log(2x\log(4))}dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{e^{2(e^x+3)}\left(e^{x-e^x-3}\left(e^x x^2-x^2+2x\right)\log(2x\log(4))-x+2x\log(2x\log(4))\log(\log(2x\log(4)))\right)}{\log(x\log(16))\left(e^x+e^{e^x+3}\log(\log(x\log(16)))\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(e^{2(e^x+3)-e^x-3}x^2+\frac{e^{2(e^x+3)}x\left(e^{e^x+3}x\log(x\log(16))\log^2(\log(x\log(16)))+x\log(x\log(16))\log(\log(x\log(16)))-\right.}{\log(x\log(16))\left(e^x+e^{e^x+3}\log(\log(x\log(16)))\right)^2}\right.$$

$$\Big\downarrow \; 2009$$

$$\int e^{3+e^x}x^2dx+\int \frac{e^{3(3+e^x)}x^2\log^2(\log(x\log(16)))}{\left(e^{3+e^x}\log(\log(x\log(16)))+e^x\right)^2}dx+\int \frac{e^{2(3+e^x)}x^2\log(\log(x\log(16)))}{\left(e^{3+e^x}\log(\log(x\log(16)))+e^x\right)^2}dx-\int \frac{e^{3+e^x}x^2}{e^{3+e^x}\log(\log(x\log(16)))+e^x}dx-2\int \frac{e^{2(3+e^x)}x^2\log(\log(x\log(16)))}{e^{3+e^x}\log(\log(x\log(16)))+e^x}dx-\int \frac{e^{2(3+e^x)}x}{\log(x\log(16))\left(e^{3+e^x}\log(\log(x\log(16)))+e^x\right)^2}dx+2\int \frac{e^{3+e^x}x}{e^{3+e^x}\log(\log(x\log(16)))+e^x}dx$$

input
```
Int[(-x + E^(-3 - E^x + x)*(2*x - x^2 + E^x*x^2)*Log[2*x*Log[4]] + 2*x*Log
[2*x*Log[4]]*Log[Log[2*x*Log[4]]])/(E^(-6 - 2*E^x + 2*x)*Log[2*x*Log[4]] +
 2*E^(-3 - E^x + x)*Log[2*x*Log[4]]*Log[Log[2*x*Log[4]]] + Log[2*x*Log[4]]
*Log[Log[2*x*Log[4]]]^2),x]
```

output
```
$Aborted
```

3.570.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.570.4 Maple [A] (verified)

Time = 5.94 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

method	result	size
risch	$\frac{x^2}{e^{-e^x+x-3}+\ln(\ln(4x\ln(2)))}$	23
parallelrisch	$\frac{x^2}{e^{-e^x+x-3}+\ln(\ln(4x\ln(2)))}$	23

input
```
int((2*x*ln(4*x*ln(2))*ln(ln(4*x*ln(2)))+(exp(x)*x^2-x^2+2*x)*ln(4*x*ln(2)
)*exp(-exp(x)+x-3)-x)/(ln(4*x*ln(2))*ln(ln(4*x*ln(2)))^2+2*ln(4*x*ln(2))*e
xp(-exp(x)+x-3)*ln(ln(4*x*ln(2)))+ln(4*x*ln(2))*exp(-exp(x)+x-3)^2),x,meth
od=_RETURNVERBOSE)
```

output
```
x^2/(exp(-exp(x)+x-3)+ln(ln(4*x*ln(2))))
```

3.570.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^x x^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4)))}$$
$$= \frac{x^2}{e^{(x-e^x-3)}+\log\left(\log\left(4\,x\log\left(2\right)\right)\right)}$$

3.570. $\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^x x^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4)))}\,dx$

input
```
integrate((2*x*log(4*x*log(2))*log(log(4*x*log(2)))+(exp(x)*x^2-x^2+2*x)*l
og(4*x*log(2))*exp(-exp(x)+x-3)-x)/(log(4*x*log(2))*log(log(4*x*log(2)))^2
+2*log(4*x*log(2))*exp(-exp(x)+x-3)*log(log(4*x*log(2)))+log(4*x*log(2))*e
xp(-exp(x)+x-3)^2),x, algorithm=\
```

output
```
x^2/(e^(x - e^x - 3) + log(log(4*x*log(2))))
```

3.570.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^xx^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4)))}$$
$$= \frac{x^2}{e^{x-e^x-3}+\log(\log(4x\log(2)))}$$

input
```
integrate((2*x*ln(4*x*ln(2))*ln(ln(4*x*ln(2)))+(exp(x)*x**2-x**2+2*x)*ln(4
*x*ln(2))*exp(-exp(x)+x-3)-x)/(ln(4*x*ln(2))*ln(ln(4*x*ln(2)))**2+2*ln(4*x
*ln(2))*exp(-exp(x)+x-3)*ln(ln(4*x*ln(2)))+ln(4*x*ln(2))*exp(-exp(x)+x-3)*
*2),x)
```

output
```
x**2/(exp(x - exp(x) - 3) + log(log(4*x*log(2))))
```

3.570.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^xx^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4)))}$$
$$= \frac{x^2e^{(e^x+3)}}{e^{(e^x+3)}\log(2\log(2)+\log(x)+\log(\log(2)))+e^x}$$

input
```
integrate((2*x*log(4*x*log(2))*log(log(4*x*log(2)))+(exp(x)*x^2-x^2+2*x)*l
og(4*x*log(2))*exp(-exp(x)+x-3)-x)/(log(4*x*log(2))*log(log(4*x*log(2)))^2
+2*log(4*x*log(2))*exp(-exp(x)+x-3)*log(log(4*x*log(2)))+log(4*x*log(2))*e
xp(-exp(x)+x-3)^2),x, algorithm=\
```

output
```
x^2*e^(e^x + 3)/(e^(e^x + 3)*log(2*log(2) + log(x) + log(log(2))) + e^x)
```

3.570.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 3138 vs. $2(24) = 48$.

Time = 0.78 (sec) , antiderivative size = 3138, normalized size of antiderivative = 120.69

$$\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^xx^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4$$
= Too large to display

input
```
integrate((2*x*log(4*x*log(2))*log(log(4*x*log(2)))+(exp(x)*x^2-x^2+2*x)*l
og(4*x*log(2))*exp(-exp(x)+x-3)-x)/(log(4*x*log(2))*log(log(4*x*log(2)))^2
+2*log(4*x*log(2))*exp(-exp(x)+x-3)*log(log(4*x*log(2)))+log(4*x*log(2))*e
xp(-exp(x)+x-3)^2),x, algorithm=\
```

output
```
(4*x^4*e^(6*x - 2*e^x + 6)*log(2)^2*log(2*log(2) + log(x) + log(log(2))) -
 8*x^4*e^(5*x - 2*e^x + 6)*log(2)^2*log(2*log(2) + log(x) + log(log(2))) +
 4*x^4*e^(4*x - 2*e^x + 6)*log(2)^2*log(2*log(2) + log(x) + log(log(2))) +
 4*x^4*e^(6*x - 2*e^x + 6)*log(2)*log(x)*log(2*log(2) + log(x) + log(log(2
))) - 8*x^4*e^(5*x - 2*e^x + 6)*log(2)*log(x)*log(2*log(2) + log(x) + log(
log(2))) + 4*x^4*e^(4*x - 2*e^x + 6)*log(2)*log(x)*log(2*log(2) + log(x) +
 log(log(2))) + x^4*e^(6*x - 2*e^x + 6)*log(x)^2*log(2*log(2) + log(x) + l
og(log(2))) - 2*x^4*e^(5*x - 2*e^x + 6)*log(x)^2*log(2*log(2) + log(x) + l
og(log(2))) + x^4*e^(4*x - 2*e^x + 6)*log(x)^2*log(2*log(2) + log(x) + log
(log(2))) + 4*x^4*e^(6*x - 2*e^x + 6)*log(2)*log(2*log(2) + log(x) + log(l
og(2)))*log(log(2)) - 8*x^4*e^(5*x - 2*e^x + 6)*log(2)*log(2*log(2) + log(
x) + log(log(2)))*log(log(2)) + 4*x^4*e^(4*x - 2*e^x + 6)*log(2)*log(2*log
(2) + log(x) + log(log(2)))*log(log(2)) + 2*x^4*e^(6*x - 2*e^x + 6)*log(x)
*log(2*log(2) + log(x) + log(log(2)))*log(log(2)) - 4*x^4*e^(5*x - 2*e^x +
 6)*log(x)*log(2*log(2) + log(x) + log(log(2)))*log(log(2)) + 2*x^4*e^(4*x
 - 2*e^x + 6)*log(x)*log(2*log(2) + log(x) + log(log(2)))*log(log(2)) + x^
4*e^(6*x - 2*e^x + 6)*log(2*log(2) + log(x) + log(log(2)))*log(log(2))^2 -
 2*x^4*e^(5*x - 2*e^x + 6)*log(2*log(2) + log(x) + log(log(2)))*log(log(2)
)^2 + x^4*e^(4*x - 2*e^x + 6)*log(2*log(2) + log(x) + log(log(2)))*log(log
(2))^2 + 4*x^4*e^(7*x - 3*e^x + 3)*log(2)^2 - 8*x^4*e^(6*x - 3*e^x + 3)...
```

3.570.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-x+e^{-3-e^x+x}(2x-x^2+e^xx^2)\log(2x\log(4))+2x\log(2x\log(4))\log(\log(2x\log(4)))}{e^{-6-2e^x+2x}\log(2x\log(4))+2e^{-3-e^x+x}\log(2x\log(4))\log(\log(2x\log(4)))+\log(2x\log(4))\log^2(\log(2x\log(4}$$

$$=\int \frac{e^{x-e^x-3}\,\ln(4\,x\,\ln(2))\,(2\,x+x^2\,e^x-x^2)-x+2\,x\,\ln(\ln(4\,x\,\ln(2)))\,\ln(4\,x\,\ln(2))}{\ln(4\,x\,\ln(2))\,\ln(\ln(4\,x\,\ln(2)))^2+2\,e^{x-e^x-3}\,\ln(4\,x\,\ln(2))\,\ln(\ln(4\,x\,\ln(2)))+e^{2\,x-2\,e^x-6}\,\ln(4\,x\,\ln(2}$$

input
```
int((exp(x - exp(x) - 3)*log(4*x*log(2))*(2*x + x^2*exp(x) - x^2) - x + 2*
x*log(log(4*x*log(2)))*log(4*x*log(2)))/(log(log(4*x*log(2)))^2*log(4*x*lo
g(2)) + exp(2*x - 2*exp(x) - 6)*log(4*x*log(2)) + 2*log(log(4*x*log(2)))*e
xp(x - exp(x) - 3)*log(4*x*log(2))),x)
```

output
```
int((exp(x - exp(x) - 3)*log(4*x*log(2))*(2*x + x^2*exp(x) - x^2) - x + 2*
x*log(log(4*x*log(2)))*log(4*x*log(2)))/(log(log(4*x*log(2)))^2*log(4*x*lo
g(2)) + exp(2*x - 2*exp(x) - 6)*log(4*x*log(2)) + 2*log(log(4*x*log(2)))*e
xp(x - exp(x) - 3)*log(4*x*log(2))), x)
```

3.571 $\int \frac{-1+192x+6x^2+15x^4+(-4-4x^2)\log(1+x^2)}{2+2x^2}\,dx$

3.571.1 Optimal result

Integrand size = 39, antiderivative size = 26

$$\int \frac{-1+192x+6x^2+15x^4+(-4-4x^2)\log(1+x^2)}{2+2x^2}\,dx = \frac{1}{2}\left(5x^3+(24-x)\left(1+4\log\left(1+x^2\right)\right)\right)$$

output
```
5/2*x^3+1/2*(-x+24)*(1+4*ln(x^2+1))
```

3.571.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.04 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.85

$$\int \frac{-1+192x+6x^2+15x^4+(-4-4x^2)\log(1+x^2)}{2+2x^2}\,dx = \frac{1}{2}\left(-x+5x^3-8\arctan(x)+(96-4i)\log(i-x)+(96+4i)\log(i+x)-4x\log\left(1+x^2\right)\right)$$

input
```
Integrate[(-1 + 192*x + 6*x^2 + 15*x^4 + (-4 - 4*x^2)*Log[1 + x^2])/(2 + 2
*x^2),x]
```

output
```
(-x + 5*x^3 - 8*ArcTan[x] + (96 - 4*I)*Log[I - x] + (96 + 4*I)*Log[I + x]
- 4*x*Log[1 + x^2])/2
```

3.571.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.051, Rules used = {7276, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{15x^4+6x^2+(-4x^2-4)\log(x^2+1)+192x-1}{2x^2+2}dx$$

$$\Big\downarrow \text{7276}$$

$$\int \left(\frac{15x^4+6x^2+192x-1}{2(x^2+1)}-2\log(x^2+1)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{5x^3}{2}-2x\log(x^2+1)+48\log(x^2+1)-\frac{x}{2}$$

input
```
Int[(-1 + 192*x + 6*x^2 + 15*x^4 + (-4 - 4*x^2)*Log[1 + x^2])/(2 + 2*x^2),
x]
```

output
```
-1/2*x + (5*x^3)/2 + 48*Log[1 + x^2] - 2*x*Log[1 + x^2]
```

3.571.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.571.4 Maple [A] (verified)

Time = 1.30 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

method	result	size
default	$\frac{5x^3}{2}-\frac{x}{2}+48\ln\left(x^2+1\right)-2x\ln\left(x^2+1\right)$	27
norman	$\frac{5x^3}{2}-\frac{x}{2}+48\ln\left(x^2+1\right)-2x\ln\left(x^2+1\right)$	27
risch	$\frac{5x^3}{2}-\frac{x}{2}+48\ln\left(x^2+1\right)-2x\ln\left(x^2+1\right)$	27
parallelrisch	$\frac{5x^3}{2}-\frac{x}{2}+48\ln\left(x^2+1\right)-2x\ln\left(x^2+1\right)$	27
parts	$\frac{5x^3}{2}-\frac{x}{2}+48\ln\left(x^2+1\right)-2x\ln\left(x^2+1\right)$	27

input
```
int(((-4*x^2-4)*ln(x^2+1)+15*x^4+6*x^2+192*x-1)/(2*x^2+2),x,method=_RETURN
VERBOSE)
```

output
```
5/2*x^3-1/2*x+48*ln(x^2+1)-2*x*ln(x^2+1)
```

3.571.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{-1+192x+6x^2+15x^4+(-4-4x^2)\log(1+x^2)}{2+2x^2}\,dx=\frac{5}{2}\,x^3-2\,(x-24)\log\left(x^2+1\right)-\frac{1}{2}\,x$$

input
```
integrate(((-4*x^2-4)*log(x^2+1)+15*x^4+6*x^2+192*x-1)/(2*x^2+2),x, algori
thm=\
```

output
```
5/2*x^3 - 2*(x - 24)*log(x^2 + 1) - 1/2*x
```

3.571.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{-1+192x+6x^2+15x^4+(-4-4x^2)\log(1+x^2)}{2+2x^2}\,dx$$
$$=\frac{5x^3}{2}-2x\log\left(x^2+1\right)-\frac{x}{2}+48\log\left(x^2+1\right)$$

input
```
integrate(((-4*x**2-4)*ln(x**2+1)+15*x**4+6*x**2+192*x-1)/(2*x**2+2),x)
```

output
```
5*x**3/2 - 2*x*log(x**2 + 1) - x/2 + 48*log(x**2 + 1)
```

3.571.7 Maxima [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{-1+192x+6x^2+15x^4+(-4-4x^2)\log(1+x^2)}{2+2x^2}\,dx = \frac{5}{2}\,x^3-2\,x\log\left(x^2+1\right)-\frac{1}{2}\,x+48\,\log\left(x^2+1\right)$$

input
```
integrate(((-4*x^2-4)*log(x^2+1)+15*x^4+6*x^2+192*x-1)/(2*x^2+2),x, algori
thm=\
```

output
```
5/2*x^3 - 2*x*log(x^2 + 1) - 1/2*x + 48*log(x^2 + 1)
```

3.571.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{-1+192x+6x^2+15x^4+(-4-4x^2)\log(1+x^2)}{2+2x^2}\,dx = \frac{5}{2}\,x^3-2\,x\log\left(x^2+1\right)-\frac{1}{2}\,x+48\,\log\left(x^2+1\right)$$

input
```
integrate(((-4*x^2-4)*log(x^2+1)+15*x^4+6*x^2+192*x-1)/(2*x^2+2),x, algori
thm=\
```

output
```
5/2*x^3 - 2*x*log(x^2 + 1) - 1/2*x + 48*log(x^2 + 1)
```

3.571.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{-1+192x+6x^2+15x^4+(-4-4x^2)\log(1+x^2)}{2+2x^2}\,dx = 48\,\ln\left(x^2+1\right)-x\left(2\,\ln\left(x^2+1\right)+\frac{1}{2}\right)+\frac{5\,x^3}{2}$$

input
```
int((192*x - log(x^2 + 1)*(4*x^2 + 4) + 6*x^2 + 15*x^4 - 1)/(2*x^2 + 2),x)
```

output
```
48*log(x^2 + 1) - x*(2*log(x^2 + 1) + 1/2) + (5*x^3)/2
```

3.572 $\int \frac{-9e^{2/3}-9e^3+e^{-4+x}(162-72x+8x^2)}{162-72x+8x^2}\,dx$

3.572.1 Optimal result

Integrand size = 42, antiderivative size = 27

$$\int \frac{-9e^{2/3}-9e^3+e^{-4+x}(162-72x+8x^2)}{162-72x+8x^2}\,dx = e^{-4+x}+\frac{\left(e^{2/3}+e^3\right)x}{4\left(-\frac{9}{2}+x\right)}$$

output
```
1/4*(exp(3)+exp(2/3))/(x-9/2)*x+exp(x-4)
```

3.572.2 Mathematica [A] (verified)

Time = 0.77 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{-9e^{2/3}-9e^3+e^{-4+x}(162-72x+8x^2)}{162-72x+8x^2}\,dx = \frac{2e^x+\frac{9\left(e^{14/3}+e^7\right)}{-18+4x}}{2e^4}$$

input
```
Integrate[(-9*E^(2/3) - 9*E^3 + E^(-4 + x)*(162 - 72*x + 8*x^2))/(162 - 72
*x + 8*x^2),x]
```

output
```
(2*E^x + (9*(E^(14/3) + E^7))/(-18 + 4*x))/(2*E^4)
```

3.572.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x-4}(8x^2-72x+162)-9e^3-9e^{2/3}}{8x^2-72x+162}dx$$

$$\Big\downarrow \text{7277}$$

$$32\int -\frac{9e^{2/3}(1+e^{7/3})-2e^{x-4}(4x^2-36x+81)}{64(9-2x)^2}dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{1}{2}\int \frac{9e^{2/3}(1+e^{7/3})-2e^{x-4}(4x^2-36x+81)}{(9-2x)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{2}\int \left(\frac{9(e^{2/3}+e^3)}{(2x-9)^2}-2e^{x-4}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(2e^{x-4}-\frac{9e^{2/3}(1+e^{7/3})}{2(9-2x)}\right)$$

input
```
Int[(-9*E^(2/3) - 9*E^3 + E^(-4 + x)*(162 - 72*x + 8*x^2))/(162 - 72*x + 8
*x^2),x]
```

output
```
(2*E^(-4 + x) - (9*E^(2/3)*(1 + E^(7/3)))/(2*(9 - 2*x)))/2
```

3.572.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.572.4 Maple [A] (verified)

Time = 1.68 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

method	result	size
risch	$\frac{9\,\mathrm{e}^{3}}{8\left(x-\frac{9}{2}\right)}+\frac{9\,\mathrm{e}^{\frac{2}{3}}}{8\left(x-\frac{9}{2}\right)}+\mathrm{e}^{x-4}$	24
parts	$-\frac{-\frac{9\,\mathrm{e}^{\frac{2}{3}}}{2}-\frac{9\,\mathrm{e}^{3}}{2}}{2(2x-9)}+\mathrm{e}^{x-4}$	24
derivativedivides	$\frac{9\,\mathrm{e}^{3}}{4(2x-9)}+\frac{9\,\mathrm{e}^{\frac{2}{3}}}{4(2x-9)}+\mathrm{e}^{x-4}$	28
default	$\frac{9\,\mathrm{e}^{3}}{4(2x-9)}+\frac{9\,\mathrm{e}^{\frac{2}{3}}}{4(2x-9)}+\mathrm{e}^{x-4}$	28
norman	$\frac{2x\,\mathrm{e}^{x-4}-9\,\mathrm{e}^{x-4}+\frac{9\,\mathrm{e}^{3}}{4}+\frac{9\,\mathrm{e}^{\frac{2}{3}}}{4}}{2x-9}$	31
parallelrisch	$\frac{8x\,\mathrm{e}^{x-4}+9\,\mathrm{e}^{3}-36\,\mathrm{e}^{x-4}+9\,\mathrm{e}^{\frac{2}{3}}}{8x-36}$	32

input
```
int(((8*x^2-72*x+162)*exp(x-4)-9*exp(3)-9*exp(2/3))/(8*x^2-72*x+162),x,met
hod=_RETURNVERBOSE)
```

output
```
9/8/(x-9/2)*exp(3)+9/8/(x-9/2)*exp(2/3)+exp(x-4)
```

3.572.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{-9e^{2/3}-9e^3+e^{-4+x}(162-72x+8x^2)}{162-72x+8x^2}\,dx=\frac{4\,(2\,x-9)e^{(x-4)}+9\,e^3+9\,e^{\frac{2}{3}}}{4\,(2\,x-9)}$$

input
```
integrate(((8*x^2-72*x+162)*exp(x-4)-9*exp(3)-9*exp(2/3))/(8*x^2-72*x+162)
,x, algorithm=\
```

output
```
1/4*(4*(2*x - 9)*e^(x - 4) + 9*e^3 + 9*e^(2/3))/(2*x - 9)
```

3.572.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{-9e^{2/3}-9e^3+e^{-4+x}(162-72x+8x^2)}{162-72x+8x^2}\,dx=e^{x-4}-\frac{-9e^3-9e^{\frac{2}{3}}}{8x-36}$$

input
```
integrate(((8*x**2-72*x+162)*exp(x-4)-9*exp(3)-9*exp(2/3))/(8*x**2-72*x+16
2),x)
```

output
```
exp(x - 4) - (-9*exp(3) - 9*exp(2/3))/(8*x - 36)
```

3.572.7 Maxima [F]

$$\int \frac{-9e^{2/3}-9e^3+e^{-4+x}(162-72x+8x^2)}{162-72x+8x^2}\,dx=\int \frac{2\,(4\,x^2-36\,x+81)e^{(x-4)}-9\,e^3-9\,e^{\frac{2}{3}}}{2\,(4\,x^2-36\,x+81)}\,dx$$

input
```
integrate(((8*x^2-72*x+162)*exp(x-4)-9*exp(3)-9*exp(2/3))/(8*x^2-72*x+162)
,x, algorithm=\
```

output
```
4*(x^2 - 9*x)*e^x/(4*x^2*e^4 - 36*x*e^4 + 81*e^4) - 81/2*e^(1/2)*exp_integ
ral_e(2, -x + 9/2)/(2*x - 9) + 9/4*e^3/(2*x - 9) + 9/4*e^(2/3)/(2*x - 9) -
 324*integrate(e^x/(8*x^3*e^4 - 108*x^2*e^4 + 486*x*e^4 - 729*e^4), x)
```

3.572.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{-9e^{2/3} - 9e^3 + e^{-4+x}(162 - 72x + 8x^2)}{162 - 72x + 8x^2}\,dx = \frac{8\,xe^x + 9\,e^7 + 9\,e^{\frac{14}{3}} - 36\,e^x}{4\,(2\,xe^4 - 9\,e^4)}$$

input
```
integrate(((8*x^2-72*x+162)*exp(x-4)-9*exp(3)-9*exp(2/3))/(8*x^2-72*x+162)
,x, algorithm=\
```

output
```
1/4*(8*x*e^x + 9*e^7 + 9*e^(14/3) - 36*e^x)/(2*x*e^4 - 9*e^4)
```

3.572.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{-9e^{2/3} - 9e^3 + e^{-4+x}(162 - 72x + 8x^2)}{162 - 72x + 8x^2}\,dx = \mathrm{e}^{x-4} + \frac{\frac{9\,\mathrm{e}^3}{2} + \frac{9\,\mathrm{e}^{2/3}}{2}}{4\,x - 18}$$

input
```
int(-(9*exp(3) + 9*exp(2/3) - exp(x - 4)*(8*x^2 - 72*x + 162))/(8*x^2 - 72
*x + 162),x)
```

output
```
exp(x - 4) + ((9*exp(3))/2 + (9*exp(2/3))/2)/(4*x - 18)
```

3.573 $\int \left(12-16x+6x^2+e^{3/4}(4-8x+3x^2)+(4-8x+\right.$

3.573.1 Optimal result

Integrand size = 39, antiderivative size = 29

$$\int \left(12-16x+6x^2+e^{3/4}\left(4-8x+3x^2\right)+\left(4-8x+3x^2\right)\log(2)\right)\,dx=x\left(x-(2-x)^2\left(-2-e^{3/4}+\frac{1}{x}-\log(2)\right)\right)$$

output
```
(x-(-2-ln(2)-exp(3/4)+1/x)*(2-x)^2)*x
```

3.573.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24

$$\int \left(12-16x+6x^2+e^{3/4}\left(4-8x+3x^2\right)+\left(4-8x+3x^2\right)\log(2)\right)\,dx=\frac{1}{3}x\left(36+3e^{3/4}(-2+x)^2-12x(2+\log(2))+x^2(6+\log(8))+\log(4096)\right)$$

input
```
Integrate[12 - 16*x + 6*x^2 + E^(3/4)*(4 - 8*x + 3*x^2) + (4 - 8*x + 3*x^2
)*Log[2],x]
```

output
```
(x*(36 + 3*E^(3/4)*(-2 + x)^2 - 12*x*(2 + Log[2]) + x^2*(6 + Log[8]) + Log
[4096]))/3
```

3.573.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.72, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.051, Rules used = {6, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(6x^2+e^{3/4}(3x^2-8x+4)+(3x^2-8x+4)\log(2)-16x+12\right)dx$$

$$\Big\downarrow \ 6$$

$$\int \left(6x^2+(3x^2-8x+4)\left(e^{3/4}+\log(2)\right)-16x+12\right)dx$$

$$\Big\downarrow \ 2009$$

$$2x^3+x^3\left(e^{3/4}+\log(2)\right)-8x^2-4x^2\left(e^{3/4}+\log(2)\right)+12x+4x\left(e^{3/4}+\log(2)\right)$$

input
```
Int[12 - 16*x + 6*x^2 + E^(3/4)*(4 - 8*x + 3*x^2) + (4 - 8*x + 3*x^2)*Log[
2],x]
```

output
```
12*x - 8*x^2 + 2*x^3 + 4*x*(E^(3/4) + Log[2]) - 4*x^2*(E^(3/4) + Log[2]) +
 x^3*(E^(3/4) + Log[2])
```

3.573.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.573.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.31

method	result	size
norman	$\left(e^{\frac{3}{4}}+\ln\left(2\right)+2\right)x^{3}+\left(-4\ln\left(2\right)-4\,e^{\frac{3}{4}}-8\right)x^{2}+\left(4\ln\left(2\right)+4\,e^{\frac{3}{4}}+12\right)x$	38
gosper	$x\left(x^{2}\ln\left(2\right)+x^{2}e^{\frac{3}{4}}-4x\ln\left(2\right)-4x\,e^{\frac{3}{4}}+2x^{2}+4\ln\left(2\right)+4\,e^{\frac{3}{4}}-8x+12\right)$	43
default	$x^{3}\ln\left(2\right)+x^{3}e^{\frac{3}{4}}-4x^{2}\ln\left(2\right)-4x^{2}e^{\frac{3}{4}}+2x^{3}+4x\ln\left(2\right)+4x\,e^{\frac{3}{4}}-8x^{2}+12x$	51
risch	$x^{3}\ln\left(2\right)+x^{3}e^{\frac{3}{4}}-4x^{2}\ln\left(2\right)-4x^{2}e^{\frac{3}{4}}+2x^{3}+4x\ln\left(2\right)+4x\,e^{\frac{3}{4}}-8x^{2}+12x$	51
parallelrisch	$x^{3}\ln\left(2\right)+x^{3}e^{\frac{3}{4}}-4x^{2}\ln\left(2\right)-4x^{2}e^{\frac{3}{4}}+2x^{3}+4x\ln\left(2\right)+4x\,e^{\frac{3}{4}}-8x^{2}+12x$	51
parts	$x^{3}\ln\left(2\right)+x^{3}e^{\frac{3}{4}}-4x^{2}\ln\left(2\right)-4x^{2}e^{\frac{3}{4}}+2x^{3}+4x\ln\left(2\right)+4x\,e^{\frac{3}{4}}-8x^{2}+12x$	51

input
```
int((3*x^2-8*x+4)*ln(2)+(3*x^2-8*x+4)*exp(3/4)+6*x^2-16*x+12,x,method=_RET
URNVERBOSE)
```

output
```
(exp(3/4)+ln(2)+2)*x^3+(-4*ln(2)-4*exp(3/4)-8)*x^2+(4*ln(2)+4*exp(3/4)+12)
*x
```

3.573.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.52

$$\int \left(12-16x+6x^2+e^{3/4}\left(4-8x+3x^2\right)+\left(4-8x+3x^2\right)\log(2)\right)\,dx=2\,x^3-8\,x^2+\left(x^3-4\,x^2+4\,x\right)e^{\frac{3}{4}}+\left(x^3-4\,x^2+4\,x\right)\log\left(2\right)+12\,x$$

input
```
integrate((3*x^2-8*x+4)*log(2)+(3*x^2-8*x+4)*exp(3/4)+6*x^2-16*x+12,x, alg
orithm=\
```

output
```
2*x^3 - 8*x^2 + (x^3 - 4*x^2 + 4*x)*e^(3/4) + (x^3 - 4*x^2 + 4*x)*log(2) +
 12*x
```

3.573.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. 2(20) = 40.

Time = 0.03 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.59

$$\int \left(12-16x+6x^2+e^{3/4}\left(4-8x+3x^2\right)+\left(4-8x+3x^2\right)\log(2)\right)\,dx=x^3\left(\log(2)+2+e^{\frac{3}{4}}\right)+x^2\left(-4e^{\frac{3}{4}}-8-4\log(2)\right)+x\left(4\log(2)+4e^{\frac{3}{4}}+12\right)$$

input
```
integrate((3*x**2-8*x+4)*ln(2)+(3*x**2-8*x+4)*exp(3/4)+6*x**2-16*x+12,x)
```

output
```
x**3*(log(2) + 2 + exp(3/4)) + x**2*(-4*exp(3/4) - 8 - 4*log(2)) + x*(4*lo
g(2) + 4*exp(3/4) + 12)
```

3.573.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.52

$$\int \left(12-16x+6x^2+e^{3/4}\left(4-8x+3x^2\right)+\left(4-8x+3x^2\right)\log(2)\right)\,dx=2\,x^3-8\,x^2+\left(x^3-4\,x^2+4\,x\right)e^{\frac{3}{4}}+\left(x^3-4\,x^2+4\,x\right)\log(2)+12\,x$$

input
```
integrate((3*x^2-8*x+4)*log(2)+(3*x^2-8*x+4)*exp(3/4)+6*x^2-16*x+12,x, alg
orithm=\
```

output
```
2*x^3 - 8*x^2 + (x^3 - 4*x^2 + 4*x)*e^(3/4) + (x^3 - 4*x^2 + 4*x)*log(2) +
 12*x
```

3.573.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.52

$$\int \left(12-16x+6x^2+e^{3/4}\left(4-8x+3x^2\right)+\left(4-8x+3x^2\right)\log(2)\right)\,dx=2\,x^3-8\,x^2+\left(x^3-4\,x^2+4\,x\right)e^{\frac{3}{4}}+\left(x^3-4\,x^2+4\,x\right)\log(2)+12\,x$$

input
```
integrate((3*x^2-8*x+4)*log(2)+(3*x^2-8*x+4)*exp(3/4)+6*x^2-16*x+12,x, alg
orithm=\
```

output
```
2*x^3 - 8*x^2 + (x^3 - 4*x^2 + 4*x)*e^(3/4) + (x^3 - 4*x^2 + 4*x)*log(2) +
 12*x
```

3.573.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

$$\int \left(12-16x+6x^2+e^{3/4}\left(4-8x+3x^2\right)+\left(4-8x+3x^2\right)\log(2)\right)\,dx=\left(\mathrm{e}^{3/4}+\ln\left(2\right)+2\right)\,x^3+\left(-4\,\mathrm{e}^{3/4}-\ln\left(16\right)-8\right)\,x^2+\left(4\,\mathrm{e}^{3/4}+\ln\left(16\right)+12\right)\,x$$

input
```
int(exp(3/4)*(3*x^2 - 8*x + 4) - 16*x + log(2)*(3*x^2 - 8*x + 4) + 6*x^2 +
 12,x)
```

output
```
x*(4*exp(3/4) + log(16) + 12) + x^3*(exp(3/4) + log(2) + 2) - x^2*(4*exp(3
/4) + log(16) + 8)
```

3.574 $\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx$

3.574.1 Optimal result

Integrand size = 61, antiderivative size = 28

$$\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx = -x+x^2+\left(1+\frac{x^4}{5(1+x)^2}\right)(5-\log(x))$$

output
```
(1+1/5/(1+x)^2*x^4)*(5-ln(x))+x^2-x
```

3.574.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.68

$$\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx = \frac{5(-3-7x-4x^2+x^3+2x^4)-(5+10x+5x^2+x^4)\log(x)}{5(1+x)^2}$$

input
```
Integrate[(-5 - 20*x - 20*x^2 + 10*x^3 + 44*x^4 + 19*x^5 + (-4*x^4 - 2*x^5
)*Log[x])/(5*x + 15*x^2 + 15*x^3 + 5*x^4),x]
```

output
```
(5*(-3 - 7*x - 4*x^2 + x^3 + 2*x^4) - (5 + 10*x + 5*x^2 + x^4)*Log[x])/(5*
(1 + x)^2)
```

3.574.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 78 vs. 2(28) = 56.

Time = 0.66 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.79, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.066$, Rules used = {2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{19x^5+44x^4+10x^3-20x^2+(-2x^5-4x^4)\log(x)-20x-5}{5x^4+15x^3+15x^2+5x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{19x^5+44x^4+10x^3-20x^2+(-2x^5-4x^4)\log(x)-20x-5}{x(5x^3+15x^2+15x+5)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{19x^5+44x^4+10x^3-20x^2+(-2x^5-4x^4)\log(x)-20x-5}{x\left(\sqrt[3]{5}x+\sqrt[3]{5}\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{19x^4}{5(x+1)^3}+\frac{44x^3}{5(x+1)^3}-\frac{2(x+2)x^3\log(x)}{5(x+1)^3}+\frac{2x^2}{(x+1)^3}-\frac{4x}{(x+1)^3}-\frac{4}{(x+1)^3}-\frac{1}{(x+1)^3x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2x^2}{(x+1)^2}+2x^2-\frac{1}{5}x^2\log(x)-3x-\frac{8}{x+1}+\frac{3}{(x+1)^2}-\frac{4x\log(x)}{5(x+1)}+\frac{2}{5}x\log(x)-\frac{\log(x)}{5(x+1)^2}-\frac{4\log(x)}{5}$$

input
```
Int[(-5 - 20*x - 20*x^2 + 10*x^3 + 44*x^4 + 19*x^5 + (-4*x^4 - 2*x^5)*Log[
x])/(5*x + 15*x^2 + 15*x^3 + 5*x^4),x]
```

output
```
-3*x + 2*x^2 + 3/(1 + x)^2 - (2*x^2)/(1 + x)^2 - 8/(1 + x) - (4*Log[x])/5
+ (2*x*Log[x])/5 - (x^2*Log[x])/5 - Log[x]/(5*(1 + x)^2) - (4*x*Log[x])/(5
*(1 + x))
```

3.574.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.574.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

method	result	size
norman	$\frac{x^3-\ln(x)+x-2x\ln(x)-x^2\ln(x)+2x^4-\frac{x^4\ln(x)}{5}+1}{(1+x)^2}$	41
parallelrisch	$\frac{-x^4\ln(x)+10x^4+5x^3-5x^2\ln(x)+5-10x\ln(x)+5x-5\ln(x)}{5x^2+10x+5}$	51
default	$2x^2-3x-\ln(x)+\frac{1}{(1+x)^2}-\frac{4}{1+x}-\frac{x^2\ln(x)}{5}+\frac{2x\ln(x)}{5}+\frac{\ln(x)x(2+x)}{5(1+x)^2}-\frac{4\ln(x)x}{5(1+x)}$	61
parts	$2x^2-3x-\ln(x)+\frac{1}{(1+x)^2}-\frac{4}{1+x}-\frac{x^2\ln(x)}{5}+\frac{2x\ln(x)}{5}+\frac{\ln(x)x(2+x)}{5(1+x)^2}-\frac{4\ln(x)x}{5(1+x)}$	61
risch	$-\frac{(x^4-3x^2-6x-3)\ln(x)}{5(x^2+2x+1)}-\frac{-10x^4+8x^2\ln(x)-5x^3+16x\ln(x)+20x^2+8\ln(x)+35x+15}{5(x^2+2x+1)}$	77

input
```
int(((-2*x^5-4*x^4)*ln(x)+19*x^5+44*x^4+10*x^3-20*x^2-20*x-5)/(5*x^4+15*x^
3+15*x^2+5*x),x,method=_RETURNVERBOSE)
```

output
```
(x^3-ln(x)+x-2*x*ln(x)-x^2*ln(x)+2*x^4-1/5*x^4*ln(x)+1)/(1+x)^2
```

3.574. $\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx$

3.574.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(24) = 48.

Time = 0.26 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.75

$$\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx = \frac{10\,x^4+5\,x^3-20\,x^2-(x^4+5\,x^2+10\,x+5)\log(x)-35\,x-15}{5\,(x^2+2\,x+1)}$$

input
```
integrate((((-2*x^5-4*x^4)*log(x)+19*x^5+44*x^4+10*x^3-20*x^2-20*x-5)/(5*x^
4+15*x^3+15*x^2+5*x),x, algorithm=\
```

output
```
1/5*(10*x^4 + 5*x^3 - 20*x^2 - (x^4 + 5*x^2 + 10*x + 5)*log(x) - 35*x - 15
)/(x^2 + 2*x + 1)
```

3.574.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. 2(20) = 40.

Time = 0.18 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.00

$$\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx = 2x^2-3x+\frac{-4x-3}{x^2+2x+1}-\frac{8\log(x)}{5}+\frac{(-x^4+3x^2+6x+3)\log(x)}{5x^2+10x+5}$$

input
```
integrate(((-2*x**5-4*x**4)*ln(x)+19*x**5+44*x**4+10*x**3-20*x**2-20*x-5)/
(5*x**4+15*x**3+15*x**2+5*x),x)
```

output
```
2*x**2 - 3*x + (-4*x - 3)/(x**2 + 2*x + 1) - 8*log(x)/5 + (-x**4 + 3*x**2
+ 6*x + 3)*log(x)/(5*x**2 + 10*x + 5)
```

3.574.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 148 vs. 2(24) = 48.

Time = 0.24 (sec) , antiderivative size = 148, normalized size of antiderivative = 5.29

$$\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx$$
$$= \frac{19}{10}\,x^2 - \frac{13}{5}\,x - \frac{2\,x^4\log(x) - x^4 + 2\,x^3 + 7\,x^2 + 2\,x - 2}{10\,(x^2+2\,x+1)} + \frac{19\,(8\,x+7)}{10\,(x^2+2\,x+1)} - \frac{22\,(6\,x+5)}{5\,(x^2+2\,x+1)} + \frac{4\,x+3}{x^2+2\,x+1} - \frac{2\,x+3}{2\,(x^2+2\,x+1)} + \frac{2\,(2\,x+1)}{x^2+2\,x+1} + \frac{2}{x^2+2\,x+1} - \log(x)$$

input
```
integrate(((-2*x^5-4*x^4)*log(x)+19*x^5+44*x^4+10*x^3-20*x^2-20*x-5)/(5*x^
4+15*x^3+15*x^2+5*x),x, algorithm=\
```

output
```
19/10*x^2 - 13/5*x - 1/10*(2*x^4*log(x) - x^4 + 2*x^3 + 7*x^2 + 2*x - 2)/(
x^2 + 2*x + 1) + 19/10*(8*x + 7)/(x^2 + 2*x + 1) - 22/5*(6*x + 5)/(x^2 + 2
*x + 1) + (4*x + 3)/(x^2 + 2*x + 1) - 1/2*(2*x + 3)/(x^2 + 2*x + 1) + 2*(2
*x + 1)/(x^2 + 2*x + 1) + 2/(x^2 + 2*x + 1) - log(x)
```

3.574.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(24) = 48.

Time = 0.27 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.07

$$\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx = 2\,x^2 - \frac{1}{5}\left(x^2 - 2\,x - \frac{4\,x+3}{x^2+2\,x+1}\right)\log(x) - 3\,x - \frac{4\,x+3}{x^2+2\,x+1} - \frac{8}{5}\,\log(x)$$

input
```
integrate(((-2*x^5-4*x^4)*log(x)+19*x^5+44*x^4+10*x^3-20*x^2-20*x-5)/(5*x^
4+15*x^3+15*x^2+5*x),x, algorithm=\
```

output
```
2*x^2 - 1/5*(x^2 - 2*x - (4*x + 3)/(x^2 + 2*x + 1))*log(x) - 3*x - (4*x +
3)/(x^2 + 2*x + 1) - 8/5*log(x)
```

3.574.9 Mupad [B] (verification not implemented)

Time = 13.86 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{-5-20x-20x^2+10x^3+44x^4+19x^5+(-4x^4-2x^5)\log(x)}{5x+15x^2+15x^3+5x^4}\,dx$$
$$=-\frac{x+\ln(x)+x^2\,\ln(x)+\frac{x^4\,\ln(x)}{5}+2\,x\,\ln(x)+x^2-x^3-2\,x^4}{(x+1)^2}$$

input
```
int(-(20*x + log(x)*(4*x^4 + 2*x^5) + 20*x^2 - 10*x^3 - 44*x^4 - 19*x^5 +
5)/(5*x + 15*x^2 + 15*x^3 + 5*x^4),x)
```

output
```
-(x + log(x) + x^2*log(x) + (x^4*log(x))/5 + 2*x*log(x) + x^2 - x^3 - 2*x^
4)/(x + 1)^2
```

3.575 $\int \frac{-2x-x^2-2\log\left(\frac{5}{4}\right.}{4x+4x^2+x^3+(4+4x+x^2)\log\left(\frac{5}{4}\right)+\left(-4x^2-2x^3+(-4x-2x^2)\log\left(\frac{5}{4}\right)\right.}$

3.575.1 Optimal result

Integrand size = 98, antiderivative size = 18

$$\int \frac{-2x-x^2-2\log\left(\frac{5}{4}\right)}{4x+4x^2+x^3+(4+4x+x^2)\log\left(\frac{5}{4}\right)+\left(-4x^2-2x^3+(-4x-2x^2)\log\left(\frac{5}{4}\right)\right)\log\left(x+\log\left(\frac{5}{4}\right)\right)+(x^3+\ldots}$$
$$=\frac{x}{-2-x+x\log\left(x+\log\left(\frac{5}{4}\right)\right)}$$

output
```
x/(ln(ln(5/4)+x)*x-2-x)
```

3.575.2 Mathematica [A] (verified)

Time = 10.04 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{-2x-x^2-2\log\left(\frac{5}{4}\right)}{4x+4x^2+x^3+(4+4x+x^2)\log\left(\frac{5}{4}\right)+\left(-4x^2-2x^3+(-4x-2x^2)\log\left(\frac{5}{4}\right)\right)\log\left(x+\log\left(\frac{5}{4}\right)\right)+(x^3+\ldots}$$
$$=-\frac{x}{2+x-x\log\left(x+\log\left(\frac{5}{4}\right)\right)}$$

input
```
Integrate[(-2*x - x^2 - 2*Log[5/4])/(4*x + 4*x^2 + x^3 + (4 + 4*x + x^2)*L
og[5/4] + (-4*x^2 - 2*x^3 + (-4*x - 2*x^2)*Log[5/4])*Log[x + Log[5/4]] + (
x^3 + x^2*Log[5/4])*Log[x + Log[5/4]]^2),x]
```

output
```
-(x/(2 + x - x*Log[x + Log[5/4]]))
```

3.575. $\int \frac{-2x-x^2-2\log\left(\frac{5}{4}\right)}{4x+4x^2+x^3+(4+4x+x^2)\log\left(\frac{5}{4}\right)+\left(-4x^2-2x^3+(-4x-2x^2)\log\left(\frac{5}{4}\right)\right)\log\left(x+\log\left(\frac{5}{4}\right)\right)+\left(x^3+x^2\log\left(\frac{5}{4}\right)\right)\log^2\left(x+\log\left(\frac{5}{4}\right)\right)}\,dx$

3.575.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2-2x-2\log\left(\frac{5}{4}\right)}{x^3+4x^2+(x^2+4x+4)\log\left(\frac{5}{4}\right)+\left(x^3+x^2\log\left(\frac{5}{4}\right)\right)\log^2\left(x+\log\left(\frac{5}{4}\right)\right)+\left(-2x^3-4x^2+(-2x^2-4x)\log\left(\frac{5}{4}\right)\right)$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-x^2-2x-\log\left(\frac{25}{16}\right)}{\left(x+\log\left(\frac{5}{4}\right)\right)\left(x+x\left(-\log\left(x+\log\left(\frac{5}{4}\right)\right)\right)+2\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{\log^2\left(\frac{5}{4}\right)}{\left(x+\log\left(\frac{5}{4}\right)\right)\left(-x+x\log\left(x+\log\left(\frac{5}{4}\right)\right)-2\right)^2}-\frac{x}{\left(-x+x\log\left(x+\log\left(\frac{5}{4}\right)\right)-2\right)^2}-\frac{2\left(1+\log\left(\frac{2}{\sqrt{5}}\right)\right)}{\left(-x+x\log\left(x+\log\left(\right.\right.\right.}$$

$$\Big\downarrow \text{2009}$$

$$-\log^2\left(\frac{5}{4}\right)\int \frac{1}{\left(x+\log\left(\frac{5}{4}\right)\right)\left(\log\left(x+\log\left(\frac{5}{4}\right)\right)x-x-2\right)^2}dx-2\left(1+\log\left(\frac{2}{\sqrt{5}}\right)\right)\int \frac{1}{\left(\log\left(x+\log\left(\frac{5}{4}\right)\right)x-x-2\right)^2}dx-\int \frac{x}{\left(\log\left(x+\log\left(\frac{5}{4}\right)\right)x-x-2\right)^2}dx$$

input
```
Int[(-2*x - x^2 - 2*Log[5/4])/(4*x + 4*x^2 + x^3 + (4 + 4*x + x^2)*Log[5/4
] + (-4*x^2 - 2*x^3 + (-4*x - 2*x^2)*Log[5/4])*Log[x + Log[5/4]] + (x^3 +
x^2*Log[5/4])*Log[x + Log[5/4]]^2),x]
```

output
```
$Aborted
```

3.575.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.575.4 Maple [A] (verified)

Time = 2.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

method	result	size
norman	$\frac{x}{\ln\left(\ln\left(\frac{5}{4}\right)+x\right)x-2-x}$	17
parallelrisch	$\frac{x}{\ln\left(\ln\left(\frac{5}{4}\right)+x\right)x-2-x}$	17
risch	$\frac{x}{x\ln(\ln(5)-2\ln(2)+x)-x-2}$	21
derivativedivides	$-\frac{-\ln\left(\frac{5}{4}\right)-x+\ln(5)-2\ln(2)}{2\ln\left(\ln\left(\frac{5}{4}\right)+x\right)\ln(2)-\ln\left(\ln\left(\frac{5}{4}\right)+x\right)\ln(5)+\ln\left(\ln\left(\frac{5}{4}\right)+x\right)\left(\ln\left(\frac{5}{4}\right)+x\right)-2\ln(2)+\ln(5)-\ln\left(\frac{5}{4}\right)-x-2}$	62
default	$-\frac{-\ln\left(\frac{5}{4}\right)-x+\ln(5)-2\ln(2)}{2\ln\left(\ln\left(\frac{5}{4}\right)+x\right)\ln(2)-\ln\left(\ln\left(\frac{5}{4}\right)+x\right)\ln(5)+\ln\left(\ln\left(\frac{5}{4}\right)+x\right)\left(\ln\left(\frac{5}{4}\right)+x\right)-2\ln(2)+\ln(5)-\ln\left(\frac{5}{4}\right)-x-2}$	62

input
```
int((-2*ln(5/4)-x^2-2*x)/((x^2*ln(5/4)+x^3)*ln(ln(5/4)+x)^2+((-2*x^2-4*x)*
ln(5/4)-2*x^3-4*x^2)*ln(ln(5/4)+x)+(x^2+4*x+4)*ln(5/4)+x^3+4*x^2+4*x),x,me
thod=_RETURNVERBOSE)
```

output
```
x/(ln(ln(5/4)+x)*x-2-x)
```

3.575.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{-2x-x^2-2\log\left(\frac{5}{4}\right)}{4x+4x^2+x^3+(4+4x+x^2)\log\left(\frac{5}{4}\right)+\left(-4x^2-2x^3+(-4x-2x^2)\log\left(\frac{5}{4}\right)\right)\log\left(x+\log\left(\frac{5}{4}\right)\right)+\left(x^3+\right.}$$
$$=\frac{x}{x\log\left(x+\log\left(\frac{5}{4}\right)\right)-x-2}$$

input
```
integrate((-2*log(5/4)-x^2-2*x)/((x^2*log(5/4)+x^3)*log(log(5/4)+x)^2+((-2
*x^2-4*x)*log(5/4)-2*x^3-4*x^2)*log(log(5/4)+x)+(x^2+4*x+4)*log(5/4)+x^3+4
*x^2+4*x),x, algorithm=\
```

output
```
x/(x*log(x + log(5/4)) - x - 2)
```

3.575.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{-2x - x^2 - 2\log\left(\frac{5}{4}\right)}{4x + 4x^2 + x^3 + (4 + 4x + x^2)\log\left(\frac{5}{4}\right) + \left(-4x^2 - 2x^3 + (-4x - 2x^2)\log\left(\frac{5}{4}\right)\right)\log\left(x + \log\left(\frac{5}{4}\right)\right) + (x^3 +$$
$$= \frac{x}{x\log\left(x + \log\left(\frac{5}{4}\right)\right) - x - 2}$$

input
```
integrate((-2*ln(5/4)-x**2-2*x)/((x**2*ln(5/4)+x**3)*ln(ln(5/4)+x)**2+((-2
*x**2-4*x)*ln(5/4)-2*x**3-4*x**2)*ln(ln(5/4)+x)+(x**2+4*x+4)*ln(5/4)+x**3+
4*x**2+4*x),x)
```

output
```
x/(x*log(x + log(5/4)) - x - 2)
```

3.575.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{-2x - x^2 - 2\log\left(\frac{5}{4}\right)}{4x + 4x^2 + x^3 + (4 + 4x + x^2)\log\left(\frac{5}{4}\right) + \left(-4x^2 - 2x^3 + (-4x - 2x^2)\log\left(\frac{5}{4}\right)\right)\log\left(x + \log\left(\frac{5}{4}\right)\right) + (x^3 +$$
$$= \frac{x}{x\log\left(x + \log(5) - 2\log(2)\right) - x - 2}$$

input
```
integrate((-2*log(5/4)-x^2-2*x)/((x^2*log(5/4)+x^3)*log(log(5/4)+x)^2+((-2
*x^2-4*x)*log(5/4)-2*x^3-4*x^2)*log(log(5/4)+x)+(x^2+4*x+4)*log(5/4)+x^3+4
*x^2+4*x),x, algorithm=\
```

output
```
x/(x*log(x + log(5) - 2*log(2)) - x - 2)
```

3.575.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 247 vs. 2(16) = 32.

Time = 0.31 (sec) , antiderivative size = 247, normalized size of antiderivative = 13.72

$$\int \frac{-2x - x^2 - 2\log\left(\frac{5}{4}\right)}{4x + 4x^2 + x^3 + (4 + 4x + x^2)\log\left(\frac{5}{4}\right) + \left(-4x^2 - 2x^3 + (-4x - 2x^2)\log\left(\frac{5}{4}\right)\right)\log\left(x + \log\left(\frac{5}{4}\right)\right) + (x^3 +$$
$$= \frac{}{x^4\log\left(x + \log\left(\frac{5}{4}\right)\right) + x^3\log(5)\log\left(x + \log\left(\frac{5}{4}\right)\right) - 2x^3\log(2)\log\left(x + \log\left(\frac{5}{4}\right)\right) - x^4 - x^3\log(5) + 2x^3 l$$

3.575.
$$\int \frac{-2x-x^2-2\log\left(\frac{5}{4}\right)}{4x+4x^2+x^3+(4+4x+x^2)\log\left(\frac{5}{4}\right)+\left(-4x^2-2x^3+(-4x-2x^2)\log\left(\frac{5}{4}\right)\right)\log\left(x+\log\left(\frac{5}{4}\right)\right)+\left(x^3+x^2\log\left(\frac{5}{4}\right)\right)\log^2\left(x+\log\left(\frac{5}{4}\right)\right)}\,dx$$

input
```
integrate((-2*log(5/4)-x^2-2*x)/((x^2*log(5/4)+x^3)*log(log(5/4)+x)^2+((-2
*x^2-4*x)*log(5/4)-2*x^3-4*x^2)*log(log(5/4)+x)+(x^2+4*x+4)*log(5/4)+x^3+4
*x^2+4*x),x, algorithm=\
```

output
```
(x^4 + x^3*log(5/4) + 2*x^3 + 2*x^2*log(5) - 4*x^2*log(2) + 2*x^2*log(5/4)
 + 2*x*log(5)*log(5/4) - 4*x*log(2)*log(5/4))/(x^4*log(x + log(5/4)) + x^3
*log(5)*log(x + log(5/4)) - 2*x^3*log(2)*log(x + log(5/4)) - x^4 - x^3*log
(5) + 2*x^3*log(2) + 2*x^3*log(x + log(5/4)) + 2*x^2*log(5)*log(x + log(5/
4)) - 4*x^2*log(2)*log(x + log(5/4)) + 2*x^2*log(5/4)*log(x + log(5/4)) +
2*x*log(5)*log(5/4)*log(x + log(5/4)) - 4*x*log(2)*log(5/4)*log(x + log(5/
4)) - 4*x^3 - 4*x^2*log(5) + 8*x^2*log(2) - 2*x^2*log(5/4) - 2*x*log(5)*lo
g(5/4) + 4*x*log(2)*log(5/4) - 4*x^2 - 4*x*log(5) + 8*x*log(2) - 4*x*log(5
/4) - 4*log(5)*log(5/4) + 8*log(2)*log(5/4))
```

3.575.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-2x-x^2-2\log\left(\frac{5}{4}\right)}{4x+4x^2+x^3+(4+4x+x^2)\log\left(\frac{5}{4}\right)+\left(-4x^2-2x^3+(-4x-2x^2)\log\left(\frac{5}{4}\right)\right)\log\left(x+\log\left(\frac{5}{4}\right)\right)+\left(x^3+\right.}$$
$$=\int -\frac{x^2+2\,x+2\,\ln\left(\frac{5}{4}\right)}{4\,x-\ln\left(x+\ln\left(\frac{5}{4}\right)\right)\,\left(\ln\left(\frac{5}{4}\right)\,\left(2\,x^2+4\,x\right)+4\,x^2+2\,x^3\right)+\ln\left(x+\ln\left(\frac{5}{4}\right)\right)^2\,\left(x^3+\ln\left(\frac{5}{4}\right)\,x^2\right)+4\,x^2+x}$$

input
```
int(-(2*x + 2*log(5/4) + x^2)/(4*x - log(x + log(5/4))*(log(5/4)*(4*x + 2*
x^2) + 4*x^2 + 2*x^3) + log(x + log(5/4))^2*(x^2*log(5/4) + x^3) + 4*x^2 +
 x^3 + log(5/4)*(4*x + x^2 + 4)),x)
```

output
```
int(-(2*x + 2*log(5/4) + x^2)/(4*x - log(x + log(5/4))*(log(5/4)*(4*x + 2*
x^2) + 4*x^2 + 2*x^3) + log(x + log(5/4))^2*(x^2*log(5/4) + x^3) + 4*x^2 +
 x^3 + log(5/4)*(4*x + x^2 + 4)), x)
```

3.576 $\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log\left(-\frac{x}{3}\right)}{x}\right)}{x\log^2\left(-\frac{x}{3}\right)}\,dx$

3.576.1 Optimal result

Integrand size = 48, antiderivative size = 22

$$\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log\left(-\frac{x}{3}\right)}{x}\right)}{x\log^2\left(-\frac{x}{3}\right)}\,dx=\frac{-4+e^{\frac{e^{3x}}{x}}}{\log\left(-\frac{x}{3}\right)}$$

output
```
(exp(exp(-ln(x)+3*x))-4)/ln(-1/3*x)
```

3.576.2 Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log\left(-\frac{x}{3}\right)}{x}\right)}{x\log^2\left(-\frac{x}{3}\right)}\,dx=\frac{-4+e^{\frac{e^{3x}}{x}}}{\log\left(-\frac{x}{3}\right)}$$

input
```
Integrate[(4 + E^(E^(3*x)/x)*(-1 + (E^(3*x)*(-1 + 3*x)*Log[-1/3*x])/x))/(x
*Log[-1/3*x]^2),x]
```

output
```
(-4 + E^(E^(3*x)/x))/Log[-1/3*x]
```

3.576. $\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log\left(-\frac{x}{3}\right)}{x}\right)}{x\log^2\left(-\frac{x}{3}\right)}\,dx$

3.576.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{e^{3x}}{x}}\left(\frac{e^{3x}(3x-1)\log\left(-\frac{x}{3}\right)}{x}-1\right)+4}{x\log^2\left(-\frac{x}{3}\right)}dx$$

$$\big\downarrow \text{7293}$$

$$\int \left(\frac{e^{3x+\frac{e^{3x}}{x}}(3x-1)}{x^2\log\left(-\frac{x}{3}\right)}-\frac{e^{\frac{e^{3x}}{x}}-4}{x\log^2\left(-\frac{x}{3}\right)}\right)dx$$

$$\big\downarrow \text{2009}$$

$$-\int \frac{e^{3x+\frac{e^{3x}}{x}}}{x^2\log\left(-\frac{x}{3}\right)}dx-\int \frac{e^{\frac{e^{3x}}{x}}}{x\log^2\left(-\frac{x}{3}\right)}dx+3\int \frac{e^{3x+\frac{e^{3x}}{x}}}{x\log\left(-\frac{x}{3}\right)}dx-\frac{4}{\log\left(-\frac{x}{3}\right)}$$

input
```
Int[(4 + E^(E^(3*x)/x)*(-1 + (E^(3*x)*(-1 + 3*x)*Log[-1/3*x])/x))/(x*Log[-
1/3*x]^2),x]
```

output
```
$Aborted
```

3.576.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.576.4 Maple [A] (verified)

Time = 0.78 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

method	result	size
parallelrisch	$-\frac{24-6\,\mathrm{e}^{\mathrm{e}^{-\ln(x)+3x}}}{6\ln\left(-\frac{x}{3}\right)}$	23
risch	$\frac{8i}{-2\pi\,\mathrm{csgn}(ix)^2+2\pi\,\mathrm{csgn}(ix)^3+2\pi+2i\ln(3)-2i\ln(x)}-\frac{2i\mathrm{e}^{\frac{\mathrm{e}^{3x}}{x}}}{-2\pi\,\mathrm{csgn}(ix)^2+2\pi\,\mathrm{csgn}(ix)^3+2\pi+2i\ln(3)-2i\ln(x)}$	89

input
```
int((((-1+3*x)*ln(-1/3*x)*exp(-ln(x)+3*x)-1)*exp(exp(-ln(x)+3*x))+4)/x/ln(
-1/3*x)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/6*(24-6*exp(exp(-ln(x)+3*x)))/ln(-1/3*x)
```

3.576.5 Fricas [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.26 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.41

$$\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log\left(-\frac{x}{3}\right)}{x}\right)}{x\log^2\left(-\frac{x}{3}\right)}\,dx = \frac{\cosh\left(-e^{\left(-i\,\pi+3\,x-\log(3)-\log\left(-\frac{1}{3}\,x\right)\right)}\right)-\sinh\left(-e^{\left(-i\,\pi+3\,x-\log(3)-\log\left(-\frac{1}{3}\,x\right)\right)}\right)-4}{\log\left(-\frac{1}{3}\,x\right)}$$

input
```
integrate((((-1+3*x)*log(-1/3*x)*exp(-log(x)+3*x)-1)*exp(exp(-log(x)+3*x))
+4)/x/log(-1/3*x)^2,x, algorithm=\
```

output
```
(cosh(-e^(-I*pi + 3*x - log(3) - log(-1/3*x))) - sinh(-e^(-I*pi + 3*x - lo
g(3) - log(-1/3*x))) - 4)/log(-1/3*x)
```

3.576.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log\left(-\frac{x}{3}\right)}{x}\right)}{x\log^2\left(-\frac{x}{3}\right)}\,dx = \frac{e^{\frac{e^{3x}}{x}}}{\log\left(-\frac{x}{3}\right)} - \frac{4}{\log\left(-\frac{x}{3}\right)}$$

input
```
integrate((((-1+3*x)*ln(-1/3*x)*exp(-ln(x)+3*x)-1)*exp(exp(-ln(x)+3*x))+4)
/x/ln(-1/3*x)**2,x)
```

output
```
exp(exp(3*x)/x)/log(-x/3) - 4/log(-x/3)
```

3.576.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.41

$$\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log\left(-\frac{x}{3}\right)}{x}\right)}{x\log^2\left(-\frac{x}{3}\right)}\,dx = -\frac{e^{\left(\frac{e^{(3x)}}{x}\right)}}{\log(3)-\log(-x)} - \frac{4}{\log\left(-\frac{1}{3}x\right)}$$

input
```
integrate((((-1+3*x)*log(-1/3*x)*exp(-log(x)+3*x)-1)*exp(exp(-log(x)+3*x))
+4)/x/log(-1/3*x)^2,x, algorithm=\
```

output
```
-e^(e^(3*x)/x)/(log(3) - log(-x)) - 4/log(-1/3*x)
```

3.576.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

$$\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log\left(-\frac{x}{3}\right)}{x}\right)}{x\log^2\left(-\frac{x}{3}\right)}\,dx = -\frac{\left(4e^{(3x)}-e^{\left(\frac{3x^2+e^{(3x)}}{x}\right)}\right)e^{(-3x)}}{\log\left(-\frac{1}{3}x\right)}$$

input
```
integrate((((-1+3*x)*log(-1/3*x)*exp(-log(x)+3*x)-1)*exp(exp(-log(x)+3*x))
+4)/x/log(-1/3*x)^2,x, algorithm=\
```

output
```
-(4*e^(3*x) - e^((3*x^2 + e^(3*x))/x))*e^(-3*x)/log(-1/3*x)
```

3.576.9 Mupad [B] (verification not implemented)

Time = 13.66 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{4+e^{\frac{e^{3x}}{x}}\left(-1+\frac{e^{3x}(-1+3x)\log\left(-\frac{x}{3}\right)}{x}\right)}{x\log^2\left(-\frac{x}{3}\right)}\,dx=\frac{\mathrm{e}^{\frac{\mathrm{e}^{3\,x}}{x}}-4}{\ln\left(-\frac{x}{3}\right)}$$

input
```
int((exp(exp(3*x - log(x)))*(log(-x/3)*exp(3*x - log(x))*(3*x - 1) - 1) +
4)/(x*log(-x/3)^2),x)
```

output
```
(exp(exp(3*x)/x) - 4)/log(-x/3)
```

3.577 $\int \frac{-6e^{25}-3x^3+e^x x^3}{2x^3}\,dx$

3.577.1 Optimal result

Integrand size = 25, antiderivative size = 20

$$\int \frac{-6e^{25}-3x^3+e^x x^3}{2x^3}\,dx=\frac{1}{2}\left(1+e^x+\frac{3e^{25}}{x^2}-3x\right)$$

output
```
1/2+1/2*exp(x)+3/2*exp(25)/x^2-3/2*x
```

3.577.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-6e^{25}-3x^3+e^x x^3}{2x^3}\,dx=\frac{1}{2}\left(e^x+\frac{3e^{25}}{x^2}-3x\right)$$

input
```
Integrate[(-6*E^25 - 3*x^3 + E^x*x^3)/(2*x^3),x]
```

output
```
(E^x + (3*E^25)/x^2 - 3*x)/2
```

3.577.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.160, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x^3-3 x^3-6 e^{25}}{2 x^3} \, dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2} \int -\frac{-e^x x^3+3 x^3+6 e^{25}}{x^3}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{2} \int \frac{-e^x x^3+3 x^3+6 e^{25}}{x^3}dx$$

$$\Big\downarrow \ 2010$$

$$-\frac{1}{2} \int \left(\frac{3 \left(x^3+2 e^{25}\right)}{x^3}-e^x\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{2} \left(\frac{3 e^{25}}{x^2}-3 x+e^x\right)$$

input
```
Int[(-6*E^25 - 3*x^3 + E^x*x^3)/(2*x^3),x]
```

output
```
(E^x + (3*E^25)/x^2 - 3*x)/2
```

3.577.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.577.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result	size
default	$-\frac{3x}{2}+\frac{3\,e^{25}}{2x^2}+\frac{e^x}{2}$	16
risch	$-\frac{3x}{2}+\frac{3\,e^{25}}{2x^2}+\frac{e^x}{2}$	16
parts	$-\frac{3x}{2}+\frac{3\,e^{25}}{2x^2}+\frac{e^x}{2}$	16
norman	$\frac{-\frac{3x^3}{2}+\frac{e^x x^2}{2}+\frac{3\,e^{25}}{2}}{x^2}$	22
parallelrisch	$\frac{e^x x^2-3x^3+3\,e^{25}}{2x^2}$	22

input
```
int(1/2*(exp(x)*x^3-6*exp(25)-3*x^3)/x^3,x,method=_RETURNVERBOSE)
```

output
```
-3/2*x+3/2*exp(25)/x^2+1/2*exp(x)
```

3.577.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{-6e^{25}-3x^3+e^x x^3}{2x^3}\,dx=-\frac{3\,x^3-x^2e^x-3\,e^{25}}{2\,x^2}$$

input
```
integrate(1/2*(exp(x)*x^3-6*exp(25)-3*x^3)/x^3,x, algorithm=\
```

output
```
-1/2*(3*x^3 - x^2*e^x - 3*e^25)/x^2
```

3.577.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-6e^{25} - 3x^3 + e^x x^3}{2x^3} \, dx = -\frac{3x}{2} + \frac{e^x}{2} + \frac{3e^{25}}{2x^2}$$

input
```
integrate(1/2*(exp(x)*x**3-6*exp(25)-3*x**3)/x**3,x)
```

output
```
-3*x/2 + exp(x)/2 + 3*exp(25)/(2*x**2)
```

3.577.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-6e^{25} - 3x^3 + e^x x^3}{2x^3} \, dx = -\frac{3}{2} \, x + \frac{3 \, e^{25}}{2 \, x^2} + \frac{1}{2} \, e^x$$

input
```
integrate(1/2*(exp(x)*x^3-6*exp(25)-3*x^3)/x^3,x, algorithm=\
```

output
```
-3/2*x + 3/2*e^25/x^2 + 1/2*e^x
```

3.577.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{-6e^{25} - 3x^3 + e^x x^3}{2x^3} \, dx = -\frac{3 \, x^3 - x^2 e^x - 3 \, e^{25}}{2 \, x^2}$$

input
```
integrate(1/2*(exp(x)*x^3-6*exp(25)-3*x^3)/x^3,x, algorithm=\
```

output
```
-1/2*(3*x^3 - x^2*e^x - 3*e^25)/x^2
```

3.577.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-6e^{25}-3x^3+e^x x^3}{2x^3}\,dx=\frac{\mathrm{e}^x}{2}-\frac{3\,x}{2}+\frac{3\,\mathrm{e}^{25}}{2\,x^2}$$

input
```
int(-(3*exp(25) - (x^3*exp(x))/2 + (3*x^3)/2)/x^3,x)
```

output
```
exp(x)/2 - (3*x)/2 + (3*exp(25))/(2*x^2)
```

3.578 $\int (-198x + 60x^2 - 4x^3) \, dx$

3.578.1 Optimal result

Integrand size = 14, antiderivative size = 19

$$\int (-198x + 60x^2 - 4x^3) \, dx = -7 + e^3 + x\left(x - (10 - x)^2 x\right)$$

output
```
(x-x*(10-x)^2)*x-7+exp(3)
```

3.578.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int (-198x + 60x^2 - 4x^3) \, dx = -99x^2 + 20x^3 - x^4$$

input
```
Integrate[-198*x + 60*x^2 - 4*x^3,x]
```

output
```
-99*x^2 + 20*x^3 - x^4
```

3.578.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-4x^3+60x^2-198x\right) dx$$
$$\big\downarrow \text{ 2009}$$
$$-x^4+20x^3-99x^2$$

input
```
Int[-198*x + 60*x^2 - 4*x^3,x]
```

output
```
-99*x^2 + 20*x^3 - x^4
```

3.578.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.578.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

method	result	size
gosper	$-x^2(x^2-20x+99)$	14
default	$-x^4+20x^3-99x^2$	17
norman	$-x^4+20x^3-99x^2$	17
risch	$-x^4+20x^3-99x^2$	17
parallelrisch	$-x^4+20x^3-99x^2$	17
parts	$-x^4+20x^3-99x^2$	17

input
```
int(-4*x^3+60*x^2-198*x,x,method=_RETURNVERBOSE)
```

output
```
-x^2*(x^2-20*x+99)
```

3.578.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \left(-198x+60x^2-4x^3\right)\,dx=-x^4+20\,x^3-99\,x^2$$

input
```
integrate(-4*x^3+60*x^2-198*x,x, algorithm=\
```

output
```
-x^4 + 20*x^3 - 99*x^2
```

3.578.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \left(-198x+60x^2-4x^3\right)\,dx=-x^4+20x^3-99x^2$$

input
```
integrate(-4*x**3+60*x**2-198*x,x)
```

output
```
-x**4 + 20*x**3 - 99*x**2
```

3.578.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \left(-198x+60x^2-4x^3\right)\,dx=-x^4+20\,x^3-99\,x^2$$

input
```
integrate(-4*x^3+60*x^2-198*x,x, algorithm=\
```

output
```
-x^4 + 20*x^3 - 99*x^2
```

3.578.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \left(-198x + 60x^2 - 4x^3\right)\,dx = -x^4 + 20\,x^3 - 99\,x^2$$

input
```
integrate(-4*x^3+60*x^2-198*x,x, algorithm=\
```

output
```
-x^4 + 20*x^3 - 99*x^2
```

3.578.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \left(-198x + 60x^2 - 4x^3\right)\,dx = -x^2\,\left(x^2 - 20\,x + 99\right)$$

input
```
int(60*x^2 - 198*x - 4*x^3,x)
```

output
```
-x^2*(x^2 - 20*x + 99)
```

3.579 $\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx$

3.579.1 Optimal result

Integrand size = 70, antiderivative size = 22

$$\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx = e^{2\left(-\frac{e^{4x^4}}{x^2}+x^2\right)^2}$$

output
```
exp(2*(x^2-exp(4*x^4)/x^2)^2)
```

3.579.2 Mathematica [A] (verified)

Time = 2.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx = e^{\frac{2\left(e^{4x^4}-x^4\right)^2}{x^4}}$$

input
```
Integrate[(E^((2*E^(8*x^4) - 4*E^(4*x^4)*x^4 + 2*x^8)/x^4)*(8*x^8 - 64*E^(
4*x^4)*x^8 + E^(8*x^4)*(-8 + 64*x^4)))/x^5,x]
```

output
```
E^((2*(E^(4*x^4) - x^4)^2)/x^4)
```

3.579.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.014$, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{2x^8-4e^{4x^4}x^4+2e^{8x^4}}{x^4}}\left(8x^8+e^{8x^4}(64x^4-8)-64e^{4x^4}x^8\right)}{x^5}dx$$

$$\Big\downarrow \ 7257$$

$$e^{\frac{2\left(x^8-2e^{4x^4}x^4+e^{8x^4}\right)}{x^4}}$$

input
```
Int[(E^((2*E^(8*x^4) - 4*E^(4*x^4)*x^4 + 2*x^8)/x^4)*(8*x^8 - 64*E^(4*x^4)
*x^8 + E^(8*x^4)*(-8 + 64*x^4)))/x^5,x]
```

output
```
E^((2*(E^(8*x^4) - 2*E^(4*x^4)*x^4 + x^8))/x^4)
```

3.579.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.579.4 Maple [A] (verified)

Time = 0.92 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

method	result	size
risch	$e^{\frac{2\,e^{8x^4}-4x^4e^{4x^4}+2x^8}{x^4}}$	28
parallelrisch	$e^{\frac{2\,e^{8x^4}-4x^4e^{4x^4}+2x^8}{x^4}}$	30

input
```
int(((64*x^4-8)*exp(4*x^4)^2-64*x^8*exp(4*x^4)+8*x^8)*exp((2*exp(4*x^4)^2-
4*x^4*exp(4*x^4)+2*x^8)/x^4)/x^5,x,method=_RETURNVERBOSE)
```

output
```
exp(2*(x^8-2*x^4*exp(4*x^4)+exp(8*x^4))/x^4)
```

3.579.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx = e^{\left(\frac{2\left(x^8-2x^4e^{\left(4x^4\right)}+e^{\left(8x^4\right)}\right)}{x^4}\right)}$$

input
```
integrate(((64*x^4-8)*exp(4*x^4)^2-64*x^8*exp(4*x^4)+8*x^8)*exp((2*exp(4*x
^4)^2-4*x^4*exp(4*x^4)+2*x^8)/x^4)/x^5,x, algorithm=\
```

output
```
e^(2*(x^8 - 2*x^4*e^(4*x^4) + e^(8*x^4))/x^4)
```

3.579.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.32

$$\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx = e^{\frac{2x^8-4x^4e^{4x^4}+2e^{8x^4}}{x^4}}$$

input
```
integrate(((64*x**4-8)*exp(4*x**4)**2-64*x**8*exp(4*x**4)+8*x**8)*exp((2*e
xp(4*x**4)**2-4*x**4*exp(4*x**4)+2*x**8)/x**4)/x**5,x)
```

output
```
exp((2*x**8 - 4*x**4*exp(4*x**4) + 2*exp(8*x**4))/x**4)
```

3.579.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx = e^{\left(2x^4+\frac{2e^{\left(8x^4\right)}}{x^4}-4e^{\left(4x^4\right)}\right)}$$

3.579. $\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx$

input
```
integrate(((64*x^4-8)*exp(4*x^4)^2-64*x^8*exp(4*x^4)+8*x^8)*exp((2*exp(4*x
^4)^2-4*x^4*exp(4*x^4)+2*x^8)/x^4)/x^5,x, algorithm=\
```

output
```
e^(2*x^4 + 2*e^(8*x^4)/x^4 - 4*e^(4*x^4))
```

3.579.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx = e^{\left(2x^4+\frac{2e^{(8x^4)}}{x^4}-4e^{(4x^4)}\right)}$$

input
```
integrate(((64*x^4-8)*exp(4*x^4)^2-64*x^8*exp(4*x^4)+8*x^8)*exp((2*exp(4*x
^4)^2-4*x^4*exp(4*x^4)+2*x^8)/x^4)/x^5,x, algorithm=\
```

output
```
e^(2*x^4 + 2*e^(8*x^4)/x^4 - 4*e^(4*x^4))
```

3.579.9 Mupad [B] (verification not implemented)

Time = 12.54 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

$$\int \frac{e^{\frac{2e^{8x^4}-4e^{4x^4}x^4+2x^8}{x^4}}\left(8x^8-64e^{4x^4}x^8+e^{8x^4}(-8+64x^4)\right)}{x^5}\,dx = e^{\frac{2e^{8x^4}}{x^4}}\,e^{-4e^{4x^4}}\,e^{2x^4}$$

input
```
int((exp((2*exp(8*x^4) - 4*x^4*exp(4*x^4) + 2*x^8)/x^4)*(exp(8*x^4)*(64*x^
4 - 8) - 64*x^8*exp(4*x^4) + 8*x^8))/x^5,x)
```

output
```
exp((2*exp(8*x^4))/x^4)*exp(-4*exp(4*x^4))*exp(2*x^4)
```

3.580 $\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}$

3.580.1 Optimal result

Integrand size = 100, antiderivative size = 17

$$\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5x^4)}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}\,dx = x-\frac{x^5}{(3-e^2+x)^2}$$

output
```
x-x^5/(-exp(2)+3+x)^2
```

3.580.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 88 vs. 2(17) = 34.

Time = 0.05 (sec) , antiderivative size = 88, normalized size of antiderivative = 5.18

$$\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5x^4)}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}\,dx = -\frac{(-3+e^2)^5}{(-3+e^2-x)^2}+\frac{5(-3+e^2)^4}{-3+e^2-x}-(-89+60e^2-10e^4)(-3+e^2-x) - 5(-3+e^2)(-3+e^2-x)^2+(-3+e^2-x)^3$$

input
```
Integrate[(-27 + E^6 + E^4*(-9 - 3*x) - 27*x - 9*x^2 - x^3 + 15*x^4 + 3*x^
5 + E^2*(27 + 18*x + 3*x^2 - 5*x^4))/(-27 + E^6 + E^4*(-9 - 3*x) - 27*x -
9*x^2 - x^3 + E^2*(27 + 18*x + 3*x^2)),x]
```

output
```
-((-3 + E^2)^5/(-3 + E^2 - x)^2) + (5*(-3 + E^2)^4)/(-3 + E^2 - x) - (-89
+ 60*E^2 - 10*E^4)*(-3 + E^2 - x) - 5*(-3 + E^2)*(-3 + E^2 - x)^2 + (-3 +
E^2 - x)^3
```

3.580.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 74 vs. $2(17) = 34$.

Time = 0.36 (sec) , antiderivative size = 74, normalized size of antiderivative = 4.35, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.030$, Rules used = {2007, 2389, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^5+15x^4-x^3-9x^2+e^2\left(-5x^4+3x^2+18x+27\right)-27x+e^4(-3x-9)+e^6-27}{-x^3-9x^2+e^2\left(3x^2+18x+27\right)-27x+e^4(-3x-9)+e^6-27}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{3x^5+15x^4-x^3-9x^2+e^2\left(-5x^4+3x^2+18x+27\right)-27x+e^4(-3x-9)+e^6-27}{\left(-x+e^2-3\right)^3}dx$$

$$\Big\downarrow \text{ 2389}$$

$$\int \left(-3x^2-4\left(e^2-3\right)x+\frac{5\left(e^2-3\right)^4}{\left(-x+e^2-3\right)^2}-\frac{2\left(e^2-3\right)^5}{\left(-x+e^2-3\right)^3}-26\left(1+\frac{3}{26}e^2\left(e^2-6\right)\right)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-x^3+2\left(3-e^2\right)x^2-\left(26-18e^2+3e^4\right)x-\frac{5\left(3-e^2\right)^4}{x-e^2+3}+\frac{\left(3-e^2\right)^5}{\left(x-e^2+3\right)^2}$$

input
```
Int[(-27 + E^6 + E^4*(-9 - 3*x) - 27*x - 9*x^2 - x^3 + 15*x^4 + 3*x^5 + E^
2*(27 + 18*x + 3*x^2 - 5*x^4))/(-27 + E^6 + E^4*(-9 - 3*x) - 27*x - 9*x^2
- x^3 + E^2*(27 + 18*x + 3*x^2)),x]
```

output
```
-((26 - 18*E^2 + 3*E^4)*x) + 2*(3 - E^2)*x^2 - x^3 + (3 - E^2)^5/(3 - E^2
+ x)^2 - (5*(3 - E^2)^4)/(3 - E^2 + x)
```

3.580.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2389
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

3.580.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(16) = 32$.

Time = 0.34 (sec) , antiderivative size = 51, normalized size of antiderivative = 3.00

method	result
norman	$\frac{-x^5-54+x^3+(18\,\mathrm{e}^2-3\,\mathrm{e}^4-27)x+2\,\mathrm{e}^6-18\,\mathrm{e}^4+54\,\mathrm{e}^2}{(\mathrm{e}^2-3-x)^2}$
gosper	$\frac{-x^5+2\,\mathrm{e}^6-3x\,\mathrm{e}^4+x^3-18\,\mathrm{e}^4+18\,\mathrm{e}^2x+54\,\mathrm{e}^2-27x-54}{\mathrm{e}^4-2\,\mathrm{e}^2x+x^2-6\,\mathrm{e}^2+6x+9}$
parallelrisch	$\frac{-x^5+2\,\mathrm{e}^6-3x\,\mathrm{e}^4+x^3-18\,\mathrm{e}^4+18\,\mathrm{e}^2x+54\,\mathrm{e}^2-27x-54}{\mathrm{e}^4-2\,\mathrm{e}^2x+x^2-6\,\mathrm{e}^2+6x+9}$
risch	$-3x\,\mathrm{e}^4-2x^2\mathrm{e}^2-x^3+18\,\mathrm{e}^2x+6x^2-26x+\frac{(60\,\mathrm{e}^6-5\,\mathrm{e}^8-270\,\mathrm{e}^4+540\,\mathrm{e}^2-405)x+4\,\mathrm{e}^{10}-60\,\mathrm{e}^8+360\,\mathrm{e}^6-1080}{\mathrm{e}^4-2\,\mathrm{e}^2x+x^2-6\,\mathrm{e}^2+6x+9}$
default	$-3x\,\mathrm{e}^4-2x^2\mathrm{e}^2-x^3+18\,\mathrm{e}^2x+6x^2-26x-\frac{\left(\sum_{\_R=\mathrm{RootOf}\left(\_Z^3+\left(-3\,\mathrm{e}^2+9\right)\_Z^2+\left(-18\,\mathrm{e}^2+3\,\mathrm{e}^4+27\right)\_Z-27\,\mathrm{e}^2\right.}\right.}{}$

input
```
int((exp(2)^3+(-3*x-9)*exp(2)^2+(-5*x^4+3*x^2+18*x+27)*exp(2)+3*x^5+15*x^4
-x^3-9*x^2-27*x-27)/(exp(2)^3+(-3*x-9)*exp(2)^2+(3*x^2+18*x+27)*exp(2)-x^3
-9*x^2-27*x-27),x,method=_RETURNVERBOSE)
```

output
```
(-x^5-54+x^3+(-3*exp(2)^2+18*exp(2)-27)*x+2*exp(2)^3-18*exp(2)^2+54*exp(2)
)/(exp(2)-3-x)^2
```

3.580. $\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5x^4)}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}\,dx$

3.580.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 91 vs. $2(16) = 32$.

Time = 0.24 (sec) , antiderivative size = 91, normalized size of antiderivative = 5.35

$$\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5x^4)}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}\,dx = -\frac{x^5-x^3+102\,x^2+4\,(2\,x+15)e^8-4\,(x^2+24\,x+90)e^6+(36\,x^2+431\,x+1080)e^4-2\,(53\,x^2+429\,x}{x^2-2\,(x+3)e^2+6\,x+e^4+9}$$

input
```
integrate((exp(2)^3+(-3*x-9)*exp(2)^2+(-5*x^4+3*x^2+18*x+27)*exp(2)+3*x^5+
15*x^4-x^3-9*x^2-27*x-27)/(exp(2)^3+(-3*x-9)*exp(2)^2+(3*x^2+18*x+27)*exp(
2)-x^3-9*x^2-27*x-27),x, algorithm=\
```

output
```
-(x^5 - x^3 + 102*x^2 + 4*(2*x + 15)*e^8 - 4*(x^2 + 24*x + 90)*e^6 + (36*x
^2 + 431*x + 1080)*e^4 - 2*(53*x^2 + 429*x + 810)*e^2 + 639*x - 4*e^10 + 9
72)/(x^2 - 2*(x + 3)*e^2 + 6*x + e^4 + 9)
```

3.580.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 100 vs. $2(12) = 24$.

Time = 0.54 (sec) , antiderivative size = 100, normalized size of antiderivative = 5.88

$$\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5x^4)}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}\,dx$$
$$= -x^3 - x^2\left(-6+2e^2\right) - x\left(-18e^2+26+3e^4\right) - \frac{x(-60e^6-540e^2+405+270e^4+5e^8)-360e^6-4e^{10}-1620e^2+972+1080e^4+60e^8}{x^2+x\left(6-2e^2\right)-6e^2+9+e^4}$$

input
```
integrate((exp(2)**3+(-3*x-9)*exp(2)**2+(-5*x**4+3*x**2+18*x+27)*exp(2)+3*
x**5+15*x**4-x**3-9*x**2-27*x-27)/(exp(2)**3+(-3*x-9)*exp(2)**2+(3*x**2+18
*x+27)*exp(2)-x**3-9*x**2-27*x-27),x)
```

output
```
-x**3 - x**2*(-6 + 2*exp(2)) - x*(-18*exp(2) + 26 + 3*exp(4)) - (x*(-60*ex
p(6) - 540*exp(2) + 405 + 270*exp(4) + 5*exp(8)) - 360*exp(6) - 4*exp(10)
- 1620*exp(2) + 972 + 1080*exp(4) + 60*exp(8))/(x**2 + x*(6 - 2*exp(2)) -
6*exp(2) + 9 + exp(4))
```

3.580.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 91 vs. 2(16) = 32.

Time = 0.20 (sec) , antiderivative size = 91, normalized size of antiderivative = 5.35

$$\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5x^4)}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}\,dx$$
$$= -x^3-2x^2(e^2-3)-x(3e^4-18e^2+26) - \frac{5x(e^8-12e^6+54e^4-108e^2+81)-4e^{10}+60e^8-360e^6+1080e^4-1620e^2+972}{x^2-2x(e^2-3)+e^4-6e^2+9}$$

input
```
integrate((exp(2)^3+(-3*x-9)*exp(2)^2+(-5*x^4+3*x^2+18*x+27)*exp(2)+3*x^5+
15*x^4-x^3-9*x^2-27*x-27)/(exp(2)^3+(-3*x-9)*exp(2)^2+(3*x^2+18*x+27)*exp(
2)-x^3-9*x^2-27*x-27),x, algorithm=\
```

output
```
-x^3 - 2*x^2*(e^2 - 3) - x*(3*e^4 - 18*e^2 + 26) - (5*x*(e^8 - 12*e^6 + 54
*e^4 - 108*e^2 + 81) - 4*e^10 + 60*e^8 - 360*e^6 + 1080*e^4 - 1620*e^2 + 9
72)/(x^2 - 2*x*(e^2 - 3) + e^4 - 6*e^2 + 9)
```

3.580.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 87 vs. 2(16) = 32.

Time = 0.27 (sec) , antiderivative size = 87, normalized size of antiderivative = 5.12

$$\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5x^4)}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}\,dx$$
$$= -x^3-2x^2e^2+6x^2-3xe^4+18xe^2-26x - \frac{5xe^8-60xe^6+270xe^4-540xe^2+405x-4e^{10}+60e^8-360e^6+1080e^4-1620e^2+972}{(x-e^2+3)^2}$$

input
```
integrate((exp(2)^3+(-3*x-9)*exp(2)^2+(-5*x^4+3*x^2+18*x+27)*exp(2)+3*x^5+
15*x^4-x^3-9*x^2-27*x-27)/(exp(2)^3+(-3*x-9)*exp(2)^2+(3*x^2+18*x+27)*exp(
2)-x^3-9*x^2-27*x-27),x, algorithm=\
```

output
```
-x^3 - 2*x^2*e^2 + 6*x^2 - 3*x*e^4 + 18*x*e^2 - 26*x - (5*x*e^8 - 60*x*e^6
 + 270*x*e^4 - 540*x*e^2 + 405*x - 4*e^10 + 60*e^8 - 360*e^6 + 1080*e^4 -
1620*e^2 + 972)/(x - e^2 + 3)^2
```

3.580.9 Mupad [B] (verification not implemented)

Time = 12.70 (sec) , antiderivative size = 109, normalized size of antiderivative = 6.41

$$\int \frac{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+15x^4+3x^5+e^2(27+18x+3x^2-5x^4)}{-27+e^6+e^4(-9-3x)-27x-9x^2-x^3+e^2(27+18x+3x^2)}\,dx$$
$$= x\left(9\left(e^2-3\right)^2-\left(3\,e^2-9\right)\left(4\,e^2-12\right)+1\right)-x^2\left(2\,e^2-6\right)$$
$$-\frac{1080\,e^4-1620\,e^2-360\,e^6+60\,e^8-4\,e^{10}+x\,(270\,e^4-540\,e^2-60\,e^6+5\,e^8+405)+972}{x^2+(6-2\,e^2)\,x-6\,e^2+e^4+9}$$
$$-x^3$$

input
```
int((27*x - exp(6) - exp(2)*(18*x + 3*x^2 - 5*x^4 + 27) + 9*x^2 + x^3 - 15
*x^4 - 3*x^5 + exp(4)*(3*x + 9) + 27)/(27*x - exp(6) - exp(2)*(18*x + 3*x^
2 + 27) + 9*x^2 + x^3 + exp(4)*(3*x + 9) + 27),x)
```

output
```
x*(9*(exp(2) - 3)^2 - (3*exp(2) - 9)*(4*exp(2) - 12) + 1) - x^2*(2*exp(2)
- 6) - (1080*exp(4) - 1620*exp(2) - 360*exp(6) + 60*exp(8) - 4*exp(10) + x
*(270*exp(4) - 540*exp(2) - 60*exp(6) + 5*exp(8) + 405) + 972)/(exp(4) - 6
*exp(2) + x^2 - x*(2*exp(2) - 6) + 9) - x^3
```

3.581 $\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}$

3.581.1 Optimal result

Integrand size = 94, antiderivative size = 19

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)} \, dx = e^x\left(-5+e^{(-2+\log(4+\log(-2+x)))^2}\right)$$

output
```
exp(x)*(exp((-2+ln(ln(-2+x)+4))^2)-5)
```

3.581.2 Mathematica [A] (verified)

Time = 5.17 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.53

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)} \, dx = -5e^x+\frac{e^{4+x+\log^2(4+\log(-2+x))}}{(4+\log(-2+x))^4}$$

input
```
Integrate[(E^x*(40 - 20*x) + E^x*(10 - 5*x)*Log[-2 + x] + (E^(4 + Log[4 + 
Log[-2 + x]]^2)*(E^x*(-12 + 4*x) + E^x*(-2 + x)*Log[-2 + x] + 2*E^x*Log[4
+ Log[-2 + x]]))/(4 + Log[-2 + x])^4)/(-8 + 4*x + (-2 + x)*Log[-2 + x]),x]
```

3.581.

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)} \, dx$$

output
```
-5*E^x + E^(4 + x + Log[4 + Log[-2 + x]]^2)/(4 + Log[-2 + x])^4
```

3.581.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(40-20x)+\frac{e^{\log^2(\log(x-2)+4)+4}(e^x(4x-12)+e^x(x-2)\log(x-2)+2e^x\log(\log(x-2)+4))}{(\log(x-2)+4)^4}+e^x(10-5x)\log(x-2)}{4x+(x-2)\log(x-2)-8}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-e^x(40-20x)-\frac{e^{\log^2(\log(x-2)+4)+4}(e^x(4x-12)+e^x(x-2)\log(x-2)+2e^x\log(\log(x-2)+4))}{(\log(x-2)+4)^4}-e^x(10-5x)\log(x-2)}{(2-x)(\log(x-2)+4)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{x+\log^2(\log(x-2)+4)+4}(4x+x\log(x-2)-2\log(x-2)+2\log(\log(x-2)+4)-12)}{(x-2)(\log(x-2)+4)^5}-5e^x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-4\int \frac{e^{\log^2(\log(x-2)+4)+x+4}}{(x-2)(\log(x-2)+4)^5}dx+\int \frac{e^{\log^2(\log(x-2)+4)+x+4}}{(\log(x-2)+4)^4}dx+2\int \frac{e^{\log^2(\log(x-2)+4)+x+4}\log(\log(x-2)+4)}{(x-2)(\log(x-2)+4)^5}dx-5e^x$$

input
```
Int[(E^x*(40 - 20*x) + E^x*(10 - 5*x)*Log[-2 + x] + (E^(4 + Log[4 + Log[-2
 + x]]^2)*(E^x*(-12 + 4*x) + E^x*(-2 + x)*Log[-2 + x] + 2*E^x*Log[4 + Log[
-2 + x]]))/(4 + Log[-2 + x])^4)/(-8 + 4*x + (-2 + x)*Log[-2 + x]),x]
```

output
```
$Aborted
```

3.581.

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}dx$$

3.581.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.581.4 Maple [A] (verified)

Time = 2.22 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.47

method	result	size
risch	$\frac{\mathrm{e}^{x+\ln(\ln(-2+x)+4)^2+4}}{(\ln(-2+x)+4)^4}-5\,\mathrm{e}^{x}$	28
parallelrisch	$\mathrm{e}^{x}\mathrm{e}^{\ln(\ln(-2+x)+4)^2-4\ln(\ln(-2+x)+4)+4}-5\,\mathrm{e}^{x}$	30

input
```
int(((2*exp(x)*ln(ln(-2+x)+4)+(-2+x)*exp(x)*ln(-2+x)+(4*x-12)*exp(x))*exp(
ln(ln(-2+x)+4)^2-4*ln(ln(-2+x)+4)+4)+(-5*x+10)*exp(x)*ln(-2+x)+(-20*x+40)*
exp(x))/((-2+x)*ln(-2+x)+4*x-8),x,method=_RETURNVERBOSE)
```

output
```
1/(ln(-2+x)+4)^4*exp(x+ln(ln(-2+x)+4)^2+4)-5*exp(x)
```

3.581.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}\left(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x))\right)}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}$$
$$= e^{\left(\log(\log(x-2)+4)^2+x-4\log(\log(x-2)+4)+4\right)}-5\,e^{x}$$

input
```
integrate(((2*exp(x)*log(log(-2+x)+4)+(-2+x)*exp(x)*log(-2+x)+(4*x-12)*exp
(x))*exp(log(log(-2+x)+4)^2-4*log(log(-2+x)+4)+4)+(-5*x+10)*exp(x)*log(-2+
x)+(-20*x+40)*exp(x))/((-2+x)*log(-2+x)+4*x-8),x, algorithm=\
```

output
```
e^(log(log(x - 2) + 4)^2 + x - 4*log(log(x - 2) + 4) + 4) - 5*e^x
```

3.581.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(17) = 34.

Time = 0.63 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.79

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}$$

$$= -5e^x + \frac{e^x e^{\log(\log(x-2)+4)^2+4}}{\log(x-2)^4+16\log(x-2)^3+96\log(x-2)^2+256\log(x-2)+256}$$

input
```
integrate(((2*exp(x)*ln(ln(-2+x)+4)+(-2+x)*exp(x)*ln(-2+x)+(4*x-12)*exp(x)
)*exp(ln(ln(-2+x)+4)**2-4*ln(ln(-2+x)+4)+4)+(-5*x+10)*exp(x)*ln(-2+x)+(-20
*x+40)*exp(x))/((-2+x)*ln(-2+x)+4*x-8),x)
```

output
```
-5*exp(x) + exp(x)*exp(log(log(x - 2) + 4)**2 + 4)/(log(x - 2)**4 + 16*log
(x - 2)**3 + 96*log(x - 2)**2 + 256*log(x - 2) + 256)
```

3.581.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 92 vs. 2(17) = 34.

Time = 0.24 (sec) , antiderivative size = 92, normalized size of antiderivative = 4.84

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}$$

$$= -\frac{5e^x\log(x-2)^4+80e^x\log(x-2)^3+480e^x\log(x-2)^2+1280e^x\log(x-2)-e^{\left(\log(\log(x-2)+4)^2+x+4\right)}}{\log(x-2)^4+16\log(x-2)^3+96\log(x-2)^2+256\log(x-2)+256}$$

input
```
integrate(((2*exp(x)*log(log(-2+x)+4)+(-2+x)*exp(x)*log(-2+x)+(4*x-12)*exp
(x))*exp(log(log(-2+x)+4)^2-4*log(log(-2+x)+4)+4)+(-5*x+10)*exp(x)*log(-2+
x)+(-20*x+40)*exp(x))/((-2+x)*log(-2+x)+4*x-8),x, algorithm=\
```

output
```
-(5*e^x*log(x - 2)^4 + 80*e^x*log(x - 2)^3 + 480*e^x*log(x - 2)^2 + 1280*e
^x*log(x - 2) - e^(log(log(x - 2) + 4)^2 + x + 4) + 1280*e^x)/(log(x - 2)^
4 + 16*log(x - 2)^3 + 96*log(x - 2)^2 + 256*log(x - 2) + 256)
```

3.581.

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}\,dx$$

3.581.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 92 vs. $2(17) = 34$.

Time = 0.37 (sec) , antiderivative size = 92, normalized size of antiderivative = 4.84

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}$$
$$= -\frac{5\,e^x\log(x-2)^4+80\,e^x\log(x-2)^3+480\,e^x\log(x-2)^2+1280\,e^x\log(x-2)-e^{\left(\log(\log(x-2)+4)^2+x+4\right)}}{\log(x-2)^4+16\,\log(x-2)^3+96\,\log(x-2)^2+256\,\log(x-2)+256}$$

input
```
integrate(((2*exp(x)*log(log(-2+x)+4)+(-2+x)*exp(x)*log(-2+x)+(4*x-12)*exp
(x))*exp(log(log(-2+x)+4)^2-4*log(log(-2+x)+4)+4)+(-5*x+10)*exp(x)*log(-2+
x)+(-20*x+40)*exp(x))/((-2+x)*log(-2+x)+4*x-8),x, algorithm=\
```

output
```
-(5*e^x*log(x - 2)^4 + 80*e^x*log(x - 2)^3 + 480*e^x*log(x - 2)^2 + 1280*e
^x*log(x - 2) - e^(log(log(x - 2) + 4)^2 + x + 4) + 1280*e^x)/(log(x - 2)^
4 + 16*log(x - 2)^3 + 96*log(x - 2)^2 + 256*log(x - 2) + 256)
```

3.581.9 Mupad [B] (verification not implemented)

Time = 13.24 (sec) , antiderivative size = 58, normalized size of antiderivative = 3.05

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}$$
$$= -\frac{e^x\left(1280\ln(x-2)-e^4\,e^{\ln(\ln(x-2)+4)^2}+480\ln(x-2)^2+80\ln(x-2)^3+5\ln(x-2)^4+1280\right)}{(\ln(x-2)+4)^4}$$

input
```
int(-(exp(x)*(20*x - 40) - exp(log(log(x - 2) + 4)^2 - 4*log(log(x - 2) +
4) + 4)*(2*log(log(x - 2) + 4)*exp(x) + exp(x)*(4*x - 12) + log(x - 2)*exp
(x)*(x - 2)) + log(x - 2)*exp(x)*(5*x - 10))/(4*x + log(x - 2)*(x - 2) - 8
),x)
```

output
```
-(exp(x)*(1280*log(x - 2) - exp(4)*exp(log(log(x - 2) + 4)^2) + 480*log(x
- 2)^2 + 80*log(x - 2)^3 + 5*log(x - 2)^4 + 1280))/(log(x - 2) + 4)^4
```

3.581.

$$\int \frac{e^x(40-20x)+e^x(10-5x)\log(-2+x)+\frac{e^{4+\log^2(4+\log(-2+x))}(e^x(-12+4x)+e^x(-2+x)\log(-2+x)+2e^x\log(4+\log(-2+x)))}{(4+\log(-2+x))^4}}{-8+4x+(-2+x)\log(-2+x)}\,dx$$

3.582 $\int \frac{-16x-16x^2\log(2)+(-}{64x-32x^2+4x^3+(-80x+84x^2-32x^3+4x^4)\log(2)+(25x-40x^2+26x^3}$

3.582.1 Optimal result

Integrand size = 195, antiderivative size = 25

$$\int \frac{-16x-16x^2\log(2)+(-20+20x-4x^3)\log^2(2)+}{64x-32x^2+4x^3+(-80x+84x^2-32x^3+4x^4)\log(2)+(25x-40x^2+26x^3-8x^4+x^5)\log^2(2)+((-}$$
$$=\frac{4}{-4+x+\frac{5}{x+\frac{2}{\log(2)}-\log(-x)}}$$

output
```
4/(5/(2/ln(2)+x-ln(-x))+x-4)
```

3.582.2 Mathematica [F]

$$\int \frac{-16x-16x^2\log(2)+(-20+20x-4x^3)\log^2(2)+}{64x-32x^2+4x^3+(-80x+84x^2-32x^3+4x^4)\log(2)+(25x-40x^2+26x^3-8x^4+x^5)\log^2(2)+((-}$$
$$=\int \frac{-16x-16x^2\log(2)+(-20+20x-4x^3)\log^2(2)}{64x-32x^2+4x^3+(-80x+84x^2-32x^3+4x^4)\log(2)+(25x-40x^2+26x^3-8x^4+x^5)\log^2(2)+(}$$

input
```
Integrate[(-16*x - 16*x^2*Log[2] + (-20 + 20*x - 4*x^3)*Log[2]^2 + (16*x*L
og[2] + 8*x^2*Log[2]^2)*Log[-x] - 4*x*Log[2]^2*Log[-x]^2)/(64*x - 32*x^2 +
 4*x^3 + (-80*x + 84*x^2 - 32*x^3 + 4*x^4)*Log[2] + (25*x - 40*x^2 + 26*x^
3 - 8*x^4 + x^5)*Log[2]^2 + ((-64*x + 32*x^2 - 4*x^3)*Log[2] + (40*x - 42*
x^2 + 16*x^3 - 2*x^4)*Log[2]^2)*Log[-x] + (16*x - 8*x^2 + x^3)*Log[2]^2*Lo
g[-x]^2),x]
```

3.582.

$\int \frac{-16x-16x^2\log(2)+(-20+20x-4x^3)\log^2(2)+(16x\log(2)+8x^2\log^2(2))\log(-x)-4x\log^2(2)\log^2(-}{64x-32x^2+4x^3+(-80x+84x^2-32x^3+4x^4)\log(2)+(25x-40x^2+26x^3-8x^4+x^5)\log^2(2)+((-64x+32x^2-4x^3)\log(2)+(40x-42x^2+16x^3-2x^4)\log}$

output
```
Integrate[(-16*x - 16*x^2*Log[2] + (-20 + 20*x - 4*x^3)*Log[2]^2 + (16*x*L
og[2] + 8*x^2*Log[2]^2)*Log[-x] - 4*x*Log[2]^2*Log[-x]^2)/(64*x - 32*x^2 +
 4*x^3 + (-80*x + 84*x^2 - 32*x^3 + 4*x^4)*Log[2] + (25*x - 40*x^2 + 26*x^
3 - 8*x^4 + x^5)*Log[2]^2 + ((-64*x + 32*x^2 - 4*x^3)*Log[2] + (40*x - 42*
x^2 + 16*x^3 - 2*x^4)*Log[2]^2)*Log[-x] + (16*x - 8*x^2 + x^3)*Log[2]^2*Lo
g[-x]^2), x]
```

3.582.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-4x^3+20x-20)\log^2(2)+(8x^2\log^2(2)+16x\log(2))\,\mathrm{l}}{4x^3-32x^2+(x^3-8x^2+16x)\log^2(2)\log^2(-x)+((-4x^3+32x^2-64x)\log(2)+(-2x^4+16x^3-42x^2+40x}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{4\left(x^3(-\log^2(2))-x^2\log(16)-x\log^2(2)\log^2(-x)-x(4-5\log^2(2))+2x\log(2)(x\log(2)+2)\log(-x)-5\log\right.}{x\left(x^2\log(2)+x(2-4\log(2))+(\log(16)-x\log(2))\log(-x)-8\left(1-\frac{5\log(2)}{8}\right)\right)^2}$$

$$\Big\downarrow \text{27}$$

$$4\int -\frac{\log^2(2)x^3+\log(16)x^2+\log^2(2)\log^2(-x)x-2\log(2)(\log(2)x+2)\log(-x)x+(4-5\log^2(2))x+5\log^2(2)}{x(-\log(2)x^2-2(1-\log(4))x+(x\log(2)-\log(16))\log(-x)-\log(32)+8)^2}$$

$$\Big\downarrow \text{25}$$

$$-4\int \frac{\log^2(2)x^3+\log(16)x^2+\log^2(2)\log^2(-x)x-2\log(2)(\log(2)x+2)\log(-x)x+(4-5\log^2(2))x+5\log^2(2)}{x(-\log(2)x^2-2(1-\log(4))x+(x\log(2)-\log(16))\log(-x)-\log(32)+8)^2}$$

$$\Big\downarrow \text{7292}$$

$$-4\int \frac{\log^2(2)x^3+\log(16)x^2+\log^2(2)\log^2(-x)x-2\log(2)(\log(2)x+2)\log(-x)x+(4-5\log^2(2))x+5\log^2(2)}{x\left(-\log(2)x^2-2(1-\log(4))x+(x\log(2)-\log(16))\log(-x)+8\left(1-\frac{5\log(2)}{8}\right)\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{2\log(2)\left(5\log^2(2)-x(\log^2(4)-\log(2)\log(16))\right)}{(x\log(2)-\log(16))^2\left(-\log(2)x^2+\log(2)\log(-x)x-2(1-\log(4))x-\log(16)\log(-x)+8\left(1-\frac{5\log(2)}{8}\right)\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-4\left(10\log^3(2)\int\frac{1}{(x\log(2)-\log(16))^2\left(-\log(2)x^2+\log(2)\log(-x)x-2(1-\log(4))x-\log(16)\log(-x)+8\left(1\right.\right.}\right.$$

input
```
Int[(-16*x - 16*x^2*Log[2] + (-20 + 20*x - 4*x^3)*Log[2]^2 + (16*x*Log[2]
+ 8*x^2*Log[2]^2)*Log[-x] - 4*x*Log[2]^2*Log[-x]^2)/(64*x - 32*x^2 + 4*x^3
 + (-80*x + 84*x^2 - 32*x^3 + 4*x^4)*Log[2] + (25*x - 40*x^2 + 26*x^3 - 8*
x^4 + x^5)*Log[2]^2 + ((-64*x + 32*x^2 - 4*x^3)*Log[2] + (40*x - 42*x^2 +
16*x^3 - 2*x^4)*Log[2]^2)*Log[-x] + (16*x - 8*x^2 + x^3)*Log[2]^2*Log[-x]^
2),x]
```

output
```
$Aborted
```

3.582.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.582.

$$\int\frac{-16x-16x^2\log(2)+(-20+20x-4x^3)\log^2(2)+(16x\log(2)+8x^2\log^2(2))\log(-x)-4x\log^2(2)\log^2(-}{64x-32x^2+4x^3+(-80x+84x^2-32x^3+4x^4)\log(2)+(25x-40x^2+26x^3-8x^4+x^5)\log^2(2)+((-64x+32x^2-4x^3)\log(2)+(40x-42x^2+16x^3-2x^4)\log}$$

3.582.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(25) = 50$.

Time = 3.65 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.24

method	result	size
derivativedivides	$\frac{4x\ln(2)-4\ln(2)\ln(-x)+8}{x^2\ln(2)-\ln(2)\ln(-x)x-4x\ln(2)+4\ln(2)\ln(-x)+5\ln(2)+2x-8}$	56
default	$\frac{4x\ln(2)-4\ln(2)\ln(-x)+8}{x^2\ln(2)-\ln(2)\ln(-x)x-4x\ln(2)+4\ln(2)\ln(-x)+5\ln(2)+2x-8}$	56
norman	$\frac{4x\ln(2)-4\ln(2)\ln(-x)+8}{x^2\ln(2)-\ln(2)\ln(-x)x-4x\ln(2)+4\ln(2)\ln(-x)+5\ln(2)+2x-8}$	56
risch	$\frac{4}{x-4}-\frac{20\ln(2)}{(x-4)(x^2\ln(2)-\ln(2)\ln(-x)x-4x\ln(2)+4\ln(2)\ln(-x)+5\ln(2)+2x-8)}$	57
parallelrisch	$\frac{4x\ln(2)^2+8\ln(2)-4\ln(-x)\ln(2)^2}{\ln(2)(x^2\ln(2)-\ln(2)\ln(-x)x-4x\ln(2)+4\ln(2)\ln(-x)+5\ln(2)+2x-8)}$	67

input
```
int((-4*x*ln(2)^2*ln(-x)^2+(8*x^2*ln(2)^2+16*x*ln(2))*ln(-x)+(-4*x^3+20*x-
20)*ln(2)^2-16*x^2*ln(2)-16*x)/((x^3-8*x^2+16*x)*ln(2)^2*ln(-x)^2+((-2*x^4
+16*x^3-42*x^2+40*x)*ln(2)^2+(-4*x^3+32*x^2-64*x)*ln(2))*ln(-x)+(x^5-8*x^4
+26*x^3-40*x^2+25*x)*ln(2)^2+(4*x^4-32*x^3+84*x^2-80*x)*ln(2)+4*x^3-32*x^2
+64*x),x,method=_RETURNVERBOSE)
```

output
```
4*(-ln(2)*ln(-x)+x*ln(2)+2)/(x^2*ln(2)-ln(2)*ln(-x)*x-4*x*ln(2)+4*ln(2)*ln
(-x)+5*ln(2)+2*x-8)
```

3.582.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.80

$$\int \frac{-16x-16x^2\log(2)+(-20+20x-4x^3)\log^2(2)+}{64x-32x^2+4x^3+(-80x+84x^2-32x^3+4x^4)\log(2)+(25x-40x^2+26x^3-8x^4+x^5)\log^2(2)+((}$$
$$=-\frac{4\,(x\log(2)-\log(2)\log(-x)+2)}{(x-4)\log(2)\log(-x)-(x^2-4\,x+5)\log(2)-2\,x+8}$$

input
```
integrate((-4*x*log(2)^2*log(-x)^2+(8*x^2*log(2)^2+16*x*log(2))*log(-x)+(-
4*x^3+20*x-20)*log(2)^2-16*x^2*log(2)-16*x)/((x^3-8*x^2+16*x)*log(2)^2*log
(-x)^2+((-2*x^4+16*x^3-42*x^2+40*x)*log(2)^2+(-4*x^3+32*x^2-64*x)*log(2))*
log(-x)+(x^5-8*x^4+26*x^3-40*x^2+25*x)*log(2)^2+(4*x^4-32*x^3+84*x^2-80*x)
*log(2)+4*x^3-32*x^2+64*x),x, algorithm=\
```

output
```
-4*(x*log(2) - log(2)*log(-x) + 2)/((x - 4)*log(2)*log(-x) - (x^2 - 4*x +
5)*log(2) - 2*x + 8)
```

3.582.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. $2(17) = 34$.

Time = 0.22 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.80

$$\int \frac{-16x - 16x^2\log(2) + (-20 + 20x - 4x^3)\log^2(2) + \cdots}{64x - 32x^2 + 4x^3 + (-80x + 84x^2 - 32x^3 + 4x^4)\log(2) + (25x - 40x^2 + 26x^3 - 8x^4 + x^5)\log^2(2) + ((\cdots}$$
$$= \frac{20\log(2)}{-x^3\log(2) - 2x^2 + 8x^2\log(2) - 21x\log(2) + 16x + (x^2\log(2) - 8x\log(2) + 16\log(2))\log(-x) - 32 + \cdots} + \frac{4}{x-4}$$

input
```
integrate((-4*x*ln(2)**2*ln(-x)**2+(8*x**2*ln(2)**2+16*x*ln(2))*ln(-x)+(-4
*x**3+20*x-20)*ln(2)**2-16*x**2*ln(2)-16*x)/((x**3-8*x**2+16*x)*ln(2)**2*l
n(-x)**2+((-2*x**4+16*x**3-42*x**2+40*x)*ln(2)**2+(-4*x**3+32*x**2-64*x)*l
n(2))*ln(-x)+(x**5-8*x**4+26*x**3-40*x**2+25*x)*ln(2)**2+(4*x**4-32*x**3+8
4*x**2-80*x)*ln(2)+4*x**3-32*x**2+64*x),x)
```

output
```
20*log(2)/(-x**3*log(2) - 2*x**2 + 8*x**2*log(2) - 21*x*log(2) + 16*x + (x
**2*log(2) - 8*x*log(2) + 16*log(2))*log(-x) - 32 + 20*log(2)) + 4/(x - 4)
```

3.582.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(25) = 50$.

Time = 0.33 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.16

$$\int \frac{-16x - 16x^2\log(2) + (-20 + 20x - 4x^3)\log^2(2) + \cdots}{64x - 32x^2 + 4x^3 + (-80x + 84x^2 - 32x^3 + 4x^4)\log(2) + (25x - 40x^2 + 26x^3 - 8x^4 + x^5)\log^2(2) + ((\cdots}$$
$$= \frac{4(x\log(2) - \log(2)\log(-x) + 2)}{x^2\log(2) - 2x(2\log(2) - 1) - (x\log(2) - 4\log(2))\log(-x) + 5\log(2) - 8}$$

input
```
integrate((-4*x*log(2)^2*log(-x)^2+(8*x^2*log(2)^2+16*x*log(2))*log(-x)+(-
4*x^3+20*x-20)*log(2)^2-16*x^2*log(2)-16*x)/((x^3-8*x^2+16*x)*log(2)^2*log
(-x)^2+((-2*x^4+16*x^3-42*x^2+40*x)*log(2)^2+(-4*x^3+32*x^2-64*x)*log(2))*
log(-x)+(x^5-8*x^4+26*x^3-40*x^2+25*x)*log(2)^2+(4*x^4-32*x^3+84*x^2-80*x)
*log(2)+4*x^3-32*x^2+64*x),x, algorithm=\
```

output
```
4*(x*log(2) - log(2)*log(-x) + 2)/(x^2*log(2) - 2*x*(2*log(2) - 1) - (x*lo
g(2) - 4*log(2))*log(-x) + 5*log(2) - 8)
```

3.582.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. 2(25) = 50.

Time = 0.30 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.96

$$\int \frac{-16x-16x^2\log(2)+(-20+20x-4x^3)\log^2(2)+}{64x-32x^2+4x^3+(-80x+84x^2-32x^3+4x^4)\log(2)+(25x-40x^2+26x^3-8x^4+x^5)\log^2(2)+((-}$$

$$= -\frac{20\log(2)}{x^3\log(2)-x^2\log(2)\log(-x)-8x^2\log(2)+8x\log(2)\log(-x)+2x^2+21x\log(2)-16\log(2)\log} + \frac{4}{x-4}$$

input
```
integrate((-4*x*log(2)^2*log(-x)^2+(8*x^2*log(2)^2+16*x*log(2))*log(-x)+(-
4*x^3+20*x-20)*log(2)^2-16*x^2*log(2)-16*x)/((x^3-8*x^2+16*x)*log(2)^2*log
(-x)^2+((-2*x^4+16*x^3-42*x^2+40*x)*log(2)^2+(-4*x^3+32*x^2-64*x)*log(2))*
log(-x)+(x^5-8*x^4+26*x^3-40*x^2+25*x)*log(2)^2+(4*x^4-32*x^3+84*x^2-80*x)
*log(2)+4*x^3-32*x^2+64*x),x, algorithm=\
```

output
```
-20*log(2)/(x^3*log(2) - x^2*log(2)*log(-x) - 8*x^2*log(2) + 8*x*log(2)*lo
g(-x) + 2*x^2 + 21*x*log(2) - 16*log(2)*log(-x) - 16*x - 20*log(2) + 32) +
 4/(x - 4)
```

3.582.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-16x - 16x^2 \log(2) + (-20 + 20x - 4x^3)\log^2(2) +}{64x - 32x^2 + 4x^3 + (-80x + 84x^2 - 32x^3 + 4x^4)\log(2) + (25x - 40x^2 + 26x^3 - 8x^4 + x^5)\log^2(2) + ((}$$

$$= \int -\frac{16\,x - \ln(-x)\,\left(8\ln(2)^2\,x^2 + 16\,\ln(2)\,x\right) +}{64\,x + \ln(-x)\,\left(\ln(2)^2\,\left(-2\,x^4 + 16\,x^3 - 42\,x^2 + 40\,x\right) - \ln(2)\,\left(4\,x^3 - 32\,x^2 + 64\,x\right)\right) - \ln(2)\,\left(-4\,x^4 +\right.}$$

input
```
int(-(16*x - log(-x)*(8*x^2*log(2)^2 + 16*x*log(2)) + log(2)^2*(4*x^3 - 20
*x + 20) + 16*x^2*log(2) + 4*x*log(-x)^2*log(2)^2)/(64*x + log(-x)*(log(2)
^2*(40*x - 42*x^2 + 16*x^3 - 2*x^4) - log(2)*(64*x - 32*x^2 + 4*x^3)) - lo
g(2)*(80*x - 84*x^2 + 32*x^3 - 4*x^4) - 32*x^2 + 4*x^3 + log(2)^2*(25*x -
40*x^2 + 26*x^3 - 8*x^4 + x^5) + log(-x)^2*log(2)^2*(16*x - 8*x^2 + x^3)),
x)
```

output
```
int(-(16*x - log(-x)*(8*x^2*log(2)^2 + 16*x*log(2)) + log(2)^2*(4*x^3 - 20
*x + 20) + 16*x^2*log(2) + 4*x*log(-x)^2*log(2)^2)/(64*x + log(-x)*(log(2)
^2*(40*x - 42*x^2 + 16*x^3 - 2*x^4) - log(2)*(64*x - 32*x^2 + 4*x^3)) - lo
g(2)*(80*x - 84*x^2 + 32*x^3 - 4*x^4) - 32*x^2 + 4*x^3 + log(2)^2*(25*x -
40*x^2 + 26*x^3 - 8*x^4 + x^5) + log(-x)^2*log(2)^2*(16*x - 8*x^2 + x^3)),
 x)
```

3.583 $\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}(-24x^2-18x^3)+e^{-\frac{3x}{-5+3e^{14}x^2}}(\cdots\right.}{25-30e^{14}x^2+9e^{28}x^4}$

3.583.1 Optimal result

Integrand size = 102, antiderivative size = 28

$$\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}(-24x^2-18x^3)+e^{-\frac{3x}{-5+3e^{14}x^2}}(-25+30e^{14}x^2-9e^{28}x^4)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$$
$$=-4-x+e^{-\frac{3x}{5-3e^{14}x^2}}(-4+2x)$$

output
```
-4+(2*x-4)/exp(3*x/(5-3*x^2*exp(7)^2))-x
```

3.583.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}(-24x^2-18x^3)+e^{-\frac{3x}{-5+3e^{14}x^2}}(-25+30e^{14}x^2-9e^{28}x^4)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$$
$$=-x+e^{\frac{3x}{-5+3e^{14}x^2}}(-4+2x)$$

input
```
Integrate[(E^((3*x)/(-5 + 3*E^14*x^2))*(110 - 30*x + 18*E^28*x^4 + E^14*(-
24*x^2 - 18*x^3) + (-25 + 30*E^14*x^2 - 9*E^28*x^4)/E^((3*x)/(-5 + 3*E^14*
x^2))))/(25 - 30*E^14*x^2 + 9*E^28*x^4),x]
```

output
```
-x + E^((3*x)/(-5 + 3*E^14*x^2))*(-4 + 2*x)
```

3.583.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{3x}{3e^{14}x^2-5}}\left(18e^{28}x^4+e^{-\frac{3x}{3e^{14}x^2-5}}\left(-9e^{28}x^4+30e^{14}x^2-25\right)+e^{14}\left(-18x^3-24x^2\right)-30x+110\right)}{9e^{28}x^4-30e^{14}x^2+25}dx$$

$$\Big\downarrow \text{ 1380}$$

$$9e^{28}\int \frac{e^{-\frac{3x}{5-3e^{14}x^2}-28}\left(18e^{28}x^4-30x-6e^{14}\left(3x^3+4x^2\right)-e^{\frac{3x}{5-3e^{14}x^2}}\left(9e^{28}x^4-30e^{14}x^2+25\right)+110\right)}{9\left(5-3e^{14}x^2\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$e^{28}\int \frac{e^{-\frac{3x}{5-3e^{14}x^2}-28}\left(18e^{28}x^4-30x-6e^{14}\left(3x^3+4x^2\right)-e^{\frac{3x}{5-3e^{14}x^2}}\left(9e^{28}x^4-30e^{14}x^2+25\right)+110\right)}{\left(5-3e^{14}x^2\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$e^{28}\int \left(\frac{18e^{-\frac{3x}{5-3e^{14}x^2}}x^4}{\left(3e^{14}x^2-5\right)^2}-\frac{6e^{-\frac{3x}{5-3e^{14}x^2}-14}(3x+4)x^2}{\left(3e^{14}x^2-5\right)^2}-\frac{30e^{-\frac{3x}{5-3e^{14}x^2}-28}x}{\left(3e^{14}x^2-5\right)^2}+\frac{110e^{-\frac{3x}{5-3e^{14}x^2}-28}}{\left(3e^{14}x^2-5\right)^2}-\frac{1}{e^{28}}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$e^{28}\left(2\int e^{-\frac{3x}{5-3e^{14}x^2}-28}dx+\frac{\left(4+\frac{\sqrt{15}}{e^7}\right)\int \frac{e^{-\frac{3x}{5-3e^{14}x^2}-28}}{\sqrt{5}-\sqrt{3}e^7x}dx}{\sqrt{5}}-\frac{3}{2}\sqrt{5}\int \frac{e^{-\frac{3x}{5-3e^{14}x^2}-28}}{\sqrt{5}-\sqrt{3}e^7x}dx+\frac{7\int \frac{e^{-\frac{3x}{5-3e^{14}x^2}-28}}{\sqrt{5}-\sqrt{3}e^7x}dx}{2\sqrt{5}}+\frac{(4\right.$$

input
```
Int[(E^((3*x)/(-5 + 3*E^14*x^2))*(110 - 30*x + 18*E^28*x^4 + E^14*(-24*x^2
 - 18*x^3) + (-25 + 30*E^14*x^2 - 9*E^28*x^4)/E^((3*x)/(-5 + 3*E^14*x^2)))
)/(25 - 30*E^14*x^2 + 9*E^28*x^4),x]
```

output
```
$Aborted
```

3.583.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.583.4 Maple [A] (verified)

Time = 2.28 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

method	result	size
risch	$-x+\left(2x-4\right){\mathrm e}^{\frac{3x}{3x^{2}{\mathrm e}^{14}-5}}$	26
parts	$-x+\frac{\left(20-10x-12x^{2}{\mathrm e}^{14}+6x^{3}{\mathrm e}^{14}\right){\mathrm e}^{\frac{3x}{3x^{2}{\mathrm e}^{14}-5}}}{3x^{2}{\mathrm e}^{14}-5}$	61
norman	$\frac{\left(20-10x+5x\,{\mathrm e}^{-\frac{3x}{3x^{2}{\mathrm e}^{14}-5}}-12x^{2}{\mathrm e}^{14}+6x^{3}{\mathrm e}^{14}-3\,{\mathrm e}^{14}x^{3}{\mathrm e}^{-\frac{3x}{3x^{2}{\mathrm e}^{14}-5}}\right){\mathrm e}^{\frac{3x}{3x^{2}{\mathrm e}^{14}-5}}}{3x^{2}{\mathrm e}^{14}-5}$	103
parallelrisch	$\frac{\left(12500-1875\,{\mathrm e}^{14}x^{3}{\mathrm e}^{-\frac{3x}{3x^{2}{\mathrm e}^{14}-5}}+3750x^{3}{\mathrm e}^{14}-7500x^{2}{\mathrm e}^{14}+3125x\,{\mathrm e}^{-\frac{3x}{3x^{2}{\mathrm e}^{14}-5}}-6250x\right){\mathrm e}^{\frac{3x}{3x^{2}{\mathrm e}^{14}-5}}}{1875x^{2}{\mathrm e}^{14}-3125}$	104

input
```
int(((-9*x^4*exp(7)^4+30*x^2*exp(7)^2-25)*exp(-3*x/(3*x^2*exp(7)^2-5))+18*
x^4*exp(7)^4+(-18*x^3-24*x^2)*exp(7)^2-30*x+110)/(9*x^4*exp(7)^4-30*x^2*ex
p(7)^2+25)/exp(-3*x/(3*x^2*exp(7)^2-5)),x,method=_RETURNVERBOSE)
```

output
```
-x+(2*x-4)*exp(3*x/(3*x^2*exp(14)-5))
```

3.583. $\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}\left(-24x^2-18x^3\right)+e^{-\frac{3x}{-5+3e^{14}x^2}}\left(-25+30e^{14}x^2-9e^{28}x^4\right)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$

3.583.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}(-24x^2-18x^3)+e^{-\frac{3x}{-5+3e^{14}x^2}}(-25+30e^{14}x^2-9e^{28}x^4)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$$
$$=2\,(x-2)e^{\left(\frac{3\,x}{3\,x^2e^{14}-5}\right)}-x$$

input
```
integrate(((-9*x^4*exp(7)^4+30*x^2*exp(7)^2-25)*exp(-3*x/(3*x^2*exp(7)^2-5
))+18*x^4*exp(7)^4+(-18*x^3-24*x^2)*exp(7)^2-30*x+110)/(9*x^4*exp(7)^4-30*
x^2*exp(7)^2+25)/exp(-3*x/(3*x^2*exp(7)^2-5)),x, algorithm=\
```

output
```
2*(x - 2)*e^(3*x/(3*x^2*e^14 - 5)) - x
```

3.583.6 Sympy [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}(-24x^2-18x^3)+e^{-\frac{3x}{-5+3e^{14}x^2}}(-25+30e^{14}x^2-9e^{28}x^4)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$$
$$=-x+(2x-4)\,e^{\frac{3x}{3x^2e^{14}-5}}$$

input
```
integrate(((-9*x**4*exp(7)**4+30*x**2*exp(7)**2-25)*exp(-3*x/(3*x**2*exp(7
)**2-5))+18*x**4*exp(7)**4+(-18*x**3-24*x**2)*exp(7)**2-30*x+110)/(9*x**4*
exp(7)**4-30*x**2*exp(7)**2+25)/exp(-3*x/(3*x**2*exp(7)**2-5)),x)
```

output
```
-x + (2*x - 4)*exp(3*x/(3*x**2*exp(14) - 5))
```

3.583.7 Maxima [F]

$$\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}(-24x^2-18x^3)+e^{-\frac{3x}{-5+3e^{14}x^2}}(-25+30e^{14}x^2-9e^{28}x^4)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$$
$$=\int \frac{\left(18\,x^4e^{28}-6\,(3\,x^3+4\,x^2)e^{14}-(9\,x^4e^{28}-30\,x^2e^{14}+25)e^{\left(-\frac{3\,x}{3\,x^2e^{14}-5}\right)}-30\,x+110\right)e^{\left(\frac{3\,x}{3\,x^2e^{14}-5}\right)}}{9\,x^4e^{28}-30\,x^2e^{14}+25}\,dx$$

input
```
integrate(((-9*x^4*exp(7)^4+30*x^2*exp(7)^2-25)*exp(-3*x/(3*x^2*exp(7)^2-5
))+18*x^4*exp(7)^4+(-18*x^3-24*x^2)*exp(7)^2-30*x+110)/(9*x^4*exp(7)^4-30*
x^2*exp(7)^2+25)/exp(-3*x/(3*x^2*exp(7)^2-5)),x, algorithm=\
```

output
```
1/12*sqrt(15)*e^(-7)*log((3*x*e^14 - sqrt(15)*e^7)/(3*x*e^14 + sqrt(15)*e^
7)) - 1/4*(sqrt(15)*e^(-35)*log((3*x*e^14 - sqrt(15)*e^7)/(3*x*e^14 + sqrt
(15)*e^7)) + 4*x*e^(-28) - 10*x/(3*x^2*e^42 - 5*e^28))*e^28 + 1/6*(sqrt(15
)*e^(-21)*log((3*x*e^14 - sqrt(15)*e^7)/(3*x*e^14 + sqrt(15)*e^7)) - 30*x/
(3*x^2*e^28 - 5*e^14))*e^14 + 2*x*e^(3*x/(3*x^2*e^14 - 5)) + 5/2*x/(3*x^2*
e^14 - 5) + integrate(12*(3*x^2*e^14 + 5)*e^(3*x/(3*x^2*e^14 - 5))/(9*x^4*
e^28 - 30*x^2*e^14 + 25), x)
```

3.583.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

$$\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}(-24x^2-18x^3)+e^{-\frac{3x}{-5+3e^{14}x^2}}(-25+30e^{14}x^2-9e^{28}x^4)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$$
$$=2\,xe^{\left(\frac{3\,x}{3\,x^2e^{14}-5}\right)}-x-4\,e^{\left(\frac{3\,x}{3\,x^2e^{14}-5}\right)}$$

input
```
integrate(((-9*x^4*exp(7)^4+30*x^2*exp(7)^2-25)*exp(-3*x/(3*x^2*exp(7)^2-5
))+18*x^4*exp(7)^4+(-18*x^3-24*x^2)*exp(7)^2-30*x+110)/(9*x^4*exp(7)^4-30*
x^2*exp(7)^2+25)/exp(-3*x/(3*x^2*exp(7)^2-5)),x, algorithm=\
```

output
```
2*x*e^(3*x/(3*x^2*e^14 - 5)) - x - 4*e^(3*x/(3*x^2*e^14 - 5))
```

3.583.9 Mupad [B] (verification not implemented)

Time = 14.69 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}(-24x^2-18x^3)+e^{-\frac{3x}{-5+3e^{14}x^2}}(-25+30e^{14}x^2-9e^{28}x^4)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$$
$$=\mathrm{e}^{\frac{3\,x}{3\,x^2\,\mathrm{e}^{14}-5}}\,\left(2\,x-4\right)-x$$

input
```
int(-(exp((3*x)/(3*x^2*exp(14) - 5))*(30*x + exp(-(3*x)/(3*x^2*exp(14) - 5
))*(9*x^4*exp(28) - 30*x^2*exp(14) + 25) + exp(14)*(24*x^2 + 18*x^3) - 18*
x^4*exp(28) - 110))/(9*x^4*exp(28) - 30*x^2*exp(14) + 25),x)
```

output
```
exp((3*x)/(3*x^2*exp(14) - 5))*(2*x - 4) - x
```

3.583. $$\int \frac{e^{\frac{3x}{-5+3e^{14}x^2}}\left(110-30x+18e^{28}x^4+e^{14}\left(-24x^2-18x^3\right)+e^{-\frac{3x}{-5+3e^{14}x^2}}\left(-25+30e^{14}x^2-9e^{28}x^4\right)\right)}{25-30e^{14}x^2+9e^{28}x^4}\,dx$$

3.584 $\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}} (-250+50x+e}{}$

3.584.1 Optimal result

Integrand size = 128, antiderivative size = 28

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}\left(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+40\right.}{25+10e^x+e^{2x}}$$
$$=e^{-\frac{5}{5+e^x}-x+x^2+x(-1+5\log(x))^2}$$

output
```
exp(x^2-x-5/(exp(x)+5)+(5*ln(x)-1)^2*x)
```

3.584.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}\left(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+40\right.}{25+10e^x+e^{2x}}$$
$$=e^{-\frac{5}{5+e^x}+x^2+25x\log^2(x)}x^{-10x}$$

input
```
Integrate[(E^((-5 + 5*x^2 + E^x*x^2 + (-50*x - 10*E^x*x)*Log[x] + (125*x +
 25*E^x*x)*Log[x]^2)/(5 + E^x))*(-250 + 50*x + E^(2*x)*(-10 + 2*x) + E^x*(
-95 + 20*x) + (1000 + 400*E^x + 40*E^(2*x))*Log[x] + (625 + 250*E^x + 25*E
^(2*x))*Log[x]^2))/(25 + 10*E^x + E^(2*x)),x]
```

output
```
E^(-5/(5 + E^x) + x^2 + 25*x*Log[x]^2)/x^(10*x)
```

3.584.

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}\left(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+400e^x+40e^{2x})\log(x)+(625+250e\right.}{25+10e^x+e^{2x}}$$

3.584.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(50x+e^{2x}(2x-10)+e^x(20x-95)+(250e^x+25e^{2x}+625)\log^2(x)+(400e^x+40e^{2x}+1000)\log(x)-250)}{10e^x+e^{2x}+25}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(50x+e^{2x}(2x-10)+e^x(20x-95)+(250e^x+25e^{2x}+625)\log^2(x)+(400e^x+40e^{2x}+1000)\log(x)-250)}{(e^x+5)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(25\log^2(x)\exp\left(\frac{e^x x^2+5x^2+(25e^x x+125x)\log^2(x)+(-10e^x x-50x)\log(x)-5}{e^x+5}\right)+40\log(x)\exp\left(\frac{e^x x^2}{}\right.\right.$$

$$\Big\downarrow \text{2009}$$

$$2\int e^{x^2+25\log^2(x)x-\frac{5}{5+e^x}}x^{1-10x}dx-10\int e^{x^2+25\log^2(x)x-\frac{5}{5+e^x}}x^{-10x}dx-25\int \frac{e^{x^2+25\log^2(x)x-\frac{5}{5+e^x}}x^{-10x}}{(5+e^x)^2}dx+5\int \frac{e^{x^2+25\log^2(x)x-\frac{5}{5+e^x}}x^{-10x}}{5+e^x}dx+40\int e^{x^2+25\log^2(x)x-\frac{5}{5+e^x}}x^{-10x}\log(x)dx+25\int e^{x^2+25\log^2(x)x-\frac{5}{5+e^x}}x^{-10x}\log^2(x)dx$$

input
```
Int[(E^((-5 + 5*x^2 + E^x*x^2 + (-50*x - 10*E^x*x)*Log[x] + (125*x + 25*E^
x*x)*Log[x]^2)/(5 + E^x))*(-250 + 50*x + E^(2*x)*(-10 + 2*x) + E^x*(-95 +
20*x) + (1000 + 400*E^x + 40*E^(2*x))*Log[x] + (625 + 250*E^x + 25*E^(2*x)
)*Log[x]^2))/(25 + 10*E^x + E^(2*x)),x]
```

output
```
$Aborted
```

3.584. $\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+400e^x+40e^{2x})\log(x)+(625+250e^x}{25+10e^x+e^{2x}}$

3.584.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.584.4 Maple [A] (verified)

Time = 2.40 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.71

method	result	size
parallelrisch	$\mathrm{e}^{\frac{\left(25\,\mathrm{e}^{x} x+125 x\right) \ln \left(x\right)^{2}+\left(-10\,\mathrm{e}^{x} x-50 x\right) \ln \left(x\right)+\mathrm{e}^{x} x^{2}+5 x^{2}-5}{\mathrm{e}^{x}+5}}$	48
risch	$\mathrm{e}^{\frac{25 x\,\mathrm{e}^{x} \ln \left(x\right)^{2}+125 x \ln \left(x\right)^{2}-10 x\,\mathrm{e}^{x} \ln \left(x\right)+\mathrm{e}^{x} x^{2}-50 x \ln \left(x\right)+5 x^{2}-5}{\mathrm{e}^{x}+5}}$	50

input
```
int(((25*exp(x)^2+250*exp(x)+625)*ln(x)^2+(40*exp(x)^2+400*exp(x)+1000)*ln
(x)+(2*x-10)*exp(x)^2+(20*x-95)*exp(x)+50*x-250)*exp(((25*exp(x)*x+125*x)*
ln(x)^2+(-10*exp(x)*x-50*x)*ln(x)+exp(x)*x^2+5*x^2-5)/(exp(x)+5))/(exp(x)^
2+10*exp(x)+25),x,method=_RETURNVERBOSE)
```

output
```
exp(((25*exp(x)*x+125*x)*ln(x)^2+(-10*exp(x)*x-50*x)*ln(x)+exp(x)*x^2+5*x^
2-5)/(exp(x)+5))
```

3.584.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.68

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}\left(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+40\right.}{25+10e^x+e^{2x}}$$

$$= e^{\left(\frac{x^{2} e^{x}+25 \, {\left(x e^{x}+5 \, x\right)} \log\left(x\right)^{2}+5 \, x^{2}-10 \, {\left(x e^{x}+5 \, x\right)} \log\left(x\right)-5}{e^{x}+5}\right)}$$

input
```
integrate(((25*exp(x)^2+250*exp(x)+625)*log(x)^2+(40*exp(x)^2+400*exp(x)+1
000)*log(x)+(2*x-10)*exp(x)^2+(20*x-95)*exp(x)+50*x-250)*exp(((25*exp(x)*x
+125*x)*log(x)^2+(-10*exp(x)*x-50*x)*log(x)+exp(x)*x^2+5*x^2-5)/(exp(x)+5)
)/(exp(x)^2+10*exp(x)+25),x, algorithm=\
```

output
```
e^((x^2*e^x + 25*(x*e^x + 5*x)*log(x)^2 + 5*x^2 - 10*(x*e^x + 5*x)*log(x)
- 5)/(e^x + 5))
```

3.584.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(22) = 44$.

Time = 0.55 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.75

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+40}{25+10e^x+e^{2x}}$$
$$= e^{\frac{x^2e^x+5x^2+(-10xe^x-50x)\log(x)+(25xe^x+125x)\log(x)^2-5}{e^x+5}}$$

input
```
integrate(((25*exp(x)**2+250*exp(x)+625)*ln(x)**2+(40*exp(x)**2+400*exp(x)
+1000)*ln(x)+(2*x-10)*exp(x)**2+(20*x-95)*exp(x)+50*x-250)*exp(((25*exp(x)
*x+125*x)*ln(x)**2+(-10*exp(x)*x-50*x)*ln(x)+exp(x)*x**2+5*x**2-5)/(exp(x)
+5))/(exp(x)**2+10*exp(x)+25),x)
```

output
```
exp((x**2*exp(x) + 5*x**2 + (-10*x*exp(x) - 50*x)*log(x) + (25*x*exp(x) +
125*x)*log(x)**2 - 5)/(exp(x) + 5))
```

3.584.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 85 vs. $2(26) = 52$.

Time = 0.42 (sec) , antiderivative size = 85, normalized size of antiderivative = 3.04

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+40}{25+10e^x+e^{2x}}$$
$$= e^{\left(\frac{25\,xe^x\log(x)^2}{e^x+5}+\frac{x^2e^x}{e^x+5}-\frac{10\,xe^x\log(x)}{e^x+5}+\frac{125\,x\log(x)^2}{e^x+5}+\frac{5\,x^2}{e^x+5}-\frac{50\,x\log(x)}{e^x+5}-\frac{5}{e^x+5}\right)}$$

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+400e^x+40e^{2x})\log(x)+(625+250e}{25+10e^x+e^{2x}}$$

input
```
integrate(((25*exp(x)^2+250*exp(x)+625)*log(x)^2+(40*exp(x)^2+400*exp(x)+1
000)*log(x)+(2*x-10)*exp(x)^2+(20*x-95)*exp(x)+50*x-250)*exp(((25*exp(x)*x
+125*x)*log(x)^2+(-10*exp(x)*x-50*x)*log(x)+exp(x)*x^2+5*x^2-5)/(exp(x)+5)
)/(exp(x)^2+10*exp(x)+25),x, algorithm=\
```

output
```
e^(25*x*e^x*log(x)^2/(e^x + 5) + x^2*e^x/(e^x + 5) - 10*x*e^x*log(x)/(e^x
+ 5) + 125*x*log(x)^2/(e^x + 5) + 5*x^2/(e^x + 5) - 50*x*log(x)/(e^x + 5)
- 5/(e^x + 5))
```

3.584.8 Giac [F]

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}\left(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+40\right.}{25+10e^x+e^{2x}}$$

$$=\int \frac{\left(25\left(e^{(2x)}+10e^x+25\right)\log(x)^2+2(x-5)e^{(2x)}+5(4x-19)e^x+40\left(e^{(2x)}+10e^x+25\right)\log(x)+50\right.}{e^{(2x)}+10e^x+25}$$

input
```
integrate(((25*exp(x)^2+250*exp(x)+625)*log(x)^2+(40*exp(x)^2+400*exp(x)+1
000)*log(x)+(2*x-10)*exp(x)^2+(20*x-95)*exp(x)+50*x-250)*exp(((25*exp(x)*x
+125*x)*log(x)^2+(-10*exp(x)*x-50*x)*log(x)+exp(x)*x^2+5*x^2-5)/(exp(x)+5)
)/(exp(x)^2+10*exp(x)+25),x, algorithm=\
```

output
```
integrate((25*(e^(2*x) + 10*e^x + 25)*log(x)^2 + 2*(x - 5)*e^(2*x) + 5*(4*
x - 19)*e^x + 40*(e^(2*x) + 10*e^x + 25)*log(x) + 50*x - 250)*e^((x^2*e^x
+ 25*(x*e^x + 5*x)*log(x)^2 + 5*x^2 - 10*(x*e^x + 5*x)*log(x) - 5)/(e^x +
5))/(e^(2*x) + 10*e^x + 25), x)
```

3.584.9 Mupad [B] (verification not implemented)

Time = 14.91 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.57

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}\left(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+(1000+40\right.}{25+10e^x+e^{2x}}$$

$$=\frac{e^{\frac{x^2\,e^x}{e^x+5}}\,e^{\frac{125\,x\,\ln(x)^2}{e^x+5}}\,e^{\frac{5\,x^2}{e^x+5}}\,e^{-\frac{5}{e^x+5}}\,e^{\frac{25\,x\,e^x\,\ln(x)^2}{e^x+5}}}{x^{10\,x}}$$

3.584.

$$\int \frac{e^{\frac{-5+5x^2+e^x x^2+(-50x-10e^x x)\log(x)+(125x+25e^x x)\log^2(x)}{5+e^x}}\left(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+\left(1000+400e^x+40e^{2x}\right)\log(x)+(625+250e\right.}{25+10e^x+e^{2x}}$$

input
```
int((exp((x^2*exp(x) - log(x)*(50*x + 10*x*exp(x)) + log(x)^2*(125*x + 25*
x*exp(x)) + 5*x^2 - 5)/(exp(x) + 5))*(50*x + exp(x)*(20*x - 95) + log(x)*(
40*exp(2*x) + 400*exp(x) + 1000) + exp(2*x)*(2*x - 10) + log(x)^2*(25*exp(
2*x) + 250*exp(x) + 625) - 250))/(exp(2*x) + 10*exp(x) + 25),x)
```

output
```
(exp((x^2*exp(x))/(exp(x) + 5))*exp((125*x*log(x)^2)/(exp(x) + 5))*exp((5*
x^2)/(exp(x) + 5))*exp(-5/(exp(x) + 5))*exp((25*x*exp(x)*log(x)^2)/(exp(x)
 + 5)))/x^(10*x)
```

3.584.

$$\int \frac{e^{\frac{-5+5x^2+e^xx^2+(-50x-10e^xx)\log(x)+(125x+25e^xx)\log^2(x)}{5+e^x}}\left(-250+50x+e^{2x}(-10+2x)+e^x(-95+20x)+\left(1000+400e^x+40e^{2x}\right)\log(x)+\left(625+250e^x\right.\right.}{25+10e^x+e^{2x}}$$

3.585 $\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4}{-x^2-x^2\log(x)+(-2x-}$

3.585.1 Optimal result

Integrand size = 172, antiderivative size = 33

$$\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2)}$$
$$=\left(1-e^3\right)\left(-x+\log\left(x+x\log(x)-\log\left(\frac{x}{2}+\log(2+\log(2))\right)\right)\right)$$

output
```
(-exp(3)+1)*(ln(x+x*ln(x)-ln(ln(ln(2)+2)+1/2*x))-x)
```

3.585.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.94

$$\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2)}$$
$$=\left(-1+e^3\right)\left(x-\log\left(x+x\log(x)-\log\left(\frac{x}{2}+\log(2+\log(2))\right)\right)\right)$$

input
```
Integrate[(1 - 2*x + x^2 + E^3*(-1 + 2*x - x^2) + (-x + x^2 + E^3*(x - x^2
))*Log[x] + (-4 + E^3*(4 - 2*x) + 2*x + (-2 + E^3*(2 - 2*x) + 2*x)*Log[x])
*Log[2 + Log[2]] + (-x + E^3*x + (-2 + 2*E^3)*Log[2 + Log[2]])*Log[(x + 2*
Log[2 + Log[2]])/2])/(-x^2 - x^2*Log[x] + (-2*x - 2*x*Log[x])*Log[2 + Log[
2]] + (x + 2*Log[2 + Log[2]])*Log[(x + 2*Log[2 + Log[2]])/2]),x]
```

3.585. $\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2-2x)+2x)\log(x))\log(2+\log(2))+(-x+e^3x+(-2+2e}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2))+(x+2\log(2+\log(2)))\log\left(\frac{1}{2}(x+2\log(2+\log(2)))\right)}$

output
```
(-1 + E^3)*(x - Log[x + x*Log[x] - Log[x/2 + Log[2 + Log[2]]]])
```

3.585.3 Rubi [A] (verified)

Time = 0.90 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.03, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029, Rules used = {7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+e^3\left(-x^2+2x-1\right)+\left(x^2+e^3\left(x-x^2\right)-x\right)\log(x)-2x+\left(e^3x-x+\left(2e^3-2\right)\log(2+\log(2))\right)\log\left(\frac{1}{2}(x\right.}{-x^2+x^2(-\log(x))+(x+2\log(2+\log(2)))\log\left(\frac{1}{2}(x+2\log(\right.}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{\left(1-e^3\right)\left(-x^2+x^2(-\log(x))+x\log\left(\frac{x}{2}+\log(2+\log(2))\right)+2x(1-\log(2+\log(2)))+x(1-2\log(2+\log(2))\right.}{(x+2\log(2+\log(2)))\left(x+x\log(x)\right.}$$

$$\Big\downarrow \text{ 27}$$

$$\left(1-e^3\right)\int -\frac{\log(x)x^2+x^2-\log\left(\frac{x}{2}+\log(2+\log(2))\right)x-2(1-\log(2+\log(2)))x-\log(x)(1-2\log(2+\log(2))}{(x+2\log(2+\log(2)))\left(\log(x)x+\right.}$$

$$\Big\downarrow \text{ 25}$$

$$-\left(\left(1-e^3\right)\int \frac{\log(x)x^2+x^2-\log\left(\frac{x}{2}+\log(2+\log(2))\right)x-2(1-\log(2+\log(2)))x-\log(x)(1-2\log(2+\log(2\right.}{(x+2\log(2+\log(2)))\left(\log(x)x\right.}$$

$$\Big\downarrow \text{ 7293}$$

$$-\left(\left(1-e^3\right)\int\left(\frac{-\log(x)x-2x-2\log(x)\log(2+\log(2))-4\log(2+\log(2))+1}{(x+2\log(2+\log(2)))\left(\log(x)x+x-\log\left(\frac{x}{2}+\log(2+\log(2))\right)\right)}+1\right)dx\right)$$

$$\Big\downarrow \text{ 2009}$$

$$-\left(\left(1-e^3\right)\left(x-\log\left(x+x\log(x)-\log\left(\frac{x}{2}+\log(2+\log(2))\right)\right)\right)\right)$$

3.585. $\int \frac{1-2x+x^2+e^3\left(-1+2x-x^2\right)+\left(-x+x^2+e^3\left(x-x^2\right)\right)\log(x)+\left(-4+e^3(4-2x)+2x+\left(-2+e^3(2-2x)+2x\right)\log(x)\right)\log(2+\log(2))+\left(-x+e^3x+(-2+2e\right.}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2))+(x+2\log(2+\log(2)))\log\left(\frac{1}{2}(x+2\log(2+\log(2)))\right)}$

input
```
Int[(1 - 2*x + x^2 + E^3*(-1 + 2*x - x^2) + (-x + x^2 + E^3*(x - x^2))*Log
[x] + (-4 + E^3*(4 - 2*x) + 2*x + (-2 + E^3*(2 - 2*x) + 2*x)*Log[x])*Log[2
 + Log[2]] + (-x + E^3*x + (-2 + 2*E^3)*Log[2 + Log[2]])*Log[(x + 2*Log[2
+ Log[2]])/2])/(-x^2 - x^2*Log[x] + (-2*x - 2*x*Log[x])*Log[2 + Log[2]] +
(x + 2*Log[2 + Log[2]])*Log[(x + 2*Log[2 + Log[2]])/2]),x]
```

output
```
-((1 - E^3)*(x - Log[x + x*Log[x] - Log[x/2 + Log[2 + Log[2]]]]))
```

3.585.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.585.4 Maple [A] (verified)

Time = 3.35 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.03

method	result
norman	$(\mathrm{e}^{3}-1) x+(-\mathrm{e}^{3}+1) \ln \left(x+x \ln (x)-\ln \left(\ln (\ln (2)+2)+\frac{x}{2}\right)\right)$
default	$(\mathrm{e}^{3}-1) x+(-\mathrm{e}^{3}+1) \ln (x \ln (x)+\ln (2)+x-\ln (2 \ln (\ln (2)+2)+x))$
risch	$-\ln \left(\ln \left(\ln (\ln (2)+2)+\frac{x}{2}\right)-(\ln (x)+1) x\right) \mathrm{e}^{3}+x \mathrm{e}^{3}+\ln \left(\ln \left(\ln (\ln (2)+2)+\frac{x}{2}\right)-(\ln (\right.$
parallelrisch	$-\mathrm{e}^{3} \ln \left(x+x \ln (x)-\ln \left(\ln (\ln (2)+2)+\frac{x}{2}\right)\right)-4 \ln (\ln (2)+2) \mathrm{e}^{3}+x \mathrm{e}^{3}+\ln \left(x+x \ln (x)\right.$

3.585.

$$\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2-2x)+2x)\log(x))\log(2+\log(2))+(-x+e^3x+(-2+2e}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2))+(x+2\log(2+\log(2)))\log\left(\frac{1}{2}(x+2\log(2+\log(2))\right)))}$$

input
```
int((((2*exp(3)-2)*ln(ln(2)+2)+x*exp(3)-x)*ln(ln(ln(2)+2)+1/2*x)+(((2-2*x)
*exp(3)+2*x-2)*ln(x)+(4-2*x)*exp(3)+2*x-4)*ln(ln(2)+2)+((-x^2+x)*exp(3)+x^
2-x)*ln(x)+(-x^2+2*x-1)*exp(3)+x^2-2*x+1)/((2*ln(ln(2)+2)+x)*ln(ln(ln(2)+2
)+1/2*x)+(-2*x*ln(x)-2*x)*ln(ln(2)+2)-x^2*ln(x)-x^2),x,method=_RETURNVERBO
SE)
```

output
```
(exp(3)-1)*x+(-exp(3)+1)*ln(x+x*ln(x)-ln(ln(ln(2)+2)+1/2*x))
```

3.585.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.03

$$\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2 \ldots}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2) \ldots}$$
$$= xe^3-(e^3-1)\log\left(-x\log(x)-x+\log\left(\frac{1}{2}x+\log(\log(2)+2)\right)\right)-x$$

input
```
integrate((((2*exp(3)-2)*log(log(2)+2)+x*exp(3)-x)*log(log(log(2)+2)+1/2*x
)+(((2-2*x)*exp(3)+2*x-2)*log(x)+(4-2*x)*exp(3)+2*x-4)*log(log(2)+2)+((-x^
2+x)*exp(3)+x^2-x)*log(x)+(-x^2+2*x-1)*exp(3)+x^2-2*x+1)/((2*log(log(2)+2)
+x)*log(log(log(2)+2)+1/2*x)+(-2*x*log(x)-2*x)*log(log(2)+2)-x^2*log(x)-x^
2),x, algorithm=\
```

output
```
x*e^3 - (e^3 - 1)*log(-x*log(x) - x + log(1/2*x + log(log(2) + 2))) - x
```

3.585.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.18

$$\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2 \ldots}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2) \ldots}$$
$$= x(-1+e^3)-(-1+e)(1+e+e^2)\log\left(-x\log(x)-x+\log\left(\frac{x}{2}+\log(\log(2)+2)\right)\right)$$

input
```
integrate((((2*exp(3)-2)*ln(ln(2)+2)+x*exp(3)-x)*ln(ln(ln(2)+2)+1/2*x)+(((
2-2*x)*exp(3)+2*x-2)*ln(x)+(4-2*x)*exp(3)+2*x-4)*ln(ln(2)+2)+((-x**2+x)*ex
p(3)+x**2-x)*ln(x)+(-x**2+2*x-1)*exp(3)+x**2-2*x+1)/((2*ln(ln(2)+2)+x)*ln(
ln(ln(2)+2)+1/2*x)+(-2*x*ln(x)-2*x)*ln(ln(2)+2)-x**2*ln(x)-x**2),x)
```

3.585.
$\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2-2x)+2x)\log(x))\log(2+\log(2))+(-x+e^3x+(-2+2e \ldots}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2))+(x+2\log(2+\log(2)))\log(\frac{1}{2}(x+2\log(2+\log(2)))) \ldots}$

output
```
x*(-1 + exp(3)) - (-1 + E)*(1 + E + exp(2))*log(-x*log(x) - x + log(x/2 +
log(log(2) + 2)))
```

3.585.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.12

$$\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2\cdots}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2\cdots}$$
$$= x(e^3-1) - (e^3-1)\log(-x\log(x) - x - \log(2) + \log(x + 2\log(\log(2)+2)))$$

input
```
integrate((((2*exp(3)-2)*log(log(2)+2)+x*exp(3)-x)*log(log(log(2)+2)+1/2*x
)+(((2-2*x)*exp(3)+2*x-2)*log(x)+(4-2*x)*exp(3)+2*x-4)*log(log(2)+2)+((-x^
2+x)*exp(3)+x^2-x)*log(x)+(-x^2+2*x-1)*exp(3)+x^2-2*x+1)/((2*log(log(2)+2)
+x)*log(log(log(2)+2)+1/2*x)+(-2*x*log(x)-2*x)*log(log(2)+2)-x^2*log(x)-x^
2),x, algorithm=\
```

output
```
x*(e^3 - 1) - (e^3 - 1)*log(-x*log(x) - x - log(2) + log(x + 2*log(log(2)
+ 2)))
```

3.585.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 153 vs. 2(28) = 56.

Time = 0.32 (sec) , antiderivative size = 153, normalized size of antiderivative = 4.64

$$\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(2\cdots}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2\cdots}$$
$$= (x+2\log(\log(2)+2))e^3 - e^3\log\left(-(x+2\log(\log(2)+2))\log(2) - (x+2\log(\log(2)+2))\log\left(\frac{1}{2}x\right) + 2\log(2)\log(\log(2)+2) + 2\log\left(\frac{1}{2}x\right)\log(\log(2)+2) - x + \log\left(\frac{1}{2}x + \log(\log(2)+2)\right)\right) - x + \log\left(-(x+2\log(\log(2)+2))\log(2) - (x+2\log(\log(2)+2))\log\left(\frac{1}{2}x\right) + 2\log(2)\log(\log(2)+2) + 2\log\left(\frac{1}{2}x\right)\log(\log(2)+2) - x + \log\left(\frac{1}{2}x + \log(\log(2)+2)\right)\right) - 2\log(\log(2)+2)$$

input
```
integrate((((2*exp(3)-2)*log(log(2)+2)+x*exp(3)-x)*log(log(log(2)+2)+1/2*x
)+(((2-2*x)*exp(3)+2*x-2)*log(x)+(4-2*x)*exp(3)+2*x-4)*log(log(2)+2)+((-x^
2+x)*exp(3)+x^2-x)*log(x)+(-x^2+2*x-1)*exp(3)+x^2-2*x+1)/((2*log(log(2)+2)
+x)*log(log(log(2)+2)+1/2*x)+(-2*x*log(x)-2*x)*log(log(2)+2)-x^2*log(x)-x^
2),x, algorithm=\
```

output
```
(x + 2*log(log(2) + 2))*e^3 - e^3*log(-(x + 2*log(log(2) + 2))*log(2) - (x
 + 2*log(log(2) + 2))*log(1/2*x) + 2*log(2)*log(log(2) + 2) + 2*log(1/2*x)
*log(log(2) + 2) - x + log(1/2*x + log(log(2) + 2))) - x + log(-(x + 2*log
(log(2) + 2))*log(2) - (x + 2*log(log(2) + 2))*log(1/2*x) + 2*log(2)*log(l
og(2) + 2) + 2*log(1/2*x)*log(log(2) + 2) - x + log(1/2*x + log(log(2) + 2
))) - 2*log(log(2) + 2)
```

3.585.9 Mupad [F(-1)]

Timed out.

$$\int \frac{1-2x+x^2+e^3(-1+2x-x^2)+(-x+x^2+e^3(x-x^2))\log(x)+(-4+e^3(4-2x)+2x+(-2+e^3(\cdots}{-x^2-x^2\log(x)+(-2x-2x\log(x))\log(2+\log(2\cdots}$$

$$=\int -\frac{\ln(x)\,\left(e^3\,(x-x^2)-x+x^2\right)-2\,x-\ln(\ln(2)+2)\,\left(\ln(x)\,\left(e^3\,(2\,x-2)-2\,x+2\right)-2\,x+e^3\,(2\,x-4)\cdots\right.}{x^2\,\ln(x)+\ln(\ln(2)+2)\,\left(2\,x+2\,x\,\ln(x)\right)-\ln\left(\frac{x}{2}\cdots\right.}$$

input
```
int(-(log(x)*(exp(3)*(x - x^2) - x + x^2) - 2*x - log(log(2) + 2)*(log(x)*
(exp(3)*(2*x - 2) - 2*x + 2) - 2*x + exp(3)*(2*x - 4) + 4) + log(x/2 + log
(log(2) + 2))*(x*exp(3) - x + log(log(2) + 2)*(2*exp(3) - 2)) - exp(3)*(x^
2 - 2*x + 1) + x^2 + 1)/(x^2*log(x) + log(log(2) + 2)*(2*x + 2*x*log(x)) -
 log(x/2 + log(log(2) + 2))*(x + 2*log(log(2) + 2)) + x^2),x)
```

output
```
int(-(log(x)*(exp(3)*(x - x^2) - x + x^2) - 2*x - log(log(2) + 2)*(log(x)*
(exp(3)*(2*x - 2) - 2*x + 2) - 2*x + exp(3)*(2*x - 4) + 4) + log(x/2 + log
(log(2) + 2))*(x*exp(3) - x + log(log(2) + 2)*(2*exp(3) - 2)) - exp(3)*(x^
2 - 2*x + 1) + x^2 + 1)/(x^2*log(x) + log(log(2) + 2)*(2*x + 2*x*log(x)) -
 log(x/2 + log(log(2) + 2))*(x + 2*log(log(2) + 2)) + x^2), x)
```

3.586 $\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840}$

3.586.1 Optimal result

Integrand size = 202, antiderivative size = 28

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+19}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x}$$
$$=\frac{\log(x)}{16-8x+\frac{5}{x^2+\frac{4}{4-\log(x)}}}$$

output
```
ln(x)/(16-8*x+5/(x^2+4/(-ln(x)+4)))
```

3.586.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.75

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+19}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x}$$
$$=\frac{\log(x)\left(4+4x^2-x^2\log(x)\right)}{84-32x+64x^2-32x^3+(-5-16x^2+8x^3)\log(x)}$$

input
```
Integrate[(336 - 128*x + 592*x^2 - 256*x^3 + 256*x^4 - 128*x^5 + (128*x -
8*x^2 + 320*x^3 - 128*x^4 + 192*x^5)*Log[x] + (-75*x^2 - 64*x^3 + 16*x^4 -
 72*x^5)*Log[x]^2 + (10*x^2 + 8*x^5)*Log[x]^3)/(7056*x - 5376*x^2 + 11776*
x^3 - 9472*x^4 + 6144*x^5 - 4096*x^6 + 1024*x^7 + (-840*x + 320*x^2 - 3328
*x^3 + 2688*x^4 - 2560*x^5 + 2048*x^6 - 512*x^7)*Log[x] + (25*x + 160*x^3
- 80*x^4 + 256*x^5 - 256*x^6 + 64*x^7)*Log[x]^2),x]
```

3.586.

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+192x^5)\log(x)+(-75x^2-64x^3+16x^4-72x^5)\log^2(x)+(}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x^4-2560x^5+2048x^6-512x^7)\log(x)+(25x+160x^3-}$$

output
```
(Log[x]*(4 + 4*x^2 - x^2*Log[x]))/(84 - 32*x + 64*x^2 - 32*x^3 + (-5 - 16*
x^2 + 8*x^3)*Log[x])
```

3.586.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-128x^5+256x^4-256x^3+592x^2+\left(8x^5+10x^2\right)\log^3(x)+\left(-72x^5+16x^4-64x^3-75x^2\right)}{1024x^7-4096x^6+6144x^5-9472x^4+11776x^3-5376x^2+\left(64x^7-256x^6+256x^5-80x^4+160x^3+25x\right)\log}$$

$\Big\downarrow$ 7292

$$\int \frac{-128x^5+256x^4-256x^3+592x^2+\left(8x^5+10x^2\right)\log^3(x)+\left(-72x^5+16x^4-64x^3-75x^2\right)\log^2(x)+\left(192x^5\right.}{x\left(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+\right.}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{2x\left(4x^3+5\right)\log(x)}{\left(8x^3-16x^2-5\right)^2}+\frac{640\left(48x^5-160x^4+192x^3-254x^2+232x+5\right)}{\left(8x^3-16x^2-5\right)^3\left(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84\right)}-\right.$$

$\Big\downarrow$ 7239

$$\int \frac{2x^2\left(4x^3+5\right)\log^3(x)-x^2\left(72x^3-16x^2+64x+75\right)\log^2(x)+8x\left(24x^4-16x^3+40x^2-x+16\right)\log(x)-16(8}{x\left(-32x^3+64x^2+\left(8x^3-16x^2-5\right)\log(x)-32x+84\right)^2}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{2x\left(4x^3+5\right)\log(x)}{\left(8x^3-16x^2-5\right)^2}+\frac{640\left(48x^5-160x^4+192x^3-254x^2+232x+5\right)}{\left(8x^3-16x^2-5\right)^3\left(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84\right)}-\right.$$

$\Big\downarrow$ 7239

$$\int \frac{2x^2\left(4x^3+5\right)\log^3(x)-x^2\left(72x^3-16x^2+64x+75\right)\log^2(x)+8x\left(24x^4-16x^3+40x^2-x+16\right)\log(x)-16(8}{x\left(-32x^3+64x^2+\left(8x^3-16x^2-5\right)\log(x)-32x+84\right)^2}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{2x\left(4x^3+5\right)\log(x)}{\left(8x^3-16x^2-5\right)^2}+\frac{640\left(48x^5-160x^4+192x^3-254x^2+232x+5\right)}{\left(8x^3-16x^2-5\right)^3\left(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84\right)}-\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2x^2\left(4x^3+5\right)\log^3(x)-x^2\left(72x^3-16x^2+64x+75\right)\log^2(x)+8x\left(24x^4-16x^3+40x^2-x+16\right)\log(x)-16(8}{x\left(-32x^3+64x^2+\left(8x^3-16x^2-5\right)\log(x)-32x+84\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2x\left(4x^3+5\right)\log(x)}{\left(8x^3-16x^2-5\right)^2}+\frac{640\left(48x^5-160x^4+192x^3-254x^2+232x+5\right)}{\left(8x^3-16x^2-5\right)^3\left(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84\right)}-\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2x^2\left(4x^3+5\right)\log^3(x)-x^2\left(72x^3-16x^2+64x+75\right)\log^2(x)+8x\left(24x^4-16x^3+40x^2-x+16\right)\log(x)-16(8}{x\left(-32x^3+64x^2+\left(8x^3-16x^2-5\right)\log(x)-32x+84\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2x\left(4x^3+5\right)\log(x)}{\left(8x^3-16x^2-5\right)^2}+\frac{640\left(48x^5-160x^4+192x^3-254x^2+232x+5\right)}{\left(8x^3-16x^2-5\right)^3\left(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84\right)}-\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2x^2\left(4x^3+5\right)\log^3(x)-x^2\left(72x^3-16x^2+64x+75\right)\log^2(x)+8x\left(24x^4-16x^3+40x^2-x+16\right)\log(x)-16(8}{x\left(-32x^3+64x^2+\left(8x^3-16x^2-5\right)\log(x)-32x+84\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2x\left(4x^3+5\right)\log(x)}{\left(8x^3-16x^2-5\right)^2}+\frac{640\left(48x^5-160x^4+192x^3-254x^2+232x+5\right)}{\left(8x^3-16x^2-5\right)^3\left(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84\right)}-\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2x^2\left(4x^3+5\right)\log^3(x)-x^2\left(72x^3-16x^2+64x+75\right)\log^2(x)+8x\left(24x^4-16x^3+40x^2-x+16\right)\log(x)-16(8}{x\left(-32x^3+64x^2+\left(8x^3-16x^2-5\right)\log(x)-32x+84\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2x\left(4x^3+5\right)\log(x)}{\left(8x^3-16x^2-5\right)^2}+\frac{640\left(48x^5-160x^4+192x^3-254x^2+232x+5\right)}{\left(8x^3-16x^2-5\right)^3\left(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84\right)}-\right.$$

$$\Big\downarrow \text{7239}$$

3.586.

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+\left(128x-8x^2+320x^3-128x^4+192x^5\right)\log(x)+\left(-75x^2-64x^3+16x^4-72x^5\right)\log^2(x)+(}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+\left(-840x+320x^2-3328x^3+2688x^4-2560x^5+2048x^6-512x^7\right)\log(x)+(25x+160x^3-}$$

$$\int \frac{2x^2(4x^3+5)\log^3(x)-x^2(72x^3-16x^2+64x+75)\log^2(x)+8x(24x^4-16x^3+40x^2-x+16)\log(x)-16(8}{x(-32x^3+64x^2+(8x^3-16x^2-5)\log(x)-32x+84)^2}$$

$$\downarrow 7293$$

$$\int \left(\frac{2x(4x^3+5)\log(x)}{(8x^3-16x^2-5)^2}+\frac{640(48x^5-160x^4+192x^3-254x^2+232x+5)}{(8x^3-16x^2-5)^3(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84)}-\right.$$

$$\downarrow 7239$$

$$\int \frac{2x^2(4x^3+5)\log^3(x)-x^2(72x^3-16x^2+64x+75)\log^2(x)+8x(24x^4-16x^3+40x^2-x+16)\log(x)-16(8}{x(-32x^3+64x^2+(8x^3-16x^2-5)\log(x)-32x+84)^2}$$

$$\downarrow 7293$$

$$\int \left(\frac{2x(4x^3+5)\log(x)}{(8x^3-16x^2-5)^2}+\frac{640(48x^5-160x^4+192x^3-254x^2+232x+5)}{(8x^3-16x^2-5)^3(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84)}-\right.$$

$$\downarrow 7239$$

$$\int \frac{2x^2(4x^3+5)\log^3(x)-x^2(72x^3-16x^2+64x+75)\log^2(x)+8x(24x^4-16x^3+40x^2-x+16)\log(x)-16(8}{x(-32x^3+64x^2+(8x^3-16x^2-5)\log(x)-32x+84)^2}$$

$$\downarrow 7293$$

$$\int \left(\frac{2x(4x^3+5)\log(x)}{(8x^3-16x^2-5)^2}+\frac{640(48x^5-160x^4+192x^3-254x^2+232x+5)}{(8x^3-16x^2-5)^3(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84)}-\right.$$

$$\downarrow 7239$$

$$\int \frac{2x^2(4x^3+5)\log^3(x)-x^2(72x^3-16x^2+64x+75)\log^2(x)+8x(24x^4-16x^3+40x^2-x+16)\log(x)-16(8}{x(-32x^3+64x^2+(8x^3-16x^2-5)\log(x)-32x+84)^2}$$

$$\downarrow 7293$$

$$\int \left(\frac{2x(4x^3+5)\log(x)}{(8x^3-16x^2-5)^2}+\frac{640(48x^5-160x^4+192x^3-254x^2+232x+5)}{(8x^3-16x^2-5)^3(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84)}-\right.$$

$$\downarrow 7239$$

$$\int \frac{2x^2(4x^3+5)\log^3(x)-x^2(72x^3-16x^2+64x+75)\log^2(x)+8x(24x^4-16x^3+40x^2-x+16)\log(x)-16(8}{x(-32x^3+64x^2+(8x^3-16x^2-5)\log(x)-32x+84)^2}$$

3.586.

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+192x^5)\log(x)+(-75x^2-64x^3+16x^4-72x^5)\log^2(x)+(}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x^4-2560x^5+2048x^6-512x^7)\log(x)+(25x+160x^3-}$$

$$\Big\downarrow \color{blue}{7293}$$

$$\int \left(\frac{2x(4x^3+5)\log(x)}{(8x^3-16x^2-5)^2}+\frac{640(48x^5-160x^4+192x^3-254x^2+232x+5)}{(8x^3-16x^2-5)^3(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84)}-\right.$$

$$\Big\downarrow \color{blue}{7239}$$

$$\int \frac{2x^2(4x^3+5)\log^3(x)-x^2(72x^3-16x^2+64x+75)\log^2(x)+8x(24x^4-16x^3+40x^2-x+16)\log(x)-16(8}{x(-32x^3+64x^2+(8x^3-16x^2-5)\log(x)-32x+84)^2}$$

$$\Big\downarrow \color{blue}{7293}$$

$$\int \left(\frac{2x(4x^3+5)\log(x)}{(8x^3-16x^2-5)^2}+\frac{640(48x^5-160x^4+192x^3-254x^2+232x+5)}{(8x^3-16x^2-5)^3(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84)}-\right.$$

$$\Big\downarrow \color{blue}{7239}$$

$$\int \frac{2x^2(4x^3+5)\log^3(x)-x^2(72x^3-16x^2+64x+75)\log^2(x)+8x(24x^4-16x^3+40x^2-x+16)\log(x)-16(8}{x(-32x^3+64x^2+(8x^3-16x^2-5)\log(x)-32x+84)^2}$$

$$\Big\downarrow \color{blue}{7293}$$

$$\int \left(\frac{2x(4x^3+5)\log(x)}{(8x^3-16x^2-5)^2}+\frac{640(48x^5-160x^4+192x^3-254x^2+232x+5)}{(8x^3-16x^2-5)^3(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84)}-\right.$$

$$\Big\downarrow \color{blue}{7239}$$

$$\int \frac{2x^2(4x^3+5)\log^3(x)-x^2(72x^3-16x^2+64x+75)\log^2(x)+8x(24x^4-16x^3+40x^2-x+16)\log(x)-16(8}{x(-32x^3+64x^2+(8x^3-16x^2-5)\log(x)-32x+84)^2}$$

$$\Big\downarrow \color{blue}{7293}$$

$$\int \left(\frac{2x(4x^3+5)\log(x)}{(8x^3-16x^2-5)^2}+\frac{640(48x^5-160x^4+192x^3-254x^2+232x+5)}{(8x^3-16x^2-5)^3(-32x^3+8x^3\log(x)+64x^2-16x^2\log(x)-32x-5\log(x)+84)}-\right.$$

input
```
Int[(336 - 128*x + 592*x^2 - 256*x^3 + 256*x^4 - 128*x^5 + (128*x - 8*x^2
+ 320*x^3 - 128*x^4 + 192*x^5)*Log[x] + (-75*x^2 - 64*x^3 + 16*x^4 - 72*x^
5)*Log[x]^2 + (10*x^2 + 8*x^5)*Log[x]^3)/(7056*x - 5376*x^2 + 11776*x^3 -
9472*x^4 + 6144*x^5 - 4096*x^6 + 1024*x^7 + (-840*x + 320*x^2 - 3328*x^3 +
 2688*x^4 - 2560*x^5 + 2048*x^6 - 512*x^7)*Log[x] + (25*x + 160*x^3 - 80*x
^4 + 256*x^5 - 256*x^6 + 64*x^7)*Log[x]^2),x]
```

3.586.

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+192x^5)\log(x)+(-75x^2-64x^3+16x^4-72x^5)\log^2(x)+(}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x^4-2560x^5+2048x^6-512x^7)\log(x)+(25x+160x^3-}$$

output
```
$Aborted
```

3.586.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.586.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. 2(28) = 56.

Time = 1.43 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.07

method	result
default	$\frac{4\ln(x)+4x^2\ln(x)-x^2\ln(x)^2}{8x^3\ln(x)-16x^2\ln(x)-32x^3+64x^2-5\ln(x)-32x+84}$
parallelrisch	$\frac{-8x^2\ln(x)^2+32\ln(x)+32x^2\ln(x)}{64x^3\ln(x)-128x^2\ln(x)-256x^3+512x^2-40\ln(x)-256x+672}$
risch	$-\frac{x^2\ln(x)}{8x^3-16x^2-5}-\frac{20}{64x^6-256x^5+256x^4-80x^3+160x^2+25}-\frac{80(8x^3-16x^2+8x-21)}{(64x^6-256x^5+256x^4-80x^3+160x^2+25)(8x^3\ln(x)-16x^2\ln(}$

input
```
int(((8*x^5+10*x^2)*ln(x)^3+(-72*x^5+16*x^4-64*x^3-75*x^2)*ln(x)^2+(192*x^
5-128*x^4+320*x^3-8*x^2+128*x)*ln(x)-128*x^5+256*x^4-256*x^3+592*x^2-128*x
+336)/((64*x^7-256*x^6+256*x^5-80*x^4+160*x^3+25*x)*ln(x)^2+(-512*x^7+2048
*x^6-2560*x^5+2688*x^4-3328*x^3+320*x^2-840*x)*ln(x)+1024*x^7-4096*x^6+614
4*x^5-9472*x^4+11776*x^3-5376*x^2+7056*x),x,method=_RETURNVERBOSE)
```

output
```
(4*ln(x)+4*x^2*ln(x)-x^2*ln(x)^2)/(8*x^3*ln(x)-16*x^2*ln(x)-32*x^3+64*x^2-
5*ln(x)-32*x+84)
```

3.586.

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+192x^5)\log(x)+(-75x^2-64x^3+16x^4-72x^5)\log^2(x)+(}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x^4-2560x^5+2048x^6-512x^7)\log(x)+(25x+160x^3-}$$

3.586.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.86

$$\int \frac{336 - 128x + 592x^2 - 256x^3 + 256x^4 - 128x^5 + (128x - 8x^2 + 320x^3 - 128x^4 + 19}{7056x - 5376x^2 + 11776x^3 - 9472x^4 + 6144x^5 - 4096x^6 + 1024x^7 + (-840x + 320x^2 - 3328x^3 + 2688x}$$
$$= \frac{x^2 \log(x)^2 - 4(x^2+1)\log(x)}{32x^3 - 64x^2 - (8x^3 - 16x^2 - 5)\log(x) + 32x - 84}$$

input
```
integrate(((8*x^5+10*x^2)*log(x)^3+(-72*x^5+16*x^4-64*x^3-75*x^2)*log(x)^2
+(192*x^5-128*x^4+320*x^3-8*x^2+128*x)*log(x)-128*x^5+256*x^4-256*x^3+592*
x^2-128*x+336)/((64*x^7-256*x^6+256*x^5-80*x^4+160*x^3+25*x)*log(x)^2+(-51
2*x^7+2048*x^6-2560*x^5+2688*x^4-3328*x^3+320*x^2-840*x)*log(x)+1024*x^7-4
096*x^6+6144*x^5-9472*x^4+11776*x^3-5376*x^2+7056*x),x, algorithm=\
```

output
```
(x^2*log(x)^2 - 4*(x^2 + 1)*log(x))/(32*x^3 - 64*x^2 - (8*x^3 - 16*x^2 - 5
)*log(x) + 32*x - 84)
```

3.586.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 153 vs. 2(19) = 38.

Time = 0.43 (sec) , antiderivative size = 153, normalized size of antiderivative = 5.46

$$\int \frac{336 - 128x + 592x^2 - 256x^3 + 256x^4 - 128x^5 + (128x - 8x^2 + 320x^3 - 128x^4 + 19}{7056x - 5376x^2 + 11776x^3 - 9472x^4 + 6144x^5 - 4096x^6 + 1024x^7 + (-840x + 320x^2 - 3328x^3 + 2688x}$$
$$= -\frac{x^2\log(x)}{8x^3 - 16x^2 - 5}$$
$$+ \frac{-640x^3 + 1280x^2 - 6}{-2048x^9 + 12288x^8 - 26624x^7 + 32512x^6 - 39936x^5 + 34304x^4 - 12640x^3 + 15040x^2 - 800x + (512x}$$
$$- \frac{20}{64x^6 - 256x^5 + 256x^4 - 80x^3 + 160x^2 + 25}$$

input
```
integrate(((8*x**5+10*x**2)*ln(x)**3+(-72*x**5+16*x**4-64*x**3-75*x**2)*ln
(x)**2+(192*x**5-128*x**4+320*x**3-8*x**2+128*x)*ln(x)-128*x**5+256*x**4-2
56*x**3+592*x**2-128*x+336)/((64*x**7-256*x**6+256*x**5-80*x**4+160*x**3+2
5*x)*ln(x)**2+(-512*x**7+2048*x**6-2560*x**5+2688*x**4-3328*x**3+320*x**2-
840*x)*ln(x)+1024*x**7-4096*x**6+6144*x**5-9472*x**4+11776*x**3-5376*x**2+
7056*x),x)
```

3.586. $\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+192x^5)\log(x)+(-75x^2-64x^3+16x^4-72x^5)\log^2(x)+(}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x^4-2560x^5+2048x^6-512x^7)\log(x)+(25x+160x^3}$

output
```
-x**2*log(x)/(8*x**3 - 16*x**2 - 5) + (-640*x**3 + 1280*x**2 - 640*x + 168
0)/(-2048*x**9 + 12288*x**8 - 26624*x**7 + 32512*x**6 - 39936*x**5 + 34304
*x**4 - 12640*x**3 + 15040*x**2 - 800*x + (512*x**9 - 3072*x**8 + 6144*x**
7 - 5056*x**6 + 3840*x**5 - 3840*x**4 + 600*x**3 - 1200*x**2 - 125)*log(x)
 + 2100) - 20/(64*x**6 - 256*x**5 + 256*x**4 - 80*x**3 + 160*x**2 + 25)
```

3.586.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.86

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+192}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x}$$
$$= \frac{x^2\log(x)^2-4(x^2+1)\log(x)}{32x^3-64x^2-(8x^3-16x^2-5)\log(x)+32x-84}$$

input
```
integrate(((8*x^5+10*x^2)*log(x)^3+(-72*x^5+16*x^4-64*x^3-75*x^2)*log(x)^2
+(192*x^5-128*x^4+320*x^3-8*x^2+128*x)*log(x)-128*x^5+256*x^4-256*x^3+592*
x^2-128*x+336)/((64*x^7-256*x^6+256*x^5-80*x^4+160*x^3+25*x)*log(x)^2+(-51
2*x^7+2048*x^6-2560*x^5+2688*x^4-3328*x^3+320*x^2-840*x)*log(x)+1024*x^7-4
096*x^6+6144*x^5-9472*x^4+11776*x^3-5376*x^2+7056*x),x, algorithm=\
```

output
```
(x^2*log(x)^2 - 4*(x^2 + 1)*log(x))/(32*x^3 - 64*x^2 - (8*x^3 - 16*x^2 - 5
)*log(x) + 32*x - 84)
```

3.586.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 177 vs. 2(27) = 54.

Time = 0.30 (sec) , antiderivative size = 177, normalized size of antiderivative = 6.32

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+192}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x}$$
$$= -\frac{x^2\log(x)}{8x^3-16x^2-5}$$
$$- \frac{}{512x^9\log(x)-2048x^9-3072x^8\log(x)+12288x^8+6144x^7\log(x)-26624x^7-5056x^6\log(x)+3}$$
$$- \frac{20}{64x^6-256x^5+256x^4-80x^3+160x^2+25}$$

3.586.

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+192x^5)\log(x)+(-75x^2-64x^3+16x^4-72x^5)\log^2(x)+(}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x^4-2560x^5+2048x^6-512x^7)\log(x)+(25x+160x^3-}$$

input
```
integrate(((8*x^5+10*x^2)*log(x)^3+(-72*x^5+16*x^4-64*x^3-75*x^2)*log(x)^2
+(192*x^5-128*x^4+320*x^3-8*x^2+128*x)*log(x)-128*x^5+256*x^4-256*x^3+592*
x^2-128*x+336)/((64*x^7-256*x^6+256*x^5-80*x^4+160*x^3+25*x)*log(x)^2+(-51
2*x^7+2048*x^6-2560*x^5+2688*x^4-3328*x^3+320*x^2-840*x)*log(x)+1024*x^7-4
096*x^6+6144*x^5-9472*x^4+11776*x^3-5376*x^2+7056*x),x, algorithm=\
```

output
```
-x^2*log(x)/(8*x^3 - 16*x^2 - 5) - 80*(8*x^3 - 16*x^2 + 8*x - 21)/(512*x^9
*log(x) - 2048*x^9 - 3072*x^8*log(x) + 12288*x^8 + 6144*x^7*log(x) - 26624
*x^7 - 5056*x^6*log(x) + 32512*x^6 + 3840*x^5*log(x) - 39936*x^5 - 3840*x^
4*log(x) + 34304*x^4 + 600*x^3*log(x) - 12640*x^3 - 1200*x^2*log(x) + 1504
0*x^2 - 800*x - 125*log(x) + 2100) - 20/(64*x^6 - 256*x^5 + 256*x^4 - 80*x
^3 + 160*x^2 + 25)
```

3.586.9 Mupad [F(-1)]

Timed out.

$$\int \frac{336-128x+592x^2-256x^3+256x^4-128x^5+(128x-8x^2+320x^3-128x^4+19}{7056x-5376x^2+11776x^3-9472x^4+6144x^5-4096x^6+1024x^7+(-840x+320x^2-3328x^3+2688x}$$
$$=\int \frac{\ln(x)\,(192\,x^5-128\,x^4+320\,x^3-8\,x^2+128\,x)-128\,x+\ln(x)^3\,(8\,x^5+10\,x^2)+}{7056\,x-\ln(x)\,(512\,x^7-2048\,x^6+2560\,x^5-2688\,x^4+3328\,x^3-320\,x^2+840\,x)-5376\,x^2+11776}$$

input
```
int((log(x)*(128*x - 8*x^2 + 320*x^3 - 128*x^4 + 192*x^5) - 128*x + log(x)
^3*(10*x^2 + 8*x^5) + 592*x^2 - 256*x^3 + 256*x^4 - 128*x^5 - log(x)^2*(75
*x^2 + 64*x^3 - 16*x^4 + 72*x^5) + 336)/(7056*x - log(x)*(840*x - 320*x^2
+ 3328*x^3 - 2688*x^4 + 2560*x^5 - 2048*x^6 + 512*x^7) - 5376*x^2 + 11776*
x^3 - 9472*x^4 + 6144*x^5 - 4096*x^6 + 1024*x^7 + log(x)^2*(25*x + 160*x^3
 - 80*x^4 + 256*x^5 - 256*x^6 + 64*x^7)),x)
```

output
```
int((log(x)*(128*x - 8*x^2 + 320*x^3 - 128*x^4 + 192*x^5) - 128*x + log(x)
^3*(10*x^2 + 8*x^5) + 592*x^2 - 256*x^3 + 256*x^4 - 128*x^5 - log(x)^2*(75
*x^2 + 64*x^3 - 16*x^4 + 72*x^5) + 336)/(7056*x - log(x)*(840*x - 320*x^2
+ 3328*x^3 - 2688*x^4 + 2560*x^5 - 2048*x^6 + 512*x^7) - 5376*x^2 + 11776*
x^3 - 9472*x^4 + 6144*x^5 - 4096*x^6 + 1024*x^7 + log(x)^2*(25*x + 160*x^3
 - 80*x^4 + 256*x^5 - 256*x^6 + 64*x^7)), x)
```

3.587 $\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x\left(-1+x^2\right)}{-1+x^2}}\left(-3+9x^2-4x^4+e^x\left(-1+2x^2-x^4\right)\right)}{1-2x^2+x^4}\,dx$

3.587.1 Optimal result

Integrand size = 75, antiderivative size = 27

$$\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x\left(-1+x^2\right)}{-1+x^2}}\left(-3+9x^2-4x^4+e^x\left(-1+2x^2-x^4\right)\right)}{1-2x^2+x^4}\,dx=9-e^{-3+e^x+4x+\frac{x^2}{-x+x^3}}$$

output
```
9-exp(exp(x)+4*x+x^2/(x^3-x)-3)
```

3.587.2 Mathematica [A] (verified)

Time = 5.09 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x\left(-1+x^2\right)}{-1+x^2}}\left(-3+9x^2-4x^4+e^x\left(-1+2x^2-x^4\right)\right)}{1-2x^2+x^4}\,dx=-e^{-3+e^x+4x+\frac{x}{-1+x^2}}$$

input
```
Integrate[(E^((3 - 3*x - 3*x^2 + 4*x^3 + E^x*(-1 + x^2))/(-1 + x^2))*(-3 +
 9*x^2 - 4*x^4 + E^x*(-1 + 2*x^2 - x^4)))/(1 - 2*x^2 + x^4),x]
```

output
```
-E^(-3 + E^x + 4*x + x/(-1 + x^2))
```

3.587. $\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x\left(-1+x^2\right)}{-1+x^2}}\left(-3+9x^2-4x^4+e^x\left(-1+2x^2-x^4\right)\right)}{1-2x^2+x^4}\,dx$

3.587.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-4x^4+9x^2+e^x\left(-x^4+2x^2-1\right)-3\right)\exp\left(\frac{4x^3-3x^2+e^x(x^2-1)-3x+3}{x^2-1}\right)}{x^4-2x^2+1}dx$$

$$\Big\downarrow \text{ 1380}$$

$$\int -\frac{\left(4x^4-9x^2+e^x\left(x^4-2x^2+1\right)+3\right)\exp\left(-\frac{4x^3-3x^2-e^x(1-x^2)-3x+3}{1-x^2}\right)}{(1-x^2)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-\int \frac{\exp\left(-\frac{4x^3-3x^2-3x-e^x(1-x^2)+3}{1-x^2}\right)\left(4x^4-9x^2+e^x\left(x^4-2x^2+1\right)+3\right)}{(1-x^2)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-\int \left(\frac{4\exp\left(-\frac{4x^3-3x^2-3x-e^x(1-x^2)+3}{1-x^2}\right)x^4}{(x^2-1)^2}-\frac{9\exp\left(-\frac{4x^3-3x^2-3x-e^x(1-x^2)+3}{1-x^2}\right)x^2}{(x^2-1)^2}+\exp\left(x-\frac{4x^3-3x^2-3x-e}{1-x}\right.\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-4\int \exp\left(-\frac{4x^3-3x^2-3x-e^x(1-x^2)+3}{1-x^2}\right)dx+\frac{3}{2}\int \frac{\exp\left(-\frac{4x^3-3x^2-3x-e^x(1-x^2)+3}{1-x^2}\right)}{(1-x)^2}dx-\int \frac{\exp\left(-\frac{4x^3-3x^2-3x-e^x(1-x^2)+3}{1-x^2}\right)}{(x-1)^2}dx+\frac{1}{2}\int \frac{\exp\left(-\frac{4x^3-3x^2-3x-e^x(1-x^2)+3}{1-x^2}\right)}{(x+1)^2}dx-\int e^{\frac{5x^3+e^xx^2-3x^2-4x-e^x+3}{x^2-1}}dx$$

input
```
Int[(E^((3 - 3*x - 3*x^2 + 4*x^3 + E^x*(-1 + x^2))/(-1 + x^2))*(-3 + 9*x^2
 - 4*x^4 + E^x*(-1 + 2*x^2 - x^4)))/(1 - 2*x^2 + x^4),x]
```

output
```
$Aborted
```

3.587. $\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x(-1+x^2)}{-1+x^2}}\left(-3+9x^2-4x^4+e^x\left(-1+2x^2-x^4\right)\right)}{1-2x^2+x^4}dx$

3.587.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.587.4 Maple [A] (verified)

Time = 2.35 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

method	result	size
parallelrisch	$-{\mathrm e}^{\frac{{\mathrm e}^{x} x^{2}+4 x^{3}-3 x^{2}-{\mathrm e}^{x}-3 x +3}{x^{2}-1}}$	37
risch	$-{\mathrm e}^{\frac{{\mathrm e}^{x} x^{2}+4 x^{3}-3 x^{2}-{\mathrm e}^{x}-3 x +3}{\left(-1+x \right) \left(1+x \right)}}$	40
norman	$\frac{-x^{2} {\mathrm e}^{\frac{\left(x^{2}-1\right) {\mathrm e}^{x}+4 x^{3}-3 x^{2}-3 x +3}{x^{2}-1}}+{\mathrm e}^{\frac{\left(x^{2}-1\right) {\mathrm e}^{x}+4 x^{3}-3 x^{2}-3 x +3}{x^{2}-1}}}{x^{2}-1}$	79

input
```
int(((-x^4+2*x^2-1)*exp(x)-4*x^4+9*x^2-3)*exp(((x^2-1)*exp(x)+4*x^3-3*x^2-
3*x+3)/(x^2-1))/(x^4-2*x^2+1),x,method=_RETURNVERBOSE)
```

output
```
-exp((exp(x)*x^2+4*x^3-3*x^2-exp(x)-3*x+3)/(x^2-1))
```

3.587.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x(-1+x^2)}{-1+x^2}}(-3+9x^2-4x^4+e^x(-1+2x^2-x^4))}{1-2x^2+x^4}\,dx$$
$$= -e^{\left(\frac{4x^3-3x^2+(x^2-1)e^x-3x+3}{x^2-1}\right)}$$

input
```
integrate(((-x^4+2*x^2-1)*exp(x)-4*x^4+9*x^2-3)*exp(((x^2-1)*exp(x)+4*x^3-
3*x^2-3*x+3)/(x^2-1))/(x^4-2*x^2+1),x, algorithm=\
```

output
```
-e^((4*x^3 - 3*x^2 + (x^2 - 1)*e^x - 3*x + 3)/(x^2 - 1))
```

3.587.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x(-1+x^2)}{-1+x^2}}(-3+9x^2-4x^4+e^x(-1+2x^2-x^4))}{1-2x^2+x^4}\,dx = -e^{\frac{4x^3-3x^2-3x+(x^2-1)e^x+3}{x^2-1}}$$

input
```
integrate(((-x**4+2*x**2-1)*exp(x)-4*x**4+9*x**2-3)*exp(((x**2-1)*exp(x)+4
*x**3-3*x**2-3*x+3)/(x**2-1))/(x**4-2*x**2+1),x)
```

output
```
-exp((4*x**3 - 3*x**2 - 3*x + (x**2 - 1)*exp(x) + 3)/(x**2 - 1))
```

3.587.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x(-1+x^2)}{-1+x^2}}(-3+9x^2-4x^4+e^x(-1+2x^2-x^4))}{1-2x^2+x^4}\,dx$$
$$= -e^{\left(4x+\frac{1}{2(x+1)}+\frac{1}{2(x-1)}+e^x-3\right)}$$

input
```
integrate(((-x^4+2*x^2-1)*exp(x)-4*x^4+9*x^2-3)*exp(((x^2-1)*exp(x)+4*x^3-
3*x^2-3*x+3)/(x^2-1))/(x^4-2*x^2+1),x, algorithm=\
```

output
```
-e^(4*x + 1/2/(x + 1) + 1/2/(x - 1) + e^x - 3)
```

3.587.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(25) = 50$.

Time = 0.30 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.63

$$\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x(-1+x^2)}{-1+x^2}}(-3+9x^2-4x^4+e^x(-1+2x^2-x^4))}{1-2x^2+x^4}\,dx$$
$$= -e^{\left(\frac{4x^3}{x^2-1}+\frac{x^2e^x}{x^2-1}-\frac{3x^2}{x^2-1}-\frac{3x}{x^2-1}-\frac{e^x}{x^2-1}+\frac{3}{x^2-1}\right)}$$

input
```
integrate((((-x^4+2*x^2-1)*exp(x)-4*x^4+9*x^2-3)*exp(((x^2-1)*exp(x)+4*x^3-
3*x^2-3*x+3)/(x^2-1))/(x^4-2*x^2+1),x, algorithm=\
```

output
```
-e^(4*x^3/(x^2 - 1) + x^2*e^x/(x^2 - 1) - 3*x^2/(x^2 - 1) - 3*x/(x^2 - 1)
- e^x/(x^2 - 1) + 3/(x^2 - 1))
```

3.587.9 Mupad [B] (verification not implemented)

Time = 14.84 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.78

$$\int \frac{e^{\frac{3-3x-3x^2+4x^3+e^x(-1+x^2)}{-1+x^2}}(-3+9x^2-4x^4+e^x(-1+2x^2-x^4))}{1-2x^2+x^4}\,dx$$
$$= -e^{\frac{x^2e^x}{x^2-1}}\,e^{-\frac{3x^2}{x^2-1}}\,e^{\frac{4x^3}{x^2-1}}\,e^{-\frac{e^x}{x^2-1}}\,e^{\frac{3}{x^2-1}}\,e^{-\frac{3x}{x^2-1}}$$

input
```
int(-(exp((exp(x)*(x^2 - 1) - 3*x - 3*x^2 + 4*x^3 + 3)/(x^2 - 1))*(exp(x)*
(x^4 - 2*x^2 + 1) - 9*x^2 + 4*x^4 + 3))/(x^4 - 2*x^2 + 1),x)
```

output
```
-exp((x^2*exp(x))/(x^2 - 1))*exp(-(3*x^2)/(x^2 - 1))*exp((4*x^3)/(x^2 - 1)
)*exp(-exp(x)/(x^2 - 1))*exp(3/(x^2 - 1))*exp(-(3*x)/(x^2 - 1))
```

3.588 $\int \frac{64+8x^2+10x^5-2ex^5+2x^6}{x^5} \, dx$

3.588.1 Optimal result

Integrand size = 27, antiderivative size = 19

$$\int \frac{64+8x^2+10x^5-2ex^5+2x^6}{x^5} \, dx = -\frac{16}{x^4}-\frac{4}{x^2}+(5-e+x)^2$$

output
```
(x-exp(1)+5)^2-16/x^4-4/x^2
```

3.588.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \frac{64+8x^2+10x^5-2ex^5+2x^6}{x^5} \, dx = 2\left(-\frac{8}{x^4}-\frac{2}{x^2}+5x-ex+\frac{x^2}{2}\right)$$

input
```
Integrate[(64 + 8*x^2 + 10*x^5 - 2*E*x^5 + 2*x^6)/x^5,x]
```

output
```
2*(-8/x^4 - 2/x^2 + 5*x - E*x + x^2/2)
```

3.588.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {6, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^6-2ex^5+10x^5+8x^2+64}{x^5}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{2x^6+(10-2e)x^5+8x^2+64}{x^5}dx$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(\frac{64}{x^5}+\frac{8}{x^3}+2x-2(e-5)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{16}{x^4}+x^2-\frac{4}{x^2}+2(5-e)x$$

input
```
Int[(64 + 8*x^2 + 10*x^5 - 2*E*x^5 + 2*x^6)/x^5,x]
```

output
```
-16/x^4 - 4/x^2 + 2*(5 - E)*x + x^2
```

3.588.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.588.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

method	result	size
default	$x^{2}-2x\,\mathrm{e}+10x-\frac{4}{x^{2}}-\frac{16}{x^{4}}$	23
risch	$-2x\,\mathrm{e}+x^{2}+10x+\frac{-4x^{2}-16}{x^{4}}$	24
norman	$\frac{-16+x^{6}+\left(-2\,\mathrm{e}+10\right)x^{5}-4x^{2}}{x^{4}}$	25
gosper	$-\frac{2x^{5}\mathrm{e}-x^{6}-10x^{5}+4x^{2}+16}{x^{4}}$	30
parallelrisch	$-\frac{2x^{5}\mathrm{e}-x^{6}-10x^{5}+4x^{2}+16}{x^{4}}$	30

input
```
int((-2*x^5*exp(1)+2*x^6+10*x^5+8*x^2+64)/x^5,x,method=_RETURNVERBOSE)
```

output
```
x^2-2*x*exp(1)+10*x-4/x^2-16/x^4
```

3.588.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.37

$$\int \frac{64+8x^2+10x^5-2ex^5+2x^6}{x^5}\,dx = \frac{x^{6}-2\,x^{5}e+10\,x^{5}-4\,x^{2}-16}{x^{4}}$$

input
```
integrate((-2*x^5*exp(1)+2*x^6+10*x^5+8*x^2+64)/x^5,x, algorithm=\
```

output
```
(x^6 - 2*x^5*e + 10*x^5 - 4*x^2 - 16)/x^4
```

3.588.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{64+8x^2+10x^5-2ex^5+2x^6}{x^5}\,dx = x^{2}+x(10-2e)+\frac{-4x^{2}-16}{x^{4}}$$

input
```
integrate((-2*x**5*exp(1)+2*x**6+10*x**5+8*x**2+64)/x**5,x)
```

output
```
x**2 + x*(10 - 2*E) + (-4*x**2 - 16)/x**4
```

3.588.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int \frac{64+8x^2+10x^5-2ex^5+2x^6}{x^5}\,dx = x^2-2\,x(e-5)-\frac{4\,(x^2+4)}{x^4}$$

input
```
integrate((-2*x^5*exp(1)+2*x^6+10*x^5+8*x^2+64)/x^5,x, algorithm=\
```

output
```
x^2 - 2*x*(e - 5) - 4*(x^2 + 4)/x^4
```

3.588.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{64+8x^2+10x^5-2ex^5+2x^6}{x^5}\,dx = x^2-2\,xe+10\,x-\frac{4\,(x^2+4)}{x^4}$$

input
```
integrate((-2*x^5*exp(1)+2*x^6+10*x^5+8*x^2+64)/x^5,x, algorithm=\
```

output
```
x^2 - 2*x*e + 10*x - 4*(x^2 + 4)/x^4
```

3.588.9 Mupad [B] (verification not implemented)

Time = 13.91 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.32

$$\int \frac{64+8x^2+10x^5-2ex^5+2x^6}{x^5}\,dx = x^2-\frac{4\,x^2+16}{x^4}-x\,(2\,\mathrm{e}-10)$$

input
```
int((8*x^2 - 2*x^5*exp(1) + 10*x^5 + 2*x^6 + 64)/x^5,x)
```

output
```
x^2 - (4*x^2 + 16)/x^4 - x*(2*exp(1) - 10)
```

3.589 $\int \frac{e^{\frac{45-9x}{x^2}}(270-27x)+3e^5x^3-6e^{7-2x}x^3}{e^5x^3}\,dx$

3.589.1 Optimal result

Integrand size = 45, antiderivative size = 28

$$\int \frac{e^{\frac{45-9x}{x^2}}(270-27x)+3e^5x^3-6e^{7-2x}x^3}{e^5x^3}\,dx = 3\left(-4-e^{-5+\frac{9(5-x)}{x^2}}+e^{2-2x}+x\right)$$

output
```
3*exp(2-2*x)+3*x-3*exp(9*(5-x)/x^2)/exp(5)-12
```

3.589.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{e^{\frac{45-9x}{x^2}}(270-27x)+3e^5x^3-6e^{7-2x}x^3}{e^5x^3}\,dx = -3e^{-5+\frac{45}{x^2}-\frac{9}{x}}+3e^{2-2x}+3x$$

input
```
Integrate[(E^((45 - 9*x)/x^2)*(270 - 27*x) + 3*E^5*x^3 - 6*E^(7 - 2*x)*x^3
)/(E^5*x^3),x]
```

output
```
-3*E^(-5 + 45/x^2 - 9/x) + 3*E^(2 - 2*x) + 3*x
```

3.589.3 Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.089, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6e^{7-2x}x^3+3e^5x^3+e^{\frac{45-9x}{x^2}}(270-27x)}{e^5x^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \frac{3\left(-2e^{7-2x}x^3+e^5x^3+9e^{\frac{9(5-x)}{x^2}}(10-x)\right)}{x^3}dx}{e^5}$$

$$\Big\downarrow \text{27}$$

$$\frac{3\int \frac{-2e^{7-2x}x^3+e^5x^3+9e^{\frac{9(5-x)}{x^2}}(10-x)}{x^3}dx}{e^5}$$

$$\Big\downarrow \text{2010}$$

$$\frac{3\int \left(\frac{e^{-9/x}\left(e^{5+\frac{9}{x}}x^3-9e^{\frac{45}{x^2}}x+90e^{\frac{45}{x^2}}\right)}{x^3}-2e^{7-2x}\right)dx}{e^5}$$

$$\Big\downarrow \text{2009}$$

$$\frac{3\left(-e^{\frac{9(5-x)}{x^2}}+e^5x+e^{7-2x}\right)}{e^5}$$

input
```
Int[(E^((45 - 9*x)/x^2)*(270 - 27*x) + 3*E^5*x^3 - 6*E^(7 - 2*x)*x^3)/(E^5
*x^3),x]
```

output
```
(3*(E^(7 - 2*x) - E^((9*(5 - x))/x^2) + E^5*x))/E^5
```

3.589.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.589.4 Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

method	result	size
parts	$3x+3\,\mathrm{e}^{2-2x}-3\,\mathrm{e}^{-5}\mathrm{e}^{\frac{-9x+45}{x^2}}$	29
risch	$3x+3\,\mathrm{e}^{2-2x}-3\,\mathrm{e}^{-\frac{5x^2+9x-45}{x^2}}$	31
parallelrisch	$\mathrm{e}^{-5}\left(3x\,\mathrm{e}^{5}+3\,\mathrm{e}^{5}\mathrm{e}^{2-2x}-3\,\mathrm{e}^{-\frac{9(-5+x)}{x^2}}\right)$	33
default	$\mathrm{e}^{-5}\left(-3\,\mathrm{e}^{-\frac{9}{x}+\frac{45}{x^2}}+3\,\mathrm{e}^{5}\mathrm{e}^{2}\mathrm{e}^{-2x}+3x\,\mathrm{e}^{5}\right)$	36
norman	$\frac{3x^3+3x^2\mathrm{e}^{2-2x}-3x^2\mathrm{e}^{-5}\mathrm{e}^{\frac{-9x+45}{x^2}}}{x^2}$	41

input
```
int(((-27*x+270)*exp((-9*x+45)/x^2)-6*x^3*exp(5)*exp(2-2*x)+3*x^3*exp(5))/
x^3/exp(5),x,method=_RETURNVERBOSE)
```

output
```
3*x+3*exp(2-2*x)-3/exp(5)*exp((-9*x+45)/x^2)
```

3.589.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^{\frac{45-9x}{x^2}}(270-27x)+3e^5x^3-6e^{7-2x}x^3}{e^5x^3}\,dx = 3\left(xe^5+e^{(-2\,x+7)}-e^{\left(-\frac{9\,(x-5)}{x^2}\right)}\right)e^{(-5)}$$

input
```
integrate(((-27*x+270)*exp((-9*x+45)/x^2)-6*x^3*exp(5)*exp(2-2*x)+3*x^3*ex
p(5))/x^3/exp(5),x, algorithm=\
```

output
```
3*(x*e^5 + e^(-2*x + 7) - e^(-9*(x - 5)/x^2))*e^(-5)
```

3.589.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^{\frac{45-9x}{x^2}}(270-27x)+3e^5x^3-6e^{7-2x}x^3}{e^5x^3}\,dx = 3x-\frac{3e^{\frac{45-9x}{x^2}}}{e^5}+3e^{2-2x}$$

input
```
integrate(((-27*x+270)*exp((-9*x+45)/x**2)-6*x**3*exp(5)*exp(2-2*x)+3*x**3
*exp(5))/x**3/exp(5),x)
```

output
```
3*x - 3*exp(-5)*exp((45 - 9*x)/x**2) + 3*exp(2 - 2*x)
```

3.589.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{e^{\frac{45-9x}{x^2}}(270-27x)+3e^5x^3-6e^{7-2x}x^3}{e^5x^3}\,dx = 3\left(xe^5-\left(e^{\left(2\,x+\frac{45}{x^2}\right)}-e^{\left(\frac{9}{x}+7\right)}\right)e^{\left(-2\,x-\frac{9}{x}\right)}\right)e^{(-5)}$$

input
```
integrate(((-27*x+270)*exp((-9*x+45)/x^2)-6*x^3*exp(5)*exp(2-2*x)+3*x^3*ex
p(5))/x^3/exp(5),x, algorithm=\
```

output
```
3*(x*e^5 - (e^(2*x + 45/x^2) - e^(9/x + 7))*e^(-2*x - 9/x))*e^(-5)
```

3.589.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{e^{\frac{45-9x}{x^2}}(270-27x)+3e^5x^3-6e^{7-2x}x^3}{e^5x^3}\,dx = 3\left(xe^5+e^{(-2x+7)}-e^{\left(-\frac{9}{x}+\frac{45}{x^2}\right)}\right)e^{(-5)}$$

input
```
integrate(((-27*x+270)*exp((-9*x+45)/x^2)-6*x^3*exp(5)*exp(2-2*x)+3*x^3*ex
p(5))/x^3/exp(5),x, algorithm=\
```

output
```
3*(x*e^5 + e^(-2*x + 7) - e^(-9/x + 45/x^2))*e^(-5)
```

3.589.9 Mupad [B] (verification not implemented)

Time = 14.45 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{45-9x}{x^2}}(270-27x)+3e^5x^3-6e^{7-2x}x^3}{e^5x^3}\,dx = 3\,x+3\,\mathrm{e}^{-2\,x}\,\mathrm{e}^2-3\,\mathrm{e}^{-5}\,\mathrm{e}^{-\frac{9}{x}}\,\mathrm{e}^{\frac{45}{x^2}}$$

input
```
int(-(exp(-5)*(exp(-(9*x - 45)/x^2)*(27*x - 270) - 3*x^3*exp(5) + 6*x^3*ex
p(5)*exp(2 - 2*x)))/x^3,x)
```

output
```
3*x + 3*exp(-2*x)*exp(2) - 3*exp(-5)*exp(-9/x)*exp(45/x^2)
```

3.590 $\int \frac{e^x(2-x)-14x^3+e^{5-x}(14x^3-14x^4)}{14x^3} dx$

3.590.1 Optimal result

Integrand size = 41, antiderivative size = 23

$$\int \frac{e^x(2-x)-14x^3+e^{5-x}(14x^3-14x^4)}{14x^3} dx = -\frac{e^x}{14x^2}-x+e^{5-x}x$$

output
```
x*exp(5-x)-x-1/14*exp(x)/x^2
```

3.590.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{e^x(2-x)-14x^3+e^{5-x}(14x^3-14x^4)}{14x^3} dx = -\frac{e^x}{14x^2}-x+e^{5-x}x$$

input
```
Integrate[(E^x*(2 - x) - 14*x^3 + E^(5 - x)*(14*x^3 - 14*x^4))/(14*x^3),x]
```

output
```
-1/14*E^x/x^2 - x + E^(5 - x)*x
```

3.590.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.70, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.073, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-14x^3+e^{5-x}(14x^3-14x^4)+e^x(2-x)}{14x^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{14}\int \frac{-14x^3+e^x(2-x)+14e^{5-x}(x^3-x^4)}{x^3}dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{14}\int \left(-\frac{e^x(x-2)}{x^3}-14e^{5-x}(x-1)-14\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{14}\left(-\frac{e^x}{x^2}-14e^{5-x}(1-x)+14e^{5-x}-14x\right)$$

input
```
Int[(E^x*(2 - x) - 14*x^3 + E^(5 - x)*(14*x^3 - 14*x^4))/(14*x^3),x]
```

output
```
(14*E^(5 - x) - 14*E^(5 - x)*(1 - x) - E^x/x^2 - 14*x)/14
```

3.590.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.590.4 Maple [A] (verified)

Time = 0.47 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

method	result	size
risch	$x\,e^{5-x}-x-\frac{e^{x}}{14x^{2}}$	20
parallelrisch	$\frac{14\,e^{5-x}x^{3}-14x^{3}-e^{x}}{14x^{2}}$	27
norman	$\frac{\left(x^{3}e^{5}-\frac{e^{2x}}{14}-e^{x}x^{3}\right)e^{-x}}{x^{2}}$	29
parts	$-x-e^{5-x}(5-x)+5\,e^{5-x}-\frac{e^{x}}{14x^{2}}$	33
default	$-x-e^{5}e^{-x}-\frac{e^{x}}{14x^{2}}-e^{5}\left(-x\,e^{-x}-e^{-x}\right)$	38

input
```
int(1/14*((2-x)*exp(x)+(-14*x^4+14*x^3)*exp(5-x)-14*x^3)/x^3,x,method=_RET
URNVERBOSE)
```

output
```
x*exp(5-x)-x-1/14*exp(x)/x^2
```

3.590.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \frac{e^{x}(2-x)-14x^{3}+e^{5-x}(14x^{3}-14x^{4})}{14x^{3}}\,dx=\frac{\left(14\,x^{3}e^{5}-14\,x^{3}e^{x}-e^{(2\,x)}\right)e^{(-x)}}{14\,x^{2}}$$

input
```
integrate(1/14*((2-x)*exp(x)+(-14*x^4+14*x^3)*exp(5-x)-14*x^3)/x^3,x, algo
rithm=\
```

output
```
1/14*(14*x^3*e^5 - 14*x^3*e^x - e^(2*x))*e^(-x)/x^2
```

3.590.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{e^{x}(2-x)-14x^{3}+e^{5-x}(14x^{3}-14x^{4})}{14x^{3}}\,dx=-x+\frac{14x^{3}e^{5}e^{-x}-e^{x}}{14x^{2}}$$

input
```
integrate(1/14*((2-x)*exp(x)+(-14*x**4+14*x**3)*exp(5-x)-14*x**3)/x**3,x)
```

output
```
-x + (14*x**3*exp(5)*exp(-x) - exp(x))/(14*x**2)
```

3.590.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.65

$$\int \frac{e^x(2-x)-14x^3+e^{5-x}(14x^3-14x^4)}{14x^3}\,dx = (xe^5+e^5)e^{(-x)}-x-e^{(-x+5)} - \frac{1}{14}\,\Gamma(-1,-x)-\frac{1}{7}\,\Gamma(-2,-x)$$

input
```
integrate(1/14*((2-x)*exp(x)+(-14*x^4+14*x^3)*exp(5-x)-14*x^3)/x^3,x, algo
rithm=\
```

output
```
(x*e^5 + e^5)*e^(-x) - x - e^(-x + 5) - 1/14*gamma(-1, -x) - 1/7*gamma(-2,
 -x)
```

3.590.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{e^x(2-x)-14x^3+e^{5-x}(14x^3-14x^4)}{14x^3}\,dx = \frac{14\,x^3e^{(-x+5)}-14\,x^3-e^x}{14\,x^2}$$

input
```
integrate(1/14*((2-x)*exp(x)+(-14*x^4+14*x^3)*exp(5-x)-14*x^3)/x^3,x, algo
rithm=\
```

output
```
1/14*(14*x^3*e^(-x + 5) - 14*x^3 - e^x)/x^2
```

3.590.9 Mupad [B] (verification not implemented)

Time = 14.06 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{e^x(2-x)-14x^3+e^{5-x}(14x^3-14x^4)}{14x^3}\,dx = x\left(\mathrm{e}^{5-x}-1\right)-\frac{\mathrm{e}^x}{14\,x^2}$$

input
```
int(-((exp(x)*(x - 2))/14 - (exp(5 - x)*(14*x^3 - 14*x^4))/14 + x^3)/x^3,x
)
```

output
```
x*(exp(5 - x) - 1) - exp(x)/(14*x^2)
```

3.591 $\int \frac{36-12x+4x^3+e^{-2-x}x(-24x^2+20x^3-4x^4)+(-12x^2+4x^3)\log(-3+x)}{-36x+9x^2+x^3+e^{-2-x}x(-12x^3+4x^4)+(-12x^3+4x^4)\log(-3+x)}$

3.591.1 Optimal result

Integrand size = 102, antiderivative size = 30

$$\int \frac{36-12x+4x^3+e^{-2-x}x(-24x^2+20x^3-4x^4)+(-12x^2+4x^3)\log(-3+x)}{-36x+9x^2+x^3+e^{-2-x}x(-12x^3+4x^4)+(-12x^3+4x^4)\log(-3+x)}\,dx = \log\left(\frac{2(x+4(3+x^2(e^{-2-x}x+\log(-3+x))))}{x}\right)$$

output
```
ln(2*(x+12+4*(ln(-3+x)+exp(ln(x)-x-2))*x^2)/x)
```

3.591.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.77

$$\int \frac{36-12x+4x^3+e^{-2-x}x(-24x^2+20x^3-4x^4)+(-12x^2+4x^3)\log(-3+x)}{-36x+9x^2+x^3+e^{-2-x}x(-12x^3+4x^4)+(-12x^3+4x^4)\log(-3+x)}\,dx = 4\left(-\frac{x}{4}-\frac{\log(x)}{4}+\frac{1}{4}\log\left(12e^{2+x}+e^{2+x}x+4x^3+4e^{2+x}x^2\log(-3+x)\right)\right)$$

input
```
Integrate[(36 - 12*x + 4*x^3 + E^(-2 - x)*x*(-24*x^2 + 20*x^3 - 4*x^4) + (
-12*x^2 + 4*x^3)*Log[-3 + x])/(-36*x + 9*x^2 + x^3 + E^(-2 - x)*x*(-12*x^3
 + 4*x^4) + (-12*x^3 + 4*x^4)*Log[-3 + x]),x]
```

output
```
4*(-1/4*x - Log[x]/4 + Log[12*E^(2 + x) + E^(2 + x)*x + 4*x^3 + 4*E^(2 + x
)*x^2*Log[-3 + x]]/4)
```

3.591.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^3+(4x^3-12x^2)\log(x-3)+e^{-x-2}(-4x^4+20x^3-24x^2)\,x-12x+36}{x^3+9x^2+e^{-x-2}(4x^4-12x^3)\,x+(4x^4-12x^3)\log(x-3)-36x}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{x+2}(-4x^3-(4x^3-12x^2)\log(x-3)-e^{-x-2}(-4x^4+20x^3-24x^2)\,x+12x-36)}{(3-x)x\,(4x^3+4e^{x+2}x^2\log(x-3)+e^{x+2}x+12e^{x+2})}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{e^{x+2}(4x^4\log(x-3)+5x^3-16x^3\log(x-3)+7x^2+12x^2\log(x-3)-66x+108)}{(x-3)x\,(4x^3+4e^{x+2}x^2\log(x-3)+e^{x+2}x+12e^{x+2})}-\frac{x-2}{x}\right)dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{e^{x+2}(4x^4\log(x-3)+5x^3-16x^3\log(x-3)+7x^2+12x^2\log(x-3)-66x+108)}{(x-3)x\,(4x^3+4e^{x+2}x^2\log(x-3)+e^{x+2}x+12e^{x+2})}+\frac{2-x}{x}\right)dx$$

$$\Big\downarrow \text{ 7299}$$

$$\int \left(\frac{e^{x+2}(4x^4\log(x-3)+5x^3-16x^3\log(x-3)+7x^2+12x^2\log(x-3)-66x+108)}{(x-3)x\,(4x^3+4e^{x+2}x^2\log(x-3)+e^{x+2}x+12e^{x+2})}+\frac{2-x}{x}\right)dx$$

input
```
Int[(36 - 12*x + 4*x^3 + E^(-2 - x)*x*(-24*x^2 + 20*x^3 - 4*x^4) + (-12*x^
2 + 4*x^3)*Log[-3 + x])/(-36*x + 9*x^2 + x^3 + E^(-2 - x)*x*(-12*x^3 + 4*x
^4) + (-12*x^3 + 4*x^4)*Log[-3 + x]),x]
```

output
```
$Aborted
```

3.591.3.1 Defintions of rubi rules used

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.591.4 Maple [A] (verified)

Time = 4.59 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

method	result	size
risch	$\ln(x)+2+\ln\left(x\,\mathrm{e}^{-2-x}+\frac{4x^2\ln(-3+x)+x+12}{4x^2}\right)$	32
parallelrisch	$\ln\left(x^2\ln(-3+x)+x^2\mathrm{e}^{\ln(x)-x-2}+\frac{x}{4}+3\right)-\ln(x)$	32

input
```
int(((-4*x^4+20*x^3-24*x^2)*exp(ln(x)-x-2)+(4*x^3-12*x^2)*ln(-3+x)+4*x^3-1
2*x+36)/((4*x^4-12*x^3)*exp(ln(x)-x-2)+(4*x^4-12*x^3)*ln(-3+x)+x^3+9*x^2-3
6*x),x,method=_RETURNVERBOSE)
```

output
```
ln(x)+2+ln(x*exp(-2-x)+1/4*(4*x^2*ln(-3+x)+x+12)/x^2)
```

3.591.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

$$\int \frac{36-12x+4x^3+e^{-2-x}x(-24x^2+20x^3-4x^4)+(-12x^2+4x^3)\log(-3+x)}{-36x+9x^2+x^3+e^{-2-x}x\left(-12x^3+4x^4\right)+\left(-12x^3+4x^4\right)\log(-3+x)}\,dx$$
$$=\log(x)+\log\left(\frac{4\,x^2e^{(-x+\log(x)-2)}+4\,x^2\log(x-3)+x+12}{x^2}\right)$$

input
```
integrate(((-4*x^4+20*x^3-24*x^2)*exp(log(x)-x-2)+(4*x^3-12*x^2)*log(-3+x)
+4*x^3-12*x+36)/((4*x^4-12*x^3)*exp(log(x)-x-2)+(4*x^4-12*x^3)*log(-3+x)+x
^3+9*x^2-36*x),x, algorithm=\
```

output
```
log(x) + log((4*x^2*e^(-x + log(x) - 2) + 4*x^2*log(x - 3) + x + 12)/x^2)
```

3.591.6 Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int \frac{36-12x+4x^3+e^{-2-x}x(-24x^2+20x^3-4x^4)+(-12x^2+4x^3)\log(-3+x)}{-36x+9x^2+x^3+e^{-2-x}x\left(-12x^3+4x^4\right)+\left(-12x^3+4x^4\right)\log(-3+x)}\,dx$$
$$= 2\log(x) + \log\left(e^{-x-2} + \frac{4x^2\log(x-3)+x+12}{4x^3}\right)$$

input
```
integrate(((-4*x**4+20*x**3-24*x**2)*exp(ln(x)-x-2)+(4*x**3-12*x**2)*ln(-3
+x)+4*x**3-12*x+36)/((4*x**4-12*x**3)*exp(ln(x)-x-2)+(4*x**4-12*x**3)*ln(-
3+x)+x**3+9*x**2-36*x),x)
```

output
```
2*log(x) + log(exp(-x - 2) + (4*x**2*log(x - 3) + x + 12)/(4*x**3))
```

3.591.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.53

$$\int \frac{36-12x+4x^3+e^{-2-x}x(-24x^2+20x^3-4x^4)+(-12x^2+4x^3)\log(-3+x)}{-36x+9x^2+x^3+e^{-2-x}x\left(-12x^3+4x^4\right)+\left(-12x^3+4x^4\right)\log(-3+x)}\,dx$$
$$= \log(x) + \log\left(\frac{\left(4\,x^2e^{(x+2)}\log(x-3)+4\,x^3+(xe^2+12\,e^2)e^x\right)e^{(-x-2)}}{4\,x^2}\right)$$

input
```
integrate(((-4*x^4+20*x^3-24*x^2)*exp(log(x)-x-2)+(4*x^3-12*x^2)*log(-3+x)
+4*x^3-12*x+36)/((4*x^4-12*x^3)*exp(log(x)-x-2)+(4*x^4-12*x^3)*log(-3+x)+x
^3+9*x^2-36*x),x, algorithm=\
```

output
```
log(x) + log(1/4*(4*x^2*e^(x + 2)*log(x - 3) + 4*x^3 + (x*e^2 + 12*e^2)*e^
x)*e^(-x - 2)/x^2)
```

3.591.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.33

$$\int \frac{36-12x+4x^3+e^{-2-x}x(-24x^2+20x^3-4x^4)+(-12x^2+4x^3)\log(-3+x)}{-36x+9x^2+x^3+e^{-2-x}x(-12x^3+4x^4)+(-12x^3+4x^4)\log(-3+x)}\,dx$$
$$= -x+\log\left(4\,x^2e^{(x+2)}\log\left(x-3\right)+4\,x^3+xe^{(x+2)}+12\,e^{(x+2)}\right)-\log\left(x\right)$$

input
```
integrate(((-4*x^4+20*x^3-24*x^2)*exp(log(x)-x-2)+(4*x^3-12*x^2)*log(-3+x)
+4*x^3-12*x+36)/((4*x^4-12*x^3)*exp(log(x)-x-2)+(4*x^4-12*x^3)*log(-3+x)+x
^3+9*x^2-36*x),x, algorithm=\
```

output
```
-x + log(4*x^2*e^(x + 2)*log(x - 3) + 4*x^3 + x*e^(x + 2) + 12*e^(x + 2))
- log(x)
```

3.591.9 Mupad [B] (verification not implemented)

Time = 14.84 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int \frac{36-12x+4x^3+e^{-2-x}x(-24x^2+20x^3-4x^4)+(-12x^2+4x^3)\log(-3+x)}{-36x+9x^2+x^3+e^{-2-x}x(-12x^3+4x^4)+(-12x^3+4x^4)\log(-3+x)}\,dx$$
$$= \ln\left(\frac{x+4\,x^2\,\ln\left(x-3\right)+4\,x^3\,\mathrm{e}^{-x-2}+12}{x^2}\right)+\ln\left(x\right)$$

input
```
int((12*x + log(x - 3)*(12*x^2 - 4*x^3) - 4*x^3 + exp(log(x) - x - 2)*(24*
x^2 - 20*x^3 + 4*x^4) - 36)/(36*x + log(x - 3)*(12*x^3 - 4*x^4) + exp(log(
x) - x - 2)*(12*x^3 - 4*x^4) - 9*x^2 - x^3),x)
```

output
```
log((x + 4*x^2*log(x - 3) + 4*x^3*exp(- x - 2) + 12)/x^2) + log(x)
```

3.592 $\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx$

3.592.1 Optimal result

Integrand size = 17, antiderivative size = 20

$$\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx=\log(3)+\frac{3+\log(3)}{x}+\frac{e^3\log(16)}{x}$$

output
```
(3+ln(3))/x+4*exp(3)*ln(2)/x+ln(3)
```

3.592.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx=\frac{3+\log(3)+e^3\log(16)}{x}$$

input
```
Integrate[(-3 - Log[3] - E^3*Log[16])/x^2,x]
```

output
```
(3 + Log[3] + E^3*Log[16])/x
```

3.592.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx$$

$$\Big\downarrow \; 15$$

$$\frac{3+\log(3)+e^3\log(16)}{x}$$

input
```
Int[(-3 - Log[3] - E^3*Log[16])/x^2,x]
```

output
```
(3 + Log[3] + E^3*Log[16])/x
```

3.592.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.592.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

method	result	size
gosper	$\frac{4\,e^{3}\ln(2)+\ln(3)+3}{x}$	15
norman	$\frac{4\,e^{3}\ln(2)+\ln(3)+3}{x}$	15
default	$-\frac{-4\,e^{3}\ln(2)-\ln(3)-3}{x}$	18
parallelrisch	$-\frac{-4\,e^{3}\ln(2)-\ln(3)-3}{x}$	18
risch	$\frac{4\,e^{3}\ln(2)}{x}+\frac{\ln(3)}{x}+\frac{3}{x}$	22

input
```
int((-4*exp(3)*ln(2)-ln(3)-3)/x^2,x,method=_RETURNVERBOSE)
```

output
```
(4*exp(3)*ln(2)+ln(3)+3)/x
```

3.592.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx = \frac{4\,e^3\log(2)+\log(3)+3}{x}$$

input
```
integrate((-4*exp(3)*log(2)-log(3)-3)/x^2,x, algorithm=\
```

output
```
(4*e^3*log(2) + log(3) + 3)/x
```

3.592.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx = -\frac{-4e^3\log(2)-3-\log(3)}{x}$$

input
```
integrate((-4*exp(3)*ln(2)-ln(3)-3)/x**2,x)
```

output
```
-(-4*exp(3)*log(2) - 3 - log(3))/x
```

3.592.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx = \frac{4\,e^3\log(2)+\log(3)+3}{x}$$

input
```
integrate((-4*exp(3)*log(2)-log(3)-3)/x^2,x, algorithm=\
```

output
```
(4*e^3*log(2) + log(3) + 3)/x
```

3.592.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx=\frac{4\,e^3\log(2)+\log(3)+3}{x}$$

input
```
integrate((-4*exp(3)*log(2)-log(3)-3)/x^2,x, algorithm=\
```

output
```
(4*e^3*log(2) + log(3) + 3)/x
```

3.592.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-3-\log(3)-e^3\log(16)}{x^2}\,dx=\frac{\ln(3)+4\,e^3\,\ln(2)+3}{x}$$

input
```
int(-(log(3) + 4*exp(3)*log(2) + 3)/x^2,x)
```

output
```
(log(3) + 4*exp(3)*log(2) + 3)/x
```

3.593 $\int e^4(-2+4x)\,dx$

3.593.1 Optimal result

Integrand size = 9, antiderivative size = 26

$$\int e^4(-2+4x)\,dx=\frac{e^4\left(x-2x\left(x-x\left(\frac{1}{9x}+x\right)\right)\right)}{x}$$

output
```
exp(4)/x*(x-2*(x-(x+1/9/x)*x)*x)
```

3.593.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.50

$$\int e^4(-2+4x)\,dx=e^4\left(-2x+2x^2\right)$$

input
```
Integrate[E^4*(-2 + 4*x),x]
```

output
```
E^4*(-2*x + 2*x^2)
```

3.593.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.54, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^4(4x-2)\,dx$$

$$\Big\downarrow \; 17$$

$$\frac{1}{2}e^4(1-2x)^2$$

input
```
Int[E^4*(-2 + 4*x),x]
```

output
```
(E^4*(1 - 2*x)^2)/2
```

3.593.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.593.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.35

method	result	size
gosper	$2\,\mathrm{e}^4 x(-1+x)$	9
default	$2\,\mathrm{e}^4(x^2-x)$	12
parallelrisch	$(2x^2-2x)\,\mathrm{e}^4$	13
norman	$-2x\,\mathrm{e}^4+2x^2\mathrm{e}^4$	14
risch	$-2x\,\mathrm{e}^4+2x^2\mathrm{e}^4$	14

input
```
int((4*x-2)*exp(4),x,method=_RETURNVERBOSE)
```

output
```
2*exp(4)*x*(-1+x)
```

3.593.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.42

$$\int e^4(-2+4x)\,dx = 2\left(x^2-x\right)e^4$$

input
```
integrate((4*x-2)*exp(4),x, algorithm=\
```

output
```
2*(x^2 - x)*e^4
```

3.593.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.54

$$\int e^4(-2+4x)\,dx = 2x^2e^4 - 2xe^4$$

input
```
integrate((4*x-2)*exp(4),x)
```

output
```
2*x**2*exp(4) - 2*x*exp(4)
```

3.593.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.42

$$\int e^4(-2+4x)\,dx = 2\left(x^2-x\right)e^4$$

input
```
integrate((4*x-2)*exp(4),x, algorithm=\
```

output
```
2*(x^2 - x)*e^4
```

3.593.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.42

$$\int e^4(-2+4x)\,dx = 2\left(x^2-x\right)e^4$$

input
```
integrate((4*x-2)*exp(4),x, algorithm=\
```

output
```
2*(x^2 - x)*e^4
```

3.593.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.42

$$\int e^4(-2+4x)\,dx = \frac{\mathrm{e}^4\,{\left(2\,x-1\right)}^2}{2}$$

input
```
int(exp(4)*(4*x - 2),x)
```

output
```
(exp(4)*(2*x - 1)^2)/2
```

3.594 $\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}\left(-10x^3+20e^3x^3-1\right.\right.}{-125x^4+\left(-75x^3+75e^3x^3\right)\log(x)+\left(-15x^2+30e^3x^2-15e^6x^2\right)}$

3.594.1 Optimal result

Integrand size = 180, antiderivative size = 23

$$\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}(-10x^3+20e^3x^3-10e^6x^3)+e^{x^2}(-2x^2+6e^3x^2\right.}{-125x^4+(-75x^3+75e^3x^3)\log(x)+(-15x^2+30e^3x^2-15e^6x^2)\log^2(x)+(-x+3e^3x-3e^6}$$
$$=\frac{e^{e^{x^2}}}{\left(-\frac{5x}{-1+e^3}+\log(x)\right)^2}$$

output
```
exp(exp(x^2))/(ln(x)-5/(exp(3)-1)*x)^2
```

3.594.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}(-10x^3+20e^3x^3-10e^6x^3)+e^{x^2}(-2x^2+6e^3x^2\right.}{-125x^4+(-75x^3+75e^3x^3)\log(x)+(-15x^2+30e^3x^2-15e^6x^2)\log^2(x)+(-x+3e^3x-3e^6}$$
$$=\frac{e^{e^{x^2}}(-1+e^3)^2}{(5x+\log(x)-e^3\log(x))^2}$$

3.594.

$$\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}(-10x^3+20e^3x^3-10e^6x^3)+e^{x^2}(-2x^2+6e^3x^2-6e^6x^2+2e^9x^2)\log(x)\right)}{-125x^4+(-75x^3+75e^3x^3)\log(x)+(-15x^2+30e^3x^2-15e^6x^2)\log^2(x)+(-x+3e^3x-3e^6x+e^9x)\log^3(x)}\,dx$$

input
```
Integrate[(E^E^x^2*(2 - 2*E^9 + E^3*(-6 - 20*x) + 10*x + E^6*(6 + 10*x) +
E^x^2*(-10*x^3 + 20*E^3*x^3 - 10*E^6*x^3) + E^x^2*(-2*x^2 + 6*E^3*x^2 - 6*
E^6*x^2 + 2*E^9*x^2)*Log[x]))/(-125*x^4 + (-75*x^3 + 75*E^3*x^3)*Log[x] +
(-15*x^2 + 30*E^3*x^2 - 15*E^6*x^2)*Log[x]^2 + (-x + 3*E^3*x - 3*E^6*x + E
^9*x)*Log[x]^3),x]
```

output
```
(E^E^x^2*(-1 + E^3)^2)/(5*x + Log[x] - E^3*Log[x])^2
```

3.594.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 144 vs. $2(23) = 46$.

Time = 0.91 (sec) , antiderivative size = 144, normalized size of antiderivative = 6.26, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.006$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^{x^2}} \left(e^{x^2} \left(2e^9x^2 - 6e^6x^2 + 6e^3x^2 - 2x^2\right) \log(x) + e^{x^2} \left(-10e^6x^3 + 20e^3x^3 - 10x^3\right) + e^3(-20x - 6) + 10x + e^6(1}{-125x^4 + \left(75e^3x^3 - 75x^3\right) \log(x) + \left(-15e^6x^2 + 30e^3x^2 - 15x^2\right) \log^2(x) + \left(e^9x - 3e^6x + 3e^3x - x\right)}$$

$$\Big\downarrow \; 2726$$

$$\frac{e^{e^{x^2}-x^2} \left(e^{x^2} \left(-e^9x^2 + 3e^6x^2 - 3e^3x^2 + x^2\right) \log(x) + 5e^{x^2} \left(e^6x^3 - 2e^3x^3 + x^3\right)\right)}{x \left(125x^4 + 75 \left(x^3 - e^3x^3\right) \log(x) + 15 \left(e^6x^2 - 2e^3x^2 + x^2\right) \log^2(x) + \left(1 - e^3\right)^3 x \log^3(x)\right)}$$

input
```
Int[(E^E^x^2*(2 - 2*E^9 + E^3*(-6 - 20*x) + 10*x + E^6*(6 + 10*x) + E^x^2*
(-10*x^3 + 20*E^3*x^3 - 10*E^6*x^3) + E^x^2*(-2*x^2 + 6*E^3*x^2 - 6*E^6*x^
2 + 2*E^9*x^2)*Log[x]))/(-125*x^4 + (-75*x^3 + 75*E^3*x^3)*Log[x] + (-15*x
^2 + 30*E^3*x^2 - 15*E^6*x^2)*Log[x]^2 + (-x + 3*E^3*x - 3*E^6*x + E^9*x)*
Log[x]^3),x]
```

output
```
(E^(E^x^2 - x^2)*(5*E^x^2*(x^3 - 2*E^3*x^3 + E^6*x^3) + E^x^2*(x^2 - 3*E^3
*x^2 + 3*E^6*x^2 - E^9*x^2)*Log[x]))/(x*(125*x^4 + 75*(x^3 - E^3*x^3)*Log[
x] + 15*(x^2 - 2*E^3*x^2 + E^6*x^2)*Log[x]^2 + (1 - E^3)^3*x*Log[x]^3))
```

3.594.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.594.4 Maple [A] (verified)

Time = 6.65 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

method	result	size
risch	$\frac{\left(-2\,\mathrm{e}^{3}+1+\mathrm{e}^{6}\right)\mathrm{e}^{\mathrm{e}^{x^{2}}}}{\left(\ln\left(x\right)\mathrm{e}^{3}-\ln\left(x\right)-5x\right)^{2}}$	30
parallelrisch	$\frac{25\,\mathrm{e}^{6}\mathrm{e}^{\mathrm{e}^{x^{2}}}-50\,\mathrm{e}^{3}\mathrm{e}^{\mathrm{e}^{x^{2}}}+25\,\mathrm{e}^{\mathrm{e}^{x^{2}}}}{25\,\mathrm{e}^{6}\ln\left(x\right)^{2}-250x\,\mathrm{e}^{3}\ln\left(x\right)-50\,\mathrm{e}^{3}\ln\left(x\right)^{2}+625x^{2}+250x\ln\left(x\right)+25\ln\left(x\right)^{2}}$	72

input
```
int(((2*x^2*exp(3)^3-6*x^2*exp(3)^2+6*x^2*exp(3)-2*x^2)*exp(x^2)*ln(x)+(-1
0*x^3*exp(3)^2+20*x^3*exp(3)-10*x^3)*exp(x^2)-2*exp(3)^3+(10*x+6)*exp(3)^2
+(-20*x-6)*exp(3)+10*x+2)*exp(exp(x^2))/((x*exp(3)^3-3*x*exp(3)^2+3*x*exp(
3)-x)*ln(x)^3+(-15*x^2*exp(3)^2+30*x^2*exp(3)-15*x^2)*ln(x)^2+(75*x^3*exp(
3)-75*x^3)*ln(x)-125*x^4),x,method=_RETURNVERBOSE)
```

output
```
(-2*exp(3)+1+exp(6))/(ln(x)*exp(3)-ln(x)-5*x)^2*exp(exp(x^2))
```

3.594.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. 2(22) = 44.

Time = 0.28 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.04

$$\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}(-10x^3+20e^3x^3-10e^6x^3)+e^{x^2}(-2x^2+6e^3x^2 \cdots\right.}{-125x^4+(-75x^3+75e^3x^3)\log(x)+(-15x^2+30e^3x^2-15e^6x^2)\log^2(x)+(-x+3e^3x-3e^6 \cdots}$$
$$=\frac{(e^6-2\,e^3+1)e^{\left(e^{\left(x^2\right)}\right)}}{(e^6-2\,e^3+1)\log\left(x\right)^2+25\,x^2-10\,(xe^3-x)\log\left(x\right)}$$

input
```
integrate(((2*x^2*exp(3)^3-6*x^2*exp(3)^2+6*x^2*exp(3)-2*x^2)*exp(x^2)*log
(x)+(-10*x^3*exp(3)^2+20*x^3*exp(3)-10*x^3)*exp(x^2)-2*exp(3)^3+(10*x+6)*e
xp(3)^2+(-20*x-6)*exp(3)+10*x+2)*exp(exp(x^2))/((x*exp(3)^3-3*x*exp(3)^2+3
*x*exp(3)-x)*log(x)^3+(-15*x^2*exp(3)^2+30*x^2*exp(3)-15*x^2)*log(x)^2+(75
*x^3*exp(3)-75*x^3)*log(x)-125*x^4),x, algorithm=\
```

output
```
(e^6 - 2*e^3 + 1)*e^(e^(x^2))/((e^6 - 2*e^3 + 1)*log(x)^2 + 25*x^2 - 10*(x
*e^3 - x)*log(x))
```

3.594.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. $2(19) = 38$.

Time = 0.29 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.65

$$\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}(-10x^3+20e^3x^3-10e^6x^3)+e^{x^2}(-2x^2+6e^3x^2\right.}{-125x^4+(-75x^3+75e^3x^3)\log(x)+(-15x^2+30e^3x^2-15e^6x^2)\log^2(x)+(-x+3e^3x-3e^6}$$
$$= \frac{(-2e^3+1+e^6)\,e^{e^{x^2}}}{25x^2-10xe^3\log(x)+10x\log(x)-2e^3\log(x)^2+\log(x)^2+e^6\log(x)^2}$$

input
```
integrate(((2*x**2*exp(3)**3-6*x**2*exp(3)**2+6*x**2*exp(3)-2*x**2)*exp(x*
*2)*ln(x)+(-10*x**3*exp(3)**2+20*x**3*exp(3)-10*x**3)*exp(x**2)-2*exp(3)**
3+(10*x+6)*exp(3)**2+(-20*x-6)*exp(3)+10*x+2)*exp(exp(x**2))/((x*exp(3)**3
-3*x*exp(3)**2+3*x*exp(3)-x)*ln(x)**3+(-15*x**2*exp(3)**2+30*x**2*exp(3)-1
5*x**2)*ln(x)**2+(75*x**3*exp(3)-75*x**3)*ln(x)-125*x**4),x)
```

output
```
(-2*exp(3) + 1 + exp(6))*exp(exp(x**2))/(25*x**2 - 10*x*exp(3)*log(x) + 10
*x*log(x) - 2*exp(3)*log(x)**2 + log(x)**2 + exp(6)*log(x)**2)
```

3.594.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(22) = 44$.

Time = 0.26 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.00

$$\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}(-10x^3+20e^3x^3-10e^6x^3)+e^{x^2}(-2x^2+6e^3x^2\right.}{-125x^4+(-75x^3+75e^3x^3)\log(x)+(-15x^2+30e^3x^2-15e^6x^2)\log^2(x)+(-x+3e^3x-3e^6}$$
$$= -\frac{(e^6-2\,e^3+1)e^{\left(e^{(x^2)}\right)}}{10\,x(e^3-1)\log(x)-(e^6-2\,e^3+1)\log(x)^2-25\,x^2}$$

---

input
```
integrate(((2*x^2*exp(3)^3-6*x^2*exp(3)^2+6*x^2*exp(3)-2*x^2)*exp(x^2)*log
(x)+(-10*x^3*exp(3)^2+20*x^3*exp(3)-10*x^3)*exp(x^2)-2*exp(3)^3+(10*x+6)*e
xp(3)^2+(-20*x-6)*exp(3)+10*x+2)*exp(exp(x^2))/((x*exp(3)^3-3*x*exp(3)^2+3
*x*exp(3)-x)*log(x)^3+(-15*x^2*exp(3)^2+30*x^2*exp(3)-15*x^2)*log(x)^2+(75
*x^3*exp(3)-75*x^3)*log(x)-125*x^4),x, algorithm=\
```

output
```
-(e^6 - 2*e^3 + 1)*e^(e^(x^2))/(10*x*(e^3 - 1)*log(x) - (e^6 - 2*e^3 + 1)*
log(x)^2 - 25*x^2)
```

3.594.8 Giac [F]

$$\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}(-10x^3+20e^3x^3-10e^6x^3)+e^{x^2}(-2x^2+6e^3x^2\right.}{-125x^4+(-75x^3+75e^3x^3)\log(x)+(-15x^2+30e^3x^2-15e^6x^2)\log^2(x)+(-x+3e^3x-3e^6}$$

$$=\int -\frac{2\left((x^2e^9-3\,x^2e^6+3\,x^2e^3-x^2)e^{(x^2)}\log(x)+(5\,x+3)e^6-(10\,x+3)e^3-5\,(x^3e^6-2\,x^3e^3+x^3)e^{(x\right.}}{125\,x^4-(xe^9-3\,xe^6+3\,xe^3-x)\log(x)^3+15\,(x^2e^6-2\,x^2e^3+x^2)\log(x)^2-75\,(x^3e^3}$$

input
```
integrate(((2*x^2*exp(3)^3-6*x^2*exp(3)^2+6*x^2*exp(3)-2*x^2)*exp(x^2)*log
(x)+(-10*x^3*exp(3)^2+20*x^3*exp(3)-10*x^3)*exp(x^2)-2*exp(3)^3+(10*x+6)*e
xp(3)^2+(-20*x-6)*exp(3)+10*x+2)*exp(exp(x^2))/((x*exp(3)^3-3*x*exp(3)^2+3
*x*exp(3)-x)*log(x)^3+(-15*x^2*exp(3)^2+30*x^2*exp(3)-15*x^2)*log(x)^2+(75
*x^3*exp(3)-75*x^3)*log(x)-125*x^4),x, algorithm=\
```

output
```
integrate(-2*((x^2*e^9 - 3*x^2*e^6 + 3*x^2*e^3 - x^2)*e^(x^2)*log(x) + (5*
x + 3)*e^6 - (10*x + 3)*e^3 - 5*(x^3*e^6 - 2*x^3*e^3 + x^3)*e^(x^2) + 5*x
- e^9 + 1)*e^(e^(x^2))/(125*x^4 - (x*e^9 - 3*x*e^6 + 3*x*e^3 - x)*log(x)^3
 + 15*(x^2*e^6 - 2*x^2*e^3 + x^2)*log(x)^2 - 75*(x^3*e^3 - x^3)*log(x)), x
)
```

3.594.9 Mupad [B] (verification not implemented)

Time = 14.96 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{e^{e^{x^2}}\left(2-2e^9+e^3(-6-20x)+10x+e^6(6+10x)+e^{x^2}(-10x^3+20e^3x^3-10e^6x^3)+e^{x^2}(-2x^2+6e^3x^2\right.}{-125x^4+(-75x^3+75e^3x^3)\log(x)+(-15x^2+30e^3x^2-15e^6x^2)\log^2(x)+(-x+3e^3x-3e^6}$$
$$=\frac{e^{e^{x^2}}\left(e^3-1\right)^2}{\left(5\,x-\ln\left(x\right)\,\left(e^3-1\right)\right)^2}$$

input
```
int(-(exp(exp(x^2))*(10*x - 2*exp(9) - exp(x^2)*(10*x^3*exp(6) - 20*x^3*ex
p(3) + 10*x^3) + exp(6)*(10*x + 6) - exp(3)*(20*x + 6) + exp(x^2)*log(x)*(
6*x^2*exp(3) - 6*x^2*exp(6) + 2*x^2*exp(9) - 2*x^2) + 2))/(log(x)^3*(x - 3
*x*exp(3) + 3*x*exp(6) - x*exp(9)) + log(x)^2*(15*x^2*exp(6) - 30*x^2*exp(
3) + 15*x^2) - log(x)*(75*x^3*exp(3) - 75*x^3) + 125*x^4),x)
```

output
```
(exp(exp(x^2))*(exp(3) - 1)^2)/(5*x - log(x)*(exp(3) - 1))^2
```

3.595 $\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}(5e^x+2x-2x^2)+e^{(-4+e^5)^x}(-5e^x-5$

3.595.1 Optimal result

Integrand size = 71, antiderivative size = 26

$$\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(5e^x+2x-2x^2\right)+e^{(-4+e^5)^x}\left(-5e^x-5\left(e\left(-4+e^5\right)\right)^x x\log\left(-4+e^5\right)\right)\right)dx$$
$$=\left(-e^{(-4+e^5)^x}+e^{\frac{2e^{-x}x}{5}}\right)x$$

output
```
(exp(1/5*x/exp(x))^2-exp(exp(x*ln(exp(5)-4))))*x
```

3.595.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 3.94 (sec) , antiderivative size = 85, normalized size of antiderivative = 3.27

$$\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(5e^x+2x-2x^2\right)+e^{(-4+e^5)^x}\left(-5e^x-5\left(e\left(-4+e^5\right)\right)^x x\log\left(-4+e^5\right)\right)\right)dx$$
$$=\frac{1}{5}\left(5e^{\frac{2e^{-x}x}{5}}x-\frac{5\,\text{ExpIntegralEi}\left(\left(-4+e^5\right)^x\right)}{\log\left(-4+e^5\right)}\right.$$
$$\left.-\left(-\frac{\text{ExpIntegralEi}\left(\left(-4+e^5\right)^x\right)}{\log^2\left(-4+e^5\right)}+\frac{e^{(-4+e^5)^x}x}{\log\left(-4+e^5\right)}\right)\log\left(-4+e^5\right)\right)$$

input
```
Integrate[(E^((2*x)/(5*E^x))*(5*E^x + 2*x - 2*x^2) + E^(-4 + E^5)^x*(-5*E^
x - 5*(E*(-4 + E^5))^x*x*Log[-4 + E^5]))/(5*E^x),x]
```

3.595.
$\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}(5e^x+2x-2x^2)+e^{(-4+e^5)^x}\left(-5e^x-5(e(-4+e^5))^x x\log(-4+e^5)\right)\right)dx$

output
```
(5*E^((2*x)/(5*E^x))*x - (5*ExpIntegralEi[(-4 + E^5)^x])/Log[-4 + E^5])/5
- (-(ExpIntegralEi[(-4 + E^5)^x]/Log[-4 + E^5]^2) + (E^(-4 + E^5)^x*x)/Log
[-4 + E^5])*Log[-4 + E^5]
```

3.595.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(-2x^2+2x+5e^x\right)+e^{\left(e^5-4\right)^x}\left(-5e^x-5\left(e\left(e^5-4\right)\right)^x x\log\left(e^5-4\right)\right)\right)dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{5}\int e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(-2x^2+2x+5e^x\right)-5e^{\left(-4+e^5\right)^x}\left(\left(e\left(-4+e^5\right)\right)^x\log\left(-4+e^5\right)x+e^x\right)\right)dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{5}\int\left(e^{\frac{2e^{-x}x}{5}-x}\left(-2x^2+2x+5e^x\right)-5e^{\left(-4+e^5\right)^x-x}\left(\left(e\left(-4+e^5\right)\right)^x\log\left(-4+e^5\right)x+e^x\right)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{5}\left(-2\int e^{\frac{2e^{-x}x}{5}-x}x^2dx+5\int e^{\frac{2e^{-x}x}{5}}dx+2\int e^{\frac{2e^{-x}x}{5}-x}xdx-5\log\left(e^5-4\right)\int e^{\left(-4+e^5\right)^x}\left(-4+e^5\right)^x xdx-\frac{5\,\mathrm{ExpI}}{}\right.$$

input
```
Int[(E^((2*x)/(5*E^x))*(5*E^x + 2*x - 2*x^2) + E^(-4 + E^5)^x*(-5*E^x - 5*
(E*(-4 + E^5))^x*x*Log[-4 + E^5]))/(5*E^x),x]
```

output
```
$Aborted
```

3.595.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.595.
$\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(5e^x+2x-2x^2\right)+e^{\left(-4+e^5\right)^x}\left(-5e^x-5\left(e\left(-4+e^5\right)\right)^x x\log\left(-4+e^5\right)\right)\right)\,dx$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.595.4 Maple [A] (verified)

Time = 3.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

method	result	size
risch	$\mathrm{e}^{\frac{2x\,\mathrm{e}^{-x}}{5}}x-x\,\mathrm{e}^{\left(\mathrm{e}^{5}-4\right)^{x}}$	22
parallelrisch	$\mathrm{e}^{\frac{2x\,\mathrm{e}^{-x}}{5}}x-x\,\mathrm{e}^{\mathrm{e}^{x\ln\left(\mathrm{e}^{5}-4\right)}}$	26

input
```
int(1/5*((-5*x*exp(x)*ln(exp(5)-4)*exp(x*ln(exp(5)-4))-5*exp(x))*exp(exp(x
*ln(exp(5)-4)))+(5*exp(x)-2*x^2+2*x)*exp(1/5*x/exp(x))^2)/exp(x),x,method=
_RETURNVERBOSE)
```

output
```
exp(2/5*x*exp(-x))*x-x*exp((exp(5)-4)^x)
```

3.595.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int\frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(5e^{x}+2x-2x^{2}\right)+e^{\left(-4+e^{5}\right)^{x}}\left(-5e^{x}-5\left(e\left(-4+e^{5}\right)\right)^{x}x\log\left(-4+e^{5}\right)\right)\right)\,dx$$
$$=xe^{\left(\frac{2}{5}\,xe^{(-x)}\right)}-xe^{\left(\left(e^{5}-4\right)^{x}\right)}$$

input
```
integrate(1/5*((-5*x*exp(x)*log(exp(5)-4)*exp(x*log(exp(5)-4))-5*exp(x))*e
xp(exp(x*log(exp(5)-4)))+(5*exp(x)-2*x^2+2*x)*exp(1/5*x/exp(x))^2)/exp(x),
x, algorithm=\
```

output
```
x*e^(2/5*x*e^(-x)) - x*e^((e^5 - 4)^x)
```

3.595.6 Sympy [A] (verification not implemented)

Time = 18.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(5e^x+2x-2x^2\right)+e^{(-4+e^5)^x}\left(-5e^x-5\left(e\left(-4+e^5\right)\right)^x x\log\left(-4+e^5\right)\right)\right)dx$$
$$=xe^{\frac{2xe^{-x}}{5}}-xe^{e^{x\log\left(-4+e^5\right)}}$$

input
```
integrate(1/5*((-5*x*exp(x)*ln(exp(5)-4)*exp(x*ln(exp(5)-4))-5*exp(x))*exp
(exp(x*ln(exp(5)-4)))+(5*exp(x)-2*x**2+2*x)*exp(1/5*x/exp(x))**2)/exp(x),x
)
```

output
```
x*exp(2*x*exp(-x)/5) - x*exp(exp(x*log(-4 + exp(5))))
```

3.595.7 Maxima [F]

$$\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(5e^x+2x-2x^2\right)+e^{(-4+e^5)^x}\left(-5e^x-5\left(e\left(-4+e^5\right)\right)^x x\log\left(-4+e^5\right)\right)\right)dx$$
$$=\int -\frac{1}{5}\left(\left(2x^2-2x-5e^x\right)e^{\left(\frac{2}{5}xe^{(-x)}\right)}+5\left(x\left(e^5-4\right)^x e^x\log\left(e^5-4\right)+e^x\right)e^{\left(\left(e^5-4\right)^x\right)}\right)e^{(-x)}\,dx$$

input
```
integrate(1/5*((-5*x*exp(x)*log(exp(5)-4)*exp(x*log(exp(5)-4))-5*exp(x))*e
xp(exp(x*log(exp(5)-4)))+(5*exp(x)-2*x^2+2*x)*exp(1/5*x/exp(x))^2)/exp(x),
x, algorithm=\
```

output
```
-integrate(x*e^(x*log(e^5 - 4) + (e^5 - 4)^x), x)*log(e^5 - 4) - Ei((e^5 -
 4)^x)/log(e^5 - 4) + 1/5*integrate(-(2*x^2 - 2*x - 5*e^x)*e^(2/5*x*e^(-x)
 - x), x)
```

3.595.8 Giac [F]

$$\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(5e^x+2x-2x^2\right)+e^{(-4+e^5)^x}\left(-5e^x-5\left(e\left(-4+e^5\right)\right)^x x\log\left(-4+e^5\right)\right)\right)dx$$
$$=\int -\frac{1}{5}\left(\left(2x^2-2x-5e^x\right)e^{\left(\frac{2}{5}xe^{(-x)}\right)}+5\left(x\left(e^5-4\right)^x e^x\log\left(e^5-4\right)+e^x\right)e^{\left(\left(e^5-4\right)^x\right)}\right)e^{(-x)}\,dx$$

input
```
integrate(1/5*((-5*x*exp(x)*log(exp(5)-4)*exp(x*log(exp(5)-4))-5*exp(x))*e
xp(exp(x*log(exp(5)-4)))+(5*exp(x)-2*x^2+2*x)*exp(1/5*x/exp(x))^2)/exp(x),
x, algorithm=\
```

output
```
integrate(-1/5*((2*x^2 - 2*x - 5*e^x)*e^(2/5*x*e^(-x)) + 5*(x*(e^5 - 4)^x*
e^x*log(e^5 - 4) + e^x)*e^((e^5 - 4)^x))*e^(-x), x)
```

3.595.9 Mupad [B] (verification not implemented)

Time = 15.76 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{1}{5}e^{-x}\left(e^{\frac{2e^{-x}x}{5}}\left(5e^x+2x-2x^2\right)+e^{(-4+e^5)^x}\left(-5e^x-5\left(e\left(-4+e^5\right)\right)^x x\log\left(-4+e^5\right)\right)\right)\,dx$$
$$= -x\left(e^{(e^5-4)^x}-e^{\frac{2\,x\,e^{-x}}{5}}\right)$$

input
```
int(-exp(-x)*((exp(exp(x*log(exp(5) - 4)))*(5*exp(x) + 5*x*log(exp(5) - 4)
*exp(x*log(exp(5) - 4))*exp(x)))/5 - (exp((2*x*exp(-x))/5)*(2*x + 5*exp(x)
 - 2*x^2))/5),x)
```

output
```
-x*(exp((exp(5) - 4)^x) - exp((2*x*exp(-x))/5))
```

3.596 $\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}(-4+4x-$

3.596.1 Optimal result

Integrand size = 81, antiderivative size = 22

$$\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}(-4+4x-4x^2+e^x(4x-4x^2))}{x}\right)\,dx$$
$$=e^{e^{-\frac{4e^{25+e^x+x}(-1+x)}{x}}x}$$

output
```
exp(x/exp(4*exp(ln(exp(25)/x)+exp(x)+x)*(-1+x)))
```

3.596.2 Mathematica [A] (verified)

Time = 5.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}(-4+4x-4x^2+e^x(4x-4x^2))}{x}\right)\,dx$$
$$=e^{e^{-\frac{4e^{25+e^x+x}(-1+x)}{x}}x}$$

input
```
Integrate[E^(x/E^((E^(25 + E^x + x)*(-4 + 4*x))/x) - (E^(25 + E^x + x)*(-4
 + 4*x))/x)*(1 + (E^(25 + E^x + x)*(-4 + 4*x - 4*x^2 + E^x*(4*x - 4*x^2)))
/x),x]
```

output
```
E^(x/E^((4*E^(25 + E^x + x)*(-1 + x))/x))
```

3.596.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\frac{e^{x+e^x+25}\left(-4x^2+e^x\left(4x-4x^2\right)+4x-4\right)}{x}+1\right)\exp\left(e^{-\frac{e^{x+e^x+25}(4x-4)}{x}}x-\frac{e^{x+e^x+25}(4x-4)}{x}\right)dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\exp\left(e^{-\frac{e^{x+e^x+25}(4x-4)}{x}}x-\frac{e^{x+e^x+25}(4x-4)}{x}\right)-\frac{4\left(e^xx^2+x^2-e^xx-x+1\right)\exp\left(e^{-\frac{e^{x+e^x+25}(4x-4)}{x}}x+x+e^x\right.}{x}\right.$$

$$\Big\downarrow \text{2009}$$

$$\int \exp\left(e^{-\frac{e^{x+e^x+25}(4x-4)}{x}}x-\frac{e^{x+e^x+25}(4x-4)}{x}\right)dx+$$
$$4\int \exp\left(e^{-\frac{e^{x+e^x+25}(4x-4)}{x}}x+x+e^x+25-\frac{e^{x+e^x+25}(4x-4)}{x}\right)dx+$$
$$4\int \exp\left(e^{-\frac{e^{x+e^x+25}(4x-4)}{x}}x+2x+e^x+25-\frac{e^{x+e^x+25}(4x-4)}{x}\right)dx-$$
$$4\int \frac{\exp\left(e^{-\frac{e^{x+e^x+25}(4x-4)}{x}}x+x+e^x+25-\frac{e^{x+e^x+25}(4x-4)}{x}\right)}{x}dx-$$
$$4\int \exp\left(e^{-\frac{e^{x+e^x+25}(4x-4)}{x}}x+x+e^x+25-\frac{e^{x+e^x+25}(4x-4)}{x}\right)xdx-$$
$$4\int \exp\left(e^{-\frac{e^{x+e^x+25}(4x-4)}{x}}x+2x+e^x+25-\frac{e^{x+e^x+25}(4x-4)}{x}\right)xdx$$

input
```
Int[E^(x/E^((E^(25 + E^x + x)*(-4 + 4*x))/x) - (E^(25 + E^x + x)*(-4 + 4*x
))/x)*(1 + (E^(25 + E^x + x)*(-4 + 4*x - 4*x^2 + E^x*(4*x - 4*x^2)))/x),x]
```

output
```
$Aborted
```

3.596. $\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}\left(-4+4x-4x^2+e^x\left(4x-4x^2\right)\right)}{x}\right)\,dx$

3.596.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.596.4 Maple [A] (verified)

Time = 5.31 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

method	result	size
risch	$e^{x\, e^{-\frac{4(-1+x) e^{25+e^x+x}}{x}}}$	19
parallelrisch	$e^{x\, e^{-\frac{(-4+4x) e^{25+e^x+x}}{x}}}$	25

input
```
int((((-4*x^2+4*x)*exp(x)-4*x^2+4*x-4)*exp(ln(exp(25)/x)+exp(x)+x)+1)*exp(
x/exp((-4+4*x)*exp(ln(exp(25)/x)+exp(x)+x)))/exp((-4+4*x)*exp(ln(exp(25)/x
)+exp(x)+x)),x,method=_RETURNVERBOSE)
```

output
```
exp(x*exp(-4*(-1+x)*exp(25+exp(x)+x)/x))
```

3.596.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}(-4+4x-4x^2+e^x(4x-4x^2))}{x}\right)\,dx$$
$$= e^{\left(xe^{\left(-4\,(x-1)e^{\left(x+e^x+\log\left(\frac{e^{25}}{x}\right)\right)}\right)}\right)}$$

input
```
integrate((((-4*x^2+4*x)*exp(x)-4*x^2+4*x-4)*exp(log(exp(25)/x)+exp(x)+x)+
1)*exp(x/exp((-4+4*x)*exp(log(exp(25)/x)+exp(x)+x)))/exp((-4+4*x)*exp(log(
exp(25)/x)+exp(x)+x)),x, algorithm=\
```

output
```
e^(x*e^(-4*(x - 1)*e^(x + e^x + log(e^25/x))))
```

3.596.6 Sympy [A] (verification not implemented)

Time = 24.51 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}(-4+4x-4x^2+e^x(4x-4x^2))}{x}\right)\,dx$$
$$=e^{xe^{-\frac{(4x-4)e^{25}e^{x+e^x}}{x}}}$$

input
```
integrate((((-4*x**2+4*x)*exp(x)-4*x**2+4*x-4)*exp(ln(exp(25)/x)+exp(x)+x)
+1)*exp(x/exp((-4+4*x)*exp(ln(exp(25)/x)+exp(x)+x)))/exp((-4+4*x)*exp(ln(e
xp(25)/x)+exp(x)+x)),x)
```

output
```
exp(x*exp(-(4*x - 4)*exp(25)*exp(x + exp(x))/x))
```

3.596.7 Maxima [A] (verification not implemented)

Time = 0.55 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}(-4+4x-4x^2+e^x(4x-4x^2))}{x}\right)\,dx$$
$$=e^{\left(xe^{\left(\frac{4\,e^{(x+e^x+25)}}{x}-4\,e^{(x+e^x+25)}\right)}\right)}$$

input
```
integrate((((-4*x^2+4*x)*exp(x)-4*x^2+4*x-4)*exp(log(exp(25)/x)+exp(x)+x)+
1)*exp(x/exp((-4+4*x)*exp(log(exp(25)/x)+exp(x)+x)))/exp((-4+4*x)*exp(log(
exp(25)/x)+exp(x)+x)),x, algorithm=\
```

output
```
e^(x*e^(4*e^(x + e^x + 25)/x - 4*e^(x + e^x + 25)))
```

3.596.8 Giac [F]

$$\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}(-4+4x-4x^2+e^x(4x-4x^2))}{x}\right)\,dx$$
$$=\int-\left(4\left(x^2+(x^2-x)e^x-x+1\right)e^{\left(x+e^x+\log\left(\frac{e^{25}}{x}\right)\right)}-1\right)e^{\left(xe^{\left(-4\,(x-1)e^{\left(x+e^x+\log\left(\frac{e^{25}}{x}\right)\right)}\right)}-4\,(x-1)e^{\left(x+e^x+\log\left(\frac{e^{25}}{x}\right)\right)}\right.}$$

input
```
integrate((((-4*x^2+4*x)*exp(x)-4*x^2+4*x-4)*exp(log(exp(25)/x)+exp(x)+x)+
1)*exp(x/exp((-4+4*x)*exp(log(exp(25)/x)+exp(x)+x)))/exp((-4+4*x)*exp(log(
exp(25)/x)+exp(x)+x)),x, algorithm=\
```

output
```
integrate(-(4*(x^2 + (x^2 - x)*e^x - x + 1)*e^(x + e^x + log(e^25/x)) - 1)
*e^(x*e^(-4*(x - 1)*e^(x + e^x + log(e^25/x))) - 4*(x - 1)*e^(x + e^x + lo
g(e^25/x))), x)
```

3.596.9 Mupad [B] (verification not implemented)

Time = 14.39 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int e^{e^{-\frac{e^{25+e^x+x}(-4+4x)}{x}}x-\frac{e^{25+e^x+x}(-4+4x)}{x}}\left(1+\frac{e^{25+e^x+x}(-4+4x-4x^2+e^x(4x-4x^2))}{x}\right)\,dx$$
$$= e^{x\,e^{\frac{4\,e^{e^x}\,e^{25}\,e^x}{x}}\,e^{-4\,e^{e^x}\,e^{25}\,e^x}}$$

input
```
int(exp(-exp(x + log(exp(25)/x) + exp(x))*(4*x - 4))*exp(x*exp(-exp(x + lo
g(exp(25)/x) + exp(x))*(4*x - 4)))*(exp(x + log(exp(25)/x) + exp(x))*(4*x
+ exp(x)*(4*x - 4*x^2) - 4*x^2 - 4) + 1),x)
```

output
```
exp(x*exp((4*exp(exp(x))*exp(25)*exp(x))/x)*exp(-4*exp(exp(x))*exp(25)*exp
(x)))
```

3.597 $\int e^{-1+e^{4x}x^2}x^4(8x^3+e^{4x}x^2(2x^3+4x^4))\,dx$

3.597.1 Optimal result

Integrand size = 43, antiderivative size = 17

$$\int e^{-1+e^{4x}x^2}x^4\left(8x^3+e^{4x}x^2\left(2x^3+4x^4\right)\right)\,dx=e^{-1+e^{4x}x^2}x^8$$

output
```
exp(1/4*exp(ln(exp(x)^2*x^2)+2*x)+ln(x)-1/4)^4*x^4
```

3.597.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int e^{-1+e^{4x}x^2}x^4\left(8x^3+e^{4x}x^2\left(2x^3+4x^4\right)\right)\,dx=e^{-1+e^{4x}x^2}x^8$$

input
```
Integrate[E^(-1 + E^(4*x)*x^2)*x^4*(8*x^3 + E^(4*x)*x^2*(2*x^3 + 4*x^4)),x
]
```

output
```
E^(-1 + E^(4*x)*x^2)*x^8
```

3.597.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 49 vs. $2(17) = 34$.

Time = 0.24 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.88, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.023$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{e^{4x}x^2-1}x^4\left(8x^3+e^{4x}\left(4x^4+2x^3\right)x^2\right)\,dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{e^{e^{4x}x^2+4x-1}x^6\left(2x^4+x^3\right)}{2e^{4x}x^2+e^{4x}x}$$

input
```
Int[E^(-1 + E^(4*x)*x^2)*x^4*(8*x^3 + E^(4*x)*x^2*(2*x^3 + 4*x^4)),x]
```

output
```
(E^(-1 + 4*x + E^(4*x)*x^2)*x^6*(x^3 + 2*x^4))/(E^(4*x)*x + 2*E^(4*x)*x^2)
```

3.597.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.597.4 Maple [A] (verified)

Time = 30.65 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.65

method	result
parallelrisch	$x^8 e^{x^2 e^{4x}-1}$
risch	$x^8 e^{x^2 e^{4x}} e^{-\frac{i\pi \operatorname{csgn}\left(i e^{2x}\right)^3}{2}} e^{-\frac{i\pi \operatorname{csgn}\left(i e^{2x}\right) \operatorname{csgn}\left(i e^{x}\right)^2}{2}} e^{-\frac{i\pi \operatorname{csgn}\left(i x^2\right)^3}{2}} e^{-\frac{i\pi \operatorname{csgn}(ix)^2 \operatorname{csgn}\left(i x^2\right)}{2}} e^{-\frac{i\pi \operatorname{csgn}\left(i e^{2x}\right) \operatorname{csgn}\left(i x^2\right) \operatorname{csgn}(i}{2}}$

input
```
int(((4*x^4+2*x^3)*exp(ln(exp(x)^2*x^2)+2*x)+8*x^3)*exp(1/4*exp(ln(exp(x)^
2*x^2)+2*x)+ln(x)-1/4)^4,x,method=_RETURNVERBOSE)
```

output
```
exp(1/4*exp(ln(exp(x)^2*x^2)+2*x)+ln(x)-1/4)^4*x^4
```

3.597.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

$$\int e^{-1+e^{4x}x^2}x^4\left(8x^3+e^{4x}x^2\left(2x^3+4x^4\right)\right)\,dx=x^4e^{\left(e^{(4\,x+2\,\log(x))}+4\,\log(x)-1\right)}$$

input
```
integrate(((4*x^4+2*x^3)*exp(log(exp(x)^2*x^2)+2*x)+8*x^3)*exp(1/4*exp(log
(exp(x)^2*x^2)+2*x)+log(x)-1/4)^4,x, algorithm=\
```

output
```
x^4*e^(e^(4*x + 2*log(x)) + 4*log(x) - 1)
```

3.597.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int e^{-1+e^{4x}x^2}x^4\left(8x^3+e^{4x}x^2\left(2x^3+4x^4\right)\right)\,dx=x^8e^{x^2e^{4x}-1}$$

input
```
integrate(((4*x**4+2*x**3)*exp(ln(exp(x)**2*x**2)+2*x)+8*x**3)*exp(1/4*exp
(ln(exp(x)**2*x**2)+2*x)+ln(x)-1/4)**4,x)
```

output
```
x**8*exp(x**2*exp(4*x) - 1)
```

3.597.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int e^{-1+e^{4x}x^2}x^4\left(8x^3+e^{4x}x^2\left(2x^3+4x^4\right)\right)\,dx=x^8e^{\left(x^2e^{(4\,x)}-1\right)}$$

input
```
integrate(((4*x^4+2*x^3)*exp(log(exp(x)^2*x^2)+2*x)+8*x^3)*exp(1/4*exp(log
(exp(x)^2*x^2)+2*x)+log(x)-1/4)^4,x, algorithm=\
```

output
```
x^8*e^(x^2*e^(4*x) - 1)
```

3.597.8 Giac [F]

$$\int e^{-1+e^{4x}x^2}x^4\left(8x^3+e^{4x}x^2\left(2x^3+4x^4\right)\right)\,dx$$
$$=\int 2\left(4x^3+\left(2x^4+x^3\right)e^{\left(2x+\log\left(x^2e^{(2x)}\right)\right)}\right)e^{\left(e^{\left(2x+\log\left(x^2e^{(2x)}\right)\right)}+4\log(x)-1\right)}\,dx$$

input
```
integrate(((4*x^4+2*x^3)*exp(log(exp(x)^2*x^2)+2*x)+8*x^3)*exp(1/4*exp(log
(exp(x)^2*x^2)+2*x)+log(x)-1/4)^4,x, algorithm=\
```

output
```
integrate(2*(4*x^3 + (2*x^4 + x^3)*e^(2*x + log(x^2*e^(2*x))))*e^(e^(2*x +
 log(x^2*e^(2*x))) + 4*log(x) - 1), x)
```

3.597.9 Mupad [B] (verification not implemented)

Time = 14.46 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int e^{-1+e^{4x}x^2}x^4\left(8x^3+e^{4x}x^2\left(2x^3+4x^4\right)\right)\,dx=x^8\,\mathrm{e}^{-1}\,\mathrm{e}^{x^2\,\mathrm{e}^{4\,x}}$$

input
```
int(exp(exp(2*x + log(x^2*exp(2*x))) + 4*log(x) - 1)*(exp(2*x + log(x^2*ex
p(2*x)))*(2*x^3 + 4*x^4) + 8*x^3),x)
```

output
```
x^8*exp(-1)*exp(x^2*exp(4*x))
```

3.598 $\int \frac{1+e^2+2x^2-\log(x)+\left(e^2(-1-2x)+2x^2+x\log(5)+\log(x)\right)\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}$

3.598.1 Optimal result

Integrand size = 89, antiderivative size = 28

$$\int \frac{1+e^2+2x^2-\log(x)+\left(e^2(-1-2x)+2x^2+x\log(5)+\log(x)\right)\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$$
$$=x\log\left(2e^2-2x-\log(5)+\frac{e^2-\log(x)}{x}\right)$$

output
```
x*ln((exp(2)-ln(x))/x+2*exp(2)-2*x-ln(5))
```

3.598.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{1+e^2+2x^2-\log(x)+\left(e^2(-1-2x)+2x^2+x\log(5)+\log(x)\right)\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$$
$$=x\log\left(-\frac{-e^2(1+2x)+x(2x+\log(5))+\log(x)}{x}\right)$$

input
```
Integrate[(1 + E^2 + 2*x^2 - Log[x] + (E^2*(-1 - 2*x) + 2*x^2 + x*Log[5] +
 Log[x])*Log[(-2*x^2 + E^2*(1 + 2*x) - x*Log[5] - Log[x])/x])/(E^2*(-1 - 2
*x) + 2*x^2 + x*Log[5] + Log[x]),x]
```

3.598. $\int \frac{1+e^2+2x^2-\log(x)+\left(e^2(-1-2x)+2x^2+x\log(5)+\log(x)\right)\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$

output
```
x*Log[-((-(E^2*(1 + 2*x)) + x*(2*x + Log[5]) + Log[x])/x)]
```

3.598.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+\left(2x^2+e^2(-2x-1)+x\log(5)+\log(x)\right)\log\left(\frac{-2x^2+e^2(2x+1)-x\log(5)-\log(x)}{x}\right)-\log(x)+e^2+1}{2x^2+e^2(-2x-1)+x\log(5)+\log(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-2x^2+\log(x)-e^2-1}{-2x^2+2e^2x\left(1-\frac{\log(5)}{2e^2}\right)-\log(x)+e^2}+\log\left(-2x+\frac{e^2(2x+1)}{x}-\frac{\log(x)}{x}-\log(5)\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\left(2e^2-\log(5)\right)\int \frac{x}{-2x^2+2e^2\left(1-\frac{\log(5)}{2e^2}\right)x-\log(x)+e^2}dx+\int \frac{1}{2x^2-2e^2\left(1-\frac{\log(5)}{2e^2}\right)x+\log(x)-e^2}dx+4\int \frac{x^2}{2x^2-2e^2\left(1-\frac{\log(5)}{2e^2}\right)x+\log(x)-e^2}dx+\int \log\left(-2x-\log(5)+\frac{e^2(2x+1)}{x}-\frac{\log(x)}{x}\right)dx-x$$

input
```
Int[(1 + E^2 + 2*x^2 - Log[x] + (E^2*(-1 - 2*x) + 2*x^2 + x*Log[5] + Log[x
])*Log[(-2*x^2 + E^2*(1 + 2*x) - x*Log[5] - Log[x])/x])/(E^2*(-1 - 2*x) +
2*x^2 + x*Log[5] + Log[x]),x]
```

output
```
$Aborted
```

3.598. $\int \frac{1+e^2+2x^2-\log(x)+\left(e^2(-1-2x)+2x^2+x\log(5)+\log(x)\right)\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}dx$

3.598.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.598.4 Maple [A] (verified)

Time = 2.66 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

method	result
default	$\ln\left(\frac{2\,\mathrm{e}^{2}x-x\ln(5)-2x^{2}+\mathrm{e}^{2}-\ln(x)}{x}\right)x$
norman	$x\ln\left(\frac{-\ln(x)-x\ln(5)+(1+2x)\mathrm{e}^{2}-2x^{2}}{x}\right)$
parallelrisch	$x\ln\left(\frac{-\ln(x)-x\ln(5)+(1+2x)\mathrm{e}^{2}-2x^{2}}{x}\right)$
risch	$\frac{i\pi x\ \mathrm{csgn}\left(i\left(\left(\frac{1}{2}+x\right)\mathrm{e}^{2}-\frac{x\ln(5)}{2}-x^{2}-\frac{\ln(x)}{2}\right)\right)\mathrm{csgn}\left(\frac{i\left(\left(\frac{1}{2}+x\right)\mathrm{e}^{2}-\frac{x\ln(5)}{2}-x^{2}-\frac{\ln(x)}{2}\right)}{x}\right)^{2}}{2}+\frac{i\pi x\mathrm{csgn}\left(\frac{i\left(\left(\frac{1}{2}+x\right)\mathrm{e}^{2}-\frac{x\ln(5)}{2}-x^{2}-\right.}{x}\right.}{2}$

input
```
int(((ln(x)+x*ln(5)+(-1-2*x)*exp(2)+2*x^2)*ln((-ln(x)-x*ln(5)+(1+2*x)*exp(
2)-2*x^2)/x)-ln(x)+exp(2)+2*x^2+1)/(ln(x)+x*ln(5)+(-1-2*x)*exp(2)+2*x^2),x
,method=_RETURNVERBOSE)
```

output
```
ln((2*exp(2)*x-x*ln(5)-2*x^2+exp(2)-ln(x))/x)*x
```

3.598.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{1+e^2+2x^2-\log(x)+(e^2(-1-2x)+2x^2+x\log(5)+\log(x))\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$$
$$=x\log\left(-\frac{2\,x^2-(2\,x+1)e^2+x\log(5)+\log(x)}{x}\right)$$

input
```
integrate(((log(x)+x*log(5)+(-1-2*x)*exp(2)+2*x^2)*log((-log(x)-x*log(5)+(
1+2*x)*exp(2)-2*x^2)/x)-log(x)+exp(2)+2*x^2+1)/(log(x)+x*log(5)+(-1-2*x)*e
xp(2)+2*x^2),x, algorithm=\
```

output
```
x*log(-(2*x^2 - (2*x + 1)*e^2 + x*log(5) + log(x))/x)
```

3.598.6 Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{1+e^2+2x^2-\log(x)+(e^2(-1-2x)+2x^2+x\log(5)+\log(x))\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$$
$$=x\log\left(\frac{-2x^2-x\log(5)+(2x+1)e^2-\log(x)}{x}\right)$$

input
```
integrate(((ln(x)+x*ln(5)+(-1-2*x)*exp(2)+2*x**2)*ln((-ln(x)-x*ln(5)+(1+2*
x)*exp(2)-2*x**2)/x)-ln(x)+exp(2)+2*x**2+1)/(ln(x)+x*ln(5)+(-1-2*x)*exp(2)
+2*x**2),x)
```

output
```
x*log((-2*x**2 - x*log(5) + (2*x + 1)*exp(2) - log(x))/x)
```

3.598.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{1+e^2+2x^2-\log(x)+(e^2(-1-2x)+2x^2+x\log(5)+\log(x))\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$$
$$=x\log\left(-2x^2+x\left(2e^2-\log(5)\right)+e^2-\log(x)\right)-x\log(x)$$

input
```
integrate(((log(x)+x*log(5)+(-1-2*x)*exp(2)+2*x^2)*log((-log(x)-x*log(5)+(
1+2*x)*exp(2)-2*x^2)/x)-log(x)+exp(2)+2*x^2+1)/(log(x)+x*log(5)+(-1-2*x)*e
xp(2)+2*x^2),x, algorithm=\
```

output
```
x*log(-2*x^2 + x*(2*e^2 - log(5)) + e^2 - log(x)) - x*log(x)
```

3.598. $\int \frac{1+e^2+2x^2-\log(x)+(e^2(-1-2x)+2x^2+x\log(5)+\log(x))\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$

3.598.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{1+e^2+2x^2-\log(x)+(e^2(-1-2x)+2x^2+x\log(5)+\log(x))\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$$
$$= x\log\left(-2\,x^2+2\,xe^2-x\log(5)+e^2-\log(x)\right)-x\log(x)$$

input
```
integrate(((log(x)+x*log(5)+(-1-2*x)*exp(2)+2*x^2)*log((-log(x)-x*log(5)+(
1+2*x)*exp(2)-2*x^2)/x)-log(x)+exp(2)+2*x^2+1)/(log(x)+x*log(5)+(-1-2*x)*e
xp(2)+2*x^2),x, algorithm=\
```

output
```
x*log(-2*x^2 + 2*x*e^2 - x*log(5) + e^2 - log(x)) - x*log(x)
```

3.598.9 Mupad [B] (verification not implemented)

Time = 15.76 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{1+e^2+2x^2-\log(x)+(e^2(-1-2x)+2x^2+x\log(5)+\log(x))\log\left(\frac{-2x^2+e^2(1+2x)-x\log(5)-\log(x)}{x}\right)}{e^2(-1-2x)+2x^2+x\log(5)+\log(x)}\,dx$$
$$= x\,\ln\left(-\frac{\ln(x)+x\,\ln(5)+2\,x^2-\mathrm{e}^2\,(2\,x+1)}{x}\right)$$

input
```
int((exp(2) - log(x) + log(-(log(x) + x*log(5) + 2*x^2 - exp(2)*(2*x + 1))
/x)*(log(x) + x*log(5) + 2*x^2 - exp(2)*(2*x + 1)) + 2*x^2 + 1)/(log(x) +
x*log(5) + 2*x^2 - exp(2)*(2*x + 1)),x)
```

output
```
x*log(-(log(x) + x*log(5) + 2*x^2 - exp(2)*(2*x + 1))/x)
```

3.599 $\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx$

3.599.1 Optimal result

Integrand size = 22, antiderivative size = 15

$$\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx = -9-e^{5\log^4(x)}-4x$$

output
```
-4*x-exp(5*ln(x)^4)-9
```

3.599.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx = -4\left(\frac{1}{4}e^{5\log^4(x)}+x\right)$$

input
```
Integrate[(-4*x - 20*E^(5*Log[x]^4)*Log[x]^3)/x,x]
```

output
```
-4*(E^(5*Log[x]^4)/4 + x)
```

3.599.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-\frac{20e^{5\log^4(x)}\log^3(x)}{x}-4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-4x-e^{5\log^4(x)}$$

input
```
Int[(-4*x - 20*E^(5*Log[x]^4)*Log[x]^3)/x,x]
```

output
```
-E^(5*Log[x]^4) - 4*x
```

3.599.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.599.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

method	result	size
default	$-4x-\mathrm{e}^{5\ln(x)^4}$	14
norman	$-4x-\mathrm{e}^{5\ln(x)^4}$	14
risch	$-4x-\mathrm{e}^{5\ln(x)^4}$	14
parallelrisch	$-4x-\mathrm{e}^{5\ln(x)^4}$	14
parts	$-4x-\mathrm{e}^{5\ln(x)^4}$	14

input
```
int((-20*ln(x)^3*exp(5*ln(x)^4)-4*x)/x,x,method=_RETURNVERBOSE)
```

output
```
-4*x-exp(5*ln(x)^4)
```

3.599.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx=-4\,x-e^{\left(5\,\log(x)^4\right)}$$

input
```
integrate((-20*log(x)^3*exp(5*log(x)^4)-4*x)/x,x, algorithm=\
```

output
```
-4*x - e^(5*log(x)^4)
```

3.599.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx=-4x-e^{5\log{(x)}^4}$$

input
```
integrate((-20*ln(x)**3*exp(5*ln(x)**4)-4*x)/x,x)
```

output
```
-4*x - exp(5*log(x)**4)
```

3.599.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx = -4\,x - e^{\left(5\,\log(x)^4\right)}$$

input
```
integrate((-20*log(x)^3*exp(5*log(x)^4)-4*x)/x,x, algorithm=\
```

output
```
-4*x - e^(5*log(x)^4)
```

3.599.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx = -4\,x - e^{\left(5\,\log(x)^4\right)}$$

input
```
integrate((-20*log(x)^3*exp(5*log(x)^4)-4*x)/x,x, algorithm=\
```

output
```
-4*x - e^(5*log(x)^4)
```

3.599.9 Mupad [B] (verification not implemented)

Time = 13.75 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int \frac{-4x-20e^{5\log^4(x)}\log^3(x)}{x}\,dx = -4\,x - \mathrm{e}^{5\ln(x)^4}$$

input
```
int(-(4*x + 20*exp(5*log(x)^4)*log(x)^3)/x,x)
```

output
```
- 4*x - exp(5*log(x)^4)
```

3.600 $\int \frac{1+(-1+2x-e^x x)\log(x)}{x\log(x)}\,dx$

3.600.1 Optimal result

Integrand size = 24, antiderivative size = 17

$$\int \frac{1+(-1+2x-e^x x)\log(x)}{x\log(x)}\,dx = -13-e^x+2x-\log(x)+\log(\log(x))$$

output
```
2*x-13-ln(x)-exp(x)+ln(ln(x))
```

3.600.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{1+(-1+2x-e^x x)\log(x)}{x\log(x)}\,dx = -e^x+2x-\log(x)+\log(\log(x))$$

input
```
Integrate[(1 + (-1 + 2*x - E^x*x)*Log[x])/(x*Log[x]),x]
```

output
```
-E^x + 2*x - Log[x] + Log[Log[x]]
```

3.600.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-e^x x+2x-1)\log(x)+1}{x\log(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2x\log(x)-\log(x)+1}{x\log(x)}-e^x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2x-e^x-\log(x)+\log(\log(x))$$

input
```
Int[(1 + (-1 + 2*x - E^x*x)*Log[x])/(x*Log[x]),x]
```

output
```
-E^x + 2*x - Log[x] + Log[Log[x]]
```

3.600.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.600.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

method	result	size
default	$\ln(\ln(x)) + 2x - \ln(x) - e^x$	16
norman	$\ln(\ln(x)) + 2x - \ln(x) - e^x$	16
risch	$\ln(\ln(x)) + 2x - \ln(x) - e^x$	16
parallelrisch	$\ln(\ln(x)) + 2x - \ln(x) - e^x$	16
parts	$\ln(\ln(x)) + 2x - \ln(x) - e^x$	16

input
```
int(((-exp(x)*x+2*x-1)*ln(x)+1)/x/ln(x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(x))+2*x-ln(x)-exp(x)
```

3.600.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{1 + (-1 + 2x - e^x x)\log(x)}{x\log(x)}\,dx = 2\,x - e^x - \log(x) + \log(\log(x))$$

input
```
integrate(((-exp(x)*x+2*x-1)*log(x)+1)/x/log(x),x, algorithm=\
```

output
```
2*x - e^x - log(x) + log(log(x))
```

3.600.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{1 + (-1 + 2x - e^x x)\log(x)}{x\log(x)}\,dx = 2x - e^x - \log(x) + \log(\log(x))$$

input
```
integrate(((-exp(x)*x+2*x-1)*ln(x)+1)/x/ln(x),x)
```

output
```
2*x - exp(x) - log(x) + log(log(x))
```

3.600.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{1+(-1+2x-e^x x)\log(x)}{x\log(x)}\,dx = 2\,x - e^x - \log\left(x\right) + \log\left(\log\left(x\right)\right)$$

input
```
integrate(((-exp(x)*x+2*x-1)*log(x)+1)/x/log(x),x, algorithm=\
```

output
```
2*x - e^x - log(x) + log(log(x))
```

3.600.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{1+(-1+2x-e^x x)\log(x)}{x\log(x)}\,dx = 2\,x - e^x - \log\left(x\right) + \log\left(\log\left(x\right)\right)$$

input
```
integrate(((-exp(x)*x+2*x-1)*log(x)+1)/x/log(x),x, algorithm=\
```

output
```
2*x - e^x - log(x) + log(log(x))
```

3.600.9 Mupad [B] (verification not implemented)

Time = 15.34 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{1+(-1+2x-e^x x)\log(x)}{x\log(x)}\,dx = 2\,x + \ln\left(\ln\left(x\right)\right) - \mathrm{e}^x - \ln\left(x\right)$$

input
```
int(-(log(x)*(x*exp(x) - 2*x + 1) - 1)/(x*log(x)),x)
```

output
```
2*x + log(log(x)) - exp(x) - log(x)
```

3.601 $\int \frac{1}{x} dx$

3.601.1 Optimal result

Integrand size = 3, antiderivative size = 6

$$\int \frac{1}{x} dx = \log\left(\frac{8x}{7}\right)$$

output
```
ln(8/7*x)
```

3.601.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.33

$$\int \frac{1}{x} dx = \log(x)$$

input
```
Integrate[x^(-1),x]
```

output
```
Log[x]
```

3.601.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.33, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{x} \, dx$$

$$\Big\downarrow \; 14$$

$$\log(x)$$

input
```
Int[x^(-1),x]
```

output
```
Log[x]
```

3.601.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.601.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.50

method	result	size
default	$\ln(x)$	3
norman	$\ln(x)$	3
risch	$\ln(x)$	3
parallelrisch	$\ln(x)$	3

input
```
int(1/x,x,method=_RETURNVERBOSE)
```

output
```
ln(x)
```

3.601.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.33

$$\int \frac{1}{x} dx = \log(x)$$

input
```
integrate(1/x,x, algorithm=\
```

output
```
log(x)
```

3.601.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.33

$$\int \frac{1}{x} dx = \log(x)$$

input
```
integrate(1/x,x)
```

output
```
log(x)
```

3.601.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.33

$$\int \frac{1}{x} dx = \log(x)$$

input
```
integrate(1/x,x, algorithm=\
```

output
```
log(x)
```

3.601.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.50

$$\int \frac{1}{x}\,dx = \log(|x|)$$

input
```
integrate(1/x,x, algorithm=\
```

output
```
log(abs(x))
```

3.601.9 Mupad [B] (verification not implemented)

Time = 0.01 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.33

$$\int \frac{1}{x}\,dx = \ln(x)$$

input
```
int(1/x,x)
```

output
```
log(x)
```

3.602 $\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2\right)+e^{\frac{2(}{}}}{9x^2+6e^x x^2}$

3.602.1 Optimal result

Integrand size = 176, antiderivative size = 26

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^x x^2\right)}{3x+e^x x}}\left(-18x^2-12e^x x^2-\right.}{9x^2+6e^x x^2+e^{2x}x^2}$$
$$=\left(-3+e^{\frac{e^{21+x}}{(3+e^x)x}-x}\right)^2$$

output
```
(-3+exp(exp(x+21)/x/(3+exp(x))-x))^2
```

3.602.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 59 vs. 2(26) = 52.

Time = 0.31 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.27

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^x x^2\right)}{3x+e^x x}}\left(-18x^2-12e^x x^2-\right.}{9x^2+6e^x x^2+e^{2x}x^2}$$
$$=-e^{\frac{e^{21}\left(1-\frac{6}{3+e^x}\right)}{x}-2x}\left(-e^{\frac{e^{21}}{x}}+6e^{\frac{3e^{21}}{(3+e^x)x}+x}\right)$$

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^x x^2\right)}{3x+e^x x}}\left(-18x^2-12e^x x^2-2e^{2x}x^2+e^{21+x}(-6-2e^x+6x)\right)}{9x^2+6e^x x^2+e^{2x}x^2}\,dx$$

input
```
Integrate[(E^((E^(21 + x) - 3*x^2 - E^x*x^2)/(3*x + E^x*x))*(E^(21 + x)*(1
8 + 6*E^x - 18*x) + 54*x^2 + 36*E^x*x^2 + 6*E^(2*x)*x^2) + E^((2*(E^(21 +
x) - 3*x^2 - E^x*x^2))/(3*x + E^x*x))*(-18*x^2 - 12*E^x*x^2 - 2*E^(2*x)*x^
2 + E^(21 + x)*(-6 - 2*E^x + 6*x)))/(9*x^2 + 6*E^x*x^2 + E^(2*x)*x^2),x]
```

output
```
-(E^((E^21*(1 - 6/(3 + E^x)))/x - 2*x)*(-E^(E^21/x) + 6*E^((3*E^21)/((3 +
E^x)*x) + x)))
```

3.602.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-12e^xx^2-2e^{2x}x^2-18x^2+e^{x+21}(6x-2e^x-6)\right)\exp\left(\frac{2\left(-e^xx^2-3x^2+e^{x+21}\right)}{e^xx+3x}\right)+e^{\frac{-e^xx^2-3x^2+e^{x+21}}{e^xx+3x}}\left(36e^xx^2+6e^{2x}\right.}{6e^xx^2+e^{2x}x^2+9x^2}$$

$\big\downarrow$ 7292

$$\int \frac{2e^{\frac{e^{x+21}}{e^xx+3x}-2x}\left(-6e^xx^2-e^{2x}x^2-9x^2+3e^{x+21}x-3e^{x+21}-e^{2x+21}\right)\left(e^{\frac{e^{x+21}}{e^xx+3x}}-3\exp\left(\frac{e^xx^2}{e^xx+3x}+\frac{3x^2}{e^xx+3x}\right)\right)}{(e^x+3)^2x^2}dx$$

$\big\downarrow$ 27

$$2\int -\frac{e^{\frac{e^{x+21}}{e^xx+3x}-2x}\left(e^{\frac{e^{x+21}}{e^xx+3x}}-3\exp\left(\frac{e^xx^2}{e^xx+3x}+\frac{3x^2}{e^xx+3x}\right)\right)\left(6e^xx^2+e^{2x}x^2+9x^2-3e^{x+21}x+3e^{x+21}+e^{2x+21}\right)}{(3+e^x)^2x^2}dx$$

$\big\downarrow$ 25

$$-2\int \frac{e^{\frac{e^{x+21}}{e^xx+3x}-2x}\left(e^{\frac{e^{x+21}}{e^xx+3x}}-3\exp\left(\frac{e^xx^2}{e^xx+3x}+\frac{3x^2}{e^xx+3x}\right)\right)\left(6e^xx^2+e^{2x}x^2+9x^2-3e^{x+21}x+3e^{x+21}+e^{2x+21}\right)}{(3+e^x)^2x^2}dx$$

$\big\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{2e^{x+21}}{e^xx+3x}-2x}\left(6e^xx^2+e^{2x}x^2+9x^2-3e^{x+21}x+3e^{x+21}+e^{2x+21}\right)}{(3+e^x)^2x^2}-\frac{3e^{\frac{e^{x+21}}{e^xx+3x}-x}\left(6e^xx^2+e^{2x}x^2+9x^2-3e^x\right.}{(3+e^x)^2x^2}\right.$$

$\big\downarrow$ 2009

$$\int e^{\frac{e^{21+x}-3x^2-e^xx^2}{3x+e^xx}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^xx^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^xx^2\right)}{3x+e^xx}}\left(-18x^2-12e^xx^2-2e^{2x}x^2+e^{21+x}(-6-2e^x+6x)\right)dx$$

$$-2\left(-3\int \frac{e^{-x+\frac{e^{x+21}}{e^x x+3x}+21}}{x^2}dx+\int \frac{e^{-2x+\frac{2e^{x+21}}{e^x x+3x}+21}}{x^2}dx+9\int \frac{e^{-x+\frac{e^{x+21}}{e^x x+3x}+21}}{(3+e^x)\,x^2}dx-3\int \frac{e^{-2x+\frac{2e^{x+21}}{e^x x+3x}+21}}{(3+e^x)\,x^2}dx-3\int e^{\frac{e^x}{e^x x}}\right.$$

input
```
Int[(E^((E^(21 + x) - 3*x^2 - E^x*x^2)/(3*x + E^x*x))*(E^(21 + x)*(18 + 6*
E^x - 18*x) + 54*x^2 + 36*E^x*x^2 + 6*E^(2*x)*x^2) + E^((2*(E^(21 + x) - 3
*x^2 - E^x*x^2))/(3*x + E^x*x))*(-18*x^2 - 12*E^x*x^2 - 2*E^(2*x)*x^2 + E^
(21 + x)*(-6 - 2*E^x + 6*x)))/(9*x^2 + 6*E^x*x^2 + E^(2*x)*x^2),x]
```

output
```
$Aborted
```

3.602.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```


$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^x x^2\right)}{3x+e^x x}}\left(-18x^2-12e^x x^2-2e^{2x}x^2+e^{21+x}(-6-2e^x+6x)\right)}{9x^2+6e^x x^2+e^{2x}x^2}\,dx$$

3.602.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(23) = 46$.

Time = 5.62 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.46

method	result	size
risch	$\mathrm{e}^{-\frac{2\left(\mathrm{e}^{x} x^{2}+3 x^{2}-\mathrm{e}^{x+21}\right)}{x\left(3+\mathrm{e}^{x}\right)}}-6 \,\mathrm{e}^{-\frac{\mathrm{e}^{x} x^{2}+3 x^{2}-\mathrm{e}^{x+21}}{x\left(3+\mathrm{e}^{x}\right)}}$	64
parallelrisch	$\mathrm{e}^{-\frac{2\left(\mathrm{e}^{x} x^{2}+3 x^{2}-\mathrm{e}^{x+21}\right)}{x\left(3+\mathrm{e}^{x}\right)}}-6 \,\mathrm{e}^{-\frac{\mathrm{e}^{x} x^{2}+3 x^{2}-\mathrm{e}^{x+21}}{x\left(3+\mathrm{e}^{x}\right)}}$	66
norman	$\frac{\mathrm{e}^{x} x \,\mathrm{e}^{\frac{2 \,\mathrm{e}^{x+21}-2 \,\mathrm{e}^{x} x^{2}-6 x^{2}}{\mathrm{e}^{x} x+3 x}}-18 x \,\mathrm{e}^{\frac{\mathrm{e}^{x} \mathrm{e}^{21}-\mathrm{e}^{x} x^{2}-3 x^{2}}{\mathrm{e}^{x} x+3 x}}+3 x \,\mathrm{e}^{\frac{2 \,\mathrm{e}^{x+21}-2 \,\mathrm{e}^{x} x^{2}-6 x^{2}}{\mathrm{e}^{x} x+3 x}}-6 \,\mathrm{e}^{x} x \,\mathrm{e}^{\frac{\mathrm{e}^{x} \mathrm{e}^{21}-\mathrm{e}^{x} x^{2}-3 x^{2}}{\mathrm{e}^{x} x+3 x}}}{x\left(3+\mathrm{e}^{x}\right)}$	151

input
```
int((((-2*exp(x)+6*x-6)*exp(x+21)-2*exp(x)^2*x^2-12*exp(x)*x^2-18*x^2)*exp
((exp(x+21)-exp(x)*x^2-3*x^2)/(exp(x)*x+3*x))^2+((6*exp(x)-18*x+18)*exp(x+
21)+6*exp(x)^2*x^2+36*exp(x)*x^2+54*x^2)*exp((exp(x+21)-exp(x)*x^2-3*x^2)/
(exp(x)*x+3*x)))/(exp(x)^2*x^2+6*exp(x)*x^2+9*x^2),x,method=_RETURNVERBOSE
)
```

output
```
exp(-2*(exp(x)*x^2+3*x^2-exp(x+21))/x/(3+exp(x)))-6*exp(-(exp(x)*x^2+3*x^2
-exp(x+21))/x/(3+exp(x)))
```

3.602.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 79 vs. $2(23) = 46$.

Time = 0.25 (sec) , antiderivative size = 79, normalized size of antiderivative = 3.04

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^xx^2}{3x+e^xx}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^xx^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^xx^2\right)}{3x+e^xx}}\left(-18x^2-12e^xx^2-\right.}{9x^2+6e^xx^2+e^{2x}x^2}$$
$$= -6\, e^{\left(-\frac{3\,x^{2}e^{21}+\left(x^{2}-e^{21}\right)e^{(x+21)}}{3\,xe^{21}+xe^{(x+21)}}\right)}+e^{\left(-\frac{2\left(3\,x^{2}e^{21}+\left(x^{2}-e^{21}\right)e^{(x+21)}\right)}{3\,xe^{21}+xe^{(x+21)}}\right)}$$

input
```
integrate((((-2*exp(x)+6*x-6)*exp(x+21)-2*exp(x)^2*x^2-12*exp(x)*x^2-18*x^
2)*exp((exp(x+21)-exp(x)*x^2-3*x^2)/(exp(x)*x+3*x))^2+((6*exp(x)-18*x+18)*
exp(x+21)+6*exp(x)^2*x^2+36*exp(x)*x^2+54*x^2)*exp((exp(x+21)-exp(x)*x^2-3
*x^2)/(exp(x)*x+3*x)))/(exp(x)^2*x^2+6*exp(x)*x^2+9*x^2),x, algorithm=\
```

output
```
-6*e^(-(3*x^2*e^21 + (x^2 - e^21)*e^(x + 21))/(3*x*e^21 + x*e^(x + 21))) +
 e^(-2*(3*x^2*e^21 + (x^2 - e^21)*e^(x + 21))/(3*x*e^21 + x*e^(x + 21)))
```

3.602.

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^xx^2}{3x+e^xx}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^xx^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^xx^2\right)}{3x+e^xx}}\left(-18x^2-12e^xx^2-2e^{2x}x^2+e^{21+x}(-6-2e^x+6x)\right)}{9x^2+6e^xx^2+e^{2x}x^2}\,dx$$

3.602.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(17) = 34.

Time = 0.41 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.35

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^x x^2\right)}{3x+e^x x}}\left(-18x^2-12e^x x^2-\right.}{9x^2+6e^x x^2+e^{2x}x^2}$$
$$= e^{\frac{2\left(-x^2e^x-3x^2+e^{21}e^x\right)}{xe^x+3x}}-6e^{\frac{-x^2e^x-3x^2+e^{21}e^x}{xe^x+3x}}$$

input
```
integrate((((-2*exp(x)+6*x-6)*exp(x+21)-2*exp(x)**2*x**2-12*exp(x)*x**2-18
*x**2)*exp((exp(x+21)-exp(x)*x**2-3*x**2)/(exp(x)*x+3*x))**2+((6*exp(x)-18
*x+18)*exp(x+21)+6*exp(x)**2*x**2+36*exp(x)*x**2+54*x**2)*exp((exp(x+21)-e
xp(x)*x**2-3*x**2)/(exp(x)*x+3*x)))/(exp(x)**2*x**2+6*exp(x)*x**2+9*x**2),
x)
```

output
```
exp(2*(-x**2*exp(x) - 3*x**2 + exp(21)*exp(x))/(x*exp(x) + 3*x)) - 6*exp((
-x**2*exp(x) - 3*x**2 + exp(21)*exp(x))/(x*exp(x) + 3*x))
```

3.602.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. 2(23) = 46.

Time = 0.36 (sec) , antiderivative size = 82, normalized size of antiderivative = 3.15

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^x x^2\right)}{3x+e^x x}}\left(-18x^2-12e^x x^2-\right.}{9x^2+6e^x x^2+e^{2x}x^2}$$
$$= -\left(6\,e^{\left(\frac{xe^x}{e^x+3}+\frac{3\,x}{e^x+3}+\frac{e^{(x+21)}}{xe^x+3\,x}\right)}-e^{\left(\frac{2\,e^{(x+21)}}{xe^x+3\,x}\right)}\right)e^{\left(-\frac{2\,xe^x}{e^x+3}-\frac{6\,x}{e^x+3}\right)}$$

input
```
integrate((((-2*exp(x)+6*x-6)*exp(x+21)-2*exp(x)^2*x^2-12*exp(x)*x^2-18*x^
2)*exp((exp(x+21)-exp(x)*x^2-3*x^2)/(exp(x)*x+3*x))^2+((6*exp(x)-18*x+18)*
exp(x+21)+6*exp(x)^2*x^2+36*exp(x)*x^2+54*x^2)*exp((exp(x+21)-exp(x)*x^2-3
*x^2)/(exp(x)*x+3*x)))/(exp(x)^2*x^2+6*exp(x)*x^2+9*x^2),x, algorithm=\
```

output
```
-(6*e^(x*e^x/(e^x + 3) + 3*x/(e^x + 3) + e^(x + 21)/(x*e^x + 3*x)) - e^(2*
e^(x + 21)/(x*e^x + 3*x)))*e^(-2*x*e^x/(e^x + 3) - 6*x/(e^x + 3))
```

3.602.

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}\left(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2\right)+e^{\frac{2\left(e^{21+x}-3x^2-e^x x^2\right)}{3x+e^x x}}\left(-18x^2-12e^x x^2-2e^{2x}x^2+e^{21+x}(-6-2e^x+6x)\right)}{9x^2+6e^x x^2+e^{2x}x^2}\,dx$$

3.602.8 Giac [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2)+e^{\frac{2(e^{21+x}-3x^2-e^x x^2)}{3x+e^x x}}(-18x^2-12e^x x^2-}{9x^2+6e^x x^2+e^{2x}x^2}$$
$= \text{Exception raised: TypeError}$

input
```
integrate((((-2*exp(x)+6*x-6)*exp(x+21)-2*exp(x)^2*x^2-12*exp(x)*x^2-18*x^
2)*exp((exp(x+21)-exp(x)*x^2-3*x^2)/(exp(x)*x+3*x))^2+((6*exp(x)-18*x+18)*
exp(x+21)+6*exp(x)^2*x^2+36*exp(x)*x^2+54*x^2)*exp((exp(x+21)-exp(x)*x^2-3
*x^2)/(exp(x)*x+3*x)))/(exp(x)^2*x^2+6*exp(x)*x^2+9*x^2),x, algorithm=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:Unable to divide, perhaps due to ro
unding error%%%{-7776,[2,0,26,24]%%%}+%%%{-606528,[2,0,25,24]%%%}+%%%{-227
44800,[2,
```

3.602.9 Mupad [B] (verification not implemented)

Time = 15.16 (sec) , antiderivative size = 103, normalized size of antiderivative = 3.96

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2)+e^{\frac{2(e^{21+x}-3x^2-e^x x^2)}{3x+e^x x}}(-18x^2-12e^x x^2-}{9x^2+6e^x x^2+e^{2x}x^2}$$
$$= e^{\frac{e^{21}e^x}{3x+xe^x}}e^{-\frac{2x^2e^x}{3x+xe^x}}e^{-\frac{6x^2}{3x+xe^x}}\left(e^{\frac{e^{21}e^x}{3x+xe^x}}-6e^{\frac{x^2e^x}{3x+xe^x}}e^{\frac{3x^2}{3x+xe^x}}\right)$$

input
```
int(-(exp(-(2*(x^2*exp(x) - exp(x + 21) + 3*x^2))/(3*x + x*exp(x)))*(exp(x
 + 21)*(2*exp(x) - 6*x + 6) + 12*x^2*exp(x) + 2*x^2*exp(2*x) + 18*x^2) - e
xp(-(x^2*exp(x) - exp(x + 21) + 3*x^2)/(3*x + x*exp(x)))*(exp(x + 21)*(6*e
xp(x) - 18*x + 18) + 36*x^2*exp(x) + 6*x^2*exp(2*x) + 54*x^2))/(6*x^2*exp(
x) + x^2*exp(2*x) + 9*x^2),x)
```

output
```
exp((exp(21)*exp(x))/(3*x + x*exp(x)))*exp(-(2*x^2*exp(x))/(3*x + x*exp(x)
))*exp(-(6*x^2)/(3*x + x*exp(x)))*(exp((exp(21)*exp(x))/(3*x + x*exp(x)))
- 6*exp((x^2*exp(x))/(3*x + x*exp(x)))*exp((3*x^2)/(3*x + x*exp(x))))
```

3.602.

$$\int \frac{e^{\frac{e^{21+x}-3x^2-e^x x^2}{3x+e^x x}}(e^{21+x}(18+6e^x-18x)+54x^2+36e^x x^2+6e^{2x}x^2)+e^{\frac{2(e^{21+x}-3x^2-e^x x^2)}{3x+e^x x}}(-18x^2-12e^x x^2-2e^{2x}x^2+e^{21+x}(-6-2e^x+6x))}{9x^2+6e^x x^2+e^{2x}x^2}\,dx$$

3.603 $\int \frac{-375+300x-64x^2+(-125+100x-20x^2)\log(4)}{25x^2-20x^3+4x^4}\,dx$

3.603.1 Optimal result

Integrand size = 42, antiderivative size = 24

$$\int \frac{-375+300x-64x^2+(-125+100x-20x^2)\log(4)}{25x^2-20x^3+4x^4}\,dx = -2+\frac{1+x+\frac{5}{-5+2x}+5(3+\log(4))}{x}$$

output
```
(5/(-5+2*x)+x+16+10*ln(2))/x-2
```

3.603.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{-375+300x-64x^2+(-125+100x-20x^2)\log(4)}{25x^2-20x^3+4x^4}\,dx = \frac{2}{-5+2x}+\frac{5(3+\log(4))}{x}$$

input
```
Integrate[(-375 + 300*x - 64*x^2 + (-125 + 100*x - 20*x^2)*Log[4])/(25*x^2
 - 20*x^3 + 4*x^4),x]
```

output
```
2/(-5 + 2*x) + (5*(3 + Log[4]))/x
```

3.603.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2026, 2084, 1331, 27, 1195, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-64x^2+\left(-20x^2+100x-125\right)\log(4)+300x-375}{4x^4-20x^3+25x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-64x^2+\left(-20x^2+100x-125\right)\log(4)+300x-375}{x^2\left(4x^2-20x+25\right)}dx$$

$$\Big\downarrow \text{2084}$$

$$\int \frac{-4x^2(16+5\log(4))+100x(3+\log(4))-125(3+\log(4))}{x^2\left(4x^2-20x+25\right)}dx$$

$$\Big\downarrow \text{1331}$$

$$4\int -\frac{4(16+5\log(4))x^2-100(3+\log(4))x+125(3+\log(4))}{4(5-2x)^2x^2}dx$$

$$\Big\downarrow \text{27}$$

$$-\int \frac{4(16+5\log(4))x^2-100(3+\log(4))x+125(3+\log(4))}{(5-2x)^2x^2}dx$$

$$\Big\downarrow \text{1195}$$

$$-\int \left(\frac{4}{(2x-5)^2}+\frac{5(3+\log(4))}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{5(3+\log(4))}{x}-\frac{2}{5-2x}$$

input
```
Int[(-375 + 300*x - 64*x^2 + (-125 + 100*x - 20*x^2)*Log[4])/(25*x^2 - 20*
x^3 + 4*x^4),x]
```

output
```
-2/(5 - 2*x) + (5*(3 + Log[4]))/x
```

3.603.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1195
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_.) + (b_.)*(x
_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(f +
 g*x)^n*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x
] && IGtQ[p, 0]
```

rule 1331
```
Int[((g_.) + (h_.)*(x_))^(m_.)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.)*((d
_.) + (e_.)*(x_) + (f_.)*(x_)^2)^(q_.), x_Symbol] :> Simp[1/c^p   Int[(g +
h*x)^m*(b/2 + c*x)^(2*p)*(d + e*x + f*x^2)^q, x], x] /; FreeQ[{a, b, c, d,
e, f, g, h, m, q}, x] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2084
```
Int[(u_)^(p_.)*(v_)^(q_.)*(z_)^(m_.), x_Symbol] :> Int[ExpandToSum[z, x]^m*
ExpandToSum[u, x]^p*ExpandToSum[v, x]^q, x] /; FreeQ[{m, p, q}, x] && Linea
rQ[z, x] && QuadraticQ[{u, v}, x] &&  !(LinearMatchQ[z, x] && QuadraticMatc
hQ[{u, v}, x]) &&  !MatchQ[z^m*u^p*v^q, ((d_.) + (e_.)*x)^m*((f_.) + (g_.)*
x)^2*((a_.) + (b_.)*x + (c_.)*x^2)^(t_.) /; FreeQ[{a, b, c, d, e, f, g, t},
 x]] &&  !MatchQ[z^m*u^p*v^q, ((d_.) + (e_.)*x)^m*((f_.) + (g_.)*x)^2*((a_.
) + (c_.)*x^2)^(t_.) /; FreeQ[{a, c, d, e, f, g, t}, x]]
```

3.603. $\int \frac{-375+300x-64x^2+(-125+100x-20x^2)\log(4)}{25x^2-20x^3+4x^4}\,dx$

3.603.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

method	result	size
default	$-\frac{-10\ln(2)-15}{x}+\frac{2}{-5+2x}$	22
gosper	$\frac{20x\ln(2)-50\ln(2)+32x-75}{x(-5+2x)}$	26
norman	$\frac{(20\ln(2)+32)x-50\ln(2)-75}{x(-5+2x)}$	26
risch	$\frac{2(10\ln(2)+16)x-50\ln(2)-75}{x(-5+2x)}$	27
parallelrisch	$\frac{-150+40x\ln(2)-100\ln(2)+64x}{2x(-5+2x)}$	27

input
```
int((2*(-20*x^2+100*x-125)*ln(2)-64*x^2+300*x-375)/(4*x^4-20*x^3+25*x^2),x
,method=_RETURNVERBOSE)
```

output
```
-(-10*ln(2)-15)/x+2/(-5+2*x)
```

3.603.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{-375+300x-64x^2+(-125+100x-20x^2)\log(4)}{25x^2-20x^3+4x^4}\,dx=\frac{10\,(2\,x-5)\log{(2)}+32\,x-75}{2\,x^2-5\,x}$$

input
```
integrate((2*(-20*x^2+100*x-125)*log(2)-64*x^2+300*x-375)/(4*x^4-20*x^3+25
*x^2),x, algorithm=\
```

output
```
(10*(2*x - 5)*log(2) + 32*x - 75)/(2*x^2 - 5*x)
```

3.603.6 Sympy [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{-375+300x-64x^2+(-125+100x-20x^2)\log(4)}{25x^2-20x^3+4x^4}\,dx = -\frac{x(-32-20\log(2))+50\log(2)+75}{2x^2-5x}$$

input
```
integrate((2*(-20*x**2+100*x-125)*ln(2)-64*x**2+300*x-375)/(4*x**4-20*x**3
+25*x**2),x)
```

output
```
-(x*(-32 - 20*log(2)) + 50*log(2) + 75)/(2*x**2 - 5*x)
```

3.603.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{-375+300x-64x^2+(-125+100x-20x^2)\log(4)}{25x^2-20x^3+4x^4}\,dx = \frac{4\,x(5\,\log(2)+8)-50\,\log(2)-75}{2\,x^2-5\,x}$$

input
```
integrate((2*(-20*x^2+100*x-125)*log(2)-64*x^2+300*x-375)/(4*x^4-20*x^3+25
*x^2),x, algorithm=\
```

output
```
(4*x*(5*log(2) + 8) - 50*log(2) - 75)/(2*x^2 - 5*x)
```

3.603.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{-375+300x-64x^2+(-125+100x-20x^2)\log(4)}{25x^2-20x^3+4x^4}\,dx = \frac{20\,x\log(2)+32\,x-50\,\log(2)-75}{2\,x^2-5\,x}$$

input
```
integrate((2*(-20*x^2+100*x-125)*log(2)-64*x^2+300*x-375)/(4*x^4-20*x^3+25
*x^2),x, algorithm=\
```

output
```
(20*x*log(2) + 32*x - 50*log(2) - 75)/(2*x^2 - 5*x)
```

3.603.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{-375 + 300x - 64x^2 + (-125 + 100x - 20x^2)\log(4)}{25x^2 - 20x^3 + 4x^4}\,dx = \frac{10\,\ln(2) + 15}{x} + \frac{2}{2\,x - 5}$$

input
```
int(-(2*log(2)*(20*x^2 - 100*x + 125) - 300*x + 64*x^2 + 375)/(25*x^2 - 20
*x^3 + 4*x^4),x)
```

output
```
(10*log(2) + 15)/x + 2/(2*x - 5)
```

3.604 $\int \frac{4x^2-2e^x x^2+3x^3+x^4+(x^2+x^3)\log(9)+(-2x^2-2x\log(9)+e^x(2x^2+2x$

3.604.1 Optimal result

Integrand size = 170, antiderivative size = 33

$$\int \frac{4x^2-2e^x x^2+3x^3+x^4+(x^2+x^3)\log(9)+(-2x^2-2x\log(9)+e^x(2x^2+2x\log(9)))\log(x+\log(9))+}{-2x^3-x^4+(-2x^2-x}$$
$$=5-\frac{\left(x-\log\left(\frac{1}{5}(-2+e^x-x)\right)\right)(x+2\log(x+\log(9)))}{x}$$

output
```
5-(x+2*ln(2*ln(3)+x))/x*(x-ln(1/5*exp(x)-2/5-1/5*x))
```

3.604.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.30

$$\int \frac{4x^2-2e^x x^2+3x^3+x^4+(x^2+x^3)\log(9)+(-2x^2-2x\log(9)+e^x(2x^2+2x\log(9)))\log(x+\log(9))+}{-2x^3-x^4+(-2x^2-x}$$
$$=-x+\log(2-e^x+x)-2\log(x+\log(9))+\frac{2\log\left(\frac{1}{5}(-2+e^x-x)\right)\log(x+\log(9))}{x}$$

input
```
Integrate[(4*x^2 - 2*E^x*x^2 + 3*x^3 + x^4 + (x^2 + x^3)*Log[9] + (-2*x^2
- 2*x*Log[9] + E^x*(2*x^2 + 2*x*Log[9]))*Log[x + Log[9]] + Log[(-2 + E^x -
 x)/5]*(-4*x + 2*E^x*x - 2*x^2 + (4*x + 2*x^2 + E^x*(-2*x - 2*Log[9]) + (4
 + 2*x)*Log[9])*Log[x + Log[9]]))/(-2*x^3 - x^4 + (-2*x^2 - x^3)*Log[9] +
E^x*(x^3 + x^2*Log[9])),x]
```

3.604.

$$\int \frac{4x^2-2e^x x^2+3x^3+x^4+(x^2+x^3)\log(9)+(-2x^2-2x\log(9)+e^x(2x^2+2x\log(9)))\log(x+\log(9))+\log\left(\frac{1}{5}(-2+e^x-x)\right)(-4x+2e^x x-2x^2+(4x+2x^2+}{-2x^3-x^4+(-2x^2-x^3)\log(9)+e^x(x^3+x^2\log(9))}$$

output
```
-x + Log[2 - E^x + x] - 2*Log[x + Log[9]] + (2*Log[(-2 + E^x - x)/5]*Log[x
 + Log[9]])/x
```

3.604.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4+3x^3-2e^x x^2+4x^2+\left(-2x^2+e^x\left(2x^2+2x\log(9)\right)-2x\log(9)\right)\log(x+\log(9))+\log\left(\frac{1}{5}(-x+e^x-2)\right)(-}{-x^4-2x^3+e^x\left(x^3+x^2\log(\right.}$$

$$\Big\downarrow \ 7239$$

$$\int \frac{2(-x+e^x-2)\log\left(\frac{1}{5}(-x+e^x-2)\right)\left((x+\log(9))\log(x+\log(9))-x\right)-x\left(x\left(x^2-2e^x+x(3+\log(9))+4+\right.\right.}{x^2\left(x-e^x+2\right)\left(x+\log(9)\right)}$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{2(x-\log(-x+e^x-2)+\log(5))\left(-x+x\log(x+\log(9))+\log(9)\log(x+\log(9))\right)}{x^2(x+\log(9))}+\frac{(x+1)(x+2\log(x+}{(-x+e^x-2)\,x}\right.$$

$$\Big\downarrow \ 2009$$

$$\int \frac{1}{-x+e^x-2}dx+\int \frac{x}{-x+e^x-2}dx+\frac{2\log(-x+e^x-2)\log(x+\log(9))}{x}-\frac{2\log(5)\log(x+\log(9))}{\log(9)}-\frac{2\log\left(\frac{9}{5}\right)\log(x+\log(9))}{\log(9)}-\frac{2\log(5)\log(x+\log(9))}{x}$$

input
```
Int[(4*x^2 - 2*E^x*x^2 + 3*x^3 + x^4 + (x^2 + x^3)*Log[9] + (-2*x^2 - 2*x*
Log[9] + E^x*(2*x^2 + 2*x*Log[9]))*Log[x + Log[9]] + Log[(-2 + E^x - x)/5]
*(-4*x + 2*E^x*x - 2*x^2 + (4*x + 2*x^2 + E^x*(-2*x - 2*Log[9]) + (4 + 2*x
)*Log[9])*Log[x + Log[9]]))/(-2*x^3 - x^4 + (-2*x^2 - x^3)*Log[9] + E^x*(x
^3 + x^2*Log[9])),x]
```

output
```
$Aborted
```

3.604.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.604.4 Maple [A] (verified)

Time = 3.84 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.33

method	result	size
risch	$\frac{2\ln(2\ln(3)+x)\ln\left(\frac{e^x}{5}-\frac{2}{5}-\frac{x}{5}\right)}{x}-2\ln(2\ln(3)+x)-x+\ln(e^x-2-x)$	44
parallelrisch	$\frac{4x\ln(3)-x^2-2\ln(2\ln(3)+x)x+\ln\left(\frac{e^x}{5}-\frac{2}{5}-\frac{x}{5}\right)x+2\ln\left(\frac{e^x}{5}-\frac{2}{5}-\frac{x}{5}\right)\ln(2\ln(3)+x)}{x}$	57

input
```
int(((((-4*ln(3)-2*x)*exp(x)+2*(4+2*x)*ln(3)+2*x^2+4*x)*ln(2*ln(3)+x)+2*ex
p(x)*x-2*x^2-4*x)*ln(1/5*exp(x)-2/5-1/5*x)+((4*x*ln(3)+2*x^2)*exp(x)-4*x*l
n(3)-2*x^2)*ln(2*ln(3)+x)-2*exp(x)*x^2+2*(x^3+x^2)*ln(3)+x^4+3*x^3+4*x^2)/
((2*x^2*ln(3)+x^3)*exp(x)+2*(-x^3-2*x^2)*ln(3)-x^4-2*x^3),x,method=_RETURN
VERBOSE)
```

output
```
2/x*ln(2*ln(3)+x)*ln(1/5*exp(x)-2/5-1/5*x)-2*ln(2*ln(3)+x)-x+ln(exp(x)-2-x
)
```

3.604.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.27

$$\int \frac{4x^2 - 2e^x x^2 + 3x^3 + x^4 + (x^2 + x^3)\log(9) + (-2x^2 - 2x\log(9) + e^x(2x^2 + 2x\log(9)))\log(x + \log(9)) +}{-2x^3 - x^4 + (-2x^2 - }$$

$$= -\frac{x^2 + 2\,x\log\left(x + 2\,\log\left(3\right)\right) - \left(x + 2\,\log\left(x + 2\,\log\left(3\right)\right)\right)\log\left(-\frac{1}{5}\,x + \frac{1}{5}\,e^x - \frac{2}{5}\right)}{x}$$

input
```
integrate(((((-4*log(3)-2*x)*exp(x)+2*(4+2*x)*log(3)+2*x^2+4*x)*log(2*log(
3)+x)+2*exp(x)*x-2*x^2-4*x)*log(1/5*exp(x)-2/5-1/5*x)+((4*x*log(3)+2*x^2)*
exp(x)-4*x*log(3)-2*x^2)*log(2*log(3)+x)-2*exp(x)*x^2+2*(x^3+x^2)*log(3)+x
^4+3*x^3+4*x^2)/((2*x^2*log(3)+x^3)*exp(x)+2*(-x^3-2*x^2)*log(3)-x^4-2*x^3
),x, algorithm=\
```

output
```
-(x^2 + 2*x*log(x + 2*log(3)) - (x + 2*log(x + 2*log(3)))*log(-1/5*x + 1/5
*e^x - 2/5))/x
```

3.604.6 Sympy [A] (verification not implemented)

Time = 0.55 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.33

$$\int \frac{4x^2 - 2e^x x^2 + 3x^3 + x^4 + (x^2 + x^3)\log(9) + (-2x^2 - 2x\log(9) + e^x(2x^2 + 2x\log(9)))\log(x + \log(9)) +}{-2x^3 - x^4 + (-2x^2 - }$$

$$= -x - 2\log\left(x + 2\log\left(3\right)\right) + \log\left(-x + e^x - 2\right) + \frac{2\log\left(x + 2\log\left(3\right)\right)\log\left(-\frac{x}{5} + \frac{e^x}{5} - \frac{2}{5}\right)}{x}$$

input
```
integrate(((((-4*ln(3)-2*x)*exp(x)+2*(4+2*x)*ln(3)+2*x**2+4*x)*ln(2*ln(3)+
x)+2*exp(x)*x-2*x**2-4*x)*ln(1/5*exp(x)-2/5-1/5*x)+((4*x*ln(3)+2*x**2)*exp
(x)-4*x*ln(3)-2*x**2)*ln(2*ln(3)+x)-2*exp(x)*x**2+2*(x**3+x**2)*ln(3)+x**4
+3*x**3+4*x**2)/((2*x**2*ln(3)+x**3)*exp(x)+2*(-x**3-2*x**2)*ln(3)-x**4-2*
x**3),x)
```

output
```
-x - 2*log(x + 2*log(3)) + log(-x + exp(x) - 2) + 2*log(x + 2*log(3))*log(
-x/5 + exp(x)/5 - 2/5)/x
```

3.604.

$$\int \frac{4x^2-2e^x x^2+3x^3+x^4+(x^2+x^3)\log(9)+(-2x^2-2x\log(9)+e^x(2x^2+2x\log(9)))\log(x+\log(9))+\log\left(\frac{1}{5}(-2+e^x-x)\right)(-4x+2e^x x-2x^2+(4x+2x^2+}{-2x^3-x^4+(-2x^2-x^3)\log(9)+e^x(x^3+x^2\log(9))}$$

3.604.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.30

$$\int \frac{4x^2-2e^x x^2+3x^3+x^4+(x^2+x^3)\log(9)+(-2x^2-2x\log(9)+e^x(2x^2+2x\log(9)))\log(x+\log(9))+}{-2x^3-x^4+(-2x^2-}$$
$$=-\frac{x^2+2\,(x+\log(5))\log(x+2\,\log(3))-(x+2\,\log(x+2\,\log(3)))\log(-x+e^x-2)}{x}$$

input
```
integrate(((((-4*log(3)-2*x)*exp(x)+2*(4+2*x)*log(3)+2*x^2+4*x)*log(2*log(
3)+x)+2*exp(x)*x-2*x^2-4*x)*log(1/5*exp(x)-2/5-1/5*x)+((4*x*log(3)+2*x^2)*
exp(x)-4*x*log(3)-2*x^2)*log(2*log(3)+x)-2*exp(x)*x^2+2*(x^3+x^2)*log(3)+x
^4+3*x^3+4*x^2)/((2*x^2*log(3)+x^3)*exp(x)+2*(-x^3-2*x^2)*log(3)-x^4-2*x^3
),x, algorithm=\
```

output
```
-(x^2 + 2*(x + log(5))*log(x + 2*log(3)) - (x + 2*log(x + 2*log(3)))*log(-
x + e^x - 2))/x
```

3.604.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.76

$$\int \frac{4x^2-2e^x x^2+3x^3+x^4+(x^2+x^3)\log(9)+(-2x^2-2x\log(9)+e^x(2x^2+2x\log(9)))\log(x+\log(9))+}{-2x^3-x^4+(-2x^2-}$$
$$=-\frac{x^2-x\log(x-e^x+2)+2\,x\log(x+2\,\log(3))+2\,\log(5)\log(x+2\,\log(3))-2\,\log(x+2\,\log(3))\log}{x}$$

input
```
integrate(((((-4*log(3)-2*x)*exp(x)+2*(4+2*x)*log(3)+2*x^2+4*x)*log(2*log(
3)+x)+2*exp(x)*x-2*x^2-4*x)*log(1/5*exp(x)-2/5-1/5*x)+((4*x*log(3)+2*x^2)*
exp(x)-4*x*log(3)-2*x^2)*log(2*log(3)+x)-2*exp(x)*x^2+2*(x^3+x^2)*log(3)+x
^4+3*x^3+4*x^2)/((2*x^2*log(3)+x^3)*exp(x)+2*(-x^3-2*x^2)*log(3)-x^4-2*x^3
),x, algorithm=\
```

output
```
-(x^2 - x*log(x - e^x + 2) + 2*x*log(x + 2*log(3)) + 2*log(5)*log(x + 2*lo
g(3)) - 2*log(x + 2*log(3))*log(-x + e^x - 2))/x
```

3.604.9 Mupad [F(-1)]

Timed out.

$$\int \frac{4x^2 - 2e^x x^2 + 3x^3 + x^4 + (x^2 + x^3)\log(9) + (-2x^2 - 2x\log(9) + e^x(2x^2 + 2x\log(9)))\log(x + \log(9)) +}{-2x^3 - x^4 + (-2x^2 - x}$$

$$= \int -\frac{4\,x^2 - \ln(x + 2\,\ln(3))\,\left(4\,x\,\ln(3) - \mathrm{e}^x\,(2\,x^2 + 4\,\ln(3)\,x) + 2\,x^2\right) - \ln\left(\frac{\mathrm{e}^x}{5} - \frac{x}{5} - \frac{2}{5}\right)\,\left(4\,x - \ln(x + 2\,\ln\right.}{2\,\ln(3)\,(x^3 + 2\,x^2) -}$$

input
```
int(-(4*x^2 - log(x + 2*log(3))*(4*x*log(3) - exp(x)*(4*x*log(3) + 2*x^2)
+ 2*x^2) - log(exp(x)/5 - x/5 - 2/5)*(4*x - log(x + 2*log(3))*(4*x + 2*log
(3)*(2*x + 4) - exp(x)*(2*x + 4*log(3)) + 2*x^2) - 2*x*exp(x) + 2*x^2) - 2
*x^2*exp(x) + 3*x^3 + x^4 + 2*log(3)*(x^2 + x^3))/(2*log(3)*(2*x^2 + x^3)
- exp(x)*(2*x^2*log(3) + x^3) + 2*x^3 + x^4),x)
```

output
```
int(-(4*x^2 - log(x + 2*log(3))*(4*x*log(3) - exp(x)*(4*x*log(3) + 2*x^2)
+ 2*x^2) - log(exp(x)/5 - x/5 - 2/5)*(4*x - log(x + 2*log(3))*(4*x + 2*log
(3)*(2*x + 4) - exp(x)*(2*x + 4*log(3)) + 2*x^2) - 2*x*exp(x) + 2*x^2) - 2
*x^2*exp(x) + 3*x^3 + x^4 + 2*log(3)*(x^2 + x^3))/(2*log(3)*(2*x^2 + x^3)
- exp(x)*(2*x^2*log(3) + x^3) + 2*x^3 + x^4), x)
```

3.604.

$$\int \frac{4x^2-2e^x x^2+3x^3+x^4+(x^2+x^3)\log(9)+(-2x^2-2x\log(9)+e^x(2x^2+2x\log(9)))\log(x+\log(9))+\log\left(\frac{1}{5}(-2+e^x-x)\right)(-4x+2e^x x-2x^2+(4x+2x^2+}{-2x^3-x^4+(-2x^2-x^3)\log(9)+e^x(x^3+x^2\log(9))}$$

3.605 $\int \frac{-9x^3-18x^4-15x^5-4x^6+e^4(27x^2+36x^3+25x^4+6x^5)}{e^{12}-3e^8x+3e^4x^2-x^3}\,dx$

3.605.1 Optimal result

Integrand size = 72, antiderivative size = 24

$$\int \frac{-9x^3-18x^4-15x^5-4x^6+e^4(27x^2+36x^3+25x^4+6x^5)}{e^{12}-3e^8x+3e^4x^2-x^3}\,dx=\frac{x^3(3+x)\left(3+2x+x^2\right)}{\left(-e^4+x\right)^2}$$

output
```
x^3*(3+x)*(x^2+2*x+3)/(x-exp(4))^2
```

3.605.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 88 vs. 2(24) = 48.

Time = 0.05 (sec) , antiderivative size = 88, normalized size of antiderivative = 3.67

$$\int \frac{-9x^3-18x^4-15x^5-4x^6+e^4(27x^2+36x^3+25x^4+6x^5)}{e^{12}-3e^8x+3e^4x^2-x^3}\,dx$$
$$=\frac{-15e^{24}-54e^8(-1+x)x-27e^4x^2+10e^{20}(-5+3x)+e^{12}(-27+108x-50x^2)+e^{16}(-54+100x-15x}{\left(e^4-x\right)^2}$$

input
```
Integrate[(-9*x^3 - 18*x^4 - 15*x^5 - 4*x^6 + E^4*(27*x^2 + 36*x^3 + 25*x^
4 + 6*x^5))/(E^12 - 3*E^8*x + 3*E^4*x^2 - x^3),x]
```

output
```
(-15*E^24 - 54*E^8*(-1 + x)*x - 27*E^4*x^2 + 10*E^20*(-5 + 3*x) + E^12*(-2
7 + 108*x - 50*x^2) + E^16*(-54 + 100*x - 15*x^2) + x^3*(9 + 9*x + 5*x^2 +
 x^3))/(E^4 - x)^2
```

3.605.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 109 vs. 2(24) = 48.

Time = 0.36 (sec) , antiderivative size = 109, normalized size of antiderivative = 4.54, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.042, Rules used = {2007, 2389, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^6-15x^5-18x^4-9x^3+e^4(6x^5+25x^4+36x^3+27x^2)}{-x^3+3e^4x^2-3e^8x+e^{12}}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-4x^6-15x^5-18x^4-9x^3+e^4(6x^5+25x^4+36x^3+27x^2)}{(e^4-x)^3}dx$$

$$\Big\downarrow \text{2389}$$

$$\int \left(4x^3+3(5+2e^4)x^2+2(9+10e^4+3e^8)x-\frac{e^8(27+36e^4+25e^8+6e^{12})}{(e^4-x)^2}+\frac{2e^{12}(9+9e^4+5e^8+e^{12})}{(e^4-x)^3}+9\left(\right.\right.$$

$$\Big\downarrow \text{2009}$$

$$x^4+(5+2e^4)x^3+(9+10e^4+3e^8)x^2+(9+18e^4+15e^8+4e^{12})x-\frac{e^8(27+36e^4+25e^8+6e^{12})}{e^4-x}+\frac{e^{12}(9+9e^4+5e^8+e^{12})}{(e^4-x)^2}$$

input
```
Int[(-9*x^3 - 18*x^4 - 15*x^5 - 4*x^6 + E^4*(27*x^2 + 36*x^3 + 25*x^4 + 6*
x^5))/(E^12 - 3*E^8*x + 3*E^4*x^2 - x^3),x]
```

output
```
(E^12*(9 + 9*E^4 + 5*E^8 + E^12))/(E^4 - x)^2 - (E^8*(27 + 36*E^4 + 25*E^8
 + 6*E^12))/(E^4 - x) + (9 + 18*E^4 + 15*E^8 + 4*E^12)*x + (9 + 10*E^4 + 3
*E^8)*x^2 + (5 + 2*E^4)*x^3 + x^4
```

3.605.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2389
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

3.605.4 Maple [A] (verified)

Time = 0.49 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

method	result
norman	$\frac{x^6+5x^5+9x^4+9x^3}{(e^4-x)^2}$
gosper	$\frac{x^3(x^3+5x^2+9x+9)}{e^8-2x e^4+x^2}$
parallelrisch	$\frac{x^6+5x^5+9x^4+9x^3}{e^8-2x e^4+x^2}$
risch	$\frac{20x^2e^{12}+5x^2e^{16}-40x e^{16}+18x^2e^4-10x e^{20}+18 e^{12}+5 e^{24}+20 e^{20}+27 e^{16}+27x^2e^8-x^6-5x^5-9x^4-9x^3-36x e^8-54x e^{12}}{2x e^4-x^2-e^8}$
default	$58x e^{12}+3x^2e^8+2x^3e^4+x^4+15x e^8-54 e^4e^8x+10x^2e^4+5x^3+18x e^4+9x^2+9x-$

input
```
int(((6*x^5+25*x^4+36*x^3+27*x^2)*exp(4)-4*x^6-15*x^5-18*x^4-9*x^3)/(exp(4
)^3-3*x*exp(4)^2+3*x^2*exp(4)-x^3),x,method=_RETURNVERBOSE)
```

output
```
(x^6+5*x^5+9*x^4+9*x^3)/(exp(4)-x)^2
```

3.605.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 92 vs. $2(23) = 46$.

Time = 0.25 (sec) , antiderivative size = 92, normalized size of antiderivative = 3.83

$$\int \frac{-9x^3 - 18x^4 - 15x^5 - 4x^6 + e^4(27x^2 + 36x^3 + 25x^4 + 6x^5)}{e^{12} - 3e^8x + 3e^4x^2 - x^3}\,dx = \frac{x^6 + 5\,x^5 + 9\,x^4 + 9\,x^3 - 18\,x^2e^4 + 10\,(x-2)e^{20} - (5\,x^2 - 40\,x + 27)e^{16} - 2\,(10\,x^2 - 27\,x + 9)e^{12} - 9\,(3}{x^2 - 2\,xe^4 + e^8}$$

input
```
integrate(((6*x^5+25*x^4+36*x^3+27*x^2)*exp(4)-4*x^6-15*x^5-18*x^4-9*x^3)/
(exp(4)^3-3*x*exp(4)^2+3*x^2*exp(4)-x^3),x, algorithm=\
```

output
```
(x^6 + 5*x^5 + 9*x^4 + 9*x^3 - 18*x^2*e^4 + 10*(x - 2)*e^20 - (5*x^2 - 40*
x + 27)*e^16 - 2*(10*x^2 - 27*x + 9)*e^12 - 9*(3*x^2 - 4*x)*e^8 - 5*e^24)/
(x^2 - 2*x*e^4 + e^8)
```

3.605.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 102 vs. $2(20) = 40$.

Time = 0.42 (sec) , antiderivative size = 102, normalized size of antiderivative = 4.25

$$\int \frac{-9x^3 - 18x^4 - 15x^5 - 4x^6 + e^4(27x^2 + 36x^3 + 25x^4 + 6x^5)}{e^{12} - 3e^8x + 3e^4x^2 - x^3}\,dx = x^4 + x^3 \cdot \left(5 + 2e^4\right) + x^2 \cdot \left(9 + 10e^4 + 3e^8\right) + x\left(9 + 18e^4 + 15e^8 + 4e^{12}\right) + \frac{x(27e^8 + 36e^{12} + 25e^{16} + 6e^{20}) - 5e^{24} - 20e^{20} - 27e^{16} - 18e^{12}}{x^2 - 2xe^4 + e^8}$$

input
```
integrate(((6*x**5+25*x**4+36*x**3+27*x**2)*exp(4)-4*x**6-15*x**5-18*x**4-
9*x**3)/(exp(4)**3-3*x*exp(4)**2+3*x**2*exp(4)-x**3),x)
```

output
```
x**4 + x**3*(5 + 2*exp(4)) + x**2*(9 + 10*exp(4) + 3*exp(8)) + x*(9 + 18*e
xp(4) + 15*exp(8) + 4*exp(12)) + (x*(27*exp(8) + 36*exp(12) + 25*exp(16) +
 6*exp(20)) - 5*exp(24) - 20*exp(20) - 27*exp(16) - 18*exp(12))/(x**2 - 2*
x*exp(4) + exp(8))
```

3.605.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. $2(23) = 46$.

Time = 0.22 (sec) , antiderivative size = 94, normalized size of antiderivative = 3.92

$$\int \frac{-9x^3 - 18x^4 - 15x^5 - 4x^6 + e^4(27x^2 + 36x^3 + 25x^4 + 6x^5)}{e^{12} - 3e^8x + 3e^4x^2 - x^3} \, dx$$
$$= x^4 + x^3(2e^4 + 5) + x^2(3e^8 + 10e^4 + 9) + x(4e^{12} + 15e^8 + 18e^4 + 9) + \frac{x(6e^{20} + 25e^{16} + 36e^{12} + 27e^8) - 5e^{24} - 20e^{20} - 27e^{16} - 18e^{12}}{x^2 - 2xe^4 + e^8}$$

input
```
integrate(((6*x^5+25*x^4+36*x^3+27*x^2)*exp(4)-4*x^6-15*x^5-18*x^4-9*x^3)/
(exp(4)^3-3*x*exp(4)^2+3*x^2*exp(4)-x^3),x, algorithm=\
```

output
```
x^4 + x^3*(2*e^4 + 5) + x^2*(3*e^8 + 10*e^4 + 9) + x*(4*e^12 + 15*e^8 + 18
*e^4 + 9) + (x*(6*e^20 + 25*e^16 + 36*e^12 + 27*e^8) - 5*e^24 - 20*e^20 -
27*e^16 - 18*e^12)/(x^2 - 2*x*e^4 + e^8)
```

3.605.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 99 vs. $2(23) = 46$.

Time = 0.27 (sec) , antiderivative size = 99, normalized size of antiderivative = 4.12

$$\int \frac{-9x^3 - 18x^4 - 15x^5 - 4x^6 + e^4(27x^2 + 36x^3 + 25x^4 + 6x^5)}{e^{12} - 3e^8x + 3e^4x^2 - x^3} \, dx$$
$$= x^4 + 2x^3e^4 + 5x^3 + 3x^2e^8 + 10x^2e^4 + 9x^2 + 4xe^{12} + 15xe^8 + 18xe^4 + 9x + \frac{6xe^{20} + 25xe^{16} + 36xe^{12} + 27xe^8 - 5e^{24} - 20e^{20} - 27e^{16} - 18e^{12}}{(x - e^4)^2}$$

input
```
integrate(((6*x^5+25*x^4+36*x^3+27*x^2)*exp(4)-4*x^6-15*x^5-18*x^4-9*x^3)/
(exp(4)^3-3*x*exp(4)^2+3*x^2*exp(4)-x^3),x, algorithm=\
```

output
```
x^4 + 2*x^3*e^4 + 5*x^3 + 3*x^2*e^8 + 10*x^2*e^4 + 9*x^2 + 4*x*e^12 + 15*x
*e^8 + 18*x*e^4 + 9*x + (6*x*e^20 + 25*x*e^16 + 36*x*e^12 + 27*x*e^8 - 5*e
^24 - 20*e^20 - 27*e^16 - 18*e^12)/(x - e^4)^2
```

3.605.9 Mupad [B] (verification not implemented)

Time = 15.45 (sec) , antiderivative size = 138, normalized size of antiderivative = 5.75

$$\int \frac{-9x^3-18x^4-15x^5-4x^6+e^4(27x^2+36x^3+25x^4+6x^5)}{e^{12}-3e^8x+3e^4x^2-x^3}\,dx$$
$$= x^3\left(2\,\mathrm{e}^4+5\right) - x\left(36\,\mathrm{e}^4-4\,\mathrm{e}^{12}+3\,\mathrm{e}^4\left(25\,\mathrm{e}^4+12\,\mathrm{e}^8-3\,\mathrm{e}^4\left(6\,\mathrm{e}^4+15\right)-18\right)+3\,\mathrm{e}^8\left(6\,\mathrm{e}^4+15\right)-9\right) - \frac{18\,\mathrm{e}^{12}+27\,\mathrm{e}^{16}+20\,\mathrm{e}^{20}+5\,\mathrm{e}^{24}-x\left(27\,\mathrm{e}^8+36\,\mathrm{e}^{12}+25\,\mathrm{e}^{16}+6\,\mathrm{e}^{20}\right)}{x^2-2\,\mathrm{e}^4\,x+\mathrm{e}^8} - x^2\left(\frac{25\,\mathrm{e}^4}{2}+6\,\mathrm{e}^8-\frac{3\,\mathrm{e}^4\left(6\,\mathrm{e}^4+15\right)}{2}-9\right)+x^4$$

input
```
int(-(9*x^3 + 18*x^4 + 15*x^5 + 4*x^6 - exp(4)*(27*x^2 + 36*x^3 + 25*x^4 +
 6*x^5))/(exp(12) - 3*x*exp(8) + 3*x^2*exp(4) - x^3),x)
```

output
```
x^3*(2*exp(4) + 5) - x*(36*exp(4) - 4*exp(12) + 3*exp(4)*(25*exp(4) + 12*e
xp(8) - 3*exp(4)*(6*exp(4) + 15) - 18) + 3*exp(8)*(6*exp(4) + 15) - 9) - (
18*exp(12) + 27*exp(16) + 20*exp(20) + 5*exp(24) - x*(27*exp(8) + 36*exp(1
2) + 25*exp(16) + 6*exp(20)))/(exp(8) - 2*x*exp(4) + x^2) - x^2*((25*exp(4
))/2 + 6*exp(8) - (3*exp(4)*(6*exp(4) + 15))/2 - 9) + x^4
```

3.606 $\int \frac{-40+40x+e^{2x}(-16+80x-40x^2)}{e^{4x}(2-10x+5x^2)+e^{2x}(-4+20x-10x^2)\log\left(\frac{1}{5}(-2+10x-5x^2)\right)+(2-}$

3.606.1 Optimal result

Integrand size = 100, antiderivative size = 31

$$\int \frac{-40+40x+e^{2x}(-16+80x-40x^2)}{e^{4x}(2-10x+5x^2)+e^{2x}(-4+20x-10x^2)\log\left(\frac{1}{5}(-2+10x-5x^2)\right)+(2-10x+5x^2)\log^2\left(\frac{1}{5}(-2+}$$
$$=-2+e^4+\log(5)+\frac{4}{e^{2x}-\log\left(-\frac{2}{5}+(2-x)x\right)}$$

output
```
ln(5)-2+exp(4)+4/(exp(2*x)-ln((2-x)*x-2/5))
```

3.606.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81

$$\int \frac{-40+40x+e^{2x}(-16+80x-40x^2)}{e^{4x}(2-10x+5x^2)+e^{2x}(-4+20x-10x^2)\log\left(\frac{1}{5}(-2+10x-5x^2)\right)+(2-10x+5x^2)\log^2\left(\frac{1}{5}(-2+}$$
$$=\frac{4}{e^{2x}-\log\left(-\frac{2}{5}+2x-x^2\right)}$$

input
```
Integrate[(-40 + 40*x + E^(2*x)*(-16 + 80*x - 40*x^2))/(E^(4*x)*(2 - 10*x
+ 5*x^2) + E^(2*x)*(-4 + 20*x - 10*x^2)*Log[(-2 + 10*x - 5*x^2)/5] + (2 -
10*x + 5*x^2)*Log[(-2 + 10*x - 5*x^2)/5]^2),x]
```

output
```
4/(E^(2*x) - Log[-2/5 + 2*x - x^2])
```

3.606.3 Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.040$, Rules used = {7239, 27, 25, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}(-40x^2+80x-16)+40x-40}{e^{4x}(5x^2-10x+2)+(5x^2-10x+2)\log^2\left(\frac{1}{5}(-5x^2+10x-2)\right)+e^{2x}(-10x^2+20x-4)\log\left(\frac{1}{5}(-5x^2+10x$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{8\left(-e^{2x}(5x^2-10x+2)+5x-5\right)}{(5x^2-10x+2)\left(e^{2x}-\log\left(-x^2+2x-\frac{2}{5}\right)\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$8\int -\frac{-5x+e^{2x}(5x^2-10x+2)+5}{(5x^2-10x+2)\left(e^{2x}-\log\left(-x^2+2x-\frac{2}{5}\right)\right)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-8\int \frac{-5x+e^{2x}(5x^2-10x+2)+5}{(5x^2-10x+2)\left(e^{2x}-\log\left(-x^2+2x-\frac{2}{5}\right)\right)^2}dx$$

$$\Big\downarrow \text{7237}$$

$$\frac{4}{e^{2x}-\log\left(-x^2+2x-\frac{2}{5}\right)}$$

input
```
Int[(-40 + 40*x + E^(2*x)*(-16 + 80*x - 40*x^2))/(E^(4*x)*(2 - 10*x + 5*x^
2) + E^(2*x)*(-4 + 20*x - 10*x^2)*Log[(-2 + 10*x - 5*x^2)/5] + (2 - 10*x +
 5*x^2)*Log[(-2 + 10*x - 5*x^2)/5]^2),x]
```

output
```
4/(E^(2*x) - Log[-2/5 + 2*x - x^2])
```

3.606.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.606.4 Maple [A] (verified)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.74

method	result	size
risch	$\frac{4}{{\mathrm e}^{2 x}-\ln \left(-x^{2}+2 x -\frac{2}{5}\right)}$	23
parallelrisch	$\frac{4}{{\mathrm e}^{2 x}-\ln \left(-x^{2}+2 x -\frac{2}{5}\right)}$	23

input
```
int(((-40*x^2+80*x-16)*exp(2*x)+40*x-40)/((5*x^2-10*x+2)*ln(-x^2+2*x-2/5)^
2+(-10*x^2+20*x-4)*exp(2*x)*ln(-x^2+2*x-2/5)+(5*x^2-10*x+2)*exp(2*x)^2),x,
method=_RETURNVERBOSE)
```

output
```
4/(exp(2*x)-ln(-x^2+2*x-2/5))
```

3.606.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.71

$$\int \frac{-40+40x+e^{2x}(-16+80x-40x^2)}{e^{4x}\left(2-10x+5x^2\right)+e^{2x}\left(-4+20x-10x^2\right)\log\left(\frac{1}{5}\left(-2+10x-5x^2\right)\right)+\left(2-10x+5x^2\right)\log^2\left(\frac{1}{5}(-2+\right.}$$
$$=\frac{4}{e^{(2x)}-\log\left(-x^2+2x-\frac{2}{5}\right)}$$

input
```
integrate(((-40*x^2+80*x-16)*exp(2*x)+40*x-40)/((5*x^2-10*x+2)*log(-x^2+2*
x-2/5)^2+(-10*x^2+20*x-4)*exp(2*x)*log(-x^2+2*x-2/5)+(5*x^2-10*x+2)*exp(2*
x)^2),x, algorithm=\
```

output
```
4/(e^(2*x) - log(-x^2 + 2*x - 2/5))
```

3.606.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.55

$$\int \frac{-40+40x+e^{2x}(-16+80x-40x^2)}{e^{4x}\left(2-10x+5x^2\right)+e^{2x}\left(-4+20x-10x^2\right)\log\left(\frac{1}{5}\left(-2+10x-5x^2\right)\right)+\left(2-10x+5x^2\right)\log^2\left(\frac{1}{5}(-2+\right.}$$
$$=\frac{4}{e^{2x}-\log\left(-x^2+2x-\frac{2}{5}\right)}$$

input
```
integrate(((-40*x**2+80*x-16)*exp(2*x)+40*x-40)/((5*x**2-10*x+2)*ln(-x**2+
2*x-2/5)**2+(-10*x**2+20*x-4)*exp(2*x)*ln(-x**2+2*x-2/5)+(5*x**2-10*x+2)*e
xp(2*x)**2),x)
```

output
```
4/(exp(2*x) - log(-x**2 + 2*x - 2/5))
```

3.606.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.77

$$\int \frac{-40+40x+e^{2x}(-16+80x-40x^2)}{e^{4x}(2-10x+5x^2)+e^{2x}(-4+20x-10x^2)\log\left(\frac{1}{5}(-2+10x-5x^2)\right)+(2-10x+5x^2)\log^2\left(\frac{1}{5}(-2+\right.}$$
$$=\frac{4}{e^{(2x)}+\log(5)-\log(-5x^2+10x-2)}$$

input
```
integrate(((-40*x^2+80*x-16)*exp(2*x)+40*x-40)/((5*x^2-10*x+2)*log(-x^2+2*
x-2/5)^2+(-10*x^2+20*x-4)*exp(2*x)*log(-x^2+2*x-2/5)+(5*x^2-10*x+2)*exp(2*
x)^2),x, algorithm=\
```

output
```
4/(e^(2*x) + log(5) - log(-5*x^2 + 10*x - 2))
```

3.606.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.77

$$\int \frac{-40+40x+e^{2x}(-16+80x-40x^2)}{e^{4x}(2-10x+5x^2)+e^{2x}(-4+20x-10x^2)\log\left(\frac{1}{5}(-2+10x-5x^2)\right)+(2-10x+5x^2)\log^2\left(\frac{1}{5}(-2+\right.}$$
$$=\frac{4}{e^{(2x)}+\log(5)-\log(-5x^2+10x-2)}$$

input
```
integrate(((-40*x^2+80*x-16)*exp(2*x)+40*x-40)/((5*x^2-10*x+2)*log(-x^2+2*
x-2/5)^2+(-10*x^2+20*x-4)*exp(2*x)*log(-x^2+2*x-2/5)+(5*x^2-10*x+2)*exp(2*
x)^2),x, algorithm=\
```

output
```
4/(e^(2*x) + log(5) - log(-5*x^2 + 10*x - 2))
```

3.606.9 Mupad [B] (verification not implemented)

Time = 16.51 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.71

$$\int \frac{-40+40x+e^{2x}(-16+80x-40x^2)}{e^{4x}(2-10x+5x^2)+e^{2x}(-4+20x-10x^2)\log\left(\frac{1}{5}(-2+10x-5x^2)\right)+(2-10x+5x^2)\log^2\left(\frac{1}{5}(-2+\right.}$$
$$=\frac{4}{e^{2x}-\ln\left(-x^2+2x-\frac{2}{5}\right)}$$

input
```
int(-(exp(2*x)*(40*x^2 - 80*x + 16) - 40*x + 40)/(log(2*x - x^2 - 2/5)^2*(
5*x^2 - 10*x + 2) + exp(4*x)*(5*x^2 - 10*x + 2) - exp(2*x)*log(2*x - x^2 -
 2/5)*(10*x^2 - 20*x + 4)),x)
```

output
```
4/(exp(2*x) - log(2*x - x^2 - 2/5))
```

3.606. $$\int \frac{-40+40x+e^{2x}\left(-16+80x-40x^2\right)}{e^{4x}(2-10x+5x^2)+e^{2x}(-4+20x-10x^2)\log\left(\frac{1}{5}(-2+10x-5x^2)\right)+(2-10x+5x^2)\log^2\left(\frac{1}{5}(-2+10x-5x^2)\right)}\,dx$$

3.607 $\int \frac{-2400x+1\ldots}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400\ldots}$

3.607.1 Optimal result

Integrand size = 229, antiderivative size = 30

$$\int \frac{-2400x+1200x^2+(-3750+1875x+48\ldots}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400x^3+3200x^4+2048x^5-1024\ldots} = \frac{3}{2x\left(-2+\frac{16}{25}(x-\log((2-x)\log(x)))^2\right)}$$

output
```
3/2/x/(4*(1/5*x-1/5*ln((2-x)*ln(x)))*(4/5*x-4/5*ln((2-x)*ln(x)))-2)
```

3.607.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.30

$$\int \frac{-2400x+1200x^2+(-3750+1875x+48\ldots}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400x^3+3200x^4+2048x^5-1024\ldots} = \frac{75}{4x\left(-25+8x^2-16x\log(-((-2+x)\log(x)))+8\log^2(-((-2+x)\log(x)))\right)}$$

input
```
Integrate[(-2400*x + 1200*x^2 + (-3750 + 1875*x + 4800*x^2 - 1800*x^3)*Log
[x] + (2400 - 1200*x + (-6000*x + 2400*x^2)*Log[x])*Log[(2 - x)*Log[x]] +
(1200 - 600*x)*Log[x]*Log[(2 - x)*Log[x]]^2)/((-5000*x^2 + 2500*x^3 + 3200
*x^4 - 1600*x^5 - 512*x^6 + 256*x^7)*Log[x] + (-6400*x^3 + 3200*x^4 + 2048
*x^5 - 1024*x^6)*Log[x]*Log[(2 - x)*Log[x]] + (3200*x^2 - 1600*x^3 - 3072*
x^4 + 1536*x^5)*Log[x]*Log[(2 - x)*Log[x]]^2 + (2048*x^3 - 1024*x^4)*Log[x
]*Log[(2 - x)*Log[x]]^3 + (-512*x^2 + 256*x^3)*Log[x]*Log[(2 - x)*Log[x]]^
4),x]
```

output
```
75/(4*x*(-25 + 8*x^2 - 16*x*Log[-((-2 + x)*Log[x])] + 8*Log[-((-2 + x)*Log
[x])]^2))
```

3.607.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1200x^2 + \left(\left(2400x^2 - 6000x\right)\log(x) - 1200x + 24\right.}{\left(2048x^3 - 1024x^4\right)\log(x)\log^3((2-x)\log(x)) + \left(256x^3 - 512x^2\right)\log(x)\log^4((2-x)\log(x)) + \left(-1024x^6 + 204\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{75\left(\log(x)\left(24x^3 - 64x^2 - 25x + 8(x-2)\log^2(-((x-2)\log(x))) + 16(5-2x)x\log(-((x-2)\log(x))) + 50\right) -}{4(2-x)x^2\log(x)\left(-8x^2 - 8\log^2(-((x-2)\log(x))) + 16x\log(-((x-2)\log(x)\right.}$$

$$\Big\downarrow \text{27}$$

$$\frac{75}{4}\int \frac{16(2-x)(x - \log((2-x)\log(x))) + \log(x)\left(24x^3 - 64x^2 + 16(5-2x)\log((2-x)\log(x))x - 25x - 8(2-\right.}{(2-x)x^2\log(x)\left(-8x^2 + 16\log((2-x)\log(x))x - 8\log^2((2-x)\log(x)) + 25\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\frac{75}{4}\int \left(-\frac{16\left(\log(x)x^2 - 3\log(x)x - x + 2\right)\left(x - \log(-((x-2)\log(x)))\right)}{(x-2)x^2\log(x)\left(8x^2 - 16\log(-((x-2)\log(x)))x + 8\log^2(-((x-2)\log(x))) - 25\right)^2} - \frac{}{x^2\left(8x^2 - 16\log\right.}\right.$$

$$\Big\downarrow \text{7299}$$

$$\frac{75}{4}\int \left(-\frac{16\left(\log(x)x^2 - 3\log(x)x - x + 2\right)\left(x - \log(-((x-2)\log(x)))\right)}{(x-2)x^2\log(x)\left(8x^2 - 16\log(-((x-2)\log(x)))x + 8\log^2(-((x-2)\log(x))) - 25\right)^2} - \frac{}{x^2\left(8x^2 - 16\log\right.}\right.$$

3.607.

$$\int \frac{-2400x + 1200x^2 + \left(-3750 + 1875x + 4800x^2 - 1800x^3\right)\log(x) + \left(2400 - 1200x + (-6000x-\right.}{\left(-5000x^2 + 2500x^3 + 3200x^4 - 1600x^5 - 512x^6 + 256x^7\right)\log(x) + \left(-6400x^3 + 3200x^4 + 2048x^5 - 1024x^6\right)\log(x)\log((2-x)\log(x)) + \left(3200x^2 - 1600x^3 -\right.}$$

input
```
Int[(-2400*x + 1200*x^2 + (-3750 + 1875*x + 4800*x^2 - 1800*x^3)*Log[x] +
(2400 - 1200*x + (-6000*x + 2400*x^2)*Log[x])*Log[(2 - x)*Log[x]] + (1200
- 600*x)*Log[x]*Log[(2 - x)*Log[x]]^2)/((-5000*x^2 + 2500*x^3 + 3200*x^4 -
 1600*x^5 - 512*x^6 + 256*x^7)*Log[x] + (-6400*x^3 + 3200*x^4 + 2048*x^5 -
 1024*x^6)*Log[x]*Log[(2 - x)*Log[x]] + (3200*x^2 - 1600*x^3 - 3072*x^4 +
1536*x^5)*Log[x]*Log[(2 - x)*Log[x]]^2 + (2048*x^3 - 1024*x^4)*Log[x]*Log[
(2 - x)*Log[x]]^3 + (-512*x^2 + 256*x^3)*Log[x]*Log[(2 - x)*Log[x]]^4),x]
```

output
```
$Aborted
```

3.607.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.607.4 Maple [A] (verified)

Time = 13.57 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.33

method	result	size
parallelrisch	$\frac{75}{4x\left(8x^2-16x\ln((2-x)\ln(x))+8\ln((2-x)\ln(x))^2-25\right)}$	40
risch	Expression too large to display	829
default	Expression too large to display	1699
parts	Expression too large to display	1699

3.607.

$$\int \frac{-2400x+1200x^2+\left(-3750+1875x+4800x^2-1800x^3\right)\log(x)+\left(2400-1200x+\left(-6000x-\right.\right.}{\left(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7\right)\log(x)+\left(-6400x^3+3200x^4+2048x^5-1024x^6\right)\log(x)\log((2-x)\log(x))+\left(3200x^2-1600x^3-\right.}$$

input
```
int(((-600*x+1200)*ln(x)*ln((2-x)*ln(x))^2+((2400*x^2-6000*x)*ln(x)-1200*x
+2400)*ln((2-x)*ln(x))+(-1800*x^3+4800*x^2+1875*x-3750)*ln(x)+1200*x^2-240
0*x)/((256*x^3-512*x^2)*ln(x)*ln((2-x)*ln(x))^4+(-1024*x^4+2048*x^3)*ln(x)
*ln((2-x)*ln(x))^3+(1536*x^5-3072*x^4-1600*x^3+3200*x^2)*ln(x)*ln((2-x)*ln
(x))^2+(-1024*x^6+2048*x^5+3200*x^4-6400*x^3)*ln(x)*ln((2-x)*ln(x))+(256*x
^7-512*x^6-1600*x^5+3200*x^4+2500*x^3-5000*x^2)*ln(x)),x,method=_RETURNVER
BOSE)
```

output
```
75/4/x/(8*x^2-16*x*ln((2-x)*ln(x))+8*ln((2-x)*ln(x))^2-25)
```

3.607.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.30

$$\int \frac{-2400x + 1200x^2 + (-3750 + 1875x + 48\cdots}{(-5000x^2 + 2500x^3 + 3200x^4 - 1600x^5 - 512x^6 + 256x^7)\log(x) + (-6400x^3 + 3200x^4 + 2048x^5 - 1024\cdots}$$
$$= \frac{75}{4\left(8\,x^3 - 16\,x^2\log\left(-(x-2)\log\left(x\right)\right) + 8\,x\log\left(-(x-2)\log\left(x\right)\right)^2 - 25\,x\right)}$$

input
```
integrate(((-600*x+1200)*log(x)*log((2-x)*log(x))^2+((2400*x^2-6000*x)*log
(x)-1200*x+2400)*log((2-x)*log(x))+(-1800*x^3+4800*x^2+1875*x-3750)*log(x)
+1200*x^2-2400*x)/((256*x^3-512*x^2)*log(x)*log((2-x)*log(x))^4+(-1024*x^4
+2048*x^3)*log(x)*log((2-x)*log(x))^3+(1536*x^5-3072*x^4-1600*x^3+3200*x^2
)*log(x)*log((2-x)*log(x))^2+(-1024*x^6+2048*x^5+3200*x^4-6400*x^3)*log(x)
*log((2-x)*log(x))+(256*x^7-512*x^6-1600*x^5+3200*x^4+2500*x^3-5000*x^2)*l
og(x)),x, algorithm=\
```

output
```
75/4/(8*x^3 - 16*x^2*log(-(x - 2)*log(x)) + 8*x*log(-(x - 2)*log(x))^2 - 2
5*x)
```

3.607.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.20

$$\int \frac{-2400x+1200x^2+(-3750+1875x+48}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400x^3+3200x^4+2048x^5-1024}$$
$$=\frac{75}{32x^3-64x^2\log\left((2-x)\log\left(x\right)\right)+32x\log\left((2-x)\log\left(x\right)\right)^2-100x}$$

input
```
integrate(((-600*x+1200)*ln(x)*ln((2-x)*ln(x))**2+((2400*x**2-6000*x)*ln(x
)-1200*x+2400)*ln((2-x)*ln(x))+(-1800*x**3+4800*x**2+1875*x-3750)*ln(x)+12
00*x**2-2400*x)/((256*x**3-512*x**2)*ln(x)*ln((2-x)*ln(x))**4+(-1024*x**4+
2048*x**3)*ln(x)*ln((2-x)*ln(x))**3+(1536*x**5-3072*x**4-1600*x**3+3200*x*
*2)*ln(x)*ln((2-x)*ln(x))**2+(-1024*x**6+2048*x**5+3200*x**4-6400*x**3)*ln
(x)*ln((2-x)*ln(x))+(256*x**7-512*x**6-1600*x**5+3200*x**4+2500*x**3-5000*
x**2)*ln(x)),x)
```

output
```
75/(32*x**3 - 64*x**2*log((2 - x)*log(x)) + 32*x*log((2 - x)*log(x))**2 -
100*x)
```

3.607.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(25) = 50$.

Time = 0.31 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.93

$$\int \frac{-2400x+1200x^2+(-3750+1875x+48}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400x^3+3200x^4+2048x^5-1024}$$
$$=\frac{75}{4\left(8\,x^3+8\,x\log\left(-x+2\right)^2-16\,x^2\log\left(\log\left(x\right)\right)+8\,x\log\left(\log\left(x\right)\right)^2-16\,\left(x^2-x\log\left(\log\left(x\right)\right)\right)\log\left(-x+2\right)}$$

input
```
integrate(((-600*x+1200)*log(x)*log((2-x)*log(x))^2+((2400*x^2-6000*x)*log
(x)-1200*x+2400)*log((2-x)*log(x))+(-1800*x^3+4800*x^2+1875*x-3750)*log(x)
+1200*x^2-2400*x)/((256*x^3-512*x^2)*log(x)*log((2-x)*log(x))^4+(-1024*x^4
+2048*x^3)*log(x)*log((2-x)*log(x))^3+(1536*x^5-3072*x^4-1600*x^3+3200*x^2
)*log(x)*log((2-x)*log(x))^2+(-1024*x^6+2048*x^5+3200*x^4-6400*x^3)*log(x)
*log((2-x)*log(x))+(256*x^7-512*x^6-1600*x^5+3200*x^4+2500*x^3-5000*x^2)*l
og(x)),x, algorithm=\
```

output
```
75/4/(8*x^3 + 8*x*log(-x + 2)^2 - 16*x^2*log(log(x)) + 8*x*log(log(x))^2 -
 16*(x^2 - x*log(log(x)))*log(-x + 2) - 25*x)
```

3.607.

$$\int \frac{-2400x+1200x^2+(-3750+1875x+4800x^2-1800x^3)\log(x)+(2400-1200x+(-6000x-}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400x^3+3200x^4+2048x^5-1024x^6)\log(x)\log((2-x)\log(x))+(3200x^2-1600x^3-}$$

3.607.8 Giac [A] (verification not implemented)

Time = 5.89 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.50

$$\int \frac{-2400x+1200x^2+(-3750+1875x+48\cdots}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400x^3+3200x^4+2048x^5-1024\cdots}$$
$$=\frac{75}{4\left(8\,x^3-16\,x^2\log\left(-x\log\left(x\right)+2\,\log\left(x\right)\right)+8\,x\log\left(-x\log\left(x\right)+2\,\log\left(x\right)\right)^2-25\,x\right)}$$

input
```
integrate((((-600*x+1200)*log(x)*log((2-x)*log(x))^2+((2400*x^2-6000*x)*log
(x)-1200*x+2400)*log((2-x)*log(x))+(-1800*x^3+4800*x^2+1875*x-3750)*log(x)
+1200*x^2-2400*x)/((256*x^3-512*x^2)*log(x)*log((2-x)*log(x))^4+(-1024*x^4
+2048*x^3)*log(x)*log((2-x)*log(x))^3+(1536*x^5-3072*x^4-1600*x^3+3200*x^2
)*log(x)*log((2-x)*log(x))^2+(-1024*x^6+2048*x^5+3200*x^4-6400*x^3)*log(x)
*log((2-x)*log(x))+(256*x^7-512*x^6-1600*x^5+3200*x^4+2500*x^3-5000*x^2)*l
og(x)),x, algorithm=\
```

output
```
75/4/(8*x^3 - 16*x^2*log(-x*log(x) + 2*log(x)) + 8*x*log(-x*log(x) + 2*log
(x))^2 - 25*x)
```

3.607.9 Mupad [B] (verification not implemented)

Time = 15.91 (sec) , antiderivative size = 270, normalized size of antiderivative = 9.00

$$\int \frac{-2400x+1200x^2+(-3750+1875x+48\cdots}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400x^3+3200x^4+2048x^5-1024\cdots}$$
$$=-\frac{300\,x^2\ln\left(x\right)^2+\frac{75\,x^8\ln(x)^4}{4}-x^5\left(1125\ln\left(x\right)^4+1125\ln\left(x\right)^3+150\ln\left(x\right)^2\right)+x^4\left(675\ln\cdots\right.}{x^2\ln\left(x\right)\left(x-2\right)\left(-8\,x^2+16\,x\ln\left(-\ln\left(x\right)\left(x-2\right)\right)-8\ln\left(-\ln\left(x\right)\left(x-2\right)\right)^2+25\right)\left(x^6\ln\left(x\right)^3-8\,x^5\cdots\right.}$$

input
```
int((2400*x + log(-log(x)*(x - 2))*(1200*x + log(x)*(6000*x - 2400*x^2) -
2400) - 1200*x^2 - log(x)*(1875*x + 4800*x^2 - 1800*x^3 - 3750) + log(-log
(x)*(x - 2))^2*log(x)*(600*x - 1200))/(log(x)*(5000*x^2 - 2500*x^3 - 3200*
x^4 + 1600*x^5 + 512*x^6 - 256*x^7) + log(-log(x)*(x - 2))*log(x)*(6400*x^
3 - 3200*x^4 - 2048*x^5 + 1024*x^6) - log(-log(x)*(x - 2))^2*log(x)*(3200*
x^2 - 1600*x^3 - 3072*x^4 + 1536*x^5) + log(-log(x)*(x - 2))^4*log(x)*(512
*x^2 - 256*x^3) - log(-log(x)*(x - 2))^3*log(x)*(2048*x^3 - 1024*x^4)),x)
```

3.607.

$$\int \frac{-2400x+1200x^2+(-3750+1875x+4800x^2-1800x^3)\log(x)+(2400-1200x+(-6000x-\cdots}{(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7)\log(x)+(-6400x^3+3200x^4+2048x^5-1024x^6)\log(x)\log((2-x)\log(x))+(3200x^2-1600x^3-\cdots}$$

output
```
-(300*x^2*log(x)^2 + (75*x^8*log(x)^4)/4 - x^5*(150*log(x)^2 + 1125*log(x)
^3 + 1125*log(x)^4) + x^4*(450*log(x)^2 + 1650*log(x)^3 + 675*log(x)^4) +
x^6*((75*log(x)^2)/4 + (675*log(x)^3)/2 + (2775*log(x)^4)/4) - x^7*((75*lo
g(x)^3)/2 + (375*log(x)^4)/2) - x^3*(600*log(x)^2 + 900*log(x)^3))/(x^2*lo
g(x)*(x - 2)*(16*x*log(-log(x)*(x - 2)) - 8*x^2 - 8*log(-log(x)*(x - 2))^2
 + 25)*(12*x^2*log(x) - 6*x^3*log(x) + x^4*log(x) + 24*x^2*log(x)^2 - 32*x
^3*log(x)^2 - 18*x^3*log(x)^3 + 14*x^4*log(x)^2 + 21*x^4*log(x)^3 - 2*x^5*
log(x)^2 - 8*x^5*log(x)^3 + x^6*log(x)^3 - 8*x*log(x)))
```

3.607.

$$\int \frac{-2400x+1200x^2+\left(-3750+1875x+4800x^2-1800x^3\right)\log(x)+\left(2400-1200x+\left(-6000x-\right.\right.}{\left(-5000x^2+2500x^3+3200x^4-1600x^5-512x^6+256x^7\right)\log(x)+\left(-6400x^3+3200x^4+2048x^5-1024x^6\right)\log(x)\log((2-x)\log(x))+\left(3200x^2-1600x^3-\right.}$$

3.608 $\int \frac{4x^2+e^8(-3+3x)}{3e^8x^2+4x^3+(3e^8x+4x^2)\log\left(\frac{3e^8+4x}{x}\right)}\,dx$

3.608.1 Optimal result

Integrand size = 59, antiderivative size = 16

$$\int \frac{4x^2+e^8(-3+3x)}{3e^8x^2+4x^3+(3e^8x+4x^2)\log\left(\frac{3e^8+4x}{x}\right)}\,dx = \log\left(12\left(x+\log\left(4+\frac{3e^8}{x}\right)\right)\right)$$

output
```
ln(12*x+12*ln(3/x*exp(4)^2+4))
```

3.608.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{4x^2+e^8(-3+3x)}{3e^8x^2+4x^3+(3e^8x+4x^2)\log\left(\frac{3e^8+4x}{x}\right)}\,dx = \log\left(x+\log\left(4+\frac{3e^8}{x}\right)\right)$$

input
```
Integrate[(4*x^2 + E^8*(-3 + 3*x))/(3*E^8*x^2 + 4*x^3 + (3*E^8*x + 4*x^2)*
Log[(3*E^8 + 4*x)/x]),x]
```

output
```
Log[x + Log[4 + (3*E^8)/x]]
```

3.608.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034, Rules used = {7292, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^2+e^8(3x-3)}{4x^3+3e^8x^2+(4x^2+3e^8x)\log\left(\frac{4x+3e^8}{x}\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{4x^2+3e^8x-3e^8}{x(4x+3e^8)\left(x+\log\left(\frac{3e^8}{x}+4\right)\right)}dx$$

$$\Big\downarrow \text{ 7235}$$

$$\log\left(x+\log\left(\frac{3e^8}{x}+4\right)\right)$$

input
```
Int[(4*x^2 + E^8*(-3 + 3*x))/(3*E^8*x^2 + 4*x^3 + (3*E^8*x + 4*x^2)*Log[(3
*E^8 + 4*x)/x]),x]
```

output
```
Log[x + Log[4 + (3*E^8)/x]]
```

3.608.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.608.4 Maple [A] (verified)

Time = 1.97 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

method	result	size
risch	$\ln\left(\ln\left(\frac{3\,\mathrm{e}^{8}+4x}{x}\right)+x\right)$	17
norman	$\ln\left(\ln\left(\frac{3\,\mathrm{e}^{8}+4x}{x}\right)+x\right)$	19
parallelrisch	$\ln\left(\ln\left(\frac{3\,\mathrm{e}^{8}+4x}{x}\right)+x\right)$	19
derivativedivides	$-\ln\left(\frac{3\,\mathrm{e}^{8}}{x}\right)+\ln\left(3\,\mathrm{e}^{8}+\ln\left(4+\frac{3\,\mathrm{e}^{8}}{x}\right)\left(4+\frac{3\,\mathrm{e}^{8}}{x}\right)-4\ln\left(4+\frac{3\,\mathrm{e}^{8}}{x}\right)\right)$	60
default	$-\ln\left(\frac{3\,\mathrm{e}^{8}}{x}\right)+\ln\left(3\,\mathrm{e}^{8}+\ln\left(4+\frac{3\,\mathrm{e}^{8}}{x}\right)\left(4+\frac{3\,\mathrm{e}^{8}}{x}\right)-4\ln\left(4+\frac{3\,\mathrm{e}^{8}}{x}\right)\right)$	60

input
```
int(((-3+3*x)*exp(4)^2+4*x^2)/((3*x*exp(4)^2+4*x^2)*ln((3*exp(4)^2+4*x)/x)
+3*x^2*exp(4)^2+4*x^3),x,method=_RETURNVERBOSE)
```

output
```
ln(ln((3*exp(8)+4*x)/x)+x)
```

3.608.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{4x^2+e^8(-3+3x)}{3e^8x^2+4x^3+(3e^8x+4x^2)\log\left(\frac{3e^8+4x}{x}\right)}\,dx=\log\left(x+\log\left(\frac{4\,x+3\,e^{8}}{x}\right)\right)$$

input
```
integrate(((-3+3*x)*exp(4)^2+4*x^2)/((3*x*exp(4)^2+4*x^2)*log((3*exp(4)^2+
4*x)/x)+3*x^2*exp(4)^2+4*x^3),x, algorithm=\
```

output
```
log(x + log((4*x + 3*e^8)/x))
```

3.608.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{4x^2+e^8(-3+3x)}{3e^8x^2+4x^3+(3e^8x+4x^2)\log\left(\frac{3e^8+4x}{x}\right)}\,dx = \log\left(x+\log\left(\frac{4x+3e^8}{x}\right)\right)$$

input
```
integrate(((-3+3*x)*exp(4)**2+4*x**2)/((3*x*exp(4)**2+4*x**2)*ln((3*exp(4)
**2+4*x)/x)+3*x**2*exp(4)**2+4*x**3),x)
```

output
```
log(x + log((4*x + 3*exp(8))/x))
```

3.608.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{4x^2+e^8(-3+3x)}{3e^8x^2+4x^3+(3e^8x+4x^2)\log\left(\frac{3e^8+4x}{x}\right)}\,dx = \log\left(x+\log\left(4\,x+3\,e^8\right)-\log\left(x\right)\right)$$

input
```
integrate(((-3+3*x)*exp(4)^2+4*x^2)/((3*x*exp(4)^2+4*x^2)*log((3*exp(4)^2+
4*x)/x)+3*x^2*exp(4)^2+4*x^3),x, algorithm=\
```

output
```
log(x + log(4*x + 3*e^8) - log(x))
```

3.608.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(17) = 34$.

Time = 0.29 (sec) , antiderivative size = 72, normalized size of antiderivative = 4.50

$$\int \frac{4x^2+e^8(-3+3x)}{3e^8x^2+4x^3+(3e^8x+4x^2)\log\left(\frac{3e^8+4x}{x}\right)}\,dx$$
$$= \left(e^8\log\left(\frac{\left(4\,x+3\,e^8\right)\log\left(\frac{4\,x+3\,e^8}{x}\right)}{x}+3\,e^8-4\,\log\left(\frac{4\,x+3\,e^8}{x}\right)\right)-e^8\log\left(\frac{4\,x+3\,e^8}{x}-4\right)\right)e^{(-8)}$$

input
```
integrate(((-3+3*x)*exp(4)^2+4*x^2)/((3*x*exp(4)^2+4*x^2)*log((3*exp(4)^2+
4*x)/x)+3*x^2*exp(4)^2+4*x^3),x, algorithm=\
```

output
```
(e^8*log((4*x + 3*e^8)*log((4*x + 3*e^8)/x)/x + 3*e^8 - 4*log((4*x + 3*e^8
)/x)) - e^8*log((4*x + 3*e^8)/x - 4))*e^(-8)
```

3.608.9 Mupad [B] (verification not implemented)

Time = 16.44 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{4x^2 + e^8(-3 + 3x)}{3e^8x^2 + 4x^3 + (3e^8x + 4x^2)\log\left(\frac{3e^8+4x}{x}\right)}\,dx = \ln\left(x + \ln\left(\frac{3\,\mathrm{e}^8}{x} + 4\right)\right)$$

input
```
int((4*x^2 + exp(8)*(3*x - 3))/(3*x^2*exp(8) + log((4*x + 3*exp(8))/x)*(3*
x*exp(8) + 4*x^2) + 4*x^3),x)
```

output
```
log(x + log((3*exp(8))/x + 4))
```

3.609 $\int \frac{30-75x+10x^2-25x^3+(-55x-70x^2+25x^3)\log(x)+(-10x+25x^2+10}{(4x-20x^2+25x^3)\log^2(x)}$

3.609.1 Optimal result

Integrand size = 74, antiderivative size = 27

$$\int \frac{30-75x+10x^2-25x^3+(-55x-70x^2+25x^3)\log(x)+(-10x+25x^2+10x\log(x))\log(5x^2)}{(4x-20x^2+25x^3)\log^2(x)}\,dx$$
$$=\frac{5(-3+x(-x+\log(5x^2)))}{(2-5x)\log(x)}$$

output
```
5*(x*(ln(5*x^2)-x)-3)/(-5*x+2)/ln(x)
```

3.609.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{30-75x+10x^2-25x^3+(-55x-70x^2+25x^3)\log(x)+(-10x+25x^2+10x\log(x))\log(5x^2)}{(4x-20x^2+25x^3)\log^2(x)}\,dx$$
$$=2+\frac{5(3+x^2-x\log(5x^2))}{(-2+5x)\log(x)}$$

input
```
Integrate[(30 - 75*x + 10*x^2 - 25*x^3 + (-55*x - 70*x^2 + 25*x^3)*Log[x]
+ (-10*x + 25*x^2 + 10*x*Log[x])*Log[5*x^2])/((4*x - 20*x^2 + 25*x^3)*Log[
x]^2),x]
```

output
```
2 + (5*(3 + x^2 - x*Log[5*x^2]))/((-2 + 5*x)*Log[x])
```

3.609.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-25x^3+10x^2+(25x^2-10x+10x\log(x))\log(5x^2)+(25x^3-70x^2-55x)\log(x)-75x+30}{(25x^3-20x^2+4x)\log^2(x)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-25x^3+10x^2+(25x^2-10x+10x\log(x))\log(5x^2)+(25x^3-70x^2-55x)\log(x)-75x+30}{x(25x^2-20x+4)\log^2(x)}dx$$

$$\Big\downarrow \text{7277}$$

$$100\int \frac{-5x^3+2x^2-15x-(-5x^3+14x^2+11x)\log(x)-(-5x^2-2\log(x)x+2x)\log(5x^2)+6}{20(2-5x)^2x\log^2(x)}dx$$

$$\Big\downarrow \text{27}$$

$$5\int \frac{-5x^3+2x^2-15x-(-5x^3+14x^2+11x)\log(x)-(-5x^2-2\log(x)x+2x)\log(5x^2)+6}{(2-5x)^2x\log^2(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$5\int \left(-\frac{5x^2}{(5x-2)^2\log^2(x)}+\frac{2x}{(5x-2)^2\log^2(x)}+\frac{(5x+2\log(x)-2)\log(5x^2)}{(5x-2)^2\log^2(x)}+\frac{5x^2-14x-11}{(5x-2)^2\log(x)}-\frac{15}{(5x-2)^2\log\right.$$

$$\Big\downarrow \text{2009}$$

$$5\left(-5\int \frac{x^2}{(5x-2)^2\log^2(x)}dx+\int \frac{\log(5x^2)}{(5x-2)\log^2(x)}dx+\int \frac{5x^2-14x-11}{(5x-2)^2\log(x)}dx+2\int \frac{\log(5x^2)}{(5x-2)^2\log(x)}dx-15\int\right.$$

input
```
Int[(30 - 75*x + 10*x^2 - 25*x^3 + (-55*x - 70*x^2 + 25*x^3)*Log[x] + (-10
*x + 25*x^2 + 10*x*Log[x])*Log[5*x^2])/((4*x - 20*x^2 + 25*x^3)*Log[x]^2),
x]
```

output
```
$Aborted
```

3.609.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.609.4 Maple [A] (verified)

Time = 32.00 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

method	result	size
parallelrisch	$\frac{1800+600x^{2}-600x\ln\left(5x^{2}\right)}{120\ln\left(x\right)\left(5x-2\right)}$	30
risch	$-\frac{4}{5x-2}+\frac{15+\frac{5i\pi x\,\mathrm{csgn}\left(ix\right)^{2}\mathrm{csgn}\left(ix^{2}\right)}{2}-5i\pi x\,\mathrm{csgn}\left(ix\right)\mathrm{csgn}\left(ix^{2}\right)^{2}+\frac{5i\pi x\,\mathrm{csgn}\left(ix^{2}\right)^{3}}{2}-5x\ln\left(5\right)+5x^{2}}{\ln\left(x\right)\left(5x-2\right)}$	88

input
```
int(((10*x*ln(x)+25*x^2-10*x)*ln(5*x^2)+(25*x^3-70*x^2-55*x)*ln(x)-25*x^3+
10*x^2-75*x+30)/(25*x^3-20*x^2+4*x)/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
1/120*(1800+600*x^2-600*x*ln(5*x^2))/ln(x)/(5*x-2)
```

3.609.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

$$\int \frac{30-75x+10x^2-25x^3+(-55x-70x^2+25x^3)\log(x)+(-10x+25x^2+10x\log(x))\log(5x^2)}{(4x-20x^2+25x^3)\log^2(x)}\,dx$$
$$=\frac{5\,x^2-5\,x\log(5)-4\,\log(x)+15}{(5\,x-2)\log(x)}$$

input
```
integrate((((10*x*log(x)+25*x^2-10*x)*log(5*x^2)+(25*x^3-70*x^2-55*x)*log(x
)-25*x^3+10*x^2-75*x+30)/(25*x^3-20*x^2+4*x)/log(x)^2,x, algorithm=\
```

output
```
(5*x^2 - 5*x*log(5) - 4*log(x) + 15)/((5*x - 2)*log(x))
```

3.609.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{30-75x+10x^2-25x^3+(-55x-70x^2+25x^3)\log(x)+(-10x+25x^2+10x\log(x))\log(5x^2)}{(4x-20x^2+25x^3)\log^2(x)}\,dx$$
$$=-\frac{20}{25x-10}+\frac{5x^2-5x\log(5)+15}{(5x-2)\log(x)}$$

input
```
integrate(((10*x*ln(x)+25*x**2-10*x)*ln(5*x**2)+(25*x**3-70*x**2-55*x)*ln(
x)-25*x**3+10*x**2-75*x+30)/(25*x**3-20*x**2+4*x)/ln(x)**2,x)
```

output
```
-20/(25*x - 10) + (5*x**2 - 5*x*log(5) + 15)/((5*x - 2)*log(x))
```

3.609.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

$$\int \frac{30-75x+10x^2-25x^3+(-55x-70x^2+25x^3)\log(x)+(-10x+25x^2+10x\log(x))\log(5x^2)}{(4x-20x^2+25x^3)\log^2(x)}\,dx$$
$$=\frac{5\,x^2-5\,x\log(5)-4\,\log(x)+15}{(5\,x-2)\log(x)}$$

input
```
integrate((((10*x*log(x)+25*x^2-10*x)*log(5*x^2)+(25*x^3-70*x^2-55*x)*log(x
)-25*x^3+10*x^2-75*x+30)/(25*x^3-20*x^2+4*x)/log(x)^2,x, algorithm=\
```

output
```
(5*x^2 - 5*x*log(5) - 4*log(x) + 15)/((5*x - 2)*log(x))
```

3.609.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{30-75x+10x^2-25x^3+(-55x-70x^2+25x^3)\log(x)+(-10x+25x^2+10x\log(x))\log(5x^2)}{(4x-20x^2+25x^3)\log^2(x)}\,dx$$
$$=\frac{5\,(x^2-x\log(5)+3)}{5\,x\log(x)-2\,\log(x)}-\frac{4}{5\,x-2}$$

input
```
integrate((((10*x*log(x)+25*x^2-10*x)*log(5*x^2)+(25*x^3-70*x^2-55*x)*log(x
)-25*x^3+10*x^2-75*x+30)/(25*x^3-20*x^2+4*x)/log(x)^2,x, algorithm=\
```

output
```
5*(x^2 - x*log(5) + 3)/(5*x*log(x) - 2*log(x)) - 4/(5*x - 2)
```

3.609.9 Mupad [B] (verification not implemented)

Time = 15.73 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{30-75x+10x^2-25x^3+(-55x-70x^2+25x^3)\log(x)+(-10x+25x^2+10x\log(x))\log(5x^2)}{(4x-20x^2+25x^3)\log^2(x)}\,dx$$
$$=\frac{5\,(x^2-x\,\ln(5\,x^2)+3)}{\ln(x)\,(5\,x-2)}$$

input
```
int(-(75*x - log(5*x^2)*(10*x*log(x) - 10*x + 25*x^2) - 10*x^2 + 25*x^3 +
log(x)*(55*x + 70*x^2 - 25*x^3) - 30)/(log(x)^2*(4*x - 20*x^2 + 25*x^3)),x
)
```

output
```
(5*(x^2 - x*log(5*x^2) + 3))/(log(x)*(5*x - 2))
```

3.610 $\int \frac{e^5(-12-2x+2x^2)+e^5(1-3x+2x^2)\log(1-2x+x^2)\log(\log(1-2x+x^2$

3.610.1 Optimal result

Integrand size = 65, antiderivative size = 17

$$\int \frac{e^5(-12-2x+2x^2)+e^5(1-3x+2x^2)\log(1-2x+x^2)\log(\log(1-2x+x^2))}{(-1+x)\log(1-2x+x^2)}\,dx = e^5(-3+x)(2+x)\log\left(\log\left((-1+x)^2\right)\right)$$

output
```
ln(ln((-1+x)^2))*exp(5)*(-3+x)*(2+x)
```

3.610.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \frac{e^5(-12-2x+2x^2)+e^5(1-3x+2x^2)\log(1-2x+x^2)\log(\log(1-2x+x^2))}{(-1+x)\log(1-2x+x^2)}\,dx = e^5(-6+(-1+x)x)\log\left(\log\left((-1+x)^2\right)\right)$$

input
```
Integrate[(E^5*(-12 - 2*x + 2*x^2) + E^5*(1 - 3*x + 2*x^2)*Log[1 - 2*x + x
^2]*Log[Log[1 - 2*x + x^2]])/((-1 + x)*Log[1 - 2*x + x^2]),x]
```

output
```
E^5*(-6 + (-1 + x)*x)*Log[Log[(-1 + x)^2]]
```

3.610.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^5(2x^2-2x-12)+e^5(2x^2-3x+1)\log(x^2-2x+1)\log(\log(x^2-2x+1))}{(x-1)\log(x^2-2x+1)}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{2e^5(x-3)(x+2)}{(x-1)\log((x-1)^2)}+e^5(2x-1)\log(\log((x-1)^2))\right)dx$$

$$\Big\downarrow \; 2009$$

$$2e^5\int x\log(\log((x-1)^2))\,dx-\frac{2e^5(1-x)\,\text{ExpIntegralEi}\left(\frac{1}{2}\log((x-1)^2)\right)}{\sqrt{(x-1)^2}}+e^5\,\text{LogIntegral}\left((x-1)^2\right)+e^5(1-x)\log(\log((x-1)^2))-6e^5\log(\log((x-1)^2))$$

input
```
Int[(E^5*(-12 - 2*x + 2*x^2) + E^5*(1 - 3*x + 2*x^2)*Log[1 - 2*x + x^2]*Lo
g[Log[1 - 2*x + x^2]])/((-1 + x)*Log[1 - 2*x + x^2]),x]
```

output
```
$Aborted
```

3.610.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.610.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(16) = 32$.

Time = 1.97 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.76

method	result	size
norman	$-6\,e^5\ln(\ln(x^2-2x+1))+x^2e^5\ln(\ln(x^2-2x+1))-x\,e^5\ln(\ln(x^2-2x+1))$	47
parallelrisch	$-6\,e^5\ln(\ln(x^2-2x+1))+x^2e^5\ln(\ln(x^2-2x+1))-x\,e^5\ln(\ln(x^2-2x+1))$	47

input
```
int(((2*x^2-3*x+1)*exp(5)*ln(x^2-2*x+1)*ln(ln(x^2-2*x+1))+(2*x^2-2*x-12)*e
xp(5))/(-1+x)/ln(x^2-2*x+1),x,method=_RETURNVERBOSE)
```

output
```
-6*exp(5)*ln(ln(x^2-2*x+1))+x^2*exp(5)*ln(ln(x^2-2*x+1))-x*exp(5)*ln(ln(x^
2-2*x+1))
```

3.610.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int \frac{e^5(-12-2x+2x^2)+e^5(1-3x+2x^2)\log(1-2x+x^2)\log(\log(1-2x+x^2))}{(-1+x)\log(1-2x+x^2)}\,dx = (x^2-x-6)e^5\log\left(\log\left(x^2-2x+1\right)\right)$$

input
```
integrate(((2*x^2-3*x+1)*exp(5)*log(x^2-2*x+1)*log(log(x^2-2*x+1))+(2*x^2-
2*x-12)*exp(5))/(-1+x)/log(x^2-2*x+1),x, algorithm=\
```

output
```
(x^2 - x - 6)*e^5*log(log(x^2 - 2*x + 1))
```

3.610.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(17) = 34$.

Time = 0.37 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.71

$$\int \frac{e^5(-12-2x+2x^2)+e^5(1-3x+2x^2)\log(1-2x+x^2)\log(\log(1-2x+x^2))}{(-1+x)\log(1-2x+x^2)}\,dx = \left(x^2e^5-xe^5+\frac{e^5}{6}\right)\log\left(\log\left(x^2-2x+1\right)\right)-\frac{37e^5\log\left(\log\left(x^2-2x+1\right)\right)}{6}$$

input
```
integrate(((2*x**2-3*x+1)*exp(5)*ln(x**2-2*x+1)*ln(ln(x**2-2*x+1))+(2*x**2
-2*x-12)*exp(5))/(-1+x)/ln(x**2-2*x+1),x)
```

output
```
(x**2*exp(5) - x*exp(5) + exp(5)/6)*log(log(x**2 - 2*x + 1)) - 37*exp(5)*l
og(log(x**2 - 2*x + 1))/6
```

3.610.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. $2(16) = 32$.

Time = 0.32 (sec) , antiderivative size = 43, normalized size of antiderivative = 2.53

$$\int \frac{e^5(-12-2x+2x^2)+e^5(1-3x+2x^2)\log(1-2x+x^2)\log(\log(1-2x+x^2))}{(-1+x)\log(1-2x+x^2)}\,dx$$
$$= x^2e^5\log(2) - xe^5\log(2) + \left(x^2e^5 - xe^5\right)\log(\log(x-1)) - 6\,e^5\log(\log(x-1))$$

input
```
integrate(((2*x^2-3*x+1)*exp(5)*log(x^2-2*x+1)*log(log(x^2-2*x+1))+(2*x^2-
2*x-12)*exp(5))/(-1+x)/log(x^2-2*x+1),x, algorithm=\
```

output
```
x^2*e^5*log(2) - x*e^5*log(2) + (x^2*e^5 - x*e^5)*log(log(x - 1)) - 6*e^5*
log(log(x - 1))
```

3.610.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(16) = 32$.

Time = 0.37 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.71

$$\int \frac{e^5(-12-2x+2x^2)+e^5(1-3x+2x^2)\log(1-2x+x^2)\log(\log(1-2x+x^2))}{(-1+x)\log(1-2x+x^2)}\,dx$$
$$= x^2e^5\log\left(\log\left(x^2-2\,x+1\right)\right) - xe^5\log\left(\log\left(x^2-2\,x+1\right)\right) - 6\,e^5\log\left(\log\left(x^2-2\,x+1\right)\right)$$

input
```
integrate(((2*x^2-3*x+1)*exp(5)*log(x^2-2*x+1)*log(log(x^2-2*x+1))+(2*x^2-
2*x-12)*exp(5))/(-1+x)/log(x^2-2*x+1),x, algorithm=\
```

output
```
x^2*e^5*log(log(x^2 - 2*x + 1)) - x*e^5*log(log(x^2 - 2*x + 1)) - 6*e^5*lo
g(log(x^2 - 2*x + 1))
```

3.610.9 Mupad [B] (verification not implemented)

Time = 15.75 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

$$\int \frac{e^5(-12-2x+2x^2)+e^5(1-3x+2x^2)\log(1-2x+x^2)\log(\log(1-2x+x^2))}{(-1+x)\log(1-2x+x^2)}\,dx$$
$$= -\mathrm{e}^5\ \ln\left(\ln\left(x^2-2\,x+1\right)\right)\ \left(-x^2+x+6\right)$$

input
```
int(-(exp(5)*(2*x - 2*x^2 + 12) - exp(5)*log(x^2 - 2*x + 1)*log(log(x^2 -
2*x + 1))*(2*x^2 - 3*x + 1))/(log(x^2 - 2*x + 1)*(x - 1)),x)
```

output
```
-exp(5)*log(log(x^2 - 2*x + 1))*(x - x^2 + 6)
```

3.611 $\int \frac{20x+(50+60x+16x^2+(25+40x+16x^2)\log(8))\log\left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50+60x+16x^2+(25+40x+16x^2)\log(8)}$

3.611.1 Optimal result

Integrand size = 76, antiderivative size = 22

$$\int \frac{20x+(50+60x+16x^2+(25+40x+16x^2)\log(8))\log\left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50+60x+16x^2+(25+40x+16x^2)\log(8)}\,dx = x\log\left(\frac{3}{-1-\frac{5}{5+4x}-\log(8)}\right)$$

output
```
ln(3/(-1-5/(5+4*x)-3*ln(2)))*x
```

3.611.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 60 vs. 2(22) = 44.

Time = 0.05 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.73

$$\int \frac{20x+(50+60x+16x^2+(25+40x+16x^2)\log(8))\log\left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50+60x+16x^2+(25+40x+16x^2)\log(8)}\,dx = \frac{1}{4}\left(-5\log(5+4x)+(5+4x)\log\left(-\frac{3(5+4x)}{4x(1+\log(8))+5(2+\log(8))}\right) + 5\log(4x(1+\log(8))+5(2+\log(8)))\right)$$

input
```
Integrate[(20*x + (50 + 60*x + 16*x^2 + (25 + 40*x + 16*x^2)*Log[8])*Log[(
-15 - 12*x)/(10 + 4*x + (5 + 4*x)*Log[8])])/(50 + 60*x + 16*x^2 + (25 + 40
*x + 16*x^2)*Log[8]),x]
```

output
```
(-5*Log[5 + 4*x] + (5 + 4*x)*Log[(-3*(5 + 4*x))/(4*x*(1 + Log[8]) + 5*(2 +
 Log[8]))] + 5*Log[4*x*(1 + Log[8]) + 5*(2 + Log[8])])/4
```

3.611.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 158 vs. $2(22) = 44$.

Time = 0.67 (sec) , antiderivative size = 158, normalized size of antiderivative = 7.18, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.039$, Rules used = {7292, 7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(16x^2+(16x^2+40x+25)\log(8)+60x+50)\log\left(\frac{-12x-15}{4x+(4x+5)\log(8)+10}\right)+20x}{16x^2+(16x^2+40x+25)\log(8)+60x+50}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(16x^2+(16x^2+40x+25)\log(8)+60x+50)\log\left(\frac{-12x-15}{4x+(4x+5)\log(8)+10}\right)+20x}{16x^2(1+\log(8))+20x(3+\log(64))+25(2+\log(8))}dx$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{20x}{16x^2(1+\log(8))+20x(3+\log(64))+25(2+\log(8))}+\frac{(4x+5)(4x(1+\log(8))+5(2+\log(8)))\log\left(-\frac{\cdots}{4x(1\cdots}\right)}{16x^2(1+\log(8))+20x(3+\log(64))+25(2\cdots}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{5(3+\log(64))\text{arctanh}\left(\frac{8x(1+\log(8))+5(3+\log(64))}{5\sqrt{1-4\log^2(8)+\log^2(64)}}\right)}{4(1+\log(8))\sqrt{1-4\log^2(8)+\log^2(64)}}+\frac{5\log\left(16x^2(1+\log(8))+20x(3+\log(64))+25(2+\log(8))\right)}{8(1+\log(8))}+\frac{1}{4}(4x+5)\log\left(-\frac{3(4x+5)}{4x(1+\log(8))+5(2+\log(8))}\right)-\frac{5\log(4x(1+\log(8))+5(2+\log(8)))}{4(1+\log(8))}$$

3.611. $\int \frac{20x+(50+60x+16x^2+(25+40x+16x^2)\log(8))\log\left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50+60x+16x^2+(25+40x+16x^2)\log(8)}dx$

input
```
Int[(20*x + (50 + 60*x + 16*x^2 + (25 + 40*x + 16*x^2)*Log[8])*Log[(-15 -
12*x)/(10 + 4*x + (5 + 4*x)*Log[8])])/(50 + 60*x + 16*x^2 + (25 + 40*x + 1
6*x^2)*Log[8]),x]
```

output
```
(5*ArcTanh[(8*x*(1 + Log[8]) + 5*(3 + Log[64]))/(5*Sqrt[1 - 4*Log[8]^2 + L
og[64]^2])]*(3 + Log[64]))/(4*(1 + Log[8])*Sqrt[1 - 4*Log[8]^2 + Log[64]^2
]) + ((5 + 4*x)*Log[(-3*(5 + 4*x))/(4*x*(1 + Log[8]) + 5*(2 + Log[8]))])/4
 - (5*Log[4*x*(1 + Log[8]) + 5*(2 + Log[8])])/(4*(1 + Log[8])) + (5*Log[16
*x^2*(1 + Log[8]) + 25*(2 + Log[8]) + 20*x*(3 + Log[64])])/(8*(1 + Log[8])
)
```

3.611.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.611.4 Maple [A] (verified)

Time = 2.08 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

method	result
norman	$x\ln\left(\frac{-12x-15}{3(5+4x)\ln(2)+4x+10}\right)$
risch	$x\ln\left(\frac{-12x-15}{3(5+4x)\ln(2)+4x+10}\right)$
parallelrisch	$-\frac{-5625\ln(2)^2 x\ln\left(-\frac{3(5+4x)}{12x\ln(2)+15\ln(2)+4x+10}\right)-7500\ln(2)\ln\left(-\frac{3(5+4x)}{12x\ln(2)+15\ln(2)+4x+10}\right)x-2500\ln\left(-\frac{3(5+4x)}{12x\ln(2)+15\ln(}\right.}{625(3\ln(2)+2)^2}$
parts	$\frac{20\left(\frac{3\ln(2)}{4}+\frac{1}{2}\right)\ln(12x\ln(2)+15\ln(2)+4x+10)}{12\ln(2)+4}-\frac{5\ln(5+4x)}{4}-\frac{15\left(9\ln(2)^2+6\ln(2)+1\right)\left(-\frac{\ln\left(3+(3\ln(2)+1)\left(-\frac{3}{3\ln(2}\right.\right.}{}\right.}{}$
derivativedivides	$-\frac{15\left(\left(9\ln(2)^2+6\ln(2)+1\right)\left(-\frac{\ln\left(3+(3\ln(2)+1)\left(-\frac{3}{3\ln(2)+1}+\frac{15}{(3\ln(2)+1)(12x\ln(2)+15\ln(2)+4x+10)}\right)\right)}{3(3\ln(2)+1)}+\frac{\ln\left(-\frac{3}{3\ln(2)+1}\right.}{9\left(-\frac{3}{3\ln(2)+1}+\right.}\right.\right.}{}$
default	$-\frac{15\left(\left(9\ln(2)^2+6\ln(2)+1\right)\left(-\frac{\ln\left(3+(3\ln(2)+1)\left(-\frac{3}{3\ln(2)+1}+\frac{15}{(3\ln(2)+1)(12x\ln(2)+15\ln(2)+4x+10)}\right)\right)}{3(3\ln(2)+1)}+\frac{\ln\left(-\frac{3}{3\ln(2)+1}\right.}{9\left(-\frac{3}{3\ln(2)+1}+\right.}\right.\right.}{}$

input
```
int(((3*(16*x^2+40*x+25)*ln(2)+16*x^2+60*x+50)*ln((-12*x-15)/(3*(5+4*x)*ln
(2)+4*x+10))+20*x)/(3*(16*x^2+40*x+25)*ln(2)+16*x^2+60*x+50),x,method=_RET
URNVERBOSE)
```

output
```
x*ln((-12*x-15)/(3*(5+4*x)*ln(2)+4*x+10))
```

3.611.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{20x+(50+60x+16x^2+(25+40x+16x^2)\log(8))\log\left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50+60x+16x^2+(25+40x+16x^2)\log(8)}\,dx = x\log\left(-\frac{3\,(4\,x+5)}{3\,(4\,x+5)\log(2)+4\,x+10}\right)$$

input
```
integrate(((3*(16*x^2+40*x+25)*log(2)+16*x^2+60*x+50)*log((-12*x-15)/(3*(5
+4*x)*log(2)+4*x+10))+20*x)/(3*(16*x^2+40*x+25)*log(2)+16*x^2+60*x+50),x,
algorithm=\
```

output
```
x*log(-3*(4*x + 5)/(3*(4*x + 5)*log(2) + 4*x + 10))
```

3.611.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{20x + (50 + 60x + 16x^2 + (25 + 40x + 16x^2) \log(8)) \log \left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50 + 60x + 16x^2 + (25 + 40x + 16x^2) \log(8)} \, dx$$
$$= x \log \left(\frac{-12x - 15}{4x + (12x + 15) \log (2) + 10}\right)$$

input
```
integrate(((3*(16*x**2+40*x+25)*ln(2)+16*x**2+60*x+50)*ln((-12*x-15)/(3*(5
+4*x)*ln(2)+4*x+10))+20*x)/(3*(16*x**2+40*x+25)*ln(2)+16*x**2+60*x+50),x)
```

output
```
x*log((-12*x - 15)/(4*x + (12*x + 15)*log(2) + 10))
```

3.611.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.37 (sec) , antiderivative size = 512, normalized size of antiderivative = 23.27

$$\int \frac{20x + (50 + 60x + 16x^2 + (25 + 40x + 16x^2) \log(8)) \log \left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50 + 60x + 16x^2 + (25 + 40x + 16x^2) \log(8)} \, dx$$
= Too large to display

input
```
integrate(((3*(16*x^2+40*x+25)*log(2)+16*x^2+60*x+50)*log((-12*x-15)/(3*(5
+4*x)*log(2)+4*x+10))+20*x)/(3*(16*x^2+40*x+25)*log(2)+16*x^2+60*x+50),x,
algorithm=\
```

output
```
-15/4*(log(4*x*(3*log(2) + 1) + 15*log(2) + 10) - log(4*x + 5))*log(2)*log
(-12*x/(12*x*log(2) + 4*x + 15*log(2) + 10) - 15/(12*x*log(2) + 4*x + 15*l
og(2) + 10)) - 15/8*(log(4*x*(3*log(2) + 1) + 15*log(2) + 10)^2 - 2*log(4*
x*(3*log(2) + 1) + 15*log(2) + 10)*log(4*x + 5) + log(4*x + 5)^2)*log(2) -
 5/4*log(4*x*(3*log(2) + 1) + 15*log(2) + 10)^2 + 5/2*log(4*x*(3*log(2) +
1) + 15*log(2) + 10)*log(4*x + 5) - 5/4*log(4*x + 5)^2 - 5/2*(log(4*x*(3*l
og(2) + 1) + 15*log(2) + 10) - log(4*x + 5))*log(-12*x/(12*x*log(2) + 4*x
+ 15*log(2) + 10) - 15/(12*x*log(2) + 4*x + 15*log(2) + 10)) + 5/4*(3*log(
2) + 2)*log(4*x*(3*log(2) + 1) + 15*log(2) + 10)/(3*log(2) + 1) - 1/8*(5*(
9*log(2)^2 + 9*log(2) + 2)*log(4*x*(3*log(2) + 1) + 15*log(2) + 10)^2 + 5*
(9*log(2)^2 + 9*log(2) + 2)*log(4*x + 5)^2 - 8*(I*pi*(3*log(2) + 1) + 3*lo
g(3)*log(2) + log(3))*x - 2*(45*log(3)*log(2)^2 + 5*I*pi*(9*log(2)^2 + 9*l
og(2) + 2) - 4*x*(3*log(2) + 1) + 15*(3*log(3) - 1)*log(2) + 5*(9*log(2)^2
 + 9*log(2) + 2)*log(4*x + 5) + 10*log(3) - 10)*log(4*x*(3*log(2) + 1) + 1
5*log(2) + 10) + 2*(45*log(3)*log(2)^2 + 5*I*pi*(9*log(2)^2 + 9*log(2) + 2
) - 4*x*(3*log(2) + 1) + 15*(3*log(3) - 1)*log(2) + 10*log(3) - 5)*log(4*x
 + 5))/(3*log(2) + 1) - 5/4*log(4*x + 5)
```

3.611.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 149 vs. $2(22) = 44$.

Time = 0.37 (sec) , antiderivative size = 149, normalized size of antiderivative = 6.77

$$\int \frac{20x + (50 + 60x + 16x^2 + (25 + 40x + 16x^2)\log(8))\log\left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50 + 60x + 16x^2 + (25 + 40x + 16x^2)\log(8)}\,dx$$
$$= -\frac{5\,(3\,\log(2) + 2)\log\left(-\frac{3\,(4\,x+5)}{12\,x\log(2)+4\,x+15\,\log(2)+10}\right)}{4\,(3\,\log(2) + 1)} - \frac{5\,\log\left(-\frac{3\,(4\,x+5)}{12\,x\log(2)+4\,x+15\,\log(2)+10}\right)}{4\left(\frac{9\,(4\,x+5)\log(2)^2}{12\,x\log(2)+4\,x+15\,\log(2)+10} + \frac{6\,(4\,x+5)\log(2)}{12\,x\log(2)+4\,x+15\,\log(2)+10} + \frac{4\,x+5}{12\,x\log(2)+4\,x+15\,\log(2)+10} - 3\,\log(2) - 1\right)}$$

input
```
integrate(((3*(16*x^2+40*x+25)*log(2)+16*x^2+60*x+50)*log((-12*x-15)/(3*(5
+4*x)*log(2)+4*x+10))+20*x)/(3*(16*x^2+40*x+25)*log(2)+16*x^2+60*x+50),x,
algorithm=\
```

output
```
-5/4*(3*log(2) + 2)*log(-3*(4*x + 5)/(12*x*log(2) + 4*x + 15*log(2) + 10))
/(3*log(2) + 1) - 5/4*log(-3*(4*x + 5)/(12*x*log(2) + 4*x + 15*log(2) + 10
))/(9*(4*x + 5)*log(2)^2/(12*x*log(2) + 4*x + 15*log(2) + 10) + 6*(4*x + 5
)*log(2)/(12*x*log(2) + 4*x + 15*log(2) + 10) + (4*x + 5)/(12*x*log(2) + 4
*x + 15*log(2) + 10) - 3*log(2) - 1)
```

3.611.9 Mupad [B] (verification not implemented)

Time = 1.33 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{20x+(50+60x+16x^2+(25+40x+16x^2)\log(8))\log\left(\frac{-15-12x}{10+4x+(5+4x)\log(8)}\right)}{50+60x+16x^2+(25+40x+16x^2)\log(8)}\,dx = x\,\ln\left(-\frac{12\,x+15}{4\,x+3\,\ln(2)\,\left(4\,x+5\right)+10}\right)$$

input
```
int((20*x + log(-(12*x + 15)/(4*x + 3*log(2)*(4*x + 5) + 10))*(60*x + 3*lo
g(2)*(40*x + 16*x^2 + 25) + 16*x^2 + 50))/(60*x + 3*log(2)*(40*x + 16*x^2
+ 25) + 16*x^2 + 50),x)
```

output
```
x*log(-(12*x + 15)/(4*x + 3*log(2)*(4*x + 5) + 10))
```

3.612 $\int \frac{-10-20x+(-5-10x-10x^2)\log(3)+e^x(-20-10x+(-5-20x-5x^2+5x^3)\log(3))}{x^2+2x^3+x^4+e^{2x}(1+2x+x^2)+e^x(2x+4x^2+2x^3)}$

3.612.1 Optimal result

Integrand size = 92, antiderivative size = 27

$$\int \frac{-10-20x+(-5-10x-10x^2)\log(3)+e^x(-20-10x+(-5-20x-5x^2+5x^3)\log(3))}{x^2+2x^3+x^4+e^{2x}(1+2x+x^2)+e^x(2x+4x^2+2x^3)}\,dx = \frac{5(2+(1+x-x^2)\log(3))}{(1+x)(e^x+x)}$$

output
```
5/(1+x)*((-x^2+x+1)*ln(3)+2)/(exp(x)+x)
```

3.612.2 Mathematica [A] (verified)

Time = 0.68 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.81

$$\int \frac{-10-20x+(-5-10x-10x^2)\log(3)+e^x(-20-10x+(-5-20x-5x^2+5x^3)\log(3))}{x^2+2x^3+x^4+e^{2x}(1+2x+x^2)+e^x(2x+4x^2+2x^3)}\,dx = -\frac{5(2+\log(3)+x\log(3)-x^3\log(3)+x^4\log(3)-x^2(2+\log(9)))}{(-1+x)(1+x)^2(e^x+x)}$$

input
```
Integrate[(-10 - 20*x + (-5 - 10*x - 10*x^2)*Log[3] + E^x*(-20 - 10*x + (-
5 - 20*x - 5*x^2 + 5*x^3)*Log[3]))/(x^2 + 2*x^3 + x^4 + E^(2*x)*(1 + 2*x +
 x^2) + E^x*(2*x + 4*x^2 + 2*x^3)),x]
```

output
```
(-5*(2 + Log[3] + x*Log[3] - x^3*Log[3] + x^4*Log[3] - x^2*(2 + Log[9])))/
((-1 + x)*(1 + x)^2*(E^x + x))
```

3.612.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-10x^2-10x-5)\log(3)+e^x\left((5x^3-5x^2-20x-5)\log(3)-10x-20\right)-20x-10}{x^4+2x^3+x^2+e^{2x}(x^2+2x+1)+e^x(2x^3+4x^2+2x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(-10x^2-10x-5)\log(3)+e^x\left((5x^3-5x^2-20x-5)\log(3)-10x-20\right)-20x-10}{(x+1)^2(x+e^x)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{5(x^3\log(3)-x^2\log(3)-2x(1+\log(9))-4-\log(3))}{(x+1)^2(x+e^x)}-\frac{5(x^3\log(3)-x^2\log(9)-2x+2+\log(3))}{(x+1)(x+e^x)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-5\log(3)\int \frac{x^2}{(x+e^x)^2}dx+5\log(27)\int \frac{1}{(x+e^x)^2}dx+5(2-\log(27))\int \frac{1}{(x+e^x)^2}dx-5(4-\log(9))\int \frac{1}{(x+1)(x+e^x)^2}dx+5\log(27)\int \frac{1}{x+e^x}dx-15\log(3)\int \frac{1}{x+e^x}dx+5\log(3)\int \frac{x}{x+e^x}dx-5(2-\log(3))\int \frac{1}{(x+1)^2(x+e^x)}dx-5(2-\log(3))\int \frac{1}{(x+1)(x+e^x)}dx+\frac{5\log(27)}{x+e^x}$$

input
```
Int[(-10 - 20*x + (-5 - 10*x - 10*x^2)*Log[3] + E^x*(-20 - 10*x + (-5 - 20
*x - 5*x^2 + 5*x^3)*Log[3]))/(x^2 + 2*x^3 + x^4 + E^(2*x)*(1 + 2*x + x^2)
+ E^x*(2*x + 4*x^2 + 2*x^3)),x]
```

output
```
$Aborted
```

3.612.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.612.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

method	result	size
risch	$-\frac{5\left(x^{2} \ln\left(3\right)-x \ln\left(3\right)-\ln\left(3\right)-2\right)}{\left(1+x\right)\left({\mathrm e}^{x}+x\right)}$	31
parallelrisch	$-\frac{5 x^{2} \ln\left(3\right)-10-5 x \ln\left(3\right)-5 \ln\left(3\right)}{{\mathrm e}^{x} x+x^{2}+{\mathrm e}^{x}+x}$	34
norman	$\frac{5 \ln\left(3\right) {\mathrm e}^{x}+10 x \ln\left(3\right)+5 x \ln\left(3\right) {\mathrm e}^{x}+5 \ln\left(3\right)+10}{{\mathrm e}^{x} x+x^{2}+{\mathrm e}^{x}+x}$	39

input
```
int((((5*x^3-5*x^2-20*x-5)*ln(3)-10*x-20)*exp(x)+(-10*x^2-10*x-5)*ln(3)-20
*x-10)/((x^2+2*x+1)*exp(x)^2+(2*x^3+4*x^2+2*x)*exp(x)+x^4+2*x^3+x^2),x,met
hod=_RETURNVERBOSE)
```

output
```
-5*(x^2*ln(3)-x*ln(3)-ln(3)-2)/(1+x)/(exp(x)+x)
```

3.612.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

$$\int \frac{-10-20x+(-5-10x-10x^2)\log(3)+e^x(-20-10x+(-5-20x-5x^2+5x^3)\log(3))}{x^2+2x^3+x^4+e^{2x}(1+2x+x^2)+e^x(2x+4x^2+2x^3)}\,dx = -\frac{5\left(\left(x^{2}-x-1\right)\log\left(3\right)-2\right)}{x^{2}+(x+1)e^{x}+x}$$

input
```
integrate((((5*x^3-5*x^2-20*x-5)*log(3)-10*x-20)*exp(x)+(-10*x^2-10*x-5)*l
og(3)-20*x-10)/((x^2+2*x+1)*exp(x)^2+(2*x^3+4*x^2+2*x)*exp(x)+x^4+2*x^3+x^
2),x, algorithm=\
```

output
```
-5*((x^2 - x - 1)*log(3) - 2)/(x^2 + (x + 1)*e^x + x)
```

3.612.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{-10-20x+(-5-10x-10x^2)\log(3)+e^x(-20-10x+(-5-20x-5x^2+5x^3)\log(3))}{x^2+2x^3+x^4+e^{2x}(1+2x+x^2)+e^x(2x+4x^2+2x^3)}\,dx$$
$$= \frac{-5x^2\log(3)+5x\log(3)+5\log(3)+10}{x^2+x+(x+1)e^x}$$

input
```
integrate((((5*x**3-5*x**2-20*x-5)*ln(3)-10*x-20)*exp(x)+(-10*x**2-10*x-5)
*ln(3)-20*x-10)/((x**2+2*x+1)*exp(x)**2+(2*x**3+4*x**2+2*x)*exp(x)+x**4+2*
x**3+x**2),x)
```

output
```
(-5*x**2*log(3) + 5*x*log(3) + 5*log(3) + 10)/(x**2 + x + (x + 1)*exp(x))
```

3.612.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{-10-20x+(-5-10x-10x^2)\log(3)+e^x(-20-10x+(-5-20x-5x^2+5x^3)\log(3))}{x^2+2x^3+x^4+e^{2x}(1+2x+x^2)+e^x(2x+4x^2+2x^3)}\,dx$$
$$= -\frac{5(x^2\log(3)-x\log(3)-\log(3)-2)}{x^2+(x+1)e^x+x}$$

input
```
integrate((((5*x^3-5*x^2-20*x-5)*log(3)-10*x-20)*exp(x)+(-10*x^2-10*x-5)*l
og(3)-20*x-10)/((x^2+2*x+1)*exp(x)^2+(2*x^3+4*x^2+2*x)*exp(x)+x^4+2*x^3+x^
2),x, algorithm=\
```

output
```
-5*(x^2*log(3) - x*log(3) - log(3) - 2)/(x^2 + (x + 1)*e^x + x)
```

3.612.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{-10-20x+(-5-10x-10x^2)\log(3)+e^x(-20-10x+(-5-20x-5x^2+5x^3)\log(3))}{x^2+2x^3+x^4+e^{2x}(1+2x+x^2)+e^x(2x+4x^2+2x^3)}\,dx$$
$$=-\frac{5(x^2\log(3)-x\log(3)-\log(3)-2)}{x^2+xe^x+x+e^x}$$

input
```
integrate((((5*x^3-5*x^2-20*x-5)*log(3)-10*x-20)*exp(x)+(-10*x^2-10*x-5)*l
og(3)-20*x-10)/((x^2+2*x+1)*exp(x)^2+(2*x^3+4*x^2+2*x)*exp(x)+x^4+2*x^3+x^
2),x, algorithm=\
```

output
```
-5*(x^2*log(3) - x*log(3) - log(3) - 2)/(x^2 + x*e^x + x + e^x)
```

3.612.9 Mupad [B] (verification not implemented)

Time = 15.96 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{-10-20x+(-5-10x-10x^2)\log(3)+e^x(-20-10x+(-5-20x-5x^2+5x^3)\log(3))}{x^2+2x^3+x^4+e^{2x}(1+2x+x^2)+e^x(2x+4x^2+2x^3)}\,dx$$
$$=\frac{-\ln(243)\,x^2+\ln(243)\,x+\ln(243)+10}{(x+e^x)\,(x+1)}$$

input
```
int(-(20*x + log(3)*(10*x + 10*x^2 + 5) + exp(x)*(10*x + log(3)*(20*x + 5*
x^2 - 5*x^3 + 5) + 20) + 10)/(exp(2*x)*(2*x + x^2 + 1) + x^2 + 2*x^3 + x^4
 + exp(x)*(2*x + 4*x^2 + 2*x^3)),x)
```

output
```
(log(243) + x*log(243) - x^2*log(243) + 10)/((x + exp(x))*(x + 1))
```

3.613 $\int \frac{1+e^x x-4x\log^2(5)}{x}\,dx$

3.613.1 Optimal result

Integrand size = 18, antiderivative size = 24

$$\int \frac{1+e^x x-4x\log^2(5)}{x}\,dx=6+e^x-\frac{4\left(-2x+x^2\log^2(5)\right)}{x}+\log(x)$$

output
```
6+exp(x)-4*(x^2*ln(5)^2-2*x)/x+ln(x)
```

3.613.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{1+e^x x-4x\log^2(5)}{x}\,dx=e^x-4x\log^2(5)+\log(x)$$

input
```
Integrate[(1 + E^x*x - 4*x*Log[5]^2)/x,x]
```

output
```
E^x - 4*x*Log[5]^2 + Log[x]
```

3.613.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x - 4x\log^2(5) + 1}{x} \, dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(e^x + \frac{1 - 4x\log^2(5)}{x}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$e^x - 4x\log^2(5) + \log(x)$$

input
```
Int[(1 + E^x*x - 4*x*Log[5]^2)/x,x]
```

output
```
E^x - 4*x*Log[5]^2 + Log[x]
```

3.613.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.613.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

method	result	size
default	$\ln(x) - 4x\ln(5)^2 + e^x$	13
norman	$\ln(x) - 4x\ln(5)^2 + e^x$	13
risch	$\ln(x) - 4x\ln(5)^2 + e^x$	13
parallelrisch	$\ln(x) - 4x\ln(5)^2 + e^x$	13
parts	$\ln(x) - 4x\ln(5)^2 + e^x$	13

input
```
int((exp(x)*x-4*x*ln(5)^2+1)/x,x,method=_RETURNVERBOSE)
```

output
```
ln(x)-4*x*ln(5)^2+exp(x)
```

3.613.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

$$\int \frac{1 + e^x x - 4x\log^2(5)}{x}\,dx = -4\,x\log(5)^2 + e^x + \log(x)$$

input
```
integrate((exp(x)*x-4*x*log(5)^2+1)/x,x, algorithm=\
```

output
```
-4*x*log(5)^2 + e^x + log(x)
```

3.613.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.58

$$\int \frac{1 + e^x x - 4x\log^2(5)}{x}\,dx = -4x\log(5)^2 + e^x + \log(x)$$

input
```
integrate((exp(x)*x-4*x*ln(5)**2+1)/x,x)
```

output
```
-4*x*log(5)**2 + exp(x) + log(x)
```

3.613.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

$$\int \frac{1 + e^x x - 4x \log^2(5)}{x} \, dx = -4 \, x \log{(5)}^2 + e^x + \log{(x)}$$

input
```
integrate((exp(x)*x-4*x*log(5)^2+1)/x,x, algorithm=\
```

output
```
-4*x*log(5)^2 + e^x + log(x)
```

3.613.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

$$\int \frac{1 + e^x x - 4x \log^2(5)}{x} \, dx = -4 \, x \log{(5)}^2 + e^x + \log{(x)}$$

input
```
integrate((exp(x)*x-4*x*log(5)^2+1)/x,x, algorithm=\
```

output
```
-4*x*log(5)^2 + e^x + log(x)
```

3.613.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

$$\int \frac{1 + e^x x - 4x \log^2(5)}{x} \, dx = \mathrm{e}^x + \ln{(x)} - 4 \, x \ln{(5)}^2$$

input
```
int((x*exp(x) - 4*x*log(5)^2 + 1)/x,x)
```

output
```
exp(x) + log(x) - 4*x*log(5)^2
```

3.614 $\int \frac{9-27\log(x)}{40x^4}\,dx$

3.614.1 Optimal result

Integrand size = 13, antiderivative size = 9

$$\int \frac{9-27\log(x)}{40x^4}\,dx = \frac{9\log(x)}{40x^3}$$

output
```
9/40*ln(x)/x^3
```

3.614.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{9-27\log(x)}{40x^4}\,dx = \frac{9\log(x)}{40x^3}$$

input
```
Integrate[(9 - 27*Log[x])/(40*x^4),x]
```

output
```
(9*Log[x])/(40*x^3)
```

3.614.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.231$, Rules used = {27, 27, 2740}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{9-27\log(x)}{40x^4}\,dx$$
$$\Big\downarrow \; 27$$
$$\frac{1}{40}\int \frac{9(1-3\log(x))}{x^4}dx$$
$$\Big\downarrow \; 27$$
$$\frac{9}{40}\int \frac{1-3\log(x)}{x^4}dx$$
$$\Big\downarrow \; 2740$$
$$\frac{9\log(x)}{40x^3}$$

input
```
Int[(9 - 27*Log[x])/(40*x^4),x]
```

output
```
(9*Log[x])/(40*x^3)
```

3.614.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2740
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[b*(d*x)^(m + 1)*(Log[c*x^n]/(d*(m + 1))), x] /; FreeQ[{a, b, c, d, m,
n}, x] && NeQ[m, -1] && EqQ[a*(m + 1) - b*n, 0]
```

3.614.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.89

method	result	size
default	$\frac{9\ln(x)}{40x^3}$	8
norman	$\frac{9\ln(x)}{40x^3}$	8
risch	$\frac{9\ln(x)}{40x^3}$	8
parallelrisch	$\frac{9\ln(x)}{40x^3}$	8
parts	$\frac{9\ln(x)}{40x^3}$	8

input
```
int(1/40*(-27*ln(x)+9)/x^4,x,method=_RETURNVERBOSE)
```

output
```
9/40*ln(x)/x^3
```

3.614.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.78

$$\int \frac{9-27\log(x)}{40x^4}\,dx = \frac{9\,\log(x)}{40\,x^3}$$

input
```
integrate(1/40*(-27*log(x)+9)/x^4,x, algorithm=\
```

output
```
9/40*log(x)/x^3
```

3.614.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.89

$$\int \frac{9-27\log(x)}{40x^4}\,dx = \frac{9\log(x)}{40x^3}$$

input
```
integrate(1/40*(-27*ln(x)+9)/x**4,x)
```

output
```
9*log(x)/(40*x**3)
```

3.614.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 17 vs. $2(7) = 14$.

Time = 0.21 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.89

$$\int \frac{9 - 27\log(x)}{40x^4}\,dx = \frac{3\,(3\,\log(x) + 1)}{40\,x^3} - \frac{3}{40\,x^3}$$

input
```
integrate(1/40*(-27*log(x)+9)/x^4,x, algorithm=\
```

output
```
3/40*(3*log(x) + 1)/x^3 - 3/40/x^3
```

3.614.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.78

$$\int \frac{9 - 27\log(x)}{40x^4}\,dx = \frac{9\,\log(x)}{40\,x^3}$$

input
```
integrate(1/40*(-27*log(x)+9)/x^4,x, algorithm=\
```

output
```
9/40*log(x)/x^3
```

3.614.9 Mupad [B] (verification not implemented)

Time = 15.65 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.78

$$\int \frac{9 - 27\log(x)}{40x^4}\,dx = \frac{9\,\ln(x)}{40\,x^3}$$

input
```
int(-((27*log(x))/40 - 9/40)/x^4,x)
```

output
```
(9*log(x))/(40*x^3)
```

3.615 $\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx$

3.615.1 Optimal result

Integrand size = 81, antiderivative size = 31

$$\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx=\log\left(e^{3\left(-2+\frac{e^{e^x}}{2}+x\right)}+x^2-\log\left(\frac{4x^2}{25}\right)\right)$$

output
```
ln(x^2+exp(3/2*exp(exp(x))+3*x-6)-ln(4/25*x^2))
```

3.615.2 Mathematica [A] (verified)

Time = 0.84 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.19

$$\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx=\log\left(e^{\frac{3e^{e^x}}{2}+3x}+e^6x^2-e^6\log\left(\frac{4x^2}{25}\right)\right)$$

input
```
Integrate[(-4 + 4*x^2 + E^((-12 + 3*E^E^x + 6*x)/2)*(6*x + 3*E^(E^x + x)*x
))/(2*E^((-12 + 3*E^E^x + 6*x)/2)*x + 2*x^3 - 2*x*Log[(4*x^2)/25]),x]
```

output
```
Log[E^((3*E^E^x)/2 + 3*x) + E^6*x^2 - E^6*Log[(4*x^2)/25]]
```

3.615.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^2+e^{\frac{1}{2}\left(6x+3e^{e^x}-12\right)}\left(3e^{x+e^x}x+6x\right)-4}{2x^3-2x\log\left(\frac{4x^2}{25}\right)+2e^{\frac{1}{2}\left(6x+3e^{e^x}-12\right)}x}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{e^6\left(3e^{x+e^x}x^3+6x^3-4x^2-3e^{x+e^x}x\log\left(\frac{4x^2}{25}\right)-6x\log\left(\frac{4x^2}{25}\right)+4\right)}{2x\left(e^6x^2-e^6\log\left(\frac{4x^2}{25}\right)+e^{3x+\frac{3e^{e^x}}{2}}\right)}+\frac{3e^{x+e^x}}{2}+3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-2e^6\int \frac{1}{x\left(e^6x^2+e^{3x+\frac{3e^{e^x}}{2}}-e^6\log\left(\frac{4x^2}{25}\right)\right)}dx+2e^6\int \frac{x}{e^6x^2+e^{3x+\frac{3e^{e^x}}{2}}-e^6\log\left(\frac{4x^2}{25}\right)}dx-3e^6\int \frac{x^2}{e^6x^2+e^{3x+\frac{3e^{e^x}}{2}}-e^6\log\left(\frac{4x^2}{25}\right)}dx-\frac{3}{2}e^6\int \frac{e^{x+e^x}x^2}{e^6x^2+e^{3x+\frac{3e^{e^x}}{2}}-e^6\log\left(\frac{4x^2}{25}\right)}dx+\frac{3}{2}e^6\int \frac{e^{x+e^x}\log\left(\frac{4x^2}{25}\right)}{e^6x^2+e^{3x+\frac{3e^{e^x}}{2}}-e^6\log\left(\frac{4x^2}{25}\right)}dx-3e^6\int \frac{\log\left(\frac{4x^2}{25}\right)}{-e^6x^2-e^{3x+\frac{3e^{e^x}}{2}}+e^6\log\left(\frac{4x^2}{25}\right)}dx+3x+\frac{3e^{e^x}}{2}$$

input
```
Int[(-4 + 4*x^2 + E^((-12 + 3*E^E^x + 6*x)/2)*(6*x + 3*E^(E^x + x)*x))/(2*
E^((-12 + 3*E^E^x + 6*x)/2)*x + 2*x^3 - 2*x*Log[(4*x^2)/25]),x]
```

output
```
$Aborted
```

3.615.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.615. $\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}dx$

3.615.4 Maple [A] (verified)

Time = 2.31 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81

method	result
parallelrisch	$\ln\left(x^{2}+{\mathrm e}^{\frac{3\,{\mathrm e}^{{\mathrm e}^{x}}}{2}+3x-6}-\ln\left(\frac{4x^{2}}{25}\right)\right)$
risch	$6+\ln\left({\mathrm e}^{\frac{3\,{\mathrm e}^{{\mathrm e}^{x}}}{2}+3x-6}-\frac{i\left(-\pi\,\mathrm{csgn}\left(i x^{2}\right)^{3}-\pi\,\mathrm{csgn}\left(i x\right)^{2}\mathrm{csgn}\left(i x^{2}\right)+2\pi\,\mathrm{csgn}\left(i x\right)\mathrm{csgn}\left(i x^{2}\right)^{2}+2 i x^{2}-4 i\ln\left(2\right)+4 i\ln\left(5\right)-4 i\ln\right.}{2}\right.$

input
```
int(((3*x*exp(x)*exp(exp(x))+6*x)*exp(3/2*exp(exp(x))+3*x-6)+4*x^2-4)/(2*x
*exp(3/2*exp(exp(x))+3*x-6)-2*x*ln(4/25*x^2)+2*x^3),x,method=_RETURNVERBOS
E)
```

output
```
ln(x^2+exp(3/2*exp(exp(x))+3*x-6)-ln(4/25*x^2))
```

3.615.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.06

$$\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx$$
$$=\log\left(x^2+e^{\left(\frac{3}{2}\left(2\,(x-2)e^x+e^{\left(x+e^x\right)}\right)e^{(-x)}\right)}-\log\left(\frac{4}{25}\,x^2\right)\right)$$

input
```
integrate(((3*x*exp(x)*exp(exp(x))+6*x)*exp(3/2*exp(exp(x))+3*x-6)+4*x^2-4
)/(2*x*exp(3/2*exp(exp(x))+3*x-6)-2*x*log(4/25*x^2)+2*x^3),x, algorithm=\
```

output
```
log(x^2 + e^(3/2*(2*(x - 2)*e^x + e^(x + e^x))*e^(-x)) - log(4/25*x^2))
```

3.615.6 Sympy [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx=\log\left(x^2+e^{3x+\frac{3e^{e^x}}{2}-6}-\log\left(\frac{4x^2}{25}\right)\right)$$

input
```
integrate(((3*x*exp(x)*exp(exp(x))+6*x)*exp(3/2*exp(exp(x))+3*x-6)+4*x**2-
4)/(2*x*exp(3/2*exp(exp(x))+3*x-6)-2*x*ln(4/25*x**2)+2*x**3),x)
```

output
```
log(x**2 + exp(3*x + 3*exp(exp(x))/2 - 6) - log(4*x**2/25))
```

3.615.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.42

$$\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx$$
$$=3\,x+\log\left(\left(x^2e^6+2\left(\log\left(5\right)-\log\left(2\right)\right)e^6-2\,e^6\log\left(x\right)+e^{\left(3\,x+\frac{3}{2}\,e^{\left(e^x\right)}\right)}\right)e^{\left(-3\,x\right)}\right)$$

input
```
integrate(((3*x*exp(x)*exp(exp(x))+6*x)*exp(3/2*exp(exp(x))+3*x-6)+4*x^2-4
)/(2*x*exp(3/2*exp(exp(x))+3*x-6)-2*x*log(4/25*x^2)+2*x^3),x, algorithm=\
```

output
```
3*x + log((x^2*e^6 + 2*(log(5) - log(2))*e^6 - 2*e^6*log(x) + e^(3*x + 3/2
*e^(e^x)))*e^(-3*x))
```

3.615.8 Giac [F]

$$\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx$$
$$=\int \frac{4\,x^2+3\left(xe^{\left(x+e^x\right)}+2\,x\right)e^{\left(3\,x+\frac{3}{2}\,e^{\left(e^x\right)}-6\right)}-4}{2\left(x^3+xe^{\left(3\,x+\frac{3}{2}\,e^{\left(e^x\right)}-6\right)}-x\log\left(\frac{4}{25}\,x^2\right)\right)}\,dx$$

3.615. $\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx$

input
```
integrate(((3*x*exp(x)*exp(exp(x))+6*x)*exp(3/2*exp(exp(x))+3*x-6)+4*x^2-4
)/(2*x*exp(3/2*exp(exp(x))+3*x-6)-2*x*log(4/25*x^2)+2*x^3),x, algorithm=\
```

output
```
integrate(1/2*(4*x^2 + 3*(x*e^(x + e^x) + 2*x)*e^(3*x + 3/2*e^(e^x) - 6) -
 4)/(x^3 + x*e^(3*x + 3/2*e^(e^x) - 6) - x*log(4/25*x^2)), x)
```

3.615.9 Mupad [B] (verification not implemented)

Time = 15.75 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{-4+4x^2+e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}\left(6x+3e^{e^x+x}x\right)}{2e^{\frac{1}{2}\left(-12+3e^{e^x}+6x\right)}x+2x^3-2x\log\left(\frac{4x^2}{25}\right)}\,dx=\ln\left(x^2-\ln\left(\frac{4\,x^2}{25}\right)+\mathrm{e}^{3\,x}\,\mathrm{e}^{-6}\,\left(\mathrm{e}^{\mathrm{e}^{\mathrm{e}^x}}\right)^{3/2}\right)$$

input
```
int((exp(3*x + (3*exp(exp(x)))/2 - 6)*(6*x + 3*x*exp(exp(x))*exp(x)) + 4*x
^2 - 4)/(2*x*exp(3*x + (3*exp(exp(x)))/2 - 6) - 2*x*log((4*x^2)/25) + 2*x^
3),x)
```

output
```
log(x^2 - log((4*x^2)/25) + exp(3*x)*exp(-6)*exp(exp(exp(x)))^(3/2))
```

3.616 $\int (-6750000 + e^x + 10845000x - 7095600x^2 + 2436$

3.616.1 Optimal result

Integrand size = 38, antiderivative size = 18

$$\int \left(-6750000 + e^x + 10845000x - 7095600x^2 + 2436696x^3 - 473040x^4 + 52056x^5 - 3024x^6 + 72x^7\right) dx = 3 + e^x + 9\left((-5+x)^2 - 2x\right)^4$$

output
```
exp(x)+9*((-5+x)^2-2*x)^4+3
```

3.616.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 42 vs. 2(18) = 36.

Time = 0.01 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.33

$$\int \left(-6750000 + e^x + 10845000x - 7095600x^2 + 2436696x^3 - 473040x^4 + 52056x^5 - 3024x^6 + 72x^7\right) dx = e^x - 6750000x + 5422500x^2 - 2365200x^3 + 609174x^4 - 94608x^5 + 8676x^6 - 432x^7 + 9x^8$$

input
```
Integrate[-6750000 + E^x + 10845000*x - 7095600*x^2 + 2436696*x^3 - 473040
*x^4 + 52056*x^5 - 3024*x^6 + 72*x^7,x]
```

output
```
E^x - 6750000*x + 5422500*x^2 - 2365200*x^3 + 609174*x^4 - 94608*x^5 + 867
6*x^6 - 432*x^7 + 9*x^8
```

3.616.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 42 vs. $2(18) = 36$.

Time = 0.16 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.33, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (72x^7 - 3024x^6 + 52056x^5 - 473040x^4 + 2436696x^3 - 7095600x^2 + 10845000x + e^x - 6750000)\,dx$$
$$\Big\downarrow \text{2009}$$
$$9x^8 - 432x^7 + 8676x^6 - 94608x^5 + 609174x^4 - 2365200x^3 + 5422500x^2 - 6750000x + e^x$$

input
```
Int[-6750000 + E^x + 10845000*x - 7095600*x^2 + 2436696*x^3 - 473040*x^4 +
 52056*x^5 - 3024*x^6 + 72*x^7,x]
```

output
```
E^x - 6750000*x + 5422500*x^2 - 2365200*x^3 + 609174*x^4 - 94608*x^5 + 867
6*x^6 - 432*x^7 + 9*x^8
```

3.616.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.616.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. $2(17) = 34$.

Time = 0.07 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.33

method	result
default	$9x^8 - 432x^7 + 8676x^6 - 94608x^5 + 609174x^4 - 2365200x^3 + 5422500x^2 - 6750000x + e^x$
norman	$9x^8 - 432x^7 + 8676x^6 - 94608x^5 + 609174x^4 - 2365200x^3 + 5422500x^2 - 6750000x + e^x$
risch	$9x^8 - 432x^7 + 8676x^6 - 94608x^5 + 609174x^4 - 2365200x^3 + 5422500x^2 - 6750000x + e^x$
parallelrisch	$9x^8 - 432x^7 + 8676x^6 - 94608x^5 + 609174x^4 - 2365200x^3 + 5422500x^2 - 6750000x + e^x$
parts	$9x^8 - 432x^7 + 8676x^6 - 94608x^5 + 609174x^4 - 2365200x^3 + 5422500x^2 - 6750000x + e^x$

3.616. $\int (-6750000 + e^x + 10845000x - 7095600x^2 + 2436696x^3 - 473040x^4 + 52056x^5 - 3024x^6 + 72x^7)\,dx$

input
```
int(exp(x)+72*x^7-3024*x^6+52056*x^5-473040*x^4+2436696*x^3-7095600*x^2+10
845000*x-6750000,x,method=_RETURNVERBOSE)
```

output
```
9*x^8-432*x^7+8676*x^6-94608*x^5+609174*x^4-2365200*x^3+5422500*x^2-675000
0*x+exp(x)
```

3.616.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. $2(17) = 34$.

Time = 0.24 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.28

$$\int \left(-6750000 + e^x + 10845000x - 7095600x^2 + 2436696x^3 - 473040x^4 + 52056x^5 - 3024x^6 + 72x^7\right) dx = 9\,x^8 - 432\,x^7 + 8676\,x^6 - 94608\,x^5 + 609174\,x^4 - 2365200\,x^3 + 5422500\,x^2 - 6750000\,x + e^x$$

input
```
integrate(exp(x)+72*x^7-3024*x^6+52056*x^5-473040*x^4+2436696*x^3-7095600*
x^2+10845000*x-6750000,x, algorithm=\
```

output
```
9*x^8 - 432*x^7 + 8676*x^6 - 94608*x^5 + 609174*x^4 - 2365200*x^3 + 542250
0*x^2 - 6750000*x + e^x
```

3.616.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. $2(15) = 30$.

Time = 0.05 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.28

$$\int \left(-6750000 + e^x + 10845000x - 7095600x^2 + 2436696x^3 - 473040x^4 + 52056x^5 - 3024x^6 + 72x^7\right) dx = 9x^8 - 432x^7 + 8676x^6 - 94608x^5 + 609174x^4 - 2365200x^3 + 5422500x^2 - 6750000x + e^x$$

input
```
integrate(exp(x)+72*x**7-3024*x**6+52056*x**5-473040*x**4+2436696*x**3-709
5600*x**2+10845000*x-6750000,x)
```

output
```
9*x**8 - 432*x**7 + 8676*x**6 - 94608*x**5 + 609174*x**4 - 2365200*x**3 +
5422500*x**2 - 6750000*x + exp(x)
```

3.616.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. $2(17) = 34$.

Time = 0.21 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.28

$$\int \left(-6750000 + e^x + 10845000x - 7095600x^2 + 2436696x^3 - 473040x^4 + 52056x^5 - 3024x^6 + 72x^7\right) dx = 9\,x^8 - 432\,x^7 + 8676\,x^6 - 94608\,x^5 + 609174\,x^4 - 2365200\,x^3 + 5422500\,x^2 - 6750000\,x + e^x$$

input
```
integrate(exp(x)+72*x^7-3024*x^6+52056*x^5-473040*x^4+2436696*x^3-7095600*
x^2+10845000*x-6750000,x, algorithm=\
```

output
```
9*x^8 - 432*x^7 + 8676*x^6 - 94608*x^5 + 609174*x^4 - 2365200*x^3 + 542250
0*x^2 - 6750000*x + e^x
```

3.616.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. $2(17) = 34$.

Time = 0.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.28

$$\int \left(-6750000 + e^x + 10845000x - 7095600x^2 + 2436696x^3 - 473040x^4 + 52056x^5 - 3024x^6 + 72x^7\right) dx = 9\,x^8 - 432\,x^7 + 8676\,x^6 - 94608\,x^5 + 609174\,x^4 - 2365200\,x^3 + 5422500\,x^2 - 6750000\,x + e^x$$

input
```
integrate(exp(x)+72*x^7-3024*x^6+52056*x^5-473040*x^4+2436696*x^3-7095600*
x^2+10845000*x-6750000,x, algorithm=\
```

output
```
9*x^8 - 432*x^7 + 8676*x^6 - 94608*x^5 + 609174*x^4 - 2365200*x^3 + 542250
0*x^2 - 6750000*x + e^x
```

3.616.9 Mupad [B] (verification not implemented)

Time = 15.48 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.28

$$\int \left(-6750000+e^x+10845000x-7095600x^2+2436696x^3-473040x^4+52056x^5-3024x^6+72x^7\right)\,dx=\mathrm{e}^x-6750000\,x+5422500\,x^2-2365200\,x^3+609174\,x^4-94608\,x^5+8676\,x^6-432\,x^7+9\,x^8$$

input
```
int(10845000*x + exp(x) - 7095600*x^2 + 2436696*x^3 - 473040*x^4 + 52056*x
^5 - 3024*x^6 + 72*x^7 - 6750000,x)
```

output
```
exp(x) - 6750000*x + 5422500*x^2 - 2365200*x^3 + 609174*x^4 - 94608*x^5 +
8676*x^6 - 432*x^7 + 9*x^8
```

3.617 $\int \frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^xx+e^{x^2}x-3x^2+4x\log(2)}\,dx$

3.617.1 Optimal result

Integrand size = 80, antiderivative size = 28

$$\int \frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^xx+e^{x^2}x-3x^2+4x\log(2)}\,dx = \log^2\left(\frac{x}{-x+\frac{1}{4}\left(5+e^x+e^{x^2}+x\right)+\log(2)}\right)$$

output
```
ln(x/(ln(2)-3/4*x+5/4+1/4*exp(x)+1/4*exp(x^2)))^2
```

3.617.2 Mathematica [A] (verified)

Time = 0.54 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^xx+e^{x^2}x-3x^2+4x\log(2)}\,dx = \log^2\left(\frac{4x}{e^x+e^{x^2}-3x+5\left(1+\frac{4\log(2)}{5}\right)}\right)$$

input
```
Integrate[((10 + E^x*(2 - 2*x) + E^x^2*(2 - 4*x^2) + 8*Log[2])*Log[(4*x)/(
5 + E^x + E^x^2 - 3*x + 4*Log[2])])/(5*x + E^x*x + E^x^2*x - 3*x^2 + 4*x*L
og[2]),x]
```

output
```
Log[(4*x)/(E^x + E^x^2 - 3*x + 5*(1 + (4*Log[2])/5))]^2
```

3.617.3 Rubi [A] (verified)

Time = 2.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.025$, Rules used = {6, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{x^2}(2-4x^2)+e^x(2-2x)+10+8\log(2)\right)\log\left(\frac{4x}{e^{x^2}-3x+e^x+5+4\log(2)}\right)}{-3x^2+e^{x^2}x+e^xx+5x+4x\log(2)}dx$$

$$\Big\downarrow \text{6}$$

$$\int \frac{\left(e^{x^2}(2-4x^2)+e^x(2-2x)+10+8\log(2)\right)\log\left(\frac{4x}{e^{x^2}-3x+e^x+5+4\log(2)}\right)}{-3x^2+e^{x^2}x+e^xx+x(5+4\log(2))}dx$$

$$\Big\downarrow \text{7237}$$

$$\log^2\left(\frac{4x}{e^{x^2}-3x+e^x+5+\log(16)}\right)$$

input
```
Int[((10 + E^x*(2 - 2*x) + E^x^2*(2 - 4*x^2) + 8*Log[2])*Log[(4*x)/(5 + E^
x + E^x^2 - 3*x + 4*Log[2])])/(5*x + E^x*x + E^x^2*x - 3*x^2 + 4*x*Log[2])
,x]
```

output
```
Log[(4*x)/(5 + E^x + E^x^2 - 3*x + Log[16])]^2
```

3.617.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /; !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

3.617. $\int \frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^xx+e^{x^2}x-3x^2+4x\log(2)}dx$

3.617.4 Maple [A] (verified)

Time = 4.55 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result
parallelrisch	$\ln\left(\frac{4x}{e^{x^2}+e^x+4\ln(2)-3x+5}\right)^2$
risch	$\ln\left(\ln(2)-\frac{3x}{4}+\frac{5}{4}+\frac{e^x}{4}+\frac{e^{x^2}}{4}\right)^2-2\ln(x)\ln\left(\ln(2)-\frac{3x}{4}+\frac{5}{4}+\frac{e^x}{4}+\frac{e^{x^2}}{4}\right)+i\ln(x)\pi\ \mathrm{csgn}$

input
```
int(((-4*x^2+2)*exp(x^2)+(2-2*x)*exp(x)+8*ln(2)+10)*ln(4*x/(exp(x^2)+exp(x
)+4*ln(2)-3*x+5))/(exp(x^2)*x+exp(x)*x+4*x*ln(2)-3*x^2+5*x),x,method=_RETU
RNVERBOSE)
```

output
```
ln(4*x/(exp(x^2)+exp(x)+4*ln(2)-3*x+5))^2
```

3.617.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int\frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^xx+e^{x^2}x-3x^2+4x\log(2)}\,dx$$
$$=\log\left(-\frac{4\,x}{3\,x-e^{(x^2)}-e^x-4\,\log(2)-5}\right)^2$$

input
```
integrate(((-4*x^2+2)*exp(x^2)+(2-2*x)*exp(x)+8*log(2)+10)*log(4*x/(exp(x^
2)+exp(x)+4*log(2)-3*x+5))/(exp(x^2)*x+exp(x)*x+4*x*log(2)-3*x^2+5*x),x, a
lgorithm=\
```

output
```
log(-4*x/(3*x - e^(x^2) - e^x - 4*log(2) - 5))^2
```

3.617.6 Sympy [A] (verification not implemented)

Time = 2.60 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^xx+e^{x^2}x-3x^2+4x\log(2)}\,dx$$
$$=\log\left(\frac{4x}{-3x+e^x+e^{x^2}+4\log(2)+5}\right)^2$$

input
```
integrate(((-4*x**2+2)*exp(x**2)+(2-2*x)*exp(x)+8*ln(2)+10)*ln(4*x/(exp(x*
*2)+exp(x)+4*ln(2)-3*x+5))/(exp(x**2)*x+exp(x)*x+4*x*ln(2)-3*x**2+5*x),x)
```

output
```
log(4*x/(-3*x + exp(x) + exp(x**2) + 4*log(2) + 5))**2
```

3.617.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. 2(27) = 54.

Time = 0.36 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.39

$$\int \frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^xx+e^{x^2}x-3x^2+4x\log(2)}\,dx=-\log(x)^2$$
$$+2\log(x)\log\left(-3x+e^{(x^2)}+e^x+4\log(2)+5\right)-\log\left(-3x+e^{(x^2)}+e^x+4\log(2)+5\right)^2$$
$$+2\left(\log(x)-\log\left(-3x+e^{(x^2)}+e^x+4\log(2)+5\right)\right)\log\left(-\frac{4x}{3x-e^{(x^2)}-e^x-4\log(2)-5}\right)$$

input
```
integrate(((-4*x^2+2)*exp(x^2)+(2-2*x)*exp(x)+8*log(2)+10)*log(4*x/(exp(x^
2)+exp(x)+4*log(2)-3*x+5))/(exp(x^2)*x+exp(x)*x+4*x*log(2)-3*x^2+5*x),x, a
lgorithm=\
```

output
```
-log(x)^2 + 2*log(x)*log(-3*x + e^(x^2) + e^x + 4*log(2) + 5) - log(-3*x +
 e^(x^2) + e^x + 4*log(2) + 5)^2 + 2*(log(x) - log(-3*x + e^(x^2) + e^x +
4*log(2) + 5))*log(-4*x/(3*x - e^(x^2) - e^x - 4*log(2) - 5))
```

3.617.8 Giac [F]

$$\int \frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^xx+e^{x^2}x-3x^2+4x\log(2)}\,dx$$
$$=\int \frac{2\left((2\,x^2-1)e^{(x^2)}+(x-1)e^x-4\,\log(2)-5\right)\log\left(-\frac{4\,x}{3\,x-e^{(x^2)}-e^x-4\,\log(2)-5}\right)}{3\,x^2-xe^{(x^2)}-xe^x-4\,x\log(2)-5\,x}\,dx$$

input
```
integrate(((-4*x^2+2)*exp(x^2)+(2-2*x)*exp(x)+8*log(2)+10)*log(4*x/(exp(x^
2)+exp(x)+4*log(2)-3*x+5))/(exp(x^2)*x+exp(x)*x+4*x*log(2)-3*x^2+5*x),x, a
lgorithm=\
```

output
```
integrate(2*((2*x^2 - 1)*e^(x^2) + (x - 1)*e^x - 4*log(2) - 5)*log(-4*x/(3
*x - e^(x^2) - e^x - 4*log(2) - 5))/(3*x^2 - x*e^(x^2) - x*e^x - 4*x*log(2
) - 5*x), x)
```

3.617.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\left(10+e^x(2-2x)+e^{x^2}(2-4x^2)+8\log(2)\right)\log\left(\frac{4x}{5+e^x+e^{x^2}-3x+4\log(2)}\right)}{5x+e^xx+e^{x^2}x-3x^2+4x\log(2)}\,dx$$
$$=\int \frac{\ln\left(\frac{4\,x}{e^{x^2}-3\,x+4\,\ln(2)+e^x+5}\right)\left(8\,\ln(2)-e^{x^2}\left(4\,x^2-2\right)-e^x\left(2\,x-2\right)+10\right)}{5\,x+x\,e^{x^2}+4\,x\,\ln(2)+x\,e^x-3\,x^2}\,dx$$

input
```
int((log((4*x)/(exp(x^2) - 3*x + 4*log(2) + exp(x) + 5))*(8*log(2) - exp(x
^2)*(4*x^2 - 2) - exp(x)*(2*x - 2) + 10))/(5*x + x*exp(x^2) + 4*x*log(2) +
 x*exp(x) - 3*x^2),x)
```

output
```
int((log((4*x)/(exp(x^2) - 3*x + 4*log(2) + exp(x) + 5))*(8*log(2) - exp(x
^2)*(4*x^2 - 2) - exp(x)*(2*x - 2) + 10))/(5*x + x*exp(x^2) + 4*x*log(2) +
 x*exp(x) - 3*x^2), x)
```

3.618 $\int \frac{-12-21x+e^{2x}(-27x+6x^2)-3x\log(x)}{32x+2e^{4x}x+16x^2+2x^3+e^{2x}(16x+4x^2)+(16x+4e^{2x}x+4x^2)\log(x)+2}$

3.618.1 Optimal result

Integrand size = 92, antiderivative size = 26

$$\int \frac{-12-21x+e^{2x}(-27x+6x^2)-3x\log(x)}{32x+2e^{4x}x+16x^2+2x^3+e^{2x}(16x+4x^2)+(16x+4e^{2x}x+4x^2)\log(x)+2x\log^2(x)}\,dx = 3\left(\log(4)+\frac{4-x}{2(4+e^{2x}+x+\log(x))}\right)$$

output
```
3/2*(-x+4)/(exp(x)^2+x+ln(x)+4)+6*ln(2)
```

3.618.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{-12-21x+e^{2x}(-27x+6x^2)-3x\log(x)}{32x+2e^{4x}x+16x^2+2x^3+e^{2x}(16x+4x^2)+(16x+4e^{2x}x+4x^2)\log(x)+2x\log^2(x)}\,dx = \frac{3(4-x)}{2(4+e^{2x}+x+\log(x))}$$

input
```
Integrate[(-12 - 21*x + E^(2*x)*(-27*x + 6*x^2) - 3*x*Log[x])/(32*x + 2*E^
(4*x)*x + 16*x^2 + 2*x^3 + E^(2*x)*(16*x + 4*x^2) + (16*x + 4*E^(2*x)*x +
4*x^2)*Log[x] + 2*x*Log[x]^2),x]
```

output
```
(3*(4 - x))/(2*(4 + E^(2*x) + x + Log[x]))
```

3.618.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}(6x^2-27x)-21x-3x\log(x)-12}{2x^3+16x^2+e^{2x}(4x^2+16x)+(4x^2+4e^{2x}x+16x)\log(x)+2e^{4x}x+32x+2x\log^2(x)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{3(2e^{2x}x^2-(9e^{2x}+7)x-x\log(x)-4)}{2x(x+e^{2x}+\log(x)+4)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{3}{2}\int -\frac{-2e^{2x}x^2+(7+9e^{2x})x+\log(x)x+4}{x(x+e^{2x}+\log(x)+4)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{3}{2}\int \frac{-2e^{2x}x^2+(7+9e^{2x})x+\log(x)x+4}{x(x+e^{2x}+\log(x)+4)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{3}{2}\int \left(\frac{(x-4)(2x^2+2\log(x)x+7x-1)}{x(x+e^{2x}+\log(x)+4)^2}-\frac{2x-9}{x+e^{2x}+\log(x)+4}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3}{2}\left(2\int \frac{x^2}{(x+e^{2x}+\log(x)+4)^2}dx-29\int \frac{1}{(x+e^{2x}+\log(x)+4)^2}dx+4\int \frac{1}{x(x+e^{2x}+\log(x)+4)^2}dx-\int \frac{}{(x}\right.$$

input
```
Int[(-12 - 21*x + E^(2*x)*(-27*x + 6*x^2) - 3*x*Log[x])/(32*x + 2*E^(4*x)*
x + 16*x^2 + 2*x^3 + E^(2*x)*(16*x + 4*x^2) + (16*x + 4*E^(2*x)*x + 4*x^2)
*Log[x] + 2*x*Log[x]^2),x]
```

output
```
$Aborted
```

3.618.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.618.4 Maple [A] (verified)

Time = 1.22 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

method	result	size
risch	$-\frac{3(x-4)}{2(e^{2x}+x+\ln(x)+4)}$	17
parallelrisch	$\frac{-3x+12}{2\,e^{2x}+2x+2\ln(x)+8}$	19

input
```
int((-3*x*ln(x)+(6*x^2-27*x)*exp(x)^2-21*x-12)/(2*x*ln(x)^2+(4*x*exp(x)^2+
4*x^2+16*x)*ln(x)+2*x*exp(x)^4+(4*x^2+16*x)*exp(x)^2+2*x^3+16*x^2+32*x),x,
method=_RETURNVERBOSE)
```

output
```
-3/2*(x-4)/(exp(2*x)+x+ln(x)+4)
```

3.618.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{-12-21x+e^{2x}(-27x+6x^2)-3x\log(x)}{32x+2e^{4x}x+16x^2+2x^3+e^{2x}(16x+4x^2)+(16x+4e^{2x}x+4x^2)\log(x)+2x\log^2(x)}\,dx = -\frac{3(x-4)}{2(x+e^{(2x)}+\log(x)+4)}$$

input
```
integrate((-3*x*log(x)+(6*x^2-27*x)*exp(x)^2-21*x-12)/(2*x*log(x)^2+(4*x*e
xp(x)^2+4*x^2+16*x)*log(x)+2*x*exp(x)^4+(4*x^2+16*x)*exp(x)^2+2*x^3+16*x^2
+32*x),x, algorithm=\
```

output
```
-3/2*(x - 4)/(x + e^(2*x) + log(x) + 4)
```

3.618.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{-12-21x+e^{2x}(-27x+6x^2)-3x\log(x)}{32x+2e^{4x}x+16x^2+2x^3+e^{2x}(16x+4x^2)+(16x+4e^{2x}x+4x^2)\log(x)+2x\log^2(x)}\,dx = \frac{12-3x}{2x+2e^{2x}+2\log(x)+8}$$

input
```
integrate((-3*x*ln(x)+(6*x**2-27*x)*exp(x)**2-21*x-12)/(2*x*ln(x)**2+(4*x*
exp(x)**2+4*x**2+16*x)*ln(x)+2*x*exp(x)**4+(4*x**2+16*x)*exp(x)**2+2*x**3+
16*x**2+32*x),x)
```

output
```
(12 - 3*x)/(2*x + 2*exp(2*x) + 2*log(x) + 8)
```

3.618.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{-12-21x+e^{2x}(-27x+6x^2)-3x\log(x)}{32x+2e^{4x}x+16x^2+2x^3+e^{2x}(16x+4x^2)+(16x+4e^{2x}x+4x^2)\log(x)+2x\log^2(x)}\,dx = -\frac{3(x-4)}{2(x+e^{(2x)}+\log(x)+4)}$$

input
```
integrate((-3*x*log(x)+(6*x^2-27*x)*exp(x)^2-21*x-12)/(2*x*log(x)^2+(4*x*e
xp(x)^2+4*x^2+16*x)*log(x)+2*x*exp(x)^4+(4*x^2+16*x)*exp(x)^2+2*x^3+16*x^2
+32*x),x, algorithm=\
```

output
```
-3/2*(x - 4)/(x + e^(2*x) + log(x) + 4)
```

3.618.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{-12-21x+e^{2x}(-27x+6x^2)-3x\log(x)}{32x+2e^{4x}x+16x^2+2x^3+e^{2x}(16x+4x^2)+(16x+4e^{2x}x+4x^2)\log(x)+2x\log^2(x)}\,dx$$
$$= -\frac{3(x-4)}{2\left(x+e^{(2x)}+\log(x)+4\right)}$$

input
```
integrate((-3*x*log(x)+(6*x^2-27*x)*exp(x)^2-21*x-12)/(2*x*log(x)^2+(4*x*e
xp(x)^2+4*x^2+16*x)*log(x)+2*x*exp(x)^4+(4*x^2+16*x)*exp(x)^2+2*x^3+16*x^2
+32*x),x, algorithm=\
```

output
```
-3/2*(x - 4)/(x + e^(2*x) + log(x) + 4)
```

3.618.9 Mupad [B] (verification not implemented)

Time = 16.68 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{-12-21x+e^{2x}(-27x+6x^2)-3x\log(x)}{32x+2e^{4x}x+16x^2+2x^3+e^{2x}(16x+4x^2)+(16x+4e^{2x}x+4x^2)\log(x)+2x\log^2(x)}\,dx$$
$$= -\frac{3(x-4)}{2\left(x+e^{2x}+\ln(x)+4\right)}$$

input
```
int(-(21*x + exp(2*x)*(27*x - 6*x^2) + 3*x*log(x) + 12)/(32*x + exp(2*x)*(
16*x + 4*x^2) + 2*x*exp(4*x) + 2*x*log(x)^2 + log(x)*(16*x + 4*x*exp(2*x)
+ 4*x^2) + 16*x^2 + 2*x^3),x)
```

output
```
-(3*(x - 4))/(2*(x + exp(2*x) + log(x) + 4))
```

3.619 $\int \frac{-60+e^{-4+x}(-3+3x-x^2)}{x^2\log(\log(4))}\,dx$

3.619.1 Optimal result

Integrand size = 27, antiderivative size = 21

$$\int \frac{-60+e^{-4+x}(-3+3x-x^2)}{x^2\log(\log(4))}\,dx = \frac{(-20-e^{-4+x})\,(-3+x)}{x\log(\log(4))}$$

output
```
(-20-exp(x-4))*(-3+x)/x/ln(2*ln(2))
```

3.619.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{-60+e^{-4+x}(-3+3x-x^2)}{x^2\log(\log(4))}\,dx = -\frac{-60+e^{-4+x}(-3+x)}{x\log(\log(4))}$$

input
```
Integrate[(-60 + E^(-4 + x)*(-3 + 3*x - x^2))/(x^2*Log[Log[4]]),x]
```

output
```
-((-60 + E^(-4 + x)*(-3 + x))/(x*Log[Log[4]]))
```

3.619.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x-4}(-x^2+3x-3)-60}{x^2\log(\log(4))}dx$$
$$\Big\downarrow \text{ 27}$$
$$\frac{\int -\frac{e^{x-4}(x^2-3x+3)+60}{x^2}dx}{\log(\log(4))}$$
$$\Big\downarrow \text{ 25}$$
$$-\frac{\int \frac{e^{x-4}(x^2-3x+3)+60}{x^2}dx}{\log(\log(4))}$$
$$\Big\downarrow \text{ 2010}$$
$$-\frac{\int \left(\frac{e^{x-4}(x^2-3x+3)}{x^2}+\frac{60}{x^2}\right)dx}{\log(\log(4))}$$
$$\Big\downarrow \text{ 2009}$$
$$-\frac{e^{x-4}-\frac{3e^{x-4}}{x}-\frac{60}{x}}{\log(\log(4))}$$

input
```
Int[(-60 + E^(-4 + x)*(-3 + 3*x - x^2))/(x^2*Log[Log[4]]),x]
```

output
```
-((E^(-4 + x) - 60/x - (3*E^(-4 + x))/x)/Log[Log[4]])
```

3.619.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.619.4 Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

method	result	size
parallelrisch	$-\frac{x\,{\mathrm e}^{x -4}-3\,{\mathrm e}^{x -4}-60}{\ln\left(2 \ln\left(2\right)\right) x}$	27
derivativedivides	$\frac{\frac{60}{x}+\frac{3\,{\mathrm e}^{x -4}}{x}-{\mathrm e}^{x -4}}{\ln\left(2 \ln\left(2\right)\right)}$	30
default	$\frac{\frac{60}{x}+\frac{3\,{\mathrm e}^{x -4}}{x}-{\mathrm e}^{x -4}}{\ln\left(2 \ln\left(2\right)\right)}$	30
risch	$\frac{60}{\left(\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)\right) x}-\frac{\left(-3+x \right) {\mathrm e}^{x -4}}{\left(\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)\right) x}$	35
parts	$\frac{60}{\ln\left(2 \ln\left(2\right)\right) x}-\frac{{\mathrm e}^{x -4}-\frac{3\,{\mathrm e}^{x -4}}{x}}{\ln\left(2 \ln\left(2\right)\right)}$	37
norman	$\frac{\frac{60}{\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)}+\frac{3\,{\mathrm e}^{x -4}}{\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)}-\frac{x\,{\mathrm e}^{x -4}}{\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)}}{x}$	45

input
```
int(((-x^2+3*x-3)*exp(x-4)-60)/x^2/ln(2*ln(2)),x,method=_RETURNVERBOSE)
```

output
```
-1/ln(2*ln(2))*(x*exp(x-4)-3*exp(x-4)-60)/x
```

3.619. $\int \frac{-60+e^{-4+x}\left(-3+3x-x^2\right)}{x^2\log(\log(4))}\,dx$

3.619.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int \frac{-60+e^{-4+x}(-3+3x-x^2)}{x^2\log(\log(4))}\,dx = -\frac{(x-3)e^{(x-4)}-60}{x\log(2\log(2))}$$

input
```
integrate(((-x^2+3*x-3)*exp(x-4)-60)/x^2/log(2*log(2)),x, algorithm=\
```

output
```
-((x - 3)*e^(x - 4) - 60)/(x*log(2*log(2)))
```

3.619.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.48

$$\int \frac{-60+e^{-4+x}(-3+3x-x^2)}{x^2\log(\log(4))}\,dx = \frac{(3-x)\,e^{x-4}}{x\log(\log(2))+x\log(2)} + \frac{60}{x(\log(\log(2))+\log(2))}$$

input
```
integrate(((-x**2+3*x-3)*exp(x-4)-60)/x**2/ln(2*ln(2)),x)
```

output
```
(3 - x)*exp(x - 4)/(x*log(log(2)) + x*log(2)) + 60/(x*(log(log(2)) + log(2
)))
```

3.619.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.67

$$\int \frac{-60+e^{-4+x}(-3+3x-x^2)}{x^2\log(\log(4))}\,dx = \frac{3\,\mathrm{Ei}(x)\,e^{(-4)}-3\,e^{(-4)}\Gamma(-1,-x)+\frac{60}{x}-e^{(x-4)}}{\log(2\log(2))}$$

input
```
integrate(((-x^2+3*x-3)*exp(x-4)-60)/x^2/log(2*log(2)),x, algorithm=\
```

output
```
(3*Ei(x)*e^(-4) - 3*e^(-4)*gamma(-1, -x) + 60/x - e^(x - 4))/log(2*log(2))
```

3.619.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{-60+e^{-4+x}(-3+3x-x^2)}{x^2\log(\log(4))}\,dx = -\frac{(xe^x-60\,e^4-3\,e^x)e^{(-4)}}{x\log(2\,\log(2))}$$

input
```
integrate(((-x^2+3*x-3)*exp(x-4)-60)/x^2/log(2*log(2)),x, algorithm=\
```

output
```
-(x*e^x - 60*e^4 - 3*e^x)*e^(-4)/(x*log(2*log(2)))
```

3.619.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{-60+e^{-4+x}(-3+3x-x^2)}{x^2\log(\log(4))}\,dx = \frac{3\,e^{x-4}-x\,e^{x-4}+60}{x\,\ln(\ln(4))}$$

input
```
int(-(exp(x - 4)*(x^2 - 3*x + 3) + 60)/(x^2*log(2*log(2))),x)
```

output
```
(3*exp(x - 4) - x*exp(x - 4) + 60)/(x*log(log(4)))
```

3.620 $\int \frac{-4e^{4/x}+2x-x^2-x\log(3)}{x^2}\,dx$

3.620.1 Optimal result

Integrand size = 27, antiderivative size = 27

$$\int \frac{-4e^{4/x}+2x-x^2-x\log(3)}{x^2}\,dx = e^{4/x}-x-\log(3)+(2-\log(3))\log(x)+\log(\log(3))$$

output
```
ln(ln(3))+exp(4/x)-ln(3)-x+(2-ln(3))*ln(x)
```

3.620.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{-4e^{4/x}+2x-x^2-x\log(3)}{x^2}\,dx = e^{4/x}-x+2\log(x)-\log(3)\log(x)$$

input
```
Integrate[(-4*E^(4/x) + 2*x - x^2 - x*Log[3])/x^2,x]
```

output
```
E^(4/x) - x + 2*Log[x] - Log[3]*Log[x]
```

3.620.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {6, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2+2x-4e^{4/x}-x\log(3)}{x^2}\,dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{-x^2-4e^{4/x}+x(2-\log(3))}{x^2}dx$$

$$\Big\downarrow \; 2010$$

$$\int \left(\frac{-x+2-\log(3)}{x}-\frac{4e^{4/x}}{x^2}\right)dx$$

$$\Big\downarrow \; 2009$$

$$-x+e^{4/x}+(2-\log(3))\log(x)$$

input
```
Int[(-4*E^(4/x) + 2*x - x^2 - x*Log[3])/x^2,x]
```

output
```
E^(4/x) - x + (2 - Log[3])*Log[x]
```

3.620.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.620.4 Maple [A] (verified)

Time = 0.87 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.70

method	result	size
parts	$\mathrm{e}^{\frac{4}{x}}-x-\left(\ln \left(3\right)-2\right) \ln \left(x \right)$	19
risch	$-\ln \left(3\right) \ln \left(x \right)+2 \ln \left(x \right)+\mathrm{e}^{\frac{4}{x}}-x$	21
parallelrisch	$-\ln \left(3\right) \ln \left(x \right)+2 \ln \left(x \right)+\mathrm{e}^{\frac{4}{x}}-x$	21
derivativedivides	$-x+\ln \left(3\right) \ln \left(\frac{1}{x}\right)-2 \ln \left(\frac{1}{x}\right)+\mathrm{e}^{\frac{4}{x}}$	24
default	$-x+\ln \left(3\right) \ln \left(\frac{1}{x}\right)-2 \ln \left(\frac{1}{x}\right)+\mathrm{e}^{\frac{4}{x}}$	24
norman	$\frac{x\,\mathrm{e}^{\frac{4}{x}}-x^{2}}{x}+\left(2-\ln \left(3\right)\right) \ln \left(x \right)$	29

input
```
int((-4*exp(4/x)-x*ln(3)-x^2+2*x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
exp(4/x)-x-(ln(3)-2)*ln(x)
```

3.620.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67

$$\int \frac{-4e^{4/x}+2x-x^2-x\log(3)}{x^2}\,dx=-(\log(3)-2)\log(x)-x+e^{\frac{4}{x}}$$

input
```
integrate((-4*exp(4/x)-x*log(3)-x^2+2*x)/x^2,x, algorithm=\
```

output
```
-(log(3) - 2)*log(x) - x + e^(4/x)
```

3.620.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.52

$$\int \frac{-4e^{4/x}+2x-x^2-x\log(3)}{x^2}\,dx=-x+e^{\frac{4}{x}}-(-2+\log(3))\log(x)$$

input
```
integrate((-4*exp(4/x)-x*ln(3)-x**2+2*x)/x**2,x)
```

output
```
-x + exp(4/x) - (-2 + log(3))*log(x)
```

3.620.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-4e^{4/x} + 2x - x^2 - x\log(3)}{x^2}\,dx = -\log(3)\log(x) - x + e^{\frac{4}{x}} + 2\log(x)$$

input
```
integrate((-4*exp(4/x)-x*log(3)-x^2+2*x)/x^2,x, algorithm=\
```

output
```
-log(3)*log(x) - x + e^(4/x) + 2*log(x)
```

3.620.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{-4e^{4/x} + 2x - x^2 - x\log(3)}{x^2}\,dx = x\left(\frac{\log(3)\log\left(\frac{4}{x}\right)}{x} + \frac{e^{\frac{4}{x}}}{x} - \frac{2\log\left(\frac{4}{x}\right)}{x} - 1\right)$$

input
```
integrate((-4*exp(4/x)-x*log(3)-x^2+2*x)/x^2,x, algorithm=\
```

output
```
x*(log(3)*log(4/x)/x + e^(4/x)/x - 2*log(4/x)/x - 1)
```

3.620.9 Mupad [B] (verification not implemented)

Time = 16.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{-4e^{4/x} + 2x - x^2 - x\log(3)}{x^2}\,dx = \frac{x^2\,e^{4/x} - x^3}{x^2} - \ln(x)\,(\ln(3) - 2)$$

input
```
int(-(4*exp(4/x) - 2*x + x*log(3) + x^2)/x^2,x)
```

output
```
(x^2*exp(4/x) - x^3)/x^2 - log(x)*(log(3) - 2)
```

3.621 $\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2(e^{10}-2e^5x+x^2)}\,dx$

3.621.1 Optimal result

Integrand size = 45, antiderivative size = 34

$$\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2(e^{10}-2e^5x+x^2)}\,dx = 5-\frac{\log(5-i\pi-\log(5-\log(\log(2))))}{\log\left((e^5-x)^2\right)}$$

output
```
5-ln(-ln(ln(ln(2))-5)+5)/ln((exp(5)-x)^2)
```

3.621.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.94

$$\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2(e^{10}-2e^5x+x^2)}\,dx = -\frac{\log(5-i\pi-\log(5-\log(\log(2))))}{\log\left((e^5-x)^2\right)}$$

input
```
Integrate[(-2*Log[5 - I*Pi - Log[5 - Log[Log[2]]]])/((E^5 - x)*Log[E^10 - 
2*E^5*x + x^2]^2),x]
```

output
```
-(Log[5 - I*Pi - Log[5 - Log[Log[2]]]]/Log[(E^5 - x)^2])
```

3.621.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.044, Rules used = {27, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2(x^2-2e^5x+e^{10})}dx$$

$$\Big\downarrow \text{27}$$

$$-2\log(5-i\pi-\log(5-\log(\log(2))))\int \frac{1}{(e^5-x)\log^2(x^2-2e^5x+e^{10})}dx$$

$$\Big\downarrow \text{7237}$$

$$-\frac{\log(5-i\pi-\log(5-\log(\log(2))))}{\log(x^2-2e^5x+e^{10})}$$

input
```
Int[(-2*Log[5 - I*Pi - Log[5 - Log[Log[2]]]])/((E^5 - x)*Log[E^10 - 2*E^5*
x + x^2]^2),x]
```

output
```
-(Log[5 - I*Pi - Log[5 - Log[Log[2]]]]/Log[E^10 - 2*E^5*x + x^2])
```

3.621.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

3.621.4 Maple [A] (verified)

Time = 0.79 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.82

method	result	size
risch	$-\frac{\ln(-\ln(\ln(\ln(2)))-5)+5)}{\ln(\mathrm{e}^{10}-2x\,\mathrm{e}^{5}+x^{2})}$	28
derivativedivides	$-\frac{\ln(-\ln(\ln(\ln(2)))-5)+5)}{\ln(\mathrm{e}^{10}-2x\,\mathrm{e}^{5}+x^{2})}$	30
default	$-\frac{\ln(-\ln(\ln(\ln(2)))-5)+5)}{\ln(\mathrm{e}^{10}-2x\,\mathrm{e}^{5}+x^{2})}$	30
norman	$-\frac{\ln(-\ln(\ln(\ln(2)))-5)+5)}{\ln(\mathrm{e}^{10}-2x\,\mathrm{e}^{5}+x^{2})}$	30
parallelrisch	$-\frac{\ln(-\ln(\ln(\ln(2)))-5)+5)}{\ln(\mathrm{e}^{10}-2x\,\mathrm{e}^{5}+x^{2})}$	30

input
```
int(-2*ln(-ln(ln(ln(2))-5)+5)/(exp(5)-x)/ln(exp(5)^2-2*x*exp(5)+x^2)^2,x,m
ethod=_RETURNVERBOSE)
```

output
```
-ln(-ln(ln(ln(2))-5)+5)/ln(exp(10)-2*x*exp(5)+x^2)
```

3.621.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2\left(e^{10}-2e^5x+x^2\right)}\,dx = -\frac{\log\left(-\log\left(\log\left(\log\left(2\right)\right)-5\right)+5\right)}{\log\left(x^2-2\,xe^5+e^{10}\right)}$$

input
```
integrate(-2*log(-log(log(log(2))-5)+5)/(exp(5)-x)/log(exp(5)^2-2*x*exp(5)
+x^2)^2,x, algorithm=\
```

output
```
-log(-log(log(log(2)) - 5) + 5)/log(x^2 - 2*x*e^5 + e^10)
```

3.621.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2(e^{10}-2e^5x+x^2)}\,dx = -\frac{\log\left(-\log\left(5-\log\left(\log\left(2\right)\right)\right)+5-i\pi\right)}{\log\left(x^2-2xe^5+e^{10}\right)}$$

input
```
integrate(-2*ln(-ln(ln(ln(2))-5)+5)/(exp(5)-x)/ln(exp(5)**2-2*x*exp(5)+x**
2)**2,x)
```

output
```
-log(-log(5 - log(log(2))) + 5 - I*pi)/log(x**2 - 2*x*exp(5) + exp(10))
```

3.621.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.65

$$\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2(e^{10}-2e^5x+x^2)}\,dx = -\frac{\log\left(-\log\left(\log\left(\log\left(2\right)\right)-5\right)+5\right)}{2\,\log\left(x-e^5\right)}$$

input
```
integrate(-2*log(-log(log(log(2))-5)+5)/(exp(5)-x)/log(exp(5)^2-2*x*exp(5)
+x^2)^2,x, algorithm=\
```

output
```
-1/2*log(-log(log(log(2)) - 5) + 5)/log(x - e^5)
```

3.621.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2(e^{10}-2e^5x+x^2)}\,dx = -\frac{\log\left(-\log\left(\log\left(\log\left(2\right)\right)-5\right)+5\right)}{\log\left(x^2-2\,xe^5+e^{10}\right)}$$

input
```
integrate(-2*log(-log(log(log(2))-5)+5)/(exp(5)-x)/log(exp(5)^2-2*x*exp(5)
+x^2)^2,x, algorithm=\
```

output
```
-log(-log(log(log(2)) - 5) + 5)/log(x^2 - 2*x*e^5 + e^10)
```

3.621.9 Mupad [B] (verification not implemented)

Time = 0.71 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int -\frac{2\log(5-i\pi-\log(5-\log(\log(2))))}{(e^5-x)\log^2(e^{10}-2e^5x+x^2)}\,dx = -\frac{\ln(5-\ln(\ln(\ln(2))-5))}{\ln(x^2-2\,\mathrm{e}^5\,x+\mathrm{e}^{10})}$$

input
```
int((2*log(5 - log(log(log(2)) - 5)))/(log(exp(10) - 2*x*exp(5) + x^2)^2*(
x - exp(5))),x)
```

output
```
-log(5 - log(log(log(2)) - 5))/log(exp(10) - 2*x*exp(5) + x^2)
```

3.622 $\int \frac{e^{1-x}(1-x)x+e^{5-x}(1-5x+e^4x)-e^{5-x}x\log(x)}{e^{1-x}x^2+e^{5-x}(5x-e^4x)+e^{5-x}x\log(x)}\,dx$

3.622.1 Optimal result

Integrand size = 89, antiderivative size = 28

$$\int \frac{e^{1-x}(1-x)x+e^{5-x}(1-5x+e^4x)-e^{5-x}x\log(x)}{e^{1-x}x^2+e^{5-x}(5x-e^4x)+e^{5-x}x\log(x)}\,dx=\log\left(e^{1-x}x+e^{5-x}\left(5-e^4+\log(x)\right)\right)$$

output
```
ln(exp(1+ln(x)-x)+(5-exp(4)+ln(x))*exp(5-x))
```

3.622.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{1-x}(1-x)x+e^{5-x}(1-5x+e^4x)-e^{5-x}x\log(x)}{e^{1-x}x^2+e^{5-x}(5x-e^4x)+e^{5-x}x\log(x)}\,dx=-x+\log\left(-5e^4+e^8-x-e^4\log(x)\right)$$

input
```
Integrate[(E^(1 - x)*(1 - x)*x + E^(5 - x)*(1 - 5*x + E^4*x) - E^(5 - x)*x
*Log[x])/(E^(1 - x)*x^2 + E^(5 - x)*(5*x - E^4*x) + E^(5 - x)*x*Log[x]),x]
```

output
```
-x + Log[-5*E^4 + E^8 - x - E^4*Log[x]]
```

3.622.3 Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{1-x}(1-x)x+e^{5-x}\left(e^4x-5x+1\right)-e^{5-x}x\log(x)}{e^{1-x}x^2+e^{5-x}\left(5x-e^4x\right)+e^{5-x}x\log(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-x^2+\left(1+e^4\left(e^4-5\right)\right)x-e^4x\log(x)+e^4}{x\left(x+e^4\log(x)+5e^4\left(1-\frac{e^4}{5}\right)\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x+e^4}{x\left(x+e^4\log(x)+5e^4\left(1-\frac{e^4}{5}\right)\right)}-1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log\left(-x-e^4\log(x)-e^4\left(5-e^4\right)\right)-x$$

input
```
Int[(E^(1 - x)*(1 - x)*x + E^(5 - x)*(1 - 5*x + E^4*x) - E^(5 - x)*x*Log[x
])/(E^(1 - x)*x^2 + E^(5 - x)*(5*x - E^4*x) + E^(5 - x)*x*Log[x]),x]
```

output
```
-x + Log[-(E^4*(5 - E^4)) - x - E^4*Log[x]]
```

3.622.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.622.4 Maple [A] (verified)

Time = 0.88 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.64

method	result	size
risch	$-x+\ln\left(x\,\mathrm{e}^{-4}+5+\ln\left(x\right)-\mathrm{e}^{4}\right)$	18
norman	$-x+\ln\left(\mathrm{e}^{8}-\mathrm{e}^{4}\ln\left(x\right)-5\,\mathrm{e}^{4}-x\right)$	24
parallelrisch	$\ln\left(\mathrm{e}^{5-x}\ln\left(x\right)-\mathrm{e}^{5-x}\mathrm{e}^{4}+\mathrm{e}^{1+\ln(x)-x}+5\,\mathrm{e}^{5-x}\right)$	38

input
```
int(((1-x)*exp(1+ln(x)-x)-x*exp(5-x)*ln(x)+(x*exp(4)-5*x+1)*exp(5-x))/(x*e
xp(1+ln(x)-x)+x*exp(5-x)*ln(x)+(-x*exp(4)+5*x)*exp(5-x)),x,method=_RETURNV
ERBOSE)
```

output
```
-x+ln(x*exp(-4)+5+ln(x)-exp(4))
```

3.622.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{e^{1-x}(1-x)x+e^{5-x}(1-5x+e^4x)-e^{5-x}x\log(x)}{e^{1-x}x^2+e^{5-x}\left(5x-e^4x\right)+e^{5-x}x\log(x)}\,dx=-x+\log\left(e^4\log\left(x\right)+x-e^8+5\,e^4\right)$$

input
```
integrate(((1-x)*exp(1+log(x)-x)-x*exp(5-x)*log(x)+(x*exp(4)-5*x+1)*exp(5-
x))/(x*exp(1+log(x)-x)+x*exp(5-x)*log(x)+(-x*exp(4)+5*x)*exp(5-x)),x, algo
rithm=\
```

output
```
-x + log(e^4*log(x) + x - e^8 + 5*e^4)
```

3.622.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{e^{1-x}(1-x)x+e^{5-x}(1-5x+e^4x)-e^{5-x}x\log(x)}{e^{1-x}x^2+e^{5-x}\left(5x-e^4x\right)+e^{5-x}x\log(x)}\,dx$$
$$=-x+\log\left(\frac{x-e^8+5e^4}{e^4}+\log\left(x\right)\right)$$

input
```
integrate(((1-x)*exp(1+ln(x)-x)-x*exp(5-x)*ln(x)+(x*exp(4)-5*x+1)*exp(5-x)
)/(x*exp(1+ln(x)-x)+x*exp(5-x)*ln(x)+(-x*exp(4)+5*x)*exp(5-x)),x)
```

output
```
-x + log((x - exp(8) + 5*exp(4))*exp(-4) + log(x))
```

3.622.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{e^{1-x}(1-x)x + e^{5-x}(1-5x+e^4x) - e^{5-x}x\log(x)}{e^{1-x}x^2 + e^{5-x}\left(5x-e^4x\right) + e^{5-x}x\log(x)}\,dx$$
$$= -x + \log\left(\left(e^4\log\left(x\right) + x - e^8 + 5\,e^4\right)e^{(-4)}\right)$$

input
```
integrate(((1-x)*exp(1+log(x)-x)-x*exp(5-x)*log(x)+(x*exp(4)-5*x+1)*exp(5-
x))/(x*exp(1+log(x)-x)+x*exp(5-x)*log(x)+(-x*exp(4)+5*x)*exp(5-x)),x, algo
rithm=\
```

output
```
-x + log((e^4*log(x) + x - e^8 + 5*e^4)*e^(-4))
```

3.622.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{e^{1-x}(1-x)x + e^{5-x}(1-5x+e^4x) - e^{5-x}x\log(x)}{e^{1-x}x^2 + e^{5-x}\left(5x-e^4x\right) + e^{5-x}x\log(x)}\,dx$$
$$= -x + \log\left(-e^4\log\left(x\right) - x + e^8 - 5\,e^4\right)$$

input
```
integrate(((1-x)*exp(1+log(x)-x)-x*exp(5-x)*log(x)+(x*exp(4)-5*x+1)*exp(5-
x))/(x*exp(1+log(x)-x)+x*exp(5-x)*log(x)+(-x*exp(4)+5*x)*exp(5-x)),x, algo
rithm=\
```

output
```
-x + log(-e^4*log(x) - x + e^8 - 5*e^4)
```

3.622.9 Mupad [B] (verification not implemented)

Time = 16.50 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int \frac{e^{1-x}(1-x)x+e^{5-x}(1-5x+e^4x)-e^{5-x}x\log(x)}{e^{1-x}x^2+e^{5-x}\left(5x-e^4x\right)+e^{5-x}x\log(x)}\,dx=\ln\left(\ln\left(x\right)-\mathrm{e}^4+x\,\mathrm{e}^{-4}+5\right)-x$$

input
```
int(-(exp(log(x) - x + 1)*(x - 1) - exp(5 - x)*(x*exp(4) - 5*x + 1) + x*ex
p(5 - x)*log(x))/(x*exp(log(x) - x + 1) + exp(5 - x)*(5*x - x*exp(4)) + x*
exp(5 - x)*log(x)),x)
```

output
```
log(log(x) - exp(4) + x*exp(-4) + 5) - x
```

3.623 $\int \frac{-10+2e^4-2x+(5-e^4)\log(x)}{(-5x+e^4x-x^2)\log(x)}\,dx$

3.623.1 Optimal result

Integrand size = 41, antiderivative size = 27

$$\int \frac{-10+2e^4-2x+(5-e^4)\log(x)}{(-5x+e^4x-x^2)\log(x)}\,dx=\log\left(\frac{4e^8(5-e^4+x)\log^2(3)\log^2(x)}{225x}\right)$$

output
```
ln(4/225*exp(4)^2*ln(3)^2*ln(x)^2/x*(5-exp(4)+x))
```

3.623.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.70

$$\int \frac{-10+2e^4-2x+(5-e^4)\log(x)}{(-5x+e^4x-x^2)\log(x)}\,dx=-\log(x)+\log\left(5-e^4+x\right)+2\log(\log(x))$$

input
```
Integrate[(-10 + 2*E^4 - 2*x + (5 - E^4)*Log[x])/((-5*x + E^4*x - x^2)*Log
[x]),x]
```

output
```
-Log[x] + Log[5 - E^4 + x] + 2*Log[Log[x]]
```

3.623.3 Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.70, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.146, Rules used = {6, 2026, 7292, 7239, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x+\left(5-e^4\right)\log(x)+2e^4-10}{\left(-x^2+e^4x-5x\right)\log(x)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{-2x+\left(5-e^4\right)\log(x)+2e^4-10}{\left(\left(e^4-5\right)x-x^2\right)\log(x)}dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{-2x+\left(5-e^4\right)\log(x)+2e^4-10}{\left(-x+e^4-5\right)x\log(x)}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{2x-\left(5-e^4\right)\log(x)+10\left(1-\frac{e^4}{5}\right)}{x\left(x-e^4+5\right)\log(x)}dx$$

$$\Big\downarrow \ 7239$$

$$\int \frac{\frac{e^4-5}{x-e^4+5}+\frac{2}{\log(x)}}{x}dx$$

$$\Big\downarrow \ 2010$$

$$\int \left(\frac{5-e^4}{\left(-x+e^4-5\right)x}+\frac{2}{x\log(x)}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\log(x)+\log\left(x-e^4+5\right)+2\log(\log(x))$$

input
```
Int[(-10 + 2*E^4 - 2*x + (5 - E^4)*Log[x])/((-5*x + E^4*x - x^2)*Log[x]),x
]
```

output
```
-Log[x] + Log[5 - E^4 + x] + 2*Log[Log[x]]
```

3.623. $\int \frac{-10+2e^4-2x+\left(5-e^4\right)\log(x)}{\left(-5x+e^4x-x^2\right)\log(x)}dx$

3.623.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.623.4 Maple [A] (verified)

Time = 0.89 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.70

method	result	size
norman	$-\ln(x)+2\ln(\ln(x))+\ln(\mathrm{e}^4-x-5)$	19
risch	$\ln(5-\mathrm{e}^4+x)-\ln(x)+2\ln(\ln(x))$	19
parallelrisch	$\ln(5-\mathrm{e}^4+x)-\ln(x)+2\ln(\ln(x))$	19
default	$2\ln(\ln(x))+(5-\mathrm{e}^4)\left(\frac{\ln(x)}{\mathrm{e}^4-5}-\frac{\ln(5-\mathrm{e}^4+x)}{\mathrm{e}^4-5}\right)$	40
parts	$2\ln(\ln(x))+(5-\mathrm{e}^4)\left(\frac{\ln(x)}{\mathrm{e}^4-5}-\frac{\ln(5-\mathrm{e}^4+x)}{\mathrm{e}^4-5}\right)$	40

input
```
int(((5-exp(4))*ln(x)+2*exp(4)-2*x-10)/(x*exp(4)-x^2-5*x)/ln(x),x,method=_
RETURNVERBOSE)
```

output
```
-ln(x)+2*ln(ln(x))+ln(exp(4)-x-5)
```

3.623.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67

$$\int \frac{-10+2e^4-2x+(5-e^4)\log(x)}{(-5x+e^4x-x^2)\log(x)}\,dx = \log\left(x-e^4+5\right)-\log(x)+2\log(\log(x))$$

input
```
integrate(((5-exp(4))*log(x)+2*exp(4)-2*x-10)/(x*exp(4)-x^2-5*x)/log(x),x,
 algorithm=\
```

output
```
log(x - e^4 + 5) - log(x) + 2*log(log(x))
```

3.623.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 102 vs. 2(26) = 52.

Time = 0.21 (sec) , antiderivative size = 102, normalized size of antiderivative = 3.78

$$\begin{aligned}\int \frac{-10+2e^4-2x+(5-e^4)\log(x)}{(-5x+e^4x-x^2)\log(x)}\,dx &= \left(-5+e^4\right)\left(\frac{\log\left(x-\frac{e^8}{2(-5+e^4)}-\frac{e^4}{2}-\frac{25}{2(-5+e^4)}+\frac{5}{2}+\frac{5e^4}{-5+e^4}\right)}{-5+e^4}\right.\\ &\left.-\frac{\log\left(x-\frac{e^4}{2}-\frac{5e^4}{-5+e^4}+\frac{25}{2(-5+e^4)}+\frac{5}{2}+\frac{e^8}{2(-5+e^4)}\right)}{-5+e^4}\right)+2\log(\log(x))\end{aligned}$$

input
```
integrate(((5-exp(4))*ln(x)+2*exp(4)-2*x-10)/(x*exp(4)-x**2-5*x)/ln(x),x)
```

output
```
(-5 + exp(4))*(log(x - exp(8)/(2*(-5 + exp(4))) - exp(4)/2 - 25/(2*(-5 + e
xp(4))) + 5/2 + 5*exp(4)/(-5 + exp(4)))/(-5 + exp(4)) - log(x - exp(4)/2 -
 5*exp(4)/(-5 + exp(4)) + 25/(2*(-5 + exp(4))) + 5/2 + exp(8)/(2*(-5 + exp
(4))))/(-5 + exp(4))) + 2*log(log(x))
```

3.623.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67

$$\int \frac{-10+2e^4-2x+(5-e^4)\log(x)}{(-5x+e^4x-x^2)\log(x)}\,dx = \log\left(x-e^4+5\right)-\log(x)+2\log(\log(x))$$

input
```
integrate(((5-exp(4))*log(x)+2*exp(4)-2*x-10)/(x*exp(4)-x^2-5*x)/log(x),x,
 algorithm=\
```

output
```
log(x - e^4 + 5) - log(x) + 2*log(log(x))
```

3.623.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67

$$\int \frac{-10+2e^4-2x+(5-e^4)\log(x)}{(-5x+e^4x-x^2)\log(x)}\,dx = \log\left(x-e^4+5\right)-\log(x)+2\log(\log(x))$$

input
```
integrate(((5-exp(4))*log(x)+2*exp(4)-2*x-10)/(x*exp(4)-x^2-5*x)/log(x),x,
 algorithm=\
```

output
```
log(x - e^4 + 5) - log(x) + 2*log(log(x))
```

3.623.9 Mupad [B] (verification not implemented)

Time = 16.88 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67

$$\int \frac{-10+2e^4-2x+(5-e^4)\log(x)}{(-5x+e^4x-x^2)\log(x)}\,dx = \ln\left(x-\mathrm{e}^4+5\right)+2\ln(\ln(x))-\ln(x)$$

input
```
int((2*x - 2*exp(4) + log(x)*(exp(4) - 5) + 10)/(log(x)*(5*x - x*exp(4) +
x^2)),x)
```

output
```
log(x - exp(4) + 5) + 2*log(log(x)) - log(x)
```

3.624 $\int \frac{-1600+x^3}{x^3}\,dx$

3.624.1 Optimal result

Integrand size = 9, antiderivative size = 13

$$\int \frac{-1600+x^3}{x^3}\,dx=-25+\log\left(e^{-20+\frac{800}{x^2}+x}\right)$$

output
```
ln(exp(x)/exp(10-400/x^2)^2)-25
```

3.624.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int \frac{-1600+x^3}{x^3}\,dx=\frac{800}{x^2}+x$$

input
```
Integrate[(-1600 + x^3)/x^3,x]
```

output
```
800/x^2 + x
```

3.624.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3-1600}{x^3} \, dx$$

$$\Big\downarrow \text{802}$$

$$\int \left(1-\frac{1600}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{800}{x^2}+x$$

input
```
Int[(-1600 + x^3)/x^3,x]
```

output
```
800/x^2 + x
```

3.624.3.1 Defintions of rubi rules used

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.624.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.62

method	result	size
default	$x+\frac{800}{x^2}$	8
risch	$x+\frac{800}{x^2}$	8
gosper	$\frac{x^3+800}{x^2}$	10
norman	$\frac{x^3+800}{x^2}$	10
parallelrisch	$\frac{x^3+800}{x^2}$	10

input
```
int((x^3-1600)/x^3,x,method=_RETURNVERBOSE)
```

output
```
x+800/x^2
```

3.624.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.69

$$\int \frac{-1600+x^3}{x^3}\,dx=\frac{x^3+800}{x^2}$$

input
```
integrate((x^3-1600)/x^3,x, algorithm=\
```

output
```
(x^3 + 800)/x^2
```

3.624.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.38

$$\int \frac{-1600+x^3}{x^3}\,dx=x+\frac{800}{x^2}$$

input
```
integrate((x**3-1600)/x**3,x)
```

output
```
x + 800/x**2
```

3.624.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int \frac{-1600+x^3}{x^3}\,dx = x+\frac{800}{x^2}$$

input
```
integrate((x^3-1600)/x^3,x, algorithm=\
```

output
```
x + 800/x^2
```

3.624.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int \frac{-1600+x^3}{x^3}\,dx = x+\frac{800}{x^2}$$

input
```
integrate((x^3-1600)/x^3,x, algorithm=\
```

output
```
x + 800/x^2
```

3.624.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.54

$$\int \frac{-1600+x^3}{x^3}\,dx = x+\frac{800}{x^2}$$

input
```
int((x^3 - 1600)/x^3,x)
```

output
```
x + 800/x^2
```

3.625 $\int e^{-9x-24x^3-16x^5}\left(40+e^{9x+24x^3+16x^5}(-3-x)+\left(40-\right.\right.$

3.625.1 Optimal result

Integrand size = 81, antiderivative size = 27

$$\int e^{-9x-24x^3-16x^5}\left(40+e^{9x+24x^3+16x^5}(-3-x)+\left(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\right)\log(x)\right)dx=\left(40e^{-x(3+4x^2)^2}x-x(3+x)\right)\log(x)$$

output
```
ln(x)*(40*x/exp((4*x^2+3)^2*x)-(3+x)*x)
```

3.625.2 Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int e^{-9x-24x^3-16x^5}\left(40+e^{9x+24x^3+16x^5}(-3-x)+\left(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\right)\log(x)\right)dx=\left(-3+40e^{-x(3+4x^2)^2}-x\right)x\log(x)$$

input
```
Integrate[E^(-9*x - 24*x^3 - 16*x^5)*(40 + E^(9*x + 24*x^3 + 16*x^5)*(-3 -
 x) + (40 + E^(9*x + 24*x^3 + 16*x^5)*(-3 - 2*x) - 360*x - 2880*x^3 - 3200
*x^5)*Log[x]),x]
```

output
```
(-3 + 40/E^(x*(3 + 4*x^2)^2) - x)*x*Log[x]
```

3.625.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 69 vs. $2(27) = 54$.

Time = 2.57 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.56, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-16x^5-24x^3-9x}\left(e^{16x^5+24x^3+9x}(-x-3)+\left(-3200x^5-2880x^3+e^{16x^5+24x^3+9x}(-2x-3)-360x+40\right)\log(x)\right.$$

$$\Big\downarrow \text{7292}$$

$$\int e^{-x(4x^2+3)^2}\left(e^{16x^5+24x^3+9x}(-x-3)+\left(-3200x^5-2880x^3+e^{16x^5+24x^3+9x}(-2x-3)-360x+40\right)\log(x)+40\right.$$

$$\Big\downarrow \text{7293}$$

$$\int \left(40e^{-x(4x^2+3)^2}-e^{-x(4x^2+3)^2}\left(3200x^5+2880x^3+2e^{x(4x^2+3)^2}x+3e^{x(4x^2+3)^2}+360x-40\right)\log(x)-x-3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^2(-\log(x))+\frac{40e^{-x(4x^2+3)^2}(80x^5+72x^3+9x)\log(x)}{16(4x^2+3)x^2+(4x^2+3)^2}-3x\log(x)$$

input
```
Int[E^(-9*x - 24*x^3 - 16*x^5)*(40 + E^(9*x + 24*x^3 + 16*x^5)*(-3 - x) +
(40 + E^(9*x + 24*x^3 + 16*x^5)*(-3 - 2*x) - 360*x - 2880*x^3 - 3200*x^5)*
Log[x]),x]
```

output
```
-3*x*Log[x] - x^2*Log[x] + (40*(9*x + 72*x^3 + 80*x^5)*Log[x])/(E^(x*(3 +
4*x^2)^2)*(16*x^2*(3 + 4*x^2) + (3 + 4*x^2)^2))
```

3.625.
$\int e^{-9x-24x^3-16x^5}\left(40+e^{9x+24x^3+16x^5}(-3-x)+\left(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\right)\right.$

3.625.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.625.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.81

method	result	size
risch	$-x\left(\mathrm{e}^{\left(4x^2+3\right)^2x}x+3\,\mathrm{e}^{\left(4x^2+3\right)^2x}-40\right)\mathrm{e}^{-\left(4x^2+3\right)^2x}\ln\left(x\right)$	49
parallelrisch	$\left(-\mathrm{e}^{16x^5+24x^3+9x}x^2\ln\left(x\right)-3\ln\left(x\right)\mathrm{e}^{16x^5+24x^3+9x}x+40x\ln\left(x\right)\right)\mathrm{e}^{-16x^5-24x^3-9x}$	67

input
```
int((((-2*x-3)*exp(16*x^5+24*x^3+9*x)-3200*x^5-2880*x^3-360*x+40)*ln(x)+(-
3-x)*exp(16*x^5+24*x^3+9*x)+40)/exp(16*x^5+24*x^3+9*x),x,method=_RETURNVER
BOSE)
```

output
```
-x*(exp((4*x^2+3)^2*x)*x+3*exp((4*x^2+3)^2*x)-40)*exp(-(4*x^2+3)^2*x)*ln(x
)
```

3.625.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.70

$$\int e^{-9x-24x^3-16x^5}\left(40+e^{9x+24x^3+16x^5}(-3-x)+\left(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\right)\log(x)\right)\,dx=-\left(\left(x^2+3\,x\right)e^{\left(16\,x^5+24\,x^3+9\,x\right)}-40\,x\right)e^{\left(-16\,x^5-24\,x^3-9\,x\right)}\log\left(x\right)$$

3.625.
$\int e^{-9x-24x^3-16x^5}\left(40+e^{9x+24x^3+16x^5}(-3-x)+\left(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\right)\right.$ l

input
```
integrate((((-2*x-3)*exp(16*x^5+24*x^3+9*x)-3200*x^5-2880*x^3-360*x+40)*lo
g(x)+(-3-x)*exp(16*x^5+24*x^3+9*x)+40)/exp(16*x^5+24*x^3+9*x),x, algorithm
=\
```

output
```
-((x^2 + 3*x)*e^(16*x^5 + 24*x^3 + 9*x) - 40*x)*e^(-16*x^5 - 24*x^3 - 9*x)
*log(x)
```

3.625.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int e^{-9x-24x^3-16x^5}\left(40+e^{9x+24x^3+16x^5}(-3-x)+\left(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\right)\log(x)\right)\,dx=40xe^{-16x^5-24x^3-9x}\log{(x)}+\left(-x^2-3x\right)\log{(x)}$$

input
```
integrate((((-2*x-3)*exp(16*x**5+24*x**3+9*x)-3200*x**5-2880*x**3-360*x+40
)*ln(x)+(-3-x)*exp(16*x**5+24*x**3+9*x)+40)/exp(16*x**5+24*x**3+9*x),x)
```

output
```
40*x*exp(-16*x**5 - 24*x**3 - 9*x)*log(x) + (-x**2 - 3*x)*log(x)
```

3.625.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(26) = 52.

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.30

$$\int e^{-9x-24x^3-16x^5}\left(40+e^{9x+24x^3+16x^5}(-3-x)+\left(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\right)\log(x)\right)\,dx=-\frac{1}{2}\,x^2+\frac{1}{2}\left(80\,xe^{(-16\,x^5)}\log{(x)}+\left(x^2-2\left(x^2+3\,x\right)\log{(x)}+6\,x\right)e^{(24\,x^3+9\,x)}\right)e^{(-24\,x^3-9\,x)}-3\,x$$

input
```
integrate((((-2*x-3)*exp(16*x^5+24*x^3+9*x)-3200*x^5-2880*x^3-360*x+40)*lo
g(x)+(-3-x)*exp(16*x^5+24*x^3+9*x)+40)/exp(16*x^5+24*x^3+9*x),x, algorithm
=\
```

output
```
-1/2*x^2 + 1/2*(80*x*e^(-16*x^5)*log(x) + (x^2 - 2*(x^2 + 3*x)*log(x) + 6*
x)*e^(24*x^3 + 9*x))*e^(-24*x^3 - 9*x) - 3*x
```

3.625. $\int e^{-9x-24x^3-16x^5}\left(40+e^{9x+24x^3+16x^5}(-3-x)+\left(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\right)\mathrm{l}\right.$

3.625.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int e^{-9x-24x^3-16x^5}\Big(40+e^{9x+24x^3+16x^5}(-3-x) + \Big(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\Big)\log(x)\Big)\,dx = -x^2\log(x)+40\,xe^{(-16\,x^5-24\,x^3-9\,x)}\log(x)-3\,x\log(x)$$

input
```
integrate((((-2*x-3)*exp(16*x^5+24*x^3+9*x)-3200*x^5-2880*x^3-360*x+40)*lo
g(x)+(-3-x)*exp(16*x^5+24*x^3+9*x)+40)/exp(16*x^5+24*x^3+9*x),x, algorithm
=\
```

output
```
-x^2*log(x) + 40*x*e^(-16*x^5 - 24*x^3 - 9*x)*log(x) - 3*x*log(x)
```

3.625.9 Mupad [F(-1)]

Timed out.

$$\int e^{-9x-24x^3-16x^5}\Big(40+e^{9x+24x^3+16x^5}(-3-x) + \Big(40+e^{9x+24x^3+16x^5}(-3-2x)-360x-2880x^3-3200x^5\Big)\log(x)\Big)\,dx = \int -\mathrm{e}^{-16\,x^5-24\,x^3-9\,x}\,\Big(\mathrm{e}^{16\,x^5+24\,x^3+9\,x}\,(x+3) + \ln(x)\,\Big(360\,x+\mathrm{e}^{16\,x^5+24\,x^3+9\,x}\,(2\,x+3)+2880\,x^3+3200\,x^5-40\Big)-40\Big)\,dx$$

input
```
int(-exp(- 9*x - 24*x^3 - 16*x^5)*(exp(9*x + 24*x^3 + 16*x^5)*(x + 3) + lo
g(x)*(360*x + exp(9*x + 24*x^3 + 16*x^5)*(2*x + 3) + 2880*x^3 + 3200*x^5 -
 40) - 40),x)
```

output
```
int(-exp(- 9*x - 24*x^3 - 16*x^5)*(exp(9*x + 24*x^3 + 16*x^5)*(x + 3) + lo
g(x)*(360*x + exp(9*x + 24*x^3 + 16*x^5)*(2*x + 3) + 2880*x^3 + 3200*x^5 -
 40) - 40), x)
```

3.626 $\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log \ldots\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24 \ldots}$

3.626.1 Optimal result

Integrand size = 165, antiderivative size = 24

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(\ldots\right.\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log \ldots}$$
$$= x^{\frac{x}{x+\frac{-1+(-4+x+\log(4))^2}{5x}}}$$

output
```
exp(ln(x)*x/(1/5*((x-4+2*ln(2))^2-1)/x+x))
```

3.626.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(\ldots\right.\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log \ldots}$$
$$= x^{\frac{5x^2}{15-8x+6x^2-8\log(4)+2x\log(4)+\log^2(4)}}$$

input
```
Integrate[(x^((5*x^2)/(15 - 8*x + 6*x^2 + (-8 + 2*x)*Log[4] + Log[4]^2))*(
75*x - 40*x^2 + 30*x^3 + (-40*x + 10*x^2)*Log[4] + 5*x*Log[4]^2 + (150*x -
 40*x^2 + (-80*x + 10*x^2)*Log[4] + 10*x*Log[4]^2)*Log[x]))/(225 - 240*x +
 244*x^2 - 96*x^3 + 36*x^4 + (-240 + 188*x - 128*x^2 + 24*x^3)*Log[4] + (9
4 - 48*x + 16*x^2)*Log[4]^2 + (-16 + 4*x)*Log[4]^3 + Log[4]^4),x]
```

3.626.

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(-80x+10x^2)\log(4)+10x\log^2(4)\right)\log(x \ldots\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log^2(4)+(-16+4x)\log^3(4)+\log^4(4)}$$

output
```
x^((5*x^2)/(15 - 8*x + 6*x^2 - 8*Log[4] + 2*x*Log[4] + Log[4]^2))
```

3.626.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^{\frac{5x^2}{6x^2-8x+(2x-8)\log(4)+15+\log^2(4)}}\left(30x^3-40x^2+\left(-40x^2+\left(10x^2-80x\right)\log(4)+150x+10x\log^2(4)\right)\log(x)+(10x}{36x^4-96x^3+244x^2+\left(16x^2-48x+94\right)\log^2(4)+\left(24x^3-128x^2+188x-240\right)\log(4)-240x+(4x}$$

$$\Big\downarrow 6$$

$$\int \frac{x^{\frac{5x^2}{6x^2-8x+(2x-8)\log(4)+15+\log^2(4)}}\left(30x^3-40x^2+\left(-40x^2+\left(10x^2-80x\right)\log(4)+150x+10x\log^2(4)\right)\log(x)+(10x}{36x^4-96x^3+244x^2+\left(16x^2-48x+94\right)\log^2(4)+\left(24x^3-128x^2+188x-240\right)\log(4)-240x+(4x}$$

$$\Big\downarrow 2463$$

$$\int \frac{x^{\frac{5x^2}{6x^2-8x+(2x-8)\log(4)+15+\log^2(4)}}\left(30x^3-40x^2+\left(-40x^2+\left(10x^2-80x\right)\log(4)+150x+10x\log^2(4)\right)\log(x)+(10x}{\left(6x^2-8x+2x\log(4)+15+\log^2(4)-8\log(4)\right)^2}$$

$$\Big\downarrow 6$$

$$\int \frac{x^{\frac{5x^2}{6x^2-8x+(2x-8)\log(4)+15+\log^2(4)}}\left(30x^3-40x^2+\left(-40x^2+\left(10x^2-80x\right)\log(4)+150x+10x\log^2(4)\right)\log(x)+(10x}{\left(6x^2+x(2\log(4)-8)+15+\log^2(4)-8\log(4)\right)^2}$$

$$\Big\downarrow 7292$$

$$\int \frac{5x^{\frac{5x^2}{6x^2-2x(4-\log(4))+(3-\log(4))(5-\log(4))}+1}\left(6x^2-8x\left(1-\frac{\log(2)}{2}\right)\log(x)-8x\left(1-\frac{\log(2)}{2}\right)+30\left(1+\frac{2}{15}(\log(2)-4\right)\log(4\right.}{\left(6x^2-2x(4-\log(4))+(3-\log(4))(5-\log(4))\right)^2}$$

$$\Big\downarrow 27$$

$$5\int \frac{x^{\frac{5x^2}{6x^2-2(4-\log(4))x+(3-\log(4))(5-\log(4))}+1}\left(6x^2-4(2-\log(2))\log(x)x-4(2-\log(2))x+2(15-2(4-\log(2))\log(4)\right)}{\left(6x^2-2(4-\log(4))x+(3-\log(4))(5-\log(4))\right)^2}$$

$$\Big\downarrow 7293$$

3.626.

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+\left(-40x+10x^2\right)\log(4)+5x\log^2(4)+\left(150x-40x^2+\left(-80x+10x^2\right)\log(4)+10x\log^2(4)\right)\log(x\right.}{225-240x+244x^2-96x^3+36x^4+\left(-240+188x-128x^2+24x^3\right)\log(4)+\left(94-48x+16x^2\right)\log^2(4)+(-16+4x)\log^3(4)+\log^4(4)}$$

$$5\int\left(\frac{2((3-\log(4))(5-\log(4))-x(4-\log(4)))\log(x)x^{\frac{5x^2}{6x^2-2(4-\log(4))x+(3-\log(4))(5-\log(4))}+1}}{(6x^2-2(4-\log(4))x+(3-\log(4))(5-\log(4)))^2}+\frac{(3-\log(4))(5-\log(}{(6x^2-2(4-\log(}\right.$$

$\downarrow$ 2009

$$5\left(\frac{\left(\frac{5x^2}{6x^2-2(4-\log(4))x+(3-\log(4))(5-\log(4))}+3\right)(6x^2-2(4-\log(4))x+(3-\log(4))(5-\log(4)))\left(4-\log(4)+i\sqrt{7}\right.}{20\left(\frac{5x^2}{6x^2-2(4-\log(4))x+(3-\log(4))(5-\log(4))}+1\right)(74-40\log(4)+5\log^2(4))\left(-6x+i\sqrt{74}\right.}\right.$$

input
```
Int[(x^((5*x^2)/(15 - 8*x + 6*x^2 + (-8 + 2*x)*Log[4] + Log[4]^2))*(75*x -
 40*x^2 + 30*x^3 + (-40*x + 10*x^2)*Log[4] + 5*x*Log[4]^2 + (150*x - 40*x^
2 + (-80*x + 10*x^2)*Log[4] + 10*x*Log[4]^2)*Log[x]))/(225 - 240*x + 244*x
^2 - 96*x^3 + 36*x^4 + (-240 + 188*x - 128*x^2 + 24*x^3)*Log[4] + (94 - 48
*x + 16*x^2)*Log[4]^2 + (-16 + 4*x)*Log[4]^3 + Log[4]^4),x]
```

output
```
$Aborted
```

3.626.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] && !BinomialQ[Px, x] && !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.626.

$$\int\frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+(150x-40x^2+(-80x+10x^2)\log(4)+10x\log^2(4))\log(}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log^2(4)+(-16+4x)\log^3(4)+\log^4(4)}$$

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.626.4 Maple [A] (verified)

Time = 5.98 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

method	result
risch	$x^{\frac{5x^2}{4\ln(2)^2+4x\ln(2)+6x^2-16\ln(2)-8x+15}}$
parallelrisch	$e^{\frac{5\ln(x)x^2}{4\ln(2)^2+4x\ln(2)+6x^2-16\ln(2)-8x+15}}$
norman	$\frac{\left(4\ln(2)^2-16\ln(2)+15\right)e^{\frac{5x^2\ln(x)}{4\ln(2)^2+2(2x-8)\ln(2)+6x^2-8x+15}}+(4\ln(2)-8)x\,e^{\frac{5x^2\ln(x)}{4\ln(2)^2+2(2x-8)\ln(2)+6x^2-8x+15}}+6x^2e^{4\ln(2)^2+2(}}{4\ln(2)^2+4x\ln(2)+6x^2-16\ln(2)-8x+15}$

input
```
int(((40*x*ln(2)^2+2*(10*x^2-80*x)*ln(2)-40*x^2+150*x)*ln(x)+20*x*ln(2)^2+
2*(10*x^2-40*x)*ln(2)+30*x^3-40*x^2+75*x)*exp(5*x^2*ln(x)/(4*ln(2)^2+2*(2*
x-8)*ln(2)+6*x^2-8*x+15))/(16*ln(2)^4+8*(4*x-16)*ln(2)^3+4*(16*x^2-48*x+94
)*ln(2)^2+2*(24*x^3-128*x^2+188*x-240)*ln(2)+36*x^4-96*x^3+244*x^2-240*x+2
25),x,method=_RETURNVERBOSE)
```

output
```
x^(5*x^2/(4*ln(2)^2+4*x*ln(2)+6*x^2-16*ln(2)-8*x+15))
```

3.626.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(-\right.\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log}$$
$$=x^{\frac{5x^2}{6x^2+4(x-4)\log(2)+4\log(2)^2-8x+15}}$$

3.626.

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(-80x+10x^2)\log(4)+10x\log^2(4)\right)\log(x\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log^2(4)+(-16+4x)\log^3(4)+\log^4(4)}$$

input
```
integrate(((40*x*log(2)^2+2*(10*x^2-80*x)*log(2)-40*x^2+150*x)*log(x)+20*x
*log(2)^2+2*(10*x^2-40*x)*log(2)+30*x^3-40*x^2+75*x)*exp(5*x^2*log(x)/(4*l
og(2)^2+2*(2*x-8)*log(2)+6*x^2-8*x+15))/(16*log(2)^4+8*(4*x-16)*log(2)^3+4
*(16*x^2-48*x+94)*log(2)^2+2*(24*x^3-128*x^2+188*x-240)*log(2)+36*x^4-96*x
^3+244*x^2-240*x+225),x, algorithm=\
```

output
```
x^(5*x^2/(6*x^2 + 4*(x - 4)*log(2) + 4*log(2)^2 - 8*x + 15))
```

3.626.6 Sympy [A] (verification not implemented)

Time = 0.66 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(-\right.\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log}$$
$$= e^{\frac{5x^2\log(x)}{6x^2-8x+(4x-16)\log(2)+4\log(2)^2+15}}$$

input
```
integrate(((40*x*ln(2)**2+2*(10*x**2-80*x)*ln(2)-40*x**2+150*x)*ln(x)+20*x
*ln(2)**2+2*(10*x**2-40*x)*ln(2)+30*x**3-40*x**2+75*x)*exp(5*x**2*ln(x)/(4
*ln(2)**2+2*(2*x-8)*ln(2)+6*x**2-8*x+15))/(16*ln(2)**4+8*(4*x-16)*ln(2)**3
+4*(16*x**2-48*x+94)*ln(2)**2+2*(24*x**3-128*x**2+188*x-240)*ln(2)+36*x**4
-96*x**3+244*x**2-240*x+225),x)
```

output
```
exp(5*x**2*log(x)/(6*x**2 - 8*x + (4*x - 16)*log(2) + 4*log(2)**2 + 15))
```

3.626.7 Maxima [F]

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(-\right.\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log}$$
$$= \int \frac{5\left(6x^3+4x\log(2)^2-8x^2+4(x^2-4x)\log(2)+2\left(4x\log(2)^2-4x^2+2(x^2-8x)\log(2)+15x\right)\log\right.}{36x^4+32(x-4)\log(2)^3+16\log(2)^4-96x^3+8(8x^2-24x+47)\log(2)^2+244x^2+8(6x^3-3}$$

input
```
integrate(((40*x*log(2)^2+2*(10*x^2-80*x)*log(2)-40*x^2+150*x)*log(x)+20*x
*log(2)^2+2*(10*x^2-40*x)*log(2)+30*x^3-40*x^2+75*x)*exp(5*x^2*log(x)/(4*l
og(2)^2+2*(2*x-8)*log(2)+6*x^2-8*x+15))/(16*log(2)^4+8*(4*x-16)*log(2)^3+4
*(16*x^2-48*x+94)*log(2)^2+2*(24*x^3-128*x^2+188*x-240)*log(2)+36*x^4-96*x
^3+244*x^2-240*x+225),x, algorithm=\
```


$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(-80x+10x^2)\log(4)+10x\log^2(4)\right)\log(x\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log^2(4)+(-16+4x)\log^3(4)+\log^4(4)}$$

output
```
5*integrate((6*x^3 + 4*x*log(2)^2 - 8*x^2 + 4*(x^2 - 4*x)*log(2) + 2*(4*x*
log(2)^2 - 4*x^2 + 2*(x^2 - 8*x)*log(2) + 15*x)*log(x) + 15*x)*x^(5*x^2/(6
*x^2 + 4*(x - 4)*log(2) + 4*log(2)^2 - 8*x + 15))/(36*x^4 + 32*(x - 4)*log
(2)^3 + 16*log(2)^4 - 96*x^3 + 8*(8*x^2 - 24*x + 47)*log(2)^2 + 244*x^2 +
8*(6*x^3 - 32*x^2 + 47*x - 60)*log(2) - 240*x + 225), x)
```

3.626.8 Giac [A] (verification not implemented)

Time = 0.84 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(-\right.\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log}$$
$$= x^{\frac{5\,x^2}{6\,x^2+4\,x\log(2)+4\,\log(2)^2-8\,x-16\,\log(2)+15}}$$

input
```
integrate(((40*x*log(2)^2+2*(10*x^2-80*x)*log(2)-40*x^2+150*x)*log(x)+20*x
*log(2)^2+2*(10*x^2-40*x)*log(2)+30*x^3-40*x^2+75*x)*exp(5*x^2*log(x)/(4*l
og(2)^2+2*(2*x-8)*log(2)+6*x^2-8*x+15))/(16*log(2)^4+8*(4*x-16)*log(2)^3+4
*(16*x^2-48*x+94)*log(2)^2+2*(24*x^3-128*x^2+188*x-240)*log(2)+36*x^4-96*x
^3+244*x^2-240*x+225),x, algorithm=\
```

output
```
x^(5*x^2/(6*x^2 + 4*x*log(2) + 4*log(2)^2 - 8*x - 16*log(2) + 15))
```

3.626.9 Mupad [B] (verification not implemented)

Time = 16.13 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+(-40x+10x^2)\log(4)+5x\log^2(4)+\left(150x-40x^2+(-\right.\right.}{225-240x+244x^2-96x^3+36x^4+(-240+188x-128x^2+24x^3)\log(4)+(94-48x+16x^2)\log}$$
$$= \mathrm{e}^{\frac{5\,x^2\,\ln(x)}{4\,x\,\ln(2)-16\,\ln(2)-8\,x+4\,\ln(2)^2+6\,x^2+15}}$$

input
```
int((exp((5*x^2*log(x))/(2*log(2)*(2*x - 8) - 8*x + 4*log(2)^2 + 6*x^2 + 1
5))*(75*x - 2*log(2)*(40*x - 10*x^2) + log(x)*(150*x - 2*log(2)*(80*x - 10
*x^2) + 40*x*log(2)^2 - 40*x^2) + 20*x*log(2)^2 - 40*x^2 + 30*x^3))/(8*log
(2)^3*(4*x - 16) - 240*x + 2*log(2)*(188*x - 128*x^2 + 24*x^3 - 240) + 4*l
og(2)^2*(16*x^2 - 48*x + 94) + 16*log(2)^4 + 244*x^2 - 96*x^3 + 36*x^4 + 2
25),x)
```

output
```
exp((5*x^2*log(x))/(4*x*log(2) - 16*log(2) - 8*x + 4*log(2)^2 + 6*x^2 + 15
))
```

3.626.

$$\int \frac{x^{\frac{5x^2}{15-8x+6x^2+(-8+2x)\log(4)+\log^2(4)}}\left(75x-40x^2+30x^3+\left(-40x+10x^2\right)\log(4)+5x\log^2(4)+\left(150x-40x^2+\left(-80x+10x^2\right)\log(4)+10x\log^2(4)\right)\log(x\right.}{225-240x+244x^2-96x^3+36x^4+\left(-240+188x-128x^2+24x^3\right)\log(4)+\left(94-48x+16x^2\right)\log^2(4)+(-16+4x)\log^3(4)+\log^4(4)}$$

3.627 $\int \frac{54-27x-9x^2+3x^3+x^4}{-27x+3x^3}\,dx$

3.627.1 Optimal result

Integrand size = 30, antiderivative size = 27

$$\int \frac{54-27x-9x^2+3x^3+x^4}{-27x+3x^3}\,dx = x+\frac{x^2}{6}-\log\left(x^2\right)+\log\left(-14\left(3-\frac{x^2}{3}\right)\right)$$

output
```
ln(-42+14/3*x^2)+x+1/6*x^2-ln(x^2)
```

3.627.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{54-27x-9x^2+3x^3+x^4}{-27x+3x^3}\,dx = x+\frac{x^2}{6}-2\log(x)+\log\left(9-x^2\right)$$

input
```
Integrate[(54 - 27*x - 9*x^2 + 3*x^3 + x^4)/(-27*x + 3*x^3),x]
```

output
```
x + x^2/6 - 2*Log[x] + Log[9 - x^2]
```

3.627.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2026, 2333, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4+3x^3-9x^2-27x+54}{3x^3-27x} \, dx$$
$$\Big\downarrow \; 2026$$
$$\int \frac{x^4+3x^3-9x^2-27x+54}{x\left(3x^2-27\right)}dx$$
$$\Big\downarrow \; 2333$$
$$\int \left(\frac{x}{3}+\frac{1}{x-3}+\frac{1}{x+3}-\frac{2}{x}+1\right)dx$$
$$\Big\downarrow \; 2009$$
$$\frac{x^2}{6}+x+\log(3-x)-2\log(x)+\log(x+3)$$

input
```
Int[(54 - 27*x - 9*x^2 + 3*x^3 + x^4)/(-27*x + 3*x^3),x]
```

output
```
x + x^2/6 + Log[3 - x] - 2*Log[x] + Log[3 + x]
```

3.627.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2333
```
Int[(Pq_)*((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[
ExpandIntegrand[(c*x)^m*Pq*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x]
&& PolyQ[Pq, x] && IGtQ[p, -2]
```

3.627.4 Maple [A] (verified)

Time = 1.53 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67

method	result	size
risch	$x+\frac{x^2}{6}-2\ln(x)+\ln(x^2-9)$	18
default	$x+\frac{x^2}{6}+\ln(-3+x)-2\ln(x)+\ln(3+x)$	20
norman	$x+\frac{x^2}{6}+\ln(-3+x)-2\ln(x)+\ln(3+x)$	20
parallelrisch	$x+\frac{x^2}{6}+\ln(-3+x)-2\ln(x)+\ln(3+x)$	20
meijerg	$-2\ln(x)+2\ln(3)-i\pi+\ln\left(1-\frac{x^2}{9}\right)+\frac{x^2}{6}-\frac{3i\left(\frac{2ix}{3}-2i\operatorname{arctanh}\left(\frac{x}{3}\right)\right)}{2}+3\operatorname{arctanh}\left(\frac{x}{3}\right)$	48

input
```
int((x^4+3*x^3-9*x^2-27*x+54)/(3*x^3-27*x),x,method=_RETURNVERBOSE)
```

output
```
x+1/6*x^2-2*ln(x)+ln(x^2-9)
```

3.627.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{54-27x-9x^2+3x^3+x^4}{-27x+3x^3}\,dx = \frac{1}{6}x^2+x+\log\left(x^2-9\right)-2\log(x)$$

input
```
integrate((x^4+3*x^3-9*x^2-27*x+54)/(3*x^3-27*x),x, algorithm=\
```

output
```
1/6*x^2 + x + log(x^2 - 9) - 2*log(x)
```

3.627.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{54-27x-9x^2+3x^3+x^4}{-27x+3x^3}\,dx = \frac{x^2}{6}+x-2\log(x)+\log\left(x^2-9\right)$$

input
```
integrate((x**4+3*x**3-9*x**2-27*x+54)/(3*x**3-27*x),x)
```

output
```
x**2/6 + x - 2*log(x) + log(x**2 - 9)
```

3.627.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.70

$$\int \frac{54-27x-9x^2+3x^3+x^4}{-27x+3x^3}\,dx=\frac{1}{6}\,x^2+x+\log\left(x+3\right)+\log\left(x-3\right)-2\,\log\left(x\right)$$

input
```
integrate((x^4+3*x^3-9*x^2-27*x+54)/(3*x^3-27*x),x, algorithm=\
```

output
```
1/6*x^2 + x + log(x + 3) + log(x - 3) - 2*log(x)
```

3.627.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{54-27x-9x^2+3x^3+x^4}{-27x+3x^3}\,dx=\frac{1}{6}\,x^2+x+\log\left(|x+3|\right)+\log\left(|x-3|\right)-2\,\log\left(|x|\right)$$

input
```
integrate((x^4+3*x^3-9*x^2-27*x+54)/(3*x^3-27*x),x, algorithm=\
```

output
```
1/6*x^2 + x + log(abs(x + 3)) + log(abs(x - 3)) - 2*log(abs(x))
```

3.627.9 Mupad [B] (verification not implemented)

Time = 14.72 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{54-27x-9x^2+3x^3+x^4}{-27x+3x^3}\,dx=x+\ln\left(x^2-9\right)-2\,\ln\left(x\right)+\frac{x^2}{6}$$

input
```
int(-(3*x^3 - 9*x^2 - 27*x + x^4 + 54)/(27*x - 3*x^3),x)
```

output
```
x + log(x^2 - 9) - 2*log(x) + x^2/6
```

3.628 $\int \frac{3208x^2-11212x^3+12006x^4-5201x^5+800x^6+e^x(-2406+6015x-6003x^2+1200x^3)}{-3200x^2+4800x^3-2400x^4+400x^5}\,dx$

3.628.1 Optimal result

Integrand size = 69, antiderivative size = 23

$$\int \frac{3208x^2-11212x^3+12006x^4-5201x^5+800x^6+e^x(-2406+6015x-6003x^2+1200x^3)}{-3200x^2+4800x^3-2400x^4+400x^5}\,dx = \left(-\frac{401}{400}+x\right)\left(\frac{3e^x}{(2-x)^2x}+x\right)$$

output
```
(3/(2-x)^2*exp(x)/x+x)*(x-401/400)
```

3.628.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.91

$$\int \frac{3208x^2-11212x^3+12006x^4-5201x^5+800x^6+e^x(-2406+6015x-6003x^2+1200x^3)}{-3200x^2+4800x^3-2400x^4+400x^5}\,dx = \frac{1}{400}\left(3e^x\left(\frac{399}{2(-2+x)^2}+\frac{401}{4(-2+x)}-\frac{401}{4x}\right)-401x+400x^2\right)$$

input
```
Integrate[(3208*x^2 - 11212*x^3 + 12006*x^4 - 5201*x^5 + 800*x^6 + E^x*(-2
406 + 6015*x - 6003*x^2 + 1200*x^3))/(-3200*x^2 + 4800*x^3 - 2400*x^4 + 40
0*x^5),x]
```

output
```
(3*E^x*(399/(2*(-2 + x)^2) + 401/(4*(-2 + x)) - 401/(4*x)) - 401*x + 400*x
^2)/400
```

3.628.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 51 vs. $2(23) = 46$.

Time = 0.85 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.22, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.072$, Rules used = {2026, 2007, 7239, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{800x^6-5201x^5+12006x^4-11212x^3+3208x^2+e^x(1200x^3-6003x^2+6015x-2406)}{400x^5-2400x^4+4800x^3-3200x^2}dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{800x^6-5201x^5+12006x^4-11212x^3+3208x^2+e^x(1200x^3-6003x^2+6015x-2406)}{x^2(400x^3-2400x^2+4800x-3200)}dx$$
$$\Big\downarrow \text{2007}$$
$$\int \frac{800x^6-5201x^5+12006x^4-11212x^3+3208x^2+e^x(1200x^3-6003x^2+6015x-2406)}{x^2\left(2\sqrt[3]{2}5^{2/3}x-4\sqrt[3]{2}5^{2/3}\right)^3}dx$$
$$\Big\downarrow \text{7239}$$
$$\int \frac{1}{400}\left(\frac{3e^x(400x^3-2001x^2+2005x-802)}{(x-2)^3x^2}+800x-401\right)dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{400}\int \left(800x-401+\frac{3e^x(-400x^3+2001x^2-2005x+802)}{(2-x)^3x^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{1}{400}\left(400x^2-401x-\frac{1203e^x}{4(2-x)}+\frac{1197e^x}{2(2-x)^2}-\frac{1203e^x}{4x}\right)$$

input
```
Int[(3208*x^2 - 11212*x^3 + 12006*x^4 - 5201*x^5 + 800*x^6 + E^x*(-2406 +
6015*x - 6003*x^2 + 1200*x^3))/(-3200*x^2 + 4800*x^3 - 2400*x^4 + 400*x^5)
,x]
```

output
```
((1197*E^x)/(2*(2 - x)^2) - (1203*E^x)/(4*(2 - x)) - (1203*E^x)/(4*x) - 40
1*x + 400*x^2)/400
```

3.628. $\int \frac{3208x^2-11212x^3+12006x^4-5201x^5+800x^6+e^x(-2406+6015x-6003x^2+1200x^3)}{-3200x^2+4800x^3-2400x^4+400x^5}dx$

3.628.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.628.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

method	result	size
risch	$x^2-\frac{401x}{400}+\frac{3(400x-401)\mathrm{e}^x}{400x(-2+x)^2}$	25
default	$x^2-\frac{401x}{400}+\frac{1203\,\mathrm{e}^x}{1600(-2+x)}+\frac{1197\,\mathrm{e}^x}{800(-2+x)^2}-\frac{1203\,\mathrm{e}^x}{1600x}$	33
parts	$x^2-\frac{401x}{400}+\frac{1203\,\mathrm{e}^x}{1600(-2+x)}+\frac{1197\,\mathrm{e}^x}{800(-2+x)^2}-\frac{1203\,\mathrm{e}^x}{1600x}$	33
norman	$\frac{x^5-\frac{801x}{25}+\frac{2803x^2}{100}-\frac{2001x^4}{400}+3\,\mathrm{e}^x x-\frac{1203\,\mathrm{e}^x}{400}}{x(-2+x)^2}$	36
parallelrisch	$\frac{400x^5-2001x^4+11212x^2+1200\,\mathrm{e}^x x-12816x-1203\,\mathrm{e}^x}{400x(x^2-4x+4)}$	44

input
```
int(((1200*x^3-6003*x^2+6015*x-2406)*exp(x)+800*x^6-5201*x^5+12006*x^4-112
12*x^3+3208*x^2)/(400*x^5-2400*x^4+4800*x^3-3200*x^2),x,method=_RETURNVERB
OSE)
```

output
```
x^2-401/400*x+3/400*(400*x-401)/x/(-2+x)^2*exp(x)
```

3.628.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. 2(21) = 42.

Time = 0.26 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.00

$$\int \frac{3208x^2 - 11212x^3 + 12006x^4 - 5201x^5 + 800x^6 + e^x(-2406 + 6015x - 6003x^2 + 1200x^3)}{-3200x^2 + 4800x^3 - 2400x^4 + 400x^5}\,dx$$
$$= \frac{400\,x^5 - 2001\,x^4 + 3204\,x^3 - 1604\,x^2 + 3\,(400\,x - 401)e^x}{400\,(x^3 - 4\,x^2 + 4\,x)}$$

input
```
integrate(((1200*x^3-6003*x^2+6015*x-2406)*exp(x)+800*x^6-5201*x^5+12006*x
^4-11212*x^3+3208*x^2)/(400*x^5-2400*x^4+4800*x^3-3200*x^2),x, algorithm=\
```

output
```
1/400*(400*x^5 - 2001*x^4 + 3204*x^3 - 1604*x^2 + 3*(400*x - 401)*e^x)/(x^
3 - 4*x^2 + 4*x)
```

3.628.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{3208x^2 - 11212x^3 + 12006x^4 - 5201x^5 + 800x^6 + e^x(-2406 + 6015x - 6003x^2 + 1200x^3)}{-3200x^2 + 4800x^3 - 2400x^4 + 400x^5}\,dx$$
$$= x^2 - \frac{401x}{400} + \frac{(1200x - 1203)\,e^x}{400x^3 - 1600x^2 + 1600x}$$

input
```
integrate(((1200*x**3-6003*x**2+6015*x-2406)*exp(x)+800*x**6-5201*x**5+120
06*x**4-11212*x**3+3208*x**2)/(400*x**5-2400*x**4+4800*x**3-3200*x**2),x)
```

output
```
x**2 - 401*x/400 + (1200*x - 1203)*exp(x)/(400*x**3 - 1600*x**2 + 1600*x)
```

3.628.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 108 vs. 2(21) = 42.

Time = 0.26 (sec) , antiderivative size = 108, normalized size of antiderivative = 4.70

$$\int \frac{3208x^2-11212x^3+12006x^4-5201x^5+800x^6+e^x(-2406+6015x-6003x^2+1200x^3)}{-3200x^2+4800x^3-2400x^4+400x^5}\,dx$$
$$= x^2 - \frac{401}{400}\,x + \frac{3\,(400\,x-401)e^x}{400\,(x^3-4\,x^2+4\,x)} - \frac{16\,(4\,x-7)}{x^2-4\,x+4} + \frac{5201\,(3\,x-5)}{100\,(x^2-4\,x+4)} - \frac{6003\,(2\,x-3)}{100\,(x^2-4\,x+4)} + \frac{2803\,(x-1)}{100\,(x^2-4\,x+4)} - \frac{401}{100\,(x^2-4\,x+4)}$$

input
```
integrate(((1200*x^3-6003*x^2+6015*x-2406)*exp(x)+800*x^6-5201*x^5+12006*x
^4-11212*x^3+3208*x^2)/(400*x^5-2400*x^4+4800*x^3-3200*x^2),x, algorithm=\
```

output
```
x^2 - 401/400*x + 3/400*(400*x - 401)*e^x/(x^3 - 4*x^2 + 4*x) - 16*(4*x -
7)/(x^2 - 4*x + 4) + 5201/100*(3*x - 5)/(x^2 - 4*x + 4) - 6003/100*(2*x -
3)/(x^2 - 4*x + 4) + 2803/100*(x - 1)/(x^2 - 4*x + 4) - 401/100/(x^2 - 4*x
 + 4)
```

3.628.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. 2(21) = 42.

Time = 0.27 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.00

$$\int \frac{3208x^2-11212x^3+12006x^4-5201x^5+800x^6+e^x(-2406+6015x-6003x^2+1200x^3)}{-3200x^2+4800x^3-2400x^4+400x^5}\,dx$$
$$= \frac{400\,x^5-2001\,x^4+3204\,x^3-1604\,x^2+1200\,xe^x-1203\,e^x}{400\,(x^3-4\,x^2+4\,x)}$$

input
```
integrate(((1200*x^3-6003*x^2+6015*x-2406)*exp(x)+800*x^6-5201*x^5+12006*x
^4-11212*x^3+3208*x^2)/(400*x^5-2400*x^4+4800*x^3-3200*x^2),x, algorithm=\
```

output
```
1/400*(400*x^5 - 2001*x^4 + 3204*x^3 - 1604*x^2 + 1200*x*e^x - 1203*e^x)/(
x^3 - 4*x^2 + 4*x)
```

3.628.9 Mupad [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

$$\int \frac{3208x^2-11212x^3+12006x^4-5201x^5+800x^6+e^x(-2406+6015x-6003x^2+1200x^3)}{-3200x^2+4800x^3-2400x^4+400x^5}\,dx = \frac{(400\,x-401)\,(3\,e^x+4\,x^2-4\,x^3+x^4)}{400\,x\,(x-2)^2}$$

input

```
int(-(3208*x^2 - 11212*x^3 + 12006*x^4 - 5201*x^5 + 800*x^6 + exp(x)*(6015
*x - 6003*x^2 + 1200*x^3 - 2406))/(3200*x^2 - 4800*x^3 + 2400*x^4 - 400*x^
5),x)
```

output

```
((400*x - 401)*(3*exp(x) + 4*x^2 - 4*x^3 + x^4))/(400*x*(x - 2)^2)
```

3.629 $\int \frac{e^{\frac{1}{16}\left(e^9-8e^5x+16ex^2\right)}\left(-2-e^5x+4ex^2\right)}{5x^2}\,dx$

3.629.1 Optimal result

Integrand size = 43, antiderivative size = 24

$$\int \frac{e^{\frac{1}{16}\left(e^9-8e^5x+16ex^2\right)}\left(-2-e^5x+4ex^2\right)}{5x^2}\,dx=\frac{2e^{e\left(\frac{e^4}{4}-x\right)^2}}{5x}$$

output
```
2/5*exp((1/4*exp(2)^2-x)^2*exp(1))/x
```

3.629.2 Mathematica [A] (verified)

Time = 1.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{1}{16}\left(e^9-8e^5x+16ex^2\right)}\left(-2-e^5x+4ex^2\right)}{5x^2}\,dx=\frac{2e^{\frac{1}{16}e\left(e^4-4x\right)^2}}{5x}$$

input
```
Integrate[(E^((E^9 - 8*E^5*x + 16*E*x^2)/16)*(-2 - E^5*x + 4*E*x^2))/(5*x^
2),x]
```

output
```
(2*E^((E*(E^4 - 4*x)^2)/16))/(5*x)
```

3.629.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 52 vs. $2(24) = 48$.

Time = 0.23 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.17, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.070$, Rules used = {27, 25, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{1}{16}(16ex^2-8e^5x+e^9)}\left(4ex^2-e^5x-2\right)}{5x^2}\,dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{5}\int -\frac{e^{\frac{1}{16}(16ex^2-8e^5x+e^9)}\left(-4ex^2+e^5x+2\right)}{x^2}dx$$
$$\Big\downarrow \text{25}$$
$$-\frac{1}{5}\int \frac{e^{\frac{1}{16}(16ex^2-8e^5x+e^9)}\left(-4ex^2+e^5x+2\right)}{x^2}dx$$
$$\Big\downarrow \text{2726}$$
$$\frac{2e^{\frac{1}{16}(16ex^2-8e^5x+e^9)-1}\left(e^5x-4ex^2\right)}{5\left(e^4-4x\right)x^2}$$

input
```
Int[(E^((E^9 - 8*E^5*x + 16*E*x^2)/16)*(-2 - E^5*x + 4*E*x^2))/(5*x^2),x]
```

output
```
(2*E^(-1 + (E^9 - 8*E^5*x + 16*E*x^2)/16)*(E^5*x - 4*E*x^2))/(5*(E^4 - 4*x
)*x^2)
```

3.629.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.629.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

method	result	size
risch	$\frac{2\,\mathrm{e}^{\frac{\mathrm{e}^{9}}{16}-\frac{x\,\mathrm{e}^{5}}{2}+x^{2}\mathrm{e}}}{5x}$	23
parallelrisch	$\frac{2\,\mathrm{e}^{\frac{\mathrm{e}\left(\mathrm{e}^{8}-8x\,\mathrm{e}^{4}+16x^{2}\right)}{16}}}{5x}$	28
gosper	$\frac{2\,\mathrm{e}^{\frac{\mathrm{e}\,\mathrm{e}^{8}}{16}-\frac{x\,\mathrm{e}\,\mathrm{e}^{4}}{2}+x^{2}\mathrm{e}}}{5x}$	31
norman	$\frac{2\,\mathrm{e}^{\frac{\mathrm{e}\,\mathrm{e}^{8}}{16}-\frac{x\,\mathrm{e}\,\mathrm{e}^{4}}{2}+x^{2}\mathrm{e}}}{5x}$	31

input
```
int(1/5*(-x*exp(1)*exp(2)^2+4*x^2*exp(1)-2)*exp(1/16*exp(1)*exp(2)^4-1/2*x
*exp(1)*exp(2)^2+x^2*exp(1))/x^2,x,method=_RETURNVERBOSE)
```

output
```
2/5/x*exp(1/16*exp(9)-1/2*x*exp(5)+x^2*exp(1))
```

3.629.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{1}{16}\left(e^9-8e^5x+16ex^2\right)}\left(-2-e^5x+4ex^2\right)}{5x^2}\,dx=\frac{2\,e^{\left(x^2e-\frac{1}{2}\,xe^5+\frac{1}{16}\,e^9\right)}}{5\,x}$$

input
```
integrate(1/5*(-x*exp(1)*exp(2)^2+4*x^2*exp(1)-2)*exp(1/16*exp(1)*exp(2)^4
-1/2*x*exp(1)*exp(2)^2+x^2*exp(1))/x^2,x, algorithm=\
```

output
```
2/5*e^(x^2*e - 1/2*x*e^5 + 1/16*e^9)/x
```

3.629.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{1}{16}(e^9-8e^5x+16ex^2)}(-2-e^5x+4ex^2)}{5x^2}\,dx = \frac{2e^{ex^2-\frac{xe^5}{2}+\frac{e^9}{16}}}{5x}$$

input
```
integrate(1/5*(-x*exp(1)*exp(2)**2+4*x**2*exp(1)-2)*exp(1/16*exp(1)*exp(2)
**4-1/2*x*exp(1)*exp(2)**2+x**2*exp(1))/x**2,x)
```

output
```
2*exp(E*x**2 - x*exp(5)/2 + exp(9)/16)/(5*x)
```

3.629.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{1}{16}(e^9-8e^5x+16ex^2)}(-2-e^5x+4ex^2)}{5x^2}\,dx = \frac{2\,e^{\left(x^2e-\frac{1}{2}\,xe^5+\frac{1}{16}\,e^9\right)}}{5\,x}$$

input
```
integrate(1/5*(-x*exp(1)*exp(2)^2+4*x^2*exp(1)-2)*exp(1/16*exp(1)*exp(2)^4
-1/2*x*exp(1)*exp(2)^2+x^2*exp(1))/x^2,x, algorithm=\
```

output
```
2/5*e^(x^2*e - 1/2*x*e^5 + 1/16*e^9)/x
```

3.629.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{1}{16}(e^9-8e^5x+16ex^2)}(-2-e^5x+4ex^2)}{5x^2}\,dx = \frac{2\,e^{\left(x^2e-\frac{1}{2}\,xe^5+\frac{1}{16}\,e^9\right)}}{5\,x}$$

input
```
integrate(1/5*(-x*exp(1)*exp(2)^2+4*x^2*exp(1)-2)*exp(1/16*exp(1)*exp(2)^4
-1/2*x*exp(1)*exp(2)^2+x^2*exp(1))/x^2,x, algorithm=\
```

output
```
2/5*e^(x^2*e - 1/2*x*e^5 + 1/16*e^9)/x
```

3.629.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{1}{16}\left(e^9-8e^5x+16ex^2\right)}\left(-2-e^5x+4ex^2\right)}{5x^2}\,dx=\frac{2\,\mathrm{e}^{x^2\,\mathrm{e}}\,\mathrm{e}^{\frac{\mathrm{e}^9}{16}}\,\mathrm{e}^{-\frac{x\,\mathrm{e}^5}{2}}}{5\,x}$$

input
```
int(-(exp(exp(9)/16 - (x*exp(5))/2 + x^2*exp(1))*(x*exp(5) - 4*x^2*exp(1)
+ 2))/(5*x^2),x)
```

output
```
(2*exp(x^2*exp(1))*exp(exp(9)/16)*exp(-(x*exp(5))/2))/(5*x)
```

3.630 $\int (-3-10x-6x^2-4x^3)\,dx$

3.630.1 Optimal result

Integrand size = 15, antiderivative size = 17

$$\int (-3-10x-6x^2-4x^3)\,dx = -e^{17}+x-(2+x+x^2)^2$$

output
```
x-(x^2+x+2)^2-exp(17)
```

3.630.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int (-3-10x-6x^2-4x^3)\,dx = -3x-5x^2-2x^3-x^4$$

input
```
Integrate[-3 - 10*x - 6*x^2 - 4*x^3,x]
```

output
```
-3*x - 5*x^2 - 2*x^3 - x^4
```

3.630.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-4x^3-6x^2-10x-3\right) \, dx$$

$$\Big\downarrow \; 2009$$

$$-x^4-2x^3-5x^2-3x$$

input
```
Int[-3 - 10*x - 6*x^2 - 4*x^3,x]
```

output
```
-3*x - 5*x^2 - 2*x^3 - x^4
```

3.630.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.630.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

method	result	size
gosper	$-x(x^3+2x^2+5x+3)$	17
default	$-x^4-2x^3-5x^2-3x$	20
norman	$-x^4-2x^3-5x^2-3x$	20
risch	$-x^4-2x^3-5x^2-3x$	20
parallelrisch	$-x^4-2x^3-5x^2-3x$	20
parts	$-x^4-2x^3-5x^2-3x$	20

input
```
int(-4*x^3-6*x^2-10*x-3,x,method=_RETURNVERBOSE)
```

output
```
-x*(x^3+2*x^2+5*x+3)
```

3.630.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \left(-3-10x-6x^2-4x^3\right)\,dx=-x^4-2\,x^3-5\,x^2-3\,x$$

input
```
integrate(-4*x^3-6*x^2-10*x-3,x, algorithm=\
```

output
```
-x^4 - 2*x^3 - 5*x^2 - 3*x
```

3.630.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \left(-3-10x-6x^2-4x^3\right)\,dx=-x^4-2x^3-5x^2-3x$$

input
```
integrate(-4*x**3-6*x**2-10*x-3,x)
```

output
```
-x**4 - 2*x**3 - 5*x**2 - 3*x
```

3.630.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \left(-3-10x-6x^2-4x^3\right)\,dx=-x^4-2\,x^3-5\,x^2-3\,x$$

input
```
integrate(-4*x^3-6*x^2-10*x-3,x, algorithm=\
```

output
```
-x^4 - 2*x^3 - 5*x^2 - 3*x
```

3.630.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int (-3-10x-6x^2-4x^3) \, dx = -x^4-2\,x^3-5\,x^2-3\,x$$

input
```
integrate(-4*x^3-6*x^2-10*x-3,x, algorithm=\
```

output
```
-x^4 - 2*x^3 - 5*x^2 - 3*x
```

3.630.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int (-3-10x-6x^2-4x^3) \, dx = -x^4-2\,x^3-5\,x^2-3\,x$$

input
```
int(- 10*x - 6*x^2 - 4*x^3 - 3,x)
```

output
```
- 3*x - 5*x^2 - 2*x^3 - x^4
```

3.631 $\int \frac{-1-x^2-x^3}{x^2+x^3}\,dx$

3.631.1 Optimal result

Integrand size = 22, antiderivative size = 29

$$\int \frac{-1-x^2-x^3}{x^2+x^3}\,dx=-4-e^4+\frac{1-x}{x}-x+\log(x)-\log(2+2x)$$

output
```
ln(x)+(1-x)/x-4-ln(2+2*x)-x-exp(4)
```

3.631.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.52

$$\int \frac{-1-x^2-x^3}{x^2+x^3}\,dx=\frac{1}{x}-x+\log(x)-\log(1+x)$$

input
```
Integrate[(-1 - x^2 - x^3)/(x^2 + x^3),x]
```

output
```
x^(-1) - x + Log[x] - Log[1 + x]
```

3.631.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.52, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136, Rules used = {2026, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^3-x^2-1}{x^3+x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-x^3-x^2-1}{x^2(x+1)}dx$$

$$\Big\downarrow \text{2123}$$

$$\int \left(-\frac{1}{x^2}+\frac{1}{x}+\frac{1}{-x-1}-1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-x+\frac{1}{x}+\log(x)-\log(x+1)$$

input
```
Int[(-1 - x^2 - x^3)/(x^2 + x^3),x]
```

output
```
x^(-1) - x + Log[x] - Log[1 + x]
```

3.631.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

3.631.4 Maple [A] (verified)

Time = 1.19 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.55

method	result	size
default	$-x+\ln(x)+\frac{1}{x}-\ln(1+x)$	16
meijerg	$-x+\ln(x)+\frac{1}{x}-\ln(1+x)$	16
risch	$-x+\ln(x)+\frac{1}{x}-\ln(1+x)$	16
parallelrisch	$\frac{x\ln(x)-\ln(1+x)x-x^2+1}{x}$	23

input
```
int((-x^3-x^2-1)/(x^3+x^2),x,method=_RETURNVERBOSE)
```

output
```
-x+ln(x)+1/x-ln(1+x)
```

3.631.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.72

$$\int \frac{-1-x^2-x^3}{x^2+x^3}\,dx=-\frac{x^2+x\log(x+1)-x\log(x)-1}{x}$$

input
```
integrate((-x^3-x^2-1)/(x^3+x^2),x, algorithm=\
```

output
```
-(x^2 + x*log(x + 1) - x*log(x) - 1)/x
```

3.631.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.41

$$\int \frac{-1-x^2-x^3}{x^2+x^3}\,dx=-x+\log(x)-\log(x+1)+\frac{1}{x}$$

input
```
integrate((-x**3-x**2-1)/(x**3+x**2),x)
```

output
```
-x + log(x) - log(x + 1) + 1/x
```

3.631.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.52

$$\int \frac{-1-x^2-x^3}{x^2+x^3}\,dx = -x+\frac{1}{x}-\log(x+1)+\log(x)$$

input
```
integrate((-x^3-x^2-1)/(x^3+x^2),x, algorithm=\
```

output
```
-x + 1/x - log(x + 1) + log(x)
```

3.631.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.59

$$\int \frac{-1-x^2-x^3}{x^2+x^3}\,dx = -x+\frac{1}{x}-\log(|x+1|)+\log(|x|)$$

input
```
integrate((-x^3-x^2-1)/(x^3+x^2),x, algorithm=\
```

output
```
-x + 1/x - log(abs(x + 1)) + log(abs(x))
```

3.631.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.52

$$\int \frac{-1-x^2-x^3}{x^2+x^3}\,dx = \frac{1}{x}-2\,\mathrm{atanh}(2\,x+1)-x$$

input
```
int(-(x^2 + x^3 + 1)/(x^2 + x^3),x)
```

output
```
1/x - 2*atanh(2*x + 1) - x
```

3.632 $\int \frac{-25+25x+x^2-x^3+(-2x^3+2x^2\log(x))\log(x-\log(x))}{-x^2+x\log(x)}\,dx$

3.632.1 Optimal result

Integrand size = 47, antiderivative size = 23

$$\int \frac{-25+25x+x^2-x^3+(-2x^3+2x^2\log(x))\log(x-\log(x))}{-x^2+x\log(x)}\,dx = -5-(5+x+(4-x)(5+x))\log(x-\log(x))$$

output
```
-5-ln(x-ln(x))*(x+5+(-x+4)*(5+x))
```

3.632.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{-25+25x+x^2-x^3+(-2x^3+2x^2\log(x))\log(x-\log(x))}{-x^2+x\log(x)}\,dx = -25\log(x-\log(x))+x^2\log(x-\log(x))$$

input
```
Integrate[(-25 + 25*x + x^2 - x^3 + (-2*x^3 + 2*x^2*Log[x])*Log[x - Log[x]
])/(-x^2 + x*Log[x]),x]
```

output
```
-25*Log[x - Log[x]] + x^2*Log[x - Log[x]]
```

3.632.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^3+x^2+\left(2x^2\log(x)-2x^3\right)\log(x-\log(x))+25x-25}{x\log(x)-x^2}dx$$

$$\Big\downarrow \text{3041}$$

$$\int \frac{-x^3+x^2+\left(2x^2\log(x)-2x^3\right)\log(x-\log(x))+25x-25}{x(\log(x)-x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x^3-x^2-25x+25}{x(x-\log(x))}+2x\log(x-\log(x))\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{x^2}{x-\log(x)}dx-25\int \frac{1}{x-\log(x)}dx+25\int \frac{1}{x(x-\log(x))}dx-\int \frac{x}{x-\log(x)}dx+2\int x\log(x-\log(x))dx$$

input
```
Int[(-25 + 25*x + x^2 - x^3 + (-2*x^3 + 2*x^2*Log[x])*Log[x - Log[x]])/(-x
^2 + x*Log[x]),x]
```

output
```
$Aborted
```

3.632.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3041
```
Int[(u_.)*((a_.)*(x_)^(m_.) + Log[(c_.)*(x_)^(n_.)]^(q_.)*(b_.)*(x_)^(r_.))
^(p_.), x_Symbol] :> Int[u*x^(p*r)*(a*x^(m - r) + b*Log[c*x^n]^q)^p, x] /;
FreeQ[{a, b, c, m, n, p, q, r}, x] && IntegerQ[p]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.632.4 Maple [A] (verified)

Time = 2.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

method	result	size
risch	$\ln(x-\ln(x))\,x^2-25\ln(\ln(x)-x)$	22
parallelrisch	$\ln(x-\ln(x))\,x^2-25\ln(x-\ln(x))$	22

input
```
int(((2*x^2*ln(x)-2*x^3)*ln(x-ln(x))-x^3+x^2+25*x-25)/(x*ln(x)-x^2),x,meth
od=_RETURNVERBOSE)
```

output
```
ln(x-ln(x))*x^2-25*ln(ln(x)-x)
```

3.632.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.57

$$\int \frac{-25+25x+x^2-x^3+(-2x^3+2x^2\log(x))\log(x-\log(x))}{-x^2+x\log(x)}\,dx$$
$$=(x^2-25)\log(x-\log(x))$$

input
```
integrate(((2*x^2*log(x)-2*x^3)*log(x-log(x))-x^3+x^2+25*x-25)/(x*log(x)-x
^2),x, algorithm=\
```

output
```
(x^2 - 25)*log(x - log(x))
```

3.632.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \frac{-25+25x+x^2-x^3+(-2x^3+2x^2\log(x))\log(x-\log(x))}{-x^2+x\log(x)}\,dx$$
$$=x^2\log(x-\log(x))-25\log(-x+\log(x))$$

input
```
integrate(((2*x**2*ln(x)-2*x**3)*ln(x-ln(x))-x**3+x**2+25*x-25)/(x*ln(x)-x
**2),x)
```

output
```
x**2*log(x - log(x)) - 25*log(-x + log(x))
```

3.632.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.57

$$\int \frac{-25+25x+x^2-x^3+(-2x^3+2x^2\log(x))\log(x-\log(x))}{-x^2+x\log(x)}\,dx$$
$$=(x^2-25)\log(x-\log(x))$$

input
```
integrate(((2*x^2*log(x)-2*x^3)*log(x-log(x))-x^3+x^2+25*x-25)/(x*log(x)-x
^2),x, algorithm=\
```

output
```
(x^2 - 25)*log(x - log(x))
```

3.632.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{-25+25x+x^2-x^3+(-2x^3+2x^2\log(x))\log(x-\log(x))}{-x^2+x\log(x)}\,dx$$
$$=x^2\log(x-\log(x))-25\log(x-\log(x))$$

input
```
integrate(((2*x^2*log(x)-2*x^3)*log(x-log(x))-x^3+x^2+25*x-25)/(x*log(x)-x
^2),x, algorithm=\
```

output
```
x^2*log(x - log(x)) - 25*log(x - log(x))
```

3.632.9 Mupad [B] (verification not implemented)

Time = 15.29 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{-25+25x+x^2-x^3+(-2x^3+2x^2\log(x))\log(x-\log(x))}{-x^2+x\log(x)}\,dx$$
$$=x^2\ln(x-\ln(x))-25\ln(\ln(x)-x)$$

input
```
int((25*x + log(x - log(x))*(2*x^2*log(x) - 2*x^3) + x^2 - x^3 - 25)/(x*lo
g(x) - x^2),x)
```

output
```
x^2*log(x - log(x)) - 25*log(log(x) - x)
```

3.633 $\int \frac{(2-6x^3-4\log(x\log(4)))\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx$

3.633.1 Optimal result

Integrand size = 58, antiderivative size = 18

$$\int \frac{(2-6x^3-4\log(x\log(4)))\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx = \log^2\left(9+3x-\frac{\log(x\log(4))}{x^2}\right)$$

output
```
ln(3*x-ln(2*x*ln(2))/x^2+9)^2
```

3.633.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{(2-6x^3-4\log(x\log(4)))\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx = \log^2\left(9+3x-\frac{\log(x\log(4))}{x^2}\right)$$

input
```
Integrate[((2 - 6*x^3 - 4*Log[x*Log[4]])*Log[(9*x^2 + 3*x^3 - Log[x*Log[4]
])/x^2])/(-9*x^3 - 3*x^4 + x*Log[x*Log[4]]),x]
```

output
```
Log[9 + 3*x - Log[x*Log[4]]/x^2]^2
```

3.633.3 Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.017, Rules used = {7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-6x^3-4\log(x\log(4))+2)\log\left(\frac{3x^3+9x^2-\log(x\log(4))}{x^2}\right)}{-3x^4-9x^3+x\log(x\log(4))}dx$$
$$\Big\downarrow \text{7237}$$
$$\log^2\left(\frac{3x^3+9x^2-\log(x\log(4))}{x^2}\right)$$

input
```
Int[((2 - 6*x^3 - 4*Log[x*Log[4]])*Log[(9*x^2 + 3*x^3 - Log[x*Log[4]])/x^2
])/(-9*x^3 - 3*x^4 + x*Log[x*Log[4]]),x]
```

output
```
Log[(9*x^2 + 3*x^3 - Log[x*Log[4]])/x^2]^2
```

3.633.3.1 Defintions of rubi rules used

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

3.633.4 Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78

method	result	size
default	$\ln\left(\frac{3x^3+9x^2-\ln(2)-\ln(\ln(2))-\ln(x)}{x^2}\right)^2$	32

input
```
int((-4*ln(2*x*ln(2))-6*x^3+2)*ln((-ln(2*x*ln(2))+3*x^3+9*x^2)/x^2)/(x*ln(
2*x*ln(2))-3*x^4-9*x^3),x,method=_RETURNVERBOSE)
```

output
```
ln((3*x^3+9*x^2-ln(2)-ln(ln(2))-ln(x))/x^2)^2
```

3.633.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.44

$$\int \frac{(2-6x^3-4\log(x\log(4)))\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx = \log\left(\frac{3\,x^3+9\,x^2-\log\left(2\,x\log\left(2\right)\right)}{x^2}\right)^2$$

input
```
integrate((-4*log(2*x*log(2))-6*x^3+2)*log((-log(2*x*log(2))+3*x^3+9*x^2)/
x^2)/(x*log(2*x*log(2))-3*x^4-9*x^3),x, algorithm=\
```

output
```
log((3*x^3 + 9*x^2 - log(2*x*log(2)))/x^2)^2
```

3.633.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33

$$\int \frac{(2-6x^3-4\log(x\log(4)))\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx = \log\left(\frac{3x^3+9x^2-\log\left(2x\log\left(2\right)\right)}{x^2}\right)^2$$

input
```
integrate((-4*ln(2*x*ln(2))-6*x**3+2)*ln((-ln(2*x*ln(2))+3*x**3+9*x**2)/x*
*2)/(x*ln(2*x*ln(2))-3*x**4-9*x**3),x)
```

output
```
log((3*x**3 + 9*x**2 - log(2*x*log(2)))/x**2)**2
```

3.633.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 103 vs. $2(19) = 38$.

Time = 0.33 (sec) , antiderivative size = 103, normalized size of antiderivative = 5.72

$$\int \frac{(2-6x^3-4\log(x\log(4)))\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx$$
$$= -\log\left(-3\,x^3-9\,x^2+\log\left(2\right)+\log\left(x\right)+\log\left(\log\left(2\right)\right)\right)^2 + 4\,\log\left(-3\,x^3-9\,x^2+\log\left(2\right)+\log\left(x\right)+\log\left(\log\left(2\right)\right)\right)\log\left(x\right) - 4\,\log\left(x\right)^2 + 2\left(\log\left(-3\,x^3-9\,x^2+\log\left(2\right)+\log\left(x\right)+\log\left(\log\left(2\right)\right)\right) - 2\,\log\left(x\right)\right)\log\left(\frac{3\,x^3+9\,x^2-\log\left(2\,x\log\left(2\right)\right)}{x^2}\right)$$

input
```
integrate((-4*log(2*x*log(2))-6*x^3+2)*log((-log(2*x*log(2))+3*x^3+9*x^2)/
x^2)/(x*log(2*x*log(2))-3*x^4-9*x^3),x, algorithm=\
```

output
```
-log(-3*x^3 - 9*x^2 + log(2) + log(x) + log(log(2)))^2 + 4*log(-3*x^3 - 9*
x^2 + log(2) + log(x) + log(log(2)))*log(x) - 4*log(x)^2 + 2*(log(-3*x^3 -
 9*x^2 + log(2) + log(x) + log(log(2))) - 2*log(x))*log((3*x^3 + 9*x^2 - l
og(2*x*log(2)))/x^2)
```

3.633.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 79 vs. $2(19) = 38$.

Time = 0.30 (sec) , antiderivative size = 79, normalized size of antiderivative = 4.39

$$\int \frac{(2-6x^3-4\log(x\log(4)))\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx = 2\left(\log\left(-3\,x^3-9\,x^2+\log(2)+\log(x)+\log(\log(2))\right)-2\,\log(x)\right)\log\left(3\,x^3+9\,x^2-\log(2)-\log(x\log(2))\right) - \log\left(-3\,x^3-9\,x^2+\log(2)+\log(x)+\log(\log(2))\right)^2+4\,\log(x)^2$$

input
```
integrate((-4*log(2*x*log(2))-6*x^3+2)*log((-log(2*x*log(2))+3*x^3+9*x^2)/
x^2)/(x*log(2*x*log(2))-3*x^4-9*x^3),x, algorithm=\
```

output
```
2*(log(-3*x^3 - 9*x^2 + log(2) + log(x) + log(log(2))) - 2*log(x))*log(3*x
^3 + 9*x^2 - log(2) - log(x*log(2))) - log(-3*x^3 - 9*x^2 + log(2) + log(x
) + log(log(2)))^2 + 4*log(x)^2
```

3.633.9 Mupad [B] (verification not implemented)

Time = 14.41 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.44

$$\int \frac{(2-6x^3-4\log(x\log(4)))\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx = \ln\left(\frac{9\,x^2-\ln(2\,x\,\ln(2))+3\,x^3}{x^2}\right)^2$$

input
```
int((log((9*x^2 - log(2*x*log(2)) + 3*x^3)/x^2)*(4*log(2*x*log(2)) + 6*x^3
 - 2))/(9*x^3 - x*log(2*x*log(2)) + 3*x^4),x)
```

output
```
log((9*x^2 - log(2*x*log(2)) + 3*x^3)/x^2)^2
```

3.633. $$\int \frac{(2-6x^3-4\log(x\log(4)))\log\left(\frac{9x^2+3x^3-\log(x\log(4))}{x^2}\right)}{-9x^3-3x^4+x\log(x\log(4))}\,dx$$

3.634 $\int \frac{1}{2}(8-3x+2\log(3))\,dx$

3.634.1 Optimal result

Integrand size = 13, antiderivative size = 23

$$\int \frac{1}{2}(8-3x+2\log(3))\,dx = 3+x\left(4-x+\frac{\left(\frac{x}{2}+\log(3)\right)^2}{x}\right)$$

output
```
((1/2*x+ln(3))^2/x+4-x)*x+3
```

3.634.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{1}{2}(8-3x+2\log(3))\,dx = 4x-\frac{3x^2}{4}+x\log(3)$$

input
```
Integrate[(8 - 3*x + 2*Log[3])/2,x]
```

output
```
4*x - (3*x^2)/4 + x*Log[3]
```

3.634.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.57, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}(-3x+8+2\log(3))\,dx$$

$$\Big\downarrow \; 17$$

$$-\frac{1}{12}(-3x+8+\log(9))^2$$

input
```
Int[(8 - 3*x + 2*Log[3])/2,x]
```

output
```
-1/12*(8 - 3*x + Log[9])^2
```

3.634.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.634.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.57

method	result	size
gosper	$\frac{x(-3x+4\ln(3)+16)}{4}$	13
norman	$(\ln(3)+4)\,x-\frac{3x^2}{4}$	13
parallelrisch	$(\ln(3)+4)\,x-\frac{3x^2}{4}$	13
default	$x\ln(3)-\frac{3x^2}{4}+4x$	14
risch	$x\ln(3)-\frac{3x^2}{4}+4x$	14
parts	$x\ln(3)-\frac{3x^2}{4}+4x$	14

input
```
int(ln(3)-3/2*x+4,x,method=_RETURNVERBOSE)
```

output
```
1/4*x*(-3*x+4*ln(3)+16)
```

3.634.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.57

$$\int \frac{1}{2}(8-3x+2\log(3))\,dx=-\frac{3}{4}\,x^2+x\log{(3)}+4\,x$$

input
```
integrate(log(3)-3/2*x+4,x, algorithm=\
```

output
```
-3/4*x^2 + x*log(3) + 4*x
```

3.634.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.52

$$\int \frac{1}{2}(8-3x+2\log(3))\,dx=-\frac{3x^2}{4}+x(\log{(3)}+4)$$

input
```
integrate(ln(3)-3/2*x+4,x)
```

output
```
-3*x**2/4 + x*(log(3) + 4)
```

3.634.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.57

$$\int \frac{1}{2}(8-3x+2\log(3))\,dx=-\frac{3}{4}\,x^2+x\log{(3)}+4\,x$$

input
```
integrate(log(3)-3/2*x+4,x, algorithm=\
```

output
```
-3/4*x^2 + x*log(3) + 4*x
```

3.634.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.57

$$\int \frac{1}{2}(8-3x+2\log(3))\,dx = -\frac{3}{4}\,x^2 + x\log{(3)} + 4\,x$$

input
```
integrate(log(3)-3/2*x+4,x, algorithm=\
```

output
```
-3/4*x^2 + x*log(3) + 4*x
```

3.634.9 Mupad [B] (verification not implemented)

Time = 13.14 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.52

$$\int \frac{1}{2}(8-3x+2\log(3))\,dx = x\,(\ln{(3)}+4) - \frac{3\,x^2}{4}$$

input
```
int(log(3) - (3*x)/2 + 4,x)
```

output
```
x*(log(3) + 4) - (3*x^2)/4
```

3.635 $\int \frac{e^{2x}((-32+32x)\log^2(6)-96\log^3(6))+e^x((-144x+144x^2)\log(6)+(43}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6}$

3.635.1 Optimal result

Integrand size = 86, antiderivative size = 24

$$\int \frac{e^{2x}\left((-32+32x)\log^2(6)-96\log^3(6)\right)+e^x\left((-144x+144x^2)\log(6)+(432-864x)\log^2(6)+1296\log^3(\right.}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6)}$$

$$=5-\left(18-\frac{4e^x}{3-\frac{x}{\log(6)}}\right)^2$$

output
```
5-(18-4/(3-x/ln(6))*exp(x))^2
```

3.635.2 Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{e^{2x}\left((-32+32x)\log^2(6)-96\log^3(6)\right)+e^x\left((-144x+144x^2)\log(6)+(432-864x)\log^2(6)+1296\log^3(\right.}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6)}$$

$$=-\frac{16e^x\log(6)\left(9x+(-27+e^x)\log(6)\right)}{(x-3\log(6))^2}$$

input
```
Integrate[(E^(2*x)*((-32 + 32*x)*Log[6]^2 - 96*Log[6]^3) + E^x*((-144*x +
144*x^2)*Log[6] + (432 - 864*x)*Log[6]^2 + 1296*Log[6]^3))/(-x^3 + 9*x^2*L
og[6] - 27*x*Log[6]^2 + 27*Log[6]^3),x]
```

output
```
(-16*E^x*Log[6]*(9*x + (-27 + E^x)*Log[6]))/(x - 3*Log[6])^2
```

3.635.3 Rubi [A] (verified)

Time = 0.85 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.058, Rules used = {2007, 7239, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(\left(144x^2-144x\right)\log(6)+(432-864x)\log^2(6)+1296\log^3(6)\right)+e^{2x}\left((32x-32)\log^2(6)-96\log^3(6)\right)}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{e^x\left(\left(144x^2-144x\right)\log(6)+(432-864x)\log^2(6)+1296\log^3(6)\right)+e^{2x}\left((32x-32)\log^2(6)-96\log^3(6)\right)}{(3\log(6)-x)^3}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{16e^x\log(6)(-x+1+3\log(6))\left(9x+(2e^x-27)\log(6)\right)}{(x-3\log(6))^3}dx$$

$$\Big\downarrow \text{27}$$

$$16\log(6)\int \frac{e^x\left(9x-(27-2e^x)\log(6)\right)(-x+\log(216)+1)}{(x-3\log(6))^3}dx$$

$$\Big\downarrow \text{7293}$$

$$16\log(6)\int \left(-\frac{9e^x(x-\log(216)-1)}{(x-3\log(6))^2}-\frac{2e^{2x}\log(6)(x-\log(216)-1)}{(x-3\log(6))^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$16\log(6)\left(-\frac{9e^x}{x-3\log(6)}-\frac{e^{2x}\log(6)}{(x-3\log(6))^2}\right)$$

input
```
Int[(E^(2*x)*((-32 + 32*x)*Log[6]^2 - 96*Log[6]^3) + E^x*((-144*x + 144*x^
2)*Log[6] + (432 - 864*x)*Log[6]^2 + 1296*Log[6]^3))/(-x^3 + 9*x^2*Log[6]
- 27*x*Log[6]^2 + 27*Log[6]^3),x]
```

output
```
16*Log[6]*((-9*E^x)/(x - 3*Log[6]) - (E^(2*x)*Log[6])/(x - 3*Log[6])^2)
```

3.635.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.635.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

method	result
parts	$-\frac{144\ln(6)\mathrm{e}^{x}}{-3\ln(6)+x}-\frac{16\ln(6)^{2}\mathrm{e}^{2x}}{(-3\ln(6)+x)^{2}}$
norman	$\frac{432\ln(6)^{2}\mathrm{e}^{x}-16\ln(6)^{2}\mathrm{e}^{2x}-144\,\mathrm{e}^{x}\ln(6)x}{(3\ln(6)-x)^{2}}$
parallelrisch	$-\frac{16\ln(6)^{2}\mathrm{e}^{2x}-432\ln(6)^{2}\mathrm{e}^{x}+144\,\mathrm{e}^{x}\ln(6)x}{9\ln(6)^{2}-6x\ln(6)+x^{2}}$
default	$1296\ln(6)^{3}\left(\frac{\mathrm{e}^{x}}{2(-3\ln(6)+x)^{2}}+\frac{\mathrm{e}^{x}}{2x-6\ln(6)}+108\,\mathrm{Ei}_{1}(3\ln(6)-x)\right)-96\ln(6)^{3}\left(\frac{\mathrm{e}^{2x}}{2(-3\ln(6)+x)^{2}}+\right.$

input
```
int(((-96*ln(6)^3+(32*x-32)*ln(6)^2)*exp(x)^2+(1296*ln(6)^3+(-864*x+432)*l
n(6)^2+(144*x^2-144*x)*ln(6))*exp(x))/(27*ln(6)^3-27*x*ln(6)^2+9*x^2*ln(6)
-x^3),x,method=_RETURNVERBOSE)
```

output
```
-144*ln(6)*exp(x)/(-3*ln(6)+x)-16*ln(6)^2*exp(x)^2/(-3*ln(6)+x)^2
```

3.635.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.83

$$\int \frac{e^{2x}\left((-32+32x)\log^2(6)-96\log^3(6)\right)+e^x\left((-144x+144x^2)\log(6)+(432-864x)\log^2(6)+1296\log^3(6)\right)}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6)}\,dx$$
$$=-\frac{16\left(e^{(2x)}\log(6)^2+9\left(x\log(6)-3\log(6)^2\right)e^x\right)}{x^2-6x\log(6)+9\log(6)^2}$$

input
```
integrate((((-96*log(6)^3+(32*x-32)*log(6)^2)*exp(x)^2+(1296*log(6)^3+(-864
*x+432)*log(6)^2+(144*x^2-144*x)*log(6))*exp(x))/(27*log(6)^3-27*x*log(6)^
2+9*x^2*log(6)-x^3),x, algorithm=\
```

output
```
-16*(e^(2*x)*log(6)^2 + 9*(x*log(6) - 3*log(6)^2)*e^x)/(x^2 - 6*x*log(6) +
 9*log(6)^2)
```

3.635.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. 2(15) = 30.

Time = 0.13 (sec) , antiderivative size = 73, normalized size of antiderivative = 3.04

$$\int \frac{e^{2x}\left((-32+32x)\log^2(6)-96\log^3(6)\right)+e^x\left((-144x+144x^2)\log(6)+(432-864x)\log^2(6)+1296\log^3(6)\right)}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6)}\,dx$$
$$=\frac{\left(-16x\log(6)^2+48\log(6)^3\right)e^{2x}+\left(-144x^2\log(6)+864x\log(6)^2-1296\log(6)^3\right)e^x}{x^3-9x^2\log(6)+27x\log(6)^2-27\log(6)^3}$$

input
```
integrate((((-96*ln(6)**3+(32*x-32)*ln(6)**2)*exp(x)**2+(1296*ln(6)**3+(-86
4*x+432)*ln(6)**2+(144*x**2-144*x)*ln(6))*exp(x))/(27*ln(6)**3-27*x*ln(6)*
*2+9*x**2*ln(6)-x**3),x)
```

output
```
((-16*x*log(6)**2 + 48*log(6)**3)*exp(2*x) + (-144*x**2*log(6) + 864*x*log
(6)**2 - 1296*log(6)**3)*exp(x))/(x**3 - 9*x**2*log(6) + 27*x*log(6)**2 -
27*log(6)**3)
```

3.635.7 Maxima [F]

$$\int \frac{e^{2x}\left((-32+32x)\log^2(6)-96\log^3(6)\right)+e^x\left((-144x+144x^2)\log(6)+(432-864x)\log^2(6)+1296\log^3(\right.}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6)}$$
$$=\int -\frac{16\left(2\left((x-1)\log(6)^2-3\log(6)^3\right)e^{(2x)}-9\left(3(2x-1)\log(6)^2-9\log(6)^3-(x^2-x)\log(6)\right)e^x\right)}{x^3-9x^2\log(6)+27x\log(6)^2-27\log(6)^3}\,d$$

input
```
integrate(((-96*log(6)^3+(32*x-32)*log(6)^2)*exp(x)^2+(1296*log(6)^3+(-864
*x+432)*log(6)^2+(144*x^2-144*x)*log(6))*exp(x))/(27*log(6)^3-27*x*log(6)^
2+9*x^2*log(6)-x^3),x, algorithm=\
```

output
```
279936*exp_integral_e(3, -x + 3*log(6))*log(6)^3/(x - 3*log(6))^2 + 93312*
exp_integral_e(3, -x + 3*log(6))*log(6)^2/(x - 3*log(6))^2 + 16*((3*log(3)
^3 + 9*log(3)^2*log(2) + 9*log(3)*log(2)^2 + 3*log(2)^3 - (log(3)^2 + 2*lo
g(3)*log(2) + log(2)^2)*x)*e^(2*x) - 9*(x^2*(log(3) + log(2)) - 6*(log(3)^
2 + 2*log(3)*log(2) + log(2)^2)*x)*e^x)/(x^3 - 9*x^2*(log(3) + log(2)) - 2
7*log(3)^3 - 81*log(3)^2*log(2) - 81*log(3)*log(2)^2 - 27*log(2)^3 + 27*(l
og(3)^2 + 2*log(3)*log(2) + log(2)^2)*x) + 16*integrate(27*(6*log(3)^3 + 1
8*log(3)^2*log(2) + 18*log(3)*log(2)^2 + 6*log(2)^3 + (log(3)^2 + 2*log(3)
*log(2) + log(2)^2)*x)*e^x/(x^4 - 12*x^3*(log(3) + log(2)) + 81*log(3)^4 +
 324*log(3)^3*log(2) + 486*log(3)^2*log(2)^2 + 324*log(3)*log(2)^3 + 81*lo
g(2)^4 + 54*(log(3)^2 + 2*log(3)*log(2) + log(2)^2)*x^2 - 108*(log(3)^3 +
3*log(3)^2*log(2) + 3*log(3)*log(2)^2 + log(2)^3)*x), x)
```

3.635.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.83

$$\int \frac{e^{2x}\left((-32+32x)\log^2(6)-96\log^3(6)\right)+e^x\left((-144x+144x^2)\log(6)+(432-864x)\log^2(6)+1296\log^3(\right.}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6)}$$
$$=-\frac{16\left(9xe^x\log(6)+e^{(2x)}\log(6)^2-27e^x\log(6)^2\right)}{x^2-6x\log(6)+9\log(6)^2}$$

input
```
integrate(((-96*log(6)^3+(32*x-32)*log(6)^2)*exp(x)^2+(1296*log(6)^3+(-864
*x+432)*log(6)^2+(144*x^2-144*x)*log(6))*exp(x))/(27*log(6)^3-27*x*log(6)^
2+9*x^2*log(6)-x^3),x, algorithm=\
```

output
```
-16*(9*x*e^x*log(6) + e^(2*x)*log(6)^2 - 27*e^x*log(6)^2)/(x^2 - 6*x*log(6
) + 9*log(6)^2)
```

3.635.9 Mupad [B] (verification not implemented)

Time = 0.50 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{e^{2x}\left((-32+32x)\log^2(6)-96\log^3(6)\right)+e^x\left((-144x+144x^2)\log(6)+(432-864x)\log^2(6)+1296\log^3(6)\right)}{-x^3+9x^2\log(6)-27x\log^2(6)+27\log^3(6)}$$

$$= -\frac{16\,\mathrm{e}^x\,\ln(6)\,\left(9\,x-27\,\ln(6)+\mathrm{e}^x\,\ln(6)\right)}{\left(x-3\,\ln(6)\right)^2}$$

input
```
int((exp(x)*(log(6)*(144*x - 144*x^2) + log(6)^2*(864*x - 432) - 1296*log(
6)^3) - exp(2*x)*(log(6)^2*(32*x - 32) - 96*log(6)^3))/(27*x*log(6)^2 - 9*
x^2*log(6) - 27*log(6)^3 + x^3),x)
```

output
```
-(16*exp(x)*log(6)*(9*x - 27*log(6) + exp(x)*log(6)))/(x - 3*log(6))^2
```

3.636 $\int \frac{-4+4x^2+(4-3x+4x^2)\log\left(\frac{-4+3x-4x^2}{2x}\right)}{4-3x+4x^2}\,dx$

3.636.1 Optimal result

Integrand size = 49, antiderivative size = 20

$$\int \frac{-4+4x^2+(4-3x+4x^2)\log\left(\frac{-4+3x-4x^2}{2x}\right)}{4-3x+4x^2}\,dx = x\log\left(2\left(1-x-\frac{4+x}{4x}\right)\right)$$

output
```
x*ln(2-1/2*(4+x)/x-2*x)
```

3.636.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-4+4x^2+(4-3x+4x^2)\log\left(\frac{-4+3x-4x^2}{2x}\right)}{4-3x+4x^2}\,dx = x\log\left(\frac{3}{2}-\frac{2}{x}-2x\right)$$

input
```
Integrate[(-4 + 4*x^2 + (4 - 3*x + 4*x^2)*Log[(-4 + 3*x - 4*x^2)/(2*x)])/(
4 - 3*x + 4*x^2),x]
```

output
```
x*Log[3/2 - 2/x - 2*x]
```

3.636.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.041$, Rules used = {7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^2 + (4x^2 - 3x + 4)\log\left(\frac{-4x^2+3x-4}{2x}\right) - 4}{4x^2 - 3x + 4}\,dx$$

$$\Big\downarrow \ 7279$$

$$\int \left(\frac{4(x^2-1)}{4x^2-3x+4} + \log\left(-2x - \frac{2}{x} + \frac{3}{2}\right)\right)dx$$

$$\Big\downarrow \ 2009$$

$$x\log\left(-2x - \frac{2}{x} + \frac{3}{2}\right)$$

input
```
Int[(-4 + 4*x^2 + (4 - 3*x + 4*x^2)*Log[(-4 + 3*x - 4*x^2)/(2*x)])/(4 - 3*
x + 4*x^2),x]
```

output
```
x*Log[3/2 - 2/x - 2*x]
```

3.636.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.636.4 Maple [A] (verified)

Time = 4.69 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
norman	$x \ln \left(\frac{-4x^2+3x-4}{2x}\right)$	19
risch	$x \ln \left(\frac{-4x^2+3x-4}{2x}\right)$	19
parallelrisch	$\ln \left(-\frac{4x^2-3x+4}{2x}\right) x$	19
default	$-x \ln (2) + x \ln \left(\frac{-4x^2+3x-4}{x}\right)$	24
parts	$-x \ln (2) + x \ln \left(\frac{-4x^2+3x-4}{x}\right)$	24

input
```
int(((4*x^2-3*x+4)*ln(1/2*(-4*x^2+3*x-4)/x)+4*x^2-4)/(4*x^2-3*x+4),x,metho
d=_RETURNVERBOSE)
```

output
```
x*ln(1/2*(-4*x^2+3*x-4)/x)
```

3.636.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{-4+4x^2+(4-3x+4x^2)\log\left(\frac{-4+3x-4x^2}{2x}\right)}{4-3x+4x^2}\,dx = x\log\left(-\frac{4\,x^2-3\,x+4}{2\,x}\right)$$

input
```
integrate(((4*x^2-3*x+4)*log(1/2*(-4*x^2+3*x-4)/x)+4*x^2-4)/(4*x^2-3*x+4),
x, algorithm=\
```

output
```
x*log(-1/2*(4*x^2 - 3*x + 4)/x)
```

3.636.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-4+4x^2+(4-3x+4x^2)\log\left(\frac{-4+3x-4x^2}{2x}\right)}{4-3x+4x^2}\,dx = x\log\left(\frac{-2x^2+\frac{3x}{2}-2}{x}\right)$$

input
```
integrate(((4*x**2-3*x+4)*ln(1/2*(-4*x**2+3*x-4)/x)+4*x**2-4)/(4*x**2-3*x+
4),x)
```

output
```
x*log((-2*x**2 + 3*x/2 - 2)/x)
```

3.636.7 Maxima [A] (verification not implemented)

Time = 0.54 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{-4+4x^2+(4-3x+4x^2)\log\left(\frac{-4+3x-4x^2}{2x}\right)}{4-3x+4x^2}\,dx$$
$$= -x\log(2)+x\log\left(-4\,x^2+3\,x-4\right)-x\log(x)$$

input
```
integrate(((4*x^2-3*x+4)*log(1/2*(-4*x^2+3*x-4)/x)+4*x^2-4)/(4*x^2-3*x+4),
x, algorithm=\
```

output
```
-x*log(2) + x*log(-4*x^2 + 3*x - 4) - x*log(x)
```

3.636.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{-4+4x^2+(4-3x+4x^2)\log\left(\frac{-4+3x-4x^2}{2x}\right)}{4-3x+4x^2}\,dx = x\log\left(-\frac{4\,x^2-3\,x+4}{2\,x}\right)$$

input
```
integrate(((4*x^2-3*x+4)*log(1/2*(-4*x^2+3*x-4)/x)+4*x^2-4)/(4*x^2-3*x+4),
x, algorithm=\
```

output
```
x*log(-1/2*(4*x^2 - 3*x + 4)/x)
```

3.636.9 Mupad [B] (verification not implemented)

Time = 13.35 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{-4+4x^2+(4-3x+4x^2)\log\left(\frac{-4+3x-4x^2}{2x}\right)}{4-3x+4x^2}\,dx = x\,\ln\left(-\frac{2\,x^2-\frac{3\,x}{2}+2}{x}\right)$$

input
```
int((4*x^2 + log(-(2*x^2 - (3*x)/2 + 2)/x)*(4*x^2 - 3*x + 4) - 4)/(4*x^2 -
 3*x + 4),x)
```

output
```
x*log(-(2*x^2 - (3*x)/2 + 2)/x)
```

3.637 $\int \frac{-4+e^4(12x^2+4x^3)}{-4x+e^4(4x^3+x^4)+12\log(\log(4))}\,dx$

3.637.1 Optimal result

Integrand size = 42, antiderivative size = 23

$$\int \frac{-4+e^4(12x^2+4x^3)}{-4x+e^4(4x^3+x^4)+12\log(\log(4))}\,dx = \log\left(-x+\frac{1}{4}e^4x^3(4+x)+3\log(\log(4))\right)$$

output
```
ln(3*ln(2*ln(2))+1/4*x^3*exp(2)^2*(4+x)-x)
```

3.637.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{-4+e^4(12x^2+4x^3)}{-4x+e^4(4x^3+x^4)+12\log(\log(4))}\,dx = \log\left(-4x+4e^4x^3+e^4x^4+12\log(\log(4))\right)$$

input
```
Integrate[(-4 + E^4*(12*x^2 + 4*x^3))/(-4*x + E^4*(4*x^3 + x^4) + 12*Log[L
og[4]]),x]
```

output
```
Log[-4*x + 4*E^4*x^3 + E^4*x^4 + 12*Log[Log[4]]]
```

3.637.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.024, Rules used = {2020}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^4(4x^3+12x^2)-4}{e^4(x^4+4x^3)-4x+12\log(\log(4))}\,dx$$

$$\Big\downarrow \text{ 2020}$$

$$\log\left(-e^4(x^4+4x^3)+4x-12\log(\log(4))\right)$$

input
```
Int[(-4 + E^4*(12*x^2 + 4*x^3))/(-4*x + E^4*(4*x^3 + x^4) + 12*Log[Log[4]]
),x]
```

output
```
Log[4*x - E^4*(4*x^3 + x^4) - 12*Log[Log[4]]]
```

3.637.3.1 Defintions of rubi rules used

rule 2020
```
Int[(Pp_)/(Qq_), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x]}, Si
mp[Coeff[Pp, x, p]*(Log[RemoveContent[Qq, x]]/(q*Coeff[Qq, x, q])), x] /; E
qQ[p, q - 1] && EqQ[Pp, Simplify[(Coeff[Pp, x, p]/(q*Coeff[Qq, x, q]))*D[Qq
, x]]]] /; PolyQ[Pp, x] && PolyQ[Qq, x]
```

3.637.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

method	result	size
derivativedivides	$\ln\left(12\ln\left(2\ln\left(2\right)\right)+\left(x^{4}+4x^{3}\right){\mathrm e}^{4}-4x\right)$	27
risch	$\ln\left(x^{4}{\mathrm e}^{4}+4x^{3}{\mathrm e}^{4}+12\ln\left(2\right)+12\ln\left(\ln\left(2\right)\right)-4x\right)$	28
default	$\ln\left(x^{4}{\mathrm e}^{4}+4x^{3}{\mathrm e}^{4}+12\ln\left(2\ln\left(2\right)\right)-4x\right)$	30
norman	$\ln\left(x^{4}{\mathrm e}^{4}+4x^{3}{\mathrm e}^{4}+12\ln\left(2\ln\left(2\right)\right)-4x\right)$	30
parallelrisch	$\ln\left(\left(x^{4}{\mathrm e}^{4}+4x^{3}{\mathrm e}^{4}+12\ln\left(2\ln\left(2\right)\right)-4x\right){\mathrm e}^{-4}\right)$	35

input
```
int(((4*x^3+12*x^2)*exp(2)^2-4)/(12*ln(2*ln(2))+(x^4+4*x^3)*exp(2)^2-4*x),
x,method=_RETURNVERBOSE)
```

output
```
ln(12*ln(2*ln(2))+(x^4+4*x^3)*exp(2)^2-4*x)
```

3.637.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{-4+e^4(12x^2+4x^3)}{-4x+e^4\left(4x^3+x^4\right)+12\log(\log(4))}\,dx = \log\left(\left(x^4+4\,x^3\right)e^4-4\,x+12\,\log\left(2\,\log\left(2\right)\right)\right)$$

input
```
integrate(((4*x^3+12*x^2)*exp(2)^2-4)/(12*log(2*log(2))+(x^4+4*x^3)*exp(2)
^2-4*x),x, algorithm=\
```

output
```
log((x^4 + 4*x^3)*e^4 - 4*x + 12*log(2*log(2)))
```

3.637.6 Sympy [A] (verification not implemented)

Time = 1.03 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{-4+e^4(12x^2+4x^3)}{-4x+e^4\left(4x^3+x^4\right)+12\log(\log(4))}\,dx$$
$$= \log\left(x^4e^4+4x^3e^4-4x+12\log\left(\log\left(2\right)\right)+12\log\left(2\right)\right)$$

input
```
integrate(((4*x**3+12*x**2)*exp(2)**2-4)/(12*ln(2*ln(2))+(x**4+4*x**3)*exp
(2)**2-4*x),x)
```

output
```
log(x**4*exp(4) + 4*x**3*exp(4) - 4*x + 12*log(log(2)) + 12*log(2))
```

3.637.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{-4+e^4(12x^2+4x^3)}{-4x+e^4(4x^3+x^4)+12\log(\log(4))}\,dx = \log\left(x^4e^4+4\,x^3e^4-4\,x+12\,\log\left(2\,\log\left(2\right)\right)\right)$$

input
```
integrate(((4*x^3+12*x^2)*exp(2)^2-4)/(12*log(2*log(2))+(x^4+4*x^3)*exp(2)
^2-4*x),x, algorithm=\
```

output
```
log(x^4*e^4 + 4*x^3*e^4 - 4*x + 12*log(2*log(2)))
```

3.637.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{-4+e^4(12x^2+4x^3)}{-4x+e^4(4x^3+x^4)+12\log(\log(4))}\,dx = \log\left(\left|(x^4+4\,x^3)e^4-4\,x+12\,\log\left(2\,\log\left(2\right)\right)\right|\right)$$

input
```
integrate(((4*x^3+12*x^2)*exp(2)^2-4)/(12*log(2*log(2))+(x^4+4*x^3)*exp(2)
^2-4*x),x, algorithm=\
```

output
```
log(abs((x^4 + 4*x^3)*e^4 - 4*x + 12*log(2*log(2))))
```

3.637.9 Mupad [B] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{-4+e^4(12x^2+4x^3)}{-4x+e^4(4x^3+x^4)+12\log(\log(4))}\,dx = \ln\left(\mathrm{e}^4\,x^4+4\,\mathrm{e}^4\,x^3-4\,x+\ln\left(\ln\left(4\right)^{12}\right)\right)$$

input
```
int((exp(4)*(12*x^2 + 4*x^3) - 4)/(12*log(2*log(2)) - 4*x + exp(4)*(4*x^3
+ x^4)),x)
```

output
```
log(log(log(4)^12) - 4*x + 4*x^3*exp(4) + x^4*exp(4))
```

3.638 $\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2}{9+6x}$

3.638.1 Optimal result

Integrand size = 163, antiderivative size = 31

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}}}{9+6x+x^2+(6+2x)\log(5x)+\log^2(5x}$$
$$=-e^{4+e^{1-\frac{16}{3+x+\log(5x)}}x}+e^{x+x^2}$$

output
```
exp(x^2+x)-exp(x*exp(1-16/(ln(5*x)+3+x))+4)
```

3.638.2 Mathematica [A] (verified)

Time = 0.68 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}}}{9+6x+x^2+(6+2x)\log(5x)+\log^2(5x}$$
$$=-e^{4+e^{1-\frac{16}{3+x+\log(5x)}}x}+e^{x+x^2}$$

input
```
Integrate[(E^(x + x^2)*(9 + 24*x + 13*x^2 + 2*x^3) + E^(x + x^2)*(6 + 14*x
 + 4*x^2)*Log[5*x] + E^(x + x^2)*(1 + 2*x)*Log[5*x]^2 + E^(4 + E^((-13 + x
 + Log[5*x])/(3 + x + Log[5*x]))*x + (-13 + x + Log[5*x])/(3 + x + Log[5*x
]))*(-25 - 22*x - x^2 + (-6 - 2*x)*Log[5*x] - Log[5*x]^2))/(9 + 6*x + x^2
+ (6 + 2*x)*Log[5*x] + Log[5*x]^2),x]
```

3.638.

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}x+\frac{-13+x+\log(5x)}{3+x+\log(5x)}}(-25-22x-x^2+(-6-2}{}$$

output
```
-E^(4 + E^(1 - 16/(3 + x + Log[5*x]))*x) + E^(x + x^2)
```

3.638.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-x^2-22x-\log^2(5x)+(-2x-6)\log(5x)-25\right)\exp\left(xe^{\frac{x+\log(5x)-13}{x+\log(5x)+3}}+\frac{x+\log(5x)-13}{x+\log(5x)+3}+4\right)+e^{x^2+x}(2x+1)\log^2}{x^2+6x+\log^2(5x)+(2x+6)\log(5x)+9}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\left(-x^2-22x-\log^2(5x)+(-2x-6)\log(5x)-25\right)\exp\left(xe^{\frac{x+\log(5x)-13}{x+\log(5x)+3}}+\frac{x+\log(5x)-13}{x+\log(5x)+3}+4\right)+e^{x^2+x}(2x+1)\log^2}{(x+\log(5x)+3)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{5^{\frac{5}{x+\log(5x)+3}}\left(x^2+22x+\log^2(5x)+2x\log(5x)+6\log(5x)+25\right)x^{\frac{5}{x+\log(5x)+3}}\exp\left(5^{\frac{1}{x+\log(5x)+3}}e^{\frac{x}{x+\log(5x)+3}-\frac{}{x+\mathrm{lo}}}\right.}{(x+\log(5x)+3)^2}\right.$$

$$\Big\downarrow \text{7299}$$

$$\int \left(-\frac{5^{\frac{5}{x+\log(5x)+3}}\left(x^2+22x+\log^2(5x)+2x\log(5x)+6\log(5x)+25\right)x^{\frac{5}{x+\log(5x)+3}}\exp\left(5^{\frac{1}{x+\log(5x)+3}}e^{\frac{x}{x+\log(5x)+3}-\frac{}{x+\mathrm{lo}}}\right.}{(x+\log(5x)+3)^2}\right.$$

input
```
Int[(E^(x + x^2)*(9 + 24*x + 13*x^2 + 2*x^3) + E^(x + x^2)*(6 + 14*x + 4*x
^2)*Log[5*x] + E^(x + x^2)*(1 + 2*x)*Log[5*x]^2 + E^(4 + E^((-13 + x + Log
[5*x])/(3 + x + Log[5*x]))*x + (-13 + x + Log[5*x])/(3 + x + Log[5*x]))*(-
25 - 22*x - x^2 + (-6 - 2*x)*Log[5*x] - Log[5*x]^2))/(9 + 6*x + x^2 + (6 +
 2*x)*Log[5*x] + Log[5*x]^2),x]
```

output
```
$Aborted
```

3.638.

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}x+\frac{-13+x+\log(5x)}{3+x+\log(5x)}}(-25-22x-x^2+(-6-2}{}$$

3.638.3.1 Defintions of rubi rules used

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.638.4 Maple [A] (verified)

Time = 9.72 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.06

method	result	size
risch	$\mathrm{e}^{(1+x)x} - \mathrm{e}^{x\,\mathrm{e}^{\frac{\ln(5x)+x-13}{\ln(5x)+3+x}}+4}$	33
parallelrisch	$\mathrm{e}^{x^2+x} - \mathrm{e}^{x\,\mathrm{e}^{\frac{\ln(5x)+x-13}{\ln(5x)+3+x}}+4}$	33

input
```
int(((-ln(5*x)^2+(-2*x-6)*ln(5*x)-x^2-22*x-25)*exp((ln(5*x)+x-13)/(ln(5*x)
+3+x))*exp(x*exp((ln(5*x)+x-13)/(ln(5*x)+3+x))+4)+(1+2*x)*exp(x^2+x)*ln(5*
x)^2+(4*x^2+14*x+6)*exp(x^2+x)*ln(5*x)+(2*x^3+13*x^2+24*x+9)*exp(x^2+x))/(
ln(5*x)^2+(2*x+6)*ln(5*x)+x^2+6*x+9),x,method=_RETURNVERBOSE)
```

output
```
exp((1+x)*x)-exp(x*exp((ln(5*x)+x-13)/(ln(5*x)+3+x))+4)
```

3.638.

$$\int \frac{e^{x+x^2}\left(9+24x+13x^2+2x^3\right)+e^{x+x^2}\left(6+14x+4x^2\right)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}x+\frac{-13+x+\log(5x)}{3+x+\log(5x)}}\left(-25-22x-x^2+(-6-2\right.}{\ldots}$$

3.638.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 100 vs. 2(28) = 56.

Time = 0.27 (sec) , antiderivative size = 100, normalized size of antiderivative = 3.23

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}}}{9+6x+x^2+(6+2x)\log(5x)+\log^2(5x}$$

$$= \left(e^{\left(x^2+x+\frac{x+\log(5x)-13}{x+\log(5x)+3}\right)} - e^{\left(\frac{\left(x^2+x\log(5x)+3x\right)e^{\left(\frac{x+\log(5x)-13}{x+\log(5x)+3}\right)}+5x+5\log(5x)-1}{x+\log(5x)+3}\right)}\right)e^{\left(-\frac{x+\log(5x)-13}{x+\log(5x)+3}\right)}$$

input
```
integrate(((-log(5*x)^2+(-2*x-6)*log(5*x)-x^2-22*x-25)*exp((log(5*x)+x-13)
/(log(5*x)+3+x))*exp(x*exp((log(5*x)+x-13)/(log(5*x)+3+x))+4)+(1+2*x)*exp(
x^2+x)*log(5*x)^2+(4*x^2+14*x+6)*exp(x^2+x)*log(5*x)+(2*x^3+13*x^2+24*x+9)
*exp(x^2+x))/(log(5*x)^2+(2*x+6)*log(5*x)+x^2+6*x+9),x, algorithm=\
```

output
```
(e^(x^2 + x + (x + log(5*x) - 13)/(x + log(5*x) + 3)) - e^(((x^2 + x*log(5
*x) + 3*x)*e^((x + log(5*x) - 13)/(x + log(5*x) + 3)) + 5*x + 5*log(5*x) -
 1)/(x + log(5*x) + 3)))*e^(-(x + log(5*x) - 13)/(x + log(5*x) + 3))
```

3.638.6 Sympy [A] (verification not implemented)

Time = 15.36 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.94

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}}}{9+6x+x^2+(6+2x)\log(5x)+\log^2(5x}$$

$$= e^{x^2+x} - e^{xe^{\frac{x+\log(5x)-13}{x+\log(5x)+3}}+4}$$

input
```
integrate(((-ln(5*x)**2+(-2*x-6)*ln(5*x)-x**2-22*x-25)*exp((ln(5*x)+x-13)/
(ln(5*x)+3+x))*exp(x*exp((ln(5*x)+x-13)/(ln(5*x)+3+x))+4)+(1+2*x)*exp(x**2
+x)*ln(5*x)**2+(4*x**2+14*x+6)*exp(x**2+x)*ln(5*x)+(2*x**3+13*x**2+24*x+9)
*exp(x**2+x))/(ln(5*x)**2+(2*x+6)*ln(5*x)+x**2+6*x+9),x)
```

output
```
exp(x**2 + x) - exp(x*exp((x + log(5*x) - 13)/(x + log(5*x) + 3)) + 4)
```

3.638.

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}x+\frac{-13+x+\log(5x)}{3+x+\log(5x)}}(-25-22x-x^2+(-6-2}{}$$

3.638.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.90

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}}}{9+6x+x^2+(6+2x)\log(5x)+\log^2(5x}$$

$$=e^{(x^2+x)}-e^{\left(xe^{\left(-\frac{16}{x+\log(5)+\log(x)+3}+1\right)}+4\right)}$$

input
```
integrate(((-log(5*x)^2+(-2*x-6)*log(5*x)-x^2-22*x-25)*exp((log(5*x)+x-13)
/(log(5*x)+3+x))*exp(x*exp((log(5*x)+x-13)/(log(5*x)+3+x))+4)+(1+2*x)*exp(
x^2+x)*log(5*x)^2+(4*x^2+14*x+6)*exp(x^2+x)*log(5*x)+(2*x^3+13*x^2+24*x+9)
*exp(x^2+x))/(log(5*x)^2+(2*x+6)*log(5*x)+x^2+6*x+9),x, algorithm=\
```

output
```
e^(x^2 + x) - e^(x*e^(-16/(x + log(5) + log(x) + 3) + 1) + 4)
```

3.638.8 Giac [F]

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}}}{9+6x+x^2+(6+2x)\log(5x)+\log^2(5x}$$

$$=\int \frac{(2x+1)e^{(x^2+x)}\log(5x)^2+2(2x^2+7x+3)e^{(x^2+x)}\log(5x)+(2x^3+13x^2+24x+9)e^{(x^2+x)}-(x^2}{x^2+2(x+3)\log(5x)+\log(5x)^2}$$

input
```
integrate(((-log(5*x)^2+(-2*x-6)*log(5*x)-x^2-22*x-25)*exp((log(5*x)+x-13)
/(log(5*x)+3+x))*exp(x*exp((log(5*x)+x-13)/(log(5*x)+3+x))+4)+(1+2*x)*exp(
x^2+x)*log(5*x)^2+(4*x^2+14*x+6)*exp(x^2+x)*log(5*x)+(2*x^3+13*x^2+24*x+9)
*exp(x^2+x))/(log(5*x)^2+(2*x+6)*log(5*x)+x^2+6*x+9),x, algorithm=\
```

output
```
integrate(((2*x + 1)*e^(x^2 + x)*log(5*x)^2 + 2*(2*x^2 + 7*x + 3)*e^(x^2 +
 x)*log(5*x) + (2*x^3 + 13*x^2 + 24*x + 9)*e^(x^2 + x) - (x^2 + 2*(x + 3)*
log(5*x) + log(5*x)^2 + 22*x + 25)*e^(x*e^((x + log(5*x) - 13)/(x + log(5*
x) + 3)) + (x + log(5*x) - 13)/(x + log(5*x) + 3) + 4))/(x^2 + 2*(x + 3)*l
og(5*x) + log(5*x)^2 + 6*x + 9), x)
```

3.638.

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}x+\frac{-13+x+\log(5x)}{3+x+\log(5x)}}(-25-22x-x^2+(-6-2}{}$$

3.638.9 Mupad [B] (verification not implemented)

Time = 14.07 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.94

$$\int \frac{e^{x+x^2}(9+24x+13x^2+2x^3)+e^{x+x^2}(6+14x+4x^2)\log(5x)+e^{x+x^2}(1+2x)\log^2(5x)+e^{4+e^{\frac{-13+x+\log(5x)}{3+x+\log(5x)}}}}{9+6x+x^2+(6+2x)\log(5x)+\log^2(5x}$$

$$= e^{x^2+x} - e^{5^{\frac{1}{x+\ln(5x)+3}}\,x\,x^{\frac{1}{x+\ln(5x)+3}}\,e^{-\frac{13}{x+\ln(5x)+3}}\,e^{\frac{x}{x+\ln(5x)+3}}+4}$$

input
```
int((exp(x + x^2)*(24*x + 13*x^2 + 2*x^3 + 9) + log(5*x)*exp(x + x^2)*(14*
x + 4*x^2 + 6) - exp((x + log(5*x) - 13)/(x + log(5*x) + 3))*exp(x*exp((x
+ log(5*x) - 13)/(x + log(5*x) + 3)) + 4)*(22*x + log(5*x)^2 + x^2 + log(5
*x)*(2*x + 6) + 25) + log(5*x)^2*exp(x + x^2)*(2*x + 1))/(6*x + log(5*x)^2
 + x^2 + log(5*x)*(2*x + 6) + 9),x)
```

output
```
exp(x + x^2) - exp(5^(1/(x + log(5*x) + 3))*x*x^(1/(x + log(5*x) + 3))*exp
(-13/(x + log(5*x) + 3))*exp(x/(x + log(5*x) + 3)) + 4)
```

3.639 $\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-155-75x+(-16-15x)\log(3))\,dx$

3.639.1 Optimal result

Integrand size = 31, antiderivative size = 21

$$\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-155-75x+(-16-15x)\log(3))\,dx = 5+e^{x+\frac{1}{5}x\log(3)}(x-16(1+x))$$

output
```
exp(1/5*x*ln(3)+x)*(-15*x-16)+5
```

3.639.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-155-75x+(-16-15x)\log(3))\,dx = -\frac{1}{5}3^{x/5}e^x(80+75x)$$

input
```
Integrate[(E^((5*x + x*Log[3])/5)*(-155 - 75*x + (-16 - 15*x)*Log[3]))/5,x
]
```

output
```
-1/5*(3^(x/5)*E^x*(80 + 75*x))
```

3.639.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 111 vs. 2(21) = 42.

Time = 0.31 (sec) , antiderivative size = 111, normalized size of antiderivative = 5.29, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.161, Rules used = {27, 25, 2725, 2626, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-75x+(-15x-16)\log(3)-155)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int -3^{x/5}e^x(75x+(15x+16)\log(3)+155)dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{5}\int 3^{x/5}e^x(75x+(15x+16)\log(3)+155)dx$$

$$\Big\downarrow \text{2725}$$

$$-\frac{1}{5}\int e^{\frac{1}{5}x(5+\log(3))}(75x+(15x+16)\log(3)+155)dx$$

$$\Big\downarrow \text{2626}$$

$$-\frac{1}{5}\int \left(75e^{\frac{1}{5}x(5+\log(3))}x+155e^{\frac{1}{5}x(5+\log(3))}+e^{\frac{1}{5}x(5+\log(3))}(15x+16)\log(3)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(-\frac{125\ 3^{\frac{x}{5}+1}e^x x}{5+\log(3)}-\frac{775\ 3^{x/5}e^x}{5+\log(3)}-\frac{5\ 3^{x/5}e^x(15x+16)\log(3)}{5+\log(3)}+\frac{625\ 3^{\frac{x}{5}+1}e^x}{(5+\log(3))^2}+\frac{125\ 3^{\frac{x}{5}+1}e^x\log(3)}{(5+\log(3))^2}\right)$$

input
```
Int[(E^((5*x + x*Log[3])/5)*(-155 - 75*x + (-16 - 15*x)*Log[3]))/5,x]
```

output
```
((625*3^(1 + x/5)*E^x)/(5 + Log[3])^2 + (125*3^(1 + x/5)*E^x*Log[3])/(5 +
Log[3])^2 - (775*3^(x/5)*E^x)/(5 + Log[3]) - (125*3^(1 + x/5)*E^x*x)/(5 +
Log[3]) - (5*3^(x/5)*E^x*(16 + 15*x)*Log[3])/(5 + Log[3]))/5
```

3.639.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2626
```
Int[(F_)^(v_)*(Px_), x_Symbol] :> Int[ExpandIntegrand[F^v, Px, x], x] /; Fr
eeQ[F, x] && PolynomialQ[Px, x] && LinearQ[v, x] &&  !TrueQ[$UseGamma]
```

rule 2725
```
Int[(u_.)*(F_)^(v_)*(G_)^(w_), x_Symbol] :> With[{z = v*Log[F] + w*Log[G]},
 Int[u*NormalizeIntegrand[E^z, x], x] /; BinomialQ[z, x] || (PolynomialQ[z,
 x] && LeQ[Exponent[z, x], 2])] /; FreeQ[{F, G}, x]
```

3.639.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

method	result
risch	$\frac{(-75x-80)3^{\frac{x}{5}}e^{x}}{5}$
gosper	$-e^{\frac{x\ln(3)}{5}+x}(15x+16)$
norman	$-15x\,e^{\frac{x\ln(3)}{5}+x}-16\,e^{\frac{x\ln(3)}{5}+x}$
parallelrisch	$-15\,e^{\frac{(5+\ln(3))x}{5}}x-16\,e^{\frac{(5+\ln(3))x}{5}}$
meijerg	$-\frac{155\left(1-e^{-\frac{x(-\ln(3)-5)}{5}}\right)}{-\ln(3)-5}+\frac{25(-3\ln(3)-15)\left(1-\frac{\left(2+\frac{2x(-\ln(3)-5)}{5}\right)e^{-\frac{x(-\ln(3)-5)}{5}}}{2}\right)}{(-\ln(3)-5)^{2}}-\frac{16\ln(3)\left(1-e^{-\frac{x(-\ln(3)}{5}}\right.}{-\ln(3)-5}$
derivativedivides	$\frac{-16\,e^{\left(\frac{\ln(3)}{5}+1\right)x}\ln(3)-\frac{375\left(e^{\left(\frac{\ln(3)}{5}+1\right)x}\left(\frac{\ln(3)}{5}+1\right)x-e^{\left(\frac{\ln(3)}{5}+1\right)x}\right)}{5+\ln(3)}-\frac{75\ln(3)\left(e^{\left(\frac{\ln(3)}{5}+1\right)x}\left(\frac{\ln(3)}{5}+1\right)x-e^{\left(\frac{\ln(3)}{5}+1\right)x}\right.}{5+\ln(3)}}{5+\ln(3)}$
default	$\frac{-16\,e^{\left(\frac{\ln(3)}{5}+1\right)x}\ln(3)-\frac{375\left(e^{\left(\frac{\ln(3)}{5}+1\right)x}\left(\frac{\ln(3)}{5}+1\right)x-e^{\left(\frac{\ln(3)}{5}+1\right)x}\right)}{5+\ln(3)}-\frac{75\ln(3)\left(e^{\left(\frac{\ln(3)}{5}+1\right)x}\left(\frac{\ln(3)}{5}+1\right)x-e^{\left(\frac{\ln(3)}{5}+1\right)x}\right.}{5+\ln(3)}}{5+\ln(3)}$
parts	$-\frac{3\,e^{\frac{x\ln(3)}{5}+x}\ln(3)x}{\frac{\ln(3)}{5}+1}-\frac{16\,e^{\frac{x\ln(3)}{5}+x}\ln(3)}{5\left(\frac{\ln(3)}{5}+1\right)}-\frac{15\,e^{\frac{x\ln(3)}{5}+x}x}{\frac{\ln(3)}{5}+1}-\frac{31\,e^{\frac{x\ln(3)}{5}+x}}{\frac{\ln(3)}{5}+1}-\frac{15(-\ln(3)-5)e^{\frac{x\ln(3)}{5}+x}}{(5+\ln(3))\left(\frac{\ln(3)}{5}+1\right)}$

input
```
int(1/5*((-15*x-16)*ln(3)-75*x-155)*exp(1/5*x*ln(3)+x),x,method=_RETURNVER
BOSE)
```

output
```
1/5*(-75*x-80)*3^(1/5*x)*exp(x)
```

3.639.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-155-75x+(-16-15x)\log(3))\,dx=-(15\,x+16)e^{\left(\frac{1}{5}\,x\log(3)+x\right)}$$

input
```
integrate(1/5*((-15*x-16)*log(3)-75*x-155)*exp(1/5*x*log(3)+x),x, algorith
m=\
```

output
```
-(15*x + 16)*e^(1/5*x*log(3) + x)
```

3.639.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-155-75x+(-16-15x)\log(3))\,dx = (-15x-16)\,e^{\frac{x\log(3)}{5}+x}$$

input
```
integrate(1/5*((-15*x-16)*ln(3)-75*x-155)*exp(1/5*x*ln(3)+x),x)
```

output
```
(-15*x - 16)*exp(x*log(3)/5 + x)
```

3.639.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 97 vs. 2(17) = 34.

Time = 0.31 (sec) , antiderivative size = 97, normalized size of antiderivative = 4.62

$$\begin{aligned}\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-155-75x+(-16-15x)\log(3))\,dx \\ = -\frac{15\,(x(\log(3)+5)-5)e^{\left(\frac{1}{5}\,x\log(3)+x\right)}\log(3)}{\log(3)^2+10\,\log(3)+25} - \frac{75\,(x(\log(3)+5)-5)e^{\left(\frac{1}{5}\,x\log(3)+x\right)}}{\log(3)^2+10\,\log(3)+25} \\ -\frac{16\,e^{\left(\frac{1}{5}\,x\log(3)+x\right)}\log(3)}{\log(3)+5} - \frac{155\,e^{\left(\frac{1}{5}\,x\log(3)+x\right)}}{\log(3)+5}\end{aligned}$$

input
```
integrate(1/5*((-15*x-16)*log(3)-75*x-155)*exp(1/5*x*log(3)+x),x, algorith
m=\
```

output
```
-15*(x*(log(3) + 5) - 5)*e^(1/5*x*log(3) + x)*log(3)/(log(3)^2 + 10*log(3)
 + 25) - 75*(x*(log(3) + 5) - 5)*e^(1/5*x*log(3) + x)/(log(3)^2 + 10*log(3
) + 25) - 16*e^(1/5*x*log(3) + x)*log(3)/(log(3) + 5) - 155*e^(1/5*x*log(3
) + x)/(log(3) + 5)
```

3.639.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(17) = 34$.

Time = 0.26 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.33

$$\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-155-75x+(-16-15x)\log(3))\,dx$$
$$= -\frac{\left(15\,x\log\left(3\right)^{2}+150\,x\log\left(3\right)+16\,\log\left(3\right)^{2}+375\,x+160\,\log\left(3\right)+400\right)e^{\left(\frac{1}{5}\,x\log(3)+x\right)}}{\log\left(3\right)^{2}+10\,\log\left(3\right)+25}$$

input
```
integrate(1/5*((-15*x-16)*log(3)-75*x-155)*exp(1/5*x*log(3)+x),x, algorith
m=\
```

output
```
-(15*x*log(3)^2 + 150*x*log(3) + 16*log(3)^2 + 375*x + 160*log(3) + 400)*e
^(1/5*x*log(3) + x)/(log(3)^2 + 10*log(3) + 25)
```

3.639.9 Mupad [B] (verification not implemented)

Time = 13.71 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.67

$$\int \frac{1}{5}e^{\frac{1}{5}(5x+x\log(3))}(-155-75x+(-16-15x)\log(3))\,dx = -3^{x/5}\,\mathrm{e}^{x}\,(15\,x+16)$$

input
```
int(-(exp(x + (x*log(3))/5)*(75*x + log(3)*(15*x + 16) + 155))/5,x)
```

output
```
-3^(x/5)*exp(x)*(15*x + 16)
```

3.640 $\int \frac{(-10-20x-10\log(x))\log(2\log(4))}{3x^4+6x^3\log(x)+3x^2\log^2(x)}\,dx$

3.640.1 Optimal result

Integrand size = 39, antiderivative size = 18

$$\int \frac{(-10-20x-10\log(x))\log(2\log(4))}{3x^4+6x^3\log(x)+3x^2\log^2(x)}\,dx=\frac{10\log(2\log(4))}{3x(x+\log(x))}$$

output
```
10/3/(x+ln(x))/x*ln(4*ln(2))
```

3.640.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{(-10-20x-10\log(x))\log(2\log(4))}{3x^4+6x^3\log(x)+3x^2\log^2(x)}\,dx=\frac{10\log(\log(16))}{3x(x+\log(x))}$$

input
```
Integrate[((-10 - 20*x - 10*Log[x])*Log[2*Log[4]])/(3*x^4 + 6*x^3*Log[x] +
 3*x^2*Log[x]^2),x]
```

output
```
(10*Log[Log[16]])/(3*x*(x + Log[x]))
```

3.640.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.103, Rules used = {27, 27, 7239, 7238}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(2\log(4))(-20x-10\log(x)-10)}{3x^4+6x^3\log(x)+3x^2\log^2(x)}dx$$

$$\Big\downarrow \ 27$$

$$\log(\log(16))\int -\frac{10(2x+\log(x)+1)}{3\left(x^4+2\log(x)x^3+\log^2(x)x^2\right)}dx$$

$$\Big\downarrow \ 27$$

$$-\frac{10}{3}\log(\log(16))\int \frac{2x+\log(x)+1}{x^4+2\log(x)x^3+\log^2(x)x^2}dx$$

$$\Big\downarrow \ 7239$$

$$-\frac{10}{3}\log(\log(16))\int \frac{2x+\log(x)+1}{x^2(x+\log(x))^2}dx$$

$$\Big\downarrow \ 7238$$

$$\frac{10\log(\log(16))}{3x(x+\log(x))}$$

input
```
Int[((-10 - 20*x - 10*Log[x])*Log[2*Log[4]])/(3*x^4 + 6*x^3*Log[x] + 3*x^2
*Log[x]^2),x]
```

output
```
(10*Log[Log[16]])/(3*x*(x + Log[x]))
```

3.640.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7238
```
Int[(u_)*(y_)^(m_.)*(z_)^(n_.), x_Symbol] :> With[{q = DerivativeDivides[y*
z, u*z^(n - m), x]}, Simp[q*y^(m + 1)*(z^(m + 1)/(m + 1)), x] /;  !FalseQ[q
]] /; FreeQ[{m, n}, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.640.4 Maple [A] (verified)

Time = 1.11 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

method	result	size
default	$\frac{10\ln(4\ln(2))}{3(x+\ln(x))x}$	17
parallelrisch	$\frac{10\ln(4\ln(2))}{3(x+\ln(x))x}$	17
risch	$\frac{\frac{20\ln(2)}{3}+\frac{10\ln(\ln(2))}{3}}{(x+\ln(x))x}$	20
norman	$\frac{\frac{20\ln(2)}{3}+\frac{10\ln(\ln(2))}{3}}{(x+\ln(x))x}$	21

input
```
int((-10*ln(x)-20*x-10)*ln(4*ln(2))/(3*x^2*ln(x)^2+6*x^3*ln(x)+3*x^4),x,me
thod=_RETURNVERBOSE)
```

output
```
10/3/(x+ln(x))/x*ln(4*ln(2))
```

3.640.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{(-10-20x-10\log(x))\log(2\log(4))}{3x^4+6x^3\log(x)+3x^2\log^2(x)}\,dx = \frac{10\log(4\log(2))}{3(x^2+x\log(x))}$$

input
```
integrate((-10*log(x)-20*x-10)*log(4*log(2))/(3*x^2*log(x)^2+6*x^3*log(x)+
3*x^4),x, algorithm=\
```

output
```
10/3*log(4*log(2))/(x^2 + x*log(x))
```

3.640.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{(-10-20x-10\log(x))\log(2\log(4))}{3x^4+6x^3\log(x)+3x^2\log^2(x)}\,dx = \frac{10\log(\log(2))+20\log(2)}{3x^2+3x\log(x)}$$

input
```
integrate((-10*ln(x)-20*x-10)*ln(4*ln(2))/(3*x**2*ln(x)**2+6*x**3*ln(x)+3*
x**4),x)
```

output
```
(10*log(log(2)) + 20*log(2))/(3*x**2 + 3*x*log(x))
```

3.640.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{(-10-20x-10\log(x))\log(2\log(4))}{3x^4+6x^3\log(x)+3x^2\log^2(x)}\,dx = \frac{10\log(4\log(2))}{3(x^2+x\log(x))}$$

input
```
integrate((-10*log(x)-20*x-10)*log(4*log(2))/(3*x^2*log(x)^2+6*x^3*log(x)+
3*x^4),x, algorithm=\
```

output
```
10/3*log(4*log(2))/(x^2 + x*log(x))
```

3.640.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{(-10-20x-10\log(x))\log(2\log(4))}{3x^4+6x^3\log(x)+3x^2\log^2(x)}\,dx = \frac{10\log(4\log(2))}{3(x^2+x\log(x))}$$

input
```
integrate((-10*log(x)-20*x-10)*log(4*log(2))/(3*x^2*log(x)^2+6*x^3*log(x)+
3*x^4),x, algorithm=\
```

output
```
10/3*log(4*log(2))/(x^2 + x*log(x))
```

3.640.9 Mupad [B] (verification not implemented)

Time = 13.57 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{(-10-20x-10\log(x))\log(2\log(4))}{3x^4+6x^3\log(x)+3x^2\log^2(x)}\,dx = \frac{10\,\ln\left(\ln\left(16\right)\right)}{3\,x\,\ln\left(x\right)+3\,x^2}$$

input
```
int(-(log(4*log(2))*(20*x + 10*log(x) + 10))/(6*x^3*log(x) + 3*x^2*log(x)^
2 + 3*x^4),x)
```

output
```
(10*log(log(16)))/(3*x*log(x) + 3*x^2)
```

3.641 $\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2 \cdots}{\cdots}}}{\cdots}$

3.641.1 Optimal result

Integrand size = 339, antiderivative size = 30

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^{\cdots}\right.\right.}{81+108x+54x^2+12x^3+x^4}}}{\cdots}$$
$$=\left(6+e^{x+e^{2x}x-\frac{x^2}{(3+x)^4}}+\frac{x}{5}\right)^2$$

output
```
(exp(x+x*exp(x)^2-x^2/(3+x)^4)+1/5*x+6)^2
```

3.641.2 Mathematica [A] (verified)

Time = 0.79 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.87

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^{\cdots}\right.\right.}{81+108x+54x^2+12x^3+x^4}}}{\cdots}$$
$$=\frac{1}{25}\left(25e^{2x\left(1+e^{2x}-\frac{x}{(3+x)^4}\right)}+10e^{x\left(1+e^{2x}-\frac{x}{(3+x)^4}\right)}(30+x)+x(60+x)\right)$$

input
```
Integrate[(14580 + 24786*x + 17010*x^2 + 5940*x^3 + 1080*x^4 + 90*x^5 + 2*
x^6 + E^((2*(81*x + 107*x^2 + 54*x^3 + 12*x^4 + x^5 + E^(2*x)*(81*x + 108*
x^2 + 54*x^3 + 12*x^4 + x^5)))/(81 + 108*x + 54*x^2 + 12*x^3 + x^4))*(1215
0 + 19950*x + 13600*x^2 + 4500*x^3 + 750*x^4 + 50*x^5 + E^(2*x)*(12150 + 4
4550*x + 54000*x^2 + 31500*x^3 + 9750*x^4 + 1550*x^5 + 100*x^6)) + E^((81*
x + 107*x^2 + 54*x^3 + 12*x^4 + x^5 + E^(2*x)*(81*x + 108*x^2 + 54*x^3 + 1
2*x^4 + x^5))/(81 + 108*x + 54*x^2 + 12*x^3 + x^4))*(75330 + 126180*x + 88
290*x^2 + 30620*x^3 + 5550*x^4 + 460*x^5 + 10*x^6 + E^(2*x)*(72900 + 26973
0*x + 332910*x^2 + 199800*x^3 + 64800*x^4 + 11250*x^5 + 910*x^6 + 20*x^7))
)/(6075 + 10125*x + 6750*x^2 + 2250*x^3 + 375*x^4 + 25*x^5),x]
```

output
```
(25*E^(2*x*(1 + E^(2*x) - x/(3 + x)^4)) + 10*E^(x*(1 + E^(2*x) - x/(3 + x)
^4))*(30 + x) + x*(60 + x))/25
```

3.641.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(50x^5+750x^4+4500x^3+13600x^2+e^{2x}\left(100x^6+1550x^5+9750x^4+31500x^3+54000x^2+44550x+12150\right)\right.}{}$$

$\Big\downarrow$ 2007

$$\int \frac{\left(50x^5+750x^4+4500x^3+13600x^2+e^{2x}\left(100x^6+1550x^5+9750x^4+31500x^3+54000x^2+44550x+12150\right)\right.}{}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{2\left(2e^{2x}x^6+31e^{2x}x^5+x^5+195e^{2x}x^4+15x^4+630e^{2x}x^3+90x^3+1080e^{2x}x^2+272x^2+891e^{2x}x+399x+2\right.}{(x+3)^5}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{2\left(25\left(x^5+15x^4+90x^3+272x^2+399x+e^{2x}(x+3)^5(2x+1)+243\right)\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right.\right.}{}$$

$\Big\downarrow$ 27

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$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}(12150+19950x+13600}{}$$

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$\downarrow$ 7293

$$\frac{2}{25}\int\left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$\downarrow$ 7239

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$\downarrow$ 7293

$$\frac{2}{25}\int\left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$\downarrow$ 7239

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$\downarrow$ 7293

$$\frac{2}{25}\int\left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$\downarrow$ 7239

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$\downarrow$ 7293

$$\frac{2}{25}\int\left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

3.641.

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}\left(12150+19950x+13600\right.}{}$$

$\Big\downarrow$ 7239

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$\Big\downarrow$ 7293

$$\frac{2}{25}\int\left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$\Big\downarrow$ 7239

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$\Big\downarrow$ 7293

$$\frac{2}{25}\int\left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$\Big\downarrow$ 7239

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$\Big\downarrow$ 7293

$$\frac{2}{25}\int\left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$\Big\downarrow$ 7239

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$\Big\downarrow$ 7293

3.641.

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}\left(12150+19950x+13600\right.}{}$$

$$\frac{2}{25}\int \left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{2}{25}\int \left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{2}{25}\int \left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{2}{25}\int \left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}\right.}{}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x\left(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81\right)}{(x+3)^4}\right)\left(x^5+15x^4\right.}{}$$

3.641.

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}\left(12150+19950x+13600\right.}{}$$

$\downarrow$ 7293

$$\frac{2}{25}\int \left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}$$

$\downarrow$ 7239

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81)}{(x+3)^4}\right)(x^5+15x^4}{}$$

$\downarrow$ 7293

$$\frac{2}{25}\int \left(\frac{x^6}{(x+3)^5}+\frac{45x^5}{(x+3)^5}+\frac{540x^4}{(x+3)^5}+\frac{2970x^3}{(x+3)^5}+\frac{8505x^2}{(x+3)^5}+\frac{12393x}{(x+3)^5}+\frac{25\exp\left(\frac{2x(x^4+12x^3+54x^2+107x+e^{2x}(x+\right.}{(x+3)^4}$$

$\downarrow$ 7239

$$\frac{2}{25}\int \frac{x^6+45x^5+540x^4+2970x^3+8505x^2+12393x+25\exp\left(\frac{2x(x^4+12x^3+54x^2+107x+e^{2x}(x+3)^4+81)}{(x+3)^4}\right)(x^5+15x^4}{}$$

input
```
Int[(14580 + 24786*x + 17010*x^2 + 5940*x^3 + 1080*x^4 + 90*x^5 + 2*x^6 +
E^((2*(81*x + 107*x^2 + 54*x^3 + 12*x^4 + x^5 + E^(2*x)*(81*x + 108*x^2 +
54*x^3 + 12*x^4 + x^5)))/(81 + 108*x + 54*x^2 + 12*x^3 + x^4))*(12150 + 19
950*x + 13600*x^2 + 4500*x^3 + 750*x^4 + 50*x^5 + E^(2*x)*(12150 + 44550*x
 + 54000*x^2 + 31500*x^3 + 9750*x^4 + 1550*x^5 + 100*x^6)) + E^((81*x + 10
7*x^2 + 54*x^3 + 12*x^4 + x^5 + E^(2*x)*(81*x + 108*x^2 + 54*x^3 + 12*x^4
+ x^5))/(81 + 108*x + 54*x^2 + 12*x^3 + x^4))*(75330 + 126180*x + 88290*x^
2 + 30620*x^3 + 5550*x^4 + 460*x^5 + 10*x^6 + E^(2*x)*(72900 + 269730*x +
332910*x^2 + 199800*x^3 + 64800*x^4 + 11250*x^5 + 910*x^6 + 20*x^7)))/(607
5 + 10125*x + 6750*x^2 + 2250*x^3 + 375*x^4 + 25*x^5),x]
```

output
```
$Aborted
```

3.641.

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}(12150+19950x+13600}{}$$

3.641.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.641.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 146 vs. $2(26) = 52$.

Time = 5.44 (sec) , antiderivative size = 147, normalized size of antiderivative = 4.90

method	result
risch	$\frac{x^2}{25}+\frac{12x}{5}+\mathrm{e}^{\frac{2x\left(\mathrm{e}^{2x}x^4+12\,\mathrm{e}^{2x}x^3+x^4+54\,\mathrm{e}^{2x}x^2+12x^3+108x\,\mathrm{e}^{2x}+54x^2+81\,\mathrm{e}^{2x}+107x+81\right)}{(3+x)^4}}+\left(12+\frac{2x}{5}\right)\mathrm{e}^{\frac{x\left(\mathrm{e}^{2x}x^4+12\,\mathrm{e}^{2x}x^3\right.}{}}$
parallelrisch	$\frac{x^2}{25}+\frac{2\,\mathrm{e}^{\frac{\left(x^5+12x^4+54x^3+108x^2+81x\right)\mathrm{e}^{2x}+x^5+12x^4+54x^3+107x^2+81x}{x^4+12x^3+54x^2+108x+81}}x}{5}+\mathrm{e}^{\frac{2\left(x^5+12x^4+54x^3+108x^2+81x\right)\mathrm{e}^{2x}+2x^5+24x^4+108x}{x^4+12x^3+54x^2+108x+81}}$

input
```
int((((100*x^6+1550*x^5+9750*x^4+31500*x^3+54000*x^2+44550*x+12150)*exp(x)
^2+50*x^5+750*x^4+4500*x^3+13600*x^2+19950*x+12150)*exp(((x^5+12*x^4+54*x^
3+108*x^2+81*x)*exp(x)^2+x^5+12*x^4+54*x^3+107*x^2+81*x)/(x^4+12*x^3+54*x^
2+108*x+81))^2+((20*x^7+910*x^6+11250*x^5+64800*x^4+199800*x^3+332910*x^2+
269730*x+72900)*exp(x)^2+10*x^6+460*x^5+5550*x^4+30620*x^3+88290*x^2+12618
0*x+75330)*exp(((x^5+12*x^4+54*x^3+108*x^2+81*x)*exp(x)^2+x^5+12*x^4+54*x^
3+107*x^2+81*x)/(x^4+12*x^3+54*x^2+108*x+81))+2*x^6+90*x^5+1080*x^4+5940*x
^3+17010*x^2+24786*x+14580)/(25*x^5+375*x^4+2250*x^3+6750*x^2+10125*x+6075
),x,method=_RETURNVERBOSE)
```

3.641.

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}\left(12150+19950x+13600\right.}{}$$

output
```
1/25*x^2+12/5*x+exp(2*x*(exp(2*x)*x^4+12*exp(2*x)*x^3+x^4+54*exp(2*x)*x^2+
12*x^3+108*x*exp(2*x)+54*x^2+81*exp(2*x)+107*x+81)/(3+x)^4)+(12+2/5*x)*exp
(x*(exp(2*x)*x^4+12*exp(2*x)*x^3+x^4+54*exp(2*x)*x^2+12*x^3+108*x*exp(2*x)
+54*x^2+81*exp(2*x)+107*x+81)/(3+x)^4)
```

3.641.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 157 vs. $2(28) = 56$.

Time = 0.25 (sec) , antiderivative size = 157, normalized size of antiderivative = 5.23

$$\int \frac{14580 + 24786x + 17010x^2 + 5940x^3 + 1080x^4 + 90x^5 + 2x^6 + e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x\right.\right.}{81+108x+54x^2+12x^3+x^4}}}{}$$

$$= \frac{1}{25}\,x^2 + \frac{2}{5}\,(x+30)e^{\left(\frac{x^5+12\,x^4+54\,x^3+107\,x^2+\left(x^5+12\,x^4+54\,x^3+108\,x^2+81\,x\right)e^{(2\,x)}+81\,x}{x^4+12\,x^3+54\,x^2+108\,x+81}\right)} + \frac{12}{5}\,x + e^{\left(\frac{2\,\left(x^5+12\,x^4+54\,x^3+107\,x^2+\left(x^5+12\,x^4+54\,x^3+108\,x^2+81\,x\right)e^{(2\,x)}+81\,x\right)}{x^4+12\,x^3+54\,x^2+108\,x+81}\right)}$$

input
```
integrate((((100*x^6+1550*x^5+9750*x^4+31500*x^3+54000*x^2+44550*x+12150)*
exp(x)^2+50*x^5+750*x^4+4500*x^3+13600*x^2+19950*x+12150)*exp(((x^5+12*x^4
+54*x^3+108*x^2+81*x)*exp(x)^2+x^5+12*x^4+54*x^3+107*x^2+81*x)/(x^4+12*x^3
+54*x^2+108*x+81))^2+((20*x^7+910*x^6+11250*x^5+64800*x^4+199800*x^3+33291
0*x^2+269730*x+72900)*exp(x)^2+10*x^6+460*x^5+5550*x^4+30620*x^3+88290*x^2
+126180*x+75330)*exp(((x^5+12*x^4+54*x^3+108*x^2+81*x)*exp(x)^2+x^5+12*x^4
+54*x^3+107*x^2+81*x)/(x^4+12*x^3+54*x^2+108*x+81))+2*x^6+90*x^5+1080*x^4+
5940*x^3+17010*x^2+24786*x+14580)/(25*x^5+375*x^4+2250*x^3+6750*x^2+10125*
x+6075),x, algorithm=\
```

output
```
1/25*x^2 + 2/5*(x + 30)*e^((x^5 + 12*x^4 + 54*x^3 + 107*x^2 + (x^5 + 12*x^
4 + 54*x^3 + 108*x^2 + 81*x)*e^(2*x) + 81*x)/(x^4 + 12*x^3 + 54*x^2 + 108*
x + 81)) + 12/5*x + e^(2*(x^5 + 12*x^4 + 54*x^3 + 107*x^2 + (x^5 + 12*x^4
+ 54*x^3 + 108*x^2 + 81*x)*e^(2*x) + 81*x)/(x^4 + 12*x^3 + 54*x^2 + 108*x
+ 81))
```


$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}(12150+19950x+13600x}{}$$

3.641.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 158 vs. $2(24) = 48$.

Time = 0.66 (sec) , antiderivative size = 158, normalized size of antiderivative = 5.27

$$\int \frac{14580 + 24786x + 17010x^2 + 5940x^3 + 1080x^4 + 90x^5 + 2x^6 + e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x\right.\right.}{81+108x+54x^2+12x^3+x^4}}}{}$$

$$= \frac{x^2}{25} + \frac{12x}{5} + \frac{(2x+60)\, e^{\frac{x^5+12x^4+54x^3+107x^2+81x+\left(x^5+12x^4+54x^3+108x^2+81x\right)e^{2x}}{x^4+12x^3+54x^2+108x+81}}}{5} + e^{\frac{2\left(x^5+12x^4+54x^3+107x^2+81x+\left(x^5+12x^4+54x^3+108x^2+81x\right)e^{2x}\right)}{x^4+12x^3+54x^2+108x+81}}$$

input
```
integrate((((100*x**6+1550*x**5+9750*x**4+31500*x**3+54000*x**2+44550*x+12
150)*exp(x)**2+50*x**5+750*x**4+4500*x**3+13600*x**2+19950*x+12150)*exp(((
x**5+12*x**4+54*x**3+108*x**2+81*x)*exp(x)**2+x**5+12*x**4+54*x**3+107*x**
2+81*x)/(x**4+12*x**3+54*x**2+108*x+81))**2+((20*x**7+910*x**6+11250*x**5+
64800*x**4+199800*x**3+332910*x**2+269730*x+72900)*exp(x)**2+10*x**6+460*x
**5+5550*x**4+30620*x**3+88290*x**2+126180*x+75330)*exp(((x**5+12*x**4+54*
x**3+108*x**2+81*x)*exp(x)**2+x**5+12*x**4+54*x**3+107*x**2+81*x)/(x**4+12
*x**3+54*x**2+108*x+81))+2*x**6+90*x**5+1080*x**4+5940*x**3+17010*x**2+247
86*x+14580)/(25*x**5+375*x**4+2250*x**3+6750*x**2+10125*x+6075),x)
```

output
```
x**2/25 + 12*x/5 + (2*x + 60)*exp((x**5 + 12*x**4 + 54*x**3 + 107*x**2 + 8
1*x + (x**5 + 12*x**4 + 54*x**3 + 108*x**2 + 81*x)*exp(2*x))/(x**4 + 12*x*
*3 + 54*x**2 + 108*x + 81))/5 + exp(2*(x**5 + 12*x**4 + 54*x**3 + 107*x**2
 + 81*x + (x**5 + 12*x**4 + 54*x**3 + 108*x**2 + 81*x)*exp(2*x))/(x**4 + 1
2*x**3 + 54*x**2 + 108*x + 81))
```

3.641.

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}\left(12150+19950x+13600\right.}{}$$

3.641.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 370 vs. 2(28) = 56.

Time = 0.85 (sec) , antiderivative size = 370, normalized size of antiderivative = 12.33

$$\int \frac{14580 + 24786x + 17010x^2 + 5940x^3 + 1080x^4 + 90x^5 + 2x^6 + e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x\right.\right.}{81+108x+54x^2+12x^3+x^4}}}{}$$

$$= \frac{1}{25}x^2 + \frac{1}{5}\left(2(x+30)e^{\left(xe^{(2x)}+x-\frac{9}{x^4+12x^3+54x^2+108x+81}+\frac{6}{x^3+9x^2+27x+27}+\frac{1}{x^2+6x+9}\right)} + 5e^{\left(2xe^{(2x)}+2x-\frac{18}{x^4+12x^3+54x^2+108x+81}+\right.}\right. + \frac{12}{5}x + \frac{27(80x^3+630x^2+1692x+1539)}{50(x^4+12x^3+54x^2+108x+81)} - \frac{81(40x^3+300x^2+780x+693)}{10(x^4+12x^3+54x^2+108x+81)} + \frac{162(16x^3+108x^2+264x+225)}{5(x^4+12x^3+54x^2+108x+81)} - \frac{297(4x^3+18x^2+36x+27)}{5(x^4+12x^3+54x^2+108x+81)} - \frac{1701(2x^2+4x+3)}{10(x^4+12x^3+54x^2+108x+81)} - \frac{4131(4x+3)}{50(x^4+12x^3+54x^2+108x+81)} - \frac{729}{5(x^4+12x^3+54x^2+108x+81)}$$

input
```
integrate((((100*x^6+1550*x^5+9750*x^4+31500*x^3+54000*x^2+44550*x+12150)*
exp(x)^2+50*x^5+750*x^4+4500*x^3+13600*x^2+19950*x+12150)*exp(((x^5+12*x^4
+54*x^3+108*x^2+81*x)*exp(x)^2+x^5+12*x^4+54*x^3+107*x^2+81*x)/(x^4+12*x^3
+54*x^2+108*x+81))^2+((20*x^7+910*x^6+11250*x^5+64800*x^4+199800*x^3+33291
0*x^2+269730*x+72900)*exp(x)^2+10*x^6+460*x^5+5550*x^4+30620*x^3+88290*x^2
+126180*x+75330)*exp(((x^5+12*x^4+54*x^3+108*x^2+81*x)*exp(x)^2+x^5+12*x^4
+54*x^3+107*x^2+81*x)/(x^4+12*x^3+54*x^2+108*x+81))+2*x^6+90*x^5+1080*x^4+
5940*x^3+17010*x^2+24786*x+14580)/(25*x^5+375*x^4+2250*x^3+6750*x^2+10125*
x+6075),x, algorithm=\
```

output
```
1/25*x^2 + 1/5*(2*(x + 30)*e^(x*e^(2*x) + x - 9/(x^4 + 12*x^3 + 54*x^2 + 1
08*x + 81) + 6/(x^3 + 9*x^2 + 27*x + 27) + 1/(x^2 + 6*x + 9)) + 5*e^(2*x*e
^(2*x) + 2*x - 18/(x^4 + 12*x^3 + 54*x^2 + 108*x + 81) + 12/(x^3 + 9*x^2 +
 27*x + 27)))*e^(-2/(x^2 + 6*x + 9)) + 12/5*x + 27/50*(80*x^3 + 630*x^2 +
1692*x + 1539)/(x^4 + 12*x^3 + 54*x^2 + 108*x + 81) - 81/10*(40*x^3 + 300*
x^2 + 780*x + 693)/(x^4 + 12*x^3 + 54*x^2 + 108*x + 81) + 162/5*(16*x^3 +
108*x^2 + 264*x + 225)/(x^4 + 12*x^3 + 54*x^2 + 108*x + 81) - 297/5*(4*x^3
 + 18*x^2 + 36*x + 27)/(x^4 + 12*x^3 + 54*x^2 + 108*x + 81) - 1701/10*(2*x
^2 + 4*x + 3)/(x^4 + 12*x^3 + 54*x^2 + 108*x + 81) - 4131/50*(4*x + 3)/(x^
4 + 12*x^3 + 54*x^2 + 108*x + 81) - 729/5/(x^4 + 12*x^3 + 54*x^2 + 108*x +
 81)
```

3.641.

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}(12150+19950x+13600}{}$$

3.641.8 Giac [F]

$$\int \frac{14580 + 24786x + 17010x^2 + 5940x^3 + 1080x^4 + 90x^5 + 2x^6 + e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x\right.\right.}{81+108x+54x^2+12x^3+x^4}}}{}$$

$$= \int \frac{2\left(x^6 + 45\,x^5 + 540\,x^4 + 2970\,x^3 + 8505\,x^2 + 25\left(x^5 + 15\,x^4 + 90\,x^3 + 272\,x^2 + \left(2\,x^6 + 31\,x^5 + 195\,x^4\right.\right.\right.}{}$$

input
```
integrate(((((100*x^6+1550*x^5+9750*x^4+31500*x^3+54000*x^2+44550*x+12150)*
exp(x)^2+50*x^5+750*x^4+4500*x^3+13600*x^2+19950*x+12150)*exp(((x^5+12*x^4
+54*x^3+108*x^2+81*x)*exp(x)^2+x^5+12*x^4+54*x^3+107*x^2+81*x)/(x^4+12*x^3
+54*x^2+108*x+81))^2+((20*x^7+910*x^6+11250*x^5+64800*x^4+199800*x^3+33291
0*x^2+269730*x+72900)*exp(x)^2+10*x^6+460*x^5+5550*x^4+30620*x^3+88290*x^2
+126180*x+75330)*exp(((x^5+12*x^4+54*x^3+108*x^2+81*x)*exp(x)^2+x^5+12*x^4
+54*x^3+107*x^2+81*x)/(x^4+12*x^3+54*x^2+108*x+81))+2*x^6+90*x^5+1080*x^4+
5940*x^3+17010*x^2+24786*x+14580)/(25*x^5+375*x^4+2250*x^3+6750*x^2+10125*
x+6075),x, algorithm=\
```

output
```
integrate(2/25*(x^6 + 45*x^5 + 540*x^4 + 2970*x^3 + 8505*x^2 + 25*(x^5 + 1
5*x^4 + 90*x^3 + 272*x^2 + (2*x^6 + 31*x^5 + 195*x^4 + 630*x^3 + 1080*x^2
+ 891*x + 243)*e^(2*x) + 399*x + 243)*e^(2*(x^5 + 12*x^4 + 54*x^3 + 107*x^
2 + (x^5 + 12*x^4 + 54*x^3 + 108*x^2 + 81*x)*e^(2*x) + 81*x)/(x^4 + 12*x^3
 + 54*x^2 + 108*x + 81)) + 5*(x^6 + 46*x^5 + 555*x^4 + 3062*x^3 + 8829*x^2
 + (2*x^7 + 91*x^6 + 1125*x^5 + 6480*x^4 + 19980*x^3 + 33291*x^2 + 26973*x
 + 7290)*e^(2*x) + 12618*x + 7533)*e^((x^5 + 12*x^4 + 54*x^3 + 107*x^2 + (
x^5 + 12*x^4 + 54*x^3 + 108*x^2 + 81*x)*e^(2*x) + 81*x)/(x^4 + 12*x^3 + 54
*x^2 + 108*x + 81)) + 12393*x + 7290)/(x^5 + 15*x^4 + 90*x^3 + 270*x^2 + 4
05*x + 243), x)
```


$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}\left(12150+19950x+13600\right.}{}$$

3.641.9 Mupad [B] (verification not implemented)

Time = 14.18 (sec) , antiderivative size = 549, normalized size of antiderivative = 18.30

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4\right.\right.}{81+108x+54x^2+12x^3+x^4}}}{}$$

$$= \frac{12\,x}{5} + e^{\frac{214\,x^2}{x^4+12\,x^3+54\,x^2+108\,x+81}+\frac{108\,x^3}{x^4+12\,x^3+54\,x^2+108\,x+81}+\frac{24\,x^4}{x^4+12\,x^3+54\,x^2+108\,x+81}+\frac{2\,x^5}{x^4+12\,x^3+54\,x^2+108\,x+81}+\frac{162\,x}{x^4+12\,x^3+54\,x^2+108\,x+81}+\cdots} + e^{\frac{107\,x^2}{x^4+12\,x^3+54\,x^2+108\,x+81}+\frac{54\,x^3}{x^4+12\,x^3+54\,x^2+108\,x+81}+\frac{12\,x^4}{x^4+12\,x^3+54\,x^2+108\,x+81}+\frac{x^5}{x^4+12\,x^3+54\,x^2+108\,x+81}+\frac{81\,x}{x^4+12\,x^3+54\,x^2+108\,x+81}+\cdots} \cdots + 12\Big) + \frac{x^2}{25}$$

input
```
int((24786*x + exp((81*x + exp(2*x)*(81*x + 108*x^2 + 54*x^3 + 12*x^4 + x^
5) + 107*x^2 + 54*x^3 + 12*x^4 + x^5)/(108*x + 54*x^2 + 12*x^3 + x^4 + 81)
)*(126180*x + exp(2*x)*(269730*x + 332910*x^2 + 199800*x^3 + 64800*x^4 + 1
1250*x^5 + 910*x^6 + 20*x^7 + 72900) + 88290*x^2 + 30620*x^3 + 5550*x^4 +
460*x^5 + 10*x^6 + 75330) + 17010*x^2 + 5940*x^3 + 1080*x^4 + 90*x^5 + 2*x
^6 + exp((2*(81*x + exp(2*x)*(81*x + 108*x^2 + 54*x^3 + 12*x^4 + x^5) + 10
7*x^2 + 54*x^3 + 12*x^4 + x^5))/(108*x + 54*x^2 + 12*x^3 + x^4 + 81))*(199
50*x + 13600*x^2 + 4500*x^3 + 750*x^4 + 50*x^5 + exp(2*x)*(44550*x + 54000
*x^2 + 31500*x^3 + 9750*x^4 + 1550*x^5 + 100*x^6 + 12150) + 12150) + 14580
)/(10125*x + 6750*x^2 + 2250*x^3 + 375*x^4 + 25*x^5 + 6075),x)
```

output
```
(12*x)/5 + exp((214*x^2)/(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (108*x^3)/
(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (24*x^4)/(108*x + 54*x^2 + 12*x^3 +
 x^4 + 81) + (2*x^5)/(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (162*x)/(108*x
 + 54*x^2 + 12*x^3 + x^4 + 81) + (216*x^2*exp(2*x))/(108*x + 54*x^2 + 12*x
^3 + x^4 + 81) + (108*x^3*exp(2*x))/(108*x + 54*x^2 + 12*x^3 + x^4 + 81) +
 (24*x^4*exp(2*x))/(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (2*x^5*exp(2*x))
/(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (162*x*exp(2*x))/(108*x + 54*x^2 +
 12*x^3 + x^4 + 81)) + exp((107*x^2)/(108*x + 54*x^2 + 12*x^3 + x^4 + 81)
+ (54*x^3)/(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (12*x^4)/(108*x + 54*x^2
 + 12*x^3 + x^4 + 81) + x^5/(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (81*x)/
(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (108*x^2*exp(2*x))/(108*x + 54*x^2
+ 12*x^3 + x^4 + 81) + (54*x^3*exp(2*x))/(108*x + 54*x^2 + 12*x^3 + x^4 +
81) + (12*x^4*exp(2*x))/(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (x^5*exp(2*
x))/(108*x + 54*x^2 + 12*x^3 + x^4 + 81) + (81*x*exp(2*x))/(108*x + 54*x^2
 + 12*x^3 + x^4 + 81))*((2*x)/5 + 12) + x^2/25
```

3.641.

$$\int \frac{14580+24786x+17010x^2+5940x^3+1080x^4+90x^5+2x^6+e^{\frac{2\left(81x+107x^2+54x^3+12x^4+x^5+e^{2x}\left(81x+108x^2+54x^3+12x^4+x^5\right)\right)}{81+108x+54x^2+12x^3+x^4}}(12150+19950x+13600\cdots}{}$$

3.642 $\int \frac{270x^2-225x^4}{-32+160x^2-200x^4+e(8-40x^2+50x^4)}\,dx$

3.642.1 Optimal result

Integrand size = 40, antiderivative size = 25

$$\int \frac{270x^2-225x^4}{-32+160x^2-200x^4+e\left(8-40x^2+50x^4\right)}\,dx=4+\frac{9x^2}{(-4+e)\left(\frac{4}{5x}-2x\right)}$$

output
```
4+9*x^2/(exp(1)-4)/(4/5/x-2*x)
```

3.642.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{270x^2-225x^4}{-32+160x^2-200x^4+e\left(8-40x^2+50x^4\right)}\,dx=-\frac{45x^3}{2(-4+e)\left(-2+5x^2\right)}$$

input
```
Integrate[(270*x^2 - 225*x^4)/(-32 + 160*x^2 - 200*x^4 + E*(8 - 40*x^2 + 5
0*x^4)),x]
```

output
```
(-45*x^3)/(2*(-4 + E)*(-2 + 5*x^2))
```

3.642.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2027, 2089, 1380, 27, 27, 356}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{270x^2-225x^4}{-200x^4+160x^2+e\left(50x^4-40x^2+8\right)-32}dx$$
$$\Big\downarrow \text{2027}$$
$$\int \frac{x^2\left(270-225x^2\right)}{-200x^4+160x^2+e\left(50x^4-40x^2+8\right)-32}dx$$
$$\Big\downarrow \text{2089}$$
$$\int \frac{x^2\left(270-225x^2\right)}{-50(4-e)x^4+40(4-e)x^2-8(4-e)}dx$$
$$\Big\downarrow \text{1380}$$
$$-50(4-e)\int \frac{9x^2\left(6-5x^2\right)}{20\left(2(4-e)-5(4-e)x^2\right)^2}dx$$
$$\Big\downarrow \text{27}$$
$$-\frac{45}{2}(4-e)\int \frac{x^2\left(6-5x^2\right)}{(4-e)^2\left(2-5x^2\right)^2}dx$$
$$\Big\downarrow \text{27}$$
$$-\frac{45\int \frac{x^2\left(6-5x^2\right)}{\left(2-5x^2\right)^2}dx}{2(4-e)}$$
$$\Big\downarrow \text{356}$$
$$-\frac{45x^3}{2(4-e)\left(2-5x^2\right)}$$

input
```
Int[(270*x^2 - 225*x^4)/(-32 + 160*x^2 - 200*x^4 + E*(8 - 40*x^2 + 50*x^4)
),x]
```

output
```
(-45*x^3)/(2*(4 - E)*(2 - 5*x^2))
```

3.642.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 356
```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x
_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] /;
 FreeQ[{a, b, c, d, e, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[a*d*(m + 1) -
b*c*(m + 2*p + 3), 0] && NeQ[m, -1]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2027
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.))^(p_.), x_Symbol] :> Int[x^
(p*r)*(a + b*x^(s - r))^p*Fx, x] /; FreeQ[{a, b, r, s}, x] && IntegerQ[p] &
& PosQ[s - r] &&  !(EqQ[p, 1] && EqQ[u, 1])
```

rule 2089
```
Int[(u_)^(p_.)*((f_.)*(x_))^(m_.)*(z_)^(q_.), x_Symbol] :> Int[(f*x)^m*Expa
ndToSum[z, x]^q*ExpandToSum[u, x]^p, x] /; FreeQ[{f, m, p, q}, x] && Binomi
alQ[z, x] && TrinomialQ[u, x] &&  !(BinomialMatchQ[z, x] && TrinomialMatchQ
[u, x])
```

3.642.4 Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

method	result	size
norman	$-\frac{45x^3}{2(\mathrm{e}-4)(5x^2-2)}$	21
parallelrisch	$-\frac{45x^3}{2(\mathrm{e}-4)(5x^2-2)}$	21
default	$\frac{-9x-\frac{18x}{5\left(x^2-\frac{2}{5}\right)}}{2\,\mathrm{e}-8}$	25
gosper	$-\frac{45x^3}{2(5x^2\mathrm{e}-20x^2-2\,\mathrm{e}+8)}$	26
risch	$-\frac{9x}{2\,\mathrm{e}-8}+\frac{\left(-\frac{18\,\mathrm{e}}{5}+\frac{72}{5}\right)x}{(2\,\mathrm{e}-8)\left(x^2\mathrm{e}-4x^2-\frac{2\,\mathrm{e}}{5}+\frac{8}{5}\right)}$	48

input
```
int((-225*x^4+270*x^2)/((50*x^4-40*x^2+8)*exp(1)-200*x^4+160*x^2-32),x,met
hod=_RETURNVERBOSE)
```

output
```
-45/2/(exp(1)-4)*x^3/(5*x^2-2)
```

3.642.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{270x^2-225x^4}{-32+160x^2-200x^4+e\left(8-40x^2+50x^4\right)}\,dx = \frac{45\,x^3}{2\left(20\,x^2-(5\,x^2-2)e-8\right)}$$

input
```
integrate((-225*x^4+270*x^2)/((50*x^4-40*x^2+8)*exp(1)-200*x^4+160*x^2-32)
,x, algorithm=\
```

output
```
45/2*x^3/(20*x^2 - (5*x^2 - 2)*e - 8)
```

3.642.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

$$\int \frac{270x^2-225x^4}{-32+160x^2-200x^4+e\left(8-40x^2+50x^4\right)}\,dx = -\frac{9x}{-8+2e}-\frac{9x}{x^2\left(-20+5e\right)-2e+8}$$

input
```
integrate((-225*x**4+270*x**2)/((50*x**4-40*x**2+8)*exp(1)-200*x**4+160*x*
*2-32),x)
```

output
```
-9*x/(-8 + 2*E) - 9*x/(x**2*(-20 + 5*E) - 2*E + 8)
```

3.642.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

$$\int \frac{270x^2-225x^4}{-32+160x^2-200x^4+e\,(8-40x^2+50x^4)}\,dx = -\frac{9\,x}{5\,x^2(e-4)-2\,e+8}-\frac{9\,x}{2\,(e-4)}$$

input
```
integrate((-225*x^4+270*x^2)/((50*x^4-40*x^2+8)*exp(1)-200*x^4+160*x^2-32)
,x, algorithm=\
```

output
```
-9*x/(5*x^2*(e - 4) - 2*e + 8) - 9/2*x/(e - 4)
```

3.642.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{270x^2-225x^4}{-32+160x^2-200x^4+e\,(8-40x^2+50x^4)}\,dx = -\frac{9\,x}{2\,(e-4)}-\frac{9\,x}{(5\,x^2-2)(e-4)}$$

input
```
integrate((-225*x^4+270*x^2)/((50*x^4-40*x^2+8)*exp(1)-200*x^4+160*x^2-32)
,x, algorithm=\
```

output
```
-9/2*x/(e - 4) - 9*x/((5*x^2 - 2)*(e - 4))
```

3.642.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{270x^2-225x^4}{-32+160x^2-200x^4+e\,(8-40x^2+50x^4)}\,dx = -\frac{45\,x^3}{2\,(5\,x^2-2)\,(\mathrm{e}-4)}$$

input
```
int((270*x^2 - 225*x^4)/(exp(1)*(50*x^4 - 40*x^2 + 8) + 160*x^2 - 200*x^4
- 32),x)
```

output
```
-(45*x^3)/(2*(5*x^2 - 2)*(exp(1) - 4))
```

3.643 $\int \frac{-5-x^2+(5+3x^2)\log(x)+e^7(1-2x)\log^2(x)}{e^7\log^2(x)}\,dx$

3.643.1 Optimal result

Integrand size = 38, antiderivative size = 22

$$\int \frac{-5-x^2+(5+3x^2)\log(x)+e^7(1-2x)\log^2(x)}{e^7\log^2(x)}\,dx = 5+x-x^2+\frac{x(5+x^2)}{e^7\log(x)}$$

output
```
5+x-x^2+(x^2+5)/ln(x)*x/exp(7)
```

3.643.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-5-x^2+(5+3x^2)\log(x)+e^7(1-2x)\log^2(x)}{e^7\log^2(x)}\,dx = \frac{x(5+x^2-e^7(-1+x)\log(x))}{e^7\log(x)}$$

input
```
Integrate[(-5 - x^2 + (5 + 3*x^2)*Log[x] + E^7*(1 - 2*x)*Log[x]^2)/(E^7*Lo
g[x]^2),x]
```

output
```
(x*(5 + x^2 - E^7*(-1 + x)*Log[x]))/(E^7*Log[x])
```

3.643.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2+\left(3x^2+5\right)\log(x)+e^7(1-2x)\log^2(x)-5}{e^7\log^2(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int -\frac{x^2-e^7(1-2x)\log^2(x)-\left(3x^2+5\right)\log(x)+5}{\log^2(x)}dx}{e^7}$$

$$\Big\downarrow \text{25}$$

$$-\frac{\int \frac{x^2-e^7(1-2x)\log^2(x)-\left(3x^2+5\right)\log(x)+5}{\log^2(x)}dx}{e^7}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{\int \left(e^7(2x-1)+\frac{-3x^2-5}{\log(x)}+\frac{x^2+5}{\log^2(x)}\right)dx}{e^7}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{-\frac{x^3}{\log(x)}+\frac{1}{4}e^7(1-2x)^2-\frac{5x}{\log(x)}}{e^7}$$

input
```
Int[(-5 - x^2 + (5 + 3*x^2)*Log[x] + E^7*(1 - 2*x)*Log[x]^2)/(E^7*Log[x]^2
),x]
```

output
```
-(((E^7*(1 - 2*x)^2)/4 - (5*x)/Log[x] - x^3/Log[x])/E^7)
```

3.643.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.643.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

method	result
risch	$-x(-1+x)+\frac{(x^2+5)x\,e^{-7}}{\ln(x)}$
parallelrisch	$\frac{e^{-7}(-e^7x^2\ln(x)+e^7x\ln(x)+x^3+5x)}{\ln(x)}$
default	$e^{-7}\left(-x^2e^7+x\,e^7+\frac{x^3}{\ln(x)}+\frac{5x}{\ln(x)}\right)$
norman	$\frac{x\ln(x)+e^{-7}x^3-x^2\ln(x)+5\,e^{-7}x}{\ln(x)}$
parts	$x+e^{-7}(-3\ \mathrm{Ei}_1(-3\ln(x))-5\ \mathrm{Ei}_1(-\ln(x)))-x^2-e^{-7}\Big(-\frac{x^3}{\ln(x)}-3\ \mathrm{Ei}_1(-3\ln(x))-\frac{5x}{\ln(x)}$

input
```
int(((1-2*x)*exp(7)*ln(x)^2+(3*x^2+5)*ln(x)-x^2-5)/exp(7)/ln(x)^2,x,method
=_RETURNVERBOSE)
```

output
```
-x*(-1+x)+(x^2+5)/ln(x)*x*exp(-7)
```

3.643.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-5-x^2+(5+3x^2)\log(x)+e^7(1-2x)\log^2(x)}{e^7\log^2(x)}\,dx = \frac{(x^3-(x^2-x)e^7\log(x)+5\,x)e^{(-7)}}{\log(x)}$$

input
```
integrate(((1-2*x)*exp(7)*log(x)^2+(3*x^2+5)*log(x)-x^2-5)/exp(7)/log(x)^2
,x, algorithm=\
```

output
```
(x^3 - (x^2 - x)*e^7*log(x) + 5*x)*e^(-7)/log(x)
```

3.643.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{-5-x^2+(5+3x^2)\log(x)+e^7(1-2x)\log^2(x)}{e^7\log^2(x)}\,dx = -x^2+x+\frac{x^3+5x}{e^7\log(x)}$$

input
```
integrate(((1-2*x)*exp(7)*ln(x)**2+(3*x**2+5)*ln(x)-x**2-5)/exp(7)/ln(x)**
2,x)
```

output
```
-x**2 + x + (x**3 + 5*x)*exp(-7)/log(x)
```

3.643.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.00

$$\int \frac{-5-x^2+(5+3x^2)\log(x)+e^7(1-2x)\log^2(x)}{e^7\log^2(x)}\,dx = -\left(x^2e^7-xe^7-3\,\mathrm{Ei}(3\,\log(x))-5\,\mathrm{Ei}(\log(x))+5\,\Gamma(-1,-\log(x))+3\,\Gamma(-1,-3\,\log(x))\right)e^{(-7)}$$

input
```
integrate(((1-2*x)*exp(7)*log(x)^2+(3*x^2+5)*log(x)-x^2-5)/exp(7)/log(x)^2
,x, algorithm=\
```

output
```
-(x^2*e^7 - x*e^7 - 3*Ei(3*log(x)) - 5*Ei(log(x)) + 5*gamma(-1, -log(x)) +
 3*gamma(-1, -3*log(x)))*e^(-7)
```

3.643.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.45

$$\int \frac{-5-x^2+(5+3x^2)\log(x)+e^7(1-2x)\log^2(x)}{e^7\log^2(x)}\,dx = -\left(x^2e^7 - xe^7 - \frac{x^3}{\log(x)} - \frac{5x}{\log(x)}\right)e^{(-7)}$$

input
```
integrate((((1-2*x)*exp(7)*log(x)^2+(3*x^2+5)*log(x)-x^2-5)/exp(7)/log(x)^2
,x, algorithm=\
```

output
```
-(x^2*e^7 - x*e^7 - x^3/log(x) - 5*x/log(x))*e^(-7)
```

3.643.9 Mupad [B] (verification not implemented)

Time = 13.39 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{-5-x^2+(5+3x^2)\log(x)+e^7(1-2x)\log^2(x)}{e^7\log^2(x)}\,dx = x\,\mathrm{e}^{-7}\left(\mathrm{e}^7 - x\,\mathrm{e}^7\right) + \frac{x\,\mathrm{e}^{-7}\left(x^2+5\right)}{\ln(x)}$$

input
```
int(-(exp(-7)*(x^2 - log(x)*(3*x^2 + 5) + exp(7)*log(x)^2*(2*x - 1) + 5))/
log(x)^2,x)
```

output
```
x*exp(-7)*(exp(7) - x*exp(7)) + (x*exp(-7)*(x^2 + 5))/log(x)
```

3.644 $\int \frac{8-8x+\left(-32x+432x^2-512x^3\right)\log(x)+(8-16x)\log(x)\log(\log(x))}{\log(x)}\,dx$

3.644.1 Optimal result

Integrand size = 38, antiderivative size = 22

$$\int \frac{8-8x+\left(-32x+432x^2-512x^3\right)\log(x)+(8-16x)\log(x)\log(\log(x))}{\log(x)}\,dx = 4x(-2+2x)\left(2x-16x^2-\log(\log(x))\right)$$

output
```
4*x*(2*x-16*x^2-ln(ln(x)))*(-2+2*x)
```

3.644.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int \frac{8-8x+\left(-32x+432x^2-512x^3\right)\log(x)+(8-16x)\log(x)\log(\log(x))}{\log(x)}\,dx = -16x^2+144x^3-128x^4+8x\log(\log(x))-8x^2\log(\log(x))$$

input
```
Integrate[(8 - 8*x + (-32*x + 432*x^2 - 512*x^3)*Log[x] + (8 - 16*x)*Log[x
]*Log[Log[x]])/Log[x],x]
```

output
```
-16*x^2 + 144*x^3 - 128*x^4 + 8*x*Log[Log[x]] - 8*x^2*Log[Log[x]]
```

3.644.3 Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-512x^3+432x^2-32x)\log(x)-8x+(8-16x)\log(x)\log(\log(x))+8}{\log(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{8(64x^3\log(x)-54x^2\log(x)+x+4x\log(x)-1)}{\log(x)}-8(2x-1)\log(\log(x))\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-128x^4+144x^3-16x^2-8x^2\log(\log(x))+8x\log(\log(x))$$

input
```
Int[(8 - 8*x + (-32*x + 432*x^2 - 512*x^3)*Log[x] + (8 - 16*x)*Log[x]*Log[
Log[x]])/Log[x],x]
```

output
```
-16*x^2 + 144*x^3 - 128*x^4 + 8*x*Log[Log[x]] - 8*x^2*Log[Log[x]]
```

3.644.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.644.4 Maple [A] (verified)

Time = 1.07 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

method	result	size
risch	$(-8x^2+8x)\ln(\ln(x))-128x^4+144x^3-16x^2$	30
default	$-8x^2\ln(\ln(x))+8x\ln(\ln(x))-16x^2+144x^3-128x^4$	31
parallelrisch	$-8x^2\ln(\ln(x))+8x\ln(\ln(x))-16x^2+144x^3-128x^4$	31
parts	$-8x^2\ln(\ln(x))+8x\ln(\ln(x))-16x^2+144x^3-128x^4$	31

input
```
int(((-16*x+8)*ln(x)*ln(ln(x))+(-512*x^3+432*x^2-32*x)*ln(x)-8*x+8)/ln(x),
x,method=_RETURNVERBOSE)
```

output
```
(-8*x^2+8*x)*ln(ln(x))-128*x^4+144*x^3-16*x^2
```

3.644.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

$$\int \frac{8-8x+(-32x+432x^2-512x^3)\log(x)+(8-16x)\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$=-128\,x^4+144\,x^3-16\,x^2-8\left(x^2-x\right)\log\left(\log\left(x\right)\right)$$

input
```
integrate(((-16*x+8)*log(x)*log(log(x))+(-512*x^3+432*x^2-32*x)*log(x)-8*x
+8)/log(x),x, algorithm=\
```

output
```
-128*x^4 + 144*x^3 - 16*x^2 - 8*(x^2 - x)*log(log(x))
```

3.644.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{8-8x+(-32x+432x^2-512x^3)\log(x)+(8-16x)\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$=-128x^4+144x^3-16x^2+\left(-8x^2+8x\right)\log\left(\log\left(x\right)\right)$$

input
```
integrate(((-16*x+8)*ln(x)*ln(ln(x))+(-512*x**3+432*x**2-32*x)*ln(x)-8*x+8
)/ln(x),x)
```

output
```
-128*x**4 + 144*x**3 - 16*x**2 + (-8*x**2 + 8*x)*log(log(x))
```

3.644.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int \frac{8-8x+(-32x+432x^2-512x^3)\log(x)+(8-16x)\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$= -128\,x^4+144\,x^3-8\,x^2\log(\log(x))-16\,x^2+8\,x\log(\log(x))$$

input
```
integrate(((-16*x+8)*log(x)*log(log(x))+(-512*x^3+432*x^2-32*x)*log(x)-8*x
+8)/log(x),x, algorithm=\
```

output
```
-128*x^4 + 144*x^3 - 8*x^2*log(log(x)) - 16*x^2 + 8*x*log(log(x))
```

3.644.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int \frac{8-8x+(-32x+432x^2-512x^3)\log(x)+(8-16x)\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$= -128\,x^4+144\,x^3-8\,x^2\log(\log(x))-16\,x^2+8\,x\log(\log(x))$$

input
```
integrate(((-16*x+8)*log(x)*log(log(x))+(-512*x^3+432*x^2-32*x)*log(x)-8*x
+8)/log(x),x, algorithm=\
```

output
```
-128*x^4 + 144*x^3 - 8*x^2*log(log(x)) - 16*x^2 + 8*x*log(log(x))
```

3.644.9 Mupad [B] (verification not implemented)

Time = 13.84 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{8-8x+(-32x+432x^2-512x^3)\log(x)+(8-16x)\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$= -8\,x\,(x-1)\,\left(\ln\left(\ln\left(x\right)\right)-2\,x+16\,x^2\right)$$

input
```
int(-(8*x + log(x)*(32*x - 432*x^2 + 512*x^3) + log(log(x))*log(x)*(16*x -
 8) - 8)/log(x),x)
```

output
```
-8*x*(x - 1)*(log(log(x)) - 2*x + 16*x^2)
```

3.645 $\int \frac{1+5^x x \log(5)}{x} \, dx$

3.645.1 Optimal result

Integrand size = 13, antiderivative size = 8

$$\int \frac{1+5^x x \log(5)}{x} \, dx = 5^x + \log(2x)$$

output
```
exp(x*ln(5))+ln(2*x)
```

3.645.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.75

$$\int \frac{1+5^x x \log(5)}{x} \, dx = 5^x + \log(x)$$

input
```
Integrate[(1 + 5^x*x*Log[5])/x,x]
```

output
```
5^x + Log[x]
```

3.645.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.75, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5^x x \log(5)+1}{x} \, dx$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(\frac{1}{x}+5^x \log(5)\right) \, dx$$

$$\Big\downarrow \text{ 2009}$$

$$5^x+\log(x)$$

input
```
Int[(1 + 5^x*x*Log[5])/x,x]
```

output
```
5^x + Log[x]
```

3.645.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.645.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

method	result	size
risch	$5^{x}+\ln \left(x \right)$	7
norman	$\mathrm{e}^{x \ln \left(5\right)}+\ln \left(x \right)$	9
parallelrisch	$\mathrm{e}^{x \ln \left(5\right)}+\ln \left(x \right)$	9
parts	$\mathrm{e}^{x \ln \left(5\right)}+\ln \left(x \right)$	9
derivativedivides	$\ln \left(x \ln \left(5\right)\right)+\mathrm{e}^{x \ln \left(5\right)}$	12
default	$\ln \left(x \ln \left(5\right)\right)+\mathrm{e}^{x \ln \left(5\right)}$	12

input
```
int((x*ln(5)*exp(x*ln(5))+1)/x,x,method=_RETURNVERBOSE)
```

output
```
5^x+ln(x)
```

3.645.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.75

$$\int \frac{1+5^x x \log(5)}{x} \, dx = 5^{x} + \log \left(x\right)$$

input
```
integrate((x*log(5)*exp(x*log(5))+1)/x,x, algorithm=\
```

output
```
5^x + log(x)
```

3.645.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 1.00

$$\int \frac{1+5^x x \log(5)}{x} \, dx = e^{x \log{\left(5 \right)}} + \log{\left(x \right)}$$

input
```
integrate((x*ln(5)*exp(x*ln(5))+1)/x,x)
```

output
```
exp(x*log(5)) + log(x)
```

3.645.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.75

$$\int \frac{1+5^x x \log(5)}{x} \, dx = 5^x + \log(x)$$

input
```
integrate((x*log(5)*exp(x*log(5))+1)/x,x, algorithm=\
```

output
```
5^x + log(x)
```

3.645.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

$$\int \frac{1+5^x x \log(5)}{x} \, dx = 5^x + \log(|x|)$$

input
```
integrate((x*log(5)*exp(x*log(5))+1)/x,x, algorithm=\
```

output
```
5^x + log(abs(x))
```

3.645.9 Mupad [B] (verification not implemented)

Time = 13.48 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.75

$$\int \frac{1+5^x x \log(5)}{x} \, dx = \ln(x) + 5^x$$

input
```
int((x*exp(x*log(5))*log(5) + 1)/x,x)
```

output
```
log(x) + 5^x
```

3.646 $\int \frac{-50-2e^{10}+e^5(20-60x)+300x}{81x^3}\,dx$

3.646.1 Optimal result

Integrand size = 26, antiderivative size = 27

$$\int \frac{-50-2e^{10}+e^5(20-60x)+300x}{81x^3}\,dx=\left(4+\frac{-x+\frac{1}{3}\left(\frac{1}{3}(-5+e^5)+x\right)}{x}\right)^2$$

output
```
((1/9*exp(5)-5/9-2/3*x)/x+4)^2
```

3.646.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-50-2e^{10}+e^5(20-60x)+300x}{81x^3}\,dx=\frac{(-5+e^5)(-5+e^5+60x)}{81x^2}$$

input
```
Integrate[(-50 - 2*E^10 + E^5*(20 - 60*x) + 300*x)/(81*x^3),x]
```

output
```
((-5 + E^5)*(-5 + E^5 + 60*x))/(81*x^2)
```

3.646.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {27, 27, 204, 48}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^5(20-60x)+300x-2e^{10}-50}{81x^3} \, dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{81}\int -\frac{2\left(-10e^5(1-3x)-150x+e^{10}+25\right)}{x^3}dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{2}{81}\int \frac{-10e^5(1-3x)-150x+e^{10}+25}{x^3}dx$$

$$\Big\downarrow \text{204}$$

$$-\frac{2}{81}\int \frac{\left(-5+e^5\right)^2-30\left(5-e^5\right)x}{x^3}dx$$

$$\Big\downarrow \text{48}$$

$$\frac{\left(\left(e^5-5\right)^2-30\left(5-e^5\right)x\right)^2}{81\left(5-e^5\right)^2x^2}$$

input
```
Int[(-50 - 2*E^10 + E^5*(20 - 60*x) + 300*x)/(81*x^3),x]
```

output
```
((-5 + E^5)^2 - 30*(5 - E^5)*x)^2/(81*(5 - E^5)^2*x^2)
```

3.646.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 48
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && EqQ[m + n + 2, 0] && NeQ[m, -1]
```

rule 204
```
Int[(u_)^(m_.)*(v_)^(n_.), x_Symbol] :> Int[ExpandToSum[u, x]^m*ExpandToSum
[v, x]^n, x] /; FreeQ[{m, n}, x] && LinearQ[{u, v}, x] && !LinearMatchQ[{u
, v}, x]
```

3.646.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

method	result	size
gosper	$\frac{\left(e^{5}-5\right)\left(e^{5}+60x-5\right)}{81x^{2}}$	17
risch	$\frac{\left(60\,e^{5}-300\right)x+e^{10}-10\,e^{5}+25}{81x^{2}}$	22
parallelrisch	$\frac{60x\,e^{5}+e^{10}-10\,e^{5}-300x+25}{81x^{2}}$	24
norman	$\frac{\left(\frac{20\,e^{5}}{27}-\frac{100}{27}\right)x+\frac{e^{10}}{81}-\frac{10\,e^{5}}{81}+\frac{25}{81}}{x^{2}}$	25
default	$\frac{\left(2\,e^{5}-10\right)\left(\frac{30}{x}-\frac{5-e^{5}}{2x^{2}}\right)}{81}$	26

input
```
int(1/81*(-2*exp(5)^2+(-60*x+20)*exp(5)+300*x-50)/x^3,x,method=_RETURNVERB
OSE)
```

output
```
1/81*(exp(5)-5)*(exp(5)+60*x-5)/x^2
```

3.646.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{-50-2e^{10}+e^{5}(20-60x)+300x}{81x^{3}}\,dx=\frac{10\,(6\,x-1)e^{5}-300\,x+e^{10}+25}{81\,x^{2}}$$

input
```
integrate(1/81*(-2*exp(5)^2+(-60*x+20)*exp(5)+300*x-50)/x^3,x, algorithm=\
```

output
```
1/81*(10*(6*x - 1)*e^5 - 300*x + e^10 + 25)/x^2
```

3.646.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{-50-2e^{10}+e^5(20-60x)+300x}{81x^3}\,dx=\frac{x(-300+60e^5)-10e^5+25+e^{10}}{81x^2}$$

input
```
integrate(1/81*(-2*exp(5)**2+(-60*x+20)*exp(5)+300*x-50)/x**3,x)
```

output
```
(x*(-300 + 60*exp(5)) - 10*exp(5) + 25 + exp(10))/(81*x**2)
```

3.646.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-50-2e^{10}+e^5(20-60x)+300x}{81x^3}\,dx=\frac{60\,x(e^5-5)+e^{10}-10\,e^5+25}{81\,x^2}$$

input
```
integrate(1/81*(-2*exp(5)^2+(-60*x+20)*exp(5)+300*x-50)/x^3,x, algorithm=\
```

output
```
1/81*(60*x*(e^5 - 5) + e^10 - 10*e^5 + 25)/x^2
```

3.646.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{-50-2e^{10}+e^5(20-60x)+300x}{81x^3}\,dx=\frac{60\,xe^5-300\,x+e^{10}-10\,e^5+25}{81\,x^2}$$

input
```
integrate(1/81*(-2*exp(5)^2+(-60*x+20)*exp(5)+300*x-50)/x^3,x, algorithm=\
```

output
```
1/81*(60*x*e^5 - 300*x + e^10 - 10*e^5 + 25)/x^2
```

3.646.9 Mupad [B] (verification not implemented)

Time = 13.47 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{-50-2e^{10}+e^5(20-60x)+300x}{81x^3}\,dx = \frac{\mathrm{e}^{10}-10\,\mathrm{e}^5+x\,(60\,\mathrm{e}^5-300)+25}{81\,x^2}$$

input
```
int(-((2*exp(10))/81 - (100*x)/27 + (exp(5)*(60*x - 20))/81 + 50/81)/x^3,x
)
```

output
```
(exp(10) - 10*exp(5) + x*(60*exp(5) - 300) + 25)/(81*x^2)
```

3.647 $\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}\left(e^5(-16-4x)-8x\right)+x^3}{x^3}\,dx$

3.647.1 Optimal result

Integrand size = 46, antiderivative size = 19

$$\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}\left(e^5(-16-4x)-8x\right)+x^3}{x^3}\,dx = e^{1+\frac{4(2+x)\left(e^5+x\right)}{x^2}}+x$$

output
```
exp(1+4*(2+x)/x^2*(exp(5)+x))+x
```

3.647.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}\left(e^5(-16-4x)-8x\right)+x^3}{x^3}\,dx = e^{5+\frac{8e^5}{x^2}+\frac{4\left(2+e^5\right)}{x}}+x$$

input
```
Integrate[(E^((8*x + 5*x^2 + E^5*(8 + 4*x))/x^2)*(E^5*(-16 - 4*x) - 8*x) +
 x^3)/x^3,x]
```

output
```
E^(5 + (8*E^5)/x^2 + (4*(2 + E^5))/x) + x
```

3.647.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3+e^{\frac{5x^2+8x+e^5(4x+8)}{x^2}}\left(e^5(-4x-16)-8x\right)}{x^3}\,dx$$
$$\Big\downarrow \text{2010}$$
$$\int \left(\frac{4e^{\frac{4e^5(x+2)}{x^2}+\frac{8}{x}+5}\left(-\left(\left(2+e^5\right)x\right)-4e^5\right)}{x^3}+1\right)dx$$
$$\Big\downarrow \text{2009}$$
$$e^{\frac{4e^5(x+2)}{x^2}+\frac{8}{x}+5}+x$$

input
```
Int[(E^((8*x + 5*x^2 + E^5*(8 + 4*x))/x^2)*(E^5*(-16 - 4*x) - 8*x) + x^3)/
x^3,x]
```

output
```
E^(5 + 8/x + (4*E^5*(2 + x))/x^2) + x
```

3.647.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.647.4 Maple [A] (verified)

Time = 0.46 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.32

method	result
parallelrisch	$\mathrm{e}^{\frac{(4x+8)\mathrm{e}^{5}+5x^{2}+8x}{x^{2}}}+x$
parts	$\mathrm{e}^{\frac{(4x+8)\mathrm{e}^{5}+5x^{2}+8x}{x^{2}}}+x$
risch	$\mathrm{e}^{\frac{4x\,\mathrm{e}^{5}+5x^{2}+8\,\mathrm{e}^{5}+8x}{x^{2}}}+x$
norman	$\frac{x^{3}+x^{2}\mathrm{e}^{\frac{(4x+8)\mathrm{e}^{5}+5x^{2}+8x}{x^{2}}}}{x^{2}}$
derivativedivides	$x-i\mathrm{e}^{5}\sqrt{\pi}\,\mathrm{e}^{-\frac{\left(8+4\,\mathrm{e}^{5}\right)^{2}\mathrm{e}^{-5}}{32}}\sqrt{2}\,\mathrm{e}^{-\frac{5}{2}}\operatorname{erf}\left(\frac{2i\sqrt{2}\,\mathrm{e}^{\frac{5}{2}}}{x}+\frac{i\left(8+4\,\mathrm{e}^{5}\right)\sqrt{2}\,\mathrm{e}^{-\frac{5}{2}}}{8}\right)-\frac{i\mathrm{e}^{10}\sqrt{\pi}\,\mathrm{e}^{-\frac{\left(8+4\,\mathrm{e}^{5}\right)^{2}\mathrm{e}^{-5}}{32}}\sqrt{2}\,\mathrm{e}^{-\ldots}}{\ldots}$
default	$x-i\mathrm{e}^{5}\sqrt{\pi}\,\mathrm{e}^{-\frac{\left(8+4\,\mathrm{e}^{5}\right)^{2}\mathrm{e}^{-5}}{32}}\sqrt{2}\,\mathrm{e}^{-\frac{5}{2}}\operatorname{erf}\left(\frac{2i\sqrt{2}\,\mathrm{e}^{\frac{5}{2}}}{x}+\frac{i\left(8+4\,\mathrm{e}^{5}\right)\sqrt{2}\,\mathrm{e}^{-\frac{5}{2}}}{8}\right)-\frac{i\mathrm{e}^{10}\sqrt{\pi}\,\mathrm{e}^{-\frac{\left(8+4\,\mathrm{e}^{5}\right)^{2}\mathrm{e}^{-5}}{32}}\sqrt{2}\,\mathrm{e}^{-\ldots}}{\ldots}$

input
```
int((((-16-4*x)*exp(5)-8*x)*exp(((4*x+8)*exp(5)+5*x^2+8*x)/x^2)+x^3)/x^3,x
,method=_RETURNVERBOSE)
```

output
```
exp(((4*x+8)*exp(5)+5*x^2+8*x)/x^2)+x
```

3.647.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

$$\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}\left(e^5(-16-4x)-8x\right)+x^3}{x^3}\,dx=x+e^{\left(\frac{5\,x^2+4\,(x+2)e^5+8\,x}{x^2}\right)}$$

input
```
integrate((((-16-4*x)*exp(5)-8*x)*exp(((4*x+8)*exp(5)+5*x^2+8*x)/x^2)+x^3)
/x^3,x, algorithm=\
```

output
```
x + e^((5*x^2 + 4*(x + 2)*e^5 + 8*x)/x^2)
```

3.647.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}(e^5(-16-4x)-8x)+x^3}{x^3}\,dx = x+e^{\frac{5x^2+8x+(4x+8)e^5}{x^2}}$$

input
```
integrate(((((-16-4*x)*exp(5)-8*x)*exp(((4*x+8)*exp(5)+5*x**2+8*x)/x**2)+x*
*3)/x**3,x)
```

output
```
x + exp((5*x**2 + 8*x + (4*x + 8)*exp(5))/x**2)
```

3.647.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}(e^5(-16-4x)-8x)+x^3}{x^3}\,dx = x+e^{\left(\frac{4\,e^5}{x}+\frac{8}{x}+\frac{8\,e^5}{x^2}+5\right)}$$

input
```
integrate(((((-16-4*x)*exp(5)-8*x)*exp(((4*x+8)*exp(5)+5*x^2+8*x)/x^2)+x^3)
/x^3,x, algorithm=\
```

output
```
x + e^(4*e^5/x + 8/x + 8*e^5/x^2 + 5)
```

3.647.8 Giac [F]

$$\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}(e^5(-16-4x)-8x)+x^3}{x^3}\,dx = \int \frac{x^3-4\,((x+4)e^5+2\,x)e^{\left(\frac{5\,x^2+4\,(x+2)e^5+8\,x}{x^2}\right)}}{x^3}\,dx$$

input
```
integrate(((((-16-4*x)*exp(5)-8*x)*exp(((4*x+8)*exp(5)+5*x^2+8*x)/x^2)+x^3)
/x^3,x, algorithm=\
```

output
```
integrate((x^3 - 4*((x + 4)*e^5 + 2*x)*e^((5*x^2 + 4*(x + 2)*e^5 + 8*x)/x^
2))/x^3, x)
```

3.647. $\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}(e^5(-16-4x)-8x)+x^3}{x^3}\,dx$

3.647.9 Mupad [B] (verification not implemented)

Time = 13.46 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \frac{e^{\frac{8x+5x^2+e^5(8+4x)}{x^2}}(e^5(-16-4x)-8x)+x^3}{x^3}\,dx = x+\mathrm{e}^{\frac{4\,\mathrm{e}^5}{x}}\,\mathrm{e}^{\frac{8\,\mathrm{e}^5}{x^2}}\,\mathrm{e}^5\,\mathrm{e}^{8/x}$$

input
```
int(-(exp((8*x + 5*x^2 + exp(5)*(4*x + 8))/x^2)*(8*x + exp(5)*(4*x + 16))
- x^3)/x^3,x)
```

output
```
x + exp((4*exp(5))/x)*exp((8*exp(5))/x^2)*exp(5)*exp(8/x)
```

3.648 $\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+\left(600+240x^2+24x^4\right)\log(x\right.$

3.648.1 Optimal result

Integrand size = 242, antiderivative size = 31

$$\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+\left(600+240x^2+24x^4\right)\log(x)+\left(-60-12x^2\right)\log^2(x)+2\log\right.}{}$$

$$=\left(2+e^{\frac{x}{\log(\log(4))}}+\frac{x^2}{2\left(5+x^2\right)-\log(x)}\right)^2$$

output
```
(x^2/(2*x^2+10-ln(x))+2+exp(x/ln(2*ln(2))))^2
```

3.648.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 68 vs. 2(31) = 62.

Time = 0.18 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.19

$$\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+\left(600+240x^2+24x^4\right)\log(x)+\left(-60-12x^2\right)\log^2(x)+2\log\right.}{}$$

$$=4e^{\frac{x}{\log(\log(4))}}+e^{\frac{2x}{\log(\log(4))}}+\frac{2\left(2+e^{\frac{x}{\log(\log(4))}}\right)x^2}{2\left(5+x^2\right)-\log(x)}+\frac{x^4}{\left(-2\left(5+x^2\right)+\log(x)\right)^2}$$

3.648.

$$\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+\left(600+240x^2+24x^4\right)\log(x)+\left(-60-12x^2\right)\log^2(x)+2\log^3(x)\right)+\left(-840x-210x^3+\left(164x+20x^3\right)\log(x\right.}{\left(-1000-600x^2-120x^4-\right.}$$

input
```
Integrate[(E^((2*x)/Log[Log[4]])*(-2000 - 1200*x^2 - 240*x^4 - 16*x^6 + (6
00 + 240*x^2 + 24*x^4)*Log[x] + (-60 - 12*x^2)*Log[x]^2 + 2*Log[x]^3) + (-
840*x - 210*x^3 + (164*x + 20*x^3)*Log[x] - 8*x*Log[x]^2)*Log[Log[4]] + E^
(x/Log[Log[4]])*(-4000 - 2600*x^2 - 560*x^4 - 40*x^6 + (1200 + 520*x^2 + 5
6*x^4)*Log[x] + (-120 - 26*x^2)*Log[x]^2 + 4*Log[x]^3 + (-420*x - 84*x^3 +
 (82*x + 8*x^3)*Log[x] - 4*x*Log[x]^2)*Log[Log[4]]))/((-1000 - 600*x^2 - 1
20*x^4 - 8*x^6 + (300 + 120*x^2 + 12*x^4)*Log[x] + (-30 - 6*x^2)*Log[x]^2
+ Log[x]^3)*Log[Log[4]]),x]
```

output
```
4*E^(x/Log[Log[4]]) + E^((2*x)/Log[Log[4]]) + (2*(2 + E^(x/Log[Log[4]]))*x
^2)/(2*(5 + x^2) - Log[x]) + x^4/(-2*(5 + x^2) + Log[x])^2
```

3.648.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(\log(4))\left(-210x^3+\left(20x^3+164x\right)\log(x)-840x-8x\log^2(x)\right)+e^{\frac{2x}{\log(\log(4))}}\left(-16x^6-240x^4-1200x^2+(-1\right.}{}$$

$\Big\downarrow$ 27

$$\int \frac{2\left(\log(\log(4))(105x^3+4\log^2(x)x+420x-2(5x^3+41x)\log(x))+e^{\frac{2x}{\log(\log(4))}}(8x^6+120x^4+600x^2-\log^3(x)+6(x^2+5)\log^2(x)-12(x^4+10x^2+25)\right.}{8x^6+120x^4+600x^2-\log}$$

$\Big\downarrow$ 27

$$2\int \frac{\log(\log(4))(105x^3+4\log^2(x)x+420x-2(5x^3+41x)\log(x))+e^{\frac{2x}{\log(\log(4))}}(8x^6+120x^4+600x^2-\log^3(x)+6(x^2+5)\log^2(x)-12(x^4+10x^2+25)\log}{8x^6+120x^4+600x^2-\log}$$

$\Big\downarrow$ 7239

$$2\int \frac{\frac{\left(5(x^2+4)+2e^{\frac{x}{\log(\log(4))}}(x^2+5)-\left(2+e^{\frac{x}{\log(\log(4))}}\right)\log(x)\right)\left(4e^{\frac{x}{\log(\log(4))}}(x^2+5)^2+e^{\frac{x}{\log(\log(4))}}\log^2(x)-2\log(x)\left(\log(\log(4))x+2e^{\frac{x}{\log(\log(4)}}\right.\right.}{(2(x^2+5)-\log(x))^3}}{\log(\log(4))}$$

$\Big\downarrow$ 7293

$$\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+(600+240x^2+24x^4)\log(x)+(-60-12x^2)\log^2(x)+2\log^3(x)\right)+\left(-840x-210x^3+(164x+20x^3)\log(x)\right.}{(-1000-600x^2-120x^4-}$$

$$2\int\left(\frac{4x\log(\log(4))\log^2(x)}{(2x^2-\log(x)+10)^3}-\frac{42x\log(\log(4))\log(x)}{(2x^2-\log(x)+10)^3}-\frac{10x(x^2+4)\log(\log(4))\log(x)}{(2x^2-\log(x)+10)^3}+e^{\frac{2x}{\log(\log(4))}}+\frac{e^{\frac{x}{\log(\log(4))}}(10x^4-9\log(x)x^2+90x^2-2\right.}{\log(\log(4))}$$

$$\Big\downarrow \text{2009}$$

$$2\left(2\log(\log(4))\int\frac{x}{(2x^2-\log(x)+10)^2}dx+4\log(\log(4))\int\frac{x}{2x^2-\log(x)+10}dx-4\log(\log(4))\int\frac{x^5}{(2x^2-\log(x)+10)^3}dx+\log(\log\right.$$

input
```
Int[(E^((2*x)/Log[Log[4]])*(-2000 - 1200*x^2 - 240*x^4 - 16*x^6 + (600 + 2
40*x^2 + 24*x^4)*Log[x] + (-60 - 12*x^2)*Log[x]^2 + 2*Log[x]^3) + (-840*x
- 210*x^3 + (164*x + 20*x^3)*Log[x] - 8*x*Log[x]^2)*Log[Log[4]] + E^(x/Log
[Log[4]])*(-4000 - 2600*x^2 - 560*x^4 - 40*x^6 + (1200 + 520*x^2 + 56*x^4)
*Log[x] + (-120 - 26*x^2)*Log[x]^2 + 4*Log[x]^3 + (-420*x - 84*x^3 + (82*x
 + 8*x^3)*Log[x] - 4*x*Log[x]^2)*Log[Log[4]]))/((-1000 - 600*x^2 - 120*x^4
 - 8*x^6 + (300 + 120*x^2 + 12*x^4)*Log[x] + (-30 - 6*x^2)*Log[x]^2 + Log[
x]^3)*Log[Log[4]]),x]
```

output
```
$Aborted
```

3.648.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

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$$\int\frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+(600+240x^2+24x^4)\log(x)+(-60-12x^2)\log^2(x)+2\log^3(x)\right)+\left(-840x-210x^3+(164x+20x^3)\log(x)\right.}{(-1000-600x^2-120x^4-}$$

3.648.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 263 vs. $2(31) = 62$.

Time = 10.02 (sec) , antiderivative size = 264, normalized size of antiderivative = 8.52

method	result
risch	$\frac{e^{\frac{2x}{\ln(2\ln(2))}}\ln(2)}{\ln(2)+\ln(\ln(2))}+\frac{e^{\frac{2x}{\ln(2\ln(2))}}\ln(\ln(2))}{\ln(2)+\ln(\ln(2))}+\frac{4\ln(2)e^{\frac{x}{\ln(2)+\ln(\ln(2))}}}{\ln(2)+\ln(\ln(2))}+\frac{4\ln(\ln(2))e^{\frac{x}{\ln(2)+\ln(\ln(2))}}}{\ln(2)+\ln(\ln(2))}+\frac{\left(4\ln(2)x^2e^{\frac{x}{\ln(2)+\ln(\ln(}}\right.}{}$
parallelrisch	$40x^2\ln(2\ln(2))+4\ln(2\ln(2))x^4e^{\frac{2x}{\ln(2\ln(2))}}+40\ln(2\ln(2))x^2e^{\frac{2x}{\ln(2\ln(2))}}+180\ln(2\ln(2))x^2e^{\frac{x}{\ln(2\ln(2))}}+\ln(2\ln(2))e^{\frac{2x}{\ln(2\ln(2))}}\ln$

input
```
int(((2*ln(x)^3+(-12*x^2-60)*ln(x)^2+(24*x^4+240*x^2+600)*ln(x)-16*x^6-240
*x^4-1200*x^2-2000)*exp(x/ln(2*ln(2)))^2+((-4*x*ln(x)^2+(8*x^3+82*x)*ln(x)
-84*x^3-420*x)*ln(2*ln(2))+4*ln(x)^3+(-26*x^2-120)*ln(x)^2+(56*x^4+520*x^2
+1200)*ln(x)-40*x^6-560*x^4-2600*x^2-4000)*exp(x/ln(2*ln(2)))+(-8*x*ln(x)^
2+(20*x^3+164*x)*ln(x)-210*x^3-840*x)*ln(2*ln(2)))/(ln(x)^3+(-6*x^2-30)*ln
(x)^2+(12*x^4+120*x^2+300)*ln(x)-8*x^6-120*x^4-600*x^2-1000)/ln(2*ln(2)),x
,method=_RETURNVERBOSE)
```

output
```
1/(ln(2)+ln(ln(2)))*exp(x/(ln(2)+ln(ln(2))))^2*ln(2)+1/(ln(2)+ln(ln(2)))*e
xp(x/(ln(2)+ln(ln(2))))^2*ln(ln(2))+4/(ln(2)+ln(ln(2)))*ln(2)*exp(x/(ln(2)
+ln(ln(2))))+4/(ln(2)+ln(ln(2)))*ln(ln(2))*exp(x/(ln(2)+ln(ln(2))))+1/(ln(
2)+ln(ln(2)))*(4*ln(2)*x^2*exp(x/(ln(2)+ln(ln(2))))+4*ln(ln(2))*x^2*exp(x/
(ln(2)+ln(ln(2))))+9*x^2*ln(2)-2*ln(2)*exp(x/(ln(2)+ln(ln(2))))*ln(x)+9*x^
2*ln(ln(2))-2*ln(ln(2))*exp(x/(ln(2)+ln(ln(2))))*ln(x)+20*ln(2)*exp(x/(ln(
2)+ln(ln(2))))-4*ln(2)*ln(x)+20*ln(ln(2))*exp(x/(ln(2)+ln(ln(2))))-4*ln(x)
*ln(ln(2))+40*ln(2)+40*ln(ln(2)))*x^2/(2*x^2+10-ln(x))^2
```

3.648.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 124 vs. $2(31) = 62$.

Time = 0.27 (sec) , antiderivative size = 124, normalized size of antiderivative = 4.00

$$\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+(600+240x^2+24x^4)\log(x)+(-60-12x^2)\log^2(x)+2\log\right.}{}$$

$$=\frac{9\,x^4-4\,x^2\log(x)+40\,x^2+\left(4\,x^4+40\,x^2-4\,(x^2+5)\log(x)+\log(x)^2+100\right)e^{\left(\frac{2\,x}{\log(2\,\log(2))}\right)}+2\,(10\,x^4+}{4\,x^4+40\,x^2-4\,(x^2+5)\log(x)+\log(x)^2+100}$$

input
```
integrate(((2*log(x)^3+(-12*x^2-60)*log(x)^2+(24*x^4+240*x^2+600)*log(x)-1
6*x^6-240*x^4-1200*x^2-2000)*exp(x/log(2*log(2)))^2+((-4*x*log(x)^2+(8*x^3
+82*x)*log(x)-84*x^3-420*x)*log(2*log(2))+4*log(x)^3+(-26*x^2-120)*log(x)^
2+(56*x^4+520*x^2+1200)*log(x)-40*x^6-560*x^4-2600*x^2-4000)*exp(x/log(2*l
og(2)))+(-8*x*log(x)^2+(20*x^3+164*x)*log(x)-210*x^3-840*x)*log(2*log(2)))
/(log(x)^3+(-6*x^2-30)*log(x)^2+(12*x^4+120*x^2+300)*log(x)-8*x^6-120*x^4-
600*x^2-1000)/log(2*log(2)),x, algorithm=\
```

output
```
(9*x^4 - 4*x^2*log(x) + 40*x^2 + (4*x^4 + 40*x^2 - 4*(x^2 + 5)*log(x) + lo
g(x)^2 + 100)*e^(2*x/log(2*log(2))) + 2*(10*x^4 + 90*x^2 - (9*x^2 + 40)*lo
g(x) + 2*log(x)^2 + 200)*e^(x/log(2*log(2))))/(4*x^4 + 40*x^2 - 4*(x^2 + 5
)*log(x) + log(x)^2 + 100)
```

3.648.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 100 vs. $2(26) = 52$.

Time = 0.39 (sec) , antiderivative size = 100, normalized size of antiderivative = 3.23

$$\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+\left(600+240x^2+24x^4\right)\log(x)+\left(-60-12x^2\right)\log^2(x)+2\log\right.}{}$$

$$= \frac{(2x^2-\log(x)+10)\,e^{\frac{2x}{\log(2\log(2))}}+(10x^2-4\log(x)+40)\,e^{\frac{x}{\log(2\log(2))}}}{2x^2-\log(x)+10} + \frac{9x^4-4x^2\log(x)+40x^2}{4x^4+40x^2+(-4x^2-20)\log(x)+\log(x)^2+100}$$

input
```
integrate(((2*ln(x)**3+(-12*x**2-60)*ln(x)**2+(24*x**4+240*x**2+600)*ln(x)
-16*x**6-240*x**4-1200*x**2-2000)*exp(x/ln(2*ln(2)))**2+((-4*x*ln(x)**2+(8
*x**3+82*x)*ln(x)-84*x**3-420*x)*ln(2*ln(2))+4*ln(x)**3+(-26*x**2-120)*ln(
x)**2+(56*x**4+520*x**2+1200)*ln(x)-40*x**6-560*x**4-2600*x**2-4000)*exp(x
/ln(2*ln(2)))+(-8*x*ln(x)**2+(20*x**3+164*x)*ln(x)-210*x**3-840*x)*ln(2*ln
(2)))/(ln(x)**3+(-6*x**2-30)*ln(x)**2+(12*x**4+120*x**2+300)*ln(x)-8*x**6-
120*x**4-600*x**2-1000)/ln(2*ln(2)),x)
```

output
```
((2*x**2 - log(x) + 10)*exp(2*x/log(2*log(2))) + (10*x**2 - 4*log(x) + 40)
*exp(x/log(2*log(2))))/(2*x**2 - log(x) + 10) + (9*x**4 - 4*x**2*log(x) +
40*x**2)/(4*x**4 + 40*x**2 + (-4*x**2 - 20)*log(x) + log(x)**2 + 100)
```

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$$\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+\left(600+240x^2+24x^4\right)\log(x)+\left(-60-12x^2\right)\log^2(x)+2\log^3(x)\right)+\left(-840x-210x^3+\left(164x+20x^3\right)\log(x)\right.}{\left(-1000-600x^2-120x^4-\right.}$$

3.648.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 233 vs. $2(31) = 62$.

Time = 0.37 (sec) , antiderivative size = 233, normalized size of antiderivative = 7.52

$$\int \frac{e^{\frac{2x}{\log(\log(4))}} \left(-2000 - 1200x^2 - 240x^4 - 16x^6 + (600 + 240x^2 + 24x^4)\log(x) + (-60 - 12x^2)\log^2(x) + 2\log\right.}{}$$

$$= \frac{9\,x^4(\log(2) + \log(\log(2))) - 4\,x^2(\log(2) + \log(\log(2)))\log(x) + 40\,x^2(\log(2) + \log(\log(2))) + \left(4\,x^4(\log\right.}{}$$

input
```
integrate(((2*log(x)^3+(-12*x^2-60)*log(x)^2+(24*x^4+240*x^2+600)*log(x)-1
6*x^6-240*x^4-1200*x^2-2000)*exp(x/log(2*log(2)))^2+((-4*x*log(x)^2+(8*x^3
+82*x)*log(x)-84*x^3-420*x)*log(2*log(2))+4*log(x)^3+(-26*x^2-120)*log(x)^
2+(56*x^4+520*x^2+1200)*log(x)-40*x^6-560*x^4-2600*x^2-4000)*exp(x/log(2*l
og(2)))+(-8*x*log(x)^2+(20*x^3+164*x)*log(x)-210*x^3-840*x)*log(2*log(2)))
/(log(x)^3+(-6*x^2-30)*log(x)^2+(12*x^4+120*x^2+300)*log(x)-8*x^6-120*x^4-
600*x^2-1000)/log(2*log(2)),x, algorithm=\
```

output
```
(9*x^4*(log(2) + log(log(2))) - 4*x^2*(log(2) + log(log(2)))*log(x) + 40*x
^2*(log(2) + log(log(2))) + (4*x^4*(log(2) + log(log(2))) + 40*x^2*(log(2)
 + log(log(2))) + (log(2) + log(log(2)))*log(x)^2 - 4*(x^2*(log(2) + log(l
og(2))) + 5*log(2) + 5*log(log(2)))*log(x) + 100*log(2) + 100*log(log(2)))
*e^(2*x/(log(2) + log(log(2)))) + 2*(10*x^4*(log(2) + log(log(2))) + 90*x^
2*(log(2) + log(log(2))) + 2*(log(2) + log(log(2)))*log(x)^2 - (9*x^2*(log
(2) + log(log(2))) + 40*log(2) + 40*log(log(2)))*log(x) + 200*log(2) + 200
*log(log(2)))*e^(x/(log(2) + log(log(2)))))/((4*x^4 + 40*x^2 - 4*(x^2 + 5)
*log(x) + log(x)^2 + 100)*log(2*log(2)))
```

3.648.8 Giac [F]

$$\int \frac{e^{\frac{2x}{\log(\log(4))}} \left(-2000 - 1200x^2 - 240x^4 - 16x^6 + (600 + 240x^2 + 24x^4)\log(x) + (-60 - 12x^2)\log^2(x) + 2\log\right.}{}$$

$$= \int \frac{2\left(\left(8\,x^6 + 120\,x^4 + 6\,(x^2+5)\log(x)^2 - \log(x)^3 + 600\,x^2 - 12\,(x^4 + 10\,x^2 + 25)\log(x) + 1000\right)e^{\left(\frac{}{\log(2}\right.}\right.}{}$$

input
```
integrate(((2*log(x)^3+(-12*x^2-60)*log(x)^2+(24*x^4+240*x^2+600)*log(x)-1
6*x^6-240*x^4-1200*x^2-2000)*exp(x/log(2*log(2)))^2+((-4*x*log(x)^2+(8*x^3
+82*x)*log(x)-84*x^3-420*x)*log(2*log(2))+4*log(x)^3+(-26*x^2-120)*log(x)^
2+(56*x^4+520*x^2+1200)*log(x)-40*x^6-560*x^4-2600*x^2-4000)*exp(x/log(2*l
og(2)))+(-8*x*log(x)^2+(20*x^3+164*x)*log(x)-210*x^3-840*x)*log(2*log(2)))
/(log(x)^3+(-6*x^2-30)*log(x)^2+(12*x^4+120*x^2+300)*log(x)-8*x^6-120*x^4-
600*x^2-1000)/log(2*log(2)),x, algorithm=\
```

output
```
undef
```

3.648.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+\left(600+240x^2+24x^4\right)\log(x)+\left(-60-12x^2\right)\log^2(x)+2\log\right.}{}$$

$$=\int \frac{e^{\frac{2\,x}{\ln(2\,\ln(2))}}\,\left(\ln\left(x\right)^2\,\left(12\,x^2+60\right)-\ln\left(x\right)\,\left(24\,x^4+240\,x^2+600\right)-2\ln\left(x\right)^3+1200\,x^2+240\,x^4+16\,x^6+\right.}{}$$

input
```
int((exp((2*x)/log(2*log(2)))*(log(x)^2*(12*x^2 + 60) - log(x)*(240*x^2 +
24*x^4 + 600) - 2*log(x)^3 + 1200*x^2 + 240*x^4 + 16*x^6 + 2000) + log(2*l
og(2))*(840*x + 8*x*log(x)^2 - log(x)*(164*x + 20*x^3) + 210*x^3) + exp(x/
log(2*log(2)))*(log(x)^2*(26*x^2 + 120) - log(x)*(520*x^2 + 56*x^4 + 1200)
 - 4*log(x)^3 + log(2*log(2))*(420*x + 4*x*log(x)^2 - log(x)*(82*x + 8*x^3
) + 84*x^3) + 2600*x^2 + 560*x^4 + 40*x^6 + 4000))/(log(2*log(2))*(log(x)^
2*(6*x^2 + 30) - log(x)*(120*x^2 + 12*x^4 + 300) - log(x)^3 + 600*x^2 + 12
0*x^4 + 8*x^6 + 1000)),x)
```

output
```
int((exp((2*x)/log(2*log(2)))*(log(x)^2*(12*x^2 + 60) - log(x)*(240*x^2 +
24*x^4 + 600) - 2*log(x)^3 + 1200*x^2 + 240*x^4 + 16*x^6 + 2000) + log(2*l
og(2))*(840*x + 8*x*log(x)^2 - log(x)*(164*x + 20*x^3) + 210*x^3) + exp(x/
log(2*log(2)))*(log(x)^2*(26*x^2 + 120) - log(x)*(520*x^2 + 56*x^4 + 1200)
 - 4*log(x)^3 + log(2*log(2))*(420*x + 4*x*log(x)^2 - log(x)*(82*x + 8*x^3
) + 84*x^3) + 2600*x^2 + 560*x^4 + 40*x^6 + 4000))/(log(2*log(2))*(log(x)^
2*(6*x^2 + 30) - log(x)*(120*x^2 + 12*x^4 + 300) - log(x)^3 + 600*x^2 + 12
0*x^4 + 8*x^6 + 1000)), x)
```


$$\int \frac{e^{\frac{2x}{\log(\log(4))}}\left(-2000-1200x^2-240x^4-16x^6+\left(600+240x^2+24x^4\right)\log(x)+\left(-60-12x^2\right)\log^2(x)+2\log^3(x)\right)+\left(-840x-210x^3+\left(164x+20x^3\right)\log(x)\right.}{\left(-1000-600x^2-120x^4-\right.}$$

3.649 $\int \frac{e^{\frac{x^2+\left(2+x^2\right)\log^2\left(x^2\right)+x\log\left(e^{4/5}x\right)\log^2\left(x^2\right)}{x}}\left(x^2+(8+4x^2)\log(x^2)+4x\right.}{x^2}$

3.649.1 Optimal result

Integrand size = 86, antiderivative size = 26

$$\int \frac{e^{\frac{x^2+\left(2+x^2\right)\log^2\left(x^2\right)+x\log\left(e^{4/5}x\right)\log^2\left(x^2\right)}{x}}\left(x^2+(8+4x^2)\log(x^2)+4x\log\left(e^{4/5}x\right)\log(x^2)+(-2+x+x^2)\log^2(x\right.}{x^2}$$

output
```
exp(x+ln(x^2)^2*(2/x+x+ln(x*exp(4/5))))
```

3.649.2 Mathematica [A] (verified)

Time = 5.12 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

$$\int \frac{e^{\frac{x^2+\left(2+x^2\right)\log^2\left(x^2\right)+x\log\left(e^{4/5}x\right)\log^2\left(x^2\right)}{x}}\left(x^2+(8+4x^2)\log(x^2)+4x\log\left(e^{4/5}x\right)\log(x^2)+(-2+x+x^2)\log^2(x\right.}{x^2}$$

input
```
Integrate[(E^((x^2 + (2 + x^2)*Log[x^2]^2 + x*Log[E^(4/5)*x]*Log[x^2]^2)/x
)*(x^2 + (8 + 4*x^2)*Log[x^2] + 4*x*Log[E^(4/5)*x]*Log[x^2] + (-2 + x + x^
2)*Log[x^2]^2))/x^2,x]
```

output
```
E^(x + (4/5 + 2/x + x)*Log[x^2]^2)*x^Log[x^2]^2
```

3.649.

$$\int \frac{e^{\frac{x^2+\left(2+x^2\right)\log^2\left(x^2\right)+x\log\left(e^{4/5}x\right)\log^2\left(x^2\right)}{x}}\left(x^2+(8+4x^2)\log(x^2)+4x\log\left(e^{4/5}x\right)\log(x^2)+(-2+x+x^2)\log^2(x^2)\right)}{x^2}\,dx$$

3.649.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(x^2+\left(x^2+x-2\right)\log^2\left(x^2\right)+4x\log\left(e^{4/5}x\right)\log\left(x^2\right)+\left(4x^2+8\right)\log\left(x^2\right)\right)\exp\left(\frac{x^2+x\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+\left(x^2+2\right)\log}{x}\right.}{x^2}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{\left(x^2+\left(x^2+x-2\right)\log^2\left(x^2\right)+4x\log\left(e^{4/5}x\right)\log\left(x^2\right)+\left(4x^2+8\right)\log\left(x^2\right)\right)\exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log\right.}{x^2}$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{(x-1)(x+2)\log^2\left(x^2\right)\exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+x\right)}{x^2}+\frac{4\left(5x^2+4x+5x\log(x)+10\right)\log}{}\right.$$

$$\Big\downarrow \ 2009$$

$$\int \exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+x\right)dx+4\int \exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+x\right)\log\left(x^2\right)dx+8\int \frac{\exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+x\right)\log\left(x^2\right)}{x^2}dx+\frac{16}{5}\int \frac{\exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+x\right)\log\left(x^2\right)}{x}dx+4\int \frac{\exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+x\right)\log(x)\log\left(x^2\right)}{x}dx+\int \exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+x\right)\log^2\left(x^2\right)dx-2\int \frac{\exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+x\right)\log^2\left(x^2\right)}{x^2}dx+\int \frac{\exp\left(\frac{\left(x^2+2\right)\log^2\left(x^2\right)}{x}+\log\left(e^{4/5}x\right)\log^2\left(x^2\right)+x\right)\log^2\left(x^2\right)}{x}dx$$

$$\int \frac{e^{\frac{x^2+\left(2+x^2\right)\log^2\left(x^2\right)+x\log\left(e^{4/5}x\right)\log^2\left(x^2\right)}{x}}\left(x^2+\left(8+4x^2\right)\log\left(x^2\right)+4x\log\left(e^{4/5}x\right)\log\left(x^2\right)+\left(-2+x+x^2\right)\log^2\left(x^2\right)\right)}{x^2}dx$$

input
```
Int[(E^((x^2 + (2 + x^2)*Log[x^2]^2 + x*Log[E^(4/5)*x]*Log[x^2]^2)/x)*(x^2
 + (8 + 4*x^2)*Log[x^2] + 4*x*Log[E^(4/5)*x]*Log[x^2] + (-2 + x + x^2)*Log
[x^2]^2))/x^2,x]
```

output
```
$Aborted
```

3.649.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.649.4 Maple [A] (verified)

Time = 1.48 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.35

method	result
parallelrisch	$\mathrm{e}^{\frac{x \ln\left(x^{2}\right)^{2} \ln\left(x\,\mathrm{e}^{\frac{4}{5}}\right)+\left(x^{2}+2\right) \ln\left(x^{2}\right)^{2}+x^{2}}{x}}$
risch	$x^{\frac{8 i \pi\, \mathrm{csgn}(i x)}{x}} x^{-\frac{8 i \pi\, \mathrm{csgn}\left(i x^{2}\right)}{x}} x^{4 i x \pi\, \mathrm{csgn}(i x)} x^{-4 i x \pi\, \mathrm{csgn}\left(i x^{2}\right)} x^{-\frac{16 i \pi\, \mathrm{csgn}\left(i x^{2}\right)}{5}} x^{\frac{16 i \pi\, \mathrm{csgn}(i x)}{5}} x^{-\frac{\pi^{2}}{2}} x^{2 \pi^{2} \mathrm{csgn}(i x)\, \mathrm{csgn}}$

input
```
int((4*x*ln(x^2)*ln(x*exp(4/5))+(x^2+x-2)*ln(x^2)^2+(4*x^2+8)*ln(x^2)+x^2)
*exp((x*ln(x^2)^2*ln(x*exp(4/5))+(x^2+2)*ln(x^2)^2+x^2)/x)/x^2,x,method=_R
ETURNVERBOSE)
```

output
```
exp((x*ln(x^2)^2*ln(x*exp(4/5))+(x^2+2)*ln(x^2)^2+x^2)/x)
```

3.649.

$$\int \frac{e^{\frac{x^2+\left(2+x^2\right)\log^2\left(x^2\right)+x\log\left(e^{4/5}x\right)\log^2\left(x^2\right)}{x}}\left(x^2+\left(8+4x^2\right)\log\left(x^2\right)+4x\log\left(e^{4/5}x\right)\log\left(x^2\right)+\left(-2+x+x^2\right)\log^2\left(x^2\right)\right)}{x^2}\,dx$$

3.649.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.50

$$\int \frac{e^{\frac{x^2+(2+x^2)\log^2(x^2)+x\log(e^{4/5}x)\log^2(x^2)}{x}}\left(x^2+(8+4x^2)\log(x^2)+4x\log(e^{4/5}x)\log(x^2)+(-2+x+x^2)\log^2(x^2)\right)}{x^2}$$

input
```
integrate((4*x*log(x^2)*log(x*exp(4/5))+(x^2+x-2)*log(x^2)^2+(4*x^2+8)*log
(x^2)+x^2)*exp((x*log(x^2)^2*log(x*exp(4/5))+(x^2+2)*log(x^2)^2+x^2)/x)/x^
2,x, algorithm=\
```

output
```
e^(1/10*(5*x*log(x^2)^3 + 2*(5*x^2 + 4*x + 10)*log(x^2)^2 + 10*x^2)/x)
```

3.649.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{e^{\frac{x^2+(2+x^2)\log^2(x^2)+x\log(e^{4/5}x)\log^2(x^2)}{x}}\left(x^2+(8+4x^2)\log(x^2)+4x\log(e^{4/5}x)\log(x^2)+(-2+x+x^2)\log^2(x^2)\right)}{x^2}$$

input
```
integrate((4*x*ln(x**2)*ln(x*exp(4/5))+(x**2+x-2)*ln(x**2)**2+(4*x**2+8)*l
n(x**2)+x**2)*exp((x*ln(x**2)**2*ln(x*exp(4/5))+(x**2+2)*ln(x**2)**2+x**2)
/x)/x**2,x)
```

output
```
exp((x**2 + x*(log(x**2)/2 + 4/5)*log(x**2)**2 + (x**2 + 2)*log(x**2)**2)/
x)
```

3.649.7 Maxima [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{e^{\frac{x^2+(2+x^2)\log^2(x^2)+x\log(e^{4/5}x)\log^2(x^2)}{x}}\left(x^2+(8+4x^2)\log(x^2)+4x\log(e^{4/5}x)\log(x^2)+(-2+x+x^2)\log^2(x^2)\right)}{x^2}$$

input
```
integrate((4*x*log(x^2)*log(x*exp(4/5))+(x^2+x-2)*log(x^2)^2+(4*x^2+8)*log
(x^2)+x^2)*exp((x*log(x^2)^2*log(x*exp(4/5))+(x^2+2)*log(x^2)^2+x^2)/x)/x^
2,x, algorithm=\
```

3.649. $\int \frac{e^{\frac{x^2+(2+x^2)\log^2(x^2)+x\log(e^{4/5}x)\log^2(x^2)}{x}}\left(x^2+(8+4x^2)\log(x^2)+4x\log(e^{4/5}x)\log(x^2)+(-2+x+x^2)\log^2(x^2)\right)}{x^2}\,dx$

output
```
e^(4*x*log(x)^2 + 4*log(x)^3 + 16/5*log(x)^2 + x + 8*log(x)^2/x)
```

3.649.8 Giac [F]

$$\int \frac{e^{\frac{x^2+(2+x^2)\log^2(x^2)+x\log(e^{4/5}x)\log^2(x^2)}{x}}(x^2+(8+4x^2)\log(x^2)+4x\log(e^{4/5}x)\log(x^2)+(-2+x+x^2)\log^2(x$$

input
```
integrate((4*x*log(x^2)*log(x*exp(4/5))+(x^2+x-2)*log(x^2)^2+(4*x^2+8)*log
(x^2)+x^2)*exp((x*log(x^2)^2*log(x*exp(4/5))+(x^2+2)*log(x^2)^2+x^2)/x)/x^
2,x, algorithm=\
```

output
```
integrate(((x^2 + x - 2)*log(x^2)^2 + 4*x*log(x^2)*log(x*e^(4/5)) + x^2 +
4*(x^2 + 2)*log(x^2))*e^((x*log(x^2)^2*log(x*e^(4/5)) + (x^2 + 2)*log(x^2)
^2 + x^2)/x)/x^2, x)
```

3.649.9 Mupad [B] (verification not implemented)

Time = 13.76 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.58

$$\int \frac{e^{\frac{x^2+(2+x^2)\log^2(x^2)+x\log(e^{4/5}x)\log^2(x^2)}{x}}(x^2+(8+4x^2)\log(x^2)+4x\log(e^{4/5}x)\log(x^2)+(-2+x+x^2)\log^2(x$$

input
```
int((exp((log(x^2)^2*(x^2 + 2) + x^2 + x*log(x^2)^2*log(x*exp(4/5)))/x)*(l
og(x^2)*(4*x^2 + 8) + log(x^2)^2*(x + x^2 - 2) + x^2 + 4*x*log(x^2)*log(x*
exp(4/5))))/x^2,x)
```

output
```
x^(log(x^2)^2)*exp((2*log(x^2)^2)/x)*exp((4*log(x^2)^2)/5)*exp(x)*exp(x*lo
g(x^2)^2)
```

3.649. $\int \frac{e^{\frac{x^2+(2+x^2)\log^2(x^2)+x\log(e^{4/5}x)\log^2(x^2)}{x}}(x^2+(8+4x^2)\log(x^2)+4x\log(e^{4/5}x)\log(x^2)+(-2+x+x^2)\log^2(x^2))}{x^2}\,dx$

3.650 $\int \frac{e^{-e^x}\left(e^{e^x}(-4x+10x^3)+(2-5x^2)\log^2(2-5x^2)+\log(x)(-20x^2\log(2-$

$-2x+5x^3$

3.650.1 Optimal result

Integrand size = 93, antiderivative size = 26

$$\int \frac{e^{-e^x}\left(e^{e^x}(-4x+10x^3)+(2-5x^2)\log^2(2-5x^2)+\log(x)\left(-20x^2\log(2-5x^2)+e^x(-2x+5x^3)\log^2(2\right.\right.}{-2x+5x^3}$$
$$=-4+2x-e^{-e^x}\log(x)\log^2\left(2-5x^2\right)$$

output
```
2*x-ln(x)*ln(-5*x^2+2)^2/exp(exp(x))-4
```

3.650.2 Mathematica [A] (verified)

Time = 0.70 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{e^{-e^x}\left(e^{e^x}(-4x+10x^3)+(2-5x^2)\log^2(2-5x^2)+\log(x)\left(-20x^2\log(2-5x^2)+e^x(-2x+5x^3)\log^2(2\right.\right.}{-2x+5x^3}$$
$$=2x-e^{-e^x}\log(x)\log^2\left(2-5x^2\right)$$

input
```
Integrate[(E^E^x*(-4*x + 10*x^3) + (2 - 5*x^2)*Log[2 - 5*x^2]^2 + Log[x]*(
-20*x^2*Log[2 - 5*x^2] + E^x*(-2*x + 5*x^3)*Log[2 - 5*x^2]^2))/(E^E^x*(-2*
x + 5*x^3)),x]
```

output
```
2*x - (Log[x]*Log[2 - 5*x^2]^2)/E^E^x
```

3.650.

$$\int \frac{e^{-e^x}\left(e^{e^x}(-4x+10x^3)+(2-5x^2)\log^2(2-5x^2)+\log(x)(-20x^2\log(2-5x^2)+e^x(-2x+5x^3)\log^2(2-5x^2))\right)}{-2x+5x^3}\,dx$$

3.650.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-e^x}\left(e^{e^x}\left(10x^3-4x\right)+\left(2-5x^2\right)\log^2\left(2-5x^2\right)+\log(x)\left(e^x\left(5x^3-2x\right)\log^2\left(2-5x^2\right)-20x^2\log\left(2-5x^2\right)\right)\right)}{5x^3-2x}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{-e^x}\left(e^{e^x}\left(10x^3-4x\right)+\left(2-5x^2\right)\log^2\left(2-5x^2\right)+\log(x)\left(e^x\left(5x^3-2x\right)\log^2\left(2-5x^2\right)-20x^2\log\left(2-5x^2\right)\right)\right)}{x\left(5x^2-2\right)}d$$

$$\Big\downarrow \text{7276}$$

$$\int \left(e^{x-e^x}\log(x)\log^2\left(2-5x^2\right)+\frac{e^{-e^x}\left(10e^{e^x}x^3-5x^2\log^2\left(2-5x^2\right)+2\log^2\left(2-5x^2\right)-20x^2\log(x)\log\left(2-5x^2\right.\right.}{x\left(5x^2-2\right)}\right.$$

$$\Big\downarrow \text{2009}$$

$$2x+2\sqrt{5}\log(x)\log\left(2-5x^2\right)\int \frac{e^{-e^x}}{\sqrt{2}-\sqrt{5}x}dx-2\sqrt{5}\log(x)\log\left(2-5x^2\right)\int \frac{e^{-e^x}}{\sqrt{5}x+\sqrt{2}}dx-\int \frac{e^{-e^x}\log^2\left(2-5x^2\right)}{x}dx+\int e^{x-e^x}\log(x)\log^2\left(2-5x^2\right)dx-2\sqrt{5}\log\left(2-5x^2\right)\int \frac{\int \frac{e^{-e^x}}{\sqrt{2}-\sqrt{5}x}dx}{x}dx+10\log(x)\int \frac{\int \frac{e^{-e^x}}{\sqrt{2}-\sqrt{5}x}dx}{\sqrt{2}-\sqrt{5}x}dx-10\log(x)\int \frac{\int \frac{e^{-e^x}}{\sqrt{2}-\sqrt{5}x}dx}{\sqrt{5}x+\sqrt{2}}dx+2\sqrt{5}\log\left(2-5x^2\right)\int \frac{\int \frac{e^{-e^x}}{\sqrt{5}x+\sqrt{2}}dx}{x}dx-10\log(x)\int \frac{\int \frac{e^{-e^x}}{\sqrt{5}x+\sqrt{2}}dx}{\sqrt{2}-\sqrt{5}x}dx+10\log(x)\int \frac{\int \frac{e^{-e^x}}{\sqrt{5}x+\sqrt{2}}dx}{\sqrt{5}x+\sqrt{2}}dx-10\int \frac{\int \frac{\int \frac{e^{-e^x}}{\sqrt{2}-\sqrt{5}x}dx}{x}dx}{\sqrt{2}-\sqrt{5}x}dx+10\int \frac{\int \frac{\int \frac{e^{-e^x}}{\sqrt{2}-\sqrt{5}x}dx}{x}dx}{\sqrt{5}x+\sqrt{2}}dx-10\int \frac{\int \frac{\int \frac{e^{-e^x}}{\sqrt{2}-\sqrt{5}x}dx}{\sqrt{2}-\sqrt{5}x}dx}{x}dx+10\int \frac{\int \frac{\int \frac{e^{-e^x}}{\sqrt{2}-\sqrt{5}x}dx}{\sqrt{5}x+\sqrt{2}}dx}{x}dx+10\int \frac{\int \frac{\int \frac{e^{-e^x}}{\sqrt{5}x+\sqrt{2}}dx}{x}dx}{\sqrt{2}-\sqrt{5}x}dx-10\int \frac{\int \frac{\int \frac{e^{-e^x}}{\sqrt{5}x+\sqrt{2}}dx}{x}dx}{\sqrt{5}x+\sqrt{2}}dx+10\int \frac{\int \frac{\int \frac{e^{-e^x}}{\sqrt{5}x+\sqrt{2}}dx}{\sqrt{2}-\sqrt{5}x}dx}{x}dx-10\int \frac{\int \frac{\int \frac{e^{-e^x}}{\sqrt{5}x+\sqrt{2}}dx}{\sqrt{5}x+\sqrt{2}}dx}{x}dx$$

input
```
Int[(E^E^x*(-4*x + 10*x^3) + (2 - 5*x^2)*Log[2 - 5*x^2]^2 + Log[x]*(-20*x^
2*Log[2 - 5*x^2] + E^x*(-2*x + 5*x^3)*Log[2 - 5*x^2]^2))/(E^E^x*(-2*x + 5*
x^3)),x]
```

3.650.
$\int \frac{e^{-e^x}\left(e^{e^x}\left(-4x+10x^3\right)+\left(2-5x^2\right)\log^2\left(2-5x^2\right)+\log(x)\left(-20x^2\log\left(2-5x^2\right)+e^x\left(-2x+5x^3\right)\log^2\left(2-5x^2\right)\right)\right)}{-2x+5x^3}dx$

output
```
$Aborted
```

3.650.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.650.4 Maple [A] (verified)

Time = 17.17 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

method	result	size
risch	$2x-\ln\left(x\right)\ln\left(-5x^{2}+2\right)^{2} {\mathrm e}^{-{\mathrm e}^{x}}$	24
parallelrisch	$\frac{\left(-100\ln\left(-5x^{2}+2\right)^{2}\ln\left(x\right)+200x\,{\mathrm e}^{{\mathrm e}^{x}}\right){\mathrm e}^{-{\mathrm e}^{x}}}{100}$	29

input
```
int(((10*x^3-4*x)*exp(exp(x))+((5*x^3-2*x)*exp(x)*ln(-5*x^2+2)^2-20*x^2*ln
(-5*x^2+2))*ln(x)+(-5*x^2+2)*ln(-5*x^2+2)^2)/(5*x^3-2*x)/exp(exp(x)),x,met
hod=_RETURNVERBOSE)
```

output
```
2*x-ln(x)*ln(-5*x^2+2)^2*exp(-exp(x))
```

3.650.
$$\int \frac{e^{-e^x}\left(e^{e^x}\left(-4x+10x^3\right)+\left(2-5x^2\right)\log^2\left(2-5x^2\right)+\log(x)\left(-20x^2\log\left(2-5x^2\right)+e^x\left(-2x+5x^3\right)\log^2\left(2-5x^2\right)\right)\right)}{-2x+5x^3}\,dx$$

3.650.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{e^{-e^x}\left(e^{e^x}(-4x+10x^3)+(2-5x^2)\log^2\left(2-5x^2\right)+\log(x)\left(-20x^2\log\left(2-5x^2\right)+e^x(-2x+5x^3)\log^2(2\right.\right.}{-2x+5x^3}$$
$$= -\left(\log\left(-5\,x^2+2\right)^2\log\left(x\right)-2\,xe^{\left(e^x\right)}\right)e^{\left(-e^x\right)}$$

input
```
integrate((((10*x^3-4*x)*exp(exp(x))+((5*x^3-2*x)*exp(x)*log(-5*x^2+2)^2-20
*x^2*log(-5*x^2+2))*log(x)+(-5*x^2+2)*log(-5*x^2+2)^2)/(5*x^3-2*x)/exp(exp
(x)),x, algorithm=\
```

output
```
-(log(-5*x^2 + 2)^2*log(x) - 2*x*e^(e^x))*e^(-e^x)
```

3.650.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{-e^x}\left(e^{e^x}(-4x+10x^3)+(2-5x^2)\log^2\left(2-5x^2\right)+\log(x)\left(-20x^2\log\left(2-5x^2\right)+e^x(-2x+5x^3)\log^2(2\right.\right.}{-2x+5x^3}$$
$$= \text{Timed out}$$

input
```
integrate((((10*x**3-4*x)*exp(exp(x))+((5*x**3-2*x)*exp(x)*ln(-5*x**2+2)**2
-20*x**2*ln(-5*x**2+2))*ln(x)+(-5*x**2+2)*ln(-5*x**2+2)**2)/(5*x**3-2*x)/e
xp(exp(x)),x)
```

output
```
Timed out
```

3.650.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{e^{-e^x}\left(e^{e^x}(-4x+10x^3)+(2-5x^2)\log^2\left(2-5x^2\right)+\log(x)\left(-20x^2\log\left(2-5x^2\right)+e^x(-2x+5x^3)\log^2(2\right.\right.}{-2x+5x^3}$$
$$= -e^{\left(-e^x\right)}\log\left(-5\,x^2+2\right)^2\log\left(x\right)+2\,x$$

input
```
integrate((((10*x^3-4*x)*exp(exp(x))+((5*x^3-2*x)*exp(x)*log(-5*x^2+2)^2-20
*x^2*log(-5*x^2+2))*log(x)+(-5*x^2+2)*log(-5*x^2+2)^2)/(5*x^3-2*x)/exp(exp
(x)),x, algorithm=\
```

output
```
-e^(-e^x)*log(-5*x^2 + 2)^2*log(x) + 2*x
```

3.650.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{e^{-e^x}\left(e^{e^x}(-4x+10x^3)+(2-5x^2)\log^2(2-5x^2)+\log(x)\left(-20x^2\log(2-5x^2)+e^x(-2x+5x^3)\log^2(2\right.}{-2x+5x^3}$$
$$= -\left(e^{(x-e^x)}\log\left(-5\,x^2+2\right)^2\log\left(x\right)-2\,xe^x\right)e^{(-x)}$$

input
```
integrate((((10*x^3-4*x)*exp(exp(x))+((5*x^3-2*x)*exp(x)*log(-5*x^2+2)^2-20
*x^2*log(-5*x^2+2))*log(x)+(-5*x^2+2)*log(-5*x^2+2)^2)/(5*x^3-2*x)/exp(exp
(x)),x, algorithm=\
```

output
```
-(e^(x - e^x)*log(-5*x^2 + 2)^2*log(x) - 2*x*e^x)*e^(-x)
```

3.650.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-e^x}\left(e^{e^x}(-4x+10x^3)+(2-5x^2)\log^2(2-5x^2)+\log(x)\left(-20x^2\log(2-5x^2)+e^x(-2x+5x^3)\log^2(2\right.}{-2x+5x^3}$$
$$= \int \frac{\mathrm{e}^{-\mathrm{e}^x}\left(\mathrm{e}^{\mathrm{e}^x}\,(4\,x-10\,x^3)+\ln\left(2-5\,x^2\right)^2\,(5\,x^2-2)+\ln\left(x\right)\,\left(20\,x^2\,\ln\left(2-5\,x^2\right)+\ln\left(2-5\,x^2\right)^2\,\mathrm{e}^x\,(2\,x-\right.\right.}{2\,x-5\,x^3}$$

input
```
int((exp(-exp(x))*(exp(exp(x))*(4*x - 10*x^3) + log(2 - 5*x^2)^2*(5*x^2 -
2) + log(x)*(20*x^2*log(2 - 5*x^2) + log(2 - 5*x^2)^2*exp(x)*(2*x - 5*x^3)
)))/(2*x - 5*x^3),x)
```

output
```
int((exp(-exp(x))*(exp(exp(x))*(4*x - 10*x^3) + log(2 - 5*x^2)^2*(5*x^2 -
2) + log(x)*(20*x^2*log(2 - 5*x^2) + log(2 - 5*x^2)^2*exp(x)*(2*x - 5*x^3)
)))/(2*x - 5*x^3), x)
```

3.651 $\int \frac{100+100x+202x^2+304x^3+6x^4+10x^5+6x^6+(200x+300x^2+4x^3+10x$

3.651.1 Optimal result

Integrand size = 135, antiderivative size = 30

$$\int \frac{100+100x+202x^2+304x^3+6x^4+10x^5+6x^6+(200x+300x^2+4x^3+10x^4+6x^5)\log(x)+(-102x}{625x+625}$$

$$=\left(2+\frac{1}{25}x^2\left(x+\frac{x-\log\left(\frac{5}{x+\log(x)}\right)}{x}\right)\right)^2$$

output
```
(2+1/25*((x-ln(5/(x+ln(x))))/x+x)*x^2)^2
```

3.651.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{100+100x+202x^2+304x^3+6x^4+10x^5+6x^6+(200x+300x^2+4x^3+10x^4+6x^5)\log(x)+(-102x}{625x+625}$$

$$=\frac{1}{625}\left(50+x^2+x^3-x\log\left(\frac{5}{x+\log(x)}\right)\right)^2$$

input
```
Integrate[(100 + 100*x + 202*x^2 + 304*x^3 + 6*x^4 + 10*x^5 + 6*x^6 + (200
*x + 300*x^2 + 4*x^3 + 10*x^4 + 6*x^5)*Log[x] + (-102*x - 2*x^2 - 6*x^3 -
8*x^4 + (-100 - 6*x^2 - 8*x^3)*Log[x])*Log[5/(x + Log[x])] + (2*x^2 + 2*x*
Log[x])*Log[5/(x + Log[x])]^2)/(625*x + 625*Log[x]),x]
```

3.651.
$\int \frac{100+100x+202x^2+304x^3+6x^4+10x^5+6x^6+(200x+300x^2+4x^3+10x^4+6x^5)\log(x)+(-102x-2x^2-6x^3-8x^4+(-100-6x^2-8x^3)\log(x))\log\left(\frac{}{x}\right.}{625x+625\log(x)}$

output
```
(50 + x^2 + x^3 - x*Log[5/(x + Log[x])])^2/625
```

3.651.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.022, Rules used = {7239, 27, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^6+10x^5+6x^4+304x^3+202x^2+\left(2x^2+2x\log(x)\right)\log^2\left(\frac{5}{x+\log(x)}\right)+\left(-8x^4-6x^3-2x^2+\left(-8x^3-6x^2-\right.\right.}{625x+625\log(x}$$

$$\Big\downarrow \ 7239$$

$$\int \frac{2\left(x^3+x^2-x\log\left(\frac{5}{x+\log(x)}\right)+50\right)\left(3x^3+2x^2+x-x\log\left(\frac{5}{x+\log(x)}\right)+\log(x)\left(x(3x+2)-\log\left(\frac{5}{x+\log(x)}\right)\right)+\right.}{625(x+\log(x))}$$

$$\Big\downarrow \ 27$$

$$\frac{2}{625}\int \frac{\left(x^3+x^2-\log\left(\frac{5}{x+\log(x)}\right)x+50\right)\left(3x^3+2x^2-\log\left(\frac{5}{x+\log(x)}\right)x+x+\log(x)\left(x(3x+2)-\log\left(\frac{5}{x+\log(x)}\right)\right.\right.}{x+\log(x)}$$

$$\Big\downarrow \ 7237$$

$$\frac{1}{625}\left(x^3+x^2-x\log\left(\frac{5}{x+\log(x)}\right)+50\right)^2$$

input
```
Int[(100 + 100*x + 202*x^2 + 304*x^3 + 6*x^4 + 10*x^5 + 6*x^6 + (200*x + 3
00*x^2 + 4*x^3 + 10*x^4 + 6*x^5)*Log[x] + (-102*x - 2*x^2 - 6*x^3 - 8*x^4
+ (-100 - 6*x^2 - 8*x^3)*Log[x])*Log[5/(x + Log[x])] + (2*x^2 + 2*x*Log[x]
)*Log[5/(x + Log[x])]^2)/(625*x + 625*Log[x]),x]
```

output
```
(50 + x^2 + x^3 - x*Log[5/(x + Log[x])])^2/625
```

3.651.

$$\int \frac{100+100x+202x^2+304x^3+6x^4+10x^5+6x^6+\left(200x+300x^2+4x^3+10x^4+6x^5\right)\log(x)+\left(-102x-2x^2-6x^3-8x^4+\left(-100-6x^2-8x^3\right)\log(x)\right)\log\left(\frac{}{x}\right.}{625x+625\log(x)}$$

3.651.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.651.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. $2(28) = 56$.

Time = 5.26 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.77

method	result
parallelrisch	$\frac{x^6}{625}+\frac{2x^5}{625}-\frac{2\ln\left(\frac{5}{x+\ln(x)}\right)x^4}{625}+\frac{x^4}{625}-\frac{2\ln\left(\frac{5}{x+\ln(x)}\right)x^3}{625}+\frac{\ln\left(\frac{5}{x+\ln(x)}\right)^2x^2}{625}+\frac{4x^3}{25}+\frac{4x^2}{25}-\frac{4x\ln\left(\frac{5}{x+\ln(x)}\right)}{25}$
risch	$\frac{x^2\ln(x+\ln(x))^2}{625}+\frac{x(100+2x^3-2x\ln(5)+2x^2)\ln(x+\ln(x))}{625}+\frac{x^6}{625}-\frac{2x^4\ln(5)}{625}+\frac{2x^5}{625}+\frac{x^2\ln(5)^2}{625}-\frac{2x^3\ln(5)}{625}+$

input
```
int(((2*x*ln(x)+2*x^2)*ln(5/(x+ln(x)))^2+((-8*x^3-6*x^2-100)*ln(x)-8*x^4-6
*x^3-2*x^2-102*x)*ln(5/(x+ln(x)))+(6*x^5+10*x^4+4*x^3+300*x^2+200*x)*ln(x)
+6*x^6+10*x^5+6*x^4+304*x^3+202*x^2+100*x+100)/(625*ln(x)+625*x),x,method=
_RETURNVERBOSE)
```

output
```
1/625*x^6+2/625*x^5-2/625*ln(5/(x+ln(x)))*x^4+1/625*x^4-2/625*ln(5/(x+ln(x
)))*x^3+1/625*ln(5/(x+ln(x)))^2*x^2+4/25*x^3+4/25*x^2-4/25*x*ln(5/(x+ln(x)
))
```

3.651.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(29) = 58$.

Time = 0.27 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.10

$$\int \frac{100 + 100x + 202x^2 + 304x^3 + 6x^4 + 10x^5 + 6x^6 + (200x + 300x^2 + 4x^3 + 10x^4 + 6x^5)\log(x) + (-102x}{625x + 625}$$

$$= \frac{1}{625}x^6 + \frac{2}{625}x^5 + \frac{1}{625}x^4 + \frac{1}{625}x^2\log\left(\frac{5}{x+\log(x)}\right)^2 + \frac{4}{25}x^3 + \frac{4}{25}x^2 - \frac{2}{625}\left(x^4 + x^3 + 50x\right)\log\left(\frac{5}{x+\log(x)}\right)$$

input
```
integrate(((2*x*log(x)+2*x^2)*log(5/(x+log(x)))^2+((-8*x^3-6*x^2-100)*log(
x)-8*x^4-6*x^3-2*x^2-102*x)*log(5/(x+log(x)))+(6*x^5+10*x^4+4*x^3+300*x^2+
200*x)*log(x)+6*x^6+10*x^5+6*x^4+304*x^3+202*x^2+100*x+100)/(625*log(x)+62
5*x),x, algorithm=\
```

output
```
1/625*x^6 + 2/625*x^5 + 1/625*x^4 + 1/625*x^2*log(5/(x + log(x)))^2 + 4/25
*x^3 + 4/25*x^2 - 2/625*(x^4 + x^3 + 50*x)*log(5/(x + log(x)))
```

3.651.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(22) = 44$.

Time = 0.29 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.43

$$\int \frac{100 + 100x + 202x^2 + 304x^3 + 6x^4 + 10x^5 + 6x^6 + (200x + 300x^2 + 4x^3 + 10x^4 + 6x^5)\log(x) + (-102x}{625x + 625}$$

$$= \frac{x^6}{625} + \frac{2x^5}{625} + \frac{x^4}{625} + \frac{4x^3}{25} + \frac{x^2\log\left(\frac{5}{x+\log(x)}\right)^2}{625} + \frac{4x^2}{25} + \left(-\frac{2x^4}{625} - \frac{2x^3}{625} - \frac{4x}{25}\right)\log\left(\frac{5}{x+\log(x)}\right)$$

input
```
integrate(((2*x*ln(x)+2*x**2)*ln(5/(x+ln(x)))**2+((-8*x**3-6*x**2-100)*ln(
x)-8*x**4-6*x**3-2*x**2-102*x)*ln(5/(x+ln(x)))+(6*x**5+10*x**4+4*x**3+300*
x**2+200*x)*ln(x)+6*x**6+10*x**5+6*x**4+304*x**3+202*x**2+100*x+100)/(625*
ln(x)+625*x),x)
```

output
```
x**6/625 + 2*x**5/625 + x**4/625 + 4*x**3/25 + x**2*log(5/(x + log(x)))**2
/625 + 4*x**2/25 + (-2*x**4/625 - 2*x**3/625 - 4*x/25)*log(5/(x + log(x)))
```

3.651.

$$\int \frac{100+100x+202x^2+304x^3+6x^4+10x^5+6x^6+(200x+300x^2+4x^3+10x^4+6x^5)\log(x)+(-102x-2x^2-6x^3-8x^4+(-100-6x^2-8x^3)\log(x))\log\left(\right.}{625x+625\log(x)}$$

3.651.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(29) = 58$.

Time = 0.33 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.77

$$\int \frac{100 + 100x + 202x^2 + 304x^3 + 6x^4 + 10x^5 + 6x^6 + (200x + 300x^2 + 4x^3 + 10x^4 + 6x^5)\log(x) + (-102x}{625x + 625}$$

$$= \frac{1}{625}x^6 + \frac{2}{625}x^5 - \frac{1}{625}x^4(2\log(5) - 1) - \frac{2}{625}x^3(\log(5) - 50) + \frac{1}{625}x^2\log(x + \log(x))^2 + \frac{1}{625}(\log(5)^2 + 100)x^2 - \frac{4}{25}x\log(5) + \frac{2}{625}(x^4 + x^3 - x^2\log(5) + 50x)\log(x + \log(x))$$

input
```
integrate(((2*x*log(x)+2*x^2)*log(5/(x+log(x)))^2+((-8*x^3-6*x^2-100)*log(
x)-8*x^4-6*x^3-2*x^2-102*x)*log(5/(x+log(x)))+(6*x^5+10*x^4+4*x^3+300*x^2+
200*x)*log(x)+6*x^6+10*x^5+6*x^4+304*x^3+202*x^2+100*x+100)/(625*log(x)+62
5*x),x, algorithm=\
```

output
```
1/625*x^6 + 2/625*x^5 - 1/625*x^4*(2*log(5) - 1) - 2/625*x^3*(log(5) - 50)
 + 1/625*x^2*log(x + log(x))^2 + 1/625*(log(5)^2 + 100)*x^2 - 4/25*x*log(5
) + 2/625*(x^4 + x^3 - x^2*log(5) + 50*x)*log(x + log(x))
```

3.651.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(29) = 58$.

Time = 0.29 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.77

$$\int \frac{100 + 100x + 202x^2 + 304x^3 + 6x^4 + 10x^5 + 6x^6 + (200x + 300x^2 + 4x^3 + 10x^4 + 6x^5)\log(x) + (-102x}{625x + 625}$$

$$= \frac{1}{625}x^6 + \frac{2}{625}x^5 - \frac{1}{625}x^4(2\log(5) - 1) - \frac{2}{625}x^3(\log(5) - 50) + \frac{1}{625}x^2\log(x + \log(x))^2 + \frac{1}{625}(\log(5)^2 + 100)x^2 - \frac{4}{25}x\log(5) + \frac{2}{625}(x^4 + x^3 - x^2\log(5) + 50x)\log(x + \log(x))$$

input
```
integrate(((2*x*log(x)+2*x^2)*log(5/(x+log(x)))^2+((-8*x^3-6*x^2-100)*log(
x)-8*x^4-6*x^3-2*x^2-102*x)*log(5/(x+log(x)))+(6*x^5+10*x^4+4*x^3+300*x^2+
200*x)*log(x)+6*x^6+10*x^5+6*x^4+304*x^3+202*x^2+100*x+100)/(625*log(x)+62
5*x),x, algorithm=\
```

3.651.

$$\int \frac{100+100x+202x^2+304x^3+6x^4+10x^5+6x^6+(200x+300x^2+4x^3+10x^4+6x^5)\log(x)+(-102x-2x^2-6x^3-8x^4+(-100-6x^2-8x^3)\log(x))\log\Big(}{625x+625\log(x)}$$

output
```
1/625*x^6 + 2/625*x^5 - 1/625*x^4*(2*log(5) - 1) - 2/625*x^3*(log(5) - 50)
 + 1/625*x^2*log(x + log(x))^2 + 1/625*(log(5)^2 + 100)*x^2 - 4/25*x*log(5
) + 2/625*(x^4 + x^3 - x^2*log(5) + 50*x)*log(x + log(x))
```

3.651.9 Mupad [B] (verification not implemented)

Time = 13.75 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.23

$$\int \frac{100 + 100x + 202x^2 + 304x^3 + 6x^4 + 10x^5 + 6x^6 + (200x + 300x^2 + 4x^3 + 10x^4 + 6x^5)\log(x) + (-102x}{625x + 625}$$

$$= \frac{x^2 \ln\left(\frac{5}{x+\ln(x)}\right)^2}{625} + \frac{4\,x^2}{25} + \frac{4\,x^3}{25} + \frac{x^4}{625} + \frac{2\,x^5}{625} + \frac{x^6}{625} - \ln\left(\frac{5}{x + \ln(x)}\right)\left(\frac{2\,x^4}{625} + \frac{2\,x^3}{625} + \frac{4\,x}{25}\right)$$

input
```
int((100*x - log(5/(x + log(x))))*(102*x + log(x)*(6*x^2 + 8*x^3 + 100) + 2
*x^2 + 6*x^3 + 8*x^4) + log(x)*(200*x + 300*x^2 + 4*x^3 + 10*x^4 + 6*x^5)
+ 202*x^2 + 304*x^3 + 6*x^4 + 10*x^5 + 6*x^6 + log(5/(x + log(x)))^2*(2*x*
log(x) + 2*x^2) + 100)/(625*x + 625*log(x)),x)
```

output
```
(x^2*log(5/(x + log(x)))^2)/625 + (4*x^2)/25 + (4*x^3)/25 + x^4/625 + (2*x
^5)/625 + x^6/625 - log(5/(x + log(x)))*((4*x)/25 + (2*x^3)/625 + (2*x^4)/
625)
```

3.652 $\int \frac{1}{3}e^{-x^2}\left(e^{x^2}(9+9x^2)+8x\log(4)\right)\,dx$

3.652.1 Optimal result

Integrand size = 30, antiderivative size = 23

$$\int \frac{1}{3}e^{-x^2}\left(e^{x^2}\left(9+9x^2\right)+8x\log(4)\right)\,dx=x\left(3+x^2-\frac{4e^{-x^2}\log(4)}{3x}\right)$$

output
```
x*(x^2+3-8/3*ln(2)/exp(x^2)/x)
```

3.652.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{1}{3}e^{-x^2}\left(e^{x^2}\left(9+9x^2\right)+8x\log(4)\right)\,dx=3x+x^3-\frac{4}{3}e^{-x^2}\log(4)$$

input
```
Integrate[(E^x^2*(9 + 9*x^2) + 8*x*Log[4])/(3*E^x^2),x]
```

output
```
3*x + x^3 - (4*Log[4])/(3*E^x^2)
```

3.652.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{3}e^{-x^2}\left(e^{x^2}(9x^2+9)+8x\log(4)\right)\,dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{3}\int e^{-x^2}\left(8\log(4)x+9e^{x^2}(x^2+1)\right)dx$$

$$\Big\downarrow \ 7293$$

$$\frac{1}{3}\int \left(8e^{-x^2}\log(4)x+9(x^2+1)\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{3}\left(3x^3-4e^{-x^2}\log(4)+9x\right)$$

input
```
Int[(E^x^2*(9 + 9*x^2) + 8*x*Log[4])/(3*E^x^2),x]
```

output
```
(9*x + 3*x^3 - (4*Log[4])/E^x^2)/3
```

3.652.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.652.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

method	result	size
default	$x^3+3x-\frac{8\ln(2)\mathrm{e}^{-x^2}}{3}$	18
risch	$x^3+3x-\frac{8\ln(2)\mathrm{e}^{-x^2}}{3}$	18
parts	$x^3+3x-\frac{8\ln(2)\mathrm{e}^{-x^2}}{3}$	18
norman	$\left(x^3\mathrm{e}^{x^2}+3\,\mathrm{e}^{x^2}x-\frac{8\ln(2)}{3}\right)\mathrm{e}^{-x^2}$	28
parallelrisch	$-\frac{\left(-3x^3\mathrm{e}^{x^2}-9\,\mathrm{e}^{x^2}x+8\ln(2)\right)\mathrm{e}^{-x^2}}{3}$	30

input
```
int(1/3*((9*x^2+9)*exp(x^2)+16*x*ln(2))/exp(x^2),x,method=_RETURNVERBOSE)
```

output
```
x^3+3*x-8/3*ln(2)/exp(x^2)
```

3.652.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{1}{3}e^{-x^2}\left(e^{x^2}(9+9x^2)+8x\log(4)\right)\,dx=\frac{1}{3}\left(3\left(x^3+3\,x\right)e^{(x^2)}-8\,\log(2)\right)e^{(-x^2)}$$

input
```
integrate(1/3*((9*x^2+9)*exp(x^2)+16*x*log(2))/exp(x^2),x, algorithm=\
```

output
```
1/3*(3*(x^3 + 3*x)*e^(x^2) - 8*log(2))*e^(-x^2)
```

3.652.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \frac{1}{3}e^{-x^2}\left(e^{x^2}(9+9x^2)+8x\log(4)\right)\,dx=x^3+3x-\frac{8e^{-x^2}\log(2)}{3}$$

input
```
integrate(1/3*((9*x**2+9)*exp(x**2)+16*x*ln(2))/exp(x**2),x)
```

output
```
x**3 + 3*x - 8*exp(-x**2)*log(2)/3
```

3.652.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \frac{1}{3}e^{-x^2}\left(e^{x^2}(9+9x^2)+8x\log(4)\right)\,dx = x^3-\frac{8}{3}\,e^{(-x^2)}\log(2)+3\,x$$

input
```
integrate(1/3*((9*x^2+9)*exp(x^2)+16*x*log(2))/exp(x^2),x, algorithm=\
```

output
```
x^3 - 8/3*e^(-x^2)*log(2) + 3*x
```

3.652.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \frac{1}{3}e^{-x^2}\left(e^{x^2}(9+9x^2)+8x\log(4)\right)\,dx = x^3-\frac{8}{3}\,e^{(-x^2)}\log(2)+3\,x$$

input
```
integrate(1/3*((9*x^2+9)*exp(x^2)+16*x*log(2))/exp(x^2),x, algorithm=\
```

output
```
x^3 - 8/3*e^(-x^2)*log(2) + 3*x
```

3.652.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \frac{1}{3}e^{-x^2}\left(e^{x^2}(9+9x^2)+8x\log(4)\right)\,dx = 3\,x-\frac{8\,\mathrm{e}^{-x^2}\,\ln(2)}{3}+x^3$$

input
```
int(exp(-x^2)*((exp(x^2)*(9*x^2 + 9))/3 + (16*x*log(2))/3),x)
```

output
```
3*x - (8*exp(-x^2)*log(2))/3 + x^3
```

3.653 $\int \frac{2-2e^5-2x+x^3+e^x x^3}{5x^3} \, dx$

3.653.1 Optimal result

Integrand size = 27, antiderivative size = 25

$$\int \frac{2-2e^5-2x+x^3+e^x x^3}{5x^3} \, dx = \frac{1}{5}\left(5+e^x+x+\frac{-1+e^5+2x+x^2}{x^2}\right)$$

output
```
1/5*(x^2+2*x-1+exp(5))/x^2+1+1/5*x+1/5*exp(x)
```

3.653.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{2-2e^5-2x+x^3+e^x x^3}{5x^3} \, dx = \frac{1}{5}\left(e^x-\frac{1}{x^2}+\frac{e^5}{x^2}+\frac{2}{x}+x\right)$$

input
```
Integrate[(2 - 2*E^5 - 2*x + x^3 + E^x*x^3)/(5*x^3),x]
```

output
```
(E^x - x^(-2) + E^5/x^2 + 2/x + x)/5
```

3.653.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x^3+x^3-2x-2e^5+2}{5x^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int \frac{e^x x^3+x^3-2x+2(1-e^5)}{x^3}dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{5}\int \left(\frac{x^3-2x+2(1-e^5)}{x^3}+e^x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(-\frac{1-e^5}{x^2}+x+e^x+\frac{2}{x}\right)$$

input
```
Int[(2 - 2*E^5 - 2*x + x^3 + E^x*x^3)/(5*x^3),x]
```

output
```
(E^x - (1 - E^5)/x^2 + 2/x + x)/5
```

3.653.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.653.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

method	result	size
risch	$\frac{x}{5}+\frac{2x+\mathrm{e}^{5}-1}{5x^{2}}+\frac{\mathrm{e}^{x}}{5}$	21
parallelrisch	$\frac{\mathrm{e}^{x}x^{2}+x^{3}+\mathrm{e}^{5}+2x-1}{5x^{2}}$	22
parts	$\frac{x}{5}+\frac{2\,\mathrm{e}^{5}-2}{10x^{2}}+\frac{2}{5x}+\frac{\mathrm{e}^{x}}{5}$	25
default	$\frac{x}{5}-\frac{1}{5x^{2}}+\frac{2}{5x}+\frac{\mathrm{e}^{5}}{5x^{2}}+\frac{\mathrm{e}^{x}}{5}$	26
norman	$\frac{\frac{2x}{5}+\frac{x^{3}}{5}+\frac{\mathrm{e}^{x}x^{2}}{5}+\frac{\mathrm{e}^{5}}{5}-\frac{1}{5}}{x^{2}}$	26

input
```
int(1/5*(exp(x)*x^3-2*exp(5)+x^3-2*x+2)/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/5*x+1/5*(2*x+exp(5)-1)/x^2+1/5*exp(x)
```

3.653.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{2-2e^5-2x+x^3+e^xx^3}{5x^3}\,dx=\frac{x^3+x^2e^x+2\,x+e^5-1}{5\,x^2}$$

input
```
integrate(1/5*(exp(x)*x^3-2*exp(5)+x^3-2*x+2)/x^3,x, algorithm=\
```

output
```
1/5*(x^3 + x^2*e^x + 2*x + e^5 - 1)/x^2
```

3.653.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{2-2e^5-2x+x^3+e^xx^3}{5x^3}\,dx=\frac{x}{5}+\frac{e^x}{5}+\frac{2x-1+e^5}{5x^2}$$

input
```
integrate(1/5*(exp(x)*x**3-2*exp(5)+x**3-2*x+2)/x**3,x)
```

output
```
x/5 + exp(x)/5 + (2*x - 1 + exp(5))/(5*x**2)
```

3.653.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{2-2e^5-2x+x^3+e^x x^3}{5x^3}\,dx = \frac{1}{5}\,x + \frac{2}{5\,x} + \frac{e^5}{5\,x^2} - \frac{1}{5\,x^2} + \frac{1}{5}\,e^x$$

input
```
integrate(1/5*(exp(x)*x^3-2*exp(5)+x^3-2*x+2)/x^3,x, algorithm=\
```

output
```
1/5*x + 2/5/x + 1/5*e^5/x^2 - 1/5/x^2 + 1/5*e^x
```

3.653.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{2-2e^5-2x+x^3+e^x x^3}{5x^3}\,dx = \frac{x^3+x^2e^x+2\,x+e^5-1}{5\,x^2}$$

input
```
integrate(1/5*(exp(x)*x^3-2*exp(5)+x^3-2*x+2)/x^3,x, algorithm=\
```

output
```
1/5*(x^3 + x^2*e^x + 2*x + e^5 - 1)/x^2
```

3.653.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{2-2e^5-2x+x^3+e^x x^3}{5x^3}\,dx = \frac{x}{5} + \frac{\mathrm{e}^x}{5} + \frac{\frac{2\,x}{5}+\frac{\mathrm{e}^5}{5}-\frac{1}{5}}{x^2}$$

input
```
int(((x^3*exp(x))/5 - (2*exp(5))/5 - (2*x)/5 + x^3/5 + 2/5)/x^3,x)
```

output
```
x/5 + exp(x)/5 + ((2*x)/5 + exp(5)/5 - 1/5)/x^2
```

3.654 $\int \frac{36x^3+24x^5+4e^{2x}x^5+4x^7+e^x(-24x^4-8x^6)+e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}}{\ldots}$

3.654.1 Optimal result

Integrand size = 415, antiderivative size = 37

$$\int \frac{36x^3+24x^5+4e^{2x}x^5+4x^7+e^x(-24x^4-8x^6)+e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x(-\ldots\right.}{\ldots}$$
$$= \left(-e^{x+e^{4+\frac{x}{x+\frac{3}{-e^x+x}}}x^2}+x^2\right)^2$$

output
```
(x^2-exp(x^2*exp(x/(x+3/(x-exp(x)))+4)+x))^2
```

3.654.2 Mathematica [A] (verified)

Time = 1.87 (sec) , antiderivative size = 35, normalized size of antiderivative = 0.95

$$\int \frac{36x^3+24x^5+4e^{2x}x^5+4x^7+e^x(-24x^4-8x^6)+e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x(-\ldots\right.}{\ldots}$$
$$= \left(e^{x\left(1+e^{5-\frac{3}{3-e^x x+x^2}}x\right)}-x^2\right)^2$$

3.654.

$$36x^3+24x^5+4e^{2x}x^5+4x^7+e^x(-24x^4-8x^6)+e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x(-12x-4x^3)+e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}(36x+36x^3+\ldots\right.$$

input
```
Integrate[(36*x^3 + 24*x^5 + 4*E^(2*x)*x^5 + 4*x^7 + E^x*(-24*x^4 - 8*x^6)
 + E^(2*x + 2*E^((-12 + 5*E^x*x - 5*x^2)/(-3 + E^x*x - x^2))*x^2)*(18 + 12
*x^2 + 2*E^(2*x)*x^2 + 2*x^4 + E^x*(-12*x - 4*x^3) + E^((-12 + 5*E^x*x - 5
*x^2)/(-3 + E^x*x - x^2))*(36*x + 36*x^3 + 4*E^(2*x)*x^3 + 4*x^5 + E^x*(-3
0*x^2 - 6*x^3 - 8*x^4))) + E^(x + E^((-12 + 5*E^x*x - 5*x^2)/(-3 + E^x*x -
 x^2))*x^2)*(-36*x - 18*x^2 - 24*x^3 - 12*x^4 - 4*x^5 - 2*x^6 + E^(2*x)*(-
4*x^3 - 2*x^4) + E^x*(24*x^2 + 12*x^3 + 8*x^4 + 4*x^5) + E^((-12 + 5*E^x*x
 - 5*x^2)/(-3 + E^x*x - x^2))*(-36*x^3 - 36*x^5 - 4*E^(2*x)*x^5 - 4*x^7 +
E^x*(30*x^4 + 6*x^5 + 8*x^6))))/(9 + 6*x^2 + E^(2*x)*x^2 + x^4 + E^x*(-6*x
 - 2*x^3)),x]
```

output
```
(E^(x*(1 + E^(5 - 3/(3 - E^x*x + x^2))*x)) - x^2)^2
```

3.654.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(2x^4+e^x\left(-4x^3-12x\right)+2e^{2x}x^2+12x^2+e^{\frac{-5x^2+5e^xx-12}{-x^2+e^xx-3}}\left(4x^5+4e^{2x}x^3+36x^3+e^x\left(-8x^4-6x^3-30x^2\right)+36\right.}{}$$

$\downarrow$ 7292

$$\int \frac{\left(2x^4+e^x\left(-4x^3-12x\right)+2e^{2x}x^2+12x^2+e^{\frac{-5x^2+5e^xx-12}{-x^2+e^xx-3}}\left(4x^5+4e^{2x}x^3+36x^3+e^x\left(-8x^4-6x^3-30x^2\right)+36\right.}{}$$

$\downarrow$ 7293

$$\int \left(\frac{4x^7}{\left(x^2-e^xx+3\right)^2}-\frac{2e^{e^{\frac{5x^2}{x^2-e^xx+3}}-\frac{5e^xx}{x^2-e^xx+3}+\frac{12}{x^2-e^xx+3}}x^2+x}x^6}{\left(-x^2+e^xx-3\right)^2}+\frac{4e^{2x}x^5}{\left(-x^2+e^xx-3\right)^2}-\frac{4e^{e^{\frac{5x^2}{x^2-e^xx+3}}-\frac{5e^xx}{x^2-e^xx+3}+\frac{12}{x^2-e^xx}}}{\left(-x^2+e^xx-3\right)^2}\right.$$

$\downarrow$ 7299

$$\int \frac{36x^3+24x^5+4e^{2x}x^5+4x^7+e^x\left(-24x^4-8x^6\right)+e^{2x+2e^{\frac{-12+5e^xx-5x^2}{-3+e^xx-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x\left(-12x-4x^3\right)+e^{\frac{-12+5e^xx-5x^2}{-3+e^xx-x^2}}\left(36x+36x^3+\right.\right.}{}$$

$$\int \left(\frac{4x^7}{(x^2 - e^x x + 3)^2} - \frac{2e^{e^{\frac{5x^2}{x^2-e^x x+3} - \frac{5e^x x}{x^2-e^x x+3} + \frac{12}{x^2-e^x x+3}} x^2 + x} x^6}{(-x^2 + e^x x - 3)^2} + \frac{4e^{2x}x^5}{(-x^2 + e^x x - 3)^2} - \frac{4e^{e^{\frac{5x^2}{x^2-e^x x+3} - \frac{5e^x x}{x^2-e^x x+3} + \frac{12}{x^2-e^x x} \cdots}}}{(-x^2 + e^x x - 3)^2} \cdots \right.$$

input
```
Int[(36*x^3 + 24*x^5 + 4*E^(2*x)*x^5 + 4*x^7 + E^x*(-24*x^4 - 8*x^6) + E^(
2*x + 2*E^((-12 + 5*E^x*x - 5*x^2)/(-3 + E^x*x - x^2))*x^2)*(18 + 12*x^2 +
 2*E^(2*x)*x^2 + 2*x^4 + E^x*(-12*x - 4*x^3) + E^((-12 + 5*E^x*x - 5*x^2)/
(-3 + E^x*x - x^2))*(36*x + 36*x^3 + 4*E^(2*x)*x^3 + 4*x^5 + E^x*(-30*x^2
- 6*x^3 - 8*x^4))) + E^(x + E^((-12 + 5*E^x*x - 5*x^2)/(-3 + E^x*x - x^2))
*x^2)*(-36*x - 18*x^2 - 24*x^3 - 12*x^4 - 4*x^5 - 2*x^6 + E^(2*x)*(-4*x^3
- 2*x^4) + E^x*(24*x^2 + 12*x^3 + 8*x^4 + 4*x^5) + E^((-12 + 5*E^x*x - 5*x
^2)/(-3 + E^x*x - x^2))*(-36*x^3 - 36*x^5 - 4*E^(2*x)*x^5 - 4*x^7 + E^x*(3
0*x^4 + 6*x^5 + 8*x^6))))/(9 + 6*x^2 + E^(2*x)*x^2 + x^4 + E^x*(-6*x - 2*x
^3)),x]
```

output
```
$Aborted
```

3.654.3.1 Defintions of rubi rules used

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

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$$36x^3+24x^5+4e^{2x}x^5+4x^7+e^x(-24x^4-8x^6)+e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x(-12x-4x^3)+e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}(36x+36x^3+\cdots\right.$$

3.654.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. $2(34) = 68$.

Time = 57.59 (sec) , antiderivative size = 79, normalized size of antiderivative = 2.14

method	result	size
risch	$x^{4}-2\,{\mathrm e}^{x \left(x\,{\mathrm e}^{\frac{5\,{\mathrm e}^{x} x-5 x^{2}-12}{{\mathrm e}^{x} x-x^{2}-3}}+1\right)} x^{2}+{\mathrm e}^{2 x \left(x\,{\mathrm e}^{\frac{5\,{\mathrm e}^{x} x-5 x^{2}-12}{{\mathrm e}^{x} x-x^{2}-3}}+1\right)}$	79
parallelrisch	$x^{4}-2\,{\mathrm e}^{x^{2} {\mathrm e}^{\frac{5\,{\mathrm e}^{x} x-5 x^{2}-12}{{\mathrm e}^{x} x-x^{2}-3}}+x} x^{2}+{\mathrm e}^{2 x^{2} {\mathrm e}^{\frac{5\,{\mathrm e}^{x} x-5 x^{2}-12}{{\mathrm e}^{x} x-x^{2}-3}}+2 x}-27$	81

input
```
int((((4*exp(x)^2*x^3+(-8*x^4-6*x^3-30*x^2)*exp(x)+4*x^5+36*x^3+36*x)*exp(
(5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+2*exp(x)^2*x^2+(-4*x^3-12*x)*exp(x
)+2*x^4+12*x^2+18)*exp(x^2*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+x)^
2+((-4*x^5*exp(x)^2+(8*x^6+6*x^5+30*x^4)*exp(x)-4*x^7-36*x^5-36*x^3)*exp((
5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+(-2*x^4-4*x^3)*exp(x)^2+(4*x^5+8*x^
4+12*x^3+24*x^2)*exp(x)-2*x^6-4*x^5-12*x^4-24*x^3-18*x^2-36*x)*exp(x^2*exp
((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+x)+4*x^5*exp(x)^2+(-8*x^6-24*x^4)
*exp(x)+4*x^7+24*x^5+36*x^3)/(exp(x)^2*x^2+(-2*x^3-6*x)*exp(x)+x^4+6*x^2+9
),x,method=_RETURNVERBOSE)
```

output
```
x^4-2*exp(x*(x*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+1))*x^2+exp(2*x
*(x*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+1))
```

3.654.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. $2(34) = 68$.

Time = 0.27 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.11

$$\int \frac{36x^3 + 24x^5 + 4e^{2x}x^5 + 4x^7 + e^x(-24x^4 - 8x^6) + e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}\Big(18 + 12x^2 + 2e^{2x}x^2 + 2x^4 + e^x(-}{}$$

$$= x^{4} - 2\, x^{2} e^{\left(x^{2} e^{\left(\frac{5\, x^{2} - 5\, x e^{x} + 12}{x^{2} - x e^{x} + 3}\right)} + x\right)} + e^{\left(2\, x^{2} e^{\left(\frac{5\, x^{2} - 5\, x e^{x} + 12}{x^{2} - x e^{x} + 3}\right)} + 2\, x\right)}$$

3.654.

$$36x^3{+}24x^5{+}4e^{2x}x^5{+}4x^7{+}e^x(-24x^4{-}8x^6){+}e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}\Big(18{+}12x^2{+}2e^{2x}x^2{+}2x^4{+}e^x(-12x{-}4x^3){+}e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}(36x{+}36x^3{+}$$

input
```
integrate((((4*exp(x)^2*x^3+(-8*x^4-6*x^3-30*x^2)*exp(x)+4*x^5+36*x^3+36*x
)*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+2*exp(x)^2*x^2+(-4*x^3-12*x)
*exp(x)+2*x^4+12*x^2+18)*exp(x^2*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3
))+x)^2+((-4*x^5*exp(x)^2+(8*x^6+6*x^5+30*x^4)*exp(x)-4*x^7-36*x^5-36*x^3)
*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+(-2*x^4-4*x^3)*exp(x)^2+(4*x^
5+8*x^4+12*x^3+24*x^2)*exp(x)-2*x^6-4*x^5-12*x^4-24*x^3-18*x^2-36*x)*exp(x
^2*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+x)+4*x^5*exp(x)^2+(-8*x^6-2
4*x^4)*exp(x)+4*x^7+24*x^5+36*x^3)/(exp(x)^2*x^2+(-2*x^3-6*x)*exp(x)+x^4+6
*x^2+9),x, algorithm=\
```

output
```
x^4 - 2*x^2*e^(x^2*e^((5*x^2 - 5*x*e^x + 12)/(x^2 - x*e^x + 3)) + x) + e^(
2*x^2*e^((5*x^2 - 5*x*e^x + 12)/(x^2 - x*e^x + 3)) + 2*x)
```

3.654.6 Sympy [F(-1)]

Timed out.

$$\int \frac{36x^3 + 24x^5 + 4e^{2x}x^5 + 4x^7 + e^x(-24x^4 - 8x^6) + e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}\bigg(18 + 12x^2 + 2e^{2x}x^2 + 2x^4 + e^x(-}{}$$
$$= \text{Timed out}$$

input
```
integrate((((4*exp(x)**2*x**3+(-8*x**4-6*x**3-30*x**2)*exp(x)+4*x**5+36*x*
*3+36*x)*exp((5*exp(x)*x-5*x**2-12)/(exp(x)*x-x**2-3))+2*exp(x)**2*x**2+(-
4*x**3-12*x)*exp(x)+2*x**4+12*x**2+18)*exp(x**2*exp((5*exp(x)*x-5*x**2-12)
/(exp(x)*x-x**2-3))+x)**2+((-4*x**5*exp(x)**2+(8*x**6+6*x**5+30*x**4)*exp(
x)-4*x**7-36*x**5-36*x**3)*exp((5*exp(x)*x-5*x**2-12)/(exp(x)*x-x**2-3))+(
-2*x**4-4*x**3)*exp(x)**2+(4*x**5+8*x**4+12*x**3+24*x**2)*exp(x)-2*x**6-4*
x**5-12*x**4-24*x**3-18*x**2-36*x)*exp(x**2*exp((5*exp(x)*x-5*x**2-12)/(ex
p(x)*x-x**2-3))+x)+4*x**5*exp(x)**2+(-8*x**6-24*x**4)*exp(x)+4*x**7+24*x**
5+36*x**3)/(exp(x)**2*x**2+(-2*x**3-6*x)*exp(x)+x**4+6*x**2+9),x)
```

output
```
Timed out
```

3.654.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.62

$$\int \frac{36x^3+24x^5+4e^{2x}x^5+4x^7+e^x(-24x^4-8x^6)+e^{2x+2e^{\frac{-12+5e^xx-5x^2}{-3+e^xx-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x(-\right.}{}$$

$$=x^4-2\,x^2e^{\left(x^2e^{\left(-\frac{3}{x^2-xe^x+3}+5\right)}+x\right)}+e^{\left(2\,x^2e^{\left(-\frac{3}{x^2-xe^x+3}+5\right)}+2\,x\right)}$$

input
```
integrate((((4*exp(x)^2*x^3+(-8*x^4-6*x^3-30*x^2)*exp(x)+4*x^5+36*x^3+36*x
)*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+2*exp(x)^2*x^2+(-4*x^3-12*x)
*exp(x)+2*x^4+12*x^2+18)*exp(x^2*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3
))+x)^2+((-4*x^5*exp(x)^2+(8*x^6+6*x^5+30*x^4)*exp(x)-4*x^7-36*x^5-36*x^3)
*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+(-2*x^4-4*x^3)*exp(x)^2+(4*x^
5+8*x^4+12*x^3+24*x^2)*exp(x)-2*x^6-4*x^5-12*x^4-24*x^3-18*x^2-36*x)*exp(x
^2*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+x)+4*x^5*exp(x)^2+(-8*x^6-2
4*x^4)*exp(x)+4*x^7+24*x^5+36*x^3)/(exp(x)^2*x^2+(-2*x^3-6*x)*exp(x)+x^4+6
*x^2+9),x, algorithm=\
```

output
```
x^4 - 2*x^2*e^(x^2*e^(-3/(x^2 - x*e^x + 3) + 5) + x) + e^(2*x^2*e^(-3/(x^2
 - x*e^x + 3) + 5) + 2*x)
```

3.654.8 Giac [F(-2)]

Exception generated.

$$\int \frac{36x^3+24x^5+4e^{2x}x^5+4x^7+e^x(-24x^4-8x^6)+e^{2x+2e^{\frac{-12+5e^xx-5x^2}{-3+e^xx-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x(-\right.}{}$$

= Exception raised: RuntimeError

input
```
integrate((((4*exp(x)^2*x^3+(-8*x^4-6*x^3-30*x^2)*exp(x)+4*x^5+36*x^3+36*x
)*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+2*exp(x)^2*x^2+(-4*x^3-12*x)
*exp(x)+2*x^4+12*x^2+18)*exp(x^2*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3
))+x)^2+((-4*x^5*exp(x)^2+(8*x^6+6*x^5+30*x^4)*exp(x)-4*x^7-36*x^5-36*x^3)
*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+(-2*x^4-4*x^3)*exp(x)^2+(4*x^
5+8*x^4+12*x^3+24*x^2)*exp(x)-2*x^6-4*x^5-12*x^4-24*x^3-18*x^2-36*x)*exp(x
^2*exp((5*exp(x)*x-5*x^2-12)/(exp(x)*x-x^2-3))+x)+4*x^5*exp(x)^2+(-8*x^6-2
4*x^4)*exp(x)+4*x^7+24*x^5+36*x^3)/(exp(x)^2*x^2+(-2*x^3-6*x)*exp(x)+x^4+6
*x^2+9),x, algorithm=\
```

3.654.

$$36x^3+24x^5+4e^{2x}x^5+4x^7+e^x(-24x^4-8x^6)+e^{2x+2e^{\frac{-12+5e^xx-5x^2}{-3+e^xx-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x(-12x-4x^3)+e^{\frac{-12+5e^xx-5x^2}{-3+e^xx-x^2}}(36x+36x^3+\right.$$

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:Unable to divide, perhaps due to rounding error%%%{16,[
0,2,10,11]%%%}+%%%{-128,[0,2,9,12]%%%}+%%%{-48,[0,2,9,11]%%%}+%%%{-432,[0,
2,9,10]%%%}+
```

3.654.9 Mupad [B] (verification not implemented)

Time = 14.62 (sec) , antiderivative size = 129, normalized size of antiderivative = 3.49

$$\int \frac{36x^3+24x^5+4e^{2x}x^5+4x^7+e^x(-24x^4-8x^6)+e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x(-\right.}{}$$

$$= \mathrm{e}^{2\,x}\,\mathrm{e}^{2\,x^2\,\mathrm{e}^{\frac{12}{x^2-x\,\mathrm{e}^x+3}}\,\mathrm{e}^{-\frac{5\,x\,\mathrm{e}^x}{x^2-x\,\mathrm{e}^x+3}}\,\mathrm{e}^{\frac{5\,x^2}{x^2-x\,\mathrm{e}^x+3}}} + x^4 - 2\,x^2\,\mathrm{e}^x\,\mathrm{e}^{x^2\,\mathrm{e}^{\frac{12}{x^2-x\,\mathrm{e}^x+3}}\,\mathrm{e}^{-\frac{5\,x\,\mathrm{e}^x}{x^2-x\,\mathrm{e}^x+3}}\,\mathrm{e}^{\frac{5\,x^2}{x^2-x\,\mathrm{e}^x+3}}}$$

input
```
int((4*x^5*exp(2*x) - exp(x)*(24*x^4 + 8*x^6) + exp(2*x + 2*x^2*exp((5*x^2
 - 5*x*exp(x) + 12)/(x^2 - x*exp(x) + 3)))*(exp((5*x^2 - 5*x*exp(x) + 12)/
(x^2 - x*exp(x) + 3))*(36*x - exp(x)*(30*x^2 + 6*x^3 + 8*x^4) + 4*x^3*exp(
2*x) + 36*x^3 + 4*x^5) + 2*x^2*exp(2*x) - exp(x)*(12*x + 4*x^3) + 12*x^2 +
 2*x^4 + 18) - exp(x + x^2*exp((5*x^2 - 5*x*exp(x) + 12)/(x^2 - x*exp(x) +
 3)))*(36*x + exp(2*x)*(4*x^3 + 2*x^4) + exp((5*x^2 - 5*x*exp(x) + 12)/(x^
2 - x*exp(x) + 3))*(4*x^5*exp(2*x) - exp(x)*(30*x^4 + 6*x^5 + 8*x^6) + 36*
x^3 + 36*x^5 + 4*x^7) - exp(x)*(24*x^2 + 12*x^3 + 8*x^4 + 4*x^5) + 18*x^2
+ 24*x^3 + 12*x^4 + 4*x^5 + 2*x^6) + 36*x^3 + 24*x^5 + 4*x^7)/(x^2*exp(2*x
) - exp(x)*(6*x + 2*x^3) + 6*x^2 + x^4 + 9),x)
```

output
```
exp(2*x)*exp(2*x^2*exp(12/(x^2 - x*exp(x) + 3))*exp(-(5*x*exp(x))/(x^2 - x
*exp(x) + 3))*exp((5*x^2)/(x^2 - x*exp(x) + 3))) + x^4 - 2*x^2*exp(x)*exp(
x^2*exp(12/(x^2 - x*exp(x) + 3))*exp(-(5*x*exp(x))/(x^2 - x*exp(x) + 3))*e
xp((5*x^2)/(x^2 - x*exp(x) + 3)))
```

3.654.

$$\frac{36x^3+24x^5+4e^{2x}x^5+4x^7+e^x\left(-24x^4-8x^6\right)+e^{2x+2e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}x^2}\left(18+12x^2+2e^{2x}x^2+2x^4+e^x\left(-12x-4x^3\right)+e^{\frac{-12+5e^x x-5x^2}{-3+e^x x-x^2}}(36x+36x^3+\right.}{}$$

3.655 $\int \frac{59-10x}{-6+x} \, dx$

3.655.1 Optimal result

Integrand size = 11, antiderivative size = 12

$$\int \frac{59-10x}{-6+x} \, dx = -10x - \log(6-x)$$

output
```
-10*x-ln(6-x)
```

3.655.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{59-10x}{-6+x} \, dx = -10(-6+x) - \log(-6+x)$$

input
```
Integrate[(59 - 10*x)/(-6 + x),x]
```

output
```
-10*(-6 + x) - Log[-6 + x]
```

3.655.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{59-10x}{x-6} \, dx$$

$$\Big\downarrow \; 49$$

$$\int \left(\frac{1}{6-x}-10\right)dx$$

$$\Big\downarrow \; 2009$$

$$-10x-\log(6-x)$$

input
```
Int[(59 - 10*x)/(-6 + x),x]
```

output
```
-10*x - Log[6 - x]
```

3.655.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.655.4 Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

method	result	size
default	$-10x-\ln\left(-6+x\right)$	11
norman	$-10x-\ln\left(-6+x\right)$	11
risch	$-10x-\ln\left(-6+x\right)$	11
parallelrisch	$-10x-\ln\left(-6+x\right)$	11
meijerg	$-\ln\left(1-\frac{x}{6}\right)-10x$	13

input
```
int((-10*x+59)/(-6+x),x,method=_RETURNVERBOSE)
```

output
```
-10*x-ln(-6+x)
```

3.655.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{59-10x}{-6+x}\,dx=-10\,x-\log\left(x-6\right)$$

input
```
integrate((-10*x+59)/(-6+x),x, algorithm=\
```

output
```
-10*x - log(x - 6)
```

3.655.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.67

$$\int \frac{59-10x}{-6+x}\,dx=-10x-\log\left(x-6\right)$$

input
```
integrate((-10*x+59)/(-6+x),x)
```

output
```
-10*x - log(x - 6)
```

3.655.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{59-10x}{-6+x}\,dx = -10\,x - \log\left(x-6\right)$$

input
```
integrate((-10*x+59)/(-6+x),x, algorithm=\
```

output
```
-10*x - log(x - 6)
```

3.655.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \frac{59-10x}{-6+x}\,dx = -10\,x - \log\left(|x-6|\right)$$

input
```
integrate((-10*x+59)/(-6+x),x, algorithm=\
```

output
```
-10*x - log(abs(x - 6))
```

3.655.9 Mupad [B] (verification not implemented)

Time = 13.90 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{59-10x}{-6+x}\,dx = -10\,x - \ln\left(x-6\right)$$

input
```
int(-(10*x - 59)/(x - 6),x)
```

output
```
- 10*x - log(x - 6)
```

3.656 $\int \frac{-8+e^3(4-8x)+32x^2+(4-8x)\log(x^2)}{x}\,dx$

3.656.1 Optimal result

Integrand size = 30, antiderivative size = 14

$$\int \frac{-8+e^3(4-8x)+32x^2+(4-8x)\log(x^2)}{x}\,dx = \left(-2+e^3-4x+\log\left(x^2\right)\right)^2$$

output
```
(ln(x^2)-4*x+exp(3)-2)^2
```

3.656.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 39 vs. 2(14) = 28.

Time = 0.00 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.79

$$\int \frac{-8+e^3(4-8x)+32x^2+(4-8x)\log(x^2)}{x}\,dx$$
$$= 16x-8e^3x+16x^2-8\log(x)+4e^3\log(x)-8x\log\left(x^2\right)+\log^2\left(x^2\right)$$

input
```
Integrate[(-8 + E^3*(4 - 8*x) + 32*x^2 + (4 - 8*x)*Log[x^2])/x,x]
```

output
```
16*x - 8*E^3*x + 16*x^2 - 8*Log[x] + 4*E^3*Log[x] - 8*x*Log[x^2] + Log[x^2
]^2
```

3.656.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 39 vs. $2(14) = 28$.

Time = 0.21 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.79, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.067$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{32x^2 + (4-8x)\log(x^2) + e^3(4-8x) - 8}{x} \, dx$$
$$\Big\downarrow \text{2010}$$
$$\int \left(\frac{4(2x-1)(4x-e^3+2)}{x} - \frac{4(2x-1)\log(x^2)}{x} \right) dx$$
$$\Big\downarrow \text{2009}$$
$$16x^2 + \log^2(x^2) - 8x\log(x^2) - 8e^3x + 16x - 4(2-e^3)\log(x)$$

input
```
Int[(-8 + E^3*(4 - 8*x) + 32*x^2 + (4 - 8*x)*Log[x^2])/x,x]
```

output
```
16*x - 8*E^3*x + 16*x^2 - 4*(2 - E^3)*Log[x] - 8*x*Log[x^2] + Log[x^2]^2
```

3.656.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.656.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 38 vs. 2(13) = 26.

Time = 0.18 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.79

method	result	size
norman	$\ln\left(x^2\right)^2+\left(16-8\,\mathrm{e}^3\right)x+\left(2\,\mathrm{e}^3-4\right)\ln\left(x^2\right)+16x^2-8x\ln\left(x^2\right)$	39
parallelrisch	$-8x\,\mathrm{e}^3+2\,\mathrm{e}^3\ln\left(x^2\right)+16x^2-8x\ln\left(x^2\right)+\ln\left(x^2\right)^2+16x-4\ln\left(x^2\right)$	42
default	$16x^2-8x\,\mathrm{e}^3-4(2-\mathrm{e}^3)\ln\left(x\right)+4\ln\left(x\right)\ln\left(x^2\right)-4\ln\left(x\right)^2-8x\ln\left(x^2\right)+16x$	46
risch	$-4\ln\left(x\right)^2+4\ln\left(x\right)\ln\left(x^2\right)+4\ln\left(x\right)\mathrm{e}^3-8x\ln\left(x^2\right)-8x\,\mathrm{e}^3+16x^2-8\ln\left(x\right)+16x$	46
parts	$16x^2-8x\,\mathrm{e}^3-4(2-\mathrm{e}^3)\ln\left(x\right)+4\ln\left(x\right)\ln\left(x^2\right)-4\ln\left(x\right)^2-8x\ln\left(x^2\right)+16x$	46

input
```
int(((-8*x+4)*ln(x^2)+(-8*x+4)*exp(3)+32*x^2-8)/x,x,method=_RETURNVERBOSE)
```

output
```
ln(x^2)^2+(16-8*exp(3))*x+(2*exp(3)-4)*ln(x^2)+16*x^2-8*x*ln(x^2)
```

3.656.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. 2(17) = 34.

Time = 0.24 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.50

$$\int \frac{-8+e^3(4-8x)+32x^2+(4-8x)\log\left(x^2\right)}{x}\,dx$$
$$=16\,x^2-8\,xe^3-2\left(4\,x-e^3+2\right)\log\left(x^2\right)+\log\left(x^2\right)^2+16\,x$$

input
```
integrate(((-8*x+4)*log(x^2)+(-8*x+4)*exp(3)+32*x^2-8)/x,x, algorithm=\
```

output
```
16*x^2 - 8*x*e^3 - 2*(4*x - e^3 + 2)*log(x^2) + log(x^2)^2 + 16*x
```

3.656.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(14) = 28$.

Time = 0.11 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.64

$$\int \frac{-8 + e^3(4 - 8x) + 32x^2 + (4 - 8x)\log(x^2)}{x}\,dx$$
$$= 16x^2 - 8x\log(x^2) + x(16 - 8e^3) + 4(-2 + e^3)\log(x) + \log(x^2)^2$$

input
```
integrate(((-8*x+4)*ln(x**2)+(-8*x+4)*exp(3)+32*x**2-8)/x,x)
```

output
```
16*x**2 - 8*x*log(x**2) + x*(16 - 8*exp(3)) + 4*(-2 + exp(3))*log(x) + log
(x**2)**2
```

3.656.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(17) = 34$.

Time = 0.21 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.64

$$\int \frac{-8 + e^3(4 - 8x) + 32x^2 + (4 - 8x)\log(x^2)}{x}\,dx$$
$$= 16\,x^2 - 8\,xe^3 - 8\,x\log(x^2) + \log(x^2)^2 + 4\,e^3\log(x) + 16\,x - 8\,\log(x)$$

input
```
integrate(((-8*x+4)*log(x^2)+(-8*x+4)*exp(3)+32*x^2-8)/x,x, algorithm=\
```

output
```
16*x^2 - 8*x*e^3 - 8*x*log(x^2) + log(x^2)^2 + 4*e^3*log(x) + 16*x - 8*log
(x)
```

3.656.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(17) = 34$.

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.64

$$\int \frac{-8 + e^3(4 - 8x) + 32x^2 + (4 - 8x)\log(x^2)}{x}\,dx$$
$$= 16\,x^2 - 8\,xe^3 - 8\,x\log(x^2) + \log(x^2)^2 + 4\,e^3\log(x) + 16\,x - 8\,\log(x)$$

input
```
integrate(((-8*x+4)*log(x^2)+(-8*x+4)*exp(3)+32*x^2-8)/x,x, algorithm=\
```

output
```
16*x^2 - 8*x*e^3 - 8*x*log(x^2) + log(x^2)^2 + 4*e^3*log(x) + 16*x - 8*log
(x)
```

3.656.9 Mupad [B] (verification not implemented)

Time = 13.54 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.86

$$\int \frac{-8+e^3(4-8x)+32x^2+(4-8x)\log(x^2)}{x}\,dx = \left(4\,x-\ln\left(x^2\right)\right)\,\left(4\,x-\ln\left(x^2\right)-2\,\mathrm{e}^3+4\right)$$

input
```
int(-(log(x^2)*(8*x - 4) - 32*x^2 + exp(3)*(8*x - 4) + 8)/x,x)
```

output
```
(4*x - log(x^2))*(4*x - log(x^2) - 2*exp(3) + 4)
```

3.657 $\int \frac{15+\left(6x+2e^2x\right)\log^2(15)}{\left(6x^2+2e^2x^2\right)\log^2(15)}\,dx$

3.657.1 Optimal result

Integrand size = 38, antiderivative size = 24

$$\int \frac{15+(6x+2e^2x)\log^2(15)}{(6x^2+2e^2x^2)\log^2(15)}\,dx=\frac{5(-3+x)}{2\left(3+e^2\right)x\log^2(15)}+\log(x)$$

output
```
5/2/x/(exp(2)+3)/ln(15)^2*(-3+x)+ln(x)
```

3.657.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{15+(6x+2e^2x)\log^2(15)}{(6x^2+2e^2x^2)\log^2(15)}\,dx=-\frac{15}{2\left(3+e^2\right)x\log^2(15)}+\log(x)$$

input
```
Integrate[(15 + (6*x + 2*E^2*x)*Log[15]^2)/((6*x^2 + 2*E^2*x^2)*Log[15]^2)
,x]
```

output
```
-15/(2*(3 + E^2)*x*Log[15]^2) + Log[x]
```

3.657.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {6, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2e^2x+6x)\log^2(15)+15}{(2e^2x^2+6x^2)\log^2(15)}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{(2e^2x+6x)\log^2(15)+15}{(6+2e^2)\,x^2\log^2(15)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\int \frac{2(3+e^2)\log^2(15)x+15}{x^2}dx}{2(3+e^2)\log^2(15)}$$

$$\Big\downarrow \text{ 49}$$

$$\frac{\int \left(\frac{2(3+e^2)\log^2(15)}{x}+\frac{15}{x^2}\right)dx}{2(3+e^2)\log^2(15)}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{2(3+e^2)\log^2(15)\log(x)-\frac{15}{x}}{2(3+e^2)\log^2(15)}$$

input
```
Int[(15 + (6*x + 2*E^2*x)*Log[15]^2)/((6*x^2 + 2*E^2*x^2)*Log[15]^2),x]
```

output
```
(-15/x + 2*(3 + E^2)*Log[15]^2*Log[x])/(2*(3 + E^2)*Log[15]^2)
```

3.657.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.657.4 Maple [A] (verified)

Time = 0.93 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

method	result	size
norman	$-\frac{15}{2 \ln \left(15\right)^{2} \left({\mathrm e}^{2}+3\right) x}+\ln \left(x \right)$	19
default	$\frac{-\frac{15}{x}+2 \ln \left(15\right)^{2} \left({\mathrm e}^{2}+3\right) \ln \left(x \right)}{2 \ln \left(15\right)^{2} \left({\mathrm e}^{2}+3\right)}$	31
parallelrisch	$\frac{2 \ln \left(15\right)^{2} \ln \left(x \right) x \,{\mathrm e}^{2}+6 \ln \left(15\right)^{2} \ln \left(x \right) x -15}{2 \ln \left(15\right)^{2} \left({\mathrm e}^{2}+3\right) x}$	38
risch	$-\frac{15}{2 \left(\ln \left(3\right)+\ln \left(5\right)\right)^{2} x \left({\mathrm e}^{2}+3\right)}+\frac{\ln \left(x \right) \ln \left(3\right)^{2}}{\left(\ln \left(3\right)+\ln \left(5\right)\right)^{2}}+\frac{2 \ln \left(x \right) \ln \left(5\right) \ln \left(3\right)}{\left(\ln \left(3\right)+\ln \left(5\right)\right)^{2}}+\frac{\ln \left(x \right) \ln \left(5\right)^{2}}{\left(\ln \left(3\right)+\ln \left(5\right)\right)^{2}}$	63

input
```
int(((2*exp(2)*x+6*x)*ln(15)^2+15)/(2*x^2*exp(2)+6*x^2)/ln(15)^2,x,method=
_RETURNVERBOSE)
```

output
```
-15/2/ln(15)^2/(exp(2)+3)/x+ln(x)
```

3.657.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{15+(6x+2e^2x)\log^2(15)}{(6x^2+2e^2x^2)\log^2(15)}\,dx = \frac{2\,(xe^2+3\,x)\log{(15)}^2\log{(x)}-15}{2\,(xe^2+3\,x)\log{(15)}^2}$$

input
```
integrate(((2*exp(2)*x+6*x)*log(15)^2+15)/(2*x^2*exp(2)+6*x^2)/log(15)^2,x
, algorithm=\
```

output
```
1/2*(2*(x*e^2 + 3*x)*log(15)^2*log(x) - 15)/((x*e^2 + 3*x)*log(15)^2)
```

3.657.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{15+(6x+2e^2x)\log^2(15)}{(6x^2+2e^2x^2)\log^2(15)}\,dx = \frac{2\cdot(3+e^2)\log{(15)}^2\log{(x)}-\frac{15}{x}}{6\log{(15)}^2+2e^2\log{(15)}^2}$$

input
```
integrate(((2*exp(2)*x+6*x)*ln(15)**2+15)/(2*x**2*exp(2)+6*x**2)/ln(15)**2
,x)
```

output
```
(2*(3 + exp(2))*log(15)**2*log(x) - 15/x)/(6*log(15)**2 + 2*exp(2)*log(15)
**2)
```

3.657.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{15+(6x+2e^2x)\log^2(15)}{(6x^2+2e^2x^2)\log^2(15)}\,dx = \frac{2\,\log{(15)}^2\log{(x)}-\frac{15}{x(e^2+3)}}{2\,\log{(15)}^2}$$

input
```
integrate(((2*exp(2)*x+6*x)*log(15)^2+15)/(2*x^2*exp(2)+6*x^2)/log(15)^2,x
, algorithm=\
```

output
```
1/2*(2*log(15)^2*log(x) - 15/(x*(e^2 + 3)))/log(15)^2
```

3.657.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{15+(6x+2e^2x)\log^2(15)}{(6x^2+2e^2x^2)\log^2(15)}\,dx = \frac{2\log(15)^2\log(|x|)-\frac{15}{x(e^2+3)}}{2\log(15)^2}$$

input
```
integrate(((2*exp(2)*x+6*x)*log(15)^2+15)/(2*x^2*exp(2)+6*x^2)/log(15)^2,x
, algorithm=\
```

output
```
1/2*(2*log(15)^2*log(abs(x)) - 15/(x*(e^2 + 3)))/log(15)^2
```

3.657.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04

$$\int \frac{15+(6x+2e^2x)\log^2(15)}{(6x^2+2e^2x^2)\log^2(15)}\,dx = \ln(x)-\frac{15}{x\left(2\,e^2\ln(15)^2+6\ln(15)^2\right)}$$

input
```
int((log(15)^2*(6*x + 2*x*exp(2)) + 15)/(log(15)^2*(2*x^2*exp(2) + 6*x^2))
,x)
```

output
```
log(x) - 15/(x*(2*exp(2)*log(15)^2 + 6*log(15)^2))
```

3.658 $\int \frac{e^{2x}(864+10368x)+e^{2x}(72+1728x)\log(5x)+72e^{2x}x\log^2(5x)}{x}\,dx$

3.658.1 Optimal result

Integrand size = 45, antiderivative size = 18

$$\int \frac{e^{2x}(864+10368x)+e^{2x}(72+1728x)\log(5x)+72e^{2x}x\log^2(5x)}{x}\,dx = 36\left(-3+e^{2x}(12+\log(5x))^2\right)$$

output
```
36*(ln(5*x)+12)^2*exp(x)^2-108
```

3.658.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{e^{2x}(864+10368x)+e^{2x}(72+1728x)\log(5x)+72e^{2x}x\log^2(5x)}{x}\,dx = 36e^{2x}(12+\log(5x))^2$$

input
```
Integrate[(E^(2*x)*(864 + 10368*x) + E^(2*x)*(72 + 1728*x)*Log[5*x] + 72*E
^(2*x)*x*Log[5*x]^2)/x,x]
```

output
```
36*E^(2*x)*(12 + Log[5*x])^2
```

3.658.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}(10368x+864)+72e^{2x}x\log^2(5x)+e^{2x}(1728x+72)\log(5x)}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(10368e^{2x}+\frac{864e^{2x}}{x}+72e^{2x}\log^2(5x)+1728e^{2x}\log(5x)+\frac{72e^{2x}\log(5x)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$72\int e^{2x}\log^2(5x)dx-144x\,{}_3F_3(1,1,1;2,2,2;2x)-72\log(x)(\text{ExpIntegralE}(1,-2x)+\text{ExpIntegralEi}(2x))+72\,\text{ExpIntegralEi}(2x)\log(5x)+5184e^{2x}-36\log^2(-2x)-72\gamma\log(x)+864e^{2x}\log(5x)$$

input
```
Int[(E^(2*x)*(864 + 10368*x) + E^(2*x)*(72 + 1728*x)*Log[5*x] + 72*E^(2*x)
*x*Log[5*x]^2)/x,x]
```

output
```
$Aborted
```

3.658.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.658.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.67

method	result	size
norman	$5184\,\mathrm{e}^{2x}+864\,\mathrm{e}^{2x}\ln\left(5x\right)+36\,\mathrm{e}^{2x}\ln\left(5x\right)^{2}$	30
risch	$5184\,\mathrm{e}^{2x}+864\,\mathrm{e}^{2x}\ln\left(5x\right)+36\,\mathrm{e}^{2x}\ln\left(5x\right)^{2}$	30
parallelrisch	$5184\,\mathrm{e}^{2x}+864\,\mathrm{e}^{2x}\ln\left(5x\right)+36\,\mathrm{e}^{2x}\ln\left(5x\right)^{2}$	30

input
```
int((72*x*exp(x)^2*ln(5*x)^2+(1728*x+72)*exp(x)^2*ln(5*x)+(10368*x+864)*ex
p(x)^2)/x,x,method=_RETURNVERBOSE)
```

output
```
5184*exp(x)^2+864*exp(x)^2*ln(5*x)+36*exp(x)^2*ln(5*x)^2
```

3.658.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.61

$$\int \frac{e^{2x}(864+10368x)+e^{2x}(72+1728x)\log(5x)+72e^{2x}x\log^2(5x)}{x}\,dx = 36\,e^{(2\,x)}\log\left(5\,x\right)^{2}+864\,e^{(2\,x)}\log\left(5\,x\right)+5184\,e^{(2\,x)}$$

input
```
integrate((72*x*exp(x)^2*log(5*x)^2+(1728*x+72)*exp(x)^2*log(5*x)+(10368*x
+864)*exp(x)^2)/x,x, algorithm=\
```

output
```
36*e^(2*x)*log(5*x)^2 + 864*e^(2*x)*log(5*x) + 5184*e^(2*x)
```

3.658.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{e^{2x}(864+10368x)+e^{2x}(72+1728x)\log(5x)+72e^{2x}x\log^2(5x)}{x}\,dx = \left(36\log\left(5x\right)^{2}+864\log\left(5x\right)+5184\right)e^{2x}$$

input
```
integrate((72*x*exp(x)**2*ln(5*x)**2+(1728*x+72)*exp(x)**2*ln(5*x)+(10368*
x+864)*exp(x)**2)/x,x)
```

output
```
(36*log(5*x)**2 + 864*log(5*x) + 5184)*exp(2*x)
```

3.658.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 38 vs. 2(16) = 32.

Time = 0.34 (sec) , antiderivative size = 38, normalized size of antiderivative = 2.11

$$\int \frac{e^{2x}(864+10368x)+e^{2x}(72+1728x)\log(5x)+72e^{2x}x\log^2(5x)}{x}\,dx$$
$$= 36\left(\log(5)^2+2\log(5)\log(x)+\log(x)^2\right)e^{(2x)}+864\,e^{(2x)}\log(5x)+5184\,e^{(2x)}$$

input
```
integrate((72*x*exp(x)^2*log(5*x)^2+(1728*x+72)*exp(x)^2*log(5*x)+(10368*x
+864)*exp(x)^2)/x,x, algorithm=\
```

output
```
36*(log(5)^2 + 2*log(5)*log(x) + log(x)^2)*e^(2*x) + 864*e^(2*x)*log(5*x)
+ 5184*e^(2*x)
```

3.658.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.61

$$\int \frac{e^{2x}(864+10368x)+e^{2x}(72+1728x)\log(5x)+72e^{2x}x\log^2(5x)}{x}\,dx$$
$$= 36\,e^{(2x)}\log(5x)^2+864\,e^{(2x)}\log(5x)+5184\,e^{(2x)}$$

input
```
integrate((72*x*exp(x)^2*log(5*x)^2+(1728*x+72)*exp(x)^2*log(5*x)+(10368*x
+864)*exp(x)^2)/x,x, algorithm=\
```

output
```
36*e^(2*x)*log(5*x)^2 + 864*e^(2*x)*log(5*x) + 5184*e^(2*x)
```

3.658.9 Mupad [B] (verification not implemented)

Time = 13.86 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{e^{2x}(864+10368x)+e^{2x}(72+1728x)\log(5x)+72e^{2x}x\log^2(5x)}{x}\,dx$$
$$=36\,\mathrm{e}^{2\,x}\,\left(\ln\left(5\,x\right)+12\right)^2$$

input
```
int((exp(2*x)*(10368*x + 864) + log(5*x)*exp(2*x)*(1728*x + 72) + 72*x*log
(5*x)^2*exp(2*x))/x,x)
```

output
```
36*exp(2*x)*(log(5*x) + 12)^2
```

3.659 $\int \frac{-72x+144x^2-108x^3+10x^4+15x^5+(-48x^2-72x^3)\log(x)+(-12x^2+\cdots}{\cdots}$

3.659.1 Optimal result

Integrand size = 490, antiderivative size = 30

$$\int \frac{-72x+144x^2-108x^3+10x^4+15x^5+(-48x^2-72x^3)\log(x)+(-12x^2+12x^3-36x^4)\log^2(x)+(-8\cdots}{-72x^2-\cdots}$$

$$= x+\log\left(5-\left(-\log^2(x)+\frac{6}{-x+\log(2+3x)}\right)^2\right)$$

output
```
x+ln(5-(2/(1/3*ln(2+3*x)-1/3*x)-ln(x)^2)^2)
```

3.659.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 95 vs. 2(30) = 60.

Time = 0.46 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.17

$$\int \frac{-72x+144x^2-108x^3+10x^4+15x^5+(-48x^2-72x^3)\log(x)+(-12x^2+12x^3-36x^4)\log^2(x)+(-8\cdots}{-72x^2-\cdots}$$

$$= x-2\log(x-\log(2+3x))+\log\left(36-5x^2+12x\log^2(x)+x^2\log^4(x)+10x\log(2+3x)\right.$$
$$\left.-12\log^2(x)\log(2+3x)-2x\log^4(x)\log(2+3x)-5\log^2(2+3x)+\log^4(x)\log^2(2+3x)\right)$$

3.659.
$\int \frac{-72x+144x^2-108x^3+10x^4+15x^5+(-48x^2-72x^3)\log(x)+(-12x^2+12x^3-36x^4)\log^2(x)+(-8x^3-12x^4)\log^3(x)+(-2x^4-3x^5)\log^4(x)+(72x+\cdots}{-72x^2-108x^3+10x^4+15x^5+(-24x^3-36x^4)\log^2(x)+(-\cdots}$

input
```
Integrate[(-72*x + 144*x^2 - 108*x^3 + 10*x^4 + 15*x^5 + (-48*x^2 - 72*x^3
)*Log[x] + (-12*x^2 + 12*x^3 - 36*x^4)*Log[x]^2 + (-8*x^3 - 12*x^4)*Log[x]
^3 + (-2*x^4 - 3*x^5)*Log[x]^4 + (72*x + 108*x^2 - 30*x^3 - 45*x^4 + (96*x
 + 144*x^2)*Log[x] + (12*x + 12*x^2 + 72*x^3)*Log[x]^2 + (24*x^2 + 36*x^3)
*Log[x]^3 + (6*x^3 + 9*x^4)*Log[x]^4)*Log[2 + 3*x] + (30*x^2 + 45*x^3 + (-
48 - 72*x)*Log[x] + (-24*x - 36*x^2)*Log[x]^2 + (-24*x - 36*x^2)*Log[x]^3
+ (-6*x^2 - 9*x^3)*Log[x]^4)*Log[2 + 3*x]^2 + (-10*x - 15*x^2 + (8 + 12*x)
*Log[x]^3 + (2*x + 3*x^2)*Log[x]^4)*Log[2 + 3*x]^3)/(-72*x^2 - 108*x^3 + 1
0*x^4 + 15*x^5 + (-24*x^3 - 36*x^4)*Log[x]^2 + (-2*x^4 - 3*x^5)*Log[x]^4 +
 (72*x + 108*x^2 - 30*x^3 - 45*x^4 + (48*x^2 + 72*x^3)*Log[x]^2 + (6*x^3 +
 9*x^4)*Log[x]^4)*Log[2 + 3*x] + (30*x^2 + 45*x^3 + (-24*x - 36*x^2)*Log[x
]^2 + (-6*x^2 - 9*x^3)*Log[x]^4)*Log[2 + 3*x]^2 + (-10*x - 15*x^2 + (2*x +
 3*x^2)*Log[x]^4)*Log[2 + 3*x]^3),x]
```

output
```
x - 2*Log[x - Log[2 + 3*x]] + Log[36 - 5*x^2 + 12*x*Log[x]^2 + x^2*Log[x]^
4 + 10*x*Log[2 + 3*x] - 12*Log[x]^2*Log[2 + 3*x] - 2*x*Log[x]^4*Log[2 + 3*
x] - 5*Log[2 + 3*x]^2 + Log[x]^4*Log[2 + 3*x]^2]
```

3.659.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{15x^5 + 10x^4 - 108x^3 + 144x^2 + \left(-15x^2 + \left(3x^2 + 2x\right)\log^4(x) - 10x + (12x+8)\log^3(x)\right)\log^3(3x+2) + \left(-3x\right.}{15x^5 + 10x^4 -}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{12x\left(x\left(3x^2 - x + 1\right) - \left(6x^2 + x + 1\right)\log(3x+2) + (3x+2)\log^2(3x+2)\right)\log^2(x) + x\left(-15x^4 - 10x^3 + 108x^2\right.}{x(3x+2)(}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2\left(75x^3 + 3x^3\log^8(x) - 30x^3\log^4(x) - 25x^2 - x^2\log^8(x) - 3x^2\log(3x+2)\log^8(x) + 18x^2\log^6(x) - 36x^2\log\right.}{}\right.$$

$$\Big\downarrow \text{ 7299}$$

$$\int \left(\frac{2\left(75x^3 + 3x^3\log^8(x) - 30x^3\log^4(x) - 25x^2 - x^2\log^8(x) - 3x^2\log(3x+2)\log^8(x) + 18x^2\log^6(x) - 36x^2\log\right.}{}\right.$$

input
```
Int[(-72*x + 144*x^2 - 108*x^3 + 10*x^4 + 15*x^5 + (-48*x^2 - 72*x^3)*Log[
x] + (-12*x^2 + 12*x^3 - 36*x^4)*Log[x]^2 + (-8*x^3 - 12*x^4)*Log[x]^3 + (
-2*x^4 - 3*x^5)*Log[x]^4 + (72*x + 108*x^2 - 30*x^3 - 45*x^4 + (96*x + 144
*x^2)*Log[x] + (12*x + 12*x^2 + 72*x^3)*Log[x]^2 + (24*x^2 + 36*x^3)*Log[x
]^3 + (6*x^3 + 9*x^4)*Log[x]^4)*Log[2 + 3*x] + (30*x^2 + 45*x^3 + (-48 - 7
2*x)*Log[x] + (-24*x - 36*x^2)*Log[x]^2 + (-24*x - 36*x^2)*Log[x]^3 + (-6*
x^2 - 9*x^3)*Log[x]^4)*Log[2 + 3*x]^2 + (-10*x - 15*x^2 + (8 + 12*x)*Log[x
]^3 + (2*x + 3*x^2)*Log[x]^4)*Log[2 + 3*x]^3)/(-72*x^2 - 108*x^3 + 10*x^4
+ 15*x^5 + (-24*x^3 - 36*x^4)*Log[x]^2 + (-2*x^4 - 3*x^5)*Log[x]^4 + (72*x
 + 108*x^2 - 30*x^3 - 45*x^4 + (48*x^2 + 72*x^3)*Log[x]^2 + (6*x^3 + 9*x^4
)*Log[x]^4)*Log[2 + 3*x] + (30*x^2 + 45*x^3 + (-24*x - 36*x^2)*Log[x]^2 +
(-6*x^2 - 9*x^3)*Log[x]^4)*Log[2 + 3*x]^2 + (-10*x - 15*x^2 + (2*x + 3*x^2
)*Log[x]^4)*Log[2 + 3*x]^3),x]
```

output
```
$Aborted
```

3.659.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

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$$\int \frac{-72x+144x^2-108x^3+10x^4+15x^5+(-48x^2-72x^3)\log(x)+(-12x^2+12x^3-36x^4)\log^2(x)+(-8x^3-12x^4)\log^3(x)+(-2x^4-3x^5)\log^4(x)+(72x+}{-72x^2-108x^3+10x^4+15x^5+(-24x^3-36x^4)\log^2(x)+(-}$$

3.659.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(32) = 64$.

Time = 11.30 (sec) , antiderivative size = 96, normalized size of antiderivative = 3.20

method	result
default	$\ln\left(\ln(x)^4-5\right)+x-2\ln\left(-x+\ln(2+3x)\right)+\ln\left(\ln(2+3x)^2-\frac{2\left(x\ln(x)^4+6\ln(x)^2-5x\right)\ln(2+3}{\ln(x)^4-5}\right.$
risch	$\ln\left(\ln(x)^4-5\right)+x-2\ln\left(-x+\ln(2+3x)\right)+\ln\left(\ln(2+3x)^2-\frac{2\left(x\ln(x)^4+6\ln(x)^2-5x\right)\ln(2+3}{\ln(x)^4-5}\right.$
parallelrisch	$-\frac{4}{3}-2\ln\left(x-\ln(2+3x)\right)+\ln\left(x^2\ln(x)^4-2\ln(x)^4\ln(2+3x)x+\ln(x)^4\ln(2+3x)^2+\right.$

input
```
int((((3*x^2+2*x)*ln(x)^4+(12*x+8)*ln(x)^3-15*x^2-10*x)*ln(2+3*x)^3+((-9*x
^3-6*x^2)*ln(x)^4+(-36*x^2-24*x)*ln(x)^3+(-36*x^2-24*x)*ln(x)^2+(-72*x-48)
*ln(x)+45*x^3+30*x^2)*ln(2+3*x)^2+((9*x^4+6*x^3)*ln(x)^4+(36*x^3+24*x^2)*l
n(x)^3+(72*x^3+12*x^2+12*x)*ln(x)^2+(144*x^2+96*x)*ln(x)-45*x^4-30*x^3+108
*x^2+72*x)*ln(2+3*x)+(-3*x^5-2*x^4)*ln(x)^4+(-12*x^4-8*x^3)*ln(x)^3+(-36*x
^4+12*x^3-12*x^2)*ln(x)^2+(-72*x^3-48*x^2)*ln(x)+15*x^5+10*x^4-108*x^3+144
*x^2-72*x)/(((3*x^2+2*x)*ln(x)^4-15*x^2-10*x)*ln(2+3*x)^3+((-9*x^3-6*x^2)*
ln(x)^4+(-36*x^2-24*x)*ln(x)^2+45*x^3+30*x^2)*ln(2+3*x)^2+((9*x^4+6*x^3)*l
n(x)^4+(72*x^3+48*x^2)*ln(x)^2-45*x^4-30*x^3+108*x^2+72*x)*ln(2+3*x)+(-3*x
^5-2*x^4)*ln(x)^4+(-36*x^4-24*x^3)*ln(x)^2+15*x^5+10*x^4-108*x^3-72*x^2),x
,method=_RETURNVERBOSE)
```

output
```
ln(ln(x)^4-5)+x-2*ln(-x+ln(2+3*x))+ln(ln(2+3*x)^2-2*(x*ln(x)^4+6*ln(x)^2-5
*x)/(ln(x)^4-5)*ln(2+3*x)+(x^2*ln(x)^4+12*x*ln(x)^2-5*x^2+36)/(ln(x)^4-5))
```

3.659.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. $2(28) = 56$.

Time = 0.29 (sec) , antiderivative size = 93, normalized size of antiderivative = 3.10

$$\int \frac{-72x+144x^2-108x^3+10x^4+15x^5+(-48x^2-72x^3)\log(x)+(-12x^2+12x^3-36x^4)\log^2(x)+(-8}{-72x^2-1}$$

$$= x+\log\left(\log(x)^4-5\right)-2\,\log\left(-x+\log(3\,x+2)\right)$$

$$+\log\left(\frac{x^2\log(x)^4+\left(\log(x)^4-5\right)\log(3\,x+2)^2+12\,x\log(x)^2-5\,x^2-2\left(x\log(x)^4+6\,\log(x)^2-5\,x\right)}{\log(x)^4-5}\right.$$

input

```
integrate((((3*x^2+2*x)*log(x)^4+(12*x+8)*log(x)^3-15*x^2-10*x)*log(2+3*x)
^3+((-9*x^3-6*x^2)*log(x)^4+(-36*x^2-24*x)*log(x)^3+(-36*x^2-24*x)*log(x)^
2+(-72*x-48)*log(x)+45*x^3+30*x^2)*log(2+3*x)^2+((9*x^4+6*x^3)*log(x)^4+(3
6*x^3+24*x^2)*log(x)^3+(72*x^3+12*x^2+12*x)*log(x)^2+(144*x^2+96*x)*log(x)
-45*x^4-30*x^3+108*x^2+72*x)*log(2+3*x)+(-3*x^5-2*x^4)*log(x)^4+(-12*x^4-8
*x^3)*log(x)^3+(-36*x^4+12*x^3-12*x^2)*log(x)^2+(-72*x^3-48*x^2)*log(x)+15
*x^5+10*x^4-108*x^3+144*x^2-72*x)/(((3*x^2+2*x)*log(x)^4-15*x^2-10*x)*log(
2+3*x)^3+((-9*x^3-6*x^2)*log(x)^4+(-36*x^2-24*x)*log(x)^2+45*x^3+30*x^2)*l
og(2+3*x)^2+((9*x^4+6*x^3)*log(x)^4+(72*x^3+48*x^2)*log(x)^2-45*x^4-30*x^3
+108*x^2+72*x)*log(2+3*x)+(-3*x^5-2*x^4)*log(x)^4+(-36*x^4-24*x^3)*log(x)^
2+15*x^5+10*x^4-108*x^3-72*x^2),x, algorithm=\
```

output

```
x + log(log(x)^4 - 5) - 2*log(-x + log(3*x + 2)) + log((x^2*log(x)^4 + (lo
g(x)^4 - 5)*log(3*x + 2)^2 + 12*x*log(x)^2 - 5*x^2 - 2*(x*log(x)^4 + 6*log
(x)^2 - 5*x)*log(3*x + 2) + 36)/(log(x)^4 - 5))
```

3.659.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{-72x + 144x^2 - 108x^3 + 10x^4 + 15x^5 + (-48x^2 - 72x^3)\log(x) + (-12x^2 + 12x^3 - 36x^4)\log^2(x) + (-8}{-72x^2 - 1}$$

= Exception raised: PolynomialError

input

```
integrate((((3*x**2+2*x)*ln(x)**4+(12*x+8)*ln(x)**3-15*x**2-10*x)*ln(2+3*x
)**3+((-9*x**3-6*x**2)*ln(x)**4+(-36*x**2-24*x)*ln(x)**3+(-36*x**2-24*x)*l
n(x)**2+(-72*x-48)*ln(x)+45*x**3+30*x**2)*ln(2+3*x)**2+((9*x**4+6*x**3)*ln
(x)**4+(36*x**3+24*x**2)*ln(x)**3+(72*x**3+12*x**2+12*x)*ln(x)**2+(144*x**
2+96*x)*ln(x)-45*x**4-30*x**3+108*x**2+72*x)*ln(2+3*x)+(-3*x**5-2*x**4)*ln
(x)**4+(-12*x**4-8*x**3)*ln(x)**3+(-36*x**4+12*x**3-12*x**2)*ln(x)**2+(-72
*x**3-48*x**2)*ln(x)+15*x**5+10*x**4-108*x**3+144*x**2-72*x)/(((3*x**2+2*x
)*ln(x)**4-15*x**2-10*x)*ln(2+3*x)**3+((-9*x**3-6*x**2)*ln(x)**4+(-36*x**2
-24*x)*ln(x)**2+45*x**3+30*x**2)*ln(2+3*x)**2+((9*x**4+6*x**3)*ln(x)**4+(7
2*x**3+48*x**2)*ln(x)**2-45*x**4-30*x**3+108*x**2+72*x)*ln(2+3*x)+(-3*x**5
-2*x**4)*ln(x)**4+(-36*x**4-24*x**3)*ln(x)**2+15*x**5+10*x**4-108*x**3-72*
x**2),x)
```

output
```
Exception raised: PolynomialError >> 1/(9*_t0**16*x**4 + 12*_t0**16*x**3 +
 4*_t0**16*x**2 - 180*_t0**12*x**4 - 240*_t0**12*x**3 - 80*_t0**12*x**2 +
1350*_t0**8*x**4 + 1800*_t0**8*x**3 + 600*_t0**8*x**2 - 4500*_t0**4*x**4 -
 6000*_t0**4*x*
```

3.659.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. $2(28) = 56$.

Time = 0.40 (sec) , antiderivative size = 93, normalized size of antiderivative = 3.10

$$\int \frac{-72x+144x^2-108x^3+10x^4+15x^5+(-48x^2-72x^3)\log(x)+(-12x^2+12x^3-36x^4)\log^2(x)+(-8}{-72x^2-1}$$

$$= x + \log\left(\log(x)^4 - 5\right) - 2\log\left(-x + \log(3x+2)\right) + \log\left(\frac{x^2\log(x)^4 + \left(\log(x)^4 - 5\right)\log(3x+2)^2 + 12x\log(x)^2 - 5x^2 - 2\left(x\log(x)^4 + 6\log(x)^2 - 5x\right)}{\log(x)^4 - 5}\right.$$

input
```
integrate((((3*x^2+2*x)*log(x)^4+(12*x+8)*log(x)^3-15*x^2-10*x)*log(2+3*x)
^3+((-9*x^3-6*x^2)*log(x)^4+(-36*x^2-24*x)*log(x)^3+(-36*x^2-24*x)*log(x)^
2+(-72*x-48)*log(x)+45*x^3+30*x^2)*log(2+3*x)^2+((9*x^4+6*x^3)*log(x)^4+(3
6*x^3+24*x^2)*log(x)^3+(72*x^3+12*x^2+12*x)*log(x)^2+(144*x^2+96*x)*log(x)
-45*x^4-30*x^3+108*x^2+72*x)*log(2+3*x)+(-3*x^5-2*x^4)*log(x)^4+(-12*x^4-8
*x^3)*log(x)^3+(-36*x^4+12*x^3-12*x^2)*log(x)^2+(-72*x^3-48*x^2)*log(x)+15
*x^5+10*x^4-108*x^3+144*x^2-72*x)/(((3*x^2+2*x)*log(x)^4-15*x^2-10*x)*log(
2+3*x)^3+((-9*x^3-6*x^2)*log(x)^4+(-36*x^2-24*x)*log(x)^2+45*x^3+30*x^2)*l
og(2+3*x)^2+((9*x^4+6*x^3)*log(x)^4+(72*x^3+48*x^2)*log(x)^2-45*x^4-30*x^3
+108*x^2+72*x)*log(2+3*x)+(-3*x^5-2*x^4)*log(x)^4+(-36*x^4-24*x^3)*log(x)^
2+15*x^5+10*x^4-108*x^3-72*x^2),x, algorithm=\
```

output
```
x + log(log(x)^4 - 5) - 2*log(-x + log(3*x + 2)) + log((x^2*log(x)^4 + (lo
g(x)^4 - 5)*log(3*x + 2)^2 + 12*x*log(x)^2 - 5*x^2 - 2*(x*log(x)^4 + 6*log
(x)^2 - 5*x)*log(3*x + 2) + 36)/(log(x)^4 - 5))
```

3.659.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(28) = 56$.

Time = 0.84 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.17

$$\int \frac{-72x + 144x^2 - 108x^3 + 10x^4 + 15x^5 + (-48x^2 - 72x^3)\log(x) + (-12x^2 + 12x^3 - 36x^4)\log^2(x) + (-8}{-72x^2 - 1}$$

$$= x + \log\left(x^2 \log(x)^4 - 2x\log(3x+2)\log(x)^4 + \log(3x+2)^2\log(x)^4 + 12x\log(x)^2 - 12\log(3x+2)\log(x)^2 - 5x^2 + 10x\log(3x+2) - 5\log(3x+2)^2 + 36\right) - 2\log(x - \log(3x+2))$$

input
```
integrate((((3*x^2+2*x)*log(x)^4+(12*x+8)*log(x)^3-15*x^2-10*x)*log(2+3*x)
^3+((-9*x^3-6*x^2)*log(x)^4+(-36*x^2-24*x)*log(x)^3+(-36*x^2-24*x)*log(x)^
2+(-72*x-48)*log(x)+45*x^3+30*x^2)*log(2+3*x)^2+((9*x^4+6*x^3)*log(x)^4+(3
6*x^3+24*x^2)*log(x)^3+(72*x^3+12*x^2+12*x)*log(x)^2+(144*x^2+96*x)*log(x)
-45*x^4-30*x^3+108*x^2+72*x)*log(2+3*x)+(-3*x^5-2*x^4)*log(x)^4+(-12*x^4-8
*x^3)*log(x)^3+(-36*x^4+12*x^3-12*x^2)*log(x)^2+(-72*x^3-48*x^2)*log(x)+15
*x^5+10*x^4-108*x^3+144*x^2-72*x)/(((3*x^2+2*x)*log(x)^4-15*x^2-10*x)*log(
2+3*x)^3+((-9*x^3-6*x^2)*log(x)^4+(-36*x^2-24*x)*log(x)^2+45*x^3+30*x^2)*l
og(2+3*x)^2+((9*x^4+6*x^3)*log(x)^4+(72*x^3+48*x^2)*log(x)^2-45*x^4-30*x^3
+108*x^2+72*x)*log(2+3*x)+(-3*x^5-2*x^4)*log(x)^4+(-36*x^4-24*x^3)*log(x)^
2+15*x^5+10*x^4-108*x^3-72*x^2),x, algorithm=\
```

output
```
x + log(x^2*log(x)^4 - 2*x*log(3*x + 2)*log(x)^4 + log(3*x + 2)^2*log(x)^4
 + 12*x*log(x)^2 - 12*log(3*x + 2)*log(x)^2 - 5*x^2 + 10*x*log(3*x + 2) -
5*log(3*x + 2)^2 + 36) - 2*log(x - log(3*x + 2))
```

3.659.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-72x + 144x^2 - 108x^3 + 10x^4 + 15x^5 + (-48x^2 - 72x^3)\log(x) + (-12x^2 + 12x^3 - 36x^4)\log^2(x) + (-8}{-72x^2 - 1}$$

$$= \int \frac{72x + \ln(x)\left(72x^3 + 48x^2\right) + \ln(3x+2)^2\left(\ln(x)^2\left(36x^2 + 24x\right) + \ln(x)^3\left(36x^2 + 24x\right) + \ln(x)^4\left(9x\right.\right.}{\ln(x)^4\left(3x^5\right.}$$

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$$\int \frac{-72x+144x^2-108x^3+10x^4+15x^5+(-48x^2-72x^3)\log(x)+(-12x^2+12x^3-36x^4)\log^2(x)+(-8x^3-12x^4)\log^3(x)+(-2x^4-3x^5)\log^4(x)+(72x+}{-72x^2-108x^3+10x^4+15x^5+(-24x^3-36x^4)\log^2(x)+(-}$$

input
```
int((72*x + log(x)*(48*x^2 + 72*x^3) + log(3*x + 2)^2*(log(x)^2*(24*x + 36
*x^2) + log(x)^3*(24*x + 36*x^2) + log(x)^4*(6*x^2 + 9*x^3) + log(x)*(72*x
 + 48) - 30*x^2 - 45*x^3) + log(x)^4*(2*x^4 + 3*x^5) + log(x)^3*(8*x^3 + 1
2*x^4) + log(x)^2*(12*x^2 - 12*x^3 + 36*x^4) - log(3*x + 2)*(72*x + log(x)
^2*(12*x + 12*x^2 + 72*x^3) + log(x)^4*(6*x^3 + 9*x^4) + log(x)^3*(24*x^2
+ 36*x^3) + log(x)*(96*x + 144*x^2) + 108*x^2 - 30*x^3 - 45*x^4) + log(3*x
 + 2)^3*(10*x - log(x)^4*(2*x + 3*x^2) + 15*x^2 - log(x)^3*(12*x + 8)) - 1
44*x^2 + 108*x^3 - 10*x^4 - 15*x^5)/(log(x)^4*(2*x^4 + 3*x^5) + log(x)^2*(
24*x^3 + 36*x^4) + log(3*x + 2)^2*(log(x)^2*(24*x + 36*x^2) + log(x)^4*(6*
x^2 + 9*x^3) - 30*x^2 - 45*x^3) - log(3*x + 2)*(72*x + log(x)^4*(6*x^3 + 9
*x^4) + log(x)^2*(48*x^2 + 72*x^3) + 108*x^2 - 30*x^3 - 45*x^4) + 72*x^2 +
 108*x^3 - 10*x^4 - 15*x^5 + log(3*x + 2)^3*(10*x - log(x)^4*(2*x + 3*x^2)
 + 15*x^2)),x)
```

output
```
int((72*x + log(x)*(48*x^2 + 72*x^3) + log(3*x + 2)^2*(log(x)^2*(24*x + 36
*x^2) + log(x)^3*(24*x + 36*x^2) + log(x)^4*(6*x^2 + 9*x^3) + log(x)*(72*x
 + 48) - 30*x^2 - 45*x^3) + log(x)^4*(2*x^4 + 3*x^5) + log(x)^3*(8*x^3 + 1
2*x^4) + log(x)^2*(12*x^2 - 12*x^3 + 36*x^4) - log(3*x + 2)*(72*x + log(x)
^2*(12*x + 12*x^2 + 72*x^3) + log(x)^4*(6*x^3 + 9*x^4) + log(x)^3*(24*x^2
+ 36*x^3) + log(x)*(96*x + 144*x^2) + 108*x^2 - 30*x^3 - 45*x^4) + log(3*x
 + 2)^3*(10*x - log(x)^4*(2*x + 3*x^2) + 15*x^2 - log(x)^3*(12*x + 8)) - 1
44*x^2 + 108*x^3 - 10*x^4 - 15*x^5)/(log(x)^4*(2*x^4 + 3*x^5) + log(x)^2*(
24*x^3 + 36*x^4) + log(3*x + 2)^2*(log(x)^2*(24*x + 36*x^2) + log(x)^4*(6*
x^2 + 9*x^3) - 30*x^2 - 45*x^3) - log(3*x + 2)*(72*x + log(x)^4*(6*x^3 + 9
*x^4) + log(x)^2*(48*x^2 + 72*x^3) + 108*x^2 - 30*x^3 - 45*x^4) + 72*x^2 +
 108*x^3 - 10*x^4 - 15*x^5 + log(3*x + 2)^3*(10*x - log(x)^4*(2*x + 3*x^2)
 + 15*x^2)), x)
```

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$$\int \frac{-72x+144x^2-108x^3+10x^4+15x^5+(-48x^2-72x^3)\log(x)+(-12x^2+12x^3-36x^4)\log^2(x)+(-8x^3-12x^4)\log^3(x)+(-2x^4-3x^5)\log^4(x)+(72x+}{-72x^2-108x^3+10x^4+15x^5+(-24x^3-36x^4)\log^2(x)+(-}$$

3.660 $\int \frac{-8+4e^{6+2x}x^2}{3x^2} dx$

3.660.1 Optimal result

Integrand size = 21, antiderivative size = 22

$$\int \frac{-8+4e^{6+2x}x^2}{3x^2} dx = -5+\frac{2(4+(6+e^{6+2x})\,x)}{3x}$$

output
```
2/3/x*(4+(exp(3)^2*exp(x)^2+6)*x)-5
```

3.660.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{-8+4e^{6+2x}x^2}{3x^2} dx = \frac{4}{3}\left(\frac{1}{2}e^{6+2x}+\frac{2}{x}\right)$$

input
```
Integrate[(-8 + 4*E^(6 + 2*x)*x^2)/(3*x^2),x]
```

output
```
(4*(E^(6 + 2*x)/2 + 2/x))/3
```

3.660.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4e^{2x+6}x^2-8}{3x^2}\,dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{3}\int -\frac{4(2-e^{2x+6}x^2)}{x^2}dx$$
$$\Big\downarrow \text{27}$$
$$-\frac{4}{3}\int \frac{2-e^{2x+6}x^2}{x^2}dx$$
$$\Big\downarrow \text{2010}$$
$$-\frac{4}{3}\int \left(\frac{2}{x^2}-e^{2x+6}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{4}{3}\left(-\frac{1}{2}e^{2x+6}-\frac{2}{x}\right)$$

input
```
Int[(-8 + 4*E^(6 + 2*x)*x^2)/(3*x^2),x]
```

output
```
(-4*(-1/2*E^(6 + 2*x) - 2/x))/3
```

3.660.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.660.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

method	result	size
risch	$\frac{2\,e^{2x+6}}{3}+\frac{8}{3x}$	15
default	$\frac{2\,e^{6}e^{2x}}{3}+\frac{8}{3x}$	17
parts	$\frac{2\,e^{6}e^{2x}}{3}+\frac{8}{3x}$	17
norman	$\frac{\frac{8}{3}+\frac{2x\,e^{6}e^{2x}}{3}}{x}$	18
parallelrisch	$\frac{8+2x\,e^{6}e^{2x}}{3x}$	19

input
```
int(1/3*(4*x^2*exp(3)^2*exp(x)^2-8)/x^2,x,method=_RETURNVERBOSE)
```

output
```
2/3*exp(2*x+6)+8/3/x
```

3.660.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{-8+4e^{6+2x}x^2}{3x^2}\,dx=\frac{2\left(xe^{(2\,x+6)}+4\right)}{3\,x}$$

input
```
integrate(1/3*(4*x^2*exp(3)^2*exp(x)^2-8)/x^2,x, algorithm=\
```

output
```
2/3*(x*e^(2*x + 6) + 4)/x
```

3.660.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{-8+4e^{6+2x}x^2}{3x^2}\,dx = \frac{2e^6e^{2x}}{3} + \frac{8}{3x}$$

input
```
integrate(1/3*(4*x**2*exp(3)**2*exp(x)**2-8)/x**2,x)
```

output
```
2*exp(6)*exp(2*x)/3 + 8/(3*x)
```

3.660.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{-8+4e^{6+2x}x^2}{3x^2}\,dx = \frac{8}{3\,x} + \frac{2}{3}\,e^{(2\,x+6)}$$

input
```
integrate(1/3*(4*x^2*exp(3)^2*exp(x)^2-8)/x^2,x, algorithm=\
```

output
```
8/3/x + 2/3*e^(2*x + 6)
```

3.660.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{-8+4e^{6+2x}x^2}{3x^2}\,dx = \frac{2\left(xe^{(2\,x+6)}+4\right)}{3\,x}$$

input
```
integrate(1/3*(4*x^2*exp(3)^2*exp(x)^2-8)/x^2,x, algorithm=\
```

output
```
2/3*(x*e^(2*x + 6) + 4)/x
```

3.660.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{-8+4e^{6+2x}x^2}{3x^2}\,dx = \frac{2\,\mathrm{e}^{2\,x}\,\mathrm{e}^6}{3}+\frac{8}{3\,x}$$

input
```
int(((4*x^2*exp(2*x)*exp(6))/3 - 8/3)/x^2,x)
```

output
```
(2*exp(2*x)*exp(6))/3 + 8/(3*x)
```

3.661 $\int \frac{(x+x^2-x^3)\log(4+4x-4x^2)+\log(-1+x)(-x+3x^2-2x^3+(1-2x^2+x$

$(1-2x^2+x^3)\log^2(-1+x)\log^2(4+4x-4x^2)$

3.661.1 Optimal result

Integrand size = 96, antiderivative size = 22

$$\int \frac{(x+x^2-x^3)\log(4+4x-4x^2)+\log(-1+x)(-x+3x^2-2x^3+(1-2x^2+x^3)\log(4+4x-4x^2))}{(1-2x^2+x^3)\log^2(-1+x)\log^2(4+4x-4x^2)}\,dx$$
$$=\frac{x}{\log(-1+x)\log(4+4(x-x^2))}$$

output
```
1/ln(-1+x)*x/ln(-4*x^2+4*x+4)
```

3.661.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{(x+x^2-x^3)\log(4+4x-4x^2)+\log(-1+x)(-x+3x^2-2x^3+(1-2x^2+x^3)\log(4+4x-4x^2))}{(1-2x^2+x^3)\log^2(-1+x)\log^2(4+4x-4x^2)}\,dx$$
$$=\frac{x}{\log(-1+x)\log(4+4x-4x^2)}$$

input
```
Integrate[((x + x^2 - x^3)*Log[4 + 4*x - 4*x^2] + Log[-1 + x]*(-x + 3*x^2
- 2*x^3 + (1 - 2*x^2 + x^3)*Log[4 + 4*x - 4*x^2]))/((1 - 2*x^2 + x^3)*Log[
-1 + x]^2*Log[4 + 4*x - 4*x^2]^2),x]
```

output
```
x/(Log[-1 + x]*Log[4 + 4*x - 4*x^2])
```

3.661.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-x^3+x^2+x)\log(-4x^2+4x+4)+\log(x-1)\left(-2x^3+3x^2+(x^3-2x^2+1)\log(-4x^2+4x+4)-x\right)}{(x^3-2x^2+1)\log^2(x-1)\log^2(-4x^2+4x+4)}dx$$

$$\Big\downarrow \text{ 2463}$$

$$\int \left(\frac{(-x^3+x^2+x)\log(-4x^2+4x+4)+\log(x-1)\left(-2x^3+3x^2+(x^3-2x^2+1)\log(-4x^2+4x+4)-x\right)}{(1-x)\log^2(x-1)\log^2(-4x^2+4x+4)}+\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-2\int \frac{1}{\log(x-1)\log^2(-4x^2+4x+4)}dx+\frac{4\int \frac{1}{\left(-2x+\sqrt{5}+1\right)\log(x-1)\log^2(-4x^2+4x+4)}dx}{\sqrt{5}}-\frac{1}{5}\left(5+\sqrt{5}\right)\int \frac{1}{(2x-\sqrt{5}-1)\log(x-1)\log^2(-4x^2+4x+4)}dx-\frac{1}{5}\left(5-\sqrt{5}\right)\int \frac{1}{(2x+\sqrt{5}-1)\log(x-1)\log^2(-4x^2+4x+4)}dx+\frac{4\int \frac{1}{\left(2x+\sqrt{5}-1\right)\log(x-1)\log^2(-4x^2+4x+4)}dx}{\sqrt{5}}-\int \frac{1}{\log^2(x-1)\log(-4x^2+4x+4)}dx-\int \frac{1}{(x-1)\log^2(x-1)\log(-4x^2+4x+4)}dx+\int \frac{1}{\log(x-1)\log(-4x^2+4x+4)}dx$$

input
```
Int[((x + x^2 - x^3)*Log[4 + 4*x - 4*x^2] + Log[-1 + x]*(-x + 3*x^2 - 2*x^
3 + (1 - 2*x^2 + x^3)*Log[4 + 4*x - 4*x^2]))/((1 - 2*x^2 + x^3)*Log[-1 + x
]^2*Log[4 + 4*x - 4*x^2]^2),x]
```

output
```
$Aborted
```

3.661.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.661.4 Maple [A] (verified)

Time = 2.90 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{x}{\ln(-1+x)\ln(-4x^2+4x+4)}$	22
parallelrisch	$\frac{x}{\ln(-1+x)\ln(-4x^2+4x+4)}$	22

input
```
int((((x^3-2*x^2+1)*ln(-4*x^2+4*x+4)-2*x^3+3*x^2-x)*ln(-1+x)+(-x^3+x^2+x)*
ln(-4*x^2+4*x+4))/(x^3-2*x^2+1)/ln(-4*x^2+4*x+4)^2/ln(-1+x)^2,x,method=_RE
TURNVERBOSE)
```

output
```
1/ln(-1+x)*x/ln(-4*x^2+4*x+4)
```

3.661.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{(x+x^2-x^3)\log(4+4x-4x^2)+\log(-1+x)\left(-x+3x^2-2x^3+(1-2x^2+x^3)\log(4+4x-4x^2)\right)}{(1-2x^2+x^3)\log^2(-1+x)\log^2(4+4x-4x^2)}\,dx$$
$$=\frac{x}{\log\left(-4\,x^2+4\,x+4\right)\log\left(x-1\right)}$$

input
```
integrate((((x^3-2*x^2+1)*log(-4*x^2+4*x+4)-2*x^3+3*x^2-x)*log(-1+x)+(-x^3
+x^2+x)*log(-4*x^2+4*x+4))/(x^3-2*x^2+1)/log(-4*x^2+4*x+4)^2/log(-1+x)^2,x
, algorithm=\
```

output
```
x/(log(-4*x^2 + 4*x + 4)*log(x - 1))
```

3.661.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{(x+x^2-x^3)\log(4+4x-4x^2)+\log(-1+x)\left(-x+3x^2-2x^3+(1-2x^2+x^3)\log(4+4x-4x^2)\right)}{(1-2x^2+x^3)\log^2(-1+x)\log^2(4+4x-4x^2)}\,dx$$
$$=\frac{x}{\log(x-1)\log(-4x^2+4x+4)}$$

input
```
integrate((((x**3-2*x**2+1)*ln(-4*x**2+4*x+4)-2*x**3+3*x**2-x)*ln(-1+x)+(-
x**3+x**2+x)*ln(-4*x**2+4*x+4))/(x**3-2*x**2+1)/ln(-4*x**2+4*x+4)**2/ln(-1
+x)**2,x)
```

output
```
x/(log(x - 1)*log(-4*x**2 + 4*x + 4))
```

3.661.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.36 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.45

$$\int \frac{(x+x^2-x^3)\log(4+4x-4x^2)+\log(-1+x)\left(-x+3x^2-2x^3+(1-2x^2+x^3)\log(4+4x-4x^2)\right)}{(1-2x^2+x^3)\log^2(-1+x)\log^2(4+4x-4x^2)}\,dx$$
$$=\frac{x}{(i\pi+2\log(2))\log(x-1)+\log(x^2-x-1)\log(x-1)}$$

input
```
integrate((((x^3-2*x^2+1)*log(-4*x^2+4*x+4)-2*x^3+3*x^2-x)*log(-1+x)+(-x^3
+x^2+x)*log(-4*x^2+4*x+4))/(x^3-2*x^2+1)/log(-4*x^2+4*x+4)^2/log(-1+x)^2,x
, algorithm=\
```

output
```
x/((I*pi + 2*log(2))*log(x - 1) + log(x^2 - x - 1)*log(x - 1))
```

3.661.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{(x+x^2-x^3)\log(4+4x-4x^2)+\log(-1+x)(-x+3x^2-2x^3+(1-2x^2+x^3)\log(4+4x-4x^2))}{(1-2x^2+x^3)\log^2(-1+x)\log^2(4+4x-4x^2)}\,dx = \frac{x}{\log(-4x^2+4x+4)\log(x-1)}$$

input
```
integrate((((x^3-2*x^2+1)*log(-4*x^2+4*x+4)-2*x^3+3*x^2-x)*log(-1+x)+(-x^3
+x^2+x)*log(-4*x^2+4*x+4))/(x^3-2*x^2+1)/log(-4*x^2+4*x+4)^2/log(-1+x)^2,x
, algorithm=\
```

output
```
x/(log(-4*x^2 + 4*x + 4)*log(x - 1))
```

3.661.9 Mupad [B] (verification not implemented)

Time = 14.06 (sec) , antiderivative size = 349, normalized size of antiderivative = 15.86

$$\int \frac{(x+x^2-x^3)\log(4+4x-4x^2)+\log(-1+x)(-x+3x^2-2x^3+(1-2x^2+x^3)\log(4+4x-4x^2))}{(1-2x^2+x^3)\log^2(-1+x)\log^2(4+4x-4x^2)}\,dx$$
$$= \frac{x}{4}-\frac{5\ln(x-1)}{8}+\frac{\frac{x}{\ln(x-1)}-\frac{\ln(-4x^2+4x+4)(-x^2+x+1)(x+\ln(x-1)-x\ln(x-1))}{\ln(x-1)^2(2x-1)(x-1)}}{\ln(-4x^2+4x+4)}$$
$$+\frac{\frac{\ln(x-1)(4x^4-11x^3+10x^2-2)}{2(2x-1)^2(x-1)}+\frac{x(-x^2+x+1)}{(2x-1)(x-1)}-\frac{\ln(x-1)^2(x-1)(2x^2-2x+3)}{2(2x-1)^2}}{\ln(x-1)^2}$$
$$+\frac{\frac{13x^3}{16}-\frac{39x^2}{32}+\frac{3x}{8}+\frac{3}{32}}{x^4-\frac{5x^3}{2}+\frac{9x^2}{4}-\frac{7x}{8}+\frac{1}{8}}$$
$$+\frac{\frac{x^3-6x^2+4x}{2(2x-1)^2(x-1)}+\frac{\ln(x-1)^2(x-1)(-4x^3+6x^2+2x-7)}{2(2x-1)^3}+\frac{\ln(x-1)(-8x^3+7x^2+4x-4)}{2(2x-1)^3(x-1)}}{\ln(x-1)}$$
$$+\frac{\ln(x-1)\left(\frac{x^4}{4}-\frac{11x^2}{16}+\frac{33x}{32}-\frac{33}{64}\right)}{x^3-\frac{3x^2}{2}+\frac{3x}{4}-\frac{1}{8}}$$

input
```
int((log(4*x - 4*x^2 + 4)*(x + x^2 - x^3) - log(x - 1)*(x - log(4*x - 4*x^
2 + 4)*(x^3 - 2*x^2 + 1) - 3*x^2 + 2*x^3))/(log(x - 1)^2*log(4*x - 4*x^2 +
 4)^2*(x^3 - 2*x^2 + 1)),x)
```

output
```
x/4 - (5*log(x - 1))/8 + (x/log(x - 1) - (log(4*x - 4*x^2 + 4)*(x - x^2 +
1)*(x + log(x - 1) - x*log(x - 1)))/(log(x - 1)^2*(2*x - 1)*(x - 1)))/log(
4*x - 4*x^2 + 4) + ((log(x - 1)*(10*x^2 - 11*x^3 + 4*x^4 - 2))/(2*(2*x - 1
)^2*(x - 1)) + (x*(x - x^2 + 1))/((2*x - 1)*(x - 1)) - (log(x - 1)^2*(x -
1)*(2*x^2 - 2*x + 3))/(2*(2*x - 1)^2))/log(x - 1)^2 + ((3*x)/8 - (39*x^2)/
32 + (13*x^3)/16 + 3/32)/((9*x^2)/4 - (7*x)/8 - (5*x^3)/2 + x^4 + 1/8) + (
(4*x - 6*x^2 + x^3)/(2*(2*x - 1)^2*(x - 1)) + (log(x - 1)^2*(x - 1)*(2*x +
 6*x^2 - 4*x^3 - 7))/(2*(2*x - 1)^3) + (log(x - 1)*(4*x + 7*x^2 - 8*x^3 -
4))/(2*(2*x - 1)^3*(x - 1)))/log(x - 1) + (log(x - 1)*((33*x)/32 - (11*x^2
)/16 + x^4/4 - 33/64))/((3*x)/4 - (3*x^2)/2 + x^3 - 1/8)
```

3.661. $\int \frac{(x+x^2-x^3)\log(4+4x-4x^2)+\log(-1+x)\left(-x+3x^2-2x^3+(1-2x^2+x^3)\log(4+4x-4x^2)\right)}{(1-2x^2+x^3)\log^2(-1+x)\log^2(4+4x-4x^2)}\,dx$

3.662 $\int \frac{10240000+e^{2+x}(-73728000x-36864000x^2)+e^{4+2x}(12441600x^3+62\ldots}{1024\ldots}$

3.662.1 Optimal result

Integrand size = 78, antiderivative size = 18

$$\int \frac{10240000+e^{2+x}(-73728000x-36864000x^2)+e^{4+2x}(12441600x^3+6220800x^4)+e^{6+3x}(-699840x^5-\ldots}{10240000}$$
$$=x+\left(2-\frac{9}{80}e^{2+x}x^2\right)^4$$

output
```
x+(2-9/80*x^2*exp(2)*exp(x))^4
```

3.662.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 56 vs. 2(18) = 36.

Time = 0.14 (sec) , antiderivative size = 56, normalized size of antiderivative = 3.11

$$\int \frac{10240000+e^{2+x}(-73728000x-36864000x^2)+e^{4+2x}(12441600x^3+6220800x^4)+e^{6+3x}(-699840x^5-\ldots}{10240000}$$
$$=x-\frac{18}{5}e^{2+x}x^2+\frac{243}{800}e^{4+2x}x^4-\frac{729e^{6+3x}x^6}{64000}+\frac{6561e^{8+4x}x^8}{40960000}$$

input
```
Integrate[(10240000 + E^(2 + x)*(-73728000*x - 36864000*x^2) + E^(4 + 2*x)
*(12441600*x^3 + 6220800*x^4) + E^(6 + 3*x)*(-699840*x^5 - 349920*x^6) + E
^(8 + 4*x)*(13122*x^7 + 6561*x^8))/10240000,x]
```

output
```
x - (18*E^(2 + x)*x^2)/5 + (243*E^(4 + 2*x)*x^4)/800 - (729*E^(6 + 3*x)*x^
6)/64000 + (6561*E^(8 + 4*x)*x^8)/40960000
```

3.662.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 56 vs. $2(18) = 36$.

Time $= 0.71$ (sec) , antiderivative size $= 56$, normalized size of antiderivative $= 3.11$, number of steps used $= 2$, number of rules used $= 2$, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$, Rules used $= \{27, 2009\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+2}\left(-36864000x^2-73728000x\right)+e^{4x+8}\left(6561x^8+13122x^7\right)+e^{3x+6}\left(-349920x^6-699840x^5\right)+e^{2x+4}\left(6220\right.}{10240000}$$

$$\Big\downarrow \; 27$$

$$\frac{\int \left(-36864000e^{x+2}\left(x^2+2x\right)+6220800e^{2x+4}\left(x^4+2x^3\right)-349920e^{3x+6}\left(x^6+2x^5\right)+6561e^{4x+8}\left(x^8+2x^7\right)+102\right.}{10240000}$$

$$\Big\downarrow \; 2009$$

$$\frac{\frac{6561}{4}e^{4x+8}x^8-116640e^{3x+6}x^6+3110400e^{2x+4}x^4-36864000e^{x+2}x^2+10240000x}{10240000}$$

input
```
Int[(10240000 + E^(2 + x)*(-73728000*x - 36864000*x^2) + E^(4 + 2*x)*(1244
1600*x^3 + 6220800*x^4) + E^(6 + 3*x)*(-699840*x^5 - 349920*x^6) + E^(8 +
4*x)*(13122*x^7 + 6561*x^8))/10240000,x]
```

output
```
(10240000*x - 36864000*E^(2 + x)*x^2 + 3110400*E^(4 + 2*x)*x^4 - 116640*E^
(6 + 3*x)*x^6 + (6561*E^(8 + 4*x)*x^8)/4)/10240000
```

3.662. $\int \frac{10240000+e^{2+x}\left(-73728000x-36864000x^2\right)+e^{4+2x}\left(12441600x^3+6220800x^4\right)+e^{6+3x}\left(-699840x^5-349920x^6\right)+e^{8+4x}\left(13122x^7+6561x^8\right)}{10240000}\,dx$

3.662.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.662.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. $2(15) = 30$.

Time = 0.23 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.50

method	result	size
risch	$x-\frac{18x^{2}{\mathrm e}^{2+x}}{5}+\frac{243\,{\mathrm e}^{4+2x}x^{4}}{800}-\frac{729x^{6}{\mathrm e}^{6+3x}}{64000}+\frac{6561x^{8}{\mathrm e}^{4x+8}}{40960000}$	45
default	$x-\frac{18x^{2}{\mathrm e}^{2}{\mathrm e}^{x}}{5}+\frac{243\,{\mathrm e}^{4}{\mathrm e}^{2x}x^{4}}{800}-\frac{729\,{\mathrm e}^{6}{\mathrm e}^{3x}x^{6}}{64000}+\frac{6561\,{\mathrm e}^{8}{\mathrm e}^{4x}x^{8}}{40960000}$	51
parallelrisch	$x-\frac{18x^{2}{\mathrm e}^{2}{\mathrm e}^{x}}{5}+\frac{243\,{\mathrm e}^{4}{\mathrm e}^{2x}x^{4}}{800}-\frac{729\,{\mathrm e}^{6}{\mathrm e}^{3x}x^{6}}{64000}+\frac{6561\,{\mathrm e}^{8}{\mathrm e}^{4x}x^{8}}{40960000}$	51
parts	$x-\frac{18x^{2}{\mathrm e}^{2}{\mathrm e}^{x}}{5}+\frac{243\,{\mathrm e}^{4}{\mathrm e}^{2x}x^{4}}{800}-\frac{729\,{\mathrm e}^{6}{\mathrm e}^{3x}x^{6}}{64000}+\frac{6561\,{\mathrm e}^{8}{\mathrm e}^{4x}x^{8}}{40960000}$	51

input
```
int(1/10240000*(6561*x^8+13122*x^7)*exp(2)^4*exp(x)^4+1/10240000*(-349920*
x^6-699840*x^5)*exp(2)^3*exp(x)^3+1/10240000*(6220800*x^4+12441600*x^3)*ex
p(2)^2*exp(x)^2+1/10240000*(-36864000*x^2-73728000*x)*exp(2)*exp(x)+1,x,me
thod=_RETURNVERBOSE)
```

output
```
x-18/5*x^2*exp(2+x)+243/800*exp(4+2*x)*x^4-729/64000*x^6*exp(6+3*x)+6561/4
0960000*x^8*exp(4*x+8)
```

3.662.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. $2(17) = 34$.

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.44

$$\int \frac{10240000 + e^{2+x}(-73728000x - 36864000x^2) + e^{4+2x}(12441600x^3 + 6220800x^4) + e^{6+3x}(-699840x^5 - }{10240000}$$

$$= \frac{6561}{40960000}\,x^{8}e^{(4\,x+8)} - \frac{729}{64000}\,x^{6}e^{(3\,x+6)} + \frac{243}{800}\,x^{4}e^{(2\,x+4)} - \frac{18}{5}\,x^{2}e^{(x+2)} + x$$

input
```
integrate(1/10240000*(6561*x^8+13122*x^7)*exp(2)^4*exp(x)^4+1/10240000*(-3
49920*x^6-699840*x^5)*exp(2)^3*exp(x)^3+1/10240000*(6220800*x^4+12441600*x
^3)*exp(2)^2*exp(x)^2+1/10240000*(-36864000*x^2-73728000*x)*exp(2)*exp(x)+
1,x, algorithm=\
```

output
```
6561/40960000*x^8*e^(4*x + 8) - 729/64000*x^6*e^(3*x + 6) + 243/800*x^4*e^
(2*x + 4) - 18/5*x^2*e^(x + 2) + x
```

3.662.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(17) = 34$.

Time = 0.15 (sec) , antiderivative size = 60, normalized size of antiderivative = 3.33

$$\int \frac{10240000 + e^{2+x}(-73728000x - 36864000x^2) + e^{4+2x}(12441600x^3 + 6220800x^4) + e^{6+3x}(-699840x^5 - \cdots}{10240000}$$
$$= \frac{6561x^8e^8e^{4x}}{40960000} - \frac{729x^6e^6e^{3x}}{64000} + \frac{243x^4e^4e^{2x}}{800} - \frac{18x^2e^2e^x}{5} + x$$

input
```
integrate(1/10240000*(6561*x**8+13122*x**7)*exp(2)**4*exp(x)**4+1/10240000
*(-349920*x**6-699840*x**5)*exp(2)**3*exp(x)**3+1/10240000*(6220800*x**4+1
2441600*x**3)*exp(2)**2*exp(x)**2+1/10240000*(-36864000*x**2-73728000*x)*e
xp(2)*exp(x)+1,x)
```

output
```
6561*x**8*exp(8)*exp(4*x)/40960000 - 729*x**6*exp(6)*exp(3*x)/64000 + 243*
x**4*exp(4)*exp(2*x)/800 - 18*x**2*exp(2)*exp(x)/5 + x
```

3.662.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(17) = 34$.

Time = 0.22 (sec) , antiderivative size = 68, normalized size of antiderivative = 3.78

$$\int \frac{10240000 + e^{2+x}(-73728000x - 36864000x^2) + e^{4+2x}(12441600x^3 + 6220800x^4) + e^{6+3x}(-699840x^5 - \cdots}{10240000}$$
$$= \frac{6561}{40960000}x^8e^{(4x+8)} - \frac{729}{64000}x^6e^{(3x+6)} + \frac{243}{800}x^4e^{(2x+4)} - \frac{18}{5}\left(x^2e^2 - 2xe^2 + 2e^2\right)e^x - \frac{36}{5}\left(xe^2 - e^2\right)e^x + x$$

3.662. $\int \frac{10240000+e^{2+x}(-73728000x-36864000x^2)+e^{4+2x}(12441600x^3+6220800x^4)+e^{6+3x}(-699840x^5-349920x^6)+e^{8+4x}(13122x^7+6561x^8)}{10240000}\,dx$

input
```
integrate(1/10240000*(6561*x^8+13122*x^7)*exp(2)^4*exp(x)^4+1/10240000*(-3
49920*x^6-699840*x^5)*exp(2)^3*exp(x)^3+1/10240000*(6220800*x^4+12441600*x
^3)*exp(2)^2*exp(x)^2+1/10240000*(-36864000*x^2-73728000*x)*exp(2)*exp(x)+
1,x, algorithm=\
```

output
```
6561/40960000*x^8*e^(4*x + 8) - 729/64000*x^6*e^(3*x + 6) + 243/800*x^4*e^
(2*x + 4) - 18/5*(x^2*e^2 - 2*x*e^2 + 2*e^2)*e^x - 36/5*(x*e^2 - e^2)*e^x
+ x
```

3.662.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. $2(17) = 34$.

Time = 0.26 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.44

$$\int \frac{10240000 + e^{2+x}(-73728000x - 36864000x^2) + e^{4+2x}(12441600x^3 + 6220800x^4) + e^{6+3x}(-699840x^5 - \cdots}{10240000}$$

$$= \frac{6561}{40960000}\,x^8e^{(4\,x+8)} - \frac{729}{64000}\,x^6e^{(3\,x+6)} + \frac{243}{800}\,x^4e^{(2\,x+4)} - \frac{18}{5}\,x^2e^{(x+2)} + x$$

input
```
integrate(1/10240000*(6561*x^8+13122*x^7)*exp(2)^4*exp(x)^4+1/10240000*(-3
49920*x^6-699840*x^5)*exp(2)^3*exp(x)^3+1/10240000*(6220800*x^4+12441600*x
^3)*exp(2)^2*exp(x)^2+1/10240000*(-36864000*x^2-73728000*x)*exp(2)*exp(x)+
1,x, algorithm=\
```

output
```
6561/40960000*x^8*e^(4*x + 8) - 729/64000*x^6*e^(3*x + 6) + 243/800*x^4*e^
(2*x + 4) - 18/5*x^2*e^(x + 2) + x
```

3.662.9 Mupad [B] (verification not implemented)

Time = 14.16 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.44

$$\int \frac{10240000 + e^{2+x}(-73728000x - 36864000x^2) + e^{4+2x}(12441600x^3 + 6220800x^4) + e^{6+3x}(-699840x^5 - \cdots}{10240000}$$

$$= x - \frac{18\,x^2\,e^{x+2}}{5} + \frac{243\,x^4\,e^{2\,x+4}}{800} - \frac{729\,x^6\,e^{3\,x+6}}{64000} + \frac{6561\,x^8\,e^{4\,x+8}}{40960000}$$

3.662.

$$\int \frac{10240000+e^{2+x}(-73728000x-36864000x^2)+e^{4+2x}(12441600x^3+6220800x^4)+e^{6+3x}(-699840x^5-349920x^6)+e^{8+4x}(13122x^7+6561x^8)}{10240000}\,dx$$

input
```
int((exp(4*x)*exp(8)*(13122*x^7 + 6561*x^8))/10240000 - (exp(2)*exp(x)*(73
728000*x + 36864000*x^2))/10240000 - (exp(3*x)*exp(6)*(699840*x^5 + 349920
*x^6))/10240000 + (exp(2*x)*exp(4)*(12441600*x^3 + 6220800*x^4))/10240000
+ 1,x)
```

output
```
x - (18*x^2*exp(x + 2))/5 + (243*x^4*exp(2*x + 4))/800 - (729*x^6*exp(3*x
+ 6))/64000 + (6561*x^8*exp(4*x + 8))/40960000
```

3.662.

$$\int \frac{10240000+e^{2+x}(-73728000x-36864000x^2)+e^{4+2x}(12441600x^3+6220800x^4)+e^{6+3x}(-699840x^5-349920x^6)+e^{8+4x}(13122x^7+6561x^8)}{10240000}\,dx$$

3.663 $\int \frac{4-24x^2}{-81-4x+8x^3}\,dx$

3.663.1 Optimal result

Integrand size = 20, antiderivative size = 24

$$\int \frac{4-24x^2}{-81-4x+8x^3}\,dx = \log\left(\frac{4}{3-3\left(2-x-8x^3+5(16+x)\right)}\right)$$

output
```
ln(4/(24*x^3-12*x-243))
```

3.663.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{4-24x^2}{-81-4x+8x^3}\,dx = -\log\left(-81-4x+8x^3\right)$$

input
```
Integrate[(4 - 24*x^2)/(-81 - 4*x + 8*x^3),x]
```

output
```
-Log[-81 - 4*x + 8*x^3]
```

3.663.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.050, Rules used = {2020}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4-24x^2}{8x^3-4x-81}\,dx$$
$$\Big\downarrow \; 2020$$
$$-\log\left(-8x^3+4x+81\right)$$

input
```
Int[(4 - 24*x^2)/(-81 - 4*x + 8*x^3),x]
```

output
```
-Log[81 + 4*x - 8*x^3]
```

3.663.3.1 Defintions of rubi rules used

rule 2020
```
Int[(Pp_)/(Qq_), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x]}, Si
mp[Coeff[Pp, x, p]*(Log[RemoveContent[Qq, x]]/(q*Coeff[Qq, x, q])), x] /; E
qQ[p, q - 1] && EqQ[Pp, Simplify[(Coeff[Pp, x, p]/(q*Coeff[Qq, x, q]))*D[Qq
, x]]]] /; PolyQ[Pp, x] && PolyQ[Qq, x]
```

3.663.4 Maple [A] (verified)

Time = 0.02 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

method	result	size
parallelrisch	$-\ln\left(x^3-\frac{1}{2}x-\frac{81}{8}\right)$	12
default	$-\ln\left(8x^3-4x-81\right)$	14
norman	$-\ln\left(8x^3-4x-81\right)$	14
risch	$-\ln\left(8x^3-4x-81\right)$	14

input
```
int((-24*x^2+4)/(8*x^3-4*x-81),x,method=_RETURNVERBOSE)
```

output
```
-ln(x^3-1/2*x-81/8)
```

3.663.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{4-24x^2}{-81-4x+8x^3}\,dx = -\log\left(8\,x^3-4\,x-81\right)$$

input
```
integrate((-24*x^2+4)/(8*x^3-4*x-81),x, algorithm=\
```

output
```
-log(8*x^3 - 4*x - 81)
```

3.663.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.50

$$\int \frac{4-24x^2}{-81-4x+8x^3}\,dx = -\log\left(8x^3-4x-81\right)$$

input
```
integrate((-24*x**2+4)/(8*x**3-4*x-81),x)
```

output
```
-log(8*x**3 - 4*x - 81)
```

3.663.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{4-24x^2}{-81-4x+8x^3}\,dx = -\log\left(8\,x^3-4\,x-81\right)$$

input
```
integrate((-24*x^2+4)/(8*x^3-4*x-81),x, algorithm=\
```

output
```
-log(8*x^3 - 4*x - 81)
```

3.663.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.58

$$\int \frac{4-24x^2}{-81-4x+8x^3}\,dx = -\log\left(\left|8\,x^3-4\,x-81\right|\right)$$

input
```
integrate((-24*x^2+4)/(8*x^3-4*x-81),x, algorithm=\
```

output
```
-log(abs(8*x^3 - 4*x - 81))
```

3.663.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.46

$$\int \frac{4-24x^2}{-81-4x+8x^3}\,dx = -\ln\left(x^3-\frac{x}{2}-\frac{81}{8}\right)$$

input
```
int((24*x^2 - 4)/(4*x - 8*x^3 + 81),x)
```

output
```
-log(x^3 - x/2 - 81/8)
```

3.664 $\int \frac{10x^2\log^3(x)+e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}\left(1440+720x+90x^2+(1440+3\right.}{x^5\log^3(x)-2e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}x^5\log^3(x)+e^{\frac{2\left(144+72x+9x^2\right.}{x^2\log}}}$

3.664.1 Optimal result

Integrand size = 161, antiderivative size = 33

$$\int \frac{10x^2\log^3(x)+e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}\left(1440+720x+90x^2+(1440+360x)\log(x)-10x^2\log^3(x)\right)}{x^5\log^3(x)-2e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}x^5\log^3(x)+e^{\frac{2\left(144+72x+9x^2+e^4x^2\log^2(x)\right)}{x^2\log^2(x)}}x^5\log^3(x)}\,dx = \frac{5}{x\left(-x+e^{e^4+\frac{9(4+x)^2}{x^2\log^2(x)}}x\right)}$$

output
```
5/(exp(9*(4+x)^2/x^2/ln(x)^2+exp(4))*x-x)/x
```

3.664.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.88

$$\int \frac{10x^2\log^3(x)+e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}\left(1440+720x+90x^2+(1440+360x)\log(x)-10x^2\log^3(x)\right)}{x^5\log^3(x)-2e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}x^5\log^3(x)+e^{\frac{2\left(144+72x+9x^2+e^4x^2\log^2(x)\right)}{x^2\log^2(x)}}x^5\log^3(x)}\,dx = \frac{5}{\left(-1+e^{e^4+\frac{9(4+x)^2}{x^2\log^2(x)}}\right)x^2}$$

input
```
Integrate[(10*x^2*Log[x]^3 + E^((144 + 72*x + 9*x^2 + E^4*x^2*Log[x]^2)/(x
^2*Log[x]^2))*(1440 + 720*x + 90*x^2 + (1440 + 360*x)*Log[x] - 10*x^2*Log[
x]^3))/(x^5*Log[x]^3 - 2*E^((144 + 72*x + 9*x^2 + E^4*x^2*Log[x]^2)/(x^2*L
og[x]^2))*x^5*Log[x]^3 + E^((2*(144 + 72*x + 9*x^2 + E^4*x^2*Log[x]^2))/(x
^2*Log[x]^2))*x^5*Log[x]^3),x]
```

output
```
5/((-1 + E^(E^4 + (9*(4 + x)^2)/(x^2*Log[x]^2)))*x^2)
```

3.664.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(90x^2-10x^2\log^3(x)+720x+(360x+1440)\log(x)+1440\right)\exp\left(\frac{9x^2+e^4x^2\log^2(x)+72x+144}{x^2\log^2(x)}\right)+10x^2\log^3(x)}{-2x^5\log^3(x)\exp\left(\frac{9x^2+e^4x^2\log^2(x)+72x+144}{x^2\log^2(x)}\right)+x^5\log^3(x)\exp\left(\frac{2(9x^2+e^4x^2\log^2(x)+72x+144)}{x^2\log^2(x)}\right)+x^5\log^3(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\left(90x^2-10x^2\log^3(x)+720x+(360x+1440)\log(x)+1440\right)\exp\left(\frac{9x^2+e^4x^2\log^2(x)+72x+144}{x^2\log^2(x)}\right)+10x^2\log^3(x)}{x^5\left(1-e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}\right)^2\log^3(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{1440e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}}{x^5\log^2(x)\left(e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}-1\right)^2}+\frac{1440e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}}{x^5\log^3(x)\left(e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}-1\right)^2}+\frac{360e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}}{x^4\log^2(x)\left(e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}-1\right)^2}+\frac{}{x^4\log}\right.$$

$$\Big\downarrow \text{2009}$$

$$1440\int \frac{e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}}{\left(-1+e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}\right)^2 x^5\log^2(x)}dx + 1440\int \frac{e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}}{\left(-1+e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}\right)^2 x^5\log^3(x)}dx + 360\int \frac{e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}}{\left(-1+e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}\right)^2 x^4\log^2(x)}dx + 720\int \frac{e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}}{\left(-1+e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}\right)^2 x^4\log^3(x)}dx + 10\int \frac{1}{\left(-1+e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}\right)^2 x^3}dx - 10\int \frac{e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}}{\left(-1+e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}\right)^2 x^3}dx + 90\int \frac{e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}}{\left(-1+e^{\frac{9(x+4)^2}{x^2\log^2(x)}+e^4}\right)^2 x^3\log^3(x)}dx$$

input
```
Int[(10*x^2*Log[x]^3 + E^((144 + 72*x + 9*x^2 + E^4*x^2*Log[x]^2)/(x^2*Log
[x]^2))*(1440 + 720*x + 90*x^2 + (1440 + 360*x)*Log[x] - 10*x^2*Log[x]^3))
/(x^5*Log[x]^3 - 2*E^((144 + 72*x + 9*x^2 + E^4*x^2*Log[x]^2)/(x^2*Log[x]^
2))*x^5*Log[x]^3 + E^((2*(144 + 72*x + 9*x^2 + E^4*x^2*Log[x]^2))/(x^2*Log
[x]^2))*x^5*Log[x]^3),x]
```

output
```
$Aborted
```

3.664.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.664. $\int \frac{10x^2\log^3(x)+e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}\left(1440+720x+90x^2+(1440+360x)\log(x)-10x^2\log^3(x)\right)}{x^5\log^3(x)-2e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}x^5\log^3(x)+e^{\frac{2\left(144+72x+9x^2+e^4x^2\log^2(x)\right)}{x^2\log^2(x)}}x^5\log^3(x)}\,dx$

3.664.4 Maple [A] (verified)

Time = 5.50 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.18

method	result	size
risch	$\frac{5}{x^{2}\left(\mathrm{e}^{\frac{x^{2} \mathrm{e}^{4} \ln(x)^{2}+9 x^{2}+72 x+144}{x^{2} \ln(x)^{2}}}-1\right)}$	39
parallelrisch	$\frac{5}{x^{2}\left(\mathrm{e}^{\frac{x^{2} \mathrm{e}^{4} \ln(x)^{2}+9 x^{2}+72 x+144}{x^{2} \ln(x)^{2}}}-1\right)}$	39

input
```
int(((-10*x^2*ln(x)^3+(360*x+1440)*ln(x)+90*x^2+720*x+1440)*exp((x^2*exp(4
)*ln(x)^2+9*x^2+72*x+144)/x^2/ln(x)^2)+10*x^2*ln(x)^3)/(x^5*ln(x)^3*exp((x
^2*exp(4)*ln(x)^2+9*x^2+72*x+144)/x^2/ln(x)^2)^2-2*x^5*ln(x)^3*exp((x^2*ex
p(4)*ln(x)^2+9*x^2+72*x+144)/x^2/ln(x)^2)+x^5*ln(x)^3),x,method=_RETURNVER
BOSE)
```

output
```
5/x^2/(exp((x^2*exp(4)*ln(x)^2+9*x^2+72*x+144)/x^2/ln(x)^2)-1)
```

3.664.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.30

$$\int \frac{10x^2\log^3(x)+e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}\left(1440+720x+90x^2+(1440+360x)\log(x)-10x^2\log^3(x)\right)}{x^5\log^3(x)-2e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}x^5\log^3(x)+e^{\frac{2\left(144+72x+9x^2+e^4x^2\log^2(x)\right)}{x^2\log^2(x)}}x^5\log^3(x)}\,dx = \frac{5}{x^2e^{\left(\frac{x^2e^4\log(x)^2+9\,x^2+72\,x+144}{x^2\log(x)^2}\right)}-x^2}$$

input
```
integrate(((-10*x^2*log(x)^3+(360*x+1440)*log(x)+90*x^2+720*x+1440)*exp((x
^2*exp(4)*log(x)^2+9*x^2+72*x+144)/x^2/log(x)^2)+10*x^2*log(x)^3)/(x^5*log
(x)^3*exp((x^2*exp(4)*log(x)^2+9*x^2+72*x+144)/x^2/log(x)^2)^2-2*x^5*log(x
)^3*exp((x^2*exp(4)*log(x)^2+9*x^2+72*x+144)/x^2/log(x)^2)+x^5*log(x)^3),x
, algorithm=\
```

output
```
5/(x^2*e^((x^2*e^4*log(x)^2 + 9*x^2 + 72*x + 144)/(x^2*log(x)^2)) - x^2)
```

3.664.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.18

$$\int \frac{10x^2\log^3(x)+e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}\left(1440+720x+90x^2+(1440+360x)\log(x)-10x^2\log^3(x)\right)}{x^5\log^3(x)-2e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}x^5\log^3(x)+e^{\frac{2\left(144+72x+9x^2+e^4x^2\log^2(x)\right)}{x^2\log^2(x)}}x^5\log^3(x)}\,dx$$
$$=\frac{5}{x^2e^{\frac{x^2e^4\log{(x)}^2+9x^2+72x+144}{x^2\log{(x)}^2}}-x^2}$$

input
```
integrate(((-10*x**2*ln(x)**3+(360*x+1440)*ln(x)+90*x**2+720*x+1440)*exp((
x**2*exp(4)*ln(x)**2+9*x**2+72*x+144)/x**2/ln(x)**2)+10*x**2*ln(x)**3)/(x*
*5*ln(x)**3*exp((x**2*exp(4)*ln(x)**2+9*x**2+72*x+144)/x**2/ln(x)**2)**2-2
*x**5*ln(x)**3*exp((x**2*exp(4)*ln(x)**2+9*x**2+72*x+144)/x**2/ln(x)**2)+x
**5*ln(x)**3),x)
```

output
```
5/(x**2*exp((x**2*exp(4)*log(x)**2 + 9*x**2 + 72*x + 144)/(x**2*log(x)**2)
) - x**2)
```

3.664.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.27

$$\int \frac{10x^2\log^3(x)+e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}\left(1440+720x+90x^2+(1440+360x)\log(x)-10x^2\log^3(x)\right)}{x^5\log^3(x)-2e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}x^5\log^3(x)+e^{\frac{2\left(144+72x+9x^2+e^4x^2\log^2(x)\right)}{x^2\log^2(x)}}x^5\log^3(x)}\,dx$$
$$=\frac{5}{x^2e^{\left(\frac{9}{\log(x)^2}+\frac{72}{x\log(x)^2}+\frac{144}{x^2\log(x)^2}+e^4\right)}-x^2}$$

input
```
integrate(((-10*x^2*log(x)^3+(360*x+1440)*log(x)+90*x^2+720*x+1440)*exp((x
^2*exp(4)*log(x)^2+9*x^2+72*x+144)/x^2/log(x)^2)+10*x^2*log(x)^3)/(x^5*log
(x)^3*exp((x^2*exp(4)*log(x)^2+9*x^2+72*x+144)/x^2/log(x)^2)^2-2*x^5*log(x
)^3*exp((x^2*exp(4)*log(x)^2+9*x^2+72*x+144)/x^2/log(x)^2)+x^5*log(x)^3),x
, algorithm=\
```

output
```
5/(x^2*e^(9/log(x)^2 + 72/(x*log(x)^2) + 144/(x^2*log(x)^2) + e^4) - x^2)
```

3.664.8 Giac [F]

$$\int \frac{10x^2\log^3(x)+e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}\left(1440+720x+90x^2+(1440+360x)\log(x)-10x^2\log^3(x)\right)}{x^5\log^3(x)-2e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}x^5\log^3(x)+e^{\frac{2\left(144+72x+9x^2+e^4x^2\log^2(x)\right)}{x^2\log^2(x)}}x^5\log^3(x)}\,dx$$
$$=\int \frac{10\left(x^2\log\left(x\right)^3-\left(x^2\log\left(x\right)^3-9\,x^2-36\,(x+4)\log\left(x\right)-72\,x-144\right)e^{\left(\frac{x^2e^4\log(x)^2+9\,x^2+72\,x+144}{x^2\log(x)^2}\right)}\right)}{x^5e^{\left(\frac{2\left(x^2e^4\log(x)^2+9\,x^2+72\,x+144\right)}{x^2\log(x)^2}\right)}\log\left(x\right)^3-2\,x^5e^{\left(\frac{x^2e^4\log(x)^2+9\,x^2+72\,x+144}{x^2\log(x)^2}\right)}\log\left(x\right)^3+x^5\log\left(x\right)^3}\,dx$$

input
```
integrate(((-10*x^2*log(x)^3+(360*x+1440)*log(x)+90*x^2+720*x+1440)*exp((x
^2*exp(4)*log(x)^2+9*x^2+72*x+144)/x^2/log(x)^2)+10*x^2*log(x)^3)/(x^5*log
(x)^3*exp((x^2*exp(4)*log(x)^2+9*x^2+72*x+144)/x^2/log(x)^2)^2-2*x^5*log(x
)^3*exp((x^2*exp(4)*log(x)^2+9*x^2+72*x+144)/x^2/log(x)^2)+x^5*log(x)^3),x
, algorithm=\
```

output
```
undef
```

3.664.9 Mupad [B] (verification not implemented)

Time = 14.13 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.09

$$\int \frac{10x^2\log^3(x)+e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}\left(1440+720x+90x^2+(1440+360x)\log(x)-10x^2\log^3(x)\right)}{x^5\log^3(x)-2e^{\frac{144+72x+9x^2+e^4x^2\log^2(x)}{x^2\log^2(x)}}x^5\log^3(x)+e^{\frac{2\left(144+72x+9x^2+e^4x^2\log^2(x)\right)}{x^2\log^2(x)}}x^5\log^3(x)}\,dx$$
$$=\frac{80\,\ln\left(x\right)+x\left(20\,\ln\left(x\right)+40\right)+5\,x^2+80}{x^2\left(\mathrm{e}^{\mathrm{e}^4+\frac{9}{\ln(x)^2}+\frac{72}{x\ln(x)^2}+\frac{144}{x^2\ln(x)^2}}-1\right)(x+4)\left(x+4\,\ln\left(x\right)+4\right)}$$

input
```
int((10*x^2*log(x)^3 + exp((72*x + 9*x^2 + x^2*exp(4)*log(x)^2 + 144)/(x^2
*log(x)^2))*(720*x + log(x)*(360*x + 1440) - 10*x^2*log(x)^3 + 90*x^2 + 14
40))/(x^5*log(x)^3 - 2*x^5*exp((72*x + 9*x^2 + x^2*exp(4)*log(x)^2 + 144)/
(x^2*log(x)^2))*log(x)^3 + x^5*exp((2*(72*x + 9*x^2 + x^2*exp(4)*log(x)^2
+ 144))/(x^2*log(x)^2))*log(x)^3),x)
```

output
```
(80*log(x) + x*(20*log(x) + 40) + 5*x^2 + 80)/(x^2*(exp(exp(4) + 9/log(x)^
2 + 72/(x*log(x)^2) + 144/(x^2*log(x)^2)) - 1)*(x + 4)*(x + 4*log(x) + 4))
```

3.665 $\int \frac{e^{-x}\left(4-36x+16x^2+e\left(8x-4x^2\right)\right)}{-4+e} \, dx$

3.665.1 Optimal result

Integrand size = 32, antiderivative size = 19

$$\int \frac{e^{-x}(4-36x+16x^2+e(8x-4x^2))}{-4+e} \, dx = 4e^{-x}x\left(-\frac{1}{4-e}+x\right)$$

output
```
4*(x-1/(4-exp(1)))*x/exp(x)
```

3.665.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{e^{-x}(4-36x+16x^2+e(8x-4x^2))}{-4+e} \, dx = \frac{4e^{-x}x(1+(-4+e)x)}{-4+e}$$

input
```
Integrate[(4 - 36*x + 16*x^2 + E*(8*x - 4*x^2))/((-4 + E)*E^x),x]
```

output
```
(4*x*(1 + (-4 + E)*x))/((-4 + E)*E^x)
```

3.665.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 38, normalized size of antiderivative = 2.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {27, 27, 2626, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(16x^2+e\left(8x-4x^2\right)-36x+4\right)}{e-4}dx$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{\int 4e^{-x}\left(4x^2-9x+e\left(2x-x^2\right)+1\right)dx}{4-e}$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{4\int e^{-x}\left(4x^2-9x+e\left(2x-x^2\right)+1\right)dx}{4-e}$$

$$\Big\downarrow \text{ 2626}$$

$$-\frac{4\int \left(4e^{-x}x^2-9e^{-x}x-e^{1-x}(x-2)x+e^{-x}\right)dx}{4-e}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{4\left(e^{1-x}x^2-4e^{-x}x^2+e^{-x}x\right)}{4-e}$$

input
```
Int[(4 - 36*x + 16*x^2 + E*(8*x - 4*x^2))/((-4 + E)*E^x),x]
```

output
```
(-4*(x/E^x + E^(1 - x)*x^2 - (4*x^2)/E^x))/(4 - E)
```

3.665.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2626
```
Int[(F_)^(v_)*(Px_), x_Symbol] :> Int[ExpandIntegrand[F^v, Px, x], x] /; Fr
eeQ[F, x] && PolynomialQ[Px, x] && LinearQ[v, x] && !TrueQ[$UseGamma]
```

3.665.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

method	result	size
norman	$\left(4x^{2}+\frac{4x}{\mathrm{e}-4}\right) \mathrm{e}^{-x}$	21
gosper	$\frac{4x\left(x\,\mathrm{e}-4x+1\right)\mathrm{e}^{-x}}{\mathrm{e}-4}$	23
risch	$\frac{\left(4x^{2}\mathrm{e}-16x^{2}+4x\right)\mathrm{e}^{-x}}{\mathrm{e}-4}$	28
parallelrisch	$\frac{\left(4x^{2}\mathrm{e}-16x^{2}+4x\right)\mathrm{e}^{-x}}{\mathrm{e}-4}$	28
default	$\frac{4x\,\mathrm{e}^{-x}-16x^{2}\mathrm{e}^{-x}+8\,\mathrm{e}\left(-x\,\mathrm{e}^{-x}-\mathrm{e}^{-x}\right)-4\,\mathrm{e}\left(-x^{2}\mathrm{e}^{-x}-2x\,\mathrm{e}^{-x}-2\,\mathrm{e}^{-x}\right)}{\mathrm{e}-4}$	70
meijerg	$\frac{4-4\,\mathrm{e}^{-x}}{\mathrm{e}-4}+\frac{\left(-4\,\mathrm{e}+16\right)\left(2-\frac{\left(3x^{2}+6x+6\right)\mathrm{e}^{-x}}{3}\right)}{\mathrm{e}-4}+\frac{\left(8\,\mathrm{e}-36\right)\left(1-\frac{\left(2+2x\right)\mathrm{e}^{-x}}{2}\right)}{\mathrm{e}-4}$	75

input
```
int(((-4*x^2+8*x)*exp(1)+16*x^2-36*x+4)/(exp(1)-4)/exp(x),x,method=_RETURN
VERBOSE)
```

output
```
(4*x^2+4/(exp(1)-4)*x)/exp(x)
```

3.665.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.32

$$\int \frac{e^{-x}(4-36x+16x^2+e(8x-4x^2))}{-4+e}\,dx = \frac{4\,(x^2e-4\,x^2+x)e^{(-x)}}{e-4}$$

input
```
integrate(((-4*x^2+8*x)*exp(1)+16*x^2-36*x+4)/(exp(1)-4)/exp(x),x, algorit
hm=\
```

output
```
4*(x^2*e - 4*x^2 + x)*e^(-x)/(e - 4)
```

3.665.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{e^{-x}(4-36x+16x^2+e(8x-4x^2))}{-4+e}\,dx = \frac{(-16x^2+4ex^2+4x)\,e^{-x}}{-4+e}$$

input
```
integrate(((-4*x**2+8*x)*exp(1)+16*x**2-36*x+4)/(exp(1)-4)/exp(x),x)
```

output
```
(-16*x**2 + 4*E*x**2 + 4*x)*exp(-x)/(-4 + E)
```

3.665.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(15) = 30.

Time = 0.22 (sec) , antiderivative size = 72, normalized size of antiderivative = 3.79

$$\int \frac{e^{-x}(4-36x+16x^2+e(8x-4x^2))}{-4+e}\,dx$$
$$= \frac{4\left((x^2e+2\,xe+2\,e)e^{(-x)}-4\,(x^2+2\,x+2)e^{(-x)}-2\,(xe+e)e^{(-x)}+9\,(x+1)e^{(-x)}-e^{(-x)}\right)}{e-4}$$

input
```
integrate(((-4*x^2+8*x)*exp(1)+16*x^2-36*x+4)/(exp(1)-4)/exp(x),x, algorit
hm=\
```

output
```
4*((x^2*e + 2*x*e + 2*e)*e^(-x) - 4*(x^2 + 2*x + 2)*e^(-x) - 2*(x*e + e)*e
^(-x) + 9*(x + 1)*e^(-x) - e^(-x))/(e - 4)
```

3.665.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. 2(15) = 30.

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.79

$$\int \frac{e^{-x}(4-36x+16x^2+e(8x-4x^2))}{-4+e}\,dx = \frac{4\left(x^2e^{(-x+1)}-(4\,x^2-x)e^{(-x)}\right)}{e-4}$$

input
```
integrate(((-4*x^2+8*x)*exp(1)+16*x^2-36*x+4)/(exp(1)-4)/exp(x),x, algorit
hm=\
```

output
```
4*(x^2*e^(-x + 1) - (4*x^2 - x)*e^(-x))/(e - 4)
```

3.665.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{e^{-x}(4-36x+16x^2+e(8x-4x^2))}{-4+e}\,dx = \frac{4\,x\,\mathrm{e}^{-x}\,(x\,\mathrm{e}-4\,x+1)}{\mathrm{e}-4}$$

input
```
int((exp(-x)*(exp(1)*(8*x - 4*x^2) - 36*x + 16*x^2 + 4))/(exp(1) - 4),x)
```

output
```
(4*x*exp(-x)*(x*exp(1) - 4*x + 1))/(exp(1) - 4)
```

3.666 $\int \frac{e^x(-15x^2+5 \ldots}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800 \ldots}$

3.666.1 Optimal result

Integrand size = 240, antiderivative size = 34

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4 \ldots}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+\left(e^{x+x^2}(800x- \ldots\right.}$$
$$=\frac{x^2}{5\left(e^x-4e^{x^2}\right)\left(-\frac{5}{x}+x+2\log(\log(3))\right)}$$

output
```
1/5*x^2/(x+2*ln(ln(3))-5/x)/(exp(x)-4*exp(x^2))
```

3.666.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.97

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4 \ldots}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+\left(e^{x+x^2}(800x- \ldots\right.}$$
$$=\frac{x^3}{5\left(e^x-4e^{x^2}\right)\left(-5+x^2+2x\log(\log(3))\right)}$$

3.666.
$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4+8x^6)+\left(e^x(4x^3-2x^4)+e^{x^2}(-16x^3+16x^5)\right) \ldots}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+\left(e^{x+x^2}(800x-160x^3)+e^{2x}(-100x+20x^3)+e^{2x^2}(-1600x+320x \ldots\right.}$$

input
```
Integrate[(E^x*(-15*x^2 + 5*x^3 + x^4 - x^5) + E^x^2*(60*x^2 - 44*x^4 + 8*
x^6) + (E^x*(4*x^3 - 2*x^4) + E^x^2*(-16*x^3 + 16*x^5))*Log[Log[3]])/(E^(x
 + x^2)*(-1000 + 400*x^2 - 40*x^4) + E^(2*x)*(125 - 50*x^2 + 5*x^4) + E^(2
*x^2)*(2000 - 800*x^2 + 80*x^4) + (E^(x + x^2)*(800*x - 160*x^3) + E^(2*x)
*(-100*x + 20*x^3) + E^(2*x^2)*(-1600*x + 320*x^3))*Log[Log[3]] + (20*E^(2
*x)*x^2 + 320*E^(2*x^2)*x^2 - 160*E^(x + x^2)*x^2)*Log[Log[3]]^2),x]
```

output
```
x^3/(5*(E^x - 4*E^x^2)*(-5 + x^2 + 2*x*Log[Log[3]]))
```

3.666.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^2}(8x^6-44x^4+60x^2)+e^x(-x^5+x^4+5x^3-15x^2}{(20e^{2x}x^2+320e^{2x^2}x^2-160e^{x^2+x}x^2)\log^2(\log(3))+e^{x^2+x}(-40x^4+400x^2-1000)+e^{2x}(5x^4-50x^2+125)+}$$

$$\Big\downarrow \ 7239$$

$$\int \frac{x^2\left(e^x(-x^3+x^2(1-2\log(\log(3)))+x(5+4\log(\log(3)))-15)+4e^{x^2}(2x^4+4x^3\log(\log(3))-11x^2-4x\log(\right.}{5(e^x-4e^{x^2})^2(-x^2-2x\log(\log(3))+5)^2}$$

$$\Big\downarrow \ 27$$

$$\frac{1}{5}\int \frac{x^2\left(4e^{x^2}(2x^4+4\log(\log(3))x^3-11x^2-4\log(\log(3))x+15)-e^x(x^3-(1-2\log(\log(3)))x^2-(5+4\log(\log\right.}{(e^x-4e^{x^2})^2(-x^2-2\log(\log(3))x+5)^2}$$

$$\Big\downarrow \ 7293$$

$$\frac{1}{5}\int\left(\frac{e^x x^3(2x-1)}{(e^x-4e^{x^2})^2(x^2+2\log(\log(3))x-5)}-\frac{x^2(2x^4+4\log(\log(3))x^3-11x^2-4\log(\log(3))x+15)}{(e^x-4e^{x^2})(x^2+2\log(\log(3))x-5)^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{5}\left(2(5+\log(\log(3))+4\log^2(\log(3)))\int\frac{e^x}{(e^x-4e^{x^2})^2}dx-(9+8\log^2(\log(3)))\int\frac{1}{e^x-4e^{x^2}}dx-(1+4\log(\log(3\right.$$

3.666.

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4+8x^6)+\left(e^x(4x^3-2x^4)+e^{x^2}(-16x^3+16x^5)\right)}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+\left(e^{x+x^2}(800x-160x^3)+e^{2x}(-100x+20x^3)+e^{2x^2}(-1600x+320x\right.}$$

input
```
Int[(E^x*(-15*x^2 + 5*x^3 + x^4 - x^5) + E^x^2*(60*x^2 - 44*x^4 + 8*x^6) +
 (E^x*(4*x^3 - 2*x^4) + E^x^2*(-16*x^3 + 16*x^5))*Log[Log[3]])/(E^(x + x^2
)*(-1000 + 400*x^2 - 40*x^4) + E^(2*x)*(125 - 50*x^2 + 5*x^4) + E^(2*x^2)*
(2000 - 800*x^2 + 80*x^4) + (E^(x + x^2)*(800*x - 160*x^3) + E^(2*x)*(-100
*x + 20*x^3) + E^(2*x^2)*(-1600*x + 320*x^3))*Log[Log[3]] + (20*E^(2*x)*x^
2 + 320*E^(2*x^2)*x^2 - 160*E^(x + x^2)*x^2)*Log[Log[3]]^2),x]
```

output
```
$Aborted
```

3.666.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.666.4 Maple [A] (verified)

Time = 2.30 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

method	result	size
risch	$\frac{x^{3}}{5(2\ln(\ln(3))x+x^{2}-5)\left(\mathrm{e}^{x}-4\,\mathrm{e}^{x^{2}}\right)}$	30
parallelrisch	$\frac{x^{3}}{5(2\ln(\ln(3))x+x^{2}-5)\left(\mathrm{e}^{x}-4\,\mathrm{e}^{x^{2}}\right)}$	30

3.666.

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4+8x^6)+\left(e^x(4x^3-2x^4)+e^{x^2}(-16x^3+16x^5)\right)}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+\left(e^{x+x^2}(800x-160x^3)+e^{2x}(-100x+20x^3)+e^{2x^2}(-1600x+320x\right.}$$

input
```
int((((16*x^5-16*x^3)*exp(x^2)+(-2*x^4+4*x^3)*exp(x))*ln(ln(3))+(8*x^6-44*
x^4+60*x^2)*exp(x^2)+(-x^5+x^4+5*x^3-15*x^2)*exp(x))/((320*x^2*exp(x^2)^2-
160*x^2*exp(x)*exp(x^2)+20*exp(x)^2*x^2)*ln(ln(3))^2+((320*x^3-1600*x)*exp
(x^2)^2+(-160*x^3+800*x)*exp(x)*exp(x^2)+(20*x^3-100*x)*exp(x)^2)*ln(ln(3)
)+(80*x^4-800*x^2+2000)*exp(x^2)^2+(-40*x^4+400*x^2-1000)*exp(x)*exp(x^2)+
(5*x^4-50*x^2+125)*exp(x)^2),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^3/(2*ln(ln(3))*x+x^2-5)/(exp(x)-4*exp(x^2))
```

3.666.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.82

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+(e^{x+x^2}(800x-}$$
$$= -\frac{x^3e^{(x^2)}}{5\,(4\,(x^2-5)e^{(2\,x^2)}-(x^2-5)e^{(x^2+x)}+2\,(4\,xe^{(2\,x^2)}-xe^{(x^2+x)})\log(\log(3)))}$$

input
```
integrate((((16*x^5-16*x^3)*exp(x^2)+(-2*x^4+4*x^3)*exp(x))*log(log(3))+(8
*x^6-44*x^4+60*x^2)*exp(x^2)+(-x^5+x^4+5*x^3-15*x^2)*exp(x))/((320*x^2*exp
(x^2)^2-160*x^2*exp(x)*exp(x^2)+20*exp(x)^2*x^2)*log(log(3))^2+((320*x^3-1
600*x)*exp(x^2)^2+(-160*x^3+800*x)*exp(x)*exp(x^2)+(20*x^3-100*x)*exp(x)^2
)*log(log(3))+(80*x^4-800*x^2+2000)*exp(x^2)^2+(-40*x^4+400*x^2-1000)*exp(
x)*exp(x^2)+(5*x^4-50*x^2+125)*exp(x)^2),x, algorithm=\
```

output
```
-1/5*x^3*e^(x^2)/(4*(x^2 - 5)*e^(2*x^2) - (x^2 - 5)*e^(x^2 + x) + 2*(4*x*e
^(2*x^2) - x*e^(x^2 + x))*log(log(3)))
```

3.666.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.44

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+(e^{x+x^2}(800x-}$$
$$= -\frac{x^3}{-5x^2e^x-10xe^x\log(\log(3))+(20x^2+40x\log(\log(3))-100)\,e^{x^2}+25e^x}$$

3.666.

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4+8x^6)+\left(e^x(4x^3-2x^4)+e^{x^2}(-16x^3+16x^5)\right)}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+\left(e^{x+x^2}(800x-160x^3)+e^{2x}(-100x+20x^3)+e^{2x^2}(-1600x+320x\right.}$$

input
```
integrate((((16*x**5-16*x**3)*exp(x**2)+(-2*x**4+4*x**3)*exp(x))*ln(ln(3))
+(8*x**6-44*x**4+60*x**2)*exp(x**2)+(-x**5+x**4+5*x**3-15*x**2)*exp(x))/((
320*x**2*exp(x**2)**2-160*x**2*exp(x)*exp(x**2)+20*exp(x)**2*x**2)*ln(ln(3
))**2+((320*x**3-1600*x)*exp(x**2)**2+(-160*x**3+800*x)*exp(x)*exp(x**2)+(
20*x**3-100*x)*exp(x)**2)*ln(ln(3))+(80*x**4-800*x**2+2000)*exp(x**2)**2+(
-40*x**4+400*x**2-1000)*exp(x)*exp(x**2)+(5*x**4-50*x**2+125)*exp(x)**2),x
)
```

output
```
-x**3/(-5*x**2*exp(x) - 10*x*exp(x)*log(log(3)) + (20*x**2 + 40*x*log(log(
3)) - 100)*exp(x**2) + 25*exp(x))
```

3.666.7 Maxima [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.18

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+(e^{x+x^2}(800x-}$$

$$= -\frac{x^3}{5\,(4\,(x^2+2\,x\log(\log(3))-5)e^{(x^2)}-(x^2+2\,x\log(\log(3))-5)e^x)}$$

input
```
integrate((((16*x^5-16*x^3)*exp(x^2)+(-2*x^4+4*x^3)*exp(x))*log(log(3))+(8
*x^6-44*x^4+60*x^2)*exp(x^2)+(-x^5+x^4+5*x^3-15*x^2)*exp(x))/((320*x^2*exp
(x^2)^2-160*x^2*exp(x)*exp(x^2)+20*exp(x)^2*x^2)*log(log(3))^2+((320*x^3-1
600*x)*exp(x^2)^2+(-160*x^3+800*x)*exp(x)*exp(x^2)+(20*x^3-100*x)*exp(x)^2
)*log(log(3))+(80*x^4-800*x^2+2000)*exp(x^2)^2+(-40*x^4+400*x^2-1000)*exp(
x)*exp(x^2)+(5*x^4-50*x^2+125)*exp(x)^2),x, algorithm=\
```

output
```
-1/5*x^3/(4*(x^2 + 2*x*log(log(3)) - 5)*e^(x^2) - (x^2 + 2*x*log(log(3)) -
 5)*e^x)
```

3.666.

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4+8x^6)+\left(e^x(4x^3-2x^4)+e^{x^2}(-16x^3+16x^5)\right)}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+\left(e^{x+x^2}(800x-160x^3)+e^{2x}(-100x+20x^3)+e^{2x^2}(-1600x+320x\right.}$$

3.666.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.53

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+(e^{x+x^2}(800x-}$$
$$= -\frac{x^3}{5\left(4\,x^2e^{(x^2)}-x^2e^x+8\,xe^{(x^2)}\log\left(\log\left(3\right)\right)-2\,xe^x\log\left(\log\left(3\right)\right)-20\,e^{(x^2)}+5\,e^x\right)}$$

input
```
integrate((((16*x^5-16*x^3)*exp(x^2)+(-2*x^4+4*x^3)*exp(x))*log(log(3))+(8
*x^6-44*x^4+60*x^2)*exp(x^2)+(-x^5+x^4+5*x^3-15*x^2)*exp(x))/((320*x^2*exp
(x^2)^2-160*x^2*exp(x)*exp(x^2)+20*exp(x)^2*x^2)*log(log(3))^2+((320*x^3-1
600*x)*exp(x^2)^2+(-160*x^3+800*x)*exp(x)*exp(x^2)+(20*x^3-100*x)*exp(x)^2
)*log(log(3))+(80*x^4-800*x^2+2000)*exp(x^2)^2+(-40*x^4+400*x^2-1000)*exp(
x)*exp(x^2)+(5*x^4-50*x^2+125)*exp(x)^2),x, algorithm=\
```

output
```
-1/5*x^3/(4*x^2*e^(x^2) - x^2*e^x + 8*x*e^(x^2)*log(log(3)) - 2*x*e^x*log(
log(3)) - 20*e^(x^2) + 5*e^x)
```

3.666.9 Mupad [B] (verification not implemented)

Time = 14.01 (sec) , antiderivative size = 100, normalized size of antiderivative = 2.94

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+(e^{x+x^2}(800x-}$$
$$= -\frac{e^x\left(\frac{2\,x^4\,\ln(\ln(3))}{5}-\frac{4\,x^5\,\ln(\ln(3))}{5}-x^3+2\,x^4+\frac{x^5}{5}-\frac{2\,x^6}{5}\right)}{\left(4\,e^{x^2}-e^x\right)\,\left(e^x-2\,x\,e^x\right)\,\left(4\,x^3\,\ln\left(\ln\left(3\right)\right)+4\,x^2\ln\left(\ln\left(3\right)\right)^2-20\,x\,\ln\left(\ln\left(3\right)\right)-10\,x^2+x^4+25\right)}$$

input
```
int((log(log(3))*(exp(x)*(4*x^3 - 2*x^4) - exp(x^2)*(16*x^3 - 16*x^5)) - e
xp(x)*(15*x^2 - 5*x^3 - x^4 + x^5) + exp(x^2)*(60*x^2 - 44*x^4 + 8*x^6))/(
exp(2*x)*(5*x^4 - 50*x^2 + 125) + log(log(3))^2*(20*x^2*exp(2*x) + 320*x^2
*exp(2*x^2) - 160*x^2*exp(x^2)*exp(x)) + exp(2*x^2)*(80*x^4 - 800*x^2 + 20
00) - log(log(3))*(exp(2*x)*(100*x - 20*x^3) + exp(2*x^2)*(1600*x - 320*x^
3) - exp(x^2)*exp(x)*(800*x - 160*x^3)) - exp(x^2)*exp(x)*(40*x^4 - 400*x^
2 + 1000)),x)
```

3.666.

$$\int \frac{e^x(-15x^2+5x^3+x^4-x^5)+e^{x^2}(60x^2-44x^4+8x^6)+\left(e^x(4x^3-2x^4)+e^{x^2}(-16x^3+16x^5)\right)}{e^{x+x^2}(-1000+400x^2-40x^4)+e^{2x}(125-50x^2+5x^4)+e^{2x^2}(2000-800x^2+80x^4)+\left(e^{x+x^2}(800x-160x^3)+e^{2x}(-100x+20x^3)+e^{2x^2}(-1600x+320x\right.}$$

output
```
-(exp(x)*((2*x^4*log(log(3)))/5 - (4*x^5*log(log(3)))/5 - x^3 + 2*x^4 + x^
5/5 - (2*x^6)/5))/((4*exp(x^2) - exp(x))*(exp(x) - 2*x*exp(x))*(4*x^3*log(
log(3)) + 4*x^2*log(log(3))^2 - 20*x*log(log(3)) - 10*x^2 + x^4 + 25))
```

3.666.

$$\int \frac{e^x\left(-15x^2+5x^3+x^4-x^5\right)+e^{x^2}\left(60x^2-44x^4+8x^6\right)+\left(e^x\left(4x^3-2x^4\right)+e^{x^2}\left(-16x^3+16x^5\right)\right)}{e^{x+x^2}\left(-1000+400x^2-40x^4\right)+e^{2x}\left(125-50x^2+5x^4\right)+e^{2x^2}\left(2000-800x^2+80x^4\right)+\left(e^{x+x^2}\left(800x-160x^3\right)+e^{2x}\left(-100x+20x^3\right)+e^{2x^2}\left(-1600x+320x\right.\right.}$$

3.667 $$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x\right.}{-64+144e^{\frac{1}{5}(5x+\log(5))}x-108e^{\frac{2}{5}(5x+l}}$$

3.667.1 Optimal result

Integrand size = 197, antiderivative size = 26

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(1\right.}{-64+144e^{\frac{1}{5}(5x+\log(5))}x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3}$$
$$= e^{-\frac{9}{\left(-\sqrt[5]{5}e^x+\frac{4}{3x}\right)^2}+x}$$

output
```
exp(x-9/(4/3/x-exp(1/5*ln(5)+x))^2)
```

3.667.2 Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(1\right.}{-64+144e^{\frac{1}{5}(5x+\log(5))}x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3}$$
$$= e^{x-\frac{81x^2}{\left(-4+3\sqrt[5]{5}e^x x\right)^2}}$$

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(144x+486x^3)\right)}{}\,d$$

input
```
Integrate[(E^((16*x - 81*x^2 - 24*E^((5*x + Log[5])/5)*x^2 + 9*E^((2*(5*x
+ Log[5]))/5)*x^3)/(16 - 24*E^((5*x + Log[5])/5)*x + 9*E^((2*(5*x + Log[5]
))/5)*x^2))*(-64 + 648*x - 108*E^((2*(5*x + Log[5]))/5)*x^2 + 27*E^((3*(5*
x + Log[5]))/5)*x^3 + E^((5*x + Log[5])/5)*(144*x + 486*x^3)))/(-64 + 144*
E^((5*x + Log[5])/5)*x - 108*E^((2*(5*x + Log[5]))/5)*x^2 + 27*E^((3*(5*x
+ Log[5]))/5)*x^3),x]
```

output
```
E^(x - (81*x^2)/(-4 + 3*5^(1/5)*E^x*x)^2)
```

3.667.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(27x^3e^{\frac{3}{5}(5x+\log(5))}+\left(486x^3+144x\right)e^{\frac{1}{5}(5x+\log(5))}-108x^2e^{\frac{2}{5}(5x+\log(5))}+648x-64\right)\exp\left(\frac{9x^3e^{\frac{2}{5}(5x+\log(5))}-81x^2-\cdots}{9x^2e^{\frac{2}{5}(5x+\log(5))}-24\cdots}\right.}{27x^3e^{\frac{3}{5}(5x+\log(5))}-108x^2e^{\frac{2}{5}(5x+\log(5))}+144xe^{\frac{1}{5}(5x+\log(5))}-64}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\left(-27x^3e^{\frac{3}{5}(5x+\log(5))}-\left(486x^3+144x\right)e^{\frac{1}{5}(5x+\log(5))}+108x^2e^{\frac{2}{5}(5x+\log(5))}-648x+64\right)\exp\left(\frac{9x^3e^{\frac{2}{5}(5x+\log(5))}-81x^2\cdots}{\left(3\sqrt[5]{5}\cdots\right.}\right.}{\left(4-3\sqrt[5]{5}e^xx\right)^3}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{27\ 5^{3/5}x^3\exp\left(\frac{9x^3e^{\frac{2}{5}(5x+\log(5))}-81x^2-24x^2e^{\frac{1}{5}(5x+\log(5))}+16x}{\left(3\sqrt[5]{5}e^xx-4\right)^2}+3x\right)}{\left(3\sqrt[5]{5}e^xx-4\right)^3}-\frac{108\ 5^{2/5}x^2\exp\left(\frac{9x^3e^{\frac{2}{5}(5x+\log(5))}-81x^2-24x^2e^{\frac{1}{5}\cdots}}{\left(3\sqrt[5]{5}e^xx-4\right)^2}\right.}{\left(3\sqrt[5]{5}e^xx-4\right)^3}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\left(-27\sqrt[5]{5}e^x\left(5^{2/5}e^{2x}+18\right)x^3+108\ 5^{2/5}e^{2x}x^2-72\left(2\sqrt[5]{5}e^x+9\right)x+64\right)\exp\left(\frac{x\left(9\ 5^{2/5}e^{2x}x^2-3\left(8\sqrt[5]{5}e^x+27\right)x+16\right)}{\left(4-3\sqrt[5]{5}e^xx\right)^2}\right.}{\left(4-3\sqrt[5]{5}e^xx\right)^3}$$

3.667.

$$\int e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}\left(144x+486x^3\right)\right)\cdots$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{162x^2\exp\left(\frac{x\left(9\ 5^{2/5}e^{2x}x^2-3\left(8\sqrt[5]{5}e^x+27\right)x+16\right)}{\left(4-3\sqrt[5]{5}e^x x\right)^2}\right)}{\left(3\sqrt[5]{5}e^x x-4\right)^2}+\frac{648(x+1)x\exp\left(\frac{x\left(9\ 5^{2/5}e^{2x}x^2-3\left(8\sqrt[5]{5}e^x+27\right)x+16\right)}{\left(4-3\sqrt[5]{5}e^x x\right)^2}\right)}{\left(3\sqrt[5]{5}e^x x-4\right)^3}+\text{ex}\right.$$

$$\Big\downarrow \text{2009}$$

$$\int \exp\left(\frac{x\left(9\ 5^{2/5}e^{2x}x^2-3\left(27+8\sqrt[5]{5}e^x\right)x+16\right)}{\left(4-3\sqrt[5]{5}e^x x\right)^2}\right)dx+648\int \frac{\exp\left(\frac{x\left(9\ 5^{2/5}e^{2x}x^2-3\left(27+8\sqrt[5]{5}e^x\right)x+16\right)}{\left(4-3\sqrt[5]{5}e^x x\right)^2}\right)x}{\left(3\sqrt[5]{5}e^x x-4\right)^3}dx+648\int \frac{\exp\left(\frac{x\left(9\ 5^{2/5}e^{2x}x^2-3\left(27+8\sqrt[5]{5}e^x\right)x+16\right)}{\left(4-3\sqrt[5]{5}e^x x\right)^2}\right)x^2}{\left(3\sqrt[5]{5}e^x x-4\right)^3}dx+162\int \frac{\exp\left(\frac{x\left(9\ 5^{2/5}e^{2x}x^2-3\left(27+8\sqrt[5]{5}e^x\right)x+16\right)}{\left(4-3\sqrt[5]{5}e^x x\right)^2}\right)x^2}{\left(3\sqrt[5]{5}e^x x-4\right)^2}dx$$

input
```
Int[(E^((16*x - 81*x^2 - 24*E^((5*x + Log[5])/5)*x^2 + 9*E^((2*(5*x + Log[
5]))/5)*x^3)/(16 - 24*E^((5*x + Log[5])/5)*x + 9*E^((2*(5*x + Log[5]))/5)*
x^2))*(-64 + 648*x - 108*E^((2*(5*x + Log[5]))/5)*x^2 + 27*E^((3*(5*x + Lo
g[5]))/5)*x^3 + E^((5*x + Log[5])/5)*(144*x + 486*x^3)))/(-64 + 144*E^((5*
x + Log[5])/5)*x - 108*E^((2*(5*x + Log[5]))/5)*x^2 + 27*E^((3*(5*x + Log[
5]))/5)*x^3),x]
```

output
```
$Aborted
```

3.667.

$$\int e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}\left(144x+486x^3\right)\right) d$$

3.667.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.667.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(22) = 44$.

Time = 2.92 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.54

method	result	size
parallelrisch	$\mathrm{e}^{\frac{9 x^{3} \mathrm{e}^{\frac{2 \ln(5)}{5}+2 x}-24 x^{2} \mathrm{e}^{\frac{\ln(5)}{5}+x}-81 x^{2}+16 x}{9 x^{2} \mathrm{e}^{\frac{2 \ln(5)}{5}+2 x}-24 x\, \mathrm{e}^{\frac{\ln(5)}{5}+x}+16}}$	66

input
```
int((27*x^3*exp(1/5*ln(5)+x)^3-108*x^2*exp(1/5*ln(5)+x)^2+(486*x^3+144*x)*
exp(1/5*ln(5)+x)+648*x-64)*exp((9*x^3*exp(1/5*ln(5)+x)^2-24*x^2*exp(1/5*ln
(5)+x)-81*x^2+16*x)/(9*x^2*exp(1/5*ln(5)+x)^2-24*x*exp(1/5*ln(5)+x)+16))/(
27*x^3*exp(1/5*ln(5)+x)^3-108*x^2*exp(1/5*ln(5)+x)^2+144*x*exp(1/5*ln(5)+x
)-64),x,method=_RETURNVERBOSE)
```

output
```
exp((9*x^3*exp(1/5*ln(5)+x)^2-24*x^2*exp(1/5*ln(5)+x)-81*x^2+16*x)/(9*x^2*
exp(1/5*ln(5)+x)^2-24*x*exp(1/5*ln(5)+x)+16))
```

3.667.

$$\int e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}\left(144x+486x^3\right)\right)$$

3.667.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. 2(22) = 44.

Time = 0.26 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.50

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(1\right.}{-64+144e^{\frac{1}{5}(5x+\log(5))}x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3}$$
$$= e^{\left(\frac{9\,x^3e^{\left(2\,x+\frac{2}{5}\,\log(5)\right)}-24\,x^2e^{\left(x+\frac{1}{5}\,\log(5)\right)}-81\,x^2+16\,x}{9\,x^2e^{\left(2\,x+\frac{2}{5}\,\log(5)\right)}-24\,xe^{\left(x+\frac{1}{5}\,\log(5)\right)}+16}\right)}$$

input
```
integrate((27*x^3*exp(1/5*log(5)+x)^3-108*x^2*exp(1/5*log(5)+x)^2+(486*x^3
+144*x)*exp(1/5*log(5)+x)+648*x-64)*exp((9*x^3*exp(1/5*log(5)+x)^2-24*x^2*
exp(1/5*log(5)+x)-81*x^2+16*x)/(9*x^2*exp(1/5*log(5)+x)^2-24*x*exp(1/5*log
(5)+x)+16))/(27*x^3*exp(1/5*log(5)+x)^3-108*x^2*exp(1/5*log(5)+x)^2+144*x*
exp(1/5*log(5)+x)-64),x, algorithm=\
```

output
```
e^((9*x^3*e^(2*x + 2/5*log(5)) - 24*x^2*e^(x + 1/5*log(5)) - 81*x^2 + 16*x
)/(9*x^2*e^(2*x + 2/5*log(5)) - 24*x*e^(x + 1/5*log(5)) + 16))
```

3.667.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(19) = 38.

Time = 2.42 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.54

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(1\right.}{-64+144e^{\frac{1}{5}(5x+\log(5))}x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3}$$
$$= e^{\frac{9\cdot 5^{\frac{2}{5}}x^3e^{2x}-24\cdot\sqrt[5]{5}x^2e^x-81x^2+16x}{9\cdot 5^{\frac{2}{5}}x^2e^{2x}-24\cdot\sqrt[5]{5}xe^x+16}}$$

input
```
integrate((27*x**3*exp(1/5*ln(5)+x)**3-108*x**2*exp(1/5*ln(5)+x)**2+(486*x
**3+144*x)*exp(1/5*ln(5)+x)+648*x-64)*exp((9*x**3*exp(1/5*ln(5)+x)**2-24*x
**2*exp(1/5*ln(5)+x)-81*x**2+16*x)/(9*x**2*exp(1/5*ln(5)+x)**2-24*x*exp(1/
5*ln(5)+x)+16))/(27*x**3*exp(1/5*ln(5)+x)**3-108*x**2*exp(1/5*ln(5)+x)**2+
144*x*exp(1/5*ln(5)+x)-64),x)
```

output
```
exp((9*5**(2/5)*x**3*exp(2*x) - 24*5**(1/5)*x**2*exp(x) - 81*x**2 + 16*x)/
(9*5**(2/5)*x**2*exp(2*x) - 24*5**(1/5)*x*exp(x) + 16))
```

3.667. $\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(144x+486x^3)\right)}{}d$

3.667.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(14\right.}{-64+144e^{\frac{1}{5}(5x+\log(5))}x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3}$$
= Exception raised: RuntimeError

input
```
integrate((27*x^3*exp(1/5*log(5)+x)^3-108*x^2*exp(1/5*log(5)+x)^2+(486*x^3
+144*x)*exp(1/5*log(5)+x)+648*x-64)*exp((9*x^3*exp(1/5*log(5)+x)^2-24*x^2*
exp(1/5*log(5)+x)-81*x^2+16*x)/(9*x^2*exp(1/5*log(5)+x)^2-24*x*exp(1/5*log
(5)+x)+16))/(27*x^3*exp(1/5*log(5)+x)^3-108*x^2*exp(1/5*log(5)+x)^2+144*x*
exp(1/5*log(5)+x)-64),x, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is un
defined.
```

3.667.8 Giac [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(14\right.}{-64+144e^{\frac{1}{5}(5x+\log(5))}x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3}$$
= Exception raised: TypeError

input
```
integrate((27*x^3*exp(1/5*log(5)+x)^3-108*x^2*exp(1/5*log(5)+x)^2+(486*x^3
+144*x)*exp(1/5*log(5)+x)+648*x-64)*exp((9*x^3*exp(1/5*log(5)+x)^2-24*x^2*
exp(1/5*log(5)+x)-81*x^2+16*x)/(9*x^2*exp(1/5*log(5)+x)^2-24*x*exp(1/5*log
(5)+x)+16))/(27*x^3*exp(1/5*log(5)+x)^3-108*x^2*exp(1/5*log(5)+x)^2+144*x*
exp(1/5*log(5)+x)-64),x, algorithm=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:Unable to divide, perhaps due to ro
unding error%%%{-51257812500000000,[2,12,0,1,0]%%%}+%%%{123018750000000000
,[2,11,1,
```

3.667.

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(144x+486x^3)\right)}{\ldots} d$$

3.667.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 131, normalized size of antiderivative = 5.04

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(14\right.}{-64+144e^{\frac{1}{5}(5x+\log(5))}x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3}$$
$$= e^{-\frac{81\,x^2}{9\,5^{2/5}\,x^2\,e^{2\,x}-24\,5^{1/5}\,x\,e^x+16}}\,e^{-\frac{24\,5^{1/5}\,x^2\,e^x}{9\,5^{2/5}\,x^2\,e^{2\,x}-24\,5^{1/5}\,x\,e^x+16}}\,e^{\frac{9\,5^{2/5}\,x^3\,e^{2\,x}}{9\,5^{2/5}\,x^2\,e^{2\,x}-24\,5^{1/5}\,x\,e^x+16}}\,e^{\frac{16\,x}{9\,5^{2/5}\,x^2\,e^{2\,x}-24\,5^{1/5}\,x\,e^x+16}}$$

input
```
int(-(exp((16*x - 24*x^2*exp(x + log(5)/5) + 9*x^3*exp(2*x + (2*log(5))/5)
 - 81*x^2)/(9*x^2*exp(2*x + (2*log(5))/5) - 24*x*exp(x + log(5)/5) + 16))*
(648*x - 108*x^2*exp(2*x + (2*log(5))/5) + 27*x^3*exp(3*x + (3*log(5))/5)
+ exp(x + log(5)/5)*(144*x + 486*x^3) - 64))/(108*x^2*exp(2*x + (2*log(5))
/5) - 27*x^3*exp(3*x + (3*log(5))/5) - 144*x*exp(x + log(5)/5) + 64),x)
```

output
```
exp(-(81*x^2)/(9*5^(2/5)*x^2*exp(2*x) - 24*5^(1/5)*x*exp(x) + 16))*exp(-(2
4*5^(1/5)*x^2*exp(x))/(9*5^(2/5)*x^2*exp(2*x) - 24*5^(1/5)*x*exp(x) + 16))
*exp((9*5^(2/5)*x^3*exp(2*x))/(9*5^(2/5)*x^2*exp(2*x) - 24*5^(1/5)*x*exp(x
) + 16))*exp((16*x)/(9*5^(2/5)*x^2*exp(2*x) - 24*5^(1/5)*x*exp(x) + 16))
```

3.667.

$$\int \frac{e^{\frac{16x-81x^2-24e^{\frac{1}{5}(5x+\log(5))}x^2+9e^{\frac{2}{5}(5x+\log(5))}x^3}{16-24e^{\frac{1}{5}(5x+\log(5))}x+9e^{\frac{2}{5}(5x+\log(5))}x^2}}\left(-64+648x-108e^{\frac{2}{5}(5x+\log(5))}x^2+27e^{\frac{3}{5}(5x+\log(5))}x^3+e^{\frac{1}{5}(5x+\log(5))}(144x+486x^3)\right)}{\ldots} d$$

3.668 $\int \frac{4e^{2e^{2/x}+\frac{2}{x}}+2x^2+e^{x+x^2}(x^2+2x^3)}{x^2}\,dx$

3.668.1 Optimal result

Integrand size = 46, antiderivative size = 27

$$\int \frac{4e^{2e^{2/x}+\frac{2}{x}}+2x^2+e^{x+x^2}(x^2+2x^3)}{x^2}\,dx = -6-e^{2e^{2/x}}+e^{x+x^2}+2x+\log(4)$$

output
```
exp(x^2+x)+2*x-6+2*ln(2)-exp(exp(2/x))^2
```

3.668.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{4e^{2e^{2/x}+\frac{2}{x}}+2x^2+e^{x+x^2}(x^2+2x^3)}{x^2}\,dx = -e^{2e^{2/x}}+e^{x(1+x)}+2x$$

input
```
Integrate[(4*E^(2*E^(2/x) + 2/x) + 2*x^2 + E^(x + x^2)*(x^2 + 2*x^3))/x^2,
x]
```

output
```
-E^(2*E^(2/x)) + E^(x*(1 + x)) + 2*x
```

3.668.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+e^{x^2+x}\left(2x^3+x^2\right)+4e^{2e^{2/x}+\frac{2}{x}}}{x^2}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(e^{x^2+x}(2x+1)+\frac{2\left(x^2+2e^{2e^{2/x}+\frac{2}{x}}\right)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$4\int \frac{e^{\frac{2\left(e^{2/x}x+1\right)}{x}}}{x^2}dx+e^{x^2+x}+2x$$

input
```
Int[(4*E^(2*E^(2/x) + 2/x) + 2*x^2 + E^(x + x^2)*(x^2 + 2*x^3))/x^2,x]
```

output
```
$Aborted
```

3.668.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.668.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

method	result	size
default	$2x-\mathrm{e}^{2\,\mathrm{e}^{\frac{2}{x}}}+\mathrm{e}^{x^2+x}$	22
risch	$-\mathrm{e}^{2\,\mathrm{e}^{\frac{2}{x}}}+2x+\mathrm{e}^{(1+x)x}$	22
parallelrisch	$2x-\mathrm{e}^{2\,\mathrm{e}^{\frac{2}{x}}}+\mathrm{e}^{x^2+x}$	22
parts	$2x-\mathrm{e}^{2\,\mathrm{e}^{\frac{2}{x}}}+\mathrm{e}^{x^2+x}$	22

input
```
int((4*exp(2/x)*exp(exp(2/x))^2+(2*x^3+x^2)*exp(x^2+x)+2*x^2)/x^2,x,method
=_RETURNVERBOSE)
```

output
```
2*x-exp(exp(1/x)^2)^2+exp(x^2+x)
```

3.668.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.70

$$\int \frac{4e^{2e^{2/x}+\frac{2}{x}}+2x^2+e^{x+x^2}(x^2+2x^3)}{x^2}\,dx=\left(2\,xe^{\frac{2}{x}}+e^{\left(x^2+x+\frac{2}{x}\right)}-e^{\left(\frac{2\left(xe^{\frac{2}{x}}+1\right)}{x}\right)}\right)e^{\left(-\frac{2}{x}\right)}$$

input
```
integrate((4*exp(2/x)*exp(exp(2/x))^2+(2*x^3+x^2)*exp(x^2+x)+2*x^2)/x^2,x,
 algorithm=\
```

output
```
(2*x*e^(2/x) + e^(x^2 + x + 2/x) - e^(2*(x*e^(2/x) + 1)/x))*e^(-2/x)
```

3.668.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{4e^{2e^{2/x}+\frac{2}{x}}+2x^2+e^{x+x^2}(x^2+2x^3)}{x^2}\,dx=2x+e^{x^2+x}-e^{2e^{\frac{2}{x}}}$$

input
```
integrate((4*exp(2/x)*exp(exp(2/x))**2+(2*x**3+x**2)*exp(x**2+x)+2*x**2)/x
**2,x)
```

output
```
2*x + exp(x**2 + x) - exp(2*exp(2/x))
```

3.668.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.25 (sec) , antiderivative size = 81, normalized size of antiderivative = 3.00

$$\int \frac{4e^{2e^{2/x}+\frac{2}{x}}+2x^2+e^{x+x^2}(x^2+2x^3)}{x^2}\,dx = -\frac{1}{2}i\sqrt{\pi}\operatorname{erf}\left(i\,x+\frac{1}{2}i\right)e^{\left(-\frac{1}{4}\right)} - \frac{1}{2}\left(\frac{\sqrt{\pi}(2\,x+1)\left(\operatorname{erf}\left(\frac{1}{2}\sqrt{-(2\,x+1)^2}\right)-1\right)}{\sqrt{-(2\,x+1)^2}} - 2\,e^{\left(\frac{1}{4}\,(2\,x+1)^2\right)}\right)e^{\left(-\frac{1}{4}\right)} + 2\,x - e^{\left(2\,e^{\frac{2}{x}}\right)}$$

input
```
integrate((4*exp(2/x)*exp(exp(2/x))^2+(2*x^3+x^2)*exp(x^2+x)+2*x^2)/x^2,x,
 algorithm=\
```

output
```
-1/2*I*sqrt(pi)*erf(I*x + 1/2*I)*e^(-1/4) - 1/2*(sqrt(pi)*(2*x + 1)*(erf(1
/2*sqrt(-(2*x + 1)^2)) - 1)/sqrt(-(2*x + 1)^2) - 2*e^(1/4*(2*x + 1)^2))*e^
(-1/4) + 2*x - e^(2*e^(2/x))
```

3.668.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.70

$$\int \frac{4e^{2e^{2/x}+\frac{2}{x}}+2x^2+e^{x+x^2}(x^2+2x^3)}{x^2}\,dx = \left(2\,xe^{\frac{2}{x}} + e^{\left(x^2+x+\frac{2}{x}\right)} - e^{\left(\frac{2\left(xe^{\frac{2}{x}}+1\right)}{x}\right)}\right)e^{\left(-\frac{2}{x}\right)}$$

input
```
integrate((4*exp(2/x)*exp(exp(2/x))^2+(2*x^3+x^2)*exp(x^2+x)+2*x^2)/x^2,x,
 algorithm=\
```

output
```
(2*x*e^(2/x) + e^(x^2 + x + 2/x) - e^(2*(x*e^(2/x) + 1)/x))*e^(-2/x)
```

3.668.9 Mupad [B] (verification not implemented)

Time = 14.07 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{4e^{2e^{2/x}+\frac{2}{x}}+2x^2+e^{x+x^2}(x^2+2x^3)}{x^2}\,dx = 2\,x+\mathrm{e}^{x^2+x}-\mathrm{e}^{2\,\mathrm{e}^{2/x}}$$

input
```
int((4*exp(2*exp(2/x))*exp(2/x) + 2*x^2 + exp(x + x^2)*(x^2 + 2*x^3))/x^2,
x)
```

output
```
2*x + exp(x + x^2) - exp(2*exp(2/x))
```

3.669 $\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}(15x+3e^2x\right.}{25+e^4+20x+4x^2+e^2(10+4x)}$

3.669.1 Optimal result

Integrand size = 111, antiderivative size = 24

$$\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}(15x+3e^2x)+e^2(10-6x-4x^2)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$$
$$=e^{5+e^{\frac{3x}{5+e^2+2x}}-x}x$$

output
```
x/exp(-exp(3*x/(exp(2)+5+2*x))+x-5)
```

3.669.2 Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}(15x+3e^2x)+e^2(10-6x-4x^2)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$$
$$=e^{5+e^{\frac{3x}{5+e^2+2x}}-x}x$$

input
```
Integrate[(E^(5 + E^((3*x)/(5 + E^2 + 2*x)) - x)*(25 + E^4*(1 - x) - 5*x -
 16*x^2 - 4*x^3 + E^((3*x)/(5 + E^2 + 2*x))*(15*x + 3*E^2*x) + E^2*(10 - 6
*x - 4*x^2)))/(25 + E^4 + 20*x + 4*x^2 + E^2*(10 + 4*x)),x]
```

output
```
E^(5 + E^((3*x)/(5 + E^2 + 2*x)) - x)*x
```

3.669.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}\left(-4x^3-16x^2+e^2\left(-4x^2-6x+10\right)-5x+e^4(1-x)+e^{\frac{3x}{2x+e^2+5}}\left(3e^2x+15x\right)+25\right)}{4x^2+20x+e^2(4x+10)+e^4+25}\,dx$$

$$\Big\downarrow \ 2007$$

$$\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}\left(-4x^3-16x^2+e^2\left(-4x^2-6x+10\right)-5x+e^4(1-x)+e^{\frac{3x}{2x+e^2+5}}\left(3e^2x+15x\right)+25\right)}{\left(2x+e^2+5\right)^2}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(-\frac{4e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}x^3}{\left(2x+e^2+5\right)^2}-\frac{16e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}x^2}{\left(2x+e^2+5\right)^2}-\frac{5e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}x}{\left(2x+e^2+5\right)^2}+\frac{3\left(5+e^2\right)e^{\frac{3x}{2x+e^2+5}-x+e^{\frac{3x}{2x+e^2+5}}+5}x}{\left(2x+e^2+5\right)^2}+\frac{25}{(}\right.$$

$$\Big\downarrow \ 2009$$

$$\left(5+e^2\right)\int e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}dx-4\int e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}dx-\int e^{-x+e^{\frac{3x}{2x+e^2+5}}+7}dx-$$
$$\int e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}xdx+\frac{1}{2}\left(5+e^2\right)^3\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}}{\left(2x+e^2+5\right)^2}dx-4\left(5+e^2\right)^2\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}}{\left(2x+e^2+5\right)^2}dx+$$
$$\frac{5}{2}\left(5+e^2\right)\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}}{\left(2x+e^2+5\right)^2}dx+25\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}}{\left(2x+e^2+5\right)^2}dx-\frac{1}{2}\left(7+e^2\right)\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+9}}{\left(2x+e^2+5\right)^2}dx-$$
$$\frac{3}{2}\left(5+e^2\right)^2\int \frac{e^{\frac{3x}{2x+e^2+5}-x+e^{\frac{3x}{2x+e^2+5}}+5}}{\left(2x+e^2+5\right)^2}dx-\frac{3}{2}\left(5+e^2\right)^2\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}}{2x+e^2+5}dx+$$
$$8\left(5+e^2\right)\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}}{2x+e^2+5}dx-\frac{5}{2}\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+5}}{2x+e^2+5}dx+\left(7+2e^2\right)\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+7}}{2x+e^2+5}dx-$$
$$\frac{1}{2}\int \frac{e^{-x+e^{\frac{3x}{2x+e^2+5}}+9}}{2x+e^2+5}dx+\frac{3}{2}\left(5+e^2\right)\int \frac{e^{\frac{3x}{2x+e^2+5}-x+e^{\frac{3x}{2x+e^2+5}}+5}}{2x+e^2+5}dx$$

3.669. $\displaystyle\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}\left(15x+3e^2x\right)+e^2\left(10-6x-4x^2\right)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$

input
```
Int[(E^(5 + E^((3*x)/(5 + E^2 + 2*x)) - x)*(25 + E^4*(1 - x) - 5*x - 16*x^
2 - 4*x^3 + E^((3*x)/(5 + E^2 + 2*x))*(15*x + 3*E^2*x) + E^2*(10 - 6*x - 4
*x^2)))/(25 + E^4 + 20*x + 4*x^2 + E^2*(10 + 4*x)),x]
```

output
```
$Aborted
```

3.669.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.669.4 Maple [A] (verified)

Time = 1.69 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

method	result	size
risch	$x\,{\mathrm e}^{{\mathrm e}^{\frac{3x}{{\mathrm e}^{2}+5+2x}}-x+5}$	22
parallelrisch	$x\,{\mathrm e}^{{\mathrm e}^{\frac{3x}{{\mathrm e}^{2}+5+2x}}-x+5}$	24
norman	$\frac{\left(\left({\mathrm e}^{2}+5\right)x+2x^{2}\right){\mathrm e}^{{\mathrm e}^{\frac{3x}{{\mathrm e}^{2}+5+2x}}-x+5}}{{\mathrm e}^{2}+5+2x}$	44

input
```
int(((3*exp(2)*x+15*x)*exp(3*x/(exp(2)+5+2*x))+(1-x)*exp(2)^2+(-4*x^2-6*x+
10)*exp(2)-4*x^3-16*x^2-5*x+25)/(exp(2)^2+(4*x+10)*exp(2)+4*x^2+20*x+25)/e
xp(-exp(3*x/(exp(2)+5+2*x))+x-5),x,method=_RETURNVERBOSE)
```

output
```
x*exp(exp(3*x/(exp(2)+5+2*x))-x+5)
```

3.669. $\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}\left(15x+3e^2x\right)+e^2\left(10-6x-4x^2\right)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$

3.669.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}(15x+3e^2x)+e^2(10-6x-4x^2)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$$
$$= xe^{\left(-x+e^{\left(\frac{3x}{2x+e^2+5}\right)}+5\right)}$$

input
```
integrate(((3*exp(2)*x+15*x)*exp(3*x/(exp(2)+5+2*x))+(1-x)*exp(2)^2+(-4*x^
2-6*x+10)*exp(2)-4*x^3-16*x^2-5*x+25)/(exp(2)^2+(4*x+10)*exp(2)+4*x^2+20*x
+25)/exp(-exp(3*x/(exp(2)+5+2*x))+x-5),x, algorithm=\
```

output
```
x*e^(-x + e^(3*x/(2*x + e^2 + 5)) + 5)
```

3.669.6 Sympy [A] (verification not implemented)

Time = 16.52 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}(15x+3e^2x)+e^2(10-6x-4x^2)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$$
$$= xe^{-x+e^{\frac{3x}{2x+5+e^2}}+5}$$

input
```
integrate(((3*exp(2)*x+15*x)*exp(3*x/(exp(2)+5+2*x))+(1-x)*exp(2)**2+(-4*x
**2-6*x+10)*exp(2)-4*x**3-16*x**2-5*x+25)/(exp(2)**2+(4*x+10)*exp(2)+4*x**
2+20*x+25)/exp(-exp(3*x/(exp(2)+5+2*x))+x-5),x)
```

output
```
x*exp(-x + exp(3*x/(2*x + 5 + exp(2))) + 5)
```

3.669.7 Maxima [F]

$$\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}(15x+3e^2x)+e^2(10-6x-4x^2)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$$

$$=\int -\frac{\left(4\,x^3+16\,x^2+(x-1)e^4+2\,(2\,x^2+3\,x-5)e^2-3\,(xe^2+5\,x)e^{\left(\frac{3\,x}{2\,x+e^2+5}\right)}+5\,x-25\right)e^{\left(-x+e^{\left(\frac{3\,x}{2\,x+e^2+}\right.}\right.}}{4\,x^2+2\,(2\,x+5)e^2+20\,x+e^4+25}$$

input
```
integrate(((3*exp(2)*x+15*x)*exp(3*x/(exp(2)+5+2*x))+(1-x)*exp(2)^2+(-4*x^
2-6*x+10)*exp(2)-4*x^3-16*x^2-5*x+25)/(exp(2)^2+(4*x+10)*exp(2)+4*x^2+20*x
+25)/exp(-exp(3*x/(exp(2)+5+2*x))+x-5),x, algorithm=\
```

output
```
-integrate((4*x^3 + 16*x^2 + (x - 1)*e^4 + 2*(2*x^2 + 3*x - 5)*e^2 - 3*(x*
e^2 + 5*x)*e^(3*x/(2*x + e^2 + 5)) + 5*x - 25)*e^(-x + e^(3*x/(2*x + e^2 +
 5)) + 5)/(4*x^2 + 2*(2*x + 5)*e^2 + 20*x + e^4 + 25), x)
```

3.669.8 Giac [F]

$$\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}(15x+3e^2x)+e^2(10-6x-4x^2)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$$

$$=\int -\frac{\left(4\,x^3+16\,x^2+(x-1)e^4+2\,(2\,x^2+3\,x-5)e^2-3\,(xe^2+5\,x)e^{\left(\frac{3\,x}{2\,x+e^2+5}\right)}+5\,x-25\right)e^{\left(-x+e^{\left(\frac{3\,x}{2\,x+e^2+}\right.}\right.}}{4\,x^2+2\,(2\,x+5)e^2+20\,x+e^4+25}$$

input
```
integrate(((3*exp(2)*x+15*x)*exp(3*x/(exp(2)+5+2*x))+(1-x)*exp(2)^2+(-4*x^
2-6*x+10)*exp(2)-4*x^3-16*x^2-5*x+25)/(exp(2)^2+(4*x+10)*exp(2)+4*x^2+20*x
+25)/exp(-exp(3*x/(exp(2)+5+2*x))+x-5),x, algorithm=\
```

output
```
integrate(-(4*x^3 + 16*x^2 + (x - 1)*e^4 + 2*(2*x^2 + 3*x - 5)*e^2 - 3*(x*
e^2 + 5*x)*e^(3*x/(2*x + e^2 + 5)) + 5*x - 25)*e^(-x + e^(3*x/(2*x + e^2 +
 5)) + 5)/(4*x^2 + 2*(2*x + 5)*e^2 + 20*x + e^4 + 25), x)
```

3.669. $\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}(15x+3e^2x)+e^2(10-6x-4x^2)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$

3.669.9 Mupad [B] (verification not implemented)

Time = 14.83 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{e^{5+e^{\frac{3x}{5+e^2+2x}}-x}\left(25+e^4(1-x)-5x-16x^2-4x^3+e^{\frac{3x}{5+e^2+2x}}(15x+3e^2x)+e^2(10-6x-4x^2)\right)}{25+e^4+20x+4x^2+e^2(10+4x)}\,dx$$
$$= x\,\mathrm{e}^{-x}\,\mathrm{e}^5\,\mathrm{e}^{\mathrm{e}^{\frac{3\,x}{2\,x+\mathrm{e}^2+5}}}$$

input
```
int(-(exp(exp((3*x)/(2*x + exp(2) + 5)) - x + 5)*(5*x - exp((3*x)/(2*x + e
xp(2) + 5))*(15*x + 3*x*exp(2)) + exp(2)*(6*x + 4*x^2 - 10) + exp(4)*(x -
1) + 16*x^2 + 4*x^3 - 25))/(20*x + exp(4) + 4*x^2 + exp(2)*(4*x + 10) + 25
),x)
```

output
```
x*exp(-x)*exp(5)*exp(exp((3*x)/(2*x + exp(2) + 5)))
```

3.670 $\int \frac{1}{4}\left(e^{\frac{1}{4}\left(16-e^{e^x}-4x\right)}\left(-4-e^{e^x+x}\right)+e^{e+27x-2x^2}(-108+$

3.670.1 Optimal result

Integrand size = 53, antiderivative size = 30

$$\int \frac{1}{4}\left(e^{\frac{1}{4}\left(16-e^{e^x}-4x\right)}\left(-4-e^{e^x+x}\right)+e^{e+27x-2x^2}(-108+16x)\right)\,dx=e^{4-\frac{e^{e^x}}{4}-x}-e^{e+(27-2x)x}$$

output
```
exp(-1/4*exp(exp(x))-x+4)-exp(x*(27-2*x)+exp(1))
```

3.670.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{1}{4}\left(e^{\frac{1}{4}\left(16-e^{e^x}-4x\right)}\left(-4-e^{e^x+x}\right)+e^{e+27x-2x^2}(-108+16x)\right)\,dx=e^{4-\frac{e^{e^x}}{4}-x}-e^{e+(27-2x)x}$$

input
```
Integrate[(E^((16 - E^E^x - 4*x)/4)*(-4 - E^(E^x + x)) + E^(E + 27*x - 2*x
^2)*(-108 + 16*x))/4,x]
```

output
```
E^(4 - E^E^x/4 - x) - E^(E + (27 - 2*x)*x)
```

3.670.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.30, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.038$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}\left(e^{-2x^2+27x+e}(16x-108)+e^{\frac{1}{4}\left(-4x-e^{e^x}+16\right)}\left(-e^{x+e^x}-4\right)\right)dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{4}\int \left(-e^{\frac{1}{4}\left(-4x-e^{e^x}+16\right)}\left(4+e^{x+e^x}\right)-4e^{-2x^2+27x+e}(27-4x)\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{4}\left(4e^{\frac{1}{4}\left(-4x-e^{e^x}+16\right)}-4e^{-2x^2+27x+e}\right)$$

input
```
Int[(E^((16 - E^E^x - 4*x)/4)*(-4 - E^(E^x + x)) + E^(E + 27*x - 2*x^2)*(-
108 + 16*x))/4,x]
```

output
```
(4*E^((16 - E^E^x - 4*x)/4) - 4*E^(E + 27*x - 2*x^2))/4
```

3.670.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.670.4 Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

method	result	s
risch	$e^{-\frac{e^{e^{x}}}{4}-x+4}-e^{e-2 x^{2}+27 x}$	2
parallelrisch	$e^{-\frac{e^{e^{x}}}{4}-x+4}-e^{e-2 x^{2}+27 x}$	2
default	$-\frac{27 e^{e} \sqrt{\pi}\, e^{\frac{729}{8}} \sqrt{2}\, \operatorname{erf}\left(\sqrt{2}\, x-\frac{27 \sqrt{2}}{4}\right)}{4}+4 e^{e} \left(-\frac{e^{-2 x^{2}+27 x}}{4}+\frac{27 \sqrt{\pi}\, e^{\frac{729}{8}} \sqrt{2}\, \operatorname{erf}\left(\sqrt{2}\, x-\frac{27 \sqrt{2}}{4}\right)}{16}\right)+e^{-\frac{e^{e^{x}}}{4}-x+4}$	7

input
```
int(1/4*(-exp(x)*exp(exp(x))-4)*exp(-1/4*exp(exp(x))-x+4)+1/4*(16*x-108)*e
xp(exp(1)-2*x^2+27*x),x,method=_RETURNVERBOSE)
```

output
```
exp(-1/4*exp(exp(x))-x+4)-exp(exp(1)-2*x^2+27*x)
```

3.670.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.17

$$\int \frac{1}{4}\left(e^{\frac{1}{4}\left(16-e^{e^{x}}-4x\right)}\left(-4-e^{e^{x}+x}\right)+e^{e+27x-2x^{2}}(-108+16x)\right)\,dx$$
$$= -e^{\left(-2\,x^{2}+27\,x+e\right)}+e^{\left(-\frac{1}{4}\,\left(4\,(x-4)e^{x}+e^{\left(x+e^{x}\right)}\right)e^{(-x)}\right)}$$

input
```
integrate(1/4*(-exp(x)*exp(exp(x))-4)*exp(-1/4*exp(exp(x))-x+4)+1/4*(16*x-
108)*exp(exp(1)-2*x^2+27*x),x, algorithm=\
```

output
```
-e^(-2*x^2 + 27*x + e) + e^(-1/4*(4*(x - 4)*e^x + e^(x + e^x))*e^(-x))
```

3.670.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{1}{4}\left(e^{\frac{1}{4}\left(16-e^{e^{x}}-4x\right)}\left(-4-e^{e^{x}+x}\right)+e^{e+27x-2x^{2}}(-108+16x)\right)\,dx = e^{-x-\frac{e^{e^{x}}}{4}+4}-e^{-2x^{2}+27x+e}$$

input
```
integrate(1/4*(-exp(x)*exp(exp(x))-4)*exp(-1/4*exp(exp(x))-x+4)+1/4*(16*x-
108)*exp(exp(1)-2*x**2+27*x),x)
```

output
```
exp(-x - exp(exp(x))/4 + 4) - exp(-2*x**2 + 27*x + E)
```

3.670.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{1}{4}\left(e^{\frac{1}{4}\left(16-e^{e^x}-4x\right)}\left(-4-e^{e^x+x}\right)+e^{e+27x-2x^2}(-108+16x)\right)\,dx$$
$$= -e^{\left(-2\,x^2+27\,x+e\right)}+e^{\left(-x-\frac{1}{4}\,e^{\left(e^x\right)}+4\right)}$$

input
```
integrate(1/4*(-exp(x)*exp(exp(x))-4)*exp(-1/4*exp(exp(x))-x+4)+1/4*(16*x-
108)*exp(exp(1)-2*x^2+27*x),x, algorithm=\
```

output
```
-e^(-2*x^2 + 27*x + e) + e^(-x - 1/4*e^(e^x) + 4)
```

3.670.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{1}{4}\left(e^{\frac{1}{4}\left(16-e^{e^x}-4x\right)}\left(-4-e^{e^x+x}\right)+e^{e+27x-2x^2}(-108+16x)\right)\,dx$$
$$= -e^{\left(-2\,x^2+27\,x+e\right)}+e^{\left(-x-\frac{1}{4}\,e^{\left(e^x\right)}+4\right)}$$

input
```
integrate(1/4*(-exp(x)*exp(exp(x))-4)*exp(-1/4*exp(exp(x))-x+4)+1/4*(16*x-
108)*exp(exp(1)-2*x^2+27*x),x, algorithm=\
```

output
```
-e^(-2*x^2 + 27*x + e) + e^(-x - 1/4*e^(e^x) + 4)
```

3.670.9 Mupad [B] (verification not implemented)

Time = 14.32 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{1}{4}\left(e^{\frac{1}{4}\left(16-e^{e^x}-4x\right)}\left(-4-e^{e^x+x}\right)+e^{e+27x-2x^2}(-108+16x)\right)\,dx = \mathrm{e}^{4-\frac{\mathrm{e}^{\mathrm{e}^x}}{4}-x}-\mathrm{e}^{-2\,x^2+27\,x+\mathrm{e}}$$

input
```
int((exp(27*x + exp(1) - 2*x^2)*(16*x - 108))/4 - (exp(4 - exp(exp(x))/4 -
 x)*(exp(exp(x))*exp(x) + 4))/4,x)
```

output
```
exp(4 - exp(exp(x))/4 - x) - exp(27*x + exp(1) - 2*x^2)
```

3.671 $\int \frac{2e\log(2)+(-4e\log(2)+2ex\log(2)\log(3))\log(x)+(e\log(2)-ex\log(2)\log(3))\log^2(x)}{4\ 3^x\log^2(x)-4\ 3^x\log^3(x)+3^x\log^4(x)}\,dx$

3.671.1 Optimal result

Integrand size = 71, antiderivative size = 20

$$\int \frac{2e\log(2)+(-4e\log(2)+2ex\log(2)\log(3))\log(x)+(e\log(2)-ex\log(2)\log(3))\log^2(x)}{4\ 3^x\log^2(x)-4\ 3^x\log^3(x)+3^x\log^4(x)}\,dx = \frac{3^{-x}ex\log(2)}{(-2+\log(x))\log(x)}$$

output
```
exp(1)/exp(x*ln(3))/(ln(x)-2)*x/ln(x)*ln(2)
```

3.671.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.70

$$\int \frac{2e\log(2)+(-4e\log(2)+2ex\log(2)\log(3))\log(x)+(e\log(2)-ex\log(2)\log(3))\log^2(x)}{4\ 3^x\log^2(x)-4\ 3^x\log^3(x)+3^x\log^4(x)}\,dx = \frac{3^{-x}ex\log(2)(-\log(9)+\log(3)\log(x))}{\log(3)(-2+\log(x))^2\log(x)}$$

input
```
Integrate[(2*E*Log[2] + (-4*E*Log[2] + 2*E*x*Log[2]*Log[3])*Log[x] + (E*Lo
g[2] - E*x*Log[2]*Log[3])*Log[x]^2)/(4*3^x*Log[x]^2 - 4*3^x*Log[x]^3 + 3^x
*Log[x]^4),x]
```

output
```
(E*x*Log[2]*(-Log[9] + Log[3]*Log[x]))/(3^x*Log[3]*(-2 + Log[x])^2*Log[x])
```

3.671.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 42 vs. 2(20) = 40.

Time = 0.45 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.10, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {7292, 27, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(e\log(2)-ex\log(2)\log(3))\log^2(x)+(2ex\log(2)\log(3)-4e\log(2))\log(x)+2e\log(2)}{3^x\log^4(x)-4\ 3^x\log^3(x)+4\ 3^x\log^2(x)}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{e3^{-x}\log(2)\left(-x\log(3)\log^2(x)+\log^2(x)+x\log(9)\log(x)-4\log(x)+2\right)}{(2-\log(x))^2\log^2(x)}dx$$
$$\Big\downarrow \text{27}$$
$$e\log(2)\int \frac{3^{-x}\left(-x\log(3)\log^2(x)+\log^2(x)+x\log(9)\log(x)-4\log(x)+2\right)}{(2-\log(x))^2\log^2(x)}dx$$
$$\Big\downarrow \text{2726}$$
$$-\frac{e3^{-x}\log(2)\left(x\log(9)\log(x)-x\log(3)\log^2(x)\right)}{\log(3)(2-\log(x))^2\log^2(x)}$$

input
```
Int[(2*E*Log[2] + (-4*E*Log[2] + 2*E*x*Log[2]*Log[3])*Log[x] + (E*Log[2] -
 E*x*Log[2]*Log[3])*Log[x]^2)/(4*3^x*Log[x]^2 - 4*3^x*Log[x]^3 + 3^x*Log[x
]^4),x]
```

output
```
-((E*Log[2]*(x*Log[9]*Log[x] - x*Log[3]*Log[x]^2))/(3^x*Log[3]*(2 - Log[x]
)^2*Log[x]^2))
```

3.671.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.671.4 Maple [A] (verified)

Time = 1.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

method	result	size
risch	$\frac{\mathrm{e} 3^{-x} x \ln(2)}{(\ln(x)-2)\ln(x)}$	22
norman	$\frac{\mathrm{e}\,\mathrm{e}^{-x\ln(3)} x \ln(2)}{(\ln(x)-2)\ln(x)}$	24
parallelrisch	$\frac{\mathrm{e}\,\mathrm{e}^{-x\ln(3)} x \ln(2)}{(\ln(x)-2)\ln(x)}$	24

input
```
int(((-x*exp(1)*ln(2)*ln(3)+exp(1)*ln(2))*ln(x)^2+(2*x*exp(1)*ln(2)*ln(3)-
4*exp(1)*ln(2))*ln(x)+2*exp(1)*ln(2))/(exp(x*ln(3))*ln(x)^4-4*exp(x*ln(3))
*ln(x)^3+4*exp(x*ln(3))*ln(x)^2),x,method=_RETURNVERBOSE)
```

output
```
exp(1)/(3^x)/(ln(x)-2)*x/ln(x)*ln(2)
```

3.671.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{2e\log(2) + (-4e\log(2) + 2ex\log(2)\log(3))\log(x) + (e\log(2) - ex\log(2)\log(3))\log^2(x)}{4\ 3^x\log^2(x) - 4\ 3^x\log^3(x) + 3^x\log^4(x)}\,dx$$
$$= \frac{xe\log(2)}{3^x\log(x)^2 - 2\cdot 3^x\log(x)}$$

input
```
integrate(((-x*exp(1)*log(2)*log(3)+exp(1)*log(2))*log(x)^2+(2*x*exp(1)*lo
g(2)*log(3)-4*exp(1)*log(2))*log(x)+2*exp(1)*log(2))/(exp(x*log(3))*log(x)
^4-4*exp(x*log(3))*log(x)^3+4*exp(x*log(3))*log(x)^2),x, algorithm=\
```

output
```
x*e*log(2)/(3^x*log(x)^2 - 2*3^x*log(x))
```

3.671.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{2e\log(2)+(-4e\log(2)+2ex\log(2)\log(3))\log(x)+(e\log(2)-ex\log(2)\log(3))\log^2(x)}{4\ 3^x\log^2(x)-4\ 3^x\log^3(x)+3^x\log^4(x)}\,dx$$
$$=\frac{exe^{-x\log{(3)}}\log{(2)}}{\log{(x)}^2-2\log{(x)}}$$

input
```
integrate(((-x*exp(1)*ln(2)*ln(3)+exp(1)*ln(2))*ln(x)**2+(2*x*exp(1)*ln(2)
*ln(3)-4*exp(1)*ln(2))*ln(x)+2*exp(1)*ln(2))/(exp(x*ln(3))*ln(x)**4-4*exp(
x*ln(3))*ln(x)**3+4*exp(x*ln(3))*ln(x)**2),x)
```

output
```
E*x*exp(-x*log(3))*log(2)/(log(x)**2 - 2*log(x))
```

3.671.7 Maxima [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{2e\log(2)+(-4e\log(2)+2ex\log(2)\log(3))\log(x)+(e\log(2)-ex\log(2)\log(3))\log^2(x)}{4\ 3^x\log^2(x)-4\ 3^x\log^3(x)+3^x\log^4(x)}\,dx$$
$$=\frac{xe^{(-x\log(3)+1)}\log{(2)}}{\log{(x)}^2-2\,\log{(x)}}$$

input
```
integrate(((-x*exp(1)*log(2)*log(3)+exp(1)*log(2))*log(x)^2+(2*x*exp(1)*lo
g(2)*log(3)-4*exp(1)*log(2))*log(x)+2*exp(1)*log(2))/(exp(x*log(3))*log(x)
^4-4*exp(x*log(3))*log(x)^3+4*exp(x*log(3))*log(x)^2),x, algorithm=\
```

output
```
x*e^(-x*log(3) + 1)*log(2)/(log(x)^2 - 2*log(x))
```

3.671.8 Giac [F]

$$\int \frac{2e\log(2)+(-4e\log(2)+2ex\log(2)\log(3))\log(x)+(e\log(2)-ex\log(2)\log(3))\log^2(x)}{4\ 3^x\log^2(x)-4\ 3^x\log^3(x)+3^x\log^4(x)}\,dx$$
$$=\int -\frac{(xe\log(3)\log(2)-e\log(2))\log(x)^2-2\,e\log(2)-2\,(xe\log(3)\log(2)-2\,e\log(2))\log(x)}{3^x\log(x)^4-4\cdot 3^x\log(x)^3+4\cdot 3^x\log(x)^2}\,dx$$

input
```
integrate(((-x*exp(1)*log(2)*log(3)+exp(1)*log(2))*log(x)^2+(2*x*exp(1)*lo
g(2)*log(3)-4*exp(1)*log(2))*log(x)+2*exp(1)*log(2))/(exp(x*log(3))*log(x)
^4-4*exp(x*log(3))*log(x)^3+4*exp(x*log(3))*log(x)^2),x, algorithm=\
```

output
```
integrate(-((x*e*log(3)*log(2) - e*log(2))*log(x)^2 - 2*e*log(2) - 2*(x*e*
log(3)*log(2) - 2*e*log(2))*log(x))/(3^x*log(x)^4 - 4*3^x*log(x)^3 + 4*3^x
*log(x)^2), x)
```

3.671.9 Mupad [B] (verification not implemented)

Time = 14.67 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{2e\log(2)+(-4e\log(2)+2ex\log(2)\log(3))\log(x)+(e\log(2)-ex\log(2)\log(3))\log^2(x)}{4\ 3^x\log^2(x)-4\ 3^x\log^3(x)+3^x\log^4(x)}\,dx$$
$$=\frac{x\,\mathrm{e}\,\ln(2)}{3^x\,\ln(x)\,(\ln(x)-2)}$$

input
```
int((2*exp(1)*log(2) + log(x)^2*(exp(1)*log(2) - x*exp(1)*log(2)*log(3)) -
 log(x)*(4*exp(1)*log(2) - 2*x*exp(1)*log(2)*log(3)))/(4*exp(x*log(3))*log
(x)^2 - 4*exp(x*log(3))*log(x)^3 + exp(x*log(3))*log(x)^4),x)
```

output
```
(x*exp(1)*log(2))/(3^x*log(x)*(log(x) - 2))
```

3.672 $\int \frac{75-53x+148x^2+6x^3}{75x+3x^2}\,dx$

3.672.1 Optimal result

Integrand size = 27, antiderivative size = 36

$$\int \frac{75-53x+148x^2+6x^3}{75x+3x^2}\,dx=\frac{-4x+x\left(\frac{2(5-x)}{3}+x^2\right)}{x}-\log\left(\frac{(25+x)^2}{x}\right)$$

output
```
(x*(10/3-2/3*x+x^2)-4*x)/x-ln((x+25)^2/x)
```

3.672.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.47

$$\int \frac{75-53x+148x^2+6x^3}{75x+3x^2}\,dx=-\frac{2x}{3}+x^2+\log(x)-2\log(25+x)$$

input
```
Integrate[(75 - 53*x + 148*x^2 + 6*x^3)/(75*x + 3*x^2),x]
```

output
```
(-2*x)/3 + x^2 + Log[x] - 2*Log[25 + x]
```

3.672.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.47, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2026, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^3+148x^2-53x+75}{3x^2+75x}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{6x^3+148x^2-53x+75}{x(3x+75)}dx$$

$$\Big\downarrow \text{ 2123}$$

$$\int \left(2x-\frac{2}{x+25}+\frac{1}{x}-\frac{2}{3}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$x^2-\frac{2x}{3}+\log(x)-2\log(x+25)$$

input
```
Int[(75 - 53*x + 148*x^2 + 6*x^3)/(75*x + 3*x^2),x]
```

output
```
(-2*x)/3 + x^2 + Log[x] - 2*Log[25 + x]
```

3.672.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

3.672.4 Maple [A] (verified)

Time = 0.86 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.44

method	result	size
default	$x^2-\frac{2x}{3}+\ln(x)-2\ln(x+25)$	16
norman	$x^2-\frac{2x}{3}+\ln(x)-2\ln(x+25)$	16
risch	$x^2-\frac{2x}{3}+\ln(x)-2\ln(x+25)$	16
parallelrisch	$x^2-\frac{2x}{3}+\ln(x)-2\ln(x+25)$	16
meijerg	$\ln(x)-2\ln(5)-2\ln\left(1+\frac{x}{25}\right)-\frac{25x\left(-\frac{3x}{25}+6\right)}{3}+\frac{148x}{3}$	27

input
```
int((6*x^3+148*x^2-53*x+75)/(3*x^2+75*x),x,method=_RETURNVERBOSE)
```

output
```
x^2-2/3*x+ln(x)-2*ln(x+25)
```

3.672.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.42

$$\int \frac{75-53x+148x^2+6x^3}{75x+3x^2}\,dx = x^2-\frac{2}{3}\,x-2\,\log(x+25)+\log(x)$$

input
```
integrate((6*x^3+148*x^2-53*x+75)/(3*x^2+75*x),x, algorithm=\
```

output
```
x^2 - 2/3*x - 2*log(x + 25) + log(x)
```

3.672.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.47

$$\int \frac{75-53x+148x^2+6x^3}{75x+3x^2}\,dx = x^2-\frac{2x}{3}+\log(x)-2\log(x+25)$$

input
```
integrate((6*x**3+148*x**2-53*x+75)/(3*x**2+75*x),x)
```

output
```
x**2 - 2*x/3 + log(x) - 2*log(x + 25)
```

3.672.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.42

$$\int \frac{75-53x+148x^2+6x^3}{75x+3x^2}\,dx = x^2 - \frac{2}{3}\,x - 2\,\log\left(x+25\right) + \log\left(x\right)$$

input
```
integrate((6*x^3+148*x^2-53*x+75)/(3*x^2+75*x),x, algorithm=\
```

output
```
x^2 - 2/3*x - 2*log(x + 25) + log(x)
```

3.672.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.47

$$\int \frac{75-53x+148x^2+6x^3}{75x+3x^2}\,dx = x^2 - \frac{2}{3}\,x - 2\,\log\left(|x+25|\right) + \log\left(|x|\right)$$

input
```
integrate((6*x^3+148*x^2-53*x+75)/(3*x^2+75*x),x, algorithm=\
```

output
```
x^2 - 2/3*x - 2*log(abs(x + 25)) + log(abs(x))
```

3.672.9 Mupad [B] (verification not implemented)

Time = 14.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.42

$$\int \frac{75-53x+148x^2+6x^3}{75x+3x^2}\,dx = \ln\left(x\right) - 2\,\ln\left(x+25\right) - \frac{2\,x}{3} + x^2$$

input
```
int((148*x^2 - 53*x + 6*x^3 + 75)/(75*x + 3*x^2),x)
```

output
```
log(x) - 2*log(x + 25) - (2*x)/3 + x^2
```

3.673 $\int (11+24e^{2x}+e^x(-48+12x))\,dx$

3.673.1 Optimal result

Integrand size = 18, antiderivative size = 20

$$\int (11+24e^{2x}+e^x(-48+12x))\,dx=-x+12\left(e^{2x}+e^x(-5+x)+x\right)$$

output
```
12*(-5+x)*exp(x)+12*exp(x)^2+11*x
```

3.673.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int (11+24e^{2x}+e^x(-48+12x))\,dx=12e^{2x}+12e^x(-5+x)+11x$$

input
```
Integrate[11 + 24*E^(2*x) + E^x*(-48 + 12*x),x]
```

output
```
12*E^(2*x) + 12*E^x*(-5 + x) + 11*x
```

3.673.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^x(12x-48)+24e^{2x}+11\right) dx$$

$$\Big\downarrow \text{2009}$$

$$-12e^x(4-x)-12e^x+12e^{2x}+11x$$

input
```
Int[11 + 24*E^(2*x) + E^x*(-48 + 12*x),x]
```

output
```
-12*E^x + 12*E^(2*x) - 12*E^x*(4 - x) + 11*x
```

3.673.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.673.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
risch	$12\,\mathrm{e}^{2x}+(12x-60)\,\mathrm{e}^{x}+11x$	19
default	$12\,\mathrm{e}^{x}x-60\,\mathrm{e}^{x}+12\,\mathrm{e}^{2x}+11x$	20
norman	$12\,\mathrm{e}^{x}x-60\,\mathrm{e}^{x}+12\,\mathrm{e}^{2x}+11x$	20
parallelrisch	$12\,\mathrm{e}^{x}x-60\,\mathrm{e}^{x}+12\,\mathrm{e}^{2x}+11x$	20
parts	$12\,\mathrm{e}^{x}x-60\,\mathrm{e}^{x}+12\,\mathrm{e}^{2x}+11x$	20

input
```
int(24*exp(x)^2+(12*x-48)*exp(x)+11,x,method=_RETURNVERBOSE)
```

output
```
12*exp(2*x)+(12*x-60)*exp(x)+11*x
```

3.673.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \left(11+24e^{2x}+e^{x}(-48+12x)\right)\,dx=12\,(x-5)e^{x}+11\,x+12\,e^{(2\,x)}$$

input
```
integrate(24*exp(x)^2+(12*x-48)*exp(x)+11,x, algorithm=\
```

output
```
12*(x - 5)*e^x + 11*x + 12*e^(2*x)
```

3.673.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \left(11+24e^{2x}+e^{x}(-48+12x)\right)\,dx=11x+(12x-60)\,e^{x}+12e^{2x}$$

input
```
integrate(24*exp(x)**2+(12*x-48)*exp(x)+11,x)
```

output
```
11*x + (12*x - 60)*exp(x) + 12*exp(2*x)
```

3.673.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \left(11+24e^{2x}+e^{x}(-48+12x)\right)\,dx=12\,(x-1)e^{x}+11\,x+12\,e^{(2\,x)}-48\,e^{x}$$

input
```
integrate(24*exp(x)^2+(12*x-48)*exp(x)+11,x, algorithm=\
```

output
```
12*(x - 1)*e^x + 11*x + 12*e^(2*x) - 48*e^x
```

3.673.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \left(11+24e^{2x}+e^x(-48+12x)\right)\,dx=12\,(x-5)e^x+11\,x+12\,e^{(2\,x)}$$

input
```
integrate(24*exp(x)^2+(12*x-48)*exp(x)+11,x, algorithm=\
```

output
```
12*(x - 5)*e^x + 11*x + 12*e^(2*x)
```

3.673.9 Mupad [B] (verification not implemented)

Time = 14.10 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(11+24e^{2x}+e^x(-48+12x)\right)\,dx=11\,x+12\,\mathrm{e}^{2\,x}-60\,\mathrm{e}^x+12\,x\,\mathrm{e}^x$$

input
```
int(24*exp(2*x) + exp(x)*(12*x - 48) + 11,x)
```

output
```
11*x + 12*exp(2*x) - 60*exp(x) + 12*x*exp(x)
```

3.674 $\int \frac{-62208+373392x^2-1728x^4+2x^6+(62208-432x^2)\log(x)}{186624x^2-864x^4+x^6}\,dx$

3.674.1 Optimal result

Integrand size = 44, antiderivative size = 23

$$\int \frac{-62208+373392x^2-1728x^4+2x^6+(62208-432x^2)\log(x)}{186624x^2-864x^4+x^6}\,dx=-6+2x-\frac{\log(x)}{x\left(3-\frac{x^2}{144}\right)}$$

output
```
2*x-6-ln(x)/x/(3-1/144*x^2)
```

3.674.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 61 vs. 2(23) = 46.

Time = 0.20 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.65

$$\int \frac{-62208+373392x^2-1728x^4+2x^6+(62208-432x^2)\log(x)}{186624x^2-864x^4+x^6}\,dx$$
$$=2\left(\frac{72\log(x)}{x(-432+x^2)}+\frac{1}{432}\left(432x+\sqrt{3}\log\left(12\sqrt{3}+x\right)-\sqrt{3}\log\left(1+\frac{x}{12\sqrt{3}}\right)\right)\right)$$

input
```
Integrate[(-62208 + 373392*x^2 - 1728*x^4 + 2*x^6 + (62208 - 432*x^2)*Log[
x])/(186624*x^2 - 864*x^4 + x^6),x]
```

output
```
2*((72*Log[x])/(x*(-432 + x^2)) + (432*x + Sqrt[3]*Log[12*Sqrt[3] + x] - S
qrt[3]*Log[1 + x/(12*Sqrt[3])])/432)
```

3.674.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 84 vs. 2(23) = 46.

Time = 0.62 (sec) , antiderivative size = 84, normalized size of antiderivative = 3.65, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.114, Rules used = {2026, 1380, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^6-1728x^4+373392x^2+(62208-432x^2)\log(x)-62208}{x^6-864x^4+186624x^2}dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{2x^6-1728x^4+373392x^2+(62208-432x^2)\log(x)-62208}{x^2(x^4-864x^2+186624)}dx$$
$$\Big\downarrow \text{1380}$$
$$\int -\frac{2(-x^6+864x^4-186696x^2-216(144-x^2)\log(x)+31104)}{x^2(432-x^2)^2}dx$$
$$\Big\downarrow \text{27}$$
$$-2\int \frac{-x^6+864x^4-186696x^2-216(144-x^2)\log(x)+31104}{x^2(432-x^2)^2}dx$$
$$\Big\downarrow \text{7293}$$
$$-2\int \left(-\frac{x^4}{(x^2-432)^2}+\frac{864x^2}{(x^2-432)^2}-\frac{186696}{(x^2-432)^2}+\frac{216(x-12)(x+12)\log(x)}{(x^2-432)^2x^2}+\frac{31104}{(x^2-432)^2x^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-2\left(\frac{2591x}{12(432-x^2)}+\frac{36}{(432-x^2)x}+\frac{x\log(x)}{6(432-x^2)}-\frac{x^3}{2(432-x^2)}-\frac{3x}{2}-\frac{1}{12x}+\frac{\log(x)}{6x}\right)$$

input
```
Int[(-62208 + 373392*x^2 - 1728*x^4 + 2*x^6 + (62208 - 432*x^2)*Log[x])/(1
86624*x^2 - 864*x^4 + x^6),x]
```

output
```
-2*(-1/12*1/x - (3*x)/2 + 36/(x*(432 - x^2)) + (2591*x)/(12*(432 - x^2)) -
 x^3/(2*(432 - x^2)) + Log[x]/(6*x) + (x*Log[x])/(6*(432 - x^2)))
```

3.674.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.674.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

method	result
risch	$\frac{144\ln(x)}{x(x^2-432)}+2x$
norman	$\frac{-864x^2+2x^4+144\ln(x)}{x(x^2-432)}$
parallelrisch	$\frac{-864x^2+2x^4+144\ln(x)}{x(x^2-432)}$
default	$2x+\frac{\ln(x)\left(\sqrt{3}\,\ln\left(1-\frac{x\sqrt{3}}{36}\right)x^2-\sqrt{3}\,\ln\left(1+\frac{x\sqrt{3}}{36}\right)x^2-432\sqrt{3}\,\ln\left(1-\frac{x\sqrt{3}}{36}\right)+432\sqrt{3}\,\ln\left(1+\frac{x\sqrt{3}}{36}\right)+72x\right)}{216x^2-93312}-\frac{\sqrt{3}\,\ln(x)\ln\left(1-\frac{x}{3}\right.}{216}$
parts	$2x+\frac{\ln(x)\left(\sqrt{3}\,\ln\left(1-\frac{x\sqrt{3}}{36}\right)x^2-\sqrt{3}\,\ln\left(1+\frac{x\sqrt{3}}{36}\right)x^2-432\sqrt{3}\,\ln\left(1-\frac{x\sqrt{3}}{36}\right)+432\sqrt{3}\,\ln\left(1+\frac{x\sqrt{3}}{36}\right)+72x\right)}{216x^2-93312}-\frac{\sqrt{3}\,\ln(x)\ln\left(1-\frac{x}{3}\right.}{216}$

input
```
int(((-432*x^2+62208)*ln(x)+2*x^6-1728*x^4+373392*x^2-62208)/(x^6-864*x^4+
186624*x^2),x,method=_RETURNVERBOSE)
```

output
```
144/x/(x^2-432)*ln(x)+2*x
```

3.674.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{-62208+373392x^2-1728x^4+2x^6+(62208-432x^2)\log(x)}{186624x^2-864x^4+x^6}\,dx = \frac{2\,(x^4-432\,x^2+72\,\log{(x)})}{x^3-432\,x}$$

input
```
integrate(((-432*x^2+62208)*log(x)+2*x^6-1728*x^4+373392*x^2-62208)/(x^6-8
64*x^4+186624*x^2),x, algorithm=\
```

output
```
2*(x^4 - 432*x^2 + 72*log(x))/(x^3 - 432*x)
```

3.674.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.61

$$\int \frac{-62208+373392x^2-1728x^4+2x^6+(62208-432x^2)\log(x)}{186624x^2-864x^4+x^6}\,dx = 2x+\frac{144\log{(x)}}{x^3-432x}$$

input
```
integrate(((-432*x**2+62208)*ln(x)+2*x**6-1728*x**4+373392*x**2-62208)/(x*
*6-864*x**4+186624*x**2),x)
```

output
```
2*x + 144*log(x)/(x**3 - 432*x)
```

3.674.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. 2(19) = 38.

Time = 0.34 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.17

$$\int \frac{-62208+373392x^2-1728x^4+2x^6+(62208-432x^2)\log(x)}{186624x^2-864x^4+x^6}\,dx = 2\,x-\frac{x^2-432\,\log{(x)}-432}{3\,(x^3-432\,x)}+\frac{x^2-288}{2\,(x^3-432\,x)}-\frac{x}{6\,(x^2-432)}$$

input
```
integrate(((-432*x^2+62208)*log(x)+2*x^6-1728*x^4+373392*x^2-62208)/(x^6-8
64*x^4+186624*x^2),x, algorithm=\
```

output
```
2*x - 1/3*(x^2 - 432*log(x) - 432)/(x^3 - 432*x) + 1/2*(x^2 - 288)/(x^3 -
432*x) - 1/6*x/(x^2 - 432)
```

3.674.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{-62208+373392x^2-1728x^4+2x^6+(62208-432x^2)\log(x)}{186624x^2-864x^4+x^6}\,dx$$
$$=\frac{1}{3}\left(\frac{x}{x^2-432}-\frac{1}{x}\right)\log\left(x\right)+2\,x$$

input
```
integrate(((-432*x^2+62208)*log(x)+2*x^6-1728*x^4+373392*x^2-62208)/(x^6-8
64*x^4+186624*x^2),x, algorithm=\
```

output
```
1/3*(x/(x^2 - 432) - 1/x)*log(x) + 2*x
```

3.674.9 Mupad [B] (verification not implemented)

Time = 14.21 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{-62208+373392x^2-1728x^4+2x^6+(62208-432x^2)\log(x)}{186624x^2-864x^4+x^6}\,dx=2\,x+\frac{144\,\ln\left(x\right)}{x\,\left(x^2-432\right)}$$

input
```
int(-(1728*x^4 - 373392*x^2 - 2*x^6 + log(x)*(432*x^2 - 62208) + 62208)/(1
86624*x^2 - 864*x^4 + x^6),x)
```

output
```
2*x + (144*log(x))/(x*(x^2 - 432))
```

3.675 $\int \frac{1}{36}e^{1+e^{\frac{1}{36}(-108-36e^x+x)}+e^{1+e^{\frac{1}{36}(-108-36e^x+x)}}x}\left(-36+e^{\frac{1}{36}(-1$

3.675.1 Optimal result

Integrand size = 69, antiderivative size = 26

$$\int \frac{1}{36}e^{1+e^{\frac{1}{36}(-108-36e^x+x)}+e^{1+e^{\frac{1}{36}(-108-36e^x+x)}}x}\left(-36+e^{\frac{1}{36}(-108-36e^x+x)}(-x+36e^x x)\right)\,dx$$
$$=-4-e^{e^{1+e^{-3-e^x+\frac{x}{36}}}x}$$

output
```
-4-exp(x*exp(exp(-exp(x)+1/36*x-3)+1))
```

3.675.2 Mathematica [A] (verified)

Time = 1.73 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{36}e^{1+e^{\frac{1}{36}(-108-36e^x+x)}+e^{1+e^{\frac{1}{36}(-108-36e^x+x)}}x}\left(-36+e^{\frac{1}{36}(-108-36e^x+x)}(-x+36e^x x)\right)\,dx$$
$$=-e^{e^{1+e^{-3-e^x+\frac{x}{36}}}x}$$

input
```
Integrate[(E^(1 + E^((-108 - 36*E^x + x)/36) + E^(1 + E^((-108 - 36*E^x +
x)/36))*x)*(-36 + E^((-108 - 36*E^x + x)/36)*(-x + 36*E^x*x)))/36,x]
```

output
```
-E^(E^(1 + E^(-3 - E^x + x/36))*x)
```

3.675.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{36}\left(e^{\frac{1}{36}(x-36e^x-108)}(36e^x x-x)-36\right)\exp\left(e^{e^{\frac{1}{36}(x-36e^x-108)}+1}x+e^{\frac{1}{36}(x-36e^x-108)}+1\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{36}\int -\exp\left(e^{1+e^{\frac{1}{36}(x-36e^x-108)}}x+e^{\frac{1}{36}(x-36e^x-108)}+1\right)\left(e^{\frac{1}{36}(x-36e^x-108)}(x-36e^x x)+36\right)dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{36}\int \exp\left(e^{1+e^{\frac{1}{36}(x-36e^x-108)}}x+e^{\frac{1}{36}(x-36e^x-108)}+1\right)\left(e^{\frac{1}{36}(x-36e^x-108)}(x-36e^x x)+36\right)dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{36}\int \left(\exp\left(e^{1+e^{\frac{1}{36}(x-36e^x-108)}}x+e^{\frac{1}{36}(x-36e^x-108)}+\frac{1}{36}(x-36e^x-108)+1\right)(x-36e^x x)+36\exp\left(e^{1+e^{\frac{1}{36}(x-3}}\right.\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{36}\left(-36\int \exp\left(e^{1+e^{\frac{1}{36}(x-36e^x-108)}}x+e^{\frac{1}{36}(x-36e^x-108)}+1\right)dx-\int \exp\left(e^{1+e^{\frac{1}{36}(x-36e^x-108)}}x+e^{\frac{1}{36}(x-36e^x-108)}+\right.\right.$$

input
```
Int[(E^(1 + E^((-108 - 36*E^x + x)/36) + E^(1 + E^((-108 - 36*E^x + x)/36)
)*x)*(-36 + E^((-108 - 36*E^x + x)/36)*(-x + 36*E^x*x)))/36,x]
```

output
```
$Aborted
```

3.675.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.675.4 Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.73

method	result	size
risch	$-\mathrm{e}^{x\,\mathrm{e}^{\mathrm{e}^{-\mathrm{e}^{x}+\frac{x}{36}-3}+1}}$	19
parallelrisch	$-\mathrm{e}^{x\,\mathrm{e}^{\mathrm{e}^{-\mathrm{e}^{x}+\frac{x}{36}-3}+1}}$	19

input
```
int(1/36*((36*exp(x)*x-x)*exp(-exp(x)+1/36*x-3)-36)*exp(exp(-exp(x)+1/36*x
-3)+1)*exp(x*exp(exp(-exp(x)+1/36*x-3)+1)),x,method=_RETURNVERBOSE)
```

output
```
-exp(x*exp(exp(-exp(x)+1/36*x-3)+1))
```

3.675.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.69

$$\int \frac{1}{36}e^{1+e^{\frac{1}{36}(-108-36e^x+x)}+e^{1+e^{\frac{1}{36}(-108-36e^x+x)}}x}\left(-36+e^{\frac{1}{36}(-108-36e^x+x)}(-x+36e^x x)\right)\,dx$$
$$=-e^{\left(xe^{\left(e^{\left(\frac{1}{36}x-e^x-3\right)}+1\right)}\right)}$$

input
```
integrate(1/36*((36*exp(x)*x-x)*exp(-exp(x)+1/36*x-3)-36)*exp(exp(-exp(x)+
1/36*x-3)+1)*exp(x*exp(exp(-exp(x)+1/36*x-3)+1)),x, algorithm=\
```

output
```
-e^(x*e^(e^(1/36*x - e^x - 3) + 1))
```

3.675.6 Sympy [A] (verification not implemented)

Time = 2.65 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

$$\int \frac{1}{36} e^{1+e^{\frac{1}{36}(-108-36e^x+x)}+e^{1+e^{\frac{1}{36}(-108-36e^x+x)}}x}\left(-36+e^{\frac{1}{36}(-108-36e^x+x)}(-x+36e^x x)\right)\,dx$$
$$= -e^{xe^{e^{\frac{x}{36}-e^x-3}+1}}$$

input
```
integrate(1/36*((36*exp(x)*x-x)*exp(-exp(x)+1/36*x-3)-36)*exp(exp(-exp(x)+
1/36*x-3)+1)*exp(x*exp(exp(-exp(x)+1/36*x-3)+1)),x)
```

output
```
-exp(x*exp(exp(x/36 - exp(x) - 3) + 1))
```

3.675.7 Maxima [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.69

$$\int \frac{1}{36} e^{1+e^{\frac{1}{36}(-108-36e^x+x)}+e^{1+e^{\frac{1}{36}(-108-36e^x+x)}}x}\left(-36+e^{\frac{1}{36}(-108-36e^x+x)}(-x+36e^x x)\right)\,dx$$
$$= -e^{\left(xe^{\left(e^{\left(\frac{1}{36}x-e^x-3\right)}+1\right)}\right)}$$

input
```
integrate(1/36*((36*exp(x)*x-x)*exp(-exp(x)+1/36*x-3)-36)*exp(exp(-exp(x)+
1/36*x-3)+1)*exp(x*exp(exp(-exp(x)+1/36*x-3)+1)),x, algorithm=\
```

output
```
-e^(x*e^(e^(1/36*x - e^x - 3) + 1))
```

3.675.8 Giac [F]

$$\int \frac{1}{36} e^{1+e^{\frac{1}{36}(-108-36e^x+x)}+e^{1+e^{\frac{1}{36}(-108-36e^x+x)}}x}\left(-36+e^{\frac{1}{36}(-108-36e^x+x)}(-x+36e^x x)\right)\,dx$$
$$= \int \frac{1}{36}\left((36\,xe^x-x)e^{\left(\frac{1}{36}\,x-e^x-3\right)}-36\right)e^{\left(xe^{\left(e^{\left(\frac{1}{36}\,x-e^x-3\right)}+1\right)}+e^{\left(\frac{1}{36}\,x-e^x-3\right)}+1\right)}\,dx$$

input
```
integrate(1/36*((36*exp(x)*x-x)*exp(-exp(x)+1/36*x-3)-36)*exp(exp(-exp(x)+
1/36*x-3)+1)*exp(x*exp(exp(-exp(x)+1/36*x-3)+1)),x, algorithm=\
```

output
```
integrate(1/36*((36*x*e^x - x)*e^(1/36*x - e^x - 3) - 36)*e^(x*e^(e^(1/36*
x - e^x - 3) + 1) + e^(1/36*x - e^x - 3) + 1), x)
```

3.675.9 Mupad [B] (verification not implemented)

Time = 15.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{1}{36}e^{1+e^{\frac{1}{36}(-108-36e^x+x)}+e^{1+e^{\frac{1}{36}(-108-36e^x+x)}}x}\left(-36+e^{\frac{1}{36}(-108-36e^x+x)}(-x+36e^xx)\right)\,dx$$
$$= -e^{x\,e^{e^{x/36}\,e^{-3}\,e^{-e^x}}\,e}$$

input
```
int(-(exp(exp(x/36 - exp(x) - 3) + 1)*exp(x*exp(exp(x/36 - exp(x) - 3) + 1
))*(exp(x/36 - exp(x) - 3)*(x - 36*x*exp(x)) + 36))/36,x)
```

output
```
-exp(x*exp(exp(x/36)*exp(-3)*exp(-exp(x)))*exp(1))
```

3.676 $\int \frac{1}{3}e^{-2x}x^{2x}(96x + (-9x^2 + 4x^3)\log(4) + (96x^2 + (-$

3.676.1 Optimal result

Integrand size = 55, antiderivative size = 26

$$\int \frac{1}{3}e^{-2x}x^{2x}\left(96x + \left(-9x^2 + 4x^3\right)\log(4) + \left(96x^2 + \left(-6x^3 + 2x^4\right)\log(4)\right)\log(x)\right)\,dx = e^{-2x}x^{2+2x}\left(16 + \left(-1 + \frac{x}{3}\right)x\log(4)\right)$$

output
```
(16+2*(-1+1/3*x)*x*ln(2))/exp(x)^2*exp(x*ln(x))^2*x^2
```

3.676.2 Mathematica [A] (verified)

Time = 1.34 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{1}{3}e^{-2x}x^{2x}\left(96x + \left(-9x^2 + 4x^3\right)\log(4) + \left(96x^2 + \left(-6x^3 + 2x^4\right)\log(4)\right)\log(x)\right)\,dx = \frac{1}{3}e^{-2x}x^{2+2x}\left(48 - 3x\log(4) + x^2\log(4)\right)$$

input
```
Integrate[(x^(2*x)*(96*x + (-9*x^2 + 4*x^3)*Log[4] + (96*x^2 + (-6*x^3 + 2
*x^4)*Log[4])*Log[x]))/(3*E^(2*x)),x]
```

output
```
(x^(2 + 2*x)*(48 - 3*x*Log[4] + x^2*Log[4]))/(3*E^(2*x))
```

3.676.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{3}e^{-2x}x^{2x}\left(\left(4x^3-9x^2\right)\log(4)+\left(96x^2+\left(2x^4-6x^3\right)\log(4)\right)\log(x)+96x\right)\,dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{3}\int e^{-2x}x^{2x}\left(96x+2\left(48x^2-\left(3x^3-x^4\right)\log(4)\right)\log(x)-\left(9x^2-4x^3\right)\log(4)\right)dx$$

$$\Big\downarrow \ 7293$$

$$\frac{1}{3}\int \left(96e^{-2x}x^{2x+1}+2e^{-2x}\left(\log(4)x^2-3\log(4)x+48\right)\log(x)x^{2x+2}+e^{-2x}(4x-9)\log(4)x^{2x+2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{3}\left(96\int e^{-2x}x^{2x+1}dx-96\int \frac{\int e^{-2x}x^{2x+2}dx}{x}dx+96\log(x)\int e^{-2x}x^{2x+2}dx-9\log(4)\int e^{-2x}x^{2x+2}dx-6\log(4)\right.$$

input
```
Int[(x^(2*x)*(96*x + (-9*x^2 + 4*x^3)*Log[4] + (96*x^2 + (-6*x^3 + 2*x^4)*
Log[4])*Log[x]))/(3*E^(2*x)),x]
```

output
```
$Aborted
```

3.676.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.676.4 Maple [A] (verified)

Time = 6.04 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

method	result	size
risch	$\frac{2x^2(x^2\ln(2)-3x\ln(2)+24)\mathrm{e}^{-2x}x^{2x}}{3}$	28
parallelrisch	$\frac{(2\ln(2)x^4\mathrm{e}^{2x\ln(x)}-6\ln(2)x^3\mathrm{e}^{2x\ln(x)}+48\,\mathrm{e}^{2x\ln(x)}x^2)\mathrm{e}^{-2x}}{3}$	48

input
```
int(1/3*((2*(2*x^4-6*x^3)*ln(2)+96*x^2)*ln(x)+2*(4*x^3-9*x^2)*ln(2)+96*x)*
exp(x*ln(x))^2/exp(x)^2,x,method=_RETURNVERBOSE)
```

output
```
2/3*x^2*(x^2*ln(2)-3*x*ln(2)+24)*exp(-2*x)*(x^x)^2
```

3.676.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{1}{3}e^{-2x}x^{2x}(96x+(-9x^2+4x^3)\log(4)+(96x^2+(-6x^3+2x^4)\log(4))\log(x))\,dx = \frac{2}{3}\left(24\,x^2+\left(x^4-3\,x^3\right)\log\left(2\right)\right)x^{2\,x}e^{(-2\,x)}$$

input
```
integrate(1/3*((2*(2*x^4-6*x^3)*log(2)+96*x^2)*log(x)+2*(4*x^3-9*x^2)*log(
2)+96*x)*exp(x*log(x))^2/exp(x)^2,x, algorithm=\
```

output
```
2/3*(24*x^2 + (x^4 - 3*x^3)*log(2))*x^(2*x)*e^(-2*x)
```

3.676.6 Sympy [A] (verification not implemented)

Time = 13.17 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.77

$$\int \frac{1}{3}e^{-2x}x^{2x}(96x+(-9x^2+4x^3)\log(4)+(96x^2+(-6x^3+2x^4)\log(4))\log(x))\,dx = \frac{(2x^4e^{-2x}\log(2)-6x^3e^{-2x}\log(2)+48x^2e^{-2x})\,e^{2x\log(x)}}{3}$$

input
```
integrate(1/3*((2*(2*x**4-6*x**3)*ln(2)+96*x**2)*ln(x)+2*(4*x**3-9*x**2)*l
n(2)+96*x)*exp(x*ln(x))**2/exp(x)**2,x)
```

output
```
(2*x**4*exp(-2*x)*log(2) - 6*x**3*exp(-2*x)*log(2) + 48*x**2*exp(-2*x))*ex
p(2*x*log(x))/3
```

3.676.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{1}{3}e^{-2x}x^{2x}\left(96x+\left(-9x^2+4x^3\right)\log(4)+\left(96x^2+\left(-6x^3+2x^4\right)\log(4)\right)\log(x)\right)\,dx$$
$$=\frac{2}{3}\left(x^4\log(2)-3x^3\log(2)+24x^2\right)e^{(2x\log(x)-2x)}$$

input
```
integrate(1/3*((2*(2*x^4-6*x^3)*log(2)+96*x^2)*log(x)+2*(4*x^3-9*x^2)*log(
2)+96*x)*exp(x*log(x))^2/exp(x)^2,x, algorithm=\
```

output
```
2/3*(x^4*log(2) - 3*x^3*log(2) + 24*x^2)*e^(2*x*log(x) - 2*x)
```

3.676.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. 2(23) = 46.

Time = 0.34 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.92

$$\int \frac{1}{3}e^{-2x}x^{2x}\left(96x+\left(-9x^2+4x^3\right)\log(4)+\left(96x^2+\left(-6x^3+2x^4\right)\log(4)\right)\log(x)\right)\,dx$$
$$=\frac{2}{3}x^4e^{(2x\log(x)-2x)}\log(2)-2x^3e^{(2x\log(x)-2x)}\log(2)+16x^2e^{(2x\log(x)-2x)}$$

input
```
integrate(1/3*((2*(2*x^4-6*x^3)*log(2)+96*x^2)*log(x)+2*(4*x^3-9*x^2)*log(
2)+96*x)*exp(x*log(x))^2/exp(x)^2,x, algorithm=\
```

output
```
2/3*x^4*e^(2*x*log(x) - 2*x)*log(2) - 2*x^3*e^(2*x*log(x) - 2*x)*log(2) +
16*x^2*e^(2*x*log(x) - 2*x)
```

3.676.9 Mupad [B] (verification not implemented)

Time = 14.71 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{1}{3}e^{-2x}x^{2x}\left(96x+\left(-9x^2+4x^3\right)\log(4)+\left(96x^2+\left(-6x^3+2x^4\right)\log(4)\right)\log(x)\right)\,dx = \frac{2\,x^{2\,x}\,x^2\,\mathrm{e}^{-2\,x}\,\left(\ln\left(2\right)\,x^2-3\,\ln\left(2\right)\,x+24\right)}{3}$$

input
```
int(-(exp(2*x*log(x))*exp(-2*x)*(log(x)*(2*log(2)*(6*x^3 - 2*x^4) - 96*x^2
) - 96*x + 2*log(2)*(9*x^2 - 4*x^3)))/3,x)
```

output
```
(2*x^(2*x)*x^2*exp(-2*x)*(x^2*log(2) - 3*x*log(2) + 24))/3
```

3.677 $\int \frac{8x^3+4ex^3+4x^4+e^2x^4+e^2(8x^3+4ex^3+4x^4)\log(e^3(2+e+x))}{2+e+x}\,dx$

3.677.1 Optimal result

Integrand size = 61, antiderivative size = 19

$$\int \frac{8x^3+4ex^3+4x^4+e^2x^4+e^2(8x^3+4ex^3+4x^4)\log(e^3(2+e+x))}{2+e+x}\,dx$$
$$= x^4\left(1+e^2\log\left(e^3(2+e+x)\right)\right)$$

output
```
x^4*(1+ln((2+x+exp(1))*exp(3))/exp(-2))
```

3.677.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{8x^3+4ex^3+4x^4+e^2x^4+e^2(8x^3+4ex^3+4x^4)\log(e^3(2+e+x))}{2+e+x}\,dx$$
$$= x^4+3e^2x^4+e^2x^4\log(2+e+x)$$

input
```
Integrate[(8*x^3 + 4*E*x^3 + 4*x^4 + E^2*x^4 + E^2*(8*x^3 + 4*E*x^3 + 4*x^
4)*Log[E^3*(2 + E + x)])/(2 + E + x),x]
```

output
```
x^4 + 3*E^2*x^4 + E^2*x^4*Log[2 + E + x]
```

3.677.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.95, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.066, Rules used = {6, 6, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2x^4+4x^4+4ex^3+8x^3+e^2\left(4x^4+4ex^3+8x^3\right)\log\left(e^3(x+e+2)\right)}{x+e+2}dx$$

$$\Big\downarrow \text{6}$$

$$\int \frac{e^2x^4+4x^4+(8+4e)x^3+e^2\left(4x^4+4ex^3+8x^3\right)\log\left(e^3(x+e+2)\right)}{x+e+2}dx$$

$$\Big\downarrow \text{6}$$

$$\int \frac{\left(4+e^2\right)x^4+(8+4e)x^3+e^2\left(4x^4+4ex^3+8x^3\right)\log\left(e^3(x+e+2)\right)}{x+e+2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{\left(\left(4+e^2\right)x+4(2+e)\right)x^3}{x+e+2}+4e^2x^3(\log(x+e+2)+3)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(4+e^2\right)x^4-\frac{e^2x^4}{4}+e^2x^4(\log(x+e+2)+3)$$

input
```
Int[(8*x^3 + 4*E*x^3 + 4*x^4 + E^2*x^4 + E^2*(8*x^3 + 4*E*x^3 + 4*x^4)*Log
[E^3*(2 + E + x)])/(2 + E + x),x]
```

output
```
-1/4*(E^2*x^4) + ((4 + E^2)*x^4)/4 + E^2*x^4*(3 + Log[2 + E + x])
```

3.677.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.677.4 Maple [A] (verified)

Time = 0.81 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

method	result
norman	$x^4 + x^4 e^2 \ln((2 + x + e) e^3)$
risch	$x^4 + x^4 e^2 \ln((2 + x + e) e^3)$
parallelrisch	$x^4 + x^4 e^2 \ln((2 + x + e) e^3)$
parts	$50(e^2)^2 + \frac{50 e^2 e^3}{3} + \frac{200 e e^2}{3} + \frac{100 e^2}{3} + x^4 + e^2 \ln(x e^3 + (e+2) e^3) x^4 - 24(e^2)^2 \ln(x e^3 +$
derivativedivides	Expression too large to display
default	Expression too large to display

input
```
int(((4*x^3*exp(1)+4*x^4+8*x^3)*exp(2)*ln((2+x+exp(1))*exp(3))+x^4*exp(2)+
4*x^3*exp(1)+4*x^4+8*x^3)/(2+x+exp(1)),x,method=_RETURNVERBOSE)
```

output
```
x^4+x^4*exp(2)*ln((2+x+exp(1))*exp(3))
```

3.677.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{8x^3 + 4ex^3 + 4x^4 + e^2x^4 + e^2(8x^3 + 4ex^3 + 4x^4) \log(e^3(2 + e + x))}{2 + e + x} \, dx$$
$$= x^4 e^2 \log\left((x+2)e^3 + e^4\right) + x^4$$

input
```
integrate(((4*x^3*exp(1)+4*x^4+8*x^3)*exp(2)*log((2+x+exp(1))*exp(3))+x^4*
exp(2)+4*x^3*exp(1)+4*x^4+8*x^3)/(2+x+exp(1)),x, algorithm=\
```

output
```
x^4*e^2*log((x + 2)*e^3 + e^4) + x^4
```

3.677.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{8x^3+4ex^3+4x^4+e^2x^4+e^2(8x^3+4ex^3+4x^4)\log(e^3(2+e+x))}{2+e+x}\,dx$$
$$= x^4e^2\log\left((x+2+e)\,e^3\right)+x^4$$

input
```
integrate(((4*x**3*exp(1)+4*x**4+8*x**3)*exp(2)*ln((2+x+exp(1))*exp(3))+x*
*4*exp(2)+4*x**3*exp(1)+4*x**4+8*x**3)/(2+x+exp(1)),x)
```

output
```
x**4*exp(2)*log((x + 2 + E)*exp(3)) + x**4
```

3.677.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 679 vs. $2(18) = 36$.

Time = 0.23 (sec) , antiderivative size = 679, normalized size of antiderivative = 35.74

$$\int \frac{8x^3+4ex^3+4x^4+e^2x^4+e^2(8x^3+4ex^3+4x^4)\log(e^3(2+e+x))}{2+e+x}\,dx$$
$$= \text{Too large to display}$$

input
```
integrate(((4*x^3*exp(1)+4*x^4+8*x^3)*exp(2)*log((2+x+exp(1))*exp(3))+x^4*
exp(2)+4*x^3*exp(1)+4*x^4+8*x^3)/(2+x+exp(1)),x, algorithm=\
```

output
```
x^4 - 4/3*x^3*(e + 2) + 8/3*x^3 + 2*x^2*(e^2 + 4*e + 4) - 4*x^2*(e + 2) +
2/3*(2*x^3 - 3*x^2*(e + 2) + 6*x*(e^2 + 4*e + 4) - 6*(e^3 + 6*e^2 + 12*e +
 8)*log(x + e + 2))*e^3*log(x*e^3 + e^4 + 2*e^3) + 1/3*(3*x^4 - 4*x^3*(e +
 2) + 6*x^2*(e^2 + 4*e + 4) - 12*x*(e^3 + 6*e^2 + 12*e + 8) + 12*(e^4 + 8*
e^3 + 24*e^2 + 32*e + 16)*log(x + e + 2))*e^2*log(x*e^3 + e^4 + 2*e^3) + 4
/3*(2*x^3 - 3*x^2*(e + 2) + 6*x*(e^2 + 4*e + 4) - 6*(e^3 + 6*e^2 + 12*e +
8)*log(x + e + 2))*e^2*log(x*e^3 + e^4 + 2*e^3) - 4*x*(e^3 + 6*e^2 + 12*e
+ 8) + 8*x*(e^2 + 4*e + 4) - 1/9*(4*x^3 - 15*x^2*(e + 2) - 18*(e^3 + 6*e^2
 + 12*e + 8)*log(x + e + 2)^2 + 66*x*(e^2 + 4*e + 4) - 66*(e^3 + 6*e^2 + 1
2*e + 8)*log(x + e + 2))*e^3 - 1/36*(9*x^4 - 28*x^3*(e + 2) + 78*x^2*(e^2
+ 4*e + 4) + 72*(e^4 + 8*e^3 + 24*e^2 + 32*e + 16)*log(x + e + 2)^2 - 300*
x*(e^3 + 6*e^2 + 12*e + 8) + 300*(e^4 + 8*e^3 + 24*e^2 + 32*e + 16)*log(x
+ e + 2))*e^2 + 1/12*(3*x^4 - 4*x^3*(e + 2) + 6*x^2*(e^2 + 4*e + 4) - 12*x
*(e^3 + 6*e^2 + 12*e + 8) + 12*(e^4 + 8*e^3 + 24*e^2 + 32*e + 16)*log(x +
e + 2))*e^2 - 2/9*(4*x^3 - 15*x^2*(e + 2) - 18*(e^3 + 6*e^2 + 12*e + 8)*lo
g(x + e + 2)^2 + 66*x*(e^2 + 4*e + 4) - 66*(e^3 + 6*e^2 + 12*e + 8)*log(x
+ e + 2))*e^2 + 2/3*(2*x^3 - 3*x^2*(e + 2) + 6*x*(e^2 + 4*e + 4) - 6*(e^3
+ 6*e^2 + 12*e + 8)*log(x + e + 2))*e + 4*(e^4 + 8*e^3 + 24*e^2 + 32*e + 1
6)*log(x + e + 2) - 8*(e^3 + 6*e^2 + 12*e + 8)*log(x + e + 2)
```

3.677.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \frac{8x^3 + 4ex^3 + 4x^4 + e^2x^4 + e^2(8x^3 + 4ex^3 + 4x^4)\log\left(e^3(2 + e + x)\right)}{2 + e + x}\,dx$$
$$= x^4e^2\log\left(xe^3 + e^4 + 2\,e^3\right) + x^4$$

input
```
integrate(((4*x^3*exp(1)+4*x^4+8*x^3)*exp(2)*log((2+x+exp(1))*exp(3))+x^4*
exp(2)+4*x^3*exp(1)+4*x^4+8*x^3)/(2+x+exp(1)),x, algorithm=\
```

output
```
x^4*e^2*log(x*e^3 + e^4 + 2*e^3) + x^4
```

3.677.9 Mupad [B] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{8x^3+4ex^3+4x^4+e^2x^4+e^2(8x^3+4ex^3+4x^4)\log(e^3(2+e+x))}{2+e+x}\,dx$$
$$= x^4\left(\mathrm{e}^2\ln\left(\mathrm{e}^3\left(x+\mathrm{e}+2\right)\right)+1\right)$$

input
```
int((4*x^3*exp(1) + x^4*exp(2) + 8*x^3 + 4*x^4 + exp(2)*log(exp(3)*(x + ex
p(1) + 2))*(4*x^3*exp(1) + 8*x^3 + 4*x^4))/(x + exp(1) + 2),x)
```

output
```
x^4*(exp(2)*log(exp(3)*(x + exp(1) + 2)) + 1)
```

3.678 $\int \frac{-3+e^x x^2+e^{72 \log^2(3x)}(-1+144 \log(3x))}{2x^2} \, dx$

3.678.1 Optimal result

Integrand size = 35, antiderivative size = 24

$$\int \frac{-3+e^x x^2+e^{72 \log^2(3x)}(-1+144 \log(3x))}{2x^2} \, dx = \frac{3+e^{72 \log^2(3x)}+e^x x}{2x}$$

output
```
1/2*(exp(x)*x+3+exp(72*ln(3*x)^2))/x
```

3.678.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{-3+e^x x^2+e^{72 \log^2(3x)}(-1+144 \log(3x))}{2x^2} \, dx = \frac{1}{2}\left(e^x+\frac{3}{x}+\frac{e^{72 \log^2(3x)}}{x}\right)$$

input
```
Integrate[(-3 + E^x*x^2 + E^(72*Log[3*x]^2)*(-1 + 144*Log[3*x]))/(2*x^2),x
]
```

output
```
(E^x + 3/x + E^(72*Log[3*x]^2)/x)/2
```

3.678.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.114$, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x^2+e^{72\log^2(3x)}(144\log(3x)-1)-3}{2x^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2}\int -\frac{-e^x x^2+e^{72\log^2(3x)}(1-144\log(3x))+3}{x^2}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{2}\int \frac{-e^x x^2+e^{72\log^2(3x)}(1-144\log(3x))+3}{x^2}dx$$

$$\Big\downarrow \ 2010$$

$$-\frac{1}{2}\int \left(-\frac{e^x x^2-3}{x^2}-\frac{e^{72\log^2(3x)}(144\log(3x)-1)}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{2}\left(e^x+\frac{3}{x}+\frac{e^{72\log^2(3x)}}{x}\right)$$

input
```
Int[(-3 + E^x*x^2 + E^(72*Log[3*x]^2)*(-1 + 144*Log[3*x]))/(2*x^2),x]
```

output
```
(E^x + 3/x + E^(72*Log[3*x]^2)/x)/2
```

3.678.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.678.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

method	result	size
parallelrisch	$-\frac{-3-e^{x} x-e^{72 \ln(3x)^{2}}}{2x}$	24
default	$\frac{e^{72 \ln(3x)^{2}}}{2x}+\frac{3}{2x}+\frac{e^{x}}{2}$	25
parts	$\frac{e^{72 \ln(3x)^{2}}}{2x}+\frac{3}{2x}+\frac{e^{x}}{2}$	25
risch	$\frac{e^{x} x+3}{2x}+\frac{e^{72 \ln(3x)^{2}}}{2x}$	27

input
```
int(1/2*((144*ln(3*x)-1)*exp(72*ln(3*x)^2)+exp(x)*x^2-3)/x^2,x,method=_RET
URNVERBOSE)
```

output
```
-1/2/x*(-3-exp(x)*x-exp(72*ln(3*x)^2))
```

3.678.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{-3+e^x x^2+e^{72\log^2(3x)}(-1+144\log(3x))}{2x^2}\,dx=\frac{xe^x+e^{\left(72\log(3x)^2\right)}+3}{2x}$$

input
```
integrate(1/2*((144*log(3*x)-1)*exp(72*log(3*x)^2)+exp(x)*x^2-3)/x^2,x, al
gorithm=\
```

output
```
1/2*(x*e^x + e^(72*log(3*x)^2) + 3)/x
```

3.678.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-3+e^x x^2+e^{72\log^2(3x)}(-1+144\log(3x))}{2x^2}\,dx=\frac{e^x}{2}+\frac{e^{72\log(3x)^2}}{2x}+\frac{3}{2x}$$

input
```
integrate(1/2*((144*ln(3*x)-1)*exp(72*ln(3*x)**2)+exp(x)*x**2-3)/x**2,x)
```

output
```
exp(x)/2 + exp(72*log(3*x)**2)/(2*x) + 3/(2*x)
```

3.678.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.33 (sec) , antiderivative size = 116, normalized size of antiderivative = 4.83

$$\begin{aligned}&\int \frac{-3+e^x x^2+e^{72\log^2(3x)}(-1+144\log(3x))}{2x^2}\,dx\\&=\frac{1}{16}i\sqrt{2}\sqrt{\pi}\operatorname{erf}\left(6i\sqrt{2}\log(3x)-\frac{1}{24}i\sqrt{2}\right)e^{\left(-\frac{1}{288}\right)}\\&\quad+\frac{1}{16}\sqrt{2}\left(\frac{\sqrt{2}\sqrt{\frac{1}{2}}\sqrt{\pi}\left(\operatorname{erf}\left(\frac{1}{12}\sqrt{\frac{1}{2}}\sqrt{-(144\log(3x)-1)^2}\right)-1\right)(144\log(3x)-1)}{\sqrt{-(144\log(3x)-1)^2}}+12\sqrt{2}e^{\left(\frac{1}{288}(144\log(\right.}\right.\\&\quad+\frac{3}{2x}+\frac{1}{2}e^x\end{aligned}$$

input
```
integrate(1/2*((144*log(3*x)-1)*exp(72*log(3*x)^2)+exp(x)*x^2-3)/x^2,x, al
gorithm=\
```

output
```
1/16*I*sqrt(2)*sqrt(pi)*erf(6*I*sqrt(2)*log(3*x) - 1/24*I*sqrt(2))*e^(-1/2
88) + 1/16*sqrt(2)*(sqrt(2)*sqrt(1/2)*sqrt(pi)*(erf(1/12*sqrt(1/2)*sqrt(-(
144*log(3*x) - 1)^2)) - 1)*(144*log(3*x) - 1)/sqrt(-(144*log(3*x) - 1)^2)
+ 12*sqrt(2)*e^(1/288*(144*log(3*x) - 1)^2))*e^(-1/288) + 3/2/x + 1/2*e^x
```

3.678.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{-3+e^x x^2+e^{72\log^2(3x)}(-1+144\log(3x))}{2x^2}\,dx = \frac{xe^x + e^{\left(72\,\log(3\,x)^2\right)} + 3}{2\,x}$$

input
```
integrate(1/2*((144*log(3*x)-1)*exp(72*log(3*x)^2)+exp(x)*x^2-3)/x^2,x, al
gorithm=\
```

output
```
1/2*(x*e^x + e^(72*log(3*x)^2) + 3)/x
```

3.678.9 Mupad [B] (verification not implemented)

Time = 16.35 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

$$\int \frac{-3+e^x x^2+e^{72\log^2(3x)}(-1+144\log(3x))}{2x^2}\,dx = \frac{e^x}{2} + \frac{3}{2\,x} + \frac{x^{144\,\ln(3)}\,e^{72\ln(x)^2}\,e^{72\ln(3)^2}}{2\,x}$$

input
```
int(((x^2*exp(x))/2 + (exp(72*log(3*x)^2)*(144*log(3*x) - 1))/2 - 3/2)/x^2
,x)
```

output
```
exp(x)/2 + 3/(2*x) + (x^(144*log(3))*exp(72*log(x)^2)*exp(72*log(3)^2))/(2
*x)
```

3.679 $\int \frac{20-18\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(e^2\left(-9-50x^2\right)\log(9)\right.}{25-20\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(-10e^2\log(9)+4e\right.}$

3.679.1 Optimal result

Integrand size = 111, antiderivative size = 26

$$\int \frac{20-18\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(e^2\left(-9-50x^2\right)\log(9)+4e^2\log^2(9)\right)}{25-20\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(-10e^2\log(9)+4e^2\log^2(9)\right)}\,dx = 4+x-\frac{x}{5+\left(-2-e^{2+25x^2}\right)\log(9)}$$

output
```
x+4-x/(5+2*(-2-exp(2)*exp(25*x^2))*ln(3))
```

3.679.2 Mathematica [A] (verified)

Time = 1.16 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{20-18\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(e^2\left(-9-50x^2\right)\log(9)+4e^2\log^2(9)\right)}{25-20\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(-10e^2\log(9)+4e^2\log^2(9)\right)}\,dx = \frac{x\left(-4+e^{2+25x^2}\log(9)+\log(81)\right)}{-5+e^{2+25x^2}\log(9)+\log(81)}$$

input
```
Integrate[(20 - 18*Log[9] + 4*Log[9]^2 + E^(4 + 50*x^2)*Log[9]^2 + E^(25*x
^2)*(E^2*(-9 - 50*x^2)*Log[9] + 4*E^2*Log[9]^2))/(25 - 20*Log[9] + 4*Log[9
]^2 + E^(4 + 50*x^2)*Log[9]^2 + E^(25*x^2)*(-10*E^2*Log[9] + 4*E^2*Log[9]^
2)),x]
```

output
```
(x*(-4 + E^(2 + 25*x^2)*Log[9] + Log[81]))/(-5 + E^(2 + 25*x^2)*Log[9] + L
og[81])
```

3.679.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{25x^2}\left(e^2\left(-50x^2-9\right)\log(9)+4e^2\log^2(9)\right)+e^{50x^2+4}\log^2(9)+20+4\log^2(9)-18\log(9)}{e^{50x^2+4}\log^2(9)+e^{25x^2}\left(4e^2\log^2(9)-10e^2\log(9)\right)+25+4\log^2(9)-20\log(9)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{25x^2}\left(e^2\left(-50x^2-9\right)\log(9)+4e^2\log^2(9)\right)+e^{50x^2+4}\log^2(9)+20\left(1+\frac{1}{10}\log(9)(\log(81)-9)\right)}{\left(5\left(1-\frac{4\log(3)}{5}\right)-e^{25x^2+2}\log(9)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2\left(-25x^2(5-\log(81))+8\log^2(3)+\log(9)\log(81)-8\log(3)\log(9)\right)}{\left(5\left(1-\frac{4\log(3)}{5}\right)-e^{25x^2+2}\log(9)\right)^2}+\frac{50x^2-1}{5\left(1-\frac{4\log(3)}{5}\right)-e^{25x^2+2}\log(9)}+1\right)$$

$$\Big\downarrow \text{2009}$$

$$-50(5-\log(81))\int \frac{x^2}{\left(5\left(1-\frac{4\log(3)}{5}\right)-e^{25x^2+2}\log(9)\right)^2}dx+50\int \frac{x^2}{5\left(1-\frac{4\log(3)}{5}\right)-e^{25x^2+2}\log(9)}dx+\int \frac{1}{-5\left(1-\frac{4\log(3)}{5}\right)+e^{25x^2+2}\log(9)}dx+x$$

input
```
Int[(20 - 18*Log[9] + 4*Log[9]^2 + E^(4 + 50*x^2)*Log[9]^2 + E^(25*x^2)*(E
^2*(-9 - 50*x^2)*Log[9] + 4*E^2*Log[9]^2))/(25 - 20*Log[9] + 4*Log[9]^2 +
E^(4 + 50*x^2)*Log[9]^2 + E^(25*x^2)*(-10*E^2*Log[9] + 4*E^2*Log[9]^2)),x]
```

output
```
$Aborted
```

3.679.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.679.4 Maple [A] (verified)

Time = 0.41 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

method	result	size
risch	$x+\frac{x}{2\ln(3)\mathrm{e}^{25x^2+2}+4\ln(3)-5}$	25
norman	$\frac{(4\ln(3)-4)x+2x\,\mathrm{e}^2\ln(3)\mathrm{e}^{25x^2}}{2\,\mathrm{e}^2\ln(3)\mathrm{e}^{25x^2}+4\ln(3)-5}$	44
parallelrisch	$\frac{8\,\mathrm{e}^2\ln(3)^2\mathrm{e}^{25x^2}x-10x\,\mathrm{e}^2\ln(3)\mathrm{e}^{25x^2}+16x\ln(3)^2-36x\ln(3)+20x}{(4\ln(3)-5)\left(2\,\mathrm{e}^2\ln(3)\mathrm{e}^{25x^2}+4\ln(3)-5\right)}$	74

input
```
int((4*exp(2)^2*ln(3)^2*exp(25*x^2)^2+(16*exp(2)*ln(3)^2+2*(-50*x^2-9)*exp
(2)*ln(3))*exp(25*x^2)+16*ln(3)^2-36*ln(3)+20)/(4*exp(2)^2*ln(3)^2*exp(25*
x^2)^2+(16*exp(2)*ln(3)^2-20*exp(2)*ln(3))*exp(25*x^2)+16*ln(3)^2-40*ln(3)
+25),x,method=_RETURNVERBOSE)
```

output
```
x+x/(2*ln(3)*exp(25*x^2+2)+4*ln(3)-5)
```

3.679.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.65

$$\int \frac{20-18\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(e^2(-9-50x^2)\log(9)+4e^2\log^2(9)\right)}{25-20\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(-10e^2\log(9)+4e^2\log^2(9)\right)}\,dx$$
$$=\frac{2\left(xe^{(25\,x^2+2)}\log(3)+2\,x\log(3)-2\,x\right)}{2\,e^{(25\,x^2+2)}\log(3)+4\,\log(3)-5}$$

input
```
integrate((4*exp(2)^2*log(3)^2*exp(25*x^2)^2+(16*exp(2)*log(3)^2+2*(-50*x^
2-9)*exp(2)*log(3))*exp(25*x^2)+16*log(3)^2-36*log(3)+20)/(4*exp(2)^2*log(
3)^2*exp(25*x^2)^2+(16*exp(2)*log(3)^2-20*exp(2)*log(3))*exp(25*x^2)+16*lo
g(3)^2-40*log(3)+25),x, algorithm=\
```

output
```
2*(x*e^(25*x^2 + 2)*log(3) + 2*x*log(3) - 2*x)/(2*e^(25*x^2 + 2)*log(3) +
4*log(3) - 5)
```

3.679.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{20-18\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(e^2\left(-9-50x^2\right)\log(9)+4e^2\log^2(9)\right)}{25-20\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(-10e^2\log(9)+4e^2\log^2(9)\right)}\,dx$$
$$= x+\frac{x}{2e^2e^{25x^2}\log(3)-5+4\log(3)}$$

input
```
integrate((4*exp(2)**2*ln(3)**2*exp(25*x**2)**2+(16*exp(2)*ln(3)**2+2*(-50
*x**2-9)*exp(2)*ln(3))*exp(25*x**2)+16*ln(3)**2-36*ln(3)+20)/(4*exp(2)**2*
ln(3)**2*exp(25*x**2)**2+(16*exp(2)*ln(3)**2-20*exp(2)*ln(3))*exp(25*x**2)
+16*ln(3)**2-40*ln(3)+25),x)
```

output
```
x + x/(2*exp(2)*exp(25*x**2)*log(3) - 5 + 4*log(3))
```

3.679.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.62

$$\int \frac{20-18\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(e^2\left(-9-50x^2\right)\log(9)+4e^2\log^2(9)\right)}{25-20\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(-10e^2\log(9)+4e^2\log^2(9)\right)}\,dx$$
$$= \frac{2\left(xe^{\left(25x^2+2\right)}\log(3)+2x(\log(3)-1)\right)}{2e^{\left(25x^2+2\right)}\log(3)+4\log(3)-5}$$

input
```
integrate((4*exp(2)^2*log(3)^2*exp(25*x^2)^2+(16*exp(2)*log(3)^2+2*(-50*x^
2-9)*exp(2)*log(3))*exp(25*x^2)+16*log(3)^2-36*log(3)+20)/(4*exp(2)^2*log(
3)^2*exp(25*x^2)^2+(16*exp(2)*log(3)^2-20*exp(2)*log(3))*exp(25*x^2)+16*lo
g(3)^2-40*log(3)+25),x, algorithm=\
```

output
```
2*(x*e^(25*x^2 + 2)*log(3) + 2*x*(log(3) - 1))/(2*e^(25*x^2 + 2)*log(3) +
4*log(3) - 5)
```

3.679.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.65

$$\int \frac{20-18\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(e^2(-9-50x^2)\log(9)+4e^2\log^2(9)\right)}{25-20\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(-10e^2\log(9)+4e^2\log^2(9)\right)}\,dx$$
$$=\frac{2\left(xe^{(25x^2+2)}\log(3)+2x\log(3)-2x\right)}{2e^{(25x^2+2)}\log(3)+4\log(3)-5}$$

input
```
integrate((4*exp(2)^2*log(3)^2*exp(25*x^2)^2+(16*exp(2)*log(3)^2+2*(-50*x^
2-9)*exp(2)*log(3))*exp(25*x^2)+16*log(3)^2-36*log(3)+20)/(4*exp(2)^2*log(
3)^2*exp(25*x^2)^2+(16*exp(2)*log(3)^2-20*exp(2)*log(3))*exp(25*x^2)+16*lo
g(3)^2-40*log(3)+25),x, algorithm=\
```

output
```
2*(x*e^(25*x^2 + 2)*log(3) + 2*x*log(3) - 2*x)/(2*e^(25*x^2 + 2)*log(3) +
4*log(3) - 5)
```

3.679.9 Mupad [B] (verification not implemented)

Time = 0.72 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{20-18\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(e^2(-9-50x^2)\log(9)+4e^2\log^2(9)\right)}{25-20\log(9)+4\log^2(9)+e^{4+50x^2}\log^2(9)+e^{25x^2}\left(-10e^2\log(9)+4e^2\log^2(9)\right)}\,dx$$
$$=x+\frac{x}{4\ln(3)+2e^{25x^2+2}\ln(3)-5}$$

input
```
int((exp(25*x^2)*(16*exp(2)*log(3)^2 - 2*exp(2)*log(3)*(50*x^2 + 9)) - 36*
log(3) + 16*log(3)^2 + 4*exp(4)*exp(50*x^2)*log(3)^2 + 20)/(16*log(3)^2 -
exp(25*x^2)*(20*exp(2)*log(3) - 16*exp(2)*log(3)^2) - 40*log(3) + 4*exp(4)
*exp(50*x^2)*log(3)^2 + 25),x)
```

output
```
x + x/(4*log(3) + 2*exp(25*x^2 + 2)*log(3) - 5)
```

3.680 $\int \frac{612-657x+162x^2+(108-54x)\log(2-x)}{-578x^3+697x^4-276x^5+36x^6+(-204x^3+174x^4-36x^5)\log(2-x)+(-}$

3.680.1 Optimal result

Integrand size = 89, antiderivative size = 20

$$\int \frac{612-657x+162x^2+(108-54x)\log(2-x)}{-578x^3+697x^4-276x^5+36x^6+(-204x^3+174x^4-36x^5)\log(2-x)+(-18x^3+9x^4)\log^2(2-x)}\,dx = \frac{3}{x^2\left(\frac{17}{3}-2x+\log(2-x)\right)}$$

output
```
3/(ln(2-x)-2*x+17/3)/x^2
```

3.680.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{612-657x+162x^2+(108-54x)\log(2-x)}{-578x^3+697x^4-276x^5+36x^6+(-204x^3+174x^4-36x^5)\log(2-x)+(-18x^3+9x^4)\log^2(2-x)}\,dx = \frac{9}{x^2(17-6x+3\log(2-x))}$$

input
```
Integrate[(612 - 657*x + 162*x^2 + (108 - 54*x)*Log[2 - x])/(-578*x^3 + 69
7*x^4 - 276*x^5 + 36*x^6 + (-204*x^3 + 174*x^4 - 36*x^5)*Log[2 - x] + (-18
*x^3 + 9*x^4)*Log[2 - x]^2),x]
```

output
```
9/(x^2*(17 - 6*x + 3*Log[2 - x]))
```

3.680.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{162x^2-657x+(108-54x)\log(2-x)+612}{36x^6-276x^5+697x^4-578x^3+(9x^4-18x^3)\log^2(2-x)+(-36x^5+174x^4-204x^3)\log(2-x)}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{9(-18x^2+73x+6(x-2)\log(2-x)-68)}{(2-x)x^3(-6x+3\log(2-x)+17)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$9\int -\frac{18x^2-73x+6(2-x)\log(2-x)+68}{(2-x)x^3(-6x+3\log(2-x)+17)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-9\int \frac{18x^2-73x+6(2-x)\log(2-x)+68}{(2-x)x^3(-6x+3\log(2-x)+17)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-9\int \left(-\frac{3(2x-5)}{(x-2)x^2(6x-3\log(2-x)-17)^2}-\frac{2}{x^3(6x-3\log(2-x)-17)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-9\left(-2\int \frac{1}{x^3(6x-3\log(2-x)-17)}dx-\frac{15}{2}\int \frac{1}{x^2(6x-3\log(2-x)-17)^2}dx+\frac{3}{4}\int \frac{1}{(x-2)(6x-3\log(2-x)\right.$$

input
```
Int[(612 - 657*x + 162*x^2 + (108 - 54*x)*Log[2 - x])/(-578*x^3 + 697*x^4
- 276*x^5 + 36*x^6 + (-204*x^3 + 174*x^4 - 36*x^5)*Log[2 - x] + (-18*x^3 +
 9*x^4)*Log[2 - x]^2),x]
```

output
```
$Aborted
```

3.680.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.680.4 Maple [A] (verified)

Time = 1.38 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

method	result	size
derivativedivides	$\frac{9}{x^2(3\ln(2-x)-6x+17)}$	21
default	$\frac{9}{x^2(3\ln(2-x)-6x+17)}$	21
norman	$-\frac{9}{x^2(-17+6x-3\ln(2-x))}$	21
risch	$-\frac{9}{x^2(-17+6x-3\ln(2-x))}$	21
parallelrisch	$-\frac{9}{x^2(-17+6x-3\ln(2-x))}$	21

input
```
int(((-54*x+108)*ln(2-x)+162*x^2-657*x+612)/((9*x^4-18*x^3)*ln(2-x)^2+(-36
*x^5+174*x^4-204*x^3)*ln(2-x)+36*x^6-276*x^5+697*x^4-578*x^3),x,method=_RE
TURNVERBOSE)
```

output
```
9/x^2/(3*ln(2-x)-6*x+17)
```

3.680. $\int \frac{612-657x+162x^2+(108-54x)\log(2-x)}{-578x^3+697x^4-276x^5+36x^6+(-204x^3+174x^4-36x^5)\log(2-x)+(-18x^3+9x^4)\log^2(2-x)}\,dx$

3.680.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30

$$\int \frac{612-657x+162x^2+(108-54x)\log(2-x)}{-578x^3+697x^4-276x^5+36x^6+(-204x^3+174x^4-36x^5)\log(2-x)+(-18x^3+9x^4)\log^2(2-x)}\,dx$$
$$= -\frac{9}{6\,x^3-3\,x^2\log\left(-x+2\right)-17\,x^2}$$

input
```
integrate(((-54*x+108)*log(2-x)+162*x^2-657*x+612)/((9*x^4-18*x^3)*log(2-x
)^2+(-36*x^5+174*x^4-204*x^3)*log(2-x)+36*x^6-276*x^5+697*x^4-578*x^3),x,
algorithm=\
```

output
```
-9/(6*x^3 - 3*x^2*log(-x + 2) - 17*x^2)
```

3.680.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{612-657x+162x^2+(108-54x)\log(2-x)}{-578x^3+697x^4-276x^5+36x^6+(-204x^3+174x^4-36x^5)\log(2-x)+(-18x^3+9x^4)\log^2(2-x)}\,dx$$
$$= \frac{9}{-6x^3+3x^2\log\left(2-x\right)+17x^2}$$

input
```
integrate(((-54*x+108)*ln(2-x)+162*x**2-657*x+612)/((9*x**4-18*x**3)*ln(2-
x)**2+(-36*x**5+174*x**4-204*x**3)*ln(2-x)+36*x**6-276*x**5+697*x**4-578*x
**3),x)
```

output
```
9/(-6*x**3 + 3*x**2*log(2 - x) + 17*x**2)
```

3.680.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30

$$\int \frac{612-657x+162x^2+(108-54x)\log(2-x)}{-578x^3+697x^4-276x^5+36x^6+(-204x^3+174x^4-36x^5)\log(2-x)+(-18x^3+9x^4)\log^2(2-x)}\,dx$$
$$= -\frac{9}{6\,x^3-3\,x^2\log\left(-x+2\right)-17\,x^2}$$

input
```
integrate(((-54*x+108)*log(2-x)+162*x^2-657*x+612)/((9*x^4-18*x^3)*log(2-x
)^2+(-36*x^5+174*x^4-204*x^3)*log(2-x)+36*x^6-276*x^5+697*x^4-578*x^3),x,
algorithm=\
```

output
```
-9/(6*x^3 - 3*x^2*log(-x + 2) - 17*x^2)
```

3.680.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(20) = 40$.

Time = 0.27 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.75

$$\int \frac{612-657x+162x^2+(108-54x)\log(2-x)}{-578x^3+697x^4-276x^5+36x^6+(-204x^3+174x^4-36x^5)\log(2-x)+(-18x^3+9x^4)\log^2(2-x)}\,dx = -\frac{9}{6(x-2)^3-3(x-2)^2\log(-x+2)+19(x-2)^2-12(x-2)\log(-x+2)+4x-12\log(-x+2)-}$$

input
```
integrate(((-54*x+108)*log(2-x)+162*x^2-657*x+612)/((9*x^4-18*x^3)*log(2-x
)^2+(-36*x^5+174*x^4-204*x^3)*log(2-x)+36*x^6-276*x^5+697*x^4-578*x^3),x,
algorithm=\
```

output
```
-9/(6*(x - 2)^3 - 3*(x - 2)^2*log(-x + 2) + 19*(x - 2)^2 - 12*(x - 2)*log(
-x + 2) + 4*x - 12*log(-x + 2) - 28)
```

3.680.9 Mupad [B] (verification not implemented)

Time = 15.50 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{612-657x+162x^2+(108-54x)\log(2-x)}{-578x^3+697x^4-276x^5+36x^6+(-204x^3+174x^4-36x^5)\log(2-x)+(-18x^3+9x^4)\log^2(2-x)}\,dx = \frac{9}{x^2\,(3\ln(2-x)-6\,x+17)}$$

input
```
int((657*x + log(2 - x)*(54*x - 108) - 162*x^2 - 612)/(log(2 - x)*(204*x^3
 - 174*x^4 + 36*x^5) + log(2 - x)^2*(18*x^3 - 9*x^4) + 578*x^3 - 697*x^4 +
 276*x^5 - 36*x^6),x)
```

output
```
9/(x^2*(3*log(2 - x) - 6*x + 17))
```

3.681 $\int \frac{e^{2x^2}(-96x^2+24x^3-24e^x x^4)+e^{4x^2}(-32x^2+8x^3-8e^x x^4)+e^{x^2}(32x^2- \cdots}{\cdots}$

3.681.1 Optimal result

Integrand size = 433, antiderivative size = 37

$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^x x^4)+e^{4x^2}(-32x^2+8x^3-8e^x x^4)+e^{x^2}(32x^2-8x^3+8e^x x^4)+e^{3x^2}(96x^2-24 \cdots}{\cdots}$$

$$= -x + \frac{x(e^{-x}(4-x)+x^2)}{\log\left(4+(1-e^{x^2})^4\right)}$$

output

```
((-x+4)/exp(x)+x^2)/ln((1-exp(x^2))^4+4)*x-x
```

3.681.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.59

$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^x x^4)+e^{4x^2}(-32x^2+8x^3-8e^x x^4)+e^{x^2}(32x^2-8x^3+8e^x x^4)+e^{3x^2}(96x^2-24 \cdots}{\cdots}$$

$$= x\left(-1+\frac{e^{-x}(4-x+e^x x^2)}{\log(5-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2})}\right)$$

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$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^x x^4)+e^{4x^2}(-32x^2+8x^3-8e^x x^4)+e^{x^2}(32x^2-8x^3+8e^x x^4)+e^{3x^2}(96x^2-24x^3+24e^x x^4)+\left(20-30x+5x^2+15e^x x^2+e^{x^2}(\cdots\right.}{\cdots}$$

input
```
Integrate[(E^(2*x^2)*(-96*x^2 + 24*x^3 - 24*E^x*x^4) + E^(4*x^2)*(-32*x^2
+ 8*x^3 - 8*E^x*x^4) + E^x^2*(32*x^2 - 8*x^3 + 8*E^x*x^4) + E^(3*x^2)*(96*
x^2 - 24*x^3 + 24*E^x*x^4) + (20 - 30*x + 5*x^2 + 15*E^x*x^2 + E^x^2*(-16
+ 24*x - 4*x^2 - 12*E^x*x^2) + E^(3*x^2)*(-16 + 24*x - 4*x^2 - 12*E^x*x^2)
 + E^(4*x^2)*(4 - 6*x + x^2 + 3*E^x*x^2) + E^(2*x^2)*(24 - 36*x + 6*x^2 +
18*E^x*x^2))*Log[5 - 4*E^x^2 + 6*E^(2*x^2) - 4*E^(3*x^2) + E^(4*x^2)] + (-
5*E^x + 4*E^(x + x^2) - 6*E^(x + 2*x^2) + 4*E^(x + 3*x^2) - E^(x + 4*x^2))
*Log[5 - 4*E^x^2 + 6*E^(2*x^2) - 4*E^(3*x^2) + E^(4*x^2)]^2)/((5*E^x - 4*E
^(x + x^2) + 6*E^(x + 2*x^2) - 4*E^(x + 3*x^2) + E^(x + 4*x^2))*Log[5 - 4*
E^x^2 + 6*E^(2*x^2) - 4*E^(3*x^2) + E^(4*x^2)]^2),x]
```

output
```
x*(-1 + (4 - x + E^x*x^2)/(E^x*Log[5 - 4*E^x^2 + 6*E^(2*x^2) - 4*E^(3*x^2)
 + E^(4*x^2)]))
```

3.681.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(4e^{x^2+x}-6e^{2x^2+x}+4e^{3x^2+x}-e^{4x^2+x}-5e^x\right)\log^2\left(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}+5\right)+\left(15e^xx^2+5x^2+e^{x^2}\right.}{}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{-x}\left(\left(4e^{x^2+x}-6e^{2x^2+x}+4e^{3x^2+x}-e^{4x^2+x}-5e^x\right)\log^2\left(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}+5\right)+\left(15e^xx^2+5x^2\right.\right.}{}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{4e^{-x}\left(e^xx^2-x+4\right)x^2}{\left(e^{2x^2}+1\right)\log^2\left(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}+5\right)}-\frac{4e^{-x}\left(2e^{x^2}-5\right)\left(e^xx^2-x+4\right)x^2}{\left(-4e^{x^2}+e^{2x^2}+5\right)\log^2\left(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}\right.}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \left(-\frac{8e^{x^2-x}x^2\left(e^xx^2-x+4\right)\left(e^{x^2}-1\right)^3}{\left(e^{2x^2}+1\right)\left(-4e^{x^2}+e^{2x^2}+5\right)\log^2\left(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}+5\right)}+\frac{e^{-x}\left(\left(3e^x+1\right)x^2-6x+4\right)}{\log\left(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}\right.}\right.$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{8e^{x^2-x}x^2(e^x x^2 - x + 4)\left(1-e^{x^2}\right)^3}{(e^{2x^2}+1)(-4e^{x^2}+e^{2x^2}+5)\log^2(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}+5)} + \frac{e^{-x}(3e^x x^2 + x^2 - 6x + 4)}{\log(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}}\right.$$

$$\Big\downarrow \text{ 7299}$$

$$\int \left(\frac{8e^{x^2-x}x^2(e^x x^2 - x + 4)\left(1-e^{x^2}\right)^3}{(e^{2x^2}+1)(-4e^{x^2}+e^{2x^2}+5)\log^2(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}+5)} + \frac{e^{-x}(3e^x x^2 + x^2 - 6x + 4)}{\log(-4e^{x^2}+6e^{2x^2}-4e^{3x^2}+e^{4x^2}}\right.$$

input
```
Int[(E^(2*x^2)*(-96*x^2 + 24*x^3 - 24*E^x*x^4) + E^(4*x^2)*(-32*x^2 + 8*x^
3 - 8*E^x*x^4) + E^x^2*(32*x^2 - 8*x^3 + 8*E^x*x^4) + E^(3*x^2)*(96*x^2 -
24*x^3 + 24*E^x*x^4) + (20 - 30*x + 5*x^2 + 15*E^x*x^2 + E^x^2*(-16 + 24*x
 - 4*x^2 - 12*E^x*x^2) + E^(3*x^2)*(-16 + 24*x - 4*x^2 - 12*E^x*x^2) + E^(
4*x^2)*(4 - 6*x + x^2 + 3*E^x*x^2) + E^(2*x^2)*(24 - 36*x + 6*x^2 + 18*E^x
*x^2))*Log[5 - 4*E^x^2 + 6*E^(2*x^2) - 4*E^(3*x^2) + E^(4*x^2)] + (-5*E^x
+ 4*E^(x + x^2) - 6*E^(x + 2*x^2) + 4*E^(x + 3*x^2) - E^(x + 4*x^2))*Log[5
 - 4*E^x^2 + 6*E^(2*x^2) - 4*E^(3*x^2) + E^(4*x^2)]^2)/((5*E^x - 4*E^(x +
x^2) + 6*E^(x + 2*x^2) - 4*E^(x + 3*x^2) + E^(x + 4*x^2))*Log[5 - 4*E^x^2
+ 6*E^(2*x^2) - 4*E^(3*x^2) + E^(4*x^2)]^2),x]
```

output
```
$Aborted
```

3.681.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

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$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^x x^4)+e^{4x^2}(-32x^2+8x^3-8e^x x^4)+e^{x^2}(32x^2-8x^3+8e^x x^4)+e^{3x^2}(96x^2-24x^3+24e^x x^4)+\left(20-30x+5x^2+15e^x x^2+e^{x^2}(\cdot\right.}{}$$

3.681.4 Maple [A] (verified)

Time = 188.22 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.49

method	result	size
risch	$-x+\frac{\left(\mathrm{e}^{x} x^{2}-x+4\right) x\,\mathrm{e}^{-x}}{\ln\left(\mathrm{e}^{4 x^{2}}-4\,\mathrm{e}^{3 x^{2}}+6\,\mathrm{e}^{2 x^{2}}-4\,\mathrm{e}^{x^{2}}+5\right)}$	55
parallelrisch	$-\frac{\left(-56\,\mathrm{e}^{x} x^{3}+56 \ln\left(\mathrm{e}^{x}\right) \mathrm{e}^{x} \ln\left(\mathrm{e}^{4 x^{2}}-4\,\mathrm{e}^{3 x^{2}}+6\,\mathrm{e}^{2 x^{2}}-4\,\mathrm{e}^{x^{2}}+5\right)+56 x^{2}-224 x\right) \mathrm{e}^{-x}}{56 \ln\left(\mathrm{e}^{4 x^{2}}-4\,\mathrm{e}^{3 x^{2}}+6\,\mathrm{e}^{2 x^{2}}-4\,\mathrm{e}^{x^{2}}+5\right)}$	94

input
```
int(((-exp(x)*exp(x^2)^4+4*exp(x)*exp(x^2)^3-6*exp(x)*exp(x^2)^2+4*exp(x)*
exp(x^2)-5*exp(x))*ln(exp(x^2)^4-4*exp(x^2)^3+6*exp(x^2)^2-4*exp(x^2)+5)^2
+((3*exp(x)*x^2+x^2-6*x+4)*exp(x^2)^4+(-12*exp(x)*x^2-4*x^2+24*x-16)*exp(x
^2)^3+(18*exp(x)*x^2+6*x^2-36*x+24)*exp(x^2)^2+(-12*exp(x)*x^2-4*x^2+24*x-
16)*exp(x^2)+15*exp(x)*x^2+5*x^2-30*x+20)*ln(exp(x^2)^4-4*exp(x^2)^3+6*exp
(x^2)^2-4*exp(x^2)+5)+(-8*exp(x)*x^4+8*x^3-32*x^2)*exp(x^2)^4+(24*exp(x)*x
^4-24*x^3+96*x^2)*exp(x^2)^3+(-24*exp(x)*x^4+24*x^3-96*x^2)*exp(x^2)^2+(8*
exp(x)*x^4-8*x^3+32*x^2)*exp(x^2))/(exp(x)*exp(x^2)^4-4*exp(x)*exp(x^2)^3+
6*exp(x)*exp(x^2)^2-4*exp(x)*exp(x^2)+5*exp(x))/ln(exp(x^2)^4-4*exp(x^2)^3
+6*exp(x^2)^2-4*exp(x^2)+5)^2,x,method=_RETURNVERBOSE)
```

output
```
-x+(exp(x)*x^2-x+4)*x*exp(-x)/ln(exp(4*x^2)-4*exp(3*x^2)+6*exp(2*x^2)-4*ex
p(x^2)+5)
```

3.681.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 202 vs. 2(32) = 64.

Time = 0.26 (sec) , antiderivative size = 202, normalized size of antiderivative = 5.46

$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^xx^4)+e^{4x^2}(-32x^2+8x^3-8e^xx^4)+e^{x^2}(32x^2-8x^3+8e^xx^4)+e^{3x^2}(96x^2-24}{}$$

$$=\frac{\left(x^3e^{(12\,x^2+4\,x)}-xe^{(12\,x^2+4\,x)}\log\left(\left(e^{(16\,x^2+4\,x)}-4\,e^{(15\,x^2+4\,x)}+6\,e^{(14\,x^2+4\,x)}-4\,e^{(13\,x^2+4\,x)}+5\,e^{(12\,x^2+4\,x)}\right)e\right.\right.}{\log\left(\left(e^{(16\,x^2+4\,x)}-4\,e^{(15\,x^2+4\,x)}+6\,e^{(14\,x^2+4\,x)}-4\,e^{(13\,x^2+4\,x)}+5\,e^{(12\,x^2+4\,x\right.\right.}}$$

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$$\int \frac{e^{2x^2}\left(-96x^2+24x^3-24e^xx^4\right)+e^{4x^2}\left(-32x^2+8x^3-8e^xx^4\right)+e^{x^2}\left(32x^2-8x^3+8e^xx^4\right)+e^{3x^2}\left(96x^2-24x^3+24e^xx^4\right)+\left(20-30x+5x^2+15e^xx^2+e^{x^2}\left(\right.\right.}{}$$

input
```
integrate(((-exp(x)*exp(x^2)^4+4*exp(x)*exp(x^2)^3-6*exp(x)*exp(x^2)^2+4*e
xp(x)*exp(x^2)-5*exp(x))*log(exp(x^2)^4-4*exp(x^2)^3+6*exp(x^2)^2-4*exp(x^
2)+5)^2+((3*exp(x)*x^2+x^2-6*x+4)*exp(x^2)^4+(-12*exp(x)*x^2-4*x^2+24*x-16
)*exp(x^2)^3+(18*exp(x)*x^2+6*x^2-36*x+24)*exp(x^2)^2+(-12*exp(x)*x^2-4*x^
2+24*x-16)*exp(x^2)+15*exp(x)*x^2+5*x^2-30*x+20)*log(exp(x^2)^4-4*exp(x^2)
^3+6*exp(x^2)^2-4*exp(x^2)+5)+(-8*exp(x)*x^4+8*x^3-32*x^2)*exp(x^2)^4+(24*
exp(x)*x^4-24*x^3+96*x^2)*exp(x^2)^3+(-24*exp(x)*x^4+24*x^3-96*x^2)*exp(x^
2)^2+(8*exp(x)*x^4-8*x^3+32*x^2)*exp(x^2))/(exp(x)*exp(x^2)^4-4*exp(x)*exp
(x^2)^3+6*exp(x)*exp(x^2)^2-4*exp(x)*exp(x^2)+5*exp(x))/log(exp(x^2)^4-4*e
xp(x^2)^3+6*exp(x^2)^2-4*exp(x^2)+5)^2,x, algorithm=\
```

output
```
(x^3*e^(12*x^2 + 4*x) - x*e^(12*x^2 + 4*x)*log((e^(16*x^2 + 4*x) - 4*e^(15
*x^2 + 4*x) + 6*e^(14*x^2 + 4*x) - 4*e^(13*x^2 + 4*x) + 5*e^(12*x^2 + 4*x)
)*e^(-12*x^2 - 4*x)) - (x^2 - 4*x)*e^(12*x^2 + 3*x))*e^(-12*x^2 - 4*x)/log
((e^(16*x^2 + 4*x) - 4*e^(15*x^2 + 4*x) + 6*e^(14*x^2 + 4*x) - 4*e^(13*x^2
 + 4*x) + 5*e^(12*x^2 + 4*x))*e^(-12*x^2 - 4*x))
```

3.681.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(24) = 48$.

Time = 0.42 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.38

$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^xx^4)+e^{4x^2}(-32x^2+8x^3-8e^xx^4)+e^{x^2}(32x^2-8x^3+8e^xx^4)+e^{3x^2}(96x^2-24}{}$$

$$= -x + \frac{(x^3e^x - x^2 + 4x)\, e^{-x}}{\log\left(e^{4x^2} - 4e^{3x^2} + 6e^{2x^2} - 4e^{x^2} + 5\right)}$$

input
```
integrate(((-exp(x)*exp(x**2)**4+4*exp(x)*exp(x**2)**3-6*exp(x)*exp(x**2)*
*2+4*exp(x)*exp(x**2)-5*exp(x))*ln(exp(x**2)**4-4*exp(x**2)**3+6*exp(x**2)
**2-4*exp(x**2)+5)**2+((3*exp(x)*x**2+x**2-6*x+4)*exp(x**2)**4+(-12*exp(x)
*x**2-4*x**2+24*x-16)*exp(x**2)**3+(18*exp(x)*x**2+6*x**2-36*x+24)*exp(x**
2)**2+(-12*exp(x)*x**2-4*x**2+24*x-16)*exp(x**2)+15*exp(x)*x**2+5*x**2-30*
x+20)*ln(exp(x**2)**4-4*exp(x**2)**3+6*exp(x**2)**2-4*exp(x**2)+5)+(-8*exp
(x)*x**4+8*x**3-32*x**2)*exp(x**2)**4+(24*exp(x)*x**4-24*x**3+96*x**2)*exp
(x**2)**3+(-24*exp(x)*x**4+24*x**3-96*x**2)*exp(x**2)**2+(8*exp(x)*x**4-8*
x**3+32*x**2)*exp(x**2))/(exp(x)*exp(x**2)**4-4*exp(x)*exp(x**2)**3+6*exp(
x)*exp(x**2)**2-4*exp(x)*exp(x**2)+5*exp(x))/ln(exp(x**2)**4-4*exp(x**2)**
3+6*exp(x**2)**2-4*exp(x**2)+5)**2,x)
```

3.681.

$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^xx^4)+e^{4x^2}(-32x^2+8x^3-8e^xx^4)+e^{x^2}(32x^2-8x^3+8e^xx^4)+e^{3x^2}(96x^2-24x^3+24e^xx^4)+\left(20-30x+5x^2+15e^xx^2+e^{x^2}(\cdots\right.}{}$$

output
```
-x + (x**3*exp(x) - x**2 + 4*x)*exp(-x)/log(exp(4*x**2) - 4*exp(3*x**2) +
6*exp(2*x**2) - 4*exp(x**2) + 5)
```

3.681.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(32) = 64$.

Time = 0.34 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.24

$$\int \frac{e^{2x^2}(-96x^2 + 24x^3 - 24e^x x^4) + e^{4x^2}(-32x^2 + 8x^3 - 8e^x x^4) + e^{x^2}(32x^2 - 8x^3 + 8e^x x^4) + e^{3x^2}(96x^2 - 24}{}$$

$$= \frac{x^3 e^x - x e^x \log\left(e^{(2\,x^2)} - 4\,e^{(x^2)} + 5\right) - x e^x \log\left(e^{(2\,x^2)} + 1\right) - x^2 + 4\,x}{e^x \log\left(e^{(2\,x^2)} - 4\,e^{(x^2)} + 5\right) + e^x \log\left(e^{(2\,x^2)} + 1\right)}$$

input
```
integrate(((-exp(x)*exp(x^2)^4+4*exp(x)*exp(x^2)^3-6*exp(x)*exp(x^2)^2+4*e
xp(x)*exp(x^2)-5*exp(x))*log(exp(x^2)^4-4*exp(x^2)^3+6*exp(x^2)^2-4*exp(x^
2)+5)^2+((3*exp(x)*x^2+x^2-6*x+4)*exp(x^2)^4+(-12*exp(x)*x^2-4*x^2+24*x-16
)*exp(x^2)^3+(18*exp(x)*x^2+6*x^2-36*x+24)*exp(x^2)^2+(-12*exp(x)*x^2-4*x^
2+24*x-16)*exp(x^2)+15*exp(x)*x^2+5*x^2-30*x+20)*log(exp(x^2)^4-4*exp(x^2)
^3+6*exp(x^2)^2-4*exp(x^2)+5)+(-8*exp(x)*x^4+8*x^3-32*x^2)*exp(x^2)^4+(24*
exp(x)*x^4-24*x^3+96*x^2)*exp(x^2)^3+(-24*exp(x)*x^4+24*x^3-96*x^2)*exp(x^
2)^2+(8*exp(x)*x^4-8*x^3+32*x^2)*exp(x^2))/(exp(x)*exp(x^2)^4-4*exp(x)*exp
(x^2)^3+6*exp(x)*exp(x^2)^2-4*exp(x)*exp(x^2)+5*exp(x))/log(exp(x^2)^4-4*e
xp(x^2)^3+6*exp(x^2)^2-4*exp(x^2)+5)^2,x, algorithm=\
```

output
```
(x^3*e^x - x*e^x*log(e^(2*x^2) - 4*e^(x^2) + 5) - x*e^x*log(e^(2*x^2) + 1)
 - x^2 + 4*x)/(e^x*log(e^(2*x^2) - 4*e^(x^2) + 5) + e^x*log(e^(2*x^2) + 1)
)
```

3.681.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(32) = 64$.

Time = 0.69 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.24

$$\int \frac{e^{2x^2}(-96x^2 + 24x^3 - 24e^x x^4) + e^{4x^2}(-32x^2 + 8x^3 - 8e^x x^4) + e^{x^2}(32x^2 - 8x^3 + 8e^x x^4) + e^{3x^2}(96x^2 - 24}{}$$

$$= \frac{x^3 e^x - x e^x \log\left(e^{(2\,x^2)} - 4\,e^{(x^2)} + 5\right) - x e^x \log\left(e^{(2\,x^2)} + 1\right) - x^2 + 4\,x}{e^x \log\left(e^{(2\,x^2)} - 4\,e^{(x^2)} + 5\right) + e^x \log\left(e^{(2\,x^2)} + 1\right)}$$

3.681.

$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^x x^4)+e^{4x^2}(-32x^2+8x^3-8e^x x^4)+e^{x^2}(32x^2-8x^3+8e^x x^4)+e^{3x^2}(96x^2-24x^3+24e^x x^4)+\left(20-30x+5x^2+15e^x x^2+e^{x^2}(\cdot\right.}{}$$

input
```
integrate(((-exp(x)*exp(x^2)^4+4*exp(x)*exp(x^2)^3-6*exp(x)*exp(x^2)^2+4*e
xp(x)*exp(x^2)-5*exp(x))*log(exp(x^2)^4-4*exp(x^2)^3+6*exp(x^2)^2-4*exp(x^
2)+5)^2+((3*exp(x)*x^2+x^2-6*x+4)*exp(x^2)^4+(-12*exp(x)*x^2-4*x^2+24*x-16
)*exp(x^2)^3+(18*exp(x)*x^2+6*x^2-36*x+24)*exp(x^2)^2+(-12*exp(x)*x^2-4*x^
2+24*x-16)*exp(x^2)+15*exp(x)*x^2+5*x^2-30*x+20)*log(exp(x^2)^4-4*exp(x^2)
^3+6*exp(x^2)^2-4*exp(x^2)+5)+(-8*exp(x)*x^4+8*x^3-32*x^2)*exp(x^2)^4+(24*
exp(x)*x^4-24*x^3+96*x^2)*exp(x^2)^3+(-24*exp(x)*x^4+24*x^3-96*x^2)*exp(x^
2)^2+(8*exp(x)*x^4-8*x^3+32*x^2)*exp(x^2))/(exp(x)*exp(x^2)^4-4*exp(x)*exp
(x^2)^3+6*exp(x)*exp(x^2)^2-4*exp(x)*exp(x^2)+5*exp(x))/log(exp(x^2)^4-4*e
xp(x^2)^3+6*exp(x^2)^2-4*exp(x^2)+5)^2,x, algorithm=\
```

output
```
(x^3*e^x - x*e^x*log(e^(2*x^2) - 4*e^(x^2) + 5) - x*e^x*log(e^(2*x^2) + 1)
 - x^2 + 4*x)/(e^x*log(e^(2*x^2) - 4*e^(x^2) + 5) + e^x*log(e^(2*x^2) + 1)
)
```

3.681.9 Mupad [B] (verification not implemented)

Time = 16.88 (sec) , antiderivative size = 343, normalized size of antiderivative = 9.27

$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^x x^4)+e^{4x^2}(-32x^2+8x^3-8e^x x^4)+e^{x^2}(32x^2-8x^3+8e^x x^4)+e^{3x^2}(96x^2-24}{}$$

$$= \frac{x\,\mathrm{e}^{-x}\,(x^2\,\mathrm{e}^x-x+4)-\frac{\mathrm{e}^{-x^2-x}\,\ln\left(6\,\mathrm{e}^{2\,x^2}-4\,\mathrm{e}^{x^2}-4\,\mathrm{e}^{3\,x^2}+\mathrm{e}^{4\,x^2}+5\right)\,(3\,x^2\,\mathrm{e}^x-6\,x+x^2+4)\,\left(6\,\mathrm{e}^{2\,x^2}-4\,\mathrm{e}^{x^2}-4\,\mathrm{e}^{3\,x^2}+\mathrm{e}^{4\,x^2}+5\right)}{8\,x\,\left(\mathrm{e}^{x^2}-1\right)^3}}{\ln\left(6\,\mathrm{e}^{2\,x^2}-4\,\mathrm{e}^{x^2}-4\,\mathrm{e}^{3\,x^2}+\mathrm{e}^{4\,x^2}+5\right)} - \frac{5\,x}{8} - \frac{\mathrm{e}^{-x^2-x}\,\left(\frac{15\,x^2\,\mathrm{e}^x}{8}-\frac{15\,x}{4}+\frac{5\,x^2}{8}+\frac{5}{2}\right)}{x} + \frac{\mathrm{e}^{-x}\,\left(\frac{x^2}{8}-\frac{3\,x}{4}+\frac{1}{2}\right)}{x} + \frac{\mathrm{e}^{-x}\,(3\,x^4\,\mathrm{e}^x+4\,x^2-6\,x^3+x^4)}{2\,x^3\,\left(3\,\mathrm{e}^{x^2}-3\,\mathrm{e}^{2\,x^2}+\mathrm{e}^{3\,x^2}-1\right)} - \frac{\mathrm{e}^{-x}\,(3\,x^4\,\mathrm{e}^x+4\,x^2-6\,x^3+x^4)}{2\,x^3\,\left(\mathrm{e}^{2\,x^2}-2\,\mathrm{e}^{x^2}+1\right)} + \frac{\mathrm{e}^{-x}\,(3\,x^4\,\mathrm{e}^x+4\,x^2-6\,x^3+x^4)}{2\,x^3\,\left(\mathrm{e}^{x^2}-1\right)}$$

3.681.

$$\int \frac{e^{2x^2}(-96x^2+24x^3-24e^x x^4)+e^{4x^2}(-32x^2+8x^3-8e^x x^4)+e^{x^2}(32x^2-8x^3+8e^x x^4)+e^{3x^2}(96x^2-24x^3+24e^x x^4)+\left(20-30x+5x^2+15e^x x^2+e^{x^2}(\cdot\right.}{}$$

input
```
int((log(6*exp(2*x^2) - 4*exp(x^2) - 4*exp(3*x^2) + exp(4*x^2) + 5)*(15*x^
2*exp(x) - 30*x + exp(4*x^2)*(3*x^2*exp(x) - 6*x + x^2 + 4) - exp(x^2)*(12
*x^2*exp(x) - 24*x + 4*x^2 + 16) - exp(3*x^2)*(12*x^2*exp(x) - 24*x + 4*x^
2 + 16) + exp(2*x^2)*(18*x^2*exp(x) - 36*x + 6*x^2 + 24) + 5*x^2 + 20) - l
og(6*exp(2*x^2) - 4*exp(x^2) - 4*exp(3*x^2) + exp(4*x^2) + 5)^2*(5*exp(x)
- 4*exp(x^2)*exp(x) + 6*exp(2*x^2)*exp(x) - 4*exp(3*x^2)*exp(x) + exp(4*x^
2)*exp(x)) + exp(x^2)*(8*x^4*exp(x) + 32*x^2 - 8*x^3) - exp(4*x^2)*(8*x^4*
exp(x) + 32*x^2 - 8*x^3) - exp(2*x^2)*(24*x^4*exp(x) + 96*x^2 - 24*x^3) +
exp(3*x^2)*(24*x^4*exp(x) + 96*x^2 - 24*x^3))/(log(6*exp(2*x^2) - 4*exp(x^
2) - 4*exp(3*x^2) + exp(4*x^2) + 5)^2*(5*exp(x) - 4*exp(x^2)*exp(x) + 6*ex
p(2*x^2)*exp(x) - 4*exp(3*x^2)*exp(x) + exp(4*x^2)*exp(x))),x)
```

output
```
(x*exp(-x)*(x^2*exp(x) - x + 4) - (exp(- x - x^2)*log(6*exp(2*x^2) - 4*exp
(x^2) - 4*exp(3*x^2) + exp(4*x^2) + 5)*(3*x^2*exp(x) - 6*x + x^2 + 4)*(6*e
xp(2*x^2) - 4*exp(x^2) - 4*exp(3*x^2) + exp(4*x^2) + 5))/(8*x*(exp(x^2) -
1)^3))/log(6*exp(2*x^2) - 4*exp(x^2) - 4*exp(3*x^2) + exp(4*x^2) + 5) - (5
*x)/8 - (exp(- x - x^2)*((15*x^2*exp(x))/8 - (15*x)/4 + (5*x^2)/8 + 5/2))/
x + (exp(-x)*(x^2/8 - (3*x)/4 + 1/2))/x + (exp(-x)*(3*x^4*exp(x) + 4*x^2 -
 6*x^3 + x^4))/(2*x^3*(3*exp(x^2) - 3*exp(2*x^2) + exp(3*x^2) - 1)) - (exp
(-x)*(3*x^4*exp(x) + 4*x^2 - 6*x^3 + x^4))/(2*x^3*(exp(2*x^2) - 2*exp(x^2)
 + 1)) + (exp(-x)*(3*x^4*exp(x) + 4*x^2 - 6*x^3 + x^4))/(2*x^3*(exp(x^2) -
 1))
```

3.681.

$$\int \frac{e^{2x^2}\left(-96x^2+24x^3-24e^x x^4\right)+e^{4x^2}\left(-32x^2+8x^3-8e^x x^4\right)+e^{x^2}\left(32x^2-8x^3+8e^x x^4\right)+e^{3x^2}\left(96x^2-24x^3+24e^x x^4\right)+\left(20-30x+5x^2+15e^x x^2+e^{x^2}\left(\right.\right.}{}$$

3.682 $\int -\frac{1}{x}\,dx$

3.682.1 Optimal result

Integrand size = 5, antiderivative size = 10

$$\int -\frac{1}{x}\,dx = 13-\log(2)-\log(x)$$

output
```
13-ln(x)-ln(2)
```

3.682.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int -\frac{1}{x}\,dx = -\log(x)$$

input
```
Integrate[-x^(-1),x]
```

output
```
-Log[x]
```

3.682.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{1}{x}\,dx$$

$$\Big\downarrow \; 14$$

$$-\log(x)$$

input
```
Int[-x^(-1),x]
```

output
```
-Log[x]
```

3.682.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.682.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

method	result	size
default	$-\ln(x)$	5
norman	$-\ln(x)$	5
risch	$-\ln(x)$	5
parallelrisch	$-\ln(x)$	5

input
```
int(-1/x,x,method=_RETURNVERBOSE)
```

output
```
-ln(x)
```

3.682.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int -\frac{1}{x}\,dx = -\log\left(x\right)$$

input
```
integrate(-1/x,x, algorithm=\
```

output
```
-log(x)
```

3.682.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.30

$$\int -\frac{1}{x}\,dx = -\log\left(x\right)$$

input
```
integrate(-1/x,x)
```

output
```
-log(x)
```

3.682.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int -\frac{1}{x}\,dx = -\log\left(x\right)$$

input
```
integrate(-1/x,x, algorithm=\
```

output
```
-log(x)
```

3.682.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

$$\int -\frac{1}{x}\,dx = -\log\left(|x|\right)$$

input
```
integrate(-1/x,x, algorithm=\
```

output
```
-log(abs(x))
```

3.682.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int -\frac{1}{x}\,dx = -\ln\left(x\right)$$

input
```
int(-1/x,x)
```

output
```
-log(x)
```

3.683 $\int \frac{-11552x^3-4864x^3\log(x^2)-512x^3\log^2(x^2)+e^{-\frac{1}{19+4\log(x^2)}}(-353-}{361x^2+152x^2\log(x^2)+16x^2\log^2(x^2)}$

3.683.1 Optimal result

Integrand size = 86, antiderivative size = 28

$$\int \frac{-11552x^3-4864x^3\log(x^2)-512x^3\log^2(x^2)+e^{-\frac{1}{19+4\log(x^2)}}\left(-353-152\log(x^2)-16\log^2(x^2)\right)}{361x^2+152x^2\log(x^2)+16x^2\log^2(x^2)}\,dx$$
$$=2+\frac{e^{\frac{x}{x-4x(5+\log(x^2))}}}{x}-16x^2$$

output
```
exp(x/(x-4*x*(5+ln(x^2))))/x-16*x^2+2
```

3.683.2 Mathematica [A] (verified)

Time = 0.34 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{-11552x^3-4864x^3\log(x^2)-512x^3\log^2(x^2)+e^{-\frac{1}{19+4\log(x^2)}}\left(-353-152\log(x^2)-16\log^2(x^2)\right)}{361x^2+152x^2\log(x^2)+16x^2\log^2(x^2)}\,dx$$
$$=\frac{e^{-\frac{1}{19+4\log(x^2)}}}{x}-16x^2$$

input
```
Integrate[(-11552*x^3 - 4864*x^3*Log[x^2] - 512*x^3*Log[x^2]^2 + (-353 - 1
52*Log[x^2] - 16*Log[x^2]^2)/E^(19 + 4*Log[x^2])^(-1))/(361*x^2 + 152*x^2*
Log[x^2] + 16*x^2*Log[x^2]^2),x]
```

3.683. $\int \frac{-11552x^3-4864x^3\log(x^2)-512x^3\log^2(x^2)+e^{-\frac{1}{19+4\log(x^2)}}\left(-353-152\log(x^2)-16\log^2(x^2)\right)}{361x^2+152x^2\log(x^2)+16x^2\log^2(x^2)}\,dx$

output
```
1/(E^(19 + 4*Log[x^2])^(-1)*x) - 16*x^2
```

3.683.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-11552x^3+e^{-\frac{1}{4\log\left(x^2\right)+19}}\left(-16\log^2\left(x^2\right)-152\log\left(x^2\right)-353\right)-512x^3\log^2\left(x^2\right)-4864x^3\log\left(x^2\right)}{361x^2+16x^2\log^2\left(x^2\right)+152x^2\log\left(x^2\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-11552x^3+e^{-\frac{1}{4\log\left(x^2\right)+19}}\left(-16\log^2\left(x^2\right)-152\log\left(x^2\right)-353\right)-512x^3\log^2\left(x^2\right)-4864x^3\log\left(x^2\right)}{x^2\left(4\log\left(x^2\right)+19\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{e^{\frac{1}{-4\log\left(x^2\right)-19}}\left(16\log^2\left(x^2\right)+152\log\left(x^2\right)+353\right)}{x^2\left(4\log\left(x^2\right)+19\right)^2}-32x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\int \frac{e^{\frac{1}{-4\log\left(x^2\right)-19}}}{x^2}dx+8\int \frac{e^{\frac{1}{-4\log\left(x^2\right)-19}}}{x^2\left(4\log\left(x^2\right)+19\right)^2}dx-16x^2$$

input
```
Int[(-11552*x^3 - 4864*x^3*Log[x^2] - 512*x^3*Log[x^2]^2 + (-353 - 152*Log
[x^2] - 16*Log[x^2]^2)/E^(19 + 4*Log[x^2])^(-1))/(361*x^2 + 152*x^2*Log[x^
2] + 16*x^2*Log[x^2]^2),x]
```

output
```
$Aborted
```

3.683.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.683.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result	size
risch	$-16x^2+\frac{e^{-\frac{1}{4\ln\left(x^2\right)+19}}}{x}$	24
parallelrisch	$\frac{-77824x^3+4864\,e^{-\frac{1}{4\ln\left(x^2\right)+19}}}{4864x}$	27
default	$-16x^2+\frac{(4\ln(x^2)-8\ln(x)+19)e^{-\frac{1}{4\ln\left(x^2\right)+19}}+8\ln(x)e^{-\frac{1}{4\ln\left(x^2\right)+19}}}{x(4\ln(x^2)+19)}$	65
parts	$-16x^2+\frac{(4\ln(x^2)-8\ln(x)+19)e^{-\frac{1}{4\ln\left(x^2\right)+19}}+8\ln(x)e^{-\frac{1}{4\ln\left(x^2\right)+19}}}{x(4\ln(x^2)+19)}$	65

input
```
int(((-16*ln(x^2)^2-152*ln(x^2)-353)*exp(-1/(4*ln(x^2)+19))-512*x^3*ln(x^2
)^2-4864*x^3*ln(x^2)-11552*x^3)/(16*x^2*ln(x^2)^2+152*x^2*ln(x^2)+361*x^2)
,x,method=_RETURNVERBOSE)
```

output
```
-16*x^2+1/x*exp(-1/(4*ln(x^2)+19))
```

3.683.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{-11552x^3 - 4864x^3 \log(x^2) - 512x^3 \log^2(x^2) + e^{-\frac{1}{19+4\log(x^2)}}(-353 - 152\log(x^2) - 16\log^2(x^2))}{361x^2 + 152x^2\log(x^2) + 16x^2\log^2(x^2)}\,dx$$
$$= -\frac{16\,x^3 - e^{\left(-\frac{1}{4\,\log(x^2)+19}\right)}}{x}$$

input
```
integrate(((-16*log(x^2)^2-152*log(x^2)-353)*exp(-1/(4*log(x^2)+19))-512*x
^3*log(x^2)^2-4864*x^3*log(x^2)-11552*x^3)/(16*x^2*log(x^2)^2+152*x^2*log(
x^2)+361*x^2),x, algorithm=\
```

output
```
-(16*x^3 - e^(-1/(4*log(x^2) + 19)))/x
```

3.683.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{-11552x^3 - 4864x^3 \log(x^2) - 512x^3 \log^2(x^2) + e^{-\frac{1}{19+4\log(x^2)}}(-353 - 152\log(x^2) - 16\log^2(x^2))}{361x^2 + 152x^2\log(x^2) + 16x^2\log^2(x^2)}\,dx$$
$$= -16x^2 + \frac{e^{-\frac{1}{4\log(x^2)+19}}}{x}$$

input
```
integrate(((-16*ln(x**2)**2-152*ln(x**2)-353)*exp(-1/(4*ln(x**2)+19))-512*
x**3*ln(x**2)**2-4864*x**3*ln(x**2)-11552*x**3)/(16*x**2*ln(x**2)**2+152*x
**2*ln(x**2)+361*x**2),x)
```

output
```
-16*x**2 + exp(-1/(4*log(x**2) + 19))/x
```

3.683.7 Maxima [F]

$$\int \frac{-11552x^3-4864x^3\log(x^2)-512x^3\log^2(x^2)+e^{-\frac{1}{19+4\log(x^2)}}(-353-152\log(x^2)-16\log^2(x^2))}{361x^2+152x^2\log(x^2)+16x^2\log^2(x^2)}\,dx$$

$$=\int -\frac{512\,x^3\log(x^2)^2+4864\,x^3\log(x^2)+11552\,x^3+\left(16\,\log(x^2)^2+152\,\log(x^2)+353\right)e^{\left(-\frac{1}{4\,\log(x^2)+19}\right)}}{16\,x^2\log(x^2)^2+152\,x^2\log(x^2)+361\,x^2}\,d$$

input
```
integrate(((-16*log(x^2)^2-152*log(x^2)-353)*exp(-1/(4*log(x^2)+19))-512*x
^3*log(x^2)^2-4864*x^3*log(x^2)-11552*x^3)/(16*x^2*log(x^2)^2+152*x^2*log(
x^2)+361*x^2),x, algorithm=\
```

output
```
-16*x^2 - integrate((64*log(x)^2 + 304*log(x) + 353)*e^(-1/(8*log(x) + 19)
)/(64*x^2*log(x)^2 + 304*x^2*log(x) + 361*x^2), x)
```

3.683.8 Giac [F]

$$\int \frac{-11552x^3-4864x^3\log(x^2)-512x^3\log^2(x^2)+e^{-\frac{1}{19+4\log(x^2)}}(-353-152\log(x^2)-16\log^2(x^2))}{361x^2+152x^2\log(x^2)+16x^2\log^2(x^2)}\,dx$$

$$=\int -\frac{512\,x^3\log(x^2)^2+4864\,x^3\log(x^2)+11552\,x^3+\left(16\,\log(x^2)^2+152\,\log(x^2)+353\right)e^{\left(-\frac{1}{4\,\log(x^2)+19}\right)}}{16\,x^2\log(x^2)^2+152\,x^2\log(x^2)+361\,x^2}\,d$$

input
```
integrate(((-16*log(x^2)^2-152*log(x^2)-353)*exp(-1/(4*log(x^2)+19))-512*x
^3*log(x^2)^2-4864*x^3*log(x^2)-11552*x^3)/(16*x^2*log(x^2)^2+152*x^2*log(
x^2)+361*x^2),x, algorithm=\
```

output
```
integrate(-(512*x^3*log(x^2)^2 + 4864*x^3*log(x^2) + 11552*x^3 + (16*log(x
^2)^2 + 152*log(x^2) + 353)*e^(-1/(4*log(x^2) + 19)))/(16*x^2*log(x^2)^2 +
 152*x^2*log(x^2) + 361*x^2), x)
```

3.683.9 Mupad [B] (verification not implemented)

Time = 15.97 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{-11552x^3 - 4864x^3 \log(x^2) - 512x^3 \log^2(x^2) + e^{-\frac{1}{19+4\log(x^2)}}\left(-353 - 152\log(x^2) - 16\log^2(x^2)\right)}{361x^2 + 152x^2\log(x^2) + 16x^2\log^2(x^2)}\,dx$$
$$= \frac{\mathrm{e}^{-\frac{1}{\ln(x^8)+19}}}{x} - 16\,x^2$$

input
```
int(-(4864*x^3*log(x^2) + exp(-1/(4*log(x^2) + 19))*(152*log(x^2) + 16*log
(x^2)^2 + 353) + 11552*x^3 + 512*x^3*log(x^2)^2)/(152*x^2*log(x^2) + 361*x
^2 + 16*x^2*log(x^2)^2),x)
```

output
```
exp(-1/(log(x^8) + 19))/x - 16*x^2
```

3.684 $\int \frac{e^{\frac{-1+125x-25x^2}{25+5x}}(626-250x-25x^2)+e^x(-125-175x-55x^2-5x^3)}{125+50x+5x^2}\,dx$

3.684.1 Optimal result

Integrand size = 64, antiderivative size = 27

$$\int \frac{e^{\frac{-1+125x-25x^2}{25+5x}}(626-250x-25x^2)+e^x(-125-175x-55x^2-5x^3)}{125+50x+5x^2}\,dx=e^{\frac{-\frac{1}{5}+5(5-x)x}{5+x}}-e^x x$$

output
```
exp((5*x*(5-x)-1/5)/(5+x))-exp(x)*x
```

3.684.2 Mathematica [A] (verified)

Time = 0.49 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^{\frac{-1+125x-25x^2}{25+5x}}(626-250x-25x^2)+e^x(-125-175x-55x^2-5x^3)}{125+50x+5x^2}\,dx$$
$$=e^{75-\frac{1251}{5(5+x)}-5(5+x)}-e^x x$$

input
```
Integrate[(E^((-1 + 125*x - 25*x^2)/(25 + 5*x))*(626 - 250*x - 25*x^2) + E
^x*(-125 - 175*x - 55*x^2 - 5*x^3))/(125 + 50*x + 5*x^2),x]
```

output
```
E^(75 - 1251/(5*(5 + x)) - 5*(5 + x)) - E^x*x
```

3.684.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-25x^2+125x-1}{5x+25}}(-25x^2-250x+626)+e^x(-5x^3-55x^2-175x-125)}{5x^2+50x+125}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{e^{\frac{-25x^2+125x-1}{5x+25}}(-25x^2-250x+626)+e^x(-5x^3-55x^2-175x-125)}{\left(\sqrt{5}x+5\sqrt{5}\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{e^{\frac{-25x^2+125x-1}{5(x+5)}}(-25x^2-250x+626)}{5(x+5)^2}-e^x(x+1)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-5\int e^{\frac{-25x^2+125x-1}{5(x+5)}}dx+\frac{1251}{5}\int \frac{e^{\frac{-25x^2+125x-1}{5(x+5)}}}{(x+5)^2}dx-e^x(x+1)+e^x$$

input
```
Int[(E^((-1 + 125*x - 25*x^2)/(25 + 5*x))*(626 - 250*x - 25*x^2) + E^x*(-1
25 - 175*x - 55*x^2 - 5*x^3))/(125 + 50*x + 5*x^2),x]
```

output
```
$Aborted
```

3.684.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.684.4 Maple [A] (verified)

Time = 1.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

method	result	size
risch	$-e^{x} x+e^{-\frac{25 x^{2}-125 x+1}{5(5+x)}}$	25
parallelrisch	$-e^{x} x+e^{-\frac{25 x^{2}-125 x+1}{5(5+x)}}$	25
parts	$-e^{x} x+\frac{x\,e^{\frac{-25 x^{2}+125 x-1}{25+5 x}}+5\,e^{\frac{-25 x^{2}+125 x-1}{25+5 x}}}{5+x}$	56
norman	$\frac{x\,e^{\frac{-25 x^{2}+125 x-1}{25+5 x}}-5\,e^{x} x-e^{x} x^{2}+5\,e^{\frac{-25 x^{2}+125 x-1}{25+5 x}}}{5+x}$	62

input
```
int(((-5*x^3-55*x^2-175*x-125)*exp(x)+(-25*x^2-250*x+626)*exp((-25*x^2+125
*x-1)/(25+5*x)))/(5*x^2+50*x+125),x,method=_RETURNVERBOSE)
```

output
```
-exp(x)*x+exp(-1/5*(25*x^2-125*x+1)/(5+x))
```

3.684.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{-1+125x-25x^2}{25+5x}}(626-250x-25x^2)+e^x(-125-175x-55x^2-5x^3)}{125+50x+5x^2}\,dx$$
$$=-xe^x+e^{\left(-\frac{25\,x^2-125\,x+1}{5\,(x+5)}\right)}$$

input
```
integrate(((-5*x^3-55*x^2-175*x-125)*exp(x)+(-25*x^2-250*x+626)*exp((-25*x
^2+125*x-1)/(25+5*x)))/(5*x^2+50*x+125),x, algorithm=\
```

output
```
-x*e^x + e^(-1/5*(25*x^2 - 125*x + 1)/(x + 5))
```

3.684.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{e^{\frac{-1+125x-25x^2}{25+5x}}(626-250x-25x^2)+e^x(-125-175x-55x^2-5x^3)}{125+50x+5x^2}\,dx$$
$$= -xe^x + e^{\frac{-25x^2+125x-1}{5x+25}}$$

input
```
integrate((((-5*x**3-55*x**2-175*x-125)*exp(x)+(-25*x**2-250*x+626)*exp((-2
5*x**2+125*x-1)/(25+5*x)))/(5*x**2+50*x+125),x)
```

output
```
-x*exp(x) + exp((-25*x**2 + 125*x - 1)/(5*x + 25))
```

3.684.7 Maxima [F]

$$\int \frac{e^{\frac{-1+125x-25x^2}{25+5x}}(626-250x-25x^2)+e^x(-125-175x-55x^2-5x^3)}{125+50x+5x^2}\,dx$$
$$= \int -\frac{5\,(x^3+11\,x^2+35\,x+25)e^x+(25\,x^2+250\,x-626)e^{\left(-\frac{25\,x^2-125\,x+1}{5\,(x+5)}\right)}}{5\,(x^2+10\,x+25)}\,dx$$

input
```
integrate((((-5*x^3-55*x^2-175*x-125)*exp(x)+(-25*x^2-250*x+626)*exp((-25*x
^2+125*x-1)/(25+5*x)))/(5*x^2+50*x+125),x, algorithm=\
```

output
```
-(x*e^(6*x) - e^(-1251/5/(x + 5) + 50))*e^(-5*x) + 25*e^(-5)*exp_integral_
e(2, -x - 5)/(x + 5) + 25*integrate(e^x/(x^2 + 10*x + 25), x)
```

3.684.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^{\frac{-1+125x-25x^2}{25+5x}}(626-250x-25x^2)+e^x(-125-175x-55x^2-5x^3)}{125+50x+5x^2}\,dx$$
$$= -xe^x + e^{\left(-\frac{125\,x^2-626\,x}{25\,(x+5)}-\frac{1}{25}\right)}$$

input
```
integrate(((-5*x^3-55*x^2-175*x-125)*exp(x)+(-25*x^2-250*x+626)*exp((-25*x
^2+125*x-1)/(25+5*x)))/(5*x^2+50*x+125),x, algorithm=\
```

output
```
-x*e^x + e^(-1/25*(125*x^2 - 626*x)/(x + 5) - 1/25)
```

3.684.9 Mupad [B] (verification not implemented)

Time = 13.94 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.52

$$\int \frac{e^{\frac{-1+125x-25x^2}{25+5x}}(626-250x-25x^2)+e^x(-125-175x-55x^2-5x^3)}{125+50x+5x^2}\,dx$$
$$= \mathrm{e}^{-\frac{25\,x^2}{5\,x+25}}\,\mathrm{e}^{-\frac{1}{5\,x+25}}\,\mathrm{e}^{\frac{125\,x}{5\,x+25}}-x\,\mathrm{e}^x$$

input
```
int(-(exp(-(25*x^2 - 125*x + 1)/(5*x + 25))*(250*x + 25*x^2 - 626) + exp(x
)*(175*x + 55*x^2 + 5*x^3 + 125))/(50*x + 5*x^2 + 125),x)
```

output
```
exp(-(25*x^2)/(5*x + 25))*exp(-1/(5*x + 25))*exp((125*x)/(5*x + 25)) - x*e
xp(x)
```

3.685 $\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+\ldots\right.}{(-16-12x+x^3)\log^2(4-x)}$

3.685.1 Optimal result

Integrand size = 104, antiderivative size = 29

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+(-160x-120x^2+10x^4)\log^2(4-\ldots\right.}{(-16-12x+x^3)\log^2(4-x)}$$
$$=-e^{\frac{8}{2+x}}+5e^{-\frac{2}{\log(4-x)}}x^2$$

output
```
5*x^2/exp(2/ln(-x+4))-exp(4/(2+x))^2
```

3.685.2 Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.21

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+(-160x-120x^2+10x^4)\log^2(4-\ldots\right.}{(-16-12x+x^3)\log^2(4-x)}$$
$$=2\left(-\frac{1}{2}e^{\frac{8}{2+x}}+\frac{5}{2}e^{-\frac{2}{\log(4-x)}}x^2\right)$$

input
```
Integrate[(40*x^2 + 40*x^3 + 10*x^4 + E^(8/(2 + x) + 2/Log[4 - x])*(-32 +
8*x)*Log[4 - x]^2 + (-160*x - 120*x^2 + 10*x^4)*Log[4 - x]^2)/(E^(2/Log[4
- x])*(-16 - 12*x + x^3)*Log[4 - x]^2),x]
```

3.685.

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+(-160x-120x^2+10x^4)\log^2(4-x)\right)}{(-16-12x+x^3)\log^2(4-x)}\,dx$$

output
```
2*(-1/2*E^(8/(2 + x)) + (5*x^2)/(2*E^(2/Log[4 - x])))
```

3.685.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(10x^4+40x^3+40x^2+\left(10x^4-120x^2-160x\right)\log^2(4-x)+(8x-32)e^{\frac{8}{x+2}+\frac{2}{\log(4-x)}}\log^2(4-x)\right)}{(x^3-12x-16)\log^2(4-x)}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{e^{-\frac{2}{\log(4-x)}}\left(10x^4+40x^3+40x^2+\left(10x^4-120x^2-160x\right)\log^2(4-x)+(8x-32)e^{\frac{8}{x+2}+\frac{2}{\log(4-x)}}\log^2(4-x)\right)}{36(x-4)\log^2(4-x)} -\right.$$

$$\Big\downarrow \text{2009}$$

$$-80\text{Subst}\left(\int \frac{e^{-\frac{2}{\log(x)}}}{\log^2(x)}dx,x,4-x\right)+10\text{Subst}\left(\int \frac{e^{-\frac{2}{\log(x)}}x}{\log^2(x)}dx,x,4-x\right)+10\int e^{-\frac{2}{\log(4-x)}}xdx-e^{\frac{8}{x+2}}+80e^{-\frac{2}{\log(4-x)}}$$

input
```
Int[(40*x^2 + 40*x^3 + 10*x^4 + E^(8/(2 + x) + 2/Log[4 - x])*(-32 + 8*x)*L
og[4 - x]^2 + (-160*x - 120*x^2 + 10*x^4)*Log[4 - x]^2)/(E^(2/Log[4 - x])*
(-16 - 12*x + x^3)*Log[4 - x]^2),x]
```

output
```
$Aborted
```

3.685.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.685.

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+\left(-160x-120x^2+10x^4\right)\log^2(4-x)\right)}{(-16-12x+x^3)\log^2(4-x)}dx$$

3.685.4 Maple [A] (verified)

Time = 13.46 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

method	result	size
risch	$5x^2 e^{-\frac{2}{\ln(-x+4)}} - e^{\frac{8}{2+x}}$	28
default	$5x^2 e^{-\frac{2}{\ln(-x+4)}} - e^{\frac{8}{2+x}}$	32
parts	$5x^2 e^{-\frac{2}{\ln(-x+4)}} - e^{\frac{8}{2+x}}$	32

input
```
int(((8*x-32)*exp(4/(2+x))^2*ln(-x+4)^2*exp(2/ln(-x+4))+(10*x^4-120*x^2-16
0*x)*ln(-x+4)^2+10*x^4+40*x^3+40*x^2)/(x^3-12*x-16)/ln(-x+4)^2/exp(2/ln(-x
+4)),x,method=_RETURNVERBOSE)
```

output
```
5*x^2*exp(-2/ln(-x+4))-exp(8/(2+x))
```

3.685.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. 2(27) = 54.

Time = 0.25 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.97

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+(-160x-120x^2+10x^4)\log^2(4-\right.}{(-16-12x+x^3)\log^2(4-x)}$$
$$= 5\,x^2 e^{\left(-\frac{2}{\log(-x+4)}\right)} - e^{\left(\frac{2\,(x+4\,\log(-x+4)+2)}{(x+2)\,\log(-x+4)} - \frac{2}{\log(-x+4)}\right)}$$

input
```
integrate(((8*x-32)*exp(4/(2+x))^2*log(-x+4)^2*exp(2/log(-x+4))+(10*x^4-12
0*x^2-160*x)*log(-x+4)^2+10*x^4+40*x^3+40*x^2)/(x^3-12*x-16)/log(-x+4)^2/e
xp(2/log(-x+4)),x, algorithm=\
```

output
```
5*x^2*e^(-2/log(-x + 4)) - e^(2*(x + 4*log(-x + 4) + 2)/((x + 2)*log(-x +
4)) - 2/log(-x + 4))
```

3.685.6 Sympy [A] (verification not implemented)

Time = 0.94 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.66

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+(-160x-120x^2+10x^4)\log^2(4-\right.}{(-16-12x+x^3)\log^2(4-x)}$$
$$=5x^2e^{-\frac{2}{\log(4-x)}}-e^{\frac{8}{x+2}}$$

input
```
integrate(((8*x-32)*exp(4/(2+x))**2*ln(-x+4)**2*exp(2/ln(-x+4))+(10*x**4-1
20*x**2-160*x)*ln(-x+4)**2+10*x**4+40*x**3+40*x**2)/(x**3-12*x-16)/ln(-x+4
)**2/exp(2/ln(-x+4)),x)
```

output
```
5*x**2*exp(-2/log(4 - x)) - exp(8/(x + 2))
```

3.685.7 Maxima [F]

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+(-160x-120x^2+10x^4)\log^2(4-\right.}{(-16-12x+x^3)\log^2(4-x)}$$
$$=\int \frac{2\left(5x^4+4(x-4)e^{\left(\frac{8}{x+2}+\frac{2}{\log(-x+4)}\right)}\log(-x+4)^2+20x^3+5(x^4-12x^2-16x)\log(-x+4)^2+20x^2\right.}{(x^3-12x-16)\log(-x+4)^2}$$

input
```
integrate(((8*x-32)*exp(4/(2+x))^2*log(-x+4)^2*exp(2/log(-x+4))+(10*x^4-12
0*x^2-160*x)*log(-x+4)^2+10*x^4+40*x^3+40*x^2)/(x^3-12*x-16)/log(-x+4)^2/e
xp(2/log(-x+4)),x, algorithm=\
```

output
```
-e^(8/(x + 2)) + 2*integrate(5*((x^2 - 4*x)*log(-x + 4)^2 + x^2)*e^(-2/log
(-x + 4))/((x - 4)*log(-x + 4)^2), x)
```

3.685.8 Giac [F(-2)]

Exception generated.

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+(-160x-120x^2+10x^4)\log^2(4-\right.}{(-16-12x+x^3)\log^2(4-x)}$$
= Exception raised: TypeError

input
```
integrate(((8*x-32)*exp(4/(2+x))^2*log(-x+4)^2*exp(2/log(-x+4))+(10*x^4-12
0*x^2-160*x)*log(-x+4)^2+10*x^4+40*x^3+40*x^2)/(x^3-12*x-16)/log(-x+4)^2/e
xp(2/log(-x+4)),x, algorithm=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:Unable to divide, perhaps due to ro
unding error%%%{8,[0,19]%%%}+%%%{64,[0,18]%%%}+%%%{-288,[0,17]%%%}+%%%{-42
24,[0,16]
```

3.685.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+(-160x-120x^2+10x^4)\log^2(4-\right.}{(-16-12x+x^3)\log^2(4-x)}$$
$$=\int -\frac{e^{-\frac{2}{\ln(4-x)}}\left(40\,x^2-\ln(4-x)^2\,(-10\,x^4+120\,x^2+160\,x)+40\,x^3+10\,x^4+e^{\frac{2}{\ln(4-x)}}\,e^{\frac{8}{x+2}}\ln(4-x)^2\,(8\,x-\right.}{\ln(4-x)^2\,(-x^3+12\,x+16)}$$

input
```
int(-(exp(-2/log(4 - x))*(40*x^2 - log(4 - x)^2*(160*x + 120*x^2 - 10*x^4)
 + 40*x^3 + 10*x^4 + exp(2/log(4 - x))*exp(8/(x + 2))*log(4 - x)^2*(8*x -
32)))/(log(4 - x)^2*(12*x - x^3 + 16)),x)
```

output
```
int(-(exp(-2/log(4 - x))*(40*x^2 - log(4 - x)^2*(160*x + 120*x^2 - 10*x^4)
 + 40*x^3 + 10*x^4 + exp(2/log(4 - x))*exp(8/(x + 2))*log(4 - x)^2*(8*x -
32)))/(log(4 - x)^2*(12*x - x^3 + 16)), x)
```

3.685.
$$\int \frac{e^{-\frac{2}{\log(4-x)}}\left(40x^2+40x^3+10x^4+e^{\frac{8}{2+x}+\frac{2}{\log(4-x)}}(-32+8x)\log^2(4-x)+(-160x-120x^2+10x^4)\log^2(4-x)\right)}{(-16-12x+x^3)\log^2(4-x)}\,dx$$

3.686 $\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(116\right.\right.}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log}$

3.686.1 Optimal result

Integrand size = 107, antiderivative size = 25

$$\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)}\,dx$$
$$= e^{\frac{x}{\frac{x}{27-x}+\frac{4\log(2)}{x^3}}}x$$

output
```
x*exp(x/(4/x^3*ln(2)+x/(27-x)))
```

3.686.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)}\,dx$$
$$= 2^{-\frac{4(-27+x)^2}{x^4+108\log(2)-4x\log(2)}}e^{27-x}x$$

input
```
Integrate[(E^((-27*x^4 + x^5)/(-x^4 + (-108 + 4*x)*Log[2]))*(x^8 - x^9 + (
11880*x^4 - 872*x^5 + 16*x^6)*Log[2] + (11664 - 864*x + 16*x^2)*Log[2]^2))
/(x^8 + (216*x^4 - 8*x^5)*Log[2] + (11664 - 864*x + 16*x^2)*Log[2]^2),x]
```

output
```
(E^(27 - x)*x)/2^((4*(-27 + x)^2)/(x^4 + 108*Log[2] - 4*x*Log[2]))
```

3.686.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{x^5-27x^4}{(4x-108)\log(2)-x^4}}\left(-x^9+x^8+\left(16x^2-864x+11664\right)\log^2(2)+\left(16x^6-872x^5+11880x^4\right)\log(2)\right)}{x^8+(16x^2-864x+11664)\log^2(2)+(216x^4-8x^5)\log(2)}dx$$

$$\Big\downarrow \text{ 2463}$$

$$\int \frac{e^{\frac{x^5-27x^4}{(4x-108)\log(2)-x^4}}\left(-x^9+x^8+\left(16x^2-864x+11664\right)\log^2(2)+\left(16x^6-872x^5+11880x^4\right)\log(2)\right)}{(x^4-4x\log(2)+108\log(2))^2}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{\frac{(x-27)x^4}{-x^4+4x\log(2)-108\log(2)}}\left(-x^9+x^8+\left(16x^2-864x+11664\right)\log^2(2)+\left(16x^6-872x^5+11880x^4\right)\log(2)\right)}{(x^4-4x\log(2)+108\log(2))^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{48(x-36)(x-27)^2\log^2(2)e^{\frac{(x-27)x^4}{-x^4+4x\log(2)-108\log(2)}}}{(x^4-4x\log(2)+108\log(2))^2}+e^{\frac{(x-27)x^4}{-x^4+4x\log(2)-108\log(2)}}-xe^{\frac{(x-27)x^4}{-x^4+4x\log(2)-108\log(2)}}+\frac{8(x^2-81x}{x}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-1259712\log^2(2)\int \frac{e^{\frac{(x-27)x^4}{-x^4+4\log(2)x-108\log(2)}}}{(x^4-4\log(2)x+108\log(2))^2}dx+128304\log^2(2)\int \frac{e^{\frac{(x-27)x^4}{-x^4+4\log(2)x-108\log(2)}}x}{(x^4-4\log(2)x+108\log(2))^2}dx+\int e^{\frac{(x-27)x^4}{-x^4+4\log(2)x-108\log(2)}}dx-\int e^{\frac{(x-27)x^4}{-x^4+4\log(2)x-108\log(2)}}xdx+11664\log(2)\int \frac{e^{\frac{(x-27)x^4}{-x^4+4\log(2)x-108\log(2)}}}{x^4-4\log(2)x+108\log(2)}dx-648\log(2)\int \frac{e^{\frac{(x-27)x^4}{-x^4+4\log(2)x-108\log(2)}}x}{x^4-4\log(2)x+108\log(2)}dx+48\log^2(2)\int \frac{e^{\frac{(x-27)x^4}{-x^4+4\log(2)x-108\log(2)}}x^3}{(x^4-4\log(2)x+108\log(2))^2}dx-4320\log^2(2)\int \frac{e^{\frac{(x-27)x^4}{-x^4+4\log(2)x-108\log(2)}}x^2}{(x^4-4\log(2)x+108\log(2))^2}dx+8\log(2)\int \frac{e^{\frac{(x-27)x^4}{-x^4+4\log(2)x-108\log(2)}}x^2}{x^4-4\log(2)x+108\log(2)}dx$$

3.686. $\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+(216x^4-8x^5)\log(2)+(11664-864x+16x^2)\log^2(2)}dx$

input
```
Int[(E^((-27*x^4 + x^5)/(-x^4 + (-108 + 4*x)*Log[2]))*(x^8 - x^9 + (11880*
x^4 - 872*x^5 + 16*x^6)*Log[2] + (11664 - 864*x + 16*x^2)*Log[2]^2))/(x^8
+ (216*x^4 - 8*x^5)*Log[2] + (11664 - 864*x + 16*x^2)*Log[2]^2),x]
```

output
```
$Aborted
```

3.686.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.686.4 Maple [A] (verified)

Time = 1.52 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

method	result	size
gosper	$x\,{\mathrm e}^{\frac{x^{4} \left(x -27\right)}{-x^{4}+4 x \ln \left(2\right)-108 \ln \left(2\right)}}$	28
risch	$x\,{\mathrm e}^{\frac{x^{4} \left(x -27\right)}{-x^{4}+4 x \ln \left(2\right)-108 \ln \left(2\right)}}$	28
parallelrisch	$x\,{\mathrm e}^{\frac{x^{4} \left(x -27\right)}{-x^{4}+4 x \ln \left(2\right)-108 \ln \left(2\right)}}$	28
norman	$\frac{-x^{5} {\mathrm e}^{\frac{x^{5}-27 x^{4}}{\left(4 x -108\right) \ln \left(2\right)-x^{4}}}-108 x \ln \left(2\right) {\mathrm e}^{\frac{x^{5}-27 x^{4}}{\left(4 x -108\right) \ln \left(2\right)-x^{4}}}+4 x^{2} \ln \left(2\right) {\mathrm e}^{\frac{x^{5}-27 x^{4}}{\left(4 x -108\right) \ln \left(2\right)-x^{4}}}}{-x^{4}+4 x \ln \left(2\right)-108 \ln \left(2\right)}$	118

3.686. $$\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)}\,dx$$

input
```
int(((16*x^2-864*x+11664)*ln(2)^2+(16*x^6-872*x^5+11880*x^4)*ln(2)-x^9+x^8
)*exp((x^5-27*x^4)/((4*x-108)*ln(2)-x^4))/((16*x^2-864*x+11664)*ln(2)^2+(-
8*x^5+216*x^4)*ln(2)+x^8),x,method=_RETURNVERBOSE)
```

output
```
x*exp(x^4*(x-27)/(-x^4+4*x*ln(2)-108*ln(2)))
```

3.686.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)}\,dx$$
$$= xe^{\left(-\frac{x^5-27\,x^4}{x^4-4\,(x-27)\log(2)}\right)}$$

input
```
integrate(((16*x^2-864*x+11664)*log(2)^2+(16*x^6-872*x^5+11880*x^4)*log(2)
-x^9+x^8)*exp((x^5-27*x^4)/((4*x-108)*log(2)-x^4))/((16*x^2-864*x+11664)*l
og(2)^2+(-8*x^5+216*x^4)*log(2)+x^8),x, algorithm=\
```

output
```
x*e^(-(x^5 - 27*x^4)/(x^4 - 4*(x - 27)*log(2)))
```

3.686.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)}\,dx$$
$$= \text{Timed out}$$

input
```
integrate(((16*x**2-864*x+11664)*ln(2)**2+(16*x**6-872*x**5+11880*x**4)*ln
(2)-x**9+x**8)*exp((x**5-27*x**4)/((4*x-108)*ln(2)-x**4))/((16*x**2-864*x+
11664)*ln(2)**2+(-8*x**5+216*x**4)*ln(2)+x**8),x)
```

output
```
Timed out
```

3.686.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. 2(23) = 46.

Time = 0.49 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.76

$$\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)}\,dx$$
$$= xe^{\left(-\frac{4\,x^2\log(2)}{x^4-4\,x\log(2)+108\,\log(2)}-x+\frac{216\,x\log(2)}{x^4-4\,x\log(2)+108\,\log(2)}-\frac{2916\,\log(2)}{x^4-4\,x\log(2)+108\,\log(2)}+27\right)}$$

input
```
integrate(((16*x^2-864*x+11664)*log(2)^2+(16*x^6-872*x^5+11880*x^4)*log(2)
-x^9+x^8)*exp((x^5-27*x^4)/((4*x-108)*log(2)-x^4))/((16*x^2-864*x+11664)*l
og(2)^2+(-8*x^5+216*x^4)*log(2)+x^8),x, algorithm=\
```

output
```
x*e^(-4*x^2*log(2)/(x^4 - 4*x*log(2) + 108*log(2)) - x + 216*x*log(2)/(x^4
 - 4*x*log(2) + 108*log(2)) - 2916*log(2)/(x^4 - 4*x*log(2) + 108*log(2))
+ 27)
```

3.686.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)}\,dx$$
$$= xe^{\left(-\frac{x^5-27\,x^4}{x^4-4\,x\log(2)+108\,\log(2)}\right)}$$

input
```
integrate(((16*x^2-864*x+11664)*log(2)^2+(16*x^6-872*x^5+11880*x^4)*log(2)
-x^9+x^8)*exp((x^5-27*x^4)/((4*x-108)*log(2)-x^4))/((16*x^2-864*x+11664)*l
og(2)^2+(-8*x^5+216*x^4)*log(2)+x^8),x, algorithm=\
```

output
```
x*e^(-(x^5 - 27*x^4)/(x^4 - 4*x*log(2) + 108*log(2)))
```

3.686.9 Mupad [B] (verification not implemented)

Time = 15.29 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

$$\int \frac{e^{\frac{-27x^4+x^5}{-x^4+(-108+4x)\log(2)}}\left(x^8-x^9+\left(11880x^4-872x^5+16x^6\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)\right)}{x^8+\left(216x^4-8x^5\right)\log(2)+\left(11664-864x+16x^2\right)\log^2(2)}\,dx$$
$$= x\,\mathrm{e}^{\frac{27\,x^4-x^5}{x^4-4\,\ln(2)\,x+108\,\ln(2)}}$$

input
```
int((exp(-(27*x^4 - x^5)/(log(2)*(4*x - 108) - x^4))*(log(2)^2*(16*x^2 - 8
64*x + 11664) + log(2)*(11880*x^4 - 872*x^5 + 16*x^6) + x^8 - x^9))/(log(2
)*(216*x^4 - 8*x^5) + log(2)^2*(16*x^2 - 864*x + 11664) + x^8),x)
```

output
```
x*exp((27*x^4 - x^5)/(108*log(2) - 4*x*log(2) + x^4))
```

3.687 $\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{(288x+288x^2+(-192x-192x^2)\log(x)+(32x+32x^2)\log^2(x))\log^2(1+x)}$

3.687.1 Optimal result

Integrand size = 69, antiderivative size = 18

$$\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{(288x+288x^2+(-192x-192x^2)\log(x)+(32x+32x^2)\log^2(x))\log^2(1+x)}\,dx = -\frac{5\log(3)}{32(-3+\log(x))\log(1+x)}$$

output
```
5/32*ln(3)/ln(1+x)/(3-ln(x))
```

3.687.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{(288x+288x^2+(-192x-192x^2)\log(x)+(32x+32x^2)\log^2(x))\log^2(1+x)}\,dx = \frac{5\log(3)}{32(3-\log(x))\log(1+x)}$$

input
```
Integrate[(-15*x*Log[3] + 5*x*Log[3]*Log[x] + (5 + 5*x)*Log[3]*Log[1 + x])
/((288*x + 288*x^2 + (-192*x - 192*x^2)*Log[x] + (32*x + 32*x^2)*Log[x]^2)
*Log[1 + x]^2),x]
```

output
```
(5*Log[3])/(32*(3 - Log[x])*Log[1 + x])
```

3.687.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5x\log(3)\log(x)-15x\log(3)+(5x+5)\log(3)\log(x+1)}{(288x^2+(32x^2+32x)\log^2(x)+(-192x^2-192x)\log(x)+288x)\log^2(x+1)}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{5\log(3)(-3x+x\log(x)+x\log(x+1)+\log(x+1))}{32x(x+1)(3-\log(x))^2\log^2(x+1)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{5}{32}\log(3)\int -\frac{-\log(x)x-\log(x+1)x+3x-\log(x+1)}{x(x+1)(3-\log(x))^2\log^2(x+1)}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{5}{32}\log(3)\int \frac{-\log(x)x-\log(x+1)x+3x-\log(x+1)}{x(x+1)(3-\log(x))^2\log^2(x+1)}dx$$

$$\Big\downarrow \ 7293$$

$$-\frac{5}{32}\log(3)\int \left(-\frac{1}{(x+1)\log^2(x+1)(\log(x)-3)}-\frac{1}{x\log(x+1)(\log(x)-3)^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{5}{32}\log(3)\left(-\int \frac{1}{(x+1)(\log(x)-3)\log^2(x+1)}dx-\int \frac{1}{x(\log(x)-3)^2\log(x+1)}dx\right)$$

input
```
Int[(-15*x*Log[3] + 5*x*Log[3]*Log[x] + (5 + 5*x)*Log[3]*Log[1 + x])/((288
*x + 288*x^2 + (-192*x - 192*x^2)*Log[x] + (32*x + 32*x^2)*Log[x]^2)*Log[1
 + x]^2),x]
```

output
```
$Aborted
```

3.687.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.687.4 Maple [A] (verified)

Time = 4.34 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

method	result	size
risch	$-\frac{5\ln(3)}{32(\ln(x)-3)\ln(1+x)}$	17
parallelrisch	$-\frac{5\ln(3)}{32(\ln(x)-3)\ln(1+x)}$	17

input
```
int(((5*x+5)*ln(3)*ln(1+x)+5*x*ln(3)*ln(x)-15*x*ln(3))/((32*x^2+32*x)*ln(x
)^2+(-192*x^2-192*x)*ln(x)+288*x^2+288*x)/ln(1+x)^2,x,method=_RETURNVERBOS
E)
```

output
```
-5/32*ln(3)/(ln(x)-3)/ln(1+x)
```

3.687.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{(288x+288x^2+(-192x-192x^2)\log(x)+(32x+32x^2)\log^2(x))\log^2(1+x)}\,dx = -\frac{5\,\log(3)}{32\,(\log(x)-3)\log(x+1)}$$

input
```
integrate(((5*x+5)*log(3)*log(1+x)+5*x*log(3)*log(x)-15*x*log(3))/((32*x^2
+32*x)*log(x)^2+(-192*x^2-192*x)*log(x)+288*x^2+288*x)/log(1+x)^2,x, algor
ithm=\
```

output
```
-5/32*log(3)/((log(x) - 3)*log(x + 1))
```

3.687.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{(288x+288x^2+(-192x-192x^2)\log(x)+(32x+32x^2)\log^2(x))\log^2(1+x)}\,dx = -\frac{5\log(3)}{(32\log(x)-96)\log(x+1)}$$

input
```
integrate(((5*x+5)*ln(3)*ln(1+x)+5*x*ln(3)*ln(x)-15*x*ln(3))/((32*x**2+32*
x)*ln(x)**2+(-192*x**2-192*x)*ln(x)+288*x**2+288*x)/ln(1+x)**2,x)
```

output
```
-5*log(3)/((32*log(x) - 96)*log(x + 1))
```

3.687.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{(288x+288x^2+(-192x-192x^2)\log(x)+(32x+32x^2)\log^2(x))\log^2(1+x)}\,dx = -\frac{5\,\log(3)}{32\,(\log(x)-3)\log(x+1)}$$

input
```
integrate(((5*x+5)*log(3)*log(1+x)+5*x*log(3)*log(x)-15*x*log(3))/((32*x^2
+32*x)*log(x)^2+(-192*x^2-192*x)*log(x)+288*x^2+288*x)/log(1+x)^2,x, algor
ithm=\
```

output
```
-5/32*log(3)/((log(x) - 3)*log(x + 1))
```

3.687.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{(288x+288x^2+(-192x-192x^2)\log(x)+(32x+32x^2)\log^2(x))\log^2(1+x)}\,dx = -\frac{5\log(3)}{32\left(\log(x+1)\log(x)-3\log(x+1)\right)}$$

input
```
integrate(((5*x+5)*log(3)*log(1+x)+5*x*log(3)*log(x)-15*x*log(3))/((32*x^2
+32*x)*log(x)^2+(-192*x^2-192*x)*log(x)+288*x^2+288*x)/log(1+x)^2,x, algor
ithm=\
```

output
```
-5/32*log(3)/(log(x + 1)*log(x) - 3*log(x + 1))
```

3.687.9 Mupad [B] (verification not implemented)

Time = 14.21 (sec) , antiderivative size = 110, normalized size of antiderivative = 6.11

$$\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{(288x+288x^2+(-192x-192x^2)\log(x)+(32x+32x^2)\log^2(x))\log^2(1+x)}\,dx = \frac{\frac{5\ln(3)}{32x}-\frac{5\ln(3)\ln(x)}{64x}}{\ln(x)-3}-\frac{\frac{5\ln(3)}{32(\ln(x)-3)}+\frac{5\ln(x+1)\ln(3)(x+1)}{32x(\ln(x)-3)^2}}{\ln(x+1)}+\frac{5\ln(3)}{64x}-\frac{\frac{5(\ln(3)-2x\ln(3))}{64x}-\frac{5\ln(3)\ln(x)}{64x}}{\ln(x)^2-6\ln(x)+9}$$

input
```
int((5*x*log(3)*log(x) - 15*x*log(3) + log(x + 1)*log(3)*(5*x + 5))/(log(x
 + 1)^2*(288*x + log(x)^2*(32*x + 32*x^2) - log(x)*(192*x + 192*x^2) + 288
*x^2)),x)
```

output
```
((5*log(3))/(32*x) - (5*log(3)*log(x))/(64*x))/(log(x) - 3) - ((5*log(3))/
(32*(log(x) - 3)) + (5*log(x + 1)*log(3)*(x + 1))/(32*x*(log(x) - 3)^2))/l
og(x + 1) + (5*log(3))/(64*x) - ((5*(log(3) - 2*x*log(3)))/(64*x) - (5*log
(3)*log(x))/(64*x))/(log(x)^2 - 6*log(x) + 9)
```

3.687. $\int \frac{-15x\log(3)+5x\log(3)\log(x)+(5+5x)\log(3)\log(1+x)}{(288x+288x^2+(-192x-192x^2)\log(x)+(32x+32x^2)\log^2(x))\log^2(1+x)}\,dx$

3.688 $\int (1-e^3+20x+75x^2)\,dx$

3.688.1 Optimal result

Integrand size = 15, antiderivative size = 15

$$\int (1-e^3+20x+75x^2)\,dx = x\left(-e^3+(1+5x)^2\right)$$

output
```
x*((1+5*x)^2-exp(3))
```

3.688.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int (1-e^3+20x+75x^2)\,dx = x-e^3x+10x^2+25x^3$$

input
```
Integrate[1 - E^3 + 20*x + 75*x^2,x]
```

output
```
x - E^3*x + 10*x^2 + 25*x^3
```

3.688.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(75x^2+20x-e^3+1\right) dx$$

$$\Big\downarrow \; 2009$$

$$25x^3+10x^2+\left(1-e^3\right) x$$

input
```
Int[1 - E^3 + 20*x + 75*x^2,x]
```

output
```
(1 - E^3)*x + 10*x^2 + 25*x^3
```

3.688.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.688.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

method	result	size
gosper	$-x(-25x^2+\mathrm{e}^3-10x-1)$	16
default	$-x\,\mathrm{e}^3+25x^3+10x^2+x$	18
risch	$-x\,\mathrm{e}^3+25x^3+10x^2+x$	18
parts	$-x\,\mathrm{e}^3+25x^3+10x^2+x$	18
norman	$\left(-\mathrm{e}^3+1\right)x+10x^2+25x^3$	20
parallelrisch	$\left(-\mathrm{e}^3+1\right)x+10x^2+25x^3$	20

input
```
int(-exp(3)+75*x^2+20*x+1,x,method=_RETURNVERBOSE)
```

output
```
-x*(-25*x^2+exp(3)-10*x-1)
```

3.688.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int \left(1 - e^3 + 20x + 75x^2\right)\,dx = 25\,x^3 + 10\,x^2 - xe^3 + x$$

input
```
integrate(-exp(3)+75*x^2+20*x+1,x, algorithm=\
```

output
```
25*x^3 + 10*x^2 - x*e^3 + x
```

3.688.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \left(1 - e^3 + 20x + 75x^2\right)\,dx = 25x^3 + 10x^2 + x\left(1 - e^3\right)$$

input
```
integrate(-exp(3)+75*x**2+20*x+1,x)
```

output
```
25*x**3 + 10*x**2 + x*(1 - exp(3))
```

3.688.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int \left(1 - e^3 + 20x + 75x^2\right)\,dx = 25\,x^3 + 10\,x^2 - xe^3 + x$$

input
```
integrate(-exp(3)+75*x^2+20*x+1,x, algorithm=\
```

output
```
25*x^3 + 10*x^2 - x*e^3 + x
```

3.688.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int (1 - e^3 + 20x + 75x^2) \, dx = 25\,x^3 + 10\,x^2 - xe^3 + x$$

input
```
integrate(-exp(3)+75*x^2+20*x+1,x, algorithm=\
```

output
```
25*x^3 + 10*x^2 - x*e^3 + x
```

3.688.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int (1 - e^3 + 20x + 75x^2) \, dx = 25\,x^3 + 10\,x^2 + (1 - \mathrm{e}^3) \, x$$

input
```
int(20*x - exp(3) + 75*x^2 + 1,x)
```

output
```
10*x^2 - x*(exp(3) - 1) + 25*x^3
```

3.689 $\int \frac{4x^4+24x^5-24x^6+(-8x^3-48x^4+48x^5)\log(4)+(4x^2+24x^3-24x^4)\log \cdots}{\cdots}$

3.689.1 Optimal result

Integrand size = 226, antiderivative size = 34

$$\int \frac{4x^4+24x^5-24x^6+(-8x^3-48x^4+48x^5)\log(4)+(4x^2+24x^3-24x^4)\log^2(4)+e^x(-12x^2-20x^3+\cdots}{5x^3-5x^4+(-10x^2+10\cdots} = \frac{4}{5}x^2\left(1+2x-\log\left(x-x^2+\frac{e^x}{-x+\log(4)}\right)\right)$$

output
```
4/5*(2*x-ln(exp(x)/(2*ln(2)-x)-x^2+x)+1)*x^2
```

3.689.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.15

$$\int \frac{4x^4+24x^5-24x^6+(-8x^3-48x^4+48x^5)\log(4)+(4x^2+24x^3-24x^4)\log^2(4)+e^x(-12x^2-20x^3+\cdots}{5x^3-5x^4+(-10x^2+10\cdots} = \frac{4}{5}\left(x^2+2x^3-x^2\log\left(x-x^2-\frac{e^x}{x-\log(4)}\right)\right)$$

3.689.

$$\int \frac{4x^4+24x^5-24x^6+(-8x^3-48x^4+48x^5)\log(4)+(4x^2+24x^3-24x^4)\log^2(4)+e^x(-12x^2-20x^3+(8x+20x^2)\log(4))+(-8x^4+8x^5+(16x^3-16x^4)\log\cdots}{\cdots}$$

input
```
Integrate[(4*x^4 + 24*x^5 - 24*x^6 + (-8*x^3 - 48*x^4 + 48*x^5)*Log[4] + (
4*x^2 + 24*x^3 - 24*x^4)*Log[4]^2 + E^x*(-12*x^2 - 20*x^3 + (8*x + 20*x^2)
*Log[4]) + (-8*x^4 + 8*x^5 + (16*x^3 - 16*x^4)*Log[4] + (-8*x^2 + 8*x^3)*L
og[4]^2 + E^x*(8*x^2 - 8*x*Log[4]))*Log[(E^x - x^2 + x^3 + (x - x^2)*Log[4
])/(-x + Log[4])])/(5*x^3 - 5*x^4 + (-10*x^2 + 10*x^3)*Log[4] + (5*x - 5*x
^2)*Log[4]^2 + E^x*(-5*x + 5*Log[4])),x]
```

output
```
(4*(x^2 + 2*x^3 - x^2*Log[x - x^2 - E^x/(x - Log[4])]))/5
```

3.689.3 Rubi [A] (verified)

Time = 4.23 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.18, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.022$, Rules used = {7292, 27, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-24x^6+24x^5+4x^4+e^x\left(-20x^3-12x^2+\left(20x^2+8x\right)\log(4)\right)+\left(48x^5-48x^4-8x^3\right)\log(4)+\left(-24x^4+24x\right.}{-5x^4+5x^3+\left(5x-5x^2\right)\log^2}$$

$\Big\downarrow$ 7292

$$\int \frac{24x^6-24x^5-4x^4-e^x\left(-20x^3-12x^2+\left(20x^2+8x\right)\log(4)\right)-\left(48x^5-48x^4-8x^3\right)\log(4)-\left(-24x^4+24x^3\right.}{5(x-\log(4))\left(x^3\right.}$$

$\Big\downarrow$ 27

$$\frac{1}{5}\int -\frac{4\left(-6x^6+6x^5+x^4-e^x\left(5x^3+3x^2-\left(5x^2+2x\right)\log(4)\right)-2\left(-x^5+x^4-e^x\left(x^2-x\log(4)\right)+\left(x^2-x^3\right)\text{lo}\right.\right.}{(x-\log(4))\left(x^3-(\right.}$$

$\Big\downarrow$ 27

$$-\frac{4}{5}\int \frac{-6x^6+6x^5+x^4-e^x\left(5x^3+3x^2-\left(5x^2+2x\right)\log(4)\right)-2\left(-x^5+x^4-e^x\left(x^2-x\log(4)\right)+\left(x^2-x^3\right)\log^2\right.}{(x-\log(4))\left(x^3-(1\right.}$$

$\Big\downarrow$ 7293

3.689.

$$\int \frac{4x^4+24x^5-24x^6+\left(-8x^3-48x^4+48x^5\right)\log(4)+\left(4x^2+24x^3-24x^4\right)\log^2(4)+e^x\left(-12x^2-20x^3+\left(8x+20x^2\right)\log(4)\right)+\left(-8x^4+8x^5+\left(16x^3-16x^4\right)\text{lo}\right.}{}$$

$$-\frac{4}{5}\int \left(\frac{\left(-x^3+(4+\log(4))x^2-(2+\log(64))x+\log(4)\right)x^2}{x^3-(1+\log(4))x^2+\log(4)x+e^x}+\frac{\left(-5x^2+2\log\left(-x^2+x-\frac{e^x}{x-\log(4)}\right)x-3\left(1-\right.\right.}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{4}{5}\left(-2x^3-x^2+x^2\log\left(-x^2+x-\frac{e^x}{x-\log(4)}\right)\right)$$

input
```
Int[(4*x^4 + 24*x^5 - 24*x^6 + (-8*x^3 - 48*x^4 + 48*x^5)*Log[4] + (4*x^2
+ 24*x^3 - 24*x^4)*Log[4]^2 + E^x*(-12*x^2 - 20*x^3 + (8*x + 20*x^2)*Log[4
]) + (-8*x^4 + 8*x^5 + (16*x^3 - 16*x^4)*Log[4] + (-8*x^2 + 8*x^3)*Log[4]^
2 + E^x*(8*x^2 - 8*x*Log[4]))*Log[(E^x - x^2 + x^3 + (x - x^2)*Log[4])/(-x
 + Log[4])])/(5*x^3 - 5*x^4 + (-10*x^2 + 10*x^3)*Log[4] + (5*x - 5*x^2)*Lo
g[4]^2 + E^x*(-5*x + 5*Log[4])),x]
```

output
```
(-4*(-x^2 - 2*x^3 + x^2*Log[x - x^2 - E^x/(x - Log[4])]))/5
```

3.689.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

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$$\int \frac{4x^4+24x^5-24x^6+\left(-8x^3-48x^4+48x^5\right)\log(4)+\left(4x^2+24x^3-24x^4\right)\log^2(4)+e^x\left(-12x^2-20x^3+\left(8x+20x^2\right)\log(4)\right)+\left(-8x^4+8x^5+\left(16x^3-16x^4\right)\log\right.}{}$$

3.689.4 Maple [A] (verified)

Time = 5.58 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.68

method	result
parallelrisch	$\frac{8x^3}{5}-\frac{4\ln\left(\frac{e^x+2\left(-x^2+x\right)\ln(2)+x^3-x^2}{2\ln(2)-x}\right)x^2}{5}-\frac{16\ln(2)^2}{5}+\frac{4x^2}{5}$
risch	$-\frac{4x^2\ln\left(\left(x^2-x\right)\ln(2)-\frac{x^3}{2}+\frac{x^2}{2}-\frac{e^x}{2}\right)}{5}+\frac{4x^2\ln\left(\ln(2)-\frac{x}{2}\right)}{5}+\frac{8x^3}{5}+\frac{4i\pi x^2\operatorname{csgn}\left(\frac{i\left(-\left(x^2-x\right)\ln(2)+\frac{x^3}{2}-\frac{x^2}{2}+\frac{e^x}{2}\right)}{\ln(2)-\frac{x}{2}}\right)^2}{5}+$

input
```
int((((-16*x*ln(2)+8*x^2)*exp(x)+4*(8*x^3-8*x^2)*ln(2)^2+2*(-16*x^4+16*x^3
)*ln(2)+8*x^5-8*x^4)*ln((exp(x)+2*(-x^2+x)*ln(2)+x^3-x^2)/(2*ln(2)-x))+(2*
(20*x^2+8*x)*ln(2)-20*x^3-12*x^2)*exp(x)+4*(-24*x^4+24*x^3+4*x^2)*ln(2)^2+
2*(48*x^5-48*x^4-8*x^3)*ln(2)-24*x^6+24*x^5+4*x^4)/((10*ln(2)-5*x)*exp(x)+
4*(-5*x^2+5*x)*ln(2)^2+2*(10*x^3-10*x^2)*ln(2)-5*x^4+5*x^3),x,method=_RETU
RNVERBOSE)
```

output
```
8/5*x^3-4/5*ln((exp(x)+2*(-x^2+x)*ln(2)+x^3-x^2)/(2*ln(2)-x))*x^2-16/5*ln(
2)^2+4/5*x^2
```

3.689.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.44

$$\int \frac{4x^4+24x^5-24x^6+(-8x^3-48x^4+48x^5)\log(4)+(4x^2+24x^3-24x^4)\log^2(4)+e^x(-12x^2-20x^3+}{5x^3-5x^4+(-10x^2+10}$$

$$=\frac{8}{5}x^3-\frac{4}{5}x^2\log\left(-\frac{x^3-x^2-2\left(x^2-x\right)\log\left(2\right)+e^x}{x-2\log\left(2\right)}\right)+\frac{4}{5}x^2$$

input
```
integrate((((-16*x*log(2)+8*x^2)*exp(x)+4*(8*x^3-8*x^2)*log(2)^2+2*(-16*x^
4+16*x^3)*log(2)+8*x^5-8*x^4)*log((exp(x)+2*(-x^2+x)*log(2)+x^3-x^2)/(2*lo
g(2)-x))+(2*(20*x^2+8*x)*log(2)-20*x^3-12*x^2)*exp(x)+4*(-24*x^4+24*x^3+4*
x^2)*log(2)^2+2*(48*x^5-48*x^4-8*x^3)*log(2)-24*x^6+24*x^5+4*x^4)/((10*log
(2)-5*x)*exp(x)+4*(-5*x^2+5*x)*log(2)^2+2*(10*x^3-10*x^2)*log(2)-5*x^4+5*x
^3),x, algorithm=\
```

output
```
8/5*x^3 - 4/5*x^2*log(-(x^3 - x^2 - 2*(x^2 - x)*log(2) + e^x)/(x - 2*log(2
))) + 4/5*x^2
```

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$$\int \frac{4x^4+24x^5-24x^6+\left(-8x^3-48x^4+48x^5\right)\log(4)+\left(4x^2+24x^3-24x^4\right)\log^2(4)+e^x\left(-12x^2-20x^3+\left(8x+20x^2\right)\log(4)\right)+\left(-8x^4+8x^5+\left(16x^3-16x^4\right)\log\right.}{}$$

3.689.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 110 vs. $2(31) = 62$.

Time = 0.60 (sec) , antiderivative size = 110, normalized size of antiderivative = 3.24

$$\int \frac{4x^4 + 24x^5 - 24x^6 + (-8x^3 - 48x^4 + 48x^5)\log(4) + (4x^2 + 24x^3 - 24x^4)\log^2(4) + e^x(-12x^2 - 20x^3 +}{5x^3 - 5x^4 + (-10x^2 + 10}$$
$$= \frac{8x^3}{5} + \frac{4x^2}{5} + \left(-\frac{4x^2}{5} + \frac{16\log(2)^2}{15}\right)\log\left(\frac{x^3 - x^2 + (-2x^2 + 2x)\log(2) + e^x}{-x + 2\log(2)}\right) + \frac{16\log(2)^2\log(x - 2\log(2))}{15} - \frac{16\log(2)^2\log(x^3 - 2x^2\log(2) - x^2 + 2x\log(2) + e^x)}{15}$$

input
```
integrate((((-16*x*ln(2)+8*x**2)*exp(x)+4*(8*x**3-8*x**2)*ln(2)**2+2*(-16*
x**4+16*x**3)*ln(2)+8*x**5-8*x**4)*ln((exp(x)+2*(-x**2+x)*ln(2)+x**3-x**2)
/(2*ln(2)-x))+(2*(20*x**2+8*x)*ln(2)-20*x**3-12*x**2)*exp(x)+4*(-24*x**4+2
4*x**3+4*x**2)*ln(2)**2+2*(48*x**5-48*x**4-8*x**3)*ln(2)-24*x**6+24*x**5+4
*x**4)/((10*ln(2)-5*x)*exp(x)+4*(-5*x**2+5*x)*ln(2)**2+2*(10*x**3-10*x**2)
*ln(2)-5*x**4+5*x**3),x)
```

output
```
8*x**3/5 + 4*x**2/5 + (-4*x**2/5 + 16*log(2)**2/15)*log((x**3 - x**2 + (-2
*x**2 + 2*x)*log(2) + exp(x))/(-x + 2*log(2))) + 16*log(2)**2*log(x - 2*lo
g(2))/15 - 16*log(2)**2*log(x**3 - 2*x**2*log(2) - x**2 + 2*x*log(2) + exp
(x))/15
```

3.689.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.59

$$\int \frac{4x^4 + 24x^5 - 24x^6 + (-8x^3 - 48x^4 + 48x^5)\log(4) + (4x^2 + 24x^3 - 24x^4)\log^2(4) + e^x(-12x^2 - 20x^3 +}{5x^3 - 5x^4 + (-10x^2 + 10}$$
$$= \frac{8}{5}x^3 - \frac{4}{5}x^2\log(-x^3 + x^2(2\log(2) + 1) - 2x\log(2) - e^x) + \frac{4}{5}x^2\log(x - 2\log(2)) + \frac{4}{5}x^2$$

input
```
integrate((((-16*x*log(2)+8*x^2)*exp(x)+4*(8*x^3-8*x^2)*log(2)^2+2*(-16*x^
4+16*x^3)*log(2)+8*x^5-8*x^4)*log((exp(x)+2*(-x^2+x)*log(2)+x^3-x^2)/(2*lo
g(2)-x))+(2*(20*x^2+8*x)*log(2)-20*x^3-12*x^2)*exp(x)+4*(-24*x^4+24*x^3+4*
x^2)*log(2)^2+2*(48*x^5-48*x^4-8*x^3)*log(2)-24*x^6+24*x^5+4*x^4)/((10*log
(2)-5*x)*exp(x)+4*(-5*x^2+5*x)*log(2)^2+2*(10*x^3-10*x^2)*log(2)-5*x^4+5*x
^3),x, algorithm=\
```

3.689.

$$\int \frac{4x^4+24x^5-24x^6+(-8x^3-48x^4+48x^5)\log(4)+(4x^2+24x^3-24x^4)\log^2(4)+e^x(-12x^2-20x^3+(8x+20x^2)\log(4))+(-8x^4+8x^5+(16x^3-16x^4)\log}{}$$

output
```
8/5*x^3 - 4/5*x^2*log(-x^3 + x^2*(2*log(2) + 1) - 2*x*log(2) - e^x) + 4/5*
x^2*log(x - 2*log(2)) + 4/5*x^2
```

3.689.8 Giac [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.59

$$\int \frac{4x^4+24x^5-24x^6+(-8x^3-48x^4+48x^5)\log(4)+(4x^2+24x^3-24x^4)\log^2(4)+e^x(-12x^2-20x^3+}{5x^3-5x^4+(-10x^2+10}$$

$$= \frac{8}{5}x^3 - \frac{4}{5}x^2\log\left(-x^3+2x^2\log(2)+x^2-2x\log(2)-e^x\right)+\frac{4}{5}x^2\log(x-2\log(2))+\frac{4}{5}x^2$$

input
```
integrate((((-16*x*log(2)+8*x^2)*exp(x)+4*(8*x^3-8*x^2)*log(2)^2+2*(-16*x^
4+16*x^3)*log(2)+8*x^5-8*x^4)*log((exp(x)+2*(-x^2+x)*log(2)+x^3-x^2)/(2*lo
g(2)-x))+(2*(20*x^2+8*x)*log(2)-20*x^3-12*x^2)*exp(x)+4*(-24*x^4+24*x^3+4*
x^2)*log(2)^2+2*(48*x^5-48*x^4-8*x^3)*log(2)-24*x^6+24*x^5+4*x^4)/((10*log
(2)-5*x)*exp(x)+4*(-5*x^2+5*x)*log(2)^2+2*(10*x^3-10*x^2)*log(2)-5*x^4+5*x
^3),x, algorithm=\
```

output
```
8/5*x^3 - 4/5*x^2*log(-x^3 + 2*x^2*log(2) + x^2 - 2*x*log(2) - e^x) + 4/5*
x^2*log(x - 2*log(2)) + 4/5*x^2
```

3.689.9 Mupad [B] (verification not implemented)

Time = 14.15 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.32

$$\int \frac{4x^4+24x^5-24x^6+(-8x^3-48x^4+48x^5)\log(4)+(4x^2+24x^3-24x^4)\log^2(4)+e^x(-12x^2-20x^3+}{5x^3-5x^4+(-10x^2+10}$$

$$= \frac{4x^2\left(2x-\ln\left(-\frac{e^x-x^2+x^3+2\ln(2)(x-x^2)}{x-2\ln(2)}\right)+1\right)}{5}$$

input
```
int((exp(x)*(12*x^2 - 2*log(2)*(8*x + 20*x^2) + 20*x^3) - 4*log(2)^2*(4*x^
2 + 24*x^3 - 24*x^4) + log(-(exp(x) - x^2 + x^3 + 2*log(2)*(x - x^2))/(x -
 2*log(2)))*(exp(x)*(16*x*log(2) - 8*x^2) - 2*log(2)*(16*x^3 - 16*x^4) + 8
*x^4 - 8*x^5 + 4*log(2)^2*(8*x^2 - 8*x^3)) + 2*log(2)*(8*x^3 + 48*x^4 - 48
*x^5) - 4*x^4 - 24*x^5 + 24*x^6)/(exp(x)*(5*x - 10*log(2)) - 4*log(2)^2*(5
*x - 5*x^2) + 2*log(2)*(10*x^2 - 10*x^3) - 5*x^3 + 5*x^4),x)
```

3.689.

$$\int \frac{4x^4+24x^5-24x^6+(-8x^3-48x^4+48x^5)\log(4)+(4x^2+24x^3-24x^4)\log^2(4)+e^x(-12x^2-20x^3+(8x+20x^2)\log(4))+(-8x^4+8x^5+(16x^3-16x^4)\log}{}$$

output
```
(4*x^2*(2*x - log(-(exp(x) - x^2 + x^3 + 2*log(2)*(x - x^2))/(x - 2*log(2)
)) + 1))/5
```

3.689.

$$\int \frac{4x^4+24x^5-24x^6+\left(-8x^3-48x^4+48x^5\right)\log(4)+\left(4x^2+24x^3-24x^4\right)\log^2(4)+e^x\left(-12x^2-20x^3+\left(8x+20x^2\right)\log(4)\right)+\left(-8x^4+8x^5+\left(16x^3-16x^4\right)\log \cdots}{\cdots}$$

3.690 $\int \frac{248+398x+216x^2+24x^3+(2120+830x+180x^2)\log(x)+(1350+450x)\log^2(x)+375\log^3(x)}{216+216x+72x^2+8x^3+(540+360x+60x^2)\log(x)+(450+150x)\log^2(x)+125\log^3(x)}\,dx$

3.690.1 Optimal result

Integrand size = 91, antiderivative size = 30

$$\int \frac{248+398x+216x^2+24x^3+(2120+830x+180x^2)\log(x)+(1350+450x)\log^2(x)+375\log^3(x)}{216+216x+72x^2+8x^3+(540+360x+60x^2)\log(x)+(450+150x)\log^2(x)+125\log^3(x)}\,dx = \frac{x+x^2\left(3+\frac{4-x}{\left(\frac{2(3+x)}{5}+\log(x)\right)^2}\right)}{x}$$

output
```
(x+x^2*(3+(-x+4)/(6/5+2/5*x+ln(x))^2))/x
```

3.690.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.70

$$\int \frac{248+398x+216x^2+24x^3+(2120+830x+180x^2)\log(x)+(1350+450x)\log^2(x)+375\log^3(x)}{216+216x+72x^2+8x^3+(540+360x+60x^2)\log(x)+(450+150x)\log^2(x)+125\log^3(x)}\,dx = 3x-\frac{25(-4+x)x}{(6+2x+5\log(x))^2}$$

input
```
Integrate[(248 + 398*x + 216*x^2 + 24*x^3 + (2120 + 830*x + 180*x^2)*Log[x
] + (1350 + 450*x)*Log[x]^2 + 375*Log[x]^3)/(216 + 216*x + 72*x^2 + 8*x^3
+ (540 + 360*x + 60*x^2)*Log[x] + (450 + 150*x)*Log[x]^2 + 125*Log[x]^3),x
]
```

output
```
3*x - (25*(-4 + x)*x)/(6 + 2*x + 5*Log[x])^2
```

3.690.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{24x^3+216x^2+\left(180x^2+830x+2120\right)\log(x)+398x+375\log^3(x)+(450x+1350)\log^2(x)+248}{8x^3+72x^2+\left(60x^2+360x+540\right)\log(x)+216x+125\log^3(x)+(150x+450)\log^2(x)+216}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{24x^3+216x^2+\left(180x^2+830x+2120\right)\log(x)+398x+375\log^3(x)+(450x+1350)\log^2(x)+248}{(2x+5\log(x)+6)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{50\left(2x^2-3x-20\right)}{(2x+5\log(x)+6)^3}-\frac{50(x-2)}{(2x+5\log(x)+6)^2}+3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$100\int \frac{x^2}{(2x+5\log(x)+6)^3}dx-1000\int \frac{1}{(2x+5\log(x)+6)^3}dx-150\int \frac{x}{(2x+5\log(x)+6)^3}dx+100\int \frac{1}{(2x+5\log(x)+6)^2}dx-50\int \frac{x}{(2x+5\log(x)+6)^2}dx+3x$$

input
```
Int[(248 + 398*x + 216*x^2 + 24*x^3 + (2120 + 830*x + 180*x^2)*Log[x] + (1
350 + 450*x)*Log[x]^2 + 375*Log[x]^3)/(216 + 216*x + 72*x^2 + 8*x^3 + (540
 + 360*x + 60*x^2)*Log[x] + (450 + 150*x)*Log[x]^2 + 125*Log[x]^3),x]
```

output
```
$Aborted
```

3.690.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.690.4 Maple [A] (verified)

Time = 1.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.73

method	result	size
risch	$3x-\frac{25(x-4)x}{(5\ln(x)+2x+6)^{2}}$	22
default	$\frac{47x^{2}+208x+180x\ln(x)+12x^{3}+75x\ln(x)^{2}+60x^{2}\ln(x)}{(5\ln(x)+2x+6)^{2}}$	46
norman	$\frac{-705\ln(x)-74x-\frac{1175\ln(x)^{2}}{4}-55x\ln(x)+12x^{3}+75x\ln(x)^{2}+60x^{2}\ln(x)-423}{(5\ln(x)+2x+6)^{2}}$	52
parallelrisch	$\frac{5200x+1875x\ln(x)^{2}+4500x\ln(x)+300x^{3}+1175x^{2}+1500x^{2}\ln(x)}{100x^{2}+500x\ln(x)+625\ln(x)^{2}+600x+1500\ln(x)+900}$	63

input
```
int((375*ln(x)^3+(450*x+1350)*ln(x)^2+(180*x^2+830*x+2120)*ln(x)+24*x^3+21
6*x^2+398*x+248)/(125*ln(x)^3+(150*x+450)*ln(x)^2+(60*x^2+360*x+540)*ln(x)
+8*x^3+72*x^2+216*x+216),x,method=_RETURNVERBOSE)
```

output
```
3*x-25*(x-4)*x/(5*ln(x)+2*x+6)^2
```

3.690.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.93

$$\int \frac{248+398x+216x^2+24x^3+(2120+830x+180x^2)\log(x)+(1350+450x)\log^2(x)+375\log^3(x)}{216+216x+72x^2+8x^3+(540+360x+60x^2)\log(x)+(450+150x)\log^2(x)+125\log^3(x)}\,dx = \frac{12\,x^3+75\,x\log\left(x\right)^2+47\,x^2+60\,\left(x^2+3\,x\right)\log\left(x\right)+208\,x}{4\,x^2+20\,\left(x+3\right)\log\left(x\right)+25\,\log\left(x\right)^2+24\,x+36}$$

input
```
integrate((375*log(x)^3+(450*x+1350)*log(x)^2+(180*x^2+830*x+2120)*log(x)+
24*x^3+216*x^2+398*x+248)/(125*log(x)^3+(150*x+450)*log(x)^2+(60*x^2+360*x
+540)*log(x)+8*x^3+72*x^2+216*x+216),x, algorithm=\
```

output
```
(12*x^3 + 75*x*log(x)^2 + 47*x^2 + 60*(x^2 + 3*x)*log(x) + 208*x)/(4*x^2 +
 20*(x + 3)*log(x) + 25*log(x)^2 + 24*x + 36)
```

3.690.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.37

$$\int \frac{248+398x+216x^2+24x^3+(2120+830x+180x^2)\log(x)+(1350+450x)\log^2(x)+375\log^3(x)}{216+216x+72x^2+8x^3+(540+360x+60x^2)\log(x)+(450+150x)\log^2(x)+125\log^3(x)}\,dx = 3x+\frac{-x^2+4x}{\frac{4x^2}{25}+\frac{24x}{25}+\left(\frac{4x}{5}+\frac{12}{5}\right)\log\left(x\right)+\log\left(x\right)^2+\frac{36}{25}}$$

input
```
integrate((375*ln(x)**3+(450*x+1350)*ln(x)**2+(180*x**2+830*x+2120)*ln(x)+
24*x**3+216*x**2+398*x+248)/(125*ln(x)**3+(150*x+450)*ln(x)**2+(60*x**2+36
0*x+540)*ln(x)+8*x**3+72*x**2+216*x+216),x)
```

output
```
3*x + (-x**2 + 4*x)/(4*x**2/25 + 24*x/25 + (4*x/5 + 12/5)*log(x) + log(x)*
*2 + 36/25)
```

3.690.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.93

$$\int \frac{248+398x+216x^2+24x^3+(2120+830x+180x^2)\log(x)+(1350+450x)\log^2(x)+375\log^3(x)}{216+216x+72x^2+8x^3+(540+360x+60x^2)\log(x)+(450+150x)\log^2(x)+125\log^3(x)}\,dx$$
$$= \frac{12\,x^3+75\,x\log(x)^2+47\,x^2+60\,(x^2+3\,x)\log(x)+208\,x}{4\,x^2+20\,(x+3)\log(x)+25\,\log(x)^2+24\,x+36}$$

input
```
integrate((375*log(x)^3+(450*x+1350)*log(x)^2+(180*x^2+830*x+2120)*log(x)+
24*x^3+216*x^2+398*x+248)/(125*log(x)^3+(150*x+450)*log(x)^2+(60*x^2+360*x
+540)*log(x)+8*x^3+72*x^2+216*x+216),x, algorithm=\
```

output
```
(12*x^3 + 75*x*log(x)^2 + 47*x^2 + 60*(x^2 + 3*x)*log(x) + 208*x)/(4*x^2 +
 20*(x + 3)*log(x) + 25*log(x)^2 + 24*x + 36)
```

3.690.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(31) = 62.

Time = 0.28 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.20

$$\int \frac{248+398x+216x^2+24x^3+(2120+830x+180x^2)\log(x)+(1350+450x)\log^2(x)+375\log^3(x)}{216+216x+72x^2+8x^3+(540+360x+60x^2)\log(x)+(450+150x)\log^2(x)+125\log^3(x)}\,dx$$
$$= 3\,x - \frac{25\,(2\,x^3-3\,x^2-20\,x)}{8\,x^3+40\,x^2\log(x)+50\,x\log(x)^2+68\,x^2+220\,x\log(x)+125\,\log(x)^2+192\,x+300\,\log(x)+180}$$

input
```
integrate((375*log(x)^3+(450*x+1350)*log(x)^2+(180*x^2+830*x+2120)*log(x)+
24*x^3+216*x^2+398*x+248)/(125*log(x)^3+(150*x+450)*log(x)^2+(60*x^2+360*x
+540)*log(x)+8*x^3+72*x^2+216*x+216),x, algorithm=\
```

output
```
3*x - 25*(2*x^3 - 3*x^2 - 20*x)/(8*x^3 + 40*x^2*log(x) + 50*x*log(x)^2 + 6
8*x^2 + 220*x*log(x) + 125*log(x)^2 + 192*x + 300*log(x) + 180)
```

3.690.9 Mupad [B] (verification not implemented)

Time = 13.59 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.27

$$\int \frac{248+398x+216x^2+24x^3+(2120+830x+180x^2)\log(x)+(1350+450x)\log^2(x)+375\log^3(x)}{216+216x+72x^2+8x^3+(540+360x+60x^2)\log(x)+(450+150x)\log^2(x)+125\log^3(x)}\,dx = \frac{x\left(12\,x^2+60\,x\,\ln(x)+47\,x+75\ln(x)^2+180\,\ln(x)+208\right)}{\left(2\,x+5\,\ln(x)+6\right)^2}$$

input
```
int((398*x + 375*log(x)^3 + log(x)*(830*x + 180*x^2 + 2120) + 216*x^2 + 24
*x^3 + log(x)^2*(450*x + 1350) + 248)/(216*x + 125*log(x)^3 + log(x)*(360*
x + 60*x^2 + 540) + 72*x^2 + 8*x^3 + log(x)^2*(150*x + 450) + 216),x)
```

output
```
(x*(47*x + 180*log(x) + 75*log(x)^2 + 60*x*log(x) + 12*x^2 + 208))/(2*x +
5*log(x) + 6)^2
```

3.691 $\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}\left(2x-4x^3\right)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx$

3.691.1 Optimal result

Integrand size = 84, antiderivative size = 27

$$\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}\left(2x-4x^3\right)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx=-2+e^{2e^5+\frac{x^2}{e^{2x^2}-x}}$$

output
```
exp(2*exp(5)+x^2/(exp(x^2)^2-x))-2
```

3.691.2 Mathematica [A] (verified)

Time = 1.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}\left(2x-4x^3\right)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx=e^{2e^5+\frac{x^2}{e^{2x^2}-x}}$$

input
```
Integrate[(E^((2*E^(5 + 2*x^2) - 2*E^5*x + x^2)/(E^(2*x^2) - x))*(-x^2 + E
^(2*x^2)*(2*x - 4*x^3)))/(E^(4*x^2) - 2*E^(2*x^2)*x + x^2),x]
```

output
```
E^(2*E^5 + x^2/(E^(2*x^2) - x))
```

3.691. $\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}\left(2x-4x^3\right)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx$

3.691.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{x^2+2e^{2x^2+5}-2e^5x}{e^{2x^2}-x}}\left(e^{2x^2}\left(2x-4x^3\right)-x^2\right)}{x^2-2e^{2x^2}x+e^{4x^2}}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{\frac{x^2+2e^{2x^2+5}-2e^5x}{e^{2x^2}-x}}\left(e^{2x^2}\left(2x-4x^3\right)-x^2\right)}{\left(e^{2x^2}-x\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{e^{\frac{x^2+2e^{2x^2+5}-2e^5x}{e^{2x^2}-x}}\left(4x^2-1\right)x^2}{\left(e^{2x^2}-x\right)^2}-\frac{2e^{\frac{x^2+2e^{2x^2+5}-2e^5x}{e^{2x^2}-x}}\left(2x^2-1\right)x}{e^{2x^2}-x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2\int \frac{e^{\frac{x^2-2e^5x+2e^{2x^2+5}}{e^{2x^2}-x}}x}{e^{2x^2}-x}dx+\int \frac{e^{\frac{x^2-2e^5x+2e^{2x^2+5}}{e^{2x^2}-x}}x^2}{\left(e^{2x^2}-x\right)^2}dx-4\int \frac{e^{\frac{x^2-2e^5x+2e^{2x^2+5}}{e^{2x^2}-x}}x^4}{\left(e^{2x^2}-x\right)^2}dx-4\int \frac{e^{\frac{x^2-2e^5x+2e^{2x^2+5}}{e^{2x^2}-x}}x^3}{e^{2x^2}-x}dx$$

input
```
Int[(E^((2*E^(5 + 2*x^2) - 2*E^5*x + x^2)/(E^(2*x^2) - x))*(-x^2 + E^(2*x^
2)*(2*x - 4*x^3)))/(E^(4*x^2) - 2*E^(2*x^2)*x + x^2),x]
```

output
```
$Aborted
```

3.691.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.691. $\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}(2x-4x^3)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.691.4 Maple [A] (verified)

Time = 1.55 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

method	result	size
parallelrisch	$\mathrm{e}^{\frac{2\,\mathrm{e}^{5}\mathrm{e}^{2x^{2}}-2x\,\mathrm{e}^{5}+x^{2}}{\mathrm{e}^{2x^{2}}-x}}$	34
risch	$\mathrm{e}^{\frac{-2\,\mathrm{e}^{2x^{2}+5}+2x\,\mathrm{e}^{5}-x^{2}}{-\mathrm{e}^{2x^{2}}+x}}$	36

input
```
int(((-4*x^3+2*x)*exp(x^2)^2-x^2)*exp((2*exp(5)*exp(x^2)^2-2*x*exp(5)+x^2)
/(exp(x^2)^2-x))/(exp(x^2)^4-2*x*exp(x^2)^2+x^2),x,method=_RETURNVERBOSE)
```

output
```
exp((2*exp(5)*exp(x^2)^2-2*x*exp(5)+x^2)/(exp(x^2)^2-x))
```

3.691.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56

$$\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}(2x-4x^3)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx=e^{\left(-\frac{x^2e^5-2\,xe^{10}+2\,e^{\left(2\,x^2+10\right)}}{xe^5-e^{\left(2\,x^2+5\right)}}\right)}$$

input
```
integrate(((-4*x^3+2*x)*exp(x^2)^2-x^2)*exp((2*exp(5)*exp(x^2)^2-2*x*exp(5
)+x^2)/(exp(x^2)^2-x))/(exp(x^2)^4-2*x*exp(x^2)^2+x^2),x, algorithm=\
```

output
```
e^(-(x^2*e^5 - 2*x*e^10 + 2*e^(2*x^2 + 10))/(x*e^5 - e^(2*x^2 + 5)))
```

3.691.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}(2x-4x^3)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx = e^{\frac{x^2-2xe^5+2e^5e^{2x^2}}{-x+e^{2x^2}}}$$

input
```
integrate(((-4*x**3+2*x)*exp(x**2)**2-x**2)*exp((2*exp(5)*exp(x**2)**2-2*x
*exp(5)+x**2)/(exp(x**2)**2-x))/(exp(x**2)**4-2*x*exp(x**2)**2+x**2),x)
```

output
```
exp((x**2 - 2*x*exp(5) + 2*exp(5)*exp(2*x**2))/(-x + exp(2*x**2)))
```

3.691.7 Maxima [F]

$$\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}(2x-4x^3)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx$$
$$= \int -\frac{\left(x^2+2\,(2\,x^3-x)e^{(2\,x^2)}\right)e^{\left(-\frac{x^2-2\,xe^5+2\,e^{(2\,x^2+5)}}{x-e^{(2\,x^2)}}\right)}}{x^2-2\,xe^{(2\,x^2)}+e^{(4\,x^2)}}\,dx$$

input
```
integrate(((-4*x^3+2*x)*exp(x^2)^2-x^2)*exp((2*exp(5)*exp(x^2)^2-2*x*exp(5
)+x^2)/(exp(x^2)^2-x))/(exp(x^2)^4-2*x*exp(x^2)^2+x^2),x, algorithm=\
```

output
```
-integrate((x^2 + 2*(2*x^3 - x)*e^(2*x^2))*e^(-(x^2 - 2*x*e^5 + 2*e^(2*x^2
 + 5))/(x - e^(2*x^2)))/(x^2 - 2*x*e^(2*x^2) + e^(4*x^2)), x)
```

3.691.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(25) = 50.

Time = 0.41 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.15

$$\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}(2x-4x^3)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx = e^{\left(-\frac{x^2}{x-e^{(2\,x^2)}}+\frac{2\,xe^5}{x-e^{(2\,x^2)}}-\frac{2\,e^{(2\,x^2+5)}}{x-e^{(2\,x^2)}}\right)}$$

3.691. $\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}(2x-4x^3)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx$

input
```
integrate((((-4*x^3+2*x)*exp(x^2)^2-x^2)*exp((2*exp(5)*exp(x^2)^2-2*x*exp(5
)+x^2)/(exp(x^2)^2-x))/(exp(x^2)^4-2*x*exp(x^2)^2+x^2),x, algorithm=\
```

output
```
e^(-x^2/(x - e^(2*x^2)) + 2*x*e^5/(x - e^(2*x^2)) - 2*e^(2*x^2 + 5)/(x - e
^(2*x^2)))
```

3.691.9 Mupad [B] (verification not implemented)

Time = 13.57 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.22

$$\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}(2x-4x^3)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx = \mathrm{e}^{-\frac{x^2}{x-\mathrm{e}^{2\,x^2}}}\,\mathrm{e}^{\frac{2\,x\,\mathrm{e}^5}{x-\mathrm{e}^{2\,x^2}}}\,\mathrm{e}^{-\frac{2\,\mathrm{e}^5\,\mathrm{e}^{2\,x^2}}{x-\mathrm{e}^{2\,x^2}}}$$

input
```
int((exp(-(2*exp(5)*exp(2*x^2) - 2*x*exp(5) + x^2)/(x - exp(2*x^2)))*(exp(
2*x^2)*(2*x - 4*x^3) - x^2))/(exp(4*x^2) - 2*x*exp(2*x^2) + x^2),x)
```

output
```
exp(-x^2/(x - exp(2*x^2)))*exp((2*x*exp(5))/(x - exp(2*x^2)))*exp(-(2*exp(
5)*exp(2*x^2))/(x - exp(2*x^2)))
```

3.691. $\int \frac{e^{\frac{2e^{5+2x^2}-2e^5x+x^2}{e^{2x^2}-x}}\left(-x^2+e^{2x^2}(2x-4x^3)\right)}{e^{4x^2}-2e^{2x^2}x+x^2}\,dx$

3.692 $\int \frac{1}{64}e^{20+\frac{1}{256}e^{20+4x+4x^{12x}}+4x+4x^{12x}}(1+x^{12x}(12+12\log(x)$

3.692.1 Optimal result

Integrand size = 50, antiderivative size = 20

$$\int \frac{1}{64}e^{20+\frac{1}{256}e^{20+4x+4x^{12x}}+4x+4x^{12x}}\left(1+x^{12x}(12+12\log(x))\right)\,dx=e^{\frac{1}{256}e^{20+4x+4x^{12x}}}$$

output
```
exp(1/256*exp(exp(12*x*ln(x))+5+x)^4)
```

3.692.2 Mathematica [A] (verified)

Time = 0.61 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{1}{64}e^{20+\frac{1}{256}e^{20+4x+4x^{12x}}+4x+4x^{12x}}\left(1+x^{12x}(12+12\log(x))\right)\,dx=e^{\frac{1}{256}e^{20+4x+4x^{12x}}}$$

input
```
Integrate[(E^(20 + E^(20 + 4*x + 4*x^(12*x))/256 + 4*x + 4*x^(12*x))*(1 +
x^(12*x)*(12 + 12*Log[x])))/64,x]
```

output
```
E^(E^(20 + 4*x + 4*x^(12*x))/256)
```

3.692.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{64} \exp \left(4x^{12x} + \frac{1}{256} e^{4x^{12x}+4x+20} + 4x + 20\right) \left(x^{12x}(12 \log(x) + 12) + 1\right) \, dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{64} \int \exp \left(4x^{12x} + 4x + \frac{1}{256} e^{4x^{12x}+4x+20} + 20\right) \left(12(\log(x) + 1)x^{12x} + 1\right) dx$$

$$\Big\downarrow \text{ 7292}$$

$$\frac{1}{64} \int \exp \left(\frac{1}{256} \left(1024x^{12x} + 1024x + e^{4x^{12x}+4x+20} + 5120\right)\right) \left(12(\log(x) + 1)x^{12x} + 1\right) dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{64} \int \left(12 \exp \left(\frac{1}{256} \left(1024x^{12x} + 1024x + e^{4x^{12x}+4x+20} + 5120\right)\right) (\log(x) + 1)x^{12x} + \exp \left(\frac{1}{256} \left(1024x^{12x} + 1024x\right.\right.\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{64} \left(\int \exp \left(\frac{1}{256} \left(1024x^{12x} + 1024x + e^{4x^{12x}+4x+20} + 5120\right)\right) dx + 12 \int \exp \left(\frac{1}{256} \left(1024x^{12x} + 1024x + e^{4x^{12x}+4\right.\right.\right.$$

input
```
Int[(E^(20 + E^(20 + 4*x + 4*x^(12*x))/256 + 4*x + 4*x^(12*x))*(1 + x^(12*
x)*(12 + 12*Log[x])))/64,x]
```

output
```
$Aborted
```

3.692.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.692.4 Maple [A] (verified)

Time = 2.44 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result	size
derivativedivides	$e^{\frac{e^{4 e^{12 x \ln(x)}+20+4 x}}{256}}$	16
default	$e^{\frac{e^{4 e^{12 x \ln(x)}+20+4 x}}{256}}$	16
parallelrisch	$e^{\frac{e^{4 e^{12 x \ln(x)}+20+4 x}}{256}}$	16
risch	$e^{\frac{e^{4 x^{12 x}+20+4 x}}{256}}$	17

input
```
int(1/64*((12*ln(x)+12)*exp(12*x*ln(x))+1)*exp(exp(12*x*ln(x))+5+x)^4*exp(
1/256*exp(exp(12*x*ln(x))+5+x)^4),x,method=_RETURNVERBOSE)
```

output
```
exp(1/256*exp(exp(12*x*ln(x))+5+x)^4)
```

3.692.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{1}{64} e^{20+\frac{1}{256} e^{20+4 x+4 x^{12 x}}+4 x+4 x^{12 x}} \left(1+x^{12 x} (12+12 \log(x))\right) \, dx = e^{\left(\frac{1}{256} e^{\left(4 x+4 x^{12 x}+20\right)}\right)}$$

input
```
integrate(1/64*((12*log(x)+12)*exp(12*x*log(x))+1)*exp(exp(12*x*log(x))+5+
x)^4*exp(1/256*exp(exp(12*x*log(x))+5+x)^4),x, algorithm=\
```

output
```
e^(1/256*e^(4*x + 4*x^(12*x) + 20))
```

3.692.6 Sympy [A] (verification not implemented)

Time = 3.35 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{1}{64}e^{20+\frac{1}{256}e^{20+4x+4x^{12x}}+4x+4x^{12x}}\left(1+x^{12x}(12+12\log(x))\right)\,dx=e^{\frac{e^{4x+4e^{12x\log(x)}+20}}{256}}$$

input
```
integrate(1/64*((12*ln(x)+12)*exp(12*x*ln(x))+1)*exp(exp(12*x*ln(x))+5+x)*
*4*exp(1/256*exp(exp(12*x*ln(x))+5+x)**4),x)
```

output
```
exp(exp(4*x + 4*exp(12*x*log(x)) + 20)/256)
```

3.692.7 Maxima [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{1}{64}e^{20+\frac{1}{256}e^{20+4x+4x^{12x}}+4x+4x^{12x}}\left(1+x^{12x}(12+12\log(x))\right)\,dx=e^{\left(\frac{1}{256}e^{\left(4x+4x^{12x}+20\right)}\right)}$$

input
```
integrate(1/64*((12*log(x)+12)*exp(12*x*log(x))+1)*exp(exp(12*x*log(x))+5+
x)^4*exp(1/256*exp(exp(12*x*log(x))+5+x)^4),x, algorithm=\
```

output
```
e^(1/256*e^(4*x + 4*x^(12*x) + 20))
```

3.692.8 Giac [F]

$$\int \frac{1}{64}e^{20+\frac{1}{256}e^{20+4x+4x^{12x}}+4x+4x^{12x}}\left(1+x^{12x}(12+12\log(x))\right)\,dx$$
$$=\int \frac{1}{64}\left(12x^{12x}(\log(x)+1)+1\right)e^{\left(4x^{12x}+4x+\frac{1}{256}e^{\left(4x+4x^{12x}+20\right)}+20\right)}\,dx$$

input
```
integrate(1/64*((12*log(x)+12)*exp(12*x*log(x))+1)*exp(exp(12*x*log(x))+5+
x)^4*exp(1/256*exp(exp(12*x*log(x))+5+x)^4),x, algorithm=\
```

output
```
integrate(1/64*(12*x^(12*x)*(log(x) + 1) + 1)*e^(4*x^(12*x) + 4*x + 1/256*
e^(4*x + 4*x^(12*x) + 20) + 20), x)
```

3.692.9 Mupad [B] (verification not implemented)

Time = 14.71 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{1}{64} e^{20+\frac{1}{256} e^{20+4x+4x^{12x}}+4x+4x^{12x}} \left(1+x^{12x}(12+12\log(x))\right) \, dx = \mathrm{e}^{\frac{\mathrm{e}^{4\,x}\,\mathrm{e}^{20}\,\mathrm{e}^{4\,x^{12\,x}}}{256}}$$

input
```
int((exp(4*x + 4*exp(12*x*log(x)) + 20)*exp(exp(4*x + 4*exp(12*x*log(x)) +
 20)/256)*(exp(12*x*log(x))*(12*log(x) + 12) + 1))/64,x)
```

output
```
exp((exp(4*x)*exp(20)*exp(4*x^(12*x)))/256)
```

3.693 $\int \frac{6x-e^5x+6x^2-5x^3-2x^4-x\log\left(\frac{1}{x^2}\right)+\left(6+2x+e^5(3+x)+(3+x)\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{3x^2+x^3}\,dx$

3.693.1 Optimal result

Integrand size = 73, antiderivative size = 34

$$\int \frac{6x-e^5x+6x^2-5x^3-2x^4-x\log\left(\frac{1}{x^2}\right)+\left(6+2x+e^5(3+x)+(3+x)\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{3x^2+x^3}\,dx$$
$$=1-x^2+\frac{\left(-e^5+x-\log\left(\frac{1}{x^2}\right)\right)\left(x+\log\left(\frac{3+x}{2}\right)\right)}{x}$$

output
```
1+(ln(3/2+1/2*x)+x)*(x-exp(5)-ln(1/x^2))/x-x^2
```

3.693.2 Mathematica [A] (verified)

Time = 0.53 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06

$$\int \frac{6x-e^5x+6x^2-5x^3-2x^4-x\log\left(\frac{1}{x^2}\right)+\left(6+2x+e^5(3+x)+(3+x)\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{3x^2+x^3}\,dx$$
$$=x-x^2+2\log(x)-\frac{\left(e^5+\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{x}+\log(3+x)$$

input
```
Integrate[(6*x - E^5*x + 6*x^2 - 5*x^3 - 2*x^4 - x*Log[x^(-2)] + (6 + 2*x
+ E^5*(3 + x) + (3 + x)*Log[x^(-2)])*Log[(3 + x)/2])/(3*x^2 + x^3),x]
```

output
```
x - x^2 + 2*Log[x] - ((E^5 + Log[x^(-2)])*Log[(3 + x)/2])/x + Log[3 + x]
```

3.693.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.82 (sec) , antiderivative size = 172, normalized size of antiderivative = 5.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.055, Rules used = {6, 2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^4-5x^3+6x^2-x\log\left(\frac{1}{x^2}\right)+\left((x+3)\log\left(\frac{1}{x^2}\right)+2x+e^5(x+3)+6\right)\log\left(\frac{x+3}{2}\right)-e^5x+6x}{x^3+3x^2}dx$$

$$\Big\downarrow \text{6}$$

$$\int \frac{-2x^4-5x^3+6x^2-x\log\left(\frac{1}{x^2}\right)+\left((x+3)\log\left(\frac{1}{x^2}\right)+2x+e^5(x+3)+6\right)\log\left(\frac{x+3}{2}\right)+\left(6-e^5\right)x}{x^3+3x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-2x^4-5x^3+6x^2-x\log\left(\frac{1}{x^2}\right)+\left((x+3)\log\left(\frac{1}{x^2}\right)+2x+e^5(x+3)+6\right)\log\left(\frac{x+3}{2}\right)+\left(6-e^5\right)x}{x^2(x+3)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{\log\left(\frac{x}{2}+\frac{3}{2}\right)\left(\log\left(\frac{1}{x^2}\right)+2\left(1+\frac{e^5}{2}\right)\right)}{x^2}+\frac{-2x^3-5x^2-\log\left(\frac{1}{x^2}\right)+6x+6\left(1-\frac{e^5}{6}\right)}{x(x+3)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2\,\text{PolyLog}\left(2,-\frac{3}{x}\right)}{3}+\frac{2\,\text{PolyLog}\left(2,-\frac{x}{3}\right)}{3}-x^2+\frac{1}{3}\log\left(\frac{3}{x}+1\right)\log\left(\frac{1}{x^2}\right)+\frac{1}{3}\left(\log\left(\frac{1}{x^2}\right)+e^5+2\right)\log(x)-\frac{1}{3}\left(\log\left(\frac{1}{x^2}\right)+e^5+2\right)\log(x+3)-\frac{\log\left(\frac{x}{2}+\frac{3}{2}\right)\left(\log\left(\frac{1}{x^2}\right)+e^5+2\right)}{x}+x+\frac{\log^2(x)}{3}-\frac{2}{3}\log(3)\log(x)+\frac{1}{3}\left(6-e^5\right)\log(x)-\frac{2\log(x)}{3}+\frac{1}{3}\left(3+e^5\right)\log(x+3)+\frac{2}{3}\log(x+3)+\frac{2\log\left(\frac{x}{2}+\frac{3}{2}\right)}{x}$$

input
```
Int[(6*x - E^5*x + 6*x^2 - 5*x^3 - 2*x^4 - x*Log[x^(-2)] + (6 + 2*x + E^5*
(3 + x) + (3 + x)*Log[x^(-2)])*Log[(3 + x)/2])/(3*x^2 + x^3),x]
```

output
```
x - x^2 + (2*Log[3/2 + x/2])/x + (Log[1 + 3/x]*Log[x^(-2)])/3 - (Log[3/2 +
 x/2]*(2 + E^5 + Log[x^(-2)]))/x - (2*Log[x])/3 + ((6 - E^5)*Log[x])/3 - (
2*Log[3]*Log[x])/3 + ((2 + E^5 + Log[x^(-2)])*Log[x])/3 + Log[x]^2/3 + (2*
Log[3 + x])/3 + ((3 + E^5)*Log[3 + x])/3 - ((2 + E^5 + Log[x^(-2)])*Log[3
+ x])/3 + (2*PolyLog[2, -3/x])/3 + (2*PolyLog[2, -1/3*x])/3
```

3.693.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.693.4 Maple [A] (verified)

Time = 2.94 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.71

method	result
parallelrisch	$-\frac{2x^3+2\ln\left(\frac{3}{2}+\frac{x}{2}\right)e^5-2x^2+2x\ln\left(\frac{1}{x^2}\right)-2\ln\left(\frac{3}{2}+\frac{x}{2}\right)x+2\ln\left(\frac{1}{x^2}\right)\ln\left(\frac{3}{2}+\frac{x}{2}\right)-6x}{2x}$
risch	$-\frac{\left(i\pi\,\mathrm{csgn}(ix)^2\,\mathrm{csgn}(ix^2)-2i\pi\,\mathrm{csgn}(ix)\,\mathrm{csgn}(ix^2)^2+i\pi\,\mathrm{csgn}(ix^2)^3+2\,e^5-4\ln(x)\right)\ln\left(\frac{3}{2}+\frac{x}{2}\right)}{2x}+2\ln(x)+\ln(3+x)$

input
```
int((((3+x)*ln(1/x^2)+(3+x)*exp(5)+2*x+6)*ln(3/2+1/2*x)-x*ln(1/x^2)-x*exp(
5)-2*x^4-5*x^3+6*x^2+6*x)/(x^3+3*x^2),x,method=_RETURNVERBOSE)
```

output
```
-1/2*(2*x^3+2*ln(3/2+1/2*x)*exp(5)-2*x^2+2*x*ln(1/x^2)-2*ln(3/2+1/2*x)*x+2
*ln(1/x^2)*ln(3/2+1/2*x)-6*x)/x
```

3.693.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.18

$$\int \frac{6x-e^5x+6x^2-5x^3-2x^4-x\log\left(\frac{1}{x^2}\right)+\left(6+2x+e^5(3+x)+(3+x)\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{3x^2+x^3}\,dx$$
$$= -\frac{x^3-x^2-\left(x-e^5-\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{1}{2}\,x+\frac{3}{2}\right)+x\log\left(\frac{1}{x^2}\right)}{x}$$

input
```
integrate(((((3+x)*log(1/x^2)+(3+x)*exp(5)+2*x+6)*log(3/2+1/2*x)-x*log(1/x^
2)-x*exp(5)-2*x^4-5*x^3+6*x^2+6*x)/(x^3+3*x^2),x, algorithm=\
```

output
```
-(x^3 - x^2 - (x - e^5 - log(x^(-2)))*log(1/2*x + 3/2) + x*log(x^(-2)))/x
```

3.693.6 Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06

$$\int \frac{6x-e^5x+6x^2-5x^3-2x^4-x\log\left(\frac{1}{x^2}\right)+\left(6+2x+e^5(3+x)+(3+x)\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{3x^2+x^3}\,dx$$
$$= -x^2+x+2\log(x)+\log(x+3)+\frac{\left(-\log\left(\frac{1}{x^2}\right)-e^5\right)\log\left(\frac{x}{2}+\frac{3}{2}\right)}{x}$$

input
```
integrate(((((3+x)*ln(1/x**2)+(3+x)*exp(5)+2*x+6)*ln(3/2+1/2*x)-x*ln(1/x**2
)-x*exp(5)-2*x**4-5*x**3+6*x**2+6*x)/(x**3+3*x**2),x)
```

output
```
-x**2 + x + 2*log(x) + log(x + 3) + (-log(x**(-2)) - exp(5))*log(x/2 + 3/2
)/x
```

3.693.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.35

$$\int \frac{6x-e^5x+6x^2-5x^3-2x^4-x\log\left(\frac{1}{x^2}\right)+\left(6+2x+e^5(3+x)+(3+x)\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{3x^2+x^3}\,dx$$
$$= -\frac{x^3-x^2-e^5\log(2)-\left(x-e^5+2\,\log(x)\right)\log(x+3)-2\,(x-\log(2))\log(x)}{x}$$

input
```
integrate((((3+x)*log(1/x^2)+(3+x)*exp(5)+2*x+6)*log(3/2+1/2*x)-x*log(1/x^
2)-x*exp(5)-2*x^4-5*x^3+6*x^2+6*x)/(x^3+3*x^2),x, algorithm=\
```

output
```
-(x^3 - x^2 - e^5*log(2) - (x - e^5 + 2*log(x))*log(x + 3) - 2*(x - log(2)
)*log(x))/x
```

3.693.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.53

$$\int \frac{6x-e^5x+6x^2-5x^3-2x^4-x\log\left(\frac{1}{x^2}\right)+\left(6+2x+e^5(3+x)+(3+x)\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{3x^2+x^3}\,dx$$
$$= -\frac{x^3-x^2+\log(2)\log(x^2)-x\log(x+3)-\log(x^2)\log(x+3)-2\,x\log(x)+e^5\log\left(\frac{1}{2}\,x+\frac{3}{2}\right)}{x}$$

input
```
integrate((((3+x)*log(1/x^2)+(3+x)*exp(5)+2*x+6)*log(3/2+1/2*x)-x*log(1/x^
2)-x*exp(5)-2*x^4-5*x^3+6*x^2+6*x)/(x^3+3*x^2),x, algorithm=\
```

output
```
-(x^3 - x^2 + log(2)*log(x^2) - x*log(x + 3) - log(x^2)*log(x + 3) - 2*x*l
og(x) + e^5*log(1/2*x + 3/2))/x
```

3.693.9 Mupad [B] (verification not implemented)

Time = 14.22 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.26

$$\int \frac{6x-e^5x+6x^2-5x^3-2x^4-x\log\left(\frac{1}{x^2}\right)+\left(6+2x+e^5(3+x)+(3+x)\log\left(\frac{1}{x^2}\right)\right)\log\left(\frac{3+x}{2}\right)}{3x^2+x^3}\,dx$$
$$= x+\ln(x+3)+2\,\ln(x)-x^2-\frac{\ln\left(\frac{1}{x^2}\right)\,\ln\left(\frac{x}{2}+\frac{3}{2}\right)}{x}-\frac{e^5\,\ln\left(\frac{x}{2}+\frac{3}{2}\right)}{x}$$

input
```
int(-(x*log(1/x^2) - 6*x + x*exp(5) - log(x/2 + 3/2)*(2*x + log(1/x^2)*(x
+ 3) + exp(5)*(x + 3) + 6) - 6*x^2 + 5*x^3 + 2*x^4)/(3*x^2 + x^3),x)
```

output
```
x + log(x + 3) + 2*log(x) - x^2 - (log(1/x^2)*log(x/2 + 3/2))/x - (exp(5)*
log(x/2 + 3/2))/x
```

3.694 $\int \frac{e^{-e^2}(-16+81x^2)}{64x^2} dx$

3.694.1 Optimal result

Integrand size = 21, antiderivative size = 26

$$\int \frac{e^{-e^2}(-16+81x^2)}{64x^2} dx = \frac{1}{4}\left(5+\frac{e^{-e^2}\left(-1+\frac{9x}{4}\right)^2}{x}\right)$$

output
```
5/4+1/4*(9/4*x-1)^2/x/exp(exp(2))
```

3.694.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{e^{-e^2}(-16+81x^2)}{64x^2} dx = \frac{1}{64}e^{-e^2}\left(\frac{16}{x}+81x\right)$$

input
```
Integrate[(-16 + 81*x^2)/(64*E^E^2*x^2),x]
```

output
```
(16/x + 81*x)/(64*E^E^2)
```

3.694.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {27, 25, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-e^2}(81x^2-16)}{64x^2}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{64}e^{-e^2}\int -\frac{16-81x^2}{x^2}dx$$
$$\Big\downarrow \text{25}$$
$$-\frac{1}{64}e^{-e^2}\int \frac{16-81x^2}{x^2}dx$$
$$\Big\downarrow \text{244}$$
$$-\frac{1}{64}e^{-e^2}\int \left(\frac{16}{x^2}-81\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{1}{64}e^{-e^2}\left(-81x-\frac{16}{x}\right)$$

input
```
Int[(-16 + 81*x^2)/(64*E^E^2*x^2),x]
```

output
```
-1/64*(-16/x - 81*x)/E^E^2
```

3.694.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.694.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

method	result	size
default	$\frac{e^{-e^2}\left(81x+\frac{16}{x}\right)}{64}$	17
gosper	$\frac{e^{-e^2}\left(81x^2+16\right)}{64x}$	18
parallelrisch	$\frac{e^{-e^2}\left(81x^2+16\right)}{64x}$	18
risch	$\frac{81x\,e^{-e^2}}{64}+\frac{e^{-e^2}}{4x}$	20
norman	$\frac{\frac{e^{-e^2}}{4}+\frac{81\,e^{-e^2}x^2}{64}}{x}$	23

input
```
int(1/64*(81*x^2-16)/x^2/exp(exp(2)),x,method=_RETURNVERBOSE)
```

output
```
1/64/exp(exp(2))*(81*x+16/x)
```

3.694.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

$$\int \frac{e^{-e^2}(-16+81x^2)}{64x^2}\,dx=\frac{(81\,x^2+16)e^{(-e^2)}}{64\,x}$$

input
```
integrate(1/64*(81*x^2-16)/x^2/exp(exp(2)),x, algorithm=\
```

output
```
1/64*(81*x^2 + 16)*e^(-e^2)/x
```

3.694.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.46

$$\int \frac{e^{-e^2}(-16+81x^2)}{64x^2}\,dx = \frac{81x+\frac{16}{x}}{64e^{e^2}}$$

input
```
integrate(1/64*(81*x**2-16)/x**2/exp(exp(2)),x)
```

output
```
(81*x + 16/x)*exp(-exp(2))/64
```

3.694.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{e^{-e^2}(-16+81x^2)}{64x^2}\,dx = \frac{1}{64}\left(81\,x+\frac{16}{x}\right)e^{(-e^2)}$$

input
```
integrate(1/64*(81*x^2-16)/x^2/exp(exp(2)),x, algorithm=\
```

output
```
1/64*(81*x + 16/x)*e^(-e^2)
```

3.694.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{e^{-e^2}(-16+81x^2)}{64x^2}\,dx = \frac{1}{64}\left(81\,x+\frac{16}{x}\right)e^{(-e^2)}$$

input
```
integrate(1/64*(81*x^2-16)/x^2/exp(exp(2)),x, algorithm=\
```

output
```
1/64*(81*x + 16/x)*e^(-e^2)
```

3.694.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

$$\int \frac{e^{-e^2}(-16+81x^2)}{64x^2}\,dx = \frac{e^{-e^2}\,(81\,x^2+16)}{64\,x}$$

input
```
int((exp(-exp(2))*((81*x^2)/64 - 1/4))/x^2,x)
```

output
```
(exp(-exp(2))*(81*x^2 + 16))/(64*x)
```

3.695 $\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}(5x^2+4\log(x)-2\log^3(x))+e^{26+5x^2+4\log^2(}}{4x}$

3.695.1 Optimal result

Integrand size = 84, antiderivative size = 32

$$\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(\right.}{4x}$$
$$=\frac{1}{16}\left(4-e^{5(6+x^2)-(2-\log^2(x))^2}\right)^2$$

output
```
1/4*(4-exp(5*x^2+30-(2-ln(x)^2)^2))*(1-1/4*exp(5*x^2+30-(2-ln(x)^2)^2))
```

3.695.2 Mathematica [A] (verified)

Time = 2.70 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.53

$$\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(\right.}{4x}$$
$$=\frac{1}{16}e^{-2\log^4(x)}\left(e^{52+10x^2+8\log^2(x)}-8e^{26+5x^2+4\log^2(x)+\log^4(x)}\right)$$

input
```
Integrate[(E^(52 + 10*x^2 + 8*Log[x]^2 - 2*Log[x]^4)*(5*x^2 + 4*Log[x] - 2
*Log[x]^3) + E^(26 + 5*x^2 + 4*Log[x]^2 - Log[x]^4)*(-20*x^2 - 16*Log[x] +
 8*Log[x]^3))/(4*x),x]
```

output
```
(E^(52 + 10*x^2 + 8*Log[x]^2) - 8*E^(26 + 5*x^2 + 4*Log[x]^2 + Log[x]^4))/
(16*E^(2*Log[x]^4))
```

3.695.3 Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.72, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.036, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{10x^2-2\log^4(x)+8\log^2(x)+52}\left(5x^2-2\log^3(x)+4\log(x)\right)+e^{5x^2-\log^4(x)+4\log^2(x)+26}\left(-20x^2+8\log^3(x)-16\log(x)\right)}{4x}$$

$$\Big\downarrow \ 27$$

$$\frac{1}{4}\int \frac{e^{-2\log^4(x)+8\log^2(x)+10x^2+52}\left(-2\log^3(x)+4\log(x)+5x^2\right)-4e^{-\log^4(x)+4\log^2(x)+5x^2+26}\left(-2\log^3(x)+4\log(x)+\right.}{x}$$

$$\Big\downarrow \ 2010$$

$$\frac{1}{4}\int \left(\frac{e^{2\left(-\log^4(x)+4\log^2(x)+5x^2+26\right)}\left(-2\log^3(x)+4\log(x)+5x^2\right)}{x}-\frac{4e^{-\log^4(x)+4\log^2(x)+5x^2+26}\left(-2\log^3(x)+4\log(x\right.}{x}\right.$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{4}\left(\frac{1}{4}e^{2\left(5x^2-\log^4(x)+4\log^2(x)+26\right)}-2e^{5x^2-\log^4(x)+4\log^2(x)+26}\right)$$

input
```
Int[(E^(52 + 10*x^2 + 8*Log[x]^2 - 2*Log[x]^4)*(5*x^2 + 4*Log[x] - 2*Log[x
]^3) + E^(26 + 5*x^2 + 4*Log[x]^2 - Log[x]^4)*(-20*x^2 - 16*Log[x] + 8*Log
[x]^3))/(4*x),x]
```

output
```
(-2*E^(26 + 5*x^2 + 4*Log[x]^2 - Log[x]^4) + E^(2*(26 + 5*x^2 + 4*Log[x]^2
 - Log[x]^4))/4)/4
```

3.695. $\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(x)\right)}{4x}\,dx$

3.695.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.695.4 Maple [A] (verified)

Time = 1.12 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.44

method	result	size
risch	$\frac{e^{-2\ln(x)^4+8\ln(x)^2+10x^2+52}}{16}-\frac{e^{-\ln(x)^4+4\ln(x)^2+5x^2+26}}{2}$	46
parallelrisch	$\frac{e^{-2\ln(x)^4+8\ln(x)^2+10x^2+52}}{16}-\frac{e^{-\ln(x)^4+4\ln(x)^2+5x^2+26}}{2}$	48

input
```
int(1/4*((-2*ln(x)^3+4*ln(x)+5*x^2)*exp(-ln(x)^4+4*ln(x)^2+5*x^2+26)^2+(8*
ln(x)^3-16*ln(x)-20*x^2)*exp(-ln(x)^4+4*ln(x)^2+5*x^2+26))/x,x,method=_RET
URNVERBOSE)
```

output
```
1/16*exp(-2*ln(x)^4+8*ln(x)^2+10*x^2+52)-1/2*exp(-ln(x)^4+4*ln(x)^2+5*x^2+
26)
```

3.695.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.41

$$\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(\right.}{4x}$$
$$=-\frac{1}{2}\,e^{\left(-\log(x)^4+5\,x^2+4\,\log(x)^2+26\right)}+\frac{1}{16}\,e^{\left(-2\,\log(x)^4+10\,x^2+8\,\log(x)^2+52\right)}$$

3.695.
$\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(x)\right)}{4x}\,dx$

input
```
integrate(1/4*((-2*log(x)^3+4*log(x)+5*x^2)*exp(-log(x)^4+4*log(x)^2+5*x^2
+26)^2+(8*log(x)^3-16*log(x)-20*x^2)*exp(-log(x)^4+4*log(x)^2+5*x^2+26))/x
,x, algorithm=\
```

output
```
-1/2*e^(-log(x)^4 + 5*x^2 + 4*log(x)^2 + 26) + 1/16*e^(-2*log(x)^4 + 10*x^
2 + 8*log(x)^2 + 52)
```

3.695.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. 2(20) = 40.

Time = 0.15 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.38

$$\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(x)\right)}{4x}\,dx$$
$$= -\frac{e^{5x^2-\log{(x)}^4+4\log{(x)}^2+26}}{2}+\frac{e^{10x^2-2\log{(x)}^4+8\log{(x)}^2+52}}{16}$$

input
```
integrate(1/4*((-2*ln(x)**3+4*ln(x)+5*x**2)*exp(-ln(x)**4+4*ln(x)**2+5*x**
2+26)**2+(8*ln(x)**3-16*ln(x)-20*x**2)*exp(-ln(x)**4+4*ln(x)**2+5*x**2+26)
)/x,x)
```

output
```
-exp(5*x**2 - log(x)**4 + 4*log(x)**2 + 26)/2 + exp(10*x**2 - 2*log(x)**4
+ 8*log(x)**2 + 52)/16
```

3.695.7 Maxima [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.41

$$\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(x)\right)}{4x}\,dx$$
$$= -\frac{1}{2}\,e^{\left(-\log(x)^4+5\,x^2+4\,\log(x)^2+26\right)}+\frac{1}{16}\,e^{\left(-2\,\log(x)^4+10\,x^2+8\,\log(x)^2+52\right)}$$

input
```
integrate(1/4*((-2*log(x)^3+4*log(x)+5*x^2)*exp(-log(x)^4+4*log(x)^2+5*x^2
+26)^2+(8*log(x)^3-16*log(x)-20*x^2)*exp(-log(x)^4+4*log(x)^2+5*x^2+26))/x
,x, algorithm=\
```

output
```
-1/2*e^(-log(x)^4 + 5*x^2 + 4*log(x)^2 + 26) + 1/16*e^(-2*log(x)^4 + 10*x^
2 + 8*log(x)^2 + 52)
```

3.695.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.41

$$\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(x)\right)}{4x}\,dx$$
$$= -\frac{1}{2}\,e^{\left(-\log(x)^4+5\,x^2+4\,\log(x)^2+26\right)}+\frac{1}{16}\,e^{\left(-2\,\log(x)^4+10\,x^2+8\,\log(x)^2+52\right)}$$

input
```
integrate(1/4*((-2*log(x)^3+4*log(x)+5*x^2)*exp(-log(x)^4+4*log(x)^2+5*x^2
+26)^2+(8*log(x)^3-16*log(x)-20*x^2)*exp(-log(x)^4+4*log(x)^2+5*x^2+26))/x
,x, algorithm=\
```

output
```
-1/2*e^(-log(x)^4 + 5*x^2 + 4*log(x)^2 + 26) + 1/16*e^(-2*log(x)^4 + 10*x^
2 + 8*log(x)^2 + 52)
```

3.695.9 Mupad [B] (verification not implemented)

Time = 14.29 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.53

$$\int \frac{e^{52+10x^2+8\log^2(x)-2\log^4(x)}\left(5x^2+4\log(x)-2\log^3(x)\right)+e^{26+5x^2+4\log^2(x)-\log^4(x)}\left(-20x^2-16\log(x)+8\log^3(x)\right)}{4x}\,dx$$
$$= -\frac{e^{4\ln(x)^2}\,e^{-2\ln(x)^4}\,e^{26}\,e^{5\,x^2}\,\left(8\,e^{\ln(x)^4}-e^{4\ln(x)^2}\,e^{26}\,e^{5\,x^2}\right)}{16}$$

input
```
int(-((exp(4*log(x)^2 - log(x)^4 + 5*x^2 + 26)*(16*log(x) - 8*log(x)^3 + 2
0*x^2))/4 - (exp(8*log(x)^2 - 2*log(x)^4 + 10*x^2 + 52)*(4*log(x) - 2*log(
x)^3 + 5*x^2))/4)/x,x)
```

output
```
-(exp(4*log(x)^2)*exp(-2*log(x)^4)*exp(26)*exp(5*x^2)*(8*exp(log(x)^4) - e
xp(4*log(x)^2)*exp(26)*exp(5*x^2)))/16
```

3.696 $\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2\left(2+x+3x^2-x^3\right)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx$

3.696.1 Optimal result

Integrand size = 76, antiderivative size = 30

$$\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2\left(2+x+3x^2-x^3\right)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx = x+\frac{1}{4}\left(-x^2-\frac{e^x x^2}{\left(1+x-x^2\right)^2}\right)$$

output
```
-1/4*exp(x+ln(x^2/(-x^2+x+1)^2))-1/4*x^2+x
```

3.696.2 Mathematica [A] (verified)

Time = 2.73 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.53

$$\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2\left(2+x+3x^2-x^3\right)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx = \frac{1}{4}\left(4x-x^2+e^x\left(\frac{-1-x}{\left(-1-x+x^2\right)^2}-\frac{1}{-1-x+x^2}\right)\right)$$

input
```
Integrate[(-4*x - 2*x^2 + 6*x^3 - 2*x^4 + (E^x*x^2*(2 + x + 3*x^2 - x^3))/
(1 + 2*x - x^2 - 2*x^3 + x^4))/(-4*x - 4*x^2 + 4*x^3),x]
```

output
```
(4*x - x^2 + E^x*((-1 - x)/(-1 - x + x^2)^2 - (-1 - x + x^2)^(-1)))/4
```

3.696.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 2.20 (sec) , antiderivative size = 774, normalized size of antiderivative = 25.80, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.039$, Rules used = {2026, 7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^4+6x^3-2x^2+\frac{e^x(-x^3+3x^2+x+2)x^2}{x^4-2x^3-x^2+2x+1}-4x}{4x^3-4x^2-4x}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{-2x^4+6x^3-2x^2+\frac{e^x(-x^3+3x^2+x+2)x^2}{x^4-2x^3-x^2+2x+1}-4x}{x(4x^2-4x-4)}dx$$

$$\Big\downarrow \text{ 7279}$$

$$\int \left(\frac{2-x}{2}-\frac{e^x x(x^3-3x^2-x-2)}{4(x^2-x-1)^3}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{3}{200}\left(5+\sqrt{5}\right)e^{\frac{1}{2}\left(1+\sqrt{5}\right)}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x-\sqrt{5}-1\right)\right)-\frac{3}{100}\left(3+\sqrt{5}\right)e^{\frac{1}{2}\left(1+\sqrt{5}\right)}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x-\sqrt{5}-1\right)\right)+\frac{1}{40}\left(1+\sqrt{5}\right)e^{\frac{1}{2}\left(1+\sqrt{5}\right)}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x-\sqrt{5}-1\right)\right)-\frac{e^{\frac{1}{2}\left(1+\sqrt{5}\right)}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x-\sqrt{5}-1\right)\right)}{20\sqrt{5}}-\frac{1}{100}e^{\frac{1}{2}\left(1+\sqrt{5}\right)}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x-\sqrt{5}-1\right)\right)+\frac{3}{200}\left(5-\sqrt{5}\right)e^{\frac{1}{2}-\frac{\sqrt{5}}{2}}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x+\sqrt{5}-1\right)\right)-\frac{3}{100}\left(3-\sqrt{5}\right)e^{\frac{1}{2}-\frac{\sqrt{5}}{2}}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x+\sqrt{5}-1\right)\right)+\frac{1}{40}\left(1-\sqrt{5}\right)e^{\frac{1}{2}-\frac{\sqrt{5}}{2}}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x+\sqrt{5}-1\right)\right)+\frac{e^{\frac{1}{2}-\frac{\sqrt{5}}{2}}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x+\sqrt{5}-1\right)\right)}{20\sqrt{5}}-\frac{1}{100}e^{\frac{1}{2}-\frac{\sqrt{5}}{2}}\text{ExpIntegralEi}\left(\frac{1}{2}\left(2x+\sqrt{5}-1\right)\right)-\frac{1}{4}(2-x)^2+\frac{3(5-\sqrt{5})e^x}{100\left(-2x-\sqrt{5}+1\right)}-\frac{3(3-\sqrt{5})e^x}{50\left(-2x-\sqrt{5}+1\right)}+\frac{(1-\sqrt{5})e^x}{20\left(-2x-\sqrt{5}+1\right)}-\frac{e^x}{10\sqrt{5}\left(-2x-\sqrt{5}+1\right)}-\frac{e^x}{50\left(-2x-\sqrt{5}+1\right)}+\frac{3(5+\sqrt{5})e^x}{100\left(-2x+\sqrt{5}+1\right)}-\frac{3(3+\sqrt{5})e^x}{50\left(-2x+\sqrt{5}+1\right)}+\frac{(1+\sqrt{5})e^x}{20\left(-2x+\sqrt{5}+1\right)}+\frac{e^x}{10\sqrt{5}\left(-2x+\sqrt{5}+1\right)}-\frac{e^x}{50\left(-2x+\sqrt{5}+1\right)}-\frac{3(5-\sqrt{5})e^x}{50\left(-2x-\sqrt{5}+1\right)^2}+\frac{e^x}{5\sqrt{5}\left(-2x-\sqrt{5}+1\right)^2}-\frac{3(5+\sqrt{5})e^x}{50\left(-2x+\sqrt{5}+1\right)^2}-\frac{e^x}{5\sqrt{5}\left(-2x+\sqrt{5}+1\right)^2}$$

input
```
Int[(-4*x - 2*x^2 + 6*x^3 - 2*x^4 + (E^x*x^2*(2 + x + 3*x^2 - x^3))/(1 + 2
*x - x^2 - 2*x^3 + x^4))/(-4*x - 4*x^2 + 4*x^3),x]
```

3.696. $\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2\left(2+x+3x^2-x^3\right)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx$

output
```
E^x/(5*Sqrt[5]*(1 - Sqrt[5] - 2*x)^2) - (3*(5 - Sqrt[5])*E^x)/(50*(1 - Sqr
t[5] - 2*x)^2) - E^x/(50*(1 - Sqrt[5] - 2*x)) - E^x/(10*Sqrt[5]*(1 - Sqrt[
5] - 2*x)) + ((1 - Sqrt[5])*E^x)/(20*(1 - Sqrt[5] - 2*x)) - (3*(3 - Sqrt[5
])*E^x)/(50*(1 - Sqrt[5] - 2*x)) + (3*(5 - Sqrt[5])*E^x)/(100*(1 - Sqrt[5]
 - 2*x)) - E^x/(5*Sqrt[5]*(1 + Sqrt[5] - 2*x)^2) - (3*(5 + Sqrt[5])*E^x)/(
50*(1 + Sqrt[5] - 2*x)^2) - E^x/(50*(1 + Sqrt[5] - 2*x)) + E^x/(10*Sqrt[5]
*(1 + Sqrt[5] - 2*x)) + ((1 + Sqrt[5])*E^x)/(20*(1 + Sqrt[5] - 2*x)) - (3*
(3 + Sqrt[5])*E^x)/(50*(1 + Sqrt[5] - 2*x)) + (3*(5 + Sqrt[5])*E^x)/(100*(
1 + Sqrt[5] - 2*x)) - (2 - x)^2/4 - (E^((1 + Sqrt[5])/2)*ExpIntegralEi[(-1
 - Sqrt[5] + 2*x)/2])/100 - (E^((1 + Sqrt[5])/2)*ExpIntegralEi[(-1 - Sqrt[
5] + 2*x)/2])/(20*Sqrt[5]) + ((1 + Sqrt[5])*E^((1 + Sqrt[5])/2)*ExpIntegra
lEi[(-1 - Sqrt[5] + 2*x)/2])/40 - (3*(3 + Sqrt[5])*E^((1 + Sqrt[5])/2)*Exp
IntegralEi[(-1 - Sqrt[5] + 2*x)/2])/100 + (3*(5 + Sqrt[5])*E^((1 + Sqrt[5]
)/2)*ExpIntegralEi[(-1 - Sqrt[5] + 2*x)/2])/200 - (E^(1/2 - Sqrt[5]/2)*Exp
IntegralEi[(-1 + Sqrt[5] + 2*x)/2])/100 + (E^(1/2 - Sqrt[5]/2)*ExpIntegral
Ei[(-1 + Sqrt[5] + 2*x)/2])/(20*Sqrt[5]) + ((1 - Sqrt[5])*E^(1/2 - Sqrt[5]
/2)*ExpIntegralEi[(-1 + Sqrt[5] + 2*x)/2])/40 - (3*(3 - Sqrt[5])*E^(1/2 -
Sqrt[5]/2)*ExpIntegralEi[(-1 + Sqrt[5] + 2*x)/2])/100 + (3*(5 - Sqrt[5])*E
^(1/2 - Sqrt[5]/2)*ExpIntegralEi[(-1 + Sqrt[5] + 2*x)/2])/200
```

3.696.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.696. $\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2\left(2+x+3x^2-x^3\right)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx$

3.696.4 Maple [A] (verified)

Time = 1.11 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.17

method	result	size
risch	$-\frac{x^2}{4}+x-\frac{x^2 e^x}{4(x^4-2x^3-x^2+2x+1)}$	35
default	$-\frac{x^2}{4}+x-\frac{e^{\ln\left(\frac{x^2}{x^4-2x^3-x^2+2x+1}\right)+x}}{4}$	38
norman	$-\frac{x^2}{4}+x-\frac{e^{\ln\left(\frac{x^2}{x^4-2x^3-x^2+2x+1}\right)+x}}{4}$	38
parts	$-\frac{x^2}{4}+x-\frac{e^{\ln\left(\frac{x^2}{x^4-2x^3-x^2+2x+1}\right)+x}}{4}$	38
parallelrisch	$-\frac{3}{4}-\frac{x^2}{4}+x-\frac{e^{\ln\left(\frac{x^2}{x^4-2x^3-x^2+2x+1}\right)+x}}{4}$	39

input
```
int(((-x^3+3*x^2+x+2)*exp(ln(x^2/(x^4-2*x^3-x^2+2*x+1))+x)-2*x^4+6*x^3-2*x
^2-4*x)/(4*x^3-4*x^2-4*x),x,method=_RETURNVERBOSE)
```

output
```
-1/4*x^2+x-1/4*x^2/(x^4-2*x^3-x^2+2*x+1)*exp(x)
```

3.696.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.23

$$\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2(2+x+3x^2-x^3)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx=-\frac{1}{4}x^2+x-\frac{1}{4}e^{\left(x+\log\left(\frac{x^2}{x^4-2x^3-x^2+2x+1}\right)\right)}$$

input
```
integrate(((-x^3+3*x^2+x+2)*exp(log(x^2/(x^4-2*x^3-x^2+2*x+1))+x)-2*x^4+6*
x^3-2*x^2-4*x)/(4*x^3-4*x^2-4*x),x, algorithm=\
```

output
```
-1/4*x^2 + x - 1/4*e^(x + log(x^2/(x^4 - 2*x^3 - x^2 + 2*x + 1)))
```

3.696.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2(2+x+3x^2-x^3)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx = -\frac{x^2}{4}-\frac{x^2e^x}{4x^4-8x^3-4x^2+8x+4}+x$$

input
```
integrate(((-x**3+3*x**2+x+2)*exp(ln(x**2/(x**4-2*x**3-x**2+2*x+1))+x)-2*x
**4+6*x**3-2*x**2-4*x)/(4*x**3-4*x**2-4*x),x)
```

output
```
-x**2/4 - x**2*exp(x)/(4*x**4 - 8*x**3 - 4*x**2 + 8*x + 4) + x
```

3.696.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

$$\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2(2+x+3x^2-x^3)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx = -\frac{1}{4}\,x^2-\frac{x^2e^x}{4\,(x^4-2\,x^3-x^2+2\,x+1)}+x$$

input
```
integrate(((-x^3+3*x^2+x+2)*exp(log(x^2/(x^4-2*x^3-x^2+2*x+1))+x)-2*x^4+6*
x^3-2*x^2-4*x)/(4*x^3-4*x^2-4*x),x, algorithm=\
```

output
```
-1/4*x^2 - 1/4*x^2*e^x/(x^4 - 2*x^3 - x^2 + 2*x + 1) + x
```

3.696.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(27) = 54.

Time = 0.26 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.83

$$\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2(2+x+3x^2-x^3)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx = -\frac{x^6-6\,x^5+7\,x^4+6\,x^3+x^2e^x-7\,x^2-4\,x}{4\,(x^4-2\,x^3-x^2+2\,x+1)}$$

input
```
integrate(((-x^3+3*x^2+x+2)*exp(log(x^2/(x^4-2*x^3-x^2+2*x+1))+x)-2*x^4+6*
x^3-2*x^2-4*x)/(4*x^3-4*x^2-4*x),x, algorithm=\
```

output
```
-1/4*(x^6 - 6*x^5 + 7*x^4 + 6*x^3 + x^2*e^x - 7*x^2 - 4*x)/(x^4 - 2*x^3 -
x^2 + 2*x + 1)
```

3.696.9 Mupad [B] (verification not implemented)

Time = 15.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{-4x-2x^2+6x^3-2x^4+\frac{e^x x^2(2+x+3x^2-x^3)}{1+2x-x^2-2x^3+x^4}}{-4x-4x^2+4x^3}\,dx = x-\frac{x^2}{4}-\frac{x^2\,\mathrm{e}^x}{4\left(-x^2+x+1\right)^2}$$

input
```
int((4*x - exp(x + log(x^2/(2*x - x^2 - 2*x^3 + x^4 + 1)))*(x + 3*x^2 - x^
3 + 2) + 2*x^2 - 6*x^3 + 2*x^4)/(4*x + 4*x^2 - 4*x^3),x)
```

output
```
x - x^2/4 - (x^2*exp(x))/(4*(x - x^2 + 1)^2)
```

3.697 $\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\Big(-3+(9+3\log(x))\log(3+\log(x)}{(3+\log(x))\log^2(3+\log(x))}$

3.697.1 Optimal result

Integrand size = 82, antiderivative size = 20

$$\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$$
$$=e^{3\left(-5+x-\frac{e^5x}{\log(3+\log(x))}\right)}$$

output
```
exp(3*x-15+3*x/exp(ln(-ln(3+ln(x)))-5))
```

3.697.2 Mathematica [A] (verified)

Time = 0.61 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$$
$$=e^{-15+3x-\frac{3e^5x}{\log(3+\log(x))}}$$

input
```
Integrate[-((E^(5 - (E^5*(3*x - ((-15 + 3*x)*Log[3 + Log[x]])/E^5))/Log[3
+ Log[x]])*(-3 + (9 + 3*Log[x])*Log[3 + Log[x]] - ((9 + 3*Log[x])*Log[3 +
Log[x]]^2)/E^5))/((3 + Log[x])*Log[3 + Log[x]]^2)),x]
```

output
```
E^(-15 + 3*x - (3*E^5*x)/Log[3 + Log[x]])
```

3.697.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{\left(-\frac{(3\log(x)+9)\log^2(\log(x)+3)}{e^5}+(3\log(x)+9)\log(\log(x)+3)-3\right)\exp\left(5-\frac{e^5\left(3x-\frac{(3x-15)\log(\log(x)+3)}{e^5}\right)}{\log(\log(x)+3)}\right)}{(\log(x)+3)\log^2(\log(x)+3)}dx$$

$$\Big\downarrow \; 25$$

$$-\int -\frac{3\exp\left(5-\frac{3e^5\left(x+\frac{(5-x)\log(\log(x)+3)}{e^5}\right)}{\log(\log(x)+3)}\right)\left(\frac{(\log(x)+3)\log^2(\log(x)+3)}{e^5}-(\log(x)+3)\log(\log(x)+3)+1\right)}{(\log(x)+3)\log^2(\log(x)+3)}dx$$

$$\Big\downarrow \; 27$$

$$3\int \frac{\exp\left(5-\frac{3e^5\left(x+\frac{(5-x)\log(\log(x)+3)}{e^5}\right)}{\log(\log(x)+3)}\right)\left(\frac{(\log(x)+3)\log^2(\log(x)+3)}{e^5}-(\log(x)+3)\log(\log(x)+3)+1\right)}{(\log(x)+3)\log^2(\log(x)+3)}dx$$

$$\Big\downarrow \; 7292$$

$$3\int \frac{\exp\left(\frac{3\log(\log(x)+3)x-3e^5x-10\log(\log(x)+3)}{\log(\log(x)+3)}\right)\left(\frac{(\log(x)+3)\log^2(\log(x)+3)}{e^5}-(\log(x)+3)\log(\log(x)+3)+1\right)}{(\log(x)+3)\log^2(\log(x)+3)}dx$$

$$\Big\downarrow \; 7293$$

$$3\int \left(\exp\left(\frac{3\log(\log(x)+3)x-3e^5x-10\log(\log(x)+3)}{\log(\log(x)+3)}-5\right)-\frac{\exp\left(\frac{3\log(\log(x)+3)x-3e^5x-10\log(\log(x)+3)}{\log(\log(x)+3)}\right)}{\log(\log(x)+3)}+\frac{\exp}{}\right.$$

$$\Big\downarrow \; 2009$$

3.697. $\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$

$$3\left(\int \frac{\exp\left(\frac{3\log(\log(x)+3)x-3e^5x-10\log(\log(x)+3)}{\log(\log(x)+3)}\right)}{(\log(x)+3)\log^2(\log(x)+3)}dx - \int \frac{\exp\left(\frac{3\log(\log(x)+3)x-3e^5x-10\log(\log(x)+3)}{\log(\log(x)+3)}\right)}{\log(\log(x)+3)}dx + \int e^{3\left(-\frac{e^5 x}{\log(\log(x)+3)}\right.}$$

input
```
Int[-((E^(5 - (E^5*(3*x - ((-15 + 3*x)*Log[3 + Log[x]])/E^5))/Log[3 + Log[
x]])*(-3 + (9 + 3*Log[x])*Log[3 + Log[x]] - ((9 + 3*Log[x])*Log[3 + Log[x]
]^2)/E^5))/((3 + Log[x])*Log[3 + Log[x]]^2)),x]
```

output
```
$Aborted
```

3.697.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.697.4 Maple [A] (verified)

Time = 26.42 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.75

method	result	size
risch	$\mathrm{e}^{\frac{3\left(\ln(3+\ln(x))\mathrm{e}^{-5}x-5\ln(3+\ln(x))\mathrm{e}^{-5}-x\right)\mathrm{e}^{5}}{\ln(3+\ln(x))}}$	35
parallelrisch	$\mathrm{e}^{-\frac{\left((3x-15)\mathrm{e}^{\ln(-\ln(3+\ln(x)))-5}+3x\right)\mathrm{e}^{5}}{\ln(3+\ln(x))}}$	37

$$3.697. \qquad \int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$$

input
```
int(((3*ln(x)+9)*ln(3+ln(x))*exp(ln(-ln(3+ln(x)))-5)+(3*ln(x)+9)*ln(3+ln(x
))-3)*exp(((3*x-15)*exp(ln(-ln(3+ln(x)))-5)+3*x)/exp(ln(-ln(3+ln(x)))-5))/
(3+ln(x))/ln(3+ln(x))/exp(ln(-ln(3+ln(x)))-5),x,method=_RETURNVERBOSE)
```

output
```
exp(3*(ln(3+ln(x))*exp(-5)*x-5*ln(3+ln(x))*exp(-5)-x)*exp(5)/ln(3+ln(x)))
```

3.697.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(22) = 44$.

Time = 0.27 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.55

$$\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$$
$$= -e^{\left(-\frac{3\,xe^5-(3\,x-10)\log(\log(x)+3)+\log(-\log(\log(x)+3))\log(\log(x)+3)}{\log(\log(x)+3)}-5\right)}\log\left(\log\left(x\right)+3\right)$$

input
```
integrate(((3*log(x)+9)*log(3+log(x))*exp(log(-log(3+log(x)))-5)+(3*log(x)
+9)*log(3+log(x))-3)*exp(((3*x-15)*exp(log(-log(3+log(x)))-5)+3*x)/exp(log
(-log(3+log(x)))-5))/(3+log(x))/log(3+log(x))/exp(log(-log(3+log(x)))-5),x
, algorithm=\
```

output
```
-e^(-(3*x*e^5 - (3*x - 10)*log(log(x) + 3) + log(-log(log(x) + 3))*log(log
(x) + 3))/log(log(x) + 3) - 5)*log(log(x) + 3)
```

3.697.6 Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.55

$$\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$$
$$= e^{-\frac{\left(3x-\frac{(3x-15)\log\left(\log\left(x\right)+3\right)}{e^5}\right)e^5}{\log\left(\log\left(x\right)+3\right)}}$$

input
```
integrate(((3*ln(x)+9)*ln(3+ln(x))*exp(ln(-ln(3+ln(x)))-5)+(3*ln(x)+9)*ln(
3+ln(x))-3)*exp(((3*x-15)*exp(ln(-ln(3+ln(x)))-5)+3*x)/exp(ln(-ln(3+ln(x))
)-5))/(3+ln(x))/ln(3+ln(x))/exp(ln(-ln(3+ln(x)))-5),x)
```

output
```
exp(-(3*x - (3*x - 15)*exp(-5)*log(log(x) + 3))*exp(5)/log(log(x) + 3))
```

3.697.7 Maxima [F(-2)]

Exception generated.

$$\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$$
$= \text{Exception raised: RuntimeError}$

input
```
integrate(((3*log(x)+9)*log(3+log(x))*exp(log(-log(3+log(x)))-5)+(3*log(x)
+9)*log(3+log(x))-3)*exp(((3*x-15)*exp(log(-log(3+log(x)))-5)+3*x)/exp(log
(-log(3+log(x)))-5))/(3+log(x))/log(3+log(x))/exp(log(-log(3+log(x)))-5),x
, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.697.8 Giac [F(-2)]

Exception generated.

$$\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$$
$= \text{Exception raised: RuntimeError}$

input
```
integrate(((3*log(x)+9)*log(3+log(x))*exp(log(-log(3+log(x)))-5)+(3*log(x)
+9)*log(3+log(x))-3)*exp(((3*x-15)*exp(log(-log(3+log(x)))-5)+3*x)/exp(log
(-log(3+log(x)))-5))/(3+log(x))/log(3+log(x))/exp(log(-log(3+log(x)))-5),x
, algorithm=\
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:Unable to divide, perhaps due to rounding error%%%{27,[
0,1,0,3]%%%}+%%%{81,[0,0,0,3]%%%} / %%%{27,[0,2,0,3]%%%}+%%%{162,[0,1,0,3]
%%%}+%%%{243
```

3.697.9 Mupad [B] (verification not implemented)

Time = 16.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int -\frac{e^{5-\frac{e^5\left(3x-\frac{(-15+3x)\log(3+\log(x))}{e^5}\right)}{\log(3+\log(x))}}\left(-3+(9+3\log(x))\log(3+\log(x))-\frac{(9+3\log(x))\log^2(3+\log(x))}{e^5}\right)}{(3+\log(x))\log^2(3+\log(x))}\,dx$$
$$= \mathrm{e}^{3\,x}\,\mathrm{e}^{-15}\,\mathrm{e}^{-\frac{3\,x\,\mathrm{e}^5}{\ln(\ln(x)+3)}}$$

input
```
int((exp(exp(5 - log(-log(log(x) + 3)))*(3*x + exp(log(-log(log(x) + 3)) -
 5)*(3*x - 15)))*exp(5 - log(-log(log(x) + 3)))*(log(log(x) + 3)*(3*log(x)
 + 9) + exp(log(-log(log(x) + 3)) - 5)*log(log(x) + 3)*(3*log(x) + 9) - 3)
)/(log(log(x) + 3)*(log(x) + 3)),x)
```

output
```
exp(3*x)*exp(-15)*exp(-(3*x*exp(5))/log(log(x) + 3))
```

3.698 $\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(10}{}$

3.698.1 Optimal result

Integrand size = 429, antiderivative size = 15

$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(1024+3584x+5376x^2+44}{}$$
$$=-1+\left(2+x+e^2\log(2x)\right)^8$$

output
```
(2+exp(2)*ln(2*x)+x)^8-1
```

3.698.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(1024+3584x+5376x^2+44}{}$$
$$=\left(2+x+e^2\log(2x)\right)^8$$

3.698.
$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7)+(e^4(3584+10}{}$

input
```
Integrate[(1024*x + 3584*x^2 + 5376*x^3 + 4480*x^4 + 2240*x^5 + 672*x^6 +
112*x^7 + 8*x^8 + E^2*(1024 + 3584*x + 5376*x^2 + 4480*x^3 + 2240*x^4 + 67
2*x^5 + 112*x^6 + 8*x^7) + (E^4*(3584 + 10752*x + 13440*x^2 + 8960*x^3 + 3
360*x^4 + 672*x^5 + 56*x^6) + E^2*(3584*x + 10752*x^2 + 13440*x^3 + 8960*x
^4 + 3360*x^5 + 672*x^6 + 56*x^7))*Log[2*x] + (E^6*(5376 + 13440*x + 13440
*x^2 + 6720*x^3 + 1680*x^4 + 168*x^5) + E^4*(5376*x + 13440*x^2 + 13440*x^
3 + 6720*x^4 + 1680*x^5 + 168*x^6))*Log[2*x]^2 + (E^8*(4480 + 8960*x + 672
0*x^2 + 2240*x^3 + 280*x^4) + E^6*(4480*x + 8960*x^2 + 6720*x^3 + 2240*x^4
 + 280*x^5))*Log[2*x]^3 + (E^10*(2240 + 3360*x + 1680*x^2 + 280*x^3) + E^8
*(2240*x + 3360*x^2 + 1680*x^3 + 280*x^4))*Log[2*x]^4 + (E^12*(672 + 672*x
 + 168*x^2) + E^10*(672*x + 672*x^2 + 168*x^3))*Log[2*x]^5 + (E^14*(112 +
56*x) + E^12*(112*x + 56*x^2))*Log[2*x]^6 + (8*E^16 + 8*E^14*x)*Log[2*x]^7
)/x,x]
```

output
```
(2 + x + E^2*Log[2*x])^8
```

3.698.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 1914 vs. $2(15) = 30$.

Time = 2.53 (sec) , antiderivative size = 1914, normalized size of antiderivative = 127.60, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.005$, Rules used = $\{2010, 2009\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^8+112x^7+672x^6+2240x^5+4480x^4+5376x^3+3584x^2+\left(e^{12}\left(56x^2+112x\right)+e^{14}(56x+112)\right)\log^6(2x)$$

$$\Big\downarrow \ 2010$$

$$\int \left(\frac{8\left(x+e^2\right)(x+2)^7}{x}+\frac{8e^{14}\left(x+e^2\right)\log^7(2x)}{x}+\frac{56e^{12}\left(x+e^2\right)(x+2)\log^6(2x)}{x}+\frac{168e^{10}\left(x+e^2\right)(x+2)^2\log^5(\right.$$

$$\Big\downarrow \ 2009$$

$$(x+2)^8+e^{16}\log^8(2x)+8e^{14}x\log^7(2x)+16e^{14}\log^7(2x)-\frac{14}{9}e^2\left(12+e^2\right)x^6+\frac{14e^4x^6}{9}+\frac{56e^2x^6}{3}+28e^{12}x^2\log^6(2x)+56e^{12}\left(2+e^2\right)x\log^6(2x)-56e^{14}x\log^6(2x)+112e^{12}\log^6(2x)+\frac{336}{125}e^4\left(10+e^2\right)x^5-\frac{672}{25}e^2\left(5+e^2\right)x^5-\frac{336e^6x^5}{125}+\frac{672e^2x^5}{5}+56e^{10}x^3\log^5(2x)+84e^{10}\left(4+e^2\right)x^2\log^5(2x)-84e^{12}x^2\log^5(2x)-336e^{12}\left(2+e^2\right)x\log^5(2x)+672e^{10}\left(1+e^2\right)x\log^5(2x)+336e^{14}x\log^5(2x)+448e^{10}\log^5(2x)-70e^2\left(8+3e^2\right)x^4-\frac{105}{16}e^6\left(8+e^2\right)x^4+\frac{105}{2}e^4\left(4+e^2\right)x^4+\frac{105e^8x^4}{16}+560e^2x^4+70e^8x^4\log^4(2x)+\frac{280}{3}e^8\left(6+e^2\right)x^3\log^4(2x)-\frac{280}{3}e^{10}x^3\log^4(2x)-210e^{10}\left(4+e^2\right)x^2\log^4(2x)+840e^8\left(2+e^2\right)x^2\log^4(2x)+210e^{12}x^2\log^4(2x)+1120e^8\left(2+3e^2\right)x\log^4(2x)+1680e^{12}\left(2+e^2\right)x\log^4(2x)-3360e^{10}\left(1+e^2\right)x\log^4(2x)-1680e^{14}x\log^4(2x)+1120e^8\log^4(2x)-\frac{4480}{9}e^2\left(3+2e^2\right)x^3+\frac{2240}{81}e^8\left(6+e^2\right)x^3-\frac{4480}{27}e^6\left(3+e^2\right)x^3+\frac{4480}{9}e^4\left(2+e^2\right)x^3-\frac{2240e^{10}x^3}{81}+\frac{4480e^2x^3}{3}+56e^6x^5\log^3(2x)+70e^6\left(8+e^2\right)x^4\log^3(2x)-70e^8x^4\log^3(2x)-\frac{1120}{9}e^8\left(6+e^2\right)x^3\log^3(2x)+\frac{2240}{3}e^6\left(3+e^2\right)x^3\log^3(2x)+\frac{1120}{9}e^{10}x^3\log^3(2x)+1120e^6\left(4+3e^2\right)x^2\log^3(2x)+420e^{10}\left(4+e^2\right)x^2\log^3(2x)-1680e^8\left(2+e^2\right)x^2\log^3(2x)-420e^{12}x^2\log^3(2x)-4480e^8\left(2+3e^2\right)x\log^3(2x)+4480e^6\left(1+2e^2\right)x\log^3(2x)-6720e^{12}\left(2+e^2\right)x\log^3(2x)+13440e^{10}\left(1+e^2\right)x\log^3(2x)+6720e^{14}x\log^3(2x)+1792e^6\log^3(2x)-672e^2\left(4+5e^2\right)x^2-840e^6\left(4+3e^2\right)x^2-315e^{10}\left(4+e^2\right)x^2+1260e^8\left(2+e^2\right)x^2+3360e^4\left(1+e^2\right)x^2+315e^{12}x^2+2688e^2x^2+28e^4x^6\log^2(2x)+\frac{168}{5}e^4\left(10+e^2\right)x^5\log^2(2x)-\frac{168}{5}e^6x^5\log^2(2x)-\frac{105}{2}e^6\left(8+e^2\right)x^4\log^2(2x)+420e^4\left(4+e^2\right)x^4\log^2(2x)+\frac{105}{2}e^8x^4\log^2(2x)+\frac{1120}{9}e^8\left(6+e^2\right)x^3\log^2(2x)-\frac{2240}{3}e^6\left(3+e^2\right)x^3\log^2(2x)+2240e^4\left(2+e^2\right)x^3\log^2(2x)-\frac{1120}{9}e^{10}x^3\log^2(2x)-1680e^6\left(4+3e^2\right)x^2\log^2(2x)-630e^{10}\left(4+e^2\right)x^2\log^2(2x)+2520e^8\left(2+e^2\right)x^2\log^2(2x)+6720e^4\left(1+e^2\right)x^2\log^2(2x)+630e^{12}x^2\log^2(2x)+2688e^4\left(2+5e^2\right)x\log^2(2x)+13440e^8\left(2+3e^2\right)x\log^2(2x)-13440e^6\left(1+2e^2\right)x\log^2(2x)+20160e^{12}\left(2+e^2\right)x\log^2(2x)-40320e^{10}\left(1+e^2\right)x\log^2(2x)-20160e^{14}x\log^2(2x)+1792e^4\log^2(2x)+5376e^4\left(2+5e^2\right)x+26880e^8\left(2+3e^2\right)x-3584e^2\left(1+3e^2\right)x-26880e^6\left(1+2e^2\right)x+40320e^{12}\left(2+e^2\right)x-80640e^{10}\left(1+e^2\right)x-40320e^{14}x+3584e^2x+1024e^2\log(x)+8e^2x^7\log(2x)+\frac{28}{3}e^2\left(12+e^2\right)x^6\log(2x)-\frac{28}{3}e^4x^6\log(2x)-\frac{336}{25}e^4\left(10+e^2\right)x^5\log(2x)+\frac{672}{5}e^2\left(5+e^2\right)x^5\log(2x)+\frac{336}{25}e^6x^5\log(2x)+280e^2\left(8+3e^2\right)x^4\log(2x)+\frac{105}{4}e^6\left(8+e^2\right)x^4\log(2x)-210e^4\left(4+e^2\right)x^4\log(2x)-\frac{105}{4}e^8x^4\log(2x)+\frac{4480}{3}e^2\left(3+2e^2\right)x^3\log(2x)-\frac{2240}{27}e^8\left(6+e^2\right)x^3\log(2x)+\frac{4480}{9}e^6\left(3+e^2\right)x^3\log(2x)-\frac{4480}{3}e^4\left(2+e^2\right)x^3\log(2x)+\frac{2240}{27}e^{10}x^3\log(2x)+1344e^2\left(4+5e^2\right)x^2\log(2x)+1680e^6\left(4+3e^2\right)x^2\log(2x)+630e^{10}\left(4+e^2\right)x^2\log(2x)-2520e^8\left(2+e^2\right)x^2\log(2x)-6720e^4\left(1+e^2\right)x^2\log(2x)-630e^{12}x^2\log(2x)-5376e^4\left(2+5e^2\right)x\log(2x)-26880e^8\left(2+3e^2\right)x\log(2x)+3584e^2\left(1+3e^2\right)x\log(2x)+26880e^6\left(1+2e^2\right)x\log(2x)-40320e^{12}\left(2+e^2\right)x\log(2x)+80640e^{10}\left(1+e^2\right)x\log(2x)+40320e^{14}x\log(2x)$$

3.698.

$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2\left(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7\right)+\left(e^4\left(3584+10\right.\right.}{}$$

input
```
Int[(1024*x + 3584*x^2 + 5376*x^3 + 4480*x^4 + 2240*x^5 + 672*x^6 + 112*x^
7 + 8*x^8 + E^2*(1024 + 3584*x + 5376*x^2 + 4480*x^3 + 2240*x^4 + 672*x^5
+ 112*x^6 + 8*x^7) + (E^4*(3584 + 10752*x + 13440*x^2 + 8960*x^3 + 3360*x^
4 + 672*x^5 + 56*x^6) + E^2*(3584*x + 10752*x^2 + 13440*x^3 + 8960*x^4 + 3
360*x^5 + 672*x^6 + 56*x^7))*Log[2*x] + (E^6*(5376 + 13440*x + 13440*x^2 +
 6720*x^3 + 1680*x^4 + 168*x^5) + E^4*(5376*x + 13440*x^2 + 13440*x^3 + 67
20*x^4 + 1680*x^5 + 168*x^6))*Log[2*x]^2 + (E^8*(4480 + 8960*x + 6720*x^2
+ 2240*x^3 + 280*x^4) + E^6*(4480*x + 8960*x^2 + 6720*x^3 + 2240*x^4 + 280
*x^5))*Log[2*x]^3 + (E^10*(2240 + 3360*x + 1680*x^2 + 280*x^3) + E^8*(2240
*x + 3360*x^2 + 1680*x^3 + 280*x^4))*Log[2*x]^4 + (E^12*(672 + 672*x + 168
*x^2) + E^10*(672*x + 672*x^2 + 168*x^3))*Log[2*x]^5 + (E^14*(112 + 56*x)
+ E^12*(112*x + 56*x^2))*Log[2*x]^6 + (8*E^16 + 8*E^14*x)*Log[2*x]^7)/x,x]
```

output
```
3584*E^2*x - 40320*E^14*x - 80640*E^10*(1 + E^2)*x + 40320*E^12*(2 + E^2)*
x - 26880*E^6*(1 + 2*E^2)*x - 3584*E^2*(1 + 3*E^2)*x + 26880*E^8*(2 + 3*E^
2)*x + 5376*E^4*(2 + 5*E^2)*x + 2688*E^2*x^2 + 315*E^12*x^2 + 3360*E^4*(1
+ E^2)*x^2 + 1260*E^8*(2 + E^2)*x^2 - 315*E^10*(4 + E^2)*x^2 - 840*E^6*(4
+ 3*E^2)*x^2 - 672*E^2*(4 + 5*E^2)*x^2 + (4480*E^2*x^3)/3 - (2240*E^10*x^3
)/81 + (4480*E^4*(2 + E^2)*x^3)/9 - (4480*E^6*(3 + E^2)*x^3)/27 + (2240*E^
8*(6 + E^2)*x^3)/81 - (4480*E^2*(3 + 2*E^2)*x^3)/9 + 560*E^2*x^4 + (105*E^
8*x^4)/16 + (105*E^4*(4 + E^2)*x^4)/2 - (105*E^6*(8 + E^2)*x^4)/16 - 70*E^
2*(8 + 3*E^2)*x^4 + (672*E^2*x^5)/5 - (336*E^6*x^5)/125 - (672*E^2*(5 + E^
2)*x^5)/25 + (336*E^4*(10 + E^2)*x^5)/125 + (56*E^2*x^6)/3 + (14*E^4*x^6)/
9 - (14*E^2*(12 + E^2)*x^6)/9 + (2 + x)^8 + 1024*E^2*Log[x] + 40320*E^14*x
*Log[2*x] + 80640*E^10*(1 + E^2)*x*Log[2*x] - 40320*E^12*(2 + E^2)*x*Log[2
*x] + 26880*E^6*(1 + 2*E^2)*x*Log[2*x] + 3584*E^2*(1 + 3*E^2)*x*Log[2*x] -
 26880*E^8*(2 + 3*E^2)*x*Log[2*x] - 5376*E^4*(2 + 5*E^2)*x*Log[2*x] - 630*
E^12*x^2*Log[2*x] - 6720*E^4*(1 + E^2)*x^2*Log[2*x] - 2520*E^8*(2 + E^2)*x
^2*Log[2*x] + 630*E^10*(4 + E^2)*x^2*Log[2*x] + 1680*E^6*(4 + 3*E^2)*x^2*L
og[2*x] + 1344*E^2*(4 + 5*E^2)*x^2*Log[2*x] + (2240*E^10*x^3*Log[2*x])/27
- (4480*E^4*(2 + E^2)*x^3*Log[2*x])/3 + (4480*E^6*(3 + E^2)*x^3*Log[2*x])/
9 - (2240*E^8*(6 + E^2)*x^3*Log[2*x])/27 + (4480*E^2*(3 + 2*E^2)*x^3*Log[2
*x])/3 - (105*E^8*x^4*Log[2*x])/4 - 210*E^4*(4 + E^2)*x^4*Log[2*x] + (1...
```

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$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7)+(e^4(3584+10$$

3.698.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.698.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 129 vs. 2(14) = 28.

Time = 0.47 (sec) , antiderivative size = 130, normalized size of antiderivative = 8.67

method	result
risch	$e^{16} \ln(2x)^8 + (8x\,e^{14} + 16\,e^{14})\ln(2x)^7 + (28x^2 e^{12} + 112x\,e^{12} + 112\,e^{12})\ln(2x)^6 + 56\,e^{1}$
parallelrisch	$28\,e^4 \ln(2x)^2 x^6 + 8\ln(2x)^7 e^{14} x + 28\ln(2x)^6 e^{12} x^2 + 56\ln(2x)^5 e^{10} x^3 + 70\ln(2x)^4 e^{8}$
parts	Expression too large to display
derivativedivides	Expression too large to display
default	Expression too large to display

input
```
int(((8*exp(2)^8+8*x*exp(2)^7)*ln(2*x)^7+((56*x+112)*exp(2)^7+(56*x^2+112*
x)*exp(2)^6)*ln(2*x)^6+((168*x^2+672*x+672)*exp(2)^6+(168*x^3+672*x^2+672*
x)*exp(2)^5)*ln(2*x)^5+((280*x^3+1680*x^2+3360*x+2240)*exp(2)^5+(280*x^4+1
680*x^3+3360*x^2+2240*x)*exp(2)^4)*ln(2*x)^4+((280*x^4+2240*x^3+6720*x^2+8
960*x+4480)*exp(2)^4+(280*x^5+2240*x^4+6720*x^3+8960*x^2+4480*x)*exp(2)^3)
*ln(2*x)^3+((168*x^5+1680*x^4+6720*x^3+13440*x^2+13440*x+5376)*exp(2)^3+(1
68*x^6+1680*x^5+6720*x^4+13440*x^3+13440*x^2+5376*x)*exp(2)^2)*ln(2*x)^2+(
(56*x^6+672*x^5+3360*x^4+8960*x^3+13440*x^2+10752*x+3584)*exp(2)^2+(56*x^7
+672*x^6+3360*x^5+8960*x^4+13440*x^3+10752*x^2+3584*x)*exp(2))*ln(2*x)+(8*
x^7+112*x^6+672*x^5+2240*x^4+4480*x^3+5376*x^2+3584*x+1024)*exp(2)+8*x^8+1
12*x^7+672*x^6+2240*x^5+4480*x^4+5376*x^3+3584*x^2+1024*x)/x,x,method=_RET
URNVERBOSE)
```

output
```
exp(16)*ln(2*x)^8+(8*x*exp(14)+16*exp(14))*ln(2*x)^7+(28*x^2*exp(12)+112*x
*exp(12)+112*exp(12))*ln(2*x)^6+56*exp(10)*(2+x)^3*ln(2*x)^5+70*exp(8)*(2+
x)^4*ln(2*x)^4+56*exp(6)*(2+x)^5*ln(2*x)^3+28*exp(4)*(2+x)^6*ln(2*x)^2+8*e
xp(2)*(2+x)^7*ln(2*x)+(2+x)^8
```

3.698.

$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2\left(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7\right)+\left(e^4\left(3584+10\right.\right.}{}$$

3.698.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 240 vs. 2(14) = 28.

Time = 0.27 (sec) , antiderivative size = 240, normalized size of antiderivative = 16.00

$$\int \frac{1024x + 3584x^2 + 5376x^3 + 4480x^4 + 2240x^5 + 672x^6 + 112x^7 + 8x^8 + e^2(1024 + 3584x + 5376x^2 + 44}{}$$

$$= 8\,(x+2)e^{14}\log(2\,x)^7 + e^{16}\log(2\,x)^8 + x^8 + 28\,(x^2+4\,x+4)e^{12}\log(2\,x)^6 + 16\,x^7 + 56\,(x^3+6\,x^2+12\,x+8)e^{10}\log(2\,x)^5 + 112\,x^6 + 70\,(x^4+8\,x^3+24\,x^2+32\,x+16)e^8\log(2\,x)^4 + 448\,x^5 + 56\,(x^5+10\,x^4+40\,x^3+80\,x^2+80\,x+32)e^6\log(2\,x)^3 + 1120\,x^4 + 28\,(x^6+12\,x^5+60\,x^4+160\,x^3+240\,x^2+192\,x+64)e^4\log(2\,x)^2 + 1792\,x^3 + 8\,(x^7+14\,x^6+84\,x^5+280\,x^4+560\,x^3+672\,x^2+448\,x+128)e^2\log(2\,x) + 1792\,x^2 + 1024\,x$$

input

```
integrate(((8*exp(2)^8+8*x*exp(2)^7)*log(2*x)^7+((56*x+112)*exp(2)^7+(56*x
^2+112*x)*exp(2)^6)*log(2*x)^6+((168*x^2+672*x+672)*exp(2)^6+(168*x^3+672*
x^2+672*x)*exp(2)^5)*log(2*x)^5+((280*x^3+1680*x^2+3360*x+2240)*exp(2)^5+(
280*x^4+1680*x^3+3360*x^2+2240*x)*exp(2)^4)*log(2*x)^4+((280*x^4+2240*x^3+
6720*x^2+8960*x+4480)*exp(2)^4+(280*x^5+2240*x^4+6720*x^3+8960*x^2+4480*x)
*exp(2)^3)*log(2*x)^3+((168*x^5+1680*x^4+6720*x^3+13440*x^2+13440*x+5376)*
exp(2)^3+(168*x^6+1680*x^5+6720*x^4+13440*x^3+13440*x^2+5376*x)*exp(2)^2)*
log(2*x)^2+((56*x^6+672*x^5+3360*x^4+8960*x^3+13440*x^2+10752*x+3584)*exp(
2)^2+(56*x^7+672*x^6+3360*x^5+8960*x^4+13440*x^3+10752*x^2+3584*x)*exp(2))
*log(2*x)+(8*x^7+112*x^6+672*x^5+2240*x^4+4480*x^3+5376*x^2+3584*x+1024)*e
xp(2)+8*x^8+112*x^7+672*x^6+2240*x^5+4480*x^4+5376*x^3+3584*x^2+1024*x)/x,
x, algorithm=\
```

output

```
8*(x + 2)*e^14*log(2*x)^7 + e^16*log(2*x)^8 + x^8 + 28*(x^2 + 4*x + 4)*e^1
2*log(2*x)^6 + 16*x^7 + 56*(x^3 + 6*x^2 + 12*x + 8)*e^10*log(2*x)^5 + 112*
x^6 + 70*(x^4 + 8*x^3 + 24*x^2 + 32*x + 16)*e^8*log(2*x)^4 + 448*x^5 + 56*
(x^5 + 10*x^4 + 40*x^3 + 80*x^2 + 80*x + 32)*e^6*log(2*x)^3 + 1120*x^4 + 2
8*(x^6 + 12*x^5 + 60*x^4 + 160*x^3 + 240*x^2 + 192*x + 64)*e^4*log(2*x)^2
+ 1792*x^3 + 8*(x^7 + 14*x^6 + 84*x^5 + 280*x^4 + 560*x^3 + 672*x^2 + 448*
x + 128)*e^2*log(2*x) + 1792*x^2 + 1024*x
```

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$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7)+(e^4(3584+10}{}$$

3.698.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 357 vs. $2(14) = 28$.

Time = 0.59 (sec) , antiderivative size = 357, normalized size of antiderivative = 23.80

$$\int \frac{1024x + 3584x^2 + 5376x^3 + 4480x^4 + 2240x^5 + 672x^6 + 112x^7 + 8x^8 + e^2(1024 + 3584x + 5376x^2 + 44}{}$$

$$= x^8 + 16x^7 + 112x^6 + 448x^5 + 1120x^4 + 1792x^3 + 1792x^2 + 1024x + (8xe^{14} + 16e^{14}) \log(2x)^7 + (28x^2e^{12} + 112xe^{12} + 112e^{12}) \log(2x)^6 + (56x^3e^{10} + 336x^2e^{10} + 672xe^{10} + 448e^{10}) \log(2x)^5 + (70x^4e^8 + 560x^3e^8 + 1680x^2e^8 + 2240xe^8 + 1120e^8) \log(2x)^4 + (56x^5e^6 + 560x^4e^6 + 2240x^3e^6 + 4480x^2e^6 + 4480xe^6 + 1792e^6) \log(2x)^3 + (28x^6e^4 + 336x^5e^4 + 1680x^4e^4 + 4480x^3e^4 + 6720x^2e^4 + 5376xe^4 + 1792e^4) \log(2x)^2 + (8x^7e^2 + 112x^6e^2 + 672x^5e^2 + 2240x^4e^2 + 4480x^3e^2 + 5376x^2e^2 + 3584xe^2) \log(2x) + 1024e^2 \log(x) + e^{16} \log(2x)^8$$

input
```
integrate(((8*exp(2)**8+8*x*exp(2)**7)*ln(2*x)**7+((56*x+112)*exp(2)**7+(5
6*x**2+112*x)*exp(2)**6)*ln(2*x)**6+((168*x**2+672*x+672)*exp(2)**6+(168*x
**3+672*x**2+672*x)*exp(2)**5)*ln(2*x)**5+((280*x**3+1680*x**2+3360*x+2240
)*exp(2)**5+(280*x**4+1680*x**3+3360*x**2+2240*x)*exp(2)**4)*ln(2*x)**4+((
280*x**4+2240*x**3+6720*x**2+8960*x+4480)*exp(2)**4+(280*x**5+2240*x**4+67
20*x**3+8960*x**2+4480*x)*exp(2)**3)*ln(2*x)**3+((168*x**5+1680*x**4+6720*
x**3+13440*x**2+13440*x+5376)*exp(2)**3+(168*x**6+1680*x**5+6720*x**4+1344
0*x**3+13440*x**2+5376*x)*exp(2)**2)*ln(2*x)**2+((56*x**6+672*x**5+3360*x*
*4+8960*x**3+13440*x**2+10752*x+3584)*exp(2)**2+(56*x**7+672*x**6+3360*x**
5+8960*x**4+13440*x**3+10752*x**2+3584*x)*exp(2))*ln(2*x)+(8*x**7+112*x**6
+672*x**5+2240*x**4+4480*x**3+5376*x**2+3584*x+1024)*exp(2)+8*x**8+112*x**
7+672*x**6+2240*x**5+4480*x**4+5376*x**3+3584*x**2+1024*x)/x,x)
```

output
```
x**8 + 16*x**7 + 112*x**6 + 448*x**5 + 1120*x**4 + 1792*x**3 + 1792*x**2 +
 1024*x + (8*x*exp(14) + 16*exp(14))*log(2*x)**7 + (28*x**2*exp(12) + 112*
x*exp(12) + 112*exp(12))*log(2*x)**6 + (56*x**3*exp(10) + 336*x**2*exp(10)
 + 672*x*exp(10) + 448*exp(10))*log(2*x)**5 + (70*x**4*exp(8) + 560*x**3*e
xp(8) + 1680*x**2*exp(8) + 2240*x*exp(8) + 1120*exp(8))*log(2*x)**4 + (56*
x**5*exp(6) + 560*x**4*exp(6) + 2240*x**3*exp(6) + 4480*x**2*exp(6) + 4480
*x*exp(6) + 1792*exp(6))*log(2*x)**3 + (28*x**6*exp(4) + 336*x**5*exp(4) +
 1680*x**4*exp(4) + 4480*x**3*exp(4) + 6720*x**2*exp(4) + 5376*x*exp(4) +
1792*exp(4))*log(2*x)**2 + (8*x**7*exp(2) + 112*x**6*exp(2) + 672*x**5*exp
(2) + 2240*x**4*exp(2) + 4480*x**3*exp(2) + 5376*x**2*exp(2) + 3584*x*exp(
2))*log(2*x) + 1024*exp(2)*log(x) + exp(16)*log(2*x)**8
```

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$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7)+(e^4(3584+10}{}$$

3.698.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1620 vs. $2(14) = 28$.

Time = 0.24 (sec) , antiderivative size = 1620, normalized size of antiderivative = 108.00

$$\int \frac{1024x + 3584x^2 + 5376x^3 + 4480x^4 + 2240x^5 + 672x^6 + 112x^7 + 8x^8 + e^2(1024 + 3584x + 5376x^2 + 44}{}$$

= Too large to display

input
```
integrate(((8*exp(2)^8+8*x*exp(2)^7)*log(2*x)^7+((56*x+112)*exp(2)^7+(56*x
^2+112*x)*exp(2)^6)*log(2*x)^6+((168*x^2+672*x+672)*exp(2)^6+(168*x^3+672*
x^2+672*x)*exp(2)^5)*log(2*x)^5+((280*x^3+1680*x^2+3360*x+2240)*exp(2)^5+(
280*x^4+1680*x^3+3360*x^2+2240*x)*exp(2)^4)*log(2*x)^4+((280*x^4+2240*x^3+
6720*x^2+8960*x+4480)*exp(2)^4+(280*x^5+2240*x^4+6720*x^3+8960*x^2+4480*x)
*exp(2)^3)*log(2*x)^3+((168*x^5+1680*x^4+6720*x^3+13440*x^2+13440*x+5376)*
exp(2)^3+(168*x^6+1680*x^5+6720*x^4+13440*x^3+13440*x^2+5376*x)*exp(2)^2)*
log(2*x)^2+((56*x^6+672*x^5+3360*x^4+8960*x^3+13440*x^2+10752*x+3584)*exp(
2)^2+(56*x^7+672*x^6+3360*x^5+8960*x^4+13440*x^3+10752*x^2+3584*x)*exp(2))
*log(2*x)+(8*x^7+112*x^6+672*x^5+2240*x^4+4480*x^3+5376*x^2+3584*x+1024)*e
xp(2)+8*x^8+112*x^7+672*x^6+2240*x^5+4480*x^4+5376*x^3+3584*x^2+1024*x)/x,
x, algorithm=\
```

output
```
e^16*log(2*x)^8 + x^8 + 14/9*(18*log(2*x)^2 - 6*log(2*x) + 1)*x^6*e^4 + 8/
7*x^7*e^2 + 16*e^14*log(2*x)^7 + 16*x^7 + 56/125*(125*log(2*x)^3 - 75*log(
2*x)^2 + 30*log(2*x) - 6)*x^5*e^6 + 168/125*(25*log(2*x)^2 - 10*log(2*x) +
 2)*x^5*e^6 + 336/25*(25*log(2*x)^2 - 10*log(2*x) + 2)*x^5*e^4 + 56/3*x^6*
e^2 + 112*e^12*log(2*x)^6 + 112*x^6 + 35/16*(32*log(2*x)^4 - 32*log(2*x)^3
 + 24*log(2*x)^2 - 12*log(2*x) + 3)*x^4*e^8 + 35/16*(32*log(2*x)^3 - 24*lo
g(2*x)^2 + 12*log(2*x) - 3)*x^4*e^8 + 35/2*(32*log(2*x)^3 - 24*log(2*x)^2
+ 12*log(2*x) - 3)*x^4*e^6 + 105/2*(8*log(2*x)^2 - 4*log(2*x) + 1)*x^4*e^6
 + 210*(8*log(2*x)^2 - 4*log(2*x) + 1)*x^4*e^4 + 672/5*x^5*e^2 + 448*e^10*
log(2*x)^5 + 448*x^5 + 56/81*(81*log(2*x)^5 - 135*log(2*x)^4 + 180*log(2*x
)^3 - 180*log(2*x)^2 + 120*log(2*x) - 40)*x^3*e^10 + 280/81*(27*log(2*x)^4
 - 36*log(2*x)^3 + 36*log(2*x)^2 - 24*log(2*x) + 8)*x^3*e^10 + 560/27*(27*
log(2*x)^4 - 36*log(2*x)^3 + 36*log(2*x)^2 - 24*log(2*x) + 8)*x^3*e^8 + 22
40/27*(9*log(2*x)^3 - 9*log(2*x)^2 + 6*log(2*x) - 2)*x^3*e^8 + 2240/9*(9*l
og(2*x)^3 - 9*log(2*x)^2 + 6*log(2*x) - 2)*x^3*e^6 + 2240/9*(9*log(2*x)^2
- 6*log(2*x) + 2)*x^3*e^6 + 4480/9*(9*log(2*x)^2 - 6*log(2*x) + 2)*x^3*e^4
 + 560*x^4*e^2 + 1120*e^8*log(2*x)^4 + 1120*x^4 + 7*(4*log(2*x)^6 - 12*log
(2*x)^5 + 30*log(2*x)^4 - 60*log(2*x)^3 + 90*log(2*x)^2 - 90*log(2*x) + 45
)*x^2*e^12 + 21*(4*log(2*x)^5 - 10*log(2*x)^4 + 20*log(2*x)^3 - 30*log(2*x
)^2 + 30*log(2*x) - 15)*x^2*e^12 + 84*(4*log(2*x)^5 - 10*log(2*x)^4 + 2...
```

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$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2\left(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7\right)+\left(e^4\left(3584+10\right.\right.}{}$$

3.698.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 448 vs. 2(14) = 28.

Time = 0.35 (sec) , antiderivative size = 448, normalized size of antiderivative = 29.87

$$\int \frac{1024x + 3584x^2 + 5376x^3 + 4480x^4 + 2240x^5 + 672x^6 + 112x^7 + 8x^8 + e^2(1024 + 3584x + 5376x^2 + 44}{}$$

$$= 8\,x^7e^2\log(2\,x) + 28\,x^6e^4\log(2\,x)^2 + 56\,x^5e^6\log(2\,x)^3 + 70\,x^4e^8\log(2\,x)^4 + 56\,x^3e^{10}\log(2\,x)^5 + 28\,x^2e^{12}\log(2\,x)^6 + 8\,xe^{14}\log(2\,x)^7 + e^{16}\log(2\,x)^8 + x^8 + 112\,x^6e^2\log(2\,x) + 336\,x^5e^4\log(2\,x)^2 + 560\,x^4e^6\log(2\,x)^3 + 560\,x^3e^8\log(2\,x)^4 + 336\,x^2e^{10}\log(2\,x)^5 + 112\,xe^{12}\log(2\,x)^6 + 16\,e^{14}\log(2\,x)^7 + 16\,x^7 + 672\,x^5e^2\log(2\,x) + 1680\,x^4e^4\log(2\,x)^2 + 2240\,x^3e^6\log(2\,x)^3 + 1680\,x^2e^8\log(2\,x)^4 + 672\,xe^{10}\log(2\,x)^5 + 112\,e^{12}\log(2\,x)^6 + 112\,x^6 + 2240\,x^4e^2\log(2\,x) + 4480\,x^3e^4\log(2\,x)^2 + 4480\,x^2e^6\log(2\,x)^3 + 2240\,xe^8\log(2\,x)^4 + 448\,e^{10}\log(2\,x)^5 + 448\,x^5 + 4480\,x^3e^2\log(2\,x) + 6720\,x^2e^4\log(2\,x)^2 + 4480\,xe^6\log(2\,x)^3 + 1120\,e^8\log(2\,x)^4 + 1120\,x^4 + 5376\,x^2e^2\log(2\,x) + 5376\,xe^4\log(2\,x)^2 + 1792\,e^6\log(2\,x)^3 + 1792\,x^3 + 3584\,xe^2\log(2\,x) + 1792\,e^4\log(2\,x)^2 + 1792\,x^2 + 1024\,e^2\log(x) + 1024\,x$$

input
```
integrate(((8*exp(2)^8+8*x*exp(2)^7)*log(2*x)^7+((56*x+112)*exp(2)^7+(56*x
^2+112*x)*exp(2)^6)*log(2*x)^6+((168*x^2+672*x+672)*exp(2)^6+(168*x^3+672*
x^2+672*x)*exp(2)^5)*log(2*x)^5+((280*x^3+1680*x^2+3360*x+2240)*exp(2)^5+(
280*x^4+1680*x^3+3360*x^2+2240*x)*exp(2)^4)*log(2*x)^4+((280*x^4+2240*x^3+
6720*x^2+8960*x+4480)*exp(2)^4+(280*x^5+2240*x^4+6720*x^3+8960*x^2+4480*x)
*exp(2)^3)*log(2*x)^3+((168*x^5+1680*x^4+6720*x^3+13440*x^2+13440*x+5376)*
exp(2)^3+(168*x^6+1680*x^5+6720*x^4+13440*x^3+13440*x^2+5376*x)*exp(2)^2)*
log(2*x)^2+((56*x^6+672*x^5+3360*x^4+8960*x^3+13440*x^2+10752*x+3584)*exp(
2)^2+(56*x^7+672*x^6+3360*x^5+8960*x^4+13440*x^3+10752*x^2+3584*x)*exp(2))
*log(2*x)+(8*x^7+112*x^6+672*x^5+2240*x^4+4480*x^3+5376*x^2+3584*x+1024)*e
xp(2)+8*x^8+112*x^7+672*x^6+2240*x^5+4480*x^4+5376*x^3+3584*x^2+1024*x)/x,
x, algorithm=\
```


$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7)+(e^4(3584+10}{}$$

output
```
8*x^7*e^2*log(2*x) + 28*x^6*e^4*log(2*x)^2 + 56*x^5*e^6*log(2*x)^3 + 70*x^
4*e^8*log(2*x)^4 + 56*x^3*e^10*log(2*x)^5 + 28*x^2*e^12*log(2*x)^6 + 8*x*e
^14*log(2*x)^7 + e^16*log(2*x)^8 + x^8 + 112*x^6*e^2*log(2*x) + 336*x^5*e^
4*log(2*x)^2 + 560*x^4*e^6*log(2*x)^3 + 560*x^3*e^8*log(2*x)^4 + 336*x^2*e
^10*log(2*x)^5 + 112*x*e^12*log(2*x)^6 + 16*e^14*log(2*x)^7 + 16*x^7 + 672
*x^5*e^2*log(2*x) + 1680*x^4*e^4*log(2*x)^2 + 2240*x^3*e^6*log(2*x)^3 + 16
80*x^2*e^8*log(2*x)^4 + 672*x*e^10*log(2*x)^5 + 112*e^12*log(2*x)^6 + 112*
x^6 + 2240*x^4*e^2*log(2*x) + 4480*x^3*e^4*log(2*x)^2 + 4480*x^2*e^6*log(2
*x)^3 + 2240*x*e^8*log(2*x)^4 + 448*e^10*log(2*x)^5 + 448*x^5 + 4480*x^3*e
^2*log(2*x) + 6720*x^2*e^4*log(2*x)^2 + 4480*x*e^6*log(2*x)^3 + 1120*e^8*l
og(2*x)^4 + 1120*x^4 + 5376*x^2*e^2*log(2*x) + 5376*x*e^4*log(2*x)^2 + 179
2*e^6*log(2*x)^3 + 1792*x^3 + 3584*x*e^2*log(2*x) + 1792*e^4*log(2*x)^2 +
1792*x^2 + 1024*e^2*log(x) + 1024*x
```

3.698.9 Mupad [B] (verification not implemented)

Time = 20.56 (sec) , antiderivative size = 448, normalized size of antiderivative = 29.87

$$\int \frac{1024x + 3584x^2 + 5376x^3 + 4480x^4 + 2240x^5 + 672x^6 + 112x^7 + 8x^8 + e^2(1024 + 3584x + 5376x^2 + 44}{}$$

$$= 1024\,x + 1792\ln(2\,x)^2\,e^4 + 1792\ln(2\,x)^3\,e^6 + 1120\ln(2\,x)^4\,e^8 + 448\ln(2\,x)^5\,e^{10} + 112\ln(2\,x)^6\,e^{12} + 16\ln(2\,x)^7\,e^{14} + \ln(2\,x)^8\,e^{16} + 1024\,e^2\,\ln(x) + 1792\,x^2 + 1792\,x^3 + 1120\,x^4 + 448\,x^5 + 112\,x^6 + 16\,x^7 + x^8 + 6720\,x^2\ln(2\,x)^2\,e^4 + 4480\,x^3\ln(2\,x)^2\,e^4 + 1680\,x^4\ln(2\,x)^2\,e^4 + 4480\,x^2\ln(2\,x)^3\,e^6 + 336\,x^5\ln(2\,x)^2\,e^4 + 2240\,x^3\ln(2\,x)^3\,e^6 + 28\,x^6\ln(2\,x)^2\,e^4 + 560\,x^4\ln(2\,x)^3\,e^6 + 1680\,x^2\ln(2\,x)^4\,e^8 + 56\,x^5\ln(2\,x)^3\,e^6 + 560\,x^3\ln(2\,x)^4\,e^8 + 70\,x^4\ln(2\,x)^4\,e^8 + 336\,x^2\ln(2\,x)^5\,e^{10} + 56\,x^3\ln(2\,x)^5\,e^{10} + 28\,x^2\ln(2\,x)^6\,e^{12} + 3584\,x\,\ln(2\,x)\,e^2 + 5376\,x^2\,\ln(2\,x)\,e^2 + 4480\,x^3\,\ln(2\,x)\,e^2 + 5376\,x\ln(2\,x)^2\,e^4 + 2240\,x^4\,\ln(2\,x)\,e^2 + 672\,x^5\,\ln(2\,x)\,e^2 + 112\,x^6\,\ln(2\,x)\,e^2 + 4480\,x\ln(2\,x)^3\,e^6 + 8\,x^7\,\ln(2\,x)\,e^2 + 2240\,x\ln(2\,x)^4\,e^8 + 672\,x\ln(2\,x)^5\,e^{10} + 112\,x\ln(2\,x)^6\,e^{12} + 8\,x\ln(2\,x)^7\,e^{14}$$

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$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7)+(e^4(3584+10}{}$$

input
```
int((1024*x + exp(2)*(3584*x + 5376*x^2 + 4480*x^3 + 2240*x^4 + 672*x^5 +
112*x^6 + 8*x^7 + 1024) + log(2*x)^2*(exp(4)*(5376*x + 13440*x^2 + 13440*x
^3 + 6720*x^4 + 1680*x^5 + 168*x^6) + exp(6)*(13440*x + 13440*x^2 + 6720*x
^3 + 1680*x^4 + 168*x^5 + 5376)) + log(2*x)*(exp(4)*(10752*x + 13440*x^2 +
 8960*x^3 + 3360*x^4 + 672*x^5 + 56*x^6 + 3584) + exp(2)*(3584*x + 10752*x
^2 + 13440*x^3 + 8960*x^4 + 3360*x^5 + 672*x^6 + 56*x^7)) + log(2*x)^7*(8*
exp(16) + 8*x*exp(14)) + log(2*x)^4*(exp(10)*(3360*x + 1680*x^2 + 280*x^3
+ 2240) + exp(8)*(2240*x + 3360*x^2 + 1680*x^3 + 280*x^4)) + log(2*x)^6*(e
xp(12)*(112*x + 56*x^2) + exp(14)*(56*x + 112)) + 3584*x^2 + 5376*x^3 + 44
80*x^4 + 2240*x^5 + 672*x^6 + 112*x^7 + 8*x^8 + log(2*x)^3*(exp(8)*(8960*x
 + 6720*x^2 + 2240*x^3 + 280*x^4 + 4480) + exp(6)*(4480*x + 8960*x^2 + 672
0*x^3 + 2240*x^4 + 280*x^5)) + log(2*x)^5*(exp(12)*(672*x + 168*x^2 + 672)
 + exp(10)*(672*x + 672*x^2 + 168*x^3)))/x,x)
```

output
```
1024*x + 1792*log(2*x)^2*exp(4) + 1792*log(2*x)^3*exp(6) + 1120*log(2*x)^4
*exp(8) + 448*log(2*x)^5*exp(10) + 112*log(2*x)^6*exp(12) + 16*log(2*x)^7*
exp(14) + log(2*x)^8*exp(16) + 1024*exp(2)*log(x) + 1792*x^2 + 1792*x^3 +
1120*x^4 + 448*x^5 + 112*x^6 + 16*x^7 + x^8 + 6720*x^2*log(2*x)^2*exp(4) +
 4480*x^3*log(2*x)^2*exp(4) + 1680*x^4*log(2*x)^2*exp(4) + 4480*x^2*log(2*
x)^3*exp(6) + 336*x^5*log(2*x)^2*exp(4) + 2240*x^3*log(2*x)^3*exp(6) + 28*
x^6*log(2*x)^2*exp(4) + 560*x^4*log(2*x)^3*exp(6) + 1680*x^2*log(2*x)^4*ex
p(8) + 56*x^5*log(2*x)^3*exp(6) + 560*x^3*log(2*x)^4*exp(8) + 70*x^4*log(2
*x)^4*exp(8) + 336*x^2*log(2*x)^5*exp(10) + 56*x^3*log(2*x)^5*exp(10) + 28
*x^2*log(2*x)^6*exp(12) + 3584*x*log(2*x)*exp(2) + 5376*x^2*log(2*x)*exp(2
) + 4480*x^3*log(2*x)*exp(2) + 5376*x*log(2*x)^2*exp(4) + 2240*x^4*log(2*x
)*exp(2) + 672*x^5*log(2*x)*exp(2) + 112*x^6*log(2*x)*exp(2) + 4480*x*log(
2*x)^3*exp(6) + 8*x^7*log(2*x)*exp(2) + 2240*x*log(2*x)^4*exp(8) + 672*x*l
og(2*x)^5*exp(10) + 112*x*log(2*x)^6*exp(12) + 8*x*log(2*x)^7*exp(14)
```

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$$\int \frac{1024x+3584x^2+5376x^3+4480x^4+2240x^5+672x^6+112x^7+8x^8+e^2(1024+3584x+5376x^2+4480x^3+2240x^4+672x^5+112x^6+8x^7)+(e^4(3584+10}{}$$

3.699 $\int \frac{16-48 \log \left(\frac{-32-7x}{4+x}\right)+48 \log ^2\left(\frac{-32-7x}{4+x}\right)-16 \log ^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2} \, dx$

3.699.1 Optimal result

Integrand size = 61, antiderivative size = 16

$$\int \frac{16-48 \log \left(\frac{-32-7x}{4+x}\right)+48 \log ^2\left(\frac{-32-7x}{4+x}\right)-16 \log ^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2} \, dx = 261+\left(-1+\log \left(-8+\frac{x}{4+x}\right)\right)^4$$

output
```
(ln(x/(4+x)-8)-1)^4+261
```

3.699.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 77 vs. 2(16) = 32.

Time = 2.29 (sec) , antiderivative size = 77, normalized size of antiderivative = 4.81

$$\int \frac{16-48 \log \left(\frac{-32-7x}{4+x}\right)+48 \log ^2\left(\frac{-32-7x}{4+x}\right)-16 \log ^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2} \, dx = -16\left(\frac{1}{4}\log \left(-\frac{32+7x}{4+x}\right)-\frac{3}{8}\log ^2\left(-\frac{32+7x}{4+x}\right)+\frac{1}{4}\log ^3\left(-\frac{32+7x}{4+x}\right)-\frac{1}{16}\log ^4\left(-\frac{32+7x}{4+x}\right)\right)$$

input
```
Integrate[(16 - 48*Log[(-32 - 7*x)/(4 + x)] + 48*Log[(-32 - 7*x)/(4 + x)]^
2 - 16*Log[(-32 - 7*x)/(4 + x)]^3)/(128 + 60*x + 7*x^2),x]
```

output
```
-16*(Log[-((32 + 7*x)/(4 + x))]/4 - (3*Log[-((32 + 7*x)/(4 + x))]^2)/8 + L
og[-((32 + 7*x)/(4 + x))]^3/4 - Log[-((32 + 7*x)/(4 + x))]^4/16)
```

3.699.3 Rubi [A] (warning: unable to verify)

Time = 0.40 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.098, Rules used = {7239, 27, 2975, 2962, 2739, 15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-16\log^3\left(\frac{-7x-32}{x+4}\right)+48\log^2\left(\frac{-7x-32}{x+4}\right)-48\log\left(\frac{-7x-32}{x+4}\right)+16}{7x^2+60x+128}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{16\left(1-\log\left(-\frac{7x+32}{x+4}\right)\right)^3}{7x^2+60x+128}dx$$

$$\Big\downarrow \text{ 27}$$

$$16\int \frac{\left(1-\log\left(-\frac{7x+32}{x+4}\right)\right)^3}{7x^2+60x+128}dx$$

$$\Big\downarrow \text{ 2975}$$

$$16\int \frac{\left(1-\log\left(-\frac{7x+32}{x+4}\right)\right)^3}{(x+4)(7x+32)}dx$$

$$\Big\downarrow \text{ 2962}$$

$$-4\int \frac{(x+4)\left(1-\log\left(-\frac{7x+32}{x+4}\right)\right)^3}{7x+32}d\frac{7x+32}{x+4}$$

$$\Big\downarrow \text{ 2739}$$

$$4\int \frac{(7x+32)^3}{(x+4)^3}d\left(1-\log\left(-\frac{7x+32}{x+4}\right)\right)$$

$$\Big\downarrow \text{ 15}$$

$$\frac{(7x+32)^4}{(x+4)^4}$$

input
```
Int[(16 - 48*Log[(-32 - 7*x)/(4 + x)] + 48*Log[(-32 - 7*x)/(4 + x)]^2 - 16
*Log[(-32 - 7*x)/(4 + x)]^3)/(128 + 60*x + 7*x^2),x]
```

output
```
(32 + 7*x)^4/(4 + x)^4
```

3.699.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2739
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Simp[1/(
b*n)   Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p}
, x]
```

rule 2962
```
Int[((A_.) + Log[(e_.)*((a_.) + (b_.)*(x_))^(n_.)*((c_.) + (d_.)*(x_))^(mn_
)]*(B_.))^(p_.)*((f_.) + (g_.)*(x_))^(m_.)*((h_.) + (i_.)*(x_))^(q_.), x_Sy
mbol] :> Simp[(b*c - a*d)^(m + q + 1)*(g/b)^m*(i/d)^q   Subst[Int[x^m*((A +
 B*Log[e*x^n])^p/(b - d*x)^(m + q + 2)), x], x, (a + b*x)/(c + d*x)], x] /;
 FreeQ[{a, b, c, d, e, f, g, h, i, A, B, n, p}, x] && EqQ[n + mn, 0] && IGt
Q[n, 0] && NeQ[b*c - a*d, 0] && EqQ[b*f - a*g, 0] && EqQ[d*h - c*i, 0] && I
ntegersQ[m, q]
```

rule 2975
```
Int[((A_.) + Log[(e_.)*((a_.) + (b_.)*(x_))^(n_.)*((c_.) + (d_.)*(x_))^(mn_
)]*(B_.))^(p_.)*((f_.) + (g_.)*(x_) + (h_.)*(x_)^2)^(m_.), x_Symbol] :> Sim
p[h^m/(b^m*d^m)   Int[(a + b*x)^m*(c + d*x)^m*(A + B*Log[e*((a + b*x)^n/(c
+ d*x)^n)])^p, x], x] /; FreeQ[{a, b, c, d, e, f, g, h, A, B, n, p}, x] &&
EqQ[n + mn, 0] && IGtQ[n, 0] && EqQ[b*d*f - a*c*h, 0] && EqQ[b*d*g - h*(b*c
 + a*d), 0] && IntegerQ[m]
```

3.699. $\int \frac{16-48\log\left(\frac{-32-7x}{4+x}\right)+48\log^2\left(\frac{-32-7x}{4+x}\right)-16\log^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2}\,dx$

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.699.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(16) = 32$.

Time = 2.35 (sec) , antiderivative size = 54, normalized size of antiderivative = 3.38

method	result
derivativedivides	$\ln\left(-7-\frac{4}{4+x}\right)^{4}-4\ln\left(-7-\frac{4}{4+x}\right)^{3}+6\ln\left(-7-\frac{4}{4+x}\right)^{2}-4\ln\left(-7-\frac{4}{4+x}\right)$
default	$\ln\left(-7-\frac{4}{4+x}\right)^{4}-4\ln\left(-7-\frac{4}{4+x}\right)^{3}+6\ln\left(-7-\frac{4}{4+x}\right)^{2}-4\ln\left(-7-\frac{4}{4+x}\right)$
risch	$-4\ln(7x+32)+4\ln(4+x)+6\ln\left(-7-\frac{4}{4+x}\right)^{2}-4\ln\left(-7-\frac{4}{4+x}\right)^{3}+\ln\left(-7-\frac{4}{4+x}\right)^{4}$
parts	$-4\ln(7x+32)+4\ln(4+x)+6\ln\left(-7-\frac{4}{4+x}\right)^{2}-4\ln\left(-7-\frac{4}{4+x}\right)^{3}+\ln\left(-7-\frac{4}{4+x}\right)^{4}$
norman	$\ln\left(\frac{-7x-32}{4+x}\right)^{4}-4\ln\left(\frac{-7x-32}{4+x}\right)+6\ln\left(\frac{-7x-32}{4+x}\right)^{2}-4\ln\left(\frac{-7x-32}{4+x}\right)^{3}$

input
```
int((-16*ln((-7*x-32)/(4+x))^3+48*ln((-7*x-32)/(4+x))^2-48*ln((-7*x-32)/(4
+x))+16)/(7*x^2+60*x+128),x,method=_RETURNVERBOSE)
```

output
```
ln(-7-4/(4+x))^4-4*ln(-7-4/(4+x))^3+6*ln(-7-4/(4+x))^2-4*ln(-7-4/(4+x))
```

3.699.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(16) = 32$.

Time = 0.26 (sec) , antiderivative size = 65, normalized size of antiderivative = 4.06

$$\int \frac{16-48\log\left(\frac{-32-7x}{4+x}\right)+48\log^2\left(\frac{-32-7x}{4+x}\right)-16\log^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2}\,dx$$
$$=\log\left(-\frac{7\,x+32}{x+4}\right)^4-4\,\log\left(-\frac{7\,x+32}{x+4}\right)^3+6\,\log\left(-\frac{7\,x+32}{x+4}\right)^2-4\,\log\left(-\frac{7\,x+32}{x+4}\right)$$

input
```
integrate((-16*log((-7*x-32)/(4+x))^3+48*log((-7*x-32)/(4+x))^2-48*log((-7
*x-32)/(4+x))+16)/(7*x^2+60*x+128),x, algorithm=\
```

output
```
log(-(7*x + 32)/(x + 4))^4 - 4*log(-(7*x + 32)/(x + 4))^3 + 6*log(-(7*x +
32)/(x + 4))^2 - 4*log(-(7*x + 32)/(x + 4))
```

3.699.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(12) = 24$.

Time = 0.11 (sec) , antiderivative size = 58, normalized size of antiderivative = 3.62

$$\int \frac{16-48\log\left(\frac{-32-7x}{4+x}\right)+48\log^2\left(\frac{-32-7x}{4+x}\right)-16\log^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2}\,dx$$
$$=\log\left(\frac{-7x-32}{x+4}\right)^4-4\log\left(\frac{-7x-32}{x+4}\right)^3+6\log\left(\frac{-7x-32}{x+4}\right)^2+4\log(x+4)-4\log\left(x+\frac{32}{7}\right)$$

input
```
integrate((-16*ln((-7*x-32)/(4+x))**3+48*ln((-7*x-32)/(4+x))**2-48*ln((-7*
x-32)/(4+x))+16)/(7*x**2+60*x+128),x)
```

output
```
log((-7*x - 32)/(x + 4))**4 - 4*log((-7*x - 32)/(x + 4))**3 + 6*log((-7*x
- 32)/(x + 4))**2 + 4*log(x + 4) - 4*log(x + 32/7)
```

3.699.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 411 vs. $2(16) = 32$.

Time = 0.22 (sec) , antiderivative size = 411, normalized size of antiderivative = 25.69

$$\int \frac{16-48\log\left(\frac{-32-7x}{4+x}\right)+48\log^2\left(\frac{-32-7x}{4+x}\right)-16\log^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2}\,dx = -\log\left(7\,x+32\right)^4$$
$$+4\,\log\left(7\,x+32\right)^3\log\left(x+4\right)-6\,\log\left(7\,x+32\right)^2\log\left(x+4\right)^2+4\,\log\left(7\,x+32\right)\log\left(x+4\right)^3$$
$$-\log\left(x+4\right)^4+4\left(\log\left(7\,x+32\right)-\log\left(x+4\right)\right)\log\left(-\frac{7\,x}{x+4}-\frac{32}{x+4}\right)^3-4\,\log\left(7\,x+32\right)^3$$
$$+12\,\log\left(7\,x+32\right)^2\log\left(x+4\right)-12\,\log\left(7\,x+32\right)\log\left(x+4\right)^2+4\,\log\left(x+4\right)^3$$
$$-6\left(\log\left(7\,x+32\right)^2-2\,\log\left(7\,x+32\right)\log\left(x+4\right)+\log\left(x+4\right)^2\right)\log\left(-\frac{7\,x}{x+4}-\frac{32}{x+4}\right)^2$$
$$-12\left(\log\left(7\,x+32\right)-\log\left(x+4\right)\right)\log\left(-\frac{7\,x}{x+4}-\frac{32}{x+4}\right)^2$$
$$-6\,\log\left(7\,x+32\right)^2+12\,\log\left(7\,x+32\right)\log\left(x+4\right)-6\,\log\left(x+4\right)^2$$
$$+4\left(\log\left(7\,x+32\right)^3-3\,\log\left(7\,x+32\right)^2\log\left(x+4\right)+3\,\log\left(7\,x+32\right)\log\left(x+4\right)^2-\log\left(x+4\right)^3\right)\log\left(-\frac{7\,x}{x+4}-\frac{32}{x+4}\right)$$
$$+12\left(\log\left(7\,x+32\right)^2-2\,\log\left(7\,x+32\right)\log\left(x+4\right)+\log\left(x+4\right)^2\right)\log\left(-\frac{7\,x}{x+4}-\frac{32}{x+4}\right)$$
$$+12\left(\log\left(7\,x+32\right)-\log\left(x+4\right)\right)\log\left(-\frac{7\,x}{x+4}-\frac{32}{x+4}\right)-4\,\log\left(7\,x+32\right)+4\,\log\left(x+4\right)$$

input
```
integrate((-16*log((-7*x-32)/(4+x))^3+48*log((-7*x-32)/(4+x))^2-48*log((-7
*x-32)/(4+x))+16)/(7*x^2+60*x+128),x, algorithm=\
```

output
```
-log(7*x + 32)^4 + 4*log(7*x + 32)^3*log(x + 4) - 6*log(7*x + 32)^2*log(x
+ 4)^2 + 4*log(7*x + 32)*log(x + 4)^3 - log(x + 4)^4 + 4*(log(7*x + 32) -
log(x + 4))*log(-7*x/(x + 4) - 32/(x + 4))^3 - 4*log(7*x + 32)^3 + 12*log(
7*x + 32)^2*log(x + 4) - 12*log(7*x + 32)*log(x + 4)^2 + 4*log(x + 4)^3 -
6*(log(7*x + 32)^2 - 2*log(7*x + 32)*log(x + 4) + log(x + 4)^2)*log(-7*x/(
x + 4) - 32/(x + 4))^2 - 12*(log(7*x + 32) - log(x + 4))*log(-7*x/(x + 4)
- 32/(x + 4))^2 - 6*log(7*x + 32)^2 + 12*log(7*x + 32)*log(x + 4) - 6*log(
x + 4)^2 + 4*(log(7*x + 32)^3 - 3*log(7*x + 32)^2*log(x + 4) + 3*log(7*x +
 32)*log(x + 4)^2 - log(x + 4)^3)*log(-7*x/(x + 4) - 32/(x + 4)) + 12*(log
(7*x + 32)^2 - 2*log(7*x + 32)*log(x + 4) + log(x + 4)^2)*log(-7*x/(x + 4)
 - 32/(x + 4)) + 12*(log(7*x + 32) - log(x + 4))*log(-7*x/(x + 4) - 32/(x
+ 4)) - 4*log(7*x + 32) + 4*log(x + 4)
```

3.699. $\int \frac{16-48\log\left(\frac{-32-7x}{4+x}\right)+48\log^2\left(\frac{-32-7x}{4+x}\right)-16\log^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2}\,dx$

3.699.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(16) = 32$.

Time = 0.28 (sec) , antiderivative size = 65, normalized size of antiderivative = 4.06

$$\int \frac{16-48\log\left(\frac{-32-7x}{4+x}\right)+48\log^2\left(\frac{-32-7x}{4+x}\right)-16\log^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2}\,dx$$
$$=\log\left(-\frac{7\,x+32}{x+4}\right)^4-4\,\log\left(-\frac{7\,x+32}{x+4}\right)^3+6\,\log\left(-\frac{7\,x+32}{x+4}\right)^2-4\,\log\left(-\frac{7\,x+32}{x+4}\right)$$

input
```
integrate((-16*log((-7*x-32)/(4+x))^3+48*log((-7*x-32)/(4+x))^2-48*log((-7
*x-32)/(4+x))+16)/(7*x^2+60*x+128),x, algorithm=\
```

output
```
log(-(7*x + 32)/(x + 4))^4 - 4*log(-(7*x + 32)/(x + 4))^3 + 6*log(-(7*x +
32)/(x + 4))^2 - 4*log(-(7*x + 32)/(x + 4))
```

3.699.9 Mupad [B] (verification not implemented)

Time = 16.50 (sec) , antiderivative size = 61, normalized size of antiderivative = 3.81

$$\int \frac{16-48\log\left(\frac{-32-7x}{4+x}\right)+48\log^2\left(\frac{-32-7x}{4+x}\right)-16\log^3\left(\frac{-32-7x}{4+x}\right)}{128+60x+7x^2}\,dx$$
$$=\ln\left(-\frac{7\,x+32}{x+4}\right)^4-4\ln\left(-\frac{7\,x+32}{x+4}\right)^3+6\ln\left(-\frac{7\,x+32}{x+4}\right)^2+\operatorname{atan}\left(\frac{x\,7\mathrm{i}}{2}+15\mathrm{i}\right)\,8\mathrm{i}$$

input
```
int(-(48*log(-(7*x + 32)/(x + 4)) - 48*log(-(7*x + 32)/(x + 4))^2 + 16*log
(-(7*x + 32)/(x + 4))^3 - 16)/(60*x + 7*x^2 + 128),x)
```

output
```
atan((x*7i)/2 + 15i)*8i + 6*log(-(7*x + 32)/(x + 4))^2 - 4*log(-(7*x + 32)
/(x + 4))^3 + log(-(7*x + 32)/(x + 4))^4
```

3.700 $\int \frac{\left(e^3\left(-4x^3+4x^4\right)+e^6\left(2x^3-6x^4+4x^5\right)\right)\log\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right)+(-}{20-40x+20x^2+e^3\left(40x-80x^2+\right.}$

3.700.1 Optimal result

Integrand size = 189, antiderivative size = 34

$$\int \frac{\left(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5)\right)\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+\left(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3\right.}{20-40x+20x^2+e^3\left(40x-80x^2+40x^3\right)+e^6\left(-20x+60x^2-60x^3\right.}$$
$$=\frac{1}{4}\left(2-\frac{x^2\log^2\left(x-\left(\frac{1}{e^3}+x\right)^2\right)}{-5+\frac{5}{x}}\right)$$

output
```
1/2-1/4*x^2*ln(x-(exp(-3)+x)^2)^2/(5/x-5)
```

3.700.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.97

$$\int \frac{\left(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5)\right)\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+\left(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3\right.}{20-40x+20x^2+e^3\left(40x-80x^2+40x^3\right)+e^6\left(-20x+60x^2-60x^3\right.}$$
$$=\frac{x^3\log^2\left(-\frac{1}{e^6}+x-\frac{2x}{e^3}-x^2\right)}{20(-1+x)}$$

3.700. $\int \frac{\left(e^3\left(-4x^3+4x^4\right)+e^6\left(2x^3-6x^4+4x^5\right)\right)\log\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right)+\left(-3x^2+2x^3+e^3\left(-6x^3+4x^4\right)+e^6\left(3x^3-5x^4+2x^5\right)\right)\log^2\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right.}{}$

input
```
Integrate[((E^3*(-4*x^3 + 4*x^4) + E^6*(2*x^3 - 6*x^4 + 4*x^5))*Log[(-1 -
2*E^3*x + E^6*(x - x^2))/E^6] + (-3*x^2 + 2*x^3 + E^3*(-6*x^3 + 4*x^4) + E
^6*(3*x^3 - 5*x^4 + 2*x^5))*Log[(-1 - 2*E^3*x + E^6*(x - x^2))/E^6]^2)/(20
 - 40*x + 20*x^2 + E^3*(40*x - 80*x^2 + 40*x^3) + E^6*(-20*x + 60*x^2 - 60
*x^3 + 20*x^4)),x]
```

output
```
(x^3*Log[-E^(-6) + x - (2*x)/E^3 - x^2]^2)/(20*(-1 + x))
```

3.700.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 20.64 (sec) , antiderivative size = 3616, normalized size of antiderivative = 106.35, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.032$, Rules used = {2463, 7239, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(2x^3-3x^2+e^3\left(4x^4-6x^3\right)+e^6\left(2x^5-5x^4+3x^3\right)\right)\log^2\left(\frac{e^6\left(x-x^2\right)-2e^3x-1}{e^6}\right)+\left(e^3\left(4x^4-4x^3\right)+e^6\left(4x^5-6x^4\right.\right.}{20x^2+e^3\left(40x^3-80x^2+40x\right)+e^6\left(20x^4-60x^3+60x^2-20x\right)-40x+20}$$

$\Big\downarrow$ 2463

$$\int \left(-\frac{e^3\left(2+e^3\right)\left(\left(2x^3-3x^2+e^3\left(4x^4-6x^3\right)+e^6\left(2x^5-5x^4+3x^3\right)\right)\log^2\left(\frac{e^6\left(x-x^2\right)-2e^3x-1}{e^6}\right)+\left(e^3\left(4x^4-4x^3\right)\right.\right.}{20\left(1+2e^3\right)^2\left(x-1\right)}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{x^2\log\left(-x^2+\left(1-\frac{2}{e^3}\right)x-\frac{1}{e^6}\right)\left((2x-3)\log\left(-x^2-\frac{2x}{e^3}+x-\frac{1}{e^6}\right)+\frac{2e^3(x-1)x\left(e^3(2x-1)+2\right)}{e^6(x-1)x+2e^3x+1}\right)}{20(1-x)^2}dx$$

$\Big\downarrow$ 27

$$\frac{1}{20}\int -\frac{x^2\log\left(-x^2+\left(1-\frac{2}{e^3}\right)x-\frac{1}{e^6}\right)\left(\frac{2e^3\left(2-e^3(1-2x)\right)(1-x)x}{-e^6(1-x)x+2e^3x+1}+(3-2x)\log\left(-x^2-\frac{2x}{e^3}+x-\frac{1}{e^6}\right)\right)}{(1-x)^2}dx$$

$\Big\downarrow$ 25

3.700.

$$\int \frac{\left(e^3\left(-4x^3+4x^4\right)+e^6\left(2x^3-6x^4+4x^5\right)\right)\log\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right)+\left(-3x^2+2x^3+e^3\left(-6x^3+4x^4\right)+e^6\left(3x^3-5x^4+2x^5\right)\right)\log^2\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right.}{}$$

$$-\frac{1}{20}\int \frac{x^2\log\left(-x^2+\left(1-\frac{2}{e^3}\right)x-\frac{1}{e^6}\right)\left(\frac{2e^3(2-e^3(1-2x))(1-x)x}{-e^6(1-x)x+2e^3x+1}+(3-2x)\log\left(-x^2-\frac{2x}{e^3}+x-\frac{1}{e^6}\right)\right)}{(1-x)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{20}\int \left(\frac{2e^3(2e^3x-e^3+2)\log\left(-x^2+\left(1-\frac{2}{e^3}\right)x-\frac{1}{e^6}\right)x^3}{(1-x)\left(e^6x^2+e^3(2-e^3)x+1\right)}+\frac{(3-2x)\log^2\left(-x^2+\left(1-\frac{2}{e^3}\right)x-\frac{1}{e^6}\right)x^2}{(1-x)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{20}\left(-\frac{\left(2-2e^3-8e^6+6e^9-e^{12}+\frac{e^{3/2}(8+6e^3-18e^6+8e^9-e^{12})}{\sqrt{-4+e^3}}\right)\log^2\left(e^3\left(-e^3(1-2x)-e^{3/2}\sqrt{-4+e^3}+2\right)\right)}{2e^6(1+2e^3)}+\frac{(2\right.$$

input
```
Int[((E^3*(-4*x^3 + 4*x^4) + E^6*(2*x^3 - 6*x^4 + 4*x^5))*Log[(-1 - 2*E^3*
x + E^6*(x - x^2))/E^6] + (-3*x^2 + 2*x^3 + E^3*(-6*x^3 + 4*x^4) + E^6*(3*
x^3 - 5*x^4 + 2*x^5))*Log[(-1 - 2*E^3*x + E^6*(x - x^2))/E^6]^2)/(20 - 40*
x + 20*x^2 + E^3*(40*x - 80*x^2 + 40*x^3) + E^6*(-20*x + 60*x^2 - 60*x^3 +
 20*x^4)),x]
```

3.700.

$$\int \frac{\left(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5)\right)\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+\left(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3x^3-5x^4+2x^5)\right)\log^2\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right.}{}$$

output
```
(8*x + (4*(2 - 3*E^3)*x)/E^3 - (4*(2 - E^3)*x)/E^3 - (4*Sqrt[-4 + E^3]*Arc
Tanh[(2 - E^3*(1 - 2*x))/(E^(3/2)*Sqrt[-4 + E^3])])/E^(3/2) - (2*(2 - 3*E^
3)*Sqrt[-4 + E^3]*ArcTanh[(2 - E^3*(1 - 2*x))/(E^(3/2)*Sqrt[-4 + E^3])])/E
^(9/2) + (2*(2 - E^3)*Sqrt[-4 + E^3]*ArcTanh[(2 - E^3*(1 - 2*x))/(E^(3/2)*
Sqrt[-4 + E^3])])/E^(9/2) - ((2 - E^3 - E^(3/2)*Sqrt[-4 + E^3])*Log[E^3*(2
 - E^(3/2)*Sqrt[-4 + E^3] - E^3*(1 - 2*x))]^2)/(2*E^3) - (E^3*(2 + E^3 + E
^(3/2)*Sqrt[-4 + E^3])*Log[E^3*(2 - E^(3/2)*Sqrt[-4 + E^3] - E^3*(1 - 2*x)
)]^2)/(2*(1 + 2*E^3)) + ((2 - 4*E^3 + E^6 + (E^(3/2)*(8 - 6*E^3 + E^6))/Sq
rt[-4 + E^3])*Log[E^3*(2 - E^(3/2)*Sqrt[-4 + E^3] - E^3*(1 - 2*x))]^2)/(2*
E^6) - ((2 - 2*E^3 - 8*E^6 + 6*E^9 - E^12 + (E^(3/2)*(8 + 6*E^3 - 18*E^6 +
 8*E^9 - E^12))/Sqrt[-4 + E^3])*Log[E^3*(2 - E^(3/2)*Sqrt[-4 + E^3] - E^3*
(1 - 2*x))]^2)/(2*E^6*(1 + 2*E^3)) - (E^3*(2 + E^3 - E^(3/2)*Sqrt[-4 + E^3
])*Log[E^3*(2 + E^(3/2)*Sqrt[-4 + E^3] - E^3*(1 - 2*x))]^2)/(2*(1 + 2*E^3)
) - ((2 - E^3 + E^(3/2)*Sqrt[-4 + E^3])*Log[E^3*(2 + E^(3/2)*Sqrt[-4 + E^3
] - E^3*(1 - 2*x))]^2)/(2*E^3) + ((2 - 4*E^3 + E^6 - (E^(3/2)*(8 - 6*E^3 +
 E^6))/Sqrt[-4 + E^3])*Log[E^3*(2 + E^(3/2)*Sqrt[-4 + E^3] - E^3*(1 - 2*x)
)]^2)/(2*E^6) - ((2 - 2*E^3 - 8*E^6 + 6*E^9 - E^12 - (E^(3/2)*(8 + 6*E^3 -
 18*E^6 + 8*E^9 - E^12))/Sqrt[-4 + E^3])*Log[E^3*(2 + E^(3/2)*Sqrt[-4 + E^
3] - E^3*(1 - 2*x))]^2)/(2*E^6*(1 + 2*E^3)) - ((2 - E^3 - E^(3/2)*Sqrt[-4
+ E^3])*Log[-1/2*(E^(3/2)*(1 - 2/E^3 - Sqrt[-4 + E^3]/E^(3/2) - 2*x))/S...
```

3.700.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.700.

$$\int \frac{\left(e^3\left(-4x^3+4x^4\right)+e^6\left(2x^3-6x^4+4x^5\right)\right)\log\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right)+\left(-3x^2+2x^3+e^3\left(-6x^3+4x^4\right)+e^6\left(3x^3-5x^4+2x^5\right)\right)\log^2\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right.}{\ldots}$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.700.4 Maple [A] (verified)

Time = 3.32 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{\ln\left(\left(\left(-x^2+x\right)\mathrm{e}^6-2x\,\mathrm{e}^3-1\right)\mathrm{e}^{-6}\right)^2 x^3}{20x-20}$	34
norman	$\frac{\ln\left(\left(\left(-x^2+x\right)\mathrm{e}^6-2x\,\mathrm{e}^3-1\right)\mathrm{e}^{-6}\right)^2 x^3}{20x-20}$	38
parallelrisch	$\frac{\ln\left(\left(\left(-x^2+x\right)\mathrm{e}^6-2x\,\mathrm{e}^3-1\right)\mathrm{e}^{-6}\right)^2 x^3}{20x-20}$	38

input
```
int((((2*x^5-5*x^4+3*x^3)*exp(3)^2+(4*x^4-6*x^3)*exp(3)+2*x^3-3*x^2)*ln(((
-x^2+x)*exp(3)^2-2*x*exp(3)-1)/exp(3)^2)^2+((4*x^5-6*x^4+2*x^3)*exp(3)^2+(
4*x^4-4*x^3)*exp(3))*ln(((-x^2+x)*exp(3)^2-2*x*exp(3)-1)/exp(3)^2))/((20*x
^4-60*x^3+60*x^2-20*x)*exp(3)^2+(40*x^3-80*x^2+40*x)*exp(3)+20*x^2-40*x+20
),x,method=_RETURNVERBOSE)
```

output
```
1/20*x^3*ln(((-x^2+x)*exp(6)-2*x*exp(3)-1)*exp(-6))^2/(-1+x)
```

3.700.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00

$$\int \frac{(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5))\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3\cdots}{20-40x+20x^2+e^3\left(40x-80x^2+40x^3\right)+e^6\left(-20x+60x^2-60x^3\cdots} = \frac{x^3\log\left(-((x^2-x)e^6+2\,xe^3+1)e^{(-6)}\right)^2}{20\,(x-1)}$$

input
```
integrate((((2*x^5-5*x^4+3*x^3)*exp(3)^2+(4*x^4-6*x^3)*exp(3)+2*x^3-3*x^2)
*log(((-x^2+x)*exp(3)^2-2*x*exp(3)-1)/exp(3)^2)^2+((4*x^5-6*x^4+2*x^3)*exp
(3)^2+(4*x^4-4*x^3)*exp(3))*log(((-x^2+x)*exp(3)^2-2*x*exp(3)-1)/exp(3)^2)
)/((20*x^4-60*x^3+60*x^2-20*x)*exp(3)^2+(40*x^3-80*x^2+40*x)*exp(3)+20*x^2
-40*x+20),x, algorithm=\
```

3.700.

$$\int \frac{(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5))\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3x^3-5x^4+2x^5))\log^2\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\cdots}{\cdots}$$

output
```
1/20*x^3*log(-((x^2 - x)*e^6 + 2*x*e^3 + 1)*e^(-6))^2/(x - 1)
```

3.700.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int \frac{(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5))\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3}{20-40x+20x^2+e^3\left(40x-80x^2+40x^3\right)+e^6\left(-20x+60x^2-60x^3\right.}$$
$$=\frac{x^3\log\left(\frac{-2xe^3+(-x^2+x)e^6-1}{e^6}\right)^2}{20x-20}$$

input
```
integrate((((2*x**5-5*x**4+3*x**3)*exp(3)**2+(4*x**4-6*x**3)*exp(3)+2*x**3
-3*x**2)*ln(((-x**2+x)*exp(3)**2-2*x*exp(3)-1)/exp(3)**2)**2+((4*x**5-6*x*
*4+2*x**3)*exp(3)**2+(4*x**4-4*x**3)*exp(3))*ln(((-x**2+x)*exp(3)**2-2*x*e
xp(3)-1)/exp(3)**2))/((20*x**4-60*x**3+60*x**2-20*x)*exp(3)**2+(40*x**3-80
*x**2+40*x)*exp(3)+20*x**2-40*x+20),x)
```

output
```
x**3*log((-2*x*exp(3) + (-x**2 + x)*exp(6) - 1)*exp(-6))**2/(20*x - 20)
```

3.700.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(27) = 54.

Time = 0.41 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.94

$$\int \frac{(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5))\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3}{20-40x+20x^2+e^3\left(40x-80x^2+40x^3\right)+e^6\left(-20x+60x^2-60x^3\right.}$$
$$=\frac{x^3\log\left(-x^2e^6+x(e^6-2e^3)-1\right)^2-12x^3\log\left(-x^2e^6+x(e^6-2e^3)-1\right)+36x^3-36x+36}{20(x-1)}$$

input
```
integrate((((2*x^5-5*x^4+3*x^3)*exp(3)^2+(4*x^4-6*x^3)*exp(3)+2*x^3-3*x^2)
*log(((-x^2+x)*exp(3)^2-2*x*exp(3)-1)/exp(3)^2)^2+((4*x^5-6*x^4+2*x^3)*exp
(3)^2+(4*x^4-4*x^3)*exp(3))*log(((-x^2+x)*exp(3)^2-2*x*exp(3)-1)/exp(3)^2)
)/((20*x^4-60*x^3+60*x^2-20*x)*exp(3)^2+(40*x^3-80*x^2+40*x)*exp(3)+20*x^2
-40*x+20),x, algorithm=\
```

output
```
1/20*(x^3*log(-x^2*e^6 + x*(e^6 - 2*e^3) - 1)^2 - 12*x^3*log(-x^2*e^6 + x*
(e^6 - 2*e^3) - 1) + 36*x^3 - 36*x + 36)/(x - 1)
```

3.700.8 Giac [F]

$$\int \frac{(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5))\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3}{20-40x+20x^2+e^3(40x-80x^2+40x^3)+e^6(-20x+60x^2-60x^3}$$
$$=\int \frac{(2x^3-3x^2+(2x^5-5x^4+3x^3)e^6+2(2x^4-3x^3)e^3)\log\left(-((x^2-x)e^6+2xe^3+1)e^{(-6)}\right)^2+2((2}{20(x^2+(x^4-3x^3+3x^2-x)e^6+2(x^3-2x^2}$$

input
```
integrate(((((2*x^5-5*x^4+3*x^3)*exp(3)^2+(4*x^4-6*x^3)*exp(3)+2*x^3-3*x^2)
*log(((-x^2+x)*exp(3)^2-2*x*exp(3)-1)/exp(3)^2)^2+((4*x^5-6*x^4+2*x^3)*exp
(3)^2+(4*x^4-4*x^3)*exp(3))*log(((-x^2+x)*exp(3)^2-2*x*exp(3)-1)/exp(3)^2)
)/((20*x^4-60*x^3+60*x^2-20*x)*exp(3)^2+(40*x^3-80*x^2+40*x)*exp(3)+20*x^2
-40*x+20),x, algorithm=\
```

output
```
integrate(1/20*((2*x^3 - 3*x^2 + (2*x^5 - 5*x^4 + 3*x^3)*e^6 + 2*(2*x^4 -
3*x^3)*e^3)*log(-((x^2 - x)*e^6 + 2*x*e^3 + 1)*e^(-6))^2 + 2*((2*x^5 - 3*x
^4 + x^3)*e^6 + 2*(x^4 - x^3)*e^3)*log(-((x^2 - x)*e^6 + 2*x*e^3 + 1)*e^(-
6)))/(x^2 + (x^4 - 3*x^3 + 3*x^2 - x)*e^6 + 2*(x^3 - 2*x^2 + x)*e^3 - 2*x
+ 1), x)
```

3.700.9 Mupad [B] (verification not implemented)

Time = 18.23 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

$$\int \frac{(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5))\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3}{20-40x+20x^2+e^3(40x-80x^2+40x^3)+e^6(-20x+60x^2-60x^3}$$
$$=\frac{x^3\ln\left(x-\mathrm{e}^{-6}-2x\,\mathrm{e}^{-3}-x^2\right)^2}{20\,(x-1)}$$

input
```
int(-(log(-exp(-6)*(2*x*exp(3) - exp(6)*(x - x^2) + 1))^2*(exp(3)*(6*x^3 -
 4*x^4) - exp(6)*(3*x^3 - 5*x^4 + 2*x^5) + 3*x^2 - 2*x^3) + log(-exp(-6)*(
2*x*exp(3) - exp(6)*(x - x^2) + 1))*(exp(3)*(4*x^3 - 4*x^4) - exp(6)*(2*x^
3 - 6*x^4 + 4*x^5)))/(exp(3)*(40*x - 80*x^2 + 40*x^3) - 40*x - exp(6)*(20*
x - 60*x^2 + 60*x^3 - 20*x^4) + 20*x^2 + 20),x)
```

3.700.

$$\int \frac{(e^3(-4x^3+4x^4)+e^6(2x^3-6x^4+4x^5))\log\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)+(-3x^2+2x^3+e^3(-6x^3+4x^4)+e^6(3x^3-5x^4+2x^5))\log^2\left(\frac{-1-2e^3x+e^6(x-x^2)}{e^6}\right)}{}$$

output
```
(x^3*log(x - exp(-6) - 2*x*exp(-3) - x^2)^2)/(20*(x - 1))
```

3.700.

$$\int \frac{\left(e^3\left(-4x^3+4x^4\right)+e^6\left(2x^3-6x^4+4x^5\right)\right)\log\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right)+\left(-3x^2+2x^3+e^3\left(-6x^3+4x^4\right)+e^6\left(3x^3-5x^4+2x^5\right)\right)\log^2\left(\frac{-1-2e^3x+e^6\left(x-x^2\right)}{e^6}\right.}{\cdots}$$

3.701 $\int \frac{1}{4}(109+e^{2x}x^2(105+70x))\,dx$

3.701.1 Optimal result

Integrand size = 20, antiderivative size = 19

$$\int \frac{1}{4}(109+e^{2x}x^2(105+70x))\,dx = x\left(1+\frac{35}{4}(3+e^{2x}x^2)\right)$$

output
```
x*(109/4+35/4*exp(ln(x^2)+2*x))
```

3.701.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{1}{4}(109+e^{2x}x^2(105+70x))\,dx = \frac{1}{4}(109x+35e^{2x}x^3)$$

input
```
Integrate[(109 + E^(2*x)*x^2*(105 + 70*x))/4,x]
```

output
```
(109*x + 35*E^(2*x)*x^3)/4
```

3.701.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}\left(e^{2x}(70x+105)x^2+109\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int \left(35e^{2x}(2x+3)x^2+109\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(35e^{2x}x^3+109x\right)$$

input
```
Int[(109 + E^(2*x)*x^2*(105 + 70*x))/4,x]
```

output
```
(109*x + 35*E^(2*x)*x^3)/4
```

3.701.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.701.4 Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

method	result
risch	$\frac{109x}{4}+\frac{35\,\mathrm{e}^{2x}x^{3}}{4}$
norman	$\frac{109x}{4}+\frac{35\,\mathrm{e}^{\ln\left(x^{2}\right)+2x}x}{4}$
parallelrisch	$\frac{109x}{4}+\frac{35\,\mathrm{e}^{\ln\left(x^{2}\right)+2x}x}{4}$
default	$\frac{109x}{4}+\frac{35\,\mathrm{e}^{\ln\left(x^{2}\right)-2\ln(x)+2x}x^{3}}{4}+\frac{35\,\mathrm{e}^{\ln\left(x^{2}\right)-2\ln(x)+2x}x^{2}}{8}-\frac{35\,\mathrm{e}^{\ln\left(x^{2}\right)-2\ln(x)+2x}x}{4}+\frac{35(\ln(x^{2})-2\ln(x))\left(\frac{\mathrm{e}^{\ln\left(x^{2}\right)-2}}{}\right.}{}$
parts	$\frac{109x}{4}+\frac{35\,\mathrm{e}^{\ln\left(x^{2}\right)-2\ln(x)+2x}x^{3}}{4}+\frac{35\,\mathrm{e}^{\ln\left(x^{2}\right)-2\ln(x)+2x}x^{2}}{8}-\frac{35\,\mathrm{e}^{\ln\left(x^{2}\right)-2\ln(x)+2x}x}{4}+\frac{35(\ln(x^{2})-2\ln(x))\left(\frac{\mathrm{e}^{\ln\left(x^{2}\right)-2}}{}\right.}{}$

input
```
int(1/4*(70*x+105)*exp(ln(x^2)+2*x)+109/4,x,method=_RETURNVERBOSE)
```

output
```
109/4*x+35/4*exp(2*x)*x^3
```

3.701.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{1}{4}\left(109+e^{2x}x^2(105+70x)\right)\,dx=\frac{35}{4}\,xe^{\left(2\,x+\log\left(x^{2}\right)\right)}+\frac{109}{4}\,x$$

input
```
integrate(1/4*(70*x+105)*exp(log(x^2)+2*x)+109/4,x, algorithm=\
```

output
```
35/4*x*x*e^(2*x + log(x^2)) + 109/4*x
```

3.701.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{1}{4}\left(109+e^{2x}x^2(105+70x)\right)\,dx=\frac{35x^3e^{2x}}{4}+\frac{109x}{4}$$

input
```
integrate(1/4*(70*x+105)*exp(ln(x**2)+2*x)+109/4,x)
```

output
```
35*x**3*exp(2*x)/4 + 109*x/4
```

3.701.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(16) = 32.

Time = 0.18 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.16

$$\int \frac{1}{4}\left(109+e^{2x}x^2(105+70x)\right)\,dx=\frac{35}{16}\left(4\,x^3-6\,x^2+6\,x-3\right)e^{(2\,x)}+\frac{105}{16}\left(2\,x^2-2\,x+1\right)e^{(2\,x)}+\frac{109}{4}\,x$$

input
```
integrate(1/4*(70*x+105)*exp(log(x^2)+2*x)+109/4,x, algorithm=\
```

output
```
35/16*(4*x^3 - 6*x^2 + 6*x - 3)*e^(2*x) + 105/16*(2*x^2 - 2*x + 1)*e^(2*x)
 + 109/4*x
```

3.701.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \frac{1}{4}\left(109+e^{2x}x^2(105+70x)\right)\,dx=\frac{35}{4}\,x^3e^{(2\,x)}+\frac{109}{4}\,x$$

input
```
integrate(1/4*(70*x+105)*exp(log(x^2)+2*x)+109/4,x, algorithm=\
```

output
```
35/4*x^3*e^(2*x) + 109/4*x
```

3.701.9 Mupad [B] (verification not implemented)

Time = 17.96 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \frac{1}{4}\left(109+e^{2x}x^2(105+70x)\right)\,dx=\frac{109\,x}{4}+\frac{35\,x^3\,\mathrm{e}^{2\,x}}{4}$$

input
```
int((exp(2*x + log(x^2))*(70*x + 105))/4 + 109/4,x)
```

output
```
(109*x)/4 + (35*x^3*exp(2*x))/4
```

3.702 $\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{(-4x+x^2)\log\left(\frac{x}{2}\right)}\,dx$

3.702.1 Optimal result

Integrand size = 32, antiderivative size = 18

$$\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{(-4x+x^2)\log\left(\frac{x}{2}\right)}\,dx = 4\log\left(\frac{484(4-x)}{\log\left(\frac{x}{2}\right)}\right)$$

output
```
4*ln(484*(-x+4)/ln(1/2*x))
```

3.702.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{(-4x+x^2)\log\left(\frac{x}{2}\right)}\,dx = 4\left(\log(4-x)-\log\left(\log\left(\frac{x}{2}\right)\right)\right)$$

input
```
Integrate[(16 - 4*x + 4*x*Log[x/2])/((-4*x + x^2)*Log[x/2]),x]
```

output
```
4*(Log[4 - x] - Log[Log[x/2]])
```

3.702.3 Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188, Rules used = {2026, 7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x+4x\log\left(\frac{x}{2}\right)+16}{(x^2-4x)\log\left(\frac{x}{2}\right)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-4x+4x\log\left(\frac{x}{2}\right)+16}{(x-4)x\log\left(\frac{x}{2}\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{4\left(x+x\left(-\log\left(\frac{x}{2}\right)\right)-4\right)}{(4-x)x\log\left(\frac{x}{2}\right)}dx$$

$$\Big\downarrow \text{27}$$

$$4\int -\frac{\log\left(\frac{x}{2}\right)x-x+4}{(4-x)x\log\left(\frac{x}{2}\right)}dx$$

$$\Big\downarrow \text{25}$$

$$-4\int \frac{\log\left(\frac{x}{2}\right)x-x+4}{(4-x)x\log\left(\frac{x}{2}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{1}{x\log\left(\frac{x}{2}\right)}+\frac{1}{4-x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-4\left(\log\left(\log\left(\frac{x}{2}\right)\right)-\log(4-x)\right)$$

input
```
Int[(16 - 4*x + 4*x*Log[x/2])/((-4*x + x^2)*Log[x/2]),x]
```

output
```
-4*(-Log[4 - x] + Log[Log[x/2]])
```

3.702. $\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{(-4x+x^2)\log\left(\frac{x}{2}\right)}\,dx$

3.702.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.702.4 Maple [A] (verified)

Time = 0.81 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

method	result	size
norman	$-4\ln\left(\ln\left(\frac{x}{2}\right)\right)+4\ln\left(x-4\right)$	15
risch	$-4\ln\left(\ln\left(\frac{x}{2}\right)\right)+4\ln\left(x-4\right)$	15
parallelrisch	$-4\ln\left(\ln\left(\frac{x}{2}\right)\right)+4\ln\left(x-4\right)$	15
parts	$-4\ln\left(\ln\left(\frac{x}{2}\right)\right)+4\ln\left(x-4\right)$	15
derivativedivides	$4\ln\left(\frac{x}{2}-2\right)-4\ln\left(\ln\left(\frac{x}{2}\right)\right)$	17
default	$4\ln\left(\frac{x}{2}-2\right)-4\ln\left(\ln\left(\frac{x}{2}\right)\right)$	17

input
```
int((4*x*ln(1/2*x)-4*x+16)/(x^2-4*x)/ln(1/2*x),x,method=_RETURNVERBOSE)
```

output
```
-4*ln(ln(1/2*x))+4*ln(x-4)
```

3.702.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{(-4x+x^2)\log\left(\frac{x}{2}\right)}\,dx = 4\,\log\left(x-4\right)-4\,\log\left(\log\left(\frac{1}{2}\,x\right)\right)$$

input
```
integrate((4*x*log(1/2*x)-4*x+16)/(x^2-4*x)/log(1/2*x),x, algorithm=\
```

output
```
4*log(x - 4) - 4*log(log(1/2*x))
```

3.702.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{(-4x+x^2)\log\left(\frac{x}{2}\right)}\,dx = 4\log\left(x-4\right)-4\log\left(\log\left(\frac{x}{2}\right)\right)$$

input
```
integrate((4*x*ln(1/2*x)-4*x+16)/(x**2-4*x)/ln(1/2*x),x)
```

output
```
4*log(x - 4) - 4*log(log(x/2))
```

3.702.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{(-4x+x^2)\log\left(\frac{x}{2}\right)}\,dx = 4\,\log\left(x-4\right)-4\,\log\left(-\log\left(2\right)+\log\left(x\right)\right)$$

input
```
integrate((4*x*log(1/2*x)-4*x+16)/(x^2-4*x)/log(1/2*x),x, algorithm=\
```

output
```
4*log(x - 4) - 4*log(-log(2) + log(x))
```

3.702.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{(-4x+x^2)\log\left(\frac{x}{2}\right)}\,dx = 4\,\log\left(\frac{1}{2}\,x-2\right)-4\,\log\left(\log\left(\frac{1}{2}\,x\right)\right)$$

input
```
integrate((4*x*log(1/2*x)-4*x+16)/(x^2-4*x)/log(1/2*x),x, algorithm=\
```

output
```
4*log(1/2*x - 2) - 4*log(log(1/2*x))
```

3.702.9 Mupad [B] (verification not implemented)

Time = 16.23 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{16-4x+4x\log\left(\frac{x}{2}\right)}{(-4x+x^2)\log\left(\frac{x}{2}\right)}\,dx = 4\,\ln\left(x-4\right)-4\,\ln\left(\ln\left(\frac{x}{2}\right)\right)$$

input
```
int(-(4*x*log(x/2) - 4*x + 16)/(log(x/2)*(4*x - x^2)),x)
```

output
```
4*log(x - 4) - 4*log(log(x/2))
```

3.703 $\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}(-16+40x-25x^2-5x^3\right.}{(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)}$

3.703.1 Optimal result

Integrand size = 104, antiderivative size = 28

$$\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)\right)}{(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)}\,dx$$
$$=x-\frac{5e^{-\frac{x^2}{(1-x)^2}}x}{(4+x)\log(5)}$$

output
```
x-5/(4+x)/exp(x^2/(1-x)^2)/ln(5)*x
```

3.703.2 Mathematica [A] (verified)

Time = 10.12 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)\right)}{(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)}\,dx$$
$$=\frac{-\frac{5e^{-\frac{x^2}{(-1+x)^2}}x}{4+x}+(-1+x)\log(5)}{\log(5)}$$

3.703. $\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)\right)}{(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)}\,dx$

input
```
Integrate[(20 - 60*x + 20*x^2 - 30*x^3 + E^(x^2/(1 - 2*x + x^2))*(-16 + 40
*x - 25*x^2 - 5*x^3 + 5*x^4 + x^5)*Log[5])/(E^(x^2/(1 - 2*x + x^2))*(-16 +
 40*x - 25*x^2 - 5*x^3 + 5*x^4 + x^5)*Log[5]),x]
```

output
```
((-5*x)/(E^(x^2/(-1 + x)^2)*(4 + x)) + (-1 + x)*Log[5])/Log[5]
```

3.703.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-\frac{x^2}{x^2-2x+1}}\left(-30x^3+20x^2+e^{\frac{x^2}{x^2-2x+1}}\left(x^5+5x^4-5x^3-25x^2+40x-16\right)\log(5)-60x+20\right)}{\left(x^5+5x^4-5x^3-25x^2+40x-16\right)\log(5)}dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int -\frac{e^{-\frac{x^2}{x^2-2x+1}}\left(-30x^3+20x^2-60x-e^{\frac{x^2}{x^2-2x+1}}\left(-x^5-5x^4+5x^3+25x^2-40x+16\right)\log(5)+20\right)}{-x^5-5x^4+5x^3+25x^2-40x+16}dx}{\log(5)}$$

$$\Big\downarrow \; 25$$

$$-\frac{\int \frac{e^{-\frac{x^2}{x^2-2x+1}}\left(-30x^3+20x^2-60x-e^{\frac{x^2}{x^2-2x+1}}\left(-x^5-5x^4+5x^3+25x^2-40x+16\right)\log(5)+20\right)}{-x^5-5x^4+5x^3+25x^2-40x+16}dx}{\log(5)}$$

$$\Big\downarrow \; 2463$$

$$-\frac{\int \left(-\frac{3e^{-\frac{x^2}{x^2-2x+1}}\left(-30x^3+20x^2-60x-e^{\frac{x^2}{x^2-2x+1}}\left(-x^5-5x^4+5x^3+25x^2-40x+16\right)\log(5)+20\right)}{625(x-1)}+\frac{3e^{-\frac{x^2}{x^2-2x+1}}\left(-30x^3+20x^2-60x-e^{\frac{x^2}{x^2-2x+1}} \right.}{}\right.}{}$$

$$\Big\downarrow \; 2009$$

$$-\frac{-\frac{2}{5}\int \frac{e^{-\frac{x^2}{x^2-2x+1}}}{(x-1)^3}dx+\frac{6}{5}\int \frac{e^{-\frac{x^2}{x^2-2x+1}}}{(x-1)^2}dx+\frac{32}{25}\int \frac{e^{-\frac{x^2}{x^2-2x+1}}}{x-1}dx+20\int \frac{e^{-\frac{x^2}{x^2-2x+1}}}{(x+4)^2}dx-\frac{32}{25}\int \frac{e^{-\frac{x^2}{x^2-2x+1}}}{x+4}dx+\frac{6}{5}e^{-\frac{x^2}{x^2-2x+1}}}{\log(5)}$$

3.703. $\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)\right)}{\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)}dx$

input
```
Int[(20 - 60*x + 20*x^2 - 30*x^3 + E^(x^2/(1 - 2*x + x^2))*(-16 + 40*x - 2
5*x^2 - 5*x^3 + 5*x^4 + x^5)*Log[5])/(E^(x^2/(1 - 2*x + x^2))*(-16 + 40*x
- 25*x^2 - 5*x^3 + 5*x^4 + x^5)*Log[5]),x]
```

output
```
$Aborted
```

3.703.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.703.4 Maple [A] (verified)

Time = 1.21 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

method	result
risch	$x-\frac{5x\,{\mathrm e}^{-\frac{x^{2}}{(-1+x)^{2}}}}{\ln(5)(4+x)}$
parts	$x+\frac{\left(\frac{10x^{2}}{\ln(5)}-\frac{5x}{\ln(5)}-\frac{5x^{3}}{\ln(5)}\right){\mathrm e}^{-\frac{x^{2}}{x^{2}-2x+1}}}{(4+x)(-1+x)^{2}}$
norman	$\frac{\left(x^{4}{\mathrm e}^{\frac{x^{2}}{x^{2}-2x+1}}-8\,{\mathrm e}^{\frac{x^{2}}{x^{2}-2x+1}}+18x\,{\mathrm e}^{\frac{x^{2}}{x^{2}-2x+1}}-11x^{2}{\mathrm e}^{\frac{x^{2}}{x^{2}-2x+1}}-\frac{5x}{\ln(5)}+\frac{10x^{2}}{\ln(5)}-\frac{5x^{3}}{\ln(5)}\right){\mathrm e}^{-\frac{x^{2}}{x^{2}-2x+1}}}{(4+x)(-1+x)^{2}}$
parallelrisch	$\frac{\left(\ln(5){\mathrm e}^{\frac{x^{2}}{x^{2}-2x+1}}x^{4}+4\ln(5){\mathrm e}^{\frac{x^{2}}{x^{2}-2x+1}}x^{3}-3\ln(5){\mathrm e}^{\frac{x^{2}}{x^{2}-2x+1}}x^{2}-10\ln(5)x\,{\mathrm e}^{\frac{x^{2}}{x^{2}-2x+1}}-5x^{3}+8\ln(5){\mathrm e}^{\frac{x^{2}}{x^{2}-2x+1}}+10x^{2}-5x\right){\mathrm e}^{-\frac{x^{2}}{x}}}{\ln(5)(4+x)(-1+x)^{2}}$

3.703. $$\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)\right)}{\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)}\,dx$$

input
```
int(((x^5+5*x^4-5*x^3-25*x^2+40*x-16)*ln(5)*exp(x^2/(x^2-2*x+1))-30*x^3+20
*x^2-60*x+20)/(x^5+5*x^4-5*x^3-25*x^2+40*x-16)/ln(5)/exp(x^2/(x^2-2*x+1)),
x,method=_RETURNVERBOSE)
```

output
```
x-5/ln(5)*x/(4+x)*exp(-x^2/(-1+x)^2)
```

3.703.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(25) = 50$.

Time = 0.28 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.96

$$\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)\right)}{(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)}\,dx$$
$$=\frac{\left((x^2+4\,x)e^{\left(\frac{x^2}{x^2-2\,x+1}\right)}\log(5)-5\,x\right)e^{\left(-\frac{x^2}{x^2-2\,x+1}\right)}}{(x+4)\log(5)}$$

input
```
integrate(((x^5+5*x^4-5*x^3-25*x^2+40*x-16)*log(5)*exp(x^2/(x^2-2*x+1))-30
*x^3+20*x^2-60*x+20)/(x^5+5*x^4-5*x^3-25*x^2+40*x-16)/log(5)/exp(x^2/(x^2-
2*x+1)),x, algorithm=\
```

output
```
((x^2 + 4*x)*e^(x^2/(x^2 - 2*x + 1))*log(5) - 5*x)*e^(-x^2/(x^2 - 2*x + 1)
)/((x + 4)*log(5))
```

3.703.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)\right)}{(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)}\,dx$$
$$=x-\frac{5xe^{-\frac{x^2}{x^2-2x+1}}}{x\log(5)+4\log(5)}$$

input
```
integrate(((x**5+5*x**4-5*x**3-25*x**2+40*x-16)*ln(5)*exp(x**2/(x**2-2*x+1
))-30*x**3+20*x**2-60*x+20)/(x**5+5*x**4-5*x**3-25*x**2+40*x-16)/ln(5)/exp
(x**2/(x**2-2*x+1)),x)
```

output
```
x - 5*x*exp(-x**2/(x**2 - 2*x + 1))/(x*log(5) + 4*log(5))
```

3.703.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. 2(25) = 50.

Time = 0.33 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.43

$$\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)\right)}{\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)}\,dx = -\frac{\left(5\,xe^{\left(-\frac{1}{x^2-2\,x+1}\right)}-\left(x^2e\log\left(5\right)+4\,xe\log\left(5\right)\right)e^{\left(\frac{2}{x-1}\right)}\right)e^{\left(-\frac{2}{x-1}\right)}}{\left(xe+4\,e\right)\log\left(5\right)}$$

input
```
integrate(((x^5+5*x^4-5*x^3-25*x^2+40*x-16)*log(5)*exp(x^2/(x^2-2*x+1))-30
*x^3+20*x^2-60*x+20)/(x^5+5*x^4-5*x^3-25*x^2+40*x-16)/log(5)/exp(x^2/(x^2-
2*x+1)),x, algorithm=\
```

output
```
-(5*x*e^(-1/(x^2 - 2*x + 1)) - (x^2*e*log(5) + 4*x*e*log(5))*e^(2/(x - 1))
)*e^(-2/(x - 1))/((x*e + 4*e)*log(5))
```

3.703.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)\right)}{\left(-16+40x-25x^2-5x^3+5x^4+x^5\right)\log(5)}\,dx = \frac{x^2\log\left(5\right)-5\,xe^{\left(-\frac{x^2}{x^2-2\,x+1}\right)}+4\,x\log\left(5\right)}{\left(x+4\right)\log\left(5\right)}$$

input
```
integrate(((x^5+5*x^4-5*x^3-25*x^2+40*x-16)*log(5)*exp(x^2/(x^2-2*x+1))-30
*x^3+20*x^2-60*x+20)/(x^5+5*x^4-5*x^3-25*x^2+40*x-16)/log(5)/exp(x^2/(x^2-
2*x+1)),x, algorithm=\
```

output
```
(x^2*log(5) - 5*x*e^(-x^2/(x^2 - 2*x + 1)) + 4*x*log(5))/((x + 4)*log(5))
```

3.703.9 Mupad [B] (verification not implemented)

Time = 16.70 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)\right)}{(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)}\,dx$$
$$=x-\frac{5\,x\,\mathrm{e}^{-\frac{x^2}{x^2-2\,x+1}}}{\ln(5)\,(x+4)}$$

input
```
int((exp(-x^2/(x^2 - 2*x + 1))*(20*x^2 - 60*x - 30*x^3 + exp(x^2/(x^2 - 2*
x + 1))*log(5)*(40*x - 25*x^2 - 5*x^3 + 5*x^4 + x^5 - 16) + 20))/(log(5)*(
40*x - 25*x^2 - 5*x^3 + 5*x^4 + x^5 - 16)),x)
```

output
```
x - (5*x*exp(-x^2/(x^2 - 2*x + 1)))/(log(5)*(x + 4))
```

3.703. $\int \frac{e^{-\frac{x^2}{1-2x+x^2}}\left(20-60x+20x^2-30x^3+e^{\frac{x^2}{1-2x+x^2}}(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)\right)}{(-16+40x-25x^2-5x^3+5x^4+x^5)\log(5)}\,dx$

3.704 $\int \frac{(9+e-x^2-18x^4+8x^5-7x}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6}$

3.704.1 Optimal result

Integrand size = 127, antiderivative size = 24

$$\int \frac{(9+e-x^2-18x^4+8x^5-7x^8)\,(i\pi+\log(3))}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6x^{10}+12x^{12}-4x^{13}+x}$$
$$=\frac{x(i\pi+\log(3))}{e+(3-x+x^4)^2}$$

output
```
x/((x^4-x+3)^2+exp(1))*(ln(3)+I*Pi)
```

3.704.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{(9+e-x^2-18x^4+8x^5-7x^8)\,(i\pi+\log(3))}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6x^{10}+12x^{12}-4x^{13}+x}$$
$$=\frac{x(i\pi+\log(3))}{e+(3-x+x^4)^2}$$

input
```
Integrate[((9 + E - x^2 - 18*x^4 + 8*x^5 - 7*x^8)*(I*Pi + Log[3]))/(81 + E
^2 - 108*x + 54*x^2 - 12*x^3 + 109*x^4 - 108*x^5 + 36*x^6 - 4*x^7 + 54*x^8
 - 36*x^9 + 6*x^10 + 12*x^12 - 4*x^13 + x^16 + E*(18 - 12*x + 2*x^2 + 12*x
^4 - 4*x^5 + 2*x^8)),x]
```

output
```
(x*(I*Pi + Log[3]))/(E + (3 - x + x^4)^2)
```

3.704.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-7x^8+8x^5-18x^4-x^2+e+9)(\log(3)+i\pi)}{x^{16}-4x^{13}+12x^{12}+6x^{10}-36x^9+54x^8-4x^7+36x^6-108x^5+109x^4-12x^3+54x^2+e(2x^8-4x^5+12x^4}$$

$$\Big\downarrow \text{27}$$

$$(\log(3)+i\pi)\int \frac{-7x^8+8x^5-18x^4-x^2+e+9}{x^{16}-4x^{13}+12x^{12}+6x^{10}-36x^9+54x^8-4x^7+36x^6-108x^5+109x^4-12x^3+54x^2-108x+2e(x^8-}$$

$$\Big\downarrow \text{2462}$$

$$(\log(3)+i\pi)\int \left(\frac{2\left(-3x^5+12x^4+3x^2-21x+36\left(1+\frac{e}{9}\right)\right)}{\left(x^8-2x^5+6x^4+x^2-6x+9\left(1+\frac{e}{9}\right)\right)^2}+\frac{7}{-x^8+2x^5-6x^4-x^2+6x-9\left(1+\frac{e}{9}\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$(\log(3)+i\pi)\left(-\frac{2(9+e)\int \frac{1}{(-x^4+x+i\sqrt{e}-3)^2}dx}{e}+\frac{2(9+e)\int \frac{1}{-ix^4+ix+\sqrt{e}-3i}dx}{e^{3/2}}-\frac{7\int \frac{1}{-ix^4+ix+\sqrt{e}-3i}dx}{2\sqrt{e}}+\frac{2(9+e)\int \frac{1}{ix^4-ix+\sqrt{}}}{e^{3/2}}\right.$$

input
```
Int[((9 + E - x^2 - 18*x^4 + 8*x^5 - 7*x^8)*(I*Pi + Log[3]))/(81 + E^2 - 1
08*x + 54*x^2 - 12*x^3 + 109*x^4 - 108*x^5 + 36*x^6 - 4*x^7 + 54*x^8 - 36*
x^9 + 6*x^10 + 12*x^12 - 4*x^13 + x^16 + E*(18 - 12*x + 2*x^2 + 12*x^4 - 4
*x^5 + 2*x^8)),x]
```

output
```
$Aborted
```

3.704.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.704.

$$\int \frac{(9+e-x^2-18x^4+8x^5-7x^8)(i\pi+\log(3))}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6x^{10}+12x^{12}-4x^{13}+x^{16}+e(18-12x+2x^2+12x^4-4x^5+2x^8)}\,dx$$

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.704.4 Maple [A] (verified)

Time = 2.12 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

method	result	size
gosper	$\frac{(\ln(3)+i\pi)x}{x^8-2x^5+6x^4+x^2+\mathrm{e}-6x+9}$	35
norman	$\frac{(\ln(3)+i\pi)x}{x^8-2x^5+6x^4+x^2+\mathrm{e}-6x+9}$	35
risch	$\frac{(\ln(3)+i\pi)x}{x^8-2x^5+6x^4+x^2+\mathrm{e}-6x+9}$	35
parallelrisch	$\frac{(\ln(3)+i\pi)x}{x^8-2x^5+6x^4+x^2+\mathrm{e}-6x+9}$	35

input
```
int((exp(1)-7*x^8+8*x^5-18*x^4-x^2+9)*(ln(3)+I*Pi)/(exp(1)^2+(2*x^8-4*x^5+
12*x^4+2*x^2-12*x+18)*exp(1)+x^16-4*x^13+12*x^12+6*x^10-36*x^9+54*x^8-4*x^
7+36*x^6-108*x^5+109*x^4-12*x^3+54*x^2-108*x+81),x,method=_RETURNVERBOSE)
```

output
```
(ln(3)+I*Pi)*x/(x^8-2*x^5+6*x^4+x^2+exp(1)-6*x+9)
```

3.704.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

$$\int \frac{(9+e-x^2-18x^4+8x^5-7x^8)\,(i\pi+\log(3))}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6x^{10}+12x^{12}-4x^{13}+x}$$
$$=\frac{i\,\pi x+x\log{(3)}}{x^8-2\,x^5+6\,x^4+x^2-6\,x+e+9}$$

input
```
integrate((exp(1)-7*x^8+8*x^5-18*x^4-x^2+9)*(log(3)+I*pi)/(exp(1)^2+(2*x^8
-4*x^5+12*x^4+2*x^2-12*x+18)*exp(1)+x^16-4*x^13+12*x^12+6*x^10-36*x^9+54*x
^8-4*x^7+36*x^6-108*x^5+109*x^4-12*x^3+54*x^2-108*x+81),x, algorithm=\
```

output
```
(I*pi*x + x*log(3))/(x^8 - 2*x^5 + 6*x^4 + x^2 - 6*x + e + 9)
```

3.704.6 Sympy [A] (verification not implemented)

Time = 152.56 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.50

$$\int \frac{(9+e-x^2-18x^4+8x^5-7x^8)\,(i\pi+\log(3))}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6x^{10}+12x^{12}-4x^{13}+x^{16}+e(18-12x+2x^2+12x^4-4x^5+2x^8)}\,dx = -\frac{x(-\log{(3)}-i\pi)}{x^8-2x^5+6x^4+x^2-6x+e+9}$$

input
```
integrate((exp(1)-7*x**8+8*x**5-18*x**4-x**2+9)*(ln(3)+I*pi)/(exp(1)**2+(2
*x**8-4*x**5+12*x**4+2*x**2-12*x+18)*exp(1)+x**16-4*x**13+12*x**12+6*x**10
-36*x**9+54*x**8-4*x**7+36*x**6-108*x**5+109*x**4-12*x**3+54*x**2-108*x+81
),x)
```

output
```
-x*(-log(3) - I*pi)/(x**8 - 2*x**5 + 6*x**4 + x**2 - 6*x + E + 9)
```

3.704.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.38

$$\int \frac{(9+e-x^2-18x^4+8x^5-7x^8)\,(i\pi+\log(3))}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6x^{10}+12x^{12}-4x^{13}+x^{16}+e(18-12x+2x^2+12x^4-4x^5+2x^8)}\,dx = \frac{(i\,\pi+\log{(3)})x}{x^8-2\,x^5+6\,x^4+x^2-6\,x+e+9}$$

input
```
integrate((exp(1)-7*x^8+8*x^5-18*x^4-x^2+9)*(log(3)+I*pi)/(exp(1)^2+(2*x^8
-4*x^5+12*x^4+2*x^2-12*x+18)*exp(1)+x^16-4*x^13+12*x^12+6*x^10-36*x^9+54*x
^8-4*x^7+36*x^6-108*x^5+109*x^4-12*x^3+54*x^2-108*x+81),x, algorithm=\
```

output
```
(I*pi + log(3))*x/(x^8 - 2*x^5 + 6*x^4 + x^2 - 6*x + e + 9)
```

3.704.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.50

$$\int \frac{(9+e-x^2-18x^4+8x^5-7x^8)\,(i\pi+\log(3))}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6x^{10}+12x^{12}-4x^{13}+x}$$
$$=-\frac{(-i\,\pi-\log{(3)})x}{x^8-2\,x^5+6\,x^4+x^2-6\,x+e+9}$$

input
```
integrate((exp(1)-7*x^8+8*x^5-18*x^4-x^2+9)*(log(3)+I*pi)/(exp(1)^2+(2*x^8
-4*x^5+12*x^4+2*x^2-12*x+18)*exp(1)+x^16-4*x^13+12*x^12+6*x^10-36*x^9+54*x
^8-4*x^7+36*x^6-108*x^5+109*x^4-12*x^3+54*x^2-108*x+81),x, algorithm=\
```

output
```
-(-I*pi - log(3))*x/(x^8 - 2*x^5 + 6*x^4 + x^2 - 6*x + e + 9)
```

3.704.9 Mupad [B] (verification not implemented)

Time = 27.89 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{(9+e-x^2-18x^4+8x^5-7x^8)\,(i\pi+\log(3))}{81+e^2-108x+54x^2-12x^3+109x^4-108x^5+36x^6-4x^7+54x^8-36x^9+6x^{10}+12x^{12}-4x^{13}+x}$$
$$=\frac{x\,(\ln{(3)}+\Pi\,1\mathrm{i})}{x^8-2\,x^5+6\,x^4+x^2-6\,x+\mathrm{e}+9}$$

input
```
int(((Pi*1i + log(3))*(exp(1) - x^2 - 18*x^4 + 8*x^5 - 7*x^8 + 9))/(exp(2)
 - 108*x + exp(1)*(2*x^2 - 12*x + 12*x^4 - 4*x^5 + 2*x^8 + 18) + 54*x^2 -
12*x^3 + 109*x^4 - 108*x^5 + 36*x^6 - 4*x^7 + 54*x^8 - 36*x^9 + 6*x^10 + 1
2*x^12 - 4*x^13 + x^16 + 81),x)
```

output
```
(x*(Pi*1i + log(3)))/(exp(1) - 6*x + x^2 + 6*x^4 - 2*x^5 + x^8 + 9)
```

3.705 $\int \frac{2^{-2x} e^{e^{\frac{2-12x-2x^2}{3x}}} \left(-3x+e^{\frac{2-12x-2x^2}{3x}} (2+2x^2)+6x^2 \log(2)\right)}{3x} \, dx$

3.705.1 Optimal result

Integrand size = 71, antiderivative size = 29

$$\int \frac{2^{-2x} e^{e^{\frac{2-12x-2x^2}{3x}}} \left(-3x+e^{\frac{2-12x-2x^2}{3x}} (2+2x^2)+6x^2 \log(2)\right)}{3x} \, dx = 4-2^{-2x} e^{e^{-4+\frac{1}{3}\left(\frac{2}{x}-2x\right)}} x$$

output
```
4-exp(exp(2/3/x-2/3*x-4))/exp(x*ln(2))^2*x
```

3.705.2 Mathematica [A] (verified)

Time = 0.99 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

$$\int \frac{2^{-2x} e^{e^{\frac{2-12x-2x^2}{3x}}} \left(-3x+e^{\frac{2-12x-2x^2}{3x}} (2+2x^2)+6x^2 \log(2)\right)}{3x} \, dx = -\frac{2^{-1-2x} e^{e^{-4+\frac{2}{3x}-\frac{2x}{3}}} x \log(4)}{\log(2)}$$

input
```
Integrate[(E^E^((2 - 12*x - 2*x^2)/(3*x))*(-3*x + E^((2 - 12*x - 2*x^2)/(3
*x))*(2 + 2*x^2) + 6*x^2*Log[2]))/(3*2^(2*x)*x),x]
```

output
```
-((2^(-1 - 2*x)*E^E^(-4 + 2/(3*x) - (2*x)/3)*x*Log[4])/Log[2])
```

3.705.3 Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.042, Rules used = {27, 25, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2^{-2x} e^{e^{\frac{-2x^2-12x+2}{3x}}} \left(e^{\frac{-2x^2-12x+2}{3x}} \left(2x^2+2\right)+6x^2\log(2)-3x\right)}{3x} \, dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{3}\int -\frac{2^{-2x} e^{e^{\frac{2\left(-x^2-6x+1\right)}{3x}}} \left(-6\log(2)x^2+3x-2e^{\frac{2\left(-x^2-6x+1\right)}{3x}}\left(x^2+1\right)\right)}{x}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{3}\int \frac{2^{-2x} e^{e^{\frac{2\left(-x^2-6x+1\right)}{3x}}} \left(-6\log(2)x^2+3x-2e^{\frac{2\left(-x^2-6x+1\right)}{3x}}\left(x^2+1\right)\right)}{x}dx$$

$$\Big\downarrow \ 2726$$

$$-2^{-2x} e^{e^{\frac{2\left(-x^2-6x+1\right)}{3x}}} x$$

input
```
Int[(E^E^((2 - 12*x - 2*x^2)/(3*x))*(-3*x + E^((2 - 12*x - 2*x^2)/(3*x))*(
2 + 2*x^2) + 6*x^2*Log[2]))/(3*2^(2*x)*x),x]
```

output
```
-((E^E^((2*(1 - 6*x - x^2))/(3*x))*x)/2^(2*x))
```

3.705.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

3.705. $\int \frac{2^{-2x} e^{e^{\frac{2-12x-2x^2}{3x}}} \left(-3x+e^{\frac{2-12x-2x^2}{3x}} (2+2x^2)+6x^2\log(2)\right)}{3x} \, dx$

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.705.4 Maple [A] (verified)

Time = 2.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

method	result	size
risch	$-x2^{-2x}e^{e^{-\frac{2\left(x^2+6x-1\right)}{3x}}}$	24
parallelrisch	$-x\, e^{e^{-\frac{2\left(x^2+6x-1\right)}{3x}}} e^{-2x\ln(2)}$	26

input
```
int(1/3*((2*x^2+2)*exp(1/3*(-2*x^2-12*x+2)/x)+6*x^2*ln(2)-3*x)*exp(exp(1/3
*(-2*x^2-12*x+2)/x))/x/exp(x*ln(2))^2,x,method=_RETURNVERBOSE)
```

output
```
-x/(2^x)^2*exp(exp(-2/3*(x^2+6*x-1)/x))
```

3.705.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{2^{-2x}e^{e^{\frac{2-12x-2x^2}{3x}}}\left(-3x+e^{\frac{2-12x-2x^2}{3x}}(2+2x^2)+6x^2\log(2)\right)}{3x}\,dx=-\frac{xe^{\left(e^{\left(-\frac{2\,\left(x^2+6\,x-1\right)}{3\,x}\right)}\right)}}{2^{2\,x}}$$

input
```
integrate(1/3*((2*x^2+2)*exp(1/3*(-2*x^2-12*x+2)/x)+6*x^2*log(2)-3*x)*exp(
exp(1/3*(-2*x^2-12*x+2)/x))/x/exp(x*log(2))^2,x, algorithm=\
```

output
```
-x*e^(e^(-2/3*(x^2 + 6*x - 1)/x))/2^(2*x)
```

3.705.6 Sympy [A] (verification not implemented)

Time = 83.31 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int \frac{2^{-2x}e^{e^{\frac{2-12x-2x^2}{3x}}}\left(-3x+e^{\frac{2-12x-2x^2}{3x}}(2+2x^2)+6x^2\log(2)\right)}{3x}\,dx = -xe^{-2x\log(2)}e^{e^{\frac{-\frac{2x^2}{3}-4x+\frac{2}{3}}{x}}}$$

input
```
integrate(1/3*((2*x**2+2)*exp(1/3*(-2*x**2-12*x+2)/x)+6*x**2*ln(2)-3*x)*ex
p(exp(1/3*(-2*x**2-12*x+2)/x))/x/exp(x*ln(2))**2,x)
```

output
```
-x*exp(-2*x*log(2))*exp(exp((-2*x**2/3 - 4*x + 2/3)/x))
```

3.705.7 Maxima [F]

$$\int \frac{2^{-2x}e^{e^{\frac{2-12x-2x^2}{3x}}}\left(-3x+e^{\frac{2-12x-2x^2}{3x}}(2+2x^2)+6x^2\log(2)\right)}{3x}\,dx$$
$$= \int \frac{\left(6\,x^2\log(2)+2\,(x^2+1)e^{\left(-\frac{2\,(x^2+6\,x-1)}{3\,x}\right)}-3\,x\right)e^{\left(e^{\left(-\frac{2\,(x^2+6\,x-1)}{3\,x}\right)}\right)}}{3\cdot 2^{2\,x}x}\,dx$$

input
```
integrate(1/3*((2*x^2+2)*exp(1/3*(-2*x^2-12*x+2)/x)+6*x^2*log(2)-3*x)*exp(
exp(1/3*(-2*x^2-12*x+2)/x))/x/exp(x*log(2))^2,x, algorithm=\
```

output
```
1/3*integrate((6*x^2*log(2) + 2*(x^2 + 1)*e^(-2/3*(x^2 + 6*x - 1)/x) - 3*x
)*e^(e^(-2/3*(x^2 + 6*x - 1)/x))/(2^(2*x)*x), x)
```

3.705.8 Giac [F]

$$\int \frac{2^{-2x}e^{e^{\frac{2-12x-2x^2}{3x}}}\left(-3x+e^{\frac{2-12x-2x^2}{3x}}(2+2x^2)+6x^2\log(2)\right)}{3x}\,dx$$
$$=\int \frac{\left(6\,x^2\log\left(2\right)+2\left(x^2+1\right)e^{\left(-\frac{2\left(x^2+6\,x-1\right)}{3\,x}\right)}-3\,x\right)e^{\left(e^{\left(-\frac{2\left(x^2+6\,x-1\right)}{3\,x}\right)}\right)}}{3\cdot 2^{2\,x}x}\,dx$$

input
```
integrate(1/3*((2*x^2+2)*exp(1/3*(-2*x^2-12*x+2)/x)+6*x^2*log(2)-3*x)*exp(
exp(1/3*(-2*x^2-12*x+2)/x))/x/exp(x*log(2))^2,x, algorithm=\
```

output
```
integrate(1/3*(6*x^2*log(2) + 2*(x^2 + 1)*e^(-2/3*(x^2 + 6*x - 1)/x) - 3*x
)*e^(e^(-2/3*(x^2 + 6*x - 1)/x))/(2^(2*x)*x), x)
```

3.705.9 Mupad [B] (verification not implemented)

Time = 15.63 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{2^{-2x}e^{e^{\frac{2-12x-2x^2}{3x}}}\left(-3x+e^{\frac{2-12x-2x^2}{3x}}(2+2x^2)+6x^2\log(2)\right)}{3x}\,dx=-\left(\frac{1}{4}\right)^x x\,\mathrm{e}^{\mathrm{e}^{-\frac{2\,x}{3}}\,\mathrm{e}^{-4}\,\mathrm{e}^{\frac{2}{3\,x}}}$$

input
```
int((exp(exp(-(4*x + (2*x^2)/3 - 2/3)/x))*exp(-2*x*log(2))*(6*x^2*log(2) -
 3*x + exp(-(4*x + (2*x^2)/3 - 2/3)/x)*(2*x^2 + 2)))/(3*x),x)
```

output
```
-(1/4)^x*x*exp(exp(-(2*x)/3)*exp(-4)*exp(2/(3*x)))
```

3.706

$$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx$$

3.706.1 Optimal result

Integrand size = 126, antiderivative size = 33

$$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx$$
$$=\log\left(\left(e^{3\left(5+\frac{2}{\log(2)}+\frac{3(3-x)}{\log\left(\frac{x}{2}\right)}\right)}+x\right)\log(4)\right)$$

output
```
ln(2*(exp(9*(-x+3)/ln(1/2*x)+15+6/ln(2))+x)*ln(2))
```

3.706.2 Mathematica [A] (verified)

Time = 1.47 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.79

$$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx$$
$$=\log\left(e^{15+\frac{6}{\log(2)}-\frac{9(-3+x)}{\log\left(\frac{x}{2}\right)}}+x\right)$$

input
```
Integrate[(x*Log[x/2]^2 + E^(((27 - 9*x)*Log[2] + (6 + 15*Log[2])*Log[x/2]
)/(Log[2]*Log[x/2]))*(-27 + 9*x - 9*x*Log[x/2]))/(E^(((27 - 9*x)*Log[2] +
(6 + 15*Log[2])*Log[x/2])/(Log[2]*Log[x/2]))*x*Log[x/2]^2 + x^2*Log[x/2]^2
),x]
```

output
```
Log[E^(15 + 6/Log[2] - (9*(-3 + x))/Log[x/2]) + x]
```

3.706.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(9x-9x\log\left(\frac{x}{2}\right)-27\right)\exp\left(\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}\right)+x\log^2\left(\frac{x}{2}\right)}{x\log^2\left(\frac{x}{2}\right)\exp\left(\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}\right)+x^2\log^2\left(\frac{x}{2}\right)}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}\left(\left(9x-9x\log\left(\frac{x}{2}\right)-27\right)\exp\left(\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}\right)+x\log^2\left(\frac{x}{2}\right)\right)}{x\left(xe^{\frac{9x}{\log\left(\frac{x}{2}\right)}}+e^{\frac{27}{\log\left(\frac{x}{2}\right)}+15+\frac{6}{\log(2)}}\right)\log^2\left(\frac{x}{2}\right)}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}\left(-9x+\log^2\left(\frac{x}{2}\right)+9x\log\left(\frac{x}{2}\right)+27\right)}{\left(xe^{\frac{9x}{\log\left(\frac{x}{2}\right)}}+e^{\frac{27}{\log\left(\frac{x}{2}\right)}+15+\frac{6}{\log(2)}}\right)\log^2\left(\frac{x}{2}\right)}+\frac{9(x(-\log(x))+x(1+\log(2))-3)}{x\log^2\left(\frac{x}{2}\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$27\int \frac{e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}}{\left(e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}x+e^{\frac{6}{\log(2)}+15+\frac{27}{\log\left(\frac{x}{2}\right)}}\right)\log^2\left(\frac{x}{2}\right)}dx-9\int \frac{e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}x}{\left(e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}x+e^{\frac{6}{\log(2)}+15+\frac{27}{\log\left(\frac{x}{2}\right)}}\right)\log^2\left(\frac{x}{2}\right)}dx+\int \frac{e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}}{e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}x+e^{\frac{6}{\log(2)}+15+\frac{27}{\log\left(\frac{x}{2}\right)}}}dx+9\int \frac{e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}x}{\left(e^{\frac{9x}{\log\left(\frac{x}{2}\right)}}x+e^{\frac{6}{\log(2)}+15+\frac{27}{\log\left(\frac{x}{2}\right)}}\right)\log\left(\frac{x}{2}\right)}dx-18\,\text{ExpIntegralEi}(\log(x)-\log(2))+18\,\text{LogIntegral}\left(\frac{x}{2}\right)\log\left(\frac{x}{2}\right)-18\,\text{LogIntegral}\left(\frac{x}{2}\right)\log(x)+18(1+\log(2))\,\text{LogIntegral}\left(\frac{x}{2}\right)-9x+\frac{9x\log(x)}{\log\left(\frac{x}{2}\right)}-\frac{9x(1+\log(2))}{\log\left(\frac{x}{2}\right)}+\frac{27}{\log\left(\frac{x}{2}\right)}$$

input
```
Int[(x*Log[x/2]^2 + E^(((27 - 9*x)*Log[2] + (6 + 15*Log[2])*Log[x/2])/(Log
[2]*Log[x/2]))*(-27 + 9*x - 9*x*Log[x/2]))/(E^(((27 - 9*x)*Log[2] + (6 + 1
5*Log[2])*Log[x/2])/(Log[2]*Log[x/2]))*x*Log[x/2]^2 + x^2*Log[x/2]^2),x]
```

output
```
$Aborted
```

3.706.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.706. $$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx$$

3.706.4 Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

method	result	size
norman	$\ln\left(x+\mathrm{e}^{\frac{(15\ln(2)+6)\ln\left(\frac{x}{2}\right)+(-9x+27)\ln(2)}{\ln(2)\ln\left(\frac{x}{2}\right)}}\right)$	36
parallelrisch	$\ln\left(x+\mathrm{e}^{\frac{(15\ln(2)+6)\ln\left(\frac{x}{2}\right)+(-9x+27)\ln(2)}{\ln(2)\ln\left(\frac{x}{2}\right)}}\right)$	36
risch	$-\frac{9(-3+x)}{\ln\left(\frac{x}{2}\right)}-\frac{(15\ln(2)+6)\ln\left(\frac{x}{2}\right)+(-9x+27)\ln(2)}{\ln(2)\ln\left(\frac{x}{2}\right)}+\ln\left(x+\mathrm{e}^{-\frac{3\left(-5\ln\left(\frac{x}{2}\right)\ln(2)+3x\ln(2)-9\ln(2)-2\ln\left(\frac{x}{2}\right)\right)}{\ln\left(\frac{x}{2}\right)\ln(2)}}\right)$	85

input
```
int(((-9*x*ln(1/2*x)+9*x-27)*exp(((15*ln(2)+6)*ln(1/2*x)+(-9*x+27)*ln(2))/
ln(2)/ln(1/2*x))+x*ln(1/2*x)^2)/(x*ln(1/2*x)^2*exp(((15*ln(2)+6)*ln(1/2*x)
+(-9*x+27)*ln(2))/ln(2)/ln(1/2*x))+x^2*ln(1/2*x)^2),x,method=_RETURNVERBOS
E)
```

output
```
ln(x+exp(((15*ln(2)+6)*ln(1/2*x)+(-9*x+27)*ln(2))/ln(2)/ln(1/2*x)))
```

3.706.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

$$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx$$
$$=\log\left(x+e^{\left(-\frac{3\left(3\,(x-3)\log(2)-(5\,\log(2)+2)\log\left(\frac{1}{2}\,x\right)\right)}{\log(2)\log\left(\frac{1}{2}\,x\right)}\right)}\right)$$

input
```
integrate(((-9*x*log(1/2*x)+9*x-27)*exp(((15*log(2)+6)*log(1/2*x)+(-9*x+27
)*log(2))/log(2)/log(1/2*x))+x*log(1/2*x)^2)/(x*log(1/2*x)^2*exp(((15*log(
2)+6)*log(1/2*x)+(-9*x+27)*log(2))/log(2)/log(1/2*x))+x^2*log(1/2*x)^2),x,
 algorithm=\
```

output
```
log(x + e^(-3*(3*(x - 3)*log(2) - (5*log(2) + 2)*log(1/2*x))/(log(2)*log(1
/2*x))))
```

3.706.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx = \log\left(x+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\right)$$

input
```
integrate(((-9*x*ln(1/2*x)+9*x-27)*exp(((15*ln(2)+6)*ln(1/2*x)+(-9*x+27)*l
n(2))/ln(2)/ln(1/2*x))+x*ln(1/2*x)**2)/(x*ln(1/2*x)**2*exp(((15*ln(2)+6)*l
n(1/2*x)+(-9*x+27)*ln(2))/ln(2)/ln(1/2*x))+x**2*ln(1/2*x)**2),x)
```

output
```
log(x + exp(((27 - 9*x)*log(2) + (6 + 15*log(2))*log(x/2))/(log(2)*log(x/2
))))
```

3.706.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. 2(27) = 54.

Time = 0.35 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.70

$$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx = \frac{9\,x}{\log(2)-\log(x)}+\log(x)+\log\left(\frac{xe^{\left(-\frac{9\,x}{\log(2)-\log(x)}\right)}+e^{\left(-\frac{27}{\log(2)-\log(x)}+\frac{6}{\log(2)}+15\right)}}{x}\right)$$

input
```
integrate(((-9*x*log(1/2*x)+9*x-27)*exp(((15*log(2)+6)*log(1/2*x)+(-9*x+27
)*log(2))/log(2)/log(1/2*x))+x*log(1/2*x)^2)/(x*log(1/2*x)^2*exp(((15*log(
2)+6)*log(1/2*x)+(-9*x+27)*log(2))/log(2)/log(1/2*x))+x^2*log(1/2*x)^2),x,
 algorithm=\
```

output
```
9*x/(log(2) - log(x)) + log(x) + log((x*e^(-9*x/(log(2) - log(x))) + e^(-2
7/(log(2) - log(x)) + 6/log(2) + 15))/x)
```

3.706.8 Giac [A] (verification not implemented)

Time = 1.24 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.24

$$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx = \log\left(x+e^{\left(\frac{9\,(x\log(2)-3\,\log(x))}{\log(2)^2-\log(2)\log(x)}+\frac{3\,(5\,\log(2)-7)}{\log(2)}\right)}\right)$$

input
```
integrate(((-9*x*log(1/2*x)+9*x-27)*exp(((15*log(2)+6)*log(1/2*x)+(-9*x+27
)*log(2))/log(2)/log(1/2*x))+x*log(1/2*x)^2)/(x*log(1/2*x)^2*exp(((15*log(
2)+6)*log(1/2*x)+(-9*x+27)*log(2))/log(2)/log(1/2*x))+x^2*log(1/2*x)^2),x,
 algorithm=\
```

output
```
log(x + e^(9*(x*log(2) - 3*log(x))/(log(2)^2 - log(2)*log(x)) + 3*(5*log(2
) - 7)/log(2)))
```

3.706.9 Mupad [B] (verification not implemented)

Time = 16.84 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.94

$$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx = \ln\left(x+\frac{\mathrm{e}^{\frac{3\,\ln(x)\,\left(2\,\ln\left(\frac{x}{2}\right)+5\,\ln(2)\,\ln(x)-5\,\ln(2)^2\right)}{\ln\left(\frac{x}{2}\right)^2\,\ln(2)}-\frac{9\,x-21}{\ln\left(\frac{x}{2}\right)}}}{2^{\frac{15}{\ln\left(\frac{x}{2}\right)}}}\right)$$

input
```
int(-(exp(-(log(2)*(9*x - 27) - log(x/2)*(15*log(2) + 6))/(log(x/2)*log(2)
))*(9*x*log(x/2) - 9*x + 27) - x*log(x/2)^2)/(x^2*log(x/2)^2 + x*log(x/2)^
2*exp(-(log(2)*(9*x - 27) - log(x/2)*(15*log(2) + 6))/(log(x/2)*log(2)))),
x)
```

output
```
log(x + exp((3*log(x)*(2*log(x/2) + 5*log(2)*log(x) - 5*log(2)^2))/(log(x/
2)^2*log(2)) - (9*x - 21)/log(x/2))/2^(15/log(x/2)))
```

3.706. $$\int \frac{x\log^2\left(\frac{x}{2}\right)+e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}\left(-27+9x-9x\log\left(\frac{x}{2}\right)\right)}{e^{\frac{(27-9x)\log(2)+(6+15\log(2))\log\left(\frac{x}{2}\right)}{\log(2)\log\left(\frac{x}{2}\right)}}x\log^2\left(\frac{x}{2}\right)+x^2\log^2\left(\frac{x}{2}\right)}\,dx$$

3.707 $\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}$

3.707.1 Optimal result

Integrand size = 90, antiderivative size = 21

$$\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}\,dx$$
$$= -x^2-\log\left(-4+\log\left(\frac{4x}{\log^2(3+x)}\right)\right)$$

output
```
-x^2-ln(ln(4*x/ln(3+x)^2)-4)
```

3.707.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}\,dx$$
$$= -x^2-\log\left(4-\log\left(\frac{4x}{\log^2(3+x)}\right)\right)$$

input
```
Integrate[(2*x + (-3 - x + 24*x^2 + 8*x^3)*Log[3 + x] + (-6*x^2 - 2*x^3)*L
og[3 + x]*Log[(4*x)/Log[3 + x]^2])/((-12*x - 4*x^2)*Log[3 + x] + (3*x + x^
2)*Log[3 + x]*Log[(4*x)/Log[3 + x]^2]),x]
```

output
```
-x^2 - Log[4 - Log[(4*x)/Log[3 + x]^2]]
```

3.707.3 Rubi [A] (verified)

Time = 1.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.033, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-2x^3-6x^2\right)\log(x+3)\log\left(\frac{4x}{\log^2(x+3)}\right)+\left(8x^3+24x^2-x-3\right)\log(x+3)+2x}{\left(x^2+3x\right)\log\left(\frac{4x}{\log^2(x+3)}\right)\log(x+3)+\left(-4x^2-12x\right)\log(x+3)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-\left(-2x^3-6x^2\right)\log(x+3)\log\left(\frac{4x}{\log^2(x+3)}\right)-\left(8x^3+24x^2-x-3\right)\log(x+3)-2x}{x(x+3)\log(x+3)\left(4-\log\left(\frac{4x}{\log^2(x+3)}\right)\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2x+x(-\log(x+3))-3\log(x+3)}{x(x+3)\log(x+3)\left(\log\left(\frac{4x}{\log^2(x+3)}\right)-4\right)}-2x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-x^2-\log\left(4-\log\left(\frac{4x}{\log^2(x+3)}\right)\right)$$

input
```
Int[(2*x + (-3 - x + 24*x^2 + 8*x^3)*Log[3 + x] + (-6*x^2 - 2*x^3)*Log[3 +
 x]*Log[(4*x)/Log[3 + x]^2])/((-12*x - 4*x^2)*Log[3 + x] + (3*x + x^2)*Log
[3 + x]*Log[(4*x)/Log[3 + x]^2]),x]
```

output
```
-x^2 - Log[4 - Log[(4*x)/Log[3 + x]^2]]
```

3.707. $\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}dx$

3.707.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.707.4 Maple [A] (verified)

Time = 2.98 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

method	result
parallelrisch	$-x^2-\ln\left(\ln\left(\frac{4x}{\ln(3+x)^2}\right)-4\right)$
risch	$-x^2-\ln\left(\ln\left(\ln\left(3+x\right)\right)-\frac{i\left(\pi\ \mathrm{csgn}\left(\frac{i}{\ln(3+x)^2}\right)\mathrm{csgn}\left(\frac{ix}{\ln(3+x)^2}\right)^2-\pi\ \mathrm{csgn}\left(\frac{i}{\ln(3+x)^2}\right)\mathrm{csgn}\left(\frac{ix}{\ln(3+x)^2}\right)\mathrm{csgn}(ix)+\right.}{}\right.$

input
```
int(((-2*x^3-6*x^2)*ln(3+x)*ln(4*x/ln(3+x)^2)+(8*x^3+24*x^2-x-3)*ln(3+x)+2
*x)/((x^2+3*x)*ln(3+x)*ln(4*x/ln(3+x)^2)+(-4*x^2-12*x)*ln(3+x)),x,method=_
RETURNVERBOSE)
```

output
```
-x^2-ln(ln(4*x/ln(3+x)^2)-4)
```

3.707.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}\,dx = -x^2-\log\left(\log\left(\frac{4\,x}{\log\left(x+3\right)^2}\right)-4\right)$$

input
```
integrate(((-2*x^3-6*x^2)*log(3+x)*log(4*x/log(3+x)^2)+(8*x^3+24*x^2-x-3)*
log(3+x)+2*x)/((x^2+3*x)*log(3+x)*log(4*x/log(3+x)^2)+(-4*x^2-12*x)*log(3+
x)),x, algorithm=\
```

output
```
-x^2 - log(log(4*x/log(x + 3)^2) - 4)
```

3.707.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}\,dx$$
$$= -x^2 - \log\left(\log\left(\frac{4x}{\log(x+3)^2}\right) - 4\right)$$

input
```
integrate(((-2*x**3-6*x**2)*ln(3+x)*ln(4*x/ln(3+x)**2)+(8*x**3+24*x**2-x-3
)*ln(3+x)+2*x)/((x**2+3*x)*ln(3+x)*ln(4*x/ln(3+x)**2)+(-4*x**2-12*x)*ln(3+
x)),x)
```

output
```
-x**2 - log(log(4*x/log(x + 3)**2) - 4)
```

3.707.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}\,dx$$
$$= -x^2 - \log\left(-\log(2) - \frac{1}{2}\log(x) + \log(\log(x+3)) + 2\right)$$

input
```
integrate(((-2*x^3-6*x^2)*log(3+x)*log(4*x/log(3+x)^2)+(8*x^3+24*x^2-x-3)*
log(3+x)+2*x)/((x^2+3*x)*log(3+x)*log(4*x/log(3+x)^2)+(-4*x^2-12*x)*log(3+
x)),x, algorithm=\
```

output
```
-x^2 - log(-log(2) - 1/2*log(x) + log(log(x + 3)) + 2)
```

3.707.8 Giac [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}\,dx$$
$$= -x^2-\log\left(\log\left(\log\left(x+3\right)^2\right)-\log\left(4\,x\right)+4\right)$$

input
```
integrate((((-2*x^3-6*x^2)*log(3+x)*log(4*x/log(3+x)^2)+(8*x^3+24*x^2-x-3)*
log(3+x)+2*x)/((x^2+3*x)*log(3+x)*log(4*x/log(3+x)^2)+(-4*x^2-12*x)*log(3+
x)),x, algorithm=\
```

output
```
-x^2 - log(log(log(x + 3)^2) - log(4*x) + 4)
```

3.707.9 Mupad [B] (verification not implemented)

Time = 16.18 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{2x+(-3-x+24x^2+8x^3)\log(3+x)+(-6x^2-2x^3)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}{(-12x-4x^2)\log(3+x)+(3x+x^2)\log(3+x)\log\left(\frac{4x}{\log^2(3+x)}\right)}\,dx$$
$$= -\ln\left(\ln\left(\frac{4\,x}{\ln\left(x+3\right)^2}\right)-4\right)-x^2$$

input
```
int((log(x + 3)*(x - 24*x^2 - 8*x^3 + 3) - 2*x + log(x + 3)*log((4*x)/log(
x + 3)^2)*(6*x^2 + 2*x^3))/(log(x + 3)*(12*x + 4*x^2) - log(x + 3)*log((4*
x)/log(x + 3)^2)*(3*x + x^2)),x)
```

output
```
- log(log((4*x)/log(x + 3)^2) - 4) - x^2
```

3.708 $\int \frac{e^5(-e^{21}-3x^2)\log(3)}{(e^{21}x+x^3)^2}\,dx$

3.708.1 Optimal result

Integrand size = 28, antiderivative size = 18

$$\int \frac{e^5(-e^{21}-3x^2)\log(3)}{(e^{21}x+x^3)^2}\,dx = \frac{e^5\log(3)}{x\,(e^{21}+x^2)}$$

output
```
exp(5+ln(ln(3)/(exp(21)+x^2)/x))
```

3.708.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{e^5(-e^{21}-3x^2)\log(3)}{(e^{21}x+x^3)^2}\,dx = \frac{e^5\log(3)}{e^{21}x+x^3}$$

input
```
Integrate[(E^5*(-E^21 - 3*x^2)*Log[3])/(E^21*x + x^3)^2,x]
```

output
```
(E^5*Log[3])/(E^21*x + x^3)
```

3.708.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.107, Rules used = {27, 25, 2021}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^5\left(-3x^2-e^{21}\right)\log(3)}{\left(x^3+e^{21}x\right)^2}dx$$

$$\Big\downarrow \; 27$$

$$e^5\log(3)\int -\frac{3x^2+e^{21}}{\left(x^3+e^{21}x\right)^2}dx$$

$$\Big\downarrow \; 25$$

$$-e^5\log(3)\int \frac{3x^2+e^{21}}{\left(x^3+e^{21}x\right)^2}dx$$

$$\Big\downarrow \; 2021$$

$$\frac{e^5\log(3)}{x^3+e^{21}x}$$

input
```
Int[(E^5*(-E^21 - 3*x^2)*Log[3])/(E^21*x + x^3)^2,x]
```

output
```
(E^5*Log[3])/(E^21*x + x^3)
```

3.708.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2021
```
Int[(Pp_)*(Qq_)^(m_.), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x
]}, Simp[Coeff[Pp, x, p]*x^(p - q + 1)*(Qq^(m + 1)/((p + m*q + 1)*Coeff[Qq,
 x, q])), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp
, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])]] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

3.708.4 Maple [A] (verified)

Time = 1.12 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

method	result	size
norman	$\frac{e^{5} \ln \left(3\right)}{x \left(e^{21}+x^{2}\right)}$	17
risch	$\frac{e^{5} \ln \left(3\right)}{x \left(e^{21}+x^{2}\right)}$	17
gosper	$e^{5+\ln \left(\frac{\ln \left(3\right)}{\left(e^{21}+x^{2}\right) x}\right)}$	19
parallelrisch	$e^{5+\ln \left(\frac{\ln \left(3\right)}{\left(e^{21}+x^{2}\right) x}\right)}$	19
default	$e^{5+\ln \left(\frac{\ln \left(3\right)}{x \,e^{21}+x^{3}}\right)+\ln \left(x \,e^{21}+x^{3}\right)} \left(\frac{e^{-21}}{x}-\frac{e^{-21} \left(e^{21} e^{-21}+1\right) x}{2 \left(e^{21}+x^{2}\right)}+\frac{\left(e^{21} e^{-21}-1\right) e^{-21} e^{-\frac{21}{2}} \arctan \left(x \,e^{-\frac{21}{2}}\right)}{2}\right)$	83

input
```
int((-exp(21)-3*x^2)*exp(ln(ln(3)/(x*exp(21)+x^3))+5)/(x*exp(21)+x^3),x,me
thod=_RETURNVERBOSE)
```

output
```
exp(5)*ln(3)/x/(exp(21)+x^2)
```

3.708.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{e^5(-e^{21}-3x^2)\log(3)}{\left(e^{21}x+x^3\right)^2}\,dx=\frac{e^5\log\left(3\right)}{x^3+xe^{21}}$$

input
```
integrate((-exp(21)-3*x^2)*exp(log(log(3)/(x*exp(21)+x^3))+5)/(x*exp(21)+x
^3),x, algorithm=\
```

output
```
e^5*log(3)/(x^3 + x*e^21)
```

3.708.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{e^5(-e^{21}-3x^2)\log(3)}{(e^{21}x+x^3)^2}\,dx = \frac{e^5\log{(3)}}{x^3+xe^{21}}$$

input
```
integrate((-exp(21)-3*x**2)*exp(ln(ln(3)/(x*exp(21)+x**3))+5)/(x*exp(21)+x
**3),x)
```

output
```
exp(5)*log(3)/(x**3 + x*exp(21))
```

3.708.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{e^5(-e^{21}-3x^2)\log(3)}{(e^{21}x+x^3)^2}\,dx = \frac{e^5\log{(3)}}{x^3+xe^{21}}$$

input
```
integrate((-exp(21)-3*x^2)*exp(log(log(3)/(x*exp(21)+x^3))+5)/(x*exp(21)+x
^3),x, algorithm=\
```

output
```
e^5*log(3)/(x^3 + x*e^21)
```

3.708.8 Giac [F(-2)]

Exception generated.

$$\int \frac{e^5(-e^{21}-3x^2)\log(3)}{(e^{21}x+x^3)^2}\,dx = \text{Exception raised: NotImplementedError}$$

input
```
integrate((-exp(21)-3*x^2)*exp(log(log(3)/(x*exp(21)+x^3))+5)/(x*exp(21)+x
^3),x, algorithm=\
```

output
```
Exception raised: NotImplementedError >> unable to parse Giac output: -(-2
*exp(5)*ln(3)*exp(1)^21+6*exp(5)*ln(3)*exp(21))*1/2/(exp(1)^21*exp(21)-exp
(21)^2)/exp(21/2)*atan(sageVARx/exp(21/2))+4*exp(5)*ln(3)*1/2/(exp(1)^21-e
xp(21))/exp(1)^10/e
```

3.708.9 Mupad [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

$$\int \frac{e^5(-e^{21}-3x^2)\log(3)}{(e^{21}x+x^3)^2}\,dx=\frac{e^5\ln(3)}{x\,(x^2+e^{21})}$$

input
```
int(-(exp(log(log(3)/(x*exp(21) + x^3)) + 5)*(exp(21) + 3*x^2))/(x*exp(21)
 + x^3),x)
```

output
```
(exp(5)*log(3))/(x*(exp(21) + x^2))
```

3.709 $\int \frac{-16+e^x(-8x-4x^2)}{40000x^2-40000e^3x^2+10000e^6x^2+e^x(20000x^3-20000e^3x^3+5000e^6x^3)+e^{2x}(2500x^4-2500e^3x^4+625e^6x^4)}\,dx$

3.709.1 Optimal result

Integrand size = 94, antiderivative size = 28

$$\int \frac{-16+e^x(-8x-4x^2)}{40000x^2-40000e^3x^2+10000e^6x^2+e^x(20000x^3-20000e^3x^3+5000e^6x^3)+e^{2x}(2500x^4-2500e^3x^4+625e^6x^4)}\,dx = \frac{1}{625(2-e^3)^2 x\left(1+\frac{e^x x}{4}\right)}$$

output
```
1/25/x/(1/4*exp(x)*x+1)/(2-exp(3))/(50-25*exp(3))
```

3.709.2 Mathematica [A] (verified)

Time = 0.44 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{-16+e^x(-8x-4x^2)}{40000x^2-40000e^3x^2+10000e^6x^2+e^x(20000x^3-20000e^3x^3+5000e^6x^3)+e^{2x}(2500x^4-2500e^3x^4+625e^6x^4)}\,dx = \frac{4}{625(-2+e^3)^2 x(4+e^x x)}$$

input
```
Integrate[(-16 + E^x*(-8*x - 4*x^2))/(40000*x^2 - 40000*E^3*x^2 + 10000*E^
6*x^2 + E^x*(20000*x^3 - 20000*E^3*x^3 + 5000*E^6*x^3) + E^(2*x)*(2500*x^4
 - 2500*E^3*x^4 + 625*E^6*x^4)),x]
```

output
```
4/(625*(-2 + E^3)^2*x*(4 + E^x*x))
```

3.709.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.064, Rules used = {6, 6, 7239, 27, 25, 7238}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(-4x^2-8x)-16}{e^{2x}(625e^6x^4-2500e^3x^4+2500x^4)+e^x(5000e^6x^3-20000e^3x^3+20000x^3)+10000e^6x^2-40000e^3x^2+4000$$

$$\Big\downarrow 6$$

$$\int \frac{e^x(-4x^2-8x)-16}{e^{2x}(625e^6x^4-2500e^3x^4+2500x^4)+e^x(5000e^6x^3-20000e^3x^3+20000x^3)+(40000-40000e^3)x^2+10000e$$

$$\Big\downarrow 6$$

$$\int \frac{e^x(-4x^2-8x)-16}{e^{2x}(625e^6x^4-2500e^3x^4+2500x^4)+e^x(5000e^6x^3-20000e^3x^3+20000x^3)+(40000-40000e^3+10000e^6)x$$

$$\Big\downarrow 7239$$

$$\int \frac{4(-e^xx(x+2)-4)}{625(2-e^3)^2x^2(e^xx+4)^2}dx$$

$$\Big\downarrow 27$$

$$\frac{4\int -\frac{e^xx(x+2)+4}{x^2(e^xx+4)^2}dx}{625(2-e^3)^2}$$

$$\Big\downarrow 25$$

$$-\frac{4\int \frac{e^xx(x+2)+4}{x^2(e^xx+4)^2}dx}{625(2-e^3)^2}$$

$$\Big\downarrow 7238$$

$$\frac{4}{625(2-e^3)^2x(e^xx+4)}$$

input
```
Int[(-16 + E^x*(-8*x - 4*x^2))/(40000*x^2 - 40000*E^3*x^2 + 10000*E^6*x^2
+ E^x*(20000*x^3 - 20000*E^3*x^3 + 5000*E^6*x^3) + E^(2*x)*(2500*x^4 - 250
0*E^3*x^4 + 625*E^6*x^4)),x]
```

3.709.

$$\int \frac{-16+e^x(-8x-4x^2)}{40000x^2-40000e^3x^2+10000e^6x^2+e^x(20000x^3-20000e^3x^3+5000e^6x^3)+e^{2x}(2500x^4-2500e^3x^4+625e^6x^4)}\,dx$$

output
```
4/(625*(2 - E^3)^2*x*(4 + E^x*x))
```

3.709.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7238
```
Int[(u_)*(y_)^(m_.)*(z_)^(n_.), x_Symbol] :> With[{q = DerivativeDivides[y*
z, u*z^(n - m), x]}, Simp[q*y^(m + 1)*(z^(m + 1)/(m + 1)), x] /; !FalseQ[q
]] /; FreeQ[{m, n}, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.709.4 Maple [A] (verified)

Time = 0.61 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

method	result	size
norman	$\frac{4}{625\left(\mathrm{e}^{3}-2\right)^{2} x \left(\mathrm{e}^{x} x+4\right)}$	20
risch	$\frac{4}{625 x \left(\mathrm{e}^{6}-4 \,\mathrm{e}^{3}+4\right) \left(\mathrm{e}^{x} x+4\right)}$	24
parallelrisch	$\frac{4}{625 x \left(\mathrm{e}^{6}-4 \,\mathrm{e}^{3}+4\right) \left(\mathrm{e}^{x} x+4\right)}$	26

input
```
int(((-4*x^2-8*x)*exp(x)-16)/((625*x^4*exp(3)^2-2500*x^4*exp(3)+2500*x^4)*
exp(x)^2+(5000*x^3*exp(3)^2-20000*x^3*exp(3)+20000*x^3)*exp(x)+10000*x^2*e
xp(3)^2-40000*x^2*exp(3)+40000*x^2),x,method=_RETURNVERBOSE)
```

output
```
4/625/(exp(3)-2)^2/x/(exp(x)*x+4)
```

3.709.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. 2(19) = 38.

Time = 0.28 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

$$\int \frac{-16+e^x(-8x-4x^2)}{40000x^2-40000e^3x^2+10000e^6x^2+e^x(20000x^3-20000e^3x^3+5000e^6x^3)+e^{2x}(2500x^4-2500e^3x^4+ \\ = \frac{4}{625\,(4\,xe^6-16\,xe^3+(x^2e^6-4\,x^2e^3+4\,x^2)e^x+16\,x)}$$

input
```
integrate(((-4*x^2-8*x)*exp(x)-16)/((625*x^4*exp(3)^2-2500*x^4*exp(3)+2500
*x^4)*exp(x)^2+(5000*x^3*exp(3)^2-20000*x^3*exp(3)+20000*x^3)*exp(x)+10000
*x^2*exp(3)^2-40000*x^2*exp(3)+40000*x^2),x, algorithm=\
```

output
```
4/625/(4*x*e^6 - 16*x*e^3 + (x^2*e^6 - 4*x^2*e^3 + 4*x^2)*e^x + 16*x)
```

3.709.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{-16+e^x(-8x-4x^2)}{40000x^2-40000e^3x^2+10000e^6x^2+e^x(20000x^3-20000e^3x^3+5000e^6x^3)+e^{2x}(2500x^4-2500e^3x^4+ \\ = \frac{4}{-10000xe^3+10000x+2500xe^6+(-2500x^2e^3+2500x^2+625x^2e^6)\,e^x}$$

input
```
integrate(((-4*x**2-8*x)*exp(x)-16)/((625*x**4*exp(3)**2-2500*x**4*exp(3)+
2500*x**4)*exp(x)**2+(5000*x**3*exp(3)**2-20000*x**3*exp(3)+20000*x**3)*ex
p(x)+10000*x**2*exp(3)**2-40000*x**2*exp(3)+40000*x**2),x)
```

output
```
4/(-10000*x*exp(3) + 10000*x + 2500*x*exp(6) + (-2500*x**2*exp(3) + 2500*x
**2 + 625*x**2*exp(6))*exp(x))
```

3.709.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{-16+e^x(-8x-4x^2)}{40000x^2-40000e^3x^2+10000e^6x^2+e^x\left(20000x^3-20000e^3x^3+5000e^6x^3\right)+e^{2x}\left(2500x^4-2500e^3x^4+\right.}$$
$$=\frac{4}{625\left(x^2(e^6-4e^3+4)e^x+4x(e^6-4e^3+4)\right)}$$

input
```
integrate(((-4*x^2-8*x)*exp(x)-16)/((625*x^4*exp(3)^2-2500*x^4*exp(3)+2500
*x^4)*exp(x)^2+(5000*x^3*exp(3)^2-20000*x^3*exp(3)+20000*x^3)*exp(x)+10000
*x^2*exp(3)^2-40000*x^2*exp(3)+40000*x^2),x, algorithm=\
```

output
```
4/625/(x^2*(e^6 - 4*e^3 + 4)*e^x + 4*x*(e^6 - 4*e^3 + 4))
```

3.709.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. 2(19) = 38.

Time = 0.27 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{-16+e^x(-8x-4x^2)}{40000x^2-40000e^3x^2+10000e^6x^2+e^x\left(20000x^3-20000e^3x^3+5000e^6x^3\right)+e^{2x}\left(2500x^4-2500e^3x^4+\right.}$$
$$=\frac{4}{625\left(x^2e^{(x+6)}-4x^2e^{(x+3)}+4x^2e^x+4xe^6-16xe^3+16x\right)}$$

input
```
integrate(((-4*x^2-8*x)*exp(x)-16)/((625*x^4*exp(3)^2-2500*x^4*exp(3)+2500
*x^4)*exp(x)^2+(5000*x^3*exp(3)^2-20000*x^3*exp(3)+20000*x^3)*exp(x)+10000
*x^2*exp(3)^2-40000*x^2*exp(3)+40000*x^2),x, algorithm=\
```

output
```
4/625/(x^2*e^(x + 6) - 4*x^2*e^(x + 3) + 4*x^2*e^x + 4*x*e^6 - 16*x*e^3 +
16*x)
```

3.709.9 Mupad [B] (verification not implemented)

Time = 16.05 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{-16 + e^x(-8x - 4x^2)}{40000x^2 - 40000e^3x^2 + 10000e^6x^2 + e^x\left(20000x^3 - 20000e^3x^3 + 5000e^6x^3\right) + e^{2x}\left(2500x^4 - 2500e^3x^4 + \right.}$$
$$= \frac{4}{625\,x\,\left(x\,e^x + 4\right)\,\left(e^3 - 2\right)^2}$$

input
```
int(-(exp(x)*(8*x + 4*x^2) + 16)/(exp(x)*(5000*x^3*exp(6) - 20000*x^3*exp(
3) + 20000*x^3) + exp(2*x)*(625*x^4*exp(6) - 2500*x^4*exp(3) + 2500*x^4) -
 40000*x^2*exp(3) + 10000*x^2*exp(6) + 40000*x^2),x)
```

output
```
4/(625*x*(x*exp(x) + 4)*(exp(3) - 2)^2)
```

3.710 $\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-}$

3.710.1 Optimal result

Integrand size = 1521, antiderivative size = 39

$$\text{the integral} = \frac{2}{x\left(2+x-\left(-e^5+\left(\frac{1}{3}\left(-2+e^x\right)-x\right)^2x+\log(3)\right)^2\right)}$$

output
```
2/(2-(x*(1/3*exp(x)-2/3-x)^2-exp(5)+ln(3))^2+x)/x
```

3.710.2 Mathematica [F(-1)]

Timed out.

$$\text{the integral} = \$\text{Aborted}$$

3.710.
$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$

input
```
Integrate[(-26244 + 13122*E^10 - 26244*x + 7776*x^2 + 62208*x^3 + 174960*x
^4 + 209952*x^5 + 91854*x^6 + E^5*(-23328*x - 104976*x^2 - 104976*x^3) + E
^(4*x)*(486*x^2 + 648*x^3) + E^(3*x)*(-3888*x^2 - 11664*x^3 - 5832*x^4) +
(-26244*E^5 + 23328*x + 104976*x^2 + 104976*x^3)*Log[3] + 13122*Log[3]^2 +
 E^(2*x)*(11664*x^2 + 54432*x^3 + 67068*x^4 + 17496*x^5 + E^5*(-5832*x - 5
832*x^2) + (5832*x + 5832*x^2)*Log[3]) + E^x*(-15552*x^2 - 98496*x^3 - 198
288*x^4 - 139968*x^5 - 17496*x^6 + E^5*(23328*x + 64152*x^2 + 17496*x^3) +
 (-23328*x - 64152*x^2 - 17496*x^3)*Log[3]))/(26244*x^2 + 6561*E^20*x^2 +
26244*x^3 + 1377*x^4 - 33696*x^5 - 85280*x^6 + E^(8*x)*x^6 - 101904*x^7 -
45108*x^8 + 35262*x^9 + 90720*x^10 + 108864*x^11 + 81648*x^12 + 34992*x^13
 + 6561*x^14 + E^15*(-11664*x^3 - 34992*x^4 - 26244*x^5) + E^(7*x)*(-16*x^
6 - 24*x^7) + E^10*(-26244*x^2 - 13122*x^3 + 7776*x^4 + 46656*x^5 + 104976
*x^6 + 104976*x^7 + 39366*x^8) + E^5*(23328*x^3 + 81648*x^4 + 85176*x^5 +
5508*x^6 - 77760*x^7 - 155520*x^8 - 174960*x^9 - 104976*x^10 - 26244*x^11)
 + (-26244*E^15*x^2 - 23328*x^3 - 81648*x^4 - 85176*x^5 - 5508*x^6 + 77760
*x^7 + 155520*x^8 + 174960*x^9 + 104976*x^10 + 26244*x^11 + E^10*(34992*x^
3 + 104976*x^4 + 78732*x^5) + E^5*(52488*x^2 + 26244*x^3 - 15552*x^4 - 933
12*x^5 - 209952*x^6 - 209952*x^7 - 78732*x^8))*Log[3] + (-26244*x^2 + 3936
6*E^10*x^2 - 13122*x^3 + 7776*x^4 + 46656*x^5 + 104976*x^6 + 104976*x^7 +
39366*x^8 + E^5*(-34992*x^3 - 104976*x^4 - 78732*x^5))*Log[3]^2 + (-26244*
E^5*x^2 + 11664*x^3 + 34992*x^4 + 26244*x^5)*Log[3]^3 + 6561*x^2*Log[3]^4
+ E^(6*x)*(-36*E^5*x^5 + 112*x^6 + 336*x^7 + 252*x^8 + 36*x^5*Log[3]) + E^
(5*x)*(-448*x^6 - 2016*x^7 - 3024*x^8 - 1512*x^9 + E^5*(432*x^5 + 648*x^6)
 + (-432*x^5 - 648*x^6)*Log[3]) + E^(4*x)*(-324*x^4 + 486*E^10*x^4 - 162*x
^5 + 1120*x^6 + 6720*x^7 + 15120*x^8 + 15120*x^9 + 5670*x^10 + E^5*(-2160*
x^5 - 6480*x^6 - 4860*x^7) + (-972*E^5*x^4 + 2160*x^5 + 6480*x^6 + 4860*x^
7)*Log[3] + 486*x^4*Log[3]^2) + E^(3*x)*(2592*x^4 + 5184*x^5 + 152*x^6 - 1
3440*x^7 - 40320*x^8 - 60480*x^9 - 45360*x^10 - 13608*x^11 + E^10*(-3888*x
^4 - 5832*x^5) + E^5*(5760*x^5 + 25920*x^6 + 38880*x^7 + 19440*x^8) + (-57
60*x^5 - 25920*x^6 - 38880*x^7 - 19440*x^8 + E^5*(7776*x^4 + 11664*x^5))*L
og[3] + (-3888*x^4 - 5832*x^5)*Log[3]^2) + E^(2*x)*(-2916*E^15*x^3 - 7776*
x^4 - 27216*x^5 - 27368*x^6 + 7380*x^7 + 60480*x^8 + 120960*x^9 + 136080*x
^10 + 81648*x^11 + 20412*x^12 + E^10*(11664*x^4 + 34992*x^5 + 26244*x^6) +
 E^5*(5832*x^3 + 2916*x^4 - 8640*x^5 - 51840*x^6 - 116640*x^7 - 116640*x^8
 - 43740*x^9) + (-5832*x^3 + 8748*E^10*x^3 - 2916*x^4 + 8640*x^5 + 51840*x
^6 + 116640*x^7 + 116640*x^8 + 43740*x^9 + E^5*(-23328*x^4 - 69984*x^5 - 5
2488*x^6))*Log[3] + (-8748*E^5*x^3 + 11664*x^4 + 34992*x^5 + 26244*x^6)*Lo
g[3]^2 + 2916*x^3*Log[3]^3) + E^x*(10368*x^4 + 51840*x^5 + 92288*x^6 + 592
32*x^7 - 30888*x^8 - 120960*x^9 - 181440*x^10 - 163296*x^11 - 81648*x^12 -
 17496*x^13 + E^15*(11664*x^3 + 17496*x^4) + E^10*(-15552*x^4 - 69984*x^5
- 104976*x^6 - 52488*x^7) + E^5*(-23328*x^3 - 46656*x^4 - 10584*x^5 + 5184
0*x^6 + 155520*x^7 + 233280*x^8 + 174960*x^9 + 52488*x^10) + (23328*x^3 +
46656*x^4 + 10584*x^5 - 51840*x^6 - 155520*x^7 - 233280*x^8 - 174960*x^9 -
 52488*x^10 + E^10*(-34992*x^3 - 52488*x^4) + E^5*(31104*x^4 + 139968*x^5
+ 209952*x^6 + 104976*x^7))*Log[3] + (-15552*x^4 - 69984*x^5 - 104976*x^6
- 52488*x^7 + E^5*(34992*x^3 + 52488*x^4))*Log[3]^2 + (-11664*x^3 - 17496*
x^4)*Log[3]^3)), x]
```

3.710

output
```
$Aborted
```

3.710.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{}{6561x^{14}+34992x^{13}+81648x^{12}+108864x^{11}+90720x^{10}+35262x^{9}-45108x^{8}-101904x^{7}+e^{8x}x^{6}-85280x^{6}}$$

$$\Big\downarrow 6$$

$$\int \frac{}{6561x^{14}+34992x^{13}+81648x^{12}+108864x^{11}+90720x^{10}+35262x^{9}-45108x^{8}-101904x^{7}+e^{8x}x^{6}-85280x^{6}}$$

$$\Big\downarrow 6$$

$$\int \frac{}{6561x^{14}+34992x^{13}+81648x^{12}+108864x^{11}+90720x^{10}+35262x^{9}-45108x^{8}-101904x^{7}+e^{8x}x^{6}-85280x^{6}}$$

$$\Big\downarrow 7239$$

$$\int \frac{162\left(e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2+36e^{x+5}\left(3x^2+11x+4\right)x-18e^5\left(36x^3+36x^2+8x+9\log(3)\right)}{x^2\left(-81x^6-216x^5-216x^4-6x^3(16+27\log(3))-e^{4x}x^2+\right.}$$

$$\Big\downarrow 27$$

$$162\int \frac{e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2-36e^{2x+5}(x+1)x+36e^{x+5}\left(3x^2+11x+4\right)x-4e^{x}\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log(3))x^3-e^{4x}x^2-\right.}$$

$$\Big\downarrow 7293$$

$$162\int \left(\frac{}{x^2\left(81x^6-108e^{x}x^5+216x^5-216e^{x}x^4+54e^{2x}x^4+216x^4-144e^{x}x^3+72e^{2x}x^3-12e^{3x}x^3+96\left(1-\frac{27}{16}\right.\right.}\right.$$

$$\Big\downarrow 7239$$

$$162\int \frac{e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2-36e^{2x+5}(x+1)x+36e^{x+5}\left(3x^2+11x+4\right)x-4e^{x}\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log(3))x^3\right.}$$

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

$$\Big\downarrow \text{7293}$$

$$162\int \left(\frac{}{x^2\left(81x^6-108e^xx^5+216x^5-216e^xx^4+54e^{2x}x^4+216x^4-144e^xx^3+72e^{2x}x^3-12e^{3x}x^3+96\left(1-\frac{27}{16}\right.\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$162\int \frac{e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2-36e^{2x+5}(x+1)x+36e^{x+5}\left(3x^2+11x+4\right)x-4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log\right.}$$

$$\Big\downarrow \text{7293}$$

$$162\int \left(\frac{}{x^2\left(81x^6-108e^xx^5+216x^5-216e^xx^4+54e^{2x}x^4+216x^4-144e^xx^3+72e^{2x}x^3-12e^{3x}x^3+96\left(1-\frac{27}{16}\right.\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$162\int \frac{e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2-36e^{2x+5}(x+1)x+36e^{x+5}\left(3x^2+11x+4\right)x-4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log\right.}$$

$$\Big\downarrow \text{7293}$$

$$162\int \left(\frac{}{x^2\left(81x^6-108e^xx^5+216x^5-216e^xx^4+54e^{2x}x^4+216x^4-144e^xx^3+72e^{2x}x^3-12e^{3x}x^3+96\left(1-\frac{27}{16}\right.\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$162\int \frac{e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2-36e^{2x+5}(x+1)x+36e^{x+5}\left(3x^2+11x+4\right)x-4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log\right.}$$

$$\Big\downarrow \text{7293}$$

$$162\int \left(\frac{}{x^2\left(81x^6-108e^xx^5+216x^5-216e^xx^4+54e^{2x}x^4+216x^4-144e^xx^3+72e^{2x}x^3-12e^{3x}x^3+96\left(1-\frac{27}{16}\right.\right.}\right.$$

$$\Big\downarrow \text{7239}$$

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

$$162\int \frac{e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2-36e^{2x+5}(x+1)x+36e^{x+5}\left(3x^2+11x+4\right)x-4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log\right.}$$

$\big\downarrow$ 7293

$$162\int\left(\frac{}{x^2\left(81x^6-108e^xx^5+216x^5-216e^xx^4+54e^{2x}x^4+216x^4-144e^xx^3+72e^{2x}x^3-12e^{3x}x^3+96\left(1-\frac{27}{16}\right.\right.}\right.$$

$\big\downarrow$ 7239

$$162\int \frac{e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2-36e^{2x+5}(x+1)x+36e^{x+5}\left(3x^2+11x+4\right)x-4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log\right.}$$

$\big\downarrow$ 7293

$$162\int\left(\frac{}{x^2\left(81x^6-108e^xx^5+216x^5-216e^xx^4+54e^{2x}x^4+216x^4-144e^xx^3+72e^{2x}x^3-12e^{3x}x^3+96\left(1-\frac{27}{16}\right.\right.}\right.$$

$\big\downarrow$ 7239

$$162\int \frac{e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2-36e^{2x+5}(x+1)x+36e^{x+5}\left(3x^2+11x+4\right)x-4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log\right.}$$

$\big\downarrow$ 7293

$$162\int\left(\frac{}{x^2\left(81x^6-108e^xx^5+216x^5-216e^xx^4+54e^{2x}x^4+216x^4-144e^xx^3+72e^{2x}x^3-12e^{3x}x^3+96\left(1-\frac{27}{16}\right.\right.}\right.$$

$\big\downarrow$ 7239

$$162\int \frac{e^{4x}(4x+3)x^2-12e^{3x}\left(3x^2+6x+2\right)x^2-36e^{2x+5}(x+1)x+36e^{x+5}\left(3x^2+11x+4\right)x-4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log\right.}$$

$\big\downarrow$ 7293

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

$$162 \int \left(\frac{}{x^2 \left(81x^6 - 108e^x x^5 + 216x^5 - 216e^x x^4 + 54e^{2x} x^4 + 216x^4 - 144e^x x^3 + 72e^{2x} x^3 - 12e^{3x} x^3 + 96 \left(1 - \frac{27}{16}\right.\right.}\right.$$

$\downarrow$ 7239

$$162 \int \frac{e^{4x}(4x+3)x^2 - 12e^{3x}\left(3x^2+6x+2\right)x^2 - 36e^{2x+5}(x+1)x + 36e^{x+5}\left(3x^2+11x+4\right)x - 4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6 - 216x^5 - 216x^4 - 6(16+27\log\right.}$$

$\downarrow$ 7293

$$162 \int \left(\frac{}{x^2 \left(81x^6 - 108e^x x^5 + 216x^5 - 216e^x x^4 + 54e^{2x} x^4 + 216x^4 - 144e^x x^3 + 72e^{2x} x^3 - 12e^{3x} x^3 + 96 \left(1 - \frac{27}{16}\right.\right.}\right.$$

$\downarrow$ 7239

$$162 \int \frac{e^{4x}(4x+3)x^2 - 12e^{3x}\left(3x^2+6x+2\right)x^2 - 36e^{2x+5}(x+1)x + 36e^{x+5}\left(3x^2+11x+4\right)x - 4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6 - 216x^5 - 216x^4 - 6(16+27\log\right.}$$

$\downarrow$ 7293

$$162 \int \left(\frac{}{x^2 \left(81x^6 - 108e^x x^5 + 216x^5 - 216e^x x^4 + 54e^{2x} x^4 + 216x^4 - 144e^x x^3 + 72e^{2x} x^3 - 12e^{3x} x^3 + 96 \left(1 - \frac{27}{16}\right.\right.}\right.$$

$\downarrow$ 7239

$$162 \int \frac{e^{4x}(4x+3)x^2 - 12e^{3x}\left(3x^2+6x+2\right)x^2 - 36e^{2x+5}(x+1)x + 36e^{x+5}\left(3x^2+11x+4\right)x - 4e^x\left(27x^5+216x\right.}{x^2\left(-81x^6 - 216x^5 - 216x^4 - 6(16+27\log\right.}$$

$\downarrow$ 7293

$$162 \int \left(\frac{}{x^2 \left(81x^6 - 108e^x x^5 + 216x^5 - 216e^x x^4 + 54e^{2x} x^4 + 216x^4 - 144e^x x^3 + 72e^{2x} x^3 - 12e^{3x} x^3 + 96 \left(1 - \frac{27}{16}\right.\right.}\right.$$

$\downarrow$ 7239

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

$$162 \int \frac{e^{4x}(4x+3)x^2 - 12e^{3x}\left(3x^2+6x+2\right)x^2 - 36e^{2x+5}(x+1)x + 36e^{x+5}\left(3x^2+11x+4\right)x - 4e^{x}\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log\right.}$$

$$\downarrow 7293$$

$$162 \int \left(\frac{}{x^2\left(81x^6-108e^{x}x^5+216x^5-216e^{x}x^4+54e^{2x}x^4+216x^4-144e^{x}x^3+72e^{2x}x^3-12e^{3x}x^3+96\left(1-\frac{27}{16}\right.\right.}\right.$$

$$\downarrow 7239$$

$$162 \int \frac{e^{4x}(4x+3)x^2 - 12e^{3x}\left(3x^2+6x+2\right)x^2 - 36e^{2x+5}(x+1)x + 36e^{x+5}\left(3x^2+11x+4\right)x - 4e^{x}\left(27x^5+216x\right.}{x^2\left(-81x^6-216x^5-216x^4-6(16+27\log\right.}$$

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

```
Int[(-26244 + 13122*E^10 - 26244*x + 7776*x^2 + 62208*x^3 + 174960*x^4 + 2
09952*x^5 + 91854*x^6 + E^5*(-23328*x - 104976*x^2 - 104976*x^3) + E^(4*x)
*(486*x^2 + 648*x^3) + E^(3*x)*(-3888*x^2 - 11664*x^3 - 5832*x^4) + (-2624
4*E^5 + 23328*x + 104976*x^2 + 104976*x^3)*Log[3] + 13122*Log[3]^2 + E^(2*
x)*(11664*x^2 + 54432*x^3 + 67068*x^4 + 17496*x^5 + E^5*(-5832*x - 5832*x^
2) + (5832*x + 5832*x^2)*Log[3]) + E^x*(-15552*x^2 - 98496*x^3 - 198288*x^
4 - 139968*x^5 - 17496*x^6 + E^5*(23328*x + 64152*x^2 + 17496*x^3) + (-233
28*x - 64152*x^2 - 17496*x^3)*Log[3]))/(26244*x^2 + 6561*E^20*x^2 + 26244*
x^3 + 1377*x^4 - 33696*x^5 - 85280*x^6 + E^(8*x)*x^6 - 101904*x^7 - 45108*
x^8 + 35262*x^9 + 90720*x^10 + 108864*x^11 + 81648*x^12 + 34992*x^13 + 656
1*x^14 + E^15*(-11664*x^3 - 34992*x^4 - 26244*x^5) + E^(7*x)*(-16*x^6 - 24
*x^7) + E^10*(-26244*x^2 - 13122*x^3 + 7776*x^4 + 46656*x^5 + 104976*x^6 +
 104976*x^7 + 39366*x^8) + E^5*(23328*x^3 + 81648*x^4 + 85176*x^5 + 5508*x
^6 - 77760*x^7 - 155520*x^8 - 174960*x^9 - 104976*x^10 - 26244*x^11) + (-2
6244*E^15*x^2 - 23328*x^3 - 81648*x^4 - 85176*x^5 - 5508*x^6 + 77760*x^7 +
 155520*x^8 + 174960*x^9 + 104976*x^10 + 26244*x^11 + E^10*(34992*x^3 + 10
4976*x^4 + 78732*x^5) + E^5*(52488*x^2 + 26244*x^3 - 15552*x^4 - 93312*x^5
 - 209952*x^6 - 209952*x^7 - 78732*x^8))*Log[3] + (-26244*x^2 + 39366*E^10
*x^2 - 13122*x^3 + 7776*x^4 + 46656*x^5 + 104976*x^6 + 104976*x^7 + 39366*
x^8 + E^5*(-34992*x^3 - 104976*x^4 - 78732*x^5))*Log[3]^2 + (-26244*E^5*x^
2 + 11664*x^3 + 34992*x^4 + 26244*x^5)*Log[3]^3 + 6561*x^2*Log[3]^4 + E^(6
*x)*(-36*E^5*x^5 + 112*x^6 + 336*x^7 + 252*x^8 + 36*x^5*Log[3]) + E^(5*x)*
(-448*x^6 - 2016*x^7 - 3024*x^8 - 1512*x^9 + E^5*(432*x^5 + 648*x^6) + (-4
32*x^5 - 648*x^6)*Log[3]) + E^(4*x)*(-324*x^4 + 486*E^10*x^4 - 162*x^5 + 1
120*x^6 + 6720*x^7 + 15120*x^8 + 15120*x^9 + 5670*x^10 + E^5*(-2160*x^5 -
6480*x^6 - 4860*x^7) + (-972*E^5*x^4 + 2160*x^5 + 6480*x^6 + 4860*x^7)*Log
[3] + 486*x^4*Log[3]^2) + E^(3*x)*(2592*x^4 + 5184*x^5 + 152*x^6 - 13440*x
^7 - 40320*x^8 - 60480*x^9 - 45360*x^10 - 13608*x^11 + E^10*(-3888*x^4 - 5
832*x^5) + E^5*(5760*x^5 + 25920*x^6 + 38880*x^7 + 19440*x^8) + (-5760*x^5
 - 25920*x^6 - 38880*x^7 - 19440*x^8 + E^5*(7776*x^4 + 11664*x^5))*Log[3]
+ (-3888*x^4 - 5832*x^5)*Log[3]^2) + E^(2*x)*(-2916*E^15*x^3 - 7776*x^4 -
27216*x^5 - 27368*x^6 + 7380*x^7 + 60480*x^8 + 120960*x^9 + 136080*x^10 +
81648*x^11 + 20412*x^12 + E^10*(11664*x^4 + 34992*x^5 + 26244*x^6) + E^5*(
5832*x^3 + 2916*x^4 - 8640*x^5 - 51840*x^6 - 116640*x^7 - 116640*x^8 - 437
40*x^9) + (-5832*x^3 + 8748*E^10*x^3 - 2916*x^4 + 8640*x^5 + 51840*x^6 + 1
16640*x^7 + 116640*x^8 + 43740*x^9 + E^5*(-23328*x^4 - 69984*x^5 - 52488*x
^6))*Log[3] + (-8748*E^5*x^3 + 11664*x^4 + 34992*x^5 + 26244*x^6)*Log[3]^2
 + 2916*x^3*Log[3]^3) + E^x*(10368*x^4 + 51840*x^5 + 92288*x^6 + 59232*x^7
 - 30888*x^8 - 120960*x^9 - 181440*x^10 - 163296*x^11 - 81648*x^12 - 17496
*x^13 + E^15*(11664*x^3 + 17496*x^4) + E^10*(-15552*x^4 - 69984*x^5 - 1049
76*x^6 - 52488*x^7) + E^5*(-23328*x^3 - 46656*x^4 - 10584*x^5 + 51840*x^6
+ 155520*x^7 + 233280*x^8 + 174960*x^9 + 52488*x^10) + (23328*x^3 + 46656*
x^4 + 10584*x^5 - 51840*x^6 - 155520*x^7 - 233280*x^8 - 174960*x^9 - 52488
*x^10 + E^10*(-34992*x^3 - 52488*x^4) + E^5*(31104*x^4 + 139968*x^5 + 2099
52*x^6 + 104976*x^7))*Log[3] + (-15552*x^4 - 69984*x^5 - 104976*x^6 - 5248
8*x^7 + E^5*(34992*x^3 + 52488*x^4))*Log[3]^2 + (-11664*x^3 - 17496*x^4)*L
og[3]^3)),x]
```

output
```
$Aborted
```

3.710.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.710.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 224 vs. $2(34) = 68$.

Time = 4.20 (sec) , antiderivative size = 225, normalized size of antiderivative = 5.77

method	result
risch	$-\frac{}{x\left(-162+54\,e^{2x}x^4-81x+18\ln(3)e^{2x}x-8x^2e^{3x}+72\,e^{2x}x^3-216x^2e^5+24\,e^{2x}x^2+162x^3\ln(3)-216\,e^{x}x^4-32\,e^{x}x^2+72x\ln(3)-\right.}$
parallelrisch	$-\frac{}{x\left(-162+54\,e^{2x}x^4-81x+18\ln(3)e^{2x}x-8x^2e^{3x}+72\,e^{2x}x^3-216x^2e^5+24\,e^{2x}x^2+162x^3\ln(3)-216\,e^{x}x^4-32\,e^{x}x^2+72x\ln(3)-\right.}$

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$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

input
```
int(((648*x^3+486*x^2)*exp(x)^4+(-5832*x^4-11664*x^3-3888*x^2)*exp(x)^3+((
5832*x^2+5832*x)*ln(3)+(-5832*x^2-5832*x)*exp(5)+17496*x^5+67068*x^4+54432
*x^3+11664*x^2)*exp(x)^2+((-17496*x^3-64152*x^2-23328*x)*ln(3)+(17496*x^3+
64152*x^2+23328*x)*exp(5)-17496*x^6-139968*x^5-198288*x^4-98496*x^3-15552*
x^2)*exp(x)+13122*ln(3)^2+(-26244*exp(5)+104976*x^3+104976*x^2+23328*x)*ln
(3)+13122*exp(5)^2+(-104976*x^3-104976*x^2-23328*x)*exp(5)+91854*x^6+20995
2*x^5+174960*x^4+62208*x^3+7776*x^2-26244*x-26244)/(6561*x^2*exp(5)^4+((-1
7496*x^4-11664*x^3)*ln(3)^3+((52488*x^4+34992*x^3)*exp(5)-52488*x^7-104976
*x^6-69984*x^5-15552*x^4)*ln(3)^2+((-52488*x^4-34992*x^3)*exp(5)^2+(104976
*x^7+209952*x^6+139968*x^5+31104*x^4)*exp(5)-52488*x^10-174960*x^9-233280*
x^8-155520*x^7-51840*x^6+10584*x^5+46656*x^4+23328*x^3)*ln(3)+(17496*x^4+1
1664*x^3)*exp(5)^3+(-52488*x^7-104976*x^6-69984*x^5-15552*x^4)*exp(5)^2+(5
2488*x^10+174960*x^9+233280*x^8+155520*x^7+51840*x^6-10584*x^5-46656*x^4-2
3328*x^3)*exp(5)-17496*x^13-81648*x^12-163296*x^11-181440*x^10-120960*x^9-
30888*x^8+59232*x^7+92288*x^6+51840*x^5+10368*x^4)*exp(x)+(-26244*x^2*exp(
5)+26244*x^5+34992*x^4+11664*x^3)*ln(3)^3+(39366*x^2*exp(5)^2+(-78732*x^5-
104976*x^4-34992*x^3)*exp(5)+39366*x^8+104976*x^7+104976*x^6+46656*x^5+777
6*x^4-13122*x^3-26244*x^2)*ln(3)^2+(486*x^4*ln(3)^2+(-972*x^4*exp(5)+4860*
x^7+6480*x^6+2160*x^5)*ln(3)+486*x^4*exp(5)^2+(-4860*x^7-6480*x^6-2160*x^5
)*exp(5)+5670*x^10+15120*x^9+15120*x^8+6720*x^7+1120*x^6-162*x^5-324*x^4)*
exp(x)^4+(-26244*x^2*exp(5)^3+(78732*x^5+104976*x^4+34992*x^3)*exp(5)^2+(-
78732*x^8-209952*x^7-209952*x^6-93312*x^5-15552*x^4+26244*x^3+52488*x^2)*e
xp(5)+26244*x^11+104976*x^10+174960*x^9+155520*x^8+77760*x^7-5508*x^6-8517
6*x^5-81648*x^4-23328*x^3)*ln(3)+(-26244*x^5-34992*x^4-11664*x^3)*exp(5)^3
+(39366*x^8+104976*x^7+104976*x^6+46656*x^5+7776*x^4-13122*x^3-26244*x^2)*
exp(5)^2+(-26244*x^11-104976*x^10-174960*x^9-155520*x^8-77760*x^7+5508*x^6
+85176*x^5+81648*x^4+23328*x^3)*exp(5)+((-5832*x^5-3888*x^4)*ln(3)^2+((116
64*x^5+7776*x^4)*exp(5)-19440*x^8-38880*x^7-25920*x^6-5760*x^5)*ln(3)+(-58
32*x^5-3888*x^4)*exp(5)^2+(19440*x^8+38880*x^7+25920*x^6+5760*x^5)*exp(5)-
13608*x^11-45360*x^10-60480*x^9-40320*x^8-13440*x^7+152*x^6+5184*x^5+2592*
x^4)*exp(x)^3+(2916*x^3*ln(3)^3+(-8748*x^3*exp(5)+26244*x^6+34992*x^5+1166
4*x^4)*ln(3)^2+(8748*x^3*exp(5)^2+(-52488*x^6-69984*x^5-23328*x^4)*exp(5)+
43740*x^9+116640*x^8+116640*x^7+51840*x^6+8640*x^5-2916*x^4-5832*x^3)*ln(3
)-2916*x^3*exp(5)^3+(26244*x^6+34992*x^5+11664*x^4)*exp(5)^2+(-43740*x^9-1
16640*x^8-116640*x^7-51840*x^6-8640*x^5+2916*x^4+5832*x^3)*exp(5)+20412*x^
12+81648*x^11+136080*x^10+120960*x^9+60480*x^8+7380*x^7-27368*x^6-27216*x^
5-7776*x^4)*exp(x)^2+x^6*exp(x)^8+(-24*x^7-16*x^6)*exp(x)^7+(36*x^5*ln(3)-
36*x^5*exp(5)+252*x^8+336*x^7+112*x^6)*exp(x)^6+((-648*x^6-432*x^5)*ln(3)+
(648*x^6+432*x^5)*exp(5)-1512*x^9-3024*x^8-2016*x^7-448*x^6)*exp(x)^5+6561
*x^2*ln(3)^4+108864*x^11+81648*x^12+34992*x^13+6561*x^14-101904*x^7-45108*
x^8+90720*x^10+35262*x^9-85280*x^6-33696*x^5+1377*x^4+26244*x^3+26244*x^2)
,x,method=_RETURNVERBOSE)
```

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$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$

output
```
-162/x/(-162-81*x-8*x^2*exp(x)^3-216*x^2*exp(5)+54*exp(x)^2*x^4+162*x^3*ln
(3)-216*exp(x)*x^4+24*exp(x)^2*x^2-32*exp(x)*x^2+72*x*ln(3)-144*exp(x)*x^3
-162*x^3*exp(5)-108*x^2*ln(3)*exp(x)-18*x*exp(5)*exp(x)^2-72*x*ln(3)*exp(x
)-162*exp(5)*ln(3)+108*x^2*exp(5)*exp(x)+x^2*exp(x)^4-12*x^3*exp(x)^3-108*
x^5*exp(x)+216*x^2*ln(3)+72*exp(x)^2*x^3-72*x*exp(5)+81*ln(3)^2+72*x*exp(5
)*exp(x)+81*x^6+216*x^5+81*exp(5)^2+216*x^4+96*x^3+16*x^2+18*exp(x)^2*ln(3
)*x)
```

3.710.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 211 vs. 2(36) = 72.

Time = 0.44 (sec) , antiderivative size = 211, normalized size of antiderivative = 5.41

the integral =

$$-\frac{}{81\,x^7 + 216\,x^6 + 216\,x^5 + 96\,x^4 + x^3e^{(4\,x)} + 16\,x^3 + 81\,x\log\left(3\right)^2 - 81\,x^2 + 81\,xe^{10} - 18\,(9\,x^4 + 12\,x^3 +}$$

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

input
```
integrate(((648*x^3+486*x^2)*exp(x)^4+(-5832*x^4-11664*x^3-3888*x^2)*exp(x
)^3+((5832*x^2+5832*x)*log(3)+(-5832*x^2-5832*x)*exp(5)+17496*x^5+67068*x^
4+54432*x^3+11664*x^2)*exp(x)^2+((-17496*x^3-64152*x^2-23328*x)*log(3)+(17
496*x^3+64152*x^2+23328*x)*exp(5)-17496*x^6-139968*x^5-198288*x^4-98496*x^
3-15552*x^2)*exp(x)+13122*log(3)^2+(-26244*exp(5)+104976*x^3+104976*x^2+23
328*x)*log(3)+13122*exp(5)^2+(-104976*x^3-104976*x^2-23328*x)*exp(5)+91854
*x^6+209952*x^5+174960*x^4+62208*x^3+7776*x^2-26244*x-26244)/(-33696*x^5+1
377*x^4+26244*x^2+6561*x^2*exp(5)^4+(2916*x^3*log(3)^3+(-8748*x^3*exp(5)+2
6244*x^6+34992*x^5+11664*x^4)*log(3)^2+(8748*x^3*exp(5)^2+(-52488*x^6-6998
4*x^5-23328*x^4)*exp(5)+43740*x^9+116640*x^8+116640*x^7+51840*x^6+8640*x^5
-2916*x^4-5832*x^3)*log(3)-2916*x^3*exp(5)^3+(26244*x^6+34992*x^5+11664*x^
4)*exp(5)^2+(-43740*x^9-116640*x^8-116640*x^7-51840*x^6-8640*x^5+2916*x^4+
5832*x^3)*exp(5)+20412*x^12+81648*x^11+136080*x^10+120960*x^9+60480*x^8+73
80*x^7-27368*x^6-27216*x^5-7776*x^4)*exp(x)^2+x^6*exp(x)^8+(-24*x^7-16*x^6
)*exp(x)^7+(36*x^5*log(3)-36*x^5*exp(5)+252*x^8+336*x^7+112*x^6)*exp(x)^6+
((-648*x^6-432*x^5)*log(3)+(648*x^6+432*x^5)*exp(5)-1512*x^9-3024*x^8-2016
*x^7-448*x^6)*exp(x)^5+81648*x^12-85280*x^6+6561*x^2*log(3)^4+26244*x^3+35
262*x^9+90720*x^10-101904*x^7-45108*x^8+(486*x^4*log(3)^2+(-972*x^4*exp(5)
+4860*x^7+6480*x^6+2160*x^5)*log(3)+486*x^4*exp(5)^2+(-4860*x^7-6480*x^6-2
160*x^5)*exp(5)+5670*x^10+15120*x^9+15120*x^8+6720*x^7+1120*x^6-162*x^5-32
4*x^4)*exp(x)^4+(-26244*x^2*exp(5)^3+(78732*x^5+104976*x^4+34992*x^3)*exp(
5)^2+(-78732*x^8-209952*x^7-209952*x^6-93312*x^5-15552*x^4+26244*x^3+52488
*x^2)*exp(5)+26244*x^11+104976*x^10+174960*x^9+155520*x^8+77760*x^7-5508*x
^6-85176*x^5-81648*x^4-23328*x^3)*log(3)+(-26244*x^5-34992*x^4-11664*x^3)*
exp(5)^3+(39366*x^8+104976*x^7+104976*x^6+46656*x^5+7776*x^4-13122*x^3-262
44*x^2)*exp(5)^2+(-26244*x^11-104976*x^10-174960*x^9-155520*x^8-77760*x^7+
5508*x^6+85176*x^5+81648*x^4+23328*x^3)*exp(5)+((-5832*x^5-3888*x^4)*log(3
)^2+((11664*x^5+7776*x^4)*exp(5)-19440*x^8-38880*x^7-25920*x^6-5760*x^5)*l
og(3)+(-5832*x^5-3888*x^4)*exp(5)^2+(19440*x^8+38880*x^7+25920*x^6+5760*x^
5)*exp(5)-13608*x^11-45360*x^10-60480*x^9-40320*x^8-13440*x^7+152*x^6+5184
*x^5+2592*x^4)*exp(x)^3+6561*x^14+34992*x^13+108864*x^11+((-17496*x^4-1166
4*x^3)*log(3)^3+((52488*x^4+34992*x^3)*exp(5)-52488*x^7-104976*x^6-69984*x
^5-15552*x^4)*log(3)^2+((-52488*x^4-34992*x^3)*exp(5)^2+(104976*x^7+209952
*x^6+139968*x^5+31104*x^4)*exp(5)-52488*x^10-174960*x^9-233280*x^8-155520*
x^7-51840*x^6+10584*x^5+46656*x^4+23328*x^3)*log(3)+(17496*x^4+11664*x^3)*
exp(5)^3+(-52488*x^7-104976*x^6-69984*x^5-15552*x^4)*exp(5)^2+(52488*x^10+
174960*x^9+233280*x^8+155520*x^7+51840*x^6-10584*x^5-46656*x^4-23328*x^3)*
exp(5)-17496*x^13-81648*x^12-163296*x^11-181440*x^10-120960*x^9-30888*x^8+
59232*x^7+92288*x^6+51840*x^5+10368*x^4)*exp(x)+(-26244*x^2*exp(5)+26244*x
^5+34992*x^4+11664*x^3)*log(3)^3+(39366*x^2*exp(5)^2+(-78732*x^5-104976*x^
4-34992*x^3)*exp(5)+39366*x^8+104976*x^7+104976*x^6+46656*x^5+7776*x^4-131
22*x^3-26244*x^2)*log(3)^2),x, algorithm=\
```

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$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

output
```
-162/(81*x^7 + 216*x^6 + 216*x^5 + 96*x^4 + x^3*e^(4*x) + 16*x^3 + 81*x*lo
g(3)^2 - 81*x^2 + 81*x*e^10 - 18*(9*x^4 + 12*x^3 + 4*x^2)*e^5 - 4*(3*x^4 +
 2*x^3)*e^(3*x) + 6*(9*x^5 + 12*x^4 + 4*x^3 - 3*x^2*e^5 + 3*x^2*log(3))*e^
(2*x) - 4*(27*x^6 + 54*x^5 + 36*x^4 + 8*x^3 - 9*(3*x^3 + 2*x^2)*e^5 + 9*(3
*x^3 + 2*x^2)*log(3))*e^x + 18*(9*x^4 + 12*x^3 + 4*x^2 - 9*x*e^5)*log(3) -
 162*x)
```

3.710.6 Sympy [F(-1)]

Timed out.

$$\text{the integral} = \text{Timed out}$$

input

```
integrate(((648*x**3+486*x**2)*exp(x)**4+(-5832*x**4-11664*x**3-3888*x**2)
*exp(x)**3+((5832*x**2+5832*x)*ln(3)+(-5832*x**2-5832*x)*exp(5)+17496*x**5
+67068*x**4+54432*x**3+11664*x**2)*exp(x)**2+((-17496*x**3-64152*x**2-2332
8*x)*ln(3)+(17496*x**3+64152*x**2+23328*x)*exp(5)-17496*x**6-139968*x**5-1
98288*x**4-98496*x**3-15552*x**2)*exp(x)+13122*ln(3)**2+(-26244*exp(5)+104
976*x**3+104976*x**2+23328*x)*ln(3)+13122*exp(5)**2+(-104976*x**3-104976*x
**2-23328*x)*exp(5)+91854*x**6+209952*x**5+174960*x**4+62208*x**3+7776*x**
2-26244*x-26244)/(26244*x**2+1377*x**4+35262*x**9+(2916*x**3*ln(3)**3+(-87
48*x**3*exp(5)+26244*x**6+34992*x**5+11664*x**4)*ln(3)**2+(8748*x**3*exp(5
)**2+(-52488*x**6-69984*x**5-23328*x**4)*exp(5)+43740*x**9+116640*x**8+116
640*x**7+51840*x**6+8640*x**5-2916*x**4-5832*x**3)*ln(3)-2916*x**3*exp(5)*
*3+(26244*x**6+34992*x**5+11664*x**4)*exp(5)**2+(-43740*x**9-116640*x**8-1
16640*x**7-51840*x**6-8640*x**5+2916*x**4+5832*x**3)*exp(5)+20412*x**12+81
648*x**11+136080*x**10+120960*x**9+60480*x**8+7380*x**7-27368*x**6-27216*x
**5-7776*x**4)*exp(x)**2+x**6*exp(x)**8+(-24*x**7-16*x**6)*exp(x)**7+(36*x
**5*ln(3)-36*x**5*exp(5)+252*x**8+336*x**7+112*x**6)*exp(x)**6+((-648*x**6
-432*x**5)*ln(3)+(648*x**6+432*x**5)*exp(5)-1512*x**9-3024*x**8-2016*x**7-
448*x**6)*exp(x)**5+(486*x**4*ln(3)**2+(-972*x**4*exp(5)+4860*x**7+6480*x*
*6+2160*x**5)*ln(3)+486*x**4*exp(5)**2+(-4860*x**7-6480*x**6-2160*x**5)*ex
p(5)+5670*x**10+15120*x**9+15120*x**8+6720*x**7+1120*x**6-162*x**5-324*x**
4)*exp(x)**4-33696*x**5-85280*x**6+6561*x**14+34992*x**13+108864*x**11+816
48*x**12+((-17496*x**4-11664*x**3)*ln(3)**3+((52488*x**4+34992*x**3)*exp(5
)-52488*x**7-104976*x**6-69984*x**5-15552*x**4)*ln(3)**2+((-52488*x**4-349
92*x**3)*exp(5)**2+(104976*x**7+209952*x**6+139968*x**5+31104*x**4)*exp(5)
-52488*x**10-174960*x**9-233280*x**8-155520*x**7-51840*x**6+10584*x**5+466
56*x**4+23328*x**3)*ln(3)+(17496*x**4+11664*x**3)*exp(5)**3+(-52488*x**7-1
04976*x**6-69984*x**5-15552*x**4)*exp(5)**2+(52488*x**10+174960*x**9+23328
0*x**8+155520*x**7+51840*x**6-10584*x**5-46656*x**4-23328*x**3)*exp(5)-174
96*x**13-81648*x**12-163296*x**11-181440*x**10-120960*x**9-30888*x**8+5923
2*x**7+92288*x**6+51840*x**5+10368*x**4)*exp(x)+(-26244*x**2*exp(5)+26244*
x**5+34992*x**4+11664*x**3)*ln(3)**3+(39366*x**2*exp(5)**2+(-78732*x**5-10
4976*x**4-34992*x**3)*exp(5)+39366*x**8+104976*x**7+104976*x**6+46656*x**5
+7776*x**4-13122*x**3-26244*x**2)*ln(3)**2+26244*x**3+(-26244*x**2*exp(5)*
*3+(78732*x**5+104976*x**4+34992*x**3)*exp(5)**2+(-78732*x**8-209952*x**7-
209952*x**6-93312*x**5-15552*x**4+26244*x**3+52488*x**2)*exp(5)+26244*x**1
1+104976*x**10+174960*x**9+155520*x**8+77760*x**7-5508*x**6-85176*x**5-816
48*x**4-23328*x**3)*ln(3)+(-26244*x**5-34992*x**4-11664*x**3)*exp(5)**3+(3
9366*x**8+104976*x**7+104976*x**6+46656*x**5+7776*x**4-13122*x**3-26244*x*
*2)*exp(5)**2+(-26244*x**11-104976*x**10-174960*x**9-155520*x**8-77760*x**
7+5508*x**6+85176*x**5+81648*x**4+23328*x**3)*exp(5)+((-5832*x**5-3888*x**
4)*ln(3)**2+((11664*x**5+7776*x**4)*exp(5)-19440*x**8-38880*x**7-25920*x**
6-5760*x**5)*ln(3)+(-5832*x**5-3888*x**4)*exp(5)**2+(19440*x**8+38880*x**7
+25920*x**6+5760*x**5)*exp(5)-13608*x**11-45360*x**10-60480*x**9-40320*x**
8-13440*x**7+152*x**6+5184*x**5+2592*x**4)*exp(x)**3+6561*x**2*exp(5)**4-1
01904*x**7-45108*x**8+6561*x**2*ln(3)**4+90720*x**10),x)
```

3.710

$$\int \overline{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

output
```
Timed out
```

3.710.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 192 vs. 2(36) = 72.

Time = 22.65 (sec) , antiderivative size = 192, normalized size of antiderivative = 4.92

the integral =

$$-\frac{}{81\,x^7+216\,x^6+216\,x^5-6\,x^4(27\,e^5-27\,\log(3)-16)-8\,x^3(27\,e^5-27\,\log(3)-2)+x^3e^{(4\,x)}-9\,x^2(}$$

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{1}}$$

input
```
integrate(((648*x^3+486*x^2)*exp(x)^4+(-5832*x^4-11664*x^3-3888*x^2)*exp(x
)^3+((5832*x^2+5832*x)*log(3)+(-5832*x^2-5832*x)*exp(5)+17496*x^5+67068*x^
4+54432*x^3+11664*x^2)*exp(x)^2+((-17496*x^3-64152*x^2-23328*x)*log(3)+(17
496*x^3+64152*x^2+23328*x)*exp(5)-17496*x^6-139968*x^5-198288*x^4-98496*x^
3-15552*x^2)*exp(x)+13122*log(3)^2+(-26244*exp(5)+104976*x^3+104976*x^2+23
328*x)*log(3)+13122*exp(5)^2+(-104976*x^3-104976*x^2-23328*x)*exp(5)+91854
*x^6+209952*x^5+174960*x^4+62208*x^3+7776*x^2-26244*x-26244)/(-33696*x^5+1
377*x^4+26244*x^2+6561*x^2*exp(5)^4+(2916*x^3*log(3)^3+(-8748*x^3*exp(5)+2
6244*x^6+34992*x^5+11664*x^4)*log(3)^2+(8748*x^3*exp(5)^2+(-52488*x^6-6998
4*x^5-23328*x^4)*exp(5)+43740*x^9+116640*x^8+116640*x^7+51840*x^6+8640*x^5
-2916*x^4-5832*x^3)*log(3)-2916*x^3*exp(5)^3+(26244*x^6+34992*x^5+11664*x^
4)*exp(5)^2+(-43740*x^9-116640*x^8-116640*x^7-51840*x^6-8640*x^5+2916*x^4+
5832*x^3)*exp(5)+20412*x^12+81648*x^11+136080*x^10+120960*x^9+60480*x^8+73
80*x^7-27368*x^6-27216*x^5-7776*x^4)*exp(x)^2+x^6*exp(x)^8+(-24*x^7-16*x^6
)*exp(x)^7+(36*x^5*log(3)-36*x^5*exp(5)+252*x^8+336*x^7+112*x^6)*exp(x)^6+
((-648*x^6-432*x^5)*log(3)+(648*x^6+432*x^5)*exp(5)-1512*x^9-3024*x^8-2016
*x^7-448*x^6)*exp(x)^5+81648*x^12-85280*x^6+6561*x^2*log(3)^4+26244*x^3+35
262*x^9+90720*x^10-101904*x^7-45108*x^8+(486*x^4*log(3)^2+(-972*x^4*exp(5)
+4860*x^7+6480*x^6+2160*x^5)*log(3)+486*x^4*exp(5)^2+(-4860*x^7-6480*x^6-2
160*x^5)*exp(5)+5670*x^10+15120*x^9+15120*x^8+6720*x^7+1120*x^6-162*x^5-32
4*x^4)*exp(x)^4+(-26244*x^2*exp(5)^3+(78732*x^5+104976*x^4+34992*x^3)*exp(
5)^2+(-78732*x^8-209952*x^7-209952*x^6-93312*x^5-15552*x^4+26244*x^3+52488
*x^2)*exp(5)+26244*x^11+104976*x^10+174960*x^9+155520*x^8+77760*x^7-5508*x
^6-85176*x^5-81648*x^4-23328*x^3)*log(3)+(-26244*x^5-34992*x^4-11664*x^3)*
exp(5)^3+(39366*x^8+104976*x^7+104976*x^6+46656*x^5+7776*x^4-13122*x^3-262
44*x^2)*exp(5)^2+(-26244*x^11-104976*x^10-174960*x^9-155520*x^8-77760*x^7+
5508*x^6+85176*x^5+81648*x^4+23328*x^3)*exp(5)+((-5832*x^5-3888*x^4)*log(3
)^2+((11664*x^5+7776*x^4)*exp(5)-19440*x^8-38880*x^7-25920*x^6-5760*x^5)*l
og(3)+(-5832*x^5-3888*x^4)*exp(5)^2+(19440*x^8+38880*x^7+25920*x^6+5760*x^
5)*exp(5)-13608*x^11-45360*x^10-60480*x^9-40320*x^8-13440*x^7+152*x^6+5184
*x^5+2592*x^4)*exp(x)^3+6561*x^14+34992*x^13+108864*x^11+((-17496*x^4-1166
4*x^3)*log(3)^3+((52488*x^4+34992*x^3)*exp(5)-52488*x^7-104976*x^6-69984*x
^5-15552*x^4)*log(3)^2+((-52488*x^4-34992*x^3)*exp(5)^2+(104976*x^7+209952
*x^6+139968*x^5+31104*x^4)*exp(5)-52488*x^10-174960*x^9-233280*x^8-155520*
x^7-51840*x^6+10584*x^5+46656*x^4+23328*x^3)*log(3)+(17496*x^4+11664*x^3)*
exp(5)^3+(-52488*x^7-104976*x^6-69984*x^5-15552*x^4)*exp(5)^2+(52488*x^10+
174960*x^9+233280*x^8+155520*x^7+51840*x^6-10584*x^5-46656*x^4-23328*x^3)*
exp(5)-17496*x^13-81648*x^12-163296*x^11-181440*x^10-120960*x^9-30888*x^8+
59232*x^7+92288*x^6+51840*x^5+10368*x^4)*exp(x)+(-26244*x^2*exp(5)+26244*x
^5+34992*x^4+11664*x^3)*log(3)^3+(39366*x^2*exp(5)^2+(-78732*x^5-104976*x^
4-34992*x^3)*exp(5)+39366*x^8+104976*x^7+104976*x^6+46656*x^5+7776*x^4-131
22*x^3-26244*x^2)*log(3)^2),x, algorithm=\
```

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

output
```
-162/(81*x^7 + 216*x^6 + 216*x^5 - 6*x^4*(27*e^5 - 27*log(3) - 16) - 8*x^3
*(27*e^5 - 27*log(3) - 2) + x^3*e^(4*x) - 9*x^2*(8*e^5 - 8*log(3) + 9) - 8
1*(2*e^5*log(3) - log(3)^2 - e^10 + 2)*x - 4*(3*x^4 + 2*x^3)*e^(3*x) + 6*(
9*x^5 + 12*x^4 + 4*x^3 - 3*x^2*(e^5 - log(3)))*e^(2*x) - 4*(27*x^6 + 54*x^
5 + 36*x^4 - x^3*(27*e^5 - 27*log(3) - 8) - 18*x^2*(e^5 - log(3)))*e^x)
```

3.710.8 Giac [F(-1)]

Timed out.

$$\text{the integral} = \text{Timed out}$$

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

input
```
integrate(((648*x^3+486*x^2)*exp(x)^4+(-5832*x^4-11664*x^3-3888*x^2)*exp(x
)^3+((5832*x^2+5832*x)*log(3)+(-5832*x^2-5832*x)*exp(5)+17496*x^5+67068*x^
4+54432*x^3+11664*x^2)*exp(x)^2+((-17496*x^3-64152*x^2-23328*x)*log(3)+(17
496*x^3+64152*x^2+23328*x)*exp(5)-17496*x^6-139968*x^5-198288*x^4-98496*x^
3-15552*x^2)*exp(x)+13122*log(3)^2+(-26244*exp(5)+104976*x^3+104976*x^2+23
328*x)*log(3)+13122*exp(5)^2+(-104976*x^3-104976*x^2-23328*x)*exp(5)+91854
*x^6+209952*x^5+174960*x^4+62208*x^3+7776*x^2-26244*x-26244)/(-33696*x^5+1
377*x^4+26244*x^2+6561*x^2*exp(5)^4+(2916*x^3*log(3)^3+(-8748*x^3*exp(5)+2
6244*x^6+34992*x^5+11664*x^4)*log(3)^2+(8748*x^3*exp(5)^2+(-52488*x^6-6998
4*x^5-23328*x^4)*exp(5)+43740*x^9+116640*x^8+116640*x^7+51840*x^6+8640*x^5
-2916*x^4-5832*x^3)*log(3)-2916*x^3*exp(5)^3+(26244*x^6+34992*x^5+11664*x^
4)*exp(5)^2+(-43740*x^9-116640*x^8-116640*x^7-51840*x^6-8640*x^5+2916*x^4+
5832*x^3)*exp(5)+20412*x^12+81648*x^11+136080*x^10+120960*x^9+60480*x^8+73
80*x^7-27368*x^6-27216*x^5-7776*x^4)*exp(x)^2+x^6*exp(x)^8+(-24*x^7-16*x^6
)*exp(x)^7+(36*x^5*log(3)-36*x^5*exp(5)+252*x^8+336*x^7+112*x^6)*exp(x)^6+
((-648*x^6-432*x^5)*log(3)+(648*x^6+432*x^5)*exp(5)-1512*x^9-3024*x^8-2016
*x^7-448*x^6)*exp(x)^5+81648*x^12-85280*x^6+6561*x^2*log(3)^4+26244*x^3+35
262*x^9+90720*x^10-101904*x^7-45108*x^8+(486*x^4*log(3)^2+(-972*x^4*exp(5)
+4860*x^7+6480*x^6+2160*x^5)*log(3)+486*x^4*exp(5)^2+(-4860*x^7-6480*x^6-2
160*x^5)*exp(5)+5670*x^10+15120*x^9+15120*x^8+6720*x^7+1120*x^6-162*x^5-32
4*x^4)*exp(x)^4+(-26244*x^2*exp(5)^3+(78732*x^5+104976*x^4+34992*x^3)*exp(
5)^2+(-78732*x^8-209952*x^7-209952*x^6-93312*x^5-15552*x^4+26244*x^3+52488
*x^2)*exp(5)+26244*x^11+104976*x^10+174960*x^9+155520*x^8+77760*x^7-5508*x
^6-85176*x^5-81648*x^4-23328*x^3)*log(3)+(-26244*x^5-34992*x^4-11664*x^3)*
exp(5)^3+(39366*x^8+104976*x^7+104976*x^6+46656*x^5+7776*x^4-13122*x^3-262
44*x^2)*exp(5)^2+(-26244*x^11-104976*x^10-174960*x^9-155520*x^8-77760*x^7+
5508*x^6+85176*x^5+81648*x^4+23328*x^3)*exp(5)+((-5832*x^5-3888*x^4)*log(3
)^2+((11664*x^5+7776*x^4)*exp(5)-19440*x^8-38880*x^7-25920*x^6-5760*x^5)*l
og(3)+(-5832*x^5-3888*x^4)*exp(5)^2+(19440*x^8+38880*x^7+25920*x^6+5760*x^
5)*exp(5)-13608*x^11-45360*x^10-60480*x^9-40320*x^8-13440*x^7+152*x^6+5184
*x^5+2592*x^4)*exp(x)^3+6561*x^14+34992*x^13+108864*x^11+((-17496*x^4-1166
4*x^3)*log(3)^3+((52488*x^4+34992*x^3)*exp(5)-52488*x^7-104976*x^6-69984*x
^5-15552*x^4)*log(3)^2+((-52488*x^4-34992*x^3)*exp(5)^2+(104976*x^7+209952
*x^6+139968*x^5+31104*x^4)*exp(5)-52488*x^10-174960*x^9-233280*x^8-155520*
x^7-51840*x^6+10584*x^5+46656*x^4+23328*x^3)*log(3)+(17496*x^4+11664*x^3)*
exp(5)^3+(-52488*x^7-104976*x^6-69984*x^5-15552*x^4)*exp(5)^2+(52488*x^10+
174960*x^9+233280*x^8+155520*x^7+51840*x^6-10584*x^5-46656*x^4-23328*x^3)*
exp(5)-17496*x^13-81648*x^12-163296*x^11-181440*x^10-120960*x^9-30888*x^8+
59232*x^7+92288*x^6+51840*x^5+10368*x^4)*exp(x)+(-26244*x^2*exp(5)+26244*x
^5+34992*x^4+11664*x^3)*log(3)^3+(39366*x^2*exp(5)^2+(-78732*x^5-104976*x^
4-34992*x^3)*exp(5)+39366*x^8+104976*x^7+104976*x^6+46656*x^5+7776*x^4-131
22*x^3-26244*x^2)*log(3)^2),x, algorithm=\
```

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

output

```
Timed out
```

3.710.9 Mupad [F(-1)]

Timed out.

$$\text{the integral} = \text{Too large to display}$$

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

input
```
int((13122*exp(10) - 26244*x + log(3)*(23328*x - 26244*exp(5) + 104976*x^2
 + 104976*x^3) + exp(2*x)*(log(3)*(5832*x + 5832*x^2) - exp(5)*(5832*x + 5
832*x^2) + 11664*x^2 + 54432*x^3 + 67068*x^4 + 17496*x^5) + exp(4*x)*(486*
x^2 + 648*x^3) - exp(5)*(23328*x + 104976*x^2 + 104976*x^3) - exp(x)*(log(
3)*(23328*x + 64152*x^2 + 17496*x^3) - exp(5)*(23328*x + 64152*x^2 + 17496
*x^3) + 15552*x^2 + 98496*x^3 + 198288*x^4 + 139968*x^5 + 17496*x^6) - exp
(3*x)*(3888*x^2 + 11664*x^3 + 5832*x^4) + 13122*log(3)^2 + 7776*x^2 + 6220
8*x^3 + 174960*x^4 + 209952*x^5 + 91854*x^6 - 26244)/(6561*x^2*log(3)^4 -
exp(5*x)*(log(3)*(432*x^5 + 648*x^6) - exp(5)*(432*x^5 + 648*x^6) + 448*x^
6 + 2016*x^7 + 3024*x^8 + 1512*x^9) - exp(5)*(77760*x^7 - 81648*x^4 - 8517
6*x^5 - 5508*x^6 - 23328*x^3 + 155520*x^8 + 174960*x^9 + 104976*x^10 + 262
44*x^11) - log(3)*(26244*x^2*exp(15) + exp(5)*(15552*x^4 - 26244*x^3 - 524
88*x^2 + 93312*x^5 + 209952*x^6 + 209952*x^7 + 78732*x^8) - exp(10)*(34992
*x^3 + 104976*x^4 + 78732*x^5) + 23328*x^3 + 81648*x^4 + 85176*x^5 + 5508*
x^6 - 77760*x^7 - 155520*x^8 - 174960*x^9 - 104976*x^10 - 26244*x^11) + ex
p(4*x)*(486*x^4*log(3)^2 + log(3)*(2160*x^5 - 972*x^4*exp(5) + 6480*x^6 +
4860*x^7) + 486*x^4*exp(10) - exp(5)*(2160*x^5 + 6480*x^6 + 4860*x^7) - 32
4*x^4 - 162*x^5 + 1120*x^6 + 6720*x^7 + 15120*x^8 + 15120*x^9 + 5670*x^10)
 - exp(7*x)*(16*x^6 + 24*x^7) + log(3)^2*(39366*x^2*exp(10) - exp(5)*(3499
2*x^3 + 104976*x^4 + 78732*x^5) - 26244*x^2 - 13122*x^3 + 7776*x^4 + 46656
*x^5 + 104976*x^6 + 104976*x^7 + 39366*x^8) + x^6*exp(8*x) - exp(x)*(log(3
)*(exp(10)*(34992*x^3 + 52488*x^4) - 23328*x^3 - 46656*x^4 - 10584*x^5 + 5
1840*x^6 + 155520*x^7 + 233280*x^8 + 174960*x^9 + 52488*x^10 - exp(5)*(311
04*x^4 + 139968*x^5 + 209952*x^6 + 104976*x^7)) - exp(15)*(11664*x^3 + 174
96*x^4) - 10368*x^4 - 51840*x^5 - 92288*x^6 - 59232*x^7 + 30888*x^8 + 1209
60*x^9 + 181440*x^10 + 163296*x^11 + 81648*x^12 + 17496*x^13 - exp(5)*(518
40*x^6 - 46656*x^4 - 10584*x^5 - 23328*x^3 + 155520*x^7 + 233280*x^8 + 174
960*x^9 + 52488*x^10) + log(3)^2*(15552*x^4 - exp(5)*(34992*x^3 + 52488*x^
4) + 69984*x^5 + 104976*x^6 + 52488*x^7) + log(3)^3*(11664*x^3 + 17496*x^4
) + exp(10)*(15552*x^4 + 69984*x^5 + 104976*x^6 + 52488*x^7)) + 6561*x^2*e
xp(20) + exp(10)*(7776*x^4 - 13122*x^3 - 26244*x^2 + 46656*x^5 + 104976*x^
6 + 104976*x^7 + 39366*x^8) - exp(15)*(11664*x^3 + 34992*x^4 + 26244*x^5)
+ log(3)^3*(11664*x^3 - 26244*x^2*exp(5) + 34992*x^4 + 26244*x^5) + exp(2*
x)*(2916*x^3*log(3)^3 + log(3)*(8748*x^3*exp(10) - exp(5)*(23328*x^4 + 699
84*x^5 + 52488*x^6) - 5832*x^3 - 2916*x^4 + 8640*x^5 + 51840*x^6 + 116640*
x^7 + 116640*x^8 + 43740*x^9) - 2916*x^3*exp(15) - exp(5)*(8640*x^5 - 2916
*x^4 - 5832*x^3 + 51840*x^6 + 116640*x^7 + 116640*x^8 + 43740*x^9) + exp(1
0)*(11664*x^4 + 34992*x^5 + 26244*x^6) + log(3)^2*(11664*x^4 - 8748*x^3*ex
p(5) + 34992*x^5 + 26244*x^6) - 7776*x^4 - 27216*x^5 - 27368*x^6 + 7380*x^
7 + 60480*x^8 + 120960*x^9 + 136080*x^10 + 81648*x^11 + 20412*x^12) - exp(
3*x)*(exp(10)*(3888*x^4 + 5832*x^5) + log(3)*(5760*x^5 - exp(5)*(7776*x^4
+ 11664*x^5) + 25920*x^6 + 38880*x^7 + 19440*x^8) - 2592*x^4 - 5184*x^5 -
152*x^6 + 13440*x^7 + 40320*x^8 + 60480*x^9 + 45360*x^10 + 13608*x^11 + lo
g(3)^2*(3888*x^4 + 5832*x^5) - exp(5)*(5760*x^5 + 25920*x^6 + 38880*x^7 +
19440*x^8)) + 26244*x^2 + 26244*x^3 + 1377*x^4 - 33696*x^5 - 85280*x^6 - 1
01904*x^7 - 45108*x^8 + 35262*x^9 + 90720*x^10 + 108864*x^11 + 81648*x^12
```

output

```
int((13122*exp(10) - 26244*x + log(3)*(23328*x - 26244*exp(5) + 104976*x^2
 + 104976*x^3) + exp(2*x)*(log(3)*(5832*x + 5832*x^2) - exp(5)*(5832*x + 5
832*x^2) + 11664*x^2 + 54432*x^3 + 67068*x^4 + 17496*x^5) + exp(4*x)*(486*
x^2 + 648*x^3) - exp(5)*(23328*x + 104976*x^2 + 104976*x^3) - exp(x)*(log(
3)*(23328*x + 64152*x^2 + 17496*x^3) - exp(5)*(23328*x + 64152*x^2 + 17496
*x^3) + 15552*x^2 + 98496*x^3 + 198288*x^4 + 139968*x^5 + 17496*x^6) - exp
(3*x)*(3888*x^2 + 11664*x^3 + 5832*x^4) + 13122*log(3)^2 + 7776*x^2 + 6220
8*x^3 + 174960*x^4 + 209952*x^5 + 91854*x^6 - 26244)/(6561*x^2*log(3)^4 -
exp(5*x)*(log(3)*(432*x^5 + 648*x^6) - exp(5)*(432*x^5 + 648*x^6) + 448*x^
6 + 2016*x^7 + 3024*x^8 + 1512*x^9) - exp(5)*(77760*x^7 - 81648*x^4 - 8517
6*x^5 - 5508*x^6 - 23328*x^3 + 155520*x^8 + 174960*x^9 + 104976*x^10 + 262
44*x^11) - log(3)*(26244*x^2*exp(15) + exp(5)*(15552*x^4 - 26244*x^3 - 524
88*x^2 + 93312*x^5 + 209952*x^6 + 209952*x^7 + 78732*x^8) - exp(10)*(34992
*x^3 + 104976*x^4 + 78732*x^5) + 23328*x^3 + 81648*x^4 + 85176*x^5 + 5508*
x^6 - 77760*x^7 - 155520*x^8 - 174960*x^9 - 104976*x^10 - 26244*x^11) + ex
p(4*x)*(486*x^4*log(3)^2 + log(3)*(2160*x^5 - 972*x^4*exp(5) + 6480*x^6 +
4860*x^7) + 486*x^4*exp(10) - exp(5)*(2160*x^5 + 6480*x^6 + 4860*x^7) - 32
4*x^4 - 162*x^5 + 1120*x^6 + 6720*x^7 + 15120*x^8 + 15120*x^9 + 5670*x^10)
 - exp(7*x)*(16*x^6 + 24*x^7) + log(3)^2*(39366*x^2*exp(10) - exp(5)*(3499
2*x^3 + 104976*x^4 + 78732*x^5) - 26244*x^2 - 13122*x^3 + 7776*x^4 + 46...
```

3.710.

$$\int \frac{}{26244x^2+6561e^{20}x^2+26244x^3+1377x^4-33696x^5-85280x^6+e^{8x}x^6-101904x^7-45108x^8+35262x^9+90720x^{10}+108864x^{11}+81648x^{12}+34992x^{13}}$$

3.711 $\int \frac{36-168x-245x^2-82x^3-54x^4+4x^5}{36x-87x^2-77x^3-17x^4-10x^5+x^6} dx$

3.711.1 Optimal result

Integrand size = 55, antiderivative size = 23

$$\int \frac{36-168x-245x^2-82x^3-54x^4+4x^5}{36x-87x^2-77x^3-17x^4-10x^5+x^6} dx = \log\left(16x\left(-3+\frac{3(3+x+x^2)^2}{12-x}\right)\right)$$

output
```
ln(16*x*(3/(12-x)*(x^2+x+3)^2-3))
```

3.711.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{36-168x-245x^2-82x^3-54x^4+4x^5}{36x-87x^2-77x^3-17x^4-10x^5+x^6} dx$$
$$= -\log(12-x)+\log(x)+\log\left(3-7x-7x^2-2x^3-x^4\right)$$

input
```
Integrate[(36 - 168*x - 245*x^2 - 82*x^3 - 54*x^4 + 4*x^5)/(36*x - 87*x^2
- 77*x^3 - 17*x^4 - 10*x^5 + x^6),x]
```

output
```
-Log[12 - x] + Log[x] + Log[3 - 7*x - 7*x^2 - 2*x^3 - x^4]
```

3.711.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.055$, Rules used = {2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^5-54x^4-82x^3-245x^2-168x+36}{x^6-10x^5-17x^4-77x^3-87x^2+36x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{4x^5-54x^4-82x^3-245x^2-168x+36}{x(x^5-10x^4-17x^3-77x^2-87x+36)}dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{4x^3+6x^2+14x+7}{x^4+2x^3+7x^2+7x-3}+\frac{1}{12-x}+\frac{1}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log\left(-x^4-2x^3-7x^2-7x+3\right)-\log(12-x)+\log(x)$$

input
```
Int[(36 - 168*x - 245*x^2 - 82*x^3 - 54*x^4 + 4*x^5)/(36*x - 87*x^2 - 77*x
^3 - 17*x^4 - 10*x^5 + x^6),x]
```

output
```
-Log[12 - x] + Log[x] + Log[3 - 7*x - 7*x^2 - 2*x^3 - x^4]
```

3.711.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.711.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

method	result	size
default	$\ln(x) - \ln(x-12) + \ln(x^4 + 2x^3 + 7x^2 + 7x - 3)$	29
norman	$\ln(x) - \ln(x-12) + \ln(x^4 + 2x^3 + 7x^2 + 7x - 3)$	29
parallelrisch	$\ln(x) - \ln(x-12) + \ln(x^4 + 2x^3 + 7x^2 + 7x - 3)$	29
risch	$-\ln(x-12) + \ln(x^5 + 2x^4 + 7x^3 + 7x^2 - 3x)$	31

input
```
int((4*x^5-54*x^4-82*x^3-245*x^2-168*x+36)/(x^6-10*x^5-17*x^4-77*x^3-87*x^
2+36*x),x,method=_RETURNVERBOSE)
```

output
```
ln(x)-ln(x-12)+ln(x^4+2*x^3+7*x^2+7*x-3)
```

3.711.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \frac{36-168x-245x^2-82x^3-54x^4+4x^5}{36x-87x^2-77x^3-17x^4-10x^5+x^6}\,dx = \log\left(x^5+2\,x^4+7\,x^3+7\,x^2-3\,x\right)-\log\left(x-12\right)$$

input
```
integrate((4*x^5-54*x^4-82*x^3-245*x^2-168*x+36)/(x^6-10*x^5-17*x^4-77*x^3
-87*x^2+36*x),x, algorithm=\
```

output
```
log(x^5 + 2*x^4 + 7*x^3 + 7*x^2 - 3*x) - log(x - 12)
```

3.711.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{36-168x-245x^2-82x^3-54x^4+4x^5}{36x-87x^2-77x^3-17x^4-10x^5+x^6}\,dx = -\log\left(x-12\right)+\log\left(x^5+2x^4+7x^3+7x^2-3x\right)$$

input
```
integrate((4*x**5-54*x**4-82*x**3-245*x**2-168*x+36)/(x**6-10*x**5-17*x**4
-77*x**3-87*x**2+36*x),x)
```

output
```
-log(x - 12) + log(x**5 + 2*x**4 + 7*x**3 + 7*x**2 - 3*x)
```

3.711.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{36-168x-245x^2-82x^3-54x^4+4x^5}{36x-87x^2-77x^3-17x^4-10x^5+x^6}\,dx = \log\left(x^4+2\,x^3+7\,x^2+7\,x-3\right)-\log\left(x-12\right)+\log\left(x\right)$$

input
```
integrate((4*x^5-54*x^4-82*x^3-245*x^2-168*x+36)/(x^6-10*x^5-17*x^4-77*x^3
-87*x^2+36*x),x, algorithm=\
```

output
```
log(x^4 + 2*x^3 + 7*x^2 + 7*x - 3) - log(x - 12) + log(x)
```

3.711.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{36-168x-245x^2-82x^3-54x^4+4x^5}{36x-87x^2-77x^3-17x^4-10x^5+x^6}\,dx = \log\left(\left|x^4+2\,x^3+7\,x^2+7\,x-3\right|\right)-\log\left(\left|x-12\right|\right)+\log\left(\left|x\right|\right)$$

input
```
integrate((4*x^5-54*x^4-82*x^3-245*x^2-168*x+36)/(x^6-10*x^5-17*x^4-77*x^3
-87*x^2+36*x),x, algorithm=\
```

output
```
log(abs(x^4 + 2*x^3 + 7*x^2 + 7*x - 3)) - log(abs(x - 12)) + log(abs(x))
```

3.711.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{36-168x-245x^2-82x^3-54x^4+4x^5}{36x-87x^2-77x^3-17x^4-10x^5+x^6}\,dx$$
$$=\ln\left(x\left(x^4+2\,x^3+7\,x^2+7\,x-3\right)\right)-\ln\left(x-12\right)$$

input
```
int((168*x + 245*x^2 + 82*x^3 + 54*x^4 - 4*x^5 - 36)/(87*x^2 - 36*x + 77*x
^3 + 17*x^4 + 10*x^5 - x^6),x)
```

output
```
log(x*(7*x + 7*x^2 + 2*x^3 + x^4 - 3)) - log(x - 12)
```

3.712 $\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2}$

3.712.1 Optimal result

Integrand size = 82, antiderivative size = 23

$$\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2+2x^3)\log^2(x)}\,dx = \frac{-3+\frac{x}{2}}{(-10+x)(5x^2+\log(x))}$$

output
```
(1/2*x-3)/(x-10)/(5*x^2+ln(x))
```

3.712.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2+2x^3)\log^2(x)}\,dx = -\frac{6-x}{2(-10+x)(5x^2+\log(x))}$$

input
```
Integrate[(-60 + 16*x - 601*x^2 + 140*x^3 - 10*x^4 - 4*x*Log[x])/(5000*x^5
 - 1000*x^6 + 50*x^7 + (2000*x^3 - 400*x^4 + 20*x^5)*Log[x] + (200*x - 40*
x^2 + 2*x^3)*Log[x]^2),x]
```

output
```
-1/2*(6 - x)/((-10 + x)*(5*x^2 + Log[x]))
```

3.712.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-10x^4+140x^3-601x^2+16x-4x\log(x)-60}{50x^7-1000x^6+5000x^5+(2x^3-40x^2+200x)\log^2(x)+(20x^5-400x^4+2000x^3)\log(x)}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{-10x^4+140x^3-601x^2+16x-4x\log(x)-60}{2(10-x)^2x\left(5x^2+\log(x)\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int -\frac{10x^4-140x^3+601x^2+4\log(x)x-16x+60}{(10-x)^2x\left(5x^2+\log(x)\right)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{1}{2}\int \frac{10x^4-140x^3+601x^2+4\log(x)x-16x+60}{(10-x)^2x\left(5x^2+\log(x)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{1}{2}\int \left(\frac{10x^3-60x^2+x-6}{(x-10)x\left(5x^2+\log(x)\right)^2}+\frac{4}{(x-10)^2\left(5x^2+\log(x)\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{2}\left(-40\int \frac{1}{\left(5x^2+\log(x)\right)^2}dx-\frac{2002}{5}\int \frac{1}{(x-10)\left(5x^2+\log(x)\right)^2}dx-\frac{3}{5}\int \frac{1}{x\left(5x^2+\log(x)\right)^2}dx-10\int \frac{x}{(5x^2+\text{lo}}\right.$$

input
```
Int[(-60 + 16*x - 601*x^2 + 140*x^3 - 10*x^4 - 4*x*Log[x])/(5000*x^5 - 100
0*x^6 + 50*x^7 + (2000*x^3 - 400*x^4 + 20*x^5)*Log[x] + (200*x - 40*x^2 +
2*x^3)*Log[x]^2),x]
```

output
```
$Aborted
```

3.712.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.712.4 Maple [A] (verified)

Time = 2.04 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

method	result	size
risch	$\frac{-6+x}{2(x-10)(5x^2+\ln(x))}$	21
default	$-\frac{-x+6}{2(x-10)(5x^2+\ln(x))}$	23
parallelrisch	$\frac{-6+x}{10x^3+2x\ln(x)-100x^2-20\ln(x)}$	27
norman	$\frac{\frac{x}{2}-3}{5x^3+x\ln(x)-50x^2-10\ln(x)}$	28

input
```
int((-4*x*ln(x)-10*x^4+140*x^3-601*x^2+16*x-60)/((2*x^3-40*x^2+200*x)*ln(x
)^2+(20*x^5-400*x^4+2000*x^3)*ln(x)+50*x^7-1000*x^6+5000*x^5),x,method=_RE
TURNVERBOSE)
```

output
```
1/2*(-6+x)/(x-10)/(5*x^2+ln(x))
```

3.712. $\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2+2x^3)\log^2(x)}\,dx$

3.712.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2+2x^3)\log^2(x)}\,dx = \frac{x-6}{2\,(5\,x^3-50\,x^2+(x-10)\log(x))}$$

input
```
integrate((-4*x*log(x)-10*x^4+140*x^3-601*x^2+16*x-60)/((2*x^3-40*x^2+200*
x)*log(x)^2+(20*x^5-400*x^4+2000*x^3)*log(x)+50*x^7-1000*x^6+5000*x^5),x,
algorithm=\
```

output
```
1/2*(x - 6)/(5*x^3 - 50*x^2 + (x - 10)*log(x))
```

3.712.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2+2x^3)\log^2(x)}\,dx = \frac{x-6}{10x^3-100x^2+(2x-20)\log(x)}$$

input
```
integrate((-4*x*ln(x)-10*x**4+140*x**3-601*x**2+16*x-60)/((2*x**3-40*x**2+
200*x)*ln(x)**2+(20*x**5-400*x**4+2000*x**3)*ln(x)+50*x**7-1000*x**6+5000*
x**5),x)
```

output
```
(x - 6)/(10*x**3 - 100*x**2 + (2*x - 20)*log(x))
```

3.712.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2+2x^3)\log^2(x)}\,dx = \frac{x-6}{2\,(5\,x^3-50\,x^2+(x-10)\log(x))}$$

input
```
integrate((-4*x*log(x)-10*x^4+140*x^3-601*x^2+16*x-60)/((2*x^3-40*x^2+200*
x)*log(x)^2+(20*x^5-400*x^4+2000*x^3)*log(x)+50*x^7-1000*x^6+5000*x^5),x,
algorithm=\
```

output
```
1/2*(x - 6)/(5*x^3 - 50*x^2 + (x - 10)*log(x))
```

3.712.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2+2x^3)\log^2(x)}\,dx = \frac{x-6}{2\,(5\,x^3-50\,x^2+x\log(x)-10\,\log(x))}$$

input
```
integrate((-4*x*log(x)-10*x^4+140*x^3-601*x^2+16*x-60)/((2*x^3-40*x^2+200*
x)*log(x)^2+(20*x^5-400*x^4+2000*x^3)*log(x)+50*x^7-1000*x^6+5000*x^5),x,
algorithm=\
```

output
```
1/2*(x - 6)/(5*x^3 - 50*x^2 + x*log(x) - 10*log(x))
```

3.712.9 Mupad [B] (verification not implemented)

Time = 15.93 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{-60+16x-601x^2+140x^3-10x^4-4x\log(x)}{5000x^5-1000x^6+50x^7+(2000x^3-400x^4+20x^5)\log(x)+(200x-40x^2+2x^3)\log^2(x)}\,dx = \frac{x-6}{2\,(\ln(x)+5\,x^2)\,(x-10)}$$

input
```
int(-(4*x*log(x) - 16*x + 601*x^2 - 140*x^3 + 10*x^4 + 60)/(log(x)^2*(200*
x - 40*x^2 + 2*x^3) + log(x)*(2000*x^3 - 400*x^4 + 20*x^5) + 5000*x^5 - 10
00*x^6 + 50*x^7),x)
```

output
```
(x - 6)/(2*(log(x) + 5*x^2)*(x - 10))
```

3.713 $\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+\right.}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(48x^2+\right.}$

3.713.1 Optimal result

Integrand size = 135, antiderivative size = 33

$$\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx=x-\frac{x}{4\left(2+2^{2x/3}\left(\frac{1}{x^2}\right)^{-1+\frac{x}{3}}+3x\right)}$$

output
```
x-1/4*x/(3*x+exp(1/3*x*ln(4/x^2))*x^2+2)
```

3.713.2 Mathematica [F]

$$\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx=\int \frac{42+144x+}{48+}$$

input
```
Integrate[(42 + 144*x + 108*x^2 + 3*2^(2 + (4*x)/3)*(x^(-2))^((2*x)/3)*x^4
 + 2^((2*x)/3)*(x^(-2))^(x/3)*(51*x^2 + 70*x^3 + x^3*Log[4/x^2]))/(48 + 14
4*x + 108*x^2 + 3*2^(2 + (4*x)/3)*(x^(-2))^((2*x)/3)*x^4 + 2^((2*x)/3)*(x^
(-2))^(x/3)*(48*x^2 + 72*x^3)),x]
```

output
```
Integrate[(42 + 144*x + 108*x^2 + 3*2^(2 + (4*x)/3)*(x^(-2))^((2*x)/3)*x^4
 + 2^((2*x)/3)*(x^(-2))^(x/3)*(51*x^2 + 70*x^3 + x^3*Log[4/x^2]))/(48 + 14
4*x + 108*x^2 + 3*2^(2 + (4*x)/3)*(x^(-2))^((2*x)/3)*x^4 + 2^((2*x)/3)*(x^
(-2))^(x/3)*(48*x^2 + 72*x^3)), x]
```

3.713.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{108x^2+3\ 2^{\frac{4x}{3}+2}x^4\left(\frac{1}{x^2}\right)^{2x/3}+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(70x^3+51x^2+x^3\log\left(\frac{4}{x^2}\right)\right)+144x+42}{108x^2+3\ 2^{\frac{4x}{3}+2}x^4\left(\frac{1}{x^2}\right)^{2x/3}+2^{2x/3}\left(72x^3+48x^2\right)\left(\frac{1}{x^2}\right)^{x/3}+144x+48}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{108x^2+3\ 2^{\frac{4x}{3}+2}x^4\left(\frac{1}{x^2}\right)^{2x/3}+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(70x^3+51x^2+x^3\log\left(\frac{4}{x^2}\right)\right)+144x+42}{12\left(2^{2x/3}\left(\frac{1}{x^2}\right)^{\frac{x}{3}-1}+3x+2\right)^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{12}\int \frac{2^{2x/3}\left(\log\left(\frac{4}{x^2}\right)x^3+70x^3+51x^2\right)\left(\frac{1}{x^2}\right)^{x/3}+3\ 2^{\frac{4x}{3}+2}x^4\left(\frac{1}{x^2}\right)^{2x/3}+108x^2+144x+42}{\left(2^{2x/3}\left(\frac{1}{x^2}\right)^{\frac{x}{3}-1}+3x+2\right)^2}dx$$

$$\Big\downarrow \ 7293$$

$$\frac{1}{12}\int \left(\frac{\log\left(\frac{4}{x^2}\right)x-2x+3}{2^{2x/3}\left(\frac{1}{x^2}\right)^{\frac{x}{3}-1}+3x+2}-\frac{3\log\left(\frac{4}{x^2}\right)x^2-6x^2+2\log\left(\frac{4}{x^2}\right)x+5x+12}{\left(2^{2x/3}\left(\frac{1}{x^2}\right)^{\frac{x}{3}-1}+3x+2\right)^2}+12\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{12}\left(-12\int \frac{1}{\left(2^{2x/3}\left(\frac{1}{x^2}\right)^{\frac{x}{3}-1}+3x+2\right)^2}dx-5\int \frac{x}{\left(2^{2x/3}\left(\frac{1}{x^2}\right)^{\frac{x}{3}-1}+3x+2\right)^2}dx+6\int \frac{x^2}{\left(2^{2x/3}\left(\frac{1}{x^2}\right)^{\frac{x}{3}-1}+3x+2\right)\right.$$

input
```
Int[(42 + 144*x + 108*x^2 + 3*2^(2 + (4*x)/3)*(x^(-2))^((2*x)/3)*x^4 + 2^(
(2*x)/3)*(x^(-2))^(x/3)*(51*x^2 + 70*x^3 + x^3*Log[4/x^2]))/(48 + 144*x +
108*x^2 + 3*2^(2 + (4*x)/3)*(x^(-2))^((2*x)/3)*x^4 + 2^((2*x)/3)*(x^(-2))^
(x/3)*(48*x^2 + 72*x^3)),x]
```

output
```
$Aborted
```

3.713.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.713.4 Maple [A] (verified)

Time = 1.78 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.79

method	result	size
risch	$x-\frac{x}{4\left(3x+\left(\frac{4}{x^{2}}\right)^{\frac{x}{3}} x^{2}+2\right)}$	26
parallelrisch	$\frac{12\,{\mathrm e}^{\frac{x \ln\left(\frac{4}{x^{2}}\right)}{3}} x^{3}+36x^{2}+21x}{36x+12\,{\mathrm e}^{\frac{x \ln\left(\frac{4}{x^{2}}\right)}{3}} x^{2}+24}$	48

input
```
int((12*x^4*exp(1/3*x*ln(4/x^2))^2+(x^3*ln(4/x^2)+70*x^3+51*x^2)*exp(1/3*x
*ln(4/x^2))+108*x^2+144*x+42)/(12*x^4*exp(1/3*x*ln(4/x^2))^2+(72*x^3+48*x^
2)*exp(1/3*x*ln(4/x^2))+108*x^2+144*x+48),x,method=_RETURNVERBOSE)
```

output
```
x-1/4*x/(3*x+(4/x^2)^(1/3*x)*x^2+2)
```

3.713. $\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx$

3.713.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.36

$$\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx = \frac{4\,x^3\left(\frac{4}{x^2}\right)^{\frac{1}{3}\,x}+1}{4\left(x^2\left(\frac{4}{x^2}\right)^{\frac{1}{3}\,x}+\right.}$$

input
```
integrate((12*x^4*exp(1/3*x*log(4/x^2))^2+(x^3*log(4/x^2)+70*x^3+51*x^2)*e
xp(1/3*x*log(4/x^2))+108*x^2+144*x+42)/(12*x^4*exp(1/3*x*log(4/x^2))^2+(72
*x^3+48*x^2)*exp(1/3*x*log(4/x^2))+108*x^2+144*x+48),x, algorithm=\
```

output
```
1/4*(4*x^3*(4/x^2)^(1/3*x) + 12*x^2 + 7*x)/(x^2*(4/x^2)^(1/3*x) + 3*x + 2)
```

3.713.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.73

$$\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx = x - \frac{x}{4x^2e^{\frac{x\log\left(\frac{4}{x^2}\right)}{3}}+12x+8}$$

input
```
integrate((12*x**4*exp(1/3*x*ln(4/x**2))**2+(x**3*ln(4/x**2)+70*x**3+51*x*
*2)*exp(1/3*x*ln(4/x**2))+108*x**2+144*x+42)/(12*x**4*exp(1/3*x*ln(4/x**2)
)**2+(72*x**3+48*x**2)*exp(1/3*x*ln(4/x**2))+108*x**2+144*x+48),x)
```

output
```
x - x/(4*x**2*exp(x*log(4/x**2)/3) + 12*x + 8)
```

3.713.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(25) = 50.

Time = 0.37 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.76

$$\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx = \frac{(12\,x^3+x^2)2^{\frac{2}{3}}}{12\left(2^{\frac{2}{3}}\right.}$$

input
```
integrate((12*x^4*exp(1/3*x*log(4/x^2))^2+(x^3*log(4/x^2)+70*x^3+51*x^2)*e
xp(1/3*x*log(4/x^2))+108*x^2+144*x+42)/(12*x^4*exp(1/3*x*log(4/x^2))^2+(72
*x^3+48*x^2)*exp(1/3*x*log(4/x^2))+108*x^2+144*x+48),x, algorithm=\
```

output
```
1/12*((12*x^3 + x^2)*2^(2/3*x) + 2*(18*x^2 + 12*x + 1)*x^(2/3*x))/(2^(2/3*
x)*x^2 + (3*x + 2)*x^(2/3*x))
```

3.713.8 Giac [F]

$$\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx=\int \frac{12\,x^4\left(\frac{4}{x^2}\right)^{\frac{2}{3}\,x}}{12\,(}$$

input
```
integrate((12*x^4*exp(1/3*x*log(4/x^2))^2+(x^3*log(4/x^2)+70*x^3+51*x^2)*e
xp(1/3*x*log(4/x^2))+108*x^2+144*x+42)/(12*x^4*exp(1/3*x*log(4/x^2))^2+(72
*x^3+48*x^2)*exp(1/3*x*log(4/x^2))+108*x^2+144*x+48),x, algorithm=\
```

output
```
integrate(1/12*(12*x^4*(4/x^2)^(2/3*x) + 108*x^2 + (x^3*log(4/x^2) + 70*x^
3 + 51*x^2)*(4/x^2)^(1/3*x) + 144*x + 42)/(x^4*(4/x^2)^(2/3*x) + 9*x^2 + 2
*(3*x^3 + 2*x^2)*(4/x^2)^(1/3*x) + 12*x + 4), x)
```

3.713.9 Mupad [B] (verification not implemented)

Time = 15.78 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.48

$$\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx=\frac{x\left(12\,x+2^{\frac{2x}{3}+}\right.}{4\left(3\,x+2^{\frac{2x}{3}}\right.}$$

input
```
int((144*x + 12*x^4*exp((2*x*log(4/x^2))/3) + 108*x^2 + exp((x*log(4/x^2))
/3)*(51*x^2 + 70*x^3 + x^3*log(4/x^2)) + 42)/(144*x + exp((x*log(4/x^2))/3
)*(48*x^2 + 72*x^3) + 12*x^4*exp((2*x*log(4/x^2))/3) + 108*x^2 + 48),x)
```

output
```
(x*(12*x + 2^((2*x)/3 + 2)*x^2*(1/x^2)^(x/3) + 7))/(4*(3*x + 2^((2*x)/3)*x
^2*(1/x^2)^(x/3) + 2))
```

3.713. $\int \frac{42+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}\left(51x^2+70x^3+x^3\log\left(\frac{4}{x^2}\right)\right)}{48+144x+108x^2+3\ 2^{2+\frac{4x}{3}}\left(\frac{1}{x^2}\right)^{2x/3}x^4+2^{2x/3}\left(\frac{1}{x^2}\right)^{x/3}(48x^2+72x^3)}\,dx$

3.714 $\int 225 \log^2(4) \, dx$

3.714.1 Optimal result

Integrand size = 6, antiderivative size = 7

$$\int 225 \log^2(4) \, dx = 225x \log^2(4)$$

output
```
900*x*ln(2)^2
```

3.714.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00

$$\int 225 \log^2(4) \, dx = 225x \log^2(4)$$

input
```
Integrate[225*Log[4]^2,x]
```

output
```
225*x*Log[4]^2
```

3.714.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int 225 \log^2(4)\,dx$$

$$\Big\downarrow \ 24$$

$$225x \log^2(4)$$

input
```
Int[225*Log[4]^2,x]
```

output
```
225*x*Log[4]^2
```

3.714.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.714.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 1.14

method	result	size
default	$900x\ln(2)^2$	8
norman	$900x\ln(2)^2$	8
risch	$900x\ln(2)^2$	8
parallelrisch	$900x\ln(2)^2$	8

input
```
int(900*ln(2)^2,x,method=_RETURNVERBOSE)
```

output
```
900*x*ln(2)^2
```

3.714.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00

$$\int 225\log^2(4)\,dx = 900\,x\log{(2)}^2$$

input
```
integrate(900*log(2)^2,x, algorithm=\
```

output
```
900*x*log(2)^2
```

3.714.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00

$$\int 225\log^2(4)\,dx = 900x\log{(2)}^2$$

input
```
integrate(900*ln(2)**2,x)
```

output
```
900*x*log(2)**2
```

3.714.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00

$$\int 225\log^2(4)\,dx = 900\,x\log{(2)}^2$$

input
```
integrate(900*log(2)^2,x, algorithm=\
```

output
```
900*x*log(2)^2
```

3.714.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00

$$\int 225\log^2(4)\,dx = 900\,x\log{(2)}^2$$

input
```
integrate(900*log(2)^2,x, algorithm=\
```

output
```
900*x*log(2)^2
```

3.714.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00

$$\int 225\log^2(4)\,dx = 900\,x\ln{(2)}^2$$

input
```
int(900*log(2)^2,x)
```

output
```
900*x*log(2)^2
```

3.715 $\int \frac{-400\log(3)-4\log(2)\log^2(3)}{16x^2\log(2)-8x\log(2)\log(3)+\log(2)\log^2(3)}\,dx$

3.715.1 Optimal result

Integrand size = 38, antiderivative size = 21

$$\int \frac{-400\log(3)-4\log(2)\log^2(3)}{16x^2\log(2)-8x\log(2)\log(3)+\log(2)\log^2(3)}\,dx=\frac{x+\frac{25}{\log(2)}}{-\frac{1}{4}+\frac{x}{\log(3)}}$$

output
```
(25/ln(2)+x)/(x/ln(3)-1/4)
```

3.715.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{-400\log(3)-4\log(2)\log^2(3)}{16x^2\log(2)-8x\log(2)\log(3)+\log(2)\log^2(3)}\,dx=-\frac{\log(3)(100+\log(2)\log(3))}{\log(2)(-4x+\log(3))}$$

input
```
Integrate[(-400*Log[3] - 4*Log[2]*Log[3]^2)/(16*x^2*Log[2] - 8*x*Log[2]*Lo
g[3] + Log[2]*Log[3]^2),x]
```

output
```
-((Log[3]*(100 + Log[2]*Log[3]))/(Log[2]*(-4*x + Log[3])))
```

3.715.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.079, Rules used = {27, 1077, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4\log(2)\log^2(3)-400\log(3)}{16x^2\log(2)-8x\log(2)\log(3)+\log(2)\log^2(3)}dx$$

$$\Big\downarrow \; 27$$

$$-4\log(3)(100+\log(2)\log(3))\int \frac{1}{16\log(2)x^2-8\log(2)\log(3)x+\log(2)\log^2(3)}dx$$

$$\Big\downarrow \; 1077$$

$$-64\log(2)\log(3)(100+\log(2)\log(3))\int \frac{1}{(16x\log(2)-4\log(2)\log(3))^2}dx$$

$$\Big\downarrow \; 17$$

$$\frac{\log(3)(100+\log(2)\log(3))}{\log(2)(4x-\log(3))}$$

input
```
Int[(-400*Log[3] - 4*Log[2]*Log[3]^2)/(16*x^2*Log[2] - 8*x*Log[2]*Log[3] +
 Log[2]*Log[3]^2),x]
```

output
```
(Log[3]*(100 + Log[2]*Log[3]))/(Log[2]*(4*x - Log[3]))
```

3.715.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1077
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/c^p   Int
[(b/2 + c*x)^(2*p), x], x] /; FreeQ[{a, b, c}, x] && EqQ[b^2 - 4*a*c, 0] &&
 IntegerQ[p]
```

3.715.4 Maple [A] (verified)

Time = 1.46 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

method	result	size
gosper	$-\frac{\ln(3)(\ln(2)\ln(3)+100)}{\ln(2)(\ln(3)-4x)}$	24
norman	$-\frac{\ln(3)(\ln(2)\ln(3)+100)}{\ln(2)(\ln(3)-4x)}$	24
parallelrisch	$\frac{-4\ln(2)\ln(3)^2-400\ln(3)}{4\ln(2)(\ln(3)-4x)}$	28
default	$-\frac{-4\ln(2)\ln(3)^2-400\ln(3)}{4\ln(2)(-\ln(3)+4x)}$	30
risch	$-\frac{\ln(3)^2}{\ln(3)-4x}-\frac{100\ln(3)}{\ln(2)(\ln(3)-4x)}$	32
meijerg	$-\frac{4x}{1-\frac{4x}{\ln(3)}}-\frac{400x}{\ln(2)\ln(3)\left(1-\frac{4x}{\ln(3)}\right)}$	38

input
```
int((-4*ln(2)*ln(3)^2-400*ln(3))/(ln(2)*ln(3)^2-8*x*ln(2)*ln(3)+16*x^2*ln(
2)),x,method=_RETURNVERBOSE)
```

output
```
-ln(3)*(ln(2)*ln(3)+100)/ln(2)/(ln(3)-4*x)
```

3.715.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{-400\log(3)-4\log(2)\log^2(3)}{16x^2\log(2)-8x\log(2)\log(3)+\log(2)\log^2(3)}\,dx=\frac{\log(3)^2\log(2)+100\log(3)}{4x\log(2)-\log(3)\log(2)}$$

input
```
integrate((-4*log(2)*log(3)^2-400*log(3))/(log(2)*log(3)^2-8*x*log(2)*log(
3)+16*x^2*log(2)),x, algorithm=\
```

output
```
(log(3)^2*log(2) + 100*log(3))/(4*x*log(2) - log(3)*log(2))
```

3.715.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. 2(14) = 28.

Time = 0.10 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.52

$$\int \frac{-400\log(3) - 4\log(2)\log^2(3)}{16x^2\log(2) - 8x\log(2)\log(3) + \log(2)\log^2(3)}\,dx = -\frac{-400\log(3) - 4\log(2)\log(3)^2}{16x\log(2) - 4\log(2)\log(3)}$$

input
```
integrate((-4*ln(2)*ln(3)**2-400*ln(3))/(ln(2)*ln(3)**2-8*x*ln(2)*ln(3)+16
*x**2*ln(2)),x)
```

output
```
-(-400*log(3) - 4*log(2)*log(3)**2)/(16*x*log(2) - 4*log(2)*log(3))
```

3.715.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{-400\log(3) - 4\log(2)\log^2(3)}{16x^2\log(2) - 8x\log(2)\log(3) + \log(2)\log^2(3)}\,dx = \frac{\log(3)^2\log(2) + 100\log(3)}{4x\log(2) - \log(3)\log(2)}$$

input
```
integrate((-4*log(2)*log(3)^2-400*log(3))/(log(2)*log(3)^2-8*x*log(2)*log(
3)+16*x^2*log(2)),x, algorithm=\
```

output
```
(log(3)^2*log(2) + 100*log(3))/(4*x*log(2) - log(3)*log(2))
```

3.715.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{-400\log(3) - 4\log(2)\log^2(3)}{16x^2\log(2) - 8x\log(2)\log(3) + \log(2)\log^2(3)}\,dx = \frac{\log(3)^2\log(2) + 100\log(3)}{(4x - \log(3))\log(2)}$$

input
```
integrate((-4*log(2)*log(3)^2-400*log(3))/(log(2)*log(3)^2-8*x*log(2)*log(
3)+16*x^2*log(2)),x, algorithm=\
```

output
```
(log(3)^2*log(2) + 100*log(3))/((4*x - log(3))*log(2))
```

3.715.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{-400\log(3)-4\log(2)\log^2(3)}{16x^2\log(2)-8x\log(2)\log(3)+\log(2)\log^2(3)}\,dx=\frac{\ln(3)\,\left(\ln(2)\,\ln(3)+100\right)}{\ln(2)\,\left(4\,x-\ln(3)\right)}$$

input
```
int(-(400*log(3) + 4*log(2)*log(3)^2)/(log(2)*log(3)^2 + 16*x^2*log(2) - 8
*x*log(2)*log(3)),x)
```

output
```
(log(3)*(log(2)*log(3) + 100))/(log(2)*(4*x - log(3)))
```

3.716 $\int \frac{1}{20}(1-40e^{-2x}+40e^{2x}+e^x(-40-40x)+e^{-x}(40$

3.716.1 Optimal result

Integrand size = 43, antiderivative size = 21

$$\int \frac{1}{20}\left(1-40e^{-2x}+40e^{2x}+e^x(-40-40x)+e^{-x}(40-40x)+40x\right)\,dx = -1+\frac{x}{20}+\left(e^{-x}-e^x+x\right)^2$$

output
```
1/20*x-1+(x-exp(x)+exp(-x))^2
```

3.716.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.57

$$\int \frac{1}{20}\left(1-40e^{-2x}+40e^{2x}+e^x(-40-40x)+e^{-x}(40-40x)+40x\right)\,dx = e^{-2x}+e^{2x}+\frac{x}{20}+2e^{-x}x-2e^x x+x^2$$

input
```
Integrate[(1 - 40/E^(2*x) + 40*E^(2*x) + E^x*(-40 - 40*x) + (40 - 40*x)/E^
x + 40*x)/20,x]
```

output
```
E^(-2*x) + E^(2*x) + x/20 + (2*x)/E^x - 2*E^x*x + x^2
```

3.716.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 57 vs. 2(21) = 42.

Time = 0.19 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.71, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.047, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{20}\left(e^x(-40x-40)-40e^{-2x}+40e^{2x}+e^{-x}(40-40x)+40x+1\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{20}\int \left(40e^{-x}(1-x)-40e^{-2x}+40e^{2x}+40x-40e^x(x+1)+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{20}\left(20x^2+x+20e^{-2x}+40e^{-x}+40e^x+20e^{2x}-40e^{-x}(1-x)-40e^x(x+1)\right)$$

input
```
Int[(1 - 40/E^(2*x) + 40*E^(2*x) + E^x*(-40 - 40*x) + (40 - 40*x)/E^x + 40
*x)/20,x]
```

output
```
(20/E^(2*x) + 40/E^x + 40*E^x + 20*E^(2*x) - (40*(1 - x))/E^x + x + 20*x^2
 - 40*E^x*(1 + x))/20
```

3.716.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.716.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33

method	result	size
risch	$\frac{x}{20}-2\,\mathrm{e}^{x}x+2x\,\mathrm{e}^{-x}+x^{2}+\mathrm{e}^{2x}+\mathrm{e}^{-2x}$	28
default	$\frac{x}{20}-2\,\mathrm{e}^{x}x+2x\,\mathrm{e}^{-x}+x^{2}+\mathrm{e}^{2x}+\mathrm{e}^{-2x}$	30
parallelrisch	$\frac{x}{20}-2\,\mathrm{e}^{x}x+2x\,\mathrm{e}^{-x}+x^{2}+\mathrm{e}^{2x}+\mathrm{e}^{-2x}$	30
parts	$\frac{x}{20}-2\,\mathrm{e}^{x}x+2x\,\mathrm{e}^{-x}+x^{2}+\mathrm{e}^{2x}+\mathrm{e}^{-2x}$	30
norman	$\left(1+\mathrm{e}^{4x}+\mathrm{e}^{2x}x^{2}+\frac{x\,\mathrm{e}^{2x}}{20}-2x\,\mathrm{e}^{3x}+2\,\mathrm{e}^{x}x\right)\mathrm{e}^{-2x}$	39

input
```
int(2*exp(x)^2+1/20*(-40*x-40)*exp(x)-2*exp(-x)^2+1/20*(-40*x+40)*exp(-x)+
2*x+1/20,x,method=_RETURNVERBOSE)
```

output
```
1/20*x-2*exp(x)*x+2*x*exp(-x)+x^2+exp(2*x)+exp(-2*x)
```

3.716.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(17) = 34.

Time = 0.24 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.86

$$\int \frac{1}{20}\left(1-40e^{-2x}+40e^{2x}+e^{x}(-40-40x)+e^{-x}(40-40x)+40x\right)\,dx$$
$$=-\frac{1}{20}\left(40\,xe^{(3\,x)}-\left(20\,x^{2}+x\right)e^{(2\,x)}-40\,xe^{x}-20\,e^{(4\,x)}-20\right)e^{(-2\,x)}$$

input
```
integrate(2*exp(x)^2+1/20*(-40*x-40)*exp(x)-2*exp(-x)^2+1/20*(-40*x+40)*ex
p(-x)+2*x+1/20,x, algorithm=\
```

output
```
-1/20*(40*x*e^(3*x) - (20*x^2 + x)*e^(2*x) - 40*x*e^x - 20*e^(4*x) - 20)*e
^(-2*x)
```

3.716.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. 2(15) = 30.

Time = 0.08 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.48

$$\int \frac{1}{20}\left(1-40e^{-2x}+40e^{2x}+e^x(-40-40x)+e^{-x}(40-40x)+40x\right)\,dx = x^2-2xe^x+\frac{x}{20}+2xe^{-x}+e^{2x}+e^{-2x}$$

input
```
integrate(2*exp(x)**2+1/20*(-40*x-40)*exp(x)-2*exp(-x)**2+1/20*(-40*x+40)*
exp(-x)+2*x+1/20,x)
```

output
```
x**2 - 2*x*exp(x) + x/20 + 2*x*exp(-x) + exp(2*x) + exp(-2*x)
```

3.716.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{1}{20}\left(1-40e^{-2x}+40e^{2x}+e^x(-40-40x)+e^{-x}(40-40x)+40x\right)\,dx = x^2+2\,xe^{(-x)}-2\,xe^x+\frac{1}{20}\,x+e^{(2\,x)}+e^{(-2\,x)}$$

input
```
integrate(2*exp(x)^2+1/20*(-40*x-40)*exp(x)-2*exp(-x)^2+1/20*(-40*x+40)*ex
p(-x)+2*x+1/20,x, algorithm=\
```

output
```
x^2 + 2*x*e^(-x) - 2*x*e^x + 1/20*x + e^(2*x) + e^(-2*x)
```

3.716.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{1}{20}\left(1-40e^{-2x}+40e^{2x}+e^x(-40-40x)+e^{-x}(40-40x)+40x\right)\,dx = x^2+2\,xe^{(-x)}-2\,xe^x+\frac{1}{20}\,x+e^{(2\,x)}+e^{(-2\,x)}$$

input
```
integrate(2*exp(x)^2+1/20*(-40*x-40)*exp(x)-2*exp(-x)^2+1/20*(-40*x+40)*ex
p(-x)+2*x+1/20,x, algorithm=\
```

output
```
x^2 + 2*x*e^(-x) - 2*x*e^x + 1/20*x + e^(2*x) + e^(-2*x)
```

3.716.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{1}{20}\left(1-40e^{-2x}+40e^{2x}+e^x(-40-40x)+e^{-x}(40-40x)+40x\right)\,dx$$
$$=\frac{x}{20}+\mathrm{e}^{-2\,x}+\mathrm{e}^{2\,x}+2\,x\,\mathrm{e}^{-x}-2\,x\,\mathrm{e}^{x}+x^2$$

input
```
int(2*x - 2*exp(-2*x) + 2*exp(2*x) - (exp(x)*(40*x + 40))/20 - (exp(-x)*(4
0*x - 40))/20 + 1/20,x)
```

output
```
x/20 + exp(-2*x) + exp(2*x) + 2*x*exp(-x) - 2*x*exp(x) + x^2
```

3.717 $\int \frac{1+e^{x+e^x \log^2(2)} \log^2(2)(2+i\pi+\log(14))}{2+i\pi+\log(14)} \, dx$

3.717.1 Optimal result

Integrand size = 40, antiderivative size = 24

$$\int \frac{1+e^{x+e^x \log^2(2)} \log^2(2)(2+i\pi+\log(14))}{2+i\pi+\log(14)} \, dx = e^{e^x \log^2(2)}+\frac{x}{2+i\pi+\log(14)}$$

output
```
x/(ln(14)+I*Pi+2)+exp(exp(2*ln(ln(2))+x))
```

3.717.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{1+e^{x+e^x \log^2(2)} \log^2(2)(2+i\pi+\log(14))}{2+i\pi+\log(14)} \, dx = e^{e^x \log^2(2)}+\frac{x}{2+i\pi+\log(14)}$$

input
```
Integrate[(1 + E^(x + E^x*Log[2]^2)*Log[2]^2*(2 + I*Pi + Log[14]))/(2 + I*
Pi + Log[14]),x]
```

output
```
E^(E^x*Log[2]^2) + x/(2 + I*Pi + Log[14])
```

3.717.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.050, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1+\log^2(2)(2+i\pi+\log(14))e^{x+e^x\log^2(2)}}{2+i\pi+\log(14)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int \left(1+e^{x+e^x\log^2(2)}\log^2(2)(2+i\pi+\log(14))\right)dx}{2+i\pi+\log(14)}$$

$$\Big\downarrow \ 2009$$

$$\frac{x+(2+i\pi+\log(14))e^{e^x\log^2(2)}}{2+i\pi+\log(14)}$$

input
```
Int[(1 + E^(x + E^x*Log[2]^2)*Log[2]^2*(2 + I*Pi + Log[14]))/(2 + I*Pi + L
og[14]),x]
```

output
```
(x + E^(E^x*Log[2]^2)*(2 + I*Pi + Log[14]))/(2 + I*Pi + Log[14])
```

3.717.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.717.4 Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

method	result	size
parts	$\frac{x}{\ln(14)+i\pi+2}+\mathrm{e}^{\mathrm{e}^{2\ln(\ln(2))+x}}$	23
risch	$\frac{x}{\ln(2)+\ln(7)+i\pi+2}+\mathrm{e}^{\ln(2)^{2}\mathrm{e}^{x}}$	24
default	$\frac{x+(\ln(14)+i\pi+2)\mathrm{e}^{\mathrm{e}^{2\ln(\ln(2))+x}}}{\ln(14)+i\pi+2}$	32
parallelrisch	$\frac{x+(\ln(14)+i\pi+2)\mathrm{e}^{\mathrm{e}^{2\ln(\ln(2))+x}}}{\ln(14)+i\pi+2}$	32
norman	$-\frac{(i\pi-\ln(14)-2)x}{\pi^{2}+\ln(14)^{2}+4\ln(14)+4}+\mathrm{e}^{\mathrm{e}^{2\ln(\ln(2))+x}}$	39
derivativedivides	$\frac{\ln\left(\mathrm{e}^{2\ln(\ln(2))+x}\right)+\mathrm{e}^{\mathrm{e}^{2\ln(\ln(2))+x}}\ln(14)+i\pi\,\mathrm{e}^{\mathrm{e}^{2\ln(\ln(2))+x}}+2\,\mathrm{e}^{\mathrm{e}^{2\ln(\ln(2))+x}}}{\ln(14)+i\pi+2}$	58

input
```
int(((ln(14)+I*Pi+2)*exp(2*ln(ln(2))+x)*exp(exp(2*ln(ln(2))+x))+1)/(ln(14)
+I*Pi+2),x,method=_RETURNVERBOSE)
```

output
```
x/(ln(14)+I*Pi+2)+exp(exp(2*ln(ln(2))+x))
```

3.717.5 Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(21) = 42$.

Time = 0.26 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.29

$$\int \frac{1+e^{x+e^{x}\log^{2}(2)}\log^{2}(2)(2+i\pi+\log(14))}{2+i\pi+\log(14)}\,dx = \frac{\left((i\,\pi+\log(14)+2)e^{\left(x+e^{(x+2\log(\log(2)))}+2\log(\log(2))\right)}+xe^{(x+2\log(\log(2)))}\right)e^{(-x-2\log(\log(2)))}}{i\,\pi+\log(14)+2}$$

input
```
integrate(((log(14)+I*pi+2)*exp(2*log(log(2))+x)*exp(exp(2*log(log(2))+x))
+1)/(log(14)+I*pi+2),x, algorithm=\
```

output
```
((I*pi + log(14) + 2)*e^(x + e^(x + 2*log(log(2))) + 2*log(log(2))) + x*e^
(x + 2*log(log(2))))*e^(-x - 2*log(log(2)))/(I*pi + log(14) + 2)
```

3.717.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{1+e^{x+e^x \log^2(2)} \log^2(2)(2+i\pi+\log(14))}{2+i\pi+\log(14)} \, dx = \frac{x}{2+\log(14)+i\pi} + e^{e^x \log(2)^2}$$

input
```
integrate(((ln(14)+I*pi+2)*exp(2*ln(ln(2))+x)*exp(exp(2*ln(ln(2))+x))+1)/(
ln(14)+I*pi+2),x)
```

output
```
x/(2 + log(14) + I*pi) + exp(exp(x)*log(2)**2)
```

3.717.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{1+e^{x+e^x \log^2(2)} \log^2(2)(2+i\pi+\log(14))}{2+i\pi+\log(14)} \, dx = \frac{(i\pi+\log(14)+2)e^{\left(e^x \log(2)^2\right)}+x}{i\pi+\log(14)+2}$$

input
```
integrate(((log(14)+I*pi+2)*exp(2*log(log(2))+x)*exp(exp(2*log(log(2))+x))
+1)/(log(14)+I*pi+2),x, algorithm=\
```

output
```
((I*pi + log(14) + 2)*e^(e^x*log(2)^2) + x)/(I*pi + log(14) + 2)
```

3.717.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{1+e^{x+e^x \log^2(2)} \log^2(2)(2+i\pi+\log(14))}{2+i\pi+\log(14)} \, dx = \frac{(i\pi+\log(14)+2)e^{\left(e^x \log(2)^2\right)}+x}{i\pi+\log(14)+2}$$

input
```
integrate(((log(14)+I*pi+2)*exp(2*log(log(2))+x)*exp(exp(2*log(log(2))+x))
+1)/(log(14)+I*pi+2),x, algorithm=\
```

output
```
((I*pi + log(14) + 2)*e^(e^x*log(2)^2) + x)/(I*pi + log(14) + 2)
```

3.717.9 Mupad [B] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{1+e^{x+e^x \log^2(2)} \log^2(2)(2+i\pi+\log(14))}{2+i\pi+\log(14)}\,dx = \mathrm{e}^{\mathrm{e}^x \ln(2)^2} + \frac{x}{\ln(14)+2+\Pi\,1\mathrm{i}}$$

input
```
int((exp(x + 2*log(log(2)))*exp(exp(x + 2*log(log(2))))*(Pi*1i + log(14) +
 2) + 1)/(Pi*1i + log(14) + 2),x)
```

output
```
exp(exp(x)*log(2)^2) + x/(Pi*1i + log(14) + 2)
```

3.718 $\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}\left(-25+e^{2x}(-50-10x)-5x\right)\right.}{\left(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x)\right)\log^2\left(-4+e^{e^{2x}+x}+\log(5-\right.}$

3.718.1 Optimal result

Integrand size = 97, antiderivative size = 22

$$\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}(-25+e^{2x}(-50-10x)-5x)\right)}{\left(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x)\right)\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx = e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}$$

output
```
exp(5/ln(exp(exp(2*x)+x)+ln(5+x)-4))
```

3.718.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}(-25+e^{2x}(-50-10x)-5x)\right)}{\left(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x)\right)\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx = e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}$$

input
```
Integrate[(E^(5/Log[-4 + E^(E^(2*x) + x) + Log[5 + x]])*(-5 + E^(E^(2*x) +
 x)*(-25 + E^(2*x)*(-50 - 10*x) - 5*x)))/((-20 - 4*x + E^(E^(2*x) + x)*(5
+ x) + (5 + x)*Log[5 + x])*Log[-4 + E^(E^(2*x) + x) + Log[5 + x]]^2),x]
```

3.718. $\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}(-25+e^{2x}(-50-10x)-5x)\right)}{\left(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x)\right)\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx$

output
```
E^(5/Log[-4 + E^(E^(2*x) + x) + Log[5 + x]])
```

3.718.3 Rubi [A] (verified)

Time = 1.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.010, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{x+e^{2x}}\left(e^{2x}(-10x-50)-5x-25\right)-5\right)e^{\frac{5}{\log\left(e^{x+e^{2x}}+\log(x+5)-4\right)}}}{\left(-4x+e^{x+e^{2x}}(x+5)+(x+5)\log(x+5)-20\right)\log^2\left(e^{x+e^{2x}}+\log(x+5)-4\right)}dx$$
$$\Big\downarrow \ 7257$$
$$e^{\frac{5}{\log\left(e^{x+e^{2x}}+\log(x+5)-4\right)}}$$

input
```
Int[(E^(5/Log[-4 + E^(E^(2*x) + x) + Log[5 + x]])*(-5 + E^(E^(2*x) + x)*(-
25 + E^(2*x)*(-50 - 10*x) - 5*x)))/((-20 - 4*x + E^(E^(2*x) + x)*(5 + x) +
 (5 + x)*Log[5 + x])*Log[-4 + E^(E^(2*x) + x) + Log[5 + x]]^2),x]
```

output
```
E^(5/Log[-4 + E^(E^(2*x) + x) + Log[5 + x]])
```

3.718.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.718.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$e^{\frac{5}{\ln\left(e^{e^{2x}+x}+\ln(5+x)-4\right)}}$$

input
```
int((((-10*x-50)*exp(2*x)-5*x-25)*exp(exp(2*x)+x)-5)*exp(5/ln(exp(exp(2*x)
+x)+ln(5+x)-4))/((5+x)*exp(exp(2*x)+x)+(5+x)*ln(5+x)-4*x-20)/ln(exp(exp(2*
x)+x)+ln(5+x)-4)^2,x)
```

3.718. $\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}\left(-25+e^{2x}(-50-10x)-5x\right)\right)}{\left(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x)\right)\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx$

output
```
exp(5/ln(exp(exp(2*x)+x)+ln(5+x)-4))
```

3.718.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}(-25+e^{2x}(-50-10x)-5x)\right)}{(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x))\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx = e^{\left(\frac{5}{\log\left(e^{\left(x+e^{(2x)}\right)}+\log(x+5)-4\right)}\right)}$$

input
```
integrate((((-10*x-50)*exp(2*x)-5*x-25)*exp(exp(2*x)+x)-5)*exp(5/log(exp(e
xp(2*x)+x)+log(5+x)-4))/((5+x)*exp(exp(2*x)+x)+(5+x)*log(5+x)-4*x-20)/log(
exp(exp(2*x)+x)+log(5+x)-4)^2,x, algorithm=\
```

output
```
e^(5/log(e^(x + e^(2*x)) + log(x + 5) - 4))
```

3.718.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}(-25+e^{2x}(-50-10x)-5x)\right)}{(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x))\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx = \text{Timed out}$$

input
```
integrate((((-10*x-50)*exp(2*x)-5*x-25)*exp(exp(2*x)+x)-5)*exp(5/ln(exp(ex
p(2*x)+x)+ln(5+x)-4))/((5+x)*exp(exp(2*x)+x)+(5+x)*ln(5+x)-4*x-20)/ln(exp(
exp(2*x)+x)+ln(5+x)-4)**2,x)
```

output
```
Timed out
```

3.718.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 264 vs. $2(19) = 38$.

Time = 0.41 (sec) , antiderivative size = 264, normalized size of antiderivative = 12.00

$$\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}(-25+e^{2x}(-50-10x)-5x)\right)}{\left(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x)\right)\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx$$
$$= \frac{2\,xe^{\left(3\,x+\frac{5}{\log\left(e^{\left(x+e^{(2\,x)}\right)}+\log(x+5)-4\right)}+e^{(2\,x)}\right)}}{\left(2\,(x+5)e^{(3\,x)}+(x+5)e^{x}\right)e^{\left(e^{(2\,x)}\right)}+1} + \frac{xe^{\left(x+\frac{5}{\log\left(e^{\left(x+e^{(2\,x)}\right)}+\log(x+5)-4\right)}+e^{(2\,x)}\right)}}{\left(2\,(x+5)e^{(3\,x)}+(x+5)e^{x}\right)e^{\left(e^{(2\,x)}\right)}+1}$$
$$+ \frac{10\,e^{\left(3\,x+\frac{5}{\log\left(e^{\left(x+e^{(2\,x)}\right)}+\log(x+5)-4\right)}+e^{(2\,x)}\right)}}{\left(2\,(x+5)e^{(3\,x)}+(x+5)e^{x}\right)e^{\left(e^{(2\,x)}\right)}+1} + \frac{5\,e^{\left(x+\frac{5}{\log\left(e^{\left(x+e^{(2\,x)}\right)}+\log(x+5)-4\right)}+e^{(2\,x)}\right)}}{\left(2\,(x+5)e^{(3\,x)}+(x+5)e^{x}\right)e^{\left(e^{(2\,x)}\right)}+1}$$
$$+ \frac{e^{\left(\frac{5}{\log\left(e^{\left(x+e^{(2\,x)}\right)}+\log(x+5)-4\right)}\right)}}{\left(2\,(x+5)e^{(3\,x)}+(x+5)e^{x}\right)e^{\left(e^{(2\,x)}\right)}+1}$$

input
```
integrate((((-10*x-50)*exp(2*x)-5*x-25)*exp(exp(2*x)+x)-5)*exp(5/log(exp(e
xp(2*x)+x)+log(5+x)-4))/((5+x)*exp(exp(2*x)+x)+(5+x)*log(5+x)-4*x-20)/log(
exp(exp(2*x)+x)+log(5+x)-4)^2,x, algorithm=\
```

output
```
2*x*e^(3*x + 5/log(e^(x + e^(2*x)) + log(x + 5) - 4) + e^(2*x))/((2*(x + 5
)*e^(3*x) + (x + 5)*e^x)*e^(e^(2*x)) + 1) + x*e^(x + 5/log(e^(x + e^(2*x))
 + log(x + 5) - 4) + e^(2*x))/((2*(x + 5)*e^(3*x) + (x + 5)*e^x)*e^(e^(2*x
)) + 1) + 10*e^(3*x + 5/log(e^(x + e^(2*x)) + log(x + 5) - 4) + e^(2*x))/(
(2*(x + 5)*e^(3*x) + (x + 5)*e^x)*e^(e^(2*x)) + 1) + 5*e^(x + 5/log(e^(x +
 e^(2*x)) + log(x + 5) - 4) + e^(2*x))/((2*(x + 5)*e^(3*x) + (x + 5)*e^x)*
e^(e^(2*x)) + 1) + e^(5/log(e^(x + e^(2*x)) + log(x + 5) - 4))/((2*(x + 5)
*e^(3*x) + (x + 5)*e^x)*e^(e^(2*x)) + 1)
```

3.718.8 Giac [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}(-25+e^{2x}(-50-10x)-5x)\right)}{(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x))\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx$$
= Exception raised: RuntimeError

input
```
integrate((((-10*x-50)*exp(2*x)-5*x-25)*exp(exp(2*x)+x)-5)*exp(5/log(exp(e
xp(2*x)+x)+log(5+x)-4))/((5+x)*exp(exp(2*x)+x)+(5+x)*log(5+x)-4*x-20)/log(
exp(exp(2*x)+x)+log(5+x)-4)^2,x, algorithm=\
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:Unable to divide, perhaps due to rounding error%%%{9112
5000,[0,7,0,3,10]%%%}+%%%{3189375000,[0,7,0,3,9]%%%}+%%%{47840625000,[0,7,
0,3,8]%%%}+%
```

3.718.9 Mupad [B] (verification not implemented)

Time = 16.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{e^{\frac{5}{\log\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}}\left(-5+e^{e^{2x}+x}(-25+e^{2x}(-50-10x)-5x)\right)}{(-20-4x+e^{e^{2x}+x}(5+x)+(5+x)\log(5+x))\log^2\left(-4+e^{e^{2x}+x}+\log(5+x)\right)}\,dx$$
$$= e^{\frac{5}{\ln\left(\ln(x+5)+e^{e^{2x}}\,e^{x}-4\right)}}$$

input
```
int((exp(5/log(log(x + 5) + exp(x + exp(2*x)) - 4))*(exp(x + exp(2*x))*(5*
x + exp(2*x)*(10*x + 50) + 25) + 5))/(log(log(x + 5) + exp(x + exp(2*x)) -
 4)^2*(4*x - log(x + 5)*(x + 5) - exp(x + exp(2*x))*(x + 5) + 20)),x)
```

output
```
exp(5/log(log(x + 5) + exp(exp(2*x))*exp(x) - 4))
```

3.719 $\int \frac{20+x+2\log\left(\frac{1}{5}(-80-4x)\log(5)\right)}{180+9x}\,dx$

3.719.1 Optimal result

Integrand size = 25, antiderivative size = 19

$$\int \frac{20+x+2\log\left(\frac{1}{5}(-80-4x)\log(5)\right)}{180+9x}\,dx = \frac{1}{9}\left(x+\log^2\left(\left(-16-\frac{4x}{5}\right)\log(5)\right)\right)$$

output
```
1/9*ln(ln(5)*(-4/5*x-16))^2+1/9*x
```

3.719.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int \frac{20+x+2\log\left(\frac{1}{5}(-80-4x)\log(5)\right)}{180+9x}\,dx = \frac{1}{9}\left(x+\log^2\left(-16\log(5)-\frac{4}{5}x\log(5)\right)\right)$$

input
```
Integrate[(20 + x + 2*Log[((-80 - 4*x)*Log[5])/5])/(180 + 9*x),x]
```

output
```
(x + Log[-16*Log[5] - (4*x*Log[5])/5]^2)/9
```

3.719.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x+2\log\left(\frac{1}{5}(-4x-80)\log(5)\right)+20}{9x+180}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2\log\left(-\frac{4}{5}x\log(5)-16\log(5)\right)}{9(x+20)}+\frac{1}{9}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{x}{9}+\frac{1}{9}\log^2\left(-\frac{4}{5}(x+20)\log(5)\right)$$

input
```
Int[(20 + x + 2*Log[((-80 - 4*x)*Log[5])/5])/(180 + 9*x),x]
```

output
```
x/9 + Log[(-4*(20 + x)*Log[5])/5]^2/9
```

3.719.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.719.4 Maple [A] (verified)

Time = 0.81 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

method	result	size
norman	$\frac{x}{9}+\frac{\ln\left(\frac{(-4x-80)\ln(5)}{5}\right)^2}{9}$	19
risch	$\frac{x}{9}+\frac{\ln\left(\frac{(-4x-80)\ln(5)}{5}\right)^2}{9}$	19
parts	$\frac{x}{9}+\frac{\ln\left(\frac{(-4x-80)\ln(5)}{5}\right)^2}{9}$	19
derivativedivides	$-\frac{-4\ln(5)\ln\left(-\frac{4x\ln(5)}{5}-16\ln(5)\right)^2-4x\ln(5)-80\ln(5)}{36\ln(5)}$	34
default	$-\frac{-4\ln(5)\ln\left(-\frac{4x\ln(5)}{5}-16\ln(5)\right)^2-4x\ln(5)-80\ln(5)}{36\ln(5)}$	34

input
```
int((2*ln(1/5*(-4*x-80)*ln(5))+20+x)/(9*x+180),x,method=_RETURNVERBOSE)
```

output
```
1/9*x+1/9*ln(1/5*(-4*x-80)*ln(5))^2
```

3.719.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{20+x+2\log\left(\frac{1}{5}(-80-4x)\log(5)\right)}{180+9x}\,dx=\frac{1}{9}\log\left(-\frac{4}{5}(x+20)\log(5)\right)^2+\frac{1}{9}x$$

input
```
integrate((2*log(1/5*(-4*x-80)*log(5))+20+x)/(9*x+180),x, algorithm=\
```

output
```
1/9*log(-4/5*(x + 20)*log(5))^2 + 1/9*x
```

3.719.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{20+x+2\log\left(\frac{1}{5}(-80-4x)\log(5)\right)}{180+9x}\,dx=\frac{x}{9}+\frac{\log\left(\left(-\frac{4x}{5}-16\right)\log\left(5\right)\right)^2}{9}$$

input
```
integrate((2*ln(1/5*(-4*x-80)*ln(5))+20+x)/(9*x+180),x)
```

output
```
x/9 + log((-4*x/5 - 16)*log(5))**2/9
```

3.719.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.30 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.74

$$\int \frac{20+x+2\log\left(\frac{1}{5}(-80-4x)\log(5)\right)}{180+9x}\,dx$$
$$=-\frac{2}{9}\left(-i\,\pi+\log\left(5\right)-2\,\log\left(2\right)-\log\left(\log\left(5\right)\right)\right)\log\left(x+20\right)+\frac{1}{9}\,\log\left(x+20\right)^2+\frac{1}{9}\,x$$

input
```
integrate((2*log(1/5*(-4*x-80)*log(5))+20+x)/(9*x+180),x, algorithm=\
```

output
```
-2/9*(-I*pi + log(5) - 2*log(2) - log(log(5)))*log(x + 20) + 1/9*log(x + 2
0)^2 + 1/9*x
```

3.719.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \frac{20+x+2\log\left(\frac{1}{5}(-80-4x)\log(5)\right)}{180+9x}\,dx=\frac{1}{9}\,\log\left(-4\,x\log\left(5\right)-80\,\log\left(5\right)\right)^2-\frac{2}{9}\,\log\left(5\right)\log\left(x+20\right)+\frac{1}{9}\,x$$

input
```
integrate((2*log(1/5*(-4*x-80)*log(5))+20+x)/(9*x+180),x, algorithm=\
```

output
```
1/9*log(-4*x*log(5) - 80*log(5))^2 - 2/9*log(5)*log(x + 20) + 1/9*x
```

3.719.9 Mupad [B] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{20+x+2\log\left(\frac{1}{5}(-80-4x)\log(5)\right)}{180+9x}\,dx=\frac{\ln\left(-\frac{\ln(5)\,(4\,x+80)}{5}\right)^2}{9}+\frac{x}{9}$$

input
```
int((x + 2*log(-(log(5)*(4*x + 80))/5) + 20)/(9*x + 180),x)
```

output
```
x/9 + log(-(log(5)*(4*x + 80))/5)^2/9
```

3.720 $\int -\frac{16(i\pi+\log(\log(16)))}{-3+9x-9x^2+3x^3}\,dx$

3.720.1 Optimal result

Integrand size = 28, antiderivative size = 20

$$\int -\frac{16(i\pi+\log(\log(16)))}{-3+9x-9x^2+3x^3}\,dx=\frac{8(i\pi+\log(\log(16)))}{3(1-x)^2}$$

output
```
8/3*ln(-4*ln(2))/(1-x)^2
```

3.720.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int -\frac{16(i\pi+\log(\log(16)))}{-3+9x-9x^2+3x^3}\,dx=\frac{8i(\pi-i\log(\log(16)))}{3(-1+x)^2}$$

input
```
Integrate[(-16*(I*Pi + Log[Log[16]]))/(-3 + 9*x - 9*x^2 + 3*x^3),x]
```

output
```
(((8*I)/3)*(Pi - I*Log[Log[16]]))/(-1 + x)^2
```

3.720.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.107, Rules used = {27, 2007, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{16(\log(\log(16))+i\pi)}{3x^3-9x^2+9x-3}\,dx$$
$$\Big\downarrow \; 27$$
$$-16(\log(\log(16))+i\pi)\int \frac{1}{3x^3-9x^2+9x-3}dx$$
$$\Big\downarrow \; 2007$$
$$-16(\log(\log(16))+i\pi)\int \frac{1}{\left(\sqrt[3]{3}x-\sqrt[3]{3}\right)^3}dx$$
$$\Big\downarrow \; 17$$
$$\frac{8(\log(\log(16))+i\pi)}{3(1-x)^2}$$

input
```
Int[(-16*(I*Pi + Log[Log[16]]))/(-3 + 9*x - 9*x^2 + 3*x^3),x]
```

output
```
(8*(I*Pi + Log[Log[16]]))/(3*(1 - x)^2)
```

3.720.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

3.720.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

method	result	size
default	$\frac{8\ln(-4\ln(2))}{3(-1+x)^2}$	13
gosper	$\frac{8\ln(-4\ln(2))}{3(x^2-2x+1)}$	18
parallelrisch	$\frac{8\ln(-4\ln(2))}{3(x^2-2x+1)}$	18
norman	$\frac{\frac{16\ln(2)}{3}+\frac{8\ln(\ln(2))}{3}+\frac{8i\pi}{3}}{(-1+x)^2}$	21
risch	$\frac{16\ln(2)}{3(x^2-2x+1)}+\frac{8\ln(\ln(2))}{3(x^2-2x+1)}+\frac{8i\pi}{3(x^2-2x+1)}$	45

input
```
int(-16*ln(-4*ln(2))/(3*x^3-9*x^2+9*x-3),x,method=_RETURNVERBOSE)
```

output
```
8/3*ln(-4*ln(2))/(-1+x)^2
```

3.720.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int -\frac{16(i\pi+\log(\log(16)))}{-3+9x-9x^2+3x^3}\,dx=\frac{8\,\log\left(-4\,\log\left(2\right)\right)}{3\,\left(x^2-2\,x+1\right)}$$

input
```
integrate(-16*log(-4*log(2))/(3*x^3-9*x^2+9*x-3),x, algorithm=\
```

output
```
8/3*log(-4*log(2))/(x^2 - 2*x + 1)
```

3.720.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int -\frac{16(i\pi + \log(\log(16)))}{-3 + 9x - 9x^2 + 3x^3}\,dx = -\frac{-32\log{(2)} - 16\log{(\log{(2)})} - 16i\pi}{6x^2 - 12x + 6}$$

input
```
integrate(-16*ln(-4*ln(2))/(3*x**3-9*x**2+9*x-3),x)
```

output
```
-(-32*log(2) - 16*log(log(2)) - 16*I*pi)/(6*x**2 - 12*x + 6)
```

3.720.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int -\frac{16(i\pi + \log(\log(16)))}{-3 + 9x - 9x^2 + 3x^3}\,dx = \frac{8\,\log{(-4\,\log{(2)})}}{3\,(x^2 - 2\,x + 1)}$$

input
```
integrate(-16*log(-4*log(2))/(3*x^3-9*x^2+9*x-3),x, algorithm=\
```

output
```
8/3*log(-4*log(2))/(x^2 - 2*x + 1)
```

3.720.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int -\frac{16(i\pi + \log(\log(16)))}{-3 + 9x - 9x^2 + 3x^3}\,dx = \frac{8\,\log{(-4\,\log{(2)})}}{3\,(x-1)^2}$$

input
```
integrate(-16*log(-4*log(2))/(3*x^3-9*x^2+9*x-3),x, algorithm=\
```

output
```
8/3*log(-4*log(2))/(x - 1)^2
```

3.720.9 Mupad [B] (verification not implemented)

Time = 15.65 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int -\frac{16(i\pi + \log(\log(16)))}{-3 + 9x - 9x^2 + 3x^3} \, dx = \frac{8 \ln(-\ln(16))}{3 (x^2 - 2x + 1)}$$

input
```
int(-(16*log(-4*log(2)))/(9*x - 9*x^2 + 3*x^3 - 3),x)
```

output
```
(8*log(-log(16)))/(3*(x^2 - 2*x + 1))
```

3.721 $\int (18x^2 + 44x^3 + 30x^4 + 30x^5 + 112x^6 + 128x^7 + 36$

3.721.1 Optimal result

Integrand size = 71, antiderivative size = 32

$$\int \left(18x^2 + 44x^3 + 30x^4 + 30x^5 + 112x^6 + 128x^7 + 36x^8 + 60x^9 + 154x^{10} + 72x^{11} + 56x^{13} + 60x^{14} + 18x^{17} + 2\log(\log(4))\right) dx = x^2\left(x + \left(-1 - x - x^4\right)^2\right)^2 - (x - \log(\log(4)))^2$$

output
```
(x+(-x^4-x-1)^2)^2*x^2-(x-ln(2*ln(2)))^2
```

3.721.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 70 vs. 2(32) = 64.

Time = 0.00 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.19

$$\int \left(18x^2 + 44x^3 + 30x^4 + 30x^5 + 112x^6 + 128x^7 + 36x^8 + 60x^9 + 154x^{10} + 72x^{11} + 56x^{13} + 60x^{14} + 18x^{17} + 2\log(\log(4))\right) dx = 6x^3 + 11x^4 + 6x^5 + 5x^6 + 16x^7 + 16x^8 + 4x^9 + 6x^{10} + 14x^{11} + 6x^{12} + 4x^{14} + 4x^{15} + x^{18} + 2x\log(\log(4))$$

input
```
Integrate[18*x^2 + 44*x^3 + 30*x^4 + 30*x^5 + 112*x^6 + 128*x^7 + 36*x^8 +
 60*x^9 + 154*x^10 + 72*x^11 + 56*x^13 + 60*x^14 + 18*x^17 + 2*Log[Log[4]]
,x]
```

output
```
6*x^3 + 11*x^4 + 6*x^5 + 5*x^6 + 16*x^7 + 16*x^8 + 4*x^9 + 6*x^10 + 14*x^1
1 + 6*x^12 + 4*x^14 + 4*x^15 + x^18 + 2*x*Log[Log[4]]
```

3.721.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 70 vs. 2(32) = 64.

Time = 0.22 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.19, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.014$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (18x^{17} + 60x^{14} + 56x^{13} + 72x^{11} + 154x^{10} + 60x^9 + 36x^8 + 128x^7 + 112x^6 + 30x^5 + 30x^4 + 44x^3 + 18x^2 + 2\,\mathrm{lo}$$

$$\Big\downarrow \text{2009}$$

$$x^{18} + 4x^{15} + 4x^{14} + 6x^{12} + 14x^{11} + 6x^{10} + 4x^9 + 16x^8 + 16x^7 + 5x^6 + 6x^5 + 11x^4 + 6x^3 + 2x\log(\log(4))$$

input
```
Int[18*x^2 + 44*x^3 + 30*x^4 + 30*x^5 + 112*x^6 + 128*x^7 + 36*x^8 + 60*x^
9 + 154*x^10 + 72*x^11 + 56*x^13 + 60*x^14 + 18*x^17 + 2*Log[Log[4]],x]
```

output
```
6*x^3 + 11*x^4 + 6*x^5 + 5*x^6 + 16*x^7 + 16*x^8 + 4*x^9 + 6*x^10 + 14*x^1
1 + 6*x^12 + 4*x^14 + 4*x^15 + x^18 + 2*x*Log[Log[4]]
```

3.721.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.721.

$\int (18x^2 + 44x^3 + 30x^4 + 30x^5 + 112x^6 + 128x^7 + 36x^8 + 60x^9 + 154x^{10} + 72x^{11} + 56x^{13} + 60x^{14} + 18x^{17}$ -

3.721.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(34) = 68.

Time = 0.14 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.28

method	result
default	$2x\ln(2\ln(2))+6x^3+11x^4+6x^5+5x^6+16x^7+16x^8+4x^9+6x^{10}+14x^{11}+6x^{12}+4x^1$
parallelrisch	$2x\ln(2\ln(2))+6x^3+11x^4+6x^5+5x^6+16x^7+16x^8+4x^9+6x^{10}+14x^{11}+6x^{12}+4x^1$
parts	$2x\ln(2\ln(2))+6x^3+11x^4+6x^5+5x^6+16x^7+16x^8+4x^9+6x^{10}+14x^{11}+6x^{12}+4x^1$
gosper	$x(x^{17}+4x^{14}+4x^{13}+6x^{11}+14x^{10}+6x^9+4x^8+16x^7+16x^6+5x^5+6x^4+11x^3+6x^2$
risch	$x^{18}+4x^{15}+4x^{14}+6x^{12}+14x^{11}+6x^{10}+4x^9+16x^8+16x^7+5x^6+6x^5+11x^4+6x^3+$
norman	$x^{18}+(2\ln(2)+2\ln(\ln(2)))x+6x^3+11x^4+6x^5+5x^6+16x^7+16x^8+4x^9+6x^{10}+14$

input
```
int(2*ln(2*ln(2))+18*x^17+60*x^14+56*x^13+72*x^11+154*x^10+60*x^9+36*x^8+1
28*x^7+112*x^6+30*x^5+30*x^4+44*x^3+18*x^2,x,method=_RETURNVERBOSE)
```

output
```
2*x*ln(2*ln(2))+6*x^3+11*x^4+6*x^5+5*x^6+16*x^7+16*x^8+4*x^9+6*x^10+14*x^1
1+6*x^12+4*x^14+4*x^15+x^18
```

3.721.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(30) = 60.

Time = 0.25 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.25

$$\int (18x^2+44x^3+30x^4+30x^5+112x^6+128x^7+36x^8+60x^9+154x^{10}+72x^{11} +56x^{13}+60x^{14}+18x^{17}+2\log(\log(4)))\,dx = x^{18}+4\,x^{15}+4\,x^{14}+6\,x^{12}+14\,x^{11} +6\,x^{10}+4\,x^9+16\,x^8+16\,x^7+5\,x^6+6\,x^5+11\,x^4+6\,x^3+2\,x\log(2\log(2))$$

input
```
integrate(2*log(2*log(2))+18*x^17+60*x^14+56*x^13+72*x^11+154*x^10+60*x^9+
36*x^8+128*x^7+112*x^6+30*x^5+30*x^4+44*x^3+18*x^2,x, algorithm=\
```

output
```
x^18 + 4*x^15 + 4*x^14 + 6*x^12 + 14*x^11 + 6*x^10 + 4*x^9 + 16*x^8 + 16*x
^7 + 5*x^6 + 6*x^5 + 11*x^4 + 6*x^3 + 2*x*log(2*log(2))
```

3.721.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. 2(26) = 52.

Time = 0.04 (sec) , antiderivative size = 76, normalized size of antiderivative = 2.38

$$\int (18x^2 + 44x^3 + 30x^4 + 30x^5 + 112x^6 + 128x^7 + 36x^8 + 60x^9 + 154x^{10} + 72x^{11} + 56x^{13} + 60x^{14} + 18x^{17} + 2\log(\log(4)))\,dx = x^{18} + 4x^{15} + 4x^{14} + 6x^{12} + 14x^{11} + 6x^{10} + 4x^9 + 16x^8 + 16x^7 + 5x^6 + 6x^5 + 11x^4 + 6x^3 + x(2\log(\log(2)) + 2\log(2))$$

input
```
integrate(2*ln(2*ln(2))+18*x**17+60*x**14+56*x**13+72*x**11+154*x**10+60*x
**9+36*x**8+128*x**7+112*x**6+30*x**5+30*x**4+44*x**3+18*x**2,x)
```

output
```
x**18 + 4*x**15 + 4*x**14 + 6*x**12 + 14*x**11 + 6*x**10 + 4*x**9 + 16*x**
8 + 16*x**7 + 5*x**6 + 6*x**5 + 11*x**4 + 6*x**3 + x*(2*log(log(2)) + 2*lo
g(2))
```

3.721.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(30) = 60.

Time = 0.20 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.25

$$\int (18x^2 + 44x^3 + 30x^4 + 30x^5 + 112x^6 + 128x^7 + 36x^8 + 60x^9 + 154x^{10} + 72x^{11} + 56x^{13} + 60x^{14} + 18x^{17} + 2\log(\log(4)))\,dx = x^{18} + 4\,x^{15} + 4\,x^{14} + 6\,x^{12} + 14\,x^{11} + 6\,x^{10} + 4\,x^9 + 16\,x^8 + 16\,x^7 + 5\,x^6 + 6\,x^5 + 11\,x^4 + 6\,x^3 + 2\,x\log(2\,\log(2))$$

input
```
integrate(2*log(2*log(2))+18*x^17+60*x^14+56*x^13+72*x^11+154*x^10+60*x^9+
36*x^8+128*x^7+112*x^6+30*x^5+30*x^4+44*x^3+18*x^2,x, algorithm=\
```

output
```
x^18 + 4*x^15 + 4*x^14 + 6*x^12 + 14*x^11 + 6*x^10 + 4*x^9 + 16*x^8 + 16*x
^7 + 5*x^6 + 6*x^5 + 11*x^4 + 6*x^3 + 2*x*log(2*log(2))
```

3.721.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(30) = 60.

Time = 0.26 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.25

$$\int \left(18x^2+44x^3+30x^4+30x^5+112x^6+128x^7+36x^8+60x^9+154x^{10}+72x^{11}+56x^{13}+60x^{14}+18x^{17}+2\log(\log(4))\right)\,dx = x^{18}+4\,x^{15}+4\,x^{14}+6\,x^{12}+14\,x^{11}+6\,x^{10}+4\,x^{9}+16\,x^{8}+16\,x^{7}+5\,x^{6}+6\,x^{5}+11\,x^{4}+6\,x^{3}+2\,x\log\left(2\,\log\left(2\right)\right)$$

input
```
integrate(2*log(2*log(2))+18*x^17+60*x^14+56*x^13+72*x^11+154*x^10+60*x^9+
36*x^8+128*x^7+112*x^6+30*x^5+30*x^4+44*x^3+18*x^2,x, algorithm=\
```

output
```
x^18 + 4*x^15 + 4*x^14 + 6*x^12 + 14*x^11 + 6*x^10 + 4*x^9 + 16*x^8 + 16*x
^7 + 5*x^6 + 6*x^5 + 11*x^4 + 6*x^3 + 2*x*log(2*log(2))
```

3.721.9 Mupad [B] (verification not implemented)

Time = 16.10 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.22

$$\int \left(18x^2+44x^3+30x^4+30x^5+112x^6+128x^7+36x^8+60x^9+154x^{10}+72x^{11}+56x^{13}+60x^{14}+18x^{17}+2\log(\log(4))\right)\,dx = x^{18}+4\,x^{15}+4\,x^{14}+6\,x^{12}+14\,x^{11}+6\,x^{10}+4\,x^{9}+16\,x^{8}+16\,x^{7}+5\,x^{6}+6\,x^{5}+11\,x^{4}+6\,x^{3}+\ln\left(\ln\left(4\right)^2\right)\,x$$

input
```
int(2*log(2*log(2)) + 18*x^2 + 44*x^3 + 30*x^4 + 30*x^5 + 112*x^6 + 128*x^
7 + 36*x^8 + 60*x^9 + 154*x^10 + 72*x^11 + 56*x^13 + 60*x^14 + 18*x^17,x)
```

output
```
x*log(log(4)^2) + 6*x^3 + 11*x^4 + 6*x^5 + 5*x^6 + 16*x^7 + 16*x^8 + 4*x^9
 + 6*x^10 + 14*x^11 + 6*x^12 + 4*x^14 + 4*x^15 + x^18
```

3.722 $\int (2x + 2(i\pi + \log(4))^2 \log(4e^x))\, dx$

3.722.1 Optimal result

Integrand size = 22, antiderivative size = 25

$$\int (2x + 2(i\pi + \log(4))^2 \log(4e^x))\, dx = 3 + e + x^2 + (i\pi + \log(4))^2 \log^2(4e^x)$$

output
```
ln(4*exp(x))^2*(2*ln(2)+I*Pi)^2+exp(1)+3+x^2
```

3.722.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int (2x + 2(i\pi + \log(4))^2 \log(4e^x))\, dx = 2\left(\frac{x^2}{2} + \frac{1}{2}(i\pi + \log(4))^2 \log^2(4e^x)\right)$$

input
```
Integrate[2*x + 2*(I*Pi + Log[4])^2*Log[4*E^x],x]
```

output
```
2*(x^2/2 + ((I*Pi + Log[4])^2*Log[4*E^x]^2)/2)
```

3.722.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(2x+2(\log(4)+i\pi)^2\log\left(4e^x\right)\right)\,dx$$
$$\Big\downarrow \text{2009}$$
$$x^2+(\log(4)+i\pi)^2\log^2\left(4e^x\right)$$

input
```
Int[2*x + 2*(I*Pi + Log[4])^2*Log[4*E^x],x]
```

output
```
x^2 + (I*Pi + Log[4])^2*Log[4*E^x]^2
```

3.722.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.722.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

method	result
default	$x^2+\ln\left(4\,\mathrm{e}^x\right)^2\left(2\ln\left(2\right)+i\pi\right)^2$
parts	$x^2+\ln\left(4\,\mathrm{e}^x\right)^2\left(2\ln\left(2\right)+i\pi\right)^2$
norman	$\left(4i\pi\ln\left(2\right)+4\ln\left(2\right)^2-\pi^2-1\right)\ln\left(4\,\mathrm{e}^x\right)^2+2x\ln\left(4\,\mathrm{e}^x\right)$
parallelrisch	$-4i\ln\left(2\right)\pi\,x^2+8i\ln\left(2\right)\pi x\ln\left(4\,\mathrm{e}^x\right)-4x^2\ln\left(2\right)^2+8\ln\left(2\right)^2x\ln\left(4\,\mathrm{e}^x\right)+\pi^2x^2-2\pi^2x\ln(4$
risch	$2(2\ln\left(2\right)+i\pi)^2\,x\ln\left(\mathrm{e}^x\right)-4\ln\left(2\right)\pi^2x+16i\ln\left(2\right)^2\pi x+16x\ln\left(2\right)^3+\pi^2x^2-4i\ln\left(2\right)\pi\,x^2$

input
```
int(2*(2*ln(2)+I*Pi)^2*ln(4*exp(x))+2*x,x,method=_RETURNVERBOSE)
```

output
```
x^2+ln(4*exp(x))^2*(2*ln(2)+I*Pi)^2
```

3.722.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.00

$$\int \left(2x + 2(i\pi + \log(4))^2 \log\left(4e^x\right)\right) dx = 16\,x \log(2)^3 - \left(\pi^2 - 1\right)x^2 - 4\left(-4i\,\pi x - x^2\right)\log(2)^2 - 4\left(\pi^2 x - i\,\pi x^2\right)\log(2)$$

input
```
integrate(2*(2*log(2)+I*pi)^2*log(4*exp(x))+2*x,x, algorithm=\
```

output
```
16*x*log(2)^3 - (pi^2 - 1)*x^2 - 4*(-4*I*pi*x - x^2)*log(2)^2 - 4*(pi^2*x
- I*pi*x^2)*log(2)
```

3.722.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \left(2x + 2(i\pi + \log(4))^2 \log\left(4e^x\right)\right) dx = x^2\left(-\pi^2 + 1 + 4\log(2)^2 + 4i\pi\log(2)\right) + x\left(-4\pi^2\log(2) + 16\log(2)^3 + 16i\pi\log(2)^2\right)$$

input
```
integrate(2*(2*ln(2)+I*pi)**2*ln(4*exp(x))+2*x,x)
```

output
```
x**2*(-pi**2 + 1 + 4*log(2)**2 + 4*I*pi*log(2)) + x*(-4*pi**2*log(2) + 16*
log(2)**3 + 16*I*pi*log(2)**2)
```

3.722.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \left(2x + 2(i\pi + \log(4))^2 \log\left(4e^x\right)\right) dx = (i\,\pi + 2\,\log(2))^2 \log\left(4\,e^x\right)^2 + x^2$$

input
```
integrate(2*(2*log(2)+I*pi)^2*log(4*exp(x))+2*x,x, algorithm=\
```

output
```
(I*pi + 2*log(2))^2*log(4*e^x)^2 + x^2
```

3.722.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \left(2x+2(i\pi+\log(4))^2\log\left(4e^x\right)\right)\,dx=(i\,\pi+2\,\log(2))^2\left(x^2+4\,x\log(2)\right)+x^2$$

input
```
integrate(2*(2*log(2)+I*pi)^2*log(4*exp(x))+2*x,x, algorithm=\
```

output
```
(I*pi + 2*log(2))^2*(x^2 + 4*x*log(2)) + x^2
```

3.722.9 Mupad [B] (verification not implemented)

Time = 14.72 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.00

$$\int \left(2x+2(i\pi+\log(4))^2\log\left(4e^x\right)\right)\,dx=\left(-\Pi^2+4\mathrm{i}\,\ln(2)\,\Pi+4\ln(2)^2+1\right)\,x^2+\left(-2\,\ln(4)\,\Pi^2+8\mathrm{i}\,\ln(2)\,\ln(4)\,\Pi+8\ln(2)^2\,\ln(4)\right)\,x$$

input
```
int(2*x + 2*log(4*exp(x))*(Pi*1i + 2*log(2))^2,x)
```

output
```
x*(8*log(2)^2*log(4) - 2*Pi^2*log(4) + Pi*log(2)*log(4)*8i) + x^2*(Pi*log(
2)*4i - Pi^2 + 4*log(2)^2 + 1)
```

3.723 $\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)(x-x^2)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)(x-$

3.723.1 Optimal result

Integrand size = 119, antiderivative size = 25

$$\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)\left(x-x^2\right)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)\left(x-x^2\right)^{2\sqrt[4]{e}}+\sqrt[4]{e}(-1200+2400x)\left(\right.}{-x+x^2}$$
$$=x+\left(3-5\left(4+\left(x-x^2\right)^{\sqrt[4]{e}}\right)^2\right)^2$$

output
```
x+(-5*(exp(exp(1/4)*ln(-x^2+x))+4)^2+3)^2
```

3.723.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 64 vs. 2(25) = 50.

Time = 5.45 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.56

$$\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)\left(x-x^2\right)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)\left(x-x^2\right)^{2\sqrt[4]{e}}+\sqrt[4]{e}(-1200+2400x)\left(\right.}{-x+x^2}$$
$$=x+6160(-((-1+x)x))^{\sqrt[4]{e}}+2370(-((-1+x)x))^{2\sqrt[4]{e}}$$
$$+400(-((-1+x)x))^{3\sqrt[4]{e}}+25(-((-1+x)x))^{4\sqrt[4]{e}}$$

input
```
Integrate[(-x + x^2 + E^(1/4)*(-6160 + 12320*x)*(x - x^2)^E^(1/4) + E^(1/4
)*(-4740 + 9480*x)*(x - x^2)^(2*E^(1/4)) + E^(1/4)*(-1200 + 2400*x)*(x - x
^2)^(3*E^(1/4)) + E^(1/4)*(-100 + 200*x)*(x - x^2)^(4*E^(1/4)))/(-x + x^2)
,x]
```

3.723. $\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)(x-x^2)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)(x-x^2)^{2\sqrt[4]{e}}+\sqrt[4]{e}(-1200+2400x)(x-x^2)^{3\sqrt[4]{e}}+\sqrt[4]{e}(-100+200x)(x-x^2)^{4\sqrt[4]{e}}}{-x+x^2}$

output
```
x + 6160*(-((-1 + x)*x))^E^(1/4) + 2370*(-((-1 + x)*x))^(2*E^(1/4)) + 400*
(-((-1 + x)*x))^(3*E^(1/4)) + 25*(-((-1 + x)*x))^(4*E^(1/4))
```

3.723.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 68 vs. $2(25) = 50$.

Time = 1.20 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.72, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.025$, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt[4]{e}(200x-100)\left(x-x^2\right)^{4\sqrt[4]{e}}+\sqrt[4]{e}(2400x-1200)\left(x-x^2\right)^{3\sqrt[4]{e}}+\sqrt[4]{e}(9480x-4740)\left(x-x^2\right)^{2\sqrt[4]{e}}+\sqrt[4]{e}(12320}{x^2-x}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{\sqrt[4]{e}(200x-100)\left(x-x^2\right)^{4\sqrt[4]{e}}+\sqrt[4]{e}(2400x-1200)\left(x-x^2\right)^{3\sqrt[4]{e}}+\sqrt[4]{e}(9480x-4740)\left(x-x^2\right)^{2\sqrt[4]{e}}+\sqrt[4]{e}(12320}{(x-1)x}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{100\sqrt[4]{e}(1-2x)\left(x-x^2\right)^{4\sqrt[4]{e}}}{(1-x)x}+\frac{1200\sqrt[4]{e}(1-2x)\left(x-x^2\right)^{3\sqrt[4]{e}}}{(1-x)x}+\frac{4740\sqrt[4]{e}(1-2x)\left(x-x^2\right)^{2\sqrt[4]{e}}}{(1-x)x}+\frac{6160\sqrt[4]{e}(1-}{(1}\right.$$

$$\Big\downarrow \text{2009}$$

$$25\left(x-x^2\right)^{4\sqrt[4]{e}}+400\left(x-x^2\right)^{3\sqrt[4]{e}}+2370\left(x-x^2\right)^{2\sqrt[4]{e}}+6160\left(x-x^2\right)^{\sqrt[4]{e}}+x$$

input
```
Int[(-x + x^2 + E^(1/4)*(-6160 + 12320*x)*(x - x^2)^E^(1/4) + E^(1/4)*(-47
40 + 9480*x)*(x - x^2)^(2*E^(1/4)) + E^(1/4)*(-1200 + 2400*x)*(x - x^2)^(3
*E^(1/4)) + E^(1/4)*(-100 + 200*x)*(x - x^2)^(4*E^(1/4)))/(-x + x^2),x]
```

output
```
x + 6160*(x - x^2)^E^(1/4) + 2370*(x - x^2)^(2*E^(1/4)) + 400*(x - x^2)^(3
*E^(1/4)) + 25*(x - x^2)^(4*E^(1/4))
```


$$\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)\left(x-x^2\right)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)\left(x-x^2\right)^{2\sqrt[4]{e}}+\sqrt[4]{e}(-1200+2400x)\left(x-x^2\right)^{3\sqrt[4]{e}}+\sqrt[4]{e}(-100+200x)\left(x-x^2\right)^{4\sqrt[4]{e}}}{-x+x^2}$$

3.723.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.723.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(24) = 48$.

Time = 2.29 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.28

method	result	size
risch	$x+2370(-x^2+x)^{2\,e^{\frac{1}{4}}}+400(-x^2+x)^{3\,e^{\frac{1}{4}}}+25(-x^2+x)^{4\,e^{\frac{1}{4}}}+6160(-x^2+x)^{e^{\frac{1}{4}}}$	57
default	$x+2370\,e^{2\,e^{\frac{1}{4}}\ln(-x^2+x)}+400\,e^{3\,e^{\frac{1}{4}}\ln(-x^2+x)}+25\,e^{4\,e^{\frac{1}{4}}\ln(-x^2+x)}+6160\,e^{e^{\frac{1}{4}}\ln(-x^2+x)}$	65
parts	$x+2370\,e^{2\,e^{\frac{1}{4}}\ln(-x^2+x)}+400\,e^{3\,e^{\frac{1}{4}}\ln(-x^2+x)}+25\,e^{4\,e^{\frac{1}{4}}\ln(-x^2+x)}+6160\,e^{e^{\frac{1}{4}}\ln(-x^2+x)}$	65
parallelrisch	$25\,e^{4\,e^{\frac{1}{4}}\ln(-x^2+x)}+400\,e^{3\,e^{\frac{1}{4}}\ln(-x^2+x)}+2+2370\,e^{2\,e^{\frac{1}{4}}\ln(-x^2+x)}+x+6160\,e^{e^{\frac{1}{4}}\ln(-x^2+x)}$	66

input
```
int(((200*x-100)*exp(1/4)*exp(exp(1/4)*ln(-x^2+x))^4+(2400*x-1200)*exp(1/4
)*exp(exp(1/4)*ln(-x^2+x))^3+(9480*x-4740)*exp(1/4)*exp(exp(1/4)*ln(-x^2+x
))^2+(12320*x-6160)*exp(1/4)*exp(exp(1/4)*ln(-x^2+x))+x^2-x)/(x^2-x),x,met
hod=_RETURNVERBOSE)
```

output
```
x+2370*((-x^2+x)^exp(1/4))^2+400*((-x^2+x)^exp(1/4))^3+25*((-x^2+x)^exp(1/
4))^4+6160*(-x^2+x)^exp(1/4)
```

3.723.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. 2(22) = 44.

Time = 0.28 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.24

$$\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)\left(x-x^2\right)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)\left(x-x^2\right)^{2\sqrt[4]{e}}+\sqrt[4]{e}(-1200+2400x)\left(\ldots\right.}{-x+x^2}$$

$$=25\left(-x^2+x\right)^{4e^{\frac{1}{4}}}+400\left(-x^2+x\right)^{3e^{\frac{1}{4}}}+2370\left(-x^2+x\right)^{2e^{\frac{1}{4}}}+6160\left(-x^2+x\right)^{e^{\frac{1}{4}}}+x$$

input
```
integrate(((200*x-100)*exp(1/4)*exp(exp(1/4)*log(-x^2+x))^4+(2400*x-1200)*
exp(1/4)*exp(exp(1/4)*log(-x^2+x))^3+(9480*x-4740)*exp(1/4)*exp(exp(1/4)*l
og(-x^2+x))^2+(12320*x-6160)*exp(1/4)*exp(exp(1/4)*log(-x^2+x))+x^2-x)/(x^
2-x),x, algorithm=\
```

output
```
25*(-x^2 + x)^(4*e^(1/4)) + 400*(-x^2 + x)^(3*e^(1/4)) + 2370*(-x^2 + x)^(
2*e^(1/4)) + 6160*(-x^2 + x)^e^(1/4) + x
```

3.723.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(19) = 38.

Time = 1.39 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)\left(x-x^2\right)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)\left(x-x^2\right)^{2\sqrt[4]{e}}+\sqrt[4]{e}(-1200+2400x)\left(\ldots\right.}{-x+x^2}$$

$$=x+25\left(-x^2+x\right)^{4e^{\frac{1}{4}}}+400\left(-x^2+x\right)^{3e^{\frac{1}{4}}}+2370\left(-x^2+x\right)^{2e^{\frac{1}{4}}}+6160\left(-x^2+x\right)^{e^{\frac{1}{4}}}$$

input
```
integrate(((200*x-100)*exp(1/4)*exp(exp(1/4)*ln(-x**2+x))**4+(2400*x-1200)
*exp(1/4)*exp(exp(1/4)*ln(-x**2+x))**3+(9480*x-4740)*exp(1/4)*exp(exp(1/4)
*ln(-x**2+x))**2+(12320*x-6160)*exp(1/4)*exp(exp(1/4)*ln(-x**2+x))+x**2-x)
/(x**2-x),x)
```

output
```
x + 25*(-x**2 + x)**(4*exp(1/4)) + 400*(-x**2 + x)**(3*exp(1/4)) + 2370*(-
x**2 + x)**(2*exp(1/4)) + 6160*(-x**2 + x)**exp(1/4)
```

3.723.
$$\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)\left(x-x^2\right)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)\left(x-x^2\right)^{2\sqrt[4]{e}}+\sqrt[4]{e}(-1200+2400x)\left(x-x^2\right)^{3\sqrt[4]{e}}+\sqrt[4]{e}(-100+200x)\left(x-x^2\right)^{4\sqrt[4]{e}}\ldots}{-x+x^2}$$

3.723.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 80 vs. $2(22) = 44$.

Time = 0.27 (sec) , antiderivative size = 80, normalized size of antiderivative = 3.20

$$\int \frac{-x + x^2 + \sqrt[4]{e}(-6160 + 12320x)\left(x - x^2\right)^{\sqrt[4]{e}} + \sqrt[4]{e}(-4740 + 9480x)\left(x - x^2\right)^{2\sqrt[4]{e}} + \sqrt[4]{e}(-1200 + 2400x)\left(\right.}{-x + x^2}$$

$$= x + 25\,e^{\left(4\,e^{\frac{1}{4}}\log(x) + 4\,e^{\frac{1}{4}}\log(-x+1)\right)} + 400\,e^{\left(3\,e^{\frac{1}{4}}\log(x) + 3\,e^{\frac{1}{4}}\log(-x+1)\right)} + 2370\,e^{\left(2\,e^{\frac{1}{4}}\log(x) + 2\,e^{\frac{1}{4}}\log(-x+1)\right)} + 6160\,e^{\left(e^{\frac{1}{4}}\log(x) + e^{\frac{1}{4}}\log(-x+1)\right)}$$

input
```
integrate(((200*x-100)*exp(1/4)*exp(exp(1/4)*log(-x^2+x))^4+(2400*x-1200)*
exp(1/4)*exp(exp(1/4)*log(-x^2+x))^3+(9480*x-4740)*exp(1/4)*exp(exp(1/4)*l
og(-x^2+x))^2+(12320*x-6160)*exp(1/4)*exp(exp(1/4)*log(-x^2+x))+x^2-x)/(x^
2-x),x, algorithm=\
```

output
```
x + 25*e^(4*e^(1/4)*log(x) + 4*e^(1/4)*log(-x + 1)) + 400*e^(3*e^(1/4)*log
(x) + 3*e^(1/4)*log(-x + 1)) + 2370*e^(2*e^(1/4)*log(x) + 2*e^(1/4)*log(-x
 + 1)) + 6160*e^(e^(1/4)*log(x) + e^(1/4)*log(-x + 1))
```

3.723.8 Giac [F]

$$\int \frac{-x + x^2 + \sqrt[4]{e}(-6160 + 12320x)\left(x - x^2\right)^{\sqrt[4]{e}} + \sqrt[4]{e}(-4740 + 9480x)\left(x - x^2\right)^{2\sqrt[4]{e}} + \sqrt[4]{e}(-1200 + 2400x)\left(\right.}{-x + x^2}$$

$$= \int \frac{100\left(-x^2 + x\right)^{4\,e^{\frac{1}{4}}}(2\,x - 1)e^{\frac{1}{4}} + 1200\left(-x^2 + x\right)^{3\,e^{\frac{1}{4}}}(2\,x - 1)e^{\frac{1}{4}} + 4740\left(-x^2 + x\right)^{2\,e^{\frac{1}{4}}}(2\,x - 1)e^{\frac{1}{4}} + 6160}{x^2 - x}$$

input
```
integrate(((200*x-100)*exp(1/4)*exp(exp(1/4)*log(-x^2+x))^4+(2400*x-1200)*
exp(1/4)*exp(exp(1/4)*log(-x^2+x))^3+(9480*x-4740)*exp(1/4)*exp(exp(1/4)*l
og(-x^2+x))^2+(12320*x-6160)*exp(1/4)*exp(exp(1/4)*log(-x^2+x))+x^2-x)/(x^
2-x),x, algorithm=\
```

output
```
integrate((100*(-x^2 + x)^(4*e^(1/4))*(2*x - 1)*e^(1/4) + 1200*(-x^2 + x)^
(3*e^(1/4))*(2*x - 1)*e^(1/4) + 4740*(-x^2 + x)^(2*e^(1/4))*(2*x - 1)*e^(1
/4) + 6160*(-x^2 + x)^e^(1/4)*(2*x - 1)*e^(1/4) + x^2 - x)/(x^2 - x), x)
```

3.723.9 Mupad [B] (verification not implemented)

Time = 13.69 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.24

$$\int \frac{-x+x^2+\sqrt[4]{e}(-6160+12320x)\left(x-x^2\right)^{\sqrt[4]{e}}+\sqrt[4]{e}(-4740+9480x)\left(x-x^2\right)^{2\sqrt[4]{e}}+\sqrt[4]{e}(-1200+2400x)\left(\right.}{-x+x^2}$$

$$=x+2370\left(x-x^2\right)^{2\,e^{1/4}}+400\left(x-x^2\right)^{3\,e^{1/4}}+25\left(x-x^2\right)^{4\,e^{1/4}}+6160\left(x-x^2\right)^{e^{1/4}}$$

input
```
int(-(x^2 - x + exp(1/4)*(x - x^2)^(4*exp(1/4))*(200*x - 100) + exp(1/4)*(
x - x^2)^(3*exp(1/4))*(2400*x - 1200) + exp(1/4)*(x - x^2)^(2*exp(1/4))*(9
480*x - 4740) + exp(1/4)*(x - x^2)^exp(1/4)*(12320*x - 6160))/(x - x^2),x)
```

output
```
x + 2370*(x - x^2)^(2*exp(1/4)) + 400*(x - x^2)^(3*exp(1/4)) + 25*(x - x^2
)^(4*exp(1/4)) + 6160*(x - x^2)^exp(1/4)
```

3.724 $\int \frac{1+(x^2+x^3+2x^4)\log(x)-2\log(x)\log(\log(x))}{(-6x^3+x^4+x^5)\log(x)+x^3\log^2(x)+x\log(x)\log(\log(x))}\,dx$

3.724.1 Optimal result

Integrand size = 58, antiderivative size = 18

$$\int \frac{1+(x^2+x^3+2x^4)\log(x)-2\log(x)\log(\log(x))}{(-6x^3+x^4+x^5)\log(x)+x^3\log^2(x)+x\log(x)\log(\log(x))}\,dx = \log\left(6\left(-6+x+x^2+\log(x)+\frac{\log(\log(x))}{x^2}\right)\right)$$

output
```
ln(6*ln(x)+6*x+6*ln(ln(x))/x^2-36+6*x^2)
```

3.724.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{1+(x^2+x^3+2x^4)\log(x)-2\log(x)\log(\log(x))}{(-6x^3+x^4+x^5)\log(x)+x^3\log^2(x)+x\log(x)\log(\log(x))}\,dx = -2\log(x)+\log\left(-6x^2+x^3+x^4+x^2\log(x)+\log(\log(x))\right)$$

input
```
Integrate[(1 + (x^2 + x^3 + 2*x^4)*Log[x] - 2*Log[x]*Log[Log[x]])/((-6*x^3
 + x^4 + x^5)*Log[x] + x^3*Log[x]^2 + x*Log[x]*Log[Log[x]]),x]
```

output
```
-2*Log[x] + Log[-6*x^2 + x^3 + x^4 + x^2*Log[x] + Log[Log[x]]]
```

3.724.3 Rubi [A] (verified)

Time = 0.85 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.89, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.052, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x^4+x^3+x^2)\log(x)-2\log(\log(x))\log(x)+1}{x^3\log^2(x)+(x^5+x^4-6x^3)\log(x)+x\log(x)\log(\log(x))}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-((2x^4+x^3+x^2)\log(x))+2\log(\log(x))\log(x)-1}{x\log(x)\left(-x^4-x^3+6x^2-x^2\log(x)-\log(\log(x))\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{4x^4\log(x)+3x^3\log(x)+2x^2\log^2(x)-11x^2\log(x)+1}{x\log(x)\left(x^4+x^3-6x^2+x^2\log(x)+\log(\log(x))\right)}-\frac{2}{x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\log\left(-x^4-x^3+6x^2-x^2\log(x)-\log(\log(x))\right)-2\log(x)$$

input
```
Int[(1 + (x^2 + x^3 + 2*x^4)*Log[x] - 2*Log[x]*Log[Log[x]])/((-6*x^3 + x^4
 + x^5)*Log[x] + x^3*Log[x]^2 + x*Log[x]*Log[Log[x]]),x]
```

output
```
-2*Log[x] + Log[6*x^2 - x^3 - x^4 - x^2*Log[x] - Log[Log[x]]]
```

3.724.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.724.4 Maple [A] (verified)

Time = 1.54 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.56

method	result	size
default	$-2\ln(x)+\ln(x^4+x^2\ln(x)+x^3-6x^2+\ln(\ln(x)))$	28
risch	$-2\ln(x)+\ln(x^4+x^2\ln(x)+x^3-6x^2+\ln(\ln(x)))$	28
parallelrisch	$-2\ln(x)+\ln(x^4+x^2\ln(x)+x^3-6x^2+\ln(\ln(x)))$	28

input
```
int((-2*ln(x)*ln(ln(x))+(2*x^4+x^3+x^2)*ln(x)+1)/(x*ln(x)*ln(ln(x))+x^3*ln
(x)^2+(x^5+x^4-6*x^3)*ln(x)),x,method=_RETURNVERBOSE)
```

output
```
-2*ln(x)+ln(x^4+x^2*ln(x)+x^3-6*x^2+ln(ln(x)))
```

3.724.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{1+(x^2+x^3+2x^4)\log(x)-2\log(x)\log(\log(x))}{(-6x^3+x^4+x^5)\log(x)+x^3\log^2(x)+x\log(x)\log(\log(x))}\,dx$$
$$=\log\left(x^4+x^3+x^2\log(x)-6\,x^2+\log(\log(x))\right)-2\,\log(x)$$

input
```
integrate((-2*log(x)*log(log(x))+(2*x^4+x^3+x^2)*log(x)+1)/(x*log(x)*log(l
og(x))+x^3*log(x)^2+(x^5+x^4-6*x^3)*log(x)),x, algorithm=\
```

output
```
log(x^4 + x^3 + x^2*log(x) - 6*x^2 + log(log(x))) - 2*log(x)
```

3.724.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.61

$$\int \frac{1+(x^2+x^3+2x^4)\log(x)-2\log(x)\log(\log(x))}{(-6x^3+x^4+x^5)\log(x)+x^3\log^2(x)+x\log(x)\log(\log(x))}\,dx$$
$$=-2\log(x)+\log\left(x^4+x^3+x^2\log(x)-6x^2+\log(\log(x))\right)$$

input
```
integrate((-2*ln(x)*ln(ln(x))+(2*x**4+x**3+x**2)*ln(x)+1)/(x*ln(x)*ln(ln(x
))+x**3*ln(x)**2+(x**5+x**4-6*x**3)*ln(x)),x)
```

output
```
-2*log(x) + log(x**4 + x**3 + x**2*log(x) - 6*x**2 + log(log(x)))
```

3.724.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{1+(x^2+x^3+2x^4)\log(x)-2\log(x)\log(\log(x))}{(-6x^3+x^4+x^5)\log(x)+x^3\log^2(x)+x\log(x)\log(\log(x))}\,dx = \log\left(x^4+x^3+x^2\log(x)-6\,x^2+\log(\log(x))\right)-2\,\log(x)$$

input
```
integrate((-2*log(x)*log(log(x))+(2*x^4+x^3+x^2)*log(x)+1)/(x*log(x)*log(l
og(x))+x^3*log(x)^2+(x^5+x^4-6*x^3)*log(x)),x, algorithm=\
```

output
```
log(x^4 + x^3 + x^2*log(x) - 6*x^2 + log(log(x))) - 2*log(x)
```

3.724.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{1+(x^2+x^3+2x^4)\log(x)-2\log(x)\log(\log(x))}{(-6x^3+x^4+x^5)\log(x)+x^3\log^2(x)+x\log(x)\log(\log(x))}\,dx = \log\left(x^4+x^3+x^2\log(x)-6\,x^2+\log(\log(x))\right)-2\,\log(x)$$

input
```
integrate((-2*log(x)*log(log(x))+(2*x^4+x^3+x^2)*log(x)+1)/(x*log(x)*log(l
og(x))+x^3*log(x)^2+(x^5+x^4-6*x^3)*log(x)),x, algorithm=\
```

output
```
log(x^4 + x^3 + x^2*log(x) - 6*x^2 + log(log(x))) - 2*log(x)
```

3.724.9 Mupad [F(-1)]

Timed out.

$$\int \frac{1+(x^2+x^3+2x^4)\log(x)-2\log(x)\log(\log(x))}{(-6x^3+x^4+x^5)\log(x)+x^3\log^2(x)+x\log(x)\log(\log(x))}\,dx$$
$$=\int \frac{\ln(x)\,\left(2\,x^4+x^3+x^2\right)-2\,\ln(\ln(x))\,\ln(x)+1}{x^3\ln(x)^2+\ln(x)\,\left(x^5+x^4-6\,x^3\right)+x\,\ln(\ln(x))\,\ln(x)}\,dx$$

input
```
int((log(x)*(x^2 + x^3 + 2*x^4) - 2*log(log(x))*log(x) + 1)/(x^3*log(x)^2
+ log(x)*(x^4 - 6*x^3 + x^5) + x*log(log(x))*log(x)),x)
```

output
```
int((log(x)*(x^2 + x^3 + 2*x^4) - 2*log(log(x))*log(x) + 1)/(x^3*log(x)^2
+ log(x)*(x^4 - 6*x^3 + x^5) + x*log(log(x))*log(x)), x)
```

3.725 $\int \frac{-x+(-5+2x)\log(-5+2x)}{(-20x+8x^2)\log(5)\log(-5+2x)+(-10x+4x^2)\log(-5+2x)\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)}$

3.725.1 Optimal result

Integrand size = 70, antiderivative size = 28

$$\int \frac{-x+(-5+2x)\log(-5+2x)}{(-20x+8x^2)\log(5)\log(-5+2x)+(-10x+4x^2)\log(-5+2x)\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)}\,dx = \frac{1}{4}\log\left(\log(5)+\frac{1}{2}\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)\right)$$

output
```
1/4*ln(1/2*ln(-8/5*x^2/ln(-5+2*x))+ln(5))
```

3.725.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{-x+(-5+2x)\log(-5+2x)}{(-20x+8x^2)\log(5)\log(-5+2x)+(-10x+4x^2)\log(-5+2x)\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)}\,dx = \frac{1}{4}\log\left(\log\left(-\frac{40x^2}{\log(-5+2x)}\right)\right)$$

input
```
Integrate[(-x + (-5 + 2*x)*Log[-5 + 2*x])/((-20*x + 8*x^2)*Log[5]*Log[-5 +
 2*x] + (-10*x + 4*x^2)*Log[-5 + 2*x]*Log[(-8*x^2)/(5*Log[-5 + 2*x])]),x]
```

output
```
Log[Log[(-40*x^2)/Log[-5 + 2*x]]]/4
```

3.725.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {7292, 27, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x-5)\log(2x-5)-x}{(4x^2-10x)\log\left(-\frac{8x^2}{5\log(2x-5)}\right)\log(2x-5)+(8x^2-20x)\log(5)\log(2x-5)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{x-(2x-5)\log(2x-5)}{2(5-2x)x\log(2x-5)\log\left(-\frac{40x^2}{\log(2x-5)}\right)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int \frac{x+(5-2x)\log(2x-5)}{(5-2x)x\log(2x-5)\log\left(-\frac{40x^2}{\log(2x-5)}\right)}dx$$

$$\Big\downarrow \text{7235}$$

$$\frac{1}{4}\log\left(\log\left(-\frac{40x^2}{\log(2x-5)}\right)\right)$$

input
```
Int[(-x + (-5 + 2*x)*Log[-5 + 2*x])/((-20*x + 8*x^2)*Log[5]*Log[-5 + 2*x]
+ (-10*x + 4*x^2)*Log[-5 + 2*x]*Log[(-8*x^2)/(5*Log[-5 + 2*x])]),x]
```

output
```
Log[Log[(-40*x^2)/Log[-5 + 2*x]]]/4
```

3.725.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.725.4 Maple [A] (verified)

Time = 3.48 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

method	result
norman	$\frac{\ln\left(2\ln(5)+\ln\left(-\frac{8x^2}{5\ln(-5+2x)}\right)\right)}{4}$
parallelrisch	$\frac{\ln\left(2\ln(5)+\ln\left(-\frac{8x^2}{5\ln(-5+2x)}\right)\right)}{4}$
risch	$\ln\left(\frac{i\pi\,\mathrm{csgn}\left(ix^2\right)^3}{2}+\frac{i\pi\,\mathrm{csgn}(ix)^2\,\mathrm{csgn}\left(ix^2\right)}{2}-\frac{i\pi\,\mathrm{csgn}\left(\frac{i}{\ln(-5+2x)}\right)\mathrm{csgn}\left(\frac{ix^2}{\ln(-5+2x)}\right)^2}{2}-i\pi\,\mathrm{csgn}(ix)\,\mathrm{csgn}\left(ix^2\right)^2+i\pi\,\mathrm{csgn}\left(\frac{ix^2}{\ln(-5+2x)}\right.\right.$

input
```
int(((-5+2*x)*ln(-5+2*x)-x)/((4*x^2-10*x)*ln(-5+2*x)*ln(-8/5*x^2/ln(-5+2*x
))+(8*x^2-20*x)*ln(5)*ln(-5+2*x)),x,method=_RETURNVERBOSE)
```

output
```
1/4*ln(2*ln(5)+ln(-8/5*x^2/ln(-5+2*x)))
```

3.725.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{-x+(-5+2x)\log(-5+2x)}{(-20x+8x^2)\log(5)\log(-5+2x)+(-10x+4x^2)\log(-5+2x)\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)}\,dx$$
$$=\frac{1}{4}\log\left(2\log(5)+\log\left(-\frac{8x^2}{5\log(2x-5)}\right)\right)$$

input
```
integrate(((-5+2*x)*log(-5+2*x)-x)/((4*x^2-10*x)*log(-5+2*x)*log(-8/5*x^2/
log(-5+2*x))+(8*x^2-20*x)*log(5)*log(-5+2*x)),x, algorithm=\
```

output
```
1/4*log(2*log(5) + log(-8/5*x^2/log(2*x - 5)))
```

3.725.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{-x+(-5+2x)\log(-5+2x)}{(-20x+8x^2)\log(5)\log(-5+2x)+(-10x+4x^2)\log(-5+2x)\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)}\,dx$$
$$=\frac{\log\left(\log\left(-\frac{8x^2}{5\log(2x-5)}\right)+2\log(5)\right)}{4}$$

input
```
integrate(((-5+2*x)*ln(-5+2*x)-x)/((4*x**2-10*x)*ln(-5+2*x)*ln(-8/5*x**2/l
n(-5+2*x))+(8*x**2-20*x)*ln(5)*ln(-5+2*x)),x)
```

output
```
log(log(-8*x**2/(5*log(2*x - 5))) + 2*log(5))/4
```

3.725.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{-x+(-5+2x)\log(-5+2x)}{(-20x+8x^2)\log(5)\log(-5+2x)+(-10x+4x^2)\log(-5+2x)\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)}\,dx$$
$$=\frac{1}{4}\log\left(-\log(5)-3\log(2)-2\log(x)+\log(-\log(2x-5))\right)$$

input
```
integrate(((-5+2*x)*log(-5+2*x)-x)/((4*x^2-10*x)*log(-5+2*x)*log(-8/5*x^2/
log(-5+2*x))+(8*x^2-20*x)*log(5)*log(-5+2*x)),x, algorithm=\
```

output
```
1/4*log(-log(5) - 3*log(2) - 2*log(x) + log(-log(2*x - 5)))
```

3.725.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{-x+(-5+2x)\log(-5+2x)}{(-20x+8x^2)\log(5)\log(-5+2x)+(-10x+4x^2)\log(-5+2x)\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)}\,dx$$
$$=\frac{1}{4}\log\left(-\log(5)-\log\left(-8x^2\right)+\log(\log(2x-5))\right)$$

input
```
integrate(((-5+2*x)*log(-5+2*x)-x)/((4*x^2-10*x)*log(-5+2*x)*log(-8/5*x^2/
log(-5+2*x))+(8*x^2-20*x)*log(5)*log(-5+2*x)),x, algorithm=\
```

output
```
1/4*log(-log(5) - log(-8*x^2) + log(log(2*x - 5)))
```

3.725.9 Mupad [B] (verification not implemented)

Time = 15.64 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int \frac{-x+(-5+2x)\log(-5+2x)}{(-20x+8x^2)\log(5)\log(-5+2x)+(-10x+4x^2)\log(-5+2x)\log\left(-\frac{8x^2}{5\log(-5+2x)}\right)}\,dx = \frac{\ln\left(\ln\left(-\frac{40\,x^2}{\ln(2\,x-5)}\right)\right)}{4}$$

input
```
int((x - log(2*x - 5)*(2*x - 5))/(log(2*x - 5)*log(-(8*x^2)/(5*log(2*x - 5
)))*(10*x - 4*x^2) + log(5)*log(2*x - 5)*(20*x - 8*x^2)),x)
```

output
```
log(log(-(40*x^2)/log(2*x - 5)))/4
```

3.726 $\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}\left(16e^{2x}x+e^x(4+4x)+\left(-e^x x-4e^{2x}x\right)\log(x^2)\right)}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx$

3.726.1 Optimal result

Integrand size = 131, antiderivative size = 26

$$\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}\left(16e^{2x}x+e^x(4+4x)+\left(-e^x x-4e^{2x}x\right)\log(x^2)\right)}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx = -e^{e^{\frac{e^{4e^x+x}}{(4-\log(x^2))^2}}}$$

output
```
-exp(exp(exp(4*exp(x))/(4-ln(x^2))^2*exp(x)))
```

3.726.2 Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}\left(16e^{2x}x+e^x(4+4x)+\left(-e^x x-4e^{2x}x\right)\log(x^2)\right)}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx = -e^{e^{\frac{e^{4e^x+x}}{(-4+\log(x^2))^2}}}$$

3.726. $\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}\left(16e^{2x}x+e^x(4+4x)+\left(-e^x x-4e^{2x}x\right)\log(x^2)\right)}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx$

input
```
Integrate[(E^(4*E^x + E^(E^(4*E^x + x)/(16 - 8*Log[x^2] + Log[x^2]^2)) + E
^(4*E^x + x)/(16 - 8*Log[x^2] + Log[x^2]^2))*(16*E^(2*x)*x + E^x*(4 + 4*x)
 + (-(E^x*x) - 4*E^(2*x)*x)*Log[x^2]))/(-64*x + 48*x*Log[x^2] - 12*x*Log[x
^2]^2 + x*Log[x^2]^3),x]
```

output
```
-E^E^(E^(4*E^x + x)/(-4 + Log[x^2])^2)
```

3.726.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\left(-e^x x-4 e^{2 x} x\right) \log \left(x^2\right)+16 e^{2 x} x+e^x (4 x+4)\right) \exp \left(e^{\frac{e^{x+4 e^x}}{\log ^2\left(x^2\right)-8 \log \left(x^2\right)+16}}+\frac{e^{x+4 e^x}}{\log ^2\left(x^2\right)-8 \log \left(x^2\right)+16}+4 e^x\right)}{x \log ^3\left(x^2\right)-12 x \log ^2\left(x^2\right)+48 x \log \left(x^2\right)-64 x} \, dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{\left(4 e^x x \log \left(x^2\right)+x \log \left(x^2\right)-16 e^x x-4 x-4\right) \exp \left(e^{\frac{e^{x+4 e^x}}{\log ^2\left(x^2\right)-8 \log \left(x^2\right)+16}}+\frac{e^{x+4 e^x}}{\log ^2\left(x^2\right)-8 \log \left(x^2\right)+16}+x+4 e^x\right)}{x \left(4-\log \left(x^2\right)\right)^3} \, dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{\log \left(x^2\right) \exp \left(e^{\frac{e^{x+4 e^x}}{\log ^2\left(x^2\right)-8 \log \left(x^2\right)+16}}+\frac{e^{x+4 e^x}}{\log ^2\left(x^2\right)-8 \log \left(x^2\right)+16}+x+4 e^x\right)}{\left(\log \left(x^2\right)-4\right)^3}-\frac{4 \exp \left(e^{\frac{e^{x+4 e^x}}{\log ^2\left(x^2\right)-8 \log \left(x^2\right)+16}}+\frac{}{\log ^2(x^2)}\right.}{\left(\log \left(x^2\right)-4\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$3.726. \quad \int \frac{e^{4 e^x+e^{\frac{e^{4 e^x+x}}{16-8 \log \left(x^2\right)+\log ^2\left(x^2\right)}}+\frac{e^{4 e^x+x}}{16-8 \log \left(x^2\right)+\log ^2\left(x^2\right)}}\left(16 e^{2 x} x+e^x (4+4 x)+\left(-e^x x-4 e^{2 x} x\right) \log \left(x^2\right)\right)}{-64 x+48 x \log \left(x^2\right)-12 x \log ^2\left(x^2\right)+x \log ^3\left(x^2\right)} \, dx$$

$$4\int \frac{\exp\left(x+4e^x+e^{\frac{e^{x+4e^x}}{\log^2(x^2)-8\log(x^2)+16}}+\frac{e^{x+4e^x}}{\log^2(x^2)-8\log(x^2)+16}\right)}{x\left(\log\left(x^2\right)-4\right)^3}dx - \int \frac{\exp\left(x+4e^x+e^{\frac{e^{x+4e^x}}{\log^2(x^2)-8\log(x^2)+16}}+\frac{e^{x+4e^x}}{\log^2(x^2)-8\log(x^2)+16}\right)}{\left(\log\left(x^2\right)-4\right)^2}dx - 4\int \frac{\exp\left(2x+4e^x+e^{\frac{e^{x+4e^x}}{\log^2(x^2)-8\log(x^2)+16}}+\frac{e^{x+4e^x}}{\log^2(x^2)-8\log(x^2)+16}\right)}{\left(\log\left(x^2\right)-4\right)^2}dx$$

input
```
Int[(E^(4*E^x + E^(E^(4*E^x + x)/(16 - 8*Log[x^2] + Log[x^2]^2)) + E^(4*E^
x + x)/(16 - 8*Log[x^2] + Log[x^2]^2))*(16*E^(2*x)*x + E^x*(4 + 4*x) + (-(
E^x*x) - 4*E^(2*x)*x)*Log[x^2]))/(-64*x + 48*x*Log[x^2] - 12*x*Log[x^2]^2
+ x*Log[x^2]^3),x]
```

output
```
$Aborted
```

3.726.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.726. $\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}\left(16e^{2x}x+e^x(4+4x)+\left(-e^xx-4e^{2x}x\right)\log\left(x^2\right)\right)}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx$

3.726.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 1.03 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.73

$$-e^{e^{\frac{4\,e^{4\,e^{x}+x}}{\left(-i\pi\,\mathrm{csgn}\left(ix^{2}\right)^{3}+2i\pi\,\mathrm{csgn}(ix)\,\mathrm{csgn}\left(ix^{2}\right)^{2}-i\pi\,\mathrm{csgn}(ix)^{2}\,\mathrm{csgn}\left(ix^{2}\right)+4\ln(x)-8\right)^{2}}}}$$

input
```
int(((-4*x*exp(x)^2-exp(x)*x)*ln(x^2)+16*x*exp(x)^2+(4+4*x)*exp(x))*exp(4*
exp(x))*exp(exp(x)*exp(4*exp(x))/(ln(x^2)^2-8*ln(x^2)+16))*exp(exp(exp(x)*
exp(4*exp(x))/(ln(x^2)^2-8*ln(x^2)+16)))/(x*ln(x^2)^3-12*x*ln(x^2)^2+48*x*
ln(x^2)-64*x),x)
```

output
```
-exp(exp(4*exp(4*exp(x)+x)/(-I*Pi*csgn(I*x^2)^3+2*I*Pi*csgn(I*x^2)^2*csgn(
I*x)-I*Pi*csgn(I*x^2)*csgn(I*x)^2+4*ln(x)-8)^2))
```

3.726.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 120 vs. $2(20) = 40$.

Time = 0.28 (sec) , antiderivative size = 120, normalized size of antiderivative = 4.62

$$\int \frac{e^{4e^{x}+e^{\frac{e^{4e^{x}+x}}{16-8\log(x^{2})+\log^{2}(x^{2})}}+\frac{e^{4e^{x}+x}}{16-8\log(x^{2})+\log^{2}(x^{2})}}\left(16e^{2x}x+e^{x}(4+4x)+\left(-e^{x}x-4e^{2x}x\right)\log\left(x^{2}\right)\right)}{-64x+48x\log\left(x^{2}\right)-12x\log^{2}\left(x^{2}\right)+x\log^{3}\left(x^{2}\right)}\,dx$$
$$= -e^{\left(\frac{4\,e^{x}\log\left(x^{2}\right)^{2}+\left(\log\left(x^{2}\right)^{2}-8\,\log\left(x^{2}\right)+16\right)e^{\left(\frac{e^{\left(x+4\,e^{x}\right)}}{\log\left(x^{2}\right)^{2}-8\,\log\left(x^{2}\right)+16}\right)}-32\,e^{x}\log\left(x^{2}\right)+e^{\left(x+4\,e^{x}\right)}+64\,e^{x}}{\log\left(x^{2}\right)^{2}-8\,\log\left(x^{2}\right)+16}-\frac{e^{\left(x+4\,e^{x}\right)}}{\log\left(x^{2}\right)^{2}-8\,\log\left(x^{2}\right)+16}-4\,e^{x}\right)}$$

input
```
integrate(((-4*x*exp(x)^2-exp(x)*x)*log(x^2)+16*x*exp(x)^2+(4+4*x)*exp(x))
*exp(4*exp(x))*exp(exp(x)*exp(4*exp(x))/(log(x^2)^2-8*log(x^2)+16))*exp(ex
p(exp(x)*exp(4*exp(x))/(log(x^2)^2-8*log(x^2)+16)))/(x*log(x^2)^3-12*x*log
(x^2)^2+48*x*log(x^2)-64*x),x, algorithm=\
```

output
```
-e^((4*e^x*log(x^2)^2 + (log(x^2)^2 - 8*log(x^2) + 16)*e^(e^(x + 4*e^x)/(l
og(x^2)^2 - 8*log(x^2) + 16)) - 32*e^x*log(x^2) + e^(x + 4*e^x) + 64*e^x)/
(log(x^2)^2 - 8*log(x^2) + 16) - e^(x + 4*e^x)/(log(x^2)^2 - 8*log(x^2) +
16) - 4*e^x)
```

3.726.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}(16e^{2x}x+e^x(4+4x)+(-e^xx-4e^{2x}x)\log(x^2))}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx$$
$$= \text{Timed out}$$

input
```
integrate(((-4*x*exp(x)**2-exp(x)*x)*ln(x**2)+16*x*exp(x)**2+(4+4*x)*exp(x
))*exp(4*exp(x))*exp(exp(x)*exp(4*exp(x))/(ln(x**2)**2-8*ln(x**2)+16))*exp
(exp(exp(x)*exp(4*exp(x))/(ln(x**2)**2-8*ln(x**2)+16)))/(x*ln(x**2)**3-12*
x*ln(x**2)**2+48*x*ln(x**2)-64*x),x)
```

output
```
Timed out
```

3.726.7 Maxima [A] (verification not implemented)

Time = 0.83 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}(16e^{2x}x+e^x(4+4x)+(-e^xx-4e^{2x}x)\log(x^2))}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx$$
$$= -e^{\left(e^{\left(\frac{e^{(x+4\,e^x)}}{4\,\left(\log(x)^2-4\,\log(x)+4\right)}\right)}\right)}$$

input
```
integrate(((-4*x*exp(x)^2-exp(x)*x)*log(x^2)+16*x*exp(x)^2+(4+4*x)*exp(x))
*exp(4*exp(x))*exp(exp(x)*exp(4*exp(x))/(log(x^2)^2-8*log(x^2)+16))*exp(ex
p(exp(x)*exp(4*exp(x))/(log(x^2)^2-8*log(x^2)+16)))/(x*log(x^2)^3-12*x*log
(x^2)^2+48*x*log(x^2)-64*x),x, algorithm=\
```

output
```
-e^(e^(1/4*e^(x + 4*e^x)/(log(x)^2 - 4*log(x) + 4)))
```

3.726.8 Giac [F]

$$\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}\left(16e^{2x}x+e^x(4+4x)+\left(-e^x x-4e^{2x}x\right)\log\left(x^2\right)\right)}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx$$
$$=\int \frac{\left(16\,xe^{(2\,x)}+4\,(x+1)e^x-\left(4\,xe^{(2\,x)}+xe^x\right)\log\left(x^2\right)\right)e^{\left(\frac{e^{(x+4\,e^x)}}{\log(x^2)^2-8\,\log(x^2)+16}+4\,e^x+e^{\left(\frac{e^{(x+4\,e^x)}}{\log(x^2)^2-8\,\log(x^2)+16}\right)}\right)}}{x\log\left(x^2\right)^3-12\,x\log\left(x^2\right)^2+48\,x\log\left(x^2\right)-64\,x}\,dx$$

input
```
integrate(((-4*x*exp(x)^2-exp(x)*x)*log(x^2)+16*x*exp(x)^2+(4+4*x)*exp(x))
*exp(4*exp(x))*exp(exp(x)*exp(4*exp(x))/(log(x^2)^2-8*log(x^2)+16))*exp(ex
p(exp(x)*exp(4*exp(x))/(log(x^2)^2-8*log(x^2)+16)))/(x*log(x^2)^3-12*x*log
(x^2)^2+48*x*log(x^2)-64*x),x, algorithm=\
```

output
```
integrate((16*x*e^(2*x) + 4*(x + 1)*e^x - (4*x*e^(2*x) + x*e^x)*log(x^2))*
e^(e^(x + 4*e^x)/(log(x^2)^2 - 8*log(x^2) + 16) + 4*e^x + e^(e^(x + 4*e^x)
/(log(x^2)^2 - 8*log(x^2) + 16)))/(x*log(x^2)^3 - 12*x*log(x^2)^2 + 48*x*l
og(x^2) - 64*x), x)
```

3.726.9 Mupad [B] (verification not implemented)

Time = 15.59 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{e^{4e^x+e^{\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}+\frac{e^{4e^x+x}}{16-8\log(x^2)+\log^2(x^2)}}\left(16e^{2x}x+e^x(4+4x)+\left(-e^x x-4e^{2x}x\right)\log\left(x^2\right)\right)}{-64x+48x\log(x^2)-12x\log^2(x^2)+x\log^3(x^2)}\,dx$$
$$=-{\mathrm{e}}^{{\mathrm{e}}^{\frac{{\mathrm{e}}^{4\,{\mathrm{e}}^x}\,{\mathrm{e}}^x}{{\ln\left(x^2\right)}^2-8\,\ln\left(x^2\right)+16}}}$$

input
```
int(-(exp((exp(4*exp(x))*exp(x))/(log(x^2)^2 - 8*log(x^2) + 16))*exp(4*exp
(x))*exp(exp((exp(4*exp(x))*exp(x))/(log(x^2)^2 - 8*log(x^2) + 16)))*(16*x
*exp(2*x) + exp(x)*(4*x + 4) - log(x^2)*(4*x*exp(2*x) + x*exp(x))))/(64*x
- 48*x*log(x^2) + 12*x*log(x^2)^2 - x*log(x^2)^3),x)
```

output
```
-exp(exp((exp(4*exp(x))*exp(x))/(log(x^2)^2 - 8*log(x^2) + 16)))
```

3.727 $\int \frac{e^{e^x x}\left(e^5+x^2+e^x\left(x^3+x^4\right)+e^{2x}\left(-e^5x-2x^3+e^x\left(-2x^4-2x^5\right)\right)+e^{4x}\left(x^4-\right.\right.}{x^2-}$

3.727.1 Optimal result

Integrand size = 162, antiderivative size = 32

$$\int \frac{e^{e^x x}(e^5+x^2+e^x(x^3+x^4)+e^{2x}(-e^5x-2x^3+e^x(-2x^4-2x^5))+e^{4x}(x^4+e^x(x^5+x^6))+(-e^5+e^{5+x}(}{x^2-2e^{2x}x^3+e^{4x}x^4}$$
$$=e^{e^x x}\left(x-\frac{e^5\log(x)}{-x+e^{2x}x^2}\right)$$

output
```
exp(exp(x)*x)*(x-ln(x)/(exp(2*x)*x^2-x)*exp(5))
```

3.727.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \frac{e^{e^x x}(e^5+x^2+e^x(x^3+x^4)+e^{2x}(-e^5x-2x^3+e^x(-2x^4-2x^5))+e^{4x}(x^4+e^x(x^5+x^6))+(-e^5+e^{5+x}(}{x^2-2e^{2x}x^3+e^{4x}x^4}$$
$$=e^{e^x x}\left(x-\frac{e^5\log(x)}{x\left(-1+e^{2x}x\right)}\right)$$

input
```
Integrate[(E^(E^x*x)*(E^5 + x^2 + E^x*(x^3 + x^4) + E^(2*x)*(-(E^5*x) - 2*
x^3 + E^x*(-2*x^4 - 2*x^5)) + E^(4*x)*(x^4 + E^x*(x^5 + x^6)) + (-E^5 + E^
(5 + x)*(x + x^2) + E^(2*x)*(E^5*(2*x + 2*x^2) + E^(5 + x)*(-x^2 - x^3)))*
Log[x]))/(x^2 - 2*E^(2*x)*x^3 + E^(4*x)*x^4),x]
```

output
```
E^(E^x*x)*(x - (E^5*Log[x])/(x*(-1 + E^(2*x)*x)))
```

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$\int \frac{e^{e^x x}(e^5+x^2+e^x(x^3+x^4)+e^{2x}(-e^5x-2x^3+e^x(-2x^4-2x^5))+e^{4x}(x^4+e^x(x^5+x^6))+(-e^5+e^{5+x}(x+x^2)+e^{2x}(e^5(2x+2x^2)+e^{5+x}(-x^2-x^3)))\,\mathrm{l}}{x^2-2e^{2x}x^3+e^{4x}x^4}$

3.727.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^x x}\left(x^2+e^x\left(x^4+x^3\right)\right)+\left(e^{x+5}\left(x^2+x\right)+e^{2x}\left(e^5\left(2x^2+2x\right)+e^{x+5}\left(-x^3-x^2\right)\right)-e^5\right)\log(x)+e^{4x}\left(x^4+e^x\left(x^6 \cdots\right.\right.}{e^{4x}x^4-2e^{2x}x^3+x^2 \cdots}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{e^{e^x x}\left(x^2+e^x\left(x^4+x^3\right)\right)+\left(e^{x+5}\left(x^2+x\right)+e^{2x}\left(e^5\left(2x^2+2x\right)+e^{x+5}\left(-x^3-x^2\right)\right)-e^5\right)\log(x)+e^{4x}\left(x^4+e^x\left(x^6 \cdots\right.\right.}{x^2\left(1-e^{2x}x\right)^2 \cdots}$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{e^{e^x x+5}(2x+1)\log(x)}{x^2\left(e^{2x}x-1\right)^2}-\frac{e^{e^x x+5}\left(e^x x^2\log(x)+e^x x\log(x)-2x\log(x)-2\log(x)+1\right)}{x^2\left(e^{2x}x-1\right)}+e^{e^x x+x}x(x+1)+e^{e^x \cdots}\right.$$

$$\Big\downarrow \ 2009$$

$$\int e^{e^x x+x}x^2dx-\int \frac{e^{e^x x+5}}{x^2\left(e^{2x}x-1\right)}dx-\int \frac{\int \frac{e^{e^x x+5}}{x^2\left(e^{2x}x-1\right)^2}dx}{x}dx-2\int \frac{\int \frac{e^{e^x x+5}}{x^2\left(e^{2x}x-1\right)}dx}{x}dx+ \log(x)\int \frac{e^{e^x x+5}}{x^2\left(e^{2x}x-1\right)^2}dx+2\log(x)\int \frac{e^{e^x x+5}}{x^2\left(e^{2x}x-1\right)}dx+\int e^{e^x x}dx+\int e^{e^x x+x}xdx- 2\int \frac{\int \frac{e^{e^x x+5}}{x\left(e^{2x}x-1\right)^2}dx}{x}dx+\int \frac{\int \frac{e^{e^x x+x+5}}{e^{2x}x-1}dx}{x}dx-2\int \frac{\int \frac{e^{e^x x+5}}{x\left(e^{2x}x-1\right)}dx}{x}dx+\int \frac{\int \frac{e^{e^x x+x+5}}{x\left(e^{2x}x-1\right)}dx}{x}dx+ 2\log(x)\int \frac{e^{e^x x+5}}{x\left(e^{2x}x-1\right)^2}dx-\log(x)\int \frac{e^{e^x x+x+5}}{e^{2x}x-1}dx+2\log(x)\int \frac{e^{e^x x+5}}{x\left(e^{2x}x-1\right)}dx- \log(x)\int \frac{e^{e^x x+x+5}}{x\left(e^{2x}x-1\right)}dx$$

input
```
Int[(E^(E^x*x)*(E^5 + x^2 + E^x*(x^3 + x^4) + E^(2*x)*(-(E^5*x) - 2*x^3 +
E^x*(-2*x^4 - 2*x^5)) + E^(4*x)*(x^4 + E^x*(x^5 + x^6)) + (-E^5 + E^(5 + x
)*(x + x^2) + E^(2*x)*(E^5*(2*x + 2*x^2) + E^(5 + x)*(-x^2 - x^3)))*Log[x]
))/(x^2 - 2*E^(2*x)*x^3 + E^(4*x)*x^4),x]
```

output
```
$Aborted
```

3.727.

$$\int \frac{e^{e^x x}\left(e^5+x^2+e^x\left(x^3+x^4\right)+e^{2x}\left(-e^5x-2x^3+e^x\left(-2x^4-2x^5\right)\right)+e^{4x}\left(x^4+e^x\left(x^5+x^6\right)\right)+\left(-e^5+e^{5+x}\left(x+x^2\right)+e^{2x}\left(e^5\left(2x+2x^2\right)+e^{5+x}\left(-x^2-x^3\right)\right)\right) \cdots\right.}{x^2-2e^{2x}x^3+e^{4x}x^4}$$

3.727.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.727.4 Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.22

$$-\frac{\left(-\mathrm{e}^{2x} x^{3}+\mathrm{e}^{5} \ln \left(x \right)+x^{2}\right) \mathrm{e}^{\mathrm{e}^{x} x}}{x \left(x \,\mathrm{e}^{2x}-1\right)}$$

input
```
int(((((-x^3-x^2)*exp(5)*exp(x)+(2*x^2+2*x)*exp(5))*exp(2*x)+(x^2+x)*exp(5
)*exp(x)-exp(5))*ln(x)+((x^6+x^5)*exp(x)+x^4)*exp(2*x)^2+((-2*x^5-2*x^4)*e
xp(x)-x*exp(5)-2*x^3)*exp(2*x)+(x^4+x^3)*exp(x)+x^2+exp(5))*exp(exp(x)*x)/
(x^4*exp(2*x)^2-2*exp(2*x)*x^3+x^2),x)
```

output
```
-(-exp(x)^2*x^3+exp(5)*ln(x)+x^2)/x/(x*exp(x)^2-1)*exp(exp(x)*x)
```

3.727.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.50

$$\int \frac{e^{e^x x}(e^5+x^2+e^x(x^3+x^4)+e^{2x}(-e^5x-2x^3+e^x(-2x^4-2x^5))+e^{4x}(x^4+e^x(x^5+x^6))+(-e^5+e^{5+x}(\ldots}{x^2-2e^{2x}x^3+e^{4x}x^4}$$
$$=\frac{\left(x^{3} e^{\left(2\,x+10\right)}-x^{2} e^{10}-e^{15} \log \left(x\right)\right) e^{\left(x e^{x}\right)}}{x^{2} e^{\left(2\,x+10\right)}-x e^{10}}$$

input
```
integrate(((((-x^3-x^2)*exp(5)*exp(x)+(2*x^2+2*x)*exp(5))*exp(2*x)+(x^2+x)
*exp(5)*exp(x)-exp(5))*log(x)+((x^6+x^5)*exp(x)+x^4)*exp(2*x)^2+((-2*x^5-2
*x^4)*exp(x)-x*exp(5)-2*x^3)*exp(2*x)+(x^4+x^3)*exp(x)+x^2+exp(5))*exp(exp
(x)*x)/(x^4*exp(2*x)^2-2*exp(2*x)*x^3+x^2),x, algorithm=\
```

output
```
(x^3*e^(2*x + 10) - x^2*e^10 - e^15*log(x))*e^(x*e^x)/(x^2*e^(2*x + 10) -
x*e^10)
```

3.727.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.06

$$\int \frac{e^{e^x x}(e^5+x^2+e^x(x^3+x^4)+e^{2x}(-e^5x-2x^3+e^x(-2x^4-2x^5))+e^{4x}(x^4+e^x(x^5+x^6))+(-e^5+e^{5+x}(}{x^2-2e^{2x}x^3+e^{4x}x^4}$$
$$=\frac{(x^3e^{2x}-x^2-e^5\log(x))\,e^{xe^x}}{x^2e^{2x}-x}$$

input
```
integrate(((((-x**3-x**2)*exp(5)*exp(x)+(2*x**2+2*x)*exp(5))*exp(2*x)+(x**
2+x)*exp(5)*exp(x)-exp(5))*ln(x)+((x**6+x**5)*exp(x)+x**4)*exp(2*x)**2+((-
2*x**5-2*x**4)*exp(x)-x*exp(5)-2*x**3)*exp(2*x)+(x**4+x**3)*exp(x)+x**2+ex
p(5))*exp(exp(x)*x)/(x**4*exp(2*x)**2-2*exp(2*x)*x**3+x**2),x)
```

output
```
(x**3*exp(2*x) - x**2 - exp(5)*log(x))*exp(x*exp(x))/(x**2*exp(2*x) - x)
```

3.727.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.25

$$\int \frac{e^{e^x x}(e^5+x^2+e^x(x^3+x^4)+e^{2x}(-e^5x-2x^3+e^x(-2x^4-2x^5))+e^{4x}(x^4+e^x(x^5+x^6))+(-e^5+e^{5+x}(}{x^2-2e^{2x}x^3+e^{4x}x^4}$$
$$=\frac{\left(x^3e^{(2\,x)}-x^2-e^5\log(x)\right)e^{(xe^x)}}{x^2e^{(2\,x)}-x}$$

input
```
integrate(((((-x^3-x^2)*exp(5)*exp(x)+(2*x^2+2*x)*exp(5))*exp(2*x)+(x^2+x)
*exp(5)*exp(x)-exp(5))*log(x)+((x^6+x^5)*exp(x)+x^4)*exp(2*x)^2+((-2*x^5-2
*x^4)*exp(x)-x*exp(5)-2*x^3)*exp(2*x)+(x^4+x^3)*exp(x)+x^2+exp(5))*exp(exp
(x)*x)/(x^4*exp(2*x)^2-2*exp(2*x)*x^3+x^2),x, algorithm=\
```

output
```
(x^3*e^(2*x) - x^2 - e^5*log(x))*e^(x*e^x)/(x^2*e^(2*x) - x)
```

3.727.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.56

$$\int \frac{e^{e^x x}(e^5+x^2+e^x(x^3+x^4)+e^{2x}(-e^5x-2x^3+e^x(-2x^4-2x^5))+e^{4x}(x^4+e^x(x^5+x^6))+(-e^5+e^{5+x}(}{x^2-2e^{2x}x^3+e^{4x}x^4}$$
$$= \frac{x^3e^{(xe^x+2x)}-x^2e^{(xe^x)}-e^{(xe^x+5)}\log(x)}{x^2e^{(2x)}-x}$$

input
```
integrate(((((-x^3-x^2)*exp(5)*exp(x)+(2*x^2+2*x)*exp(5))*exp(2*x)+(x^2+x)
*exp(5)*exp(x)-exp(5))*log(x)+((x^6+x^5)*exp(x)+x^4)*exp(2*x)^2+((-2*x^5-2
*x^4)*exp(x)-x*exp(5)-2*x^3)*exp(2*x)+(x^4+x^3)*exp(x)+x^2+exp(5))*exp(exp
(x)*x)/(x^4*exp(2*x)^2-2*exp(2*x)*x^3+x^2),x, algorithm=\
```

output
```
(x^3*e^(x*e^x + 2*x) - x^2*e^(x*e^x) - e^(x*e^x + 5)*log(x))/(x^2*e^(2*x)
- x)
```

3.727.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{e^x x}(e^5+x^2+e^x(x^3+x^4)+e^{2x}(-e^5x-2x^3+e^x(-2x^4-2x^5))+e^{4x}(x^4+e^x(x^5+x^6))+(-e^5+e^{5+x}(}{x^2-2e^{2x}x^3+e^{4x}x^4}$$
$$= \int \frac{\mathrm{e}^{x\,\mathrm{e}^x}\,\left(\mathrm{e}^5+\mathrm{e}^{4\,x}\,\left(\mathrm{e}^x\,\left(x^6+x^5\right)+x^4\right)+\mathrm{e}^x\,\left(x^4+x^3\right)-\mathrm{e}^{2\,x}\,\left(\mathrm{e}^x\,\left(2\,x^5+2\,x^4\right)+x\,\mathrm{e}^5+2\,x^3\right)+\ln\left(x\right)\,\left(\mathrm{e}^{x+5}\,\left(x^2\right.\right.\right.}{x^4\,\mathrm{e}^{4\,x}-2\,x^3\,\mathrm{e}^{2\,x}+x^2}$$

input
```
int((exp(x*exp(x))*(exp(5) + exp(4*x)*(exp(x)*(x^5 + x^6) + x^4) + exp(x)*
(x^3 + x^4) - exp(2*x)*(exp(x)*(2*x^4 + 2*x^5) + x*exp(5) + 2*x^3) + log(x
)*(exp(2*x)*(exp(5)*(2*x + 2*x^2) - exp(5)*exp(x)*(x^2 + x^3)) - exp(5) +
exp(5)*exp(x)*(x + x^2)) + x^2))/(x^4*exp(4*x) - 2*x^3*exp(2*x) + x^2),x)
```

output
```
int((exp(x*exp(x))*(exp(5) + exp(4*x)*(exp(x)*(x^5 + x^6) + x^4) + exp(x)*
(x^3 + x^4) - exp(2*x)*(exp(x)*(2*x^4 + 2*x^5) + x*exp(5) + 2*x^3) + log(x
)*(exp(x + 5)*(x + x^2) - exp(5) + exp(2*x)*(exp(5)*(2*x + 2*x^2) - exp(x
+ 5)*(x^2 + x^3))) + x^2))/(x^4*exp(4*x) - 2*x^3*exp(2*x) + x^2), x)
```

3.728 $$\int \frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+\right.\right.}{x^3\log\left(\frac{e^{-x}}{x}\right)}$$

3.728.1 Optimal result

Integrand size = 146, antiderivative size = 32

$$\int \frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\right.\right.\right.\right.}{x^3\log\left(\frac{e^{-x}}{x}\right)}$$

output
```
exp(x^2-exp(exp(ln(ln(1/exp(x)/x))-exp(15/x)))/x)
```

3.728.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\right.\right.\right.\right.}{x^3\log\left(\frac{e^{-x}}{x}\right)}$$

3.728.

$$e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\right)\right)$$

input
```
Integrate[(E^((-(1/(E^x*x))^E^(-E^(15/x)) + x^3)/x)*(2*x^4*Log[1/(E^x*x)]
+ (1/(E^x*x))^E^(-E^(15/x))*(x*Log[1/(E^x*x)] + (Log[1/(E^x*x)]*(x + x^2 -
 15*E^(15/x)*Log[1/(E^x*x)]))/E^E^(15/x))))/(x^3*Log[1/(E^x*x)]),x]
```

output
```
E^(-((1/(E^x*x))^E^(-E^(15/x))/x) + x^2)
```

3.728.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{x^3-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(e^{-e^{15/x}}\left(x^2+x-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\log\left(\frac{e^{-x}}{x}\right)+x\log\left(\frac{e^{-x}}{x}\right.\right.\right.}{x^3\log\left(\frac{e^{-x}}{x}\right)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{x^2-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(e^{-e^{15/x}}\left(x^2+x-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\log\left(\frac{e^{-x}}{x}\right)+x\log\left(\frac{e^{-x}}{x}\right.\right.\right.}{x^3\log\left(\frac{e^{-x}}{x}\right)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(2e^{x^2-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}}x+\frac{e^{x^2-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}-e^{15/x}}\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x^2+e^{e^{15/x}}x+x-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\right)\right)$$

$$\int \frac{e^{x^2-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}}\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x^2}dx+\int \frac{e^{-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}-e^{15/x}+x^2}\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x^2}dx+$$

$$\int \frac{e^{-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}-e^{15/x}+x^2}\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}dx+2\int e^{x^2-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}}xdx-$$

$$15\int \int \frac{e^{-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}-e^{15/x}+x^2+\frac{15}{x}}\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x^3}dxdx-$$

$$15\int \frac{\int \frac{e^{-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}-e^{15/x}+x^2+\frac{15}{x}}\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x^3}dx}{x}dx-$$

$$15\log \left(\frac{e^{-x}}{x}\right)\int \frac{e^{-\frac{\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x}-e^{15/x}+x^2+\frac{15}{x}}\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}}{x^3}dx$$

input
```
Int[(E^((-(1/(E^x*x))^E^(-E^(15/x)) + x^3)/x)*(2*x^4*Log[1/(E^x*x)] + (1/(
E^x*x))^E^(-E^(15/x))*(x*Log[1/(E^x*x)] + (Log[1/(E^x*x)]*(x + x^2 - 15*E^
(15/x)*Log[1/(E^x*x)]))/E^E^(15/x))))/(x^3*Log[1/(E^x*x)]),x]
```

output
```
$Aborted
```

3.728.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.728.

$$e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\right)\right)$$

3.728.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.54 (sec) , antiderivative size = 130, normalized size of antiderivative = 4.06

$$
e^{\frac{-e^{-\frac{\left(i\pi \operatorname{csgn}\left(\frac{ie^{-x}}{x}\right)^{3}-i\pi \operatorname{csgn}\left(\frac{ie^{-x}}{x}\right)^{2}\operatorname{csgn}\left(\frac{i}{x}\right)-i\pi \operatorname{csgn}\left(\frac{ie^{-x}}{x}\right)^{2}\operatorname{csgn}\left(ie^{-x}\right)+i\pi \operatorname{csgn}\left(\frac{ie^{-x}}{x}\right)\operatorname{csgn}\left(\frac{i}{x}\right)\operatorname{csgn}\left(ie^{-x}\right)+2\ln(x)+2\ln(e^{x})\right)e^{-e^{\frac{15}{x}}}}{2}}+x^{3}}{x}}
$$

input
```
int((((-15*exp(15/x)*ln(1/exp(x)/x)+x^2+x)*exp(ln(ln(1/exp(x)/x))-exp(15/x
))+x*ln(1/exp(x)/x))*exp(exp(ln(ln(1/exp(x)/x))-exp(15/x)))+2*x^4*ln(1/exp
(x)/x))*exp((-exp(exp(ln(ln(1/exp(x)/x))-exp(15/x)))+x^3)/x)/x^3/ln(1/exp(
x)/x),x)
```

output
```
exp((-exp(-1/2*(I*Pi*csgn(I*exp(-x)/x)^3-I*Pi*csgn(I*exp(-x)/x)^2*csgn(I/x
)-I*Pi*csgn(I*exp(-x)/x)^2*csgn(I*exp(-x))+I*Pi*csgn(I*exp(-x)/x)*csgn(I/x
)*csgn(I*exp(-x))+2*ln(x)+2*ln(exp(x)))*exp(-exp(15/x)))+x^3)/x)
```

3.728.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

$$
\int \frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\right)\right)}{x^3\log\left(\frac{e^{-x}}{x}\right)}
$$

input
```
integrate((((-15*exp(15/x)*log(1/exp(x)/x)+x^2+x)*exp(log(log(1/exp(x)/x))
-exp(15/x))+x*log(1/exp(x)/x))*exp(exp(log(log(1/exp(x)/x))-exp(15/x)))+2*
x^4*log(1/exp(x)/x))*exp((-exp(exp(log(log(1/exp(x)/x))-exp(15/x)))+x^3)/x
)/x^3/log(1/exp(x)/x),x, algorithm=\
```

output
```
e^((x^3 - e^(e^(-e^(15/x) + log(log(e^(-x)/x)))))/x)
```

3.728.

$$
\frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\right)\right)}{x^3\log\left(\frac{e^{-x}}{x}\right)}
$$

3.728.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\right.\right.\right.\right.}{x^3\log\left(\frac{e^{-x}}{x}\right)}$$

input
```
integrate((((-15*exp(15/x)*ln(1/exp(x)/x)+x**2+x)*exp(ln(ln(1/exp(x)/x))-e
xp(15/x))+x*ln(1/exp(x)/x))*exp(exp(ln(ln(1/exp(x)/x))-exp(15/x)))+2*x**4*
ln(1/exp(x)/x))*exp((-exp(exp(ln(ln(1/exp(x)/x))-exp(15/x)))+x**3)/x)/x**3
/ln(1/exp(x)/x),x)
```

output
```
Timed out
```

3.728.7 Maxima [A] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.16

$$\int \frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\right.\right.\right.\right.}{x^3\log\left(\frac{e^{-x}}{x}\right)}$$

input
```
integrate((((-15*exp(15/x)*log(1/exp(x)/x)+x^2+x)*exp(log(log(1/exp(x)/x))
-exp(15/x))+x*log(1/exp(x)/x))*exp(exp(log(log(1/exp(x)/x))-exp(15/x)))+2*
x^4*log(1/exp(x)/x))*exp((-exp(exp(log(log(1/exp(x)/x))-exp(15/x)))+x^3)/x
)/x^3/log(1/exp(x)/x),x, algorithm=\
```

output
```
e^(x^2 - e^(-x*e^(-e^(15/x)) - e^(-e^(15/x))*log(x))/x)
```


$$e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\right)\right)$$

3.728.8 Giac [F]

$$\int \frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\right.\right.\right.\right.}{x^3\log\left(\frac{e^{-x}}{x}\right)}$$

input
```
integrate((((-15*exp(15/x)*log(1/exp(x)/x)+x^2+x)*exp(log(log(1/exp(x)/x))
-exp(15/x))+x*log(1/exp(x)/x))*exp(exp(log(log(1/exp(x)/x))-exp(15/x)))+2*
x^4*log(1/exp(x)/x))*exp((-exp(exp(log(log(1/exp(x)/x))-exp(15/x)))+x^3)/x
)/x^3/log(1/exp(x)/x),x, algorithm=\
```

output
```
integrate((2*x^4*log(e^(-x)/x) + ((x^2 - 15*e^(15/x)*log(e^(-x)/x) + x)*e^
(-e^(15/x) + log(log(e^(-x)/x))) + x*log(e^(-x)/x))*e^(e^(-e^(15/x) + log(
log(e^(-x)/x)))))*e^((x^3 - e^(e^(-e^(15/x) + log(log(e^(-x)/x)))))/x)/(x^
3*log(e^(-x)/x)), x)
```

3.728.9 Mupad [B] (verification not implemented)

Time = 15.53 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.16

$$\int \frac{e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\right.\right.\right.\right.}{x^3\log\left(\frac{e^{-x}}{x}\right)}$$

input
```
int((exp(-(exp(exp(log(log(exp(-x)/x)) - exp(15/x))) - x^3)/x)*(2*x^4*log(
exp(-x)/x) + exp(exp(log(log(exp(-x)/x)) - exp(15/x)))*(x*log(exp(-x)/x) +
 exp(log(log(exp(-x)/x)) - exp(15/x))*(x + x^2 - 15*exp(15/x)*log(exp(-x)/
x)))))/(x^3*log(exp(-x)/x)),x)
```

output
```
exp(x^2)*exp(-(exp(-x*exp(-exp(15/x)))*(1/x)^exp(-exp(15/x)))/x)
```

3.728.

$$e^{\frac{-\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}+x^3}{x}}\left(2x^4\log\left(\frac{e^{-x}}{x}\right)+\left(\frac{e^{-x}}{x}\right)^{e^{-e^{15/x}}}\left(x\log\left(\frac{e^{-x}}{x}\right)+e^{-e^{15/x}}\log\left(\frac{e^{-x}}{x}\right)\left(x+x^2-15e^{15/x}\log\left(\frac{e^{-x}}{x}\right)\right)\right)\right)$$

3.729 $\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2}$

3.729.1 Optimal result

Integrand size = 179, antiderivative size = 35

$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{}{-2}\right.}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+}\right.}$$
$$= -3+\frac{x^2\log^2(2)}{\left(-x+\frac{\log(2)}{\log\left(\frac{2}{x+2(-1+x^2)}\right)}\right)^2}$$

output
```
ln(2)^2*x^2/(ln(2)/ln(2/(2*x^2+x-2))-x)^2-3
```

3.729.2 Mathematica [A] (verified)

Time = 5.07 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.31

$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{}{-2}\right.}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+}\right.}$$
$$= -\frac{\log^3(2)\left(\log(2)-2x\log\left(\frac{2}{-2+x+2x^2}\right)\right)}{\left(\log(2)-x\log\left(\frac{2}{-2+x+2x^2}\right)\right)^2}$$

3.729.
$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+(-2x^3+x^4+2x^5)\log^3\left(\frac{2}{-2+x+2x^2}\right)}\, d$$

input
```
Integrate[((2*x^2 + 8*x^3)*Log[2]^3*Log[2/(-2 + x + 2*x^2)] + (4*x - 2*x^2
 - 4*x^3)*Log[2]^3*Log[2/(-2 + x + 2*x^2)]^2)/((2 - x - 2*x^2)*Log[2]^3 +
(-6*x + 3*x^2 + 6*x^3)*Log[2]^2*Log[2/(-2 + x + 2*x^2)] + (6*x^2 - 3*x^3 -
 6*x^4)*Log[2]*Log[2/(-2 + x + 2*x^2)]^2 + (-2*x^3 + x^4 + 2*x^5)*Log[2/(-
2 + x + 2*x^2)]^3),x]
```

output
```
-((Log[2]^3*(Log[2] - 2*x*Log[2/(-2 + x + 2*x^2)]))/(Log[2] - x*Log[2/(-2
+ x + 2*x^2)])^2)
```

3.729.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(8x^3+2x^2)\log^3(2)\log\left(\frac{2}{2x^2+x-2}\right)+(-4x^3-2x^2+4x)\log^3(2)\log^2\left(\frac{2}{2x^2+x-\cdots}\right.}{(-2x^2-x+2)\log^3(2)+(6x^3+3x^2-6x)\log^2(2)\log\left(\frac{2}{2x^2+x-2}\right)+(-6x^4-3x^3+6x^2)\log(2)\log^2\left(\frac{2}{2x^2+x-2}\right)\cdots}$$

$$\Big\downarrow \ 7239$$

$$\int \frac{2x\log^3(2)\log\left(\frac{2}{2x^2+x-2}\right)\left(x(4x+1)-(2x^2+x-2)\log\left(\frac{2}{2x^2+x-2}\right)\right)}{(-2x^2-x+2)\left(\log(2)-x\log\left(\frac{2}{2x^2+x-2}\right)\right)^3}dx$$

$$\Big\downarrow \ 27$$

$$2\log^3(2)\int \frac{x\log\left(-\frac{2}{-2x^2-x+2}\right)\left(x(4x+1)+(-2x^2-x+2)\log\left(-\frac{2}{-2x^2-x+2}\right)\right)}{(-2x^2-x+2)\left(\log(2)-x\log\left(-\frac{2}{-2x^2-x+2}\right)\right)^3}dx$$

$$\Big\downarrow \ 7279$$

$$2\log^3(2)\int \left(\frac{\log(2)\left(4x^3+(1-\log(4))x^2-\log(2)x+\log(4)\right)}{x(-2x^2-x+2)\left(\log(2)-x\log\left(\frac{2}{2x^2+x-2}\right)\right)^3}-\frac{1}{x\left(x\log\left(\frac{2}{2x^2+x-2}\right)-\log(2)\right)}+\frac{-4x^3-(1-\cdots}{x(-2x^2-x+\cdots}\right.$$

$$\Big\downarrow \ 2009$$

$$2\log^3(2)\left(-2\log(2)\int \frac{1}{\left(\log(2)-x\log\left(\frac{2}{2x^2+x-2}\right)\right)^3}dx+2\int \frac{1}{\left(\log(2)-x\log\left(\frac{2}{2x^2+x-2}\right)\right)^2}dx-\frac{16\log(2)\int \cdots}{\cdots}\right.$$

3.729.

$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+(-2x^3+x^4+2x^5)\log^3\left(\frac{2}{\cdots}\right)}\cdots$$

input
```
Int[((2*x^2 + 8*x^3)*Log[2]^3*Log[2/(-2 + x + 2*x^2)] + (4*x - 2*x^2 - 4*x
^3)*Log[2]^3*Log[2/(-2 + x + 2*x^2)]^2)/((2 - x - 2*x^2)*Log[2]^3 + (-6*x
+ 3*x^2 + 6*x^3)*Log[2]^2*Log[2/(-2 + x + 2*x^2)] + (6*x^2 - 3*x^3 - 6*x^4
)*Log[2]*Log[2/(-2 + x + 2*x^2)]^2 + (-2*x^3 + x^4 + 2*x^5)*Log[2/(-2 + x
+ 2*x^2)]^3),x]
```

output
```
$Aborted
```

3.729.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.729.4 Maple [A] (verified)

Time = 2.18 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.34

method	result	size
risch	$-\frac{\left(-2x\ln\left(\frac{2}{2x^2+x-2}\right)+\ln(2)\right)\ln(2)^3}{\left(-x\ln\left(\frac{2}{2x^2+x-2}\right)+\ln(2)\right)^2}$	47
norman	$\frac{2\ln(2)^3 x\ln\left(\frac{2}{2x^2+x-2}\right)-\ln(2)^4}{\left(-x\ln\left(\frac{2}{2x^2+x-2}\right)+\ln(2)\right)^2}$	50
parallelrisch	$-\frac{-8\ln(2)^3 x\ln\left(\frac{2}{2x^2+x-2}\right)+4\ln(2)^4}{4\left(\ln\left(\frac{2}{2x^2+x-2}\right)^2 x^2-2\ln\left(\frac{2}{2x^2+x-2}\right)\ln(2)x+\ln(2)^2\right)}$	74

3.729.

$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+(-2x^3+x^4+2x^5)\log^3\left(\frac{2}{-2+x+2x^2}\right)}\,d$$

input
```
int(((-4*x^3-2*x^2+4*x)*ln(2)^3*ln(2/(2*x^2+x-2))^2+(8*x^3+2*x^2)*ln(2)^3*
ln(2/(2*x^2+x-2)))/((2*x^5+x^4-2*x^3)*ln(2/(2*x^2+x-2))^3+(-6*x^4-3*x^3+6*
x^2)*ln(2)*ln(2/(2*x^2+x-2))^2+(6*x^3+3*x^2-6*x)*ln(2)^2*ln(2/(2*x^2+x-2))
+(-2*x^2-x+2)*ln(2)^3),x,method=_RETURNVERBOSE)
```

output
```
-(-2*x*ln(2/(2*x^2+x-2))+ln(2))*ln(2)^3/(-x*ln(2/(2*x^2+x-2))+ln(2))^2
```

3.729.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(33) = 66$.

Time = 0.26 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.06

$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+\ldots}$$
$$= \frac{2\,x\log(2)^3\log\left(\frac{2}{2\,x^2+x-2}\right)-\log(2)^4}{x^2\log\left(\frac{2}{2\,x^2+x-2}\right)^2-2\,x\log(2)\log\left(\frac{2}{2\,x^2+x-2}\right)+\log(2)^2}$$

input
```
integrate((((-4*x^3-2*x^2+4*x)*log(2)^3*log(2/(2*x^2+x-2))^2+(8*x^3+2*x^2)*
log(2)^3*log(2/(2*x^2+x-2)))/((2*x^5+x^4-2*x^3)*log(2/(2*x^2+x-2))^3+(-6*x
^4-3*x^3+6*x^2)*log(2)*log(2/(2*x^2+x-2))^2+(6*x^3+3*x^2-6*x)*log(2)^2*log
(2/(2*x^2+x-2))+(-2*x^2-x+2)*log(2)^3),x, algorithm=\
```

output
```
(2*x*log(2)^3*log(2/(2*x^2 + x - 2)) - log(2)^4)/(x^2*log(2/(2*x^2 + x - 2
))^2 - 2*x*log(2)*log(2/(2*x^2 + x - 2)) + log(2)^2)
```

3.729.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(27) = 54$.

Time = 0.17 (sec) , antiderivative size = 65, normalized size of antiderivative = 1.86

$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+\ldots}$$
$$= \frac{2x\log(2)^3\log\left(\frac{2}{2x^2+x-2}\right)-\log(2)^4}{x^2\log\left(\frac{2}{2x^2+x-2}\right)^2-2x\log(2)\log\left(\frac{2}{2x^2+x-2}\right)+\log(2)^2}$$

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$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+(-2x^3+x^4+2x^5)\log^3\left(\frac{2}{-2+x+2x^2}\right)}\,d$$

input
```
integrate((((-4*x**3-2*x**2+4*x)*ln(2)**3*ln(2/(2*x**2+x-2))**2+(8*x**3+2*x
**2)*ln(2)**3*ln(2/(2*x**2+x-2)))/((2*x**5+x**4-2*x**3)*ln(2/(2*x**2+x-2))
**3+(-6*x**4-3*x**3+6*x**2)*ln(2)*ln(2/(2*x**2+x-2))**2+(6*x**3+3*x**2-6*x
)*ln(2)**2*ln(2/(2*x**2+x-2))+(-2*x**2-x+2)*ln(2)**3),x)
```

output
```
(2*x*log(2)**3*log(2/(2*x**2 + x - 2)) - log(2)**4)/(x**2*log(2/(2*x**2 +
x - 2))**2 - 2*x*log(2)*log(2/(2*x**2 + x - 2)) + log(2)**2)
```

3.729.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 91 vs. 2(33) = 66.

Time = 0.38 (sec) , antiderivative size = 91, normalized size of antiderivative = 2.60

$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+\dots}$$
$$= \frac{2\,x\log(2)^4-2\,x\log(2)^3\log(2\,x^2+x-2)-\log(2)^4}{x^2\log(2)^2+x^2\log(2\,x^2+x-2)^2-2\,x\log(2)^2+\log(2)^2-2\,(x^2\log(2)-x\log(2))\log(2\,x^2+x-2)}$$

input
```
integrate((((-4*x^3-2*x^2+4*x)*log(2)^3*log(2/(2*x^2+x-2))^2+(8*x^3+2*x^2)*
log(2)^3*log(2/(2*x^2+x-2)))/((2*x^5+x^4-2*x^3)*log(2/(2*x^2+x-2))^3+(-6*x
^4-3*x^3+6*x^2)*log(2)*log(2/(2*x^2+x-2))^2+(6*x^3+3*x^2-6*x)*log(2)^2*log
(2/(2*x^2+x-2))+(-2*x^2-x+2)*log(2)^3),x, algorithm=\
```

output
```
(2*x*log(2)^4 - 2*x*log(2)^3*log(2*x^2 + x - 2) - log(2)^4)/(x^2*log(2)^2
+ x^2*log(2*x^2 + x - 2)^2 - 2*x*log(2)^2 + log(2)^2 - 2*(x^2*log(2) - x*l
og(2))*log(2*x^2 + x - 2))
```

3.729.8 Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.41 (sec) , antiderivative size = 145, normalized size of antiderivative = 4.14

$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+\dots}$$
$$= \frac{-4i\,\pi x\log(2)^3-2\,x\log(2)^4+2\,x\log(2)^3\log(\dots}{4\,\pi^2x^2-4i\,\pi x^2\log(2)-x^2\log(2)^2+4i\,\pi x^2\log(2\,x^2+x-2)+2\,x^2\log(2)\log(2\,x^2+x-2)-x^2\log(2\dots}$$

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$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+2x^2}\right)+(-2x^3+x^4+2x^5)\log^3\left(\frac{2}{-2+x+2x^2}\right)}\,d\dots$$

input
```
integrate(((-4*x^3-2*x^2+4*x)*log(2)^3*log(2/(2*x^2+x-2))^2+(8*x^3+2*x^2)*
log(2)^3*log(2/(2*x^2+x-2)))/((2*x^5+x^4-2*x^3)*log(2/(2*x^2+x-2))^3+(-6*x
^4-3*x^3+6*x^2)*log(2)*log(2/(2*x^2+x-2))^2+(6*x^3+3*x^2-6*x)*log(2)^2*log
(2/(2*x^2+x-2))+(-2*x^2-x+2)*log(2)^3),x, algorithm=\
```

output
```
(-4*I*pi*x*log(2)^3 - 2*x*log(2)^4 + 2*x*log(2)^3*log(2*x^2 + x - 2) + log
(2)^4)/(4*pi^2*x^2 - 4*I*pi*x^2*log(2) - x^2*log(2)^2 + 4*I*pi*x^2*log(2*x
^2 + x - 2) + 2*x^2*log(2)*log(2*x^2 + x - 2) - x^2*log(2*x^2 + x - 2)^2 +
 4*I*pi*x*log(2) + 2*x*log(2)^2 - 2*x*log(2)*log(2*x^2 + x - 2) - log(2)^2
)
```

3.729.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(2x^2+8x^3)\log^3(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(4x-2x^2-4x^3)\log^3(2)\log^2\left(\frac{2}{-2}\right.}{(2-x-2x^2)\log^3(2)+(-6x+3x^2+6x^3)\log^2(2)\log\left(\frac{2}{-2+x+2x^2}\right)+(6x^2-3x^3-6x^4)\log(2)\log^2\left(\frac{2}{-2+x+}\right.}$$
$$= -\int \frac{\ln\left(\frac{2}{2x^2+x-2}\right)\ln(2)^3\left(8x^3+2x^2\right)-\ln\left(\frac{2}{2x^2+x-2}\right)^2\ln(2)^3\left(4x^3+2\right.}{\left(-2x^5-x^4+2x^3\right)\ln\left(\frac{2}{2x^2+x-2}\right)^3+\ln(2)\left(6x^4+3x^3-6x^2\right)\ln\left(\frac{2}{2x^2+x-2}\right)^2-\ln(2)^2\left(6x^3+3x^2\right.}$$

input
```
int(-(log(2/(x + 2*x^2 - 2))*log(2)^3*(2*x^2 + 8*x^3) - log(2/(x + 2*x^2 -
 2))^2*log(2)^3*(2*x^2 - 4*x + 4*x^3))/(log(2)^3*(x + 2*x^2 - 2) - log(2/(
x + 2*x^2 - 2))^3*(x^4 - 2*x^3 + 2*x^5) - log(2/(x + 2*x^2 - 2))*log(2)^2*
(3*x^2 - 6*x + 6*x^3) + log(2/(x + 2*x^2 - 2))^2*log(2)*(3*x^3 - 6*x^2 + 6
*x^4)),x)
```

output
```
-int((log(2/(x + 2*x^2 - 2))*log(2)^3*(2*x^2 + 8*x^3) - log(2/(x + 2*x^2 -
 2))^2*log(2)^3*(2*x^2 - 4*x + 4*x^3))/(log(2)^3*(x + 2*x^2 - 2) - log(2/(
x + 2*x^2 - 2))^3*(x^4 - 2*x^3 + 2*x^5) - log(2/(x + 2*x^2 - 2))*log(2)^2*
(3*x^2 - 6*x + 6*x^3) + log(2/(x + 2*x^2 - 2))^2*log(2)*(3*x^3 - 6*x^2 + 6
*x^4)), x)
```

3.730 $\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145}{8388608+3145728x+58}$

3.730.1 Optimal result

Integrand size = 132, antiderivative size = 24

$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-708147}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+}$$
$$=e^{x-x^3\left(2+\frac{1}{x^2+(16+x)^2}\right)^2}$$

output
```
exp(x-x^3*(2+1/(x^2+(x+16)^2))^2)
```

3.730.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.92

$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-708147}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+}$$
$$=e^{32-x-4x^3-\frac{32(16+x)}{(128+16x+x^2)^2}+\frac{-16368-1025x}{4(128+16x+x^2)}}$$

input
```
Integrate[(E^((65536*x + 16384*x^2 - 261121*x^3 - 65536*x^4 - 8196*x^5 - 5
12*x^6 - 16*x^7)/(65536 + 16384*x + 2048*x^2 + 128*x^3 + 4*x^4))*(8388608
+ 3145728*x - 100467072*x^2 - 37765136*x^3 - 7081471*x^4 - 786624*x^5 - 55
300*x^6 - 2304*x^7 - 48*x^8))/(8388608 + 3145728*x + 589824*x^2 + 65536*x^
3 + 4608*x^4 + 192*x^5 + 4*x^6),x]
```

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$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-7081471x^4-786624x^5-55300x^6-230}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+4x^6}$$

output
```
E^(32 - x - 4*x^3 - (32*(16 + x))/(128 + 16*x + x^2)^2 + (-16368 - 1025*x)
/(4*(128 + 16*x + x^2)))
```

3.730.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-48x^8-2304x^7-55300x^6-786624x^5-7081471x^4-37765136x^3-100467072x^2+3145728x+8388608)\,e}{4x^6+192x^5+4608x^4+65536x^3+589824x^2+3145728x+8}$$

$$\Big\downarrow 2463$$

$$\int \frac{(-48x^8-2304x^7-55300x^6-786624x^5-7081471x^4-37765136x^3-100467072x^2+3145728x+8388608)\,e}{4\left(x^2+16x+128\right)^3}$$

$$\Big\downarrow 27$$

$$\frac{1}{4}\int \frac{\exp\left(\frac{-16x^7-512x^6-8196x^5-65536x^4-261121x^3+16384x^2+65536x}{4(x^4+32x^3+512x^2+4096x+16384)}\right)(-48x^8-2304x^7-55300x^6-786624x^5-708147}{\left(x^2+16x+128\right)^3}$$

$$\Big\downarrow 7292$$

$$\frac{1}{4}\int \frac{\exp\left(\frac{x(-16x^6-512x^5-8196x^4-65536x^3-261121x^2+16384x+65536)}{4(x^4+32x^3+512x^2+4096x+16384)}\right)(-48x^8-2304x^7-55300x^6-786624x^5-70814}{\left(x^2+16x+128\right)^3}$$

$$\Big\downarrow 7293$$

$$\frac{1}{4}\int\left(-48\exp\left(\frac{x\left(-16x^6-512x^5-8196x^4-65536x^3-261121x^2+16384x+65536\right)}{4\left(x^4+32x^3+512x^2+4096x+16384\right)}\right)x^2+\frac{4096\exp\left(\frac{x(-16x}{}\right.}{}\right.$$

$$\Big\downarrow 2009$$

$$\frac{1}{4}\left(-4\int\exp\left(\frac{x\left(-16x^6-512x^5-8196x^4-65536x^3-261121x^2+16384x+65536\right)}{4\left(x^4+32x^3+512x^2+4096x+16384\right)}\right)dx+(64+64i)\int\frac{\exp\left(\right.}{}\right.$$

$$\int\frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-7081471x^4-786624x^5-55300x^6-230}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+4x^6}$$

input
```
Int[(E^((65536*x + 16384*x^2 - 261121*x^3 - 65536*x^4 - 8196*x^5 - 512*x^6
 - 16*x^7)/(65536 + 16384*x + 2048*x^2 + 128*x^3 + 4*x^4))*(8388608 + 3145
728*x - 100467072*x^2 - 37765136*x^3 - 7081471*x^4 - 786624*x^5 - 55300*x^
6 - 2304*x^7 - 48*x^8))/(8388608 + 3145728*x + 589824*x^2 + 65536*x^3 + 46
08*x^4 + 192*x^5 + 4*x^6),x]
```

output
```
$Aborted
```

3.730.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

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$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-7081471x^4-786624x^5-55300x^6-230}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+4x^6}$$

3.730.4 Maple [A] (verified)

Time = 15.86 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.88

method	result
risch	$e^{-\frac{x\left(4x^{3}+62x^{2}+481x-256\right)\left(4x^{3}+66x^{2}+545x+256\right)}{4\left(x^{2}+16x+128\right)^{2}}}$
gosper	$e^{-\frac{x\left(16x^{6}+512x^{5}+8196x^{4}+65536x^{3}+261121x^{2}-16384x-65536\right)}{4\left(x^{4}+32x^{3}+512x^{2}+4096x+16384\right)}}$
parallelrisch	$e^{\frac{-16x^{7}-512x^{6}-8196x^{5}-65536x^{4}-261121x^{3}+16384x^{2}+65536x}{4x^{4}+128x^{3}+2048x^{2}+16384x+65536}}$
norman	$\frac{x^{4}e^{\frac{-16x^{7}-512x^{6}-8196x^{5}-65536x^{4}-261121x^{3}+16384x^{2}+65536x}{4x^{4}+128x^{3}+2048x^{2}+16384x+65536}}+4096x\,e^{\frac{-16x^{7}-512x^{6}-8196x^{5}-65536x^{4}-261121x^{3}+16384x^{2}+6553}{4x^{4}+128x^{3}+2048x^{2}+16384x+65536}}}{}$

input
```
int((-48*x^8-2304*x^7-55300*x^6-786624*x^5-7081471*x^4-37765136*x^3-100467
072*x^2+3145728*x+8388608)*exp((-16*x^7-512*x^6-8196*x^5-65536*x^4-261121*
x^3+16384*x^2+65536*x)/(4*x^4+128*x^3+2048*x^2+16384*x+65536))/(4*x^6+192*
x^5+4608*x^4+65536*x^3+589824*x^2+3145728*x+8388608),x,method=_RETURNVERBO
SE)
```

output
```
exp(-1/4*x*(4*x^3+62*x^2+481*x-256)*(4*x^3+66*x^2+545*x+256)/(x^2+16*x+128
)^2)
```

3.730.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. 2(23) = 46.

Time = 0.27 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.38

$$\int \frac{e^{\frac{65536x+16384x^{2}-261121x^{3}-65536x^{4}-8196x^{5}-512x^{6}-16x^{7}}{65536+16384x+2048x^{2}+128x^{3}+4x^{4}}}(8388608+3145728x-100467072x^{2}-37765136x^{3}-708147}{8388608+3145728x+589824x^{2}+65536x^{3}+4608x^{4}+192x^{5}+}$$
$$=e^{\left(-\frac{16\,x^{7}+512\,x^{6}+8196\,x^{5}+65536\,x^{4}+261121\,x^{3}-16384\,x^{2}-65536\,x}{4\,\left(x^{4}+32\,x^{3}+512\,x^{2}+4096\,x+16384\right)}\right)}$$

input
```
integrate((-48*x^8-2304*x^7-55300*x^6-786624*x^5-7081471*x^4-37765136*x^3-
100467072*x^2+3145728*x+8388608)*exp((-16*x^7-512*x^6-8196*x^5-65536*x^4-2
61121*x^3+16384*x^2+65536*x)/(4*x^4+128*x^3+2048*x^2+16384*x+65536))/(4*x^
6+192*x^5+4608*x^4+65536*x^3+589824*x^2+3145728*x+8388608),x, algorithm=\
```

output
```
e^(-1/4*(16*x^7 + 512*x^6 + 8196*x^5 + 65536*x^4 + 261121*x^3 - 16384*x^2
- 65536*x)/(x^4 + 32*x^3 + 512*x^2 + 4096*x + 16384))
```

3.730.

$$\int \frac{e^{\frac{65536x+16384x^{2}-261121x^{3}-65536x^{4}-8196x^{5}-512x^{6}-16x^{7}}{65536+16384x+2048x^{2}+128x^{3}+4x^{4}}}(8388608+3145728x-100467072x^{2}-37765136x^{3}-7081471x^{4}-786624x^{5}-55300x^{6}-230}{8388608+3145728x+589824x^{2}+65536x^{3}+4608x^{4}+192x^{5}+4x^{6}}$$

3.730.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(19) = 38$.

Time = 0.25 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.25

$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-708147}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+}$$
$$= e^{\frac{-16x^7-512x^6-8196x^5-65536x^4-261121x^3+16384x^2+65536x}{4x^4+128x^3+2048x^2+16384x+65536}}$$

input
```
integrate((-48*x**8-2304*x**7-55300*x**6-786624*x**5-7081471*x**4-37765136
*x**3-100467072*x**2+3145728*x+8388608)*exp((-16*x**7-512*x**6-8196*x**5-6
5536*x**4-261121*x**3+16384*x**2+65536*x)/(4*x**4+128*x**3+2048*x**2+16384
*x+65536))/(4*x**6+192*x**5+4608*x**4+65536*x**3+589824*x**2+3145728*x+838
8608),x)
```

output
```
exp((-16*x**7 - 512*x**6 - 8196*x**5 - 65536*x**4 - 261121*x**3 + 16384*x*
*2 + 65536*x)/(4*x**4 + 128*x**3 + 2048*x**2 + 16384*x + 65536))
```

3.730.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. $2(23) = 46$.

Time = 0.66 (sec) , antiderivative size = 81, normalized size of antiderivative = 3.38

$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-708147}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+}$$
$$= e^{\left(-4x^3-x-\frac{32x}{x^4+32x^3+512x^2+4096x+16384}-\frac{1025x}{4(x^2+16x+128)}-\frac{512}{x^4+32x^3+512x^2+4096x+16384}-\frac{4092}{x^2+16x+128}+32\right)}$$

input
```
integrate((-48*x^8-2304*x^7-55300*x^6-786624*x^5-7081471*x^4-37765136*x^3-
100467072*x^2+3145728*x+8388608)*exp((-16*x^7-512*x^6-8196*x^5-65536*x^4-2
61121*x^3+16384*x^2+65536*x)/(4*x^4+128*x^3+2048*x^2+16384*x+65536))/(4*x^
6+192*x^5+4608*x^4+65536*x^3+589824*x^2+3145728*x+8388608),x, algorithm=\
```

output
```
e^(-4*x^3 - x - 32*x/(x^4 + 32*x^3 + 512*x^2 + 4096*x + 16384) - 1025/4*x/
(x^2 + 16*x + 128) - 512/(x^4 + 32*x^3 + 512*x^2 + 4096*x + 16384) - 4092/
(x^2 + 16*x + 128) + 32)
```

3.730. $\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-7081471x^4-786624x^5-55300x^6-23}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+4x^6}$

3.730.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 175 vs. $2(23) = 46$.

Time = 0.29 (sec) , antiderivative size = 175, normalized size of antiderivative = 7.29

$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-708147}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+}$$

$$=e^{\left(-\frac{4x^7}{x^4+32x^3+512x^2+4096x+16384}-\frac{128x^6}{x^4+32x^3+512x^2+4096x+16384}-\frac{2049x^5}{x^4+32x^3+512x^2+4096x+16384}-\frac{16384x^4}{x^4+32x^3+512x^2+4096x+16384}-\frac{}{4\left(x^4+32x^3\right.}\right.}$$

input
```
integrate((-48*x^8-2304*x^7-55300*x^6-786624*x^5-7081471*x^4-37765136*x^3-
100467072*x^2+3145728*x+8388608)*exp((-16*x^7-512*x^6-8196*x^5-65536*x^4-2
61121*x^3+16384*x^2+65536*x)/(4*x^4+128*x^3+2048*x^2+16384*x+65536))/(4*x^
6+192*x^5+4608*x^4+65536*x^3+589824*x^2+3145728*x+8388608),x, algorithm=\
```

output
```
e^(-4*x^7/(x^4 + 32*x^3 + 512*x^2 + 4096*x + 16384) - 128*x^6/(x^4 + 32*x^
3 + 512*x^2 + 4096*x + 16384) - 2049*x^5/(x^4 + 32*x^3 + 512*x^2 + 4096*x
+ 16384) - 16384*x^4/(x^4 + 32*x^3 + 512*x^2 + 4096*x + 16384) - 261121/4*
x^3/(x^4 + 32*x^3 + 512*x^2 + 4096*x + 16384) + 4096*x^2/(x^4 + 32*x^3 + 5
12*x^2 + 4096*x + 16384) + 16384*x/(x^4 + 32*x^3 + 512*x^2 + 4096*x + 1638
4))
```

3.730.9 Mupad [B] (verification not implemented)

Time = 15.91 (sec) , antiderivative size = 183, normalized size of antiderivative = 7.62

$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-708147}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+}$$

$$=e^{\frac{16384x}{x^4+32x^3+512x^2+4096x+16384}}\,e^{-\frac{4x^7}{x^4+32x^3+512x^2+4096x+16384}}\,e^{-\frac{128x^6}{x^4+32x^3+512x^2+4096x+16384}}\,e^{-\frac{2049x^5}{x^4+32x^3+512x^2+4096x+16384}}\,e^{x^4+32x^3}$$

input
```
int(-(exp(-(261121*x^3 - 16384*x^2 - 65536*x + 65536*x^4 + 8196*x^5 + 512*
x^6 + 16*x^7)/(16384*x + 2048*x^2 + 128*x^3 + 4*x^4 + 65536))*(100467072*x
^2 - 3145728*x + 37765136*x^3 + 7081471*x^4 + 786624*x^5 + 55300*x^6 + 230
4*x^7 + 48*x^8 - 8388608))/(3145728*x + 589824*x^2 + 65536*x^3 + 4608*x^4
+ 192*x^5 + 4*x^6 + 8388608),x)
```

3.730.

$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}(8388608+3145728x-100467072x^2-37765136x^3-7081471x^4-786624x^5-55300x^6-230}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+4x^6}$$

output
```
exp((16384*x)/(4096*x + 512*x^2 + 32*x^3 + x^4 + 16384))*exp(-(4*x^7)/(409
6*x + 512*x^2 + 32*x^3 + x^4 + 16384))*exp(-(128*x^6)/(4096*x + 512*x^2 +
32*x^3 + x^4 + 16384))*exp(-(2049*x^5)/(4096*x + 512*x^2 + 32*x^3 + x^4 +
16384))*exp((4096*x^2)/(4096*x + 512*x^2 + 32*x^3 + x^4 + 16384))*exp(-(16
384*x^4)/(4096*x + 512*x^2 + 32*x^3 + x^4 + 16384))*exp(-(261121*x^3)/(163
84*x + 2048*x^2 + 128*x^3 + 4*x^4 + 65536))
```

3.730.

$$\int \frac{e^{\frac{65536x+16384x^2-261121x^3-65536x^4-8196x^5-512x^6-16x^7}{65536+16384x+2048x^2+128x^3+4x^4}}\left(8388608+3145728x-100467072x^2-37765136x^3-7081471x^4-786624x^5-55300x^6-230\right.}{8388608+3145728x+589824x^2+65536x^3+4608x^4+192x^5+4x^6}$$

3.731

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(\ldots}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}\ldots}$$

3.731.1 Optimal result

Integrand size = 211, antiderivative size = 29

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+\ldots}}\ldots}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3)+e^{\frac{-9+\log(x)}{-2x+x^2}}\ldots}$$
$$= x+\frac{x}{e^{\frac{-9+\log(x)}{(-2+x)x}}-x}+\log^2(x)$$

output
```
ln(x)^2+x+x/(exp((ln(x)-9)/(-2+x)/x)-x)
```

3.731.2 Mathematica [F]

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+\ldots}}\ldots}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3)+e^{\frac{-9+\log(x)}{-2x+x^2}}\ldots}$$
$$=\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\ldots}\ldots}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3)+e^{\frac{-9+\log(x)}{-2x+\ldots}}\ldots}$$

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+x^2}}(20-15x-12x^2+9x^3-2x^4+(-2-14x+1\ldots}{\ldots}$$

input
```
Integrate[(4*x^3 - 4*x^4 + x^5 + (8*x^2 - 8*x^3 + 2*x^4)*Log[x] + E^((2*(-
9 + Log[x]))/(-2*x + x^2))*(4*x - 4*x^2 + x^3 + (8 - 8*x + 2*x^2)*Log[x])
+ E^((-9 + Log[x])/(-2*x + x^2))*(20 - 15*x - 12*x^2 + 9*x^3 - 2*x^4 + (-2
 - 14*x + 16*x^2 - 4*x^3)*Log[x]))/(4*x^3 - 4*x^4 + x^5 + E^((2*(-9 + Log[
x]))/(-2*x + x^2))*(4*x - 4*x^2 + x^3) + E^((-9 + Log[x])/(-2*x + x^2))*(-
8*x^2 + 8*x^3 - 2*x^4)),x]
```

output
```
Integrate[(4*x^3 - 4*x^4 + x^5 + (8*x^2 - 8*x^3 + 2*x^4)*Log[x] + E^((2*(-
9 + Log[x]))/(-2*x + x^2))*(4*x - 4*x^2 + x^3 + (8 - 8*x + 2*x^2)*Log[x])
+ E^((-9 + Log[x])/(-2*x + x^2))*(20 - 15*x - 12*x^2 + 9*x^3 - 2*x^4 + (-2
 - 14*x + 16*x^2 - 4*x^3)*Log[x]))/(4*x^3 - 4*x^4 + x^5 + E^((2*(-9 + Log[
x]))/(-2*x + x^2))*(4*x - 4*x^2 + x^3) + E^((-9 + Log[x])/(-2*x + x^2))*(-
8*x^2 + 8*x^3 - 2*x^4)), x]
```

3.731.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5-4x^4+4x^3+e^{\frac{2(\log(x)-9)}{x^2-2x}}\left(x^3-4x^2+\left(2x^2-8x+8\right)\log(x)+4x\right)+\left(2x^4-8x^3+8x^2\right)\log(x)+e^{\frac{\log(x)-9}{x^2-2x}}(-}{x^5-4x^4+4x^3+\left(x^3-4x^2+4x\right)e^{\frac{2(\log(x)-9)}{x^2-2x}}+\left(-2x^4+8x^3\right.}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{\frac{18}{(x-2)x}}\left(x^5-4x^4+4x^3+e^{\frac{2(\log(x)-9)}{x^2-2x}}\left(x^3-4x^2+\left(2x^2-8x+8\right)\log(x)+4x\right)+\left(2x^4-8x^3+8x^2\right)\log(x)+e^{\frac{\mathrm{lo}}{}}\right.}{(2-x)^2x\left(e^{\frac{9}{(x-2)x}}x-x^{\frac{1}{x^2-2x}}\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-8\log(x)x^{\frac{2}{x^2-2x}}+15e^{\frac{9}{(x-2)x}}x^{1+\frac{1}{x^2-2x}}+14e^{\frac{9}{(x-2)x}}\log(x)x^{1+\frac{1}{x^2-2x}}+12e^{\frac{9}{(x-2)x}}x^{2+\frac{1}{x^2-2x}}-16e^{\frac{9}{(x-2)x}}\log(x)x^{2+}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{(x-2)^2x^{\frac{2}{(x-2)x}+1}+e^{\frac{18}{(x-2)x}}(x-2)^2x^3+2\left((x-2)^2x^{\frac{2}{(x-2)x}}+e^{\frac{18}{(x-2)x}}(x-2)^2x^2-e^{\frac{9}{(x-2)x}}\left(2x^3-8x^2+7x+1\right)\right.}{(2-x)^2x\left(e^{\frac{9}{(x-2)x}}x-x^{\frac{1}{x^2-2x}}\right)^2}$$

3.731.

$$\int \frac{4x^3-4x^4+x^5+\left(8x^2-8x^3+2x^4\right)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}\left(4x-4x^2+x^3+\left(8-8x+2x^2\right)\log(x)\right)+e^{\frac{-9+\log(x)}{-2x+x^2}}\left(20-15x-12x^2+9x^3-2x^4+(-2-14x+1\right.}{\quad e^{\frac{2(-9+\log(x))}{}}\quad e^{\frac{-9+\log(x)}{}}}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{e^{\frac{9}{(x-2)x}}\left(x^3-4x^2-15x+2x\log(x)-2\log(x)+20\right)}{(x-2)^2x\left(e^{\frac{9}{(x-2)x}}x-x^{\frac{1}{x^2-2x}}\right)}+\frac{e^{\frac{18}{(x-2)x}}\left(x^3-4x^2-15x+2x\log(x)-2\log(x)+20\right.}{(x-2)^2\left(e^{\frac{9}{(x-2)x}}x-x^{\frac{1}{x^2-2x}}\right)^2}\right.$$

$$\Big\downarrow \text{7299}$$

$$\int \left(-\frac{e^{\frac{9}{(x-2)x}}\left(x^3-4x^2-15x+2x\log(x)-2\log(x)+20\right)}{(x-2)^2x\left(e^{\frac{9}{(x-2)x}}x-x^{\frac{1}{x^2-2x}}\right)}+\frac{e^{\frac{18}{(x-2)x}}\left(x^3-4x^2-15x+2x\log(x)-2\log(x)+20\right.}{(x-2)^2\left(e^{\frac{9}{(x-2)x}}x-x^{\frac{1}{x^2-2x}}\right)^2}\right.$$

input
```
Int[(4*x^3 - 4*x^4 + x^5 + (8*x^2 - 8*x^3 + 2*x^4)*Log[x] + E^((2*(-9 + Lo
g[x]))/(-2*x + x^2))*(4*x - 4*x^2 + x^3 + (8 - 8*x + 2*x^2)*Log[x]) + E^((
-9 + Log[x])/(-2*x + x^2))*(20 - 15*x - 12*x^2 + 9*x^3 - 2*x^4 + (-2 - 14*
x + 16*x^2 - 4*x^3)*Log[x]))/(4*x^3 - 4*x^4 + x^5 + E^((2*(-9 + Log[x]))/(
-2*x + x^2))*(4*x - 4*x^2 + x^3) + E^((-9 + Log[x])/(-2*x + x^2))*(-8*x^2
+ 8*x^3 - 2*x^4)),x]
```

output
```
$Aborted
```

3.731.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.731.

$$\int \frac{4x^3-4x^4+x^5+\left(8x^2-8x^3+2x^4\right)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}\left(4x-4x^2+x^3+\left(8-8x+2x^2\right)\log(x)\right)+e^{\frac{-9+\log(x)}{-2x+x^2}}\left(20-15x-12x^2+9x^3-2x^4+(-2-14x+1\right.}{\ldots\frac{2(-9+\log(x))}{}\ldots\frac{-9+\log(x)}{}}$$

3.731.4 Maple [A] (verified)

Time = 1.35 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

method	result	size
risch	$\ln\left(x\right)^{2}+x-\frac{x}{x-{\mathrm e}^{\frac{\ln\left(x\right)-9}{\left(-2+x\right) x}}}$	30
parallelrisch	$\frac{x\ln\left(x\right)^{2}-\ln\left(x\right)^{2}{\mathrm e}^{\frac{\ln\left(x\right)-9}{\left(-2+x\right) x}}+x^{2}-{\mathrm e}^{\frac{\ln\left(x\right)-9}{\left(-2+x\right) x}} x+7 x-8\,{\mathrm e}^{\frac{\ln\left(x\right)-9}{\left(-2+x\right) x}}}{x-{\mathrm e}^{\frac{\ln\left(x\right)-9}{\left(-2+x\right) x}}}$	88

input
```
int((((2*x^2-8*x+8)*ln(x)+x^3-4*x^2+4*x)*exp((ln(x)-9)/(x^2-2*x))^2+((-4*x
^3+16*x^2-14*x-2)*ln(x)-2*x^4+9*x^3-12*x^2-15*x+20)*exp((ln(x)-9)/(x^2-2*x
))+(2*x^4-8*x^3+8*x^2)*ln(x)+x^5-4*x^4+4*x^3)/((x^3-4*x^2+4*x)*exp((ln(x)-
9)/(x^2-2*x))^2+(-2*x^4+8*x^3-8*x^2)*exp((ln(x)-9)/(x^2-2*x))+x^5-4*x^4+4*
x^3),x,method=_RETURNVERBOSE)
```

output
```
ln(x)^2+x-x/(x-exp((ln(x)-9)/(-2+x)/x))
```

3.731.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.00

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3)+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}$$
$$=\frac{x\log\left(x\right)^{2}+x^{2}-\left(\log\left(x\right)^{2}+x\right)e^{\left(\frac{\log\left(x\right)-9}{x^{2}-2\,x}\right)}-x}{x-e^{\left(\frac{\log\left(x\right)-9}{x^{2}-2\,x}\right)}}$$

input
```
integrate((((2*x^2-8*x+8)*log(x)+x^3-4*x^2+4*x)*exp((log(x)-9)/(x^2-2*x))^
2+((-4*x^3+16*x^2-14*x-2)*log(x)-2*x^4+9*x^3-12*x^2-15*x+20)*exp((log(x)-9
)/(x^2-2*x))+(2*x^4-8*x^3+8*x^2)*log(x)+x^5-4*x^4+4*x^3)/((x^3-4*x^2+4*x)*
exp((log(x)-9)/(x^2-2*x))^2+(-2*x^4+8*x^3-8*x^2)*exp((log(x)-9)/(x^2-2*x))
+x^5-4*x^4+4*x^3),x, algorithm=\
```

output
```
(x*log(x)^2 + x^2 - (log(x)^2 + x)*e^((log(x) - 9)/(x^2 - 2*x)) - x)/(x -
e^((log(x) - 9)/(x^2 - 2*x)))
```

3.731.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3)+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}$$
$$= x+\frac{x}{-x+e^{\frac{\log(x)-9}{x^2-2x}}}+\log(x)^2$$

input
```
integrate(((((2*x**2-8*x+8)*ln(x)+x**3-4*x**2+4*x)*exp((ln(x)-9)/(x**2-2*x)
)**2+((-4*x**3+16*x**2-14*x-2)*ln(x)-2*x**4+9*x**3-12*x**2-15*x+20)*exp((l
n(x)-9)/(x**2-2*x))+(2*x**4-8*x**3+8*x**2)*ln(x)+x**5-4*x**4+4*x**3)/((x**
3-4*x**2+4*x)*exp((ln(x)-9)/(x**2-2*x))**2+(-2*x**4+8*x**3-8*x**2)*exp((ln
(x)-9)/(x**2-2*x))+x**5-4*x**4+4*x**3),x)
```

output
```
x + x/(-x + exp((log(x) - 9)/(x**2 - 2*x))) + log(x)**2
```

3.731.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 96 vs. 2(29) = 58.

Time = 0.33 (sec) , antiderivative size = 96, normalized size of antiderivative = 3.31

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3)+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}$$
$$= -\frac{(\log(x)^2+x)e^{\left(\frac{\log(x)}{2(x-2)}+\frac{9}{2x}\right)}-(x\log(x)^2+x^2-x)e^{\left(\frac{\log(x)}{2x}+\frac{9}{2(x-2)}\right)}}{xe^{\left(\frac{\log(x)}{2x}+\frac{9}{2(x-2)}\right)}-e^{\left(\frac{\log(x)}{2(x-2)}+\frac{9}{2x}\right)}}$$

input
```
integrate((((2*x^2-8*x+8)*log(x)+x^3-4*x^2+4*x)*exp((log(x)-9)/(x^2-2*x))^
2+((-4*x^3+16*x^2-14*x-2)*log(x)-2*x^4+9*x^3-12*x^2-15*x+20)*exp((log(x)-9
)/(x^2-2*x))+(2*x^4-8*x^3+8*x^2)*log(x)+x^5-4*x^4+4*x^3)/((x^3-4*x^2+4*x)*
exp((log(x)-9)/(x^2-2*x))^2+(-2*x^4+8*x^3-8*x^2)*exp((log(x)-9)/(x^2-2*x))
+x^5-4*x^4+4*x^3),x, algorithm=\
```

output
```
-((log(x)^2 + x)*e^(1/2*log(x)/(x - 2) + 9/2/x) - (x*log(x)^2 + x^2 - x)*e
^(1/2*log(x)/x + 9/2/(x - 2)))/(x*e^(1/2*log(x)/x + 9/2/(x - 2)) - e^(1/2*
log(x)/(x - 2) + 9/2/x))
```


$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+x^2}}(20-15x-12x^2+9x^3-2x^4+(-2-14x+1\cdots}{\cdots}$$

3.731.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. $2(29) = 58$.

Time = 0.67 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.55

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3)+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}$$

$$= \frac{x\log(x)^2-e^{\left(\frac{\log(x)-9}{x^2-2x}\right)}\log(x)^2+x^2-xe^{\left(\frac{\log(x)-9}{x^2-2x}\right)}-x}{x-e^{\left(\frac{\log(x)-9}{x^2-2x}\right)}}$$

input
```
integrate((((2*x^2-8*x+8)*log(x)+x^3-4*x^2+4*x)*exp((log(x)-9)/(x^2-2*x))^
2+((-4*x^3+16*x^2-14*x-2)*log(x)-2*x^4+9*x^3-12*x^2-15*x+20)*exp((log(x)-9
)/(x^2-2*x))+(2*x^4-8*x^3+8*x^2)*log(x)+x^5-4*x^4+4*x^3)/((x^3-4*x^2+4*x)*
exp((log(x)-9)/(x^2-2*x))^2+(-2*x^4+8*x^3-8*x^2)*exp((log(x)-9)/(x^2-2*x))
+x^5-4*x^4+4*x^3),x, algorithm=\
```

output
```
(x*log(x)^2 - e^((log(x) - 9)/(x^2 - 2*x))*log(x)^2 + x^2 - x*e^((log(x) -
 9)/(x^2 - 2*x)) - x)/(x - e^((log(x) - 9)/(x^2 - 2*x)))
```

3.731.9 Mupad [B] (verification not implemented)

Time = 16.16 (sec) , antiderivative size = 123, normalized size of antiderivative = 4.24

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}{4x^3-4x^4+x^5+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3)+e^{\frac{-9+\log(x)}{-2x+x^2}}\cdots}$$

$$= \frac{e^{\frac{9}{2x-x^2}}\ln(x)^2+x\,e^{\frac{9}{2x-x^2}}+x\,x^{\frac{1}{2x-x^2}}-x^{\frac{1}{2x-x^2}}\,x^2-x\,x^{\frac{1}{2x-x^2}}\ln(x)^2}{e^{\frac{9}{2x-x^2}}-x\,x^{\frac{1}{2x-x^2}}}$$

input
```
int((exp(-(2*(log(x) - 9))/(2*x - x^2))*(4*x + log(x)*(2*x^2 - 8*x + 8) -
4*x^2 + x^3) + log(x)*(8*x^2 - 8*x^3 + 2*x^4) + 4*x^3 - 4*x^4 + x^5 - exp(
-(log(x) - 9)/(2*x - x^2))*(15*x + 12*x^2 - 9*x^3 + 2*x^4 + log(x)*(14*x -
 16*x^2 + 4*x^3 + 2) - 20))/(exp(-(2*(log(x) - 9))/(2*x - x^2))*(4*x - 4*x
^2 + x^3) - exp(-(log(x) - 9)/(2*x - x^2))*(8*x^2 - 8*x^3 + 2*x^4) + 4*x^3
 - 4*x^4 + x^5),x)
```

output
```
(exp(9/(2*x - x^2))*log(x)^2 + x*exp(9/(2*x - x^2)) + x*x^(1/(2*x - x^2))
- x^(1/(2*x - x^2))*x^2 - x*x^(1/(2*x - x^2))*log(x)^2)/(exp(9/(2*x - x^2)
) - x*x^(1/(2*x - x^2)))
```

3.731.

$$\int \frac{4x^3-4x^4+x^5+(8x^2-8x^3+2x^4)\log(x)+e^{\frac{2(-9+\log(x))}{-2x+x^2}}(4x-4x^2+x^3+(8-8x+2x^2)\log(x))+e^{\frac{-9+\log(x)}{-2x+x^2}}(20-15x-12x^2+9x^3-2x^4+(-2-14x+1\cdots}{\cdots}$$

3.732 $\int \frac{-16x^2+(-2e^4x^2+6x^4)\log(x)+(16+4x^2\log(x))\log(\log^2(x))-10\log(x)\log^2(\log^2(x))}{(e^4x^3+x^5)\log(x)-2x^3\log(x)\log(\log^2(x))+x\log(x)\log^2(\log^2(x))}\,dx$

3.732.1 Optimal result

Integrand size = 90, antiderivative size = 27

$$\int \frac{-16x^2+(-2e^4x^2+6x^4)\log(x)+(16+4x^2\log(x))\log(\log^2(x))-10\log(x)\log^2(\log^2(x))}{(e^4x^3+x^5)\log(x)-2x^3\log(x)\log(\log^2(x))+x\log(x)\log^2(\log^2(x))}\,dx$$
$$=\log\left(\frac{8\left(e^4+\left(-x+\frac{\log(\log^2(x))}{x}\right)^2\right)^4}{x^2}\right)$$

output
```
ln(8/x^2*((ln(ln(x)^2)/x-x)^2+exp(4))^4)
```

3.732.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.41

$$\int \frac{-16x^2+(-2e^4x^2+6x^4)\log(x)+(16+4x^2\log(x))\log(\log^2(x))-10\log(x)\log^2(\log^2(x))}{(e^4x^3+x^5)\log(x)-2x^3\log(x)\log(\log^2(x))+x\log(x)\log^2(\log^2(x))}\,dx$$
$$=-2\left(5\log(x)-2\log\left(e^4x^2+x^4-2x^2\log(\log^2(x))+\log^2(\log^2(x))\right)\right)$$

input
```
Integrate[(-16*x^2 + (-2*E^4*x^2 + 6*x^4)*Log[x] + (16 + 4*x^2*Log[x])*Log
[Log[x]^2] - 10*Log[x]*Log[Log[x]^2]^2)/((E^4*x^3 + x^5)*Log[x] - 2*x^3*Lo
g[x]*Log[Log[x]^2] + x*Log[x]*Log[Log[x]^2]^2),x]
```

output
```
-2*(5*Log[x] - 2*Log[E^4*x^2 + x^4 - 2*x^2*Log[Log[x]^2] + Log[Log[x]^2]^2
])
```

3.732.3 Rubi [A] (verified)

Time = 0.96 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.033, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-16x^2+\left(4x^2\log(x)+16\right)\log\left(\log^2(x)\right)+\left(6x^4-2e^4x^2\right)\log(x)-10\log(x)\log^2\left(\log^2(x)\right)}{-2x^3\log(x)\log\left(\log^2(x)\right)+\left(x^5+e^4x^3\right)\log(x)+x\log(x)\log^2\left(\log^2(x)\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-16x^2+\left(4x^2\log(x)+16\right)\log\left(\log^2(x)\right)+\left(6x^4-2e^4x^2\right)\log(x)-10\log(x)\log^2\left(\log^2(x)\right)}{x\log(x)\left(x^4+e^4x^2-2x^2\log\left(\log^2(x)\right)+\log^2\left(\log^2(x)\right)\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{8\left(2x^4\log(x)-2x^2-2x^2\log(x)\log\left(\log^2(x)\right)+e^4x^2\log(x)+2\log\left(\log^2(x)\right)\right)}{x\log(x)\left(x^4+e^4x^2-2x^2\log\left(\log^2(x)\right)+\log^2\left(\log^2(x)\right)\right)}-\frac{10}{x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$4\log\left(x^4+e^4x^2-2x^2\log\left(\log^2(x)\right)+\log^2\left(\log^2(x)\right)\right)-10\log(x)$$

input
```
Int[(-16*x^2 + (-2*E^4*x^2 + 6*x^4)*Log[x] + (16 + 4*x^2*Log[x])*Log[Log[x
]^2] - 10*Log[x]*Log[Log[x]^2]^2)/((E^4*x^3 + x^5)*Log[x] - 2*x^3*Log[x]*L
og[Log[x]^2] + x*Log[x]*Log[Log[x]^2]^2),x]
```

output
```
-10*Log[x] + 4*Log[E^4*x^2 + x^4 - 2*x^2*Log[Log[x]^2] + Log[Log[x]^2]^2]
```

3.732.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.732.4 Maple [A] (verified)

Time = 8.26 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

method	result
parallelrisch	$-10\ln(x)+4\ln\left(x^4+x^2\mathrm{e}^4-2x^2\ln\left(\ln(x)^2\right)+\ln\left(\ln(x)^2\right)^2\right)$
risch	$-10\ln(x)+4\ln\left(-\frac{\pi^2\,\mathrm{csgn}(i\ln(x))^4\,\mathrm{csgn}\left(i\ln(x)^2\right)^2}{16}+\frac{\pi^2\,\mathrm{csgn}(i\ln(x))^3\,\mathrm{csgn}\left(i\ln(x)^2\right)^3}{4}-\frac{3\pi^2\,\mathrm{csgn}(i\ln(x))^2\,\mathrm{csg}}{8}\right.$

input
```
int((-10*ln(x)*ln(ln(x)^2)^2+(4*x^2*ln(x)+16)*ln(ln(x)^2)+(-2*x^2*exp(4)+6
*x^4)*ln(x)-16*x^2)/(x*ln(x)*ln(ln(x)^2)^2-2*x^3*ln(x)*ln(ln(x)^2)+(x^3*ex
p(4)+x^5)*ln(x)),x,method=_RETURNVERBOSE)
```

output
```
-10*ln(x)+4*ln(x^4+x^2*exp(4)-2*x^2*ln(ln(x)^2)+ln(ln(x)^2)^2)
```

3.732.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

$$\int \frac{-16x^2+(-2e^4x^2+6x^4)\log(x)+(16+4x^2\log(x))\log\left(\log^2(x)\right)-10\log(x)\log^2\left(\log^2(x)\right)}{(e^4x^3+x^5)\log(x)-2x^3\log(x)\log\left(\log^2(x)\right)+x\log(x)\log^2\left(\log^2(x)\right)}\,dx$$
$$=4\,\log\left(x^4+x^2e^4-2\,x^2\log\left(\log(x)^2\right)+\log\left(\log(x)^2\right)^2\right)-10\,\log(x)$$

input
```
integrate((-10*log(x)*log(log(x)^2)^2+(4*x^2*log(x)+16)*log(log(x)^2)+(-2*
x^2*exp(4)+6*x^4)*log(x)-16*x^2)/(x*log(x)*log(log(x)^2)^2-2*x^3*log(x)*lo
g(log(x)^2)+(x^3*exp(4)+x^5)*log(x)),x, algorithm=\
```

output
```
4*log(x^4 + x^2*e^4 - 2*x^2*log(log(x)^2) + log(log(x)^2)^2) - 10*log(x)
```

3.732.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{-16x^2 + (-2e^4x^2 + 6x^4)\log(x) + (16 + 4x^2\log(x))\log(\log^2(x)) - 10\log(x)\log^2(\log^2(x))}{(e^4x^3 + x^5)\log(x) - 2x^3\log(x)\log(\log^2(x)) + x\log(x)\log^2(\log^2(x))}\,dx$$
$$= -10\log(x) + 4\log\left(x^4 - 2x^2\log\left(\log(x)^2\right) + x^2e^4 + \log\left(\log(x)^2\right)^2\right)$$

input
```
integrate((-10*ln(x)*ln(ln(x)**2)**2+(4*x**2*ln(x)+16)*ln(ln(x)**2)+(-2*x*
*2*exp(4)+6*x**4)*ln(x)-16*x**2)/(x*ln(x)*ln(ln(x)**2)**2-2*x**3*ln(x)*ln(
ln(x)**2)+(x**3*exp(4)+x**5)*ln(x)),x)
```

output
```
-10*log(x) + 4*log(x**4 - 2*x**2*log(log(x)**2) + x**2*exp(4) + log(log(x)
**2)**2)
```

3.732.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{-16x^2 + (-2e^4x^2 + 6x^4)\log(x) + (16 + 4x^2\log(x))\log(\log^2(x)) - 10\log(x)\log^2(\log^2(x))}{(e^4x^3 + x^5)\log(x) - 2x^3\log(x)\log(\log^2(x)) + x\log(x)\log^2(\log^2(x))}\,dx$$
$$= 4\log\left(\frac{1}{4}x^4 + \frac{1}{4}x^2e^4 - x^2\log(\log(x)) + \log(\log(x))^2\right) - 10\log(x)$$

input
```
integrate((-10*log(x)*log(log(x)^2)^2+(4*x^2*log(x)+16)*log(log(x)^2)+(-2*
x^2*exp(4)+6*x^4)*log(x)-16*x^2)/(x*log(x)*log(log(x)^2)^2-2*x^3*log(x)*lo
g(log(x)^2)+(x^3*exp(4)+x^5)*log(x)),x, algorithm=\
```

output
```
4*log(1/4*x^4 + 1/4*x^2*e^4 - x^2*log(log(x)) + log(log(x))^2) - 10*log(x)
```

3.732.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

$$\int \frac{-16x^2+(-2e^4x^2+6x^4)\log(x)+(16+4x^2\log(x))\log(\log^2(x))-10\log(x)\log^2(\log^2(x))}{(e^4x^3+x^5)\log(x)-2x^3\log(x)\log(\log^2(x))+x\log(x)\log^2(\log^2(x))}\,dx$$
$$= 4\log\left(x^4+x^2e^4-2x^2\log\left(\log(x)^2\right)+\log\left(\log(x)^2\right)^2\right)-10\log(x)$$

input
```
integrate((-10*log(x)*log(log(x)^2)^2+(4*x^2*log(x)+16)*log(log(x)^2)+(-2*
x^2*exp(4)+6*x^4)*log(x)-16*x^2)/(x*log(x)*log(log(x)^2)^2-2*x^3*log(x)*lo
g(log(x)^2)+(x^3*exp(4)+x^5)*log(x)),x, algorithm=\
```

output
```
4*log(x^4 + x^2*e^4 - 2*x^2*log(log(x)^2) + log(log(x)^2)^2) - 10*log(x)
```

3.732.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-16x^2+(-2e^4x^2+6x^4)\log(x)+(16+4x^2\log(x))\log(\log^2(x))-10\log(x)\log^2(\log^2(x))}{(e^4x^3+x^5)\log(x)-2x^3\log(x)\log(\log^2(x))+x\log(x)\log^2(\log^2(x))}\,dx$$
$$= \int -\frac{10\ln\left(\ln(x)^2\right)^2\ln(x)+\ln(x)\left(2x^2e^4-6x^4\right)-\ln\left(\ln(x)^2\right)\left(4x^2\ln(x)+16\right)+16x^2}{\ln(x)\left(x^5+e^4x^3\right)+x\ln\left(\ln(x)^2\right)^2\ln(x)-2x^3\ln\left(\ln(x)^2\right)\ln(x)}\,dx$$

input
```
int(-(10*log(log(x)^2)^2*log(x) + log(x)*(2*x^2*exp(4) - 6*x^4) - log(log(
x)^2)*(4*x^2*log(x) + 16) + 16*x^2)/(log(x)*(x^3*exp(4) + x^5) + x*log(log
(x)^2)^2*log(x) - 2*x^3*log(log(x)^2)*log(x)),x)
```

output
```
int(-(10*log(log(x)^2)^2*log(x) + log(x)*(2*x^2*exp(4) - 6*x^4) - log(log(
x)^2)*(4*x^2*log(x) + 16) + 16*x^2)/(log(x)*(x^3*exp(4) + x^5) + x*log(log
(x)^2)^2*log(x) - 2*x^3*log(log(x)^2)*log(x)), x)
```

3.733 $\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)\,dx$

3.733.1 Optimal result

Integrand size = 30, antiderivative size = 15

$$\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)\,dx=e^{12+4e^{-2x^3}}x$$

output
```
x*exp(exp(-x^3)^2)^4*exp(3)^4
```

3.733.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)\,dx=e^{4\left(3+e^{-2x^3}\right)}x$$

input
```
Integrate[E^(4/E^(2*x^3))*(E^12 - 24*E^(12 - 2*x^3)*x^3),x]
```

output
```
E^(4*(3 + E^(-2*x^3)))*x
```

3.733.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.033$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)dx$$
$$\Big\downarrow \text{ 2726}$$
$$e^{4e^{-2x^3}+12}x$$

input
```
Int[E^(4/E^(2*x^3))*(E^12 - 24*E^(12 - 2*x^3)*x^3),x]
```

output
```
E^(12 + 4/E^(2*x^3))*x
```

3.733.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.733.4 Maple [A] (verified)

Time = 1.43 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

method	result	size
risch	$x\,\mathrm{e}^{4\,\mathrm{e}^{-2x^3}+12}$	14
parallelrisch	$x\,\mathrm{e}^{4\,\mathrm{e}^{-2x^3}}\mathrm{e}^{12}$	18

input
```
int((-24*x^3*exp(3)^4*exp(-x^3)^2+exp(3)^4)*exp(exp(-x^3)^2)^4,x,method=_R
ETURNVERBOSE)
```

output
```
x*exp(4*exp(-2*x^3)+12)
```

3.733.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)\,dx = xe^{\left(4\,e^{\left(-2\,x^3\right)}+12\right)}$$

input
```
integrate((-24*x^3*exp(3)^4*exp(-x^3)^2+exp(3)^4)*exp(exp(-x^3)^2)^4,x, al
gorithm=\
```

output
```
x*e^(4*e^(-2*x^3) + 12)
```

3.733.6 Sympy [A] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)\,dx = xe^{12}e^{4e^{-2x^3}}$$

input
```
integrate((-24*x**3*exp(3)**4*exp(-x**3)**2+exp(3)**4)*exp(exp(-x**3)**2)*
*4,x)
```

output
```
x*exp(12)*exp(4*exp(-2*x**3))
```

3.733.7 Maxima [F]

$$\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)\,dx = \int -\left(24\,x^3e^{\left(-2\,x^3+12\right)}-e^{12}\right)e^{\left(4\,e^{\left(-2\,x^3\right)}\right)}\,dx$$

input
```
integrate((-24*x^3*exp(3)^4*exp(-x^3)^2+exp(3)^4)*exp(exp(-x^3)^2)^4,x, al
gorithm=\
```

output
```
-integrate((24*x^3*e^(-2*x^3 + 12) - e^12)*e^(4*e^(-2*x^3)), x)
```

3.733.8 Giac [F]

$$\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)\,dx=\int -\left(24\,x^3e^{\left(-2\,x^3+12\right)}-e^{12}\right)e^{\left(4\,e^{\left(-2\,x^3\right)}\right)}\,dx$$

input
```
integrate((-24*x^3*exp(3)^4*exp(-x^3)^2+exp(3)^4)*exp(exp(-x^3)^2)^4,x, al
gorithm=\
```

output
```
integrate(-(24*x^3*e^(-2*x^3 + 12) - e^12)*e^(4*e^(-2*x^3)), x)
```

3.733.9 Mupad [B] (verification not implemented)

Time = 15.41 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int e^{4e^{-2x^3}}\left(e^{12}-24e^{12-2x^3}x^3\right)\,dx=x\,\mathrm{e}^{4\,\mathrm{e}^{-2\,x^3}}\,\mathrm{e}^{12}$$

input
```
int(exp(4*exp(-2*x^3))*(exp(12) - 24*x^3*exp(12)*exp(-2*x^3)),x)
```

output
```
x*exp(4*exp(-2*x^3))*exp(12)
```

3.734 $\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)\,dx$

3.734.1 Optimal result

Integrand size = 18, antiderivative size = 14

$$\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)\,dx=2-e^{\frac{16x^2}{9}}+x$$

output
```
2+x-exp(16/9*x^2)
```

3.734.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)\,dx=-e^{\frac{16x^2}{9}}+x$$

input
```
Integrate[(9 - 32*E^((16*x^2)/9)*x)/9,x]
```

output
```
-E^((16*x^2)/9) + x
```

3.734.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.36, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{9}\int \left(9-32e^{\frac{16x^2}{9}}x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{9}\left(9x-9e^{\frac{16x^2}{9}}\right)$$

input
```
Int[(9 - 32*E^((16*x^2)/9)*x)/9,x]
```

output
```
(-9*E^((16*x^2)/9) + 9*x)/9
```

3.734.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.734.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.79

method	result	size
default	$x-\mathrm{e}^{\frac{16x^2}{9}}$	11
norman	$x-\mathrm{e}^{\frac{16x^2}{9}}$	11
risch	$x-\mathrm{e}^{\frac{16x^2}{9}}$	11
parallelrisch	$x-\mathrm{e}^{\frac{16x^2}{9}}$	11
parts	$x-\mathrm{e}^{\frac{16x^2}{9}}$	11

input
```
int(-32/9*x*exp(16/9*x^2)+1,x,method=_RETURNVERBOSE)
```

output
```
x-exp(16/9*x^2)
```

3.734.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)\,dx = x-e^{\left(\frac{16}{9}\,x^2\right)}$$

input
```
integrate(-32/9*x*exp(16/9*x^2)+1,x, algorithm=\
```

output
```
x - e^(16/9*x^2)
```

3.734.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.57

$$\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)\,dx = x-e^{\frac{16x^2}{9}}$$

input
```
integrate(-32/9*x*exp(16/9*x**2)+1,x)
```

output
```
x - exp(16*x**2/9)
```

3.734.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)\,dx = x-e^{\left(\frac{16}{9}\,x^2\right)}$$

input
```
integrate(-32/9*x*exp(16/9*x^2)+1,x, algorithm=\
```

output
```
x - e^(16/9*x^2)
```

3.734.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)\,dx = x-e^{\left(\frac{16}{9}\,x^2\right)}$$

input
```
integrate(-32/9*x*exp(16/9*x^2)+1,x, algorithm=\
```

output
```
x - e^(16/9*x^2)
```

3.734.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{1}{9}\left(9-32e^{\frac{16x^2}{9}}x\right)\,dx = x-\mathrm{e}^{\frac{16\,x^2}{9}}$$

input
```
int(1 - (32*x*exp((16*x^2)/9))/9,x)
```

output
```
x - exp((16*x^2)/9)
```

3.735 $\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616}{}$

3.735.1 Optimal result

Integrand size = 781, antiderivative size = 31

$$\text{the integral} = \left(5-\left(\frac{1}{5}(4-e^2+2x)+5\log(3-x)\right)^2\right)^4$$

output
```
(5-(5*ln(-x+3)-1/5*exp(2)+2/5*x+4/5)^2)^4
```

3.735.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 633 vs. 2(31) = 62.

Time = 3.01 (sec) , antiderivative size = 633, normalized size of antiderivative = 20.42

the integral

$$= \frac{8\left(\frac{390625}{8}+\frac{e^{16}}{8}-10360232x-308906x^2+917344x^3-16660x^4-33664x^5-416x^6+512x^7+32x^8-2e\right.}{}$$

3.735.

$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+25}{}$

input
```
Integrate[(-787377632 + E^14*(-152 - 16*x) - 129835568*x + 204211936*x^2 +
 16951616*x^3 - 13325440*x^4 - 1536256*x^5 + 252416*x^6 + 48128*x^7 + 2048
*x^8 + E^12*(4256 + 2576*x + 224*x^2) + E^10*(5928 - 50448*x - 18144*x^2 -
 1344*x^3) + E^8*(-799520 - 143440*x + 249120*x^2 + 69440*x^3 + 4480*x^4)
+ E^6*(633080 + 6462800*x + 910400*x^2 - 656000*x^3 - 156800*x^4 - 8960*x^
5) + E^4*(52288608 + 1705584*x - 19588320*x^2 - 2494080*x^3 + 971520*x^4 +
 209664*x^5 + 10752*x^6) + E^2*(23476856 - 206683184*x - 14419296*x^2 + 26
384320*x^3 + 3167360*x^4 - 767232*x^5 - 154112*x^6 - 7168*x^7) + (-5869214
00 + 5167079600*x + 360482400*x^2 - 659608000*x^3 - 79184000*x^4 + 1918080
0*x^5 + 3852800*x^6 + 179200*x^7 + E^12*(26600 + 2800*x) + E^10*(-638400 -
 386400*x - 33600*x^2) + E^8*(-741000 + 6306000*x + 2268000*x^2 + 168000*x
^3) + E^6*(79952000 + 14344000*x - 24912000*x^2 - 6944000*x^3 - 448000*x^4
) + E^4*(-47481000 - 484710000*x - 68280000*x^2 + 49200000*x^3 + 11760000*
x^4 + 672000*x^5) + E^2*(-2614430400 - 85279200*x + 979416000*x^2 + 124704
000*x^3 - 48576000*x^4 - 10483200*x^5 - 537600*x^6))*Log[3 - x] + (3268038
0000 + E^10*(-1995000 - 210000*x) + 1065990000*x - 12242700000*x^2 - 15588
00000*x^3 + 607200000*x^4 + 131040000*x^5 + 6720000*x^6 + E^8*(39900000 +
24150000*x + 2100000*x^2) + E^6*(37050000 - 315300000*x - 113400000*x^2 -
8400000*x^3) + E^4*(-2998200000 - 537900000*x + 934200000*x^2 + 260400000*
x^3 + 16800000*x^4) + E^2*(1187025000 + 12117750000*x + 1707000000*x^2 - 1
230000000*x^3 - 294000000*x^4 - 16800000*x^5))*Log[3 - x]^2 + (-9891875000
 - 100981250000*x - 14225000000*x^2 + 10250000000*x^3 + 2450000000*x^4 + 1
40000000*x^5 + E^8*(83125000 + 8750000*x) + E^6*(-1330000000 - 805000000*x
 - 70000000*x^2) + E^4*(-926250000 + 7882500000*x + 2835000000*x^2 + 21000
0000*x^3) + E^2*(49970000000 + 8965000000*x - 15570000000*x^2 - 4340000000
*x^3 - 280000000*x^4))*Log[3 - x]^3 + (-312312500000 + E^6*(-2078125000 -
218750000*x) - 56031250000*x + 97312500000*x^2 + 27125000000*x^3 + 1750000
000*x^4 + E^4*(24937500000 + 15093750000*x + 1312500000*x^2) + E^2*(115781
25000 - 98531250000*x - 35437500000*x^2 - 2625000000*x^3))*Log[3 - x]^4 +
(-57890625000 + 492656250000*x + 177187500000*x^2 + 13125000000*x^3 + E^4*
(31171875000 + 3281250000*x) + E^2*(-249375000000 - 150937500000*x - 13125
000000*x^2))*Log[3 - x]^5 + (1039062500000 + E^2*(-259765625000 - 27343750
000*x) + 628906250000*x + 54687500000*x^2)*Log[3 - x]^6 + (927734375000 +
97656250000*x)*Log[3 - x]^7)/(-1171875 + 390625*x),x]
```

3.735.

$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257$$

output
```
(8*(390625/8 + E^16/8 - 10360232*x - 308906*x^2 + 917344*x^3 - 16660*x^4 -
 33664*x^5 - 416*x^6 + 512*x^7 + 32*x^8 - 2*E^14*(5 + x) + E^12*(575/2 + 5
6*x + 14*x^2) - 2*E^10*(1625 - 39*x + 168*x^2 + 28*x^3) + (5*E^8*(4375 - 8
416*x - 312*x^2 + 896*x^3 + 112*x^4))/4 + E^6*(81250 + 8330*x + 42080*x^2
+ 1040*x^3 - 2240*x^4 - 224*x^5) + E^4*(359375/2 + 688008*x - 24990*x^2 -
84160*x^3 - 1560*x^4 + 2688*x^5 + 224*x^6) - 2*E^2*(-78125 - 154453*x + 68
8008*x^2 - 16660*x^3 - 42080*x^4 - 624*x^5 + 896*x^6 + 64*x^7) - 25*(E^2 -
 2*(2 + x))*(-109 + E^4 + 16*x + 4*x^2 - 4*E^2*(2 + x))^3*Log[3 - x] + (62
5*(-13 + 7*E^4 + 112*x + 28*x^2 - 28*E^2*(2 + x))*(-109 + E^4 + 16*x + 4*x
^2 - 4*E^2*(2 + x))^2*Log[3 - x]^2)/2 - 15625*(-114668 + 7*E^10 + 8330*x +
 42080*x^2 + 1040*x^3 - 2240*x^4 - 224*x^5 - 70*E^8*(2 + x) + 10*E^6*(-13
+ 112*x + 28*x^2) - 20*E^4*(-526 - 39*x + 168*x^2 + 28*x^3) + 5*E^2*(-833
- 8416*x - 312*x^2 + 896*x^3 + 112*x^4))*Log[3 - x]^3 + (1953125*(-833 + 7
*E^8 - 8416*x - 312*x^2 + 896*x^3 + 112*x^4 - 56*E^6*(2 + x) + 6*E^4*(-13
+ 112*x + 28*x^2) - 8*E^2*(-526 - 39*x + 168*x^2 + 28*x^3))*Log[3 - x]^4)/
4 - 9765625*(1052 + 7*E^6 + 78*x - 336*x^2 - 56*x^3 - 42*E^4*(2 + x) + E^2
*(-39 + 336*x + 84*x^2))*Log[3 - x]^5 + (244140625*(-13 + 7*E^4 + 112*x +
28*x^2 - 28*E^2*(2 + x))*Log[3 - x]^6)/2 - 6103515625*(E^2 - 2*(2 + x))*Lo
g[3 - x]^7 + (152587890625*Log[3 - x]^8)/8))/390625
```

3.735.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 6532 vs. $2(31) = 62$.

Time = 34.13 (sec) , antiderivative size = 6532, normalized size of antiderivative = 210.71, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.006$, Rules used = {7239, 27, 7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2048x^8 + 48128x^7 + 252416x^6 - 1536256x^5 - 13325440x^4 + 16951616x^3 + 204211936x^2 + e^{12}(224x^2 + 2576x}{}$$

$$\Big\downarrow 7239$$

$$\int \frac{8(2x+19)\left(2x+25\log(3-x)+4\left(1-\frac{e^2}{4}\right)\right)\left(-4x^2-16x+4e^2(x+2)-625\log^2(3-x)+50\left(e^2-2(x+2)\right)\right.}{390625(3-x)}$$

$$\Big\downarrow 27$$

3.735.
$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257}{}$$

$$\frac{8\int \frac{(2x+19)\left(2x+25\log(3-x)-e^2+4\right)\left(-4x^2-16x-625\log^2(3-x)+4e^2(x+2)+50\left(e^2-2(x+2)\right)\log(3-x)-e^4+109\right)^3}{3-x}dx}{390625}$$

$\downarrow$ 7292

$$\frac{8\int \frac{(2x+19)\left(2x+25\log(3-x)+4\left(1-\frac{e^2}{4}\right)\right)\left(-4x^2-16x-625\log^2(3-x)+4e^2(x+2)+50\left(e^2-2(x+2)\right)\log(3-x)+109\left(1-\frac{e^4}{109}\right)\right)^3}{3-x}dx}{390625}$$

$\downarrow$ 7293

$$8\int \left(\frac{128(2x+19)x^7}{x-3}+\frac{1536\left(1-\frac{1}{24}(-2+e)(2+e)\right)(2x+19)x^6}{x-3}-\frac{384e^2(x+2)(2x+19)x^5}{x-3}+\frac{6144\left(1+\frac{1}{64}\left(-77-8e^2+e^4\right)\right)(2x+19)x^5}{x-3}-\frac{3072e^2}{}\right.$$

$\downarrow$ 2009

$$\overline{390625}$$

3.735.

$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257}{}$$

input
```
Int[(-787377632 + E^14*(-152 - 16*x) - 129835568*x + 204211936*x^2 + 16951
616*x^3 - 13325440*x^4 - 1536256*x^5 + 252416*x^6 + 48128*x^7 + 2048*x^8 +
 E^12*(4256 + 2576*x + 224*x^2) + E^10*(5928 - 50448*x - 18144*x^2 - 1344*
x^3) + E^8*(-799520 - 143440*x + 249120*x^2 + 69440*x^3 + 4480*x^4) + E^6*
(633080 + 6462800*x + 910400*x^2 - 656000*x^3 - 156800*x^4 - 8960*x^5) + E
^4*(52288608 + 1705584*x - 19588320*x^2 - 2494080*x^3 + 971520*x^4 + 20966
4*x^5 + 10752*x^6) + E^2*(23476856 - 206683184*x - 14419296*x^2 + 26384320
*x^3 + 3167360*x^4 - 767232*x^5 - 154112*x^6 - 7168*x^7) + (-586921400 + 5
167079600*x + 360482400*x^2 - 659608000*x^3 - 79184000*x^4 + 19180800*x^5
+ 3852800*x^6 + 179200*x^7 + E^12*(26600 + 2800*x) + E^10*(-638400 - 38640
0*x - 33600*x^2) + E^8*(-741000 + 6306000*x + 2268000*x^2 + 168000*x^3) +
E^6*(79952000 + 14344000*x - 24912000*x^2 - 6944000*x^3 - 448000*x^4) + E^
4*(-47481000 - 484710000*x - 68280000*x^2 + 49200000*x^3 + 11760000*x^4 +
672000*x^5) + E^2*(-2614430400 - 85279200*x + 979416000*x^2 + 124704000*x^
3 - 48576000*x^4 - 10483200*x^5 - 537600*x^6))*Log[3 - x] + (32680380000 +
 E^10*(-1995000 - 210000*x) + 1065990000*x - 12242700000*x^2 - 1558800000*
x^3 + 607200000*x^4 + 131040000*x^5 + 6720000*x^6 + E^8*(39900000 + 241500
00*x + 2100000*x^2) + E^6*(37050000 - 315300000*x - 113400000*x^2 - 840000
0*x^3) + E^4*(-2998200000 - 537900000*x + 934200000*x^2 + 260400000*x^3 +
16800000*x^4) + E^2*(1187025000 + 12117750000*x + 1707000000*x^2 - 1230000
000*x^3 - 294000000*x^4 - 16800000*x^5))*Log[3 - x]^2 + (-9891875000 - 100
981250000*x - 14225000000*x^2 + 10250000000*x^3 + 2450000000*x^4 + 1400000
00*x^5 + E^8*(83125000 + 8750000*x) + E^6*(-1330000000 - 805000000*x - 700
00000*x^2) + E^4*(-926250000 + 7882500000*x + 2835000000*x^2 + 210000000*x
^3) + E^2*(49970000000 + 8965000000*x - 15570000000*x^2 - 4340000000*x^3 -
 280000000*x^4))*Log[3 - x]^3 + (-312312500000 + E^6*(-2078125000 - 218750
000*x) - 56031250000*x + 97312500000*x^2 + 27125000000*x^3 + 1750000000*x^
4 + E^4*(24937500000 + 15093750000*x + 1312500000*x^2) + E^2*(11578125000
- 98531250000*x - 35437500000*x^2 - 2625000000*x^3))*Log[3 - x]^4 + (-5789
0625000 + 492656250000*x + 177187500000*x^2 + 13125000000*x^3 + E^4*(31171
875000 + 3281250000*x) + E^2*(-249375000000 - 150937500000*x - 13125000000
*x^2))*Log[3 - x]^5 + (1039062500000 + E^2*(-259765625000 - 27343750000*x)
 + 628906250000*x + 54687500000*x^2)*Log[3 - x]^6 + (927734375000 + 976562
50000*x)*Log[3 - x]^7)/(-1171875 + 390625*x),x]
```

3.735.

$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+25}{}$

output
```
(8*((47602209375*(3 - x)^2)/2 - 88593750*(41 - 4*E^2)*(3 - x)^2 + 49218750
0*(37 - 3*E^2)*(3 - x)^2 - (3076171875*(33 - 2*E^2)*(3 - x)^2)/2 + 5670000
0*(9 - E^2)*(3 - x)^2 + 17578125*(1037 - 231*E^2 + 7*E^4)*(3 - x)^2 + 1012
500*(884 - 287*E^2 + 14*E^4)*(3 - x)^2 - 2812500*(1886 - 518*E^2 + 21*E^4)
*(3 - x)^2 - 234375*(8471 - 6222*E^2 + 693*E^4 - 14*E^6)*(3 - x)^2 + 22500
0*(1353 - 1886*E^2 + 259*E^4 - 7*E^6)*(3 - x)^2 - 9375*(24573 + 16942*E^2
- 6222*E^4 + 462*E^6 - 7*E^8)*(3 - x)^2 + (10434200000*(3 - x)^3)/81 + (17
500000*(41 - 4*E^2)*(3 - x)^3)/3 - (875000000*(37 - 3*E^2)*(3 - x)^3)/81 -
 8400000*(9 - E^2)*(3 - x)^3 - 100000*(884 - 287*E^2 + 14*E^4)*(3 - x)^3 +
 (2500000*(1886 - 518*E^2 + 21*E^4)*(3 - x)^3)/27 - (100000*(1353 - 1886*E
^2 + 259*E^4 - 7*E^6)*(3 - x)^3)/9 + (20540625*(3 - x)^4)/8 - (1640625*(41
 - 4*E^2)*(3 - x)^4)/8 + 787500*(9 - E^2)*(3 - x)^4 + (9375*(884 - 287*E^2
 + 14*E^4)*(3 - x)^4)/2 - 33600*(3 - x)^5 - 33600*(9 - E^2)*(3 - x)^5 + (7
0000*(3 - x)^6)/9 - 1638221760000*x - 3888000*E^2*x + 2160000*E^4*x - 4000
00*E^6*x - 63424*(2 - E)*E^6*(2 + E)*x - 453600*(49 - 6*E^2)*x - 141750000
0*(41 - 4*E^2)*x + 23625000000*(37 - 3*E^2)*x - 295312500000*(33 - 2*E^2)*
x + 340200000*(9 - E^2)*x + 2460937500000*(10 - E^2)*x + 360000*E^4*(12 -
E^2)*x - 648000*E^2*(20 - E^2)*x + 388800*(28 - E^2)*x - 8784*(2 - E)*E^4*
(2 + E)*(109 - E^4)*x - 348*(2 - E)*E^2*(2 + E)*(109 - E^4)^2*x - 2*(2 - E
)*(2 + E)*(109 - E^4)^3*x - 194400*(13 + 8*E^2 - E^4)*x + 216000*E^2*(4...
```

3.735.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.735.
$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+25\ldots}{}$

3.735.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 960 vs. $2(25) = 50$.

Time = 1.60 (sec) , antiderivative size = 961, normalized size of antiderivative = 31.00

method	result	size
risch	Expression too large to display	961
parallelrisch	Expression too large to display	1909
parts	Expression too large to display	3747
derivativedivides	Expression too large to display	3929
default	Expression too large to display	3929

3.735.

$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257}{}$

input
```
int(((97656250000*x+927734375000)*ln(-x+3)^7+((-27343750000*x-259765625000
)*exp(2)+54687500000*x^2+628906250000*x+1039062500000)*ln(-x+3)^6+((328125
0000*x+31171875000)*exp(2)^2+(-13125000000*x^2-150937500000*x-249375000000
)*exp(2)+13125000000*x^3+177187500000*x^2+492656250000*x-57890625000)*ln(-
x+3)^5+((-218750000*x-2078125000)*exp(2)^3+(1312500000*x^2+15093750000*x+2
4937500000)*exp(2)^2+(-2625000000*x^3-35437500000*x^2-98531250000*x+115781
25000)*exp(2)+1750000000*x^4+27125000000*x^3+97312500000*x^2-56031250000*x
-312312500000)*ln(-x+3)^4+((8750000*x+83125000)*exp(2)^4+(-70000000*x^2-80
5000000*x-1330000000)*exp(2)^3+(210000000*x^3+2835000000*x^2+7882500000*x-
926250000)*exp(2)^2+(-280000000*x^4-4340000000*x^3-15570000000*x^2+8965000
000*x+49970000000)*exp(2)+140000000*x^5+2450000000*x^4+10250000000*x^3-142
25000000*x^2-100981250000*x-9891875000)*ln(-x+3)^3+((-210000*x-1995000)*ex
p(2)^5+(2100000*x^2+24150000*x+39900000)*exp(2)^4+(-8400000*x^3-113400000*
x^2-315300000*x+37050000)*exp(2)^3+(16800000*x^4+260400000*x^3+934200000*x
^2-537900000*x-2998200000)*exp(2)^2+(-16800000*x^5-294000000*x^4-123000000
0*x^3+1707000000*x^2+12117750000*x+1187025000)*exp(2)+6720000*x^6+13104000
0*x^5+607200000*x^4-1558800000*x^3-12242700000*x^2+1065990000*x+3268038000
0)*ln(-x+3)^2+((2800*x+26600)*exp(2)^6+(-33600*x^2-386400*x-638400)*exp(2)
^5+(168000*x^3+2268000*x^2+6306000*x-741000)*exp(2)^4+(-448000*x^4-6944000
*x^3-24912000*x^2+14344000*x+79952000)*exp(2)^3+(672000*x^5+11760000*x^4+4
9200000*x^3-68280000*x^2-484710000*x-47481000)*exp(2)^2+(-537600*x^6-10483
200*x^5-48576000*x^4+124704000*x^3+979416000*x^2-85279200*x-2614430400)*ex
p(2)+179200*x^7+3852800*x^6+19180800*x^5-79184000*x^4-659608000*x^3+360482
400*x^2+5167079600*x-586921400)*ln(-x+3)+(-16*x-152)*exp(2)^7+(224*x^2+257
6*x+4256)*exp(2)^6+(-1344*x^3-18144*x^2-50448*x+5928)*exp(2)^5+(4480*x^4+6
9440*x^3+249120*x^2-143440*x-799520)*exp(2)^4+(-8960*x^5-156800*x^4-656000
*x^3+910400*x^2+6462800*x+633080)*exp(2)^3+(10752*x^6+209664*x^5+971520*x^
4-2494080*x^3-19588320*x^2+1705584*x+52288608)*exp(2)^2+(-7168*x^7-154112*
x^6-767232*x^5+3167360*x^4+26384320*x^3-14419296*x^2-206683184*x+23476856)
*exp(2)+2048*x^8+48128*x^7+252416*x^6-1536256*x^5-13325440*x^4+16951616*x^
3+204211936*x^2-129835568*x-787377632)/(390625*x-1171875),x,method=_RETURN
VERBOSE)
```

3.735.

$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257}{}$$

output
```
112/390625*x^2*exp(12)-16/390625*x*exp(14)-82881856/390625*x+624/390625*x*
exp(10)-14336/390625*x^6*exp(2)-134656/78125*x^3*exp(4)-39984/78125*x^2*ex
p(4)+13328/78125*x*exp(6)+53312/78125*x^3*exp(2)-11008128/390625*x^2*exp(2
)+134656/78125*x^4*exp(2)-32/390625*exp(14)-2688/390625*x^2*exp(10)-448/39
0625*x^3*exp(10)-52/390625*exp(12)-2496/78125*x^4*exp(4)+21504/390625*x^5*
exp(4)-1666/78125*exp(8)-41440928/15625*ln(-3+x)+1792/390625*x^6*exp(4)+1/
390625*exp(16)-917344/390625*exp(6)+8416/390625*exp(10)+5504064/390625*x*e
xp(4)-624/78125*x^2*exp(8)-617812/390625*exp(4)+4096/390625*x^7+256/390625
*x^8+41440928/390625*exp(2)-3328/390625*x^6-269312/390625*x^5-26656/78125*
x^4+7338752/390625*x^3-2471248/390625*x^2+9984/390625*exp(2)*x^5+2471248/3
90625*exp(2)*x+1664/78125*x^3*exp(6)+67328/78125*x^2*exp(6)-16832/78125*x*
exp(8)+390625*ln(-x+3)^8+(5504064/625*x-336/625*x*exp(10)+10752/125*x^3*ex
p(4)-3744/125*x^2*exp(4)+1248/125*x*exp(6)+4992/125*x^3*exp(2)+201984/125*
x^2*exp(2)-10752/125*x^4*exp(2)+28/625*exp(12)+1344/125*x^4*exp(4)-156/125
*exp(8)+16832/125*exp(6)-672/625*exp(10)-100992/125*x*exp(4)+336/125*x^2*e
xp(8)-9996/125*exp(4)-2752032/625*exp(2)+1792/625*x^6+21504/625*x^5-2496/1
25*x^4-134656/125*x^3-39984/125*x^2-5376/625*exp(2)*x^5+39984/125*exp(2)*x
-896/125*x^3*exp(6)-5376/125*x^2*exp(6)+1344/125*x*exp(8)-617812/625)*ln(-
x+3)^2+(-1400*exp(6)+8400*x*exp(4)-16800*x^2*exp(2)+11200*x^3+16800*exp(4)
-67200*exp(2)*x+67200*x^2+7800*exp(2)-15600*x-210400)*ln(-x+3)^5+(-2471...
```

3.735.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 793 vs. $2(25) = 50$.

Time = 0.29 (sec) , antiderivative size = 793, normalized size of antiderivative = 25.58

$$\text{the integral} = \text{Too large to display}$$

3.735.

$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+25}{}$

input
```
integrate(((97656250000*x+927734375000)*log(-x+3)^7+((-27343750000*x-25976
5625000)*exp(2)+54687500000*x^2+628906250000*x+1039062500000)*log(-x+3)^6+
((3281250000*x+31171875000)*exp(2)^2+(-13125000000*x^2-150937500000*x-2493
75000000)*exp(2)+13125000000*x^3+177187500000*x^2+492656250000*x-578906250
00)*log(-x+3)^5+((-218750000*x-2078125000)*exp(2)^3+(1312500000*x^2+150937
50000*x+24937500000)*exp(2)^2+(-2625000000*x^3-35437500000*x^2-98531250000
*x+11578125000)*exp(2)+1750000000*x^4+27125000000*x^3+97312500000*x^2-5603
1250000*x-312312500000)*log(-x+3)^4+((8750000*x+83125000)*exp(2)^4+(-70000
000*x^2-805000000*x-1330000000)*exp(2)^3+(210000000*x^3+2835000000*x^2+788
2500000*x-926250000)*exp(2)^2+(-280000000*x^4-4340000000*x^3-15570000000*x
^2+8965000000*x+49970000000)*exp(2)+140000000*x^5+2450000000*x^4+102500000
00*x^3-14225000000*x^2-100981250000*x-9891875000)*log(-x+3)^3+((-210000*x-
1995000)*exp(2)^5+(2100000*x^2+24150000*x+39900000)*exp(2)^4+(-8400000*x^3
-113400000*x^2-315300000*x+37050000)*exp(2)^3+(16800000*x^4+260400000*x^3+
934200000*x^2-537900000*x-2998200000)*exp(2)^2+(-16800000*x^5-294000000*x^
4-1230000000*x^3+1707000000*x^2+12117750000*x+1187025000)*exp(2)+6720000*x
^6+131040000*x^5+607200000*x^4-1558800000*x^3-12242700000*x^2+1065990000*x
+32680380000)*log(-x+3)^2+((2800*x+26600)*exp(2)^6+(-33600*x^2-386400*x-63
8400)*exp(2)^5+(168000*x^3+2268000*x^2+6306000*x-741000)*exp(2)^4+(-448000
*x^4-6944000*x^3-24912000*x^2+14344000*x+79952000)*exp(2)^3+(672000*x^5+11
760000*x^4+49200000*x^3-68280000*x^2-484710000*x-47481000)*exp(2)^2+(-5376
00*x^6-10483200*x^5-48576000*x^4+124704000*x^3+979416000*x^2-85279200*x-26
14430400)*exp(2)+179200*x^7+3852800*x^6+19180800*x^5-79184000*x^4-65960800
0*x^3+360482400*x^2+5167079600*x-586921400)*log(-x+3)+(-16*x-152)*exp(2)^7
+(224*x^2+2576*x+4256)*exp(2)^6+(-1344*x^3-18144*x^2-50448*x+5928)*exp(2)^
5+(4480*x^4+69440*x^3+249120*x^2-143440*x-799520)*exp(2)^4+(-8960*x^5-1568
00*x^4-656000*x^3+910400*x^2+6462800*x+633080)*exp(2)^3+(10752*x^6+209664*
x^5+971520*x^4-2494080*x^3-19588320*x^2+1705584*x+52288608)*exp(2)^2+(-716
8*x^7-154112*x^6-767232*x^5+3167360*x^4+26384320*x^3-14419296*x^2-20668318
4*x+23476856)*exp(2)+2048*x^8+48128*x^7+252416*x^6-1536256*x^5-13325440*x^
4+16951616*x^3+204211936*x^2-129835568*x-787377632)/(390625*x-1171875),x,
algorithm=\
```

3.735.

$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257}{}$$

output
```
256/390625*x^8 + 125000*(2*x - e^2 + 4)*log(-x + 3)^7 + 390625*log(-x + 3)
^8 + 4096/390625*x^7 + 2500*(28*x^2 - 28*(x + 2)*e^2 + 112*x + 7*e^4 - 13)
*log(-x + 3)^6 - 3328/390625*x^6 + 200*(56*x^3 + 336*x^2 + 42*(x + 2)*e^4
- 3*(28*x^2 + 112*x - 13)*e^2 - 78*x - 7*e^6 - 1052)*log(-x + 3)^5 - 26931
2/390625*x^5 + 10*(112*x^4 + 896*x^3 - 312*x^2 - 56*(x + 2)*e^6 + 6*(28*x^
2 + 112*x - 13)*e^4 - 8*(28*x^3 + 168*x^2 - 39*x - 526)*e^2 - 8416*x + 7*e
^8 - 833)*log(-x + 3)^4 - 26656/78125*x^4 + 8/25*(224*x^5 + 2240*x^4 - 104
0*x^3 - 42080*x^2 + 70*(x + 2)*e^8 - 10*(28*x^2 + 112*x - 13)*e^6 + 20*(28
*x^3 + 168*x^2 - 39*x - 526)*e^4 - 5*(112*x^4 + 896*x^3 - 312*x^2 - 8416*x
 - 833)*e^2 - 8330*x - 7*e^10 + 114668)*log(-x + 3)^3 + 7338752/390625*x^3
 + 4/625*(448*x^6 + 5376*x^5 - 3120*x^4 - 168320*x^3 - 49980*x^2 - 84*(x +
 2)*e^10 + 15*(28*x^2 + 112*x - 13)*e^8 - 40*(28*x^3 + 168*x^2 - 39*x - 52
6)*e^6 + 15*(112*x^4 + 896*x^3 - 312*x^2 - 8416*x - 833)*e^4 - 12*(112*x^5
 + 1120*x^4 - 520*x^3 - 21040*x^2 - 4165*x + 57334)*e^2 + 1376016*x + 7*e^
12 - 154453)*log(-x + 3)^2 - 2471248/390625*x^2 - 16/390625*x*e^14 + 112/3
90625*(x^2 + 4*x)*e^12 - 16/390625*(28*x^3 + 168*x^2 - 39*x)*e^10 + 16/781
25*(14*x^4 + 112*x^3 - 39*x^2 - 1052*x)*e^8 - 16/390625*(112*x^5 + 1120*x^
4 - 520*x^3 - 21040*x^2 - 4165*x)*e^6 + 16/390625*(112*x^6 + 1344*x^5 - 78
0*x^4 - 42080*x^3 - 12495*x^2 + 344004*x)*e^4 - 16/390625*(64*x^7 + 896*x^
6 - 624*x^5 - 42080*x^4 - 16660*x^3 + 688008*x^2 - 154453*x)*e^2 + 8/15...
```

3.735.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1146 vs. $2(24) = 48$.

Time = 2.33 (sec) , antiderivative size = 1146, normalized size of antiderivative = 36.97

$$\text{the integral} = \text{Too large to display}$$

3.735.

$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+25\ldots}{}$

input
```
integrate(((97656250000*x+927734375000)*ln(-x+3)**7+((-27343750000*x-25976
5625000)*exp(2)+54687500000*x**2+628906250000*x+1039062500000)*ln(-x+3)**6
+((3281250000*x+31171875000)*exp(2)**2+(-13125000000*x**2-150937500000*x-2
49375000000)*exp(2)+13125000000*x**3+177187500000*x**2+492656250000*x-5789
0625000)*ln(-x+3)**5+((-218750000*x-2078125000)*exp(2)**3+(1312500000*x**2
+15093750000*x+24937500000)*exp(2)**2+(-2625000000*x**3-35437500000*x**2-9
8531250000*x+11578125000)*exp(2)+1750000000*x**4+27125000000*x**3+97312500
000*x**2-56031250000*x-312312500000)*ln(-x+3)**4+((8750000*x+83125000)*exp
(2)**4+(-70000000*x**2-805000000*x-1330000000)*exp(2)**3+(210000000*x**3+2
835000000*x**2+7882500000*x-926250000)*exp(2)**2+(-280000000*x**4-43400000
00*x**3-15570000000*x**2+8965000000*x+49970000000)*exp(2)+140000000*x**5+2
450000000*x**4+10250000000*x**3-14225000000*x**2-100981250000*x-9891875000
)*ln(-x+3)**3+((-210000*x-1995000)*exp(2)**5+(2100000*x**2+24150000*x+3990
0000)*exp(2)**4+(-8400000*x**3-113400000*x**2-315300000*x+37050000)*exp(2)
**3+(16800000*x**4+260400000*x**3+934200000*x**2-537900000*x-2998200000)*e
xp(2)**2+(-16800000*x**5-294000000*x**4-1230000000*x**3+1707000000*x**2+12
117750000*x+1187025000)*exp(2)+6720000*x**6+131040000*x**5+607200000*x**4-
1558800000*x**3-12242700000*x**2+1065990000*x+32680380000)*ln(-x+3)**2+((2
800*x+26600)*exp(2)**6+(-33600*x**2-386400*x-638400)*exp(2)**5+(168000*x**
3+2268000*x**2+6306000*x-741000)*exp(2)**4+(-448000*x**4-6944000*x**3-2491
2000*x**2+14344000*x+79952000)*exp(2)**3+(672000*x**5+11760000*x**4+492000
00*x**3-68280000*x**2-484710000*x-47481000)*exp(2)**2+(-537600*x**6-104832
00*x**5-48576000*x**4+124704000*x**3+979416000*x**2-85279200*x-2614430400)
*exp(2)+179200*x**7+3852800*x**6+19180800*x**5-79184000*x**4-659608000*x**
3+360482400*x**2+5167079600*x-586921400)*ln(-x+3)+(-16*x-152)*exp(2)**7+(2
24*x**2+2576*x+4256)*exp(2)**6+(-1344*x**3-18144*x**2-50448*x+5928)*exp(2)
**5+(4480*x**4+69440*x**3+249120*x**2-143440*x-799520)*exp(2)**4+(-8960*x*
*5-156800*x**4-656000*x**3+910400*x**2+6462800*x+633080)*exp(2)**3+(10752*
x**6+209664*x**5+971520*x**4-2494080*x**3-19588320*x**2+1705584*x+52288608
)*exp(2)**2+(-7168*x**7-154112*x**6-767232*x**5+3167360*x**4+26384320*x**3
-14419296*x**2-206683184*x+23476856)*exp(2)+2048*x**8+48128*x**7+252416*x*
*6-1536256*x**5-13325440*x**4+16951616*x**3+204211936*x**2-129835568*x-787
377632)/(390625*x-1171875),x)
```

3.735.

$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257

output
```
256*x**8/390625 + x**7*(4096/390625 - 1024*exp(2)/390625) + x**6*(-14336*e
xp(2)/390625 - 3328/390625 + 1792*exp(4)/390625) + x**5*(-1792*exp(6)/3906
25 - 269312/390625 + 9984*exp(2)/390625 + 21504*exp(4)/390625) + x**4*(-35
84*exp(6)/78125 - 2496*exp(4)/78125 - 26656/78125 + 224*exp(8)/78125 + 134
656*exp(2)/78125) + x**3*(-134656*exp(4)/78125 - 448*exp(10)/390625 + 5331
2*exp(2)/78125 + 1664*exp(6)/78125 + 7338752/390625 + 1792*exp(8)/78125) +
 x**2*(-11008128*exp(2)/390625 - 2688*exp(10)/390625 - 39984*exp(4)/78125
- 624*exp(8)/78125 - 2471248/390625 + 112*exp(12)/390625 + 67328*exp(6)/78
125) + x*(-16832*exp(8)/78125 - 82881856/390625 - 16*exp(14)/390625 + 624*
exp(10)/390625 + 2471248*exp(2)/390625 + 13328*exp(6)/78125 + 448*exp(12)/
390625 + 5504064*exp(4)/390625) + (250000*x - 125000*exp(2) + 500000)*log(
3 - x)**7 + (70000*x**2 - 70000*x*exp(2) + 280000*x - 140000*exp(2) - 3250
0 + 17500*exp(4))*log(3 - x)**6 + (11200*x**3 - 16800*x**2*exp(2) + 67200*
x**2 - 67200*x*exp(2) - 15600*x + 8400*x*exp(4) - 1400*exp(6) - 210400 + 7
800*exp(2) + 16800*exp(4))*log(3 - x)**5 + (1120*x**4 - 2240*x**3*exp(2) +
 8960*x**3 - 13440*x**2*exp(2) - 3120*x**2 + 1680*x**2*exp(4) - 560*x*exp(
6) - 84160*x + 3120*x*exp(2) + 6720*x*exp(4) - 1120*exp(6) - 780*exp(4) -
8330 + 70*exp(8) + 42080*exp(2))*log(3 - x)**4 + (1792*x**5/25 - 896*x**4*
exp(2)/5 + 3584*x**4/5 - 7168*x**3*exp(2)/5 - 1664*x**3/5 + 896*x**3*exp(4
)/5 - 448*x**2*exp(6)/5 - 67328*x**2/5 + 2496*x**2*exp(2)/5 + 5376*x**2...
```

3.735.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 6363 vs. $2(25) = 50$.

Time = 0.41 (sec) , antiderivative size = 6363, normalized size of antiderivative = 205.26

$$\text{the integral} = \text{Too large to display}$$

3.735.

$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+25}{}$$

input
```
integrate(((97656250000*x+927734375000)*log(-x+3)^7+((-27343750000*x-25976
5625000)*exp(2)+54687500000*x^2+628906250000*x+1039062500000)*log(-x+3)^6+
((3281250000*x+31171875000)*exp(2)^2+(-13125000000*x^2-150937500000*x-2493
75000000)*exp(2)+13125000000*x^3+177187500000*x^2+492656250000*x-578906250
00)*log(-x+3)^5+((-218750000*x-2078125000)*exp(2)^3+(1312500000*x^2+150937
50000*x+24937500000)*exp(2)^2+(-2625000000*x^3-35437500000*x^2-98531250000
*x+11578125000)*exp(2)+1750000000*x^4+27125000000*x^3+97312500000*x^2-5603
1250000*x-312312500000)*log(-x+3)^4+((8750000*x+83125000)*exp(2)^4+(-70000
000*x^2-805000000*x-1330000000)*exp(2)^3+(210000000*x^3+2835000000*x^2+788
2500000*x-926250000)*exp(2)^2+(-280000000*x^4-4340000000*x^3-15570000000*x
^2+8965000000*x+49970000000)*exp(2)+140000000*x^5+2450000000*x^4+102500000
00*x^3-14225000000*x^2-100981250000*x-9891875000)*log(-x+3)^3+((-210000*x-
1995000)*exp(2)^5+(2100000*x^2+24150000*x+39900000)*exp(2)^4+(-8400000*x^3
-113400000*x^2-315300000*x+37050000)*exp(2)^3+(16800000*x^4+260400000*x^3+
934200000*x^2-537900000*x-2998200000)*exp(2)^2+(-16800000*x^5-294000000*x^
4-1230000000*x^3+1707000000*x^2+12117750000*x+1187025000)*exp(2)+6720000*x
^6+131040000*x^5+607200000*x^4-1558800000*x^3-12242700000*x^2+1065990000*x
+32680380000)*log(-x+3)^2+((2800*x+26600)*exp(2)^6+(-33600*x^2-386400*x-63
8400)*exp(2)^5+(168000*x^3+2268000*x^2+6306000*x-741000)*exp(2)^4+(-448000
*x^4-6944000*x^3-24912000*x^2+14344000*x+79952000)*exp(2)^3+(672000*x^5+11
760000*x^4+49200000*x^3-68280000*x^2-484710000*x-47481000)*exp(2)^2+(-5376
00*x^6-10483200*x^5-48576000*x^4+124704000*x^3+979416000*x^2-85279200*x-26
14430400)*exp(2)+179200*x^7+3852800*x^6+19180800*x^5-79184000*x^4-65960800
0*x^3+360482400*x^2+5167079600*x-586921400)*log(-x+3)+(-16*x-152)*exp(2)^7
+(224*x^2+2576*x+4256)*exp(2)^6+(-1344*x^3-18144*x^2-50448*x+5928)*exp(2)^
5+(4480*x^4+69440*x^3+249120*x^2-143440*x-799520)*exp(2)^4+(-8960*x^5-1568
00*x^4-656000*x^3+910400*x^2+6462800*x+633080)*exp(2)^3+(10752*x^6+209664*
x^5+971520*x^4-2494080*x^3-19588320*x^2+1705584*x+52288608)*exp(2)^2+(-716
8*x^7-154112*x^6-767232*x^5+3167360*x^4+26384320*x^3-14419296*x^2-20668318
4*x+23476856)*exp(2)+2048*x^8+48128*x^7+252416*x^6-1536256*x^5-13325440*x^
4+16951616*x^3+204211936*x^2-129835568*x-787377632)/(390625*x-1171875),x,
algorithm=\
```

3.735.

$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257}{}$$

output
```
256/390625*x^8 - 95000*e^2*log(-x + 3)^7 + 390625*log(-x + 3)^8 + 896/5625
*(18*log(-x + 3)^2 - 6*log(-x + 3) + 1)*(x - 3)^6 + 4096/390625*x^7 + 1330
0*e^4*log(-x + 3)^6 - 106400*e^2*log(-x + 3)^6 + 1250000*log(-x + 3)^7 + 1
792/3125*(125*log(-x + 3)^3 - 75*log(-x + 3)^2 + 30*log(-x + 3) - 6)*(x -
3)^5 + 16128/3125*(25*log(-x + 3)^2 - 10*log(-x + 3) + 2)*(x - 3)^5 - 5899
52/3515625*x^6 - 1064*e^6*log(-x + 3)^5 + 12768*e^4*log(-x + 3)^5 + 5928*e
^2*log(-x + 3)^5 + 1437500*log(-x + 3)^6 + 35*(32*log(-x + 3)^4 - 32*log(-
x + 3)^3 + 24*log(-x + 3)^2 - 12*log(-x + 3) + 3)*(x - 3)^4 + 91*(32*log(-
x + 3)^3 - 24*log(-x + 3)^2 + 12*log(-x + 3) - 3)*(x - 3)^4 + 1392/5*(8*lo
g(-x + 3)^2 - 4*log(-x + 3) + 1)*(x - 3)^4 - 1837312/390625*x^5 + 266/5*e^
8*log(-x + 3)^4 - 4256/5*e^6*log(-x + 3)^4 - 2964/5*e^4*log(-x + 3)^4 + 15
9904/5*e^2*log(-x + 3)^4 + 650000*log(-x + 3)^5 + 11200/81*(81*log(-x + 3)
^5 - 135*log(-x + 3)^4 + 180*log(-x + 3)^3 - 180*log(-x + 3)^2 + 120*log(-
x + 3) - 40)*(x - 3)^3 + 123200/81*(27*log(-x + 3)^4 - 36*log(-x + 3)^3 +
36*log(-x + 3)^2 - 24*log(-x + 3) + 8)*(x - 3)^3 + 133760/27*(9*log(-x + 3
)^3 - 9*log(-x + 3)^2 + 6*log(-x + 3) - 2)*(x - 3)^3 + 6016/3*(9*log(-x +
3)^2 - 6*log(-x + 3) + 2)*(x - 3)^3 - 2267656/78125*x^4 - 1064/625*e^10*lo
g(-x + 3)^3 + 4256/125*e^8*log(-x + 3)^3 + 3952/125*e^6*log(-x + 3)^3 - 31
9808/125*e^4*log(-x + 3)^3 + 126616/125*e^2*log(-x + 3)^3 + 43750*log(-x +
 3)^4 + 17500*(4*log(-x + 3)^6 - 12*log(-x + 3)^5 + 30*log(-x + 3)^4 - ...
```

3.735.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1952 vs. $2(25) = 50$.

Time = 0.39 (sec) , antiderivative size = 1952, normalized size of antiderivative = 62.97

$$\text{the integral} = \text{Too large to display}$$

3.735.

$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+25\ldots}{}$

input
```
integrate(((97656250000*x+927734375000)*log(-x+3)^7+((-27343750000*x-25976
5625000)*exp(2)+54687500000*x^2+628906250000*x+1039062500000)*log(-x+3)^6+
((3281250000*x+31171875000)*exp(2)^2+(-13125000000*x^2-150937500000*x-2493
75000000)*exp(2)+13125000000*x^3+177187500000*x^2+492656250000*x-578906250
00)*log(-x+3)^5+((-218750000*x-2078125000)*exp(2)^3+(1312500000*x^2+150937
50000*x+24937500000)*exp(2)^2+(-2625000000*x^3-35437500000*x^2-98531250000
*x+11578125000)*exp(2)+1750000000*x^4+27125000000*x^3+97312500000*x^2-5603
1250000*x-312312500000)*log(-x+3)^4+((8750000*x+83125000)*exp(2)^4+(-70000
000*x^2-805000000*x-1330000000)*exp(2)^3+(210000000*x^3+2835000000*x^2+788
2500000*x-926250000)*exp(2)^2+(-280000000*x^4-4340000000*x^3-15570000000*x
^2+8965000000*x+49970000000)*exp(2)+140000000*x^5+2450000000*x^4+102500000
00*x^3-14225000000*x^2-100981250000*x-9891875000)*log(-x+3)^3+((-210000*x-
1995000)*exp(2)^5+(2100000*x^2+24150000*x+39900000)*exp(2)^4+(-8400000*x^3
-113400000*x^2-315300000*x+37050000)*exp(2)^3+(16800000*x^4+260400000*x^3+
934200000*x^2-537900000*x-2998200000)*exp(2)^2+(-16800000*x^5-294000000*x^
4-1230000000*x^3+1707000000*x^2+12117750000*x+1187025000)*exp(2)+6720000*x
^6+131040000*x^5+607200000*x^4-1558800000*x^3-12242700000*x^2+1065990000*x
+32680380000)*log(-x+3)^2+((2800*x+26600)*exp(2)^6+(-33600*x^2-386400*x-63
8400)*exp(2)^5+(168000*x^3+2268000*x^2+6306000*x-741000)*exp(2)^4+(-448000
*x^4-6944000*x^3-24912000*x^2+14344000*x+79952000)*exp(2)^3+(672000*x^5+11
760000*x^4+49200000*x^3-68280000*x^2-484710000*x-47481000)*exp(2)^2+(-5376
00*x^6-10483200*x^5-48576000*x^4+124704000*x^3+979416000*x^2-85279200*x-26
14430400)*exp(2)+179200*x^7+3852800*x^6+19180800*x^5-79184000*x^4-65960800
0*x^3+360482400*x^2+5167079600*x-586921400)*log(-x+3)+(-16*x-152)*exp(2)^7
+(224*x^2+2576*x+4256)*exp(2)^6+(-1344*x^3-18144*x^2-50448*x+5928)*exp(2)^
5+(4480*x^4+69440*x^3+249120*x^2-143440*x-799520)*exp(2)^4+(-8960*x^5-1568
00*x^4-656000*x^3+910400*x^2+6462800*x+633080)*exp(2)^3+(10752*x^6+209664*
x^5+971520*x^4-2494080*x^3-19588320*x^2+1705584*x+52288608)*exp(2)^2+(-716
8*x^7-154112*x^6-767232*x^5+3167360*x^4+26384320*x^3-14419296*x^2-20668318
4*x+23476856)*exp(2)+2048*x^8+48128*x^7+252416*x^6-1536256*x^5-13325440*x^
4+16951616*x^3+204211936*x^2-129835568*x-787377632)/(390625*x-1171875),x,
algorithm=\
```

3.735.

$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257}{}$$

output
```
256/390625*(x - 3)^8 - 1024/390625*(x - 3)^7*e^2 + 1024/15625*(x - 3)^7*lo
g(-x + 3) - 3584/15625*(x - 3)^6*e^2*log(-x + 3) + 1792/625*(x - 3)^6*log(
-x + 3)^2 - 5376/625*(x - 3)^5*e^2*log(-x + 3)^2 + 1792/25*(x - 3)^5*log(-
x + 3)^3 - 896/5*(x - 3)^4*e^2*log(-x + 3)^3 + 1120*(x - 3)^4*log(-x + 3)^
4 - 2240*(x - 3)^3*e^2*log(-x + 3)^4 + 11200*(x - 3)^3*log(-x + 3)^5 - 168
00*(x - 3)^2*e^2*log(-x + 3)^5 + 70000*(x - 3)^2*log(-x + 3)^6 - 70000*(x
- 3)*e^2*log(-x + 3)^6 + 250000*(x - 3)*log(-x + 3)^7 - 125000*e^2*log(-x
+ 3)^7 + 390625*log(-x + 3)^8 + 2048/78125*(x - 3)^7 + 1792/390625*(x - 3)
^6*e^4 - 7168/78125*(x - 3)^6*e^2 + 7168/3125*(x - 3)^6*log(-x + 3) + 5376
/15625*(x - 3)^5*e^4*log(-x + 3) - 21504/3125*(x - 3)^5*e^2*log(-x + 3) +
10752/125*(x - 3)^5*log(-x + 3)^2 + 1344/125*(x - 3)^4*e^4*log(-x + 3)^2 -
 5376/25*(x - 3)^4*e^2*log(-x + 3)^2 + 1792*(x - 3)^4*log(-x + 3)^3 + 896/
5*(x - 3)^3*e^4*log(-x + 3)^3 - 3584*(x - 3)^3*e^2*log(-x + 3)^3 + 22400*(
x - 3)^3*log(-x + 3)^4 + 1680*(x - 3)^2*e^4*log(-x + 3)^4 - 33600*(x - 3)^
2*e^2*log(-x + 3)^4 + 168000*(x - 3)^2*log(-x + 3)^5 + 8400*(x - 3)*e^4*lo
g(-x + 3)^5 - 168000*(x - 3)*e^2*log(-x + 3)^5 + 700000*(x - 3)*log(-x + 3
)^6 + 17500*e^4*log(-x + 3)^6 - 350000*e^2*log(-x + 3)^6 + 1250000*log(-x
+ 3)^7 + 5888/15625*(x - 3)^6 - 1792/390625*(x - 3)^5*e^6 + 10752/78125*(x
 - 3)^5*e^4 - 17664/15625*(x - 3)^5*e^2 + 17664/625*(x - 3)^5*log(-x + 3)
- 896/3125*(x - 3)^4*e^6*log(-x + 3) + 5376/625*(x - 3)^4*e^4*log(-x + ...
```

3.735.9 Mupad [B] (verification not implemented)

Time = 18.69 (sec) , antiderivative size = 772, normalized size of antiderivative = 24.90

$$\text{the integral} = \text{Too large to display}$$

$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+25\ldots}{}$

input
```
int((log(3 - x)^2*(1065990000*x + exp(8)*(24150000*x + 2100000*x^2 + 39900
000) - exp(6)*(315300000*x + 113400000*x^2 + 8400000*x^3 - 37050000) + exp
(2)*(12117750000*x + 1707000000*x^2 - 1230000000*x^3 - 294000000*x^4 - 168
00000*x^5 + 1187025000) + exp(4)*(934200000*x^2 - 537900000*x + 260400000*
x^3 + 16800000*x^4 - 2998200000) - 12242700000*x^2 - 1558800000*x^3 + 6072
00000*x^4 + 131040000*x^5 + 6720000*x^6 - exp(10)*(210000*x + 1995000) + 3
2680380000) - 129835568*x + exp(4)*(1705584*x - 19588320*x^2 - 2494080*x^3
 + 971520*x^4 + 209664*x^5 + 10752*x^6 + 52288608) + exp(12)*(2576*x + 224
*x^2 + 4256) + log(3 - x)*(5167079600*x - exp(10)*(386400*x + 33600*x^2 +
638400) + exp(8)*(6306000*x + 2268000*x^2 + 168000*x^3 - 741000) - exp(6)*
(24912000*x^2 - 14344000*x + 6944000*x^3 + 448000*x^4 - 79952000) + 360482
400*x^2 - 659608000*x^3 - 79184000*x^4 + 19180800*x^5 + 3852800*x^6 + 1792
00*x^7 - exp(2)*(85279200*x - 979416000*x^2 - 124704000*x^3 + 48576000*x^4
 + 10483200*x^5 + 537600*x^6 + 2614430400) + exp(12)*(2800*x + 26600) - ex
p(4)*(484710000*x + 68280000*x^2 - 49200000*x^3 - 11760000*x^4 - 672000*x^
5 + 47481000) - 586921400) - exp(2)*(206683184*x + 14419296*x^2 - 26384320
*x^3 - 3167360*x^4 + 767232*x^5 + 154112*x^6 + 7168*x^7 - 23476856) + log(
3 - x)^7*(97656250000*x + 927734375000) - exp(10)*(50448*x + 18144*x^2 + 1
344*x^3 - 5928) - log(3 - x)^3*(100981250000*x - exp(8)*(8750000*x + 83125
000) + exp(2)*(15570000000*x^2 - 8965000000*x + 4340000000*x^3 + 280000000
*x^4 - 49970000000) - exp(4)*(7882500000*x + 2835000000*x^2 + 210000000*x^
3 - 926250000) + exp(6)*(805000000*x + 70000000*x^2 + 1330000000) + 142250
00000*x^2 - 10250000000*x^3 - 2450000000*x^4 - 140000000*x^5 + 9891875000)
 + exp(8)*(249120*x^2 - 143440*x + 69440*x^3 + 4480*x^4 - 799520) - log(3
- x)^4*(56031250000*x + exp(6)*(218750000*x + 2078125000) - exp(4)*(150937
50000*x + 1312500000*x^2 + 24937500000) - 97312500000*x^2 - 27125000000*x^
3 - 1750000000*x^4 + exp(2)*(98531250000*x + 35437500000*x^2 + 2625000000*
x^3 - 11578125000) + 312312500000) + log(3 - x)^6*(628906250000*x - exp(2)
*(27343750000*x + 259765625000) + 54687500000*x^2 + 1039062500000) + 20421
1936*x^2 + 16951616*x^3 - 13325440*x^4 - 1536256*x^5 + 252416*x^6 + 48128*
x^7 + 2048*x^8 + exp(6)*(6462800*x + 910400*x^2 - 656000*x^3 - 156800*x^4
- 8960*x^5 + 633080) - exp(14)*(16*x + 152) + log(3 - x)^5*(492656250000*x
 + exp(4)*(3281250000*x + 31171875000) - exp(2)*(150937500000*x + 13125000
000*x^2 + 249375000000) + 177187500000*x^2 + 13125000000*x^3 - 57890625000
) - 787377632)/(390625*x - 1171875),x)
```

3.735.

$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+257}{}$

output
```
390625*log(3 - x)^8 - log(3 - x)^4*(780*exp(4) - 42080*exp(2) + 1120*exp(6
) - 70*exp(8) + x^2*(13440*exp(2) - 1680*exp(4) + 3120) + x^3*(2240*exp(2)
 - 8960) - x*(3120*exp(2) + 6720*exp(4) - 560*exp(6) - 84160) - 1120*x^4 +
 8330) - x^6*((14336*exp(2))/390625 - (1792*exp(4))/390625 + 3328/390625)
- x^2*((11008128*exp(2))/390625 + (39984*exp(4))/78125 - (67328*exp(6))/78
125 + (624*exp(8))/78125 + (2688*exp(10))/390625 - (112*exp(12))/390625 +
2471248/390625) - x^7*((1024*exp(2))/390625 - 4096/390625) + log(3 - x)^7*
(250000*x - 125000*exp(2) + 500000) - log(3 - x)^5*(1400*exp(6) - 16800*ex
p(4) - 7800*exp(2) + x^2*(16800*exp(2) - 67200) + x*(67200*exp(2) - 8400*e
xp(4) + 15600) - 11200*x^3 + 210400) + log(x - 3)*((1235624*exp(2))/15625
+ (2752032*exp(4))/15625 + (6664*exp(6))/3125 - (8416*exp(8))/3125 + (312*
exp(10))/15625 + (224*exp(12))/15625 - (8*exp(14))/15625 - 41440928/15625)
 + x^3*((53312*exp(2))/78125 - (134656*exp(4))/78125 + (1664*exp(6))/78125
 + (1792*exp(8))/78125 - (448*exp(10))/390625 + 7338752/390625) + log(3 -
x)^3*((6664*exp(2))/5 - (16832*exp(4))/5 + (208*exp(6))/5 + (224*exp(8))/5
 - (56*exp(10))/25 - x^3*((7168*exp(2))/5 - (896*exp(4))/5 + 1664/5) - x*(
(1248*exp(4))/5 - (67328*exp(2))/5 + (1792*exp(6))/5 - (112*exp(8))/5 + 13
328/5) - x^4*((896*exp(2))/5 - 3584/5) + (1792*x^5)/25 + x^2*((2496*exp(2)
)/5 + (5376*exp(4))/5 - (448*exp(6))/5 - 67328/5) + 917344/25) - log(3 - x
)^6*(140000*exp(2) - 17500*exp(4) - 70000*x^2 + x*(70000*exp(2) - 28000...
```

3.735.

$$\int \frac{-787377632+e^{14}(-152-16x)-129835568x+204211936x^2+16951616x^3-13325440x^4-1536256x^5+252416x^6+48128x^7+2048x^8+e^{12}(4256+25\ldots}{\ldots}$$

3.736 $\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}(1-8x+16x^2)\right)}\,dx$

3.736.1 Optimal result

Integrand size = 38, antiderivative size = 17

$$\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}(1-8x+16x^2)\right)}\,dx = \log\left(\frac{4}{3}\left(3+\log(4)+\log\left(\left(-\frac{1}{4}+x\right)^2\right)\right)\right)$$

output
```
ln(4+8/3*ln(2)+4/3*ln((x-1/4)^2))
```

3.736.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}(1-8x+16x^2)\right)}\,dx = \log\left(3+\log\left(\frac{1}{4}(1-4x)^2\right)\right)$$

input
```
Integrate[8/(-3 + 12*x + (-1 + 4*x)*Log[4] + (-1 + 4*x)*Log[(1 - 8*x + 16*
x^2)/16]),x]
```

output
```
Log[3 + Log[(1 - 4*x)^2/4]]
```

3.736.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$, Rules used = {27, 7292, 2837, 25, 2739, 14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8}{(4x-1)\log\left(\frac{1}{16}\left(16x^2-8x+1\right)\right)+12x+(4x-1)\log(4)-3}dx$$
$$\Big\downarrow \text{27}$$
$$8\int \frac{1}{-\log\left(\frac{1}{16}\left(16x^2-8x+1\right)\right)(1-4x)-\log(4)(1-4x)+12x-3}dx$$
$$\Big\downarrow \text{7292}$$
$$8\int \frac{1}{(4x-1)\left(\log\left(\frac{1}{4}(1-4x)^2\right)+3\right)}dx$$
$$\Big\downarrow \text{2837}$$
$$-2\int -\frac{1}{(1-4x)\left(\log\left(\frac{1}{4}(1-4x)^2\right)+3\right)}d(1-4x)$$
$$\Big\downarrow \text{25}$$
$$2\int \frac{1}{(1-4x)\left(\log\left(\frac{1}{4}(1-4x)^2\right)+3\right)}d(1-4x)$$
$$\Big\downarrow \text{2739}$$
$$\int \frac{1}{\log\left(\frac{1}{4}(1-4x)^2\right)+3}d\left(\log\left(\frac{1}{4}(1-4x)^2\right)+3\right)$$
$$\Big\downarrow \text{14}$$
$$\log\left(\log\left(\frac{1}{4}(1-4x)^2\right)+3\right)$$

input
```
Int[8/(-3 + 12*x + (-1 + 4*x)*Log[4] + (-1 + 4*x)*Log[(1 - 8*x + 16*x^2)/1
6]),x]
```

output
```
Log[3 + Log[(1 - 4*x)^2/4]]
```

3.736.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2739
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Simp[1/(
b*n)   Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p}
, x]
```

rule 2837
```
Int[((a_.) + Log[(c_.)*((d_) + (e_.)*(x_))^(n_.)]*(b_.))^(p_.)*((f_) + (g_.
)*(x_))^(q_.), x_Symbol] :> Simp[1/e   Subst[Int[(f*(x/d))^q*(a + b*Log[c*x
^n])^p, x], x, d + e*x], x] /; FreeQ[{a, b, c, d, e, f, g, n, p, q}, x] &&
EqQ[e*f - d*g, 0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.736.4 Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

method	result	size
norman	$\ln\left(2\ln\left(2\right)+\ln\left(x^{2}-\frac{1}{2}x+\frac{1}{16}\right)+3\right)$	17
risch	$\ln\left(2\ln\left(2\right)+\ln\left(x^{2}-\frac{1}{2}x+\frac{1}{16}\right)+3\right)$	17
parallelrisch	$\ln\left(2\ln\left(2\right)+\ln\left(x^{2}-\frac{1}{2}x+\frac{1}{16}\right)+3\right)$	17
default	$\ln\left(2\ln\left(2\right)-\ln\left(16x^{2}-8x+1\right)-3\right)$	21

input
```
int(8/((-1+4*x)*ln(x^2-1/2*x+1/16)+2*(-1+4*x)*ln(2)+12*x-3),x,method=_RETU
RNVERBOSE)
```

output
```
ln(2*ln(2)+ln(x^2-1/2*x+1/16)+3)
```

3.736.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}\left(1-8x+16x^2\right)\right)}\,dx$$
$$=\log\left(2\,\log\left(2\right)+\log\left(x^2-\frac{1}{2}\,x+\frac{1}{16}\right)+3\right)$$

input
```
integrate(8/((-1+4*x)*log(x^2-1/2*x+1/16)+2*(-1+4*x)*log(2)+12*x-3),x, alg
orithm=\
```

output
```
log(2*log(2) + log(x^2 - 1/2*x + 1/16) + 3)
```

3.736.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}\left(1-8x+16x^2\right)\right)}\,dx$$
$$=\log\left(\log\left(x^2-\frac{x}{2}+\frac{1}{16}\right)+2\log\left(2\right)+3\right)$$

input
```
integrate(8/((-1+4*x)*ln(x**2-1/2*x+1/16)+2*(-1+4*x)*ln(2)+12*x-3),x)
```

output
```
log(log(x**2 - x/2 + 1/16) + 2*log(2) + 3)
```

3.736.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}\left(1-8x+16x^2\right)\right)}\,dx = \log\left(-\log(2)+\log(4x-1)+\frac{3}{2}\right)$$

input
```
integrate(8/((-1+4*x)*log(x^2-1/2*x+1/16)+2*(-1+4*x)*log(2)+12*x-3),x, alg
orithm=\
```

output
```
log(-log(2) + log(4*x - 1) + 3/2)
```

3.736.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}\left(1-8x+16x^2\right)\right)}\,dx = \log\left(-2\,\log(2)+\log\left(16\,x^2-8\,x+1\right)+3\right)$$

input
```
integrate(8/((-1+4*x)*log(x^2-1/2*x+1/16)+2*(-1+4*x)*log(2)+12*x-3),x, alg
orithm=\
```

output
```
log(-2*log(2) + log(16*x^2 - 8*x + 1) + 3)
```

3.736.9 Mupad [F(-1)]

Timed out.

$$\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}\left(1-8x+16x^2\right)\right)}\,dx = \int \frac{8}{12\,x+2\,\ln(2)\,(4\,x-1)+\ln\left(x^2-\frac{x}{2}+\frac{1}{16}\right)\,(4\,x-1)-3}\,dx$$

input
```
int(8/(12*x + 2*log(2)*(4*x - 1) + log(x^2 - x/2 + 1/16)*(4*x - 1) - 3),x)
```

output
```
int(8/(12*x + 2*log(2)*(4*x - 1) + log(x^2 - x/2 + 1/16)*(4*x - 1) - 3), x
)
```

3.736. $\int \frac{8}{-3+12x+(-1+4x)\log(4)+(-1+4x)\log\left(\frac{1}{16}(1-8x+16x^2)\right)}\,dx$

3.737 $\int \frac{1853x-7252x^2+10252x^3-5952x^4+1508x^5+784x^6-1856x^7+768x^8+}{-500x+200x^2+940x^3-464x^4-}$

3.737.1 Optimal result

Integrand size = 201, antiderivative size = 38

$$\int \frac{1853x-7252x^2+10252x^3-5952x^4+1508x^5+784x^6-1856x^7+768x^8+(2890-7752x+10312x^2-}{-500x+200x^2+940x^3-464x^4-448x^5+256x^6+(-1000x+}$$

$$=\frac{\left(-2+\frac{1}{2\left(\frac{5-x}{3}-x\right)}-x^2\right)^2}{1+x+\log^2(x)}$$

output
```
(1/(10/3-8/3*x)-x^2-2)^2/(x+ln(x)^2+1)
```

3.737.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.97

$$\int \frac{1853x-7252x^2+10252x^3-5952x^4+1508x^5+784x^6-1856x^7+768x^8+(2890-7752x+10312x^2-}{-500x+200x^2+940x^3-464x^4-448x^5+256x^6+(-1000x+}$$

$$=\frac{(17-16x+10x^2-8x^3)^2}{4(5-4x)^2\left(1+x+\log^2(x)\right)}$$

input
```
Integrate[(1853*x - 7252*x^2 + 10252*x^3 - 5952*x^4 + 1508*x^5 + 784*x^6 -
 1856*x^7 + 768*x^8 + (2890 - 7752*x + 10312*x^2 - 10688*x^3 + 8296*x^4 -
4448*x^5 + 1920*x^6 - 512*x^7)*Log[x] + (408*x - 3784*x^2 + 8880*x^3 - 948
8*x^4 + 6848*x^5 - 3840*x^6 + 1024*x^7)*Log[x]^2)/(-500*x + 200*x^2 + 940*
x^3 - 464*x^4 - 448*x^5 + 256*x^6 + (-1000*x + 1400*x^2 + 480*x^3 - 1408*x
^4 + 512*x^5)*Log[x]^2 + (-500*x + 1200*x^2 - 960*x^3 + 256*x^4)*Log[x]^4)
,x]
```

output
```
(17 - 16*x + 10*x^2 - 8*x^3)^2/(4*(5 - 4*x)^2*(1 + x + Log[x]^2))
```

3.737.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{768x^8-1856x^7+784x^6+1508x^5-5952x^4+10252x^3-7252x^2+\left(1024x^7-3840x^6+6848x^5-9488x^4+8\right.}{256x^6-448x^5-464x^4+940x^3+200x^2+\left(256x^4-960x^3+120\right.}$$

$\Big\downarrow$ 7239

$$\int \frac{\left(-8x^3+10x^2-16x+17\right)\left(8x\left(16x^3-40x^2+25x-3\right)\log^2(x)+x\left(96x^4-112x^3-234x^2+324x-109\right)-2\right.}{4(5-4x)^3x\left(x+\log^2(x)+1\right)^2}$$

$\Big\downarrow$ 27

$$\frac{1}{4}\int -\frac{\left(-8x^3+10x^2-16x+17\right)\left(8x\left(-16x^3+40x^2-25x+3\right)\log^2(x)+2\left(32x^4-80x^3+114x^2-148x+85\right)\right.}{(5-4x)^3x\left(\log^2(x)+x+1\right)^2}$$

$\Big\downarrow$ 25

$$-\frac{1}{4}\int \frac{\left(-8x^3+10x^2-16x+17\right)\left(8x\left(-16x^3+40x^2-25x+3\right)\log^2(x)+2\left(32x^4-80x^3+114x^2-148x+85\right)\right.}{(5-4x)^3x\left(\log^2(x)+x+1\right)^2}$$

$\Big\downarrow$ 7293

$$-\frac{1}{4}\int \left(\frac{\left(8x^3-10x^2+16x-17\right)^2(x+2\log(x))}{x(4x-5)^2\left(\log^2(x)+x+1\right)^2}-\frac{8\left(128x^6-480x^5+856x^4-1186x^3+1110x^2-473x+51\right)}{(4x-5)^3\left(\log^2(x)+x+1\right)}\right)$$

$\Big\downarrow$ 2009

$$\frac{1}{4}\left(-4\int \frac{x^4}{\left(\log^2(x)+x+1\right)^2}dx-8\int \frac{x^3\log(x)}{\left(\log^2(x)+x+1\right)^2}dx+16\int \frac{x^3}{\log^2(x)+x+1}dx-16\int \frac{x^2}{\left(\log^2(x)+x+1\right)\right.$$

input
```
Int[(1853*x - 7252*x^2 + 10252*x^3 - 5952*x^4 + 1508*x^5 + 784*x^6 - 1856*
x^7 + 768*x^8 + (2890 - 7752*x + 10312*x^2 - 10688*x^3 + 8296*x^4 - 4448*x
^5 + 1920*x^6 - 512*x^7)*Log[x] + (408*x - 3784*x^2 + 8880*x^3 - 9488*x^4
+ 6848*x^5 - 3840*x^6 + 1024*x^7)*Log[x]^2)/(-500*x + 200*x^2 + 940*x^3 -
464*x^4 - 448*x^5 + 256*x^6 + (-1000*x + 1400*x^2 + 480*x^3 - 1408*x^4 + 5
12*x^5)*Log[x]^2 + (-500*x + 1200*x^2 - 960*x^3 + 256*x^4)*Log[x]^4),x]
```

output
```
$Aborted
```

3.737.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.737.

$$\int \frac{1853x-7252x^2+10252x^3-5952x^4+1508x^5+784x^6-1856x^7+768x^8+\left(2890-7752x+10312x^2-10688x^3+8296x^4-4448x^5+1920x^6-512x^7\right)\log(x}{-500x+200x^2+940x^3-464x^4-448x^5+256x^6+\left(-1000x+1400x^2+480x^3-1408x^4+512x^5\right)\log^2(x)+(-500}$$

3.737.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(26) = 52.

Time = 2.05 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.42

method	result	size
risch	$\frac{64x^6-160x^5+356x^4-592x^3+596x^2-544x+289}{4(16x^2-40x+25)\left(x+\ln(x)^2+1\right)}$	54
default	$\frac{714-799x+425\ln(x)^2+64x^6-320x^3+272x^2\ln(x)^2-680x\ln(x)^2+188x^2+356x^4-160x^5}{4(-5+4x)^2\left(x+\ln(x)^2+1\right)}$	71
parallelrisch	$\frac{1024x^6-2560x^5+5696x^4-9472x^3+9536x^2-8704x+4624}{1024x^2\ln(x)^2+1024x^3-2560x\ln(x)^2-1536x^2+1600\ln(x)^2-960x+1600}$	72

input
```
int(((1024*x^7-3840*x^6+6848*x^5-9488*x^4+8880*x^3-3784*x^2+408*x)*ln(x)^2
+(-512*x^7+1920*x^6-4448*x^5+8296*x^4-10688*x^3+10312*x^2-7752*x+2890)*ln(
x)+768*x^8-1856*x^7+784*x^6+1508*x^5-5952*x^4+10252*x^3-7252*x^2+1853*x)/(
(256*x^4-960*x^3+1200*x^2-500*x)*ln(x)^4+(512*x^5-1408*x^4+480*x^3+1400*x^
2-1000*x)*ln(x)^2+256*x^6-448*x^5-464*x^4+940*x^3+200*x^2-500*x),x,method=
_RETURNVERBOSE)
```

output
```
1/4*(64*x^6-160*x^5+356*x^4-592*x^3+596*x^2-544*x+289)/(16*x^2-40*x+25)/(x
+ln(x)^2+1)
```

3.737.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. 2(29) = 58.

Time = 0.25 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.68

$$\int \frac{1853x-7252x^2+10252x^3-5952x^4+1508x^5+784x^6-1856x^7+768x^8+(2890-7752x+10312x^2 -}{-500x+200x^2+940x^3-464x^4-448x^5+256x^6+(-1000x +}$$
$$= \frac{64\,x^6-160\,x^5+356\,x^4-592\,x^3+596\,x^2-544\,x+289}{4\left(16\,x^3+\left(16\,x^2-40\,x+25\right)\log\left(x\right)^2-24\,x^2-15\,x+25\right)}$$

input
```
integrate(((1024*x^7-3840*x^6+6848*x^5-9488*x^4+8880*x^3-3784*x^2+408*x)*l
og(x)^2+(-512*x^7+1920*x^6-4448*x^5+8296*x^4-10688*x^3+10312*x^2-7752*x+28
90)*log(x)+768*x^8-1856*x^7+784*x^6+1508*x^5-5952*x^4+10252*x^3-7252*x^2+1
853*x)/((256*x^4-960*x^3+1200*x^2-500*x)*log(x)^4+(512*x^5-1408*x^4+480*x^
3+1400*x^2-1000*x)*log(x)^2+256*x^6-448*x^5-464*x^4+940*x^3+200*x^2-500*x)
,x, algorithm=\
```

output
```
1/4*(64*x^6 - 160*x^5 + 356*x^4 - 592*x^3 + 596*x^2 - 544*x + 289)/(16*x^3
 + (16*x^2 - 40*x + 25)*log(x)^2 - 24*x^2 - 15*x + 25)
```

3.737.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(24) = 48$.

Time = 0.14 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.58

$$\int \frac{1853x - 7252x^2 + 10252x^3 - 5952x^4 + 1508x^5 + 784x^6 - 1856x^7 + 768x^8 + (2890 - 7752x + 10312x^2 -}{-500x + 200x^2 + 940x^3 - 464x^4 - 448x^5 + 256x^6 + (-1000x +} = \frac{64x^6 - 160x^5 + 356x^4 - 592x^3 + 596x^2 - 544x + 289}{64x^3 - 96x^2 - 60x + (64x^2 - 160x + 100)\log(x)^2 + 100}$$

input
```
integrate(((1024*x**7-3840*x**6+6848*x**5-9488*x**4+8880*x**3-3784*x**2+40
8*x)*ln(x)**2+(-512*x**7+1920*x**6-4448*x**5+8296*x**4-10688*x**3+10312*x*
*2-7752*x+2890)*ln(x)+768*x**8-1856*x**7+784*x**6+1508*x**5-5952*x**4+1025
2*x**3-7252*x**2+1853*x)/((256*x**4-960*x**3+1200*x**2-500*x)*ln(x)**4+(51
2*x**5-1408*x**4+480*x**3+1400*x**2-1000*x)*ln(x)**2+256*x**6-448*x**5-464
*x**4+940*x**3+200*x**2-500*x),x)
```

output
```
(64*x**6 - 160*x**5 + 356*x**4 - 592*x**3 + 596*x**2 - 544*x + 289)/(64*x*
*3 - 96*x**2 - 60*x + (64*x**2 - 160*x + 100)*log(x)**2 + 100)
```

3.737.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. $2(29) = 58$.

Time = 0.26 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.68

$$\int \frac{1853x - 7252x^2 + 10252x^3 - 5952x^4 + 1508x^5 + 784x^6 - 1856x^7 + 768x^8 + (2890 - 7752x + 10312x^2 -}{-500x + 200x^2 + 940x^3 - 464x^4 - 448x^5 + 256x^6 + (-1000x +} = \frac{64\,x^6 - 160\,x^5 + 356\,x^4 - 592\,x^3 + 596\,x^2 - 544\,x + 289}{4\left(16\,x^3 + (16\,x^2 - 40\,x + 25)\log(x)^2 - 24\,x^2 - 15\,x + 25\right)}$$

input
```
integrate(((1024*x^7-3840*x^6+6848*x^5-9488*x^4+8880*x^3-3784*x^2+408*x)*l
og(x)^2+(-512*x^7+1920*x^6-4448*x^5+8296*x^4-10688*x^3+10312*x^2-7752*x+28
90)*log(x)+768*x^8-1856*x^7+784*x^6+1508*x^5-5952*x^4+10252*x^3-7252*x^2+1
853*x)/((256*x^4-960*x^3+1200*x^2-500*x)*log(x)^4+(512*x^5-1408*x^4+480*x^
3+1400*x^2-1000*x)*log(x)^2+256*x^6-448*x^5-464*x^4+940*x^3+200*x^2-500*x)
,x, algorithm=\
```

output
```
1/4*(64*x^6 - 160*x^5 + 356*x^4 - 592*x^3 + 596*x^2 - 544*x + 289)/(16*x^3
 + (16*x^2 - 40*x + 25)*log(x)^2 - 24*x^2 - 15*x + 25)
```

3.737.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(29) = 58$.

Time = 0.35 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.87

$$\int \frac{1853x - 7252x^2 + 10252x^3 - 5952x^4 + 1508x^5 + 784x^6 - 1856x^7 + 768x^8 + (2890 - 7752x + 10312x^2 -}{-500x + 200x^2 + 940x^3 - 464x^4 - 448x^5 + 256x^6 + (-1000x +}$$
$$= \frac{64\,x^6 - 160\,x^5 + 356\,x^4 - 592\,x^3 + 596\,x^2 - 544\,x + 289}{4\left(16\,x^2\log\left(x\right)^2 + 16\,x^3 - 40\,x\log\left(x\right)^2 - 24\,x^2 + 25\,\log\left(x\right)^2 - 15\,x + 25\right)}$$

input
```
integrate(((1024*x^7-3840*x^6+6848*x^5-9488*x^4+8880*x^3-3784*x^2+408*x)*l
og(x)^2+(-512*x^7+1920*x^6-4448*x^5+8296*x^4-10688*x^3+10312*x^2-7752*x+28
90)*log(x)+768*x^8-1856*x^7+784*x^6+1508*x^5-5952*x^4+10252*x^3-7252*x^2+1
853*x)/((256*x^4-960*x^3+1200*x^2-500*x)*log(x)^4+(512*x^5-1408*x^4+480*x^
3+1400*x^2-1000*x)*log(x)^2+256*x^6-448*x^5-464*x^4+940*x^3+200*x^2-500*x)
,x, algorithm=\
```

output
```
1/4*(64*x^6 - 160*x^5 + 356*x^4 - 592*x^3 + 596*x^2 - 544*x + 289)/(16*x^2
*log(x)^2 + 16*x^3 - 40*x*log(x)^2 - 24*x^2 + 25*log(x)^2 - 15*x + 25)
```

3.737.9 Mupad [B] (verification not implemented)

Time = 14.34 (sec) , antiderivative size = 81, normalized size of antiderivative = 2.13

$$\int \frac{1853x - 7252x^2 + 10252x^3 - 5952x^4 + 1508x^5 + 784x^6 - 1856x^7 + 768x^8 + (2890 - 7752x + 10312x^2 -}{-500x + 200x^2 + 940x^3 - 464x^4 - 448x^5 + 256x^6 + (-1000x +}$$
$$= -\frac{-64\,x^{10} - 16\,x^9 + 148\,x^8 - 227\,x^7 + 588\,x^6 + 93\,x^5 - 1157\,x^4 + \frac{6565\,x^3}{4} - 2431\,x^2 + 1445\,x}{(4\,x-5)^3\,\left(\ln(x)^2 + x + 1\right)\,\left(x^3 + 4\,x^2 + 4\,x\right)}$$

input
```
int(-(1853*x + log(x)^2*(408*x - 3784*x^2 + 8880*x^3 - 9488*x^4 + 6848*x^5
 - 3840*x^6 + 1024*x^7) - log(x)*(7752*x - 10312*x^2 + 10688*x^3 - 8296*x^
4 + 4448*x^5 - 1920*x^6 + 512*x^7 - 2890) - 7252*x^2 + 10252*x^3 - 5952*x^
4 + 1508*x^5 + 784*x^6 - 1856*x^7 + 768*x^8)/(500*x + log(x)^4*(500*x - 12
00*x^2 + 960*x^3 - 256*x^4) - log(x)^2*(1400*x^2 - 1000*x + 480*x^3 - 1408
*x^4 + 512*x^5) - 200*x^2 - 940*x^3 + 464*x^4 + 448*x^5 - 256*x^6),x)
```

output
```
-(1445*x - 2431*x^2 + (6565*x^3)/4 - 1157*x^4 + 93*x^5 + 588*x^6 - 227*x^7
 + 148*x^8 - 16*x^9 - 64*x^10)/((4*x - 5)^3*(x + log(x)^2 + 1)*(4*x + 4*x^
2 + x^3))
```

3.738 $\int \frac{-5-22x-4x^2+2e^{-2-x}(16+3x)}{-5x-x^2+2e^{-2-x}(5+x)}\,dx$

3.738.1 Optimal result

Integrand size = 48, antiderivative size = 28

$$\int \frac{-5-22x-4x^2+2e^{-2-x}(16+3x)}{-5x-x^2+2e^{-2-x}(5+x)}\,dx = 1+2x+\log\left(e^{2x}\left(2e^{-2-x}-x\right)(5+x)\right)$$

output
```
ln(exp(x)^2*(5+x)*(exp(ln(2)-x-2)-x))+2*x+1
```

3.738.2 Mathematica [A] (verified)

Time = 0.44 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{-5-22x-4x^2+2e^{-2-x}(16+3x)}{-5x-x^2+2e^{-2-x}(5+x)}\,dx = 4x+2\text{arctanh}\left(1-e^{2+x}x\right)+\log(x)+\log(5+x)$$

input
```
Integrate[(-5 - 22*x - 4*x^2 + 2*E^(-2 - x)*(16 + 3*x))/(-5*x - x^2 + 2*E^
(-2 - x)*(5 + x)),x]
```

output
```
4*x + 2*ArcTanh[1 - E^(2 + x)*x] + Log[x] + Log[5 + x]
```

3.738.3 Rubi [A] (verified)

Time = 0.89 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^2-22x+2e^{-x-2}(3x+16)-5}{-x^2-5x+2e^{-x-2}(x+5)}dx$$
$$\Big\downarrow \ 7292$$
$$\int \frac{e^{x+2}\left(-4x^2-22x+2e^{-x-2}(3x+16)-5\right)}{(x+5)\left(2-e^{x+2}x\right)}dx$$
$$\Big\downarrow \ 7293$$
$$\int \left(\frac{e^{x+2}(x+1)}{e^{x+2}x-2}+\frac{3x+16}{x+5}\right)dx$$
$$\Big\downarrow \ 2009$$
$$3x+\log(x+5)+\log\left(2-e^{x+2}x\right)$$

input
```
Int[(-5 - 22*x - 4*x^2 + 2*E^(-2 - x)*(16 + 3*x))/(-5*x - x^2 + 2*E^(-2 -
x)*(5 + x)),x]
```

output
```
3*x + Log[5 + x] + Log[2 - E^(2 + x)*x]
```

3.738.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.738.4 Maple [A] (verified)

Time = 0.71 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

method	result	size
norman	$4x+\ln\left(5+x\right)+\ln\left(x-\mathrm{e}^{\ln(2)-x-2}\right)$	22
parallelrisch	$4x+\ln\left(5+x\right)+\ln\left(x-\mathrm{e}^{\ln(2)-x-2}\right)$	22
risch	$4x+\ln\left(5+x\right)-\ln\left(2\right)+2+\ln\left(2\,\mathrm{e}^{-2-x}-x\right)$	27

input
```
int(((3*x+16)*exp(ln(2)-x-2)-4*x^2-22*x-5)/((5+x)*exp(ln(2)-x-2)-x^2-5*x),
x,method=_RETURNVERBOSE)
```

output
```
4*x+ln(5+x)+ln(x-exp(ln(2)-x-2))
```

3.738.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{-5-22x-4x^2+2e^{-2-x}(16+3x)}{-5x-x^2+2e^{-2-x}(5+x)}\,dx = 4\,x+\log\left(x+5\right)+\log\left(-x+e^{(-x+\log(2)-2)}\right)$$

input
```
integrate(((3*x+16)*exp(log(2)-x-2)-4*x^2-22*x-5)/((5+x)*exp(log(2)-x-2)-x
^2-5*x),x, algorithm=\
```

output
```
4*x + log(x + 5) + log(-x + e^(-x + log(2) - 2))
```

3.738.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{-5-22x-4x^2+2e^{-2-x}(16+3x)}{-5x-x^2+2e^{-2-x}(5+x)}\,dx = 4x+\log\left(-\frac{x}{2}+e^{-x-2}\right)+\log\left(x+5\right)$$

input
```
integrate(((3*x+16)*exp(ln(2)-x-2)-4*x**2-22*x-5)/((5+x)*exp(ln(2)-x-2)-x*
*2-5*x),x)
```

output
```
4*x + log(-x/2 + exp(-x - 2)) + log(x + 5)
```

3.738.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{-5-22x-4x^2+2e^{-2-x}(16+3x)}{-5x-x^2+2e^{-2-x}(5+x)}\,dx = 3\,x+\log\left(x+5\right)+\log\left(x\right)+\log\left(\frac{\left(xe^{(x+2)}-2\right)e^{(-2)}}{x}\right)$$

input
```
integrate(((3*x+16)*exp(log(2)-x-2)-4*x^2-22*x-5)/((5+x)*exp(log(2)-x-2)-x
^2-5*x),x, algorithm=\
```

output
```
3*x + log(x + 5) + log(x) + log((x*e^(x + 2) - 2)*e^(-2)/x)
```

3.738.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{-5-22x-4x^2+2e^{-2-x}(16+3x)}{-5x-x^2+2e^{-2-x}(5+x)}\,dx = 4\,x-4\,\log\left(2\right)+\log\left(x-e^{(-x+\log(2)-2)}\right)+\log\left(-x-5\right)+8$$

input
```
integrate(((3*x+16)*exp(log(2)-x-2)-4*x^2-22*x-5)/((5+x)*exp(log(2)-x-2)-x
^2-5*x),x, algorithm=\
```

output
```
4*x - 4*log(2) + log(x - e^(-x + log(2) - 2)) + log(-x - 5) + 8
```

3.738.9 Mupad [B] (verification not implemented)

Time = 15.24 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{-5-22x-4x^2+2e^{-2-x}(16+3x)}{-5x-x^2+2e^{-2-x}(5+x)}\,dx = 4\,x+\ln\left(x-2\,\mathrm{e}^{-x-2}\right)+\ln\left(x+5\right)$$

input
```
int((22*x - exp(log(2) - x - 2)*(3*x + 16) + 4*x^2 + 5)/(5*x - exp(log(2)
- x - 2)*(x + 5) + x^2),x)
```

output
```
4*x + log(x - 2*exp(- x - 2)) + log(x + 5)
```

3.739 $\int \frac{-e^2 \log(x \log(5)) - x \log(x \log(5))}{x \log(x \log(5))} \, dx$

3.739.1 Optimal result

Integrand size = 30, antiderivative size = 15

$$\int \frac{-e^2 \log(x \log(5)) - x \log(x \log(5))}{x \log(x \log(5))} \, dx = 9 - x - e^2 \log(x \log(5))$$

output
```
9+exp(ln(-ln(x*ln(5)))+2)-x
```

3.739.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.73

$$\int \frac{-e^2 \log(x \log(5)) - x \log(x \log(5))}{x \log(x \log(5))} \, dx = -x - e^2 \log(x)$$

input
```
Integrate[(-(E^2*Log[x*Log[5]]) - x*Log[x*Log[5]])/(x*Log[x*Log[5]]),x]
```

output
```
-x - E^2*Log[x]
```

3.739.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 35 vs. $2(15) = 30$.

Time = 0.20 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.33, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.067$, Rules used = {2589, 14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x\log(x\log(5)) - e^2\log(x\log(5))}{x\log(x\log(5))}\,dx$$

$$\Big\downarrow \text{2589}$$

$$\left(x - \frac{x\log(x\log(5)) + e^2\log(x\log(5))}{\log(x\log(5))}\right)\int \frac{1}{x}dx - x$$

$$\Big\downarrow \text{14}$$

$$\log(x)\left(x - \frac{x\log(x\log(5)) + e^2\log(x\log(5))}{\log(x\log(5))}\right) - x$$

input
```
Int[(-(E^2*Log[x*Log[5]]) - x*Log[x*Log[5]])/(x*Log[x*Log[5]]),x]
```

output
```
-x + Log[x]*(x - (E^2*Log[x*Log[5]] + x*Log[x*Log[5]])/Log[x*Log[5]])
```

3.739.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

rule 2589
```
Int[(v_)/(u_), x_Symbol] :> With[{a = Simplify[D[u, x]], b = Simplify[D[v,
x]]}, Simp[b*(x/a), x] - Simp[(b*u - a*v)/a   Int[1/u, x], x] /; NeQ[b*u -
a*v, 0]] /; PiecewiseLinearQ[u, v, x]
```

3.739.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.73

method	result	size
risch	$-x-\mathrm{e}^{2} \ln \left(x\right)$	11
norman	$-\mathrm{e}^{2} \ln \left(x \ln \left(5\right)\right)-x$	14
default	$-x+\mathrm{e}^{\ln \left(-\ln \left(x \ln \left(5\right)\right)\right)+2}$	16
parts	$-x+\mathrm{e}^{\ln \left(-\ln \left(x \ln \left(5\right)\right)\right)+2}$	16
parallelrisch	$\frac{-\ln \left(x \ln \left(5\right)\right)^{2} x+\mathrm{e}^{\ln \left(-\ln \left(x \ln \left(5\right)\right)\right)+2} \ln \left(x \ln \left(5\right)\right)^{2}}{\ln \left(x \ln \left(5\right)\right)^{2}}$	39

input
```
int((exp(ln(-ln(x*ln(5)))+2)-x*ln(x*ln(5)))/x/ln(x*ln(5)),x,method=_RETURN
VERBOSE)
```

output
```
-x-exp(2)*ln(x)
```

3.739.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.67

$$\int \frac{-e^2 \log(x \log(5)) - x \log(x \log(5))}{x \log(x \log(5))} \, dx = -e^{2} \log\left(x\right) - x$$

input
```
integrate((exp(log(-log(x*log(5)))+2)-x*log(x*log(5)))/x/log(x*log(5)),x,
algorithm=\
```

output
```
-e^2*log(x) - x
```

3.739.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int \frac{-e^2 \log(x \log(5)) - x \log(x \log(5))}{x \log(x \log(5))} \, dx = -x - e^{2} \log\left(x\right)$$

input
```
integrate((exp(ln(-ln(x*ln(5)))+2)-x*ln(x*ln(5)))/x/ln(x*ln(5)),x)
```

output
```
-x - exp(2)*log(x)
```

3.739.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.67

$$\int \frac{-e^2 \log(x\log(5)) - x\log(x\log(5))}{x\log(x\log(5))}\,dx = -e^2\log(x) - x$$

input
```
integrate((exp(log(-log(x*log(5)))+2)-x*log(x*log(5)))/x/log(x*log(5)),x,
algorithm=\
```

output
```
-e^2*log(x) - x
```

3.739.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.67

$$\int \frac{-e^2 \log(x\log(5)) - x\log(x\log(5))}{x\log(x\log(5))}\,dx = -e^2\log(x) - x$$

input
```
integrate((exp(log(-log(x*log(5)))+2)-x*log(x*log(5)))/x/log(x*log(5)),x,
algorithm=\
```

output
```
-e^2*log(x) - x
```

3.739.9 Mupad [B] (verification not implemented)

Time = 15.68 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.67

$$\int \frac{-e^2 \log(x\log(5)) - x\log(x\log(5))}{x\log(x\log(5))}\,dx = -x - e^2\ln(x)$$

input
```
int((exp(log(-log(x*log(5))) + 2) - x*log(x*log(5)))/(x*log(x*log(5))),x)
```

output
```
- x - exp(2)*log(x)
```

3.740 $\int \frac{32x^2+24x^3-8x^4+(-8x+7x^2+3x^3-2x^4)\log(1-2x+x^2)\log(\log^4(1-$ $(-5-5x+5x^2+5x^3)\log(1-2x+x^2)$

3.740.1 Optimal result

Integrand size = 86, antiderivative size = 28

$$\int \frac{32x^2+24x^3-8x^4+(-8x+7x^2+3x^3-2x^4)\log(1-2x+x^2)\log(\log^4(1-2x+x^2))}{(-5-5x+5x^2+5x^3)\log(1-2x+x^2)}\,dx$$
$$=\frac{(4-x)x^2\log(\log^4((1-x)^2))}{5(1+x)}$$

output
```
1/5*x^2/(1+x)*(-x+4)*ln(ln((1-x)^2)^4)
```

3.740.2 Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.54

$$\int \frac{32x^2+24x^3-8x^4+(-8x+7x^2+3x^3-2x^4)\log(1-2x+x^2)\log(\log^4(1-2x+x^2))}{(-5-5x+5x^2+5x^3)\log(1-2x+x^2)}\,dx$$
$$=\frac{1}{5}\left(-20\log(\log((-1+x)^2))-\frac{(-5-5x-4x^2+x^3)\log(\log^4((-1+x)^2))}{1+x}\right)$$

input
```
Integrate[(32*x^2 + 24*x^3 - 8*x^4 + (-8*x + 7*x^2 + 3*x^3 - 2*x^4)*Log[1
- 2*x + x^2]*Log[Log[1 - 2*x + x^2]^4])/((-5 - 5*x + 5*x^2 + 5*x^3)*Log[1
- 2*x + x^2]),x]
```

output
```
(-20*Log[Log[(-1 + x)^2]] - ((-5 - 5*x - 4*x^2 + x^3)*Log[Log[(-1 + x)^2]^
4])/(1 + x))/5
```

3.740.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x^4+24x^3+32x^2+\left(-2x^4+3x^3+7x^2-8x\right)\log\left(x^2-2x+1\right)\log\left(\log^4\left(x^2-2x+1\right)\right)}{\left(5x^3+5x^2-5x-5\right)\log\left(x^2-2x+1\right)}\,dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{-8x^4+24x^3+32x^2+\left(-2x^4+3x^3+7x^2-8x\right)\log\left(x^2-2x+1\right)\log\left(\log^4\left(x^2-2x+1\right)\right)}{10\left(x^2-1\right)\log\left(x^2-2x+1\right)}-\frac{-8x^4+24x^3}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2}{5}\int x\log\left(\log^4\left((x-1)^2\right)\right)dx-\int\frac{\log\left(\log^4\left((x-1)^2\right)\right)}{(x+1)^2}dx-4\int\frac{1}{(x+1)\log\left((x-1)^2\right)}dx+\frac{8(1-x)\,\text{ExpIntegralEi}\left(\frac{1}{2}\log\left((x-1)^2\right)\right)}{5\sqrt{(x-1)^2}}-\frac{4}{5}\text{LogIntegral}\left((x-1)^2\right)-(1-x)\log\left(\log^4\left((x-1)^2\right)\right)+\frac{6}{5}\log\left(\log\left((x-1)^2\right)\right)$$

input
```
Int[(32*x^2 + 24*x^3 - 8*x^4 + (-8*x + 7*x^2 + 3*x^3 - 2*x^4)*Log[1 - 2*x
+ x^2]*Log[Log[1 - 2*x + x^2]^4])/((-5 - 5*x + 5*x^2 + 5*x^3)*Log[1 - 2*x
+ x^2]),x]
```

output
```
$Aborted
```

3.740.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.740.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 96 vs. 2(26) = 52.

Time = 2.65 (sec) , antiderivative size = 97, normalized size of antiderivative = 3.46

method	result
parallelrisch	$\frac{-x^{3} \ln\left(\ln\left(x^{2}-2 x+1\right)^{4}\right)+4 \ln\left(\ln\left(x^{2}-2 x+1\right)^{4}\right) x^{2}-16 \ln\left(\ln\left(x^{2}-2 x+1\right)\right) x+4 \ln\left(\ln\left(x^{2}-2 x+1\right)^{4}\right) x-16 \ln\left(\ln\left(x^{2}-2 x+1\right)\right)+4 \ln}{5 x+5}$

input
```
int(((-2*x^4+3*x^3+7*x^2-8*x)*ln(x^2-2*x+1)*ln(ln(x^2-2*x+1)^4)-8*x^4+24*x
^3+32*x^2)/(5*x^3+5*x^2-5*x-5)/ln(x^2-2*x+1),x,method=_RETURNVERBOSE)
```

output
```
1/5*(-x^3*ln(ln(x^2-2*x+1)^4)+4*ln(ln(x^2-2*x+1)^4)*x^2-16*ln(ln(x^2-2*x+1
))*x+4*ln(ln(x^2-2*x+1)^4)*x-16*ln(ln(x^2-2*x+1))+4*ln(ln(x^2-2*x+1)^4))/(
1+x)
```

3.740.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{32x^2+24x^3-8x^4+(-8x+7x^2+3x^3-2x^4)\log(1-2x+x^2)\log\left(\log^4(1-2x+x^2)\right)}{(-5-5x+5x^2+5x^3)\log(1-2x+x^2)}\,dx = -\frac{(x^3-4x^2)\log\left(\log\left(x^2-2x+1\right)^4\right)}{5(x+1)}$$

input
```
integrate(((-2*x^4+3*x^3+7*x^2-8*x)*log(x^2-2*x+1)*log(log(x^2-2*x+1)^4)-8
*x^4+24*x^3+32*x^2)/(5*x^3+5*x^2-5*x-5)/log(x^2-2*x+1),x, algorithm=\
```

output
```
-1/5*(x^3 - 4*x^2)*log(log(x^2 - 2*x + 1)^4)/(x + 1)
```

3.740.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. 2(20) = 40.

Time = 0.27 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.57

$$\int \frac{32x^2+24x^3-8x^4+(-8x+7x^2+3x^3-2x^4)\log(1-2x+x^2)\log\left(\log^4(1-2x+x^2)\right)}{(-5-5x+5x^2+5x^3)\log(1-2x+x^2)}\,dx$$
$$= -4\log\left(\log\left(x^2-2x+1\right)\right)+\frac{(-x^3+4x^2+5x+5)\log\left(\log\left(x^2-2x+1\right)^4\right)}{5x+5}$$

input
```
integrate((((-2*x**4+3*x**3+7*x**2-8*x)*ln(x**2-2*x+1)*ln(ln(x**2-2*x+1)**4
)-8*x**4+24*x**3+32*x**2)/(5*x**3+5*x**2-5*x-5)/ln(x**2-2*x+1),x)
```

output
```
-4*log(log(x**2 - 2*x + 1)) + (-x**3 + 4*x**2 + 5*x + 5)*log(log(x**2 - 2*
x + 1)**4)/(5*x + 5)
```

3.740.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(22) = 44.

Time = 0.34 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.61

$$\int \frac{32x^2+24x^3-8x^4+(-8x+7x^2+3x^3-2x^4)\log(1-2x+x^2)\log\left(\log^4(1-2x+x^2)\right)}{(-5-5x+5x^2+5x^3)\log(1-2x+x^2)}\,dx$$
$$= -\frac{4\left(x^3\log(2)-4\,x^2\log(2)-5\,x\log(2)+(x^3-4\,x^2)\log(\log(x-1))-5\,\log(2)\right)}{5\,(x+1)}$$

input
```
integrate((((-2*x^4+3*x^3+7*x^2-8*x)*log(x^2-2*x+1)*log(log(x^2-2*x+1)^4)-8
*x^4+24*x^3+32*x^2)/(5*x^3+5*x^2-5*x-5)/log(x^2-2*x+1),x, algorithm=\
```

output
```
-4/5*(x^3*log(2) - 4*x^2*log(2) - 5*x*log(2) + (x^3 - 4*x^2)*log(log(x - 1
)) - 5*log(2))/(x + 1)
```

3.740.8 Giac [A] (verification not implemented)

Time = 0.65 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int \frac{32x^2+24x^3-8x^4+(-8x+7x^2+3x^3-2x^4)\log(1-2x+x^2)\log(\log^4(1-2x+x^2))}{(-5-5x+5x^2+5x^3)\log(1-2x+x^2)}\,dx$$
$$=-\frac{1}{5}\left(x^2-5\,x-\frac{5}{x+1}\right)\log\left(\log\left(x^2-2\,x+1\right)^4\right)-4\,\log\left(\log\left(x^2-2\,x+1\right)\right)$$

input
```
integrate((((-2*x^4+3*x^3+7*x^2-8*x)*log(x^2-2*x+1)*log(log(x^2-2*x+1)^4)-8
*x^4+24*x^3+32*x^2)/(5*x^3+5*x^2-5*x-5)/log(x^2-2*x+1),x, algorithm=\
```

output
```
-1/5*(x^2 - 5*x - 5/(x + 1))*log(log(x^2 - 2*x + 1)^4) - 4*log(log(x^2 - 2
*x + 1))
```

3.740.9 Mupad [B] (verification not implemented)

Time = 15.78 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{32x^2+24x^3-8x^4+(-8x+7x^2+3x^3-2x^4)\log(1-2x+x^2)\log(\log^4(1-2x+x^2))}{(-5-5x+5x^2+5x^3)\log(1-2x+x^2)}\,dx$$
$$=-\frac{x^2\,\ln\left(\ln\left(x^2-2\,x+1\right)^4\right)\,\left(x-4\right)}{5\,\left(x+1\right)}$$

input
```
int(-(32*x^2 + 24*x^3 - 8*x^4 - log(log(x^2 - 2*x + 1)^4)*log(x^2 - 2*x +
1)*(8*x - 7*x^2 - 3*x^3 + 2*x^4))/(log(x^2 - 2*x + 1)*(5*x - 5*x^2 - 5*x^3
 + 5)),x)
```

output
```
-(x^2*log(log(x^2 - 2*x + 1)^4)*(x - 4))/(5*(x + 1))
```

3.741 $\int \frac{2+e^x(3-x)+\left(-120-120x+30x^2\right)\log(5)}{4+e^{2x}+\left(-240x-120x^2\right)\log(5)+\left(3600x^2+3600x^3+900x^4\right)\log^2(5)+e}$

3.741.1 Optimal result

Integrand size = 85, antiderivative size = 26

$$\int \frac{2+e^x(3-x)+\left(-120-120x+30x^2\right)\log(5)}{4+e^{2x}+\left(-240x-120x^2\right)\log(5)+\left(3600x^2+3600x^3+900x^4\right)\log^2(5)+e^x\left(4+\left(-120x-60x^2\right)\log(5\right.}$$
$$=\frac{2-x}{-2-e^x+30\left(2x+x^2\right)\log(5)}$$

output
```
(2-x)/(30*(x^2+2*x)*ln(5)-exp(x)-2)
```

3.741.2 Mathematica [A] (verified)

Time = 0.38 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{2+e^x(3-x)+\left(-120-120x+30x^2\right)\log(5)}{4+e^{2x}+\left(-240x-120x^2\right)\log(5)+\left(3600x^2+3600x^3+900x^4\right)\log^2(5)+e^x\left(4+\left(-120x-60x^2\right)\log(5\right.}$$
$$=\frac{-2+x}{2+e^x-60x\log(5)-30x^2\log(5)}$$

input
```
Integrate[(2 + E^x*(3 - x) + (-120 - 120*x + 30*x^2)*Log[5])/(4 + E^(2*x)
+ (-240*x - 120*x^2)*Log[5] + (3600*x^2 + 3600*x^3 + 900*x^4)*Log[5]^2 + E
^x*(4 + (-120*x - 60*x^2)*Log[5])),x]
```

output
```
(-2 + x)/(2 + E^x - 60*x*Log[5] - 30*x^2*Log[5])
```

3.741.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(30x^2-120x-120)\log(5)+e^x(3-x)+2}{(-120x^2-240x)\log(5)+e^x((-60x^2-120x)\log(5)+4)+(900x^4+3600x^3+3600x^2)\log^2(5)+e^{2x}+4}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2(15x^2\log(5)-60x\log(5)+1-60\log(5))-e^x(x-3)}{(-30x^2\log(5)+e^x-60x\log(5)+2)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x-3}{30x^2\log(5)-e^x+60x\log(5)-2}-\frac{2(x-2)(15x^2\log(5)-1-30\log(5))}{(30x^2\log(5)-e^x+60x\log(5)-2)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$3\int \frac{1}{-30\log(5)x^2-60\log(5)x+e^x+2}dx-4(1+30\log(5))\int \frac{1}{(30\log(5)x^2+60\log(5)x-e^x-2)^2}dx+2(1+30\log(5))\int \frac{x}{(30\log(5)x^2+60\log(5)x-e^x-2)^2}dx+60\log(5)\int \frac{x^2}{(30\log(5)x^2+60\log(5)x-e^x-2)^2}dx+\int \frac{x}{30\log(5)x^2+60\log(5)x-e^x-2}dx-30\log(5)\int \frac{x^3}{(30\log(5)x^2+60\log(5)x-e^x-2)^2}dx$$

input
```
Int[(2 + E^x*(3 - x) + (-120 - 120*x + 30*x^2)*Log[5])/(4 + E^(2*x) + (-24
0*x - 120*x^2)*Log[5] + (3600*x^2 + 3600*x^3 + 900*x^4)*Log[5]^2 + E^x*(4
+ (-120*x - 60*x^2)*Log[5])),x]
```

output
```
$Aborted
```

3.741.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.741.4 Maple [A] (verified)

Time = 0.41 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

method	result	size
risch	$-\frac{-2+x}{30x^2\ln(5)+60x\ln(5)-e^x-2}$	26
parallelrisch	$-\frac{-2+x}{30x^2\ln(5)+60x\ln(5)-e^x-2}$	26
norman	$\frac{2-x}{30x^2\ln(5)+60x\ln(5)-e^x-2}$	27

input
```
int(((-x+3)*exp(x)+(30*x^2-120*x-120)*ln(5)+2)/(exp(x)^2+((-60*x^2-120*x)*
ln(5)+4)*exp(x)+(900*x^4+3600*x^3+3600*x^2)*ln(5)^2+(-120*x^2-240*x)*ln(5)
+4),x,method=_RETURNVERBOSE)
```

output
```
-(-2+x)/(30*x^2*ln(5)+60*x*ln(5)-exp(x)-2)
```

3.741.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{2+e^x(3-x)+(-120-120x+30x^2)\log(5)}{4+e^{2x}+(-240x-120x^2)\log(5)+(3600x^2+3600x^3+900x^4)\log^2(5)+e^x\left(4+(-120x-60x^2)\log(5\right.}$$
$$=-\frac{x-2}{30\left(x^2+2x\right)\log\left(5\right)-e^x-2}$$

input
```
integrate(((-x+3)*exp(x)+(30*x^2-120*x-120)*log(5)+2)/(exp(x)^2+((-60*x^2-
120*x)*log(5)+4)*exp(x)+(900*x^4+3600*x^3+3600*x^2)*log(5)^2+(-120*x^2-240
*x)*log(5)+4),x, algorithm=\
```

output
```
-(x - 2)/(30*(x^2 + 2*x)*log(5) - e^x - 2)
```

3.741.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{2+e^x(3-x)+(-120-120x+30x^2)\log(5)}{4+e^{2x}+(-240x-120x^2)\log(5)+(3600x^2+3600x^3+900x^4)\log^2(5)+e^x(4+(-120x-60x^2)\log(5))}\,dx = \frac{x-2}{-30x^2\log(5)-60x\log(5)+e^x+2}$$

input
```
integrate(((-x+3)*exp(x)+(30*x**2-120*x-120)*ln(5)+2)/(exp(x)**2+((-60*x**
2-120*x)*ln(5)+4)*exp(x)+(900*x**4+3600*x**3+3600*x**2)*ln(5)**2+(-120*x**
2-240*x)*ln(5)+4),x)
```

output
```
(x - 2)/(-30*x**2*log(5) - 60*x*log(5) + exp(x) + 2)
```

3.741.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{2+e^x(3-x)+(-120-120x+30x^2)\log(5)}{4+e^{2x}+(-240x-120x^2)\log(5)+(3600x^2+3600x^3+900x^4)\log^2(5)+e^x(4+(-120x-60x^2)\log(5))}\,dx = -\frac{x-2}{30\,x^2\log(5)+60\,x\log(5)-e^x-2}$$

input
```
integrate(((-x+3)*exp(x)+(30*x^2-120*x-120)*log(5)+2)/(exp(x)^2+((-60*x^2-
120*x)*log(5)+4)*exp(x)+(900*x^4+3600*x^3+3600*x^2)*log(5)^2+(-120*x^2-240
*x)*log(5)+4),x, algorithm=\
```

output
```
-(x - 2)/(30*x^2*log(5) + 60*x*log(5) - e^x - 2)
```

3.741.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{2+e^x(3-x)+(-120-120x+30x^2)\log(5)}{4+e^{2x}+(-240x-120x^2)\log(5)+(3600x^2+3600x^3+900x^4)\log^2(5)+e^x\left(4+(-120x-60x^2)\log(5\right.}$$
$$=-\frac{x-2}{30\,x^2\log(5)+60\,x\log(5)-e^x-2}$$

input
```
integrate(((-x+3)*exp(x)+(30*x^2-120*x-120)*log(5)+2)/(exp(x)^2+((-60*x^2-
120*x)*log(5)+4)*exp(x)+(900*x^4+3600*x^3+3600*x^2)*log(5)^2+(-120*x^2-240
*x)*log(5)+4),x, algorithm=\
```

output
```
-(x - 2)/(30*x^2*log(5) + 60*x*log(5) - e^x - 2)
```

3.741.9 Mupad [B] (verification not implemented)

Time = 0.74 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{2+e^x(3-x)+(-120-120x+30x^2)\log(5)}{4+e^{2x}+(-240x-120x^2)\log(5)+(3600x^2+3600x^3+900x^4)\log^2(5)+e^x\left(4+(-120x-60x^2)\log(5\right.}$$
$$=\frac{x-2}{\mathrm{e}^x-60\,x\,\ln(5)-30\,x^2\,\ln(5)+2}$$

input
```
int(-(exp(x)*(x - 3) + log(5)*(120*x - 30*x^2 + 120) - 2)/(exp(2*x) + log(
5)^2*(3600*x^2 + 3600*x^3 + 900*x^4) - log(5)*(240*x + 120*x^2) - exp(x)*(
log(5)*(120*x + 60*x^2) - 4) + 4),x)
```

output
```
(x - 2)/(exp(x) - 60*x*log(5) - 30*x^2*log(5) + 2)
```

3.742 $\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}$

3.742.1 Optimal result

Integrand size = 98, antiderivative size = 26

$$\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx = \frac{4-2x+\log\left(-5+\frac{5e^4\log(4)}{4+2x}\right)}{x}$$

output
```
(ln(10*exp(4)/(4+2*x)*ln(2)-5)+4-2*x)/x
```

3.742.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx = \frac{4}{x}+\frac{\log\left(\frac{5(-4-2x+e^4\log(4))}{2(2+x)}\right)}{x}$$

input
```
Integrate[(32 + 32*x + 8*x^2 + E^4*(-8 - 5*x)*Log[4] + (8 + 8*x + 2*x^2 +
E^4*(-2 - x)*Log[4])*Log[(-20 - 10*x + 5*E^4*Log[4])/(4 + 2*x)])/(-8*x^2 -
 8*x^3 - 2*x^4 + E^4*(2*x^2 + x^3)*Log[4]),x]
```

3.742. $\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx$

output
```
4/x + Log[(5*(-4 - 2*x + E^4*Log[4]))/(2*(2 + x))]/x
```

3.742.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 295 vs. $2(26) = 52$.

Time = 1.27 (sec) , antiderivative size = 295, normalized size of antiderivative = 11.35, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.031$, Rules used = {2026, 7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^2+\left(2x^2+8x+e^4(-x-2)\log(4)+8\right)\log\left(\frac{-10x-20+5e^4\log(4)}{2x+4}\right)+32x+e^4(-5x-8)\log(4)+32}{-2x^4-8x^3-8x^2+e^4\left(x^3+2x^2\right)\log(4)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{8x^2+\left(2x^2+8x+e^4(-x-2)\log(4)+8\right)\log\left(\frac{-10x-20+5e^4\log(4)}{2x+4}\right)+32x+e^4(-5x-8)\log(4)+32}{x^2\left(-2x^2-x\left(8-e^4\log(4)\right)-8+e^4\log(16)\right)}dx$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{-8x^2-x\left(32-5e^4\log(4)\right)-8\left(4-e^4\log(4)\right)}{x^2\left(2x^2+x\left(8-e^4\log(4)\right)+8-e^4\log(16)\right)}+\frac{(x+2)\left(-2x-4+e^4\log(4)\right)\log\left(\frac{5\left(-2x-4+e^4\log(4)\right)}{2(x+2)}\right)}{x^2\left(2x^2+x\left(8-e^4\log(4)\right)+8-e^4\log(16)\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^4\left(e^4\left(8\log^2(4)-\log(16)\log(1024)\right)+\log(65536)\right)\log(x)}{\left(8-e^4\log(16)\right)^2}+\frac{\left(e^8\log^2(4)\log(16)+4e^4\left(22\log^2(4)-22\log(4)\log(16)+\log(16)\log(262144)\right)+64\log(4)-4\log(65536)\right)\log(x+}{\log(4)\left(8-e^4\log(16)\right)^2}$$
$$\frac{\left(e^8\log(4)\left(8\log^2(4)+\log(4)\log(16)-\log(16)\log(1024)\right)+e^4\left(88\log^2(4)-\log(4)(88\log(16)-\log(65536))+4\log\right.\right.}{\log(4)\left(8-e^4\log(16)\right)^2}$$
$$\frac{e^4\log(4)\log\left(\frac{x}{x+2}\right)}{2\left(4-e^4\log(4)\right)}+\frac{\left(2x+4-e^4\log(4)\right)\log\left(-\frac{5\left(2x+4-e^4\log(4)\right)}{2(x+2)}\right)}{x\left(4-e^4\log(4)\right)}+\frac{8\left(4-e^4\log(4)\right)}{x\left(8-e^4\log(16)\right)}$$

input
```
Int[(32 + 32*x + 8*x^2 + E^4*(-8 - 5*x)*Log[4] + (8 + 8*x + 2*x^2 + E^4*(-
2 - x)*Log[4])*Log[(-20 - 10*x + 5*E^4*Log[4])/(4 + 2*x)])/(-8*x^2 - 8*x^3
 - 2*x^4 + E^4*(2*x^2 + x^3)*Log[4]),x]
```

3.742. $\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+\left(8+8x+2x^2+e^4(-2-x)\log(4)\right)\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4\left(2x^2+x^3\right)\log(4)}dx$

output
```
(8*(4 - E^4*Log[4]))/(x*(8 - E^4*Log[16])) + (E^4*(E^4*(8*Log[4]^2 - Log[1
6]*Log[1024]) + Log[65536])*Log[x])/(8 - E^4*Log[16])^2 - (E^4*Log[4]*Log[
x/(2 + x)])/(2*(4 - E^4*Log[4])) + ((64*Log[4] + E^8*Log[4]^2*Log[16] - 4*
Log[65536] + 4*E^4*(22*Log[4]^2 - 22*Log[4]*Log[16] + Log[16]*Log[262144])
)*Log[2 + x])/(Log[4]*(8 - E^4*Log[16])^2) - ((64*Log[4] + E^8*Log[4]*(8*L
og[4]^2 + Log[4]*Log[16] - Log[16]*Log[1024]) - 4*Log[65536] + E^4*(88*Log
[4]^2 - Log[4]*(88*Log[16] - Log[65536]) + 4*Log[16]*Log[262144]))*Log[4 +
 2*x - E^4*Log[4]])/(Log[4]*(8 - E^4*Log[16])^2) + ((4 + 2*x - E^4*Log[4])
*Log[(-5*(4 + 2*x - E^4*Log[4]))/(2*(2 + x))])/(x*(4 - E^4*Log[4]))
```

3.742.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.742.4 Maple [A] (verified)

Time = 0.98 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

3.742. $\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx$

method	result
norman	$\frac{4+\ln\left(\frac{10\,\mathrm{e}^{4}\ln(2)-10x-20}{4+2x}\right)}{x}$
parallelrisch	$-\frac{-4-\ln\left(\frac{5\,\mathrm{e}^{4}\ln(2)-5x-10}{2+x}\right)}{x}$
risch	$\frac{\ln\left(\frac{10\,\mathrm{e}^{4}\ln(2)-10x-20}{4+2x}\right)}{x}+\frac{4}{x}$
parts	$5\,\mathrm{e}^{4}\ln(2)\left(\frac{\ln\left(5\,\mathrm{e}^{4}\ln(2)-\frac{10\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}{10\,\mathrm{e}^{4}\ln(2)-20}+\frac{\ln\left(-5+\frac{5\,\mathrm{e}^{4}\ln(2)}{2+x}\right)\left(-5+\frac{5\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}{5(\mathrm{e}^{4}\ln(2)-2)\left(5\,\mathrm{e}^{4}\ln(2)-\frac{10\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}\right)+\frac{\ln(-\mathrm{e}^{4}\ln(2)+x+2)}{\mathrm{e}^{4}\ln(2)-2}-\frac{\mathrm{e}^{4}\,\mathrm{l}}{2\,\mathrm{e}}$
derivativedivides	$-\frac{5\,\mathrm{e}^{4}\ln(2)\left(-\frac{\ln\left(5\,\mathrm{e}^{4}\ln(2)-\frac{10\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}{5\left(\mathrm{e}^{4}\ln(2)-2\right)}-\frac{2\ln\left(-5+\frac{5\,\mathrm{e}^{4}\ln(2)}{2+x}\right)\left(-5+\frac{5\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}{5\left(\mathrm{e}^{4}\ln(2)-2\right)\left(5\,\mathrm{e}^{4}\ln(2)-\frac{10\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}-\frac{2\,\mathrm{e}^{-4}\ln\left(-5+\frac{5\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}{5\ln(2)\left(\mathrm{e}^{4}\ln(2)-2\right)}+\frac{4}{-5\,\mathrm{e}^{4}\ln(2)+\frac{10}{}}\right.}{2}$
default	$-\frac{5\,\mathrm{e}^{4}\ln(2)\left(-\frac{\ln\left(5\,\mathrm{e}^{4}\ln(2)-\frac{10\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}{5\left(\mathrm{e}^{4}\ln(2)-2\right)}-\frac{2\ln\left(-5+\frac{5\,\mathrm{e}^{4}\ln(2)}{2+x}\right)\left(-5+\frac{5\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}{5\left(\mathrm{e}^{4}\ln(2)-2\right)\left(5\,\mathrm{e}^{4}\ln(2)-\frac{10\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}-\frac{2\,\mathrm{e}^{-4}\ln\left(-5+\frac{5\,\mathrm{e}^{4}\ln(2)}{2+x}\right)}{5\ln(2)\left(\mathrm{e}^{4}\ln(2)-2\right)}+\frac{4}{-5\,\mathrm{e}^{4}\ln(2)+\frac{10}{}}\right.}{2}$

input
```
int(((2*(-2-x)*exp(4)*ln(2)+2*x^2+8*x+8)*ln((10*exp(4)*ln(2)-10*x-20)/(4+2
*x))+2*(-5*x-8)*exp(4)*ln(2)+8*x^2+32*x+32)/(2*(x^3+2*x^2)*exp(4)*ln(2)-2*
x^4-8*x^3-8*x^2),x,method=_RETURNVERBOSE)
```

output
```
(4+ln((10*exp(4)*ln(2)-10*x-20)/(4+2*x)))/x
```

3.742.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx$$
$$=\frac{\log\left(\frac{5\left(e^4\log(2)-x-2\right)}{x+2}\right)+4}{x}$$

input
```
integrate(((2*(-2-x)*exp(4)*log(2)+2*x^2+8*x+8)*log((10*exp(4)*log(2)-10*x
-20)/(4+2*x))+2*(-5*x-8)*exp(4)*log(2)+8*x^2+32*x+32)/(2*(x^3+2*x^2)*exp(4
)*log(2)-2*x^4-8*x^3-8*x^2),x, algorithm=\
```

output
```
(log(5*(e^4*log(2) - x - 2)/(x + 2)) + 4)/x
```

3.742. $\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx$

3.742.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx = \frac{\log\left(\frac{-10x-20+10e^4\log(2)}{2x+4}\right)}{x}+\frac{4}{x}$$

input
```
integrate(((2*(-2-x)*exp(4)*ln(2)+2*x**2+8*x+8)*ln((10*exp(4)*ln(2)-10*x-2
0)/(4+2*x))+2*(-5*x-8)*exp(4)*ln(2)+8*x**2+32*x+32)/(2*(x**3+2*x**2)*exp(4
)*ln(2)-2*x**4-8*x**3-8*x**2),x)
```

output
```
log((-10*x - 20 + 10*exp(4)*log(2))/(2*x + 4))/x + 4/x
```

3.742.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.40 (sec) , antiderivative size = 391, normalized size of antiderivative = 15.04

$$\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx$$
$$= -2\left(\frac{e^{(-4)}\log(x+2)}{\log(2)}-\frac{(e^4\log(2)-4)\log(x)}{e^8\log(2)^2-4e^4\log(2)+4}-\frac{4\log(-e^4\log(2)+x+2)}{e^{12}\log(2)^3-4e^8\log(2)^2+4e^4\log(2)}-\frac{}{(e^4\log(}\right.$$
$$+\frac{5}{2}\left(\frac{e^{(-4)}\log(x+2)}{\log(2)}+\frac{2\log(-e^4\log(2)+x+2)}{e^8\log(2)^2-2e^4\log(2)}-\frac{\log(x)}{e^4\log(2)-2}\right)e^4\log(2)$$
$$+\frac{e^4\log(2)\log(x)}{2(e^4\log(2)-2)}-\frac{4e^{(-4)}\log(-e^4\log(2)+x+2)}{\log(2)}-\frac{4(e^4\log(2)-4)\log(x)}{e^8\log(2)^2-4e^4\log(2)+4}$$
$$-\frac{16\log(-e^4\log(2)+x+2)}{e^{12}\log(2)^3-4e^8\log(2)^2+4e^4\log(2)}-\frac{16\log(-e^4\log(2)+x+2)}{e^8\log(2)^2-2e^4\log(2)}+\frac{8\log(x)}{e^4\log(2)-2}$$
$$-\frac{4i\pi-2(i\pi\log(2)+\log(5)\log(2))e^4-2(e^4\log(2)-x-2)\log(-e^4\log(2)+x+2)+((e^4\log(2)-}{2(e^4\log(2)-2)x}$$
$$-\frac{8}{(e^4\log(2)-2)x}$$

input
```
integrate(((2*(-2-x)*exp(4)*log(2)+2*x^2+8*x+8)*log((10*exp(4)*log(2)-10*x
-20)/(4+2*x))+2*(-5*x-8)*exp(4)*log(2)+8*x^2+32*x+32)/(2*(x^3+2*x^2)*exp(4
)*log(2)-2*x^4-8*x^3-8*x^2),x, algorithm=\
```

output
```
-2*(e^(-4)*log(x + 2)/log(2) - (e^4*log(2) - 4)*log(x)/(e^8*log(2)^2 - 4*e
^4*log(2) + 4) - 4*log(-e^4*log(2) + x + 2)/(e^12*log(2)^3 - 4*e^8*log(2)^
2 + 4*e^4*log(2)) - 2/((e^4*log(2) - 2)*x))*e^4*log(2) + 5/2*(e^(-4)*log(x
 + 2)/log(2) + 2*log(-e^4*log(2) + x + 2)/(e^8*log(2)^2 - 2*e^4*log(2)) -
log(x)/(e^4*log(2) - 2))*e^4*log(2) + 1/2*e^4*log(2)*log(x)/(e^4*log(2) -
2) - 4*e^(-4)*log(-e^4*log(2) + x + 2)/log(2) - 4*(e^4*log(2) - 4)*log(x)/
(e^8*log(2)^2 - 4*e^4*log(2) + 4) - 16*log(-e^4*log(2) + x + 2)/(e^12*log(
2)^3 - 4*e^8*log(2)^2 + 4*e^4*log(2)) - 16*log(-e^4*log(2) + x + 2)/(e^8*l
og(2)^2 - 2*e^4*log(2)) + 8*log(x)/(e^4*log(2) - 2) - 1/2*(4*I*pi - 2*(I*p
i*log(2) + log(5)*log(2))*e^4 - 2*(e^4*log(2) - x - 2)*log(-e^4*log(2) + x
 + 2) + ((e^4*log(2) - 2)*x + 2*e^4*log(2) - 4)*log(x + 2) + 4*log(5))/((e
^4*log(2) - 2)*x) - 8/((e^4*log(2) - 2)*x)
```

3.742.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 120 vs. $2(26) = 52$.

Time = 0.51 (sec) , antiderivative size = 120, normalized size of antiderivative = 4.62

$$\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx$$
$$= \frac{\left(2e^8\log(2)^2 + \frac{(e^4\log(2)-x-2)e^4\log(2)\log\left(\frac{5(e^4\log(2)-x-2)}{x+2}\right)}{x+2} + e^4\log(2)\log\left(\frac{5(e^4\log(2)-x-2)}{x+2}\right)\right)\left(\frac{(e^4\log(2)-2)e^{(-8)}}{\log(2)^2}\right.}{e^4\log(2) - \frac{2(e^4\log(2)-x-2)}{x+2} - 2}$$

input
```
integrate(((2*(-2-x)*exp(4)*log(2)+2*x^2+8*x+8)*log((10*exp(4)*log(2)-10*x
-20)/(4+2*x))+2*(-5*x-8)*exp(4)*log(2)+8*x^2+32*x+32)/(2*(x^3+2*x^2)*exp(4
)*log(2)-2*x^4-8*x^3-8*x^2),x, algorithm=\
```

output
```
(2*e^8*log(2)^2 + (e^4*log(2) - x - 2)*e^4*log(2)*log(5*(e^4*log(2) - x -
2)/(x + 2))/(x + 2) + e^4*log(2)*log(5*(e^4*log(2) - x - 2)/(x + 2)))*((e^
4*log(2) - 2)*e^(-8)/log(2)^2 + 2*e^(-8)/log(2)^2)/(e^4*log(2) - 2*(e^4*lo
g(2) - x - 2)/(x + 2) - 2)
```

3.742. $\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx$

3.742.9 Mupad [B] (verification not implemented)

Time = 14.93 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{32+32x+8x^2+e^4(-8-5x)\log(4)+(8+8x+2x^2+e^4(-2-x)\log(4))\log\left(\frac{-20-10x+5e^4\log(4)}{4+2x}\right)}{-8x^2-8x^3-2x^4+e^4(2x^2+x^3)\log(4)}\,dx$$
$$=\frac{\ln\left(-\frac{5\left(x-e^4\ln(2)+2\right)}{x+2}\right)+4}{x}$$

input
```
int(-(32*x + log(-(10*x - 10*exp(4)*log(2) + 20)/(2*x + 4))*(8*x + 2*x^2 -
 2*exp(4)*log(2)*(x + 2) + 8) + 8*x^2 - 2*exp(4)*log(2)*(5*x + 8) + 32)/(8
*x^2 + 8*x^3 + 2*x^4 - 2*exp(4)*log(2)*(2*x^2 + x^3)),x)
```

output
```
(log(-(5*(x - exp(4)*log(2) + 2))/(x + 2)) + 4)/x
```

3.743 $\int \frac{6e^{2e^4}+6x-3e^{2e^4}\log(x^2)}{x^2\log(8)}\,dx$

3.743.1 Optimal result

Integrand size = 34, antiderivative size = 22

$$\int \frac{6e^{2e^4}+6x-3e^{2e^4}\log(x^2)}{x^2\log(8)}\,dx=\frac{3\left(e^{2e^4}+x\right)\log(x^2)}{x\log(8)}$$

output
```
1/x*ln(x^2)*(x+exp(exp(4))^2)/ln(2)
```

3.743.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{6e^{2e^4}+6x-3e^{2e^4}\log(x^2)}{x^2\log(8)}\,dx=\frac{6\log(x)+\frac{3e^{2e^4}\log(x^2)}{x}}{\log(8)}$$

input
```
Integrate[(6*E^(2*E^4) + 6*x - 3*E^(2*E^4)*Log[x^2])/(x^2*Log[8]),x]
```

output
```
(6*Log[x] + (3*E^(2*E^4)*Log[x^2])/x)/Log[8]
```

3.743.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3e^{2e^4}\log(x^2)+6x+6e^{2e^4}}{x^2\log(8)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \frac{3\left(2x-e^{2e^4}\log(x^2)+2e^{2e^4}\right)}{x^2}dx}{\log(8)}$$

$$\Big\downarrow \text{27}$$

$$\frac{3\int \frac{2x-e^{2e^4}\log(x^2)+2e^{2e^4}}{x^2}dx}{\log(8)}$$

$$\Big\downarrow \text{2010}$$

$$\frac{3\int \left(\frac{2\left(x+e^{2e^4}\right)}{x^2}-\frac{e^{2e^4}\log(x^2)}{x^2}\right)dx}{\log(8)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{3\left(\frac{e^{2e^4}\log(x^2)}{x}+2\log(x)\right)}{\log(8)}$$

input
```
Int[(6*E^(2*E^4) + 6*x - 3*E^(2*E^4)*Log[x^2])/(x^2*Log[8]),x]
```

output
```
(3*(2*Log[x] + (E^(2*E^4)*Log[x^2])/x))/Log[8]
```

3.743. $\int \frac{6e^{2e^4}+6x-3e^{2e^4}\log(x^2)}{x^2\log(8)}\,dx$

3.743.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.743.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

method	result	size
norman	$\frac{e^{2 e^{4}} \ln\left(x^{2}\right)}{\ln\left(2\right) x}+\frac{2 \ln\left(x\right)}{\ln\left(2\right)}$	27
risch	$\frac{e^{2 e^{4}} \ln\left(x^{2}\right)}{\ln\left(2\right) x}+\frac{2 \ln\left(x\right)}{\ln\left(2\right)}$	27
parallelrisch	$\frac{6 e^{2 e^{4}} \ln\left(x^{2}\right)+6 x \ln\left(x^{2}\right)}{6 \ln\left(2\right) x}$	29
default	$\frac{2 \ln\left(x\right)-\frac{2 e^{2 e^{4}}}{x}-e^{2 e^{4}} \left(-\frac{\ln\left(x^{2}\right)}{x}-\frac{2}{x}\right)}{\ln\left(2\right)}$	43
parts	$\frac{2 \ln\left(x\right)-\frac{2 e^{2 e^{4}}}{x}}{\ln\left(2\right)}-\frac{e^{2 e^{4}} \left(-\frac{\ln\left(x^{2}\right)}{x}-\frac{2}{x}\right)}{\ln\left(2\right)}$	47

input
```
int(1/3*(-3*exp(exp(4))^2*ln(x^2)+6*exp(exp(4))^2+6*x)/x^2/ln(2),x,method=
_RETURNVERBOSE)
```

output
```
1/ln(2)*exp(exp(4))^2*ln(x^2)/x+2*ln(x)/ln(2)
```

3.743.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{6e^{2e^4}+6x-3e^{2e^4}\log\left(x^2\right)}{x^2\log(8)}\,dx=\frac{\left(x+e^{\left(2\,e^4\right)}\right)\log\left(x^2\right)}{x\log\left(2\right)}$$

input
```
integrate(1/3*(-3*exp(exp(4))^2*log(x^2)+6*exp(exp(4))^2+6*x)/x^2/log(2),x
, algorithm=\
```

output
```
(x + e^(2*e^4))*log(x^2)/(x*log(2))
```

3.743.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{6e^{2e^4}+6x-3e^{2e^4}\log\left(x^2\right)}{x^2\log(8)}\,dx=\frac{2\log\left(x\right)}{\log\left(2\right)}+\frac{e^{2e^4}\log\left(x^2\right)}{x\log\left(2\right)}$$

input
```
integrate(1/3*(-3*exp(exp(4))**2*ln(x**2)+6*exp(exp(4))**2+6*x)/x**2/ln(2)
,x)
```

output
```
2*log(x)/log(2) + exp(2*exp(4))*log(x**2)/(x*log(2))
```

3.743.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. 2(19) = 38.

Time = 0.22 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.82

$$\int \frac{6e^{2e^4}+6x-3e^{2e^4}\log\left(x^2\right)}{x^2\log(8)}\,dx=\frac{\left(\frac{\log\left(x^2\right)}{x}+\frac{2}{x}\right)e^{\left(2\,e^4\right)}-\frac{2\,e^{\left(2\,e^4\right)}}{x}+2\,\log\left(x\right)}{\log\left(2\right)}$$

input
```
integrate(1/3*(-3*exp(exp(4))^2*log(x^2)+6*exp(exp(4))^2+6*x)/x^2/log(2),x
, algorithm=\
```

output
```
((log(x^2)/x + 2/x)*e^(2*e^4) - 2*e^(2*e^4)/x + 2*log(x))/log(2)
```

3.743.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{6e^{2e^4} + 6x - 3e^{2e^4} \log(x^2)}{x^2 \log(8)} \, dx = \frac{e^{(2e^4)} \log(x^2) + 2x \log(x)}{x \log(2)}$$

input
```
integrate(1/3*(-3*exp(exp(4))^2*log(x^2)+6*exp(exp(4))^2+6*x)/x^2/log(2),x
, algorithm=\
```

output
```
(e^(2*e^4)*log(x^2) + 2*x*log(x))/(x*log(2))
```

3.743.9 Mupad [B] (verification not implemented)

Time = 13.41 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{6e^{2e^4} + 6x - 3e^{2e^4} \log(x^2)}{x^2 \log(8)} \, dx = \frac{\ln(x^2) \left(x + e^{2e^4}\right)}{x \ln(2)}$$

input
```
int((2*x + 2*exp(2*exp(4)) - log(x^2)*exp(2*exp(4)))/(x^2*log(2)),x)
```

output
```
(log(x^2)*(x + exp(2*exp(4))))/(x*log(2))
```

3.744 $\int \frac{(6-30x+5x^2)\log(x)+\left(150x^2-25x^3+(30x-5x^2)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)}{\left(150x^3-25x^4+(30x^2-5x^3)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(-30x^2+5x^3+\right.}$

3.744.1 Optimal result

Integrand size = 180, antiderivative size = 25

$$\int \frac{(6-30x+5x^2)\log(x)+\left(150x^2-25x^3+(30x-5x^2)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(30x-5x^2+(6-x)\log\left(\frac{6-x}{x}\right)\right.}{\left(150x^3-25x^4+(30x^2-5x^3)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(-30x^2+5x^3+(-6x+x^2)\log\left(\frac{6-x}{x}\right)\right)\log(x)\,\mathrm{lo}} = \log\left(-5x+\frac{\log\left(5x+\log\left(\frac{6-x}{x}\right)\right)}{\log(x)}\right)$$

output
```
ln(ln(ln((6-x)/x)+5*x)/ln(x)-5*x)
```

3.744.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{(6-30x+5x^2)\log(x)+\left(150x^2-25x^3+(30x-5x^2)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(30x-5x^2+(6-x)\log\left(\frac{6-x}{x}\right)\right.}{\left(150x^3-25x^4+(30x^2-5x^3)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(-30x^2+5x^3+(-6x+x^2)\log\left(\frac{6-x}{x}\right)\right)\log(x)\,\mathrm{lo}} = -\log(\log(x))+\log\left(5x\log(x)-\log\left(5x+\log\left(-1+\frac{6}{x}\right)\right)\right)$$

input
```
Integrate[((6 - 30*x + 5*x^2)*Log[x] + (150*x^2 - 25*x^3 + (30*x - 5*x^2)*
Log[(6 - x)/x])*Log[x]^2 + (30*x - 5*x^2 + (6 - x)*Log[(6 - x)/x])*Log[5*x
 + Log[(6 - x)/x]])/((150*x^3 - 25*x^4 + (30*x^2 - 5*x^3)*Log[(6 - x)/x])*
Log[x]^2 + (-30*x^2 + 5*x^3 + (-6*x + x^2)*Log[(6 - x)/x])*Log[x]*Log[5*x
+ Log[(6 - x)/x]]),x]
```

3.744.

$$\int \frac{(6-30x+5x^2)\log(x)+\left(150x^2-25x^3+(30x-5x^2)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(30x-5x^2+(6-x)\log\left(\frac{6-x}{x}\right)\right)\log\left(5x+\log\left(\frac{6-x}{x}\right)\right)}{\left(150x^3-25x^4+(30x^2-5x^3)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(-30x^2+5x^3+(-6x+x^2)\log\left(\frac{6-x}{x}\right)\right)\log(x)\log\left(5x+\log\left(\frac{6-x}{x}\right)\right)}\,dx$$

output
```
-Log[Log[x]] + Log[5*x*Log[x] - Log[5*x + Log[-1 + 6/x]]]
```

3.744.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(5x^2-30x+6)\log(x)+\left(-5x^2+30x+(6-x)\log\left(\frac{6-x}{x}\right)\right)\log\left(5x+\log\left(\frac{6-x}{x}\right)\right)+\left(-25x^3+150x^2+(30x-\right.}{\left(5x^3-30x^2+(x^2-6x)\log\left(\frac{6-x}{x}\right)\right)\log\left(5x+\log\left(\frac{6-x}{x}\right)\right)\log(x)+\left(-25x^4+150x^3+(30x^2-5x^3)\log\right.}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{(5x^2-30x+6)\log(x)+\left(-5x^2+30x+(6-x)\log\left(\frac{6-x}{x}\right)\right)\log\left(5x+\log\left(\frac{6-x}{x}\right)\right)+\left(-25x^3+150x^2+(30x-\right.}{(6-x)x\left(5x+\log\left(\frac{6}{x}-1\right)\right)\log(x)\left(5x\log(x)-\log\left(5x+\log\left(\frac{6}{x}-1\right)\right)\right)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{25x^3\log(x)-5x^2+5x^2\log\left(\frac{6}{x}-1\right)\log(x)-150x^2\log(x)+30x-30x\log\left(\frac{6}{x}-1\right)\log(x)-6}{(x-6)x\left(5x+\log\left(\frac{6}{x}-1\right)\right)\left(5x\log(x)-\log\left(5x+\log\left(\frac{6}{x}-1\right)\right)\right)}+\frac{\text{lo}}{x\log(x)\,(5x}\right.$$

$$\Big\downarrow \text{ 7299}$$

$$\int \left(\frac{25x^3\log(x)-5x^2+5x^2\log\left(\frac{6}{x}-1\right)\log(x)-150x^2\log(x)+30x-30x\log\left(\frac{6}{x}-1\right)\log(x)-6}{(x-6)x\left(5x+\log\left(\frac{6}{x}-1\right)\right)\left(5x\log(x)-\log\left(5x+\log\left(\frac{6}{x}-1\right)\right)\right)}+\frac{\text{lo}}{x\log(x)\,(5x}\right.$$

input
```
Int[((6 - 30*x + 5*x^2)*Log[x] + (150*x^2 - 25*x^3 + (30*x - 5*x^2)*Log[(6
 - x)/x])*Log[x]^2 + (30*x - 5*x^2 + (6 - x)*Log[(6 - x)/x])*Log[5*x + Log
[(6 - x)/x]])/((150*x^3 - 25*x^4 + (30*x^2 - 5*x^3)*Log[(6 - x)/x])*Log[x]
^2 + (-30*x^2 + 5*x^3 + (-6*x + x^2)*Log[(6 - x)/x])*Log[x]*Log[5*x + Log[
(6 - x)/x]]),x]
```

output
```
$Aborted
```

3.744.3.1 Defintions of rubi rules used

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.744.4 Maple [A] (verified)

Time = 26.85 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

method	result
parallelrisch	$-\ln(\ln(x))+\ln\left(x\ln(x)-\frac{\ln\left(\ln\left(-\frac{-6+x}{x}\right)+5x\right)}{5}\right)$
default	$-\ln(\ln(x))+\ln\Bigg(-5x\ln(x)+\ln\Bigg(i\pi-\ln(x)+\ln(-6+x)-\frac{i\pi\ \operatorname{csgn}\left(\frac{i(-6+x)}{x}\right)\left(-\operatorname{csgn}\left(\frac{i(-6+x)}{x}\right)\right.}{}$
risch	$-\ln(\ln(x))+\ln\Bigg(-5x\ln(x)+\ln\Bigg(i\pi-\ln(x)+\ln(-6+x)-\frac{i\pi\ \operatorname{csgn}\left(\frac{i(-6+x)}{x}\right)\left(-\operatorname{csgn}\left(\frac{i(-6+x)}{x}\right)\right.}{}$

input
```
int((((-x+6)*ln((-x+6)/x)-5*x^2+30*x)*ln(ln((-x+6)/x)+5*x)+((-5*x^2+30*x)*
ln((-x+6)/x)-25*x^3+150*x^2)*ln(x)^2+(5*x^2-30*x+6)*ln(x))/(((x^2-6*x)*ln(
(-x+6)/x)+5*x^3-30*x^2)*ln(x)*ln(ln((-x+6)/x)+5*x)+((-5*x^3+30*x^2)*ln((-x
+6)/x)-25*x^4+150*x^3)*ln(x)^2),x,method=_RETURNVERBOSE)
```

output
```
-ln(ln(x))+ln(x*ln(x)-1/5*ln(ln(-(-6+x)/x)+5*x))
```

3.744.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(6-30x+5x^2)\log(x)+\left(150x^2-25x^3+(30x-5x^2)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(30x-5x^2+(6-x)\log\left(\frac{6-}{}\right.\right.}{\left(150x^3-25x^4+(30x^2-5x^3)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(-30x^2+5x^3+(-6x+x^2)\log\left(\frac{6-x}{x}\right)\right)\log(x)\,\mathrm{lo}}$$
$$=\log\left(-5\,x\log\left(x\right)+\log\left(5\,x+\log\left(-\frac{x-6}{x}\right)\right)\right)-\log\left(\log\left(x\right)\right)$$

input
```
integrate((((-x+6)*log((-x+6)/x)-5*x^2+30*x)*log(log((-x+6)/x)+5*x)+((-5*x
^2+30*x)*log((-x+6)/x)-25*x^3+150*x^2)*log(x)^2+(5*x^2-30*x+6)*log(x))/(((
x^2-6*x)*log((-x+6)/x)+5*x^3-30*x^2)*log(x)*log(log((-x+6)/x)+5*x)+((-5*x^
3+30*x^2)*log((-x+6)/x)-25*x^4+150*x^3)*log(x)^2),x, algorithm=\
```

output
```
log(-5*x*log(x) + log(5*x + log(-(x - 6)/x))) - log(log(x))
```

3.744.6 Sympy [A] (verification not implemented)

Time = 0.83 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{(6-30x+5x^2)\log(x)+\left(150x^2-25x^3+(30x-5x^2)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(30x-5x^2+(6-x)\log\left(\frac{6-}{}\right.\right.}{\left(150x^3-25x^4+(30x^2-5x^3)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(-30x^2+5x^3+(-6x+x^2)\log\left(\frac{6-x}{x}\right)\right)\log(x)\,\mathrm{lo}}$$
$$=\log\left(-5x\log\left(x\right)+\log\left(5x+\log\left(\frac{6-x}{x}\right)\right)\right)-\log\left(\log\left(x\right)\right)$$

input
```
integrate((((-x+6)*ln((-x+6)/x)-5*x**2+30*x)*ln(ln((-x+6)/x)+5*x)+((-5*x**
2+30*x)*ln((-x+6)/x)-25*x**3+150*x**2)*ln(x)**2+(5*x**2-30*x+6)*ln(x))/(((
x**2-6*x)*ln((-x+6)/x)+5*x**3-30*x**2)*ln(x)*ln(ln((-x+6)/x)+5*x)+((-5*x**
3+30*x**2)*ln((-x+6)/x)-25*x**4+150*x**3)*ln(x)**2),x)
```

output
```
log(-5*x*log(x) + log(5*x + log((6 - x)/x))) - log(log(x))
```

3.744.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{(6-30x+5x^2)\log(x)+\left(150x^2-25x^3+(30x-5x^2)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(30x-5x^2+(6-x)\log\left(\frac{6-x}{x}\right.\right.}{\left(150x^3-25x^4+(30x^2-5x^3)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(-30x^2+5x^3+(-6x+x^2)\log\left(\frac{6-x}{x}\right)\right)\log(x)\log}$$
$$=\log\left(-5\,x\log\left(x\right)+\log\left(5\,x-\log\left(x\right)+\log\left(-x+6\right)\right)\right)-\log\left(\log\left(x\right)\right)$$

input
```
integrate((((-x+6)*log((-x+6)/x)-5*x^2+30*x)*log(log((-x+6)/x)+5*x)+((-5*x
^2+30*x)*log((-x+6)/x)-25*x^3+150*x^2)*log(x)^2+(5*x^2-30*x+6)*log(x))/(((
x^2-6*x)*log((-x+6)/x)+5*x^3-30*x^2)*log(x)*log(log((-x+6)/x)+5*x)+((-5*x^
3+30*x^2)*log((-x+6)/x)-25*x^4+150*x^3)*log(x)^2),x, algorithm=\
```

output
```
log(-5*x*log(x) + log(5*x - log(x) + log(-x + 6))) - log(log(x))
```

3.744.8 Giac [A] (verification not implemented)

Time = 0.64 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{(6-30x+5x^2)\log(x)+\left(150x^2-25x^3+(30x-5x^2)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(30x-5x^2+(6-x)\log\left(\frac{6-x}{x}\right.\right.}{\left(150x^3-25x^4+(30x^2-5x^3)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(-30x^2+5x^3+(-6x+x^2)\log\left(\frac{6-x}{x}\right)\right)\log(x)\log}$$
$$=\log\left(-5\,x\log\left(x\right)+\log\left(5\,x-\log\left(x\right)+\log\left(-x+6\right)\right)\right)-\log\left(\log\left(x\right)\right)$$

input
```
integrate((((-x+6)*log((-x+6)/x)-5*x^2+30*x)*log(log((-x+6)/x)+5*x)+((-5*x
^2+30*x)*log((-x+6)/x)-25*x^3+150*x^2)*log(x)^2+(5*x^2-30*x+6)*log(x))/(((
x^2-6*x)*log((-x+6)/x)+5*x^3-30*x^2)*log(x)*log(log((-x+6)/x)+5*x)+((-5*x^
3+30*x^2)*log((-x+6)/x)-25*x^4+150*x^3)*log(x)^2),x, algorithm=\
```

output
```
log(-5*x*log(x) + log(5*x - log(x) + log(-x + 6))) - log(log(x))
```

3.744.9 Mupad [B] (verification not implemented)

Time = 14.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(6-30x+5x^2)\log(x)+\left(150x^2-25x^3+(30x-5x^2)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(30x-5x^2+(6-x)\log\left(\frac{6-x}{x}\right)\right)\log\left(5x+\log\left(\frac{6-x}{x}\right)\right)}{\left(150x^3-25x^4+(30x^2-5x^3)\log\left(\frac{6-x}{x}\right)\right)\log^2(x)+\left(-30x^2+5x^3+(-6x+x^2)\log\left(\frac{6-x}{x}\right)\right)\log(x)\log\left(5x+\log\left(\frac{6-x}{x}\right)\right)}\,dx$$
$$= \ln\left(\ln\left(5\,x+\ln\left(-\frac{x-6}{x}\right)\right)-5\,x\,\ln\left(x\right)\right)-\ln\left(\ln\left(x\right)\right)$$

input
```
int((log(x)*(5*x^2 - 30*x + 6) - log(5*x + log(-(x - 6)/x))*(log(-(x - 6)/
x)*(x - 6) - 30*x + 5*x^2) + log(x)^2*(log(-(x - 6)/x)*(30*x - 5*x^2) + 15
0*x^2 - 25*x^3))/(log(x)^2*(log(-(x - 6)/x)*(30*x^2 - 5*x^3) + 150*x^3 - 2
5*x^4) - log(5*x + log(-(x - 6)/x))*log(x)*(log(-(x - 6)/x)*(6*x - x^2) +
30*x^2 - 5*x^3)),x)
```

output
```
log(log(5*x + log(-(x - 6)/x)) - 5*x*log(x)) - log(log(x))
```

3.745 $\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)}$

3.745.1 Optimal result

Integrand size = 276, antiderivative size = 25

$$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+e}$$
$$= x\left(x+\frac{18}{(-5+x)\left(x^2+\log\left(-1+e^{-5+x}\right)\right)}\right)$$

output
```
(18/(-5+x)/(ln(exp(-5+x)-1)+x^2)+x)*x
```

3.745.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+e}$$
$$= 2\left(\frac{x^2}{2}+\frac{9x}{(-5+x)\left(x^2+\log\left(-1+e^{-5+x}\right)\right)}\right)$$

3.745.

$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+40x^4-4x^5+e^{-5+x}(-90+100x^3-40x^4+4x^5))\log(-}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+e^{-5+x}(50x^2-20x^3+2x^4))\log(-1+e^{-5+x})+(-25-}$

input
```
Integrate[(-90*x^2 + 36*x^3 - 50*x^5 + 20*x^6 - 2*x^7 + E^(-5 + x)*(90*x +
 72*x^2 - 36*x^3 + 50*x^5 - 20*x^6 + 2*x^7) + (90 - 100*x^3 + 40*x^4 - 4*x
^5 + E^(-5 + x)*(-90 + 100*x^3 - 40*x^4 + 4*x^5))*Log[-1 + E^(-5 + x)] + (
-50*x + 20*x^2 - 2*x^3 + E^(-5 + x)*(50*x - 20*x^2 + 2*x^3))*Log[-1 + E^(-
5 + x)]^2)/(-25*x^4 + 10*x^5 - x^6 + E^(-5 + x)*(25*x^4 - 10*x^5 + x^6) +
(-50*x^2 + 20*x^3 - 2*x^4 + E^(-5 + x)*(50*x^2 - 20*x^3 + 2*x^4))*Log[-1 +
 E^(-5 + x)] + (-25 + 10*x - x^2 + E^(-5 + x)*(25 - 10*x + x^2))*Log[-1 +
E^(-5 + x)]^2),x]
```

output
```
2*(x^2/2 + (9*x)/((-5 + x)*(x^2 + Log[-1 + E^(-5 + x)])))
```

3.745.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^7+20x^6-50x^5+36x^3-90x^2+\left(-2x^3+20x^2+e^{x-5}\left(2x^3-20x^2+50x\right)-50x\right)\log^2\left(e^{x-5}-1\right)+\left(-4x\right.}{-x^6+10x^5-25x^4+\left(-x^2+e^{x-5}\left(x^2-10x+25\right)+10x-25\right)\log^2\left(e^{x-5}-1\right)}$$

$\Big\downarrow$ 7239

$$\int \frac{2\left(-\left(e^x-e^5\right)\left(2x^5-20x^4+50x^3-45\right)\log\left(e^{x-5}-1\right)-x\left(e^x\left(x^6-10x^5+25x^4-18x^2+36x+45\right)-e^5x\left(x^5\right.\right.\right.}{\left(e^5-e^x\right)(5-x)^2\left(x^2+\log\left(e^{x-5}-1\right)\right)^2}$$

$\Big\downarrow$ 27

$$2\int \frac{\left(e^5-e^x\right)(5-x)^2x\log^2\left(-1+e^{x-5}\right)-\left(e^5-e^x\right)\left(-2x^5+20x^4-50x^3+45\right)\log\left(-1+e^{x-5}\right)+x\left(e^5x\left(x^5-\right.\right.}{\left(e^5-e^x\right)(5-x)^2\left(x^2+\log\left(-1+e^{x-5}\right)\right)}$$

$\Big\downarrow$ 7293

$$2\int \left(\frac{9e^5x}{\left(e^5-e^x\right)(x-5)\left(x^2+\log\left(-1+e^{x-5}\right)\right)^2}+\frac{x^7-10x^6+2\log\left(-1+e^{x-5}\right)x^5+25x^5-20\log\left(-1+e^{x-5}\right)\right.}{}\right.$$

$\Big\downarrow$ 2009

$$2\left(-99\int \frac{1}{\left(x^2+\log\left(-1+e^{x-5}\right)\right)^2}dx-9e^5\int \frac{1}{\left(-e^5+e^x\right)\left(x^2+\log\left(-1+e^{x-5}\right)\right)^2}dx-495\int \frac{1}{(x-5)\left(x^2+\log\left(-\right.\right.}\right.$$

3.745.
$$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}\left(90x+72x^2-36x^3+50x^5-20x^6+2x^7\right)+\left(90-100x^3+40x^4-4x^5+e^{-5+x}\left(-90+100x^3-40x^4+4x^5\right)\right)\log\left(-\right.}{-25x^4+10x^5-x^6+e^{-5+x}\left(25x^4-10x^5+x^6\right)+\left(-50x^2+20x^3-2x^4+e^{-5+x}\left(50x^2-20x^3+2x^4\right)\right)\log\left(-1+e^{-5+x}\right)+\left(-25-\right.}$$

input
```
Int[(-90*x^2 + 36*x^3 - 50*x^5 + 20*x^6 - 2*x^7 + E^(-5 + x)*(90*x + 72*x^
2 - 36*x^3 + 50*x^5 - 20*x^6 + 2*x^7) + (90 - 100*x^3 + 40*x^4 - 4*x^5 + E
^(-5 + x)*(-90 + 100*x^3 - 40*x^4 + 4*x^5))*Log[-1 + E^(-5 + x)] + (-50*x
+ 20*x^2 - 2*x^3 + E^(-5 + x)*(50*x - 20*x^2 + 2*x^3))*Log[-1 + E^(-5 + x)
]^2)/(-25*x^4 + 10*x^5 - x^6 + E^(-5 + x)*(25*x^4 - 10*x^5 + x^6) + (-50*x
^2 + 20*x^3 - 2*x^4 + E^(-5 + x)*(50*x^2 - 20*x^3 + 2*x^4))*Log[-1 + E^(-5
 + x)] + (-25 + 10*x - x^2 + E^(-5 + x)*(25 - 10*x + x^2))*Log[-1 + E^(-5
+ x)]^2),x]
```

output
```
$Aborted
```

3.745.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.745.4 Maple [A] (verified)

Time = 2.03 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

method	result	size
risch	$x^2+\frac{18x}{(-5+x)(\ln(\mathrm{e}^{-5+x}-1)+x^2)}$	26
parallelrisch	$\frac{2x^5-10x^4+2\ln(\mathrm{e}^{-5+x}-1)x^3-10\ln(\mathrm{e}^{-5+x}-1)x^2+36x}{2x^3+2x\ln(\mathrm{e}^{-5+x}-1)-10x^2-10\ln(\mathrm{e}^{-5+x}-1)}$	70

3.745.
$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+40x^4-4x^5+e^{-5+x}(-90+100x^3-40x^4+4x^5))\log(-}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+e^{-5+x}(50x^2-20x^3+2x^4))\log(-1+e^{-5+x})+(-25-}$

input
```
int((((2*x^3-20*x^2+50*x)*exp(-5+x)-2*x^3+20*x^2-50*x)*ln(exp(-5+x)-1)^2+(
(4*x^5-40*x^4+100*x^3-90)*exp(-5+x)-4*x^5+40*x^4-100*x^3+90)*ln(exp(-5+x)-
1)+(2*x^7-20*x^6+50*x^5-36*x^3+72*x^2+90*x)*exp(-5+x)-2*x^7+20*x^6-50*x^5+
36*x^3-90*x^2)/(((x^2-10*x+25)*exp(-5+x)-x^2+10*x-25)*ln(exp(-5+x)-1)^2+((
2*x^4-20*x^3+50*x^2)*exp(-5+x)-2*x^4+20*x^3-50*x^2)*ln(exp(-5+x)-1)+(x^6-1
0*x^5+25*x^4)*exp(-5+x)-x^6+10*x^5-25*x^4),x,method=_RETURNVERBOSE)
```

output
```
x^2+18*x/(-5+x)/(ln(exp(-5+x)-1)+x^2)
```

3.745.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. 2(24) = 48.

Time = 0.27 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.08

$$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+e}$$
$$= \frac{x^5-5\,x^4+(x^3-5\,x^2)\log\left(e^{(x-5)}-1\right)+18\,x}{x^3-5\,x^2+(x-5)\log\left(e^{(x-5)}-1\right)}$$

input
```
integrate((((2*x^3-20*x^2+50*x)*exp(-5+x)-2*x^3+20*x^2-50*x)*log(exp(-5+x)
-1)^2+((4*x^5-40*x^4+100*x^3-90)*exp(-5+x)-4*x^5+40*x^4-100*x^3+90)*log(ex
p(-5+x)-1)+(2*x^7-20*x^6+50*x^5-36*x^3+72*x^2+90*x)*exp(-5+x)-2*x^7+20*x^6
-50*x^5+36*x^3-90*x^2)/(((x^2-10*x+25)*exp(-5+x)-x^2+10*x-25)*log(exp(-5+x
)-1)^2+((2*x^4-20*x^3+50*x^2)*exp(-5+x)-2*x^4+20*x^3-50*x^2)*log(exp(-5+x)
-1)+(x^6-10*x^5+25*x^4)*exp(-5+x)-x^6+10*x^5-25*x^4),x, algorithm=\
```

output
```
(x^5 - 5*x^4 + (x^3 - 5*x^2)*log(e^(x - 5) - 1) + 18*x)/(x^3 - 5*x^2 + (x
- 5)*log(e^(x - 5) - 1))
```

3.745.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+e}$$
$$= x^2+\frac{18x}{x^3-5x^2+(x-5)\log\left(e^{x-5}-1\right)}$$

3.745.
$$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+40x^4-4x^5+e^{-5+x}(-90+100x^3-40x^4+4x^5))\log(-}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+e^{-5+x}(50x^2-20x^3+2x^4))\log(-1+e^{-5+x})+(-25-}$$

input
```
integrate((((2*x**3-20*x**2+50*x)*exp(-5+x)-2*x**3+20*x**2-50*x)*ln(exp(-5
+x)-1)**2+((4*x**5-40*x**4+100*x**3-90)*exp(-5+x)-4*x**5+40*x**4-100*x**3+
90)*ln(exp(-5+x)-1)+(2*x**7-20*x**6+50*x**5-36*x**3+72*x**2+90*x)*exp(-5+x
)-2*x**7+20*x**6-50*x**5+36*x**3-90*x**2)/(((x**2-10*x+25)*exp(-5+x)-x**2+
10*x-25)*ln(exp(-5+x)-1)**2+((2*x**4-20*x**3+50*x**2)*exp(-5+x)-2*x**4+20*
x**3-50*x**2)*ln(exp(-5+x)-1)+(x**6-10*x**5+25*x**4)*exp(-5+x)-x**6+10*x**
5-25*x**4),x)
```

output
```
x**2 + 18*x/(x**3 - 5*x**2 + (x - 5)*log(exp(x - 5) - 1))
```

3.745.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(24) = 48$.

Time = 0.47 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.72

$$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+\cdots}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+\cdots}$$
$$= \frac{x^5-5x^4-5x^3+25x^2+(x^3-5x^2)\log(-e^5+e^x)+18x}{x^3-5x^2+(x-5)\log(-e^5+e^x)-5x+25}$$

input
```
integrate((((2*x^3-20*x^2+50*x)*exp(-5+x)-2*x^3+20*x^2-50*x)*log(exp(-5+x)
-1)^2+((4*x^5-40*x^4+100*x^3-90)*exp(-5+x)-4*x^5+40*x^4-100*x^3+90)*log(ex
p(-5+x)-1)+(2*x^7-20*x^6+50*x^5-36*x^3+72*x^2+90*x)*exp(-5+x)-2*x^7+20*x^6
-50*x^5+36*x^3-90*x^2)/(((x^2-10*x+25)*exp(-5+x)-x^2+10*x-25)*log(exp(-5+x
)-1)^2+((2*x^4-20*x^3+50*x^2)*exp(-5+x)-2*x^4+20*x^3-50*x^2)*log(exp(-5+x)
-1)+(x^6-10*x^5+25*x^4)*exp(-5+x)-x^6+10*x^5-25*x^4),x, algorithm=\
```

output
```
(x^5 - 5*x^4 - 5*x^3 + 25*x^2 + (x^3 - 5*x^2)*log(-e^5 + e^x) + 18*x)/(x^3
 - 5*x^2 + (x - 5)*log(-e^5 + e^x) - 5*x + 25)
```

3.745.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(24) = 48$.

Time = 0.68 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.32

$$\int \frac{-90x^2 + 36x^3 - 50x^5 + 20x^6 - 2x^7 + e^{-5+x}(90x + 72x^2 - 36x^3 + 50x^5 - 20x^6 + 2x^7) + (90 - 100x^3 +}{-25x^4 + 10x^5 - x^6 + e^{-5+x}(25x^4 - 10x^5 + x^6) + (-50x^2 + 20x^3 - 2x^4 + e}$$
$$= \frac{x^5 - 5x^4 + x^3 \log(-e^5 + e^x) - 5x^3 - 5x^2 \log(-e^5 + e^x) + 25x^2 + 18x}{x^3 - 5x^2 + x \log(-e^5 + e^x) - 5x - 5 \log(-e^5 + e^x) + 25}$$

input
```
integrate((((2*x^3-20*x^2+50*x)*exp(-5+x)-2*x^3+20*x^2-50*x)*log(exp(-5+x)
-1)^2+((4*x^5-40*x^4+100*x^3-90)*exp(-5+x)-4*x^5+40*x^4-100*x^3+90)*log(ex
p(-5+x)-1)+(2*x^7-20*x^6+50*x^5-36*x^3+72*x^2+90*x)*exp(-5+x)-2*x^7+20*x^6
-50*x^5+36*x^3-90*x^2)/(((x^2-10*x+25)*exp(-5+x)-x^2+10*x-25)*log(exp(-5+x
)-1)^2+((2*x^4-20*x^3+50*x^2)*exp(-5+x)-2*x^4+20*x^3-50*x^2)*log(exp(-5+x)
-1)+(x^6-10*x^5+25*x^4)*exp(-5+x)-x^6+10*x^5-25*x^4),x, algorithm=\
```

output
```
(x^5 - 5*x^4 + x^3*log(-e^5 + e^x) - 5*x^3 - 5*x^2*log(-e^5 + e^x) + 25*x^
2 + 18*x)/(x^3 - 5*x^2 + x*log(-e^5 + e^x) - 5*x - 5*log(-e^5 + e^x) + 25)
```

3.745.9 Mupad [B] (verification not implemented)

Time = 13.98 (sec) , antiderivative size = 192, normalized size of antiderivative = 7.68

$$\int \frac{-90x^2 + 36x^3 - 50x^5 + 20x^6 - 2x^7 + e^{-5+x}(90x + 72x^2 - 36x^3 + 50x^5 - 20x^6 + 2x^7) + (90 - 100x^3 +}{-25x^4 + 10x^5 - x^6 + e^{-5+x}(25x^4 - 10x^5 + x^6) + (-50x^2 + 20x^3 - 2x^4 + e}$$
$$= x^2 - \frac{45}{x^3 - \frac{19x^2}{2} + 20x + \frac{25}{2}} - \frac{\frac{18(5x\,e^{x-5} + 4x^2 e^{x-5} - 2x^3 e^{x-5} - 5x^2 + 2x^3)}{(x-5)^2 (e^{x-5} - 2x + 2x\,e^{x-5})} - \frac{90 \ln(e^{-5} e^x - 1)(e^{x-5} - 1)}{(x-5)^2 (e^{x-5} - 2x + 2x\,e^{x-5})}}{\ln(e^{-5} e^x - 1) + x^2}$$
$$+ \frac{90(-2x^3 + 9x^2 + 6x - 5)}{(2x - e^{x-5}(2x+1))(2x+1)(x-5)^3 (2x^2 + x - 1)}$$

input
```
int((log(exp(x - 5) - 1)*(exp(x - 5)*(100*x^3 - 40*x^4 + 4*x^5 - 90) - 100
*x^3 + 40*x^4 - 4*x^5 + 90) - log(exp(x - 5) - 1)^2*(50*x - exp(x - 5)*(50
*x - 20*x^2 + 2*x^3) - 20*x^2 + 2*x^3) - 90*x^2 + 36*x^3 - 50*x^5 + 20*x^6
 - 2*x^7 + exp(x - 5)*(90*x + 72*x^2 - 36*x^3 + 50*x^5 - 20*x^6 + 2*x^7))/
(log(exp(x - 5) - 1)*(exp(x - 5)*(50*x^2 - 20*x^3 + 2*x^4) - 50*x^2 + 20*x
^3 - 2*x^4) + exp(x - 5)*(25*x^4 - 10*x^5 + x^6) - 25*x^4 + 10*x^5 - x^6 +
 log(exp(x - 5) - 1)^2*(10*x + exp(x - 5)*(x^2 - 10*x + 25) - x^2 - 25)),x
)
```

output

```
x^2 - 45/(20*x - (19*x^2)/2 + x^3 + 25/2) - ((18*(5*x*exp(x - 5) + 4*x^2*e
xp(x - 5) - 2*x^3*exp(x - 5) - 5*x^2 + 2*x^3))/((x - 5)^2*(exp(x - 5) - 2*
x + 2*x*exp(x - 5))) - (90*log(exp(-5)*exp(x) - 1)*(exp(x - 5) - 1))/((x -
 5)^2*(exp(x - 5) - 2*x + 2*x*exp(x - 5))))/(log(exp(-5)*exp(x) - 1) + x^2
) + (90*(6*x + 9*x^2 - 2*x^3 - 5))/((2*x - exp(x - 5)*(2*x + 1))*(2*x + 1)
*(x - 5)^3*(x + 2*x^2 - 1))
```

3.745.

$$\int \frac{-90x^2+36x^3-50x^5+20x^6-2x^7+e^{-5+x}(90x+72x^2-36x^3+50x^5-20x^6+2x^7)+(90-100x^3+40x^4-4x^5+e^{-5+x}(-90+100x^3-40x^4+4x^5))\log(-}{-25x^4+10x^5-x^6+e^{-5+x}(25x^4-10x^5+x^6)+(-50x^2+20x^3-2x^4+e^{-5+x}(50x^2-20x^3+2x^4))\log(-1+e^{-5+x})+(-25-}$$

3.746 $\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx$

3.746.1 Optimal result

Integrand size = 72, antiderivative size = 30

$$\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx = 4\left(5-\frac{x^2}{\left(6+\frac{x}{2+x}\right)^2\log^2\left(\frac{3}{2+x}\right)}\right)$$

output
```
20-4*x^2/ln(3/(2+x))^2/(x/(2+x)+6)^2
```

3.746.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx = -\frac{4x^2(2+x)^2}{(12+7x)^2\log^2\left(\frac{3}{2+x}\right)}$$

input
```
Integrate[(-192*x^2 - 208*x^3 - 56*x^4 + (-384*x - 576*x^2 - 304*x^3 - 56*
x^4)*Log[3/(2 + x)])/((1728 + 3024*x + 1764*x^2 + 343*x^3)*Log[3/(2 + x)]^
3),x]
```

output
```
(-4*x^2*(2 + x)^2)/((12 + 7*x)^2*Log[3/(2 + x)]^2)
```

3.746.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-56x^4-208x^3-192x^2+\left(-56x^4-304x^3-576x^2-384x\right)\log\left(\frac{3}{x+2}\right)}{\left(343x^3+1764x^2+3024x+1728\right)\log^3\left(\frac{3}{x+2}\right)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-56x^4-208x^3-192x^2+\left(-56x^4-304x^3-576x^2-384x\right)\log\left(\frac{3}{x+2}\right)}{(7x+12)^3\log^3\left(\frac{3}{x+2}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{8(x+2)x^2}{(7x+12)^2\log^3\left(\frac{3}{x+2}\right)}-\frac{8(x+2)\left(7x^2+24x+24\right)x}{(7x+12)^3\log^2\left(\frac{3}{x+2}\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2304}{343}\int \frac{1}{(7x+12)^2\log^3\left(\frac{3}{x+2}\right)}dx-\frac{768}{343}\int \frac{1}{(7x+12)\log^3\left(\frac{3}{x+2}\right)}dx+\frac{4608}{343}\int \frac{1}{(7x+12)^3\log^2\left(\frac{3}{x+2}\right)}dx+\frac{1920}{343}\int \frac{1}{(7x+12)^2\log^2\left(\frac{3}{x+2}\right)}dx-\frac{4x(x+2)}{49\log^2\left(\frac{3}{x+2}\right)}+\frac{40(x+2)}{343\log^2\left(\frac{3}{x+2}\right)}$$

input
```
Int[(-192*x^2 - 208*x^3 - 56*x^4 + (-384*x - 576*x^2 - 304*x^3 - 56*x^4)*L
og[3/(2 + x)])/((1728 + 3024*x + 1764*x^2 + 343*x^3)*Log[3/(2 + x)]^3),x]
```

output
```
$Aborted
```

3.746.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.746.4 Maple [A] (verified)

Time = 38.87 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

method	result	size
risch	$-\frac{4x^{2}(2+x)^{2}}{(49x^{2}+168x+144)\ln\left(\frac{3}{2+x}\right)^{2}}$	33
norman	$\frac{-4x^{4}-16x^{3}-16x^{2}}{(7x+12)^{2}\ln\left(\frac{3}{2+x}\right)^{2}}$	35
parallelrisch	$\frac{-196x^{4}-784x^{3}-784x^{2}}{49\ln\left(\frac{3}{2+x}\right)^{2}(49x^{2}+168x+144)}$	41
derivativedivides	$-\frac{4(2+x)^{2}}{49\ln\left(\frac{3}{2+x}\right)^{2}}+\frac{\frac{192}{343}+\frac{96x}{343}}{\ln\left(\frac{3}{2+x}\right)^{2}}-\frac{3456}{343\ln\left(\frac{3}{2+x}\right)^{3}\left(\frac{6}{2+x}-21\right)}-\frac{1152\left(\frac{3\ln\left(\frac{3}{2+x}\right)}{2+x}+21\ln\left(\frac{3}{2+x}\right)-\frac{18}{2+x}+63\right)}{343\ln\left(\frac{3}{2+x}\right)^{3}\left(\frac{6}{2+x}-21\right)^{2}}$	114
default	$-\frac{4(2+x)^{2}}{49\ln\left(\frac{3}{2+x}\right)^{2}}+\frac{\frac{192}{343}+\frac{96x}{343}}{\ln\left(\frac{3}{2+x}\right)^{2}}-\frac{3456}{343\ln\left(\frac{3}{2+x}\right)^{3}\left(\frac{6}{2+x}-21\right)}-\frac{1152\left(\frac{3\ln\left(\frac{3}{2+x}\right)}{2+x}+21\ln\left(\frac{3}{2+x}\right)-\frac{18}{2+x}+63\right)}{343\ln\left(\frac{3}{2+x}\right)^{3}\left(\frac{6}{2+x}-21\right)^{2}}$	114

input
```
int(((-56*x^4-304*x^3-576*x^2-384*x)*ln(3/(2+x))-56*x^4-208*x^3-192*x^2)/(
343*x^3+1764*x^2+3024*x+1728)/ln(3/(2+x))^3,x,method=_RETURNVERBOSE)
```

output
```
-4*x^2*(2+x)^2/(49*x^2+168*x+144)/ln(3/(2+x))^2
```

3.746.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.27

$$\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx$$
$$= -\frac{4\,(x^4+4\,x^3+4\,x^2)}{(49\,x^2+168\,x+144)\log\left(\frac{3}{x+2}\right)^2}$$

input
```
integrate(((-56*x^4-304*x^3-576*x^2-384*x)*log(3/(2+x))-56*x^4-208*x^3-192
*x^2)/(343*x^3+1764*x^2+3024*x+1728)/log(3/(2+x))^3,x, algorithm=\
```

output
```
-4*(x^4 + 4*x^3 + 4*x^2)/((49*x^2 + 168*x + 144)*log(3/(x + 2))^2)
```

3.746.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

$$\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx$$
$$= \frac{-4x^4-16x^3-16x^2}{(49x^2+168x+144)\log\left(\frac{3}{x+2}\right)^2}$$

input
```
integrate(((-56*x**4-304*x**3-576*x**2-384*x)*ln(3/(2+x))-56*x**4-208*x**3
-192*x**2)/(343*x**3+1764*x**2+3024*x+1728)/ln(3/(2+x))**3,x)
```

output
```
(-4*x**4 - 16*x**3 - 16*x**2)/((49*x**2 + 168*x + 144)*log(3/(x + 2))**2)
```

3.746.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. 2(28) = 56.

Time = 0.33 (sec) , antiderivative size = 81, normalized size of antiderivative = 2.70

$$\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx =$$
$$-\frac{4\,(x^4+4\,x^3+4\,x^2)}{49\,x^2\log(3)^2+168\,x\log(3)^2+(49\,x^2+168\,x+144)\log(x+2)^2+144\,\log(3)^2-2\,(49\,x^2\log(3)+16}$$

input
```
integrate(((-56*x^4-304*x^3-576*x^2-384*x)*log(3/(2+x))-56*x^4-208*x^3-192
*x^2)/(343*x^3+1764*x^2+3024*x+1728)/log(3/(2+x))^3,x, algorithm=\
```

output
```
-4*(x^4 + 4*x^3 + 4*x^2)/(49*x^2*log(3)^2 + 168*x*log(3)^2 + (49*x^2 + 168
*x + 144)*log(x + 2)^2 + 144*log(3)^2 - 2*(49*x^2*log(3) + 168*x*log(3) +
144*log(3))*log(x + 2))
```

3.746.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(28) = 56$.

Time = 0.29 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.40

$$\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx$$
$$= \frac{4\left(\frac{4}{x+2}-\frac{4}{(x+2)^2}-1\right)}{\frac{49\log\left(\frac{3}{x+2}\right)^2}{(x+2)^2}-\frac{28\log\left(\frac{3}{x+2}\right)^2}{(x+2)^3}+\frac{4\log\left(\frac{3}{x+2}\right)^2}{(x+2)^4}}$$

input
```
integrate(((-56*x^4-304*x^3-576*x^2-384*x)*log(3/(2+x))-56*x^4-208*x^3-192
*x^2)/(343*x^3+1764*x^2+3024*x+1728)/log(3/(2+x))^3,x, algorithm=\
```

output
```
4*(4/(x + 2) - 4/(x + 2)^2 - 1)/(49*log(3/(x + 2))^2/(x + 2)^2 - 28*log(3/
(x + 2))^2/(x + 2)^3 + 4*log(3/(x + 2))^2/(x + 2)^4)
```

3.746.9 Mupad [B] (verification not implemented)

Time = 14.32 (sec) , antiderivative size = 200, normalized size of antiderivative = 6.67

$$\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx$$
$$= \frac{\frac{4\,(x+2)\,(7\,x^4+38\,x^3+72\,x^2+48\,x)}{(7\,x+12)^3}+\frac{8\,\ln\left(\frac{3}{x+2}\right)\,(x+2)\,(49\,x^5+392\,x^4+1248\,x^3+1992\,x^2+1632\,x+576)}{(7\,x+12)^4}}{\ln\left(\frac{3}{x+2}\right)}$$
$$-\frac{\frac{4\,x^2\,(x+2)^2}{(7\,x+12)^2}+\frac{4\,x\,\ln\left(\frac{3}{x+2}\right)\,(x+2)\,(7\,x^3+38\,x^2+72\,x+48)}{(7\,x+12)^3}}{\ln\left(\frac{3}{x+2}\right)^2}-\frac{176\,x}{343}$$
$$-\frac{8\,x^2}{49}-\frac{\frac{960\,x^3}{16807}+\frac{44928\,x^2}{117649}+\frac{694272\,x}{823543}+\frac{506880}{823543}}{x^4+\frac{48\,x^3}{7}+\frac{864\,x^2}{49}+\frac{6912\,x}{343}+\frac{20736}{2401}}$$

input
```
int(-(log(3/(x + 2))*(384*x + 576*x^2 + 304*x^3 + 56*x^4) + 192*x^2 + 208*
x^3 + 56*x^4)/(log(3/(x + 2))^3*(3024*x + 1764*x^2 + 343*x^3 + 1728)),x)
```

output
```
((4*(x + 2)*(48*x + 72*x^2 + 38*x^3 + 7*x^4))/(7*x + 12)^3 + (8*log(3/(x +
 2))*(x + 2)*(1632*x + 1992*x^2 + 1248*x^3 + 392*x^4 + 49*x^5 + 576))/(7*x
 + 12)^4)/log(3/(x + 2)) - ((4*x^2*(x + 2)^2)/(7*x + 12)^2 + (4*x*log(3/(x
 + 2))*(x + 2)*(72*x + 38*x^2 + 7*x^3 + 48))/(7*x + 12)^3)/log(3/(x + 2))^
2 - (176*x)/343 - (8*x^2)/49 - ((694272*x)/823543 + (44928*x^2)/117649 + (
960*x^3)/16807 + 506880/823543)/((6912*x)/343 + (864*x^2)/49 + (48*x^3)/7
+ x^4 + 20736/2401)
```

3.746. $\int \frac{-192x^2-208x^3-56x^4+(-384x-576x^2-304x^3-56x^4)\log\left(\frac{3}{2+x}\right)}{(1728+3024x+1764x^2+343x^3)\log^3\left(\frac{3}{2+x}\right)}\,dx$

3.747 $\int \frac{90x+45x^2-60x^4+e^x(-15+20x^2)+(20x+5e^xx^2-15x^4)\log(x)}{-12+16x^2+4x^2\log(x)}\,dx$

3.747.1 Optimal result

Integrand size = 62, antiderivative size = 27

$$\int \frac{90x+45x^2-60x^4+e^x(-15+20x^2)+(20x+5e^xx^2-15x^4)\log(x)}{-12+16x^2+4x^2\log(x)}\,dx = \frac{5}{4}\left(e^x-x^3+\log\left(\left(3-x^2(4+\log(x))\right)^2\right)\right)$$

output
```
5/4*exp(x)-5/4*x^3+5/4*ln((3-(ln(x)+4)*x^2)^2)
```

3.747.2 Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{90x+45x^2-60x^4+e^x(-15+20x^2)+(20x+5e^xx^2-15x^4)\log(x)}{-12+16x^2+4x^2\log(x)}\,dx = \frac{5}{4}\left(e^x-x^3+2\log\left(3-4x^2-x^2\log(x)\right)\right)$$

input
```
Integrate[(90*x + 45*x^2 - 60*x^4 + E^x*(-15 + 20*x^2) + (20*x + 5*E^x*x^2
 - 15*x^4)*Log[x])/(-12 + 16*x^2 + 4*x^2*Log[x]),x]
```

output
```
(5*(E^x - x^3 + 2*Log[3 - 4*x^2 - x^2*Log[x]]))/4
```

3.747.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-60x^4+45x^2+e^x(20x^2-15)+(-15x^4+5e^xx^2+20x)\log(x)+90x}{16x^2+4x^2\log(x)-12}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{60x^4-45x^2-e^x(20x^2-15)-(-15x^4+5e^xx^2+20x)\log(x)-90x}{4(-4x^2+x^2(-\log(x))+3)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{4}\int -\frac{5(-12x^4+9x^2+18x-e^x(3-4x^2)+(-3x^4+e^xx^2+4x)\log(x))}{-\log(x)x^2-4x^2+3}dx$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{5}{4}\int \frac{-12x^4+9x^2+18x-e^x(3-4x^2)+(-3x^4+e^xx^2+4x)\log(x)}{-\log(x)x^2-4x^2+3}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{5}{4}\int \left(\frac{x(3\log(x)x^3+12x^3-9x-4\log(x)-18)}{\log(x)x^2+4x^2-3}-e^x\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{5}{4}\left(-12\int \frac{1}{x(\log(x)x^2+4x^2-3)}dx-2\int \frac{x}{\log(x)x^2+4x^2-3}dx+x^3-e^x-4\log(x)\right)$$

input
```
Int[(90*x + 45*x^2 - 60*x^4 + E^x*(-15 + 20*x^2) + (20*x + 5*E^x*x^2 - 15*
x^4)*Log[x])/(-12 + 16*x^2 + 4*x^2*Log[x]),x]
```

output
```
$Aborted
```

3.747.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.747.4 Maple [A] (verified)

Time = 1.39 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

method	result	size
default	$-\frac{5x^3}{4}+\frac{5\ln\left(x^2\ln\left(x\right)+4x^2-3\right)}{2}+\frac{5\,{\mathrm e}^{x}}{4}$	27
parallelrisch	$-\frac{5x^3}{4}+\frac{5\ln\left(x^2\ln\left(x\right)+4x^2-3\right)}{2}+\frac{5\,{\mathrm e}^{x}}{4}$	27
parts	$-\frac{5x^3}{4}+\frac{5\ln\left(x^2\ln\left(x\right)+4x^2-3\right)}{2}+\frac{5\,{\mathrm e}^{x}}{4}$	27
norman	$-\frac{5x^3}{4}+\frac{5\,{\mathrm e}^{x}}{4}+\frac{5\ln\left(4x^2\ln\left(x\right)+16x^2-12\right)}{2}$	28
risch	$-\frac{5x^3}{4}+5\ln\left(x\right)+\frac{5\,{\mathrm e}^{x}}{4}+\frac{5\ln\left(\ln\left(x\right)+\frac{4x^2-3}{x^2}\right)}{2}$	32

input
```
int(((5*exp(x)*x^2-15*x^4+20*x)*ln(x)+(20*x^2-15)*exp(x)-60*x^4+45*x^2+90*
x)/(4*x^2*ln(x)+16*x^2-12),x,method=_RETURNVERBOSE)
```

output
```
-5/4*x^3+5/2*ln(x^2*ln(x)+4*x^2-3)+5/4*exp(x)
```

3.747. $\int \frac{90x+45x^2-60x^4+e^x\left(-15+20x^2\right)+\left(20x+5e^xx^2-15x^4\right)\log(x)}{-12+16x^2+4x^2\log(x)}\,dx$

3.747.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{90x + 45x^2 - 60x^4 + e^x(-15 + 20x^2) + (20x + 5e^x x^2 - 15x^4)\log(x)}{-12 + 16x^2 + 4x^2\log(x)}\,dx = -\frac{5}{4}\,x^3 + \frac{5}{4}\,e^x + 5\,\log(x) + \frac{5}{2}\,\log\left(\frac{x^2\log(x) + 4\,x^2 - 3}{x^2}\right)$$

input
```
integrate(((5*exp(x)*x^2-15*x^4+20*x)*log(x)+(20*x^2-15)*exp(x)-60*x^4+45*
x^2+90*x)/(4*x^2*log(x)+16*x^2-12),x, algorithm=\
```

output
```
-5/4*x^3 + 5/4*e^x + 5*log(x) + 5/2*log((x^2*log(x) + 4*x^2 - 3)/x^2)
```

3.747.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{90x + 45x^2 - 60x^4 + e^x(-15 + 20x^2) + (20x + 5e^x x^2 - 15x^4)\log(x)}{-12 + 16x^2 + 4x^2\log(x)}\,dx = -\frac{5x^3}{4} + \frac{5e^x}{4} + 5\log(x) + \frac{5\log\left(\log(x) + \frac{4x^2-3}{x^2}\right)}{2}$$

input
```
integrate(((5*exp(x)*x**2-15*x**4+20*x)*ln(x)+(20*x**2-15)*exp(x)-60*x**4+
45*x**2+90*x)/(4*x**2*ln(x)+16*x**2-12),x)
```

output
```
-5*x**3/4 + 5*exp(x)/4 + 5*log(x) + 5*log(log(x) + (4*x**2 - 3)/x**2)/2
```

3.747.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{90x + 45x^2 - 60x^4 + e^x(-15 + 20x^2) + (20x + 5e^x x^2 - 15x^4)\log(x)}{-12 + 16x^2 + 4x^2\log(x)}\,dx = -\frac{5}{4}\,x^3 + \frac{5}{4}\,e^x + 5\,\log(x) + \frac{5}{2}\,\log\left(\frac{x^2\log(x) + 4\,x^2 - 3}{x^2}\right)$$

input
```
integrate(((5*exp(x)*x^2-15*x^4+20*x)*log(x)+(20*x^2-15)*exp(x)-60*x^4+45*
x^2+90*x)/(4*x^2*log(x)+16*x^2-12),x, algorithm=\
```

output
```
-5/4*x^3 + 5/4*e^x + 5*log(x) + 5/2*log((x^2*log(x) + 4*x^2 - 3)/x^2)
```

3.747.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{90x + 45x^2 - 60x^4 + e^x(-15 + 20x^2) + (20x + 5e^x x^2 - 15x^4)\log(x)}{-12 + 16x^2 + 4x^2\log(x)}\,dx$$
$$= -\frac{5}{4}x^3 + \frac{5}{4}e^x + \frac{5}{2}\log\left(-x^2\log\left(x\right) - 4x^2 + 3\right)$$

input
```
integrate(((5*exp(x)*x^2-15*x^4+20*x)*log(x)+(20*x^2-15)*exp(x)-60*x^4+45*
x^2+90*x)/(4*x^2*log(x)+16*x^2-12),x, algorithm=\
```

output
```
-5/4*x^3 + 5/4*e^x + 5/2*log(-x^2*log(x) - 4*x^2 + 3)
```

3.747.9 Mupad [B] (verification not implemented)

Time = 14.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{90x + 45x^2 - 60x^4 + e^x(-15 + 20x^2) + (20x + 5e^x x^2 - 15x^4)\log(x)}{-12 + 16x^2 + 4x^2\log(x)}\,dx$$
$$= \frac{5\,\ln\left(\frac{x^2\,\ln(x)+4\,x^2-3}{x^2}\right)}{2} + \frac{5\,e^x}{4} + 5\,\ln\left(x\right) - \frac{5\,x^3}{4}$$

input
```
int((90*x + log(x)*(20*x + 5*x^2*exp(x) - 15*x^4) + exp(x)*(20*x^2 - 15) +
 45*x^2 - 60*x^4)/(4*x^2*log(x) + 16*x^2 - 12),x)
```

output
```
(5*log((x^2*log(x) + 4*x^2 - 3)/x^2))/2 + (5*exp(x))/4 + 5*log(x) - (5*x^3
)/4
```

3.748 $\int \frac{234x+156e^4x+26e^8x+(1725+234x+156e^4x+26e^8x)\log\left(\frac{-1725-234x}{621+41}\right.}{1725+234x+156e^4x+26e^8x}$

3.748.1 Optimal result

Integrand size = 87, antiderivative size = 18

$$\int \frac{234x+156e^4x+26e^8x+(1725+234x+156e^4x+26e^8x)\log\left(\frac{-1725-234x-156e^4x-26e^8x}{621+414e^4+69e^8}\right)}{1725+234x+156e^4x+26e^8x}\,dx = x\log\left(-\frac{25}{(3+e^4)^2}-\frac{26x}{69}\right)$$

output
```
ln(-26/69*x-25/(exp(4)+3)^2)*x
```

3.748.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 56 vs. 2(18) = 36.

Time = 0.08 (sec) , antiderivative size = 56, normalized size of antiderivative = 3.11

$$\int \frac{234x+156e^4x+26e^8x+(1725+234x+156e^4x+26e^8x)\log\left(\frac{-1725-234x-156e^4x-26e^8x}{621+414e^4+69e^8}\right)}{1725+234x+156e^4x+26e^8x}\,dx = \frac{\left(1725+26(3+e^4)^2x\right)\log\left(-\frac{25}{(3+e^4)^2}-\frac{26x}{69}\right)-1725\log\left(1725+26(3+e^4)^2x\right)}{26(3+e^4)^2}$$

input
```
Integrate[(234*x + 156*E^4*x + 26*E^8*x + (1725 + 234*x + 156*E^4*x + 26*E
^8*x)*Log[(-1725 - 234*x - 156*E^4*x - 26*E^8*x)/(621 + 414*E^4 + 69*E^8)]
)/(1725 + 234*x + 156*E^4*x + 26*E^8*x),x]
```

output
```
((1725 + 26*(3 + E^4)^2*x)*Log[-25/(3 + E^4)^2 - (26*x)/69] - 1725*Log[172
5 + 26*(3 + E^4)^2*x])/(26*(3 + E^4)^2)
```

3.748.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 58 vs. $2(18) = 36$.

Time = 0.33 (sec) , antiderivative size = 58, normalized size of antiderivative = 3.22, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.069$, Rules used = {6, 6, 6, 6, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{26e^8x+156e^4x+234x+\left(26e^8x+156e^4x+234x+1725\right)\log\left(\frac{-26e^8x-156e^4x-234x-1725}{621+414e^4+69e^8}\right)}{26e^8x+156e^4x+234x+1725}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{26e^8x+156e^4x+234x+\left(26e^8x+156e^4x+234x+1725\right)\log\left(\frac{-26e^8x-156e^4x-234x-1725}{621+414e^4+69e^8}\right)}{\left(234+156e^4\right)x+26e^8x+1725}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{26e^8x+156e^4x+234x+\left(26e^8x+156e^4x+234x+1725\right)\log\left(\frac{-26e^8x-156e^4x-234x-1725}{621+414e^4+69e^8}\right)}{\left(234+156e^4+26e^8\right)x+1725}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{\left(234+156e^4\right)x+26e^8x+\left(26e^8x+156e^4x+234x+1725\right)\log\left(\frac{-26e^8x-156e^4x-234x-1725}{621+414e^4+69e^8}\right)}{\left(234+156e^4+26e^8\right)x+1725}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{\left(234+156e^4+26e^8\right)x+\left(26e^8x+156e^4x+234x+1725\right)\log\left(\frac{-26e^8x-156e^4x-234x-1725}{621+414e^4+69e^8}\right)}{\left(234+156e^4+26e^8\right)x+1725}dx$$

$$\Big\downarrow \ 7239$$

$$\int \left(\frac{26\left(3+e^4\right)^2x}{26\left(3+e^4\right)^2x+1725}+\log\left(-\frac{26x}{69}-\frac{25}{\left(3+e^4\right)^2}\right)\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{26}\left(26x+\frac{1725}{(3+e^4)^2}\right)\log\left(-\frac{26x}{69}-\frac{25}{(3+e^4)^2}\right)-\frac{1725\log\left(26(3+e^4)^2x+1725\right)}{26\,(3+e^4)^2}$$

input
```
Int[(234*x + 156*E^4*x + 26*E^8*x + (1725 + 234*x + 156*E^4*x + 26*E^8*x)*
Log[(-1725 - 234*x - 156*E^4*x - 26*E^8*x)/(621 + 414*E^4 + 69*E^8)])/(172
5 + 234*x + 156*E^4*x + 26*E^8*x),x]
```

output
```
((1725/(3 + E^4)^2 + 26*x)*Log[-25/(3 + E^4)^2 - (26*x)/69])/26 - (1725*Lo
g[1725 + 26*(3 + E^4)^2*x])/(26*(3 + E^4)^2)
```

3.748.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.748.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. $2(15) = 30$.

Time = 1.83 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78

method	result
risch	$x\ln\left(\frac{-26x\,\mathrm{e}^{8}-156x\,\mathrm{e}^{4}-234x-1725}{69\,\mathrm{e}^{8}+414\,\mathrm{e}^{4}+621}\right)$
parallelrisch	$\ln\left(-\frac{26x\,\mathrm{e}^{8}+156x\,\mathrm{e}^{4}+234x+1725}{69(\mathrm{e}^{8}+6\,\mathrm{e}^{4}+9)}\right)x$
norman	$x\ln\left(\frac{-26x\,\mathrm{e}^{8}-156x\,\mathrm{e}^{4}-234x-1725}{69\,\mathrm{e}^{8}+414\,\mathrm{e}^{4}+621}\right)$
parts	$(26\,\mathrm{e}^{8}+156\,\mathrm{e}^{4}+234)\left(\frac{x}{26\,\mathrm{e}^{8}+156\,\mathrm{e}^{4}+234}-\frac{1725\ln(26x\,\mathrm{e}^{8}+156x\,\mathrm{e}^{4}+234x+1725)}{(26\,\mathrm{e}^{8}+156\,\mathrm{e}^{4}+234)^{2}}\right)+\frac{(69\,\mathrm{e}^{8}+414\,\mathrm{e}^{4}+62}{}$
derivativedivides	Expression too large to display
default	Expression too large to display

input
```
int(((26*x*exp(4)^2+156*x*exp(4)+234*x+1725)*ln((-26*x*exp(4)^2-156*x*exp(
4)-234*x-1725)/(69*exp(4)^2+414*exp(4)+621))+26*x*exp(4)^2+156*x*exp(4)+23
4*x)/(26*x*exp(4)^2+156*x*exp(4)+234*x+1725),x,method=_RETURNVERBOSE)
```

output
```
x*ln((-26*x*exp(8)-156*x*exp(4)-234*x-1725)/(69*exp(8)+414*exp(4)+621))
```

3.748.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.67

$$\int \frac{234x+156e^4x+26e^8x+(1725+234x+156e^4x+26e^8x)\log\left(\frac{-1725-234x-156e^4x-26e^8x}{621+414e^4+69e^8}\right)}{1725+234x+156e^4x+26e^8x}\,dx$$
$$= x\log\left(-\frac{26\,xe^{8}+156\,xe^{4}+234\,x+1725}{69\,(e^{8}+6\,e^{4}+9)}\right)$$

input
```
integrate(((26*x*exp(4)^2+156*x*exp(4)+234*x+1725)*log((-26*x*exp(4)^2-156
*x*exp(4)-234*x-1725)/(69*exp(4)^2+414*exp(4)+621))+26*x*exp(4)^2+156*x*ex
p(4)+234*x)/(26*x*exp(4)^2+156*x*exp(4)+234*x+1725),x, algorithm=\
```

output
```
x*log(-1/69*(26*x*e^8 + 156*x*e^4 + 234*x + 1725)/(e^8 + 6*e^4 + 9))
```

3.748.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.89

$$\int \frac{234x + 156e^4x + 26e^8x + (1725 + 234x + 156e^4x + 26e^8x)\log\left(\frac{-1725-234x-156e^4x-26e^8x}{621+414e^4+69e^8}\right)}{1725 + 234x + 156e^4x + 26e^8x}\,dx$$
$$= x\log\left(\frac{-26xe^8 - 156xe^4 - 234x - 1725}{621 + 414e^4 + 69e^8}\right)$$

input
```
integrate(((26*x*exp(4)**2+156*x*exp(4)+234*x+1725)*ln((-26*x*exp(4)**2-15
6*x*exp(4)-234*x-1725)/(69*exp(4)**2+414*exp(4)+621))+26*x*exp(4)**2+156*x
*exp(4)+234*x)/(26*x*exp(4)**2+156*x*exp(4)+234*x+1725),x)
```

output
```
x*log((-26*x*exp(8) - 156*x*exp(4) - 234*x - 1725)/(621 + 414*exp(4) + 69*
exp(8)))
```

3.748.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 858 vs. 2(15) = 30.

Time = 0.31 (sec) , antiderivative size = 858, normalized size of antiderivative = 47.67

$$\int \frac{234x + 156e^4x + 26e^8x + (1725 + 234x + 156e^4x + 26e^8x)\log\left(\frac{-1725-234x-156e^4x-26e^8x}{621+414e^4+69e^8}\right)}{1725 + 234x + 156e^4x + 26e^8x}\,dx$$
= Too large to display

input
```
integrate(((26*x*exp(4)^2+156*x*exp(4)+234*x+1725)*log((-26*x*exp(4)^2-156
*x*exp(4)-234*x-1725)/(69*exp(4)^2+414*exp(4)+621))+26*x*exp(4)^2+156*x*ex
p(4)+234*x)/(26*x*exp(4)^2+156*x*exp(4)+234*x+1725),x, algorithm=\
```

output
```
1/26*(26*x/(e^8 + 6*e^4 + 9) - 1725*log(26*x*(e^8 + 6*e^4 + 9) + 1725)/(e^
16 + 12*e^12 + 54*e^8 + 108*e^4 + 81))*e^8*log(-26/69*x*e^8/(e^8 + 6*e^4 +
 9) - 52/23*x*e^4/(e^8 + 6*e^4 + 9) - 78/23*x/(e^8 + 6*e^4 + 9) - 25/(e^8
+ 6*e^4 + 9)) + 3/13*(26*x/(e^8 + 6*e^4 + 9) - 1725*log(26*x*(e^8 + 6*e^4
+ 9) + 1725)/(e^16 + 12*e^12 + 54*e^8 + 108*e^4 + 81))*e^4*log(-26/69*x*e^
8/(e^8 + 6*e^4 + 9) - 52/23*x*e^4/(e^8 + 6*e^4 + 9) - 78/23*x/(e^8 + 6*e^4
 + 9) - 25/(e^8 + 6*e^4 + 9)) + 1/26*(26*x/(e^8 + 6*e^4 + 9) - 1725*log(26
*x*(e^8 + 6*e^4 + 9) + 1725)/(e^16 + 12*e^12 + 54*e^8 + 108*e^4 + 81))*e^8
 - 1/52*(52*x*(e^8 + 6*e^4 + 9) - 1725*log(26*x*(e^8 + 6*e^4 + 9) + 1725)^
2 - 3450*log(26*x*(e^8 + 6*e^4 + 9) + 1725))*(e^8/(e^8 + 6*e^4 + 9) + 6*e^
4/(e^8 + 6*e^4 + 9) + 9/(e^8 + 6*e^4 + 9))*e^8/(e^16 + 12*e^12 + 54*e^8 +
108*e^4 + 81) + 3/13*(26*x/(e^8 + 6*e^4 + 9) - 1725*log(26*x*(e^8 + 6*e^4
+ 9) + 1725)/(e^16 + 12*e^12 + 54*e^8 + 108*e^4 + 81))*e^4 - 3/26*(52*x*(e
^8 + 6*e^4 + 9) - 1725*log(26*x*(e^8 + 6*e^4 + 9) + 1725)^2 - 3450*log(26*
x*(e^8 + 6*e^4 + 9) + 1725))*(e^8/(e^8 + 6*e^4 + 9) + 6*e^4/(e^8 + 6*e^4 +
 9) + 9/(e^8 + 6*e^4 + 9))*e^4/(e^16 + 12*e^12 + 54*e^8 + 108*e^4 + 81) +
9/26*(26*x/(e^8 + 6*e^4 + 9) - 1725*log(26*x*(e^8 + 6*e^4 + 9) + 1725)/(e^
16 + 12*e^12 + 54*e^8 + 108*e^4 + 81))*log(-26/69*x*e^8/(e^8 + 6*e^4 + 9)
- 52/23*x*e^4/(e^8 + 6*e^4 + 9) - 78/23*x/(e^8 + 6*e^4 + 9) - 25/(e^8 + 6*
e^4 + 9)) - 9/52*(52*x*(e^8 + 6*e^4 + 9) - 1725*log(26*x*(e^8 + 6*e^4 +...
```

3.748.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.67

$$\int \frac{234x+156e^4x+26e^8x+(1725+234x+156e^4x+26e^8x)\log\left(\frac{-1725-234x-156e^4x-26e^8x}{621+414e^4+69e^8}\right)}{1725+234x+156e^4x+26e^8x}\,dx$$
$$= x\log\left(-\frac{26\,xe^8+156\,xe^4+234\,x+1725}{69\,(e^8+6\,e^4+9)}\right)$$

input
```
integrate(((26*x*exp(4)^2+156*x*exp(4)+234*x+1725)*log((-26*x*exp(4)^2-156
*x*exp(4)-234*x-1725)/(69*exp(4)^2+414*exp(4)+621))+26*x*exp(4)^2+156*x*ex
p(4)+234*x)/(26*x*exp(4)^2+156*x*exp(4)+234*x+1725),x, algorithm=\
```

output
```
x*log(-1/69*(26*x*e^8 + 156*x*e^4 + 234*x + 1725)/(e^8 + 6*e^4 + 9))
```

3.748.9 Mupad [B] (verification not implemented)

Time = 1.22 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.78

$$\int \frac{234x+156e^4x+26e^8x+(1725+234x+156e^4x+26e^8x)\log\left(\frac{-1725-234x-156e^4x-26e^8x}{621+414e^4+69e^8}\right)}{1725+234x+156e^4x+26e^8x}\,dx$$
$$= x\left(\ln\left(-234\,x-156\,x\,\mathrm{e}^4-26\,x\,\mathrm{e}^8-1725\right)-\ln\left(414\,\mathrm{e}^4+69\,\mathrm{e}^8+621\right)\right)$$

input
```
int((234*x + 156*x*exp(4) + 26*x*exp(8) + log(-(234*x + 156*x*exp(4) + 26*
x*exp(8) + 1725)/(414*exp(4) + 69*exp(8) + 621))*(234*x + 156*x*exp(4) + 2
6*x*exp(8) + 1725))/(234*x + 156*x*exp(4) + 26*x*exp(8) + 1725),x)
```

output
```
x*(log(- 234*x - 156*x*exp(4) - 26*x*exp(8) - 1725) - log(414*exp(4) + 69*
exp(8) + 621))
```

3.749 $\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}}{25+10e}$

3.749.1 Optimal result

Integrand size = 150, antiderivative size = 25

$$\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4(10+3x^3)\right.}{25+10e^4+e^8+(10+2e^4)\log(x)+\mathrm{l}}$$
$$=\left(e^{\frac{x^2(x+\log(4))}{5+e^4+\log(x)}}-x\right)x$$

output
```
x*(exp((x+2*ln(2))*x^2/(ln(x)+5+exp(4)))-x)
```

3.749.2 Mathematica [F]

$$\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4(10+3x^3)\right.}{25+10e^4+e^8+(10+2e^4)\log(x)+\mathrm{l}}$$
$$=\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4(10+3x\right.}{25+10e^4+e^8+(10+2e^4)\log(x)}$$

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$$\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}(25+e^8+14x^3+e^4(10+3x^3)+(9x^2+2e^4x^2)\log(4)+(10+2e^4+3x^3+2x^2\log}{25+10e^4+e^8+(10+2e^4)\log(x)+\log^2(x)}$$

input
```
Integrate[(-50*x - 20*E^4*x - 2*E^8*x + (-20*x - 4*E^4*x)*Log[x] - 2*x*Log
[x]^2 + E^((x^3 + x^2*Log[4])/(5 + E^4 + Log[x]))*(25 + E^8 + 14*x^3 + E^4
*(10 + 3*x^3) + (9*x^2 + 2*E^4*x^2)*Log[4] + (10 + 2*E^4 + 3*x^3 + 2*x^2*L
og[4])*Log[x] + Log[x]^2))/(25 + 10*E^4 + E^8 + (10 + 2*E^4)*Log[x] + Log[
x]^2),x]
```

output
```
Integrate[(-50*x - 20*E^4*x - 2*E^8*x + (-20*x - 4*E^4*x)*Log[x] - 2*x*Log
[x]^2 + E^((x^3 + x^2*Log[4])/(5 + E^4 + Log[x]))*(25 + E^8 + 14*x^3 + E^4
*(10 + 3*x^3) + (9*x^2 + 2*E^4*x^2)*Log[4] + (10 + 2*E^4 + 3*x^3 + 2*x^2*L
og[4])*Log[x] + Log[x]^2))/(25 + 10*E^4 + E^8 + (10 + 2*E^4)*Log[x] + Log[
x]^2), x]
```

3.749.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 99 vs. $2(25) = 50$.

Time = 2.25 (sec) , antiderivative size = 99, normalized size of antiderivative = 3.96, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.033$, Rules used = {6, 6, 7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{x^3+x^2\log(4)}{\log(x)+e^4+5}}\left(14x^3+e^4\left(3x^3+10\right)+\left(2e^4x^2+9x^2\right)\log(4)+\left(3x^3+2x^2\log(4)+2e^4+10\right)\log(x)+\log^2(x)+e^8}{\log^2(x)+\left(10+2e^4\right)\log(x)+e^8+10e^4+25}$$

$$\Big\downarrow 6$$

$$\int \frac{e^{\frac{x^3+x^2\log(4)}{\log(x)+e^4+5}}\left(14x^3+e^4\left(3x^3+10\right)+\left(2e^4x^2+9x^2\right)\log(4)+\left(3x^3+2x^2\log(4)+2e^4+10\right)\log(x)+\log^2(x)+e^8}{\log^2(x)+\left(10+2e^4\right)\log(x)+e^8+10e^4+2}$$

$$\Big\downarrow 6$$

$$\int \frac{e^{\frac{x^3+x^2\log(4)}{\log(x)+e^4+5}}\left(14x^3+e^4\left(3x^3+10\right)+\left(2e^4x^2+9x^2\right)\log(4)+\left(3x^3+2x^2\log(4)+2e^4+10\right)\log(x)+\log^2(x)+e^8}{\log^2(x)+\left(10+2e^4\right)\log(x)+e^8+10e^4+2}$$

$$\Big\downarrow 7292$$

$$\int \frac{e^{\frac{x^3+x^2\log(4)}{\log(x)+e^4+5}}\left(14x^3+e^4\left(3x^3+10\right)+\left(2e^4x^2+9x^2\right)\log(4)+\left(3x^3+2x^2\log(4)+2e^4+10\right)\log(x)+\log^2(x)+e^8\right.}{\left(\log(x)+5\left(1+\frac{e^4}{5}\right)\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4^{\frac{x^2}{\log(x)+5\left(1+\frac{e^4}{5}\right)}}e^{\frac{x^3}{\log(x)+5\left(1+\frac{e^4}{5}\right)}}\left(14\left(1+\frac{3e^4}{14}\right)x^3+3x^3\log(x)+x^2\log(16)\log(x)+9x^2\log(4)\left(1+\frac{e^4\log(16)}{9\log(4)}\right)+\right.}{\left(\log(x)+5\left(1+\frac{e^4}{5}\right)\right)^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$-x^2-\frac{4^{\frac{x^2}{\log(x)+e^4+5}}e^{\frac{x^3}{\log(x)+e^4+5}}\left(x^2\log(16)\log(x)+\left(9+2e^4\right)x^2\log(4)\right)}{\log(4)\left(\log(x)+e^4+5\right)^2\left(\frac{x}{\left(\log(x)+e^4+5\right)^2}-\frac{2x}{\log(x)+e^4+5}\right)}$$

input
```
Int[(-50*x - 20*E^4*x - 2*E^8*x + (-20*x - 4*E^4*x)*Log[x] - 2*x*Log[x]^2
+ E^((x^3 + x^2*Log[4])/(5 + E^4 + Log[x]))*(25 + E^8 + 14*x^3 + E^4*(10 +
 3*x^3) + (9*x^2 + 2*E^4*x^2)*Log[4] + (10 + 2*E^4 + 3*x^3 + 2*x^2*Log[4])
*Log[x] + Log[x]^2))/(25 + 10*E^4 + E^8 + (10 + 2*E^4)*Log[x] + Log[x]^2),
x]
```

output
```
-x^2 - (4^(x^2/(5 + E^4 + Log[x]))*E^(x^3/(5 + E^4 + Log[x]))*((9 + 2*E^4)
*x^2*Log[4] + x^2*Log[16]*Log[x]))/(Log[4]*(5 + E^4 + Log[x])^2*(x/(5 + E^
4 + Log[x])^2 - (2*x)/(5 + E^4 + Log[x])))
```

3.749.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.749.

$$\int \frac{-50x-20e^4x-2e^8x+\left(-20x-4e^4x\right)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4\left(10+3x^3\right)+\left(9x^2+2e^4x^2\right)\log(4)+\left(10+2e^4+3x^3+2x^2\log\right.\right.}{25+10e^4+e^8+\left(10+2e^4\right)\log(x)+\log^2(x)}$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.749.4 Maple [A] (verified)

Time = 4.14 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

method	result	size
risch	$-x^2+e^{\frac{(x+2\ln(2))x^2}{\ln(x)+5+e^4}}x$	28
parallelrisch	$-x^2+e^{\frac{(x+2\ln(2))x^2}{\ln(x)+5+e^4}}x$	28

input
```
int(((ln(x)^2+(4*x^2*ln(2)+2*exp(4)+3*x^3+10)*ln(x)+2*(2*x^2*exp(4)+9*x^2)
*ln(2)+exp(4)^2+(3*x^3+10)*exp(4)+14*x^3+25)*exp((2*x^2*ln(2)+x^3)/(ln(x)+
5+exp(4)))-2*x*ln(x)^2+(-4*x*exp(4)-20*x)*ln(x)-2*x*exp(4)^2-20*x*exp(4)-5
0*x)/(ln(x)^2+(2*exp(4)+10)*ln(x)+exp(4)^2+10*exp(4)+25),x,method=_RETURNV
ERBOSE)
```

output
```
-x^2+exp((x+2*ln(2))*x^2/(ln(x)+5+exp(4)))*x
```

3.749.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4(10+3x^3)\right.}{25+10e^4+e^8+(10+2e^4)\log(x)+\mathrm{l}}$$

$$=-x^2+xe^{\left(\frac{x^3+2x^2\log(2)}{e^4+\log(x)+5}\right)}$$

input
```
integrate(((log(x)^2+(4*x^2*log(2)+2*exp(4)+3*x^3+10)*log(x)+2*(2*x^2*exp(
4)+9*x^2)*log(2)+exp(4)^2+(3*x^3+10)*exp(4)+14*x^3+25)*exp((2*x^2*log(2)+x
^3)/(log(x)+5+exp(4)))-2*x*log(x)^2+(-4*x*exp(4)-20*x)*log(x)-2*x*exp(4)^2
-20*x*exp(4)-50*x)/(log(x)^2+(2*exp(4)+10)*log(x)+exp(4)^2+10*exp(4)+25),x
, algorithm=\
```

output
```
-x^2 + x*e^((x^3 + 2*x^2*log(2))/(e^4 + log(x) + 5))
```

3.749.

$$\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4(10+3x^3)+(9x^2+2e^4x^2)\log(4)+(10+2e^4+3x^3+2x^2\log\right.}{25+10e^4+e^8+(10+2e^4)\log(x)+\log^2(x)}$$

3.749.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{-50x - 20e^4x - 2e^8x + (-20x - 4e^4x)\log(x) - 2x\log^2(x) + e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25 + e^8 + 14x^3 + e^4(10 + 3x^3)\right.}{25 + 10e^4 + e^8 + (10 + 2e^4)\log(x) + \text{l}}$$

= Exception raised: TypeError

input
```
integrate(((ln(x)**2+(4*x**2*ln(2)+2*exp(4)+3*x**3+10)*ln(x)+2*(2*x**2*exp
(4)+9*x**2)*ln(2)+exp(4)**2+(3*x**3+10)*exp(4)+14*x**3+25)*exp((2*x**2*ln(
2)+x**3)/(ln(x)+5+exp(4)))-2*x*ln(x)**2+(-4*x*exp(4)-20*x)*ln(x)-2*x*exp(4
)**2-20*x*exp(4)-50*x)/(ln(x)**2+(2*exp(4)+10)*ln(x)+exp(4)**2+10*exp(4)+2
5),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.749.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{-50x - 20e^4x - 2e^8x + (-20x - 4e^4x)\log(x) - 2x\log^2(x) + e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25 + e^8 + 14x^3 + e^4(10 + 3x^3)\right.}{25 + 10e^4 + e^8 + (10 + 2e^4)\log(x) + \text{l}}$$

= Exception raised: RuntimeError

input
```
integrate(((log(x)^2+(4*x^2*log(2)+2*exp(4)+3*x^3+10)*log(x)+2*(2*x^2*exp(
4)+9*x^2)*log(2)+exp(4)^2+(3*x^3+10)*exp(4)+14*x^3+25)*exp((2*x^2*log(2)+x
^3)/(log(x)+5+exp(4)))-2*x*log(x)^2+(-4*x*exp(4)-20*x)*log(x)-2*x*exp(4)^2
-20*x*exp(4)-50*x)/(log(x)^2+(2*exp(4)+10)*log(x)+exp(4)^2+10*exp(4)+25),x
, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.749.

$$\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4(10+3x^3)+(9x^2+2e^4x^2)\log(4)+(10+2e^4+3x^3+2x^2\log\right.}{25+10e^4+e^8+(10+2e^4)\log(x)+\log^2(x)}$$

3.749.8 Giac [A] (verification not implemented)

Time = 0.95 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4(10+3x^3)\right.}{25+10e^4+e^8+(10+2e^4)\log(x)+\mathrm{l}}$$

$$=-x^2+xe^{\left(\frac{x^3+2\,x^2\log(2)}{e^4+\log(x)+5}\right)}$$

input
```
integrate(((log(x)^2+(4*x^2*log(2)+2*exp(4)+3*x^3+10)*log(x)+2*(2*x^2*exp(
4)+9*x^2)*log(2)+exp(4)^2+(3*x^3+10)*exp(4)+14*x^3+25)*exp((2*x^2*log(2)+x
^3)/(log(x)+5+exp(4)))-2*x*log(x)^2+(-4*x*exp(4)-20*x)*log(x)-2*x*exp(4)^2
-20*x*exp(4)-50*x)/(log(x)^2+(2*exp(4)+10)*log(x)+exp(4)^2+10*exp(4)+25),x
, algorithm=\
```

output
```
-x^2 + x*e^((x^3 + 2*x^2*log(2))/(e^4 + log(x) + 5))
```

3.749.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4(10+3x^3)\right.}{25+10e^4+e^8+(10+2e^4)\log(x)+\mathrm{l}}$$

$$=-\int \frac{50\,x+2\,x\ln(x)^2+20\,x\,e^4+2\,x\,e^8+\ln(x)\,(20\,x+4\,x\,e^4)-e^{\frac{x^3+2\,\ln(2)\,x^2}{e^4+\ln(x)+5}}\,\left(e^8+\ln(x)\,(3\,x^3+4\,\ln(2)\right.}{\ln(x)^2+(2\,e^4+10)\,\ln(x)+1}$$

input
```
int(-(50*x + 2*x*log(x)^2 + 20*x*exp(4) + 2*x*exp(8) + log(x)*(20*x + 4*x*
exp(4)) - exp((2*x^2*log(2) + x^3)/(exp(4) + log(x) + 5))*(exp(8) + log(x)
*(2*exp(4) + 4*x^2*log(2) + 3*x^3 + 10) + log(x)^2 + exp(4)*(3*x^3 + 10) +
 14*x^3 + 2*log(2)*(2*x^2*exp(4) + 9*x^2) + 25))/(10*exp(4) + exp(8) + log
(x)^2 + log(x)*(2*exp(4) + 10) + 25),x)
```

output
```
-int((50*x + 2*x*log(x)^2 + 20*x*exp(4) + 2*x*exp(8) + log(x)*(20*x + 4*x*
exp(4)) - exp((2*x^2*log(2) + x^3)/(exp(4) + log(x) + 5))*(exp(8) + log(x)
*(2*exp(4) + 4*x^2*log(2) + 3*x^3 + 10) + log(x)^2 + exp(4)*(3*x^3 + 10) +
 14*x^3 + 2*log(2)*(2*x^2*exp(4) + 9*x^2) + 25))/(10*exp(4) + exp(8) + log
(x)^2 + log(x)*(2*exp(4) + 10) + 25), x)
```

3.749.

$$\int \frac{-50x-20e^4x-2e^8x+(-20x-4e^4x)\log(x)-2x\log^2(x)+e^{\frac{x^3+x^2\log(4)}{5+e^4+\log(x)}}\left(25+e^8+14x^3+e^4(10+3x^3)+(9x^2+2e^4x^2)\log(4)+(10+2e^4+3x^3+2x^2\log\right.}{25+10e^4+e^8+(10+2e^4)\log(x)+\log^2(x)}$$

3.750 $\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx$

3.750.1 Optimal result

Integrand size = 56, antiderivative size = 24

$$\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx = 4+e^{-1-\frac{1}{10\left(-5+(4+2x)^2\right)}}\log(2)$$

output
```
4+ln(2)/exp(1+1/(10*(4+2*x)^2-50))
```

3.750.2 Mathematica [A] (verified)

Time = 1.13 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx = e^{-1-\frac{1}{110+160x+40x^2}}\log(2)$$

input
```
Integrate[((8 + 4*x)*Log[2])/(E^((111 + 160*x + 40*x^2)/(110 + 160*x + 40*
x^2))*(605 + 1760*x + 1720*x^2 + 640*x^3 + 80*x^4)),x]
```

output
```
E^(-1 - (110 + 160*x + 40*x^2)^(-1))*Log[2]
```

3.750.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-\frac{40x^2+160x+111}{40x^2+160x+110}}(4x+8)\log(2)}{80x^4+640x^3+1720x^2+1760x+605}\,dx$$

$$\Big\downarrow \ 27$$

$$\log(2)\int \frac{4e^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}(x+2)}{5(16x^4+128x^3+344x^2+352x+121)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{4}{5}\log(2)\int \frac{e^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}(x+2)}{16x^4+128x^3+344x^2+352x+121}dx$$

$$\Big\downarrow \ 2463$$

$$\frac{4}{5}\log(2)\int \left(\frac{e^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}(x+2)}{5\sqrt{5}\left(-8x+4\sqrt{5}-16\right)}+\frac{e^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}(x+2)}{5\sqrt{5}\left(8x+4\sqrt{5}+16\right)}+\frac{4e^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}(x+2)}{5\left(-8x+4\sqrt{5}-16\right)^2}+\frac{4e^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}(x}{5\left(8x+4\sqrt{5}+16\right.}\right.$$

$$\Big\downarrow \ 2009$$

$$\frac{4}{5}\log(2)\left(\frac{\int \frac{e^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}}{\left(-2x+\sqrt{5}-4\right)^2}dx}{8\sqrt{5}}-\frac{\int \frac{e^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}}{\left(2x+\sqrt{5}+4\right)^2}dx}{8\sqrt{5}}\right)$$

input
```
Int[((8 + 4*x)*Log[2])/(E^((111 + 160*x + 40*x^2)/(110 + 160*x + 40*x^2))*
(605 + 1760*x + 1720*x^2 + 640*x^3 + 80*x^4)),x]
```

output
```
$Aborted
```

3.750. $\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx$

3.750.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.750.4 Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

method	result	size
default	$\ln(2)\,\mathrm{e}^{-1-\frac{1}{40x^2+160x+110}}$	21
risch	$\ln(2)\,\mathrm{e}^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}$	29
gosper	$\ln(2)\,\mathrm{e}^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}$	31
parallelrisch	$\ln(2)\,\mathrm{e}^{-\frac{40x^2+160x+111}{10(4x^2+16x+11)}}$	54
norman	$\frac{(16x\ln(2)+4x^2\ln(2)+11\ln(2))\mathrm{e}^{-\frac{40x^2+160x+111}{40x^2+160x+110}}}{4x^2+16x+11}$	57

input
```
int((4*x+8)*ln(2)/(80*x^4+640*x^3+1720*x^2+1760*x+605)/exp((40*x^2+160*x+1
11)/(40*x^2+160*x+110)),x,method=_RETURNVERBOSE)
```

output
```
ln(2)*exp(-1-1/(40*x^2+160*x+110))
```

3.750.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx = e^{\left(-\frac{40\,x^2+160\,x+111}{10\,\left(4\,x^2+16\,x+11\right)}\right)}\log\left(2\right)$$

input
```
integrate((4*x+8)*log(2)/(80*x^4+640*x^3+1720*x^2+1760*x+605)/exp((40*x^2+
160*x+111)/(40*x^2+160*x+110)),x, algorithm=\
```

output
```
e^(-1/10*(40*x^2 + 160*x + 111)/(4*x^2 + 16*x + 11))*log(2)
```

3.750.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx = e^{-\frac{40x^2+160x+111}{40x^2+160x+110}}\log\left(2\right)$$

input
```
integrate((4*x+8)*ln(2)/(80*x**4+640*x**3+1720*x**2+1760*x+605)/exp((40*x*
*2+160*x+111)/(40*x**2+160*x+110)),x)
```

output
```
exp(-(40*x**2 + 160*x + 111)/(40*x**2 + 160*x + 110))*log(2)
```

3.750.7 Maxima [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx = e^{\left(-\frac{1}{10\,\left(4\,x^2+16\,x+11\right)}-1\right)}\log\left(2\right)$$

input
```
integrate((4*x+8)*log(2)/(80*x^4+640*x^3+1720*x^2+1760*x+605)/exp((40*x^2+
160*x+111)/(40*x^2+160*x+110)),x, algorithm=\
```

output
```
e^(-1/10/(4*x^2 + 16*x + 11) - 1)*log(2)
```

3.750.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(21) = 42$.

Time = 0.28 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.12

$$\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx = e^{\left(-\frac{4x^2}{4x^2+16x+11}-\frac{16x}{4x^2+16x+11}-\frac{111}{10\left(4x^2+16x+11\right)}\right)}\log(2)$$

input
```
integrate((4*x+8)*log(2)/(80*x^4+640*x^3+1720*x^2+1760*x+605)/exp((40*x^2+
160*x+111)/(40*x^2+160*x+110)),x, algorithm=\
```

output
```
e^(-4*x^2/(4*x^2 + 16*x + 11) - 16*x/(4*x^2 + 16*x + 11) - 111/10/(4*x^2 +
 16*x + 11))*log(2)
```

3.750.9 Mupad [B] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.17

$$\int \frac{e^{-\frac{111+160x+40x^2}{110+160x+40x^2}}(8+4x)\log(2)}{605+1760x+1720x^2+640x^3+80x^4}\,dx = e^{-\frac{16x}{4x^2+16x+11}}\,e^{-\frac{4x^2}{4x^2+16x+11}}\,e^{-\frac{111}{40x^2+160x+110}}\ln(2)$$

input
```
int((exp(-(160*x + 40*x^2 + 111)/(160*x + 40*x^2 + 110))*log(2)*(4*x + 8))
/(1760*x + 1720*x^2 + 640*x^3 + 80*x^4 + 605),x)
```

output
```
exp(-(16*x)/(16*x + 4*x^2 + 11))*exp(-(4*x^2)/(16*x + 4*x^2 + 11))*exp(-11
1/(160*x + 40*x^2 + 110))*log(2)
```

3.751 $\int \frac{e^{x^2}\left(16x^2-8x^3+x^4\right)+\left(-225+195x-85x^2+15x^3\right)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(\right.}{\left(-225+75x\right)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-\right.}$

3.751.1 Optimal result

Integrand size = 241, antiderivative size = 38

$$\int \frac{e^{x^2}\left(16x^2-8x^3+x^4\right)+\left(-225+195x-85x^2+15x^3\right)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-306x+110x^2+74x^3-\right.}{\left(-225+75x\right)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-210x+30x^2\right)\log\left(-\frac{4}{-3+x}\right)\log}$$
$$=x+\frac{x^2}{3\left(\frac{5}{-4+x}+e^{x^2}\log\left(5\log\left(\frac{4}{3-x}\right)\right)\right)}$$

output
```
x^2/(3*ln(5*ln(4/(-x+3)))*exp(x^2)+15/(x-4))+x
```

3.751.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.08

$$\int \frac{e^{x^2}\left(16x^2-8x^3+x^4\right)+\left(-225+195x-85x^2+15x^3\right)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-306x+110x^2+74x^3-\right.}{\left(-225+75x\right)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-210x+30x^2\right)\log\left(-\frac{4}{-3+x}\right)\log}$$
$$=\frac{1}{3}\left(3(-3+x)+\frac{(-4+x)x^2}{5+e^{x^2}(-4+x)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)}\right)$$

3.751.
$\int \frac{e^{x^2}\left(16x^2-8x^3+x^4\right)+\left(-225+195x-85x^2+15x^3\right)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6\right)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3}\right.\right.}{\left(-225+75x\right)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-210x+30x^2\right)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}\left(-144+120x-33x^2\right.}$

input
```
Integrate[(E^x^2*(16*x^2 - 8*x^3 + x^4) + (-225 + 195*x - 85*x^2 + 15*x^3)
*Log[-4/(-3 + x)] + E^x^2*(360 - 306*x + 110*x^2 + 74*x^3 - 78*x^4 + 22*x^
5 - 2*x^6)*Log[-4/(-3 + x)]*Log[5*Log[-4/(-3 + x)]] + E^(2*x^2)*(-144 + 12
0*x - 33*x^2 + 3*x^3)*Log[-4/(-3 + x)]*Log[5*Log[-4/(-3 + x)]]^2)/((-225 +
 75*x)*Log[-4/(-3 + x)] + E^x^2*(360 - 210*x + 30*x^2)*Log[-4/(-3 + x)]*Lo
g[5*Log[-4/(-3 + x)]] + E^(2*x^2)*(-144 + 120*x - 33*x^2 + 3*x^3)*Log[-4/(
-3 + x)]*Log[5*Log[-4/(-3 + x)]]^2),x]
```

output
```
(3*(-3 + x) + ((-4 + x)*x^2)/(5 + E^x^2*(-4 + x)*Log[5*Log[-4/(-3 + x)]]))
/3
```

3.751.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x^2}\left(3x^3-33x^2+120x-144\right)\log\left(-\frac{4}{x-3}\right)\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+\left(15x^3-85x^2+195x-225\right)\log\left(-\frac{4}{x-3}\right)+}{e^{x^2}\left(30x^2-210x+360\right)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+e^{2x^2}\left(3x^3-33\right.}$$

$$\Big\downarrow 7292$$

$$\int \frac{-e^{2x^2}\left(3x^3-33x^2+120x-144\right)\log\left(-\frac{4}{x-3}\right)\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)-\left(15x^3-85x^2+195x-225\right)\log\left(-\frac{4}{x-3}\right)}{3(3-x)\log\left(-\frac{4}{x-3}\right)\left(-4e^{x^2}\log\left(5\log\right.\right.}$$

$$\Big\downarrow 27$$

$$\frac{1}{3}\int -\frac{-3e^{2x^2}\left(-x^3+11x^2-40x+48\right)\log\left(\frac{4}{3-x}\right)\log^2\left(5\log\left(\frac{4}{3-x}\right)\right)+2e^{x^2}\left(-x^6+11x^5-39x^4+37x^3+55x^2\right.}{(3-x)\log\left(\frac{4}{3-x}\right)\left(-4e^{x^2}\log\left(5\log\right.\right.}$$

$$\Big\downarrow 25$$

$$-\frac{1}{3}\int \frac{-3e^{2x^2}\left(-x^3+11x^2-40x+48\right)\log\left(\frac{4}{3-x}\right)\log^2\left(5\log\left(\frac{4}{3-x}\right)\right)+2e^{x^2}\left(-x^6+11x^5-39x^4+37x^3+55x^2\right.}{(3-x)\log\left(\frac{4}{3-x}\right)\left(-4e^{x^2}\log\left(5\log\right.\right.}$$

$$\Big\downarrow 7293$$

$$-\frac{1}{3}\int \Bigg(-\frac{5\Big(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\Big(5}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\Big(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+}$$

$$\Big\downarrow \text{ 7239}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\Big(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2-}{(3-x)\log\left(-\frac{4}{x-3}\right)\Big(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5}$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{1}{3}\int \Bigg(-\frac{5\Big(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\Big(5}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\Big(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+}$$

$$\Big\downarrow \text{ 7239}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\Big(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2-}{(3-x)\log\left(-\frac{4}{x-3}\right)\Big(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5}$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{1}{3}\int \Bigg(-\frac{5\Big(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\Big(5}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\Big(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+}$$

$$\Big\downarrow \text{ 7239}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\Big(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2-}{(3-x)\log\left(-\frac{4}{x-3}\right)\Big(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5}$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{1}{3}\int \Bigg(-\frac{5\Big(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\Big(5}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\Big(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+}$$

$$\Big\downarrow \text{ 7239}$$

3.751.

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6)\log\left(-\frac{4}{-3+x}\right)\log\Big(5\log\Big(-\frac{4}{-3}}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-210x+30x^2)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}(-144+120x-33x^2}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\Big(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2-}{(3-x)\log\left(-\frac{4}{x-3}\right)\Big(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{3}\int \Bigg(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\Big(5\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\Big(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+}$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\Big(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2-}{(3-x)\log\left(-\frac{4}{x-3}\right)\Big(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{3}\int \Bigg(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\Big(5\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\Big(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+}$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\Big(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2-}{(3-x)\log\left(-\frac{4}{x-3}\right)\Big(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{3}\int \Bigg(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\Big(5\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\Big(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+}$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\Big(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2-}{(3-x)\log\left(-\frac{4}{x-3}\right)\Big(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5}$$

$$\Big\downarrow \text{7293}$$

3.751.

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6)\log\left(-\frac{4}{-3+x}\right)\log\Big(5\log\Big(-\frac{4}{-3}}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-210x+30x^2)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}(-144+120x-33x^2}$$

$$-\frac{1}{3}\int \left(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\left(5\cdots\right.\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\left(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+\cdots\right.}\cdots\right.$$

$\downarrow$ 7239

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\left(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2\cdots\right.}{(3-x)\log\left(-\frac{4}{x-3}\right)\left(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5\cdots\right.}$$

$\downarrow$ 7293

$$-\frac{1}{3}\int \left(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\left(5\cdots\right.\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\left(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+\cdots\right.}\cdots\right.$$

$\downarrow$ 7239

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\left(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2\cdots\right.}{(3-x)\log\left(-\frac{4}{x-3}\right)\left(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5\cdots\right.}$$

$\downarrow$ 7293

$$-\frac{1}{3}\int \left(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\left(5\cdots\right.\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\left(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+\cdots\right.}\cdots\right.$$

$\downarrow$ 7239

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\left(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}(x^5-8x^4+15x^3+8x^2\cdots\right.}{(3-x)\log\left(-\frac{4}{x-3}\right)\left(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5\cdots\right.}$$

$\downarrow$ 7293

$$-\frac{1}{3}\int \left(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\left(5\cdots\right.\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\left(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+\cdots\right.}\cdots\right.$$

$\downarrow$ 7239

3.751.

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3\cdots}\right.\right.}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-210x+30x^2)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}(-144+120x-33x^2\cdots}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\left(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}\left(x^5-8x^4+15x^3+8x^2\right.\right.}{(3-x)\log\left(-\frac{4}{x-3}\right)\left(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5\right.}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{3}\int\left(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\left(5\right.\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\left(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\left(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}\left(x^5-8x^4+15x^3+8x^2\right.\right.}{(3-x)\log\left(-\frac{4}{x-3}\right)\left(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5\right.}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{3}\int\left(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\left(5\right.\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\left(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$-\frac{1}{3}\int \frac{e^{x^2}(x-4)^2x^2-(x-3)\log\left(-\frac{4}{x-3}\right)\left(-3e^{2x^2}(x-4)^2\log^2\left(5\log\left(-\frac{4}{x-3}\right)\right)+2e^{x^2}\left(x^5-8x^4+15x^3+8x^2\right.\right.}{(3-x)\log\left(-\frac{4}{x-3}\right)\left(e^{x^2}(x-4)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+5\right.}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{3}\int\left(-\frac{5\left(2\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^3-14\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)x^2+25\log\left(-\frac{4}{x-3}\right)\log\left(5\right.\right.}{(x-3)\log\left(-\frac{4}{x-3}\right)\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\left(-4e^{x^2}\log\left(5\log\left(-\frac{4}{x-3}\right)\right)+\right.}\right.$$

input
```
Int[(E^x^2*(16*x^2 - 8*x^3 + x^4) + (-225 + 195*x - 85*x^2 + 15*x^3)*Log[-
4/(-3 + x)] + E^x^2*(360 - 306*x + 110*x^2 + 74*x^3 - 78*x^4 + 22*x^5 - 2*
x^6)*Log[-4/(-3 + x)]*Log[5*Log[-4/(-3 + x)]] + E^(2*x^2)*(-144 + 120*x -
33*x^2 + 3*x^3)*Log[-4/(-3 + x)]*Log[5*Log[-4/(-3 + x)]]^2)/((-225 + 75*x)
*Log[-4/(-3 + x)] + E^x^2*(360 - 210*x + 30*x^2)*Log[-4/(-3 + x)]*Log[5*Lo
g[-4/(-3 + x)]] + E^(2*x^2)*(-144 + 120*x - 33*x^2 + 3*x^3)*Log[-4/(-3 + x
)]*Log[5*Log[-4/(-3 + x)]]^2),x]
```

3.751.

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right.\right.}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-210x+30x^2)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}(-144+120x-33x^2\right.}$$

output
```
$Aborted
```

3.751.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.751.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 30.56 (sec) , antiderivative size = 111, normalized size of antiderivative = 2.92

method	result
risch	$x+\frac{(x-4)x^2}{3x\,\mathrm{e}^{x^2}\ln\left(10\ln(2)+5i\pi-5\ln(-3+x)+5i\pi\,\mathrm{csgn}\left(\frac{i}{-3+x}\right)^2\left(\mathrm{csgn}\left(\frac{i}{-3+x}\right)-1\right)\right)-12\,\mathrm{e}^{x^2}\ln\left(10\ln(2)+5i\pi-5\ln(-3+x)+5i\right.}$
parallelrisch	$\frac{5400+990x^2\ln\left(5\ln\left(-\frac{4}{-3+x}\right)\right)\mathrm{e}^{x^2}+330x^3-2880\,\mathrm{e}^{x^2}\ln\left(5\ln\left(-\frac{4}{-3+x}\right)\right)x-1320x^2-4320\,\mathrm{e}^{x^2}\ln\left(5\ln\left(-\frac{4}{-3+x}\right)\right)+4950x}{990\,\mathrm{e}^{x^2}\ln\left(5\ln\left(-\frac{4}{-3+x}\right)\right)x-3960\,\mathrm{e}^{x^2}\ln\left(5\ln\left(-\frac{4}{-3+x}\right)\right)+4950}$

3.751.

$$\int\frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3\right.\right.}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-210x+30x^2)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}(-144+120x-33x^2\ldots}$$

input
```
int(((3*x^3-33*x^2+120*x-144)*exp(x^2)^2*ln(-4/(-3+x))*ln(5*ln(-4/(-3+x)))
^2+(-2*x^6+22*x^5-78*x^4+74*x^3+110*x^2-306*x+360)*exp(x^2)*ln(-4/(-3+x))*
ln(5*ln(-4/(-3+x)))+(15*x^3-85*x^2+195*x-225)*ln(-4/(-3+x))+(x^4-8*x^3+16*
x^2)*exp(x^2))/((3*x^3-33*x^2+120*x-144)*exp(x^2)^2*ln(-4/(-3+x))*ln(5*ln(
-4/(-3+x)))^2+(30*x^2-210*x+360)*exp(x^2)*ln(-4/(-3+x))*ln(5*ln(-4/(-3+x))
)+(75*x-225)*ln(-4/(-3+x))),x,method=_RETURNVERBOSE)
```

output
```
x+1/3*(x-4)*x^2/(x*exp(x^2)*ln(10*ln(2)+5*I*Pi-5*ln(-3+x)+5*I*Pi*csgn(I/(-
3+x))^2*(csgn(I/(-3+x))-1))-4*exp(x^2)*ln(10*ln(2)+5*I*Pi-5*ln(-3+x)+5*I*P
i*csgn(I/(-3+x))^2*(csgn(I/(-3+x))-1))+5)
```

3.751.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.61

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-210x+30x^2\right)\log\left(-\frac{4}{-3+x}\right)\log}$$

$$= \frac{x^3+3\left(x^2-4\,x\right)e^{\left(x^2\right)}\log\left(5\,\log\left(-\frac{4}{x-3}\right)\right)-4\,x^2+15\,x}{3\left((x-4)e^{\left(x^2\right)}\log\left(5\,\log\left(-\frac{4}{x-3}\right)\right)+5\right)}$$

input
```
integrate(((3*x^3-33*x^2+120*x-144)*exp(x^2)^2*log(-4/(-3+x))*log(5*log(-4
/(-3+x)))^2+(-2*x^6+22*x^5-78*x^4+74*x^3+110*x^2-306*x+360)*exp(x^2)*log(-
4/(-3+x))*log(5*log(-4/(-3+x)))+(15*x^3-85*x^2+195*x-225)*log(-4/(-3+x))+(
x^4-8*x^3+16*x^2)*exp(x^2))/((3*x^3-33*x^2+120*x-144)*exp(x^2)^2*log(-4/(-
3+x))*log(5*log(-4/(-3+x)))^2+(30*x^2-210*x+360)*exp(x^2)*log(-4/(-3+x))*l
og(5*log(-4/(-3+x)))+(75*x-225)*log(-4/(-3+x))),x, algorithm=\
```

output
```
1/3*(x^3 + 3*(x^2 - 4*x)*e^(x^2)*log(5*log(-4/(x - 3))) - 4*x^2 + 15*x)/((
x - 4)*e^(x^2)*log(5*log(-4/(x - 3))) + 5)
```

3.751.6 Sympy [A] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.16

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-210x+30x^2\right)\log\left(-\frac{4}{-3+x}\right)\log}$$
$$=x+\frac{x^3-4x^2}{\left(3x\log\left(5\log\left(-\frac{4}{x-3}\right)\right)-12\log\left(5\log\left(-\frac{4}{x-3}\right)\right)\right)e^{x^2}+15}$$

input
```
integrate(((3*x**3-33*x**2+120*x-144)*exp(x**2)**2*ln(-4/(-3+x))*ln(5*ln(-
4/(-3+x)))**2+(-2*x**6+22*x**5-78*x**4+74*x**3+110*x**2-306*x+360)*exp(x**
2)*ln(-4/(-3+x))*ln(5*ln(-4/(-3+x)))+(15*x**3-85*x**2+195*x-225)*ln(-4/(-3
+x))+(x**4-8*x**3+16*x**2)*exp(x**2))/((3*x**3-33*x**2+120*x-144)*exp(x**2
)**2*ln(-4/(-3+x))*ln(5*ln(-4/(-3+x)))**2+(30*x**2-210*x+360)*exp(x**2)*ln
(-4/(-3+x))*ln(5*ln(-4/(-3+x)))+(75*x-225)*ln(-4/(-3+x))),x)
```

output
```
x + (x**3 - 4*x**2)/((3*x*log(5*log(-4/(x - 3))) - 12*log(5*log(-4/(x - 3)
)))*exp(x**2) + 15)
```

3.751.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.48 (sec) , antiderivative size = 112, normalized size of antiderivative = 2.95

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-210x+30x^2\right)\log\left(-\frac{4}{-3+x}\right)\log}$$
$$=\frac{x^3+3\,(x^2-4\,x)e^{(x^2)}\log\left(-2\,\log\left(2\right)+\log\left(-x+3\right)\right)-4\,x^2-3\left((-i\,\pi-\log\left(5\right))x^2+4\left(i\,\pi+\log\left(5\right)\right)x\right)e}{3\left((x-4)e^{(x^2)}\log\left(-2\,\log\left(2\right)+\log\left(-x+3\right)\right)+(-4i\,\pi+\left(i\,\pi+\log\left(5\right)\right)x-4\,\log\left(5\right))e^{(x^2)}+5\right)}$$

input
```
integrate(((3*x^3-33*x^2+120*x-144)*exp(x^2)^2*log(-4/(-3+x))*log(5*log(-4
/(-3+x)))^2+(-2*x^6+22*x^5-78*x^4+74*x^3+110*x^2-306*x+360)*exp(x^2)*log(-
4/(-3+x))*log(5*log(-4/(-3+x)))+(15*x^3-85*x^2+195*x-225)*log(-4/(-3+x))+(
x^4-8*x^3+16*x^2)*exp(x^2))/((3*x^3-33*x^2+120*x-144)*exp(x^2)^2*log(-4/(-
3+x))*log(5*log(-4/(-3+x)))^2+(30*x^2-210*x+360)*exp(x^2)*log(-4/(-3+x))*l
og(5*log(-4/(-3+x)))+(75*x-225)*log(-4/(-3+x))),x, algorithm=\
```

3.751.

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6\right)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3}\right.\right.}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-210x+30x^2)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}(-144+120x-33x^2}$$

output
```
1/3*(x^3 + 3*(x^2 - 4*x)*e^(x^2)*log(-2*log(2) + log(-x + 3)) - 4*x^2 - 3*
((-I*pi - log(5))*x^2 + 4*(I*pi + log(5))*x)*e^(x^2) + 15*x)/((x - 4)*e^(x
^2)*log(-2*log(2) + log(-x + 3)) + (-4*I*pi + (I*pi + log(5))*x - 4*log(5)
)*e^(x^2) + 5)
```

3.751.8 Giac [F(-1)]

Timed out.

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-210x+30x^2\right)\log\left(-\frac{4}{-3+x}\right)\log}$$
$$= \text{Timed out}$$

input
```
integrate(((3*x^3-33*x^2+120*x-144)*exp(x^2)^2*log(-4/(-3+x))*log(5*log(-4
/(-3+x)))^2+(-2*x^6+22*x^5-78*x^4+74*x^3+110*x^2-306*x+360)*exp(x^2)*log(-
4/(-3+x))*log(5*log(-4/(-3+x)))+(15*x^3-85*x^2+195*x-225)*log(-4/(-3+x))+(
x^4-8*x^3+16*x^2)*exp(x^2))/((3*x^3-33*x^2+120*x-144)*exp(x^2)^2*log(-4/(-
3+x))*log(5*log(-4/(-3+x)))^2+(30*x^2-210*x+360)*exp(x^2)*log(-4/(-3+x))*l
og(5*log(-4/(-3+x)))+(75*x-225)*log(-4/(-3+x))),x, algorithm=\
```

output
```
Timed out
```

3.751.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}\left(360-210x+30x^2\right)\log\left(-\frac{4}{-3+x}\right)\log}$$
$$= \int \frac{\ln\left(-\frac{4}{x-3}\right)\,\mathrm{e}^{2\,x^2}\,\left(3\,x^3-33\,x^2+120\,x-144\right)\,\ln\left(5\,\ln\left(-\frac{4}{x-3}\right)\right)^2+\ln\left(-\frac{4}{x-3}\right)\,\mathrm{e}^{x^2}\,\left(-2\,x^6+22\,x^5-78\,x^4\right.}{\ln\left(-\frac{4}{x-3}\right)\,\mathrm{e}^{2\,x^2}\,\left(3\,x^3-33\,x^2+120\,x-144\right)\,\ln\left(5\,\ln\left(-\frac{4}{x-3}\right)\right)^2+}$$

input
```
int((log(-4/(x - 3))*(195*x - 85*x^2 + 15*x^3 - 225) + exp(x^2)*(16*x^2 -
8*x^3 + x^4) + log(-4/(x - 3))*exp(x^2)*log(5*log(-4/(x - 3)))*(110*x^2 -
306*x + 74*x^3 - 78*x^4 + 22*x^5 - 2*x^6 + 360) + log(-4/(x - 3))*exp(2*x^
2)*log(5*log(-4/(x - 3)))^2*(120*x - 33*x^2 + 3*x^3 - 144))/(log(-4/(x - 3
))*(75*x - 225) + log(-4/(x - 3))*exp(2*x^2)*log(5*log(-4/(x - 3)))^2*(120
*x - 33*x^2 + 3*x^3 - 144) + log(-4/(x - 3))*exp(x^2)*log(5*log(-4/(x - 3)
))*(30*x^2 - 210*x + 360)),x)
```

3.751.

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3}\right.\right.}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-210x+30x^2)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}(-144+120x-33x^2}$$

output
```
int((log(-4/(x - 3))*(195*x - 85*x^2 + 15*x^3 - 225) + exp(x^2)*(16*x^2 -
8*x^3 + x^4) + log(-4/(x - 3))*exp(x^2)*log(5*log(-4/(x - 3)))*(110*x^2 -
306*x + 74*x^3 - 78*x^4 + 22*x^5 - 2*x^6 + 360) + log(-4/(x - 3))*exp(2*x^
2)*log(5*log(-4/(x - 3)))^2*(120*x - 33*x^2 + 3*x^3 - 144))/(log(-4/(x - 3
))*(75*x - 225) + log(-4/(x - 3))*exp(2*x^2)*log(5*log(-4/(x - 3)))^2*(120
*x - 33*x^2 + 3*x^3 - 144) + log(-4/(x - 3))*exp(x^2)*log(5*log(-4/(x - 3)
))*(30*x^2 - 210*x + 360)), x)
```

3.751.

$$\int \frac{e^{x^2}(16x^2-8x^3+x^4)+(-225+195x-85x^2+15x^3)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-306x+110x^2+74x^3-78x^4+22x^5-2x^6)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right.\right.}{(-225+75x)\log\left(-\frac{4}{-3+x}\right)+e^{x^2}(360-210x+30x^2)\log\left(-\frac{4}{-3+x}\right)\log\left(5\log\left(-\frac{4}{-3+x}\right)\right)+e^{2x^2}(-144+120x-33x^2}$$

3.752 $\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}(27x+x^2)}$

3.752.1 Optimal result

Integrand size = 86, antiderivative size = 15

$$\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}(27x+x^2)}\,dx = x\log^2\left(27+\frac{1}{e^{100}x}+x\right)$$

output
```
x*ln(27+1/x/exp(25)^4+x)^2
```

3.752.2 Mathematica [A] (verified)

Time = 0.59 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}(27x+x^2)}\,dx = x\log^2\left(27+\frac{1}{e^{100}x}+x\right)$$

input
```
Integrate[((-2 + 2*E^100*x^2)*Log[(1 + E^100*(27*x + x^2))/(E^100*x)] + (1
 + E^100*(27*x + x^2))*Log[(1 + E^100*(27*x + x^2))/(E^100*x)]^2)/(1 + E^1
00*(27*x + x^2)),x]
```

output
```
x*Log[27 + 1/(E^100*x) + x]^2
```

3.752.3 Rubi [A] (verified)

Time = 3.46 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.047, Rules used = {7292, 7239, 7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{100}\left(x^2+27x\right)+1\right)\log^2\left(\frac{e^{100}\left(x^2+27x\right)+1}{e^{100}x}\right)+\left(2e^{100}x^2-2\right)\log\left(\frac{e^{100}\left(x^2+27x\right)+1}{e^{100}x}\right)}{e^{100}\left(x^2+27x\right)+1}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\log\left(x+\frac{1}{e^{100}x}+27\right)\left(2e^{100}x^2+e^{100}x^2\log\left(x+\frac{1}{e^{100}x}+27\right)+27e^{100}x\log\left(x+\frac{1}{e^{100}x}+27\right)+\log\left(x+\frac{1}{e^{100}x}+27\right.\right.}{e^{100}x^2+27e^{100}x+1}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\log\left(x+\frac{1}{e^{100}x}+27\right)\left(2e^{100}x^2+\left(e^{100}x(x+27)+1\right)\log\left(x+\frac{1}{e^{100}x}+27\right)-2\right)}{e^{100}x^2+27e^{100}x+1}dx$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{2\left(e^{100}x^2-1\right)\log\left(x+\frac{1}{e^{100}x}+27\right)}{e^{100}x^2+27e^{100}x+1}+\log^2\left(x+\frac{1}{e^{100}x}+27\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x\log^2\left(x+\frac{1}{e^{100}x}+27\right)$$

input
```
Int[((-2 + 2*E^100*x^2)*Log[(1 + E^100*(27*x + x^2))/(E^100*x)] + (1 + E^1
00*(27*x + x^2))*Log[(1 + E^100*(27*x + x^2))/(E^100*x)]^2)/(1 + E^100*(27
*x + x^2)),x]
```

output
```
x*Log[27 + 1/(E^100*x) + x]^2
```

3.752. $\int \frac{\left(-2+2e^{100}x^2\right)\log\left(\frac{1+e^{100}\left(27x+x^2\right)}{e^{100}x}\right)+\left(1+e^{100}\left(27x+x^2\right)\right)\log^2\left(\frac{1+e^{100}\left(27x+x^2\right)}{e^{100}x}\right)}{1+e^{100}\left(27x+x^2\right)}dx$

3.752.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.752.4 Maple [A] (verified)

Time = 2.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.60

method	result	size
risch	$x \ln \left(\frac{\left(\left(x^{2}+27 x\right) \mathrm{e}^{100}+1\right) \mathrm{e}^{-100}}{x}\right)^{2}$	24
norman	$x \ln \left(\frac{\left(\left(x^{2}+27 x\right) \mathrm{e}^{100}+1\right) \mathrm{e}^{-100}}{x}\right)^{2}$	28
parallelrisch	$x \ln \left(\frac{\left(\left(x^{2}+27 x\right) \mathrm{e}^{100}+1\right) \mathrm{e}^{-100}}{x}\right)^{2}$	28

input
```
int((((x^2+27*x)*exp(25)^4+1)*ln(((x^2+27*x)*exp(25)^4+1)/x/exp(25)^4)^2+(
2*x^2*exp(25)^4-2)*ln(((x^2+27*x)*exp(25)^4+1)/x/exp(25)^4))/((x^2+27*x)*e
xp(25)^4+1),x,method=_RETURNVERBOSE)
```

output
```
x*ln(((x^2+27*x)*exp(100)+1)/x*exp(-100))^2
```

3.752.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.53

$$\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}\left(27x+x^2\right)}\,dx$$
$$= x\log\left(\frac{((x^2+27\,x)e^{100}+1)e^{(-100)}}{x}\right)^2$$

input
```
integrate((((x^2+27*x)*exp(25)^4+1)*log(((x^2+27*x)*exp(25)^4+1)/x/exp(25)
^4)^2+(2*x^2*exp(25)^4-2)*log(((x^2+27*x)*exp(25)^4+1)/x/exp(25)^4))/((x^2
+27*x)*exp(25)^4+1),x, algorithm=\
```

output
```
x*log(((x^2 + 27*x)*e^100 + 1)*e^(-100)/x)^2
```

3.752.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33

$$\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}\left(27x+x^2\right)}\,dx$$
$$= x\log\left(\frac{(x^2+27x)\,e^{100}+1}{xe^{100}}\right)^2$$

input
```
integrate((((x**2+27*x)*exp(25)**4+1)*ln(((x**2+27*x)*exp(25)**4+1)/x/exp(
25)**4)**2+(2*x**2*exp(25)**4-2)*ln(((x**2+27*x)*exp(25)**4+1)/x/exp(25)**
4))/((x**2+27*x)*exp(25)**4+1),x)
```

output
```
x*log(((x**2 + 27*x)*exp(100) + 1)*exp(-100)/x)**2
```

3.752.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(14) = 28$.

Time = 1.14 (sec) , antiderivative size = 57, normalized size of antiderivative = 3.80

$$\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}(27x+x^2)}\,dx$$
$$= x\log\left(x^2e^{100}+27\,xe^{100}+1\right)^2+x\log(x)^2 - 2\,(x\log(x)+100\,x)\log\left(x^2e^{100}+27\,xe^{100}+1\right)+200\,x\log(x)+10000\,x$$

input
```
integrate((((x^2+27*x)*exp(25)^4+1)*log(((x^2+27*x)*exp(25)^4+1)/x/exp(25)
^4)^2+(2*x^2*exp(25)^4-2)*log(((x^2+27*x)*exp(25)^4+1)/x/exp(25)^4))/((x^2
+27*x)*exp(25)^4+1),x, algorithm=\
```

output
```
x*log(x^2*e^100 + 27*x*e^100 + 1)^2 + x*log(x)^2 - 2*(x*log(x) + 100*x)*lo
g(x^2*e^100 + 27*x*e^100 + 1) + 200*x*log(x) + 10000*x
```

3.752.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(14) = 28$.

Time = 0.45 (sec) , antiderivative size = 47, normalized size of antiderivative = 3.13

$$\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}(27x+x^2)}\,dx$$
$$= x\log\left(\frac{x^2e^{100}+27\,xe^{100}+1}{x}\right)^2 - 200\,x\log\left(\frac{x^2e^{100}+27\,xe^{100}+1}{x}\right)+10000\,x$$

input
```
integrate((((x^2+27*x)*exp(25)^4+1)*log(((x^2+27*x)*exp(25)^4+1)/x/exp(25)
^4)^2+(2*x^2*exp(25)^4-2)*log(((x^2+27*x)*exp(25)^4+1)/x/exp(25)^4))/((x^2
+27*x)*exp(25)^4+1),x, algorithm=\
```

output
```
x*log((x^2*e^100 + 27*x*e^100 + 1)/x)^2 - 200*x*log((x^2*e^100 + 27*x*e^10
0 + 1)/x) + 10000*x
```

3.752. $\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}(27x+x^2)}\,dx$

3.752.9 Mupad [B] (verification not implemented)

Time = 15.63 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{(-2+2e^{100}x^2)\log\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)+(1+e^{100}(27x+x^2))\log^2\left(\frac{1+e^{100}(27x+x^2)}{e^{100}x}\right)}{1+e^{100}(27x+x^2)}\,dx$$
$$= x\ln\left(x+\frac{\mathrm{e}^{-100}}{x}+27\right)^2$$

input
```
int((log((exp(-100)*(exp(100)*(27*x + x^2) + 1))/x)^2*(exp(100)*(27*x + x^
2) + 1) + log((exp(-100)*(exp(100)*(27*x + x^2) + 1))/x)*(2*x^2*exp(100) -
 2))/(exp(100)*(27*x + x^2) + 1),x)
```

output
```
x*log(x + exp(-100)/x + 27)^2
```

3.753 $\int \frac{x+(16+x)\log(-16-x)}{(16+x)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}\,dx$

3.753.1 Optimal result

Integrand size = 33, antiderivative size = 23

$$\int \frac{x+(16+x)\log(-16-x)}{(16+x)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}\,dx=\frac{x\log(-16-x)}{\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}$$

output
```
ln(-x-16)/ln(1/25*exp(4/ln(3))^2)^2*x
```

3.753.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{x+(16+x)\log(-16-x)}{(16+x)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}\,dx=\frac{(16+x)\log(-16-x)-16\log(16+x)}{\left(-\frac{8}{\log(3)}+\log(25)\right)^2}$$

input
```
Integrate[(x + (16 + x)*Log[-16 - x])/((16 + x)*Log[E^(8/Log[3])/25]^2),x]
```

output
```
((16 + x)*Log[-16 - x] - 16*Log[16 + x])/(-8/Log[3] + Log[25])^2
```

3.753.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x+(x+16)\log(-x-16)}{(x+16)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}dx$$

$$\Big\downarrow \; 27$$

$$\frac{\log^2(3)\int \frac{x+(x+16)\log(-x-16)}{x+16}dx}{(8-\log(3)\log(25))^2}$$

$$\Big\downarrow \; 7293$$

$$\frac{\log^2(3)\int \left(\frac{x}{x+16}+\log(-x-16)\right)dx}{(8-\log(3)\log(25))^2}$$

$$\Big\downarrow \; 2009$$

$$\frac{\log^2(3)((x+16)\log(-x-16)-16\log(x+16))}{(8-\log(3)\log(25))^2}$$

input
```
Int[(x + (16 + x)*Log[-16 - x])/((16 + x)*Log[E^(8/Log[3])/25]^2),x]
```

output
```
(Log[3]^2*((16 + x)*Log[-16 - x] - 16*Log[16 + x]))/(8 - Log[3]*Log[25])^2
```

3.753.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.753.4 Maple [A] (verified)

Time = 0.84 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

method	result	size
risch	$\frac{\ln(-x-16)x}{\left(-2\ln(5)+\frac{8}{\ln(3)}\right)^2}$	22
norman	$\frac{\ln(3)^2 x\ln(-x-16)}{4(\ln(3)\ln(5)-4)^2}$	23
parallelrisch	$\frac{\ln(-x-16)x}{\ln\left(\frac{e^{\frac{8}{\ln(3)}}}{25}\right)^2}$	23
derivativedivides	$\frac{-(-x-16)\ln(-x-16)-16\ln(-x-16)}{\ln\left(\frac{e^{\frac{8}{\ln(3)}}}{25}\right)^2}$	38
default	$\frac{-(-x-16)\ln(-x-16)-16\ln(-x-16)}{\ln\left(\frac{e^{\frac{8}{\ln(3)}}}{25}\right)^2}$	38
parts	$\frac{-(-x-16)\ln(-x-16)-x-16}{\ln\left(\frac{e^{\frac{8}{\ln(3)}}}{25}\right)^2}+\frac{x-16\ln(x+16)}{\ln\left(\frac{e^{\frac{8}{\ln(3)}}}{25}\right)^2}$	58

input
```
int(((x+16)*ln(-x-16)+x)/(x+16)/ln(1/25*exp(4/ln(3))^2)^2,x,method=_RETURN
VERBOSE)
```

output
```
1/(-2*ln(5)+8/ln(3))^2*ln(-x-16)*x
```

3.753.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{x+(16+x)\log(-16-x)}{(16+x)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}\,dx = \frac{x\log(3)^2\log(-x-16)}{4\left(\log(5)^2\log(3)^2-8\log(5)\log(3)+16\right)}$$

input
```
integrate(((x+16)*log(-x-16)+x)/(x+16)/log(1/25*exp(4/log(3))^2)^2,x, algo
rithm=\
```

output
```
1/4*x*log(3)^2*log(-x - 16)/(log(5)^2*log(3)^2 - 8*log(5)*log(3) + 16)
```

3.753.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.48

$$\int \frac{x+(16+x)\log(-16-x)}{(16+x)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}\,dx=\frac{x\log{(3)}^2\log{(-x-16)}}{-32\log{(3)}\log{(5)}+4\log{(3)}^2\log{(5)}^2+64}$$

input
```
integrate(((x+16)*ln(-x-16)+x)/(x+16)/ln(1/25*exp(4/ln(3))**2)**2,x)
```

output
```
x*log(3)**2*log(-x - 16)/(-32*log(3)*log(5) + 4*log(3)**2*log(5)**2 + 64)
```

3.753.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. 2(20) = 40.

Time = 0.21 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.04

$$\int \frac{x+(16+x)\log(-16-x)}{(16+x)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}\,dx$$
$$=\frac{8\log{(x+16)}^2+(x-16\log{(x+16)})\log{(-x-16)}+8\log{(-x-16)}^2}{\log{\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}^2}$$

input
```
integrate(((x+16)*log(-x-16)+x)/(x+16)/log(1/25*exp(4/log(3))^2)^2,x, algo
rithm=\
```

output
```
(8*log(x + 16)^2 + (x - 16*log(x + 16))*log(-x - 16) + 8*log(-x - 16)^2)/l
og(1/25*e^(8/log(3)))^2
```

3.753.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{x+(16+x)\log(-16-x)}{(16+x)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}\,dx=\frac{(x+16)\log{(-x-16)}-16\log{(-x-16)}}{\log{\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}^2}$$

input
```
integrate(((x+16)*log(-x-16)+x)/(x+16)/log(1/25*exp(4/log(3))^2)^2,x, algo
rithm=\
```

output
```
((x + 16)*log(-x - 16) - 16*log(-x - 16))/log(1/25*e^(8/log(3)))^2
```

3.753.9 Mupad [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{x+(16+x)\log(-16-x)}{(16+x)\log^2\left(\frac{1}{25}e^{\frac{8}{\log(3)}}\right)}\,dx = \frac{x\ln(3)^2\,\ln(-x-16)}{4\ln(3)^2\ln(5)^2-32\,\ln(3)\,\ln(5)+64}$$

input
```
int((x + log(- x - 16)*(x + 16))/(log(exp(8/log(3))/25)^2*(x + 16)),x)
```

output
```
(x*log(3)^2*log(- x - 16))/(4*log(3)^2*log(5)^2 - 32*log(3)*log(5) + 64)
```

3.754 $\int \frac{-e^{-6+x}x^2+2e^x x^2+5\log(2)}{x^2}\,dx$

3.754.1 Optimal result

Integrand size = 27, antiderivative size = 20

$$\int \frac{-e^{-6+x}x^2+2e^x x^2+5\log(2)}{x^2}\,dx = -e^{-6+x}+2e^x-\frac{5\log(2)}{x}$$

output
```
2*exp(x)-exp(-6+x)-5*ln(2)/x
```

3.754.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{-e^{-6+x}x^2+2e^x x^2+5\log(2)}{x^2}\,dx = -e^{-6+x}+2e^x-\frac{\log(32)}{x}$$

input
```
Integrate[(-(E^(-6 + x)*x^2) + 2*E^x*x^2 + 5*Log[2])/x^2,x]
```

output
```
-E^(-6 + x) + 2*E^x - Log[32]/x
```

3.754.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^{x-6}x^2+2e^x x^2+5\log(2)}{x^2} \, dx$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(\frac{\log(32)}{x^2}+\left(2e^6-1\right)e^{x-6}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\left(1-2e^6\right)\left(-e^{x-6}\right)-\frac{\log(32)}{x}$$

input
```
Int[(-(E^(-6 + x)*x^2) + 2*E^x*x^2 + 5*Log[2])/x^2,x]
```

output
```
-(E^(-6 + x)*(1 - 2*E^6)) - Log[32]/x
```

3.754.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.754.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
default	$-\mathrm{e}^{-6}\mathrm{e}^{x}-\frac{5\ln(2)}{x}+2\,\mathrm{e}^{x}$	19
risch	$-\mathrm{e}^{-6}\mathrm{e}^{x}-\frac{5\ln(2)}{x}+2\,\mathrm{e}^{x}$	19
parts	$2\,\mathrm{e}^{x}-\mathrm{e}^{-6+x}-\frac{5\ln(2)}{x}$	19
parallelrisch	$-\frac{x\,\mathrm{e}^{-6+x}-2\,\mathrm{e}^{x}x+5\ln(2)}{x}$	22
norman	$\frac{(2\,\mathrm{e}^{6}-1)\mathrm{e}^{-6}x\,\mathrm{e}^{x}-5\ln(2)}{x}$	24

input
```
int((2*exp(x)*x^2-x^2*exp(-6+x)+5*ln(2))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-exp(-6)*exp(x)-5*ln(2)/x+2*exp(x)
```

3.754.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.25

$$\int \frac{-e^{-6+x}x^2+2e^xx^2+5\log(2)}{x^2}\,dx=\frac{((2\,xe^6-x)e^x-5\,e^6\log{(2)})e^{(-6)}}{x}$$

input
```
integrate((2*exp(x)*x^2-x^2*exp(-6+x)+5*log(2))/x^2,x, algorithm=\
```

output
```
((2*x*e^6 - x)*e^x - 5*e^6*log(2))*e^(-6)/x
```

3.754.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-e^{-6+x}x^2+2e^xx^2+5\log(2)}{x^2}\,dx=\frac{(-1+2e^6)\,e^x}{e^6}-\frac{5\log{(2)}}{x}$$

input
```
integrate((2*exp(x)*x**2-x**2*exp(-6+x)+5*ln(2))/x**2,x)
```

output
```
(-1 + 2*exp(6))*exp(-6)*exp(x) - 5*log(2)/x
```

3.754.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{-e^{-6+x}x^2 + 2e^x x^2 + 5\log(2)}{x^2}\,dx = -\frac{5\,\log(2)}{x} - e^{(x-6)} + 2\,e^x$$

input
```
integrate((2*exp(x)*x^2-x^2*exp(-6+x)+5*log(2))/x^2,x, algorithm=\
```

output
```
-5*log(2)/x - e^(x - 6) + 2*e^x
```

3.754.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.25

$$\int \frac{-e^{-6+x}x^2 + 2e^x x^2 + 5\log(2)}{x^2}\,dx = \frac{\left(2\,xe^{(x+6)} - xe^x - 5\,e^6\log(2)\right)e^{(-6)}}{x}$$

input
```
integrate((2*exp(x)*x^2-x^2*exp(-6+x)+5*log(2))/x^2,x, algorithm=\
```

output
```
(2*x*e^(x + 6) - x*e^x - 5*e^6*log(2))*e^(-6)/x
```

3.754.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{-e^{-6+x}x^2 + 2e^x x^2 + 5\log(2)}{x^2}\,dx = -\mathrm{e}^x\left(\mathrm{e}^{-6} - 2\right) - \frac{\ln(32)}{x}$$

input
```
int((5*log(2) + 2*x^2*exp(x) - x^2*exp(x - 6))/x^2,x)
```

output
```
- exp(x)*(exp(-6) - 2) - log(32)/x
```

3.755 $\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4\right.}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/}}}$

3.755.1 Optimal result

Integrand size = 184, antiderivative size = 36

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx=$$

output
```
4/x/(exp(x^2*(5*x-5)^2)-x*(exp(exp(5/x)+x)+5))
```

3.755.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.61

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx=$$
$$-\frac{4e^{50x^3}}{x\left(-e^{25x^2+25x^4}+5e^{50x^3}x+e^{e^{5/x}+x+50x^3}x\right)}$$

input
```
Integrate[(40*x + E^(E^(5/x) + x)*(-20*E^(5/x) + 8*x + 4*x^2) + E^(25*x^2
- 50*x^3 + 25*x^4)*(-4 - 200*x^2 + 600*x^3 - 400*x^4))/(E^(50*x^2 - 100*x^
3 + 50*x^4)*x^2 - 10*E^(25*x^2 - 50*x^3 + 25*x^4)*x^3 + 25*x^4 + E^(2*E^(5
/x) + 2*x)*x^4 + E^(E^(5/x) + x)*(-2*E^(25*x^2 - 50*x^3 + 25*x^4)*x^3 + 10
*x^4)),x]
```

3.755.

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx$$

output
```
(-4*E^(50*x^3))/(x*(-E^(25*x^2 + 25*x^4) + 5*E^(50*x^3)*x + E^(E^(5/x) + x
 + 50*x^3)*x))
```

3.755.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+e^{5/x}}\left(4x^2+8x-20e^{5/x}\right)+e^{25x^4-50x^3+25x^2}\left(-400x^4+600x^3-200x^2-4\right)+40x}{e^{2x+2e^{5/x}}x^4+25x^4-10e^{25x^4-50x^3+25x^2}x^3+e^{50x^4-100x^3+50x^2}x^2+e^{x+e^{5/x}}\left(10x^4-2e^{25x^4-50x^3+25x^2}x^3\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{100x^3}\left(e^{x+e^{5/x}}\left(4x^2+8x-20e^{5/x}\right)+e^{25x^4-50x^3+25x^2}\left(-400x^4+600x^3-200x^2-4\right)+40x\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25x^4+25x^2}\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{4e^{50x^3}\left(100x^4-150x^3+50x^2+1\right)}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)}-\frac{4e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+\cdots}\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{\cdots}}\right.}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{4e^{50x^3}\left(10e^{50x^3}x+e^{50x^3+x+e^{5/x}}(x+2)x-5e^{50x^3+x+e^{5/x}+\frac{5}{x}}-e^{25\left(x^4+x^2\right)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25\left(x^4+x^2\right)}\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$4\int -\frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25\left(x^4+x^2\right)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25\left(x^4+x^2\right)}\right)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25\left(x^4+x^2\right)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25\left(x^4+x^2\right)}\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}dx$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\cdots\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25(x^4+x^2)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25(x^4+x^2)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\cdots\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25(x^4+x^2)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25(x^4+x^2)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\cdots\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25(x^4+x^2)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25(x^4+x^2)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\cdots\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25(x^4+x^2)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25(x^4+x^2)}\right)^2}dx$$

3.755.

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\cdots\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\cdots\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25\left(x^4+x^2\right)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25\left(x^4+x^2\right)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\cdots\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\cdots\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25\left(x^4+x^2\right)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25\left(x^4+x^2\right)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\cdots\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\cdots\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25\left(x^4+x^2\right)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25\left(x^4+x^2\right)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\cdots\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\cdots\right.$$

$$\Big\downarrow \text{7239}$$

3.755.

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25(x^4+x^2)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25(x^4+x^2)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25(x^4+x^2)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25(x^4+x^2)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25(x^4+x^2)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25(x^4+x^2)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25(x^4+x^2)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25(x^4+x^2)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\right.$$

3.755.

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx$$

$$\Big\downarrow \text{7239}$$

$$-4\int \frac{e^{50x^3}\left(-10e^{50x^3}x-e^{50x^3+x+e^{5/x}}(x+2)x+5e^{50x^3+x+e^{5/x}+\frac{5}{x}}+e^{25(x^4+x^2)}\left(100x^4-150x^3+50x^2+1\right)\right)}{x^2\left(-5e^{50x^3}x-e^{50x^3+x+e^{5/x}}x+e^{25(x^4+x^2)}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^{100x^3}\left(100e^{x+e^{5/x}}x^5+500x^5-150e^{x+e^{5/x}}x^4-750x^4+50e^{x+e^{5/x}}x^3+250x^3-e^{x+e^{5/x}}x^2-e^{x+e^{5/x}}x-5\right.}{x^2\left(5e^{50x^3}x+e^{50x^3+x+e^{5/x}}x-e^{25x^4+25x^2}\right)^2}\right.$$

input
```
Int[(40*x + E^(E^(5/x) + x)*(-20*E^(5/x) + 8*x + 4*x^2) + E^(25*x^2 - 50*x
^3 + 25*x^4)*(-4 - 200*x^2 + 600*x^3 - 400*x^4))/(E^(50*x^2 - 100*x^3 + 50
*x^4)*x^2 - 10*E^(25*x^2 - 50*x^3 + 25*x^4)*x^3 + 25*x^4 + E^(2*E^(5/x) +
2*x)*x^4 + E^(E^(5/x) + x)*(-2*E^(25*x^2 - 50*x^3 + 25*x^4)*x^3 + 10*x^4))
,x]
```

output
```
$Aborted
```

3.755.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.755.

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx$$

3.755.4 Maple [A] (verified)

Time = 5.11 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.00

method	result	size
risch	$-\frac{4}{x\left(x\,{\mathrm e}^{{\mathrm e}^{\frac{5}{x}}+x}-{\mathrm e}^{25 x^{2} \left(-1+x\right)^{2}}+5 x\right)}$	36
parallelrisch	$-\frac{4}{x\left(x\,{\mathrm e}^{{\mathrm e}^{\frac{5}{x}}+x}-{\mathrm e}^{25 x^{4}-50 x^{3}+25 x^{2}}+5 x\right)}$	42

input
```
int(((-20*exp(5/x)+4*x^2+8*x)*exp(exp(5/x)+x)+(-400*x^4+600*x^3-200*x^2-4)
*exp(25*x^4-50*x^3+25*x^2)+40*x)/(x^4*exp(exp(5/x)+x)^2+(-2*x^3*exp(25*x^4
-50*x^3+25*x^2)+10*x^4)*exp(exp(5/x)+x)+x^2*exp(25*x^4-50*x^3+25*x^2)^2-10
*x^3*exp(25*x^4-50*x^3+25*x^2)+25*x^4),x,method=_RETURNVERBOSE)
```

output
```
-4/x/(x*exp(exp(5/x)+x)-exp(25*x^2*(-1+x)^2)+5*x)
```

3.755.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.19

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx =$$
$$-\frac{4}{x^{2} e^{\left(x + e^{\frac{5}{x}}\right)} + 5 \, x^{2} - x e^{\left(25 \, x^{4} - 50 \, x^{3} + 25 \, x^{2}\right)}}$$

input
```
integrate(((-20*exp(5/x)+4*x^2+8*x)*exp(exp(5/x)+x)+(-400*x^4+600*x^3-200*
x^2-4)*exp(25*x^4-50*x^3+25*x^2)+40*x)/(x^4*exp(exp(5/x)+x)^2+(-2*x^3*exp(
25*x^4-50*x^3+25*x^2)+10*x^4)*exp(exp(5/x)+x)+x^2*exp(25*x^4-50*x^3+25*x^2
)^2-10*x^3*exp(25*x^4-50*x^3+25*x^2)+25*x^4),x, algorithm=\
```

output
```
-4/(x^2*e^(x + e^(5/x)) + 5*x^2 - x*e^(25*x^4 - 50*x^3 + 25*x^2))
```

3.755.6 Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.03

$$\int \frac{40x + e^{e^{5/x}+x}\left(-20e^{5/x} + 8x + 4x^2\right) + e^{25x^2-50x^3+25x^4}\left(-4 - 200x^2 + 600x^3 - 400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2 - 10e^{25x^2-50x^3+25x^4}x^3 + 25x^4 + e^{2e^{5/x}+2x}x^4 + e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3 + 10x^4\right)}\,dx = -\frac{4}{x^2e^{x+e^{\frac{5}{x}}} + 5x^2 - xe^{25x^4-50x^3+25x^2}}$$

input
```
integrate(((-20*exp(5/x)+4*x**2+8*x)*exp(exp(5/x)+x)+(-400*x**4+600*x**3-2
00*x**2-4)*exp(25*x**4-50*x**3+25*x**2)+40*x)/(x**4*exp(exp(5/x)+x)**2+(-2
*x**3*exp(25*x**4-50*x**3+25*x**2)+10*x**4)*exp(exp(5/x)+x)+x**2*exp(25*x*
*4-50*x**3+25*x**2)**2-10*x**3*exp(25*x**4-50*x**3+25*x**2)+25*x**4),x)
```

output
```
-4/(x**2*exp(x + exp(5/x)) + 5*x**2 - x*exp(25*x**4 - 50*x**3 + 25*x**2))
```

3.755.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.53

$$\int \frac{40x + e^{e^{5/x}+x}\left(-20e^{5/x} + 8x + 4x^2\right) + e^{25x^2-50x^3+25x^4}\left(-4 - 200x^2 + 600x^3 - 400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2 - 10e^{25x^2-50x^3+25x^4}x^3 + 25x^4 + e^{2e^{5/x}+2x}x^4 + e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3 + 10x^4\right)}\,dx = -\frac{4\,e^{(50\,x^3)}}{5\,x^2e^{(50\,x^3)} + x^2e^{\left(50\,x^3+x+e^{\frac{5}{x}}\right)} - xe^{(25\,x^4+25\,x^2)}}$$

input
```
integrate(((-20*exp(5/x)+4*x^2+8*x)*exp(exp(5/x)+x)+(-400*x^4+600*x^3-200*
x^2-4)*exp(25*x^4-50*x^3+25*x^2)+40*x)/(x^4*exp(exp(5/x)+x)^2+(-2*x^3*exp(
25*x^4-50*x^3+25*x^2)+10*x^4)*exp(exp(5/x)+x)+x^2*exp(25*x^4-50*x^3+25*x^2
)^2-10*x^3*exp(25*x^4-50*x^3+25*x^2)+25*x^4),x, algorithm=\
```

output
```
-4*e^(50*x^3)/(5*x^2*e^(50*x^3) + x^2*e^(50*x^3 + x + e^(5/x)) - x*e^(25*x
^4 + 25*x^2))
```

3.755.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 14225 vs. 2(34) = 68.

Time = 0.47 (sec) , antiderivative size = 14225, normalized size of antiderivative = 395.14

$$\int \frac{40x + e^{e^{5/x}+x}\left(-20e^{5/x} + 8x + 4x^2\right) + e^{25x^2-50x^3+25x^4}\left(-4 - 200x^2 + 600x^3 - 400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2 - 10e^{25x^2-50x^3+25x^4}x^3 + 25x^4 + e^{2e^{5/x}+2x}x^4 + e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3 + 10x^4\right)}\,dx =$$

input
```
integrate(((-20*exp(5/x)+4*x^2+8*x)*exp(exp(5/x)+x)+(-400*x^4+600*x^3-200*
x^2-4)*exp(25*x^4-50*x^3+25*x^2)+40*x)/(x^4*exp(exp(5/x)+x)^2+(-2*x^3*exp(
25*x^4-50*x^3+25*x^2)+10*x^4)*exp(exp(5/x)+x)+x^2*exp(25*x^4-50*x^3+25*x^2
)^2-10*x^3*exp(25*x^4-50*x^3+25*x^2)+25*x^4),x, algorithm=\
```

output
```
-4*(10000*x^11*e^(x + 2*(x^2 + x*e^(5/x) + 5)/x + e^(5/x)) + 100000*x^11*e
^(x + (x^2 + x*e^(5/x) + 5)/x + 5/x + e^(5/x)) + 250000*x^11*e^(x + 10/x +
 e^(5/x)) + 50000*x^11*e^(2*(x^2 + x*e^(5/x) + 5)/x) + 500000*x^11*e^((x^2
 + x*e^(5/x) + 5)/x + 5/x) + 1250000*x^11*e^(10/x) - 10000*x^10*e^(25*x^4
- 50*x^3 + 25*x^2 + x + (x^2 + x*e^(5/x) + 5)/x + 5/x + e^(5/x)) - 50000*x
^10*e^(25*x^4 - 50*x^3 + 25*x^2 + x + 10/x + e^(5/x)) - 50000*x^10*e^(25*x
^4 - 50*x^3 + 25*x^2 + (x^2 + x*e^(5/x) + 5)/x + 5/x) - 250000*x^10*e^(25*
x^4 - 50*x^3 + 25*x^2 + 10/x) - 30000*x^10*e^(x + 2*(x^2 + x*e^(5/x) + 5)/
x + e^(5/x)) - 300000*x^10*e^(x + (x^2 + x*e^(5/x) + 5)/x + 5/x + e^(5/x))
 - 750000*x^10*e^(x + 10/x + e^(5/x)) - 150000*x^10*e^(2*(x^2 + x*e^(5/x)
+ 5)/x) - 1500000*x^10*e^((x^2 + x*e^(5/x) + 5)/x + 5/x) - 3750000*x^10*e^
(10/x) + 30000*x^9*e^(25*x^4 - 50*x^3 + 25*x^2 + x + (x^2 + x*e^(5/x) + 5)
/x + 5/x + e^(5/x)) + 150000*x^9*e^(25*x^4 - 50*x^3 + 25*x^2 + x + 10/x +
e^(5/x)) + 150000*x^9*e^(25*x^4 - 50*x^3 + 25*x^2 + (x^2 + x*e^(5/x) + 5)/
x + 5/x) + 750000*x^9*e^(25*x^4 - 50*x^3 + 25*x^2 + 10/x) + 32500*x^9*e^(x
 + 2*(x^2 + x*e^(5/x) + 5)/x + e^(5/x)) + 325000*x^9*e^(x + (x^2 + x*e^(5/
x) + 5)/x + 5/x + e^(5/x)) + 812500*x^9*e^(x + 10/x + e^(5/x)) + 162500*x^
9*e^(2*(x^2 + x*e^(5/x) + 5)/x) + 1625000*x^9*e^((x^2 + x*e^(5/x) + 5)/x +
 5/x) + 4062500*x^9*e^(10/x) - 32500*x^8*e^(25*x^4 - 50*x^3 + 25*x^2 + x +
 (x^2 + x*e^(5/x) + 5)/x + 5/x + e^(5/x)) - 162500*x^8*e^(25*x^4 - 50*x...
```

3.755.9 Mupad [B] (verification not implemented)

Time = 13.81 (sec) , antiderivative size = 274, normalized size of antiderivative = 7.61

$$\int \frac{40x+e^{e^{5/x}+x}\left(-20e^{5/x}+8x+4x^2\right)+e^{25x^2-50x^3+25x^4}\left(-4-200x^2+600x^3-400x^4\right)}{e^{50x^2-100x^3+50x^4}x^2-10e^{25x^2-50x^3+25x^4}x^3+25x^4+e^{2e^{5/x}+2x}x^4+e^{e^{5/x}+x}\left(-2e^{25x^2-50x^3+25x^4}x^3+10x^4\right)}\,dx = -\frac{20\,\mathrm{e}^{\frac{5}{x}+25\,x^2-50\,x^3+25\,x^4}-100\,x\,\mathrm{e}^{5/x}+20\,x^3-\mathrm{e}^{25\,x^4-50\,x^3+25\,x^2}}{\left(5\,x-\mathrm{e}^{25\,x^4-50\,x^3+25\,x^2}+x\,\mathrm{e}^{x+\mathrm{e}^{5/x}}\right)\left(5\,x\,\mathrm{e}^{\frac{5}{x}+25\,x^2-50\,x^3+25\,x^4}-x^2\,\mathrm{e}^{25\,x^4-50\,x^3+25\,x^2}-x^3\,\mathrm{e}^{25\,x^4-50\,x^3+25\,x^2}+50\right.}$$

input
```
int((40*x + exp(x + exp(5/x))*(8*x - 20*exp(5/x) + 4*x^2) - exp(25*x^2 - 5
0*x^3 + 25*x^4)*(200*x^2 - 600*x^3 + 400*x^4 + 4))/(x^2*exp(50*x^2 - 100*x
^3 + 50*x^4) - 10*x^3*exp(25*x^2 - 50*x^3 + 25*x^4) - exp(x + exp(5/x))*(2
*x^3*exp(25*x^2 - 50*x^3 + 25*x^4) - 10*x^4) + x^4*exp(2*x + 2*exp(5/x)) +
 25*x^4),x)
```

output
```
-(20*exp(5/x + 25*x^2 - 50*x^3 + 25*x^4) - 100*x*exp(5/x) + 20*x^3 - exp(2
5*x^2 - 50*x^3 + 25*x^4)*(4*x + 4*x^2 - 200*x^3 + 600*x^4 - 400*x^5))/((5*
x - exp(25*x^2 - 50*x^3 + 25*x^4) + x*exp(x + exp(5/x)))*(5*x*exp(5/x + 25
*x^2 - 50*x^3 + 25*x^4) - x^2*exp(25*x^2 - 50*x^3 + 25*x^4) - x^3*exp(25*x
^2 - 50*x^3 + 25*x^4) + 50*x^4*exp(25*x^2 - 50*x^3 + 25*x^4) - 150*x^5*exp
(25*x^2 - 50*x^3 + 25*x^4) + 100*x^6*exp(25*x^2 - 50*x^3 + 25*x^4) - 25*x^
2*exp(5/x) + 5*x^4))
```

3.756 $\int \frac{12+x^2}{x^2} \, dx$

3.756.1 Optimal result

Integrand size = 9, antiderivative size = 25

$$\int \frac{12+x^2}{x^2} \, dx = -3+x-\frac{4+x+2(4+x)}{x}-\frac{e^3}{\log(2)}$$

output
```
x-exp(3)/ln(2)-(3*x+12)/x-3
```

3.756.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.28

$$\int \frac{12+x^2}{x^2} \, dx = -\frac{12}{x}+x$$

input
```
Integrate[(12 + x^2)/x^2,x]
```

output
```
-12/x + x
```

3.756.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.28, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+12}{x^2} \, dx$$

$$\Big\downarrow \text{244}$$

$$\int \left(\frac{12}{x^2}+1\right) dx$$

$$\Big\downarrow \text{2009}$$

$$x-\frac{12}{x}$$

input
```
Int[(12 + x^2)/x^2,x]
```

output
```
-12/x + x
```

3.756.3.1 Defintions of rubi rules used

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.756.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.32

method	result	size
default	$x-\frac{12}{x}$	8
risch	$x-\frac{12}{x}$	8
gosper	$\frac{x^{2}-12}{x}$	10
norman	$\frac{x^{2}-12}{x}$	10
parallelrisch	$\frac{x^{2}-12}{x}$	10

input
```
int((x^2+12)/x^2,x,method=_RETURNVERBOSE)
```

output
```
x-12/x
```

3.756.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.36

$$\int \frac{12+x^2}{x^2}\,dx=\frac{x^2-12}{x}$$

input
```
integrate((x^2+12)/x^2,x, algorithm=\
```

output
```
(x^2 - 12)/x
```

3.756.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.12

$$\int \frac{12+x^2}{x^2}\,dx=x-\frac{12}{x}$$

input
```
integrate((x**2+12)/x**2,x)
```

output
```
x - 12/x
```

3.756.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.28

$$\int \frac{12+x^2}{x^2}\,dx = x - \frac{12}{x}$$

input
```
integrate((x^2+12)/x^2,x, algorithm=\
```

output
```
x - 12/x
```

3.756.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.28

$$\int \frac{12+x^2}{x^2}\,dx = x - \frac{12}{x}$$

input
```
integrate((x^2+12)/x^2,x, algorithm=\
```

output
```
x - 12/x
```

3.756.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.28

$$\int \frac{12+x^2}{x^2}\,dx = x - \frac{12}{x}$$

input
```
int((x^2 + 12)/x^2,x)
```

output
```
x - 12/x
```

3.757 $\int \frac{-48+e^3(-175x^6+240x^7+99x^8-120x^9-44x^{10})}{80e^3} dx$

3.757.1 Optimal result

Integrand size = 39, antiderivative size = 36

$$\int \frac{-48+e^3(-175x^6+240x^7+99x^8-120x^9-44x^{10})}{80e^3} dx = 3-\frac{1}{5}x\left(\frac{3}{e^3}+\frac{1}{16}x^4(5+2x)^2\left(-x+x^2\right)^2\right)$$

output
```
3-1/5*x*(3/exp(3)+1/16*x^4*(x^2-x)^2*(5+2*x)^2)
```

3.757.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.22

$$\int \frac{-48+e^3(-175x^6+240x^7+99x^8-120x^9-44x^{10})}{80e^3} dx = -\frac{3x}{5e^3}-\frac{5x^7}{16}+\frac{3x^8}{8}+\frac{11x^9}{80}-\frac{3x^{10}}{20}-\frac{x^{11}}{20}$$

input
```
Integrate[(-48 + E^3*(-175*x^6 + 240*x^7 + 99*x^8 - 120*x^9 - 44*x^10))/(8
0*E^3),x]
```

output
```
(-3*x)/(5*E^3) - (5*x^7)/16 + (3*x^8)/8 + (11*x^9)/80 - (3*x^10)/20 - x^11
/20
```

3.757.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.42, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.051, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^3(-44x^{10}-120x^9+99x^8+240x^7-175x^6)-48}{80e^3}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{\int \left(-e^3(44x^{10}+120x^9-99x^8-240x^7+175x^6)-48\right)dx}{80e^3}$$
$$\Big\downarrow \text{2009}$$
$$\frac{-4e^3x^{11}-12e^3x^{10}+11e^3x^9+30e^3x^8-25e^3x^7-48x}{80e^3}$$

input
```
Int[(-48 + E^3*(-175*x^6 + 240*x^7 + 99*x^8 - 120*x^9 - 44*x^10))/(80*E^3)
,x]
```

output
```
(-48*x - 25*E^3*x^7 + 30*E^3*x^8 + 11*E^3*x^9 - 12*E^3*x^10 - 4*E^3*x^11)/
(80*E^3)
```

3.757.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.757.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.89

method	result	size
risch	$-\frac{5x^{7}}{16}+\frac{3x^{8}}{8}+\frac{11x^{9}}{80}-\frac{3x^{10}}{20}-\frac{x^{11}}{20}-\frac{3\,\mathrm{e}^{-3}x}{5}$	32
norman	$-\frac{5x^{7}}{16}+\frac{3x^{8}}{8}+\frac{11x^{9}}{80}-\frac{3x^{10}}{20}-\frac{x^{11}}{20}-\frac{3\,\mathrm{e}^{-3}x}{5}$	34
parallelrisch	$\frac{\mathrm{e}^{-3}\left(\mathrm{e}^{3}\left(-4x^{11}-12x^{10}+11x^{9}+30x^{8}-25x^{7}\right)-48x\right)}{80}$	40
gosper	$-\frac{x\left(4\,\mathrm{e}^{3}x^{10}+12\,\mathrm{e}^{3}x^{9}-11\,\mathrm{e}^{3}x^{8}-30x^{7}\mathrm{e}^{3}+25x^{6}\mathrm{e}^{3}+48\right)\mathrm{e}^{-3}}{80}$	45
default	$\frac{\mathrm{e}^{-3}\left(-4\,\mathrm{e}^{3}x^{11}-12\,\mathrm{e}^{3}x^{10}+11\,\mathrm{e}^{3}x^{9}+30\,\mathrm{e}^{3}x^{8}-25x^{7}\mathrm{e}^{3}-48x\right)}{80}$	46

input
```
int(1/80*((-44*x^10-120*x^9+99*x^8+240*x^7-175*x^6)*exp(3)-48)/exp(3),x,me
thod=_RETURNVERBOSE)
```

output
```
-5/16*x^7+3/8*x^8+11/80*x^9-3/20*x^10-1/20*x^11-3/5*exp(-3)*x
```

3.757.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.03

$$\int \frac{-48+e^3(-175x^6+240x^7+99x^8-120x^9-44x^{10})}{80e^3}\,dx$$
$$=-\frac{1}{80}\left(\left(4\,x^{11}+12\,x^{10}-11\,x^{9}-30\,x^{8}+25\,x^{7}\right)e^{3}+48\,x\right)e^{(-3)}$$

input
```
integrate(1/80*((-44*x^10-120*x^9+99*x^8+240*x^7-175*x^6)*exp(3)-48)/exp(3
),x, algorithm=\
```

output
```
-1/80*((4*x^11 + 12*x^10 - 11*x^9 - 30*x^8 + 25*x^7)*e^3 + 48*x)*e^(-3)
```

3.757.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.08

$$\int \frac{-48+e^3(-175x^6+240x^7+99x^8-120x^9-44x^{10})}{80e^3}\,dx$$
$$= -\frac{x^{11}}{20}-\frac{3x^{10}}{20}+\frac{11x^9}{80}+\frac{3x^8}{8}-\frac{5x^7}{16}-\frac{3x}{5e^3}$$

input
```
integrate(1/80*((-44*x**10-120*x**9+99*x**8+240*x**7-175*x**6)*exp(3)-48)/
exp(3),x)
```

output
```
-x**11/20 - 3*x**10/20 + 11*x**9/80 + 3*x**8/8 - 5*x**7/16 - 3*x*exp(-3)/5
```

3.757.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.03

$$\int \frac{-48+e^3(-175x^6+240x^7+99x^8-120x^9-44x^{10})}{80e^3}\,dx$$
$$= -\frac{1}{80}\left(\left(4\,x^{11}+12\,x^{10}-11\,x^9-30\,x^8+25\,x^7\right)e^3+48\,x\right)e^{(-3)}$$

input
```
integrate(1/80*((-44*x^10-120*x^9+99*x^8+240*x^7-175*x^6)*exp(3)-48)/exp(3
),x, algorithm=\
```

output
```
-1/80*((4*x^11 + 12*x^10 - 11*x^9 - 30*x^8 + 25*x^7)*e^3 + 48*x)*e^(-3)
```

3.757.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.03

$$\int \frac{-48+e^3(-175x^6+240x^7+99x^8-120x^9-44x^{10})}{80e^3}\,dx$$
$$= -\frac{1}{80}\left(\left(4\,x^{11}+12\,x^{10}-11\,x^9-30\,x^8+25\,x^7\right)e^3+48\,x\right)e^{(-3)}$$

input
```
integrate(1/80*((-44*x^10-120*x^9+99*x^8+240*x^7-175*x^6)*exp(3)-48)/exp(3
),x, algorithm=\
```

output
```
-1/80*((4*x^11 + 12*x^10 - 11*x^9 - 30*x^8 + 25*x^7)*e^3 + 48*x)*e^(-3)
```

3.757.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.86

$$\int \frac{-48+e^3(-175x^6+240x^7+99x^8-120x^9-44x^{10})}{80e^3}\,dx$$
$$=-\frac{x^{11}}{20}-\frac{3\,x^{10}}{20}+\frac{11\,x^9}{80}+\frac{3\,x^8}{8}-\frac{5\,x^7}{16}-\frac{3\,\mathrm{e}^{-3}\,x}{5}$$

input
```
int(-exp(-3)*((exp(3)*(175*x^6 - 240*x^7 - 99*x^8 + 120*x^9 + 44*x^10))/80
 + 3/5),x)
```

output
```
(3*x^8)/8 - (5*x^7)/16 - (3*x*exp(-3))/5 + (11*x^9)/80 - (3*x^10)/20 - x^1
1/20
```

3.758 $\int \frac{-24-5x+(-8-2x)\log(4+x)}{4x^3+x^4}\,dx$

3.758.1 Optimal result

Integrand size = 27, antiderivative size = 18

$$\int \frac{-24-5x+(-8-2x)\log(4+x)}{4x^3+x^4}\,dx = e^{2e^5}+\frac{3+\log(4+x)}{x^2}$$

output
```
exp(exp(5))^2+(3+ln(4+x))/x^2
```

3.758.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{-24-5x+(-8-2x)\log(4+x)}{4x^3+x^4}\,dx = \frac{3}{x^2}+\frac{\log(4+x)}{x^2}$$

input
```
Integrate[(-24 - 5*x + (-8 - 2*x)*Log[4 + x])/(4*x^3 + x^4),x]
```

output
```
3/x^2 + Log[4 + x]/x^2
```

3.758.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-5x+(-2x-8)\log(x+4)-24}{x^4+4x^3}\,dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{-5x+(-2x-8)\log(x+4)-24}{x^3(x+4)}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{-5x-24}{x^3(x+4)}-\frac{2\log(x+4)}{x^3}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{3}{x^2}+\frac{\log(x+4)}{x^2}$$

input
```
Int[(-24 - 5*x + (-8 - 2*x)*Log[4 + x])/(4*x^3 + x^4),x]
```

output
```
3/x^2 + Log[4 + x]/x^2
```

3.758.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.758.4 Maple [A] (verified)

Time = 1.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.61

method	result	size
norman	$\frac{3+\ln(4+x)}{x^2}$	11
parallelrisch	$\frac{3+\ln(4+x)}{x^2}$	11
risch	$\frac{\ln(4+x)}{x^2}+\frac{3}{x^2}$	15
derivativedivides	$-\frac{\ln(4+x)(4+x)(x-4)}{16x^2}+\frac{3}{x^2}+\frac{\ln(4+x)}{16}$	28
default	$-\frac{\ln(4+x)(4+x)(x-4)}{16x^2}+\frac{3}{x^2}+\frac{\ln(4+x)}{16}$	28
parts	$-\frac{\ln(4+x)(4+x)(x-4)}{16x^2}+\frac{3}{x^2}+\frac{\ln(4+x)}{16}$	28

input
```
int(((-2*x-8)*ln(4+x)-5*x-24)/(x^4+4*x^3),x,method=_RETURNVERBOSE)
```

output
```
(3+ln(4+x))/x^2
```

3.758.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.56

$$\int \frac{-24-5x+(-8-2x)\log(4+x)}{4x^3+x^4}\,dx=\frac{\log(x+4)+3}{x^2}$$

input
```
integrate(((-2*x-8)*log(4+x)-5*x-24)/(x^4+4*x^3),x, algorithm=\
```

output
```
(log(x + 4) + 3)/x^2
```

3.758.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

$$\int \frac{-24-5x+(-8-2x)\log(4+x)}{4x^3+x^4}\,dx=\frac{\log(x+4)}{x^2}+\frac{3}{x^2}$$

input
```
integrate(((-2*x-8)*ln(4+x)-5*x-24)/(x**4+4*x**3),x)
```

output
```
log(x + 4)/x**2 + 3/x**2
```

3.758.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. $2(16) = 32$.

Time = 0.25 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.17

$$\int \frac{-24-5x+(-8-2x)\log(4+x)}{4x^3+x^4}\,dx = -\frac{(x^2-16)\log(x+4)-4x}{16x^2} - \frac{3(x-2)}{2x^2} + \frac{5}{4x} + \frac{1}{16}\log(x+4)$$

input
```
integrate(((-2*x-8)*log(4+x)-5*x-24)/(x^4+4*x^3),x, algorithm=\
```

output
```
-1/16*((x^2 - 16)*log(x + 4) - 4*x)/x^2 - 3/2*(x - 2)/x^2 + 5/4/x + 1/16*l
og(x + 4)
```

3.758.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{-24-5x+(-8-2x)\log(4+x)}{4x^3+x^4}\,dx = \frac{\log(x+4)}{x^2} + \frac{3}{x^2}$$

input
```
integrate(((-2*x-8)*log(4+x)-5*x-24)/(x^4+4*x^3),x, algorithm=\
```

output
```
log(x + 4)/x^2 + 3/x^2
```

3.758.9 Mupad [B] (verification not implemented)

Time = 14.11 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.56

$$\int \frac{-24-5x+(-8-2x)\log(4+x)}{4x^3+x^4}\,dx = \frac{\ln(x+4)+3}{x^2}$$

input
```
int(-(5*x + log(x + 4)*(2*x + 8) + 24)/(4*x^3 + x^4),x)
```

output
```
(log(x + 4) + 3)/x^2
```

3.759 $\int \frac{1+(2x+12x^2+16x^3+5x^4)\log(x)+\log(x)\log(\log(x))}{\log(x)}\,dx$

3.759.1 Optimal result

Integrand size = 35, antiderivative size = 18

$$\int \frac{1+(2x+12x^2+16x^3+5x^4)\log(x)+\log(x)\log(\log(x))}{\log(x)}\,dx = -6+x\left(x+x^2(2+x)^2+\log(\log(x))\right)$$

output
```
x*(x^2*(2+x)^2+ln(ln(x))+x)-6
```

3.759.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{1+(2x+12x^2+16x^3+5x^4)\log(x)+\log(x)\log(\log(x))}{\log(x)}\,dx = x^2+4x^3+4x^4+x^5+x\log(\log(x))$$

input
```
Integrate[(1 + (2*x + 12*x^2 + 16*x^3 + 5*x^4)*Log[x] + Log[x]*Log[Log[x]]
)/Log[x],x]
```

output
```
x^2 + 4*x^3 + 4*x^4 + x^5 + x*Log[Log[x]]
```

3.759.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.057, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(5x^4+16x^3+12x^2+2x)\log(x)+\log(\log(x))\log(x)+1}{\log(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{5x^4\log(x)+16x^3\log(x)+12x^2\log(x)+2x\log(x)+1}{\log(x)}+\log(\log(x))\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^5+4x^4+4x^3+x^2+x\log(\log(x))$$

input
```
Int[(1 + (2*x + 12*x^2 + 16*x^3 + 5*x^4)*Log[x] + Log[x]*Log[Log[x]])/Log[
x],x]
```

output
```
x^2 + 4*x^3 + 4*x^4 + x^5 + x*Log[Log[x]]
```

3.759.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.759.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

method	result	size
default	$x^{2}+4x^{3}+4x^{4}+x^{5}+x\ln\left(\ln\left(x\right)\right)$	23
risch	$x^{2}+4x^{3}+4x^{4}+x^{5}+x\ln\left(\ln\left(x\right)\right)$	23
parallelrisch	$x^{2}+4x^{3}+4x^{4}+x^{5}+x\ln\left(\ln\left(x\right)\right)$	23
parts	$x^{2}+4x^{3}+4x^{4}+x^{5}+x\ln\left(\ln\left(x\right)\right)$	23

input
```
int((ln(x)*ln(ln(x))+(5*x^4+16*x^3+12*x^2+2*x)*ln(x)+1)/ln(x),x,method=_RE
TURNVERBOSE)
```

output
```
x^2+4*x^3+4*x^4+x^5+x*ln(ln(x))
```

3.759.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{1+(2x+12x^2+16x^3+5x^4)\log(x)+\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$= x^5+4\,x^4+4\,x^3+x^2+x\log\left(\log\left(x\right)\right)$$

input
```
integrate((log(x)*log(log(x))+(5*x^4+16*x^3+12*x^2+2*x)*log(x)+1)/log(x),x
, algorithm=\
```

output
```
x^5 + 4*x^4 + 4*x^3 + x^2 + x*log(log(x))
```

3.759.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{1+(2x+12x^2+16x^3+5x^4)\log(x)+\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$= x^5+4x^4+4x^3+x^2+x\log\left(\log\left(x\right)\right)$$

input
```
integrate((ln(x)*ln(ln(x))+(5*x**4+16*x**3+12*x**2+2*x)*ln(x)+1)/ln(x),x)
```

output
```
x**5 + 4*x**4 + 4*x**3 + x**2 + x*log(log(x))
```

3.759.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{1+(2x+12x^2+16x^3+5x^4)\log(x)+\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$= x^5+4\,x^4+4\,x^3+x^2+x\log\left(\log\left(x\right)\right)$$

input
```
integrate((log(x)*log(log(x))+(5*x^4+16*x^3+12*x^2+2*x)*log(x)+1)/log(x),x
, algorithm=\
```

output
```
x^5 + 4*x^4 + 4*x^3 + x^2 + x*log(log(x))
```

3.759.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{1+(2x+12x^2+16x^3+5x^4)\log(x)+\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$= x^5+4\,x^4+4\,x^3+x^2+x\log\left(\log\left(x\right)\right)$$

input
```
integrate((log(x)*log(log(x))+(5*x^4+16*x^3+12*x^2+2*x)*log(x)+1)/log(x),x
, algorithm=\
```

output
```
x^5 + 4*x^4 + 4*x^3 + x^2 + x*log(log(x))
```

3.759.9 Mupad [B] (verification not implemented)

Time = 14.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{1+(2x+12x^2+16x^3+5x^4)\log(x)+\log(x)\log(\log(x))}{\log(x)}\,dx$$
$$= x\,\ln\left(\ln\left(x\right)\right)+x^2+4\,x^3+4\,x^4+x^5$$

input
```
int((log(x)*(2*x + 12*x^2 + 16*x^3 + 5*x^4) + log(log(x))*log(x) + 1)/log(
x),x)
```

output
```
x*log(log(x)) + x^2 + 4*x^3 + 4*x^4 + x^5
```

3.760 $\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}(\cdots}{\cdots}$

3.760.1 Optimal result

Integrand size = 316, antiderivative size = 26

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}\left(-64+320x-400x^2\right)+e^{-\frac{9x}{-2+\cdots}}\cdots}{\cdots}$$

$$=\frac{-1+\left(-4+2e^{\frac{3x}{2-5x}}+x\right)^4}{\log(x)}$$

output
```
((2*exp(3/(-5*x+2)*x)+x-4)^4-1)/ln(x)
```

3.760.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 92 vs. 2(26) = 52.

Time = 0.43 (sec) , antiderivative size = 92, normalized size of antiderivative = 3.54

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}\left(-64+320x-400x^2\right)+e^{-\frac{9x}{-2+\cdots}}\cdots}{\cdots}$$

$$=\frac{255+16e^{\frac{12x}{2-5x}}+32e^{\frac{9x}{2-5x}}(-4+x)+24e^{\frac{6x}{2-5x}}(-4+x)^2+8e^{\frac{3x}{2-5x}}(-4+x)^3-256x+96x^2-16x^3+x^4}{\log(x)}$$

3.760.

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}\left(-64+320x-400x^2\right)+e^{-\frac{9x}{-2+5x}}\left(512-2688x+3840x^2-800x^3\right)+e^{-\frac{6x}{-2+5x}}\left(\cdots\right.}{\cdots}$$

input
```
Integrate[(-1020 + 6124*x - 11879*x^2 + 8384*x^3 - 2724*x^4 + 420*x^5 - 25
*x^6 + (-64 + 320*x - 400*x^2)/E^((12*x)/(-2 + 5*x)) + (512 - 2688*x + 384
0*x^2 - 800*x^3)/E^((9*x)/(-2 + 5*x)) + (-1536 + 8448*x - 13536*x^2 + 5280
*x^3 - 600*x^4)/E^((6*x)/(-2 + 5*x)) + (2048 - 11776*x + 20864*x^2 - 11552
*x^3 + 2560*x^4 - 200*x^5)/E^((3*x)/(-2 + 5*x)) + (-1024*x + (384*x)/E^((1
2*x)/(-2 + 5*x)) + 5888*x^2 - 10432*x^3 + 5776*x^4 - 1280*x^5 + 100*x^6 +
(-2176*x - 64*x^2 + 800*x^3)/E^((9*x)/(-2 + 5*x)) + (3840*x + 1728*x^2 - 5
472*x^3 + 1200*x^4)/E^((6*x)/(-2 + 5*x)) + (-1536*x - 6144*x^2 + 12960*x^3
 - 5232*x^4 + 600*x^5)/E^((3*x)/(-2 + 5*x)))*Log[x])/((4*x - 20*x^2 + 25*x
^3)*Log[x]^2),x]
```

output
```
(255 + 16*E^((12*x)/(2 - 5*x)) + 32*E^((9*x)/(2 - 5*x))*(-4 + x) + 24*E^((
6*x)/(2 - 5*x))*(-4 + x)^2 + 8*E^((3*x)/(2 - 5*x))*(-4 + x)^3 - 256*x + 96
*x^2 - 16*x^3 + x^4)/Log[x]
```

3.760.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-25x^6+420x^5-2724x^4+8384x^3-11879x^2+e^{-\frac{12x}{5x-2}}\left(-400x^2+320x-64\right)+e^{-\frac{9x}{5x-2}}\left(-800x^3+3840x^2-\right.}{}$$

$\downarrow$ 2026

$$\int \frac{-25x^6+420x^5-2724x^4+8384x^3-11879x^2+e^{-\frac{12x}{5x-2}}\left(-400x^2+320x-64\right)+e^{-\frac{9x}{5x-2}}\left(-800x^3+3840x^2-\right.}{}$$

$\downarrow$ 7239

$$\int \frac{\frac{4\left((2-5x)^2+12e^{\frac{3x}{2-5x}}\right)\left(x+2e^{\frac{3x}{2-5x}}-4\right)^3\log(x)}{(2-5x)^2}-\frac{x^4-16x^3+96x^2-256x+16e^{\frac{12x}{2-5x}}+8e^{\frac{3x}{2-5x}}(x-4)^3+24e^{\frac{6x}{2-5x}}(x-4)^2+32e^{\frac{9x}{2-5x}}(x-4)+2}{x}}{\log^2(x)}$$

$\downarrow$ 7293

$$\int \left(-\frac{16e^{\frac{12x}{2-5x}}\left(25x^2-20x-24x\log(x)+4\right)}{x(5x-2)^2\log^2(x)}+\frac{8e^{\frac{3x}{2-5x}}(x-4)^2\left(-25x^3+75x^3\log(x)+120x^2-54x^2\log(x)-84\right.}{x(5x-2)^2\log^2(x)}\right.$$

$\downarrow$ 2009

3.760.

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}\left(-64+320x-400x^2\right)+e^{-\frac{9x}{-2+5x}}\left(512-2688x+3840x^2-800x^3\right)+e^{-\frac{6x}{-2+5x}}\left(\right.}{}$$

$$-8\int \frac{e^{\frac{3x}{2-5x}}x^2}{\log^2(x)}dx+24\int \frac{e^{\frac{3x}{2-5x}}x^2}{\log(x)}dx+\int \frac{-x^4+16x^3-96x^2+256x-255}{x\log^2(x)}dx-384\int \frac{e^{\frac{3x}{2-5x}}}{\log^2(x)}dx+$$
$$192\int \frac{e^{\frac{6x}{2-5x}}}{\log^2(x)}dx-32\int \frac{e^{\frac{9x}{2-5x}}}{\log^2(x)}dx+512\int \frac{e^{\frac{3x}{2-5x}}}{x\log^2(x)}dx-384\int \frac{e^{\frac{6x}{2-5x}}}{x\log^2(x)}dx+128\int \frac{e^{\frac{9x}{2-5x}}}{x\log^2(x)}dx+$$
$$96\int \frac{e^{\frac{3x}{2-5x}}x}{\log^2(x)}dx-24\int \frac{e^{\frac{6x}{2-5x}}x}{\log^2(x)}dx+\frac{45312}{125}\int \frac{e^{\frac{3x}{2-5x}}}{\log(x)}dx-\frac{4512}{25}\int \frac{e^{\frac{6x}{2-5x}}}{\log(x)}dx+32\int \frac{e^{\frac{9x}{2-5x}}}{\log(x)}dx-$$
$$\frac{4752}{25}\int \frac{e^{\frac{3x}{2-5x}}x}{\log(x)}dx+48\int \frac{e^{\frac{6x}{2-5x}}x}{\log(x)}dx-\frac{279936}{125}\int \frac{e^{\frac{3x}{2-5x}}}{(5x-2)^2\log(x)}dx+\frac{93312}{25}\int \frac{e^{\frac{6x}{2-5x}}}{(5x-2)^2\log(x)}dx-$$
$$\frac{10368}{5}\int \frac{e^{\frac{9x}{2-5x}}}{(5x-2)^2\log(x)}dx+\frac{46656}{125}\int \frac{e^{\frac{3x}{2-5x}}}{(5x-2)\log(x)}dx-\frac{10368}{25}\int \frac{e^{\frac{6x}{2-5x}}}{(5x-2)\log(x)}dx+$$
$$\frac{576}{5}\int \frac{e^{\frac{9x}{2-5x}}}{(5x-2)\log(x)}dx+192\,\text{ExpIntegralEi}(2\log(x))-48\,\text{ExpIntegralEi}(3\log(x))+$$
$$4\,\text{ExpIntegralEi}(4\log(x))-256\,\text{LogIntegral}(x)+\frac{32e^{\frac{12x}{2-5x}}}{(2-5x)^2\left(\frac{5x}{(2-5x)^2}+\frac{1}{2-5x}\right)\log(x)}$$

input
```
Int[(-1020 + 6124*x - 11879*x^2 + 8384*x^3 - 2724*x^4 + 420*x^5 - 25*x^6 +
 (-64 + 320*x - 400*x^2)/E^((12*x)/(-2 + 5*x)) + (512 - 2688*x + 3840*x^2
- 800*x^3)/E^((9*x)/(-2 + 5*x)) + (-1536 + 8448*x - 13536*x^2 + 5280*x^3 -
 600*x^4)/E^((6*x)/(-2 + 5*x)) + (2048 - 11776*x + 20864*x^2 - 11552*x^3 +
 2560*x^4 - 200*x^5)/E^((3*x)/(-2 + 5*x)) + (-1024*x + (384*x)/E^((12*x)/(
-2 + 5*x)) + 5888*x^2 - 10432*x^3 + 5776*x^4 - 1280*x^5 + 100*x^6 + (-2176
*x - 64*x^2 + 800*x^3)/E^((9*x)/(-2 + 5*x)) + (3840*x + 1728*x^2 - 5472*x^
3 + 1200*x^4)/E^((6*x)/(-2 + 5*x)) + (-1536*x - 6144*x^2 + 12960*x^3 - 523
2*x^4 + 600*x^5)/E^((3*x)/(-2 + 5*x)))*Log[x])/((4*x - 20*x^2 + 25*x^3)*Lo
g[x]^2),x]
```

output
```
$Aborted
```

3.760.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

3.760.

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}\left(-64+320x-400x^2\right)+e^{-\frac{9x}{-2+5x}}\left(512-2688x+3840x^2-800x^3\right)+e^{-\frac{6x}{-2+5x}}\left(\ldots\right.}{}$$

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.760.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 165 vs. $2(25) = 50$.

Time = 10.95 (sec) , antiderivative size = 166, normalized size of antiderivative = 6.38

method	result
risch	$\frac{x^4+8\,\mathrm{e}^{-\frac{3x}{5x-2}}x^3+24\,\mathrm{e}^{-\frac{6x}{5x-2}}x^2+32\,\mathrm{e}^{-\frac{9x}{5x-2}}x+16\,\mathrm{e}^{-\frac{12x}{5x-2}}-16x^3-96\,\mathrm{e}^{-\frac{3x}{5x-2}}x^2-192\,\mathrm{e}^{-\frac{6x}{5x-2}}x-128\,\mathrm{e}^{-\frac{9x}{5x-2}}+96x^2+384x\,\mathrm{e}}{\ln(x)}$
parallelrisch	$\frac{1000x^4+8000\,\mathrm{e}^{-\frac{3x}{5x-2}}x^3+24000\,\mathrm{e}^{-\frac{6x}{5x-2}}x^2+32000\,\mathrm{e}^{-\frac{9x}{5x-2}}x+16000\,\mathrm{e}^{-\frac{12x}{5x-2}}-16000x^3-96000\,\mathrm{e}^{-\frac{3x}{5x-2}}x^2-192000\,\mathrm{e}^{-\frac{6x}{5x-2}}x}{1000\ln(x)}$

input
```
int(((384*x*exp(-3*x/(5*x-2))^4+(800*x^3-64*x^2-2176*x)*exp(-3*x/(5*x-2))^
3+(1200*x^4-5472*x^3+1728*x^2+3840*x)*exp(-3*x/(5*x-2))^2+(600*x^5-5232*x^
4+12960*x^3-6144*x^2-1536*x)*exp(-3*x/(5*x-2))+100*x^6-1280*x^5+5776*x^4-1
0432*x^3+5888*x^2-1024*x)*ln(x)+(-400*x^2+320*x-64)*exp(-3*x/(5*x-2))^4+(-
800*x^3+3840*x^2-2688*x+512)*exp(-3*x/(5*x-2))^3+(-600*x^4+5280*x^3-13536*
x^2+8448*x-1536)*exp(-3*x/(5*x-2))^2+(-200*x^5+2560*x^4-11552*x^3+20864*x^
2-11776*x+2048)*exp(-3*x/(5*x-2))-25*x^6+420*x^5-2724*x^4+8384*x^3-11879*x
^2+6124*x-1020)/(25*x^3-20*x^2+4*x)/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
(x^4+8*exp(-3*x/(5*x-2))*x^3+24*exp(-6*x/(5*x-2))*x^2+32*exp(-9*x/(5*x-2))
*x+16*exp(-12*x/(5*x-2))-16*x^3-96*exp(-3*x/(5*x-2))*x^2-192*exp(-6*x/(5*x
-2))*x-128*exp(-9*x/(5*x-2))+96*x^2+384*x*exp(-3*x/(5*x-2))+384*exp(-6*x/(
5*x-2))-256*x-512*exp(-3*x/(5*x-2))+255)/ln(x)
```

3.760.

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}(-64+320x-400x^2)+e^{-\frac{9x}{-2+5x}}(512-2688x+3840x^2-800x^3)+e^{-\frac{6x}{-2+5x}}(}{}$$

3.760.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 99 vs. $2(25) = 50$.

Time = 0.27 (sec) , antiderivative size = 99, normalized size of antiderivative = 3.81

$$\int \frac{-1020 + 6124x - 11879x^2 + 8384x^3 - 2724x^4 + 420x^5 - 25x^6 + e^{-\frac{12x}{-2+5x}}(-64 + 320x - 400x^2) + e^{-\frac{9x}{-2+}}}{}$$

$$= \frac{x^4 - 16\,x^3 + 96\,x^2 + 8\,(x^3 - 12\,x^2 + 48\,x - 64)e^{\left(-\frac{3\,x}{5\,x-2}\right)} + 24\,(x^2 - 8\,x + 16)e^{\left(-\frac{6\,x}{5\,x-2}\right)} + 32\,(x-4)e^{\left(-\frac{9\,x}{5\,x-}\right.}}{\log(x)}$$

input
```
integrate(((384*x*exp(-3*x/(5*x-2))^4+(800*x^3-64*x^2-2176*x)*exp(-3*x/(5*
x-2))^3+(1200*x^4-5472*x^3+1728*x^2+3840*x)*exp(-3*x/(5*x-2))^2+(600*x^5-5
232*x^4+12960*x^3-6144*x^2-1536*x)*exp(-3*x/(5*x-2))+100*x^6-1280*x^5+5776
*x^4-10432*x^3+5888*x^2-1024*x)*log(x)+(-400*x^2+320*x-64)*exp(-3*x/(5*x-2
))^4+(-800*x^3+3840*x^2-2688*x+512)*exp(-3*x/(5*x-2))^3+(-600*x^4+5280*x^3
-13536*x^2+8448*x-1536)*exp(-3*x/(5*x-2))^2+(-200*x^5+2560*x^4-11552*x^3+2
0864*x^2-11776*x+2048)*exp(-3*x/(5*x-2))-25*x^6+420*x^5-2724*x^4+8384*x^3-
11879*x^2+6124*x-1020)/(25*x^3-20*x^2+4*x)/log(x)^2,x, algorithm=\
```

output
```
(x^4 - 16*x^3 + 96*x^2 + 8*(x^3 - 12*x^2 + 48*x - 64)*e^(-3*x/(5*x - 2)) +
 24*(x^2 - 8*x + 16)*e^(-6*x/(5*x - 2)) + 32*(x - 4)*e^(-9*x/(5*x - 2)) -
256*x + 16*e^(-12*x/(5*x - 2)) + 255)/log(x)
```

3.760.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 150 vs. $2(20) = 40$.

Time = 0.43 (sec) , antiderivative size = 150, normalized size of antiderivative = 5.77

$$\int \frac{-1020 + 6124x - 11879x^2 + 8384x^3 - 2724x^4 + 420x^5 - 25x^6 + e^{-\frac{12x}{-2+5x}}(-64 + 320x - 400x^2) + e^{-\frac{9x}{-2+}}}{}$$

$$= \frac{\left(32x\log(x)^3 - 128\log(x)^3\right)e^{-\frac{9x}{5x-2}} + \left(24x^2\log(x)^3 - 192x\log(x)^3 + 384\log(x)^3\right)e^{-\frac{6x}{5x-2}} + \left(8x^3\log(x)^3\right.}{\log(x)^4}$$
$$+ \frac{x^4 - 16x^3 + 96x^2 - 256x + 255}{\log(x)}$$

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}(-64+320x-400x^2)+e^{-\frac{9x}{-2+5x}}(512-2688x+3840x^2-800x^3)+e^{-\frac{6x}{-2+5x}}(}{}$$

input
```
integrate(((384*x*exp(-3*x/(5*x-2))**4+(800*x**3-64*x**2-2176*x)*exp(-3*x/
(5*x-2))**3+(1200*x**4-5472*x**3+1728*x**2+3840*x)*exp(-3*x/(5*x-2))**2+(6
00*x**5-5232*x**4+12960*x**3-6144*x**2-1536*x)*exp(-3*x/(5*x-2))+100*x**6-
1280*x**5+5776*x**4-10432*x**3+5888*x**2-1024*x)*ln(x)+(-400*x**2+320*x-64
)*exp(-3*x/(5*x-2))**4+(-800*x**3+3840*x**2-2688*x+512)*exp(-3*x/(5*x-2))*
*3+(-600*x**4+5280*x**3-13536*x**2+8448*x-1536)*exp(-3*x/(5*x-2))**2+(-200
*x**5+2560*x**4-11552*x**3+20864*x**2-11776*x+2048)*exp(-3*x/(5*x-2))-25*x
**6+420*x**5-2724*x**4+8384*x**3-11879*x**2+6124*x-1020)/(25*x**3-20*x**2+
4*x)/ln(x)**2,x)
```

output
```
((32*x*log(x)**3 - 128*log(x)**3)*exp(-9*x/(5*x - 2)) + (24*x**2*log(x)**3
 - 192*x*log(x)**3 + 384*log(x)**3)*exp(-6*x/(5*x - 2)) + (8*x**3*log(x)**
3 - 96*x**2*log(x)**3 + 384*x*log(x)**3 - 512*log(x)**3)*exp(-3*x/(5*x - 2
)) + 16*exp(-12*x/(5*x - 2))*log(x)**3)/log(x)**4 + (x**4 - 16*x**3 + 96*x
**2 - 256*x + 255)/log(x)
```

3.760.7 Maxima [F]

$$\int \frac{-1020 + 6124x - 11879x^2 + 8384x^3 - 2724x^4 + 420x^5 - 25x^6 + e^{-\frac{12x}{-2+5x}}(-64 + 320x - 400x^2) + e^{-\frac{9x}{-2+}}}{}$$

$$= \int -\frac{25\,x^6 - 420\,x^5 + 2724\,x^4 - 8384\,x^3 + 11879\,x^2 + 8\,(25\,x^5 - 320\,x^4 + 1444\,x^3 - 2608\,x^2 + 1472\,x - 2}{}$$

input
```
integrate(((384*x*exp(-3*x/(5*x-2))^4+(800*x^3-64*x^2-2176*x)*exp(-3*x/(5*
x-2))^3+(1200*x^4-5472*x^3+1728*x^2+3840*x)*exp(-3*x/(5*x-2))^2+(600*x^5-5
232*x^4+12960*x^3-6144*x^2-1536*x)*exp(-3*x/(5*x-2))+100*x^6-1280*x^5+5776
*x^4-10432*x^3+5888*x^2-1024*x)*log(x)+(-400*x^2+320*x-64)*exp(-3*x/(5*x-2
))^4+(-800*x^3+3840*x^2-2688*x+512)*exp(-3*x/(5*x-2))^3+(-600*x^4+5280*x^3
-13536*x^2+8448*x-1536)*exp(-3*x/(5*x-2))^2+(-200*x^5+2560*x^4-11552*x^3+2
0864*x^2-11776*x+2048)*exp(-3*x/(5*x-2))-25*x^6+420*x^5-2724*x^4+8384*x^3-
11879*x^2+6124*x-1020)/(25*x^3-20*x^2+4*x)/log(x)^2,x, algorithm=\
```

3.760.

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}(-64+320x-400x^2)+e^{-\frac{9x}{-2+5x}}(512-2688x+3840x^2-800x^3)+e^{-\frac{6x}{-2+5x}}(}{}$$

output
```
(x^4*e^(12/5) - 16*x^3*e^(12/5) + 96*x^2*e^(12/5) - 256*x*e^(12/5) + 255*e
^(12/5) + 16*e^(-24/5/(5*x - 2)))*e^(-12/5)/log(x) + integrate(-8*(25*x^5*
e^(2/5) - 320*x^4*e^(2/5) + 1444*x^3*e^(2/5) - 2608*x^2*e^(2/5) + 1472*x*e
^(2/5) - 3*(25*x^5*e^(2/5) - 218*x^4*e^(2/5) + 540*x^3*e^(2/5) - 256*x^2*e
^(2/5) - 64*x*e^(2/5))*log(x) - 256*e^(2/5))*e^(-6/5/(5*x - 2))/((25*x^3*e
 - 20*x^2*e + 4*x*e)*log(x)^2), x) + integrate(-24*(25*x^4 - 220*x^3 + 564
*x^2 - 2*(25*x^4 - 114*x^3 + 36*x^2 + 80*x)*log(x) - 352*x + 64)*e^(-12/5/
(5*x - 2))/((25*x^3*e^(6/5) - 20*x^2*e^(6/5) + 4*x*e^(6/5))*log(x)^2), x)
+ integrate(-32*(25*x^3*e^(1/5) - 120*x^2*e^(1/5) + 84*x*e^(1/5) - (25*x^3
*e^(1/5) - 2*x^2*e^(1/5) - 68*x*e^(1/5))*log(x) - 16*e^(1/5))*e^(-18/5/(5*
x - 2))/((25*x^3*e^2 - 20*x^2*e^2 + 4*x*e^2)*log(x)^2), x)
```

3.760.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 165 vs. $2(25) = 50$.

Time = 0.33 (sec) , antiderivative size = 165, normalized size of antiderivative = 6.35

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}(-64+320x-400x^2)+e^{-\frac{9x}{-2+}}}{}$$

$$= \frac{x^4+8\,x^3e^{\left(-\frac{3\,x}{5\,x-2}\right)}-16\,x^3-96\,x^2e^{\left(-\frac{3\,x}{5\,x-2}\right)}+24\,x^2e^{\left(-\frac{6\,x}{5\,x-2}\right)}+96\,x^2+384\,xe^{\left(-\frac{3\,x}{5\,x-2}\right)}-192\,xe^{\left(-\frac{6\,x}{5\,x-2}\right)}+3}{\log\left(x\right)}$$

input
```
integrate(((384*x*exp(-3*x/(5*x-2))^4+(800*x^3-64*x^2-2176*x)*exp(-3*x/(5*
x-2))^3+(1200*x^4-5472*x^3+1728*x^2+3840*x)*exp(-3*x/(5*x-2))^2+(600*x^5-5
232*x^4+12960*x^3-6144*x^2-1536*x)*exp(-3*x/(5*x-2))+100*x^6-1280*x^5+5776
*x^4-10432*x^3+5888*x^2-1024*x)*log(x)+(-400*x^2+320*x-64)*exp(-3*x/(5*x-2
))^4+(-800*x^3+3840*x^2-2688*x+512)*exp(-3*x/(5*x-2))^3+(-600*x^4+5280*x^3
-13536*x^2+8448*x-1536)*exp(-3*x/(5*x-2))^2+(-200*x^5+2560*x^4-11552*x^3+2
0864*x^2-11776*x+2048)*exp(-3*x/(5*x-2))-25*x^6+420*x^5-2724*x^4+8384*x^3-
11879*x^2+6124*x-1020)/(25*x^3-20*x^2+4*x)/log(x)^2,x, algorithm=\
```

output
```
(x^4 + 8*x^3*e^(-3*x/(5*x - 2)) - 16*x^3 - 96*x^2*e^(-3*x/(5*x - 2)) + 24*
x^2*e^(-6*x/(5*x - 2)) + 96*x^2 + 384*x*e^(-3*x/(5*x - 2)) - 192*x*e^(-6*x
/(5*x - 2)) + 32*x*e^(-9*x/(5*x - 2)) - 256*x - 512*e^(-3*x/(5*x - 2)) + 3
84*e^(-6*x/(5*x - 2)) - 128*e^(-9*x/(5*x - 2)) + 16*e^(-12*x/(5*x - 2)) +
255)/log(x)
```

3.760.

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}(-64+320x-400x^2)+e^{-\frac{9x}{-2+5x}}(512-2688x+3840x^2-800x^3)+e^{-\frac{6x}{-2+5x}}(}{}$$

3.760.9 Mupad [B] (verification not implemented)

Time = 14.67 (sec) , antiderivative size = 150, normalized size of antiderivative = 5.77

$$\int \frac{-1020 + 6124x - 11879x^2 + 8384x^3 - 2724x^4 + 420x^5 - 25x^6 + e^{-\frac{12x}{-2+5x}}(-64 + 320x - 400x^2) + e^{-\frac{9x}{-2+}}}{}$$

$$= \frac{16\,\mathrm{e}^{-\frac{12\,x}{5\,x-2}}}{\ln(x)} - \frac{256\,x - 96\,x^2 + 16\,x^3 - x^4 + 4\,x\,\ln(x)\,(x-4)^3 - 255}{\ln(x)} - 256\,x + 192\,x^2 - 48\,x^3 + 4\,x^4 + \frac{\mathrm{e}^{-\frac{3\,x}{5\,x-2}}\,(8\,x^3 - 96\,x^2 + 384\,x - 512)}{\ln(x)} + \frac{\mathrm{e}^{-\frac{9\,x}{5\,x-2}}\,(32\,x - 128)}{\ln(x)} + \frac{\mathrm{e}^{-\frac{6\,x}{5\,x-2}}\,(24\,x^2 - 192\,x + 384)}{\ln(x)}$$

input
```
int(-(exp(-(6*x)/(5*x - 2))*(13536*x^2 - 8448*x - 5280*x^3 + 600*x^4 + 153
6) - 6124*x + exp(-(3*x)/(5*x - 2))*(11776*x - 20864*x^2 + 11552*x^3 - 256
0*x^4 + 200*x^5 - 2048) + log(x)*(1024*x - exp(-(6*x)/(5*x - 2))*(3840*x +
 1728*x^2 - 5472*x^3 + 1200*x^4) + exp(-(3*x)/(5*x - 2))*(1536*x + 6144*x^
2 - 12960*x^3 + 5232*x^4 - 600*x^5) - 384*x*exp(-(12*x)/(5*x - 2)) + exp(-
(9*x)/(5*x - 2))*(2176*x + 64*x^2 - 800*x^3) - 5888*x^2 + 10432*x^3 - 5776
*x^4 + 1280*x^5 - 100*x^6) + exp(-(12*x)/(5*x - 2))*(400*x^2 - 320*x + 64)
 + exp(-(9*x)/(5*x - 2))*(2688*x - 3840*x^2 + 800*x^3 - 512) + 11879*x^2 -
 8384*x^3 + 2724*x^4 - 420*x^5 + 25*x^6 + 1020)/(log(x)^2*(4*x - 20*x^2 +
25*x^3)),x)
```

output
```
(16*exp(-(12*x)/(5*x - 2)))/log(x) - (256*x - 96*x^2 + 16*x^3 - x^4 + 4*x*
log(x)*(x - 4)^3 - 255)/log(x) - 256*x + 192*x^2 - 48*x^3 + 4*x^4 + (exp(-
(3*x)/(5*x - 2))*(384*x - 96*x^2 + 8*x^3 - 512))/log(x) + (exp(-(9*x)/(5*x
 - 2))*(32*x - 128))/log(x) + (exp(-(6*x)/(5*x - 2))*(24*x^2 - 192*x + 384
))/log(x)
```

3.760.

$$\int \frac{-1020+6124x-11879x^2+8384x^3-2724x^4+420x^5-25x^6+e^{-\frac{12x}{-2+5x}}(-64+320x-400x^2)+e^{-\frac{9x}{-2+5x}}(512-2688x+3840x^2-800x^3)+e^{-\frac{6x}{-2+5x}}(}{}$$

3.761 $\int \frac{72x^2\log(x)+e^2(400x+80x^2)\log^2(x)+(-360x-72x^2+(720x+144x^2)}{(25+5x)\log^2(x)}$

3.761.1 Optimal result

Integrand size = 63, antiderivative size = 25

$$\int \frac{72x^2\log(x)+e^2(400x+80x^2)\log^2(x)+(-360x-72x^2+(720x+144x^2)\log(x))\log(5+x)}{(25+5x)\log^2(x)}\,dx = 8\left(e^2x^2+\frac{9x^2\log(5+x)}{5\log(x)}\right)$$

output
```
8*x^2*exp(2)+72/5*x^2/ln(x)*ln(5+x)
```

3.761.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{72x^2\log(x)+e^2(400x+80x^2)\log^2(x)+(-360x-72x^2+(720x+144x^2)\log(x))\log(5+x)}{(25+5x)\log^2(x)}\,dx = \frac{8}{5}\left(5e^2x^2+\frac{9x^2\log(5+x)}{\log(x)}\right)$$

input
```
Integrate[(72*x^2*Log[x] + E^2*(400*x + 80*x^2)*Log[x]^2 + (-360*x - 72*x^
2 + (720*x + 144*x^2)*Log[x])*Log[5 + x])/((25 + 5*x)*Log[x]^2),x]
```

output
```
(8*(5*E^2*x^2 + (9*x^2*Log[5 + x])/Log[x]))/5
```

3.761.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2 (80x^2 + 400x) \log^2(x) + 72x^2 \log(x) + (-72x^2 + (144x^2 + 720x) \log(x) - 360x) \log(x + 5)}{(5x + 25) \log^2(x)} dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{72x(2\log(x) - 1) \log(x + 5)}{5\log^2(x)} + \frac{8x(9x + 10e^2 x\log(x) + 50e^2 \log(x))}{5(x + 5)\log(x)}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{72}{5}\int \frac{x^2}{(x + 5)\log(x)}dx - \frac{72}{5}\int \frac{x\log(x + 5)}{\log^2(x)}dx + \frac{144}{5}\int \frac{x\log(x + 5)}{\log(x)}dx + 8e^2x^2$$

input
```
Int[(72*x^2*Log[x] + E^2*(400*x + 80*x^2)*Log[x]^2 + (-360*x - 72*x^2 + (7
20*x + 144*x^2)*Log[x])*Log[5 + x])/((25 + 5*x)*Log[x]^2),x]
```

output
```
$Aborted
```

3.761.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.761.4 Maple [A] (verified)

Time = 4.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

method	result	size
risch	$8x^2 e^2 + \frac{72x^2 \ln(5+x)}{5\ln(x)}$	22
parallelrisch	$\frac{40x^2 e^2 \ln(x)+72\ln(5+x)x^2-1000\, e^2 \ln(x)}{5\ln(x)}$	32

input
```
int((((144*x^2+720*x)*ln(x)-72*x^2-360*x)*ln(5+x)+(80*x^2+400*x)*exp(2)*ln
(x)^2+72*x^2*ln(x))/(25+5*x)/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
8*x^2*exp(2)+72/5*x^2/ln(x)*ln(5+x)
```

3.761.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{72x^2\log(x)+e^2(400x+80x^2)\log^2(x)+(-360x-72x^2+(720x+144x^2)\log(x))\log(5+x)}{(25+5x)\log^2(x)}\,dx$$
$$=\frac{8\left(5\,x^2e^2\log\left(x\right)+9\,x^2\log\left(x+5\right)\right)}{5\,\log\left(x\right)}$$

input
```
integrate((((144*x^2+720*x)*log(x)-72*x^2-360*x)*log(5+x)+(80*x^2+400*x)*e
xp(2)*log(x)^2+72*x^2*log(x))/(25+5*x)/log(x)^2,x, algorithm=\
```

output
```
8/5*(5*x^2*e^2*log(x) + 9*x^2*log(x + 5))/log(x)
```

3.761.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{72x^2\log(x)+e^2(400x+80x^2)\log^2(x)+(-360x-72x^2+(720x+144x^2)\log(x))\log(5+x)}{(25+5x)\log^2(x)}\,dx$$
$$=8x^2e^2+\frac{72x^2\log\left(x+5\right)}{5\log\left(x\right)}$$

input
```
integrate((((144*x**2+720*x)*ln(x)-72*x**2-360*x)*ln(5+x)+(80*x**2+400*x)*
exp(2)*ln(x)**2+72*x**2*ln(x))/(25+5*x)/ln(x)**2,x)
```

output
```
8*x**2*exp(2) + 72*x**2*log(x + 5)/(5*log(x))
```

3.761.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{72x^2\log(x)+e^2(400x+80x^2)\log^2(x)+(-360x-72x^2+(720x+144x^2)\log(x))\log(5+x)}{(25+5x)\log^2(x)}\,dx$$
$$=\frac{8\left(5\,x^2e^2\log\left(x\right)+9\,x^2\log\left(x+5\right)\right)}{5\,\log\left(x\right)}$$

input
```
integrate((((144*x^2+720*x)*log(x)-72*x^2-360*x)*log(5+x)+(80*x^2+400*x)*e
xp(2)*log(x)^2+72*x^2*log(x))/(25+5*x)/log(x)^2,x, algorithm=\
```

output
```
8/5*(5*x^2*e^2*log(x) + 9*x^2*log(x + 5))/log(x)
```

3.761.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{72x^2\log(x)+e^2(400x+80x^2)\log^2(x)+(-360x-72x^2+(720x+144x^2)\log(x))\log(5+x)}{(25+5x)\log^2(x)}\,dx$$
$$=\frac{8\left(5\,x^2e^2\log\left(x\right)+9\,x^2\log\left(x+5\right)\right)}{5\,\log\left(x\right)}$$

input
```
integrate((((144*x^2+720*x)*log(x)-72*x^2-360*x)*log(5+x)+(80*x^2+400*x)*e
xp(2)*log(x)^2+72*x^2*log(x))/(25+5*x)/log(x)^2,x, algorithm=\
```

output
```
8/5*(5*x^2*e^2*log(x) + 9*x^2*log(x + 5))/log(x)
```

3.761.9 Mupad [B] (verification not implemented)

Time = 14.74 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{72x^2\log(x)+e^2(400x+80x^2)\log^2(x)+(-360x-72x^2+(720x+144x^2)\log(x))\log(5+x)}{(25+5x)\log^2(x)}\,dx$$
$$=8\,x^2\,\mathrm{e}^2+\frac{72\,x^2\,\ln\left(x+5\right)}{5\,\ln\left(x\right)}$$

input
```
int((72*x^2*log(x) - log(x + 5)*(360*x - log(x)*(720*x + 144*x^2) + 72*x^2
) + exp(2)*log(x)^2*(400*x + 80*x^2))/(log(x)^2*(5*x + 25)),x)
```

output
```
8*x^2*exp(2) + (72*x^2*log(x + 5))/(5*log(x))
```

3.761. $\int \frac{72x^2 \log(x)+e^2(400x+80x^2)\log^2(x)+(-360x-72x^2+(720x+144x^2)\log(x))\log(5+x)}{(25+5x)\log^2(x)}\,dx$

3.762 $\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36}$

3.762.1 Optimal result

Integrand size = 139, antiderivative size = 33

$$\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x^2+8x^3)+(2000+700x+}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36x^3-4x^4)\log\left(\frac{1}{4}(-20+x\right)}$$
$$=\frac{4(-e^2+x)}{2+2x-\frac{5}{5+x}-\log\left(-5+\frac{x}{4}\right)}$$

output
```
4*(x-exp(2))/(2*x-5/(5+x)-ln(1/4*x-5)+2)
```

3.762.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.12

$$\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x^2+8x^3)+(2000+700x+}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36x^3-4x^4)\log\left(\frac{1}{4}(-20+x\right)}$$
$$=\frac{4(5+x)(-e^2+x)}{5+12x+2x^2-(5+x)\log\left(-5+\frac{x}{4}\right)}$$

input
```
Integrate[(-2000 - 600*x - 80*x^2 + 12*x^3 + E^2*(-4500 - 1420*x - 84*x^2
+ 8*x^3) + (2000 + 700*x + 40*x^2 - 4*x^3)*Log[(-20 + x)/4])/(-500 - 2375*
x - 3160*x^2 - 796*x^3 - 32*x^4 + 4*x^5 + (1000 + 2550*x + 750*x^2 + 36*x^
3 - 4*x^4)*Log[(-20 + x)/4] + (-500 - 175*x - 10*x^2 + x^3)*Log[(-20 + x)/
4]^2),x]
```

3.762.
$$\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x^2+8x^3)+(2000+700x+40x^2-4x^3)\log\left(\frac{1}{4}(-20+x)\right)}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36x^3-4x^4)\log\left(\frac{1}{4}(-20+x)\right)+(-500-175x-10x^2+x^3)\log^2\left(\frac{1}{4}(-20+x)\right)}\,dx$$

output
```
(4*(5 + x)*(-E^2 + x))/(5 + 12*x + 2*x^2 - (5 + x)*Log[-5 + x/4])
```

3.762.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{12x^3-80x^2+e^2\left(8x^3-84x^2-1420x-4500\right)+\left(-4x^3+40x^2+700x+2000\right)\log\left(\frac{x-20}{4}\right)-}{4x^5-32x^4-796x^3-3160x^2+\left(x^3-10x^2-175x-500\right)\log^2\left(\frac{x-20}{4}\right)+\left(-4x^4+36x^3+750x^2+2550x+100\right.}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-12x^3+80x^2-e^2\left(8x^3-84x^2-1420x-4500\right)-\left(-4x^3+40x^2+700x+2000\right)\log\left(\frac{x-20}{4}\right)+600x+2000}{(20-x)\left(2x^2+12x-x\log\left(\frac{x}{4}-5\right)-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int\left(-\frac{80x^2}{(x-20)\left(2x^2+12x-x\log\left(\frac{x}{4}-5\right)-5\log\left(\frac{x}{4}-5\right)+5\right)^2}-\frac{600x}{(x-20)\left(2x^2+12x-x\log\left(\frac{x}{4}-5\right)-5\log\left(\frac{x}{4}\right.\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$100e^2\int \frac{1}{\left(2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx+$$
$$2500\int \frac{1}{\left(2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx-$$
$$2500e^2\int \frac{1}{(x-20)\left(2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx+$$
$$50000\int \frac{1}{(x-20)\left(2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx+$$
$$76e^2\int \frac{x}{\left(2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx-$$
$$100\int \frac{x}{\left(2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx+$$
$$8e^2\int \frac{x^2}{\left(2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx-$$
$$76\int \frac{x^2}{\left(2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx+$$
$$20\int \frac{1}{2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5}dx+$$
$$4\int \frac{x}{2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5}dx-$$
$$8\int \frac{x^3}{\left(2x^2-\log\left(\frac{x}{4}-5\right)x+12x-5\log\left(\frac{x}{4}-5\right)+5\right)^2}dx$$

input
```
Int[(-2000 - 600*x - 80*x^2 + 12*x^3 + E^2*(-4500 - 1420*x - 84*x^2 + 8*x^
3) + (2000 + 700*x + 40*x^2 - 4*x^3)*Log[(-20 + x)/4])/(-500 - 2375*x - 31
60*x^2 - 796*x^3 - 32*x^4 + 4*x^5 + (1000 + 2550*x + 750*x^2 + 36*x^3 - 4*
x^4)*Log[(-20 + x)/4] + (-500 - 175*x - 10*x^2 + x^3)*Log[(-20 + x)/4]^2),
x]
```

output
```
$Aborted
```

3.762.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

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$$\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x^2+8x^3)+(2000+700x+40x^2-4x^3)\log\left(\frac{1}{4}(-20+x)\right)}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36x^3-4x^4)\log\left(\frac{1}{4}(-20+x)\right)+(-500-175x-10x^2+x^3)\log^2\left(\frac{1}{4}(-20+x)\right)}\,dx$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.762.4 Maple [A] (verified)

Time = 1.64 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.24

method	result	size
risch	$-\frac{4(\mathrm{e}^{2}-x)(5+x)}{2x^{2}-\ln\left(\frac{x}{4}-5\right)x+12x-5\ln\left(\frac{x}{4}-5\right)+5}$	41
parallelrisch	$-\frac{4\,\mathrm{e}^{2}x-4x^{2}+20\,\mathrm{e}^{2}-20x}{2x^{2}-\ln\left(\frac{x}{4}-5\right)x+12x-5\ln\left(\frac{x}{4}-5\right)+5}$	50
norman	$\frac{\left(-4\,\mathrm{e}^{2}-4\right)x+10\ln\left(\frac{x}{4}-5\right)-10+2\ln\left(\frac{x}{4}-5\right)x-20\,\mathrm{e}^{2}}{2x^{2}-\ln\left(\frac{x}{4}-5\right)x+12x-5\ln\left(\frac{x}{4}-5\right)+5}$	62
derivativedivides	$\frac{-64\left(\frac{x}{4}-5\right)^{2}+4\left(-180+4\,\mathrm{e}^{2}\right)\left(\frac{x}{4}-5\right)-2000+100\,\mathrm{e}^{2}}{4\ln\left(\frac{x}{4}-5\right)\left(\frac{x}{4}-5\right)-32\left(\frac{x}{4}-5\right)^{2}+25\ln\left(\frac{x}{4}-5\right)-92x+795}$	67
default	$\frac{-64\left(\frac{x}{4}-5\right)^{2}+4\left(-180+4\,\mathrm{e}^{2}\right)\left(\frac{x}{4}-5\right)-2000+100\,\mathrm{e}^{2}}{4\ln\left(\frac{x}{4}-5\right)\left(\frac{x}{4}-5\right)-32\left(\frac{x}{4}-5\right)^{2}+25\ln\left(\frac{x}{4}-5\right)-92x+795}$	67

input
```
int(((-4*x^3+40*x^2+700*x+2000)*ln(1/4*x-5)+(8*x^3-84*x^2-1420*x-4500)*exp
(2)+12*x^3-80*x^2-600*x-2000)/((x^3-10*x^2-175*x-500)*ln(1/4*x-5)^2+(-4*x^
4+36*x^3+750*x^2+2550*x+1000)*ln(1/4*x-5)+4*x^5-32*x^4-796*x^3-3160*x^2-23
75*x-500),x,method=_RETURNVERBOSE)
```

output
```
-4*(exp(2)-x)*(5+x)/(2*x^2-ln(1/4*x-5)*x+12*x-5*ln(1/4*x-5)+5)
```

3.762.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.18

$$\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x^2+8x^3)+(2000+700x+}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36x^3-4x^4)\log\left(\frac{1}{4}(-20+x)\right.}$$
$$=\frac{4\left(x^2-(x+5)e^2+5\,x\right)}{2\,x^2-(x+5)\log\left(\frac{1}{4}\,x-5\right)+12\,x+5}$$

input
```
integrate(((-4*x^3+40*x^2+700*x+2000)*log(1/4*x-5)+(8*x^3-84*x^2-1420*x-45
00)*exp(2)+12*x^3-80*x^2-600*x-2000)/((x^3-10*x^2-175*x-500)*log(1/4*x-5)^
2+(-4*x^4+36*x^3+750*x^2+2550*x+1000)*log(1/4*x-5)+4*x^5-32*x^4-796*x^3-31
60*x^2-2375*x-500),x, algorithm=\
```

output
```
4*(x^2 - (x + 5)*e^2 + 5*x)/(2*x^2 - (x + 5)*log(1/4*x - 5) + 12*x + 5)
```

3.762.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.18

$$\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x^2+8x^3)+(2000+700x+}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36x^3-4x^4)\log\left(\frac{1}{4}(-20+x)\right)}$$
$$= \frac{-4x^2-20x+4xe^2+20e^2}{-2x^2-12x+(x+5)\log\left(\frac{x}{4}-5\right)-5}$$

input
```
integrate(((-4*x**3+40*x**2+700*x+2000)*ln(1/4*x-5)+(8*x**3-84*x**2-1420*x
-4500)*exp(2)+12*x**3-80*x**2-600*x-2000)/((x**3-10*x**2-175*x-500)*ln(1/4
*x-5)**2+(-4*x**4+36*x**3+750*x**2+2550*x+1000)*ln(1/4*x-5)+4*x**5-32*x**4
-796*x**3-3160*x**2-2375*x-500),x)
```

output
```
(-4*x**2 - 20*x + 4*x*exp(2) + 20*exp(2))/(-2*x**2 - 12*x + (x + 5)*log(x/
4 - 5) - 5)
```

3.762.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.39

$$\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x^2+8x^3)+(2000+700x+}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36x^3-4x^4)\log\left(\frac{1}{4}(-20+x)\right)}$$
$$= \frac{4\left(x^2-x(e^2-5)-5e^2\right)}{2x^2+2x(\log(2)+6)-(x+5)\log(x-20)+10\log(2)+5}$$

input
```
integrate(((-4*x^3+40*x^2+700*x+2000)*log(1/4*x-5)+(8*x^3-84*x^2-1420*x-45
00)*exp(2)+12*x^3-80*x^2-600*x-2000)/((x^3-10*x^2-175*x-500)*log(1/4*x-5)^
2+(-4*x^4+36*x^3+750*x^2+2550*x+1000)*log(1/4*x-5)+4*x^5-32*x^4-796*x^3-31
60*x^2-2375*x-500),x, algorithm=\
```

output
```
4*(x^2 - x*(e^2 - 5) - 5*e^2)/(2*x^2 + 2*x*(log(2) + 6) - (x + 5)*log(x -
20) + 10*log(2) + 5)
```

3.762.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.42

$$\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x^2+8x^3)+(2000+700x+}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36x^3-4x^4)\log\left(\frac{1}{4}(-20+x)\right.}$$
$$=\frac{4\left(x^2-xe^2+5\,x-5\,e^2\right)}{2\,x^2-x\log\left(\frac{1}{4}\,x-5\right)+12\,x-5\,\log\left(\frac{1}{4}\,x-5\right)+5}$$

input
```
integrate(((-4*x^3+40*x^2+700*x+2000)*log(1/4*x-5)+(8*x^3-84*x^2-1420*x-45
00)*exp(2)+12*x^3-80*x^2-600*x-2000)/((x^3-10*x^2-175*x-500)*log(1/4*x-5)^
2+(-4*x^4+36*x^3+750*x^2+2550*x+1000)*log(1/4*x-5)+4*x^5-32*x^4-796*x^3-31
60*x^2-2375*x-500),x, algorithm=\
```

output
```
4*(x^2 - x*e^2 + 5*x - 5*e^2)/(2*x^2 - x*log(1/4*x - 5) + 12*x - 5*log(1/4
*x - 5) + 5)
```

3.762.9 Mupad [B] (verification not implemented)

Time = 15.43 (sec) , antiderivative size = 113, normalized size of antiderivative = 3.42

$$\int \frac{-2000-600x-80x^2+12x^3+e^2(-4500-1420x-84x^2+8x^3)+(2000+700x+}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+(1000+2550x+750x^2+36x^3-4x^4)\log\left(\frac{1}{4}(-20+x)\right.}$$
$$=\frac{4\left(112500\,x-112500\,\mathrm{e}^2-52375\,x\,\mathrm{e}^2-6300\,x^2\,\mathrm{e}^2+240\,x^3\,\mathrm{e}^2+51\,x^4\,\mathrm{e}^2-2\,x^5\,\mathrm{e}^2+52375\,x^2+6300\,x^3-\right.}{\left(12\,x+2\,x^2-\ln\left(\frac{x}{4}-5\right)\,(x+5)+5\right)\,\left(2\,x^4-61\,x^3+65\,x^2+5975\,x+22500\right)}$$

input
```
int((600*x + exp(2)*(1420*x + 84*x^2 - 8*x^3 + 4500) - log(x/4 - 5)*(700*x
 + 40*x^2 - 4*x^3 + 2000) + 80*x^2 - 12*x^3 + 2000)/(2375*x + log(x/4 - 5)
^2*(175*x + 10*x^2 - x^3 + 500) + 3160*x^2 + 796*x^3 + 32*x^4 - 4*x^5 - lo
g(x/4 - 5)*(2550*x + 750*x^2 + 36*x^3 - 4*x^4 + 1000) + 500),x)
```

output
```
(4*(112500*x - 112500*exp(2) - 52375*x*exp(2) - 6300*x^2*exp(2) + 240*x^3*
exp(2) + 51*x^4*exp(2) - 2*x^5*exp(2) + 52375*x^2 + 6300*x^3 - 240*x^4 - 5
1*x^5 + 2*x^6))/((12*x + 2*x^2 - log(x/4 - 5)*(x + 5) + 5)*(5975*x + 65*x^
2 - 61*x^3 + 2*x^4 + 22500))
```

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$$\int \frac{-2000-600x-80x^2+12x^3+e^2\left(-4500-1420x-84x^2+8x^3\right)+\left(2000+700x+40x^2-4x^3\right)\log\left(\frac{1}{4}(-20+x)\right)}{-500-2375x-3160x^2-796x^3-32x^4+4x^5+\left(1000+2550x+750x^2+36x^3-4x^4\right)\log\left(\frac{1}{4}(-20+x)\right)+\left(-500-175x-10x^2+x^3\right)\log^2\left(\frac{1}{4}(-20+x)\right)}\,dx$$

3.763 $\int \frac{1}{5}(15+e^5(-4x-9x^2+4x^3)) \, dx$

3.763.1 Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{5}\left(15+e^5\left(-4x-9x^2+4x^3\right)\right) \, dx=3x-\frac{1}{5}e^5\left(3+\frac{2}{x}-x\right)x^3$$

output
```
3*x-x^3*exp(5)*(2/5/x+3/5-1/5*x)
```

3.763.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{1}{5}\left(15+e^5\left(-4x-9x^2+4x^3\right)\right) \, dx=3x-\frac{2e^5x^2}{5}-\frac{3e^5x^3}{5}+\frac{e^5x^4}{5}$$

input
```
Integrate[(15 + E^5*(-4*x - 9*x^2 + 4*x^3))/5,x]
```

output
```
3*x - (2*E^5*x^2)/5 - (3*E^5*x^3)/5 + (E^5*x^4)/5
```

3.763.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5}\left(e^5\left(4x^3-9x^2-4x\right)+15\right) \, dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{5}\int \left(15-e^5\left(-4x^3+9x^2+4x\right)\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{5}\left(e^5x^4-3e^5x^3-2e^5x^2+15x\right)$$

input
```
Int[(15 + E^5*(-4*x - 9*x^2 + 4*x^3))/5,x]
```

output
```
(15*x - 2*E^5*x^2 - 3*E^5*x^3 + E^5*x^4)/5
```

3.763.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.763.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

method	result	size
parallelrisch	$\frac{e^5(x^4-3x^3-2x^2)}{5}+3x$	23
gosper	$\frac{x(x^3e^5-3x^2e^5-2x\,e^5+15)}{5}$	24
default	$\frac{x^4e^5}{5}-\frac{3x^3e^5}{5}-\frac{2x^2e^5}{5}+3x$	26
norman	$\frac{x^4e^5}{5}-\frac{3x^3e^5}{5}-\frac{2x^2e^5}{5}+3x$	26
risch	$\frac{x^4e^5}{5}-\frac{3x^3e^5}{5}-\frac{2x^2e^5}{5}+3x$	26
parts	$\frac{x^4e^5}{5}-\frac{3x^3e^5}{5}-\frac{2x^2e^5}{5}+3x$	26

input
```
int(1/5*(4*x^3-9*x^2-4*x)*exp(5)+3,x,method=_RETURNVERBOSE)
```

output
```
1/5*exp(5)*(x^4-3*x^3-2*x^2)+3*x
```

3.763.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{5}\left(15+e^5\left(-4x-9x^2+4x^3\right)\right)\,dx=\frac{1}{5}\left(x^4-3\,x^3-2\,x^2\right)e^5+3\,x$$

input
```
integrate(1/5*(4*x^3-9*x^2-4*x)*exp(5)+3,x, algorithm=\
```

output
```
1/5*(x^4 - 3*x^3 - 2*x^2)*e^5 + 3*x
```

3.763.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

$$\int \frac{1}{5}\left(15+e^5\left(-4x-9x^2+4x^3\right)\right)\,dx=\frac{x^4e^5}{5}-\frac{3x^3e^5}{5}-\frac{2x^2e^5}{5}+3x$$

input
```
integrate(1/5*(4*x**3-9*x**2-4*x)*exp(5)+3,x)
```

output
```
x**4*exp(5)/5 - 3*x**3*exp(5)/5 - 2*x**2*exp(5)/5 + 3*x
```

3.763.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{5}\left(15+e^5\left(-4x-9x^2+4x^3\right)\right)\,dx=\frac{1}{5}\left(x^4-3\,x^3-2\,x^2\right)e^5+3\,x$$

input
```
integrate(1/5*(4*x^3-9*x^2-4*x)*exp(5)+3,x, algorithm=\
```

output
```
1/5*(x^4 - 3*x^3 - 2*x^2)*e^5 + 3*x
```

3.763.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{5}\left(15+e^5\left(-4x-9x^2+4x^3\right)\right)\,dx=\frac{1}{5}\left(x^4-3\,x^3-2\,x^2\right)e^5+3\,x$$

input
```
integrate(1/5*(4*x^3-9*x^2-4*x)*exp(5)+3,x, algorithm=\
```

output
```
1/5*(x^4 - 3*x^3 - 2*x^2)*e^5 + 3*x
```

3.763.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04

$$\int \frac{1}{5}\left(15+e^5\left(-4x-9x^2+4x^3\right)\right)\,dx=\frac{\mathrm{e}^5\,x^4}{5}-\frac{3\,\mathrm{e}^5\,x^3}{5}-\frac{2\,\mathrm{e}^5\,x^2}{5}+3\,x$$

input
```
int(3 - (exp(5)*(4*x + 9*x^2 - 4*x^3))/5,x)
```

output
```
3*x - (2*x^2*exp(5))/5 - (3*x^3*exp(5))/5 + (x^4*exp(5))/5
```

3.764 $\int \frac{1+x+e^{1+e^2-x}x}{x} \, dx$

3.764.1 Optimal result

Integrand size = 19, antiderivative size = 22

$$\int \frac{1+x+e^{1+e^2-x}x}{x} \, dx = -3+e^{e^4}-e^{1+e^2-x}+x+\log(x)$$

output
```
ln(x)-3-exp(exp(2)-x+1)+x+exp(exp(1)*exp(3))
```

3.764.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{1+x+e^{1+e^2-x}x}{x} \, dx = -e^{1+e^2-x}+x+\log(x)$$

input
```
Integrate[(1 + x + E^(1 + E^2 - x)*x)/x,x]
```

output
```
-E^(1 + E^2 - x) + x + Log[x]
```

3.764.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x+e^2+1}x+x+1}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{x+1}{x}+e^{-x+e^2+1}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x-e^{-x+e^2+1}+\log(x)$$

input
```
Int[(1 + x + E^(1 + E^2 - x)*x)/x,x]
```

output
```
-E^(1 + E^2 - x) + x + Log[x]
```

3.764.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.764.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

method	result
norman	$x-{\mathrm e}^{{\mathrm e}^{2}-x+1}+\ln \left(x \right)$
risch	$x-{\mathrm e}^{{\mathrm e}^{2}-x+1}+\ln \left(x \right)$
parallelrisch	$x-{\mathrm e}^{{\mathrm e}^{2}-x+1}+\ln \left(x \right)$
parts	$x-{\mathrm e}^{{\mathrm e}^{2}-x+1}+\ln \left(x \right)$
derivativedivides	${\mathrm e}^{2} \ln \left(x \right)-{\mathrm e}^{{\mathrm e}^{2}+1} \operatorname{Ei}_{1}\left(x \right)-{\mathrm e}^{2} {\mathrm e}^{{\mathrm e}^{2}+1} \operatorname{Ei}_{1}\left(x \right)+2 \ln \left(x \right)-{\mathrm e}^{2}+x-1+\left(-{\mathrm e}^{2}-1\right) \ln \left(-x \right)-$
default	${\mathrm e}^{2} \ln \left(x \right)-{\mathrm e}^{{\mathrm e}^{2}+1} \operatorname{Ei}_{1}\left(x \right)-{\mathrm e}^{2} {\mathrm e}^{{\mathrm e}^{2}+1} \operatorname{Ei}_{1}\left(x \right)+2 \ln \left(x \right)-{\mathrm e}^{2}+x-1+\left(-{\mathrm e}^{2}-1\right) \ln \left(-x \right)-$

input
```
int((x*exp(exp(2)-x+1)+x+1)/x,x,method=_RETURNVERBOSE)
```

output
```
x-exp(exp(2)-x+1)+ln(x)
```

3.764.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{1+x+e^{1+e^2-x} x}{x} \, dx=x - e^{\left(-x + e^{2} + 1\right)} + \log \left(x\right)$$

input
```
integrate((x*exp(exp(2)-x+1)+x+1)/x,x, algorithm=\
```

output
```
x - e^(-x + e^2 + 1) + log(x)
```

3.764.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.55

$$\int \frac{1+x+e^{1+e^2-x} x}{x} \, dx=x - e^{- x + 1 + e^{2}} + \log{\left(x \right)}$$

input
```
integrate((x*exp(exp(2)-x+1)+x+1)/x,x)
```

output
```
x - exp(-x + 1 + exp(2)) + log(x)
```

3.764.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{1+x+e^{1+e^2-x}x}{x}\,dx = x - e^{(-x+e^2+1)} + \log(x)$$

input
```
integrate((x*exp(exp(2)-x+1)+x+1)/x,x, algorithm=\
```

output
```
x - e^(-x + e^2 + 1) + log(x)
```

3.764.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{1+x+e^{1+e^2-x}x}{x}\,dx = x - e^2 - e^{(-x+e^2+1)} + \log(-x) - 1$$

input
```
integrate((x*exp(exp(2)-x+1)+x+1)/x,x, algorithm=\
```

output
```
x - e^2 - e^(-x + e^2 + 1) + log(-x) - 1
```

3.764.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{1+x+e^{1+e^2-x}x}{x}\,dx = x + \ln(x) - e^{-x}\,e\,e^{e^2}$$

input
```
int((x + x*exp(exp(2) - x + 1) + 1)/x,x)
```

output
```
x + log(x) - exp(-x)*exp(1)*exp(exp(2))
```

3.765 $\int \frac{}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}(-10x^3+50x^4+10x^5)\cdots}$

3.765.1 Optimal result

Integrand size = 229, antiderivative size = 31

$$\int \frac{-400+2000x-60\cdots}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}\left(-10x^3+50x^4+10x^5\right)+\left(-100x+1000x^2-2300\cdots\right.} = \frac{4}{\left(-5-\frac{e^{2x}}{5}+\frac{1}{x}-x\right)\left(-\frac{x}{2}+\log(x)\right)}$$

output
```
4/(1/x-x-5-1/5*exp(2*x))/(ln(x)-1/2*x)
```

3.765.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{-400+2000x-60\cdots}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}\left(-10x^3+50x^4+10x^5\right)+\left(-100x+1000x^2-2300\cdots\right.} = -\frac{40x}{\left(-5+25x+e^{2x}x+5x^2\right)\left(-x+2\log(x)\right)}$$

input
```
Integrate[(-400 + 2000*x - 600*x^2 - 400*x^3 + E^(2*x)*(80*x - 40*x^2 - 80
*x^3) + (400 + 400*x^2 + 160*E^(2*x)*x^2)*Log[x])/(25*x^2 - 250*x^3 + 575*
x^4 + E^(4*x)*x^4 + 250*x^5 + 25*x^6 + E^(2*x)*(-10*x^3 + 50*x^4 + 10*x^5)
 + (-100*x + 1000*x^2 - 2300*x^3 - 4*E^(4*x)*x^3 - 1000*x^4 - 100*x^5 + E^
(2*x)*(40*x^2 - 200*x^3 - 40*x^4))*Log[x] + (100 - 1000*x + 2300*x^2 + 4*E
^(4*x)*x^2 + 1000*x^3 + 100*x^4 + E^(2*x)*(-40*x + 200*x^2 + 40*x^3))*Log[
x]^2),x]
```

3.765.
$\int \frac{-400+2000x-600x^2-400x^3+e^{2x}(80x-40x^2-80x^3)+(400+400x^2\cdots}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}(-10x^3+50x^4+10x^5)+(-100x+1000x^2-2300x^3-4e^{4x}x^3-1000x^4-100x^5+e^{2x}(40x^2-200x^3-4\cdots}$

output
```
(-40*x)/((-5 + 25*x + E^(2*x)*x + 5*x^2)*(-x + 2*Log[x]))
```

3.765.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-400x^3-600x^2+\left(160e^{2x}\right.}{25x^6+250x^5+e^{4x}x^4+575x^4-250x^3+25x^2+e^{2x}\left(10x^5+50x^4-10x^3\right)+\left(100x^4+1000x^3+4e^{4x}x^2+230\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{40\left(-2\left(e^{2x}+5\right)x^3-\left(e^{2x}+15\right)x^2+2\left(\left(2e^{2x}+5\right)x^2+5\right)\log(x)+2\left(e^{2x}+25\right)x-10\right)}{\left(-5x^2-\left(e^{2x}+25\right)x+5\right)^2\left(x-2\log(x)\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$40\int -\frac{2\left(5+e^{2x}\right)x^3+\left(15+e^{2x}\right)x^2-2\left(25+e^{2x}\right)x-2\left(\left(5+2e^{2x}\right)x^2+5\right)\log(x)+10}{\left(-5x^2-\left(25+e^{2x}\right)x+5\right)^2\left(x-2\log(x)\right)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-40\int \frac{2\left(5+e^{2x}\right)x^3+\left(15+e^{2x}\right)x^2-2\left(25+e^{2x}\right)x-2\left(\left(5+2e^{2x}\right)x^2+5\right)\log(x)+10}{\left(-5x^2-\left(25+e^{2x}\right)x+5\right)^2\left(x-2\log(x)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-40\int \left(\frac{2x^2-4\log(x)x+x-2}{\left(5x^2+e^{2x}x+25x-5\right)\left(x-2\log(x)\right)^2}-\frac{5\left(2x^3+9x^2-2x-1\right)}{\left(5x^2+e^{2x}x+25x-5\right)^2\left(x-2\log(x)\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-40\left(-2\int \frac{1}{\left(5x^2+e^{2x}x+25x-5\right)\left(x-2\log(x)\right)^2}dx+\int \frac{x}{\left(5x^2+e^{2x}x+25x-5\right)\left(x-2\log(x)\right)^2}dx+2\int \frac{}{(5x^2}\right.$$

input
```
Int[(-400 + 2000*x - 600*x^2 - 400*x^3 + E^(2*x)*(80*x - 40*x^2 - 80*x^3)
+ (400 + 400*x^2 + 160*E^(2*x)*x^2)*Log[x])/(25*x^2 - 250*x^3 + 575*x^4 +
E^(4*x)*x^4 + 250*x^5 + 25*x^6 + E^(2*x)*(-10*x^3 + 50*x^4 + 10*x^5) + (-1
00*x + 1000*x^2 - 2300*x^3 - 4*E^(4*x)*x^3 - 1000*x^4 - 100*x^5 + E^(2*x)*
(40*x^2 - 200*x^3 - 40*x^4))*Log[x] + (100 - 1000*x + 2300*x^2 + 4*E^(4*x)
*x^2 + 1000*x^3 + 100*x^4 + E^(2*x)*(-40*x + 200*x^2 + 40*x^3))*Log[x]^2),
x]
```

output
```
$Aborted
```

3.765.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.765.4 Maple [A] (verified)

Time = 1.28 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.97

method	result	size
risch	$\frac{40x}{\left(5x^{2}+x\,{\mathrm e}^{2x}+25x-5\right)\left(x-2\ln\left(x\right)\right)}$	30
parallelrisch	$\frac{40x}{5x^{3}+{\mathrm e}^{2x}x^{2}-10x^{2}\ln\left(x\right)-2\ln\left(x\right){\mathrm e}^{2x}x+25x^{2}-50x\ln\left(x\right)-5x+10\ln\left(x\right)}$	53

input
```
int(((160*exp(2*x)*x^2+400*x^2+400)*ln(x)+(-80*x^3-40*x^2+80*x)*exp(2*x)-4
00*x^3-600*x^2+2000*x-400)/((4*x^2*exp(2*x)^2+(40*x^3+200*x^2-40*x)*exp(2*
x)+100*x^4+1000*x^3+2300*x^2-1000*x+100)*ln(x)^2+(-4*x^3*exp(2*x)^2+(-40*x
^4-200*x^3+40*x^2)*exp(2*x)-100*x^5-1000*x^4-2300*x^3+1000*x^2-100*x)*ln(x
)+x^4*exp(2*x)^2+(10*x^5+50*x^4-10*x^3)*exp(2*x)+25*x^6+250*x^5+575*x^4-25
0*x^3+25*x^2),x,method=_RETURNVERBOSE)
```

output
```
40*x/(5*x^2+x*exp(2*x)+25*x-5)/(x-2*ln(x))
```

3.765.

$$\int \frac{-400+2000x-600x^2-400x^3+e^{2x}\left(80x-40x^2-80x^3\right)+\left(400+400x^2\right.}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}\left(-10x^3+50x^4+10x^5\right)+\left(-100x+1000x^2-2300x^3-4e^{4x}x^3-1000x^4-100x^5+e^{2x}\left(40x^2-200x^3-4\right.\right.}$$

3.765.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.52

$$\int \frac{-400+2000x-60}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}\left(-10x^3+50x^4+10x^5\right)+\left(-100x+1000x^2-2300\right.}$$
$$=\frac{40\,x}{5\,x^3+x^2e^{(2\,x)}+25\,x^2-2\,(5\,x^2+xe^{(2\,x)}+25\,x-5)\log\left(x\right)-5\,x}$$

input
```
integrate(((160*exp(2*x)*x^2+400*x^2+400)*log(x)+(-80*x^3-40*x^2+80*x)*exp
(2*x)-400*x^3-600*x^2+2000*x-400)/((4*x^2*exp(2*x)^2+(40*x^3+200*x^2-40*x)
*exp(2*x)+100*x^4+1000*x^3+2300*x^2-1000*x+100)*log(x)^2+(-4*x^3*exp(2*x)^
2+(-40*x^4-200*x^3+40*x^2)*exp(2*x)-100*x^5-1000*x^4-2300*x^3+1000*x^2-100
*x)*log(x)+x^4*exp(2*x)^2+(10*x^5+50*x^4-10*x^3)*exp(2*x)+25*x^6+250*x^5+5
75*x^4-250*x^3+25*x^2),x, algorithm=\
```

output
```
40*x/(5*x^3 + x^2*e^(2*x) + 25*x^2 - 2*(5*x^2 + x*e^(2*x) + 25*x - 5)*log(
x) - 5*x)
```

3.765.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. 2(20) = 40.

Time = 0.21 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.65

$$\int \frac{-400+2000x-60}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}\left(-10x^3+50x^4+10x^5\right)+\left(-100x+1000x^2-2300\right.}$$
$$=\frac{40x}{5x^3-10x^2\log\left(x\right)+25x^2-50x\log\left(x\right)-5x+\left(x^2-2x\log\left(x\right)\right)e^{2x}+10\log\left(x\right)}$$

input
```
integrate(((160*exp(2*x)*x**2+400*x**2+400)*ln(x)+(-80*x**3-40*x**2+80*x)*
exp(2*x)-400*x**3-600*x**2+2000*x-400)/((4*x**2*exp(2*x)**2+(40*x**3+200*x
**2-40*x)*exp(2*x)+100*x**4+1000*x**3+2300*x**2-1000*x+100)*ln(x)**2+(-4*x
**3*exp(2*x)**2+(-40*x**4-200*x**3+40*x**2)*exp(2*x)-100*x**5-1000*x**4-23
00*x**3+1000*x**2-100*x)*ln(x)+x**4*exp(2*x)**2+(10*x**5+50*x**4-10*x**3)*
exp(2*x)+25*x**6+250*x**5+575*x**4-250*x**3+25*x**2),x)
```

output
```
40*x/(5*x**3 - 10*x**2*log(x) + 25*x**2 - 50*x*log(x) - 5*x + (x**2 - 2*x*
log(x))*exp(2*x) + 10*log(x))
```

3.765.
$$\int \frac{-400+2000x-600x^2-400x^3+e^{2x}\left(80x-40x^2-80x^3\right)+\left(400+400x^2\right.}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}\left(-10x^3+50x^4+10x^5\right)+\left(-100x+1000x^2-2300x^3-4e^{4x}x^3-1000x^4-100x^5+e^{2x}\left(40x^2-200x^3-4\right.\right.}$$

3.765.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.45

$$\int \frac{-400 + 2000x - 60}{25x^2 - 250x^3 + 575x^4 + e^{4x}x^4 + 250x^5 + 25x^6 + e^{2x}\left(-10x^3 + 50x^4 + 10x^5\right) + \left(-100x + 1000x^2 - 2300\right.}$$
$$= \frac{40\,x}{5\,x^3 + 25\,x^2 + (x^2 - 2\,x\log(x))e^{(2\,x)} - 10\,(x^2 + 5\,x - 1)\log(x) - 5\,x}$$

input
```
integrate(((160*exp(2*x)*x^2+400*x^2+400)*log(x)+(-80*x^3-40*x^2+80*x)*exp
(2*x)-400*x^3-600*x^2+2000*x-400)/((4*x^2*exp(2*x)^2+(40*x^3+200*x^2-40*x)
*exp(2*x)+100*x^4+1000*x^3+2300*x^2-1000*x+100)*log(x)^2+(-4*x^3*exp(2*x)^
2+(-40*x^4-200*x^3+40*x^2)*exp(2*x)-100*x^5-1000*x^4-2300*x^3+1000*x^2-100
*x)*log(x)+x^4*exp(2*x)^2+(10*x^5+50*x^4-10*x^3)*exp(2*x)+25*x^6+250*x^5+5
75*x^4-250*x^3+25*x^2),x, algorithm=\
```

output
```
40*x/(5*x^3 + 25*x^2 + (x^2 - 2*x*log(x))*e^(2*x) - 10*(x^2 + 5*x - 1)*log
(x) - 5*x)
```

3.765.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.68

$$\int \frac{-400 + 2000x - 60}{25x^2 - 250x^3 + 575x^4 + e^{4x}x^4 + 250x^5 + 25x^6 + e^{2x}\left(-10x^3 + 50x^4 + 10x^5\right) + \left(-100x + 1000x^2 - 2300\right.}$$
$$= \frac{40\,x}{5\,x^3 + x^2e^{(2\,x)} - 10\,x^2\log(x) - 2\,xe^{(2\,x)}\log(x) + 25\,x^2 - 50\,x\log(x) - 5\,x + 10\,\log(x)}$$

input
```
integrate(((160*exp(2*x)*x^2+400*x^2+400)*log(x)+(-80*x^3-40*x^2+80*x)*exp
(2*x)-400*x^3-600*x^2+2000*x-400)/((4*x^2*exp(2*x)^2+(40*x^3+200*x^2-40*x)
*exp(2*x)+100*x^4+1000*x^3+2300*x^2-1000*x+100)*log(x)^2+(-4*x^3*exp(2*x)^
2+(-40*x^4-200*x^3+40*x^2)*exp(2*x)-100*x^5-1000*x^4-2300*x^3+1000*x^2-100
*x)*log(x)+x^4*exp(2*x)^2+(10*x^5+50*x^4-10*x^3)*exp(2*x)+25*x^6+250*x^5+5
75*x^4-250*x^3+25*x^2),x, algorithm=\
```

output
```
40*x/(5*x^3 + x^2*e^(2*x) - 10*x^2*log(x) - 2*x*e^(2*x)*log(x) + 25*x^2 -
50*x*log(x) - 5*x + 10*log(x))
```

3.765.

$$\int \frac{-400+2000x-600x^2-400x^3+e^{2x}\left(80x-40x^2-80x^3\right)+\left(400+400x^2\right.}{25x^2-250x^3+575x^4+e^{4x}x^4+250x^5+25x^6+e^{2x}\left(-10x^3+50x^4+10x^5\right)+\left(-100x+1000x^2-2300x^3-4e^{4x}x^3-1000x^4-100x^5+e^{2x}\left(40x^2-200x^3-4\right.\right.}$$

3.765.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-400 + 2000x - 60}{25x^2 - 250x^3 + 575x^4 + e^{4x}x^4 + 250x^5 + 25x^6 + e^{2x}\left(-10x^3 + 50x^4 + 10x^5\right) + \left(-100x + 1000x^2 - 2300\right.}$$
$$= -\int \frac{e^{2\,x}\,\left(80\,x^3 +\right.}{\ln\left(x\right)^2\,\left(e^{2\,x}\,\left(40\,x^3 + 200\,x^2 - 40\,x\right) - 1000\,x + 4\,x^2\,e^{4\,x} + 2300\,x^2 + 1000\,x^3 + 100\,x^4 + 100\right) - \ln\left(x\right.}$$

input
```
int(-(exp(2*x)*(40*x^2 - 80*x + 80*x^3) - 2000*x - log(x)*(160*x^2*exp(2*x
) + 400*x^2 + 400) + 600*x^2 + 400*x^3 + 400)/(log(x)^2*(exp(2*x)*(200*x^2
 - 40*x + 40*x^3) - 1000*x + 4*x^2*exp(4*x) + 2300*x^2 + 1000*x^3 + 100*x^
4 + 100) - log(x)*(100*x + 4*x^3*exp(4*x) + exp(2*x)*(200*x^3 - 40*x^2 + 4
0*x^4) - 1000*x^2 + 2300*x^3 + 1000*x^4 + 100*x^5) + x^4*exp(4*x) + exp(2*
x)*(50*x^4 - 10*x^3 + 10*x^5) + 25*x^2 - 250*x^3 + 575*x^4 + 250*x^5 + 25*
x^6),x)
```

output
```
-int((exp(2*x)*(40*x^2 - 80*x + 80*x^3) - 2000*x - log(x)*(160*x^2*exp(2*x
) + 400*x^2 + 400) + 600*x^2 + 400*x^3 + 400)/(log(x)^2*(exp(2*x)*(200*x^2
 - 40*x + 40*x^3) - 1000*x + 4*x^2*exp(4*x) + 2300*x^2 + 1000*x^3 + 100*x^
4 + 100) - log(x)*(100*x + 4*x^3*exp(4*x) + exp(2*x)*(200*x^3 - 40*x^2 + 4
0*x^4) - 1000*x^2 + 2300*x^3 + 1000*x^4 + 100*x^5) + x^4*exp(4*x) + exp(2*
x)*(50*x^4 - 10*x^3 + 10*x^5) + 25*x^2 - 250*x^3 + 575*x^4 + 250*x^5 + 25*
x^6), x)
```

3.766 $\int \frac{-5+2x+5\log(4)}{5\log(4)}\,dx$

3.766.1 Optimal result

Integrand size = 17, antiderivative size = 15

$$\int \frac{-5+2x+5\log(4)}{5\log(4)}\,dx = 1+x+\frac{(-5+x)x}{5\log(4)}$$

output
```
1/2*x/ln(2)*(1/5*x-1)+1+x
```

3.766.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33

$$\int \frac{-5+2x+5\log(4)}{5\log(4)}\,dx = \frac{-5x+x^2+5x\log(4)}{5\log(4)}$$

input
```
Integrate[(-5 + 2*x + 5*Log[4])/(5*Log[4]),x]
```

output
```
(-5*x + x^2 + 5*x*Log[4])/(5*Log[4])
```

3.766.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x-5+5\log(4)}{5\log(4)}\,dx$$
$$\Big\downarrow \ 17$$
$$\frac{(2x-5(1-\log(4)))^2}{20\log(4)}$$

input
```
Int[(-5 + 2*x + 5*Log[4])/(5*Log[4]),x]
```

output
```
(2*x - 5*(1 - Log[4]))^2/(20*Log[4])
```

3.766.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.766.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result	size
gosper	$\frac{x(x+10\ln(2)-5)}{10\ln(2)}$	15
default	$\frac{10x\ln(2)+x^2-5x}{10\ln(2)}$	19
risch	$x+\frac{x^2}{10\ln(2)}-\frac{x}{2\ln(2)}$	19
parallelrisch	$\frac{x^2+(10\ln(2)-5)x}{10\ln(2)}$	19
norman	$\frac{x^2}{10\ln(2)}+\frac{(2\ln(2)-1)x}{2\ln(2)}$	24

input
```
int(1/10*(10*ln(2)+2*x-5)/ln(2),x,method=_RETURNVERBOSE)
```

output
```
1/10*x*(x+10*ln(2)-5)/ln(2)
```

3.766.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int \frac{-5+2x+5\log(4)}{5\log(4)}\,dx = \frac{x^2+10\,x\log{(2)}-5\,x}{10\,\log{(2)}}$$

input
```
integrate(1/10*(10*log(2)+2*x-5)/log(2),x, algorithm=\
```

output
```
1/10*(x^2 + 10*x*log(2) - 5*x)/log(2)
```

3.766.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33

$$\int \frac{-5+2x+5\log(4)}{5\log(4)}\,dx = \frac{x^2}{10\log{(2)}} + \frac{x(-1+2\log{(2)})}{2\log{(2)}}$$

input
```
integrate(1/10*(10*ln(2)+2*x-5)/ln(2),x)
```

output
```
x**2/(10*log(2)) + x*(-1 + 2*log(2))/(2*log(2))
```

3.766.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int \frac{-5+2x+5\log(4)}{5\log(4)}\,dx = \frac{x^2+10\,x\log{(2)}-5\,x}{10\,\log{(2)}}$$

input
```
integrate(1/10*(10*log(2)+2*x-5)/log(2),x, algorithm=\
```

output
```
1/10*(x^2 + 10*x*log(2) - 5*x)/log(2)
```

3.766.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int \frac{-5+2x+5\log(4)}{5\log(4)}\,dx = \frac{x^2+10\,x\log{(2)}-5\,x}{10\,\log{(2)}}$$

input
```
integrate(1/10*(10*log(2)+2*x-5)/log(2),x, algorithm=\
```

output
```
1/10*(x^2 + 10*x*log(2) - 5*x)/log(2)
```

3.766.9 Mupad [B] (verification not implemented)

Time = 14.99 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{-5+2x+5\log(4)}{5\log(4)}\,dx = \frac{5\,\left(\frac{x}{5}+\ln{(2)}-\frac{1}{2}\right)^2}{2\,\ln{(2)}}$$

input
```
int((x/5 + log(2) - 1/2)/log(2),x)
```

output
```
(5*(x/5 + log(2) - 1/2)^2)/(2*log(2))
```

3.767 $\int \frac{2040x+1008x^2+144x^3+16x^4+(7225+2040x+504x^2+48x^3+4x^4)\log}{7225+2040x+504x^2+48x^3+4x^4}$

3.767.1 Optimal result

Integrand size = 88, antiderivative size = 20

$$\int \frac{2040x+1008x^2+144x^3+16x^4+(7225+2040x+504x^2+48x^3+4x^4)\log\left(\frac{1}{4}(7225+2040x+504x^2\right.}{7225+2040x+504x^2+48x^3+4x^4}$$

$$= x\log\left(5x^2+\left(\frac{67}{2}+(3+x)^2\right)^2\right)$$

output
```
x*ln(5*x^2+(67/2+(3+x)^2)^2)
```

3.767.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{2040x+1008x^2+144x^3+16x^4+(7225+2040x+504x^2+48x^3+4x^4)\log\left(\frac{1}{4}(7225+2040x+504x^2\right.}{7225+2040x+504x^2+48x^3+4x^4}$$

$$= x\log\left(\frac{7225}{4}+510x+126x^2+12x^3+x^4\right)$$

input
```
Integrate[(2040*x + 1008*x^2 + 144*x^3 + 16*x^4 + (7225 + 2040*x + 504*x^2
 + 48*x^3 + 4*x^4)*Log[(7225 + 2040*x + 504*x^2 + 48*x^3 + 4*x^4)/4])/(722
5 + 2040*x + 504*x^2 + 48*x^3 + 4*x^4),x]
```

output
```
x*Log[7225/4 + 510*x + 126*x^2 + 12*x^3 + x^4]
```

3.767.3 Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.87 (sec) , antiderivative size = 202, normalized size of antiderivative = 10.10, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.023$, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16x^4+144x^3+1008x^2+\left(4x^4+48x^3+504x^2+2040x+7225\right)\log\left(\frac{1}{4}\left(4x^4+48x^3+504x^2+2040x+7225\right)\right)}{4x^4+48x^3+504x^2+2040x+7225}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{8x\left(2x^3+18x^2+126x+255\right)}{4x^4+48x^3+504x^2+2040x+7225}+\log\left(x^4+12x^3+126x^2+510x+\frac{7225}{4}\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\sqrt{139-12i\sqrt{5}}\arctan\left(\frac{2x+i\sqrt{5}+6}{\sqrt{139-12i\sqrt{5}}}\right)-i\sqrt{139-12i\sqrt{5}}\text{arctanh}\left(\frac{2ix-\sqrt{5}+6i}{\sqrt{139-12i\sqrt{5}}}\right)+\frac{1}{2}\left(6+i\sqrt{5}\right)\log\left(2ix^2+2\left(-\sqrt{5}+6i\right)x+85i\right)-\frac{1}{2}\left(6+i\sqrt{5}\right)\log\left(2x^2+2\left(6+i\sqrt{5}\right)x+85\right)+x\log\left(x^4+12x^3+126x^2+510x+\frac{7225}{4}\right)$$

input
```
Int[(2040*x + 1008*x^2 + 144*x^3 + 16*x^4 + (7225 + 2040*x + 504*x^2 + 48*
x^3 + 4*x^4)*Log[(7225 + 2040*x + 504*x^2 + 48*x^3 + 4*x^4)/4])/(7225 + 20
40*x + 504*x^2 + 48*x^3 + 4*x^4),x]
```

output
```
-(Sqrt[139 - (12*I)*Sqrt[5]]*ArcTan[(6 + I*Sqrt[5] + 2*x)/Sqrt[139 - (12*I
)*Sqrt[5]]]) - I*Sqrt[139 - (12*I)*Sqrt[5]]*ArcTanh[(6*I - Sqrt[5] + (2*I)
*x)/Sqrt[139 - (12*I)*Sqrt[5]]] + ((6 + I*Sqrt[5])*Log[85*I + 2*(6*I - Sqr
t[5])*x + (2*I)*x^2])/2 - ((6 + I*Sqrt[5])*Log[85 + 2*(6 + I*Sqrt[5])*x +
2*x^2])/2 + x*Log[7225/4 + 510*x + 126*x^2 + 12*x^3 + x^4]
```

3.767.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.767.4 Maple [A] (verified)

Time = 0.45 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

method	result	size
norman	$\ln\left(x^4+12x^3+126x^2+510x+\frac{7225}{4}\right)x$	22
risch	$\ln\left(x^4+12x^3+126x^2+510x+\frac{7225}{4}\right)x$	22
parallelrisch	$\ln\left(x^4+12x^3+126x^2+510x+\frac{7225}{4}\right)x$	22
default	$-2x\ln\left(2\right)+x\ln\left(4x^4+48x^3+504x^2+2040x+7225\right)$	30
parts	$-2x\ln\left(2\right)+x\ln\left(4x^4+48x^3+504x^2+2040x+7225\right)$	30

input
```
int(((4*x^4+48*x^3+504*x^2+2040*x+7225)*ln(x^4+12*x^3+126*x^2+510*x+7225/4
)+16*x^4+144*x^3+1008*x^2+2040*x)/(4*x^4+48*x^3+504*x^2+2040*x+7225),x,met
hod=_RETURNVERBOSE)
```

output
```
ln(x^4+12*x^3+126*x^2+510*x+7225/4)*x
```

3.767.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{2040x+1008x^2+144x^3+16x^4+(7225+2040x+504x^2+48x^3+4x^4)\log\left(\frac{1}{4}(7225+2040x+504x^2-\right.}{7225+2040x+504x^2+48x^3+4x^4}$$
$$= x\log\left(x^4+12\,x^3+126\,x^2+510\,x+\frac{7225}{4}\right)$$

input
```
integrate(((4*x^4+48*x^3+504*x^2+2040*x+7225)*log(x^4+12*x^3+126*x^2+510*x
+7225/4)+16*x^4+144*x^3+1008*x^2+2040*x)/(4*x^4+48*x^3+504*x^2+2040*x+7225
),x, algorithm=\
```

output
```
x*log(x^4 + 12*x^3 + 126*x^2 + 510*x + 7225/4)
```

3.767.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{2040x + 1008x^2 + 144x^3 + 16x^4 + (7225 + 2040x + 504x^2 + 48x^3 + 4x^4)\log\left(\frac{1}{4}(7225 + 2040x + 504x^2 + 48x^3 + 4x^4)\right)}{7225 + 2040x + 504x^2 + 48x^3 + 4x^4}$$
$$= x\log\left(x^4 + 12x^3 + 126x^2 + 510x + \frac{7225}{4}\right)$$

input
```
integrate(((4*x**4+48*x**3+504*x**2+2040*x+7225)*ln(x**4+12*x**3+126*x**2+
510*x+7225/4)+16*x**4+144*x**3+1008*x**2+2040*x)/(4*x**4+48*x**3+504*x**2+
2040*x+7225),x)
```

output
```
x*log(x**4 + 12*x**3 + 126*x**2 + 510*x + 7225/4)
```

3.767.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{2040x + 1008x^2 + 144x^3 + 16x^4 + (7225 + 2040x + 504x^2 + 48x^3 + 4x^4)\log\left(\frac{1}{4}(7225 + 2040x + 504x^2 + 48x^3 + 4x^4)\right)}{7225 + 2040x + 504x^2 + 48x^3 + 4x^4}$$
$$= -2\,x\log(2) + x\log\left(4\,x^4 + 48\,x^3 + 504\,x^2 + 2040\,x + 7225\right)$$

input
```
integrate(((4*x^4+48*x^3+504*x^2+2040*x+7225)*log(x^4+12*x^3+126*x^2+510*x
+7225/4)+16*x^4+144*x^3+1008*x^2+2040*x)/(4*x^4+48*x^3+504*x^2+2040*x+7225
),x, algorithm=\
```

output
```
-2*x*log(2) + x*log(4*x^4 + 48*x^3 + 504*x^2 + 2040*x + 7225)
```

3.767.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{2040x + 1008x^2 + 144x^3 + 16x^4 + (7225 + 2040x + 504x^2 + 48x^3 + 4x^4)\log\left(\frac{1}{4}(7225 + 2040x + 504x^2 + \dots\right.}{7225 + 2040x + 504x^2 + 48x^3 + 4x^4}$$

$$= x\log\left(x^4 + 12\,x^3 + 126\,x^2 + 510\,x + \frac{7225}{4}\right)$$

input
```
integrate(((4*x^4+48*x^3+504*x^2+2040*x+7225)*log(x^4+12*x^3+126*x^2+510*x
+7225/4)+16*x^4+144*x^3+1008*x^2+2040*x)/(4*x^4+48*x^3+504*x^2+2040*x+7225
),x, algorithm=\
```

output
```
x*log(x^4 + 12*x^3 + 126*x^2 + 510*x + 7225/4)
```

3.767.9 Mupad [B] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{2040x + 1008x^2 + 144x^3 + 16x^4 + (7225 + 2040x + 504x^2 + 48x^3 + 4x^4)\log\left(\frac{1}{4}(7225 + 2040x + 504x^2 + \dots\right.}{7225 + 2040x + 504x^2 + 48x^3 + 4x^4}$$

$$= x\,\ln\left(x^4 + 12\,x^3 + 126\,x^2 + 510\,x + \frac{7225}{4}\right)$$

input
```
int((2040*x + log(510*x + 126*x^2 + 12*x^3 + x^4 + 7225/4)*(2040*x + 504*x
^2 + 48*x^3 + 4*x^4 + 7225) + 1008*x^2 + 144*x^3 + 16*x^4)/(2040*x + 504*x
^2 + 48*x^3 + 4*x^4 + 7225),x)
```

output
```
x*log(510*x + 126*x^2 + 12*x^3 + x^4 + 7225/4)
```

3.768 $\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}\left(-4x-48x^2-32x^3+34x^4-6x\right.}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}\left(6x-2x^2\right)\right)\log(3-x)+\left(\right.}$

3.768.1 Optimal result

Integrand size = 228, antiderivative size = 35

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}\left(-4x-48x^2-32x^3+34x^4-6x^5\right)+\left(-12+e^{-32x-16x^2+4x^3}(-3\right.}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}\left(6x-2x^2\right)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+\right.}$$
$$=\frac{x}{-\frac{x}{2+e^{8x\left(-2-x+\frac{x^2}{4}\right)}}+\log(3-x)}$$

output
```
x/(ln(-x+3)-x/(2+exp(x*(x^2-4*x-8))^2))
```

3.768.2 Mathematica [A] (verified)

Time = 0.38 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.69

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}\left(-4x-48x^2-32x^3+34x^4-6x^5\right)+\left(-12+e^{-32x-16x^2+4x^3}(-3\right.}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}\left(6x-2x^2\right)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+\right.}$$
$$=\frac{\left(e^{2x^3}+2e^{8x(2+x)}\right)x}{-e^{8x(2+x)}x+\left(e^{2x^3}+2e^{8x(2+x)}\right)\log(3-x)}$$

3.768.
$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}\left(-4x-48x^2-32x^3+34x^4-6x^5\right)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}\left(6x-2x^2\right)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log^2(3-x)}$

input
```
Integrate[(-4*x - E^(-32*x - 16*x^2 + 4*x^3)*x + E^(-16*x - 8*x^2 + 2*x^3)
*(-4*x - 48*x^2 - 32*x^3 + 34*x^4 - 6*x^5) + (-12 + E^(-32*x - 16*x^2 + 4*
x^3)*(-3 + x) + 4*x + E^(-16*x - 8*x^2 + 2*x^3)*(-12 + 4*x))*Log[3 - x])/(
-3*x^2 + x^3 + (12*x - 4*x^2 + E^(-16*x - 8*x^2 + 2*x^3)*(6*x - 2*x^2))*Lo
g[3 - x] + (-12 + E^(-32*x - 16*x^2 + 4*x^3)*(-3 + x) + 4*x + E^(-16*x - 8
*x^2 + 2*x^3)*(-12 + 4*x))*Log[3 - x]^2),x]
```

output
```
((E^(2*x^3) + 2*E^(8*x*(2 + x)))*x)/(-(E^(8*x*(2 + x))*x) + (E^(2*x^3) + 2
*E^(8*x*(2 + x)))*Log[3 - x])
```

3.768.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^{4x^3-16x^2-32x}x+\left(e^{4x^3-16x^2-32x}(x-3)+e^{2x^3-8x^2-16x}(4x-12)+4x-12\right)\log(3-x)+e^{2x^3-8x^2-16x}\left(-6x^5\right.}{x^3-3x^2+\left(e^{4x^3-16x^2-32x}(x-3)+e^{2x^3-8x^2-16x}(4x-12)+4x-12\right)\log^2(3-x)+\left(-4x^2+e^{2x^3-8x^2-16x}\right.}$$

$\Big\downarrow$ 7239

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}\left(6x^4-34x^3+32x^2+48x+4\right)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2\log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2}-\frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}\left(6x^4-34x^3+32x^2+48x+4\right)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$\Big\downarrow$ 7293

3.768.

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}\left(-4x-48x^2-32x^3+34x^4-6x^5\right)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}(6x-2x^2)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log^2(3-x)}$$

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2 \log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2} - \frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}\left(6x^4-34x^3+32x^2+48x+4\right)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2 \log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2} - \frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}\left(6x^4-34x^3+32x^2+48x+4\right)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2 \log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2} - \frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$$\Big\downarrow \; 7239$$

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}\left(6x^4-34x^3+32x^2+48x+4\right)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2 \log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2} - \frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$$\Big\downarrow \; 7239$$

3.768.

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}\left(-4x-48x^2-32x^3+34x^4-6x^5\right)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}\left(6x-2x^2\right)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log^2(3-x)}$$

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}\left(6x^4-34x^3+32x^2+48x+4\right)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$\downarrow$ 7293

$$\int\left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2\log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2}-\frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}\left(6x^4-34x^3+32x^2+48x+4\right)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$\downarrow$ 7293

$$\int\left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2\log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2}-\frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}\left(6x^4-34x^3+32x^2+48x+4\right)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$\downarrow$ 7293

$$\int\left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2\log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2}-\frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$\downarrow$ 7239

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}\left(6x^4-34x^3+32x^2+48x+4\right)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$\downarrow$ 7293

3.768.

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}\left(-4x-48x^2-32x^3+34x^4-6x^5\right)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}\left(6x-2x^2\right)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log^2(3-x)}$$

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2 \log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2} - \frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}(6x^4-34x^3+32x^2+48x+4)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2 \log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2} - \frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}(6x^4-34x^3+32x^2+48x+4)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2 \log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2} - \frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}(6x^4-34x^3+32x^2+48x+4)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2 \log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2} - \frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$$\Big\downarrow \text{7239}$$

3.768.

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}(-4x-48x^2-32x^3+34x^4-6x^5)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}(6x-2x^2)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log^2(3-x)}$$

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}(6x^4-34x^3+32x^2+48x+4)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2\log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2}-\frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}(6x^4-34x^3+32x^2+48x+4)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2\log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2}-\frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{x\left(e^{4x^3}+e^{2x(x^2+4x+8)}(6x^4-34x^3+32x^2+48x+4)+4e^{16x(x+2)}\right)-\left(e^{2x^3}+2e^{8x(x+2)}\right)^2(x-3)\log(3-x)}{(3-x)\left(e^{8x(x+2)}x-\left(e^{2x^3}+2e^{8x(x+2)}\right)\log(3-x)\right)^2}dx$$

$\Big\downarrow$ 7293

$$\int \left(\frac{\left(e^{2x^3}+2e^{8x(x+2)}\right)^2\log(3-x)}{\left(e^{2x^3}\log(3-x)-e^{8x(x+2)}x+2e^{8x(x+2)}\log(3-x)\right)^2}-\frac{4e^{16x(x+2)}x}{(x-3)\left(-e^{2x^3}\log(3-x)+e^{8x(x+2)}x-2e^{8x(x+2)}\log\right.}\right.$$

input
```
Int[(-4*x - E^(-32*x - 16*x^2 + 4*x^3)*x + E^(-16*x - 8*x^2 + 2*x^3)*(-4*x
 - 48*x^2 - 32*x^3 + 34*x^4 - 6*x^5) + (-12 + E^(-32*x - 16*x^2 + 4*x^3)*(
-3 + x) + 4*x + E^(-16*x - 8*x^2 + 2*x^3)*(-12 + 4*x))*Log[3 - x])/(-3*x^2
 + x^3 + (12*x - 4*x^2 + E^(-16*x - 8*x^2 + 2*x^3)*(6*x - 2*x^2))*Log[3 -
x] + (-12 + E^(-32*x - 16*x^2 + 4*x^3)*(-3 + x) + 4*x + E^(-16*x - 8*x^2 +
 2*x^3)*(-12 + 4*x))*Log[3 - x]^2),x]
```

3.768.

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}(-4x-48x^2-32x^3+34x^4-6x^5)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}(6x-2x^2)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log^2(3-x)}$$

output
```
$Aborted
```

3.768.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.768.4 Maple [A] (verified)

Time = 0.82 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.43

method	result	size
risch	$-\frac{x\left(e^{2x\left(x^{2}-4x-8\right)}+2\right)}{-\ln\left(-x+3\right)e^{2x\left(x^{2}-4x-8\right)}+x-2\ln\left(-x+3\right)}$	50
parallelrisch	$\frac{-e^{2x^{3}-8x^{2}-16x}x-2x}{-e^{2x^{3}-8x^{2}-16x}\ln\left(-x+3\right)+x-2\ln\left(-x+3\right)}$	59

input
```
int((((-3+x)*exp(x^3-4*x^2-8*x)^4+(4*x-12)*exp(x^3-4*x^2-8*x)^2+4*x-12)*ln
(-x+3)-x*exp(x^3-4*x^2-8*x)^4+(-6*x^5+34*x^4-32*x^3-48*x^2-4*x)*exp(x^3-4*
x^2-8*x)^2-4*x)/(((-3+x)*exp(x^3-4*x^2-8*x)^4+(4*x-12)*exp(x^3-4*x^2-8*x)^
2+4*x-12)*ln(-x+3)^2+((-2*x^2+6*x)*exp(x^3-4*x^2-8*x)^2-4*x^2+12*x)*ln(-x+
3)+x^3-3*x^2),x,method=_RETURNVERBOSE)
```

output
```
-x*(exp(2*x*(x^2-4*x-8))+2)/(-ln(-x+3)*exp(2*x*(x^2-4*x-8))+x-2*ln(-x+3))
```

3.768.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.49

$$\int \frac{-4x - e^{-32x-16x^2+4x^3}x + e^{-16x-8x^2+2x^3}\left(-4x - 48x^2 - 32x^3 + 34x^4 - 6x^5\right) + \left(-12 + e^{-32x-16x^2+4x^3}(-3\right.}{-3x^2 + x^3 + \left(12x - 4x^2 + e^{-16x-8x^2+2x^3}\left(6x - 2x^2\right)\right)\log(3-x) + \left(-12 + e^{-32x-16x^2+4x^3}(-3+x)\right. +}$$
$$= \frac{xe^{\left(2\,x^3-8\,x^2-16\,x\right)} + 2\,x}{\left(e^{\left(2\,x^3-8\,x^2-16\,x\right)} + 2\right)\log\left(-x+3\right) - x}$$

input
```
integrate((((-3+x)*exp(x^3-4*x^2-8*x)^4+(4*x-12)*exp(x^3-4*x^2-8*x)^2+4*x-
12)*log(-x+3)-x*exp(x^3-4*x^2-8*x)^4+(-6*x^5+34*x^4-32*x^3-48*x^2-4*x)*exp
(x^3-4*x^2-8*x)^2-4*x)/((((-3+x)*exp(x^3-4*x^2-8*x)^4+(4*x-12)*exp(x^3-4*x^
2-8*x)^2+4*x-12)*log(-x+3)^2+((-2*x^2+6*x)*exp(x^3-4*x^2-8*x)^2-4*x^2+12*x
)*log(-x+3)+x^3-3*x^2),x, algorithm=\
```

output
```
(x*e^(2*x^3 - 8*x^2 - 16*x) + 2*x)/((e^(2*x^3 - 8*x^2 - 16*x) + 2)*log(-x
+ 3) - x)
```

3.768.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(22) = 44$.

Time = 0.27 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.31

$$\int \frac{-4x - e^{-32x-16x^2+4x^3}x + e^{-16x-8x^2+2x^3}\left(-4x - 48x^2 - 32x^3 + 34x^4 - 6x^5\right) + \left(-12 + e^{-32x-16x^2+4x^3}(-3\right.}{-3x^2 + x^3 + \left(12x - 4x^2 + e^{-16x-8x^2+2x^3}\left(6x - 2x^2\right)\right)\log(3-x) + \left(-12 + e^{-32x-16x^2+4x^3}(-3+x)\right. +}$$
$$= \frac{x^2}{-x\log\left(3-x\right) + e^{2x^3-8x^2-16x}\log\left(3-x\right)^2 + 2\log\left(3-x\right)^2} + \frac{x}{\log\left(3-x\right)}$$

input
```
integrate((((-3+x)*exp(x**3-4*x**2-8*x)**4+(4*x-12)*exp(x**3-4*x**2-8*x)**
2+4*x-12)*ln(-x+3)-x*exp(x**3-4*x**2-8*x)**4+(-6*x**5+34*x**4-32*x**3-48*x
**2-4*x)*exp(x**3-4*x**2-8*x)**2-4*x)/((((-3+x)*exp(x**3-4*x**2-8*x)**4+(4*
x-12)*exp(x**3-4*x**2-8*x)**2+4*x-12)*ln(-x+3)**2+((-2*x**2+6*x)*exp(x**3-
4*x**2-8*x)**2-4*x**2+12*x)*ln(-x+3)+x**3-3*x**2),x)
```

output
```
x**2/(-x*log(3 - x) + exp(2*x**3 - 8*x**2 - 16*x)*log(3 - x)**2 + 2*log(3
- x)**2) + x/log(3 - x)
```

3.768.

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}\left(-4x-48x^2-32x^3+34x^4-6x^5\right)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}\left(6x-2x^2\right)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log^2(3-x)}$$

3.768.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(32) = 64.

Time = 0.36 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.89

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}(-4x-48x^2-32x^3+34x^4-6x^5)+\left(-12+e^{-32x-16x^2+4x^3}(-3\right.}{-3x^2+x^3+(12x-4x^2+e^{-16x-8x^2+2x^3}(6x-2x^2))\log(3-x)+(-12+e^{-32x-16x^2+4x^3}(-3+x)+}$$
$$= -\frac{xe^{(2x^3)}+2xe^{(8x^2+16x)}}{xe^{(8x^2+16x)}-\left(e^{(2x^3)}+2e^{(8x^2+16x)}\right)\log(-x+3)}$$

input
```
integrate((((-3+x)*exp(x^3-4*x^2-8*x)^4+(4*x-12)*exp(x^3-4*x^2-8*x)^2+4*x-
12)*log(-x+3)-x*exp(x^3-4*x^2-8*x)^4+(-6*x^5+34*x^4-32*x^3-48*x^2-4*x)*exp
(x^3-4*x^2-8*x)^2-4*x)/(((-3+x)*exp(x^3-4*x^2-8*x)^4+(4*x-12)*exp(x^3-4*x^
2-8*x)^2+4*x-12)*log(-x+3)^2+((-2*x^2+6*x)*exp(x^3-4*x^2-8*x)^2-4*x^2+12*x
)*log(-x+3)+x^3-3*x^2),x, algorithm=\
```

output
```
-(x*e^(2*x^3) + 2*x*e^(8*x^2 + 16*x))/(x*e^(8*x^2 + 16*x) - (e^(2*x^3) + 2
*e^(8*x^2 + 16*x))*log(-x + 3))
```

3.768.8 Giac [A] (verification not implemented)

Time = 0.89 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.66

$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}(-4x-48x^2-32x^3+34x^4-6x^5)+\left(-12+e^{-32x-16x^2+4x^3}(-3\right.}{-3x^2+x^3+(12x-4x^2+e^{-16x-8x^2+2x^3}(6x-2x^2))\log(3-x)+(-12+e^{-32x-16x^2+4x^3}(-3+x)+}$$
$$= \frac{xe^{(2x^3-8x^2-16x)}+2x}{e^{(2x^3-8x^2-16x)}\log(-x+3)-x+2\log(-x+3)}$$

input
```
integrate((((-3+x)*exp(x^3-4*x^2-8*x)^4+(4*x-12)*exp(x^3-4*x^2-8*x)^2+4*x-
12)*log(-x+3)-x*exp(x^3-4*x^2-8*x)^4+(-6*x^5+34*x^4-32*x^3-48*x^2-4*x)*exp
(x^3-4*x^2-8*x)^2-4*x)/(((-3+x)*exp(x^3-4*x^2-8*x)^4+(4*x-12)*exp(x^3-4*x^
2-8*x)^2+4*x-12)*log(-x+3)^2+((-2*x^2+6*x)*exp(x^3-4*x^2-8*x)^2-4*x^2+12*x
)*log(-x+3)+x^3-3*x^2),x, algorithm=\
```

output
```
(x*e^(2*x^3 - 8*x^2 - 16*x) + 2*x)/(e^(2*x^3 - 8*x^2 - 16*x)*log(-x + 3) -
 x + 2*log(-x + 3))
```

3.768.
$$\int \frac{-4x-e^{-32x-16x^2+4x^3}x+e^{-16x-8x^2+2x^3}(-4x-48x^2-32x^3+34x^4-6x^5)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log}{-3x^2+x^3+\left(12x-4x^2+e^{-16x-8x^2+2x^3}(6x-2x^2)\right)\log(3-x)+\left(-12+e^{-32x-16x^2+4x^3}(-3+x)+4x+e^{-16x-8x^2+2x^3}(-12+4x)\right)\log^2(3-x)}$$

3.768.9 Mupad [B] (verification not implemented)

Time = 15.17 (sec) , antiderivative size = 89, normalized size of antiderivative = 2.54

$$\int \frac{-4x - e^{-32x-16x^2+4x^3}x + e^{-16x-8x^2+2x^3}(-4x - 48x^2 - 32x^3 + 34x^4 - 6x^5) + \left(-12 + e^{-32x-16x^2+4x^3}(-3 \right.}{-3x^2 + x^3 + \left(12x - 4x^2 + e^{-16x-8x^2+2x^3}\left(6x - 2x^2\right)\right)\log(3-x) + \left(-12 + e^{-32x-16x^2+4x^3}(-3+x) + \right.}$$
$$= \frac{6\ln(3-x) - x + 3e^{2x^3-8x^2-16x}\ln(3-x) + x e^{2x^3-8x^2-16x}}{2\ln(3-x) - x + e^{2x^3-8x^2-16x}\ln(3-x)}$$

input
```
int(-(4*x - log(3 - x)*(4*x + exp(4*x^3 - 16*x^2 - 32*x)*(x - 3) + exp(2*x
^3 - 8*x^2 - 16*x)*(4*x - 12) - 12) + exp(2*x^3 - 8*x^2 - 16*x)*(4*x + 48*
x^2 + 32*x^3 - 34*x^4 + 6*x^5) + x*exp(4*x^3 - 16*x^2 - 32*x))/(log(3 - x)
*(12*x + exp(2*x^3 - 8*x^2 - 16*x)*(6*x - 2*x^2) - 4*x^2) + log(3 - x)^2*(
4*x + exp(4*x^3 - 16*x^2 - 32*x)*(x - 3) + exp(2*x^3 - 8*x^2 - 16*x)*(4*x
- 12) - 12) - 3*x^2 + x^3),x)
```

output
```
(6*log(3 - x) - x + 3*exp(2*x^3 - 8*x^2 - 16*x)*log(3 - x) + x*exp(2*x^3 -
 8*x^2 - 16*x))/(2*log(3 - x) - x + exp(2*x^3 - 8*x^2 - 16*x)*log(3 - x))
```

3.769 $\int \frac{4+x-x\log(x)-x\log^2(x)}{(4x+x^2)\log(x)+x^2\log^2(x)}\,dx$

3.769.1 Optimal result

Integrand size = 37, antiderivative size = 15

$$\int \frac{4+x-x\log(x)-x\log^2(x)}{(4x+x^2)\log(x)+x^2\log^2(x)}\,dx = 1+\log\left(\frac{1}{x+\frac{4+x}{\log(x)}}\right)$$

output
```
ln(1/(x+(4+x)/ln(x)))+1
```

3.769.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{4+x-x\log(x)-x\log^2(x)}{(4x+x^2)\log(x)+x^2\log^2(x)}\,dx = \log(\log(x))-\log(4+x+x\log(x))$$

input
```
Integrate[(4 + x - x*Log[x] - x*Log[x]^2)/((4*x + x^2)*Log[x] + x^2*Log[x]
^2),x]
```

output
```
Log[Log[x]] - Log[4 + x + x*Log[x]]
```

3.769.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x-x\log^2(x)-x\log(x)+4}{x^2\log^2(x)+(x^2+4x)\log(x)}\,dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{x-x\log^2(x)-x\log(x)+4}{x\log(x)(x+x\log(x)+4)}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(-\frac{1}{x}+\frac{4-x}{x(x+x\log(x)+4)}+\frac{1}{x\log(x)}\right)dx$$

$$\Big\downarrow \; 2009$$

$$\int \frac{1}{-\log(x)x-x-4}dx+4\int \frac{1}{x(\log(x)x+x+4)}dx-\log(x)+\log(\log(x))$$

input
```
Int[(4 + x - x*Log[x] - x*Log[x]^2)/((4*x + x^2)*Log[x] + x^2*Log[x]^2),x]
```

output
```
$Aborted
```

3.769.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.769.4 Maple [A] (verified)

Time = 1.24 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result	size
default	$\ln(\ln(x)) - \ln(x\ln(x) + x + 4)$	15
norman	$\ln(\ln(x)) - \ln(x\ln(x) + x + 4)$	15
parallelrisch	$\ln(\ln(x)) - \ln(x\ln(x) + x + 4)$	15
risch	$-\ln(x) + \ln(\ln(x)) - \ln\left(\ln(x) + \frac{4+x}{x}\right)$	22

input
```
int((-x*ln(x)^2-x*ln(x)+4+x)/(x^2*ln(x)^2+(x^2+4*x)*ln(x)),x,method=_RETUR
NVERBOSE)
```

output
```
ln(ln(x))-ln(x*ln(x)+x+4)
```

3.769.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47

$$\int \frac{4+x-x\log(x)-x\log^2(x)}{(4x+x^2)\log(x)+x^2\log^2(x)}\,dx = -\log(x) - \log\left(\frac{x\log(x)+x+4}{x}\right) + \log(\log(x))$$

input
```
integrate((-x*log(x)^2-x*log(x)+4+x)/(x^2*log(x)^2+(x^2+4*x)*log(x)),x, al
gorithm=\
```

output
```
-log(x) - log((x*log(x) + x + 4)/x) + log(log(x))
```

3.769.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33

$$\int \frac{4+x-x\log(x)-x\log^2(x)}{(4x+x^2)\log(x)+x^2\log^2(x)}\,dx = -\log(x) - \log\left(\log(x) + \frac{2x+8}{2x}\right) + \log(\log(x))$$

input
```
integrate((-x*ln(x)**2-x*ln(x)+4+x)/(x**2*ln(x)**2+(x**2+4*x)*ln(x)),x)
```

output
```
-log(x) - log(log(x) + (2*x + 8)/(2*x)) + log(log(x))
```

3.769.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47

$$\int \frac{4+x-x\log(x)-x\log^2(x)}{(4x+x^2)\log(x)+x^2\log^2(x)}\,dx = -\log(x)-\log\left(\frac{x\log(x)+x+4}{x}\right)+\log(\log(x))$$

input
```
integrate((-x*log(x)^2-x*log(x)+4+x)/(x^2*log(x)^2+(x^2+4*x)*log(x)),x, al
gorithm=\
```

output
```
-log(x) - log((x*log(x) + x + 4)/x) + log(log(x))
```

3.769.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{4+x-x\log(x)-x\log^2(x)}{(4x+x^2)\log(x)+x^2\log^2(x)}\,dx = -\log(x\log(x)+x+4)+\log(\log(x))$$

input
```
integrate((-x*log(x)^2-x*log(x)+4+x)/(x^2*log(x)^2+(x^2+4*x)*log(x)),x, al
gorithm=\
```

output
```
-log(x*log(x) + x + 4) + log(log(x))
```

3.769.9 Mupad [B] (verification not implemented)

Time = 14.59 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{4+x-x\log(x)-x\log^2(x)}{(4x+x^2)\log(x)+x^2\log^2(x)}\,dx = \ln(\ln(x))-\ln(x+x\,\ln(x)+4)$$

input
```
int((x - x*log(x)^2 - x*log(x) + 4)/(log(x)*(4*x + x^2) + x^2*log(x)^2),x)
```

output
```
log(log(x)) - log(x + x*log(x) + 4)
```

3.770 $\int \frac{75+e^x(-28224-39984x)+460992e^{2x}x^2}{576-240x+25x^2+153664e^{2x}x^4+e^x(18816x^2-3920x^3)}\,dx$

3.770.1 Optimal result

Integrand size = 59, antiderivative size = 22

$$\int \frac{75+e^x(-28224-39984x)+460992e^{2x}x^2}{576-240x+25x^2+153664e^{2x}x^4+e^x(18816x^2-3920x^3)}\,dx = 6-\frac{3}{x+\frac{3}{-\frac{5}{8}+49e^x x}}$$

output
```
6-3/(x+3/(49*exp(x)*x-5/8))
```

3.770.2 Mathematica [A] (verified)

Time = 2.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{75+e^x(-28224-39984x)+460992e^{2x}x^2}{576-240x+25x^2+153664e^{2x}x^4+e^x(18816x^2-3920x^3)}\,dx = -\frac{3}{x}+\frac{72}{x(24-5x+392e^x x^2)}$$

input
```
Integrate[(75 + E^x*(-28224 - 39984*x) + 460992*E^(2*x)*x^2)/(576 - 240*x
+ 25*x^2 + 153664*E^(2*x)*x^4 + E^x*(18816*x^2 - 3920*x^3)),x]
```

output
```
-3/x + 72/(x*(24 - 5*x + 392*E^x*x^2))
```

3.770.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{460992e^{2x}x^2+e^x(-39984x-28224)+75}{153664e^{2x}x^4+25x^2+e^x(18816x^2-3920x^3)-240x+576}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{460992e^{2x}x^2+e^x(-39984x-28224)+75}{(392e^xx^2-5x+24)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{72(x+3)}{x^2(392e^xx^2-5x+24)}+\frac{3}{x^2}-\frac{72(5x^2-19x-48)}{x^2(392e^xx^2-5x+24)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-360\int \frac{1}{(392e^xx^2-5x+24)^2}dx+3456\int \frac{1}{x^2(392e^xx^2-5x+24)^2}dx+1368\int \frac{1}{x(392e^xx^2-5x+24)^2}dx-216\int \frac{1}{x^2(392e^xx^2-5x+24)}dx-72\int \frac{1}{x(392e^xx^2-5x+24)}dx-\frac{3}{x}$$

input
```
Int[(75 + E^x*(-28224 - 39984*x) + 460992*E^(2*x)*x^2)/(576 - 240*x + 25*x
^2 + 153664*E^(2*x)*x^4 + E^x*(18816*x^2 - 3920*x^3)),x]
```

output
```
$Aborted
```

3.770.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.770.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

method	result	size
norman	$\frac{15-1176\,e^{x}x}{392\,e^{x}x^{2}-5x+24}$	23
parallelrisch	$\frac{5880-460992\,e^{x}x}{153664\,e^{x}x^{2}-1960x+9408}$	24
risch	$-\frac{3}{x}+\frac{72}{x(392\,e^{x}x^{2}-5x+24)}$	26

input
```
int((460992*exp(x)^2*x^2+(-39984*x-28224)*exp(x)+75)/(153664*exp(x)^2*x^4+
(-3920*x^3+18816*x^2)*exp(x)+25*x^2-240*x+576),x,method=_RETURNVERBOSE)
```

output
```
(15-1176*exp(x)*x)/(392*exp(x)*x^2-5*x+24)
```

3.770.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{75+e^{x}(-28224-39984x)+460992e^{2x}x^{2}}{576-240x+25x^{2}+153664e^{2x}x^{4}+e^{x}\left(18816x^{2}-3920x^{3}\right)}\,dx=-\frac{3\,(392\,xe^{x}-5)}{392\,x^{2}e^{x}-5\,x+24}$$

input
```
integrate((460992*exp(x)^2*x^2+(-39984*x-28224)*exp(x)+75)/(153664*exp(x)^
2*x^4+(-3920*x^3+18816*x^2)*exp(x)+25*x^2-240*x+576),x, algorithm=\
```

output
```
-3*(392*x*e^x - 5)/(392*x^2*e^x - 5*x + 24)
```

3.770.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{75+e^{x}(-28224-39984x)+460992e^{2x}x^{2}}{576-240x+25x^{2}+153664e^{2x}x^{4}+e^{x}\left(18816x^{2}-3920x^{3}\right)}\,dx =\frac{72}{392x^{3}e^{x}-5x^{2}+24x}-\frac{3}{x}$$

input
```
integrate((460992*exp(x)**2*x**2+(-39984*x-28224)*exp(x)+75)/(153664*exp(x
)**2*x**4+(-3920*x**3+18816*x**2)*exp(x)+25*x**2-240*x+576),x)
```

output
```
72/(392*x**3*exp(x) - 5*x**2 + 24*x) - 3/x
```

3.770.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{75+e^x(-28224-39984x)+460992e^{2x}x^2}{576-240x+25x^2+153664e^{2x}x^4+e^x\left(18816x^2-3920x^3\right)}\,dx=-\frac{3\left(392\,xe^x-5\right)}{392\,x^2e^x-5\,x+24}$$

input
```
integrate((460992*exp(x)^2*x^2+(-39984*x-28224)*exp(x)+75)/(153664*exp(x)^
2*x^4+(-3920*x^3+18816*x^2)*exp(x)+25*x^2-240*x+576),x, algorithm=\
```

output
```
-3*(392*x*e^x - 5)/(392*x^2*e^x - 5*x + 24)
```

3.770.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{75+e^x(-28224-39984x)+460992e^{2x}x^2}{576-240x+25x^2+153664e^{2x}x^4+e^x\left(18816x^2-3920x^3\right)}\,dx=-\frac{3\left(392\,xe^x-5\right)}{392\,x^2e^x-5\,x+24}$$

input
```
integrate((460992*exp(x)^2*x^2+(-39984*x-28224)*exp(x)+75)/(153664*exp(x)^
2*x^4+(-3920*x^3+18816*x^2)*exp(x)+25*x^2-240*x+576),x, algorithm=\
```

output
```
-3*(392*x*e^x - 5)/(392*x^2*e^x - 5*x + 24)
```

3.770.9 Mupad [B] (verification not implemented)

Time = 14.51 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{75+e^x(-28224-39984x)+460992e^{2x}x^2}{576-240x+25x^2+153664e^{2x}x^4+e^x\left(18816x^2-3920x^3\right)}\,dx=-\frac{1176\,x\,\mathrm{e}^x-15}{392\,x^2\,\mathrm{e}^x-5\,x+24}$$

input
```
int((460992*x^2*exp(2*x) - exp(x)*(39984*x + 28224) + 75)/(exp(x)*(18816*x
^2 - 3920*x^3) - 240*x + 153664*x^4*exp(2*x) + 25*x^2 + 576),x)
```

output
```
-(1176*x*exp(x) - 15)/(392*x^2*exp(x) - 5*x + 24)
```

3.771 $\int \frac{-2560000x^2-96000x^3-20100x^4-360x^5-36x^6+e^x(-240000+23100$

$640000x^2+24000x^3+5025x^4+90x^5+9x^6$

3.771.1 Optimal result

Integrand size = 74, antiderivative size = 25

$$\int \frac{-2560000x^2-96000x^3-20100x^4-360x^5-36x^6+e^x(-240000+231000x+1800x^2+900x^3)}{640000x^2+24000x^3+5025x^4+90x^5+9x^6}\,dx$$
$$= -4x+\frac{e^x}{x\left(\frac{8}{3}+\frac{1}{100}x(5+x)\right)}$$

output
```
exp(x)/x/(1/100*(5+x)*x+8/3)-4*x
```

3.771.2 Mathematica [A] (verified)

Time = 0.58 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \frac{-2560000x^2-96000x^3-20100x^4-360x^5-36x^6+e^x(-240000+231000x+1800x^2+900x^3)}{640000x^2+24000x^3+5025x^4+90x^5+9x^6}\,dx$$
$$= -4x+300e^x\left(\frac{1}{800x}-\frac{3(5+x)}{800(800+15x+3x^2)}\right)$$

input
```
Integrate[(-2560000*x^2 - 96000*x^3 - 20100*x^4 - 360*x^5 - 36*x^6 + E^x*(
-240000 + 231000*x + 1800*x^2 + 900*x^3))/(640000*x^2 + 24000*x^3 + 5025*x
^4 + 90*x^5 + 9*x^6),x]
```

output
```
-4*x + 300*E^x*(1/(800*x) - (3*(5 + x))/(800*(800 + 15*x + 3*x^2)))
```

3.771.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 6.71 (sec) , antiderivative size = 1678, normalized size of antiderivative = 67.12, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.041$, Rules used = {2026, 2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-36x^6-360x^5-20100x^4-96000x^3-2560000x^2+e^x(900x^3+1800x^2+231000x-240000)}{9x^6+90x^5+5025x^4+24000x^3+640000x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-36x^6-360x^5-20100x^4-96000x^3-2560000x^2+e^x(900x^3+1800x^2+231000x-240000)}{x^2(9x^4+90x^3+5025x^2+24000x+640000)}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{4i\sqrt{\frac{3}{5}}(-36x^6-360x^5-20100x^4-96000x^3-2560000x^2+e^x(900x^3+1800x^2+231000x-240000))}{78125x^2(6x+25i\sqrt{15}+15)}+\frac{4i}{\ }\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{6i\sqrt{\frac{3}{5}}\left(\frac{320}{3i-5\sqrt{15}}-ix\right)^4}{78125}-\frac{8i\left(\frac{320}{3i-5\sqrt{15}}-ix\right)^3}{3125}+\frac{6i\sqrt{\frac{3}{5}}\left(\frac{320}{3i+5\sqrt{15}}-ix\right)^4}{78125}-\frac{8i\left(\frac{320}{3i+5\sqrt{15}}-ix\right)^3}{3125}+$$

$$\frac{8x^3}{3125}-\frac{2}{625}\left(3+5i\sqrt{15}\right)x^2-\frac{2}{625}\left(3-5i\sqrt{15}\right)x^2+\frac{24x^2}{625}-\frac{6}{125}\left(61+5i\sqrt{15}\right)x-$$

$$\frac{8}{125}\left(3+5i\sqrt{15}\right)x-\frac{6}{125}\left(61-5i\sqrt{15}\right)x-\frac{8}{125}\left(3-5i\sqrt{15}\right)x+\frac{536x}{125}+$$

$$\frac{144e^{-\frac{5}{6}\left(3+5i\sqrt{15}\right)}\operatorname{ExpIntegralEi}\left(-\frac{1}{6}i\left(6ix+5\left(3i-5\sqrt{15}\right)\right)\right)}{625\left(3+5i\sqrt{15}\right)}+$$

$$\frac{72\left(25-i\sqrt{15}\right)e^{-\frac{5}{6}\left(3+5i\sqrt{15}\right)}\operatorname{ExpIntegralEi}\left(-\frac{1}{6}i\left(6ix+5\left(3i-5\sqrt{15}\right)\right)\right)}{25\left(3i-5\sqrt{15}\right)^2}-$$

$$\frac{144\left(2241i-1495\sqrt{15}\right)e^{-\frac{5}{6}\left(3+5i\sqrt{15}\right)}\operatorname{ExpIntegralEi}\left(-\frac{1}{6}i\left(6ix+5\left(3i-5\sqrt{15}\right)\right)\right)}{625\left(3i-5\sqrt{15}\right)^3}-$$

$$\frac{144\left(2241i+1495\sqrt{15}\right)e^{\frac{5}{6}i\left(3i+5\sqrt{15}\right)}\operatorname{ExpIntegralEi}\left(-\frac{1}{6}i\left(6ix+5\left(3i+5\sqrt{15}\right)\right)\right)}{625\left(3i+5\sqrt{15}\right)^3}+$$

$$\frac{72\left(25+i\sqrt{15}\right)e^{\frac{5}{6}i\left(3i+5\sqrt{15}\right)}\operatorname{ExpIntegralEi}\left(-\frac{1}{6}i\left(6ix+5\left(3i+5\sqrt{15}\right)\right)\right)}{25\left(3i+5\sqrt{15}\right)^2}+$$

$$\frac{144e^{\frac{5}{6}i\left(3i+5\sqrt{15}\right)}\operatorname{ExpIntegralEi}\left(-\frac{1}{6}i\left(6ix+5\left(3i+5\sqrt{15}\right)\right)\right)}{625\left(3-5i\sqrt{15}\right)}+$$

$$\frac{288\left(423i+385\sqrt{15}\right)\operatorname{ExpIntegralEi}(x)}{625\left(3i+5\sqrt{15}\right)^3}-\frac{1536\sqrt{\frac{3}{5}}\operatorname{ExpIntegralEi}(x)}{625\left(3i+5\sqrt{15}\right)}+$$

$$\frac{288\left(1925+109i\sqrt{15}\right)\operatorname{ExpIntegralEi}(x)}{15625\left(3i+5\sqrt{15}\right)^2}-\frac{4608\operatorname{ExpIntegralEi}(x)}{125\left(3i+5\sqrt{15}\right)^2}+$$

$$\frac{288\left(1925-109i\sqrt{15}\right)\operatorname{ExpIntegralEi}(x)}{15625\left(3i-5\sqrt{15}\right)^2}+\frac{1536\sqrt{\frac{3}{5}}\operatorname{ExpIntegralEi}(x)}{625\left(3i-5\sqrt{15}\right)}-\frac{4608\operatorname{ExpIntegralEi}(x)}{125\left(3i-5\sqrt{15}\right)^2}+$$

$$\frac{288\left(423i-385\sqrt{15}\right)\operatorname{ExpIntegralEi}(x)}{625\left(3i-5\sqrt{15}\right)^3}+\frac{8}{75}\left(279+145i\sqrt{15}\right)\log\left(6ix+5\left(3i-5\sqrt{15}\right)\right)-$$

$$\frac{268}{75}\left(3+5i\sqrt{15}\right)\log\left(6ix+5\left(3i-5\sqrt{15}\right)\right)-\frac{12}{25}\left(61-5i\sqrt{15}\right)\log\left(6ix+5\left(3i-5\sqrt{15}\right)\right)+$$

$$\frac{256}{25}\log\left(6ix+5\left(3i-5\sqrt{15}\right)\right)+\frac{8}{75}\left(279-145i\sqrt{15}\right)\log\left(6ix+5\left(3i+5\sqrt{15}\right)\right)-$$

$$\frac{12}{25}\left(61+5i\sqrt{15}\right)\log\left(6ix+5\left(3i+5\sqrt{15}\right)\right)-\frac{268}{75}\left(3-5i\sqrt{15}\right)\log\left(6ix+5\left(3i+5\sqrt{15}\right)\right)+$$

$$\frac{256}{25}\log\left(6ix+5\left(3i+5\sqrt{15}\right)\right)-\frac{432\left(25i+\sqrt{15}\right)e^x}{25\left(3i-5\sqrt{15}\right)^2\left(6ix+5\left(3i-5\sqrt{15}\right)\right)}-$$

$$\frac{4\left(1673i+305\sqrt{15}\right)}{5\left(6ix+5\left(3i-5\sqrt{15}\right)\right)}+\frac{268\left(61i+5\sqrt{15}\right)}{5\left(6ix+5\left(3i-5\sqrt{15}\right)\right)}+\frac{256\left(3i-5\sqrt{15}\right)}{5\left(6ix+5\left(3i-5\sqrt{15}\right)\right)}-$$

$$\frac{8\left(279i-145\sqrt{15}\right)}{5\left(6ix+5\left(3i-5\sqrt{15}\right)\right)}-\frac{8192i}{5\left(6ix+5\left(3i-5\sqrt{15}\right)\right)}-\frac{432\left(25i-\sqrt{15}\right)e^x}{25\left(3i+5\sqrt{15}\right)^2\left(6ix+5\left(3i+5\sqrt{15}\right)\right)}-$$

$$\frac{8\left(279i+145\sqrt{15}\right)}{5\left(6ix+5\left(3i+5\sqrt{15}\right)\right)}+\frac{256\left(3i+5\sqrt{15}\right)}{5\left(6ix+5\left(3i+5\sqrt{15}\right)\right)}+\frac{268\left(61i-5\sqrt{15}\right)}{5\left(6ix+5\left(3i+5\sqrt{15}\right)\right)}-$$

$$\frac{4\left(1673i-305\sqrt{15}\right)}{5\left(6ix+5\left(3i+5\sqrt{15}\right)\right)}-\frac{8192i}{5\left(6ix+5\left(3i+5\sqrt{15}\right)\right)}+\frac{1536\sqrt{\frac{3}{5}}e^x}{625\left(3i+5\sqrt{15}\right)x}+\frac{4608e^x}{125\left(3i+5\sqrt{15}\right)^2x}-$$

3.774 $\int\frac{-2560000x^2-96000x^3-20100x^4-360x^5-36x^6+e^x\left(-240000+24000x+1800x^2+900x^3\right)}{640000x^2+24000x^3+5025x^4+90x^5+9x^6}\,dx$

input
```
Int[(-2560000*x^2 - 96000*x^3 - 20100*x^4 - 360*x^5 - 36*x^6 + E^x*(-24000
0 + 231000*x + 1800*x^2 + 900*x^3))/(640000*x^2 + 24000*x^3 + 5025*x^4 + 9
0*x^5 + 9*x^6),x]
```

output
```
((-8*I)/3125)*(320/(3*I - 5*Sqrt[15]) - I*x)^3 - ((6*I)/78125)*Sqrt[3/5]*(
320/(3*I - 5*Sqrt[15]) - I*x)^4 - ((8*I)/3125)*(320/(3*I + 5*Sqrt[15]) - I
*x)^3 + ((6*I)/78125)*Sqrt[3/5]*(320/(3*I + 5*Sqrt[15]) - I*x)^4 - ((8192*
I)/5)/(5*(3*I - 5*Sqrt[15]) + (6*I)*x) - (8*(279*I - 145*Sqrt[15]))/(5*(5*
(3*I - 5*Sqrt[15]) + (6*I)*x)) + (256*(3*I - 5*Sqrt[15]))/(5*(5*(3*I - 5*S
qrt[15]) + (6*I)*x)) + (268*(61*I + 5*Sqrt[15]))/(5*(5*(3*I - 5*Sqrt[15])
+ (6*I)*x)) - (4*(1673*I + 305*Sqrt[15]))/(5*(5*(3*I - 5*Sqrt[15]) + (6*I)
*x)) - (432*(25*I + Sqrt[15])*E^x)/(25*(3*I - 5*Sqrt[15])^2*(5*(3*I - 5*Sq
rt[15]) + (6*I)*x)) - ((8192*I)/5)/(5*(3*I + 5*Sqrt[15]) + (6*I)*x) - (4*(
1673*I - 305*Sqrt[15]))/(5*(5*(3*I + 5*Sqrt[15]) + (6*I)*x)) + (268*(61*I
- 5*Sqrt[15]))/(5*(5*(3*I + 5*Sqrt[15]) + (6*I)*x)) + (256*(3*I + 5*Sqrt[1
5]))/(5*(5*(3*I + 5*Sqrt[15]) + (6*I)*x)) - (8*(279*I + 145*Sqrt[15]))/(5*
(5*(3*I + 5*Sqrt[15]) + (6*I)*x)) - (432*(25*I - Sqrt[15])*E^x)/(25*(3*I +
 5*Sqrt[15])^2*(5*(3*I + 5*Sqrt[15]) + (6*I)*x)) + (4608*E^x)/(125*(3*I -
5*Sqrt[15])^2*x) - (1536*Sqrt[3/5]*E^x)/(625*(3*I - 5*Sqrt[15])*x) + (4608
*E^x)/(125*(3*I + 5*Sqrt[15])^2*x) + (1536*Sqrt[3/5]*E^x)/(625*(3*I + 5*Sq
rt[15])*x) + (536*x)/125 - (8*(3 - (5*I)*Sqrt[15])*x)/125 - (6*(61 - (5*I)
*Sqrt[15])*x)/125 - (8*(3 + (5*I)*Sqrt[15])*x)/125 - (6*(61 + (5*I)*Sqrt[1
5])*x)/125 + (24*x^2)/625 - (2*(3 - (5*I)*Sqrt[15])*x^2)/625 - (2*(3 + (5*
I)*Sqrt[15])*x^2)/625 + (8*x^3)/3125 - (144*(2241*I - 1495*Sqrt[15])*Ex...
```

3.771.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.771. $\int \frac{-2560000x^2-96000x^3-20100x^4-360x^5-36x^6+e^x\left(-240000+231000x+1800x^2+900x^3\right)}{640000x^2+24000x^3+5025x^4+90x^5+9x^6}\,dx$

3.771.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

method	result
risch	$-4x+\frac{300\,\mathrm{e}^{x}}{x(3x^{2}+15x+800)}$
norman	$\frac{-2900x^{2}+16000x-12x^{4}+300\,\mathrm{e}^{x}}{x(3x^{2}+15x+800)}$
parallelrisch	$-\frac{36x^{4}+8700x^{2}-48000x-900\,\mathrm{e}^{x}}{3x(3x^{2}+15x+800)}$
parts	$-4x+\frac{72\,\mathrm{e}^{x}(5+2x)}{125(3x^{2}+15x+800)}+\frac{3\,\mathrm{e}^{x}(279x^{2}+1635x+50000)}{500(3x^{2}+15x+800)x}-\frac{231\,\mathrm{e}^{x}(3x-305)}{500(3x^{2}+15x+800)}-\frac{12\,\mathrm{e}^{x}(3x+320)}{25(3x^{2}+15x+800)}$
default	$-\frac{4096(6x+15)}{15(3x^{2}+15x+800)}-\frac{256(-15x-1600)}{25(3x^{2}+15x+800)}-\frac{20100\left(-\frac{61x}{1125}+\frac{32}{225}\right)}{x^{2}+5x+\frac{800}{3}}-\frac{360\left(\frac{31x}{75}+\frac{1952}{135}\right)}{x^{2}+5x+\frac{800}{3}}-4x+\frac{-\frac{6692x}{15}+3968}{x^{2}+5x+\frac{800}{3}}+\frac{3\,\mathrm{e}^{x}\ldots}{5\ldots}$

input
```
int(((900*x^3+1800*x^2+231000*x-240000)*exp(x)-36*x^6-360*x^5-20100*x^4-96
000*x^3-2560000*x^2)/(9*x^6+90*x^5+5025*x^4+24000*x^3+640000*x^2),x,method
=_RETURNVERBOSE)
```

output
```
-4*x+300/x/(3*x^2+15*x+800)*exp(x)
```

3.771.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.52

$$\int \frac{-2560000x^{2}-96000x^{3}-20100x^{4}-360x^{5}-36x^{6}+e^{x}(-240000+231000x+1800x^{2}+900x^{3})}{640000x^{2}+24000x^{3}+5025x^{4}+90x^{5}+9x^{6}}\,dx$$
$$=-\frac{4\left(3\,x^{4}+15\,x^{3}+800\,x^{2}-75\,e^{x}\right)}{3\,x^{3}+15\,x^{2}+800\,x}$$

input
```
integrate(((900*x^3+1800*x^2+231000*x-240000)*exp(x)-36*x^6-360*x^5-20100*
x^4-96000*x^3-2560000*x^2)/(9*x^6+90*x^5+5025*x^4+24000*x^3+640000*x^2),x,
 algorithm=\
```

output
```
-4*(3*x^4 + 15*x^3 + 800*x^2 - 75*e^x)/(3*x^3 + 15*x^2 + 800*x)
```

3.771.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{-2560000x^2 - 96000x^3 - 20100x^4 - 360x^5 - 36x^6 + e^x(-240000 + 231000x + 1800x^2 + 900x^3)}{640000x^2 + 24000x^3 + 5025x^4 + 90x^5 + 9x^6}\,dx = -4x + \frac{300e^x}{3x^3 + 15x^2 + 800x}$$

input
```
integrate(((900*x**3+1800*x**2+231000*x-240000)*exp(x)-36*x**6-360*x**5-20
100*x**4-96000*x**3-2560000*x**2)/(9*x**6+90*x**5+5025*x**4+24000*x**3+640
000*x**2),x)
```

output
```
-4*x + 300*exp(x)/(3*x**3 + 15*x**2 + 800*x)
```

3.771.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 119 vs. 2(21) = 42.

Time = 0.31 (sec) , antiderivative size = 119, normalized size of antiderivative = 4.76

$$\int \frac{-2560000x^2 - 96000x^3 - 20100x^4 - 360x^5 - 36x^6 + e^x(-240000 + 231000x + 1800x^2 + 900x^3)}{640000x^2 + 24000x^3 + 5025x^4 + 90x^5 + 9x^6}\,dx = -4\,x - \frac{4\,(1673\,x - 14880)}{5\,(3\,x^2 + 15\,x + 800)} - \frac{8\,(279\,x + 9760)}{5\,(3\,x^2 + 15\,x + 800)} + \frac{268\,(61\,x - 160)}{5\,(3\,x^2 + 15\,x + 800)} + \frac{256\,(3\,x + 320)}{5\,(3\,x^2 + 15\,x + 800)} - \frac{4096\,(2\,x + 5)}{5\,(3\,x^2 + 15\,x + 800)} + \frac{300\,e^x}{3\,x^3 + 15\,x^2 + 800\,x}$$

input
```
integrate(((900*x^3+1800*x^2+231000*x-240000)*exp(x)-36*x^6-360*x^5-20100*
x^4-96000*x^3-2560000*x^2)/(9*x^6+90*x^5+5025*x^4+24000*x^3+640000*x^2),x,
 algorithm=\
```

output
```
-4*x - 4/5*(1673*x - 14880)/(3*x^2 + 15*x + 800) - 8/5*(279*x + 9760)/(3*x
^2 + 15*x + 800) + 268/5*(61*x - 160)/(3*x^2 + 15*x + 800) + 256/5*(3*x +
320)/(3*x^2 + 15*x + 800) - 4096/5*(2*x + 5)/(3*x^2 + 15*x + 800) + 300*e^
x/(3*x^3 + 15*x^2 + 800*x)
```

3.771.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.52

$$\int \frac{-2560000x^2 - 96000x^3 - 20100x^4 - 360x^5 - 36x^6 + e^x(-240000 + 231000x + 1800x^2 + 900x^3)}{640000x^2 + 24000x^3 + 5025x^4 + 90x^5 + 9x^6}\,dx$$
$$= -\frac{4\,(3\,x^4 + 15\,x^3 + 800\,x^2 - 75\,e^x)}{3\,x^3 + 15\,x^2 + 800\,x}$$

input
```
integrate(((900*x^3+1800*x^2+231000*x-240000)*exp(x)-36*x^6-360*x^5-20100*
x^4-96000*x^3-2560000*x^2)/(9*x^6+90*x^5+5025*x^4+24000*x^3+640000*x^2),x,
 algorithm=\
```

output
```
-4*(3*x^4 + 15*x^3 + 800*x^2 - 75*e^x)/(3*x^3 + 15*x^2 + 800*x)
```

3.771.9 Mupad [B] (verification not implemented)

Time = 15.58 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-2560000x^2 - 96000x^3 - 20100x^4 - 360x^5 - 36x^6 + e^x(-240000 + 231000x + 1800x^2 + 900x^3)}{640000x^2 + 24000x^3 + 5025x^4 + 90x^5 + 9x^6}\,dx$$
$$= \frac{300\,e^x}{x\,(3\,x^2 + 15\,x + 800)} - 4\,x$$

input
```
int(-(2560000*x^2 + 96000*x^3 + 20100*x^4 + 360*x^5 + 36*x^6 - exp(x)*(231
000*x + 1800*x^2 + 900*x^3 - 240000))/(640000*x^2 + 24000*x^3 + 5025*x^4 +
 90*x^5 + 9*x^6),x)
```

output
```
(300*exp(x))/(x*(15*x + 3*x^2 + 800)) - 4*x
```

3.772 $\int (1650 + 838x + 108x^2 + 4x^3 + e^4(6 + 2x) + e^3(30$

3.772.1 Optimal result

Integrand size = 52, antiderivative size = 20

$$\int \left(1650 + 838x + 108x^2 + 4x^3 + e^4(6 + 2x) + e^3\left(30 + 2e^2 + 2x\right) + e^2\left(198 + 84x + 6x^2\right)\right) dx = \left(e^3 + (3 + x)^2\right)\left(5 + \left(15 + e^2 + x\right)^2\right)$$

output
```
(5+(x+exp(2)+15)^2)*((3+x)^2+exp(3))
```

3.772.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 83 vs. 2(20) = 40.

Time = 0.01 (sec) , antiderivative size = 83, normalized size of antiderivative = 4.15

$$\int \left(1650 + 838x + 108x^2 + 4x^3 + e^4(6 + 2x) + e^3\left(30 + 2e^2 + 2x\right) + e^2\left(198 + 84x + 6x^2\right)\right) dx = 2\left(825x + 99e^2x + 15e^3x + 3e^4x + e^5x + \frac{419x^2}{2} + 21e^2x^2 + \frac{e^3x^2}{2} + \frac{e^4x^2}{2} + 18x^3 + e^2x^3 + \frac{x^4}{2}\right)$$

input
```
Integrate[1650 + 838*x + 108*x^2 + 4*x^3 + E^4*(6 + 2*x) + E^3*(30 + 2*E^2
 + 2*x) + E^2*(198 + 84*x + 6*x^2),x]
```

output
```
2*(825*x + 99*E^2*x + 15*E^3*x + 3*E^4*x + E^5*x + (419*x^2)/2 + 21*E^2*x^
2 + (E^3*x^2)/2 + (E^4*x^2)/2 + 18*x^3 + E^2*x^3 + x^4/2)
```

3.772.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 60 vs. 2(20) = 40.

Time = 0.19 (sec) , antiderivative size = 60, normalized size of antiderivative = 3.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.019$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(4x^3+108x^2+e^2\left(6x^2+84x+198\right)+838x+e^4(2x+6)+e^3\left(2x+2e^2+30\right)+1650\right)\,dx$$

$$\Big\downarrow \text{2009}$$

$$x^4+2e^2x^3+36x^3+42e^2x^2+419x^2+198e^2x+1650x+e^4(x+3)^2+e^3\left(x+e^2+15\right)^2$$

input
```
Int[1650 + 838*x + 108*x^2 + 4*x^3 + E^4*(6 + 2*x) + E^3*(30 + 2*E^2 + 2*x
) + E^2*(198 + 84*x + 6*x^2),x]
```

output
```
1650*x + 198*E^2*x + 419*x^2 + 42*E^2*x^2 + 36*x^3 + 2*E^2*x^3 + x^4 + E^4
*(3 + x)^2 + E^3*(15 + E^2 + x)^2
```

3.772.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.772.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(18) = 36.

Time = 0.18 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.75

method	result
norman	$x^4+(2\,\mathrm{e}^2+36)\,x^3+(\mathrm{e}^4+42\,\mathrm{e}^2+\mathrm{e}^3+419)\,x^2+(6\,\mathrm{e}^4+2\,\mathrm{e}^2\mathrm{e}^3+198\,\mathrm{e}^2+30\,\mathrm{e}^3+1650)\,x$
gosper	$x(x\,\mathrm{e}^4+2x^2\mathrm{e}^2+x^3+6\,\mathrm{e}^4+2\,\mathrm{e}^2\mathrm{e}^3+42\,\mathrm{e}^2x+x\,\mathrm{e}^3+36x^2+198\,\mathrm{e}^2+30\,\mathrm{e}^3+419x+1650)$
risch	$2x\,\mathrm{e}^5+x^2\mathrm{e}^3+30x\,\mathrm{e}^3+x^2\mathrm{e}^4+6x\,\mathrm{e}^4+2x^3\mathrm{e}^2+42x^2\mathrm{e}^2+198\,\mathrm{e}^2x+x^4+36x^3+419x^2+16$
default	$x^2\mathrm{e}^4+2x^3\mathrm{e}^2+x^4+6x\,\mathrm{e}^4+2x\,\mathrm{e}^2\mathrm{e}^3+42x^2\mathrm{e}^2+x^2\mathrm{e}^3+36x^3+198\,\mathrm{e}^2x+30x\,\mathrm{e}^3+419x^2+$
parallelrisch	$x^2\mathrm{e}^4+2x^3\mathrm{e}^2+x^4+6x\,\mathrm{e}^4+2x\,\mathrm{e}^2\mathrm{e}^3+42x^2\mathrm{e}^2+x^2\mathrm{e}^3+36x^3+198\,\mathrm{e}^2x+30x\,\mathrm{e}^3+419x^2+$
parts	$x^2\mathrm{e}^4+2x^3\mathrm{e}^2+x^4+6x\,\mathrm{e}^4+2x\,\mathrm{e}^2\mathrm{e}^3+42x^2\mathrm{e}^2+x^2\mathrm{e}^3+36x^3+198\,\mathrm{e}^2x+30x\,\mathrm{e}^3+419x^2+$

input
```
int((2*exp(2)+2*x+30)*exp(3)+(2*x+6)*exp(2)^2+(6*x^2+84*x+198)*exp(2)+4*x^
3+108*x^2+838*x+1650,x,method=_RETURNVERBOSE)
```

output
```
x^4+(2*exp(2)+36)*x^3+(exp(2)^2+42*exp(2)+exp(3)+419)*x^2+(6*exp(2)^2+2*ex
p(2)*exp(3)+198*exp(2)+30*exp(3)+1650)*x
```

3.772.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(18) = 36$.

Time = 0.25 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.90

$$\int (1650+838x+108x^2+4x^3+e^4(6+2x)+e^3(30+2e^2+2x)+e^2(198+84x+6x^2))\,dx=x^4+36\,x^3+419\,x^2+2\,xe^5+(x^2+6\,x)e^4+(x^2+30\,x)e^3+2\,(x^3+21\,x^2+99\,x)e^2+1650\,x$$

input
```
integrate((2*exp(2)+2*x+30)*exp(3)+(2*x+6)*exp(2)^2+(6*x^2+84*x+198)*exp(2
)+4*x^3+108*x^2+838*x+1650,x, algorithm=\
```

output
```
x^4 + 36*x^3 + 419*x^2 + 2*x*e^5 + (x^2 + 6*x)*e^4 + (x^2 + 30*x)*e^3 + 2*
(x^3 + 21*x^2 + 99*x)*e^2 + 1650*x
```

3.772.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(17) = 34.

Time = 0.03 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.65

$$\int \left(1650+838x+108x^2+4x^3+e^4(6+2x)+e^3\left(30+2e^2+2x\right)+e^2\left(198+84x+6x^2\right)\right)\,dx = x^4 + x^3\cdot\left(2e^2+36\right)+x^2\left(e^3+e^4+42e^2+419\right)+x\left(2e^5+6e^4+30e^3+198e^2+1650\right)$$

input
```
integrate((2*exp(2)+2*x+30)*exp(3)+(2*x+6)*exp(2)**2+(6*x**2+84*x+198)*exp
(2)+4*x**3+108*x**2+838*x+1650,x)
```

output
```
x**4 + x**3*(2*exp(2) + 36) + x**2*(exp(3) + exp(4) + 42*exp(2) + 419) + x
*(2*exp(5) + 6*exp(4) + 30*exp(3) + 198*exp(2) + 1650)
```

3.772.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(18) = 36.

Time = 0.20 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.90

$$\int \left(1650+838x+108x^2+4x^3+e^4(6+2x)+e^3\left(30+2e^2+2x\right)+e^2\left(198+84x+6x^2\right)\right)\,dx = x^4 + 36\,x^3+419\,x^2+\left(x^2+6\,x\right)e^4+\left(x^2+2\,xe^2+30\,x\right)e^3+2\,\left(x^3+21\,x^2+99\,x\right)e^2+1650\,x$$

input
```
integrate((2*exp(2)+2*x+30)*exp(3)+(2*x+6)*exp(2)^2+(6*x^2+84*x+198)*exp(2
)+4*x^3+108*x^2+838*x+1650,x, algorithm=\
```

output
```
x^4 + 36*x^3 + 419*x^2 + (x^2 + 6*x)*e^4 + (x^2 + 2*x*e^2 + 30*x)*e^3 + 2*
(x^3 + 21*x^2 + 99*x)*e^2 + 1650*x
```

3.772.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(18) = 36$.

Time = 0.26 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.90

$$\int (1650+838x+108x^2+4x^3+e^4(6+2x)+e^3(30+2e^2+2x)+e^2(198+84x+6x^2))\,dx = x^4 + 36x^3 + 419x^2 + (x^2+6x)e^4 + (x^2+2xe^2+30x)e^3 + 2(x^3+21x^2+99x)e^2 + 1650x$$

input
```
integrate((2*exp(2)+2*x+30)*exp(3)+(2*x+6)*exp(2)^2+(6*x^2+84*x+198)*exp(2
)+4*x^3+108*x^2+838*x+1650,x, algorithm=\
```

output
```
x^4 + 36*x^3 + 419*x^2 + (x^2 + 6*x)*e^4 + (x^2 + 2*x*e^2 + 30*x)*e^3 + 2*
(x^3 + 21*x^2 + 99*x)*e^2 + 1650*x
```

3.772.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.45

$$\int (1650+838x+108x^2+4x^3+e^4(6+2x)+e^3(30+2e^2+2x)+e^2(198+84x+6x^2))\,dx = x^4 + (2e^2+36)x^3 + (42e^2+e^3+e^4+419)x^2 + (198e^2+6e^4+e^3(2e^2+30)+1650)x$$

input
```
int(838*x + exp(2)*(84*x + 6*x^2 + 198) + exp(3)*(2*x + 2*exp(2) + 30) + 1
08*x^2 + 4*x^3 + exp(4)*(2*x + 6) + 1650,x)
```

output
```
x^2*(42*exp(2) + exp(3) + exp(4) + 419) + x^3*(2*exp(2) + 36) + x*(198*exp
(2) + 6*exp(4) + exp(3)*(2*exp(2) + 30) + 1650) + x^4
```

3.773 $\int \frac{-256+32x+255x^2-32x^3+x^4+e^{-10+x}(32x^2-17x^4+x^5)+(256-32x+$

3.773.1 Optimal result

Integrand size = 66, antiderivative size = 25

$$\int \frac{-256+32x+255x^2-32x^3+x^4+e^{-10+x}(32x^2-17x^4+x^5)+(256-32x+x^2)\log(x)}{256x^2-32x^3+x^4}\,dx$$
$$=-2+x+\frac{e^{-10+x}(-2+x)x}{-16+x}-\frac{\log(x)}{x}$$

output
```
exp(x-10)/(x-16)*(-2+x)*x-ln(x)/x+x-2
```

3.773.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{-256+32x+255x^2-32x^3+x^4+e^{-10+x}(32x^2-17x^4+x^5)+(256-32x+x^2)\log(x)}{256x^2-32x^3+x^4}\,dx$$
$$=x+\frac{e^{-10+x}(-2+x)x}{-16+x}-\frac{\log(x)}{x}$$

input
```
Integrate[(-256 + 32*x + 255*x^2 - 32*x^3 + x^4 + E^(-10 + x)*(32*x^2 - 17
*x^4 + x^5) + (256 - 32*x + x^2)*Log[x])/(256*x^2 - 32*x^3 + x^4),x]
```

output
```
x + (E^(-10 + x)*(-2 + x)*x)/(-16 + x) - Log[x]/x
```

3.773.3 Rubi [A] (verified)

Time = 0.74 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.48, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {2026, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4-32x^3+255x^2+\left(x^2-32x+256\right)\log(x)+e^{x-10}\left(x^5-17x^4+32x^2\right)+32x-256}{x^4-32x^3+256x^2}dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{x^4-32x^3+255x^2+\left(x^2-32x+256\right)\log(x)+e^{x-10}\left(x^5-17x^4+32x^2\right)+32x-256}{x^2\left(x^2-32x+256\right)}dx$$

$$\Big\downarrow \ 7239$$

$$\int \left(-\frac{1}{x^2}+\frac{\log(x)}{x^2}+\frac{e^{x-10}\left(x^3-17x^2+32\right)}{(x-16)^2}+1\right)dx$$

$$\Big\downarrow \ 2009$$

$$e^{x-10}x+x+14e^{x-10}-\frac{224e^{x-10}}{16-x}-\frac{\log(x)}{x}$$

input
```
Int[(-256 + 32*x + 255*x^2 - 32*x^3 + x^4 + E^(-10 + x)*(32*x^2 - 17*x^4 +
 x^5) + (256 - 32*x + x^2)*Log[x])/(256*x^2 - 32*x^3 + x^4),x]
```

output
```
14*E^(-10 + x) - (224*E^(-10 + x))/(16 - x) + x + E^(-10 + x)*x - Log[x]/x
```

3.773.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.773.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

method	result	size
risch	$-\frac{\ln(x)}{x}+\frac{x(x\,\mathrm{e}^{x-10}+x-2\,\mathrm{e}^{x-10}-16)}{x-16}$	31
default	$x-\frac{\ln(x)}{x}+\mathrm{e}^{x-10}(x-10)+24\,\mathrm{e}^{x-10}+\frac{224\,\mathrm{e}^{x-10}}{x-16}$	35
parts	$x-\frac{\ln(x)}{x}+\mathrm{e}^{x-10}(x-10)+24\,\mathrm{e}^{x-10}+\frac{224\,\mathrm{e}^{x-10}}{x-16}$	35
parallelrisch	$\frac{16x^3\mathrm{e}^{x-10}+16x^3-32x^2\mathrm{e}^{x-10}-16x\ln(x)-4096x+256\ln(x)}{16x(x-16)}$	47

input
```
int(((x^2-32*x+256)*ln(x)+(x^5-17*x^4+32*x^2)*exp(x-10)+x^4-32*x^3+255*x^2
+32*x-256)/(x^4-32*x^3+256*x^2),x,method=_RETURNVERBOSE)
```

output
```
-ln(x)/x+x*(x*exp(x-10)+x-2*exp(x-10)-16)/(x-16)
```

3.773.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60

$$\int \frac{-256+32x+255x^2-32x^3+x^4+e^{-10+x}(32x^2-17x^4+x^5)+(256-32x+x^2)\log(x)}{256x^2-32x^3+x^4}\,dx$$
$$=\frac{x^3-16\,x^2+(x^3-2\,x^2)e^{(x-10)}-(x-16)\log(x)}{x^2-16\,x}$$

input
```
integrate(((x^2-32*x+256)*log(x)+(x^5-17*x^4+32*x^2)*exp(x-10)+x^4-32*x^3+
255*x^2+32*x-256)/(x^4-32*x^3+256*x^2),x, algorithm=\
```

output
```
(x^3 - 16*x^2 + (x^3 - 2*x^2)*e^(x - 10) - (x - 16)*log(x))/(x^2 - 16*x)
```

3.773.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{-256+32x+255x^2-32x^3+x^4+e^{-10+x}(32x^2-17x^4+x^5)+(256-32x+x^2)\log(x)}{256x^2-32x^3+x^4}\,dx$$
$$= x+\frac{(x^2-2x)\,e^{x-10}}{x-16}-\frac{\log{(x)}}{x}$$

input
```
integrate(((x**2-32*x+256)*ln(x)+(x**5-17*x**4+32*x**2)*exp(x-10)+x**4-32*
x**3+255*x**2+32*x-256)/(x**4-32*x**3+256*x**2),x)
```

output
```
x + (x**2 - 2*x)*exp(x - 10)/(x - 16) - log(x)/x
```

3.773.7 Maxima [F]

$$\int \frac{-256+32x+255x^2-32x^3+x^4+e^{-10+x}(32x^2-17x^4+x^5)+(256-32x+x^2)\log(x)}{256x^2-32x^3+x^4}\,dx$$
$$= \int \frac{x^4-32\,x^3+255\,x^2+(x^5-17\,x^4+32\,x^2)e^{(x-10)}+(x^2-32\,x+256)\log{(x)}+32\,x-256}{x^4-32\,x^3+256\,x^2}\,dx$$

input
```
integrate(((x^2-32*x+256)*log(x)+(x^5-17*x^4+32*x^2)*exp(x-10)+x^4-32*x^3+
255*x^2+32*x-256)/(x^4-32*x^3+256*x^2),x, algorithm=\
```

output
```
x - 32*e^6*exp_integral_e(2, -x + 16)/(x - 16) + 2*(x - 8)/(x^2 - 16*x) -
(log(x) + 1)/x - 1/(x - 16) + integrate((x^3 - 17*x^2)*e^x/(x^2*e^10 - 32*
x*e^10 + 256*e^10), x)
```

3.773.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(24) = 48.

Time = 0.27 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.20

$$\int \frac{-256+32x+255x^2-32x^3+x^4+e^{-10+x}(32x^2-17x^4+x^5)+(256-32x+x^2)\log(x)}{256x^2-32x^3+x^4}\,dx$$
$$= \frac{x^3e^{10}+x^3e^x-16\,x^2e^{10}-2\,x^2e^x-xe^{10}\log{(x)}+16\,e^{10}\log{(x)}}{x^2e^{10}-16\,xe^{10}}$$

input
```
integrate(((x^2-32*x+256)*log(x)+(x^5-17*x^4+32*x^2)*exp(x-10)+x^4-32*x^3+
255*x^2+32*x-256)/(x^4-32*x^3+256*x^2),x, algorithm=\
```

output
```
(x^3*e^10 + x^3*e^x - 16*x^2*e^10 - 2*x^2*e^x - x*e^10*log(x) + 16*e^10*lo
g(x))/(x^2*e^10 - 16*x*e^10)
```

3.773.9 Mupad [B] (verification not implemented)

Time = 15.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{-256+32x+255x^2-32x^3+x^4+e^{-10+x}(32x^2-17x^4+x^5)+(256-32x+x^2)\log(x)}{256x^2-32x^3+x^4}\,dx$$
$$= x-\frac{\ln(x)}{x}-\frac{\mathrm{e}^{x-10}\,(2\,x-x^2)}{x-16}$$

input
```
int((32*x + exp(x - 10)*(32*x^2 - 17*x^4 + x^5) + log(x)*(x^2 - 32*x + 256
) + 255*x^2 - 32*x^3 + x^4 - 256)/(256*x^2 - 32*x^3 + x^4),x)
```

output
```
x - log(x)/x - (exp(x - 10)*(2*x - x^2))/(x - 16)
```

3.774 $\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-4$

3.774.1 Optimal result

Integrand size = 151, antiderivative size = 33

$$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-42x^5-24x^6)+e^{2x}(2x^4+}{x^3}$$
$$=\left(e^4\left(3+\frac{4}{x}\right)-x-\left(-e^x+x^2\right)\left(x+x^2\right)\right)^2$$

output
```
((4/x+3)*exp(4)-(-exp(x)+x^2)*(x^2+x)-x)^2
```

3.774.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 98 vs. 2(33) = 66.

Time = 0.49 (sec) , antiderivative size = 98, normalized size of antiderivative = 2.97

$$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-42x^5-24x^6)+e^{2x}(2x^4+}{x^3}$$
$$=e^{2x}x^2(1+x)^2+\frac{8e^8(2+3x)}{x^2}+2e^{4+x}\left(4+7x+3x^2\right)$$
$$-2e^4x\left(3+4x+7x^2+3x^3\right)+\left(x+x^3+x^4\right)^2-2e^xx^2\left(1+x+x^2+2x^3+x^4\right)$$

input
```
Integrate[(E^8*(-32 - 24*x) + 2*x^4 + 8*x^6 + 10*x^7 + 6*x^8 + 14*x^9 + 8*
x^10 + E^4*(-6*x^3 - 16*x^4 - 42*x^5 - 24*x^6) + E^(2*x)*(2*x^4 + 8*x^5 +
8*x^6 + 2*x^7) + E^x*(-4*x^4 - 8*x^5 - 10*x^6 - 22*x^7 - 16*x^8 - 2*x^9 +
E^4*(22*x^3 + 26*x^4 + 6*x^5)))/x^3,x]
```

output
```
E^(2*x)*x^2*(1 + x)^2 + (8*E^8*(2 + 3*x))/x^2 + 2*E^(4 + x)*(4 + 7*x + 3*x
^2) - 2*E^4*x*(3 + 4*x + 7*x^2 + 3*x^3) + (x + x^3 + x^4)^2 - 2*E^x*x^2*(1
 + x + x^2 + 2*x^3 + x^4)
```

3.774.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 221 vs. 2(33) = 66.

Time = 0.79 (sec) , antiderivative size = 221, normalized size of antiderivative = 6.70, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.013$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^{10}+14x^9+6x^8+10x^7+8x^6+2x^4+e^{2x}\left(2x^7+8x^6+8x^5+2x^4\right)+e^4\left(-24x^6-42x^5-16x^4-6x^3\right)+e^x}{x^3}$$

$$\Big\downarrow \text{2010}$$

$$\int \left(2e^{2x}x(x+1)\left(x^2+3x+1\right)+2e^x\left(-x^6-8x^5-11x^4-5x^3-4\left(1-\frac{3e^4}{4}\right)x^2-2\left(1-\frac{13e^4}{2}\right)x+11e^4\right)+\right.$$

$$\Big\downarrow \text{2009}$$

$$x^8+2x^7-2e^xx^6+x^6-4e^xx^5+2x^5-2e^xx^4+e^{2x}x^4+2\left(1-3e^4\right)x^4-2e^xx^3+2e^{2x}x^3-14e^4x^3+6e^xx^2+e^{2x}x^2-2\left(4-3e^4\right)e^xx^2+\left(1-8e^4\right)x^2+\frac{16e^8}{x^2}-12e^xx+4\left(4-3e^4\right)e^xx-2\left(2-13e^4\right)e^xx-6e^4x+12e^x+22e^{x+4}-4\left(4-3e^4\right)e^x+2\left(2-13e^4\right)e^x+\frac{24e^8}{x}$$

input
```
Int[(E^8*(-32 - 24*x) + 2*x^4 + 8*x^6 + 10*x^7 + 6*x^8 + 14*x^9 + 8*x^10 +
 E^4*(-6*x^3 - 16*x^4 - 42*x^5 - 24*x^6) + E^(2*x)*(2*x^4 + 8*x^5 + 8*x^6
+ 2*x^7) + E^x*(-4*x^4 - 8*x^5 - 10*x^6 - 22*x^7 - 16*x^8 - 2*x^9 + E^4*(2
2*x^3 + 26*x^4 + 6*x^5)))/x^3,x]
```

output
```
12*E^x + 22*E^(4 + x) + 2*E^x*(2 - 13*E^4) - 4*E^x*(4 - 3*E^4) + (16*E^8)/
x^2 + (24*E^8)/x - 6*E^4*x - 12*E^x*x - 2*E^x*(2 - 13*E^4)*x + 4*E^x*(4 -
3*E^4)*x + 6*E^x*x^2 + E^(2*x)*x^2 + (1 - 8*E^4)*x^2 - 2*E^x*(4 - 3*E^4)*x
^2 - 14*E^4*x^3 - 2*E^x*x^3 + 2*E^(2*x)*x^3 - 2*E^x*x^4 + E^(2*x)*x^4 + 2*
(1 - 3*E^4)*x^4 + 2*x^5 - 4*E^x*x^5 + x^6 - 2*E^x*x^6 + 2*x^7 + x^8
```

3.774.

$$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4\left(-6x^3-16x^4-42x^5-24x^6\right)+e^{2x}\left(2x^4+8x^5+8x^6+2x^7\right)+e^x\left(-4x^4-8x^5-10x^6-22x^7-16x^8\right.}{x^3}$$

3.774.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.774.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 127 vs. $2(31) = 62$.

Time = 0.32 (sec) , antiderivative size = 128, normalized size of antiderivative = 3.88

method	result
risch	$x^8+2x^7+x^6-6x^4e^4+2x^5-14x^3e^4+2x^4-8x^2e^4-6x\,e^4+x^2+\frac{24x\,e^8+16\,e^8}{x^2}+(x^4+2x^3$
norman	$\frac{x^8+x^{10}+e^{2x}x^6+(2-6\,e^4)x^6+(-8\,e^4+1)x^4+e^{2x}x^4+(-2+6\,e^4)x^4e^x+2x^7+2x^9+16\,e^8+24x\,e^8-6x^3e^4-14x^5e^4-2x^5e^x+2x^5e}{x^2}$
parallelrisch	$\frac{x^{10}-2x^8e^x+2x^9-4x^7e^x+x^8-6x^6e^4-2x^6e^x+e^{2x}x^6+2x^7+6\,e^4e^xx^4-14x^5e^4-2x^5e^x+2x^5e^{2x}+2x^6+14\,e^4e^xx^3-8x^4e^4-2\,e^xx}{x^2}$
parts	$-4x^5e^x-2\,e^xx^4-2\,e^xx^3-2\,e^xx^2-2x^6e^x+22\,e^4e^x+26\,e^4(e^xx-e^x)+6\,e^4(e^xx^2-2\,e^xx$
default	$-4x^5e^x-2\,e^xx^4-2\,e^xx^3-2\,e^xx^2-2x^6e^x+22\,e^4e^x+26\,e^4(e^xx-e^x)+6\,e^4(e^xx^2-2\,e^xx$

input
```
int(((2*x^7+8*x^6+8*x^5+2*x^4)*exp(x)^2+((6*x^5+26*x^4+22*x^3)*exp(4)-2*x^
9-16*x^8-22*x^7-10*x^6-8*x^5-4*x^4)*exp(x)+(-24*x-32)*exp(4)^2+(-24*x^6-42
*x^5-16*x^4-6*x^3)*exp(4)+8*x^10+14*x^9+6*x^8+10*x^7+8*x^6+2*x^4)/x^3,x,me
thod=_RETURNVERBOSE)
```

output
```
x^8+2*x^7+x^6-6*x^4*exp(4)+2*x^5-14*x^3*exp(4)+2*x^4-8*x^2*exp(4)-6*x*exp(
4)+x^2+(24*x*exp(8)+16*exp(8))/x^2+(x^4+2*x^3+x^2)*exp(2*x)+(-2*x^6-4*x^5-
2*x^4+6*x^2*exp(4)-2*x^3+14*x*exp(4)-2*x^2+8*exp(4))*exp(x)
```

3.774.
$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-42x^5-24x^6)+e^{2x}(2x^4+8x^5+8x^6+2x^7)+e^x(-4x^4-8x^5-10x^6-22x^7-16x^8}{x^3}$

3.774.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 122 vs. 2(29) = 58.

Time = 0.27 (sec) , antiderivative size = 122, normalized size of antiderivative = 3.70

$$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-42x^5-24x^6)+e^{2x}(2x^4+}{x^3}$$
$$=\frac{x^{10}+2x^9+x^8+2x^7+2x^6+x^4+8(3x+2)e^8-2(3x^6+7x^5+4x^4+3x^3)e^4+(x^6+2x^5+x^4)e^{(2x)}}{x^2}$$

input
```
integrate(((2*x^7+8*x^6+8*x^5+2*x^4)*exp(x)^2+((6*x^5+26*x^4+22*x^3)*exp(4
)-2*x^9-16*x^8-22*x^7-10*x^6-8*x^5-4*x^4)*exp(x)+(-24*x-32)*exp(4)^2+(-24*
x^6-42*x^5-16*x^4-6*x^3)*exp(4)+8*x^10+14*x^9+6*x^8+10*x^7+8*x^6+2*x^4)/x^
3,x, algorithm=\
```

output
```
(x^10 + 2*x^9 + x^8 + 2*x^7 + 2*x^6 + x^4 + 8*(3*x + 2)*e^8 - 2*(3*x^6 + 7
*x^5 + 4*x^4 + 3*x^3)*e^4 + (x^6 + 2*x^5 + x^4)*e^(2*x) - 2*(x^8 + 2*x^7 +
 x^6 + x^5 + x^4 - (3*x^4 + 7*x^3 + 4*x^2)*e^4)*e^x)/x^2
```

3.774.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 133 vs. 2(22) = 44.

Time = 0.18 (sec) , antiderivative size = 133, normalized size of antiderivative = 4.03

$$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-42x^5-24x^6)+e^{2x}(2x^4+}{x^3}$$
$$=x^8+2x^7+x^6+2x^5+x^4\cdot\left(2-6e^4\right)-14x^3e^4+x^2\cdot\left(1-8e^4\right)-6xe^4+\left(x^4+2x^3+x^2\right)e^{2x}$$
$$+\left(-2x^6-4x^5-2x^4-2x^3-2x^2+6x^2e^4+14xe^4+8e^4\right)e^x+\frac{24xe^8+16e^8}{x^2}$$

input
```
integrate(((2*x**7+8*x**6+8*x**5+2*x**4)*exp(x)**2+((6*x**5+26*x**4+22*x**
3)*exp(4)-2*x**9-16*x**8-22*x**7-10*x**6-8*x**5-4*x**4)*exp(x)+(-24*x-32)*
exp(4)**2+(-24*x**6-42*x**5-16*x**4-6*x**3)*exp(4)+8*x**10+14*x**9+6*x**8+
10*x**7+8*x**6+2*x**4)/x**3,x)
```

output
```
x**8 + 2*x**7 + x**6 + 2*x**5 + x**4*(2 - 6*exp(4)) - 14*x**3*exp(4) + x**
2*(1 - 8*exp(4)) - 6*x*exp(4) + (x**4 + 2*x**3 + x**2)*exp(2*x) + (-2*x**6
 - 4*x**5 - 2*x**4 - 2*x**3 - 2*x**2 + 6*x**2*exp(4) + 14*x*exp(4) + 8*exp
(4))*exp(x) + (24*x*exp(8) + 16*exp(8))/x**2
```

3.774.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 294 vs. 2(29) = 58.

Time = 0.21 (sec) , antiderivative size = 294, normalized size of antiderivative = 8.91

$$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-42x^5-24x^6)+e^{2x}(2x^4+}{x^3}$$

$$\begin{aligned}&= x^8+2\,x^7+x^6+2\,x^5-6\,x^4e^4+2\,x^4-14\,x^3e^4-8\,x^2e^4 \\ &\quad +x^2-6\,xe^4+\frac{1}{2}\left(2\,x^4-4\,x^3+6\,x^2-6\,x+3\right)e^{(2\,x)} \\ &\quad +\left(4\,x^3-6\,x^2+6\,x-3\right)e^{(2\,x)}+2\left(2\,x^2-2\,x+1\right)e^{(2\,x)}+\frac{1}{2}\left(2\,x-1\right)e^{(2\,x)} \\ &\quad -2\left(x^6-6\,x^5+30\,x^4-120\,x^3+360\,x^2-720\,x+720\right)e^x \\ &\quad -16\left(x^5-5\,x^4+20\,x^3-60\,x^2+120\,x-120\right)e^x-22\left(x^4-4\,x^3+12\,x^2-24\,x+24\right)e^x \\ &\quad -10\left(x^3-3\,x^2+6\,x-6\right)e^x+6\left(x^2e^4-2\,xe^4+2\,e^4\right)e^x-8\left(x^2-2\,x+2\right)e^x \\ &\quad +26\left(xe^4-e^4\right)e^x-4\,(x-1)e^x+\frac{24\,e^8}{x}+\frac{16\,e^8}{x^2}+22\,e^{(x+4)}\end{aligned}$$

input
```
integrate(((2*x^7+8*x^6+8*x^5+2*x^4)*exp(x)^2+((6*x^5+26*x^4+22*x^3)*exp(4
)-2*x^9-16*x^8-22*x^7-10*x^6-8*x^5-4*x^4)*exp(x)+(-24*x-32)*exp(4)^2+(-24*
x^6-42*x^5-16*x^4-6*x^3)*exp(4)+8*x^10+14*x^9+6*x^8+10*x^7+8*x^6+2*x^4)/x^
3,x, algorithm=\
```

output
```
x^8 + 2*x^7 + x^6 + 2*x^5 - 6*x^4*e^4 + 2*x^4 - 14*x^3*e^4 - 8*x^2*e^4 + x
^2 - 6*x*e^4 + 1/2*(2*x^4 - 4*x^3 + 6*x^2 - 6*x + 3)*e^(2*x) + (4*x^3 - 6*
x^2 + 6*x - 3)*e^(2*x) + 2*(2*x^2 - 2*x + 1)*e^(2*x) + 1/2*(2*x - 1)*e^(2*
x) - 2*(x^6 - 6*x^5 + 30*x^4 - 120*x^3 + 360*x^2 - 720*x + 720)*e^x - 16*(
x^5 - 5*x^4 + 20*x^3 - 60*x^2 + 120*x - 120)*e^x - 22*(x^4 - 4*x^3 + 12*x^
2 - 24*x + 24)*e^x - 10*(x^3 - 3*x^2 + 6*x - 6)*e^x + 6*(x^2*e^4 - 2*x*e^4
 + 2*e^4)*e^x - 8*(x^2 - 2*x + 2)*e^x + 26*(x*e^4 - e^4)*e^x - 4*(x - 1)*e
^x + 24*e^8/x + 16*e^8/x^2 + 22*e^(x + 4)
```

3.774.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 153 vs. 2(29) = 58.

Time = 0.26 (sec) , antiderivative size = 153, normalized size of antiderivative = 4.64

$$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-42x^5-24x^6)+e^{2x}(2x^4+}{x^3}$$
$$=\frac{x^{10}+2x^9-2x^8e^x+x^8-4x^7e^x+2x^7-6x^6e^4+x^6e^{(2x)}-2x^6e^x+2x^6-14x^5e^4+2x^5e^{(2x)}-2x^5e^x}{x^2}$$

input
```
integrate(((2*x^7+8*x^6+8*x^5+2*x^4)*exp(x)^2+((6*x^5+26*x^4+22*x^3)*exp(4
)-2*x^9-16*x^8-22*x^7-10*x^6-8*x^5-4*x^4)*exp(x)+(-24*x-32)*exp(4)^2+(-24*
x^6-42*x^5-16*x^4-6*x^3)*exp(4)+8*x^10+14*x^9+6*x^8+10*x^7+8*x^6+2*x^4)/x^
3,x, algorithm=\
```

output
```
(x^10 + 2*x^9 - 2*x^8*e^x + x^8 - 4*x^7*e^x + 2*x^7 - 6*x^6*e^4 + x^6*e^(2
*x) - 2*x^6*e^x + 2*x^6 - 14*x^5*e^4 + 2*x^5*e^(2*x) - 2*x^5*e^x - 8*x^4*e
^4 + x^4*e^(2*x) + 6*x^4*e^(x + 4) - 2*x^4*e^x + x^4 - 6*x^3*e^4 + 14*x^3*
e^(x + 4) + 8*x^2*e^(x + 4) + 24*x*e^8 + 16*e^8)/x^2
```

3.774.9 Mupad [B] (verification not implemented)

Time = 15.95 (sec) , antiderivative size = 143, normalized size of antiderivative = 4.33

$$\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-42x^5-24x^6)+e^{2x}(2x^4+}{x^3}$$
$$=8\,e^{x+4}+14\,x\,e^{x+4}-2\,x^3\,e^x-2\,x^4\,e^x-4\,x^5\,e^x-2\,x^6\,e^x-6\,x\,e^4-x^2\left(8\,e^4-1\right)-x^4\left(6\,e^4-2\right)$$
$$+x^2\,e^{2\,x}+2\,x^3\,e^{2\,x}+x^4\,e^{2\,x}-14\,x^3\,e^4+\frac{24\,e^8}{x}+\frac{16\,e^8}{x^2}+2\,x^5+x^6+2\,x^7+x^8+x^2\,e^x\left(6\,e^4-2\right)$$

input
```
int((exp(2*x)*(2*x^4 + 8*x^5 + 8*x^6 + 2*x^7) - exp(x)*(4*x^4 - exp(4)*(22
*x^3 + 26*x^4 + 6*x^5) + 8*x^5 + 10*x^6 + 22*x^7 + 16*x^8 + 2*x^9) + 2*x^4
 + 8*x^6 + 10*x^7 + 6*x^8 + 14*x^9 + 8*x^10 - exp(8)*(24*x + 32) - exp(4)*
(6*x^3 + 16*x^4 + 42*x^5 + 24*x^6))/x^3,x)
```

output
```
8*exp(x + 4) + 14*x*exp(x + 4) - 2*x^3*exp(x) - 2*x^4*exp(x) - 4*x^5*exp(x
) - 2*x^6*exp(x) - 6*x*exp(4) - x^2*(8*exp(4) - 1) - x^4*(6*exp(4) - 2) +
x^2*exp(2*x) + 2*x^3*exp(2*x) + x^4*exp(2*x) - 14*x^3*exp(4) + (24*exp(8))
/x + (16*exp(8))/x^2 + 2*x^5 + x^6 + 2*x^7 + x^8 + x^2*exp(x)*(6*exp(4) -
2)
```

3.774. $\int \frac{e^8(-32-24x)+2x^4+8x^6+10x^7+6x^8+14x^9+8x^{10}+e^4(-6x^3-16x^4-42x^5-24x^6)+e^{2x}(2x^4+8x^5+8x^6+2x^7)+e^x(-4x^4-8x^5-10x^6-22x^7-16x^8}{x^3}$

3.775 $\int \frac{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)+e^{\frac{4x^3}{e^5\log(e^{10}-2e^5x+x^2)}}(8x^3+(12e^5x^2-$

3.775.1 Optimal result

Integrand size = 119, antiderivative size = 25

$$\int \frac{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)+e^{\frac{4x^3}{e^5\log(e^{10}-2e^5x+x^2)}}(8x^3+(12e^5x^2-12x^3)\log(e^{10}-2e^5x+x^2))}{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)}\,dx = 1+e^{\frac{4x^3}{e^5\log\left((e^5-x)^2\right)}}+x$$

output
```
1+exp(4/ln((exp(5)-x)^2)*x^3/exp(5))+x
```

3.775.2 Mathematica [A] (verified)

Time = 4.77 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)+e^{\frac{4x^3}{e^5\log(e^{10}-2e^5x+x^2)}}(8x^3+(12e^5x^2-12x^3)\log(e^{10}-2e^5x+x^2))}{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)}\,dx = -e^5+e^{\frac{4x^3}{e^5\log\left((e^5-x)^2\right)}}+x$$

input
```
Integrate[((E^10 - E^5*x)*Log[E^10 - 2*E^5*x + x^2]^2 + E^((4*x^3)/(E^5*Lo
g[E^10 - 2*E^5*x + x^2]))*(8*x^3 + (12*E^5*x^2 - 12*x^3)*Log[E^10 - 2*E^5*
x + x^2]))/((E^10 - E^5*x)*Log[E^10 - 2*E^5*x + x^2]^2),x]
```

output
```
-E^5 + E^((4*x^3)/(E^5*Log[(E^5 - x)^2])) + x
```

3.775.3 Rubi [A] (verified)

Time = 1.48 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.017, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(e^{10}-e^5x)\log^2(x^2-2e^5x+e^{10})+e^{\frac{4x^3}{e^5\log(x^2-2e^5x+e^{10})}}\left(8x^3+(12e^5x^2-12x^3)\log(x^2-2e^5x+e^{10})\right)}{(e^{10}-e^5x)\log^2(x^2-2e^5x+e^{10})}dx$$

$$\Big\downarrow 7293$$

$$\int \left(\frac{4x^2e^{\frac{4x^3}{e^5\log\left((e^5-x)^2\right)}-5}\left(2x-3x\log\left((e^5-x)^2\right)+3e^5\log\left((e^5-x)^2\right)\right)}{(e^5-x)\log^2\left((e^5-x)^2\right)}+1\right)dx$$

$$\Big\downarrow 2009$$

$$e^{\frac{4x^3}{e^5\log\left((e^5-x)^2\right)}}+x$$

input
```
Int[((E^10 - E^5*x)*Log[E^10 - 2*E^5*x + x^2]^2 + E^((4*x^3)/(E^5*Log[E^10
 - 2*E^5*x + x^2]))*(8*x^3 + (12*E^5*x^2 - 12*x^3)*Log[E^10 - 2*E^5*x + x^
2]))/((E^10 - E^5*x)*Log[E^10 - 2*E^5*x + x^2]^2),x]
```

output
```
E^((4*x^3)/(E^5*Log[(E^5 - x)^2])) + x
```

3.775. $\int \frac{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)+e^{\frac{4x^3}{e^5\log(e^{10}-2e^5x+x^2)}}\left(8x^3+(12e^5x^2-12x^3)\log(e^{10}-2e^5x+x^2)\right)}{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)}dx$

3.775.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.775.4 Maple [A] (verified)

Time = 2.39 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

method	result	size
risch	$x+\mathrm{e}^{\frac{4x^{3}\mathrm{e}^{-5}}{\ln\left(\mathrm{e}^{10}-2x\,\mathrm{e}^{5}+x^{2}\right)}}$	25
parallelrisch	$\frac{\left(4\,\mathrm{e}^{10}+2x\,\mathrm{e}^{5}+2\,\mathrm{e}^{\frac{4x^{3}\mathrm{e}^{-5}}{\ln\left(\mathrm{e}^{10}-2x\,\mathrm{e}^{5}+x^{2}\right)}}\mathrm{e}^{5}\right)\mathrm{e}^{-5}}{2}$	49

input
```
int((((12*x^2*exp(5)-12*x^3)*ln(exp(5)^2-2*x*exp(5)+x^2)+8*x^3)*exp(4*x^3/
exp(5)/ln(exp(5)^2-2*x*exp(5)+x^2))+(exp(5)^2-x*exp(5))*ln(exp(5)^2-2*x*ex
p(5)+x^2)^2)/(exp(5)^2-x*exp(5))/ln(exp(5)^2-2*x*exp(5)+x^2)^2,x,method=_R
ETURNVERBOSE)
```

output
```
x+exp(4*x^3*exp(-5)/ln(exp(10)-2*x*exp(5)+x^2))
```

3.775.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)+e^{\frac{4x^3}{e^5\log(e^{10}-2e^5x+x^2)}}(8x^3+(12e^5x^2-12x^3)\log(e^{10}-2e^5x+x^2))}{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)}\,dx$$
$$= x+e^{\left(\frac{4\,x^3e^{(-5)}}{\log\left(x^2-2\,xe^5+e^{10}\right)}\right)}$$

input
```
integrate((((12*x^2*exp(5)-12*x^3)*log(exp(5)^2-2*x*exp(5)+x^2)+8*x^3)*exp
(4*x^3/exp(5)/log(exp(5)^2-2*x*exp(5)+x^2))+(exp(5)^2-x*exp(5))*log(exp(5)
^2-2*x*exp(5)+x^2)^2)/(exp(5)^2-x*exp(5))/log(exp(5)^2-2*x*exp(5)+x^2)^2,x
, algorithm=\
```

output
```
x + e^(4*x^3*e^(-5)/log(x^2 - 2*x*e^5 + e^10))
```

3.775.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)+e^{\frac{4x^3}{e^5\log(e^{10}-2e^5x+x^2)}}(8x^3+(12e^5x^2-12x^3)\log(e^{10}-2e^5x+x^2))}{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)}\,dx$$
= Exception raised: TypeError

input
```
integrate((((12*x**2*exp(5)-12*x**3)*ln(exp(5)**2-2*x*exp(5)+x**2)+8*x**3)
*exp(4*x**3/exp(5)/ln(exp(5)**2-2*x*exp(5)+x**2))+(exp(5)**2-x*exp(5))*ln(
exp(5)**2-2*x*exp(5)+x**2)**2)/(exp(5)**2-x*exp(5))/ln(exp(5)**2-2*x*exp(5
)+x**2)**2,x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.775.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)+e^{\frac{4x^3}{e^5\log(e^{10}-2e^5x+x^2)}}(8x^3+(12e^5x^2-12x^3)\log(e^{10}-2e^5x+x^2))}{(e^{10}-e^5x)\log^2(e^{10}-2e^5x+x^2)}\,dx$$
= Exception raised: RuntimeError

input
```
integrate((((12*x^2*exp(5)-12*x^3)*log(exp(5)^2-2*x*exp(5)+x^2)+8*x^3)*exp
(4*x^3/exp(5)/log(exp(5)^2-2*x*exp(5)+x^2))+(exp(5)^2-x*exp(5))*log(exp(5)
^2-2*x*exp(5)+x^2)^2)/(exp(5)^2-x*exp(5))/log(exp(5)^2-2*x*exp(5)+x^2)^2,x
, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.775.8 Giac [F(-2)]

Exception generated.

$$\int \frac{(e^{10} - e^5x)\log^2(e^{10} - 2e^5x + x^2) + e^{\frac{4x^3}{e^5\log(e^{10}-2e^5x+x^2)}}(8x^3 + (12e^5x^2 - 12x^3)\log(e^{10} - 2e^5x + x^2))}{(e^{10} - e^5x)\log^2(e^{10} - 2e^5x + x^2)}\,dx$$
= Exception raised: TypeError

input
```
integrate((((12*x^2*exp(5)-12*x^3)*log(exp(5)^2-2*x*exp(5)+x^2)+8*x^3)*exp
(4*x^3/exp(5)/log(exp(5)^2-2*x*exp(5)+x^2))+(exp(5)^2-x*exp(5))*log(exp(5)
^2-2*x*exp(5)+x^2)^2)/(exp(5)^2-x*exp(5))/log(exp(5)^2-2*x*exp(5)+x^2)^2,x
, algorithm=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:Unable to divide, perhaps due to ro
unding error%%%{-196608,[1,22,6]%%%}+%%%{786432,[1,21,7]%%%}+%%%{-1179648,
[1,20,8]%
```

3.775.9 Mupad [B] (verification not implemented)

Time = 15.99 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{(e^{10} - e^5x)\log^2(e^{10} - 2e^5x + x^2) + e^{\frac{4x^3}{e^5\log(e^{10}-2e^5x+x^2)}}(8x^3 + (12e^5x^2 - 12x^3)\log(e^{10} - 2e^5x + x^2))}{(e^{10} - e^5x)\log^2(e^{10} - 2e^5x + x^2)}\,dx$$
$$= x + \mathrm{e}^{\frac{4\,x^3\,\mathrm{e}^{-5}}{\ln\left(x^2-2\,\mathrm{e}^5\,x+\mathrm{e}^{10}\right)}}$$

input
```
int((log(exp(10) - 2*x*exp(5) + x^2)^2*(exp(10) - x*exp(5)) + exp((4*x^3*e
xp(-5))/log(exp(10) - 2*x*exp(5) + x^2))*(8*x^3 + log(exp(10) - 2*x*exp(5)
 + x^2)*(12*x^2*exp(5) - 12*x^3)))/(log(exp(10) - 2*x*exp(5) + x^2)^2*(exp
(10) - x*exp(5))),x)
```

output
```
x + exp((4*x^3*exp(-5))/log(exp(10) - 2*x*exp(5) + x^2))
```

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$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(\right.}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right.}$$

3.776.1 Optimal result

Integrand size = 119, antiderivative size = 27

$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\right.}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}$$
$$=\left(3-\frac{5}{3}e^{\frac{e^x}{x\left(x+x\log\left(\frac{1}{x}\right)\right)}}\right)^2$$

output
```
(3-5/3*exp(exp(x)/(x+x*ln(1/x))/x))^2
```

3.776.2 Mathematica [A] (verified)

Time = 5.16 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.70

$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\right.}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}$$
$$=\frac{10}{9}\left(-9e^{\frac{e^x}{x^2\left(1+\log\left(\frac{1}{x}\right)\right)}}+\frac{5}{2}e^{\frac{2e^x}{x^2\left(1+\log\left(\frac{1}{x}\right)\right)}}\right)$$

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$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\left(\frac{1}{x}\right)\right)}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}\,dx$$

input
```
Integrate[(E^(E^x/(x^2 + x^2*Log[x^(-1)]))*(E^x*(90 - 90*x) + E^x*(180 - 9
0*x)*Log[x^(-1)]) + E^((2*E^x)/(x^2 + x^2*Log[x^(-1)]))*(E^x*(-50 + 50*x)
+ E^x*(-100 + 50*x)*Log[x^(-1)]))/(9*x^3 + 18*x^3*Log[x^(-1)] + 9*x^3*Log[
x^(-1)]^2),x]
```

output
```
(10*(-9*E^(E^x/(x^2*(1 + Log[x^(-1)]))) + (5*E^((2*E^x)/(x^2*(1 + Log[x^(-
1)]))))/2))/9
```

3.776.3 Rubi [A] (verified)

Time = 3.06 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034, Rules used = {7239, 27, 7259, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(50x-50)+e^x(50x-100)\log\left(\frac{1}{x}\right)\right)}{9x^3+9x^3\log^2\left(\frac{1}{x}\right)+18x^3\log\left(\frac{1}{x}\right)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{10e^{\frac{e^x}{x^2\left(\log\left(\frac{1}{x}\right)+1\right)}+x}\left(9-5e^{\frac{e^x}{x^2\left(\log\left(\frac{1}{x}\right)+1\right)}}\right)\left(-x-(x-2)\log\left(\frac{1}{x}\right)+1\right)}{9x^3\left(\log\left(\frac{1}{x}\right)+1\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{10}{9}\int \frac{e^{x+\frac{e^x}{\left(\log\left(\frac{1}{x}\right)+1\right)x^2}}\left(9-5e^{\frac{e^x}{x^2\left(\log\left(\frac{1}{x}\right)+1\right)}}\right)\left(-x+(2-x)\log\left(\frac{1}{x}\right)+1\right)}{x^3\left(\log\left(\frac{1}{x}\right)+1\right)^2}dx$$

$$\Big\downarrow \text{7259}$$

$$\frac{2}{9}\int \left(9-5e^{\frac{e^x}{x^2\left(\log\left(\frac{1}{x}\right)+1\right)}}\right)d\left(-5e^{\frac{e^x}{x^2\left(\log\left(\frac{1}{x}\right)+1\right)}}\right)$$

$$\Big\downarrow \text{17}$$

$$\frac{1}{9}\left(9-5e^{\frac{e^x}{x^2\left(\log\left(\frac{1}{x}\right)+1\right)}}\right)^2$$

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$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\left(\frac{1}{x}\right)\right)}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}dx$$

input
```
Int[(E^(E^x/(x^2 + x^2*Log[x^(-1)]))*(E^x*(90 - 90*x) + E^x*(180 - 90*x)*L
og[x^(-1)]) + E^((2*E^x)/(x^2 + x^2*Log[x^(-1)]))*(E^x*(-50 + 50*x) + E^x*
(-100 + 50*x)*Log[x^(-1)]))/(9*x^3 + 18*x^3*Log[x^(-1)] + 9*x^3*Log[x^(-1)
]^2),x]
```

output
```
(9 - 5*E^(E^x/(x^2*(1 + Log[x^(-1)]))))^2/9
```

3.776.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7259
```
Int[(u_)*((a_) + (b_.)*(v_)^(p_.)*(w_)^(p_.))^(m_.), x_Symbol] :> With[{c =
 Simplify[u/(w*D[v, x] + v*D[w, x])]}, Simp[c   Subst[Int[(a + b*x^p)^m, x]
, x, v*w], x] /; FreeQ[c, x]] /; FreeQ[{a, b, m, p}, x] && IntegerQ[p]
```

3.776.4 Maple [A] (verified)

Time = 7.40 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

method	result	size
risch	$\frac{25\,\mathrm{e}^{-\frac{2\,\mathrm{e}^{x}}{x^{2}(\ln(x)-1)}}}{9}-10\,\mathrm{e}^{-\frac{\mathrm{e}^{x}}{x^{2}(\ln(x)-1)}}$	34

input
```
int((((50*x-100)*exp(x)*ln(1/x)+(50*x-50)*exp(x))*exp(exp(x)/(x^2*ln(1/x)+
x^2))^2+((-90*x+180)*exp(x)*ln(1/x)+(-90*x+90)*exp(x))*exp(exp(x)/(x^2*ln(
1/x)+x^2)))/(9*x^3*ln(1/x)^2+18*x^3*ln(1/x)+9*x^3),x,method=_RETURNVERBOSE
)
```

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$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\left(\frac{1}{x}\right)\right)}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}\,dx$$

output
```
25/9*exp(-2*exp(x)/x^2/(ln(x)-1))-10*exp(-exp(x)/x^2/(ln(x)-1))
```

3.776.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56

$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\right.}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}$$
$$=\frac{25}{9}\,e^{\left(\frac{2\,e^x}{x^2\log\left(\frac{1}{x}\right)+x^2}\right)}-10\,e^{\left(\frac{e^x}{x^2\log\left(\frac{1}{x}\right)+x^2}\right)}$$

input
```
integrate((((50*x-100)*exp(x)*log(1/x)+(50*x-50)*exp(x))*exp(exp(x)/(x^2*l
og(1/x)+x^2))^2+((-90*x+180)*exp(x)*log(1/x)+(-90*x+90)*exp(x))*exp(exp(x)
/(x^2*log(1/x)+x^2)))/(9*x^3*log(1/x)^2+18*x^3*log(1/x)+9*x^3),x, algorith
m=\
```

output
```
25/9*e^(2*e^x/(x^2*log(1/x) + x^2)) - 10*e^(e^x/(x^2*log(1/x) + x^2))
```

3.776.6 Sympy [A] (verification not implemented)

Time = 0.50 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44

$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\right.}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}$$
$$=\frac{25e^{\frac{2e^x}{x^2\log\left(\frac{1}{x}\right)+x^2}}}{9}-10e^{\frac{e^x}{x^2\log\left(\frac{1}{x}\right)+x^2}}$$

input
```
integrate((((50*x-100)*exp(x)*ln(1/x)+(50*x-50)*exp(x))*exp(exp(x)/(x**2*l
n(1/x)+x**2))**2+((-90*x+180)*exp(x)*ln(1/x)+(-90*x+90)*exp(x))*exp(exp(x)
/(x**2*ln(1/x)+x**2)))/(9*x**3*ln(1/x)**2+18*x**3*ln(1/x)+9*x**3),x)
```

output
```
25*exp(2*exp(x)/(x**2*log(1/x) + x**2))/9 - 10*exp(exp(x)/(x**2*log(1/x) +
 x**2))
```

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$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\left(\frac{1}{x}\right)\right)}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}\,dx$$

3.776.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.59

$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\right.}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}$$
$$= -\frac{5}{9}\left(18\,e^{\left(\frac{e^x}{x^2\log(x)-x^2}\right)}-5\right)e^{\left(-\frac{2\,e^x}{x^2\log(x)-x^2}\right)}$$

input
```
integrate((((50*x-100)*exp(x)*log(1/x)+(50*x-50)*exp(x))*exp(exp(x)/(x^2*l
og(1/x)+x^2))^2+((-90*x+180)*exp(x)*log(1/x)+(-90*x+90)*exp(x))*exp(exp(x)
/(x^2*log(1/x)+x^2)))/(9*x^3*log(1/x)^2+18*x^3*log(1/x)+9*x^3),x, algorith
m=\
```

output
```
-5/9*(18*e^(e^x/(x^2*log(x) - x^2)) - 5)*e^(-2*e^x/(x^2*log(x) - x^2))
```

3.776.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.59

$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\right.}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}$$
$$= -10\,e^{\left(-\frac{e^x}{x^2\log(x)-x^2}\right)}+\frac{25}{9}\,e^{\left(-\frac{2\,e^x}{x^2\log(x)-x^2}\right)}$$

input
```
integrate((((50*x-100)*exp(x)*log(1/x)+(50*x-50)*exp(x))*exp(exp(x)/(x^2*l
og(1/x)+x^2))^2+((-90*x+180)*exp(x)*log(1/x)+(-90*x+90)*exp(x))*exp(exp(x)
/(x^2*log(1/x)+x^2)))/(9*x^3*log(1/x)^2+18*x^3*log(1/x)+9*x^3),x, algorith
m=\
```

output
```
-10*e^(-e^x/(x^2*log(x) - x^2)) + 25/9*e^(-2*e^x/(x^2*log(x) - x^2))
```

3.776.9 Mupad [B] (verification not implemented)

Time = 16.58 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56

$$\int \frac{e^{\frac{e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(90-90x)+e^x(180-90x)\log\left(\frac{1}{x}\right)\right)+e^{\frac{2e^x}{x^2+x^2\log\left(\frac{1}{x}\right)}}\left(e^x(-50+50x)+e^x(-100+50x)\log\right.}{9x^3+18x^3\log\left(\frac{1}{x}\right)+9x^3\log^2\left(\frac{1}{x}\right)}$$

$$=\frac{5\,\mathrm{e}^{\frac{\mathrm{e}^x}{x^2\,\ln\left(\frac{1}{x}\right)+x^2}}\left(5\,\mathrm{e}^{\frac{\mathrm{e}^x}{x^2\,\ln\left(\frac{1}{x}\right)+x^2}}-18\right)}{9}$$

input
```
int((exp((2*exp(x))/(x^2*log(1/x) + x^2))*(exp(x)*(50*x - 50) + log(1/x)*e
xp(x)*(50*x - 100)) - exp(exp(x)/(x^2*log(1/x) + x^2))*(exp(x)*(90*x - 90)
 + log(1/x)*exp(x)*(90*x - 180)))/(18*x^3*log(1/x) + 9*x^3 + 9*x^3*log(1/x
)^2),x)
```

output
```
(5*exp(exp(x)/(x^2*log(1/x) + x^2))*(5*exp(exp(x)/(x^2*log(1/x) + x^2)) -
18))/9
```

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$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}\left(4x+4x^2\right)+(\cdots}{-6x^2+4e^{4+x}x^2+x^3-4\cdots}$$

3.777.1 Optimal result

Integrand size = 125, antiderivative size = 33

$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}(-6+4e^{\cdots}\right.\right.}{-6x^2+4e^{4+x}x^2+x^3-4x^4}$$
$$= e^{x+\frac{\log\left(e^{4+x}+\frac{1}{4}\left(x-4x\left(\frac{3}{2x}+x\right)\right)\right)}{x}}$$

output
```
exp(x+ln(-(x+3/2/x)*x+1/4*x+exp(4+x))/x)
```

3.777.2 Mathematica [F]

$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}(-6+4e^{\cdots}\right.\right.}{-6x^2+4e^{4+x}x^2+x^3-4x^4}$$
$$=\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}(-6+\cdots\right.\right.}{-6x^2+4e^{4+x}x^2+x^3-4x^4}$$

input
```
Integrate[(E^((x^2 + Log[(-6 + 4*E^(4 + x) + x - 4*x^2)/4])/x)*(x - 14*x^2
 + x^3 - 4*x^4 + E^(4 + x)*(4*x + 4*x^2) + (6 - 4*E^(4 + x) - x + 4*x^2)*L
og[(-6 + 4*E^(4 + x) + x - 4*x^2)/4]))/(-6*x^2 + 4*E^(4 + x)*x^2 + x^3 - 4
*x^4),x]
```

3.777.

$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)\right)}{-6x^2+4e^{4+x}x^2+x^3-4x^4}\,dx$$

output
```
Integrate[(E^((x^2 + Log[(-6 + 4*E^(4 + x) + x - 4*x^2)/4])/x)*(x - 14*x^2
 + x^3 - 4*x^4 + E^(4 + x)*(4*x + 4*x^2) + (6 - 4*E^(4 + x) - x + 4*x^2)*L
og[(-6 + 4*E^(4 + x) + x - 4*x^2)/4]))/(-6*x^2 + 4*E^(4 + x)*x^2 + x^3 - 4
*x^4), x]
```

3.777.3 Rubi [A] (verified)

Time = 4.65 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.91, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.008$, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-4x^4+x^3-14x^2+e^{x+4}\left(4x^2+4x\right)+\left(4x^2-x-4e^{x+4}+6\right)\log\left(\frac{1}{4}\left(-4x^2+x+4e^{x+4}-6\right)\right)+x\right)\exp\left(\frac{x^2+\mathrm{lo}}{}\right.}{-4x^4+x^3+4e^{x+4}x^2-6x^2}$$

$$\Big\downarrow \ 7257$$

$$4^{-1/x}e^x\left(-4x^2+x+4e^{x+4}-6\right)^{\frac{1}{x}}$$

input
```
Int[(E^((x^2 + Log[(-6 + 4*E^(4 + x) + x - 4*x^2)/4])/x)*(x - 14*x^2 + x^3
 - 4*x^4 + E^(4 + x)*(4*x + 4*x^2) + (6 - 4*E^(4 + x) - x + 4*x^2)*Log[(-6
 + 4*E^(4 + x) + x - 4*x^2)/4]))/(-6*x^2 + 4*E^(4 + x)*x^2 + x^3 - 4*x^4),
x]
```

output
```
(E^x*(-6 + 4*E^(4 + x) + x - 4*x^2)^x^(-1))/4^x^(-1)
```

3.777.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.777.4 Maple [A] (verified)

Time = 5.94 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.67

method	result	size
risch	$\left(\mathrm{e}^{4+x}-x^{2}+\frac{x}{4}-\frac{3}{2}\right)^{\frac{1}{x}} \mathrm{e}^{x}$	22
parallelrisch	$\mathrm{e}^{\frac{\ln\left(\mathrm{e}^{4+x}-x^{2}+\frac{x}{4}-\frac{3}{2}\right)+x^{2}}{x}}$	25

input
```
int(((-4*exp(4+x)+4*x^2-x+6)*ln(exp(4+x)-x^2+1/4*x-3/2)+(4*x^2+4*x)*exp(4+
x)-4*x^4+x^3-14*x^2+x)*exp((ln(exp(4+x)-x^2+1/4*x-3/2)+x^2)/x)/(4*x^2*exp(
4+x)-4*x^4+x^3-6*x^2),x,method=_RETURNVERBOSE)
```

output
```
(exp(4+x)-x^2+1/4*x-3/2)^(1/x)*exp(x)
```

3.777.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.73

$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}(-6+4e^{\cdots}\right.\right.}{-6x^2+4e^{4+x}x^2+x^3-4x^4}$$
$$= e^{\left(\frac{x^2+\log\left(-x^2+\frac{1}{4}x+e^{(x+4)}-\frac{3}{2}\right)}{x}\right)}$$

input
```
integrate(((-4*exp(4+x)+4*x^2-x+6)*log(exp(4+x)-x^2+1/4*x-3/2)+(4*x^2+4*x)
*exp(4+x)-4*x^4+x^3-14*x^2+x)*exp((log(exp(4+x)-x^2+1/4*x-3/2)+x^2)/x)/(4*
x^2*exp(4+x)-4*x^4+x^3-6*x^2),x, algorithm=\
```

output
```
e^((x^2 + log(-x^2 + 1/4*x + e^(x + 4) - 3/2))/x)
```

3.777.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}(-6+4e^{\cdots}\right.\right.}{-6x^2+4e^{4+x}x^2+x^3-4x^4}$$
$$= \text{Timed out}$$

input
```
integrate(((-4*exp(4+x)+4*x**2-x+6)*ln(exp(4+x)-x**2+1/4*x-3/2)+(4*x**2+4*
x)*exp(4+x)-4*x**4+x**3-14*x**2+x)*exp((ln(exp(4+x)-x**2+1/4*x-3/2)+x**2)/
x)/(4*x**2*exp(4+x)-4*x**4+x**3-6*x**2),x)
```

output
```
Timed out
```

3.777.7 Maxima [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.88

$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}(-6+4e^{\cdots}\right.\right.}{-6x^2+4e^{4+x}x^2+x^3-4x^4}$$
$$= e^{\left(x-\frac{2\,\log(2)}{x}+\frac{\log\left(-4\,x^2+x+4\,e^{(x+4)}-6\right)}{x}\right)}$$

input
```
integrate(((-4*exp(4+x)+4*x^2-x+6)*log(exp(4+x)-x^2+1/4*x-3/2)+(4*x^2+4*x)
*exp(4+x)-4*x^4+x^3-14*x^2+x)*exp((log(exp(4+x)-x^2+1/4*x-3/2)+x^2)/x)/(4*
x^2*exp(4+x)-4*x^4+x^3-6*x^2),x, algorithm=\
```

output
```
e^(x - 2*log(2)/x + log(-4*x^2 + x + 4*e^(x + 4) - 6)/x)
```

3.777.8 Giac [A] (verification not implemented)

Time = 0.57 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.67

$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}(-6+4e^{\cdots}\right.\right.}{-6x^2+4e^{4+x}x^2+x^3-4x^4}$$
$$= e^{\left(x+\frac{\log\left(-x^2+\frac{1}{4}\,x+e^{(x+4)}-\frac{3}{2}\right)}{x}\right)}$$

input
```
integrate(((-4*exp(4+x)+4*x^2-x+6)*log(exp(4+x)-x^2+1/4*x-3/2)+(4*x^2+4*x)
*exp(4+x)-4*x^4+x^3-14*x^2+x)*exp((log(exp(4+x)-x^2+1/4*x-3/2)+x^2)/x)/(4*
x^2*exp(4+x)-4*x^4+x^3-6*x^2),x, algorithm=\
```

output
```
e^(x + log(-x^2 + 1/4*x + e^(x + 4) - 3/2)/x)
```

3.777.9 Mupad [B] (verification not implemented)

Time = 15.66 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.64

$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}(-6+4e^{4+x}+x-4x^2)\right)\right)}{-6x^2+4e^{4+x}x^2+x^3-4x^4}\,dx = e^x\left(\frac{x}{4}+e^{x+4}-x^2-\frac{3}{2}\right)^{1/x}$$

input
```
int((exp((log(x/4 + exp(x + 4) - x^2 - 3/2) + x^2)/x)*(x + exp(x + 4)*(4*x
 + 4*x^2) - log(x/4 + exp(x + 4) - x^2 - 3/2)*(x + 4*exp(x + 4) - 4*x^2 -
6) - 14*x^2 + x^3 - 4*x^4))/(4*x^2*exp(x + 4) - 6*x^2 + x^3 - 4*x^4),x)
```

output
```
exp(x)*(x/4 + exp(x + 4) - x^2 - 3/2)^(1/x)
```

3.777.

$$\int \frac{e^{\frac{x^2+\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)}{x}}\left(x-14x^2+x^3-4x^4+e^{4+x}(4x+4x^2)+(6-4e^{4+x}-x+4x^2)\log\left(\frac{1}{4}\left(-6+4e^{4+x}+x-4x^2\right)\right)\right)}{-6x^2+4e^{4+x}x^2+x^3-4x^4}\,dx$$

3.778 $\int -\frac{4e^{2e^{4e^2}}}{x^3}\,dx$

3.778.1 Optimal result

Integrand size = 16, antiderivative size = 16

$$\int -\frac{4e^{2e^{4e^2}}}{x^3}\,dx = \frac{2e^{2e^{4e^2}}}{x^2}$$

output
```
2*exp(-ln(x)+exp(exp(2))^4)^2
```

3.778.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int -\frac{4e^{2e^{4e^2}}}{x^3}\,dx = \frac{2e^{2e^{4e^2}}}{x^2}$$

input
```
Integrate[(-4*E^(2*E^(4*E^2)))/x^3,x]
```

output
```
(2*E^(2*E^(4*E^2)))/x^2
```

3.778.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{4e^{2e^{4e^2}}}{x^3} \, dx$$

$$\Big\downarrow \; 15$$

$$\frac{2e^{2e^{4e^2}}}{x^2}$$

input
```
Int[(-4*E^(2*E^(4*E^2)))/x^3,x]
```

output
```
(2*E^(2*E^(4*E^2)))/x^2
```

3.778.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.778.4 Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

method	result	size
norman	$\frac{2\,{\mathrm e}^{2\,{\mathrm e}^{4\,{\mathrm e}^{2}}}}{x^{2}}$	14
risch	$\frac{2\,{\mathrm e}^{2\,{\mathrm e}^{4\,{\mathrm e}^{2}}}}{x^{2}}$	14
gosper	$\frac{2\,{\mathrm e}^{2\,{\mathrm e}^{4\,{\mathrm e}^{2}}}}{x^{2}}$	16
derivativedivides	$\frac{2\,{\mathrm e}^{2\,{\mathrm e}^{4\,{\mathrm e}^{2}}}}{x^{2}}$	16
default	$\frac{2\,{\mathrm e}^{2\,{\mathrm e}^{4\,{\mathrm e}^{2}}}}{x^{2}}$	16
parallelrisch	$\frac{2\,{\mathrm e}^{2\,{\mathrm e}^{4\,{\mathrm e}^{2}}}}{x^{2}}$	16

input
```
int(-4*exp(-ln(x)+exp(exp(2))^4)^2/x,x,method=_RETURNVERBOSE)
```

output
```
2*exp(exp(exp(2))^4)^2/x^2
```

3.778.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int -\frac{4e^{2e^{4e^2}}}{x^3}\,dx = \frac{2\,e^{\left(2\,e^{\left(4\,e^2\right)}\right)}}{x^2}$$

input
```
integrate(-4*exp(-log(x)+exp(exp(2))^4)^2/x,x, algorithm=\
```

output
```
2*e^(2*e^(4*e^2))/x^2
```

3.778.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int -\frac{4e^{2e^{4e^2}}}{x^3}\,dx = \frac{2e^{2e^{4e^2}}}{x^2}$$

input
```
integrate(-4*exp(-ln(x)+exp(exp(2))**4)**2/x,x)
```

output
```
2*exp(2*exp(4*exp(2)))/x**2
```

3.778.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int -\frac{4e^{2e^{4e^2}}}{x^3}\,dx = \frac{2\,e^{\left(2\,e^{\left(4\,e^2\right)}\right)}}{x^2}$$

input
```
integrate(-4*exp(-log(x)+exp(exp(2))^4)^2/x,x, algorithm=\
```

output
```
2*e^(2*e^(4*e^2))/x^2
```

3.778.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int -\frac{4e^{2e^{4e^2}}}{x^3}\,dx = \frac{2\,e^{\left(2\,e^{\left(4\,e^2\right)}\right)}}{x^2}$$

input
```
integrate(-4*exp(-log(x)+exp(exp(2))^4)^2/x,x, algorithm=\
```

output
```
2*e^(2*e^(4*e^2))/x^2
```

3.778.9 Mupad [B] (verification not implemented)

Time = 14.55 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int -\frac{4e^{2e^{4e^2}}}{x^3}\,dx = \frac{2\,\mathrm{e}^{2\,\mathrm{e}^{4\,\mathrm{e}^2}}}{x^2}$$

input
```
int(-(4*exp(2*exp(4*exp(2)) - 2*log(x)))/x,x)
```

output
```
(2*exp(2*exp(4*exp(2))))/x^2
```

3.779 $\int \frac{2x^3+e^{\frac{1}{2}\left(-e^{\frac{1}{x^2}+e^x x}+e^{\frac{1}{x^2}}(3+x)\right)}\left(e^{\frac{1}{x^2}}(-6-2x+x^3)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}(-x^3-x^4)\right)\right)}{2x^3}$

3.779.1 Optimal result

Integrand size = 93, antiderivative size = 31

$$\int \frac{2x^3+e^{\frac{1}{2}\left(-e^{\frac{1}{x^2}+e^x x}+e^{\frac{1}{x^2}}(3+x)\right)}\left(e^{\frac{1}{x^2}}(-6-2x+x^3)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}(-x^3-x^4)\right)\right)}{2x^3}\,dx = -3-e^3+e^{\frac{1}{2}e^{\frac{1}{x^2}}\left(3-e^{e^x x}+x\right)}+x$$

output
```
exp(1/2*(x-exp(exp(x)*x)+3)*exp(1/x^2))+x-3-exp(3)
```

3.779.2 Mathematica [A] (verified)

Time = 6.16 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{2x^3+e^{\frac{1}{2}\left(-e^{\frac{1}{x^2}+e^x x}+e^{\frac{1}{x^2}}(3+x)\right)}\left(e^{\frac{1}{x^2}}(-6-2x+x^3)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}(-x^3-x^4)\right)\right)}{2x^3}\,dx = e^{-\frac{1}{2}e^{\frac{1}{x^2}+e^x x}+\frac{1}{2}e^{\frac{1}{x^2}}(3+x)}+x$$

input
```
Integrate[(2*x^3 + E^((-E^(x^(-2) + E^x*x) + E^x^(-2)*(3 + x))/2)*(E^x^(-2
)*(-6 - 2*x + x^3) + E^(E^x*x)*(2*E^x^(-2) + E^(x^(-2) + x)*(-x^3 - x^4)))
)/(2*x^3),x]
```

output
```
E^(-1/2*E^(x^(-2) + E^x*x) + (E^x^(-2)*(3 + x))/2) + x
```

3.779.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3+e^{\frac{1}{2}\left(e^{\frac{1}{x^2}}(x+3)-e^{\frac{1}{x^2}+e^x x}\right)}\left(e^{\frac{1}{x^2}}\left(x^3-2x-6\right)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}\left(-x^4-x^3\right)\right)\right)}{2x^3}dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{2}\int \frac{2x^3-e^{\frac{1}{2}\left(e^{\frac{1}{x^2}}(x+3)-e^{e^x x+\frac{1}{x^2}}\right)}\left(e^{\frac{1}{x^2}}\left(-x^3+2x+6\right)-e^{e^x x}\left(2e^{\frac{1}{x^2}}-e^{x+\frac{1}{x^2}}\left(x^4+x^3\right)\right)\right)}{x^3}dx$$

$$\Big\downarrow \; 2010$$

$$\frac{1}{2}\int \left(2-\frac{\exp\left(\frac{1}{2}e^{\frac{1}{x^2}}(x+3)-\frac{1}{2}e^{e^x x+\frac{1}{x^2}}+\frac{1}{x^2}\right)\left(e^{e^x x+x}x^4+e^{e^x x+x}x^3-x^3+2x-2e^{e^x x}+6\right)}{x^3}\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{2}\left(\int \exp\left(\frac{1}{2}e^{\frac{1}{x^2}}(x+3)-\frac{1}{2}e^{e^x x+\frac{1}{x^2}}+\frac{1}{x^2}\right)dx-\int \exp\left(e^x x+x-\frac{1}{2}e^{e^x x+\frac{1}{x^2}}+\frac{1}{2}e^{\frac{1}{x^2}}(x+3)+\frac{1}{x^2}\right)dx-2\int \frac{\text{ex}}{}\right.$$

input
```
Int[(2*x^3 + E^((-E^(x^(-2) + E^x*x) + E^x^(-2)*(3 + x))/2)*(E^x^(-2)*(-6
- 2*x + x^3) + E^(E^x*x)*(2*E^x^(-2) + E^(x^(-2) + x)*(-x^3 - x^4))))/(2*x
^3),x]
```

output
```
$Aborted
```

3.779.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.779.4 Maple [A] (verified)

Time = 13.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.65

method	result	size
parallelrisch	$x+{\mathrm e}^{-\frac{{\mathrm e}^{\frac{1}{x^{2}}} \left({\mathrm e}^{{\mathrm e}^{x} x}-x-3\right)}{2}}$	20
risch	$x+{\mathrm e}^{-\frac{{\mathrm e}^{\frac{1+{\mathrm e}^{x} x^{3}}{x^{2}}}}{2}+\frac{x\,{\mathrm e}^{\frac{1}{x^{2}}}}{2}+\frac{3\,{\mathrm e}^{\frac{1}{x^{2}}}}{2}}$	33

input
```
int(1/2*((((-x^4-x^3)*exp(1/x^2)*exp(x)+2*exp(1/x^2))*exp(exp(x)*x)+(x^3-2
*x-6)*exp(1/x^2))*exp(-1/2*exp(1/x^2)*exp(exp(x)*x)+1/2*(3+x)*exp(1/x^2))+
2*x^3)/x^3,x,method=_RETURNVERBOSE)
```

output
```
x+exp(-1/2*exp(1/x^2)*(exp(exp(x)*x)-x-3))
```

3.779.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.32

$$\int \frac{2x^3+e^{\frac{1}{2}\left(-e^{\frac{1}{x^2}+e^x x}+e^{\frac{1}{x^2}}(3+x)\right)}\left(e^{\frac{1}{x^2}}(-6-2x+x^3)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}(-x^3-x^4)\right)\right)}{2x^3}\,dx$$
$$= x+e^{\left(\frac{1}{2}\left((x+3)e^{\left(\frac{x^3+1}{x^2}\right)}-e^{\left(x+\frac{x^3e^x+1}{x^2}\right)}\right)e^{(-x)}\right)}$$

input
```
integrate(1/2*((((-x^4-x^3)*exp(1/x^2)*exp(x)+2*exp(1/x^2))*exp(exp(x)*x)+
(x^3-2*x-6)*exp(1/x^2))*exp(-1/2*exp(1/x^2)*exp(exp(x)*x)+1/2*(3+x)*exp(1/
x^2))+2*x^3)/x^3,x, algorithm=\
```

output
```
x + e^(1/2*((x + 3)*e^((x^3 + 1)/x^2) - e^(x + (x^3*e^x + 1)/x^2))*e^(-x))
```

3.779.6 Sympy [A] (verification not implemented)

Time = 7.19 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

$$\int \frac{2x^3 + e^{\frac{1}{2}\left(-e^{\frac{1}{x^2}+e^x x}+e^{\frac{1}{x^2}}(3+x)\right)}\left(e^{\frac{1}{x^2}}(-6-2x+x^3)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}(-x^3-x^4)\right)\right)}{2x^3}\,dx$$
$$= x + e^{\left(\frac{x}{2}+\frac{3}{2}\right)e^{\frac{1}{x^2}} - \frac{e^{\frac{1}{x^2}}e^{xe^x}}{2}}$$

input
```
integrate(1/2*((((-x**4-x**3)*exp(1/x**2)*exp(x)+2*exp(1/x**2))*exp(exp(x)
*x)+(x**3-2*x-6)*exp(1/x**2))*exp(-1/2*exp(1/x**2)*exp(exp(x)*x)+1/2*(3+x)
*exp(1/x**2))+2*x**3)/x**3,x)
```

output
```
x + exp((x/2 + 3/2)*exp(x**(-2)) - exp(x**(-2))*exp(x*exp(x))/2)
```

3.779.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.90

$$\int \frac{2x^3 + e^{\frac{1}{2}\left(-e^{\frac{1}{x^2}+e^x x}+e^{\frac{1}{x^2}}(3+x)\right)}\left(e^{\frac{1}{x^2}}(-6-2x+x^3)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}(-x^3-x^4)\right)\right)}{2x^3}\,dx$$
$$= x + e^{\left(\frac{1}{2}\,xe^{\left(\frac{1}{x^2}\right)} - \frac{1}{2}\,e^{\left(xe^x+\frac{1}{x^2}\right)} + \frac{3}{2}\,e^{\left(\frac{1}{x^2}\right)}\right)}$$

input
```
integrate(1/2*((((-x^4-x^3)*exp(1/x^2)*exp(x)+2*exp(1/x^2))*exp(exp(x)*x)+
(x^3-2*x-6)*exp(1/x^2))*exp(-1/2*exp(1/x^2)*exp(exp(x)*x)+1/2*(3+x)*exp(1/
x^2))+2*x^3)/x^3,x, algorithm=\
```

output
```
x + e^(1/2*x*e^(x^(-2)) - 1/2*e^(x*e^x + 1/x^2) + 3/2*e^(x^(-2)))
```

3.779.8 Giac [F]

$$\int \frac{2x^3+e^{\frac{1}{2}\left(-e^{\frac{1}{x^2}+e^x x}+e^{\frac{1}{x^2}}(3+x)\right)}\left(e^{\frac{1}{x^2}}(-6-2x+x^3)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}(-x^3-x^4)\right)\right)}{2x^3}\,dx$$
$$=\int \frac{2\,x^3-\left(\left((x^4+x^3)e^{\left(x+\frac{1}{x^2}\right)}-2\,e^{\left(\frac{1}{x^2}\right)}\right)e^{(xe^x)}-(x^3-2\,x-6)e^{\left(\frac{1}{x^2}\right)}\right)e^{\left(\frac{1}{2}\,(x+3)e^{\left(\frac{1}{x^2}\right)}-\frac{1}{2}\,e^{\left(xe^x+\frac{1}{x^2}\right)}\right)}}{2\,x^3}\,dx$$

input
```
integrate(1/2*((((-x^4-x^3)*exp(1/x^2)*exp(x)+2*exp(1/x^2))*exp(exp(x)*x)+
(x^3-2*x-6)*exp(1/x^2))*exp(-1/2*exp(1/x^2)*exp(exp(x)*x)+1/2*(3+x)*exp(1/
x^2))+2*x^3)/x^3,x, algorithm=\
```

output
```
integrate(1/2*(2*x^3 - (((x^4 + x^3)*e^(x + 1/x^2) - 2*e^(x^(-2)))*e^(x*e^
x) - (x^3 - 2*x - 6)*e^(x^(-2)))*e^(1/2*(x + 3)*e^(x^(-2)) - 1/2*e^(x*e^x
+ 1/x^2)))/x^3, x)
```

3.779.9 Mupad [B] (verification not implemented)

Time = 15.06 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.90

$$\int \frac{2x^3+e^{\frac{1}{2}\left(-e^{\frac{1}{x^2}+e^x x}+e^{\frac{1}{x^2}}(3+x)\right)}\left(e^{\frac{1}{x^2}}(-6-2x+x^3)+e^{e^x x}\left(2e^{\frac{1}{x^2}}+e^{\frac{1}{x^2}+x}(-x^3-x^4)\right)\right)}{2x^3}\,dx$$
$$=x+\mathrm{e}^{\frac{3\,\mathrm{e}^{\frac{1}{x^2}}}{2}+\frac{x\,\mathrm{e}^{\frac{1}{x^2}}}{2}-\frac{\mathrm{e}^{x\,\mathrm{e}^x}\,\mathrm{e}^{\frac{1}{x^2}}}{2}}$$

input
```
int(-((exp((exp(1/x^2)*(x + 3))/2 - (exp(x*exp(x))*exp(1/x^2))/2)*(exp(1/x
^2)*(2*x - x^3 + 6) - exp(x*exp(x))*(2*exp(1/x^2) - exp(1/x^2)*exp(x)*(x^3
 + x^4))))/2 - x^3)/x^3,x)
```

output
```
x + exp((3*exp(1/x^2))/2 + (x*exp(1/x^2))/2 - (exp(x*exp(x))*exp(1/x^2))/2
)
```

3.780 $\int \frac{-e^{40+e^4-x^2\log^2(3x)}+e^{40+e^4-x^2\log^2(3x)}(-2x^2\log(x)\log(3x)-2x^2\log$

$x\log(x)\log^2(\log(x))$

3.780.1 Optimal result

Integrand size = 81, antiderivative size = 24

$$\int \frac{-e^{40+e^4-x^2\log^2(3x)}+e^{40+e^4-x^2\log^2(3x)}\left(-2x^2\log(x)\log(3x)-2x^2\log(x)\log^2(3x)\right)\log(\log(x))}{x\log(x)\log^2(\log(x))}\,dx = \frac{e^{40+e^4-x^2\log^2(3x)}}{\log(\log(x))}$$

output
```
exp(-x^2*ln(3*x)^2+exp(4)+40)/ln(ln(x))
```

3.780.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{-e^{40+e^4-x^2\log^2(3x)}+e^{40+e^4-x^2\log^2(3x)}\left(-2x^2\log(x)\log(3x)-2x^2\log(x)\log^2(3x)\right)\log(\log(x))}{x\log(x)\log^2(\log(x))}\,dx = \frac{e^{40+e^4-x^2\log^2(3x)}}{\log(\log(x))}$$

input
```
Integrate[(-E^(40 + E^4 - x^2*Log[3*x]^2) + E^(40 + E^4 - x^2*Log[3*x]^2)*
(-2*x^2*Log[x]*Log[3*x] - 2*x^2*Log[x]*Log[3*x]^2)*Log[Log[x]])/(x*Log[x]*
Log[Log[x]]^2),x]
```

output
```
E^(40 + E^4 - x^2*Log[3*x]^2)/Log[Log[x]]
```

3.780.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 77 vs. $2(24) = 48$.

Time = 1.45 (sec) , antiderivative size = 77, normalized size of antiderivative = 3.21, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.025$, Rules used = {7292, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x^2\log^2(3x)+e^4+40}\left(-2x^2\log(x)\log^2(3x)-2x^2\log(x)\log(3x)\right)\log(\log(x))-e^{-x^2\log^2(3x)+e^4+40}}{x\log(x)\log^2(\log(x))}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{40\left(1+\frac{e^4}{40}\right)-x^2\log^2(3x)}\left(-2x^2\log(x)\log^2(3x)\log(\log(x))-2x^2\log(x)\log(3x)\log(\log(x))-1\right)}{x\log(x)\log^2(\log(x))}dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{e^{-x^2\log^2(3x)+e^4+40}\left(x^2\log(x)\log^2(3x)\log(\log(x))+x^2\log(x)\log(3x)\log(\log(x))\right)}{x\log(x)\left(x\log^2(3x)+x\log(3x)\right)\log^2(\log(x))}$$

input
```
Int[(-E^(40 + E^4 - x^2*Log[3*x]^2) + E^(40 + E^4 - x^2*Log[3*x]^2)*(-2*x^
2*Log[x]*Log[3*x] - 2*x^2*Log[x]*Log[3*x]^2)*Log[Log[x]])/(x*Log[x]*Log[Lo
g[x]]^2),x]
```

output
```
(E^(40 + E^4 - x^2*Log[3*x]^2)*(x^2*Log[x]*Log[3*x]*Log[Log[x]] + x^2*Log[
x]*Log[3*x]^2*Log[Log[x]]))/(x*Log[x]*(x*Log[3*x] + x*Log[3*x]^2)*Log[Log[
x]]^2)
```

3.780.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.780.4 Maple [A] (verified)

Time = 2.57 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

method	result	size
parallelrisch	$\frac{e^{-x^2 \ln(3x)^2+e^4+40}}{\ln(\ln(x))}$	23
risch	$\frac{x^{-2x^2 \ln(3)} e^{-x^2 \ln(x)^2+40-x^2 \ln(3)^2+e^4}}{\ln(\ln(x))}$	39

input
```
int(((-2*x^2*ln(x)*ln(3*x)^2-2*x^2*ln(x)*ln(3*x))*exp(-x^2*ln(3*x)^2+exp(4
)+40)*ln(ln(x))-exp(-x^2*ln(3*x)^2+exp(4)+40))/x/ln(x)/ln(ln(x))^2,x,metho
d=_RETURNVERBOSE)
```

output
```
exp(-x^2*ln(3*x)^2+exp(4)+40)/ln(ln(x))
```

3.780.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.58

$$\int \frac{-e^{40+e^4-x^2 \log^2(3x)}+e^{40+e^4-x^2 \log^2(3x)}\left(-2x^2 \log(x)\log(3x)-2x^2 \log(x)\log^2(3x)\right)\log(\log(x))}{x\log(x)\log^2(\log(x))}\,dx$$
$$=\frac{e^{\left(-x^2 \log(3)^2-2\,x^2 \log(3)\log(x)-x^2 \log(x)^2+e^4+40\right)}}{\log\left(\log\left(x\right)\right)}$$

input
```
integrate(((-2*x^2*log(x)*log(3*x)^2-2*x^2*log(x)*log(3*x))*exp(-x^2*log(3
*x)^2+exp(4)+40)*log(log(x))-exp(-x^2*log(3*x)^2+exp(4)+40))/x/log(x)/log(
log(x))^2,x, algorithm=\
```

output
```
e^(-x^2*log(3)^2 - 2*x^2*log(3)*log(x) - x^2*log(x)^2 + e^4 + 40)/log(log(
x))
```

3.780.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-e^{40+e^4-x^2\log^2(3x)}+e^{40+e^4-x^2\log^2(3x)}\left(-2x^2\log(x)\log(3x)-2x^2\log(x)\log^2(3x)\right)\log(\log(x))}{x\log(x)\log^2(\log(x))}\,dx$$
$$=\frac{e^{-x^2(\log(x)+\log(3))^2+40+e^4}}{\log(\log(x))}$$

input
```
integrate(((-2*x**2*ln(x)*ln(3*x)**2-2*x**2*ln(x)*ln(3*x))*exp(-x**2*ln(3*
x)**2+exp(4)+40)*ln(ln(x))-exp(-x**2*ln(3*x)**2+exp(4)+40))/x/ln(x)/ln(ln(
x))**2,x)
```

output
```
exp(-x**2*(log(x) + log(3))**2 + 40 + exp(4))/log(log(x))
```

3.780.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.58

$$\int \frac{-e^{40+e^4-x^2\log^2(3x)}+e^{40+e^4-x^2\log^2(3x)}\left(-2x^2\log(x)\log(3x)-2x^2\log(x)\log^2(3x)\right)\log(\log(x))}{x\log(x)\log^2(\log(x))}\,dx$$
$$=\frac{e^{\left(-x^2\log(3)^2-2\,x^2\log(3)\log(x)-x^2\log(x)^2+e^4+40\right)}}{\log(\log(x))}$$

input
```
integrate(((-2*x^2*log(x)*log(3*x)^2-2*x^2*log(x)*log(3*x))*exp(-x^2*log(3
*x)^2+exp(4)+40)*log(log(x))-exp(-x^2*log(3*x)^2+exp(4)+40))/x/log(x)/log(
log(x))^2,x, algorithm=\
```

output
```
e^(-x^2*log(3)^2 - 2*x^2*log(3)*log(x) - x^2*log(x)^2 + e^4 + 40)/log(log(
x))
```

3.780.8 Giac [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.58

$$\int \frac{-e^{40+e^4-x^2\log^2(3x)}+e^{40+e^4-x^2\log^2(3x)}\left(-2x^2\log(x)\log(3x)-2x^2\log(x)\log^2(3x)\right)\log(\log(x))}{x\log(x)\log^2(\log(x))}\,dx$$
$$=\frac{e^{\left(-x^2\log(3)^2-2\,x^2\log(3)\log(x)-x^2\log(x)^2+e^4+40\right)}}{\log\left(\log\left(x\right)\right)}$$

input
```
integrate((((-2*x^2*log(x)*log(3*x)^2-2*x^2*log(x)*log(3*x))*exp(-x^2*log(3
*x)^2+exp(4)+40)*log(log(x))-exp(-x^2*log(3*x)^2+exp(4)+40))/x/log(x)/log(
log(x))^2,x, algorithm=\
```

output
```
e^(-x^2*log(3)^2 - 2*x^2*log(3)*log(x) - x^2*log(x)^2 + e^4 + 40)/log(log(
x))
```

3.780.9 Mupad [B] (verification not implemented)

Time = 15.36 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.75

$$\int \frac{-e^{40+e^4-x^2\log^2(3x)}+e^{40+e^4-x^2\log^2(3x)}\left(-2x^2\log(x)\log(3x)-2x^2\log(x)\log^2(3x)\right)\log(\log(x))}{x\log(x)\log^2(\log(x))}\,dx$$
$$=\frac{\mathrm{e}^{40}\,\mathrm{e}^{-x^2\ln(3)^2}\,\mathrm{e}^{\mathrm{e}^4}\,\mathrm{e}^{-x^2\ln(x)^2}}{x^{2\,x^2\,\ln(3)}\,\ln\left(\ln\left(x\right)\right)}$$

input
```
int(-(exp(exp(4) - x^2*log(3*x)^2 + 40) + log(log(x))*exp(exp(4) - x^2*log
(3*x)^2 + 40)*(2*x^2*log(3*x)*log(x) + 2*x^2*log(3*x)^2*log(x)))/(x*log(lo
g(x))^2*log(x)),x)
```

output
```
(exp(40)*exp(-x^2*log(3)^2)*exp(exp(4))*exp(-x^2*log(x)^2))/(x^(2*x^2*log(
3))*log(log(x)))
```

3.781 $\int \frac{-4+e^{3+x}(-4+2x)}{x+e^{3+x}x} \, dx$

3.781.1 Optimal result

Integrand size = 25, antiderivative size = 14

$$\int \frac{-4+e^{3+x}(-4+2x)}{x+e^{3+x}x} \, dx = \log \left(\frac{(1+e^{3+x})^2}{x^4}\right)$$

output
```
ln(1/x^4*(exp(3+x)+1)^2)
```

3.781.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.43

$$\int \frac{-4+e^{3+x}(-4+2x)}{x+e^{3+x}x} \, dx = 2\left(x+2\text{arctanh}\left(1+2e^{3+x}\right)-2\log(x)\right)$$

input
```
Integrate[(-4 + E^(3 + x)*(-4 + 2*x))/(x + E^(3 + x)*x),x]
```

output
```
2*(x + 2*ArcTanh[1 + 2*E^(3 + x)] - 2*Log[x])
```

3.781.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.07, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+3}(2x-4)-4}{e^{x+3}x+x}\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2(x-2)}{x}-\frac{2}{e^{x+3}+1}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2\log\left(e^{x+3}+1\right)-4\log(x)$$

input
```
Int[(-4 + E^(3 + x)*(-4 + 2*x))/(x + E^(3 + x)*x),x]
```

output
```
2*Log[1 + E^(3 + x)] - 4*Log[x]
```

3.781.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.781.4 Maple [A] (verified)

Time = 2.17 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.07

method	result	size
norman	$-4\ln(x)+2\ln\left(e^{3+x}+1\right)$	15
parallelrisch	$-4\ln(x)+2\ln\left(e^{3+x}+1\right)$	15
risch	$-4\ln(x)-6+2\ln\left(e^{3+x}+1\right)$	16

input
```
int(((2*x-4)*exp(3+x)-4)/(exp(3+x)*x+x),x,method=_RETURNVERBOSE)
```

output
```
-4*ln(x)+2*ln(exp(3+x)+1)
```

3.781.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{-4+e^{3+x}(-4+2x)}{x+e^{3+x}x}\,dx = -4\,\log\left(x\right)+2\,\log\left(e^{(x+3)}+1\right)$$

input
```
integrate(((2*x-4)*exp(3+x)-4)/(exp(3+x)*x+x),x, algorithm=\
```

output
```
-4*log(x) + 2*log(e^(x + 3) + 1)
```

3.781.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{-4+e^{3+x}(-4+2x)}{x+e^{3+x}x}\,dx = -4\log\left(x\right)+2\log\left(e^{x+3}+1\right)$$

input
```
integrate(((2*x-4)*exp(3+x)-4)/(exp(3+x)*x+x),x)
```

output
```
-4*log(x) + 2*log(exp(x + 3) + 1)
```

3.781.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.21

$$\int \frac{-4+e^{3+x}(-4+2x)}{x+e^{3+x}x}\,dx = 2\,\log\left(\left(e^{(x+3)}+1\right)e^{(-3)}\right)-4\,\log\left(x\right)$$

input
```
integrate(((2*x-4)*exp(3+x)-4)/(exp(3+x)*x+x),x, algorithm=\
```

output
```
2*log((e^(x + 3) + 1)*e^(-3)) - 4*log(x)
```

3.781.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{-4+e^{3+x}(-4+2x)}{x+e^{3+x}x}\,dx = -4\log(x) + 2\log\left(e^{(x+3)}+1\right)$$

input
```
integrate(((2*x-4)*exp(3+x)-4)/(exp(3+x)*x+x),x, algorithm=\
```

output
```
-4*log(x) + 2*log(e^(x + 3) + 1)
```

3.781.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.07

$$\int \frac{-4+e^{3+x}(-4+2x)}{x+e^{3+x}x}\,dx = 2\ln\left(e^3\,e^x+1\right) - 4\ln(x)$$

input
```
int((exp(x + 3)*(2*x - 4) - 4)/(x + x*exp(x + 3)),x)
```

output
```
2*log(exp(3)*exp(x) + 1) - 4*log(x)
```

3.782 $\int \frac{}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-}$

3.782.1 Optimal result

Integrand size = 183, antiderivative size = 31

$$\int \frac{-}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-5}$$
$$=3-\frac{x}{-3+x+16\left(\frac{2}{5}(-5+x)+x+\frac{3}{-2+\log(x)}\right)^2}$$

output
```
3-x/(4*(7/5*x-2+3/(ln(x)-2))*(28/5*x-8+12/(ln(x)-2))+x-3)
```

3.782.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.71

$$\int \frac{-}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-5}$$
$$=-\frac{25x(-2+\log(x))^2}{4(4825-3895x+784x^2)-4(2725-3055x+784x^2)\log(x)+(1525-2215x+784x^2)\log^2(x)}$$

input
```
Integrate[(-1090000 - 336000*x + 313600*x^2 + (2360000 + 336000*x - 627200
*x^2)*Log[x] + (-1605000 - 84000*x + 470400*x^2)*Log[x]^2 + (425000 - 1568
00*x^2)*Log[x]^3 + (-38125 + 19600*x^2)*Log[x]^4)/(372490000 - 601388000*x
 + 363786000*x^2 - 97717760*x^3 + 9834496*x^4 + (-420740000 + 811336000*x
- 570189600*x^2 + 174361600*x^3 - 19668992*x^4)*Log[x] + (177675000 - 3994
14000*x + 326539800*x^2 - 114965760*x^3 + 14751744*x^4)*Log[x]^2 + (-33245
000 + 85558000*x - 80790600*x^2 + 33053440*x^3 - 4917248*x^4)*Log[x]^3 + (
2325625 - 6755750*x + 7297425*x^2 - 3473120*x^3 + 614656*x^4)*Log[x]^4),x]
```

output
```
(-25*x*(-2 + Log[x])^2)/(4*(4825 - 3895*x + 784*x^2) - 4*(2725 - 3055*x +
784*x^2)*Log[x] + (1525 - 2215*x + 784*x^2)*Log[x]^2)
```

3.782.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{313600}{9834496x^4 - 97717760x^3 + 363786000x^2 + (614656x^4 - 3473120x^3 + 7297425x^2 - 6755750x + 2325625)\log^4(}$$

$\big\downarrow$ 7239

$$\int \frac{25(2-\log(x))\left(-8(-784x^2+840x+2725) - \left((784x^2-1525)\log^3(x)\right) + 6(784x^2-2325)\log^2(x) - 12(784x\right.}{\left(4\left(784x^2-3895x+4825\right) + (784x^2-2215x+1525)\log^2(x) - 4\left(784x^2-3055x+2725\right)\mathrm{lo}\right.}$$

$\big\downarrow$ 27

$$25\int -\frac{(2-\log(x))\left(-\left((1525-784x^2)\log^3(x)\right) + 6(2325-784x^2)\log^2(x) - 12(-784x^2+280x+3025)\log(x)\right.}{\left((784x^2-2215x+1525)\log^2(x) - 4\left(784x^2-3055x+2725\right)\log(x) + 4\left(784x^2-3895x\right.\right.}$$

$\big\downarrow$ 25

$$-25\int \frac{(2-\log(x))\left(-\left((1525-784x^2)\log^3(x)\right) + 6(2325-784x^2)\log^2(x) - 12(-784x^2+280x+3025)\log(x)\right.}{\left((784x^2-2215x+1525)\log^2(x) - 4\left(784x^2-3055x+2725\right)\log(x) + 4\left(784x^2-3895x\right.\right.}$$

$\big\downarrow$ 7293

$$-25\int \left(\frac{1525-784x^2}{(784x^2-2215x+1525)^2} + \frac{240\left(17210368\log(x)x^5 - 25815552x^5 - 85503040\log(x)x^4 + 100869440x^4\right.}{(784x^2-2215x+1525)^3\left(784\log^2(x)x^2 - \right.}\right.$$

3.782.

$$\int \frac{-1090000-336000x+313600x^2+(2360000+336}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-570189600x^2+174361600x^3-19668992x^4)\log(x)}$$

$$\Big\downarrow \text{7239}$$

$$-25\int \frac{(2-\log(x))\left(\left(784x^2-1525\right)\log^3(x)-6\left(784x^2-2325\right)\log^2(x)+12\left(784x^2-280x-3025\right)\log(x)+8\left(-\right.\right.}{\left(\left(784x^2-2215x+1525\right)\log^2(x)-4\left(784x^2-3055x+2725\right)\log(x)+4\left(784x^2-3895x+\right.\right.}$$

$$\Big\downarrow \text{7293}$$

$$-25\int \left(\frac{1525-784x^2}{\left(784x^2-2215x+1525\right)^2}+\frac{240\left(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4\right.}{\left(784x^2-2215x+1525\right)^3\left(784\log^2(x)x^2-\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$-25\int \frac{(2-\log(x))\left(\left(784x^2-1525\right)\log^3(x)-6\left(784x^2-2325\right)\log^2(x)+12\left(784x^2-280x-3025\right)\log(x)+8\left(-\right.\right.}{\left(\left(784x^2-2215x+1525\right)\log^2(x)-4\left(784x^2-3055x+2725\right)\log(x)+4\left(784x^2-3895x+\right.\right.}$$

$$\Big\downarrow \text{7293}$$

$$-25\int \left(\frac{1525-784x^2}{\left(784x^2-2215x+1525\right)^2}+\frac{240\left(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4\right.}{\left(784x^2-2215x+1525\right)^3\left(784\log^2(x)x^2-\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$-25\int \frac{(2-\log(x))\left(\left(784x^2-1525\right)\log^3(x)-6\left(784x^2-2325\right)\log^2(x)+12\left(784x^2-280x-3025\right)\log(x)+8\left(-\right.\right.}{\left(\left(784x^2-2215x+1525\right)\log^2(x)-4\left(784x^2-3055x+2725\right)\log(x)+4\left(784x^2-3895x+\right.\right.}$$

$$\Big\downarrow \text{7293}$$

$$-25\int \left(\frac{1525-784x^2}{\left(784x^2-2215x+1525\right)^2}+\frac{240\left(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4\right.}{\left(784x^2-2215x+1525\right)^3\left(784\log^2(x)x^2-\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$-25\int \frac{(2-\log(x))\left(\left(784x^2-1525\right)\log^3(x)-6\left(784x^2-2325\right)\log^2(x)+12\left(784x^2-280x-3025\right)\log(x)+8\left(-\right.\right.}{\left(\left(784x^2-2215x+1525\right)\log^2(x)-4\left(784x^2-3055x+2725\right)\log(x)+4\left(784x^2-3895x+\right.\right.}$$

$$\Big\downarrow \text{7293}$$

$$-25\int \left(\frac{1525-784x^2}{\left(784x^2-2215x+1525\right)^2}+\frac{240\left(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4\right.}{\left(784x^2-2215x+1525\right)^3\left(784\log^2(x)x^2-\right.}\right.$$

$$\Big\downarrow \text{7239}$$

3.782.

$$\int \frac{-1090000-336000x+313600x^2+(2360000+336}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-570189600x^2+174361600x^3-19668992x^4)\log(x)}$$

$$-25\int \frac{(2-\log(x))\left((784x^2-1525)\log^3(x)-6(784x^2-2325)\log^2(x)+12(784x^2-280x-3025)\log(x)+8(-\right.}{\left((784x^2-2215x+1525)\log^2(x)-4(784x^2-3055x+2725)\log(x)+4(784x^2-3895x+\right.}$$

$$\Big\downarrow 7293$$

$$-25\int \left(\frac{1525-784x^2}{(784x^2-2215x+1525)^2}+\frac{240(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4}{(784x^2-2215x+1525)^3(784\log^2(x)x^2-}\right.$$

$$\Big\downarrow 7239$$

$$-25\int \frac{(2-\log(x))\left((784x^2-1525)\log^3(x)-6(784x^2-2325)\log^2(x)+12(784x^2-280x-3025)\log(x)+8(-\right.}{\left((784x^2-2215x+1525)\log^2(x)-4(784x^2-3055x+2725)\log(x)+4(784x^2-3895x+\right.}$$

$$\Big\downarrow 7293$$

$$-25\int \left(\frac{1525-784x^2}{(784x^2-2215x+1525)^2}+\frac{240(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4}{(784x^2-2215x+1525)^3(784\log^2(x)x^2-}\right.$$

$$\Big\downarrow 7239$$

$$-25\int \frac{(2-\log(x))\left((784x^2-1525)\log^3(x)-6(784x^2-2325)\log^2(x)+12(784x^2-280x-3025)\log(x)+8(-\right.}{\left((784x^2-2215x+1525)\log^2(x)-4(784x^2-3055x+2725)\log(x)+4(784x^2-3895x+\right.}$$

$$\Big\downarrow 7293$$

$$-25\int \left(\frac{1525-784x^2}{(784x^2-2215x+1525)^2}+\frac{240(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4}{(784x^2-2215x+1525)^3(784\log^2(x)x^2-}\right.$$

$$\Big\downarrow 7239$$

$$-25\int \frac{(2-\log(x))\left((784x^2-1525)\log^3(x)-6(784x^2-2325)\log^2(x)+12(784x^2-280x-3025)\log(x)+8(-\right.}{\left((784x^2-2215x+1525)\log^2(x)-4(784x^2-3055x+2725)\log(x)+4(784x^2-3895x+\right.}$$

$$\Big\downarrow 7293$$

$$-25\int \left(\frac{1525-784x^2}{(784x^2-2215x+1525)^2}+\frac{240(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4}{(784x^2-2215x+1525)^3(784\log^2(x)x^2-}\right.$$

$$\Big\downarrow 7239$$

3.782.

$$\int \frac{-1090000-336000x+313600x^2+(2360000+336}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-570189600x^2+174361600x^3-19668992x^4)\log(x)}$$

$$-25\int \frac{(2-\log(x))\left(\left(784x^2-1525\right)\log^3(x)-6\left(784x^2-2325\right)\log^2(x)+12\left(784x^2-280x-3025\right)\log(x)+8(-\right.}{\left(\left(784x^2-2215x+1525\right)\log^2(x)-4\left(784x^2-3055x+2725\right)\log(x)+4\left(784x^2-3895x+\right.\right.}$$

$\big\downarrow$ 7293

$$-25\int \left(\frac{1525-784x^2}{\left(784x^2-2215x+1525\right)^2}+\frac{240\left(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4\right.}{\left(784x^2-2215x+1525\right)^3\left(784\log^2(x)x^2-\right.}\right.$$

$\big\downarrow$ 7239

$$-25\int \frac{(2-\log(x))\left(\left(784x^2-1525\right)\log^3(x)-6\left(784x^2-2325\right)\log^2(x)+12\left(784x^2-280x-3025\right)\log(x)+8(-\right.}{\left(\left(784x^2-2215x+1525\right)\log^2(x)-4\left(784x^2-3055x+2725\right)\log(x)+4\left(784x^2-3895x+\right.\right.}$$

$\big\downarrow$ 7293

$$-25\int \left(\frac{1525-784x^2}{\left(784x^2-2215x+1525\right)^2}+\frac{240\left(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4\right.}{\left(784x^2-2215x+1525\right)^3\left(784\log^2(x)x^2-\right.}\right.$$

$\big\downarrow$ 7239

$$-25\int \frac{(2-\log(x))\left(\left(784x^2-1525\right)\log^3(x)-6\left(784x^2-2325\right)\log^2(x)+12\left(784x^2-280x-3025\right)\log(x)+8(-\right.}{\left(\left(784x^2-2215x+1525\right)\log^2(x)-4\left(784x^2-3055x+2725\right)\log(x)+4\left(784x^2-3895x+\right.\right.}$$

$\big\downarrow$ 7293

$$-25\int \left(\frac{1525-784x^2}{\left(784x^2-2215x+1525\right)^2}+\frac{240\left(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4\right.}{\left(784x^2-2215x+1525\right)^3\left(784\log^2(x)x^2-\right.}\right.$$

$\big\downarrow$ 7239

$$-25\int \frac{(2-\log(x))\left(\left(784x^2-1525\right)\log^3(x)-6\left(784x^2-2325\right)\log^2(x)+12\left(784x^2-280x-3025\right)\log(x)+8(-\right.}{\left(\left(784x^2-2215x+1525\right)\log^2(x)-4\left(784x^2-3055x+2725\right)\log(x)+4\left(784x^2-3895x+\right.\right.}$$

$\big\downarrow$ 7293

$$-25\int \left(\frac{1525-784x^2}{\left(784x^2-2215x+1525\right)^2}+\frac{240\left(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4\right.}{\left(784x^2-2215x+1525\right)^3\left(784\log^2(x)x^2-\right.}\right.$$

$\big\downarrow$ 7239

3.782.

$$\int \frac{-1090000-336000x+313600x^2+(2360000+336}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-570189600x^2+174361600x^3-19668992x^4)\log(x)}$$

$$-25\int \frac{(2-\log(x))\left((784x^2-1525)\log^3(x)-6(784x^2-2325)\log^2(x)+12(784x^2-280x-3025)\log(x)+8(-\right.}{\left((784x^2-2215x+1525)\log^2(x)-4\left(784x^2-3055x+2725\right)\log(x)+4\left(784x^2-3895x+\right.\right.}$$

$$\Big\downarrow \text{7293}$$

$$-25\int \left(\frac{1525-784x^2}{(784x^2-2215x+1525)^2}+\frac{240\left(17210368\log(x)x^5-25815552x^5-85503040\log(x)x^4+100869440x^4\right.}{(784x^2-2215x+1525)^3\left(784\log^2(x)x^2-\right.}\right.$$

input
```
Int[(-1090000 - 336000*x + 313600*x^2 + (2360000 + 336000*x - 627200*x^2)*
Log[x] + (-1605000 - 84000*x + 470400*x^2)*Log[x]^2 + (425000 - 156800*x^2
)*Log[x]^3 + (-38125 + 19600*x^2)*Log[x]^4)/(372490000 - 601388000*x + 363
786000*x^2 - 97717760*x^3 + 9834496*x^4 + (-420740000 + 811336000*x - 5701
89600*x^2 + 174361600*x^3 - 19668992*x^4)*Log[x] + (177675000 - 399414000*
x + 326539800*x^2 - 114965760*x^3 + 14751744*x^4)*Log[x]^2 + (-33245000 +
85558000*x - 80790600*x^2 + 33053440*x^3 - 4917248*x^4)*Log[x]^3 + (232562
5 - 6755750*x + 7297425*x^2 - 3473120*x^3 + 614656*x^4)*Log[x]^4),x]
```

output
```
$Aborted
```

3.782.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.782.

$$\int \frac{-1090000-336000x+313600x^2+(2360000+336\cdots}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-570189600x^2+174361600x^3-19668992x^4)\log(x)\cdots}$$

3.782.4 Maple [A] (verified)

Time = 2.09 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.19

method	result
norman	$\frac{-100x-25x\ln(x)^2+100x\ln(x)}{784x^2\ln(x)^2-2215x\ln(x)^2-3136x^2\ln(x)+1525\ln(x)^2+12220x\ln(x)+3136x^2-10900\ln(x)-15580x+19300}$
default	$\frac{-100x-25x\ln(x)^2+100x\ln(x)}{784x^2\ln(x)^2-2215x\ln(x)^2-3136x^2\ln(x)+1525\ln(x)^2+12220x\ln(x)+3136x^2-10900\ln(x)-15580x+19300}$
parallelrisch	$\frac{-78400x-19600x\ln(x)^2+78400x\ln(x)}{614656x^2\ln(x)^2-1736560x\ln(x)^2-2458624x^2\ln(x)+1195600\ln(x)^2+9580480x\ln(x)+2458624x^2-8545600\ln(x)-12214720}$
risch	$-\frac{25x}{784x^2-2215x+1525}+\frac{6000x(14x\ln(x)-28x-20\ln(x)+55)}{(784x^2-2215x+1525)\left(784x^2\ln(x)^2-2215x\ln(x)^2-3136x^2\ln(x)+1525\ln(x)^2+12220x\ln(x)+313\right.}$

input
```
int(((19600*x^2-38125)*ln(x)^4+(-156800*x^2+425000)*ln(x)^3+(470400*x^2-84
000*x-1605000)*ln(x)^2+(-627200*x^2+336000*x+2360000)*ln(x)+313600*x^2-336
000*x-1090000)/((614656*x^4-3473120*x^3+7297425*x^2-6755750*x+2325625)*ln(
x)^4+(-4917248*x^4+33053440*x^3-80790600*x^2+85558000*x-33245000)*ln(x)^3+
(14751744*x^4-114965760*x^3+326539800*x^2-399414000*x+177675000)*ln(x)^2+(
-19668992*x^4+174361600*x^3-570189600*x^2+811336000*x-420740000)*ln(x)+983
4496*x^4-97717760*x^3+363786000*x^2-601388000*x+372490000),x,method=_RETUR
NVERBOSE)
```

output
```
(-100*x-25*x*ln(x)^2+100*x*ln(x))/(784*x^2*ln(x)^2-2215*x*ln(x)^2-3136*x^2
*ln(x)+1525*ln(x)^2+12220*x*ln(x)+3136*x^2-10900*ln(x)-15580*x+19300)
```

3.782.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.87

$$\int \frac{-}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-5}$$
$$= -\frac{25\left(x\log(x)^2-4x\log(x)+4x\right)}{(784x^2-2215x+1525)\log(x)^2+3136x^2-4(784x^2-3055x+2725)\log(x)-15580x+19300}$$

input
```
integrate(((19600*x^2-38125)*log(x)^4+(-156800*x^2+425000)*log(x)^3+(47040
0*x^2-84000*x-1605000)*log(x)^2+(-627200*x^2+336000*x+2360000)*log(x)+3136
00*x^2-336000*x-1090000)/((614656*x^4-3473120*x^3+7297425*x^2-6755750*x+23
25625)*log(x)^4+(-4917248*x^4+33053440*x^3-80790600*x^2+85558000*x-3324500
0)*log(x)^3+(14751744*x^4-114965760*x^3+326539800*x^2-399414000*x+17767500
0)*log(x)^2+(-19668992*x^4+174361600*x^3-570189600*x^2+811336000*x-4207400
00)*log(x)+9834496*x^4-97717760*x^3+363786000*x^2-601388000*x+372490000),x
, algorithm=\
```

output
```
-25*(x*log(x)^2 - 4*x*log(x) + 4*x)/((784*x^2 - 2215*x + 1525)*log(x)^2 +
3136*x^2 - 4*(784*x^2 - 3055*x + 2725)*log(x) - 15580*x + 19300)
```

3.782.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 102 vs. $2(20) = 40$.

Time = 0.46 (sec) , antiderivative size = 102, normalized size of antiderivative = 3.29

$$\int \frac{-}{372490000 - 601388000x + 363786000x^2 - 97717760x^3 + 9834496x^4 + (-420740000 + 811336000x - 5}$$
$$= -\frac{25x}{784x^2 - 2215x + 1525} + \frac{-168000x^2 + 33000}{2458624x^4 - 19160960x^3 + 54423300x^2 - 66509000x + (-2458624x^4 + 16526720x^3 - 40395300x^2 + 4}$$

input
```
integrate(((19600*x**2-38125)*ln(x)**4+(-156800*x**2+425000)*ln(x)**3+(470
400*x**2-84000*x-1605000)*ln(x)**2+(-627200*x**2+336000*x+2360000)*ln(x)+3
13600*x**2-336000*x-1090000)/((614656*x**4-3473120*x**3+7297425*x**2-67557
50*x+2325625)*ln(x)**4+(-4917248*x**4+33053440*x**3-80790600*x**2+85558000
*x-33245000)*ln(x)**3+(14751744*x**4-114965760*x**3+326539800*x**2-3994140
00*x+177675000)*ln(x)**2+(-19668992*x**4+174361600*x**3-570189600*x**2+811
336000*x-420740000)*ln(x)+9834496*x**4-97717760*x**3+363786000*x**2-601388
000*x+372490000),x)
```

output
```
-25*x/(784*x**2 - 2215*x + 1525) + (-168000*x**2 + 330000*x + (84000*x**2
- 120000*x)*log(x))/(2458624*x**4 - 19160960*x**3 + 54423300*x**2 - 665090
00*x + (-2458624*x**4 + 16526720*x**3 - 40395300*x**2 + 42779000*x - 16622
500)*log(x) + (614656*x**4 - 3473120*x**3 + 7297425*x**2 - 6755750*x + 232
5625)*log(x)**2 + 29432500)
```

3.782.

$$\int \frac{-1090000 - 336000x + 313600x^2 + (2360000 + 336}{372490000 - 601388000x + 363786000x^2 - 97717760x^3 + 9834496x^4 + (-420740000 + 811336000x - 570189600x^2 + 174361600x^3 - 19668992x^4)\log(x)}$$

3.782.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.87

$$\int \frac{-}{372490000 - 601388000x + 363786000x^2 - 97717760x^3 + 9834496x^4 + (-420740000 + 811336000x - 5}$$
$$= -\frac{25\left(x\log(x)^2 - 4x\log(x) + 4x\right)}{(784x^2 - 2215x + 1525)\log(x)^2 + 3136x^2 - 4(784x^2 - 3055x + 2725)\log(x) - 15580x + 19300}$$

input
```
integrate(((19600*x^2-38125)*log(x)^4+(-156800*x^2+425000)*log(x)^3+(47040
0*x^2-84000*x-1605000)*log(x)^2+(-627200*x^2+336000*x+2360000)*log(x)+3136
00*x^2-336000*x-1090000)/((614656*x^4-3473120*x^3+7297425*x^2-6755750*x+23
25625)*log(x)^4+(-4917248*x^4+33053440*x^3-80790600*x^2+85558000*x-3324500
0)*log(x)^3+(14751744*x^4-114965760*x^3+326539800*x^2-399414000*x+17767500
0)*log(x)^2+(-19668992*x^4+174361600*x^3-570189600*x^2+811336000*x-4207400
00)*log(x)+9834496*x^4-97717760*x^3+363786000*x^2-601388000*x+372490000),x
, algorithm=\
```

output
```
-25*(x*log(x)^2 - 4*x*log(x) + 4*x)/((784*x^2 - 2215*x + 1525)*log(x)^2 +
3136*x^2 - 4*(784*x^2 - 3055*x + 2725)*log(x) - 15580*x + 19300)
```

3.782.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 131 vs. 2(29) = 58.

Time = 0.49 (sec) , antiderivative size = 131, normalized size of antiderivative = 4.23

$$\int \frac{-}{372490000 - 601388000x + 363786000x^2 - 97717760x^3 + 9834496x^4 + (-420740000 + 811336000x - 5}$$
$$= \frac{}{614656x^4\log(x)^2 - 2458624x^4\log(x) - 3473120x^3\log(x)^2 + 2458624x^4 + 16526720x^3\log(x) + 72974}$$
$$-\frac{25x}{784x^2 - 2215x + 1525}$$

input
```
integrate(((19600*x^2-38125)*log(x)^4+(-156800*x^2+425000)*log(x)^3+(47040
0*x^2-84000*x-1605000)*log(x)^2+(-627200*x^2+336000*x+2360000)*log(x)+3136
00*x^2-336000*x-1090000)/((614656*x^4-3473120*x^3+7297425*x^2-6755750*x+23
25625)*log(x)^4+(-4917248*x^4+33053440*x^3-80790600*x^2+85558000*x-3324500
0)*log(x)^3+(14751744*x^4-114965760*x^3+326539800*x^2-399414000*x+17767500
0)*log(x)^2+(-19668992*x^4+174361600*x^3-570189600*x^2+811336000*x-4207400
00)*log(x)+9834496*x^4-97717760*x^3+363786000*x^2-601388000*x+372490000),x
, algorithm=\
```

output
```
6000*(14*x^2*log(x) - 28*x^2 - 20*x*log(x) + 55*x)/(614656*x^4*log(x)^2 -
2458624*x^4*log(x) - 3473120*x^3*log(x)^2 + 2458624*x^4 + 16526720*x^3*log
(x) + 7297425*x^2*log(x)^2 - 19160960*x^3 - 40395300*x^2*log(x) - 6755750*
x*log(x)^2 + 54423300*x^2 + 42779000*x*log(x) + 2325625*log(x)^2 - 6650900
0*x - 16622500*log(x) + 29432500) - 25*x/(784*x^2 - 2215*x + 1525)
```

3.782.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-}{372490000 - 601388000x + 363786000x^2 - 97717760x^3 + 9834496x^4 + (-420740000 + 811336000x - 5}$$

$$= \int -\frac{}{\ln(x)^4\,(614656\,x^4 - 3473120\,x^3 + 7297425\,x^2 - 6755750\,x + 2325625) - 601388000\,x - \ln(x)^3\,(4917}$$

input
```
int(-(336000*x + log(x)^2*(84000*x - 470400*x^2 + 1605000) - log(x)^4*(196
00*x^2 - 38125) + log(x)^3*(156800*x^2 - 425000) - log(x)*(336000*x - 6272
00*x^2 + 2360000) - 313600*x^2 + 1090000)/(log(x)^4*(7297425*x^2 - 6755750
*x - 3473120*x^3 + 614656*x^4 + 2325625) - 601388000*x - log(x)^3*(8079060
0*x^2 - 85558000*x - 33053440*x^3 + 4917248*x^4 + 33245000) - log(x)*(5701
89600*x^2 - 811336000*x - 174361600*x^3 + 19668992*x^4 + 420740000) + log(
x)^2*(326539800*x^2 - 399414000*x - 114965760*x^3 + 14751744*x^4 + 1776750
00) + 363786000*x^2 - 97717760*x^3 + 9834496*x^4 + 372490000),x)
```


$$\int \frac{-1090000-336000x+313600x^2+(2360000+336}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-570189600x^2+174361600x^3-19668992x^4)\log(x}$$

output
```
int(-(336000*x + log(x)^2*(84000*x - 470400*x^2 + 1605000) - log(x)^4*(196
00*x^2 - 38125) + log(x)^3*(156800*x^2 - 425000) - log(x)*(336000*x - 6272
00*x^2 + 2360000) - 313600*x^2 + 1090000)/(log(x)^4*(7297425*x^2 - 6755750
*x - 3473120*x^3 + 614656*x^4 + 2325625) - 601388000*x - log(x)^3*(8079060
0*x^2 - 85558000*x - 33053440*x^3 + 4917248*x^4 + 33245000) - log(x)*(5701
89600*x^2 - 811336000*x - 174361600*x^3 + 19668992*x^4 + 420740000) + log(
x)^2*(326539800*x^2 - 399414000*x - 114965760*x^3 + 14751744*x^4 + 1776750
00) + 363786000*x^2 - 97717760*x^3 + 9834496*x^4 + 372490000), x)
```

3.782.

$$\int \frac{-1090000-336000x+313600x^2+(2360000+336}{372490000-601388000x+363786000x^2-97717760x^3+9834496x^4+(-420740000+811336000x-570189600x^2+174361600x^3-19668992x^4)\log(x)}$$

3.783 $\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}}{}$

3.783.1 Optimal result

Integrand size = 351, antiderivative size = 29

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x\right.\right.}{}$$

$$=e^{\frac{\left(3+e^{2-e^{2x}}(-1+x)\right)^4}{\left(25+x^2\right)^4}}$$

output
```
exp((exp(ln(-1+x)-exp(x)^2+2)+3)^4/(x^2+25)^4)
```

3.783.2 Mathematica [A] (verified)

Time = 1.05 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.31

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x\right.\right.}{}$$

$$=e^{\frac{e^{-4e^{2x}}\left(3e^{e^{2x}}+e^2(-1+x)\right)^4}{\left(25+x^2\right)^4}}$$

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)(2700+864x-756x^2+e^{2x}(5400-5\right.}{}$$

input
```
Integrate[(E^((81 + 108*E^(2 - E^(2*x))*(-1 + x) + 54*E^(4 - 2*E^(2*x))*(-
1 + x)^2 + 12*E^(6 - 3*E^(2*x))*(-1 + x)^3 + E^(8 - 4*E^(2*x))*(-1 + x)^4)
/(390625 + 62500*x^2 + 3750*x^4 + 100*x^6 + x^8))*(648*x - 648*x^2 + E^(2
- E^(2*x))*(-1 + x)*(2700 + 864*x - 756*x^2 + E^(2*x)*(5400 - 5400*x + 216
*x^2 - 216*x^3)) + E^(4 - 2*E^(2*x))*(-1 + x)^2*(2700 + 432*x - 324*x^2 +
E^(2*x)*(5400 - 5400*x + 216*x^2 - 216*x^3)) + E^(6 - 3*E^(2*x))*(-1 + x)^
3*(900 + 96*x - 60*x^2 + E^(2*x)*(1800 - 1800*x + 72*x^2 - 72*x^3)) + E^(8
 - 4*E^(2*x))*(-1 + x)^4*(100 + 8*x - 4*x^2 + E^(2*x)*(200 - 200*x + 8*x^2
 - 8*x^3))))/(-9765625 + 9765625*x - 1953125*x^2 + 1953125*x^3 - 156250*x^
4 + 156250*x^5 - 6250*x^6 + 6250*x^7 - 125*x^8 + 125*x^9 - x^10 + x^11),x]
```

output
```
E^((3*E^E^(2*x) + E^2*(-1 + x))^4/(E^(4*E^(2*x))*(25 + x^2)^4))
```

3.783.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-648x^2+e^{8-4e^{2x}}\left(-4x^2+e^{2x}\left(-8x^3+8x^2-200x+200\right)+8x+100\right)(x-1)^4+e^{6-3e^{2x}}\left(-60x^2+e^{2x}\left(-72x\right.\right.\right.}{}$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{e^{\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)+81}{x^8+100x^6+3750x^4+62500x^2+390625}}\left(e^{8-4e^{2x}}\left(-4x^2+8x+e^{2x}\left(-8x^3+8x^2-200x+20\right.\right.\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{4\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(-e^2\left(x^2-2x-25\right)-2e^{2x+2}\left(x^3-x^2+25x-25\right)-6e^{e^{2x}}x\right)\exp\left(\frac{-4e^{2x}\left(x^2+25\right)^4+e^{8-4e^2}}{}\right.}{\left(x^2+25\right)^5}$$

$$\Big\downarrow \text{27}$$

$$4\int -\frac{\exp\left(\frac{e^{8-4e^{2x}}(1-x)^4-12e^{6-3e^{2x}}(1-x)^3+54e^{4-2e^{2x}}(1-x)^2-108e^{2-e^{2x}}(1-x)-4e^{2x}\left(x^2+25\right)^4+81}{\left(x^2+25\right)^4}\right)\left(3e^{e^{2x}}-e^2(1-x)\right)^3\left(6e^{e}\right.}{\left(x^2+25\right)^5}$$

$$\Big\downarrow \text{25}$$

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x-756x^2+e^{2x}\left(5400-5\right.\right.\right.}{}$$

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(1-x)^4-12e^{6-3e^{2x}}(1-x)^3+54e^{4-2e^{2x}}(1-x)^2-108e^{2-e^{2x}}(1-x)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(3e^{e^{2x}}-e^2(1-x)\right)^3\left(6e^{e}\cdots\right.}{(x^2+25)^5}$$

$\downarrow$ 7293

$$-4\int\left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(1-x)^4-12e^{6-3e^{2x}}(1-x)^3+54e^{4-2e^{2x}}(1-x)^2-108e^{2-e^{2x}}(1-x)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x\cdots\right.}{(x^2+25)^5}\right.$$

$\downarrow$ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\cdots\right.}{(x^2+25)^5}$$

$\downarrow$ 7293

$$-4\int\left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x\cdots\right.}{(x^2+25)^5}\right.$$

$\downarrow$ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\cdots\right.}{(x^2+25)^5}$$

$\downarrow$ 7293

$$-4\int\left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x\cdots\right.}{(x^2+25)^5}\right.$$

$\downarrow$ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\cdots\right.}{(x^2+25)^5}$$

$\downarrow$ 7293

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x-756x^2+e^{2x}\left(5400-5\cdots\right.\right.\right.}{\cdots}$$

$$-4\int \left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x \cdots\right.}{(x^2+25)^5}\right.$$

$\big\downarrow$ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e \cdots}\right.}{(x^2+25)^5}$$

$\big\downarrow$ 7293

$$-4\int \left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x \cdots\right.}{(x^2+25)^5}\right.$$

$\big\downarrow$ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e \cdots}\right.}{(x^2+25)^5}$$

$\big\downarrow$ 7293

$$-4\int \left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x \cdots\right.}{(x^2+25)^5}\right.$$

$\big\downarrow$ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e \cdots}\right.}{(x^2+25)^5}$$

$\big\downarrow$ 7293

$$-4\int \left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x \cdots\right.}{(x^2+25)^5}\right.$$

$\big\downarrow$ 7239

3.783.

$$\int e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x-756x^2+e^{2x}(5400-5 \cdots\right.\right.$$

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\right.}{(x^2+25)^5}$$

↓ 7293

$$-4\int\left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x\right.}{(x^2+25)^5}\right.$$

↓ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\right.}{(x^2+25)^5}$$

↓ 7293

$$-4\int\left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x\right.}{(x^2+25)^5}\right.$$

↓ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\right.}{(x^2+25)^5}$$

↓ 7293

$$-4\int\left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x\right.}{(x^2+25)^5}\right.$$

↓ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\right.}{(x^2+25)^5}$$

↓ 7293

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)(2700+864x-756x^2+e^{2x}(5400-5\right.}{}$$

$$-4\int \left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x\right.}{(x^2+25)^5}\right.$$

$\downarrow$ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\right.}{(x^2+25)^5}$$

$\downarrow$ 7293

$$-4\int \left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x\right.}{(x^2+25)^5}\right.$$

$\downarrow$ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\right.}{(x^2+25)^5}$$

$\downarrow$ 7293

$$-4\int \left(\frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}+2\right)(x^2-2x-25)\left(e^2x\right.}{(x^2+25)^5}\right.$$

$\downarrow$ 7239

$$-4\int \frac{\exp\left(\frac{e^{8-4e^{2x}}(x-1)^4+12e^{6-3e^{2x}}(x-1)^3+54e^{4-2e^{2x}}(x-1)^2+108e^{2-e^{2x}}(x-1)-4e^{2x}(x^2+25)^4+81}{(x^2+25)^4}\right)\left(e^2(x-1)+3e^{e^{2x}}\right)^3\left(6e^{e}\right.}{(x^2+25)^5}$$

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)(2700+864x-756x^2+e^{2x}(5400-5\right.}{}$$

input
```
Int[(E^((81 + 108*E^(2 - E^(2*x))*(-1 + x) + 54*E^(4 - 2*E^(2*x))*(-1 + x)
^2 + 12*E^(6 - 3*E^(2*x))*(-1 + x)^3 + E^(8 - 4*E^(2*x))*(-1 + x)^4)/(3906
25 + 62500*x^2 + 3750*x^4 + 100*x^6 + x^8))*(648*x - 648*x^2 + E^(2 - E^(2
*x))*(-1 + x)*(2700 + 864*x - 756*x^2 + E^(2*x)*(5400 - 5400*x + 216*x^2 -
 216*x^3)) + E^(4 - 2*E^(2*x))*(-1 + x)^2*(2700 + 432*x - 324*x^2 + E^(2*x
)*(5400 - 5400*x + 216*x^2 - 216*x^3)) + E^(6 - 3*E^(2*x))*(-1 + x)^3*(900
 + 96*x - 60*x^2 + E^(2*x)*(1800 - 1800*x + 72*x^2 - 72*x^3)) + E^(8 - 4*E
^(2*x))*(-1 + x)^4*(100 + 8*x - 4*x^2 + E^(2*x)*(200 - 200*x + 8*x^2 - 8*x
^3))))/(-9765625 + 9765625*x - 1953125*x^2 + 1953125*x^3 - 156250*x^4 + 15
6250*x^5 - 6250*x^6 + 6250*x^7 - 125*x^8 + 125*x^9 - x^10 + x^11),x]
```

output
```
$Aborted
```

3.783.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x-756x^2+e^{2x}(5400-5\right.\right.}{}$$

3.783.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 184 vs. 2(26) = 52.

Time = 12.65 (sec) , antiderivative size = 185, normalized size of antiderivative = 6.38

$$e^{\frac{e^{8-4\,e^{2x}}x^{4}-4\,e^{8-4\,e^{2x}}x^{3}+12\,e^{6-3\,e^{2x}}x^{3}+6\,e^{8-4\,e^{2x}}x^{2}-36\,e^{6-3\,e^{2x}}x^{2}+54\,e^{-2\,e^{2x}+4}x^{2}-4\,e^{8-4\,e^{2x}}x+36\,e^{6-3\,e^{2x}}x-108\,e^{-2\,e^{2x}+4}x+108\,e^{2-e^{2x}}x+e^{8-4\,e^{2x}}}{\left(x^{2}+25\right)^{4}}}$$

input
```
int((((-8*x^3+8*x^2-200*x+200)*exp(x)^2-4*x^2+8*x+100)*exp(ln(-1+x)-exp(x)
^2+2)^4+((-72*x^3+72*x^2-1800*x+1800)*exp(x)^2-60*x^2+96*x+900)*exp(ln(-1+
x)-exp(x)^2+2)^3+((-216*x^3+216*x^2-5400*x+5400)*exp(x)^2-324*x^2+432*x+27
00)*exp(ln(-1+x)-exp(x)^2+2)^2+((-216*x^3+216*x^2-5400*x+5400)*exp(x)^2-75
6*x^2+864*x+2700)*exp(ln(-1+x)-exp(x)^2+2)-648*x^2+648*x)*exp((exp(ln(-1+x
)-exp(x)^2+2)^4+12*exp(ln(-1+x)-exp(x)^2+2)^3+54*exp(ln(-1+x)-exp(x)^2+2)^
2+108*exp(ln(-1+x)-exp(x)^2+2)+81)/(x^8+100*x^6+3750*x^4+62500*x^2+390625)
)/(x^11-x^10+125*x^9-125*x^8+6250*x^7-6250*x^6+156250*x^5-156250*x^4+19531
25*x^3-1953125*x^2+9765625*x-9765625),x)
```

output
```
exp((exp(8-4*exp(2*x))*x^4-4*exp(8-4*exp(2*x))*x^3+12*exp(6-3*exp(2*x))*x^
3+6*exp(8-4*exp(2*x))*x^2-36*exp(6-3*exp(2*x))*x^2+54*exp(-2*exp(2*x)+4)*x
^2-4*exp(8-4*exp(2*x))*x+36*exp(6-3*exp(2*x))*x-108*exp(-2*exp(2*x)+4)*x+1
08*exp(2-exp(2*x))*x+exp(8-4*exp(2*x))-12*exp(6-3*exp(2*x))+54*exp(-2*exp(
2*x)+4)-108*exp(2-exp(2*x))+81)/(x^2+25)^4)
```

3.783.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 90 vs. 2(26) = 52.

Time = 0.28 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.10

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x\right.\right.}{}$$

$$= e^{\left(\frac{108\,e^{\left(-e^{(2\,x)}+\log(x-1)+2\right)}+54\,e^{\left(-2\,e^{(2\,x)}+2\,\log(x-1)+4\right)}+12\,e^{\left(-3\,e^{(2\,x)}+3\,\log(x-1)+6\right)}+e^{\left(-4\,e^{(2\,x)}+4\,\log(x-1)+8\right)}+81}{x^{8}+100\,x^{6}+3750\,x^{4}+62500\,x^{2}+390625}\right)}$$

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)(2700+864x-756x^2+e^{2x}(5400-5\right.}{}$$

input
```
integrate((((-8*x^3+8*x^2-200*x+200)*exp(x)^2-4*x^2+8*x+100)*exp(log(-1+x)
-exp(x)^2+2)^4+((-72*x^3+72*x^2-1800*x+1800)*exp(x)^2-60*x^2+96*x+900)*exp
(log(-1+x)-exp(x)^2+2)^3+((-216*x^3+216*x^2-5400*x+5400)*exp(x)^2-324*x^2+
432*x+2700)*exp(log(-1+x)-exp(x)^2+2)^2+((-216*x^3+216*x^2-5400*x+5400)*ex
p(x)^2-756*x^2+864*x+2700)*exp(log(-1+x)-exp(x)^2+2)-648*x^2+648*x)*exp((e
xp(log(-1+x)-exp(x)^2+2)^4+12*exp(log(-1+x)-exp(x)^2+2)^3+54*exp(log(-1+x)
-exp(x)^2+2)^2+108*exp(log(-1+x)-exp(x)^2+2)+81)/(x^8+100*x^6+3750*x^4+625
00*x^2+390625))/(x^11-x^10+125*x^9-125*x^8+6250*x^7-6250*x^6+156250*x^5-15
6250*x^4+1953125*x^3-1953125*x^2+9765625*x-9765625),x, algorithm=\
```

output
```
e^((108*e^(-e^(2*x) + log(x - 1) + 2) + 54*e^(-2*e^(2*x) + 2*log(x - 1) +
4) + 12*e^(-3*e^(2*x) + 3*log(x - 1) + 6) + e^(-4*e^(2*x) + 4*log(x - 1) +
 8) + 81)/(x^8 + 100*x^6 + 3750*x^4 + 62500*x^2 + 390625))
```

3.783.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 85 vs. $2(22) = 44$.

Time = 7.14 (sec) , antiderivative size = 85, normalized size of antiderivative = 2.93

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x\right.\right.}{}$$

$$= e^{\frac{(x-1)^4e^{8-4e^{2x}}+12(x-1)^3e^{6-3e^{2x}}+54(x-1)^2e^{4-2e^{2x}}+108(x-1)e^{2-e^{2x}}+81}{x^8+100x^6+3750x^4+62500x^2+390625}}$$

input
```
integrate((((-8*x**3+8*x**2-200*x+200)*exp(x)**2-4*x**2+8*x+100)*exp(ln(-1
+x)-exp(x)**2+2)**4+((-72*x**3+72*x**2-1800*x+1800)*exp(x)**2-60*x**2+96*x
+900)*exp(ln(-1+x)-exp(x)**2+2)**3+((-216*x**3+216*x**2-5400*x+5400)*exp(x
)**2-324*x**2+432*x+2700)*exp(ln(-1+x)-exp(x)**2+2)**2+((-216*x**3+216*x**
2-5400*x+5400)*exp(x)**2-756*x**2+864*x+2700)*exp(ln(-1+x)-exp(x)**2+2)-64
8*x**2+648*x)*exp((exp(ln(-1+x)-exp(x)**2+2)**4+12*exp(ln(-1+x)-exp(x)**2+
2)**3+54*exp(ln(-1+x)-exp(x)**2+2)**2+108*exp(ln(-1+x)-exp(x)**2+2)+81)/(x
**8+100*x**6+3750*x**4+62500*x**2+390625))/(x**11-x**10+125*x**9-125*x**8+
6250*x**7-6250*x**6+156250*x**5-156250*x**4+1953125*x**3-1953125*x**2+9765
625*x-9765625),x)
```

output
```
exp(((x - 1)**4*exp(8 - 4*exp(2*x)) + 12*(x - 1)**3*exp(6 - 3*exp(2*x)) +
54*(x - 1)**2*exp(4 - 2*exp(2*x)) + 108*(x - 1)*exp(2 - exp(2*x)) + 81)/(x
**8 + 100*x**6 + 3750*x**4 + 62500*x**2 + 390625))
```

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x-756x^2+e^{2x}\left(5400-5\right.\right.\right.}{}$$

3.783.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 458 vs. $2(26) = 52$.

Time = 2.61 (sec) , antiderivative size = 458, normalized size of antiderivative = 15.79

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x\right.\right.}{}$$

$$=e^{\left(\frac{108\,xe^{\left(-e^{(2\,x)}+2\right)}}{x^8+100\,x^6+3750\,x^4+62500\,x^2+390625}-\frac{108\,xe^{\left(-2\,e^{(2\,x)}+4\right)}}{x^8+100\,x^6+3750\,x^4+62500\,x^2+390625}-\frac{264\,xe^{\left(-3\,e^{(2\,x)}+6\right)}}{x^8+100\,x^6+3750\,x^4+62500\,x^2+390625}+\frac{12\,xe^{\left(-3\,e^{(2\,x)}+6\right)}}{x^6+75\,x^4+1875\,x^2+15625}+\frac{}{x^8+}\right.}$$

input
```
integrate((((-8*x^3+8*x^2-200*x+200)*exp(x)^2-4*x^2+8*x+100)*exp(log(-1+x)
-exp(x)^2+2)^4+((-72*x^3+72*x^2-1800*x+1800)*exp(x)^2-60*x^2+96*x+900)*exp
(log(-1+x)-exp(x)^2+2)^3+((-216*x^3+216*x^2-5400*x+5400)*exp(x)^2-324*x^2+
432*x+2700)*exp(log(-1+x)-exp(x)^2+2)^2+((-216*x^3+216*x^2-5400*x+5400)*ex
p(x)^2-756*x^2+864*x+2700)*exp(log(-1+x)-exp(x)^2+2)-648*x^2+648*x)*exp((e
xp(log(-1+x)-exp(x)^2+2)^4+12*exp(log(-1+x)-exp(x)^2+2)^3+54*exp(log(-1+x)
-exp(x)^2+2)^2+108*exp(log(-1+x)-exp(x)^2+2)+81)/(x^8+100*x^6+3750*x^4+625
00*x^2+390625))/(x^11-x^10+125*x^9-125*x^8+6250*x^7-6250*x^6+156250*x^5-15
6250*x^4+1953125*x^3-1953125*x^2+9765625*x-9765625),x, algorithm=\
```

output
```
e^(108*x*e^(-e^(2*x) + 2)/(x^8 + 100*x^6 + 3750*x^4 + 62500*x^2 + 390625)
- 108*x*e^(-2*e^(2*x) + 4)/(x^8 + 100*x^6 + 3750*x^4 + 62500*x^2 + 390625)
 - 264*x*e^(-3*e^(2*x) + 6)/(x^8 + 100*x^6 + 3750*x^4 + 62500*x^2 + 390625
) + 12*x*e^(-3*e^(2*x) + 6)/(x^6 + 75*x^4 + 1875*x^2 + 15625) + 96*x*e^(-4
*e^(2*x) + 8)/(x^8 + 100*x^6 + 3750*x^4 + 62500*x^2 + 390625) - 4*x*e^(-4*
e^(2*x) + 8)/(x^6 + 75*x^4 + 1875*x^2 + 15625) - 108*e^(-e^(2*x) + 2)/(x^8
 + 100*x^6 + 3750*x^4 + 62500*x^2 + 390625) - 1296*e^(-2*e^(2*x) + 4)/(x^8
 + 100*x^6 + 3750*x^4 + 62500*x^2 + 390625) + 54*e^(-2*e^(2*x) + 4)/(x^6 +
 75*x^4 + 1875*x^2 + 15625) + 888*e^(-3*e^(2*x) + 6)/(x^8 + 100*x^6 + 3750
*x^4 + 62500*x^2 + 390625) - 36*e^(-3*e^(2*x) + 6)/(x^6 + 75*x^4 + 1875*x^
2 + 15625) + 476*e^(-4*e^(2*x) + 8)/(x^8 + 100*x^6 + 3750*x^4 + 62500*x^2
+ 390625) - 44*e^(-4*e^(2*x) + 8)/(x^6 + 75*x^4 + 1875*x^2 + 15625) + e^(-
4*e^(2*x) + 8)/(x^4 + 50*x^2 + 625) + 81/(x^8 + 100*x^6 + 3750*x^4 + 62500
*x^2 + 390625))
```

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x-756x^2+e^{2x}\left(5400-5\right.\right.\right.}{}$$

3.783.8 Giac [F]

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x\right.\right.}{}$$

$$=\int -\frac{4\left(162\,x^2+27\left(7\,x^2+2\left(x^3-x^2+25\,x-25\right)e^{(2\,x)}-8\,x-25\right)e^{\left(-e^{(2\,x)}+\log(x-1)+2\right)}+27\left(3\,x^2+2\left(x^3\right.\right.\right.}{}$$

input
```
integrate((((-8*x^3+8*x^2-200*x+200)*exp(x)^2-4*x^2+8*x+100)*exp(log(-1+x)
-exp(x)^2+2)^4+((-72*x^3+72*x^2-1800*x+1800)*exp(x)^2-60*x^2+96*x+900)*exp
(log(-1+x)-exp(x)^2+2)^3+((-216*x^3+216*x^2-5400*x+5400)*exp(x)^2-324*x^2+
432*x+2700)*exp(log(-1+x)-exp(x)^2+2)^2+((-216*x^3+216*x^2-5400*x+5400)*ex
p(x)^2-756*x^2+864*x+2700)*exp(log(-1+x)-exp(x)^2+2)-648*x^2+648*x)*exp((e
xp(log(-1+x)-exp(x)^2+2)^4+12*exp(log(-1+x)-exp(x)^2+2)^3+54*exp(log(-1+x)
-exp(x)^2+2)^2+108*exp(log(-1+x)-exp(x)^2+2)+81)/(x^8+100*x^6+3750*x^4+625
00*x^2+390625))/(x^11-x^10+125*x^9-125*x^8+6250*x^7-6250*x^6+156250*x^5-15
6250*x^4+1953125*x^3-1953125*x^2+9765625*x-9765625),x, algorithm=\
```

output
```
integrate(-4*(162*x^2 + 27*(7*x^2 + 2*(x^3 - x^2 + 25*x - 25)*e^(2*x) - 8*
x - 25)*e^(-e^(2*x) + log(x - 1) + 2) + 27*(3*x^2 + 2*(x^3 - x^2 + 25*x -
25)*e^(2*x) - 4*x - 25)*e^(-2*e^(2*x) + 2*log(x - 1) + 4) + 3*(5*x^2 + 6*(
x^3 - x^2 + 25*x - 25)*e^(2*x) - 8*x - 75)*e^(-3*e^(2*x) + 3*log(x - 1) +
6) + (x^2 + 2*(x^3 - x^2 + 25*x - 25)*e^(2*x) - 2*x - 25)*e^(-4*e^(2*x) +
4*log(x - 1) + 8) - 162*x)*e^((108*e^(-e^(2*x) + log(x - 1) + 2) + 54*e^(-
2*e^(2*x) + 2*log(x - 1) + 4) + 12*e^(-3*e^(2*x) + 3*log(x - 1) + 6) + e^(
-4*e^(2*x) + 4*log(x - 1) + 8) + 81)/(x^8 + 100*x^6 + 3750*x^4 + 62500*x^2
 + 390625))/(x^11 - x^10 + 125*x^9 - 125*x^8 + 6250*x^7 - 6250*x^6 + 15625
0*x^5 - 156250*x^4 + 1953125*x^3 - 1953125*x^2 + 9765625*x - 9765625), x)
```

3.783.9 Mupad [B] (verification not implemented)

Time = 16.34 (sec) , antiderivative size = 522, normalized size of antiderivative = 18.00

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x\right.\right.}{}$$

$$=\mathrm{e}^{\frac{x^4\,\mathrm{e}^{-4\,\mathrm{e}^{2\,x}}\,\mathrm{e}^8}{x^8+100\,x^6+3750\,x^4+62500\,x^2+390625}}\,\mathrm{e}^{-\frac{4\,x^3\,\mathrm{e}^{-4\,\mathrm{e}^{2\,x}}\,\mathrm{e}^8}{x^8+100\,x^6+3750\,x^4+62500\,x^2+390625}}\,\mathrm{e}^{\frac{6\,x^2\,\mathrm{e}^{-4\,\mathrm{e}^{2\,x}}\,\mathrm{e}^8}{x^8+100\,x^6+3750\,x^4+62500\,x^2+390625}}\,\mathrm{e}^{\frac{12\,x^3\,\mathrm{e}^{-3\,\mathrm{e}^{2\,x}}\,\mathrm{e}^6}{x^8+100\,x^6+3750\,x^4+62500\,x^2+}}$$

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x-756x^2+e^{2x}\left(5400-5\right.\right.\right.}{}$$

input
```
int((exp((54*exp(2*log(x - 1) - 2*exp(2*x) + 4) + 12*exp(3*log(x - 1) - 3*
exp(2*x) + 6) + exp(4*log(x - 1) - 4*exp(2*x) + 8) + 108*exp(log(x - 1) -
exp(2*x) + 2) + 81)/(62500*x^2 + 3750*x^4 + 100*x^6 + x^8 + 390625))*(648*
x + exp(4*log(x - 1) - 4*exp(2*x) + 8)*(8*x - exp(2*x)*(200*x - 8*x^2 + 8*
x^3 - 200) - 4*x^2 + 100) + exp(3*log(x - 1) - 3*exp(2*x) + 6)*(96*x - exp
(2*x)*(1800*x - 72*x^2 + 72*x^3 - 1800) - 60*x^2 + 900) + exp(2*log(x - 1)
 - 2*exp(2*x) + 4)*(432*x - exp(2*x)*(5400*x - 216*x^2 + 216*x^3 - 5400) -
 324*x^2 + 2700) + exp(log(x - 1) - exp(2*x) + 2)*(864*x - exp(2*x)*(5400*
x - 216*x^2 + 216*x^3 - 5400) - 756*x^2 + 2700) - 648*x^2))/(9765625*x - 1
953125*x^2 + 1953125*x^3 - 156250*x^4 + 156250*x^5 - 6250*x^6 + 6250*x^7 -
 125*x^8 + 125*x^9 - x^10 + x^11 - 9765625),x)
```

output
```
exp((x^4*exp(-4*exp(2*x))*exp(8))/(62500*x^2 + 3750*x^4 + 100*x^6 + x^8 +
390625))*exp(-(4*x^3*exp(-4*exp(2*x))*exp(8))/(62500*x^2 + 3750*x^4 + 100*
x^6 + x^8 + 390625))*exp((6*x^2*exp(-4*exp(2*x))*exp(8))/(62500*x^2 + 3750
*x^4 + 100*x^6 + x^8 + 390625))*exp((12*x^3*exp(-3*exp(2*x))*exp(6))/(6250
0*x^2 + 3750*x^4 + 100*x^6 + x^8 + 390625))*exp(-(36*x^2*exp(-3*exp(2*x))*
exp(6))/(62500*x^2 + 3750*x^4 + 100*x^6 + x^8 + 390625))*exp((54*x^2*exp(-
2*exp(2*x))*exp(4))/(62500*x^2 + 3750*x^4 + 100*x^6 + x^8 + 390625))*exp((
exp(-4*exp(2*x))*exp(8))/(62500*x^2 + 3750*x^4 + 100*x^6 + x^8 + 390625))*
exp(-(12*exp(-3*exp(2*x))*exp(6))/(62500*x^2 + 3750*x^4 + 100*x^6 + x^8 +
390625))*exp((54*exp(-2*exp(2*x))*exp(4))/(62500*x^2 + 3750*x^4 + 100*x^6
+ x^8 + 390625))*exp(-(108*exp(-exp(2*x))*exp(2))/(62500*x^2 + 3750*x^4 +
100*x^6 + x^8 + 390625))*exp(-(4*x*exp(-4*exp(2*x))*exp(8))/(62500*x^2 + 3
750*x^4 + 100*x^6 + x^8 + 390625))*exp((36*x*exp(-3*exp(2*x))*exp(6))/(625
00*x^2 + 3750*x^4 + 100*x^6 + x^8 + 390625))*exp((108*x*exp(-exp(2*x))*exp
(2))/(62500*x^2 + 3750*x^4 + 100*x^6 + x^8 + 390625))*exp(-(108*x*exp(-2*e
xp(2*x))*exp(4))/(62500*x^2 + 3750*x^4 + 100*x^6 + x^8 + 390625))*exp(81/(
62500*x^2 + 3750*x^4 + 100*x^6 + x^8 + 390625))
```

3.783.

$$\int \frac{e^{\frac{81+108e^{2-e^{2x}}(-1+x)+54e^{4-2e^{2x}}(-1+x)^2+12e^{6-3e^{2x}}(-1+x)^3+e^{8-4e^{2x}}(-1+x)^4}{390625+62500x^2+3750x^4+100x^6+x^8}}\left(648x-648x^2+e^{2-e^{2x}}(-1+x)\left(2700+864x-756x^2+e^{2x}(5400-5\right.\right.}{}$$

3.784 $\int \frac{e^{5x}\left(-45x+15x^2+e^x\left(15x^2-5x^3\right)\right)+\left(36-24x+e^x\left(-12x+8x^2\right)\right)\log\left(e^{\cdot}\right.}{9x-3x^2+e^x\left(\cdot\right.}$

3.784.1 Optimal result

Integrand size = 124, antiderivative size = 32

$$\int \frac{e^{5x}(-45x+15x^2+e^x(15x^2-5x^3))+(36-24x+e^x(-12x+8x^2))\log\left(e^{-x}(-3+e^x x)\right)+(-36x+12x}{9x-3x^2+e^x\left(-3x^2+x^3\right)}$$

$$=-e^{5x}+4\log\left(-3e^{-x}+x\right)\log\left(-x+\frac{x^2}{3}\right)$$

output
```
4*ln(1/3*x^2-x)*ln(x-3/exp(x))-exp(5*x)
```

3.784.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 95 vs. 2(32) = 64.

Time = 0.46 (sec) , antiderivative size = 95, normalized size of antiderivative = 2.97

$$\int \frac{e^{5x}(-45x+15x^2+e^x(15x^2-5x^3))+(36-24x+e^x(-12x+8x^2))\log\left(e^{-x}(-3+e^x x)\right)+(-36x+12x}{9x-3x^2+e^x\left(-3x^2+x^3\right)}$$

$$=-e^{5x}-4x\log\left(\frac{1}{3}(-3+x)x\right)+4\log(3-x)\left(x+\log\left(-3e^{-x}+x\right)-\log\left(-3+e^x x\right)\right)$$
$$+4\log(x)\left(x+\log\left(-3e^{-x}+x\right)-\log\left(-3+e^x x\right)\right)+4\log\left(\frac{1}{3}(-3+x)x\right)\log\left(-3+e^x x\right)$$

input
```
Integrate[(E^(5*x)*(-45*x + 15*x^2 + E^x*(15*x^2 - 5*x^3)) + (36 - 24*x +
E^x*(-12*x + 8*x^2))*Log[(-3 + E^x*x)/E^x] + (-36*x + 12*x^2 + E^x*(-12*x
+ 4*x^2))*Log[(-3*x + x^2)/3])/(9*x - 3*x^2 + E^x*(-3*x^2 + x^3)),x]
```

output
```
-E^(5*x) - 4*x*Log[((-3 + x)*x)/3] + 4*Log[3 - x]*(x + Log[-3/E^x + x] - L
og[-3 + E^x*x]) + 4*Log[x]*(x + Log[-3/E^x + x] - Log[-3 + E^x*x]) + 4*Log
[((-3 + x)*x)/3]*Log[-3 + E^x*x]
```

3.784.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(e^x(8x^2-12x)-24x+36)\log(e^{-x}(e^x x-3))+(12x^2+e^x(4x^2-12x)-36x)\log\left(\frac{1}{3}(x^2-3x)\right)+e^{5x}(15x^2}{-3x^2+e^x(x^3-3x^2)+9x}$$

$$\Big\downarrow \text{7239}$$

$$\int \left(-5e^{5x}+\frac{4(e^x+3)\log\left(\frac{1}{3}(x-3)x\right)}{e^x x-3}+\frac{4(2x-3)\log(x-3e^{-x})}{(x-3)x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-12\int \frac{\int \frac{1}{e^x x-3}dx}{x-3}dx-12\int \frac{\int \frac{1}{e^x x-3}dx}{x}dx-12\int \frac{\int \frac{1}{x(e^x x-3)}dx}{x-3}dx-12\int \frac{\int \frac{1}{x(e^x x-3)}dx}{x}dx+ 12\log\left(-\frac{1}{3}(3-x)x\right)\int \frac{1}{e^x x-3}dx+12\log\left(-\frac{1}{3}(3-x)x\right)\int \frac{1}{x(e^x x-3)}dx+ 4\int \frac{\log(x-3e^{-x})}{x-3}dx+4\int \frac{\log(x-3e^{-x})}{x}dx+4\,\text{PolyLog}\left(2,1-\frac{x}{3}\right)-e^{5x}-2\log^2(x)+ 4\log\left(-\frac{1}{3}(3-x)x\right)\log(x)-4\log(3)\log(x-3)$$

input
```
Int[(E^(5*x)*(-45*x + 15*x^2 + E^x*(15*x^2 - 5*x^3)) + (36 - 24*x + E^x*(-
12*x + 8*x^2))*Log[(-3 + E^x*x)/E^x] + (-36*x + 12*x^2 + E^x*(-12*x + 4*x^
2))*Log[(-3*x + x^2)/3])/(9*x - 3*x^2 + E^x*(-3*x^2 + x^3)),x]
```

output
```
$Aborted
```

3.784.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.784.4 Maple [A] (verified)

Time = 84.62 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

method	result	size
parallelrisch	$4\ln\left(\left(\mathrm{e}^{x} x-3\right) \mathrm{e}^{-x}\right) \ln\left(\frac{1}{3} x^{2}-x\right)-\mathrm{e}^{5 x}$	32

input
```
int((((8*x^2-12*x)*exp(x)-24*x+36)*ln((exp(x)*x-3)/exp(x))+((4*x^2-12*x)*e
xp(x)+12*x^2-36*x)*ln(1/3*x^2-x)+((-5*x^3+15*x^2)*exp(x)+15*x^2-45*x)*exp(
5*x))/((x^3-3*x^2)*exp(x)-3*x^2+9*x),x,method=_RETURNVERBOSE)
```

output
```
4*ln((exp(x)*x-3)/exp(x))*ln(1/3*x^2-x)-exp(5*x)
```

3.784.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \frac{e^{5x}(-45x+15x^2+e^x(15x^2-5x^3))+(36-24x+e^x(-12x+8x^2))\log\left(e^{-x}(-3+e^x x)\right)+(-36x+12x}{9x-3x^2+e^x\left(-3x^2+x^3\right)}$$
$$=4\log\left(\frac{1}{3}x^2-x\right)\log\left((xe^x-3)e^{(-x)}\right)-e^{(5x)}$$

input
```
integrate((((8*x^2-12*x)*exp(x)-24*x+36)*log((exp(x)*x-3)/exp(x))+((4*x^2-
12*x)*exp(x)+12*x^2-36*x)*log(1/3*x^2-x)+((-5*x^3+15*x^2)*exp(x)+15*x^2-45
*x)*exp(5*x))/((x^3-3*x^2)*exp(x)-3*x^2+9*x),x, algorithm=\
```

output
```
4*log(1/3*x^2 - x)*log((x*e^x - 3)*e^(-x)) - e^(5*x)
```

3.784.6 Sympy [A] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{e^{5x}(-45x+15x^2+e^x(15x^2-5x^3))+(36-24x+e^x(-12x+8x^2))\log(e^{-x}(-3+e^xx))+(-36x+12x}{9x-3x^2+e^x(-3x^2+x^3)}$$
$$=-e^{5x}+4\log\left((xe^x-3)e^{-x}\right)\log\left(\frac{x^2}{3}-x\right)$$

input
```
integrate((((8*x**2-12*x)*exp(x)-24*x+36)*ln((exp(x)*x-3)/exp(x))+((4*x**2
-12*x)*exp(x)+12*x**2-36*x)*ln(1/3*x**2-x)+((-5*x**3+15*x**2)*exp(x)+15*x*
*2-45*x)*exp(5*x))/((x**3-3*x**2)*exp(x)-3*x**2+9*x),x)
```

output
```
-exp(5*x) + 4*log((x*exp(x) - 3)*exp(-x))*log(x**2/3 - x)
```

3.784.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(28) = 56.

Time = 0.34 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.81

$$\int \frac{e^{5x}(-45x+15x^2+e^x(15x^2-5x^3))+(36-24x+e^x(-12x+8x^2))\log(e^{-x}(-3+e^xx))+(-36x+12x}{9x-3x^2+e^x(-3x^2+x^3)}$$
$$=4x\log(3)+4(\log(x-3)+\log(x))\log(xe^x-3)-4x\log(x-3)$$
$$-4(x+\log(3))\log(x)-4\log(3)\log\left(\frac{xe^x-3}{x}\right)-e^{(5x)}$$

input
```
integrate((((8*x^2-12*x)*exp(x)-24*x+36)*log((exp(x)*x-3)/exp(x))+((4*x^2-
12*x)*exp(x)+12*x^2-36*x)*log(1/3*x^2-x)+((-5*x^3+15*x^2)*exp(x)+15*x^2-45
*x)*exp(5*x))/((x^3-3*x^2)*exp(x)-3*x^2+9*x),x, algorithm=\
```

output
```
4*x*log(3) + 4*(log(x - 3) + log(x))*log(x*e^x - 3) - 4*x*log(x - 3) - 4*(
x + log(3))*log(x) - 4*log(3)*log((x*e^x - 3)/x) - e^(5*x)
```

3.784. $\int \frac{e^{5x}(-45x+15x^2+e^x(15x^2-5x^3))+(36-24x+e^x(-12x+8x^2))\log(e^{-x}(-3+e^xx))+(-36x+12x^2+e^x(-12x+4x^2))\log(\frac{1}{3}(-3x+x^2))}{9x-3x^2+e^x(-3x^2+x^3)}\,dx$

3.784.8 Giac [F]

$$\int \frac{e^{5x}(-45x+15x^2+e^x(15x^2-5x^3))+(36-24x+e^x(-12x+8x^2))\log\left(e^{-x}(-3+e^xx)\right)+(-36x+12x}{9x-3x^2+e^x\left(-3x^2+x^3\right)}$$
$$=\int -\frac{5\left(3x^2-(x^3-3x^2)e^x-9x\right)e^{(5x)}+4\left(3x^2+(x^2-3x)e^x-9x\right)\log\left(\frac{1}{3}x^2-x\right)+4\left((2x^2-3x)e^x-\right.}{3x^2-(x^3-3x^2)e^x-9x}$$

input
```
integrate((((8*x^2-12*x)*exp(x)-24*x+36)*log((exp(x)*x-3)/exp(x))+((4*x^2-
12*x)*exp(x)+12*x^2-36*x)*log(1/3*x^2-x)+((-5*x^3+15*x^2)*exp(x)+15*x^2-45
*x)*exp(5*x))/((x^3-3*x^2)*exp(x)-3*x^2+9*x),x, algorithm=\
```

output
```
integrate(-(5*(3*x^2 - (x^3 - 3*x^2)*e^x - 9*x)*e^(5*x) + 4*(3*x^2 + (x^2
- 3*x)*e^x - 9*x)*log(1/3*x^2 - x) + 4*((2*x^2 - 3*x)*e^x - 6*x + 9)*log((
x*e^x - 3)*e^(-x)))/(3*x^2 - (x^3 - 3*x^2)*e^x - 9*x), x)
```

3.784.9 Mupad [B] (verification not implemented)

Time = 15.87 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.88

$$\int \frac{e^{5x}(-45x+15x^2+e^x(15x^2-5x^3))+(36-24x+e^x(-12x+8x^2))\log\left(e^{-x}(-3+e^xx)\right)+(-36x+12x}{9x-3x^2+e^x\left(-3x^2+x^3\right)}$$
$$=4\ln\left(\frac{x^2}{3}-x\right)\ln\left(x-3\,e^{-x}\right)-e^{5x}$$

input
```
int((log(x^2/3 - x)*(36*x + exp(x)*(12*x - 4*x^2) - 12*x^2) - exp(5*x)*(ex
p(x)*(15*x^2 - 5*x^3) - 45*x + 15*x^2) + log(exp(-x)*(x*exp(x) - 3))*(24*x
 + exp(x)*(12*x - 8*x^2) - 36))/(exp(x)*(3*x^2 - x^3) - 9*x + 3*x^2),x)
```

output
```
4*log(x^2/3 - x)*log(x - 3*exp(-x)) - exp(5*x)
```

3.785 $\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}$

3.785.1 Optimal result

Integrand size = 102, antiderivative size = 34

$$\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}\,dx = -e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}+2x$$

output
```
2*x-exp(x/(4+x)/exp(2-x)/ln(exp(1)-9)^2)
```

3.785.2 Mathematica [A] (verified)

Time = 5.31 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.03

$$\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}\,dx = -e^{-\frac{e^{-2+x}x}{(4+x)(\pi-i\log(9-e))^2}}+2x$$

input
```
Integrate[(E^(-2 + x)*(E^((E^(-2 + x)*x)/((4 + x)*(I*Pi + Log[9 - E])^2))*
(-4 - 4*x - x^2) + E^(2 - x)*(32 + 16*x + 2*x^2)*(I*Pi + Log[9 - E])^2))/(
(16 + 8*x + x^2)*(I*Pi + Log[9 - E])^2),x]
```

3.785. $\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}\,dx$

output
```
-E^(-((E^(-2 + x)*x)/((4 + x)*(Pi - I*Log[9 - E])^2))) + 2*x
```

3.785.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x-2}\left(\left(-x^2-4x-4\right)e^{\frac{e^{x-2}x}{(x+4)(\log(9-e)+i\pi)^2}}+e^{2-x}\left(2x^2+16x+32\right)(\log(9-e)+i\pi)^2\right)}{\left(x^2+8x+16\right)(\log(9-e)+i\pi)^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int -\frac{e^{x-2}\left(e^{\frac{e^{x-2}x}{(x+4)(i\pi+\log(9-e))^2}}\left(x^2+4x+4\right)-2e^{2-x}\left(x^2+8x+16\right)(i\pi+\log(9-e))^2\right)}{x^2+8x+16}dx}{(\log(9-e)+i\pi)^2}$$

$$\Big\downarrow \ 25$$

$$-\frac{\int \frac{e^{x-2}\left(e^{\frac{e^{x-2}x}{(x+4)(i\pi+\log(9-e))^2}}\left(x^2+4x+4\right)-2e^{2-x}\left(x^2+8x+16\right)(i\pi+\log(9-e))^2\right)}{x^2+8x+16}dx}{(\log(9-e)+i\pi)^2}$$

$$\Big\downarrow \ 2007$$

$$-\frac{\int \frac{e^{x-2}\left(e^{\frac{e^{x-2}x}{(x+4)(i\pi+\log(9-e))^2}}\left(x^2+4x+4\right)-2e^{2-x}\left(x^2+8x+16\right)(i\pi+\log(9-e))^2\right)}{(x+4)^2}dx}{(\log(9-e)+i\pi)^2}$$

$$\Big\downarrow \ 7293$$

$$-\frac{\int \left(\frac{\exp\left(\frac{e^{x-2}x}{(x+4)(i\pi+\log(9-e))^2}+x-2\right)(x+2)^2}{(x+4)^2}+2(\pi-i\log(9-e))^2\right)dx}{(\log(9-e)+i\pi)^2}$$

$$\Big\downarrow \ 2009$$

$$-\frac{\int \exp\left(\frac{e^{x-2}x}{(x+4)(i\pi+\log(9-e))^2}+x-2\right)dx+4\int \frac{\exp\left(\frac{e^{x-2}x}{(x+4)(i\pi+\log(9-e))^2}+x-2\right)}{(x+4)^2}dx-4\int \frac{\exp\left(\frac{e^{x-2}x}{(x+4)(i\pi+\log(9-e))^2}+x-2\right)}{x+4}dx+2}{(\log(9-e)+i\pi)^2}$$

input
```
Int[(E^(-2 + x)*(E^((E^(-2 + x)*x)/((4 + x)*(I*Pi + Log[9 - E])^2))*(-4 -
4*x - x^2) + E^(2 - x)*(32 + 16*x + 2*x^2)*(I*Pi + Log[9 - E])^2))/((16 +
8*x + x^2)*(I*Pi + Log[9 - E])^2),x]
```

output
```
$Aborted
```

3.785.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.785. $\int \frac{e^{-2+x} \left(e^{\frac{e^{-2+x} x}{(4+x)(i\pi+\log(9-e))^2}} \left(-4-4x-x^2\right)+e^{2-x} \left(32+16x+2x^2\right) (i\pi+\log(9-e))^2\right)}{(16+8x+x^2) (i\pi+\log(9-e))^2} \, dx$

3.785.4 Maple [A] (verified)

Time = 3.45 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.76

method	result	size
risch	$2x-\mathrm{e}^{\frac{x\,\mathrm{e}^{-2+x}}{(4+x)\ln(\mathrm{e}-9)^2}}$	26
parallelrisch	$\frac{-2\ln(\mathrm{e}-9)^2\ln(\mathrm{e}^{2-x})-\ln(\mathrm{e}-9)^2\mathrm{e}^{\frac{x\,\mathrm{e}^{-2+x}}{(4+x)\ln(\mathrm{e}-9)^2}}}{\ln(\mathrm{e}-9)^2}$	58
parts	$2x+\frac{\left(-4\,\mathrm{e}^{2-x}\ln(\mathrm{e}-9)\mathrm{e}^{\frac{x\,\mathrm{e}^{-2+x}}{(4+x)\ln(\mathrm{e}-9)^2}}-\ln(\mathrm{e}-9)x\,\mathrm{e}^{2-x}\mathrm{e}^{\frac{x\,\mathrm{e}^{-2+x}}{(4+x)\ln(\mathrm{e}-9)^2}}\right)\mathrm{e}^{-2+x}}{(4+x)\ln(\mathrm{e}-9)}$	100
norman	$\frac{\left(-32\,\mathrm{e}^{2-x}\ln(\mathrm{e}-9)-4\,\mathrm{e}^{2-x}\ln(\mathrm{e}-9)\mathrm{e}^{\frac{x\,\mathrm{e}^{-2+x}}{(4+x)\ln(\mathrm{e}-9)^2}}+2\ln(\mathrm{e}-9)x^2\mathrm{e}^{2-x}-\ln(\mathrm{e}-9)x\,\mathrm{e}^{2-x}\mathrm{e}^{\frac{x\,\mathrm{e}^{-2+x}}{(4+x)\ln(\mathrm{e}-9)^2}}\right)\mathrm{e}^{-2+x}}{(4+x)\ln(\mathrm{e}-9)}$	125

input
```
int(((-x^2-4*x-4)*exp(x/(4+x)/exp(2-x)/ln(exp(1)-9)^2)+(2*x^2+16*x+32)*exp
(2-x)*ln(exp(1)-9)^2)/(x^2+8*x+16)/exp(2-x)/ln(exp(1)-9)^2,x,method=_RETUR
NVERBOSE)
```

output
```
2*x-exp(x/(4+x)*exp(-2+x)/ln(exp(1)-9)^2)
```

3.785.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.74

$$\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}\,dx$$
$$=2\,x-e^{\left(\frac{xe^{(x-2)}}{(x+4)\log(e-9)^2}\right)}$$

input
```
integrate(((-x^2-4*x-4)*exp(x/(4+x)/exp(2-x)/log(exp(1)-9)^2)+(2*x^2+16*x+
32)*exp(2-x)*log(exp(1)-9)^2)/(x^2+8*x+16)/exp(2-x)/log(exp(1)-9)^2,x, alg
orithm=\
```

output
```
2*x - e^(x*e^(x - 2)/((x + 4)*log(e - 9)^2))
```

3.785. $\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}\,dx$

3.785.6 Sympy [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 85 vs. 2(26) = 52.

Time = 1.13 (sec) , antiderivative size = 85, normalized size of antiderivative = 2.50

$$\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}\,dx$$
$$= 2x - e^{\frac{xe^x}{-\pi^2xe^2+xe^2\log(9-e)^2+2i\pi xe^2\log(9-e)-4\pi^2e^2+4e^2\log(9-e)^2+8i\pi e^2\log(9-e)}}$$

input
```
integrate(((-x**2-4*x-4)*exp(x/(4+x)/exp(2-x)/ln(exp(1)-9)**2)+(2*x**2+16*
x+32)*exp(2-x)*ln(exp(1)-9)**2)/(x**2+8*x+16)/exp(2-x)/ln(exp(1)-9)**2,x)
```

output
```
2*x - exp(x*exp(x)/(-pi**2*x*exp(2) + x*exp(2)*log(9 - E)**2 + 2*I*pi*x*ex
p(2)*log(9 - E) - 4*pi**2*exp(2) + 4*exp(2)*log(9 - E)**2 + 8*I*pi*exp(2)*
log(9 - E)))
```

3.785.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 120 vs. 2(25) = 50.

Time = 0.38 (sec) , antiderivative size = 120, normalized size of antiderivative = 3.53

$$\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}\,dx$$
$$= \frac{2\left(x-\frac{16}{x+4}-8\log(x+4)\right)\log(e-9)^2+16\left(\frac{4}{x+4}+\log(x+4)\right)\log(e-9)^2-e^{\left(-\frac{4e^x}{xe^2\log(e-9)^2+4e^2\log(e-9)^2}+\cdots\right.}}{\log(e-9)^2}$$

input
```
integrate(((-x^2-4*x-4)*exp(x/(4+x)/exp(2-x)/log(exp(1)-9)^2)+(2*x^2+16*x+
32)*exp(2-x)*log(exp(1)-9)^2)/(x^2+8*x+16)/exp(2-x)/log(exp(1)-9)^2,x, alg
orithm=\
```

output
```
(2*(x - 16/(x + 4) - 8*log(x + 4))*log(e - 9)^2 + 16*(4/(x + 4) + log(x +
4))*log(e - 9)^2 - e^(-4*e^x/(x*e^2*log(e - 9)^2 + 4*e^2*log(e - 9)^2) + e
^(x - 2)/log(e - 9)^2)*log(e - 9)^2 - 32*log(e - 9)^2/(x + 4))/log(e - 9)^
2
```

3.785.8 Giac [F]

$$\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}\,dx$$
$$=\int \frac{\left(2\,(x^2+8\,x+16)e^{(-x+2)}\log(e-9)^2-(x^2+4\,x+4)e^{\left(\frac{xe^{(x-2)}}{(x+4)\log(e-9)^2}\right)}\right)e^{(x-2)}}{(x^2+8\,x+16)\log(e-9)^2}\,dx$$

input
```
integrate(((-x^2-4*x-4)*exp(x/(4+x)/exp(2-x)/log(exp(1)-9)^2)+(2*x^2+16*x+
32)*exp(2-x)*log(exp(1)-9)^2)/(x^2+8*x+16)/exp(2-x)/log(exp(1)-9)^2,x, alg
orithm=\
```

output
```
undef
```

3.785.9 Mupad [B] (verification not implemented)

Time = 16.71 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00

$$\int \frac{e^{-2+x}\left(e^{\frac{e^{-2+x}x}{(4+x)(i\pi+\log(9-e))^2}}(-4-4x-x^2)+e^{2-x}(32+16x+2x^2)(i\pi+\log(9-e))^2\right)}{(16+8x+x^2)(i\pi+\log(9-e))^2}\,dx$$
$$=2\,x-\mathrm{e}^{\frac{x\,\mathrm{e}^{-2}\,\mathrm{e}^x}{x\,\ln(\mathrm{e}-9)^2+4\,\ln(\mathrm{e}-9)^2}}$$

input
```
int(-(exp(x - 2)*(exp((x*exp(x - 2))/(log(exp(1) - 9)^2*(x + 4)))*(4*x + x
^2 + 4) - log(exp(1) - 9)^2*exp(2 - x)*(16*x + 2*x^2 + 32)))/(log(exp(1) -
 9)^2*(8*x + x^2 + 16)),x)
```

output
```
2*x - exp((x*exp(-2)*exp(x))/(x*log(exp(1) - 9)^2 + 4*log(exp(1) - 9)^2))
```

3.786 $\int \frac{-24-48x-33x^2-29x^3-25x^4-2x^5+(8x^2+8x^3-x^4-x^5)\log(x+x^2)}{4x^4+4x^5}\,dx$

3.786.1 Optimal result

Integrand size = 67, antiderivative size = 30

$$\int \frac{-24-48x-33x^2-29x^3-25x^4-2x^5+(8x^2+8x^3-x^4-x^5)\log(x+x^2)}{4x^4+4x^5}\,dx = \frac{\left(2-x+\left(4+\frac{x}{4}\right)x\right)\left(\frac{1}{x^2}-\log(x+x^2)\right)}{x}$$

output
```
(1/x^2-ln(x^2+x))/x*(x*(1/4*x+4)-x+2)
```

3.786.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.60

$$\int \frac{-24-48x-33x^2-29x^3-25x^4-2x^5+(8x^2+8x^3-x^4-x^5)\log(x+x^2)}{4x^4+4x^5}\,dx = \frac{1}{4}\left(\frac{8}{x^3}+\frac{12}{x^2}+\frac{1}{x}-12\log(x)-12\log(1+x)-\frac{8\log(x(1+x))}{x}-x\log(x(1+x))\right)$$

input
```
Integrate[(-24 - 48*x - 33*x^2 - 29*x^3 - 25*x^4 - 2*x^5 + (8*x^2 + 8*x^3
- x^4 - x^5)*Log[x + x^2])/(4*x^4 + 4*x^5),x]
```

output
```
(8/x^3 + 12/x^2 + x^(-1) - 12*Log[x] - 12*Log[1 + x] - (8*Log[x*(1 + x)])/
x - x*Log[x*(1 + x)])/4
```

3.786.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 100 vs. 2(30) = 60.

Time = 0.61 (sec) , antiderivative size = 100, normalized size of antiderivative = 3.33, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^5-25x^4-29x^3-33x^2+(-x^5-x^4+8x^3+8x^2)\log(x^2+x)-48x-24}{4x^5+4x^4}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{-2x^5-25x^4-29x^3-33x^2+(-x^5-x^4+8x^3+8x^2)\log(x^2+x)-48x-24}{x^4(4x+4)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{-2x^5-25x^4-29x^3-33x^2-48x-24}{4x^4(x+1)}-\frac{(x^2-8)\log(x(x+1))}{4x^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{2}{x^3}+\frac{3}{x^2}+\frac{1}{4x}-\frac{1}{4}x\log(x)-\frac{2\log(x)}{x}-3\log(x)-\frac{1}{4}x\log(x+1)-\frac{2\log(x+1)}{x}-3\log(x+1)+\frac{1}{4}x(\log(x)+\log(x+1)-\log(x(x+1)))+\frac{2(\log(x)+\log(x+1)-\log(x(x+1)))}{x}$$

input
```
Int[(-24 - 48*x - 33*x^2 - 29*x^3 - 25*x^4 - 2*x^5 + (8*x^2 + 8*x^3 - x^4
- x^5)*Log[x + x^2])/(4*x^4 + 4*x^5),x]
```

output
```
2/x^3 + 3/x^2 + 1/(4*x) - 3*Log[x] - (2*Log[x])/x - (x*Log[x])/4 - 3*Log[1
 + x] - (2*Log[1 + x])/x - (x*Log[1 + x])/4 + (2*(Log[x] + Log[1 + x] - Lo
g[x*(1 + x)]))/x + (x*(Log[x] + Log[1 + x] - Log[x*(1 + x)]))/4
```

3.786.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.786.4 Maple [A] (verified)

Time = 0.96 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.47

method	result	size
risch	$-\frac{(x^2+8)\ln(x^2+x)}{4x}-\frac{12\ln(x^2+x)x^3-x^2-12x-8}{4x^3}$	44
default	$-\frac{x\ln(x^2+x)}{4}-3\ln(1+x)-\frac{2\ln(x^2+x)}{x}+\frac{1}{4x}-3\ln(x)+\frac{2}{x^3}+\frac{3}{x^2}$	47
parallelrisch	$\frac{8-\ln(x^2+x)x^4-12\ln(x^2+x)x^3-8x^2\ln(x^2+x)+x^2+12x}{4x^3}$	47
parts	$-\frac{x\ln(x^2+x)}{4}-3\ln(1+x)-\frac{2\ln(x^2+x)}{x}+\frac{1}{4x}-3\ln(x)+\frac{2}{x^3}+\frac{3}{x^2}$	47
norman	$\frac{2-3\ln(x^2+x)x^3+3x+\frac{x^2}{4}-2x^2\ln(x^2+x)-\frac{\ln(x^2+x)x^4}{4}}{x^3}$	48

input
```
int(((-x^5-x^4+8*x^3+8*x^2)*ln(x^2+x)-2*x^5-25*x^4-29*x^3-33*x^2-48*x-24)/
(4*x^5+4*x^4),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(x^2+8)/x*ln(x^2+x)-1/4*(12*ln(x^2+x)*x^3-x^2-12*x-8)/x^3
```

3.786.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.17

$$\int \frac{-24-48x-33x^2-29x^3-25x^4-2x^5+(8x^2+8x^3-x^4-x^5)\log(x+x^2)}{4x^4+4x^5}\,dx = \frac{x^2-(x^4+12\,x^3+8\,x^2)\log(x^2+x)+12\,x+8}{4\,x^3}$$

input
```
integrate(((-x^5-x^4+8*x^3+8*x^2)*log(x^2+x)-2*x^5-25*x^4-29*x^3-33*x^2-48
*x-24)/(4*x^5+4*x^4),x, algorithm=\
```

output
```
1/4*(x^2 - (x^4 + 12*x^3 + 8*x^2)*log(x^2 + x) + 12*x + 8)/x^3
```

3.786.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.30

$$\int \frac{-24-48x-33x^2-29x^3-25x^4-2x^5+(8x^2+8x^3-x^4-x^5)\log(x+x^2)}{4x^4+4x^5}\,dx = -3\log\left(x^2+x\right)+\frac{(-x^2-8)\log(x^2+x)}{4x}-\frac{-x^2-12x-8}{4x^3}$$

input
```
integrate(((-x**5-x**4+8*x**3+8*x**2)*ln(x**2+x)-2*x**5-25*x**4-29*x**3-33
*x**2-48*x-24)/(4*x**5+4*x**4),x)
```

output
```
-3*log(x**2 + x) + (-x**2 - 8)*log(x**2 + x)/(4*x) - (-x**2 - 12*x - 8)/(4
*x**3)
```

3.786.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. 2(27) = 54.

Time = 0.24 (sec) , antiderivative size = 81, normalized size of antiderivative = 2.70

$$\int \frac{-24-48x-33x^2-29x^3-25x^4-2x^5+(8x^2+8x^3-x^4-x^5)\log(x+x^2)}{4x^4+4x^5}\,dx = -\frac{1}{2}\,x+\frac{2\,x^2-(x^2+9\,x+8)\log(x+1)-(x^2-8\,x+8)\log(x)-8}{4\,x} - \frac{6\,(2\,x-1)}{x^2}+\frac{33}{4\,x}+\frac{6\,x^2-3\,x+2}{x^3}-\frac{3}{4}\,\log(x+1)-5\,\log(x)$$

input
```
integrate(((-x^5-x^4+8*x^3+8*x^2)*log(x^2+x)-2*x^5-25*x^4-29*x^3-33*x^2-48
*x-24)/(4*x^5+4*x^4),x, algorithm=\
```

output
```
-1/2*x + 1/4*(2*x^2 - (x^2 + 9*x + 8)*log(x + 1) - (x^2 - 8*x + 8)*log(x)
- 8)/x - 6*(2*x - 1)/x^2 + 33/4/x + (6*x^2 - 3*x + 2)/x^3 - 3/4*log(x + 1)
 - 5*log(x)
```

3.786.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.30

$$\int \frac{-24-48x-33x^2-29x^3-25x^4-2x^5+(8x^2+8x^3-x^4-x^5)\log(x+x^2)}{4x^4+4x^5}\,dx$$
$$=-\frac{1}{4}\left(x+\frac{8}{x}\right)\log\left(x^2+x\right)+\frac{x^2+12\,x+8}{4\,x^3}-3\,\log\left(x+1\right)-3\,\log\left(x\right)$$

input
```
integrate(((-x^5-x^4+8*x^3+8*x^2)*log(x^2+x)-2*x^5-25*x^4-29*x^3-33*x^2-48
*x-24)/(4*x^5+4*x^4),x, algorithm=\
```

output
```
-1/4*(x + 8/x)*log(x^2 + x) + 1/4*(x^2 + 12*x + 8)/x^3 - 3*log(x + 1) - 3*
log(x)
```

3.786.9 Mupad [B] (verification not implemented)

Time = 16.31 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.40

$$\int \frac{-24-48x-33x^2-29x^3-25x^4-2x^5+(8x^2+8x^3-x^4-x^5)\log(x+x^2)}{4x^4+4x^5}\,dx$$
$$=\frac{3\,x-x^2\,\left(2\,\ln\left(x^2+x\right)-\frac{1}{4}\right)+2}{x^3}-3\,\ln\left(x\,\left(x+1\right)\right)-\frac{x\,\ln\left(x^2+x\right)}{4}$$

input
```
int(-(48*x - log(x + x^2)*(8*x^2 + 8*x^3 - x^4 - x^5) + 33*x^2 + 29*x^3 +
25*x^4 + 2*x^5 + 24)/(4*x^4 + 4*x^5),x)
```

output
```
(3*x - x^2*(2*log(x + x^2) - 1/4) + 2)/x^3 - 3*log(x*(x + 1)) - (x*log(x +
 x^2))/4
```

3.787 $\int \frac{5e^3-7x^3-3x^3\log(x)}{5x}\,dx$

3.787.1 Optimal result

Integrand size = 25, antiderivative size = 18

$$\int \frac{5e^3-7x^3-3x^3\log(x)}{5x}\,dx = 629+\left(e^3-\frac{x^3}{5}\right)(2+\log(x))$$

output
```
629+(exp(3)-1/5*x^3)*(ln(x)+2)
```

3.787.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

$$\int \frac{5e^3-7x^3-3x^3\log(x)}{5x}\,dx = -\frac{2x^3}{5}+e^3\log(x)-\frac{1}{5}x^3\log(x)$$

input
```
Integrate[(5*E^3 - 7*x^3 - 3*x^3*Log[x])/(5*x),x]
```

output
```
(-2*x^3)/5 + E^3*Log[x] - (x^3*Log[x])/5
```

3.787.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-7x^3-3x^3\log(x)+5e^3}{5x}\,dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{5}\int \frac{-3\log(x)x^3-7x^3+5e^3}{x}dx$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{5}\int \left(\frac{5e^3-7x^3}{x}-3x^2\log(x)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{5}\left(-2x^3+x^3(-\log(x))+5e^3\log(x)\right)$$

input
```
Int[(5*E^3 - 7*x^3 - 3*x^3*Log[x])/(5*x),x]
```

output
```
(-2*x^3 + 5*E^3*Log[x] - x^3*Log[x])/5
```

3.787.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.787.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

method	result	size
default	$-\frac{x^3 \ln(x)}{5}-\frac{2x^3}{5}+\ln\left(x\right) \mathrm{e}^3$	19
norman	$-\frac{x^3 \ln(x)}{5}-\frac{2x^3}{5}+\ln\left(x\right) \mathrm{e}^3$	19
risch	$-\frac{x^3 \ln(x)}{5}-\frac{2x^3}{5}+\ln\left(x\right) \mathrm{e}^3$	19
parallelrisch	$-\frac{x^3 \ln(x)}{5}-\frac{2x^3}{5}+\ln\left(x\right) \mathrm{e}^3$	19
parts	$-\frac{x^3 \ln(x)}{5}-\frac{2x^3}{5}+\ln\left(x\right) \mathrm{e}^3$	19

input
```
int(1/5*(-3*x^3*ln(x)+5*exp(3)-7*x^3)/x,x,method=_RETURNVERBOSE)
```

output
```
-1/5*x^3*ln(x)-2/5*x^3+ln(x)*exp(3)
```

3.787.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{5e^3-7x^3-3x^3\log(x)}{5x}\,dx = -\frac{2}{5}\,x^3-\frac{1}{5}\,\left(x^3-5\,e^3\right)\log\left(x\right)$$

input
```
integrate(1/5*(-3*x^3*log(x)+5*exp(3)-7*x^3)/x,x, algorithm=\
```

output
```
-2/5*x^3 - 1/5*(x^3 - 5*e^3)*log(x)
```

3.787.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{5e^3-7x^3-3x^3\log(x)}{5x}\,dx = -\frac{x^3\log\left(x\right)}{5}-\frac{2x^3}{5}+e^3\log\left(x\right)$$

input
```
integrate(1/5*(-3*x**3*ln(x)+5*exp(3)-7*x**3)/x,x)
```

output
```
-x**3*log(x)/5 - 2*x**3/5 + exp(3)*log(x)
```

3.787.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{5e^3-7x^3-3x^3\log(x)}{5x}\,dx=-\frac{1}{5}\,x^3\log\left(x\right)-\frac{2}{5}\,x^3+e^3\log\left(x\right)$$

input
```
integrate(1/5*(-3*x^3*log(x)+5*exp(3)-7*x^3)/x,x, algorithm=\
```

output
```
-1/5*x^3*log(x) - 2/5*x^3 + e^3*log(x)
```

3.787.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{5e^3-7x^3-3x^3\log(x)}{5x}\,dx=-\frac{1}{5}\,x^3\log\left(x\right)-\frac{2}{5}\,x^3+e^3\log\left(x\right)$$

input
```
integrate(1/5*(-3*x^3*log(x)+5*exp(3)-7*x^3)/x,x, algorithm=\
```

output
```
-1/5*x^3*log(x) - 2/5*x^3 + e^3*log(x)
```

3.787.9 Mupad [B] (verification not implemented)

Time = 15.94 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{5e^3-7x^3-3x^3\log(x)}{5x}\,dx=\mathrm{e}^3\,\ln\left(x\right)-\frac{x^3\,\ln\left(x\right)}{5}-\frac{2\,x^3}{5}$$

input
```
int(-((3*x^3*log(x))/5 - exp(3) + (7*x^3)/5)/x,x)
```

output
```
exp(3)*log(x) - (x^3*log(x))/5 - (2*x^3)/5
```

3.788 $\int \frac{e^{-x-\frac{e^{-x}x}{5}}(-10e^x+2x-3x^2+x^3)}{20-20x+5x^2}\,dx$

3.788.1 Optimal result

Integrand size = 46, antiderivative size = 19

$$\int \frac{e^{-x-\frac{e^{-x}x}{5}}(-10e^x+2x-3x^2+x^3)}{20-20x+5x^2}\,dx=\frac{e^{-\frac{1}{5}e^{-x}x}x}{-2+x}$$

output
```
x/(-2+x)/exp(1/5*x/exp(x))
```

3.788.2 Mathematica [A] (verified)

Time = 0.83 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.32

$$\int \frac{e^{-x-\frac{e^{-x}x}{5}}(-10e^x+2x-3x^2+x^3)}{20-20x+5x^2}\,dx=\frac{1}{5}e^{-\frac{1}{5}e^{-x}x}\left(5+\frac{10}{-2+x}\right)$$

input
```
Integrate[(E^(-x - x/(5*E^x))*(-10*E^x + 2*x - 3*x^2 + x^3))/(20 - 20*x + 
5*x^2),x]
```

output
```
(5 + 10/(-2 + x))/(5*E^(x/(5*E^x)))
```

3.788.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-\frac{1}{5}e^{-x}x-x}(x^3-3x^2+2x-10e^x)}{5x^2-20x+20}\,dx$$

$$\Big\downarrow \text{ 7277}$$

$$20\int -\frac{e^{-\frac{1}{5}e^{-x}x-x}(-x^3+3x^2-2x+10e^x)}{100(2-x)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{1}{5}\int \frac{e^{-\frac{1}{5}e^{-x}x-x}(-x^3+3x^2-2x+10e^x)}{(2-x)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{1}{5}\int \left(\frac{10e^{-\frac{1}{5}e^{-x}x}}{(x-2)^2}-\frac{e^{-\frac{1}{5}e^{-x}x-x}(x-1)x}{x-2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{5}\left(\int e^{-\frac{1}{5}e^{-x}x-x}dx-10\int \frac{e^{-\frac{1}{5}e^{-x}x}}{(x-2)^2}dx+2\int \frac{e^{-\frac{1}{5}e^{-x}x-x}}{x-2}dx+\int e^{-\frac{1}{5}e^{-x}x-x}xdx\right)$$

input
```
Int[(E^(-x - x/(5*E^x))*(-10*E^x + 2*x - 3*x^2 + x^3))/(20 - 20*x + 5*x^2)
,x]
```

output
```
$Aborted
```

3.788.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.788.4 Maple [A] (verified)

Time = 1.18 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

method	result	size
risch	$\frac{x\,\mathrm{e}^{-\frac{x\,\mathrm{e}^{-x}}{5}}}{-2+x}$	16
norman	$\frac{x\,\mathrm{e}^{-\frac{x\,\mathrm{e}^{-x}}{5}}}{-2+x}$	18
parallelrisch	$\frac{x\,\mathrm{e}^{-\frac{x\,\mathrm{e}^{-x}}{5}}}{-2+x}$	18

input
```
int((-10*exp(x)+x^3-3*x^2+2*x)/(5*x^2-20*x+20)/exp(x)/exp(1/5*x/exp(x)),x,
method=_RETURNVERBOSE)
```

output
```
x/(-2+x)*exp(-1/5*x*exp(-x))
```

3.788.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

$$\int \frac{e^{-x-\frac{e^{-x}x}{5}}(-10e^x+2x-3x^2+x^3)}{20-20x+5x^2}\,dx=\frac{xe^{\left(-\frac{1}{5}\,(5\,xe^x+x)e^{(-x)}+x\right)}}{x-2}$$

input
```
integrate((-10*exp(x)+x^3-3*x^2+2*x)/(5*x^2-20*x+20)/exp(x)/exp(1/5*x/exp(
x)),x, algorithm=\
```

output
```
x*e^(-1/5*(5*x*e^x + x)*e^(-x) + x)/(x - 2)
```

3.788.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{e^{-x-\frac{e^{-x}x}{5}}(-10e^x+2x-3x^2+x^3)}{20-20x+5x^2}\,dx=\frac{xe^{-\frac{xe^{-x}}{5}}}{x-2}$$

input
```
integrate((-10*exp(x)+x**3-3*x**2+2*x)/(5*x**2-20*x+20)/exp(x)/exp(1/5*x/e
xp(x)),x)
```

output
```
x*exp(-x*exp(-x)/5)/(x - 2)
```

3.788.7 Maxima [F]

$$\int \frac{e^{-x-\frac{e^{-x}x}{5}}(-10e^x+2x-3x^2+x^3)}{20-20x+5x^2}\,dx=\int \frac{(x^3-3x^2+2x-10e^x)e^{\left(-\frac{1}{5}xe^{(-x)}-x\right)}}{5(x^2-4x+4)}\,dx$$

input
```
integrate((-10*exp(x)+x^3-3*x^2+2*x)/(5*x^2-20*x+20)/exp(x)/exp(1/5*x/exp(
x)),x, algorithm=\
```

output
```
1/5*integrate((x^3 - 3*x^2 + 2*x - 10*e^x)*e^(-1/5*x*e^(-x) - x)/(x^2 - 4*
x + 4), x)
```

3.788.8 Giac [F]

$$\int \frac{e^{-x-\frac{e^{-x}x}{5}}(-10e^x+2x-3x^2+x^3)}{20-20x+5x^2}\,dx=\int \frac{(x^3-3x^2+2x-10e^x)e^{\left(-\frac{1}{5}xe^{(-x)}-x\right)}}{5(x^2-4x+4)}\,dx$$

input
```
integrate((-10*exp(x)+x^3-3*x^2+2*x)/(5*x^2-20*x+20)/exp(x)/exp(1/5*x/exp(
x)),x, algorithm=\
```

output
```
integrate(1/5*(x^3 - 3*x^2 + 2*x - 10*e^x)*e^(-1/5*x*e^(-x) - x)/(x^2 - 4*
x + 4), x)
```

3.788.9 Mupad [B] (verification not implemented)

Time = 16.49 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int \frac{e^{-x-\frac{e^{-x}x}{5}}(-10e^x+2x-3x^2+x^3)}{20-20x+5x^2}\,dx=\frac{x\,\mathrm{e}^{-x}\,\mathrm{e}^{x-\frac{x\,\mathrm{e}^{-x}}{5}}}{x-2}$$

input
```
int((exp(-x)*exp(-(x*exp(-x))/5)*(2*x - 10*exp(x) - 3*x^2 + x^3))/(5*x^2 -
 20*x + 20),x)
```

output
```
(x*exp(-x)*exp(x - (x*exp(-x))/5))/(x - 2)
```

3.789 $\int \frac{1}{30}\left(-81+30e^{e^x+x}-50x\right)\,dx$

3.789.1 Optimal result

Integrand size = 18, antiderivative size = 28

$$\int \frac{1}{30}\left(-81+30e^{e^x+x}-50x\right)\,dx=-1+e^{e^x}+\frac{1}{5}\left(-e^4-x\right)-\frac{5}{6}x(3+x)$$

output
```
-1/5*x-1/6*x*(5*x+15)-1/5*exp(4)+exp(exp(x))-1
```

3.789.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.64

$$\int \frac{1}{30}\left(-81+30e^{e^x+x}-50x\right)\,dx=e^{e^x}-\frac{27x}{10}-\frac{5x^2}{6}$$

input
```
Integrate[(-81 + 30*E^(E^x + x) - 50*x)/30,x]
```

output
```
E^E^x - (27*x)/10 - (5*x^2)/6
```

3.789.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{30} \left(-50x + 30e^{x+e^x} - 81\right) \, dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{30} \int \left(-50x + 30e^{x+e^x} - 81\right) dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{30} \left(-25x^2 - 81x + 30e^{e^x}\right)$$

input
```
Int[(-81 + 30*E^(E^x + x) - 50*x)/30,x]
```

output
```
(30*E^E^x - 81*x - 25*x^2)/30
```

3.789.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.789.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.46

method	result	size
default	$-\frac{5x^2}{6}-\frac{27x}{10}+e^{e^x}$	13
norman	$-\frac{5x^2}{6}-\frac{27x}{10}+e^{e^x}$	13
risch	$-\frac{5x^2}{6}-\frac{27x}{10}+e^{e^x}$	13
parallelrisch	$-\frac{5x^2}{6}-\frac{27x}{10}+e^{e^x}$	13
parts	$-\frac{5x^2}{6}-\frac{27x}{10}+e^{e^x}$	13

input
```
int(exp(x)*exp(exp(x))-5/3*x-27/10,x,method=_RETURNVERBOSE)
```

output
```
-5/6*x^2-27/10*x+exp(exp(x))
```

3.789.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{1}{30}\left(-81+30e^{e^x+x}-50x\right)\,dx = -\frac{1}{30}\left((25\,x^2+81\,x)e^x-30\,e^{(x+e^x)}\right)e^{(-x)}$$

input
```
integrate(exp(x)*exp(exp(x))-5/3*x-27/10,x, algorithm=\
```

output
```
-1/30*((25*x^2 + 81*x)*e^x - 30*e^(x + e^x))*e^(-x)
```

3.789.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.54

$$\int \frac{1}{30}\left(-81+30e^{e^x+x}-50x\right)\,dx = -\frac{5x^2}{6}-\frac{27x}{10}+e^{e^x}$$

input
```
integrate(exp(x)*exp(exp(x))-5/3*x-27/10,x)
```

output
```
-5*x**2/6 - 27*x/10 + exp(exp(x))
```

3.789.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.43

$$\int \frac{1}{30}\left(-81+30e^{e^x+x}-50x\right)\,dx=-\frac{5}{6}\,x^2-\frac{27}{10}\,x+e^{\left(e^x\right)}$$

input
```
integrate(exp(x)*exp(exp(x))-5/3*x-27/10,x, algorithm=\
```

output
```
-5/6*x^2 - 27/10*x + e^(e^x)
```

3.789.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.43

$$\int \frac{1}{30}\left(-81+30e^{e^x+x}-50x\right)\,dx=-\frac{5}{6}\,x^2-\frac{27}{10}\,x+e^{\left(e^x\right)}$$

input
```
integrate(exp(x)*exp(exp(x))-5/3*x-27/10,x, algorithm=\
```

output
```
-5/6*x^2 - 27/10*x + e^(e^x)
```

3.789.9 Mupad [B] (verification not implemented)

Time = 17.33 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.43

$$\int \frac{1}{30}\left(-81+30e^{e^x+x}-50x\right)\,dx=\mathrm{e}^{\mathrm{e}^x}-\frac{27\,x}{10}-\frac{5\,x^2}{6}$$

input
```
int(exp(exp(x))*exp(x) - (5*x)/3 - 27/10,x)
```

output
```
exp(exp(x)) - (27*x)/10 - (5*x^2)/6
```

3.790 $\int \frac{36223740e^{5x}-209790e^{6x}+486e^{7x}+e^{2x}(-2330928984272-402486x)+}{}$

3.790.1 Optimal result

Integrand size = 375, antiderivative size = 22

$$\int \frac{36223740e^{5x}-209790e^{6x}+486e^{7x}+e^{2x}(-2330928984272-402486x)+e^{3x}(134995830852-4662x)-}{-}$$

$$=\left(e^x-\frac{x}{(259-3e^x-\log(x))^2}\right)^2$$

output
```
(exp(x)-x/(259-3*exp(x)-ln(x))^2)^2
```

3.790.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.73

$$\int \frac{36223740e^{5x}-209790e^{6x}+486e^{7x}+e^{2x}(-2330928984272-402486x)+e^{3x}(134995830852-4662x)-}{-}$$

$$=e^{2x}+\frac{x^2}{(-259+3e^x+\log(x))^4}-\frac{2e^xx}{(-259+3e^x+\log(x))^2}$$

input
```
Integrate[(36223740*E^(5*x) - 209790*E^(6*x) + 486*E^(7*x) + E^(2*x)*(-233
0928984272 - 402486*x) + E^(3*x)*(134995830852 - 4662*x) - 522*x + E^(4*x)
*(-3127316274 + 54*x) + E^x*(35016282 + 34747964*x - 12*x^2) + (36223740*E
^(4*x) - 279720*E^(5*x) + 810*E^(6*x) + E^x*(-404558 - 402486*x) + 2*x + E
^(3*x)*(-2084877534 + 18*x) + E^(2*x)*(44998614958 + 3108*x))*Log[x] + (12
074580*E^(3*x) - 139860*E^(4*x) + 540*E^(5*x) + E^(2*x)*(-347479598 - 6*x)
 + E^x*(1558 + 1554*x))*Log[x]^2 + (1341620*E^(2*x) - 31080*E^(3*x) + 180*
E^(4*x) + E^x*(-2 - 2*x))*Log[x]^3 + (-2590*E^(2*x) + 30*E^(3*x))*Log[x]^4
 + 2*E^(2*x)*Log[x]^5)/(-1165463885299 + 67497908415*E^x - 1563658110*E^(2
*x) + 18111870*E^(3*x) - 104895*E^(4*x) + 243*E^(5*x) + (22499302805 - 104
2438740*E^x + 18111870*E^(2*x) - 139860*E^(3*x) + 405*E^(4*x))*Log[x] + (-
173739790 + 6037290*E^x - 69930*E^(2*x) + 270*E^(3*x))*Log[x]^2 + (670810
- 15540*E^x + 90*E^(2*x))*Log[x]^3 + (-1295 + 15*E^x)*Log[x]^4 + Log[x]^5)
,x]
```

output
```
E^(2*x) + x^2/(-259 + 3*E^x + Log[x])^4 - (2*E^x*x)/(-259 + 3*E^x + Log[x]
)^2
```

3.790.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(-12x^2+34747964x+35016282\right)+36223740e^{5x}-209790e^{6x}+486e^{7x}+e^{2x}(-402486x-2330928984272)}{6749790}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-e^x\left(-12x^2+34747964x+35016282\right)-36223740e^{5x}+209790e^{6x}-486e^{7x}-e^{2x}(-402486x-233092898427}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(2e^{2x}+\frac{2(x-1)}{3\left(3e^x+\log(x)-259\right)}+\frac{4(\log(x)-259)(-259x+x\log(x)-1)}{3\left(3e^x+\log(x)-259\right)^3}+\frac{4x(-259x+x\log(x)-1)}{\left(3e^x+\log(x)-259\right)^5}-\frac{2(-}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-1036\int \frac{x^2}{(\log(x)+3e^x-259)^5}dx+4\int \frac{x^2\log(x)}{(\log(x)+3e^x-259)^5}dx-4\int \frac{x^2}{(\log(x)+3e^x-259)^4}dx+\frac{4}{3}\int \frac{x\log^2(x)}{(\log(x)+3e^x-259)^3}dx-4\int \frac{x}{(\log(x)+3e^x-259)^5}dx+2\int \frac{x}{(\log(x)+3e^x-259)^4}dx+\frac{1036}{3}\int \frac{1}{(\log(x)+3e^x-259)^3}dx+\frac{268324}{3}\int \frac{x}{(\log(x)+3e^x-259)^3}dx-\frac{4}{3}\int \frac{\log(x)}{(\log(x)+3e^x-259)^3}dx-\frac{2072}{3}\int \frac{x\log(x)}{(\log(x)+3e^x-259)^3}dx-\frac{514}{3}\int \frac{1}{(\log(x)+3e^x-259)^2}dx+518\int \frac{x}{(\log(x)+3e^x-259)^2}dx+\frac{2}{3}\int \frac{\log(x)}{(\log(x)+3e^x-259)^2}dx-2\int \frac{x\log(x)}{(\log(x)+3e^x-259)^2}dx-\frac{2}{3}\int \frac{1}{\log(x)+3e^x-259}dx+\frac{2}{3}\int \frac{x}{\log(x)+3e^x-259}dx+e^{2x}$$

input
```
Int[(36223740*E^(5*x) - 209790*E^(6*x) + 486*E^(7*x) + E^(2*x)*(-233092898
4272 - 402486*x) + E^(3*x)*(134995830852 - 4662*x) - 522*x + E^(4*x)*(-312
7316274 + 54*x) + E^x*(35016282 + 34747964*x - 12*x^2) + (36223740*E^(4*x)
 - 279720*E^(5*x) + 810*E^(6*x) + E^x*(-404558 - 402486*x) + 2*x + E^(3*x)
*(-2084877534 + 18*x) + E^(2*x)*(44998614958 + 3108*x))*Log[x] + (12074580
*E^(3*x) - 139860*E^(4*x) + 540*E^(5*x) + E^(2*x)*(-347479598 - 6*x) + E^x
*(1558 + 1554*x))*Log[x]^2 + (1341620*E^(2*x) - 31080*E^(3*x) + 180*E^(4*x
) + E^x*(-2 - 2*x))*Log[x]^3 + (-2590*E^(2*x) + 30*E^(3*x))*Log[x]^4 + 2*E
^(2*x)*Log[x]^5)/(-1165463885299 + 67497908415*E^x - 1563658110*E^(2*x) +
18111870*E^(3*x) - 104895*E^(4*x) + 243*E^(5*x) + (22499302805 - 104243874
0*E^x + 18111870*E^(2*x) - 139860*E^(3*x) + 405*E^(4*x))*Log[x] + (-173739
790 + 6037290*E^x - 69930*E^(2*x) + 270*E^(3*x))*Log[x]^2 + (670810 - 1554
0*E^x + 90*E^(2*x))*Log[x]^3 + (-1295 + 15*E^x)*Log[x]^4 + Log[x]^5),x]
```

output
```
$Aborted
```

3.790.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.790.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. 2(20) = 40.

Time = 2.88 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.64

method	result
risch	$\mathrm{e}^{2x}+\frac{x\left(-18\,\mathrm{e}^{3x}-12\ln(x)\mathrm{e}^{2x}-2\,\mathrm{e}^{x}\ln(x)^{2}+3108\,\mathrm{e}^{2x}+1036\,\mathrm{e}^{x}\ln(x)+x-134162\,\mathrm{e}^{x}\right)}{(\ln(x)+3\,\mathrm{e}^{x}-259)^{4}}$
parallelrisch	$\frac{-1811130877754646+3752779464\,\mathrm{e}^{x}\ln(x)^{2}-4829832\,\mathrm{e}^{x}\ln(x)^{3}-972x\,\mathrm{e}^{3x}+167832x\,\mathrm{e}^{2x}-971969881176\,\mathrm{e}^{x}\ln(x)-7244748\,\mathrm{e}^{x}x}{}$

input

```
int((2*exp(x)^2*ln(x)^5+(30*exp(x)^3-2590*exp(x)^2)*ln(x)^4+(180*exp(x)^4-
31080*exp(x)^3+1341620*exp(x)^2+(-2-2*x)*exp(x))*ln(x)^3+(540*exp(x)^5-139
860*exp(x)^4+12074580*exp(x)^3+(-6*x-347479598)*exp(x)^2+(1554*x+1558)*exp
(x))*ln(x)^2+(810*exp(x)^6-279720*exp(x)^5+36223740*exp(x)^4+(18*x-2084877
534)*exp(x)^3+(3108*x+44998614958)*exp(x)^2+(-402486*x-404558)*exp(x)+2*x)
*ln(x)+486*exp(x)^7-209790*exp(x)^6+36223740*exp(x)^5+(54*x-3127316274)*ex
p(x)^4+(-4662*x+134995830852)*exp(x)^3+(-402486*x-2330928984272)*exp(x)^2+
(-12*x^2+34747964*x+35016282)*exp(x)-522*x)/(ln(x)^5+(15*exp(x)-1295)*ln(x
)^4+(90*exp(x)^2-15540*exp(x)+670810)*ln(x)^3+(270*exp(x)^3-69930*exp(x)^2
+6037290*exp(x)-173739790)*ln(x)^2+(405*exp(x)^4-139860*exp(x)^3+18111870*
exp(x)^2-1042438740*exp(x)+22499302805)*ln(x)+243*exp(x)^5-104895*exp(x)^4
+18111870*exp(x)^3-1563658110*exp(x)^2+67497908415*exp(x)-1165463885299),x
,method=_RETURNVERBOSE)
```

output

```
exp(x)^2+x*(-18*exp(x)^3-12*exp(x)^2*ln(x)-2*exp(x)*ln(x)^2+3108*exp(x)^2+
1036*exp(x)*ln(x)+x-134162*exp(x))/(ln(x)+3*exp(x)-259)^4
```

3.790.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 227 vs. 2(19) = 38.

Time = 0.27 (sec) , antiderivative size = 227, normalized size of antiderivative = 10.32

$$\int \frac{36223740e^{5x}-209790e^{6x}+486e^{7x}+e^{2x}(-2330928984272-402486x)+e^{3x}(134995830852-4662x)-}{-}$$

$$=\frac{e^{(2x)}\log(x)^{4}+4\left(3e^{(3x)}-259e^{(2x)}\right)\log(x)^{3}-2\left(xe^{x}-27e^{(4x)}+4662e^{(3x)}-201243e^{(2x)}\right)\log(x)^{2}+x}{4\left(3e^{x}-259\right)\log(x)^{3}+\log(x)^{4}+6\left(9e^{(2x)}-1554e^{x}\right.}$$

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$$\int \frac{36223740e^{5x}-209790e^{6x}+486e^{7x}+e^{2x}(-2330928984272-402486x)+e^{3x}(134995830852-4662x)-522x+e^{4x}(-3127316274+54x)+e^{x}(35016282}{-1165463885299+67497908415e^{x}-1563658110e}$$

input
```
integrate((2*exp(x)^2*log(x)^5+(30*exp(x)^3-2590*exp(x)^2)*log(x)^4+(180*e
xp(x)^4-31080*exp(x)^3+1341620*exp(x)^2+(-2-2*x)*exp(x))*log(x)^3+(540*exp
(x)^5-139860*exp(x)^4+12074580*exp(x)^3+(-6*x-347479598)*exp(x)^2+(1554*x+
1558)*exp(x))*log(x)^2+(810*exp(x)^6-279720*exp(x)^5+36223740*exp(x)^4+(18
*x-2084877534)*exp(x)^3+(3108*x+44998614958)*exp(x)^2+(-402486*x-404558)*e
xp(x)+2*x)*log(x)+486*exp(x)^7-209790*exp(x)^6+36223740*exp(x)^5+(54*x-312
7316274)*exp(x)^4+(-4662*x+134995830852)*exp(x)^3+(-402486*x-2330928984272
)*exp(x)^2+(-12*x^2+34747964*x+35016282)*exp(x)-522*x)/(log(x)^5+(15*exp(x
)-1295)*log(x)^4+(90*exp(x)^2-15540*exp(x)+670810)*log(x)^3+(270*exp(x)^3-
69930*exp(x)^2+6037290*exp(x)-173739790)*log(x)^2+(405*exp(x)^4-139860*exp
(x)^3+18111870*exp(x)^2-1042438740*exp(x)+22499302805)*log(x)+243*exp(x)^5
-104895*exp(x)^4+18111870*exp(x)^3-1563658110*exp(x)^2+67497908415*exp(x)-
1165463885299),x, algorithm=\
```

output
```
(e^(2*x)*log(x)^4 + 4*(3*e^(3*x) - 259*e^(2*x))*log(x)^3 - 2*(x*e^x - 27*e
^(4*x) + 4662*e^(3*x) - 201243*e^(2*x))*log(x)^2 + x^2 - 6*(3*x + 34747958
)*e^(3*x) + 259*(12*x + 17373979)*e^(2*x) - 134162*x*e^x - 4*((3*x + 17373
979)*e^(2*x) - 259*x*e^x - 27*e^(5*x) + 6993*e^(4*x) - 603729*e^(3*x))*log
(x) + 81*e^(6*x) - 27972*e^(5*x) + 3622374*e^(4*x))/(4*(3*e^x - 259)*log(x
)^3 + log(x)^4 + 6*(9*e^(2*x) - 1554*e^x + 67081)*log(x)^2 + 4*(27*e^(3*x)
 - 6993*e^(2*x) + 603729*e^x - 17373979)*log(x) + 81*e^(4*x) - 27972*e^(3*
x) + 3622374*e^(2*x) - 208487748*e^x + 4499860561)
```

3.790.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 139 vs. $2(17) = 34$.

Time = 0.40 (sec) , antiderivative size = 139, normalized size of antiderivative = 6.32

$$\int \frac{36223740e^{5x} - 209790e^{6x} + 486e^{7x} + e^{2x}(-2330928984272 - 402486x) + e^{3x}(134995830852 - 4662x) -}{-}$$

$$= \frac{x^2 - 18xe^{3x} + (-12x\log(x) + 3108x)}{(108\log(x) - 27972)e^{3x} + \left(54\log(x)^2 - 27972\log(x) + 3622374\right)e^{2x} + \left(12\log(x)^3 - 9324\log(x)^2 + 2\right. + e^{2x}}$$

input
```
integrate((2*exp(x)**2*ln(x)**5+(30*exp(x)**3-2590*exp(x)**2)*ln(x)**4+(18
0*exp(x)**4-31080*exp(x)**3+1341620*exp(x)**2+(-2-2*x)*exp(x))*ln(x)**3+(5
40*exp(x)**5-139860*exp(x)**4+12074580*exp(x)**3+(-6*x-347479598)*exp(x)**
2+(1554*x+1558)*exp(x))*ln(x)**2+(810*exp(x)**6-279720*exp(x)**5+36223740*
exp(x)**4+(18*x-2084877534)*exp(x)**3+(3108*x+44998614958)*exp(x)**2+(-402
486*x-404558)*exp(x)+2*x)*ln(x)+486*exp(x)**7-209790*exp(x)**6+36223740*ex
p(x)**5+(54*x-3127316274)*exp(x)**4+(-4662*x+134995830852)*exp(x)**3+(-402
486*x-2330928984272)*exp(x)**2+(-12*x**2+34747964*x+35016282)*exp(x)-522*x
)/(ln(x)**5+(15*exp(x)-1295)*ln(x)**4+(90*exp(x)**2-15540*exp(x)+670810)*l
n(x)**3+(270*exp(x)**3-69930*exp(x)**2+6037290*exp(x)-173739790)*ln(x)**2+
(405*exp(x)**4-139860*exp(x)**3+18111870*exp(x)**2-1042438740*exp(x)+22499
302805)*ln(x)+243*exp(x)**5-104895*exp(x)**4+18111870*exp(x)**3-1563658110
*exp(x)**2+67497908415*exp(x)-1165463885299),x)
```

output
```
(x**2 - 18*x*exp(3*x) + (-12*x*log(x) + 3108*x)*exp(2*x) + (-2*x*log(x)**2
 + 1036*x*log(x) - 134162*x)*exp(x))/((108*log(x) - 27972)*exp(3*x) + (54*
log(x)**2 - 27972*log(x) + 3622374)*exp(2*x) + (12*log(x)**3 - 9324*log(x)
**2 + 2414916*log(x) - 208487748)*exp(x) + 81*exp(4*x) + log(x)**4 - 1036*
log(x)**3 + 402486*log(x)**2 - 69495916*log(x) + 4499860561) + exp(2*x)
```

3.790.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 194 vs. $2(19) = 38$.

Time = 0.60 (sec) , antiderivative size = 194, normalized size of antiderivative = 8.82

$$\int \frac{36223740e^{5x} - 209790e^{6x} + 486e^{7x} + e^{2x}(-2330928984272 - 402486x) + e^{3x}(134995830852 - 4662x) - \cdots}{-\cdots}$$

$$= \frac{x^2 + 108\,(\log(x) - 259)e^{(5\,x)} + 54\,\left(\log(x)^2 - 518\,\log(x) + 67081\right)e^{(4\,x)} + 6\,\left(2\,\log(x)^3 - 1554\,\log(x)^2 - \cdots\right.}{\log(x)^4 - 1036\,\log(x)^3 + 108\,(\log(x) - 259)e^{(3\,x)} + 54\,\left(\log(x\cdots\right.}$$

input
```
integrate((2*exp(x)^2*log(x)^5+(30*exp(x)^3-2590*exp(x)^2)*log(x)^4+(180*e
xp(x)^4-31080*exp(x)^3+1341620*exp(x)^2+(-2-2*x)*exp(x))*log(x)^3+(540*exp
(x)^5-139860*exp(x)^4+12074580*exp(x)^3+(-6*x-347479598)*exp(x)^2+(1554*x+
1558)*exp(x))*log(x)^2+(810*exp(x)^6-279720*exp(x)^5+36223740*exp(x)^4+(18
*x-2084877534)*exp(x)^3+(3108*x+44998614958)*exp(x)^2+(-402486*x-404558)*e
xp(x)+2*x)*log(x)+486*exp(x)^7-209790*exp(x)^6+36223740*exp(x)^5+(54*x-312
7316274)*exp(x)^4+(-4662*x+134995830852)*exp(x)^3+(-402486*x-2330928984272
)*exp(x)^2+(-12*x^2+34747964*x+35016282)*exp(x)-522*x)/(log(x)^5+(15*exp(x
)-1295)*log(x)^4+(90*exp(x)^2-15540*exp(x)+670810)*log(x)^3+(270*exp(x)^3-
69930*exp(x)^2+6037290*exp(x)-173739790)*log(x)^2+(405*exp(x)^4-139860*exp
(x)^3+18111870*exp(x)^2-1042438740*exp(x)+22499302805)*log(x)+243*exp(x)^5
-104895*exp(x)^4+18111870*exp(x)^3-1563658110*exp(x)^2+67497908415*exp(x)-
1165463885299),x, algorithm=\
```

output
```
(x^2 + 108*(log(x) - 259)*e^(5*x) + 54*(log(x)^2 - 518*log(x) + 67081)*e^(
4*x) + 6*(2*log(x)^3 - 1554*log(x)^2 - 3*x + 402486*log(x) - 34747958)*e^(
3*x) + (log(x)^4 - 1036*log(x)^3 - 4*(3*x + 17373979)*log(x) + 402486*log(
x)^2 + 3108*x + 4499860561)*e^(2*x) - 2*(x*log(x)^2 - 518*x*log(x) + 67081
*x)*e^x + 81*e^(6*x))/(log(x)^4 - 1036*log(x)^3 + 108*(log(x) - 259)*e^(3*
x) + 54*(log(x)^2 - 518*log(x) + 67081)*e^(2*x) + 12*(log(x)^3 - 777*log(x
)^2 + 201243*log(x) - 17373979)*e^x + 402486*log(x)^2 + 81*e^(4*x) - 69495
916*log(x) + 4499860561)
```

3.790.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 264 vs. $2(19) = 38$.

Time = 0.70 (sec) , antiderivative size = 264, normalized size of antiderivative = 12.00

$$\int \frac{36223740e^{5x} - 209790e^{6x} + 486e^{7x} + e^{2x}(-2330928984272 - 402486x) + e^{3x}(134995830852 - 4662x) - \cdots}{-\cdots}$$

$$= \frac{e^{(2x)}\log(x)^4 - 2xe^x\log(x)^2 + 12e^{(3x)}\log(x)^3 - 1036e^{(2x)}\log(x)^3 - 12xe^{(2x)}\log(x) + 1036xe^x\log(x) \cdots}{12e^x\log(x)^3 + \log(x)^4 + 54e^{(2x)}\log(\cdots}$$

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$$\int \frac{36223740e^{5x} - 209790e^{6x} + 486e^{7x} + e^{2x}(-2330928984272 - 402486x) + e^{3x}(134995830852 - 4662x) - 522x + e^{4x}(-3127316274 + 54x) + e^x(35016282\cdots}{-1165463885299 + 67497908415e^x - 1563658110\cdots}$$

input
```
integrate((2*exp(x)^2*log(x)^5+(30*exp(x)^3-2590*exp(x)^2)*log(x)^4+(180*e
xp(x)^4-31080*exp(x)^3+1341620*exp(x)^2+(-2-2*x)*exp(x))*log(x)^3+(540*exp
(x)^5-139860*exp(x)^4+12074580*exp(x)^3+(-6*x-347479598)*exp(x)^2+(1554*x+
1558)*exp(x))*log(x)^2+(810*exp(x)^6-279720*exp(x)^5+36223740*exp(x)^4+(18
*x-2084877534)*exp(x)^3+(3108*x+44998614958)*exp(x)^2+(-402486*x-404558)*e
xp(x)+2*x)*log(x)+486*exp(x)^7-209790*exp(x)^6+36223740*exp(x)^5+(54*x-312
7316274)*exp(x)^4+(-4662*x+134995830852)*exp(x)^3+(-402486*x-2330928984272
)*exp(x)^2+(-12*x^2+34747964*x+35016282)*exp(x)-522*x)/(log(x)^5+(15*exp(x
)-1295)*log(x)^4+(90*exp(x)^2-15540*exp(x)+670810)*log(x)^3+(270*exp(x)^3-
69930*exp(x)^2+6037290*exp(x)-173739790)*log(x)^2+(405*exp(x)^4-139860*exp
(x)^3+18111870*exp(x)^2-1042438740*exp(x)+22499302805)*log(x)+243*exp(x)^5
-104895*exp(x)^4+18111870*exp(x)^3-1563658110*exp(x)^2+67497908415*exp(x)-
1165463885299),x, algorithm=\
```

output
```
(e^(2*x)*log(x)^4 - 2*x*e^x*log(x)^2 + 12*e^(3*x)*log(x)^3 - 1036*e^(2*x)*
log(x)^3 - 12*x*e^(2*x)*log(x) + 1036*x*e^x*log(x) + 54*e^(4*x)*log(x)^2 -
 9324*e^(3*x)*log(x)^2 + 402486*e^(2*x)*log(x)^2 + x^2 - 18*x*e^(3*x) + 31
08*x*e^(2*x) - 134162*x*e^x + 108*e^(5*x)*log(x) - 27972*e^(4*x)*log(x) +
2414916*e^(3*x)*log(x) - 69495916*e^(2*x)*log(x) + 81*e^(6*x) - 27972*e^(5
*x) + 3622374*e^(4*x) - 208487748*e^(3*x) + 4499860561*e^(2*x))/(12*e^x*lo
g(x)^3 + log(x)^4 + 54*e^(2*x)*log(x)^2 - 9324*e^x*log(x)^2 - 1036*log(x)^
3 + 108*e^(3*x)*log(x) - 27972*e^(2*x)*log(x) + 2414916*e^x*log(x) + 40248
6*log(x)^2 + 81*e^(4*x) - 27972*e^(3*x) + 3622374*e^(2*x) - 208487748*e^x
- 69495916*log(x) + 4499860561)
```

3.790.9 Mupad [F(-1)]

Timed out.

$$\int \frac{36223740e^{5x} - 209790e^{6x} + 486e^{7x} + e^{2x}(-2330928984272 - 402486x) + e^{3x}(134995830852 - 4662x) -}{}$$

$$= \int \frac{2\,\mathrm{e}^{2\,x}\,\ln(x)^5 + \left(30\,\mathrm{e}^{3\,x} - 2590\,\mathrm{e}^{2\,x}\right)\,\ln(x)^4 + \left(1341620\,\mathrm{e}^{2\,x} - 31080\,\mathrm{e}^{3\,x} + 180\,\mathrm{e}^{4\,x} - \mathrm{e}^{x}\,(2\,x+2)\right)\,\ln(x)^3}{}$$

input
```
int((36223740*exp(5*x) - 522*x - 209790*exp(6*x) + 486*exp(7*x) + log(x)^2
*(12074580*exp(3*x) - 139860*exp(4*x) + 540*exp(5*x) + exp(x)*(1554*x + 15
58) - exp(2*x)*(6*x + 347479598)) - log(x)^4*(2590*exp(2*x) - 30*exp(3*x))
 - exp(3*x)*(4662*x - 134995830852) + log(x)^3*(1341620*exp(2*x) - 31080*e
xp(3*x) + 180*exp(4*x) - exp(x)*(2*x + 2)) + log(x)*(2*x + 36223740*exp(4*
x) - 279720*exp(5*x) + 810*exp(6*x) + exp(2*x)*(3108*x + 44998614958) + ex
p(3*x)*(18*x - 2084877534) - exp(x)*(402486*x + 404558)) - exp(2*x)*(40248
6*x + 2330928984272) + exp(4*x)*(54*x - 3127316274) + exp(x)*(34747964*x -
 12*x^2 + 35016282) + 2*exp(2*x)*log(x)^5)/(18111870*exp(3*x) - 1563658110
*exp(2*x) - 104895*exp(4*x) + 243*exp(5*x) + 67497908415*exp(x) + log(x)*(
18111870*exp(2*x) - 139860*exp(3*x) + 405*exp(4*x) - 1042438740*exp(x) + 2
2499302805) + log(x)^4*(15*exp(x) - 1295) + log(x)^5 - log(x)^2*(69930*exp
(2*x) - 270*exp(3*x) - 6037290*exp(x) + 173739790) + log(x)^3*(90*exp(2*x)
 - 15540*exp(x) + 670810) - 1165463885299),x)
```

output
```
int((36223740*exp(5*x) - 522*x - 209790*exp(6*x) + 486*exp(7*x) + log(x)^2
*(12074580*exp(3*x) - 139860*exp(4*x) + 540*exp(5*x) + exp(x)*(1554*x + 15
58) - exp(2*x)*(6*x + 347479598)) - log(x)^4*(2590*exp(2*x) - 30*exp(3*x))
 - exp(3*x)*(4662*x - 134995830852) + log(x)^3*(1341620*exp(2*x) - 31080*e
xp(3*x) + 180*exp(4*x) - exp(x)*(2*x + 2)) + log(x)*(2*x + 36223740*exp(4*
x) - 279720*exp(5*x) + 810*exp(6*x) + exp(2*x)*(3108*x + 44998614958) + ex
p(3*x)*(18*x - 2084877534) - exp(x)*(402486*x + 404558)) - exp(2*x)*(40248
6*x + 2330928984272) + exp(4*x)*(54*x - 3127316274) + exp(x)*(34747964*x -
 12*x^2 + 35016282) + 2*exp(2*x)*log(x)^5)/(18111870*exp(3*x) - 1563658110
*exp(2*x) - 104895*exp(4*x) + 243*exp(5*x) + 67497908415*exp(x) + log(x)*(
18111870*exp(2*x) - 139860*exp(3*x) + 405*exp(4*x) - 1042438740*exp(x) + 2
2499302805) + log(x)^4*(15*exp(x) - 1295) + log(x)^5 - log(x)^2*(69930*exp
(2*x) - 270*exp(3*x) - 6037290*exp(x) + 173739790) + log(x)^3*(90*exp(2*x)
 - 15540*exp(x) + 670810) - 1165463885299), x)
```

3.790.

$$\int \frac{36223740e^{5x}-209790e^{6x}+486e^{7x}+e^{2x}(-2330928984272-402486x)+e^{3x}(134995830852-4662x)-522x+e^{4x}(-3127316274+54x)+e^{x}(35016282}{-1165463885299+67497908415e^{x}-1563658110e}$$

3.791 $\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx$

3.791.1 Optimal result

Integrand size = 51, antiderivative size = 26

$$\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx = x-\frac{\frac{5}{4}+x-\frac{x}{5+\log(2)}}{16e^4x^2}$$

output
```
x-1/16*(x+5/4-x/(ln(2)+5))/x^2/exp(2)^2
```

3.791.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.50

$$\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx = -\frac{25-64e^4x^3(5+\log(2))+2x(8+\log(4))+\log(32)}{64e^4x^2(5+\log(2))}$$

input
```
Integrate[(25 + 8*x + 160*E^4*x^3 + (5 + 2*x + 32*E^4*x^3)*Log[2])/(160*E^
4*x^3 + 32*E^4*x^3*Log[2]),x]
```

output
```
-1/64*(25 - 64*E^4*x^3*(5 + Log[2]) + 2*x*(8 + Log[4]) + Log[32])/(E^4*x^2
*(5 + Log[2]))
```

3.791.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.69, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.078, Rules used = {6, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{160e^4x^3+\left(32e^4x^3+2x+5\right)\log(2)+8x+25}{160e^4x^3+32e^4x^3\log(2)}\,dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{160e^4x^3+\left(32e^4x^3+2x+5\right)\log(2)+8x+25}{e^4x^3(160+32\log(2))}dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int \frac{160e^4x^3+8x+\left(32e^4x^3+2x+5\right)\log(2)+25}{x^3}dx}{32e^4(5+\log(2))}$$

$$\Big\downarrow \; 2010$$

$$\frac{\int \left(32e^4(5+\log(2))+\frac{8+\log(4)}{x^2}+\frac{5(5+\log(2))}{x^3}\right)dx}{32e^4(5+\log(2))}$$

$$\Big\downarrow \; 2009$$

$$\frac{-\frac{5(5+\log(2))}{2x^2}+32e^4x(5+\log(2))-\frac{8+\log(4)}{x}}{32e^4(5+\log(2))}$$

input
```
Int[(25 + 8*x + 160*E^4*x^3 + (5 + 2*x + 32*E^4*x^3)*Log[2])/(160*E^4*x^3
+ 32*E^4*x^3*Log[2]),x]
```

output
```
((-5*(5 + Log[2]))/(2*x^2) + 32*E^4*x*(5 + Log[2]) - (8 + Log[4])/x)/(32*E
^4*(5 + Log[2]))
```

3.791.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.791.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

method	result	size
risch	$x+\frac{\left(\left(-\frac{\ln\left(2\right)}{16}-\frac{1}{4}\right)x-\frac{5\ln\left(2\right)}{64}-\frac{25}{64}\right){\mathrm e}^{-4}}{x^{2}\left(\ln\left(2\right)+5\right)}$	29
norman	$\frac{\left(x^{3}{\mathrm e}^{2}-\frac{5\,{\mathrm e}^{-2}}{64}-\frac{\left(4+\ln\left(2\right)\right){\mathrm e}^{-2}x}{16\left(\ln\left(2\right)+5\right)}\right){\mathrm e}^{-2}}{x^{2}}$	39
default	$\frac{{\mathrm e}^{-4}\left(32x\,{\mathrm e}^{4}\ln\left(2\right)+160x\,{\mathrm e}^{4}-\frac{8+2\ln\left(2\right)}{x}-\frac{5\ln\left(2\right)+25}{2x^{2}}\right)}{32\ln\left(2\right)+160}$	48
gosper	$\frac{\left(64x^{3}{\mathrm e}^{4}\ln\left(2\right)+320x^{3}{\mathrm e}^{4}-4x\ln\left(2\right)-5\ln\left(2\right)-16x-25\right){\mathrm e}^{-4}}{64x^{2}\left(\ln\left(2\right)+5\right)}$	50
parallelrisch	$\frac{\left(64x^{3}{\mathrm e}^{4}\ln\left(2\right)+320x^{3}{\mathrm e}^{4}-4x\ln\left(2\right)-5\ln\left(2\right)-16x-25\right){\mathrm e}^{-4}}{64x^{2}\left(\ln\left(2\right)+5\right)}$	50

input
```
int(((32*x^3*exp(2)^2+5+2*x)*ln(2)+160*x^3*exp(2)^2+8*x+25)/(32*x^3*exp(2)
^2*ln(2)+160*x^3*exp(2)^2),x,method=_RETURNVERBOSE)
```

output
```
x+((-1/16*ln(2)-1/4)*x-5/64*ln(2)-25/64)/x^2*exp(-4)/(ln(2)+5)
```

3.791. $\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx$

3.791.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(23) = 46$.

Time = 0.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.81

$$\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx = \frac{320\,x^3e^4+(64\,x^3e^4-4\,x-5)\log(2)-16\,x-25}{64\,(x^2e^4\log(2)+5\,x^2e^4)}$$

input
```
integrate(((32*x^3*exp(2)^2+5+2*x)*log(2)+160*x^3*exp(2)^2+8*x+25)/(32*x^3
*exp(2)^2*log(2)+160*x^3*exp(2)^2),x, algorithm=\
```

output
```
1/64*(320*x^3*e^4 + (64*x^3*e^4 - 4*x - 5)*log(2) - 16*x - 25)/(x^2*e^4*lo
g(2) + 5*x^2*e^4)
```

3.791.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(22) = 44$.

Time = 0.13 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.88

$$\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx = \frac{x(32e^4\log(2)+160e^4)+\frac{x(-16-4\log(2))-25-5\log(2)}{2x^2}}{32e^4\log(2)+160e^4}$$

input
```
integrate(((32*x**3*exp(2)**2+5+2*x)*ln(2)+160*x**3*exp(2)**2+8*x+25)/(32*
x**3*exp(2)**2*ln(2)+160*x**3*exp(2)**2),x)
```

output
```
(x*(32*exp(4)*log(2) + 160*exp(4)) + (x*(-16 - 4*log(2)) - 25 - 5*log(2))/
(2*x**2))/(32*exp(4)*log(2) + 160*exp(4))
```

3.791.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx = x-\frac{4\,x(\log(2)+4)+5\,\log(2)+25}{64\,(e^4\log(2)+5\,e^4)x^2}$$

input
```
integrate(((32*x^3*exp(2)^2+5+2*x)*log(2)+160*x^3*exp(2)^2+8*x+25)/(32*x^3
*exp(2)^2*log(2)+160*x^3*exp(2)^2),x, algorithm=\
```

output
```
x - 1/64*(4*x*(log(2) + 4) + 5*log(2) + 25)/((e^4*log(2) + 5*e^4)*x^2)
```

3.791.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. 2(23) = 46.

Time = 0.26 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.19

$$\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx = \frac{xe^4\log(2)+5\,xe^4}{e^4\log(2)+5\,e^4}-\frac{4\,x\log(2)+16\,x+5\,\log(2)+25}{64\,(e^4\log(2)+5\,e^4)x^2}$$

input
```
integrate(((32*x^3*exp(2)^2+5+2*x)*log(2)+160*x^3*exp(2)^2+8*x+25)/(32*x^3
*exp(2)^2*log(2)+160*x^3*exp(2)^2),x, algorithm=\
```

output
```
(x*e^4*log(2) + 5*x*e^4)/(e^4*log(2) + 5*e^4) - 1/64*(4*x*log(2) + 16*x +
5*log(2) + 25)/((e^4*log(2) + 5*e^4)*x^2)
```

3.791.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx = x-\frac{\frac{\ln(32)}{2}+x\,(\ln(4)+8)+\frac{25}{2}}{x^2\,(160\,e^4+32\,e^4\,\ln(2))}$$

input
```
int((8*x + 160*x^3*exp(4) + log(2)*(2*x + 32*x^3*exp(4) + 5) + 25)/(160*x^
3*exp(4) + 32*x^3*exp(4)*log(2)),x)
```

output
```
x - (log(32)/2 + x*(log(4) + 8) + 25/2)/(x^2*(160*exp(4) + 32*exp(4)*log(2
)))
```

3.791. $\int \frac{25+8x+160e^4x^3+(5+2x+32e^4x^3)\log(2)}{160e^4x^3+32e^4x^3\log(2)}\,dx$

3.792 $\int \frac{\frac{150x}{e^2} - \frac{250x^2}{e^4}}{x} \, dx$

3.792.1 Optimal result

Integrand size = 19, antiderivative size = 16

$$\int \frac{\frac{150x}{e^2} - \frac{250x^2}{e^4}}{x} \, dx = 5\left(9 - \left(-3 + \frac{5x}{e^2}\right)^2\right)$$

output
```
45-5*(exp(ln(x)+ln(5)-2)-3)^2
```

3.792.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.19

$$\int \frac{\frac{150x}{e^2} - \frac{250x^2}{e^4}}{x} \, dx = \frac{50\left(3e^2x - \frac{5x^2}{2}\right)}{e^4}$$

input
```
Integrate[((150*x)/E^2 - (250*x^2)/E^4)/x,x]
```

output
```
(50*(3*E^2*x - (5*x^2)/2))/E^4
```

3.792.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {9, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\frac{150x}{e^2}-\frac{250x^2}{e^4}}{x} \, dx$$

$$\Big\downarrow \; 9$$

$$\int \left(\frac{150}{e^2}-\frac{250x}{e^4}\right)dx$$

$$\Big\downarrow \; 17$$

$$-\frac{5\left(3e^2-5x\right)^2}{e^4}$$

input
```
Int[((150*x)/E^2 - (250*x^2)/E^4)/x,x]
```

output
```
(-5*(3*E^2 - 5*x)^2)/E^4
```

3.792.3.1 Defintions of rubi rules used

rule 9
```
Int[(u_.)*(Px_)^(p_.)*((e_.)*(x_))^(m_.), x_Symbol] :> With[{r = Expon[Px,
x, Min]}, Simp[1/e^(p*r)   Int[u*(e*x)^(m + p*r)*ExpandToSum[Px/x^r, x]^p,
x], x] /; IGtQ[r, 0]] /; FreeQ[{e, m}, x] && PolyQ[Px, x] && IntegerQ[p] &&
  !MonomialQ[Px, x]
```

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.792.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

method	result	size
risch	$-125\,\mathrm{e}^{-4}x^{2}+150x\,\mathrm{e}^{-2}$	16
norman	$\left(150x-125\,\mathrm{e}^{-2}x^{2}\right)\mathrm{e}^{-2}$	19
derivativedivides	$-125\,\mathrm{e}^{-4}x^{2}+30\,\mathrm{e}^{\ln(x)+\ln(5)-2}$	22
default	$-125\,\mathrm{e}^{-4}x^{2}+30\,\mathrm{e}^{\ln(x)+\ln(5)-2}$	22
parts	$-125\,\mathrm{e}^{-4}x^{2}+30\,\mathrm{e}^{\ln(x)+\ln(5)-2}$	22
parallelrisch	$\frac{-125\,\mathrm{e}^{-4}x^{4}+30\,\mathrm{e}^{\ln(x)+\ln(5)-2}x^{2}}{x^{2}}$	32

input
```
int((-10*exp(ln(x)+ln(5)-2)^2+30*exp(ln(x)+ln(5)-2))/x,x,method=_RETURNVER
BOSE)
```

output
```
-125*exp(-2)^2*x^2+150*x*exp(-2)
```

3.792.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.31

$$\int \frac{\frac{150x}{e^2}-\frac{250x^2}{e^4}}{x}\,dx=-5\,x^{2}e^{(2\,\log(5)-4)}+30\,xe^{(\log(5)-2)}$$

input
```
integrate((-10*exp(log(x)+log(5)-2)^2+30*exp(log(x)+log(5)-2))/x,x, algori
thm=\
```

output
```
-5*x^2*e^(2*log(5) - 4) + 30*x*e^(log(5) - 2)
```

3.792.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{\frac{150x}{e^2} - \frac{250x^2}{e^4}}{x} \, dx = -\frac{125x^2}{e^4} + \frac{150x}{e^2}$$

input
```
integrate((-10*exp(ln(x)+ln(5)-2)**2+30*exp(ln(x)+ln(5)-2))/x,x)
```

output
```
-125*x**2*exp(-4) + 150*x*exp(-2)
```

3.792.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\frac{150x}{e^2} - \frac{250x^2}{e^4}}{x} \, dx = -25 \left(5 x^2 - 6 x e^2\right) e^{(-4)}$$

input
```
integrate((-10*exp(log(x)+log(5)-2)^2+30*exp(log(x)+log(5)-2))/x,x, algori
thm=\
```

output
```
-25*(5*x^2 - 6*x*e^2)*e^(-4)
```

3.792.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\frac{150x}{e^2} - \frac{250x^2}{e^4}}{x} \, dx = -25 \left(5 x^2 - 6 x e^2\right) e^{(-4)}$$

input
```
integrate((-10*exp(log(x)+log(5)-2)^2+30*exp(log(x)+log(5)-2))/x,x, algori
thm=\
```

output
```
-25*(5*x^2 - 6*x*e^2)*e^(-4)
```

3.792.9 Mupad [B] (verification not implemented)

Time = 16.44 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{\frac{150x}{e^2} - \frac{250x^2}{e^4}}{x} \, dx = -25 \, x \, \mathrm{e}^{-4} \left(5 \, x - 6 \, \mathrm{e}^2\right)$$

input
```
int((30*exp(log(5) + log(x) - 2) - 10*exp(2*log(5) + 2*log(x) - 4))/x,x)
```

output
```
-25*x*exp(-4)*(5*x - 6*exp(2))
```

3.793 $\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(-7461720x^8+7482888x^7\log^2(2)\right)}{-3125x+3125\log^2(2)+\left(-3125x+31\right.}$

3.793.1 Optimal result

Integrand size = 267, antiderivative size = 31

$$\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(-7461720x^8+7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-287481\right.}{-3125x+3125\log^2(2)+\left(-3125x+3125\log^2(2)\right)\log\left(-x+\log^2(2)\right)+}$$
$$=x^8\left(5+\frac{-x+\frac{x}{5+\log\left(-x+\log^2(2)\right)}}{x}\right)^4$$

output
```
((x/(5+ln(ln(2)^2-x))-x)/x+5)^4*x^8
```

3.793.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 122 vs. 2(31) = 62.

Time = 10.08 (sec) , antiderivative size = 122, normalized size of antiderivative = 3.94

$$\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(-7461720x^8+7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-287481\right.}{-3125x+3125\log^2(2)+\left(-3125x+3125\log^2(2)\right)\log\left(-x+\log^2(2)\right)+}$$
$$=\frac{194481x^8-160000\log^{16}(2)+16\left(9261x^8-8000\log^{16}(2)\right)\log\left(-x+\log^2(2)\right)+96\left(441x^8-400\log^{16}(2)\right)}{\left(5+\log\left(-\right.\right.}$$

3.793.
$\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(-7461720x^8+7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-2874816x^8+2878848x^7\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+}{-3125x+3125\log^2(2)+\left(-3125x+3125\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-1250x+1250\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+}$

input
```
Integrate[(-7742196*x^8 + 7779240*x^7*Log[2]^2 + (-7461720*x^8 + 7482888*x
^7*Log[2]^2)*Log[-x + Log[2]^2] + (-2874816*x^8 + 2878848*x^7*Log[2]^2)*Lo
g[-x + Log[2]^2]^2 + (-553472*x^8 + 553728*x^7*Log[2]^2)*Log[-x + Log[2]^2
]^3 + (-53248*x^8 + 53248*x^7*Log[2]^2)*Log[-x + Log[2]^2]^4 + (-2048*x^8
+ 2048*x^7*Log[2]^2)*Log[-x + Log[2]^2]^5)/(-3125*x + 3125*Log[2]^2 + (-31
25*x + 3125*Log[2]^2)*Log[-x + Log[2]^2] + (-1250*x + 1250*Log[2]^2)*Log[-
x + Log[2]^2]^2 + (-250*x + 250*Log[2]^2)*Log[-x + Log[2]^2]^3 + (-25*x +
25*Log[2]^2)*Log[-x + Log[2]^2]^4 + (-x + Log[2]^2)*Log[-x + Log[2]^2]^5),
x]
```

output
```
(194481*x^8 - 160000*Log[2]^16 + 16*(9261*x^8 - 8000*Log[2]^16)*Log[-x + L
og[2]^2] + 96*(441*x^8 - 400*Log[2]^16)*Log[-x + Log[2]^2]^2 + 256*(21*x^8
 - 20*Log[2]^16)*Log[-x + Log[2]^2]^3 + 256*(x^8 - Log[2]^16)*Log[-x + Log
[2]^2]^4)/(5 + Log[-x + Log[2]^2])^4
```

3.793.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(2878848x^7\log^2(2)-2874816x^8\right)\log^2\left(\log^2(2)-x\right)+\left(7482888x^7\log^2(2)\right.}{-3125x+\left(1250\log^2(2)-1250x\right)\log^2\left(\log^2(2)-x\right)+\left(3125\log^2(2)-3125x\right)}$$

$$\Big\downarrow 7239$$

$$\int \frac{4x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(209x+8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$$\Big\downarrow 27$$

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$$\Big\downarrow 7293$$

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$$\Big\downarrow 7239$$

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\big\downarrow$ 7239

3.793.

$$\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(-7461720x^8+7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-2874816x^8+2878848x^7\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+}{-3125x+3125\log^2(2)+\left(-3125x+3125\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-1250x+1250\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+}$$

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\Big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\Big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\Big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\Big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\Big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\Big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\Big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\Big\downarrow$ 7239

3.793.

$$\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(-7461720x^8+7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-2874816x^8+2878848x^7\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+\left(\right.}{-3125x+3125\log^2(2)+\left(-3125x+3125\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-1250x+1250\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+}$$

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\Big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\Big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\Big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\Big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\Big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\Big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\Big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\Big\downarrow$ 7239

3.793.

$$\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(-7461720x^8+7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-2874816x^8+2878848x^7\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+\left(\right.}{-3125x+3125\log^2(2)+\left(-3125x+3125\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-1250x+1250\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+}$$

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

$\Big\downarrow$ 7293

$$4\int\left(-\frac{x^8}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}+\frac{512x^7}{\log\left(\log^2(2)-x\right)+5}+\frac{64\left(2x-3\log^2(2)\right)x^7}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^2}-\right.$$

$\Big\downarrow$ 7239

$$4\int \frac{x^7\left(4\log\left(\log^2(2)-x\right)+21\right)^3\left(8\left(x-\log^2(2)\right)\log^2\left(\log^2(2)-x\right)+82\left(x-\log^2(2)\right)\log\left(\log^2(2)-x\right)+209x-\right.}{\left(x-\log^2(2)\right)\left(\log\left(\log^2(2)-x\right)+5\right)^5}$$

input
```
Int[(-7742196*x^8 + 7779240*x^7*Log[2]^2 + (-7461720*x^8 + 7482888*x^7*Log
[2]^2)*Log[-x + Log[2]^2] + (-2874816*x^8 + 2878848*x^7*Log[2]^2)*Log[-x +
 Log[2]^2]^2 + (-553472*x^8 + 553728*x^7*Log[2]^2)*Log[-x + Log[2]^2]^3 +
(-53248*x^8 + 53248*x^7*Log[2]^2)*Log[-x + Log[2]^2]^4 + (-2048*x^8 + 2048
*x^7*Log[2]^2)*Log[-x + Log[2]^2]^5)/(-3125*x + 3125*Log[2]^2 + (-3125*x +
 3125*Log[2]^2)*Log[-x + Log[2]^2] + (-1250*x + 1250*Log[2]^2)*Log[-x + Lo
g[2]^2]^2 + (-250*x + 250*Log[2]^2)*Log[-x + Log[2]^2]^3 + (-25*x + 25*Log
[2]^2)*Log[-x + Log[2]^2]^4 + (-x + Log[2]^2)*Log[-x + Log[2]^2]^5),x]
```

output
```
$Aborted
```

3.793.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.793.

$$\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(-7461720x^8+7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-2874816x^8+2878848x^7\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+\left(\right.}{-3125x+3125\log^2(2)+\left(-3125x+3125\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-1250x+1250\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+}$$

3.793.4 Maple [A] (verified)

Time = 4.63 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.03

method	result	size
risch	$256x^{8}+\frac{x^{8}\left(256\ln\left(\ln(2)^{2}-x\right)^{3}+3936\ln\left(\ln(2)^{2}-x\right)^{2}+20176\ln\left(\ln(2)^{2}-x\right)+34481\right)}{\left(5+\ln\left(\ln(2)^{2}-x\right)\right)^{4}}$	63
parallelrisch	$\frac{256\ln\left(\ln(2)^{2}-x\right)^{4}x^{8}+5376\ln\left(\ln(2)^{2}-x\right)^{3}x^{8}+42336\ln\left(\ln(2)^{2}-x\right)^{2}x^{8}+148176\ln\left(\ln(2)^{2}-x\right)x^{8}+194481x^{8}}{\ln\left(\ln(2)^{2}-x\right)^{4}+20\ln\left(\ln(2)^{2}-x\right)^{3}+150\ln\left(\ln(2)^{2}-x\right)^{2}+500\ln\left(\ln(2)^{2}-x\right)+625}$	122
derivativedivides	Expression too large to display	1022
default	Expression too large to display	1022

input
```
int(((2048*x^7*ln(2)^2-2048*x^8)*ln(ln(2)^2-x)^5+(53248*x^7*ln(2)^2-53248*
x^8)*ln(ln(2)^2-x)^4+(553728*x^7*ln(2)^2-553472*x^8)*ln(ln(2)^2-x)^3+(2878
848*x^7*ln(2)^2-2874816*x^8)*ln(ln(2)^2-x)^2+(7482888*x^7*ln(2)^2-7461720*
x^8)*ln(ln(2)^2-x)+7779240*x^7*ln(2)^2-7742196*x^8)/((ln(2)^2-x)*ln(ln(2)^
2-x)^5+(25*ln(2)^2-25*x)*ln(ln(2)^2-x)^4+(250*ln(2)^2-250*x)*ln(ln(2)^2-x)
^3+(1250*ln(2)^2-1250*x)*ln(ln(2)^2-x)^2+(3125*ln(2)^2-3125*x)*ln(ln(2)^2-
x)+3125*ln(2)^2-3125*x),x,method=_RETURNVERBOSE)
```

output
```
256*x^8+x^8*(256*ln(ln(2)^2-x)^3+3936*ln(ln(2)^2-x)^2+20176*ln(ln(2)^2-x)+
34481)/(5+ln(ln(2)^2-x))^4
```

3.793.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 121 vs. 2(30) = 60.

Time = 0.25 (sec) , antiderivative size = 121, normalized size of antiderivative = 3.90

$$\int \frac{-7742196x^{8}+7779240x^{7}\log^{2}(2)+\left(-7461720x^{8}+7482888x^{7}\log^{2}(2)\right)\log\left(-x+\log^{2}(2)\right)+\left(-2874816\right.}{-3125x+3125\log^{2}(2)+\left(-3125x+3125\log^{2}(2)\right)\log\left(-x+\log^{2}(2)\right)+}$$
$$=\frac{256\,x^{8}\log\left(\log\left(2\right)^{2}-x\right)^{4}+5376\,x^{8}\log\left(\log\left(2\right)^{2}-x\right)^{3}+42336\,x^{8}\log\left(\log\left(2\right)^{2}-x\right)^{2}+148176\,x^{8}\log\left(\log\right.}{\log\left(\log\left(2\right)^{2}-x\right)^{4}+20\,\log\left(\log\left(2\right)^{2}-x\right)^{3}+150\,\log\left(\log\left(2\right)^{2}-x\right)^{2}+500\,\log\left(\log\left(2\right)^{2}-\right.}$$

3.793.
$$\int \frac{-7742196x^{8}+7779240x^{7}\log^{2}(2)+\left(-7461720x^{8}+7482888x^{7}\log^{2}(2)\right)\log\left(-x+\log^{2}(2)\right)+\left(-2874816x^{8}+2878848x^{7}\log^{2}(2)\right)\log^{2}\left(-x+\log^{2}(2)\right)+}{-3125x+3125\log^{2}(2)+\left(-3125x+3125\log^{2}(2)\right)\log\left(-x+\log^{2}(2)\right)+\left(-1250x+1250\log^{2}(2)\right)\log^{2}\left(-x+\log^{2}(2)\right)+}$$

input
```
integrate(((2048*x^7*log(2)^2-2048*x^8)*log(log(2)^2-x)^5+(53248*x^7*log(2
)^2-53248*x^8)*log(log(2)^2-x)^4+(553728*x^7*log(2)^2-553472*x^8)*log(log(
2)^2-x)^3+(2878848*x^7*log(2)^2-2874816*x^8)*log(log(2)^2-x)^2+(7482888*x^
7*log(2)^2-7461720*x^8)*log(log(2)^2-x)+7779240*x^7*log(2)^2-7742196*x^8)/
((log(2)^2-x)*log(log(2)^2-x)^5+(25*log(2)^2-25*x)*log(log(2)^2-x)^4+(250*
log(2)^2-250*x)*log(log(2)^2-x)^3+(1250*log(2)^2-1250*x)*log(log(2)^2-x)^2
+(3125*log(2)^2-3125*x)*log(log(2)^2-x)+3125*log(2)^2-3125*x),x, algorithm
=\
```

output
```
(256*x^8*log(log(2)^2 - x)^4 + 5376*x^8*log(log(2)^2 - x)^3 + 42336*x^8*lo
g(log(2)^2 - x)^2 + 148176*x^8*log(log(2)^2 - x) + 194481*x^8)/(log(log(2)
^2 - x)^4 + 20*log(log(2)^2 - x)^3 + 150*log(log(2)^2 - x)^2 + 500*log(log
(2)^2 - x) + 625)
```

3.793.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 99 vs. $2(20) = 40$.

Time = 0.12 (sec) , antiderivative size = 99, normalized size of antiderivative = 3.19

$$\int \frac{-7742196x^8 + 7779240x^7\log^2(2) + \left(-7461720x^8 + 7482888x^7\log^2(2)\right)\log\left(-x + \log^2(2)\right) + \left(-2874816\right.}{-3125x + 3125\log^2(2) + \left(-3125x + 3125\log^2(2)\right)\log\left(-x + \log^2(2)\right) +}$$
$$= 256x^8 + \frac{256x^8\log\left(-x + \log(2)^2\right)^3 + 3936x^8\log\left(-x + \log(2)^2\right)^2 + 20176x^8\log\left(-x + \log(2)^2\right) + 34481x^8}{\log\left(-x + \log(2)^2\right)^4 + 20\log\left(-x + \log(2)^2\right)^3 + 150\log\left(-x + \log(2)^2\right)^2 + 500\log\left(-x + \log(2)^2\right) + 6}$$

input
```
integrate(((2048*x**7*ln(2)**2-2048*x**8)*ln(ln(2)**2-x)**5+(53248*x**7*ln
(2)**2-53248*x**8)*ln(ln(2)**2-x)**4+(553728*x**7*ln(2)**2-553472*x**8)*ln
(ln(2)**2-x)**3+(2878848*x**7*ln(2)**2-2874816*x**8)*ln(ln(2)**2-x)**2+(74
82888*x**7*ln(2)**2-7461720*x**8)*ln(ln(2)**2-x)+7779240*x**7*ln(2)**2-774
2196*x**8)/((ln(2)**2-x)*ln(ln(2)**2-x)**5+(25*ln(2)**2-25*x)*ln(ln(2)**2-
x)**4+(250*ln(2)**2-250*x)*ln(ln(2)**2-x)**3+(1250*ln(2)**2-1250*x)*ln(ln(
2)**2-x)**2+(3125*ln(2)**2-3125*x)*ln(ln(2)**2-x)+3125*ln(2)**2-3125*x),x)
```

output
```
256*x**8 + (256*x**8*log(-x + log(2)**2)**3 + 3936*x**8*log(-x + log(2)**2
)**2 + 20176*x**8*log(-x + log(2)**2) + 34481*x**8)/(log(-x + log(2)**2)**
4 + 20*log(-x + log(2)**2)**3 + 150*log(-x + log(2)**2)**2 + 500*log(-x +
log(2)**2) + 625)
```

3.793.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 121 vs. 2(30) = 60.

Time = 0.33 (sec) , antiderivative size = 121, normalized size of antiderivative = 3.90

$$\int \frac{-7742196x^8 + 7779240x^7\log^2(2) + \left(-7461720x^8 + 7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right) + \left(-287481\right.}{-3125x + 3125\log^2(2) + \left(-3125x + 3125\log^2(2)\right)\log\left(-x+\log^2(2)\right) +}$$

$$= \frac{256\,x^8\log\left(\log(2)^2 - x\right)^4 + 5376\,x^8\log\left(\log(2)^2 - x\right)^3 + 42336\,x^8\log\left(\log(2)^2 - x\right)^2 + 148176\,x^8\log\left(\log\right.}{\log\left(\log(2)^2 - x\right)^4 + 20\log\left(\log(2)^2 - x\right)^3 + 150\log\left(\log(2)^2 - x\right)^2 + 500\log\left(\log(2)^2 - \right.}$$

input
```
integrate(((2048*x^7*log(2)^2-2048*x^8)*log(log(2)^2-x)^5+(53248*x^7*log(2
)^2-53248*x^8)*log(log(2)^2-x)^4+(553728*x^7*log(2)^2-553472*x^8)*log(log(
2)^2-x)^3+(2878848*x^7*log(2)^2-2874816*x^8)*log(log(2)^2-x)^2+(7482888*x^
7*log(2)^2-7461720*x^8)*log(log(2)^2-x)+7779240*x^7*log(2)^2-7742196*x^8)/
((log(2)^2-x)*log(log(2)^2-x)^5+(25*log(2)^2-25*x)*log(log(2)^2-x)^4+(250*
log(2)^2-250*x)*log(log(2)^2-x)^3+(1250*log(2)^2-1250*x)*log(log(2)^2-x)^2
+(3125*log(2)^2-3125*x)*log(log(2)^2-x)+3125*log(2)^2-3125*x),x, algorithm
=\
```

output
```
(256*x^8*log(log(2)^2 - x)^4 + 5376*x^8*log(log(2)^2 - x)^3 + 42336*x^8*lo
g(log(2)^2 - x)^2 + 148176*x^8*log(log(2)^2 - x) + 194481*x^8)/(log(log(2)
^2 - x)^4 + 20*log(log(2)^2 - x)^3 + 150*log(log(2)^2 - x)^2 + 500*log(log
(2)^2 - x) + 625)
```

3.793.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 968 vs. 2(30) = 60.

Time = 0.31 (sec) , antiderivative size = 968, normalized size of antiderivative = 31.23

$$\int \frac{-7742196x^8 + 7779240x^7\log^2(2) + \left(-7461720x^8 + 7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right) + \left(-287481\right.}{-3125x + 3125\log^2(2) + \left(-3125x + 3125\log^2(2)\right)\log\left(-x+\log^2(2)\right) +}$$

= Too large to display

input
```
integrate(((2048*x^7*log(2)^2-2048*x^8)*log(log(2)^2-x)^5+(53248*x^7*log(2
)^2-53248*x^8)*log(log(2)^2-x)^4+(553728*x^7*log(2)^2-553472*x^8)*log(log(
2)^2-x)^3+(2878848*x^7*log(2)^2-2874816*x^8)*log(log(2)^2-x)^2+(7482888*x^
7*log(2)^2-7461720*x^8)*log(log(2)^2-x)+7779240*x^7*log(2)^2-7742196*x^8)/
((log(2)^2-x)*log(log(2)^2-x)^5+(25*log(2)^2-25*x)*log(log(2)^2-x)^4+(250*
log(2)^2-250*x)*log(log(2)^2-x)^3+(1250*log(2)^2-1250*x)*log(log(2)^2-x)^2
+(3125*log(2)^2-3125*x)*log(log(2)^2-x)+3125*log(2)^2-3125*x),x, algorithm
=\
```

output
```
-2048*(log(2)^2 - x)*log(2)^14 + 7168*(log(2)^2 - x)^2*log(2)^12 - 14336*(
log(2)^2 - x)^3*log(2)^10 + 17920*(log(2)^2 - x)^4*log(2)^8 - 14336*(log(2
)^2 - x)^5*log(2)^6 + 7168*(log(2)^2 - x)^6*log(2)^4 - 2048*(log(2)^2 - x)
^7*log(2)^2 + 256*(log(2)^2 - x)^8 + (256*log(2)^16*log(log(2)^2 - x)^3 +
3936*log(2)^16*log(log(2)^2 - x)^2 - 2048*(log(2)^2 - x)*log(2)^14*log(log
(2)^2 - x)^3 + 20176*log(2)^16*log(log(2)^2 - x) - 31488*(log(2)^2 - x)*lo
g(2)^14*log(log(2)^2 - x)^2 + 7168*(log(2)^2 - x)^2*log(2)^12*log(log(2)^2
 - x)^3 + 34481*log(2)^16 - 161408*(log(2)^2 - x)*log(2)^14*log(log(2)^2 -
 x) + 110208*(log(2)^2 - x)^2*log(2)^12*log(log(2)^2 - x)^2 - 14336*(log(2
)^2 - x)^3*log(2)^10*log(log(2)^2 - x)^3 - 275848*(log(2)^2 - x)*log(2)^14
 + 564928*(log(2)^2 - x)^2*log(2)^12*log(log(2)^2 - x) - 220416*(log(2)^2
- x)^3*log(2)^10*log(log(2)^2 - x)^2 + 17920*(log(2)^2 - x)^4*log(2)^8*log
(log(2)^2 - x)^3 + 965468*(log(2)^2 - x)^2*log(2)^12 - 1129856*(log(2)^2 -
 x)^3*log(2)^10*log(log(2)^2 - x) + 275520*(log(2)^2 - x)^4*log(2)^8*log(l
og(2)^2 - x)^2 - 14336*(log(2)^2 - x)^5*log(2)^6*log(log(2)^2 - x)^3 - 193
0936*(log(2)^2 - x)^3*log(2)^10 + 1412320*(log(2)^2 - x)^4*log(2)^8*log(lo
g(2)^2 - x) - 220416*(log(2)^2 - x)^5*log(2)^6*log(log(2)^2 - x)^2 + 7168*
(log(2)^2 - x)^6*log(2)^4*log(log(2)^2 - x)^3 + 2413670*(log(2)^2 - x)^4*l
og(2)^8 - 1129856*(log(2)^2 - x)^5*log(2)^6*log(log(2)^2 - x) + 110208*(lo
g(2)^2 - x)^6*log(2)^4*log(log(2)^2 - x)^2 - 2048*(log(2)^2 - x)^7*log(...
```

3.793.9 Mupad [B] (verification not implemented)

Time = 16.68 (sec) , antiderivative size = 1087, normalized size of antiderivative = 35.06

$$\int \frac{-7742196x^8 + 7779240x^7\log^2(2) + \left(-7461720x^8 + 7482888x^7\log^2(2)\right)\log\left(-x + \log^2(2)\right) + \left(-287481\ldots\right.}{-3125x + 3125\log^2(2) + \left(-3125x + 3125\log^2(2)\right)\log\left(-x + \log^2(2)\right) + \ldots}$$

= Too large to display

3.793. $\int \frac{-7742196x^8+7779240x^7\log^2(2)+(-7461720x^8+7482888x^7\log^2(2))\log(-x+\log^2(2))+(-2874816x^8+2878848x^7\log^2(2))\log^2(-x+\log^2(2))+\ldots}{-3125x+3125\log^2(2)+(-3125x+3125\log^2(2))\log(-x+\log^2(2))+(-1250x+1250\log^2(2))\log^2(-x+\log^2(2))+\ldots}$

input
```
int(-(7779240*x^7*log(2)^2 + log(log(2)^2 - x)*(7482888*x^7*log(2)^2 - 746
1720*x^8) + log(log(2)^2 - x)^5*(2048*x^7*log(2)^2 - 2048*x^8) + log(log(2
)^2 - x)^4*(53248*x^7*log(2)^2 - 53248*x^8) + log(log(2)^2 - x)^3*(553728*
x^7*log(2)^2 - 553472*x^8) + log(log(2)^2 - x)^2*(2878848*x^7*log(2)^2 - 2
874816*x^8) - 7742196*x^8)/(3125*x + log(log(2)^2 - x)*(3125*x - 3125*log(
2)^2) + log(log(2)^2 - x)^5*(x - log(2)^2) + log(log(2)^2 - x)^4*(25*x - 2
5*log(2)^2) + log(log(2)^2 - x)^3*(250*x - 250*log(2)^2) + log(log(2)^2 -
x)^2*(1250*x - 1250*log(2)^2) - 3125*log(2)^2),x)
```

output
```
(83397377*x^6*log(2)^4)/3 - (72798895*x^7*log(2)^2)/3 - 13680940*x^5*log(2
)^6 + 2413670*x^4*log(2)^8 - ((256*log(log(2)^2 - x)^4*(x - log(2)^2)*(42*
x^5*log(2)^4 - 105*x^6*log(2)^2 + 64*x^7))/3 - (x^5*log(log(2)^2 - x)*(249
65017*x^2*log(2)^2 - 20865859*x*log(2)^4 + 5685162*log(2)^6 - 9784128*x^3)
)/3 - (x^5*(32678991*x^2*log(2)^2 - 26979281*x*log(2)^4 + 7241010*log(2)^6
 - 12939712*x^3))/3 + (32*log(log(2)^2 - x)^3*(x - log(2)^2)*(6846*x^5*log
(2)^4 - 17507*x^6*log(2)^2 + 10880*x^7))/3 + (112*log(log(2)^2 - x)^2*(x -
 log(2)^2)*(14946*x^5*log(2)^4 - 39069*x^6*log(2)^2 + 24736*x^7))/3)/(10*l
og(log(2)^2 - x) + log(log(2)^2 - x)^2 + 25) + log(log(2)^2 - x)*((4635668
8*x^6*log(2)^4)/3 - 13219344*x^7*log(2)^2 - 7784896*x^5*log(2)^6 + 1412320
*x^4*log(2)^8 + (12419072*x^8)/3) + ((log(log(2)^2 - x)*(x - log(2)^2)*(18
3506575*x^6*log(2)^2 - 128543058*x^5*log(2)^4 + 28425810*x^4*log(2)^6 - 83
813888*x^7))/3 - (2*x^4*(205747241*x^2*log(2)^4 - 178617825*x^3*log(2)^2 -
 101882949*x*log(2)^6 + 18102525*log(2)^8 + 56650912*x^4))/3 + (256*log(lo
g(2)^2 - x)^4*(x - log(2)^2)*(1183*x^6*log(2)^2 - 882*x^5*log(2)^4 + 210*x
^4*log(2)^6 - 512*x^7))/3 + (32*log(log(2)^2 - x)^3*(x - log(2)^2)*(202069
*x^6*log(2)^2 - 147462*x^5*log(2)^4 + 34230*x^4*log(2)^6 - 89088*x^7))/3 +
 (16*log(log(2)^2 - x)^2*(x - log(2)^2)*(3231487*x^6*log(2)^2 - 2309706*x^
5*log(2)^4 + 523110*x^4*log(2)^6 - 1450496*x^7))/3)/(log(log(2)^2 - x) + 5
) + log(log(2)^2 - x)^3*((528640*x^6*log(2)^4)/3 - 144640*x^7*log(2)^2 ...
```

3.793.

$$\int \frac{-7742196x^8+7779240x^7\log^2(2)+\left(-7461720x^8+7482888x^7\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-2874816x^8+2878848x^7\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+(}{-3125x+3125\log^2(2)+\left(-3125x+3125\log^2(2)\right)\log\left(-x+\log^2(2)\right)+\left(-1250x+1250\log^2(2)\right)\log^2\left(-x+\log^2(2)\right)+}$$

3.794 $\int \frac{2304+5632x+512x^2+3x^4+22x^5+6x^6+e^9(-768-x^4)}{x^4}\,dx$

3.794.1 Optimal result

Integrand size = 40, antiderivative size = 26

$$\int \frac{2304+5632x+512x^2+3x^4+22x^5+6x^6+e^9(-768-x^4)}{x^4}\,dx = \left(\frac{256}{x^3}-x\right)\left(-3+e^9-x-x(10+2x)\right)$$

output
```
(exp(9)-x*(2*x+10)-3-x)*(256/x^3-x)
```

3.794.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{2304+5632x+512x^2+3x^4+22x^5+6x^6+e^9(-768-x^4)}{x^4}\,dx = \frac{(3-e^9+11x+2x^2)(-256+x^4)}{x^3}$$

input
```
Integrate[(2304 + 5632*x + 512*x^2 + 3*x^4 + 22*x^5 + 6*x^6 + E^9*(-768 -
x^4))/x^4,x]
```

output
```
((3 - E^9 + 11*x + 2*x^2)*(-256 + x^4))/x^3
```

3.794.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.62, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.050, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^6+22x^5+3x^4+e^9\left(-x^4-768\right)+512x^2+5632x+2304}{x^4}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-\frac{768\left(e^9-3\right)}{x^4}+\frac{5632}{x^3}+6x^2+\frac{512}{x^2}+22x+3\left(1-\frac{e^9}{3}\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2x^3-\frac{256\left(3-e^9\right)}{x^3}+11x^2-\frac{2816}{x^2}+\left(3-e^9\right)x-\frac{512}{x}$$

input
```
Int[(2304 + 5632*x + 512*x^2 + 3*x^4 + 22*x^5 + 6*x^6 + E^9*(-768 - x^4))/
x^4,x]
```

output
```
(-256*(3 - E^9))/x^3 - 2816/x^2 - 512/x + (3 - E^9)*x + 11*x^2 + 2*x^3
```

3.794.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.794.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.46

method	result	size
risch	$2x^3 - x\,e^9 + 11x^2 + 3x + \frac{-512x^2+256\,e^9-2816x-768}{x^3}$	38
norman	$\frac{(-e^9+3)x^4-2816x-512x^2+11x^5+2x^6+256\,e^9-768}{x^3}$	39
gosper	$-\frac{-2x^6+x^4e^9-11x^5-3x^4+512x^2-256\,e^9+2816x+768}{x^3}$	41
default	$2x^3 + 11x^2 - x\,e^9 + 3x - \frac{512}{x} - \frac{2816}{x^2} - \frac{-768\,e^9+2304}{3x^3}$	41
parallelrisch	$-\frac{-2x^6+x^4e^9-11x^5-3x^4+512x^2-256\,e^9+2816x+768}{x^3}$	41

input
```
int(((-x^4-768)*exp(9)+6*x^6+22*x^5+3*x^4+512*x^2+5632*x+2304)/x^4,x,metho
d=_RETURNVERBOSE)
```

output
```
2*x^3-x*exp(9)+11*x^2+3*x+(-512*x^2+256*exp(9)-2816*x-768)/x^3
```

3.794.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.46

$$\int \frac{2304+5632x+512x^2+3x^4+22x^5+6x^6+e^9(-768-x^4)}{x^4}\,dx = \frac{2\,x^6+11\,x^5+3\,x^4-512\,x^2-(x^4-256)e^9-2816\,x-768}{x^3}$$

input
```
integrate(((-x^4-768)*exp(9)+6*x^6+22*x^5+3*x^4+512*x^2+5632*x+2304)/x^4,x
, algorithm=\
```

output
```
(2*x^6 + 11*x^5 + 3*x^4 - 512*x^2 - (x^4 - 256)*e^9 - 2816*x - 768)/x^3
```

3.794.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int \frac{2304 + 5632x + 512x^2 + 3x^4 + 22x^5 + 6x^6 + e^9(-768 - x^4)}{x^4} \, dx$$
$$= 2x^3 + 11x^2 + x(3 - e^9) + \frac{-512x^2 - 2816x - 768 + 256e^9}{x^3}$$

input
```
integrate(((-x**4-768)*exp(9)+6*x**6+22*x**5+3*x**4+512*x**2+5632*x+2304)/
x**4,x)
```

output
```
2*x**3 + 11*x**2 + x*(3 - exp(9)) + (-512*x**2 - 2816*x - 768 + 256*exp(9)
)/x**3
```

3.794.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\int \frac{2304 + 5632x + 512x^2 + 3x^4 + 22x^5 + 6x^6 + e^9(-768 - x^4)}{x^4} \, dx$$
$$= 2x^3 + 11x^2 - x(e^9 - 3) - \frac{256(2x^2 + 11x - e^9 + 3)}{x^3}$$

input
```
integrate(((-x^4-768)*exp(9)+6*x^6+22*x^5+3*x^4+512*x^2+5632*x+2304)/x^4,x
, algorithm=\
```

output
```
2*x^3 + 11*x^2 - x*(e^9 - 3) - 256*(2*x^2 + 11*x - e^9 + 3)/x^3
```

3.794.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.46

$$\int \frac{2304 + 5632x + 512x^2 + 3x^4 + 22x^5 + 6x^6 + e^9(-768 - x^4)}{x^4} \, dx$$
$$= 2x^3 + 11x^2 - xe^9 + 3x - \frac{256(2x^2 + 11x - e^9 + 3)}{x^3}$$

input
```
integrate((((-x^4-768)*exp(9)+6*x^6+22*x^5+3*x^4+512*x^2+5632*x+2304)/x^4,x
, algorithm=\
```

output
```
2*x^3 + 11*x^2 - x*e^9 + 3*x - 256*(2*x^2 + 11*x - e^9 + 3)/x^3
```

3.794.9 Mupad [B] (verification not implemented)

Time = 16.67 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\int \frac{2304 + 5632x + 512x^2 + 3x^4 + 22x^5 + 6x^6 + e^9(-768 - x^4)}{x^4} dx$$
$$= 11\,x^2 - x\,\left(\mathrm{e}^9 - 3\right) - \frac{512\,x^2 + 2816\,x - 256\,\mathrm{e}^9 + 768}{x^3} + 2\,x^3$$

input
```
int((5632*x + 512*x^2 + 3*x^4 + 22*x^5 + 6*x^6 - exp(9)*(x^4 + 768) + 2304
)/x^4,x)
```

output
```
11*x^2 - x*(exp(9) - 3) - (2816*x - 256*exp(9) + 512*x^2 + 768)/x^3 + 2*x^
3
```

3.795 $\int \frac{-2\log(-2x^3\log(3))+\log(x^2)(3e^x-e^x x\log(-2x^3\log(3)))+3\log(x^2)\log(\log(x^2))}{e^x x\log(x^2)\log(-2x^3\log(3))+x\log(x^2)\log(-2x^3\log(3))\log(\log(x^2))}\,dx$

3.795.1 Optimal result

Integrand size = 87, antiderivative size = 21

$$\int \frac{-2\log\left(-2x^3\log(3)\right)+\log\left(x^2\right)\left(3e^x-e^x x\log\left(-2x^3\log(3)\right)\right)+3\log\left(x^2\right)\log\left(\log\left(x^2\right)\right)}{e^x x\log\left(x^2\right)\log\left(-2x^3\log(3)\right)+x\log\left(x^2\right)\log\left(-2x^3\log(3)\right)\log\left(\log\left(x^2\right)\right)}\,dx = \log\left(\frac{\log\left(-2x^3\log(3)\right)}{e^x+\log\left(\log\left(x^2\right)\right)}\right)$$

output
```
ln(ln(-2*x^3*ln(3))/(ln(ln(x^2))+exp(x)))
```

3.795.2 Mathematica [A] (verified)

Time = 0.72 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.90

$$\int \frac{-2\log\left(-2x^3\log(3)\right)+\log\left(x^2\right)\left(3e^x-e^x x\log\left(-2x^3\log(3)\right)\right)+3\log\left(x^2\right)\log\left(\log\left(x^2\right)\right)}{e^x x\log\left(x^2\right)\log\left(-2x^3\log(3)\right)+x\log\left(x^2\right)\log\left(-2x^3\log(3)\right)\log\left(\log\left(x^2\right)\right)}\,dx = \log\left(3\log\left(x^2\right)+2\left(-\frac{3}{2}\log\left(x^2\right)+\log\left(-x^3\log(9)\right)\right)\right)-\log\left(e^x+\log\left(\log\left(x^2\right)\right)\right)$$

input
```
Integrate[(-2*Log[-2*x^3*Log[3]] + Log[x^2]*(3*E^x - E^x*x*Log[-2*x^3*Log[
3]]) + 3*Log[x^2]*Log[Log[x^2]])/(E^x*x*Log[x^2]*Log[-2*x^3*Log[3]] + x*Lo
g[x^2]*Log[-2*x^3*Log[3]]*Log[Log[x^2]]),x]
```

output
```
Log[3*Log[x^2] + 2*((-3*Log[x^2])/2 + Log[-(x^3*Log[9])])] - Log[E^x + Log
[Log[x^2]]]
```

3.795.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2\log(-2x^3\log(3))+3\log(x^2)\log(\log(x^2))+\log(x^2)(3e^x-e^x x\log(-2x^3\log(3)))}{e^x x\log(x^2)\log(-2x^3\log(3))+x\log(x^2)\log(\log(x^2))\log(-2x^3\log(3))}\,dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-2\log(-2x^3\log(3))+3\log(x^2)\log(\log(x^2))+\log(x^2)(3e^x-e^x x\log(-2x^3\log(3)))}{x\log(x^2)\log(-x^3\log(9))(\log(\log(x^2))+e^x)}\,dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{3-x\log(-x^3\log(9))}{x\log(-x^3\log(9))}+\frac{x\log(x^2)\log(\log(x^2))-2}{x\log(x^2)(\log(\log(x^2))+e^x)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-2\int \frac{1}{x\log(x^2)(\log(\log(x^2))+e^x)}dx+\int \frac{\log(\log(x^2))}{\log(\log(x^2))+e^x}dx+\log(\log(-x^3\log(9)))-x$$

input
```
Int[(-2*Log[-2*x^3*Log[3]] + Log[x^2]*(3*E^x - E^x*x*Log[-2*x^3*Log[3]]) +
 3*Log[x^2]*Log[Log[x^2]])/(E^x*x*Log[x^2]*Log[-2*x^3*Log[3]] + x*Log[x^2]
*Log[-2*x^3*Log[3]]*Log[Log[x^2]]),x]
```

output
```
$Aborted
```

3.795.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.795.4 Maple [A] (verified)

Time = 3.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

method	result
parallelrisch	$\ln(\ln(-2x^3\ln(3))) - \ln(\ln(\ln(x^2)) + e^x)$
risch	$\ln\left(\frac{\ln(2)}{3} + \frac{\ln(\ln(3))}{3} + \frac{i\pi}{3} + \ln(x) - \frac{i\pi\,\mathrm{csgn}(ix)^2\,\mathrm{csgn}(ix^2)}{6} + \frac{i\pi\,\mathrm{csgn}(ix)\,\mathrm{csgn}(ix^2)^2}{3} - \frac{i\pi\,\mathrm{csgn}(ix^2)^3}{6} + \frac{i\pi\,\mathrm{csg}}{}\right.$

input
```
int((3*ln(x^2)*ln(ln(x^2))+(-x*exp(x)*ln(-2*x^3*ln(3))+3*exp(x))*ln(x^2)-2
*ln(-2*x^3*ln(3)))/(x*ln(-2*x^3*ln(3))*ln(x^2)*ln(ln(x^2))+x*exp(x)*ln(-2*
x^3*ln(3))*ln(x^2)),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(-2*x^3*ln(3)))-ln(ln(ln(x^2))+exp(x))
```

3.795.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.76

$$\int \frac{-2\log(-2x^3\log(3)) + \log(x^2)(3e^x - e^x x\log(-2x^3\log(3))) + 3\log(x^2)\log(\log(x^2))}{e^x x\log(x^2)\log(-2x^3\log(3)) + x\log(x^2)\log(-2x^3\log(3))\log(\log(x^2))}\,dx$$
$$= -\log\left(e^x + \log\left(\frac{2}{3}\log\left(-2x^3\log(3)\right) - \frac{1}{3}\log\left(4\log(3)^2\right)\right)\right) + \log\left(\log\left(-2x^3\log(3)\right)\right)$$

input
```
integrate((3*log(x^2)*log(log(x^2))+(-x*exp(x)*log(-2*x^3*log(3))+3*exp(x)
)*log(x^2)-2*log(-2*x^3*log(3)))/(x*log(-2*x^3*log(3))*log(x^2)*log(log(x^
2))+x*exp(x)*log(-2*x^3*log(3))*log(x^2)),x, algorithm=\
```

output
```
-log(e^x + log(2/3*log(-2*x^3*log(3)) - 1/3*log(4*log(3)^2))) + log(log(-2
*x^3*log(3)))
```

3.795.6 Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.37 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.86

$$\int \frac{-2\log(-2x^3\log(3)) + \log(x^2)(3e^x - e^x x\log(-2x^3\log(3))) + 3\log(x^2)\log(\log(x^2))}{e^x x\log(x^2)\log(-2x^3\log(3)) + x\log(x^2)\log(-2x^3\log(3))\log(\log(x^2))}\,dx$$
$$= -\log\left(e^x + \log\left(\log\left(x^2\right)\right)\right) + \log\left(\log\left(x^2\right) + \frac{2\log(\log(3))}{3} + \frac{2\log(2)}{3} + \frac{2i\pi}{3}\right)$$

input
```
integrate((3*ln(x**2)*ln(ln(x**2))+(-x*exp(x)*ln(-2*x**3*ln(3))+3*exp(x))*
ln(x**2)-2*ln(-2*x**3*ln(3)))/(x*ln(-2*x**3*ln(3))*ln(x**2)*ln(ln(x**2))+x
*exp(x)*ln(-2*x**3*ln(3))*ln(x**2)),x)
```

output
```
-log(exp(x) + log(log(x**2))) + log(log(x**2) + 2*log(log(3))/3 + 2*log(2)
/3 + 2*I*pi/3)
```

3.795.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \frac{-2\log(-2x^3\log(3)) + \log(x^2)(3e^x - e^x x\log(-2x^3\log(3))) + 3\log(x^2)\log(\log(x^2))}{e^x x\log(x^2)\log(-2x^3\log(3)) + x\log(x^2)\log(-2x^3\log(3))\log(\log(x^2))}\,dx$$
$$= -\log(e^x + \log(2) + \log(\log(x))) + \log\left(\frac{1}{3}\log(2) + \log(-x) + \frac{1}{3}\log(\log(3))\right)$$

input
```
integrate((3*log(x^2)*log(log(x^2))+(-x*exp(x)*log(-2*x^3*log(3))+3*exp(x)
)*log(x^2)-2*log(-2*x^3*log(3)))/(x*log(-2*x^3*log(3))*log(x^2)*log(log(x^
2))+x*exp(x)*log(-2*x^3*log(3))*log(x^2)),x, algorithm=\
```

output
```
-log(e^x + log(2) + log(log(x))) + log(1/3*log(2) + log(-x) + 1/3*log(log(
3)))
```

3.795.8 Giac [F]

$$\int \frac{-2\log(-2x^3\log(3)) + \log(x^2)(3e^x - e^x x\log(-2x^3\log(3))) + 3\log(x^2)\log(\log(x^2))}{e^x x\log(x^2)\log(-2x^3\log(3)) + x\log(x^2)\log(-2x^3\log(3))\log(\log(x^2))}\,dx$$
$$= \int -\frac{(xe^x\log(-2x^3\log(3)) - 3e^x)\log(x^2) - 3\log(x^2)\log(\log(x^2)) + 2\log(-2x^3\log(3))}{xe^x\log(-2x^3\log(3))\log(x^2) + x\log(-2x^3\log(3))\log(x^2)\log(\log(x^2))}\,dx$$

input
```
integrate((3*log(x^2)*log(log(x^2))+(-x*exp(x)*log(-2*x^3*log(3))+3*exp(x)
)*log(x^2)-2*log(-2*x^3*log(3)))/(x*log(-2*x^3*log(3))*log(x^2)*log(log(x^
2))+x*exp(x)*log(-2*x^3*log(3))*log(x^2)),x, algorithm=\
```

output
```
integrate(-((x*e^x*log(-2*x^3*log(3)) - 3*e^x)*log(x^2) - 3*log(x^2)*log(l
og(x^2)) + 2*log(-2*x^3*log(3)))/(x*e^x*log(-2*x^3*log(3))*log(x^2) + x*lo
g(-2*x^3*log(3))*log(x^2)*log(log(x^2))), x)
```

3.795.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-2\log(-2x^3\log(3)) + \log(x^2)(3e^x - e^x x\log(-2x^3\log(3))) + 3\log(x^2)\log(\log(x^2))}{e^x x\log(x^2)\log(-2x^3\log(3)) + x\log(x^2)\log(-2x^3\log(3))\log(\log(x^2))}\,dx$$
$$= \int \frac{\ln(x^2)\,(3\,e^x - x\,\ln(-2\,x^3\,\ln(3))\,e^x) - 2\,\ln(-2\,x^3\,\ln(3)) + 3\,\ln(x^2)\,\ln(\ln(x^2))}{x\,\ln(-2\,x^3\,\ln(3))\,\ln(x^2)\,e^x + x\,\ln(-2\,x^3\,\ln(3))\,\ln(x^2)\,\ln(\ln(x^2))}\,dx$$

input
```
int((log(x^2)*(3*exp(x) - x*log(-2*x^3*log(3))*exp(x)) - 2*log(-2*x^3*log(
3)) + 3*log(x^2)*log(log(x^2)))/(x*log(-2*x^3*log(3))*log(x^2)*exp(x) + x*
log(-2*x^3*log(3))*log(x^2)*log(log(x^2))),x)
```

output
```
int((log(x^2)*(3*exp(x) - x*log(-2*x^3*log(3))*exp(x)) - 2*log(-2*x^3*log(
3)) + 3*log(x^2)*log(log(x^2)))/(x*log(-2*x^3*log(3))*log(x^2)*exp(x) + x*
log(-2*x^3*log(3))*log(x^2)*log(log(x^2))), x)
```

3.796 $\int \frac{e^6(4+2x)+e^{\frac{2e^5x}{3}}(18x+6e^5x^2)+e^{\frac{e^5x}{3}}(e^3(12+12x)+e^8(4x+2x^2))}{e^6}\,dx$

3.796.1 Optimal result

Integrand size = 71, antiderivative size = 20

$$\int \frac{e^6(4+2x)+e^{\frac{2e^5x}{3}}(18x+6e^5x^2)+e^{\frac{e^5x}{3}}(e^3(12+12x)+e^8(4x+2x^2))}{e^6}\,dx = \left(2+x+3e^{-3+\frac{e^5x}{3}}x\right)^2$$

output
```
(2+3*x*exp(1/3*x*exp(5))/exp(3)+x)^2
```

3.796.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 60 vs. 2(20) = 40.

Time = 0.27 (sec) , antiderivative size = 60, normalized size of antiderivative = 3.00

$$\int \frac{e^6(4+2x)+e^{\frac{2e^5x}{3}}(18x+6e^5x^2)+e^{\frac{e^5x}{3}}(e^3(12+12x)+e^8(4x+2x^2))}{e^6}\,dx = 2\left(2x+\frac{x^2}{2}+\frac{9}{2}e^{-6+\frac{2e^5x}{3}}x^2+3e^{-8+\frac{e^5x}{3}}\left(2e^5x+e^5x^2\right)\right)$$

input
```
Integrate[(E^6*(4 + 2*x) + E^((2*E^5*x)/3)*(18*x + 6*E^5*x^2) + E^((E^5*x)
/3)*(E^3*(12 + 12*x) + E^8*(4*x + 2*x^2)))/E^6,x]
```

output
```
2*(2*x + x^2/2 + (9*E^(-6 + (2*E^5*x)/3)*x^2)/2 + 3*E^(-8 + (E^5*x)/3)*(2*
E^5*x + E^5*x^2))
```

3.796.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 107 vs. $2(20) = 40$.

Time = 0.36 (sec) , antiderivative size = 107, normalized size of antiderivative = 5.35, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{2e^5x}{3}}(6e^5x^2+18x)+e^{\frac{e^5x}{3}}\left(e^8(2x^2+4x)+e^3(12x+12)\right)+e^6(2x+4)}{e^6}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \left(2e^6(x+2)+6e^{\frac{2e^5x}{3}}(e^5x^2+3x)+2e^{\frac{e^5x}{3}}\left(6e^3(x+1)+e^8(x^2+2x)\right)\right)dx}{e^6}$$

$$\Big\downarrow \text{2009}$$

$$\frac{9e^{\frac{2e^5x}{3}}x^2+6e^{\frac{e^5x}{3}+3}x^2-36e^{\frac{e^5x}{3}-2}x+12e^{\frac{e^5x}{3}+3}x-36e^{\frac{e^5x}{3}-2}+e^6(x+2)^2+36e^{\frac{e^5x}{3}-2}(x+1)}{e^6}$$

input
```
Int[(E^6*(4 + 2*x) + E^((2*E^5*x)/3)*(18*x + 6*E^5*x^2) + E^((E^5*x)/3)*(E
^3*(12 + 12*x) + E^8*(4*x + 2*x^2)))/E^6,x]
```

output
```
(-36*E^(-2 + (E^5*x)/3) - 36*E^(-2 + (E^5*x)/3)*x + 12*E^(3 + (E^5*x)/3)*x
 + 9*E^((2*E^5*x)/3)*x^2 + 6*E^(3 + (E^5*x)/3)*x^2 + 36*E^(-2 + (E^5*x)/3)
*(1 + x) + E^6*(2 + x)^2)/E^6
```

3.796.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.796.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. $2(18) = 36$.

Time = 0.45 (sec) , antiderivative size = 43, normalized size of antiderivative = 2.15

method	result
risch	$x^2+4x+9x^2\mathrm{e}^{-6+\frac{2x\,\mathrm{e}^5}{3}}+\left(6x^2\mathrm{e}^3+12x\,\mathrm{e}^3\right)\mathrm{e}^{-6+\frac{x\,\mathrm{e}^5}{3}}$
norman	$\left(x^2\mathrm{e}^3+4x\,\mathrm{e}^3+12x\,\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}+6x^2\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}+9x^2\mathrm{e}^{-3}\mathrm{e}^{\frac{2x\,\mathrm{e}^5}{3}}\right)\mathrm{e}^{-3}$
parallelrisch	$\mathrm{e}^{-6}\left(4x\,\mathrm{e}^6+x^2\mathrm{e}^6+12\,\mathrm{e}^3\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}x+6\,\mathrm{e}^3x^2\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}+9\,\mathrm{e}^{\frac{2x\,\mathrm{e}^5}{3}}x^2\right)$
parts	$x^2+4x+18\,\mathrm{e}^{-3}\mathrm{e}^{-5}\left(\frac{2x\,\mathrm{e}^5\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}}{3}+6\,\mathrm{e}^{-5}\left(\frac{x\,\mathrm{e}^5\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}}{3}-\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}\right)+3\,\mathrm{e}^{-5}\left(\frac{x^2\mathrm{e}^{10}\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}}{9}-\frac{2x\,\mathrm{e}^5\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}}{3}+\right.\right.$
default	$\mathrm{e}^{-6}\left(2\,\mathrm{e}^6\left(\frac{1}{2}x^2+2x\right)+162\,\mathrm{e}^{-5}\left(\mathrm{e}^{-5}\left(\frac{\mathrm{e}^5\mathrm{e}^{\frac{2x\,\mathrm{e}^5}{3}}x}{6}-\frac{\mathrm{e}^{\frac{2x\,\mathrm{e}^5}{3}}}{4}\right)+\mathrm{e}^{-5}\left(\frac{\mathrm{e}^{10}\mathrm{e}^{\frac{2x\,\mathrm{e}^5}{3}}x^2}{18}-\frac{\mathrm{e}^5\mathrm{e}^{\frac{2x\,\mathrm{e}^5}{3}}x}{6}+\mathrm{e}\right.\right.\right.$
derivativedivides	$3\,\mathrm{e}^{-6}\mathrm{e}^{-5}\left(2\,\mathrm{e}^6\mathrm{e}^{-5}\left(\frac{2x\,\mathrm{e}^{10}}{3}+\frac{x^2\mathrm{e}^{10}}{6}\right)+54\,\mathrm{e}^{-5}\left(\frac{\mathrm{e}^5\mathrm{e}^{\frac{2x\,\mathrm{e}^5}{3}}x}{6}-\frac{\mathrm{e}^{\frac{2x\,\mathrm{e}^5}{3}}}{4}\right)+54\,\mathrm{e}^{-5}\left(\frac{\mathrm{e}^{10}\mathrm{e}^{\frac{2x\,\mathrm{e}^5}{3}}x^2}{18}-\mathrm{e}^5\mathrm{e}\right.\right.$

input
```
int(((6*x^2*exp(5)+18*x)*exp(1/3*x*exp(5))^2+((2*x^2+4*x)*exp(3)*exp(5)+(1
2*x+12)*exp(3))*exp(1/3*x*exp(5))+(4+2*x)*exp(3)^2)/exp(3)^2,x,method=_RET
URNVERBOSE)
```

output
```
x^2+4*x+9*x^2*exp(-6+2/3*x*exp(5))+(6*x^2*exp(3)+12*x*exp(3))*exp(-6+1/3*x
*exp(5))
```

3.796. $\int \frac{e^6(4+2x)+e^{\frac{2e^5x}{3}}\left(18x+6e^5x^2\right)+e^{\frac{e^5x}{3}}\left(e^3(12+12x)+e^8\left(4x+2x^2\right)\right)}{e^6}\,dx$

3.796.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. 2(16) = 32.

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.10

$$\int \frac{e^6(4+2x)+e^{\frac{2e^5x}{3}}(18x+6e^5x^2)+e^{\frac{e^5x}{3}}(e^3(12+12x)+e^8(4x+2x^2))}{e^6}\,dx$$
$$= \left(9\,x^2e^{\left(\frac{2}{3}\,xe^5\right)}+\left(x^2+4\,x\right)e^6+6\left(x^2+2\,x\right)e^{\left(\frac{1}{3}\,xe^5+3\right)}\right)e^{(-6)}$$

input
```
integrate(((6*x^2*exp(5)+18*x)*exp(1/3*x*exp(5))^2+((2*x^2+4*x)*exp(3)*exp
(5)+(12*x+12)*exp(3))*exp(1/3*x*exp(5))+(4+2*x)*exp(3)^2)/exp(3)^2,x, algo
rithm=\
```

output
```
(9*x^2*e^(2/3*x*e^5) + (x^2 + 4*x)*e^6 + 6*(x^2 + 2*x)*e^(1/3*x*e^5 + 3))*
e^(-6)
```

3.796.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. 2(19) = 38.

Time = 0.15 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.55

$$\int \frac{e^6(4+2x)+e^{\frac{2e^5x}{3}}(18x+6e^5x^2)+e^{\frac{e^5x}{3}}(e^3(12+12x)+e^8(4x+2x^2))}{e^6}\,dx$$
$$= x^2+4x+\frac{9x^2e^3e^{\frac{2xe^5}{3}}+(6x^2e^6+12xe^6)\,e^{\frac{xe^5}{3}}}{e^9}$$

input
```
integrate(((6*x**2*exp(5)+18*x)*exp(1/3*x*exp(5))**2+((2*x**2+4*x)*exp(3)*
exp(5)+(12*x+12)*exp(3))*exp(1/3*x*exp(5))+(4+2*x)*exp(3)**2)/exp(3)**2,x)
```

output
```
x**2 + 4*x + (9*x**2*exp(3)*exp(2*x*exp(5)/3) + (6*x**2*exp(6) + 12*x*exp(
6))*exp(x*exp(5)/3))*exp(-9)
```

3.796.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(16) = 32$.

Time = 0.20 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.25

$$\int \frac{e^6(4+2x)+e^{\frac{2e^5x}{3}}(18x+6e^5x^2)+e^{\frac{e^5x}{3}}(e^3(12+12x)+e^8(4x+2x^2))}{e^6}\,dx$$
$$= \left(9\,x^2e^{\left(\frac{2}{3}\,xe^5\right)} + \left(x^2+4\,x\right)e^6 + 6\,\left(x^2e^3+2\,xe^3\right)e^{\left(\frac{1}{3}\,xe^5\right)}\right)e^{(-6)}$$

input
```
integrate(((6*x^2*exp(5)+18*x)*exp(1/3*x*exp(5))^2+((2*x^2+4*x)*exp(3)*exp
(5)+(12*x+12)*exp(3))*exp(1/3*x*exp(5))+(4+2*x)*exp(3)^2)/exp(3)^2,x, algo
rithm=\
```

output
```
(9*x^2*e^(2/3*x*e^5) + (x^2 + 4*x)*e^6 + 6*(x^2*e^3 + 2*x*e^3)*e^(1/3*x*e^
5))*e^(-6)
```

3.796.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 107 vs. $2(16) = 32$.

Time = 0.27 (sec) , antiderivative size = 107, normalized size of antiderivative = 5.35

$$\int \frac{e^6(4+2x)+e^{\frac{2e^5x}{3}}(18x+6e^5x^2)+e^{\frac{e^5x}{3}}(e^3(12+12x)+e^8(4x+2x^2))}{e^6}\,dx$$
$$= \frac{1}{2}\left(2\,\left(x^2+4\,x\right)e^6 + 9\,\left(2\,x^2e^{10}-6\,xe^5+9\right)e^{\left(\frac{2}{3}\,xe^5-10\right)} + 27\,\left(2\,xe^5-3\right)e^{\left(\frac{2}{3}\,xe^5-10\right)} + 12\,\left(x^2e^{10}+2\,xe^{10}-6\right.\right.$$

input
```
integrate(((6*x^2*exp(5)+18*x)*exp(1/3*x*exp(5))^2+((2*x^2+4*x)*exp(3)*exp
(5)+(12*x+12)*exp(3))*exp(1/3*x*exp(5))+(4+2*x)*exp(3)^2)/exp(3)^2,x, algo
rithm=\
```

output
```
1/2*(2*(x^2 + 4*x)*e^6 + 9*(2*x^2*e^10 - 6*x*e^5 + 9)*e^(2/3*x*e^5 - 10) +
 27*(2*x*e^5 - 3)*e^(2/3*x*e^5 - 10) + 12*(x^2*e^10 + 2*x*e^10 - 6*x*e^5 -
 6*e^5 + 18)*e^(1/3*x*e^5 - 7) + 72*(x*e^5 + e^5 - 3)*e^(1/3*x*e^5 - 7))*e
^(-6)
```

3.796.9 Mupad [B] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.65

$$\int \frac{e^6(4+2x)+e^{\frac{2e^5x}{3}}(18x+6e^5x^2)+e^{\frac{e^5x}{3}}(e^3(12+12x)+e^8(4x+2x^2))}{e^6}\,dx$$
$$= x\,\mathrm{e}^{-6}\left(\mathrm{e}^3+3\,\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}\right)\left(4\,\mathrm{e}^3+x\,\mathrm{e}^3+3\,x\,\mathrm{e}^{\frac{x\,\mathrm{e}^5}{3}}\right)$$

input
```
int(exp(-6)*(exp((x*exp(5))/3)*(exp(8)*(4*x + 2*x^2) + exp(3)*(12*x + 12))
 + exp((2*x*exp(5))/3)*(18*x + 6*x^2*exp(5)) + exp(6)*(2*x + 4)),x)
```

output
```
x*exp(-6)*(exp(3) + 3*exp((x*exp(5))/3))*(4*exp(3) + x*exp(3) + 3*x*exp((x
*exp(5))/3))
```

3.797 $\int \frac{16-2e^{\frac{2x}{-4+2x}}-16x+4x^2+16x^3-16x^4+4x^5}{4-4x+x^2}\,dx$

3.797.1 Optimal result

Integrand size = 50, antiderivative size = 19

$$\int \frac{16-2e^{\frac{2x}{-4+2x}}-16x+4x^2+16x^3-16x^4+4x^5}{4-4x+x^2}\,dx = e^{\frac{2x}{-4+2x}}+4x+x^4$$

output
```
4*x+x^4+exp(x/(2*x-4))^2
```

3.797.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{16-2e^{\frac{2x}{-4+2x}}-16x+4x^2+16x^3-16x^4+4x^5}{4-4x+x^2}\,dx = e^{\frac{x}{-2+x}}+4x+x^4$$

input
```
Integrate[(16 - 2*E^((2*x)/(-4 + 2*x)) - 16*x + 4*x^2 + 16*x^3 - 16*x^4 +
4*x^5)/(4 - 4*x + x^2),x]
```

output
```
E^(x/(-2 + x)) + 4*x + x^4
```

3.797.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.040$, Rules used = {7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^5 - 16x^4 + 16x^3 + 4x^2 - 16x - 2e^{\frac{2x}{2x-4}} + 16}{x^2 - 4x + 4} \, dx$$

$$\Big\downarrow \text{7239}$$

$$\int \left(4x^3 - \frac{2e^{\frac{x}{x-2}}}{(x-2)^2} + 4\right) dx$$

$$\Big\downarrow \text{2009}$$

$$x^4 + 4x + e^{1-\frac{2}{2-x}}$$

input
```
Int[(16 - 2*E^((2*x)/(-4 + 2*x)) - 16*x + 4*x^2 + 16*x^3 - 16*x^4 + 4*x^5)
/(4 - 4*x + x^2),x]
```

output
```
E^(1 - 2/(2 - x)) + 4*x + x^4
```

3.797.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.797.4 Maple [A] (verified)

Time = 1.50 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

method	result	size
risch	$4x + x^4 + \mathrm{e}^{\frac{x}{-2+x}}$	16
parts	$x^4 + 4x + \mathrm{e}^{1+\frac{2}{-2+x}}$	18
parallelrisch	$x^4 + \mathrm{e}^{\frac{x}{-2+x}} + 4x + 16$	20
derivativedivides	$-72 + 36x + (-2+x)^4 + 8(-2+x)^3 + 24(-2+x)^2 + \mathrm{e}^{1+\frac{2}{-2+x}}$	35
default	$-72 + 36x + (-2+x)^4 + 8(-2+x)^3 + 24(-2+x)^2 + \mathrm{e}^{1+\frac{2}{-2+x}}$	35
norman	$\frac{x^5 + x\,\mathrm{e}^{\frac{2x}{2x-4}} + 4x^2 - 2x^4 - 2\,\mathrm{e}^{\frac{2x}{2x-4}} - 16}{-2+x}$	50

input
```
int((-2*exp(x/(2*x-4))^2+4*x^5-16*x^4+16*x^3+4*x^2-16*x+16)/(x^2-4*x+4),x,
method=_RETURNVERBOSE)
```

output
```
4*x+x^4+exp(x/(-2+x))
```

3.797.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{16 - 2e^{\frac{2x}{-4+2x}} - 16x + 4x^2 + 16x^3 - 16x^4 + 4x^5}{4 - 4x + x^2}\,dx = x^4 + 4\,x + e^{\left(\frac{x}{x-2}\right)}$$

input
```
integrate((-2*exp(x/(2*x-4))^2+4*x^5-16*x^4+16*x^3+4*x^2-16*x+16)/(x^2-4*x
+4),x, algorithm=\
```

output
```
x^4 + 4*x + e^(x/(x - 2))
```

3.797.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{16-2e^{\frac{2x}{-4+2x}}-16x+4x^2+16x^3-16x^4+4x^5}{4-4x+x^2}\,dx = x^4+4x+e^{\frac{2x}{2x-4}}$$

input
```
integrate((-2*exp(x/(2*x-4))**2+4*x**5-16*x**4+16*x**3+4*x**2-16*x+16)/(x*
*2-4*x+4),x)
```

output
```
x**4 + 4*x + exp(2*x/(2*x - 4))
```

3.797.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{16-2e^{\frac{2x}{-4+2x}}-16x+4x^2+16x^3-16x^4+4x^5}{4-4x+x^2}\,dx = x^4+4\,x+e^{\left(\frac{2}{x-2}+1\right)}$$

input
```
integrate((-2*exp(x/(2*x-4))^2+4*x^5-16*x^4+16*x^3+4*x^2-16*x+16)/(x^2-4*x
+4),x, algorithm=\
```

output
```
x^4 + 4*x + e^(2/(x - 2) + 1)
```

3.797.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 153 vs. 2(15) = 30.

Time = 0.28 (sec) , antiderivative size = 153, normalized size of antiderivative = 8.05

$$\int \frac{16-2e^{\frac{2x}{-4+2x}}-16x+4x^2+16x^3-16x^4+4x^5}{4-4x+x^2}\,dx = \frac{\frac{4\,xe^{\left(\frac{x}{x-2}\right)}}{x-2}-\frac{6\,x^2e^{\left(\frac{x}{x-2}\right)}}{(x-2)^2}+\frac{4\,x^3e^{\left(\frac{x}{x-2}\right)}}{(x-2)^3}-\frac{x^4e^{\left(\frac{x}{x-2}\right)}}{(x-2)^4}-\frac{88\,x}{x-2}+\frac{120\,x^2}{(x-2)^2}-\frac{72\,x^3}{(x-2)^3}-e^{\left(\frac{x}{x-2}\right)}+24}{\frac{4\,x}{x-2}-\frac{6\,x^2}{(x-2)^2}+\frac{4\,x^3}{(x-2)^3}-\frac{x^4}{(x-2)^4}-1}$$

input
```
integrate((-2*exp(x/(2*x-4))^2+4*x^5-16*x^4+16*x^3+4*x^2-16*x+16)/(x^2-4*x
+4),x, algorithm=\
```

output
```
(4*x*e^(x/(x - 2))/(x - 2) - 6*x^2*e^(x/(x - 2))/(x - 2)^2 + 4*x^3*e^(x/(x
 - 2))/(x - 2)^3 - x^4*e^(x/(x - 2))/(x - 2)^4 - 88*x/(x - 2) + 120*x^2/(x
 - 2)^2 - 72*x^3/(x - 2)^3 - e^(x/(x - 2)) + 24)/(4*x/(x - 2) - 6*x^2/(x -
 2)^2 + 4*x^3/(x - 2)^3 - x^4/(x - 2)^4 - 1)
```

3.797.9 Mupad [B] (verification not implemented)

Time = 15.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{16-2e^{\frac{2x}{-4+2x}}-16x+4x^2+16x^3-16x^4+4x^5}{4-4x+x^2}\,dx = 4\,x+\mathrm{e}^{\frac{x}{x-2}}+x^4$$

input
```
int((4*x^2 - 2*exp((2*x)/(2*x - 4)) - 16*x + 16*x^3 - 16*x^4 + 4*x^5 + 16)
/(x^2 - 4*x + 4),x)
```

output
```
4*x + exp(x/(x - 2)) + x^4
```

3.798 $\int \frac{6-6x+(9-6x-18x^2+12x^3)\log\left(\frac{-1+2x^2}{x^2}\right)}{-2x^4+4x^6}\,dx$

3.798.1 Optimal result

Integrand size = 47, antiderivative size = 20

$$\int \frac{6-6x+(9-6x-18x^2+12x^3)\log\left(\frac{-1+2x^2}{x^2}\right)}{-2x^4+4x^6}\,dx=\frac{3(1-x)\log\left(2-\frac{1}{x^2}\right)}{2x^3}$$

output
```
3/2*(1-x)*ln(2-1/x^2)/x^3
```

3.798.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 86 vs. 2(20) = 40.

Time = 0.16 (sec) , antiderivative size = 86, normalized size of antiderivative = 4.30

$$\begin{aligned}&\int \frac{6-6x+(9-6x-18x^2+12x^3)\log\left(\frac{-1+2x^2}{x^2}\right)}{-2x^4+4x^6}\,dx\\&=6\sqrt{2}\text{arctanh}\left(\frac{1}{\sqrt{2}x}\right)+\frac{3(1-x+2x^3)\log\left(2-\frac{1}{x^2}\right)}{2x^3}+6\log(x)\\&\quad+3\left(-1+\sqrt{2}\right)\log\left(1-\sqrt{2}x\right)-3\left(1+\sqrt{2}\right)\log\left(1+\sqrt{2}x\right)\end{aligned}$$

input
```
Integrate[(6 - 6*x + (9 - 6*x - 18*x^2 + 12*x^3)*Log[(-1 + 2*x^2)/x^2])/(-
2*x^4 + 4*x^6),x]
```

output
```
6*Sqrt[2]*ArcTanh[1/(Sqrt[2]*x)] + (3*(1 - x + 2*x^3)*Log[2 - x^(-2)])/(2*
x^3) + 6*Log[x] + 3*(-1 + Sqrt[2])*Log[1 - Sqrt[2]*x] - 3*(1 + Sqrt[2])*Lo
g[1 + Sqrt[2]*x]
```

3.798.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 49 vs. $2(20) = 40$.

Time = 0.46 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.45, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.064$, Rules used = {2026, 7276, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(12x^3-18x^2-6x+9)\log\left(\frac{2x^2-1}{x^2}\right)-6x+6}{4x^6-2x^4}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(12x^3-18x^2-6x+9)\log\left(\frac{2x^2-1}{x^2}\right)-6x+6}{x^4(4x^2-2)}dx$$

$$\Big\downarrow \text{7276}$$

$$\int \left(\frac{3(2x-3)\log\left(2-\frac{1}{x^2}\right)}{2x^4}-\frac{3(x-1)}{x^4(2x^2-1)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{3}{2}\left(2-\frac{1}{x^2}\right)\log\left(2-\frac{1}{x^2}\right)-3\log\left(1-2x^2\right)+\frac{3\log\left(2-\frac{1}{x^2}\right)}{2x^3}+6\log(x)$$

input
```
Int[(6 - 6*x + (9 - 6*x - 18*x^2 + 12*x^3)*Log[(-1 + 2*x^2)/x^2])/(-2*x^4
+ 4*x^6),x]
```

output
```
(3*(2 - x^(-2))*Log[2 - x^(-2)])/2 + (3*Log[2 - x^(-2)])/(2*x^3) + 6*Log[x
] - 3*Log[1 - 2*x^2]
```

3.798. $\int \frac{6-6x+(9-6x-18x^2+12x^3)\log\left(\frac{-1+2x^2}{x^2}\right)}{-2x^4+4x^6}\,dx$

3.798.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.798.4 Maple [A] (verified)

Time = 1.07 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

method	result
risch	$-\frac{3(-1+x)\ln\left(\frac{2x^2-1}{x^2}\right)}{2x^3}$
norman	$\frac{-\frac{3\ln\left(\frac{2x^2-1}{x^2}\right)x}{2}+\frac{3\ln\left(\frac{2x^2-1}{x^2}\right)}{2}}{x^3}$
derivativedivides	$-3\ln\left(\frac{1}{x^2}-2\right)+\frac{3\left(2-\frac{1}{x^2}\right)\ln\left(2-\frac{1}{x^2}\right)}{2}-3+\frac{3\ln\left(2-\frac{1}{x^2}\right)}{2x^3}$
default	$-3\ln\left(\frac{1}{x^2}-2\right)+\frac{3\left(2-\frac{1}{x^2}\right)\ln\left(2-\frac{1}{x^2}\right)}{2}-3+\frac{3\ln\left(2-\frac{1}{x^2}\right)}{2x^3}$
parallelrisch	$\frac{-96x^3\ln(x)+48\ln\left(x^2-\frac{1}{2}\right)x^3-48\ln\left(\frac{2x^2-1}{x^2}\right)x^3-12\ln\left(\frac{2x^2-1}{x^2}\right)x+12\ln\left(\frac{2x^2-1}{x^2}\right)}{8x^3}$
parts	$\frac{3\left(2-\frac{1}{x^2}\right)\ln\left(2-\frac{1}{x^2}\right)}{2}-3+\frac{3\ln\left(2-\frac{1}{x^2}\right)}{2x^3}+6\sqrt{2}\,\text{arctanh}\left(\frac{\sqrt{2}}{2x}\right)-3\ln\left(2x^2-1\right)-6\sqrt{2}\,\text{arctanh}$

input
```
int(((12*x^3-18*x^2-6*x+9)*ln((2*x^2-1)/x^2)+6-6*x)/(4*x^6-2*x^4),x,method
=_RETURNVERBOSE)
```

output
```
-3/2*(-1+x)/x^3*ln((2*x^2-1)/x^2)
```

3.798.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{6-6x+(9-6x-18x^2+12x^3)\log\left(\frac{-1+2x^2}{x^2}\right)}{-2x^4+4x^6}\,dx = -\frac{3\,(x-1)\log\left(\frac{2\,x^2-1}{x^2}\right)}{2\,x^3}$$

input
```
integrate(((12*x^3-18*x^2-6*x+9)*log((2*x^2-1)/x^2)+6-6*x)/(4*x^6-2*x^4),x
, algorithm=\
```

output
```
-3/2*(x - 1)*log((2*x^2 - 1)/x^2)/x^3
```

3.798.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{6-6x+(9-6x-18x^2+12x^3)\log\left(\frac{-1+2x^2}{x^2}\right)}{-2x^4+4x^6}\,dx = \frac{(3-3x)\log\left(\frac{2x^2-1}{x^2}\right)}{2x^3}$$

input
```
integrate(((12*x**3-18*x**2-6*x+9)*ln((2*x**2-1)/x**2)+6-6*x)/(4*x**6-2*x*
*4),x)
```

output
```
(3 - 3*x)*log((2*x**2 - 1)/x**2)/(2*x**3)
```

3.798.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. 2(16) = 32.

Time = 0.33 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.20

$$\int \frac{6-6x+(9-6x-18x^2+12x^3)\log\left(\frac{-1+2x^2}{x^2}\right)}{-2x^4+4x^6}\,dx$$
$$= -\frac{12\,x^2+3\,(x-1)\log\left(2\,x^2-1\right)-6\,(x-1)\log\left(x\right)+2}{2\,x^3}+\frac{6\,x^2+1}{x^3}$$

input
```
integrate((((12*x^3-18*x^2-6*x+9)*log((2*x^2-1)/x^2)+6-6*x)/(4*x^6-2*x^4),x
, algorithm=\
```

output
```
-1/2*(12*x^2 + 3*(x - 1)*log(2*x^2 - 1) - 6*(x - 1)*log(x) + 2)/x^3 + (6*x
^2 + 1)/x^3
```

3.798.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{6-6x+(9-6x-18x^2+12x^3)\log\left(\frac{-1+2x^2}{x^2}\right)}{-2x^4+4x^6}\,dx = -\frac{3\,(x-1)\log\left(\frac{2\,x^2-1}{x^2}\right)}{2\,x^3}$$

input
```
integrate((((12*x^3-18*x^2-6*x+9)*log((2*x^2-1)/x^2)+6-6*x)/(4*x^6-2*x^4),x
, algorithm=\
```

output
```
-3/2*(x - 1)*log((2*x^2 - 1)/x^2)/x^3
```

3.798.9 Mupad [B] (verification not implemented)

Time = 16.41 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{6-6x+(9-6x-18x^2+12x^3)\log\left(\frac{-1+2x^2}{x^2}\right)}{-2x^4+4x^6}\,dx = -\frac{3\,\ln\left(\frac{2\,x^2-1}{x^2}\right)\,(x-1)}{2\,x^3}$$

input
```
int((6*x + log((2*x^2 - 1)/x^2)*(6*x + 18*x^2 - 12*x^3 - 9) - 6)/(2*x^4 -
4*x^6),x)
```

output
```
-(3*log((2*x^2 - 1)/x^2)*(x - 1))/(2*x^3)
```

3.799 $\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx$

3.799.1 Optimal result

Integrand size = 35, antiderivative size = 23

$$\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx = 3(3-e^4)\log^2\left(\left(2e^2-x\right)^2\right)$$

output
```
3*ln((2*exp(2)-x)^2)^2*(3-exp(4))
```

3.799.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx = -3(-3+e^4)\log^2\left(\left(-2e^2+x\right)^2\right)$$

input
```
Integrate[((-36 + 12*E^4)*Log[4*E^4 - 4*E^2*x + x^2])/(2*E^2 - x),x]
```

output
```
-3*(-3 + E^4)*Log[(-2*E^2 + x)^2]^2
```

3.799.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 50 vs. $2(23) = 46$.

Time = 0.31 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.17, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.171$, Rules used = {27, 3004, 27, 2004, 2837, 2738}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(12e^4-36)\log(x^2-4e^2x+4e^4)}{2e^2-x}dx$$

$$\Big\downarrow \text{27}$$

$$-12(3-e^4)\int \frac{\log(x^2-4e^2x+4e^4)}{2e^2-x}dx$$

$$\Big\downarrow \text{3004}$$

$$-12(3-e^4)\left(\int -\frac{2(2e^2-x)\log(2e^2-x)}{x^2-4e^2x+4e^4}dx-\log(2e^2-x)\log(x^2-4e^2x+4e^4)\right)$$

$$\Big\downarrow \text{27}$$

$$-12(3-e^4)\left(-2\int \frac{(2e^2-x)\log(2e^2-x)}{x^2-4e^2x+4e^4}dx-\log(2e^2-x)\log(x^2-4e^2x+4e^4)\right)$$

$$\Big\downarrow \text{2004}$$

$$-12(3-e^4)\left(-2\int \frac{\log(2e^2-x)}{2e^2-x}dx-\log(2e^2-x)\log(x^2-4e^2x+4e^4)\right)$$

$$\Big\downarrow \text{2837}$$

$$-12(3-e^4)\left(2\int \frac{\log(2e^2-x)}{2e^2-x}d(2e^2-x)-\log(2e^2-x)\log(x^2-4e^2x+4e^4)\right)$$

$$\Big\downarrow \text{2738}$$

$$-12(3-e^4)\left(\log^2(2e^2-x)-\log(2e^2-x)\log(x^2-4e^2x+4e^4)\right)$$

input
```
Int[((-36 + 12*E^4)*Log[4*E^4 - 4*E^2*x + x^2])/(2*E^2 - x),x]
```

output
```
-12*(3 - E^4)*(Log[2*E^2 - x]^2 - Log[2*E^2 - x]*Log[4*E^4 - 4*E^2*x + x^2
])
```

3.799. $\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx$

3.799.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2004
```
Int[(u_)*((d_) + (e_.)*(x_))^(q_.)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.)
, x_Symbol] :> Int[u*(d + e*x)^(p + q)*(a/d + (c/e)*x)^p, x] /; FreeQ[{a, b
, c, d, e, q}, x] && EqQ[c*d^2 - b*d*e + a*e^2, 0] && IntegerQ[p]
```

rule 2738
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

rule 2837
```
Int[((a_.) + Log[(c_.)*((d_) + (e_.)*(x_))^(n_.)]*(b_.))^(p_.)*((f_) + (g_.
)*(x_))^(q_.), x_Symbol] :> Simp[1/e   Subst[Int[(f*(x/d))^q*(a + b*Log[c*x
^n])^p, x], x, d + e*x], x] /; FreeQ[{a, b, c, d, e, f, g, n, p, q}, x] &&
EqQ[e*f - d*g, 0]
```

rule 3004
```
Int[((a_.) + Log[(c_.)*(RFx_)^(p_.)]*(b_.))^(n_.)/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[Log[d + e*x]*((a + b*Log[c*RFx^p])^n/e), x] - Simp[b*n*(p/e)
   Int[Log[d + e*x]*(a + b*Log[c*RFx^p])^(n - 1)*(D[RFx, x]/RFx), x], x] /;
 FreeQ[{a, b, c, d, e, p}, x] && RationalFunctionQ[RFx, x] && IGtQ[n, 0]
```

3.799.4 Maple [A] (verified)

Time = 1.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

method	result
norman	$(9-3\,\mathrm{e}^{4})\ln\left(4\,\mathrm{e}^{4}-4\,\mathrm{e}^{2}x+x^{2}\right)^{2}$
derivativedivides	$-\frac{(12\,\mathrm{e}^{4}-36)\ln\left(4\,\mathrm{e}^{4}-4\,\mathrm{e}^{2}x+x^{2}\right)^{2}}{4}$
default	$-\frac{(12\,\mathrm{e}^{4}-36)\ln\left(4\,\mathrm{e}^{4}-4\,\mathrm{e}^{2}x+x^{2}\right)^{2}}{4}$
risch	$-3\ln\left(4\,\mathrm{e}^{4}-4\,\mathrm{e}^{2}x+x^{2}\right)^{2}\mathrm{e}^{4}+9\ln\left(4\,\mathrm{e}^{4}-4\,\mathrm{e}^{2}x+x^{2}\right)^{2}$
parts	$-12\ln\left(4\,\mathrm{e}^{4}-4\,\mathrm{e}^{2}x+x^{2}\right)\ln\left(2\,\mathrm{e}^{2}-x\right)\mathrm{e}^{4}+36\ln\left(4\,\mathrm{e}^{4}-4\,\mathrm{e}^{2}x+x^{2}\right)\ln\left(2\,\mathrm{e}^{2}-x\right)-\frac{(72-$

3.799. $\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx$

input
```
int((12*exp(4)-36)*ln(4*exp(2)^2-4*exp(2)*x+x^2)/(2*exp(2)-x),x,method=_RE
TURNVERBOSE)
```

output
```
(9-3*exp(4))*ln(4*exp(2)^2-4*exp(2)*x+x^2)^2
```

3.799.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx = -3\left(e^4-3\right)\log\left(x^2-4\,xe^2+4\,e^4\right)^2$$

input
```
integrate((12*exp(4)-36)*log(4*exp(2)^2-4*exp(2)*x+x^2)/(2*exp(2)-x),x, al
gorithm=\
```

output
```
-3*(e^4 - 3)*log(x^2 - 4*x*e^2 + 4*e^4)^2
```

3.799.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx = \left(9-3e^4\right)\log\left(x^2-4xe^2+4e^4\right)^2$$

input
```
integrate((12*exp(4)-36)*ln(4*exp(2)**2-4*exp(2)*x+x**2)/(2*exp(2)-x),x)
```

output
```
(9 - 3*exp(4))*log(x**2 - 4*x*exp(2) + 4*exp(4))**2
```

3.799.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. 2(17) = 34.

Time = 0.21 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.96

$$\begin{aligned}\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx &= -12\left(e^4-3\right)\log\left(x^2-4\,xe^2+4\,e^4\right)\log\left(x-2\,e^2\right)\\ &\quad+12\left(\log\left(x^2-4\,xe^2+4\,e^4\right)\log\left(x-2\,e^2\right)-\log\left(x-2\,e^2\right)^2\right)\left(e^4-3\right)\end{aligned}$$

input
```
integrate((12*exp(4)-36)*log(4*exp(2)^2-4*exp(2)*x+x^2)/(2*exp(2)-x),x, al
gorithm=\
```

output
```
-12*(e^4 - 3)*log(x^2 - 4*x*e^2 + 4*e^4)*log(x - 2*e^2) + 12*(log(x^2 - 4*
x*e^2 + 4*e^4)*log(x - 2*e^2) - log(x - 2*e^2)^2)*(e^4 - 3)
```

3.799.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx = -3\left(e^4-3\right)\log\left(x^2-4\,xe^2+4\,e^4\right)^2$$

input
```
integrate((12*exp(4)-36)*log(4*exp(2)^2-4*exp(2)*x+x^2)/(2*exp(2)-x),x, al
gorithm=\
```

output
```
-3*(e^4 - 3)*log(x^2 - 4*x*e^2 + 4*e^4)^2
```

3.799.9 Mupad [B] (verification not implemented)

Time = 15.48 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{(-36+12e^4)\log(4e^4-4e^2x+x^2)}{2e^2-x}\,dx = -\ln\left(x^2-4\,\mathrm{e}^2\,x+4\,\mathrm{e}^4\right)^2\left(3\,\mathrm{e}^4-9\right)$$

input
```
int(-(log(4*exp(4) - 4*x*exp(2) + x^2)*(12*exp(4) - 36))/(x - 2*exp(2)),x)
```

output
```
-log(4*exp(4) - 4*x*exp(2) + x^2)^2*(3*exp(4) - 9)
```

3.800 $\int e^{-e^{16}+e^{-e^{16}}\left(-4x^2+e^{e^{16}}(-4x+e^x x)+(x^2-x^3)\log(5)\right)}\Big(-8x+$

3.800.1 Optimal result

Integrand size = 81, antiderivative size = 28

$$\int e^{-e^{16}+e^{-e^{16}}\left(-4x^2+e^{e^{16}}(-4x+e^x x)+(x^2-x^3)\log(5)\right)}\Big(-8x+e^{e^{16}}(-4+e^x(1+x)) + (2x-3x^2)\log(5)\Big)\,dx = e^{x\left(-4+e^x+e^{-e^{16}}x(-4+(1-x)\log(5))\right)}$$

output
```
exp(x*(exp(x)-4+x/exp(exp(16))*((1-x)*ln(5)-4)))
```

3.800.2 Mathematica [A] (verified)

Time = 2.09 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

$$\int e^{-e^{16}+e^{-e^{16}}\left(-4x^2+e^{e^{16}}(-4x+e^x x)+(x^2-x^3)\log(5)\right)}\Big(-8x+e^{e^{16}}(-4+e^x(1+x)) + (2x-3x^2)\log(5)\Big)\,dx = 5^{-e^{-e^{16}}(-1+x)x^2}e^{x\left(-4+e^x-4e^{-e^{16}}x\right)}$$

input
```
Integrate[E^(-E^16 + (-4*x^2 + E^E^16*(-4*x + E^x*x) + (x^2 - x^3)*Log[5])
/E^E^16)*(-8*x + E^E^16*(-4 + E^x*(1 + x)) + (2*x - 3*x^2)*Log[5]),x]
```

output
```
E^(x*(-4 + E^x - (4*x)/E^E^16))/5^(((-1 + x)*x^2)/E^E^16)
```

3.800.3 Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.89, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.012, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left((2x-3x^2)\log(5)-8x+e^{e^{16}}(e^x(x+1)-4)\right)\exp\left(e^{-e^{16}}\left(-4x^2+(x^2-x^3)\log(5)+e^{e^{16}}(e^x x-4x)\right)-e^{16}\right)$$
$$\Big\downarrow \text{7257}$$
$$5^{e^{-e^{16}}(x^2-x^3)}\exp\left(-e^{-e^{16}}\left(4x^2+e^{e^{16}}(4x-e^x x)\right)\right)$$

input
```
Int[E^(-E^16 + (-4*x^2 + E^E^16*(-4*x + E^x*x) + (x^2 - x^3)*Log[5])/E^E^1
6)*(-8*x + E^E^16*(-4 + E^x*(1 + x)) + (2*x - 3*x^2)*Log[5]),x]
```

output
```
5^((x^2 - x^3)/E^E^16)/E^((4*x^2 + E^E^16*(4*x - E^x*x))/E^E^16)
```

3.800.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.800.4 Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

method	result	size
risch	$\mathrm{e}^{-x\left(x^2\ln(5)-x\ln(5)-\mathrm{e}^{x+\mathrm{e}^{16}}+4\,\mathrm{e}^{\mathrm{e}^{16}}+4x\right)\mathrm{e}^{-\mathrm{e}^{16}}}$	37
norman	$\mathrm{e}^{\left((\mathrm{e}^x x-4x)\mathrm{e}^{\mathrm{e}^{16}}+(-x^3+x^2)\ln(5)-4x^2\right)\mathrm{e}^{-\mathrm{e}^{16}}}$	38
parallelrisch	$\mathrm{e}^{\left((\mathrm{e}^x x-4x)\mathrm{e}^{\mathrm{e}^{16}}+(-x^3+x^2)\ln(5)-4x^2\right)\mathrm{e}^{-\mathrm{e}^{16}}}$	38

input
```
int((((1+x)*exp(x)-4)*exp(exp(16))+(-3*x^2+2*x)*ln(5)-8*x)*exp(((exp(x)*x-
4*x)*exp(exp(16))+(-x^3+x^2)*ln(5)-4*x^2)/exp(exp(16)))/exp(exp(16)),x,met
hod=_RETURNVERBOSE)
```

output
```
exp(-x*(x^2*ln(5)-x*ln(5)-exp(x+exp(16))+4*exp(exp(16))+4*x)*exp(-exp(16))
)
```

3.800.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.64

$$\int e^{-e^{16}+e^{-e^{16}}\left(-4x^2+e^{e^{16}}(-4x+e^x x)+(x^2-x^3)\log(5)\right)}\left(-8x+e^{e^{16}}(-4+e^x(1+x))+(2x-3x^2)\log(5)\right)\,dx = e^{\left(-\left(4\,x^2-(xe^x-4\,x-e^{16})e^{\left(e^{16}\right)}+(x^3-x^2)\log(5)\right)e^{\left(-e^{16}\right)}+e^{16}\right)}$$

input
```
integrate((((1+x)*exp(x)-4)*exp(exp(16))+(-3*x^2+2*x)*log(5)-8*x)*exp(((ex
p(x)*x-4*x)*exp(exp(16))+(-x^3+x^2)*log(5)-4*x^2)/exp(exp(16)))/exp(exp(16
)),x, algorithm=\
```

output
```
e^(-(4*x^2 - (x*e^x - 4*x - e^16)*e^(e^16) + (x^3 - x^2)*log(5))*e^(-e^16)
 + e^16)
```

3.800.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int e^{-e^{16}+e^{-e^{16}}\left(-4x^2+e^{e^{16}}(-4x+e^x x)+(x^2-x^3)\log(5)\right)}\left(-8x+e^{e^{16}}(-4+e^x(1+x))+(2x-3x^2)\log(5)\right)\,dx = e^{\frac{-4x^2+\left(-x^3+x^2\right)\log(5)+(xe^x-4x)e^{e^{16}}}{e^{e^{16}}}}$$

input
```
integrate((((1+x)*exp(x)-4)*exp(exp(16))+(-3*x**2+2*x)*ln(5)-8*x)*exp(((ex
p(x)*x-4*x)*exp(exp(16))+(-x**3+x**2)*ln(5)-4*x**2)/exp(exp(16)))/exp(exp(
16)),x)
```

output
```
exp((-4*x**2 + (-x**3 + x**2)*log(5) + (x*exp(x) - 4*x)*exp(exp(16)))*exp(
-exp(16)))
```

3.800.7 Maxima [A] (verification not implemented)

Time = 0.46 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int e^{-e^{16}+e^{-e^{16}}\left(-4x^2+e^{e^{16}}(-4x+e^x x)+(x^2-x^3)\log(5)\right)}\left(-8x+e^{e^{16}}(-4+e^x(1+x))+(2x-3x^2)\log(5)\right)\,dx = e^{\left(-x^3e^{\left(-e^{16}\right)}\log(5)+x^2e^{\left(-e^{16}\right)}\log(5)-4\,x^2e^{\left(-e^{16}\right)}+xe^x-4\,x\right)}$$

input
```
integrate((((1+x)*exp(x)-4)*exp(exp(16))+(-3*x^2+2*x)*log(5)-8*x)*exp(((ex
p(x)*x-4*x)*exp(exp(16))+(-x^3+x^2)*log(5)-4*x^2)/exp(exp(16)))/exp(exp(16
)),x, algorithm=\
```

output
```
e^(-x^3*e^(-e^16)*log(5) + x^2*e^(-e^16)*log(5) - 4*x^2*e^(-e^16) + x*e^x
- 4*x)
```

3.800.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int e^{-e^{16}+e^{-e^{16}}\left(-4x^2+e^{e^{16}}(-4x+e^x x)+(x^2-x^3)\log(5)\right)}\left(-8x+e^{e^{16}}(-4+e^x(1+x))+(2x-3x^2)\log(5)\right)\,dx = e^{\left(-x^3e^{\left(-e^{16}\right)}\log(5)+x^2e^{\left(-e^{16}\right)}\log(5)-4\,x^2e^{\left(-e^{16}\right)}+xe^x-4\,x\right)}$$

input
```
integrate((((1+x)*exp(x)-4)*exp(exp(16))+(-3*x^2+2*x)*log(5)-8*x)*exp(((ex
p(x)*x-4*x)*exp(exp(16))+(-x^3+x^2)*log(5)-4*x^2)/exp(exp(16)))/exp(exp(16
)),x, algorithm=\
```

output
```
e^(-x^3*e^(-e^16)*log(5) + x^2*e^(-e^16)*log(5) - 4*x^2*e^(-e^16) + x*e^x
- 4*x)
```

3.800.9 Mupad [B] (verification not implemented)

Time = 15.95 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.36

$$\int e^{-e^{16}+e^{-e^{16}}\left(-4x^2+e^{e^{16}}(-4x+e^x x)+(x^2-x^3)\log(5)\right)}\left(-8x+e^{e^{16}}(-4+e^x(1+x))+(2x-3x^2)\log(5)\right)\,dx=5^{e^{-e^{16}}\,(x^2-x^3)}\,e^{x\,e^x}\,e^{-4\,x}\,e^{-4\,x^2\,e^{-e^{16}}}$$

input
```
int(exp(-exp(16))*exp(-exp(-exp(16))*(exp(exp(16))*(4*x - x*exp(x)) - log(
5)*(x^2 - x^3) + 4*x^2))*(log(5)*(2*x - 3*x^2) - 8*x + exp(exp(16))*(exp(x
)*(x + 1) - 4)),x)
```

output
```
5^(exp(-exp(16))*(x^2 - x^3))*exp(x*exp(x))*exp(-4*x)*exp(-4*x^2*exp(-exp(
16)))
```

3.801 $\int e^{398+160x+16x^2+\frac{2(e^2x+e^4x)}{e^2}}(18e^4+e^2(1458+288x))\,dx$

3.801.1 Optimal result

Integrand size = 44, antiderivative size = 21

$$\int e^{398+160x+16x^2+\frac{2(e^2x+e^4x)}{e^2}}\left(18e^4+e^2(1458+288x)\right)\,dx=9e^{2x+2e^2x+16(5+x)^2}$$

output
```
9*exp(4*(5+x)*(20+4*x))*exp(x+x*exp(2)^2/exp(1)^2)^2
```

3.801.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int e^{398+160x+16x^2+\frac{2(e^2x+e^4x)}{e^2}}\left(18e^4+e^2(1458+288x)\right)\,dx=9e^{400+2(81+e^2)x+16x^2}$$

input
```
Integrate[E^(398 + 160*x + 16*x^2 + (2*(E^2*x + E^4*x))/E^2)*(18*E^4 + E^2
*(1458 + 288*x)),x]
```

output
```
9*E^(400 + 2*(81 + E^2)*x + 16*x^2)
```

3.801.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {2674, 2666}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{16x^2+160x+\frac{2(e^4x+e^2x)}{e^2}+398}\left(e^2(288x+1458)+18e^4\right)\,dx$$

$$\Big\downarrow \ 2674$$

$$\int e^{16x^2+2(81+e^2)x+398}\left(288e^2x+18e^2(81+e^2)\right)dx$$

$$\Big\downarrow \ 2666$$

$$9e^{16x^2+2(81+e^2)x+400}$$

input
```
Int[E^(398 + 160*x + 16*x^2 + (2*(E^2*x + E^4*x))/E^2)*(18*E^4 + E^2*(1458
 + 288*x)),x]
```

output
```
9*E^(400 + 2*(81 + E^2)*x + 16*x^2)
```

3.801.3.1 Defintions of rubi rules used

rule 2666
```
Int[(F_)^((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)*((d_.) + (e_.)*(x_)), x_Symbol
] :> Simp[e*(F^(a + b*x + c*x^2)/(2*c*Log[F])), x] /; FreeQ[{F, a, b, c, d,
 e}, x] && EqQ[b*e - 2*c*d, 0]
```

rule 2674
```
Int[(F_)^(v_)*(u_)^(m_.), x_Symbol] :> Int[ExpandToSum[u, x]^m*F^ExpandToSu
m[v, x], x] /; FreeQ[{F, m}, x] && LinearQ[u, x] && QuadraticQ[v, x] &&  !(
LinearMatchQ[u, x] && QuadraticMatchQ[v, x])
```

3.801.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33

method	result
risch	$9\,\mathrm{e}^{2x\,\mathrm{e}^{-2}\mathrm{e}^{2}+2x\,\mathrm{e}^{-2}\mathrm{e}^{4}+16x^{2}+160x+400}$
gosper	$9\,\mathrm{e}^{16x^{2}+160x+400}\mathrm{e}^{2x\left(\mathrm{e}^{2}+\mathrm{e}^{4}\right)\mathrm{e}^{-2}}$
parallelrisch	$9\,\mathrm{e}^{16x^{2}+160x+400}\mathrm{e}^{2x\left(\mathrm{e}^{2}+\mathrm{e}^{4}\right)\mathrm{e}^{-2}}$
norman	$9\,\mathrm{e}^{16x^{2}+160x+400}\mathrm{e}^{2\left(x\,\mathrm{e}^{4}+\mathrm{e}^{2}x\right)\mathrm{e}^{-2}}$
default	$\mathrm{e}^{-2}\left(-\frac{729 i\,\mathrm{e}^{400}\mathrm{e}^{2}\sqrt{\pi}\,\mathrm{e}^{-\frac{\left(2\,\mathrm{e}^{2}+162\right)^{2}}{64}}\operatorname{erf}\left(4ix+\frac{i\left(2\,\mathrm{e}^{2}+162\right)}{8}\right)}{4}-\frac{9 i\,\mathrm{e}^{400}\mathrm{e}^{4}\sqrt{\pi}\,\mathrm{e}^{-\frac{\left(2\,\mathrm{e}^{2}+162\right)^{2}}{64}}\operatorname{erf}\left(4ix+\frac{i\left(2\,\mathrm{e}^{2}+162\right)}{8}\right)}{4}+ 2\right.$

input
```
int((18*exp(2)^2+(288*x+1458)*exp(1)^2)*exp(16*x^2+160*x+400)*exp((x*exp(2
)^2+x*exp(1)^2)/exp(1)^2)^2/exp(1)^2,x,method=_RETURNVERBOSE)
```

output
```
9*exp(2*x*exp(-2)*exp(2)+2*x*exp(-2)*exp(4)+16*x^2+160*x+400)
```

3.801.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int e^{398+160x+16x^2+\frac{2\left(e^2x+e^4x\right)}{e^2}}\left(18e^4+e^2(1458+288x)\right)\,dx=9\,e^{\left(16\,x^2+2\,xe^2+162\,x+400\right)}$$

input
```
integrate((18*exp(2)^2+(288*x+1458)*exp(1)^2)*exp(16*x^2+160*x+400)*exp((x
*exp(2)^2+x*exp(1)^2)/exp(1)^2)^2/exp(1)^2,x, algorithm=\
```

output
```
9*e^(16*x^2 + 2*x*e^2 + 162*x + 400)
```

3.801.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.48

$$\int e^{398+160x+16x^2+\frac{2\left(e^2x+e^4x\right)}{e^2}}\left(18e^4+e^2(1458+288x)\right)\,dx=9e^{\frac{2\left(xe^2+xe^4\right)}{e^2}}e^{16x^2+160x+400}$$

input
```
integrate((18*exp(2)**2+(288*x+1458)*exp(1)**2)*exp(16*x**2+160*x+400)*exp
((x*exp(2)**2+x*exp(1)**2)/exp(1)**2)**2/exp(1)**2,x)
```

output
```
9*exp(2*(x*exp(2) + x*exp(4))*exp(-2))*exp(16*x**2 + 160*x + 400)
```

3.801.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.32 (sec) , antiderivative size = 127, normalized size of antiderivative = 6.05

$$\int e^{398+160x+16x^2+\frac{2\left(e^2x+e^4x\right)}{e^2}}\left(18e^4+e^2(1458+288x)\right)\,dx$$
$$=-\frac{9}{4}i\sqrt{\pi}\,\mathrm{erf}\left(4i\,x+\frac{1}{4}i\,e^2+\frac{81}{4}i\right)e^{\left(-\frac{1}{16}\left(e^2+81\right)^2+402\right)}$$
$$-\frac{729}{4}i\sqrt{\pi}\,\mathrm{erf}\left(4i\,x+\frac{1}{4}i\,e^2+\frac{81}{4}i\right)e^{\left(-\frac{1}{16}\left(e^2+81\right)^2+400\right)}$$
$$-\frac{9}{4}\left(\frac{\sqrt{\pi}(16\,x+e^2+81)\left(\mathrm{erf}\left(\frac{1}{4}\sqrt{-(16\,x+e^2+81)^2}\right)-1\right)(e^2+81)}{\sqrt{-(16\,x+e^2+81)^2}}-4\,e^{\left(\frac{1}{16}\left(16\,x+e^2+81\right)^2\right)}\right)e^{\left(-\frac{1}{16}\left(e^2\cdot\right.\right.}$$

input
```
integrate((18*exp(2)^2+(288*x+1458)*exp(1)^2)*exp(16*x^2+160*x+400)*exp((x
*exp(2)^2+x*exp(1)^2)/exp(1)^2)^2/exp(1)^2,x, algorithm=\
```

output
```
-9/4*I*sqrt(pi)*erf(4*I*x + 1/4*I*e^2 + 81/4*I)*e^(-1/16*(e^2 + 81)^2 + 40
2) - 729/4*I*sqrt(pi)*erf(4*I*x + 1/4*I*e^2 + 81/4*I)*e^(-1/16*(e^2 + 81)^
2 + 400) - 9/4*(sqrt(pi)*(16*x + e^2 + 81)*(erf(1/4*sqrt(-(16*x + e^2 + 81
)^2)) - 1)*(e^2 + 81)/sqrt(-(16*x + e^2 + 81)^2) - 4*e^(1/16*(16*x + e^2 +
 81)^2))*e^(-1/16*(e^2 + 81)^2 + 400)
```

3.801.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int e^{398+160x+16x^2+\frac{2\left(e^2x+e^4x\right)}{e^2}}\left(18e^4+e^2(1458+288x)\right)\,dx=9\,e^{\left(16\,x^2+2\,xe^2+162\,x+400\right)}$$

input
```
integrate((18*exp(2)^2+(288*x+1458)*exp(1)^2)*exp(16*x^2+160*x+400)*exp((x
*exp(2)^2+x*exp(1)^2)/exp(1)^2)^2/exp(1)^2,x, algorithm=\
```

output
```
9*e^(16*x^2 + 2*x*e^2 + 162*x + 400)
```

3.801.9 Mupad [B] (verification not implemented)

Time = 15.16 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int e^{398+160x+16x^2+\frac{2\left(e^2x+e^4x\right)}{e^2}}\left(18e^4+e^2(1458+288x)\right)\,dx=9\,\mathrm{e}^{162\,x}\,\mathrm{e}^{400}\,\mathrm{e}^{16\,x^2}\,\mathrm{e}^{2\,x\,\mathrm{e}^2}$$

input
```
int(exp(2*exp(-2)*(x*exp(2) + x*exp(4)))*exp(-2)*exp(160*x + 16*x^2 + 400)
*(18*exp(4) + exp(2)*(288*x + 1458)),x)
```

output
```
9*exp(162*x)*exp(400)*exp(16*x^2)*exp(2*x*exp(2))
```

3.802 $\int \frac{e^8(12288ex^2+12800x^3)+e^8(1536ex^2+1568x^3)\log(e+x)+e^8(48ex^2+$

3.802.1 Optimal result

Integrand size = 65, antiderivative size = 16

$$\int \frac{e^8(12288ex^2+12800x^3)+e^8(1536ex^2+1568x^3)\log(e+x)+e^8(48ex^2+48x^3)\log^2(e+x)}{e+x}\,dx = 16e^8x^3(16+\log(e+x))^2$$

output
```
16*exp(4)^2*(16+ln(x+exp(1)))^2*x^3
```

3.802.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.88

$$\int \frac{e^8(12288ex^2+12800x^3)+e^8(1536ex^2+1568x^3)\log(e+x)+e^8(48ex^2+48x^3)\log^2(e+x)}{e+x}\,dx = 16e^8\left(256x^3+32x^3\log(e+x)+x^3\log^2(e+x)\right)$$

input
```
Integrate[(E^8*(12288*E*x^2 + 12800*x^3) + E^8*(1536*E*x^2 + 1568*x^3)*Log
[E + x] + E^8*(48*E*x^2 + 48*x^3)*Log[E + x]^2)/(E + x),x]
```

output
```
16*E^8*(256*x^3 + 32*x^3*Log[E + x] + x^3*Log[E + x]^2)
```

3.802.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 127 vs. 2(16) = 32.

Time = 0.74 (sec) , antiderivative size = 127, normalized size of antiderivative = 7.94, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {7239, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^8(12800x^3+12288ex^2)+e^8(48x^3+48ex^2)\log^2(x+e)+e^8(1568x^3+1536ex^2)\log(x+e)}{x+e}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{16e^8x^2(\log(x+e)+16)(50x+3(x+e)\log(x+e)+48e)}{x+e}dx$$

$$\Big\downarrow \text{27}$$

$$16e^8\int \frac{x^2(\log(x+e)+16)(50x+3(x+e)\log(x+e)+48e)}{x+e}dx$$

$$\Big\downarrow \text{7293}$$

$$16e^8\int \left(3\log^2(x+e)x^2+\frac{32(25x+24e)x^2}{x+e}+\frac{2(49x+48e)\log(x+e)x^2}{x+e}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$16e^8\left(\frac{2302x^3}{9}+x^3\log^2(x+e)+\frac{98}{3}x^3\log(x+e)+\frac{5ex^2}{6}-ex^2\log(x+e)+\frac{7e^2x}{3}+\frac{2}{9}(x+e)^3-\frac{3}{2}e(x+e)^2-\frac{2}{3}\right.$$

input
```
Int[(E^8*(12288*E*x^2 + 12800*x^3) + E^8*(1536*E*x^2 + 1568*x^3)*Log[E + x
] + E^8*(48*E*x^2 + 48*x^3)*Log[E + x]^2)/(E + x),x]
```

output
```
16*E^8*((7*E^2*x)/3 + (5*E*x^2)/6 + (2302*x^3)/9 - (3*E*(E + x)^2)/2 + (2*
(E + x)^3)/9 + (5*E^3*Log[E + x])/3 - E*x^2*Log[E + x] + (98*x^3*Log[E + x
])/3 - 4*E^2*(E + x)*Log[E + x] + 3*E*(E + x)^2*Log[E + x] - (2*(E + x)^3*
Log[E + x])/3 + x^3*Log[E + x]^2)
```

3.802.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.802.4 Maple [A] (verified)

Time = 0.92 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.19

method	result
risch	$16x^3 e^8 \ln(x+e)^2 + 512x^3 e^8 \ln(x+e) + 4096x^3 e^8$
norman	$16x^3 e^8 \ln(x+e)^2 + 512x^3 e^8 \ln(x+e) + 4096x^3 e^8$
parallelrisch	$16x^3 e^8 \ln(x+e)^2 + 512x^3 e^8 \ln(x+e) + 4096x^3 e^8$
parts	$48\,e^8\left(\frac{\ln(x+e)^2(x+e)^3}{3} - \frac{2\ln(x+e)(x+e)^3}{9} + \frac{2(x+e)^3}{27} - 2\,e\left(\frac{(x+e)^2\ln(x+e)^2}{2} - \frac{(x+e)^2\ln(x+e)}{2} + \frac{(x+e)^2}{4}\right.\right.$
derivativedivides	$48\,e^8 e^2\left((x+e)\ln(x+e)^2 - 2(x+e)\ln(x+e) + 2x + 2\,e\right) - 96\,e\,e^8\left(\frac{(x+e)^2\ln(x+e)^2}{2} - \right.$
default	$48\,e^8 e^2\left((x+e)\ln(x+e)^2 - 2(x+e)\ln(x+e) + 2x + 2\,e\right) - 96\,e\,e^8\left(\frac{(x+e)^2\ln(x+e)^2}{2} - \right.$

input
```
int(((48*x^2*exp(1)+48*x^3)*exp(4)^2*ln(x+exp(1))^2+(1536*x^2*exp(1)+1568*
x^3)*exp(4)^2*ln(x+exp(1))+(12288*x^2*exp(1)+12800*x^3)*exp(4)^2)/(x+exp(1
)),x,method=_RETURNVERBOSE)
```

output
```
16*x^3*exp(8)*ln(x+exp(1))^2+512*x^3*exp(8)*ln(x+exp(1))+4096*x^3*exp(8)
```

3.802.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. 2(16) = 32.

Time = 0.25 (sec) , antiderivative size = 34, normalized size of antiderivative = 2.12

$$\int \frac{e^8(12288ex^2+12800x^3)+e^8(1536ex^2+1568x^3)\log(e+x)+e^8(48ex^2+48x^3)\log^2(e+x)}{e+x}\,dx$$
$$=16\,x^3e^8\log\left(x+e\right)^2+512\,x^3e^8\log\left(x+e\right)+4096\,x^3e^8$$

input
```
integrate(((48*x^2*exp(1)+48*x^3)*exp(4)^2*log(x+exp(1))^2+(1536*x^2*exp(1
)+1568*x^3)*exp(4)^2*log(x+exp(1))+(12288*x^2*exp(1)+12800*x^3)*exp(4)^2)/
(x+exp(1)),x, algorithm=\
```

output
```
16*x^3*e^8*log(x + e)^2 + 512*x^3*e^8*log(x + e) + 4096*x^3*e^8
```

3.802.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(17) = 34.

Time = 0.10 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.44

$$\int \frac{e^8(12288ex^2+12800x^3)+e^8(1536ex^2+1568x^3)\log(e+x)+e^8(48ex^2+48x^3)\log^2(e+x)}{e+x}\,dx$$
$$=16x^3e^8\log\left(x+e\right)^2+512x^3e^8\log\left(x+e\right)+4096x^3e^8$$

input
```
integrate(((48*x**2*exp(1)+48*x**3)*exp(4)**2*ln(x+exp(1))**2+(1536*x**2*e
xp(1)+1568*x**3)*exp(4)**2*ln(x+exp(1))+(12288*x**2*exp(1)+12800*x**3)*exp
(4)**2)/(x+exp(1)),x)
```

output
```
16*x**3*exp(8)*log(x + E)**2 + 512*x**3*exp(8)*log(x + E) + 4096*x**3*exp(
8)
```

3.802.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 367 vs. 2(16) = 32.

Time = 0.21 (sec) , antiderivative size = 367, normalized size of antiderivative = 22.94

$$\int \frac{e^8(12288ex^2+12800x^3)+e^8(1536ex^2+1568x^3)\log(e+x)+e^8(48ex^2+48x^3)\log^2(e+x)}{e+x}\,dx$$
$$= 768\left(x^2-2\,xe+2\,e^2\log\left(x+e\right)\right)e^9\log\left(x+e\right)$$
$$+\frac{784}{3}\left(2\,x^3-3\,x^2e+6\,xe^2-6\,e^3\log\left(x+e\right)\right)e^8\log\left(x+e\right)$$
$$+4\left(4\,e^2\log\left(x+e\right)^3+3\left(2\,\log\left(x+e\right)^2-2\,\log\left(x+e\right)+1\right)\left(x+e\right)^2-24\left(e\log\left(x+e\right)^2-2\,e\log\left(x+e\right)\right.\right.$$
$$-384\left(2\,e^2\log\left(x+e\right)^2+x^2-6\,xe+6\,e^2\log\left(x+e\right)\right)e^9$$
$$+6144\left(x^2-2\,xe+2\,e^2\log\left(x+e\right)\right)e^9$$
$$+\frac{4}{9}\left(4\left(9\,\log\left(x+e\right)^2-6\,\log\left(x+e\right)+2\right)\left(x+e\right)^3-36\,e^3\log\left(x+e\right)^3-81\left(2\,e\log\left(x+e\right)^2-2\,e\log\left(x+\right.\right.\right.$$
$$-\frac{392}{9}\left(4\,x^3-15\,x^2e-18\,e^3\log\left(x+e\right)^2+66\,xe^2-66\,e^3\log\left(x+e\right)\right)e^8$$
$$+\frac{6400}{3}\left(2\,x^3-3\,x^2e+6\,xe^2-6\,e^3\log\left(x+e\right)\right)e^8$$

input
```
integrate(((48*x^2*exp(1)+48*x^3)*exp(4)^2*log(x+exp(1))^2+(1536*x^2*exp(1
)+1568*x^3)*exp(4)^2*log(x+exp(1))+(12288*x^2*exp(1)+12800*x^3)*exp(4)^2)/
(x+exp(1)),x, algorithm=\
```

output
```
768*(x^2 - 2*x*e + 2*e^2*log(x + e))*e^9*log(x + e) + 784/3*(2*x^3 - 3*x^2
*e + 6*x*e^2 - 6*e^3*log(x + e))*e^8*log(x + e) + 4*(4*e^2*log(x + e)^3 +
3*(2*log(x + e)^2 - 2*log(x + e) + 1)*(x + e)^2 - 24*(e*log(x + e)^2 - 2*e
*log(x + e) + 2*e)*(x + e))*e^9 - 384*(2*e^2*log(x + e)^2 + x^2 - 6*x*e +
6*e^2*log(x + e))*e^9 + 6144*(x^2 - 2*x*e + 2*e^2*log(x + e))*e^9 + 4/9*(4
*(9*log(x + e)^2 - 6*log(x + e) + 2)*(x + e)^3 - 36*e^3*log(x + e)^3 - 81*
(2*e*log(x + e)^2 - 2*e*log(x + e) + e)*(x + e)^2 + 324*(e^2*log(x + e)^2
- 2*e^2*log(x + e) + 2*e^2)*(x + e))*e^8 - 392/9*(4*x^3 - 15*x^2*e - 18*e^
3*log(x + e)^2 + 66*x*e^2 - 66*e^3*log(x + e))*e^8 + 6400/3*(2*x^3 - 3*x^2
*e + 6*x*e^2 - 6*e^3*log(x + e))*e^8
```

3.802.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. $2(16) = 32$.

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 2.12

$$\int \frac{e^8(12288ex^2 + 12800x^3) + e^8(1536ex^2 + 1568x^3)\log(e + x) + e^8(48ex^2 + 48x^3)\log^2(e + x)}{e + x}\,dx$$
$$= 16\,x^3e^8\log{(x + e)}^2 + 512\,x^3e^8\log{(x + e)} + 4096\,x^3e^8$$

input
```
integrate(((48*x^2*exp(1)+48*x^3)*exp(4)^2*log(x+exp(1))^2+(1536*x^2*exp(1
)+1568*x^3)*exp(4)^2*log(x+exp(1))+(12288*x^2*exp(1)+12800*x^3)*exp(4)^2)/
(x+exp(1)),x, algorithm=\
```

output
```
16*x^3*e^8*log(x + e)^2 + 512*x^3*e^8*log(x + e) + 4096*x^3*e^8
```

3.802.9 Mupad [B] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{e^8(12288ex^2 + 12800x^3) + e^8(1536ex^2 + 1568x^3)\log(e + x) + e^8(48ex^2 + 48x^3)\log^2(e + x)}{e + x}\,dx$$
$$= 16\,x^3\,\mathrm{e}^8\,{\left(\ln{(x + \mathrm{e})} + 16\right)}^2$$

input
```
int((exp(8)*(12288*x^2*exp(1) + 12800*x^3) + exp(8)*log(x + exp(1))^2*(48*
x^2*exp(1) + 48*x^3) + exp(8)*log(x + exp(1))*(1536*x^2*exp(1) + 1568*x^3)
)/(x + exp(1)),x)
```

output
```
16*x^3*exp(8)*(log(x + exp(1)) + 16)^2
```

3.803 $\int \frac{-55+220x-82x^2+8x^3+e^{2-x^2}(-50x+20x^2-2x^3)}{(-75-25x+118x^2-42x^3+4x^4+e^{2-x^2}(25-10x+x^2))\log\left(\frac{15+e^{2-x^2}(\ldots}{}\right)}$

3.803.1 Optimal result

Integrand size = 117, antiderivative size = 33

$$\int \frac{-55+220x-82x^2+8x^3+e^{2-x^2}(-50x+20x^2-2x^3)}{(-75-25x+118x^2-42x^3+4x^4+e^{2-x^2}(25-10x+x^2))\log\left(\frac{15+e^{2-x^2}(-5+x)+8x-22x^2+4x^3}{-5+x}\right)}\,dx = 2+\log\left(\log\left(-3+e^{2-x^2}-2x-\frac{x}{5-x}+4x^2\right)\right)$$

output
```
ln(ln(exp(-x^2+2)+4*x^2-x/(5-x)-2*x-3))+2
```

3.803.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

$$\int \frac{-55+220x-82x^2+8x^3+e^{2-x^2}(-50x+20x^2-2x^3)}{(-75-25x+118x^2-42x^3+4x^4+e^{2-x^2}(25-10x+x^2))\log\left(\frac{15+e^{2-x^2}(-5+x)+8x-22x^2+4x^3}{-5+x}\right)}\,dx = \log\left(\log\left(\frac{15+e^{2-x^2}(-5+x)+8x-22x^2+4x^3}{-5+x}\right)\right)$$

input
```
Integrate[(-55 + 220*x - 82*x^2 + 8*x^3 + E^(2 - x^2)*(-50*x + 20*x^2 - 2*
x^3))/((-75 - 25*x + 118*x^2 - 42*x^3 + 4*x^4 + E^(2 - x^2)*(25 - 10*x + x
^2))*Log[(15 + E^(2 - x^2)*(-5 + x) + 8*x - 22*x^2 + 4*x^3)/(-5 + x)]),x]
```

output
```
Log[Log[(15 + E^(2 - x^2)*(-5 + x) + 8*x - 22*x^2 + 4*x^3)/(-5 + x)]]
```

3.803.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^3-82x^2+e^{2-x^2}\left(-2x^3+20x^2-50x\right)+220x-55}{\left(4x^4-42x^3+118x^2+e^{2-x^2}\left(x^2-10x+25\right)-25x-75\right)\log\left(\frac{4x^3-22x^2+e^{2-x^2}(x-5)+8x+15}{x-5}\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{8x^3-82x^2+220x-55}{(x-5)\left(4x^3-22x^2+8x+15\right)\log\left(\frac{4x^3-22x^2+e^{2-x^2}(x-5)+8x+15}{x-5}\right)}-\frac{e^2\left(8x^5-\right.}{\left(4x^3-22x^2+8x+15\right)\left(-22e^{x^2}x^2+8e^{x^2}\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-\int \frac{1}{(x-5)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right)}dx+$$
$$8\int \frac{1}{\left(4x^3-22x^2+8x+15\right)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right)}dx-$$
$$44\int \frac{x}{\left(4x^3-22x^2+8x+15\right)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right)}dx+$$
$$12\int \frac{x^2}{\left(4x^3-22x^2+8x+15\right)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right)}dx-$$
$$2e^2\int \frac{1}{\left(4e^{x^2}x^3-22e^{x^2}x^2+8e^{x^2}x+e^2x+15e^{x^2}-5e^2\right)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right)}dx+$$
$$10e^2\int \frac{x}{\left(4e^{x^2}x^3-22e^{x^2}x^2+8e^{x^2}x+e^2x+15e^{x^2}-5e^2\right)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right)}dx-$$
$$2e^2\int \frac{x^2}{\left(4e^{x^2}x^3-22e^{x^2}x^2+8e^{x^2}x+e^2x+15e^{x^2}-5e^2\right)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right)}dx+$$
$$85e^2\int \frac{1}{\left(4x^3-22x^2+8x+15\right)\left(4e^{x^2}x^3-22e^{x^2}x^2+8e^{x^2}x+e^2x+15e^{x^2}-5e^2\right)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right)}$$
$$204e^2\int \frac{x}{\left(4x^3-22x^2+8x+15\right)\left(4e^{x^2}x^3-22e^{x^2}x^2+8e^{x^2}x+e^2x+15e^{x^2}-5e^2\right)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right.}$$
$$38e^2\int \frac{x^2}{\left(4x^3-22x^2+8x+15\right)\left(4e^{x^2}x^3-22e^{x^2}x^2+8e^{x^2}x+e^2x+15e^{x^2}-5e^2\right)\log\left(\frac{4x^3-22x^2+8x+e^{2-x^2}(x-5)+15}{x-5}\right)}$$

3.803. $\int \frac{-55+220x-82x^2+8x^3+e^{2-x^2}\left(-50x+20x^2-2x^3\right)}{\left(-75-25x+118x^2-42x^3+4x^4+e^{2-x^2}\left(25-10x+x^2\right)\right)\log\left(\frac{15+e^{2-x^2}(-5+x)+8x-22x^2+4x^3}{-5+x}\right)}dx$

input
```
Int[(-55 + 220*x - 82*x^2 + 8*x^3 + E^(2 - x^2)*(-50*x + 20*x^2 - 2*x^3))/
((-75 - 25*x + 118*x^2 - 42*x^3 + 4*x^4 + E^(2 - x^2)*(25 - 10*x + x^2))*L
og[(15 + E^(2 - x^2)*(-5 + x) + 8*x - 22*x^2 + 4*x^3)/(-5 + x)]),x]
```

output
```
$Aborted
```

3.803.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.803.4 Maple [A] (verified)

Time = 1.54 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

method	result
norman	$\ln\left(\ln\left(\frac{(-5+x)\mathrm{e}^{-x^2+2}+4x^3-22x^2+8x+15}{-5+x}\right)\right)$
parallelrisch	$\ln\left(\ln\left(\frac{(-5+x)\mathrm{e}^{-x^2+2}+4x^3-22x^2+8x+15}{-5+x}\right)\right)$
risch	$\ln\left(2\ln(2)-\ln(-5+x)+\ln\left(x^3-\frac{11x^2}{2}+\left(\frac{\mathrm{e}^{-x^2+2}}{4}+2\right)x-\frac{5\,\mathrm{e}^{-x^2+2}}{4}+\frac{15}{4}\right)+\frac{i\pi\,\mathrm{csgn}\left(i\left(x^3-\right.\right.}{}\right.$

input
```
int(((-2*x^3+20*x^2-50*x)*exp(-x^2+2)+8*x^3-82*x^2+220*x-55)/((x^2-10*x+25
)*exp(-x^2+2)+4*x^4-42*x^3+118*x^2-25*x-75)/ln(((-5+x)*exp(-x^2+2)+4*x^3-2
2*x^2+8*x+15)/(-5+x)),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(((-5+x)*exp(-x^2+2)+4*x^3-22*x^2+8*x+15)/(-5+x)))
```

3.803.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-55+220x-82x^2+8x^3+e^{2-x^2}(-50x+20x^2-2x^3)}{(-75-25x+118x^2-42x^3+4x^4+e^{2-x^2}(25-10x+x^2))\log\left(\frac{15+e^{2-x^2}(-5+x)+8x-22x^2+4x^3}{-5+x}\right)}\,dx$$
$$=\log\left(\log\left(\frac{4\,x^3-22\,x^2+(x-5)e^{(-x^2+2)}+8\,x+15}{x-5}\right)\right)$$

input
```
integrate((((-2*x^3+20*x^2-50*x)*exp(-x^2+2)+8*x^3-82*x^2+220*x-55)/((x^2-1
0*x+25)*exp(-x^2+2)+4*x^4-42*x^3+118*x^2-25*x-75)/log(((-5+x)*exp(-x^2+2)+
4*x^3-22*x^2+8*x+15)/(-5+x)),x, algorithm=\
```

output
```
log(log((4*x^3 - 22*x^2 + (x - 5)*e^(-x^2 + 2) + 8*x + 15)/(x - 5)))
```

3.803.6 Sympy [A] (verification not implemented)

Time = 0.69 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.94

$$\int \frac{-55+220x-82x^2+8x^3+e^{2-x^2}(-50x+20x^2-2x^3)}{(-75-25x+118x^2-42x^3+4x^4+e^{2-x^2}(25-10x+x^2))\log\left(\frac{15+e^{2-x^2}(-5+x)+8x-22x^2+4x^3}{-5+x}\right)}\,dx$$
$$=\log\left(\log\left(\frac{4x^3-22x^2+8x+(x-5)\,e^{2-x^2}+15}{x-5}\right)\right)$$

input
```
integrate((((-2*x**3+20*x**2-50*x)*exp(-x**2+2)+8*x**3-82*x**2+220*x-55)/((
x**2-10*x+25)*exp(-x**2+2)+4*x**4-42*x**3+118*x**2-25*x-75)/ln(((-5+x)*exp
(-x**2+2)+4*x**3-22*x**2+8*x+15)/(-5+x)),x)
```

output
```
log(log((4*x**3 - 22*x**2 + 8*x + (x - 5)*exp(2 - x**2) + 15)/(x - 5)))
```

3.803.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.30

$$\int \frac{-55+220x-82x^2+8x^3+e^{2-x^2}(-50x+20x^2-2x^3)}{(-75-25x+118x^2-42x^3+4x^4+e^{2-x^2}(25-10x+x^2))\log\left(\frac{15+e^{2-x^2}(-5+x)+8x-22x^2+4x^3}{-5+x}\right)}\,dx$$
$$=\log\left(-x^2+\log\left(xe^2+\left(4\,x^3-22\,x^2+8\,x+15\right)e^{(x^2)}-5\,e^2\right)-\log\left(x-5\right)\right)$$

input
```
integrate((((-2*x^3+20*x^2-50*x)*exp(-x^2+2)+8*x^3-82*x^2+220*x-55)/((x^2-1
0*x+25)*exp(-x^2+2)+4*x^4-42*x^3+118*x^2-25*x-75)/log(((-5+x)*exp(-x^2+2)+
4*x^3-22*x^2+8*x+15)/(-5+x)),x, algorithm=\
```

output
```
log(-x^2 + log(x*e^2 + (4*x^3 - 22*x^2 + 8*x + 15)*e^(x^2) - 5*e^2) - log(
x - 5))
```

3.803.8 Giac [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.30

$$\int \frac{-55+220x-82x^2+8x^3+e^{2-x^2}(-50x+20x^2-2x^3)}{(-75-25x+118x^2-42x^3+4x^4+e^{2-x^2}(25-10x+x^2))\log\left(\frac{15+e^{2-x^2}(-5+x)+8x-22x^2+4x^3}{-5+x}\right)}\,dx$$
$$=\log\left(\log\left(\frac{4\,x^3-22\,x^2+xe^{(-x^2+2)}+8\,x-5\,e^{(-x^2+2)}+15}{x-5}\right)\right)$$

input
```
integrate((((-2*x^3+20*x^2-50*x)*exp(-x^2+2)+8*x^3-82*x^2+220*x-55)/((x^2-1
0*x+25)*exp(-x^2+2)+4*x^4-42*x^3+118*x^2-25*x-75)/log(((-5+x)*exp(-x^2+2)+
4*x^3-22*x^2+8*x+15)/(-5+x)),x, algorithm=\
```

output
```
log(log((4*x^3 - 22*x^2 + x*e^(-x^2 + 2) + 8*x - 5*e^(-x^2 + 2) + 15)/(x -
 5)))
```

3.803.9 Mupad [B] (verification not implemented)

Time = 17.91 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-55+220x-82x^2+8x^3+e^{2-x^2}(-50x+20x^2-2x^3)}{(-75-25x+118x^2-42x^3+4x^4+e^{2-x^2}(25-10x+x^2))\log\left(\frac{15+e^{2-x^2}(-5+x)+8x-22x^2+4x^3}{-5+x}\right)}\,dx$$
$$= \ln\left(\ln\left(\frac{8\,x-22\,x^2+4\,x^3+\mathrm{e}^2\,\mathrm{e}^{-x^2}\,(x-5)+15}{x-5}\right)\right)$$

input
```
int((82*x^2 - 220*x - 8*x^3 + exp(2 - x^2)*(50*x - 20*x^2 + 2*x^3) + 55)/(
log((8*x + exp(2 - x^2)*(x - 5) - 22*x^2 + 4*x^3 + 15)/(x - 5))*(25*x - ex
p(2 - x^2)*(x^2 - 10*x + 25) - 118*x^2 + 42*x^3 - 4*x^4 + 75)),x)
```

output
```
log(log((8*x - 22*x^2 + 4*x^3 + exp(2)*exp(-x^2)*(x - 5) + 15)/(x - 5)))
```

3.804 $\int \frac{5x^3+2x^4+e^x(-80+40x^2+8x^3)+e^{-1-x}(-20x-20x^2-16x^3-4x^4)}{4x^3}\,dx$

3.804.1 Optimal result

Integrand size = 61, antiderivative size = 32

$$\int \frac{5x^3+2x^4+e^x(-80+40x^2+8x^3)+e^{-1-x}(-20x-20x^2-16x^3-4x^4)}{4x^3}\,dx = \frac{\left(e^{-1-x}+\frac{2e^x}{x}+\frac{x}{4}\right)(5+x(5+x))}{x}$$

output
```
(5+(5+x)*x)/x*(exp(-1-x)+2*exp(x)/x+1/4*x)
```

3.804.2 Mathematica [A] (verified)

Time = 0.49 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.72

$$\int \frac{5x^3+2x^4+e^x(-80+40x^2+8x^3)+e^{-1-x}(-20x-20x^2-16x^3-4x^4)}{4x^3}\,dx = \frac{1}{4}\left(8e^x\left(1+\frac{5}{x^2}+\frac{5}{x}\right)+5x+x^2-4e^{-x}\left(-\frac{5}{e}-\frac{5}{ex}-\frac{x}{e}\right)\right)$$

input
```
Integrate[(5*x^3 + 2*x^4 + E^x*(-80 + 40*x^2 + 8*x^3) + E^(-1 - x)*(-20*x
- 20*x^2 - 16*x^3 - 4*x^4))/(4*x^3),x]
```

output
```
(8*E^x*(1 + 5/x^2 + 5/x) + 5*x + x^2 - (4*(-5/E - 5/(E*x) - x/E))/E^x)/4
```

3.804.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.97, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4+5x^3+e^x(8x^3+40x^2-80)+e^{-x-1}(-4x^4-16x^3-20x^2-20x)}{4x^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int \frac{2x^4+5x^3-8e^x(-x^3-5x^2+10)-4e^{-x-1}(x^4+4x^3+5x^2+5x)}{x^3}dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{4}\int \left(2x+5-\frac{4e^{-x-1}(x^3+4x^2+5x+5)}{x^2}+\frac{8e^x(x^3+5x^2-10)}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(x^2+\frac{40e^x}{x^2}+4e^{-x-1}x+5x+20e^{-x-1}+8e^x+\frac{20e^{-x-1}}{x}+\frac{40e^x}{x}\right)$$

input
```
Int[(5*x^3 + 2*x^4 + E^x*(-80 + 40*x^2 + 8*x^3) + E^(-1 - x)*(-20*x - 20*x
^2 - 16*x^3 - 4*x^4))/(4*x^3),x]
```

output
```
(20*E^(-1 - x) + 8*E^x + (40*E^x)/x^2 + (20*E^(-1 - x))/x + (40*E^x)/x + 5
*x + 4*E^(-1 - x)*x + x^2)/4
```

3.804.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.804.4 Maple [A] (verified)

Time = 0.65 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.34

method	result
risch	$\frac{x^2}{4}+\frac{5x}{4}+\frac{2(x^2+5x+5)\,\mathrm{e}^{x}}{x^2}+\frac{(x^2+5x+5)\,\mathrm{e}^{-1-x}}{x}$
parts	$\frac{5x}{4}+\frac{x^2}{4}+4\,\mathrm{e}^{-1-x}+\frac{5\,\mathrm{e}^{-1-x}}{x}-\mathrm{e}^{-1-x}(-1-x)+\frac{10\,\mathrm{e}^{x}}{x^2}+\frac{10\,\mathrm{e}^{x}}{x}+2\,\mathrm{e}^{x}$
parallelrisch	$\frac{4x^3\mathrm{e}^{-1-x}+x^4+8\,\mathrm{e}^{x}x^2+20\,\mathrm{e}^{-1-x}x^2+5x^3+40\,\mathrm{e}^{x}x+20x\,\mathrm{e}^{-1-x}+40\,\mathrm{e}^{x}}{4x^2}$
norman	$\frac{\left(\mathrm{e}^{-1}x^3+10\,\mathrm{e}^{2x}+5\,\mathrm{e}^{-1}x+10x\,\mathrm{e}^{2x}+5x^2\mathrm{e}^{-1}+\frac{5\,\mathrm{e}^{x}x^3}{4}+\frac{\mathrm{e}^{x}x^4}{4}+2\,\mathrm{e}^{2x}x^2\right)\mathrm{e}^{-x}}{x^2}$
default	$\frac{x^2}{4}+\frac{5x}{4}+4\,\mathrm{e}^{-1}\mathrm{e}^{-x}+\frac{10\,\mathrm{e}^{x}}{x^2}+\frac{10\,\mathrm{e}^{x}}{x}-5\,\mathrm{e}^{-1}\left(-\frac{\mathrm{e}^{-x}}{x}+\mathrm{Ei}_1(x)\right)+5\,\mathrm{e}^{-1}\,\mathrm{Ei}_1(x)-\mathrm{e}^{-1}(-x\,\mathrm{e}^{-x}-\mathrm{e}$

input
```
int(1/4*((8*x^3+40*x^2-80)*exp(x)+(-4*x^4-16*x^3-20*x^2-20*x)*exp(-1-x)+2*
x^4+5*x^3)/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4*x^2+5/4*x+2*(x^2+5*x+5)/x^2*exp(x)+1/x*(x^2+5*x+5)*exp(-1-x)
```

3.804.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.72

$$\int \frac{5x^3+2x^4+e^x(-80+40x^2+8x^3)+e^{-1-x}(-20x-20x^2-16x^3-4x^4)}{4x^3}\,dx = \frac{(4\,x^3+20\,x^2+8\,(x^2+5\,x+5)e^{(2\,x+1)}+(x^4+5\,x^3)e^{(x+1)}+20\,x)e^{(-x-1)}}{4\,x^2}$$

input
```
integrate(1/4*((8*x^3+40*x^2-80)*exp(x)+(-4*x^4-16*x^3-20*x^2-20*x)*exp(-1
-x)+2*x^4+5*x^3)/x^3,x, algorithm=\
```

output
```
1/4*(4*x^3 + 20*x^2 + 8*(x^2 + 5*x + 5)*e^(2*x + 1) + (x^4 + 5*x^3)*e^(x +
 1) + 20*x)*e^(-x - 1)/x^2
```

3.804.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(24) = 48$.

Time = 0.14 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.88

$$\int \frac{5x^3 + 2x^4 + e^x(-80 + 40x^2 + 8x^3) + e^{-1-x}(-20x - 20x^2 - 16x^3 - 4x^4)}{4x^3} \, dx$$
$$= \frac{x^2}{4} + \frac{5x}{4} + \frac{(x^4 + 5x^3 + 5x^2) e^{-x} + (2ex^3 + 10ex^2 + 10ex) e^x}{ex^3}$$

input
```
integrate(1/4*((8*x**3+40*x**2-80)*exp(x)+(-4*x**4-16*x**3-20*x**2-20*x)*e
xp(-1-x)+2*x**4+5*x**3)/x**3,x)
```

output
```
x**2/4 + 5*x/4 + ((x**4 + 5*x**3 + 5*x**2)*exp(-x) + (2*E*x**3 + 10*E*x**2
 + 10*E*x)*exp(x))*exp(-1)/x**3
```

3.804.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.78

$$\int \frac{5x^3 + 2x^4 + e^x(-80 + 40x^2 + 8x^3) + e^{-1-x}(-20x - 20x^2 - 16x^3 - 4x^4)}{4x^3} \, dx$$
$$= \frac{1}{4}x^2 - 5\operatorname{Ei}(-x)\, e^{(-1)} + (x+1)e^{(-x-1)} + 5\, e^{(-1)}\Gamma(-1, x) + \frac{5}{4}x + 10\operatorname{Ei}(x) + 2\, e^x + 4\, e^{(-x-1)} + 20\,\Gamma(-2, -x)$$

input
```
integrate(1/4*((8*x^3+40*x^2-80)*exp(x)+(-4*x^4-16*x^3-20*x^2-20*x)*exp(-1
-x)+2*x^4+5*x^3)/x^3,x, algorithm=\
```

output
```
1/4*x^2 - 5*Ei(-x)*e^(-1) + (x + 1)*e^(-x - 1) + 5*e^(-1)*gamma(-1, x) + 5
/4*x + 10*Ei(x) + 2*e^x + 4*e^(-x - 1) + 20*gamma(-2, -x)
```

3.804.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(29) = 58$.

Time = 0.28 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.12

$$\int \frac{5x^3+2x^4+e^x(-80+40x^2+8x^3)+e^{-1-x}(-20x-20x^2-16x^3-4x^4)}{4x^3}\,dx$$
$$= \frac{\left(x^4e+5\,x^3e+4\,x^3e^{(-x)}+20\,x^2e^{(-x)}+8\,x^2e^{(x+1)}+20\,xe^{(-x)}+40\,xe^{(x+1)}+40\,e^{(x+1)}\right)e^{(-1)}}{4\,x^2}$$

input
```
integrate(1/4*((8*x^3+40*x^2-80)*exp(x)+(-4*x^4-16*x^3-20*x^2-20*x)*exp(-1
-x)+2*x^4+5*x^3)/x^3,x, algorithm=\
```

output
```
1/4*(x^4*e + 5*x^3*e + 4*x^3*e^(-x) + 20*x^2*e^(-x) + 8*x^2*e^(x + 1) + 20
*x*e^(-x) + 40*x*e^(x + 1) + 40*e^(x + 1))*e^(-1)/x^2
```

3.804.9 Mupad [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.69

$$\int \frac{5x^3+2x^4+e^x(-80+40x^2+8x^3)+e^{-1-x}(-20x-20x^2-16x^3-4x^4)}{4x^3}\,dx$$
$$= \frac{5\,x}{4}+5\,\mathrm{e}^{-x-1}+2\,\mathrm{e}^x+\frac{10\,\mathrm{e}^x}{x}+\frac{10\,\mathrm{e}^x}{x^2}+x\,\mathrm{e}^{-x-1}+\frac{5\,\mathrm{e}^{-x-1}}{x}+\frac{x^2}{4}$$

input
```
int(((exp(x)*(40*x^2 + 8*x^3 - 80))/4 - (exp(- x - 1)*(20*x + 20*x^2 + 16*
x^3 + 4*x^4))/4 + (5*x^3)/4 + x^4/2)/x^3,x)
```

output
```
(5*x)/4 + 5*exp(- x - 1) + 2*exp(x) + (10*exp(x))/x + (10*exp(x))/x^2 + x*
exp(- x - 1) + (5*exp(- x - 1))/x + x^2/4
```

3.805 $\int \frac{-20+5x}{(-2x+x^2)\log^2\left(\frac{2-x}{x^2}\right)}\,dx$

3.805.1 Optimal result

Integrand size = 27, antiderivative size = 16

$$\int \frac{-20+5x}{(-2x+x^2)\log^2\left(\frac{2-x}{x^2}\right)}\,dx=\frac{5}{\log\left(\frac{2}{x^2}-\frac{1}{x}\right)}$$

output
```
5/ln(2/x^2-1/x)
```

3.805.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{-20+5x}{(-2x+x^2)\log^2\left(\frac{2-x}{x^2}\right)}\,dx=\frac{5}{\log\left(\frac{2-x}{x^2}\right)}$$

input
```
Integrate[(-20 + 5*x)/((-2*x + x^2)*Log[(2 - x)/x^2]^2),x]
```

output
```
5/Log[(2 - x)/x^2]
```

3.805.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5x-20}{(x^2-2x)\log^2\left(\frac{2-x}{x^2}\right)}\,dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{5x-20}{(x-2)x\log^2\left(\frac{2-x}{x^2}\right)}dx$$
$$\Big\downarrow \text{2995}$$
$$\int \frac{5x-20}{(x-2)x\log^2\left(\frac{2-x}{x^2}\right)}dx$$

input
```
Int[(-20 + 5*x)/((-2*x + x^2)*Log[(2 - x)/x^2]^2),x]
```

output
```
$Aborted
```

3.805.3.1 Defintions of rubi rules used

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2995
```
Int[Log[(e_.)*((f_.)*((a_.) + (b_.)*(x_))^(p_.)*((c_.) + (d_.)*(x_))^(q_.))
^(r_.)]^(s_.)*(RFx_), x_Symbol] :> Unintegrable[RFx*Log[e*(f*(a + b*x)^p*(c
 + d*x)^q)^r]^s, x] /; FreeQ[{a, b, c, d, e, f, p, q, r, s}, x] && Rational
FunctionQ[RFx, x]
```

3.805.4 Maple [A] (verified)

Time = 0.59 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

method	result	size
parallelrisch	$\frac{5}{\ln\left(-\frac{-2+x}{x^{2}}\right)}$	14
norman	$\frac{5}{\ln\left(\frac{2-x}{x^{2}}\right)}$	15
risch	$\frac{5}{\ln\left(\frac{2-x}{x^{2}}\right)}$	15
derivativedivides	$\frac{5}{\ln\left(\frac{\frac{2}{x}-1}{x}\right)}$	17
default	$\frac{5}{\ln\left(\frac{\frac{2}{x}-1}{x}\right)}$	17

input
```
int((5*x-20)/(x^2-2*x)/ln((2-x)/x^2)^2,x,method=_RETURNVERBOSE)
```

output
```
5/ln(-(-2+x)/x^2)
```

3.805.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-20+5x}{(-2x+x^2)\log^2\left(\frac{2-x}{x^2}\right)}\,dx = \frac{5}{\log\left(-\frac{x-2}{x^2}\right)}$$

input
```
integrate((5*x-20)/(x^2-2*x)/log((2-x)/x^2)^2,x, algorithm=\
```

output
```
5/log(-(x - 2)/x^2)
```

3.805.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.50

$$\int \frac{-20+5x}{(-2x+x^2)\log^2\left(\frac{2-x}{x^2}\right)}\,dx = \frac{5}{\log\left(\frac{2-x}{x^2}\right)}$$

input
```
integrate((5*x-20)/(x**2-2*x)/ln((2-x)/x**2)**2,x)
```

output
```
5/log((2 - x)/x**2)
```

3.805.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{-20+5x}{(-2x+x^2)\log^2\left(\frac{2-x}{x^2}\right)}\,dx = -\frac{5}{2\log(x)-\log(-x+2)}$$

input
```
integrate((5*x-20)/(x^2-2*x)/log((2-x)/x^2)^2,x, algorithm=\
```

output
```
-5/(2*log(x) - log(-x + 2))
```

3.805.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-20+5x}{(-2x+x^2)\log^2\left(\frac{2-x}{x^2}\right)}\,dx = \frac{5}{\log\left(-\frac{x-2}{x^2}\right)}$$

input
```
integrate((5*x-20)/(x^2-2*x)/log((2-x)/x^2)^2,x, algorithm=\
```

output
```
5/log(-(x - 2)/x^2)
```

3.805.9 Mupad [B] (verification not implemented)

Time = 15.93 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-20+5x}{(-2x+x^2)\log^2\left(\frac{2-x}{x^2}\right)}\,dx = \frac{5}{\ln\left(-\frac{x-2}{x^2}\right)}$$

input
```
int(-(5*x - 20)/(log(-(x - 2)/x^2)^2*(2*x - x^2)),x)
```

output
```
5/log(-(x - 2)/x^2)
```

3.806 $\int \frac{1}{3}\left(3+e^{-\frac{2e^2x}{3}}(6x-2e^2x^2)\right)\,dx$

3.806.1 Optimal result

Integrand size = 29, antiderivative size = 26

$$\int \frac{1}{3}\left(3+e^{-\frac{2e^2x}{3}}(6x-2e^2x^2)\right)\,dx = x+e^{\frac{2e^2(4-x)x}{3(-4+x)}}x^2$$

output
```
exp(1/3*exp(2)*x/(x-4)*(-x+4))^2*x^2+x
```

3.806.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.62

$$\int \frac{1}{3}\left(3+e^{-\frac{2e^2x}{3}}(6x-2e^2x^2)\right)\,dx = x+e^{-\frac{2e^2x}{3}}x^2$$

input
```
Integrate[(3 + (6*x - 2*E^2*x^2)/E^((2*E^2*x)/3))/3,x]
```

output
```
x + x^2/E^((2*E^2*x)/3)
```

3.806.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.069, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{3}\left(e^{-\frac{2e^2x}{3}}\left(6x-2e^2x^2\right)+3\right)dx$$

$$\Big\downarrow \textbf{27}$$

$$\frac{1}{3}\int \left(2e^{-\frac{2e^2x}{3}}\left(3x-e^2x^2\right)+3\right)dx$$

$$\Big\downarrow \textbf{2009}$$

$$\frac{1}{3}\left(3e^{-\frac{2e^2x}{3}}x^2+3x\right)$$

input
```
Int[(3 + (6*x - 2*E^2*x^2)/E^((2*E^2*x)/3))/3,x]
```

output
```
(3*x + (3*x^2)/E^((2*E^2*x)/3))/3
```

3.806.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.806.4 Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.50

method	result
risch	$x+x^{2} {\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}$
norman	$x+x^{2} {\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}$
parallelrisch	$x+x^{2} {\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}$
default	$x -18 \,{\mathrm e}^{-2} \left(-{\mathrm e}^{-2} \left(-\frac{{\mathrm e}^{2} x \,{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{6}-\frac{{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{4}\right)-{\mathrm e}^{-2} \left(\frac{{\mathrm e}^{4} x^{2} {\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{18}+\frac{{\mathrm e}^{2} x \,{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{6}+\frac{{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{4}\right)\right)$
parts	$x -18 \,{\mathrm e}^{-2} \left(-{\mathrm e}^{-2} \left(-\frac{{\mathrm e}^{2} x \,{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{6}-\frac{{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{4}\right)-{\mathrm e}^{-2} \left(\frac{{\mathrm e}^{4} x^{2} {\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{18}+\frac{{\mathrm e}^{2} x \,{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{6}+\frac{{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{4}\right)\right)$
derivativedivides	$-{\mathrm e}^{-2} \left(-{\mathrm e}^{2} x -18 \,{\mathrm e}^{-2} \left(-\frac{{\mathrm e}^{2} x \,{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{6}-\frac{{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{4}\right)-18 \,{\mathrm e}^{-2} \left(\frac{{\mathrm e}^{4} x^{2} {\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{18}+\frac{{\mathrm e}^{2} x \,{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{6}+\frac{{\mathrm e}^{-\frac{2 \,{\mathrm e}^{2} x}{3}}}{4}\right.\right.$

input
```
int(1/3*(-2*x^2*exp(2)+6*x)*exp(-1/3*exp(2)*x)^2+1,x,method=_RETURNVERBOSE
)
```

output
```
x+x^2*exp(-2/3*exp(2)*x)
```

3.806.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.46

$$\int \frac{1}{3}\left(3+e^{-\frac{2e^2x}{3}}\left(6x-2e^2x^2\right)\right)\,dx = x^2e^{\left(-\frac{2}{3}\,xe^2\right)}+x$$

input
```
integrate(1/3*(-2*x^2*exp(2)+6*x)*exp(-1/3*exp(2)*x)^2+1,x, algorithm=\
```

output
```
x^2*e^(-2/3*x*e^2) + x
```

3.806.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.54

$$\int \frac{1}{3}\left(3+e^{-\frac{2e^2x}{3}}\left(6x-2e^2x^2\right)\right)\,dx = x^2e^{-\frac{2xe^2}{3}}+x$$

input
```
integrate(1/3*(-2*x**2*exp(2)+6*x)*exp(-1/3*exp(2)*x)**2+1,x)
```

output
```
x**2*exp(-2*x*exp(2)/3) + x
```

3.806.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. 2(12) = 24.

Time = 0.20 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.65

$$\int \frac{1}{3}\left(3+e^{-\frac{2e^2x}{3}}\left(6x-2e^2x^2\right)\right)\,dx = \frac{1}{2}\left(2\,x^2e^4+6\,xe^2+9\right)e^{\left(-\frac{2}{3}\,xe^2-4\right)} - \frac{3}{2}\left(2\,xe^2+3\right)e^{\left(-\frac{2}{3}\,xe^2-4\right)}+x$$

input
```
integrate(1/3*(-2*x^2*exp(2)+6*x)*exp(-1/3*exp(2)*x)^2+1,x, algorithm=\
```

output
```
1/2*(2*x^2*e^4 + 6*x*e^2 + 9)*e^(-2/3*x*e^2 - 4) - 3/2*(2*x*e^2 + 3)*e^(-2
/3*x*e^2 - 4) + x
```

3.806.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. 2(12) = 24.

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.65

$$\int \frac{1}{3}\left(3+e^{-\frac{2e^2x}{3}}\left(6x-2e^2x^2\right)\right)\,dx = \frac{1}{2}\left(2\,x^2e^4+6\,xe^2+9\right)e^{\left(-\frac{2}{3}\,xe^2-4\right)} - \frac{3}{2}\left(2\,xe^2+3\right)e^{\left(-\frac{2}{3}\,xe^2-4\right)}+x$$

input
```
integrate(1/3*(-2*x^2*exp(2)+6*x)*exp(-1/3*exp(2)*x)^2+1,x, algorithm=\
```

output
```
1/2*(2*x^2*e^4 + 6*x*e^2 + 9)*e^(-2/3*x*e^2 - 4) - 3/2*(2*x*e^2 + 3)*e^(-2
/3*x*e^2 - 4) + x
```

3.806.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.46

$$\int \frac{1}{3}\left(3+e^{-\frac{2e^2x}{3}}\left(6x-2e^2x^2\right)\right)\,dx = x+x^2\,\mathrm{e}^{-\frac{2\,x\,\mathrm{e}^2}{3}}$$

input
```
int((exp(-(2*x*exp(2))/3)*(6*x - 2*x^2*exp(2)))/3 + 1,x)
```

output
```
x + x^2*exp(-(2*x*exp(2))/3)
```

3.807 $\int (2 - e^3 + 6x - 64x^3)\, dx$

3.807.1 Optimal result

Integrand size = 15, antiderivative size = 20

$$\int (2 - e^3 + 6x - 64x^3)\, dx = 2x - 16x^4 + x(-e^3 + 3x)$$

output
```
2*x-16*x^4+x*(3*x-exp(3))
```

3.807.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int (2 - e^3 + 6x - 64x^3)\, dx = 2x - e^3x + 3x^2 - 16x^4$$

input
```
Integrate[2 - E^3 + 6*x - 64*x^3,x]
```

output
```
2*x - E^3*x + 3*x^2 - 16*x^4
```

3.807.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-64x^3+6x-e^3+2\right) dx$$

$$\Big\downarrow \text{2009}$$

$$-16x^4+3x^2+\left(2-e^3\right)x$$

input
```
Int[2 - E^3 + 6*x - 64*x^3,x]
```

output
```
(2 - E^3)*x + 3*x^2 - 16*x^4
```

3.807.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.807.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result	size
gosper	$-x(16x^3+e^3-3x-2)$	16
default	$-x\,e^3-16x^4+3x^2+2x$	20
norman	$(2-e^3)\,x+3x^2-16x^4$	20
risch	$-x\,e^3-16x^4+3x^2+2x$	20
parallelrisch	$(2-e^3)\,x+3x^2-16x^4$	20
parts	$-x\,e^3-16x^4+3x^2+2x$	20

input
```
int(-exp(3)-64*x^3+6*x+2,x,method=_RETURNVERBOSE)
```

output
```
-x*(16*x^3+exp(3)-3*x-2)
```

3.807.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(2-e^3+6x-64x^3\right)\,dx=-16\,x^4+3\,x^2-xe^3+2\,x$$

input
```
integrate(-exp(3)-64*x^3+6*x+2,x, algorithm=\
```

output
```
-16*x^4 + 3*x^2 - x*e^3 + 2*x
```

3.807.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \left(2-e^3+6x-64x^3\right)\,dx=-16x^4+3x^2+x\left(2-e^3\right)$$

input
```
integrate(-exp(3)-64*x**3+6*x+2,x)
```

output
```
-16*x**4 + 3*x**2 + x*(2 - exp(3))
```

3.807.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(2-e^3+6x-64x^3\right)\,dx=-16\,x^4+3\,x^2-xe^3+2\,x$$

input
```
integrate(-exp(3)-64*x^3+6*x+2,x, algorithm=\
```

output
```
-16*x^4 + 3*x^2 - x*e^3 + 2*x
```

3.807.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(2-e^3+6x-64x^3\right) \, dx = -16\,x^4+3\,x^2-xe^3+2\,x$$

input
```
integrate(-exp(3)-64*x^3+6*x+2,x, algorithm=\
```

output
```
-16*x^4 + 3*x^2 - x*e^3 + 2*x
```

3.807.9 Mupad [B] (verification not implemented)

Time = 16.86 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \left(2-e^3+6x-64x^3\right) \, dx = -16\,x^4+3\,x^2+\left(2-\mathrm{e}^3\right)\,x$$

input
```
int(6*x - exp(3) - 64*x^3 + 2,x)
```

output
```
3*x^2 - x*(exp(3) - 2) - 16*x^4
```

3.808 $\int \frac{10+22x+4x^2+5x^5+x^6+\left(10+4x+15x^4+3x^5\right)\log(x)+\left(15x^3+3x^4\right)\log}{5x^6+x^7+\left(15x^5+3x^6\right)\log(x)+\left(15x^4+3x^5\right)\log^2(x}$

3.808.1 Optimal result

Integrand size = 354, antiderivative size = 22

$$\int \frac{10+22x+4x^2+5x^5+x^6+(10+4x+15x^4+3x^5)\log(x)+(15x^3+3x^4)\log^2(x)+(5x^2+x^3)\log^3(x)}{5x^6+x^7+(15x^5+3x^6)\log(x)+(15x^4+3x^5)\log^2(x)+(5x^3+x^4)\log^3(x)+(}$$
$$=\log(x)-\frac{1}{(x^2+\log(x)(x+x\log(5+x)))^2}$$

output
```
ln(x)-1/(ln(x)*(x*ln(5+x)+x)+x^2)^2
```

3.808.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{10+22x+4x^2+5x^5+x^6+(10+4x+15x^4+3x^5)\log(x)+(15x^3+3x^4)\log^2(x)+(5x^2+x^3)\log^3(x)}{5x^6+x^7+(15x^5+3x^6)\log(x)+(15x^4+3x^5)\log^2(x)+(5x^3+x^4)\log^3(x)+(}$$
$$=\log(x)-\frac{1}{x^2(x+\log(x)+\log(x)\log(5+x))^2}$$

input
```
Integrate[(10 + 22*x + 4*x^2 + 5*x^5 + x^6 + (10 + 4*x + 15*x^4 + 3*x^5)*L
og[x] + (15*x^3 + 3*x^4)*Log[x]^2 + (5*x^2 + x^3)*Log[x]^3 + (10 + 2*x + (
10 + 2*x + 15*x^4 + 3*x^5)*Log[x] + (30*x^3 + 6*x^4)*Log[x]^2 + (15*x^2 +
3*x^3)*Log[x]^3)*Log[5 + x] + ((15*x^3 + 3*x^4)*Log[x]^2 + (15*x^2 + 3*x^3
)*Log[x]^3)*Log[5 + x]^2 + (5*x^2 + x^3)*Log[x]^3*Log[5 + x]^3)/(5*x^6 + x
^7 + (15*x^5 + 3*x^6)*Log[x] + (15*x^4 + 3*x^5)*Log[x]^2 + (5*x^3 + x^4)*L
og[x]^3 + ((15*x^5 + 3*x^6)*Log[x] + (30*x^4 + 6*x^5)*Log[x]^2 + (15*x^3 +
 3*x^4)*Log[x]^3)*Log[5 + x] + ((15*x^4 + 3*x^5)*Log[x]^2 + (15*x^3 + 3*x^
4)*Log[x]^3)*Log[5 + x]^2 + (5*x^3 + x^4)*Log[x]^3*Log[5 + x]^3),x]
```

output
```
Log[x] - 1/(x^2*(x + Log[x] + Log[x]*Log[5 + x])^2)
```

3.808.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^6+5x^5+4x^2+\left(3x^5+15x^4+4x+10\right)\log(x)+\left(3x^4+15x^3\right)\log^2(x)+\left(x^3+5x^2\right)\log^3(x)+\left(x^3+5x^2\right)\log}{x^7+5x^6+\left(3x^6+15x^5\right)\log(x)+\left(3x^5+15x^4\right)\log^2(x)+\left(x^4+5x^3\right)\log^3(x)+\left(x^4+\right.}$$

$$\Big\downarrow \; 7239$$

$$\int \frac{(x+5)\left(x^5+4x+2\log(x+5)+2\right)+3(x+5)x^3\log^2(x)(\log(x+5)+1)^2+(x+5)x^2\log^3(x)(\log(x+5)+1)}{x^3(x+5)(x+\log(x)(\log(x+5)+1))^3}$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{2(\log(x)+1)}{x^3\log(x)(x+\log(x)+\log(x)\log(x+5))^2}+\frac{2\left(-x+\log^2(x)+x\log(x)+5\log(x)-5\right)}{x^2(x+5)\log(x)(x+\log(x)+\log(x)\log(x+5))^3}+\frac{1}{x}\right)dx$$

$$\Big\downarrow \; 2009$$

$$2\int \frac{1}{x^3(x+\log(x)+\log(x)\log(x+5))^2}dx+2\int \frac{1}{x^3\log(x)(x+\log(x)+\log(x)\log(x+5))^2}dx+2\int \frac{1}{x^2(x+\log(x)+\log(x)\log(x+5))^3}dx-2\int \frac{1}{x^2\log(x)(x+\log(x)+\log(x)\log(x+5))^3}dx+\frac{2}{5}\int \frac{\log(x)}{x^2(x+\log(x)+\log(x)\log(x+5))^3}dx-\frac{2}{25}\int \frac{\log(x)}{x(x+\log(x)+\log(x)\log(x+5))^3}dx+\frac{2}{25}\int \frac{\log(x)}{(x+5)(x+\log(x)+\log(x)\log(x+5))^3}dx+\log(x)$$

input
```
Int[(10 + 22*x + 4*x^2 + 5*x^5 + x^6 + (10 + 4*x + 15*x^4 + 3*x^5)*Log[x]
+ (15*x^3 + 3*x^4)*Log[x]^2 + (5*x^2 + x^3)*Log[x]^3 + (10 + 2*x + (10 + 2
*x + 15*x^4 + 3*x^5)*Log[x] + (30*x^3 + 6*x^4)*Log[x]^2 + (15*x^2 + 3*x^3)
*Log[x]^3)*Log[5 + x] + ((15*x^3 + 3*x^4)*Log[x]^2 + (15*x^2 + 3*x^3)*Log[
x]^3)*Log[5 + x]^2 + (5*x^2 + x^3)*Log[x]^3*Log[5 + x]^3)/(5*x^6 + x^7 + (
15*x^5 + 3*x^6)*Log[x] + (15*x^4 + 3*x^5)*Log[x]^2 + (5*x^3 + x^4)*Log[x]^
3 + ((15*x^5 + 3*x^6)*Log[x] + (30*x^4 + 6*x^5)*Log[x]^2 + (15*x^3 + 3*x^4
)*Log[x]^3)*Log[5 + x] + ((15*x^4 + 3*x^5)*Log[x]^2 + (15*x^3 + 3*x^4)*Log
[x]^3)*Log[5 + x]^2 + (5*x^3 + x^4)*Log[x]^3*Log[5 + x]^3),x]
```

output
```
$Aborted
```

3.808.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.808.4 Maple [A] (verified)

Time = 6.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

method	result	size
default	$\ln\left(x\right)-\frac{1}{x^{2}\left(\ln(x)\ln(5+x)+\ln(x)+x\right)^{2}}$	22
risch	$\ln\left(x\right)-\frac{1}{x^{2}\left(\ln(x)\ln(5+x)+\ln(x)+x\right)^{2}}$	22
parallelrisch	$\frac{-20+20x^{4}\ln(x)+20x^{2}\ln(x)^{3}+40x^{3}\ln(x)^{2}+40\ln(x)^{3}\ln(5+x)x^{2}+40\ln(x)^{2}x^{3}\ln(5+x)+20x^{2}\ln(x)^{3}\ln(5+x)^{2}}{20x^{2}\left(\ln(x)^{2}\ln(5+x)^{2}+2\ln(x)\ln(5+x)x+2\ln(x)^{2}\ln(5+x)+x^{2}+2x\ln(x)+\ln(x)^{2}\right)}$	119

3.808. $\int \frac{10+22x+4x^2+5x^5+x^6+\left(10+4x+15x^4+3x^5\right)\log(x)+\left(15x^3+3x^4\right)\log^2(x)+\left(5x^2+x^3\right)\log^3(x)+\left(10+2x+\left(10+2x+15x^4+3x^5\right)\log(x)+\left(30x^3+6x\right.\right.}{5x^6+x^7+\left(15x^5+3x^6\right)\log(x)+\left(15x^4+3x^5\right)\log^2(x)+\left(5x^3+x^4\right)\log^3(x)+\left(\left(15x^5+3x^6\right)\log(x)+\left(30x^4+6x^5\right)\log^2(x)+\left(15x^3+3\right.\right.}$

input
```
int(((x^3+5*x^2)*ln(x)^3*ln(5+x)^3+((3*x^3+15*x^2)*ln(x)^3+(3*x^4+15*x^3)*
ln(x)^2)*ln(5+x)^2+((3*x^3+15*x^2)*ln(x)^3+(6*x^4+30*x^3)*ln(x)^2+(3*x^5+1
5*x^4+2*x+10)*ln(x)+2*x+10)*ln(5+x)+(x^3+5*x^2)*ln(x)^3+(3*x^4+15*x^3)*ln(
x)^2+(3*x^5+15*x^4+4*x+10)*ln(x)+x^6+5*x^5+4*x^2+22*x+10)/((x^4+5*x^3)*ln(
x)^3*ln(5+x)^3+((3*x^4+15*x^3)*ln(x)^3+(3*x^5+15*x^4)*ln(x)^2)*ln(5+x)^2+(
(3*x^4+15*x^3)*ln(x)^3+(6*x^5+30*x^4)*ln(x)^2+(3*x^6+15*x^5)*ln(x))*ln(5+x
)+(x^4+5*x^3)*ln(x)^3+(3*x^5+15*x^4)*ln(x)^2+(3*x^6+15*x^5)*ln(x)+x^7+5*x^
6),x,method=_RETURNVERBOSE)
```

output
```
ln(x)-1/x^2/(ln(x)*ln(5+x)+ln(x)+x)^2
```

3.808.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 119 vs. $2(22) = 44$.

Time = 0.26 (sec) , antiderivative size = 119, normalized size of antiderivative = 5.41

$$\int \frac{10+22x+4x^2+5x^5+x^6+(10+4x+15x^4+3x^5)\log(x)+(15x^3+3x^4)\log^2(x)+(5x^2+x^3)\log^3(x)}{5x^6+x^7+(15x^5+3x^6)\log(x)+(15x^4+3x^5)\log^2(x)+(5x^3+x^4)\log^3(x)+(}$$
$$= \frac{x^2\log(x+5)^2\log(x)^3+x^4\log(x)+2x^3\log(x)^2+x^2\log(x)^3+2\left(x^3\log(x)^2+x^2\log(x)^3\right)\log(x+5)}{x^2\log(x+5)^2\log(x)^2+x^4+2x^3\log(x)+x^2\log(x)^2+2\left(x^3\log(x)+x^2\log(x)^2\right)\log(x+5)}$$

input
```
integrate(((x^3+5*x^2)*log(x)^3*log(5+x)^3+((3*x^3+15*x^2)*log(x)^3+(3*x^4
+15*x^3)*log(x)^2)*log(5+x)^2+((3*x^3+15*x^2)*log(x)^3+(6*x^4+30*x^3)*log(
x)^2+(3*x^5+15*x^4+2*x+10)*log(x)+2*x+10)*log(5+x)+(x^3+5*x^2)*log(x)^3+(3
*x^4+15*x^3)*log(x)^2+(3*x^5+15*x^4+4*x+10)*log(x)+x^6+5*x^5+4*x^2+22*x+10
)/((x^4+5*x^3)*log(x)^3*log(5+x)^3+((3*x^4+15*x^3)*log(x)^3+(3*x^5+15*x^4)
*log(x)^2)*log(5+x)^2+((3*x^4+15*x^3)*log(x)^3+(6*x^5+30*x^4)*log(x)^2+(3*
x^6+15*x^5)*log(x))*log(5+x)+(x^4+5*x^3)*log(x)^3+(3*x^5+15*x^4)*log(x)^2+
(3*x^6+15*x^5)*log(x)+x^7+5*x^6),x, algorithm=\
```

output
```
(x^2*log(x + 5)^2*log(x)^3 + x^4*log(x) + 2*x^3*log(x)^2 + x^2*log(x)^3 +
2*(x^3*log(x)^2 + x^2*log(x)^3)*log(x + 5) - 1)/(x^2*log(x + 5)^2*log(x)^2
 + x^4 + 2*x^3*log(x) + x^2*log(x)^2 + 2*(x^3*log(x) + x^2*log(x)^2)*log(x
 + 5))
```

3.808.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. 2(20) = 40.

Time = 0.23 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.86

$$\int \frac{10+22x+4x^2+5x^5+x^6+(10+4x+15x^4+3x^5)\log(x)+(15x^3+3x^4)\log^2(x)+(5x^2+x^3)\log^3(x)}{5x^6+x^7+(15x^5+3x^6)\log(x)+(15x^4+3x^5)\log^2(x)+(5x^3+x^4)\log^3(x)+(}$$
$$= \log(x) - \frac{1}{x^4+2x^3\log(x)+x^2\log(x)^2\log(x+5)^2+x^2\log(x)^2+(2x^3\log(x)+2x^2\log(x)^2)\log(x+5)}$$

input
```
integrate(((x**3+5*x**2)*ln(x)**3*ln(5+x)**3+((3*x**3+15*x**2)*ln(x)**3+(3
*x**4+15*x**3)*ln(x)**2)*ln(5+x)**2+((3*x**3+15*x**2)*ln(x)**3+(6*x**4+30*
x**3)*ln(x)**2+(3*x**5+15*x**4+2*x+10)*ln(x)+2*x+10)*ln(5+x)+(x**3+5*x**2)
*ln(x)**3+(3*x**4+15*x**3)*ln(x)**2+(3*x**5+15*x**4+4*x+10)*ln(x)+x**6+5*x
**5+4*x**2+22*x+10)/((x**4+5*x**3)*ln(x)**3*ln(5+x)**3+((3*x**4+15*x**3)*l
n(x)**3+(3*x**5+15*x**4)*ln(x)**2)*ln(5+x)**2+((3*x**4+15*x**3)*ln(x)**3+(
6*x**5+30*x**4)*ln(x)**2+(3*x**6+15*x**5)*ln(x))*ln(5+x)+(x**4+5*x**3)*ln(
x)**3+(3*x**5+15*x**4)*ln(x)**2+(3*x**6+15*x**5)*ln(x)+x**7+5*x**6),x)
```

output
```
log(x) - 1/(x**4 + 2*x**3*log(x) + x**2*log(x)**2*log(x + 5)**2 + x**2*log
(x)**2 + (2*x**3*log(x) + 2*x**2*log(x)**2)*log(x + 5))
```

3.808.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(22) = 44.

Time = 0.29 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.77

$$\int \frac{10+22x+4x^2+5x^5+x^6+(10+4x+15x^4+3x^5)\log(x)+(15x^3+3x^4)\log^2(x)+(5x^2+x^3)\log^3(x)}{5x^6+x^7+(15x^5+3x^6)\log(x)+(15x^4+3x^5)\log^2(x)+(5x^3+x^4)\log^3(x)+(}$$
$$= -\frac{1}{x^2\log(x+5)^2\log(x)^2+x^4+2\,x^3\log(x)+x^2\log(x)^2+2\,(x^3\log(x)+x^2\log(x)^2)\log(x+5)} + \log(x)$$

3.808.
$$\int \frac{10+22x+4x^2+5x^5+x^6+(10+4x+15x^4+3x^5)\log(x)+(15x^3+3x^4)\log^2(x)+(5x^2+x^3)\log^3(x)+(10+2x+(10+2x+15x^4+3x^5)\log(x)+(30x^3+6x}{5x^6+x^7+(15x^5+3x^6)\log(x)+(15x^4+3x^5)\log^2(x)+(5x^3+x^4)\log^3(x)+((15x^5+3x^6)\log(x)+(30x^4+6x^5)\log^2(x)+(15x^3+3}$$

input
```
integrate(((x^3+5*x^2)*log(x)^3*log(5+x)^3+((3*x^3+15*x^2)*log(x)^3+(3*x^4
+15*x^3)*log(x)^2)*log(5+x)^2+((3*x^3+15*x^2)*log(x)^3+(6*x^4+30*x^3)*log(
x)^2+(3*x^5+15*x^4+2*x+10)*log(x)+2*x+10)*log(5+x)+(x^3+5*x^2)*log(x)^3+(3
*x^4+15*x^3)*log(x)^2+(3*x^5+15*x^4+4*x+10)*log(x)+x^6+5*x^5+4*x^2+22*x+10
)/((x^4+5*x^3)*log(x)^3*log(5+x)^3+((3*x^4+15*x^3)*log(x)^3+(3*x^5+15*x^4)
*log(x)^2)*log(5+x)^2+((3*x^4+15*x^3)*log(x)^3+(6*x^5+30*x^4)*log(x)^2+(3*
x^6+15*x^5)*log(x))*log(5+x)+(x^4+5*x^3)*log(x)^3+(3*x^5+15*x^4)*log(x)^2+
(3*x^6+15*x^5)*log(x)+x^7+5*x^6),x, algorithm=\
```

output
```
-1/(x^2*log(x + 5)^2*log(x)^2 + x^4 + 2*x^3*log(x) + x^2*log(x)^2 + 2*(x^3
*log(x) + x^2*log(x)^2)*log(x + 5)) + log(x)
```

3.808.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 281 vs. $2(22) = 44$.

Time = 0.52 (sec) , antiderivative size = 281, normalized size of antiderivative = 12.77

$$\int \frac{10 + 22x + 4x^2 + 5x^5 + x^6 + (10 + 4x + 15x^4 + 3x^5)\log(x) + (15x^3 + 3x^4)\log^2(x) + (5x^2 + x^3)\log^3(x)}{5x^6 + x^7 + (15x^5 + 3x^6)\log(x) + (15x^4 + 3x^5)\log^2(x) + (5x^3 + x^4)\log^3(x) + (}$$
$$= -\frac{}{x^3 \log(x+5)^2 \log(x)^3 + x^2 \log(x+5)^2 \log(x)^4 + 2\,x^4 \log(x+5)\log(x)^2 - x^3 \log(x+5)^2 \log(x)^2 + 4}$$
$$+ \log(x)$$

input
```
integrate(((x^3+5*x^2)*log(x)^3*log(5+x)^3+((3*x^3+15*x^2)*log(x)^3+(3*x^4
+15*x^3)*log(x)^2)*log(5+x)^2+((3*x^3+15*x^2)*log(x)^3+(6*x^4+30*x^3)*log(
x)^2+(3*x^5+15*x^4+2*x+10)*log(x)+2*x+10)*log(5+x)+(x^3+5*x^2)*log(x)^3+(3
*x^4+15*x^3)*log(x)^2+(3*x^5+15*x^4+4*x+10)*log(x)+x^6+5*x^5+4*x^2+22*x+10
)/((x^4+5*x^3)*log(x)^3*log(5+x)^3+((3*x^4+15*x^3)*log(x)^3+(3*x^5+15*x^4)
*log(x)^2)*log(5+x)^2+((3*x^4+15*x^3)*log(x)^3+(6*x^5+30*x^4)*log(x)^2+(3*
x^6+15*x^5)*log(x))*log(5+x)+(x^4+5*x^3)*log(x)^3+(3*x^5+15*x^4)*log(x)^2+
(3*x^6+15*x^5)*log(x)+x^7+5*x^6),x, algorithm=\
```

output
```
-(x*log(x) + log(x)^2 - x + 5*log(x) - 5)/(x^3*log(x + 5)^2*log(x)^3 + x^2
*log(x + 5)^2*log(x)^4 + 2*x^4*log(x + 5)*log(x)^2 - x^3*log(x + 5)^2*log(
x)^2 + 4*x^3*log(x + 5)*log(x)^3 + 5*x^2*log(x + 5)^2*log(x)^3 + 2*x^2*log
(x + 5)*log(x)^4 + x^5*log(x) - 2*x^4*log(x + 5)*log(x) + 3*x^4*log(x)^2 +
 8*x^3*log(x + 5)*log(x)^2 - 5*x^2*log(x + 5)^2*log(x)^2 + 3*x^3*log(x)^3
+ 10*x^2*log(x + 5)*log(x)^3 + x^2*log(x)^4 - x^5 + 3*x^4*log(x) - 10*x^3*
log(x + 5)*log(x) + 9*x^3*log(x)^2 - 10*x^2*log(x + 5)*log(x)^2 + 5*x^2*lo
g(x)^3 - 5*x^4 - 10*x^3*log(x) - 5*x^2*log(x)^2) + log(x)
```

3.808.9 Mupad [B] (verification not implemented)

Time = 15.76 (sec) , antiderivative size = 82, normalized size of antiderivative = 3.73

$$\int \frac{10+22x+4x^2+5x^5+x^6+(10+4x+15x^4+3x^5)\log(x)+(15x^3+3x^4)\log^2(x)+(5x^2+x^3)\log^3(x)}{5x^6+x^7+(15x^5+3x^6)\log(x)+(15x^4+3x^5)\log^2(x)+(5x^3+x^4)\log^3(x)+(}$$
$$= \frac{x^4\,\ln(x)+2\,x^3\,\ln(x+5)\,\ln(x)^2+2\,x^3\ln(x)^2+x^2\ln(x+5)^2\ln(x)^3+2\,x^2\,\ln(x+5)\,\ln(x)^3+x^2\ln(x}{x^2\,(x+\ln(x)+\ln(x+5)\,\ln(x))^2}$$

input
```
int((22*x + log(x)^3*(5*x^2 + x^3) + log(x + 5)^2*(log(x)^3*(15*x^2 + 3*x^
3) + log(x)^2*(15*x^3 + 3*x^4)) + log(x)^2*(15*x^3 + 3*x^4) + log(x + 5)*(
2*x + log(x)^3*(15*x^2 + 3*x^3) + log(x)^2*(30*x^3 + 6*x^4) + log(x)*(2*x
+ 15*x^4 + 3*x^5 + 10) + 10) + 4*x^2 + 5*x^5 + x^6 + log(x)*(4*x + 15*x^4
+ 3*x^5 + 10) + log(x + 5)^3*log(x)^3*(5*x^2 + x^3) + 10)/(log(x)*(15*x^5
+ 3*x^6) + log(x)^3*(5*x^3 + x^4) + log(x + 5)^2*(log(x)^3*(15*x^3 + 3*x^4
) + log(x)^2*(15*x^4 + 3*x^5)) + log(x)^2*(15*x^4 + 3*x^5) + 5*x^6 + x^7 +
 log(x + 5)*(log(x)*(15*x^5 + 3*x^6) + log(x)^3*(15*x^3 + 3*x^4) + log(x)^
2*(30*x^4 + 6*x^5)) + log(x + 5)^3*log(x)^3*(5*x^3 + x^4)),x)
```

output
```
(x^4*log(x) + x^2*log(x)^3 + 2*x^3*log(x)^2 + x^2*log(x + 5)^2*log(x)^3 +
2*x^2*log(x + 5)*log(x)^3 + 2*x^3*log(x + 5)*log(x)^2 - 1)/(x^2*(x + log(x
) + log(x + 5)*log(x))^2)
```

3.809 $\int \frac{-8+16x-8x^2+(-12-14x+34x}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(}$

3.809.1 Optimal result

Integrand size = 170, antiderivative size = 24

$$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log\left(\log^2(6+x)\right)+}$$
$$=\frac{1}{\left(-x+\frac{2(x+\log(\log^2(6+x)))}{1-x}\right)^2}$$

output
```
1/(2*(x+ln(ln(6+x)^2))/(1-x)-x)^2
```

3.809.2 Mathematica [A] (verified)

Time = 1.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log\left(\log^2(6+x)\right)+}$$
$$=\frac{(-1+x)^2}{\left(x+x^2+2\log\left(\log^2(6+x)\right)\right)^2}$$

input
```
Integrate[(-8 + 16*x - 8*x^2 + (-12 - 14*x + 34*x^2 - 6*x^3 - 2*x^4)*Log[6
 + x] + (-24 + 20*x + 4*x^2)*Log[6 + x]*Log[Log[6 + x]^2])/((6*x^3 + 19*x^
4 + 21*x^5 + 9*x^6 + x^7)*Log[6 + x] + (36*x^2 + 78*x^3 + 48*x^4 + 6*x^5)*
Log[6 + x]*Log[Log[6 + x]^2] + (72*x + 84*x^2 + 12*x^3)*Log[6 + x]*Log[Log
[6 + x]^2]^2 + (48 + 8*x)*Log[6 + x]*Log[Log[6 + x]^2]^3),x]
```

3.809.

$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)+(-24+20x+4x^2)\log(6+x)\log(\log^2(6+x))}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log(\log^2(6+x))+(72x+84x^2+12x^3)\log(6+x)\log^2(\log^2(6+x))+(48+}$

output
```
(-1 + x)^2/(x + x^2 + 2*Log[Log[6 + x]^2])^2
```

3.809.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x^2+(4x^2+20x-24)\log(x+6)\log\left(\log^2(x+6)\right)+\left(-2x^4-6x\right.}{(12x^3+84x^2+72x)\log(x+6)\log^2\left(\log^2(x+6)\right)+(6x^5+48x^4+78x^3+36x^2)\log(x+6)\log\left(\log^2(x+6)\right)+}$$

$\Big\downarrow$ 7239

$$\int \frac{2(1-x)\left((x+6)\log(x+6)\left(x^2-2x-2\log\left(\log^2(x+6)\right)-1\right)+4(x-1)\right)}{(x+6)\log(x+6)\left(x^2+x+2\log\left(\log^2(x+6)\right)\right)^3}dx$$

$\Big\downarrow$ 27

$$2\int -\frac{(1-x)\left(4(1-x)+(x+6)\log(x+6)\left(-x^2+2x+2\log\left(\log^2(x+6)\right)+1\right)\right)}{(x+6)\log(x+6)\left(x^2+x+2\log\left(\log^2(x+6)\right)\right)^3}dx$$

$\Big\downarrow$ 25

$$-2\int \frac{(1-x)\left(4(1-x)+(x+6)\log(x+6)\left(-x^2+2x+2\log\left(\log^2(x+6)\right)+1\right)\right)}{(x+6)\log(x+6)\left(x^2+x+2\log\left(\log^2(x+6)\right)\right)^3}dx$$

$\Big\downarrow$ 7293

$$-2\int \left(\frac{(2\log(x+6)x^2+13\log(x+6)x+6\log(x+6)+4)(x-1)^2}{(x+6)\log(x+6)\left(x^2+x+2\log\left(\log^2(x+6)\right)\right)^3}+\frac{1-x}{\left(x^2+x+2\log\left(\log^2(x+6)\right)\right)^2}\right)dx$$

$\Big\downarrow$ 2009

$$-2\left(-48\int \frac{1}{\left(x^2+x+2\log\left(\log^2(x+6)\right)\right)^3}dx-98\int \frac{x}{\left(x^2+x+2\log\left(\log^2(x+6)\right)\right)^3}dx-3\int \frac{x^2}{\left(x^2+x+2\log\left(\mathrm{l}\right.\right.}\right.$$

input
```
Int[(-8 + 16*x - 8*x^2 + (-12 - 14*x + 34*x^2 - 6*x^3 - 2*x^4)*Log[6 + x]
+ (-24 + 20*x + 4*x^2)*Log[6 + x]*Log[Log[6 + x]^2])/((6*x^3 + 19*x^4 + 21
*x^5 + 9*x^6 + x^7)*Log[6 + x] + (36*x^2 + 78*x^3 + 48*x^4 + 6*x^5)*Log[6
+ x]*Log[Log[6 + x]^2] + (72*x + 84*x^2 + 12*x^3)*Log[6 + x]*Log[Log[6 + x
]^2]^2 + (48 + 8*x)*Log[6 + x]*Log[Log[6 + x]^2]^3),x]
```

3.809.

$$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)+(-24+20x+4x^2)\log(6+x)\log\left(\log^2(6+x)\right)}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log\left(\log^2(6+x)\right)+(72x+84x^2+12x^3)\log(6+x)\log^2\left(\log^2(6+x)\right)+(48+}$$

output
```
$Aborted
```

3.809.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.809.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(24) = 48$.

Time = 5.69 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.50

method	result
parallelrisch	$\frac{52x^2-104x+52}{52x^4+104x^3+208x^2\ln\left(\ln(6+x)^2\right)+52x^2+208x\ln\left(\ln(6+x)^2\right)+208\ln\left(\ln(6+x)^2\right)^2}$
risch	$\frac{x^2-2x+1}{\left(4\ln(\ln(6+x))-i\pi\,\mathrm{csgn}\left(i\ln(6+x)^2\right)^3+x^2+x-i\pi\,\mathrm{csgn}(i\ln(6+x))^2\,\mathrm{csgn}\left(i\ln(6+x)^2\right)+2i\pi\,\mathrm{csgn}(i\ln(6+x))\,\mathrm{csgn}\left(i\ln(6+x)^2\right)\right.}$
default	Expression too large to display

input
```
int(((4*x^2+20*x-24)*ln(6+x)*ln(ln(6+x)^2)+(-2*x^4-6*x^3+34*x^2-14*x-12)*l
n(6+x)-8*x^2+16*x-8)/((8*x+48)*ln(6+x)*ln(ln(6+x)^2)^3+(12*x^3+84*x^2+72*x
)*ln(6+x)*ln(ln(6+x)^2)^2+(6*x^5+48*x^4+78*x^3+36*x^2)*ln(6+x)*ln(ln(6+x)^
2)+(x^7+9*x^6+21*x^5+19*x^4+6*x^3)*ln(6+x)),x,method=_RETURNVERBOSE)
```

3.809.

$$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)+(-24+20x+4x^2)\log(6+x)\log(\log^2(6+x))}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log(\log^2(6+x))+(72x+84x^2+12x^3)\log(6+x)\log^2(\log^2(6+x))+(48+}$$

output
```
1/52*(52*x^2-104*x+52)/(x^4+2*x^3+4*x^2*ln(ln(6+x)^2)+x^2+4*x*ln(ln(6+x)^2
)+4*ln(ln(6+x)^2)^2)
```

3.809.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(20) = 40$.

Time = 0.24 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.00

$$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log\left(\log^2(6+x)\right)+}$$
$$=\frac{x^2-2\,x+1}{x^4+2\,x^3+x^2+4\,(x^2+x)\log\left(\log\left(x+6\right)^2\right)+4\,\log\left(\log\left(x+6\right)^2\right)^2}$$

input
```
integrate(((4*x^2+20*x-24)*log(6+x)*log(log(6+x)^2)+(-2*x^4-6*x^3+34*x^2-1
4*x-12)*log(6+x)-8*x^2+16*x-8)/((8*x+48)*log(6+x)*log(log(6+x)^2)^3+(12*x^
3+84*x^2+72*x)*log(6+x)*log(log(6+x)^2)^2+(6*x^5+48*x^4+78*x^3+36*x^2)*log
(6+x)*log(log(6+x)^2)+(x^7+9*x^6+21*x^5+19*x^4+6*x^3)*log(6+x)),x, algorit
hm=\
```

output
```
(x^2 - 2*x + 1)/(x^4 + 2*x^3 + x^2 + 4*(x^2 + x)*log(log(x + 6)^2) + 4*log
(log(x + 6)^2)^2)
```

3.809.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(20) = 40$.

Time = 0.15 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.00

$$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log\left(\log^2(6+x)\right)+}$$
$$=\frac{x^2-2x+1}{x^4+2x^3+x^2+(4x^2+4x)\log\left(\log\left(x+6\right)^2\right)+4\log\left(\log\left(x+6\right)^2\right)^2}$$

input
```
integrate(((4*x**2+20*x-24)*ln(6+x)*ln(ln(6+x)**2)+(-2*x**4-6*x**3+34*x**2
-14*x-12)*ln(6+x)-8*x**2+16*x-8)/((8*x+48)*ln(6+x)*ln(ln(6+x)**2)**3+(12*x
**3+84*x**2+72*x)*ln(6+x)*ln(ln(6+x)**2)**2+(6*x**5+48*x**4+78*x**3+36*x**
2)*ln(6+x)*ln(ln(6+x)**2)+(x**7+9*x**6+21*x**5+19*x**4+6*x**3)*ln(6+x)),x)
```

output
```
(x**2 - 2*x + 1)/(x**4 + 2*x**3 + x**2 + (4*x**2 + 4*x)*log(log(x + 6)**2)
 + 4*log(log(x + 6)**2)**2)
```

3.809.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. $2(20) = 40$.

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.83

$$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log\left(\log^2(6+x)\right)+}$$
$$= \frac{x^2-2\,x+1}{x^4+2\,x^3+x^2+8\,(x^2+x)\log\left(\log\left(x+6\right)\right)+16\,\log\left(\log\left(x+6\right)\right)^2}$$

input
```
integrate(((4*x^2+20*x-24)*log(6+x)*log(log(6+x)^2)+(-2*x^4-6*x^3+34*x^2-1
4*x-12)*log(6+x)-8*x^2+16*x-8)/((8*x+48)*log(6+x)*log(log(6+x)^2)^3+(12*x^
3+84*x^2+72*x)*log(6+x)*log(log(6+x)^2)^2+(6*x^5+48*x^4+78*x^3+36*x^2)*log
(6+x)*log(log(6+x)^2)+(x^7+9*x^6+21*x^5+19*x^4+6*x^3)*log(6+x)),x, algorit
hm=\
```

output
```
(x^2 - 2*x + 1)/(x^4 + 2*x^3 + x^2 + 8*(x^2 + x)*log(log(x + 6)) + 16*log(
log(x + 6))^2)
```

3.809.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 257 vs. $2(20) = 40$.

Time = 1.03 (sec) , antiderivative size = 257, normalized size of antiderivative = 10.71

$$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log\left(\log^2(6+x)\right)+}$$
$$= \frac{}{2\,x^6\log\left(x+6\right)+17\,x^5\log\left(x+6\right)+8\,x^4\log\left(\log\left(x+6\right)^2\right)\log\left(x+6\right)+34\,x^4\log\left(x+6\right)+60\,x^3\log\left(\log\right.}$$

input
```
integrate(((4*x^2+20*x-24)*log(6+x)*log(log(6+x)^2)+(-2*x^4-6*x^3+34*x^2-1
4*x-12)*log(6+x)-8*x^2+16*x-8)/((8*x+48)*log(6+x)*log(log(6+x)^2)^3+(12*x^
3+84*x^2+72*x)*log(6+x)*log(log(6+x)^2)^2+(6*x^5+48*x^4+78*x^3+36*x^2)*log
(6+x)*log(log(6+x)^2)+(x^7+9*x^6+21*x^5+19*x^4+6*x^3)*log(6+x)),x, algorit
hm=\
```

3.809.

$$\int \frac{-8+16x-8x^2+(-12-14x+34x^2-6x^3-2x^4)\log(6+x)+(-24+20x+4x^2)\log(6+x)\log\left(\log^2(6+x)\right)}{(6x^3+19x^4+21x^5+9x^6+x^7)\log(6+x)+(36x^2+78x^3+48x^4+6x^5)\log(6+x)\log\left(\log^2(6+x)\right)+(72x+84x^2+12x^3)\log(6+x)\log^2\left(\log^2(6+x)\right)+(48+}$$

output
```
(2*x^4*log(x + 6) + 9*x^3*log(x + 6) - 18*x^2*log(x + 6) + 4*x^2 + x*log(x
 + 6) - 8*x + 6*log(x + 6) + 4)/(2*x^6*log(x + 6) + 17*x^5*log(x + 6) + 8*
x^4*log(log(x + 6)^2)*log(x + 6) + 34*x^4*log(x + 6) + 60*x^3*log(log(x +
6)^2)*log(x + 6) + 8*x^2*log(log(x + 6)^2)^2*log(x + 6) + 4*x^4 + 25*x^3*l
og(x + 6) + 76*x^2*log(log(x + 6)^2)*log(x + 6) + 52*x*log(log(x + 6)^2)^2
*log(x + 6) + 8*x^3 + 16*x^2*log(log(x + 6)^2) + 6*x^2*log(x + 6) + 24*x*l
og(log(x + 6)^2)*log(x + 6) + 24*log(log(x + 6)^2)^2*log(x + 6) + 4*x^2 +
16*x*log(log(x + 6)^2) + 16*log(log(x + 6)^2)^2)
```

3.809.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-8+16x-8x^2+\left(-12-14x+34x^2-6x^3-2x^4\right)\log(6+x)}{\left(6x^3+19x^4+21x^5+9x^6+x^7\right)\log(6+x)+\left(36x^2+78x^3+48x^4+6x^5\right)\log(6+x)\log\left(\log^2(6+x)\right)+}$$
$$=\int -\frac{\ln(x+6)\ \left(2\,x^4+6\,x^3-34\,x^2+14\,x+12\right)-16\,x+8\,x^2-}{\ln(x+6)\ (8\,x+48)\ \ln\left(\ln(x+6)^2\right)^3+\ln(x+6)\ \left(12\,x^3+84\,x^2+72\,x\right)\ \ln\left(\ln(x+6)^2\right)^2+\ln(x+6)}$$

input
```
int(-(log(x + 6)*(14*x - 34*x^2 + 6*x^3 + 2*x^4 + 12) - 16*x + 8*x^2 - log
(log(x + 6)^2)*log(x + 6)*(20*x + 4*x^2 - 24) + 8)/(log(x + 6)*(6*x^3 + 19
*x^4 + 21*x^5 + 9*x^6 + x^7) + log(log(x + 6)^2)^3*log(x + 6)*(8*x + 48) +
 log(log(x + 6)^2)^2*log(x + 6)*(72*x + 84*x^2 + 12*x^3) + log(log(x + 6)^
2)*log(x + 6)*(36*x^2 + 78*x^3 + 48*x^4 + 6*x^5)),x)
```

output
```
int(-(log(x + 6)*(14*x - 34*x^2 + 6*x^3 + 2*x^4 + 12) - 16*x + 8*x^2 - log
(log(x + 6)^2)*log(x + 6)*(20*x + 4*x^2 - 24) + 8)/(log(x + 6)*(6*x^3 + 19
*x^4 + 21*x^5 + 9*x^6 + x^7) + log(log(x + 6)^2)^3*log(x + 6)*(8*x + 48) +
 log(log(x + 6)^2)^2*log(x + 6)*(72*x + 84*x^2 + 12*x^3) + log(log(x + 6)^
2)*log(x + 6)*(36*x^2 + 78*x^3 + 48*x^4 + 6*x^5)), x)
```

3.810 $\int \left(2-e^x+\log \left(\frac{2 x^2}{3}\right)\right) \, dx$

3.810.1 Optimal result

Integrand size = 15, antiderivative size = 19

$$\int \left(2-e^x+\log \left(\frac{2 x^2}{3}\right)\right) \, dx=x \left(-\frac{e^x}{x}+\log \left(\frac{2 x^2}{3}\right)\right)$$

output
```
exp(ln(x)+ln(ln(2/3*x^2)-exp(x)/x))
```

3.810.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \left(2-e^x+\log \left(\frac{2 x^2}{3}\right)\right) \, dx=-e^x+x \log \left(\frac{2 x^2}{3}\right)$$

input
```
Integrate[2 - E^x + Log[(2*x^2)/3],x]
```

output
```
-E^x + x*Log[(2*x^2)/3]
```

3.810.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\log \left(\frac{2x^2}{3}\right)-e^x+2\right) \, dx$$

$$\Big\downarrow \ 2009$$

$$x \log \left(\frac{2x^2}{3}\right)-e^x$$

input
```
Int[2 - E^x + Log[(2*x^2)/3],x]
```

output
```
-E^x + x*Log[(2*x^2)/3]
```

3.810.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.810.4 Maple [A] (verified)

Time = 1.79 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

method	result
norman	$x \ln \left(\frac{2 x^{2}}{3}\right)-{\mathrm e}^{x}$
default	$2 x \ln \left(x \right)+x \left(\ln \left(\frac{2 x^{2}}{3}\right)-2 \ln \left(x \right)\right)-{\mathrm e}^{x}$
parallelrisch	$\frac{12 \,{\mathrm e}^{\ln \left(-\frac{-x \ln \left(\frac{2 x^{2}}{3}\right)+{\mathrm e}^{x}}{x}\right)+\ln \left(x \right)} {\mathrm e}^{2 x}-24 \,{\mathrm e}^{\ln \left(-\frac{-x \ln \left(\frac{2 x^{2}}{3}\right)+{\mathrm e}^{x}}{x}\right)+\ln \left(x \right)} {\mathrm e}^{x} \ln \left(\frac{2 x^{2}}{3}\right) x +12 \,{\mathrm e}^{\ln \left(-\frac{-x \ln \left(\frac{2 x^{2}}{3}\right)+{\mathrm e}^{x}}{x}\right)+\ln \left(x \right)} \ln \left(\frac{2 x^{2}}{3}\right.}{12 \left(x \ln \left(\frac{2 x^{2}}{3}\right)-{\mathrm e}^{x}\right)^{2}}$

input
```
int((ln(2/3*x^2)-exp(x)+2)*exp(ln((x*ln(2/3*x^2)-exp(x))/x)+ln(x))/(x*ln(2
/3*x^2)-exp(x)),x,method=_RETURNVERBOSE)
```

output
```
x*ln(2/3*x^2)-exp(x)
```

3.810.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \left(2-e^x+\log \left(\frac{2x^2}{3}\right)\right) \, dx = x \log \left(\frac{2}{3}\right) + 2\,x \log \left(x\right) - e^x$$

input
```
integrate((log(2/3*x^2)-exp(x)+2)*exp(log((x*log(2/3*x^2)-exp(x))/x)+log(x
))/(x*log(2/3*x^2)-exp(x)),x, algorithm=\
```

output
```
x*log(2/3) + 2*x*log(x) - e^x
```

3.810.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \left(2-e^x+\log \left(\frac{2x^2}{3}\right)\right) \, dx = x \log \left(\frac{2x^2}{3}\right) - e^x$$

input
```
integrate((ln(2/3*x**2)-exp(x)+2)*exp(ln((x*ln(2/3*x**2)-exp(x))/x)+ln(x))
/(x*ln(2/3*x**2)-exp(x)),x)
```

output
```
x*log(2*x**2/3) - exp(x)
```

3.810.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \left(2-e^x+\log \left(\frac{2x^2}{3}\right)\right) \, dx = x \log \left(\frac{2}{3}\,x^2\right) - e^x$$

input
```
integrate((log(2/3*x^2)-exp(x)+2)*exp(log((x*log(2/3*x^2)-exp(x))/x)+log(x
))/(x*log(2/3*x^2)-exp(x)),x, algorithm=\
```

output
```
x*log(2/3*x^2) - e^x
```

3.810.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int \left(2-e^x+\log\left(\frac{2x^2}{3}\right)\right)\,dx = -x\log(3)+x\log(2)+2\,x\log(x\mathrm{sgn}(x))-e^x$$

input
```
integrate((log(2/3*x^2)-exp(x)+2)*exp(log((x*log(2/3*x^2)-exp(x))/x)+log(x
))/(x*log(2/3*x^2)-exp(x)),x, algorithm=\
```

output
```
-x*log(3) + x*log(2) + 2*x*log(x*sgn(x)) - e^x
```

3.810.9 Mupad [B] (verification not implemented)

Time = 15.38 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \left(2-e^x+\log\left(\frac{2x^2}{3}\right)\right)\,dx = x\,\ln\left(x^2\right)-\mathrm{e}^x+x\,\ln(2)-x\,\ln(3)$$

input
```
int(-(exp(log(-(exp(x) - x*log((2*x^2)/3))/x) + log(x))*(log((2*x^2)/3) -
exp(x) + 2))/(exp(x) - x*log((2*x^2)/3)),x)
```

output
```
x*log(x^2) - exp(x) + x*log(2) - x*log(3)
```

3.811 $\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}(-5-30x^2-243x^3-45x^4-243x^5)}{5+30x^2+45x^4}\,dx$

3.811.1 Optimal result

Integrand size = 66, antiderivative size = 22

$$\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}(-5-30x^2-243x^3-45x^4-243x^5)}{5+30x^2+45x^4}\,dx = \left(1-e^{\frac{81x^3}{5+15x^2}}\right)x$$

output
```
x*(1-exp(81*x^3/(15*x^2+5)))
```

3.811.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}(-5-30x^2-243x^3-45x^4-243x^5)}{5+30x^2+45x^4}\,dx = x-e^{\frac{81x^3}{5+15x^2}}x$$

input
```
Integrate[(5 + 30*x^2 + 45*x^4 + E^((81*x^3)/(5 + 15*x^2))*(-5 - 30*x^2 -
243*x^3 - 45*x^4 - 243*x^5))/(5 + 30*x^2 + 45*x^4),x]
```

output
```
x - E^((81*x^3)/(5 + 15*x^2))*x
```

3.811.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 75 vs. 2(22) = 44.

Time = 0.50 (sec) , antiderivative size = 75, normalized size of antiderivative = 3.41, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.061$, Rules used = {1380, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{45x^4+30x^2+e^{\frac{81x^3}{15x^2+5}}\left(-243x^5-45x^4-243x^3-30x^2-5\right)+5}{45x^4+30x^2+5}dx$$

$$\Big\downarrow \text{1380}$$

$$45\int \frac{45x^4+30x^2-e^{\frac{81x^3}{5\left(3x^2+1\right)}}\left(243x^5+45x^4+243x^3+30x^2+5\right)+5}{225\left(3x^2+1\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int \frac{45x^4+30x^2-e^{\frac{81x^3}{5\left(3x^2+1\right)}}\left(243x^5+45x^4+243x^3+30x^2+5\right)+5}{\left(3x^2+1\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{5}\int \left(5-\frac{e^{\frac{81x^3}{15x^2+5}}\left(243x^5+45x^4+243x^3+30x^2+5\right)}{\left(3x^2+1\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(\frac{5e^{\frac{81x^3}{5\left(3x^2+1\right)}}\left(x^5+x^3\right)}{\left(3x^2+1\right)^2\left(\frac{2x^4}{\left(3x^2+1\right)^2}-\frac{x^2}{3x^2+1}\right)}+5x\right)$$

input
```
Int[(5 + 30*x^2 + 45*x^4 + E^((81*x^3)/(5 + 15*x^2))*(-5 - 30*x^2 - 243*x^
3 - 45*x^4 - 243*x^5))/(5 + 30*x^2 + 45*x^4),x]
```

output
```
(5*x + (5*E^((81*x^3)/(5*(1 + 3*x^2)))*(x^3 + x^5))/((1 + 3*x^2)^2*((2*x^4
)/(1 + 3*x^2)^2 - x^2/(1 + 3*x^2))))/5
```

3.811. $\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}\left(-5-30x^2-243x^3-45x^4-243x^5\right)}{5+30x^2+45x^4}dx$

3.811.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.811.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

method	result	size
risch	$-x\,{\mathrm e}^{\frac{81 x^{3}}{5 \left(3 x^{2}+1\right)}}+x$	21
parallelrisch	$-x\,{\mathrm e}^{\frac{81 x^{3}}{5 \left(3 x^{2}+1\right)}}+x$	21
parts	$x +\frac{-x\,{\mathrm e}^{\frac{81 x^{3}}{15 x^{2}+5}}-3 x^{3} {\mathrm e}^{\frac{81 x^{3}}{15 x^{2}+5}}}{3 x^{2}+1}$	52
norman	$\frac{x +3 x^{3}-x\,{\mathrm e}^{\frac{81 x^{3}}{15 x^{2}+5}}-3 x^{3} {\mathrm e}^{\frac{81 x^{3}}{15 x^{2}+5}}}{3 x^{2}+1}$	56

input
```
int(((-243*x^5-45*x^4-243*x^3-30*x^2-5)*exp(81*x^3/(15*x^2+5))+45*x^4+30*x
^2+5)/(45*x^4+30*x^2+5),x,method=_RETURNVERBOSE)
```

output
```
-x*exp(81/5*x^3/(3*x^2+1))+x
```

3.811.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}(-5-30x^2-243x^3-45x^4-243x^5)}{5+30x^2+45x^4}\,dx = -xe^{\left(\frac{81\,x^3}{5\,(3\,x^2+1)}\right)}+x$$

input
```
integrate(((-243*x^5-45*x^4-243*x^3-30*x^2-5)*exp(81*x^3/(15*x^2+5))+45*x^
4+30*x^2+5)/(45*x^4+30*x^2+5),x, algorithm=\
```

output
```
-x*e^(81/5*x^3/(3*x^2 + 1)) + x
```

3.811.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}(-5-30x^2-243x^3-45x^4-243x^5)}{5+30x^2+45x^4}\,dx = -xe^{\frac{81x^3}{15x^2+5}}+x$$

input
```
integrate(((-243*x**5-45*x**4-243*x**3-30*x**2-5)*exp(81*x**3/(15*x**2+5))
+45*x**4+30*x**2+5)/(45*x**4+30*x**2+5),x)
```

output
```
-x*exp(81*x**3/(15*x**2 + 5)) + x
```

3.811.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}(-5-30x^2-243x^3-45x^4-243x^5)}{5+30x^2+45x^4}\,dx$$
$$= -xe^{\left(\frac{27}{5}\,x-\frac{27\,x}{5\,(3\,x^2+1)}\right)}+x$$

input
```
integrate(((-243*x^5-45*x^4-243*x^3-30*x^2-5)*exp(81*x^3/(15*x^2+5))+45*x^
4+30*x^2+5)/(45*x^4+30*x^2+5),x, algorithm=\
```

output
```
-x*e^(27/5*x - 27/5*x/(3*x^2 + 1)) + x
```

3.811.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}(-5-30x^2-243x^3-45x^4-243x^5)}{5+30x^2+45x^4}\,dx = -xe^{\left(\frac{81\,x^3}{5\,(3\,x^2+1)}\right)}+x$$

input
```
integrate(((-243*x^5-45*x^4-243*x^3-30*x^2-5)*exp(81*x^3/(15*x^2+5))+45*x^
4+30*x^2+5)/(45*x^4+30*x^2+5),x, algorithm=\
```

output
```
-x*e^(81/5*x^3/(3*x^2 + 1)) + x
```

3.811.9 Mupad [B] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{5+30x^2+45x^4+e^{\frac{81x^3}{5+15x^2}}(-5-30x^2-243x^3-45x^4-243x^5)}{5+30x^2+45x^4}\,dx = -x\left(\mathrm{e}^{\frac{81\,x^3}{15\,x^2+5}}-1\right)$$

input
```
int((30*x^2 - exp((81*x^3)/(15*x^2 + 5))*(30*x^2 + 243*x^3 + 45*x^4 + 243*
x^5 + 5) + 45*x^4 + 5)/(30*x^2 + 45*x^4 + 5),x)
```

output
```
-x*(exp((81*x^3)/(15*x^2 + 5)) - 1)
```

3.812 $\int \frac{-36963+11655x+219x^2+x^3+(36963-23310x-657x^2-4x^3)\log(x)}{\log^2(x)}\,dx$

3.812.1 Optimal result

Integrand size = 36, antiderivative size = 16

$$\int \frac{-36963+11655x+219x^2+x^3+(36963-23310x-657x^2-4x^3)\log(x)}{\log^2(x)}\,dx = \frac{(3-x)x(111+x)^2}{\log(x)}$$

output
```
(111+x)^2*x/ln(x)*(-x+3)
```

3.812.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{-36963+11655x+219x^2+x^3+(36963-23310x-657x^2-4x^3)\log(x)}{\log^2(x)}\,dx = -\frac{(-3+x)x(111+x)^2}{\log(x)}$$

input
```
Integrate[(-36963 + 11655*x + 219*x^2 + x^3 + (36963 - 23310*x - 657*x^2 -
 4*x^3)*Log[x])/Log[x]^2,x]
```

output
```
-(((-3 + x)*x*(111 + x)^2)/Log[x])
```

3.812.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 35 vs. $2(16) = 32$.

Time = 0.54 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.19, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3+219x^2+\left(-4x^3-657x^2-23310x+36963\right)\log(x)+11655x-36963}{\log^2(x)}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{(x+111)\left(x^2-4x^2\log(x)+108x-213x\log(x)+333\log(x)-333\right)}{\log^2(x)}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{-4x^3-657x^2-23310x+36963}{\log(x)}+\frac{(x-3)(x+111)^2}{\log^2(x)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{x^4}{\log(x)}-\frac{219x^3}{\log(x)}-\frac{11655x^2}{\log(x)}+\frac{36963x}{\log(x)}$$

input
```
Int[(-36963 + 11655*x + 219*x^2 + x^3 + (36963 - 23310*x - 657*x^2 - 4*x^3
)*Log[x])/Log[x]^2,x]
```

output
```
(36963*x)/Log[x] - (11655*x^2)/Log[x] - (219*x^3)/Log[x] - x^4/Log[x]
```

3.812.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.812.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.31

method	result	size
risch	$-\frac{x(x^3+219x^2+11655x-36963)}{\ln(x)}$	21
norman	$\frac{-x^4-219x^3-11655x^2+36963x}{\ln(x)}$	25
parallelrisch	$\frac{-x^4-219x^3-11655x^2+36963x}{\ln(x)}$	25
default	$-\frac{x^4}{\ln(x)}-\frac{219x^3}{\ln(x)}-\frac{11655x^2}{\ln(x)}+\frac{36963x}{\ln(x)}$	36
parts	$-\frac{x^4}{\ln(x)}-\frac{219x^3}{\ln(x)}-\frac{11655x^2}{\ln(x)}+\frac{36963x}{\ln(x)}$	36

input
```
int(((-4*x^3-657*x^2-23310*x+36963)*ln(x)+x^3+219*x^2+11655*x-36963)/ln(x)
^2,x,method=_RETURNVERBOSE)
```

output
```
-x*(x^3+219*x^2+11655*x-36963)/ln(x)
```

3.812.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.44

$$\int \frac{-36963+11655x+219x^2+x^3+(36963-23310x-657x^2-4x^3)\log(x)}{\log^2(x)}\,dx$$
$$=-\frac{x^4+219\,x^3+11655\,x^2-36963\,x}{\log(x)}$$

input
```
integrate(((-4*x^3-657*x^2-23310*x+36963)*log(x)+x^3+219*x^2+11655*x-36963
)/log(x)^2,x, algorithm=\
```

output
```
-(x^4 + 219*x^3 + 11655*x^2 - 36963*x)/log(x)
```

3.812.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.19

$$\int \frac{-36963+11655x+219x^2+x^3+(36963-23310x-657x^2-4x^3)\log(x)}{\log^2(x)}\,dx = \frac{-x^4-219x^3-11655x^2+36963x}{\log(x)}$$

input
```
integrate((((-4*x**3-657*x**2-23310*x+36963)*ln(x)+x**3+219*x**2+11655*x-36
963)/ln(x)**2,x)
```

output
```
(-x**4 - 219*x**3 - 11655*x**2 + 36963*x)/log(x)
```

3.812.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 59, normalized size of antiderivative = 3.69

$$\int \frac{-36963+11655x+219x^2+x^3+(36963-23310x-657x^2-4x^3)\log(x)}{\log^2(x)}\,dx = -4\,\mathrm{Ei}(4\log(x)) - 657\,\mathrm{Ei}(3\log(x)) - 23310\,\mathrm{Ei}(2\log(x)) + 36963\,\mathrm{Ei}(\log(x)) - 36963\,\Gamma(-1,-\log(x)) + 23310\,\Gamma(-1,-2\log(x)) + 657\,\Gamma(-1,-3\log(x)) + 4\,\Gamma(-1,-4\log(x))$$

input
```
integrate(((-4*x^3-657*x^2-23310*x+36963)*log(x)+x^3+219*x^2+11655*x-36963
)/log(x)^2,x, algorithm=\
```

output
```
-4*Ei(4*log(x)) - 657*Ei(3*log(x)) - 23310*Ei(2*log(x)) + 36963*Ei(log(x))
 - 36963*gamma(-1, -log(x)) + 23310*gamma(-1, -2*log(x)) + 657*gamma(-1, -
3*log(x)) + 4*gamma(-1, -4*log(x))
```

3.812.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. $2(15) = 30$.

Time = 0.27 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.19

$$\int \frac{-36963 + 11655x + 219x^2 + x^3 + (36963 - 23310x - 657x^2 - 4x^3)\log(x)}{\log^2(x)}\,dx$$
$$= -\frac{x^4}{\log(x)} - \frac{219\,x^3}{\log(x)} - \frac{11655\,x^2}{\log(x)} + \frac{36963\,x}{\log(x)}$$

input
```
integrate(((-4*x^3-657*x^2-23310*x+36963)*log(x)+x^3+219*x^2+11655*x-36963
)/log(x)^2,x, algorithm=\
```

output
```
-x^4/log(x) - 219*x^3/log(x) - 11655*x^2/log(x) + 36963*x/log(x)
```

3.812.9 Mupad [B] (verification not implemented)

Time = 15.21 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{-36963 + 11655x + 219x^2 + x^3 + (36963 - 23310x - 657x^2 - 4x^3)\log(x)}{\log^2(x)}\,dx$$
$$= -\frac{x\,(x-3)\,(x+111)^2}{\ln(x)}$$

input
```
int((11655*x + 219*x^2 + x^3 - log(x)*(23310*x + 657*x^2 + 4*x^3 - 36963)
- 36963)/log(x)^2,x)
```

output
```
-(x*(x - 3)*(x + 111)^2)/log(x)
```

3.813 $\int \frac{2-2e^x x+e^x x(1+x)}{2x}\,dx$

3.813.1 Optimal result

Integrand size = 23, antiderivative size = 20

$$\int \frac{2-2e^x x+e^x x(1+x)}{2x}\,dx = 2-e^x+\frac{1}{2}(2+e^x x)+\log(x)$$

output
```
3+1/2*exp(x+ln(x))-exp(x)+ln(x)
```

3.813.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int \frac{2-2e^x x+e^x x(1+x)}{2x}\,dx = \frac{1}{2}e^x(-2+x)+\log(x)$$

input
```
Integrate[(2 - 2*E^x*x + E^x*x*(1 + x))/(2*x),x]
```

output
```
(E^x*(-2 + x))/2 + Log[x]
```

3.813.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2e^x x + e^x (x+1)x + 2}{2x} \, dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2} \int \frac{-2e^x x + e^x (x+1)x + 2}{x} dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{2} \int \left(e^x (x-1) + \frac{2}{x}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}(-e^x (1-x) - e^x + 2\log(x))$$

input
```
Int[(2 - 2*E^x*x + E^x*x*(1 + x))/(2*x),x]
```

output
```
(-E^x - E^x*(1 - x) + 2*Log[x])/2
```

3.813.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.813.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.55

method	result	size
risch	$\ln(x)+\frac{e^{x}(-2+x)}{2}$	11
norman	$\frac{e^{x}x}{2}-e^{x}+\ln(x)$	13
default	$\frac{e^{x+\ln(x)}}{2}+\ln(x)-e^{x}$	15
parallelrisch	$\frac{e^{x+\ln(x)}}{2}+\ln(x)-e^{x}$	15
parts	$\frac{e^{x+\ln(x)}}{2}+\ln(x)-e^{x}$	15

input
```
int(1/2*((1+x)*exp(x+ln(x))-2*exp(x)*x+2)/x,x,method=_RETURNVERBOSE)
```

output
```
ln(x)+1/2*exp(x)*(-2+x)
```

3.813.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{2-2e^{x}x+e^{x}x(1+x)}{2x}\,dx=\frac{(x-2)e^{(x+\log(x))}+2\,x\log(x)}{2\,x}$$

input
```
integrate(1/2*((1+x)*exp(x+log(x))-2*exp(x)*x+2)/x,x, algorithm=\
```

output
```
1/2*((x - 2)*e^(x + log(x)) + 2*x*log(x))/x
```

3.813.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int \frac{2-2e^{x}x+e^{x}x(1+x)}{2x}\,dx=\frac{(x-2)\,e^{x}}{2}+\log(x)$$

input
```
integrate(1/2*((1+x)*exp(x+ln(x))-2*exp(x)*x+2)/x,x)
```

output
```
(x - 2)*exp(x)/2 + log(x)
```

3.813.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{2-2e^x x+e^x x(1+x)}{2x}\,dx=\frac{1}{2}\,(x-1)e^x-\frac{1}{2}\,e^x+\log\left(x\right)$$

input
```
integrate(1/2*((1+x)*exp(x+log(x))-2*exp(x)*x+2)/x,x, algorithm=\
```

output
```
1/2*(x - 1)*e^x - 1/2*e^x + log(x)
```

3.813.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int \frac{2-2e^x x+e^x x(1+x)}{2x}\,dx=\frac{1}{2}\,xe^x-e^x+\log\left(x\right)$$

input
```
integrate(1/2*((1+x)*exp(x+log(x))-2*exp(x)*x+2)/x,x, algorithm=\
```

output
```
1/2*x*e^x - e^x + log(x)
```

3.813.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int \frac{2-2e^x x+e^x x(1+x)}{2x}\,dx=\ln\left(x\right)-\mathrm{e}^x+\frac{x\,\mathrm{e}^x}{2}$$

input
```
int(((exp(x + log(x))*(x + 1))/2 - x*exp(x) + 1)/x,x)
```

output
```
log(x) - exp(x) + (x*exp(x))/2
```

3.814 $\int \frac{-40e^{3+2e^x}x\log^2(2)+e^{e^x}(125e^3\log(2)-125e^{3+x}x\log(2))}{1250x^2-400e^{e^x}x^3\log(2)+32e^{2e^x}x^4\log^2(2)}\,dx$

3.814.1 Optimal result

Integrand size = 78, antiderivative size = 38

$$\int \frac{-40e^{3+2e^x}x\log^2(2)+e^{e^x}(125e^3\log(2)-125e^{3+x}x\log(2))}{1250x^2-400e^{e^x}x^3\log(2)+32e^{2e^x}x^4\log^2(2)}\,dx=\frac{\frac{x}{5}+\frac{e^3}{\frac{4x}{5}-\frac{5e^{-e^x}}{\log(2)}}}{2x}$$

output
```
1/2*(1/5*x+exp(3)/(4/5*x-5/ln(2)/exp(exp(x))))/x
```

3.814.2 Mathematica [A] (verified)

Time = 2.33 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.82

$$\int \frac{-40e^{3+2e^x}x\log^2(2)+e^{e^x}(125e^3\log(2)-125e^{3+x}x\log(2))}{1250x^2-400e^{e^x}x^3\log(2)+32e^{2e^x}x^4\log^2(2)}\,dx=-\frac{5e^{3+e^x}\log(2)}{2(25x-e^{e^x}x^2\log(16))}$$

input
```
Integrate[(-40*E^(3 + 2*E^x)*x*Log[2]^2 + E^E^x*(125*E^3*Log[2] - 125*E^(3
 + x)*x*Log[2]))/(1250*x^2 - 400*E^E^x*x^3*Log[2] + 32*E^(2*E^x)*x^4*Log[2
]^2),x]
```

output
```
(-5*E^(3 + E^x)*Log[2])/(2*(25*x - E^E^x*x^2*Log[16]))
```

3.814.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^x}\left(125e^3\log(2)-125e^{x+3}x\log(2)\right)-40e^{2e^x+3}x\log^2(2)}{32e^{2e^x}x^4\log^2(2)-400e^{e^x}x^3\log(2)+1250x^2}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{5e^{e^x+3}\log(2)\left(-25e^xx-8e^{e^x}x\log(2)+25\right)}{2x^2\left(25-e^{e^x}x\log(16)\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{5}{2}\log(2)\int \frac{e^{3+e^x}\left(-25e^xx-8e^{e^x}\log(2)x+25\right)}{x^2\left(25-e^{e^x}x\log(16)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{5}{2}\log(2)\int \left(-\frac{e^{3+e^x}\left(8e^{e^x}x\log(2)-25\right)}{x^2\left(e^{e^x}x\log(16)-25\right)^2}-\frac{25e^{x+e^x+3}}{x\left(e^{e^x}x\log(16)-25\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{5}{2}\log(2)\left(-25\int \frac{e^{3+e^x}}{x^2\left(e^{e^x}x\log(16)-25\right)^2}dx-\frac{8\log(2)\int \frac{e^{3+e^x}}{x^2\left(e^{e^x}x\log(16)-25\right)}dx}{\log(16)}-25\int \frac{e^{x+e^x+3}}{x\left(e^{e^x}x\log(16)-25\right)^2}dx\right)$$

input
```
Int[(-40*E^(3 + 2*E^x)*x*Log[2]^2 + E^E^x*(125*E^3*Log[2] - 125*E^(3 + x)*
x*Log[2]))/(1250*x^2 - 400*E^E^x*x^3*Log[2] + 32*E^(2*E^x)*x^4*Log[2]^2),x
]
```

output
```
$Aborted
```

3.814.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.814.4 Maple [A] (verified)

Time = 1.38 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.66

method	result	size
norman	$\frac{5\,\mathrm{e}^{\mathrm{e}^{x}}\mathrm{e}^{3}\ln(2)}{2x\left(4\ln(2)\mathrm{e}^{\mathrm{e}^{x}}x-25\right)}$	25
parallelrisch	$\frac{5\,\mathrm{e}^{\mathrm{e}^{x}}\mathrm{e}^{3}\ln(2)}{2x\left(4\ln(2)\mathrm{e}^{\mathrm{e}^{x}}x-25\right)}$	25
risch	$\frac{5\,\mathrm{e}^{3}}{8x^{2}}+\frac{125\,\mathrm{e}^{3}}{8x^{2}\left(4\ln(2)\mathrm{e}^{\mathrm{e}^{x}}x-25\right)}$	28

input
```
int((-40*x*exp(3)*ln(2)^2*exp(exp(x))^2+(-125*x*exp(3)*ln(2)*exp(x)+125*ex
p(3)*ln(2))*exp(exp(x)))/(32*x^4*ln(2)^2*exp(exp(x))^2-400*x^3*ln(2)*exp(e
xp(x))+1250*x^2),x,method=_RETURNVERBOSE)
```

output
```
5/2*exp(exp(x))*exp(3)*ln(2)/x/(4*ln(2)*exp(exp(x))*x-25)
```

3.814.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.66

$$\int \frac{-40e^{3+2e^x}x\log^2(2)+e^{e^x}\left(125e^3\log(2)-125e^{3+x}x\log(2)\right)}{1250x^2-400e^{e^x}x^3\log(2)+32e^{2e^x}x^4\log^2(2)}\,dx=\frac{5\,e^{(e^x+3)}\log(2)}{2\left(4\,x^2e^{(e^x)}\log(2)-25\,x\right)}$$

input
```
integrate((-40*x*exp(3)*log(2)^2*exp(exp(x))^2+(-125*x*exp(3)*log(2)*exp(x
)+125*exp(3)*log(2))*exp(exp(x)))/(32*x^4*log(2)^2*exp(exp(x))^2-400*x^3*l
og(2)*exp(exp(x))+1250*x^2),x, algorithm=\
```

output
```
5/2*e^(e^x + 3)*log(2)/(4*x^2*e^(e^x)*log(2) - 25*x)
```

3.814.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.84

$$\int \frac{-40e^{3+2e^x}x\log^2(2)+e^{e^x}(125e^3\log(2)-125e^{3+x}x\log(2))}{1250x^2-400e^{e^x}x^3\log(2)+32e^{2e^x}x^4\log^2(2)}\,dx$$
$$=\frac{125e^3}{32x^3e^{e^x}\log{(2)}-200x^2}+\frac{5e^3}{8x^2}$$

input
```
integrate((-40*x*exp(3)*ln(2)**2*exp(exp(x))**2+(-125*x*exp(3)*ln(2)*exp(x
)+125*exp(3)*ln(2))*exp(exp(x)))/(32*x**4*ln(2)**2*exp(exp(x))**2-400*x**3
*ln(2)*exp(exp(x))+1250*x**2),x)
```

output
```
125*exp(3)/(32*x**3*exp(exp(x))*log(2) - 200*x**2) + 5*exp(3)/(8*x**2)
```

3.814.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.66

$$\int \frac{-40e^{3+2e^x}x\log^2(2)+e^{e^x}(125e^3\log(2)-125e^{3+x}x\log(2))}{1250x^2-400e^{e^x}x^3\log(2)+32e^{2e^x}x^4\log^2(2)}\,dx=\frac{5\,e^{(e^x+3)}\log{(2)}}{2\,(4\,x^2e^{(e^x)}\log{(2)}-25\,x)}$$

input
```
integrate((-40*x*exp(3)*log(2)^2*exp(exp(x))^2+(-125*x*exp(3)*log(2)*exp(x
)+125*exp(3)*log(2))*exp(exp(x)))/(32*x^4*log(2)^2*exp(exp(x))^2-400*x^3*l
og(2)*exp(exp(x))+1250*x^2),x, algorithm=\
```

output
```
5/2*e^(e^x + 3)*log(2)/(4*x^2*e^(e^x)*log(2) - 25*x)
```

3.814.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.66

$$\int \frac{-40e^{3+2e^x}x\log^2(2)+e^{e^x}(125e^3\log(2)-125e^{3+x}x\log(2))}{1250x^2-400e^{e^x}x^3\log(2)+32e^{2e^x}x^4\log^2(2)}\,dx=\frac{5\,e^{(e^x+3)}\log{(2)}}{2\,(4\,x^2e^{(e^x)}\log{(2)}-25\,x)}$$

input
```
integrate((-40*x*exp(3)*log(2)^2*exp(exp(x))^2+(-125*x*exp(3)*log(2)*exp(x
)+125*exp(3)*log(2))*exp(exp(x)))/(32*x^4*log(2)^2*exp(exp(x))^2-400*x^3*l
og(2)*exp(exp(x))+1250*x^2),x, algorithm=\
```

output
```
5/2*e^(e^x + 3)*log(2)/(4*x^2*e^(e^x)*log(2) - 25*x)
```

3.814.9 Mupad [B] (verification not implemented)

Time = 14.94 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.42

$$\int \frac{-40e^{3+2e^x}x\log^2(2)+e^{e^x}(125e^3\log(2)-125e^{3+x}x\log(2))}{1250x^2-400e^{e^x}x^3\log(2)+32e^{2e^x}x^4\log^2(2)}\,dx$$
$$=\frac{5\,\mathrm{e}^3}{8\,x^2}+\frac{125\,(\mathrm{e}^3+x\,\mathrm{e}^{x+3})}{32\,x\,\left(x^2\,\ln(2)+x^3\,\mathrm{e}^x\,\ln(2)\right)\left(\mathrm{e}^{\mathrm{e}^x}-\frac{25}{4\,x\,\ln(2)}\right)}$$

input
```
int((exp(exp(x))*(125*exp(3)*log(2) - 125*x*exp(3)*exp(x)*log(2)) - 40*x*e
xp(3)*exp(2*exp(x))*log(2)^2)/(1250*x^2 + 32*x^4*exp(2*exp(x))*log(2)^2 -
400*x^3*exp(exp(x))*log(2)),x)
```

output
```
(5*exp(3))/(8*x^2) + (125*(exp(3) + x*exp(x + 3)))/(32*x*(x^2*log(2) + x^3
*exp(x)*log(2))*(exp(exp(x)) - 25/(4*x*log(2))))
```

3.815 $\int \frac{-6480-4320x-924x^2-70x^3-}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+26}$

3.815.1 Optimal result

Integrand size = 125, antiderivative size = 28

$$\int \frac{-6480-4320x-924x^2-70x^3-x^4+(1296+864x+216x}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+2664x+4344x^2+1250x^3+} = \frac{x}{-4-x+\frac{\left(2x+\frac{x}{6+x}\right)^2}{x}+\log(x)}$$

output
```
x/(ln(x)-4+(2*x+x/(6+x))^2/x-x)
```

3.815.2 Mathematica [A] (verified)

Time = 0.53 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{-6480-4320x-924x^2-70x^3-x^4+(1296+864x+216x}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+2664x+4344x^2+1250x^3+} = \frac{x(6+x)^2}{-144+85x+36x^2+3x^3+(6+x)^2\log(x)}$$

input
```
Integrate[(-6480 - 4320*x - 924*x^2 - 70*x^3 - x^4 + (1296 + 864*x + 216*x
^2 + 24*x^3 + x^4)*Log[x])/(20736 - 24480*x - 3143*x^2 + 5256*x^3 + 1806*x
^4 + 216*x^5 + 9*x^6 + (-10368 + 2664*x + 4344*x^2 + 1250*x^3 + 144*x^4 +
6*x^5)*Log[x] + (1296 + 864*x + 216*x^2 + 24*x^3 + x^4)*Log[x]^2),x]
```

output
```
(x*(6 + x)^2)/(-144 + 85*x + 36*x^2 + 3*x^3 + (6 + x)^2*Log[x])
```

3.815.

$\int \frac{-6480-4320x-924x^2-70x^3-x^4+(1296+864x+216x^2+24x^3+x^4)\log(x)}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+2664x+4344x^2+1250x^3+144x^4+6x^5)\log(x)+(1296+864x+216x^2+24x^3+x^4}$

3.815.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^4-70x^3-924x^2+\left(x^4+24x^3+216x^2+864x+1296\right)\log(x)-}{9x^6+216x^5+1806x^4+5256x^3-3143x^2+\left(x^4+24x^3+216x^2+864x+1296\right)\log^2(x)+\left(6x^5+144x^4+125\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{(x+6)\left(-x^3-64x^2-540x+(x+6)^3\log(x)-1080\right)}{\left(-3x^3-36x^2-85x-(x+6)^2\log(x)+144\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{(x+6)^2}{3x^3+36x^2+x^2\log(x)+85x+12x\log(x)+36\log(x)-144}+\frac{-3x^5-73x^4-695x^3-3096x^2-56}{(3x^3+36x^2+x^2\log(x)+85x+12x\log(x)-}\right.$$

$$\Big\downarrow \text{2009}$$

$$-1296\int \frac{1}{\left(3x^3+\log(x)x^2+36x^2+12\log(x)x+85x+36\log(x)-144\right)^2}dx-5652\int \frac{x}{\left(3x^3+\log(x)x^2+36x^2+12\log(x)x+85x+36\log(x)-144\right)^2}dx-3096\int \frac{x^2}{\left(3x^3+\log(x)x^2+36x^2+12\log(x)x+85x+36\log(x)-144\right)^2}dx-695\int \frac{x^3}{\left(3x^3+\log(x)x^2+36x^2+12\log(x)x+85x+36\log(x)-144\right)^2}dx+36\int \frac{1}{3x^3+\log(x)x^2+36x^2+12\log(x)x+85x+36\log(x)-144}dx+12\int \frac{x}{3x^3+\log(x)x^2+36x^2+12\log(x)x+85x+36\log(x)-144}dx+\int \frac{x^2}{3x^3+\log(x)x^2+36x^2+12\log(x)x+85x+36\log(x)-144}dx-3\int \frac{x^5}{\left(3x^3+\log(x)x^2+36x^2+12\log(x)x+85x+36\log(x)-144\right)^2}dx-73\int \frac{x^4}{\left(3x^3+\log(x)x^2+36x^2+12\log(x)x+85x+36\log(x)-144\right)^2}dx$$

input
```
Int[(-6480 - 4320*x - 924*x^2 - 70*x^3 - x^4 + (1296 + 864*x + 216*x^2 + 2
4*x^3 + x^4)*Log[x])/(20736 - 24480*x - 3143*x^2 + 5256*x^3 + 1806*x^4 + 2
16*x^5 + 9*x^6 + (-10368 + 2664*x + 4344*x^2 + 1250*x^3 + 144*x^4 + 6*x^5)
*Log[x] + (1296 + 864*x + 216*x^2 + 24*x^3 + x^4)*Log[x]^2),x]
```

3.815. $\int \frac{-6480-4320x-924x^2-70x^3-x^4+\left(1296+864x+216x^2+24x^3+x^4\right)\log(x)}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+\left(-10368+2664x+4344x^2+1250x^3+144x^4+6x^5\right)\log(x)+\left(1296+864x+216x^2+24x^3+x^4\right.}$

output
```
$Aborted
```

3.815.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.815.4 Maple [A] (verified)

Time = 1.16 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

method	result	size
risch	$\frac{(6+x)^2 x}{x^2\ln(x)+3x^3+12x\ln(x)+36x^2+36\ln(x)+85x-144}$	40
default	$\frac{x^3+12x^2+36x}{x^2\ln(x)+3x^3+12x\ln(x)+36x^2+36\ln(x)+85x-144}$	46
parallelrisch	$\frac{x^3+12x^2+36x}{x^2\ln(x)+3x^3+12x\ln(x)+36x^2+36\ln(x)+85x-144}$	46
norman	$\frac{-12\ln(x)+\frac{23x}{3}-4x\ln(x)-\frac{x^2\ln(x)}{3}+48}{x^2\ln(x)+3x^3+12x\ln(x)+36x^2+36\ln(x)+85x-144}$	55

input
```
int(((x^4+24*x^3+216*x^2+864*x+1296)*ln(x)-x^4-70*x^3-924*x^2-4320*x-6480)
/((x^4+24*x^3+216*x^2+864*x+1296)*ln(x)^2+(6*x^5+144*x^4+1250*x^3+4344*x^2
+2664*x-10368)*ln(x)+9*x^6+216*x^5+1806*x^4+5256*x^3-3143*x^2-24480*x+2073
6),x,method=_RETURNVERBOSE)
```

output
```
(6+x)^2*x/(x^2*ln(x)+3*x^3+12*x*ln(x)+36*x^2+36*ln(x)+85*x-144)
```

3.815.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int \frac{-6480-4320x-924x^2-70x^3-x^4+(1296+864x+216x^2+24x^3+x^4)\log(x)}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+2664x+4344x^2+1250x^3+144x^4+6x^5)\log(x)+(1296+864x+216x^2+24x^3+x^4)\log^2(x)}\,dx = \frac{x^3+12\,x^2+36\,x}{3\,x^3+36\,x^2+(x^2+12\,x+36)\log(x)+85\,x-144}$$

input
```
integrate(((x^4+24*x^3+216*x^2+864*x+1296)*log(x)-x^4-70*x^3-924*x^2-4320*
x-6480)/((x^4+24*x^3+216*x^2+864*x+1296)*log(x)^2+(6*x^5+144*x^4+1250*x^3+
4344*x^2+2664*x-10368)*log(x)+9*x^6+216*x^5+1806*x^4+5256*x^3-3143*x^2-244
80*x+20736),x, algorithm=\
```

output
```
(x^3 + 12*x^2 + 36*x)/(3*x^3 + 36*x^2 + (x^2 + 12*x + 36)*log(x) + 85*x -
144)
```

3.815.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

$$\int \frac{-6480-4320x-924x^2-70x^3-x^4+(1296+864x+216x^2+24x^3+x^4)\log(x)}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+2664x+4344x^2+1250x^3+144x^4+6x^5)\log(x)+(1296+864x+216x^2+24x^3+x^4)\log^2(x)}\,dx = \frac{x^3+12x^2+36x}{3x^3+36x^2+85x+(x^2+12x+36)\log(x)-144}$$

input
```
integrate(((x**4+24*x**3+216*x**2+864*x+1296)*ln(x)-x**4-70*x**3-924*x**2-
4320*x-6480)/((x**4+24*x**3+216*x**2+864*x+1296)*ln(x)**2+(6*x**5+144*x**4
+1250*x**3+4344*x**2+2664*x-10368)*ln(x)+9*x**6+216*x**5+1806*x**4+5256*x*
*3-3143*x**2-24480*x+20736),x)
```

output
```
(x**3 + 12*x**2 + 36*x)/(3*x**3 + 36*x**2 + 85*x + (x**2 + 12*x + 36)*log(
x) - 144)
```

3.815.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int \frac{-6480-4320x-924x^2-70x^3-x^4+(1296+864x+216x^2+24x^3+x^4)\log(x)}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+2664x+4344x^2+1250x^3+144x^4+6x^5)\log(x)+(1296+864x+216x^2+24x^3+x^4)\log^2(x)}\,dx = \frac{x^3+12\,x^2+36\,x}{3\,x^3+36\,x^2+(x^2+12\,x+36)\log(x)+85\,x-144}$$

input
```
integrate(((x^4+24*x^3+216*x^2+864*x+1296)*log(x)-x^4-70*x^3-924*x^2-4320*
x-6480)/((x^4+24*x^3+216*x^2+864*x+1296)*log(x)^2+(6*x^5+144*x^4+1250*x^3+
4344*x^2+2664*x-10368)*log(x)+9*x^6+216*x^5+1806*x^4+5256*x^3-3143*x^2-244
80*x+20736),x, algorithm=\
```

output
```
(x^3 + 12*x^2 + 36*x)/(3*x^3 + 36*x^2 + (x^2 + 12*x + 36)*log(x) + 85*x -
144)
```

3.815.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.61

$$\int \frac{-6480-4320x-924x^2-70x^3-x^4+(1296+864x+216x^2+24x^3+x^4)\log(x)}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+2664x+4344x^2+1250x^3+144x^4+6x^5)\log(x)+(1296+864x+216x^2+24x^3+x^4)\log^2(x)}\,dx = \frac{x^3+12\,x^2+36\,x}{3\,x^3+x^2\log(x)+36\,x^2+12\,x\log(x)+85\,x+36\,\log(x)-144}$$

input
```
integrate(((x^4+24*x^3+216*x^2+864*x+1296)*log(x)-x^4-70*x^3-924*x^2-4320*
x-6480)/((x^4+24*x^3+216*x^2+864*x+1296)*log(x)^2+(6*x^5+144*x^4+1250*x^3+
4344*x^2+2664*x-10368)*log(x)+9*x^6+216*x^5+1806*x^4+5256*x^3-3143*x^2-244
80*x+20736),x, algorithm=\
```

output
```
(x^3 + 12*x^2 + 36*x)/(3*x^3 + x^2*log(x) + 36*x^2 + 12*x*log(x) + 85*x +
36*log(x) - 144)
```

3.815.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-6480-4320x-924x^2-70x^3-x^4+(1296+864x+216x^2+24x^3+x^4)\log(x)}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+2664x+4344x^2+1250x^3+144x^4+6x^5)\log(x)+(1296+864x+216x^2+24x^3+x^4)\log^2(x)}\,dx$$
$$= \int -\frac{4320\,x-\ln(x)\,(x^4+24\,x^3+216\,x^2+864\,x+1296)+924\,x^2+70\,x^3+x^4+6480}{\ln(x)^2\,(x^4+24\,x^3+216\,x^2+864\,x+1296)-24480\,x+\ln(x)\,(6\,x^5+144\,x^4+1250\,x^3+4344\,x^2+2664\,x-10368)-3143\,x^2+5256\,x^3+1806\,x^4+216\,x^5+9\,x^6+20736}\,dx$$

input
```
int(-(4320*x - log(x)*(864*x + 216*x^2 + 24*x^3 + x^4 + 1296) + 924*x^2 +
70*x^3 + x^4 + 6480)/(log(x)^2*(864*x + 216*x^2 + 24*x^3 + x^4 + 1296) - 2
4480*x + log(x)*(2664*x + 4344*x^2 + 1250*x^3 + 144*x^4 + 6*x^5 - 10368) -
 3143*x^2 + 5256*x^3 + 1806*x^4 + 216*x^5 + 9*x^6 + 20736),x)
```

output
```
int(-(4320*x - log(x)*(864*x + 216*x^2 + 24*x^3 + x^4 + 1296) + 924*x^2 +
70*x^3 + x^4 + 6480)/(log(x)^2*(864*x + 216*x^2 + 24*x^3 + x^4 + 1296) - 2
4480*x + log(x)*(2664*x + 4344*x^2 + 1250*x^3 + 144*x^4 + 6*x^5 - 10368) -
 3143*x^2 + 5256*x^3 + 1806*x^4 + 216*x^5 + 9*x^6 + 20736), x)
```

3.815.
$$\int \frac{-6480-4320x-924x^2-70x^3-x^4+(1296+864x+216x^2+24x^3+x^4)\log(x)}{20736-24480x-3143x^2+5256x^3+1806x^4+216x^5+9x^6+(-10368+2664x+4344x^2+1250x^3+144x^4+6x^5)\log(x)+(1296+864x+216x^2+24x^3+x^4)\log^2(x)}$$

3.816 $\int (-10+x^x(-1-\log(x)))\,dx$

3.816.1 Optimal result

Integrand size = 12, antiderivative size = 17

$$\int (-10+x^x(-1-\log(x)))\,dx=\frac{1}{e^2}-x^x-5\log\left(e^{2x}\right)$$

output
```
exp(-2)-exp(x*ln(x))-5*ln(exp(x)^2)
```

3.816.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53

$$\int (-10+x^x(-1-\log(x)))\,dx=-10x-x^x$$

input
```
Integrate[-10 + x^x*(-1 - Log[x]),x]
```

output
```
-10*x - x^x
```

3.816.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (x^x(-\log(x)-1)-10)\,dx$$

$$\Big\downarrow \text{2009}$$

$$-x^x-10x$$

input
```
Int[-10 + x^x*(-1 - Log[x]),x]
```

output
```
-10*x - x^x
```

3.816.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.816.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

method	result	size
risch	$-10x-x^x$	10
default	$-10x-e^{x\ln(x)}$	12
norman	$-10x-e^{x\ln(x)}$	12
parallelrisch	$-10x-e^{x\ln(x)}$	12
parts	$-10x-e^{x\ln(x)}$	12

input
```
int((-ln(x)-1)*exp(x*ln(x))-10,x,method=_RETURNVERBOSE)
```

output
```
-10*x-x^x
```

3.816.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53

$$\int (-10 + x^x(-1 - \log(x)))\, dx = -x^x - 10\,x$$

input
```
integrate((-log(x)-1)*exp(x*log(x))-10,x, algorithm=\
```

output
```
-x^x - 10*x
```

3.816.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int (-10 + x^x(-1 - \log(x)))\, dx = -10x - e^{x\log(x)}$$

input
```
integrate((-ln(x)-1)*exp(x*ln(x))-10,x)
```

output
```
-10*x - exp(x*log(x))
```

3.816.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53

$$\int (-10 + x^x(-1 - \log(x)))\, dx = -x^x - 10\,x$$

input
```
integrate((-log(x)-1)*exp(x*log(x))-10,x, algorithm=\
```

output
```
-x^x - 10*x
```

3.816.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53

$$\int (-10 + x^x(-1 - \log(x)))\, dx = -x^x - 10\,x$$

input
```
integrate((-log(x)-1)*exp(x*log(x))-10,x, algorithm=\
```

output
```
-x^x - 10*x
```

3.816.9 Mupad [B] (verification not implemented)

Time = 16.26 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.53

$$\int (-10 + x^x(-1 - \log(x)))\, dx = -10\,x - x^x$$

input
```
int(- exp(x*log(x))*(log(x) + 1) - 10,x)
```

output
```
- 10*x - x^x
```

3.817 $\int -\frac{\log(6)}{2} \, dx$

3.817.1 Optimal result

Integrand size = 6, antiderivative size = 7

$$\int -\frac{\log(6)}{2} \, dx = -\frac{1}{2}x\log(6)$$

output
```
-1/2*x*ln(6)
```

3.817.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00

$$\int -\frac{\log(6)}{2} \, dx = -\frac{1}{2}x\log(6)$$

input
```
Integrate[-1/2*Log[6],x]
```

output
```
-1/2*(x*Log[6])
```

3.817.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{\log(6)}{2}\,dx$$

$$\Big\downarrow \text{24}$$

$$-\frac{1}{2}x\log(6)$$

input
```
Int[-1/2*Log[6],x]
```

output
```
-1/2*(x*Log[6])
```

3.817.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.817.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.86

method	result	size
default	$-\frac{x\ln(6)}{2}$	6
norman	$-\frac{x\ln(6)}{2}$	6
parallelrisch	$-\frac{x\ln(6)}{2}$	6
risch	$-\frac{x\ln(2)}{2}-\frac{x\ln(3)}{2}$	12

input
```
int(-1/2*ln(6),x,method=_RETURNVERBOSE)
```

output
```
-1/2*x*ln(6)
```

3.817.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.71

$$\int -\frac{\log(6)}{2}\,dx = -\frac{1}{2}\,x\log\left(6\right)$$

input
```
integrate(-1/2*log(6),x, algorithm=\
```

output
```
-1/2*x*log(6)
```

3.817.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 1.00

$$\int -\frac{\log(6)}{2}\,dx = -\frac{x\log\left(6\right)}{2}$$

input
```
integrate(-1/2*ln(6),x)
```

output
```
-x*log(6)/2
```

3.817.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.71

$$\int -\frac{\log(6)}{2}\,dx = -\frac{1}{2}\,x\log\left(6\right)$$

input
```
integrate(-1/2*log(6),x, algorithm=\
```

output
```
-1/2*x*log(6)
```

3.817.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.71

$$\int -\frac{\log(6)}{2}\,dx = -\frac{1}{2}\,x\log{(6)}$$

input
```
integrate(-1/2*log(6),x, algorithm=\
```

output
```
-1/2*x*log(6)
```

3.817.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.71

$$\int -\frac{\log(6)}{2}\,dx = -\frac{x\,\ln{(6)}}{2}$$

input
```
int(-log(6)/2,x)
```

output
```
-(x*log(6))/2
```

3.818 $\int \frac{e^{2x}(1-6x)-3x^2-6x^3+e^x(6x+8x^2)}{e^{2x}-2e^xx+x^2}\,dx$

3.818.1 Optimal result

Integrand size = 53, antiderivative size = 30

$$\int \frac{e^{2x}(1-6x)-3x^2-6x^3+e^x(6x+8x^2)}{e^{2x}-2e^xx+x^2}\,dx=\frac{4}{3}-x+(1+x)^2+4x\left(-x+\frac{x}{e^x-x}\right)$$

output
```
x*(4*x/(exp(x)-x)-4*x)+(1+x)^2+4/3-x
```

3.818.2 Mathematica [A] (verified)

Time = 1.02 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.70

$$\int \frac{e^{2x}(1-6x)-3x^2-6x^3+e^x(6x+8x^2)}{e^{2x}-2e^xx+x^2}\,dx=x-3x^2+\frac{4x^2}{e^x-x}$$

input
```
Integrate[(E^(2*x)*(1 - 6*x) - 3*x^2 - 6*x^3 + E^x*(6*x + 8*x^2))/(E^(2*x)
 - 2*E^x*x + x^2),x]
```

output
```
x - 3*x^2 + (4*x^2)/(E^x - x)
```

3.818.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x^3-3x^2+e^x(8x^2+6x)+e^{2x}(1-6x)}{x^2-2e^xx+e^{2x}}\,dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-6x^3-3x^2+e^x(8x^2+6x)+e^{2x}(1-6x)}{(e^x-x)^2}\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{4(x-1)x^2}{(e^x-x)^2}-\frac{4(x-2)x}{e^x-x}-6x+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-4\int \frac{x^3}{(e^x-x)^2}dx+4\int \frac{x^2}{(e^x-x)^2}dx-4\int \frac{x^2}{e^x-x}dx+8\int \frac{x}{e^x-x}dx-3x^2+x$$

input
```
Int[(E^(2*x)*(1 - 6*x) - 3*x^2 - 6*x^3 + E^x*(6*x + 8*x^2))/(E^(2*x) - 2*E
^x*x + x^2),x]
```

output
```
$Aborted
```

3.818.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.818.4 Maple [A] (verified)

Time = 0.43 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.70

method	result	size
risch	$-3x^2+x-\frac{4x^2}{x-e^x}$	21
norman	$\frac{-3x^2-3x^3-e^x x+3\,e^x x^2}{x-e^x}$	33
parallelrisch	$-\frac{3x^3-3\,e^x x^2+3x^2+e^x x}{x-e^x}$	33

input
```
int(((1-6*x)*exp(x)^2+(8*x^2+6*x)*exp(x)-6*x^3-3*x^2)/(exp(x)^2-2*exp(x)*x
+x^2),x,method=_RETURNVERBOSE)
```

output
```
-3*x^2+x-4*x^2/(x-exp(x))
```

3.818.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

$$\int \frac{e^{2x}(1-6x)-3x^2-6x^3+e^x(6x+8x^2)}{e^{2x}-2e^x x+x^2}\,dx = -\frac{3\,x^3+3\,x^2-(3\,x^2-x)e^x}{x-e^x}$$

input
```
integrate(((1-6*x)*exp(x)^2+(8*x^2+6*x)*exp(x)-6*x^3-3*x^2)/(exp(x)^2-2*ex
p(x)*x+x^2),x, algorithm=\
```

output
```
-(3*x^3 + 3*x^2 - (3*x^2 - x)*e^x)/(x - e^x)
```

3.818.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.50

$$\int \frac{e^{2x}(1-6x)-3x^2-6x^3+e^x(6x+8x^2)}{e^{2x}-2e^x x+x^2}\,dx = -3x^2+\frac{4x^2}{-x+e^x}+x$$

input
```
integrate(((1-6*x)*exp(x)**2+(8*x**2+6*x)*exp(x)-6*x**3-3*x**2)/(exp(x)**2
-2*exp(x)*x+x**2),x)
```

output
```
-3*x**2 + 4*x**2/(-x + exp(x)) + x
```

3.818.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

$$\int \frac{e^{2x}(1-6x)-3x^2-6x^3+e^x(6x+8x^2)}{e^{2x}-2e^xx+x^2}\,dx = -\frac{3\,x^3+3\,x^2-(3\,x^2-x)e^x}{x-e^x}$$

input
```
integrate(((1-6*x)*exp(x)^2+(8*x^2+6*x)*exp(x)-6*x^3-3*x^2)/(exp(x)^2-2*ex
p(x)*x+x^2),x, algorithm=\
```

output
```
-(3*x^3 + 3*x^2 - (3*x^2 - x)*e^x)/(x - e^x)
```

3.818.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{e^{2x}(1-6x)-3x^2-6x^3+e^x(6x+8x^2)}{e^{2x}-2e^xx+x^2}\,dx = -\frac{3\,x^3-3\,x^2e^x+3\,x^2+xe^x}{x-e^x}$$

input
```
integrate(((1-6*x)*exp(x)^2+(8*x^2+6*x)*exp(x)-6*x^3-3*x^2)/(exp(x)^2-2*ex
p(x)*x+x^2),x, algorithm=\
```

output
```
-(3*x^3 - 3*x^2*e^x + 3*x^2 + x*e^x)/(x - e^x)
```

3.818.9 Mupad [B] (verification not implemented)

Time = 14.19 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \frac{e^{2x}(1-6x)-3x^2-6x^3+e^x(6x+8x^2)}{e^{2x}-2e^xx+x^2}\,dx = x-\frac{4\,x^2}{x-\mathrm{e}^x}-3\,x^2$$

input
```
int(-(exp(2*x)*(6*x - 1) - exp(x)*(6*x + 8*x^2) + 3*x^2 + 6*x^3)/(exp(2*x)
 - 2*x*exp(x) + x^2),x)
```

output
```
x - (4*x^2)/(x - exp(x)) - 3*x^2
```

3.819 $\int \frac{-274-68x-4x^2}{289+68x+4x^2} \, dx$

3.819.1 Optimal result

Integrand size = 23, antiderivative size = 32

$$\int \frac{-274-68x-4x^2}{289+68x+4x^2} \, dx = 3-x-\frac{x}{x+\frac{x+x^2}{16+x}}+\log(i\pi+\log(5))$$

output
```
ln(ln(5)+I*Pi)-x+3-x/((x^2+x)/(x+16)+x)
```

3.819.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.53

$$\int \frac{-274-68x-4x^2}{289+68x+4x^2} \, dx = -\frac{2(76+17x+x^2)}{17+2x}$$

input
```
Integrate[(-274 - 68*x - 4*x^2)/(289 + 68*x + 4*x^2),x]
```

output
```
(-2*(76 + 17*x + x^2))/(17 + 2*x)
```

3.819.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.59, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {1294, 27, 1107, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^2-68x-274}{4x^2+68x+289}dx$$

$$\Big\downarrow \text{ 1294}$$

$$4\int -\frac{2x^2+34x+137}{2(2x+17)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$-2\int \frac{2x^2+34x+137}{(2x+17)^2}dx$$

$$\Big\downarrow \text{ 1107}$$

$$-2\int \left(\frac{1}{2}-\frac{15}{2(2x+17)^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-2\left(\frac{x}{2}+\frac{15}{4(2x+17)}\right)$$

input
```
Int[(-274 - 68*x - 4*x^2)/(289 + 68*x + 4*x^2),x]
```

output
```
-2*(x/2 + 15/(4*(17 + 2*x)))
```

3.819.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1107
```
Int[((d_.) + (e_.)*(x_))^(m_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_
Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; F
reeQ[{a, b, c, d, e, m}, x] && EqQ[2*c*d - b*e, 0] && IGtQ[p, 0] &&  !(EqQ[
m, 3] && NeQ[p, 1])
```

rule 1294
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.)*((d_.) + (e_.)*(x_) + (f_.)*(x
_)^2)^(q_.), x_Symbol] :> Simp[1/c^p   Int[(b/2 + c*x)^(2*p)*(d + e*x + f*x
^2)^q, x], x] /; FreeQ[{a, b, c, d, e, f, q}, x] && EqQ[b^2 - 4*a*c, 0] &&
IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.819.4 Maple [A] (verified)

Time = 1.09 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.38

method	result	size
risch	$-x-\frac{15}{4\left(x+\frac{17}{2}\right)}$	12
default	$-x-\frac{15}{2(2x+17)}$	14
gosper	$-\frac{2x^{2}-137}{2x+17}$	17
parallelrisch	$-\frac{4x^{2}-274}{2(2x+17)}$	17
meijerg	$\frac{304x}{289\left(1+\frac{2x}{17}\right)}-\frac{x\left(6+\frac{6x}{17}\right)}{3\left(1+\frac{2x}{17}\right)}$	27

input
```
int((-4*x^2-68*x-274)/(4*x^2+68*x+289),x,method=_RETURNVERBOSE)
```

output
```
-x-15/4/(x+17/2)
```

3.819.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.59

$$\int \frac{-274-68x-4x^2}{289+68x+4x^2}\,dx = -\frac{4\,x^2+34\,x+15}{2\,(2\,x+17)}$$

input
```
integrate((-4*x^2-68*x-274)/(4*x^2+68*x+289),x, algorithm=\
```

output
```
-1/2*(4*x^2 + 34*x + 15)/(2*x + 17)
```

3.819.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.25

$$\int \frac{-274-68x-4x^2}{289+68x+4x^2}\,dx = -x-\frac{15}{4x+34}$$

input
```
integrate((-4*x**2-68*x-274)/(4*x**2+68*x+289),x)
```

output
```
-x - 15/(4*x + 34)
```

3.819.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.41

$$\int \frac{-274-68x-4x^2}{289+68x+4x^2}\,dx = -x-\frac{15}{2\,(2\,x+17)}$$

input
```
integrate((-4*x^2-68*x-274)/(4*x^2+68*x+289),x, algorithm=\
```

output
```
-x - 15/2/(2*x + 17)
```

3.819.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.41

$$\int \frac{-274-68x-4x^2}{289+68x+4x^2}\,dx = -x-\frac{15}{2\,(2\,x+17)}$$

input
```
integrate((-4*x^2-68*x-274)/(4*x^2+68*x+289),x, algorithm=\
```

output
```
-x - 15/2/(2*x + 17)
```

3.819.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.41

$$\int \frac{-274-68x-4x^2}{289+68x+4x^2}\,dx = -x-\frac{15}{4\,\left(x+\frac{17}{2}\right)}$$

input
```
int(-(68*x + 4*x^2 + 274)/(68*x + 4*x^2 + 289),x)
```

output
```
- x - 15/(4*(x + 17/2))
```

3.820 $\int \frac{e^{\frac{x^3}{e^4\left(4+x^2\right)}}\left(-12x^2-x^4\right)+e^4\left(32+16x^2+2x^4\right)}{e^4\left(16+8x^2+x^4\right)}\,dx$

3.820.1 Optimal result

Integrand size = 61, antiderivative size = 22

$$\int \frac{e^{\frac{x^3}{e^4\left(4+x^2\right)}}\left(-12x^2-x^4\right)+e^4(32+16x^2+2x^4)}{e^4\left(16+8x^2+x^4\right)}\,dx=-e^{\frac{x^3}{e^4\left(4+x^2\right)}}+2x$$

output
```
2*x-exp(x^3/(x^2+4)/exp(4))
```

3.820.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{e^{\frac{x^3}{e^4\left(4+x^2\right)}}\left(-12x^2-x^4\right)+e^4(32+16x^2+2x^4)}{e^4\left(16+8x^2+x^4\right)}\,dx=-e^{\frac{x}{e^4}-\frac{4x}{e^4\left(4+x^2\right)}}+2x$$

input
```
Integrate[(E^(x^3/(E^4*(4 + x^2)))*(-12*x^2 - x^4) + E^4*(32 + 16*x^2 + 2*
x^4))/(E^4*(16 + 8*x^2 + x^4)),x]
```

output
```
-E^(x/E^4 - (4*x)/(E^4*(4 + x^2))) + 2*x
```

3.820.3 Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.41, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.066$, Rules used = {27, 1380, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^4(2x^4+16x^2+32)+e^{\frac{x^3}{e^4(x^2+4)}}(-x^4-12x^2)}{e^4(x^4+8x^2+16)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \frac{2e^4(x^4+8x^2+16)-e^{\frac{x^3}{e^4(x^2+4)}}(x^4+12x^2)}{x^4+8x^2+16}dx}{e^4}$$

$$\Big\downarrow \text{1380}$$

$$\frac{\int \frac{2e^4(x^4+8x^2+16)-e^{\frac{x^3}{e^4(x^2+4)}}(x^4+12x^2)}{(x^2+4)^2}dx}{e^4}$$

$$\Big\downarrow \text{7293}$$

$$\frac{\int \left(2e^4-\frac{e^{\frac{x^3}{e^4(x^2+4)}}x^2(x^2+12)}{(x^2+4)^2}\right)dx}{e^4}$$

$$\Big\downarrow \text{2009}$$

$$\frac{2e^4x-e^{\frac{x^3}{e^4(x^2+4)}+4}}{e^4}$$

input
```
Int[(E^(x^3/(E^4*(4 + x^2)))*(-12*x^2 - x^4) + E^4*(32 + 16*x^2 + 2*x^4))/
(E^4*(16 + 8*x^2 + x^4)),x]
```

output
```
(-E^(4 + x^3/(E^4*(4 + x^2))) + 2*E^4*x)/E^4
```

3.820. $\int \frac{e^{\frac{x^3}{e^4(4+x^2)}}(-12x^2-x^4)+e^4(32+16x^2+2x^4)}{e^4(16+8x^2+x^4)}dx$

3.820.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.820.4 Maple [A] (verified)

Time = 0.86 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

method	result	size
risch	$2x-{\mathrm e}^{\frac{x^{3} {\mathrm e}^{-4}}{x^{2}+4}}$	21
parallelrisch	${\mathrm e}^{-4} \left(2 x \,{\mathrm e}^{4}-{\mathrm e}^{4} {\mathrm e}^{\frac{x^{3} {\mathrm e}^{-4}}{x^{2}+4}}\right)$	32
parts	$2 x +\frac{-{\mathrm e}^{\frac{x^{3} {\mathrm e}^{-4}}{x^{2}+4}} x^{2}-4 \,{\mathrm e}^{\frac{x^{3} {\mathrm e}^{-4}}{x^{2}+4}}}{x^{2}+4}$	53
norman	$\frac{8 x +2 x^{3}-{\mathrm e}^{\frac{x^{3} {\mathrm e}^{-4}}{x^{2}+4}} x^{2}-4 \,{\mathrm e}^{\frac{x^{3} {\mathrm e}^{-4}}{x^{2}+4}}}{x^{2}+4}$	57

input
```
int(((-x^4-12*x^2)*exp(x^3/(x^2+4)/exp(4))+(2*x^4+16*x^2+32)*exp(4))/(x^4+
8*x^2+16)/exp(4),x,method=_RETURNVERBOSE)
```

output
```
2*x-exp(x^3/(x^2+4)*exp(-4))
```

3.820. $\int \frac{e^{\frac{x^3}{e^4\left(4+x^2\right)}}\left(-12x^2-x^4\right)+e^4\left(32+16x^2+2x^4\right)}{e^4\left(16+8x^2+x^4\right)}\,dx$

3.820.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{e^{\frac{x^3}{e^4(4+x^2)}}(-12x^2-x^4)+e^4(32+16x^2+2x^4)}{e^4(16+8x^2+x^4)}\,dx = 2\,x - e^{\left(\frac{x^3e^{(-4)}}{x^2+4}\right)}$$

input
```
integrate(((-x^4-12*x^2)*exp(x^3/(x^2+4)/exp(4))+(2*x^4+16*x^2+32)*exp(4))
/(x^4+8*x^2+16)/exp(4),x, algorithm=\
```

output
```
2*x - e^(x^3*e^(-4)/(x^2 + 4))
```

3.820.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{e^{\frac{x^3}{e^4(4+x^2)}}(-12x^2-x^4)+e^4(32+16x^2+2x^4)}{e^4(16+8x^2+x^4)}\,dx = 2x - e^{\frac{x^3}{(x^2+4)e^4}}$$

input
```
integrate(((-x**4-12*x**2)*exp(x**3/(x**2+4)/exp(4))+(2*x**4+16*x**2+32)*e
xp(4))/(x**4+8*x**2+16)/exp(4),x)
```

output
```
2*x - exp(x**3*exp(-4)/(x**2 + 4))
```

3.820.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 91 vs. 2(20) = 40.

Time = 0.36 (sec) , antiderivative size = 91, normalized size of antiderivative = 4.14

$$\int \frac{e^{\frac{x^3}{e^4(4+x^2)}}(-12x^2-x^4)+e^4(32+16x^2+2x^4)}{e^4(16+8x^2+x^4)}\,dx$$
$$= \left(2\left(x+\frac{2\,x}{x^2+4}-3\arctan\left(\frac{1}{2}\,x\right)\right)e^4+2\left(\frac{2\,x}{x^2+4}+\arctan\left(\frac{1}{2}\,x\right)\right)e^4-4\left(\frac{2\,x}{x^2+4}-\arctan\left(\frac{1}{2}\,x\right)\right)e$$

input
```
integrate((((-x^4-12*x^2)*exp(x^3/(x^2+4)/exp(4))+(2*x^4+16*x^2+32)*exp(4))
/(x^4+8*x^2+16)/exp(4),x, algorithm=\
```

output
```
(2*(x + 2*x/(x^2 + 4) - 3*arctan(1/2*x))*e^4 + 2*(2*x/(x^2 + 4) + arctan(1
/2*x))*e^4 - 4*(2*x/(x^2 + 4) - arctan(1/2*x))*e^4 - e^(x*e^(-4) - 4*x/(x^
2*e^4 + 4*e^4) + 4))*e^(-4)
```

3.820.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.41

$$\int \frac{e^{\frac{x^3}{e^4(4+x^2)}}(-12x^2-x^4)+e^4(32+16x^2+2x^4)}{e^4(16+8x^2+x^4)}\,dx = \left(2\,xe^4-e^{\left(\frac{x^3}{x^2e^4+4\,e^4}+4\right)}\right)e^{(-4)}$$

input
```
integrate((((-x^4-12*x^2)*exp(x^3/(x^2+4)/exp(4))+(2*x^4+16*x^2+32)*exp(4))
/(x^4+8*x^2+16)/exp(4),x, algorithm=\
```

output
```
(2*x*e^4 - e^(x^3/(x^2*e^4 + 4*e^4) + 4))*e^(-4)
```

3.820.9 Mupad [B] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{e^{\frac{x^3}{e^4(4+x^2)}}(-12x^2-x^4)+e^4(32+16x^2+2x^4)}{e^4(16+8x^2+x^4)}\,dx = 2\,x-\mathrm{e}^{\frac{x^3\,\mathrm{e}^{-4}}{x^2+4}}$$

input
```
int(-(exp(-4)*(exp((x^3*exp(-4))/(x^2 + 4))*(12*x^2 + x^4) - exp(4)*(16*x^
2 + 2*x^4 + 32)))/(8*x^2 + x^4 + 16),x)
```

output
```
2*x - exp((x^3*exp(-4))/(x^2 + 4))
```

3.821 $\int (1 + 10\log(\log(2)))\,dx$

3.821.1 Optimal result

Integrand size = 7, antiderivative size = 14

$$\int (1 + 10\log(\log(2)))\,dx = x + 5\left(\frac{619}{125} + 2x\right)\log(\log(2))$$

output
```
x+5*ln(ln(2))*(2*x+619/125)
```

3.821.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.57

$$\int (1 + 10\log(\log(2)))\,dx = x + 10x\log(\log(2))$$

input
```
Integrate[1 + 10*Log[Log[2]],x]
```

output
```
x + 10*x*Log[Log[2]]
```

3.821.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.64, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (1+10\log(\log(2)))\,dx$$

$$\Big\downarrow \; 24$$

$$x(1+10\log(\log(2)))$$

input
```
Int[1 + 10*Log[Log[2]],x]
```

output
```
x*(1 + 10*Log[Log[2]])
```

3.821.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.821.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.64

method	result	size
risch	$10x\ln(\ln(2))+x$	9
parts	$10x\ln(\ln(2))+x$	9
default	$x(10\ln(\ln(2))+1)$	10
norman	$x(10\ln(\ln(2))+1)$	10
parallelrisch	$x(10\ln(\ln(2))+1)$	10

input
```
int(10*ln(ln(2))+1,x,method=_RETURNVERBOSE)
```

output
```
10*x*ln(ln(2))+x
```

3.821.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.57

$$\int (1 + 10\log(\log(2)))\,dx = 10\,x\log(\log(2)) + x$$

input
```
integrate(10*log(log(2))+1,x, algorithm=\
```

output
```
10*x*log(log(2)) + x
```

3.821.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.57

$$\int (1 + 10\log(\log(2)))\,dx = x(10\log(\log(2)) + 1)$$

input
```
integrate(10*ln(ln(2))+1,x)
```

output
```
x*(10*log(log(2)) + 1)
```

3.821.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.64

$$\int (1 + 10\log(\log(2)))\,dx = x(10\ \log(\log(2)) + 1)$$

input
```
integrate(10*log(log(2))+1,x, algorithm=\
```

output
```
x*(10*log(log(2)) + 1)
```

3.821.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.64

$$\int (1 + 10\log(\log(2)))\,dx = x(10\,\log(\log(2)) + 1)$$

input
```
integrate(10*log(log(2))+1,x, algorithm=\
```

output
```
x*(10*log(log(2)) + 1)
```

3.821.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.64

$$\int (1 + 10\log(\log(2)))\,dx = x\,(10\,\ln(\ln(2)) + 1)$$

input
```
int(10*log(log(2)) + 1,x)
```

output
```
x*(10*log(log(2)) + 1)
```

3.822 $\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}\left(-8x^2+\right.\right.}{x^2}$

3.822.1 Optimal result

Integrand size = 123, antiderivative size = 29

$$\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}(-8x^2+16e^{2x}x^3)+e^{3-e^{2x}}(-16x^2+16e^{2x}x^3)\log(\mathrm{l}\right.}{x^2}$$
$$=\frac{4e^{-x^2\left(e^{3-e^{2x}}+\log(\log(4))\right)^2}}{x}$$

output
```
4/x/exp((ln(2*ln(2))+exp(-exp(x)^2+3))^2*x^2)
```

3.822.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.66

$$\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}(-8x^2+16e^{2x}x^3)+e^{3-e^{2x}}(-16x^2+16e^{2x}x^3)\log(\mathrm{l}\right.}{x^2}$$
$$=\frac{4e^{-x^2\left(e^{6-2e^{2x}}+\log^2(\log(4))\right)}\log^{-2e^{3-e^{2x}}x^2}(4)}{x}$$

input
```
Integrate[(E^(-(E^(6 - 2*E^(2*x))*x^2) - 2*E^(3 - E^(2*x))*x^2*Log[Log[4]]
 - x^2*Log[Log[4]]^2)*(-4 + E^(6 - 2*E^(2*x))*(-8*x^2 + 16*E^(2*x)*x^3) +
E^(3 - E^(2*x))*(-16*x^2 + 16*E^(2*x)*x^3)*Log[Log[4]] - 8*x^2*Log[Log[4]]
^2))/x^2,x]
```

3.822.

$$\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}(-8x^2+16e^{2x}x^3)+e^{3-e^{2x}}(-16x^2+16e^{2x}x^3)\log(\log(4))-8x^2\log^2(\log(4))\right)}{x^2}\,dx$$

output
```
4/(E^(x^2*(E^(6 - 2*E^(2*x)) + Log[Log[4]]^2))*x*Log[4]^(2*E^(3 - E^(2*x))
*x^2))
```

3.822.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 200 vs. $2(29) = 58$.

Time = 1.33 (sec) , antiderivative size = 200, normalized size of antiderivative = 6.90, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.008$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-8x^2\log^2(\log(4))+e^{6-2e^{2x}}\left(16e^{2x}x^3-8x^2\right)+e^{3-e^{2x}}\left(16e^{2x}x^3-16x^2\right)\log(\log(4))-4\right)\exp\left(-e^{6-2e^{2x}}x^2-x^2\right.}{x^2}$$

$$\Big\downarrow \text{2726}$$

$$\frac{4e^{-e^{6-2e^{2x}}x^2-x^2\log^2(\log(4))}\log^{-2e^{3-e^{2x}}x^2}(4)\left(x^2\log^2(\log(4))+e^{6-2e^{2x}}\left(x^2-2e^{2x}x^3\right)+2e^{3-e^{2x}}\left(x^2-e^{2x}x^3\right)\log(\log(\right.}{x^2\left(-2e^{2x-2e^{2x}+6}x^2-2e^{2x-e^{2x}+3}x^2\log(\log(4))+e^{6-2e^{2x}}x+x\log^2(\log(4))+2e^{3-e^{2x}}x\log(\log(4))\right)}$$

input
```
Int[(E^(-(E^(6 - 2*E^(2*x))*x^2) - 2*E^(3 - E^(2*x))*x^2*Log[Log[4]] - x^2
*Log[Log[4]]^2)*(-4 + E^(6 - 2*E^(2*x))*(-8*x^2 + 16*E^(2*x)*x^3) + E^(3 -
 E^(2*x))*(-16*x^2 + 16*E^(2*x)*x^3)*Log[Log[4]] - 8*x^2*Log[Log[4]]^2))/x
^2,x]
```

output
```
(4*E^(-(E^(6 - 2*E^(2*x))*x^2) - x^2*Log[Log[4]]^2)*(E^(6 - 2*E^(2*x))*(x^
2 - 2*E^(2*x)*x^3) + 2*E^(3 - E^(2*x))*(x^2 - E^(2*x)*x^3)*Log[Log[4]] + x
^2*Log[Log[4]]^2))/(x^2*Log[4]^(2*E^(3 - E^(2*x))*x^2)*(E^(6 - 2*E^(2*x))*
x - 2*E^(6 - 2*E^(2*x) + 2*x)*x^2 + 2*E^(3 - E^(2*x))*x*Log[Log[4]] - 2*E^
(3 - E^(2*x) + 2*x)*x^2*Log[Log[4]] + x*Log[Log[4]]^2))
```

3.822.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.822.4 Maple [A] (verified)

Time = 3.50 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.66

method	result	size
parallelrisch	$\frac{4\,\mathrm{e}^{-x^{2} \left(\mathrm{e}^{3-\mathrm{e}^{2 x}} \ln\left(4 \ln(2)^{2}\right)+\ln(2 \ln(2))^{2}+\mathrm{e}^{6-2\,\mathrm{e}^{2 x}}\right)}}{x}$	48
risch	$\frac{4 \ln(2)^{-2 x^{2} \mathrm{e}^{3-\mathrm{e}^{2 x}}} 4^{-x^{2} \mathrm{e}^{3-\mathrm{e}^{2 x}}} \ln(2)^{-2 x^{2} \ln(2)} \mathrm{e}^{-x^{2} \left(\ln(2)^{2}+\ln(\ln(2))^{2}+\mathrm{e}^{6-2\,\mathrm{e}^{2 x}}\right)}}{x}$	79

input
```
int(((16*exp(x)^2*x^3-8*x^2)*exp(-exp(x)^2+3)^2+(16*exp(x)^2*x^3-16*x^2)*l
n(2*ln(2))*exp(-exp(x)^2+3)-8*x^2*ln(2*ln(2))^2-4)/x^2/exp(x^2*exp(-exp(x)
^2+3)^2+2*x^2*ln(2*ln(2))*exp(-exp(x)^2+3)+x^2*ln(2*ln(2))^2),x,method=_RE
TURNVERBOSE)
```

output
```
4/x/exp(x^2*(exp(-exp(x)^2+3)^2+2*ln(2*ln(2))*exp(-exp(x)^2+3)+ln(2*ln(2))
^2))
```

3.822.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.79

$$\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}(-8x^2+16e^{2x}x^3)+e^{3-e^{2x}}(-16x^2+16e^{2x}x^3)\log(l\right.}{x^2}$$
$$=\frac{4\,e^{\left(-2\,x^{2}e^{\left(-e^{(2\,x)}+3\right)}\log(2\,\log(2))-x^{2}\log(2\,\log(2))^{2}-x^{2}e^{\left(-2\,e^{(2\,x)}+6\right)}\right)}}{x}$$

input
```
integrate(((16*exp(x)^2*x^3-8*x^2)*exp(-exp(x)^2+3)^2+(16*exp(x)^2*x^3-16*
x^2)*log(2*log(2))*exp(-exp(x)^2+3)-8*x^2*log(2*log(2))^2-4)/x^2/exp(x^2*e
xp(-exp(x)^2+3)^2+2*x^2*log(2*log(2))*exp(-exp(x)^2+3)+x^2*log(2*log(2))^2
),x, algorithm=\
```

output
```
4*e^(-2*x^2*e^(-e^(2*x) + 3)*log(2*log(2)) - x^2*log(2*log(2))^2 - x^2*e^(
-2*e^(2*x) + 6))/x
```

3.822.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(24) = 48$.

Time = 0.34 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.76

$$\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}(-8x^2+16e^{2x}x^3)+e^{3-e^{2x}}(-16x^2+16e^{2x}x^3)\log(l\right.}{x^2}$$
$$=\frac{4e^{-2x^2e^{3-e^{2x}}\log(2\log(2))-x^2e^{6-2e^{2x}}-x^2\log(2\log(2))^2}}{x}$$

input
```
integrate(((16*exp(x)**2*x**3-8*x**2)*exp(-exp(x)**2+3)**2+(16*exp(x)**2*x
**3-16*x**2)*ln(2*ln(2))*exp(-exp(x)**2+3)-8*x**2*ln(2*ln(2))**2-4)/x**2/e
xp(x**2*exp(-exp(x)**2+3)**2+2*x**2*ln(2*ln(2))*exp(-exp(x)**2+3)+x**2*ln(
2*ln(2))**2),x)
```

output
```
4*exp(-2*x**2*exp(3 - exp(2*x))*log(2*log(2)) - x**2*exp(6 - 2*exp(2*x)) -
 x**2*log(2*log(2))**2)/x
```

3.822.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(28) = 56$.

Time = 0.40 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.86

$$\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}(-8x^2+16e^{2x}x^3)+e^{3-e^{2x}}(-16x^2+16e^{2x}x^3)\log(l\right.}{x^2}$$
$$=\frac{4\,e^{\left(-2\,x^2e^{\left(-e^{(2\,x)}+3\right)}\log(2)-x^2\log(2)^2-2\,x^2e^{\left(-e^{(2\,x)}+3\right)}\log(\log(2))-2\,x^2\log(2)\log(\log(2))-x^2\log(\log(2))^2-x^2e^{\left(-2\,e^{(2\,x)}+6\right)}\right)}}{x}$$

input
```
integrate(((16*exp(x)^2*x^3-8*x^2)*exp(-exp(x)^2+3)^2+(16*exp(x)^2*x^3-16*
x^2)*log(2*log(2))*exp(-exp(x)^2+3)-8*x^2*log(2*log(2))^2-4)/x^2/exp(x^2*e
xp(-exp(x)^2+3)^2+2*x^2*log(2*log(2))*exp(-exp(x)^2+3)+x^2*log(2*log(2))^2
),x, algorithm=\
```

output
```
4*e^(-2*x^2*e^(-e^(2*x) + 3)*log(2) - x^2*log(2)^2 - 2*x^2*e^(-e^(2*x) + 3
)*log(log(2)) - 2*x^2*log(2)*log(log(2)) - x^2*log(log(2))^2 - x^2*e^(-2*e
^(2*x) + 6))/x
```

3.822.8 Giac [F]

$$\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}(-8x^2+16e^{2x}x^3)+e^{3-e^{2x}}(-16x^2+16e^{2x}x^3)\log(\mathrm{l}\right.}{x^2}$$

$$=\int -\frac{4\left(2\,x^2\log\left(2\,\log\left(2\right)\right)^2-4\left(x^3e^{(2\,x)}-x^2\right)e^{\left(-e^{(2\,x)}+3\right)}\log\left(2\,\log\left(2\right)\right)-2\left(2\,x^3e^{(2\,x)}-x^2\right)e^{\left(-2\,e^{(2\,x)}+6\right)}+\right.}{x^2}$$

input
```
integrate(((16*exp(x)^2*x^3-8*x^2)*exp(-exp(x)^2+3)^2+(16*exp(x)^2*x^3-16*
x^2)*log(2*log(2))*exp(-exp(x)^2+3)-8*x^2*log(2*log(2))^2-4)/x^2/exp(x^2*e
xp(-exp(x)^2+3)^2+2*x^2*log(2*log(2))*exp(-exp(x)^2+3)+x^2*log(2*log(2))^2
),x, algorithm=\
```

output
```
undef
```

3.822.9 Mupad [B] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.10

$$\int \frac{e^{-e^{6-2e^{2x}}x^2-2e^{3-e^{2x}}x^2\log(\log(4))-x^2\log^2(\log(4))}\left(-4+e^{6-2e^{2x}}(-8x^2+16e^{2x}x^3)+e^{3-e^{2x}}(-16x^2+16e^{2x}x^3)\log(\mathrm{l}\right.}{x^2}$$

$$=\frac{4\,{\mathrm{e}}^{-x^2\,{\mathrm{e}}^{-2\,{\mathrm{e}}^{2\,x}}\,{\mathrm{e}}^6}\,{\mathrm{e}}^{-x^2\,{\ln\left(2\right)}^2}\,{\mathrm{e}}^{-x^2\,{\ln\left(\ln\left(2\right)\right)}^2}}{2^{2\,x^2\,\ln\left(\ln\left(2\right)\right)}\,2^{2\,x^2\,{\mathrm{e}}^{-{\mathrm{e}}^{2\,x}}\,{\mathrm{e}}^3}\,x\,{\ln\left(2\right)}^{2\,x^2\,{\mathrm{e}}^{-{\mathrm{e}}^{2\,x}}\,{\mathrm{e}}^3}}$$

input
```
int((exp(- x^2*exp(6 - 2*exp(2*x)) - x^2*log(2*log(2))^2 - 2*x^2*log(2*log
(2))*exp(3 - exp(2*x)))*(exp(6 - 2*exp(2*x))*(16*x^3*exp(2*x) - 8*x^2) - 8
*x^2*log(2*log(2))^2 + log(2*log(2))*exp(3 - exp(2*x))*(16*x^3*exp(2*x) -
16*x^2) - 4))/x^2,x)
```

output
```
(4*exp(-x^2*exp(-2*exp(2*x))*exp(6))*exp(-x^2*log(2)^2)*exp(-x^2*log(log(2
))^2))/(2^(2*x^2*log(log(2)))*2^(2*x^2*exp(-exp(2*x))*exp(3))*x*log(2)^(2*
x^2*exp(-exp(2*x))*exp(3)))
```

3.823 $\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x\right.\right.}{\left(6400-4000x+625x^2\right)\log^2(5)+e^x\left(\left(-800x^3+250x^4\right)\log(5)+\left(-480x^2\right.\right.}$

3.823.1 Optimal result

Integrand size = 198, antiderivative size = 30

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25\right.\right.\right.}{\left(6400-4000x+625x^2\right)\log^2(5)+e^x\left(\left(-800x^3+250x^4\right)\log(5)+\left(-480x^2-650x^3+250x^4\right)\log^2(5)\right)+\ldots}$$
$$= e^{\frac{x^2}{-16+x\left(5+e^x x\left(\frac{3}{5}+x+\frac{x}{\log(5)}\right)\right)}}$$

output
```
exp(x^2/((x*(x+x/ln(5)+3/5)*exp(x)+5)*x-16))
```

3.823.2 Mathematica [F]

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25\right.\right.\right.}{\left(6400-4000x+625x^2\right)\log^2(5)+e^x\left(\left(-800x^3+250x^4\right)\log(5)+\left(-480x^2-650x^3+250x^4\right)\log^2(5)\right)+\ldots}$$
$$=\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-\right.\right.\right.}{\left(6400-4000x+625x^2\right)\log^2(5)+e^x\left(\left(-800x^3+250x^4\right)\log(5)+\left(-480x^2-650x^3+250x^4\right)\log^2(5)\right)\ldots}$$

3.823.

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x^5\right)\log(5)+\left(-40x^4-25x^5\right)\log^2(5)\right)\right)}{\ldots}$$

input
```
Integrate[(5^((5*x^2)/((-80 + 25*x)*Log[5] + E^x*(5*x^3 + (3*x^2 + 5*x^3)*
Log[5])))*((-800*x + 125*x^2)*Log[5]^2 + E^x*((-25*x^4 - 25*x^5)*Log[5] +
(-40*x^4 - 25*x^5)*Log[5]^2)))/((6400 - 4000*x + 625*x^2)*Log[5]^2 + E^x*(
(-800*x^3 + 250*x^4)*Log[5] + (-480*x^2 - 650*x^3 + 250*x^4)*Log[5]^2) + E
^(2*x)*(25*x^6 + (30*x^5 + 50*x^6)*Log[5] + (9*x^4 + 30*x^5 + 25*x^6)*Log[
5]^2)),x]
```

output
```
Integrate[(5^((5*x^2)/((-80 + 25*x)*Log[5] + E^x*(5*x^3 + (3*x^2 + 5*x^3)*
Log[5])))*((-800*x + 125*x^2)*Log[5]^2 + E^x*((-25*x^4 - 25*x^5)*Log[5] +
(-40*x^4 - 25*x^5)*Log[5]^2)))/((6400 - 4000*x + 625*x^2)*Log[5]^2 + E^x*(
(-800*x^3 + 250*x^4)*Log[5] + (-480*x^2 - 650*x^3 + 250*x^4)*Log[5]^2) + E
^(2*x)*(25*x^6 + (30*x^5 + 50*x^6)*Log[5] + (9*x^4 + 30*x^5 + 25*x^6)*Log[
5]^2)), x]
```

3.823.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5^{\frac{5x^2}{e^x\left(5x^3+\left(5x^3+3x^2\right)\log(5)\right)+(25x-80)\log(5)}}\left(\left(125x^2-800x\right)\log^2(5)+e^x\left(\left(-25x^5-40x^4\right)\log^2(\right.\right.}{(625x^2-4000x+6400)\log^2(5)+e^{2x}\left(25x^6+\left(50x^6+30x^5\right)\log(5)+\left(25x^6+30x^5+9x^4\right)\log^2(5)\right)+e^x\left(\left(250\right.\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{x\log(5)5^{\frac{5x^2}{e^x x^2(5x(1+\log(5))+\log(125))+5(5x-16)\log(5)}+1}\left(-e^x x^3(5x(1+\log(5))+5+8\log(5))-5(32-5x)\log(5)\right)}{\left(e^x x^2(5x(1+\log(5))+\log(125))+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\log(5)\int -\frac{5^{1-\frac{5x^2}{5(16-5x)\log(5)-e^x x^2(5(1+\log(5))x+\log(125))}}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(5(16-5x)\log(5)-e^x x^2(5(1+\log(5))x+\log(125))\right)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-\log(5)\int \frac{5^{1-\frac{5x^2}{5(16-5x)\log(5)-e^x x^2(5(1+\log(5))x+\log(125))}}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(5(16-5x)\log(5)-e^x x^2(5(1+\log(5))x+\log(125))\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x^5\right)\log(5)+\left(-40x^4-25x^5\right)\log^2(5)\right)\right)}{\cdots}$$

$$-\log(5)\int\left(\frac{5^{1-\frac{5x^2}{5(16-5x)\log(5)-e^x x^2(5(1+\log(5))x+\log(125))}}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\right.$$

$\Big\downarrow$ 7239

$$-\log(5)\int\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$\Big\downarrow$ 7293

$$-\log(5)\int\left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\right.$$

$\Big\downarrow$ 7239

$$-\log(5)\int\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$\Big\downarrow$ 7293

$$-\log(5)\int\left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\right.$$

$\Big\downarrow$ 7239

$$-\log(5)\int\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$\Big\downarrow$ 7293

$$-\log(5)\int\left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\right.$$

$\Big\downarrow$ 7239

$$-\log(5)\int\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

3.823.

$$\int\frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x^5\right)\log(5)+\left(-40x^4-25x^5\right)\log^2(5)\right)\right)}{\cdots}$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+5^{\frac{}{e^x(5(1\cdots}}\right.$$

$$\Big\downarrow \text{7239}$$

$$-\log(5)\int \frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+5^{\frac{}{e^x(5(1\cdots}}\right.$$

$$\Big\downarrow \text{7239}$$

$$-\log(5)\int \frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+5^{\frac{}{e^x(5(1\cdots}}\right.$$

$$\Big\downarrow \text{7239}$$

$$-\log(5)\int \frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+5^{\frac{}{e^x(5(1\cdots}}\right.$$

$$\Big\downarrow \text{7239}$$

3.823.

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x^5\right)\log(5)+\left(-40x^4-25x^5\right)\log^2(5)\right)\right)}{\cdots}$$

$$-\log(5)\int \frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\frac{5^{\frac{\cdots}{e^x(5(1\cdots}}}{\cdots}\cdots\right.$$

$$\Big\downarrow \text{7239}$$

$$-\log(5)\int \frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\frac{5^{\frac{\cdots}{e^x(5(1\cdots}}}{\cdots}\cdots\right.$$

$$\Big\downarrow \text{7239}$$

$$-\log(5)\int \frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\frac{5^{\frac{\cdots}{e^x(5(1\cdots}}}{\cdots}\cdots\right.$$

$$\Big\downarrow \text{7239}$$

$$-\log(5)\int \frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\frac{5^{\frac{\cdots}{e^x(5(1\cdots}}}{\cdots}\cdots\right.$$

3.823.

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x^5\right)\log(5)+\left(-40x^4-25x^5\right)\log^2(5)\right)\right)}{\cdots}$$

$$\Big\downarrow \text{7239}$$

$$-\log(5)\int \frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\frac{5^{\overline{e^x(5(1\cdot}}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$-\log(5)\int \frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}x\left(e^x(5(1+\log(5))x+8\log(5)+5)x^3+5(32-5x)\log(5)\right)}{\left(e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\log(5)\int \left(\frac{5^{\frac{5x^2}{e^x(5(1+\log(5))x+\log(125))x^2+5(5x-16)\log(5)}+1}(-5(1+\log(5))x-8\log(5)-5)x^2}{(5(1+\log(5))x+\log(125))\left(-5e^x(1+\log(5))x^3-e^x\log(125)x^2-25\log(5)x+80\log(5)\right)}+\frac{5^{\overline{e^x(5(1\cdot}}}{}\right.$$

input
```
Int[(5^((5*x^2)/((-80 + 25*x)*Log[5] + E^x*(5*x^3 + (3*x^2 + 5*x^3)*Log[5]
)))*((-800*x + 125*x^2)*Log[5]^2 + E^x*((-25*x^4 - 25*x^5)*Log[5] + (-40*x
^4 - 25*x^5)*Log[5]^2)))/((6400 - 4000*x + 625*x^2)*Log[5]^2 + E^x*((-800*
x^3 + 250*x^4)*Log[5] + (-480*x^2 - 650*x^3 + 250*x^4)*Log[5]^2) + E^(2*x)
*(25*x^6 + (30*x^5 + 50*x^6)*Log[5] + (9*x^4 + 30*x^5 + 25*x^6)*Log[5]^2))
,x]
```

output
```
$Aborted
```

3.823.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

3.823.

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x^5\right)\log(5)+\left(-40x^4-25x^5\right)\log^2(5)\right)\right)}{\left(6400-4000x+625x^2\right)\log^2(5)+e^x\left(-800x^3+250x^4\right)\log(5)+\left(-480x^2-650x^3+250x^4\right)\log^2(5)\right)+e^{2x}\left(25x^6+\left(30x^5+50x^6\right)\log(5)+\left(9x^4+30x^5+25\right.\right.}$$

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.823.4 Maple [A] (verified)

Time = 60.96 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.47

method	result	size
risch	$3125^{\frac{x^{2}}{5 \ln(5) \mathrm{e}^{x} x^{3}+3 x^{2} \ln(5) \mathrm{e}^{x}+5 \,\mathrm{e}^{x} x^{3}+25 x \ln(5)-80 \ln(5)}}$	44
parallelrisch	$\mathrm{e}^{\frac{5 x^{2} \ln(5)}{5 \ln(5) \mathrm{e}^{x} x^{3}+3 x^{2} \ln(5) \mathrm{e}^{x}+5 \,\mathrm{e}^{x} x^{3}+25 x \ln(5)-80 \ln(5)}}$	46

input
```
int((((-25*x^5-40*x^4)*ln(5)^2+(-25*x^5-25*x^4)*ln(5))*exp(x)+(125*x^2-800
*x)*ln(5)^2)*exp(5*x^2*ln(5)/(((5*x^3+3*x^2)*ln(5)+5*x^3)*exp(x)+(25*x-80)
*ln(5)))/(((25*x^6+30*x^5+9*x^4)*ln(5)^2+(50*x^6+30*x^5)*ln(5)+25*x^6)*exp
(x)^2+((250*x^4-650*x^3-480*x^2)*ln(5)^2+(250*x^4-800*x^3)*ln(5))*exp(x)+(
625*x^2-4000*x+6400)*ln(5)^2),x,method=_RETURNVERBOSE)
```

output
```
3125^(x^2/(5*ln(5)*exp(x)*x^3+3*x^2*ln(5)*exp(x)+5*exp(x)*x^3+25*x*ln(5)-8
0*ln(5)))
```

3.823.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.40

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25\right.\right.\right.}{\left(6400-4000x+625x^2\right)\log^2(5)+e^x\left(\left(-800x^3+250x^4\right)\log(5)+\left(-480x^2-650x^3+250x^4\right)\log^2(5)\right)+}$$
$$=5^{\frac{5x^2}{\left(5x^3+\left(5x^3+3x^2\right)\log(5)\right)e^x+5(5x-16)\log(5)}}$$

input
```
integrate(((((-25*x^5-40*x^4)*log(5)^2+(-25*x^5-25*x^4)*log(5))*exp(x)+(125
*x^2-800*x)*log(5)^2)*exp(5*x^2*log(5)/((((5*x^3+3*x^2)*log(5)+5*x^3)*exp(x
)+(25*x-80)*log(5)))/((((25*x^6+30*x^5+9*x^4)*log(5)^2+(50*x^6+30*x^5)*log(
5)+25*x^6)*exp(x)^2+((250*x^4-650*x^3-480*x^2)*log(5)^2+(250*x^4-800*x^3)*
log(5))*exp(x)+(625*x^2-4000*x+6400)*log(5)^2),x, algorithm=\
```

output
```
5^(5*x^2/((5*x^3 + (5*x^3 + 3*x^2)*log(5))*e^x + 5*(5*x - 16)*log(5)))
```

3.823.6 Sympy [A] (verification not implemented)

Time = 0.71 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.30

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x\right.\right.\right.}{\left(6400-4000x+625x^2\right)\log^2(5)+e^x\left(\left(-800x^3+250x^4\right)\log(5)+\left(-480x^2-650x^3+250x^4\right)\log^2(5)\right)+}$$

$$= e^{\frac{5x^2\log(5)}{(25x-80)\log(5)+\left(5x^3+\left(5x^3+3x^2\right)\log(5)\right)e^x}}$$

input
```
integrate(((((-25*x**5-40*x**4)*ln(5)**2+(-25*x**5-25*x**4)*ln(5))*exp(x)+(
125*x**2-800*x)*ln(5)**2)*exp(5*x**2*ln(5)/((((5*x**3+3*x**2)*ln(5)+5*x**3)
*exp(x)+(25*x-80)*ln(5)))/((((25*x**6+30*x**5+9*x**4)*ln(5)**2+(50*x**6+30*
x**5)*ln(5)+25*x**6)*exp(x)**2+((250*x**4-650*x**3-480*x**2)*ln(5)**2+(250
*x**4-800*x**3)*ln(5))*exp(x)+(625*x**2-4000*x+6400)*ln(5)**2),x)
```

output
```
exp(5*x**2*log(5)/((25*x - 80)*log(5) + (5*x**3 + (5*x**3 + 3*x**2)*log(5)
)*exp(x)))
```

3.823.7 Maxima [A] (verification not implemented)

Time = 0.51 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.30

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x\right.\right.\right.}{\left(6400-4000x+625x^2\right)\log^2(5)+e^x\left(\left(-800x^3+250x^4\right)\log(5)+\left(-480x^2-650x^3+250x^4\right)\log^2(5)\right)+}$$

$$= 5^{\frac{5x^2}{\left(5x^3(\log(5)+1)+3x^2\log(5)\right)e^x+25x\log(5)-80\log(5)}}$$

3.823.

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x^5\right)\log(5)+\left(-40x^4-25x^5\right)\log^2(5)\right)\right)}{\ldots}$$

input
```
integrate((((-25*x^5-40*x^4)*log(5)^2+(-25*x^5-25*x^4)*log(5))*exp(x)+(125
*x^2-800*x)*log(5)^2)*exp(5*x^2*log(5)/((((5*x^3+3*x^2)*log(5)+5*x^3)*exp(x
)+(25*x-80)*log(5)))/(((25*x^6+30*x^5+9*x^4)*log(5)^2+(50*x^6+30*x^5)*log(
5)+25*x^6)*exp(x)^2+((250*x^4-650*x^3-480*x^2)*log(5)^2+(250*x^4-800*x^3)*
log(5))*exp(x)+(625*x^2-4000*x+6400)*log(5)^2),x, algorithm=\
```

output
```
5^(5*x^2/((5*x^3*(log(5) + 1) + 3*x^2*log(5))*e^x + 25*x*log(5) - 80*log(5
)))
```

3.823.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.47

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left((-800x+125x^2)\log^2(5)+e^x\left((-25x^4-25x\right.\right.}{(6400-4000x+625x^2)\log^2(5)+e^x\left((-800x^3+250x^4)\log(5)+(-480x^2-650x^3+250x^4)\log^2(5)\right)+}$$
$$=5^{\frac{5x^2}{5x^3e^x\log(5)+5x^3e^x+3x^2e^x\log(5)+25x\log(5)-80\log(5)}}$$

input
```
integrate((((-25*x^5-40*x^4)*log(5)^2+(-25*x^5-25*x^4)*log(5))*exp(x)+(125
*x^2-800*x)*log(5)^2)*exp(5*x^2*log(5)/((((5*x^3+3*x^2)*log(5)+5*x^3)*exp(x
)+(25*x-80)*log(5)))/(((25*x^6+30*x^5+9*x^4)*log(5)^2+(50*x^6+30*x^5)*log(
5)+25*x^6)*exp(x)^2+((250*x^4-650*x^3-480*x^2)*log(5)^2+(250*x^4-800*x^3)*
log(5))*exp(x)+(625*x^2-4000*x+6400)*log(5)^2),x, algorithm=\
```

output
```
5^(5*x^2/(5*x^3*e^x*log(5) + 5*x^3*e^x + 3*x^2*e^x*log(5) + 25*x*log(5) -
80*log(5)))
```

3.823.9 Mupad [B] (verification not implemented)

Time = 15.61 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.50

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left((-800x+125x^2)\log^2(5)+e^x\left((-25x^4-25x\right.\right.}{(6400-4000x+625x^2)\log^2(5)+e^x\left((-800x^3+250x^4)\log(5)+(-480x^2-650x^3+250x^4)\log^2(5)\right)+}$$
$$=e^{\frac{5x^2\ln(5)}{5x^3e^x-80\ln(5)+25x\ln(5)+3x^2e^x\ln(5)+5x^3e^x\ln(5)}}$$

3.823.

$$\int \frac{5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left((-800x+125x^2)\log^2(5)+e^x\left((-25x^4-25x^5)\log(5)+(-40x^4-25x^5)\log^2(5)\right)\right)}{\ldots}$$

input
```
int(-(exp((5*x^2*log(5))/(log(5)*(25*x - 80) + exp(x)*(log(5)*(3*x^2 + 5*x
^3) + 5*x^3)))*(exp(x)*(log(5)*(25*x^4 + 25*x^5) + log(5)^2*(40*x^4 + 25*x
^5)) + log(5)^2*(800*x - 125*x^2)))/(log(5)^2*(625*x^2 - 4000*x + 6400) -
exp(x)*(log(5)^2*(480*x^2 + 650*x^3 - 250*x^4) + log(5)*(800*x^3 - 250*x^4
)) + exp(2*x)*(log(5)^2*(9*x^4 + 30*x^5 + 25*x^6) + log(5)*(30*x^5 + 50*x^
6) + 25*x^6)),x)
```

output
```
exp((5*x^2*log(5))/(5*x^3*exp(x) - 80*log(5) + 25*x*log(5) + 3*x^2*exp(x)*
log(5) + 5*x^3*exp(x)*log(5)))
```

3.823.

$$\int 5^{\frac{5x^2}{(-80+25x)\log(5)+e^x\left(5x^3+\left(3x^2+5x^3\right)\log(5)\right)}}\left(\left(-800x+125x^2\right)\log^2(5)+e^x\left(\left(-25x^4-25x^5\right)\log(5)+\left(-40x^4-25x^5\right)\log^2(5)\right)\right)$$

3.824 $\int \frac{x+2e^{2x}x+2x^2+12x^3+4x^4+e^x(2+2x+2x^2)+(2+2x+2e^x x)\log(x)}{x}\,dx$

3.824.1 Optimal result

Integrand size = 57, antiderivative size = 29

$$\int \frac{x+2e^{2x}x+2x^2+12x^3+4x^4+e^x(2+2x+2x^2)+(2+2x+2e^x x)\log(x)}{x}\,dx = -x+\frac{1}{3}x^3(-x+4(3+x))+(e^x+x+\log(x))^2$$

output
```
1/3*x^3*(3*x+12)+(x+ln(x)+exp(x))^2-x
```

3.824.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \frac{x+2e^{2x}x+2x^2+12x^3+4x^4+e^x(2+2x+2x^2)+(2+2x+2e^x x)\log(x)}{x}\,dx = e^{2x}-x+2e^x x+x^2+4x^3+x^4+2(e^x+x)\log(x)+\log^2(x)$$

input
```
Integrate[(x + 2*E^(2*x)*x + 2*x^2 + 12*x^3 + 4*x^4 + E^x*(2 + 2*x + 2*x^2
) + (2 + 2*x + 2*E^x*x)*Log[x])/x,x]
```

output
```
E^(2*x) - x + 2*E^x*x + x^2 + 4*x^3 + x^4 + 2*(E^x + x)*Log[x] + Log[x]^2
```

3.824.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.55, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.035, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^4+12x^3+2x^2+e^x(2x^2+2x+2)+2e^{2x}x+x+(2e^xx+2x+2)\log(x)}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2e^x(x^2+x+x\log(x)+1)}{x}+\frac{4x^4+12x^3+2x^2+x+2x\log(x)+2\log(x)}{x}+2e^{2x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^4+4x^3+x^2+\frac{2e^x(x^2+x\log(x))}{x}-x+e^{2x}+\log^2(x)+2x\log(x)$$

input
```
Int[(x + 2*E^(2*x)*x + 2*x^2 + 12*x^3 + 4*x^4 + E^x*(2 + 2*x + 2*x^2) + (2
 + 2*x + 2*E^x*x)*Log[x])/x,x]
```

output
```
E^(2*x) - x + x^2 + 4*x^3 + x^4 + 2*x*Log[x] + Log[x]^2 + (2*E^x*(x^2 + x*
Log[x]))/x
```

3.824.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.824.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.38

method	result	size
default	$x^4+4x^3+\ln(x)^2+2\,\mathrm{e}^x\ln(x)+2x\ln(x)+2\,\mathrm{e}^x x+x^2+\mathrm{e}^{2x}-x$	40
risch	$\ln(x)^2+(2\,\mathrm{e}^x+2x)\ln(x)+x^4+4x^3+x^2+2\,\mathrm{e}^x x+\mathrm{e}^{2x}-x$	40
parallelrisch	$x^4+4x^3+\ln(x)^2+2\,\mathrm{e}^x\ln(x)+2x\ln(x)+2\,\mathrm{e}^x x+x^2+\mathrm{e}^{2x}-x$	40
parts	$x^4+4x^3+\ln(x)^2+2\,\mathrm{e}^x\ln(x)+2x\ln(x)+2\,\mathrm{e}^x x+x^2+\mathrm{e}^{2x}-x$	40

input
```
int(((2*exp(x)*x+2*x+2)*ln(x)+2*x*exp(x)^2+(2*x^2+2*x+2)*exp(x)+4*x^4+12*x
^3+2*x^2+x)/x,x,method=_RETURNVERBOSE)
```

output
```
-x+2*exp(x)*x+2*exp(x)*ln(x)+x^2+4*x^3+x^4+exp(x)^2+2*x*ln(x)+ln(x)^2
```

3.824.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24

$$\int \frac{x+2e^{2x}x+2x^2+12x^3+4x^4+e^x(2+2x+2x^2)+(2+2x+2e^x x)\log(x)}{x}\,dx$$
$$= x^4+4\,x^3+x^2+2\,xe^x+2\,(x+e^x)\log(x)+\log(x)^2-x+e^{(2\,x)}$$

input
```
integrate(((2*exp(x)*x+2*x+2)*log(x)+2*x*exp(x)^2+(2*x^2+2*x+2)*exp(x)+4*x
^4+12*x^3+2*x^2+x)/x,x, algorithm=\
```

output
```
x^4 + 4*x^3 + x^2 + 2*x*e^x + 2*(x + e^x)*log(x) + log(x)^2 - x + e^(2*x)
```

3.824.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(20) = 40.

Time = 0.17 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.41

$$\int \frac{x+2e^{2x}x+2x^2+12x^3+4x^4+e^x(2+2x+2x^2)+(2+2x+2e^x x)\log(x)}{x}\,dx$$
$$= x^4+4x^3+x^2+2x\log(x)-x+(2x+2\log(x))\,e^x+e^{2x}+\log(x)^2$$

input
```
integrate(((2*exp(x)*x+2*x+2)*ln(x)+2*x*exp(x)**2+(2*x**2+2*x+2)*exp(x)+4*
x**4+12*x**3+2*x**2+x)/x,x)
```

output
```
x**4 + 4*x**3 + x**2 + 2*x*log(x) - x + (2*x + 2*log(x))*exp(x) + exp(2*x)
 + log(x)**2
```

3.824.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(19) = 38$.

Time = 0.24 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.55

$$\int \frac{x + 2e^{2x}x + 2x^2 + 12x^3 + 4x^4 + e^x(2 + 2x + 2x^2) + (2 + 2x + 2e^x x)\log(x)}{x}\,dx$$
$$= x^4 + 4\,x^3 + x^2 + 2\,(x-1)e^x + 2\,x\log(x) + 2\,e^x\log(x) + \log(x)^2 - x + e^{(2\,x)} + 2\,e^x$$

input
```
integrate(((2*exp(x)*x+2*x+2)*log(x)+2*x*exp(x)^2+(2*x^2+2*x+2)*exp(x)+4*x
^4+12*x^3+2*x^2+x)/x,x, algorithm=\
```

output
```
x^4 + 4*x^3 + x^2 + 2*(x - 1)*e^x + 2*x*log(x) + 2*e^x*log(x) + log(x)^2 -
 x + e^(2*x) + 2*e^x
```

3.824.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. $2(19) = 38$.

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \frac{x + 2e^{2x}x + 2x^2 + 12x^3 + 4x^4 + e^x(2 + 2x + 2x^2) + (2 + 2x + 2e^x x)\log(x)}{x}\,dx$$
$$= x^4 + 4\,x^3 + x^2 + 2\,xe^x + 2\,x\log(x) + 2\,e^x\log(x) + \log(x)^2 - x + e^{(2\,x)}$$

input
```
integrate(((2*exp(x)*x+2*x+2)*log(x)+2*x*exp(x)^2+(2*x^2+2*x+2)*exp(x)+4*x
^4+12*x^3+2*x^2+x)/x,x, algorithm=\
```

output
```
x^4 + 4*x^3 + x^2 + 2*x*e^x + 2*x*log(x) + 2*e^x*log(x) + log(x)^2 - x + e
^(2*x)
```

3.824.9 Mupad [B] (verification not implemented)

Time = 16.08 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \frac{x+2e^{2x}x+2x^2+12x^3+4x^4+e^x(2+2x+2x^2)+(2+2x+2e^x x)\log(x)}{x}\,dx$$
$$= e^{2x}-x+2e^x\ln(x)+\ln(x)^2+2xe^x+2x\ln(x)+x^2+4x^3+x^4$$

input
```
int((x + 2*x*exp(2*x) + log(x)*(2*x + 2*x*exp(x) + 2) + exp(x)*(2*x + 2*x^
2 + 2) + 2*x^2 + 12*x^3 + 4*x^4)/x,x)
```

output
```
exp(2*x) - x + 2*exp(x)*log(x) + log(x)^2 + 2*x*exp(x) + 2*x*log(x) + x^2
+ 4*x^3 + x^4
```

3.825 $\int \frac{20+(16x+8x^2+x^3)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{(16x+8x^2+x^3)\log(19)}\,dx$

3.825.1 Optimal result

Integrand size = 46, antiderivative size = 25

$$\int \frac{20+(16x+8x^2+x^3)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{(16x+8x^2+x^3)\log(19)}\,dx=x+\frac{5\left(-3-x+\log\left(\frac{x}{\log(5)}\right)\right)}{(4+x)\log(19)}$$

output
```
5*(ln(x/ln(5))-3-x)/(4+x)/ln(19)+x
```

3.825.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{20+(16x+8x^2+x^3)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{(16x+8x^2+x^3)\log(19)}\,dx=\frac{x\log(19)+\frac{5\left(1+\log\left(\frac{x}{\log(5)}\right)\right)}{4+x}}{\log(19)}$$

input
```
Integrate[(20 + (16*x + 8*x^2 + x^3)*Log[19] - 5*x*Log[x/Log[5]])/((16*x +
 8*x^2 + x^3)*Log[19]),x]
```

output
```
(x*Log[19] + (5*(1 + Log[x/Log[5]]))/(4 + x))/Log[19]
```

3.825.3 Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.109$, Rules used = {27, 2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x^3+8x^2+16x)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)+20}{(x^3+8x^2+16x)\log(19)}dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int \frac{\log(19)(x^3+8x^2+16x)-5x\log\left(\frac{x}{\log(5)}\right)+20}{x^3+8x^2+16x}dx}{\log(19)}$$

$$\Big\downarrow \; 2026$$

$$\frac{\int \frac{\log(19)(x^3+8x^2+16x)-5x\log\left(\frac{x}{\log(5)}\right)+20}{x(x^2+8x+16)}dx}{\log(19)}$$

$$\Big\downarrow \; 2007$$

$$\frac{\int \frac{\log(19)(x^3+8x^2+16x)-5x\log\left(\frac{x}{\log(5)}\right)+20}{x(x+4)^2}dx}{\log(19)}$$

$$\Big\downarrow \; 7293$$

$$\frac{\int \left(\frac{\log(19)x^3+8\log(19)x^2+16\log(19)x+20}{x(x+4)^2}-\frac{5\log\left(\frac{x}{\log(5)}\right)}{(x+4)^2}\right)dx}{\log(19)}$$

$$\Big\downarrow \; 2009$$

$$\frac{\frac{5}{x+4}-\frac{5x\log\left(\frac{x}{\log(5)}\right)}{4(x+4)}+x\log(19)+\frac{5\log(x)}{4}}{\log(19)}$$

input
```
Int[(20 + (16*x + 8*x^2 + x^3)*Log[19] - 5*x*Log[x/Log[5]])/((16*x + 8*x^2
 + x^3)*Log[19]),x]
```

output
```
(5/(4 + x) + x*Log[19] + (5*Log[x])/4 - (5*x*Log[x/Log[5]])/(4*(4 + x)))/L
og[19]
```

3.825. $\int \frac{20+(16x+8x^2+x^3)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{(16x+8x^2+x^3)\log(19)}dx$

3.825.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.825.4 Maple [A] (verified)

Time = 0.74 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

method	result	size
parallelrisch	$\frac{5+\ln(19)x^2-16\ln(19)+5\ln\left(\frac{x}{\ln(5)}\right)}{\ln(19)(4+x)}$	32
norman	$\frac{x^2+\frac{5\ln\left(\frac{x}{\ln(5)}\right)}{\ln(19)}-\frac{16\ln(19)-5}{\ln(19)}}{4+x}$	36
risch	$\frac{5\ln\left(\frac{x}{\ln(5)}\right)}{\ln(19)(4+x)}+\frac{\ln(19)x^2+4x\ln(19)+5}{\ln(19)(4+x)}$	43
parts	$\frac{x\ln(19)+\frac{5\ln(x)}{4}+\frac{5}{4+x}-\frac{5\ln(4+x)}{4}}{\ln(19)}+\frac{5\ln(4+x)}{4\ln(19)}-\frac{5\ln\left(\frac{x}{\ln(5)}\right)x}{4\ln(19)(4+x)}$	58
derivativedivides	$\frac{\ln(5)\left(\frac{5\ln(4+x)}{4\ln(5)}-\frac{5\ln\left(\frac{x}{\ln(5)}\right)x}{4\ln(5)(4+x)}+\frac{\frac{5\ln\left(\frac{x}{\ln(5)}\right)}{4}+\frac{20}{4x+16}-\frac{5\ln(4+x)}{4}}{\ln(5)}+\frac{x\ln(19)}{\ln(5)}\right)}{\ln(19)}$	75
default	$\frac{\ln(5)\left(\frac{5\ln(4+x)}{4\ln(5)}-\frac{5\ln\left(\frac{x}{\ln(5)}\right)x}{4\ln(5)(4+x)}+\frac{\frac{5\ln\left(\frac{x}{\ln(5)}\right)}{4}+\frac{20}{4x+16}-\frac{5\ln(4+x)}{4}}{\ln(5)}+\frac{x\ln(19)}{\ln(5)}\right)}{\ln(19)}$	75

input
```
int((-5*x*ln(x/ln(5))+(x^3+8*x^2+16*x)*ln(19)+20)/(x^3+8*x^2+16*x)/ln(19),
x,method=_RETURNVERBOSE)
```

output
```
1/ln(19)*(5+ln(19)*x^2-16*ln(19)+5*ln(x/ln(5)))/(4+x)
```

3.825.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

$$\int \frac{20+(16x+8x^2+x^3)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{(16x+8x^2+x^3)\log(19)}\,dx = \frac{(x^2+4\,x)\log{(19)}+5\,\log\left(\frac{x}{\log(5)}\right)+5}{(x+4)\log{(19)}}$$

input
```
integrate((-5*x*log(x/log(5))+(x^3+8*x^2+16*x)*log(19)+20)/(x^3+8*x^2+16*x
)/log(19),x, algorithm=\
```

output
```
((x^2 + 4*x)*log(19) + 5*log(x/log(5)) + 5)/((x + 4)*log(19))
```

3.825.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

$$\int \frac{20+(16x+8x^2+x^3)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{(16x+8x^2+x^3)\log(19)}\,dx = x+\frac{5\log\left(\frac{x}{\log(5)}\right)}{x\log(19)+4\log(19)}+\frac{5}{x\log(19)+4\log(19)}$$

input
```
integrate((-5*x*ln(x/ln(5))+(x**3+8*x**2+16*x)*ln(19)+20)/(x**3+8*x**2+16*
x)/ln(19),x)
```

output
```
x + 5*log(x/log(5))/(x*log(19) + 4*log(19)) + 5/(x*log(19) + 4*log(19))
```

3.825.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. 2(25) = 50.

Time = 0.19 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.80

$$\int \frac{20+(16x+8x^2+x^3)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{(16x+8x^2+x^3)\log(19)}\,dx = \frac{\left(x-\frac{16}{x+4}-8\log(x+4)\right)\log(19)+8\left(\frac{4}{x+4}+\log(x+4)\right)\log(19)-\frac{16\log(19)}{x+4}+\frac{5\log\left(\frac{x}{\log(5)}\right)}{x+4}+\frac{5}{x+4}}{\log(19)}$$

input
```
integrate((-5*x*log(x/log(5))+(x^3+8*x^2+16*x)*log(19)+20)/(x^3+8*x^2+16*x
)/log(19),x, algorithm=\
```

output
```
((x - 16/(x + 4) - 8*log(x + 4))*log(19) + 8*(4/(x + 4) + log(x + 4))*log(
19) - 16*log(19)/(x + 4) + 5*log(x/log(5))/(x + 4) + 5/(x + 4))/log(19)
```

3.825.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

$$\int \frac{20+(16x+8x^2+x^3)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{(16x+8x^2+x^3)\log(19)}\,dx=\frac{x\log(19)-\frac{5(\log(\log(5))-1)}{x+4}+\frac{5\log(x)}{x+4}}{\log(19)}$$

input
```
integrate((-5*x*log(x/log(5))+(x^3+8*x^2+16*x)*log(19)+20)/(x^3+8*x^2+16*x
)/log(19),x, algorithm=\
```

output
```
(x*log(19) - 5*(log(log(5)) - 1)/(x + 4) + 5*log(x)/(x + 4))/log(19)
```

3.825.9 Mupad [B] (verification not implemented)

Time = 16.10 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{20+(16x+8x^2+x^3)\log(19)-5x\log\left(\frac{x}{\log(5)}\right)}{(16x+8x^2+x^3)\log(19)}\,dx=x+\frac{5\ln\left(\frac{x}{\ln(5)}\right)+5}{\ln(19)\,(x+4)}$$

input
```
int((log(19)*(16*x + 8*x^2 + x^3) - 5*x*log(x/log(5)) + 20)/(log(19)*(16*x
 + 8*x^2 + x^3)),x)
```

output
```
x + (5*log(x/log(5)) + 5)/(log(19)*(x + 4))
```

3.826 $\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}(2x+l}\right.}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}$

3.826.1 Optimal result

Integrand size = 130, antiderivative size = 25

$$\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}(2x+\log(e^2x))}\left(-x^2-2x^3\right)\right)}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}\,dx$$
$$=-x+\frac{x^3}{1+e^{e^{1+x}\sqrt{x}}}$$

output
```
x^3/(exp(exp(1/2*ln(exp(2)*x)+x))+1)-x
```

3.826.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

$$\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}(2x+\log(e^2x))}\left(-x^2-2x^3\right)\right)}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}\,dx$$
$$=\frac{1}{2}\left(-2x+\frac{2x^3}{1+e^{e^{1+x}\sqrt{x}}}\right)$$

input
```
Integrate[(-2 - 2*E^(2*E^((2*x + Log[E^2*x])/2)) + 6*x^2 + E^E^((2*x + Log
[E^2*x])/2)*(-4 + 6*x^2 + E^((2*x + Log[E^2*x])/2)*(-x^2 - 2*x^3)))/(2 + 4
*E^E^((2*x + Log[E^2*x])/2) + 2*E^(2*E^((2*x + Log[E^2*x])/2))),x]
```

output
```
(-2*x + (2*x^3)/(1 + E^(E^(1 + x)*Sqrt[x])))/2
```

3.826.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(6x^2+\left(-2x^3-x^2\right)e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}-4\right)-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}-2}{4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(6x^2+\left(-2x^3-x^2\right)e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}-4\right)-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}-2}{2\left(e^{e^{x+1}\sqrt{x}}+1\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int -\frac{-6x^2+2e^{2e^{x+1}\sqrt{x}}+e^{e^{x+1}\sqrt{x}}\left(-6x^2+e^{x+1}\left(2x^3+x^2\right)\sqrt{x}+4\right)+2}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{1}{2}\int \frac{-6x^2+2e^{2e^{x+1}\sqrt{x}}+e^{e^{x+1}\sqrt{x}}\left(-6x^2+e^{x+1}\left(2x^3+x^2\right)\sqrt{x}+4\right)+2}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}dx$$

$$\Big\downarrow \text{ 7267}$$

$$-\int \frac{\sqrt{x}\left(-6x^2+2e^{2e^{x+1}\sqrt{x}}+e^{e^{x+1}\sqrt{x}}\left(e^{x+1}(2x+1)x^{5/2}-6x^2+4\right)+2\right)}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}d\sqrt{x}$$

$$\Big\downarrow \text{ 7293}$$

$$-\int \left(\frac{e^{x+e^{x+1}\sqrt{x}+1}(2x+1)x^3}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}-\frac{6e^{e^{x+1}\sqrt{x}}x^{5/2}}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}-\frac{6x^{5/2}}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}+\frac{4e^{e^{x+1}\sqrt{x}}\sqrt{x}}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}+\frac{2e^{2e^{x+1}\sqrt{x}}\sqrt{x}}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}+\frac{2\sqrt{\cdots}}{\left(1+e^{e\cdots}\right.}$$

$$\Big\downarrow \text{ 2009}$$

$$6\int \frac{x^{5/2}}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}d\sqrt{x}+6\int \frac{e^{e^{x+1}\sqrt{x}}x^{5/2}}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}d\sqrt{x}-2\int \frac{e^{x+e^{x+1}\sqrt{x}+1}x^4}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}d\sqrt{x}-\int \frac{e^{x+e^{x+1}\sqrt{x}+1}x^3}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}d\sqrt{x}-2\int \frac{\sqrt{x}}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}d\sqrt{x}-4\int \frac{e^{e^{x+1}\sqrt{x}}\sqrt{x}}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}d\sqrt{x}-2\int \frac{e^{2e^{x+1}\sqrt{x}}\sqrt{x}}{\left(1+e^{e^{x+1}\sqrt{x}}\right)^2}d\sqrt{x}$$

input
```
Int[(-2 - 2*E^(2*E^((2*x + Log[E^2*x])/2)) + 6*x^2 + E^E^((2*x + Log[E^2*x
])/2)*(-4 + 6*x^2 + E^((2*x + Log[E^2*x])/2)*(-x^2 - 2*x^3)))/(2 + 4*E^E^(
(2*x + Log[E^2*x])/2) + 2*E^(2*E^((2*x + Log[E^2*x])/2))),x]
```

output
```
$Aborted
```

3.826.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.826. $$\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}\left(-x^2-2x^3\right)\right)}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}\,dx$$

3.826.4 Maple [A] (verified)

Time = 2.00 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

method	result	size
risch	$\frac{x^{3}}{\mathrm{e}^{\sqrt{\mathrm{e}^{2} x}\, \mathrm{e}^{x}}+1}-x$	23
parallelrisch	$-\frac{-2 x^{3}+2 x\, \mathrm{e}^{\mathrm{e}^{\frac{\ln \left(\mathrm{e}^{2} x\right)}{2}+x}}+2 x}{2 \left(\mathrm{e}^{\mathrm{e}^{\frac{\ln \left(\mathrm{e}^{2} x\right)}{2}+x}}+1\right)}$	41

input
```
int((-2*exp(exp(1/2*ln(exp(2)*x)+x))^2+((-2*x^3-x^2)*exp(1/2*ln(exp(2)*x)+
x)+6*x^2-4)*exp(exp(1/2*ln(exp(2)*x)+x))+6*x^2-2)/(2*exp(exp(1/2*ln(exp(2)
*x)+x))^2+4*exp(exp(1/2*ln(exp(2)*x)+x))+2),x,method=_RETURNVERBOSE)
```

output
```
x^3/(exp((exp(2)*x)^(1/2)*exp(x))+1)-x
```

3.826.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.48

$$\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}\left(-x^2-2x^3\right)\right)}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}\,dx = \frac{x^3-xe^{\left(e^{\left(x+\frac{1}{2}\,\log\left(xe^2\right)\right)}\right)}-x}{e^{\left(e^{\left(x+\frac{1}{2}\,\log\left(xe^2\right)\right)}\right)}+1}$$

input
```
integrate((-2*exp(exp(1/2*log(exp(2)*x)+x))^2+((-2*x^3-x^2)*exp(1/2*log(ex
p(2)*x)+x)+6*x^2-4)*exp(exp(1/2*log(exp(2)*x)+x))+6*x^2-2)/(2*exp(exp(1/2*
log(exp(2)*x)+x))^2+4*exp(exp(1/2*log(exp(2)*x)+x))+2),x, algorithm=\
```

output
```
(x^3 - x*e^(e^(x + 1/2*log(x*e^2))) - x)/(e^(e^(x + 1/2*log(x*e^2))) + 1)
```

3.826.6 Sympy [F(-1)]

Timed out.

$$\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}\left(-x^2-2x^3\right)\right)}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}\,dx = \text{Timed out}$$

input
```
integrate((-2*exp(exp(1/2*ln(exp(2)*x)+x))**2+((-2*x**3-x**2)*exp(1/2*ln(e
xp(2)*x)+x)+6*x**2-4)*exp(exp(1/2*ln(exp(2)*x)+x))+6*x**2-2)/(2*exp(exp(1/
2*ln(exp(2)*x)+x))**2+4*exp(exp(1/2*ln(exp(2)*x)+x))+2),x)
```

output
```
Timed out
```

3.826.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.80

$$\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}\left(-x^2-2x^3\right)\right)}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}\,dx = \frac{\left(x^3e^6-xe^6-xe^{\left(\sqrt{x}e^{(x+1)}+6\right)}\right)e^{(-2)}}{e^4+e^{\left(\sqrt{x}e^{(x+1)}+4\right)}}$$

input
```
integrate((-2*exp(exp(1/2*log(exp(2)*x)+x))^2+((-2*x^3-x^2)*exp(1/2*log(ex
p(2)*x)+x)+6*x^2-4)*exp(exp(1/2*log(exp(2)*x)+x))+6*x^2-2)/(2*exp(exp(1/2*
log(exp(2)*x)+x))^2+4*exp(exp(1/2*log(exp(2)*x)+x))+2),x, algorithm=\
```

output
```
(x^3*e^6 - x*e^6 - x*e^(sqrt(x)*e^(x + 1) + 6))*e^(-2)/(e^4 + e^(sqrt(x)*e
^(x + 1) + 4))
```

3.826.8 Giac [F]

$$\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}(2x+\log(e^2x))}(-x^2-2x^3)\right)}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}\,dx$$
$$=\int \frac{6\,x^2+\left(6\,x^2-(2\,x^3+x^2)e^{\left(x+\frac{1}{2}\log\left(xe^2\right)\right)}-4\right)e^{\left(e^{\left(x+\frac{1}{2}\log\left(xe^2\right)\right)}\right)}-2\,e^{\left(2\,e^{\left(x+\frac{1}{2}\log\left(xe^2\right)\right)}\right)}-2}{2\left(e^{\left(2\,e^{\left(x+\frac{1}{2}\log\left(xe^2\right)\right)}\right)}+2\,e^{\left(e^{\left(x+\frac{1}{2}\log\left(xe^2\right)\right)}\right)}+1\right)}\,dx$$

input
```
integrate((-2*exp(exp(1/2*log(exp(2)*x)+x))^2+((-2*x^3-x^2)*exp(1/2*log(ex
p(2)*x)+x)+6*x^2-4)*exp(exp(1/2*log(exp(2)*x)+x))+6*x^2-2)/(2*exp(exp(1/2*
log(exp(2)*x)+x))^2+4*exp(exp(1/2*log(exp(2)*x)+x))+2),x, algorithm=\
```

output
```
integrate(1/2*(6*x^2 + (6*x^2 - (2*x^3 + x^2)*e^(x + 1/2*log(x*e^2)) - 4)*
e^(e^(x + 1/2*log(x*e^2))) - 2*e^(2*e^(x + 1/2*log(x*e^2))) - 2)/(e^(2*e^(
x + 1/2*log(x*e^2))) + 2*e^(e^(x + 1/2*log(x*e^2))) + 1), x)
```

3.826.9 Mupad [B] (verification not implemented)

Time = 14.81 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{-2-2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+6x^2+e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}\left(-4+6x^2+e^{\frac{1}{2}(2x+\log(e^2x))}(-x^2-2x^3)\right)}{2+4e^{e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}+2e^{2e^{\frac{1}{2}\left(2x+\log\left(e^2x\right)\right)}}}\,dx$$
$$=\frac{x^3}{\mathrm{e}^{\sqrt{x}\,\mathrm{e}\,\mathrm{e}^x}+1}-x$$

input
```
int(-(2*exp(2*exp(x + log(x*exp(2))/2)) + exp(exp(x + log(x*exp(2))/2))*(e
xp(x + log(x*exp(2))/2)*(x^2 + 2*x^3) - 6*x^2 + 4) - 6*x^2 + 2)/(2*exp(2*e
xp(x + log(x*exp(2))/2)) + 4*exp(exp(x + log(x*exp(2))/2)) + 2),x)
```

output
```
x^3/(exp(x^(1/2)*exp(1)*exp(x)) + 1) - x
```

3.827 $\int \frac{e^{e^{2x}}\left(-1+2e^{2x}x\right)\log(x)\log^3(\log(x))}{e^{\frac{2\left(256+x\log^2(\log(x))\right)}{\log^2(\log(x))}}\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(-2e^{e^{2x}}\right.}$

3.827.1 Optimal result

Integrand size = 166, antiderivative size = 26

$$\int \frac{e^{e^{2x}}\left(-1+2e^{2x}x\right)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(512+(1-x)\log(x)\right.}{e^{\frac{2\left(256+x\log^2(\log(x))\right)}{\log^2(\log(x))}}\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(-2e^{e^{2x}}\log(x)+2x\log(x)\right)\log^3(\log(x))+\left(e^{2e^{2x}}\log\right.} = \frac{x}{-e^{e^{2x}}+e^{x+\frac{256}{\log^2(\log(x))}}+x}$$

output
```
x/(exp(256/ln(ln(x))^2+x)+x-exp(exp(x)^2))
```

3.827.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{e^{2x}}\left(-1+2e^{2x}x\right)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(512+(1-x)\log(x)\right.}{e^{\frac{2\left(256+x\log^2(\log(x))\right)}{\log^2(\log(x))}}\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(-2e^{e^{2x}}\log(x)+2x\log(x)\right)\log^3(\log(x))+\left(e^{2e^{2x}}\log\right.} = \frac{x}{-e^{e^{2x}}+e^{x+\frac{256}{\log^2(\log(x))}}+x}$$

$$\int \frac{e^{e^{2x}}\left(-1+2e^{2x}x\right)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(512+(1-x)\log(x)\log^3(\log(x))\right)}{\ldots}$$

input
```
Integrate[(E^E^(2*x)*(-1 + 2*E^(2*x)*x)*Log[x]*Log[Log[x]]^3 + E^((256 + x
*Log[Log[x]]^2)/Log[Log[x]]^2)*(512 + (1 - x)*Log[x]*Log[Log[x]]^3))/(E^((
2*(256 + x*Log[Log[x]]^2))/Log[Log[x]]^2)*Log[x]*Log[Log[x]]^3 + E^((256 +
 x*Log[Log[x]]^2)/Log[Log[x]]^2)*(-2*E^E^(2*x)*Log[x] + 2*x*Log[x])*Log[Lo
g[x]]^3 + (E^(2*E^(2*x))*Log[x] - 2*E^E^(2*x)*x*Log[x] + x^2*Log[x])*Log[L
og[x]]^3),x]
```

output
```
x/(-E^E^(2*x) + E^(x + 256/Log[Log[x]]^2) + x)
```

3.827.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^{2x}}\left(2e^{2x}x-1\right)\log(x)\log^3(\log(x))+e^{\frac{x\log^2(\log(x))+256}{\log^2(\log(x))}}\left((1-x)\log(x)\log^3(\log(x))\right)}{\left(x^2\log(x)-2e^{e^{2x}}x\log(x)+e^{2e^{2x}}\log(x)\right)\log^3(\log(x))+e^{\frac{2\left(x\log^2(\log(x))+256\right)}{\log^2(\log(x))}}\log(x)\log^3(\log(x))+e^{\frac{x\log^2(\log(x))+256}{\log^2(\log(x))}}}$$

$$\Big\downarrow \; 7239$$

$$\int \frac{512e^{x+\frac{256}{\log^2(\log(x))}}+\left(-e^{e^{2x}}+2e^{2x+e^{2x}}x+(x-1)\left(-e^{x+\frac{256}{\log^2(\log(x))}}\right)\right)\log(x)\log^3(\log(x))}{\left(-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}\right)^2\log(x)\log^3(\log(x))}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{x^2\log(x)\log^3(\log(x))+512e^{e^{2x}}-512x-e^{e^{2x}}x\log(x)\log^3(\log(x))+2e^{2x+e^{2x}}x\log(x)\log^3(\log(x))-x\log(x)}{\left(-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}\right)^2\log(x)\log^3(\log(x))}\right.$$

$$\Big\downarrow \; 2009$$

3.827.

$$\int \frac{e^{e^{2x}}\left(-1+2e^{2x}x\right)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(512+(1-x)\log(x)\log^3(\log(x))\right)}{}$$

$$\int \frac{x^2}{\left(-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}\right)^2}dx-\int \frac{1}{-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}}dx-$$
$$\int \frac{x}{\left(-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}\right)^2}dx-\int \frac{e^{e^{2x}}x}{\left(-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}\right)^2}dx+$$
$$\int \frac{x}{-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}}dx+2\int \frac{e^{2x+e^{2x}}x}{\left(x-e^{e^{2x}}+e^{x+\frac{256}{\log^2(\log(x))}}\right)^2}dx+$$
$$512\int \frac{e^{e^{2x}}}{\left(-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}\right)^2\log(x)\log^3(\log(x))}dx-$$
$$512\int \frac{1}{\left(-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}\right)\log(x)\log^3(\log(x))}dx-$$
$$512\int \frac{x}{\left(-x+e^{e^{2x}}-e^{x+\frac{256}{\log^2(\log(x))}}\right)^2\log(x)\log^3(\log(x))}dx$$

input
```
Int[(E^E^(2*x)*(-1 + 2*E^(2*x)*x)*Log[x]*Log[Log[x]]^3 + E^((256 + x*Log[L
og[x]]^2)/Log[Log[x]]^2)*(512 + (1 - x)*Log[x]*Log[Log[x]]^3))/(E^((2*(256
 + x*Log[Log[x]]^2))/Log[Log[x]]^2)*Log[x]*Log[Log[x]]^3 + E^((256 + x*Log
[Log[x]]^2)/Log[Log[x]]^2)*(-2*E^E^(2*x)*Log[x] + 2*x*Log[x])*Log[Log[x]]^
3 + (E^(2*E^(2*x))*Log[x] - 2*E^E^(2*x)*x*Log[x] + x^2*Log[x])*Log[Log[x]]
^3),x]
```

output
```
$Aborted
```

3.827.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.827.

$$\int \frac{e^{e^{2x}}\left(-1+2e^{2x}x\right)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(512+(1-x)\log(x)\log^3(\log(x))\right)}{\cdots}$$

3.827.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

$$\frac{x}{x+\mathrm{e}^{\frac{x\ln(\ln(x))^{2}+256}{\ln(\ln(x))^{2}}}-\mathrm{e}^{\mathrm{e}^{2x}}}$$

input
```
int((((1-x)*ln(x)*ln(ln(x))^3+512)*exp((x*ln(ln(x))^2+256)/ln(ln(x))^2)+(2
*x*exp(x)^2-1)*ln(x)*exp(exp(x)^2)*ln(ln(x))^3)/(ln(x)*ln(ln(x))^3*exp((x*
ln(ln(x))^2+256)/ln(ln(x))^2)^2+(-2*ln(x)*exp(exp(x)^2)+2*x*ln(x))*ln(ln(x
))^3*exp((x*ln(ln(x))^2+256)/ln(ln(x))^2)+(ln(x)*exp(exp(x)^2)^2-2*x*ln(x)
*exp(exp(x)^2)+x^2*ln(x))*ln(ln(x))^3),x)
```

output
```
x/(x+exp((x*ln(ln(x))^2+256)/ln(ln(x))^2)-exp(exp(2*x)))
```

3.827.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{e^{e^{2x}}(-1+2e^{2x}x)\log(x)\log^{3}(\log(x))+e^{\frac{256+x\log^{2}(\log(x))}{\log^{2}(\log(x))}}(512+(1-x)\log(x)}{e^{\frac{2\left(256+x\log^{2}(\log(x))\right)}{\log^{2}(\log(x))}}\log(x)\log^{3}(\log(x))+e^{\frac{256+x\log^{2}(\log(x))}{\log^{2}(\log(x))}}\left(-2e^{e^{2x}}\log(x)+2x\log(x)\right)\log^{3}(\log(x))+(e^{2e^{2x}}\log}$$
$$=\frac{x}{x+e^{\left(\frac{x\log(\log(x))^{2}+256}{\log(\log(x))^{2}}\right)}-e^{\left(e^{(2x)}\right)}}$$

input
```
integrate((((1-x)*log(x)*log(log(x))^3+512)*exp((x*log(log(x))^2+256)/log(
log(x))^2)+(2*x*exp(x)^2-1)*log(x)*exp(exp(x)^2)*log(log(x))^3)/(log(x)*lo
g(log(x))^3*exp((x*log(log(x))^2+256)/log(log(x))^2)^2+(-2*log(x)*exp(exp(
x)^2)+2*x*log(x))*log(log(x))^3*exp((x*log(log(x))^2+256)/log(log(x))^2)+(
log(x)*exp(exp(x)^2)^2-2*x*log(x)*exp(exp(x)^2)+x^2*log(x))*log(log(x))^3)
,x, algorithm=\
```

output
```
x/(x + e^((x*log(log(x))^2 + 256)/log(log(x))^2) - e^(e^(2*x)))
```

3.827.

$$\int \frac{e^{e^{2x}}(-1+2e^{2x}x)\log(x)\log^{3}(\log(x))+e^{\frac{256+x\log^{2}(\log(x))}{\log^{2}(\log(x))}}(512+(1-x)\log(x)\log^{3}(\log(x)))}{\cdots}$$

3.827.6 Sympy [A] (verification not implemented)

Time = 3.35 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{e^{e^{2x}}(-1+2e^{2x}x)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(512+(1-x)\log(x)}{e^{\frac{2\left(256+x\log^2(\log(x))\right)}{\log^2(\log(x))}}\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(-2e^{e^{2x}}\log(x)+2x\log(x))\log^3(\log(x))+(e^{2e^{2x}}\log}$$
$$=-\frac{x}{-x-e^{\frac{x\log(\log(x))^2+256}{\log(\log(x))^2}}+e^{e^{2x}}}$$

input
```
integrate((((1-x)*ln(x)*ln(ln(x))**3+512)*exp((x*ln(ln(x))**2+256)/ln(ln(x
))**2)+(2*x*exp(x)**2-1)*ln(x)*exp(exp(x)**2)*ln(ln(x))**3)/(ln(x)*ln(ln(x
))**3*exp((x*ln(ln(x))**2+256)/ln(ln(x))**2)**2+(-2*ln(x)*exp(exp(x)**2)+2
*x*ln(x))*ln(ln(x))**3*exp((x*ln(ln(x))**2+256)/ln(ln(x))**2)+(ln(x)*exp(e
xp(x)**2)**2-2*x*ln(x)*exp(exp(x)**2)+x**2*ln(x))*ln(ln(x))**3),x)
```

output
```
-x/(-x - exp((x*log(log(x))**2 + 256)/log(log(x))**2) + exp(exp(2*x)))
```

3.827.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{e^{e^{2x}}(-1+2e^{2x}x)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(512+(1-x)\log(x)}{e^{\frac{2\left(256+x\log^2(\log(x))\right)}{\log^2(\log(x))}}\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(-2e^{e^{2x}}\log(x)+2x\log(x))\log^3(\log(x))+(e^{2e^{2x}}\log}$$
$$=\frac{x}{x+e^{\left(x+\frac{256}{\log(\log(x))^2}\right)}-e^{\left(e^{(2x)}\right)}}$$

input
```
integrate((((1-x)*log(x)*log(log(x))^3+512)*exp((x*log(log(x))^2+256)/log(
log(x))^2)+(2*x*exp(x)^2-1)*log(x)*exp(exp(x)^2)*log(log(x))^3)/(log(x)*lo
g(log(x))^3*exp((x*log(log(x))^2+256)/log(log(x))^2)^2+(-2*log(x)*exp(exp(
x)^2)+2*x*log(x))*log(log(x))^3*exp((x*log(log(x))^2+256)/log(log(x))^2)+(
log(x)*exp(exp(x)^2)^2-2*x*log(x)*exp(exp(x)^2)+x^2*log(x))*log(log(x))^3)
,x, algorithm=\
```

output
```
x/(x + e^(x + 256/log(log(x))^2) - e^(e^(2*x)))
```

3.827.

$$\int \frac{e^{e^{2x}}(-1+2e^{2x}x)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(512+(1-x)\log(x)\log^3(\log(x)))}{\cdots}$$

3.827.8 Giac [F]

$$\int \frac{e^{e^{2x}}(-1+2e^{2x}x)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(512+(1-x)\log(x)}{e^{\frac{2(256+x\log^2(\log(x)))}{\log^2(\log(x))}}\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(-2e^{e^{2x}}\log(x)+2x\log(x))\log^3(\log(x))+(e^{2e^{2x}}\log}$$

$$=\int \frac{\left(2\,xe^{(2\,x)}-1\right)e^{\left(e^{(2\,x)}\right)}\log\left(x\right)\log\left(\log\left(x\right)\right)^3-\left(\left(x-1\right)\log\left(x\right)\log\left(\log\right.\right.}{2\left(x\log\left(x\right)-e^{\left(e^{(2\,x)}\right)}\log\left(x\right)\right)e^{\left(\frac{x\log(\log(x))^2+256}{\log(\log(x))^2}\right)}\log\left(\log\left(x\right)\right)^3+e^{\left(\frac{2\left(x\log(\log(x))^2+256\right)}{\log(\log(x))^2}\right)}\log\left(x\right)\log\left(\log\left(x\right)\right)^3+}$$

input
```
integrate((((1-x)*log(x)*log(log(x))^3+512)*exp((x*log(log(x))^2+256)/log(
log(x))^2)+(2*x*exp(x)^2-1)*log(x)*exp(exp(x)^2)*log(log(x))^3)/(log(x)*lo
g(log(x))^3*exp((x*log(log(x))^2+256)/log(log(x))^2)^2+(-2*log(x)*exp(exp(
x)^2)+2*x*log(x))*log(log(x))^3*exp((x*log(log(x))^2+256)/log(log(x))^2)+(
log(x)*exp(exp(x)^2)^2-2*x*log(x)*exp(exp(x)^2)+x^2*log(x))*log(log(x))^3)
,x, algorithm=\
```

output
```
undef
```

3.827.9 Mupad [B] (verification not implemented)

Time = 14.99 (sec) , antiderivative size = 215, normalized size of antiderivative = 8.27

$$\int \frac{e^{e^{2x}}(-1+2e^{2x}x)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(512+(1-x)\log(x)}{e^{\frac{2(256+x\log^2(\log(x)))}{\log^2(\log(x))}}\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(-2e^{e^{2x}}\log(x)+2x\log(x))\log^3(\log(x))+(e^{2e^{2x}}\log}$$

$$=\frac{\mathrm{e}^{\mathrm{e}^{2\,x}}\,\left(x^3\ln\left(\ln\left(x\right)\right)^6\ln\left(x\right)^2-512\,x^2\ln\left(\ln\left(x\right)\right)^3\,\ln\left(x\right)\right)+x^3\ln\left(\ln\left(x\right)\right)^6\ln\left(x\right)^2-x^4\ln\left(\ln\left(x\right.\right.}{\left(x+\mathrm{e}^{x+\frac{256}{\ln(\ln(x))^2}}-\mathrm{e}^{\mathrm{e}^{2\,x}}\right)\,\left(x^2\ln\left(\ln\left(x\right)\right)^6\ln\left(x\right)^2-x^3\ln\left(\ln\left(x\right)\right)^6\ln\left(x\right)^2+512\,x^2\ln\left(\ln\left(x\right)\right)^3\,\ln\left(x\right)-2\,x^2\ln\right.}$$

input
```
int(-(exp((x*log(log(x))^2 + 256)/log(log(x))^2)*(log(log(x))^3*log(x)*(x
- 1) - 512) - log(log(x))^3*exp(exp(2*x))*log(x)*(2*x*exp(2*x) - 1))/(log(
log(x))^3*(x^2*log(x) + exp(2*exp(2*x))*log(x) - 2*x*exp(exp(2*x))*log(x))
 + log(log(x))^3*exp((2*(x*log(log(x))^2 + 256))/log(log(x))^2)*log(x) + l
og(log(x))^3*exp((x*log(log(x))^2 + 256)/log(log(x))^2)*(2*x*log(x) - 2*ex
p(exp(2*x))*log(x))),x)
```

3.827.

$$\int \frac{e^{e^{2x}}(-1+2e^{2x}x)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}(512+(1-x)\log(x)\log^3(\log(x)))}{}$$

output
```
(exp(exp(2*x))*(x^3*log(log(x))^6*log(x)^2 - 512*x^2*log(log(x))^3*log(x))
 + x^3*log(log(x))^6*log(x)^2 - x^4*log(log(x))^6*log(x)^2 + 512*x^3*log(l
og(x))^3*log(x) - 2*x^3*log(log(x))^6*exp(2*x + exp(2*x))*log(x)^2)/((x +
exp(x + 256/log(log(x))^2) - exp(exp(2*x)))*(x^2*log(log(x))^6*log(x)^2 -
x^3*log(log(x))^6*log(x)^2 + 512*x^2*log(log(x))^3*log(x) - 2*x^2*log(log(
x))^6*exp(2*x + exp(2*x))*log(x)^2 - 512*x*log(log(x))^3*exp(exp(2*x))*log
(x) + x^2*log(log(x))^6*exp(exp(2*x))*log(x)^2))
```

3.827.

$$\int \frac{e^{e^{2x}}\left(-1+2e^{2x}x\right)\log(x)\log^3(\log(x))+e^{\frac{256+x\log^2(\log(x))}{\log^2(\log(x))}}\left(512+(1-x)\log(x)\log^3(\log(x))\right)}{\dots}$$

3.828 $\int \frac{1}{\left(22x+x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22-\log\left(\sqrt[3]{2}x\right)\right)}\,dx$

3.828.1 Optimal result

Integrand size = 32, antiderivative size = 14

$$\int \frac{1}{\left(22x+x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22-\log\left(\sqrt[3]{2}x\right)\right)}\,dx=\log\left(\log\left(-22-\log\left(\sqrt[3]{2}x\right)\right)\right)$$

output
```
ln(ln(-ln(2^(1/3)*x)-22))
```

3.828.2 Mathematica [F]

$$\int \frac{1}{\left(22x+x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22-\log\left(\sqrt[3]{2}x\right)\right)}\,dx =\int \frac{1}{\left(22x+x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22-\log\left(\sqrt[3]{2}x\right)\right)}\,dx$$

input
```
Integrate[1/((22*x + x*Log[2^(1/3)*x])*Log[-22 - Log[2^(1/3)*x]]),x]
```

output
```
Integrate[1/((22*x + x*Log[2^(1/3)*x])*Log[-22 - Log[2^(1/3)*x]]), x]
```

3.828.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156, Rules used = {3039, 2837, 25, 2739, 14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\left(22x+x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-\log\left(\sqrt[3]{2}x\right)-22\right)}dx$$

$$\Big\downarrow \text{3039}$$

$$\int \frac{1}{\left(\log\left(\sqrt[3]{2}x\right)+22\right)\log\left(-\log\left(\sqrt[3]{2}x\right)-22\right)}d\log\left(\sqrt[3]{2}x\right)$$

$$\Big\downarrow \text{2837}$$

$$-\int -\frac{1}{\left(-\log\left(\sqrt[3]{2}x\right)-22\right)\log\left(-\log\left(\sqrt[3]{2}x\right)-22\right)}d\left(-\log\left(\sqrt[3]{2}x\right)-22\right)$$

$$\Big\downarrow \text{25}$$

$$\int \frac{1}{\left(-\log\left(\sqrt[3]{2}x\right)-22\right)\log\left(-\log\left(\sqrt[3]{2}x\right)-22\right)}d\left(-\log\left(\sqrt[3]{2}x\right)-22\right)$$

$$\Big\downarrow \text{2739}$$

$$\int \frac{1}{\log\left(-\log\left(\sqrt[3]{2}x\right)-22\right)}d\log\left(-\log\left(\sqrt[3]{2}x\right)-22\right)$$

$$\Big\downarrow \text{14}$$

$$\log\left(\log\left(-\log\left(\sqrt[3]{2}x\right)-22\right)\right)$$

input
```
Int[1/((22*x + x*Log[2^(1/3)*x])*Log[-22 - Log[2^(1/3)*x]]),x]
```

output
```
Log[Log[-22 - Log[2^(1/3)*x]]]
```

3.828.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2739
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Simp[1/(
b*n)   Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p}
, x]
```

rule 2837
```
Int[((a_.) + Log[(c_.)*((d_) + (e_.)*(x_))^(n_.)]*(b_.))^(p_.)*((f_) + (g_.
)*(x_))^(q_.), x_Symbol] :> Simp[1/e   Subst[Int[(f*(x/d))^q*(a + b*Log[c*x
^n])^p, x], x, d + e*x], x] /; FreeQ[{a, b, c, d, e, f, g, n, p, q}, x] &&
EqQ[e*f - d*g, 0]
```

rule 3039
```
Int[u_, x_Symbol] :> With[{lst = FunctionOfLog[Cancel[x*u], x]}, Simp[1/lst
[[3]]   Subst[Int[lst[[1]], x], x, Log[lst[[2]]]], x] /;  !FalseQ[lst]] /;
NonsumQ[u]
```

3.828.4 Maple [A] (verified)

Time = 184.90 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

method	result	size
norman	$\ln\left(\ln\left(-\ln\left(2^{\frac{1}{3}}x\right)-22\right)\right)$	13
parallelrisch	$\ln\left(\ln\left(-\ln\left(2^{\frac{1}{3}}x\right)-22\right)\right)$	13

input
```
int(1/(x*ln(2^(1/3)*x)+22*x)/ln(-ln(2^(1/3)*x)-22),x,method=_RETURNVERBOSE
)
```

output
```
ln(ln(-ln(2^(1/3)*x)-22))
```

3.828.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.86

$$\int \frac{1}{\left(22x+x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22-\log\left(\sqrt[3]{2}x\right)\right)}\,dx = \log\left(\log\left(-\log\left(2^{\frac{1}{3}}x\right)-22\right)\right)$$

input
```
integrate(1/(x*log(2^(1/3)*x)+22*x)/log(-log(2^(1/3)*x)-22),x, algorithm=\
```

output
```
log(log(-log(2^(1/3)*x) - 22))
```

3.828.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(22x+x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22-\log\left(\sqrt[3]{2}x\right)\right)}\,dx = \log\left(\log\left(-\log\left(\sqrt[3]{2}x\right)-22\right)\right)$$

input
```
integrate(1/(x*ln(2**(1/3)*x)+22*x)/ln(-ln(2**(1/3)*x)-22),x)
```

output
```
log(log(-log(2**(1/3)*x) - 22))
```

3.828.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.21

$$\int \frac{1}{\left(22x+x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22-\log\left(\sqrt[3]{2}x\right)\right)}\,dx$$
$$= \log\left(-\log\left(3\right)+\log\left(-\log\left(2\right)-3\log\left(x\right)-66\right)\right)$$

input
```
integrate(1/(x*log(2^(1/3)*x)+22*x)/log(-log(2^(1/3)*x)-22),x, algorithm=\
```

output
```
log(-log(3) + log(-log(2) - 3*log(x) - 66))
```

3.828.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.21

$$\int \frac{1}{\left(22x + x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22 - \log\left(\sqrt[3]{2}x\right)\right)}\,dx = \log\left(\log\left(3\right) - \log\left(-\log\left(2\right) - 3\log\left(x\right) - 66\right)\right)$$

input
```
integrate(1/(x*log(2^(1/3)*x)+22*x)/log(-log(2^(1/3)*x)-22),x, algorithm=\
```

output
```
log(log(3) - log(-log(2) - 3*log(x) - 66))
```

3.828.9 Mupad [B] (verification not implemented)

Time = 15.70 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.86

$$\int \frac{1}{\left(22x + x\log\left(\sqrt[3]{2}x\right)\right)\log\left(-22 - \log\left(\sqrt[3]{2}x\right)\right)}\,dx = \ln\left(\ln\left(-\ln\left(2^{1/3}\,x\right) - 22\right)\right)$$

input
```
int(1/(log(- log(2^(1/3)*x) - 22)*(22*x + x*log(2^(1/3)*x))),x)
```

output
```
log(log(- log(2^(1/3)*x) - 22))
```

3.829 $\int \frac{e^{-e^x-x}\left(3-3x-x^2+e^x\left(10-3x-x^2\right)\right)}{4-4x+x^2}\,dx$

3.829.1 Optimal result

Integrand size = 46, antiderivative size = 23

$$\int \frac{e^{-e^x-x}(3-3x-x^2+e^x(10-3x-x^2))}{4-4x+x^2}\,dx=\frac{2e^{-e^x-x}(5+x)}{-4+2x}$$

output
```
2/(2*x-4)*(5+x)/exp(exp(x)+x)
```

3.829.2 Mathematica [A] (verified)

Time = 1.57 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{e^{-e^x-x}(3-3x-x^2+e^x(10-3x-x^2))}{4-4x+x^2}\,dx=e^{-e^x-x}\left(1+\frac{7}{-2+x}\right)$$

input
```
Integrate[(E^(-E^x - x)*(3 - 3*x - x^2 + E^x*(10 - 3*x - x^2)))/(4 - 4*x +
 x^2),x]
```

output
```
E^(-E^x - x)*(1 + 7/(-2 + x))
```

3.829.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x-e^x}\left(-x^2+e^x\left(-x^2-3x+10\right)-3x+3\right)}{x^2-4x+4}dx$$

$$\Big\downarrow \text{7277}$$

$$4\int \frac{e^{-x-e^x}\left(-x^2-3x+e^x\left(-x^2-3x+10\right)+3\right)}{4(2-x)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\int \frac{e^{-x-e^x}\left(-x^2+e^x\left(-x^2-3x+10\right)-3x+3\right)}{(2-x)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{-x-e^x}\left(-x^2-3x+3\right)}{(x-2)^2}-\frac{e^{-e^x}(x+5)}{x-2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-7\int \frac{e^{-x-e^x}}{(x-2)^2}dx-7\int \frac{e^{-e^x}}{x-2}dx-7\int \frac{e^{-x-e^x}}{x-2}dx+e^{-x-e^x}$$

input
```
Int[(E^(-E^x - x)*(3 - 3*x - x^2 + E^x*(10 - 3*x - x^2)))/(4 - 4*x + x^2),
x]
```

output
```
$Aborted
```

3.829.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.829.4 Maple [A] (verified)

Time = 1.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

method	result	size
norman	$\frac{(5+x) e^{-e^{x}-x}}{-2+x}$	17
parallelrisch	$\frac{(5+x) e^{-e^{x}-x}}{-2+x}$	17
risch	$\frac{(5+x) e^{-e^{x}-x}}{-2+x}$	19

input
```
int(((-x^2-3*x+10)*exp(x)-x^2-3*x+3)/(x^2-4*x+4)/exp(exp(x)+x),x,method=_R
ETURNVERBOSE)
```

output
```
(5+x)/(-2+x)/exp(exp(x)+x)
```

3.829.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{e^{-e^x-x}(3-3x-x^2+e^x(10-3x-x^2))}{4-4x+x^2}\,dx=\frac{(x+5)e^{(-x-e^x)}}{x-2}$$

input
```
integrate(((-x^2-3*x+10)*exp(x)-x^2-3*x+3)/(x^2-4*x+4)/exp(exp(x)+x),x, al
gorithm=\
```

output
```
(x + 5)*e^(-x - e^x)/(x - 2)
```

3.829.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.61

$$\int \frac{e^{-e^x-x}(3-3x-x^2+e^x(10-3x-x^2))}{4-4x+x^2}\,dx = \frac{(x+5)\,e^{-x-e^x}}{x-2}$$

input
```
integrate(((-x**2-3*x+10)*exp(x)-x**2-3*x+3)/(x**2-4*x+4)/exp(exp(x)+x),x)
```

output
```
(x + 5)*exp(-x - exp(x))/(x - 2)
```

3.829.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{e^{-e^x-x}(3-3x-x^2+e^x(10-3x-x^2))}{4-4x+x^2}\,dx = \frac{(x+5)e^{(-x-e^x)}}{x-2}$$

input
```
integrate(((-x^2-3*x+10)*exp(x)-x^2-3*x+3)/(x^2-4*x+4)/exp(exp(x)+x),x, al
gorithm=\
```

output
```
(x + 5)*e^(-x - e^x)/(x - 2)
```

3.829.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{e^{-e^x-x}(3-3x-x^2+e^x(10-3x-x^2))}{4-4x+x^2}\,dx = \frac{xe^{(-x-e^x)}+5\,e^{(-x-e^x)}}{x-2}$$

input
```
integrate(((-x^2-3*x+10)*exp(x)-x^2-3*x+3)/(x^2-4*x+4)/exp(exp(x)+x),x, al
gorithm=\
```

output
```
(x*e^(-x - e^x) + 5*e^(-x - e^x))/(x - 2)
```

3.829.9 Mupad [B] (verification not implemented)

Time = 14.93 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{e^{-e^x-x}(3-3x-x^2+e^x(10-3x-x^2))}{4-4x+x^2}\,dx = \frac{\mathrm{e}^{-x-\mathrm{e}^x}\,(x+5)}{x-2}$$

input
```
int(-(exp(- x - exp(x))*(3*x + exp(x)*(3*x + x^2 - 10) + x^2 - 3))/(x^2 -
4*x + 4),x)
```

output
```
(exp(- x - exp(x))*(x + 5))/(x - 2)
```

3.830 $\int \frac{-40x+60x^5+\frac{\left(-10+15x^4\right)^5\left(-100x-1350x^5\right)}{e}}{-8+12x^4+\frac{\left(-10+15x^4\right)^5\left(-40+60x^4\right)}{e}+\frac{\left(-10+15x^4\right)^{10}\left(-50+75x^4\right)}{e^2}}\,dx$

3.830.1 Optimal result

Integrand size = 81, antiderivative size = 24

$$\int \frac{-40x+60x^5+\frac{(-10+15x^4)^5(-100x-1350x^5)}{e}}{-8+12x^4+\frac{(-10+15x^4)^5(-40+60x^4)}{e}+\frac{(-10+15x^4)^{10}(-50+75x^4)}{e^2}}\,dx=\frac{x^2}{\frac{2}{5}+\frac{3125(-2+3x^4)^5}{e}}$$

output
```
x^2/(exp(5*ln(15*x^4-10)-1)+2/5)
```

3.830.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{-40x+60x^5+\frac{(-10+15x^4)^5(-100x-1350x^5)}{e}}{-8+12x^4+\frac{(-10+15x^4)^5(-40+60x^4)}{e}+\frac{(-10+15x^4)^{10}(-50+75x^4)}{e^2}}\,dx=\frac{10ex^2}{4e+31250\,(-2+3x^4)^5}$$

input
```
Integrate[(-40*x + 60*x^5 + ((-10 + 15*x^4)^5*(-100*x - 1350*x^5))/E)/(-8
+ 12*x^4 + ((-10 + 15*x^4)^5*(-40 + 60*x^4))/E + ((-10 + 15*x^4)^10*(-50 +
 75*x^4))/E^2),x]
```

output
```
(10*E*x^2)/(4*E + 31250*(-2 + 3*x^4)^5)
```

3.830. $\int \frac{-40x+60x^5+\frac{\left(-10+15x^4\right)^5\left(-100x-1350x^5\right)}{e}}{-8+12x^4+\frac{\left(-10+15x^4\right)^5\left(-40+60x^4\right)}{e}+\frac{\left(-10+15x^4\right)^{10}\left(-50+75x^4\right)}{e^2}}\,dx$

3.830.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{60x^5+\frac{(15x^4-10)^5(-1350x^5-100x)}{e}-40x}{\frac{(75x^4-50)(15x^4-10)^{10}}{e^2}+\frac{(60x^4-40)(15x^4-10)^5}{e}+12x^4-8}dx$$

$$\Big\downarrow \text{2457}$$

$$\int \frac{}{14416259765625x^{40}-96108398437500x^{36}+288325195312500x^{32}-512578125000000x^{28}+598007812500000}$$

$$\Big\downarrow \text{2460}$$

$$\int \left(\frac{90ex}{-3796875x^{20}+12656250x^{16}-16875000x^{12}+11250000x^8-3750000x^4+500000\left(1-\frac{e}{250000}\right)}+\frac{200}{(-379687}\right.$$

$$\Big\downarrow \text{2009}$$

$$-100(250000-e)e\text{Subst}\left(\int \frac{1}{\left(15625\left(3x^2-2\right)^5+2e\right)^2}dx,x,x^2\right)+$$

$$150000000e\text{Subst}\left(\int \frac{x^2}{\left(15625\left(3x^2-2\right)^5+2e\right)^2}dx,x,x^2\right)-$$

$$126562500e\text{Subst}\left(\int \frac{x^8}{\left(15625\left(3x^2-2\right)^5+2e\right)^2}dx,x,x^2\right)+$$

$$337500000e\text{Subst}\left(\int \frac{x^6}{\left(15625\left(3x^2-2\right)^5+2e\right)^2}dx,x,x^2\right)-$$

$$337500000e\text{Subst}\left(\int \frac{x^4}{\left(15625\left(3x^2-2\right)^5+2e\right)^2}dx,x,x^2\right)+$$

$$\frac{3\sqrt{3\left(50+5^{4/5}\sqrt[5]{-2e}\right)}e\text{arctanh}\left(\frac{5x^2}{\sqrt{\frac{1}{3}\left(50+5^{4/5}\sqrt[5]{-2e}\right)}}\right)}{10\left(5\sqrt[5]{5}(-2e)^{4/5}-e\right)}+$$

$$\frac{3\sqrt{\frac{3}{5\ 2^{4/5}\sqrt[5]{\frac{5}{e}}-1}}\sqrt[10]{e}\text{arctanh}\left(\frac{5^{3/5}\sqrt{\frac{3}{5\ 2^{4/5}\sqrt[5]{\frac{5}{e}}-1}}x^2}{\sqrt[10]{2e}}\right)}{2^{9/10}5^{3/5}}-$$

$$\frac{3e\sqrt{3\left(50-(-5)^{4/5}\sqrt[5]{2e}\right)}\text{arctanh}\left(\frac{5x^2}{\sqrt{\frac{1}{3}\left(50-(-5)^{4/5}\sqrt[5]{2e}\right)}}\right)}{10\left(e+5\sqrt[5]{-5}(2e)^{4/5}\right)}-$$

$$\frac{3e\sqrt{3\left(50-(-1)^{2/5}5^{4/5}\sqrt[5]{2e}\right)}\text{arctanh}\left(\frac{5x^2}{\sqrt{\frac{1}{3}\left(50-(-1)^{2/5}5^{4/5}\sqrt[5]{2e}\right)}}\right)}{10\left(e+5(-1)^{3/5}\sqrt[5]{5}(2e)^{4/5}\right)}-$$

$$\frac{3e\sqrt{3\left(50+(-1)^{3/5}5^{4/5}\sqrt[5]{2e}\right)}\text{arctanh}\left(\frac{5x^2}{\sqrt{\frac{1}{3}\left(50+(-1)^{3/5}5^{4/5}\sqrt[5]{2e}\right)}}\right)}{10\left(e-5(-1)^{2/5}\sqrt[5]{5}(2e)^{4/5}\right)}$$

3.830. $$\int \frac{-40x+60x^5+\frac{\left(-10+15x^4\right)^5\left(-100x-1350x^5\right)}{e}}{-8+12x^4+\frac{\left(-10+15x^4\right)^5\left(-40+60x^4\right)}{e}+\frac{\left(-10+15x^4\right)^{10}\left(-50+75x^4\right)}{e^2}}\,dx$$

input
```
Int[(-40*x + 60*x^5 + ((-10 + 15*x^4)^5*(-100*x - 1350*x^5))/E)/(-8 + 12*x
^4 + ((-10 + 15*x^4)^5*(-40 + 60*x^4))/E + ((-10 + 15*x^4)^10*(-50 + 75*x^
4))/E^2),x]
```

output
```
$Aborted
```

3.830.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2457
```
Int[(u_.)*(Px_)*(Qx_)^(q_), x_Symbol] :> Module[{Rx = PolyGCD[Px, Qx, x]},
Int[u*Rx^(q + 1)*PolynomialQuotient[Px, Rx, x]*PolynomialQuotient[Qx, Rx, x
]^q, x] /; NeQ[Rx, 1]] /; ILtQ[q, 0] && PolyQ[Px, x] && PolyQ[Qx, x]
```

rule 2460
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px /. x -> Sqrt[x]]},
Int[ExpandIntegrand[u*(Qx /. x -> x^2)^p, x], x] /;  !SumQ[NonfreeFactors[Q
x, x]]] /; PolyQ[Px, x^2] && GtQ[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&
 !TrinomialQ[Px, x] && ILtQ[p, 0] && RationalFunctionQ[u, x]
```

3.830.4 Maple [A] (verified)

Time = 4.56 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04

method	result	size
parallelrisch	$\frac{5x^2}{2+5\,\mathrm{e}^{5\ln\left(15x^4-10\right)-1}}$	25
risch	$\frac{x^2}{759375\,\mathrm{e}^{-1}x^{20}-2531250\,\mathrm{e}^{-1}x^{16}+3375000\,\mathrm{e}^{-1}x^{12}-2250000\,\mathrm{e}^{-1}x^8+750000\,\mathrm{e}^{-1}x^4-100000\,\mathrm{e}^{-1}+\frac{2}{5}}$	48

input
```
int(((-1350*x^5-100*x)*exp(5*ln(15*x^4-10)-1)+60*x^5-40*x)/((75*x^4-50)*ex
p(5*ln(15*x^4-10)-1)^2+(60*x^4-40)*exp(5*ln(15*x^4-10)-1)+12*x^4-8),x,meth
od=_RETURNVERBOSE)
```

output
```
5*x^2/(2+5*exp(5*ln(15*x^4-10)-1))
```

3.830. $\int \frac{-40x+60x^5+\frac{\left(-10+15x^4\right)^5\left(-100x-1350x^5\right)}{e}}{-8+12x^4+\frac{\left(-10+15x^4\right)^5\left(-40+60x^4\right)}{e}+\frac{\left(-10+15x^4\right)^{10}\left(-50+75x^4\right)}{e^2}}\,dx$

3.830.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{-40x+60x^5+\frac{(-10+15x^4)^5(-100x-1350x^5)}{e}}{-8+12x^4+\frac{(-10+15x^4)^5(-40+60x^4)}{e}+\frac{(-10+15x^4)^{10}(-50+75x^4)}{e^2}}\,dx = \frac{5\,x^2e}{3796875\,x^{20}-12656250\,x^{16}+16875000\,x^{12}-11250000\,x^8+3750000\,x^4+2\,e-500000}$$

input
```
integrate(((-1350*x^5-100*x)*exp(5*log(15*x^4-10)-1)+60*x^5-40*x)/((75*x^4
-50)*exp(5*log(15*x^4-10)-1)^2+(60*x^4-40)*exp(5*log(15*x^4-10)-1)+12*x^4-
8),x, algorithm=\
```

output
```
5*x^2*e/(3796875*x^20 - 12656250*x^16 + 16875000*x^12 - 11250000*x^8 + 375
0000*x^4 + 2*e - 500000)
```

3.830.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(17) = 34.

Time = 4.40 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{-40x+60x^5+\frac{(-10+15x^4)^5(-100x-1350x^5)}{e}}{-8+12x^4+\frac{(-10+15x^4)^5(-40+60x^4)}{e}+\frac{(-10+15x^4)^{10}(-50+75x^4)}{e^2}}\,dx = \frac{5ex^2}{3796875x^{20}-12656250x^{16}+16875000x^{12}-11250000x^8+3750000x^4-500000+2e}$$

input
```
integrate(((-1350*x**5-100*x)*exp(5*ln(15*x**4-10)-1)+60*x**5-40*x)/((75*x
**4-50)*exp(5*ln(15*x**4-10)-1)**2+(60*x**4-40)*exp(5*ln(15*x**4-10)-1)+12
*x**4-8),x)
```

output
```
5*E*x**2/(3796875*x**20 - 12656250*x**16 + 16875000*x**12 - 11250000*x**8
+ 3750000*x**4 - 500000 + 2*E)
```

3.830.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{-40x+60x^5+\frac{(-10+15x^4)^5(-100x-1350x^5)}{e}}{-8+12x^4+\frac{(-10+15x^4)^5(-40+60x^4)}{e}+\frac{(-10+15x^4)^{10}(-50+75x^4)}{e^2}}\,dx$$
$$= \frac{5\,x^2e}{3796875\,x^{20}-12656250\,x^{16}+16875000\,x^{12}-11250000\,x^8+3750000\,x^4+2\,e-500000}$$

input
```
integrate(((-1350*x^5-100*x)*exp(5*log(15*x^4-10)-1)+60*x^5-40*x)/((75*x^4
-50)*exp(5*log(15*x^4-10)-1)^2+(60*x^4-40)*exp(5*log(15*x^4-10)-1)+12*x^4-
8),x, algorithm=\
```

output
```
5*x^2*e/(3796875*x^20 - 12656250*x^16 + 16875000*x^12 - 11250000*x^8 + 375
0000*x^4 + 2*e - 500000)
```

3.830.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{-40x+60x^5+\frac{(-10+15x^4)^5(-100x-1350x^5)}{e}}{-8+12x^4+\frac{(-10+15x^4)^5(-40+60x^4)}{e}+\frac{(-10+15x^4)^{10}(-50+75x^4)}{e^2}}\,dx$$
$$= \frac{5\,x^2e}{3796875\,x^{20}-12656250\,x^{16}+16875000\,x^{12}-11250000\,x^8+3750000\,x^4+2\,e-500000}$$

input
```
integrate(((-1350*x^5-100*x)*exp(5*log(15*x^4-10)-1)+60*x^5-40*x)/((75*x^4
-50)*exp(5*log(15*x^4-10)-1)^2+(60*x^4-40)*exp(5*log(15*x^4-10)-1)+12*x^4-
8),x, algorithm=\
```

output
```
5*x^2*e/(3796875*x^20 - 12656250*x^16 + 16875000*x^12 - 11250000*x^8 + 375
0000*x^4 + 2*e - 500000)
```

3.830.9 Mupad [B] (verification not implemented)

Time = 16.72 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{-40x+60x^5+\frac{(-10+15x^4)^5(-100x-1350x^5)}{e}}{-8+12x^4+\frac{(-10+15x^4)^5(-40+60x^4)}{e}+\frac{(-10+15x^4)^{10}(-50+75x^4)}{e^2}}\,dx$$
$$=\frac{5\,x^2\,\mathrm{e}}{3796875\,x^{20}-12656250\,x^{16}+16875000\,x^{12}-11250000\,x^8+3750000\,x^4+2\,\mathrm{e}-500000}$$

input
```
int(-(40*x - 60*x^5 + exp(5*log(15*x^4 - 10) - 1)*(100*x + 1350*x^5))/(exp
(5*log(15*x^4 - 10) - 1)*(60*x^4 - 40) + exp(10*log(15*x^4 - 10) - 2)*(75*
x^4 - 50) + 12*x^4 - 8),x)
```

output
```
(5*x^2*exp(1))/(2*exp(1) + 3750000*x^4 - 11250000*x^8 + 16875000*x^12 - 12
656250*x^16 + 3796875*x^20 - 500000)
```

3.831 $\int \frac{-18x^2+60x^3+e^{e^x}(12x-30x^2+e^x(6x^2-30x^3))}{1-10x+25x^2} dx$

3.831.1 Optimal result

Integrand size = 54, antiderivative size = 19

$$\int \frac{-18x^2+60x^3+e^{e^x}(12x-30x^2+e^x(6x^2-30x^3))}{1-10x+25x^2} dx = \frac{6\left(e^{e^x}-x\right)x}{-5+\frac{1}{x}}$$

output
```
6*(exp(exp(x))-x)*x/(1/x-5)
```

3.831.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.53

$$\int \frac{-18x^2+60x^3+e^{e^x}(12x-30x^2+e^x(6x^2-30x^3))}{1-10x+25x^2} dx = -\frac{6\left(1-5x-125e^{e^x}x^2+125x^3\right)}{125-625x}$$

input
```
Integrate[(-18*x^2 + 60*x^3 + E^E^x*(12*x - 30*x^2 + E^x*(6*x^2 - 30*x^3))
)/(1 - 10*x + 25*x^2),x]
```

output
```
(-6*(1 - 5*x - 125*E^E^x*x^2 + 125*x^3))/(125 - 625*x)
```

3.831.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{60x^3-18x^2+e^{e^x}\left(-30x^2+e^x\left(6x^2-30x^3\right)+12x\right)}{25x^2-10x+1}\,dx$$

$$\Big\downarrow \text{ 7277}$$

$$100\int -\frac{3\left(-10x^3+3x^2-e^{e^x}\left(-5x^2+2x+e^x\left(x^2-5x^3\right)\right)\right)}{50(1-5x)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$-6\int \frac{-10x^3+3x^2-e^{e^x}\left(-5x^2+2x+e^x\left(x^2-5x^3\right)\right)}{(1-5x)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-6\int \left(-\frac{10x^3}{(5x-1)^2}+\frac{e^{x+e^x}x^2}{5x-1}+\frac{5e^{e^x}x^2}{(5x-1)^2}+\frac{3x^2}{(5x-1)^2}-\frac{2e^{e^x}x}{(5x-1)^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-6\left(\frac{1}{5}\int e^{x+e^x}xdx-\frac{1}{5}\int \frac{e^{e^x}}{(5x-1)^2}dx+\frac{1}{25}\int \frac{e^{x+e^x}}{5x-1}dx+\frac{\text{ExpIntegralEi}\left(e^x\right)}{5}-\frac{x^2}{5}-\frac{x}{25}+\frac{e^{e^x}}{25}+\frac{1}{125(1-5x)}\right.$$

input
```
Int[(-18*x^2 + 60*x^3 + E^E^x*(12*x - 30*x^2 + E^x*(6*x^2 - 30*x^3)))/(1 -
 10*x + 25*x^2),x]
```

output
```
$Aborted
```

3.831.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.831.4 Maple [A] (verified)

Time = 1.33 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

method	result	size
norman	$\frac{6x^3-6\,\mathrm{e}^{\mathrm{e}^x}x^2}{5x-1}$	23
parallelrisch	$\frac{30x^3-30\,\mathrm{e}^{\mathrm{e}^x}x^2}{25x-5}$	24
risch	$\frac{6x^2}{5}+\frac{6x}{25}+\frac{6}{625\left(x-\frac{1}{5}\right)}-\frac{6x^2\mathrm{e}^{\mathrm{e}^x}}{5x-1}$	32

input
```
int((((-30*x^3+6*x^2)*exp(x)-30*x^2+12*x)*exp(exp(x))+60*x^3-18*x^2)/(25*x
^2-10*x+1),x,method=_RETURNVERBOSE)
```

output
```
(6*x^3-6*exp(exp(x))*x^2)/(5*x-1)
```

3.831.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \frac{-18x^2+60x^3+e^{e^x}(12x-30x^2+e^x(6x^2-30x^3))}{1-10x+25x^2}\,dx=\frac{6\left(125\,x^3-125\,x^2e^{(e^x)}-5\,x+1\right)}{125\,(5\,x-1)}$$

input
```
integrate((((-30*x^3+6*x^2)*exp(x)-30*x^2+12*x)*exp(exp(x))+60*x^3-18*x^2)
/(25*x^2-10*x+1),x, algorithm=\
```

output
```
6/125*(125*x^3 - 125*x^2*e^(e^x) - 5*x + 1)/(5*x - 1)
```

3.831.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. $2(15) = 30$.

Time = 0.13 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.68

$$\int \frac{-18x^2+60x^3+e^{e^x}(12x-30x^2+e^x(6x^2-30x^3))}{1-10x+25x^2}\,dx = \frac{6x^2}{5}-\frac{6x^2e^{e^x}}{5x-1}+\frac{6x}{25}+\frac{6}{625x-125}$$

input
```
integrate(((((-30*x**3+6*x**2)*exp(x)-30*x**2+12*x)*exp(exp(x))+60*x**3-18*
x**2)/(25*x**2-10*x+1),x)
```

output
```
6*x**2/5 - 6*x**2*exp(exp(x))/(5*x - 1) + 6*x/25 + 6/(625*x - 125)
```

3.831.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.74

$$\int \frac{-18x^2+60x^3+e^{e^x}(12x-30x^2+e^x(6x^2-30x^3))}{1-10x+25x^2}\,dx$$
$$= \frac{6}{5}x^2-\frac{6x^2e^{(e^x)}}{5x-1}+\frac{6}{25}x+\frac{6}{125(5x-1)}$$

input
```
integrate(((((-30*x^3+6*x^2)*exp(x)-30*x^2+12*x)*exp(exp(x))+60*x^3-18*x^2)
/(25*x^2-10*x+1),x, algorithm=\
```

output
```
6/5*x^2 - 6*x^2*e^(e^x)/(5*x - 1) + 6/25*x + 6/125/(5*x - 1)
```

3.831.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. $2(17) = 34$.

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.05

$$\int \frac{-18x^2+60x^3+e^{e^x}(12x-30x^2+e^x(6x^2-30x^3))}{1-10x+25x^2}\,dx$$
$$= \frac{6\left(125x^3e^x-125x^2e^{(x+e^x)}-5xe^x+e^x\right)}{125(5xe^x-e^x)}$$

input
```
integrate((((-30*x^3+6*x^2)*exp(x)-30*x^2+12*x)*exp(exp(x))+60*x^3-18*x^2)
/(25*x^2-10*x+1),x, algorithm=\
```

output
```
6/125*(125*x^3*e^x - 125*x^2*e^(x + e^x) - 5*x*e^x + e^x)/(5*x*e^x - e^x)
```

3.831.9 Mupad [B] (verification not implemented)

Time = 16.17 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{-18x^2+60x^3+e^{e^x}(12x-30x^2+e^x(6x^2-30x^3))}{1-10x+25x^2}\,dx = \frac{6\,x^2\,\left(x-\mathrm{e}^{\mathrm{e}^x}\right)}{5\,x-1}$$

input
```
int((exp(exp(x))*(12*x + exp(x)*(6*x^2 - 30*x^3) - 30*x^2) - 18*x^2 + 60*x
^3)/(25*x^2 - 10*x + 1),x)
```

output
```
(6*x^2*(x - exp(exp(x))))/(5*x - 1)
```

3.832 $\int \frac{24+e^x(-24-12x)+12x+e^2(24+12x)+e^{-3+2x}(24+12x)+(-12x-12e}{4x+4x^2+x^3}$

3.832.1 Optimal result

Integrand size = 94, antiderivative size = 26

$$\int \frac{24+e^x(-24-12x)+12x+e^2(24+12x)+e^{-3+2x}(24+12x)+(-12x-12e^2x+e^x(-12x-12x^2)+e}{4x+4x^2+x^3}$$

$$=\frac{12(1+e^2-e^x+e^{-3+2x})\log(x)}{2+x}$$

output
```
12/(2+x)*(exp(2)+1+exp(-3+2*x)-exp(x))*ln(x)
```

3.832.2 Mathematica [A] (verified)

Time = 0.72 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{24+e^x(-24-12x)+12x+e^2(24+12x)+e^{-3+2x}(24+12x)+(-12x-12e^2x+e^x(-12x-12x^2)+e}{4x+4x^2+x^3}$$

$$=\frac{12(e^3+e^5+e^{2x}-e^{3+x})\log(x)}{e^3(2+x)}$$

input
```
Integrate[(24 + E^x*(-24 - 12*x) + 12*x + E^2*(24 + 12*x) + E^(-3 + 2*x)*(
24 + 12*x) + (-12*x - 12*E^2*x + E^x*(-12*x - 12*x^2) + E^(-3 + 2*x)*(36*x
 + 24*x^2))*Log[x])/(4*x + 4*x^2 + x^3),x]
```

output
```
(12*(E^3 + E^5 + E^(2*x) - E^(3 + x))*Log[x])/(E^3*(2 + x))
```

3.832.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 81 vs. 2(26) = 52.

Time = 1.96 (sec) , antiderivative size = 81, normalized size of antiderivative = 3.12, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^x\left(-12x^2-12x\right)+e^{2x-3}\left(24x^2+36x\right)-12e^2x-12x\right)\log(x)+e^x(-12x-24)+12x+e^{2x-3}(12x+24)+e}{x^3+4x^2+4x}$$

$$\Big\downarrow 2026$$

$$\int \frac{\left(e^x\left(-12x^2-12x\right)+e^{2x-3}\left(24x^2+36x\right)-12e^2x-12x\right)\log(x)+e^x(-12x-24)+12x+e^{2x-3}(12x+24)+e}{x\left(x^2+4x+4\right)}$$

$$\Big\downarrow 2007$$

$$\int \frac{\left(e^x\left(-12x^2-12x\right)+e^{2x-3}\left(24x^2+36x\right)-12e^2x-12x\right)\log(x)+e^x(-12x-24)+12x+e^{2x-3}(12x+24)+e}{x(x+2)^2}$$

$$\Big\downarrow 7293$$

$$\int \left(-\frac{12e^x\left(x^2\log(x)+x+x\log(x)+2\right)}{x(x+2)^2}+\frac{12e^{2x-3}\left(2x^2\log(x)+x+3x\log(x)+2\right)}{x(x+2)^2}+\frac{12e^2}{x(x+2)}+\frac{24}{x(x+2)^2}+\right.$$

$$\Big\downarrow 2009$$

$$-\frac{12e^x\log(x)}{x+2}+\frac{12e^{2x-3}\log(x)}{x+2}-\frac{6\left(1+e^2\right)x\log(x)}{x+2}+6e^2\log(x)+6\log(x)+6\left(1+e^2\right)\log(x+2)-6e^2\log(x+2)-6\log(x+2)$$

input
```
Int[(24 + E^x*(-24 - 12*x) + 12*x + E^2*(24 + 12*x) + E^(-3 + 2*x)*(24 + 1
2*x) + (-12*x - 12*E^2*x + E^x*(-12*x - 12*x^2) + E^(-3 + 2*x)*(36*x + 24*
x^2))*Log[x])/(4*x + 4*x^2 + x^3),x]
```

output
```
6*Log[x] + 6*E^2*Log[x] - (12*E^x*Log[x])/(2 + x) + (12*E^(-3 + 2*x)*Log[x
])/(2 + x) - (6*(1 + E^2)*x*Log[x])/(2 + x) - 6*Log[2 + x] - 6*E^2*Log[2 +
 x] + 6*(1 + E^2)*Log[2 + x]
```

3.832.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.832.4 Maple [A] (verified)

Time = 1.34 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

method	result
risch	$\frac{12\left(\mathrm{e}^{-5+2x}-\mathrm{e}^{-2+x}+\mathrm{e}^{-2}+1\right)\mathrm{e}^{2}\ln(x)}{2+x}$
parallelrisch	$\frac{12\,\mathrm{e}^{2}\ln(x)-12\,\mathrm{e}^{x}\ln(x)+12\ln(x)\mathrm{e}^{-3+2x}+12\ln(x)}{2+x}$
default	$\frac{-24\,\mathrm{e}^{x}\ln(x)-12x\,\mathrm{e}^{x}\ln(x)}{(2+x)^{2}}+\frac{24\ln(x)\mathrm{e}^{-3+2x}+12\ln(x)\mathrm{e}^{-3+2x}x}{(2+x)^{2}}+\left(12\,\mathrm{e}^{2}+12\right)\left(\frac{\ln(x)}{2}-\frac{\ln(2+x)}{2}\right)+\left(-12\,\mathrm{e}^{2}-\right.$
parts	$\frac{-24\,\mathrm{e}^{x}\ln(x)-12x\,\mathrm{e}^{x}\ln(x)}{(2+x)^{2}}+\frac{24\ln(x)\mathrm{e}^{-3+2x}+12\ln(x)\mathrm{e}^{-3+2x}x}{(2+x)^{2}}+\left(12\,\mathrm{e}^{2}+12\right)\left(\frac{\ln(x)}{2}-\frac{\ln(2+x)}{2}\right)+\left(-12\,\mathrm{e}^{2}-\right.$

input
```
int((((24*x^2+36*x)*exp(-3+2*x)+(-12*x^2-12*x)*exp(x)-12*exp(2)*x-12*x)*ln
(x)+(12*x+24)*exp(-3+2*x)+(-12*x-24)*exp(x)+(12*x+24)*exp(2)+12*x+24)/(x^3
+4*x^2+4*x),x,method=_RETURNVERBOSE)
```

output
```
12*(exp(-5+2*x)-exp(-2+x)+exp(-2)+1)*exp(2)/(2+x)*ln(x)
```

3.832.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{24+e^x(-24-12x)+12x+e^2(24+12x)+e^{-3+2x}(24+12x)+(-12x-12e^2x+e^x(-12x-12x^2)+e^{-3+2x}(36x+24x^2))\log(x)}{4x+4x^2+x^3}\,dx$$
$$=\frac{12\left(e^5+e^3+e^{(2x)}-e^{(x+3)}\right)e^{(-3)}\log(x)}{x+2}$$

input
```
integrate(((((24*x^2+36*x)*exp(-3+2*x)+(-12*x^2-12*x)*exp(x)-12*exp(2)*x-12
*x)*log(x)+(12*x+24)*exp(-3+2*x)+(-12*x-24)*exp(x)+(12*x+24)*exp(2)+12*x+2
4)/(x^3+4*x^2+4*x),x, algorithm=\
```

output
```
12*(e^5 + e^3 + e^(2*x) - e^(x + 3))*e^(-3)*log(x)/(x + 2)
```

3.832.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. 2(22) = 44.

Time = 0.24 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.73

$$\int \frac{24+e^x(-24-12x)+12x+e^2(24+12x)+e^{-3+2x}(24+12x)+(-12x-12e^2x+e^x(-12x-12x^2)+e^{-3+2x}(36x+24x^2))\log(x)}{4x+4x^2+x^3}\,dx$$
$$=\frac{(12x\log(x)+24\log(x))\,e^{2x}+(-12xe^3\log(x)-24e^3\log(x))\,e^x}{x^2e^3+4xe^3+4e^3}+\frac{(12+12e^2)\log(x)}{x+2}$$

input
```
integrate(((((24*x**2+36*x)*exp(-3+2*x)+(-12*x**2-12*x)*exp(x)-12*exp(2)*x-
12*x)*ln(x)+(12*x+24)*exp(-3+2*x)+(-12*x-24)*exp(x)+(12*x+24)*exp(2)+12*x+
24)/(x**3+4*x**2+4*x),x)
```

output
```
((12*x*log(x) + 24*log(x))*exp(2*x) + (-12*x*exp(3)*log(x) - 24*exp(3)*log
(x))*exp(x))/(x**2*exp(3) + 4*x*exp(3) + 4*exp(3)) + (12 + 12*exp(2))*log(
x)/(x + 2)
```

3.832.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(23) = 46$.

Time = 0.24 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.65

$$\int \frac{24+e^x(-24-12x)+12x+e^2(24+12x)+e^{-3+2x}(24+12x)+(-12x-12e^2x+e^x(-12x-12x^2)+e}{4x+4x^2+x^3}$$

$$= 6\left(\frac{2}{x+2}-\log(x+2)+\log(x)\right)e^2+6\left(e^2+1\right)\log(x+2)-6\left(e^2+1\right)\log(x) + \frac{12\left(\left(e^5+e^3\right)\log(x)+e^{(2x)}\log(x)-e^{(x+3)}\log(x)\right)}{xe^3+2e^3}-\frac{12e^2}{x+2}-6\log(x+2)+6\log(x)$$

input
```
integrate((((24*x^2+36*x)*exp(-3+2*x)+(-12*x^2-12*x)*exp(x)-12*exp(2)*x-12
*x)*log(x)+(12*x+24)*exp(-3+2*x)+(-12*x-24)*exp(x)+(12*x+24)*exp(2)+12*x+2
4)/(x^3+4*x^2+4*x),x, algorithm=\
```

output
```
6*(2/(x + 2) - log(x + 2) + log(x))*e^2 + 6*(e^2 + 1)*log(x + 2) - 6*(e^2
+ 1)*log(x) + 12*((e^5 + e^3)*log(x) + e^(2*x)*log(x) - e^(x + 3)*log(x))/
(x*e^3 + 2*e^3) - 12*e^2/(x + 2) - 6*log(x + 2) + 6*log(x)
```

3.832.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.50

$$\int \frac{24+e^x(-24-12x)+12x+e^2(24+12x)+e^{-3+2x}(24+12x)+(-12x-12e^2x+e^x(-12x-12x^2)+e}{4x+4x^2+x^3}$$

$$= \frac{12\left(e^5\log(x)+e^3\log(x)+e^{(2x)}\log(x)-e^{(x+3)}\log(x)\right)}{xe^3+2e^3}$$

input
```
integrate((((24*x^2+36*x)*exp(-3+2*x)+(-12*x^2-12*x)*exp(x)-12*exp(2)*x-12
*x)*log(x)+(12*x+24)*exp(-3+2*x)+(-12*x-24)*exp(x)+(12*x+24)*exp(2)+12*x+2
4)/(x^3+4*x^2+4*x),x, algorithm=\
```

output
```
12*(e^5*log(x) + e^3*log(x) + e^(2*x)*log(x) - e^(x + 3)*log(x))/(x*e^3 +
2*e^3)
```

3.832.9 Mupad [F(-1)]

Timed out.

$$\int \frac{24 + e^x(-24 - 12x) + 12x + e^2(24 + 12x) + e^{-3+2x}(24 + 12x) + (-12x - 12e^2x + e^x(-12x - 12x^2) + e}{4x + 4x^2 + x^3}$$

$$= \int \frac{12\,x + \mathrm{e}^{2\,x-3}\,(12\,x + 24) - \mathrm{e}^x\,(12\,x + 24) - \ln(x)\,\left(12\,x + 12\,x\,\mathrm{e}^2 - \mathrm{e}^{2\,x-3}\,(24\,x^2 + 36\,x) + \mathrm{e}^x\,(12\,x^2 + 1\right.}{x^3 + 4\,x^2 + 4\,x}$$

input
```
int((12*x + exp(2*x - 3)*(12*x + 24) - exp(x)*(12*x + 24) - log(x)*(12*x +
 12*x*exp(2) - exp(2*x - 3)*(36*x + 24*x^2) + exp(x)*(12*x + 12*x^2)) + ex
p(2)*(12*x + 24) + 24)/(4*x + 4*x^2 + x^3),x)
```

output
```
int((12*x + exp(2*x - 3)*(12*x + 24) - exp(x)*(12*x + 24) - log(x)*(12*x +
 12*x*exp(2) - exp(2*x - 3)*(36*x + 24*x^2) + exp(x)*(12*x + 12*x^2)) + ex
p(2)*(12*x + 24) + 24)/(4*x + 4*x^2 + x^3), x)
```

3.833 $\int \frac{e^{-x}\left(4\log^2(5)+\left(\left(-x-x^2\right)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}$

3.833.1 Optimal result

Integrand size = 73, antiderivative size = 32

$$\int \frac{e^{-x}\left(4\log^2(5)+\left(\left(-x-x^2\right)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}\,dx = e^{-x}\left(e^{1+x}-\frac{\log\left(-\log(3)+\frac{4\log^2(5)}{x}\right)}{x}\right)$$

output
```
(exp(1+x)-ln(4/x*ln(5)^2-ln(3))/x)/exp(x)
```

3.833.2 Mathematica [A] (verified)

Time = 0.66 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.78

$$\int \frac{e^{-x}\left(4\log^2(5)+\left(\left(-x-x^2\right)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}\,dx = -\frac{e^{-x}\log\left(-\log(3)+\frac{4\log^2(5)}{x}\right)}{x}$$

input
```
Integrate[(4*Log[5]^2 + ((-x - x^2)*Log[3] + (4 + 4*x)*Log[5]^2)*Log[(-(x*
Log[3]) + 4*Log[5]^2)/x])/(E^x*(-(x^3*Log[3]) + 4*x^2*Log[5]^2)),x]
```

output
```
-(Log[-Log[3] + (4*Log[5]^2)/x]/(E^x*x))
```

3.833.3 Rubi [A] (verified)

Time = 1.15 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.041, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(\left(\left(-x^2-x\right)\log(3)+(4x+4)\log^2(5)\right)\log\left(\frac{4\log^2(5)-x\log(3)}{x}\right)+4\log^2(5)\right)}{4x^2\log^2(5)-x^3\log(3)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{-x}\left(\left(\left(-x^2-x\right)\log(3)+(4x+4)\log^2(5)\right)\log\left(\frac{4\log^2(5)-x\log(3)}{x}\right)+4\log^2(5)\right)}{x^2\left(4\log^2(5)-x\log(3)\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{-x}(x+1)\log\left(\frac{4\log^2(5)}{x}-\log(3)\right)}{x^2}-\frac{4e^{-x}\log^2(5)}{x^2\left(x\log(3)-4\log^2(5)\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{e^{-x}\log\left(\frac{4\log^2(5)}{x}-\log(3)\right)}{x}$$

input
```
Int[(4*Log[5]^2 + ((-x - x^2)*Log[3] + (4 + 4*x)*Log[5]^2)*Log[(-(x*Log[3]
) + 4*Log[5]^2)/x])/(E^x*(-(x^3*Log[3]) + 4*x^2*Log[5]^2)),x]
```

output
```
-(Log[-Log[3] + (4*Log[5]^2)/x]/(E^x*x))
```

3.833. $\int \frac{e^{-x}\left(4\log^2(5)+\left(\left(-x-x^2\right)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}dx$

3.833.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.833.4 Maple [A] (verified)

Time = 1.61 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.84

method	result
norman	$-\frac{\ln\left(\frac{4\ln(5)^2-x\ln(3)}{x}\right)\mathrm{e}^{-x}}{x}$
parallelrisch	$-\frac{\ln\left(\frac{4\ln(5)^2-x\ln(3)}{x}\right)\mathrm{e}^{-x}}{x}$
risch	$-\frac{\mathrm{e}^{-x}\ln\left(\ln(5)^2-\frac{x\ln(3)}{4}\right)}{x}-\frac{\left(-i\pi\,\mathrm{csgn}\left(i\left(-\ln(5)^2+\frac{x\ln(3)}{4}\right)\right)\mathrm{csgn}\left(\frac{i\left(-\ln(5)^2+\frac{x\ln(3)}{4}\right)}{x}\right)^2-i\pi\,\mathrm{csgn}\left(i\left(-\ln(5)^2+\frac{x\ln(3)}{4}\right)\right.\right.}{}$

input
```
int((((4+4*x)*ln(5)^2+(-x^2-x)*ln(3))*ln((4*ln(5)^2-x*ln(3))/x)+4*ln(5)^2)
/(4*x^2*ln(5)^2-x^3*ln(3))/exp(x),x,method=_RETURNVERBOSE)
```

output
```
-ln((4*ln(5)^2-x*ln(3))/x)/exp(x)/x
```

3.833.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{e^{-x}\left(4\log^2(5)+\left(\left(-x-x^2\right)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}\,dx = -\frac{e^{(-x)}\log\left(\frac{4\log(5)^2-x\log(3)}{x}\right)}{x}$$

input
```
integrate((((4+4*x)*log(5)^2+(-x^2-x)*log(3))*log((4*log(5)^2-x*log(3))/x)
+4*log(5)^2)/(4*x^2*log(5)^2-x^3*log(3))/exp(x),x, algorithm=\
```

output
```
-e^(-x)*log((4*log(5)^2 - x*log(3))/x)/x
```

3.833.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.62

$$\int \frac{e^{-x}\left(4\log^2(5)+\left(\left(-x-x^2\right)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}\,dx = -\frac{e^{-x}\log\left(\frac{-x\log(3)+4\log(5)^2}{x}\right)}{x}$$

input
```
integrate((((4+4*x)*ln(5)**2+(-x**2-x)*ln(3))*ln((4*ln(5)**2-x*ln(3))/x)+4
*ln(5)**2)/(4*x**2*ln(5)**2-x**3*ln(3))/exp(x),x)
```

output
```
-exp(-x)*log((-x*log(3) + 4*log(5)**2)/x)/x
```

3.833.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

$$\int \frac{e^{-x}\left(4\log^2(5)+\left(\left(-x-x^2\right)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}\,dx = -\frac{e^{(-x)}\log\left(4\log(5)^2-x\log(3)\right)-e^{(-x)}\log(x)}{x}$$

input
```
integrate((((4+4*x)*log(5)^2+(-x^2-x)*log(3))*log((4*log(5)^2-x*log(3))/x)
+4*log(5)^2)/(4*x^2*log(5)^2-x^3*log(3))/exp(x),x, algorithm=\
```

output
```
-(e^(-x)*log(4*log(5)^2 - x*log(3)) - e^(-x)*log(x))/x
```

3.833.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

$$\int \frac{e^{-x}\left(4\log^2(5)+\left((-x-x^2)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}\,dx$$
$$=-\frac{e^{(-x)}\log\left(4\log(5)^2-x\log(3)\right)-e^{(-x)}\log(x)}{x}$$

input
```
integrate((((4+4*x)*log(5)^2+(-x^2-x)*log(3))*log((4*log(5)^2-x*log(3))/x)
+4*log(5)^2)/(4*x^2*log(5)^2-x^3*log(3))/exp(x),x, algorithm=\
```

output
```
-(e^(-x)*log(4*log(5)^2 - x*log(3)) - e^(-x)*log(x))/x
```

3.833.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-x}\left(4\log^2(5)+\left((-x-x^2)\log(3)+(4+4x)\log^2(5)\right)\log\left(\frac{-x\log(3)+4\log^2(5)}{x}\right)\right)}{-x^3\log(3)+4x^2\log^2(5)}\,dx$$
$$=\int \frac{\mathrm{e}^{-x}\left(\ln\left(-\frac{x\,\ln(3)-4\ln(5)^2}{x}\right)\,\left(\ln(5)^2\,(4\,x+4)-\ln(3)\,\left(x^2+x\right)\right)+4\ln(5)^2\right)}{4\,x^2\ln(5)^2-x^3\,\ln(3)}\,dx$$

input
```
int((exp(-x)*(log(-(x*log(3) - 4*log(5)^2)/x)*(log(5)^2*(4*x + 4) - log(3)
*(x + x^2)) + 4*log(5)^2))/(4*x^2*log(5)^2 - x^3*log(3)),x)
```

output
```
int((exp(-x)*(log(-(x*log(3) - 4*log(5)^2)/x)*(log(5)^2*(4*x + 4) - log(3)
*(x + x^2)) + 4*log(5)^2))/(4*x^2*log(5)^2 - x^3*log(3)), x)
```

3.834 $\int \frac{-8x^3-8x^4+8x^5+e^{e^2}(8x^3-8x^4)+\left(-16x^3+16e^{e^2}x^3-16x^4\right)\log\left(\frac{}{-3x\cdots}\right.}{\left(-1+e^{e^2}-x\right)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}$

3.834.1 Optimal result

Integrand size = 120, antiderivative size = 33

$$\int \frac{-8x^3-8x^4+8x^5+e^{e^2}(8x^3-8x^4)+\left(-16x^3+16e^{e^2}x^3-16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{\left(-1+e^{e^2}-x\right)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}\,dx = 4\left(-2+\frac{x^4}{\log^2\left(\frac{5e^x}{3\left(-1+e^{e^2}-x\right)x}\right)}\right)$$

output
```
4*x^4/ln(5/3/x*exp(x)/(exp(exp(2))-x-1))^2-8
```

3.834.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.91

$$\int \frac{-8x^3-8x^4+8x^5+e^{e^2}(8x^3-8x^4)+\left(-16x^3+16e^{e^2}x^3-16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{\left(-1+e^{e^2}-x\right)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}\,dx = \frac{4x^4}{\log^2\left(-\frac{5e^x}{3x\left(1-e^{e^2}+x\right)}\right)}$$

input
```
Integrate[(-8*x^3 - 8*x^4 + 8*x^5 + E^E^2*(8*x^3 - 8*x^4) + (-16*x^3 + 16*
E^E^2*x^3 - 16*x^4)*Log[(5*E^x)/(-3*x + 3*E^E^2*x - 3*x^2)])/((-1 + E^E^2
- x)*Log[(5*E^x)/(-3*x + 3*E^E^2*x - 3*x^2)]^3),x]
```

output
```
(4*x^4)/Log[(-5*E^x)/(3*x*(1 - E^E^2 + x))]^2
```

3.834.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^5-8x^4-8x^3+e^{e^2}\left(8x^3-8x^4\right)+\left(-16x^4+16e^{e^2}x^3-16x^3\right)\log\left(\frac{5e^x}{-3x^2+3e^{e^2}x-3x}\right)}{\left(-x+e^{e^2}-1\right)\log^3\left(\frac{5e^x}{-3x^2+3e^{e^2}x-3x}\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-8x^5+8x^4+8x^3-e^{e^2}\left(8x^3-8x^4\right)-\left(-16x^4+16e^{e^2}x^3-16x^3\right)\log\left(\frac{5e^x}{-3x^2+3e^{e^2}x-3x}\right)}{\left(x-e^{e^2}+1\right)\log^3\left(\frac{5e^x}{\left(3\left(e^{e^2}-1\right)-3x\right)x}\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{16x^3\log\left(-\frac{5e^x}{3x\left(x-e^{e^2}+1\right)}\right)}{\log^3\left(\frac{5e^x}{3\left(-x+e^{e^2}-1\right)x}\right)}+\frac{8\left(-x^2+\left(1+e^{e^2}\right)x-e^{e^2}+1\right)x^3}{\left(x-e^{e^2}+1\right)\log^3\left(\frac{5e^x}{3\left(-x+e^{e^2}-1\right)x}\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-8\int \frac{x^4}{\log^3\left(\frac{5e^x}{3\left(-x+e^{e^2}-1\right)x}\right)}dx+16\int \frac{x^3}{\log^3\left(\frac{5e^x}{3\left(-x+e^{e^2}-1\right)x}\right)}dx+16\int \frac{x^3\log\left(-\frac{5e^x}{3x\left(x-e^{e^2}+1\right)}\right)}{\log^3\left(\frac{5e^x}{3\left(-x+e^{e^2}-1\right)x}\right)}dx-8\left(1-e^{e^2}\right)\int \frac{x^2}{\log^3\left(\frac{5e^x}{3\left(-x+e^{e^2}-1\right)x}\right)}dx-8\left(1-e^{e^2}\right)^3\int \frac{1}{\log^3\left(\frac{5e^x}{3\left(-x+e^{e^2}-1\right)x}\right)}dx-8\left(1-e^{e^2}\right)^4\int \frac{1}{\left(-x+e^{e^2}-1\right)\log^3\left(\frac{5e^x}{3\left(-x+e^{e^2}-1\right)x}\right)}dx+8\left(1-e^{e^2}\right)^2\int \frac{x}{\log^3\left(\frac{5e^x}{3\left(-x+e^{e^2}-1\right)x}\right)}dx$$

3.834. $\int \frac{-8x^3-8x^4+8x^5+e^{e^2}\left(8x^3-8x^4\right)+\left(-16x^3+16e^{e^2}x^3-16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{\left(-1+e^{e^2}-x\right)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}dx$

input
```
Int[(-8*x^3 - 8*x^4 + 8*x^5 + E^E^2*(8*x^3 - 8*x^4) + (-16*x^3 + 16*E^E^2*
x^3 - 16*x^4)*Log[(5*E^x)/(-3*x + 3*E^E^2*x - 3*x^2)])/((-1 + E^E^2 - x)*L
og[(5*E^x)/(-3*x + 3*E^E^2*x - 3*x^2)]^3),x]
```

output
```
$Aborted
```

3.834.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.834.4 Maple [A] (verified)

Time = 8.32 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.79

method	result
parallelrisch	$\frac{4x^4}{\ln\left(\frac{5\,e^{x}}{3x\left(e^{e^2}-x-1\right)}\right)^2}$
default	$\frac{16\left(e^{e^2}-x-1\right)x^4}{\left(x\,e^{e^2}-x^2-e^{e^2}+x+1\right)\left(-\ln(5)+\ln(3)-\ln\left(\frac{e^{x}}{x\left(e^{e^2}-x-1\right)}\right)\right)}-\frac{4x^4\left(4\ln(3)e^{e^2}-4x\ln(3)-4\ln(5)e^{e^2}+4x\ln(5)+4\,e^{e^2}\ln(x)-\right.}{}$
parts	$\frac{16\left(e^{e^2}-x-1\right)x^4}{\left(x\,e^{e^2}-x^2-e^{e^2}+x+1\right)\left(-\ln(5)+\ln(3)-\ln\left(\frac{e^{x}}{x\left(e^{e^2}-x-1\right)}\right)\right)}-\frac{4x^4\left(4\ln(3)e^{e^2}-4x\ln(3)-4\ln(5)e^{e^2}+4x\ln(5)+4\,e^{e^2}\ln(x)-\right.}{}$
risch	$-\frac{}{\left(\pi\,\mathrm{csgn}\left(\frac{i}{1-e^{e^2}+x}\right)\mathrm{csgn}\left(\frac{ie^{x}}{1-e^{e^2}+x}\right)^2+\pi\,\mathrm{csgn}\left(\frac{i}{1-e^{e^2}+x}\right)\mathrm{csgn}\left(\frac{ie^{x}}{1-e^{e^2}+x}\right)\mathrm{csgn}(ie^{x})-\pi\,\mathrm{csgn}\left(\frac{ie^{x}}{1-e^{e^2}+x}\right)^3-\pi\,\mathrm{csgn}\left(\frac{}{1-}\right.\right.}$

3.834. $\int \frac{-8x^3-8x^4+8x^5+e^{e^2}\left(8x^3-8x^4\right)+\left(-16x^3+16e^{e^2}x^3-16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{\left(-1+e^{e^2}-x\right)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}\,dx$

input
```
int(((16*x^3*exp(exp(2))-16*x^4-16*x^3)*ln(5*exp(x)/(3*x*exp(exp(2))-3*x^2
-3*x))+(-8*x^4+8*x^3)*exp(exp(2))+8*x^5-8*x^4-8*x^3)/(exp(exp(2))-x-1)/ln(
5*exp(x)/(3*x*exp(exp(2))-3*x^2-3*x))^3,x,method=_RETURNVERBOSE)
```

output
```
4*x^4/ln(5/3/x*exp(x)/(exp(exp(2))-x-1))^2
```

3.834.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.76

$$\int \frac{-8x^3-8x^4+8x^5+e^{e^2}(8x^3-8x^4)+\left(-16x^3+16e^{e^2}x^3-16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{(-1+e^{e^2}-x)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}\,dx$$
$$=\frac{4\,x^4}{\log\left(-\frac{5\,e^x}{3\left(x^2-xe^{\left(e^2\right)}+x\right)}\right)^2}$$

input
```
integrate(((16*x^3*exp(exp(2))-16*x^4-16*x^3)*log(5*exp(x)/(3*x*exp(exp(2)
)-3*x^2-3*x))+(-8*x^4+8*x^3)*exp(exp(2))+8*x^5-8*x^4-8*x^3)/(exp(exp(2))-x
-1)/log(5*exp(x)/(3*x*exp(exp(2))-3*x^2-3*x))^3,x, algorithm=\
```

output
```
4*x^4/log(-5/3*e^x/(x^2 - x*e^(e^2) + x))^2
```

3.834.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.88

$$\int \frac{-8x^3-8x^4+8x^5+e^{e^2}(8x^3-8x^4)+\left(-16x^3+16e^{e^2}x^3-16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{(-1+e^{e^2}-x)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}\,dx$$
$$=\frac{4x^4}{\log\left(\frac{5e^x}{-3x^2-3x+3xe^{e^2}}\right)^2}$$

input
```
integrate(((16*x**3*exp(exp(2))-16*x**4-16*x**3)*ln(5*exp(x)/(3*x*exp(exp(
2))-3*x**2-3*x))+(-8*x**4+8*x**3)*exp(exp(2))+8*x**5-8*x**4-8*x**3)/(exp(e
xp(2))-x-1)/ln(5*exp(x)/(3*x*exp(exp(2))-3*x**2-3*x))**3,x)
```

output
```
4*x**4/log(5*exp(x)/(-3*x**2 - 3*x + 3*x*exp(exp(2))))**2
```

3.834.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 85 vs. $2(27) = 54$.

Time = 0.37 (sec) , antiderivative size = 85, normalized size of antiderivative = 2.58

$$\int \frac{-8x^3 - 8x^4 + 8x^5 + e^{e^2}(8x^3 - 8x^4) + \left(-16x^3 + 16e^{e^2}x^3 - 16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{(-1+e^{e^2}-x)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}\,dx$$
$$= \frac{4\,x^4}{x^2 + 2\,x(\log(5) - \log(3)) + \log(5)^2 - 2\,\log(5)\log(3) + \log(3)^2 - 2\,(x + \log(5) - \log(3))\log(x) + \log(}$$

input
```
integrate(((16*x^3*exp(exp(2))-16*x^4-16*x^3)*log(5*exp(x)/(3*x*exp(exp(2)
)-3*x^2-3*x))+(-8*x^4+8*x^3)*exp(exp(2))+8*x^5-8*x^4-8*x^3)/(exp(exp(2))-x
-1)/log(5*exp(x)/(3*x*exp(exp(2))-3*x^2-3*x))^3,x, algorithm=\
```

output
```
4*x^4/(x^2 + 2*x*(log(5) - log(3)) + log(5)^2 - 2*log(5)*log(3) + log(3)^2
 - 2*(x + log(5) - log(3))*log(x) + log(x)^2 - 2*(x + log(5) - log(3) - lo
g(x))*log(-x + e^(e^2) - 1) + log(-x + e^(e^2) - 1)^2)
```

3.834.8 Giac [A] (verification not implemented)

Time = 0.46 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.45

$$\int \frac{-8x^3 - 8x^4 + 8x^5 + e^{e^2}(8x^3 - 8x^4) + \left(-16x^3 + 16e^{e^2}x^3 - 16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{(-1+e^{e^2}-x)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}\,dx$$
$$= \frac{4\,x^4}{x^2 + 2\,x\log\left(-\frac{5}{3\left(x^2 - xe^{\left(e^2\right)} + x\right)}\right) + \log\left(-\frac{5}{3\left(x^2 - xe^{\left(e^2\right)} + x\right)}\right)^2}$$

input
```
integrate(((16*x^3*exp(exp(2))-16*x^4-16*x^3)*log(5*exp(x)/(3*x*exp(exp(2)
)-3*x^2-3*x))+(-8*x^4+8*x^3)*exp(exp(2))+8*x^5-8*x^4-8*x^3)/(exp(exp(2))-x
-1)/log(5*exp(x)/(3*x*exp(exp(2))-3*x^2-3*x))^3,x, algorithm=\
```

output
```
4*x^4/(x^2 + 2*x*log(-5/3/(x^2 - x*e^(e^2) + x)) + log(-5/3/(x^2 - x*e^(e^
2) + x))^2)
```

3.834.9 Mupad [B] (verification not implemented)

Time = 16.47 (sec) , antiderivative size = 551, normalized size of antiderivative = 16.70

$$\int \frac{-8x^3-8x^4+8x^5+e^{e^2}(8x^3-8x^4)+\left(-16x^3+16e^{e^2}x^3-16x^4\right)\log\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}{\left(-1+e^{e^2}-x\right)\log^3\left(\frac{5e^x}{-3x+3e^{e^2}x-3x^2}\right)}\,dx$$
$$= \text{Too large to display}$$

input
```
int((log(-(5*exp(x))/(3*x - 3*x*exp(exp(2)) + 3*x^2))*(16*x^3 - 16*x^3*exp
(exp(2)) + 16*x^4) + 8*x^3 + 8*x^4 - 8*x^5 - exp(exp(2))*(8*x^3 - 8*x^4))/
(log(-(5*exp(x))/(3*x - 3*x*exp(exp(2)) + 3*x^2))^3*(x - exp(exp(2)) + 1))
,x)
```

output
```
80*x - ((8*x^4*(x - exp(exp(2)) + 1))/(x - exp(exp(2)) + x*exp(exp(2)) - x
^2 + 1) + (8*x^4*log(-(5*exp(x))/(3*x - 3*x*exp(exp(2)) + 3*x^2))*(x - exp
(exp(2)) + 1)*(8*x + 4*exp(2*exp(2)) - 8*exp(exp(2)) - 3*x*exp(2*exp(2)) +
 6*x^2*exp(exp(2)) - 5*x*exp(exp(2)) + 2*x^2 - 3*x^3 + 4))/(x - exp(exp(2)
) + x*exp(exp(2)) - x^2 + 1)^3)/log(-(5*exp(x))/(3*x - 3*x*exp(exp(2)) + 3
*x^2)) + (384*exp(2*exp(2)) - 64*exp(3*exp(2)) - 32*exp(4*exp(2)) - 448*ex
p(exp(2)) + x^5*(24*exp(2*exp(2)) + 96*exp(exp(2)) + 264) - x^2*(840*exp(2
*exp(2)) + 456*exp(3*exp(2)) + 96*exp(4*exp(2)) - 1128*exp(exp(2)) - 264)
+ x^3*(984*exp(2*exp(2)) + 280*exp(3*exp(2)) + 32*exp(4*exp(2)) + 968*exp(
exp(2)) - 728) - x^4*(288*exp(2*exp(2)) + 56*exp(3*exp(2)) + 888*exp(exp(2
)) + 432) + x*(304*exp(3*exp(2)) - 336*exp(2*exp(2)) + 96*exp(4*exp(2)) -
624*exp(exp(2)) + 560) + 160)/(exp(3*exp(2)) - 3*exp(2*exp(2)) + 3*exp(exp
(2)) + x^4*(3*exp(2*exp(2)) + 9*exp(exp(2))) + x*(3*exp(2*exp(2)) - 3*exp(
3*exp(2)) + 3*exp(exp(2)) - 3) - x^3*(9*exp(2*exp(2)) + exp(3*exp(2)) + 3*
exp(exp(2)) - 5) - x^5*(3*exp(exp(2)) + 3) + x^2*(6*exp(2*exp(2)) + 3*exp(
3*exp(2)) - 9*exp(exp(2))) + x^6 - 1) + 24*x^2 + (4*x^4 + (8*x^4*log(-(5*e
xp(x))/(3*x - 3*x*exp(exp(2)) + 3*x^2))*(x - exp(exp(2)) + 1))/(x - exp(ex
p(2)) + x*exp(exp(2)) - x^2 + 1))/log(-(5*exp(x))/(3*x - 3*x*exp(exp(2)) +
 3*x^2))^2
```

3.835 $\int \frac{14-4x}{5+e^{-3+x}-2x} \, dx$

3.835.1 Optimal result

Integrand size = 18, antiderivative size = 21

$$\int \frac{14-4x}{5+e^{-3+x}-2x} \, dx = 2\left(-2+e^3+x-\log\left(5+e^{-3+x}-2x\right)\right)$$

output
```
-4-2*ln(exp(-3+x)-2*x+5)+2*x+2*exp(3)
```

3.835.2 Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int \frac{14-4x}{5+e^{-3+x}-2x} \, dx = 2x-2\log\left(5e^3+e^x-2e^3x\right)$$

input
```
Integrate[(14 - 4*x)/(5 + E^(-3 + x) - 2*x),x]
```

output
```
2*x - 2*Log[5*E^3 + E^x - 2*E^3*x]
```

3.835.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{14-4x}{-2x+e^{x-3}+5} \, dx$$
$$\Big\downarrow \text{ 7293}$$
$$\int \left(\frac{4e^3x}{2e^3x-e^x-5e^3}-\frac{14e^3}{2e^3x-e^x-5e^3}\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$4e^3\int \frac{x}{2e^3x-e^x-5e^3}dx-14e^3\int \frac{1}{2e^3x-e^x-5e^3}dx$$

input
```
Int[(14 - 4*x)/(5 + E^(-3 + x) - 2*x),x]
```

output
```
$Aborted
```

3.835.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.835.4 Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

method	result	size
parallelrisch	$2x-2\ln\left(-\frac{\mathrm{e}^{-3+x}}{2}+x-\frac{5}{2}\right)$	17
risch	$-6+2x-2\ln\left(\mathrm{e}^{-3+x}-2x+5\right)$	18
norman	$2x-2\ln\left(-\mathrm{e}^{-3+x}+2x-5\right)$	19

input
```
int((-4*x+14)/(exp(-3+x)-2*x+5),x,method=_RETURNVERBOSE)
```

output
```
2*x-2*ln(-1/2*exp(-3+x)+x-5/2)
```

3.835.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

$$\int \frac{14-4x}{5+e^{-3+x}-2x}\,dx = 2\,x - 2\,\log\left(-2\,x + e^{(x-3)} + 5\right)$$

input
```
integrate((-4*x+14)/(exp(-3+x)-2*x+5),x, algorithm=\
```

output
```
2*x - 2*log(-2*x + e^(x - 3) + 5)
```

3.835.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \frac{14-4x}{5+e^{-3+x}-2x}\,dx = 2x - 2\log\left(-2x + e^{x-3} + 5\right)$$

input
```
integrate((-4*x+14)/(exp(-3+x)-2*x+5),x)
```

output
```
2*x - 2*log(-2*x + exp(x - 3) + 5)
```

3.835.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{14-4x}{5+e^{-3+x}-2x}\,dx = 2\,x - 2\,\log\left(-2\,xe^3 + 5\,e^3 + e^x\right)$$

input
```
integrate((-4*x+14)/(exp(-3+x)-2*x+5),x, algorithm=\
```

output
```
2*x - 2*log(-2*x*e^3 + 5*e^3 + e^x)
```

3.835.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{14-4x}{5+e^{-3+x}-2x}\,dx = 2\,x - 2\,\log\left(2\,xe^3 - 5\,e^3 - e^x\right)$$

input
```
integrate((-4*x+14)/(exp(-3+x)-2*x+5),x, algorithm=\
```

output
```
2*x - 2*log(2*x*e^3 - 5*e^3 - e^x)
```

3.835.9 Mupad [B] (verification not implemented)

Time = 15.37 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{14-4x}{5+e^{-3+x}-2x}\,dx = 2\,x - 2\,\ln\left(2\,x - \mathrm{e}^{x-3} - 5\right)$$

input
```
int(-(4*x - 14)/(exp(x - 3) - 2*x + 5),x)
```

output
```
2*x - 2*log(2*x - exp(x - 3) - 5)
```

3.836 $\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)\right.$

3.836.1 Optimal result

Integrand size = 66, antiderivative size = 27

$$\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx=3^{4x^2(15+\log(x))}\left(\frac{1}{x}\right)^{-1+4x^2(15+\log(x))}$$

output
```
x*exp(4*(ln(x)+15)*x^2*ln(3/x))
```

3.836.2 Mathematica [F]

$$\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx=\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx$$

input
```
Integrate[E^(60*x^2*Log[3/x] + 4*x^2*Log[3/x]*Log[x])*(1 - 60*x^2 + 124*x^
2*Log[3/x] + (-4*x^2 + 8*x^2*Log[3/x])*Log[x]),x]
```

output
```
Integrate[E^(60*x^2*Log[3/x] + 4*x^2*Log[3/x]*Log[x])*(1 - 60*x^2 + 124*x^
2*Log[3/x] + (-4*x^2 + 8*x^2*Log[3/x])*Log[x]), x]
```

3.836.
$\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx$

3.836.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 97 vs. $2(27) = 54$.

Time = 0.45 (sec) , antiderivative size = 97, normalized size of antiderivative = 3.59, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.015$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(8x^2\log\left(\frac{3}{x}\right)-4x^2\right)\log(x)+1\right)dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{3^{60x^2}\left(\frac{1}{x}\right)^{60x^2}e^{4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(15x^2-31x^2\log\left(\frac{3}{x}\right)+\left(x^2-2x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)}{15x-31x\log\left(\frac{3}{x}\right)-2x\log\left(\frac{3}{x}\right)\log(x)+x\log(x)}$$

input
```
Int[E^(60*x^2*Log[3/x] + 4*x^2*Log[3/x]*Log[x])*(1 - 60*x^2 + 124*x^2*Log[
3/x] + (-4*x^2 + 8*x^2*Log[3/x])*Log[x]),x]
```

output
```
(3^(60*x^2)*E^(4*x^2*Log[3/x]*Log[x])*(x^(-1))^(60*x^2)*(15*x^2 - 31*x^2*L
og[3/x] + (x^2 - 2*x^2*Log[3/x])*Log[x]))/(15*x - 31*x*Log[3/x] + x*Log[x]
 - 2*x*Log[3/x]*Log[x])
```

3.836.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.836.4 Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.70

method	result	size
parallelrisch	$x\,\mathrm{e}^{4(\ln(x)+15)x^2\ln\left(\frac{3}{x}\right)}$	19
default	$\mathrm{e}^{4x^2\ln\left(\frac{3}{x}\right)\ln(x)+60x^2\ln\left(\frac{3}{x}\right)}x$	29
risch	$x^{-4x^2(\ln(x)-\ln(3))}\mathrm{e}^{60x^2(-\ln(x)+\ln(3))}x$	30

input
```
int(((8*x^2*ln(3/x)-4*x^2)*ln(x)+124*x^2*ln(3/x)-60*x^2+1)*exp(4*x^2*ln(3/
x)*ln(x)+60*x^2*ln(3/x)),x,method=_RETURNVERBOSE)
```

output
```
x*exp(4*(ln(x)+15)*x^2*ln(3/x))
```

3.836.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(17) = 34$.

Time = 0.24 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx = xe^{\left(-4\,x^2\log\left(\frac{3}{x}\right)^2+4\,\left(x^2\log(3)+15\,x^2\right)\log\left(\frac{3}{x}\right)\right)}$$

input
```
integrate(((8*x^2*log(3/x)-4*x^2)*log(x)+124*x^2*log(3/x)-60*x^2+1)*exp(4*
x^2*log(3/x)*log(x)+60*x^2*log(3/x)),x, algorithm=\
```

output
```
x*e^(-4*x^2*log(3/x)^2 + 4*(x^2*log(3) + 15*x^2)*log(3/x))
```

3.836.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx = xe^{4x^2(-\log(x)+\log(3))\log(x)+60x^2(-\log(x)+\log(3))}$$

input
```
integrate(((8*x**2*ln(3/x)-4*x**2)*ln(x)+124*x**2*ln(3/x)-60*x**2+1)*exp(4
*x**2*ln(3/x)*ln(x)+60*x**2*ln(3/x)),x)
```

output
```
x*exp(4*x**2*(-log(x) + log(3))*log(x) + 60*x**2*(-log(x) + log(3)))
```

3.836.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. $2(17) = 34$.

Time = 0.35 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx=xe^{\left(4\,x^2\log(3)\log(x)-4\,x^2\log(x)^2+60\,x^2\log(3)-60\,x^2\log(x)\right)}$$

input
```
integrate(((8*x^2*log(3/x)-4*x^2)*log(x)+124*x^2*log(3/x)-60*x^2+1)*exp(4*
x^2*log(3/x)*log(x)+60*x^2*log(3/x)),x, algorithm=\
```

output
```
x*e^(4*x^2*log(3)*log(x) - 4*x^2*log(x)^2 + 60*x^2*log(3) - 60*x^2*log(x))
```

3.836.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. $2(17) = 34$.

Time = 0.34 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx=xe^{\left(4\,x^2\log(3)\log(x)-4\,x^2\log(x)^2+60\,x^2\log(3)-60\,x^2\log(x)\right)}$$

input
```
integrate(((8*x^2*log(3/x)-4*x^2)*log(x)+124*x^2*log(3/x)-60*x^2+1)*exp(4*
x^2*log(3/x)*log(x)+60*x^2*log(3/x)),x, algorithm=\
```

output
```
x*e^(4*x^2*log(3)*log(x) - 4*x^2*log(x)^2 + 60*x^2*log(3) - 60*x^2*log(x))
```

3.836.9 Mupad [B] (verification not implemented)

Time = 15.87 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.41

$$\int e^{60x^2\log\left(\frac{3}{x}\right)+4x^2\log\left(\frac{3}{x}\right)\log(x)}\left(1-60x^2+124x^2\log\left(\frac{3}{x}\right)+\left(-4x^2+8x^2\log\left(\frac{3}{x}\right)\right)\log(x)\right)\,dx=3^{60\,x^2}\,x\,x^{4\,x^2\,\ln\left(\frac{1}{x}\right)}\,x^{4\,x^2\,\ln(3)}\,\left(\frac{1}{x}\right)^{60\,x^2}$$

input
```
int(-exp(60*x^2*log(3/x) + 4*x^2*log(3/x)*log(x))*(log(x)*(4*x^2 - 8*x^2*l
og(3/x)) + 60*x^2 - 124*x^2*log(3/x) - 1),x)
```

output
```
3^(60*x^2)*x*x^(4*x^2*log(1/x))*x^(4*x^2*log(3))*(1/x)^(60*x^2)
```

3.837 $\int (3x^2 + x^4 + 5x^4 \log(x)) \, dx$

3.837.1 Optimal result

Integrand size = 16, antiderivative size = 17

$$\int (3x^2 + x^4 + 5x^4 \log(x)) \, dx = x\left(\frac{2}{x} + x^2 + x^4 \log(x)\right)$$

output
```
x*(x^2+x^4*ln(x)+2/x)
```

3.837.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int (3x^2 + x^4 + 5x^4 \log(x)) \, dx = x^3 + x^5 \log(x)$$

input
```
Integrate[3*x^2 + x^4 + 5*x^4*Log[x],x]
```

output
```
x^3 + x^5*Log[x]
```

3.837.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.062$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(x^4+5 x^4 \log (x)+3 x^2\right) \, dx$$
$$\Big\downarrow \ 2009$$
$$x^5 \log (x)+x^3$$

input
```
Int[3*x^2 + x^4 + 5*x^4*Log[x],x]
```

output
```
x^3 + x^5*Log[x]
```

3.837.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.837.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.65

method	result	size
default	$x^{3}+x^{5} \ln \left(x \right)$	11
norman	$x^{3}+x^{5} \ln \left(x \right)$	11
risch	$x^{3}+x^{5} \ln \left(x \right)$	11
parallelrisch	$x^{3}+x^{5} \ln \left(x \right)$	11
parts	$x^{3}+x^{5} \ln \left(x \right)$	11

input
```
int(5*x^4*ln(x)+x^4+3*x^2,x,method=_RETURNVERBOSE)
```

output
```
x^3+x^5*ln(x)
```

3.837.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \left(3x^2+x^4+5x^4\log(x)\right)\,dx=x^5\log\left(x\right)+x^3$$

input
```
integrate(5*x^4*log(x)+x^4+3*x^2,x, algorithm=\
```

output
```
x^5*log(x) + x^3
```

3.837.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.47

$$\int \left(3x^2+x^4+5x^4\log(x)\right)\,dx=x^5\log\left(x\right)+x^3$$

input
```
integrate(5*x**4*ln(x)+x**4+3*x**2,x)
```

output
```
x**5*log(x) + x**3
```

3.837.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \left(3x^2+x^4+5x^4\log(x)\right)\,dx=x^5\log\left(x\right)+x^3$$

input
```
integrate(5*x^4*log(x)+x^4+3*x^2,x, algorithm=\
```

output
```
x^5*log(x) + x^3
```

3.837.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \left(3x^2+x^4+5x^4\log(x)\right)\,dx=x^5\log\left(x\right)+x^3$$

input
```
integrate(5*x^4*log(x)+x^4+3*x^2,x, algorithm=\
```

output
```
x^5*log(x) + x^3
```

3.837.9 Mupad [B] (verification not implemented)

Time = 14.47 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \left(3x^2+x^4+5x^4\log(x)\right)\,dx=x^5\,\ln\left(x\right)+x^3$$

input
```
int(5*x^4*log(x) + 3*x^2 + x^4,x)
```

output
```
x^5*log(x) + x^3
```

3.838 $\int \frac{144-144x+38x^2+e^4(12-12x+3x^2)}{144x-128x^2+18x^3+5x^4+e^4(12x-12x^2+3x^3)}\,dx$

3.838.1 Optimal result

Integrand size = 64, antiderivative size = 26

$$\int \frac{144-144x+38x^2+e^4(12-12x+3x^2)}{144x-128x^2+18x^3+5x^4+e^4(12x-12x^2+3x^3)}\,dx=\log\left(\frac{2}{4-\frac{3(-12-e^4)}{x}+\frac{x}{-2+x}}\right)$$

output
```
ln(2/(x/(-2+x)-3/x*(-12-exp(2)^2)+4))
```

3.838.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.27

$$\int \frac{144-144x+38x^2+e^4(12-12x+3x^2)}{144x-128x^2+18x^3+5x^4+e^4(12x-12x^2+3x^3)}\,dx$$
$$=\log(2-x)+\log(x)-\log\left(72+6e^4-28x-3e^4x-5x^2\right)$$

input
```
Integrate[(144 - 144*x + 38*x^2 + E^4*(12 - 12*x + 3*x^2))/(144*x - 128*x^
2 + 18*x^3 + 5*x^4 + E^4*(12*x - 12*x^2 + 3*x^3)),x]
```

output
```
Log[2 - x] + Log[x] - Log[72 + 6*E^4 - 28*x - 3*E^4*x - 5*x^2]
```

3.838.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.35, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.047$, Rules used = {2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{38x^2 + e^4(3x^2 - 12x + 12) - 144x + 144}{5x^4 + 18x^3 - 128x^2 + e^4(3x^3 - 12x^2 + 12x) + 144x} dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{38x^2 + e^4(3x^2 - 12x + 12) - 144x + 144}{x(5x^3 + 3(6+e^4)x^2 - 4(32+3e^4)x + 12(12+e^4))} dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{10x + 3e^4 + 28}{-5x^2 - (28+3e^4)x + 6(12+e^4)} + \frac{1}{x-2} + \frac{1}{x}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$-\log\left(-5x^2 - (28+3e^4)x + 6(12+e^4)\right) + \log(2-x) + \log(x)$$

input
```
Int[(144 - 144*x + 38*x^2 + E^4*(12 - 12*x + 3*x^2))/(144*x - 128*x^2 + 18
*x^3 + 5*x^4 + E^4*(12*x - 12*x^2 + 3*x^3)),x]
```

output
```
Log[2 - x] + Log[x] - Log[6*(12 + E^4) - (28 + 3*E^4)*x - 5*x^2]
```

3.838.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.838.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15

method	result	size
default	$\ln(x) - \ln(3x\,\mathrm{e}^4 + 5x^2 - 6\,\mathrm{e}^4 + 28x - 72) + \ln(-2 + x)$	30
parallelrisch	$\ln(x) + \ln(-2 + x) - \ln\left(\frac{3x\,\mathrm{e}^4}{5} - \frac{6\,\mathrm{e}^4}{5} + x^2 + \frac{28x}{5} - \frac{72}{5}\right)$	32
norman	$\ln(x) - \ln(3x\,\mathrm{e}^4 + 5x^2 - 6\,\mathrm{e}^4 + 28x - 72) + \ln(-2 + x)$	34
risch	$-\ln(-5x^2 + (-3\,\mathrm{e}^4 - 28)\,x + 6\,\mathrm{e}^4 + 72) + \ln(-x^2 + 2x)$	34

input
```
int(((3*x^2-12*x+12)*exp(2)^2+38*x^2-144*x+144)/((3*x^3-12*x^2+12*x)*exp(2
)^2+5*x^4+18*x^3-128*x^2+144*x),x,method=_RETURNVERBOSE)
```

output
```
ln(x)-ln(3*x*exp(4)+5*x^2-6*exp(4)+28*x-72)+ln(-2+x)
```

3.838.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{144 - 144x + 38x^2 + e^4(12 - 12x + 3x^2)}{144x - 128x^2 + 18x^3 + 5x^4 + e^4\,(12x - 12x^2 + 3x^3)}\,dx = -\log\left(5\,x^2 + 3\,(x-2)e^4 + 28\,x - 72\right) + \log\left(x^2 - 2\,x\right)$$

input
```
integrate(((3*x^2-12*x+12)*exp(2)^2+38*x^2-144*x+144)/((3*x^3-12*x^2+12*x)
*exp(2)^2+5*x^4+18*x^3-128*x^2+144*x),x, algorithm=\
```

output
```
-log(5*x^2 + 3*(x - 2)*e^4 + 28*x - 72) + log(x^2 - 2*x)
```

3.838.6 Sympy [A] (verification not implemented)

Time = 1.08 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int \frac{144-144x+38x^2+e^4(12-12x+3x^2)}{144x-128x^2+18x^3+5x^4+e^4(12x-12x^2+3x^3)}\,dx = \log\left(x^2-2x\right)-\log\left(x^2+x\left(\frac{28}{5}+\frac{3e^4}{5}\right)-\frac{6e^4}{5}-\frac{72}{5}\right)$$

input
```
integrate(((3*x**2-12*x+12)*exp(2)**2+38*x**2-144*x+144)/((3*x**3-12*x**2+
12*x)*exp(2)**2+5*x**4+18*x**3-128*x**2+144*x),x)
```

output
```
log(x**2 - 2*x) - log(x**2 + x*(28/5 + 3*exp(4)/5) - 6*exp(4)/5 - 72/5)
```

3.838.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{144-144x+38x^2+e^4(12-12x+3x^2)}{144x-128x^2+18x^3+5x^4+e^4(12x-12x^2+3x^3)}\,dx = -\log\left(5x^2+x\left(3e^4+28\right)-6e^4-72\right)+\log\left(x-2\right)+\log\left(x\right)$$

input
```
integrate(((3*x^2-12*x+12)*exp(2)^2+38*x^2-144*x+144)/((3*x^3-12*x^2+12*x)
*exp(2)^2+5*x^4+18*x^3-128*x^2+144*x),x, algorithm=\
```

output
```
-log(5*x^2 + x*(3*e^4 + 28) - 6*e^4 - 72) + log(x - 2) + log(x)
```

3.838.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{144-144x+38x^2+e^4(12-12x+3x^2)}{144x-128x^2+18x^3+5x^4+e^4(12x-12x^2+3x^3)}\,dx = -\log\left(\left|5x^2+3xe^4+28x-6e^4-72\right|\right)+\log\left(|x-2|\right)+\log\left(|x|\right)$$

input
```
integrate(((3*x^2-12*x+12)*exp(2)^2+38*x^2-144*x+144)/((3*x^3-12*x^2+12*x)
*exp(2)^2+5*x^4+18*x^3-128*x^2+144*x),x, algorithm=\
```

output
```
-log(abs(5*x^2 + 3*x*e^4 + 28*x - 6*e^4 - 72)) + log(abs(x - 2)) + log(abs
(x))
```

3.838.9 Mupad [B] (verification not implemented)

Time = 14.44 (sec) , antiderivative size = 91, normalized size of antiderivative = 3.50

$$\int \frac{144-144x+38x^2+e^4(12-12x+3x^2)}{144x-128x^2+18x^3+5x^4+e^4\left(12x-12x^2+3x^3\right)}\,dx$$
$$=\operatorname{atan}\left(\frac{-x\,5008\mathrm{i}+\mathrm{e}^4\,120\mathrm{i}-x\,\mathrm{e}^4\,636\mathrm{i}-x\,\mathrm{e}^8\,18\mathrm{i}+x^2\,\mathrm{e}^4\,288\mathrm{i}+x^2\,\mathrm{e}^8\,9\mathrm{i}+x^2\,2124\mathrm{i}+1440\mathrm{i}}{3888\,x+120\,\mathrm{e}^4+516\,x\,\mathrm{e}^4+18\,x\,\mathrm{e}^8-288\,x^2\,\mathrm{e}^4-9\,x^2\,\mathrm{e}^8-2324\,x^2+1440}\right)\,2\mathrm{i}$$

input
```
int((exp(4)*(3*x^2 - 12*x + 12) - 144*x + 38*x^2 + 144)/(144*x + exp(4)*(1
2*x - 12*x^2 + 3*x^3) - 128*x^2 + 18*x^3 + 5*x^4),x)
```

output
```
atan((exp(4)*120i - x*5008i - x*exp(4)*636i - x*exp(8)*18i + x^2*exp(4)*28
8i + x^2*exp(8)*9i + x^2*2124i + 1440i)/(3888*x + 120*exp(4) + 516*x*exp(4
) + 18*x*exp(8) - 288*x^2*exp(4) - 9*x^2*exp(8) - 2324*x^2 + 1440))*2i
```

3.839 $\int \frac{-16-24x-65x^2-36x^3-4x^4+(8+2x+16x^2+8x^3)\log(x)-\log^2(x)}{16x^2+8x^3+x^4+(-8x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx$

3.839.1 Optimal result

Integrand size = 83, antiderivative size = 25

$$\int \frac{-16-24x-65x^2-36x^3-4x^4+(8+2x+16x^2+8x^3)\log(x)-\log^2(x)}{16x^2+8x^3+x^4+(-8x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx = \frac{1+x+\frac{x(4+2x)^2}{-4-x+\log(x)}}{x}$$

output
```
(x*(4+2*x)^2/(ln(x)-x-4)+x+1)/x
```

3.839.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{-16-24x-65x^2-36x^3-4x^4+(8+2x+16x^2+8x^3)\log(x)-\log^2(x)}{16x^2+8x^3+x^4+(-8x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx = \frac{1}{x}+\frac{4(2+x)^2}{-4-x+\log(x)}$$

input
```
Integrate[(-16 - 24*x - 65*x^2 - 36*x^3 - 4*x^4 + (8 + 2*x + 16*x^2 + 8*x^
3)*Log[x] - Log[x]^2)/(16*x^2 + 8*x^3 + x^4 + (-8*x^2 - 2*x^3)*Log[x] + x^
2*Log[x]^2),x]
```

output
```
x^(-1) + (4*(2 + x)^2)/(-4 - x + Log[x])
```

3.839.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^4-36x^3-65x^2+(8x^3+16x^2+2x+8)\log(x)-24x-\log^2(x)-16}{x^4+8x^3+16x^2+x^2\log^2(x)+(-2x^3-8x^2)\log(x)}\,dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-4x^4-36x^3-65x^2+(8x^3+16x^2+2x+8)\log(x)-24x-\log^2(x)-16}{x^2(x-\log(x)+4)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{1}{x^2}+\frac{4(x-1)(x+2)^2}{x(x-\log(x)+4)^2}-\frac{8(x+2)}{x-\log(x)+4}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$4\int \frac{x^2}{(x-\log(x)+4)^2}dx-16\int \frac{1}{x(x-\log(x)+4)^2}dx+12\int \frac{x}{(x-\log(x)+4)^2}dx-16\int \frac{1}{x-\log(x)+4}dx-8\int \frac{x}{x-\log(x)+4}dx+\frac{1}{x}$$

input
```
Int[(-16 - 24*x - 65*x^2 - 36*x^3 - 4*x^4 + (8 + 2*x + 16*x^2 + 8*x^3)*Log
[x] - Log[x]^2)/(16*x^2 + 8*x^3 + x^4 + (-8*x^2 - 2*x^3)*Log[x] + x^2*Log[
x]^2),x]
```

output
```
$Aborted
```

3.839.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.839.4 Maple [A] (verified)

Time = 1.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

method	result	size
risch	$\frac{1}{x}-\frac{4(x^2+4x+4)}{-\ln(x)+4+x}$	24
norman	$\frac{4+49x-16x\ln(x)-4x^3-\ln(x)}{x(-\ln(x)+4+x)}$	33
parallelrisch	$\frac{4-16x^2-15x-\ln(x)-4x^3}{x(-\ln(x)+4+x)}$	33
default	$-\frac{4-16x^2-15x-\ln(x)-4x^3}{x(\ln(x)-x-4)}$	34

input
```
int((-ln(x)^2+(8*x^3+16*x^2+2*x+8)*ln(x)-4*x^4-36*x^3-65*x^2-24*x-16)/(x^2
*ln(x)^2+(-2*x^3-8*x^2)*ln(x)+x^4+8*x^3+16*x^2),x,method=_RETURNVERBOSE)
```

output
```
1/x-4*(x^2+4*x+4)/(-ln(x)+4+x)
```

3.839.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{-16-24x-65x^2-36x^3-4x^4+(8+2x+16x^2+8x^3)\log(x)-\log^2(x)}{16x^2+8x^3+x^4+(-8x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx = -\frac{4\,x^3+16\,x^2+15\,x+\log(x)-4}{x^2-x\log(x)+4\,x}$$

input
```
integrate((-log(x)^2+(8*x^3+16*x^2+2*x+8)*log(x)-4*x^4-36*x^3-65*x^2-24*x-
16)/(x^2*log(x)^2+(-2*x^3-8*x^2)*log(x)+x^4+8*x^3+16*x^2),x, algorithm=\
```

output
```
-(4*x^3 + 16*x^2 + 15*x + log(x) - 4)/(x^2 - x*log(x) + 4*x)
```

3.839.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{-16-24x-65x^2-36x^3-4x^4+(8+2x+16x^2+8x^3)\log(x)-\log^2(x)}{16x^2+8x^3+x^4+(-8x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx = \frac{4x^2+16x+16}{-x+\log(x)-4}+\frac{1}{x}$$

input
```
integrate((-ln(x)**2+(8*x**3+16*x**2+2*x+8)*ln(x)-4*x**4-36*x**3-65*x**2-2
4*x-16)/(x**2*ln(x)**2+(-2*x**3-8*x**2)*ln(x)+x**4+8*x**3+16*x**2),x)
```

output
```
(4*x**2 + 16*x + 16)/(-x + log(x) - 4) + 1/x
```

3.839.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{-16-24x-65x^2-36x^3-4x^4+(8+2x+16x^2+8x^3)\log(x)-\log^2(x)}{16x^2+8x^3+x^4+(-8x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx = -\frac{4x^3+16x^2+15x+\log(x)-4}{x^2-x\log(x)+4x}$$

input
```
integrate((-log(x)^2+(8*x^3+16*x^2+2*x+8)*log(x)-4*x^4-36*x^3-65*x^2-24*x-
16)/(x^2*log(x)^2+(-2*x^3-8*x^2)*log(x)+x^4+8*x^3+16*x^2),x, algorithm=\
```

output
```
-(4*x^3 + 16*x^2 + 15*x + log(x) - 4)/(x^2 - x*log(x) + 4*x)
```

3.839.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-16-24x-65x^2-36x^3-4x^4+(8+2x+16x^2+8x^3)\log(x)-\log^2(x)}{16x^2+8x^3+x^4+(-8x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx = -\frac{4(x^2+4x+4)}{x-\log(x)+4}+\frac{1}{x}$$

input
```
integrate((-log(x)^2+(8*x^3+16*x^2+2*x+8)*log(x)-4*x^4-36*x^3-65*x^2-24*x-
16)/(x^2*log(x)^2+(-2*x^3-8*x^2)*log(x)+x^4+8*x^3+16*x^2),x, algorithm=\
```

output
```
-4*(x^2 + 4*x + 4)/(x - log(x) + 4) + 1/x
```

3.839.9 Mupad [B] (verification not implemented)

Time = 14.42 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.48

$$\int \frac{-16-24x-65x^2-36x^3-4x^4+(8+2x+16x^2+8x^3)\log(x)-\log^2(x)}{16x^2+8x^3+x^4+(-8x^2-2x^3)\log(x)+x^2\log^2(x)}\,dx$$
$$=\frac{81\,x-\ln(x)-24\,x\,\ln(x)+8\,x^2-4\,x^3+4}{x\,(x-\ln(x)+4)}$$

input
```
int(-(24*x + log(x)^2 + 65*x^2 + 36*x^3 + 4*x^4 - log(x)*(2*x + 16*x^2 + 8
*x^3 + 8) + 16)/(x^2*log(x)^2 - log(x)*(8*x^2 + 2*x^3) + 16*x^2 + 8*x^3 +
x^4),x)
```

output
```
(81*x - log(x) - 24*x*log(x) + 8*x^2 - 4*x^3 + 4)/(x*(x - log(x) + 4))
```

3.840 $\int \frac{36x^4+e^{32}(-2x+2x^2)+e^{16}(6x^2-18x^3)+(e^{32}(2-2x)+12e^{16}x^2)\log(x)}{9x}$

3.840.1 Optimal result

Integrand size = 62, antiderivative size = 26

$$\int \frac{36x^4+e^{32}(-2x+2x^2)+e^{16}(6x^2-18x^3)+(e^{32}(2-2x)+12e^{16}x^2)\log(x)}{9x}\,dx$$
$$=1+x^2\left(x+\frac{e^{16}(-x+\log(x))}{3x}\right)^2$$

output
```
(x+1/3*(ln(x)-x)/x*exp(16))^2*x^2+1
```

3.840.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{36x^4+e^{32}(-2x+2x^2)+e^{16}(6x^2-18x^3)+(e^{32}(2-2x)+12e^{16}x^2)\log(x)}{9x}\,dx$$
$$=\frac{1}{9}\left(\left(e^{16}-3x\right)x-e^{16}\log(x)\right)^2$$

input
```
Integrate[(36*x^4 + E^32*(-2*x + 2*x^2) + E^16*(6*x^2 - 18*x^3) + (E^32*(2
 - 2*x) + 12*E^16*x^2)*Log[x])/(9*x),x]
```

output
```
((E^16 - 3*x)*x - E^16*Log[x])^2/9
```

3.840.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 74 vs. $2(26) = 52$.

Time = 0.28 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.85, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.065$, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{36x^4 + e^{32}(2x^2 - 2x) + (12e^{16}x^2 + e^{32}(2 - 2x))\log(x) + e^{16}(6x^2 - 18x^3)}{9x}\,dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{9}\int \frac{2(18x^4 - e^{32}(x - x^2) + 3e^{16}(x^2 - 3x^3) + (6e^{16}x^2 + e^{32}(1 - x))\log(x))}{x}dx$$

$$\Big\downarrow \; 27$$

$$\frac{2}{9}\int \frac{18x^4 - e^{32}(x - x^2) + 3e^{16}(x^2 - 3x^3) + (6e^{16}x^2 + e^{32}(1 - x))\log(x)}{x}dx$$

$$\Big\downarrow \; 2010$$

$$\frac{2}{9}\int \left(18x^3 - 9e^{16}x^2 + 3e^{16}\left(1 + \frac{e^{16}}{3}\right)x - e^{32} - \frac{(-6e^{16}x^2 + e^{32}x - e^{32})\log(x)}{x}\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{2}{9}\left(\frac{9x^4}{2} - 3e^{16}x^3 + \frac{1}{2}e^{16}(3 + e^{16})x^2 - \frac{3e^{16}x^2}{2} + 3e^{16}x^2\log(x) + \frac{1}{2}e^{32}\log^2(x) - e^{32}x\log(x)\right)$$

input
```
Int[(36*x^4 + E^32*(-2*x + 2*x^2) + E^16*(6*x^2 - 18*x^3) + (E^32*(2 - 2*x
) + 12*E^16*x^2)*Log[x])/(9*x),x]
```

output
```
(2*((-3*E^16*x^2)/2 + (E^16*(3 + E^16)*x^2)/2 - 3*E^16*x^3 + (9*x^4)/2 - E
^32*x*Log[x] + 3*E^16*x^2*Log[x] + (E^32*Log[x]^2)/2))/9
```

3.840.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.840.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.54

method	result	size
risch	$\frac{e^{32} \ln(x)^2}{9}-\frac{2\,e^{16} x (e^{16}-3x) \ln(x)}{9}+\frac{x^2 e^{32}}{9}-\frac{2x^3 e^{16}}{3}+x^4$	40
norman	$\frac{e^{32} \ln(x)^2}{9}-\frac{2\,e^{32} \ln(x) x}{9}+\frac{2x^2 e^{16} \ln(x)}{3}+\frac{x^2 e^{32}}{9}-\frac{2x^3 e^{16}}{3}+x^4$	49
parallelrisch	$\frac{e^{32} \ln(x)^2}{9}-\frac{2\,e^{32} \ln(x) x}{9}+\frac{2x^2 e^{16} \ln(x)}{3}+\frac{x^2 e^{32}}{9}-\frac{2x^3 e^{16}}{3}+x^4$	49
parts	$x^4-\frac{2x\,e^{32}}{9}+\frac{x^2 e^{16}}{3}+\frac{x^2 e^{32}}{9}-\frac{2x^3 e^{16}}{3}-\frac{2\,e^{16}\left(e^{16}(x\ln(x)-x)-3x^2\ln(x)+\frac{3x^2}{2}-\frac{e^{16}\ln(x)^2}{2}\right)}{9}$	71
default	$-\frac{2\,e^{32}(x\ln(x)-x)}{9}+\frac{4\,e^{16}\left(\frac{x^2\ln(x)}{2}-\frac{x^2}{4}\right)}{3}+\frac{x^2 e^{32}}{9}-\frac{2x^3 e^{16}}{3}+x^4+\frac{e^{32}\ln(x)^2}{9}-\frac{2x\,e^{32}}{9}+\frac{x^2 e^{16}}{3}$	76

input
```
int(1/9*(((2-2*x)*exp(16)^2+12*x^2*exp(16))*ln(x)+(2*x^2-2*x)*exp(16)^2+(-
18*x^3+6*x^2)*exp(16)+36*x^4)/x,x,method=_RETURNVERBOSE)
```

output
```
1/9*exp(32)*ln(x)^2-2/9*exp(16)*x*(exp(16)-3*x)*ln(x)+1/9*x^2*exp(32)-2/3*
x^3*exp(16)+x^4
```

3.840.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.65

$$\int \frac{36x^4 + e^{32}(-2x + 2x^2) + e^{16}(6x^2 - 18x^3) + (e^{32}(2 - 2x) + 12e^{16}x^2)\log(x)}{9x}\,dx$$
$$= x^4 - \frac{2}{3}\,x^3e^{16} + \frac{1}{9}\,x^2e^{32} + \frac{1}{9}\,e^{32}\log\left(x\right)^2 + \frac{2}{9}\left(3\,x^2e^{16} - xe^{32}\right)\log\left(x\right)$$

input
```
integrate(1/9*(((2-2*x)*exp(16)^2+12*x^2*exp(16))*log(x)+(2*x^2-2*x)*exp(1
6)^2+(-18*x^3+6*x^2)*exp(16)+36*x^4)/x,x, algorithm=\
```

output
```
x^4 - 2/3*x^3*e^16 + 1/9*x^2*e^32 + 1/9*e^32*log(x)^2 + 2/9*(3*x^2*e^16 -
x*e^32)*log(x)
```

3.840.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(20) = 40.

Time = 0.10 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.04

$$\int \frac{36x^4 + e^{32}(-2x + 2x^2) + e^{16}(6x^2 - 18x^3) + (e^{32}(2 - 2x) + 12e^{16}x^2)\log(x)}{9x}\,dx$$
$$= x^4 - \frac{2x^3e^{16}}{3} + \frac{x^2e^{32}}{9} + \left(\frac{2x^2e^{16}}{3} - \frac{2xe^{32}}{9}\right)\log\left(x\right) + \frac{e^{32}\log\left(x\right)^2}{9}$$

input
```
integrate(1/9*(((2-2*x)*exp(16)**2+12*x**2*exp(16))*ln(x)+(2*x**2-2*x)*exp
(16)**2+(-18*x**3+6*x**2)*exp(16)+36*x**4)/x,x)
```

output
```
x**4 - 2*x**3*exp(16)/3 + x**2*exp(32)/9 + (2*x**2*exp(16)/3 - 2*x*exp(32)
/9)*log(x) + exp(32)*log(x)**2/9
```

3.840.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(26) = 52$.

Time = 0.20 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.58

$$\int \frac{36x^4 + e^{32}(-2x + 2x^2) + e^{16}(6x^2 - 18x^3) + (e^{32}(2 - 2x) + 12e^{16}x^2)\log(x)}{9x}\,dx$$
$$= x^4 - \frac{2}{3}x^3e^{16} + \frac{1}{9}x^2e^{32} + \frac{1}{3}x^2e^{16} + \frac{1}{9}e^{32}\log(x)^2 - \frac{2}{9}(x\log(x) - x)e^{32} - \frac{2}{9}xe^{32} + \frac{1}{3}(2x^2\log(x) - x^2)e^{16}$$

input
```
integrate(1/9*(((2-2*x)*exp(16)^2+12*x^2*exp(16))*log(x)+(2*x^2-2*x)*exp(1
6)^2+(-18*x^3+6*x^2)*exp(16)+36*x^4)/x,x, algorithm=\
```

output
```
x^4 - 2/3*x^3*e^16 + 1/9*x^2*e^32 + 1/3*x^2*e^16 + 1/9*e^32*log(x)^2 - 2/9
*(x*log(x) - x)*e^32 - 2/9*x*e^32 + 1/3*(2*x^2*log(x) - x^2)*e^16
```

3.840.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.62

$$\int \frac{36x^4 + e^{32}(-2x + 2x^2) + e^{16}(6x^2 - 18x^3) + (e^{32}(2 - 2x) + 12e^{16}x^2)\log(x)}{9x}\,dx$$
$$= x^4 - \frac{2}{3}x^3e^{16} + \frac{2}{3}x^2e^{16}\log(x) + \frac{1}{9}x^2e^{32} - \frac{2}{9}xe^{32}\log(x) + \frac{1}{9}e^{32}\log(x)^2$$

input
```
integrate(1/9*(((2-2*x)*exp(16)^2+12*x^2*exp(16))*log(x)+(2*x^2-2*x)*exp(1
6)^2+(-18*x^3+6*x^2)*exp(16)+36*x^4)/x,x, algorithm=\
```

output
```
x^4 - 2/3*x^3*e^16 + 2/3*x^2*e^16*log(x) + 1/9*x^2*e^32 - 2/9*x*e^32*log(x
) + 1/9*e^32*log(x)^2
```

3.840.9 Mupad [B] (verification not implemented)

Time = 16.75 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{36x^4 + e^{32}(-2x + 2x^2) + e^{16}(6x^2 - 18x^3) + (e^{32}(2 - 2x) + 12e^{16}x^2)\log(x)}{9x}\,dx = \frac{\left(\mathrm{e}^{16}\,\ln(x) - x\,\mathrm{e}^{16} + 3\,x^2\right)^2}{9}$$

input
```
int(((log(x)*(12*x^2*exp(16) - exp(32)*(2*x - 2)))/9 - (exp(32)*(2*x - 2*x
^2))/9 + (exp(16)*(6*x^2 - 18*x^3))/9 + 4*x^4)/x,x)
```

output
```
(exp(16)*log(x) - x*exp(16) + 3*x^2)^2/9
```

3.841 $\int \frac{2e^{e^5}-4e^{e^5}\log(x)}{5e^7x^3+2e^{e^5}x\log(x)}\,dx$

3.841.1 Optimal result

Integrand size = 39, antiderivative size = 17

$$\int \frac{2e^{e^5}-4e^{e^5}\log(x)}{5e^7x^3+2e^{e^5}x\log(x)}\,dx = \log\left(5+\frac{2e^{-7+e^5}\log(x)}{x^2}\right)$$

output
```
ln(5+2*exp(exp(5))/x^2/exp(1)/exp(3)^2*ln(x))
```

3.841.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.41

$$\int \frac{2e^{e^5}-4e^{e^5}\log(x)}{5e^7x^3+2e^{e^5}x\log(x)}\,dx = -2\log(x)+\log\left(5e^7x^2+2e^{e^5}\log(x)\right)$$

input
```
Integrate[(2*E^E^5 - 4*E^E^5*Log[x])/(5*E^7*x^3 + 2*E^E^5*x*Log[x]),x]
```

output
```
-2*Log[x] + Log[5*E^7*x^2 + 2*E^E^5*Log[x]]
```

3.841.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {3041, 7263, 16}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2e^{e^5}-4e^{e^5}\log(x)}{5e^7x^3+2e^{e^5}x\log(x)}\,dx$$

$$\Big\downarrow \text{ 3041}$$

$$\int \frac{2e^{e^5}-4e^{e^5}\log(x)}{x\left(5e^7x^2+2e^{e^5}\log(x)\right)}dx$$

$$\Big\downarrow \text{ 7263}$$

$$2e^{e^5}\int \frac{1}{\frac{2e^{e^5}\log(x)}{x^2}+5e^7}d\frac{\log(x)}{x^2}$$

$$\Big\downarrow \text{ 16}$$

$$\log\left(\frac{2e^{e^5}\log(x)}{x^2}+5e^7\right)$$

input
```
Int[(2*E^E^5 - 4*E^E^5*Log[x])/(5*E^7*x^3 + 2*E^E^5*x*Log[x]),x]
```

output
```
Log[5*E^7 + (2*E^E^5*Log[x])/x^2]
```

3.841.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 3041
```
Int[(u_.)*((a_.)*(x_)^(m_.) + Log[(c_.)*(x_)^(n_.)]^(q_.)*(b_.)*(x_)^(r_.))
^(p_.), x_Symbol] :> Int[u*x^(p*r)*(a*x^(m - r) + b*Log[c*x^n]^q)^p, x] /;
FreeQ[{a, b, c, m, n, p, q, r}, x] && IntegerQ[p]
```

rule 7263
```
Int[(u_)*(v_)^(r_.)*((a_.)*(v_)^(p_.) + (b_.)*(w_)^(q_.))^(m_.), x_Symbol]
:> With[{c = Simplify[u/(p*w*D[v, x] - q*v*D[w, x])]}, Simp[(-c)*q   Subst[
Int[(a + b*x^q)^m, x], x, v^(m*p + r + 1)*w], x] /; FreeQ[c, x]] /; FreeQ[{
a, b, m, p, q, r}, x] && EqQ[p + q*(m*p + r + 1), 0] && IntegerQ[q] && Inte
gerQ[m]
```

3.841.4 Maple [A] (verified)

Time = 1.91 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

method	result	size
risch	$-2\ln(x)+\ln\left(\ln(x)+\frac{5x^2 \mathrm{e}^{7-\mathrm{e}^5}}{2}\right)$	22
norman	$-2\ln(x)+\ln\left(5x^2 \mathrm{e}\,\mathrm{e}^6+2\,\mathrm{e}^{\mathrm{e}^5}\ln(x)\right)$	26
parallelrisch	$\ln\left(\frac{\left(5x^2 \mathrm{e}\,\mathrm{e}^6+2\,\mathrm{e}^{\mathrm{e}^5}\ln(x)\right)\mathrm{e}^{-1}\mathrm{e}^{-6}}{5}\right)-2\ln(x)$	36
default	$-2\,\mathrm{e}^{\mathrm{e}^5}\left(\mathrm{e}^{-\mathrm{e}^5}\ln(x)-\frac{\mathrm{e}^{-\mathrm{e}^5}\ln\left(5x^2 \mathrm{e}\,\mathrm{e}^6+2\,\mathrm{e}^{\mathrm{e}^5}\ln(x)\right)}{2}\right)$	42

input
```
int((-4*exp(exp(5))*ln(x)+2*exp(exp(5)))/(2*x*exp(exp(5))*ln(x)+5*x^3*exp(
1)*exp(3)^2),x,method=_RETURNVERBOSE)
```

output
```
-2*ln(x)+ln(ln(x)+5/2*x^2*exp(7-exp(5)))
```

3.841.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int \frac{2e^{e^5}-4e^{e^5}\log(x)}{5e^7x^3+2e^{e^5}x\log(x)}\,dx=\log\left(5\,x^2e^7+2\,e^{\left(e^5\right)}\log(x)\right)-2\,\log(x)$$

input
```
integrate((-4*exp(exp(5))*log(x)+2*exp(exp(5)))/(2*x*exp(exp(5))*log(x)+5*
x^3*exp(1)*exp(3)^2),x, algorithm=\
```

output
```
log(5*x^2*e^7 + 2*e^(e^5)*log(x)) - 2*log(x)
```

3.841.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.41

$$\int \frac{2e^{e^5} - 4e^{e^5}\log(x)}{5e^7x^3 + 2e^{e^5}x\log(x)}\,dx = -2\log{(x)} + \log{\left(\frac{5x^2e^7}{2e^{e^5}} + \log{(x)}\right)}$$

input
```
integrate((-4*exp(exp(5))*ln(x)+2*exp(exp(5)))/(2*x*exp(exp(5))*ln(x)+5*x*
*3*exp(1)*exp(3)**2),x)
```

output
```
-2*log(x) + log(5*x**2*exp(7)*exp(-exp(5))/2 + log(x))
```

3.841.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.65

$$\int \frac{2e^{e^5} - 4e^{e^5}\log(x)}{5e^7x^3 + 2e^{e^5}x\log(x)}\,dx = \log\left(\frac{1}{2}\left(5\,x^2e^7 + 2\,e^{\left(e^5\right)}\log\left(x\right)\right)e^{\left(-e^5\right)}\right) - 2\,\log\left(x\right)$$

input
```
integrate((-4*exp(exp(5))*log(x)+2*exp(exp(5)))/(2*x*exp(exp(5))*log(x)+5*
x^3*exp(1)*exp(3)^2),x, algorithm=\
```

output
```
log(1/2*(5*x^2*e^7 + 2*e^(e^5)*log(x))*e^(-e^5)) - 2*log(x)
```

3.841.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int \frac{2e^{e^5} - 4e^{e^5}\log(x)}{5e^7x^3 + 2e^{e^5}x\log(x)}\,dx = \log\left(-5\,x^2e^7 - 2\,e^{\left(e^5\right)}\log\left(x\right)\right) - 2\,\log\left(x\right)$$

input
```
integrate((-4*exp(exp(5))*log(x)+2*exp(exp(5)))/(2*x*exp(exp(5))*log(x)+5*
x^3*exp(1)*exp(3)^2),x, algorithm=\
```

output
```
log(-5*x^2*e^7 - 2*e^(e^5)*log(x)) - 2*log(x)
```

3.841.9 Mupad [B] (verification not implemented)

Time = 16.74 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{2e^{e^5} - 4e^{e^5}\log(x)}{5e^7x^3 + 2e^{e^5}x\log(x)}\,dx = \ln\left(\frac{2\,e^{e^5-7}\,\ln(x)}{5} + x^2\right) - 2\,\ln(x)$$

input
```
int((2*exp(exp(5)) - 4*exp(exp(5))*log(x))/(5*x^3*exp(7) + 2*x*exp(exp(5))
*log(x)),x)
```

output
```
log((2*exp(exp(5) - 7)*log(x))/5 + x^2) - 2*log(x)
```

3.842 $\int \frac{e^x(-784-170x-34x^2-2x^3+(196+28x+x^2)\log(4))+e^x(112+12x+2}{196+28x+x^2+(-28-2x)\log}$

3.842.1 Optimal result

Integrand size = 98, antiderivative size = 24

$$\int \frac{e^x(-784-170x-34x^2-2x^3+(196+28x+x^2)\log(4))+e^x(112+12x+2x^2+(-28-2x)\log(4))\,\mathrm{lo}}{196+28x+x^2+(-28-2x)\log(3x)+\log^2(3x)}$$
$$=e^x\left(-4+\log(4)+\frac{2x^2}{-14-x+\log(3x)}\right)$$

output
```
(4*x^2/(2*ln(3*x)-2*x-28)-4+2*ln(2))*exp(x)
```

3.842.2 Mathematica [A] (verified)

Time = 5.10 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^x(-784-170x-34x^2-2x^3+(196+28x+x^2)\log(4))+e^x(112+12x+2x^2+(-28-2x)\log(4))\,\mathrm{lo}}{196+28x+x^2+(-28-2x)\log(3x)+\log^2(3x)}$$
$$=e^x\left(-4+\log(4)-\frac{2x^2}{14+x-\log(3x)}\right)$$

input
```
Integrate[(E^x*(-784 - 170*x - 34*x^2 - 2*x^3 + (196 + 28*x + x^2)*Log[4])
 + E^x*(112 + 12*x + 2*x^2 + (-28 - 2*x)*Log[4])*Log[3*x] + E^x*(-4 + Log[
4])*Log[3*x]^2)/(196 + 28*x + x^2 + (-28 - 2*x)*Log[3*x] + Log[3*x]^2),x]
```

output
```
E^x*(-4 + Log[4] - (2*x^2)/(14 + x - Log[3*x]))
```

3.842.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(2x^2+12x+(-2x-28)\log(4)+112\right)\log(3x)+e^x\left(-2x^3-34x^2+\left(x^2+28x+196\right)\log(4)-170x-784\right)}{x^2+28x+\log^2(3x)+(-2x-28)\log(3x)+196}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^x\left(2x^2+12x+(-2x-28)\log(4)+112\right)\log(3x)+e^x\left(-2x^3-34x^2+\left(x^2+28x+196\right)\log(4)-170x-784\right)}{(x-\log(3x)+14)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2e^x x^3}{(x-\log(3x)+14)^2}+\frac{2e^x x^2\log(3x)}{(x-\log(3x)+14)^2}-\frac{34e^x x^2\left(1-\frac{\log(2)}{17}\right)}{(x-\log(3x)+14)^2}+\frac{e^x(\log(4)-4)\log^2(3x)}{(x-\log(3x)+14)^2}+\frac{12e^x x\left(1-\right.}{(x-\log}\right.$$

$$\Big\downarrow \text{2009}$$

$$-(4-\log(4))\int \frac{e^x x^2}{(x-\log(3x)+14)^2}dx-2(17-\log(2))\int \frac{e^x x^2}{(x-\log(3x)+14)^2}dx+4(3-\log(2))\int \frac{e^x x^2}{(x-\log(3x)+14)^2}dx+28\int \frac{e^x x^2}{(x-\log(3x)+14)^2}dx-2\int \frac{e^x x^2}{x-\log(3x)+14}dx-196(4-\log(4))\int \frac{e^x}{(x-\log(3x)+14)^2}dx+392(2-\log(2))\int \frac{e^x}{(x-\log(3x)+14)^2}dx-28(4-\log(4))\int \frac{e^x x}{(x-\log(3x)+14)^2}dx+56(3-\log(2))\int \frac{e^x x}{(x-\log(3x)+14)^2}dx+56(2-\log(2))\int \frac{e^x x}{(x-\log(3x)+14)^2}dx-2(85-28\log(2))\int \frac{e^x x}{(x-\log(3x)+14)^2}dx+28(4-\log(4))\int \frac{e^x}{x-\log(3x)+14}dx+2(4-\log(4))\int \frac{e^x x}{x-\log(3x)+14}dx-4(3-\log(2))\int \frac{e^x x}{x-\log(3x)+14}dx+56(2-\log(2))\int \frac{e^x}{-x+\log(3x)-14}dx-e^x(4-\log(4))$$

input
```
Int[(E^x*(-784 - 170*x - 34*x^2 - 2*x^3 + (196 + 28*x + x^2)*Log[4]) + E^x
*(112 + 12*x + 2*x^2 + (-28 - 2*x)*Log[4])*Log[3*x] + E^x*(-4 + Log[4])*Lo
g[3*x]^2)/(196 + 28*x + x^2 + (-28 - 2*x)*Log[3*x] + Log[3*x]^2),x]
```

output
```
$Aborted
```

3.842.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.842.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.25

method	result	size
risch	$2\,\mathrm{e}^{x}\ln\left(2\right)-4\,\mathrm{e}^{x}-\frac{2\,\mathrm{e}^{x} x^{2}}{x-\ln\left(3x\right)+14}$	30
parallelrisch	$\frac{2x\ln(2)\mathrm{e}^{x}-2\,\mathrm{e}^{x}\ln(2)\ln(3x)-2\,\mathrm{e}^{x} x^{2}+28\,\mathrm{e}^{x}\ln(2)-4\,\mathrm{e}^{x} x+4\ln(3x)\mathrm{e}^{x}-56\,\mathrm{e}^{x}}{x-\ln(3x)+14}$	61

input
```
int(((2*ln(2)-4)*exp(x)*ln(3*x)^2+(2*(-2*x-28)*ln(2)+2*x^2+12*x+112)*exp(x
)*ln(3*x)+(2*(x^2+28*x+196)*ln(2)-2*x^3-34*x^2-170*x-784)*exp(x))/(ln(3*x)
^2+(-2*x-28)*ln(3*x)+x^2+28*x+196),x,method=_RETURNVERBOSE)
```

output
```
2*exp(x)*ln(2)-4*exp(x)-2*exp(x)*x^2/(x-ln(3*x)+14)
```

3.842.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.79

$$\int \frac{e^x(-784-170x-34x^2-2x^3+(196+28x+x^2)\log(4))+e^x(112+12x+2x^2+(-28-2x)\log(4))\,\mathrm{lo}}{196+28x+x^2+(-28-2x)\log(3x)+\log^2(3x)}$$
$$=-\frac{2\left((\log(2)-2)e^{x}\log(3\,x)+(x^{2}-(x+14)\log(2)+2\,x+28)e^{x}\right)}{x-\log(3\,x)+14}$$

input
```
integrate(((2*log(2)-4)*exp(x)*log(3*x)^2+(2*(-2*x-28)*log(2)+2*x^2+12*x+1
12)*exp(x)*log(3*x)+(2*(x^2+28*x+196)*log(2)-2*x^3-34*x^2-170*x-784)*exp(x
))/(log(3*x)^2+(-2*x-28)*log(3*x)+x^2+28*x+196),x, algorithm=\
```

output
```
-2*((log(2) - 2)*e^x*log(3*x) + (x^2 - (x + 14)*log(2) + 2*x + 28)*e^x)/(x
 - log(3*x) + 14)
```

3.842.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.04

$$\int \frac{e^x(-784-170x-34x^2-2x^3+(196+28x+x^2)\log(4))+e^x(112+12x+2x^2+(-28-2x)\log(4))\log(3x)+e^x(-4+\log(4))\log^2(3x)}{196+28x+x^2+(-28-2x)\log(3x)+\log^2(3x)} = \frac{(-2x^2-4x+2x\log{(2)}-2\log{(2)}\log{(3x)}+4\log{(3x)}-56+28\log{(2)})\,e^x}{x-\log{(3x)}+14}$$

input
```
integrate(((2*ln(2)-4)*exp(x)*ln(3*x)**2+(2*(-2*x-28)*ln(2)+2*x**2+12*x+11
2)*exp(x)*ln(3*x)+(2*(x**2+28*x+196)*ln(2)-2*x**3-34*x**2-170*x-784)*exp(x
))/(ln(3*x)**2+(-2*x-28)*ln(3*x)+x**2+28*x+196),x)
```

output
```
(-2*x**2 - 4*x + 2*x*log(2) - 2*log(2)*log(3*x) + 4*log(3*x) - 56 + 28*log
(2))*exp(x)/(x - log(3*x) + 14)
```

3.842.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.96

$$\int \frac{e^x(-784-170x-34x^2-2x^3+(196+28x+x^2)\log(4))+e^x(112+12x+2x^2+(-28-2x)\log(4))\log(3x)+e^x(-4+\log(4))\log^2(3x)}{196+28x+x^2+(-28-2x)\log(3x)+\log^2(3x)} = -\frac{2\,(x^2-x(\log{(2)}-2)+(\log{(3)}-14)\log{(2)}+(\log{(2)}-2)\log{(x)}-2\,\log{(3)}+28)e^x}{x-\log{(3)}-\log{(x)}+14}$$

input
```
integrate(((2*log(2)-4)*exp(x)*log(3*x)^2+(2*(-2*x-28)*log(2)+2*x^2+12*x+1
12)*exp(x)*log(3*x)+(2*(x^2+28*x+196)*log(2)-2*x^3-34*x^2-170*x-784)*exp(x
))/(log(3*x)^2+(-2*x-28)*log(3*x)+x^2+28*x+196),x, algorithm=\
```

output
```
-2*(x^2 - x*(log(2) - 2) + (log(3) - 14)*log(2) + (log(2) - 2)*log(x) - 2*
log(3) + 28)*e^x/(x - log(3) - log(x) + 14)
```

3.842.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(25) = 50$.

Time = 0.27 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.46

$$\int \frac{e^x(-784-170x-34x^2-2x^3+(196+28x+x^2)\log(4))+e^x(112+12x+2x^2+(-28-2x)\log(4))\log}{196+28x+x^2+(-28-2x)\log(3x)+\log^2(3x)}$$
$$= -\frac{2\left(x^2e^x - xe^x\log(2) + e^x\log(2)\log(3x) + 2xe^x - 14e^x\log(2) - 2e^x\log(3x) + 28e^x\right)}{x-\log(3x)+14}$$

input
```
integrate(((2*log(2)-4)*exp(x)*log(3*x)^2+(2*(-2*x-28)*log(2)+2*x^2+12*x+1
12)*exp(x)*log(3*x)+(2*(x^2+28*x+196)*log(2)-2*x^3-34*x^2-170*x-784)*exp(x
))/(log(3*x)^2+(-2*x-28)*log(3*x)+x^2+28*x+196),x, algorithm=\
```

output
```
-2*(x^2*e^x - x*e^x*log(2) + e^x*log(2)*log(3*x) + 2*x*e^x - 14*e^x*log(2)
 - 2*e^x*log(3*x) + 28*e^x)/(x - log(3*x) + 14)
```

3.842.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^x(-784-170x-34x^2-2x^3+(196+28x+x^2)\log(4))+e^x(112+12x+2x^2+(-28-2x)\log(4))\log}{196+28x+x^2+(-28-2x)\log(3x)+\log^2(3x)}$$
$$= \int \frac{e^x\left(2\ln(2)-4\right)\ln(3x)^2+e^x\left(12x-2\ln(2)\left(2x+28\right)+2x^2+112\right)\ln(3x)-e^x\left(170x+34x^2+2\right.}{28x+\ln(3x)^2+x^2-\ln(3x)\left(2x+28\right)+196}$$

input
```
int((log(3*x)^2*exp(x)*(2*log(2) - 4) - exp(x)*(170*x + 34*x^2 + 2*x^3 - 2
*log(2)*(28*x + x^2 + 196) + 784) + log(3*x)*exp(x)*(12*x - 2*log(2)*(2*x
+ 28) + 2*x^2 + 112))/(28*x + log(3*x)^2 + x^2 - log(3*x)*(2*x + 28) + 196
),x)
```

output
```
int((log(3*x)^2*exp(x)*(2*log(2) - 4) - exp(x)*(170*x + 34*x^2 + 2*x^3 - 2
*log(2)*(28*x + x^2 + 196) + 784) + log(3*x)*exp(x)*(12*x - 2*log(2)*(2*x
+ 28) + 2*x^2 + 112))/(28*x + log(3*x)^2 + x^2 - log(3*x)*(2*x + 28) + 196
), x)
```

3.843 $\int \frac{24x+6x^2-21x^3+5x^4+5x^5+(4+6x-5x^2-5x^3)\log\left(\frac{-100+}{(16+80x+140x^2+1}\right.}{-4x^2-6x^3+5x^4+5x^5}$

3.843.1 Optimal result

Integrand size = 97, antiderivative size = 29

$$\int \frac{24x+6x^2-21x^3+5x^4+5x^5+(4+6x-5x^2-5x^3)\log\left(\frac{-100+100x}{(16+80x+140x^2+100x^3+25x^4)\log(2)}\right)}{-4x^2-6x^3+5x^4+5x^5}\,dx$$
$$=5+x+\frac{\log\left(\frac{4(-1+x)}{\left(\frac{4}{5}+2x+x^2\right)^2\log(2)}\right)}{x}$$

output
```
ln(4*(-1+x)/ln(2)/(2*x+x^2+4/5)^2)/x+5+x
```

3.843.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{24x+6x^2-21x^3+5x^4+5x^5+(4+6x-5x^2-5x^3)\log\left(\frac{-100+100x}{(16+80x+140x^2+100x^3+25x^4)\log(2)}\right)}{-4x^2-6x^3+5x^4+5x^5}\,dx$$
$$=x+\frac{\log\left(\frac{100(-1+x)}{(4+10x+5x^2)^2\log(2)}\right)}{x}$$

input
```
Integrate[(24*x + 6*x^2 - 21*x^3 + 5*x^4 + 5*x^5 + (4 + 6*x - 5*x^2 - 5*x^
3)*Log[(-100 + 100*x)/((16 + 80*x + 140*x^2 + 100*x^3 + 25*x^4)*Log[2])])/
(-4*x^2 - 6*x^3 + 5*x^4 + 5*x^5),x]
```

output
```
x + Log[(100*(-1 + x))/((4 + 10*x + 5*x^2)^2*Log[2])]/x
```

3.843.3 Rubi [A] (verified)

Time = 1.86 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.031, Rules used = {2026, 2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5x^5+5x^4-21x^3+6x^2+\left(-5x^3-5x^2+6x+4\right)\log\left(\frac{100x-100}{(25x^4+100x^3+140x^2+80x+16)\log(2)}\right)+24x}{5x^5+5x^4-6x^3-4x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{5x^5+5x^4-21x^3+6x^2+\left(-5x^3-5x^2+6x+4\right)\log\left(\frac{100x-100}{(25x^4+100x^3+140x^2+80x+16)\log(2)}\right)+24x}{x^2\left(5x^3+5x^2-6x-4\right)}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{5x^5+5x^4-21x^3+6x^2+\left(-5x^3-5x^2+6x+4\right)\log\left(\frac{100x-100}{(25x^4+100x^3+140x^2+80x+16)\log(2)}\right)+24x}{19(x-1)x^2}-\frac{5(x+3)\left(5\right.}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{\log\left(-\frac{100(1-x)}{(5x^2+10x+4)^2\log(2)}\right)}{x}+x$$

input
```
Int[(24*x + 6*x^2 - 21*x^3 + 5*x^4 + 5*x^5 + (4 + 6*x - 5*x^2 - 5*x^3)*Log
[(-100 + 100*x)/((16 + 80*x + 140*x^2 + 100*x^3 + 25*x^4)*Log[2])])/(-4*x^
2 - 6*x^3 + 5*x^4 + 5*x^5),x]
```

output
```
x + Log[(-100*(1 - x))/((4 + 10*x + 5*x^2)^2*Log[2])]/x
```

3.843. $\int \frac{24x+6x^2-21x^3+5x^4+5x^5+\left(4+6x-5x^2-5x^3\right)\log\left(\frac{-100+100x}{\left(16+80x+140x^2+100x^3+25x^4\right)\log(2)}\right)}{-4x^2-6x^3+5x^4+5x^5}dx$

3.843.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.843.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.38

method	result	size
risch	$\frac{\ln\left(\frac{100x-100}{\left(25x^4+100x^3+140x^2+80x+16\right)\ln(2)}\right)}{x}+x$	40
norman	$\frac{x^2+\ln\left(\frac{100x-100}{\left(25x^4+100x^3+140x^2+80x+16\right)\ln(2)}\right)}{x}$	42
default	$-\frac{\ln(\ln(2))}{x}+x+\frac{2\ln(10)}{x}+\frac{\ln\left(\frac{-1+x}{25x^4+100x^3+140x^2+80x+16}\right)}{x}$	49
parallelrisch	$-\frac{-50x^2+100x-50\ln\left(\frac{100x-100}{\left(25x^4+100x^3+140x^2+80x+16\right)\ln(2)}\right)}{50x}$	49
parts	$-\frac{\ln(\ln(2))}{x}+x+\frac{2\ln(10)}{x}+\frac{\ln\left(\frac{-1+x}{25x^4+100x^3+140x^2+80x+16}\right)}{x}$	49

input
```
int(((-5*x^3-5*x^2+6*x+4)*ln((100*x-100)/(25*x^4+100*x^3+140*x^2+80*x+16)/
ln(2))+5*x^5+5*x^4-21*x^3+6*x^2+24*x)/(5*x^5+5*x^4-6*x^3-4*x^2),x,method=_
RETURNVERBOSE)
```

output
```
1/x*ln((100*x-100)/(25*x^4+100*x^3+140*x^2+80*x+16)/ln(2))+x
```

3.843. $\int \frac{24x+6x^2-21x^3+5x^4+5x^5+\left(4+6x-5x^2-5x^3\right)\log\left(\frac{-100+100x}{\left(16+80x+140x^2+100x^3+25x^4\right)\log(2)}\right)}{-4x^2-6x^3+5x^4+5x^5}\,dx$

3.843.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.38

$$\int \frac{24x+6x^2-21x^3+5x^4+5x^5+(4+6x-5x^2-5x^3)\log\left(\frac{-100+100x}{(16+80x+140x^2+100x^3+25x^4)\log(2)}\right)}{-4x^2-6x^3+5x^4+5x^5}\,dx$$
$$=\frac{x^2+\log\left(\frac{100\,(x-1)}{(25\,x^4+100\,x^3+140\,x^2+80\,x+16)\log(2)}\right)}{x}$$

input
```
integrate(((-5*x^3-5*x^2+6*x+4)*log((100*x-100)/(25*x^4+100*x^3+140*x^2+80
*x+16)/log(2))+5*x^5+5*x^4-21*x^3+6*x^2+24*x)/(5*x^5+5*x^4-6*x^3-4*x^2),x,
 algorithm=\
```

output
```
(x^2 + log(100*(x - 1)/((25*x^4 + 100*x^3 + 140*x^2 + 80*x + 16)*log(2))))
/x
```

3.843.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \frac{24x+6x^2-21x^3+5x^4+5x^5+(4+6x-5x^2-5x^3)\log\left(\frac{-100+100x}{(16+80x+140x^2+100x^3+25x^4)\log(2)}\right)}{-4x^2-6x^3+5x^4+5x^5}\,dx$$
$$=x+\frac{\log\left(\frac{100x-100}{(25x^4+100x^3+140x^2+80x+16)\log(2)}\right)}{x}$$

input
```
integrate(((-5*x**3-5*x**2+6*x+4)*ln((100*x-100)/(25*x**4+100*x**3+140*x**
2+80*x+16)/ln(2))+5*x**5+5*x**4-21*x**3+6*x**2+24*x)/(5*x**5+5*x**4-6*x**3
-4*x**2),x)
```

output
```
x + log((100*x - 100)/((25*x**4 + 100*x**3 + 140*x**2 + 80*x + 16)*log(2))
)/x
```

3.843.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. $2(29) = 58$.

Time = 0.36 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.21

$$\int \frac{24x + 6x^2 - 21x^3 + 5x^4 + 5x^5 + (4 + 6x - 5x^2 - 5x^3)\log\left(\frac{-100+100x}{(16+80x+140x^2+100x^3+25x^4)\log(2)}\right)}{-4x^2 - 6x^3 + 5x^4 + 5x^5}\,dx$$
$$= x - \frac{(5x+4)\log(5x^2+10x+4) + 2(x-1)\log(x-1) - 4\log(5) - 4\log(2) + 2\log(\log(2))}{2x} + \frac{5}{2}\log(5x^2+10x+4) + \log(x-1)$$

input
```
integrate((((-5*x^3-5*x^2+6*x+4)*log((100*x-100)/(25*x^4+100*x^3+140*x^2+80
*x+16)/log(2))+5*x^5+5*x^4-21*x^3+6*x^2+24*x)/(5*x^5+5*x^4-6*x^3-4*x^2),x,
 algorithm=\
```

output
```
x - 1/2*((5*x + 4)*log(5*x^2 + 10*x + 4) + 2*(x - 1)*log(x - 1) - 4*log(5)
 - 4*log(2) + 2*log(log(2)))/x + 5/2*log(5*x^2 + 10*x + 4) + log(x - 1)
```

3.843.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.93

$$\int \frac{24x + 6x^2 - 21x^3 + 5x^4 + 5x^5 + (4 + 6x - 5x^2 - 5x^3)\log\left(\frac{-100+100x}{(16+80x+140x^2+100x^3+25x^4)\log(2)}\right)}{-4x^2 - 6x^3 + 5x^4 + 5x^5}\,dx$$
$$= x + \frac{2\log(2)}{x} - \frac{\log(25x^4\log(2) + 100x^3\log(2) + 140x^2\log(2) + 80x\log(2) + 16\log(2))}{x} + \frac{\log(25x-25)}{x}$$

input
```
integrate((((-5*x^3-5*x^2+6*x+4)*log((100*x-100)/(25*x^4+100*x^3+140*x^2+80
*x+16)/log(2))+5*x^5+5*x^4-21*x^3+6*x^2+24*x)/(5*x^5+5*x^4-6*x^3-4*x^2),x,
 algorithm=\
```

output
```
x + 2*log(2)/x - log(25*x^4*log(2) + 100*x^3*log(2) + 140*x^2*log(2) + 80*
x*log(2) + 16*log(2))/x + log(25*x - 25)/x
```

3.843. $\int \frac{24x+6x^2-21x^3+5x^4+5x^5+(4+6x-5x^2-5x^3)\log\left(\frac{-100+100x}{\left(16+80x+140x^2+100x^3+25x^4\right)\log(2)}\right)}{-4x^2-6x^3+5x^4+5x^5}\,dx$

3.843.9 Mupad [B] (verification not implemented)

Time = 14.19 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.31

$$\int \frac{24x+6x^2-21x^3+5x^4+5x^5+(4+6x-5x^2-5x^3)\log\left(\frac{-100+100x}{(16+80x+140x^2+100x^3+25x^4)\log(2)}\right)}{-4x^2-6x^3+5x^4+5x^5}\,dx$$
$$= x+\frac{\ln\left(\frac{100\,(x-1)}{\ln(2)\,(25\,x^4+100\,x^3+140\,x^2+80\,x+16)}\right)}{x}$$

input
```
int(-(24*x + log((100*x - 100)/(log(2)*(80*x + 140*x^2 + 100*x^3 + 25*x^4
+ 16)))*(6*x - 5*x^2 - 5*x^3 + 4) + 6*x^2 - 21*x^3 + 5*x^4 + 5*x^5)/(4*x^2
 + 6*x^3 - 5*x^4 - 5*x^5),x)
```

output
```
x + log((100*(x - 1))/(log(2)*(80*x + 140*x^2 + 100*x^3 + 25*x^4 + 16)))/x
```

3.844 $\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+12}{}$

3.844.1 Optimal result

Integrand size = 259, antiderivative size = 29

$$\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+1280x^7+96x^8+200x^9-2e^4x}{}$$

$$=\left(e^8+\frac{16}{x^4}-x+\frac{e^2+x}{5+x}-\log(x)\right)^2$$

output
```
((x+exp(2))/(5+x)+16/x^4-ln(x)+exp(4)^2-x)^2
```

3.844.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 169 vs. 2(29) = 58.

Time = 0.14 (sec) , antiderivative size = 169, normalized size of antiderivative = 5.83

$$\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+1280x^7+96x^8+200x^9-2e^4x}{}$$

$$=2\left(\frac{128}{x^8}+\frac{16e^2(1+5e^6)}{5x^4}-\frac{16(20+e^2)}{25x^3}+\frac{16(-5+e^2)}{125x^2}-\frac{16(-5+e^2)}{625x}-\left(1+e^8\right)x+\frac{x^2}{2}\right.$$
$$+\frac{(-5+e^2)^2}{2(5+x)^2}+\frac{-18830+3766e^2-3125e^8+625e^{10}}{625(5+x)}-\left(1+e^8\right)\log(x)$$
$$\left.+\frac{\left(-80-16x-\left(-5+e^2\right)x^4+5x^5+x^6\right)\log(x)}{x^4(5+x)}+\frac{\log^2(x)}{2}\right)$$

3.844.
$\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+1280x^7+96x^8+200x^9-2e^4x^9+290x^{10}+148x^{11}+30x^{12}+2x^{13}+e^2(-3200x^4-}{}$

input
```
Integrate[(-256000 - 153600*x - 30720*x^2 - 2048*x^3 - 4000*x^4 + 7200*x^5
 + 5600*x^6 + 1280*x^7 + 96*x^8 + 200*x^9 - 2*E^4*x^9 + 290*x^10 + 148*x^1
1 + 30*x^12 + 2*x^13 + E^2*(-3200*x^4 - 1440*x^5 - 160*x^6 - 50*x^8 - 60*x
^9 - 14*x^10) + E^8*(-16000*x^4 - 9600*x^5 - 1920*x^6 - 128*x^7 - 250*x^8
- 350*x^9 - 170*x^10 - 32*x^11 - 2*x^12 + E^2*(-10*x^9 - 2*x^10)) + (16000
*x^4 + 9600*x^5 + 1920*x^6 + 128*x^7 + 250*x^8 + 350*x^9 + 170*x^10 + 32*x
^11 + 2*x^12 + E^2*(10*x^9 + 2*x^10))*Log[x])/(125*x^9 + 75*x^10 + 15*x^11
 + x^12),x]
```

output
```
2*(128/x^8 + (16*E^2*(1 + 5*E^6))/(5*x^4) - (16*(20 + E^2))/(25*x^3) + (16
*(-5 + E^2))/(125*x^2) - (16*(-5 + E^2))/(625*x) - (1 + E^8)*x + x^2/2 + (
-5 + E^2)^2/(2*(5 + x)^2) + (-18830 + 3766*E^2 - 3125*E^8 + 625*E^10)/(625
*(5 + x)) - (1 + E^8)*Log[x] + ((-80 - 16*x - (-5 + E^2)*x^4 + 5*x^5 + x^6
)*Log[x])/(x^4*(5 + x)) + Log[x]^2/2)
```

3.844.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 534 vs. $2(29) = 58$.

Time = 3.06 (sec) , antiderivative size = 534, normalized size of antiderivative = 18.41, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.031$, Rules used = {6, 2026, 2007, 7239, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^{13}+30x^{12}+148x^{11}+290x^{10}-2e^4x^9+200x^9+96x^8+1280x^7+5600x^6+7200x^5-4000x^4-2048x^3-3}{}$$

$$\Big\downarrow \ 6$$

$$\int \frac{2x^{13}+30x^{12}+148x^{11}+290x^{10}+\left(200-2e^4\right)x^9+96x^8+1280x^7+5600x^6+7200x^5-4000x^4-2048x^3-3}{}$$

$$\Big\downarrow \ 2026$$

$$\int \frac{2x^{13}+30x^{12}+148x^{11}+290x^{10}+\left(200-2e^4\right)x^9+96x^8+1280x^7+5600x^6+7200x^5-4000x^4-2048x^3-3}{}$$

$$\Big\downarrow \ 2007$$

$$\int \frac{2x^{13}+30x^{12}+148x^{11}+290x^{10}+\left(200-2e^4\right)x^9+96x^8+1280x^7+5600x^6+7200x^5-4000x^4-2048x^3-3}{}$$

$$\Big\downarrow \; 7239$$

$$\int \frac{2\left(x^7+11x^6+\left(30+e^2\right)x^5+25x^4+64x^2+640x+1600\right)\left(x^6-\left(e^8-4\right)x^5-\left(e^2+5e^8\right)x^4+(x+5)x^4\log(x\right.}{x^9(x+5)^3}$$

$$\Big\downarrow \; 27$$

$$2\int -\frac{\left(x^7+11x^6+\left(30+e^2\right)x^5+25x^4+64x^2+640x+1600\right)\left(-x^6-\left(4-e^8\right)x^5-(x+5)\log(x)x^4+e^2(1+5\right.}{x^9(x+5)^3}$$

$$\Big\downarrow \; 25$$

$$-2\int \frac{\left(x^7+11x^6+\left(30+e^2\right)x^5+25x^4+64x^2+640x+1600\right)\left(-x^6-\left(4-e^8\right)x^5-(x+5)\log(x)x^4+e^2(1+5\right.}{x^9(x+5)^3}$$

$$\Big\downarrow \; 7293$$

$$-2\int \left(\frac{\log(x)\left(-x^7-11x^6-30\left(1+\frac{e^2}{30}\right)x^5-25x^4-64x^2-640x-1600\right)}{x^5(x+5)^2}+\frac{-x^7-11x^6-30\left(1+\frac{e^2}{30}\right)x^5-2}{x^3(x+5}\right.$$

$$\Big\downarrow \; 2009$$

$$-2\left(-\frac{128}{x^8}-\frac{16e^2\left(1+5e^6\right)}{5x^4}+\frac{16\log(x)}{x^4}+\frac{64\left(4-e^8\right)}{15x^3}+\frac{64e^2\left(1+5e^6\right)}{75x^3}-\frac{16\left(1811+125e^2\right)}{9375x^3}-\frac{11024}{9375x^3}-\frac{x^2}{2}-\frac{3}{}\right.$$

input
```
Int[(-256000 - 153600*x - 30720*x^2 - 2048*x^3 - 4000*x^4 + 7200*x^5 + 560
0*x^6 + 1280*x^7 + 96*x^8 + 200*x^9 - 2*E^4*x^9 + 290*x^10 + 148*x^11 + 30
*x^12 + 2*x^13 + E^2*(-3200*x^4 - 1440*x^5 - 160*x^6 - 50*x^8 - 60*x^9 - 1
4*x^10) + E^8*(-16000*x^4 - 9600*x^5 - 1920*x^6 - 128*x^7 - 250*x^8 - 350*
x^9 - 170*x^10 - 32*x^11 - 2*x^12 + E^2*(-10*x^9 - 2*x^10)) + (16000*x^4 +
 9600*x^5 + 1920*x^6 + 128*x^7 + 250*x^8 + 350*x^9 + 170*x^10 + 32*x^11 +
2*x^12 + E^2*(10*x^9 + 2*x^10))*Log[x])/(125*x^9 + 75*x^10 + 15*x^11 + x^1
2),x]
```

3.844.

$$\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+1280x^7+96x^8+200x^9-2e^4x^9+290x^{10}+148x^{11}+30x^{12}+2x^{13}+e^2\left(-3200x^4-\right.}{}$$

output
```
-2*(-128/x^8 - (16*E^2*(1 + 5*E^6))/(5*x^4) - 11024/(9375*x^3) - (16*(1811
 + 125*E^2))/(9375*x^3) + (64*E^2*(1 + 5*E^6))/(75*x^3) + (64*(4 - E^8))/(
15*x^3) + 32/(5*x^2) + (24*(187 + 125*E^2))/(15625*x^2) - (8*(1811 + 125*E
^2))/(15625*x^2) - (32*E^2*(1 + 5*E^6))/(125*x^2) - (32*(4 - E^8))/(25*x^2
) - 64/(25*x) + (96*(219 - 125*E^2))/(78125*x) + (48*(187 + 125*E^2))/(781
25*x) + (64*E^2*(1 + 5*E^6))/(625*x) + (64*(4 - E^8))/(125*x) + 5*x - (4 -
 E^8)*x - x^2/2 - (25*(5 - E^2))/(2*(5 + x)^2) + (5*(5 - E^2)*(2 - E^4)*(2
 + E^4))/(2*(5 + x)^2) + (E^2*(5 - E^2)*(1 + 5*E^6))/(2*(5 + x)^2) + (6266
*(5 - E^2))/(625*(5 + x)) - ((5 - E^2)*(2 - E^4)*(2 + E^4))/(5 + x) - (64*
Log[x])/125 + (32*(1907 - 625*E^2)*Log[x])/390625 - (96*(219 - 125*E^2)*Lo
g[x])/390625 + (689*E^2*(1 + 5*E^6)*Log[x])/3125 + (64*(4 - E^8)*Log[x])/6
25 + (16*Log[x])/x^4 - x*Log[x] + ((5 - E^2)*x*Log[x])/(5*(5 + x)) - Log[x
]^2/2 - (32*(1907 - 625*E^2)*Log[5 + x])/390625 + (96*(219 - 125*E^2)*Log[
5 + x])/390625 - ((5 - E^2)*Log[5 + x])/5 - ((1811 + 125*E^2)*Log[5 + x])/
125 + (2436*E^2*(1 + 5*E^6)*Log[5 + x])/3125 + (2436*(4 - E^8)*Log[5 + x])
/625)
```

3.844.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.844.

$\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+1280x^7+96x^8+200x^9-2e^4x^9+290x^{10}+148x^{11}+30x^{12}+2x^{13}+e^2(-3200x^4-\cdots}{\cdots}$

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.844.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 164 vs. $2(29) = 58$.

Time = 0.61 (sec) , antiderivative size = 165, normalized size of antiderivative = 5.69

method	result
default	$x^2 - 2x\,e^8 + \frac{256}{x^8} + \frac{-\frac{128}{5}-\frac{32\,e^2}{25}}{x^3} + \frac{-\frac{32}{25}+\frac{32\,e^2}{125}}{x^2} + \frac{\frac{32}{125}-\frac{32\,e^2}{625}}{x} - 2\left(\frac{e^2}{5}+e^8\right)\ln(x) + \frac{16+\frac{64\,e^2}{5}+64\,e^8}{2x^4} + 25$
parts	$x^2 - 2x\,e^8 + \frac{256}{x^8} + \frac{-\frac{128}{5}-\frac{32\,e^2}{25}}{x^3} + \frac{-\frac{32}{25}+\frac{32\,e^2}{125}}{x^2} + \frac{\frac{32}{125}-\frac{32\,e^2}{625}}{x} - 2\left(\frac{e^2}{5}+e^8\right)\ln(x) + \frac{16+\frac{64\,e^2}{5}+64\,e^8}{2x^4} + 25$
risch	$\ln(x)^2 - \frac{2(-x^6+x^4e^2-5x^5-5x^4+16x+80)\ln(x)}{(5+x)x^4} - \frac{-6400+20\,e^8x^{10}+2\,e^8x^{11}-2\,e^{10}x^9-2560x-x^8e^4+20x^9\ln(x)-50x}{}$
parallelrisch	$\frac{6400-2\,e^8x^{11}+2560x+x^8e^4+40x^9\ln(x)+x^{10}\ln(x)^2+2x^{11}\ln(x)+25x^8\ln(x)^2-32x^6\ln(x)+50x^8e^2-320x^5\ln(x)-800x^4\ln(x)}{}$

input
```
int((((2*x^10+10*x^9)*exp(2)+2*x^12+32*x^11+170*x^10+350*x^9+250*x^8+128*x
^7+1920*x^6+9600*x^5+16000*x^4)*ln(x)+((-2*x^10-10*x^9)*exp(2)-2*x^12-32*x
^11-170*x^10-350*x^9-250*x^8-128*x^7-1920*x^6-9600*x^5-16000*x^4)*exp(4)^2
-2*x^9*exp(2)^2+(-14*x^10-60*x^9-50*x^8-160*x^6-1440*x^5-3200*x^4)*exp(2)+
2*x^13+30*x^12+148*x^11+290*x^10+200*x^9+96*x^8+1280*x^7+5600*x^6+7200*x^5
-4000*x^4-2048*x^3-30720*x^2-153600*x-256000)/(x^12+15*x^11+75*x^10+125*x^
9),x,method=_RETURNVERBOSE)
```

output
```
x^2-2*x*exp(8)+256/x^8+2/3*(-192/5-48/25*exp(2))/x^3+(-32/25+32/125*exp(2)
)/x^2+2*(16/125-16/625*exp(2))/x-2*(1/5*exp(2)+exp(8))*ln(x)+1/2*(16+64/5*
exp(2)+64*exp(8))/x^4+(25-10*exp(2)+exp(4))/(5+x)^2-2*(1-1/5*exp(2))*ln(5+
x)+2*(-3766/125+3766/625*exp(2)-5*exp(8)+exp(10))/(5+x)+2*x*ln(x)-2*x-32/x
^4*ln(x)-8/x^4+ln(x)^2+2*(exp(2)-5)*(-1/5*ln(5+x)+1/5*ln(x)*x/(5+x))
```

3.844.
$$\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+1280x^7+96x^8+200x^9-2e^4x^9+290x^{10}+148x^{11}+30x^{12}+2x^{13}+e^2(-3200x^4-}{}$$

3.844.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 230 vs. 2(26) = 52.

Time = 0.28 (sec) , antiderivative size = 230, normalized size of antiderivative = 7.93

$$\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+1280x^7+96x^8+200x^9-2e^4x}{}$$

$$= \frac{x^{12}+8x^{11}+5x^{10}-110x^9+x^8e^4-275x^8-32x^7-288x^6-640x^5+(x^{10}+10x^9+25x^8)\log(x)^2+}{}$$

input
```
integrate((((2*x^10+10*x^9)*exp(2)+2*x^12+32*x^11+170*x^10+350*x^9+250*x^8
+128*x^7+1920*x^6+9600*x^5+16000*x^4)*log(x)+((-2*x^10-10*x^9)*exp(2)-2*x^
12-32*x^11-170*x^10-350*x^9-250*x^8-128*x^7-1920*x^6-9600*x^5-16000*x^4)*e
xp(4)^2-2*x^9*exp(2)^2+(-14*x^10-60*x^9-50*x^8-160*x^6-1440*x^5-3200*x^4)*
exp(2)+2*x^13+30*x^12+148*x^11+290*x^10+200*x^9+96*x^8+1280*x^7+5600*x^6+7
200*x^5-4000*x^4-2048*x^3-30720*x^2-153600*x-256000)/(x^12+15*x^11+75*x^10
+125*x^9),x, algorithm=\
```

output
```
(x^12 + 8*x^11 + 5*x^10 - 110*x^9 + x^8*e^4 - 275*x^8 - 32*x^7 - 288*x^6 -
 640*x^5 + (x^10 + 10*x^9 + 25*x^8)*log(x)^2 + 256*x^2 + 2*(x^9 + 5*x^8)*e
^10 - 2*(x^11 + 10*x^10 + 30*x^9 + 25*x^8 - 16*x^6 - 160*x^5 - 400*x^4)*e^
8 + 2*(6*x^9 + 25*x^8 + 16*x^5 + 80*x^4)*e^2 + 2*(x^11 + 9*x^10 + 20*x^9 -
 16*x^6 - 160*x^5 - 400*x^4 - (x^10 + 10*x^9 + 25*x^8)*e^8 - (x^9 + 5*x^8)
*e^2)*log(x) + 2560*x + 6400)/(x^10 + 10*x^9 + 25*x^8)
```

3.844.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 180 vs. 2(22) = 44.

Time = 29.00 (sec) , antiderivative size = 180, normalized size of antiderivative = 6.21

$$\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+1280x^7+96x^8+200x^9-2e^4x}{}$$

$$= x^2+x(-2e^8-2)+\log(x)^2-2\cdot(1+e^8)\log(x)$$
$$+\frac{x^9(-10e^8-60+12e^2+2e^{10})+x^8(-50e^8-275+e^4+50e^2+10e^{10})-32x^7+x^6(-288+32e^8)+x^5}{x^{10}+10x^9+25x^8}$$
$$+\frac{(2x^6+10x^5-2x^4e^2+10x^4-32x-160)\log(x)}{x^5+5x^4}$$

input
```
integrate((((2*x**10+10*x**9)*exp(2)+2*x**12+32*x**11+170*x**10+350*x**9+2
50*x**8+128*x**7+1920*x**6+9600*x**5+16000*x**4)*ln(x)+((-2*x**10-10*x**9)
*exp(2)-2*x**12-32*x**11-170*x**10-350*x**9-250*x**8-128*x**7-1920*x**6-96
00*x**5-16000*x**4)*exp(4)**2-2*x**9*exp(2)**2+(-14*x**10-60*x**9-50*x**8-
160*x**6-1440*x**5-3200*x**4)*exp(2)+2*x**13+30*x**12+148*x**11+290*x**10+
200*x**9+96*x**8+1280*x**7+5600*x**6+7200*x**5-4000*x**4-2048*x**3-30720*x
**2-153600*x-256000)/(x**12+15*x**11+75*x**10+125*x**9),x)
```

output
```
x**2 + x*(-2*exp(8) - 2) + log(x)**2 - 2*(1 + exp(8))*log(x) + (x**9*(-10*
exp(8) - 60 + 12*exp(2) + 2*exp(10)) + x**8*(-50*exp(8) - 275 + exp(4) + 5
0*exp(2) + 10*exp(10)) - 32*x**7 + x**6*(-288 + 32*exp(8)) + x**5*(-640 +
32*exp(2) + 320*exp(8)) + x**4*(160*exp(2) + 800*exp(8)) + 256*x**2 + 2560
*x + 6400)/(x**10 + 10*x**9 + 25*x**8) + (2*x**6 + 10*x**5 - 2*x**4*exp(2)
 + 10*x**4 - 32*x - 160)*log(x)/(x**5 + 5*x**4)
```

3.844.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1137 vs. $2(26) = 52$.

Time = 0.27 (sec) , antiderivative size = 1137, normalized size of antiderivative = 39.21

$$\int \frac{-256000 - 153600x - 30720x^2 - 2048x^3 - 4000x^4 + 7200x^5 + 5600x^6 + 1280x^7 + 96x^8 + 200x^9 - 2e^4x}{}$$

= Too large to display

input
```
integrate((((2*x^10+10*x^9)*exp(2)+2*x^12+32*x^11+170*x^10+350*x^9+250*x^8
+128*x^7+1920*x^6+9600*x^5+16000*x^4)*log(x)+((-2*x^10-10*x^9)*exp(2)-2*x^
12-32*x^11-170*x^10-350*x^9-250*x^8-128*x^7-1920*x^6-9600*x^5-16000*x^4)*e
xp(4)^2-2*x^9*exp(2)^2+(-14*x^10-60*x^9-50*x^8-160*x^6-1440*x^5-3200*x^4)*
exp(2)+2*x^13+30*x^12+148*x^11+290*x^10+200*x^9+96*x^8+1280*x^7+5600*x^6+7
200*x^5-4000*x^4-2048*x^3-30720*x^2-153600*x-256000)/(x^12+15*x^11+75*x^10
+125*x^9),x, algorithm=\
```

output
```
x^2 - (2*x - 25*(6*x + 25)/(x^2 + 10*x + 25) - 30*log(x + 5))*e^8 - 32/125
*(5*(12*x^5 + 90*x^4 + 100*x^3 - 125*x^2 + 250*x - 625)/(x^6 + 10*x^5 + 25
*x^4) - 12*log(x + 5) + 12*log(x))*e^8 + 64/125*(5*(12*x^4 + 90*x^3 + 100*
x^2 - 125*x + 250)/(x^5 + 10*x^4 + 25*x^3) - 12*log(x + 5) + 12*log(x))*e^
8 - 192/625*(5*(12*x^3 + 90*x^2 + 100*x - 125)/(x^4 + 10*x^3 + 25*x^2) - 1
2*log(x + 5) + 12*log(x))*e^8 + 64/625*(5*(6*x^2 + 45*x + 50)/(x^3 + 10*x^
2 + 25*x) - 6*log(x + 5) + 6*log(x))*e^8 - 16*(5*(4*x + 15)/(x^2 + 10*x +
25) + 2*log(x + 5))*e^8 - (5*(2*x + 15)/(x^2 + 10*x + 25) - 2*log(x + 5) +
 2*log(x))*e^8 - 32/625*(5*(12*x^5 + 90*x^4 + 100*x^3 - 125*x^2 + 250*x -
625)/(x^6 + 10*x^5 + 25*x^4) - 12*log(x + 5) + 12*log(x))*e^2 + 48/625*(5*
(12*x^4 + 90*x^3 + 100*x^2 - 125*x + 250)/(x^5 + 10*x^4 + 25*x^3) - 12*log
(x + 5) + 12*log(x))*e^2 - 16/625*(5*(12*x^3 + 90*x^2 + 100*x - 125)/(x^4
+ 10*x^3 + 25*x^2) - 12*log(x + 5) + 12*log(x))*e^2 - 1/5*(5*(2*x + 15)/(x
^2 + 10*x + 25) - 2*log(x + 5) + 2*log(x))*e^2 - 2/5*(e^2 - 5)*log(x + 5)
+ (2*x + 5)*e^10/(x^2 + 10*x + 25) + 85*(2*x + 5)*e^8/(x^2 + 10*x + 25) +
7*(2*x + 5)*e^2/(x^2 + 10*x + 25) - 256/109375*(504*x^9 + 3780*x^8 + 4200*
x^7 - 5250*x^6 + 10500*x^5 - 26250*x^4 + 75000*x^3 - 234375*x^2 + 781250*x
 - 2734375)/(x^10 + 10*x^9 + 25*x^8) + 3072/546875*(504*x^8 + 3780*x^7 + 4
200*x^6 - 5250*x^5 + 10500*x^4 - 26250*x^3 + 75000*x^2 - 234375*x + 781250
)/(x^9 + 10*x^8 + 25*x^7) - 1024/78125*(168*x^7 + 1260*x^6 + 1400*x^5 -...
```

3.844.8 Giac [F]

$$\int \frac{-256000 - 153600x - 30720x^2 - 2048x^3 - 4000x^4 + 7200x^5 + 5600x^6 + 1280x^7 + 96x^8 + 200x^9 - 2e^4x$$

$$= \int \frac{2\,(x^{13} + 15\,x^{12} + 74\,x^{11} + 145\,x^{10} - x^9e^4 + 100\,x^9 + 48\,x^8 + 640\,x^7 + 2800\,x^6 + 3600\,x^5 - 2000\,x^4 - 1$$

input
```
integrate((((2*x^10+10*x^9)*exp(2)+2*x^12+32*x^11+170*x^10+350*x^9+250*x^8
+128*x^7+1920*x^6+9600*x^5+16000*x^4)*log(x)+((-2*x^10-10*x^9)*exp(2)-2*x^
12-32*x^11-170*x^10-350*x^9-250*x^8-128*x^7-1920*x^6-9600*x^5-16000*x^4)*e
xp(4)^2-2*x^9*exp(2)^2+(-14*x^10-60*x^9-50*x^8-160*x^6-1440*x^5-3200*x^4)*
exp(2)+2*x^13+30*x^12+148*x^11+290*x^10+200*x^9+96*x^8+1280*x^7+5600*x^6+7
200*x^5-4000*x^4-2048*x^3-30720*x^2-153600*x-256000)/(x^12+15*x^11+75*x^10
+125*x^9),x, algorithm=\
```

output
```
integrate(2*(x^13 + 15*x^12 + 74*x^11 + 145*x^10 - x^9*e^4 + 100*x^9 + 48*
x^8 + 640*x^7 + 2800*x^6 + 3600*x^5 - 2000*x^4 - 1024*x^3 - 15360*x^2 - (x
^12 + 16*x^11 + 85*x^10 + 175*x^9 + 125*x^8 + 64*x^7 + 960*x^6 + 4800*x^5
+ 8000*x^4 + (x^10 + 5*x^9)*e^2)*e^8 - (7*x^10 + 30*x^9 + 25*x^8 + 80*x^6
+ 720*x^5 + 1600*x^4)*e^2 + (x^12 + 16*x^11 + 85*x^10 + 175*x^9 + 125*x^8
+ 64*x^7 + 960*x^6 + 4800*x^5 + 8000*x^4 + (x^10 + 5*x^9)*e^2)*log(x) - 76
800*x - 128000)/(x^12 + 15*x^11 + 75*x^10 + 125*x^9), x)
```

3.844.9 Mupad [B] (verification not implemented)

Time = 16.08 (sec) , antiderivative size = 178, normalized size of antiderivative = 6.14

$$\int \frac{-256000-153600x-30720x^2-2048x^3-4000x^4+7200x^5+5600x^6+1280x^7+96x^8+200x^9-2e^4x}{}$$

$$= \ln(x)^2 - \ln(x)\left(2\,e^8 - \frac{5}{3}\right) + \frac{(36\,e^2 - 30\,e^8 + 6\,e^{10} - 180)\,x^9 + (150\,e^2 + 3\,e^4 - 150\,e^8 + 30\,e^{10} - 825)\,x^8 - 96\,x^7 + (96\,e^8 - 864)\,x^6}{3\,x^{10} + 30\,x^9 + 75\,x^8} + x^2 - x\,(2\,e^8 + 2) - \frac{\ln(x)\,\left(-2\,x^6 - \frac{19\,x^5}{3} + \left(2\,e^2 + \frac{25}{3}\right)\,x^4 + 32\,x + 160\right)}{x^5 + 5\,x^4}$$

input
```
int((log(x)*(exp(2)*(10*x^9 + 2*x^10) + 16000*x^4 + 9600*x^5 + 1920*x^6 +
128*x^7 + 250*x^8 + 350*x^9 + 170*x^10 + 32*x^11 + 2*x^12) - 153600*x - ex
p(2)*(3200*x^4 + 1440*x^5 + 160*x^6 + 50*x^8 + 60*x^9 + 14*x^10) - 2*x^9*e
xp(4) - exp(8)*(exp(2)*(10*x^9 + 2*x^10) + 16000*x^4 + 9600*x^5 + 1920*x^6
 + 128*x^7 + 250*x^8 + 350*x^9 + 170*x^10 + 32*x^11 + 2*x^12) - 30720*x^2
- 2048*x^3 - 4000*x^4 + 7200*x^5 + 5600*x^6 + 1280*x^7 + 96*x^8 + 200*x^9
+ 290*x^10 + 148*x^11 + 30*x^12 + 2*x^13 - 256000)/(125*x^9 + 75*x^10 + 15
*x^11 + x^12),x)
```

output
```
log(x)^2 - log(x)*(2*exp(8) - 5/3) + (7680*x + x^4*(480*exp(2) + 2400*exp(
8)) + x^5*(96*exp(2) + 960*exp(8) - 1920) + x^6*(96*exp(8) - 864) + x^8*(1
50*exp(2) + 3*exp(4) - 150*exp(8) + 30*exp(10) - 825) + 768*x^2 - 96*x^7 +
 x^9*(36*exp(2) - 30*exp(8) + 6*exp(10) - 180) + 19200)/(75*x^8 + 30*x^9 +
 3*x^10) + x^2 - x*(2*exp(8) + 2) - (log(x)*(32*x + x^4*(2*exp(2) + 25/3)
- (19*x^5)/3 - 2*x^6 + 160))/(5*x^4 + x^5)
```

3.845 $\int \frac{e^{e^{e^2}(100-2e^x+x)}\left(-5+e^{e^2}(5x-10e^x x)\right)}{e^{2e^{e^2}(100-2e^x+x)}-2e^{e^{e^2}(100-2e^x+x)}x+x^2}\,dx$

3.845.1 Optimal result

Integrand size = 77, antiderivative size = 25

$$\int \frac{e^{e^{e^2}(100-2e^x+x)}\left(-5+e^{e^2}(5x-10e^x x)\right)}{e^{2e^{e^2}(100-2e^x+x)}-2e^{e^{e^2}(100-2e^x+x)}x+x^2}\,dx=\frac{5x}{-e^{e^{e^2}(100-2e^x+x)}+x}$$

output
```
x/(1/5*x-1/5*exp((-2*exp(x)+x+100)*exp(exp(2))))
```

3.845.2 Mathematica [A] (verified)

Time = 0.90 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{e^{e^{e^2}(100-2e^x+x)}\left(-5+e^{e^2}(5x-10e^x x)\right)}{e^{2e^{e^2}(100-2e^x+x)}-2e^{e^{e^2}(100-2e^x+x)}x+x^2}\,dx=-\frac{5x}{e^{e^{e^2}(100-2e^x+x)}-x}$$

input
```
Integrate[(E^(E^E^2*(100 - 2*E^x + x))*(-5 + E^E^2*(5*x - 10*E^x*x)))/(E^(
2*E^E^2*(100 - 2*E^x + x)) - 2*E^(E^E^2*(100 - 2*E^x + x))*x + x^2),x]
```

output
```
(-5*x)/(E^(E^E^2*(100 - 2*E^x + x)) - x)
```

3.845.3 Rubi [A] (verified)

Time = 2.34 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.039$, Rules used = {7292, 7262, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^{e^2}(x-2e^x+100)}\left(e^{e^2}(5x-10e^x x)-5\right)}{x^2-2e^{e^{e^2}(x-2e^x+100)}x+e^{2e^{e^2}(x-2e^x+100)}}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{e^{e^{e^2}(x-2e^x+100)}\left(e^{e^2}(5x-10e^x x)-5\right)}{\left(e^{e^{e^2}(x-2e^x+100)}-x\right)^2}dx$$
$$\Big\downarrow \text{7262}$$
$$5\int \frac{1}{\left(\frac{e^{e^{e^2}(x-2e^x+100)}}{x}-1\right)^2}d\frac{e^{e^{e^2}(x-2e^x+100)}}{x}$$
$$\Big\downarrow \text{17}$$
$$\frac{5}{1-\frac{e^{e^{e^2}(x-2e^x+100)}}{x}}$$

input
```
Int[(E^(E^E^2*(100 - 2*E^x + x))*(-5 + E^E^2*(5*x - 10*E^x*x)))/(E^(2*E^E^
2*(100 - 2*E^x + x)) - 2*E^(E^E^2*(100 - 2*E^x + x))*x + x^2),x]
```

output
```
5/(1 - E^(E^E^2*(100 - 2*E^x + x))/x)
```

3.845.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 7262
```
Int[(u_)*((a_.)*(v_)^(p_.) + (b_.)*(w_)^(q_.))^(m_.), x_Symbol] :> With[{c
= Simplify[u/(p*w*D[v, x] - q*v*D[w, x])]}, Simp[c*p   Subst[Int[(b + a*x^p
)^m, x], x, v*w^(m*q + 1)], x] /; FreeQ[c, x]] /; FreeQ[{a, b, m, p, q}, x]
 && EqQ[p + q*(m*p + 1), 0] && IntegerQ[p] && IntegerQ[m]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.845.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

method	result	size
parallelrisch	$\frac{5x}{x-{\mathrm e}^{\left(-2\,{\mathrm e}^{x}+x+100\right){\mathrm e}^{{\mathrm e}^{2}}}}$	22
risch	$\frac{5x}{x-{\mathrm e}^{-\left(2\,{\mathrm e}^{x}-x-100\right){\mathrm e}^{{\mathrm e}^{2}}}}$	25
norman	$\frac{5\,{\mathrm e}^{\left(-2\,{\mathrm e}^{x}+x+100\right){\mathrm e}^{{\mathrm e}^{2}}}}{x-{\mathrm e}^{\left(-2\,{\mathrm e}^{x}+x+100\right){\mathrm e}^{{\mathrm e}^{2}}}}$	33

input
```
int(((-10*exp(x)*x+5*x)*exp(exp(2))-5)*exp((-2*exp(x)+x+100)*exp(exp(2)))/
(exp((-2*exp(x)+x+100)*exp(exp(2)))^2-2*x*exp((-2*exp(x)+x+100)*exp(exp(2)
))+x^2),x,method=_RETURNVERBOSE)
```

output
```
5*x/(x-exp((-2*exp(x)+x+100)*exp(exp(2))))
```

3.845.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{e^{e^{e^2}(100-2e^x+x)}\left(-5+e^{e^2}(5x-10e^x x)\right)}{e^{2e^{e^2}(100-2e^x+x)}-2e^{e^{e^2}(100-2e^x+x)}x+x^2}\,dx=\frac{5\,x}{x-e^{\left((x-2\,e^x+100)e^{\left(e^2\right)}\right)}}$$

input
```
integrate(((-10*exp(x)*x+5*x)*exp(exp(2))-5)*exp((-2*exp(x)+x+100)*exp(exp
(2)))/(exp((-2*exp(x)+x+100)*exp(exp(2)))^2-2*x*exp((-2*exp(x)+x+100)*exp(
exp(2)))+x^2),x, algorithm=\
```

output
```
5*x/(x - e^((x - 2*e^x + 100)*e^(e^2)))
```

3.845.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{e^{e^{e^2}(100-2e^x+x)}\left(-5+e^{e^2}(5x-10e^x x)\right)}{e^{2e^{e^2}(100-2e^x+x)}-2e^{e^{e^2}(100-2e^x+x)}x+x^2}\,dx=-\frac{5x}{-x+e^{(x-2e^x+100)e^{e^2}}}$$

input
```
integrate(((-10*exp(x)*x+5*x)*exp(exp(2))-5)*exp((-2*exp(x)+x+100)*exp(exp
(2)))/(exp((-2*exp(x)+x+100)*exp(exp(2)))**2-2*x*exp((-2*exp(x)+x+100)*exp
(exp(2)))+x**2),x)
```

output
```
-5*x/(-x + exp((x - 2*exp(x) + 100)*exp(exp(2))))
```

3.845.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.64

$$\int \frac{e^{e^{e^2}(100-2e^x+x)}\left(-5+e^{e^2}(5x-10e^x x)\right)}{e^{2e^{e^2}(100-2e^x+x)}-2e^{e^{e^2}(100-2e^x+x)}x+x^2}\,dx=\frac{5\,e^{\left(xe^{\left(e^2\right)}+100\,e^{\left(e^2\right)}\right)}}{xe^{\left(2\,e^{\left(x+e^2\right)}\right)}-e^{\left(xe^{\left(e^2\right)}+100\,e^{\left(e^2\right)}\right)}}$$

input
```
integrate(((-10*exp(x)*x+5*x)*exp(exp(2))-5)*exp((-2*exp(x)+x+100)*exp(exp
(2)))/(exp((-2*exp(x)+x+100)*exp(exp(2))))^2-2*x*exp((-2*exp(x)+x+100)*exp(
exp(2)))+x^2),x, algorithm=\
```

output
```
5*e^(x*e^(e^2) + 100*e^(e^2))/(x*e^(2*e^(x + e^2)) - e^(x*e^(e^2) + 100*e^
(e^2)))
```

3.845.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 149 vs. $2(21) = 42$.

Time = 0.33 (sec) , antiderivative size = 149, normalized size of antiderivative = 5.96

$$\int \frac{e^{e^{e^2}(100-2e^x+x)}\left(-5+e^{e^2}(5x-10e^x x)\right)}{e^{2e^{e^2}(100-2e^x+x)}-2e^{e^{e^2}(100-2e^x+x)}x+x^2}\,dx$$
$$= \frac{5\left(2\,x^2 e^{\left(x+e^2+100\,e^{\left(e^2\right)}\right)}-x^2 e^{\left(e^2+100\,e^{\left(e^2\right)}\right)}+x e^{\left(100\,e^{\left(e^2\right)}\right)}\right)}{2\,x^2 e^{\left(x+e^2+100\,e^{\left(e^2\right)}\right)}-x^2 e^{\left(e^2+100\,e^{\left(e^2\right)}\right)}-2\,x e^{\left(x e^{\left(e^2\right)}+x+e^2-2\,e^{\left(x+e^2\right)}+200\,e^{\left(e^2\right)}\right)}+x e^{\left(x e^{\left(e^2\right)}+e^2-2\,e^{\left(x+e^2\right)}+200\,e^{\left(e\right.}\right.}}$$

input
```
integrate(((-10*exp(x)*x+5*x)*exp(exp(2))-5)*exp((-2*exp(x)+x+100)*exp(exp
(2)))/(exp((-2*exp(x)+x+100)*exp(exp(2)))^2-2*x*exp((-2*exp(x)+x+100)*exp(
exp(2)))+x^2),x, algorithm=\
```

output
```
5*(2*x^2*e^(x + e^2 + 100*e^(e^2)) - x^2*e^(e^2 + 100*e^(e^2)) + x*e^(100*
e^(e^2)))/(2*x^2*e^(x + e^2 + 100*e^(e^2)) - x^2*e^(e^2 + 100*e^(e^2)) - 2
*x*e^(x*e^(e^2) + x + e^2 - 2*e^(x + e^2) + 200*e^(e^2)) + x*e^(x*e^(e^2)
+ e^2 - 2*e^(x + e^2) + 200*e^(e^2)) + x*e^(100*e^(e^2)) - e^(x*e^(e^2) -
2*e^(x + e^2) + 200*e^(e^2)))
```

3.845.9 Mupad [B] (verification not implemented)

Time = 15.14 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{e^{e^{e^2}(100-2e^x+x)}\left(-5+e^{e^2}(5x-10e^x x)\right)}{e^{2e^{e^2}(100-2e^x+x)}-2e^{e^{e^2}(100-2e^x+x)}x+x^2}\,dx = \frac{5\,x}{x-\mathrm{e}^{x\,\mathrm{e}^{\mathrm{e}^2}}\,\mathrm{e}^{-2\,\mathrm{e}^{\mathrm{e}^2}\,\mathrm{e}^x}\,\mathrm{e}^{100\,\mathrm{e}^{\mathrm{e}^2}}}$$

input
```
int((exp(exp(exp(2))*(x - 2*exp(x) + 100))*(exp(exp(2))*(5*x - 10*x*exp(x)
) - 5))/(exp(2*exp(exp(2))*(x - 2*exp(x) + 100)) - 2*x*exp(exp(exp(2))*(x
- 2*exp(x) + 100)) + x^2),x)
```

output
```
(5*x)/(x - exp(x*exp(exp(2)))*exp(-2*exp(exp(2))*exp(x))*exp(100*exp(exp(2
))))
```

3.846 $\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+4\right.\right.}{}}\right.}{}$

3.846.1 Optimal result

Integrand size = 362, antiderivative size = 30

$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-\right.}{}$$

$$=\left(1+3e^{5-\left(4+e^x+\frac{5}{x}\right)^2x\log^2(x)}+x\right)^2$$

output
```
(1+x+3/exp(ln(x)^2*(5/x+exp(x)+4)^2*x-5))^2
```

3.846.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 61 vs. 2(30) = 60.

Time = 0.62 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.03

$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-\right.}{}$$

$$=9e^{10-\frac{2(5+(4+e^x)x)^2\log^2(x)}{x}}+6e^{5-\frac{(5+(4+e^x)x)^2\log^2(x)}{x}}(1+x)+x(2+x)$$

3.846.
$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-1440x-576x\right.}{}$$

input
```
Integrate[(E^((2*(-5*x + (25 + 40*x + 16*x^2 + E^(2*x)*x^2 + E^x*(10*x + 8
*x^2))*Log[x]^2))/x)*(2*x^2 + 2*x^3) + (-900 - 1440*x - 576*x^2 - 36*E^(2*
x)*x^2 + E^x*(-360*x - 288*x^2))*Log[x] + (450 - 288*x^2 + E^x*(-324*x^2 -
 144*x^3) + E^(2*x)*(-18*x^2 - 36*x^3))*Log[x]^2 + E^((-5*x + (25 + 40*x +
 16*x^2 + E^(2*x)*x^2 + E^x*(10*x + 8*x^2))*Log[x]^2)/x)*(6*x^2 + (-300 -
780*x - 672*x^2 - 192*x^3 + E^x*(-120*x - 216*x^2 - 96*x^3) + E^(2*x)*(-12
*x^2 - 12*x^3))*Log[x] + (150 + 150*x - 96*x^2 - 96*x^3 + E^x*(-108*x^2 -
156*x^3 - 48*x^4) + E^(2*x)*(-6*x^2 - 18*x^3 - 12*x^4))*Log[x]^2))/(E^((2*
(-5*x + (25 + 40*x + 16*x^2 + E^(2*x)*x^2 + E^x*(10*x + 8*x^2))*Log[x]^2))
/x)*x^2),x]
```

output
```
9*E^(10 - (2*(5 + (4 + E^x)*x)^2*Log[x]^2)/x) + 6*E^(5 - ((5 + (4 + E^x)*x
)^2*Log[x]^2)/x)*(1 + x) + x*(2 + x)
```

3.846.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\exp\left(-\frac{2((e^{2x}x^2+16x^2+e^x(8x^2+10x)+40x+25)\log^2(x)-5x)}{x}\right)\left((2x^3+2x^2)\exp\left(\frac{2((e^{2x}x^2+16x^2+e^x(8x^2+10x)+40x+25)\log^2(x)}{x}\right.\right.}{}$$

$\Big\downarrow$ 7239

$$\int \frac{2e^{-\frac{2((e^x+4)x+5)^2\log^2(x)}{x}}\left((x+1)e^{\frac{((e^x+4)x+5)^2\log^2(x)}{x}}+3e^5\right)\left(x^2e^{\frac{((e^x+4)x+5)^2\log^2(x)}{x}}-3e^5\left(2e^x(e^x+4)x^3+(18e^x+e\right.\right.}{x^2}$$

$\Big\downarrow$ 27

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2+3e^5\left(-2e^x(4+e^x)x^3-(16+1\right.\right.}{x^2}$$

$\Big\downarrow$ 7293

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$\Big\downarrow$ 7239

$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-1440x-576x\right.}{}$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

$\Big\downarrow$ 7293

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$\Big\downarrow$ 7239

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

$\Big\downarrow$ 7293

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$\Big\downarrow$ 7239

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

$\Big\downarrow$ 7293

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$\Big\downarrow$ 7239

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

$\Big\downarrow$ 7293

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

3.846.

$$\int e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-1440x-576x\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

$$2\int\left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

$$2\int\left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

$$2\int\left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

3.846.

$$\int e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-1440x-576x\right.$$

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^x x+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^x x+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$$\Big\downarrow \; 7239$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18\right.\right.}{x^2}$$

$$\Big\downarrow \; 7293$$

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^x x+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^x x+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$$\Big\downarrow \; 7239$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18\right.\right.}{x^2}$$

$$\Big\downarrow \; 7293$$

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^x x+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^x x+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$$\Big\downarrow \; 7239$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18\right.\right.}{x^2}$$

$$\Big\downarrow \; 7293$$

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^x x+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^x x+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$$\Big\downarrow \; 7239$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18\right.\right.}{x^2}$$

3.846.

$$\int e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(2x^2+2x^3\right)+\left(-900-1440x-576x\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(x+1-\frac{9e^{10-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}(e^xx+4x+5)\log(x)\left(2e^x\log(x)x^2+2e^xx+e^x\log(x)x+4\log(x)x+8x-\right.}{x^2}\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \frac{e^{-\frac{2((4+e^x)x+5)^2\log^2(x)}{x}}\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}(x+1)+3e^5\right)\left(e^{\frac{((4+e^x)x+5)^2\log^2(x)}{x}}x^2-3e^5\left(2e^x(4+e^x)x^3+(16+18e\right.\right.}{x^2}$$

input
```
Int[(E^((2*(-5*x + (25 + 40*x + 16*x^2 + E^(2*x)*x^2 + E^x*(10*x + 8*x^2))
*Log[x]^2))/x)*(2*x^2 + 2*x^3) + (-900 - 1440*x - 576*x^2 - 36*E^(2*x)*x^2
 + E^x*(-360*x - 288*x^2))*Log[x] + (450 - 288*x^2 + E^x*(-324*x^2 - 144*x
^3) + E^(2*x)*(-18*x^2 - 36*x^3))*Log[x]^2 + E^((-5*x + (25 + 40*x + 16*x^
2 + E^(2*x)*x^2 + E^x*(10*x + 8*x^2))*Log[x]^2)/x)*(6*x^2 + (-300 - 780*x
- 672*x^2 - 192*x^3 + E^x*(-120*x - 216*x^2 - 96*x^3) + E^(2*x)*(-12*x^2 -
 12*x^3))*Log[x] + (150 + 150*x - 96*x^2 - 96*x^3 + E^x*(-108*x^2 - 156*x^
3 - 48*x^4) + E^(2*x)*(-6*x^2 - 18*x^3 - 12*x^4))*Log[x]^2))/(E^((2*(-5*x
+ (25 + 40*x + 16*x^2 + E^(2*x)*x^2 + E^x*(10*x + 8*x^2))*Log[x]^2))/x)*x^
2),x]
```

output
```
$Aborted
```

3.846.

$$\int e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-1440x-576x\right.$$

3.846.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.846.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 143 vs. $2(29) = 58$.

Time = 2.90 (sec) , antiderivative size = 144, normalized size of antiderivative = 4.80

method	result
risch	$x^2+2x+(6+6x)\,e^{-\frac{8x^2 e^x \ln(x)^2+e^{2x}\ln(x)^2 x^2+10x\,e^x \ln(x)^2+16x^2\ln(x)^2+40x\ln(x)^2+25\ln(x)^2-5x}{x}}+9\,e^{-\frac{2\left(8x^2 e^x \ln(x\right.}{}}$
parallelrisch	$\left(e^{\frac{2\left(e^{2x}x^2+\left(8x^2+10x\right)e^x+16x^2+40x+25\right)\ln(x)^2-10x}{x}}x^3+2x^2e^{\frac{2\left(e^{2x}x^2+\left(8x^2+10x\right)e^x+16x^2+40x+25\right)\ln(x)^2-10x}{x}}+6\,e^{\frac{\left(e^{2x}x^2+\left(8\right.\right.}{}}\right.$

input
```
int(((2*x^3+2*x^2)*exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*x+25)*
ln(x)^2-5*x)/x)^2+(((-12*x^4-18*x^3-6*x^2)*exp(x)^2+(-48*x^4-156*x^3-108*x
^2)*exp(x)-96*x^3-96*x^2+150*x+150)*ln(x)^2+((-12*x^3-12*x^2)*exp(x)^2+(-9
6*x^3-216*x^2-120*x)*exp(x)-192*x^3-672*x^2-780*x-300)*ln(x)+6*x^2)*exp(((
exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*x+25)*ln(x)^2-5*x)/x)+((-36*x^3
-18*x^2)*exp(x)^2+(-144*x^3-324*x^2)*exp(x)-288*x^2+450)*ln(x)^2+(-36*exp(
x)^2*x^2+(-288*x^2-360*x)*exp(x)-576*x^2-1440*x-900)*ln(x))/x^2/exp(((exp(
x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*x+25)*ln(x)^2-5*x)/x)^2,x,method=_R
ETURNVERBOSE)
```

output
```
x^2+2*x+(6+6*x)*exp(-(8*x^2*exp(x)*ln(x)^2+exp(2*x)*ln(x)^2*x^2+10*x*exp(x
)*ln(x)^2+16*x^2*ln(x)^2+40*x*ln(x)^2+25*ln(x)^2-5*x)/x)+9*exp(-2*(8*x^2*e
xp(x)*ln(x)^2+exp(2*x)*ln(x)^2*x^2+10*x*exp(x)*ln(x)^2+16*x^2*ln(x)^2+40*x
*ln(x)^2+25*ln(x)^2-5*x)/x)
```


$e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(2x^2+2x^3\right)+\left(-900-1440x-576x\right.\right.$

3.846.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 153 vs. $2(28) = 56$.

Time = 0.26 (sec) , antiderivative size = 153, normalized size of antiderivative = 5.10

$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-\right.}{}$$

$$=\left((x^2+2\,x)e^{\left(\frac{2\,\left(\left(x^2e^{(2\,x)}+16\,x^2+2\,\left(4\,x^2+5\,x\right)e^x+40\,x+25\right)\log(x)^2-5\,x\right)}{x}\right)}+6\,(x+1)e^{\left(\frac{\left(x^2e^{(2\,x)}+16\,x^2+2\,\left(4\,x^2+5\,x\right)e^x+40\,x+25\right)\log(x)^2}{x}\right.}\right.$$

input
```
integrate(((2*x^3+2*x^2)*exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*
x+25)*log(x)^2-5*x)/x)^2+(((-12*x^4-18*x^3-6*x^2)*exp(x)^2+(-48*x^4-156*x^
3-108*x^2)*exp(x)-96*x^3-96*x^2+150*x+150)*log(x)^2+((-12*x^3-12*x^2)*exp(
x)^2+(-96*x^3-216*x^2-120*x)*exp(x)-192*x^3-672*x^2-780*x-300)*log(x)+6*x^
2)*exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*x+25)*log(x)^2-5*x)/x)
+((-36*x^3-18*x^2)*exp(x)^2+(-144*x^3-324*x^2)*exp(x)-288*x^2+450)*log(x)^
2+(-36*exp(x)^2*x^2+(-288*x^2-360*x)*exp(x)-576*x^2-1440*x-900)*log(x))/x^
2/exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*x+25)*log(x)^2-5*x)/x)^
2,x, algorithm=\
```

output
```
((x^2 + 2*x)*e^(2*((x^2*e^(2*x) + 16*x^2 + 2*(4*x^2 + 5*x)*e^x + 40*x + 25
)*log(x)^2 - 5*x)/x) + 6*(x + 1)*e^(((x^2*e^(2*x) + 16*x^2 + 2*(4*x^2 + 5*
x)*e^x + 40*x + 25)*log(x)^2 - 5*x)/x) + 9)*e^(-2*((x^2*e^(2*x) + 16*x^2 +
 2*(4*x^2 + 5*x)*e^x + 40*x + 25)*log(x)^2 - 5*x)/x)
```

3.846.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 99 vs. $2(26) = 52$.

Time = 81.65 (sec) , antiderivative size = 99, normalized size of antiderivative = 3.30

$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-\right.}{}$$

$$=x^2+2x+(6x+6)\,e^{-\frac{-5x+\left(x^2e^{2x}+16x^2+40x+\left(8x^2+10x\right)e^x+25\right)\log(x)^2}{x}}+9e^{-\frac{2\left(-5x+\left(x^2e^{2x}+16x^2+40x+\left(8x^2+10x\right)e^x+25\right)\log(x)^2\right)}{x}}$$

3.846.

$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-1440x-576x\right.}{}$$

input
```
integrate(((2*x**3+2*x**2)*exp(((exp(x)**2*x**2+(8*x**2+10*x)*exp(x)+16*x*
*2+40*x+25)*ln(x)**2-5*x)/x)**2+(((-12*x**4-18*x**3-6*x**2)*exp(x)**2+(-48
*x**4-156*x**3-108*x**2)*exp(x)-96*x**3-96*x**2+150*x+150)*ln(x)**2+((-12*
x**3-12*x**2)*exp(x)**2+(-96*x**3-216*x**2-120*x)*exp(x)-192*x**3-672*x**2
-780*x-300)*ln(x)+6*x**2)*exp(((exp(x)**2*x**2+(8*x**2+10*x)*exp(x)+16*x**
2+40*x+25)*ln(x)**2-5*x)/x)+((-36*x**3-18*x**2)*exp(x)**2+(-144*x**3-324*x
**2)*exp(x)-288*x**2+450)*ln(x)**2+(-36*exp(x)**2*x**2+(-288*x**2-360*x)*e
xp(x)-576*x**2-1440*x-900)*ln(x))/x**2/exp(((exp(x)**2*x**2+(8*x**2+10*x)*
exp(x)+16*x**2+40*x+25)*ln(x)**2-5*x)/x)**2,x)
```

output
```
x**2 + 2*x + (6*x + 6)*exp(-(-5*x + (x**2*exp(2*x) + 16*x**2 + 40*x + (8*x
**2 + 10*x)*exp(x) + 25)*log(x)**2)/x) + 9*exp(-2*(-5*x + (x**2*exp(2*x) +
 16*x**2 + 40*x + (8*x**2 + 10*x)*exp(x) + 25)*log(x)**2)/x)
```

3.846.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 128 vs. $2(28) = 56$.

Time = 0.40 (sec) , antiderivative size = 128, normalized size of antiderivative = 4.27

$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(2x^2+2x^3\right)+\left(-900-\right.\right.}{}$$

$$= x^2 + 3\left(2\left(xe^5+e^5\right)e^{\left(-xe^{(2x)}\log(x)^2+8xe^x\log(x)^2+16x\log(x)^2+10e^x\log(x)^2+40\log(x)^2+\frac{25\log(x)^2}{x}\right)}+3e^{\left(-2xe^{(2x)}\log(x)^2+10\right.}\right. + 2x$$

input
```
integrate(((2*x^3+2*x^2)*exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*
x+25)*log(x)^2-5*x)/x)^2+(((-12*x^4-18*x^3-6*x^2)*exp(x)^2+(-48*x^4-156*x^
3-108*x^2)*exp(x)-96*x^3-96*x^2+150*x+150)*log(x)^2+((-12*x^3-12*x^2)*exp(
x)^2+(-96*x^3-216*x^2-120*x)*exp(x)-192*x^3-672*x^2-780*x-300)*log(x)+6*x^
2)*exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*x+25)*log(x)^2-5*x)/x)
+((-36*x^3-18*x^2)*exp(x)^2+(-144*x^3-324*x^2)*exp(x)-288*x^2+450)*log(x)^
2+(-36*exp(x)^2*x^2+(-288*x^2-360*x)*exp(x)-576*x^2-1440*x-900)*log(x))/x^
2/exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*x+25)*log(x)^2-5*x)/x)^
2,x, algorithm=\
```

3.846.

$$e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(2x^2+2x^3\right)+\left(-900-1440x-576x\right.\right.$$

output
```
x^2 + 3*(2*(x*e^5 + e^5)*e^(-x*e^(2*x)*log(x)^2 + 8*x*e^x*log(x)^2 + 16*x*
log(x)^2 + 10*e^x*log(x)^2 + 40*log(x)^2 + 25*log(x)^2/x) + 3*e^(-2*x*e^(2
*x)*log(x)^2 + 10))*e^(-16*x*e^x*log(x)^2 - 32*x*log(x)^2 - 20*e^x*log(x)^
2 - 80*log(x)^2 - 50*log(x)^2/x) + 2*x
```

3.846.8 Giac [F]

$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-\right.}{}$$

$$=\int -\frac{2\left(9\left(16x^2+(2x^3+x^2)e^{(2x)}+2(4x^3+9x^2)e^x-25\right)\log(x)^2-(x^3+x^2)e^{\left(\frac{2\left(\left(x^2e^{(2x)}+16x^2+2\left(4x^2+5x\right)\right.\right.}{x}\right.}\right.}{}$$

input
```
integrate(((2*x^3+2*x^2)*exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*
x+25)*log(x)^2-5*x)/x)^2+(((-12*x^4-18*x^3-6*x^2)*exp(x)^2+(-48*x^4-156*x^
3-108*x^2)*exp(x)-96*x^3-96*x^2+150*x+150)*log(x)^2+((-12*x^3-12*x^2)*exp(
x)^2+(-96*x^3-216*x^2-120*x)*exp(x)-192*x^3-672*x^2-780*x-300)*log(x)+6*x^
2)*exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*x+25)*log(x)^2-5*x)/x)
+((-36*x^3-18*x^2)*exp(x)^2+(-144*x^3-324*x^2)*exp(x)-288*x^2+450)*log(x)^
2+(-36*exp(x)^2*x^2+(-288*x^2-360*x)*exp(x)-576*x^2-1440*x-900)*log(x))/x^
2/exp(((exp(x)^2*x^2+(8*x^2+10*x)*exp(x)+16*x^2+40*x+25)*log(x)^2-5*x)/x)^
2,x, algorithm=\
```

output
```
integrate(-2*(9*(16*x^2 + (2*x^3 + x^2)*e^(2*x) + 2*(4*x^3 + 9*x^2)*e^x -
25)*log(x)^2 - (x^3 + x^2)*e^(2*((x^2*e^(2*x) + 16*x^2 + 2*(4*x^2 + 5*x)*e
^x + 40*x + 25)*log(x)^2 - 5*x)/x) + 3*((16*x^3 + 16*x^2 + (2*x^4 + 3*x^3
+ x^2)*e^(2*x) + 2*(4*x^4 + 13*x^3 + 9*x^2)*e^x - 25*x - 25)*log(x)^2 - x^
2 + 2*(16*x^3 + 56*x^2 + (x^3 + x^2)*e^(2*x) + 2*(4*x^3 + 9*x^2 + 5*x)*e^x
 + 65*x + 25)*log(x))*e^(((x^2*e^(2*x) + 16*x^2 + 2*(4*x^2 + 5*x)*e^x + 40
*x + 25)*log(x)^2 - 5*x)/x) + 18*(x^2*e^(2*x) + 16*x^2 + 2*(4*x^2 + 5*x)*e
^x + 40*x + 25)*log(x))*e^(-2*((x^2*e^(2*x) + 16*x^2 + 2*(4*x^2 + 5*x)*e^x
 + 40*x + 25)*log(x)^2 - 5*x)/x)/x^2, x)
```


$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-1440x-576x\right.}{}$$

3.846.9 Mupad [B] (verification not implemented)

Time = 15.14 (sec) , antiderivative size = 121, normalized size of antiderivative = 4.03

$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-\right.}{}$$

$$= 2\,x + 9\,\mathrm{e}^{10-80\ln(x)^2-\frac{50\ln(x)^2}{x}-20\,\mathrm{e}^x\ln(x)^2-2\,x\,\mathrm{e}^{2\,x}\ln(x)^2-16\,x\,\mathrm{e}^x\ln(x)^2-32\,x\ln(x)^2} + \mathrm{e}^{5-40\ln(x)^2-\frac{25\ln(x)^2}{x}-10\,\mathrm{e}^x\ln(x)^2-x\,\mathrm{e}^{2\,x}\ln(x)^2-8\,x\,\mathrm{e}^x\ln(x)^2-16\,x\ln(x)^2}\,(6\,x+6) + x^2$$

input
```
int(-(exp((2*(5*x - log(x)^2*(40*x + x^2*exp(2*x) + exp(x)*(10*x + 8*x^2)
+ 16*x^2 + 25)))/x)*(exp(-(5*x - log(x)^2*(40*x + x^2*exp(2*x) + exp(x)*(1
0*x + 8*x^2) + 16*x^2 + 25))/x)*(log(x)^2*(exp(x)*(108*x^2 + 156*x^3 + 48*
x^4) - 150*x + exp(2*x)*(6*x^2 + 18*x^3 + 12*x^4) + 96*x^2 + 96*x^3 - 150)
 + log(x)*(780*x + exp(2*x)*(12*x^2 + 12*x^3) + 672*x^2 + 192*x^3 + exp(x)
*(120*x + 216*x^2 + 96*x^3) + 300) - 6*x^2) - exp(-(2*(5*x - log(x)^2*(40*
x + x^2*exp(2*x) + exp(x)*(10*x + 8*x^2) + 16*x^2 + 25)))/x)*(2*x^2 + 2*x^
3) + log(x)^2*(exp(x)*(324*x^2 + 144*x^3) + exp(2*x)*(18*x^2 + 36*x^3) + 2
88*x^2 - 450) + log(x)*(1440*x + 36*x^2*exp(2*x) + exp(x)*(360*x + 288*x^2
) + 576*x^2 + 900)))/x^2,x)
```

output
```
2*x + 9*exp(10 - 80*log(x)^2 - (50*log(x)^2)/x - 20*exp(x)*log(x)^2 - 2*x*
exp(2*x)*log(x)^2 - 16*x*exp(x)*log(x)^2 - 32*x*log(x)^2) + exp(5 - 40*log
(x)^2 - (25*log(x)^2)/x - 10*exp(x)*log(x)^2 - x*exp(2*x)*log(x)^2 - 8*x*e
xp(x)*log(x)^2 - 16*x*log(x)^2)*(6*x + 6) + x^2
```


$$\int \frac{e^{-\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}\left(e^{\frac{2\left(-5x+\left(25+40x+16x^2+e^{2x}x^2+e^x\left(10x+8x^2\right)\right)\log^2(x)\right)}{x}}(2x^2+2x^3)+(-900-1440x-576x\right.}{}$$

3.847 $\int \frac{e^x(-20-12x+4x^2)+e^x(12+8x)\log(x)+e^{e^{-x}x}(-e^x+x^2-x^3+(e^x+x-}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(}$

3.847.1 Optimal result

Integrand size = 112, antiderivative size = 32

$$\int \frac{e^x(-20-12x+4x^2)+e^x(12+8x)\log(x)+e^{e^{-x}x}(-e^x+x^2-x^3+(e^x+x-x^2)\log(x))+(4e^x-4e^x\,\mathrm{l}}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(x)}$$
$$=\frac{x\left(5+\frac{1}{4}e^{e^{-x}x}+x-\log(2x^2)\right)}{x+\log(x)}$$

output
```
(x-ln(2*x^2)+1/4*exp(x/exp(x))+5)/(x+ln(x))*x
```

3.847.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.06

$$\int \frac{e^x(-20-12x+4x^2)+e^x(12+8x)\log(x)+e^{e^{-x}x}(-e^x+x^2-x^3+(e^x+x-x^2)\log(x))+(4e^x-4e^x\,\mathrm{l}}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(x)}$$
$$=\frac{x\left(e^{e^{-x}x}+4(5+x)-4\log(2x^2)\right)}{4(x+\log(x))}$$

input
```
Integrate[(E^x*(-20 - 12*x + 4*x^2) + E^x*(12 + 8*x)*Log[x] + E^(x/E^x)*(-
E^x + x^2 - x^3 + (E^x + x - x^2)*Log[x]) + (4*E^x - 4*E^x*Log[x])*Log[2*x
^2])/(4*E^x*x^2 + 8*E^x*x*Log[x] + 4*E^x*Log[x]^2),x]
```

output
```
(x*(E^(x/E^x) + 4*(5 + x) - 4*Log[2*x^2]))/(4*(x + Log[x]))
```

3.847.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(4x^2-12x-20)+(4e^x-4e^x\log(x))\log(2x^2)+e^{e^{-x}x}(-x^3+x^2+(-x^2+x+e^x)\log(x)-e^x)+e^x(8x+}{4e^xx^2+4e^x\log^2(x)+8e^xx\log(x)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{-x}\left(e^x(4x^2-12x-20)+(4e^x-4e^x\log(x))\log(2x^2)+e^{e^{-x}x}(-x^3+x^2+(-x^2+x+e^x)\log(x)-e^x)+e^x\right.}{4(x+\log(x))^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int -\frac{e^{-x}\left(4e^x(-x^2+3x+5)-4e^x(2x+3)\log(x)+e^{e^{-x}x}(x^3-x^2+e^x-(-x^2+x+e^x)\log(x))-4(e^x-e^x\right.}{(x+\log(x))^2}$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{4}\int \frac{e^{-x}\left(4e^x(-x^2+3x+5)-4e^x(2x+3)\log(x)+e^{e^{-x}x}(x^3-x^2+e^x-(-x^2+x+e^x)\log(x))-4(e^x-e^x\right.}{(x+\log(x))^2}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{4}\int \left(\frac{e^{e^{-x}x-x}(x^3+\log(x)x^2-x^2-\log(x)x+e^x-e^x\log(x))}{(x+\log(x))^2}-\frac{4(x^2+2\log(x)x-3x+3\log(x)-\log(x)\log}{(x+\log(x))^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(-4\int \frac{x^2}{(x+\log(x))^2}dx-\int \frac{e^{-e^{-x}(-1+e^x)x}x^2}{x+\log(x)}dx+4\int \frac{\log(2x^2)}{(x+\log(x))^2}dx-4\int \frac{\log(x)\log(2x^2)}{(x+\log(x))^2}dx-20\int \frac{}{(x+}\right.$$

input
```
Int[(E^x*(-20 - 12*x + 4*x^2) + E^x*(12 + 8*x)*Log[x] + E^(x/E^x)*(-E^x +
x^2 - x^3 + (E^x + x - x^2)*Log[x]) + (4*E^x - 4*E^x*Log[x])*Log[2*x^2])/(
4*E^x*x^2 + 8*E^x*x*Log[x] + 4*E^x*Log[x]^2),x]
```

3.847.
$\int \frac{e^x(-20-12x+4x^2)+e^x(12+8x)\log(x)+e^{e^{-x}x}(-e^x+x^2-x^3+(e^x+x-x^2)\log(x))+(4e^x-4e^x\log(x))\log(2x^2)}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(x)}\,dx$

output
```
$Aborted
```

3.847.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.847.4 Maple [A] (verified)

Time = 5.40 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.56

method	result	size
parallelrisch	$-\frac{-240x+48x\ln\left(2x^{2}\right)+48x\ln\left(x\right)-48\ln\left(x\right)\ln\left(\mathrm{e}^{x}\right)-12\,\mathrm{e}^{x\,\mathrm{e}^{-x}}x-48x\ln\left(\mathrm{e}^{x}\right)}{48\left(x+\ln\left(x\right)\right)}$	50
risch	$-2x+\frac{\left(10+i\pi\,\mathrm{csgn}\left(ix\right)^{2}\mathrm{csgn}\left(ix^{2}\right)-2i\pi\,\mathrm{csgn}\left(ix\right)\mathrm{csgn}\left(ix^{2}\right)^{2}+i\pi\,\mathrm{csgn}\left(ix^{2}\right)^{3}-2\ln\left(2\right)+6x\right)x}{2x+2\ln\left(x\right)}+\frac{\mathrm{e}^{x\,\mathrm{e}^{-x}}x}{4x+4\ln\left(x\right)}$	88

input
```
int((((x+exp(x)-x^2)*ln(x)-exp(x)-x^3+x^2)*exp(x/exp(x))+(-4*exp(x)*ln(x)+
4*exp(x))*ln(2*x^2)+(8*x+12)*exp(x)*ln(x)+(4*x^2-12*x-20)*exp(x))/(4*exp(x
)*ln(x)^2+8*x*exp(x)*ln(x)+4*exp(x)*x^2),x,method=_RETURNVERBOSE)
```

output
```
-1/48*(-240*x+48*x*ln(2*x^2)+48*x*ln(x)-48*ln(x)*ln(exp(x))-12*exp(x/exp(x
))*x-48*x*ln(exp(x)))/(x+ln(x))
```

3.847.

$$\int \frac{e^x\left(-20-12x+4x^2\right)+e^x(12+8x)\log(x)+e^{e^{-x}x}\left(-e^x+x^2-x^3+\left(e^x+x-x^2\right)\log(x)\right)+\left(4e^x-4e^x\log(x)\right)\log\left(2x^2\right)}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(x)}\,dx$$

3.847.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.12

$$\int \frac{e^x(-20-12x+4x^2)+e^x(12+8x)\log(x)+e^{e^{-x}x}(-e^x+x^2-x^3+(e^x+x-x^2)\log(x))+(4e^x-4e^x\log(x))\log(2x^2)}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(x)}\,dx$$
$$=\frac{4\,x^2+xe^{\left(xe^{(-x)}\right)}-4\,x\log(2)-8\,x\log(x)+20\,x}{4\,(x+\log(x))}$$

input
```
integrate((((x+exp(x)-x^2)*log(x)-exp(x)-x^3+x^2)*exp(x/exp(x))+(-4*exp(x)
*log(x)+4*exp(x))*log(2*x^2)+(8*x+12)*exp(x)*log(x)+(4*x^2-12*x-20)*exp(x)
)/(4*exp(x)*log(x)^2+8*x*exp(x)*log(x)+4*exp(x)*x^2),x, algorithm=\
```

output
```
1/4*(4*x^2 + x*e^(x*e^(-x)) - 4*x*log(2) - 8*x*log(x) + 20*x)/(x + log(x))
```

3.847.6 Sympy [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.16

$$\int \frac{e^x(-20-12x+4x^2)+e^x(12+8x)\log(x)+e^{e^{-x}x}(-e^x+x^2-x^3+(e^x+x-x^2)\log(x))+(4e^x-4e^x\log(x))\log(2x^2)}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(x)}\,dx$$
$$=-2x+\frac{xe^{xe^{-x}}}{4x+4\log(x)}+\frac{3x^2-x\log(2)+5x}{x+\log(x)}$$

input
```
integrate((((x+exp(x)-x**2)*ln(x)-exp(x)-x**3+x**2)*exp(x/exp(x))+(-4*exp(
x)*ln(x)+4*exp(x))*ln(2*x**2)+(8*x+12)*exp(x)*ln(x)+(4*x**2-12*x-20)*exp(x
))/(4*exp(x)*ln(x)**2+8*x*exp(x)*ln(x)+4*exp(x)*x**2),x)
```

output
```
-2*x + x*exp(x*exp(-x))/(4*x + 4*log(x)) + (3*x**2 - x*log(2) + 5*x)/(x +
log(x))
```

3.847.7 Maxima [F]

$$\int \frac{e^x(-20-12x+4x^2)+e^x(12+8x)\log(x)+e^{e^{-x}x}(-e^x+x^2-x^3+(e^x+x-x^2)\log(x))+(4e^x-4e^x l}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(x)}$$
$$=\int \frac{4\,(2\,x+3)e^x\log(x)-(x^3-x^2+(x^2-x-e^x)\log(x)+e^x)e^{(xe^{(-x)})}+4\,(x^2-3\,x-5)e^x-4\,(e^x\log(x}{4\,(x^2e^x+2\,xe^x\log(x)+e^x\log(x)^2)}$$

input
```
integrate((((x+exp(x)-x^2)*log(x)-exp(x)-x^3+x^2)*exp(x/exp(x))+(-4*exp(x)
*log(x)+4*exp(x))*log(2*x^2)+(8*x+12)*exp(x)*log(x)+(4*x^2-12*x-20)*exp(x)
)/(4*exp(x)*log(x)^2+8*x*exp(x)*log(x)+4*exp(x)*x^2),x, algorithm=\
```

output
```
(x^2 - x*(log(2) - 5) - 2*x*log(x))/(x + log(x)) + 1/4*integrate(-(x^3 - x
^2 - (log(x) - 1)*e^x + (x^2 - x)*log(x))*e^(x*e^(-x) - x)/(x^2 + 2*x*log(
x) + log(x)^2), x)
```

3.847.8 Giac [F]

$$\int \frac{e^x(-20-12x+4x^2)+e^x(12+8x)\log(x)+e^{e^{-x}x}(-e^x+x^2-x^3+(e^x+x-x^2)\log(x))+(4e^x-4e^x l}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(x)}$$
$$=\int \frac{4\,(2\,x+3)e^x\log(x)-(x^3-x^2+(x^2-x-e^x)\log(x)+e^x)e^{(xe^{(-x)})}+4\,(x^2-3\,x-5)e^x-4\,(e^x\log(x}{4\,(x^2e^x+2\,xe^x\log(x)+e^x\log(x)^2)}$$

input
```
integrate((((x+exp(x)-x^2)*log(x)-exp(x)-x^3+x^2)*exp(x/exp(x))+(-4*exp(x)
*log(x)+4*exp(x))*log(2*x^2)+(8*x+12)*exp(x)*log(x)+(4*x^2-12*x-20)*exp(x)
)/(4*exp(x)*log(x)^2+8*x*exp(x)*log(x)+4*exp(x)*x^2),x, algorithm=\
```

output
```
integrate(1/4*(4*(2*x + 3)*e^x*log(x) - (x^3 - x^2 + (x^2 - x - e^x)*log(x
) + e^x)*e^(x*e^(-x)) + 4*(x^2 - 3*x - 5)*e^x - 4*(e^x*log(x) - e^x)*log(2
*x^2))/(x^2*e^x + 2*x*e^x*log(x) + e^x*log(x)^2), x)
```

3.847.9 Mupad [B] (verification not implemented)

Time = 13.94 (sec) , antiderivative size = 105, normalized size of antiderivative = 3.28

$$\int \frac{e^x(-20-12x+4x^2)+e^x(12+8x)\log(x)+e^{e^{-x}x}(-e^x+x^2-x^3+(e^x+x-x^2)\log(x))+(4e^x-4e^x\log(x))\log(2x^2)}{4e^xx^2+8e^xx\log(x)+4e^x\log^2(x)}\,dx$$

$$= 4\,x+\frac{\frac{x\,\left(3\,x-\ln\left(2\,x^2\right)+2\,\ln\left(x\right)-3\,x^2+5\right)}{x+1}-\frac{x\,\ln\left(x\right)\,\left(6\,x-\ln\left(2\,x^2\right)+2\,\ln\left(x\right)+5\right)}{x+1}}{x+\ln\left(x\right)} + \frac{\ln\left(2\,x^2\right)-2\,\ln\left(x\right)+1}{x+1}+\frac{x\,{\mathrm{e}}^{x\,{\mathrm{e}}^{-x}}}{4\,\left(x+\ln\left(x\right)\right)}$$

input
```
int(-(exp(x*exp(-x))*(exp(x) - log(x)*(x + exp(x) - x^2) - x^2 + x^3) + ex
p(x)*(12*x - 4*x^2 + 20) - log(2*x^2)*(4*exp(x) - 4*exp(x)*log(x)) - exp(x
)*log(x)*(8*x + 12))/(4*x^2*exp(x) + 4*exp(x)*log(x)^2 + 8*x*exp(x)*log(x)
),x)
```

output
```
4*x + ((x*(3*x - log(2*x^2) + 2*log(x) - 3*x^2 + 5))/(x + 1) - (x*log(x)*(
6*x - log(2*x^2) + 2*log(x) + 5))/(x + 1))/(x + log(x)) + (log(2*x^2) - 2*
log(x) + 1)/(x + 1) + (x*exp(x*exp(-x)))/(4*(x + log(x)))
```

3.848 $\int -\frac{60}{-21+20e^4-15x}\,dx$

3.848.1 Optimal result

Integrand size = 14, antiderivative size = 20

$$\int -\frac{60}{-21+20e^4-15x}\,dx=4\log\left(-1+e^4+\frac{1}{4}\left(-\frac{1}{5}+x\right)-x\right)$$

output
```
4*ln(-3/4*x-21/20+exp(4))
```

3.848.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int -\frac{60}{-21+20e^4-15x}\,dx=4\log\left(21-20e^4+15x\right)$$

input
```
Integrate[-60/(-21 + 20*E^4 - 15*x),x]
```

output
```
4*Log[21 - 20*E^4 + 15*x]
```

3.848.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {16}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{60}{-15x+20e^4-21}\,dx$$

$$\Big\downarrow \ 16$$

$$4\log\left(15x-20e^4+21\right)$$

input
```
Int[-60/(-21 + 20*E^4 - 15*x),x]
```

output
```
4*Log[21 - 20*E^4 + 15*x]
```

3.848.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

3.848.4 Maple [A] (verified)

Time = 0.67 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.55

method	result	size
parallelrisch	$4\ln\left(-\frac{4\,e^{4}}{3}+x+\frac{7}{5}\right)$	11
default	$4\ln\left(20\,e^{4}-15x-21\right)$	13
norman	$4\ln\left(20\,e^{4}-15x-21\right)$	13
risch	$4\ln\left(-20\,e^{4}+15x+21\right)$	13
meijerg	$-\frac{60\left(-\frac{4\,e^{4}}{3}+\frac{7}{5}\right)\ln\left(1-\frac{15x}{20\,e^{4}-21}\right)}{20\,e^{4}-21}$	31

input
```
int(-60/(20*exp(4)-15*x-21),x,method=_RETURNVERBOSE)
```

output
```
4*ln(-4/3*exp(4)+x+7/5)
```

3.848.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int -\frac{60}{-21+20e^4-15x}\,dx = 4\,\log\left(15\,x-20\,e^4+21\right)$$

input
```
integrate(-60/(20*exp(4)-15*x-21),x, algorithm=\
```

output
```
4*log(15*x - 20*e^4 + 21)
```

3.848.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int -\frac{60}{-21+20e^4-15x}\,dx = 4\log\left(15x-20e^4+21\right)$$

input
```
integrate(-60/(20*exp(4)-15*x-21),x)
```

output
```
4*log(15*x - 20*exp(4) + 21)
```

3.848.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int -\frac{60}{-21+20e^4-15x}\,dx = 4\,\log\left(15\,x-20\,e^4+21\right)$$

input
```
integrate(-60/(20*exp(4)-15*x-21),x, algorithm=\
```

output
```
4*log(15*x - 20*e^4 + 21)
```

3.848.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int -\frac{60}{-21+20e^4-15x}\,dx = 4\,\log\left(\left|15\,x-20\,e^4+21\right|\right)$$

input
```
integrate(-60/(20*exp(4)-15*x-21),x, algorithm=\
```

output
```
4*log(abs(15*x - 20*e^4 + 21))
```

3.848.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int -\frac{60}{-21+20e^4-15x}\,dx = 4\,\ln\left(x-\frac{4\,\mathrm{e}^4}{3}+\frac{7}{5}\right)$$

input
```
int(60/(15*x - 20*exp(4) + 21),x)
```

output
```
4*log(x - (4*exp(4))/3 + 7/5)
```

3.849 $\int \frac{2x-7x^2+3x^3+e^3(4x^3-32x^4+48x^5-20x^6)+e^6(-28x^6+84x^7-84x^8+$

3.849.1 Optimal result

Integrand size = 141, antiderivative size = 25

$$\int \frac{2x-7x^2+3x^3+e^3(4x^3-32x^4+48x^5-20x^6)+e^6(-28x^6+84x^7-84x^8+28x^9)+(-2+10x-12x}{-1+3x-3x^2+x^3}$$
$$=x\left(-\frac{x}{-1+x}+2e^3x^3-\log(x)\right)^2$$

output
```
x*(2*x^3*exp(3)-ln(x)-x/(-1+x))^2
```

3.849.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 121 vs. 2(25) = 50.

Time = 0.11 (sec) , antiderivative size = 121, normalized size of antiderivative = 4.84

$$\int \frac{2x-7x^2+3x^3+e^3(4x^3-32x^4+48x^5-20x^6)+e^6(-28x^6+84x^7-84x^8+28x^9)+(-2+10x-12x}{-1+3x-3x^2+x^3}$$
$$=-3+17e^3-4e^6+\frac{1}{(-1+x)^2}+\frac{3}{-1+x}-\frac{4e^3}{-1+x}+x-4e^3x-4e^3x^2-4e^3x^3-4e^3x^4+4e^6x^7$$
$$-2\log(1-x)+2\log(-1+x)+2\log(x)+\frac{2\log(x)}{-1+x}+2x\log(x)-4e^3x^4\log(x)+x\log^2(x)$$

input
```
Integrate[(2*x - 7*x^2 + 3*x^3 + E^3*(4*x^3 - 32*x^4 + 48*x^5 - 20*x^6) +
E^6*(-28*x^6 + 84*x^7 - 84*x^8 + 28*x^9) + (-2 + 10*x - 12*x^2 + 4*x^3 + E
^3*(16*x^3 - 48*x^4 + 48*x^5 - 16*x^6))*Log[x] + (-1 + 3*x - 3*x^2 + x^3)*
Log[x]^2)/(-1 + 3*x - 3*x^2 + x^3),x]
```

3.849. $\int \frac{2x-7x^2+3x^3+e^3(4x^3-32x^4+48x^5-20x^6)+e^6(-28x^6+84x^7-84x^8+28x^9)+(-2+10x-12x^2+4x^3+e^3(16x^3-48x^4+48x^5-16x^6))\log(x)+(-1}{-1+3x-3x^2+x^3}$

output
```
-3 + 17*E^3 - 4*E^6 + (-1 + x)^(-2) + 3/(-1 + x) - (4*E^3)/(-1 + x) + x -
4*E^3*x - 4*E^3*x^2 - 4*E^3*x^3 - 4*E^3*x^4 + 4*E^6*x^7 - 2*Log[1 - x] + 2
*Log[-1 + x] + 2*Log[x] + (2*Log[x])/(-1 + x) + 2*x*Log[x] - 4*E^3*x^4*Log
[x] + x*Log[x]^2
```

3.849.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 115 vs. $2(25) = 50$.

Time = 0.61 (sec) , antiderivative size = 115, normalized size of antiderivative = 4.60, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.021$, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^3-7x^2+\left(x^3-3x^2+3x-1\right)\log^2(x)+e^6\left(28x^9-84x^8+84x^7-28x^6\right)+e^3\left(-20x^6+48x^5-32x^4+4x^3\right)}{x^3-3x^2+3x-1}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{3x^3-7x^2+\left(x^3-3x^2+3x-1\right)\log^2(x)+e^6\left(28x^9-84x^8+84x^7-28x^6\right)+e^3\left(-20x^6+48x^5-32x^4+4x^3\right)}{(x-1)^3}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(28e^6x^6+\frac{3x^3}{(x-1)^3}-\frac{7x^2}{(x-1)^3}-\frac{4e^3\left(5x^2-7x+1\right)x^3}{(x-1)^2}-\frac{2\left(8e^3x^5-16e^3x^4+8e^3x^3-2x^2+4x-1\right)\log(x)}{(x-1)^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$4e^6x^7-4e^3x^4-4e^3x^4\log(x)-4e^3x^3-\frac{x^2}{(1-x)^2}-4e^3x^2-4e^3x+x+\frac{4e^3}{1-x}-\frac{5}{1-x}+\frac{2}{(1-x)^2}+x\log^2(x)-\frac{2x\log(x)}{1-x}+2x\log(x)$$

input
```
Int[(2*x - 7*x^2 + 3*x^3 + E^3*(4*x^3 - 32*x^4 + 48*x^5 - 20*x^6) + E^6*(-
28*x^6 + 84*x^7 - 84*x^8 + 28*x^9) + (-2 + 10*x - 12*x^2 + 4*x^3 + E^3*(16
*x^3 - 48*x^4 + 48*x^5 - 16*x^6))*Log[x] + (-1 + 3*x - 3*x^2 + x^3)*Log[x]
^2)/(-1 + 3*x - 3*x^2 + x^3),x]
```

3.849. $\int \frac{2x-7x^2+3x^3+e^3\left(4x^3-32x^4+48x^5-20x^6\right)+e^6\left(-28x^6+84x^7-84x^8+28x^9\right)+\left(-2+10x-12x^2+4x^3+e^3\left(16x^3-48x^4+48x^5-16x^6\right)\right)\log(x)+(-1\cdots}{-1+3x-3x^2+x^3}$

output
```
2/(1 - x)^2 - 5/(1 - x) + (4*E^3)/(1 - x) + x - 4*E^3*x - 4*E^3*x^2 - x^2/
(1 - x)^2 - 4*E^3*x^3 - 4*E^3*x^4 + 4*E^6*x^7 + 2*x*Log[x] - (2*x*Log[x])/
(1 - x) - 4*E^3*x^4*Log[x] + x*Log[x]^2
```

3.849.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.849.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. 2(24) = 48.

Time = 0.43 (sec) , antiderivative size = 84, normalized size of antiderivative = 3.36

method	result
default	$x\ln(x)^2+2x\ln(x)+x+4\,\mathrm{e}^6x^7-4x^4\mathrm{e}^3-4x^3\mathrm{e}^3-4x^2\mathrm{e}^3-4x\,\mathrm{e}^3+\frac{1}{(-1+x)^2}-\frac{4\,\mathrm{e}^3-3}{-1+x}-4\ln$
parts	$x\ln(x)^2+2x\ln(x)+x+4\,\mathrm{e}^6x^7-4x^4\mathrm{e}^3-4x^3\mathrm{e}^3-4x^2\mathrm{e}^3-4x\,\mathrm{e}^3+\frac{1}{(-1+x)^2}-\frac{4\,\mathrm{e}^3-3}{-1+x}-4\ln$
parallelrisch	$\frac{4\,\mathrm{e}^6x^9-8\,\mathrm{e}^6x^8+4\,\mathrm{e}^6x^7-4\ln(x)\mathrm{e}^3x^6-4x^6\mathrm{e}^3+8\ln(x)\mathrm{e}^3x^5+4x^5\mathrm{e}^3-4\ln(x)\mathrm{e}^3x^4+x^3\ln(x)^2+2x^3\ln(x)-2x^2\ln(x)^2+x^3-2x^2\ln(x}{x^2-2x+1}$
risch	$x\ln(x)^2-\frac{2(2x^5\mathrm{e}^3-2x^4\mathrm{e}^3-x^2+x-1)\ln(x)}{-1+x}+\frac{4\,\mathrm{e}^6x^9-8\,\mathrm{e}^6x^8+4\,\mathrm{e}^6x^7-4x^6\mathrm{e}^3+4x^5\mathrm{e}^3+2x^2\ln(x)+4x^2\mathrm{e}^3+x^3-4x\ln(x)-}{(-1+x)^2}$

input
```
int(((x^3-3*x^2+3*x-1)*ln(x)^2+((-16*x^6+48*x^5-48*x^4+16*x^3)*exp(3)+4*x^
3-12*x^2+10*x-2)*ln(x)+(28*x^9-84*x^8+84*x^7-28*x^6)*exp(3)^2+(-20*x^6+48*
x^5-32*x^4+4*x^3)*exp(3)+3*x^3-7*x^2+2*x)/(x^3-3*x^2+3*x-1),x,method=_RETU
RNVERBOSE)
```

3.849.
$\int\frac{2x-7x^2+3x^3+e^3(4x^3-32x^4+48x^5-20x^6)+e^6(-28x^6+84x^7-84x^8+28x^9)+(-2+10x-12x^2+4x^3+e^3(16x^3-48x^4+48x^5-16x^6))\log(x)+(-1-}{-1+3x-3x^2+x^3}$

output
```
x*ln(x)^2+2*x*ln(x)+x+4*exp(6)*x^7-4*x^4*exp(3)-4*x^3*exp(3)-4*x^2*exp(3)-
4*x*exp(3)+1/(-1+x)^2-(4*exp(3)-3)/(-1+x)-4*ln(x)*exp(3)*x^4+2*ln(x)*x/(-1
+x)
```

3.849.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 106 vs. $2(24) = 48$.

Time = 0.24 (sec) , antiderivative size = 106, normalized size of antiderivative = 4.24

$$\int \frac{2x-7x^2+3x^3+e^3(4x^3-32x^4+48x^5-20x^6)+e^6(-28x^6+84x^7-84x^8+28x^9)+(-2+10x-12x}{-1+3x-3x^2+x^3}$$

$$= \frac{x^3+(x^3-2x^2+x)\log(x)^2-2x^2+4(x^9-2x^8+x^7)e^6-4(x^6-x^5-x^2+2x-1)e^3+2(x^3-x^2-}{x^2-2x+1}$$

input
```
integrate(((x^3-3*x^2+3*x-1)*log(x)^2+((-16*x^6+48*x^5-48*x^4+16*x^3)*exp(
3)+4*x^3-12*x^2+10*x-2)*log(x)+(28*x^9-84*x^8+84*x^7-28*x^6)*exp(3)^2+(-20
*x^6+48*x^5-32*x^4+4*x^3)*exp(3)+3*x^3-7*x^2+2*x)/(x^3-3*x^2+3*x-1),x, alg
orithm=\
```

output
```
(x^3 + (x^3 - 2*x^2 + x)*log(x)^2 - 2*x^2 + 4*(x^9 - 2*x^8 + x^7)*e^6 - 4*
(x^6 - x^5 - x^2 + 2*x - 1)*e^3 + 2*(x^3 - x^2 - 2*(x^6 - 2*x^5 + x^4)*e^3
)*log(x) + 4*x - 2)/(x^2 - 2*x + 1)
```

3.849.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 110 vs. $2(19) = 38$.

Time = 0.43 (sec) , antiderivative size = 110, normalized size of antiderivative = 4.40

$$\int \frac{2x-7x^2+3x^3+e^3(4x^3-32x^4+48x^5-20x^6)+e^6(-28x^6+84x^7-84x^8+28x^9)+(-2+10x-12x}{-1+3x-3x^2+x^3}$$

$$= 4x^7e^6-4x^4e^3-4x^3e^3-4x^2e^3+x\log(x)^2+x(1-4e^3)+2\log(x) + \frac{x(3-4e^3)-2+4e^3}{x^2-2x+1} + \frac{(-4x^5e^3+4x^4e^3+2x^2-2x+2)\log(x)}{x-1}$$

input
```
integrate(((x**3-3*x**2+3*x-1)*ln(x)**2+((-16*x**6+48*x**5-48*x**4+16*x**3
)*exp(3)+4*x**3-12*x**2+10*x-2)*ln(x)+(28*x**9-84*x**8+84*x**7-28*x**6)*ex
p(3)**2+(-20*x**6+48*x**5-32*x**4+4*x**3)*exp(3)+3*x**3-7*x**2+2*x)/(x**3-
3*x**2+3*x-1),x)
```

3.849. $\int \frac{2x-7x^2+3x^3+e^3(4x^3-32x^4+48x^5-20x^6)+e^6(-28x^6+84x^7-84x^8+28x^9)+(-2+10x-12x^2+4x^3+e^3(16x^3-48x^4+48x^5-16x^6))\log(x)+(-1-}{-1+3x-3x^2+x^3}$

output
```
4*x**7*exp(6) - 4*x**4*exp(3) - 4*x**3*exp(3) - 4*x**2*exp(3) + x*log(x)**
2 + x*(1 - 4*exp(3)) + 2*log(x) + (x*(3 - 4*exp(3)) - 2 + 4*exp(3))/(x**2
- 2*x + 1) + (-4*x**5*exp(3) + 4*x**4*exp(3) + 2*x**2 - 2*x + 2)*log(x)/(x
 - 1)
```

3.849.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 557 vs. $2(24) = 48$.

Time = 0.26 (sec) , antiderivative size = 557, normalized size of antiderivative = 22.28

$$\int \frac{2x - 7x^2 + 3x^3 + e^3(4x^3 - 32x^4 + 48x^5 - 20x^6) + e^6(-28x^6 + 84x^7 - 84x^8 + 28x^9) + (-2 + 10x - 12x}{-1 + 3x - 3x^2 + x^3}$$
= Too large to display

input
```
integrate(((x^3-3*x^2+3*x-1)*log(x)^2+((-16*x^6+48*x^5-48*x^4+16*x^3)*exp(
3)+4*x^3-12*x^2+10*x-2)*log(x)+(28*x^9-84*x^8+84*x^7-28*x^6)*exp(3)^2+(-20
*x^6+48*x^5-32*x^4+4*x^3)*exp(3)+3*x^3-7*x^2+2*x)/(x^3-3*x^2+3*x-1),x, alg
orithm=\
```

output
```
2/5*(10*x^7 + 35*x^6 + 84*x^5 + 175*x^4 + 350*x^3 + 735*x^2 + 1960*x - 35*
(18*x - 17)/(x^2 - 2*x + 1) + 2520*log(x - 1))*e^6 - 14/5*(5*x^6 + 18*x^5
+ 45*x^4 + 100*x^3 + 225*x^2 + 630*x - 15*(16*x - 15)/(x^2 - 2*x + 1) + 84
0*log(x - 1))*e^6 + 21/5*(4*x^5 + 15*x^4 + 40*x^3 + 100*x^2 + 300*x - 10*(
14*x - 13)/(x^2 - 2*x + 1) + 420*log(x - 1))*e^6 - 7*(x^4 + 4*x^3 + 12*x^2
 + 40*x - 2*(12*x - 11)/(x^2 - 2*x + 1) + 60*log(x - 1))*e^6 - 5*(x^4 + 4*
x^3 + 12*x^2 + 40*x - 2*(12*x - 11)/(x^2 - 2*x + 1) + 60*log(x - 1))*e^3 +
 8*(2*x^3 + 9*x^2 + 36*x - 3*(10*x - 9)/(x^2 - 2*x + 1) + 60*log(x - 1))*e
^3 - 16*(x^2 + 6*x - (8*x - 7)/(x^2 - 2*x + 1) + 12*log(x - 1))*e^3 + 2*(2
*x - (6*x - 5)/(x^2 - 2*x + 1) + 6*log(x - 1))*e^3 + 3*x - 5*(2*x - 1)*log
(x)/(x^2 - 2*x + 1) + (x^6*e^3 - 2*x^5*e^3 + x^4*e^3 - 2*x^3 + (x^3 - 2*x^
2 + x)*log(x)^2 + 4*x^2 - 2*(2*x^6*e^3 - 4*x^5*e^3 + 2*x^4*e^3 - x^3 - 2*x
^2 + x)*log(x) + 2*x - 4)/(x^2 - 2*x + 1) - 3/2*(6*x - 5)/(x^2 - 2*x + 1)
+ 7/2*(4*x - 3)/(x^2 - 2*x + 1) - (2*x - 1)/(x^2 - 2*x + 1) + log(x)/(x^2
- 2*x + 1) - 4/(x - 1) - 6*log(x)
```

3.849.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 139 vs. $2(24) = 48$.

Time = 0.27 (sec) , antiderivative size = 139, normalized size of antiderivative = 5.56

$$\int \frac{2x - 7x^2 + 3x^3 + e^3(4x^3 - 32x^4 + 48x^5 - 20x^6) + e^6(-28x^6 + 84x^7 - 84x^8 + 28x^9) + (-2 + 10x - 12x}{-1 + 3x - 3x^2 + x^3}$$
$$= \frac{4x^9e^6 - 8x^8e^6 + 4x^7e^6 - 4x^6e^3\log(x) - 4x^6e^3 + 8x^5e^3\log(x) + 4x^5e^3 - 4x^4e^3\log(x) + x^3\log(x)^2 +}{x^2 - 2x +}$$

input
```
integrate(((x^3-3*x^2+3*x-1)*log(x)^2+((-16*x^6+48*x^5-48*x^4+16*x^3)*exp(
3)+4*x^3-12*x^2+10*x-2)*log(x)+(28*x^9-84*x^8+84*x^7-28*x^6)*exp(3)^2+(-20
*x^6+48*x^5-32*x^4+4*x^3)*exp(3)+3*x^3-7*x^2+2*x)/(x^3-3*x^2+3*x-1),x, alg
orithm=\
```

output
```
(4*x^9*e^6 - 8*x^8*e^6 + 4*x^7*e^6 - 4*x^6*e^3*log(x) - 4*x^6*e^3 + 8*x^5*
e^3*log(x) + 4*x^5*e^3 - 4*x^4*e^3*log(x) + x^3*log(x)^2 + 2*x^3*log(x) -
2*x^2*log(x)^2 + x^3 + 4*x^2*e^3 - 2*x^2*log(x) + x*log(x)^2 - 2*x^2 - 8*x
*e^3 + 4*x + 4*e^3 - 2)/(x^2 - 2*x + 1)
```

3.849.9 Mupad [B] (verification not implemented)

Time = 14.11 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{2x - 7x^2 + 3x^3 + e^3(4x^3 - 32x^4 + 48x^5 - 20x^6) + e^6(-28x^6 + 84x^7 - 84x^8 + 28x^9) + (-2 + 10x - 12x}{-1 + 3x - 3x^2 + x^3}$$
$$= \frac{x\left(x - \ln(x) + 2x^3 e^3 - 2x^4 e^3 + x\ln(x)\right)^2}{(x-1)^2}$$

input
```
int((2*x - 7*x^2 + 3*x^3 + log(x)*(10*x - 12*x^2 + 4*x^3 + exp(3)*(16*x^3
- 48*x^4 + 48*x^5 - 16*x^6) - 2) + log(x)^2*(3*x - 3*x^2 + x^3 - 1) + exp(
3)*(4*x^3 - 32*x^4 + 48*x^5 - 20*x^6) - exp(6)*(28*x^6 - 84*x^7 + 84*x^8 -
 28*x^9))/(3*x - 3*x^2 + x^3 - 1),x)
```

output
```
(x*(x - log(x) + 2*x^3*exp(3) - 2*x^4*exp(3) + x*log(x))^2)/(x - 1)^2
```

3.849. $\int \frac{2x-7x^2+3x^3+e^3(4x^3-32x^4+48x^5-20x^6)+e^6(-28x^6+84x^7-84x^8+28x^9)+(-2+10x-12x^2+4x^3+e^3(16x^3-48x^4+48x^5-16x^6))\log(x)+(-1}{-1+3x-3x^2+x^3}$

3.850 $\int \frac{400+150x}{-100x-25x^2+(64x^5+48x^6+12x^7+x^8)\log^2(\log(4))}\,dx$

3.850.1 Optimal result

Integrand size = 42, antiderivative size = 20

$$\int \frac{400+150x}{-100x-25x^2+(64x^5+48x^6+12x^7+x^8)\log^2(\log(4))}\,dx = \log\left(8\left(-1+\frac{25}{x^4(4+x)^2\log^2(\log(4))}\right)\right)$$

output
```
ln(200/x^4/(4+x)^2/ln(2*ln(2))^2-8)
```

3.850.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 54 vs. 2(20) = 40.

Time = 0.03 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.70

$$\int \frac{400+150x}{-100x-25x^2+(64x^5+48x^6+12x^7+x^8)\log^2(\log(4))}\,dx = 50\left(-\frac{2\log(x)}{25}-\frac{1}{25}\log(4+x) + \frac{1}{50}\log\left(25-16x^4\log^2(\log(4))-8x^5\log^2(\log(4))-x^6\log^2(\log(4))\right)\right)$$

input
```
Integrate[(400 + 150*x)/(-100*x - 25*x^2 + (64*x^5 + 48*x^6 + 12*x^7 + x^8
)*Log[Log[4]]^2),x]
```

output
```
50*((-2*Log[x])/25 - Log[4 + x]/25 + Log[25 - 16*x^4*Log[Log[4]]^2 - 8*x^5
*Log[Log[4]]^2 - x^6*Log[Log[4]]^2]/50)
```

3.850.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 48 vs. $2(20) = 40$.

Time = 0.37 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.40, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{150x+400}{-25x^2+(x^8+12x^7+48x^6+64x^5)\log^2(\log(4))-100x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{150x+400}{x\left(x^7\log^2(\log(4))+12x^6\log^2(\log(4))+48x^5\log^2(\log(4))+64x^4\log^2(\log(4))-25x-100\right)}dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{x(3x+8)\log(\log(4))}{x^3\log(\log(4))+4x^2\log(\log(4))-5}+\frac{x(3x+8)\log(\log(4))}{x^3\log(\log(4))+4x^2\log(\log(4))+5}-\frac{4}{x}-\frac{2}{x+4}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log\left(x^3(-\log(\log(4)))-4x^2\log(\log(4))+5\right)+\log\left(x^3\log(\log(4))+4x^2\log(\log(4))+5\right)-4\log(x)-2\log(x+4)$$

input
```
Int[(400 + 150*x)/(-100*x - 25*x^2 + (64*x^5 + 48*x^6 + 12*x^7 + x^8)*Log[
Log[4]]^2),x]
```

output
```
-4*Log[x] - 2*Log[4 + x] + Log[5 - 4*x^2*Log[Log[4]] - x^3*Log[Log[4]]] +
Log[5 + 4*x^2*Log[Log[4]] + x^3*Log[Log[4]]]
```

3.850.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /; !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] && !BinomialQ[Px, x] && !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.850.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(20) = 40$.

Time = 0.52 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.80

method	result
default	$-4\ln(x)+\ln(x^3\ln(2\ln(2))+4x^2\ln(2\ln(2))+5)+\ln(x^3\ln(2\ln(2))+4x^2\ln(2\ln(2))$
norman	$-4\ln(x)+\ln(x^3\ln(2\ln(2))+4x^2\ln(2\ln(2))+5)+\ln(x^3\ln(2\ln(2))+4x^2\ln(2\ln(2))$
parallelrisch	$-4\ln(x)+\ln\left(\frac{x^3\ln(2\ln(2))+4x^2\ln(2\ln(2))-5}{\ln(2\ln(2))}\right)+\ln\left(\frac{x^3\ln(2\ln(2))+4x^2\ln(2\ln(2))+5}{\ln(2\ln(2))}\right)-2\ln(4+x)$
risch	$-4\ln(-x)-2\ln(4+x)+\ln\left(\left(-\ln(2)^2-2\ln(2)\ln(\ln(2))-\ln(\ln(2))^2\right)x^6+\left(-8\ln(2)\right.\right.$

input
```
int((150*x+400)/((x^8+12*x^7+48*x^6+64*x^5)*ln(2*ln(2))^2-25*x^2-100*x),x,
method=_RETURNVERBOSE)
```

output
```
-4*ln(x)+ln(x^3*ln(2*ln(2))+4*x^2*ln(2*ln(2))+5)+ln(x^3*ln(2*ln(2))+4*x^2*
ln(2*ln(2))-5)-2*ln(4+x)
```

3.850.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

$$\int \frac{400+150x}{-100x-25x^2+(64x^5+48x^6+12x^7+x^8)\log^2(\log(4))}\,dx$$
$$= \log\left(\left(x^6+8\,x^5+16\,x^4\right)\log\left(2\,\log\left(2\right)\right)^2-25\right)-2\,\log\left(x+4\right)-4\,\log\left(x\right)$$

input
```
integrate((150*x+400)/((x^8+12*x^7+48*x^6+64*x^5)*log(2*log(2))^2-25*x^2-1
00*x),x, algorithm=\
```

output
```
log((x^6 + 8*x^5 + 16*x^4)*log(2*log(2))^2 - 25) - 2*log(x + 4) - 4*log(x)
```

3.850.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(20) = 40.

Time = 10.17 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.45

$$\int \frac{400+150x}{-100x-25x^2+(64x^5+48x^6+12x^7+x^8)\log^2(\log(4))}\,dx$$
$$= -4\log\left(x\right)-2\log\left(x+4\right)$$
$$+\log\left(x^6+8x^5+16x^4-\frac{25}{2\log\left(2\right)\log\left(\log\left(2\right)\right)+\log\left(\log\left(2\right)\right)^2+\log\left(2\right)^2}\right)$$

input
```
integrate((150*x+400)/((x**8+12*x**7+48*x**6+64*x**5)*ln(2*ln(2))**2-25*x*
*2-100*x),x)
```

output
```
-4*log(x) - 2*log(x + 4) + log(x**6 + 8*x**5 + 16*x**4 - 25/(2*log(2)*log(
log(2)) + log(log(2))**2 + log(2)**2))
```

3.850.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. $2(20) = 40$.

Time = 0.19 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.75

$$\int \frac{400+150x}{-100x-25x^2+(64x^5+48x^6+12x^7+x^8)\log^2(\log(4))}\,dx$$
$$= \log\left(x^3\log(2\log(2))+4x^2\log(2\log(2))+5\right) + \log\left(x^3\log(2\log(2))+4x^2\log(2\log(2))-5\right) - 2\log(x+4) - 4\log(x)$$

input
```
integrate((150*x+400)/((x^8+12*x^7+48*x^6+64*x^5)*log(2*log(2))^2-25*x^2-1
00*x),x, algorithm=\
```

output
```
log(x^3*log(2*log(2)) + 4*x^2*log(2*log(2)) + 5) + log(x^3*log(2*log(2)) +
 4*x^2*log(2*log(2)) - 5) - 2*log(x + 4) - 4*log(x)
```

3.850.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(20) = 40$.

Time = 0.26 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.95

$$\int \frac{400+150x}{-100x-25x^2+(64x^5+48x^6+12x^7+x^8)\log^2(\log(4))}\,dx$$
$$= \log\left(\left|x^3\log(2\log(2))+4x^2\log(2\log(2))+5\right|\right) + \log\left(\left|x^3\log(2\log(2))+4x^2\log(2\log(2))-5\right|\right) - 2\log(|x+4|) - 4\log(|x|)$$

input
```
integrate((150*x+400)/((x^8+12*x^7+48*x^6+64*x^5)*log(2*log(2))^2-25*x^2-1
00*x),x, algorithm=\
```

output
```
log(abs(x^3*log(2*log(2)) + 4*x^2*log(2*log(2)) + 5)) + log(abs(x^3*log(2*
log(2)) + 4*x^2*log(2*log(2)) - 5)) - 2*log(abs(x + 4)) - 4*log(abs(x))
```

3.850.9 Mupad [B] (verification not implemented)

Time = 13.89 (sec) , antiderivative size = 43, normalized size of antiderivative = 2.15

$$\int \frac{400+150x}{-100x-25x^2+(64x^5+48x^6+12x^7+x^8)\log^2(\log(4))}\,dx$$
$$= \ln\left(\ln\left(\ln\left(4\right)\right)^2 x^6 + 8\ln\left(\ln\left(4\right)\right)^2 x^5 + 16\ln\left(\ln\left(4\right)\right)^2 x^4 - 25\right) - 2\ \ln\left(x+4\right) - 4\ \ln\left(x\right)$$

input
```
int(-(150*x + 400)/(100*x - log(2*log(2))^2*(64*x^5 + 48*x^6 + 12*x^7 + x^
8) + 25*x^2),x)
```

output
```
log(16*x^4*log(log(4))^2 + 8*x^5*log(log(4))^2 + x^6*log(log(4))^2 - 25) -
 2*log(x + 4) - 4*log(x)
```

3.851 $\int \frac{500x^2+e^{5/x}(150000+33000x+1815x^2)}{30000x^2+6600x^3+363x^4}\,dx$

3.851.1 Optimal result

Integrand size = 43, antiderivative size = 25

$$\int \frac{500x^2+e^{5/x}(150000+33000x+1815x^2)}{30000x^2+6600x^3+363x^4}\,dx = 8-e^{5/x}+\frac{x}{3\left(20+\frac{11x}{5}\right)}$$

output
```
8+1/3*x/(11/5*x+20)-exp(5/x)
```

3.851.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{500x^2+e^{5/x}(150000+33000x+1815x^2)}{30000x^2+6600x^3+363x^4}\,dx = \frac{5}{3}\left(-\frac{3e^{5/x}}{5}-\frac{100}{11(100+11x)}\right)$$

input
```
Integrate[(500*x^2 + E^(5/x)*(150000 + 33000*x + 1815*x^2))/(30000*x^2 + 6
600*x^3 + 363*x^4),x]
```

output
```
(5*((-3*E^(5/x))/5 - 100/(11*(100 + 11*x))))/3
```

3.851.3 Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.093, Rules used = {2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{500x^2+e^{5/x}\left(1815x^2+33000x+150000\right)}{363x^4+6600x^3+30000x^2}\,dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{500x^2+e^{5/x}\left(1815x^2+33000x+150000\right)}{x^2\left(363x^2+6600x+30000\right)}dx$$

$$\Big\downarrow \ 2007$$

$$\int \frac{500x^2+e^{5/x}\left(1815x^2+33000x+150000\right)}{x^2\left(11\sqrt{3}x+100\sqrt{3}\right)^2}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{5e^{5/x}}{x^2}+\frac{500}{3(11x+100)^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-e^{5/x}-\frac{500}{33(11x+100)}$$

input
```
Int[(500*x^2 + E^(5/x)*(150000 + 33000*x + 1815*x^2))/(30000*x^2 + 6600*x^
3 + 363*x^4),x]
```

output
```
-E^(5/x) - 500/(33*(100 + 11*x))
```

3.851.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.851.4 Maple [A] (verified)

Time = 0.64 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

method	result	size
risch	$-\frac{500}{363\left(x+\frac{100}{11}\right)}-{\mathrm e}^{\frac{5}{x}}$	17
parts	$-\frac{500}{33\left(11 x+100\right)}-{\mathrm e}^{\frac{5}{x}}$	19
derivativedivides	$\frac{5}{3\left(\frac{100}{x}+11\right)}-{\mathrm e}^{\frac{5}{x}}$	21
default	$\frac{5}{3\left(\frac{100}{x}+11\right)}-{\mathrm e}^{\frac{5}{x}}$	21
parallelrisch	$-\frac{363 x\,{\mathrm e}^{\frac{5}{x}}+3300\,{\mathrm e}^{\frac{5}{x}}+500}{33\left(11 x+100\right)}$	29
norman	$\frac{-\frac{500 x}{33}-100 x\,{\mathrm e}^{\frac{5}{x}}-11 x^{2} {\mathrm e}^{\frac{5}{x}}}{x\left(11 x+100\right)}$	36

input
```
int(((1815*x^2+33000*x+150000)*exp(5/x)+500*x^2)/(363*x^4+6600*x^3+30000*x
^2),x,method=_RETURNVERBOSE)
```

output
```
-500/363/(x+100/11)-exp(5/x)
```

3.851.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{500x^2 + e^{5/x}(150000 + 33000x + 1815x^2)}{30000x^2 + 6600x^3 + 363x^4}\,dx = -\frac{33\,(11\,x + 100)e^{\frac{5}{x}} + 500}{33\,(11\,x + 100)}$$

input
```
integrate(((1815*x^2+33000*x+150000)*exp(5/x)+500*x^2)/(363*x^4+6600*x^3+3
0000*x^2),x, algorithm=\
```

output
```
-1/33*(33*(11*x + 100)*e^(5/x) + 500)/(11*x + 100)
```

3.851.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.48

$$\int \frac{500x^2 + e^{5/x}(150000 + 33000x + 1815x^2)}{30000x^2 + 6600x^3 + 363x^4}\,dx = -e^{\frac{5}{x}} - \frac{500}{363x + 3300}$$

input
```
integrate(((1815*x**2+33000*x+150000)*exp(5/x)+500*x**2)/(363*x**4+6600*x*
*3+30000*x**2),x)
```

output
```
-exp(5/x) - 500/(363*x + 3300)
```

3.851.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.72

$$\int \frac{500x^2 + e^{5/x}(150000 + 33000x + 1815x^2)}{30000x^2 + 6600x^3 + 363x^4}\,dx = -\frac{500}{33\,(11\,x + 100)} - e^{\frac{5}{x}}$$

input
```
integrate(((1815*x^2+33000*x+150000)*exp(5/x)+500*x^2)/(363*x^4+6600*x^3+3
0000*x^2),x, algorithm=\
```

output
```
-500/33/(11*x + 100) - e^(5/x)
```

3.851.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \frac{500x^2 + e^{5/x}(150000 + 33000x + 1815x^2)}{30000x^2 + 6600x^3 + 363x^4}\,dx = -\frac{\frac{300\,e^{\frac{5}{x}}}{x} + 33\,e^{\frac{5}{x}} - 5}{3\left(\frac{100}{x} + 11\right)}$$

input
```
integrate(((1815*x^2+33000*x+150000)*exp(5/x)+500*x^2)/(363*x^4+6600*x^3+3
0000*x^2),x, algorithm=\
```

output
```
-1/3*(300*e^(5/x)/x + 33*e^(5/x) - 5)/(100/x + 11)
```

3.851.9 Mupad [B] (verification not implemented)

Time = 13.66 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.72

$$\int \frac{500x^2 + e^{5/x}(150000 + 33000x + 1815x^2)}{30000x^2 + 6600x^3 + 363x^4}\,dx = -\mathrm{e}^{5/x} - \frac{500}{33\,(11\,x + 100)}$$

input
```
int((exp(5/x)*(33000*x + 1815*x^2 + 150000) + 500*x^2)/(30000*x^2 + 6600*x
^3 + 363*x^4),x)
```

output
```
- exp(5/x) - 500/(33*(11*x + 100))
```

3.852 $\int \frac{e^{x^2}\left(-60x^3+2x^4\right)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}\left(120x^3-4x^4\right)\right)\mathrm{lo}}{-30x^2+x^3+(60x^2}$

3.852.1 Optimal result

Integrand size = 279, antiderivative size = 29

$$\int \frac{e^{x^2}(-60x^3+2x^4)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}(120x^3-4x^4)\right)\log^2(-30+x)+\left(30x-31x^2\right.}{-30x^2+x^3+(60x^2-2x^3)\log^2(-30+x)+(-30}$$

$$=e^{x^2}-\frac{x^2}{-x+\frac{x}{\log^2(-30+x)}-\log(x)}$$

output
```
exp(x^2)-x^2/(1/ln(x-30)^2*x-x-ln(x))
```

3.852.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

$$\int \frac{e^{x^2}(-60x^3+2x^4)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}(120x^3-4x^4)\right)\log^2(-30+x)+\left(30x-31x^2\right.}{-30x^2+x^3+(60x^2-2x^3)\log^2(-30+x)+(-30}$$

$$=e^{x^2}+\frac{x^2\log^2(-30+x)}{-x+\log^2(-30+x)(x+\log(x))}$$

3.852. $\int \frac{e^{x^2}(-60x^3+2x^4)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}(120x^3-4x^4)\right)\log^2(-30+x)+\left(30x-31x^2+x^3+e^{x^2}(-60x^3+2x^4)\right)\log^4(-30+x)+\left(e^{x^2}(12\right.}{-30x^2+x^3+(60x^2-2x^3)\log^2(-30+x)+(-30x^2+x^3)\log^4(-30+x)+((60x-2x^2)\log^2(-30+}$

input
```
Integrate[(E^x^2*(-60*x^3 + 2*x^4) - 2*x^3*Log[-30 + x] + (30*x^2 - x^3 +
E^x^2*(120*x^3 - 4*x^4))*Log[-30 + x]^2 + (30*x - 31*x^2 + x^3 + E^x^2*(-6
0*x^3 + 2*x^4))*Log[-30 + x]^4 + (E^x^2*(120*x^2 - 4*x^3)*Log[-30 + x]^2 +
 (-60*x + 2*x^2 + E^x^2*(-120*x^2 + 4*x^3))*Log[-30 + x]^4)*Log[x] + E^x^2
*(-60*x + 2*x^2)*Log[-30 + x]^4*Log[x]^2)/(-30*x^2 + x^3 + (60*x^2 - 2*x^3
)*Log[-30 + x]^2 + (-30*x^2 + x^3)*Log[-30 + x]^4 + ((60*x - 2*x^2)*Log[-3
0 + x]^2 + (-60*x + 2*x^2)*Log[-30 + x]^4)*Log[x] + (-30 + x)*Log[-30 + x]
^4*Log[x]^2),x]
```

output
```
E^x^2 + (x^2*Log[-30 + x]^2)/(-x + Log[-30 + x]^2*(x + Log[x]))
```

3.852.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^3\log(x-30)+e^{x^2}\left(2x^2-60x\right)\log^2(x)\log^4(x-30)+\left(\left(2x^2+e^{x^2}\left(4x^3-120x^2\right)-60x\right)\log^4(x-30)+e^{\cdots}\right.}{x^3-30x^2+\left(\left(2x^2-60x\right)\log^4(x-30)+\left(60x-2x^2\right)\log\cdots\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{x\left(-2e^{x^2}(x-30)x^2+(x-30)x\left(4e^{x^2}x+4e^{x^2}\log(x)+1\right)\log^2(x-30)-\left((x-30)\left(2e^{x^2}x^2+2e^{x^2}\log^2(x)+\cdots\right.\right.\right.}{(30-x)\left(x-\log^2(x-30)(x+\log(x))\right)^2}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{2x^3\log(x-30)}{(x-30)\left(-x+x\log^2(x-30)+\log(x)\log^2(x-30)\right)^2}+2e^{x^2}x-\frac{x^2\log^2(x-30)}{\left(-x+x\log^2(x-30)+\log(x)\log^2(x-3\cdots\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-2\int \frac{x^2\log(x-30)}{\left(x\log^2(x-30)+\log(x)\log^2(x-30)-x\right)^2}dx+\int \frac{x^2\log^2(x-30)}{\left(x\log^2(x-30)+\log(x)\log^2(x-30)-x\right)^2}dx-\int \frac{x^2\log^4(x-30)}{\left(x\log^2(x-30)+\log(x)\log^2(x-30)-x\right)^2}dx-1800\int \frac{\log(x-30)}{\left(x\log^2(x-30)+\log(x)\log^2(x-30)-x\right)^2}dx-54000\int \frac{\log(x-30)}{(x-30)\left(x\log^2(x-30)+\log(x)\log^2(x-30)-x\right)^2}dx-60\int \frac{x\log(x-30)}{\left(x\log^2(x-30)+\log(x)\log^2(x-30)-x\right)^2}dx+2\int \frac{x\log^2(x-30)}{x\log^2(x-30)+\log(x)\log^2(x-30)-x}dx-\int \frac{x\log^4(x-30)}{\left(x\log^2(x-30)+\log(x)\log^2(x-30)-x\right)^2}dx+e^{x^2}$$

input
```
Int[(E^x^2*(-60*x^3 + 2*x^4) - 2*x^3*Log[-30 + x] + (30*x^2 - x^3 + E^x^2*
(120*x^3 - 4*x^4))*Log[-30 + x]^2 + (30*x - 31*x^2 + x^3 + E^x^2*(-60*x^3
+ 2*x^4))*Log[-30 + x]^4 + (E^x^2*(120*x^2 - 4*x^3)*Log[-30 + x]^2 + (-60*
x + 2*x^2 + E^x^2*(-120*x^2 + 4*x^3))*Log[-30 + x]^4)*Log[x] + E^x^2*(-60*
x + 2*x^2)*Log[-30 + x]^4*Log[x]^2)/(-30*x^2 + x^3 + (60*x^2 - 2*x^3)*Log[
-30 + x]^2 + (-30*x^2 + x^3)*Log[-30 + x]^4 + ((60*x - 2*x^2)*Log[-30 + x]
^2 + (-60*x + 2*x^2)*Log[-30 + x]^4)*Log[x] + (-30 + x)*Log[-30 + x]^4*Log
[x]^2),x]
```

output
```
$Aborted
```

3.852.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.852.

$$\int \frac{e^{x^2}\left(-60x^3+2x^4\right)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}\left(120x^3-4x^4\right)\right)\log^2(-30+x)+\left(30x-31x^2+x^3+e^{x^2}\left(-60x^3+2x^4\right)\right)\log^4(-30+x)+\left(e^{x^2}(12\right.}{-30x^2+x^3+\left(60x^2-2x^3\right)\log^2(-30+x)+\left(-30x^2+x^3\right)\log^4(-30+x)+\left(\left(60x-2x^2\right)\log^2(-30+\right.}$$

3.852.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(28) = 56$.

Time = 51.58 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.03

method	result	size
risch	$\frac{x^{2}+{\mathrm e}^{x^{2}} x+{\mathrm e}^{x^{2}} \ln \left(x \right)}{x+\ln \left(x \right)}+\frac{x^{3}}{\left(x+\ln \left(x \right)\right) \left(\ln \left(x-30\right)^{2} \ln \left(x \right)+x \ln \left(x-30\right)^{2}-x \right)}$	59
parallelrisch	$\frac{60 x^{2} \ln \left(x-30\right)^{2}+60 \,{\mathrm e}^{x^{2}} \ln \left(x-30\right)^{2} x+60 \,{\mathrm e}^{x^{2}} \ln \left(x-30\right)^{2} \ln \left(x \right)-60 \,{\mathrm e}^{x^{2}} x}{60 \ln \left(x-30\right)^{2} \ln \left(x \right)+60 x \ln \left(x-30\right)^{2}-60 x}$	72

input
```
int(((2*x^2-60*x)*exp(x^2)*ln(x-30)^4*ln(x)^2+(((4*x^3-120*x^2)*exp(x^2)+2
*x^2-60*x)*ln(x-30)^4+(-4*x^3+120*x^2)*exp(x^2)*ln(x-30)^2)*ln(x)+((2*x^4-
60*x^3)*exp(x^2)+x^3-31*x^2+30*x)*ln(x-30)^4+((-4*x^4+120*x^3)*exp(x^2)-x^
3+30*x^2)*ln(x-30)^2-2*x^3*ln(x-30)+(2*x^4-60*x^3)*exp(x^2))/((x-30)*ln(x-
30)^4*ln(x)^2+((2*x^2-60*x)*ln(x-30)^4+(-2*x^2+60*x)*ln(x-30)^2)*ln(x)+(x^
3-30*x^2)*ln(x-30)^4+(-2*x^3+60*x^2)*ln(x-30)^2+x^3-30*x^2),x,method=_RETU
RNVERBOSE)
```

output
```
(x^2+exp(x^2)*x+exp(x^2)*ln(x))/(x+ln(x))+x^3/(x+ln(x))/(ln(x-30)^2*ln(x)+
x*ln(x-30)^2-x)
```

3.852.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(24) = 48$.

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.14

$$\int \frac{e^{x^2}(-60x^3+2x^4)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}(120x^3-4x^4)\right)\log^2(-30+x)+\left(30x-31x^2\right.}{-30x^2+x^3+(60x^2-2x^3)\log^2(-30+x)+(-30}$$
$$=\frac{e^{(x^2)}\log(x-30)^2\log(x)+\left(x^2+xe^{(x^2)}\right)\log(x-30)^2-xe^{(x^2)}}{x\log(x-30)^2+\log(x-30)^2\log(x)-x}$$

input
```
integrate(((2*x^2-60*x)*exp(x^2)*log(x-30)^4*log(x)^2+(((4*x^3-120*x^2)*ex
p(x^2)+2*x^2-60*x)*log(x-30)^4+(-4*x^3+120*x^2)*exp(x^2)*log(x-30)^2)*log(
x)+((2*x^4-60*x^3)*exp(x^2)+x^3-31*x^2+30*x)*log(x-30)^4+((-4*x^4+120*x^3)
*exp(x^2)-x^3+30*x^2)*log(x-30)^2-2*x^3*log(x-30)+(2*x^4-60*x^3)*exp(x^2))
/((x-30)*log(x-30)^4*log(x)^2+((2*x^2-60*x)*log(x-30)^4+(-2*x^2+60*x)*log(
x-30)^2)*log(x)+(x^3-30*x^2)*log(x-30)^4+(-2*x^3+60*x^2)*log(x-30)^2+x^3-3
0*x^2),x, algorithm=\
```

output
```
(e^(x^2)*log(x - 30)^2*log(x) + (x^2 + x*e^(x^2))*log(x - 30)^2 - x*e^(x^2
))/(x*log(x - 30)^2 + log(x - 30)^2*log(x) - x)
```

3.852.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(20) = 40$.

Time = 0.42 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.59

$$\int \frac{e^{x^2}(-60x^3+2x^4)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}(120x^3-4x^4)\right)\log^2(-30+x)+\left(30x-31x^2\right.}{-30x^2+x^3+(60x^2-2x^3)\log^2(-30+x)+(-30}$$
$$=\frac{x^3}{-x^2-x\log{(x)}+\left(x^2+2x\log{(x)}+\log{(x)}^2\right)\log{(x-30)}^2}+\frac{x^2}{x+\log{(x)}}+e^{x^2}$$

input
```
integrate(((2*x**2-60*x)*exp(x**2)*ln(x-30)**4*ln(x)**2+(((4*x**3-120*x**2
)*exp(x**2)+2*x**2-60*x)*ln(x-30)**4+(-4*x**3+120*x**2)*exp(x**2)*ln(x-30)
**2)*ln(x)+((2*x**4-60*x**3)*exp(x**2)+x**3-31*x**2+30*x)*ln(x-30)**4+((-4
*x**4+120*x**3)*exp(x**2)-x**3+30*x**2)*ln(x-30)**2-2*x**3*ln(x-30)+(2*x**
4-60*x**3)*exp(x**2))/((x-30)*ln(x-30)**4*ln(x)**2+((2*x**2-60*x)*ln(x-30)
**4+(-2*x**2+60*x)*ln(x-30)**2)*ln(x)+(x**3-30*x**2)*ln(x-30)**4+(-2*x**3+
60*x**2)*ln(x-30)**2+x**3-30*x**2),x)
```

output
```
x**3/(-x**2 - x*log(x) + (x**2 + 2*x*log(x) + log(x)**2)*log(x - 30)**2) +
 x**2/(x + log(x)) + exp(x**2)
```

3.852.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(24) = 48$.

Time = 0.29 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.69

$$\int \frac{e^{x^2}(-60x^3+2x^4)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}(120x^3-4x^4)\right)\log^2(-30+x)+\left(30x-31x^2\right.}{-30x^2+x^3+(60x^2-2x^3)\log^2(-30+x)+(-30}$$
$$= \frac{x^2\log{(x-30)}^2+\left((x+\log{(x)})\log{(x-30)}^2-x\right)e^{(x^2)}}{(x+\log{(x)})\log{(x-30)}^2-x}$$

input
```
integrate((((2*x^2-60*x)*exp(x^2)*log(x-30)^4*log(x)^2+(((4*x^3-120*x^2)*ex
p(x^2)+2*x^2-60*x)*log(x-30)^4+(-4*x^3+120*x^2)*exp(x^2)*log(x-30)^2)*log(
x)+((2*x^4-60*x^3)*exp(x^2)+x^3-31*x^2+30*x)*log(x-30)^4+((-4*x^4+120*x^3)
*exp(x^2)-x^3+30*x^2)*log(x-30)^2-2*x^3*log(x-30)+(2*x^4-60*x^3)*exp(x^2))
/((x-30)*log(x-30)^4*log(x)^2+((2*x^2-60*x)*log(x-30)^4+(-2*x^2+60*x)*log(
x-30)^2)*log(x)+(x^3-30*x^2)*log(x-30)^4+(-2*x^3+60*x^2)*log(x-30)^2+x^3-3
0*x^2),x, algorithm=\
```

output
```
(x^2*log(x - 30)^2 + ((x + log(x))*log(x - 30)^2 - x)*e^(x^2))/((x + log(x
))*log(x - 30)^2 - x)
```

3.852.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(24) = 48$.

Time = 0.56 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.31

$$\int \frac{e^{x^2}(-60x^3+2x^4)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}(120x^3-4x^4)\right)\log^2(-30+x)+\left(30x-31x^2\right.}{-30x^2+x^3+(60x^2-2x^3)\log^2(-30+x)+(-30}$$
$$= \frac{x^2\log{(x-30)}^2+xe^{(x^2)}\log{(x-30)}^2+e^{(x^2)}\log{(x-30)}^2\log{(x)}-xe^{(x^2)}}{x\log{(x-30)}^2+\log{(x-30)}^2\log{(x)}-x}$$

input
```
integrate((((2*x^2-60*x)*exp(x^2)*log(x-30)^4*log(x)^2+(((4*x^3-120*x^2)*ex
p(x^2)+2*x^2-60*x)*log(x-30)^4+(-4*x^3+120*x^2)*exp(x^2)*log(x-30)^2)*log(
x)+((2*x^4-60*x^3)*exp(x^2)+x^3-31*x^2+30*x)*log(x-30)^4+((-4*x^4+120*x^3)
*exp(x^2)-x^3+30*x^2)*log(x-30)^2-2*x^3*log(x-30)+(2*x^4-60*x^3)*exp(x^2))
/((x-30)*log(x-30)^4*log(x)^2+((2*x^2-60*x)*log(x-30)^4+(-2*x^2+60*x)*log(
x-30)^2)*log(x)+(x^3-30*x^2)*log(x-30)^4+(-2*x^3+60*x^2)*log(x-30)^2+x^3-3
0*x^2),x, algorithm=\
```

output
```
(x^2*log(x - 30)^2 + x*e^(x^2)*log(x - 30)^2 + e^(x^2)*log(x - 30)^2*log(x
) - x*e^(x^2))/(x*log(x - 30)^2 + log(x - 30)^2*log(x) - x)
```

3.852.9 Mupad [B] (verification not implemented)

Time = 14.16 (sec) , antiderivative size = 317, normalized size of antiderivative = 10.93

$$\int \frac{e^{x^2}(-60x^3+2x^4)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}(120x^3-4x^4)\right)\log^2(-30+x)+\left(30x-31x^2\right.}{-30x^2+x^3+(60x^2-2x^3)\log^2(-30+x)+(-30}$$

$$= 2\,x+\mathrm{e}^{x^2}+\frac{2}{x+1}-\frac{\frac{x^2\,(x-1)}{x+1}+\frac{2\,x^2\,\ln(x)}{x+1}}{x+\ln(x)}$$

$$+\frac{}{\left(x-\ln(x-30)^2\,(x+\ln(x))\right)\,(x-30)\,\left(-4\,x^7-16\,x^6\,\ln(x)+120\,x^6-23\,x^5\,\ln(x)^2+478\,x^5\,\ln(x)\right.}$$

input
```
int(-(exp(x^2)*(60*x^3 - 2*x^4) - log(x - 30)^2*(exp(x^2)*(120*x^3 - 4*x^4
) + 30*x^2 - x^3) + 2*x^3*log(x - 30) + log(x)*(log(x - 30)^4*(60*x + exp(
x^2)*(120*x^2 - 4*x^3) - 2*x^2) - log(x - 30)^2*exp(x^2)*(120*x^2 - 4*x^3)
) - log(x - 30)^4*(30*x - exp(x^2)*(60*x^3 - 2*x^4) - 31*x^2 + x^3) + log(
x - 30)^4*exp(x^2)*log(x)^2*(60*x - 2*x^2))/(log(x)*(log(x - 30)^2*(60*x -
 2*x^2) - log(x - 30)^4*(60*x - 2*x^2)) - log(x - 30)^4*(30*x^2 - x^3) + l
og(x - 30)^2*(60*x^2 - 2*x^3) - 30*x^2 + x^3 + log(x - 30)^4*log(x)^2*(x -
 30)),x)
```

output
```
2*x + exp(x^2) + 2/(x + 1) - ((x^2*(x - 1))/(x + 1) + (2*x^2*log(x))/(x +
1))/(x + log(x)) + (x^2*(30*x - x^2)^2*(60*x + 1800*log(x) + 60*x*log(x)^2
 + 2*x^2*log(x) + 4*x*log(x)^3 + 12*x^3*log(x) - 900*log(x)^2 + 11*x^2*log
(x)^2 - 120*x*log(x) - x^2 + 4*x^4 - 900))/((x - log(x - 30)^2*(x + log(x)
))*(x - 30)*(54000*x*log(x)^2 + 56700*x^2*log(x) - 27000*x*log(x)^3 - 5490
*x^3*log(x) + 181*x^4*log(x) + 478*x^5*log(x) - 16*x^6*log(x) - 32400*x^2*
log(x)^2 + 2700*x^2*log(x)^3 + 2880*x^3*log(x)^2 + 120*x^2*log(x)^4 + 390*
x^3*log(x)^3 + 628*x^4*log(x)^2 - 4*x^3*log(x)^4 - 15*x^4*log(x)^3 - 23*x^
5*log(x)^2 - 27000*x*log(x) - 27000*x^2 + 2700*x^3 - 90*x^4 + x^5 + 120*x^
6 - 4*x^7))
```


$$\int \frac{e^{x^2}(-60x^3+2x^4)-2x^3\log(-30+x)+\left(30x^2-x^3+e^{x^2}(120x^3-4x^4)\right)\log^2(-30+x)+\left(30x-31x^2+x^3+e^{x^2}(-60x^3+2x^4)\right)\log^4(-30+x)+\left(e^{x^2}(12\right.}{-30x^2+x^3+(60x^2-2x^3)\log^2(-30+x)+(-30x^2+x^3)\log^4(-30+x)+((60x-2x^2)\log^2(-30+}$$

3.853 $\int \frac{48-98x+53x^2+15x^3+(-440+314x+286x^2+45x^3)\log(4+x)}{48+12x}\,dx$

3.853.1 Optimal result

Integrand size = 43, antiderivative size = 21

$$\int \frac{48-98x+53x^2+15x^3+(-440+314x+286x^2+45x^3)\log(4+x)}{48+12x}\,dx = x-\left(\frac{11}{6}-\frac{5x}{4}\right)x(5+x)\log(4+x)$$

output
```
x-x*ln(4+x)*(11/6-5/4*x)*(5+x)
```

3.853.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.57

$$\int \frac{48-98x+53x^2+15x^3+(-440+314x+286x^2+45x^3)\log(4+x)}{48+12x}\,dx = \frac{1}{12}\left(12x-110x\log(4+x)+53x^2\log(4+x)+15x^3\log(4+x)\right)$$

input
```
Integrate[(48 - 98*x + 53*x^2 + 15*x^3 + (-440 + 314*x + 286*x^2 + 45*x^3)
*Log[4 + x])/(48 + 12*x),x]
```

output
```
(12*x - 110*x*Log[4 + x] + 53*x^2*Log[4 + x] + 15*x^3*Log[4 + x])/12
```

3.853.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 43 vs. 2(21) = 42.

Time = 0.33 (sec) , antiderivative size = 43, normalized size of antiderivative = 2.05, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.047, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{15x^3+53x^2+(45x^3+286x^2+314x-440)\log(x+4)-98x+48}{12x+48}\,dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{1}{12}(45x^2+106x-110)\log(x+4)+\frac{15x^3+53x^2-98x+48}{12(x+4)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{5}{4}x^3\log(x+4)+\frac{53}{12}x^2\log(x+4)+x-\frac{55}{6}(x+4)\log(x+4)+\frac{110}{3}\log(x+4)$$

input
```
Int[(48 - 98*x + 53*x^2 + 15*x^3 + (-440 + 314*x + 286*x^2 + 45*x^3)*Log[4
 + x])/(48 + 12*x),x]
```

output
```
x + (110*Log[4 + x])/3 + (53*x^2*Log[4 + x])/12 + (5*x^3*Log[4 + x])/4 - (
55*(4 + x)*Log[4 + x])/6
```

3.853.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.853.4 Maple [A] (verified)

Time = 0.86 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

method	result	size
risch	$\left(\frac{5}{4}x^3+\frac{53}{12}x^2-\frac{55}{6}x\right)\ln\left(4+x\right)+x$	22
norman	$x+\frac{53x^2\ln(4+x)}{12}+\frac{5x^3\ln(4+x)}{4}-\frac{55\ln(4+x)x}{6}$	28
parallelrisch	$\frac{5x^3\ln(4+x)}{4}+\frac{53x^2\ln(4+x)}{12}-\frac{55\ln(4+x)x}{6}+x-8$	29
derivativedivides	$\frac{5\ln(4+x)(4+x)^3}{4}-\frac{127\ln(4+x)(4+x)^2}{12}+\frac{31(4+x)\ln(4+x)}{2}+4+x+\frac{82\ln(4+x)}{3}$	41
default	$\frac{5\ln(4+x)(4+x)^3}{4}-\frac{127\ln(4+x)(4+x)^2}{12}+\frac{31(4+x)\ln(4+x)}{2}+4+x+\frac{82\ln(4+x)}{3}$	41
parts	$\frac{5\ln(4+x)(4+x)^3}{4}+x-4-\frac{127\ln(4+x)(4+x)^2}{12}+\frac{31(4+x)\ln(4+x)}{2}+\frac{82\ln(4+x)}{3}$	41

input
```
int(((45*x^3+286*x^2+314*x-440)*ln(4+x)+15*x^3+53*x^2-98*x+48)/(12*x+48),x
,method=_RETURNVERBOSE)
```

output
```
(5/4*x^3+53/12*x^2-55/6*x)*ln(4+x)+x
```

3.853.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int\frac{48-98x+53x^2+15x^3+(-440+314x+286x^2+45x^3)\log(4+x)}{48+12x}\,dx$$
$$=\frac{1}{12}\left(15\,x^3+53\,x^2-110\,x\right)\log\left(x+4\right)+x$$

input
```
integrate(((45*x^3+286*x^2+314*x-440)*log(4+x)+15*x^3+53*x^2-98*x+48)/(12*
x+48),x, algorithm=\
```

output
```
1/12*(15*x^3 + 53*x^2 - 110*x)*log(x + 4) + x
```

3.853.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{48-98x+53x^2+15x^3+(-440+314x+286x^2+45x^3)\log(4+x)}{48+12x}\,dx$$
$$=x+\left(\frac{5x^3}{4}+\frac{53x^2}{12}-\frac{55x}{6}\right)\log(x+4)$$

input
```
integrate(((45*x**3+286*x**2+314*x-440)*ln(4+x)+15*x**3+53*x**2-98*x+48)/(
12*x+48),x)
```

output
```
x + (5*x**3/4 + 53*x**2/12 - 55*x/6)*log(x + 4)
```

3.853.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. 2(17) = 34.

Time = 0.19 (sec) , antiderivative size = 67, normalized size of antiderivative = 3.19

$$\int \frac{48-98x+53x^2+15x^3+(-440+314x+286x^2+45x^3)\log(4+x)}{48+12x}\,dx$$
$$=\frac{5}{4}\left(x^3-6x^2+48x-192\log(x+4)\right)\log(x+4)$$
$$+\frac{143}{12}\left(x^2-8x+32\log(x+4)\right)\log(x+4)$$
$$+\frac{157}{6}(x-4\log(x+4))\log(x+4)-\frac{110}{3}\log(x+4)^2+x$$

input
```
integrate(((45*x^3+286*x^2+314*x-440)*log(4+x)+15*x^3+53*x^2-98*x+48)/(12*
x+48),x, algorithm=\
```

output
```
5/4*(x^3 - 6*x^2 + 48*x - 192*log(x + 4))*log(x + 4) + 143/12*(x^2 - 8*x +
 32*log(x + 4))*log(x + 4) + 157/6*(x - 4*log(x + 4))*log(x + 4) - 110/3*l
og(x + 4)^2 + x
```

3.853.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int \frac{48-98x+53x^2+15x^3+(-440+314x+286x^2+45x^3)\log(4+x)}{48+12x}\,dx$$
$$=\frac{1}{12}\left(15\,x^3+53\,x^2-110\,x\right)\log\left(x+4\right)+x$$

input
```
integrate(((45*x^3+286*x^2+314*x-440)*log(4+x)+15*x^3+53*x^2-98*x+48)/(12*
x+48),x, algorithm=\
```

output
```
1/12*(15*x^3 + 53*x^2 - 110*x)*log(x + 4) + x
```

3.853.9 Mupad [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.43

$$\int \frac{48-98x+53x^2+15x^3+(-440+314x+286x^2+45x^3)\log(4+x)}{48+12x}\,dx$$
$$=\frac{53\,x^2\,\ln\left(x+4\right)}{12}+\frac{5\,x^3\,\ln\left(x+4\right)}{4}-x\left(\frac{55\,\ln\left(x+4\right)}{6}-1\right)$$

input
```
int((log(x + 4)*(314*x + 286*x^2 + 45*x^3 - 440) - 98*x + 53*x^2 + 15*x^3
+ 48)/(12*x + 48),x)
```

output
```
(53*x^2*log(x + 4))/12 + (5*x^3*log(x + 4))/4 - x*((55*log(x + 4))/6 - 1)
```

3.854 $\int \frac{2-2x-2e^{2-x}x+e^{4x+x^2}(7x-e^{2-x}x+4x^2)+(-x-e^{2-x}x)\log(x)}{2x+e^{4x+x^2}x+x\log(x)}\,dx$

3.854.1 Optimal result

Integrand size = 83, antiderivative size = 29

$$\int \frac{2-2x-2e^{2-x}x+e^{4x+x^2}(7x-e^{2-x}x+4x^2)+(-x-e^{2-x}x)\log(x)}{2x+e^{4x+x^2}x+x\log(x)}\,dx$$
$$= e^{2-x}-x+\log\left(\frac{1}{9}\left(2+e^{x(4+x)}+\log(x)\right)^2\right)$$

output
```
exp(2-x)-x+ln(1/3*(2+exp((4+x)*x)+ln(x))*(2/3+1/3*exp((4+x)*x)+1/3*ln(x)))
```

3.854.2 Mathematica [A] (verified)

Time = 5.83 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{2-2x-2e^{2-x}x+e^{4x+x^2}(7x-e^{2-x}x+4x^2)+(-x-e^{2-x}x)\log(x)}{2x+e^{4x+x^2}x+x\log(x)}\,dx$$
$$= e^{2-x}-x+2\log\left(2+e^{x(4+x)}+\log(x)\right)$$

input
```
Integrate[(2 - 2*x - 2*E^(2 - x)*x + E^(4*x + x^2)*(7*x - E^(2 - x)*x + 4*
x^2) + (-x - E^(2 - x)*x)*Log[x])/(2*x + E^(4*x + x^2)*x + x*Log[x]),x]
```

output
```
E^(2 - x) - x + 2*Log[2 + E^(x*(4 + x)) + Log[x]]
```

3.854.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^2+4x}(4x^2-e^{2-x}x+7x)-2e^{2-x}x-2x+(-e^{2-x}x-x)\log(x)+2}{e^{x^2+4x}x+2x+x\log(x)}\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(e^{-x}(4e^x x+7e^x-e^2)-\frac{2(4x^2+2x^2\log(x)+8x+4x\log(x)-1)}{x\left(e^{x(x+4)}+\log(x)+2\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-16\int \frac{1}{\log(x)+e^{x(x+4)}+2}dx+2\int \frac{1}{x\left(\log(x)+e^{x(x+4)}+2\right)}dx-8\int \frac{x}{\log(x)+e^{x(x+4)}+2}dx-8\int \frac{\log(x)}{\log(x)+e^{x(x+4)}+2}dx-4\int \frac{x\log(x)}{\log(x)+e^{x(x+4)}+2}dx+2x^2+7x+e^{2-x}$$

input
```
Int[(2 - 2*x - 2*E^(2 - x)*x + E^(4*x + x^2)*(7*x - E^(2 - x)*x + 4*x^2) +
 (-x - E^(2 - x)*x)*Log[x])/(2*x + E^(4*x + x^2)*x + x*Log[x]),x]
```

output
```
$Aborted
```

3.854.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.854.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

method	result	size
risch	$-x+2\ln\left(2+\mathrm{e}^{(4+x)x}+\ln\left(x\right)\right)+\mathrm{e}^{2-x}$	24
default	$-x+2\ln\left(\ln\left(x\right)+\mathrm{e}^{x^{2}+4x}+2\right)+\mathrm{e}^{2-x}$	26
parallelrisch	$-x+2\ln\left(\ln\left(x\right)+\mathrm{e}^{x^{2}+4x}+2\right)+\mathrm{e}^{2-x}$	26
parts	$-x+2\ln\left(\ln\left(x\right)+\mathrm{e}^{x^{2}+4x}+2\right)+\mathrm{e}^{2-x}$	26

input
```
int(((-x*exp(2-x)-x)*ln(x)+(-x*exp(2-x)+4*x^2+7*x)*exp(x^2+4*x)-2*x*exp(2-
x)-2*x+2)/(x*ln(x)+x*exp(x^2+4*x)+2*x),x,method=_RETURNVERBOSE)
```

output
```
-x+2*ln(2+exp((4+x)*x)+ln(x))+exp(2-x)
```

3.854.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{2-2x-2e^{2-x}x+e^{4x+x^2}(7x-e^{2-x}x+4x^2)+(-x-e^{2-x}x)\log(x)}{2x+e^{4x+x^2}x+x\log(x)}\,dx$$
$$= -x+e^{(-x+2)}+2\,\log\left(e^{(x^2+4\,x)}+\log\left(x\right)+2\right)$$

input
```
integrate(((-x*exp(2-x)-x)*log(x)+(-x*exp(2-x)+4*x^2+7*x)*exp(x^2+4*x)-2*x
*exp(2-x)-2*x+2)/(x*log(x)+x*exp(x^2+4*x)+2*x),x, algorithm=\
```

output
```
-x + e^(-x + 2) + 2*log(e^(x^2 + 4*x) + log(x) + 2)
```

3.854.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{2-2x-2e^{2-x}x+e^{4x+x^2}(7x-e^{2-x}x+4x^2)+(-x-e^{2-x}x)\log(x)}{2x+e^{4x+x^2}x+x\log(x)}\,dx$$
$$=-x+e^{2-x}+2\log\left(e^{x^2+4x}+\log(x)+2\right)$$

input
```
integrate(((-x*exp(2-x)-x)*ln(x)+(-x*exp(2-x)+4*x**2+7*x)*exp(x**2+4*x)-2*
x*exp(2-x)-2*x+2)/(x*ln(x)+x*exp(x**2+4*x)+2*x),x)
```

output
```
-x + exp(2 - x) + 2*log(exp(x**2 + 4*x) + log(x) + 2)
```

3.854.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

$$\int \frac{2-2x-2e^{2-x}x+e^{4x+x^2}(7x-e^{2-x}x+4x^2)+(-x-e^{2-x}x)\log(x)}{2x+e^{4x+x^2}x+x\log(x)}\,dx$$
$$=(7\,xe^{x}+e^{2})e^{(-x)}+2\,\log\left(\left(e^{(x^2+4\,x)}+\log(x)+2\right)e^{(-4\,x)}\right)$$

input
```
integrate(((-x*exp(2-x)-x)*log(x)+(-x*exp(2-x)+4*x^2+7*x)*exp(x^2+4*x)-2*x
*exp(2-x)-2*x+2)/(x*log(x)+x*exp(x^2+4*x)+2*x),x, algorithm=\
```

output
```
(7*x*e^x + e^2)*e^(-x) + 2*log((e^(x^2 + 4*x) + log(x) + 2)*e^(-4*x))
```

3.854.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. 2(25) = 50.

Time = 0.28 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.97

$$\int \frac{2-2x-2e^{2-x}x+e^{4x+x^2}(7x-e^{2-x}x+4x^2)+(-x-e^{2-x}x)\log(x)}{2x+e^{4x+x^2}x+x\log(x)}\,dx$$
$$=-\left(xe^{(x^2+4\,x)}-2\,e^{(x^2+4\,x)}\log\left(e^{(x^2+4\,x)}+\log(x)+2\right)-e^{(x^2+3\,x+2)}\right)e^{(-x^2-4\,x)}$$

input
```
integrate(((-x*exp(2-x)-x)*log(x)+(-x*exp(2-x)+4*x^2+7*x)*exp(x^2+4*x)-2*x
*exp(2-x)-2*x+2)/(x*log(x)+x*exp(x^2+4*x)+2*x),x, algorithm=\
```

output
```
-(x*e^(x^2 + 4*x) - 2*e^(x^2 + 4*x)*log(e^(x^2 + 4*x) + log(x) + 2) - e^(x
^2 + 3*x + 2))*e^(-x^2 - 4*x)
```

3.854.9 Mupad [B] (verification not implemented)

Time = 14.49 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{2-2x-2e^{2-x}x+e^{4x+x^2}(7x-e^{2-x}x+4x^2)+(-x-e^{2-x}x)\log(x)}{2x+e^{4x+x^2}x+x\log(x)}\,dx$$
$$=2\,\ln\left(\ln\left(x\right)+\mathrm{e}^{4\,x}\,\mathrm{e}^{x^2}+2\right)-x+\mathrm{e}^{2-x}$$

input
```
int(-(2*x + 2*x*exp(2 - x) + log(x)*(x + x*exp(2 - x)) - exp(4*x + x^2)*(7
*x - x*exp(2 - x) + 4*x^2) - 2)/(2*x + x*exp(4*x + x^2) + x*log(x)),x)
```

output
```
2*log(log(x) + exp(4*x)*exp(x^2) + 2) - x + exp(2 - x)
```

3.855 $\int \frac{-4-x^2-\log(2x)}{(5x-x^3+x\log(2x))\log\left(\frac{-5+x^2-\log(2x)}{x}\right)}\,dx$

3.855.1 Optimal result

Integrand size = 49, antiderivative size = 15

$$\int \frac{-4-x^2-\log(2x)}{(5x-x^3+x\log(2x))\log\left(\frac{-5+x^2-\log(2x)}{x}\right)}\,dx=\log\left(\log\left(x-\frac{5+\log(2x)}{x}\right)\right)$$

output
```
ln(ln(x-(ln(2*x)+5)/x))
```

3.855.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int \frac{-4-x^2-\log(2x)}{(5x-x^3+x\log(2x))\log\left(\frac{-5+x^2-\log(2x)}{x}\right)}\,dx=\log\left(\log\left(\frac{-5+x^2-\log(2x)}{x}\right)\right)$$

input
```
Integrate[(-4 - x^2 - Log[2*x])/((5*x - x^3 + x*Log[2*x])*Log[(-5 + x^2 - 
Log[2*x])/x]),x]
```

output
```
Log[Log[(-5 + x^2 - Log[2*x])/x]]
```

3.855.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.020, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2-\log(2x)-4}{(-x^3+5x+x\log(2x))\log\left(\frac{x^2-\log(2x)-5}{x}\right)}dx$$

$$\Big\downarrow \text{7235}$$

$$\log\left(\log\left(-\frac{-x^2+\log(2x)+5}{x}\right)\right)$$

input
```
Int[(-4 - x^2 - Log[2*x])/((5*x - x^3 + x*Log[2*x])*Log[(-5 + x^2 - Log[2*
x])/x]),x]
```

output
```
Log[Log[-((5 - x^2 + Log[2*x])/x)]]
```

3.855.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.855.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.27

method	result	size
parallelrisch	$\ln\left(\ln\left(-\frac{-x^2+\ln(2x)+5}{x}\right)\right)$	19
default	$\ln\left(\ln\left(\frac{x^2-\ln(2)-\ln(x)-5}{x}\right)\right)$	20

input
```
int((-ln(2*x)-x^2-4)/(x*ln(2*x)-x^3+5*x)/ln((-ln(2*x)+x^2-5)/x),x,method=_
RETURNVERBOSE)
```

output
```
ln(ln(-(-x^2+ln(2*x)+5)/x))
```

3.855.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int \frac{-4-x^2-\log(2x)}{(5x-x^3+x\log(2x))\log\left(\frac{-5+x^2-\log(2x)}{x}\right)}\,dx = \log\left(\log\left(\frac{x^2-\log(2x)-5}{x}\right)\right)$$

input
```
integrate((-log(2*x)-x^2-4)/(x*log(2*x)-x^3+5*x)/log((-log(2*x)+x^2-5)/x),
x, algorithm=\
```

output
```
log(log((x^2 - log(2*x) - 5)/x))
```

3.855.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{-4-x^2-\log(2x)}{(5x-x^3+x\log(2x))\log\left(\frac{-5+x^2-\log(2x)}{x}\right)}\,dx = \log\left(\log\left(\frac{x^2-\log(2x)-5}{x}\right)\right)$$

input
```
integrate((-ln(2*x)-x**2-4)/(x*ln(2*x)-x**3+5*x)/ln((-ln(2*x)+x**2-5)/x),x
)
```

output
```
log(log((x**2 - log(2*x) - 5)/x))
```

3.855.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33

$$\int \frac{-4-x^2-\log(2x)}{(5x-x^3+x\log(2x))\log\left(\frac{-5+x^2-\log(2x)}{x}\right)}\,dx = \log\left(\log\left(x^2-\log(2)-\log(x)-5\right)-\log(x)\right)$$

input
```
integrate((-log(2*x)-x^2-4)/(x*log(2*x)-x^3+5*x)/log((-log(2*x)+x^2-5)/x),
x, algorithm=\
```

output
```
log(log(x^2 - log(2) - log(x) - 5) - log(x))
```

3.855.8 Giac [F]

$$\int \frac{-4-x^2-\log(2x)}{(5x-x^3+x\log(2x))\log\left(\frac{-5+x^2-\log(2x)}{x}\right)}\,dx=\int \frac{x^2+\log(2x)+4}{(x^3-x\log(2x)-5x)\log\left(\frac{x^2-\log(2x)-5}{x}\right)}\,dx$$

input
```
integrate((-log(2*x)-x^2-4)/(x*log(2*x)-x^3+5*x)/log((-log(2*x)+x^2-5)/x),
x, algorithm=\
```

output
```
integrate((x^2 + log(2*x) + 4)/((x^3 - x*log(2*x) - 5*x)*log((x^2 - log(2*
x) - 5)/x)), x)
```

3.855.9 Mupad [B] (verification not implemented)

Time = 14.57 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int \frac{-4-x^2-\log(2x)}{(5x-x^3+x\log(2x))\log\left(\frac{-5+x^2-\log(2x)}{x}\right)}\,dx=\ln\left(\ln\left(-\frac{\ln(2x)-x^2+5}{x}\right)\right)$$

input
```
int(-(log(2*x) + x^2 + 4)/(log(-(log(2*x) - x^2 + 5)/x)*(5*x + x*log(2*x)
- x^3)),x)
```

output
```
log(log(-(log(2*x) - x^2 + 5)/x))
```

3.856 $\int e^{20e^{-2x+9x^3}-2x+9x^3}(-40+540x^2)\,dx$

3.856.1 Optimal result

Integrand size = 32, antiderivative size = 15

$$\int e^{20e^{-2x+9x^3}-2x+9x^3}(-40+540x^2)\,dx = e^{20e^{-2x+9x^3}}$$

output
```
exp(20/exp(-9*x^3+2*x))
```

3.856.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int e^{20e^{-2x+9x^3}-2x+9x^3}(-40+540x^2)\,dx = e^{20e^{-2x+9x^3}}$$

input
```
Integrate[E^(20*E^(-2*x + 9*x^3) - 2*x + 9*x^3)*(-40 + 540*x^2),x]
```

output
```
E^(20*E^(-2*x + 9*x^3))
```

3.856.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{9x^3+20e^{9x^3-2x}-2x}\left(540x^2-40\right) dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(540e^{9x^3+20e^{9x^3-2x}-2x}x^2-40e^{9x^3+20e^{9x^3-2x}-2x}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$540\int e^{9x^3-2x+20e^{9x^3-2x}}x^2dx-40\int e^{9x^3-2x+20e^{9x^3-2x}}dx$$

input
```
Int[E^(20*E^(-2*x + 9*x^3) - 2*x + 9*x^3)*(-40 + 540*x^2),x]
```

output
```
$Aborted
```

3.856.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.856.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

method	result	size
risch	$e^{20\,e^{x\left(9x^2-2\right)}}$	14
default	$e^{20\,e^{9x^3-2x}}$	16
norman	$e^{20\,e^{9x^3-2x}}$	16
parallelrisch	$e^{20\,e^{9x^3-2x}}$	16

input
```
int((540*x^2-40)*exp(20/exp(-9*x^3+2*x))/exp(-9*x^3+2*x),x,method=_RETURNV
ERBOSE)
```

output
```
exp(20*exp(x*(9*x^2-2)))
```

3.856.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int e^{20e^{-2x+9x^3}-2x+9x^3}\left(-40+540x^2\right)\,dx=e^{\left(20\,e^{\left(9\,x^3-2\,x\right)}\right)}$$

input
```
integrate((540*x^2-40)*exp(20/exp(-9*x^3+2*x))/exp(-9*x^3+2*x),x, algorith
m=\
```

output
```
e^(20*e^(9*x^3 - 2*x))
```

3.856.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int e^{20e^{-2x+9x^3}-2x+9x^3}\left(-40+540x^2\right)\,dx=e^{20e^{9x^3-2x}}$$

input
```
integrate((540*x**2-40)*exp(20/exp(-9*x**3+2*x))/exp(-9*x**3+2*x),x)
```

output
```
exp(20*exp(9*x**3 - 2*x))
```

3.856.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int e^{20e^{-2x+9x^3}-2x+9x^3}\left(-40+540x^2\right)\,dx=e^{\left(20\,e^{\left(9\,x^3-2\,x\right)}\right)}$$

input
```
integrate((540*x^2-40)*exp(20/exp(-9*x^3+2*x))/exp(-9*x^3+2*x),x, algorith
m=\
```

output
```
e^(20*e^(9*x^3 - 2*x))
```

3.856.8 Giac [F]

$$\int e^{20e^{-2x+9x^3}-2x+9x^3}\left(-40+540x^2\right)\,dx=\int 20\left(27\,x^2-2\right)e^{\left(9\,x^3-2\,x+20\,e^{\left(9\,x^3-2\,x\right)}\right)}\,dx$$

input
```
integrate((540*x^2-40)*exp(20/exp(-9*x^3+2*x))/exp(-9*x^3+2*x),x, algorith
m=\
```

output
```
integrate(20*(27*x^2 - 2)*e^(9*x^3 - 2*x + 20*e^(9*x^3 - 2*x)), x)
```

3.856.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int e^{20e^{-2x+9x^3}-2x+9x^3}\left(-40+540x^2\right)\,dx=\mathrm{e}^{20\,\mathrm{e}^{9\,x^3-2\,x}}$$

input
```
int(exp(20*exp(9*x^3 - 2*x))*exp(9*x^3 - 2*x)*(540*x^2 - 40),x)
```

output
```
exp(20*exp(9*x^3 - 2*x))
```

3.857 $\int \frac{24x+72x^2+48x^3+32x^5+80x^6+64x^7+16x^8+e^x(64x^4+192}{9-24x^4-24x^5+16x^8+32x^9+16x^{10}+e^{2x}(256x^6+512x^7+256x^8)+e^x(}$

3.857.1 Optimal result

Integrand size = 146, antiderivative size = 29

$$\int \frac{24x+72x^2+48x^3+32x^5+80x^6+64x^7+16x^8+e^x(64x^4+192x^5+256x^6+192x^7+64x}{9-24x^4-24x^5+16x^8+32x^9+16x^{10}+e^{2x}(256x^6+512x^7+256x^8)+e^x(-96x^3-96x^4+128x^7+2}$$
$$= \frac{1+x}{-x(4e^x+x)+\frac{3}{x^2(4+4x)}}$$

output
```
(1+x)/(3/x^2/(4+4*x)-x*(4*exp(x)+x))
```

3.857.2 Mathematica [A] (verified)

Time = 5.00 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.21

$$\int \frac{24x+72x^2+48x^3+32x^5+80x^6+64x^7+16x^8+e^x(64x^4+192x^5+256x^6+192x^7+64x}{9-24x^4-24x^5+16x^8+32x^9+16x^{10}+e^{2x}(256x^6+512x^7+256x^8)+e^x(-96x^3-96x^4+128x^7+2}$$
$$= -\frac{8x^2(1+x)^2}{-6+8x^4+8x^5+32e^x x^3(1+x)}$$

input
```
Integrate[(24*x + 72*x^2 + 48*x^3 + 32*x^5 + 80*x^6 + 64*x^7 + 16*x^8 + E^
x*(64*x^4 + 192*x^5 + 256*x^6 + 192*x^7 + 64*x^8))/(9 - 24*x^4 - 24*x^5 +
16*x^8 + 32*x^9 + 16*x^10 + E^(2*x)*(256*x^6 + 512*x^7 + 256*x^8) + E^x*(-
96*x^3 - 96*x^4 + 128*x^7 + 256*x^8 + 128*x^9)),x]
```

output
```
(-8*x^2*(1 + x)^2)/(-6 + 8*x^4 + 8*x^5 + 32*E^x*x^3*(1 + x))
```

3.857.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16x^8+64x^7+80x^6+32x^5+48x^3+72x^2+e^x\left(64x^8+192x^7+256x^6+192x^5+64x^4\right)+24x}{16x^{10}+32x^9+16x^8-24x^5-24x^4+e^{2x}\left(256x^8+512x^7+256x^6\right)+e^x\left(128x^9+256x^8+128x^7-96x^4-96x^3\right)}$$

$$\Big\downarrow \; 7239$$

$$\int \frac{8x(x+1)\left((8e^x+2)x^6+2(8e^x+3)x^5+4(4e^x+1)x^4+8e^xx^3+6x+3\right)}{\left(-4x^5-4x^4-16e^x(x+1)x^3+3\right)^2}dx$$

$$\Big\downarrow \; 27$$

$$8\int \frac{x(x+1)\left(2(1+4e^x)x^6+2(3+8e^x)x^5+4(1+4e^x)x^4+8e^xx^3+6x+3\right)}{\left(-4x^5-4x^4-16e^x(x+1)x^3+3\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$8\int \left(\frac{x\left(x^3+2x^2+2x+1\right)}{2\left(4x^5+16e^xx^4+4x^4+16e^xx^3-3\right)}-\frac{x\left(4x^8+8x^7-8x^5-4x^4-3x^3-18x^2-24x-9\right)}{2\left(4x^5+16e^xx^4+4x^4+16e^xx^3-3\right)^2}\right)dx$$

$$\Big\downarrow \; 2009$$

$$8\left(\frac{9}{2}\int \frac{x}{\left(4x^5+16e^xx^4+4x^4+16e^xx^3-3\right)^2}dx+9\int \frac{x^3}{\left(4x^5+16e^xx^4+4x^4+16e^xx^3-3\right)^2}dx+\frac{3}{2}\int \frac{}{\left(4x^5+16e^x\right.}\right.$$

input
```
Int[(24*x + 72*x^2 + 48*x^3 + 32*x^5 + 80*x^6 + 64*x^7 + 16*x^8 + E^x*(64*
x^4 + 192*x^5 + 256*x^6 + 192*x^7 + 64*x^8))/(9 - 24*x^4 - 24*x^5 + 16*x^8
 + 32*x^9 + 16*x^10 + E^(2*x)*(256*x^6 + 512*x^7 + 256*x^8) + E^x*(-96*x^3
 - 96*x^4 + 128*x^7 + 256*x^8 + 128*x^9)),x]
```

output
```
$Aborted
```

3.857.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.857.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

method	result	size
risch	$-\frac{4x^2(1+x)^2}{16\,e^x x^4+4x^5+16\,e^x x^3+4x^4-3}$	39
norman	$\frac{-4x^4-8x^3-4x^2}{16\,e^x x^4+4x^5+16\,e^x x^3+4x^4-3}$	46
parallelrisch	$\frac{-64x^4-128x^3-64x^2}{256\,e^x x^4+64x^5+256\,e^x x^3+64x^4-48}$	47

input
```
int(((64*x^8+192*x^7+256*x^6+192*x^5+64*x^4)*exp(x)+16*x^8+64*x^7+80*x^6+3
2*x^5+48*x^3+72*x^2+24*x)/((256*x^8+512*x^7+256*x^6)*exp(x)^2+(128*x^9+256
*x^8+128*x^7-96*x^4-96*x^3)*exp(x)+16*x^10+32*x^9+16*x^8-24*x^5-24*x^4+9),
x,method=_RETURNVERBOSE)
```

output
```
-4*x^2*(1+x)^2/(16*exp(x)*x^4+4*x^5+16*exp(x)*x^3+4*x^4-3)
```

3.857.
$\int \frac{24x+72x^2+48x^3+32x^5+80x^6+64x^7+16x^8+e^x(64x^4+192x^5+256x^6+192x^7+64x^8)}{9-24x^4-24x^5+16x^8+32x^9+16x^{10}+e^{2x}(256x^6+512x^7+256x^8)+e^x(-96x^3-96x^4+128x^7+256x^8+128x^9)}\,dx$

3.857.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \frac{24x + 72x^2 + 48x^3 + 32x^5 + 80x^6 + 64x^7 + 16x^8 + e^x(64x^4 + 192x^5 + 256x^6 + 192x^7 + 64x}{9 - 24x^4 - 24x^5 + 16x^8 + 32x^9 + 16x^{10} + e^{2x}(256x^6 + 512x^7 + 256x^8) + e^x(-96x^3 - 96x^4 + 128x^7 + 2}$$
$$= -\frac{4\,(x^4 + 2\,x^3 + x^2)}{4\,x^5 + 4\,x^4 + 16\,(x^4 + x^3)e^x - 3}$$

input
```
integrate(((64*x^8+192*x^7+256*x^6+192*x^5+64*x^4)*exp(x)+16*x^8+64*x^7+80
*x^6+32*x^5+48*x^3+72*x^2+24*x)/((256*x^8+512*x^7+256*x^6)*exp(x)^2+(128*x
^9+256*x^8+128*x^7-96*x^4-96*x^3)*exp(x)+16*x^10+32*x^9+16*x^8-24*x^5-24*x
^4+9),x, algorithm=\
```

output
```
-4*(x^4 + 2*x^3 + x^2)/(4*x^5 + 4*x^4 + 16*(x^4 + x^3)*e^x - 3)
```

3.857.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(20) = 40.

Time = 0.21 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.41

$$\int \frac{24x + 72x^2 + 48x^3 + 32x^5 + 80x^6 + 64x^7 + 16x^8 + e^x(64x^4 + 192x^5 + 256x^6 + 192x^7 + 64x}{9 - 24x^4 - 24x^5 + 16x^8 + 32x^9 + 16x^{10} + e^{2x}(256x^6 + 512x^7 + 256x^8) + e^x(-96x^3 - 96x^4 + 128x^7 + 2}$$
$$= \frac{-4x^4 - 8x^3 - 4x^2}{4x^5 + 4x^4 + (16x^4 + 16x^3)\,e^x - 3}$$

input
```
integrate(((64*x**8+192*x**7+256*x**6+192*x**5+64*x**4)*exp(x)+16*x**8+64*
x**7+80*x**6+32*x**5+48*x**3+72*x**2+24*x)/((256*x**8+512*x**7+256*x**6)*e
xp(x)**2+(128*x**9+256*x**8+128*x**7-96*x**4-96*x**3)*exp(x)+16*x**10+32*x
**9+16*x**8-24*x**5-24*x**4+9),x)
```

output
```
(-4*x**4 - 8*x**3 - 4*x**2)/(4*x**5 + 4*x**4 + (16*x**4 + 16*x**3)*exp(x)
- 3)
```

3.857.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \frac{24x + 72x^2 + 48x^3 + 32x^5 + 80x^6 + 64x^7 + 16x^8 + e^x(64x^4 + 192x^5 + 256x^6 + 192x^7 + 64x}{9 - 24x^4 - 24x^5 + 16x^8 + 32x^9 + 16x^{10} + e^{2x}\left(256x^6 + 512x^7 + 256x^8\right) + e^x\left(-96x^3 - 96x^4 + 128x^7 + 2\right.}$$
$$= -\frac{4\left(x^4 + 2x^3 + x^2\right)}{4x^5 + 4x^4 + 16\left(x^4 + x^3\right)e^x - 3}$$

input
```
integrate(((64*x^8+192*x^7+256*x^6+192*x^5+64*x^4)*exp(x)+16*x^8+64*x^7+80
*x^6+32*x^5+48*x^3+72*x^2+24*x)/((256*x^8+512*x^7+256*x^6)*exp(x)^2+(128*x
^9+256*x^8+128*x^7-96*x^4-96*x^3)*exp(x)+16*x^10+32*x^9+16*x^8-24*x^5-24*x
^4+9),x, algorithm=\
```

output
```
-4*(x^4 + 2*x^3 + x^2)/(4*x^5 + 4*x^4 + 16*(x^4 + x^3)*e^x - 3)
```

3.857.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45

$$\int \frac{24x + 72x^2 + 48x^3 + 32x^5 + 80x^6 + 64x^7 + 16x^8 + e^x(64x^4 + 192x^5 + 256x^6 + 192x^7 + 64x}{9 - 24x^4 - 24x^5 + 16x^8 + 32x^9 + 16x^{10} + e^{2x}\left(256x^6 + 512x^7 + 256x^8\right) + e^x\left(-96x^3 - 96x^4 + 128x^7 + 2\right.}$$
$$= -\frac{4\left(x^4 + 2x^3 + x^2\right)}{4x^5 + 16x^4e^x + 4x^4 + 16x^3e^x - 3}$$

input
```
integrate(((64*x^8+192*x^7+256*x^6+192*x^5+64*x^4)*exp(x)+16*x^8+64*x^7+80
*x^6+32*x^5+48*x^3+72*x^2+24*x)/((256*x^8+512*x^7+256*x^6)*exp(x)^2+(128*x
^9+256*x^8+128*x^7-96*x^4-96*x^3)*exp(x)+16*x^10+32*x^9+16*x^8-24*x^5-24*x
^4+9),x, algorithm=\
```

output
```
-4*(x^4 + 2*x^3 + x^2)/(4*x^5 + 16*x^4*e^x + 4*x^4 + 16*x^3*e^x - 3)
```

3.857.9 Mupad [F(-1)]

Timed out.

$$\int \frac{24x + 72x^2 + 48x^3 + 32x^5 + 80x^6 + 64x^7 + 16x^8 + e^x(64x^4 + 192x^5 + 256x^6 + 192x^7 + 64x}{9 - 24x^4 - 24x^5 + 16x^8 + 32x^9 + 16x^{10} + e^{2x}(256x^6 + 512x^7 + 256x^8) + e^x(-96x^3 - 96x^4 + 128x^7 + 2}$$
$$= \int \frac{24\,x + \mathrm{e}^x\,(64\,x^8 + 192\,x^7 + 256\,x^6 + 192\,x^5 + 64\,x^4) + 72\,x^2 + 48\,x^3 + 32\,x^5 + 80\,x^6 + 64\,x}{\mathrm{e}^{2\,x}\,(256\,x^8 + 512\,x^7 + 256\,x^6) + \mathrm{e}^x\,(128\,x^9 + 256\,x^8 + 128\,x^7 - 96\,x^4 - 96\,x^3) - 24\,x^4 - 24\,x^5 + 16\,x^8}$$

input
```
int((24*x + exp(x)*(64*x^4 + 192*x^5 + 256*x^6 + 192*x^7 + 64*x^8) + 72*x^
2 + 48*x^3 + 32*x^5 + 80*x^6 + 64*x^7 + 16*x^8)/(exp(2*x)*(256*x^6 + 512*x
^7 + 256*x^8) + exp(x)*(128*x^7 - 96*x^4 - 96*x^3 + 256*x^8 + 128*x^9) - 2
4*x^4 - 24*x^5 + 16*x^8 + 32*x^9 + 16*x^10 + 9),x)
```

output
```
int((24*x + exp(x)*(64*x^4 + 192*x^5 + 256*x^6 + 192*x^7 + 64*x^8) + 72*x^
2 + 48*x^3 + 32*x^5 + 80*x^6 + 64*x^7 + 16*x^8)/(exp(2*x)*(256*x^6 + 512*x
^7 + 256*x^8) + exp(x)*(128*x^7 - 96*x^4 - 96*x^3 + 256*x^8 + 128*x^9) - 2
4*x^4 - 24*x^5 + 16*x^8 + 32*x^9 + 16*x^10 + 9), x)
```

3.858 $\int -\frac{8}{144+192x+64x^2+(-24-16x)\log(16)+\log^2(16)}\,dx$

3.858.1 Optimal result

Integrand size = 26, antiderivative size = 15

$$\int -\frac{8}{144+192x+64x^2+(-24-16x)\log(16)+\log^2(16)}\,dx=\frac{1}{2x+6(2+x)-\log(16)}$$

output
```
1/(8*x+12-4*ln(2))
```

3.858.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.73

$$\int -\frac{8}{144+192x+64x^2+(-24-16x)\log(16)+\log^2(16)}\,dx=-\frac{1}{-12-8x+\log(16)}$$

input
```
Integrate[-8/(144 + 192*x + 64*x^2 + (-24 - 16*x)*Log[16] + Log[16]^2),x]
```

output
```
-(-12 - 8*x + Log[16])^(-1)
```

3.858.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.73, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {27, 2080, 1077, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{8}{64x^2+192x+(-16x-24)\log(16)+144+\log^2(16)}dx$$

$$\Big\downarrow \; 27$$

$$-8\int \frac{1}{64x^2+192x+\log^2(16)-8(2x+3)\log(16)+144}dx$$

$$\Big\downarrow \; 2080$$

$$-8\int \frac{1}{64x^2+16(12-\log(16))x+(-12+\log(16))^2}dx$$

$$\Big\downarrow \; 1077$$

$$-512\int \frac{1}{(64x+8(12-\log(16)))^2}dx$$

$$\Big\downarrow \; 17$$

$$\frac{1}{8x+12-\log(16)}$$

input
```
Int[-8/(144 + 192*x + 64*x^2 + (-24 - 16*x)*Log[16] + Log[16]^2),x]
```

output
```
(12 + 8*x - Log[16])^(-1)
```

3.858.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1077
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/c^p   Int
[(b/2 + c*x)^(2*p), x], x] /; FreeQ[{a, b, c}, x] && EqQ[b^2 - 4*a*c, 0] &&
 IntegerQ[p]
```

rule 2080
```
Int[(u_)^(p_), x_Symbol] :> Int[ExpandToSum[u, x]^p, x] /; FreeQ[p, x] && Q
uadraticQ[u, x] &&  !QuadraticMatchQ[u, x]
```

3.858.4 Maple [A] (verified)

Time = 1.55 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

method	result	size
gosper	$-\frac{1}{4(\ln(2)-2x-3)}$	12
norman	$-\frac{1}{4(\ln(2)-2x-3)}$	12
risch	$-\frac{1}{4(\ln(2)-2x-3)}$	12
parallelrisch	$-\frac{1}{4(\ln(2)-2x-3)}$	12
default	$\frac{1}{8x+12-4\ln(2)}$	14
meijerg	$-\frac{x}{4\left(-\frac{\ln(2)}{2}+\frac{3}{2}\right)(-\ln(2)+3)\left(1+\frac{2x}{-\ln(2)+3}\right)}$	35

input
```
int(-8/(16*ln(2)^2+4*(-16*x-24)*ln(2)+64*x^2+192*x+144),x,method=_RETURNVE
RBOSE)
```

output
```
-1/4/(ln(2)-2*x-3)
```

3.858.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int -\frac{8}{144+192x+64x^2+(-24-16x)\log(16)+\log^2(16)}\,dx = \frac{1}{4\,(2\,x-\log\,(2)+3)}$$

input
```
integrate(-8/(16*log(2)^2+4*(-16*x-24)*log(2)+64*x^2+192*x+144),x, algorit
hm=\
```

output
```
1/4/(2*x - log(2) + 3)
```

3.858.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.67

$$\int -\frac{8}{144+192x+64x^2+(-24-16x)\log(16)+\log^2(16)}\,dx = \frac{1}{8x-4\log(2)+12}$$

input
```
integrate(-8/(16*ln(2)**2+4*(-16*x-24)*ln(2)+64*x**2+192*x+144),x)
```

output
```
1/(8*x - 4*log(2) + 12)
```

3.858.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int -\frac{8}{144+192x+64x^2+(-24-16x)\log(16)+\log^2(16)}\,dx = \frac{1}{4(2x-\log(2)+3)}$$

input
```
integrate(-8/(16*log(2)^2+4*(-16*x-24)*log(2)+64*x^2+192*x+144),x, algorit
hm=\
```

output
```
1/4/(2*x - log(2) + 3)
```

3.858.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int -\frac{8}{144+192x+64x^2+(-24-16x)\log(16)+\log^2(16)}\,dx = \frac{1}{4(2x-\log(2)+3)}$$

input
```
integrate(-8/(16*log(2)^2+4*(-16*x-24)*log(2)+64*x^2+192*x+144),x, algorit
hm=\
```

output
```
1/4/(2*x - log(2) + 3)
```

3.858.9 Mupad [B] (verification not implemented)

Time = 15.14 (sec) , antiderivative size = 51, normalized size of antiderivative = 3.40

$$\int -\frac{8}{144+192x+64x^2+(-24-16x)\log(16)+\log^2(16)}\,dx = \frac{2\,\mathrm{atanh}\left(\frac{16\,x-\ln(256)+24}{\sqrt{\ln(256)-8\,\ln(2)}\,\sqrt{8\,\ln(2)+\ln(256)-48}}\right)}{\sqrt{\ln(256)-8\,\ln(2)}\,\sqrt{8\,\ln(2)+\ln(256)-48}}$$

input
```
int(-8/(192*x - 4*log(2)*(16*x + 24) + 16*log(2)^2 + 64*x^2 + 144),x)
```

output
```
(2*atanh((16*x - log(256) + 24)/((log(256) - 8*log(2))^(1/2)*(8*log(2) + l
og(256) - 48)^(1/2))))/((log(256) - 8*log(2))^(1/2)*(8*log(2) + log(256) -
 48)^(1/2))
```

3.859 $\int \frac{(-125-55x-6x^2+50x^4+20x^5+2x^6)\log(4)+(-5x+200x^4+80x^5+8x^6)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)}{(25x+10x^2+x^3)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}$

3.859.1 Optimal result

Integrand size = 88, antiderivative size = 27

$$\int \frac{(-125-55x-6x^2+50x^4+20x^5+2x^6)\log(4)+(-5x+200x^4+80x^5+8x^6)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)}{(25x+10x^2+x^3)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}\,dx = \frac{\left(-5+2x^4-\frac{x}{5+x}\right)\log(4)}{\log\left(\frac{2}{\log(x)}\right)}$$

output
```
2*ln(2)/ln(2/ln(x))*(2*x^4-x/(5+x)-5)
```

3.859.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{(-125-55x-6x^2+50x^4+20x^5+2x^6)\log(4)+(-5x+200x^4+80x^5+8x^6)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)}{(25x+10x^2+x^3)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}\,dx = \frac{(-25-6x+10x^4+2x^5)\log(4)}{(5+x)\log\left(\frac{2}{\log(x)}\right)}$$

input
```
Integrate[((-125 - 55*x - 6*x^2 + 50*x^4 + 20*x^5 + 2*x^6)*Log[4] + (-5*x
+ 200*x^4 + 80*x^5 + 8*x^6)*Log[4]*Log[x]*Log[2/Log[x]])/((25*x + 10*x^2 +
 x^3)*Log[x]*Log[2/Log[x]]^2),x]
```

output
```
((-25 - 6*x + 10*x^4 + 2*x^5)*Log[4])/((5 + x)*Log[2/Log[x]])
```

3.859.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(8x^6+80x^5+200x^4-5x)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)+(2x^6+20x^5+50x^4-6x^2-55x-125)\log(4)}{(x^3+10x^2+25x)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{(8x^6+80x^5+200x^4-5x)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)+(2x^6+20x^5+50x^4-6x^2-55x-125)\log(4)}{x(x^2+10x+25)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{(8x^6+80x^5+200x^4-5x)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)+(2x^6+20x^5+50x^4-6x^2-55x-125)\log(4)}{x(x+5)^2\log(x)\log^2\left(\frac{2}{\log(x)}\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{(2x^5+10x^4-6x-25)\log(4)}{x(x+5)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}+\frac{(8x^5+80x^4+200x^3-5)\log(4)}{(x+5)^2\log\left(\frac{2}{\log(x)}\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2\log(4)\int \frac{x^3}{\log(x)\log^2\left(\frac{2}{\log(x)}\right)}dx+8\log(4)\int \frac{x^3}{\log\left(\frac{2}{\log(x)}\right)}dx-\log(4)\int \frac{1}{(x+5)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}dx-5\log(4)\int \frac{1}{(x+5)^2\log\left(\frac{2}{\log(x)}\right)}dx-\frac{5\log(4)}{\log\left(\frac{2}{\log(x)}\right)}$$

input
```
Int[((-125 - 55*x - 6*x^2 + 50*x^4 + 20*x^5 + 2*x^6)*Log[4] + (-5*x + 200*
x^4 + 80*x^5 + 8*x^6)*Log[4]*Log[x]*Log[2/Log[x]])/((25*x + 10*x^2 + x^3)*
Log[x]*Log[2/Log[x]]^2),x]
```

output
```
$Aborted
```

3.859.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.859.4 Maple [A] (verified)

Time = 5.45 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

method	result	size
risch	$\frac{4\ln(2)\left(2x^5+10x^4-6x-25\right)}{(5+x)\left(2\ln(2)-2\ln(\ln(x))\right)}$	37
parallelrisch	$\frac{4x^5\ln(2)+20x^4\ln(2)-12x\ln(2)-50\ln(2)}{\ln\left(\frac{2}{\ln(x)}\right)(5+x)}$	40

input
```
int((2*(8*x^6+80*x^5+200*x^4-5*x)*ln(2)*ln(x)*ln(2/ln(x))+2*(2*x^6+20*x^5+
50*x^4-6*x^2-55*x-125)*ln(2))/(x^3+10*x^2+25*x)/ln(x)/ln(2/ln(x))^2,x,meth
od=_RETURNVERBOSE)
```

output
```
4*ln(2)*(2*x^5+10*x^4-6*x-25)/(5+x)/(2*ln(2)-2*ln(ln(x)))
```

3.859.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int \frac{(-125-55x-6x^2+50x^4+20x^5+2x^6)\log(4)+(-5x+200x^4+80x^5+8x^6)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)}{(25x+10x^2+x^3)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}$$
$$= \frac{2\,(2\,x^5+10\,x^4-6\,x-25)\log(2)}{(x+5)\log\left(\frac{2}{\log(x)}\right)}$$

input
```
integrate((2*(8*x^6+80*x^5+200*x^4-5*x)*log(2)*log(x)*log(2/log(x))+2*(2*x
^6+20*x^5+50*x^4-6*x^2-55*x-125)*log(2))/(x^3+10*x^2+25*x)/log(x)/log(2/lo
g(x))^2,x, algorithm=\
```

output
```
2*(2*x^5 + 10*x^4 - 6*x - 25)*log(2)/((x + 5)*log(2/log(x)))
```

3.859.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{(-125-55x-6x^2+50x^4+20x^5+2x^6)\log(4)+(-5x+200x^4+80x^5+8x^6)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)}{(25x+10x^2+x^3)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}$$
$$= \frac{4x^5\log(2)+20x^4\log(2)-12x\log(2)-50\log(2)}{(x+5)\log\left(\frac{2}{\log(x)}\right)}$$

input
```
integrate((2*(8*x**6+80*x**5+200*x**4-5*x)*ln(2)*ln(x)*ln(2/ln(x))+2*(2*x*
*6+20*x**5+50*x**4-6*x**2-55*x-125)*ln(2))/(x**3+10*x**2+25*x)/ln(x)/ln(2/
ln(x))**2,x)
```

output
```
(4*x**5*log(2) + 20*x**4*log(2) - 12*x*log(2) - 50*log(2))/((x + 5)*log(2/
log(x)))
```

3.859.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.67

$$\int \frac{(-125-55x-6x^2+50x^4+20x^5+2x^6)\log(4)+(-5x+200x^4+80x^5+8x^6)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)}{(25x+10x^2+x^3)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}$$
$$= \frac{2\,(2\,x^5\log(2)+10\,x^4\log(2)-6\,x\log(2)-25\,\log(2))}{x\log(2)-(x+5)\log(\log(x))+5\,\log(2)}$$

input
```
integrate((2*(8*x^6+80*x^5+200*x^4-5*x)*log(2)*log(x)*log(2/log(x))+2*(2*x
^6+20*x^5+50*x^4-6*x^2-55*x-125)*log(2))/(x^3+10*x^2+25*x)/log(x)/log(2/lo
g(x))^2,x, algorithm=\
```

output
```
2*(2*x^5*log(2) + 10*x^4*log(2) - 6*x*log(2) - 25*log(2))/(x*log(2) - (x +
 5)*log(log(x)) + 5*log(2))
```

3.859.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.78

$$\int \frac{(-125-55x-6x^2+50x^4+20x^5+2x^6)\log(4)+(-5x+200x^4+80x^5+8x^6)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)}{(25x+10x^2+x^3)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}$$
$$= \frac{2\,(2\,x^5\log(2)+10\,x^4\log(2)-6\,x\log(2)-25\,\log(2))}{x\log(2)-x\log(\log(x))+5\,\log(2)-5\,\log(\log(x))}$$

input
```
integrate((2*(8*x^6+80*x^5+200*x^4-5*x)*log(2)*log(x)*log(2/log(x))+2*(2*x
^6+20*x^5+50*x^4-6*x^2-55*x-125)*log(2))/(x^3+10*x^2+25*x)/log(x)/log(2/lo
g(x))^2,x, algorithm=\
```

output
```
2*(2*x^5*log(2) + 10*x^4*log(2) - 6*x*log(2) - 25*log(2))/(x*log(2) - x*lo
g(log(x)) + 5*log(2) - 5*log(log(x)))
```

3.859.9 Mupad [B] (verification not implemented)

Time = 15.73 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int \frac{(-125-55x-6x^2+50x^4+20x^5+2x^6)\log(4)+(-5x+200x^4+80x^5+8x^6)\log(4)\log(x)\log\left(\frac{2}{\log(x)}\right)}{(25x+10x^2+x^3)\log(x)\log^2\left(\frac{2}{\log(x)}\right)}$$

$$=-\frac{2\ln(2)\left(-2x^5-10x^4+6x+25\right)}{\ln\left(\frac{2}{\ln(x)}\right)(x+5)}$$

input
```
int(-(2*log(2)*(55*x + 6*x^2 - 50*x^4 - 20*x^5 - 2*x^6 + 125) - 2*log(2/lo
g(x))*log(2)*log(x)*(200*x^4 - 5*x + 80*x^5 + 8*x^6))/(log(2/log(x))^2*log
(x)*(25*x + 10*x^2 + x^3)),x)
```

output
```
-(2*log(2)*(6*x - 10*x^4 - 2*x^5 + 25))/(log(2/log(x))*(x + 5))
```

3.860 $\int \frac{-750+750x-247x^2+150x^3+3x^4+\left(750-30x+780x^2-530x^3+30x^4\right) \mathrm{l}}{x^2+\left(-10x+10x^2\right)\log(x)+\left(25-50x\right.}$

3.860.1 Optimal result

Integrand size = 102, antiderivative size = 28

$$\int \frac{-750+750x-247x^2+150x^3+3x^4+(750-30x+780x^2-530x^3+30x^4)\log(x)+(75-150x+150}{x^2+(-10x+10x^2)\log(x)+(25-50x+25x^2)\log^2(x)}$$

$$=(3+x^2)\left(x-\frac{2x}{\frac{x}{25}+\frac{1}{5}(-1+x)\log(x)}\right)$$

output
```
(x-2/(1/5*(-1+x)*ln(x)+1/25*x)*x)*(x^2+3)
```

3.860.2 Mathematica [A] (verified)

Time = 0.34 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{-750+750x-247x^2+150x^3+3x^4+(750-30x+780x^2-530x^3+30x^4)\log(x)+(75-150x+150}{x^2+(-10x+10x^2)\log(x)+(25-50x+25x^2)\log^2(x)}$$

$$=x\left(3+x^2-\frac{50(3+x^2)}{x+5(-1+x)\log(x)}\right)$$

input
```
Integrate[(-750 + 750*x - 247*x^2 + 150*x^3 + 3*x^4 + (750 - 30*x + 780*x^
2 - 530*x^3 + 30*x^4)*Log[x] + (75 - 150*x + 150*x^2 - 150*x^3 + 75*x^4)*L
og[x]^2)/(x^2 + (-10*x + 10*x^2)*Log[x] + (25 - 50*x + 25*x^2)*Log[x]^2),x
]
```

output
```
x*(3 + x^2 - (50*(3 + x^2))/(x + 5*(-1 + x)*Log[x]))
```

3.860.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^4+150x^3-247x^2+(75x^4-150x^3+150x^2-150x+75)\log^2(x)+(30x^4-530x^3+780x^2-30x+750)\log}{x^2+(25x^2-50x+25)\log^2(x)+(10x^2-10x)\log(x)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{3x^4+150x^3-247x^2+(75x^4-150x^3+150x^2-150x+75)\log^2(x)+(30x^4-530x^3+780x^2-30x+750)\log}{(x+5x\log(x)-5\log(x))^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(3(x^2+1)-\frac{50(2x^3-3x^2-3)}{(x-1)(x+5x\log(x)-5\log(x))}+\frac{50(5x^4-11x^3+20x^2-33x+15)}{(x-1)(x+5x\log(x)-5\log(x))^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$250\int \frac{x^3}{(5\log(x)x+x-5\log(x))^2}dx-300\int \frac{x^2}{(5\log(x)x+x-5\log(x))^2}dx-100\int \frac{x^2}{5\log(x)x+x-5\log(x)}dx-950\int \frac{1}{(5\log(x)x+x-5\log(x))^2}dx-200\int \frac{1}{(x-1)(5\log(x)x+x-5\log(x))^2}dx+700\int \frac{x}{(5\log(x)x+x-5\log(x))^2}dx+50\int \frac{1}{5\log(x)x+x-5\log(x)}dx+200\int \frac{1}{(x-1)(5\log(x)x+x-5\log(x))}dx+50\int \frac{x}{5\log(x)x+x-5\log(x)}dx+x^3+3x$$

input
```
Int[(-750 + 750*x - 247*x^2 + 150*x^3 + 3*x^4 + (750 - 30*x + 780*x^2 - 53
0*x^3 + 30*x^4)*Log[x] + (75 - 150*x + 150*x^2 - 150*x^3 + 75*x^4)*Log[x]^
2)/(x^2 + (-10*x + 10*x^2)*Log[x] + (25 - 50*x + 25*x^2)*Log[x]^2),x]
```

output
```
$Aborted
```

3.860.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.860.4 Maple [A] (verified)

Time = 1.57 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

method	result	size
risch	$x^{3}+3x-\frac{50\left(x^{2}+3\right)x}{5x\ln\left(x\right)-5\ln\left(x\right)+x}$	29
default	$\frac{x^{4}-147x-15\ln\left(x\right)+3x^{2}-50x^{3}+15x^{2}\ln\left(x\right)-5x^{3}\ln\left(x\right)+5x^{4}\ln\left(x\right)}{5x\ln\left(x\right)-5\ln\left(x\right)+x}$	57
norman	$\frac{x^{4}-147x-15\ln\left(x\right)+3x^{2}-50x^{3}+15x^{2}\ln\left(x\right)-5x^{3}\ln\left(x\right)+5x^{4}\ln\left(x\right)}{5x\ln\left(x\right)-5\ln\left(x\right)+x}$	57
parallelrisch	$\frac{25x^{4}\ln\left(x\right)+5x^{4}-25x^{3}\ln\left(x\right)-250x^{3}+75x^{2}\ln\left(x\right)+15x^{2}-735x-75\ln\left(x\right)}{25x\ln\left(x\right)-25\ln\left(x\right)+5x}$	60

input
```
int(((75*x^4-150*x^3+150*x^2-150*x+75)*ln(x)^2+(30*x^4-530*x^3+780*x^2-30*
x+750)*ln(x)+3*x^4+150*x^3-247*x^2+750*x-750)/((25*x^2-50*x+25)*ln(x)^2+(1
0*x^2-10*x)*ln(x)+x^2),x,method=_RETURNVERBOSE)
```

output
```
x^3+3*x-50*(x^2+3)*x/(5*x*ln(x)-5*ln(x)+x)
```

3.860.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(22) = 44$.

Time = 0.24 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.79

$$\int \frac{-750+750x-247x^2+150x^3+3x^4+(750-30x+780x^2-530x^3+30x^4)\log(x)+(75-150x+150}{x^2+(-10x+10x^2)\log(x)+(25-50x+25x^2)\log^2(x)}$$
$$=\frac{x^{4}-50\,x^{3}+3\,x^{2}+5\,{\left(x^{4}-x^{3}+3\,x^{2}-3\,x\right)}\log\left(x\right)-150\,x}{5\,{\left(x-1\right)}\log\left(x\right)+x}$$

input
```
integrate(((75*x^4-150*x^3+150*x^2-150*x+75)*log(x)^2+(30*x^4-530*x^3+780*
x^2-30*x+750)*log(x)+3*x^4+150*x^3-247*x^2+750*x-750)/((25*x^2-50*x+25)*lo
g(x)^2+(10*x^2-10*x)*log(x)+x^2),x, algorithm=\
```

output
```
(x^4 - 50*x^3 + 3*x^2 + 5*(x^4 - x^3 + 3*x^2 - 3*x)*log(x) - 150*x)/(5*(x
- 1)*log(x) + x)
```

3.860.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{-750+750x-247x^2+150x^3+3x^4+(750-30x+780x^2-530x^3+30x^4)\log(x)+(75-150x+150}{x^2+(-10x+10x^2)\log(x)+(25-50x+25x^2)\log^2(x)}$$
$$= x^3+3x+\frac{-50x^3-150x}{x+(5x-5)\log(x)}$$

input
```
integrate(((75*x**4-150*x**3+150*x**2-150*x+75)*ln(x)**2+(30*x**4-530*x**3
+780*x**2-30*x+750)*ln(x)+3*x**4+150*x**3-247*x**2+750*x-750)/((25*x**2-50
*x+25)*ln(x)**2+(10*x**2-10*x)*ln(x)+x**2),x)
```

output
```
x**3 + 3*x + (-50*x**3 - 150*x)/(x + (5*x - 5)*log(x))
```

3.860.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(22) = 44$.

Time = 0.22 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.79

$$\int \frac{-750+750x-247x^2+150x^3+3x^4+(750-30x+780x^2-530x^3+30x^4)\log(x)+(75-150x+150}{x^2+(-10x+10x^2)\log(x)+(25-50x+25x^2)\log^2(x)}$$
$$= \frac{x^4-50x^3+3x^2+5(x^4-x^3+3x^2-3x)\log(x)-150x}{5(x-1)\log(x)+x}$$

input
```
integrate(((75*x^4-150*x^3+150*x^2-150*x+75)*log(x)^2+(30*x^4-530*x^3+780*
x^2-30*x+750)*log(x)+3*x^4+150*x^3-247*x^2+750*x-750)/((25*x^2-50*x+25)*lo
g(x)^2+(10*x^2-10*x)*log(x)+x^2),x, algorithm=\
```

output
```
(x^4 - 50*x^3 + 3*x^2 + 5*(x^4 - x^3 + 3*x^2 - 3*x)*log(x) - 150*x)/(5*(x
- 1)*log(x) + x)
```

3.860.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{-750 + 750x - 247x^2 + 150x^3 + 3x^4 + (750 - 30x + 780x^2 - 530x^3 + 30x^4)\log(x) + (75 - 150x + 150x^2 - 150x^3 + 75x^4)\log^2(x)}{x^2 + (-10x + 10x^2)\log(x) + (25 - 50x + 25x^2)\log^2(x)}\,dx$$
$$= x^3 + 3\,x - \frac{50\,(x^3 + 3\,x)}{5\,x\log(x) + x - 5\,\log(x)}$$

input
```
integrate(((75*x^4-150*x^3+150*x^2-150*x+75)*log(x)^2+(30*x^4-530*x^3+780*
x^2-30*x+750)*log(x)+3*x^4+150*x^3-247*x^2+750*x-750)/((25*x^2-50*x+25)*lo
g(x)^2+(10*x^2-10*x)*log(x)+x^2),x, algorithm=\
```

output
```
x^3 + 3*x - 50*(x^3 + 3*x)/(5*x*log(x) + x - 5*log(x))
```

3.860.9 Mupad [B] (verification not implemented)

Time = 15.74 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.57

$$\int \frac{-750 + 750x - 247x^2 + 150x^3 + 3x^4 + (750 - 30x + 780x^2 - 530x^3 + 30x^4)\log(x) + (75 - 150x + 150x^2 - 150x^3 + 75x^4)\log^2(x)}{x^2 + (-10x + 10x^2)\log(x) + (25 - 50x + 25x^2)\log^2(x)}\,dx$$
$$= x\,(x^2 + 3) - \frac{x^2\,(x^2 + 3) - x\,(x^2 + 3)\,(x - 50)}{x - 5\,\ln(x) + 5\,x\,\ln(x)}$$

input
```
int((750*x + log(x)*(780*x^2 - 30*x - 530*x^3 + 30*x^4 + 750) + log(x)^2*(
150*x^2 - 150*x - 150*x^3 + 75*x^4 + 75) - 247*x^2 + 150*x^3 + 3*x^4 - 750
)/(log(x)^2*(25*x^2 - 50*x + 25) - log(x)*(10*x - 10*x^2) + x^2),x)
```

output
```
x*(x^2 + 3) - (x^2*(x^2 + 3) - x*(x^2 + 3)*(x - 50))/(x - 5*log(x) + 5*x*l
og(x))
```

3.861 $\int \frac{e^{\frac{25-320x+128x^2-64x\log(x)}{64x}}(-25-64x+128x^2)}{16x^2}\,dx$

3.861.1 Optimal result

Integrand size = 41, antiderivative size = 19

$$\int \frac{e^{\frac{25-320x+128x^2-64x\log(x)}{64x}}(-25-64x+128x^2)}{16x^2}\,dx=\frac{4e^{-5+\frac{25}{64x}+2x}}{x}$$

output
```
4*exp(25/64/x+2*x-5-ln(x))
```

3.861.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{25-320x+128x^2-64x\log(x)}{64x}}(-25-64x+128x^2)}{16x^2}\,dx=\frac{4e^{-5+\frac{25}{64x}+2x}}{x}$$

input
```
Integrate[(E^((25 - 320*x + 128*x^2 - 64*x*Log[x])/(64*x))*(-25 - 64*x + 1
28*x^2))/(16*x^2),x]
```

output
```
(4*E^(-5 + 25/(64*x) + 2*x))/x
```

3.861.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 58 vs. $2(19) = 38$.

Time = 0.22 (sec) , antiderivative size = 58, normalized size of antiderivative = 3.05, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.073$, Rules used = {27, 25, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(128x^2-64x-25)\, e^{\frac{128x^2-320x-64x\log(x)+25}{64x}}}{16x^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{16}\int -\frac{e^{\frac{128x^2-320x+25}{64x}}(-128x^2+64x+25)}{x^3}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{16}\int \frac{e^{\frac{128x^2-320x+25}{64x}}(-128x^2+64x+25)}{x^3}dx$$

$$\Big\downarrow \ 2726$$

$$\frac{4e^{\frac{128x^2-320x+25}{64x}}(25-128x^2)}{x^3\left(\frac{128x^2-320x+25}{x^2}+\frac{64(5-4x)}{x}\right)}$$

input
```
Int[(E^((25 - 320*x + 128*x^2 - 64*x*Log[x])/(64*x))*(-25 - 64*x + 128*x^2
))/(16*x^2),x]
```

output
```
(4*E^((25 - 320*x + 128*x^2)/(64*x))*(25 - 128*x^2))/(x^3*((64*(5 - 4*x))/
x + (25 - 320*x + 128*x^2)/x^2))
```

3.861.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.861.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

method	result	size
risch	$\frac{4\,\mathrm{e}^{\frac{128x^2-320x+25}{64x}}}{x}$	22
gosper	$4\,\mathrm{e}^{-\frac{64x\ln(x)-128x^2+320x-25}{64x}}$	24
derivativedivides	$4\,\mathrm{e}^{\frac{-64x\ln(x)+128x^2-320x+25}{64x}}$	24
default	$4\,\mathrm{e}^{\frac{-64x\ln(x)+128x^2-320x+25}{64x}}$	24
norman	$4\,\mathrm{e}^{\frac{-64x\ln(x)+128x^2-320x+25}{64x}}$	24
parallelrisch	$4\,\mathrm{e}^{-\frac{64x\ln(x)-128x^2+320x-25}{64x}}$	24

input
```
int(1/16*(128*x^2-64*x-25)*exp(1/64*(-64*x*ln(x)+128*x^2-320*x+25)/x)/x^2,
x,method=_RETURNVERBOSE)
```

output
```
4/x*exp(1/64*(128*x^2-320*x+25)/x)
```

3.861.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

$$\int \frac{e^{\frac{25-320x+128x^2-64x\log(x)}{64x}}(-25-64x+128x^2)}{16x^2}\,dx = 4\,e^{\left(\frac{128\,x^2-64\,x\log(x)-320\,x+25}{64\,x}\right)}$$

input
```
integrate(1/16*(128*x^2-64*x-25)*exp(1/64*(-64*x*log(x)+128*x^2-320*x+25)/
x)/x^2,x, algorithm=\
```

output
```
4*e^(1/64*(128*x^2 - 64*x*log(x) - 320*x + 25)/x)
```

3.861.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{e^{\frac{25-320x+128x^2-64x\log(x)}{64x}}(-25-64x+128x^2)}{16x^2}\,dx = 4e^{\frac{2x^2-x\log(x)-5x+\frac{25}{64}}{x}}$$

input
```
integrate(1/16*(128*x**2-64*x-25)*exp(1/64*(-64*x*ln(x)+128*x**2-320*x+25)
/x)/x**2,x)
```

output
```
4*exp((2*x**2 - x*log(x) - 5*x + 25/64)/x)
```

3.861.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{e^{\frac{25-320x+128x^2-64x\log(x)}{64x}}(-25-64x+128x^2)}{16x^2}\,dx = \frac{4\,e^{\left(2\,x+\frac{25}{64\,x}-5\right)}}{x}$$

input
```
integrate(1/16*(128*x^2-64*x-25)*exp(1/64*(-64*x*log(x)+128*x^2-320*x+25)/
x)/x^2,x, algorithm=\
```

output
```
4*e^(2*x + 25/64/x - 5)/x
```

3.861. $\int \frac{e^{\frac{25-320x+128x^2-64x\log(x)}{64x}}(-25-64x+128x^2)}{16x^2}\,dx$

3.861.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{25-320x+128x^2-64x\log(x)}{64x}}(-25-64x+128x^2)}{16x^2}\,dx = 4\,e^{\left(2\,x+\frac{25}{64\,x}-\log(x)-5\right)}$$

input
```
integrate(1/16*(128*x^2-64*x-25)*exp(1/64*(-64*x*log(x)+128*x^2-320*x+25)/
x)/x^2,x, algorithm=\
```

output
```
4*e^(2*x + 25/64/x - log(x) - 5)
```

3.861.9 Mupad [B] (verification not implemented)

Time = 15.42 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{e^{\frac{25-320x+128x^2-64x\log(x)}{64x}}(-25-64x+128x^2)}{16x^2}\,dx = \frac{4\,e^{2\,x+\frac{25}{64\,x}-5}}{x}$$

input
```
int(-(exp(-(5*x + x*log(x) - 2*x^2 - 25/64)/x)*(64*x - 128*x^2 + 25))/(16*
x^2),x)
```

output
```
(4*exp(2*x + 25/(64*x) - 5))/x
```

3.862 $\int \left(1+59049 e^{-e^{-3+4 x}+2 x} \left(-2+4 e^{-3+4 x}\right)\right) \, dx$

3.862.1 Optimal result

Integrand size = 30, antiderivative size = 20

$$\int \left(1+59049 e^{-e^{-3+4 x}+2 x} \left(-2+4 e^{-3+4 x}\right)\right) \, dx=-1-59049 e^{-e^{-3+4 x}+2 x}+x$$

output
```
x-1-exp(-exp(-3+4*x)+10*ln(3)+2*x)
```

3.862.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(1+59049 e^{-e^{-3+4 x}+2 x} \left(-2+4 e^{-3+4 x}\right)\right) \, dx=-59049 e^{-e^{-3+4 x}+2 x}+x$$

input
```
Integrate[1 + 59049*E^(-E^(-3 + 4*x) + 2*x)*(-2 + 4*E^(-3 + 4*x)),x]
```

output
```
-59049*E^(-E^(-3 + 4*x) + 2*x) + x
```

3.862.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.033$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(59049e^{2x-e^{4x-3}}\left(4e^{4x-3}-2\right)+1\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$x-59049e^{2x-e^{4x-3}}$$

input
```
Int[1 + 59049*E^(-E^(-3 + 4*x) + 2*x)*(-2 + 4*E^(-3 + 4*x)),x]
```

output
```
-59049*E^(-E^(-3 + 4*x) + 2*x) + x
```

3.862.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.862.4 Maple [A] (verified)

Time = 0.40 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

method	result	size
risch	$x-59049\,{\rm e}^{-{\rm e}^{-3+4x}+2x}$	18
default	$x-{\rm e}^{-{\rm e}^{-3+4x}+10\ln(3)+2x}$	22
norman	$x-{\rm e}^{-{\rm e}^{-3+4x}+10\ln(3)+2x}$	22
parallelrisch	$x-{\rm e}^{-{\rm e}^{-3+4x}+10\ln(3)+2x}$	22

input
```
int((4*exp(-3+4*x)-2)*exp(-exp(-3+4*x)+10*ln(3)+2*x)+1,x,method=_RETURNVER
BOSE)
```

output
```
x-59049*exp(-exp(-3+4*x)+2*x)
```

3.862.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \left(1+59049e^{-e^{-3+4x}+2x}\left(-2+4e^{-3+4x}\right)\right)\,dx=x-e^{\left(2\,x-e^{\left(4\,x-3\right)}+10\,\log\left(3\right)\right)}$$

input
```
integrate((4*exp(-3+4*x)-2)*exp(-exp(-3+4*x)+10*log(3)+2*x)+1,x, algorithm
=\
```

output
```
x - e^(2*x - e^(4*x - 3) + 10*log(3))
```

3.862.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \left(1+59049e^{-e^{-3+4x}+2x}\left(-2+4e^{-3+4x}\right)\right)\,dx=x-59049e^{2x-e^{4x-3}}$$

input
```
integrate((4*exp(-3+4*x)-2)*exp(-exp(-3+4*x)+10*ln(3)+2*x)+1,x)
```

output
```
x - 59049*exp(2*x - exp(4*x - 3))
```

3.862.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \left(1+59049e^{-e^{-3+4x}+2x}\left(-2+4e^{-3+4x}\right)\right)\,dx=x-59049\,e^{\left(2\,x-e^{\left(4\,x-3\right)}\right)}$$

input
```
integrate((4*exp(-3+4*x)-2)*exp(-exp(-3+4*x)+10*log(3)+2*x)+1,x, algorithm
=\
```

output
```
x - 59049*e^(2*x - e^(4*x - 3))
```

3.862.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \left(1+59049e^{-e^{-3+4x}+2x}\left(-2+4e^{-3+4x}\right)\right)\,dx = x-e^{\left(2\,x-e^{\left(4\,x-3\right)}+10\,\log\left(3\right)\right)}$$

input
```
integrate((4*exp(-3+4*x)-2)*exp(-exp(-3+4*x)+10*log(3)+2*x)+1,x, algorithm
=\
```

output
```
x - e^(2*x - e^(4*x - 3) + 10*log(3))
```

3.862.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \left(1+59049e^{-e^{-3+4x}+2x}\left(-2+4e^{-3+4x}\right)\right)\,dx = x-59049\,\mathrm{e}^{2\,x}\,\mathrm{e}^{-\mathrm{e}^{4\,x}\,\mathrm{e}^{-3}}$$

input
```
int(exp(2*x + 10*log(3) - exp(4*x - 3))*(4*exp(4*x - 3) - 2) + 1,x)
```

output
```
x - 59049*exp(2*x)*exp(-exp(4*x)*exp(-3))
```

3.863 $\int \frac{5+e^2(5-100x-90x^2-20x^3)+5e^2\log(4)}{e^2}\,dx$

3.863.1 Optimal result

Integrand size = 32, antiderivative size = 29

$$\int \frac{5+e^2(5-100x-90x^2-20x^3)+5e^2\log(4)}{e^2}\,dx = 5\left(6+x+\frac{x}{e^2}-x^2(3+x)^2-x(x-\log(4))\right)$$

output
```
30+5*x-5*x*(x-2*ln(2))-5*x^2*(3+x)^2+5*x/exp(2)
```

3.863.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{5+e^2(5-100x-90x^2-20x^3)+5e^2\log(4)}{e^2}\,dx = 5\left(x+\frac{x}{e^2}-10x^2-6x^3-x^4+x\log(4)\right)$$

input
```
Integrate[(5 + E^2*(5 - 100*x - 90*x^2 - 20*x^3) + 5*E^2*Log[4])/E^2,x]
```

output
```
5*(x + x/E^2 - 10*x^2 - 6*x^3 - x^4 + x*Log[4])
```

3.863.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.59, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2(-20x^3-90x^2-100x+5)+5+5e^2\log(4)}{e^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \left(5e^2(-4x^3-18x^2-20x+1)+5(1+e^2\log(4))\right)dx}{e^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{-5e^2x^4-30e^2x^3-50e^2x^2+5e^2x+5x(1+e^2\log(4))}{e^2}$$

input
```
Int[(5 + E^2*(5 - 100*x - 90*x^2 - 20*x^3) + 5*E^2*Log[4])/E^2,x]
```

output
```
(5*E^2*x - 50*E^2*x^2 - 30*E^2*x^3 - 5*E^2*x^4 + 5*x*(1 + E^2*Log[4]))/E^2
```

3.863.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.863.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

method	result	size
risch	$-5x^4 - 30x^3 + 10x \ln(2) - 50x^2 + 5x + 5x\,\mathrm{e}^{-2}$	30
norman	$-50x^2 - 30x^3 - 5x^4 + 5(2\,\mathrm{e}^2 \ln(2) + \mathrm{e}^2 + 1)\,\mathrm{e}^{-2}x$	34
gosper	$5x(-x^3\mathrm{e}^2 - 6x^2\mathrm{e}^2 + 2\,\mathrm{e}^2 \ln(2) - 10\,\mathrm{e}^2 x + \mathrm{e}^2 + 1)\,\mathrm{e}^{-2}$	37
parallelrisch	$\mathrm{e}^{-2}(\mathrm{e}^2(-5x^4 - 30x^3 - 50x^2 + 5x) + (10\,\mathrm{e}^2 \ln(2) + 5)\,x)$	39
default	$\mathrm{e}^{-2}(-5x^4\mathrm{e}^2 - 30x^3\mathrm{e}^2 + 10x\,\mathrm{e}^2 \ln(2) - 50x^2\mathrm{e}^2 + 5\,\mathrm{e}^2 x + 5x)$	43

input
```
int((10*exp(2)*ln(2)+(-20*x^3-90*x^2-100*x+5)*exp(2)+5)/exp(2),x,method=_R
ETURNVERBOSE)
```

output
```
-5*x^4-30*x^3+10*x*ln(2)-50*x^2+5*x+5*x*exp(-2)
```

3.863.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

$$\int \frac{5 + e^2(5 - 100x - 90x^2 - 20x^3) + 5e^2 \log(4)}{e^2}\,dx$$
$$= 5\left(2\,xe^2 \log(2) - \left(x^4 + 6\,x^3 + 10\,x^2 - x\right)e^2 + x\right)e^{(-2)}$$

input
```
integrate((10*exp(2)*log(2)+(-20*x^3-90*x^2-100*x+5)*exp(2)+5)/exp(2),x, a
lgorithm=\
```

output
```
5*(2*x*e^2*log(2) - (x^4 + 6*x^3 + 10*x^2 - x)*e^2 + x)*e^(-2)
```

3.863.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

$$\int \frac{5 + e^2(5 - 100x - 90x^2 - 20x^3) + 5e^2 \log(4)}{e^2}\,dx$$
$$= -5x^4 - 30x^3 - 50x^2 + \frac{x(5 + 5e^2 + 10e^2 \log(2))}{e^2}$$

input
```
integrate((10*exp(2)*ln(2)+(-20*x**3-90*x**2-100*x+5)*exp(2)+5)/exp(2),x)
```

output
```
-5*x**4 - 30*x**3 - 50*x**2 + x*(5 + 5*exp(2) + 10*exp(2)*log(2))*exp(-2)
```

3.863.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

$$\int \frac{5+e^2(5-100x-90x^2-20x^3)+5e^2\log(4)}{e^2}\,dx$$
$$= 5\left(2\,xe^2\log\left(2\right) - \left(x^4 + 6\,x^3 + 10\,x^2 - x\right)e^2 + x\right)e^{(-2)}$$

input
```
integrate((10*exp(2)*log(2)+(-20*x^3-90*x^2-100*x+5)*exp(2)+5)/exp(2),x, a
lgorithm=\
```

output
```
5*(2*x*e^2*log(2) - (x^4 + 6*x^3 + 10*x^2 - x)*e^2 + x)*e^(-2)
```

3.863.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.17

$$\int \frac{5+e^2(5-100x-90x^2-20x^3)+5e^2\log(4)}{e^2}\,dx$$
$$= 5\left(2\,xe^2\log\left(2\right) - \left(x^4 + 6\,x^3 + 10\,x^2 - x\right)e^2 + x\right)e^{(-2)}$$

input
```
integrate((10*exp(2)*log(2)+(-20*x^3-90*x^2-100*x+5)*exp(2)+5)/exp(2),x, a
lgorithm=\
```

output
```
5*(2*x*e^2*log(2) - (x^4 + 6*x^3 + 10*x^2 - x)*e^2 + x)*e^(-2)
```

3.863.9 Mupad [B] (verification not implemented)

Time = 16.73 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{5+e^2(5-100x-90x^2-20x^3)+5e^2\log(4)}{e^2}\,dx$$
$$= -5\,x^4-30\,x^3-50\,x^2+\left(5\,\mathrm{e}^{-2}+10\,\ln\left(2\right)+5\right)\,x$$

input
```
int(exp(-2)*(10*exp(2)*log(2) - exp(2)*(100*x + 90*x^2 + 20*x^3 - 5) + 5),
x)
```

output
```
x*(5*exp(-2) + 10*log(2) + 5) - 50*x^2 - 30*x^3 - 5*x^4
```

3.864 $\int \frac{-432+216x-3x^2+36\log(5)}{1296-72x+x^2} dx$

3.864.1 Optimal result

Integrand size = 25, antiderivative size = 19

$$\int \frac{-432+216x-3x^2+36\log(5)}{1296-72x+x^2} dx = \frac{x(3(4-x)-\log(5))}{-36+x}$$

output
```
(-3*x+12-ln(5))/(x-36)*x
```

3.864.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{-432+216x-3x^2+36\log(5)}{1296-72x+x^2} dx = -3\left(x+\frac{12(96+\log(5))}{-36+x}\right)$$

input
```
Integrate[(-432 + 216*x - 3*x^2 + 36*Log[5])/(1296 - 72*x + x^2),x]
```

output
```
-3*(x + (12*(96 + Log[5]))/(-36 + x))
```

3.864.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {1294, 27, 1107, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^2+216x-432+36\log(5)}{x^2-72x+1296} \, dx$$
$$\Big\downarrow \text{ 1294}$$
$$\int \frac{3\left(-x^2+72x-12(12-\log(5))\right)}{(36-x)^2}dx$$
$$\Big\downarrow \text{ 27}$$
$$3\int \frac{-x^2+72x-12(12-\log(5))}{(36-x)^2}dx$$
$$\Big\downarrow \text{ 1107}$$
$$3\int \left(\frac{12(96+\log(5))}{(x-36)^2}-1\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$3\left(\frac{12(96+\log(5))}{36-x}-x\right)$$

input
```
Int[(-432 + 216*x - 3*x^2 + 36*Log[5])/(1296 - 72*x + x^2),x]
```

output
```
3*(-x + (12*(96 + Log[5]))/(36 - x))
```

3.864.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1107
```
Int[((d_.) + (e_.)*(x_))^(m_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_
Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; F
reeQ[{a, b, c, d, e, m}, x] && EqQ[2*c*d - b*e, 0] && IGtQ[p, 0] &&  !(EqQ[
m, 3] && NeQ[p, 1])
```

rule 1294
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.)*((d_.) + (e_.)*(x_) + (f_.)*(x
_)^2)^(q_.), x_Symbol] :> Simp[1/c^p   Int[(b/2 + c*x)^(2*p)*(d + e*x + f*x
^2)^q, x], x] /; FreeQ[{a, b, c, d, e, f, q}, x] && EqQ[b^2 - 4*a*c, 0] &&
IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.864.4 Maple [A] (verified)

Time = 1.35 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

method	result	size
gosper	$-\frac{3(x^2+12\ln(5)-144)}{x-36}$	17
default	$-3x-\frac{3(1152+12\ln(5))}{x-36}$	18
norman	$\frac{-3x^2+432-36\ln(5)}{x-36}$	18
parallelrisch	$-\frac{3x^2-432+36\ln(5)}{x-36}$	19
risch	$-3x-\frac{3456}{x-36}-\frac{36\ln(5)}{x-36}$	21
meijerg	$\frac{17x}{3(1-\frac{x}{36})}+\frac{x\ln(5)}{-x+36}-\frac{x(-\frac{x}{12}+6)}{1-\frac{x}{36}}$	39

input
```
int((36*ln(5)-3*x^2+216*x-432)/(x^2-72*x+1296),x,method=_RETURNVERBOSE)
```

output
```
-3*(x^2+12*ln(5)-144)/(x-36)
```

3.864.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{-432+216x-3x^2+36\log(5)}{1296-72x+x^2}\,dx = -\frac{3\left(x^2-36\,x+12\,\log\left(5\right)+1152\right)}{x-36}$$

input
```
integrate((36*log(5)-3*x^2+216*x-432)/(x^2-72*x+1296),x, algorithm=\
```

output
```
-3*(x^2 - 36*x + 12*log(5) + 1152)/(x - 36)
```

3.864.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \frac{-432+216x-3x^2+36\log(5)}{1296-72x+x^2}\,dx = -3x-\frac{36\log\left(5\right)+3456}{x-36}$$

input
```
integrate((36*ln(5)-3*x**2+216*x-432)/(x**2-72*x+1296),x)
```

output
```
-3*x - (36*log(5) + 3456)/(x - 36)
```

3.864.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{-432+216x-3x^2+36\log(5)}{1296-72x+x^2}\,dx = -3\,x-\frac{36\left(\log\left(5\right)+96\right)}{x-36}$$

input
```
integrate((36*log(5)-3*x^2+216*x-432)/(x^2-72*x+1296),x, algorithm=\
```

output
```
-3*x - 36*(log(5) + 96)/(x - 36)
```

3.864.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{-432 + 216x - 3x^2 + 36\log(5)}{1296 - 72x + x^2}\,dx = -3\,x - \frac{36\,(\log{(5)} + 96)}{x - 36}$$

input
```
integrate((36*log(5)-3*x^2+216*x-432)/(x^2-72*x+1296),x, algorithm=\
```

output
```
-3*x - 36*(log(5) + 96)/(x - 36)
```

3.864.9 Mupad [B] (verification not implemented)

Time = 17.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{-432 + 216x - 3x^2 + 36\log(5)}{1296 - 72x + x^2}\,dx = -3\,x - \frac{36\,\ln{(5)} + 3456}{x - 36}$$

input
```
int((216*x + 36*log(5) - 3*x^2 - 432)/(x^2 - 72*x + 1296),x)
```

output
```
- 3*x - (36*log(5) + 3456)/(x - 36)
```

3.865 $\int \left(2 e^{16+2 x}+e^{8+x} (2+2 x)\right) \, dx$

3.865.1 Optimal result

Integrand size = 21, antiderivative size = 19

$$\int \left(2 e^{16+2 x}+e^{8+x} (2+2 x)\right) \, dx=-x^2+\left(e^{8+x}+x\right)^2+4 \log (2)$$

output
```
(x+exp(4)^2*exp(x))^2+4*ln(2)-x^2
```

3.865.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int \left(2 e^{16+2 x}+e^{8+x} (2+2 x)\right) \, dx=2 \left(\frac{1}{2} e^{16+2 x}+e^{8+x} x\right)$$

input
```
Integrate[2*E^(16 + 2*x) + E^(8 + x)*(2 + 2*x),x]
```

output
```
2*(E^(16 + 2*x)/2 + E^(8 + x)*x)
```

3.865.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.32, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.048, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{x+8}(2x+2)+2e^{2x+16}\right) \, dx$$
$$\Big\downarrow \text{2009}$$
$$2e^{x+8}(x+1)-2e^{x+8}+e^{2x+16}$$

input
```
Int[2*E^(16 + 2*x) + E^(8 + x)*(2 + 2*x),x]
```

output
```
-2*E^(8 + x) + E^(16 + 2*x) + 2*E^(8 + x)*(1 + x)
```

3.865.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.865.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

method	result	size
risch	$2x\,\mathrm{e}^{x+8}+\mathrm{e}^{2x+16}$	15
default	$2\,\mathrm{e}^{8}\mathrm{e}^{x}x+\mathrm{e}^{16}\mathrm{e}^{2x}$	20
norman	$2\,\mathrm{e}^{8}\mathrm{e}^{x}x+\mathrm{e}^{16}\mathrm{e}^{2x}$	20
parallelrisch	$2\,\mathrm{e}^{8}\mathrm{e}^{x}x+\mathrm{e}^{16}\mathrm{e}^{2x}$	20
parts	$2\,\mathrm{e}^{8}\mathrm{e}^{x}x+\mathrm{e}^{16}\mathrm{e}^{2x}$	20
meijerg	$-\mathrm{e}^{16}(1-\mathrm{e}^{2x})-2\,\mathrm{e}^{8}(1-\mathrm{e}^{x})+2\,\mathrm{e}^{8}\left(1-\frac{(2-2x)\mathrm{e}^{x}}{2}\right)$	39

input
```
int(2*exp(4)^4*exp(x)^2+(2+2*x)*exp(4)^2*exp(x),x,method=_RETURNVERBOSE)
```

output
```
2*x*exp(x+8)+exp(2*x+16)
```

3.865.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \left(2e^{16+2x}+e^{8+x}(2+2x)\right)\,dx=2\,xe^{(x+8)}+e^{(2\,x+16)}$$

input
```
integrate(2*exp(4)^4*exp(x)^2+(2+2*x)*exp(4)^2*exp(x),x, algorithm=\
```

output
```
2*x*e^(x + 8) + e^(2*x + 16)
```

3.865.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \left(2e^{16+2x}+e^{8+x}(2+2x)\right)\,dx=2xe^{8}e^{x}+e^{16}e^{2x}$$

input
```
integrate(2*exp(4)**4*exp(x)**2+(2+2*x)*exp(4)**2*exp(x),x)
```

output
```
2*x*exp(8)*exp(x) + exp(16)*exp(2*x)
```

3.865.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.37

$$\int \left(2e^{16+2x}+e^{8+x}(2+2x)\right)\,dx=2\left(xe^{8}-e^{8}\right)e^{x}+e^{(2\,x+16)}+2\,e^{(x+8)}$$

input
```
integrate(2*exp(4)^4*exp(x)^2+(2+2*x)*exp(4)^2*exp(x),x, algorithm=\
```

output
```
2*(x*e^8 - e^8)*e^x + e^(2*x + 16) + 2*e^(x + 8)
```

3.865.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \left(2e^{16+2x}+e^{8+x}(2+2x)\right)\,dx=2\,xe^{(x+8)}+e^{(2\,x+16)}$$

input
```
integrate(2*exp(4)^4*exp(x)^2+(2+2*x)*exp(4)^2*exp(x),x, algorithm=\
```

output
```
2*x*e^(x + 8) + e^(2*x + 16)
```

3.865.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \left(2e^{16+2x}+e^{8+x}(2+2x)\right)\,dx=\mathrm{e}^{x+8}\,\left(2\,x+\mathrm{e}^{x+8}\right)$$

input
```
int(2*exp(2*x)*exp(16) + exp(8)*exp(x)*(2*x + 2),x)
```

output
```
exp(x + 8)*(2*x + exp(x + 8))
```

3.866 $\int \left(3+e^{2+e^3}+e^x(-1-x)-2x\right)\,dx$

3.866.1 Optimal result

Integrand size = 21, antiderivative size = 21

$$\int \left(3+e^{2+e^3}+e^x(-1-x)-2x\right)\,dx=-4+\left(3+e^{2+e^3}-e^x-x\right)x$$

output
```
(3+exp(2+exp(3))-x-exp(x))*x-4
```

3.866.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \left(3+e^{2+e^3}+e^x(-1-x)-2x\right)\,dx=3x+e^{2+e^3}x-e^xx-x^2$$

input
```
Integrate[3 + E^(2 + E^3) + E^x*(-1 - x) - 2*x,x]
```

output
```
3*x + E^(2 + E^3)*x - E^x*x - x^2
```

3.866.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.048$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^x(-x-1)-2x+e^{2+e^3}+3\right) dx$$

$$\Big\downarrow \text{ 2009}$$

$$-x^2+\left(3+e^{2+e^3}\right)x+e^x-e^x(x+1)$$

input
```
Int[3 + E^(2 + E^3) + E^x*(-1 - x) - 2*x,x]
```

output
```
E^x + (3 + E^(2 + E^3))*x - x^2 - E^x*(1 + x)
```

3.866.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.866.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

method	result	size
parallelrisch	$-\mathrm{e}^{x} x - x^{2}+\left(\mathrm{e}^{2+\mathrm{e}^{3}}+3\right) x$	21
default	$-\mathrm{e}^{x} x + 3 x - x^{2}+x\,\mathrm{e}^{2+\mathrm{e}^{3}}$	22
norman	$\left(\mathrm{e}^{2} \mathrm{e}^{\mathrm{e}^{3}}+3\right) x - x^{2}-\mathrm{e}^{x} x$	22
risch	$-\mathrm{e}^{x} x + 3 x - x^{2}+x\,\mathrm{e}^{2+\mathrm{e}^{3}}$	22
parts	$-\mathrm{e}^{x} x + 3 x - x^{2}+x\,\mathrm{e}^{2+\mathrm{e}^{3}}$	22

input
```
int(exp(2+exp(3))+(-1-x)*exp(x)+3-2*x,x,method=_RETURNVERBOSE)
```

output
```
-exp(x)*x-x^2+(exp(2+exp(3))+3)*x
```

3.866.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \left(3+e^{2+e^3}+e^x(-1-x)-2x\right)\,dx=-x^2-xe^x+xe^{\left(e^3+2\right)}+3\,x$$

input
```
integrate(exp(2+exp(3))+(-1-x)*exp(x)+3-2*x,x, algorithm=\
```

output
```
-x^2 - x*e^x + x*e^(e^3 + 2) + 3*x
```

3.866.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \left(3+e^{2+e^3}+e^x(-1-x)-2x\right)\,dx=-x^2-xe^x+x\left(3+e^2e^{e^3}\right)$$

input
```
integrate(exp(2+exp(3))+(-1-x)*exp(x)+3-2*x,x)
```

output
```
-x**2 - x*exp(x) + x*(3 + exp(2)*exp(exp(3)))
```

3.866.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \left(3+e^{2+e^3}+e^x(-1-x)-2x\right)\,dx=-x^2-xe^x+xe^{\left(e^3+2\right)}+3\,x$$

input
```
integrate(exp(2+exp(3))+(-1-x)*exp(x)+3-2*x,x, algorithm=\
```

output
```
-x^2 - x*e^x + x*e^(e^3 + 2) + 3*x
```

3.866.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \left(3+e^{2+e^3}+e^x(-1-x)-2x\right)\,dx=-x^2-xe^x+xe^{\left(e^3+2\right)}+3\,x$$

input
```
integrate(exp(2+exp(3))+(-1-x)*exp(x)+3-2*x,x, algorithm=\
```

output
```
-x^2 - x*e^x + x*e^(e^3 + 2) + 3*x
```

3.866.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \left(3+e^{2+e^3}+e^x(-1-x)-2x\right)\,dx=-x\left(x-\mathrm{e}^{\mathrm{e}^3+2}+\mathrm{e}^x-3\right)$$

input
```
int(exp(exp(3) + 2) - 2*x - exp(x)*(x + 1) + 3,x)
```

output
```
-x*(x - exp(exp(3) + 2) + exp(x) - 3)
```

3.867 $\int \frac{2x^2+e^{-4+5x}(2-10x+(-9+45x+15x^2)\log(2))}{x^2}\,dx$

3.867.1 Optimal result

Integrand size = 36, antiderivative size = 25

$$\int \frac{2x^2+e^{-4+5x}(2-10x+(-9+45x+15x^2)\log(2))}{x^2}\,dx = 3+2x+\frac{e^{-4+5x}(-2+3(3+x)\log(2))}{x}$$

output
```
2*x+exp(5*x-4)*(3*(3+x)*ln(2)-2)/x+3
```

3.867.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

$$\int \frac{2x^2+e^{-4+5x}(2-10x+(-9+45x+15x^2)\log(2))}{x^2}\,dx = 2x+\frac{e^{-4+5x}(-10x+15x^2\log(2)+5x\log(512))}{5x^2}$$

input
```
Integrate[(2*x^2 + E^(-4 + 5*x)*(2 - 10*x + (-9 + 45*x + 15*x^2)*Log[2]))/
x^2,x]
```

output
```
2*x + (E^(-4 + 5*x)*(-10*x + 15*x^2*Log[2] + 5*x*Log[512]))/(5*x^2)
```

3.867.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.30 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.52, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+e^{5x-4}\left(\left(15x^2+45x-9\right)\log(2)-10x+2\right)}{x^2}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{e^{5x-4}\left(15x^2\log(2)-5x(2-\log(512))+2-9\log(2)\right)}{x^2}+2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{5(2-\log(512))\,\text{ExpIntegralEi}(5x)}{e^4}+\frac{5(2-9\log(2))\,\text{ExpIntegralEi}(5x)}{e^4}+2x+3e^{5x-4}\log(2)-\frac{e^{5x-4}(2-\log(512))}{x}$$

input
```
Int[(2*x^2 + E^(-4 + 5*x)*(2 - 10*x + (-9 + 45*x + 15*x^2)*Log[2]))/x^2,x]
```

output
```
2*x + (5*ExpIntegralEi[5*x]*(2 - 9*Log[2]))/E^4 + 3*E^(-4 + 5*x)*Log[2] -
(E^(-4 + 5*x)*(2 - Log[512]))/x - (5*ExpIntegralEi[5*x]*(2 - Log[512]))/E^
4
```

3.867.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.867.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

method	result
risch	$2x+\frac{(3x\ln(2)+9\ln(2)-2)\mathrm{e}^{5x-4}}{x}$
norman	$\frac{(9\ln(2)-2)\mathrm{e}^{5x-4}+2x^2+3\ln(2)\mathrm{e}^{5x-4}x}{x}$
parts	$2x-\frac{2\,\mathrm{e}^{5x-4}}{x}+\frac{9\ln(2)\mathrm{e}^{5x-4}}{x}+3\ln(2)\,\mathrm{e}^{5x-4}$
parallelrisch	$\frac{3\ln(2)\mathrm{e}^{5x-4}x+9\ln(2)\mathrm{e}^{5x-4}+2x^2-2\,\mathrm{e}^{5x-4}}{x}$
derivativedivides	$2x-\frac{8}{5}-\frac{2\,\mathrm{e}^{5x-4}}{x}+183\ln(2)\left(-\frac{\mathrm{e}^{5x-4}}{5x}-\mathrm{e}^{-4}\,\mathrm{Ei}_1(-5x)\right)+69\ln(2)\left(\frac{4\,\mathrm{e}^{5x-4}}{5x}+3\,\mathrm{e}^{-4}\,\mathrm{Ei}_1\,($
default	$2x-\frac{8}{5}-\frac{2\,\mathrm{e}^{5x-4}}{x}+183\ln(2)\left(-\frac{\mathrm{e}^{5x-4}}{5x}-\mathrm{e}^{-4}\,\mathrm{Ei}_1(-5x)\right)+69\ln(2)\left(\frac{4\,\mathrm{e}^{5x-4}}{5x}+3\,\mathrm{e}^{-4}\,\mathrm{Ei}_1\,($

input
```
int((((15*x^2+45*x-9)*ln(2)-10*x+2)*exp(5*x-4)+2*x^2)/x^2,x,method=_RETURN
VERBOSE)
```

output
```
2*x+(3*x*ln(2)+9*ln(2)-2)/x*exp(5*x-4)
```

3.867.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{2x^2+e^{-4+5x}(2-10x+(-9+45x+15x^2)\log(2))}{x^2}\,dx$$
$$=\frac{2\,x^2+(3\,(x+3)\log(2)-2)e^{(5\,x-4)}}{x}$$

input
```
integrate((((15*x^2+45*x-9)*log(2)-10*x+2)*exp(5*x-4)+2*x^2)/x^2,x, algori
thm=\
```

output
```
(2*x^2 + (3*(x + 3)*log(2) - 2)*e^(5*x - 4))/x
```

3.867.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{2x^2+e^{-4+5x}(2-10x+(-9+45x+15x^2)\log(2))}{x^2}\,dx = 2x+\frac{(3x\log(2)-2+9\log(2))\,e^{5x-4}}{x}$$

input
```
integrate((((15*x**2+45*x-9)*ln(2)-10*x+2)*exp(5*x-4)+2*x**2)/x**2,x)
```

output
```
2*x + (3*x*log(2) - 2 + 9*log(2))*exp(5*x - 4)/x
```

3.867.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.24 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.08

$$\int \frac{2x^2+e^{-4+5x}(2-10x+(-9+45x+15x^2)\log(2))}{x^2}\,dx = 45\,\mathrm{Ei}(5\,x)\,e^{(-4)}\log(2)-45\,e^{(-4)}\Gamma(-1,-5\,x)\log(2) - 10\,\mathrm{Ei}(5\,x)\,e^{(-4)}+10\,e^{(-4)}\Gamma(-1,-5\,x)+3\,e^{(5\,x-4)}\log(2)+2\,x$$

input
```
integrate((((15*x^2+45*x-9)*log(2)-10*x+2)*exp(5*x-4)+2*x^2)/x^2,x, algori
thm=\
```

output
```
45*Ei(5*x)*e^(-4)*log(2) - 45*e^(-4)*gamma(-1, -5*x)*log(2) - 10*Ei(5*x)*e
^(-4) + 10*e^(-4)*gamma(-1, -5*x) + 3*e^(5*x - 4)*log(2) + 2*x
```

3.867.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.48

$$\int \frac{2x^2+e^{-4+5x}(2-10x+(-9+45x+15x^2)\log(2))}{x^2}\,dx = \frac{\left(2\,x^2e^4+3\,xe^{(5\,x)}\log(2)+9\,e^{(5\,x)}\log(2)-2\,e^{(5\,x)}\right)e^{(-4)}}{x}$$

input
```
integrate((((15*x^2+45*x-9)*log(2)-10*x+2)*exp(5*x-4)+2*x^2)/x^2,x, algori
thm=\
```

output
```
(2*x^2*e^4 + 3*x*e^(5*x)*log(2) + 9*e^(5*x)*log(2) - 2*e^(5*x))*e^(-4)/x
```

3.867.9 Mupad [B] (verification not implemented)

Time = 16.88 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{2x^2+e^{-4+5x}(2-10x+(-9+45x+15x^2)\log(2))}{x^2}\,dx$$
$$=2\,x+\mathrm{e}^{5\,x-4}\,\ln{(8)}+\frac{\mathrm{e}^{5\,x-4}\,\left(\ln{(512)}-2\right)}{x}$$

input
```
int((exp(5*x - 4)*(log(2)*(45*x + 15*x^2 - 9) - 10*x + 2) + 2*x^2)/x^2,x)
```

output
```
2*x + exp(5*x - 4)*log(8) + (exp(5*x - 4)*(log(512) - 2))/x
```

3.868 $\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log\left(3x^2\right)}{-1+x}}\left(e^3(6-6x)+3e^3x\log(3)+3e^3x\log\left(3\right.\right.}{x-2x^2+x^3}$

3.868.1 Optimal result

Integrand size = 79, antiderivative size = 24

$$\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log\left(3x^2\right)}{-1+x}}\left(e^3(6-6x)+3e^3x\log(3)+3e^3x\log\left(3x^2\right)\right)}{x-2x^2+x^3}\,dx = e^{e^3\left(5-\frac{3\left(\log(3)+\log\left(3x^2\right)\right)}{-1+x}\right)}$$

output
```
exp((-3*(ln(3*x^2)+ln(3))/(-1+x)+5)*exp(3))
```

3.868.2 Mathematica [A] (verified)

Time = 0.49 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

$$\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log\left(3x^2\right)}{-1+x}}\left(e^3(6-6x)+3e^3x\log(3)+3e^3x\log\left(3x^2\right)\right)}{x-2x^2+x^3}\,dx = 729^{\frac{e^3}{1-x}}e^{5e^3}\left(x^2\right)^{-\frac{3e^3}{-1+x}}$$

input
```
Integrate[(E^((E^3*(-5 + 5*x) - 3*E^3*Log[3] - 3*E^3*Log[3*x^2])/(-1 + x))
*(E^3*(6 - 6*x) + 3*E^3*x*Log[3] + 3*E^3*x*Log[3*x^2]))/(x - 2*x^2 + x^3),
x]
```

output
```
(729^(E^3/(1 - x))*E^(5*E^3))/(x^2)^((3*E^3)/(-1 + x))
```

3.868.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(3e^3x\log\left(3x^2\right)+e^3(6-6x)+3e^3x\log(3)\right)\exp\left(\frac{-3e^3\log\left(3x^2\right)+e^3(5x-5)-3e^3\log(3)}{x-1}\right)}{x^3-2x^2+x}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{\left(3e^3x\log\left(3x^2\right)+e^3(6-6x)+3e^3x\log(3)\right)\exp\left(\frac{-3e^3\log\left(3x^2\right)+e^3(5x-5)-3e^3\log(3)}{x-1}\right)}{x\left(x^2-2x+1\right)}dx$$

$$\Big\downarrow \text{ 7277}$$

$$4\int \frac{3^{1+\frac{6e^3}{1-x}}e^{5e^3}\left(x^2\right)^{\frac{3e^3}{1-x}}\left(2e^3(1-x)+e^3x\log\left(3x^2\right)+e^3x\log(3)\right)}{4(1-x)^2x}dx$$

$$\Big\downarrow \text{ 27}$$

$$e^{5e^3}\int \frac{3^{1+\frac{6e^3}{1-x}}\left(x^2\right)^{\frac{3e^3}{1-x}}\left(2e^3(1-x)+e^3x\log\left(3x^2\right)+e^3x\log(3)\right)}{(1-x)^2x}dx$$

$$\Big\downarrow \text{ 7292}$$

$$e^{5e^3}\int \frac{3^{\frac{x-6e^3-1}{x-1}}e^3\left(x^2\right)^{\frac{3e^3}{1-x}}\left(\log\left(x^2\right)x-2(1-\log(3))x+2\right)}{(1-x)^2x}dx$$

$$\Big\downarrow \text{ 27}$$

$$e^{3+5e^3}\int \frac{3^{\frac{-x+6e^3+1}{1-x}}\left(x^2\right)^{\frac{3e^3}{1-x}}\left(\log\left(x^2\right)x-2(1-\log(3))x+2\right)}{(1-x)^2x}dx$$

$$\Big\downarrow \text{ 7293}$$

$$e^{3+5e^3}\int \left(\frac{3^{\frac{-x+6e^3+1}{1-x}}(2-x(2-\log(9)))\left(x^2\right)^{\frac{3e^3}{1-x}}}{(1-x)^2x}+\frac{3^{\frac{-x+6e^3+1}{1-x}}\log\left(x^2\right)\left(x^2\right)^{\frac{3e^3}{1-x}}}{(x-1)^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$e^{3+5e^3}\left(-2\int \frac{3^{\frac{-x+6e^3+1}{1-x}}\left(x^2\right)^{\frac{3e^3}{1-x}}}{x-1}dx+2\int \frac{3^{\frac{-x+6e^3+1}{1-x}}\left(x^2\right)^{\frac{3e^3}{1-x}}}{x}dx-2\int \frac{\int \frac{3^{\frac{x-6e^3-1}{x-1}}\left(x^2\right)^{-\frac{3e^3}{x-1}}}{(x-1)^2}dx}{x}dx+\log\left(x^2\right)\int \frac{3^{\frac{-x+}{1}}}{}\right.$$

3.868. $\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log\left(3x^2\right)}{-1+x}}\left(e^3(6-6x)+3e^3x\log(3)+3e^3x\log\left(3x^2\right)\right)}{x-2x^2+x^3}dx$

input
```
Int[(E^((E^3*(-5 + 5*x) - 3*E^3*Log[3] - 3*E^3*Log[3*x^2])/(-1 + x))*(E^3*
(6 - 6*x) + 3*E^3*x*Log[3] + 3*E^3*x*Log[3*x^2]))/(x - 2*x^2 + x^3),x]
```

output
```
$Aborted
```

3.868.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.868. $\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log\left(3x^2\right)}{-1+x}}\left(e^3(6-6x)+3e^3x\log(3)+3e^3x\log\left(3x^2\right)\right)}{x-2x^2+x^3}\,dx$

3.868.4 Maple [A] (verified)

Time = 0.94 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

method	result	size
risch	$e^{-\frac{e^3\left(3\ln\left(3x^2\right)+3\ln(3)-5x+5\right)}{-1+x}}$	28
parallelrisch	$e^{-\frac{e^3\left(3\ln\left(3x^2\right)+3\ln(3)-5x+5\right)}{-1+x}}$	28
default	$\frac{x\,e^{\frac{-3\,e^3\ln\left(3x^2\right)-3\,e^3\ln(3)+(5x-5)e^3}{-1+x}}-e^{\frac{-3\,e^3\ln\left(3x^2\right)-3\,e^3\ln(3)+(5x-5)e^3}{-1+x}}}{-1+x}$	76
norman	$\frac{x\,e^{\frac{-3\,e^3\ln\left(3x^2\right)-3\,e^3\ln(3)+(5x-5)e^3}{-1+x}}-e^{\frac{-3\,e^3\ln\left(3x^2\right)-3\,e^3\ln(3)+(5x-5)e^3}{-1+x}}}{-1+x}$	76

input
```
int((3*x*exp(3)*ln(3*x^2)+3*x*exp(3)*ln(3)+(6-6*x)*exp(3))*exp((-3*exp(3)*
ln(3*x^2)-3*exp(3)*ln(3)+(5*x-5)*exp(3))/(-1+x))/(x^3-2*x^2+x),x,method=_R
ETURNVERBOSE)
```

output
```
exp(-exp(3)*(3*ln(3*x^2)+3*ln(3)-5*x+5)/(-1+x))
```

3.868.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

$$\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log\left(3x^2\right)}{-1+x}}\left(e^3(6-6x)+3e^3x\log(3)+3e^3x\log\left(3x^2\right)\right)}{x-2x^2+x^3}\,dx$$
$$= e^{\left(\frac{5\,(x-1)e^3-3\,e^3\log(3)-3\,e^3\log\left(3\,x^2\right)}{x-1}\right)}$$

input
```
integrate((3*x*exp(3)*log(3*x^2)+3*x*exp(3)*log(3)+(6-6*x)*exp(3))*exp((-3
*exp(3)*log(3*x^2)-3*exp(3)*log(3)+(5*x-5)*exp(3))/(-1+x))/(x^3-2*x^2+x),x
, algorithm=\
```

output
```
e^((5*(x - 1)*e^3 - 3*e^3*log(3) - 3*e^3*log(3*x^2))/(x - 1))
```

3.868.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log(3x^2)}{-1+x}}(e^3(6-6x)+3e^3x\log(3)+3e^3x\log(3x^2))}{x-2x^2+x^3}\,dx = e^{\frac{(5x-5)e^3-3e^3\log(3x^2)-3e^3\log(3)}{x-1}}$$

input
```
integrate((3*x*exp(3)*ln(3*x**2)+3*x*exp(3)*ln(3)+(6-6*x)*exp(3))*exp((-3*
exp(3)*ln(3*x**2)-3*exp(3)*ln(3)+(5*x-5)*exp(3))/(-1+x))/(x**3-2*x**2+x),x
)
```

output
```
exp(((5*x - 5)*exp(3) - 3*exp(3)*log(3*x**2) - 3*exp(3)*log(3))/(x - 1))
```

3.868.7 Maxima [A] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log(3x^2)}{-1+x}}(e^3(6-6x)+3e^3x\log(3)+3e^3x\log(3x^2))}{x-2x^2+x^3}\,dx = e^{\left(-\frac{6e^3\log(3)}{x-1}-\frac{6e^3\log(x)}{x-1}+5e^3\right)}$$

input
```
integrate((3*x*exp(3)*log(3*x^2)+3*x*exp(3)*log(3)+(6-6*x)*exp(3))*exp((-3
*exp(3)*log(3*x^2)-3*exp(3)*log(3)+(5*x-5)*exp(3))/(-1+x))/(x^3-2*x^2+x),x
, algorithm=\
```

output
```
e^(-6*e^3*log(3)/(x - 1) - 6*e^3*log(x)/(x - 1) + 5*e^3)
```

3.868.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(23) = 46$.

Time = 0.31 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.96

$$\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log(3x^2)}{-1+x}}(e^3(6-6x)+3e^3x\log(3)+3e^3x\log(3x^2))}{x-2x^2+x^3}\,dx = e^{\left(\frac{5xe^3}{x-1}-\frac{3e^3\log(3)}{x-1}-\frac{3e^3\log(3x^2)}{x-1}-\frac{5e^3}{x-1}\right)}$$

input
```
integrate((3*x*exp(3)*log(3*x^2)+3*x*exp(3)*log(3)+(6-6*x)*exp(3))*exp((-3
*exp(3)*log(3*x^2)-3*exp(3)*log(3)+(5*x-5)*exp(3))/(-1+x))/(x^3-2*x^2+x),x
, algorithm=\
```

output
```
e^(5*x*e^3/(x - 1) - 3*e^3*log(3)/(x - 1) - 3*e^3*log(3*x^2)/(x - 1) - 5*e
^3/(x - 1))
```

3.868.9 Mupad [B] (verification not implemented)

Time = 18.16 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.50

$$\int \frac{e^{\frac{e^3(-5+5x)-3e^3\log(3)-3e^3\log\left(3x^2\right)}{-1+x}}\left(e^3(6-6x)+3e^3x\log(3)+3e^3x\log\left(3x^2\right)\right)}{x-2x^2+x^3}\,dx$$
$$= \mathrm{e}^{-\frac{5\,\mathrm{e}^3}{x-1}}\,\mathrm{e}^{\frac{5\,x\,\mathrm{e}^3}{x-1}}\,{\left(\frac{1}{729\,x^6}\right)}^{\frac{\mathrm{e}^3}{x-1}}$$

input
```
int((exp(-(3*exp(3)*log(3) + 3*exp(3)*log(3*x^2) - exp(3)*(5*x - 5))/(x -
1))*(3*x*exp(3)*log(3) - exp(3)*(6*x - 6) + 3*x*exp(3)*log(3*x^2)))/(x - 2
*x^2 + x^3),x)
```

output
```
exp(-(5*exp(3))/(x - 1))*exp((5*x*exp(3))/(x - 1))*(1/(729*x^6))^(exp(3)/(
x - 1))
```

3.869 $\int e^{-16x}(675x^2-3600x^3)\,dx$

3.869.1 Optimal result

Integrand size = 17, antiderivative size = 19

$$\int e^{-16x}\left(675x^2-3600x^3\right)\,dx=-2-e^5+225e^{-16x}x^3+\log(4)$$

output
```
225*x^3/exp(16*x)-2+2*ln(2)-exp(5)
```

3.869.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53

$$\int e^{-16x}\left(675x^2-3600x^3\right)\,dx=225e^{-16x}x^3$$

input
```
Integrate[(675*x^2 - 3600*x^3)/E^(16*x),x]
```

output
```
(225*x^3)/E^(16*x)
```

3.869.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {2027, 2626, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-16x}\left(675x^2-3600x^3\right)\,dx$$

$$\Big\downarrow \text{2027}$$

$$\int e^{-16x}(675-3600x)x^2dx$$

$$\Big\downarrow \text{2626}$$

$$\int \left(675e^{-16x}x^2-3600e^{-16x}x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$225e^{-16x}x^3$$

input
```
Int[(675*x^2 - 3600*x^3)/E^(16*x),x]
```

output
```
(225*x^3)/E^(16*x)
```

3.869.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2027
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.))^(p_.), x_Symbol] :> Int[x^
(p*r)*(a + b*x^(s - r))^p*Fx, x] /; FreeQ[{a, b, r, s}, x] && IntegerQ[p] &
& PosQ[s - r] &&  !(EqQ[p, 1] && EqQ[u, 1])
```

rule 2626
```
Int[(F_)^(v_)*(Px_), x_Symbol] :> Int[ExpandIntegrand[F^v, Px, x], x] /; Fr
eeQ[F, x] && PolynomialQ[Px, x] && LinearQ[v, x] &&  !TrueQ[$UseGamma]
```

3.869.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53

method	result	size
risch	$225x^3\mathrm{e}^{-16x}$	10
gosper	$225x^3\mathrm{e}^{-16x}$	12
derivativedivides	$225x^3\mathrm{e}^{-16x}$	12
default	$225x^3\mathrm{e}^{-16x}$	12
norman	$225x^3\mathrm{e}^{-16x}$	12
parallelrisch	$225x^3\mathrm{e}^{-16x}$	12
meijerg	$\frac{225(16384x^3+3072x^2+384x+24)\mathrm{e}^{-16x}}{16384}-\frac{225(768x^2+96x+6)\mathrm{e}^{-16x}}{4096}$	39

input
```
int((-3600*x^3+675*x^2)/exp(16*x),x,method=_RETURNVERBOSE)
```

output
```
225*x^3*exp(-16*x)
```

3.869.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.47

$$\int e^{-16x}\left(675x^2-3600x^3\right)\,dx=225\,x^3e^{(-16\,x)}$$

input
```
integrate((-3600*x^3+675*x^2)/exp(16*x),x, algorithm=\
```

output
```
225*x^3*e^(-16*x)
```

3.869.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.42

$$\int e^{-16x}\left(675x^2-3600x^3\right)\,dx=225x^3e^{-16x}$$

input
```
integrate((-3600*x**3+675*x**2)/exp(16*x),x)
```

output
```
225*x**3*exp(-16*x)
```

3.869.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 38, normalized size of antiderivative = 2.00

$$\int e^{-16x}(675x^2-3600x^3)\,dx = \frac{225}{2048}\left(2048\,x^3+384\,x^2+48\,x+3\right)e^{(-16\,x)} - \frac{675}{2048}\left(128\,x^2+16\,x+1\right)e^{(-16\,x)}$$

input
```
integrate((-3600*x^3+675*x^2)/exp(16*x),x, algorithm=\
```

output
```
225/2048*(2048*x^3 + 384*x^2 + 48*x + 3)*e^(-16*x) - 675/2048*(128*x^2 + 1
6*x + 1)*e^(-16*x)
```

3.869.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.47

$$\int e^{-16x}(675x^2-3600x^3)\,dx = 225\,x^3e^{(-16\,x)}$$

input
```
integrate((-3600*x^3+675*x^2)/exp(16*x),x, algorithm=\
```

output
```
225*x^3*e^(-16*x)
```

3.869.9 Mupad [B] (verification not implemented)

Time = 16.49 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.47

$$\int e^{-16x}(675x^2-3600x^3)\,dx = 225\,x^3\,\mathrm{e}^{-16\,x}$$

input
```
int(exp(-16*x)*(675*x^2 - 3600*x^3),x)
```

output
```
225*x^3*exp(-16*x)
```

3.870 $\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-11}{}$

3.870.1 Optimal result

Integrand size = 302, antiderivative size = 30

$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+}{}$$

$$=x\left(3-\log\left(\frac{5}{\log(25+x)}-\log\left(\log\left(\frac{1}{3}(-3-x)x\right)\right)\right)\right)$$

output
```
(3-ln(5/ln(x+25)-ln(ln(1/3*x*(-3-x)))))*x
```

3.870.2 Mathematica [A] (verified)

Time = 0.46 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+}{}$$

$$=3x-x\log\left(\frac{5}{\log(25+x)}-\log\left(\log\left(-\frac{1}{3}x(3+x)\right)\right)\right)$$

3.870.

$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+x)\log\left(\frac{1}{3}(-3x-x^2)\right)+(225+84x+3x^2)\log^2(25+x)}{}$$

input
```
Integrate[((-75 - 53*x - 2*x^2)*Log[25 + x]^2 + (-15*x - 5*x^2)*Log[(-3*x
- x^2)/3] + (-1125 - 420*x - 15*x^2)*Log[25 + x]*Log[(-3*x - x^2)/3] + (22
5 + 84*x + 3*x^2)*Log[25 + x]^2*Log[(-3*x - x^2)/3]*Log[Log[(-3*x - x^2)/3
]] + ((375 + 140*x + 5*x^2)*Log[25 + x]*Log[(-3*x - x^2)/3] + (-75 - 28*x
- x^2)*Log[25 + x]^2*Log[(-3*x - x^2)/3]*Log[Log[(-3*x - x^2)/3]])*Log[(5
- Log[25 + x]*Log[Log[(-3*x - x^2)/3]])/Log[25 + x]])/((-375 - 140*x - 5*x
^2)*Log[25 + x]*Log[(-3*x - x^2)/3] + (75 + 28*x + x^2)*Log[25 + x]^2*Log[
(-3*x - x^2)/3]*Log[Log[(-3*x - x^2)/3]]),x]
```

output
```
3*x - x*Log[5/Log[25 + x] - Log[Log[-1/3*(x*(3 + x))]]]
```

3.870.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-2x^2-53x-75\right)\log^2(x+25)+\left(3x^2+84x+225\right)\log\left(\frac{1}{3}\left(-x^2-3x\right)\right)\log\left(\log\left(\frac{1}{3}\left(-x^2-3x\right)\right)\right)\log^2(x+25)}{}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \left(-\frac{5x}{(x+25)\log(x+25)\left(\log(x+25)\log\left(\log\left(-\frac{1}{3}x(x+3)\right)\right)-5\right)}-\log\left(\frac{5}{\log(x+25)}-\log\left(\log\left(-\frac{1}{3}x(x+3)\right)\right)\right)\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-5\int \frac{1}{\log(x+25)\left(\log(x+25)\log\left(\log\left(-\frac{1}{3}x(x+3)\right)\right)-5\right)}dx+125\int \frac{1}{(x+25)\log(x+25)\left(\log(x+25)\log\left(\log\left(-\frac{1}{3}x(x+3)\right)\right)-5\right)}dx-2\int \frac{\log(x+25)}{\log\left(-\frac{1}{3}x(x+3)\right)\left(\log(x+25)\log\left(\log\left(-\frac{1}{3}x(x+3)\right)\right)-5\right)}dx+3\int \frac{\log(x+25)}{(x+3)\log\left(-\frac{1}{3}x(x+3)\right)\left(\log(x+25)\log\left(\log\left(-\frac{1}{3}x(x+3)\right)\right)-5\right)}dx-\int \log\left(\frac{5}{\log(x+25)}-\log\left(\log\left(-\frac{1}{3}x(x+3)\right)\right)\right)dx+3x$$

3.870.

$$\int \frac{\left(-75-53x-2x^2\right)\log^2(25+x)+\left(-15x-5x^2\right)\log\left(\frac{1}{3}\left(-3x-x^2\right)\right)+\left(-1125-420x-15x^2\right)\log(25+x)\log\left(\frac{1}{3}\left(-3x-x^2\right)\right)+\left(225+84x+3x^2\right)\log^2(25+x)}{}$$

input
```
Int[((-75 - 53*x - 2*x^2)*Log[25 + x]^2 + (-15*x - 5*x^2)*Log[(-3*x - x^2)
/3] + (-1125 - 420*x - 15*x^2)*Log[25 + x]*Log[(-3*x - x^2)/3] + (225 + 84
*x + 3*x^2)*Log[25 + x]^2*Log[(-3*x - x^2)/3]*Log[Log[(-3*x - x^2)/3]] + (
(375 + 140*x + 5*x^2)*Log[25 + x]*Log[(-3*x - x^2)/3] + (-75 - 28*x - x^2)
*Log[25 + x]^2*Log[(-3*x - x^2)/3]*Log[Log[(-3*x - x^2)/3]])*Log[(5 - Log[
25 + x]*Log[Log[(-3*x - x^2)/3]])/Log[25 + x]])/((-375 - 140*x - 5*x^2)*Lo
g[25 + x]*Log[(-3*x - x^2)/3] + (75 + 28*x + x^2)*Log[25 + x]^2*Log[(-3*x
- x^2)/3]*Log[Log[(-3*x - x^2)/3]]),x]
```

output
```
$Aborted
```

3.870.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.870.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.03 (sec) , antiderivative size = 876, normalized size of antiderivative = 29.20

Expression too large to display

input
```
int((((-x^2-28*x-75)*ln(-1/3*x^2-x)*ln(x+25)^2*ln(ln(-1/3*x^2-x))+(5*x^2+1
40*x+375)*ln(-1/3*x^2-x)*ln(x+25))*ln((-ln(x+25)*ln(ln(-1/3*x^2-x))+5)/ln(
x+25))+(3*x^2+84*x+225)*ln(-1/3*x^2-x)*ln(x+25)^2*ln(ln(-1/3*x^2-x))+(-2*x
^2-53*x-75)*ln(x+25)^2+(-15*x^2-420*x-1125)*ln(-1/3*x^2-x)*ln(x+25)+(-5*x^
2-15*x)*ln(-1/3*x^2-x))/((x^2+28*x+75)*ln(-1/3*x^2-x)*ln(x+25)^2*ln(ln(-1/
3*x^2-x))+(-5*x^2-140*x-375)*ln(-1/3*x^2-x)*ln(x+25)),x)
```

output
```
-x*ln(ln(x+25)*ln(-ln(3)+I*Pi+ln(x)+ln(3+x)-1/2*I*Pi*csgn(I*x*(3+x))*(-csg
n(I*x*(3+x))+csgn(I*x))*(-csgn(I*x*(3+x))+csgn(I*(3+x)))+I*Pi*csgn(I*x*(3+
x))^2*(csgn(I*x*(3+x))-1))-5)+x*ln(ln(x+25))+I*Pi*x*csgn(I*(ln(x+25)*ln(-l
n(3)+I*Pi+ln(x)+ln(3+x)-1/2*I*Pi*csgn(I*x*(3+x))*(-csgn(I*x*(3+x))+csgn(I*
x))*(-csgn(I*x*(3+x))+csgn(I*(3+x)))+I*Pi*csgn(I*x*(3+x))^2*(csgn(I*x*(3+x
))-1))-5)/ln(x+25))^2+1/2*I*Pi*x*csgn(I*(ln(x+25)*ln(-ln(3)+I*Pi+ln(x)+ln(
3+x)-1/2*I*Pi*csgn(I*x*(3+x))*(-csgn(I*x*(3+x))+csgn(I*x))*(-csgn(I*x*(3+x
))+csgn(I*(3+x)))+I*Pi*csgn(I*x*(3+x))^2*(csgn(I*x*(3+x))-1))-5))*csgn(I/l
n(x+25))*csgn(I*(ln(x+25)*ln(-ln(3)+I*Pi+ln(x)+ln(3+x)-1/2*I*Pi*csgn(I*x*(
3+x))*(-csgn(I*x*(3+x))+csgn(I*x))*(-csgn(I*x*(3+x))+csgn(I*(3+x)))+I*Pi*c
sgn(I*x*(3+x))^2*(csgn(I*x*(3+x))-1))-5)/ln(x+25))-1/2*I*Pi*x*csgn(I*(ln(x
+25)*ln(-ln(3)+I*Pi+ln(x)+ln(3+x)-1/2*I*Pi*csgn(I*x*(3+x))*(-csgn(I*x*(3+x
))+csgn(I*x))*(-csgn(I*x*(3+x))+csgn(I*(3+x)))+I*Pi*csgn(I*x*(3+x))^2*(csg
n(I*x*(3+x))-1))-5))*csgn(I*(ln(x+25)*ln(-ln(3)+I*Pi+ln(x)+ln(3+x)-1/2*I*P
i*csgn(I*x*(3+x))*(-csgn(I*x*(3+x))+csgn(I*x))*(-csgn(I*x*(3+x))+csgn(I*(3
+x)))+I*Pi*csgn(I*x*(3+x))^2*(csgn(I*x*(3+x))-1))-5)/ln(x+25))^2-1/2*I*Pi*
x*csgn(I/ln(x+25))*csgn(I*(ln(x+25)*ln(-ln(3)+I*Pi+ln(x)+ln(3+x)-1/2*I*Pi*
csgn(I*x*(3+x))*(-csgn(I*x*(3+x))+csgn(I*x))*(-csgn(I*x*(3+x))+csgn(I*(3+x
)))+I*Pi*csgn(I*x*(3+x))^2*(csgn(I*x*(3+x))-1))-5)/ln(x+25))^2-1/2*I*Pi*x*
csgn(I*(ln(x+25)*ln(-ln(3)+I*Pi+ln(x)+ln(3+x)-1/2*I*Pi*csgn(I*x*(3+x))*...
```

3.870.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+ \dots}{\dots}$$

$$= -x\log\left(-\frac{\log(x+25)\log\left(\log\left(-\frac{1}{3}x^2-x\right)\right)-5}{\log(x+25)}\right)+3x$$

input
```
integrate((((-x^2-28*x-75)*log(-1/3*x^2-x)*log(x+25)^2*log(log(-1/3*x^2-x)
)+(5*x^2+140*x+375)*log(-1/3*x^2-x)*log(x+25))*log((-log(x+25)*log(log(-1/
3*x^2-x))+5)/log(x+25))+(3*x^2+84*x+225)*log(-1/3*x^2-x)*log(x+25)^2*log(l
og(-1/3*x^2-x))+(-2*x^2-53*x-75)*log(x+25)^2+(-15*x^2-420*x-1125)*log(-1/3
*x^2-x)*log(x+25)+(-5*x^2-15*x)*log(-1/3*x^2-x))/((x^2+28*x+75)*log(-1/3*x
^2-x)*log(x+25)^2*log(log(-1/3*x^2-x))+(-5*x^2-140*x-375)*log(-1/3*x^2-x)*
log(x+25)),x, algorithm=\
```

output
```
-x*log(-(log(x + 25)*log(log(-1/3*x^2 - x)) - 5)/log(x + 25)) + 3*x
```

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$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+x)\log\left(\frac{1}{3}(-3x-x^2)\right)+(225+84x+3x^2)\log^2(25+x) \dots}{\dots}$$

3.870.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+x)}{}$$

= Timed out

input
```
integrate((((-x**2-28*x-75)*ln(-1/3*x**2-x)*ln(x+25)**2*ln(ln(-1/3*x**2-x)
)+(5*x**2+140*x+375)*ln(-1/3*x**2-x)*ln(x+25))*ln((-ln(x+25)*ln(ln(-1/3*x*
*2-x))+5)/ln(x+25))+(3*x**2+84*x+225)*ln(-1/3*x**2-x)*ln(x+25)**2*ln(ln(-1
/3*x**2-x))+(-2*x**2-53*x-75)*ln(x+25)**2+(-15*x**2-420*x-1125)*ln(-1/3*x*
*2-x)*ln(x+25)+(-5*x**2-15*x)*ln(-1/3*x**2-x))/((x**2+28*x+75)*ln(-1/3*x**
2-x)*ln(x+25)**2*ln(ln(-1/3*x**2-x))+(-5*x**2-140*x-375)*ln(-1/3*x**2-x)*l
n(x+25)),x)
```

output
```
Timed out
```

3.870.7 Maxima [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.23

$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+x)}{}$$

$$= -x\log\left(-\log\left(x+25\right)\log\left(-\log\left(3\right)+\log\left(x\right)+\log\left(-x-3\right)\right)+5\right)+x\log\left(\log\left(x+25\right)\right)+3\,x$$

input
```
integrate((((-x^2-28*x-75)*log(-1/3*x^2-x)*log(x+25)^2*log(log(-1/3*x^2-x)
)+(5*x^2+140*x+375)*log(-1/3*x^2-x)*log(x+25))*log((-log(x+25)*log(log(-1/
3*x^2-x))+5)/log(x+25))+(3*x^2+84*x+225)*log(-1/3*x^2-x)*log(x+25)^2*log(l
og(-1/3*x^2-x))+(-2*x^2-53*x-75)*log(x+25)^2+(-15*x^2-420*x-1125)*log(-1/3
*x^2-x)*log(x+25)+(-5*x^2-15*x)*log(-1/3*x^2-x))/((x^2+28*x+75)*log(-1/3*x
^2-x)*log(x+25)^2*log(log(-1/3*x^2-x))+(-5*x^2-140*x-375)*log(-1/3*x^2-x)*
log(x+25)),x, algorithm=\
```

output
```
-x*log(-log(x + 25)*log(-log(3) + log(x) + log(-x - 3)) + 5) + x*log(log(x
 + 25)) + 3*x
```

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$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+x)\log\left(\frac{1}{3}(-3x-x^2)\right)+(225+84x+3x^2)\log^2(25+x)}{}$$

3.870.8 Giac [A] (verification not implemented)

Time = 1.06 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+x)}{}$$

$$= -x\log\left(-\log(x+25)\log\left(\log\left(-\frac{1}{3}x^2-x\right)\right)+5\right)+x\log(\log(x+25))+3x$$

input
```
integrate((((-x^2-28*x-75)*log(-1/3*x^2-x)*log(x+25)^2*log(log(-1/3*x^2-x)
)+(5*x^2+140*x+375)*log(-1/3*x^2-x)*log(x+25))*log((-log(x+25)*log(log(-1/
3*x^2-x))+5)/log(x+25))+(3*x^2+84*x+225)*log(-1/3*x^2-x)*log(x+25)^2*log(l
og(-1/3*x^2-x))+(-2*x^2-53*x-75)*log(x+25)^2+(-15*x^2-420*x-1125)*log(-1/3
*x^2-x)*log(x+25)+(-5*x^2-15*x)*log(-1/3*x^2-x))/((x^2+28*x+75)*log(-1/3*x
^2-x)*log(x+25)^2*log(log(-1/3*x^2-x))+(-5*x^2-140*x-375)*log(-1/3*x^2-x)*
log(x+25)),x, algorithm=\
```

output
```
-x*log(-log(x + 25)*log(log(-1/3*x^2 - x)) + 5) + x*log(log(x + 25)) + 3*x
```

3.870.9 Mupad [B] (verification not implemented)

Time = 17.81 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+x)}{}$$

$$= -x\left(\ln\left(-\frac{\ln(x+25)\ln\left(\ln\left(-\frac{x^2}{3}-x\right)\right)-5}{\ln(x+25)}\right)-3\right)$$

input
```
int((log(x + 25)^2*(53*x + 2*x^2 + 75) - log(-(log(x + 25)*log(log(- x - x
^2/3)) - 5)/log(x + 25))*(log(x + 25)*log(- x - x^2/3)*(140*x + 5*x^2 + 37
5) - log(x + 25)^2*log(log(- x - x^2/3))*log(- x - x^2/3)*(28*x + x^2 + 75
)) + log(- x - x^2/3)*(15*x + 5*x^2) + log(x + 25)*log(- x - x^2/3)*(420*x
 + 15*x^2 + 1125) - log(x + 25)^2*log(log(- x - x^2/3))*log(- x - x^2/3)*(
84*x + 3*x^2 + 225))/(log(x + 25)*log(- x - x^2/3)*(140*x + 5*x^2 + 375) -
 log(x + 25)^2*log(log(- x - x^2/3))*log(- x - x^2/3)*(28*x + x^2 + 75)),x
)
```

output
```
-x*(log(-(log(x + 25)*log(log(- x - x^2/3)) - 5)/log(x + 25)) - 3)
```

3.870.

$$\int \frac{(-75-53x-2x^2)\log^2(25+x)+(-15x-5x^2)\log\left(\frac{1}{3}(-3x-x^2)\right)+(-1125-420x-15x^2)\log(25+x)\log\left(\frac{1}{3}(-3x-x^2)\right)+(225+84x+3x^2)\log^2(25+x)}{}$$

3.871 $\int \frac{e^{-x}\left(-5x+e^x\left(e^{4/x}(4-x)+e^4x-2x^2\right)\right)}{5x}\,dx$

3.871.1 Optimal result

Integrand size = 44, antiderivative size = 28

$$\int \frac{e^{-x}\left(-5x+e^x\left(e^{4/x}(4-x)+e^4x-2x^2\right)\right)}{5x}\,dx = 2+e^{-x}+\frac{1}{5}\left(e^4-e^{4/x}-x\right)x$$

output
```
1/5*(exp(4)-exp(4/x)-x)*x+2+1/exp(x)
```

3.871.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{e^{-x}\left(-5x+e^x\left(e^{4/x}(4-x)+e^4x-2x^2\right)\right)}{5x}\,dx = \frac{1}{5}\left(5e^{-x}+e^4x-e^{4/x}x-x^2\right)$$

input
```
Integrate[(-5*x + E^x*(E^(4/x)*(4 - x) + E^4*x - 2*x^2))/(5*E^x*x),x]
```

output
```
(5/E^x + E^4*x - E^(4/x)*x - x^2)/5
```

3.871.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(e^x\left(-2x^2+e^4x+e^{4/x}(4-x)\right)-5x\right)}{5x}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{5}\int -\frac{e^{-x}\left(5x-e^x\left(-2x^2+e^4x+e^{4/x}(4-x)\right)\right)}{x}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{5}\int \frac{e^{-x}\left(5x-e^x\left(-2x^2+e^4x+e^{4/x}(4-x)\right)\right)}{x}dx$$

$$\Big\downarrow \ 7293$$

$$-\frac{1}{5}\int \left(\frac{2x^2+e^{4/x}x-e^4x-4e^{4/x}}{x}+5e^{-x}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{5}\left(-x^2-e^{4/x}x+e^4x+5e^{-x}\right)$$

input
```
Int[(-5*x + E^x*(E^(4/x)*(4 - x) + E^4*x - 2*x^2))/(5*E^x*x),x]
```

output
```
(5/E^x + E^4*x - E^(4/x)*x - x^2)/5
```

3.871.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.871.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

method	result	size
default	$\frac{x\,\mathrm{e}^{4}}{5}-\frac{x^{2}}{5}+\mathrm{e}^{-x}-\frac{x\,\mathrm{e}^{\frac{4}{x}}}{5}$	25
risch	$\frac{x\,\mathrm{e}^{4}}{5}-\frac{x^{2}}{5}+\mathrm{e}^{-x}-\frac{x\,\mathrm{e}^{\frac{4}{x}}}{5}$	25
parts	$\frac{x\,\mathrm{e}^{4}}{5}-\frac{x^{2}}{5}+\mathrm{e}^{-x}-\frac{x\,\mathrm{e}^{\frac{4}{x}}}{5}$	25
norman	$\left(1-\frac{\mathrm{e}^{x} x^{2}}{5}+\frac{x\,\mathrm{e}^{4} \mathrm{e}^{x}}{5}-\frac{\mathrm{e}^{x} \mathrm{e}^{\frac{4}{x}} x}{5}\right) \mathrm{e}^{-x}$	33
parallelrisch	$\frac{\left(x\,\mathrm{e}^{4} \mathrm{e}^{x}+5-\mathrm{e}^{x} x^{2}-\mathrm{e}^{x} \mathrm{e}^{\frac{4}{x}} x\right) \mathrm{e}^{-x}}{5}$	33

input
```
int(1/5*(((-x+4)*exp(4/x)+x*exp(4)-2*x^2)*exp(x)-5*x)/exp(x)/x,x,method=_R
ETURNVERBOSE)
```

output
```
-1/5*x^2+1/exp(x)-1/5*exp(1/x)^4*x+1/5*x*exp(4)
```

3.871.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{e^{-x}\left(-5x+e^{x}\left(e^{4/x}(4-x)+e^{4}x-2x^{2}\right)\right)}{5x}\,dx=-\frac{1}{5}\left(\left(x^{2}-xe^{4}+xe^{\frac{4}{x}}\right)e^{x}-5\right)e^{(-x)}$$

input
```
integrate(1/5*(((-x+4)*exp(4/x)+x*exp(4)-2*x^2)*exp(x)-5*x)/exp(x)/x,x, al
gorithm=\
```

output
```
-1/5*((x^2 - x*e^4 + x*e^(4/x))*e^x - 5)*e^(-x)
```

3.871.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{-x}\left(-5x+e^x\left(e^{4/x}(4-x)+e^4x-2x^2\right)\right)}{5x}\,dx=-\frac{x^2}{5}-\frac{xe^{\frac{4}{x}}}{5}+\frac{xe^4}{5}+e^{-x}$$

input
```
integrate(1/5*(((-x+4)*exp(4/x)+x*exp(4)-2*x**2)*exp(x)-5*x)/exp(x)/x,x)
```

output
```
-x**2/5 - x*exp(4/x)/5 + x*exp(4)/5 + exp(-x)
```

3.871.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{e^{-x}\left(-5x+e^x\left(e^{4/x}(4-x)+e^4x-2x^2\right)\right)}{5x}\,dx = -\frac{1}{5}\,x^2+\frac{1}{5}\,xe^4-\frac{4}{5}\,\mathrm{Ei}\left(\frac{4}{x}\right)+e^{(-x)}+\frac{4}{5}\,\Gamma\left(-1,-\frac{4}{x}\right)$$

input
```
integrate(1/5*(((-x+4)*exp(4/x)+x*exp(4)-2*x^2)*exp(x)-5*x)/exp(x)/x,x, al
gorithm=\
```

output
```
-1/5*x^2 + 1/5*x*e^4 - 4/5*Ei(4/x) + e^(-x) + 4/5*gamma(-1, -4/x)
```

3.871.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{-x}\left(-5x+e^x\left(e^{4/x}(4-x)+e^4x-2x^2\right)\right)}{5x}\,dx=-\frac{1}{5}\,x^2+\frac{1}{5}\,xe^4-\frac{1}{5}\,xe^{\frac{4}{x}}+e^{(-x)}$$

input
```
integrate(1/5*(((-x+4)*exp(4/x)+x*exp(4)-2*x^2)*exp(x)-5*x)/exp(x)/x,x, al
gorithm=\
```

output
```
-1/5*x^2 + 1/5*x*e^4 - 1/5*x*e^(4/x) + e^(-x)
```

3.871.9 Mupad [B] (verification not implemented)

Time = 17.93 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{-x}\left(-5x+e^x\left(e^{4/x}(4-x)+e^4x-2x^2\right)\right)}{5x}\,dx=\mathrm{e}^{-x}+\frac{x\,\mathrm{e}^4}{5}-\frac{x\,\mathrm{e}^{4/x}}{5}-\frac{x^2}{5}$$

input
```
int(-(exp(-x)*(x + (exp(x)*(exp(4/x)*(x - 4) - x*exp(4) + 2*x^2))/5))/x,x)
```

output
```
exp(-x) + (x*exp(4))/5 - (x*exp(4/x))/5 - x^2/5
```

3.872 $\int \frac{-8x-40x^2+(-1-10x)\log^2(x)+(-4-20x+(1+5x)\log^2(x))\log(x+5x^2)}{(2x^2+10x^3)\log^2(x)+(x+5x^2)\log^2(x)\log(x+5x^2)}$

3.872.1 Optimal result

Integrand size = 83, antiderivative size = 25

$$\int \frac{-8x-40x^2+(-1-10x)\log^2(x)+\left(-4-20x+(1+5x)\log^2(x)\right)\log\left(x+5x^2\right)}{(2x^2+10x^3)\log^2(x)+(x+5x^2)\log^2(x)\log\left(x+5x^2\right)}\,dx$$
$$= -4+\frac{4}{\log(x)}-\log\left(2+\frac{\log\left(x+5x^2\right)}{x}\right)$$

output
```
4/ln(x)-4-ln(2+ln(5*x^2+x)/x)
```

3.872.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{-8x-40x^2+(-1-10x)\log^2(x)+\left(-4-20x+(1+5x)\log^2(x)\right)\log\left(x+5x^2\right)}{(2x^2+10x^3)\log^2(x)+(x+5x^2)\log^2(x)\log\left(x+5x^2\right)}\,dx$$
$$= \frac{4}{\log(x)}+\log(x)-\log(2x+\log(x(1+5x)))$$

input
```
Integrate[(-8*x - 40*x^2 + (-1 - 10*x)*Log[x]^2 + (-4 - 20*x + (1 + 5*x)*L
og[x]^2)*Log[x + 5*x^2])/((2*x^2 + 10*x^3)*Log[x]^2 + (x + 5*x^2)*Log[x]^2
*Log[x + 5*x^2]),x]
```

output
```
4/Log[x] + Log[x] - Log[2*x + Log[x*(1 + 5*x)]]
```

3.872.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-40x^2+(-20x+(5x+1)\log^2(x)-4)\log(5x^2+x)-8x+(-10x-1)\log^2(x)}{(5x^2+x)\log(5x^2+x)\log^2(x)+(10x^3+2x^2)\log^2(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-40x^2+(-20x+(5x+1)\log^2(x)-4)\log(5x^2+x)-8x+(-10x-1)\log^2(x)}{x(5x+1)\log^2(x)(2x+\log(x(5x+1)))}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-40x^2-8x-10x\log^2(x)-\log^2(x)}{x(5x+1)\log^2(x)(2x+\log(x(5x+1)))}+\frac{(\log(x)-2)(\log(x)+2)\log(x(5x+1))}{x\log^2(x)(2x+\log(x(5x+1)))}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-2\int \frac{1}{2x+\log(x(5x+1))}dx-\int \frac{1}{x(2x+\log(x(5x+1)))}dx-5\int \frac{1}{(5x+1)(2x+\log(x(5x+1)))}dx+\log(x)+\frac{4}{\log(x)}$$

input
```
Int[(-8*x - 40*x^2 + (-1 - 10*x)*Log[x]^2 + (-4 - 20*x + (1 + 5*x)*Log[x]^
2)*Log[x + 5*x^2])/((2*x^2 + 10*x^3)*Log[x]^2 + (x + 5*x^2)*Log[x]^2*Log[x
 + 5*x^2]),x]
```

output
```
$Aborted
```

3.872.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.872.4 Maple [A] (verified)

Time = 1.22 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

method	result
default	$\ln(x)-\ln(2x+\ln(5x^2+x))+\frac{4}{\ln(x)}$
parts	$\ln(x)-\ln(2x+\ln(5x^2+x))+\frac{4}{\ln(x)}$
parallelrisch	$\frac{100-25\ln\left(x+\frac{\ln(5x^2+x)}{2}\right)\ln(x)+25\ln(x)^2}{25\ln(x)}$
risch	$\frac{\ln(x)^2+4}{\ln(x)}-\ln\left(\ln\left(\frac{1}{5}+x\right)+\frac{i\left(\pi\ \mathrm{csgn}\left(i\left(\frac{1}{5}+x\right)\right)\mathrm{csgn}\left(ix\left(\frac{1}{5}+x\right)\right)^2-\pi\ \mathrm{csgn}\left(i\left(\frac{1}{5}+x\right)\right)\mathrm{csgn}\left(ix\left(\frac{1}{5}+x\right)\right)\mathrm{csgn}(ix)-\pi\ \mathrm{csgn}\right.}{2}\right.$

input
```
int((((1+5*x)*ln(x)^2-20*x-4)*ln(5*x^2+x)+(-10*x-1)*ln(x)^2-40*x^2-8*x)/((
5*x^2+x)*ln(x)^2*ln(5*x^2+x)+(10*x^3+2*x^2)*ln(x)^2),x,method=_RETURNVERBO
SE)
```

output
```
ln(x)-ln(2*x+ln(5*x^2+x))+4/ln(x)
```

3.872.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

$$\int \frac{-8x-40x^2+(-1-10x)\log^2(x)+\left(-4-20x+(1+5x)\log^2(x)\right)\log(x+5x^2)}{(2x^2+10x^3)\log^2(x)+(x+5x^2)\log^2(x)\log(x+5x^2)}\,dx$$
$$=-\frac{\log(2\,x+\log(5\,x^2+x))\log(x)-\log(x)^2-4}{\log(x)}$$

input
```
integrate((((1+5*x)*log(x)^2-20*x-4)*log(5*x^2+x)+(-10*x-1)*log(x)^2-40*x^
2-8*x)/((5*x^2+x)*log(x)^2*log(5*x^2+x)+(10*x^3+2*x^2)*log(x)^2),x, algori
thm=\
```

output
```
-(log(2*x + log(5*x^2 + x))*log(x) - log(x)^2 - 4)/log(x)
```

3.872.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{-8x-40x^2+(-1-10x)\log^2(x)+\left(-4-20x+(1+5x)\log^2(x)\right)\log\left(x+5x^2\right)}{\left(2x^2+10x^3\right)\log^2(x)+\left(x+5x^2\right)\log^2(x)\log\left(x+5x^2\right)}\,dx$$
$$=\log\left(x\right)-\log\left(2x+\log\left(5x^2+x\right)\right)+\frac{4}{\log\left(x\right)}$$

input
```
integrate(((((1+5*x)*ln(x)**2-20*x-4)*ln(5*x**2+x)+(-10*x-1)*ln(x)**2-40*x*
*2-8*x)/((5*x**2+x)*ln(x)**2*ln(5*x**2+x)+(10*x**3+2*x**2)*ln(x)**2),x)
```

output
```
log(x) - log(2*x + log(5*x**2 + x)) + 4/log(x)
```

3.872.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{-8x-40x^2+(-1-10x)\log^2(x)+\left(-4-20x+(1+5x)\log^2(x)\right)\log\left(x+5x^2\right)}{\left(2x^2+10x^3\right)\log^2(x)+\left(x+5x^2\right)\log^2(x)\log\left(x+5x^2\right)}\,dx$$
$$=\frac{4}{\log\left(x\right)}-\log\left(2\,x+\log\left(5\,x+1\right)+\log\left(x\right)\right)+\log\left(x\right)$$

input
```
integrate(((((1+5*x)*log(x)^2-20*x-4)*log(5*x^2+x)+(-10*x-1)*log(x)^2-40*x^
2-8*x)/((5*x^2+x)*log(x)^2*log(5*x^2+x)+(10*x^3+2*x^2)*log(x)^2),x, algori
thm=\
```

output
```
4/log(x) - log(2*x + log(5*x + 1) + log(x)) + log(x)
```

3.872.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{-8x-40x^2+(-1-10x)\log^2(x)+\left(-4-20x+(1+5x)\log^2(x)\right)\log\left(x+5x^2\right)}{\left(2x^2+10x^3\right)\log^2(x)+\left(x+5x^2\right)\log^2(x)\log\left(x+5x^2\right)}\,dx$$
$$=\frac{4}{\log\left(x\right)}-\log\left(2\,x+\log\left(5\,x+1\right)+\log\left(x\right)\right)+\log\left(x\right)$$

input
```
integrate((((1+5*x)*log(x)^2-20*x-4)*log(5*x^2+x)+(-10*x-1)*log(x)^2-40*x^
2-8*x)/((5*x^2+x)*log(x)^2*log(5*x^2+x)+(10*x^3+2*x^2)*log(x)^2),x, algori
thm=\
```

output
```
4/log(x) - log(2*x + log(5*x + 1) + log(x)) + log(x)
```

3.872.9 Mupad [B] (verification not implemented)

Time = 18.96 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{-8x-40x^2+(-1-10x)\log^2(x)+\left(-4-20x+(1+5x)\log^2(x)\right)\log\left(x+5x^2\right)}{(2x^2+10x^3)\log^2(x)+(x+5x^2)\log^2(x)\log\left(x+5x^2\right)}\,dx$$
$$=\ln(x)-\ln\left(2\,x+\ln\left(x\,(5\,x+1)\right)\right)+\frac{4}{\ln(x)}$$

input
```
int(-(8*x + 40*x^2 + log(x)^2*(10*x + 1) + log(x + 5*x^2)*(20*x - log(x)^2
*(5*x + 1) + 4))/(log(x)^2*(2*x^2 + 10*x^3) + log(x + 5*x^2)*log(x)^2*(x +
 5*x^2)),x)
```

output
```
log(x) - log(2*x + log(x*(5*x + 1))) + 4/log(x)
```

3.873 $\int \frac{e^3(10+x^2)+e^{3+x}(-5x^2-5x^3)}{x^2} dx$

3.873.1 Optimal result

Integrand size = 31, antiderivative size = 21

$$\int \frac{e^3(10+x^2)+e^{3+x}(-5x^2-5x^3)}{x^2} dx = 4+e^3\left(x-5\left(\frac{2}{x}+e^x x\right)\right)$$

output
```
4+(x-10/x-5*exp(x)*x)*exp(3)
```

3.873.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{e^3(10+x^2)+e^{3+x}(-5x^2-5x^3)}{x^2} dx = e^3\left(-\frac{10}{x}+x-5e^x x\right)$$

input
```
Integrate[(E^3*(10 + x^2) + E^(3 + x)*(-5*x^2 - 5*x^3))/x^2,x]
```

output
```
E^3*(-10/x + x - 5*E^x*x)
```

3.873.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.48, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.065, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^3(x^2+10)+e^{x+3}(-5x^3-5x^2)}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{e^3(x^2+10)}{x^2}-5e^{x+3}(x+1)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$e^3x+5e^{x+3}-5e^{x+3}(x+1)-\frac{10e^3}{x}$$

input
```
Int[(E^3*(10 + x^2) + E^(3 + x)*(-5*x^2 - 5*x^3))/x^2,x]
```

output
```
5*E^(3 + x) - (10*E^3)/x + E^3*x - 5*E^(3 + x)*(1 + x)
```

3.873.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.873.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

method	result	size
parts	$e^3\left(x-\frac{10}{x}\right)-5x\,e^3e^x$	19
risch	$x\,e^3-\frac{10\,e^3}{x}-5\,e^{3+x}x$	20
norman	$\frac{x^2e^3-5x^2e^3e^x-10\,e^3}{x}$	25
parallelrisch	$-\frac{5x^2e^3e^x-x^2e^3+10\,e^3}{x}$	27
default	$-\frac{10\,e^3}{x}-5\,e^xe^3-5\,e^3(e^xx-e^x)+x\,e^3$	32

input
```
int(((-5*x^3-5*x^2)*exp(3)*exp(x)+(x^2+10)*exp(3))/x^2,x,method=_RETURNVER
BOSE)
```

output
```
exp(3)*(x-10/x)-5*x*exp(3)*exp(x)
```

3.873.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{e^3(10+x^2)+e^{3+x}(-5x^2-5x^3)}{x^2}\,dx=-\frac{5\,x^2e^{(x+3)}-(x^2-10)e^3}{x}$$

input
```
integrate(((-5*x^3-5*x^2)*exp(3)*exp(x)+(x^2+10)*exp(3))/x^2,x, algorithm=
\
```

output
```
-(5*x^2*e^(x + 3) - (x^2 - 10)*e^3)/x
```

3.873.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{e^3(10+x^2)+e^{3+x}(-5x^2-5x^3)}{x^2}\,dx=-5xe^3e^x+xe^3-\frac{10e^3}{x}$$

input
```
integrate(((-5*x**3-5*x**2)*exp(3)*exp(x)+(x**2+10)*exp(3))/x**2,x)
```

output
```
-5*x*exp(3)*exp(x) + x*exp(3) - 10*exp(3)/x
```

3.873.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.48

$$\int \frac{e^3(10+x^2)+e^{3+x}(-5x^2-5x^3)}{x^2}\,dx = xe^3-5\left(xe^3-e^3\right)e^x-\frac{10\,e^3}{x}-5\,e^{(x+3)}$$

input
```
integrate(((-5*x^3-5*x^2)*exp(3)*exp(x)+(x^2+10)*exp(3))/x^2,x, algorithm=
\
```

output
```
x*e^3 - 5*(x*e^3 - e^3)*e^x - 10*e^3/x - 5*e^(x + 3)
```

3.873.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{e^3(10+x^2)+e^{3+x}(-5x^2-5x^3)}{x^2}\,dx = \frac{x^2e^3-5\,x^2e^{(x+3)}-10\,e^3}{x}$$

input
```
integrate(((-5*x^3-5*x^2)*exp(3)*exp(x)+(x^2+10)*exp(3))/x^2,x, algorithm=
\
```

output
```
(x^2*e^3 - 5*x^2*e^(x + 3) - 10*e^3)/x
```

3.873.9 Mupad [B] (verification not implemented)

Time = 16.86 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{e^3(10+x^2)+e^{3+x}(-5x^2-5x^3)}{x^2}\,dx = -\frac{10\,\mathrm{e}^3}{x}-x\,\mathrm{e}^3\,(5\,\mathrm{e}^x-1)$$

input
```
int((exp(3)*(x^2 + 10) - exp(3)*exp(x)*(5*x^2 + 5*x^3))/x^2,x)
```

output
```
- (10*exp(3))/x - x*exp(3)*(5*exp(x) - 1)
```

3.874 $\int \frac{e^{-x}\left(-20x^2-2e^{2x}x^2-2x^4+e^x\left(4x^2-4x^3\right)+\left(-50-50x+15x^2+5x^3-x^4\right.}{-5x^2+x^4}$

3.874.1 Optimal result

Integrand size = 115, antiderivative size = 32

$$\int \frac{e^{-x}(-20x^2-2e^{2x}x^2-2x^4+e^x(4x^2-4x^3)+(-50-50x+15x^2+5x^3-x^4+x^5+e^x(10-2x^2)+e^{2x}}{-5x^2+x^4}$$
$$=\frac{\left(2-e^{-x}\left(10+(e^x+x)^2\right)\right)\log\left(2(5-x^2)\right)}{x}$$

output
```
(2-((exp(x)+x)^2+10)/exp(x))*ln(-2*x^2+10)/x
```

3.874.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 125 vs. 2(32) = 64.

Time = 1.24 (sec) , antiderivative size = 125, normalized size of antiderivative = 3.91

$$\int \frac{e^{-x}(-20x^2-2e^{2x}x^2-2x^4+e^x(4x^2-4x^3)+(-50-50x+15x^2+5x^3-x^4+x^5+e^x(10-2x^2)+e^{2x}}{-5x^2+x^4}$$
$$=\frac{4\operatorname{arctanh}\left(\frac{x}{\sqrt{5}}\right)}{\sqrt{5}}+\frac{2}{5}\left(-5+\sqrt{5}\right)\log\left(\sqrt{5}-x\right)-2\log\left(\sqrt{5}+x\right)-\frac{2\log\left(\sqrt{5}+x\right)}{\sqrt{5}}+\frac{2\log\left(-2(-5+x^2)\right)}{x}-\frac{10e^{-x}\log\left(-2(-5+x^2)\right)}{x}-\frac{e^x\log\left(-2(-5+x^2)\right)}{x}-e^{-x}x\log\left(-2(-5+x^2)\right)$$

input
```
Integrate[(-20*x^2 - 2*E^(2*x)*x^2 - 2*x^4 + E^x*(4*x^2 - 4*x^3) + (-50 -
50*x + 15*x^2 + 5*x^3 - x^4 + x^5 + E^x*(10 - 2*x^2) + E^(2*x)*(-5 + 5*x +
 x^2 - x^3))*Log[10 - 2*x^2])/(E^x*(-5*x^2 + x^4)),x]
```

output
```
(4*ArcTanh[x/Sqrt[5]])/Sqrt[5] + (2*(-5 + Sqrt[5])*Log[Sqrt[5] - x])/5 - 2
*Log[Sqrt[5] + x] - (2*Log[Sqrt[5] + x])/Sqrt[5] + (2*Log[-2*(-5 + x^2)])/
x - (10*Log[-2*(-5 + x^2)])/(E^x*x) - (E^x*Log[-2*(-5 + x^2)])/x - (x*Log[
-2*(-5 + x^2)])/E^x
```

3.874.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 7.20 (sec) , antiderivative size = 253, normalized size of antiderivative = 7.91, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$, Rules used = {2026, 7276, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(-2x^4-2e^{2x}x^2-20x^2+e^x\left(4x^2-4x^3\right)+\left(x^5-x^4+5x^3+15x^2+e^x\left(10-2x^2\right)+e^{2x}\left(-x^3+x^2+5x-\right.\right.}{x^4-5x^2}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{-x}\left(-2x^4-2e^{2x}x^2-20x^2+e^x\left(4x^2-4x^3\right)+\left(x^5-x^4+5x^3+15x^2+e^x\left(10-2x^2\right)+e^{2x}\left(-x^3+x^2+5x-\right.\right.}{x^2\left(x^2-5\right)}$$

$$\Big\downarrow \text{7276}$$

$$\int \left(-\frac{2e^{-x}x^2}{x^2-5}-\frac{20e^{-x}}{x^2-5}+\frac{e^{-x}x^2\log\left(10-2x^2\right)}{5-x^2}+\frac{5e^{-x}x\log\left(10-2x^2\right)}{x^2-5}+\frac{15e^{-x}\log\left(10-2x^2\right)}{x^2-5}+\frac{50e^{-x}\log\left(10\right.}{\left(5-x^2\right)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\left(1-\sqrt{5}\right)e^{\sqrt{5}}\,\text{ExpIntegralEi}\left(-x-\sqrt{5}\right)+\sqrt{5}e^{\sqrt{5}}\,\text{ExpIntegralEi}\left(-x-\sqrt{5}\right)-e^{\sqrt{5}}\,\text{ExpIntegralEi}\left(-x-\sqrt{5}\right)+\left(1+\sqrt{5}\right)e^{-\sqrt{5}}\,\text{ExpIntegralEi}\left(\sqrt{5}-x\right)-\sqrt{5}e^{-\sqrt{5}}\,\text{ExpIntegralEi}\left(\sqrt{5}-x\right)-e^{-\sqrt{5}}\,\text{ExpIntegralEi}\left(\sqrt{5}-x\right)-e^{-x}x\log\left(10-2x^2\right)-\frac{10e^{-x}\log\left(10-2x^2\right)}{x}+\frac{2\log\left(10-2x^2\right)}{x}-2\log\left(5-x^2\right)-\frac{e^x\left(5x\log\left(2\left(5-x^2\right)\right)-x^3\log\left(2\left(5-x^2\right)\right)\right)}{x^2\left(5-x^2\right)}$$

input
```
Int[(-20*x^2 - 2*E^(2*x)*x^2 - 2*x^4 + E^x*(4*x^2 - 4*x^3) + (-50 - 50*x +
 15*x^2 + 5*x^3 - x^4 + x^5 + E^x*(10 - 2*x^2) + E^(2*x)*(-5 + 5*x + x^2 -
 x^3))*Log[10 - 2*x^2])/(E^x*(-5*x^2 + x^4)),x]
```

output
```
-(E^Sqrt[5]*ExpIntegralEi[-Sqrt[5] - x]) + Sqrt[5]*E^Sqrt[5]*ExpIntegralEi
[-Sqrt[5] - x] + (1 - Sqrt[5])*E^Sqrt[5]*ExpIntegralEi[-Sqrt[5] - x] - Exp
IntegralEi[Sqrt[5] - x]/E^Sqrt[5] - (Sqrt[5]*ExpIntegralEi[Sqrt[5] - x])/E
^Sqrt[5] + ((1 + Sqrt[5])*ExpIntegralEi[Sqrt[5] - x])/E^Sqrt[5] + (2*Log[1
0 - 2*x^2])/x - (10*Log[10 - 2*x^2])/(E^x*x) - (x*Log[10 - 2*x^2])/E^x - 2
*Log[5 - x^2] - (E^x*(5*x*Log[2*(5 - x^2)] - x^3*Log[2*(5 - x^2)]))/(x^2*(
5 - x^2))
```

3.874.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.874.
$$\int \frac{e^{-x}\left(-20x^2-2e^{2x}x^2-2x^4+e^x\left(4x^2-4x^3\right)+\left(-50-50x+15x^2+5x^3-x^4+x^5+e^x\left(10-2x^2\right)+e^{2x}\left(-5+5x+x^2-x^3\right)\right)\log\left(10-2x^2\right)\right)}{-5x^2+x^4}\,dx$$

3.874.4 Maple [A] (verified)

Time = 1.08 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.25

method	result	size
risch	$-\frac{(x^2+e^{2x}-2e^x+10)e^{-x}\ln(-2x^2+10)}{x}-2\ln(x^2-5)$	40
parallelrisch	$\frac{(-20\ln(x^2-5)e^x x-10\ln(-2x^2+10)x^2-10\ln(-2x^2+10)e^{2x}+20e^x\ln(-2x^2+10)-100\ln(-2x^2+10))e^{-x}}{10x}$	71

input
```
int((((-x^3+x^2+5*x-5)*exp(x)^2+(-2*x^2+10)*exp(x)+x^5-x^4+5*x^3+15*x^2-50
*x-50)*ln(-2*x^2+10)-2*exp(x)^2*x^2+(-4*x^3+4*x^2)*exp(x)-2*x^4-20*x^2)/(x
^4-5*x^2)/exp(x),x,method=_RETURNVERBOSE)
```

output
```
-(x^2+exp(x)^2-2*exp(x)+10)/x/exp(x)*ln(-2*x^2+10)-2*ln(x^2-5)
```

3.874.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.03

$$\int \frac{e^{-x}(-20x^2-2e^{2x}x^2-2x^4+e^x(4x^2-4x^3)+(-50-50x+15x^2+5x^3-x^4+x^5+e^x(10-2x^2)+e^{2x}}{-5x^2+x^4}$$
$$=-\frac{(x^2+2(x-1)e^x+e^{(2x)}+10)e^{(-x)}\log(-2x^2+10)}{x}$$

input
```
integrate((((-x^3+x^2+5*x-5)*exp(x)^2+(-2*x^2+10)*exp(x)+x^5-x^4+5*x^3+15*
x^2-50*x-50)*log(-2*x^2+10)-2*exp(x)^2*x^2+(-4*x^3+4*x^2)*exp(x)-2*x^4-20*
x^2)/(x^4-5*x^2)/exp(x),x, algorithm=\
```

output
```
-(x^2 + 2*(x - 1)*e^x + e^(2*x) + 10)*e^(-x)*log(-2*x^2 + 10)/x
```

3.874.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. 2(22) = 44.

Time = 0.19 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.03

$$\int \frac{e^{-x}(-20x^2-2e^{2x}x^2-2x^4+e^x(4x^2-4x^3)+(-50-50x+15x^2+5x^3-x^4+x^5+e^x(10-2x^2)+e^{2x}}{-5x^2+x^4}$$
$$=-2\log(x^2-5)+\frac{2\log(10-2x^2)}{x}$$
$$+\frac{-xe^x\log(10-2x^2)+(-x^3\log(10-2x^2)-10x\log(10-2x^2))e^{-x}}{x^2}$$

input
```
integrate((((-x**3+x**2+5*x-5)*exp(x)**2+(-2*x**2+10)*exp(x)+x**5-x**4+5*x
**3+15*x**2-50*x-50)*ln(-2*x**2+10)-2*exp(x)**2*x**2+(-4*x**3+4*x**2)*exp(
x)-2*x**4-20*x**2)/(x**4-5*x**2)/exp(x),x)
```

output
```
-2*log(x**2 - 5) + 2*log(10 - 2*x**2)/x + (-x*exp(x)*log(10 - 2*x**2) + (-
x**3*log(10 - 2*x**2) - 10*x*log(10 - 2*x**2))*exp(-x))/x**2
```

3.874.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.34 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.84

$$\int \frac{e^{-x}(-20x^2 - 2e^{2x}x^2 - 2x^4 + e^x(4x^2 - 4x^3) + (-50 - 50x + 15x^2 + 5x^3 - x^4 + x^5 + e^x(10 - 2x^2) + e^{2x}}{-5x^2 + x^4}$$
$$= -\frac{-2i\pi + (10i\pi + (i\pi + \log(2))x^2 + 10\log(2))e^{(-x)} + (i\pi + \log(2))e^x + (2x + e^x - 2)\log(x^2 - 5) -}{x}$$

input
```
integrate((((-x^3+x^2+5*x-5)*exp(x)^2+(-2*x^2+10)*exp(x)+x^5-x^4+5*x^3+15*
x^2-50*x-50)*log(-2*x^2+10)-2*exp(x)^2*x^2+(-4*x^3+4*x^2)*exp(x)-2*x^4-20*
x^2)/(x^4-5*x^2)/exp(x),x, algorithm=\
```

output
```
-(-2*I*pi + (10*I*pi + (I*pi + log(2))*x^2 + 10*log(2))*e^(-x) + (I*pi + l
og(2))*e^x + (2*x + e^x - 2)*log(x^2 - 5) - 2*log(2))/x
```

3.874.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(28) = 56.

Time = 0.29 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.06

$$\int \frac{e^{-x}(-20x^2 - 2e^{2x}x^2 - 2x^4 + e^x(4x^2 - 4x^3) + (-50 - 50x + 15x^2 + 5x^3 - x^4 + x^5 + e^x(10 - 2x^2) + e^{2x}}{-5x^2 + x^4}$$
$$= -\frac{x^2e^{(-x)}\log(-2x^2 + 10) + 2x\log(x^2 - 5) + 10e^{(-x)}\log(-2x^2 + 10) + e^x\log(-2x^2 + 10) - 2\log(-2}{x}$$

input
```
integrate((((-x^3+x^2+5*x-5)*exp(x)^2+(-2*x^2+10)*exp(x)+x^5-x^4+5*x^3+15*
x^2-50*x-50)*log(-2*x^2+10)-2*exp(x)^2*x^2+(-4*x^3+4*x^2)*exp(x)-2*x^4-20*
x^2)/(x^4-5*x^2)/exp(x),x, algorithm=\
```

output
```
-(x^2*e^(-x)*log(-2*x^2 + 10) + 2*x*log(x^2 - 5) + 10*e^(-x)*log(-2*x^2 +
10) + e^x*log(-2*x^2 + 10) - 2*log(-2*x^2 + 10))/x
```

3.874.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-x}(-20x^2 - 2e^{2x}x^2 - 2x^4 + e^x(4x^2 - 4x^3) + (-50 - 50x + 15x^2 + 5x^3 - x^4 + x^5 + e^x(10 - 2x^2) + e^{2x}}{-5x^2 + x^4}$$
$$= \int \frac{e^{-x}\left(2\,x^2\,e^{2\,x} - e^x\left(4\,x^2 - 4\,x^3\right) + \ln\left(10 - 2\,x^2\right)\left(50\,x + e^x\left(2\,x^2 - 10\right) - 15\,x^2 - 5\,x^3 + x^4 - x^5 - e^{2\,x}\,(\right.\right.}{5\,x^2 - x^4}$$

input
```
int((exp(-x)*(2*x^2*exp(2*x) - exp(x)*(4*x^2 - 4*x^3) + log(10 - 2*x^2)*(5
0*x + exp(x)*(2*x^2 - 10) - 15*x^2 - 5*x^3 + x^4 - x^5 - exp(2*x)*(5*x + x
^2 - x^3 - 5) + 50) + 20*x^2 + 2*x^4))/(5*x^2 - x^4),x)
```

output
```
int((exp(-x)*(2*x^2*exp(2*x) - exp(x)*(4*x^2 - 4*x^3) + log(10 - 2*x^2)*(5
0*x + exp(x)*(2*x^2 - 10) - 15*x^2 - 5*x^3 + x^4 - x^5 - exp(2*x)*(5*x + x
^2 - x^3 - 5) + 50) + 20*x^2 + 2*x^4))/(5*x^2 - x^4), x)
```

3.875 $\int \frac{20-}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}(e^6-6e^3x+9x^2)+e^6(}$

3.875.1 Optimal result

Integrand size = 206, antiderivative size = 38

$$\int \frac{20-12e^{10-8x}-40x-8x^2+}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}\left(e^6-6e^3x+9x^2\right)+e^6\left(x^2-2x^3+x^4\right)+e^3(-10}$$
$$=\frac{4}{-e^3+3x-\frac{5-x}{-e^{5-4x}-x+x^2}}$$

output
```
4/(3*x-(5-x)/(x^2-x-exp(-4*x+5))-exp(3))
```

3.875.2 Mathematica [A] (verified)

Time = 10.13 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.61

$$\int \frac{20-12e^{10-8x}-40x-8x^2+}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}\left(e^6-6e^3x+9x^2\right)+e^6\left(x^2-2x^3+x^4\right)+e^3(-10}$$
$$=-\frac{4(e^5-e^{4x}(-1+x)x)}{e^8-3e^5x-e^{3+4x}(-1+x)x+e^{4x}\left(-5+x-3x^2+3x^3\right)}$$

input
```
Integrate[(20 - 12*E^(10 - 8*x) - 40*x - 8*x^2 + 24*x^3 - 12*x^4 + E^(5 -
4*x)*(-76 - 8*x + 24*x^2))/(25 - 10*x + 31*x^2 - 36*x^3 + 15*x^4 - 18*x^5
+ 9*x^6 + E^(10 - 8*x)*(E^6 - 6*E^3*x + 9*x^2) + E^6*(x^2 - 2*x^3 + x^4) +
 E^3*(-10*x + 12*x^2 - 8*x^3 + 12*x^4 - 6*x^5) + E^(5 - 4*x)*(30*x - 6*x^2
 + 18*x^3 - 18*x^4 + E^6*(2*x - 2*x^2) + E^3*(-10 + 2*x - 12*x^2 + 12*x^3)
)),x]
```

output
```
(-4*(E^5 - E^(4*x)*(-1 + x)*x))/(E^8 - 3*E^5*x - E^(3 + 4*x)*(-1 + x)*x +
E^(4*x)*(-5 + x - 3*x^2 + 3*x^3))
```

3.875.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-12x^4+24x^3-8x^2+e^{5-4x}(24x^2}{9x^6-18x^5+15x^4-36x^3+31x^2+e^{10-8x}\left(9x^2-6e^3x+e^6\right)+e^6\left(x^4-2x^3+x^2\right)+e^{5-4x}\left(-18x^4+18x^3-6\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{4\left(-e^{4x+5}\left(-6x^2+2x+19\right)-e^{8x}\left(3x^4-6x^3+2x^2+10x-5\right)-3e^{10}\right)}{\left(e^{4x}\left(3x^3-3x^2+x-5\right)-e^{4x+3}(x-1)x-3e^5x+e^8\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$4\int -\frac{e^{4x+5}\left(-6x^2+2x+19\right)-e^{8x}\left(-3x^4+6x^3-2x^2-10x+5\right)+3e^{10}}{\left(e^{4x+3}(1-x)x-3e^5x-e^{4x}\left(-3x^3+3x^2-x+5\right)+e^8\right)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-4\int \frac{e^{4x+5}\left(-6x^2+2x+19\right)-e^{8x}\left(-3x^4+6x^3-2x^2-10x+5\right)+3e^{10}}{\left(e^{4x+3}(1-x)x-3e^5x-e^{4x}\left(-3x^3+3x^2-x+5\right)+e^8\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(\frac{e^5\left(-12x^4+\left(57+4e^3\right)x^3+7\left(5-3e^3\right)x^2-\left(21+e^3\right)x-5\left(19-2e^3\right)\right)}{\left(-3x^3+\left(3+e^3\right)x^2-\left(1+e^3\right)x+5\right)^2\left(3e^{4x}x^3-3e^{4x}\left(1+\frac{e^3}{3}\right)x^2+e^{4x}\left(1+e^3\right)x-3e^5x-5e^{4x}+e^8\right)}\right.$$

$$\Big\downarrow \text{2009}$$

$$-4\left(\frac{x^2}{-3x^3+\left(3+e^3\right)x^2-\left(1+e^3\right)x+5}-\frac{x}{-3x^3+\left(3+e^3\right)x^2-\left(1+e^3\right)x+5}+5e^{10}\left(42+e^3-e^6\right)\int \frac{}{\left(-3x^3+\right.}\right.$$

3.875.
$$\int \frac{20-12e^{10-8x}-40x-8x^2+24x^3-12x^4+e^{5-4x}\left(-76-8x+24x^2\right)}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}\left(e^6-6e^3x+9x^2\right)+e^6\left(x^2-2x^3+x^4\right)+e^3\left(-10x+12x^2-8x^3+12x^4-6x^5\right)+e^{5-4x}\left(30x-6x^2+18x^3-\right.}$$

input
```
Int[(20 - 12*E^(10 - 8*x) - 40*x - 8*x^2 + 24*x^3 - 12*x^4 + E^(5 - 4*x)*(
-76 - 8*x + 24*x^2))/(25 - 10*x + 31*x^2 - 36*x^3 + 15*x^4 - 18*x^5 + 9*x^
6 + E^(10 - 8*x)*(E^6 - 6*E^3*x + 9*x^2) + E^6*(x^2 - 2*x^3 + x^4) + E^3*(
-10*x + 12*x^2 - 8*x^3 + 12*x^4 - 6*x^5) + E^(5 - 4*x)*(30*x - 6*x^2 + 18*
x^3 - 18*x^4 + E^6*(2*x - 2*x^2) + E^3*(-10 + 2*x - 12*x^2 + 12*x^3))),x]
```

output
```
$Aborted
```

3.875.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.875.4 Maple [A] (verified)

Time = 1.39 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.74

method	result	size
norman	$\frac{-4x^2+4x+4\,\mathrm{e}^{-4x+5}}{x^2\mathrm{e}^3-3x^3-x\,\mathrm{e}^3-\mathrm{e}^3\mathrm{e}^{-4x+5}+3x^2+3\,\mathrm{e}^{-4x+5}x-x+5}$	66
parallelrisch	$\frac{-12x^2+12x+12\,\mathrm{e}^{-4x+5}}{3x^2\mathrm{e}^3-9x^3-3x\,\mathrm{e}^3-3\,\mathrm{e}^3\mathrm{e}^{-4x+5}+9x^2+9\,\mathrm{e}^{-4x+5}x-3x+15}$	67
risch	$-\frac{4}{\mathrm{e}^3-3x}-\frac{4(-5+x)}{(\mathrm{e}^3-3x)(x^2\mathrm{e}^3-3x^3-x\,\mathrm{e}^3-\mathrm{e}^{-4x+8}+3x^2+3\,\mathrm{e}^{-4x+5}x-x+5)}$	70

3.875.
$\int \frac{20-12e^{10-8x}-40x-8x^2+24x^3-12x^4+e^{5-4x}(-76-8x+24x^2)}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}(e^6-6e^3x+9x^2)+e^6(x^2-2x^3+x^4)+e^3(-10x+12x^2-8x^3+12x^4-6x^5)+e^{5-4x}(30x-6x^2+18x^3-}$

input
```
int((-12*exp(-4*x+5)^2+(24*x^2-8*x-76)*exp(-4*x+5)-12*x^4+24*x^3-8*x^2-40*
x+20)/((exp(3)^2-6*x*exp(3)+9*x^2)*exp(-4*x+5)^2+((-2*x^2+2*x)*exp(3)^2+(1
2*x^3-12*x^2+2*x-10)*exp(3)-18*x^4+18*x^3-6*x^2+30*x)*exp(-4*x+5)+(x^4-2*x
^3+x^2)*exp(3)^2+(-6*x^5+12*x^4-8*x^3+12*x^2-10*x)*exp(3)+9*x^6-18*x^5+15*
x^4-36*x^3+31*x^2-10*x+25),x,method=_RETURNVERBOSE)
```

output
```
(-4*x^2+4*x+4*exp(-4*x+5))/(x^2*exp(3)-3*x^3-x*exp(3)-exp(3)*exp(-4*x+5)+3
*x^2+3*exp(-4*x+5)*x-x+5)
```

3.875.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.55

$$\int \frac{20-12e^{10-8x}-40x-8x^2+}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}\left(e^6-6e^3x+9x^2\right)+e^6\left(x^2-2x^3+x^4\right)+e^3\left(-10\right.}$$
$$=\frac{4\left(x^2-x-e^{(-4x+5)}\right)}{3x^3-3x^2-(x^2-x)e^3-(3x-e^3)e^{(-4x+5)}+x-5}$$

input
```
integrate((-12*exp(-4*x+5)^2+(24*x^2-8*x-76)*exp(-4*x+5)-12*x^4+24*x^3-8*x
^2-40*x+20)/((exp(3)^2-6*x*exp(3)+9*x^2)*exp(-4*x+5)^2+((-2*x^2+2*x)*exp(3
)^2+(12*x^3-12*x^2+2*x-10)*exp(3)-18*x^4+18*x^3-6*x^2+30*x)*exp(-4*x+5)+(x
^4-2*x^3+x^2)*exp(3)^2+(-6*x^5+12*x^4-8*x^3+12*x^2-10*x)*exp(3)+9*x^6-18*x
^5+15*x^4-36*x^3+31*x^2-10*x+25),x, algorithm=\
```

output
```
4*(x^2 - x - e^(-4*x + 5))/(3*x^3 - 3*x^2 - (x^2 - x)*e^3 - (3*x - e^3)*e^
(-4*x + 5) + x - 5)
```

3.875.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. 2(22) = 44.

Time = 0.34 (sec) , antiderivative size = 94, normalized size of antiderivative = 2.47

$$\int \frac{20-12e^{10-8x}-40x-8x^2+}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}\left(e^6-6e^3x+9x^2\right)+e^6\left(x^2-2x^3+x^4\right)+e^3\left(-10\right.}$$
$$=\frac{4x-20}{-9x^4+9x^3+6x^3e^3-x^2e^6-6x^2e^3-3x^2+15x+xe^3+xe^6+\left(9x^2-6xe^3+e^6\right)e^{5-4x}-5e^3}+\frac{12}{9x-3e^3}$$

input
```
integrate((-12*exp(-4*x+5)**2+(24*x**2-8*x-76)*exp(-4*x+5)-12*x**4+24*x**3
-8*x**2-40*x+20)/((exp(3)**2-6*x*exp(3)+9*x**2)*exp(-4*x+5)**2+((-2*x**2+2
*x)*exp(3)**2+(12*x**3-12*x**2+2*x-10)*exp(3)-18*x**4+18*x**3-6*x**2+30*x)
*exp(-4*x+5)+(x**4-2*x**3+x**2)*exp(3)**2+(-6*x**5+12*x**4-8*x**3+12*x**2-
10*x)*exp(3)+9*x**6-18*x**5+15*x**4-36*x**3+31*x**2-10*x+25),x)
```

output
```
(4*x - 20)/(-9*x**4 + 9*x**3 + 6*x**3*exp(3) - x**2*exp(6) - 6*x**2*exp(3)
 - 3*x**2 + 15*x + x*exp(3) + x*exp(6) + (9*x**2 - 6*x*exp(3) + exp(6))*ex
p(5 - 4*x) - 5*exp(3)) + 12/(9*x - 3*exp(3))
```

3.875.7 Maxima [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.55

$$\int \frac{20-12e^{10-8x}-40x-8x^2+}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}\left(e^6-6e^3x+9x^2\right)+e^6\left(x^2-2x^3+x^4\right)+e^3\left(-10\right.}$$
$$= -\frac{4\left((x^2-x)e^{(4x)}-e^5\right)}{3\,xe^5-(3\,x^3-x^2(e^3+3)+x(e^3+1)-5)e^{(4x)}-e^8}$$

input
```
integrate((-12*exp(-4*x+5)^2+(24*x^2-8*x-76)*exp(-4*x+5)-12*x^4+24*x^3-8*x
^2-40*x+20)/((exp(3)^2-6*x*exp(3)+9*x^2)*exp(-4*x+5)^2+((-2*x^2+2*x)*exp(3
)^2+(12*x^3-12*x^2+2*x-10)*exp(3)-18*x^4+18*x^3-6*x^2+30*x)*exp(-4*x+5)+(x
^4-2*x^3+x^2)*exp(3)^2+(-6*x^5+12*x^4-8*x^3+12*x^2-10*x)*exp(3)+9*x^6-18*x
^5+15*x^4-36*x^3+31*x^2-10*x+25),x, algorithm=\
```

output
```
-4*((x^2 - x)*e^(4*x) - e^5)/(3*x*e^5 - (3*x^3 - x^2*(e^3 + 3) + x*(e^3 +
1) - 5)*e^(4*x) - e^8)
```

3.875.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 100 vs. 2(33) = 66.

Time = 0.36 (sec) , antiderivative size = 100, normalized size of antiderivative = 2.63

$$\int \frac{20-12e^{10-8x}-40x-8x^2+}{25-10x+31x^2-36x^3+15x^4-18x^5+9x^6+e^{10-8x}\left(e^6-6e^3x+9x^2\right)+e^6\left(x^2-2x^3+x^4\right)+e^3\left(-10\right.}$$
$$= \frac{16\left((4\,x-5)^2+24\,x-16\,e^{(-4\,x+5)}-25\right)}{3\,(4\,x-5)^3-4\,(4\,x-5)^2e^3+33\,(4\,x-5)^2-24\,(4\,x-5)e^3-48\,(4\,x-5)e^{(-4\,x+5)}+484\,x-20\,e^3+64\,e}$$

input
```
integrate((-12*exp(-4*x+5)^2+(24*x^2-8*x-76)*exp(-4*x+5)-12*x^4+24*x^3-8*x
^2-40*x+20)/((exp(3)^2-6*x*exp(3)+9*x^2)*exp(-4*x+5)^2+((-2*x^2+2*x)*exp(3
)^2+(12*x^3-12*x^2+2*x-10)*exp(3)-18*x^4+18*x^3-6*x^2+30*x)*exp(-4*x+5)+(x
^4-2*x^3+x^2)*exp(3)^2+(-6*x^5+12*x^4-8*x^3+12*x^2-10*x)*exp(3)+9*x^6-18*x
^5+15*x^4-36*x^3+31*x^2-10*x+25),x, algorithm=\
```

output
```
16*((4*x - 5)^2 + 24*x - 16*e^(-4*x + 5) - 25)/(3*(4*x - 5)^3 - 4*(4*x - 5
)^2*e^3 + 33*(4*x - 5)^2 - 24*(4*x - 5)*e^3 - 48*(4*x - 5)*e^(-4*x + 5) +
484*x - 20*e^3 + 64*e^(-4*x + 8) - 240*e^(-4*x + 5) - 770)
```

3.875.9 Mupad [F(-1)]

Timed out.

$$\int \frac{20 - 12e^{10-8x} - 40x - 8x^2 +}{25 - 10x + 31x^2 - 36x^3 + 15x^4 - 18x^5 + 9x^6 + e^{10-8x}\left(e^6 - 6e^3x + 9x^2\right) + e^6\left(x^2 - 2x^3 + x^4\right) + e^3\left(-10\right.}$$
$$= \int -\frac{40\,x + 12\,e^{10-8\,x} + e^{5-4\,x}\,(}{e^6\,\left(x^4 - 2\,x^3 + x^2\right) - 10\,x + e^{10-8\,x}\,\left(9\,x^2 - 6\,e^3\,x + e^6\right) + e^{5-4\,x}\,\left(30\,x + e^6\,\left(2\,x - 2\,x^2\right) + e^3\,\left(12\,x^3 - 1\right.\right.}$$

input
```
int(-(40*x + 12*exp(10 - 8*x) + exp(5 - 4*x)*(8*x - 24*x^2 + 76) + 8*x^2 -
 24*x^3 + 12*x^4 - 20)/(exp(6)*(x^2 - 2*x^3 + x^4) - 10*x + exp(10 - 8*x)*
(exp(6) - 6*x*exp(3) + 9*x^2) + exp(5 - 4*x)*(30*x + exp(6)*(2*x - 2*x^2)
+ exp(3)*(2*x - 12*x^2 + 12*x^3 - 10) - 6*x^2 + 18*x^3 - 18*x^4) - exp(3)*
(10*x - 12*x^2 + 8*x^3 - 12*x^4 + 6*x^5) + 31*x^2 - 36*x^3 + 15*x^4 - 18*x
^5 + 9*x^6 + 25),x)
```

output
```
int(-(40*x + 12*exp(10 - 8*x) + exp(5 - 4*x)*(8*x - 24*x^2 + 76) + 8*x^2 -
 24*x^3 + 12*x^4 - 20)/(exp(6)*(x^2 - 2*x^3 + x^4) - 10*x + exp(10 - 8*x)*
(exp(6) - 6*x*exp(3) + 9*x^2) + exp(5 - 4*x)*(30*x + exp(6)*(2*x - 2*x^2)
+ exp(3)*(2*x - 12*x^2 + 12*x^3 - 10) - 6*x^2 + 18*x^3 - 18*x^4) - exp(3)*
(10*x - 12*x^2 + 8*x^3 - 12*x^4 + 6*x^5) + 31*x^2 - 36*x^3 + 15*x^4 - 18*x
^5 + 9*x^6 + 25), x)
```

3.876 $\int \frac{4e^5x+24e^5\log(3)-x\log\left(\frac{1}{25}\left(\log^2(4)-2\log(4)\log(5)+\log^2(5)\right)\right)}{x^3}\,dx$

3.876.1 Optimal result

Integrand size = 41, antiderivative size = 33

$$\int \frac{4e^5x+24e^5\log(3)-x\log\left(\frac{1}{25}\left(\log^2(4)-2\log(4)\log(5)+\log^2(5)\right)\right)}{x^3}\,dx = \frac{-e^5\left(4+\frac{12\log(3)}{x}\right)+\log\left(\frac{1}{25}(-\log(4)+\log(5))^2\right)}{x}$$

output
```
(ln(1/5*(ln(5)-2*ln(2))*(1/5*ln(5)-2/5*ln(2)))-(4+12*ln(3)/x)*exp(5))/x
```

3.876.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.88

$$\int \frac{4e^5x+24e^5\log(3)-x\log\left(\frac{1}{25}\left(\log^2(4)-2\log(4)\log(5)+\log^2(5)\right)\right)}{x^3}\,dx = -\frac{2e^5(2x+\log(729))+x\left(\log(25)-2\log\left(\log\left(\frac{5}{4}\right)\right)\right)}{x^2}$$

input
```
Integrate[(4*E^5*x + 24*E^5*Log[3] - x*Log[(Log[4]^2 - 2*Log[4]*Log[5] + L
og[5]^2)/25])/x^3,x]
```

output
```
-((2*E^5*(2*x + Log[729]) + x*(Log[25] - 2*Log[Log[5/4]]))/x^2)
```

3.876.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.24, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {6, 48}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4e^5x + x\left(-\log\left(\frac{1}{25}\left(\log^2(4) + \log^2(5) - 2\log(4)\log(5)\right)\right)\right) + 24e^5\log(3)}{x^3}\,dx$$

$$\Big\downarrow \text{6}$$

$$\int \frac{x\left(4e^5 - \log\left(\frac{1}{25}\left(\log^2(4) + \log^2(5) - 2\log(4)\log(5)\right)\right)\right) + 24e^5\log(3)}{x^3}dx$$

$$\Big\downarrow \text{48}$$

$$-\frac{\left(x\left(4e^5 + \log(25) - 2\log\left(\log\left(\frac{5}{4}\right)\right)\right) + 24e^5\log(3)\right)^2}{48e^5x^2\log(3)}$$

input
```
Int[(4*E^5*x + 24*E^5*Log[3] - x*Log[(Log[4]^2 - 2*Log[4]*Log[5] + Log[5]^
2)/25])/x^3,x]
```

output
```
-1/48*(24*E^5*Log[3] + x*(4*E^5 + Log[25] - 2*Log[Log[5/4]]))^2/(E^5*x^2*L
og[3])
```

3.876.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 48
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && EqQ[m + n + 2, 0] && NeQ[m, -1]
```

3.876.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{(-2\ln(5)+2\ln(\ln(5)-2\ln(2))-4\,\mathrm{e}^{5})x-12\,\mathrm{e}^{5}\ln(3)}{x^{2}}$	33
gosper	$-\frac{12\,\mathrm{e}^{5}\ln(3)+4x\,\mathrm{e}^{5}-x\ln\left(\frac{\ln(5)^{2}}{25}-\frac{4\ln(2)\ln(5)}{25}+\frac{4\ln(2)^{2}}{25}\right)}{x^{2}}$	41
norman	$\frac{\left(-2\ln(5)+\ln\left(\ln(5)^{2}-4\ln(2)\ln(5)+4\ln(2)^{2}\right)-4\,\mathrm{e}^{5}\right)x-12\,\mathrm{e}^{5}\ln(3)}{x^{2}}$	41
parallelrisch	$-\frac{12\,\mathrm{e}^{5}\ln(3)+4x\,\mathrm{e}^{5}-x\ln\left(\frac{\ln(5)^{2}}{25}-\frac{4\ln(2)\ln(5)}{25}+\frac{4\ln(2)^{2}}{25}\right)}{x^{2}}$	41
default	$-\frac{-\ln\left(\frac{\ln(5)^{2}}{25}-\frac{4\ln(2)\ln(5)}{25}+\frac{4\ln(2)^{2}}{25}\right)+4\,\mathrm{e}^{5}}{x}-\frac{12\,\mathrm{e}^{5}\ln(3)}{x^{2}}$	43

input
```
int((-x*ln(1/25*ln(5)^2-4/25*ln(2)*ln(5)+4/25*ln(2)^2)+24*exp(5)*ln(3)+4*x
*exp(5))/x^3,x,method=_RETURNVERBOSE)
```

output
```
((-2*ln(5)+2*ln(ln(5)-2*ln(2))-4*exp(5))*x-12*exp(5)*ln(3))/x^2
```

3.876.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.21

$$\int \frac{4e^5x+24e^5\log(3)-x\log\left(\frac{1}{25}\left(\log^2(4)-2\log(4)\log(5)+\log^2(5)\right)\right)}{x^3}\,dx$$
$$=-\frac{4\,xe^{5}+12\,e^{5}\log(3)-x\log\left(\frac{1}{25}\,\log(5)^{2}-\frac{4}{25}\,\log(5)\log(2)+\frac{4}{25}\,\log(2)^{2}\right)}{x^{2}}$$

input
```
integrate((-x*log(1/25*log(5)^2-4/25*log(2)*log(5)+4/25*log(2)^2)+24*exp(5
)*log(3)+4*x*exp(5))/x^3,x, algorithm=\
```

output
```
-(4*x*e^5 + 12*e^5*log(3) - x*log(1/25*log(5)^2 - 4/25*log(5)*log(2) + 4/2
5*log(2)^2))/x^2
```

3.876.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.33

$$\int \frac{4e^5x+24e^5\log(3)-x\log\left(\frac{1}{25}\left(\log^2(4)-2\log(4)\log(5)+\log^2(5)\right)\right)}{x^3}\,dx = \frac{x\left(-4e^5-2\log(5)+\log\left(-4\log(2)\log(5)+4\log(2)^2+\log(5)^2\right)\right)-12e^5\log(3)}{x^2}$$

input
```
integrate((-x*ln(1/25*ln(5)**2-4/25*ln(2)*ln(5)+4/25*ln(2)**2)+24*exp(5)*l
n(3)+4*x*exp(5))/x**3,x)
```

output
```
(x*(-4*exp(5) - 2*log(5) + log(-4*log(2)*log(5) + 4*log(2)**2 + log(5)**2)
) - 12*exp(5)*log(3))/x**2
```

3.876.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.24

$$\int \frac{4e^5x+24e^5\log(3)-x\log\left(\frac{1}{25}\left(\log^2(4)-2\log(4)\log(5)+\log^2(5)\right)\right)}{x^3}\,dx = -\frac{x\left(4e^5-\log\left(\frac{1}{25}\log(5)^2-\frac{4}{25}\log(5)\log(2)+\frac{4}{25}\log(2)^2\right)\right)+12e^5\log(3)}{x^2}$$

input
```
integrate((-x*log(1/25*log(5)^2-4/25*log(2)*log(5)+4/25*log(2)^2)+24*exp(5
)*log(3)+4*x*exp(5))/x^3,x, algorithm=\
```

output
```
-(x*(4*e^5 - log(1/25*log(5)^2 - 4/25*log(5)*log(2) + 4/25*log(2)^2)) + 12
*e^5*log(3))/x^2
```

3.876.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.21

$$\int \frac{4e^5x+24e^5\log(3)-x\log\left(\frac{1}{25}\left(\log^2(4)-2\log(4)\log(5)+\log^2(5)\right)\right)}{x^3}\,dx = -\frac{4xe^5+12e^5\log(3)-x\log\left(\frac{1}{25}\log(5)^2-\frac{4}{25}\log(5)\log(2)+\frac{4}{25}\log(2)^2\right)}{x^2}$$

input
```
integrate((-x*log(1/25*log(5)^2-4/25*log(2)*log(5)+4/25*log(2)^2)+24*exp(5
)*log(3)+4*x*exp(5))/x^3,x, algorithm=\
```

output
```
-(4*x*e^5 + 12*e^5*log(3) - x*log(1/25*log(5)^2 - 4/25*log(5)*log(2) + 4/2
5*log(2)^2))/x^2
```

3.876.9 Mupad [B] (verification not implemented)

Time = 17.97 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.18

$$\int \frac{4e^5x+24e^5\log(3)-x\log\left(\frac{1}{25}\left(\log^2(4)-2\log(4)\log(5)+\log^2(5)\right)\right)}{x^3}\,dx$$
$$=\frac{\ln\left(\frac{4\ln(2)^2}{25}-\frac{4\ln(2)\ln(5)}{25}+\frac{\ln(5)^2}{25}\right)-4\,\mathrm{e}^5}{x}-\frac{12\,\mathrm{e}^5\,\ln(3)}{x^2}$$

input
```
int((24*exp(5)*log(3) - x*log((4*log(2)^2)/25 - (4*log(2)*log(5))/25 + log
(5)^2/25) + 4*x*exp(5))/x^3,x)
```

output
```
(log((4*log(2)^2)/25 - (4*log(2)*log(5))/25 + log(5)^2/25) - 4*exp(5))/x -
 (12*exp(5)*log(3))/x^2
```

3.877 $\int \left(-6+e^{5x-x^3}(-20+12x^2)-\log(x)\right)\,dx$

3.877.1 Optimal result

Integrand size = 25, antiderivative size = 26

$$\int \left(-6+e^{5x-x^3}(-20+12x^2)-\log(x)\right)\,dx=-4e^{\left(\frac{5}{x}-x\right)x^2}-5x-x\log(x)$$

output
```
-4*exp(x^2*(5/x-x))-x*ln(x)-5*x
```

3.877.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \left(-6+e^{5x-x^3}(-20+12x^2)-\log(x)\right)\,dx=-4e^{5x-x^3}-5x-x\log(x)$$

input
```
Integrate[-6 + E^(5*x - x^3)*(-20 + 12*x^2) - Log[x],x]
```

output
```
-4*E^(5*x - x^3) - 5*x - x*Log[x]
```

3.877.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.040, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{5x-x^3}\left(12x^2-20\right)-\log(x)-6\right)\,dx$$
$$\Big\downarrow \text{ 2009}$$
$$-4e^{5x-x^3}-5x+x(-\log(x))$$

input
```
Int[-6 + E^(5*x - x^3)*(-20 + 12*x^2) - Log[x],x]
```

output
```
-4*E^(5*x - x^3) - 5*x - x*Log[x]
```

3.877.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.877.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

method	result	size
risch	$-5x-4\,\mathrm{e}^{-x\left(x^{2}-5\right)}-x\ln\left(x\right)$	21
default	$-5x-4\,\mathrm{e}^{-x^{3}+5x}-x\ln\left(x\right)$	22
norman	$-5x-4\,\mathrm{e}^{-x^{3}+5x}-x\ln\left(x\right)$	22
parallelrisch	$-5x-4\,\mathrm{e}^{-x^{3}+5x}-x\ln\left(x\right)$	22
parts	$-5x-4\,\mathrm{e}^{-x^{3}+5x}-x\ln\left(x\right)$	22

input
```
int(-ln(x)+(12*x^2-20)*exp(-x^3+5*x)-6,x,method=_RETURNVERBOSE)
```

output
```
-5*x-4*exp(-x*(x^2-5))-x*ln(x)
```

3.877.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \left(-6+e^{5x-x^3}\left(-20+12x^2\right)-\log(x)\right)\,dx = -x\log\left(x\right)-5\,x-4\,e^{\left(-x^3+5\,x\right)}$$

input
```
integrate(-log(x)+(12*x^2-20)*exp(-x^3+5*x)-6,x, algorithm=\
```

output
```
-x*log(x) - 5*x - 4*e^(-x^3 + 5*x)
```

3.877.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.73

$$\int \left(-6+e^{5x-x^3}\left(-20+12x^2\right)-\log(x)\right)\,dx = -x\log\left(x\right)-5x-4e^{-x^3+5x}$$

input
```
integrate(-ln(x)+(12*x**2-20)*exp(-x**3+5*x)-6,x)
```

output
```
-x*log(x) - 5*x - 4*exp(-x**3 + 5*x)
```

3.877.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \left(-6+e^{5x-x^3}\left(-20+12x^2\right)-\log(x)\right)\,dx = -x\log\left(x\right)-5\,x-4\,e^{\left(-x^3+5\,x\right)}$$

input
```
integrate(-log(x)+(12*x^2-20)*exp(-x^3+5*x)-6,x, algorithm=\
```

output
```
-x*log(x) - 5*x - 4*e^(-x^3 + 5*x)
```

3.877.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \left(-6+e^{5x-x^3}\left(-20+12x^2\right)-\log(x)\right)\,dx=-x\log\left(x\right)-5\,x-4\,e^{\left(-x^3+5\,x\right)}$$

input
```
integrate(-log(x)+(12*x^2-20)*exp(-x^3+5*x)-6,x, algorithm=\
```

output
```
-x*log(x) - 5*x - 4*e^(-x^3 + 5*x)
```

3.877.9 Mupad [B] (verification not implemented)

Time = 18.23 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \left(-6+e^{5x-x^3}\left(-20+12x^2\right)-\log(x)\right)\,dx=-5\,x-4\,\mathrm{e}^{5\,x-x^3}-x\,\ln\left(x\right)$$

input
```
int(exp(5*x - x^3)*(12*x^2 - 20) - log(x) - 6,x)
```

output
```
- 5*x - 4*exp(5*x - x^3) - x*log(x)
```

3.878 $\int \frac{e^{5+e^{x^2}} \left(-3+6e^{x^2}x^2\right)}{x^2} \, dx$

3.878.1 Optimal result

Integrand size = 25, antiderivative size = 22

$$\int \frac{e^{5+e^{x^2}} \left(-3+6e^{x^2}x^2\right)}{x^2} \, dx = -1+\frac{3e^{5+e^{x^2}}}{x}-\log^2(2)$$

output
```
3*exp(5+exp(x^2))/x-ln(2)^2-1
```

3.878.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{e^{5+e^{x^2}} \left(-3+6e^{x^2}x^2\right)}{x^2} \, dx = \frac{3e^{5+e^{x^2}}}{x}$$

input
```
Integrate[(E^(5 + E^x^2)*(-3 + 6*E^x^2*x^2))/x^2,x]
```

output
```
(3*E^(5 + E^x^2))/x
```

3.878.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.040$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^{x^2}+5}\left(6e^{x^2}x^2-3\right)}{x^2}\,dx$$
$$\Big\downarrow \ 2726$$
$$\frac{3e^{e^{x^2}+5}}{x}$$

input
```
Int[(E^(5 + E^x^2)*(-3 + 6*E^x^2*x^2))/x^2,x]
```

output
```
(3*E^(5 + E^x^2))/x
```

3.878.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.878.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.59

method	result	size
norman	$\frac{3\,{\rm e}^{5+{\rm e}^{x^2}}}{x}$	13
risch	$\frac{3\,{\rm e}^{5+{\rm e}^{x^2}}}{x}$	13
parallelrisch	$\frac{3\,{\rm e}^{5+{\rm e}^{x^2}}}{x}$	13

input
```
int((6*x^2*exp(x^2)-3)*exp(5+exp(x^2))/x^2,x,method=_RETURNVERBOSE)
```

output
```
3*exp(5+exp(x^2))/x
```

3.878.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.55

$$\int \frac{e^{5+e^{x^2}}\left(-3+6e^{x^2}x^2\right)}{x^2}\,dx = \frac{3\,e^{\left(e^{\left(x^2\right)}+5\right)}}{x}$$

input
```
integrate((6*x^2*exp(x^2)-3)*exp(5+exp(x^2))/x^2,x, algorithm=\
```

output
```
3*e^(e^(x^2) + 5)/x
```

3.878.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.45

$$\int \frac{e^{5+e^{x^2}}\left(-3+6e^{x^2}x^2\right)}{x^2}\,dx = \frac{3e^{e^{x^2}+5}}{x}$$

input
```
integrate((6*x**2*exp(x**2)-3)*exp(5+exp(x**2))/x**2,x)
```

output
```
3*exp(exp(x**2) + 5)/x
```

3.878.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.55

$$\int \frac{e^{5+e^{x^2}}\left(-3+6e^{x^2}x^2\right)}{x^2}\,dx = \frac{3\,e^{\left(e^{\left(x^2\right)}+5\right)}}{x}$$

input
```
integrate((6*x^2*exp(x^2)-3)*exp(5+exp(x^2))/x^2,x, algorithm=\
```

output
```
3*e^(e^(x^2) + 5)/x
```

3.878.8 Giac [F]

$$\int \frac{e^{5+e^{x^2}}\left(-3+6e^{x^2}x^2\right)}{x^2}\,dx = \int \frac{3\left(2\,x^2e^{\left(x^2\right)}-1\right)e^{\left(e^{\left(x^2\right)}+5\right)}}{x^2}\,dx$$

input
```
integrate((6*x^2*exp(x^2)-3)*exp(5+exp(x^2))/x^2,x, algorithm=\
```

output
```
integrate(3*(2*x^2*e^(x^2) - 1)*e^(e^(x^2) + 5)/x^2, x)
```

3.878.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.55

$$\int \frac{e^{5+e^{x^2}}\left(-3+6e^{x^2}x^2\right)}{x^2}\,dx = \frac{3\,\mathrm{e}^5\,\mathrm{e}^{\mathrm{e}^{x^2}}}{x}$$

input
```
int((exp(exp(x^2) + 5)*(6*x^2*exp(x^2) - 3))/x^2,x)
```

output
```
(3*exp(5)*exp(exp(x^2)))/x
```

3.879 $\int \frac{(4+5x+x^2)\log\left(\frac{4+x}{2+2x}\right)+\log(2x)\left(3x+(-4-5x-x^2)\log\left(\frac{4+x}{2+2x}\right)\right)}{(4x^2+5x^3+x^4)\log^2\left(\frac{4+x}{2+2x}\right)}\,dx$

3.879.1 Optimal result

Integrand size = 85, antiderivative size = 25

$$\int \frac{(4+5x+x^2)\log\left(\frac{4+x}{2+2x}\right)+\log(2x)\left(3x+(-4-5x-x^2)\log\left(\frac{4+x}{2+2x}\right)\right)}{(4x^2+5x^3+x^4)\log^2\left(\frac{4+x}{2+2x}\right)}\,dx$$
$$=-7+\frac{\log(2x)}{x\log\left(\frac{4+x}{2(1+x)}\right)}$$

output
```
ln(2*x)/ln((4+x)/(2+2*x))/x-7
```

3.879.2 Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{(4+5x+x^2)\log\left(\frac{4+x}{2+2x}\right)+\log(2x)\left(3x+(-4-5x-x^2)\log\left(\frac{4+x}{2+2x}\right)\right)}{(4x^2+5x^3+x^4)\log^2\left(\frac{4+x}{2+2x}\right)}\,dx=\frac{\log(2x)}{x\log\left(\frac{4+x}{2+2x}\right)}$$

input
```
Integrate[((4 + 5*x + x^2)*Log[(4 + x)/(2 + 2*x)] + Log[2*x]*(3*x + (-4 -
5*x - x^2)*Log[(4 + x)/(2 + 2*x)]))/((4*x^2 + 5*x^3 + x^4)*Log[(4 + x)/(2
+ 2*x)]^2),x]
```

output
```
Log[2*x]/(x*Log[(4 + x)/(2 + 2*x)])
```

3.879.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x^2+5x+4)\log\left(\frac{x+4}{2x+2}\right)+\log(2x)\left(\left(-x^2-5x-4\right)\log\left(\frac{x+4}{2x+2}\right)+3x\right)}{(x^4+5x^3+4x^2)\log^2\left(\frac{x+4}{2x+2}\right)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(x^2+5x+4)\log\left(\frac{x+4}{2x+2}\right)+\log(2x)\left(\left(-x^2-5x-4\right)\log\left(\frac{x+4}{2x+2}\right)+3x\right)}{x^2(x^2+5x+4)\log^2\left(\frac{x+4}{2x+2}\right)}dx$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{1-\log(2x)}{x^2\log\left(\frac{x+4}{2x+2}\right)}+\frac{3\log(2x)}{x(x+1)(x+4)\log^2\left(\frac{x+4}{2x+2}\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{1}{x^2\log\left(\frac{x+4}{2x+2}\right)}dx-\int \frac{\log(2x)}{x^2\log\left(\frac{x+4}{2x+2}\right)}dx+\frac{3}{4}\int \frac{\log(2x)}{x\log^2\left(\frac{x+4}{2x+2}\right)}dx-\int \frac{\log(2x)}{(x+1)\log^2\left(\frac{x+4}{2x+2}\right)}dx+\frac{1}{4}\int \frac{\log(2x)}{(x+4)\log^2\left(\frac{x+4}{2x+2}\right)}dx$$

input
```
Int[((4 + 5*x + x^2)*Log[(4 + x)/(2 + 2*x)] + Log[2*x]*(3*x + (-4 - 5*x -
x^2)*Log[(4 + x)/(2 + 2*x)]))/((4*x^2 + 5*x^3 + x^4)*Log[(4 + x)/(2 + 2*x)
]^2),x]
```

output
```
$Aborted
```

3.879.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.879.4 Maple [A] (verified)

Time = 11.05 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

method	result
parallelrisch	$\frac{\ln(2x)}{\ln\left(\frac{4+x}{2+2x}\right)x}$
risch	$\frac{2i\ln(2x)}{x\left(\pi\ \mathrm{csgn}(i(4+x))\ \mathrm{csgn}\left(\frac{i}{1+x}\right)\ \mathrm{csgn}\left(\frac{i(4+x)}{1+x}\right)-\pi\ \mathrm{csgn}(i(4+x))\ \mathrm{csgn}\left(\frac{i(4+x)}{1+x}\right)^2-\pi\ \mathrm{csgn}\left(\frac{i}{1+x}\right)\ \mathrm{csgn}\left(\frac{i(4+x)}{1+x}\right)^2+\pi\ \mathrm{csgn}\left(\frac{i(4+x)}{1+x}\right.\right.}$

input
```
int((((-x^2-5*x-4)*ln((4+x)/(2+2*x))+3*x)*ln(2*x)+(x^2+5*x+4)*ln((4+x)/(2+
2*x)))/(x^4+5*x^3+4*x^2)/ln((4+x)/(2+2*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/x*ln(2*x)/ln(1/2*(4+x)/(1+x))
```

3.879.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{(4+5x+x^2)\log\left(\frac{4+x}{2+2x}\right)+\log(2x)\left(3x+(-4-5x-x^2)\log\left(\frac{4+x}{2+2x}\right)\right)}{(4x^2+5x^3+x^4)\log^2\left(\frac{4+x}{2+2x}\right)}\,dx=\frac{\log(2\,x)}{x\log\left(\frac{x+4}{2\,(x+1)}\right)}$$

input
```
integrate((((-x^2-5*x-4)*log((4+x)/(2+2*x))+3*x)*log(2*x)+(x^2+5*x+4)*log(
(4+x)/(2+2*x)))/(x^4+5*x^3+4*x^2)/log((4+x)/(2+2*x))^2,x, algorithm=\
```

output
```
log(2*x)/(x*log(1/2*(x + 4)/(x + 1)))
```

3.879.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{(4+5x+x^2)\log\left(\frac{4+x}{2+2x}\right)+\log(2x)\left(3x+(-4-5x-x^2)\log\left(\frac{4+x}{2+2x}\right)\right)}{(4x^2+5x^3+x^4)\log^2\left(\frac{4+x}{2+2x}\right)}\,dx=\frac{\log(2x)}{x\log\left(\frac{x+4}{2x+2}\right)}$$

input
```
integrate((((-x**2-5*x-4)*ln((4+x)/(2+2*x))+3*x)*ln(2*x)+(x**2+5*x+4)*ln((
4+x)/(2+2*x)))/(x**4+5*x**3+4*x**2)/ln((4+x)/(2+2*x))**2,x)
```

output
```
log(2*x)/(x*log((x + 4)/(2*x + 2)))
```

3.879.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(4+5x+x^2)\log\left(\frac{4+x}{2+2x}\right)+\log(2x)\left(3x+(-4-5x-x^2)\log\left(\frac{4+x}{2+2x}\right)\right)}{(4x^2+5x^3+x^4)\log^2\left(\frac{4+x}{2+2x}\right)}\,dx$$
$$=-\frac{\log(2)+\log(x)}{x\log(2)-x\log(x+4)+x\log(x+1)}$$

input
```
integrate((((-x^2-5*x-4)*log((4+x)/(2+2*x))+3*x)*log(2*x)+(x^2+5*x+4)*log(
(4+x)/(2+2*x)))/(x^4+5*x^3+4*x^2)/log((4+x)/(2+2*x))^2,x, algorithm=\
```

output
```
-(log(2) + log(x))/(x*log(2) - x*log(x + 4) + x*log(x + 1))
```

3.879.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(4+5x+x^2)\log\left(\frac{4+x}{2+2x}\right)+\log(2x)\left(3x+(-4-5x-x^2)\log\left(\frac{4+x}{2+2x}\right)\right)}{(4x^2+5x^3+x^4)\log^2\left(\frac{4+x}{2+2x}\right)}\,dx$$
$$=-\frac{\log(2)+\log(x)}{x\log(2)-x\log(x+4)+x\log(x+1)}$$

input
```
integrate((((-x^2-5*x-4)*log((4+x)/(2+2*x))+3*x)*log(2*x)+(x^2+5*x+4)*log(
(4+x)/(2+2*x)))/(x^4+5*x^3+4*x^2)/log((4+x)/(2+2*x))^2,x, algorithm=\
```

output
```
-(log(2) + log(x))/(x*log(2) - x*log(x + 4) + x*log(x + 1))
```

3.879.9 Mupad [B] (verification not implemented)

Time = 15.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{(4+5x+x^2)\log\left(\frac{4+x}{2+2x}\right)+\log(2x)\left(3x+(-4-5x-x^2)\log\left(\frac{4+x}{2+2x}\right)\right)}{(4x^2+5x^3+x^4)\log^2\left(\frac{4+x}{2+2x}\right)}\,dx=\frac{\ln(2\,x)}{x\,\ln\left(\frac{x+4}{2\,x+2}\right)}$$

input
```
int((log(2*x)*(3*x - log((x + 4)/(2*x + 2))*(5*x + x^2 + 4)) + log((x + 4)
/(2*x + 2))*(5*x + x^2 + 4))/(log((x + 4)/(2*x + 2))^2*(4*x^2 + 5*x^3 + x^
4)),x)
```

output
```
log(2*x)/(x*log((x + 4)/(2*x + 2)))
```

3.880 $\int \frac{-2+e^{1+e^x x}(-6x+e^x(-6x^2-6x^3))}{27e^{3+3e^x x}x^4+27e^{2+2e^x x}x^3\log(x)+9e^{1+e^x x}x^2\log^2(x)+x\log^3(x)}\,dx$

3.880.1 Optimal result

Integrand size = 91, antiderivative size = 17

$$\int \frac{-2+e^{1+e^x x}(-6x+e^x(-6x^2-6x^3))}{27e^{3+3e^x x}x^4+27e^{2+2e^x x}x^3\log(x)+9e^{1+e^x x}x^2\log^2(x)+x\log^3(x)}\,dx = \frac{1}{(3e^{1+e^x x}x+\log(x))^2}$$

output
```
1/(3*exp(exp(x)*x+1)*x+ln(x))^2
```

3.880.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{-2+e^{1+e^x x}(-6x+e^x(-6x^2-6x^3))}{27e^{3+3e^x x}x^4+27e^{2+2e^x x}x^3\log(x)+9e^{1+e^x x}x^2\log^2(x)+x\log^3(x)}\,dx = \frac{1}{(3e^{1+e^x x}x+\log(x))^2}$$

input
```
Integrate[(-2 + E^(1 + E^x*x)*(-6*x + E^x*(-6*x^2 - 6*x^3)))/(27*E^(3 + 3*
E^x*x)*x^4 + 27*E^(2 + 2*E^x*x)*x^3*Log[x] + 9*E^(1 + E^x*x)*x^2*Log[x]^2
+ x*Log[x]^3),x]
```

output
```
(3*E^(1 + E^x*x)*x + Log[x])^(-2)
```

3.880.3 Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.044$, Rules used = {7239, 27, 25, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^x x+1} \left(e^x \left(-6 x^3-6 x^2\right)-6 x\right)-2}{27 e^{3 e^x x+3} x^4+27 e^{2 e^x x+2} x^3 \log (x)+9 e^{e^x x+1} x^2 \log ^2(x)+x \log ^3(x)} \, dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2 \left(-3 e^{e^x x+x+1} (x+1) x^2-3 e^{e^x x+1} x-1\right)}{x \left(3 e^{e^x x+1} x+\log (x)\right)^3}dx$$

$$\Big\downarrow \text{27}$$

$$2 \int -\frac{3 e^{e^x x+x+1} (x+1) x^2+3 e^{e^x x+1} x+1}{x \left(3 e^{e^x x+1} x+\log (x)\right)^3}dx$$

$$\Big\downarrow \text{25}$$

$$-2 \int \frac{3 e^{e^x x+x+1} (x+1) x^2+3 e^{e^x x+1} x+1}{x \left(3 e^{e^x x+1} x+\log (x)\right)^3}dx$$

$$\Big\downarrow \text{7237}$$

$$\frac{1}{\left(3 e^{e^x x+1} x+\log (x)\right)^2}$$

input
```
Int[(-2 + E^(1 + E^x*x)*(-6*x + E^x*(-6*x^2 - 6*x^3)))/(27*E^(3 + 3*E^x*x)
*x^4 + 27*E^(2 + 2*E^x*x)*x^3*Log[x] + 9*E^(1 + E^x*x)*x^2*Log[x]^2 + x*Lo
g[x]^3),x]
```

output
```
(3*E^(1 + E^x*x)*x + Log[x])^(-2)
```

3.880.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.880.4 Maple [A] (verified)

Time = 3.92 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

method	result	size
risch	$\frac{1}{\left(3\,{\mathrm e}^{{\mathrm e}^{x} x +1} x +\ln \left(x \right)\right)^{2}}$	16
parallelrisch	$\frac{1}{9 x^{2} {\mathrm e}^{2 \,{\mathrm e}^{x} x +2}+6 x \ln \left(x \right) {\mathrm e}^{{\mathrm e}^{x} x +1}+\ln \left(x \right)^{2}}$	34

input
```
int((((-6*x^3-6*x^2)*exp(x)-6*x)*exp(exp(x)*x+1)-2)/(27*x^4*exp(exp(x)*x+1
)^3+27*x^3*ln(x)*exp(exp(x)*x+1)^2+9*x^2*ln(x)^2*exp(exp(x)*x+1)+x*ln(x)^3
),x,method=_RETURNVERBOSE)
```

output
```
1/(3*exp(exp(x)*x+1)*x+ln(x))^2
```

3.880. $\int \frac{-2+e^{1+e^x x} \left(-6 x+e^x \left(-6 x^2-6 x^3\right)\right)}{27 e^{3+3 e^x x} x^4+27 e^{2+2 e^x x} x^3 \log (x)+9 e^{1+e^x x} x^2 \log ^2(x)+x \log ^3(x)} \, dx$

3.880.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. 2(15) = 30.

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.88

$$\int \frac{-2+e^{1+e^x x}(-6x+e^x(-6x^2-6x^3))}{27e^{3+3e^x x}x^4+27e^{2+2e^x x}x^3\log(x)+9e^{1+e^x x}x^2\log^2(x)+x\log^3(x)}\,dx$$
$$=\frac{1}{9\,x^2e^{(2\,xe^x+2)}+6\,xe^{(xe^x+1)}\log(x)+\log(x)^2}$$

input
```
integrate((((-6*x^3-6*x^2)*exp(x)-6*x)*exp(exp(x)*x+1)-2)/(27*x^4*exp(exp(
x)*x+1)^3+27*x^3*log(x)*exp(exp(x)*x+1)^2+9*x^2*log(x)^2*exp(exp(x)*x+1)+x
*log(x)^3),x, algorithm=\
```

output
```
1/(9*x^2*e^(2*x*e^x + 2) + 6*x*e^(x*e^x + 1)*log(x) + log(x)^2)
```

3.880.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. 2(17) = 34.

Time = 0.13 (sec) , antiderivative size = 36, normalized size of antiderivative = 2.12

$$\int \frac{-2+e^{1+e^x x}(-6x+e^x(-6x^2-6x^3))}{27e^{3+3e^x x}x^4+27e^{2+2e^x x}x^3\log(x)+9e^{1+e^x x}x^2\log^2(x)+x\log^3(x)}\,dx$$
$$=\frac{1}{9x^2e^{2xe^x+2}+6xe^{xe^x+1}\log(x)+\log(x)^2}$$

input
```
integrate((((-6*x**3-6*x**2)*exp(x)-6*x)*exp(exp(x)*x+1)-2)/(27*x**4*exp(e
xp(x)*x+1)**3+27*x**3*ln(x)*exp(exp(x)*x+1)**2+9*x**2*ln(x)**2*exp(exp(x)*
x+1)+x*ln(x)**3),x)
```

output
```
1/(9*x**2*exp(2*x*exp(x) + 2) + 6*x*exp(x*exp(x) + 1)*log(x) + log(x)**2)
```

3.880.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. $2(15) = 30$.

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.88

$$\int \frac{-2+e^{1+e^x x}(-6x+e^x(-6x^2-6x^3))}{27e^{3+3e^x x}x^4+27e^{2+2e^x x}x^3\log(x)+9e^{1+e^x x}x^2\log^2(x)+x\log^3(x)}\,dx = \frac{1}{9\,x^2e^{(2\,xe^x+2)}+6\,xe^{(xe^x+1)}\log{(x)}+\log{(x)}^2}$$

input
```
integrate((((-6*x^3-6*x^2)*exp(x)-6*x)*exp(exp(x)*x+1)-2)/(27*x^4*exp(exp(
x)*x+1)^3+27*x^3*log(x)*exp(exp(x)*x+1)^2+9*x^2*log(x)^2*exp(exp(x)*x+1)+x
*log(x)^3),x, algorithm=\
```

output
```
1/(9*x^2*e^(2*x*e^x + 2) + 6*x*e^(x*e^x + 1)*log(x) + log(x)^2)
```

3.880.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. $2(15) = 30$.

Time = 0.32 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.88

$$\int \frac{-2+e^{1+e^x x}(-6x+e^x(-6x^2-6x^3))}{27e^{3+3e^x x}x^4+27e^{2+2e^x x}x^3\log(x)+9e^{1+e^x x}x^2\log^2(x)+x\log^3(x)}\,dx = \frac{1}{9\,x^2e^{(2\,xe^x+2)}+6\,xe^{(xe^x+1)}\log{(x)}+\log{(x)}^2}$$

input
```
integrate((((-6*x^3-6*x^2)*exp(x)-6*x)*exp(exp(x)*x+1)-2)/(27*x^4*exp(exp(
x)*x+1)^3+27*x^3*log(x)*exp(exp(x)*x+1)^2+9*x^2*log(x)^2*exp(exp(x)*x+1)+x
*log(x)^3),x, algorithm=\
```

output
```
1/(9*x^2*e^(2*x*e^x + 2) + 6*x*e^(x*e^x + 1)*log(x) + log(x)^2)
```

3.880.9 Mupad [B] (verification not implemented)

Time = 15.77 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.88

$$\int \frac{-2+e^{1+e^x x}(-6x+e^x(-6x^2-6x^3))}{27e^{3+3e^x x}x^4+27e^{2+2e^x x}x^3\log(x)+9e^{1+e^x x}x^2\log^2(x)+x\log^3(x)}\,dx$$
$$=\frac{1}{\ln(x)^2+9\,x^2\,e^{2\,x\,e^x}\,e^2+6\,x\,e^{x\,e^x}\,e\,\ln(x)}$$

input
```
int(-(exp(x*exp(x) + 1)*(6*x + exp(x)*(6*x^2 + 6*x^3)) + 2)/(x*log(x)^3 +
27*x^4*exp(3*x*exp(x) + 3) + 27*x^3*exp(2*x*exp(x) + 2)*log(x) + 9*x^2*exp
(x*exp(x) + 1)*log(x)^2),x)
```

output
```
1/(log(x)^2 + 9*x^2*exp(2*x*exp(x))*exp(2) + 6*x*exp(x*exp(x))*exp(1)*log(
x))
```

3.881 $\int \left(e^{2x}(7+14x)+x^{-3+6x}\left(e^{2x}(-2+8x)+6e^{2x}x\log(x)\right)\right)dx$

3.881.1 Optimal result

Integrand size = 42, antiderivative size = 21

$$\int \left(e^{2x}(7+14x)+x^{-3+6x}\left(e^{2x}(-2+8x)+6e^{2x}x\log(x)\right)\right)dx=-9+e^{2x}\left(x+x\left(6+x^{-3+6x}\right)\right)$$

output
```
(x+(6+exp((-3+6*x)*ln(x)))*x)*exp(x)^2-9
```

3.881.2 Mathematica [A] (verified)

Time = 0.50 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \left(e^{2x}(7+14x)+x^{-3+6x}\left(e^{2x}(-2+8x)+6e^{2x}x\log(x)\right)\right)dx=\frac{e^{2x}(7x^3+x^{6x})}{x^2}$$

input
```
Integrate[E^(2*x)*(7 + 14*x) + x^(-3 + 6*x)*(E^(2*x)*(-2 + 8*x) + 6*E^(2*x
)*x*Log[x]),x]
```

output
```
(E^(2*x)*(7*x^3 + x^(6*x)))/x^2
```

3.881.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(x^{6x-3}\left(e^{2x}(8x-2)+6e^{2x}x\log(x)\right)+e^{2x}(14x+7)\right) dx$$

$$\Big\downarrow \text{2009}$$

$$-2\int e^{2x}x^{6x-3}dx+8\int e^{2x}x^{6x-2}dx-6\int \frac{\int e^{2x}x^{6x-2}dx}{x}dx+6\log(x)\int e^{2x}x^{6x-2}dx+\frac{7}{2}e^{2x}(2x+1)-\frac{7e^{2x}}{2}$$

input
```
Int[E^(2*x)*(7 + 14*x) + x^(-3 + 6*x)*(E^(2*x)*(-2 + 8*x) + 6*E^(2*x)*x*Lo
g[x]),x]
```

output
```
$Aborted
```

3.881.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.881.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

method	result	size
risch	$e^{2x}x^{-3+6x}x+7x\,e^{2x}$	22
default	$7x\,e^{2x}+e^{2x}e^{(-3+6x)\ln(x)}x$	24
parallelrisch	$7x\,e^{2x}+e^{2x}e^{(-3+6x)\ln(x)}x$	24

input
```
int((6*x*exp(x)^2*ln(x)+(8*x-2)*exp(x)^2)*exp((-3+6*x)*ln(x))+(14*x+7)*exp
(x)^2,x,method=_RETURNVERBOSE)
```

output
```
exp(2*x)*x^(-3+6*x)*x+7*x*exp(2*x)
```

3.881.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \left(e^{2x}(7+14x)+x^{-3+6x}\left(e^{2x}(-2+8x)+6e^{2x}x\log(x)\right)\right)\,dx = xx^{6\,x-3}e^{(2\,x)}+7\,xe^{(2\,x)}$$

input
```
integrate((6*x*exp(x)^2*log(x)+(8*x-2)*exp(x)^2)*exp((-3+6*x)*log(x))+(14*
x+7)*exp(x)^2,x, algorithm=\
```

output
```
x*x^(6*x - 3)*e^(2*x) + 7*x*e^(2*x)
```

3.881.6 Sympy [A] (verification not implemented)

Time = 2.82 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \left(e^{2x}(7+14x)+x^{-3+6x}\left(e^{2x}(-2+8x)+6e^{2x}x\log(x)\right)\right)\,dx = xe^{2x}e^{(6x-3)\log{(x)}}+7xe^{2x}$$

input
```
integrate((6*x*exp(x)**2*ln(x)+(8*x-2)*exp(x)**2)*exp((-3+6*x)*ln(x))+(14*
x+7)*exp(x)**2,x)
```

output
```
x*exp(2*x)*exp((6*x - 3)*log(x)) + 7*x*exp(2*x)
```

3.881.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.52

$$\int \left(e^{2x}(7+14x)+x^{-3+6x}\left(e^{2x}(-2+8x)+6e^{2x}x\log(x)\right)\right)\,dx$$
$$=\frac{7}{2}\,(2\,x-1)e^{(2\,x)}+\frac{e^{(6\,x\log(x)+2\,x)}}{x^2}+\frac{7}{2}\,e^{(2\,x)}$$

input
```
integrate((6*x*exp(x)^2*log(x)+(8*x-2)*exp(x)^2)*exp((-3+6*x)*log(x))+(14*
x+7)*exp(x)^2,x, algorithm=\
```

output
```
7/2*(2*x - 1)*e^(2*x) + e^(6*x*log(x) + 2*x)/x^2 + 7/2*e^(2*x)
```

3.881.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int \left(e^{2x}(7+14x)+x^{-3+6x}\left(e^{2x}(-2+8x)+6e^{2x}x\log(x)\right)\right)\,dx=7\,xe^{(2\,x)}+e^{(6\,x\log(x)+2\,x-2\,\log(x))}$$

input
```
integrate((6*x*exp(x)^2*log(x)+(8*x-2)*exp(x)^2)*exp((-3+6*x)*log(x))+(14*
x+7)*exp(x)^2,x, algorithm=\
```

output
```
7*x*e^(2*x) + e^(6*x*log(x) + 2*x - 2*log(x))
```

3.881.9 Mupad [B] (verification not implemented)

Time = 16.01 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \left(e^{2x}(7+14x)+x^{-3+6x}\left(e^{2x}(-2+8x)+6e^{2x}x\log(x)\right)\right)\,dx=\frac{e^{2\,x}\,\left(x^{6\,x}+7\,x^3\right)}{x^2}$$

input
```
int(exp(log(x)*(6*x - 3))*(exp(2*x)*(8*x - 2) + 6*x*exp(2*x)*log(x)) + exp
(2*x)*(14*x + 7),x)
```

output
```
(exp(2*x)*(x^(6*x) + 7*x^3))/x^2
```

3.882 $\int \frac{18+18x-15x^2+2x^3}{18x-13x^2+2x^3}\,dx$

3.882.1 Optimal result

Integrand size = 32, antiderivative size = 24

$$\int \frac{18+18x-15x^2+2x^3}{18x-13x^2+2x^3}\,dx = -4+x+\log\left(\frac{x}{3(-3+(5-x)(-3+2x))}\right)$$

output
```
ln(x/(3*(-3+2*x)*(5-x)-9))+x-4
```

3.882.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{18+18x-15x^2+2x^3}{18x-13x^2+2x^3}\,dx = x+\log(x)-\log\left(18-13x+2x^2\right)$$

input
```
Integrate[(18 + 18*x - 15*x^2 + 2*x^3)/(18*x - 13*x^2 + 2*x^3),x]
```

output
```
x + Log[x] - Log[18 - 13*x + 2*x^2]
```

3.882.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.094, Rules used = {2026, 2159, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3-15x^2+18x+18}{2x^3-13x^2+18x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{2x^3-15x^2+18x+18}{x(2x^2-13x+18)}dx$$

$$\Big\downarrow \text{2159}$$

$$\int \left(\frac{1}{x}-\frac{2}{2x-9}+\frac{1}{2-x}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x-\log(9-2x)-\log(2-x)+\log(x)$$

input
```
Int[(18 + 18*x - 15*x^2 + 2*x^3)/(18*x - 13*x^2 + 2*x^3),x]
```

output
```
x - Log[9 - 2*x] - Log[2 - x] + Log[x]
```

3.882.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2159
```
Int[(Pq_)*((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p
_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*Pq*(a + b*x + c*x^2)^p, x
], x] /; FreeQ[{a, b, c, d, e, m}, x] && PolyQ[Pq, x] && IGtQ[p, -2]
```

3.882.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

method	result	size
parallelrisch	$x+\ln(x)-\ln(-2+x)-\ln\left(x-\frac{9}{2}\right)$	17
risch	$x+\ln(x)-\ln(2x^2-13x+18)$	18
default	$x+\ln(x)-\ln(2x-9)-\ln(-2+x)$	19
norman	$x+\ln(x)-\ln(2x-9)-\ln(-2+x)$	19

input
```
int((2*x^3-15*x^2+18*x+18)/(2*x^3-13*x^2+18*x),x,method=_RETURNVERBOSE)
```

output
```
x+ln(x)-ln(-2+x)-ln(x-9/2)
```

3.882.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{18+18x-15x^2+2x^3}{18x-13x^2+2x^3}\,dx = x-\log\left(2\,x^2-13\,x+18\right)+\log(x)$$

input
```
integrate((2*x^3-15*x^2+18*x+18)/(2*x^3-13*x^2+18*x),x, algorithm=\
```

output
```
x - log(2*x^2 - 13*x + 18) + log(x)
```

3.882.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{18+18x-15x^2+2x^3}{18x-13x^2+2x^3}\,dx = x+\log(x)-\log\left(2x^2-13x+18\right)$$

input
```
integrate((2*x**3-15*x**2+18*x+18)/(2*x**3-13*x**2+18*x),x)
```

output
```
x + log(x) - log(2*x**2 - 13*x + 18)
```

3.882.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.75

$$\int \frac{18+18x-15x^2+2x^3}{18x-13x^2+2x^3}\,dx = x-\log\left(2\,x-9\right)-\log\left(x-2\right)+\log\left(x\right)$$

input
```
integrate((2*x^3-15*x^2+18*x+18)/(2*x^3-13*x^2+18*x),x, algorithm=\
```

output
```
x - log(2*x - 9) - log(x - 2) + log(x)
```

3.882.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{18+18x-15x^2+2x^3}{18x-13x^2+2x^3}\,dx = x-\log\left(|2\,x-9|\right)-\log\left(|x-2|\right)+\log\left(|x|\right)$$

input
```
integrate((2*x^3-15*x^2+18*x+18)/(2*x^3-13*x^2+18*x),x, algorithm=\
```

output
```
x - log(abs(2*x - 9)) - log(abs(x - 2)) + log(abs(x))
```

3.882.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{18+18x-15x^2+2x^3}{18x-13x^2+2x^3}\,dx = x-\ln\left(x^2-\frac{13\,x}{2}+9\right)+\ln\left(x\right)$$

input
```
int((18*x - 15*x^2 + 2*x^3 + 18)/(18*x - 13*x^2 + 2*x^3),x)
```

output
```
x - log(x^2 - (13*x)/2 + 9) + log(x)
```

3.883 $\int \frac{e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}\right.}{}$

3.883.1 Optimal result

Integrand size = 177, antiderivative size = 27

$$\int \frac{e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e\right.}{\log^2(4)}$$

$$=-x+\left(4+2e^{-\frac{x(2+3x)}{4\log^2(4)}}x\right)^4$$

output
```
(2*x/exp(1/16*x*(2+3*x)/ln(2)^2)+4)^4-x
```

3.883.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 94 vs. 2(27) = 54.

Time = 0.31 (sec) , antiderivative size = 94, normalized size of antiderivative = 3.48

$$\int \frac{e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e\right.}{\log^2(4)}$$

$$=-e^{-\frac{x(2+3x)}{\log^2(4)}}x\left(-512e^{\frac{3x(2+3x)}{4\log^2(4)}}+e^{\frac{x(2+3x)}{\log^2(4)}}-384e^{\frac{x(2+3x)}{2\log^2(4)}}x-128e^{\frac{x(2+3x)}{4\log^2(4)}}x^2-16x^3\right)$$

3.883.

$e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}(-256x-768x^2+512\log^2(4))+e^{\frac{2x+3x^2}{2\log^2(4)}}(-384x^2-1152x^3+768x\log^2(4\right.$

input
```
Integrate[(-32*x^4 - 96*x^5 - E^((2*x + 3*x^2)/Log[4]^2)*Log[4]^2 + 64*x^3
*Log[4]^2 + E^((3*(2*x + 3*x^2))/(4*Log[4]^2))*(-256*x - 768*x^2 + 512*Log
[4]^2) + E^((2*x + 3*x^2)/(2*Log[4]^2))*(-384*x^2 - 1152*x^3 + 768*x*Log[4
]^2) + E^((2*x + 3*x^2)/(4*Log[4]^2))*(-192*x^3 - 576*x^4 + 384*x^2*Log[4]
^2))/(E^((2*x + 3*x^2)/Log[4]^2)*Log[4]^2),x]
```

output
```
-((x*(-512*E^((3*x*(2 + 3*x))/(4*Log[4]^2)) + E^((x*(2 + 3*x))/Log[4]^2) -
 384*E^((x*(2 + 3*x))/(2*Log[4]^2))*x - 128*E^((x*(2 + 3*x))/(4*Log[4]^2))
*x^2 - 16*x^3))/E^((x*(2 + 3*x))/Log[4]^2))
```

3.883.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 180 vs. $2(27) = 54$.

Time = 8.64 (sec) , antiderivative size = 180, normalized size of antiderivative = 6.67, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$, Rules used = {27, 25, 7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-\frac{3x^2+2x}{\log^2(4)}}\left(-96x^5-32x^4+64x^3\log^2(4)+e^{\frac{3\left(3x^2+2x\right)}{4\log^2(4)}}\left(-768x^2-256x+512\log^2(4)\right)-\log^2(4)e^{\frac{3x^2+2x}{\log^2(4)}}+e^{\frac{3x^2+2x}{2\log^2(4}}\right.}{\log^2(4)}$$

$$\Big\downarrow \; 27$$

$$\frac{\int -e^{-\frac{3x^2+2x}{\log^2(4)}}\left(96x^5+32x^4-64\log^2(4)x^3+256e^{\frac{3\left(3x^2+2x\right)}{4\log^2(4)}}\left(3x^2+x-2\log^2(4)\right)+384e^{\frac{3x^2+2x}{2\log^2(4)}}\left(3x^3+x^2-2\log^2(4\right.\right.}{\log^2(4)}$$

$$\Big\downarrow \; 25$$

$$-\frac{\int e^{-\frac{3x^2+2x}{\log^2(4)}}\left(96x^5+32x^4-64\log^2(4)x^3+256e^{\frac{3\left(3x^2+2x\right)}{4\log^2(4)}}\left(3x^2+x-2\log^2(4)\right)+384e^{\frac{3x^2+2x}{2\log^2(4)}}\left(3x^3+x^2-2\log^2(4\right.\right.}{\log^2(4)}$$

$$\Big\downarrow \; 7292$$

3.883.

$$e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3\left(2x+3x^2\right)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e^{\frac{2x+3x^2}{2\log^2(4)}}\left(-384x^2-1152x^3+768x\log^2(4\right.\right.$$

$$-\frac{\int e^{-\frac{x(3x+2)}{\log^2(4)}}\left(96x^5+32x^4-64\log^2(4)x^3+256e^{\frac{3\left(3x^2+2x\right)}{4\log^2(4)}}\left(3x^2+x-2\log^2(4)\right)+384e^{\frac{3x^2+2x}{2\log^2(4)}}\left(3x^3+x^2-2\log^2(4\right.\right.}{\log^2(4)}$$

$\downarrow$ 7293

$$-\frac{\int\left(96e^{-\frac{x(3x+2)}{\log^2(4)}}x^5+32e^{-\frac{x(3x+2)}{\log^2(4)}}x^4-64e^{-\frac{x(3x+2)}{\log^2(4)}}\log^2(4)x^3+192e^{-\frac{3x(3x+2)}{4\log^2(4)}}\left(3x^2+x-2\log^2(4)\right)x^2+384e^{-\frac{x(3x+}{2\log^2}}\right.}{\log^2(4)}$$

$\downarrow$ 2009

$$-\frac{-\frac{256(3x^2+x)x^2e^{-\frac{3x(3x+2)}{4\log^2(4)}}}{\frac{3x}{\log^2(4)}+\frac{3x+2}{\log^2(4)}}-\frac{768(3x^2+x)xe^{-\frac{x(3x+2)}{2\log^2(4)}}}{\frac{3x}{\log^2(4)}+\frac{3x+2}{\log^2(4)}}-\frac{1024(3x^2+x)e^{-\frac{x(3x+2)}{4\log^2(4)}}}{\frac{3x}{\log^2(4)}+\frac{3x+2}{\log^2(4)}}-16x^4\log^2(4)e^{-\frac{3x^2}{\log^2(4)}-\frac{2x}{\log^2(4)}}+x\log^2(4)}{\log^2(4)}$$

input

```
Int[(-32*x^4 - 96*x^5 - E^((2*x + 3*x^2)/Log[4]^2)*Log[4]^2 + 64*x^3*Log[4
]^2 + E^((3*(2*x + 3*x^2))/(4*Log[4]^2))*(-256*x - 768*x^2 + 512*Log[4]^2)
 + E^((2*x + 3*x^2)/(2*Log[4]^2))*(-384*x^2 - 1152*x^3 + 768*x*Log[4]^2) +
 E^((2*x + 3*x^2)/(4*Log[4]^2))*(-192*x^3 - 576*x^4 + 384*x^2*Log[4]^2))/(
E^((2*x + 3*x^2)/Log[4]^2)*Log[4]^2),x]
```

output

```
-(((-1024*(x + 3*x^2))/(E^((x*(2 + 3*x))/(4*Log[4]^2))*((3*x)/Log[4]^2 + (
2 + 3*x)/Log[4]^2)) - (768*x*(x + 3*x^2))/(E^((x*(2 + 3*x))/(2*Log[4]^2))*
((3*x)/Log[4]^2 + (2 + 3*x)/Log[4]^2)) - (256*x^2*(x + 3*x^2))/(E^((3*x*(2
 + 3*x))/(4*Log[4]^2))*((3*x)/Log[4]^2 + (2 + 3*x)/Log[4]^2)) + x*Log[4]^2
 - 16*E^((-2*x)/Log[4]^2 - (3*x^2)/Log[4]^2)*x^4*Log[4]^2)/Log[4]^2)
```

3.883.3.1 Defintions of rubi rules used

rule 25

```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27

```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.883.

$$e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3\left(2x+3x^2\right)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e^{\frac{2x+3x^2}{2\log^2(4)}}\left(-384x^2-1152x^3+768x\log^2(4\right.\right.$$

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.883.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. $2(26) = 52$.

Time = 0.36 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.78

method	result
risch	$-x+512x\,\mathrm{e}^{-\frac{x(2+3x)}{16\ln(2)^2}}+384x^2\mathrm{e}^{-\frac{x(2+3x)}{8\ln(2)^2}}+128x^3\mathrm{e}^{-\frac{3x(2+3x)}{16\ln(2)^2}}+16x^4\mathrm{e}^{-\frac{x(2+3x)}{4\ln(2)^2}}$
parts	$-x+512x\,\mathrm{e}^{-\frac{3x^2}{16\ln(2)^2}-\frac{x}{8\ln(2)^2}}+384x^2\mathrm{e}^{-\frac{3x^2}{8\ln(2)^2}-\frac{x}{4\ln(2)^2}}+128x^3\mathrm{e}^{-\frac{9x^2}{16\ln(2)^2}-\frac{3x}{8\ln(2)^2}}+16x^4\mathrm{e}^{-\frac{3x^2}{4\ln(2)^2}-}$
default	$\frac{-4x\ln(2)^2+64\ln(2)^2x^4\mathrm{e}^{-\frac{3x^2}{4\ln(2)^2}-\frac{x}{2\ln(2)^2}}+512\ln(2)^2x^3\mathrm{e}^{-\frac{9x^2}{16\ln(2)^2}-\frac{3x}{8\ln(2)^2}}+1536\ln(2)^2x^2\mathrm{e}^{-\frac{3x^2}{8\ln(2)^2}-\frac{x}{4\ln(2)^2}}+2048\ln(2)}{4\ln(2)^2}$
parallelrisch	$-\frac{\left(12\ln(2)^2\mathrm{e}^{\frac{3x^2+2x}{4\ln(2)^2}}x-192x^4\ln(2)^2-1536\ln(2)^2x^3\mathrm{e}^{\frac{3x^2+2x}{16\ln(2)^2}}-4608\ln(2)^2x^2\mathrm{e}^{\frac{3x^2+2x}{8\ln(2)^2}}-6144\ln(2)^2x\,\mathrm{e}^{\frac{\frac{9}{16}x^2+\frac{3}{8}x}{\ln(2)^2}}\right)\mathrm{e}^{-\frac{x(2+3x}{4\ln(2}}}{12\ln(2)^2}$

input
```
int(1/4*(-4*ln(2)^2*exp(1/16*(3*x^2+2*x)/ln(2)^2)^4+(2048*ln(2)^2-768*x^2-
256*x)*exp(1/16*(3*x^2+2*x)/ln(2)^2)^3+(3072*x*ln(2)^2-1152*x^3-384*x^2)*e
xp(1/16*(3*x^2+2*x)/ln(2)^2)^2+(1536*x^2*ln(2)^2-576*x^4-192*x^3)*exp(1/16
*(3*x^2+2*x)/ln(2)^2)+256*x^3*ln(2)^2-96*x^5-32*x^4)/ln(2)^2/exp(1/16*(3*x
^2+2*x)/ln(2)^2)^4,x,method=_RETURNVERBOSE)
```

output
```
-x+512*x*exp(-1/16*x*(2+3*x)/ln(2)^2)+384*x^2*exp(-1/8*x*(2+3*x)/ln(2)^2)+
128*x^3*exp(-3/16*x*(2+3*x)/ln(2)^2)+16*x^4*exp(-1/4*x*(2+3*x)/ln(2)^2)
```

3.883.

$e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3\left(2x+3x^2\right)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e^{\frac{2x+3x^2}{2\log^2(4)}}\left(-384x^2-1152x^3+768x\log^2(4\right.\right.$

3.883.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 103 vs. 2(25) = 50.

Time = 0.28 (sec) , antiderivative size = 103, normalized size of antiderivative = 3.81

$$\int \frac{e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e\right.}{\log^2(4)}$$

$$= \left(16\,x^4+128\,x^3e^{\left(\frac{3\,x^2+2\,x}{16\,\log(2)^2}\right)}+384\,x^2e^{\left(\frac{3\,x^2+2\,x}{8\,\log(2)^2}\right)}-xe^{\left(\frac{3\,x^2+2\,x}{4\,\log(2)^2}\right)}+512\,xe^{\left(\frac{3\,(3\,x^2+2\,x)}{16\,\log(2)^2}\right)}\right)e^{\left(-\frac{3\,x^2+2\,x}{4\,\log(2)^2}\right)}$$

input
```
integrate(1/4*(-4*log(2)^2*exp(1/16*(3*x^2+2*x)/log(2)^2)^4+(2048*log(2)^2
-768*x^2-256*x)*exp(1/16*(3*x^2+2*x)/log(2)^2)^3+(3072*x*log(2)^2-1152*x^3
-384*x^2)*exp(1/16*(3*x^2+2*x)/log(2)^2)^2+(1536*x^2*log(2)^2-576*x^4-192*
x^3)*exp(1/16*(3*x^2+2*x)/log(2)^2)+256*x^3*log(2)^2-96*x^5-32*x^4)/log(2)
^2/exp(1/16*(3*x^2+2*x)/log(2)^2)^4,x, algorithm=\
```

output
```
(16*x^4 + 128*x^3*e^(1/16*(3*x^2 + 2*x)/log(2)^2) + 384*x^2*e^(1/8*(3*x^2
+ 2*x)/log(2)^2) - x*e^(1/4*(3*x^2 + 2*x)/log(2)^2) + 512*x*e^(3/16*(3*x^2
 + 2*x)/log(2)^2))*e^(-1/4*(3*x^2 + 2*x)/log(2)^2)
```

3.883.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 88 vs. 2(22) = 44.

Time = 0.21 (sec) , antiderivative size = 88, normalized size of antiderivative = 3.26

$$\int \frac{e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e\right.}{\log^2(4)}$$

$$= 16x^4e^{-\frac{4\cdot\left(\frac{3x^2}{16}+\frac{x}{8}\right)}{\log(2)^2}}+128x^3e^{-\frac{3\cdot\left(\frac{3x^2}{16}+\frac{x}{8}\right)}{\log(2)^2}}+384x^2e^{-\frac{2\cdot\left(\frac{3x^2}{16}+\frac{x}{8}\right)}{\log(2)^2}}-x+512xe^{-\frac{\frac{3x^2}{16}+\frac{x}{8}}{\log(2)^2}}$$

input
```
integrate(1/4*(-4*ln(2)**2*exp(1/16*(3*x**2+2*x)/ln(2)**2)**4+(2048*ln(2)*
*2-768*x**2-256*x)*exp(1/16*(3*x**2+2*x)/ln(2)**2)**3+(3072*x*ln(2)**2-115
2*x**3-384*x**2)*exp(1/16*(3*x**2+2*x)/ln(2)**2)**2+(1536*x**2*ln(2)**2-57
6*x**4-192*x**3)*exp(1/16*(3*x**2+2*x)/ln(2)**2)+256*x**3*ln(2)**2-96*x**5
-32*x**4)/ln(2)**2/exp(1/16*(3*x**2+2*x)/ln(2)**2)**4,x)
```

3.883.

$$e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}(-256x-768x^2+512\log^2(4))+e^{\frac{2x+3x^2}{2\log^2(4)}}(-384x^2-1152x^3+768x\log^2(4\right.$$

output
```
16*x**4*exp(-4*(3*x**2/16 + x/8)/log(2)**2) + 128*x**3*exp(-3*(3*x**2/16 +
 x/8)/log(2)**2) + 384*x**2*exp(-2*(3*x**2/16 + x/8)/log(2)**2) - x + 512*
x*exp(-(3*x**2/16 + x/8)/log(2)**2)
```

3.883.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.54 (sec) , antiderivative size = 2622, normalized size of antiderivative = 97.11

$$\int \frac{e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e\right.}{\log^2(4)}$$
$$= \text{Too large to display}$$

input
```
integrate(1/4*(-4*log(2)^2*exp(1/16*(3*x^2+2*x)/log(2)^2)^4+(2048*log(2)^2
-768*x^2-256*x)*exp(1/16*(3*x^2+2*x)/log(2)^2)^3+(3072*x*log(2)^2-1152*x^3
-384*x^2)*exp(1/16*(3*x^2+2*x)/log(2)^2)^2+(1536*x^2*log(2)^2-576*x^4-192*
x^3)*exp(1/16*(3*x^2+2*x)/log(2)^2)+256*x^3*log(2)^2-96*x^5-32*x^4)/log(2)
^2/exp(1/16*(3*x^2+2*x)/log(2)^2)^4,x, algorithm=\
```

3.883.

$$e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e^{\frac{2x+3x^2}{2\log^2(4)}}\left(-384x^2-1152x^3+768x\log^2(4\right.\right.$$

output
```
1/243*(82944*sqrt(3)*sqrt(pi)*erf(1/4*sqrt(3)*x/log(2) + 1/12*sqrt(3)/log(
2))*e^(1/48/log(2)^2)*log(2)^3 + 192*sqrt(3)*(36*sqrt(3)*sqrt(1/3)*(3*x/lo
g(2)^2 + 1/log(2)^2)^3*gamma(3/2, 1/12*(3*x/log(2)^2 + 1/log(2)^2)^2*log(2
)^2)/(((3*x/log(2)^2 + 1/log(2)^2)^2)^(3/2)*(-1/log(2)^2)^(7/2)*log(2)^5)
- 24*sqrt(3)*gamma(2, 1/12*(3*x/log(2)^2 + 1/log(2)^2)^2*log(2)^2)/((-1/lo
g(2)^2)^(7/2)*log(2)^4) - sqrt(3)*sqrt(1/3)*sqrt(pi)*(3*x/log(2)^2 + 1/log
(2)^2)*(erf(1/2*sqrt(1/3)*sqrt((3*x/log(2)^2 + 1/log(2)^2)^2)*log(2)) - 1)
/(sqrt((3*x/log(2)^2 + 1/log(2)^2)^2)*(-1/log(2)^2)^(7/2)*log(2)^7) - 6*sq
rt(3)*e^(-1/12*(3*x/log(2)^2 + 1/log(2)^2)^2*log(2)^2)/((-1/log(2)^2)^(7/2
)*log(2)^6))*e^(1/12/log(2)^2)*log(2)^2/sqrt(-1/log(2)^2) - 82944*sqrt(3/2
)*(sqrt(3/2)*sqrt(1/6)*sqrt(pi)*(3*x/log(2)^2 + 1/log(2)^2)*(erf(1/2*sqrt(
1/6)*sqrt((3*x/log(2)^2 + 1/log(2)^2)^2)*log(2)) - 1)/(sqrt((3*x/log(2)^2
+ 1/log(2)^2)^2)*(-1/log(2)^2)^(3/2)*log(2)^3) + 2*sqrt(3/2)*e^(-1/24*(3*x
/log(2)^2 + 1/log(2)^2)^2*log(2)^2)/((-1/log(2)^2)^(3/2)*log(2)^2))*e^(1/2
4/log(2)^2)*log(2)^2/sqrt(-1/log(2)^2) + 6912*(16*(3*x/log(2)^2 + 1/log(2)
^2)^3*gamma(3/2, 1/16*(3*x/log(2)^2 + 1/log(2)^2)^2*log(2)^2)/(((3*x/log(2
)^2 + 1/log(2)^2)^2)^(3/2)*(-1/log(2)^2)^(5/2)*log(2)^3) - sqrt(pi)*(3*x/l
og(2)^2 + 1/log(2)^2)*(erf(1/4*sqrt((3*x/log(2)^2 + 1/log(2)^2)^2)*log(2))
 - 1)/(sqrt((3*x/log(2)^2 + 1/log(2)^2)^2)*(-1/log(2)^2)^(5/2)*log(2)^5) -
 8*e^(-1/16*(3*x/log(2)^2 + 1/log(2)^2)^2*log(2)^2)/((-1/log(2)^2)^(5/2...
```

3.883.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 228 vs. $2(25) = 50$.

Time = 0.31 (sec) , antiderivative size = 228, normalized size of antiderivative = 8.44

$$\int \frac{e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3(2x+3x^2)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e\right.}{\log^2(4)}$$

$$= -\frac{81\,x\log(2)^2 - 13824\left((3\,x+1)\log(2)^2 - \log(2)^2\right)e^{\left(-\frac{3\,x^2+2\,x}{16\,\log(2)^2}\right)} - 3456\left((3\,x+1)^2\log(2)^2 - 2\,(3\,x+1)\right.}{}$$

input
```
integrate(1/4*(-4*log(2)^2*exp(1/16*(3*x^2+2*x)/log(2)^2)^4+(2048*log(2)^2
-768*x^2-256*x)*exp(1/16*(3*x^2+2*x)/log(2)^2)^3+(3072*x*log(2)^2-1152*x^3
-384*x^2)*exp(1/16*(3*x^2+2*x)/log(2)^2)^2+(1536*x^2*log(2)^2-576*x^4-192*
x^3)*exp(1/16*(3*x^2+2*x)/log(2)^2)+256*x^3*log(2)^2-96*x^5-32*x^4)/log(2)
^2/exp(1/16*(3*x^2+2*x)/log(2)^2)^4,x, algorithm=\
```

output
```
-1/81*(81*x*log(2)^2 - 13824*((3*x + 1)*log(2)^2 - log(2)^2)*e^(-1/16*(3*x
^2 + 2*x)/log(2)^2) - 3456*((3*x + 1)^2*log(2)^2 - 2*(3*x + 1)*log(2)^2 +
log(2)^2)*e^(-1/8*(3*x^2 + 2*x)/log(2)^2) - 384*((3*x + 1)^3*log(2)^2 - 3*
(3*x + 1)^2*log(2)^2 + 3*(3*x + 1)*log(2)^2 - log(2)^2)*e^(-3/16*(3*x^2 +
2*x)/log(2)^2) - 16*((3*x + 1)^4*log(2)^2 - 4*(3*x + 1)^3*log(2)^2 + 6*(3*
x + 1)^2*log(2)^2 - 4*(3*x + 1)*log(2)^2 + log(2)^2)*e^(-1/4*(3*x^2 + 2*x)
/log(2)^2))/log(2)^2
```

3.883.9 Mupad [B] (verification not implemented)

Time = 0.47 (sec) , antiderivative size = 94, normalized size of antiderivative = 3.48

$$\int \frac{e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3\left(2x+3x^2\right)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e\cdots\right.}{\log^2(4)}$$

$$= 512\,x\,\mathrm{e}^{-\frac{3\,x^2}{16\ln(2)^2}-\frac{x}{8\ln(2)^2}}-x+16\,x^4\,\mathrm{e}^{-\frac{3\,x^2}{4\ln(2)^2}-\frac{x}{2\ln(2)^2}}+384\,x^2\,\mathrm{e}^{-\frac{3\,x^2}{8\ln(2)^2}-\frac{x}{4\ln(2)^2}}+128\,x^3\,\mathrm{e}^{-\frac{9\,x^2}{16\ln(2)^2}-\frac{3\,x}{8\ln(2)^2}}$$

input
```
int(-(exp(-(4*(x/8 + (3*x^2)/16))/log(2)^2)*(exp((4*(x/8 + (3*x^2)/16))/lo
g(2)^2)*log(2)^2 - 64*x^3*log(2)^2 + (exp((x/8 + (3*x^2)/16)/log(2)^2)*(19
2*x^3 - 1536*x^2*log(2)^2 + 576*x^4))/4 + (exp((2*(x/8 + (3*x^2)/16))/log(
2)^2)*(384*x^2 - 3072*x*log(2)^2 + 1152*x^3))/4 + 8*x^4 + 24*x^5 + (exp((3
*(x/8 + (3*x^2)/16))/log(2)^2)*(256*x - 2048*log(2)^2 + 768*x^2))/4))/log(
2)^2,x)
```

output
```
512*x*exp(- (3*x^2)/(16*log(2)^2) - x/(8*log(2)^2)) - x + 16*x^4*exp(- (3*
x^2)/(4*log(2)^2) - x/(2*log(2)^2)) + 384*x^2*exp(- (3*x^2)/(8*log(2)^2) -
 x/(4*log(2)^2)) + 128*x^3*exp(- (9*x^2)/(16*log(2)^2) - (3*x)/(8*log(2)^2
))
```

3.883.

$$e^{-\frac{2x+3x^2}{\log^2(4)}}\left(-32x^4-96x^5-e^{\frac{2x+3x^2}{\log^2(4)}}\log^2(4)+64x^3\log^2(4)+e^{\frac{3\left(2x+3x^2\right)}{4\log^2(4)}}\left(-256x-768x^2+512\log^2(4)\right)+e^{\frac{2x+3x^2}{2\log^2(4)}}\left(-384x^2-1152x^3+768x\log^2(4\cdots\right.\right.$$

3.884 $\int \frac{-20+4e^{4x}x^2+8x^3}{x^2} dx$

3.884.1 Optimal result

Integrand size = 21, antiderivative size = 16

$$\int \frac{-20+4e^{4x}x^2+8x^3}{x^2} dx = e^{4x}+4x\left(\frac{5}{x^2}+x\right)$$

output
```
exp(x)^4+4*(5/x^2+x)*x
```

3.884.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.25

$$\int \frac{-20+4e^{4x}x^2+8x^3}{x^2} dx = 4\left(\frac{e^{4x}}{4}+\frac{5}{x}+x^2\right)$$

input
```
Integrate[(-20 + 4*E^(4*x)*x^2 + 8*x^3)/x^2,x]
```

output
```
4*(E^(4*x)/4 + 5/x + x^2)
```

3.884.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^3+4e^{4x}x^2-20}{x^2}\,dx$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(\frac{4(2x^3-5)}{x^2}+4e^{4x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$4x^2+e^{4x}+\frac{20}{x}$$

input
```
Int[(-20 + 4*E^(4*x)*x^2 + 8*x^3)/x^2,x]
```

output
```
E^(4*x) + 20/x + 4*x^2
```

3.884.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.884.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

method	result	size
default	$e^{4x}+4x^2+\frac{20}{x}$	16
risch	$e^{4x}+4x^2+\frac{20}{x}$	16
parts	$e^{4x}+4x^2+\frac{20}{x}$	16
norman	$\frac{4x^3+x\,e^{4x}+20}{x}$	18
parallelrisch	$\frac{4x^3+x\,e^{4x}+20}{x}$	18

input
```
int((4*x^2*exp(x)^4+8*x^3-20)/x^2,x,method=_RETURNVERBOSE)
```

output
```
exp(x)^4+4*x^2+20/x
```

3.884.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{-20+4e^{4x}x^2+8x^3}{x^2}\,dx=\frac{4\,x^3+xe^{(4\,x)}+20}{x}$$

input
```
integrate((4*x^2*exp(x)^4+8*x^3-20)/x^2,x, algorithm=\
```

output
```
(4*x^3 + x*e^(4*x) + 20)/x
```

3.884.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{-20+4e^{4x}x^2+8x^3}{x^2}\,dx=4x^2+e^{4x}+\frac{20}{x}$$

input
```
integrate((4*x**2*exp(x)**4+8*x**3-20)/x**2,x)
```

output
```
4*x**2 + exp(4*x) + 20/x
```

3.884.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{-20+4e^{4x}x^2+8x^3}{x^2}\,dx = 4\,x^2+\frac{20}{x}+e^{(4\,x)}$$

input
```
integrate((4*x^2*exp(x)^4+8*x^3-20)/x^2,x, algorithm=\
```

output
```
4*x^2 + 20/x + e^(4*x)
```

3.884.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{-20+4e^{4x}x^2+8x^3}{x^2}\,dx = \frac{4\,x^3+xe^{(4\,x)}+20}{x}$$

input
```
integrate((4*x^2*exp(x)^4+8*x^3-20)/x^2,x, algorithm=\
```

output
```
(4*x^3 + x*e^(4*x) + 20)/x
```

3.884.9 Mupad [B] (verification not implemented)

Time = 16.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{-20+4e^{4x}x^2+8x^3}{x^2}\,dx = \mathrm{e}^{4\,x}+\frac{20}{x}+4\,x^2$$

input
```
int((4*x^2*exp(4*x) + 8*x^3 - 20)/x^2,x)
```

output
```
exp(4*x) + 20/x + 4*x^2
```

3.885 $\int e^{-4+2x-2x^2-\frac{4(4+x)}{x}}(16+2x+2x^2-4x^3)\,dx$

3.885.1 Optimal result

Integrand size = 36, antiderivative size = 24

$$\int e^{-4+2x-2x^2-\frac{4(4+x)}{x}}\left(16+2x+2x^2-4x^3\right)\,dx=e^{-4+2x-2x^2-\frac{4(4+x)}{x}}x^2$$

output
```
x^2/exp((4+x)/x)^4/exp(x^2-x+2)^2
```

3.885.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int e^{-4+2x-2x^2-\frac{4(4+x)}{x}}\left(16+2x+2x^2-4x^3\right)\,dx=e^{-2\left(4+\frac{8}{x}-x+x^2\right)}x^2$$

input
```
Integrate[E^(-4 + 2*x - 2*x^2 - (4*(4 + x))/x)*(16 + 2*x + 2*x^2 - 4*x^3),
x]
```

output
```
x^2/E^(2*(4 + 8/x - x + x^2))
```

3.885.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 51 vs. $2(24) = 48$.

Time = 0.19 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.12, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-2x^2+2x-\frac{4(x+4)}{x}-4}\left(-4x^3+2x^2+2x+16\right)\,dx$$

$$\Big\downarrow \text{ 2726}$$

$$\frac{e^{-2x^2+2x-\frac{4(x+4)}{x}-4}\left(-2x^3+x^2+8\right)}{\frac{2(x+4)}{x^2}-2x-\frac{2}{x}+1}$$

input
```
Int[E^(-4 + 2*x - 2*x^2 - (4*(4 + x))/x)*(16 + 2*x + 2*x^2 - 4*x^3),x]
```

output
```
(E^(-4 + 2*x - 2*x^2 - (4*(4 + x))/x)*(8 + x^2 - 2*x^3))/(1 - 2/x - 2*x +
(2*(4 + x))/x^2)
```

3.885.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.885.4 Maple [A] (verified)

Time = 1.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

method	result	size
risch	$x^2 \mathrm{e}^{-\frac{2\left(x^3-x^2+4x+8\right)}{x}}$	24
gosper	$x^2 \mathrm{e}^{-\frac{4(4+x)}{x}} \mathrm{e}^{-2x^2+2x-4}$	26
parallelrisch	$x^2 \mathrm{e}^{-\frac{4(4+x)}{x}} \mathrm{e}^{-2x^2+2x-4}$	26

input
```
int((-4*x^3+2*x^2+2*x+16)/exp((4+x)/x)^4/exp(x^2-x+2)^2,x,method=_RETURNVE
RBOSE)
```

output
```
x^2*exp(-2*(x^3-x^2+4*x+8)/x)
```

3.885.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int e^{-4+2x-2x^2-\frac{4(4+x)}{x}}\left(16+2x+2x^2-4x^3\right)\,dx=x^2e^{\left(-\frac{2\left(x^3-x^2+4\,x+8\right)}{x}\right)}$$

input
```
integrate((-4*x^3+2*x^2+2*x+16)/exp((4+x)/x)^4/exp(x^2-x+2)^2,x, algorithm
=\
```

output
```
x^2*e^(-2*(x^3 - x^2 + 4*x + 8)/x)
```

3.885.6 Sympy [A] (verification not implemented)

Time = 0.52 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int e^{-4+2x-2x^2-\frac{4(4+x)}{x}}\left(16+2x+2x^2-4x^3\right)\,dx=x^2e^{-\frac{4(x+4)}{x}}e^{-2x^2+2x-4}$$

input
```
integrate((-4*x**3+2*x**2+2*x+16)/exp((4+x)/x)**4/exp(x**2-x+2)**2,x)
```

output
```
x**2*exp(-4*(x + 4)/x)*exp(-2*x**2 + 2*x - 4)
```

3.885.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int e^{-4+2x-2x^2-\frac{4(4+x)}{x}}\left(16+2x+2x^2-4x^3\right)\,dx=x^2e^{\left(-2\,x^2+2\,x-\frac{16}{x}-8\right)}$$

input
```
integrate((-4*x^3+2*x^2+2*x+16)/exp((4+x)/x)^4/exp(x^2-x+2)^2,x, algorithm
=\
```

output
```
x^2*e^(-2*x^2 + 2*x - 16/x - 8)
```

3.885.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int e^{-4+2x-2x^2-\frac{4(4+x)}{x}}\left(16+2x+2x^2-4x^3\right)\,dx=x^2e^{\left(-\frac{2\left(x^3-x^2+4\,x+8\right)}{x}\right)}$$

input
```
integrate((-4*x^3+2*x^2+2*x+16)/exp((4+x)/x)^4/exp(x^2-x+2)^2,x, algorithm
=\
```

output
```
x^2*e^(-2*(x^3 - x^2 + 4*x + 8)/x)
```

3.885.9 Mupad [B] (verification not implemented)

Time = 15.61 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int e^{-4+2x-2x^2-\frac{4(4+x)}{x}}\left(16+2x+2x^2-4x^3\right)\,dx=x^2\,\mathrm{e}^{2\,x}\,\mathrm{e}^{-8}\,\mathrm{e}^{-2\,x^2}\,\mathrm{e}^{-\frac{16}{x}}$$

input
```
int(exp(-(4*(x + 4))/x)*exp(2*x - 2*x^2 - 4)*(2*x + 2*x^2 - 4*x^3 + 16),x)
```

output
```
x^2*exp(2*x)*exp(-8)*exp(-2*x^2)*exp(-16/x)
```

3.886 $\int 1250e^{\frac{2}{3}\left(1+3e^{x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\right)+x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\,dx$

3.886.1 Optimal result

Integrand size = 46, antiderivative size = 28

$$\int 1250e^{\frac{2}{3}\left(1+3e^{x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\right)+x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\,dx=625e^{\frac{2}{3}+2e^{x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}}$$

output
```
625*exp(exp(ln(2-exp(5))^2+x)+1/3)^2
```

3.886.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int 1250e^{\frac{2}{3}\left(1+3e^{x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\right)+x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\,dx=625e^{\frac{2}{3}+2e^{x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}}$$

input
```
Integrate[1250*E^((2*(1 + 3*E^(x + (I*Pi + Log[-2 + E^5])^2)))/3 + x + (I*
Pi + Log[-2 + E^5])^2),x]
```

output
```
625*E^(2/3 + 2*E^(x + (I*Pi + Log[-2 + E^5])^2))
```

3.886.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.065, Rules used = {27, 2720, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int 1250 \exp \left(x+\frac{2}{3} \left(1+3 e^{x+\left(\log \left(e^5-2\right)+i \pi \right)^2}\right)+\left(\log \left(e^5-2\right)+i \pi \right)^2\right) \, dx$$

$$\Big\downarrow \ 27$$

$$1250 \int \exp \left(\frac{2}{3} \left(1+3 e^{x+\left(i \pi +\log \left(-2+e^5\right)\right)^2}\right)+x+\left(i \pi +\log \left(-2+e^5\right)\right)^2\right) \, dx$$

$$\Big\downarrow \ 2720$$

$$1250 \int e^{\frac{2}{3}+2 e^{x+\left(i \pi +\log \left(-2+e^5\right)\right)^2}}de^{x+\left(i \pi +\log \left(-2+e^5\right)\right)^2}$$

$$\Big\downarrow \ 2624$$

$$625 e^{\frac{2}{3}+2 e^{x+\left(\log \left(e^5-2\right)+i \pi \right)^2}}$$

input
```
Int[1250*E^((2*(1 + 3*E^(x + (I*Pi + Log[-2 + E^5])^2)))/3 + x + (I*Pi + L
og[-2 + E^5])^2),x]
```

output
```
625*E^(2/3 + 2*E^(x + (I*Pi + Log[-2 + E^5])^2))
```

3.886.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

rule 2720
```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ
[{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))
*(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

3.886.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

method	result	size
derivativedivides	$625\,\mathrm{e}^{2\,\mathrm{e}^{\ln\left(2-\mathrm{e}^{5}\right)^{2}+x}+\frac{2}{3}}$	20
default	$625\,\mathrm{e}^{2\,\mathrm{e}^{\ln\left(2-\mathrm{e}^{5}\right)^{2}+x}+\frac{2}{3}}$	20
norman	$625\,\mathrm{e}^{2\,\mathrm{e}^{\ln\left(2-\mathrm{e}^{5}\right)^{2}+x}+\frac{2}{3}}$	20
risch	$625\,\mathrm{e}^{2\,\mathrm{e}^{\ln\left(2-\mathrm{e}^{5}\right)^{2}+x}+\frac{2}{3}}$	20
parallelrisch	$625\,\mathrm{e}^{2\,\mathrm{e}^{\ln\left(2-\mathrm{e}^{5}\right)^{2}+x}+\frac{2}{3}}$	20

input
```
int(1250*exp(ln(2-exp(5))^2+x)*exp(exp(ln(2-exp(5))^2+x)+1/3)^2,x,method=_
RETURNVERBOSE)
```

output
```
625*exp(exp(ln(2-exp(5))^2+x)+1/3)^2
```

3.886.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int 1250e^{\frac{2}{3}\left(1+3e^{x+\left(i\pi+\log\left(-2+e^{5}\right)\right)^{2}}\right)+x+\left(i\pi+\log\left(-2+e^{5}\right)\right)^{2}}\,dx=625\,e^{\left(2\,e^{\left(\log\left(-e^{5}+2\right)^{2}+x\right)}+\frac{2}{3}\right)}$$

input
```
integrate(1250*exp(log(2-exp(5))^2+x)*exp(exp(log(2-exp(5))^2+x)+1/3)^2,x,
 algorithm=\
```

output
```
625*e^(2*e^(log(-e^5 + 2)^2 + x) + 2/3)
```

3.886.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int 1250e^{\frac{2}{3}\left(1+3e^{x+(i\pi+\log(-2+e^5))^2}\right)+x+(i\pi+\log(-2+e^5))^2}\,dx = 625e^{\frac{2}{3}}e^{\frac{2e^xe^{2i\pi\log(-2+e^5)}e^{\log(-2+e^5)^2}}{e^{\pi^2}}}$$

input
```
integrate(1250*exp(ln(2-exp(5))**2+x)*exp(exp(ln(2-exp(5))**2+x)+1/3)**2,x
)
```

output
```
625*exp(2/3)*exp(2*exp(-pi**2)*exp(x)*exp(2*I*pi*log(-2 + exp(5)))*exp(log
(-2 + exp(5))**2))
```

3.886.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int 1250e^{\frac{2}{3}\left(1+3e^{x+(i\pi+\log(-2+e^5))^2}\right)+x+(i\pi+\log(-2+e^5))^2}\,dx = 625\,e^{\left(2\,e^{\left(\log(-e^5+2)^2+x\right)}+\frac{2}{3}\right)}$$

input
```
integrate(1250*exp(log(2-exp(5))^2+x)*exp(exp(log(2-exp(5))^2+x)+1/3)^2,x,
 algorithm=\
```

output
```
625*e^(2*e^(log(-e^5 + 2)^2 + x) + 2/3)
```

3.886.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int 1250e^{\frac{2}{3}\left(1+3e^{x+(i\pi+\log(-2+e^5))^2}\right)+x+(i\pi+\log(-2+e^5))^2}\,dx = 625\,e^{\left(2\,e^{\left(\log(-e^5+2)^2+x\right)}+\frac{2}{3}\right)}$$

input
```
integrate(1250*exp(log(2-exp(5))^2+x)*exp(exp(log(2-exp(5))^2+x)+1/3)^2,x,
 algorithm=\
```

output
```
625*e^(2*e^(log(-e^5 + 2)^2 + x) + 2/3)
```

3.886.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int 1250e^{\frac{2}{3}\left(1+3e^{x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\right)+x+\left(i\pi+\log\left(-2+e^5\right)\right)^2}\,dx = 625\,\mathrm{e}^{2/3}\,\mathrm{e}^{2\,\mathrm{e}^{\ln\left(2-\mathrm{e}^5\right)^2}\,\mathrm{e}^x}$$

input
```
int(1250*exp(x + log(2 - exp(5))^2)*exp(2*exp(x + log(2 - exp(5))^2) + 2/3
),x)
```

output
```
625*exp(2/3)*exp(2*exp(log(2 - exp(5))^2)*exp(x))
```

3.887 $\int \frac{2}{-8+2x+\log(4)}\,dx$

3.887.1 Optimal result

Integrand size = 11, antiderivative size = 8

$$\int \frac{2}{-8+2x+\log(4)}\,dx = \log(-8+2x+\log(4))$$

output
```
ln(2*ln(2)+2*x-8)
```

3.887.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 8, normalized size of antiderivative = 1.00

$$\int \frac{2}{-8+2x+\log(4)}\,dx = \log(-8+2x+\log(4))$$

input
```
Integrate[2/(-8 + 2*x + Log[4]),x]
```

output
```
Log[-8 + 2*x + Log[4]]
```

3.887.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.25, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {16}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2}{2x-8+\log(4)}\,dx$$
$$\Big\downarrow \text{ 16}$$
$$\log(-2x+8-\log(4))$$

input
```
Int[2/(-8 + 2*x + Log[4]),x]
```

output
```
Log[8 - 2*x - Log[4]]
```

3.887.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

3.887.4 Maple [A] (verified)

Time = 0.95 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

method	result	size
default	$\ln\left(\ln\left(2\right)+x-4\right)$	7
norman	$\ln\left(\ln\left(2\right)+x-4\right)$	7
risch	$\ln\left(\ln\left(2\right)+x-4\right)$	7
parallelrisch	$\ln\left(\ln\left(2\right)+x-4\right)$	7
meijerg	$\frac{2(\ln(2)-4)\ln\left(1+\frac{2x}{2\ln(2)-8}\right)}{2\ln(2)-8}$	29

input
```
int(2/(2*ln(2)+2*x-8),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(2)+x-4)
```

3.887.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.75

$$\int \frac{2}{-8+2x+\log(4)}\,dx = \log\left(x+\log\left(2\right)-4\right)$$

input
```
integrate(2/(2*log(2)+2*x-8),x, algorithm=\
```

output
```
log(x + log(2) - 4)
```

3.887.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

$$\int \frac{2}{-8+2x+\log(4)}\,dx = \log\left(x-4+\log\left(2\right)\right)$$

input
```
integrate(2/(2*ln(2)+2*x-8),x)
```

output
```
log(x - 4 + log(2))
```

3.887.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.75

$$\int \frac{2}{-8+2x+\log(4)}\,dx = \log\left(x+\log\left(2\right)-4\right)$$

input
```
integrate(2/(2*log(2)+2*x-8),x, algorithm=\
```

output
```
log(x + log(2) - 4)
```

3.887.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.88

$$\int \frac{2}{-8+2x+\log(4)}\,dx = \log\left(|x+\log\left(2\right)-4|\right)$$

input
```
integrate(2/(2*log(2)+2*x-8),x, algorithm=\
```

output
```
log(abs(x + log(2) - 4))
```

3.887.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.75

$$\int \frac{2}{-8+2x+\log(4)}\,dx = \ln\left(x+\ln\left(2\right)-4\right)$$

input
```
int(2/(2*x + 2*log(2) - 8),x)
```

output
```
log(x + log(2) - 4)
```

3.888 $\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+(-20x^2+}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+(-8x^2+8}$

3.888.1 Optimal result

Integrand size = 164, antiderivative size = 31

$$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\log}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2}$$
$$=-8+x+\frac{x}{1-\frac{\log^2(\log(3e^3))}{(2x-x\log(3))^2}}$$

output
```
x/(1-ln(ln(3*exp(3)))^2/(-x*ln(3)+2*x)^2)-8+x
```

3.888.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\log}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2}$$
$$=x\left(2+\frac{\log^2(3+\log(3))}{x^2(-2+\log(3))^2-\log^2(3+\log(3))}\right)$$

input
```
Integrate[(32*x^4 - 64*x^4*Log[3] + 48*x^4*Log[3]^2 - 16*x^4*Log[3]^3 + 2*
x^4*Log[3]^4 + (-20*x^2 + 20*x^2*Log[3] - 5*x^2*Log[3]^2)*Log[Log[3*E^3]]^
2 + Log[Log[3*E^3]]^4)/(16*x^4 - 32*x^4*Log[3] + 24*x^4*Log[3]^2 - 8*x^4*L
og[3]^3 + x^4*Log[3]^4 + (-8*x^2 + 8*x^2*Log[3] - 2*x^2*Log[3]^2)*Log[Log[
3*E^3]]^2 + Log[Log[3*E^3]]^4),x]
```

3.888.
$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}\,dx$

output
```
x*(2 + Log[3 + Log[3]]^2/(x^2*(-2 + Log[3])^2 - Log[3 + Log[3]]^2))
```

3.888.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.19, number of steps used = 14, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.085$, Rules used = {6, 6, 6, 6, 6, 6, 6, 6, 2454, 1380, 27, 2087, 1471, 24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{32x^4+2x^4\log^4(3)-16x^4\log^3(3)+48x^4\log^2(3)-64x^4\log(3)+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\right.}{16x^4+x^4\log^4(3)-8x^4\log^3(3)+24x^4\log^2(3)-32x^4\log(3)+\log^2\left(\log\left(3e^3\right)\right)\left(-8x^2-2x^2\log^2(3)+8x^2\log\right.}$$

$$\Big\downarrow 6$$

$$\int \frac{2x^4\log^4(3)-16x^4\log^3(3)+48x^4\log^2(3)+x^4(32-64\log(3))+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\right.}{16x^4+x^4\log^4(3)-8x^4\log^3(3)+24x^4\log^2(3)-32x^4\log(3)+\log^2\left(\log\left(3e^3\right)\right)\left(-8x^2-2x^2\log^2(3)+8x^2\log\right.}$$

$$\Big\downarrow 6$$

$$\int \frac{2x^4\log^4(3)-16x^4\log^3(3)+x^4\left(32+48\log^2(3)-64\log(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\log\right.}{16x^4+x^4\log^4(3)-8x^4\log^3(3)+24x^4\log^2(3)-32x^4\log(3)+\log^2\left(\log\left(3e^3\right)\right)\left(-8x^2-2x^2\log^2(3)+8x^2\log\right.}$$

$$\Big\downarrow 6$$

$$\int \frac{x^4\left(32+48\log^2(3)-64\log(3)\right)+x^4\left(2\log^4(3)-16\log^3(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\log\right.}{16x^4+x^4\log^4(3)-8x^4\log^3(3)+24x^4\log^2(3)-32x^4\log(3)+\log^2\left(\log\left(3e^3\right)\right)\left(-8x^2-2x^2\log^2(3)+8x^2\log\right.}$$

$$\Big\downarrow 6$$

$$\int \frac{x^4\left(32+2\log^4(3)-16\log^3(3)+48\log^2(3)-64\log(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\log(3)\right.}{16x^4+x^4\log^4(3)-8x^4\log^3(3)+24x^4\log^2(3)-32x^4\log(3)+\log^2\left(\log\left(3e^3\right)\right)\left(-8x^2-2x^2\log^2(3)+8x^2\log(3\right.}$$

$$\Big\downarrow 6$$

$$\int \frac{x^4\left(32+2\log^4(3)-16\log^3(3)+48\log^2(3)-64\log(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\log(3)\right.}{x^4\log^4(3)-8x^4\log^3(3)+24x^4\log^2(3)+x^4(16-32\log(3))+\log^2\left(\log\left(3e^3\right)\right)\left(-8x^2-2x^2\log^2(3)+8x^2\log(3\right.}$$

$$\Big\downarrow 6$$

$$\int \frac{x^4\left(32+2\log^4(3)-16\log^3(3)+48\log^2(3)-64\log(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\log(3)\right)}{x^4\log^4(3)-8x^4\log^3(3)+x^4\left(16+24\log^2(3)-32\log(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-8x^2-2x^2\log^2(3)+8x^2\log(3)\right)}$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{x^4\left(32+2\log^4(3)-16\log^3(3)+48\log^2(3)-64\log(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\log(3)\right)}{x^4\left(16+24\log^2(3)-32\log(3)\right)+x^4\left(\log^4(3)-8\log^3(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-8x^2-2x^2\log^2(3)+8x^2\log(3)\right)}$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{x^4\left(32+2\log^4(3)-16\log^3(3)+48\log^2(3)-64\log(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\log(3)\right)}{x^4\left(16+\log^4(3)-8\log^3(3)+24\log^2(3)-32\log(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-8x^2-2x^2\log^2(3)+8x^2\log(3)\right)+}$$

$$\Big\downarrow \text{ 2454}$$

$$\int \frac{x^4\left(32+2\log^4(3)-16\log^3(3)+48\log^2(3)-64\log(3)\right)+\log^2\left(\log\left(3e^3\right)\right)\left(-20x^2-5x^2\log^2(3)+20x^2\log(3)\right)}{x^4(2-\log(3))^4-2x^2(2-\log(3))^2\log^2(3+\log(3))+\log^4(3+\log(3))}$$

$$\Big\downarrow \text{ 1380}$$

$$(2-\log(3))^4\int \frac{2(2-\log(3))^4x^4+\log^4(3+\log(3))-5\left(\log^2(3)x^2-4\log(3)x^2+4x^2\right)\log^2(3+\log(3))}{(2-\log(3))^4\left(x^2(2-\log(3))^2-\log^2(3+\log(3))\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\int \frac{2x^4(2-\log(3))^4-5\log^2(3+\log(3))\left(4x^2+x^2\log^2(3)-4x^2\log(3)\right)+\log^4(3+\log(3))}{\left(x^2(2-\log(3))^2-\log^2(3+\log(3))\right)^2}dx$$

$$\Big\downarrow \text{ 2087}$$

$$\int \frac{2x^4(2-\log(3))^4-5x^2(2-\log(3))^2\log^2(3+\log(3))+\log^4(3+\log(3))}{\left(x^2(2-\log(3))^2-\log^2(3+\log(3))\right)^2}dx$$

$$\Big\downarrow \text{ 1471}$$

$$\frac{\int 4\log^2(3+\log(3))dx}{2\log^2(3+\log(3))}+\frac{x\log^2(3+\log(3))}{x^2(2-\log(3))^2-\log^2(3+\log(3))}$$

$$\Big\downarrow \text{ 24}$$

$$\frac{x\log^2(3+\log(3))}{x^2(2-\log(3))^2-\log^2(3+\log(3))}+2x$$

3.888.

$$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\log^2\left(\log\left(3e^3\right)\right)+\log^4\left(\log\left(3e^3\right)\right)}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2\left(\log\left(3e^3\right)\right)+\log^4\left(\log\left(3e^3\right)\right)}\,dx$$

input
```
Int[(32*x^4 - 64*x^4*Log[3] + 48*x^4*Log[3]^2 - 16*x^4*Log[3]^3 + 2*x^4*Lo
g[3]^4 + (-20*x^2 + 20*x^2*Log[3] - 5*x^2*Log[3]^2)*Log[Log[3*E^3]]^2 + Lo
g[Log[3*E^3]]^4)/(16*x^4 - 32*x^4*Log[3] + 24*x^4*Log[3]^2 - 8*x^4*Log[3]^
3 + x^4*Log[3]^4 + (-8*x^2 + 8*x^2*Log[3] - 2*x^2*Log[3]^2)*Log[Log[3*E^3]
]^2 + Log[Log[3*E^3]]^4),x]
```

output
```
2*x + (x*Log[3 + Log[3]]^2)/(x^2*(2 - Log[3])^2 - Log[3 + Log[3]]^2)
```

3.888.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 1471
```
Int[((d_) + (e_.)*(x_)^2)^(q_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.),
x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 + c*x^4)^p, d + e*x^2
, x], R = Coeff[PolynomialRemainder[(a + b*x^2 + c*x^4)^p, d + e*x^2, x], x
, 0]}, Simp[(-R)*x*((d + e*x^2)^(q + 1)/(2*d*(q + 1))), x] + Simp[1/(2*d*(q
 + 1))   Int[(d + e*x^2)^(q + 1)*ExpandToSum[2*d*(q + 1)*Qx + R*(2*q + 3),
x], x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^
2 - b*d*e + a*e^2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2087
```
Int[(u_)^(q_.)*(v_)^(p_.), x_Symbol] :> Int[ExpandToSum[u, x]^q*ExpandToSum
[v, x]^p, x] /; FreeQ[{p, q}, x] && BinomialQ[u, x] && TrinomialQ[v, x] &&
 !(BinomialMatchQ[u, x] && TrinomialMatchQ[v, x])
```

3.888.

$$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\log^2\left(\log\left(3e^3\right)\right)+\log^4\left(\log\left(3e^3\right)\right)}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2\left(\log\left(3e^3\right)\right)+\log^4\left(\log\left(3e^3\right)\right)}\,dx$$

rule 2454
```
Int[(Pq_)*(u_)^(p_.), x_Symbol] :> Int[Pq*ExpandToSum[u, x]^p, x] /; FreeQ[
p, x] && PolyQ[Pq, x] && TrinomialQ[u, x] && !TrinomialMatchQ[u, x]
```

3.888.4 Maple [A] (verified)

Time = 1.30 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.48

method	result	siz
risch	$2x+\frac{\ln(3+\ln(3))^{2}x}{x^{2}\ln(3)^{2}-4x^{2}\ln(3)-\ln(3+\ln(3))^{2}+4x^{2}}$	46
norman	$\frac{\left(2\ln(3)^{2}-8\ln(3)+8\right)x^{3}-\ln(3+\ln(3))^{2}x}{x^{2}\ln(3)^{2}-4x^{2}\ln(3)-\ln(3+\ln(3))^{2}+4x^{2}}$	61
gosper	$\frac{x\left(2x^{2}\ln(3)^{2}-8x^{2}\ln(3)-\ln\left(\ln(3\,e^{3})\right)^{2}+8x^{2}\right)}{x^{2}\ln(3)^{2}-4x^{2}\ln(3)-\ln(\ln(3\,e^{3}))^{2}+4x^{2}}$	68
default	$2x+\frac{\ln\left(\ln(3\,e^{3})\right)^{2}}{2(2-\ln(3))(-x\ln(3)+\ln(\ln(3\,e^{3}))+2x)}+\frac{\ln\left(\ln(3\,e^{3})\right)^{2}}{2(2-\ln(3))(-x\ln(3)-\ln(\ln(3\,e^{3}))+2x)}$	77
parallelrisch	$\frac{2x^{3}\ln(3)^{4}-16x^{3}\ln(3)^{3}-\ln(3)^{2}\ln\left(\ln(3\,e^{3})\right)^{2}x+48x^{3}\ln(3)^{2}+4\ln(3)\ln\left(\ln(3\,e^{3})\right)^{2}x-64x^{3}\ln(3)-4\ln\left(\ln(3\,e^{3})\right)^{2}x+32x^{3}}{\left(\ln(3)^{2}-4\ln(3)+4\right)\left(x^{2}\ln(3)^{2}-4x^{2}\ln(3)-\ln(\ln(3\,e^{3}))^{2}+4x^{2}\right)}$	120

input
```
int((ln(ln(3*exp(3))))^4+(-5*x^2*ln(3)^2+20*x^2*ln(3)-20*x^2)*ln(ln(3*exp(3
)))^2+2*x^4*ln(3)^4-16*x^4*ln(3)^3+48*x^4*ln(3)^2-64*x^4*ln(3)+32*x^4)/(ln
(ln(3*exp(3))))^4+(-2*x^2*ln(3)^2+8*x^2*ln(3)-8*x^2)*ln(ln(3*exp(3)))^2+x^4
*ln(3)^4-8*x^4*ln(3)^3+24*x^4*ln(3)^2-32*x^4*ln(3)+16*x^4),x,method=_RETUR
NVERBOSE)
```

output
```
2*x+ln(3+ln(3))^2*x/(x^2*ln(3)^2-4*x^2*ln(3)-ln(3+ln(3))^2+4*x^2)
```

3.888.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. 2(29) = 58.

Time = 0.28 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.10

$$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\text{lo}}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2}$$
$$=\frac{2\,x^3\log(3)^2-8\,x^3\log(3)+8\,x^3-x\log(\log(3)+3)^2}{x^2\log(3)^2-4\,x^2\log(3)+4\,x^2-\log(\log(3)+3)^2}$$

input
```
integrate((log(log(3*exp(3)))^4+(-5*x^2*log(3)^2+20*x^2*log(3)-20*x^2)*log
(log(3*exp(3)))^2+2*x^4*log(3)^4-16*x^4*log(3)^3+48*x^4*log(3)^2-64*x^4*lo
g(3)+32*x^4)/(log(log(3*exp(3)))^4+(-2*x^2*log(3)^2+8*x^2*log(3)-8*x^2)*lo
g(log(3*exp(3)))^2+x^4*log(3)^4-8*x^4*log(3)^3+24*x^4*log(3)^2-32*x^4*log(
3)+16*x^4),x, algorithm=\
```

output
```
(2*x^3*log(3)^2 - 8*x^3*log(3) + 8*x^3 - x*log(log(3) + 3)^2)/(x^2*log(3)^
2 - 4*x^2*log(3) + 4*x^2 - log(log(3) + 3)^2)
```

3.888.6 Sympy [A] (verification not implemented)

Time = 1.02 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.16

$$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}\,dx$$
$$= 2x+\frac{x\log\left(\log\left(3\right)+3\right)^2}{x^2\left(-4\log\left(3\right)+\log\left(3\right)^2+4\right)-\log\left(\log\left(3\right)+3\right)^2}$$

input
```
integrate((ln(ln(3*exp(3)))**4+(-5*x**2*ln(3)**2+20*x**2*ln(3)-20*x**2)*ln
(ln(3*exp(3)))**2+2*x**4*ln(3)**4-16*x**4*ln(3)**3+48*x**4*ln(3)**2-64*x**
4*ln(3)+32*x**4)/(ln(ln(3*exp(3)))**4+(-2*x**2*ln(3)**2+8*x**2*ln(3)-8*x**
2)*ln(ln(3*exp(3)))**2+x**4*ln(3)**4-8*x**4*ln(3)**3+24*x**4*ln(3)**2-32*x
**4*ln(3)+16*x**4),x)
```

output
```
2*x + x*log(log(3) + 3)**2/(x**2*(-4*log(3) + log(3)**2 + 4) - log(log(3)
+ 3)**2)
```

3.888.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.32

$$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}\,dx$$
$$= \frac{x\log\left(\log\left(3\,e^3\right)\right)^2}{\left(\log\left(3\right)^2-4\,\log\left(3\right)+4\right)x^2-\log\left(\log\left(3\,e^3\right)\right)^2}+2\,x$$

3.888.
$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}\,dx$

input
```
integrate((log(log(3*exp(3)))^4+(-5*x^2*log(3)^2+20*x^2*log(3)-20*x^2)*log
(log(3*exp(3)))^2+2*x^4*log(3)^4-16*x^4*log(3)^3+48*x^4*log(3)^2-64*x^4*lo
g(3)+32*x^4)/(log(log(3*exp(3)))^4+(-2*x^2*log(3)^2+8*x^2*log(3)-8*x^2)*lo
g(log(3*exp(3)))^2+x^4*log(3)^4-8*x^4*log(3)^3+24*x^4*log(3)^2-32*x^4*log(
3)+16*x^4),x, algorithm=\
```

output
```
x*log(log(3*e^3))^2/((log(3)^2 - 4*log(3) + 4)*x^2 - log(log(3*e^3))^2) +
2*x
```

3.888.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 99 vs. $2(29) = 58$.

Time = 0.27 (sec) , antiderivative size = 99, normalized size of antiderivative = 3.19

$$\int \frac{32x^4 - 64x^4\log(3) + 48x^4\log^2(3) - 16x^4\log^3(3) + 2x^4\log^4(3) + \left(-20x^2 + 20x^2\log(3) - 5x^2\log^2(3)\right)\log}{16x^4 - 32x^4\log(3) + 24x^4\log^2(3) - 8x^4\log^3(3) + x^4\log^4(3) + \left(-8x^2 + 8x^2\log(3) - 2x^2\log^2(3)\right)\log^2}$$

$$= \frac{x\log\left(\log\left(3\,e^3\right)\right)^2}{x^2\log\left(3\right)^2 - 4\,x^2\log\left(3\right) + 4\,x^2 - \log\left(\log\left(3\,e^3\right)\right)^2} + \frac{2\,\left(x\log\left(3\right)^4 - 8\,x\log\left(3\right)^3 + 24\,x\log\left(3\right)^2 - 32\,x\log\left(3\right) + 16\,x\right)}{\log\left(3\right)^4 - 8\,\log\left(3\right)^3 + 24\,\log\left(3\right)^2 - 32\,\log\left(3\right) + 16}$$

input
```
integrate((log(log(3*exp(3)))^4+(-5*x^2*log(3)^2+20*x^2*log(3)-20*x^2)*log
(log(3*exp(3)))^2+2*x^4*log(3)^4-16*x^4*log(3)^3+48*x^4*log(3)^2-64*x^4*lo
g(3)+32*x^4)/(log(log(3*exp(3)))^4+(-2*x^2*log(3)^2+8*x^2*log(3)-8*x^2)*lo
g(log(3*exp(3)))^2+x^4*log(3)^4-8*x^4*log(3)^3+24*x^4*log(3)^2-32*x^4*log(
3)+16*x^4),x, algorithm=\
```

output
```
x*log(log(3*e^3))^2/(x^2*log(3)^2 - 4*x^2*log(3) + 4*x^2 - log(log(3*e^3))
^2) + 2*(x*log(3)^4 - 8*x*log(3)^3 + 24*x*log(3)^2 - 32*x*log(3) + 16*x)/(
log(3)^4 - 8*log(3)^3 + 24*log(3)^2 - 32*log(3) + 16)
```

3.888.9 Mupad [B] (verification not implemented)

Time = 16.79 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.10

$$\int \frac{32x^4-64x^4\log(3)+48x^4\log^2(3)-16x^4\log^3(3)+2x^4\log^4(3)+\left(-20x^2+20x^2\log(3)-5x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}{16x^4-32x^4\log(3)+24x^4\log^2(3)-8x^4\log^3(3)+x^4\log^4(3)+\left(-8x^2+8x^2\log(3)-2x^2\log^2(3)\right)\log^2(\log(3e^3))+\log^4(\log(3e^3))}\,dx$$
$$= \frac{x\left(2\,x^2\ln(3)^2-\ln(\ln(3)+3)^2-8\,x^2\ln(3)+8\,x^2\right)}{x^2\ln(3)^2-\ln(\ln(3)+3)^2-4\,x^2\ln(3)+4\,x^2}$$

input
```
int((48*x^4*log(3)^2 - 16*x^4*log(3)^3 + 2*x^4*log(3)^4 - log(log(3*exp(3)
))^2*(5*x^2*log(3)^2 - 20*x^2*log(3) + 20*x^2) - 64*x^4*log(3) + 32*x^4 +
log(log(3*exp(3)))^4)/(24*x^4*log(3)^2 - 8*x^4*log(3)^3 + x^4*log(3)^4 - l
og(log(3*exp(3)))^2*(2*x^2*log(3)^2 - 8*x^2*log(3) + 8*x^2) - 32*x^4*log(3
) + 16*x^4 + log(log(3*exp(3)))^4),x)
```

output
```
(x*(2*x^2*log(3)^2 - log(log(3) + 3)^2 - 8*x^2*log(3) + 8*x^2))/(x^2*log(3
)^2 - log(log(3) + 3)^2 - 4*x^2*log(3) + 4*x^2)
```

3.889 $\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(1250e^5+300x^2+4x^3)+e^{e^{-x}x}(-75\ldots\right.}{625x^2}$

3.889.1 Optimal result

Integrand size = 89, antiderivative size = 31

$$\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(1250e^5+300x^2+4x^3)+e^{e^{-x}x}(-7500x^2-100e^xx^2+7400x^3+100x\ldots\right.}{625x^2}$$
$$=\frac{2\left(-e^5+\left(-3+e^{e^{-x}x}-\frac{x}{25}\right)^2x\right)}{x}$$

output
```
2/x*((exp(x/exp(x))-3-1/25*x)^2*x-exp(5))
```

3.889.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.45

$$\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(1250e^5+300x^2+4x^3)+e^{e^{-x}x}(-7500x^2-100e^xx^2+7400x^3+100x\ldots\right.}{625x^2}$$
$$=2e^{2e^{-x}x}-\frac{2e^5}{x}-\frac{4}{25}e^{e^{-x}x}(75+x)+\frac{2}{625}x(150+x)$$

input
```
Integrate[(E^((2*x)/E^x)*(2500*x^2 - 2500*x^3) + E^x*(1250*E^5 + 300*x^2 + 
 4*x^3) + E^(x/E^x)*(-7500*x^2 - 100*E^x*x^2 + 7400*x^3 + 100*x^4))/(625*E
^x*x^2),x]
```

output
```
2*E^((2*x)/E^x) - (2*E^5)/x - (4*E^(x/E^x)*(75 + x))/25 + (2*x*(150 + x))/
625
```

3.889.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(4x^3+300x^2+1250e^5)+e^{e^{-x}x}(100x^4+7400x^3-100e^xx^2-7500x^2)\right)}{625x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{625}\int \frac{2e^{-x}\left(1250e^{2e^{-x}x}(x^2-x^3)+e^x(2x^3+150x^2+625e^5)-50e^{e^{-x}x}(-x^4-74x^3+e^xx^2+75x^2)\right)}{x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{2}{625}\int \frac{e^{-x}\left(1250e^{2e^{-x}x}(x^2-x^3)+e^x(2x^3+150x^2+625e^5)-50e^{e^{-x}x}(-x^4-74x^3+e^xx^2+75x^2)\right)}{x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{2}{625}\int \left(-1250e^{2e^{-x}x-x}(x-1)-50e^{e^{-x}x-x}(-x^2-74x+e^x+75)+\frac{2x^3+150x^2+625e^5}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2}{625}\left(50\int e^{-e^{-x}(-1+e^x)x}x^2dx-50\int e^{e^{-x}x}dx+1250\int e^{-e^{-x}(-2+e^x)x}dx-3750\int e^{-e^{-x}(-1+e^x)x}dx-1250\int e^{-}\right.$$

input
```
Int[(E^((2*x)/E^x)*(2500*x^2 - 2500*x^3) + E^x*(1250*E^5 + 300*x^2 + 4*x^3
) + E^(x/E^x)*(-7500*x^2 - 100*E^x*x^2 + 7400*x^3 + 100*x^4))/(625*E^x*x^2
),x]
```

output
```
$Aborted
```

3.889.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.889.4 Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.32

method	result	size
risch	$\frac{2x^2}{625}+\frac{12x}{25}-\frac{2\,\mathrm{e}^5}{x}+2\,\mathrm{e}^{2x\,\mathrm{e}^{-x}}+\frac{(-100x-7500)\mathrm{e}^{x\,\mathrm{e}^{-x}}}{625}$	41
parallelrisch	$\frac{2x^3-100\,\mathrm{e}^{x\,\mathrm{e}^{-x}}x^2+1250\,\mathrm{e}^{2x\,\mathrm{e}^{-x}}x+300x^2-7500\,\mathrm{e}^{x\,\mathrm{e}^{-x}}x-1250\,\mathrm{e}^5}{625x}$	55
norman	$\frac{\left(-2\,\mathrm{e}^5\mathrm{e}^x+\frac{12\,\mathrm{e}^x x^2}{25}+\frac{2\,\mathrm{e}^x x^3}{625}-12\,\mathrm{e}^x x\,\mathrm{e}^{x\,\mathrm{e}^{-x}}+2\,\mathrm{e}^x x\,\mathrm{e}^{2x\,\mathrm{e}^{-x}}-\frac{4\,\mathrm{e}^x\mathrm{e}^{x\,\mathrm{e}^{-x}}x^2}{25}\right)\mathrm{e}^{-x}}{x}$	70

input
```
int(1/625*((-2500*x^3+2500*x^2)*exp(x/exp(x))^2+(-100*exp(x)*x^2+100*x^4+7
400*x^3-7500*x^2)*exp(x/exp(x))+(1250*exp(5)+4*x^3+300*x^2)*exp(x))/exp(x)
/x^2,x,method=_RETURNVERBOSE)
```

output
```
2/625*x^2+12/25*x-2*exp(5)/x+2*exp(2*x*exp(-x))+1/625*(-100*x-7500)*exp(x*
exp(-x))
```

3.889.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.45

$$\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(1250e^5+300x^2+4x^3)+e^{e^{-x}x}(-7500x^2-100e^xx^2+7400x^3+100x^4)\right)}{625x^2}$$

$$=\frac{2\left(x^3+150\,x^2+625\,xe^{\left(2\,xe^{(-x)}\right)}-50\,(x^2+75\,x)e^{\left(xe^{(-x)}\right)}-625\,e^5\right)}{625\,x}$$

input
```
integrate(1/625*((-2500*x^3+2500*x^2)*exp(x/exp(x))^2+(-100*exp(x)*x^2+100
*x^4+7400*x^3-7500*x^2)*exp(x/exp(x))+(1250*exp(5)+4*x^3+300*x^2)*exp(x))/
exp(x)/x^2,x, algorithm=\
```

output
```
2/625*(x^3 + 150*x^2 + 625*x*e^(2*x*e^(-x)) - 50*(x^2 + 75*x)*e^(x*e^(-x))
 - 625*e^5)/x
```

3.889.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.35

$$\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(1250e^5+300x^2+4x^3)+e^{e^{-x}x}(-7500x^2-100e^xx^2+7400x^3+100x$$

$$= \frac{2x^2}{625}+\frac{12x}{25}+\frac{(-4x-300)\,e^{xe^{-x}}}{25}+2e^{2xe^{-x}}-\frac{2e^5}{x}$$

input
```
integrate(1/625*((-2500*x**3+2500*x**2)*exp(x/exp(x))**2+(-100*exp(x)*x**2
+100*x**4+7400*x**3-7500*x**2)*exp(x/exp(x))+(1250*exp(5)+4*x**3+300*x**2)
*exp(x))/exp(x)/x**2,x)
```

output
```
2*x**2/625 + 12*x/25 + (-4*x - 300)*exp(x*exp(-x))/25 + 2*exp(2*x*exp(-x))
 - 2*exp(5)/x
```

3.889.7 Maxima [F]

$$\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(1250e^5+300x^2+4x^3)+e^{e^{-x}x}(-7500x^2-100e^xx^2+7400x^3+100x$$

$$= \int -\frac{2\left(1250\,(x^3-x^2)e^{\left(2\,xe^{(-x)}\right)}-50\,(x^4+74\,x^3-x^2e^x-75\,x^2)e^{\left(xe^{(-x)}\right)}-(2\,x^3+150\,x^2+625\,e^5)e^x\right)e^{(-}}{625\,x^2}$$

input
```
integrate(1/625*((-2500*x^3+2500*x^2)*exp(x/exp(x))^2+(-100*exp(x)*x^2+100
*x^4+7400*x^3-7500*x^2)*exp(x/exp(x))+(1250*exp(5)+4*x^3+300*x^2)*exp(x))/
exp(x)/x^2,x, algorithm=\
```

output
```
2/625*x^2 + 12/25*x - 2*e^5/x + 2*e^(2*x*e^(-x)) - 2/625*integrate(-50*(x^
2 + 74*x - e^x - 75)*e^(x*e^(-x) - x), x)
```

3.889.8 Giac [F]

$$\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(1250e^5+300x^2+4x^3)+e^{e^{-x}x}(-7500x^2-100e^xx^2+7400x^3+100x^4)\right)}{625x^2}$$

$$=\int -\frac{2\left(1250\,(x^3-x^2)e^{\left(2\,xe^{(-x)}\right)}-50\,(x^4+74\,x^3-x^2e^x-75\,x^2)e^{\left(xe^{(-x)}\right)}-(2\,x^3+150\,x^2+625\,e^5)e^x\right)e^{(-x)}}{625\,x^2}$$

input
```
integrate(1/625*((-2500*x^3+2500*x^2)*exp(x/exp(x))^2+(-100*exp(x)*x^2+100
*x^4+7400*x^3-7500*x^2)*exp(x/exp(x))+(1250*exp(5)+4*x^3+300*x^2)*exp(x))/
exp(x)/x^2,x, algorithm=\
```

output
```
integrate(-2/625*(1250*(x^3 - x^2)*e^(2*x*e^(-x)) - 50*(x^4 + 74*x^3 - x^2
*e^x - 75*x^2)*e^(x*e^(-x)) - (2*x^3 + 150*x^2 + 625*e^5)*e^x)*e^(-x)/x^2,
 x)
```

3.889.9 Mupad [B] (verification not implemented)

Time = 17.08 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.32

$$\int \frac{e^{-x}\left(e^{2e^{-x}x}(2500x^2-2500x^3)+e^x(1250e^5+300x^2+4x^3)+e^{e^{-x}x}(-7500x^2-100e^xx^2+7400x^3+100x^4)\right)}{625x^2}$$

$$=2\,\mathrm{e}^{2\,x\,\mathrm{e}^{-x}}+\frac{2\,(x^3+150\,x^2-625\,\mathrm{e}^5)}{625\,x}-\frac{4\,\mathrm{e}^{x\,\mathrm{e}^{-x}}\,(x+75)}{25}$$

input
```
int((exp(-x)*((exp(2*x*exp(-x))*(2500*x^2 - 2500*x^3))/625 + (exp(x)*(1250
*exp(5) + 300*x^2 + 4*x^3))/625 - (exp(x*exp(-x))*(100*x^2*exp(x) + 7500*x
^2 - 7400*x^3 - 100*x^4))/625))/x^2,x)
```

output
```
2*exp(2*x*exp(-x)) + (2*(150*x^2 - 625*exp(5) + x^3))/(625*x) - (4*exp(x*e
xp(-x))*(x + 75))/25
```

3.890 $\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\ldots}{16+24x+12x^2+2x^3+e^2(8x+12x^2+6x^3+x^4)+e^{\frac{3\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}(\ldots}$

3.890.1 Optimal result

Integrand size = 293, antiderivative size = 31

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2\ldots\right.}{16+24x+12x^2+2x^3+e^2(8x+12x^2+6x^3+x^4)+e^{\frac{3\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}(2x^3+e^2x^4)+e^{\frac{2\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}\ldots}$$
$$= \frac{x}{\left(2+x+e^{x+\frac{\log^2\left(\frac{2+e^2x}{x}\right)}{x}}x\right)^2}$$

output
```
x/(x+exp(x+ln((exp(2)*x+2)/x)^2/x)*x+2)^2
```

3.890.

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-2x^3)+8\log\left(\frac{2+e^2x}{x}\right)+(4+2e^2x)\log^2\left(\frac{2+\ldots}{}\right)\right.}{}$$

3.890.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.94

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2 \cdots\right.}{16+24x+12x^2+2x^3+e^2\left(8x+12x^2+6x^3+x^4\right)+e^{\frac{3\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}\left(2x^3+e^2x^4\right)+e^{\frac{2\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}} \cdots}$$
$$= \frac{x}{\left(2+x+e^{x+\frac{\log^2\left(e^2+\frac{2}{x}\right)}{x}}x\right)^2}$$

input
```
Integrate[(4 - 2*x + E^2*(2*x - x^2) + E^((x^2 + Log[(2 + E^2*x)/x]^2)/x)*
(-2*x - 4*x^2 + E^2*(-x^2 - 2*x^3) + 8*Log[(2 + E^2*x)/x] + (4 + 2*E^2*x)*
Log[(2 + E^2*x)/x]^2))/(16 + 24*x + 12*x^2 + 2*x^3 + E^2*(8*x + 12*x^2 + 6
*x^3 + x^4) + E^((3*(x^2 + Log[(2 + E^2*x)/x]^2))/x)*(2*x^3 + E^2*x^4) + E
^((2*(x^2 + Log[(2 + E^2*x)/x]^2))/x)*(12*x^2 + 6*x^3 + E^2*(6*x^3 + 3*x^4
)) + E^((x^2 + Log[(2 + E^2*x)/x]^2)/x)*(24*x + 24*x^2 + 6*x^3 + E^2*(12*x
^2 + 12*x^3 + 3*x^4))),x]
```

output
```
x/(2 + x + E^(x + Log[E^2 + 2/x]^2/x)*x)^2
```

3.890.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2\left(2x-x^2\right)+e^{\frac{x^2+\log^2\left(\frac{e^2x+2}{x}\right)}{x}}\left(-4x^2+e^2\left(-2x^3-x^2\right)-2x+\left(2e^2 \cdots\right.}{2x^3+12x^2+e^2\left(x^4+6x^3+12x^2+8x\right)+\left(e^2x^4+2x^3\right)e^{\frac{3\left(x^2+\log^2\left(\frac{e^2x+2}{x}\right)\right)}{x}}+\left(6x^3+12x^2+e^2\left(3x^4+6x^3\right)\right)e^{\frac{2\left(\cdots\right)}{\cdots}} \cdots}$$
$$\Big\downarrow \ 7239$$
$$\int \frac{-\left(e^2x+2\right)\left(2x^2e^{x+\frac{\log^2\left(\frac{2}{x}+e^2\right)}{x}}+x+xe^{x+\frac{\log^2\left(\frac{2}{x}+e^2\right)}{x}}-2\right)+2\left(e^2x+2\right)e^{x+\frac{\log^2\left(\frac{2}{x}+e^2\right)}{x}}\log^2\left(\frac{2}{x}+e^2\right)+8e^{x+\frac{\log^2\left(\cdots\right)}{\cdots}} \cdots}{\left(e^2x+2\right)\left(x+xe^{x+\frac{\log^2\left(\frac{2}{x}+e^2\right)}{x}}+2\right)^3}$$
$$\Big\downarrow \ 7293$$

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-2x^3)+8\log\left(\frac{2+e^2x}{x}\right)+(4+2e^2x)\log^2\left(\frac{2+ \cdots}{\cdots}\right)\right.}{\cdots}$$

$$\int \left(\frac{-2e^2x^3 - 4\left(1 + \frac{e^2}{4}\right)x^2 - 2x + 2e^2x\log^2\left(\frac{2}{x} + e^2\right) + 4\log^2\left(\frac{2}{x} + e^2\right) + 8\log\left(\frac{2}{x} + e^2\right)}{x\left(e^2x + 2\right)\left(x + xe^{x + \frac{\log^2\left(\frac{2}{x} + e^2\right)}{x}} + 2\right)^2} + \frac{2\left(e^2x^4 + 2\left(1 + e^2\right)x\right.}{}\right.$$

$\downarrow$ 7299

$$\int \left(\frac{-2e^2x^3 - 4\left(1 + \frac{e^2}{4}\right)x^2 - 2x + 2e^2x\log^2\left(\frac{2}{x} + e^2\right) + 4\log^2\left(\frac{2}{x} + e^2\right) + 8\log\left(\frac{2}{x} + e^2\right)}{x\left(e^2x + 2\right)\left(x + xe^{x + \frac{\log^2\left(\frac{2}{x} + e^2\right)}{x}} + 2\right)^2} + \frac{2\left(e^2x^4 + 2\left(1 + e^2\right)x\right.}{}\right.$$

input
```
Int[(4 - 2*x + E^2*(2*x - x^2) + E^((x^2 + Log[(2 + E^2*x)/x]^2)/x)*(-2*x
- 4*x^2 + E^2*(-x^2 - 2*x^3) + 8*Log[(2 + E^2*x)/x] + (4 + 2*E^2*x)*Log[(2
 + E^2*x)/x]^2))/(16 + 24*x + 12*x^2 + 2*x^3 + E^2*(8*x + 12*x^2 + 6*x^3 +
 x^4) + E^((3*(x^2 + Log[(2 + E^2*x)/x]^2))/x)*(2*x^3 + E^2*x^4) + E^((2*(
x^2 + Log[(2 + E^2*x)/x]^2))/x)*(12*x^2 + 6*x^3 + E^2*(6*x^3 + 3*x^4)) + E
^((x^2 + Log[(2 + E^2*x)/x]^2)/x)*(24*x + 24*x^2 + 6*x^3 + E^2*(12*x^2 + 1
2*x^3 + 3*x^4))),x]
```

output
```
$Aborted
```

3.890.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.890.

$$\int \frac{4-2x+e^2\left(2x-x^2\right)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2\left(-x^2-2x^3\right)+8\log\left(\frac{2+e^2x}{x}\right)+\left(4+2e^2x\right)\log^2\left(\frac{2+}{}\right.\right.}{}$$

3.890.4 Maple [A] (verified)

Time = 9.31 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

method	result	size
risch	$\frac{x}{\left(x\,\mathrm{e}^{\frac{\ln\left(\frac{\mathrm{e}^{2} x+2}{x}\right)^{2}+x^{2}}{x}}+x+2\right)^{2}}$	32
parallelrisch	$\frac{x}{\mathrm{e}^{\frac{2\ln\left(\frac{\mathrm{e}^{2} x+2}{x}\right)^{2}+2x^{2}}{x}} x^{2}+2\,\mathrm{e}^{\frac{\ln\left(\frac{\mathrm{e}^{2} x+2}{x}\right)^{2}+x^{2}}{x}} x^{2}+x^{2}+4x\,\mathrm{e}^{\frac{\ln\left(\frac{\mathrm{e}^{2} x+2}{x}\right)^{2}+x^{2}}{x}}+4x+4}$	93

input
```
int((((2*exp(2)*x+4)*ln((exp(2)*x+2)/x)^2+8*ln((exp(2)*x+2)/x)+(-2*x^3-x^2
)*exp(2)-4*x^2-2*x)*exp((ln((exp(2)*x+2)/x)^2+x^2)/x)+(-x^2+2*x)*exp(2)+4-
2*x)/((x^4*exp(2)+2*x^3)*exp((ln((exp(2)*x+2)/x)^2+x^2)/x)^3+((3*x^4+6*x^3
)*exp(2)+6*x^3+12*x^2)*exp((ln((exp(2)*x+2)/x)^2+x^2)/x)^2+((3*x^4+12*x^3+
12*x^2)*exp(2)+6*x^3+24*x^2+24*x)*exp((ln((exp(2)*x+2)/x)^2+x^2)/x)+(x^4+6
*x^3+12*x^2+8*x)*exp(2)+2*x^3+12*x^2+24*x+16),x,method=_RETURNVERBOSE)
```

output
```
x/(x*exp((ln((exp(2)*x+2)/x)^2+x^2)/x)+x+2)^2
```

3.890.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. 2(29) = 58.

Time = 0.28 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.26

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-\right.}{16+24x+12x^2+2x^3+e^2\left(8x+12x^2+6x^3+x^4\right)+e^{\frac{3\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}\left(2x^3+e^2x^4\right)+e^{\frac{2\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}}$$

$$= \frac{x}{x^2 e^{\left(\frac{2\left(x^2+\log\left(\frac{xe^2+2}{x}\right)^2\right)}{x}\right)}+x^2+2\,(x^2+2\,x)e^{\left(\frac{x^2+\log\left(\frac{xe^2+2}{x}\right)^2}{x}\right)}+4\,x+4}$$

input
```
integrate((((2*exp(2)*x+4)*log((exp(2)*x+2)/x)^2+8*log((exp(2)*x+2)/x)+(-2
*x^3-x^2)*exp(2)-4*x^2-2*x)*exp((log((exp(2)*x+2)/x)^2+x^2)/x)+(-x^2+2*x)*
exp(2)+4-2*x)/((x^4*exp(2)+2*x^3)*exp((log((exp(2)*x+2)/x)^2+x^2)/x)^3+((3
*x^4+6*x^3)*exp(2)+6*x^3+12*x^2)*exp((log((exp(2)*x+2)/x)^2+x^2)/x)^2+((3*
x^4+12*x^3+12*x^2)*exp(2)+6*x^3+24*x^2+24*x)*exp((log((exp(2)*x+2)/x)^2+x^
2)/x)+(x^4+6*x^3+12*x^2+8*x)*exp(2)+2*x^3+12*x^2+24*x+16),x, algorithm=\
```


$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-2x^3)+8\log\left(\frac{2+e^2x}{x}\right)+(4+2e^2x)\log^2\left(\frac{2+\right.\right.}{}$$

output
```
x/(x^2*e^(2*(x^2 + log((x*e^2 + 2)/x)^2)/x) + x^2 + 2*(x^2 + 2*x)*e^((x^2
+ log((x*e^2 + 2)/x)^2)/x) + 4*x + 4)
```

3.890.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(24) = 48.

Time = 0.33 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.97

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-\right.}{16+24x+12x^2+2x^3+e^2\left(8x+12x^2+6x^3+x^4\right)+e^{\frac{3\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}\left(2x^3+e^2x^4\right)+e^{\frac{2\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}}$$
$$= \frac{x}{x^2e^{\frac{2\left(x^2+\log\left(\frac{xe^2+2}{x}\right)^2\right)}{x}}+x^2+4x+(2x^2+4x)\,e^{\frac{x^2+\log\left(\frac{xe^2+2}{x}\right)^2}{x}}+4}$$

input
```
integrate((((2*exp(2)*x+4)*ln((exp(2)*x+2)/x)**2+8*ln((exp(2)*x+2)/x)+(-2*
x**3-x**2)*exp(2)-4*x**2-2*x)*exp((ln((exp(2)*x+2)/x)**2+x**2)/x)+(-x**2+2
*x)*exp(2)+4-2*x)/((x**4*exp(2)+2*x**3)*exp((ln((exp(2)*x+2)/x)**2+x**2)/x
)**3+((3*x**4+6*x**3)*exp(2)+6*x**3+12*x**2)*exp((ln((exp(2)*x+2)/x)**2+x*
*2)/x)**2+((3*x**4+12*x**3+12*x**2)*exp(2)+6*x**3+24*x**2+24*x)*exp((ln((e
xp(2)*x+2)/x)**2+x**2)/x)+(x**4+6*x**3+12*x**2+8*x)*exp(2)+2*x**3+12*x**2+
24*x+16),x)
```

output
```
x/(x**2*exp(2*(x**2 + log((x*exp(2) + 2)/x)**2)/x) + x**2 + 4*x + (2*x**2
+ 4*x)*exp((x**2 + log((x*exp(2) + 2)/x)**2)/x) + 4)
```

3.890.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 123 vs. 2(29) = 58.

Time = 5.85 (sec) , antiderivative size = 123, normalized size of antiderivative = 3.97

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-\right.}{16+24x+12x^2+2x^3+e^2\left(8x+12x^2+6x^3+x^4\right)+e^{\frac{3\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}\left(2x^3+e^2x^4\right)+e^{\frac{2\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}}$$
$$= \frac{xe^{\left(\frac{4\log\left(xe^2+2\right)\log(x)}{x}\right)}}{x^2e^{\left(2x+\frac{2\log\left(xe^2+2\right)^2}{x}+\frac{2\log(x)^2}{x}\right)}+2\,(x^2+2\,x)e^{\left(x+\frac{\log\left(xe^2+2\right)^2}{x}+\frac{2\log\left(xe^2+2\right)\log(x)}{x}+\frac{\log(x)^2}{x}\right)}+(x^2+4\,x+4)e^{\left(\frac{4\log\left(xe^2\right.}{}\right.}}$$

3.890.

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-2x^3)+8\log\left(\frac{2+e^2x}{x}\right)+(4+2e^2x)\log^2\left(\frac{2+}{}\right.\right.}{}$$

input
```
integrate((((2*exp(2)*x+4)*log((exp(2)*x+2)/x)^2+8*log((exp(2)*x+2)/x)+(-2
*x^3-x^2)*exp(2)-4*x^2-2*x)*exp((log((exp(2)*x+2)/x)^2+x^2)/x)+(-x^2+2*x)*
exp(2)+4-2*x)/((x^4*exp(2)+2*x^3)*exp((log((exp(2)*x+2)/x)^2+x^2)/x)^3+((3
*x^4+6*x^3)*exp(2)+6*x^3+12*x^2)*exp((log((exp(2)*x+2)/x)^2+x^2)/x)^2+((3*
x^4+12*x^3+12*x^2)*exp(2)+6*x^3+24*x^2+24*x)*exp((log((exp(2)*x+2)/x)^2+x^
2)/x)+(x^4+6*x^3+12*x^2+8*x)*exp(2)+2*x^3+12*x^2+24*x+16),x, algorithm=\
```

output
```
x*e^(4*log(x*e^2 + 2)*log(x)/x)/(x^2*e^(2*x + 2*log(x*e^2 + 2)^2/x + 2*log
(x)^2/x) + 2*(x^2 + 2*x)*e^(x + log(x*e^2 + 2)^2/x + 2*log(x*e^2 + 2)*log(
x)/x + log(x)^2/x) + (x^2 + 4*x + 4)*e^(4*log(x*e^2 + 2)*log(x)/x))
```

3.890.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 91 vs. $2(29) = 58$.

Time = 92.32 (sec) , antiderivative size = 91, normalized size of antiderivative = 2.94

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-\right.}{16+24x+12x^2+2x^3+e^2\left(8x+12x^2+6x^3+x^4\right)+e^{\frac{3\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}\left(2x^3+e^2x^4\right)+e^{\frac{2\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}}$$
$$=\frac{x}{x^2e^{\left(\frac{2\left(x^2+\log\left(\frac{xe^2+2}{x}\right)^2\right)}{x}\right)}+2\,x^2e^{\left(\frac{x^2+\log\left(\frac{xe^2+2}{x}\right)^2}{x}\right)}+x^2+4\,xe^{\left(\frac{x^2+\log\left(\frac{xe^2+2}{x}\right)^2}{x}\right)}+4\,x+4}$$

input
```
integrate((((2*exp(2)*x+4)*log((exp(2)*x+2)/x)^2+8*log((exp(2)*x+2)/x)+(-2
*x^3-x^2)*exp(2)-4*x^2-2*x)*exp((log((exp(2)*x+2)/x)^2+x^2)/x)+(-x^2+2*x)*
exp(2)+4-2*x)/((x^4*exp(2)+2*x^3)*exp((log((exp(2)*x+2)/x)^2+x^2)/x)^3+((3
*x^4+6*x^3)*exp(2)+6*x^3+12*x^2)*exp((log((exp(2)*x+2)/x)^2+x^2)/x)^2+((3*
x^4+12*x^3+12*x^2)*exp(2)+6*x^3+24*x^2+24*x)*exp((log((exp(2)*x+2)/x)^2+x^
2)/x)+(x^4+6*x^3+12*x^2+8*x)*exp(2)+2*x^3+12*x^2+24*x+16),x, algorithm=\
```

output
```
x/(x^2*e^(2*(x^2 + log((x*e^2 + 2)/x)^2)/x) + 2*x^2*e^((x^2 + log((x*e^2 +
 2)/x)^2)/x) + x^2 + 4*x*e^((x^2 + log((x*e^2 + 2)/x)^2)/x) + 4*x + 4)
```


$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-2x^3)+8\log\left(\frac{2+e^2x}{x}\right)+(4+2e^2x)\log^2\left(\frac{2+\right.\right.}{}$$

3.890.9 Mupad [B] (verification not implemented)

Time = 19.62 (sec) , antiderivative size = 452, normalized size of antiderivative = 14.58

$$\int \frac{4-2x+e^2(2x-x^2)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2(-x^2-\right.}{16+24x+12x^2+2x^3+e^2\left(8x+12x^2+6x^3+x^4\right)+e^{\frac{3\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}\left(2x^3+e^2x^4\right)+e^{\frac{2\left(x^2+\log^2\left(\frac{2+e^2x}{x}\right)\right)}{x}}}$$

$$= -\frac{\left(e^2\,x^2+2\,x\right)^2\left(4\right.}{\left(x\,e^2+2\right)\left(\left(x+2\right)^2+x^2\,e^{2\,x+\frac{2\ln\left(\frac{x\,e^2+2}{x}\right)^2}{x}}+2\,x\,e^{x+\frac{\ln\left(\frac{x\,e^2+2}{x}\right)^2}{x}}\,\left(x+2\right)\right)\left(16\,x\,\ln\left(\frac{x\,e^2+2}{x}\right)+8\,x\ln\left(\frac{x\,e^2+2}{x}\right.\right.}$$

input
```
int(-(2*x - exp(2)*(2*x - x^2) + exp((log((x*exp(2) + 2)/x)^2 + x^2)/x)*(2
*x - 8*log((x*exp(2) + 2)/x) + exp(2)*(x^2 + 2*x^3) - log((x*exp(2) + 2)/x
)^2*(2*x*exp(2) + 4) + 4*x^2) - 4)/(24*x + exp((3*(log((x*exp(2) + 2)/x)^2
 + x^2))/x)*(x^4*exp(2) + 2*x^3) + exp((2*(log((x*exp(2) + 2)/x)^2 + x^2))
/x)*(exp(2)*(6*x^3 + 3*x^4) + 12*x^2 + 6*x^3) + exp((log((x*exp(2) + 2)/x)
^2 + x^2)/x)*(24*x + exp(2)*(12*x^2 + 12*x^3 + 3*x^4) + 24*x^2 + 6*x^3) +
exp(2)*(8*x + 12*x^2 + 6*x^3 + x^4) + 12*x^2 + 2*x^3 + 16),x)
```

output
```
-((2*x + x^2*exp(2))^2*(4*x - 8*log((x*exp(2) + 2)/x) - 4*x*log((x*exp(2)
+ 2)/x) - 2*x*log((x*exp(2) + 2)/x)^2 + 2*x^2*exp(2) + 2*x^3*exp(2) + x^4*
exp(2) - 4*log((x*exp(2) + 2)/x)^2 + 4*x^2 + 2*x^3 - x^2*log((x*exp(2) + 2
)/x)^2*exp(2) - 2*x*log((x*exp(2) + 2)/x)^2*exp(2)))/((x*exp(2) + 2)*((x +
 2)^2 + x^2*exp(2*x + (2*log((x*exp(2) + 2)/x)^2)/x) + 2*x*exp(x + log((x*
exp(2) + 2)/x)^2/x)*(x + 2))*(16*x*log((x*exp(2) + 2)/x) + 8*x*log((x*exp(
2) + 2)/x)^2 + 8*x^2*log((x*exp(2) + 2)/x) - 8*x^3*exp(2) - 8*x^4*exp(2) -
 4*x^5*exp(2) - 2*x^4*exp(4) - 2*x^5*exp(4) - x^6*exp(4) + 4*x^2*log((x*ex
p(2) + 2)/x)^2 - 8*x^2 - 8*x^3 - 4*x^4 + 8*x^2*log((x*exp(2) + 2)/x)^2*exp
(2) + 4*x^3*log((x*exp(2) + 2)/x)^2*exp(2) + 2*x^3*log((x*exp(2) + 2)/x)^2
*exp(4) + x^4*log((x*exp(2) + 2)/x)^2*exp(4) + 8*x^2*log((x*exp(2) + 2)/x)
*exp(2) + 4*x^3*log((x*exp(2) + 2)/x)*exp(2)))
```

3.890.

$$\int \frac{4-2x+e^2\left(2x-x^2\right)+e^{\frac{x^2+\log^2\left(\frac{2+e^2x}{x}\right)}{x}}\left(-2x-4x^2+e^2\left(-x^2-2x^3\right)+8\log\left(\frac{2+e^2x}{x}\right)+\left(4+2e^2x\right)\log^2\left(\frac{2+\right.\right.}{}$$

3.891 $\int \frac{-5+10x-15x^2+e^{2+x+e^4x^2}(-5-5x-10e^4x^2)}{1+2x-x^2+e^{4+2x+2e^4x^2}x^2+3x^4-2x^5+x^6+e^{2+x+e^4x^2}(2x+2x^2-2x^3+$

3.891.1 Optimal result

Integrand size = 113, antiderivative size = 33

$$\int \frac{-5+10x-15x^2+e^{2+x+e^4x^2}(-5-5x-10e^4x^2)}{1+2x-x^2+e^{4+2x+2e^4x^2}x^2+3x^4-2x^5+x^6+e^{2+x+e^4x^2}(2x+2x^2-2x^3+2x^4)}\,dx = \frac{5}{1+x^2\left(\frac{1+e^{2+x+e^4x^2}-x}{x}+x\right)}$$

output
```
5/(1+(x+(1+exp(x^2*exp(4)+2+x)-x)/x)*x^2)
```

3.891.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.88

$$\int \frac{-5+10x-15x^2+e^{2+x+e^4x^2}(-5-5x-10e^4x^2)}{1+2x-x^2+e^{4+2x+2e^4x^2}x^2+3x^4-2x^5+x^6+e^{2+x+e^4x^2}(2x+2x^2-2x^3+2x^4)}\,dx = \frac{5}{1+x+e^{2+x+e^4x^2}x-x^2+x^3}$$

input
```
Integrate[(-5 + 10*x - 15*x^2 + E^(2 + x + E^4*x^2)*(-5 - 5*x - 10*E^4*x^2
))/(1 + 2*x - x^2 + E^(4 + 2*x + 2*E^4*x^2)*x^2 + 3*x^4 - 2*x^5 + x^6 + E^
(2 + x + E^4*x^2)*(2*x + 2*x^2 - 2*x^3 + 2*x^4)),x]
```

output
```
5/(1 + x + E^(2 + x + E^4*x^2)*x - x^2 + x^3)
```

3.891.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.88, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.018$, Rules used = {7292, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-15x^2+e^{e^4x^2+x+2}\left(-10e^4x^2-5x-5\right)+10x-5}{x^6-2x^5+3x^4+e^{2e^4x^2+2x+4}x^2-x^2+e^{e^4x^2+x+2}\left(2x^4-2x^3+2x^2+2x\right)+2x+1}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{-15x^2+e^{e^4x^2+x+2}\left(-10e^4x^2-5x-5\right)+10x-5}{\left(x^3-x^2+e^{e^4x^2+x+2}x+x+1\right)^2}dx$$
$$\Big\downarrow \text{7237}$$
$$\frac{5}{x^3-x^2+e^{e^4x^2+x+2}x+x+1}$$

input
```
Int[(-5 + 10*x - 15*x^2 + E^(2 + x + E^4*x^2)*(-5 - 5*x - 10*E^4*x^2))/(1
+ 2*x - x^2 + E^(4 + 2*x + 2*E^4*x^2)*x^2 + 3*x^4 - 2*x^5 + x^6 + E^(2 + x
 + E^4*x^2)*(2*x + 2*x^2 - 2*x^3 + 2*x^4)),x]
```

output
```
5/(1 + x + E^(2 + x + E^4*x^2)*x - x^2 + x^3)
```

3.891.3.1 Defintions of rubi rules used

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.891.4 Maple [A] (verified)

Time = 1.06 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.85

method	result	size
norman	$\frac{5}{x^3+e^{x^2 e^4+2+x}x-x^2+x+1}$	28
risch	$\frac{5}{x^3+e^{x^2 e^4+2+x}x-x^2+x+1}$	28
parallelrisch	$\frac{5}{x^3+e^{x^2 e^4+2+x}x-x^2+x+1}$	28

input
```
int(((-10*x^2*exp(4)-5*x-5)*exp(x^2*exp(4)+2+x)-15*x^2+10*x-5)/(x^2*exp(x^
2*exp(4)+2+x)^2+(2*x^4-2*x^3+2*x^2+2*x)*exp(x^2*exp(4)+2+x)+x^6-2*x^5+3*x^
4-x^2+2*x+1),x,method=_RETURNVERBOSE)
```

output
```
5/(x^3+exp(x^2*exp(4)+2+x)*x-x^2+x+1)
```

3.891.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.82

$$\int \frac{-5+10x-15x^2+e^{2+x+e^4x^2}(-5-5x-10e^4x^2)}{1+2x-x^2+e^{4+2x+2e^4x^2}x^2+3x^4-2x^5+x^6+e^{2+x+e^4x^2}(2x+2x^2-2x^3+2x^4)}\,dx = \frac{5}{x^3-x^2+xe^{(x^2e^4+x+2)}+x+1}$$

input
```
integrate(((-10*x^2*exp(4)-5*x-5)*exp(x^2*exp(4)+2+x)-15*x^2+10*x-5)/(x^2*
exp(x^2*exp(4)+2+x)^2+(2*x^4-2*x^3+2*x^2+2*x)*exp(x^2*exp(4)+2+x)+x^6-2*x^
5+3*x^4-x^2+2*x+1),x, algorithm=\
```

output
```
5/(x^3 - x^2 + x*e^(x^2*e^4 + x + 2) + x + 1)
```

3.891.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.73

$$\int \frac{-5+10x-15x^2+e^{2+x+e^4x^2}(-5-5x-10e^4x^2)}{1+2x-x^2+e^{4+2x+2e^4x^2}x^2+3x^4-2x^5+x^6+e^{2+x+e^4x^2}(2x+2x^2-2x^3+2x^4)}\,dx = \frac{5}{x^3-x^2+xe^{x^2e^4+x+2}+x+1}$$

input
```
integrate(((-10*x**2*exp(4)-5*x-5)*exp(x**2*exp(4)+2+x)-15*x**2+10*x-5)/(x
**2*exp(x**2*exp(4)+2+x)**2+(2*x**4-2*x**3+2*x**2+2*x)*exp(x**2*exp(4)+2+x
)+x**6-2*x**5+3*x**4-x**2+2*x+1),x)
```

output
```
5/(x**3 - x**2 + x*exp(x**2*exp(4) + x + 2) + x + 1)
```

3.891.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.82

$$\int \frac{-5+10x-15x^2+e^{2+x+e^4x^2}(-5-5x-10e^4x^2)}{1+2x-x^2+e^{4+2x+2e^4x^2}x^2+3x^4-2x^5+x^6+e^{2+x+e^4x^2}(2x+2x^2-2x^3+2x^4)}\,dx = \frac{5}{x^3-x^2+xe^{(x^2e^4+x+2)}+x+1}$$

input
```
integrate(((-10*x^2*exp(4)-5*x-5)*exp(x^2*exp(4)+2+x)-15*x^2+10*x-5)/(x^2*
exp(x^2*exp(4)+2+x)^2+(2*x^4-2*x^3+2*x^2+2*x)*exp(x^2*exp(4)+2+x)+x^6-2*x^
5+3*x^4-x^2+2*x+1),x, algorithm=\
```

output
```
5/(x^3 - x^2 + x*e^(x^2*e^4 + x + 2) + x + 1)
```

3.891.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 253 vs. 2(32) = 64.

Time = 0.36 (sec) , antiderivative size = 253, normalized size of antiderivative = 7.67

$$\int \frac{-5+10x-15x^2+e^{2+x+e^4x^2}(-5-5x-10e^4x^2)}{1+2x-x^2+e^{4+2x+2e^4x^2}x^2+3x^4-2x^5+x^6+e^{2+x+e^4x^2}(2x+2x^2-2x^3+2x^4)}\,dx = \frac{5\,(2\,x^5e^4-2}{2\,x^8e^4-4\,x^7e^4+x^7+6\,x^6e^4+2\,x^6e^{(x^2e^4+x+6)}-4\,x^6-2\,x^5e^{(x^2e^4+x+6)}+x^5e^{(x^2e^4+x+2)}+6\,x^5-2\,x^4e^4+2}$$

input
```
integrate(((-10*x^2*exp(4)-5*x-5)*exp(x^2*exp(4)+2+x)-15*x^2+10*x-5)/(x^2*
exp(x^2*exp(4)+2+x)^2+(2*x^4-2*x^3+2*x^2+2*x)*exp(x^2*exp(4)+2+x)+x^6-2*x^
5+3*x^4-x^2+2*x+1),x, algorithm=\
```

output
```
5*(2*x^5*e^4 - 2*x^4*e^4 + x^4 + 2*x^3*e^4 - 3*x^3 + 2*x^2*e^4 + 2*x^2 + x
 + 1)/(2*x^8*e^4 - 4*x^7*e^4 + x^7 + 6*x^6*e^4 + 2*x^6*e^(x^2*e^4 + x + 6)
 - 4*x^6 - 2*x^5*e^(x^2*e^4 + x + 6) + x^5*e^(x^2*e^4 + x + 2) + 6*x^5 - 2
*x^4*e^4 + 2*x^4*e^(x^2*e^4 + x + 6) - 3*x^4*e^(x^2*e^4 + x + 2) - 3*x^4 +
 4*x^3*e^4 + 2*x^3*e^(x^2*e^4 + x + 6) + 2*x^3*e^(x^2*e^4 + x + 2) - x^3 +
 2*x^2*e^4 + x^2*e^(x^2*e^4 + x + 2) + 2*x^2 + x*e^(x^2*e^4 + x + 2) + 2*x
 + 1)
```

3.891.9 Mupad [B] (verification not implemented)

Time = 17.44 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.85

$$\int \frac{-5+10x-15x^2+e^{2+x+e^4x^2}(-5-5x-10e^4x^2)}{1+2x-x^2+e^{4+2x+2e^4x^2}x^2+3x^4-2x^5+x^6+e^{2+x+e^4x^2}(2x+2x^2-2x^3+2x^4)}\,dx = \frac{5}{x-x^2+x^3+x\,e^{x^2\,e^4}\,e^2\,e^x+1}$$

input
```
int(-(exp(x + x^2*exp(4) + 2)*(5*x + 10*x^2*exp(4) + 5) - 10*x + 15*x^2 +
5)/(2*x + exp(x + x^2*exp(4) + 2)*(2*x + 2*x^2 - 2*x^3 + 2*x^4) + x^2*exp(
2*x + 2*x^2*exp(4) + 4) - x^2 + 3*x^4 - 2*x^5 + x^6 + 1),x)
```

output
```
5/(x - x^2 + x^3 + x*exp(x^2*exp(4))*exp(2)*exp(x) + 1)
```

3.892 $\int \frac{e^2}{3x} dx$

3.892.1 Optimal result

Integrand size = 10, antiderivative size = 11

$$\int \frac{e^2}{3x} dx = -14 + \frac{1}{3}e^2 \log(x)$$

output
```
-14+1/3*exp(2)*ln(x)
```

3.892.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.82

$$\int \frac{e^2}{3x} dx = \frac{1}{3}e^2 \log(x)$$

input
```
Integrate[E^2/(3*x),x]
```

output
```
(E^2*Log[x])/3
```

3.892.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.82, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2}{3x} \, dx$$

$$\Big\downarrow \text{14}$$

$$\frac{1}{3} e^2 \log(x)$$

input
```
Int[E^2/(3*x),x]
```

output
```
(E^2*Log[x])/3
```

3.892.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

3.892.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.64

method	result	size
default	$\frac{e^2 \ln(x)}{3}$	7
norman	$\frac{e^2 \ln(x)}{3}$	7
risch	$\frac{e^2 \ln(x)}{3}$	7
parallelrisch	$\frac{e^2 \ln(x)}{3}$	7

input
```
int(1/3*exp(2)/x,x,method=_RETURNVERBOSE)
```

output
```
1/3*exp(2)*ln(x)
```

3.892.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.55

$$\int \frac{e^2}{3x}\,dx = \frac{1}{3}\,e^2\log\left(x\right)$$

input
```
integrate(1/3*exp(2)/x,x, algorithm=\
```

output
```
1/3*e^2*log(x)
```

3.892.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.64

$$\int \frac{e^2}{3x}\,dx = \frac{e^2\log\left(x\right)}{3}$$

input
```
integrate(1/3*exp(2)/x,x)
```

output
```
exp(2)*log(x)/3
```

3.892.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.55

$$\int \frac{e^2}{3x}\,dx = \frac{1}{3}\,e^2\log\left(x\right)$$

input
```
integrate(1/3*exp(2)/x,x, algorithm=\
```

output
```
1/3*e^2*log(x)
```

3.892.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.64

$$\int \frac{e^2}{3x}\,dx = \frac{1}{3}\,e^2 \log\left(|x|\right)$$

input
```
integrate(1/3*exp(2)/x,x, algorithm=\
```

output
```
1/3*e^2*log(abs(x))
```

3.892.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.55

$$\int \frac{e^2}{3x}\,dx = \frac{\mathrm{e}^2\,\ln\left(x\right)}{3}$$

input
```
int(exp(2)/(3*x),x)
```

output
```
(exp(2)*log(x))/3
```

3.893 $\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}(-1+8x^2+8x\log(4))}{2x^2}\,dx$

3.893.1 Optimal result

Integrand size = 38, antiderivative size = 20

$$\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}(-1+8x^2+8x\log(4))}{2x^2}\,dx=\frac{1}{2}\left(9+\frac{e^{4(x+\log(4))^2}}{x}\right)$$

output
```
1/2*exp(2*(x+2*ln(2))*(2*x+4*ln(2)))/x+9/2
```

3.893.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}(-1+8x^2+8x\log(4))}{2x^2}\,dx=\frac{2^{-1+16x}e^{4(x^2+\log^2(4))}}{x}$$

input
```
Integrate[(E^(4*x^2 + 8*x*Log[4] + 4*Log[4]^2)*(-1 + 8*x^2 + 8*x*Log[4]))/
(2*x^2),x]
```

output
```
(2^(-1 + 16*x)*E^(4*(x^2 + Log[4]^2)))/x
```

3.893.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.95, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {27, 25, 2725, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}\left(8x^2+8x\log(4)-1\right)}{2x^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2}\int -\frac{4^{8x}e^{4x^2+4\log^2(4)}\left(-8x^2-8\log(4)x+1\right)}{x^2}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{2}\int \frac{4^{8x}e^{4x^2+4\log^2(4)}\left(-8x^2-8\log(4)x+1\right)}{x^2}dx$$

$$\Big\downarrow \ 2725$$

$$-\frac{1}{2}\int \frac{e^{4x^2+8\log(4)x+4\log^2(4)}\left(-8x^2-8\log(4)x+1\right)}{x^2}dx$$

$$\Big\downarrow \ 2726$$

$$\frac{2^{16x-1}e^{4x^2+4\log^2(4)}\left(x^2+x\log(4)\right)}{x^2(x+\log(4))}$$

input
```
Int[(E^(4*x^2 + 8*x*Log[4] + 4*Log[4]^2)*(-1 + 8*x^2 + 8*x*Log[4]))/(2*x^2
),x]
```

output
```
(2^(-1 + 16*x)*E^(4*x^2 + 4*Log[4]^2)*(x^2 + x*Log[4]))/(x^2*(x + Log[4]))
```

3.893.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2725
```
Int[(u_.)*(F_)^(v_)*(G_)^(w_), x_Symbol] :> With[{z = v*Log[F] + w*Log[G]},
 Int[u*NormalizeIntegrand[E^z, x], x] /; BinomialQ[z, x] || (PolynomialQ[z,
 x] && LeQ[Exponent[z, x], 2])] /; FreeQ[{F, G}, x]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.893.4 Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

method	result	size
risch	$\frac{65536^{x} {\mathrm e}^{16 \ln \left(2\right)^{2}+4 x^{2}}}{2 x}$	22
gosper	$\frac{{\mathrm e}^{16 \ln \left(2\right)^{2}+16 x \ln \left(2\right)+4 x^{2}}}{2 x}$	24
norman	$\frac{{\mathrm e}^{16 \ln \left(2\right)^{2}+16 x \ln \left(2\right)+4 x^{2}}}{2 x}$	24
parallelrisch	$\frac{{\mathrm e}^{16 \ln \left(2\right)^{2}+16 x \ln \left(2\right)+4 x^{2}}}{2 x}$	24

input
```
int(1/2*(16*x*ln(2)+8*x^2-1)*exp(16*ln(2)^2+16*x*ln(2)+4*x^2)/x^2,x,method
=_RETURNVERBOSE)
```

output
```
1/2/x*65536^x*exp(16*ln(2)^2+4*x^2)
```

3.893.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}(-1+8x^2+8x\log(4))}{2x^2}\,dx = \frac{e^{\left(4\,x^2+16\,x\log(2)+16\,\log(2)^2\right)}}{2\,x}$$

input
```
integrate(1/2*(16*x*log(2)+8*x^2-1)*exp(16*log(2)^2+16*x*log(2)+4*x^2)/x^2
,x, algorithm=\
```

output
```
1/2*e^(4*x^2 + 16*x*log(2) + 16*log(2)^2)/x
```

3.893.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}(-1+8x^2+8x\log(4))}{2x^2}\,dx = \frac{e^{4x^2+16x\log{(2)}+16\log{(2)}^2}}{2x}$$

input
```
integrate(1/2*(16*x*ln(2)+8*x**2-1)*exp(16*ln(2)**2+16*x*ln(2)+4*x**2)/x**
2,x)
```

output
```
exp(4*x**2 + 16*x*log(2) + 16*log(2)**2)/(2*x)
```

3.893.7 Maxima [F]

$$\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}(-1+8x^2+8x\log(4))}{2x^2}\,dx = \int \frac{(8\,x^2+16\,x\log{(2)}-1)e^{\left(4\,x^2+16\,x\log(2)+16\,\log(2)^2\right)}}{2\,x^2}\,dx$$

input
```
integrate(1/2*(16*x*log(2)+8*x^2-1)*exp(16*log(2)^2+16*x*log(2)+4*x^2)/x^2
,x, algorithm=\
```

output
```
-I*sqrt(pi)*erf(2*I*x + 4*I*log(2)) + 1/2*integrate((16*x*e^(16*log(2)^2)*
log(2) - e^(16*log(2)^2))*e^(4*x^2 + 16*x*log(2))/x^2, x)
```

3.893.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}(-1+8x^2+8x\log(4))}{2x^2}\,dx = \frac{e^{\left(4\,x^2+16\,x\log(2)+16\,\log(2)^2\right)}}{2\,x}$$

input
```
integrate(1/2*(16*x*log(2)+8*x^2-1)*exp(16*log(2)^2+16*x*log(2)+4*x^2)/x^2
,x, algorithm=\
```

output
```
1/2*e^(4*x^2 + 16*x*log(2) + 16*log(2)^2)/x
```

3.893.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{e^{4x^2+8x\log(4)+4\log^2(4)}(-1+8x^2+8x\log(4))}{2x^2}\,dx = \frac{2^{16\,x}\,e^{16\ln(2)^2}\,e^{4\,x^2}}{2\,x}$$

input
```
int((exp(16*x*log(2) + 16*log(2)^2 + 4*x^2)*(16*x*log(2) + 8*x^2 - 1))/(2*
x^2),x)
```

output
```
(2^(16*x)*exp(16*log(2)^2)*exp(4*x^2))/(2*x)
```

3.894 $\int e^{e^{-x}\left(24+2e^{256}\right)-x}\left(-24-2e^{256}\right)\,dx$

3.894.1 Optimal result

Integrand size = 27, antiderivative size = 14

$$\int e^{e^{-x}\left(24+2e^{256}\right)-x}\left(-24-2e^{256}\right)\,dx=e^{2e^{-x}\left(12+e^{256}\right)}$$

output
```
exp(2*(exp(256)+12)/exp(x))
```

3.894.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int e^{e^{-x}\left(24+2e^{256}\right)-x}\left(-24-2e^{256}\right)\,dx=e^{2e^{-x}\left(12+e^{256}\right)}$$

input
```
Integrate[E^((24 + 2*E^256)/E^x - x)*(-24 - 2*E^256),x]
```

output
```
E^((2*(12 + E^256))/E^x)
```

3.894.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {27, 2720, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-24-2 e^{256}\right) e^{\left(24+2 e^{256}\right) e^{-x}-x} \, dx$$

$$\Big\downarrow \ 27$$

$$-2 \left(12+e^{256}\right) \int e^{2 e^{-x} \left(12+e^{256}\right)-x}dx$$

$$\Big\downarrow \ 2720$$

$$2 \left(12+e^{256}\right) \int e^{2 e^{-x} \left(12+e^{256}\right)}de^{-x}$$

$$\Big\downarrow \ 2624$$

$$e^{2 \left(12+e^{256}\right) e^{-x}}$$

input
```
Int[E^((24 + 2*E^256)/E^x - x)*(-24 - 2*E^256),x]
```

output
```
E^((2*(12 + E^256))/E^x)
```

3.894.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

rule 2720
```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ
[{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))
*(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

3.894.4 Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

method	result	size
norman	$\mathrm{e}^{\left(2\,\mathrm{e}^{256}+24\right)\mathrm{e}^{-x}}$	13
parallelrisch	$-\frac{\left(-2\,\mathrm{e}^{256}-24\right)\mathrm{e}^{2\left(\mathrm{e}^{256}+12\right)\mathrm{e}^{-x}}}{2\left(\mathrm{e}^{256}+12\right)}$	26
derivativedivides	$-\frac{\left(-2\,\mathrm{e}^{256}-24\right)\mathrm{e}^{\left(2\,\mathrm{e}^{256}+24\right)\mathrm{e}^{-x}}}{2\,\mathrm{e}^{256}+24}$	29
default	$-\frac{\left(-2\,\mathrm{e}^{256}-24\right)\mathrm{e}^{\left(2\,\mathrm{e}^{256}+24\right)\mathrm{e}^{-x}}}{2\,\mathrm{e}^{256}+24}$	29
risch	$\frac{\mathrm{e}^{2\left(\mathrm{e}^{256}+12\right)\mathrm{e}^{-x}}\,\mathrm{e}^{256}}{\mathrm{e}^{256}+12}+\frac{12\,\mathrm{e}^{2\left(\mathrm{e}^{256}+12\right)\mathrm{e}^{-x}}}{\mathrm{e}^{256}+12}$	41

input
```
int((-2*exp(256)-24)*exp((2*exp(256)+24)/exp(x))/exp(x),x,method=_RETURNVE
RBOSE)
```

output
```
exp((2*exp(256)+24)/exp(x))
```

3.894.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.79

$$\int e^{e^{-x}(24+2e^{256})-x}\left(-24-2e^{256}\right)\,dx=e^{\left(2\,\left(e^{256}+12\right)e^{(-x)}\right)}$$

input
```
integrate((-2*exp(256)-24)*exp((2*exp(256)+24)/exp(x))/exp(x),x, algorithm
=\
```

output
```
e^(2*(e^256 + 12)*e^(-x))
```

3.894.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int e^{e^{-x}(24+2e^{256})-x}(-24-2e^{256})\,dx=e^{(24+2e^{256})e^{-x}}$$

input
```
integrate((-2*exp(256)-24)*exp((2*exp(256)+24)/exp(x))/exp(x),x)
```

output
```
exp((24 + 2*exp(256))*exp(-x))
```

3.894.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.14

$$\int e^{e^{-x}(24+2e^{256})-x}(-24-2e^{256})\,dx=e^{\left(24\,e^{(-x)}+2\,e^{(-x+256)}\right)}$$

input
```
integrate((-2*exp(256)-24)*exp((2*exp(256)+24)/exp(x))/exp(x),x, algorithm
=\
```

output
```
e^(24*e^(-x) + 2*e^(-x + 256))
```

3.894.8 Giac [F]

$$\int e^{e^{-x}(24+2e^{256})-x}(-24-2e^{256})\,dx=\int -2\left(e^{256}+12\right)e^{\left(2\left(e^{256}+12\right)e^{(-x)}-x\right)}\,dx$$

input
```
integrate((-2*exp(256)-24)*exp((2*exp(256)+24)/exp(x))/exp(x),x, algorithm
=\
```

output
```
integrate(-2*(e^256 + 12)*e^(2*(e^256 + 12)*e^(-x) - x), x)
```

3.894.9 Mupad [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.14

$$\int e^{e^{-x}(24+2e^{256})-x}\left(-24-2e^{256}\right)\,dx=\mathrm{e}^{24\,\mathrm{e}^{-x}+2\,\mathrm{e}^{256-x}}$$

input
```
int(-exp(exp(-x)*(2*exp(256) + 24))*exp(-x)*(2*exp(256) + 24),x)
```

output
```
exp(24*exp(-x) + 2*exp(256 - x))
```

3.895 $\int \frac{2x+e^5(-1-12x-3x^2)+e^5\log\left(\frac{2-e}{x}\right)}{e^5}\,dx$

3.895.1 Optimal result

Integrand size = 36, antiderivative size = 24

$$\int \frac{2x+e^5(-1-12x-3x^2)+e^5\log\left(\frac{2-e}{x}\right)}{e^5}\,dx = x\left(-x\left(6-\frac{1}{e^5}+x\right)+\log\left(\frac{2-e}{x}\right)\right)$$

output
```
(ln((2-exp(1))/x)-x*(x+6-1/exp(5)))*x
```

3.895.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.38

$$\int \frac{2x+e^5(-1-12x-3x^2)+e^5\log\left(\frac{2-e}{x}\right)}{e^5}\,dx = -\frac{(-1+6e^5)\,x^2}{e^5}-x^3+x\log\left(\frac{2-e}{x}\right)$$

input
```
Integrate[(2*x + E^5*(-1 - 12*x - 3*x^2) + E^5*Log[(2 - E)/x])/E^5,x]
```

output
```
-(((-1 + 6*E^5)*x^2)/E^5) - x^3 + x*Log[(2 - E)/x]
```

3.895.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^5(-3x^2-12x-1)+2x+e^5\log\left(\frac{2-e}{x}\right)}{e^5}dx$$
$$\Big\downarrow \; 27$$
$$\frac{\int \left(2x-e^5(3x^2+12x+1)+e^5\log\left(\frac{2-e}{x}\right)\right)dx}{e^5}$$
$$\Big\downarrow \; 2009$$
$$\frac{-e^5x^3-6e^5x^2+x^2+e^5x\log\left(\frac{2-e}{x}\right)}{e^5}$$

input
```
Int[(2*x + E^5*(-1 - 12*x - 3*x^2) + E^5*Log[(2 - E)/x])/E^5,x]
```

output
```
(x^2 - 6*E^5*x^2 - E^5*x^3 + E^5*x*Log[(2 - E)/x])/E^5
```

3.895.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.895.4 Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

method	result
risch	$-x^{3}-6x^{2}+x\ln\left(\frac{2-\mathrm{e}}{x}\right)+x^{2}\mathrm{e}^{-5}$
norman	$x\ln\left(\frac{2-\mathrm{e}}{x}\right)-x^{3}-\left(6\,\mathrm{e}^{5}-1\right)\mathrm{e}^{-5}x^{2}$
parallelrisch	$\mathrm{e}^{-5}\left(-x^{3}\mathrm{e}^{5}-6x^{2}\mathrm{e}^{5}+\mathrm{e}^{5}x\ln\left(-\frac{\mathrm{e}-2}{x}\right)+x^{2}\right)$
default	$\mathrm{e}^{-5}\left(\mathrm{e}^{5}(-x^{3}-6x^{2}-x)-\mathrm{e}^{5}(2-\mathrm{e})\left(-\frac{x\ln\left(\frac{2-\mathrm{e}}{x}\right)}{2-\mathrm{e}}-\frac{x}{2-\mathrm{e}}\right)+x^{2}\right)$
parts	$-\mathrm{e}^{-5}(x^{3}\mathrm{e}^{5}+6x^{2}\mathrm{e}^{5}+x\,\mathrm{e}^{5}-x^{2})-(2-\mathrm{e})\left(-\frac{x\ln\left(\frac{2-\mathrm{e}}{x}\right)}{2-\mathrm{e}}-\frac{x}{2-\mathrm{e}}\right)$
derivativedivides	$-\mathrm{e}^{-5}(2-\mathrm{e})\left(\mathrm{e}^{5}\left(-\frac{x\ln\left(\frac{2-\mathrm{e}}{x}\right)}{2-\mathrm{e}}-\frac{x}{2-\mathrm{e}}\right)+\frac{\mathrm{e}^{2}\mathrm{e}^{5}x^{3}}{(2-\mathrm{e})^{3}}-\frac{6\,\mathrm{e}\,\mathrm{e}^{5}x^{2}}{(2-\mathrm{e})^{2}}+\frac{\mathrm{e}^{5}x}{2-\mathrm{e}}-\frac{4x^{3}\mathrm{e}^{5}\mathrm{e}}{(2-\mathrm{e})^{3}}+\frac{12x^{2}\mathrm{e}^{5}}{(2-\mathrm{e})^{2}}+\frac{\mathrm{e}x^{2}}{(2-\mathrm{e})^{2}}+\right.$

input
```
int((exp(5)*ln((2-exp(1))/x)+(-3*x^2-12*x-1)*exp(5)+2*x)/exp(5),x,method=_
RETURNVERBOSE)
```

output
```
-x^3-6*x^2+x*ln((2-exp(1))/x)+x^2*exp(-5)
```

3.895.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int\frac{2x+e^{5}(-1-12x-3x^{2})+e^{5}\log\left(\frac{2-e}{x}\right)}{e^{5}}\,dx$$
$$=\left(xe^{5}\log\left(-\frac{e-2}{x}\right)+x^{2}-\left(x^{3}+6\,x^{2}\right)e^{5}\right)e^{(-5)}$$

input
```
integrate((exp(5)*log((2-exp(1))/x)+(-3*x^2-12*x-1)*exp(5)+2*x)/exp(5),x,
algorithm=\
```

output
```
(x*e^5*log(-(e - 2)/x) + x^2 - (x^3 + 6*x^2)*e^5)*e^(-5)
```

3.895.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{2x+e^5(-1-12x-3x^2)+e^5\log\left(\frac{2-e}{x}\right)}{e^5}\,dx=-x^3+\frac{x^2\cdot(1-6e^5)}{e^5}+x\log\left(\frac{2-e}{x}\right)$$

input
```
integrate((exp(5)*ln((2-exp(1))/x)+(-3*x**2-12*x-1)*exp(5)+2*x)/exp(5),x)
```

output
```
-x**3 + x**2*(1 - 6*exp(5))*exp(-5) + x*log((2 - E)/x)
```

3.895.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.58

$$\int \frac{2x+e^5(-1-12x-3x^2)+e^5\log\left(\frac{2-e}{x}\right)}{e^5}\,dx$$
$$=\left(x^2-(x^3+6\,x^2+x)e^5+\left(x\log\left(-\frac{e-2}{x}\right)+x\right)e^5\right)e^{(-5)}$$

input
```
integrate((exp(5)*log((2-exp(1))/x)+(-3*x^2-12*x-1)*exp(5)+2*x)/exp(5),x,
algorithm=\
```

output
```
(x^2 - (x^3 + 6*x^2 + x)*e^5 + (x*log(-(e - 2)/x) + x)*e^5)*e^(-5)
```

3.895.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(25) = 50$.

Time = 0.27 (sec) , antiderivative size = 73, normalized size of antiderivative = 3.04

$$\int \frac{2x+e^5(-1-12x-3x^2)+e^5\log\left(\frac{2-e}{x}\right)}{e^5}\,dx$$
$$=\left(x^2-(x^3+6\,x^2+x)e^5+\frac{\left(\frac{x(e^2-4\,e+4)\log\left(-\frac{e-2}{x}\right)}{e-2}+\frac{x(e^2-4\,e+4)}{e-2}\right)e^5}{e-2}\right)e^{(-5)}$$

input
```
integrate((exp(5)*log((2-exp(1))/x)+(-3*x^2-12*x-1)*exp(5)+2*x)/exp(5),x,
algorithm=\
```

output
```
(x^2 - (x^3 + 6*x^2 + x)*e^5 + (x*(e^2 - 4*e + 4)*log(-(e - 2)/x)/(e - 2)
+ x*(e^2 - 4*e + 4)/(e - 2))*e^5/(e - 2))*e^(-5)
```

3.895.9 Mupad [B] (verification not implemented)

Time = 18.54 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{2x+e^5(-1-12x-3x^2)+e^5\log\left(\frac{2-e}{x}\right)}{e^5}\,dx = x\left(\ln\left(\mathrm{e}-2\right)-6\,x+\ln\left(-\frac{1}{x}\right)+x\,\mathrm{e}^{-5}-x^2\right)$$

input
```
int(exp(-5)*(2*x + exp(5)*log(-(exp(1) - 2)/x) - exp(5)*(12*x + 3*x^2 + 1)
),x)
```

output
```
x*(log(exp(1) - 2) - 6*x + log(-1/x) + x*exp(-5) - x^2)
```

3.896 $\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}$

3.896.1 Optimal result

Integrand size = 112, antiderivative size = 33

$$\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}\,dx = \frac{\frac{1}{x}+\frac{3-x}{3x-2x^2}}{e^2+2x\log(x)}$$

output
```
(1/x+(-x+3)/(-2*x^2+3*x))/(2*x*ln(x)+exp(2))
```

3.896.2 Mathematica [A] (verified)

Time = 0.37 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.85

$$\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}\,dx = -\frac{3(2-x)}{x(-3+2x)(e^2+2x\log(x))}$$

input
```
Integrate[(-36*x + 42*x^2 - 12*x^3 + E^2*(-18 + 24*x - 6*x^2) + (-72*x + 9
0*x^2 - 24*x^3)*Log[x])/(E^4*(9*x^2 - 12*x^3 + 4*x^4) + E^2*(36*x^3 - 48*x
^4 + 16*x^5)*Log[x] + (36*x^4 - 48*x^5 + 16*x^6)*Log[x]^2),x]
```

output
```
(-3*(2 - x))/(x*(-3 + 2*x)*(E^2 + 2*x*Log[x]))
```

3.896.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-12x^3+42x^2+e^2(-6x^2+24x-18)+(-24x^3+90x^2-72x)\log(x)-36x}{(16x^6-48x^5+36x^4)\log^2(x)+e^2(16x^5-48x^4+36x^3)\log(x)+e^4(4x^4-12x^3+9x^2)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{6\left(-e^2(x^2-4x+3)-x(2x^2-7x+6)-x(4x^2-15x+12)\log(x)\right)}{(3-2x)^2x^2(2x\log(x)+e^2)^2}dx$$

$$\Big\downarrow \text{27}$$

$$6\int -\frac{e^2(x^2-4x+3)+x(2x^2-7x+6)+x(4x^2-15x+12)\log(x)}{(3-2x)^2x^2(2x\log(x)+e^2)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-6\int \frac{e^2(x^2-4x+3)+x(2x^2-7x+6)+x(4x^2-15x+12)\log(x)}{(3-2x)^2x^2(2x\log(x)+e^2)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-6\int \left(\frac{4x^2-15x+12}{2x^2(2x-3)^2(2x\log(x)+e^2)}-\frac{(e^2-2x)(x-2)}{2x^2(2x-3)(2x\log(x)+e^2)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-6\left(-\frac{1}{3}e^2\int \frac{1}{x^2(2x\log(x)+e^2)^2}dx+\frac{2}{3}\int \frac{1}{x^2(2x\log(x)+e^2)}dx+\frac{1}{18}(12-e^2)\int \frac{1}{x(2x\log(x)+e^2)^2}dx-\frac{1}{9}(3\right.$$

input
```
Int[(-36*x + 42*x^2 - 12*x^3 + E^2*(-18 + 24*x - 6*x^2) + (-72*x + 90*x^2
- 24*x^3)*Log[x])/(E^4*(9*x^2 - 12*x^3 + 4*x^4) + E^2*(36*x^3 - 48*x^4 + 1
6*x^5)*Log[x] + (36*x^4 - 48*x^5 + 16*x^6)*Log[x]^2),x]
```

output
```
$Aborted
```

3.896.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.896.4 Maple [A] (verified)

Time = 3.68 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.79

method	result	size
risch	$\frac{-6+3x}{x(-3+2x)(2x\ln(x)+e^{2})}$	26
norman	$\frac{-6+3x}{x(-3+2x)(2x\ln(x)+e^{2})}$	27
default	$-\frac{6\left(1-\frac{x}{2}\right)}{x(-3+2x)(2x\ln(x)+e^{2})}$	28
parallelrisch	$\frac{12x-24}{4x(4x^{2}\ln(x)+2\,e^{2}x-6x\ln(x)-3\,e^{2})}$	35

input
```
int(((-24*x^3+90*x^2-72*x)*ln(x)+(-6*x^2+24*x-18)*exp(2)-12*x^3+42*x^2-36*
x)/((16*x^6-48*x^5+36*x^4)*ln(x)^2+(16*x^5-48*x^4+36*x^3)*exp(2)*ln(x)+(4*
x^4-12*x^3+9*x^2)*exp(2)^2),x,method=_RETURNVERBOSE)
```

output
```
3*(-2+x)/x/(-3+2*x)/(2*x*ln(x)+exp(2))
```

3.896. $\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}\,dx$

3.896.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}\,dx = \frac{3(x-2)}{(2x^2-3x)e^2+2(2x^3-3x^2)\log(x)}$$

input
```
integrate((((-24*x^3+90*x^2-72*x)*log(x)+(-6*x^2+24*x-18)*exp(2)-12*x^3+42*
x^2-36*x)/((16*x^6-48*x^5+36*x^4)*log(x)^2+(16*x^5-48*x^4+36*x^3)*exp(2)*l
og(x)+(4*x^4-12*x^3+9*x^2)*exp(2)^2),x, algorithm=\
```

output
```
3*(x - 2)/((2*x^2 - 3*x)*e^2 + 2*(2*x^3 - 3*x^2)*log(x))
```

3.896.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}\,dx = \frac{3x-6}{2x^2e^2-3xe^2+(4x^3-6x^2)\log(x)}$$

input
```
integrate((((-24*x**3+90*x**2-72*x)*ln(x)+(-6*x**2+24*x-18)*exp(2)-12*x**3+
42*x**2-36*x)/((16*x**6-48*x**5+36*x**4)*ln(x)**2+(16*x**5-48*x**4+36*x**3
)*exp(2)*ln(x)+(4*x**4-12*x**3+9*x**2)*exp(2)**2),x)
```

output
```
(3*x - 6)/(2*x**2*exp(2) - 3*x*exp(2) + (4*x**3 - 6*x**2)*log(x))
```

3.896.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}\,dx = \frac{3(x-2)}{2x^2e^2-3xe^2+2(2x^3-3x^2)\log(x)}$$

input
```
integrate((((-24*x^3+90*x^2-72*x)*log(x)+(-6*x^2+24*x-18)*exp(2)-12*x^3+42*
x^2-36*x)/((16*x^6-48*x^5+36*x^4)*log(x)^2+(16*x^5-48*x^4+36*x^3)*exp(2)*l
og(x)+(4*x^4-12*x^3+9*x^2)*exp(2)^2),x, algorithm=\
```

output
```
3*(x - 2)/(2*x^2*e^2 - 3*x*e^2 + 2*(2*x^3 - 3*x^2)*log(x))
```

3.896.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.03

$$\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}\,dx = \frac{3(x-2)}{4x^3\log(x)+2x^2e^2-6x^2\log(x)-3xe^2}$$

input
```
integrate((((-24*x^3+90*x^2-72*x)*log(x)+(-6*x^2+24*x-18)*exp(2)-12*x^3+42*
x^2-36*x)/((16*x^6-48*x^5+36*x^4)*log(x)^2+(16*x^5-48*x^4+36*x^3)*exp(2)*l
og(x)+(4*x^4-12*x^3+9*x^2)*exp(2)^2),x, algorithm=\
```

output
```
3*(x - 2)/(4*x^3*log(x) + 2*x^2*e^2 - 6*x^2*log(x) - 3*x*e^2)
```

3.896.9 Mupad [B] (verification not implemented)

Time = 17.96 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.76

$$\int \frac{-36x+42x^2-12x^3+e^2(-18+24x-6x^2)+(-72x+90x^2-24x^3)\log(x)}{e^4(9x^2-12x^3+4x^4)+e^2(36x^3-48x^4+16x^5)\log(x)+(36x^4-48x^5+16x^6)\log^2(x)}\,dx = \frac{3(x-2)}{x(2x-3)(e^2+2x\ln(x))}$$

input
```
int(-(36*x + exp(2)*(6*x^2 - 24*x + 18) - 42*x^2 + 12*x^3 + log(x)*(72*x -
 90*x^2 + 24*x^3))/(log(x)^2*(36*x^4 - 48*x^5 + 16*x^6) + exp(4)*(9*x^2 -
12*x^3 + 4*x^4) + exp(2)*log(x)*(36*x^3 - 48*x^4 + 16*x^5)),x)
```

output
```
(3*(x - 2))/(x*(2*x - 3)*(exp(2) + 2*x*log(x)))
```

3.897 $\int \frac{1}{5}e^{\frac{4e^x+20x}{5x}}(120x+60x^2+e^{2x}(-12+8x+4x^2)+e^x$

3.897.1 Optimal result

Integrand size = 66, antiderivative size = 26

$$\int \frac{1}{5}e^{\frac{4e^x+20x}{5x}}\left(120x+60x^2+e^{2x}\left(-12+8x+4x^2\right)+e^x\left(-48+62x+46x^2+5x^3\right)\right)\,dx = e^{4+\frac{4e^x}{5x}}\left(4+e^x\right)x^2(3+x)$$

output
```
(3+x)*x^2*(exp(x)+4)*exp(4+4/5*exp(x)/x)
```

3.897.2 Mathematica [A] (verified)

Time = 5.04 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{5}e^{\frac{4e^x+20x}{5x}}\left(120x+60x^2+e^{2x}\left(-12+8x+4x^2\right)+e^x\left(-48+62x+46x^2+5x^3\right)\right)\,dx = e^{4+\frac{4e^x}{5x}}\left(4+e^x\right)x^2(3+x)$$

input
```
Integrate[(E^((4*E^x + 20*x)/(5*x))*(120*x + 60*x^2 + E^(2*x)*(-12 + 8*x +
 4*x^2) + E^x*(-48 + 62*x + 46*x^2 + 5*x^3)))/5,x]
```

output
```
E^(4 + (4*E^x)/(5*x))*(4 + E^x)*x^2*(3 + x)
```

3.897.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5}e^{\frac{20x+4e^x}{5x}}\left(60x^2+e^{2x}\left(4x^2+8x-12\right)+e^x\left(5x^3+46x^2+62x-48\right)+120x\right)dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{5}\int e^{\frac{4(5x+e^x)}{5x}}\left(60x^2+120x-4e^{2x}\left(-x^2-2x+3\right)-e^x\left(-5x^3-46x^2-62x+48\right)\right)dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{5}\int \left(60e^{\frac{4(5x+e^x)}{5x}}x^2+120e^{\frac{4(5x+e^x)}{5x}}x+4e^{2x+\frac{4(5x+e^x)}{5x}}\left(x^2+2x-3\right)+e^{x+\frac{4(5x+e^x)}{5x}}\left(5x^3+46x^2+62x-48\right)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{5}\left(5\int e^{x+\frac{4(5x+e^x)}{5x}}x^3dx+60\int e^{\frac{4(5x+e^x)}{5x}}x^2dx+46\int e^{x+\frac{4(5x+e^x)}{5x}}x^2dx+4\int e^{2x+\frac{4(5x+e^x)}{5x}}x^2dx-48\int e^{x+\frac{4(5x+e^x)}{5x}}\right.$$

input
```
Int[(E^((4*E^x + 20*x)/(5*x))*(120*x + 60*x^2 + E^(2*x)*(-12 + 8*x + 4*x^2
) + E^x*(-48 + 62*x + 46*x^2 + 5*x^3)))/5,x]
```

output
```
$Aborted
```

3.897.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.897.4 Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

method	result	size
risch	$\left(\mathrm{e}^{x}+4\right) x^{2}(3+x) \mathrm{e}^{\frac{4 x+\frac{4 \mathrm{e}^{x}}{5}}{x}}$	24
parallelrisch	$\mathrm{e}^{\frac{4 x+\frac{4 \mathrm{e}^{x}}{5}}{x}} \mathrm{e}^{x} x^{3}+4 x^{3} \mathrm{e}^{\frac{4 x+\frac{4 \mathrm{e}^{x}}{5}}{x}}+3 \mathrm{e}^{\frac{4 x+\frac{4 \mathrm{e}^{x}}{5}}{x}} x^{2} \mathrm{e}^{x}+12 \mathrm{e}^{\frac{4 x+\frac{4 \mathrm{e}^{x}}{5}}{x}} x^{2}$	73
norman	$\mathrm{e}^{x} x^{3} \mathrm{e}^{\frac{4 \mathrm{e}^{x}+20 x}{5 x}}+12 x^{2} \mathrm{e}^{\frac{4 \mathrm{e}^{x}+20 x}{5 x}}+4 x^{3} \mathrm{e}^{\frac{4 \mathrm{e}^{x}+20 x}{5 x}}+3 \mathrm{e}^{x} x^{2} \mathrm{e}^{\frac{4 \mathrm{e}^{x}+20 x}{5 x}}$	81

input
```
int(1/5*((4*x^2+8*x-12)*exp(x)^2+(5*x^3+46*x^2+62*x-48)*exp(x)+60*x^2+120*
x)*exp(1/5*(4*exp(x)+20*x)/x),x,method=_RETURNVERBOSE)
```

output
```
(exp(x)+4)*x^2*(3+x)*exp(4/5*(5*x+exp(x))/x)
```

3.897.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{1}{5} e^{\frac{4 e^{x}+20 x}{5 x}}\left(120 x+60 x^{2}+e^{2 x}\left(-12+8 x+4 x^{2}\right)+e^{x}\left(-48+62 x+46 x^{2}+5 x^{3}\right)\right) d x$$
$$=\left(4 x^{3}+12 x^{2}+\left(x^{3}+3 x^{2}\right) e^{x}\right) e^{\left(\frac{4\left(5 x+e^{x}\right)}{5 x}\right)}$$

input
```
integrate(1/5*((4*x^2+8*x-12)*exp(x)^2+(5*x^3+46*x^2+62*x-48)*exp(x)+60*x^
2+120*x)*exp(1/5*(4*exp(x)+20*x)/x),x, algorithm=\
```

output
```
(4*x^3 + 12*x^2 + (x^3 + 3*x^2)*e^x)*e^(4/5*(5*x + e^x)/x)
```

3.897.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\int \frac{1}{5} e^{\frac{4 e^{x}+20 x}{5 x}}\left(120 x+60 x^{2}+e^{2 x}\left(-12+8 x+4 x^{2}\right)+e^{x}\left(-48+62 x+46 x^{2}+5 x^{3}\right)\right) d x$$
$$=\left(x^{3} e^{x}+4 x^{3}+3 x^{2} e^{x}+12 x^{2}\right) e^{\frac{4 x+\frac{4 e^{x}}{5}}{x}}$$

input
```
integrate(1/5*((4*x**2+8*x-12)*exp(x)**2+(5*x**3+46*x**2+62*x-48)*exp(x)+6
0*x**2+120*x)*exp(1/5*(4*exp(x)+20*x)/x),x)
```

output
```
(x**3*exp(x) + 4*x**3 + 3*x**2*exp(x) + 12*x**2)*exp((4*x + 4*exp(x)/5)/x)
```

3.897.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.58

$$\int \frac{1}{5}e^{\frac{4e^x+20x}{5x}}\left(120x+60x^2+e^{2x}\left(-12+8x+4x^2\right)+e^x\left(-48+62x+46x^2+5x^3\right)\right)\,dx$$
$$=\left(4\,x^3e^4+12\,x^2e^4+\left(x^3e^4+3\,x^2e^4\right)e^x\right)e^{\left(\frac{4\,e^x}{5\,x}\right)}$$

input
```
integrate(1/5*((4*x^2+8*x-12)*exp(x)^2+(5*x^3+46*x^2+62*x-48)*exp(x)+60*x^
2+120*x)*exp(1/5*(4*exp(x)+20*x)/x),x, algorithm=\
```

output
```
(4*x^3*e^4 + 12*x^2*e^4 + (x^3*e^4 + 3*x^2*e^4)*e^x)*e^(4/5*e^x/x)
```

3.897.8 Giac [F]

$$\int \frac{1}{5}e^{\frac{4e^x+20x}{5x}}\left(120x+60x^2+e^{2x}\left(-12+8x+4x^2\right)+e^x\left(-48+62x+46x^2+5x^3\right)\right)\,dx$$
$$=\int \frac{1}{5}\left(60\,x^2+4\left(x^2+2\,x-3\right)e^{(2\,x)}+\left(5\,x^3+46\,x^2+62\,x-48\right)e^x+120\,x\right)e^{\left(\frac{4\,(5\,x+e^x)}{5\,x}\right)}\,dx$$

input
```
integrate(1/5*((4*x^2+8*x-12)*exp(x)^2+(5*x^3+46*x^2+62*x-48)*exp(x)+60*x^
2+120*x)*exp(1/5*(4*exp(x)+20*x)/x),x, algorithm=\
```

output
```
integrate(1/5*(60*x^2 + 4*(x^2 + 2*x - 3)*e^(2*x) + (5*x^3 + 46*x^2 + 62*x
 - 48)*e^x + 120*x)*e^(4/5*(5*x + e^x)/x), x)
```

3.897.9 Mupad [B] (verification not implemented)

Time = 16.47 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int \frac{1}{5}e^{\frac{4e^x+20x}{5x}}\left(120x+60x^2+e^{2x}\left(-12+8x+4x^2\right)+e^x\left(-48+62x+46x^2+5x^3\right)\right)\,dx$$
$$=x^2\,\mathrm{e}^{\frac{4\,\mathrm{e}^x}{5\,x}+4}\,\left(\mathrm{e}^x+4\right)\,\left(x+3\right)$$

input
```
int((exp((4*x + (4*exp(x))/5)/x)*(120*x + exp(2*x)*(8*x + 4*x^2 - 12) + 60
*x^2 + exp(x)*(62*x + 46*x^2 + 5*x^3 - 48)))/5,x)
```

output
```
x^2*exp((4*exp(x))/(5*x) + 4)*(exp(x) + 4)*(x + 3)
```

3.898 $\int \frac{1}{3}e^{-\frac{x^2}{3}}\left(-3+e^{\frac{72+6x\log(\log(4))}{\log(\log(4))}}(54-6x)+2x^2\right)\,dx$

3.898.1 Optimal result

Integrand size = 42, antiderivative size = 31

$$\int \frac{1}{3}e^{-\frac{x^2}{3}}\left(-3+e^{\frac{72+6x\log(\log(4))}{\log(\log(4))}}(54-6x)+2x^2\right)\,dx=e^{-\frac{x^2}{3}}\left(3e^{3\left(2x+\frac{24}{\log(\log(4))}\right)}-x\right)$$

output
```
(3*exp(6*x+72/ln(2*ln(2)))-x)/exp(1/3*x^2)
```

3.898.2 Mathematica [A] (verified)

Time = 1.61 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{1}{3}e^{-\frac{x^2}{3}}\left(-3+e^{\frac{72+6x\log(\log(4))}{\log(\log(4))}}(54-6x)+2x^2\right)\,dx=\frac{1}{3}e^{-\frac{x^2}{3}}\left(9e^{6x+\frac{72}{\log(\log(4))}}-3x\right)$$

input
```
Integrate[(-3 + E^((72 + 6*x*Log[Log[4]])/Log[Log[4]])*(54 - 6*x) + 2*x^2)
/(3*E^(x^2/3)),x]
```

output
```
(9*E^(6*x + 72/Log[Log[4]]) - 3*x)/(3*E^(x^2/3))
```

3.898.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.26, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{3} e^{-\frac{x^2}{3}} \left(2x^2+(54-6x)e^{\frac{6x\log(\log(4))+72}{\log(\log(4))}}-3\right) \, dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{3}\int -e^{-\frac{x^2}{3}}\left(-2x^2-6e^{\frac{72}{\log(\log(4))}}(9-x)\log^{\frac{6x}{\log(\log(4))}}(4)+3\right)dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{3}\int e^{-\frac{x^2}{3}}\left(-2x^2-6e^{\frac{72}{\log(\log(4))}}(9-x)\log^{\frac{6x}{\log(\log(4))}}(4)+3\right)dx$$

$$\Big\downarrow \ 7293$$

$$-\frac{1}{3}\int \left(-2e^{-\frac{x^2}{3}}x^2+3e^{-\frac{x^2}{3}}+6e^{-\frac{x^2}{3}+6x+\frac{72}{\log(\log(4))}}(x-9)\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{3}\left(9e^{-\frac{x^2}{3}+6x+\frac{72}{\log(\log(4))}}-3e^{-\frac{x^2}{3}}x\right)$$

input
```
Int[(-3 + E^((72 + 6*x*Log[Log[4]])/Log[Log[4]])*(54 - 6*x) + 2*x^2)/(3*E^
(x^2/3)),x]
```

output
```
(9*E^(6*x - x^2/3 + 72/Log[Log[4]]) - (3*x)/E^(x^2/3))/3
```

3.898.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.898.4 Maple [A] (verified)

Time = 0.37 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

method	result	size
default	$-x\,{\mathrm e}^{-\frac{x^{2}}{3}}+3\,{\mathrm e}^{-\frac{x^{2}}{3}+6x+\frac{72}{\ln(2\ln(2))}}$	32
parts	$-x\,{\mathrm e}^{-\frac{x^{2}}{3}}+3\,{\mathrm e}^{-\frac{x^{2}}{3}+6x+\frac{72}{\ln(2\ln(2))}}$	32
norman	$\left(-x+3\,{\mathrm e}^{\frac{6x\ln(2\ln(2))+72}{\ln(2\ln(2))}}\right){\mathrm e}^{-\frac{x^{2}}{3}}$	35
parallelrisch	$\frac{\left(-9x+27\,{\mathrm e}^{\frac{6x\ln(2\ln(2))+72}{\ln(2\ln(2))}}\right){\mathrm e}^{-\frac{x^{2}}{3}}}{9}$	36
risch	$-x\,{\mathrm e}^{-\frac{x^{2}}{3}}+3\,{\mathrm e}^{-\frac{x^{2}\ln(2)+x^{2}\ln(\ln(2))-18x\ln(2)-18x\ln(\ln(2))-216}{3(\ln(2)+\ln(\ln(2)))}}$	50

input
```
int(1/3*((-6*x+54)*exp((6*x*ln(2*ln(2))+72)/ln(2*ln(2)))+2*x^2-3)/exp(1/3*
x^2),x,method=_RETURNVERBOSE)
```

output
```
-x*exp(-1/3*x^2)+3*exp(-1/3*x^2+6*x+72/ln(2*ln(2)))
```

3.898.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.19

$$\int \frac{1}{3}e^{-\frac{x^2}{3}}\left(-3+e^{\frac{72+6x\log(\log(4))}{\log(\log(4))}}(54-6x)+2x^2\right)\,dx=-xe^{\left(-\frac{1}{3}\,x^{2}\right)}+3\,e^{\left(-\frac{1}{3}\,x^{2}+\frac{6\,(x\log\left(2\,\log\left(2\right)\right)+12)}{\log\left(2\,\log\left(2\right)\right)}\right)}$$

input
```
integrate(1/3*((-6*x+54)*exp((6*x*log(2*log(2))+72)/log(2*log(2)))+2*x^2-3
)/exp(1/3*x^2),x, algorithm=\
```

output
```
-x*e^(-1/3*x^2) + 3*e^(-1/3*x^2 + 6*(x*log(2*log(2)) + 12)/log(2*log(2)))
```

3.898.6 Sympy [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.16

$$\int \frac{1}{3}e^{-\frac{x^2}{3}}\left(-3+e^{\frac{72+6x\log(\log(4))}{\log(\log(4))}}(54-6x)+2x^2\right)\,dx = -xe^{-\frac{x^2}{3}}+3e^{-\frac{x^2}{3}}e^{\frac{6x\log(2\log(2))+72}{\log(2\log(2))}}$$

input
```
integrate(1/3*((-6*x+54)*exp((6*x*ln(2*ln(2))+72)/ln(2*ln(2)))+2*x**2-3)/e
xp(1/3*x**2),x)
```

output
```
-x*exp(-x**2/3) + 3*exp(-x**2/3)*exp((6*x*log(2*log(2)) + 72)/log(2*log(2)
))
```

3.898.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.33 (sec) , antiderivative size = 110, normalized size of antiderivative = 3.55

$$\int \frac{1}{3}e^{-\frac{x^2}{3}}\left(-3+e^{\frac{72+6x\log(\log(4))}{\log(\log(4))}}(54-6x)+2x^2\right)\,dx$$
$$= 9\sqrt{3}\sqrt{\pi}\,\mathrm{erf}\left(\frac{1}{3}\sqrt{3}x-3\sqrt{3}\right)e^{\left(\frac{72}{\log(2)+\log(\log(2))}+27\right)} - i\sqrt{3}\left(-\frac{9i\sqrt{3}\sqrt{\frac{1}{3}}\sqrt{\pi}(x-9)\left(\mathrm{erf}\left(\sqrt{\frac{1}{3}}\sqrt{(x-9)^2}\right)-1\right)}{\sqrt{(x-9)^2}}+i\sqrt{3}e^{\left(-\frac{1}{3}(x-9)^2\right)}\right)e^{\left(\frac{72}{\log(2\log(2))}+27\right)} - xe^{\left(-\frac{1}{3}x^2\right)}$$

input
```
integrate(1/3*((-6*x+54)*exp((6*x*log(2*log(2))+72)/log(2*log(2)))+2*x^2-3
)/exp(1/3*x^2),x, algorithm=\
```

output
```
9*sqrt(3)*sqrt(pi)*erf(1/3*sqrt(3)*x - 3*sqrt(3))*e^(72/(log(2) + log(log(
2))) + 27) - I*sqrt(3)*(-9*I*sqrt(3)*sqrt(1/3)*sqrt(pi)*(x - 9)*(erf(sqrt(
1/3)*sqrt((x - 9)^2)) - 1)/sqrt((x - 9)^2) + I*sqrt(3)*e^(-1/3*(x - 9)^2))
*e^(72/log(2*log(2)) + 27) - x*e^(-1/3*x^2)
```

3.898.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.32

$$\int \frac{1}{3} e^{-\frac{x^2}{3}} \left(-3+e^{\frac{72+6x\log(\log(4))}{\log(\log(4))}}(54-6x)+2x^2\right)\,dx$$
$$= -xe^{\left(-\frac{1}{3}\,x^2\right)} + 3\,e^{\left(-\frac{x^2\log(2\,\log(2))-18\,x\log(2\,\log(2))-216}{3\,\log(2\,\log(2))}\right)}$$

input
```
integrate(1/3*((-6*x+54)*exp((6*x*log(2*log(2))+72)/log(2*log(2)))+2*x^2-3
)/exp(1/3*x^2),x, algorithm=\
```

output
```
-x*e^(-1/3*x^2) + 3*e^(-1/3*(x^2*log(2*log(2)) - 18*x*log(2*log(2)) - 216)
/log(2*log(2)))
```

3.898.9 Mupad [B] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.61

$$\int \frac{1}{3} e^{-\frac{x^2}{3}} \left(-3+e^{\frac{72+6x\log(\log(4))}{\log(\log(4))}}(54-6x)+2x^2\right)\,dx$$
$$= 3\,64^{\frac{x}{\ln(2\,\ln(2))}}\,\mathrm{e}^{\frac{72}{\ln(2\,\ln(2))}}\,\mathrm{e}^{-\frac{x^2}{3}}\,\ln(2)^{\frac{6\,x}{\ln(\ln(4))}} - x\,\mathrm{e}^{-\frac{x^2}{3}}$$

input
```
int(-exp(-x^2/3)*((exp((6*x*log(2*log(2)) + 72)/log(2*log(2)))*(6*x - 54))
/3 - (2*x^2)/3 + 1),x)
```

output
```
3*64^(x/log(2*log(2)))*exp(72/log(2*log(2)))*exp(-x^2/3)*log(2)^((6*x)/log
(log(4))) - x*exp(-x^2/3)
```

3.899 $\int \frac{-1+16x+8e^3x+e^x x-48x^2}{x}\,dx$

3.899.1 Optimal result

Integrand size = 25, antiderivative size = 27

$$\int \frac{-1+16x+8e^3x+e^x x-48x^2}{x}\,dx = e^x+8x\left(e^3+x+x\left(-5+\frac{2+x}{x}\right)\right)-\log(x)$$

output
```
exp(x)-ln(x)+8*(exp(3)+x+x*((2+x)/x-5))*x
```

3.899.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{-1+16x+8e^3x+e^x x-48x^2}{x}\,dx = e^x+16x+8e^3x-24x^2-\log(x)$$

input
```
Integrate[(-1 + 16*x + 8*E^3*x + E^x*x - 48*x^2)/x,x]
```

output
```
E^x + 16*x + 8*E^3*x - 24*x^2 - Log[x]
```

3.899.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {6, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-48x^2+e^x x+8e^3x+16x-1}{x} \, dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{-48x^2+e^x x+\left(16+8e^3\right)x-1}{x}dx$$

$$\Big\downarrow \text{ 2010}$$

$$\int \left(\frac{-48x^2+8\left(2+e^3\right)x-1}{x}+e^x\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-24x^2+8\left(2+e^3\right)x+e^x-\log(x)$$

input
```
Int[(-1 + 16*x + 8*E^3*x + E^x*x - 48*x^2)/x,x]
```

output
```
E^x + 8*(2 + E^3)*x - 24*x^2 - Log[x]
```

3.899.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.899.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

method	result	size
default	$-24x^2+16x-\ln(x)+8x\,e^3+e^x$	21
norman	$(8\,e^3+16)\,x-24x^2+e^x-\ln(x)$	21
risch	$-24x^2+16x-\ln(x)+8x\,e^3+e^x$	21
parallelrisch	$-24x^2+16x-\ln(x)+8x\,e^3+e^x$	21
parts	$-24x^2+16x-\ln(x)+8x\,e^3+e^x$	21

input
```
int((exp(x)*x+8*x*exp(3)-48*x^2+16*x-1)/x,x,method=_RETURNVERBOSE)
```

output
```
-24*x^2+16*x-ln(x)+8*x*exp(3)+exp(x)
```

3.899.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-1+16x+8e^3x+e^xx-48x^2}{x}\,dx = -24\,x^2+8\,xe^3+16\,x+e^x-\log(x)$$

input
```
integrate((exp(x)*x+8*x*exp(3)-48*x^2+16*x-1)/x,x, algorithm=\
```

output
```
-24*x^2 + 8*x*e^3 + 16*x + e^x - log(x)
```

3.899.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-1+16x+8e^3x+e^xx-48x^2}{x}\,dx = -24x^2-x\left(-8e^3-16\right)+e^x-\log(x)$$

input
```
integrate((exp(x)*x+8*x*exp(3)-48*x**2+16*x-1)/x,x)
```

output
```
-24*x**2 - x*(-8*exp(3) - 16) + exp(x) - log(x)
```

3.899.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-1+16x+8e^3x+e^xx-48x^2}{x}\,dx = -24\,x^2+8\,xe^3+16\,x+e^x-\log\left(x\right)$$

input
```
integrate((exp(x)*x+8*x*exp(3)-48*x^2+16*x-1)/x,x, algorithm=\
```

output
```
-24*x^2 + 8*x*e^3 + 16*x + e^x - log(x)
```

3.899.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-1+16x+8e^3x+e^xx-48x^2}{x}\,dx = -24\,x^2+8\,xe^3+16\,x+e^x-\log\left(x\right)$$

input
```
integrate((exp(x)*x+8*x*exp(3)-48*x^2+16*x-1)/x,x, algorithm=\
```

output
```
-24*x^2 + 8*x*e^3 + 16*x + e^x - log(x)
```

3.899.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-1+16x+8e^3x+e^xx-48x^2}{x}\,dx = \mathrm{e}^x-\ln\left(x\right)-24\,x^2+x\,\left(8\,\mathrm{e}^3+16\right)$$

input
```
int((16*x + 8*x*exp(3) + x*exp(x) - 48*x^2 - 1)/x,x)
```

output
```
exp(x) - log(x) - 24*x^2 + x*(8*exp(3) + 16)
```

3.900 $\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+(-x-2x^2+e^x\ldots}{(x+\log(x))\log(x+\log(x))\ldots}$

3.900.1 Optimal result

Integrand size = 112, antiderivative size = 30

$$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+\left(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-\ldots\right.}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$$
$$=5-x+x\left(-e^x-x+\frac{3}{\log\left(\frac{3}{\log(x+\log(x))}\right)}\right)$$

output
```
(3/ln(3/ln(x+ln(x)))-x-exp(x))*x+5-x
```

3.900.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+\left(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-\ldots\right.}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$$
$$=x\left(-1-e^x-x+\frac{3}{\log\left(\frac{3}{\log(x+\log(x))}\right)}\right)$$

3.900.
$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-x)-2x)\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)\ldots}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$

input
```
Integrate[(3 + 3*x + (3*x + 3*Log[x])*Log[x + Log[x]]*Log[3/Log[x + Log[x]
]] + (-x - 2*x^2 + E^x*(-x - x^2) + (-1 + E^x*(-1 - x) - 2*x)*Log[x])*Log[
x + Log[x]]*Log[3/Log[x + Log[x]]]^2)/((x + Log[x])*Log[x + Log[x]]*Log[3/
Log[x + Log[x]]]^2),x]
```

output
```
x*(-1 - E^x - x + 3/Log[3/Log[x + Log[x]]])
```

3.900.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-2x^2+e^x\left(-x^2-x\right)-x+\left(e^x(-x-1)-2x-1\right)\log(x)\right)\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)+3x+(3x+3}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2x^2}{x+\log(x)}-e^x(x+1)+\frac{3x}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}+\frac{3}{(x+\log(x))\log(x+\log(x))\text{lo}}\right.$$

$$\Big\downarrow \text{2009}$$

$$3\int \frac{1}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}dx+$$
$$3\int \frac{x}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}dx+3\int \frac{1}{\log\left(\frac{3}{\log(x+\log(x))}\right)}dx-x^2-x+e^x-$$
$$e^x(x+1)$$

input
```
Int[(3 + 3*x + (3*x + 3*Log[x])*Log[x + Log[x]]*Log[3/Log[x + Log[x]]] + (
-x - 2*x^2 + E^x*(-x - x^2) + (-1 + E^x*(-1 - x) - 2*x)*Log[x])*Log[x + Lo
g[x]]*Log[3/Log[x + Log[x]]]^2)/((x + Log[x])*Log[x + Log[x]]*Log[3/Log[x
+ Log[x]]]^2),x]
```

output
```
$Aborted
```

3.900. $\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+\left(-x-2x^2+e^x\left(-x-x^2\right)+\left(-1+e^x(-1-x)-2x\right)\log(x)\right)\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$

3.900.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.900.4 Maple [A] (verified)

Time = 21.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

method	result	size
default	$-{\mathrm e}^{x} x -x^{2}-x +\frac{3 x}{\ln \left(3\right)-\ln \left(\ln \left(x +\ln \left(x \right)\right)\right)}$	31
parts	$-{\mathrm e}^{x} x -x^{2}-x +\frac{3 x}{\ln \left(3\right)-\ln \left(\ln \left(x +\ln \left(x \right)\right)\right)}$	31
risch	$-x^{2}-{\mathrm e}^{x} x -x -\frac{6 i x}{-2 i \ln \left(3\right)+2 i \ln \left(\ln \left(x +\ln \left(x \right)\right)\right)}$	36
parallelrisch	$\frac{-2 \ln \left(\frac{3}{\ln \left(x +\ln \left(x \right)\right)}\right) x^{2}-2 \ln \left(\frac{3}{\ln \left(x +\ln \left(x \right)\right)}\right) {\mathrm e}^{x} x -2 \ln \left(\frac{3}{\ln \left(x +\ln \left(x \right)\right)}\right) x +6 x}{2 \ln \left(\frac{3}{\ln \left(x +\ln \left(x \right)\right)}\right)}$	62

input
```
int(((((-1-x)*exp(x)-2*x-1)*ln(x)+(-x^2-x)*exp(x)-2*x^2-x)*ln(x+ln(x))*ln(
3/ln(x+ln(x)))^2+(3*x+3*ln(x))*ln(x+ln(x))*ln(3/ln(x+ln(x)))+3*x+3)/(x+ln(
x))/ln(x+ln(x))/ln(3/ln(x+ln(x)))^2,x,method=_RETURNVERBOSE)
```

output
```
-exp(x)*x-x^2-x+3*x/(ln(3)-ln(ln(x+ln(x))))
```

3.900.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.27

$$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$$

$$= -\frac{(x^2+xe^x+x)\log\left(\frac{3}{\log(x+\log(x))}\right)-3\,x}{\log\left(\frac{3}{\log(x+\log(x))}\right)}$$

input
```
integrate(((((-1-x)*exp(x)-2*x-1)*log(x)+(-x^2-x)*exp(x)-2*x^2-x)*log(x+lo
g(x))*log(3/log(x+log(x)))^2+(3*x+3*log(x))*log(x+log(x))*log(3/log(x+log(
x)))+3*x+3)/(x+log(x))/log(x+log(x))/log(3/log(x+log(x)))^2,x, algorithm=\
```

output
```
-((x^2 + x*e^x + x)*log(3/log(x + log(x))) - 3*x)/log(3/log(x + log(x)))
```

3.900.6 Sympy [A] (verification not implemented)

Time = 1.54 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.73

$$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$$
$$= -x^2 - xe^x - x + \frac{3x}{\log\left(\frac{3}{\log(x+\log(x))}\right)}$$

input
```
integrate(((((-1-x)*exp(x)-2*x-1)*ln(x)+(-x**2-x)*exp(x)-2*x**2-x)*ln(x+ln
(x))*ln(3/ln(x+ln(x)))**2+(3*x+3*ln(x))*ln(x+ln(x))*ln(3/ln(x+ln(x)))+3*x+
3)/(x+ln(x))/ln(x+ln(x))/ln(3/ln(x+ln(x)))**2,x)
```

output
```
-x**2 - x*exp(x) - x + 3*x/log(3/log(x + log(x)))
```

3.900.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.70

$$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$$
$$= -\frac{x^2\log(3)+xe^x\log(3)+x(\log(3)-3)-(x^2+xe^x+x)\log(\log(x+\log(x)))}{\log(3)-\log(\log(x+\log(x)))}$$

input
```
integrate(((((-1-x)*exp(x)-2*x-1)*log(x)+(-x^2-x)*exp(x)-2*x^2-x)*log(x+lo
g(x))*log(3/log(x+log(x)))^2+(3*x+3*log(x))*log(x+log(x))*log(3/log(x+log(
x)))+3*x+3)/(x+log(x))/log(x+log(x))/log(3/log(x+log(x)))^2,x, algorithm=\
```

output
```
-(x^2*log(3) + x*e^x*log(3) + x*(log(3) - 3) - (x^2 + x*e^x + x)*log(log(x
 + log(x))))/(log(3) - log(log(x + log(x))))
```

3.900.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(26) = 52$.

Time = 0.46 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.20

$$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-\ldots}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$$
$$= -\frac{x^2\log(3)+xe^x\log(3)-x^2\log(\log(x+\log(x)))-xe^x\log(\log(x+\log(x)))+x\log(3)-x\log(\log(\ldots}{\log(3)-\log(\log(x+\log(x)))}$$

input
```
integrate(((((-1-x)*exp(x)-2*x-1)*log(x)+(-x^2-x)*exp(x)-2*x^2-x)*log(x+lo
g(x))*log(3/log(x+log(x)))^2+(3*x+3*log(x))*log(x+log(x))*log(3/log(x+log(
x)))+3*x+3)/(x+log(x))/log(x+log(x))/log(3/log(x+log(x)))^2,x, algorithm=\
```

output
```
-(x^2*log(3) + x*e^x*log(3) - x^2*log(log(x + log(x))) - x*e^x*log(log(x +
 log(x))) + x*log(3) - x*log(log(x + log(x))) - 3*x)/(log(3) - log(log(x +
 log(x))))
```

3.900.9 Mupad [B] (verification not implemented)

Time = 16.90 (sec) , antiderivative size = 204, normalized size of antiderivative = 6.80

$$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-\ldots}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$$
$$= \frac{3\,x+\frac{3\,x\,\ln(x+\ln(x))\,\ln\left(\frac{3}{\ln(x+\ln(x))}\right)\,(x+\ln(x))}{x+1}}{\ln\left(\frac{3}{\ln(x+\ln(x))}\right)} - \ln(x+\ln(x))\,\left(\ln(x)\,\left(\frac{3\,(x^3+2\,x^2+x)}{x\,(x+1)^2}-\frac{3\,x^2+3\,x}{x\,(x+1)^2}\right)-\frac{3\,x^4+12\,x^3+12\,x^2+3\,x}{x\,(x+1)^2} + \frac{6\,x^4+12\,x^3+6\,x^2}{x\,(x+1)^2}+\frac{3\,(x^3+3\,x^2+2\,x)}{x\,(x+1)^2}-\frac{3\,x^2+3\,x}{x\,(x+1)^2}\right)-x-x\,e^x-x^2$$

3.900.
$$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+(-x-2x^2+e^x(-x-x^2)+(-1+e^x(-1-x)-2x)\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)\ldots}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\ldots}\right)}$$

input
```
int((3*x + log(x + log(x))*log(3/log(x + log(x)))*(3*x + 3*log(x)) - log(x
 + log(x))*log(3/log(x + log(x)))^2*(x + log(x)*(2*x + exp(x)*(x + 1) + 1)
 + 2*x^2 + exp(x)*(x + x^2)) + 3)/(log(x + log(x))*log(3/log(x + log(x)))^
2*(x + log(x))),x)
```

output
```
(3*x + (3*x*log(x + log(x))*log(3/log(x + log(x)))*(x + log(x)))/(x + 1))/
log(3/log(x + log(x))) - log(x + log(x))*(log(x)*((3*(x + 2*x^2 + x^3))/(x
*(x + 1)^2) - (3*x + 3*x^2)/(x*(x + 1)^2)) - (3*x + 12*x^2 + 12*x^3 + 3*x^
4)/(x*(x + 1)^2) + (6*x^2 + 12*x^3 + 6*x^4)/(x*(x + 1)^2) + (3*(2*x + 3*x^
2 + x^3))/(x*(x + 1)^2) - (3*x + 3*x^2)/(x*(x + 1)^2)) - x - x*exp(x) - x^
2
```

3.900.

$$\int \frac{3+3x+(3x+3\log(x))\log(x+\log(x))\log\left(\frac{3}{\log(x+\log(x))}\right)+\left(-x-2x^2+e^x\left(-x-x^2\right)+\left(-1+e^x(-1-x)-2x\right)\log(x)\right)\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}{(x+\log(x))\log(x+\log(x))\log^2\left(\frac{3}{\log(x+\log(x))}\right)}$$

3.901 $\int \frac{e^{\frac{1}{16}(33+16x)}(1+2x+x^2)-2^{1+\frac{4}{1+x}}\log(4)}{1+2x+x^2}\,dx$

3.901.1 Optimal result

Integrand size = 47, antiderivative size = 17

$$\int \frac{e^{\frac{1}{16}(33+16x)}(1+2x+x^2)-2^{1+\frac{4}{1+x}}\log(4)}{1+2x+x^2}\,dx = 4^{\frac{2}{1+x}}+e^{\frac{33}{16}+x}$$

output
```
exp(2*ln(2)/(1+x))^2+exp(x+33/16)
```

3.901.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{e^{\frac{1}{16}(33+16x)}(1+2x+x^2)-2^{1+\frac{4}{1+x}}\log(4)}{1+2x+x^2}\,dx = 16^{\frac{1}{1+x}}+e^{\frac{33}{16}+x}$$

input
```
Integrate[(E^((33 + 16*x)/16)*(1 + 2*x + x^2) - 2^(1 + 4/(1 + x))*Log[4])/
(1 + 2*x + x^2),x]
```

output
```
16^(1 + x)^(-1) + E^(33/16 + x)
```

3.901.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.53, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.064, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{1}{16}(16x+33)}(x^2+2x+1)-2^{\frac{4}{x+1}+1}\log(4)}{x^2+2x+1}dx$$
$$\Big\downarrow \text{2007}$$
$$\int \frac{e^{\frac{1}{16}(16x+33)}(x^2+2x+1)-2^{\frac{4}{x+1}+1}\log(4)}{(x+1)^2}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(e^{x+\frac{33}{16}}-\frac{2^{\frac{x+5}{x+1}}\log(4)}{(x+1)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$e^{x+\frac{33}{16}}+\frac{2^{\frac{4}{x+1}-1}\log(4)}{\log(2)}$$

input
```
Int[(E^((33 + 16*x)/16)*(1 + 2*x + x^2) - 2^(1 + 4/(1 + x))*Log[4])/(1 + 2
*x + x^2),x]
```

output
```
E^(33/16 + x) + (2^(-1 + 4/(1 + x))*Log[4])/Log[2]
```

3.901.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.901.4 Maple [A] (verified)

Time = 1.46 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

method	result
risch	$4^{\frac{2}{1+x}}+\mathrm{e}^{x+\frac{33}{16}}$
parallelrisch	$\mathrm{e}^{\frac{4\ln(2)}{1+x}}+\mathrm{e}^{x+\frac{33}{16}}$
parts	$\mathrm{e}^{\frac{4\ln(2)}{1+x}}+\mathrm{e}^{x+\frac{33}{16}}$
norman	$\frac{\mathrm{e}^{\frac{4\ln(2)}{1+x}}+x\,\mathrm{e}^{\frac{4\ln(2)}{1+x}}+\mathrm{e}^{x+\frac{33}{16}}x+\mathrm{e}^{x+\frac{33}{16}}}{1+x}$
default	$\mathrm{e}^{\frac{33}{16}}\left(-\frac{\mathrm{e}^{x}}{1+x}-\mathrm{e}^{-1}\,\mathrm{Ei}_{1}\left(-1-x\right)\right)+\mathrm{e}^{\frac{33}{16}}\left(\mathrm{e}^{x}-\frac{\mathrm{e}^{x}}{1+x}+\mathrm{e}^{-1}\,\mathrm{Ei}_{1}\left(-1-x\right)\right)+\frac{\mathrm{e}^{\frac{4\ln(2)}{1+x}}+x\,\mathrm{e}^{\frac{4\ln(2)}{1+x}}}{1+x}+\frac{2\,\mathrm{e}^{\frac{33}{16}}\mathrm{e}}{1+x}$

input
```
int((-4*ln(2)*exp(2*ln(2)/(1+x))^2+(x^2+2*x+1)*exp(x+33/16))/(x^2+2*x+1),x
,method=_RETURNVERBOSE)
```

output
```
(4^(1/(1+x)))^2+exp(x+33/16)
```

3.901.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{e^{\frac{1}{16}(33+16x)}(1+2x+x^2)-2^{1+\frac{4}{1+x}}\log(4)}{1+2x+x^2}\,dx=2^{\frac{4}{x+1}}+e^{\left(x+\frac{33}{16}\right)}$$

input
```
integrate((-4*log(2)*exp(2*log(2)/(1+x))^2+(x^2+2*x+1)*exp(x+33/16))/(x^2+
2*x+1),x, algorithm=\
```

output
```
2^(4/(x + 1)) + e^(x + 33/16)
```

3.901.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{e^{\frac{1}{16}(33+16x)}(1+2x+x^2)-2^{1+\frac{4}{1+x}}\log(4)}{1+2x+x^2}\,dx=e^{\frac{4\log(2)}{x+1}}+e^{x+\frac{33}{16}}$$

input
```
integrate((-4*ln(2)*exp(2*ln(2)/(1+x))**2+(x**2+2*x+1)*exp(x+33/16))/(x**2
+2*x+1),x)
```

output
```
exp(4*log(2)/(x + 1)) + exp(x + 33/16)
```

3.901.7 Maxima [F]

$$\int \frac{e^{\frac{1}{16}(33+16x)}(1+2x+x^2)-2^{1+\frac{4}{1+x}}\log(4)}{1+2x+x^2}\,dx=\int \frac{(x^2+2\,x+1)e^{\left(x+\frac{33}{16}\right)}-4\cdot 2^{\frac{4}{x+1}}\log(2)}{x^2+2\,x+1}\,dx$$

input
```
integrate((-4*log(2)*exp(2*log(2)/(1+x))^2+(x^2+2*x+1)*exp(x+33/16))/(x^2+
2*x+1),x, algorithm=\
```

output
```
-e^(17/16)*exp_integral_e(2, -x - 1)/(x + 1) + (x^2*e^(x + 33/16) + (x^2 +
 2*x + 1)*2^(4/(x + 1)))/(x^2 + 2*x + 1) + 2*e^(x + 33/16)/(x + 1) - 2*int
egrate(x*e^(x + 33/16)/(x^3 + 3*x^2 + 3*x + 1), x)
```

3.901.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{e^{\frac{1}{16}(33+16x)}(1+2x+x^2)-2^{1+\frac{4}{1+x}}\log(4)}{1+2x+x^2}\,dx=2^{\frac{4}{x+1}}+e^{\left(x+\frac{33}{16}\right)}$$

input
```
integrate((-4*log(2)*exp(2*log(2)/(1+x))^2+(x^2+2*x+1)*exp(x+33/16))/(x^2+
2*x+1),x, algorithm=\
```

output
```
2^(4/(x + 1)) + e^(x + 33/16)
```

3.901.9 Mupad [B] (verification not implemented)

Time = 15.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{e^{\frac{1}{16}(33+16x)}(1+2x+x^2)-2^{1+\frac{4}{1+x}}\log(4)}{1+2x+x^2}\,dx=\mathrm{e}^{33/16}\,\mathrm{e}^{x}+2^{\frac{4}{x+1}}$$

input
```
int(-(4*exp((4*log(2))/(x + 1))*log(2) - exp(x + 33/16)*(2*x + x^2 + 1))/(
2*x + x^2 + 1),x)
```

output
```
exp(33/16)*exp(x) + 2^(4/(x + 1))
```

3.902 $\int \frac{-10x\log(5)\log(e^{-x}x)+(-1+x)\log^{\frac{2}{\log(5)}}(e^{-x}x)}{10x\log(5)\log(e^{-x}x)}\,dx$

3.902.1 Optimal result

Integrand size = 54, antiderivative size = 29

$$\int \frac{-10x\log(5)\log(e^{-x}x)+(-1+x)\log^{\frac{2}{\log(5)}}(e^{-x}x)}{10x\log(5)\log(e^{-x}x)}\,dx = 25-e^5-x-\frac{1}{20}\log^{\frac{2}{\log(5)}}(e^{-x}x)$$

output
```
25-1/20*exp(2*ln(ln(x/exp(x)))/ln(5))-exp(5)-x
```

3.902.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \frac{-10x\log(5)\log(e^{-x}x)+(-1+x)\log^{\frac{2}{\log(5)}}(e^{-x}x)}{10x\log(5)\log(e^{-x}x)}\,dx = -x-\frac{1}{20}\log^{\frac{2}{\log(5)}}(e^{-x}x)$$

input
```
Integrate[(-10*x*Log[5]*Log[x/E^x] + (-1 + x)*Log[x/E^x]^(2/Log[5]))/(10*x
*Log[5]*Log[x/E^x]),x]
```

output
```
-x - Log[x/E^x]^(2/Log[5])/20
```

3.902.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.21, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {27, 25, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x-1)\log^{\frac{2}{\log(5)}}\left(e^{-x}x\right)-10x\log(5)\log\left(e^{-x}x\right)}{10x\log(5)\log\left(e^{-x}x\right)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int -\frac{(1-x)\log^{\frac{2}{\log(5)}}\left(e^{-x}x\right)+10x\log(5)\log\left(e^{-x}x\right)}{x\log\left(e^{-x}x\right)}dx}{10\log(5)}$$

$$\Big\downarrow \ 25$$

$$-\frac{\int \frac{(1-x)\log^{\frac{2}{\log(5)}}\left(e^{-x}x\right)+10x\log(5)\log\left(e^{-x}x\right)}{x\log\left(e^{-x}x\right)}dx}{10\log(5)}$$

$$\Big\downarrow \ 7239$$

$$-\frac{\int \left(\left(\frac{1}{x}-1\right)\log^{-1+\frac{2}{\log(5)}}\left(e^{-x}x\right)+10\log(5)\right)dx}{10\log(5)}$$

$$\Big\downarrow \ 2009$$

$$-\frac{\frac{1}{2}\log(5)\log^{\frac{2}{\log(5)}}\left(e^{-x}x\right)+10x\log(5)}{10\log(5)}$$

input
```
Int[(-10*x*Log[5]*Log[x/E^x] + (-1 + x)*Log[x/E^x]^(2/Log[5]))/(10*x*Log[5
]*Log[x/E^x]),x]
```

output
```
-1/10*(10*x*Log[5] + (Log[5]*Log[x/E^x]^(2/Log[5]))/2)/Log[5]
```

3.902.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.902.4 Maple [A] (verified)

Time = 2.40 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

method	result	size
parts	$-x-\frac{{\mathrm e}^{\frac{2 \ln \left(\ln \left(x \,{\mathrm e}^{-x}\right)\right)}{\ln \left(5\right)}}}{20}$	22
default	$\frac{-\frac{{\mathrm e}^{\frac{2 \ln \left(\ln \left(x \,{\mathrm e}^{-x}\right)\right)}{\ln \left(5\right)}} \ln \left(5\right)}{2}-10 x \ln \left(5\right)}{10 \ln \left(5\right)}$	32
parallelrisch	$\frac{-\frac{{\mathrm e}^{\frac{2 \ln \left(\ln \left(x \,{\mathrm e}^{-x}\right)\right)}{\ln \left(5\right)}} \ln \left(5\right)}{2}-10 x \ln \left(5\right)}{10 \ln \left(5\right)}$	32
risch	$-x-\frac{\left(\ln \left(x \right)-\ln \left({\mathrm e}^{x}\right)-\frac{i \pi \,\operatorname{csgn}\left(i x \,{\mathrm e}^{-x}\right) \left(-\operatorname{csgn}\left(i x \,{\mathrm e}^{-x}\right)+\operatorname{csgn}\left(i x \right)\right) \left(-\operatorname{csgn}\left(i x \,{\mathrm e}^{-x}\right)+\operatorname{csgn}\left(i {\mathrm e}^{-x}\right)\right)}{2}\right)^{\frac{2}{\ln \left(5\right)}}}{20}$	72

input
```
int(1/10*((-1+x)*exp(2*ln(ln(x/exp(x)))/ln(5))-10*x*ln(5)*ln(x/exp(x)))/x/
ln(5)/ln(x/exp(x)),x,method=_RETURNVERBOSE)
```

output
```
-x-1/20*exp(2*ln(ln(x/exp(x)))/ln(5))
```

3.902.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{-10x\log(5)\log(e^{-x}x)+(-1+x)\log^{\frac{2}{\log(5)}}(e^{-x}x)}{10x\log(5)\log(e^{-x}x)}\,dx = -x-\frac{1}{20}\log\left(xe^{(-x)}\right)^{\frac{2}{\log(5)}}$$

input
```
integrate(1/10*((-1+x)*exp(2*log(log(x/exp(x)))/log(5))-10*x*log(5)*log(x/
exp(x)))/x/log(5)/log(x/exp(x)),x, algorithm=\
```

output
```
-x - 1/20*log(x*e^(-x))^(2/log(5))
```

3.902.6 Sympy [A] (verification not implemented)

Time = 0.58 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{-10x\log(5)\log(e^{-x}x)+(-1+x)\log^{\frac{2}{\log(5)}}(e^{-x}x)}{10x\log(5)\log(e^{-x}x)}\,dx = \frac{-x\log(5)-\frac{\log(5)\log(xe^{-x})^{\frac{2}{\log(5)}}}{20}}{\log(5)}$$

input
```
integrate(1/10*((-1+x)*exp(2*ln(ln(x/exp(x)))/ln(5))-10*x*ln(5)*ln(x/exp(x
)))/x/ln(5)/ln(x/exp(x)),x)
```

output
```
(-x*log(5) - log(5)*log(x*exp(-x))**(2/log(5))/20)/log(5)
```

3.902.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{-10x\log(5)\log(e^{-x}x)+(-1+x)\log^{\frac{2}{\log(5)}}(e^{-x}x)}{10x\log(5)\log(e^{-x}x)}\,dx$$
$$= -\frac{20\,x\log(5)+(-x+\log(x))^{\frac{2}{\log(5)}}\log(5)}{20\,\log(5)}$$

input
```
integrate(1/10*((-1+x)*exp(2*log(log(x/exp(x)))/log(5))-10*x*log(5)*log(x/
exp(x)))/x/log(5)/log(x/exp(x)),x, algorithm=\
```

output
```
-1/20*(20*x*log(5) + (-x + log(x))^(2/log(5))*log(5))/log(5)
```

3.902.8 Giac [F]

$$\int \frac{-10x\log(5)\log\left(e^{-x}x\right)+(-1+x)\log^{\frac{2}{\log(5)}}\left(e^{-x}x\right)}{10x\log(5)\log\left(e^{-x}x\right)}\,dx$$
$$=\int -\frac{10\,x\log\left(5\right)\log\left(xe^{(-x)}\right)-(x-1)\log\left(xe^{(-x)}\right)^{\frac{2}{\log(5)}}}{10\,x\log\left(5\right)\log\left(xe^{(-x)}\right)}\,dx$$

input
```
integrate(1/10*((-1+x)*exp(2*log(log(x/exp(x)))/log(5))-10*x*log(5)*log(x/
exp(x)))/x/log(5)/log(x/exp(x)),x, algorithm=\
```

output
```
integrate(-1/10*(10*x*log(5)*log(x*e^(-x)) - (x - 1)*log(x*e^(-x))^(2/log(
5)))/(x*log(5)*log(x*e^(-x))), x)
```

3.902.9 Mupad [B] (verification not implemented)

Time = 14.70 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.66

$$\int \frac{-10x\log(5)\log\left(e^{-x}x\right)+(-1+x)\log^{\frac{2}{\log(5)}}\left(e^{-x}x\right)}{10x\log(5)\log\left(e^{-x}x\right)}\,dx=-x-\frac{\left(\ln\left(x\right)-x\right)^{\frac{2}{\ln(5)}}}{20}$$

input
```
int(((log(x*exp(-x))^(2/log(5))*(x - 1))/10 - x*log(5)*log(x*exp(-x)))/(x*
log(5)*log(x*exp(-x))),x)
```

output
```
- x - (log(x) - x)^(2/log(5))/20
```

3.903 $\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}(60x+12ex+24x^2)+e(40x^2+1$

3.903.1 Optimal result

Integrand size = 73, antiderivative size = 20

$$\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}(60x+12ex+24x^2)+e(40x^2+16x^3)}\,dx = \frac{15}{5+e+\frac{3e^{53}}{2x}+2x}$$

output
```
15/(2*x+exp(1)+5+3/2/x*exp(3)*exp(25)^2)
```

3.903.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}(60x+12ex+24x^2)+e(40x^2+16x^3)}\,dx = \frac{30x}{3e^{53}+10x+2ex+4x^2}$$

input
```
Integrate[(90*E^53 - 120*x^2)/(9*E^106 + 100*x^2 + 4*E^2*x^2 + 80*x^3 + 16
*x^4 + E^53*(60*x + 12*E*x + 24*x^2) + E*(40*x^2 + 16*x^3)),x]
```

output
```
(30*x)/(3*E^53 + 10*x + 2*E*x + 4*x^2)
```

3.903.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 91 vs. $2(20) = 40$.

Time = 0.35 (sec) , antiderivative size = 91, normalized size of antiderivative = 4.55, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.082$, Rules used = {6, 2459, 1380, 27, 2345, 24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{90e^{53}-120x^2}{16x^4+80x^3+4e^2x^2+100x^2+e^{53}\left(24x^2+12ex+60x\right)+e\left(16x^3+40x^2\right)+9e^{106}}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{90e^{53}-120x^2}{16x^4+80x^3+\left(100+4e^2\right)x^2+e^{53}\left(24x^2+12ex+60x\right)+e\left(16x^3+40x^2\right)+9e^{106}}dx$$

$$\Big\downarrow \ 2459$$

$$\int \frac{-120\left(x+\frac{1}{64}(80+16e)\right)^2+60(5+e)\left(x+\frac{1}{64}(80+16e)\right)-\frac{15}{2}\left(25+10e+e^2-12e^{53}\right)}{16\left(x+\frac{1}{64}(80+16e)\right)^4-2\left(25+10e+e^2-12e^{53}\right)\left(x+\frac{1}{64}(80+16e)\right)^2+\frac{1}{16}\left(25+10e+e^2-12e^{53}\right)^2}d\Big(x+$$

$$\Big\downarrow \ 1380$$

$$16\int -\frac{15\left(16\left(x+\frac{1}{64}(80+16e)\right)^2-8(5+e)\left(x+\frac{1}{64}(80+16e)\right)-12e^{53}+e^2+10e+25\right)}{2\left(-16\left(x+\frac{1}{64}(80+16e)\right)^2-12e^{53}+e^2+10e+25\right)^2}d\left(x+\frac{1}{64}(80+16e)\right)$$

$$\Big\downarrow \ 27$$

$$-120\int \frac{16\left(x+\frac{1}{64}(80+16e)\right)^2-8(5+e)\left(x+\frac{1}{64}(80+16e)\right)-12e^{53}+e^2+10e+25}{\left(-16\left(x+\frac{1}{64}(80+16e)\right)^2-12e^{53}+e^2+10e+25\right)^2}d\left(x+\frac{1}{64}(80+16e)\right)$$

$$\Big\downarrow \ 2345$$

$$-120\left(-\frac{\int 0d\left(x+\frac{1}{64}(80+16e)\right)}{2\left(25+10e+e^2-12e^{53}\right)}-\frac{(5+e)\left(25+10e+e^2-12e^{53}\right)-4\left(25+10e+e^2-12e^{53}\right)\left(x+\frac{1}{64}(80+16\right.}{4\left(25+10e+e^2-12e^{53}\right)\left(-16\left(x+\frac{1}{64}(80+16e)\right)^2-12e^{53}+e^2+10e+\right.}\right.$$

$$\Big\downarrow \ 24$$

$$\frac{30\left((5+e)\left(25+10e+e^2-12e^{53}\right)-4\left(25+10e+e^2-12e^{53}\right)\left(x+\frac{1}{64}(80+16e)\right)\right)}{\left(25+10e+e^2-12e^{53}\right)\left(-16\left(x+\frac{1}{64}(80+16e)\right)^2-12e^{53}+e^2+10e+25\right)}$$

input
```
Int[(90*E^53 - 120*x^2)/(9*E^106 + 100*x^2 + 4*E^2*x^2 + 80*x^3 + 16*x^4 +
 E^53*(60*x + 12*E*x + 24*x^2) + E*(40*x^2 + 16*x^3)),x]
```

output
```
(30*((5 + E)*(25 + 10*E + E^2 - 12*E^53) - 4*(25 + 10*E + E^2 - 12*E^53)*(
(80 + 16*E)/64 + x)))/((25 + 10*E + E^2 - 12*E^53)*(25 + 10*E + E^2 - 12*E
^53 - 16*((80 + 16*E)/64 + x)^2))
```

3.903.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2345
```
Int[(Pq_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q = PolynomialQuot
ient[Pq, a + b*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x,
 0], g = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b
*f*x)*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   In
t[(a + b*x^2)^(p + 1)*ExpandToSum[2*a*(p + 1)*Q + f*(2*p + 3), x], x], x]]
/; FreeQ[{a, b}, x] && PolyQ[Pq, x] && LtQ[p, -1]
```

rule 2459
```
Int[(Pn_)^(p_.)*(Qx_), x_Symbol] :> With[{S = Coeff[Pn, x, Expon[Pn, x] - 1
]/(Expon[Pn, x]*Coeff[Pn, x, Expon[Pn, x]])}, Subst[Int[ExpandToSum[Pn /. x
 -> x - S, x]^p*ExpandToSum[Qx /. x -> x - S, x], x], x, x + S] /; Binomial
Q[Pn /. x -> x - S, x] || (IntegerQ[Expon[Pn, x]/2] && TrinomialQ[Pn /. x -
> x - S, x])] /; FreeQ[p, x] && PolyQ[Pn, x] && GtQ[Expon[Pn, x], 2] && NeQ
[Coeff[Pn, x, Expon[Pn, x] - 1], 0] && PolyQ[Qx, x] &&  !(MonomialQ[Qx, x]
&& IGtQ[p, 0])
```

3.903. $\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}(60x+12ex+24x^2)+e(40x^2+16x^3)}\,dx$

3.903.4 Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

method	result
risch	$\frac{10x}{e^{53}+\frac{2x\,e}{3}+\frac{4x^2}{3}+\frac{10x}{3}}$
gosper	$\frac{30x}{3\,e^3e^{50}+2x\,e+4x^2+10x}$
norman	$\frac{30x}{3\,e^3e^{50}+2x\,e+4x^2+10x}$
parallelrisch	$\frac{30x}{3\,e^3e^{50}+2x\,e+4x^2+10x}$
default	$\frac{15\left(\sum_{\_R=\mathrm{RootOf}\left(16\_Z^4+(16\,e+80)\_Z^3+\left(24\,e^{53}+4\,e^2+40\,e+100\right)\_Z^2+\left(12\,e^{54}+60\,e^{53}\right)\_Z+9\,e^{106}\right)}\frac{\left(3\,e^{5}\right.}{3\,e^{54}+12\_R\,e^{53}+2\,e^2\_R+12\_}\right.}{2}$

input
```
int((90*exp(3)*exp(25)^2-120*x^2)/(9*exp(3)^2*exp(25)^4+(12*x*exp(1)+24*x^
2+60*x)*exp(3)*exp(25)^2+4*x^2*exp(1)^2+(16*x^3+40*x^2)*exp(1)+16*x^4+80*x
^3+100*x^2),x,method=_RETURNVERBOSE)
```

output
```
10*x/(exp(53)+2/3*x*exp(1)+4/3*x^2+10/3*x)
```

3.903.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}\left(60x+12ex+24x^2\right)+e\left(40x^2+16x^3\right)}\,dx$$
$$=\frac{30\,x}{4\,x^2+2\,xe+10\,x+3\,e^{53}}$$

input
```
integrate((90*exp(3)*exp(25)^2-120*x^2)/(9*exp(3)^2*exp(25)^4+(12*x*exp(1)
+24*x^2+60*x)*exp(3)*exp(25)^2+4*x^2*exp(1)^2+(16*x^3+40*x^2)*exp(1)+16*x^
4+80*x^3+100*x^2),x, algorithm=\
```

output
```
30*x/(4*x^2 + 2*x*e + 10*x + 3*e^53)
```

3.903.6 Sympy [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}\left(60x+12ex+24x^2\right)+e\left(40x^2+16x^3\right)}\,dx = \frac{30x}{4x^2+x\left(2e+10\right)+3e^{53}}$$

input
```
integrate((90*exp(3)*exp(25)**2-120*x**2)/(9*exp(3)**2*exp(25)**4+(12*x*ex
p(1)+24*x**2+60*x)*exp(3)*exp(25)**2+4*x**2*exp(1)**2+(16*x**3+40*x**2)*ex
p(1)+16*x**4+80*x**3+100*x**2),x)
```

output
```
30*x/(4*x**2 + x*(2*E + 10) + 3*exp(53))
```

3.903.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}\left(60x+12ex+24x^2\right)+e\left(40x^2+16x^3\right)}\,dx = \frac{30\,x}{4\,x^2+2\,x(e+5)+3\,e^{53}}$$

input
```
integrate((90*exp(3)*exp(25)^2-120*x^2)/(9*exp(3)^2*exp(25)^4+(12*x*exp(1)
+24*x^2+60*x)*exp(3)*exp(25)^2+4*x^2*exp(1)^2+(16*x^3+40*x^2)*exp(1)+16*x^
4+80*x^3+100*x^2),x, algorithm=\
```

output
```
30*x/(4*x^2 + 2*x*(e + 5) + 3*e^53)
```

3.903.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}\left(60x+12ex+24x^2\right)+e\left(40x^2+16x^3\right)}\,dx = \frac{30\,x}{4\,x^2+2\,xe+10\,x+3\,e^{53}}$$

input
```
integrate((90*exp(3)*exp(25)^2-120*x^2)/(9*exp(3)^2*exp(25)^4+(12*x*exp(1)
+24*x^2+60*x)*exp(3)*exp(25)^2+4*x^2*exp(1)^2+(16*x^3+40*x^2)*exp(1)+16*x^
4+80*x^3+100*x^2),x, algorithm=\
```

output
```
30*x/(4*x^2 + 2*x*e + 10*x + 3*e^53)
```

3.903.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{90e^{53}-120x^2}{9e^{106}+100x^2+4e^2x^2+80x^3+16x^4+e^{53}\left(60x+12ex+24x^2\right)+e\left(40x^2+16x^3\right)}\,dx = \frac{30\,x}{4\,x^2+\left(2\,\mathrm{e}+10\right)\,x+3\,\mathrm{e}^{53}}$$

input
```
int((90*exp(53) - 120*x^2)/(9*exp(106) + exp(53)*(60*x + 12*x*exp(1) + 24*
x^2) + exp(1)*(40*x^2 + 16*x^3) + 4*x^2*exp(2) + 100*x^2 + 80*x^3 + 16*x^4
),x)
```

output
```
(30*x)/(3*exp(53) + 4*x^2 + x*(2*exp(1) + 10))
```

3.904 $\int \frac{43+12x-6x^2}{6-12x+6x^2} \, dx$

3.904.1 Optimal result

Integrand size = 23, antiderivative size = 32

$$\int \frac{43+12x-6x^2}{6-12x+6x^2} \, dx = -\frac{3+\frac{4x}{3}+3(3+x)}{-2+2x}+\log \left(2e^{5-x}\right)$$

output
```
ln(2*exp(5-x))-(13/3*x+12)/(-2+2*x)
```

3.904.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.53

$$\int \frac{43+12x-6x^2}{6-12x+6x^2} \, dx = \frac{1}{6}\left(-\frac{49}{-1+x}-6(-1+x)\right)$$

input
```
Integrate[(43 + 12*x - 6*x^2)/(6 - 12*x + 6*x^2),x]
```

output
```
(-49/(-1 + x) - 6*(-1 + x))/6
```

3.904.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.53, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {1294, 27, 1107, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x^2+12x+43}{6x^2-12x+6}dx$$
$$\Big\downarrow \ 1294$$
$$6\int \frac{-6x^2+12x+43}{36(1-x)^2}dx$$
$$\Big\downarrow \ 27$$
$$\frac{1}{6}\int \frac{-6x^2+12x+43}{(1-x)^2}dx$$
$$\Big\downarrow \ 1107$$
$$\frac{1}{6}\int \left(\frac{49}{(x-1)^2}-6\right)dx$$
$$\Big\downarrow \ 2009$$
$$\frac{1}{6}\left(\frac{49}{1-x}-6x\right)$$

input
```
Int[(43 + 12*x - 6*x^2)/(6 - 12*x + 6*x^2),x]
```

output
```
(49/(1 - x) - 6*x)/6
```

3.904.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1107
```
Int[((d_.) + (e_.)*(x_))^(m_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_
Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; F
reeQ[{a, b, c, d, e, m}, x] && EqQ[2*c*d - b*e, 0] && IGtQ[p, 0] &&  !(EqQ[
m, 3] && NeQ[p, 1])
```

rule 1294
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.)*((d_.) + (e_.)*(x_) + (f_.)*(x
_)^2)^(q_.), x_Symbol] :> Simp[1/c^p   Int[(b/2 + c*x)^(2*p)*(d + e*x + f*x
^2)^q, x], x] /; FreeQ[{a, b, c, d, e, f, q}, x] && EqQ[b^2 - 4*a*c, 0] &&
IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.904.4 Maple [A] (verified)

Time = 1.78 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.38

method	result	size
default	$-x-\frac{49}{6(-1+x)}$	12
risch	$-x-\frac{49}{6(-1+x)}$	12
gosper	$-\frac{6x^2+43}{6(-1+x)}$	15
parallelrisch	$-\frac{6x^2+43}{6(-1+x)}$	15
meijerg	$\frac{55x}{6(1-x)}-\frac{x(-3x+6)}{3(1-x)}$	27

input
```
int((-6*x^2+12*x+43)/(6*x^2-12*x+6),x,method=_RETURNVERBOSE)
```

output
```
-x-49/6/(-1+x)
```

3.904.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.53

$$\int \frac{43+12x-6x^2}{6-12x+6x^2}\,dx = -\frac{6\,x^2-6\,x+49}{6\,(x-1)}$$

input
```
integrate((-6*x^2+12*x+43)/(6*x^2-12*x+6),x, algorithm=\
```

output
```
-1/6*(6*x^2 - 6*x + 49)/(x - 1)
```

3.904.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.25

$$\int \frac{43+12x-6x^2}{6-12x+6x^2}\,dx = -x - \frac{49}{6x-6}$$

input
```
integrate((-6*x**2+12*x+43)/(6*x**2-12*x+6),x)
```

output
```
-x - 49/(6*x - 6)
```

3.904.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.34

$$\int \frac{43+12x-6x^2}{6-12x+6x^2}\,dx = -x - \frac{49}{6\,(x-1)}$$

input
```
integrate((-6*x^2+12*x+43)/(6*x^2-12*x+6),x, algorithm=\
```

output
```
-x - 49/6/(x - 1)
```

3.904.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.34

$$\int \frac{43 + 12x - 6x^2}{6 - 12x + 6x^2} \, dx = -x - \frac{49}{6 \, (x - 1)}$$

input
```
integrate((-6*x^2+12*x+43)/(6*x^2-12*x+6),x, algorithm=\
```

output
```
-x - 49/6/(x - 1)
```

3.904.9 Mupad [B] (verification not implemented)

Time = 14.16 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.41

$$\int \frac{43 + 12x - 6x^2}{6 - 12x + 6x^2} \, dx = -x - \frac{49}{6 \, (x - 1)}$$

input
```
int((12*x - 6*x^2 + 43)/(6*x^2 - 12*x + 6),x)
```

output
```
- x - 49/(6*(x - 1))
```

3.905 $\int \frac{1}{4}(-1+8x)\,dx$

3.905.1 Optimal result

Integrand size = 9, antiderivative size = 19

$$\int \frac{1}{4}(-1+8x)\,dx = 6+\frac{1}{4}\left(-x+4x^2\right)-\log(5)$$

output
```
-1/4*x+x^2+6-ln(5)
```

3.905.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.47

$$\int \frac{1}{4}(-1+8x)\,dx = -\frac{x}{4}+x^2$$

input
```
Integrate[(-1 + 8*x)/4,x]
```

output
```
-1/4*x + x^2
```

3.905.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.58, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}(8x-1)\,dx$$

$$\Big\downarrow \; 17$$

$$\frac{1}{64}(1-8x)^2$$

input
```
Int[(-1 + 8*x)/4,x]
```

output
```
(1 - 8*x)^2/64
```

3.905.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.905.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.42

method	result	size
default	$x^2-\frac{1}{4}x$	8
norman	$x^2-\frac{1}{4}x$	8
risch	$x^2-\frac{1}{4}x$	8
parallelrisch	$x^2-\frac{1}{4}x$	8
parts	$x^2-\frac{1}{4}x$	8
gosper	$\frac{x(-1+4x)}{4}$	9

input
```
int(2*x-1/4,x,method=_RETURNVERBOSE)
```

output
```
x^2-1/4*x
```

3.905.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.37

$$\int \frac{1}{4}(-1+8x)\,dx = x^2 - \frac{1}{4}\,x$$

input
```
integrate(2*x-1/4,x, algorithm=\
```

output
```
x^2 - 1/4*x
```

3.905.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.26

$$\int \frac{1}{4}(-1+8x)\,dx = x^2 - \frac{x}{4}$$

input
```
integrate(2*x-1/4,x)
```

output
```
x**2 - x/4
```

3.905.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.37

$$\int \frac{1}{4}(-1+8x)\,dx = x^2 - \frac{1}{4}\,x$$

input
```
integrate(2*x-1/4,x, algorithm=\
```

output
```
x^2 - 1/4*x
```

3.905.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.37

$$\int \frac{1}{4}(-1+8x)\,dx = x^2 - \frac{1}{4}\,x$$

input
```
integrate(2*x-1/4,x, algorithm=\
```

output
```
x^2 - 1/4*x
```

3.905.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.42

$$\int \frac{1}{4}(-1+8x)\,dx = \frac{x\,(4\,x-1)}{4}$$

input
```
int(2*x - 1/4,x)
```

output
```
(x*(4*x - 1))/4
```

3.906 $\int e^{3-e-x}(1+e^{-3+e+x}(1-2x))\,dx$

3.906.1 Optimal result

Integrand size = 25, antiderivative size = 19

$$\int e^{3-e-x}\left(1+e^{-3+e+x}(1-2x)\right)\,dx=-e^{3-e-x}+x-x^2$$

output
```
x-x^2-1/exp(x)*exp(3-exp(1))
```

3.906.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int e^{3-e-x}\left(1+e^{-3+e+x}(1-2x)\right)\,dx=-e^{3-e-x}+x-x^2$$

input
```
Integrate[E^(3 - E - x)*(1 + E^(-3 + E + x)*(1 - 2*x)),x]
```

output
```
-E^(3 - E - x) + x - x^2
```

3.906.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-x-e+3}\left(e^{x+e-3}(1-2x)+1\right)\,dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(-2x+e^{-x-e+3}+1\right)dx$$

$$\Big\downarrow \; 2009$$

$$-x^2+x-e^{-x-e+3}$$

input
```
Int[E^(3 - E - x)*(1 + E^(-3 + E + x)*(1 - 2*x)),x]
```

output
```
-E^(3 - E - x) + x - x^2
```

3.906.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.906.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

method	result	size
risch	$-x^2+x-\mathrm{e}^{3-\mathrm{e}-x}$	20
parts	$x-\mathrm{e}^{3-\mathrm{e}}\mathrm{e}^{-x}-x^2$	21
norman	$(\mathrm{e}^x x-\mathrm{e}^x x^2-\mathrm{e}^{-\mathrm{e}}\mathrm{e}^3)\,\mathrm{e}^{-x}$	29
default	$\mathrm{e}^{3-\mathrm{e}}(-\mathrm{e}^{-x}+\mathrm{e}^{\mathrm{e}}\mathrm{e}^{-3}x-\mathrm{e}^{\mathrm{e}}\mathrm{e}^{-3}x^2)$	33
parallelrisch	$\mathrm{e}^{3-\mathrm{e}}(-\mathrm{e}^{\mathrm{e}-3}x^2\mathrm{e}^x-1+\mathrm{e}^x\mathrm{e}^{\mathrm{e}-3}x)\,\mathrm{e}^{-x}$	36

input
```
int(((1-2*x)*exp(x)*exp(exp(1)-3)+1)/exp(x)/exp(exp(1)-3),x,method=_RETURN
VERBOSE)
```

output
```
-x^2+x-exp(3-exp(1)-x)
```

3.906.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.47

$$\int e^{3-e-x}\left(1+e^{-3+e+x}(1-2x)\right)\,dx=-\left((x^2-x)e^{(x+e-3)}+1\right)e^{(-x-e+3)}$$

input
```
integrate(((1-2*x)*exp(x)*exp(exp(1)-3)+1)/exp(x)/exp(exp(1)-3),x, algorit
hm=\
```

output
```
-((x^2 - x)*e^(x + e - 3) + 1)*e^(-x - e + 3)
```

3.906.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int e^{3-e-x}\left(1+e^{-3+e+x}(1-2x)\right)\,dx=-x^2+x-\frac{e^3e^{-x}}{e^e}$$

input
```
integrate(((1-2*x)*exp(x)*exp(exp(1)-3)+1)/exp(x)/exp(exp(1)-3),x)
```

output
```
-x**2 + x - exp(3)*exp(-E)*exp(-x)
```

3.906.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int e^{3-e-x}\left(1+e^{-3+e+x}(1-2x)\right)\,dx=-x^2+x-e^{(-x-e+3)}$$

input
```
integrate(((1-2*x)*exp(x)*exp(exp(1)-3)+1)/exp(x)/exp(exp(1)-3),x, algorit
hm=\
```

output
```
-x^2 + x - e^(-x - e + 3)
```

3.906.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(19) = 38.

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.05

$$\int e^{3-e-x}\left(1+e^{-3+e+x}(1-2x)\right)\,dx=-(x+e-3)^2+2\,(x+e-3)e-5\,x-5\,e-e^{(-x-e+3)}+15$$

input
```
integrate(((1-2*x)*exp(x)*exp(exp(1)-3)+1)/exp(x)/exp(exp(1)-3),x, algorit
hm=\
```

output
```
-(x + e - 3)^2 + 2*(x + e - 3)*e - 5*x - 5*e - e^(-x - e + 3) + 15
```

3.906.9 Mupad [B] (verification not implemented)

Time = 14.62 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int e^{3-e-x}\left(1+e^{-3+e+x}(1-2x)\right)\,dx=x-x^2-\mathrm{e}^{-\mathrm{e}}\,\mathrm{e}^{-x}\,\mathrm{e}^3$$

input
```
int(-exp(-x)*exp(3 - exp(1))*(exp(exp(1) - 3)*exp(x)*(2*x - 1) - 1),x)
```

output
```
x - x^2 - exp(-exp(1))*exp(-x)*exp(3)
```

3.907 $\int (-160 + e(10 - 4x) + 64x) \, dx$

3.907.1 Optimal result

Integrand size = 12, antiderivative size = 11

$$\int (-160 + e(10 - 4x) + 64x) \, dx = 2(-16 + e)(5 - x)x$$

output
```
2*(5-x)*x*(exp(1)-16)
```

3.907.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.09

$$\int (-160 + e(10 - 4x) + 64x) \, dx = -2(-16 + e)\left(-5x + x^2\right)$$

input
```
Integrate[-160 + E*(10 - 4*x) + 64*x,x]
```

output
```
-2*(-16 + E)*(-5*x + x^2)
```

3.907.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.91, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (e(10-4x)+64x-160)\,dx$$

$$\Big\downarrow \; 2009$$

$$32x^2-\frac{1}{2}e(5-2x)^2-160x$$

input
```
Int[-160 + E*(10 - 4*x) + 64*x,x]
```

output
```
-1/2*(E*(5 - 2*x)^2) - 160*x + 32*x^2
```

3.907.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.907.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.00

method	result	size
gosper	$-2(\mathrm{e}-16)\left(-5+x\right)x$	11
default	$-2(\mathrm{e}-16)\left(x^{2}-5x\right)$	14
norman	$\left(-2\,\mathrm{e}+32\right)x^{2}+\left(10\,\mathrm{e}-160\right)x$	20
risch	$-2x^{2}\mathrm{e}+10x\,\mathrm{e}+32x^{2}-160x$	22
parallelrisch	$-2x^{2}\mathrm{e}+10x\,\mathrm{e}+32x^{2}-160x$	22
parts	$-2x^{2}\mathrm{e}+10x\,\mathrm{e}+32x^{2}-160x$	22

input
```
int((10-4*x)*exp(1)+64*x-160,x,method=_RETURNVERBOSE)
```

output
```
-2*(exp(1)-16)*(-5+x)*x
```

3.907.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.82

$$\int (-160 + e(10 - 4x) + 64x) \, dx = 32\, x^2 - 2\left(x^2 - 5\, x\right) e - 160\, x$$

input
```
integrate((10-4*x)*exp(1)+64*x-160,x, algorithm=\
```

output
```
32*x^2 - 2*(x^2 - 5*x)*e - 160*x
```

3.907.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.55

$$\int (-160 + e(10 - 4x) + 64x) \, dx = x^2 \cdot (32 - 2e) + x(-160 + 10e)$$

input
```
integrate((10-4*x)*exp(1)+64*x-160,x)
```

output
```
x**2*(32 - 2*E) + x*(-160 + 10*E)
```

3.907.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.82

$$\int (-160 + e(10 - 4x) + 64x) \, dx = 32\, x^2 - 2\left(x^2 - 5\, x\right) e - 160\, x$$

input
```
integrate((10-4*x)*exp(1)+64*x-160,x, algorithm=\
```

output
```
32*x^2 - 2*(x^2 - 5*x)*e - 160*x
```

3.907.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.82

$$\int (-160 + e(10 - 4x) + 64x)\, dx = 32\, x^2 - 2\, (x^2 - 5\, x) e - 160\, x$$

input
```
integrate((10-4*x)*exp(1)+64*x-160,x, algorithm=\
```

output
```
32*x^2 - 2*(x^2 - 5*x)*e - 160*x
```

3.907.9 Mupad [B] (verification not implemented)

Time = 15.32 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

$$\int (-160 + e(10 - 4x) + 64x)\, dx = -2\, x\, (\mathrm{e} - 16)\, (x - 5)$$

input
```
int(64*x - exp(1)*(4*x - 10) - 160,x)
```

output
```
-2*x*(exp(1) - 16)*(x - 5)
```

3.908 $\int \frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}+\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}(-6-\log(2))+(3+\log(2))}{(3+\log(2))\log(6)}$

3.908.1 Optimal result

Integrand size = 67, antiderivative size = 28

$$\int \frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}+\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}(-6-\log(2))+(3+\log(2))\log(6)}{(3+\log(2))\log(6)}\,dx = -1+x-\frac{e^{e^{-2+x+\frac{1+3x}{3+\log(2)}}}}{\log(6)}$$

output
```
x-exp(exp((1+3*x)/(3+ln(2))+x-2))/ln(6)-1
```

3.908.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int \frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}+\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}(-6-\log(2))+(3+\log(2))\log(6)}{(3+\log(2))\log(6)}\,dx = x+\frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}}(-6-\log(2))}{(6+\log(2))\log(6)}$$

input
```
Integrate[(E^(E^((-5 + 6*x + (-2 + x)*Log[2])/(3 + Log[2])) + (-5 + 6*x + 
(-2 + x)*Log[2])/(3 + Log[2]))*(-6 - Log[2]) + (3 + Log[2])*Log[6])/((3 + 
Log[2])*Log[6]),x]
```

output
```
x + (E^E^((-5 + 6*x + (-2 + x)*Log[2])/(3 + Log[2]))*(-6 - Log[2]))/((6 +
Log[2])*Log[6])
```

3.908.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-6-\log(2))\exp\left(\frac{6x+(x-2)\log(2)-5}{3+\log(2)}+e^{\frac{6x+(x-2)\log(2)-5}{3+\log(2)}}\right)+(3+\log(2))\log(6)}{(3+\log(2))\log(6)}dx$$

$$\Big\downarrow \textbf{27}$$

$$\frac{\int \left(-\exp\left(2^{-\frac{2-x}{3+\log(2)}}e^{-\frac{5-6x}{3+\log(2)}}-\frac{\log(2)(2-x)-6x+5}{3+\log(2)}\right)(6+\log(2))+(3+\log(2))\log(6)\right)dx}{(3+\log(2))\log(6)}$$

$$\Big\downarrow \textbf{2009}$$

$$\frac{x(3+\log(2))\log(6)-(6+\log(2))\int \exp\left(2^{-\frac{2-x}{3+\log(2)}}e^{-\frac{5-6x}{3+\log(2)}}-\frac{\log(2)(2-x)-6x+5}{3+\log(2)}\right)dx}{(3+\log(2))\log(6)}$$

input
```
Int[(E^(E^((-5 + 6*x + (-2 + x)*Log[2])/(3 + Log[2])) + (-5 + 6*x + (-2 +
x)*Log[2])/(3 + Log[2]))*(-6 - Log[2]) + (3 + Log[2])*Log[6])/((3 + Log[2]
)*Log[6]),x]
```

output
```
$Aborted
```

3.908.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.908.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

method	result
norman	$x-\frac{e^{e^{\frac{(-2+x)\ln(2)+6x-5}{3+\ln(2)}}}}{\ln(6)}$
parts	$x-\frac{e^{e^{\frac{(-2+x)\ln(2)+6x-5}{3+\ln(2)}}}}{\ln(6)}$
default	$\frac{(3+\ln(2))\ln(6)x+\frac{(-\ln(2)-6)e^{e^{\frac{(-2+x)\ln(2)+6x-5}{3+\ln(2)}}}(3+\ln(2))}{\ln(2)+6}}{(3+\ln(2))\ln(6)}$
parallelrisch	$\frac{\frac{(-\ln(2)-6)\left(e^{e^{\frac{(-2+x)\ln(2)+6x-5}{3+\ln(2)}}}\ln(2)+3\,e^{e^{\frac{(-2+x)\ln(2)+6x-5}{3+\ln(2)}}}\right)}{\ln(2)+6}+(3+\ln(2))\ln(6)x}{(3+\ln(2))\ln(6)}$
derivativedivides	$\frac{\ln(6)\ln(2)\ln\left(e^{\frac{(-2+x)\ln(2)+6x-5}{3+\ln(2)}}\right)+3\ln(6)\ln\left(e^{\frac{(-2+x)\ln(2)+6x-5}{3+\ln(2)}}\right)-e^{e^{\frac{(-2+x)\ln(2)+6x-5}{3+\ln(2)}}}\ln(2)-6\,e^{e^{\frac{(-2+x)\ln(2)+6x}{3+\ln(2)}}}}{\ln(6)(\ln(2)+6)}$
risch	$\frac{x\ln(2)^2}{(3+\ln(2))(\ln(2)+\ln(3))}+\frac{x\ln(2)\ln(3)}{(3+\ln(2))(\ln(2)+\ln(3))}+\frac{3x\ln(2)}{(3+\ln(2))(\ln(2)+\ln(3))}+\frac{3x\ln(3)}{(3+\ln(2))(\ln(2)+\ln(3))}-\frac{e^{e^{x\ln(}}}{(3+}$

input
```
int(((-ln(2)-6)*exp(((-2+x)*ln(2)+6*x-5)/(3+ln(2)))*exp(exp(((-2+x)*ln(2)+
6*x-5)/(3+ln(2))))+(3+ln(2))*ln(6))/(3+ln(2))/ln(6),x,method=_RETURNVERBOS
E)
```

output
```
x-1/ln(6)*exp(exp(((-2+x)*ln(2)+6*x-5)/(3+ln(2))))
```

3.908.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. 2(26) = 52.

Time = 0.28 (sec) , antiderivative size = 94, normalized size of antiderivative = 3.36

$$\int \frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}+\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}(-6-\log(2))+(3+\log(2))\log(6)}{(3+\log(2))\log(6)}\,dx$$
$$=\frac{\left(xe^{\left(\frac{(x-2)\log(2)+6\,x-5}{\log(2)+3}\right)}\log(6)-e^{\left(\frac{(\log(2)+3)e^{\left(\frac{(x-2)\log(2)+6\,x-5}{\log(2)+3}\right)}+(x-2)\log(2)+6\,x-5}{\log(2)+3}\right)}\right)e^{\left(-\frac{(x-2)\log(2)+6\,x-5}{\log(2)+3}\right)}}{\log(6)}$$

input
```
integrate(((-log(2)-6)*exp(((-2+x)*log(2)+6*x-5)/(3+log(2)))*exp(exp(((-2+
x)*log(2)+6*x-5)/(3+log(2))))+(3+log(2))*log(6))/(3+log(2))/log(6),x, algo
rithm=\
```

output
```
(x*e^(((x - 2)*log(2) + 6*x - 5)/(log(2) + 3))*log(6) - e^(((log(2) + 3)*e
^(((x - 2)*log(2) + 6*x - 5)/(log(2) + 3)) + (x - 2)*log(2) + 6*x - 5)/(lo
g(2) + 3)))*e^(-((x - 2)*log(2) + 6*x - 5)/(log(2) + 3))/log(6)
```

3.908.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}+\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}(-6-\log(2))+(3+\log(2))\log(6)}{(3+\log(2))\log(6)}\,dx$$
$$= x - \frac{e^{e^{\frac{6x+(x-2)\log(2)-5}{\log(2)+3}}}}{\log(6)}$$

input
```
integrate(((-ln(2)-6)*exp(((-2+x)*ln(2)+6*x-5)/(3+ln(2)))*exp(exp(((-2+x)*
ln(2)+6*x-5)/(3+ln(2))))+(3+ln(2))*ln(6))/(3+ln(2))/ln(6),x)
```

output
```
x - exp(exp((6*x + (x - 2)*log(2) - 5)/(log(2) + 3)))/log(6)
```

3.908.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. 2(26) = 52.

Time = 0.30 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.46

$$\int \frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}+\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}(-6-\log(2))+(3+\log(2))\log(6)}{(3+\log(2))\log(6)}\,dx$$
$$= \frac{x(\log(2)+3)\log(6)-(\log(2)+3)e^{\left(\frac{e^{\left(\frac{x\log(2)}{\log(2)+3}+\frac{6x}{\log(2)+3}-\frac{5}{\log(2)+3}\right)}}{2^{\frac{2}{\log(2)+3}}}\right)}}{(\log(2)+3)\log(6)}$$

input
```
integrate(((-log(2)-6)*exp(((-2+x)*log(2)+6*x-5)/(3+log(2)))*exp(exp(((-2+
x)*log(2)+6*x-5)/(3+log(2))))+(3+log(2))*log(6))/(3+log(2))/log(6),x, algo
rithm=\
```

output
```
(x*(log(2) + 3)*log(6) - (log(2) + 3)*e^(e^(x*log(2)/(log(2) + 3) + 6*x/(l
og(2) + 3) - 5/(log(2) + 3))/2^(2/(log(2) + 3))))/((log(2) + 3)*log(6))
```

3.908.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 254 vs. $2(26) = 52$.

Time = 0.38 (sec) , antiderivative size = 254, normalized size of antiderivative = 9.07

$$\int \frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}+\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}(-6-\log(2))+(3+\log(2))\log(6)}{(3+\log(2))\log(6)}\,dx$$

$$= \frac{2\,x(\log(2)+3)\log(6) - \left(\frac{2^{\frac{8}{9}}e^{\left(\frac{x\log(2)+e^{\left(\frac{x\log(2)+6\,x-2\,\log(2)-5}{\log(2)+3}\right)}\log(2)+6\,x+3\,e^{\left(\frac{x\log(2)+6\,x-2\,\log(2)-5}{\log(2)+3}\right)}}{\log(2)+3}+\frac{\log(2)^2-15\,\log(2)-45}{9\,(\log(2)+3)}\right)}\log}{e^{\left(\frac{x\log(2)+6\,x-2\,\log(2)-5}{\log(2)+3}\right.}}\right.}{2\,(\log(2)+3)\log}$$

input
```
integrate(((-log(2)-6)*exp(((-2+x)*log(2)+6*x-5)/(3+log(2)))*exp(exp(((-2+
x)*log(2)+6*x-5)/(3+log(2))))+(3+log(2))*log(6))/(3+log(2))/log(6),x, algo
rithm=\
```

output
```
1/2*(2*x*(log(2) + 3)*log(6) - (2^(8/9)*e^((x*log(2) + e^((x*log(2) + 6*x
- 2*log(2) - 5)/(log(2) + 3))*log(2) + 6*x + 3*e^((x*log(2) + 6*x - 2*log(
2) - 5)/(log(2) + 3)))/(log(2) + 3) + 1/9*(log(2)^2 - 15*log(2) - 45)/(log
(2) + 3))*log(2) + 3*2^(8/9)*e^((x*log(2) + e^((x*log(2) + 6*x - 2*log(2)
- 5)/(log(2) + 3))*log(2) + 6*x + 3*e^((x*log(2) + 6*x - 2*log(2) - 5)/(lo
g(2) + 3)))/(log(2) + 3) + 1/9*(log(2)^2 - 15*log(2) - 45)/(log(2) + 3)))*
(log(2) + 6)/(e^((x*log(2) + 6*x - 2*log(2) - 5)/(log(2) + 3))*log(2) + 6*
e^((x*log(2) + 6*x - 2*log(2) - 5)/(log(2) + 3))))/((log(2) + 3)*log(6))
```

3.908.9 Mupad [B] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.18

$$\int \frac{e^{e^{\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}+\frac{-5+6x+(-2+x)\log(2)}{3+\log(2)}}(-6-\log(2))+(3+\log(2))\log(6)}{(3+\log(2))\log(6)}\,dx$$
$$= x-\frac{\mathrm{e}^{\frac{2^{\frac{x}{\ln(2)+3}}\,\mathrm{e}^{\frac{6\,x}{\ln(2)+3}}\,\mathrm{e}^{-\frac{5}{\ln(2)+3}}}{2^{\frac{2}{\ln(2)+3}}}}\,(\ln(2)+3)}{\ln(216)+\ln(2)\,\ln(6)}$$

input
```
int((log(6)*(log(2) + 3) - exp(exp((6*x + log(2)*(x - 2) - 5)/(log(2) + 3)
))*exp((6*x + log(2)*(x - 2) - 5)/(log(2) + 3))*(log(2) + 6))/(log(6)*(log
(2) + 3)),x)
```

output
```
x - (exp((2^(x/(log(2) + 3))*exp((6*x)/(log(2) + 3))*exp(-5/(log(2) + 3)))
/2^(2/(log(2) + 3)))*(log(2) + 3))/(log(216) + log(2)*log(6))
```

3.909 $\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)}\,dx$

3.909.1 Optimal result

Integrand size = 120, antiderivative size = 31

$$\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)} = -3+e^{\frac{6+e+5x}{\frac{x}{3}+\log^2\left(\frac{8}{4-x}\right)}}$$

output
```
exp((exp(1)+5*x+6)/(ln(8/(-x+4))^2+1/3*x))-3
```

3.909.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.90

$$\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)} = e^{\frac{3(26+e+5(-4+x))}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}$$

input
```
Integrate[(E^((18 + 3*E + 15*x)/(x + 3*Log[-8/(-4 + x)]^2))*(72 + E*(12 -
3*x) - 18*x + (108 + 18*E + 90*x)*Log[-8/(-4 + x)] + (-180 + 45*x)*Log[-8/
(-4 + x)]^2))/(-4*x^2 + x^3 + (-24*x + 6*x^2)*Log[-8/(-4 + x)]^2 + (-36 +
9*x)*Log[-8/(-4 + x)]^4),x]
```

3.909. $\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)}\,dx$

output
```
E^((3*(26 + E + 5*(-4 + x)))/(x + 3*Log[-8/(-4 + x)]^2))
```

3.909.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{15x+3e+18}{x+3\log^2\left(-\frac{8}{x-4}\right)}}\left(e(12-3x)-18x+(45x-180)\log^2\left(-\frac{8}{x-4}\right)+(90x+18e+108)\log\left(-\frac{8}{x-4}\right)+72\right)}{x^3-4x^2+(6x^2-24x)\log^2\left(-\frac{8}{x-4}\right)+(9x-36)\log^4\left(-\frac{8}{x-4}\right)}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{e^{\frac{15x+3e+18}{x+3\log^2\left(-\frac{8}{x-4}\right)}}\left(-e(12-3x)+18x-\left((45x-180)\log^2\left(-\frac{8}{x-4}\right)\right)-(90x+18e+108)\log\left(-\frac{8}{x-4}\right)-72\right)}{(4-x)\left(x+3\log^2\left(-\frac{8}{x-4}\right)\right)^2}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{15e^{\frac{15x+3e+18}{x+3\log^2\left(-\frac{8}{x-4}\right)}}}{x+3\log^2\left(-\frac{8}{x-4}\right)}-\frac{3(5x+e+6)e^{\frac{15x+3e+18}{x+3\log^2\left(-\frac{8}{x-4}\right)}}\left(x-6\log\left(-\frac{8}{x-4}\right)-4\right)}{(x-4)\left(x+3\log^2\left(-\frac{8}{x-4}\right)\right)^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-3(26+e)\int \frac{e^{\frac{15x+3e+18}{3\log^2\left(-\frac{8}{x-4}\right)+x}}}{\left(3\log^2\left(-\frac{8}{x-4}\right)+x\right)^2}dx+60\int \frac{e^{\frac{15x+3e+18}{3\log^2\left(-\frac{8}{x-4}\right)+x}}}{\left(3\log^2\left(-\frac{8}{x-4}\right)+x\right)^2}dx-15\int \frac{e^{\frac{15x+3e+18}{3\log^2\left(-\frac{8}{x-4}\right)+x}}x}{\left(3\log^2\left(-\frac{8}{x-4}\right)+x\right)^2}dx+90\int \frac{e^{\frac{15x+3e+18}{3\log^2\left(-\frac{8}{x-4}\right)+x}}\log\left(-\frac{8}{x-4}\right)}{\left(3\log^2\left(-\frac{8}{x-4}\right)+x\right)^2}dx+18(26+e)\int \frac{e^{\frac{15x+3e+18}{3\log^2\left(-\frac{8}{x-4}\right)+x}}\log\left(-\frac{8}{x-4}\right)}{(x-4)\left(3\log^2\left(-\frac{8}{x-4}\right)+x\right)^2}dx+15\int \frac{e^{\frac{15x+3e+18}{3\log^2\left(-\frac{8}{x-4}\right)+x}}}{3\log^2\left(-\frac{8}{x-4}\right)+x}dx$$

input
```
Int[(E^((18 + 3*E + 15*x)/(x + 3*Log[-8/(-4 + x)]^2))*(72 + E*(12 - 3*x) -
 18*x + (108 + 18*E + 90*x)*Log[-8/(-4 + x)] + (-180 + 45*x)*Log[-8/(-4 +
x)]^2))/(-4*x^2 + x^3 + (-24*x + 6*x^2)*Log[-8/(-4 + x)]^2 + (-36 + 9*x)*L
og[-8/(-4 + x)]^4),x]
```

3.909. $\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)}dx$

output
```
$Aborted
```

3.909.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.909.4 Maple [A] (verified)

Time = 5.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

method	result	size
risch	$\mathrm{e}^{\frac{3\,\mathrm{e}+15x+18}{3\ln\left(-\frac{8}{x-4}\right)^{2}+x}}$	27
parallelrisch	$\mathrm{e}^{\frac{3\,\mathrm{e}+15x+18}{3\ln\left(-\frac{8}{x-4}\right)^{2}+x}}$	27

input
```
int(((45*x-180)*ln(-8/(x-4))^2+(18*exp(1)+90*x+108)*ln(-8/(x-4))+(-3*x+12)
*exp(1)-18*x+72)*exp((3*exp(1)+15*x+18)/(3*ln(-8/(x-4))^2+x))/((9*x-36)*ln
(-8/(x-4))^4+(6*x^2-24*x)*ln(-8/(x-4))^2+x^3-4*x^2),x,method=_RETURNVERBOS
E)
```

output
```
exp(3*(exp(1)+5*x+6)/(3*ln(-8/(x-4))^2+x))
```

3.909.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)}$$
$$= e^{\left(\frac{3\,(5\,x+e+6)}{3\,\log\left(-\frac{8}{x-4}\right)^2+x}\right)}$$

input
```
integrate(((45*x-180)*log(-8/(x-4))^2+(18*exp(1)+90*x+108)*log(-8/(x-4))+(
-3*x+12)*exp(1)-18*x+72)*exp((3*exp(1)+15*x+18)/(3*log(-8/(x-4))^2+x))/((9
*x-36)*log(-8/(x-4))^4+(6*x^2-24*x)*log(-8/(x-4))^2+x^3-4*x^2),x, algorith
m=\
```

output
```
e^(3*(5*x + e + 6)/(3*log(-8/(x - 4))^2 + x))
```

3.909.6 Sympy [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.77

$$\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)}$$
$$= e^{\frac{15x+3e+18}{x+3\log\left(-\frac{8}{x-4}\right)^2}}$$

input
```
integrate(((45*x-180)*ln(-8/(x-4))**2+(18*exp(1)+90*x+108)*ln(-8/(x-4))+(-
3*x+12)*exp(1)-18*x+72)*exp((3*exp(1)+15*x+18)/(3*ln(-8/(x-4))**2+x))/((9*
x-36)*ln(-8/(x-4))**4+(6*x**2-24*x)*ln(-8/(x-4))**2+x**3-4*x**2),x)
```

output
```
exp((15*x + 3*E + 18)/(x + 3*log(-8/(x - 4))**2))
```

3.909.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 185 vs. 2(28) = 56.

Time = 0.45 (sec) , antiderivative size = 185, normalized size of antiderivative = 5.97

$$\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)}$$

$$=e^{\left(-\frac{405\,\log(2)^2}{27\,\log(2)^2-18\,\log(2)\log(-x+4)+3\,\log(-x+4)^2+x}+\frac{270\,\log(2)\log(-x+4)}{27\,\log(2)^2-18\,\log(2)\log(-x+4)+3\,\log(-x+4)^2+x}-\frac{45\,\log(-x+4)^2}{27\,\log(2)^2-18\,\log(2)\log(-x+4)+3\,\log(-x+4)^2+}\right.}$$

input
```
integrate(((45*x-180)*log(-8/(x-4))^2+(18*exp(1)+90*x+108)*log(-8/(x-4))+(
-3*x+12)*exp(1)-18*x+72)*exp((3*exp(1)+15*x+18)/(3*log(-8/(x-4))^2+x))/((9
*x-36)*log(-8/(x-4))^4+(6*x^2-24*x)*log(-8/(x-4))^2+x^3-4*x^2),x, algorith
m=\
```

output
```
e^(-405*log(2)^2/(27*log(2)^2 - 18*log(2)*log(-x + 4) + 3*log(-x + 4)^2 +
x) + 270*log(2)*log(-x + 4)/(27*log(2)^2 - 18*log(2)*log(-x + 4) + 3*log(-
x + 4)^2 + x) - 45*log(-x + 4)^2/(27*log(2)^2 - 18*log(2)*log(-x + 4) + 3*
log(-x + 4)^2 + x) + 3*e/(27*log(2)^2 - 18*log(2)*log(-x + 4) + 3*log(-x +
 4)^2 + x) + 18/(27*log(2)^2 - 18*log(2)*log(-x + 4) + 3*log(-x + 4)^2 + x
) + 15)
```

3.909.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. 2(28) = 56.

Time = 1.68 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.90

$$\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)}$$

$$=e^{\left(\frac{15\,x}{3\,\log\left(-\frac{8}{x-4}\right)^2+x}+\frac{3\,e}{3\,\log\left(-\frac{8}{x-4}\right)^2+x}+\frac{18}{3\,\log\left(-\frac{8}{x-4}\right)^2+x}\right)}$$

input
```
integrate(((45*x-180)*log(-8/(x-4))^2+(18*exp(1)+90*x+108)*log(-8/(x-4))+(
-3*x+12)*exp(1)-18*x+72)*exp((3*exp(1)+15*x+18)/(3*log(-8/(x-4))^2+x))/((9
*x-36)*log(-8/(x-4))^4+(6*x^2-24*x)*log(-8/(x-4))^2+x^3-4*x^2),x, algorith
m=\
```

output
```
e^(15*x/(3*log(-8/(x - 4))^2 + x) + 3*e/(3*log(-8/(x - 4))^2 + x) + 18/(3*
log(-8/(x - 4))^2 + x))
```

3.909.9 Mupad [B] (verification not implemented)

Time = 17.85 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.97

$$\int \frac{e^{\frac{18+3e+15x}{x+3\log^2\left(-\frac{8}{-4+x}\right)}}\left(72+e(12-3x)-18x+(108+18e+90x)\log\left(-\frac{8}{-4+x}\right)+(-180+45x)\log^2\left(-\frac{8}{-4+x}\right)\right)}{-4x^2+x^3+(-24x+6x^2)\log^2\left(-\frac{8}{-4+x}\right)+(-36+9x)\log^4\left(-\frac{8}{-4+x}\right)}$$
$$= \mathrm{e}^{\frac{3\,\mathrm{e}}{3\ln\left(-\frac{8}{x-4}\right)^2+x}}\,\mathrm{e}^{\frac{15\,x}{3\ln\left(-\frac{8}{x-4}\right)^2+x}}\,\mathrm{e}^{\frac{18}{3\ln\left(-\frac{8}{x-4}\right)^2+x}}$$

input
```
int(-(exp((15*x + 3*exp(1) + 18)/(x + 3*log(-8/(x - 4))^2))*(log(-8/(x - 4
))*(90*x + 18*exp(1) + 108) - 18*x + log(-8/(x - 4))^2*(45*x - 180) - exp(
1)*(3*x - 12) + 72))/(log(-8/(x - 4))^2*(24*x - 6*x^2) + 4*x^2 - x^3 - log
(-8/(x - 4))^4*(9*x - 36)),x)
```

output
```
exp((3*exp(1))/(x + 3*log(-8/(x - 4))^2))*exp((15*x)/(x + 3*log(-8/(x - 4)
)^2))*exp(18/(x + 3*log(-8/(x - 4))^2))
```

3.910 $\int \frac{6+(-3+20x^3)\log(x^2)+10x^3\log^2(x^2)}{45x^2}\,dx$

3.910.1 Optimal result

Integrand size = 32, antiderivative size = 28

$$\int \frac{6+(-3+20x^3)\log(x^2)+10x^3\log^2(x^2)}{45x^2}\,dx = \frac{1}{9}x^2\log^2(x^2)+\frac{1}{15}\left(-1+\frac{\log(x^2)}{x}\right)$$

output
```
1/9*x^2*ln(x^2)^2+1/15*ln(x^2)/x-1/15
```

3.910.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{6+(-3+20x^3)\log(x^2)+10x^3\log^2(x^2)}{45x^2}\,dx = \frac{\log(x^2)}{15x}+\frac{1}{9}x^2\log^2(x^2)$$

input
```
Integrate[(6 + (-3 + 20*x^3)*Log[x^2] + 10*x^3*Log[x^2]^2)/(45*x^2),x]
```

output
```
Log[x^2]/(15*x) + (x^2*Log[x^2]^2)/9
```

3.910.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.094, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{10x^3\log^2\left(x^2\right)+\left(20x^3-3\right)\log\left(x^2\right)+6}{45x^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{45}\int \frac{10\log^2\left(x^2\right)x^3-\left(3-20x^3\right)\log\left(x^2\right)+6}{x^2}dx$$

$$\Big\downarrow \ 2010$$

$$\frac{1}{45}\int \left(10x\log^2\left(x^2\right)+\frac{\left(20x^3-3\right)\log\left(x^2\right)}{x^2}+\frac{6}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{45}\left(5x^2\log^2\left(x^2\right)+\frac{3\log\left(x^2\right)}{x}\right)$$

input
```
Int[(6 + (-3 + 20*x^3)*Log[x^2] + 10*x^3*Log[x^2]^2)/(45*x^2),x]
```

output
```
((3*Log[x^2])/x + 5*x^2*Log[x^2]^2)/45
```

3.910.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.910.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

method	result	size
default	$\frac{\ln(x^2)}{15x}+\frac{x^2\ln(x^2)^2}{9}$	22
risch	$\frac{\ln(x^2)}{15x}+\frac{x^2\ln(x^2)^2}{9}$	22
parts	$\frac{\ln(x^2)}{15x}+\frac{x^2\ln(x^2)^2}{9}$	22
norman	$\frac{\frac{x^3\ln\left(x^2\right)^2}{9}+\frac{\ln\left(x^2\right)}{15}}{x}$	23
parallelrisch	$\frac{10x^3\ln(x^2)^2+6\ln(x^2)}{90x}$	24

input
```
int(1/45*(10*x^3*ln(x^2)^2+(20*x^3-3)*ln(x^2)+6)/x^2,x,method=_RETURNVERBO
SE)
```

output
```
1/15*ln(x^2)/x+1/9*x^2*ln(x^2)^2
```

3.910.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{6+(-3+20x^3)\log(x^2)+10x^3\log^2(x^2)}{45x^2}\,dx=\frac{5\,x^3\log(x^2)^2+3\,\log(x^2)}{45\,x}$$

input
```
integrate(1/45*(10*x^3*log(x^2)^2+(20*x^3-3)*log(x^2)+6)/x^2,x, algorithm=
\
```

output
```
1/45*(5*x^3*log(x^2)^2 + 3*log(x^2))/x
```

3.910.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{6+(-3+20x^3)\log(x^2)+10x^3\log^2(x^2)}{45x^2}\,dx = \frac{x^2\log(x^2)^2}{9}+\frac{\log(x^2)}{15x}$$

input
```
integrate(1/45*(10*x**3*ln(x**2)**2+(20*x**3-3)*ln(x**2)+6)/x**2,x)
```

output
```
x**2*log(x**2)**2/9 + log(x**2)/(15*x)
```

3.910.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{6+(-3+20x^3)\log(x^2)+10x^3\log^2(x^2)}{45x^2}\,dx = \frac{1}{9}\,x^2\log\left(x^2\right)^2+\frac{\log(x^2)}{15\,x}$$

input
```
integrate(1/45*(10*x^3*log(x^2)^2+(20*x^3-3)*log(x^2)+6)/x^2,x, algorithm=
\
```

output
```
1/9*x^2*log(x^2)^2 + 1/15*log(x^2)/x
```

3.910.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{6+(-3+20x^3)\log(x^2)+10x^3\log^2(x^2)}{45x^2}\,dx = \frac{1}{9}\,x^2\log\left(x^2\right)^2+\frac{\log(x^2)}{15\,x}$$

input
```
integrate(1/45*(10*x^3*log(x^2)^2+(20*x^3-3)*log(x^2)+6)/x^2,x, algorithm=
\
```

output
```
1/9*x^2*log(x^2)^2 + 1/15*log(x^2)/x
```

3.910.9 Mupad [B] (verification not implemented)

Time = 16.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{6+(-3+20x^3)\log(x^2)+10x^3\log^2(x^2)}{45x^2}\,dx = \frac{\ln(x^2)\,\left(5\,x^3\,\ln(x^2)+3\right)}{45\,x}$$

input
```
int(((log(x^2)*(20*x^3 - 3))/45 + (2*x^3*log(x^2)^2)/9 + 2/15)/x^2,x)
```

output
```
(log(x^2)*(5*x^3*log(x^2) + 3))/(45*x)
```

3.911 $\int \frac{-e^{2-2x}x^2+e^{1-x+\frac{1}{4}(4+\log(4))}(-5+5x-2x^2)+e^{\frac{1}{2}(4+\log(4))}(-5-x^2)}{e^{2-2x}x^2+e^{\frac{1}{2}(4+\log(4))}x^2+2e^{1-x+\frac{1}{4}(4+\log(4))}x^2} dx$

3.911.1 Optimal result

Integrand size = 106, antiderivative size = 22

$$\int \frac{-e^{2-2x}x^2+e^{1-x+\frac{1}{4}(4+\log(4))}(-5+5x-2x^2)+e^{\frac{1}{2}(4+\log(4))}(-5-x^2)}{e^{2-2x}x^2+e^{\frac{1}{2}(4+\log(4))}x^2+2e^{1-x+\frac{1}{4}(4+\log(4))}x^2} dx = -x+\frac{5}{x+\frac{e^{-x}x}{\sqrt{2}}}$$

output
```
5/(x+x/exp(1+1/2*ln(2))*exp(1-x))-x
```

3.911.2 Mathematica [A] (verified)

Time = 2.43 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int \frac{-e^{2-2x}x^2+e^{1-x+\frac{1}{4}(4+\log(4))}(-5+5x-2x^2)+e^{\frac{1}{2}(4+\log(4))}(-5-x^2)}{e^{2-2x}x^2+e^{\frac{1}{2}(4+\log(4))}x^2+2e^{1-x+\frac{1}{4}(4+\log(4))}x^2} dx = -\frac{x^2+\sqrt{2}e^x(-5+x^2)}{x+\sqrt{2}e^xx}$$

input
```
Integrate[(-(E^(2 - 2*x)*x^2) + E^(1 - x + (4 + Log[4])/4)*(-5 + 5*x - 2*x
^2) + E^((4 + Log[4])/2)*(-5 - x^2))/(E^(2 - 2*x)*x^2 + E^((4 + Log[4])/2)
*x^2 + 2*E^(1 - x + (4 + Log[4])/4)*x^2),x]
```

output
```
-((x^2 + Sqrt[2]*E^x*(-5 + x^2))/(x + Sqrt[2]*E^x*x))
```

3.911.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^{2-2x}x^2+\left(-2x^2+5x-5\right)e^{-x+1+\frac{1}{4}(4+\log(4))}+\left(-x^2-5\right)e^{\frac{1}{2}(4+\log(4))}}{e^{2-2x}x^2+2x^2e^{-x+1+\frac{1}{4}(4+\log(4))}+x^2e^{\frac{1}{2}(4+\log(4))}}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-x^2+\sqrt{2}e^x\left(-2x^2+5x-5\right)-2e^{2x}\left(x^2+5\right)}{\left(\sqrt{2}e^x x+x\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{5(x+1)}{\left(\sqrt{2}e^x+1\right)x^2}+\frac{-x^2-5}{x^2}-\frac{5}{\left(\sqrt{2}e^x+1\right)^2 x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$5\int \frac{1}{\left(1+\sqrt{2}e^x\right)x^2}dx-5\int \frac{1}{\left(1+\sqrt{2}e^x\right)^2 x}dx+5\int \frac{1}{\left(1+\sqrt{2}e^x\right)x}dx-x+\frac{5}{x}$$

input
```
Int[(-(E^(2 - 2*x)*x^2) + E^(1 - x + (4 + Log[4])/4)*(-5 + 5*x - 2*x^2) +
E^((4 + Log[4])/2)*(-5 - x^2))/(E^(2 - 2*x)*x^2 + E^((4 + Log[4])/2)*x^2 +
 2*E^(1 - x + (4 + Log[4])/4)*x^2),x]
```

output
```
$Aborted
```

3.911.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.911.4 Maple [A] (verified)

Time = 8.66 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.32

method	result	size
risch	$-x+\frac{10\,\mathrm{e}}{x\left(2\,\mathrm{e}+\sqrt{2}\,\mathrm{e}^{1-x}\right)}$	29
norman	$\frac{-x^{2}\mathrm{e}^{1-x}+5\,\mathrm{e}\sqrt{2}-\mathrm{e}\sqrt{2}\,x^{2}}{x\left(\mathrm{e}^{1+\frac{\ln(2)}{2}}+\mathrm{e}^{1-x}\right)}$	50
parallelrisch	$-\frac{\mathrm{e}^{1+\frac{\ln(2)}{2}}x^{2}+x^{2}\mathrm{e}^{1-x}-5\,\mathrm{e}^{1+\frac{\ln(2)}{2}}}{\left(\mathrm{e}^{1+\frac{\ln(2)}{2}}+\mathrm{e}^{1-x}\right)x}$	53

input
```
int(((-x^2-5)*exp(1+1/2*ln(2))^2+(-2*x^2+5*x-5)*exp(1-x)*exp(1+1/2*ln(2))-
x^2*exp(1-x)^2)/(x^2*exp(1+1/2*ln(2))^2+2*x^2*exp(1-x)*exp(1+1/2*ln(2))+x^
2*exp(1-x)^2),x,method=_RETURNVERBOSE)
```

output
```
-x+10*exp(1)/x/(2*exp(1)+2^(1/2)*exp(1-x))
```

3.911.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. 2(21) = 42.

Time = 0.26 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.27

$$\int \frac{-e^{2-2x}x^2+e^{1-x+\frac{1}{4}(4+\log(4))}(-5+5x-2x^2)+e^{\frac{1}{2}(4+\log(4))}(-5-x^2)}{e^{2-2x}x^2+e^{\frac{1}{2}(4+\log(4))}x^2+2e^{1-x+\frac{1}{4}(4+\log(4))}x^2}\,dx$$
$$=-\frac{x^2e^{\left(-x+\frac{1}{2}\log(2)+2\right)}+(x^2-5)e^{(\log(2)+2)}}{xe^{\left(-x+\frac{1}{2}\log(2)+2\right)}+xe^{(\log(2)+2)}}$$

input
```
integrate(((-x^2-5)*exp(1+1/2*log(2))^2+(-2*x^2+5*x-5)*exp(1-x)*exp(1+1/2*
log(2))-x^2*exp(1-x)^2)/(x^2*exp(1+1/2*log(2))^2+2*x^2*exp(1-x)*exp(1+1/2*
log(2))+x^2*exp(1-x)^2),x, algorithm=\
```

output
```
-(x^2*e^(-x + 1/2*log(2) + 2) + (x^2 - 5)*e^(log(2) + 2))/(x*e^(-x + 1/2*l
og(2) + 2) + x*e^(log(2) + 2))
```

3.911.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{-e^{2-2x}x^2+e^{1-x+\frac{1}{4}(4+\log(4))}(-5+5x-2x^2)+e^{\frac{1}{2}(4+\log(4))}(-5-x^2)}{e^{2-2x}x^2+e^{\frac{1}{2}(4+\log(4))}x^2+2e^{1-x+\frac{1}{4}(4+\log(4))}x^2}\,dx$$
$$=-x+\frac{5\sqrt{2}e}{x\left(e^{1-x}+\sqrt{2}e\right)}$$

input
```
integrate((((-x**2-5)*exp(1+1/2*ln(2))**2+(-2*x**2+5*x-5)*exp(1-x)*exp(1+1/
2*ln(2))-x**2*exp(1-x)**2)/(x**2*exp(1+1/2*ln(2))**2+2*x**2*exp(1-x)*exp(1
+1/2*ln(2))+x**2*exp(1-x)**2),x)
```

output
```
-x + 5*sqrt(2)*E/(x*(exp(1 - x) + sqrt(2)*E))
```

3.911.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{-e^{2-2x}x^2+e^{1-x+\frac{1}{4}(4+\log(4))}(-5+5x-2x^2)+e^{\frac{1}{2}(4+\log(4))}(-5-x^2)}{e^{2-2x}x^2+e^{\frac{1}{2}(4+\log(4))}x^2+2e^{1-x+\frac{1}{4}(4+\log(4))}x^2}\,dx$$
$$=\text{Exception raised: RuntimeError}$$

input
```
integrate((((-x^2-5)*exp(1+1/2*log(2))^2+(-2*x^2+5*x-5)*exp(1-x)*exp(1+1/2*
log(2))-x^2*exp(1-x)^2)/(x^2*exp(1+1/2*log(2))^2+2*x^2*exp(1-x)*exp(1+1/2*
log(2))+x^2*exp(1-x)^2),x, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is un
defined.
```

3.911.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 530 vs. 2(21) = 42.

Time = 0.29 (sec) , antiderivative size = 530, normalized size of antiderivative = 24.09

$$\int \frac{-e^{2-2x}x^2 + e^{1-x+\frac{1}{4}(4+\log(4))}(-5+5x-2x^2) + e^{\frac{1}{2}(4+\log(4))}(-5-x^2)}{e^{2-2x}x^2 + e^{\frac{1}{2}(4+\log(4))}x^2 + 2e^{1-x+\frac{1}{4}(4+\log(4))}x^2}\,dx$$
$$= \text{Too large to display}$$

input
```
integrate(((-x^2-5)*exp(1+1/2*log(2))^2+(-2*x^2+5*x-5)*exp(1-x)*exp(1+1/2*
log(2))-x^2*exp(1-x)^2)/(x^2*exp(1+1/2*log(2))^2+2*x^2*exp(1-x)*exp(1+1/2*
log(2))+x^2*exp(1-x)^2),x, algorithm=\
```

output
```
-1/2*(2*(2*x - log(2) - 4)^2*e^2 + (2*x - log(2) - 4)^2*e^(-x + 1/2*log(2)
 + 2) + 2*(2*x - log(2) - 4)*e^2*log(2) + (2*x - log(2) - 4)*e^(-x + 1/2*l
og(2) + 2)*log(2) - 4*(2*x - log(2) - 4)*e^2*log(2*e^2 + e^(-x + 1/2*log(2
) + 2)) - 2*(2*x - log(2) - 4)*e^(-x + 1/2*log(2) + 2)*log(2*e^2 + e^(-x +
 1/2*log(2) + 2)) - 4*e^2*log(2)*log(2*e^2 + e^(-x + 1/2*log(2) + 2)) - 2*
e^(-x + 1/2*log(2) + 2)*log(2)*log(2*e^2 + e^(-x + 1/2*log(2) + 2)) + 4*(2
*x - log(2) - 4)*e^2*log(-2*e^2 - e^(-x + 1/2*log(2) + 2)) + 2*(2*x - log(
2) - 4)*e^(-x + 1/2*log(2) + 2)*log(-2*e^2 - e^(-x + 1/2*log(2) + 2)) + 4*
e^2*log(2)*log(-2*e^2 - e^(-x + 1/2*log(2) + 2)) + 2*e^(-x + 1/2*log(2) +
2)*log(2)*log(-2*e^2 - e^(-x + 1/2*log(2) + 2)) + 8*(2*x - log(2) - 4)*e^2
 + 4*(2*x - log(2) - 4)*e^(-x + 1/2*log(2) + 2) - 16*e^2*log(2*e^2 + e^(-x
 + 1/2*log(2) + 2)) - 8*e^(-x + 1/2*log(2) + 2)*log(2*e^2 + e^(-x + 1/2*lo
g(2) + 2)) + 16*e^2*log(-2*e^2 - e^(-x + 1/2*log(2) + 2)) + 8*e^(-x + 1/2*
log(2) + 2)*log(-2*e^2 - e^(-x + 1/2*log(2) + 2)) - 40*e^2)/(2*(2*x - log(
2) - 4)*e^2 + (2*x - log(2) - 4)*e^(-x + 1/2*log(2) + 2) + 2*e^2*log(2) +
e^(-x + 1/2*log(2) + 2)*log(2) + 8*e^2 + 4*e^(-x + 1/2*log(2) + 2))
```

3.911.9 Mupad [B] (verification not implemented)

Time = 16.88 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.32

$$\int \frac{-e^{2-2x}x^2 + e^{1-x+\frac{1}{4}(4+\log(4))}(-5+5x-2x^2) + e^{\frac{1}{2}(4+\log(4))}(-5-x^2)}{e^{2-2x}x^2 + e^{\frac{1}{2}(4+\log(4))}x^2 + 2e^{1-x+\frac{1}{4}(4+\log(4))}x^2}\,dx$$
$$= \frac{5\sqrt{2}\,\mathrm{e}}{x\,\left(\mathrm{e}^{1-x} + \sqrt{2}\,\mathrm{e}\right)} - x$$

input
```
int(-(exp(log(2) + 2)*(x^2 + 5) + x^2*exp(2 - 2*x) + exp(log(2)/2 + 1)*exp
(1 - x)*(2*x^2 - 5*x + 5))/(x^2*exp(log(2) + 2) + x^2*exp(2 - 2*x) + 2*x^2
*exp(log(2)/2 + 1)*exp(1 - x)),x)
```

output
```
(5*2^(1/2)*exp(1))/(x*(exp(1 - x) + 2^(1/2)*exp(1))) - x
```

3.911. $$\int \frac{-e^{2-2x}x^2+e^{1-x+\frac{1}{4}(4+\log(4))}\left(-5+5x-2x^2\right)+e^{\frac{1}{2}(4+\log(4))}\left(-5-x^2\right)}{e^{2-2x}x^2+e^{\frac{1}{2}(4+\log(4))}x^2+2e^{1-x+\frac{1}{4}(4+\log(4))}x^2}\,dx$$

3.912 $\int \frac{3x+e^{3+e^4+\frac{2}{x}+2e^{2/x}x}(-4+2x)}{4x}\,dx$

3.912.1 Optimal result

Integrand size = 39, antiderivative size = 25

$$\int \frac{3x+e^{3+e^4+\frac{2}{x}+2e^{2/x}x}(-4+2x)}{4x}\,dx = \frac{1}{4}\left(e^{3+e^4+2e^{2/x}x}+3x\right)$$

output
```
1/4*exp(2*x*exp(2/x)+exp(4)+3)+3/4*x
```

3.912.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{3x+e^{3+e^4+\frac{2}{x}+2e^{2/x}x}(-4+2x)}{4x}\,dx = \frac{1}{4}e^{3+e^4+2e^{2/x}x}+\frac{3x}{4}$$

input
```
Integrate[(3*x + E^(3 + E^4 + 2/x + 2*E^(2/x)*x)*(-4 + 2*x))/(4*x),x]
```

output
```
E^(3 + E^4 + 2*E^(2/x)*x)/4 + (3*x)/4
```

3.912.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x+e^{2e^{2/x}x+\frac{2}{x}+e^4+3}(2x-4)}{4x} \, dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{4}\int -\frac{2e^{2e^{2/x}x+e^4+3+\frac{2}{x}}(2-x)-3x}{x}dx$$

$$\Big\downarrow \; 25$$

$$-\frac{1}{4}\int \frac{2e^{2e^{2/x}x+e^4+3+\frac{2}{x}}(2-x)-3x}{x}dx$$

$$\Big\downarrow \; 2010$$

$$-\frac{1}{4}\int \left(\frac{2e^{2e^{2/x}x+3\left(1+\frac{e^4}{3}\right)+\frac{2}{x}}(2-x)}{x}-3\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{4}\left(2\int e^{2e^{2/x}x+3\left(1+\frac{e^4}{3}\right)+\frac{2}{x}}dx-4\int \frac{e^{2e^{2/x}x+3\left(1+\frac{e^4}{3}\right)+\frac{2}{x}}}{x}dx+3x\right)$$

input
```
Int[(3*x + E^(3 + E^4 + 2/x + 2*E^(2/x)*x)*(-4 + 2*x))/(4*x),x]
```

output
```
$Aborted
```

3.912.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.912.4 Maple [A] (verified)

Time = 0.64 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

method	result	size
norman	$\frac{\mathrm{e}^{2x\,\mathrm{e}^{\frac{2}{x}}+\mathrm{e}^{4}+3}}{4}+\frac{3x}{4}$	21
risch	$\frac{\mathrm{e}^{2x\,\mathrm{e}^{\frac{2}{x}}+\mathrm{e}^{4}+3}}{4}+\frac{3x}{4}$	21
parallelrisch	$\frac{\mathrm{e}^{2x\,\mathrm{e}^{\frac{2}{x}}+\mathrm{e}^{4}+3}}{4}+\frac{3x}{4}$	21
parts	$\frac{\mathrm{e}^{2x\,\mathrm{e}^{\frac{2}{x}}+\mathrm{e}^{4}+3}}{4}+\frac{3x}{4}$	21

input
```
int(1/4*((2*x-4)*exp(2/x)*exp(2*x*exp(2/x)+exp(4)+3)+3*x)/x,x,method=_RETU
RNVERBOSE)
```

output
```
1/4*exp(2*x*exp(2/x)+exp(4)+3)+3/4*x
```

3.912.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. $2(20) = 40$.

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.72

$$\int \frac{3x+e^{3+e^4+\frac{2}{x}+2e^{2/x}x}(-4+2x)}{4x}\,dx=\frac{1}{4}\left(3\,xe^{\frac{2}{x}}+e^{\left(\frac{2\,x^2e^{\frac{2}{x}}+xe^4+3\,x+2}{x}\right)}\right)e^{\left(-\frac{2}{x}\right)}$$

input
```
integrate(1/4*((2*x-4)*exp(2/x)*exp(2*x*exp(2/x)+exp(4)+3)+3*x)/x,x, algor
ithm=\
```

output
```
1/4*(3*x*e^(2/x) + e^((2*x^2*e^(2/x) + x*e^4 + 3*x + 2)/x))*e^(-2/x)
```

3.912.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{3x+e^{3+e^4+\frac{2}{x}+2e^{2/x}x}(-4+2x)}{4x}\,dx=\frac{3x}{4}+\frac{e^{2xe^{\frac{2}{x}}+3+e^4}}{4}$$

input
```
integrate(1/4*((2*x-4)*exp(2/x)*exp(2*x*exp(2/x)+exp(4)+3)+3*x)/x,x)
```

output
```
3*x/4 + exp(2*x*exp(2/x) + 3 + exp(4))/4
```

3.912.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{3x+e^{3+e^4+\frac{2}{x}+2e^{2/x}x}(-4+2x)}{4x}\,dx=\frac{3}{4}\,x+\frac{1}{4}\,e^{\left(2\,xe^{\frac{2}{x}}+e^4+3\right)}$$

input
```
integrate(1/4*((2*x-4)*exp(2/x)*exp(2*x*exp(2/x)+exp(4)+3)+3*x)/x,x, algor
ithm=\
```

output
```
3/4*x + 1/4*e^(2*x*e^(2/x) + e^4 + 3)
```

3.912.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. 2(20) = 40.

Time = 0.28 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.72

$$\int \frac{3x+e^{3+e^4+\frac{2}{x}+2e^{2/x}x}(-4+2x)}{4x}\,dx=\frac{1}{4}\left(3\,xe^{\frac{2}{x}}+e^{\left(\frac{2\,x^2e^{\frac{2}{x}}+xe^4+3\,x+2}{x}\right)}\right)e^{\left(-\frac{2}{x}\right)}$$

input
```
integrate(1/4*((2*x-4)*exp(2/x)*exp(2*x*exp(2/x)+exp(4)+3)+3*x)/x,x, algor
ithm=\
```

output
```
1/4*(3*x*e^(2/x) + e^((2*x^2*e^(2/x) + x*e^4 + 3*x + 2)/x))*e^(-2/x)
```

3.912.9 Mupad [B] (verification not implemented)

Time = 16.66 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{3x+e^{3+e^4+\frac{2}{x}+2e^{2/x}x}(-4+2x)}{4x}\,dx=\frac{3\,x}{4}+\frac{e^3\,e^{e^4}\,e^{2\,x\,e^{2/x}}}{4}$$

input
```
int(((3*x)/4 + (exp(2/x)*exp(exp(4) + 2*x*exp(2/x) + 3)*(2*x - 4))/4)/x,x)
```

output
```
(3*x)/4 + (exp(3)*exp(exp(4))*exp(2*x*exp(2/x)))/4
```

3.913 $\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx$

3.913.1 Optimal result

Integrand size = 59, antiderivative size = 26

$$\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx = 2e^{-16\log^2\left(-2-x+\frac{1}{3}\left(2+\frac{2}{e^4}+x\right)\right)}$$

output
```
2/exp(16*ln(2/3/exp(4)-4/3-2/3*x)^2)
```

3.913.2 Mathematica [A] (verified)

Time = 8.94 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

$$\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx = 2e^{-16\log^2\left(\frac{2}{3}\left(-2+\frac{1}{e^4}-x\right)\right)}$$

input
```
Integrate[(-64*E^(4 - 16*Log[(2 + E^4*(-4 - 2*x))/(3*E^4)]^2)*Log[(2 + E^4
*(-4 - 2*x))/(3*E^4)])/(-1 + E^4*(2 + x)),x]
```

output
```
2/E^(16*Log[(2*(-2 + E^(-4) - x))/3]^2)
```

3.913. $\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx$

3.913.3 Rubi [A] (verified)

Time = 27.99 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.068, Rules used = {27, 25, 2894, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{64 \log \left(\frac{e^4(-2x-4)+2}{3e^4}\right) \exp \left(4-16 \log ^2\left(\frac{e^4(-2x-4)+2}{3e^4}\right)\right)}{e^4(x+2)-1} \, dx$$

$$\Big\downarrow \text{27}$$

$$-64 \int -\frac{e^{4-16 \log ^2\left(\frac{2\left(1-e^4(x+2)\right)}{3e^4}\right)} \log \left(\frac{2(1-e^4(x+2))}{3e^4}\right)}{1-e^4(x+2)}dx$$

$$\Big\downarrow \text{25}$$

$$64 \int \frac{e^{4-16 \log ^2\left(\frac{2\left(1-e^4(x+2)\right)}{3e^4}\right)} \log \left(\frac{2(1-e^4(x+2))}{3e^4}\right)}{1-e^4(x+2)}dx$$

$$\Big\downarrow \text{2894}$$

$$64 \int \frac{e^{4-16 \log ^2\left(\frac{2\left(1-e^4(x+2)\right)}{3e^4}\right)} \log \left(\frac{2(-e^4x-2e^4+1)}{3e^4}\right)}{1-e^4(x+2)}dx$$

$$\Big\downarrow \text{7257}$$

$$2e^{-16 \log ^2\left(\frac{2\left(1-e^4(x+2)\right)}{3e^4}\right)}$$

input
```
Int[(-64*E^(4 - 16*Log[(2 + E^4*(-4 - 2*x))/(3*E^4)]^2)*Log[(2 + E^4*(-4 -
 2*x))/(3*E^4)])/(-1 + E^4*(2 + x)),x]
```

output
```
2/E^(16*Log[(2*(1 - E^4*(2 + x)))/(3*E^4)]^2)
```

3.913.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2894
```
Int[((a_.) + Log[(c_.)*(v_)^(n_.)]*(b_.))^(p_.)*(u_.), x_Symbol] :> Int[u*(
a + b*Log[c*ExpandToSum[v, x]^n])^p, x] /; FreeQ[{a, b, c, n, p}, x] && Lin
earQ[v, x] &&  !LinearMatchQ[v, x] &&  !(EqQ[n, 1] && MatchQ[c*v, (e_.)*((f
_) + (g_.)*x) /; FreeQ[{e, f, g}, x]])
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.913.4 Maple [A] (verified)

Time = 1.05 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

method	result	size
risch	$2\,{\mathrm e}^{-16 \ln\left(\frac{\left(\left(-2 x -4\right) {\mathrm e}^{4}+2\right) {\mathrm e}^{-4}}{3}\right)^{2}}$	23
norman	$2\,{\mathrm e}^{-16 \ln\left(\frac{\left(\left(-2 x -4\right) {\mathrm e}^{4}+2\right) {\mathrm e}^{-4}}{3}\right)^{2}}$	27
parallelrisch	$2\,{\mathrm e}^{-16 \ln\left(\frac{\left(\left(-2 x -4\right) {\mathrm e}^{4}+2\right) {\mathrm e}^{-4}}{3}\right)^{2}}$	27

input
```
int(-64*exp(4)*ln(1/3*((-2*x-4)*exp(4)+2)/exp(4))/((2+x)*exp(4)-1)/exp(16*
ln(1/3*((-2*x-4)*exp(4)+2)/exp(4))^2),x,method=_RETURNVERBOSE)
```

output
```
2*exp(-16*ln(1/3*((-2*x-4)*exp(4)+2)*exp(-4))^2)
```

3.913. $\displaystyle \int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx$

3.913.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx = 2\,e^{\left(-16\,\log\left(-\frac{2}{3}\,\left((x+2)e^4-1\right)e^{(-4)}\right)^2\right)}$$

input
```
integrate(-64*exp(4)*log(1/3*((-2*x-4)*exp(4)+2)/exp(4))/((2+x)*exp(4)-1)/
exp(16*log(1/3*((-2*x-4)*exp(4)+2)/exp(4))^2),x, algorithm=\
```

output
```
2*e^(-16*log(-2/3*((x + 2)*e^4 - 1)*e^(-4))^2)
```

3.913.6 Sympy [A] (verification not implemented)

Time = 34.72 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx = 2e^{-16\log\left(\frac{\frac{(-2x-4)e^4}{3}+\frac{2}{3}}{e^4}\right)^2}$$

input
```
integrate(-64*exp(4)*ln(1/3*((-2*x-4)*exp(4)+2)/exp(4))/((2+x)*exp(4)-1)/e
xp(16*ln(1/3*((-2*x-4)*exp(4)+2)/exp(4))**2),x)
```

output
```
2*exp(-16*log(((-2*x - 4)*exp(4)/3 + 2/3)*exp(-4))**2)
```

3.913.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx = 2\,e^{\left(-16\,\log\left(-\frac{2}{3}\,\left((x+2)e^4-1\right)e^{(-4)}\right)^2\right)}$$

input
```
integrate(-64*exp(4)*log(1/3*((-2*x-4)*exp(4)+2)/exp(4))/((2+x)*exp(4)-1)/
exp(16*log(1/3*((-2*x-4)*exp(4)+2)/exp(4))^2),x, algorithm=\
```

output
```
2*e^(-16*log(-2/3*((x + 2)*e^4 - 1)*e^(-4))^2)
```

3.913.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. $2(17) = 34$.

Time = 0.97 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.35

$$\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx$$
$$= 2\,e^{\left(-16\,\log(3)^2+32\,\log(3)\log\left(-2\,xe^4-4\,e^4+2\right)-16\,\log\left(-2\,xe^4-4\,e^4+2\right)^2-128\,\log(3)+128\,\log\left(-2\,xe^4-4\,e^4+2\right)-256\right)}$$

input
```
integrate(-64*exp(4)*log(1/3*((-2*x-4)*exp(4)+2)/exp(4))/((2+x)*exp(4)-1)/
exp(16*log(1/3*((-2*x-4)*exp(4)+2)/exp(4))^2),x, algorithm=\
```

output
```
2*e^(-16*log(3)^2 + 32*log(3)*log(-2*x*e^4 - 4*e^4 + 2) - 16*log(-2*x*e^4
- 4*e^4 + 2)^2 - 128*log(3) + 128*log(-2*x*e^4 - 4*e^4 + 2) - 256)
```

3.913.9 Mupad [B] (verification not implemented)

Time = 14.43 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

$$\int -\frac{64e^{4-16\log^2\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}\log\left(\frac{2+e^4(-4-2x)}{3e^4}\right)}{-1+e^4(2+x)}\,dx = 2\,\mathrm{e}^{-16\ln\left(\frac{2\,\mathrm{e}^{-4}}{3}-\frac{2\,x}{3}-\frac{4}{3}\right)^2}$$

input
```
int(-(64*exp(4)*exp(-16*log(-exp(-4)*((exp(4)*(2*x + 4))/3 - 2/3))^2)*log(
-exp(-4)*((exp(4)*(2*x + 4))/3 - 2/3)))/(exp(4)*(x + 2) - 1),x)
```

output
```
2*exp(-16*log((2*exp(-4))/3 - (2*x)/3 - 4/3)^2)
```

3.914 $\int \frac{2x-x^2+(8-6x)\log\left(\frac{1}{4}(2x^2-x^3)\right)+(-4+2x)\log^2\left(\frac{1}{4}(2x^2-x^3)\right)}{-4x^3+2x^4}\,dx$

3.914.1 Optimal result

Integrand size = 69, antiderivative size = 26

$$\int \frac{2x-x^2+(8-6x)\log\left(\frac{1}{4}(2x^2-x^3)\right)+(-4+2x)\log^2\left(\frac{1}{4}(2x^2-x^3)\right)}{-4x^3+2x^4}\,dx = \frac{x-\log^2\left(\frac{1}{4}(2-x)x^2\right)}{2x^2}$$

output
```
1/2*(x-ln(1/4*(2-x)*x^2)^2)/x^2
```

3.914.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 61 vs. 2(26) = 52.

Time = 0.11 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.35

$$\int \frac{2x-x^2+(8-6x)\log\left(\frac{1}{4}(2x^2-x^3)\right)+(-4+2x)\log^2\left(\frac{1}{4}(2x^2-x^3)\right)}{-4x^3+2x^4}\,dx = \frac{1}{2}\left(\frac{1}{x}+\frac{\log\left(\frac{1}{4}(2-x)x^2\right)}{x}-\frac{\log^2\left(\frac{1}{4}(2-x)x^2\right)}{x^2}-\frac{\log\left(-\frac{1}{4}(-2+x)x^2\right)}{x}\right)$$

input
```
Integrate[(2*x - x^2 + (8 - 6*x)*Log[(2*x^2 - x^3)/4] + (-4 + 2*x)*Log[(2*
x^2 - x^3)/4]^2)/(-4*x^3 + 2*x^4),x]
```

output
```
(x^(-1) + Log[((2 - x)*x^2)/4]/x - Log[((2 - x)*x^2)/4]^2/x^2 - Log[-1/4*(
(-2 + x)*x^2)]/x)/2
```

3.914.3 Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.15, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2+(2x-4)\log^2\left(\frac{1}{4}\left(2x^2-x^3\right)\right)+(8-6x)\log\left(\frac{1}{4}\left(2x^2-x^3\right)\right)+2x}{2x^4-4x^3}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-x^2+(2x-4)\log^2\left(\frac{1}{4}\left(2x^2-x^3\right)\right)+(8-6x)\log\left(\frac{1}{4}\left(2x^2-x^3\right)\right)+2x}{x^3(2x-4)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{1}{2x^2}+\frac{\log^2\left(-\frac{1}{4}(x-2)x^2\right)}{x^3}-\frac{(3x-4)\log\left(-\frac{1}{4}(x-2)x^2\right)}{(x-2)x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2x}-\frac{\log^2\left(\frac{1}{4}(2-x)x^2\right)}{2x^2}$$

input
```
Int[(2*x - x^2 + (8 - 6*x)*Log[(2*x^2 - x^3)/4] + (-4 + 2*x)*Log[(2*x^2 -
x^3)/4]^2)/(-4*x^3 + 2*x^4),x]
```

output
```
1/(2*x) - Log[((2 - x)*x^2)/4]^2/(2*x^2)
```

3.914.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.914.4 Maple [A] (verified)

Time = 0.91 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

method	result	size
parallelrisch	$\frac{-\ln\left(-\frac{1}{4}x^{3}+\frac{1}{2}x^{2}\right)^{2}+x}{2x^{2}}$	24
norman	$\frac{\frac{x}{2}-\frac{\ln\left(-\frac{1}{4}x^{3}+\frac{1}{2}x^{2}\right)^{2}}{2}}{x^{2}}$	25
risch	$-\frac{\ln\left(-\frac{1}{4}x^{3}+\frac{1}{2}x^{2}\right)^{2}}{2x^{2}}+\frac{1}{2x}$	26

input
```
int(((2*x-4)*ln(-1/4*x^3+1/2*x^2)^2+(-6*x+8)*ln(-1/4*x^3+1/2*x^2)-x^2+2*x)
/(2*x^4-4*x^3),x,method=_RETURNVERBOSE)
```

output
```
1/2*(-ln(-1/4*x^3+1/2*x^2)^2+x)/x^2
```

3.914.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{2x-x^2+(8-6x)\log\left(\frac{1}{4}(2x^2-x^3)\right)+(-4+2x)\log^2\left(\frac{1}{4}(2x^2-x^3)\right)}{-4x^3+2x^4}\,dx$$
$$=-\frac{\log\left(-\frac{1}{4}\,x^{3}+\frac{1}{2}\,x^{2}\right)^{2}-x}{2\,x^{2}}$$

input
```
integrate(((2*x-4)*log(-1/4*x^3+1/2*x^2)^2+(-6*x+8)*log(-1/4*x^3+1/2*x^2)-
x^2+2*x)/(2*x^4-4*x^3),x, algorithm=\
```

output
```
-1/2*(log(-1/4*x^3 + 1/2*x^2)^2 - x)/x^2
```

3.914.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{2x-x^2+(8-6x)\log\left(\frac{1}{4}(2x^2-x^3)\right)+(-4+2x)\log^2\left(\frac{1}{4}(2x^2-x^3)\right)}{-4x^3+2x^4}\,dx$$
$$=\frac{1}{2x}-\frac{\log\left(-\frac{x^3}{4}+\frac{x^2}{2}\right)^2}{2x^2}$$

input
```
integrate(((2*x-4)*ln(-1/4*x**3+1/2*x**2)**2+(-6*x+8)*ln(-1/4*x**3+1/2*x**
2)-x**2+2*x)/(2*x**4-4*x**3),x)
```

output
```
1/(2*x) - log(-x**3/4 + x**2/2)**2/(2*x**2)
```

3.914.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(20) = 40.

Time = 0.31 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.04

$$\int \frac{2x-x^2+(8-6x)\log\left(\frac{1}{4}(2x^2-x^3)\right)+(-4+2x)\log^2\left(\frac{1}{4}(2x^2-x^3)\right)}{-4x^3+2x^4}\,dx=$$
$$-\frac{4\,\log(2)^2-8\,\log(2)\log(x)+4\,\log(x)^2-4\,(\log(2)-\log(x))\log(-x+2)+\log(-x+2)^2}{2\,x^2}$$
$$+\frac{1}{2\,x}$$

input
```
integrate(((2*x-4)*log(-1/4*x^3+1/2*x^2)^2+(-6*x+8)*log(-1/4*x^3+1/2*x^2)-
x^2+2*x)/(2*x^4-4*x^3),x, algorithm=\
```

output
```
-1/2*(4*log(2)^2 - 8*log(2)*log(x) + 4*log(x)^2 - 4*(log(2) - log(x))*log(
-x + 2) + log(-x + 2)^2)/x^2 + 1/2/x
```

3.914.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{2x - x^2 + (8 - 6x)\log\left(\frac{1}{4}(2x^2 - x^3)\right) + (-4 + 2x)\log^2\left(\frac{1}{4}(2x^2 - x^3)\right)}{-4x^3 + 2x^4}\,dx$$
$$= -\frac{\log\left(-\frac{1}{4}\,x^3 + \frac{1}{2}\,x^2\right)^2}{2\,x^2} + \frac{1}{2\,x}$$

input
```
integrate((((2*x-4)*log(-1/4*x^3+1/2*x^2)^2+(-6*x+8)*log(-1/4*x^3+1/2*x^2)-
x^2+2*x)/(2*x^4-4*x^3),x, algorithm=\
```

output
```
-1/2*log(-1/4*x^3 + 1/2*x^2)^2/x^2 + 1/2/x
```

3.914.9 Mupad [B] (verification not implemented)

Time = 14.91 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{2x - x^2 + (8 - 6x)\log\left(\frac{1}{4}(2x^2 - x^3)\right) + (-4 + 2x)\log^2\left(\frac{1}{4}(2x^2 - x^3)\right)}{-4x^3 + 2x^4}\,dx = \frac{\frac{x}{2} - \frac{\ln\left(\frac{x^2}{2} - \frac{x^3}{4}\right)^2}{2}}{x^2}$$

input
```
int(-(2*x + log(x^2/2 - x^3/4)^2*(2*x - 4) - log(x^2/2 - x^3/4)*(6*x - 8)
- x^2)/(4*x^3 - 2*x^4),x)
```

output
```
(x/2 - log(x^2/2 - x^3/4)^2/2)/x^2
```

3.915 $\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5(-510x^2-600x^3)+(-100e^{10}x-72\cdots}{450e^{10}+324x^2+765x^3+450x^4+e^5(-765x-900x^2)+(300e^{10}+21\cdots}$

3.915.1 Optimal result

Integrand size = 366, antiderivative size = 34

$$\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5(-510x^2-600x^3)+(-100e^{10}x-72x^3-160x^4-100x^5+e^5(18\cdots}{450e^{10}+324x^2+765x^3+450x^4+e^5\left(-765x-900x^2\right)+(300e^{10}+216x^2+510x^3+300x^4+e^5\left(-\cdots\right.}$$

$$=\frac{x^2}{3+\log^2\left(2x+\frac{x}{4-5\left(\frac{e^5}{x}-x\right)}\right)}$$

output
```
x^2/(3+ln(2*x+x/(4-5*exp(5)/x+5*x))^2)
```

3.915.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.21

$$\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5(-510x^2-600x^3)+(-100e^{10}x-72x^3-160x^4-100x^5+e^5(18\cdots}{450e^{10}+324x^2+765x^3+450x^4+e^5\left(-765x-900x^2\right)+(300e^{10}+216x^2+510x^3+300x^4+e^5\left(-\cdots\right.}$$

$$=\frac{x^2}{3+\log^2\left(\frac{x(-10e^5+x(9+10x))}{-5e^5+x(4+5x)}\right)}$$

3.915.

$$\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5(-510x^2-600x^3)+(-100e^{10}x-72x^3-160x^4-100x^5+e^5(180x^2+200x^3))\log\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)+(100e^{10}x+\cdots}{450e^{10}+324x^2+765x^3+450x^4+e^5(-765x-900x^2)+(300e^{10}+216x^2+510x^3+300x^4+e^5(-510x-600x^2))\log^2\left(\frac{10e^5x-9x^2-10x^3}{\cdots}\right)+(50e^{10}+\cdots}$$

input
```
Integrate[(300*E^10*x + 216*x^3 + 510*x^4 + 300*x^5 + E^5*(-510*x^2 - 600*
x^3) + (-100*E^10*x - 72*x^3 - 160*x^4 - 100*x^5 + E^5*(180*x^2 + 200*x^3)
)*Log[(10*E^5*x - 9*x^2 - 10*x^3)/(5*E^5 - 4*x - 5*x^2)] + (100*E^10*x + 7
2*x^3 + 170*x^4 + 100*x^5 + E^5*(-170*x^2 - 200*x^3))*Log[(10*E^5*x - 9*x^
2 - 10*x^3)/(5*E^5 - 4*x - 5*x^2)]^2)/(450*E^10 + 324*x^2 + 765*x^3 + 450*
x^4 + E^5*(-765*x - 900*x^2) + (300*E^10 + 216*x^2 + 510*x^3 + 300*x^4 + E
^5*(-510*x - 600*x^2))*Log[(10*E^5*x - 9*x^2 - 10*x^3)/(5*E^5 - 4*x - 5*x^
2)]^2 + (50*E^10 + 36*x^2 + 85*x^3 + 50*x^4 + E^5*(-85*x - 100*x^2))*Log[(
10*E^5*x - 9*x^2 - 10*x^3)/(5*E^5 - 4*x - 5*x^2)]^4),x]
```

output
```
x^2/(3 + Log[(x*(-10*E^5 + x*(9 + 10*x)))/(-5*E^5 + x*(4 + 5*x))]^2)
```

3.915.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{300x^5+510x^4+216x^3+e^5\left(-600x^3-510x^2\right)+\left(100x^5+170x^4+72x^3+e^5\left(-200x^3-170x^2\right)+100e^{10}x\right)\text{lo}}{450x^4+765x^3+324x^2+e^5\left(-900x^2-765x\right)+\left(50x^4+85x^3+36x^2+e^5\left(-100x^2-85x\right)+50e^{10}\right)\log^4}$$

$\big\downarrow$ 7292

$$\int \frac{300x^5+510x^4+216x^3+e^5\left(-600x^3-510x^2\right)+\left(100x^5+170x^4+72x^3+e^5\left(-200x^3-170x^2\right)+100e^{10}x\right)\text{lo}}{\left(50x^4+85x^3+4\left(9-25e^5\right)x^2-85e\right.}$$

$\big\downarrow$ 2463

$$\int \left(\frac{(-5x-4)\left(300x^5+510x^4+216x^3+e^5\left(-600x^3-510x^2\right)+\left(100x^5+170x^4+72x^3+e^5\left(-200x^3-170x^2\right)\right.\right.}{5e^5\left(-5x^2-4x\right.}\right.$$

$\big\downarrow$ 7239

$$\int \frac{2x\left(3\left(\left(50x^2+85x+36\right)x^2-5e^5(20x+17)x+50e^{10}\right)+\left(\left(50x^2+85x+36\right)x^2-5e^5(20x+17)x+50e^{10}\right)\text{lo}\right.}{\left(-10x^2-9x+10e^5\right)\left(-5x^2-4x+5e^5\right)\left(\right.}$$

$\big\downarrow$ 27

3.915.

$$\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5\left(-510x^2-600x^3\right)+\left(-100e^{10}x-72x^3-160x^4-100x^5+e^5\left(180x^2+200x^3\right)\right)\log\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)+\left(100e^{10}x+\right.}{450e^{10}+324x^2+765x^3+450x^4+e^5\left(-765x-900x^2\right)+\left(300e^{10}+216x^2+510x^3+300x^4+e^5\left(-510x-600x^2\right)\right)\log^2\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)+\left(50e^{10}+\right.}$$

$$2\int \frac{x\left(\left(\left(50x^2+85x+36\right)x^2-5e^5(20x+17)x+50e^{10}\right)\log^2\left(\frac{x\left(10e^5-x(10x+9)\right)}{5e^5-x(5x+4)}\right)-2\left(\left(25x^2+40x+18\right)x^2-5e^5\right.\right.}{\left(-10x^2-9x+10e^5\right)\left(-5x^2-4x+5e^5\right)}$$

$$\Big\downarrow \ 7279$$

$$2\int \left(\frac{x}{\log^2\left(\frac{x(x(10x+9)-10e^5)}{x(5x+4)-5e^5}\right)+3}+\frac{2\left(-25x^4-40x^3-2\left(9-25e^5\right)x^2+45e^5x-25e^{10}\right)\log\left(\frac{x(10x^2+9x-10e^5)}{5x^2+4x-5e^5}\right)x}{\left(-10x^2-9x+10e^5\right)\left(-5x^2-4x+5e^5\right)\left(\log^2\left(\frac{x(x(10x+9)-10e^5)}{x(5x+4)-5e^5}\right)+3\right)^2}\right.$$

$$\Big\downarrow \ 7299$$

$$2\int \left(\frac{x}{\log^2\left(\frac{x(x(10x+9)-10e^5)}{x(5x+4)-5e^5}\right)+3}+\frac{2\left(-25x^4-40x^3-2\left(9-25e^5\right)x^2+45e^5x-25e^{10}\right)\log\left(\frac{x(10x^2+9x-10e^5)}{5x^2+4x-5e^5}\right)x}{\left(-10x^2-9x+10e^5\right)\left(-5x^2-4x+5e^5\right)\left(\log^2\left(\frac{x(x(10x+9)-10e^5)}{x(5x+4)-5e^5}\right)+3\right)^2}\right.$$

input
```
Int[(300*E^10*x + 216*x^3 + 510*x^4 + 300*x^5 + E^5*(-510*x^2 - 600*x^3) +
 (-100*E^10*x - 72*x^3 - 160*x^4 - 100*x^5 + E^5*(180*x^2 + 200*x^3))*Log[
(10*E^5*x - 9*x^2 - 10*x^3)/(5*E^5 - 4*x - 5*x^2)] + (100*E^10*x + 72*x^3
+ 170*x^4 + 100*x^5 + E^5*(-170*x^2 - 200*x^3))*Log[(10*E^5*x - 9*x^2 - 10
*x^3)/(5*E^5 - 4*x - 5*x^2)]^2)/(450*E^10 + 324*x^2 + 765*x^3 + 450*x^4 +
E^5*(-765*x - 900*x^2) + (300*E^10 + 216*x^2 + 510*x^3 + 300*x^4 + E^5*(-5
10*x - 600*x^2))*Log[(10*E^5*x - 9*x^2 - 10*x^3)/(5*E^5 - 4*x - 5*x^2)]^2
+ (50*E^10 + 36*x^2 + 85*x^3 + 50*x^4 + E^5*(-85*x - 100*x^2))*Log[(10*E^5
*x - 9*x^2 - 10*x^3)/(5*E^5 - 4*x - 5*x^2)]^4),x]
```

output
```
$Aborted
```

3.915.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.915.

$$\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5\left(-510x^2-600x^3\right)+\left(-100e^{10}x-72x^3-160x^4-100x^5+e^5\left(180x^2+200x^3\right)\right)\log\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)+\left(100e^{10}x+\right.}{450e^{10}+324x^2+765x^3+450x^4+e^5\left(-765x-900x^2\right)+\left(300e^{10}+216x^2+510x^3+300x^4+e^5\left(-510x-600x^2\right)\right)\log^2\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)+\left(50e^{10}+\right.}$$

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.915.4 Maple [A] (verified)

Time = 5.69 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.29

method	result	size
risch	$\frac{x^{2}}{\ln\left(\frac{10x\,\mathrm{e}^{5}-10x^{3}-9x^{2}}{5\,\mathrm{e}^{5}-5x^{2}-4x}\right)^{2}+3}$	44
parallelrisch	$-\frac{\left(-25500x^{2}\mathrm{e}^{10}+6120x^{2}\mathrm{e}^{5}\right)\mathrm{e}^{-5}}{1020\left(\ln\left(\frac{x\left(-10x^{2}+10\,\mathrm{e}^{5}-9x\right)}{5\,\mathrm{e}^{5}-5x^{2}-4x}\right)^{2}+3\right)\left(-6+25\,\mathrm{e}^{5}\right)}$	69

input
```
int(((100*x*exp(5)^2+(-200*x^3-170*x^2)*exp(5)+100*x^5+170*x^4+72*x^3)*ln(
(10*x*exp(5)-10*x^3-9*x^2)/(5*exp(5)-5*x^2-4*x))^2+(-100*x*exp(5)^2+(200*x
^3+180*x^2)*exp(5)-100*x^5-160*x^4-72*x^3)*ln((10*x*exp(5)-10*x^3-9*x^2)/(
5*exp(5)-5*x^2-4*x))+300*x*exp(5)^2+(-600*x^3-510*x^2)*exp(5)+300*x^5+510*
x^4+216*x^3)/((50*exp(5)^2+(-100*x^2-85*x)*exp(5)+50*x^4+85*x^3+36*x^2)*ln
((10*x*exp(5)-10*x^3-9*x^2)/(5*exp(5)-5*x^2-4*x))^4+(300*exp(5)^2+(-600*x^
2-510*x)*exp(5)+300*x^4+510*x^3+216*x^2)*ln((10*x*exp(5)-10*x^3-9*x^2)/(5*
exp(5)-5*x^2-4*x))^2+450*exp(5)^2+(-900*x^2-765*x)*exp(5)+450*x^4+765*x^3+
324*x^2),x,method=_RETURNVERBOSE)
```

output
```
x^2/(ln((10*x*exp(5)-10*x^3-9*x^2)/(5*exp(5)-5*x^2-4*x))^2+3)
```

3.915.

$$\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5\left(-510x^2-600x^3\right)+\left(-100e^{10}x-72x^3-160x^4-100x^5+e^5\left(180x^2+200x^3\right)\right)\log\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)+\left(100e^{10}x+\right.}{450e^{10}+324x^2+765x^3+450x^4+e^5\left(-765x-900x^2\right)+\left(300e^{10}+216x^2+510x^3+300x^4+e^5\left(-510x-600x^2\right)\right)\log^2\left(\frac{10e^5x-9x^2-10x^3}{\ldots}\right)+\left(50e^{10}+\right.}$$

3.915.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.26

$$\int \frac{300e^{10}x + 216x^3 + 510x^4 + 300x^5 + e^5(-510x^2 - 600x^3) + (-100e^{10}x - 72x^3 - 160x^4 - 100x^5 + e^5(180}{450e^{10} + 324x^2 + 765x^3 + 450x^4 + e^5\left(-765x - 900x^2\right) + (300e^{10} + 216x^2 + 510x^3 + 300x^4 + e^5\left(-\right.}$$
$$= \frac{x^2}{\log\left(\frac{10\,x^3+9\,x^2-10\,xe^5}{5\,x^2+4\,x-5\,e^5}\right)^2+3}$$

input
```
integrate(((100*x*exp(5)^2+(-200*x^3-170*x^2)*exp(5)+100*x^5+170*x^4+72*x^
3)*log((10*x*exp(5)-10*x^3-9*x^2)/(5*exp(5)-5*x^2-4*x))^2+(-100*x*exp(5)^2
+(200*x^3+180*x^2)*exp(5)-100*x^5-160*x^4-72*x^3)*log((10*x*exp(5)-10*x^3-
9*x^2)/(5*exp(5)-5*x^2-4*x))+300*x*exp(5)^2+(-600*x^3-510*x^2)*exp(5)+300*
x^5+510*x^4+216*x^3)/((50*exp(5)^2+(-100*x^2-85*x)*exp(5)+50*x^4+85*x^3+36
*x^2)*log((10*x*exp(5)-10*x^3-9*x^2)/(5*exp(5)-5*x^2-4*x))^4+(300*exp(5)^2
+(-600*x^2-510*x)*exp(5)+300*x^4+510*x^3+216*x^2)*log((10*x*exp(5)-10*x^3-
9*x^2)/(5*exp(5)-5*x^2-4*x))^2+450*exp(5)^2+(-900*x^2-765*x)*exp(5)+450*x^
4+765*x^3+324*x^2),x, algorithm=\
```

output
```
x^2/(log((10*x^3 + 9*x^2 - 10*x*e^5)/(5*x^2 + 4*x - 5*e^5))^2 + 3)
```

3.915.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.09

$$\int \frac{300e^{10}x + 216x^3 + 510x^4 + 300x^5 + e^5(-510x^2 - 600x^3) + (-100e^{10}x - 72x^3 - 160x^4 - 100x^5 + e^5(180}{450e^{10} + 324x^2 + 765x^3 + 450x^4 + e^5\left(-765x - 900x^2\right) + (300e^{10} + 216x^2 + 510x^3 + 300x^4 + e^5\left(-\right.}$$
$$= \frac{x^2}{\log\left(\frac{-10x^3-9x^2+10xe^5}{-5x^2-4x+5e^5}\right)^2+3}$$

input
```
integrate(((100*x*exp(5)**2+(-200*x**3-170*x**2)*exp(5)+100*x**5+170*x**4+
72*x**3)*ln((10*x*exp(5)-10*x**3-9*x**2)/(5*exp(5)-5*x**2-4*x))**2+(-100*x
*exp(5)**2+(200*x**3+180*x**2)*exp(5)-100*x**5-160*x**4-72*x**3)*ln((10*x*
exp(5)-10*x**3-9*x**2)/(5*exp(5)-5*x**2-4*x))+300*x*exp(5)**2+(-600*x**3-5
10*x**2)*exp(5)+300*x**5+510*x**4+216*x**3)/((50*exp(5)**2+(-100*x**2-85*x
)*exp(5)+50*x**4+85*x**3+36*x**2)*ln((10*x*exp(5)-10*x**3-9*x**2)/(5*exp(5
)-5*x**2-4*x))**4+(300*exp(5)**2+(-600*x**2-510*x)*exp(5)+300*x**4+510*x**
3+216*x**2)*ln((10*x*exp(5)-10*x**3-9*x**2)/(5*exp(5)-5*x**2-4*x))**2+450*
exp(5)**2+(-900*x**2-765*x)*exp(5)+450*x**4+765*x**3+324*x**2),x)
```

3.915.

$$\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5\left(-510x^2-600x^3\right)+\left(-100e^{10}x-72x^3-160x^4-100x^5+e^5\left(180x^2+200x^3\right)\right)\log\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)+\left(100e^{10}x+\right.}{450e^{10}+324x^2+765x^3+450x^4+e^5(-765x-900x^2)+(300e^{10}+216x^2+510x^3+300x^4+e^5(-510x-600x^2))\log^2\left(\frac{10e^5x-9x^2-10x^3}{\ldots}\right)+(50e^{10}+}$$

output
```
x**2/(log((-10*x**3 - 9*x**2 + 10*x*exp(5))/(-5*x**2 - 4*x + 5*exp(5)))**2
 + 3)
```

3.915.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 104 vs. $2(31) = 62$.

Time = 0.35 (sec) , antiderivative size = 104, normalized size of antiderivative = 3.06

$$\int \frac{300e^{10}x + 216x^3 + 510x^4 + 300x^5 + e^5(-510x^2 - 600x^3) + (-100e^{10}x - 72x^3 - 160x^4 - 100x^5 + e^5(18}{450e^{10} + 324x^2 + 765x^3 + 450x^4 + e^5(-765x - 900x^2) + (300e^{10} + 216x^2 + 510x^3 + 300x^4 + e^5(-}$$
$$= -\frac{x^2}{2(\log(5x^2 + 4x - 5e^5) - \log(x))\log(10x^2 + 9x - 10e^5) - \log(10x^2 + 9x - 10e^5)^2 - \log(5x^2 + 4}$$

input
```
integrate(((100*x*exp(5)^2+(-200*x^3-170*x^2)*exp(5)+100*x^5+170*x^4+72*x^
3)*log((10*x*exp(5)-10*x^3-9*x^2)/(5*exp(5)-5*x^2-4*x))^2+(-100*x*exp(5)^2
+(200*x^3+180*x^2)*exp(5)-100*x^5-160*x^4-72*x^3)*log((10*x*exp(5)-10*x^3-
9*x^2)/(5*exp(5)-5*x^2-4*x))+300*x*exp(5)^2+(-600*x^3-510*x^2)*exp(5)+300*
x^5+510*x^4+216*x^3)/((50*exp(5)^2+(-100*x^2-85*x)*exp(5)+50*x^4+85*x^3+36
*x^2)*log((10*x*exp(5)-10*x^3-9*x^2)/(5*exp(5)-5*x^2-4*x))^4+(300*exp(5)^2
+(-600*x^2-510*x)*exp(5)+300*x^4+510*x^3+216*x^2)*log((10*x*exp(5)-10*x^3-
9*x^2)/(5*exp(5)-5*x^2-4*x))^2+450*exp(5)^2+(-900*x^2-765*x)*exp(5)+450*x^
4+765*x^3+324*x^2),x, algorithm=\
```

output
```
-x^2/(2*(log(5*x^2 + 4*x - 5*e^5) - log(x))*log(10*x^2 + 9*x - 10*e^5) - l
og(10*x^2 + 9*x - 10*e^5)^2 - log(5*x^2 + 4*x - 5*e^5)^2 + 2*log(5*x^2 + 4
*x - 5*e^5)*log(x) - log(x)^2 - 3)
```

3.915.8 Giac [A] (verification not implemented)

Time = 2.99 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.29

$$\int \frac{300e^{10}x + 216x^3 + 510x^4 + 300x^5 + e^5(-510x^2 - 600x^3) + (-100e^{10}x - 72x^3 - 160x^4 - 100x^5 + e^5(18}{450e^{10} + 324x^2 + 765x^3 + 450x^4 + e^5(-765x - 900x^2) + (300e^{10} + 216x^2 + 510x^3 + 300x^4 + e^5(-}$$
$$= \frac{2x^2}{\log\left(\frac{10x^3+9x^2-10xe^5}{5x^2+4x-5e^5}\right)^2 + 3}$$

3.915.
$$\int \frac{300e^{10}x+216x^3+510x^4+300x^5+e^5(-510x^2-600x^3)+(-100e^{10}x-72x^3-160x^4-100x^5+e^5(180x^2+200x^3))\log\left(\frac{10e^5x-9x^2-10x^3}{5e^5-4x-5x^2}\right)+(100e^{10}x+}{450e^{10}+324x^2+765x^3+450x^4+e^5(-765x-900x^2)+(300e^{10}+216x^2+510x^3+300x^4+e^5(-510x-600x^2))\log^2\left(\frac{10e^5x-9x^2-10x^3}{\ldots}\right)+(50e^{10}+}$$

input
```
integrate(((100*x*exp(5)^2+(-200*x^3-170*x^2)*exp(5)+100*x^5+170*x^4+72*x^
3)*log((10*x*exp(5)-10*x^3-9*x^2)/(5*exp(5)-5*x^2-4*x))^2+(-100*x*exp(5)^2
+(200*x^3+180*x^2)*exp(5)-100*x^5-160*x^4-72*x^3)*log((10*x*exp(5)-10*x^3-
9*x^2)/(5*exp(5)-5*x^2-4*x))+300*x*exp(5)^2+(-600*x^3-510*x^2)*exp(5)+300*
x^5+510*x^4+216*x^3)/((50*exp(5)^2+(-100*x^2-85*x)*exp(5)+50*x^4+85*x^3+36
*x^2)*log((10*x*exp(5)-10*x^3-9*x^2)/(5*exp(5)-5*x^2-4*x))^4+(300*exp(5)^2
+(-600*x^2-510*x)*exp(5)+300*x^4+510*x^3+216*x^2)*log((10*x*exp(5)-10*x^3-
9*x^2)/(5*exp(5)-5*x^2-4*x))^2+450*exp(5)^2+(-900*x^2-765*x)*exp(5)+450*x^
4+765*x^3+324*x^2),x, algorithm=\
```

output
```
2*x^2/(log((10*x^3 + 9*x^2 - 10*x*e^5)/(5*x^2 + 4*x - 5*e^5))^2 + 3)
```

3.915.9 Mupad [B] (verification not implemented)

Time = 18.56 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.26

$$\int \frac{300e^{10}x + 216x^3 + 510x^4 + 300x^5 + e^5(-510x^2 - 600x^3) + (-100e^{10}x - 72x^3 - 160x^4 - 100x^5 + e^5(18\cdots}{450e^{10} + 324x^2 + 765x^3 + 450x^4 + e^5\left(-765x - 900x^2\right) + \left(300e^{10} + 216x^2 + 510x^3 + 300x^4 + e^5\left(-\cdots\right.\right.}$$
$$= \frac{x^2}{\ln\left(\frac{10\,x^3+9\,x^2-10\,e^5\,x}{5\,x^2+4\,x-5\,e^5}\right)^2 + 3}$$

input
```
int((300*x*exp(10) - exp(5)*(510*x^2 + 600*x^3) - log((9*x^2 - 10*x*exp(5)
 + 10*x^3)/(4*x - 5*exp(5) + 5*x^2))*(100*x*exp(10) - exp(5)*(180*x^2 + 20
0*x^3) + 72*x^3 + 160*x^4 + 100*x^5) + 216*x^3 + 510*x^4 + 300*x^5 + log((
9*x^2 - 10*x*exp(5) + 10*x^3)/(4*x - 5*exp(5) + 5*x^2))^2*(100*x*exp(10) -
 exp(5)*(170*x^2 + 200*x^3) + 72*x^3 + 170*x^4 + 100*x^5))/(450*exp(10) +
log((9*x^2 - 10*x*exp(5) + 10*x^3)/(4*x - 5*exp(5) + 5*x^2))^4*(50*exp(10)
 - exp(5)*(85*x + 100*x^2) + 36*x^2 + 85*x^3 + 50*x^4) + log((9*x^2 - 10*x
*exp(5) + 10*x^3)/(4*x - 5*exp(5) + 5*x^2))^2*(300*exp(10) - exp(5)*(510*x
 + 600*x^2) + 216*x^2 + 510*x^3 + 300*x^4) - exp(5)*(765*x + 900*x^2) + 32
4*x^2 + 765*x^3 + 450*x^4),x)
```

output
```
x^2/(log((9*x^2 - 10*x*exp(5) + 10*x^3)/(4*x - 5*exp(5) + 5*x^2))^2 + 3)
```

3.916 $\int \left(1+e^{8/3}+e^{\frac{8}{3}+x}\right) dx$

3.916.1 Optimal result

Integrand size = 14, antiderivative size = 17

$$\int \left(1+e^{8/3}+e^{\frac{8}{3}+x}\right) dx = x+e^{8/3}(-5+e+e^x+x+\log(4))$$

output
```
exp(4/3)^2*(exp(x)+2*ln(2)+exp(1)+x-5)+x
```

3.916.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \left(1+e^{8/3}+e^{\frac{8}{3}+x}\right) dx = e^{\frac{8}{3}+x}+x+e^{8/3}x$$

input
```
Integrate[1 + E^(8/3) + E^(8/3 + x),x]
```

output
```
E^(8/3 + x) + x + E^(8/3)*x
```

3.916.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{x+\frac{8}{3}}+1+e^{8/3}\right) dx$$

$$\Big\downarrow \; 2009$$

$$\left(1+e^{8/3}\right) x+e^{x+\frac{8}{3}}$$

input
```
Int[1 + E^(8/3) + E^(8/3 + x),x]
```

output
```
E^(8/3 + x) + (1 + E^(8/3))*x
```

3.916.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.916.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.65

method	result	size
risch	$x+{\mathrm e}^{\frac{8}{3}} x+{\mathrm e}^{x+\frac{8}{3}}$	11
derivativedivides	${\mathrm e}^{\frac{8}{3}} {\mathrm e}^{x}+\left({\mathrm e}^{\frac{8}{3}}+1\right) \ln \left({\mathrm e}^{x}\right)$	15
default	$x+{\mathrm e}^{\frac{8}{3}} x+{\mathrm e}^{\frac{8}{3}} {\mathrm e}^{x}$	16
parts	$x+{\mathrm e}^{\frac{8}{3}} x+{\mathrm e}^{\frac{8}{3}} {\mathrm e}^{x}$	16
norman	$\left({\mathrm e}^{\frac{8}{3}}+1\right) x+{\mathrm e}^{\frac{8}{3}} {\mathrm e}^{x}$	17
parallelrisch	$\left({\mathrm e}^{\frac{8}{3}}+1\right) x+{\mathrm e}^{\frac{8}{3}} {\mathrm e}^{x}$	17

input
```
int(exp(4/3)^2*exp(x)+exp(4/3)^2+1,x,method=_RETURNVERBOSE)
```

output
```
x+exp(8/3)*x+exp(x+8/3)
```

3.916.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \left(1+e^{8/3}+e^{\frac{8}{3}+x}\right) dx = xe^{\frac{8}{3}}+x+e^{\left(x+\frac{8}{3}\right)}$$

input
```
integrate(exp(4/3)^2*exp(x)+exp(4/3)^2+1,x, algorithm=\
```

output
```
x*e^(8/3) + x + e^(x + 8/3)
```

3.916.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \left(1+e^{8/3}+e^{\frac{8}{3}+x}\right) dx = x\left(1+e^{\frac{8}{3}}\right)+e^{\frac{8}{3}}e^{x}$$

input
```
integrate(exp(4/3)**2*exp(x)+exp(4/3)**2+1,x)
```

output
```
x*(1 + exp(8/3)) + exp(8/3)*exp(x)
```

3.916.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \left(1+e^{8/3}+e^{\frac{8}{3}+x}\right) dx = xe^{\frac{8}{3}}+x+e^{\left(x+\frac{8}{3}\right)}$$

input
```
integrate(exp(4/3)^2*exp(x)+exp(4/3)^2+1,x, algorithm=\
```

output
```
x*e^(8/3) + x + e^(x + 8/3)
```

3.916.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \left(1+e^{8/3}+e^{\frac{8}{3}+x}\right)\,dx = xe^{\frac{8}{3}} + x + e^{\left(x+\frac{8}{3}\right)}$$

input
```
integrate(exp(4/3)^2*exp(x)+exp(4/3)^2+1,x, algorithm=\
```

output
```
x*e^(8/3) + x + e^(x + 8/3)
```

3.916.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.65

$$\int \left(1+e^{8/3}+e^{\frac{8}{3}+x}\right)\,dx = \mathrm{e}^{x+\frac{8}{3}} + x\left(\mathrm{e}^{8/3}+1\right)$$

input
```
int(exp(8/3) + exp(8/3)*exp(x) + 1,x)
```

output
```
exp(x + 8/3) + x*(exp(8/3) + 1)
```

3.917 $\int \frac{-15+\frac{3e^{1+\frac{e}{5-x}}}{5-x}+33x-6x^2}{-5+x}\,dx$

3.917.1 Optimal result

Integrand size = 38, antiderivative size = 22

$$\int \frac{-15+\frac{3e^{1+\frac{e}{5-x}}}{5-x}+33x-6x^2}{-5+x}\,dx=3\left(-e^{\frac{e}{5-x}}+x-x^2\right)$$

output
```
3*x-3*x^2-3*exp(exp(-ln(5-x)+1))
```

3.917.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{-15+\frac{3e^{1+\frac{e}{5-x}}}{5-x}+33x-6x^2}{-5+x}\,dx=-3\left(e^{\frac{e}{5-x}}+(-1+x)x\right)$$

input
```
Integrate[(-15 + (3*E^(1 + E/(5 - x)))/(5 - x) + 33*x - 6*x^2)/(-5 + x),x]
```

output
```
-3*(E^(E/(5 - x)) + (-1 + x)*x)
```

3.917.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x^2+33x+\frac{3e^{\frac{e}{5-x}+1}}{5-x}-15}{x-5}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-3(2x-1)-\frac{3e^{\frac{x-e-5}{x-5}}}{(5-x)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3}{4}(1-2x)^2-3e^{\frac{e}{5-x}}$$

input
```
Int[(-15 + (3*E^(1 + E/(5 - x)))/(5 - x) + 33*x - 6*x^2)/(-5 + x),x]
```

output
```
-3*E^(E/(5 - x)) - (3*(1 - 2*x)^2)/4
```

3.917.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.917.4 Maple [A] (verified)

Time = 1.54 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

method	result	size
risch	$-3x^2+3x-3\,\mathrm{e}^{-\frac{\mathrm{e}}{-5+x}}$	22
default	$3x-3x^2-3\,\mathrm{e}^{\mathrm{e}^{-\ln(5-x)+1}}$	24
parts	$3x-3x^2-3\,\mathrm{e}^{\mathrm{e}^{-\ln(5-x)+1}}$	24
parallelrisch	$\frac{15}{2}-3x^2+3x-3\,\mathrm{e}^{\mathrm{e}^{-\ln(5-x)+1}}$	25
norman	$\frac{18x^2-3x^3-3x\,\mathrm{e}^{\frac{\mathrm{e}}{5-x}}+15\,\mathrm{e}^{\frac{\mathrm{e}}{5-x}}-75}{-5+x}$	46

input
```
int((3*exp(-ln(5-x)+1)*exp(exp(-ln(5-x)+1))-6*x^2+33*x-15)/(-5+x),x,method
=_RETURNVERBOSE)
```

output
```
-3*x^2+3*x-3*exp(-exp(1)/(-5+x))
```

3.917.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.05

$$\int \frac{-15+\frac{3e^{1+\frac{e}{5-x}}}{5-x}+33x-6x^2}{-5+x}\,dx=-3\left((x^2-x)e-(x-5)e^{\left(-\frac{(x-5)\log(-x+5)-x+e+5}{x-5}\right)}\right)e^{(-1)}$$

input
```
integrate((3*exp(-log(5-x)+1)*exp(exp(-log(5-x)+1))-6*x^2+33*x-15)/(-5+x),
x, algorithm=\
```

output
```
-3*((x^2 - x)*e - (x - 5)*e^(-((x - 5)*log(-x + 5) - x + e + 5)/(x - 5)))*
e^(-1)
```

3.917.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{-15+\frac{3e^{1+\frac{e}{5-x}}}{5-x}+33x-6x^2}{-5+x}\,dx = -3x^2+3x-3e^{\frac{e}{5-x}}$$

input
```
integrate((3*exp(-ln(5-x)+1)*exp(exp(-ln(5-x)+1))-6*x**2+33*x-15)/(-5+x),x
)
```

output
```
-3*x**2 + 3*x - 3*exp(E/(5 - x))
```

3.917.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{-15+\frac{3e^{1+\frac{e}{5-x}}}{5-x}+33x-6x^2}{-5+x}\,dx = -3\,x^2+3\,x-3\,e^{\left(-\frac{e}{x-5}\right)}$$

input
```
integrate((3*exp(-log(5-x)+1)*exp(exp(-log(5-x)+1))-6*x^2+33*x-15)/(-5+x),
x, algorithm=\
```

output
```
-3*x^2 + 3*x - 3*e^(-e/(x - 5))
```

3.917.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.77

$$\int \frac{-15+\frac{3e^{1+\frac{e}{5-x}}}{5-x}+33x-6x^2}{-5+x}\,dx = -3\,(x-5)^2\left(\frac{9\,e^3}{x-5}+\frac{e^{\left(-\frac{e}{x-5}+3\right)}}{(x-5)^2}+e^3\right)e^{(-3)}$$

input
```
integrate((3*exp(-log(5-x)+1)*exp(exp(-log(5-x)+1))-6*x^2+33*x-15)/(-5+x),
x, algorithm=\
```

output
```
-3*(x - 5)^2*(9*e^3/(x - 5) + e^(-e/(x - 5) + 3)/(x - 5)^2 + e^3)*e^(-3)
```

3.917.9 Mupad [B] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{-15+\frac{3e^{1+\frac{e}{5-x}}}{5-x}+33x-6x^2}{-5+x}\,dx = 3\,x-3\,\mathrm{e}^{-\frac{\mathrm{e}}{x-5}}-3\,x^2$$

input
```
int((33*x + 3*exp(exp(1 - log(5 - x)))*exp(1 - log(5 - x)) - 6*x^2 - 15)/(
x - 5),x)
```

output
```
3*x - 3*exp(-exp(1)/(x - 5)) - 3*x^2
```

3.918 $\int -2e^{\frac{1}{2}(-237-2x^2+2\log(2))}x\,dx$

3.918.1 Optimal result

Integrand size = 20, antiderivative size = 13

$$\int -2e^{\frac{1}{2}(-237-2x^2+2\log(2))}x\,dx = 2e^{-\frac{237}{2}-x^2}$$

output
```
exp(ln(2)-x^2-237/2)
```

3.918.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int -2e^{\frac{1}{2}(-237-2x^2+2\log(2))}x\,dx = 2e^{-\frac{237}{2}-x^2}$$

input
```
Integrate[-2*E^((-237 - 2*x^2 + 2*Log[2])/2)*x,x]
```

output
```
2*E^(-237/2 - x^2)
```

3.918.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {27, 27, 2655, 2638}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -2xe^{\frac{1}{2}(-2x^2-237+2\log(2))}dx$$
$$\Big\downarrow \; 27$$
$$-2\int 2e^{\frac{1}{2}(-2x^2-237)}xdx$$
$$\Big\downarrow \; 27$$
$$-4\int e^{\frac{1}{2}(-2x^2-237)}xdx$$
$$\Big\downarrow \; 2655$$
$$-4\int e^{-x^2-\frac{237}{2}}xdx$$
$$\Big\downarrow \; 2638$$
$$2e^{-x^2-\frac{237}{2}}$$

input
```
Int[-2*E^((-237 - 2*x^2 + 2*Log[2])/2)*x,x]
```

output
```
2*E^(-237/2 - x^2)
```

3.918.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2638
```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^(n_))*((e_.) + (f_.)*(x_))^(m_
.), x_Symbol] :> Simp[(e + f*x)^n*(F^(a + b*(c + d*x)^n)/(b*f*n*(c + d*x)^n
*Log[F])), x] /; FreeQ[{F, a, b, c, d, e, f, n}, x] && EqQ[m, n - 1] && EqQ
[d*e - c*f, 0]
```

rule 2655
```
Int[(F_)^(v_)*((e_.) + (f_.)*(x_))^(m_.), x_Symbol] :> Int[(e + f*x)^m*F^Ex
pandToSum[v, x], x] /; FreeQ[{F, e, f, m}, x] && BinomialQ[v, x] &&  !Binom
ialMatchQ[v, x]
```

3.918.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

method	result	size
gosper	$\mathrm{e}^{\ln(2)-x^2-\frac{237}{2}}$	11
derivativedivides	$\mathrm{e}^{\ln(2)-x^2-\frac{237}{2}}$	11
default	$\mathrm{e}^{\ln(2)-x^2-\frac{237}{2}}$	11
norman	$\mathrm{e}^{\ln(2)-x^2-\frac{237}{2}}$	11
risch	$2\,\mathrm{e}^{-\frac{237}{2}-x^2}$	11
parallelrisch	$\mathrm{e}^{\ln(2)-x^2-\frac{237}{2}}$	11
meijerg	$-\mathrm{e}^{\ln(2)-\frac{237}{2}}\left(1-\mathrm{e}^{-x^2}\right)$	18
parts	$-2x\,\mathrm{e}^{-\frac{237}{2}}\sqrt{\pi}\,\operatorname{erf}(x)+2\,\mathrm{e}^{-\frac{237}{2}}\left(\operatorname{erf}(x)\,x\sqrt{\pi}+\mathrm{e}^{-x^2}\right)$	30

input
```
int(-2*x*exp(ln(2)-x^2-237/2),x,method=_RETURNVERBOSE)
```

output
```
exp(ln(2)-x^2-237/2)
```

3.918.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int -2e^{\frac{1}{2}(-237-2x^2+2\log(2))}x\,dx = e^{\left(-x^2+\log(2)-\frac{237}{2}\right)}$$

input
```
integrate(-2*x*exp(log(2)-x^2-237/2),x, algorithm=\
```

output
```
e^(-x^2 + log(2) - 237/2)
```

3.918.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int -2e^{\frac{1}{2}(-237-2x^2+2\log(2))}x\,dx = 2e^{-x^2-\frac{237}{2}}$$

input
```
integrate(-2*x*exp(ln(2)-x**2-237/2),x)
```

output
```
2*exp(-x**2 - 237/2)
```

3.918.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int -2e^{\frac{1}{2}(-237-2x^2+2\log(2))}x\,dx = 2\,e^{\left(-x^2-\frac{237}{2}\right)}$$

input
```
integrate(-2*x*exp(log(2)-x^2-237/2),x, algorithm=\
```

output
```
2*e^(-x^2 - 237/2)
```

3.918.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int -2e^{\frac{1}{2}(-237-2x^2+2\log(2))}x\,dx = e^{\left(-x^2+\log(2)-\frac{237}{2}\right)}$$

input
```
integrate(-2*x*exp(log(2)-x^2-237/2),x, algorithm=\
```

output
```
e^(-x^2 + log(2) - 237/2)
```

3.918.9 Mupad [B] (verification not implemented)

Time = 14.98 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int -2e^{\frac{1}{2}(-237-2x^2+2\log(2))}x\,dx = 2\,\mathrm{e}^{-\frac{237}{2}}\,\mathrm{e}^{-x^2}$$

input
```
int(-2*x*exp(log(2) - x^2 - 237/2),x)
```

output
```
2*exp(-237/2)*exp(-x^2)
```

3.919 $\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x\right.\right.\right.$

3.919.1 Optimal result

Integrand size = 72, antiderivative size = 36

$$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^x x)\right)\right)\right)dx$$
$$=x-\frac{e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(x+\frac{e^{-x}x}{3}\right)}{x}$$

output
```
x-exp(5*exp(1/2*exp(x^2)+1/2*x))/x*(x+1/3*x/exp(x))
```

3.919.2 Mathematica [A] (verified)

Time = 3.92 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.00

$$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^x x)\right)\right)\right)dx$$
$$=\frac{1}{6}e^{5e^{\frac{e^{x^2}}{2}+\frac{x}{2}}}\left(-6-2e^{-x}\right)+x$$

input
```
Integrate[(6*E^x + E^(5*E^((E^x^2 + x)/2))*(2 + E^((E^x^2 + x)/2)*(-5 - 15
*E^x + E^x^2*(-10*x - 30*E^x*x))))/(6*E^x),x]
```

3.919.

$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^x x)\right)\right)\right)dx$

output
```
(E^(5*E^(E^x^2/2 + x/2))*(-6 - 2/E^x))/6 + x
```

3.919.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{6}e^{-x}\left(e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(e^{x^2}(-30e^x x-10x)-15e^x-5\right)+2\right)+6e^x\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{6}\int e^{-x}\left(e^{5e^{\frac{1}{2}\left(x+e^{x^2}\right)}}\left(2-5e^{\frac{1}{2}\left(x+e^{x^2}\right)}\left(2e^{x^2}(3e^x x+x)+3e^x+1\right)\right)+6e^x\right)dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{6}\int \left(e^{5e^{\frac{1}{2}\left(x+e^{x^2}\right)}-x}\left(-10e^{x^2+\frac{x}{2}+\frac{e^{x^2}}{2}}x-30e^{x^2+\frac{3x}{2}+\frac{e^{x^2}}{2}}x-5e^{\frac{x}{2}+\frac{e^{x^2}}{2}}-15e^{\frac{3x}{2}+\frac{e^{x^2}}{2}}+2\right)+6\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{6}\left(-10\text{Subst}\left(\int \exp\left(\frac{1}{2}\left(-2x+e^{4x^2}+10e^{x+\frac{e^{4x^2}}{2}}\right)\right)dx,x,\frac{x}{2}\right)-30\text{Subst}\left(\int e^{\frac{1}{2}\left(2x+e^{4x^2}+10e^{x+\frac{e^{4x^2}}{2}}\right)}dx,x,\frac{x}{2}\right)\right)$$

input
```
Int[(6*E^x + E^(5*E^((E^x^2 + x)/2))*(2 + E^((E^x^2 + x)/2)*(-5 - 15*E^x +
 E^x^2*(-10*x - 30*E^x*x))))/(6*E^x),x]
```

output
```
$Aborted
```

3.919.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.919.

$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^x x)\right)\right)\right)dx$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.919.4 Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.81

method	result	size
risch	$x-\frac{(1+3\,\mathrm{e}^{x})\mathrm{e}^{-x+5\,\mathrm{e}^{\frac{\mathrm{e}^{x^{2}}}{2}+\frac{x}{2}}}}{3}$	29
parallelrisch	$-\frac{\left(-6\ln(\mathrm{e}^{x})\mathrm{e}^{x}+6\,\mathrm{e}^{5\,\mathrm{e}^{\frac{\mathrm{e}^{x^{2}}}{2}+\frac{x}{2}}}\mathrm{e}^{x}+2\,\mathrm{e}^{5\,\mathrm{e}^{\frac{\mathrm{e}^{x^{2}}}{2}+\frac{x}{2}}}\right)\mathrm{e}^{-x}}{6}$	49

input
```
int(1/6*((((-30*exp(x)*x-10*x)*exp(x^2)-15*exp(x)-5)*exp(1/2*exp(x^2)+1/2*
x)+2)*exp(5*exp(1/2*exp(x^2)+1/2*x))+6*exp(x))/exp(x),x,method=_RETURNVERB
OSE)
```

output
```
x-1/3*(1+3*exp(x))*exp(-x+5*exp(1/2*exp(x^2)+1/2*x))
```

3.919.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 34, normalized size of antiderivative = 0.94

$$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^xx)\right)\right)\right)\,dx =\frac{1}{3}\left(3\,xe^{x}-(3\,e^{x}+1)e^{\left(5\,e^{\left(\frac{1}{2}\,x+\frac{1}{2}\,e^{\left(x^{2}\right)}\right)}\right)}\right)e^{(-x)}$$

input
```
integrate(1/6*((((-30*exp(x)*x-10*x)*exp(x^2)-15*exp(x)-5)*exp(1/2*exp(x^2
)+1/2*x)+2)*exp(5*exp(1/2*exp(x^2)+1/2*x))+6*exp(x))/exp(x),x, algorithm=\
```

output
```
1/3*(3*x*e^x - (3*e^x + 1)*e^(5*e^(1/2*x + 1/2*e^(x^2))))*e^(-x)
```

3.919.

$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^xx)\right)\right)\right)\,dx$

3.919.6 Sympy [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.81

$$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^x x)\right)\right)\right)\,dx$$
$$=x+\frac{(-3e^x-1)\,e^{-x}e^{5e^{\frac{x}{2}+\frac{e^{x^2}}{2}}}}{3}$$

input
```
integrate(1/6*((((-30*exp(x)*x-10*x)*exp(x**2)-15*exp(x)-5)*exp(1/2*exp(x*
*2)+1/2*x)+2)*exp(5*exp(1/2*exp(x**2)+1/2*x))+6*exp(x))/exp(x),x)
```

output
```
x + (-3*exp(x) - 1)*exp(-x)*exp(5*exp(x/2 + exp(x**2)/2))/3
```

3.919.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.78

$$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^x x)\right)\right)\right)\,dx$$
$$=-\frac{1}{3}\,(3\,e^x+1)e^{\left(-x+5\,e^{\left(\frac{1}{2}\,x+\frac{1}{2}\,e^{\left(x^2\right)}\right)}\right)}+x$$

input
```
integrate(1/6*((((-30*exp(x)*x-10*x)*exp(x^2)-15*exp(x)-5)*exp(1/2*exp(x^2
)+1/2*x)+2)*exp(5*exp(1/2*exp(x^2)+1/2*x))+6*exp(x))/exp(x),x, algorithm=\
```

output
```
-1/3*(3*e^x + 1)*e^(-x + 5*e^(1/2*x + 1/2*e^(x^2))) + x
```

3.919. $\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^x x)\right)\right)\right)\,dx$

3.919.8 Giac [F]

$$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^xx)\right)\right)\right)\,dx$$
$$=\int -\frac{1}{6}\left(\left(5\left(2\left(3\,xe^x+x\right)e^{\left(x^2\right)}+3\,e^x+1\right)e^{\left(\frac{1}{2}\,x+\frac{1}{2}\,e^{\left(x^2\right)}\right)}-2\right)e^{\left(5\,e^{\left(\frac{1}{2}\,x+\frac{1}{2}\,e^{\left(x^2\right)}\right)}\right)}-6\,e^x\right)e^{(-x)}\,dx$$

input
```
integrate(1/6*((((-30*exp(x)*x-10*x)*exp(x^2)-15*exp(x)-5)*exp(1/2*exp(x^2
)+1/2*x)+2)*exp(5*exp(1/2*exp(x^2)+1/2*x))+6*exp(x))/exp(x),x, algorithm=\
```

output
```
integrate(-1/6*((5*(2*(3*x*e^x + x)*e^(x^2) + 3*e^x + 1)*e^(1/2*x + 1/2*e^
(x^2)) - 2)*e^(5*e^(1/2*x + 1/2*e^(x^2))) - 6*e^x)*e^(-x), x)
```

3.919.9 Mupad [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.72

$$\int \frac{1}{6}e^{-x}\left(6e^x+e^{5e^{\frac{1}{2}\left(e^{x^2}+x\right)}}\left(2+e^{\frac{1}{2}\left(e^{x^2}+x\right)}\left(-5-15e^x+e^{x^2}(-10x-30e^xx)\right)\right)\right)\,dx$$
$$=x-\mathrm{e}^{5\sqrt{\mathrm{e}^{\mathrm{e}^{x^2}}}\sqrt{\mathrm{e}^x}-x}\left(\mathrm{e}^x+\frac{1}{3}\right)$$

input
```
int(exp(-x)*(exp(x) - (exp(5*exp(x/2 + exp(x^2)/2))*(exp(x/2 + exp(x^2)/2)
*(15*exp(x) + exp(x^2)*(10*x + 30*x*exp(x)) + 5) - 2))/6),x)
```

output
```
x - exp(5*exp(exp(x^2))^(1/2)*exp(x)^(1/2) - x)*(exp(x) + 1/3)
```

3.920 $\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2)}{-3125+3125x-1250x^2+250x^3}$

3.920.1 Optimal result

Integrand size = 104, antiderivative size = 22

$$\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}$$
$$=\frac{3(e^x+x)^2(x-\log(2))}{(5-x)^4}$$

output
```
(exp(x)+x)^2*(3*x-3*ln(2))/(5-x)^4
```

3.920.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 51 vs. 2(22) = 44.

Time = 9.58 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.32

$$\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}$$
$$=\frac{8e^xx(6x-\log(64))+2x^2(12x-\log(4096))+e^{2x}(24x-\log(16777216))}{8(-5+x)^4}$$

input
```
Integrate[(-45*x^2 - 3*x^3 + (30*x + 6*x^2)*Log[2] + E^(2*x)*(-15 - 39*x +
 6*x^2 + (42 - 6*x)*Log[2]) + E^x*(-60*x - 42*x^2 + 6*x^3 + (30 + 48*x - 6
*x^2)*Log[2]))/(-3125 + 3125*x - 1250*x^2 + 250*x^3 - 25*x^4 + x^5),x]
```

3.920.
$$\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3+(30+48x-6x^2)\log(2))}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}\,dx$$

output
```
(8*E^x*x*(6*x - Log[64]) + 2*x^2*(12*x - Log[4096]) + E^(2*x)*(24*x - Log[
16777216]))/(8*(-5 + x)^4)
```

3.920.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 1.63 (sec) , antiderivative size = 575, normalized size of antiderivative = 26.14, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.048, Rules used = {2007, 7292, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^3-45x^2+e^{2x}\left(6x^2-39x+(42-6x)\log(2)-15\right)+\left(6x^2+30x\right)\log(2)+e^x\left(6x^3-42x^2+\left(-6x^2+48x\right.\right.}{x^5-25x^4+250x^3-1250x^2+3125x-3125}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-3x^3-45x^2+e^{2x}\left(6x^2-39x+(42-6x)\log(2)-15\right)+\left(6x^2+30x\right)\log(2)+e^x\left(6x^3-42x^2+\left(-6x^2+48x\right.\right.}{(x-5)^5}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{3(x+e^x)\left(-2e^xx^2+x^2+13e^xx\left(1+\frac{2\log(2)}{13}\right)+15x\left(1-\frac{2\log(2)}{15}\right)+5e^x\left(1-\frac{14\log(2)}{5}\right)-\log(1024)\right)}{(5-x)^5}dx$$

$$\Big\downarrow \text{27}$$

$$3\int \frac{(x+e^x)\left(-2e^xx^2+x^2+e^x(13+\log(4))x+(15-\log(4))x-\log(1024)+e^x(5-14\log(2))\right)}{(5-x)^5}dx$$

$$\Big\downarrow \text{7293}$$

$$3\int \left(-\frac{x^3}{(x-5)^5}+\frac{(-15+\log(4))x^2}{(x-5)^5}+\frac{\log(1024)x}{(x-5)^5}+\frac{e^{2x}\left(-2x^2+(13+\log(4))x-14\log(2)+5\right)}{(5-x)^5}+\frac{e^x\left(-2x^3+\right.}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$3\left(4e^{10}\,\text{ExpIntegralEi}(-2(5-x))+2e^5\,\text{ExpIntegralEi}(x-5)-\frac{1}{24}e^5(200-\log(1099511627776))\,\text{ExpIntegralEi}(\right.$$

3.920. $\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}\left(-15-39x+6x^2+(42-6x)\log(2)\right)+e^x\left(-60x-42x^2+6x^3+(30+48x-6x^2)\log(2)\right)}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}\,dx$

input
```
Int[(-45*x^2 - 3*x^3 + (30*x + 6*x^2)*Log[2] + E^(2*x)*(-15 - 39*x + 6*x^2
 + (42 - 6*x)*Log[2]) + E^x*(-60*x - 42*x^2 + 6*x^3 + (30 + 48*x - 6*x^2)*
Log[2]))/(-3125 + 3125*x - 1250*x^2 + 250*x^3 - 25*x^4 + x^5),x]
```

output
```
3*(-(E^(2*x)/(5 - x)^2) + (2*E^x)/(5 - x) + (2*E^(2*x))/(5 - x) + x^4/(20*
(5 - x)^4) + 4*E^10*ExpIntegralEi[-2*(5 - x)] + 2*E^5*ExpIntegralEi[-5 + x
] + (E^(2*x)*(7 - Log[4]))/(3*(5 - x)^3) - (E^(2*x)*(7 - Log[4]))/(3*(5 -
x)^2) + (2*E^(2*x)*(7 - Log[4]))/(3*(5 - x)) + (4*E^10*ExpIntegralEi[-2*(5
 - x)]*(7 - Log[4]))/3 + (25*(15 - Log[4]))/(4*(5 - x)^4) - (10*(15 - Log[
4]))/(3*(5 - x)^3) + (15 - Log[4])/(2*(5 - x)^2) - (E^x*(16 - Log[4]))/(2*
(5 - x)^2) + (E^x*(16 - Log[4]))/(2*(5 - x)) + (E^5*ExpIntegralEi[-5 + x]*
(16 - Log[4]))/2 + (E^(2*x)*(20 - Log[16]))/(4*(5 - x)^4) - (E^(2*x)*(20 -
 Log[16]))/(6*(5 - x)^3) + (E^(2*x)*(20 - Log[16]))/(6*(5 - x)^2) - (E^(2*
x)*(20 - Log[16]))/(3*(5 - x)) - (2*E^10*ExpIntegralEi[-2*(5 - x)]*(20 - L
og[16]))/3 - (E^x*(10 + Log[16]))/(3*(5 - x)^3) + (E^x*(10 + Log[16]))/(6*
(5 - x)^2) - (E^x*(10 + Log[16]))/(6*(5 - x)) - (E^5*ExpIntegralEi[-5 + x]
*(10 + Log[16]))/6 - (5*Log[1024])/(4*(5 - x)^4) + Log[1024]/(3*(5 - x)^3)
 + (E^x*(200 - Log[1099511627776]))/(4*(5 - x)^4) - (E^x*(200 - Log[109951
1627776]))/(12*(5 - x)^3) + (E^x*(200 - Log[1099511627776]))/(24*(5 - x)^2
) - (E^x*(200 - Log[1099511627776]))/(24*(5 - x)) - (E^5*ExpIntegralEi[-5
+ x]*(200 - Log[1099511627776]))/24)
```

3.920.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.920.

$$\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3+(30+48x-6x^2)\log(2))}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}\,dx$$

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.920.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(22) = 44$.

Time = 0.34 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.23

method	result
norman	$\frac{3x^3-3x^2\ln(2)+3x\,e^{2x}+6\,e^x x^2-3\ln(2)e^{2x}-6x\ln(2)e^x}{(-5+x)^4}$
parallelrisch	$-\frac{3x^2\ln(2)+6x\ln(2)e^x+3\ln(2)e^{2x}-3x^3-6\,e^x x^2-3x\,e^{2x}}{x^4-20x^3+150x^2-500x+625}$
risch	$\frac{-3x^2\ln(2)+3x^3}{x^4-20x^3+150x^2-500x+625}-\frac{3(\ln(2)-x)e^{2x}}{(-5+x)^4}-\frac{6x(\ln(2)-x)e^x}{(-5+x)^4}$
parts	$-\frac{30\ln(2)-225}{(-5+x)^3}-\frac{3(2\ln(2)-30)}{2(-5+x)^2}+\frac{3}{-5+x}-\frac{3(100\ln(2)-500)}{4(-5+x)^4}+\frac{15\,e^{2x}}{(-5+x)^4}+\frac{3\,e^{2x}}{(-5+x)^3}-\frac{3\ln(2)e^{2x}}{(-5+x)^4}-\frac{6\ln(2)e^x}{(-5+x)^3}-$
default	$\frac{225}{(-5+x)^3}+\frac{45}{(-5+x)^2}+\frac{375}{(-5+x)^4}+\frac{3}{-5+x}+\frac{15\,e^{2x}}{(-5+x)^4}+\frac{3\,e^{2x}}{(-5+x)^3}-\frac{10\ln(2)}{(-5+x)^3}-\frac{75\ln(2)}{2(-5+x)^4}+6\ln(2)\left(-\right.$

input
```
int((((-6*x+42)*ln(2)+6*x^2-39*x-15)*exp(x)^2+((-6*x^2+48*x+30)*ln(2)+6*x^
3-42*x^2-60*x)*exp(x)+(6*x^2+30*x)*ln(2)-3*x^3-45*x^2)/(x^5-25*x^4+250*x^3
-1250*x^2+3125*x-3125),x,method=_RETURNVERBOSE)
```

output
```
(3*x^3-3*x^2*ln(2)+3*x*exp(x)^2+6*exp(x)*x^2-3*ln(2)*exp(x)^2-6*x*ln(2)*ex
p(x))/(-5+x)^4
```

3.920.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(19) = 38$.

Time = 0.28 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.59

$$\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}$$
$$=\frac{3\left(x^3-x^2\log(2)+(x-\log(2))e^{(2x)}+2\left(x^2-x\log(2)\right)e^x\right)}{x^4-20x^3+150x^2-500x+625}$$

input
```
integrate((((-6*x+42)*log(2)+6*x^2-39*x-15)*exp(x)^2+((-6*x^2+48*x+30)*log
(2)+6*x^3-42*x^2-60*x)*exp(x)+(6*x^2+30*x)*log(2)-3*x^3-45*x^2)/(x^5-25*x^
4+250*x^3-1250*x^2+3125*x-3125),x, algorithm=\
```

output
```
3*(x^3 - x^2*log(2) + (x - log(2))*e^(2*x) + 2*(x^2 - x*log(2))*e^x)/(x^4
- 20*x^3 + 150*x^2 - 500*x + 625)
```

3.920.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 206 vs. $2(19) = 38$.

Time = 0.51 (sec) , antiderivative size = 206, normalized size of antiderivative = 9.36

$$\int \frac{-45x^2 - 3x^3 + (30x + 6x^2)\log(2) + e^{2x}(-15 - 39x + 6x^2 + (42 - 6x)\log(2)) + e^x(-60x - 42x^2 + 6x^3}{-3125 + 3125x - 1250x^2 + 250x^3 - 25x^4 + x^5}$$
$$= -\frac{-3x^3 + 3x^2\log(2)}{x^4 - 20x^3 + 150x^2 - 500x + 625} + \frac{(3x^5 - 60x^4 - 3x^4\log(2) + 60x^3\log(2) + 450x^3 - 1500x^2 - 450x^2\log(2) + 1500x\log(2) + 1875x - 1}{x^8 - 40x^7 + 700x^6 - 70}$$

input
```
integrate((((-6*x+42)*ln(2)+6*x**2-39*x-15)*exp(x)**2+((-6*x**2+48*x+30)*l
n(2)+6*x**3-42*x**2-60*x)*exp(x)+(6*x**2+30*x)*ln(2)-3*x**3-45*x**2)/(x**5
-25*x**4+250*x**3-1250*x**2+3125*x-3125),x)
```

output
```
-(-3*x**3 + 3*x**2*log(2))/(x**4 - 20*x**3 + 150*x**2 - 500*x + 625) + ((3
*x**5 - 60*x**4 - 3*x**4*log(2) + 60*x**3*log(2) + 450*x**3 - 1500*x**2 -
450*x**2*log(2) + 1500*x*log(2) + 1875*x - 1875*log(2))*exp(2*x) + (6*x**6
 - 120*x**5 - 6*x**5*log(2) + 120*x**4*log(2) + 900*x**4 - 3000*x**3 - 900
*x**3*log(2) + 3000*x**2*log(2) + 3750*x**2 - 3750*x*log(2))*exp(x))/(x**8
 - 40*x**7 + 700*x**6 - 7000*x**5 + 43750*x**4 - 175000*x**3 + 437500*x**2
 - 625000*x + 390625)
```

3.920.7 Maxima [F]

$$\int \frac{-45x^2 - 3x^3 + (30x + 6x^2)\log(2) + e^{2x}(-15 - 39x + 6x^2 + (42 - 6x)\log(2)) + e^x(-60x - 42x^2 + 6x^3}{-3125 + 3125x - 1250x^2 + 250x^3 - 25x^4 + x^5}$$
$$= \int -\frac{3\left(x^3 + 15\,x^2 - (2\,x^2 - 2\,(x - 7)\log(2) - 13\,x - 5)e^{(2\,x)} - 2\,(x^3 - 7\,x^2 - (x^2 - 8\,x - 5)\log(2) - 10\right.}{x^5 - 25\,x^4 + 250\,x^3 - 1250\,x^2 + 3125\,x - 3125}$$

input
```
integrate((((-6*x+42)*log(2)+6*x^2-39*x-15)*exp(x)^2+((-6*x^2+48*x+30)*log
(2)+6*x^3-42*x^2-60*x)*exp(x)+(6*x^2+30*x)*log(2)-3*x^3-45*x^2)/(x^5-25*x^
4+250*x^3-1250*x^2+3125*x-3125),x, algorithm=\
```

output
```
-30*integrate(e^x/(x^5 - 25*x^4 + 250*x^3 - 1250*x^2 + 3125*x - 3125), x)*
log(2) - 1/2*(6*x^2 - 20*x + 25)*log(2)/(x^4 - 20*x^3 + 150*x^2 - 500*x +
625) - 5/2*(4*x - 5)*log(2)/(x^4 - 20*x^3 + 150*x^2 - 500*x + 625) + 3/4*(
4*x^3 - 30*x^2 + 100*x - 125)/(x^4 - 20*x^3 + 150*x^2 - 500*x + 625) + 15/
4*(6*x^2 - 20*x + 25)/(x^4 - 20*x^3 + 150*x^2 - 500*x + 625) + 3*((x - log
(2))*e^(2*x) + 2*(x^2 - x*log(2))*e^x)/(x^4 - 20*x^3 + 150*x^2 - 500*x + 6
25) - 30*e^5*exp_integral_e(5, -x + 5)*log(2)/(x - 5)^4
```

3.920.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. $2(19) = 38$.

Time = 0.26 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.77

$$\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}$$
$$=\frac{3\left(x^3+2\,x^2e^x-x^2\log(2)-2\,xe^x\log(2)+xe^{(2\,x)}-e^{(2\,x)}\log(2)\right)}{x^4-20\,x^3+150\,x^2-500\,x+625}$$

input
```
integrate((((-6*x+42)*log(2)+6*x^2-39*x-15)*exp(x)^2+((-6*x^2+48*x+30)*log
(2)+6*x^3-42*x^2-60*x)*exp(x)+(6*x^2+30*x)*log(2)-3*x^3-45*x^2)/(x^5-25*x^
4+250*x^3-1250*x^2+3125*x-3125),x, algorithm=\
```

output
```
3*(x^3 + 2*x^2*e^x - x^2*log(2) - 2*x*e^x*log(2) + x*e^(2*x) - e^(2*x)*log
(2))/(x^4 - 20*x^3 + 150*x^2 - 500*x + 625)
```

3.920.9 Mupad [B] (verification not implemented)

Time = 13.66 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.82

$$\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}$$
$$=-\frac{\mathrm{e}^{2\,x}\,\ln(8)+x^2\,(\ln(8)-6\,\mathrm{e}^x)-x\,(3\,\mathrm{e}^{2\,x}-\mathrm{e}^x\,\ln(64))-3\,x^3}{x^4-20\,x^3+150\,x^2-500\,x+625}$$

input
```
int(-(exp(2*x)*(39*x + log(2)*(6*x - 42) - 6*x^2 + 15) + exp(x)*(60*x - lo
g(2)*(48*x - 6*x^2 + 30) + 42*x^2 - 6*x^3) - log(2)*(30*x + 6*x^2) + 45*x^
2 + 3*x^3)/(3125*x - 1250*x^2 + 250*x^3 - 25*x^4 + x^5 - 3125),x)
```

3.920.
$$\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3+(30+48x-6x^2)\log(2))}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}\,dx$$

output
```
-(exp(2*x)*log(8) + x^2*(log(8) - 6*exp(x)) - x*(3*exp(2*x) - exp(x)*log(6
4)) - 3*x^3)/(150*x^2 - 500*x - 20*x^3 + x^4 + 625)
```

3.920.

$$\int \frac{-45x^2-3x^3+(30x+6x^2)\log(2)+e^{2x}(-15-39x+6x^2+(42-6x)\log(2))+e^x(-60x-42x^2+6x^3+(30+48x-6x^2)\log(2))}{-3125+3125x-1250x^2+250x^3-25x^4+x^5}\,dx$$

3.921 $\int \frac{-7500+e^{4x}+4600x+2600x^2-19900x^3+2501x^4+2500x^5+50x^6+625x}{2500+e^{4x}+5000x+2600x^2+100x^3+2501x^4+2500x^5+50x^6+625x^8}$

3.921.1 Optimal result

Integrand size = 125, antiderivative size = 27

$$\int \frac{-7500+e^{4x}+4600x+2600x^2-19900x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}(-300+100x+2x^2}{2500+e^{4x}+5000x+2600x^2+100x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}\left(100+100x+2x^2+\right.}$$
$$=x+\frac{8}{2+2x+x^4+\frac{1}{25}\left(e^{2x}+x^2\right)}$$

output
```
4/(x+1+1/2*x^4+1/50*x^2+1/50*exp(x)^2)+x
```

3.921.2 Mathematica [A] (verified)

Time = 3.02 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.70

$$\int \frac{-7500+e^{4x}+4600x+2600x^2-19900x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}(-300+100x+2x^2}{2500+e^{4x}+5000x+2600x^2+100x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}\left(100+100x+2x^2+\right.}$$
$$=\frac{200+50x+e^{2x}x+50x^2+x^3+25x^5}{50+e^{2x}+50x+x^2+25x^4}$$

input
```
Integrate[(-7500 + E^(4*x) + 4600*x + 2600*x^2 - 19900*x^3 + 2501*x^4 + 25
00*x^5 + 50*x^6 + 625*x^8 + E^(2*x)*(-300 + 100*x + 2*x^2 + 50*x^4))/(2500
 + E^(4*x) + 5000*x + 2600*x^2 + 100*x^3 + 2501*x^4 + 2500*x^5 + 50*x^6 +
625*x^8 + E^(2*x)*(100 + 100*x + 2*x^2 + 50*x^4)),x]
```

output
```
(200 + 50*x + E^(2*x)*x + 50*x^2 + x^3 + 25*x^5)/(50 + E^(2*x) + 50*x + x^
2 + 25*x^4)
```

3.921.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{625x^8+50x^6+2500x^5+2501x^4-19900x^3+2600x^2+e^{2x}\left(50x^4+2x^2+100x-300\right)+4600x+e^{4x}-7500}{625x^8+50x^6+2500x^5+2501x^4+100x^3+2600x^2+e^{2x}\left(50x^4+2x^2+100x+100\right)+5000x+e^{4x}+2500}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{625x^8+50x^6+2500x^5+2501x^4-19900x^3+2600x^2+e^{2x}\left(50x^4+2x^2+100x-300\right)+4600x+e^{4x}-7500}{\left(25x^4+x^2+50x+e^{2x}+50\right)^2}$$

$$\Big\downarrow \ 7293$$

$$\int \left(-\frac{400}{25x^4+x^2+50x+e^{2x}+50}+\frac{400\left(25x^4-50x^3+x^2+49x+25\right)}{\left(25x^4+x^2+50x+e^{2x}+50\right)^2}+1\right)dx$$

$$\Big\downarrow \ 2009$$

$$10000\int \frac{1}{\left(25x^4+x^2+50x+e^{2x}+50\right)^2}dx+19600\int \frac{x}{\left(25x^4+x^2+50x+e^{2x}+50\right)^2}dx+400\int \frac{x^2}{\left(25x^4+x^2+50x+e^{2x}+50\right)^2}dx+10000\int \frac{x^4}{\left(25x^4+x^2+50x+e^{2x}+50\right)^2}dx-400\int \frac{1}{25x^4+x^2+50x+e^{2x}+50}dx-20000\int \frac{x^3}{\left(25x^4+x^2+50x+e^{2x}+50\right)^2}dx+x$$

input
```
Int[(-7500 + E^(4*x) + 4600*x + 2600*x^2 - 19900*x^3 + 2501*x^4 + 2500*x^5
 + 50*x^6 + 625*x^8 + E^(2*x)*(-300 + 100*x + 2*x^2 + 50*x^4))/(2500 + E^(
4*x) + 5000*x + 2600*x^2 + 100*x^3 + 2501*x^4 + 2500*x^5 + 50*x^6 + 625*x^
8 + E^(2*x)*(100 + 100*x + 2*x^2 + 50*x^4)),x]
```

output
```
$Aborted
```

3.921.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.921.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

method	result	size
risch	$x+\frac{200}{25x^4+\mathrm{e}^{2x}+x^2+50x+50}$	24
parallelrisch	$\frac{25x^5+x^3+x\,\mathrm{e}^{2x}+50x^2+50x+200}{25x^4+\mathrm{e}^{2x}+x^2+50x+50}$	45

input
```
int((exp(x)^4+(50*x^4+2*x^2+100*x-300)*exp(x)^2+625*x^8+50*x^6+2500*x^5+25
01*x^4-19900*x^3+2600*x^2+4600*x-7500)/(exp(x)^4+(50*x^4+2*x^2+100*x+100)*
exp(x)^2+625*x^8+50*x^6+2500*x^5+2501*x^4+100*x^3+2600*x^2+5000*x+2500),x,
method=_RETURNVERBOSE)
```

output
```
x+200/(25*x^4+exp(2*x)+x^2+50*x+50)
```

3.921.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \frac{-7500+e^{4x}+4600x+2600x^2-19900x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}(-300+100x+2x^2}{2500+e^{4x}+5000x+2600x^2+100x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}\left(100+100x+2x^2+\right.}$$
$$=\frac{25\,x^5+x^3+50\,x^2+xe^{(2\,x)}+50\,x+200}{25\,x^4+x^2+50\,x+e^{(2\,x)}+50}$$

input
```
integrate((exp(x)^4+(50*x^4+2*x^2+100*x-300)*exp(x)^2+625*x^8+50*x^6+2500*
x^5+2501*x^4-19900*x^3+2600*x^2+4600*x-7500)/(exp(x)^4+(50*x^4+2*x^2+100*x
+100)*exp(x)^2+625*x^8+50*x^6+2500*x^5+2501*x^4+100*x^3+2600*x^2+5000*x+25
00),x, algorithm=\
```

output
```
(25*x^5 + x^3 + 50*x^2 + x*e^(2*x) + 50*x + 200)/(25*x^4 + x^2 + 50*x + e^
(2*x) + 50)
```

3.921.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-7500+e^{4x}+4600x+2600x^2-19900x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}(-300+100x+2x^2+50x^4)}{2500+e^{4x}+5000x+2600x^2+100x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}(100+100x+2x^2+50x^4)}\,dx = x+\frac{200}{25x^4+x^2+50x+e^{2x}+50}$$

input
```
integrate((exp(x)**4+(50*x**4+2*x**2+100*x-300)*exp(x)**2+625*x**8+50*x**6
+2500*x**5+2501*x**4-19900*x**3+2600*x**2+4600*x-7500)/(exp(x)**4+(50*x**4
+2*x**2+100*x+100)*exp(x)**2+625*x**8+50*x**6+2500*x**5+2501*x**4+100*x**3
+2600*x**2+5000*x+2500),x)
```

output
```
x + 200/(25*x**4 + x**2 + 50*x + exp(2*x) + 50)
```

3.921.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \frac{-7500+e^{4x}+4600x+2600x^2-19900x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}(-300+100x+2x^2+50x^4)}{2500+e^{4x}+5000x+2600x^2+100x^3+2501x^4+2500x^5+50x^6+625x^8+e^{2x}(100+100x+2x^2+50x^4)}\,dx = \frac{25\,x^5+x^3+50\,x^2+xe^{(2\,x)}+50\,x+200}{25\,x^4+x^2+50\,x+e^{(2\,x)}+50}$$

input
```
integrate((exp(x)^4+(50*x^4+2*x^2+100*x-300)*exp(x)^2+625*x^8+50*x^6+2500*
x^5+2501*x^4-19900*x^3+2600*x^2+4600*x-7500)/(exp(x)^4+(50*x^4+2*x^2+100*x
+100)*exp(x)^2+625*x^8+50*x^6+2500*x^5+2501*x^4+100*x^3+2600*x^2+5000*x+25
00),x, algorithm=\
```

output
```
(25*x^5 + x^3 + 50*x^2 + x*e^(2*x) + 50*x + 200)/(25*x^4 + x^2 + 50*x + e^
(2*x) + 50)
```

3.921.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \frac{-7500 + e^{4x} + 4600x + 2600x^2 - 19900x^3 + 2501x^4 + 2500x^5 + 50x^6 + 625x^8 + e^{2x}(-300 + 100x + 2x^2}{2500 + e^{4x} + 5000x + 2600x^2 + 100x^3 + 2501x^4 + 2500x^5 + 50x^6 + 625x^8 + e^{2x}(100 + 100x + 2x^2 +}$$
$$= \frac{25\,x^5 + x^3 + 50\,x^2 + xe^{(2\,x)} + 50\,x + 200}{25\,x^4 + x^2 + 50\,x + e^{(2\,x)} + 50}$$

input
```
integrate((exp(x)^4+(50*x^4+2*x^2+100*x-300)*exp(x)^2+625*x^8+50*x^6+2500*
x^5+2501*x^4-19900*x^3+2600*x^2+4600*x-7500)/(exp(x)^4+(50*x^4+2*x^2+100*x
+100)*exp(x)^2+625*x^8+50*x^6+2500*x^5+2501*x^4+100*x^3+2600*x^2+5000*x+25
00),x, algorithm=\
```

output
```
(25*x^5 + x^3 + 50*x^2 + x*e^(2*x) + 50*x + 200)/(25*x^4 + x^2 + 50*x + e^
(2*x) + 50)
```

3.921.9 Mupad [B] (verification not implemented)

Time = 13.81 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{-7500 + e^{4x} + 4600x + 2600x^2 - 19900x^3 + 2501x^4 + 2500x^5 + 50x^6 + 625x^8 + e^{2x}(-300 + 100x + 2x^2}{2500 + e^{4x} + 5000x + 2600x^2 + 100x^3 + 2501x^4 + 2500x^5 + 50x^6 + 625x^8 + e^{2x}(100 + 100x + 2x^2 +}$$
$$= x + \frac{200}{50\,x + \mathrm{e}^{2\,x} + x^2 + 25\,x^4 + 50}$$

input
```
int((4600*x + exp(4*x) + exp(2*x)*(100*x + 2*x^2 + 50*x^4 - 300) + 2600*x^
2 - 19900*x^3 + 2501*x^4 + 2500*x^5 + 50*x^6 + 625*x^8 - 7500)/(5000*x + e
xp(4*x) + exp(2*x)*(100*x + 2*x^2 + 50*x^4 + 100) + 2600*x^2 + 100*x^3 + 2
501*x^4 + 2500*x^5 + 50*x^6 + 625*x^8 + 2500),x)
```

output
```
x + 200/(50*x + exp(2*x) + x^2 + 25*x^4 + 50)
```

3.922 $\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2$

3.922.1 Optimal result

Integrand size = 306, antiderivative size = 27

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log}{}$$

$$=\frac{x+\log\left(\log\left(\log\left(\frac{\frac{1}{x}+\log(\log(x))}{2-x}\right)\right)\right)}{\log(3x)}$$

output
```
(x+ln(ln(ln((ln(ln(x))+1/x)/(2-x)))))/ln(3*x)
```

3.922.2 Mathematica [A] (verified)

Time = 0.48 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log}{}$$

$$=\frac{x}{\log(3x)}+\frac{\log\left(\log\left(\log\left(-\frac{1+x\log(\log(x))}{(-2+x)x}\right)\right)\right)}{\log(3x)}$$

input
```
Integrate[((-2*x + x^2 + (2 - 2*x)*Log[x])*Log[3*x] - x^2*Log[x]*Log[3*x]*
Log[Log[x]] + ((2*x - x^2)*Log[x] + (-2*x + x^2)*Log[x]*Log[3*x] + ((2*x^2
 - x^3)*Log[x] + (-2*x^2 + x^3)*Log[x]*Log[3*x])*Log[Log[x]])*Log[(-1 - x*
Log[Log[x]])/(-2*x + x^2)]*Log[Log[(-1 - x*Log[Log[x]])/(-2*x + x^2)]] + (
(2 - x)*Log[x] + (2*x - x^2)*Log[x]*Log[Log[x]])*Log[(-1 - x*Log[Log[x]])/
(-2*x + x^2)]*Log[Log[(-1 - x*Log[Log[x]])/(-2*x + x^2)]]*Log[Log[Log[(-1
- x*Log[Log[x]])/(-2*x + x^2)]]])/(((-2*x + x^2)*Log[x]*Log[3*x]^2 + (-2*x
^2 + x^3)*Log[x]*Log[3*x]^2*Log[Log[x]])*Log[(-1 - x*Log[Log[x]])/(-2*x +
x^2)]*Log[Log[(-1 - x*Log[Log[x]])/(-2*x + x^2)]]),x]
```

output
```
x/Log[3*x] + Log[Log[Log[-((1 + x*Log[Log[x]])/((-2 + x)*x))]]]/Log[3*x]
```

3.922.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(-\log(x))\log(3x)\log(\log(x)) + \left(x^2-2x+(2-2x)\log(x)\right)\log(3x) + \left(\left(2x-x^2\right)\log(\log(x))\log(x) + (2-$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\frac{((x-2)x-2(x-1)\log(x))\log(3x)}{(x-2)x\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)} - \frac{x\log(\log(x))\log(3x)}{(x-2)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(\right.\right.}}{\log^2(3x)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right) + x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$$\Big\downarrow \text{7293}$$

3.922.

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(-2x^2+x^3)\log}{((-2x+x^2)\log(x)\log^2(3x)+}$$

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$$\downarrow \text{7239}$$

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$$\downarrow \text{7293}$$

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$$\downarrow \text{7239}$$

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$$\downarrow \text{7293}$$

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$$\downarrow \text{7239}$$

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$$\downarrow \text{7293}$$

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$$\downarrow \text{7239}$$

3.922.

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(-2x^2+x^3)\log}{((-2x+x^2)\log(x)\log^2(3x)+}$$

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x \cdots}{\cdots}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}\cdots}{x\log^2(3x)}$$

$\downarrow$ 7293

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\cdots\right.}{\cdots}\cdots\right.$$

$\downarrow$ 7239

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x \cdots}{\cdots}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}\cdots}{x\log^2(3x)}$$

$\downarrow$ 7293

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\cdots\right.}{\cdots}\cdots\right.$$

$\downarrow$ 7239

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x \cdots}{\cdots}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}\cdots}{x\log^2(3x)}$$

$\downarrow$ 7293

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\cdots\right.}{\cdots}\cdots\right.$$

$\downarrow$ 7239

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x \cdots}{\cdots}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}\cdots}{x\log^2(3x)}$$

$\downarrow$ 7293

3.922.

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(-2x^2+x^3)\log\cdots}{((-2x+x^2)\log(x)\log^2(3x)+\cdots}$$

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$$\Big\downarrow \text{7239}$$

3.922.

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(-2x^2+x^3)\log}{((-2x+x^2)\log(x)\log^2(3x)+}$$

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$\downarrow$ 7293

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$\downarrow$ 7239

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$\downarrow$ 7293

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

$\downarrow$ 7239

$$\int \frac{\frac{\log(3x)\left(\log(x)\left(x^2\log(\log(x))\left((x-2)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)-1\right)-2x+(x-2)x\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x}{}\right.\right.\right.\right.}{(x-2)\log(x)(x\log(\log(x))+1)\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)}}{x\log^2(3x)}$$

$\downarrow$ 7293

$$\int \left(\frac{x^3(-\log(x))\log(\log(x))\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\log\left(\log\left(-\frac{x\log(\log(x))+1}{(x-2)x}\right)\right)+x^3\log(x)\log(3x)\log(\log(x))\log\left(\right.}{}\right.$$

3.922.

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(-2x^2+x^3)\log}{((-2x+x^2)\log(x)\log^2(3x)+}$$

input
```
Int[((-2*x + x^2 + (2 - 2*x)*Log[x])*Log[3*x] - x^2*Log[x]*Log[3*x]*Log[Lo
g[x]] + ((2*x - x^2)*Log[x] + (-2*x + x^2)*Log[x]*Log[3*x] + ((2*x^2 - x^3
)*Log[x] + (-2*x^2 + x^3)*Log[x]*Log[3*x])*Log[Log[x]])*Log[(-1 - x*Log[Lo
g[x]])/(-2*x + x^2)]*Log[Log[(-1 - x*Log[Log[x]])/(-2*x + x^2)]] + ((2 - x
)*Log[x] + (2*x - x^2)*Log[x]*Log[Log[x]])*Log[(-1 - x*Log[Log[x]])/(-2*x
+ x^2)]*Log[Log[(-1 - x*Log[Log[x]])/(-2*x + x^2)]]*Log[Log[Log[(-1 - x*Lo
g[Log[x]])/(-2*x + x^2)]]])/(((-2*x + x^2)*Log[x]*Log[3*x]^2 + (-2*x^2 + x
^3)*Log[x]*Log[3*x]^2*Log[Log[x]])*Log[(-1 - x*Log[Log[x]])/(-2*x + x^2)]*
Log[Log[(-1 - x*Log[Log[x]])/(-2*x + x^2)]]),x]
```

output
```
$Aborted
```

3.922.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.922.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 11.71 (sec) , antiderivative size = 274, normalized size of antiderivative = 10.15

$$2i \ln \left(\ln \left(i\pi - \ln (x) - \ln (-2+x) + \ln (x \ln (\ln (x)) + 1) - \frac{i\pi \operatorname{csgn}\left(\frac{i(x\ln(\ln(x))+1)}{-2+x}\right)\left(-\operatorname{csgn}\left(\frac{i(x\ln(\ln(x))+1)}{-2+x}\right)+\operatorname{csgn}\left(\frac{i}{-2+}\right.\right.}{2}\right.\right.$$

input
```
int((((-x^2+2*x)*ln(x)*ln(ln(x))+(2-x)*ln(x))*ln((-x*ln(ln(x))-1)/(x^2-2*x
))*ln(ln((-x*ln(ln(x))-1)/(x^2-2*x)))*ln(ln(ln((-x*ln(ln(x))-1)/(x^2-2*x))
))+(((x^3-2*x^2)*ln(x)*ln(3*x)+(-x^3+2*x^2)*ln(x))*ln(ln(x))+(x^2-2*x)*ln(
x)*ln(3*x)+(-x^2+2*x)*ln(x))*ln((-x*ln(ln(x))-1)/(x^2-2*x))*ln(ln((-x*ln(l
n(x))-1)/(x^2-2*x)))-x^2*ln(x)*ln(3*x)*ln(ln(x))+((2-2*x)*ln(x)+x^2-2*x)*l
n(3*x))/((x^3-2*x^2)*ln(x)*ln(3*x)^2*ln(ln(x))+(x^2-2*x)*ln(x)*ln(3*x)^2)/
ln((-x*ln(ln(x))-1)/(x^2-2*x))/ln(ln((-x*ln(ln(x))-1)/(x^2-2*x))),x)
```

3.922.

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(-2x^2+x^3)\log\ldots}{((-2x+x^2)\log(x)\log^2(3x)+\ldots}$$

output
```
2*I/(2*I*ln(3)+2*I*ln(x))*ln(ln(I*Pi-ln(x)-ln(-2+x)+ln(x*ln(ln(x))+1)-1/2*
I*Pi*csgn(I/(-2+x)*(x*ln(ln(x))+1))*(-csgn(I/(-2+x)*(x*ln(ln(x))+1))+csgn(
I/(-2+x)))*(-csgn(I/(-2+x)*(x*ln(ln(x))+1))+csgn(I*(x*ln(ln(x))+1)))-1/2*I
*Pi*csgn(I/x/(-2+x)*(x*ln(ln(x))+1))*(-csgn(I/x/(-2+x)*(x*ln(ln(x))+1))+cs
gn(I/x))*(-csgn(I/x/(-2+x)*(x*ln(ln(x))+1))+csgn(I/(-2+x)*(x*ln(ln(x))+1))
)+I*Pi*csgn(I/x/(-2+x)*(x*ln(ln(x))+1))^2*(csgn(I/x/(-2+x)*(x*ln(ln(x))+1)
)-1)))+2*I*x/(2*I*ln(3)+2*I*ln(x))
```

3.922.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{(-2x + x^2 + (2-2x)\log(x))\log(3x) - x^2\log(x)\log(3x)\log(\log(x)) + ((2x-x^2)\log(x) + (-2x+x^2)\log}{}$$

$$= \frac{x + \log\left(\log\left(\log\left(-\frac{x\log(\log(x))+1}{x^2-2\,x}\right)\right)\right)}{\log(3) + \log(x)}$$

input
```
integrate((((-x^2+2*x)*log(x)*log(log(x))+(2-x)*log(x))*log((-x*log(log(x)
)-1)/(x^2-2*x))*log(log((-x*log(log(x))-1)/(x^2-2*x)))*log(log(log((-x*log
(log(x))-1)/(x^2-2*x))))+(((x^3-2*x^2)*log(x)*log(3*x)+(-x^3+2*x^2)*log(x)
)*log(log(x))+(x^2-2*x)*log(x)*log(3*x)+(-x^2+2*x)*log(x))*log((-x*log(log
(x))-1)/(x^2-2*x))*log(log((-x*log(log(x))-1)/(x^2-2*x)))-x^2*log(x)*log(3
*x)*log(log(x))+((2-2*x)*log(x)+x^2-2*x)*log(3*x))/((x^3-2*x^2)*log(x)*log
(3*x)^2*log(log(x))+(x^2-2*x)*log(x)*log(3*x)^2)/log((-x*log(log(x))-1)/(x
^2-2*x))/log(log((-x*log(log(x))-1)/(x^2-2*x))),x, algorithm=\
```

output
```
(x + log(log(log(-(x*log(log(x)) + 1)/(x^2 - 2*x)))))/(log(3) + log(x))
```

3.922.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(-2x + x^2 + (2-2x)\log(x))\log(3x) - x^2\log(x)\log(3x)\log(\log(x)) + ((2x-x^2)\log(x) + (-2x+x^2)\log}{}$$

= Timed out

3.922.

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(-2x^2+x^3)\log}{((-2x+x^2)\log(x)\log^2(3x)+}$$

input
```
integrate((((-x**2+2*x)*ln(x)*ln(ln(x))+(2-x)*ln(x))*ln((-x*ln(ln(x))-1)/(
x**2-2*x))*ln(ln((-x*ln(ln(x))-1)/(x**2-2*x)))*ln(ln(ln((-x*ln(ln(x))-1)/(
x**2-2*x))))+(((x**3-2*x**2)*ln(x)*ln(3*x)+(-x**3+2*x**2)*ln(x))*ln(ln(x))
+(x**2-2*x)*ln(x)*ln(3*x)+(-x**2+2*x)*ln(x))*ln((-x*ln(ln(x))-1)/(x**2-2*x
))*ln(ln((-x*ln(ln(x))-1)/(x**2-2*x)))-x**2*ln(x)*ln(3*x)*ln(ln(x))+((2-2*
x)*ln(x)+x**2-2*x)*ln(3*x))/((x**3-2*x**2)*ln(x)*ln(3*x)**2*ln(ln(x))+(x**
2-2*x)*ln(x)*ln(3*x)**2)/ln((-x*ln(ln(x))-1)/(x**2-2*x))/ln(ln((-x*ln(ln(x
))-1)/(x**2-2*x))),x)
```

output
```
Timed out
```

3.922.7 Maxima [A] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log\cdots}{\cdots}$$

$$= \frac{x+\log\left(\log\left(\log\left(x\log\left(\log\left(x\right)\right)+1\right)-\log\left(x\right)-\log\left(-x+2\right)\right)\right)}{\log\left(3\right)+\log\left(x\right)}$$

input
```
integrate((((-x^2+2*x)*log(x)*log(log(x))+(2-x)*log(x))*log((-x*log(log(x)
)-1)/(x^2-2*x))*log(log((-x*log(log(x))-1)/(x^2-2*x)))*log(log(log((-x*log
(log(x))-1)/(x^2-2*x))))+(((x^3-2*x^2)*log(x)*log(3*x)+(-x^3+2*x^2)*log(x)
)*log(log(x))+(x^2-2*x)*log(x)*log(3*x)+(-x^2+2*x)*log(x))*log((-x*log(log
(x))-1)/(x^2-2*x))*log(log((-x*log(log(x))-1)/(x^2-2*x)))-x^2*log(x)*log(3
*x)*log(log(x))+((2-2*x)*log(x)+x^2-2*x)*log(3*x))/((x^3-2*x^2)*log(x)*log
(3*x)^2*log(log(x))+(x^2-2*x)*log(x)*log(3*x)^2)/log((-x*log(log(x))-1)/(x
^2-2*x))/log(log((-x*log(log(x))-1)/(x^2-2*x))),x, algorithm=\
```

output
```
(x + log(log(log(x*log(log(x)) + 1) - log(x) - log(-x + 2))))/(log(3) + lo
g(x))
```

3.922.8 Giac [A] (verification not implemented)

Time = 1.84 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.48

$$\int \frac{(-2x + x^2 + (2 - 2x)\log(x))\log(3x) - x^2\log(x)\log(3x)\log(\log(x)) + ((2x - x^2)\log(x) + (-2x + x^2)\log}{}$$

$$= \frac{x}{\log(3) + \log(x)} + \frac{\log(\log(\log(-x\log(\log(x)) - 1) - \log(x - 2) - \log(x)))}{\log(3) + \log(x)}$$

input
```
integrate((((-x^2+2*x)*log(x)*log(log(x))+(2-x)*log(x))*log((-x*log(log(x)
)-1)/(x^2-2*x))*log(log((-x*log(log(x))-1)/(x^2-2*x)))*log(log(log((-x*log
(log(x))-1)/(x^2-2*x))))+(((x^3-2*x^2)*log(x)*log(3*x)+(-x^3+2*x^2)*log(x)
)*log(log(x))+(x^2-2*x)*log(x)*log(3*x)+(-x^2+2*x)*log(x))*log((-x*log(log
(x))-1)/(x^2-2*x))*log(log((-x*log(log(x))-1)/(x^2-2*x)))-x^2*log(x)*log(3
*x)*log(log(x))+((2-2*x)*log(x)+x^2-2*x)*log(3*x))/((x^3-2*x^2)*log(x)*log
(3*x)^2*log(log(x))+(x^2-2*x)*log(x)*log(3*x)^2)/log((-x*log(log(x))-1)/(x
^2-2*x))/log(log((-x*log(log(x))-1)/(x^2-2*x))),x, algorithm=\
```

output
```
x/(log(3) + log(x)) + log(log(log(-x*log(log(x)) - 1) - log(x - 2) - log(x
)))/(log(3) + log(x))
```

3.922.9 Mupad [B] (verification not implemented)

Time = 20.56 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{(-2x + x^2 + (2 - 2x)\log(x))\log(3x) - x^2\log(x)\log(3x)\log(\log(x)) + ((2x - x^2)\log(x) + (-2x + x^2)\log}{}$$

$$= \frac{x + \ln\left(\ln\left(\ln\left(\frac{x\ln(\ln(x))+1}{2x-x^2}\right)\right)\right)}{\ln(3x)}$$

3.922.
$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(-2x^2+x^3)\log}{((-2x+x^2)\log(x)\log^2(3x)+}$

input
```
int((log(3*x)*(2*x + log(x)*(2*x - 2) - x^2) - log((x*log(log(x)) + 1)/(2*
x - x^2))*log(log((x*log(log(x)) + 1)/(2*x - x^2)))*(log(log(x))*(log(x)*(
2*x^2 - x^3) - log(3*x)*log(x)*(2*x^2 - x^3)) + log(x)*(2*x - x^2) - log(3
*x)*log(x)*(2*x - x^2)) + log((x*log(log(x)) + 1)/(2*x - x^2))*log(log((x*
log(log(x)) + 1)/(2*x - x^2)))*log(log(log((x*log(log(x)) + 1)/(2*x - x^2)
)))*(log(x)*(x - 2) - log(log(x))*log(x)*(2*x - x^2)) + x^2*log(3*x)*log(l
og(x))*log(x))/(log((x*log(log(x)) + 1)/(2*x - x^2))*log(log((x*log(log(x)
) + 1)/(2*x - x^2)))*(log(3*x)^2*log(x)*(2*x - x^2) + log(3*x)^2*log(log(x
))*log(x)*(2*x^2 - x^3))),x)
```

output
```
(x + log(log(log((x*log(log(x)) + 1)/(2*x - x^2)))))/log(3*x)
```

3.922.

$$\int \frac{(-2x+x^2+(2-2x)\log(x))\log(3x)-x^2\log(x)\log(3x)\log(\log(x))+((2x-x^2)\log(x)+(-2x+x^2)\log(x)\log(3x)+((2x^2-x^3)\log(x)+(-2x^2+x^3)\log}{((-2x+x^2)\log(x)\log^2(3x)+}$$

3.923 $\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx$

3.923.1 Optimal result

Integrand size = 36, antiderivative size = 31

$$\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx=\frac{5x\log(2)\left(x-\frac{(2+x)^2-\log(5)}{x}\right)}{-5+2x^2}$$

output
```
5*(x-((2+x)^2-ln(5))/x)*x/(2*x^2-5)*ln(2)
```

3.923.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.65

$$\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx=\frac{20\log(2)(-4-4x+\log(5))}{-20+8x^2}$$

input
```
Integrate[((100 + 80*x + 40*x^2)*Log[2] - 20*x*Log[2]*Log[5])/(25 - 20*x^2
 + 4*x^4),x]
```

output
```
(20*Log[2]*(-4 - 4*x + Log[5]))/(-20 + 8*x^2)
```

3.923.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.71, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.139, Rules used = {1380, 27, 2083, 2345, 24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(40x^2+80x+100)\log(2)-20x\log(2)\log(5)}{4x^4-20x^2+25}dx$$
$$\Big\downarrow \text{1380}$$
$$4\int \frac{5\left((2x^2+4x+5)\log(2)-x\log(2)\log(5)\right)}{(5-2x^2)^2}dx$$
$$\Big\downarrow \text{27}$$
$$20\int \frac{(2x^2+4x+5)\log(2)-x\log(2)\log(5)}{(5-2x^2)^2}dx$$
$$\Big\downarrow \text{2083}$$
$$20\int \frac{2\log(2)x^2+\log(2)(4-\log(5))x+\log(32)}{(5-2x^2)^2}dx$$
$$\Big\downarrow \text{2345}$$
$$20\left(\frac{\log(2)(4x+4-\log(5))}{4(5-2x^2)}-\frac{\int 0dx}{10}\right)$$
$$\Big\downarrow \text{24}$$
$$\frac{5\log(2)(4x+4-\log(5))}{5-2x^2}$$

input
```
Int[((100 + 80*x + 40*x^2)*Log[2] - 20*x*Log[2]*Log[5])/(25 - 20*x^2 + 4*x
^4),x]
```

output
```
(5*Log[2]*(4 + 4*x - Log[5]))/(5 - 2*x^2)
```

3.923.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2083
```
Int[(u_)^(p_.)*(v_)^(q_.), x_Symbol] :> Int[ExpandToSum[u, x]^p*ExpandToSum
[v, x]^q, x] /; FreeQ[{p, q}, x] && QuadraticQ[{u, v}, x] &&  !QuadraticMat
chQ[{u, v}, x]
```

rule 2345
```
Int[(Pq_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q = PolynomialQuot
ient[Pq, a + b*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x,
 0], g = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b
*f*x)*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   In
t[(a + b*x^2)^(p + 1)*ExpandToSum[2*a*(p + 1)*Q + f*(2*p + 3), x], x], x]]
/; FreeQ[{a, b}, x] && PolyQ[Pq, x] && LtQ[p, -1]
```

3.923.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.68

method	result	size
gosper	$\frac{5\ln(2)(\ln(5)-4x-4)}{2x^2-5}$	21
default	$-\frac{20\ln(2)\left(\frac{x}{2}-\frac{\ln(5)}{8}+\frac{1}{2}\right)}{x^2-\frac{5}{2}}$	21
risch	$\frac{-10x\ln(2)+\frac{5\ln(2)\ln(5)}{2}-10\ln(2)}{x^2-\frac{5}{2}}$	25
norman	$\frac{-20x\ln(2)+5\ln(2)\ln(5)-20\ln(2)}{2x^2-5}$	27
parallelrisch	$\frac{10\ln(2)\ln(5)-40x\ln(2)-40\ln(2)}{4x^2-10}$	28

3.923. $\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx$

input
```
int((-20*x*ln(2)*ln(5)+(40*x^2+80*x+100)*ln(2))/(4*x^4-20*x^2+25),x,method
=_RETURNVERBOSE)
```

output
```
5*ln(2)*(ln(5)-4*x-4)/(2*x^2-5)
```

3.923.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81

$$\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx = -\frac{5\,(4\,(x+1)\log{(2)}-\log{(5)}\log{(2)})}{2\,x^2-5}$$

input
```
integrate((-20*x*log(2)*log(5)+(40*x^2+80*x+100)*log(2))/(4*x^4-20*x^2+25)
,x, algorithm=\
```

output
```
-5*(4*(x + 1)*log(2) - log(5)*log(2))/(2*x^2 - 5)
```

3.923.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx = \frac{-20x\log{(2)}-20\log{(2)}+5\log{(2)}\log{(5)}}{2x^2-5}$$

input
```
integrate((-20*x*ln(2)*ln(5)+(40*x**2+80*x+100)*ln(2))/(4*x**4-20*x**2+25)
,x)
```

output
```
(-20*x*log(2) - 20*log(2) + 5*log(2)*log(5))/(2*x**2 - 5)
```

3.923.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx = -\frac{5\,(4\,x\log(2)-\log(5)\log(2)+4\,\log(2))}{2\,x^2-5}$$

input
```
integrate((-20*x*log(2)*log(5)+(40*x^2+80*x+100)*log(2))/(4*x^4-20*x^2+25)
,x, algorithm=\
```

output
```
-5*(4*x*log(2) - log(5)*log(2) + 4*log(2))/(2*x^2 - 5)
```

3.923.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx = -\frac{5\,(4\,x\log(2)-\log(5)\log(2)+4\,\log(2))}{2\,x^2-5}$$

input
```
integrate((-20*x*log(2)*log(5)+(40*x^2+80*x+100)*log(2))/(4*x^4-20*x^2+25)
,x, algorithm=\
```

output
```
-5*(4*x*log(2) - log(5)*log(2) + 4*log(2))/(2*x^2 - 5)
```

3.923.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.71

$$\int \frac{(100+80x+40x^2)\log(2)-20x\log(2)\log(5)}{25-20x^2+4x^4}\,dx = -\frac{5\,\ln(2)\,\left(4\,x-\ln(5)+4\right)}{2\,x^2-5}$$

input
```
int((log(2)*(80*x + 40*x^2 + 100) - 20*x*log(2)*log(5))/(4*x^4 - 20*x^2 +
25),x)
```

output
```
-(5*log(2)*(4*x - log(5) + 4))/(2*x^2 - 5)
```

3.924 $\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+}}\right.}{3-6\log(x)+3\log^2(x)}$

3.924.1 Optimal result

Integrand size = 92, antiderivative size = 21

$$\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}\left(3-6\log(x)+3\log^2(x)\right)\right)}{3-6\log(x)+3\log^2(x)}\,dx$$
$$=e^{2e^{-\frac{8}{3-3\log(x)}}x^4}x$$

output
```
exp(2*x^4/exp(4/(3-3*ln(x)))^2)*x
```

3.924.2 Mathematica [A] (verified)

Time = 1.88 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}\left(3-6\log(x)+3\log^2(x)\right)\right)}{3-6\log(x)+3\log^2(x)}\,dx$$
$$=e^{2e^{\frac{8}{3(-1+\log(x))}}x^4}x$$

input
```
Integrate[(E^(2*E^(8/(-3 + 3*Log[x]))*x^4 + 8/(-3 + 3*Log[x]))*(8*x^4 - 48
*x^4*Log[x] + 24*x^4*Log[x]^2 + (3 - 6*Log[x] + 3*Log[x]^2)/E^(8/(-3 + 3*L
og[x]))))/(3 - 6*Log[x] + 3*Log[x]^2),x]
```

output
```
E^(2*E^(8/(3*(-1 + Log[x])))*x^4)*x
```

3.924.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x^4e^{\frac{8}{3\log(x)-3}}+\frac{8}{3\log(x)-3}}\left(8x^4+24x^4\log^2(x)-48x^4\log(x)+e^{-\frac{8}{3\log(x)-3}}\left(3\log^2(x)-6\log(x)+3\right)\right)}{3\log^2(x)-6\log(x)+3}\,dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{2x^4e^{\frac{8}{3\log(x)-3}}+\frac{8}{3\log(x)-3}}\left(8x^4+24x^4\log^2(x)-48x^4\log(x)+e^{-\frac{8}{3\log(x)-3}}\left(3\log^2(x)-6\log(x)+3\right)\right)}{3(1-\log(x))^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\int \frac{\exp\left(2e^{-\frac{8}{3(1-\log(x))}}x^4-\frac{8}{3(1-\log(x))}\right)\left(24\log^2(x)x^4-48\log(x)x^4+8x^4+3e^{\frac{8}{3(1-\log(x))}}\left(\log^2(x)-2\log(x)+1\right)\right)}{(1-\log(x))^2}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{3}\int\left(\frac{8\exp\left(2e^{-\frac{8}{3(1-\log(x))}}x^4-\frac{8}{3(1-\log(x))}\right)\left(3\log^2(x)-6\log(x)+1\right)x^4}{(\log(x)-1)^2}+3\exp\left(2e^{-\frac{8}{3(1-\log(x))}}x^4-\frac{8}{3(1-\log(x))}\right.\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(24\int\exp\left(2e^{-\frac{8}{3(1-\log(x))}}x^4-\frac{8}{3(1-\log(x))}\right)x^4dx-16\int\frac{\exp\left(2e^{-\frac{8}{3(1-\log(x))}}x^4-\frac{8}{3(1-\log(x))}\right)x^4}{(\log(x)-1)^2}dx+3\int e^{2e^{3}}\right.$$

input
```
Int[(E^(2*E^(8/(-3 + 3*Log[x]))*x^4 + 8/(-3 + 3*Log[x]))*(8*x^4 - 48*x^4*L
og[x] + 24*x^4*Log[x]^2 + (3 - 6*Log[x] + 3*Log[x]^2)/E^(8/(-3 + 3*Log[x])
)))/(3 - 6*Log[x] + 3*Log[x]^2),x]
```

output
```
$Aborted
```

3.924. $\displaystyle\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}\left(3-6\log(x)+3\log^2(x)\right)\right)}{3-6\log(x)+3\log^2(x)}\,dx$

3.924.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.924.4 Maple [A] (verified)

Time = 10.19 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

method	result	size
risch	$x\,\mathrm{e}^{2x^4 \mathrm{e}^{\frac{8}{3(\ln(x)-1)}}}$	18
parallelrisch	$-\frac{-30\ln(x)\mathrm{e}^{2x^4 \mathrm{e}^{\frac{8}{3(\ln(x)-1)}}}x+30x\,\mathrm{e}^{2x^4 \mathrm{e}^{\frac{8}{3(\ln(x)-1)}}}}{30(\ln(x)-1)}$	52

input
```
int(((3*ln(x)^2-6*ln(x)+3)*exp(-4/(3*ln(x)-3))^2+24*x^4*ln(x)^2-48*x^4*ln(
x)+8*x^4)*exp(2*x^4/exp(-4/(3*ln(x)-3))^2)/(3*ln(x)^2-6*ln(x)+3)/exp(-4/(3
*ln(x)-3))^2,x,method=_RETURNVERBOSE)
```

output
```
x*exp(2*x^4*exp(8/3/(ln(x)-1)))
```

3.924. $$\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}\left(3-6\log(x)+3\log^2(x)\right)\right)}{3-6\log(x)+3\log^2(x)}\,dx$$

3.924.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(17) = 34$.

Time = 0.28 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.14

$$\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}\left(3-6\log(x)+3\log^2(x)\right)\right)}{3-6\log(x)+3\log^2(x)}\,dx$$
$$= xe^{\left(\frac{2\left(3\left(x^4\log(x)-x^4\right)e^{\left(\frac{8}{3(\log(x)-1)}\right)}+4\right)}{3(\log(x)-1)}-\frac{8}{3(\log(x)-1)}\right)}$$

input
```
integrate(((3*log(x)^2-6*log(x)+3)*exp(-4/(3*log(x)-3))^2+24*x^4*log(x)^2-
48*x^4*log(x)+8*x^4)*exp(2*x^4/exp(-4/(3*log(x)-3))^2)/(3*log(x)^2-6*log(x
)+3)/exp(-4/(3*log(x)-3))^2,x, algorithm=\
```

output
```
x*e^(2/3*(3*(x^4*log(x) - x^4)*e^(8/3/(log(x) - 1)) + 4)/(log(x) - 1) - 8/
3/(log(x) - 1))
```

3.924.6 Sympy [A] (verification not implemented)

Time = 32.89 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}\left(3-6\log(x)+3\log^2(x)\right)\right)}{3-6\log(x)+3\log^2(x)}\,dx$$
$$= xe^{2x^4e^{\frac{8}{3\log(x)-3}}}$$

input
```
integrate(((3*ln(x)**2-6*ln(x)+3)*exp(-4/(3*ln(x)-3))**2+24*x**4*ln(x)**2-
48*x**4*ln(x)+8*x**4)*exp(2*x**4/exp(-4/(3*ln(x)-3))**2)/(3*ln(x)**2-6*ln(
x)+3)/exp(-4/(3*ln(x)-3))**2,x)
```

output
```
x*exp(2*x**4*exp(8/(3*log(x) - 3)))
```

3.924.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}\left(3-6\log(x)+3\log^2(x)\right)\right)}{3-6\log(x)+3\log^2(x)}\,dx$$
$$= xe^{\left(2\,x^4e^{\left(\frac{8}{3\,(\log(x)-1)}\right)}\right)}$$

input
```
integrate(((3*log(x)^2-6*log(x)+3)*exp(-4/(3*log(x)-3))^2+24*x^4*log(x)^2-
48*x^4*log(x)+8*x^4)*exp(2*x^4/exp(-4/(3*log(x)-3))^2)/(3*log(x)^2-6*log(x
)+3)/exp(-4/(3*log(x)-3))^2,x, algorithm=\
```

output
```
x*e^(2*x^4*e^(8/3/(log(x) - 1)))
```

3.924.8 Giac [F]

$$\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}\left(3-6\log(x)+3\log^2(x)\right)\right)}{3-6\log(x)+3\log^2(x)}\,dx$$
$$= \int \frac{\left(24\,x^4\log(x)^2-48\,x^4\log(x)+8\,x^4+3\left(\log(x)^2-2\,\log(x)+1\right)e^{\left(-\frac{8}{3\,(\log(x)-1)}\right)}\right)e^{\left(2\,x^4e^{\left(\frac{8}{3\,(\log(x)-1)}\right)}+\frac{8}{3\,(\log(x)-1)}\right)}}{3\left(\log(x)^2-2\,\log(x)+1\right)}\,dx$$

input
```
integrate(((3*log(x)^2-6*log(x)+3)*exp(-4/(3*log(x)-3))^2+24*x^4*log(x)^2-
48*x^4*log(x)+8*x^4)*exp(2*x^4/exp(-4/(3*log(x)-3))^2)/(3*log(x)^2-6*log(x
)+3)/exp(-4/(3*log(x)-3))^2,x, algorithm=\
```

output
```
integrate(1/3*(24*x^4*log(x)^2 - 48*x^4*log(x) + 8*x^4 + 3*(log(x)^2 - 2*l
og(x) + 1)*e^(-8/3/(log(x) - 1)))*e^(2*x^4*e^(8/3/(log(x) - 1)) + 8/3/(log
(x) - 1))/(log(x)^2 - 2*log(x) + 1), x)
```

3.924.9 Mupad [B] (verification not implemented)

Time = 14.61 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{e^{2e^{\frac{8}{-3+3\log(x)}}x^4+\frac{8}{-3+3\log(x)}}\left(8x^4-48x^4\log(x)+24x^4\log^2(x)+e^{-\frac{8}{-3+3\log(x)}}\left(3-6\log(x)+3\log^2(x)\right)\right)}{3-6\log(x)+3\log^2(x)}\,dx$$
$$= x\,\mathrm{e}^{2\,x^4\,\mathrm{e}^{\frac{8}{3\,\ln(x)-3}}}$$

input
```
int((exp(2*x^4*exp(8/(3*log(x) - 3)))*exp(8/(3*log(x) - 3))*(exp(-8/(3*log
(x) - 3))*(3*log(x)^2 - 6*log(x) + 3) - 48*x^4*log(x) + 24*x^4*log(x)^2 +
8*x^4))/(3*log(x)^2 - 6*log(x) + 3),x)
```

output
```
x*exp(2*x^4*exp(8/(3*log(x) - 3)))
```

3.925 $\int \frac{6+e^3-x-2\log(6+e^3-x)}{6x+e^3x-x^2+(6+e^3-x)\log^2(6+e^3-x)}\,dx$

3.925.1 Optimal result

Integrand size = 56, antiderivative size = 18

$$\int \frac{6+e^3-x-2\log(6+e^3-x)}{6x+e^3x-x^2+(6+e^3-x)\log^2(6+e^3-x)}\,dx = \log\left(x+\log^2\left(e^3+2(3-x)+x\right)\right)$$

output
```
ln(ln(exp(3)-x+6)^2+x)
```

3.925.2 Mathematica [A] (verified)

Time = 0.58 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{6+e^3-x-2\log(6+e^3-x)}{6x+e^3x-x^2+(6+e^3-x)\log^2(6+e^3-x)}\,dx = \log\left(x+\log^2\left(6+e^3-x\right)\right)$$

input
```
Integrate[(6 + E^3 - x - 2*Log[6 + E^3 - x])/(6*x + E^3*x - x^2 + (6 + E^3
 - x)*Log[6 + E^3 - x]^2),x]
```

output
```
Log[x + Log[6 + E^3 - x]^2]
```

3.925.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.054, Rules used = {6, 7292, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x-2\log\left(-x+e^3+6\right)+e^3+6}{-x^2+e^3x+6x+\left(-x+e^3+6\right)\log^2\left(-x+e^3+6\right)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{-x-2\log\left(-x+e^3+6\right)+e^3+6}{-x^2+\left(6+e^3\right)x+\left(-x+e^3+6\right)\log^2\left(-x+e^3+6\right)}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{-x-2\log\left(-x+e^3+6\right)+6\left(1+\frac{e^3}{6}\right)}{\left(-x+e^3+6\right)\left(x+\log^2\left(-x+e^3+6\right)\right)}dx$$

$$\Big\downarrow \ 7235$$

$$\log\left(x+\log^2\left(-x+e^3+6\right)\right)$$

input
```
Int[(6 + E^3 - x - 2*Log[6 + E^3 - x])/(6*x + E^3*x - x^2 + (6 + E^3 - x)*
Log[6 + E^3 - x]^2),x]
```

output
```
Log[x + Log[6 + E^3 - x]^2]
```

3.925.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /; !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.925.4 Maple [A] (verified)

Time = 1.50 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

method	result	size
default	$\ln\left(\ln\left(e^{3}-x+6\right)^{2}+x\right)$	14
norman	$\ln\left(\ln\left(e^{3}-x+6\right)^{2}+x\right)$	14
risch	$\ln\left(\ln\left(e^{3}-x+6\right)^{2}+x\right)$	14
parallelrisch	$\ln\left(\ln\left(e^{3}-x+6\right)^{2}+x\right)$	14

input
```
int((-2*ln(exp(3)-x+6)+exp(3)-x+6)/((exp(3)-x+6)*ln(exp(3)-x+6)^2+x*exp(3)
-x^2+6*x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(exp(3)-x+6)^2+x)
```

3.925.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int \frac{6+e^3-x-2\log\left(6+e^3-x\right)}{6x+e^3x-x^2+\left(6+e^3-x\right)\log^2\left(6+e^3-x\right)}\,dx = \log\left(\log\left(-x+e^{3}+6\right)^{2}+x\right)$$

input
```
integrate((-2*log(exp(3)-x+6)+exp(3)-x+6)/((exp(3)-x+6)*log(exp(3)-x+6)^2+
x*exp(3)-x^2+6*x),x, algorithm=\
```

output
```
log(log(-x + e^3 + 6)^2 + x)
```

3.925.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

$$\int \frac{6+e^3-x-2\log\left(6+e^3-x\right)}{6x+e^3x-x^2+\left(6+e^3-x\right)\log^2\left(6+e^3-x\right)}\,dx = \log\left(x+\log\left(-x+6+e^{3}\right)^{2}\right)$$

input
```
integrate((-2*ln(exp(3)-x+6)+exp(3)-x+6)/((exp(3)-x+6)*ln(exp(3)-x+6)**2+x
*exp(3)-x**2+6*x),x)
```

output
```
log(x + log(-x + 6 + exp(3))**2)
```

3.925.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int \frac{6+e^3-x-2\log(6+e^3-x)}{6x+e^3x-x^2+(6+e^3-x)\log^2(6+e^3-x)}\,dx = \log\left(\log\left(-x+e^3+6\right)^2+x\right)$$

input
```
integrate((-2*log(exp(3)-x+6)+exp(3)-x+6)/((exp(3)-x+6)*log(exp(3)-x+6)^2+
x*exp(3)-x^2+6*x),x, algorithm=\
```

output
```
log(log(-x + e^3 + 6)^2 + x)
```

3.925.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{6+e^3-x-2\log(6+e^3-x)}{6x+e^3x-x^2+(6+e^3-x)\log^2(6+e^3-x)}\,dx = \log\left(-\log\left(-x+e^3+6\right)^2-x\right)$$

input
```
integrate((-2*log(exp(3)-x+6)+exp(3)-x+6)/((exp(3)-x+6)*log(exp(3)-x+6)^2+
x*exp(3)-x^2+6*x),x, algorithm=\
```

output
```
log(-log(-x + e^3 + 6)^2 - x)
```

3.925.9 Mupad [B] (verification not implemented)

Time = 14.78 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int \frac{6+e^3-x-2\log(6+e^3-x)}{6x+e^3x-x^2+(6+e^3-x)\log^2(6+e^3-x)}\,dx = \ln\left(\ln\left(e^3-x+6\right)^2+x\right)$$

input
```
int(-(x + 2*log(exp(3) - x + 6) - exp(3) - 6)/(6*x + x*exp(3) + log(exp(3)
 - x + 6)^2*(exp(3) - x + 6) - x^2),x)
```

output
```
log(x + log(exp(3) - x + 6)^2)
```

3.926

$$\int \frac{e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^{\dots}\right.}{405x^2+5e^2x^2+540x^3+270x^4+60x^5+5x^6+e\left(90x^2+60x^3+10x^4\right)+e^{10}\left(\dots\right.}$$

3.926.1 Optimal result

Integrand size = 275, antiderivative size = 32

$$\int \frac{e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)\dots\right.}{405x^2+5e^2x^2+540x^3+270x^4+60x^5+5x^6+e\left(90x^2+60x^3+10x^4\right)+e^{10}\left(405+5e^2+540x+270x^{\dots}\right.}$$
$$=\frac{e^{2e^{-\frac{e^4}{5\left(e+(3+x)^2\right)}}}}{e^5-x}$$

output
```
exp(2/exp(1/5*exp(4)/((3+x)^2+exp(1))))/(exp(5)-x)
```

3.926.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.03

$$\int \frac{e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)\dots\right.}{405x^2+5e^2x^2+540x^3+270x^4+60x^5+5x^6+e\left(90x^2+60x^3+10x^4\right)+e^{10}\left(405+5e^2+540x+270x^{\dots}\right.}$$
$$=-\frac{e^{2e^{-\frac{e^4}{5\left(e+(3+x)^2\right)}}}}{-e^5+x}$$

3.926.

$$e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)+e^{\frac{e^4}{45+5e+30x+5x^2}}(405+5e^2+540x+270x^2+60\dots\right.$$

input
```
Integrate[(E^(2/E^(E^4/(45 + 5*E + 30*x + 5*x^2)) - E^4/(45 + 5*E + 30*x +
 5*x^2))*(E^9*(12 + 4*x) + E^4*(-12*x - 4*x^2) + E^(E^4/(45 + 5*E + 30*x +
 5*x^2))*(405 + 5*E^2 + 540*x + 270*x^2 + 60*x^3 + 5*x^4 + E*(90 + 60*x +
10*x^2))))/(405*x^2 + 5*E^2*x^2 + 540*x^3 + 270*x^4 + 60*x^5 + 5*x^6 + E*(
90*x^2 + 60*x^3 + 10*x^4) + E^10*(405 + 5*E^2 + 540*x + 270*x^2 + 60*x^3 +
 5*x^4 + E*(90 + 60*x + 10*x^2)) + E^5*(-810*x - 10*E^2*x - 1080*x^2 - 540
*x^3 - 120*x^4 - 10*x^5 + E*(-180*x - 120*x^2 - 20*x^3))),x]
```

output
```
-(E^(2/E^(E^4/(5*(E + (3 + x)^2))))/(-E^5 + x))
```

3.926.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^4(-4x^2-12x)+e^{\frac{e^4}{5x^2+30x+5e+45}}\left(5x^4+60x^3+270x^2+e(10x^2+60x+\right.\right.}{5x^6+60x^5+270x^4+540x^3+5e^2x^2+405x^2+e\left(10x^4+60x^3+90x^2\right)+e^{10}\left(5x^4+60x^3+270x^2+e\left(10x^2+\right.\right.}$$

$\downarrow$ 6

$$\int \frac{\left(e^4(-4x^2-12x)+e^{\frac{e^4}{5x^2+30x+5e+45}}\left(5x^4+60x^3+270x^2+e(10x^2+60x+\right.\right.}{5x^6+60x^5+270x^4+540x^3+(405+5e^2)x^2+e\left(10x^4+60x^3+90x^2\right)+e^{10}\left(5x^4+60x^3+270x^2+e\left(10x^2+\right.\right.}$$

$\downarrow$ 2463

$$\int \left(\frac{4(3+e^5)\left(e^4(-4x^2-12x)+e^{\frac{e^4}{5x^2+30x+5e+45}}\left(5x^4+60x^3+270x^2+e(10x^2+60x+90)+540x+5e^2+405\right.\right.}{5\left(9+e+6e^5+e^{10}\right)^3(e^5-x)}\right.$$

$\downarrow$ 7239

$$\int \frac{\left(5e^{\frac{e^4}{5((x+3)^2+e)}}(x+3)^4+10e^{\frac{e^4}{5((x+3)^2+e)}+1}(x+3)^2-4e^4x(x+3)+4e^9(x+3)+5e^{\frac{e^4}{5((x+3)^2+e)}+2}\right)\exp\left(2e^{-\frac{}{5((x}}\right.}{5(e^5-x)^2(x^2+6x+e+9)^2}$$

$\downarrow$ 27

$$e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)+e^{\frac{e^4}{45+5e+30x+5x^2}}(405+5e^2+540x+270x^2+60x\right.$$

$$\frac{1}{5}\int \frac{\exp\left(2e^{-\frac{e^4}{5\left((x+3)^2+e\right)}}-\frac{e^4}{5((x+3)^2+e)}\right)\left(5e^{\frac{e^4}{5\left((x+3)^2+e\right)}}(x+3)^4+10e^{1+\frac{e^4}{5\left((x+3)^2+e\right)}}(x+3)^2-4e^4x(x+3)+4e^9(x$$
$$\overline{\left(e^5-x\right)^2\left(x^2+6x+e+9\right)^2}$$

$\Big\downarrow$ 7293

$$\frac{1}{5}\int \left(-\frac{4\exp\left(2e^{-\frac{e^4}{5\left((x+3)^2+e\right)}}+4-\frac{e^4}{5((x+3)^2+e)}\right)x(x+3)}{\left(e^5-x\right)^2\left(x^2+6x+e+9\right)^2}+\frac{4\exp\left(2e^{-\frac{e^4}{5\left((x+3)^2+e\right)}}+9-\frac{e^4}{5((x+3)^2+e)}\right)(x+3)}{\left(e^5-x\right)^2\left(x^2+6x+e+9\right)^2}+\right.$$

$\Big\downarrow$ 7292

$$\frac{1}{5}\int \left(-\frac{4\exp\left(2e^{-\frac{e^4}{5\left((x+3)^2+e\right)}}+4-\frac{e^4}{5((x+3)^2+e)}\right)x(x+3)}{\left(e^5-x\right)^2\left(x^2+6x+e+9\right)^2}+\frac{4\exp\left(2e^{-\frac{e^4}{5\left((x+3)^2+e\right)}}+9-\frac{e^4}{5((x+3)^2+e)}\right)(x+3)}{\left(e^5-x\right)^2\left(x^2+6x+e+9\right)^2}+\right.$$

$\Big\downarrow$ 7299

$$\frac{1}{5}\int \left(-\frac{4\exp\left(2e^{-\frac{e^4}{5\left((x+3)^2+e\right)}}+4-\frac{e^4}{5((x+3)^2+e)}\right)x(x+3)}{\left(e^5-x\right)^2\left(x^2+6x+e+9\right)^2}+\frac{4\exp\left(2e^{-\frac{e^4}{5\left((x+3)^2+e\right)}}+9-\frac{e^4}{5((x+3)^2+e)}\right)(x+3)}{\left(e^5-x\right)^2\left(x^2+6x+e+9\right)^2}+\right.$$

input
```
Int[(E^(2/E^(E^4/(45 + 5*E + 30*x + 5*x^2)) - E^4/(45 + 5*E + 30*x + 5*x^2
))*(E^9*(12 + 4*x) + E^4*(-12*x - 4*x^2) + E^(E^4/(45 + 5*E + 30*x + 5*x^2
))*(405 + 5*E^2 + 540*x + 270*x^2 + 60*x^3 + 5*x^4 + E*(90 + 60*x + 10*x^2
))))/(405*x^2 + 5*E^2*x^2 + 540*x^3 + 270*x^4 + 60*x^5 + 5*x^6 + E*(90*x^2
 + 60*x^3 + 10*x^4) + E^10*(405 + 5*E^2 + 540*x + 270*x^2 + 60*x^3 + 5*x^4
 + E*(90 + 60*x + 10*x^2)) + E^5*(-810*x - 10*E^2*x - 1080*x^2 - 540*x^3 -
 120*x^4 - 10*x^5 + E*(-180*x - 120*x^2 - 20*x^3))),x]
```

output
```
$Aborted
```

3.926.

$$e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4\left(-12x-4x^2\right)+e^{\frac{e^4}{45+5e+30x+5x^2}}\left(405+5e^2+540x+270x^2+60x\right.\right.$$

3.926.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.926.

$$e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)+e^{\frac{e^4}{45+5e+30x+5x^2}}(405+5e^2+540x+270x^2+60x\right.$$

3.926.4 Maple [A] (verified)

Time = 24.02 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94

method	result
risch	$\frac{e^{2 e^{-\frac{e^4}{5(x^2+e+6x+9)}}}}{e^5-x}$
parallelrisch	$\frac{5 e^{2 e^{-\frac{e^4}{5(x^2+e+6x+9)}}} x^2+5 e e^{2 e^{-\frac{e^4}{5(x^2+e+6x+9)}}}+30 e^{2 e^{-\frac{e^4}{5(x^2+e+6x+9)}}} x+45 e^{2 e^{-\frac{e^4}{5(x^2+e+6x+9)}}}}{5(e^5-x)(x^2+e+6x+9)}$
norman	$\frac{\left((e+9) e^{\frac{e^4}{5 e+5x^2+30x+45}} e^{2 e^{-\frac{e^4}{5 e+5x^2+30x+45}}}+e^{\frac{e^4}{5 e+5x^2+30x+45}} x^2 e^{2 e^{-\frac{e^4}{5 e+5x^2+30x+45}}}+6 e^{\frac{e^4}{5 e+5x^2+30x+45}} x e^{2 e^{-\frac{e^4}{5 e+5x^2+\cdots}}}\right.}{(x^2+e+6x+9)(e^5-x)}$

input
```
int(((5*exp(1)^2+(10*x^2+60*x+90)*exp(1)+5*x^4+60*x^3+270*x^2+540*x+405)*e
xp(exp(4)/(5*exp(1)+5*x^2+30*x+45))+(4*x+12)*exp(4)*exp(5)+(-4*x^2-12*x)*e
xp(4))*exp(2/exp(exp(4)/(5*exp(1)+5*x^2+30*x+45)))/((5*exp(1)^2+(10*x^2+60
*x+90)*exp(1)+5*x^4+60*x^3+270*x^2+540*x+405)*exp(5)^2+(-10*x*exp(1)^2+(-2
0*x^3-120*x^2-180*x)*exp(1)-10*x^5-120*x^4-540*x^3-1080*x^2-810*x)*exp(5)+
5*x^2*exp(1)^2+(10*x^4+60*x^3+90*x^2)*exp(1)+5*x^6+60*x^5+270*x^4+540*x^3+
405*x^2)/exp(exp(4)/(5*exp(1)+5*x^2+30*x+45)),x,method=_RETURNVERBOSE)
```

output
```
1/(exp(5)-x)*exp(2*exp(-1/5*exp(4)/(x^2+exp(1)+6*x+9)))
```

3.926.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. $2(28) = 56$.

Time = 0.29 (sec) , antiderivative size = 94, normalized size of antiderivative = 2.94

$$\int \frac{e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)\cdots\right.}{405x^2+5e^2x^2+540x^3+270x^4+60x^5+5x^6+e\,(90x^2+60x^3+10x^4)+e^{10}\,(405+5e^2+540x+270x^2\cdots}$$

$$= -\frac{e^{\left(\frac{\left(10\,x^2+60\,x+10\,e-e^{\left(\frac{e^4}{5\,(x^2+6\,x+e+9)}+4\right)}+90\right)e^{\left(-\frac{e^4}{5\,(x^2+6\,x+e+9)}\right)}}{5\,(x^2+6\,x+e+9)}+\frac{e^4}{5\,(x^2+6\,x+e+9)}\right)}}{x-e^5}$$

3.926.

$$e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)+e^{\frac{e^4}{45+5e+30x+5x^2}}(405+5e^2+540x+270x^2+60x\cdots\right.$$

input
```
integrate(((5*exp(1)^2+(10*x^2+60*x+90)*exp(1)+5*x^4+60*x^3+270*x^2+540*x+
405)*exp(exp(4)/(5*exp(1)+5*x^2+30*x+45))+(4*x+12)*exp(4)*exp(5)+(-4*x^2-1
2*x)*exp(4))*exp(2/exp(exp(4)/(5*exp(1)+5*x^2+30*x+45)))/((5*exp(1)^2+(10*
x^2+60*x+90)*exp(1)+5*x^4+60*x^3+270*x^2+540*x+405)*exp(5)^2+(-10*x*exp(1)
^2+(-20*x^3-120*x^2-180*x)*exp(1)-10*x^5-120*x^4-540*x^3-1080*x^2-810*x)*e
xp(5)+5*x^2*exp(1)^2+(10*x^4+60*x^3+90*x^2)*exp(1)+5*x^6+60*x^5+270*x^4+54
0*x^3+405*x^2)/exp(exp(4)/(5*exp(1)+5*x^2+30*x+45)),x, algorithm=\
```

output
```
-e^(1/5*(10*x^2 + 60*x + 10*e - e^(1/5*e^4/(x^2 + 6*x + e + 9) + 4) + 90)*
e^(-1/5*e^4/(x^2 + 6*x + e + 9))/(x^2 + 6*x + e + 9) + 1/5*e^4/(x^2 + 6*x
+ e + 9))/(x - e^5)
```

3.926.6 Sympy [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.91

$$\int \frac{e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)\right.}{405x^2+5e^2x^2+540x^3+270x^4+60x^5+5x^6+e\left(90x^2+60x^3+10x^4\right)+e^{10}\left(405+5e^2+540x+270x^2\right.}$$

$$= -\frac{e^{2e^{-\frac{e^4}{5x^2+30x+5e+45}}}}{x-e^5}$$

input
```
integrate(((5*exp(1)**2+(10*x**2+60*x+90)*exp(1)+5*x**4+60*x**3+270*x**2+5
40*x+405)*exp(exp(4)/(5*exp(1)+5*x**2+30*x+45))+(4*x+12)*exp(4)*exp(5)+(-4
*x**2-12*x)*exp(4))*exp(2/exp(exp(4)/(5*exp(1)+5*x**2+30*x+45)))/((5*exp(1
)**2+(10*x**2+60*x+90)*exp(1)+5*x**4+60*x**3+270*x**2+540*x+405)*exp(5)**2
+(-10*x*exp(1)**2+(-20*x**3-120*x**2-180*x)*exp(1)-10*x**5-120*x**4-540*x*
*3-1080*x**2-810*x)*exp(5)+5*x**2*exp(1)**2+(10*x**4+60*x**3+90*x**2)*exp(
1)+5*x**6+60*x**5+270*x**4+540*x**3+405*x**2)/exp(exp(4)/(5*exp(1)+5*x**2+
30*x+45)),x)
```

output
```
-exp(2*exp(-exp(4)/(5*x**2 + 30*x + 5*E + 45)))/(x - exp(5))
```

3.926.

$$e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)+e^{\frac{e^4}{45+5e+30x+5x^2}}\left(405+5e^2+540x+270x^2+60x\right.\right.$$

3.926.7 Maxima [F]

$$\int \frac{e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)\right.}{405x^2+5e^2x^2+540x^3+270x^4+60x^5+5x^6+e\left(90x^2+60x^3+10x^4\right)+e^{10}\left(405+5e^2+540x+270x^2\right.}$$

$$=\int \frac{\left(4\,(x+3)e^9-4\,(x^2+3\,x)e^4+5\,(x^4+12\,x^3+54\,x^2+2\,(x^2+6\,x+9)e\right.}{5\,(x^6+12\,x^5+54\,x^4+108\,x^3+x^2e^2+81\,x^2+(x^4+12\,x^3+54\,x^2+2\,(x^2+6\,x+9)e+108\,x+e^2+}$$

input
```
integrate(((5*exp(1)^2+(10*x^2+60*x+90)*exp(1)+5*x^4+60*x^3+270*x^2+540*x+
405)*exp(exp(4)/(5*exp(1)+5*x^2+30*x+45))+(4*x+12)*exp(4)*exp(5)+(-4*x^2-1
2*x)*exp(4))*exp(2/exp(exp(4)/(5*exp(1)+5*x^2+30*x+45)))/((5*exp(1)^2+(10*
x^2+60*x+90)*exp(1)+5*x^4+60*x^3+270*x^2+540*x+405)*exp(5)^2+(-10*x*exp(1)
^2+(-20*x^3-120*x^2-180*x)*exp(1)-10*x^5-120*x^4-540*x^3-1080*x^2-810*x)*e
xp(5)+5*x^2*exp(1)^2+(10*x^4+60*x^3+90*x^2)*exp(1)+5*x^6+60*x^5+270*x^4+54
0*x^3+405*x^2)/exp(exp(4)/(5*exp(1)+5*x^2+30*x+45)),x, algorithm=\
```

output
```
1/5*integrate((4*(x + 3)*e^9 - 4*(x^2 + 3*x)*e^4 + 5*(x^4 + 12*x^3 + 54*x^
2 + 2*(x^2 + 6*x + 9)*e + 108*x + e^2 + 81)*e^(1/5*e^4/(x^2 + 6*x + e + 9)
))*e^(-1/5*e^4/(x^2 + 6*x + e + 9) + 2*e^(-1/5*e^4/(x^2 + 6*x + e + 9)))/(
x^6 + 12*x^5 + 54*x^4 + 108*x^3 + x^2*e^2 + 81*x^2 + (x^4 + 12*x^3 + 54*x^
2 + 2*(x^2 + 6*x + 9)*e + 108*x + e^2 + 81)*e^10 - 2*(x^5 + 12*x^4 + 54*x^
3 + 108*x^2 + x*e^2 + 2*(x^3 + 6*x^2 + 9*x)*e + 81*x)*e^5 + 2*(x^4 + 6*x^3
 + 9*x^2)*e), x)
```

3.926.8 Giac [F]

$$\int \frac{e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)\right.}{405x^2+5e^2x^2+540x^3+270x^4+60x^5+5x^6+e\left(90x^2+60x^3+10x^4\right)+e^{10}\left(405+5e^2+540x+270x^2\right.}$$

$$=\int \frac{\left(4\,(x+3)e^9-4\,(x^2+3\,x)e^4+5\,(x^4+12\,x^3+54\,x^2+2\,(x^2+6\,x+9)e\right.}{5\,(x^6+12\,x^5+54\,x^4+108\,x^3+x^2e^2+81\,x^2+(x^4+12\,x^3+54\,x^2+2\,(x^2+6\,x+9)e+108\,x+e^2+}$$

3.926.

$$e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)+e^{\frac{e^4}{45+5e+30x+5x^2}}(405+5e^2+540x+270x^2+60x\right.$$

input
```
integrate(((5*exp(1)^2+(10*x^2+60*x+90)*exp(1)+5*x^4+60*x^3+270*x^2+540*x+
405)*exp(exp(4)/(5*exp(1)+5*x^2+30*x+45))+(4*x+12)*exp(4)*exp(5)+(-4*x^2-1
2*x)*exp(4))*exp(2/exp(exp(4)/(5*exp(1)+5*x^2+30*x+45)))/((5*exp(1)^2+(10*
x^2+60*x+90)*exp(1)+5*x^4+60*x^3+270*x^2+540*x+405)*exp(5)^2+(-10*x*exp(1)
^2+(-20*x^3-120*x^2-180*x)*exp(1)-10*x^5-120*x^4-540*x^3-1080*x^2-810*x)*e
xp(5)+5*x^2*exp(1)^2+(10*x^4+60*x^3+90*x^2)*exp(1)+5*x^6+60*x^5+270*x^4+54
0*x^3+405*x^2)/exp(exp(4)/(5*exp(1)+5*x^2+30*x+45)),x, algorithm=\
```

output
```
integrate(1/5*(4*(x + 3)*e^9 - 4*(x^2 + 3*x)*e^4 + 5*(x^4 + 12*x^3 + 54*x^
2 + 2*(x^2 + 6*x + 9)*e + 108*x + e^2 + 81)*e^(1/5*e^4/(x^2 + 6*x + e + 9)
))*e^(-1/5*e^4/(x^2 + 6*x + e + 9) + 2*e^(-1/5*e^4/(x^2 + 6*x + e + 9)))/(
x^6 + 12*x^5 + 54*x^4 + 108*x^3 + x^2*e^2 + 81*x^2 + (x^4 + 12*x^3 + 54*x^
2 + 2*(x^2 + 6*x + 9)*e + 108*x + e^2 + 81)*e^10 - 2*(x^5 + 12*x^4 + 54*x^
3 + 108*x^2 + x*e^2 + 2*(x^3 + 6*x^2 + 9*x)*e + 81*x)*e^5 + 2*(x^4 + 6*x^3
 + 9*x^2)*e), x)
```

3.926.9 Mupad [B] (verification not implemented)

Time = 16.43 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.06

$$\int \frac{e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)\right.}{405x^2+5e^2x^2+540x^3+270x^4+60x^5+5x^6+e\left(90x^2+60x^3+10x^4\right)+e^{10}\left(405+5e^2+540x+270x^2\right.}$$
$$= -\frac{e^{2\,e^{-\frac{e^4}{5\,\left(x^2+6\,x+e+9\right)}}}}{x-e^5}$$

input
```
int((exp(2*exp(-exp(4)/(30*x + 5*exp(1) + 5*x^2 + 45)))*exp(-exp(4)/(30*x
+ 5*exp(1) + 5*x^2 + 45))*(exp(exp(4)/(30*x + 5*exp(1) + 5*x^2 + 45))*(540
*x + 5*exp(2) + exp(1)*(60*x + 10*x^2 + 90) + 270*x^2 + 60*x^3 + 5*x^4 + 4
05) - exp(4)*(12*x + 4*x^2) + exp(9)*(4*x + 12)))/(exp(10)*(540*x + 5*exp(
2) + exp(1)*(60*x + 10*x^2 + 90) + 270*x^2 + 60*x^3 + 5*x^4 + 405) - exp(5
)*(810*x + 10*x*exp(2) + exp(1)*(180*x + 120*x^2 + 20*x^3) + 1080*x^2 + 54
0*x^3 + 120*x^4 + 10*x^5) + 5*x^2*exp(2) + exp(1)*(90*x^2 + 60*x^3 + 10*x^
4) + 405*x^2 + 540*x^3 + 270*x^4 + 60*x^5 + 5*x^6),x)
```

output
```
-exp(2*exp(-exp(4)/(5*(6*x + exp(1) + x^2 + 9))))/(x - exp(5))
```

3.926.

$$e^{2e^{-\frac{e^4}{45+5e+30x+5x^2}}-\frac{e^4}{45+5e+30x+5x^2}}\left(e^9(12+4x)+e^4(-12x-4x^2)+e^{\frac{e^4}{45+5e+30x+5x^2}}\left(405+5e^2+540x+270x^2+60x\right.\right.$$

3.927 $\int \frac{e^{e^x}(28x+14e^x x^2)}{18+e}\,dx$

3.927.1 Optimal result

Integrand size = 23, antiderivative size = 15

$$\int \frac{e^{e^x}(28x+14e^x x^2)}{18+e}\,dx = \frac{14e^{e^x}x^2}{18+e}$$

output
```
14*x^2/(exp(1)+18)*exp(exp(x))
```

3.927.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{e^{e^x}(28x+14e^x x^2)}{18+e}\,dx = \frac{14e^{e^x}x^2}{18+e}$$

input
```
Integrate[(E^E^x*(28*x + 14*E^x*x^2))/(18 + E),x]
```

output
```
(14*E^E^x*x^2)/(18 + E)
```

3.927.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {27, 27, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^x}\left(14e^x x^2+28x\right)}{18+e}dx$$
$$\Big\downarrow \; 27$$
$$\frac{\int 14e^{e^x}\left(e^x x^2+2x\right)dx}{18+e}$$
$$\Big\downarrow \; 27$$
$$\frac{14\int e^{e^x}\left(e^x x^2+2x\right)dx}{18+e}$$
$$\Big\downarrow \; 2726$$
$$\frac{14e^{e^x}x^2}{18+e}$$

input
```
Int[(E^E^x*(28*x + 14*E^x*x^2))/(18 + E),x]
```

output
```
(14*E^E^x*x^2)/(18 + E)
```

3.927.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.927.4 Maple [A] (verified)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result	size
norman	$\frac{14x^2 e^{e^x}}{e+18}$	15
risch	$\frac{14x^2 e^{e^x}}{e+18}$	15
parallelrisch	$\frac{14x^2 e^{e^x}}{e+18}$	15

input
```
int((14*exp(x)*x^2+28*x)*exp(exp(x))/(exp(1)+18),x,method=_RETURNVERBOSE)
```

output
```
14*x^2/(exp(1)+18)*exp(exp(x))
```

3.927.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{e^{e^x}(28x+14e^x x^2)}{18+e}\,dx = \frac{14\,x^2 e^{(e^x)}}{e+18}$$

input
```
integrate((14*exp(x)*x^2+28*x)*exp(exp(x))/(exp(1)+18),x, algorithm=\
```

output
```
14*x^2*e^(e^x)/(e + 18)
```

3.927.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{e^{e^x}(28x+14e^x x^2)}{18+e}\,dx = \frac{14x^2 e^{e^x}}{e+18}$$

input
```
integrate((14*exp(x)*x**2+28*x)*exp(exp(x))/(exp(1)+18),x)
```

output
```
14*x**2*exp(exp(x))/(E + 18)
```

3.927.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{e^{e^x}(28x+14e^x x^2)}{18+e}\,dx = \frac{14\,x^2 e^{(e^x)}}{e+18}$$

input
```
integrate((14*exp(x)*x^2+28*x)*exp(exp(x))/(exp(1)+18),x, algorithm=\
```

output
```
14*x^2*e^(e^x)/(e + 18)
```

3.927.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{e^{e^x}(28x+14e^x x^2)}{18+e}\,dx = \frac{14\,x^2 e^{(e^x)}}{e+18}$$

input
```
integrate((14*exp(x)*x^2+28*x)*exp(exp(x))/(exp(1)+18),x, algorithm=\
```

output
```
14*x^2*e^(e^x)/(e + 18)
```

3.927.9 Mupad [B] (verification not implemented)

Time = 14.64 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{e^{e^x}(28x+14e^x x^2)}{18+e}\,dx = \frac{14\,x^2\,\mathrm{e}^{\mathrm{e}^x}}{\mathrm{e}+18}$$

input
```
int((exp(exp(x))*(28*x + 14*x^2*exp(x)))/(exp(1) + 18),x)
```

output
```
(14*x^2*exp(exp(x)))/(exp(1) + 18)
```

3.928 $\int \frac{13122x^4+e(-160x^2-6561x^3+12800x^4)+2e\log(x)-2e\log^2(x)}{6561ex^3}\,dx$

3.928.1 Optimal result

Integrand size = 46, antiderivative size = 28

$$\int \frac{13122x^4+e(-160x^2-6561x^3+12800x^4)+2e\log(x)-2e\log^2(x)}{6561ex^3}\,dx = x\left(-1+\frac{x}{e}\right)+\left(-x+\frac{1}{81}\left(x+\frac{\log(x)}{x}\right)\right)^2$$

output
```
x*(x/exp(1)-1)+(1/81*ln(x)/x-80/81*x)^2
```

3.928.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{13122x^4+e(-160x^2-6561x^3+12800x^4)+2e\log(x)-2e\log^2(x)}{6561ex^3}\,dx = \frac{-6561ex+(6561+6400e)x^2-160e\log(x)+\frac{e\log^2(x)}{x^2}}{6561e}$$

input
```
Integrate[(13122*x^4 + E*(-160*x^2 - 6561*x^3 + 12800*x^4) + 2*E*Log[x] -
2*E*Log[x]^2)/(6561*E*x^3),x]
```

output
```
(-6561*E*x + (6561 + 6400*E)*x^2 - 160*E*Log[x] + (E*Log[x]^2)/x^2)/(6561*
E)
```

3.928.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.065$, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{13122x^4+e\left(12800x^4-6561x^3-160x^2\right)-2e\log^2(x)+2e\log(x)}{6561ex^3}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{\int \frac{13122x^4-2e\log^2(x)-e\left(-12800x^4+6561x^3+160x^2\right)+2e\log(x)}{x^3}dx}{6561e}$$
$$\Big\downarrow \text{2010}$$
$$\frac{\int \left(-\frac{2e\log^2(x)}{x^3}+\frac{2e\log(x)}{x^3}+\frac{2(6561+6400e)x^2-6561ex-160e}{x}\right)dx}{6561e}$$
$$\Big\downarrow \text{2009}$$
$$\frac{(6561+6400e)x^2+\frac{e\log^2(x)}{x^2}-6561ex-160e\log(x)}{6561e}$$

input
```
Int[(13122*x^4 + E*(-160*x^2 - 6561*x^3 + 12800*x^4) + 2*E*Log[x] - 2*E*Lo
g[x]^2)/(6561*E*x^3),x]
```

output
```
(-6561*E*x + (6561 + 6400*E)*x^2 - 160*E*Log[x] + (E*Log[x]^2)/x^2)/(6561*
E)
```

3.928.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.928.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

method	result	size
risch	$\frac{\ln(x)^2}{6561x^2}+\frac{6400x^2}{6561}-x+x^2\mathrm{e}^{-1}-\frac{160\ln(x)}{6561}$	29
parts	$\frac{\ln(x)^2}{6561x^2}+\frac{6400x^2}{6561}-x+x^2\mathrm{e}^{-1}-\frac{160\ln(x)}{6561}$	31
norman	$\frac{-\frac{160x^2\ln(x)}{6561}-x^3+\frac{\ln(x)^2}{6561}+\frac{(6400\,\mathrm{e}+6561)\mathrm{e}^{-1}x^4}{6561}}{x^2}$	39
parallelrisch	$\frac{\mathrm{e}^{-1}\left(6400x^4\mathrm{e}-6561x^3\mathrm{e}-160x^2\mathrm{e}\ln(x)+6561x^4+\mathrm{e}\ln(x)^2\right)}{6561x^2}$	46
default	$\frac{\mathrm{e}^{-1}\left(6400x^2\mathrm{e}-6561x\,\mathrm{e}+6561x^2-2\,\mathrm{e}\left(-\frac{\ln(x)^2}{2x^2}-\frac{\ln(x)}{2x^2}-\frac{1}{4x^2}\right)-160\,\mathrm{e}\ln(x)+2\,\mathrm{e}\left(-\frac{\ln(x)}{2x^2}-\frac{1}{4x^2}\right)\right)}{6561}$	74

input
```
int(1/6561*(-2*exp(1)*ln(x)^2+2*exp(1)*ln(x)+(12800*x^4-6561*x^3-160*x^2)*
exp(1)+13122*x^4)/x^3/exp(1),x,method=_RETURNVERBOSE)
```

output
```
1/6561*ln(x)^2/x^2+6400/6561*x^2-x+x^2*exp(-1)-160/6561*ln(x)
```

3.928.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.54

$$\int \frac{13122x^4+e(-160x^2-6561x^3+12800x^4)+2e\log(x)-2e\log^2(x)}{6561ex^3}\,dx$$
$$=\frac{\left(6561\,x^4-160\,x^2e\log\left(x\right)+e\log\left(x\right)^2+\left(6400\,x^4-6561\,x^3\right)e\right)e^{(-1)}}{6561\,x^2}$$

input
```
integrate(1/6561*(-2*exp(1)*log(x)^2+2*exp(1)*log(x)+(12800*x^4-6561*x^3-1
60*x^2)*exp(1)+13122*x^4)/x^3/exp(1),x, algorithm=\
```

output
```
1/6561*(6561*x^4 - 160*x^2*e*log(x) + e*log(x)^2 + (6400*x^4 - 6561*x^3)*e
)*e^(-1)/x^2
```

3.928.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

$$\int \frac{13122x^4 + e(-160x^2 - 6561x^3 + 12800x^4) + 2e\log(x) - 2e\log^2(x)}{6561ex^3}\,dx$$
$$= \frac{x^2 \cdot (6561 + 6400e) - 6561ex - 160e\log(x)}{6561e} + \frac{\log(x)^2}{6561x^2}$$

input
```
integrate(1/6561*(-2*exp(1)*ln(x)**2+2*exp(1)*ln(x)+(12800*x**4-6561*x**3-
160*x**2)*exp(1)+13122*x**4)/x**3/exp(1),x)
```

output
```
(x**2*(6561 + 6400*E) - 6561*E*x - 160*E*log(x))*exp(-1)/6561 + log(x)**2/
(6561*x**2)
```

3.928.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(24) = 48.

Time = 0.21 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.18

$$\int \frac{13122x^4 + e(-160x^2 - 6561x^3 + 12800x^4) + 2e\log(x) - 2e\log^2(x)}{6561ex^3}\,dx$$
$$= \frac{1}{13122}\left(12800\,x^2e + 13122\,x^2 - 13122\,xe - \left(\frac{2\,\log(x)}{x^2} + \frac{1}{x^2}\right)e - 320\,e\log(x) + \frac{(2\,\log(x)^2 + 2\,\log(x) +}{x^2}\right.$$

input
```
integrate(1/6561*(-2*exp(1)*log(x)^2+2*exp(1)*log(x)+(12800*x^4-6561*x^3-1
60*x^2)*exp(1)+13122*x^4)/x^3/exp(1),x, algorithm=\
```

output
```
1/13122*(12800*x^2*e + 13122*x^2 - 13122*x*e - (2*log(x)/x^2 + 1/x^2)*e -
320*e*log(x) + (2*log(x)^2 + 2*log(x) + 1)*e/x^2)*e^(-1)
```

3.928.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.54

$$\int \frac{13122x^4 + e(-160x^2 - 6561x^3 + 12800x^4) + 2e\log(x) - 2e\log^2(x)}{6561ex^3}\,dx$$
$$= \frac{\left(6400\,x^4e + 6561\,x^4 - 6561\,x^3e - 160\,x^2e\log\left(x\right) + e\log\left(x\right)^2\right)e^{(-1)}}{6561\,x^2}$$

input
```
integrate(1/6561*(-2*exp(1)*log(x)^2+2*exp(1)*log(x)+(12800*x^4-6561*x^3-1
60*x^2)*exp(1)+13122*x^4)/x^3/exp(1),x, algorithm=\
```

output
```
1/6561*(6400*x^4*e + 6561*x^4 - 6561*x^3*e - 160*x^2*e*log(x) + e*log(x)^2
)*e^(-1)/x^2
```

3.928.9 Mupad [B] (verification not implemented)

Time = 15.22 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{13122x^4 + e(-160x^2 - 6561x^3 + 12800x^4) + 2e\log(x) - 2e\log^2(x)}{6561ex^3}\,dx$$
$$= \frac{\ln\left(x\right)^2}{6561\,x^2} - \frac{160\,\ln\left(x\right)}{6561} - x + x^2\left(\mathrm{e}^{-1} + \frac{6400}{6561}\right)$$

input
```
int(-(exp(-1)*((2*exp(1)*log(x)^2)/6561 - (2*exp(1)*log(x))/6561 + (exp(1)
*(160*x^2 + 6561*x^3 - 12800*x^4))/6561 - 2*x^4))/x^3,x)
```

output
```
log(x)^2/(6561*x^2) - (160*log(x))/6561 - x + x^2*(exp(-1) + 6400/6561)
```

3.929 $\int \frac{-290x+e^{x^3}(-100-600x+1850x^2-300x^3+900x^4-150x^5)+e^{2x^3}(-12$

3.929.1 Optimal result

Integrand size = 86, antiderivative size = 25

$$\int \frac{-290x+e^{x^3}(-100-600x+1850x^2-300x^3+900x^4-150x^5)+e^{2x^3}(-120-340x+2220x^2-720x^3}{4+4x^2+x^4}$$

$$=\frac{5\left(4+\left(5-e^{x^3}(-6+x)\right)^2\right)}{2+x^2}$$

output
```
5*(4+(5-(-6+x)*exp(x^3))^2)/(x^2+2)
```

3.929.2 Mathematica [A] (verified)

Time = 3.56 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

$$\int \frac{-290x+e^{x^3}(-100-600x+1850x^2-300x^3+900x^4-150x^5)+e^{2x^3}(-120-340x+2220x^2-720x^3}{4+4x^2+x^4}$$

$$=\frac{5\left(29-10e^{x^3}(-6+x)+e^{2x^3}(-6+x)^2\right)}{2+x^2}$$

input
```
Integrate[(-290*x + E^x^3*(-100 - 600*x + 1850*x^2 - 300*x^3 + 900*x^4 - 1
50*x^5) + E^(2*x^3)*(-120 - 340*x + 2220*x^2 - 720*x^3 + 1140*x^4 - 360*x^
5 + 30*x^6))/(4 + 4*x^2 + x^4),x]
```

output
```
(5*(29 - 10*E^x^3*(-6 + x) + E^(2*x^3)*(-6 + x)^2))/(2 + x^2)
```

3.929.

$$\int \frac{-290x+e^{x^3}(-100-600x+1850x^2-300x^3+900x^4-150x^5)+e^{2x^3}(-120-340x+2220x^2-720x^3+1140x^4-360x^5+30x^6)}{4+4x^2+x^4}\,dx$$

3.929.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^3}\left(-150x^5+900x^4-300x^3+1850x^2-600x-100\right)+e^{2x^3}\left(30x^6-360x^5+1140x^4-720x^3+2220x^2-340\right.}{x^4+4x^2+4}$$

$$\Big\downarrow \text{1380}$$

$$\int -\frac{10\left(5e^{x^3}\left(3x^5-18x^4+6x^3-37x^2+12x+2\right)+e^{2x^3}\left(-3x^6+36x^5-114x^4+72x^3-222x^2+34x+12\right)+2\right.}{(x^2+2)^2}$$

$$\Big\downarrow \text{27}$$

$$-10\int \frac{29x+5e^{x^3}\left(3x^5-18x^4+6x^3-37x^2+12x+2\right)+e^{2x^3}\left(-3x^6+36x^5-114x^4+72x^3-222x^2+34x+12\right.}{(x^2+2)^2}$$

$$\Big\downarrow \text{7293}$$

$$-10\int \left(\frac{29x}{(x^2+2)^2}+\frac{5e^{x^3}\left(3x^5-18x^4+6x^3-37x^2+12x+2\right)}{(x^2+2)^2}-\frac{e^{2x^3}(x-6)\left(3x^5-18x^4+6x^3-36x^2+6x+\right.}{(x^2+2)^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$-10\left(\frac{5}{4}\left(12+35i\sqrt{2}\right)\int \frac{e^{x^3}}{i\sqrt{2}-x}dx+\frac{5i\int \frac{e^{x^3}}{i\sqrt{2}-x}dx}{2\sqrt{2}}-15\int \frac{e^{x^3}}{i\sqrt{2}-x}dx-\frac{5}{4}\left(12-35i\sqrt{2}\right)\int \frac{e^{x^3}}{x+i\sqrt{2}}dx+\frac{5i\int}{2}\right.$$

input
```
Int[(-290*x + E^x^3*(-100 - 600*x + 1850*x^2 - 300*x^3 + 900*x^4 - 150*x^5
) + E^(2*x^3)*(-120 - 340*x + 2220*x^2 - 720*x^3 + 1140*x^4 - 360*x^5 + 30
*x^6))/(4 + 4*x^2 + x^4),x]
```

output
```
$Aborted
```

3.929.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.929.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(24) = 48$.

Time = 0.31 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.00

method	result	size
risch	$\frac{145}{x^2+2}+\frac{5(x^2-12x+36)\mathrm{e}^{2x^3}}{x^2+2}-\frac{50(-6+x)\mathrm{e}^{x^3}}{x^2+2}$	50
norman	$\frac{180\,\mathrm{e}^{2x^3}+5\,\mathrm{e}^{2x^3}x^2-50\,\mathrm{e}^{x^3}x-60\,\mathrm{e}^{2x^3}x+300\,\mathrm{e}^{x^3}+145}{x^2+2}$	52
parallelrisch	$\frac{180\,\mathrm{e}^{2x^3}+5\,\mathrm{e}^{2x^3}x^2-50\,\mathrm{e}^{x^3}x-60\,\mathrm{e}^{2x^3}x+300\,\mathrm{e}^{x^3}+145}{x^2+2}$	52
parts	$\frac{145}{x^2+2}+\frac{-50\,\mathrm{e}^{x^3}x+300\,\mathrm{e}^{x^3}}{x^2+2}+\frac{180\,\mathrm{e}^{2x^3}-60\,\mathrm{e}^{2x^3}x+5\,\mathrm{e}^{2x^3}x^2}{x^2+2}$	70

input
```
int(((30*x^6-360*x^5+1140*x^4-720*x^3+2220*x^2-340*x-120)*exp(x^3)^2+(-150
*x^5+900*x^4-300*x^3+1850*x^2-600*x-100)*exp(x^3)-290*x)/(x^4+4*x^2+4),x,m
ethod=_RETURNVERBOSE)
```

output
```
145/(x^2+2)+5*(x^2-12*x+36)/(x^2+2)*exp(x^3)^2-50*(-6+x)/(x^2+2)*exp(x^3)
```

3.929.
$$\int \frac{-290x+e^{x^3}(-100-600x+1850x^2-300x^3+900x^4-150x^5)+e^{2x^3}(-120-340x+2220x^2-720x^3+1140x^4-360x^5+30x^6)}{4+4x^2+x^4}\,dx$$

3.929.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.40

$$\int \frac{-290x + e^{x^3}(-100 - 600x + 1850x^2 - 300x^3 + 900x^4 - 150x^5) + e^{2x^3}(-120 - 340x + 2220x^2 - 720x^3}{4 + 4x^2 + x^4}$$
$$= \frac{5\left((x^2 - 12\,x + 36)e^{(2\,x^3)} - 10\,(x - 6)e^{(x^3)} + 29\right)}{x^2 + 2}$$

input
```
integrate(((30*x^6-360*x^5+1140*x^4-720*x^3+2220*x^2-340*x-120)*exp(x^3)^2
+(-150*x^5+900*x^4-300*x^3+1850*x^2-600*x-100)*exp(x^3)-290*x)/(x^4+4*x^2+
4),x, algorithm=\
```

output
```
5*((x^2 - 12*x + 36)*e^(2*x^3) - 10*(x - 6)*e^(x^3) + 29)/(x^2 + 2)
```

3.929.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. 2(19) = 38.

Time = 0.11 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.60

$$\int \frac{-290x + e^{x^3}(-100 - 600x + 1850x^2 - 300x^3 + 900x^4 - 150x^5) + e^{2x^3}(-120 - 340x + 2220x^2 - 720x^3}{4 + 4x^2 + x^4}$$
$$= \frac{(-50x^3 + 300x^2 - 100x + 600)\,e^{x^3} + (5x^4 - 60x^3 + 190x^2 - 120x + 360)\,e^{2x^3}}{x^4 + 4x^2 + 4} + \frac{290}{2x^2 + 4}$$

input
```
integrate(((30*x**6-360*x**5+1140*x**4-720*x**3+2220*x**2-340*x-120)*exp(x
**3)**2+(-150*x**5+900*x**4-300*x**3+1850*x**2-600*x-100)*exp(x**3)-290*x)
/(x**4+4*x**2+4),x)
```

output
```
((-50*x**3 + 300*x**2 - 100*x + 600)*exp(x**3) + (5*x**4 - 60*x**3 + 190*x
**2 - 120*x + 360)*exp(2*x**3))/(x**4 + 4*x**2 + 4) + 290/(2*x**2 + 4)
```

3.929.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.76

$$\int \frac{-290x + e^{x^3}(-100 - 600x + 1850x^2 - 300x^3 + 900x^4 - 150x^5) + e^{2x^3}(-120 - 340x + 2220x^2 - 720x^3}{4 + 4x^2 + x^4}$$
$$= \frac{5\left((x^2 - 12\,x + 36)e^{(2\,x^3)} - 10\,(x-6)e^{(x^3)}\right)}{x^2+2} + \frac{145}{x^2+2}$$

input
```
integrate(((30*x^6-360*x^5+1140*x^4-720*x^3+2220*x^2-340*x-120)*exp(x^3)^2
+(-150*x^5+900*x^4-300*x^3+1850*x^2-600*x-100)*exp(x^3)-290*x)/(x^4+4*x^2+
4),x, algorithm=\
```

output
```
5*((x^2 - 12*x + 36)*e^(2*x^3) - 10*(x - 6)*e^(x^3))/(x^2 + 2) + 145/(x^2
+ 2)
```

3.929.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(23) = 46$.

Time = 0.27 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.04

$$\int \frac{-290x + e^{x^3}(-100 - 600x + 1850x^2 - 300x^3 + 900x^4 - 150x^5) + e^{2x^3}(-120 - 340x + 2220x^2 - 720x^3}{4 + 4x^2 + x^4}$$
$$= \frac{5\left(x^2e^{(2\,x^3)} - 12\,xe^{(2\,x^3)} - 10\,xe^{(x^3)} + 36\,e^{(2\,x^3)} + 60\,e^{(x^3)} + 29\right)}{x^2+2}$$

input
```
integrate(((30*x^6-360*x^5+1140*x^4-720*x^3+2220*x^2-340*x-120)*exp(x^3)^2
+(-150*x^5+900*x^4-300*x^3+1850*x^2-600*x-100)*exp(x^3)-290*x)/(x^4+4*x^2+
4),x, algorithm=\
```

output
```
5*(x^2*e^(2*x^3) - 12*x*e^(2*x^3) - 10*x*e^(x^3) + 36*e^(2*x^3) + 60*e^(x^
3) + 29)/(x^2 + 2)
```

3.929.9 Mupad [B] (verification not implemented)

Time = 15.15 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.04

$$\int \frac{-290x + e^{x^3}(-100 - 600x + 1850x^2 - 300x^3 + 900x^4 - 150x^5) + e^{2x^3}(-120 - 340x + 2220x^2 - 720x^3 + \dots}{4 + 4x^2 + x^4}$$

$$= 5\,e^{2\,x^3} + \frac{300\,e^{x^3} + 170\,e^{2\,x^3} - x\left(50\,e^{x^3} + 60\,e^{2\,x^3}\right) + 145}{x^2 + 2}$$

input
```
int(-(290*x + exp(2*x^3)*(340*x - 2220*x^2 + 720*x^3 - 1140*x^4 + 360*x^5
- 30*x^6 + 120) + exp(x^3)*(600*x - 1850*x^2 + 300*x^3 - 900*x^4 + 150*x^5
 + 100))/(4*x^2 + x^4 + 4),x)
```

output
```
5*exp(2*x^3) + (300*exp(x^3) + 170*exp(2*x^3) - x*(50*exp(x^3) + 60*exp(2*
x^3)) + 145)/(x^2 + 2)
```

3.929.
$\int \frac{-290x+e^{x^3}(-100-600x+1850x^2-300x^3+900x^4-150x^5)+e^{2x^3}(-120-340x+2220x^2-720x^3+1140x^4-360x^5+30x^6)}{4+4x^2+x^4}\,dx$

3.930 $\int \frac{}{625+1000x+600x^2+160x^3+16x^4+\left(500+600x+240x^2+32x^3\right)\log(5)+}$

3.930.1 Optimal result

Integrand size = 114, antiderivative size = 21

$$\int \frac{-100 -}{625+1000x+600x^2+160x^3+16x^4+(500+600x+240x^2+32x^3)\log(5)+(150+120x+24x^2)\log^2}$$
$$=\frac{5}{(5+2x+\log(5))^2-\log^2(\log(4))}$$

output
```
5/((5+2*x+ln(5))^2-ln(2*ln(2))^2)
```

3.930.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.62

$$\int \frac{-100 -}{625+1000x+600x^2+160x^3+16x^4+(500+600x+240x^2+32x^3)\log(5)+(150+120x+24x^2)\log^2}$$
$$=\frac{5}{25+20x+4x^2+10\log(5)+4x\log(5)+\log^2(5)-\log^2(\log(4))}$$

input
```
Integrate[(-100 - 40*x - 20*Log[5])/(625 + 1000*x + 600*x^2 + 160*x^3 + 16
*x^4 + (500 + 600*x + 240*x^2 + 32*x^3)*Log[5] + (150 + 120*x + 24*x^2)*Lo
g[5]^2 + (20 + 8*x)*Log[5]^3 + Log[5]^4 + (-50 - 40*x - 8*x^2 + (-20 - 8*x
)*Log[5] - 2*Log[5]^2)*Log[Log[4]]^2 + Log[Log[4]]^4),x]
```

output
```
5/(25 + 20*x + 4*x^2 + 10*Log[5] + 4*x*Log[5] + Log[5]^2 - Log[Log[4]]^2)
```

3.930.

$\int \frac{-100-40x-20\log(5)}{625+1000x+600x^2+160x^3+16x^4+(500+600x+240x^2+32x^3)\log(5)+(150+120x+24x^2)\log^2(5)+(20+8x)\log^3(5)+\log^4(5)+(-50-40x-8x^2+(}$

3.930.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.044, Rules used = {2459, 27, 1380, 27, 241}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-40x-100-}{16x^4+160x^3+600x^2+\log^2(\log(4))\left(-8x^2-40x+(-8x-20)\log(5)-50-2\log^2(5)\right)+(24x^2+120x+15}$$

$$\Big\downarrow \text{ 2459}$$

$$\int -\frac{40\left(x+\frac{1}{64}(160+32\log(5))\right)}{-8\log^2(\log(4))\left(x+\frac{1}{64}(160+32\log(5))\right)^2+16\left(x+\frac{1}{64}(160+32\log(5))\right)^4+\log^4(\log(4))}d\left(x+\frac{1}{64}(160+32\right.$$

$$\Big\downarrow \text{ 27}$$

$$-40\int \frac{x+\frac{1}{64}(160+32\log(5))}{16\left(x+\frac{1}{64}(160+32\log(5))\right)^4-8\log^2(\log(4))\left(x+\frac{1}{64}(160+32\log(5))\right)^2+\log^4(\log(4))}d\left(x+\frac{1}{64}(160+3\right.$$

$$\Big\downarrow \text{ 1380}$$

$$-640\int \frac{x+\frac{1}{64}(160+32\log(5))}{16\left(4\left(x+\frac{1}{64}(160+32\log(5))\right)^2-\log^2(\log(4))\right)^2}d\left(x+\frac{1}{64}(160+32\log(5))\right)$$

$$\Big\downarrow \text{ 27}$$

$$-40\int \frac{x+\frac{1}{64}(160+32\log(5))}{\left(4\left(x+\frac{1}{64}(160+32\log(5))\right)^2-\log^2(\log(4))\right)^2}d\left(x+\frac{1}{64}(160+32\log(5))\right)$$

$$\Big\downarrow \text{ 241}$$

$$\frac{5}{4\left(x+\frac{1}{64}(160+32\log(5))\right)^2-\log^2(\log(4))}$$

input
```
Int[(-100 - 40*x - 20*Log[5])/(625 + 1000*x + 600*x^2 + 160*x^3 + 16*x^4 +
 (500 + 600*x + 240*x^2 + 32*x^3)*Log[5] + (150 + 120*x + 24*x^2)*Log[5]^2
 + (20 + 8*x)*Log[5]^3 + Log[5]^4 + (-50 - 40*x - 8*x^2 + (-20 - 8*x)*Log[
5] - 2*Log[5]^2)*Log[Log[4]]^2 + Log[Log[4]]^4),x]
```

output
```
5/(4*(x + (160 + 32*Log[5])/64)^2 - Log[Log[4]]^2)
```

3.930.

$$\int \frac{-100-40x-20\log(5)}{625+1000x+600x^2+160x^3+16x^4+(500+600x+240x^2+32x^3)\log(5)+(150+120x+24x^2)\log^2(5)+(20+8x)\log^3(5)+\log^4(5)+(-50-40x-8x^2+(-}$$

3.930.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2459
```
Int[(Pn_)^(p_.)*(Qx_), x_Symbol] :> With[{S = Coeff[Pn, x, Expon[Pn, x] - 1
]/(Expon[Pn, x]*Coeff[Pn, x, Expon[Pn, x]])}, Subst[Int[ExpandToSum[Pn /. x
 -> x - S, x]^p*ExpandToSum[Qx /. x -> x - S, x], x], x, x + S] /; Binomial
Q[Pn /. x -> x - S, x] || (IntegerQ[Expon[Pn, x]/2] && TrinomialQ[Pn /. x -
> x - S, x])] /; FreeQ[p, x] && PolyQ[Pn, x] && GtQ[Expon[Pn, x], 2] && NeQ
[Coeff[Pn, x, Expon[Pn, x] - 1], 0] && PolyQ[Qx, x] &&  !(MonomialQ[Qx, x]
&& IGtQ[p, 0])
```

3.930.4 Maple [A] (verified)

Time = 0.74 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.76

method	result	size
gosper	$\frac{5}{\ln(5)^{2}+4x\ln(5)-\ln(2\ln(2))^{2}+4x^{2}+10\ln(5)+20x+25}$	37
norman	$\frac{5}{\ln(5)^{2}+4x\ln(5)-\ln(2\ln(2))^{2}+4x^{2}+10\ln(5)+20x+25}$	37
parallelrisch	$\frac{5}{\ln(5)^{2}+4x\ln(5)-\ln(2\ln(2))^{2}+4x^{2}+10\ln(5)+20x+25}$	37
risch	$-\frac{5}{\ln(\ln(2))^{2}+2\ln(2)\ln(\ln(2))+\ln(2)^{2}-\ln(5)^{2}-4x\ln(5)-4x^{2}-10\ln(5)-20x-25}$	46
default	$\frac{5}{2\ln(2\ln(2))(2x+5-\ln(2\ln(2))+\ln(5))}-\frac{5}{2\ln(2\ln(2))(2x+5+\ln(2\ln(2))+\ln(5))}$	50

input
```
int((-20*ln(5)-40*x-100)/(ln(2*ln(2))^4+(-2*ln(5)^2+(-8*x-20)*ln(5)-8*x^2-
40*x-50)*ln(2*ln(2))^2+ln(5)^4+(8*x+20)*ln(5)^3+(24*x^2+120*x+150)*ln(5)^2
+(32*x^3+240*x^2+600*x+500)*ln(5)+16*x^4+160*x^3+600*x^2+1000*x+625),x,met
hod=_RETURNVERBOSE)
```

output
```
5/(ln(5)^2+4*x*ln(5)-ln(2*ln(2))^2+4*x^2+10*ln(5)+20*x+25)
```

3.930.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.71

$$\int \frac{-100 -}{625 + 1000x + 600x^2 + 160x^3 + 16x^4 + (500 + 600x + 240x^2 + 32x^3)\log(5) + (150 + 120x + 24x^2)\log^2}$$
$$= \frac{5}{4\,x^2 + 2\,(2\,x + 5)\log(5) + \log(5)^2 - \log(2\,\log(2))^2 + 20\,x + 25}$$

input
```
integrate((-20*log(5)-40*x-100)/(log(2*log(2))^4+(-2*log(5)^2+(-8*x-20)*lo
g(5)-8*x^2-40*x-50)*log(2*log(2))^2+log(5)^4+(8*x+20)*log(5)^3+(24*x^2+120
*x+150)*log(5)^2+(32*x^3+240*x^2+600*x+500)*log(5)+16*x^4+160*x^3+600*x^2+
1000*x+625),x, algorithm=\
```

output
```
5/(4*x^2 + 2*(2*x + 5)*log(5) + log(5)^2 - log(2*log(2))^2 + 20*x + 25)
```

3.930.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. 2(19) = 38.

Time = 0.71 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.29

$$\int \frac{-100 -}{625 + 1000x + 600x^2 + 160x^3 + 16x^4 + (500 + 600x + 240x^2 + 32x^3)\log(5) + (150 + 120x + 24x^2)\log^2}$$
$$= \frac{5}{4x^2 + x\,(4\log(5) + 20) - \log(2)^2 - \log(\log(2))^2 - 2\log(2)\log(\log(2)) + \log(5)^2 + 10\log(5) + 25}$$

input
```
integrate((-20*ln(5)-40*x-100)/(ln(2*ln(2))**4+(-2*ln(5)**2+(-8*x-20)*ln(5
)-8*x**2-40*x-50)*ln(2*ln(2))**2+ln(5)**4+(8*x+20)*ln(5)**3+(24*x**2+120*x
+150)*ln(5)**2+(32*x**3+240*x**2+600*x+500)*ln(5)+16*x**4+160*x**3+600*x**
2+1000*x+625),x)
```

output
```
5/(4*x**2 + x*(4*log(5) + 20) - log(2)**2 - log(log(2))**2 - 2*log(2)*log(
log(2)) + log(5)**2 + 10*log(5) + 25)
```

3.930.
$$\int \frac{-100-40x-20\log(5)}{625+1000x+600x^2+160x^3+16x^4+(500+600x+240x^2+32x^3)\log(5)+(150+120x+24x^2)\log^2(5)+(20+8x)\log^3(5)+\log^4(5)+(-50-40x-8x^2+(}$$

3.930.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.67

$$\int \frac{-100 -}{625 + 1000x + 600x^2 + 160x^3 + 16x^4 + (500 + 600x + 240x^2 + 32x^3)\log(5) + (150 + 120x + 24x^2)\log^2}$$
$$= \frac{5}{4\,x^2 + 4\,x(\log(5) + 5) + \log(5)^2 - \log(2\,\log(2))^2 + 10\,\log(5) + 25}$$

input
```
integrate((-20*log(5)-40*x-100)/(log(2*log(2))^4+(-2*log(5)^2+(-8*x-20)*lo
g(5)-8*x^2-40*x-50)*log(2*log(2))^2+log(5)^4+(8*x+20)*log(5)^3+(24*x^2+120
*x+150)*log(5)^2+(32*x^3+240*x^2+600*x+500)*log(5)+16*x^4+160*x^3+600*x^2+
1000*x+625),x, algorithm=\
```

output
```
5/(4*x^2 + 4*x*(log(5) + 5) + log(5)^2 - log(2*log(2))^2 + 10*log(5) + 25)
```

3.930.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.71

$$\int \frac{-100 -}{625 + 1000x + 600x^2 + 160x^3 + 16x^4 + (500 + 600x + 240x^2 + 32x^3)\log(5) + (150 + 120x + 24x^2)\log^2}$$
$$= \frac{5}{4\,x^2 + 4\,x\log(5) + \log(5)^2 - \log(2\,\log(2))^2 + 20\,x + 10\,\log(5) + 25}$$

input
```
integrate((-20*log(5)-40*x-100)/(log(2*log(2))^4+(-2*log(5)^2+(-8*x-20)*lo
g(5)-8*x^2-40*x-50)*log(2*log(2))^2+log(5)^4+(8*x+20)*log(5)^3+(24*x^2+120
*x+150)*log(5)^2+(32*x^3+240*x^2+600*x+500)*log(5)+16*x^4+160*x^3+600*x^2+
1000*x+625),x, algorithm=\
```

output
```
5/(4*x^2 + 4*x*log(5) + log(5)^2 - log(2*log(2))^2 + 20*x + 10*log(5) + 25
)
```

3.930.9 Mupad [B] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.62

$$\int \frac{-100 -}{625+1000x+600x^2+160x^3+16x^4+(500+600x+240x^2+32x^3)\log(5)+(150+120x+24x^2)\log^2}$$
$$= \frac{5}{4\,x^2+\left(4\,\ln\left(5\right)+20\right)\,x+10\,\ln\left(5\right)-{\ln\left(\ln\left(4\right)\right)}^2+{\ln\left(5\right)}^2+25}$$

input
```
int(-(40*x + 20*log(5) + 100)/(1000*x + log(5)^3*(8*x + 20) + log(5)*(600*
x + 240*x^2 + 32*x^3 + 500) - log(2*log(2))^2*(40*x + log(5)*(8*x + 20) +
2*log(5)^2 + 8*x^2 + 50) + log(2*log(2))^4 + log(5)^2*(120*x + 24*x^2 + 15
0) + log(5)^4 + 600*x^2 + 160*x^3 + 16*x^4 + 625),x)
```

output
```
5/(10*log(5) + x*(4*log(5) + 20) - log(log(4))^2 + log(5)^2 + 4*x^2 + 25)
```

3.931 $\int \frac{e^{\frac{16}{x^4}}(-51200-6400e^5)+2x^5}{200x^5+25e^5x^5}\,dx$

3.931.1 Optimal result

Integrand size = 38, antiderivative size = 22

$$\int \frac{e^{\frac{16}{x^4}}(-51200-6400e^5)+2x^5}{200x^5+25e^5x^5}\,dx = 4\left(e^{\frac{16}{x^4}}+\frac{x}{50(8+e^5)}\right)$$

output
```
4/5*x/(10*exp(5)+80)+4*exp(16/x^4)
```

3.931.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{16}{x^4}}(-51200-6400e^5)+2x^5}{200x^5+25e^5x^5}\,dx = 4e^{\frac{16}{x^4}}+\frac{2x}{25(8+e^5)}$$

input
```
Integrate[(E^(16/x^4)*(-51200 - 6400*E^5) + 2*x^5)/(200*x^5 + 25*E^5*x^5),
x]
```

output
```
4*E^(16/x^4) + (2*x)/(25*(8 + E^5))
```

3.931.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.32, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.132, Rules used = {6, 27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^5+\left(-51200-6400e^5\right)e^{\frac{16}{x^4}}}{25e^5x^5+200x^5}\,dx$$
$$\Big\downarrow \ 6$$
$$\int \frac{2x^5+\left(-51200-6400e^5\right)e^{\frac{16}{x^4}}}{\left(200+25e^5\right)x^5}dx$$
$$\Big\downarrow \ 27$$
$$\frac{\int -\frac{2\left(3200e^{\frac{16}{x^4}}\left(8+e^5\right)-x^5\right)}{x^5}dx}{25\left(8+e^5\right)}$$
$$\Big\downarrow \ 27$$
$$-\frac{2\int \frac{3200e^{\frac{16}{x^4}}\left(8+e^5\right)-x^5}{x^5}dx}{25\left(8+e^5\right)}$$
$$\Big\downarrow \ 2010$$
$$-\frac{2\int \left(\frac{3200e^{\frac{16}{x^4}}\left(8+e^5\right)}{x^5}-1\right)dx}{25\left(8+e^5\right)}$$
$$\Big\downarrow \ 2009$$
$$-\frac{2\left(-50\left(8+e^5\right)e^{\frac{16}{x^4}}-x\right)}{25\left(8+e^5\right)}$$

input
```
Int[(E^(16/x^4)*(-51200 - 6400*E^5) + 2*x^5)/(200*x^5 + 25*E^5*x^5),x]
```

output
```
(-2*(-50*E^(16/x^4)*(8 + E^5) - x))/(25*(8 + E^5))
```

3.931. $\int \frac{e^{\frac{16}{x^4}}\left(-51200-6400e^5\right)+2x^5}{200x^5+25e^5x^5}\,dx$

3.931.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.931.4 Maple [A] (verified)

Time = 0.97 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

method	result	size
parts	$\frac{2x}{25(\mathrm{e}^5+8)}+4\,\mathrm{e}^{\frac{16}{x^4}}$	19
risch	$\frac{2x}{25\,\mathrm{e}^5+200}+4\,\mathrm{e}^{\frac{16}{x^4}}$	21
norman	$\frac{4x^4\mathrm{e}^{\frac{16}{x^4}}+\frac{2x^5}{25\left(\mathrm{e}^5+8\right)}}{x^4}$	28
parallelrisch	$\frac{100\,\mathrm{e}^{\frac{16}{x^4}}\mathrm{e}^5+2x+800\,\mathrm{e}^{\frac{16}{x^4}}}{25\,\mathrm{e}^5+200}$	31

input
```
int(((-6400*exp(5)-51200)*exp(16/x^4)+2*x^5)/(25*x^5*exp(5)+200*x^5),x,met
hod=_RETURNVERBOSE)
```

output
```
2/25/(exp(5)+8)*x+4*exp(16/x^4)
```

3.931.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{16}{x^4}}(-51200 - 6400e^5) + 2x^5}{200x^5 + 25e^5x^5} \, dx = \frac{2\left(50\,(e^5 + 8)e^{\left(\frac{16}{x^4}\right)} + x\right)}{25\,(e^5 + 8)}$$

input
```
integrate(((-6400*exp(5)-51200)*exp(16/x^4)+2*x^5)/(25*x^5*exp(5)+200*x^5)
,x, algorithm=\
```

output
```
2/25*(50*(e^5 + 8)*e^(16/x^4) + x)/(e^5 + 8)
```

3.931.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{e^{\frac{16}{x^4}}(-51200 - 6400e^5) + 2x^5}{200x^5 + 25e^5x^5} \, dx = \frac{2x}{200 + 25e^5} + 4e^{\frac{16}{x^4}}$$

input
```
integrate(((-6400*exp(5)-51200)*exp(16/x**4)+2*x**5)/(25*x**5*exp(5)+200*x
**5),x)
```

output
```
2*x/(200 + 25*exp(5)) + 4*exp(16/x**4)
```

3.931.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. 2(18) = 36.

Time = 0.19 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.82

$$\int \frac{e^{\frac{16}{x^4}}(-51200 - 6400e^5) + 2x^5}{200x^5 + 25e^5x^5} \, dx = \frac{2\,x}{25\,(e^5 + 8)} + \frac{32\,e^{\left(\frac{16}{x^4}\right)}}{e^5 + 8} + \frac{4\,e^{\left(\frac{16}{x^4} + 5\right)}}{e^5 + 8}$$

input
```
integrate(((-6400*exp(5)-51200)*exp(16/x^4)+2*x^5)/(25*x^5*exp(5)+200*x^5)
,x, algorithm=\
```

output
```
2/25*x/(e^5 + 8) + 32*e^(16/x^4)/(e^5 + 8) + 4*e^(16/x^4 + 5)/(e^5 + 8)
```

3.931.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{e^{\frac{16}{x^4}}(-51200-6400e^5)+2x^5}{200x^5+25e^5x^5}\,dx=\frac{2\,x}{25\,(e^5+8)}+4\,e^{\left(\frac{16}{x^4}\right)}$$

input
```
integrate(((-6400*exp(5)-51200)*exp(16/x^4)+2*x^5)/(25*x^5*exp(5)+200*x^5)
,x, algorithm=\
```

output
```
2/25*x/(e^5 + 8) + 4*e^(16/x^4)
```

3.931.9 Mupad [B] (verification not implemented)

Time = 15.50 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.50

$$\int \frac{e^{\frac{16}{x^4}}(-51200-6400e^5)+2x^5}{200x^5+25e^5x^5}\,dx=\frac{2\,x}{25\,(\mathrm{e}^5+8)}+\frac{\mathrm{e}^{\frac{16}{x^4}}\,(100\,\mathrm{e}^5+800)}{25\,(\mathrm{e}^5+8)}$$

input
```
int(-(exp(16/x^4)*(6400*exp(5) + 51200) - 2*x^5)/(25*x^5*exp(5) + 200*x^5)
,x)
```

output
```
(2*x)/(25*(exp(5) + 8)) + (exp(16/x^4)*(100*exp(5) + 800))/(25*(exp(5) + 8
))
```

3.932 $\int \frac{64+128x+64x^2+8x^3+4x^4+e^{5/4}(16+32x+16x}{256+512x+256x^2-32x^3-32x^4+x^6+e^{5/2}(16+32x+16x^2)+e^{5/4}(128+}$

3.932.1 Optimal result

Integrand size = 104, antiderivative size = 25

$$\int \frac{64+128x+64x^2+8x^3+4x^4+e^{5/4}(16+32x+16x^2)}{256+512x+256x^2-32x^3-32x^4+x^6+e^{5/2}\left(16+32x+16x^2\right)+e^{5/4}\left(128+256x+128x^2-8x^3-8\right.}$$

output
```
x/(4-x^2/(4+4/x)+exp(5/4))
```

3.932.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{64+128x+64x^2+8x^3+4x^4+e^{5/4}(16+32x+16x^2)}{256+512x+256x^2-32x^3-32x^4+x^6+e^{5/2}\left(16+32x+16x^2\right)+e^{5/4}\left(128+256x+128x^2-8x^3-8\right.}$$

input
```
Integrate[(64 + 128*x + 64*x^2 + 8*x^3 + 4*x^4 + E^(5/4)*(16 + 32*x + 16*x
^2))/(256 + 512*x + 256*x^2 - 32*x^3 - 32*x^4 + x^6 + E^(5/2)*(16 + 32*x +
 16*x^2) + E^(5/4)*(128 + 256*x + 128*x^2 - 8*x^3 - 8*x^4)),x]
```

output
```
(4*x*(1 + x))/(16 + 16*x - x^3 + 4*E^(5/4)*(1 + x))
```

3.932.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^4+8x^3+64x^2+e^{5/4}(16x^2+32x+16)+128x+64}{x^6-32x^4-32x^3+256x^2+e^{5/2}(16x^2+32x+16)+e^{5/4}(-8x^4-8x^3+128x^2+256x+128)+512x+256}$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{4(-x-2)}{-x^3+4(4+e^{5/4})x+4(4+e^{5/4})}+\frac{16(4+e^{5/4})(2x^2+5x+3)}{(-x^3+4(4+e^{5/4})x+4(4+e^{5/4}))^2}\right)dx$$

$$\Big\downarrow \text{7299}$$

$$\int \left(\frac{4(-x-2)}{-x^3+4(4+e^{5/4})x+4(4+e^{5/4})}+\frac{16(4+e^{5/4})(2x^2+5x+3)}{(-x^3+4(4+e^{5/4})x+4(4+e^{5/4}))^2}\right)dx$$

input
```
Int[(64 + 128*x + 64*x^2 + 8*x^3 + 4*x^4 + E^(5/4)*(16 + 32*x + 16*x^2))/(
256 + 512*x + 256*x^2 - 32*x^3 - 32*x^4 + x^6 + E^(5/2)*(16 + 32*x + 16*x^
2) + E^(5/4)*(128 + 256*x + 128*x^2 - 8*x^3 - 8*x^4)),x]
```

output
```
$Aborted
```

3.932.3.1 Defintions of rubi rules used

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.932.4 Maple [A] (verified)

Time = 0.82 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

method	result
risch	$\frac{x^2+x}{-\frac{x^3}{4}+x\,\mathrm{e}^{\frac{5}{4}}+\mathrm{e}^{\frac{5}{4}}+4x+4}$
gosper	$\frac{4(1+x)x}{-x^3+4x\,\mathrm{e}^{\frac{5}{4}}+4\,\mathrm{e}^{\frac{5}{4}}+16x+16}$
norman	$\frac{4x^2+4x}{-x^3+4x\,\mathrm{e}^{\frac{5}{4}}+4\,\mathrm{e}^{\frac{5}{4}}+16x+16}$
parallelrisch	$-\frac{-4x^2-4x}{-x^3+4x\,\mathrm{e}^{\frac{5}{4}}+4\,\mathrm{e}^{\frac{5}{4}}+16x+16}$
default	$-2\left(\sum_{\_R=\mathrm{RootOf}\left(\_Z^6+\left(-8\,\mathrm{e}^{\frac{5}{4}}-32\right)\_Z^4+\left(-8\,\mathrm{e}^{\frac{5}{4}}-32\right)\_Z^3+\left(256+16\,\mathrm{e}^{\frac{5}{2}}+128\,\mathrm{e}^{\frac{5}{4}}\right)\_Z^2+\left(256\,\mathrm{e}^{\frac{5}{4}}+32\,\mathrm{e}^{\frac{5}{2}}+512\right)\_Z+256\right.}\right.$

input
```
int(((16*x^2+32*x+16)*exp(5/4)+4*x^4+8*x^3+64*x^2+128*x+64)/((16*x^2+32*x+
16)*exp(5/4)^2+(-8*x^4-8*x^3+128*x^2+256*x+128)*exp(5/4)+x^6-32*x^4-32*x^3
+256*x^2+512*x+256),x,method=_RETURNVERBOSE)
```

output
```
(x^2+x)/(-1/4*x^3+x*exp(5/4)+exp(5/4)+4*x+4)
```

3.932.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{64+128x+64x^2+8x^3+4x^4+e^{5/4}(16+32x+16x^2)}{256+512x+256x^2-32x^3-32x^4+x^6+e^{5/2}\left(16+32x+16x^2\right)+e^{5/4}\left(128+256x+128x^2-8x^3-8\right.}$$
$$-\frac{4\left(x^2+x\right)}{x^3-4\left(x+1\right)e^{\frac{5}{4}}-16\,x-16}$$

input
```
integrate(((16*x^2+32*x+16)*exp(5/4)+4*x^4+8*x^3+64*x^2+128*x+64)/((16*x^2
+32*x+16)*exp(5/4)^2+(-8*x^4-8*x^3+128*x^2+256*x+128)*exp(5/4)+x^6-32*x^4-
32*x^3+256*x^2+512*x+256),x, algorithm=\
```

output
```
-4*(x^2 + x)/(x^3 - 4*(x + 1)*e^(5/4) - 16*x - 16)
```

3.932.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 134 vs. $2(15) = 30$.

Time = 2.38 (sec) , antiderivative size = 134, normalized size of antiderivative = 5.36

$$\int \frac{64 + 128x + 64x^2 + 8x^3 + 4x^4 + e^{5/4}(16 + 32x + 16x^2)}{256 + 512x + 256x^2 - 32x^3 - 32x^4 + x^6 + e^{5/2}(16 + 32x + 16x^2) + e^{5/4}(128 + 256x + 128x^2 - 8x^3 - 8$$

input
```
integrate(((16*x**2+32*x+16)*exp(5/4)+4*x**4+8*x**3+64*x**2+128*x+64)/((16
*x**2+32*x+16)*exp(5/4)**2+(-8*x**4-8*x**3+128*x**2+256*x+128)*exp(5/4)+x*
*6-32*x**4-32*x**3+256*x**2+512*x+256),x)
```

output
```
(x**2*(-660*exp(5/2) - 2208*exp(5/4) - 64*exp(15/4) - 2368) + x*(-660*exp(
5/2) - 2208*exp(5/4) - 64*exp(15/4) - 2368))/(x**3*(592 + 16*exp(15/4) + 5
52*exp(5/4) + 165*exp(5/2)) + x*(-4848*exp(5/2) - 11200*exp(5/4) - 916*exp
(15/4) - 64*exp(5) - 9472) - 4848*exp(5/2) - 11200*exp(5/4) - 916*exp(15/4
) - 64*exp(5) - 9472)
```

3.932.7 Maxima [F]

$$\int \frac{64 + 128x + 64x^2 + 8x^3 + 4x^4 + e^{5/4}(16 + 32x + 16x^2)}{256 + 512x + 256x^2 - 32x^3 - 32x^4 + x^6 + e^{5/2}(16 + 32x + 16x^2) + e^{5/4}(128 + 256x + 128x^2 - 8x^3 - 8$$

input
```
integrate(((16*x^2+32*x+16)*exp(5/4)+4*x^4+8*x^3+64*x^2+128*x+64)/((16*x^2
+32*x+16)*exp(5/4)^2+(-8*x^4-8*x^3+128*x^2+256*x+128)*exp(5/4)+x^6-32*x^4-
32*x^3+256*x^2+512*x+256),x, algorithm=\
```

output
```
4*integrate((x^4 + 2*x^3 + 16*x^2 + 4*(x^2 + 2*x + 1)*e^(5/4) + 32*x + 16)
/(x^6 - 32*x^4 - 32*x^3 + 256*x^2 + 16*(x^2 + 2*x + 1)*e^(5/2) - 8*(x^4 +
x^3 - 16*x^2 - 32*x - 16)*e^(5/4) + 512*x + 256), x)
```

3.932.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{64+128x+64x^2+8x^3+4x^4+e^{5/4}(16+32x+16x^2)}{256+512x+256x^2-32x^3-32x^4+x^6+e^{5/2}(16+32x+16x^2)+e^{5/4}(128+256x+128x^2-8x^3-8$$

$$-\frac{4\left(x^2+x\right)}{x^3-4\,xe^{\frac{5}{4}}-16\,x-4\,e^{\frac{5}{4}}-16}$$

input
```
integrate(((16*x^2+32*x+16)*exp(5/4)+4*x^4+8*x^3+64*x^2+128*x+64)/((16*x^2
+32*x+16)*exp(5/4)^2+(-8*x^4-8*x^3+128*x^2+256*x+128)*exp(5/4)+x^6-32*x^4-
32*x^3+256*x^2+512*x+256),x, algorithm=\
```

output
```
-4*(x^2 + x)/(x^3 - 4*x*e^(5/4) - 16*x - 4*e^(5/4) - 16)
```

3.932.9 Mupad [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{64+128x+64x^2+8x^3+4x^4+e^{5/4}(16+32x+16x^2)}{256+512x+256x^2-32x^3-32x^4+x^6+e^{5/2}(16+32x+16x^2)+e^{5/4}(128+256x+128x^2-8x^3-8$$

input
```
int((128*x + exp(5/4)*(32*x + 16*x^2 + 16) + 64*x^2 + 8*x^3 + 4*x^4 + 64)/
(512*x + exp(5/2)*(32*x + 16*x^2 + 16) + exp(5/4)*(256*x + 128*x^2 - 8*x^3
 - 8*x^4 + 128) + 256*x^2 - 32*x^3 - 32*x^4 + x^6 + 256),x)
```

output
```
(4*x*(x + 1))/(4*exp(5/4) - x^3 + x*(4*exp(5/4) + 16) + 16)
```

3.933 $\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}(-1-2x^2-4x^3-2x^5)+e^{x+x^2}(x^2+2x^5+x^8)\right)}{x^2+2x^5+x^8}\,dx$

3.933.1 Optimal result

Integrand size = 82, antiderivative size = 28

$$\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}(-1-2x^2-4x^3-2x^5)+e^{x+x^2}(x^2+2x^5+x^8)\right)}{x^2+2x^5+x^8}\,dx=-e^4+e^x+e^{\frac{e^{3-x^2}}{x+x^4}}$$

output
```
exp(x)+exp(exp(3)/(x^4+x)/exp(x^2))-exp(4)
```

3.933.2 Mathematica [A] (verified)

Time = 2.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}(-1-2x^2-4x^3-2x^5)+e^{x+x^2}(x^2+2x^5+x^8)\right)}{x^2+2x^5+x^8}\,dx=e^x+e^{\frac{e^{3-x^2}}{x(1+x^3)}}$$

input
```
Integrate[(E^(3 + E^(3 - x^2)/(x + x^4))*(-1 - 2*x^2 - 4*x^3 - 2*x^5) + E^
(x + x^2)*(x^2 + 2*x^5 + x^8))/(E^x^2*(x^2 + 2*x^5 + x^8)),x]
```

output
```
E^x + E^(E^(3 - x^2)/(x*(1 + x^3)))
```

3.933.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x^2}\left(e^{x^2+x}\left(x^8+2x^5+x^2\right)+e^{\frac{e^{3-x^2}}{x^4+x}+3}\left(-2x^5-4x^3-2x^2-1\right)\right)}{x^8+2x^5+x^2}dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{e^{-x^2}\left(e^{x^2+x}\left(x^8+2x^5+x^2\right)+e^{\frac{e^{3-x^2}}{x^4+x}+3}\left(-2x^5-4x^3-2x^2-1\right)\right)}{x^2\left(x^6+2x^3+1\right)}dx$$

$$\Big\downarrow \ 1380$$

$$\int -\frac{e^{-x^2}\left(e^{\frac{e^{3-x^2}}{x^4+x}+3}\left(2x^5+4x^3+2x^2+1\right)-e^{x^2+x}\left(x^8+2x^5+x^2\right)\right)}{x^2\left(x^3+1\right)^2}dx$$

$$\Big\downarrow \ 25$$

$$-\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x^4+x}}\left(2x^5+4x^3+2x^2+1\right)-e^{x^2+x}\left(x^8+2x^5+x^2\right)\right)}{x^2\left(x^3+1\right)^2}dx$$

$$\Big\downarrow \ 7293$$

$$-\int \left(\frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}\left(2x^5+4x^3+2x^2+1\right)}{x^2\left(x^3+1\right)^2}-e^x\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{4}{3}\int \frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}}{\left(-2x+i\sqrt{3}+1\right)^2}dx-\frac{4i\int \frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}}{-2x+i\sqrt{3}+1}dx}{3\sqrt{3}}-\int \frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}}{x^2}dx+\frac{1}{3}\int \frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}}{(x+1)^2}dx-\frac{2}{3}\int \frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}}{x+1}dx+\frac{2}{9}\left(3+i\sqrt{3}\right)\int \frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}}{2x-i\sqrt{3}-1}dx+\frac{4}{3}\int \frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}}{\left(2x+i\sqrt{3}-1\right)^2}dx+\frac{2}{9}\left(3-i\sqrt{3}\right)\int \frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}}{2x+i\sqrt{3}-1}dx-\frac{4i\int \frac{e^{-x^2+\frac{e^{3-x^2}}{x^4+x}+3}}{2x+i\sqrt{3}-1}dx}{3\sqrt{3}}+e^x$$

3.933. $\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}\left(-1-2x^2-4x^3-2x^5\right)+e^{x+x^2}\left(x^2+2x^5+x^8\right)\right)}{x^2+2x^5+x^8}dx$

input
```
Int[(E^(3 + E^(3 - x^2)/(x + x^4))*(-1 - 2*x^2 - 4*x^3 - 2*x^5) + E^(x + x
^2)*(x^2 + 2*x^5 + x^8))/(E^x^2*(x^2 + 2*x^5 + x^8)),x]
```

output
```
$Aborted
```

3.933.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.933.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$e^{x}+e^{\frac{e^{-x^{2}+3}}{x(1+x)\left(x^{2}-x+1\right)}}$$

input
```
int(((-2*x^5-4*x^3-2*x^2-1)*exp(3)*exp(exp(3)/(x^4+x)/exp(x^2))+(x^8+2*x^5
+x^2)*exp(x)*exp(x^2))/(x^8+2*x^5+x^2)/exp(x^2),x)
```

output
```
exp(x)+exp(exp(-x^2+3)/x/(1+x)/(x^2-x+1))
```

3.933. $\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}\left(-1-2x^2-4x^3-2x^5\right)+e^{x+x^2}\left(x^2+2x^5+x^8\right)\right)}{x^2+2x^5+x^8}\,dx$

3.933.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}(-1-2x^2-4x^3-2x^5)+e^{x+x^2}(x^2+2x^5+x^8)\right)}{x^2+2x^5+x^8}\,dx = \left(e^{(x+3)}+e^{\left(\frac{3\,x^4+3\,x+e^{\left(-x^2+3\right)}}{x^4+x}\right)}\right)e^{(-3)}$$

input
```
integrate(((-2*x^5-4*x^3-2*x^2-1)*exp(3)*exp(exp(3)/(x^4+x)/exp(x^2))+(x^8
+2*x^5+x^2)*exp(x)*exp(x^2))/(x^8+2*x^5+x^2)/exp(x^2),x, algorithm=\
```

output
```
(e^(x + 3) + e^((3*x^4 + 3*x + e^(-x^2 + 3))/(x^4 + x)))*e^(-3)
```

3.933.6 Sympy [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}(-1-2x^2-4x^3-2x^5)+e^{x+x^2}(x^2+2x^5+x^8)\right)}{x^2+2x^5+x^8}\,dx = e^x+e^{\frac{e^3e^{-x^2}}{x^4+x}}$$

input
```
integrate(((-2*x**5-4*x**3-2*x**2-1)*exp(3)*exp(exp(3)/(x**4+x)/exp(x**2))
+(x**8+2*x**5+x**2)*exp(x)*exp(x**2))/(x**8+2*x**5+x**2)/exp(x**2),x)
```

output
```
exp(x) + exp(exp(3)*exp(-x**2)/(x**4 + x))
```

3.933.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 91 vs. 2(24) = 48.

Time = 0.34 (sec) , antiderivative size = 91, normalized size of antiderivative = 3.25

$$\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}(-1-2x^2-4x^3-2x^5)+e^{x+x^2}(x^2+2x^5+x^8)\right)}{x^2+2x^5+x^8}\,dx = \left(e^{\left(x+\frac{e^{\left(-x^2+3\right)}}{3\,(x+1)}\right)}+e^{\left(-\frac{2\,xe^{\left(-x^2+3\right)}}{3\,(x^2-x+1)}+\frac{e^{\left(-x^2+3\right)}}{3\,(x^2-x+1)}+\frac{e^{\left(-x^2+3\right)}}{x}\right)}\right)e^{\left(-\frac{e^{\left(-x^2+3\right)}}{3\,(x+1)}\right)}$$

input
```
integrate(((-2*x^5-4*x^3-2*x^2-1)*exp(3)*exp(exp(3)/(x^4+x)/exp(x^2))+(x^8
+2*x^5+x^2)*exp(x)*exp(x^2))/(x^8+2*x^5+x^2)/exp(x^2),x, algorithm=\
```

output
```
(e^(x + 1/3*e^(-x^2 + 3)/(x + 1)) + e^(-2/3*x*e^(-x^2 + 3)/(x^2 - x + 1) +
 1/3*e^(-x^2 + 3)/(x^2 - x + 1) + e^(-x^2 + 3)/x))*e^(-1/3*e^(-x^2 + 3)/(x
 + 1))
```

3.933.8 Giac [F]

$$\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}(-1-2x^2-4x^3-2x^5)+e^{x+x^2}(x^2+2x^5+x^8)\right)}{x^2+2x^5+x^8}\,dx$$
$$=\int \frac{\left((x^8+2\,x^5+x^2)e^{(x^2+x)}-(2\,x^5+4\,x^3+2\,x^2+1)e^{\left(\frac{e^{(-x^2+3)}}{x^4+x}+3\right)}\right)e^{(-x^2)}}{x^8+2\,x^5+x^2}\,dx$$

input
```
integrate(((-2*x^5-4*x^3-2*x^2-1)*exp(3)*exp(exp(3)/(x^4+x)/exp(x^2))+(x^8
+2*x^5+x^2)*exp(x)*exp(x^2))/(x^8+2*x^5+x^2)/exp(x^2),x, algorithm=\
```

output
```
integrate(((x^8 + 2*x^5 + x^2)*e^(x^2 + x) - (2*x^5 + 4*x^3 + 2*x^2 + 1)*e
^(e^(-x^2 + 3)/(x^4 + x) + 3))*e^(-x^2)/(x^8 + 2*x^5 + x^2), x)
```

3.933.9 Mupad [B] (verification not implemented)

Time = 15.72 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{e^{-x^2}\left(e^{3+\frac{e^{3-x^2}}{x+x^4}}(-1-2x^2-4x^3-2x^5)+e^{x+x^2}(x^2+2x^5+x^8)\right)}{x^2+2x^5+x^8}\,dx = \mathrm{e}^{\frac{\mathrm{e}^3\,\mathrm{e}^{-x^2}}{x^4+x}}+\mathrm{e}^x$$

input
```
int(-(exp(-x^2)*(exp(3)*exp((exp(3)*exp(-x^2))/(x + x^4))*(2*x^2 + 4*x^3 +
 2*x^5 + 1) - exp(x^2)*exp(x)*(x^2 + 2*x^5 + x^8)))/(x^2 + 2*x^5 + x^8),x)
```

output
```
exp((exp(3)*exp(-x^2))/(x + x^4)) + exp(x)
```

3.934 $\int \frac{e^{\frac{1}{16}\left(80+x^2\right)}\left(-32x+8x^2\right)\log(x)+\left(e^{\frac{1}{16}\left(80+x^2\right)}\left(-32+40x-8x^2\right)\log(-\right.}{(-5x+5x^2}$

3.934.1 Optimal result

Integrand size = 114, antiderivative size = 27

$$\int \frac{e^{\frac{1}{16}(80+x^2)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}(-8x+12x^2-5\right.}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$
$$=\frac{8e^{5+\frac{x^2}{16}}(-4+x)\log(\log(-1+x))}{5\log(x)}$$

output
```
8/5*ln(ln(-1+x))*exp(1/16*x^2+5)/ln(x)*(x-4)
```

3.934.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{1}{16}(80+x^2)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}(-8x+12x^2-5\right.}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$
$$=\frac{8e^{5+\frac{x^2}{16}}(-4+x)\log(\log(-1+x))}{5\log(x)}$$

3.934.
$$\int \frac{e^{\frac{1}{16}\left(80+x^2\right)}\left(-32x+8x^2\right)\log(x)+\left(e^{\frac{1}{16}\left(80+x^2\right)}\left(-32+40x-8x^2\right)\log(-1+x)+e^{\frac{1}{16}\left(80+x^2\right)}\left(-8x+12x^2-5x^3+x^4\right)\log(-1+x)\log(x)\right)\log(\log(-1-\right.}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$

input
```
Integrate[(E^((80 + x^2)/16)*(-32*x + 8*x^2)*Log[x] + (E^((80 + x^2)/16)*(
-32 + 40*x - 8*x^2)*Log[-1 + x] + E^((80 + x^2)/16)*(-8*x + 12*x^2 - 5*x^3
 + x^4)*Log[-1 + x]*Log[x])*Log[Log[-1 + x]])/((-5*x + 5*x^2)*Log[-1 + x]*
Log[x]^2),x]
```

output
```
(8*E^(5 + x^2/16)*(-4 + x)*Log[Log[-1 + x]])/(5*Log[x])
```

3.934.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{1}{16}(x^2+80)}\left(8x^2-32x\right)\log(x)+\left(e^{\frac{1}{16}(x^2+80)}\left(-8x^2+40x-32\right)\log(x-1)+e^{\frac{1}{16}(x^2+80)}\left(x^4-5x^3+12x^2-8x\right)\right.}{\left(5x^2-5x\right)\log(x-1)\log^2(x)}$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{e^{\frac{1}{16}(x^2+80)}\left(8x^2-32x\right)\log(x)+\left(e^{\frac{1}{16}(x^2+80)}\left(-8x^2+40x-32\right)\log(x-1)+e^{\frac{1}{16}(x^2+80)}\left(x^4-5x^3+12x^2-8x\right)\right.}{x(5x-5)\log(x-1)\log^2(x)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{e^{\frac{x^2}{16}+5}\left(x^4\log(x-1)\log(x)\log(\log(x-1))-5x^3\log(x-1)\log(x)\log(\log(x-1))+8x^2\log(x)-8x^2\log(x-\right.}{}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{8}{5}\int \frac{e^{\frac{x^2}{16}+5}\log(\log(x-1))}{\log^2(x)}dx+\frac{32}{5}\int \frac{e^{\frac{x^2}{16}+5}\log(\log(x-1))}{x\log^2(x)}dx+\frac{8}{5}\int \frac{e^{\frac{x^2}{16}+5}}{\log(x-1)\log(x)}dx-\frac{24}{5}\int \frac{e^{\frac{x^2}{16}+5}}{(x-1)\log(x-1)\log(x)}dx+\frac{8}{5}\int \frac{e^{\frac{x^2}{16}+5}\log(\log(x-1))}{\log(x)}dx-\frac{4}{5}\int \frac{e^{\frac{x^2}{16}+5}x\log(\log(x-1))}{\log(x)}dx+\frac{1}{5}\int \frac{e^{\frac{x^2}{16}+5}x^2\log(\log(x-1))}{\log(x)}dx$$

input
```
Int[(E^((80 + x^2)/16)*(-32*x + 8*x^2)*Log[x] + (E^((80 + x^2)/16)*(-32 +
40*x - 8*x^2)*Log[-1 + x] + E^((80 + x^2)/16)*(-8*x + 12*x^2 - 5*x^3 + x^4
)*Log[-1 + x]*Log[x])*Log[Log[-1 + x]])/((-5*x + 5*x^2)*Log[-1 + x]*Log[x]
^2),x]
```

3.934.

$$\int \frac{e^{\frac{1}{16}(80+x^2)}\left(-32x+8x^2\right)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}\left(-32+40x-8x^2\right)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}\left(-8x+12x^2-5x^3+x^4\right)\log(-1+x)\log(x)\right)\log(\log(-1-\right.}{\left(-5x+5x^2\right)\log(-1+x)\log^2(x)}$$

output
```
$Aborted
```

3.934.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.934.4 Maple [A] (verified)

Time = 47.99 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

method	result	size
risch	$\frac{8 \ln(\ln(-1+x)) e^{\frac{x^2}{16}+5} (x-4)}{5 \ln(x)}$	23
parallelrisch	$\frac{16\, e^{\frac{x^2}{16}+5} x \ln(\ln(-1+x)) - 64\, e^{\frac{x^2}{16}+5} \ln(\ln(-1+x))}{10 \ln(x)}$	39

input
```
int((((x^4-5*x^3+12*x^2-8*x)*exp(1/16*x^2+5)*ln(-1+x)*ln(x)+(-8*x^2+40*x-3
2)*exp(1/16*x^2+5)*ln(-1+x))*ln(ln(-1+x))+(8*x^2-32*x)*exp(1/16*x^2+5)*ln(
x))/(5*x^2-5*x)/ln(-1+x)/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
8/5*ln(ln(-1+x))*exp(1/16*x^2+5)/ln(x)*(x-4)
```

3.934.

$$\int \frac{e^{\frac{1}{16}(80+x^2)} (-32x+8x^2) \log(x)+\left(e^{\frac{1}{16}(80+x^2)} (-32+40x-8x^2) \log(-1+x)+e^{\frac{1}{16}(80+x^2)} (-8x+12x^2-5x^3+x^4) \log(-1+x) \log(x)\right) \log(\log(-1+x))}{(-5x+5x^2) \log(-1+x) \log^2(x)}$$

3.934.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{e^{\frac{1}{16}(80+x^2)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}(-8x+12x^2-5\right.}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$

$$= \frac{8\,(x-4)e^{\left(\frac{1}{16}\,x^2+5\right)}\log\left(\log\left(x-1\right)\right)}{5\,\log\left(x\right)}$$

input
```
integrate(((((x^4-5*x^3+12*x^2-8*x)*exp(1/16*x^2+5)*log(-1+x)*log(x)+(-8*x^
2+40*x-32)*exp(1/16*x^2+5)*log(-1+x))*log(log(-1+x))+(8*x^2-32*x)*exp(1/16
*x^2+5)*log(x))/(5*x^2-5*x)/log(-1+x)/log(x)^2,x, algorithm=\
```

output
```
8/5*(x - 4)*e^(1/16*x^2 + 5)*log(log(x - 1))/log(x)
```

3.934.6 Sympy [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{e^{\frac{1}{16}(80+x^2)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}(-8x+12x^2-5\right.}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$

$$= \frac{\left(8x\log\left(\log\left(x-1\right)\right)-32\log\left(\log\left(x-1\right)\right)\right)e^{\frac{x^2}{16}+5}}{5\log\left(x\right)}$$

input
```
integrate(((((x**4-5*x**3+12*x**2-8*x)*exp(1/16*x**2+5)*ln(-1+x)*ln(x)+(-8*
x**2+40*x-32)*exp(1/16*x**2+5)*ln(-1+x))*ln(ln(-1+x))+(8*x**2-32*x)*exp(1/
16*x**2+5)*ln(x))/(5*x**2-5*x)/ln(-1+x)/ln(x)**2,x)
```

output
```
(8*x*log(log(x - 1)) - 32*log(log(x - 1)))*exp(x**2/16 + 5)/(5*log(x))
```

3.934.

$$\int \frac{e^{\frac{1}{16}\left(80+x^2\right)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}\left(80+x^2\right)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}\left(80+x^2\right)}(-8x+12x^2-5x^3+x^4)\log(-1+x)\log(x)\right)\log(\log(-1-}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$

3.934.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{1}{16}(80+x^2)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}(-8x+12x^2-5\ldots\right.}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$

$$=\frac{8\,(xe^5-4\,e^5)e^{\left(\frac{1}{16}\,x^2\right)}\log\left(\log\left(x-1\right)\right)}{5\,\log\left(x\right)}$$

input
```
integrate((((x^4-5*x^3+12*x^2-8*x)*exp(1/16*x^2+5)*log(-1+x)*log(x)+(-8*x^
2+40*x-32)*exp(1/16*x^2+5)*log(-1+x))*log(log(-1+x))+(8*x^2-32*x)*exp(1/16
*x^2+5)*log(x))/(5*x^2-5*x)/log(-1+x)/log(x)^2,x, algorithm=\
```

output
```
8/5*(x*e^5 - 4*e^5)*e^(1/16*x^2)*log(log(x - 1))/log(x)
```

3.934.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{e^{\frac{1}{16}(80+x^2)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}(-8x+12x^2-5\ldots\right.}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$

$$=\frac{8\left(xe^{\left(\frac{1}{16}\,x^2+5\right)}\log\left(\log\left(x-1\right)\right)-4\,e^{\left(\frac{1}{16}\,x^2+5\right)}\log\left(\log\left(x-1\right)\right)\right)}{5\,\log\left(x\right)}$$

input
```
integrate((((x^4-5*x^3+12*x^2-8*x)*exp(1/16*x^2+5)*log(-1+x)*log(x)+(-8*x^
2+40*x-32)*exp(1/16*x^2+5)*log(-1+x))*log(log(-1+x))+(8*x^2-32*x)*exp(1/16
*x^2+5)*log(x))/(5*x^2-5*x)/log(-1+x)/log(x)^2,x, algorithm=\
```

output
```
8/5*(x*e^(1/16*x^2 + 5)*log(log(x - 1)) - 4*e^(1/16*x^2 + 5)*log(log(x - 1
)))/log(x)
```

3.934.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{\frac{1}{16}(80+x^2)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}(-8x+12x^2-5}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$

$$=\int \frac{\ln(\ln(x-1))\left(\ln(x-1)\,\mathrm{e}^{\frac{x^2}{16}+5}(8x^2-40x+32)+\ln(x-1)\,\mathrm{e}^{\frac{x^2}{16}+5}\ln(x)\,(-x^4+5x^3-12x^2+8x}{\ln(x-1)\,\ln(x)^2\,(5x-5x^2)}$$

input
```
int((log(log(x - 1))*(log(x - 1)*exp(x^2/16 + 5)*(8*x^2 - 40*x + 32) + log
(x - 1)*exp(x^2/16 + 5)*log(x)*(8*x - 12*x^2 + 5*x^3 - x^4)) + exp(x^2/16
+ 5)*log(x)*(32*x - 8*x^2))/(log(x - 1)*log(x)^2*(5*x - 5*x^2)),x)
```

output
```
int((log(log(x - 1))*(log(x - 1)*exp(x^2/16 + 5)*(8*x^2 - 40*x + 32) + log
(x - 1)*exp(x^2/16 + 5)*log(x)*(8*x - 12*x^2 + 5*x^3 - x^4)) + exp(x^2/16
+ 5)*log(x)*(32*x - 8*x^2))/(log(x - 1)*log(x)^2*(5*x - 5*x^2)), x)
```

3.934.

$$\int \frac{e^{\frac{1}{16}(80+x^2)}(-32x+8x^2)\log(x)+\left(e^{\frac{1}{16}(80+x^2)}(-32+40x-8x^2)\log(-1+x)+e^{\frac{1}{16}(80+x^2)}(-8x+12x^2-5x^3+x^4)\log(-1+x)\log(x)\right)\log(\log(-1-}{(-5x+5x^2)\log(-1+x)\log^2(x)}$$

3.935 $\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}\left(-2-10x^5\right)+e^{e^{\frac{e^{-x^5}\left(1-2e\right.}{x}}}\right.}{x^2}$

3.935.1 Optimal result

Integrand size = 124, antiderivative size = 23

$$\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}\left(-2-10x^5\right)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}\left(8+40x^5\right)\right)}{x^2}\,dx = \left(4-e^{e^{-2+\frac{e^{-x^5}}{x}}}\right)^2$$

output
```
(4-exp(exp(-2+1/exp(x^5)/x)))^2
```

3.935.2 Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}\left(-2-10x^5\right)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}\left(8+40x^5\right)\right)}{x^2}\,dx = \left(-4+e^{e^{-2+\frac{e^{-x^5}}{x}}}\right)^2$$

3.935.

$$\frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)$$

input
```
Integrate[(E^(2*E^((1 - 2*E^x^5*x)/(E^x^5*x)) + (1 - 2*E^x^5*x)/(E^x^5*x))
*(-2 - 10*x^5) + E^(E^((1 - 2*E^x^5*x)/(E^x^5*x)) + (1 - 2*E^x^5*x)/(E^x^5
*x))*(8 + 40*x^5))/(E^x^5*x^2),x]
```

output
```
(-4 + E^E^(-2 + 1/(E^x^5*x)))^2
```

3.935.3 Rubi [A] (verified)

Time = 1.08 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.024$, Rules used = {7239, 27, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x^5}\left(\left(-10x^5-2\right)\exp\left(\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}+2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}\right)+\left(40x^5+8\right)\exp\left(\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}+e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}\right.\right.}{x^2}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2e^{-x^5+e^{\frac{e^{-x^5}}{x}-2}+\frac{e^{-x^5}}{x}-2}\left(4-e^{e^{\frac{e^{-x^5}}{x}-2}}\right)\left(5x^5+1\right)}{x^2}dx$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{e^{-x^5+e^{\frac{e^{-x^5}}{x}-2}-2+\frac{e^{-x^5}}{x}}\left(4-e^{e^{\frac{e^{-x^5}}{x}-2}}\right)\left(5x^5+1\right)}{x^2}dx$$

$$\Big\downarrow \text{7237}$$

$$\left(4-e^{e^{\frac{e^{-x^5}}{x}-2}}\right)^2$$

input
```
Int[(E^(2*E^((1 - 2*E^x^5*x)/(E^x^5*x)) + (1 - 2*E^x^5*x)/(E^x^5*x))*(-2 -
 10*x^5) + E^(E^((1 - 2*E^x^5*x)/(E^x^5*x)) + (1 - 2*E^x^5*x)/(E^x^5*x))*(
8 + 40*x^5))/(E^x^5*x^2),x]
```

3.935.

$$e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}\left(-2-10x^5\right)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}\left(8+40x^5\right)\right)$$

output
```
(4 - E^E^(-2 + 1/(E^x^5*x)))^2
```

3.935.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.935.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(20) = 40$.

Time = 1.45 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.17

method	result	size
risch	$e^{2 e^{-\frac{\left(2x e^{x^5}-1\right) e^{-x^5}}{x}}}-8 e^{e^{-\frac{\left(2x e^{x^5}-1\right) e^{-x^5}}{x}}}$	50
parallelrisch	$e^{2 e^{-\frac{\left(2x e^{x^5}-1\right) e^{-x^5}}{x}}}-8 e^{e^{-\frac{\left(2x e^{x^5}-1\right) e^{-x^5}}{x}}}$	50

input
```
int(((-10*x^5-2)*exp((-2*x*exp(x^5)+1)/x/exp(x^5))*exp(exp((-2*x*exp(x^5)+
1)/x/exp(x^5)))^2+(40*x^5+8)*exp((-2*x*exp(x^5)+1)/x/exp(x^5))*exp(exp((-2
*x*exp(x^5)+1)/x/exp(x^5))))/x^2/exp(x^5),x,method=_RETURNVERBOSE)
```

output
```
exp(2*exp(-(2*x*exp(x^5)-1)*exp(-x^5)/x))-8*exp(exp(-(2*x*exp(x^5)-1)*exp(
-x^5)/x))
```

3.935.

$$e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)$$

3.935.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. $2(18) = 36$.

Time = 0.27 (sec) , antiderivative size = 141, normalized size of antiderivative = 6.13

$$\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)}{x^2}\,dx$$

$$= \left(e^{\left(\frac{2\left(xe^{\left(x^5-\frac{\left(2xe^{(x^5)}-1\right)e^{(-x^5)}}{x}\right)}-2xe^{(x^5)}+1\right)e^{(-x^5)}}{x}\right)} - 8e^{\left(\frac{\left(xe^{\left(x^5-\frac{\left(2xe^{(x^5)}-1\right)e^{(-x^5)}}{x}\right)}-2xe^{(x^5)}+1\right)e^{(-x^5)}}{x}-\frac{\left(2xe^{(x^5)}-1\right.}{x}\right.}$$

input
```
integrate(((-10*x^5-2)*exp((-2*x*exp(x^5)+1)/x/exp(x^5))*exp(exp((-2*x*exp
(x^5)+1)/x/exp(x^5)))^2+(40*x^5+8)*exp((-2*x*exp(x^5)+1)/x/exp(x^5))*exp(e
xp((-2*x*exp(x^5)+1)/x/exp(x^5))))/x^2/exp(x^5),x, algorithm=\
```

output
```
(e^(2*(x*e^(x^5 - (2*x*e^(x^5) - 1)*e^(-x^5)/x) - 2*x*e^(x^5) + 1)*e^(-x^5
)/x) - 8*e^((x*e^(x^5 - (2*x*e^(x^5) - 1)*e^(-x^5)/x) - 2*x*e^(x^5) + 1)*e
^(-x^5)/x - (2*x*e^(x^5) - 1)*e^(-x^5)/x))*e^(2*(2*x*e^(x^5) - 1)*e^(-x^5)
/x)
```


$$\frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)}{}$$

3.935.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. 2(15) = 30.

Time = 0.39 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)}{x^2}\,dx$$
$$= e^{2e^{\frac{\left(-2xe^{x^5}+1\right)e^{-x^5}}{x}}} - 8e^{e^{\frac{\left(-2xe^{x^5}+1\right)e^{-x^5}}{x}}}$$

input
```
integrate(((-10*x**5-2)*exp((-2*x*exp(x**5)+1)/x/exp(x**5))*exp(exp((-2*x*
exp(x**5)+1)/x/exp(x**5)))**2+(40*x**5+8)*exp((-2*x*exp(x**5)+1)/x/exp(x**
5))*exp(exp((-2*x*exp(x**5)+1)/x/exp(x**5))))/x**2/exp(x**5),x)
```

output
```
exp(2*exp((-2*x*exp(x**5) + 1)*exp(-x**5)/x)) - 8*exp(exp((-2*x*exp(x**5)
+ 1)*exp(-x**5)/x))
```

3.935.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

$$\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)}{x^2}\,dx$$
$$= e^{\left(2\,e^{\left(\frac{e^{\left(-x^5\right)}}{x}-2\right)}\right)} - 8\,e^{\left(e^{\left(\frac{e^{\left(-x^5\right)}}{x}-2\right)}\right)}$$

input
```
integrate(((-10*x^5-2)*exp((-2*x*exp(x^5)+1)/x/exp(x^5))*exp(exp((-2*x*exp
(x^5)+1)/x/exp(x^5)))^2+(40*x^5+8)*exp((-2*x*exp(x^5)+1)/x/exp(x^5))*exp(e
xp((-2*x*exp(x^5)+1)/x/exp(x^5))))/x^2/exp(x^5),x, algorithm=\
```

output
```
e^(2*e^(e^(-x^5)/x - 2)) - 8*e^(e^(e^(-x^5)/x - 2))
```

3.935. $\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)}{x^2}$

3.935.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. $2(18) = 36$.

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.74

$$\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)}{x^2}\,dx$$
$$= \left(e^{\left(2e^{\left(\frac{e^{(-x^5)}}{x}-2\right)}+2\right)} - 8e^{\left(e^{\left(\frac{e^{(-x^5)}}{x}-2\right)}+2\right)}\right)e^{(-2)}$$

input
```
integrate(((-10*x^5-2)*exp((-2*x*exp(x^5)+1)/x/exp(x^5))*exp(exp((-2*x*exp
(x^5)+1)/x/exp(x^5)))^2+(40*x^5+8)*exp((-2*x*exp(x^5)+1)/x/exp(x^5))*exp(e
xp((-2*x*exp(x^5)+1)/x/exp(x^5))))/x^2/exp(x^5),x, algorithm=\
```

output
```
(e^(2*e^(e^(-x^5)/x - 2) + 2) - 8*e^(e^(e^(-x^5)/x - 2) + 2))*e^(-2)
```

3.935.9 Mupad [B] (verification not implemented)

Time = 16.31 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

$$\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)}{x^2}\,dx$$
$$= e^{e^{\frac{e^{-x^5}}{x}}\,e^{-2}}\left(e^{e^{\frac{e^{-x^5}}{x}}\,e^{-2}}-8\right)$$

input
```
int(-(exp(-x^5)*(exp(2*exp(-(exp(-x^5)*(2*x*exp(x^5) - 1))/x))*exp(-(exp(-
x^5)*(2*x*exp(x^5) - 1))/x)*(10*x^5 + 2) - exp(exp(-(exp(-x^5)*(2*x*exp(x^
5) - 1))/x))*exp(-(exp(-x^5)*(2*x*exp(x^5) - 1))/x)*(40*x^5 + 8)))/x^2,x)
```

output
```
exp(exp(exp(-x^5)/x)*exp(-2))*(exp(exp(exp(-x^5)/x)*exp(-2)) - 8)
```

3.935.

$$\int \frac{e^{-x^5}\left(e^{2e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(-2-10x^5)+e^{e^{\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}+\frac{e^{-x^5}\left(1-2e^{x^5}x\right)}{x}}(8+40x^5)\right)}{}$$

3.936 $\int \frac{(-5+10x-x^2-2x^3)\log(x)+(5-x^2)\log\left(\frac{5-x^2}{x}\right)}{-10x+2x^3}\,dx$

3.936.1 Optimal result

Integrand size = 51, antiderivative size = 29

$$\int \frac{(-5+10x-x^2-2x^3)\log(x)+(5-x^2)\log\left(\frac{5-x^2}{x}\right)}{-10x+2x^3}\,dx = -4+x-\log(x)+\left(1-x-\frac{1}{2}\log\left(\frac{5}{x}-x\right)\right)\log(x)$$

output
```
x-ln(x)-4+(1-x-1/2*ln(5/x-x))*ln(x)
```

3.936.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int \frac{(-5+10x-x^2-2x^3)\log(x)+(5-x^2)\log\left(\frac{5-x^2}{x}\right)}{-10x+2x^3}\,dx = \frac{1}{2}\left(2x-2x\log(x)-\log(x)\log\left(\frac{5-x^2}{x}\right)\right)$$

input
```
Integrate[((-5 + 10*x - x^2 - 2*x^3)*Log[x] + (5 - x^2)*Log[(5 - x^2)/x])/
(-10*x + 2*x^3),x]
```

output
```
(2*x - 2*x*Log[x] - Log[x]*Log[(5 - x^2)/x])/2
```

3.936.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$, Rules used = {2026, 7276, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(5-x^2)\log\left(\frac{5-x^2}{x}\right)+(-2x^3-x^2+10x-5)\log(x)}{2x^3-10x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(5-x^2)\log\left(\frac{5-x^2}{x}\right)+(-2x^3-x^2+10x-5)\log(x)}{x(2x^2-10)}dx$$

$$\Big\downarrow \text{7276}$$

$$\int \left(-\frac{\log\left(\frac{5-x^2}{x}\right)}{2x}-\frac{(2x^3+x^2-10x+5)\log(x)}{2x(x^2-5)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{1}{2}\log(x)\log\left(\frac{5-x^2}{x}\right)+x+x(-\log(x))$$

input
```
Int[((-5 + 10*x - x^2 - 2*x^3)*Log[x] + (5 - x^2)*Log[(5 - x^2)/x])/(-10*x
 + 2*x^3),x]
```

output
```
x - x*Log[x] - (Log[x]*Log[(5 - x^2)/x])/2
```

3.936.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.936.4 Maple [A] (verified)

Time = 0.90 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

method	result
parallelrisch	$-x\ln\left(x\right)-\frac{\ln(x)\ln\left(-\frac{x^2-5}{x}\right)}{2}+x$
default	$-\frac{\ln(x)\ln\left(\frac{-x^2+5}{x}\right)}{2}-x\ln\left(x\right)+x$
parts	$-\frac{\ln(x)\ln\left(\frac{-x^2+5}{x}\right)}{2}-x\ln\left(x\right)+x$
risch	$-\frac{\ln\left(x^2-5\right)\ln(x)}{2}+\frac{\ln(x)^2}{2}-x\ln\left(x\right)+x+\frac{i\ln(x)\pi\operatorname{csgn}\left(\frac{i\left(x^2-5\right)}{x}\right)^2}{2}-\frac{i\ln(x)\pi\ \operatorname{csgn}\left(i\left(x^2-5\right)\right)\operatorname{csgn}\left(\frac{i\left(x^2-5\right)}{x}\right)^2}{4}$

input
```
int(((-2*x^3-x^2+10*x-5)*ln(x)+(-x^2+5)*ln((-x^2+5)/x))/(2*x^3-10*x),x,met
hod=_RETURNVERBOSE)
```

output
```
-x*ln(x)-1/2*ln(x)*ln(-(x^2-5)/x)+x
```

3.936.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.72

$$\int \frac{(-5+10x-x^2-2x^3)\log(x)+(5-x^2)\log\left(\frac{5-x^2}{x}\right)}{-10x+2x^3}\,dx$$
$$=-\frac{1}{2}\left(2\,x+\log\left(-\frac{x^2-5}{x}\right)\right)\log\left(x\right)+x$$

input
```
integrate(((-2*x^3-x^2+10*x-5)*log(x)+(-x^2+5)*log((-x^2+5)/x))/(2*x^3-10*
x),x, algorithm=\
```

output
```
-1/2*(2*x + log(-(x^2 - 5)/x))*log(x) + x
```

3.936.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.66

$$\int \frac{(-5+10x-x^2-2x^3)\log(x)+(5-x^2)\log\left(\frac{5-x^2}{x}\right)}{-10x+2x^3}\,dx = -x\log(x)+x-\frac{\log(x)\log\left(\frac{5-x^2}{x}\right)}{2}$$

input
```
integrate(((-2*x**3-x**2+10*x-5)*ln(x)+(-x**2+5)*ln((-x**2+5)/x))/(2*x**3-
10*x),x)
```

output
```
-x*log(x) + x - log(x)*log((5 - x**2)/x)/2
```

3.936.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{(-5+10x-x^2-2x^3)\log(x)+(5-x^2)\log\left(\frac{5-x^2}{x}\right)}{-10x+2x^3}\,dx = -x\log(x)-\frac{1}{2}\log(-x^2+5)\log(x)+\frac{1}{2}\log(x)^2+x$$

input
```
integrate(((-2*x^3-x^2+10*x-5)*log(x)+(-x^2+5)*log((-x^2+5)/x))/(2*x^3-10*
x),x, algorithm=\
```

output
```
-x*log(x) - 1/2*log(-x^2 + 5)*log(x) + 1/2*log(x)^2 + x
```

3.936.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{(-5+10x-x^2-2x^3)\log(x)+(5-x^2)\log\left(\frac{5-x^2}{x}\right)}{-10x+2x^3}\,dx = -x\log(x)-\frac{1}{2}\log(-x^2+5)\log(x)+\frac{1}{2}\log(x)^2+x$$

input
```
integrate(((-2*x^3-x^2+10*x-5)*log(x)+(-x^2+5)*log((-x^2+5)/x))/(2*x^3-10*
x),x, algorithm=\
```

output
```
-x*log(x) - 1/2*log(-x^2 + 5)*log(x) + 1/2*log(x)^2 + x
```

3.936.9 Mupad [B] (verification not implemented)

Time = 16.42 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{(-5+10x-x^2-2x^3)\log(x)+(5-x^2)\log\left(\frac{5-x^2}{x}\right)}{-10x+2x^3}\,dx = x-\frac{\ln\left(-\frac{x^2-5}{x}\right)\,\ln(x)}{2}-x\,\ln(x)$$

input
```
int((log(-(x^2 - 5)/x)*(x^2 - 5) + log(x)*(x^2 - 10*x + 2*x^3 + 5))/(10*x
- 2*x^3),x)
```

output
```
x - (log(-(x^2 - 5)/x)*log(x))/2 - x*log(x)
```

3.937 $\int \frac{e^{6-x}(-12+e^5(-12-6x)-6x)}{x^3}\,dx$

3.937.1 Optimal result

Integrand size = 25, antiderivative size = 17

$$\int \frac{e^{6-x}(-12+e^5(-12-6x)-6x)}{x^3}\,dx = \frac{6e^{6-x}(1+e^5)}{x^2}$$

output
```
6/x^2*(exp(5)+1)*exp(6-x)
```

3.937.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{e^{6-x}(-12+e^5(-12-6x)-6x)}{x^3}\,dx = \frac{6e^{6-x}(1+e^5)}{x^2}$$

input
```
Integrate[(E^(6 - x)*(-12 + E^5*(-12 - 6*x) - 6*x))/x^3,x]
```

output
```
(6*E^(6 - x)*(1 + E^5))/x^2
```

3.937.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2092, 2627}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{6-x} \left(e^5 (-6 x-12)-6 x-12\right)}{x^3} \, dx$$

$$\Big\downarrow \text{2092}$$

$$\int \frac{e^{6-x} \left(-6 \left(1+e^5\right) x-12 \left(1+e^5\right)\right)}{x^3}dx$$

$$\Big\downarrow \text{2627}$$

$$\frac{6 \left(1+e^5\right) e^{6-x}}{x^2}$$

input
```
Int[(E^(6 - x)*(-12 + E^5*(-12 - 6*x) - 6*x))/x^3,x]
```

output
```
(6*E^(6 - x)*(1 + E^5))/x^2
```

3.937.3.1 Defintions of rubi rules used

rule 2092
```
Int[(Px_)*(u_)^(p_.)*(z_)^(q_.), x_Symbol] :> Int[Px*ExpandToSum[z, x]^q*Ex
pandToSum[u, x]^p, x] /; FreeQ[{p, q}, x] && BinomialQ[z, x] && BinomialQ[u
, x] &&  !(BinomialMatchQ[z, x] && BinomialMatchQ[u, x])
```

rule 2627
```
Int[(F_)^(v_)*((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_)), x_Symbol] :>
 Simp[g*(d + e*x)^(m + 1)*(F^v/(D[v, x]*e*Log[F])), x] /; FreeQ[{F, d, e, f
, g, m}, x] && LinearQ[v, x] && EqQ[e*g*(m + 1) - D[v, x]*(e*f - d*g)*Log[F
], 0]
```

3.937.4 Maple [A] (verified)

Time = 0.91 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

method	result
gosper	$\frac{6(\mathrm{e}^{5}+1)\mathrm{e}^{-x+6}}{x^{2}}$
risch	$\frac{6(\mathrm{e}^{5}+1)\mathrm{e}^{-x+6}}{x^{2}}$
norman	$\frac{(6\,\mathrm{e}^{5}+6)\mathrm{e}^{-x+6}}{x^{2}}$
parallelrisch	$\frac{6\,\mathrm{e}^{5}\mathrm{e}^{-x+6}+6\,\mathrm{e}^{-x+6}}{x^{2}}$
derivativedivides	$\frac{6\,\mathrm{e}^{-x+6}}{x^{2}}+48\,\mathrm{e}^{5}\left(\frac{\mathrm{e}^{-x+6}}{2x^{2}}-\frac{\mathrm{e}^{-x+6}}{2x}+\frac{\mathrm{e}^{6}\,\mathrm{Ei}_{1}(x)}{2}\right)-6\,\mathrm{e}^{5}\left(\frac{3\,\mathrm{e}^{-x+6}}{x^{2}}-\frac{4\,\mathrm{e}^{-x+6}}{x}+4\,\mathrm{e}^{6}\,\mathrm{Ei}_{1}\left(x\right)\right)$
default	$\frac{6\,\mathrm{e}^{-x+6}}{x^{2}}+48\,\mathrm{e}^{5}\left(\frac{\mathrm{e}^{-x+6}}{2x^{2}}-\frac{\mathrm{e}^{-x+6}}{2x}+\frac{\mathrm{e}^{6}\,\mathrm{Ei}_{1}(x)}{2}\right)-6\,\mathrm{e}^{5}\left(\frac{3\,\mathrm{e}^{-x+6}}{x^{2}}-\frac{4\,\mathrm{e}^{-x+6}}{x}+4\,\mathrm{e}^{6}\,\mathrm{Ei}_{1}\left(x\right)\right)$
meijerg	$\left(-6\,\mathrm{e}^{5}-6\right)\mathrm{e}^{6}\left(-\frac{1}{x}+1+\frac{2-2x}{2x}-\frac{\mathrm{e}^{-x}}{x}+\mathrm{Ei}_{1}\left(x\right)\right)-12\,\mathrm{e}^{11}\left(-\frac{1}{2x^{2}}+\frac{1}{x}-\frac{3}{4}+\frac{9x^{2}-12x+6}{12x^{2}}-\right.$

input
```
int(((-6*x-12)*exp(5)-6*x-12)*exp(-x+6)/x^3,x,method=_RETURNVERBOSE)
```

output
```
6/x^2*(exp(5)+1)*exp(-x+6)
```

3.937.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{e^{6-x}(-12+e^{5}(-12-6x)-6x)}{x^{3}}\,dx=\frac{6\left(e^{5}+1\right)e^{(-x+6)}}{x^{2}}$$

input
```
integrate(((-6*x-12)*exp(5)-6*x-12)*exp(-x+6)/x^3,x, algorithm=\
```

output
```
6*(e^5 + 1)*e^(-x + 6)/x^2
```

3.937.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{e^{6-x}(-12+e^5(-12-6x)-6x)}{x^3}\,dx = \frac{(6+6e^5)\,e^{6-x}}{x^2}$$

input
```
integrate(((-6*x-12)*exp(5)-6*x-12)*exp(-x+6)/x**3,x)
```

output
```
(6 + 6*exp(5))*exp(6 - x)/x**2
```

3.937.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.71

$$\int \frac{e^{6-x}(-12+e^5(-12-6x)-6x)}{x^3}\,dx = 6\,e^{11}\Gamma(-1,x)+6\,e^{6}\Gamma(-1,x) + 12\,e^{11}\Gamma(-2,x)+12\,e^{6}\Gamma(-2,x)$$

input
```
integrate(((-6*x-12)*exp(5)-6*x-12)*exp(-x+6)/x^3,x, algorithm=\
```

output
```
6*e^11*gamma(-1, x) + 6*e^6*gamma(-1, x) + 12*e^11*gamma(-2, x) + 12*e^6*g
amma(-2, x)
```

3.937.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.59

$$\int \frac{e^{6-x}(-12+e^5(-12-6x)-6x)}{x^3}\,dx = \frac{6\left(e^{(-x+11)}+e^{(-x+6)}\right)}{(x-6)^2+12\,x-36}$$

input
```
integrate(((-6*x-12)*exp(5)-6*x-12)*exp(-x+6)/x^3,x, algorithm=\
```

output
```
6*(e^(-x + 11) + e^(-x + 6))/((x - 6)^2 + 12*x - 36)
```

3.937.9 Mupad [B] (verification not implemented)

Time = 15.23 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{e^{6-x}(-12+e^5(-12-6x)-6x)}{x^3}\,dx = \frac{6\,\mathrm{e}^{6-x}\,(\mathrm{e}^5+1)}{x^2}$$

input
```
int(-(exp(6 - x)*(6*x + exp(5)*(6*x + 12) + 12))/x^3,x)
```

output
```
(6*exp(6 - x)*(exp(5) + 1))/x^2
```

3.938 $\int \frac{e^4x-e^5x+e^3\log(2e^{-2x})\log(x)+(-2e^2x+e^3x)\log^2(x)+x\log^4(x)}{2e^4x-4e^2x\log^2(x)+2x\log^4(x)}\,dx$

3.938.1 Optimal result

Integrand size = 76, antiderivative size = 34

$$\int \frac{e^4x-e^5x+e^3\log(2e^{-2x})\log(x)+(-2e^2x+e^3x)\log^2(x)+x\log^4(x)}{2e^4x-4e^2x\log^2(x)+2x\log^4(x)}\,dx = 2+\frac{1}{4}\left(2x+\frac{e^3\log(2e^{-2x})}{e^2-\log^2(x)}\right)$$

output
```
1/2*x+1/4*exp(3)*ln(2/exp(x)^2)/(exp(2)-ln(x)^2)+2
```

3.938.2 Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.97

$$\int \frac{e^4x-e^5x+e^3\log(2e^{-2x})\log(x)+(-2e^2x+e^3x)\log^2(x)+x\log^4(x)}{2e^4x-4e^2x\log^2(x)+2x\log^4(x)}\,dx = \frac{1}{2}\left(x+\frac{e^3\log(2e^{-2x})}{2(e^2-\log^2(x))}\right)$$

input
```
Integrate[(E^4*x - E^5*x + E^3*Log[2/E^(2*x)]*Log[x] + (-2*E^2*x + E^3*x)*
Log[x]^2 + x*Log[x]^4)/(2*E^4*x - 4*E^2*x*Log[x]^2 + 2*x*Log[x]^4),x]
```

output
```
(x + (E^3*Log[2/E^(2*x)])/(2*(E^2 - Log[x]^2)))/2
```

3.938.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^5x+e^4x+x\log^4(x)+\left(e^3x-2e^2x\right)\log^2(x)+e^3\log\left(2e^{-2x}\right)\log(x)}{2e^4x+2x\log^4(x)-4e^2x\log^2(x)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{\left(e^4-e^5\right)x+x\log^4(x)+\left(e^3x-2e^2x\right)\log^2(x)+e^3\log\left(2e^{-2x}\right)\log(x)}{2e^4x+2x\log^4(x)-4e^2x\log^2(x)}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{\left(e^4-e^5\right)x+x\log^4(x)+\left(e^3x-2e^2x\right)\log^2(x)+e^3\log\left(2e^{-2x}\right)\log(x)}{2x\left(e^2-\log^2(x)\right)^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2}\int \frac{x\log^4(x)-(2-e)e^2x\log^2(x)+e^3\log\left(2e^{-2x}\right)\log(x)+(1-e)e^4x}{x\left(e^2-\log^2(x)\right)^2}dx$$

$$\Big\downarrow \ 7293$$

$$\frac{1}{2}\int \left(\frac{e^2\log\left(2e^{-2x}\right)}{4x(e-\log(x))^2}-\frac{e^2\log\left(2e^{-2x}\right)}{4x(\log(x)+e)^2}-\frac{e^2}{2(e-\log(x))}-\frac{e^2}{2(\log(x)+e)}+1\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{2}\left(\frac{1}{4}e^2\int \frac{\log\left(2e^{-2x}\right)}{x(e-\log(x))^2}dx-\frac{1}{4}e^2\int \frac{\log\left(2e^{-2x}\right)}{x(\log(x)+e)^2}dx+\frac{1}{2}e^{2+e}\text{ExpIntegralEi}(\log(x)-e)-\frac{1}{2}e^{2-e}\text{ExpIntegralE}\right.$$

input
```
Int[(E^4*x - E^5*x + E^3*Log[2/E^(2*x)]*Log[x] + (-2*E^2*x + E^3*x)*Log[x]
^2 + x*Log[x]^4)/(2*E^4*x - 4*E^2*x*Log[x]^2 + 2*x*Log[x]^4),x]
```

output
```
$Aborted
```

3.938.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.938.4 Maple [A] (verified)

Time = 4.22 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.09

method	result
parallelrisch	$\frac{-2x\ln(x)^2+2\,\mathrm{e}^2x+\mathrm{e}^3\ln\left(2\,\mathrm{e}^{-2x}\right)}{4\,\mathrm{e}^2-4\ln(x)^2}$
risch	$-\frac{\mathrm{e}^3\ln(\mathrm{e}^x)}{2\left(\mathrm{e}^2-\ln(x)^2\right)}+\frac{-i\pi\,\mathrm{e}^3\,\mathrm{csgn}(i\mathrm{e}^x)^2\,\mathrm{csgn}\left(i\mathrm{e}^{2x}\right)+2i\pi\,\mathrm{e}^3\,\mathrm{csgn}(i\mathrm{e}^x)\,\mathrm{csgn}\left(i\mathrm{e}^{2x}\right)^2-i\pi\,\mathrm{e}^3\,\mathrm{csgn}\left(i\mathrm{e}^{2x}\right)^3-2\,\mathrm{e}^3\ln(2)-4\,\mathrm{e}^2x+4x\ln(x}{-8\,\mathrm{e}^2+8\ln(x)^2}$
default	$\frac{x}{2}-\frac{\mathrm{e}^2\mathrm{e}^{-1}\mathrm{e}^{\mathrm{e}}\,\mathrm{Ei}_1(-\ln(x)+\mathrm{e})}{8}+\frac{\mathrm{e}^2\mathrm{e}^{-1}\mathrm{e}^{-\mathrm{e}}\,\mathrm{Ei}_1(-\ln(x)-\mathrm{e})}{8}-\frac{\mathrm{e}^4\mathrm{e}^{-2}\mathrm{e}^{\mathrm{e}}\,\mathrm{Ei}_1(-\ln(x)+\mathrm{e})}{8}-\frac{\mathrm{e}^4\mathrm{e}^{-2}\mathrm{e}^{-\mathrm{e}}\,\mathrm{Ei}_1(-\ln(x)-\mathrm{e})}{8}+\frac{\mathrm{e}^3}{}$

input
```
int((exp(3)*ln(x)*ln(2/exp(x)^2)+x*ln(x)^4+(x*exp(3)-2*exp(2)*x)*ln(x)^2-x
*exp(2)*exp(3)+x*exp(2)^2)/(2*x*ln(x)^4-4*x*exp(2)*ln(x)^2+2*x*exp(2)^2),x
,method=_RETURNVERBOSE)
```

output
```
1/4*(-2*x*ln(x)^2+2*exp(2)*x+exp(3)*ln(2/exp(x)^2))/(exp(2)-ln(x)^2)
```

3.938.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.09

$$\int \frac{e^4x-e^5x+e^3\log\left(2e^{-2x}\right)\log(x)+\left(-2e^2x+e^3x\right)\log^2(x)+x\log^4(x)}{2e^4x-4e^2x\log^2(x)+2x\log^4(x)}\,dx$$
$$=\frac{2\,x\log\left(x\right)^2+2\,xe^3-2\,xe^2-e^3\log\left(2\right)}{4\left(\log\left(x\right)^2-e^2\right)}$$

input
```
integrate((exp(3)*log(x)*log(2/exp(x)^2)+x*log(x)^4+(x*exp(3)-2*exp(2)*x)*
log(x)^2-x*exp(2)*exp(3)+x*exp(2)^2)/(2*x*log(x)^4-4*x*exp(2)*log(x)^2+2*x
*exp(2)^2),x, algorithm=\
```

output
```
1/4*(2*x*log(x)^2 + 2*x*e^3 - 2*x*e^2 - e^3*log(2))/(log(x)^2 - e^2)
```

3.938.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \frac{e^4x-e^5x+e^3\log\left(2e^{-2x}\right)\log(x)+\left(-2e^2x+e^3x\right)\log^2(x)+x\log^4(x)}{2e^4x-4e^2x\log^2(x)+2x\log^4(x)}\,dx$$
$$=\frac{x}{2}+\frac{2xe^3-e^3\log\left(2\right)}{4\log\left(x\right)^2-4e^2}$$

input
```
integrate((exp(3)*ln(x)*ln(2/exp(x)**2)+x*ln(x)**4+(x*exp(3)-2*exp(2)*x)*l
n(x)**2-x*exp(2)*exp(3)+x*exp(2)**2)/(2*x*ln(x)**4-4*x*exp(2)*ln(x)**2+2*x
*exp(2)**2),x)
```

output
```
x/2 + (2*x*exp(3) - exp(3)*log(2))/(4*log(x)**2 - 4*exp(2))
```

3.938.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.09

$$\int \frac{e^4x-e^5x+e^3\log\left(2e^{-2x}\right)\log(x)+\left(-2e^2x+e^3x\right)\log^2(x)+x\log^4(x)}{2e^4x-4e^2x\log^2(x)+2x\log^4(x)}\,dx$$
$$=\frac{2\,x\log\left(x\right)^2+2\,x(e^3-e^2)-e^3\log\left(2\right)}{4\left(\log\left(x\right)^2-e^2\right)}$$

input
```
integrate((exp(3)*log(x)*log(2/exp(x)^2)+x*log(x)^4+(x*exp(3)-2*exp(2)*x)*
log(x)^2-x*exp(2)*exp(3)+x*exp(2)^2)/(2*x*log(x)^4-4*x*exp(2)*log(x)^2+2*x
*exp(2)^2),x, algorithm=\
```

output
```
1/4*(2*x*log(x)^2 + 2*x*(e^3 - e^2) - e^3*log(2))/(log(x)^2 - e^2)
```

3.938.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.09

$$\int \frac{e^4x-e^5x+e^3\log\left(2e^{-2x}\right)\log(x)+\left(-2e^2x+e^3x\right)\log^2(x)+x\log^4(x)}{2e^4x-4e^2x\log^2(x)+2x\log^4(x)}\,dx$$
$$=\frac{2\,x\log\left(x\right)^2+2\,xe^3-2\,xe^2-e^3\log\left(2\right)}{4\left(\log\left(x\right)^2-e^2\right)}$$

input
```
integrate((exp(3)*log(x)*log(2/exp(x)^2)+x*log(x)^4+(x*exp(3)-2*exp(2)*x)*
log(x)^2-x*exp(2)*exp(3)+x*exp(2)^2)/(2*x*log(x)^4-4*x*exp(2)*log(x)^2+2*x
*exp(2)^2),x, algorithm=\
```

output
```
1/4*(2*x*log(x)^2 + 2*x*e^3 - 2*x*e^2 - e^3*log(2))/(log(x)^2 - e^2)
```

3.938.9 Mupad [B] (verification not implemented)

Time = 15.37 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{e^4x-e^5x+e^3\log\left(2e^{-2x}\right)\log(x)+\left(-2e^2x+e^3x\right)\log^2(x)+x\log^4(x)}{2e^4x-4e^2x\log^2(x)+2x\log^4(x)}\,dx$$
$$=\frac{x}{2}-\frac{\mathrm{e}^3\,(2\,x-\ln(2))}{4\,\left(\mathrm{e}^2-\ln(x)^2\right)}$$

input
```
int((x*log(x)^4 + x*exp(4) - x*exp(5) - log(x)^2*(2*x*exp(2) - x*exp(3)) +
 log(2*exp(-2*x))*exp(3)*log(x))/(2*x*log(x)^4 + 2*x*exp(4) - 4*x*exp(2)*l
og(x)^2),x)
```

output
```
x/2 - (exp(3)*(2*x - log(2)))/(4*(exp(2) - log(x)^2))
```

3.939 $\int \frac{(-20x-20x^2-5x^3)\log(2x)+\log^{\frac{9}{2+x}}(2x)(216+108x-108x\log(2x)\log(\log(2x)))}{(48x+48x^2+12x^3)\log(2x)}$

3.939.1 Optimal result

Integrand size = 73, antiderivative size = 22

$$\int \frac{(-20x-20x^2-5x^3)\log(2x)+\log^{\frac{9}{2+x}}(2x)(216+108x-108x\log(2x)\log(\log(2x)))}{(48x+48x^2+12x^3)\log(2x)}\,dx = \frac{1}{12}(-4-5x)+\log^{\frac{9}{2+x}}(2x)$$

output
```
exp(9*ln(ln(2*x))/(2+x))-1/3-5/12*x
```

3.939.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{(-20x-20x^2-5x^3)\log(2x)+\log^{\frac{9}{2+x}}(2x)(216+108x-108x\log(2x)\log(\log(2x)))}{(48x+48x^2+12x^3)\log(2x)}\,dx = -\frac{5x}{12}+\log^{\frac{9}{2+x}}(2x)$$

input
```
Integrate[((-20*x - 20*x^2 - 5*x^3)*Log[2*x] + Log[2*x]^(9/(2 + x))*(216 +
 108*x - 108*x*Log[2*x]*Log[Log[2*x]]))/((48*x + 48*x^2 + 12*x^3)*Log[2*x]
),x]
```

output
```
(-5*x)/12 + Log[2*x]^(9/(2 + x))
```

3.939.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-5x^3-20x^2-20x)\log(2x)+(108x-108x\log(2x)\log(\log(2x))+216)\log^{\frac{9}{x+2}}(2x)}{(12x^3+48x^2+48x)\log(2x)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(-5x^3-20x^2-20x)\log(2x)+(108x-108x\log(2x)\log(\log(2x))+216)\log^{\frac{9}{x+2}}(2x)}{x(12x^2+48x+48)\log(2x)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{(-5x^3-20x^2-20x)\log(2x)+(108x-108x\log(2x)\log(\log(2x))+216)\log^{\frac{9}{x+2}}(2x)}{x\left(2\sqrt{3}x+4\sqrt{3}\right)^2\log(2x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{9\log^{\frac{7-x}{x+2}}(2x)(x+x(-\log(2x))\log(\log(2x))+2)}{x(x+2)^2}-\frac{5}{12}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{9}{2}\int \frac{\log^{\frac{7-x}{x+2}}(2x)}{x}dx-\frac{9}{2}\int \frac{\log^{\frac{7-x}{x+2}}(2x)}{x+2}dx-9\int \frac{\log^{\frac{9}{x+2}}(2x)\log(\log(2x))}{(x+2)^2}dx-\frac{5x}{12}$$

input
```
Int[((-20*x - 20*x^2 - 5*x^3)*Log[2*x] + Log[2*x]^(9/(2 + x))*(216 + 108*x
 - 108*x*Log[2*x]*Log[Log[2*x]]))/((48*x + 48*x^2 + 12*x^3)*Log[2*x]),x]
```

output
```
$Aborted
```

3.939.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.939.4 Maple [A] (verified)

Time = 2.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

method	result	size
risch	$-\frac{5x}{12}+\ln\left(2x\right)^{\frac{9}{2+x}}$	17
parallelrisch	$\frac{5}{24}-\frac{5x}{12}+{\mathrm e}^{\frac{9\ln\left(\ln\left(2x\right)\right)}{2+x}}$	19

input
```
int(((-108*x*ln(2*x)*ln(ln(2*x))+108*x+216)*exp(9*ln(ln(2*x))/(2+x))+(-5*x
^3-20*x^2-20*x)*ln(2*x))/(12*x^3+48*x^2+48*x)/ln(2*x),x,method=_RETURNVERB
OSE)
```

output
```
-5/12*x+ln(2*x)^(9/(2+x))
```

3.939.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{(-20x-20x^2-5x^3)\log(2x)+\log^{\frac{9}{2+x}}(2x)(216+108x-108x\log(2x)\log(\log(2x)))}{(48x+48x^2+12x^3)\log(2x)}\,dx$$
$$=-\frac{5}{12}\,x+\log\left(2\,x\right)^{\frac{9}{x+2}}$$

input
```
integrate(((-108*x*log(2*x)*log(log(2*x))+108*x+216)*exp(9*log(log(2*x))/(
2+x))+(-5*x^3-20*x^2-20*x)*log(2*x))/(12*x^3+48*x^2+48*x)/log(2*x),x, algo
rithm=\
```

output
```
-5/12*x + log(2*x)^(9/(x + 2))
```

3.939.6 Sympy [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{(-20x-20x^2-5x^3)\log(2x)+\log^{\frac{9}{2+x}}(2x)(216+108x-108x\log(2x)\log(\log(2x)))}{(48x+48x^2+12x^3)\log(2x)}\,dx$$
$$=-\frac{5x}{12}+e^{\frac{9\log(\log(2x))}{x+2}}$$

input
```
integrate(((-108*x*ln(2*x)*ln(ln(2*x))+108*x+216)*exp(9*ln(ln(2*x))/(2+x))
+(-5*x**3-20*x**2-20*x)*ln(2*x))/(12*x**3+48*x**2+48*x)/ln(2*x),x)
```

output
```
-5*x/12 + exp(9*log(log(2*x))/(x + 2))
```

3.939.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. $2(17) = 34$.

Time = 0.38 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

$$\int \frac{(-20x-20x^2-5x^3)\log(2x)+\log^{\frac{9}{2+x}}(2x)(216+108x-108x\log(2x)\log(\log(2x)))}{(48x+48x^2+12x^3)\log(2x)}\,dx$$
$$=(\log(2)+\log(x))^{\frac{9}{x+2}}-\frac{5(x^2+2x-4)}{12(x+2)}-\frac{5}{3(x+2)}$$

input
```
integrate(((-108*x*log(2*x)*log(log(2*x))+108*x+216)*exp(9*log(log(2*x))/(
2+x))+(-5*x^3-20*x^2-20*x)*log(2*x))/(12*x^3+48*x^2+48*x)/log(2*x),x, algo
rithm=\
```

output
```
(log(2) + log(x))^(9/(x + 2)) - 5/12*(x^2 + 2*x - 4)/(x + 2) - 5/3/(x + 2)
```

3.939.8 Giac [F]

$$\int \frac{(-20x-20x^2-5x^3)\log(2x)+\log^{\frac{9}{2+x}}(2x)(216+108x-108x\log(2x)\log(\log(2x)))}{(48x+48x^2+12x^3)\log(2x)}\,dx$$
$$=\int -\frac{108\,(x\log(2\,x)\log(\log(2\,x))-x-2)\log(2\,x)^{\frac{9}{x+2}}+5\,(x^3+4\,x^2+4\,x)\log(2\,x)}{12\,(x^3+4\,x^2+4\,x)\log(2\,x)}\,dx$$

input
```
integrate(((-108*x*log(2*x)*log(log(2*x))+108*x+216)*exp(9*log(log(2*x))/(
2+x))+(-5*x^3-20*x^2-20*x)*log(2*x))/(12*x^3+48*x^2+48*x)/log(2*x),x, algo
rithm=\
```

output
```
undef
```

3.939.9 Mupad [B] (verification not implemented)

Time = 15.70 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{(-20x-20x^2-5x^3)\log(2x)+\log^{\frac{9}{2+x}}(2x)(216+108x-108x\log(2x)\log(\log(2x)))}{(48x+48x^2+12x^3)\log(2x)}\,dx$$
$$=\ln(2\,x)^{\frac{9}{x+2}}-\frac{5\,x}{12}$$

input
```
int((exp((9*log(log(2*x)))/(x + 2))*(108*x - 108*x*log(2*x)*log(log(2*x))
+ 216) - log(2*x)*(20*x + 20*x^2 + 5*x^3))/(log(2*x)*(48*x + 48*x^2 + 12*x
^3)),x)
```

output
```
log(2*x)^(9/(x + 2)) - (5*x)/12
```

3.940 $\int \left(6-6x^2+e^{x^3}(2+6x^3)-8x\log(\log(5))-2\log^2($

3.940.1 Optimal result

Integrand size = 33, antiderivative size = 25

$$\int \left(6-6x^2+e^{x^3}\left(2+6x^3\right)-8x\log(\log(5))-2\log^2(\log(5))\right)\,dx = 1-\log(3)+2x\left(3+e^{x^3}-(x+\log(\log(5)))^2\right)$$

output
```
1+2*x*(3+exp(x^3)-(ln(ln(5))+x)^2)-ln(3)
```

3.940.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.09 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.80

$$\int \left(6-6x^2+e^{x^3}\left(2+6x^3\right)-8x\log(\log(5))-2\log^2(\log(5))\right)\,dx = -2x^3-\frac{2x\Gamma\left(\frac{1}{3},-x^3\right)}{3\sqrt[3]{-x^3}}-\frac{2\left(-x^3\right)^{2/3}\Gamma\left(\frac{4}{3},-x^3\right)}{x^2}-4x^2\log(\log(5))-2x\left(-3+\log^2(\log(5))\right)$$

input
```
Integrate[6 - 6*x^2 + E^x^3*(2 + 6*x^3) - 8*x*Log[Log[5]] - 2*Log[Log[5]]^
2,x]
```

output
```
-2*x^3 - (2*x*Gamma[1/3, -x^3])/(3*(-x^3)^(1/3)) - (2*(-x^3)^(2/3)*Gamma[4
/3, -x^3])/x^2 - 4*x^2*Log[Log[5]] - 2*x*(-3 + Log[Log[5]]^2)
```

3.940.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.22 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.88, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.030, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{x^3}(6x^3+2)-6x^2-8x\log(\log(5))+6-2\log^2(\log(5))\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-2x^3-\frac{2x\Gamma\left(\frac{1}{3},-x^3\right)}{3\sqrt[3]{-x^3}}-4x^2\log(\log(5))-\frac{2x^4\Gamma\left(\frac{4}{3},-x^3\right)}{(-x^3)^{4/3}}+2x\left(3-\log^2(\log(5))\right)$$

input
```
Int[6 - 6*x^2 + E^x^3*(2 + 6*x^3) - 8*x*Log[Log[5]] - 2*Log[Log[5]]^2,x]
```

output
```
-2*x^3 - (2*x*Gamma[1/3, -x^3])/(3*(-x^3)^(1/3)) - (2*x^4*Gamma[4/3, -x^3]
)/(-x^3)^(4/3) - 4*x^2*Log[Log[5]] + 2*x*(3 - Log[Log[5]]^2)
```

3.940.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.940.4 Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

method	result	size
default	$6x+2\,\mathrm{e}^{x^3}x-2x^3-2x\ln\left(\ln\left(5\right)\right)^2-4\ln\left(\ln\left(5\right)\right)x^2$	33
norman	$\left(-2\ln\left(\ln\left(5\right)\right)^2+6\right)x-2x^3+2\,\mathrm{e}^{x^3}x-4\ln\left(\ln\left(5\right)\right)x^2$	33
risch	$6x+2\,\mathrm{e}^{x^3}x-2x^3-2x\ln\left(\ln\left(5\right)\right)^2-4\ln\left(\ln\left(5\right)\right)x^2$	33
parallelrisch	$\left(-2\ln\left(\ln\left(5\right)\right)^2+6\right)x-2x^3+2\,\mathrm{e}^{x^3}x-4\ln\left(\ln\left(5\right)\right)x^2$	33
parts	$6x+2\,\mathrm{e}^{x^3}x-2x^3-2x\ln\left(\ln\left(5\right)\right)^2-4\ln\left(\ln\left(5\right)\right)x^2$	33

input
```
int(-2*ln(ln(5))^2-8*x*ln(ln(5))+(6*x^3+2)*exp(x^3)-6*x^2+6,x,method=_RETU
RNVERBOSE)
```

output
```
6*x+2*exp(x^3)*x-2*x^3-2*x*ln(ln(5))^2-4*ln(ln(5))*x^2
```

3.940.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \left(6-6x^2+e^{x^3}\left(2+6x^3\right)-8x\log(\log(5))-2\log^2(\log(5))\right)\,dx$$
$$= -2\,x^3-4\,x^2\log\left(\log\left(5\right)\right)-2\,x\log\left(\log\left(5\right)\right)^2+2\,xe^{\left(x^3\right)}+6\,x$$

input
```
integrate(-2*log(log(5))^2-8*x*log(log(5))+(6*x^3+2)*exp(x^3)-6*x^2+6,x, a
lgorithm=\
```

output
```
-2*x^3 - 4*x^2*log(log(5)) - 2*x*log(log(5))^2 + 2*x*e^(x^3) + 6*x
```

3.940.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

$$\int \left(6-6x^2+e^{x^3}\left(2+6x^3\right)-8x\log(\log(5))-2\log^2(\log(5))\right)\,dx$$
$$= -2x^3-4x^2\log\left(\log\left(5\right)\right)+2xe^{x^3}+x\left(6-2\log\left(\log\left(5\right)\right)^2\right)$$

input
```
integrate(-2*ln(ln(5))**2-8*x*ln(ln(5))+(6*x**3+2)*exp(x**3)-6*x**2+6,x)
```

output
```
-2*x**3 - 4*x**2*log(log(5)) + 2*x*exp(x**3) + x*(6 - 2*log(log(5))**2)
```

3.940.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \left(6-6x^2+e^{x^3}\left(2+6x^3\right)-8x\log(\log(5))-2\log^2(\log(5))\right)\,dx$$
$$=-2\,x^3-4\,x^2\log\left(\log\left(5\right)\right)-2\,x\log\left(\log\left(5\right)\right)^2+2\,xe^{\left(x^3\right)}+6\,x$$

input
```
integrate(-2*log(log(5))^2-8*x*log(log(5))+(6*x^3+2)*exp(x^3)-6*x^2+6,x, a
lgorithm=\
```

output
```
-2*x^3 - 4*x^2*log(log(5)) - 2*x*log(log(5))^2 + 2*x*e^(x^3) + 6*x
```

3.940.8 Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.72

$$\int \left(6-6x^2+e^{x^3}\left(2+6x^3\right)-8x\log(\log(5))-2\log^2(\log(5))\right)\,dx$$
$$=-2\,x^3-4\,x^2\log\left(\log\left(5\right)\right)-2\,x\log\left(\log\left(5\right)\right)^2+6\,x+2\,\gamma\left(\frac{4}{3},-x^3\right)-\frac{2}{3}\,\gamma\left(\frac{1}{3},-x^3\right)$$

input
```
integrate(-2*log(log(5))^2-8*x*log(log(5))+(6*x^3+2)*exp(x^3)-6*x^2+6,x, a
lgorithm=\
```

output
```
-2*x^3 - 4*x^2*log(log(5)) - 2*x*log(log(5))^2 + 6*x + 2*gamma_inc_lower(4
/3, -x^3) - 2/3*gamma_inc_lower(1/3, -x^3)
```

3.940.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \left(6-6x^2+e^{x^3}\left(2+6x^3\right)-8x\log(\log(5))-2\log^2(\log(5))\right)\,dx$$
$$=-2\,x\,\left({\ln\left(\ln\left(5\right)\right)}^2-{\mathrm{e}}^{x^3}+2\,x\,\ln\left(\ln\left(5\right)\right)+x^2-3\right)$$

input
```
int(exp(x^3)*(6*x^3 + 2) - 2*log(log(5))^2 - 8*x*log(log(5)) - 6*x^2 + 6,x
)
```

output
```
-2*x*(log(log(5))^2 - exp(x^3) + 2*x*log(log(5)) + x^2 - 3)
```

3.940. $\int \left(6-6x^2+e^{x^3}(2+6x^3)-8x\log(\log(5))-2\log^2(\log(5))\right)\,dx$

3.941 $\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}(6x+2x^2+6x\log(x))+}{}$

3.941.1 Optimal result

Integrand size = 204, antiderivative size = 32

$$\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}(6x+2x^2+6x\log(x))+e^{e^x}(-3+3e^x x)\log(x)\log\left(\right.}{(3e^2}$$

$$=-\frac{x}{e^{e^x}+x}+x\left(1+\frac{x}{3}+\log(x)\right)\log\left(\log\left(\frac{\log(x)}{2}\right)\right)$$

output

```
(1+1/3*x+ln(x))*ln(ln(1/2*ln(x)))*x-x/(x+exp(exp(x)))
```

3.941.2 Mathematica [A] (verified)

Time = 0.55 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.06

$$\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}(6x+2x^2+6x\log(x))+e^{e^x}(-3+3e^x x)\log(x)\log\left(\right.}{(3e^2}$$

$$=\frac{1}{3}\left(-\frac{3x}{e^{e^x}+x}+x(3+x+3\log(x))\log\left(\log\left(\frac{\log(x)}{2}\right)\right)\right)$$

3.941.

$$\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}(6x+2x^2+6x\log(x))+e^{e^x}(-3+3e^x x)\log(x)\log\left(\frac{\log(x)}{2}\right)+\left((6x^2+2x^3)\log(x)+3x^2\log^2(x)+e^{2e^x}\right.}{(3e^{2e^x}\log(x)+6e^{e^x}x\log(x)+3x^2\log(x))\log\left(\frac{\log(x)}{2}\right.}$$

input
```
Integrate[(3*x^2 + x^3 + 3*x^2*Log[x] + E^(2*E^x)*(3 + x + 3*Log[x]) + E^E
^x*(6*x + 2*x^2 + 6*x*Log[x]) + E^E^x*(-3 + 3*E^x*x)*Log[x]*Log[Log[x]/2]
+ ((6*x^2 + 2*x^3)*Log[x] + 3*x^2*Log[x]^2 + E^(2*E^x)*((6 + 2*x)*Log[x] +
 3*Log[x]^2) + E^E^x*((12*x + 4*x^2)*Log[x] + 6*x*Log[x]^2))*Log[Log[x]/2]
*Log[Log[Log[x]/2]])/((3*E^(2*E^x)*Log[x] + 6*E^E^x*x*Log[x] + 3*x^2*Log[x
])*Log[Log[x]/2]),x]
```

output
```
((-3*x)/(E^E^x + x) + x*(3 + x + 3*Log[x])*Log[Log[Log[x]/2]])/3
```

3.941.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3+3x^2+3x^2\log(x)+e^{e^x}\left(2x^2+6x+6x\log(x)\right)+\left(3x^2\log^2(x)+e^{e^x}\left(\left(4x^2+12x\right)\log(x)+6x\log^2(x)\right)+(2\cdots}{(3x^2\log(x\cdots}$$

$\big\downarrow$ 7239

$$\int \frac{1}{3}\left(\frac{3e^{e^x}(e^xx-1)}{(x+e^{e^x})^2}+(2x+3\log(x)+6)\log\left(\log\left(\frac{\log(x)}{2}\right)\right)+\frac{x+3\log(x)+3}{\log(x)\log\left(\frac{\log(x)}{2}\right)}\right)dx$$

$\big\downarrow$ 27

$$\frac{1}{3}\int\left(-\frac{3e^{e^x}(1-e^xx)}{(x+e^{e^x})^2}+(2x+3\log(x)+6)\log\left(\log\left(\frac{\log(x)}{2}\right)\right)+\frac{x+3\log(x)+3}{\log(x)\log\left(\frac{\log(x)}{2}\right)}\right)dx$$

$\big\downarrow$ 2009

$$\frac{1}{3}\left(3\int\frac{1}{\log\left(\frac{\log(x)}{2}\right)}dx+3\int\frac{1}{\log(x)\log\left(\frac{\log(x)}{2}\right)}dx+\int\frac{x}{\log(x)\log\left(\frac{\log(x)}{2}\right)}dx+6\int\log\left(\log\left(\frac{\log(x)}{2}\right)\right)dx+2\cdots\right.$$

input
```
Int[(3*x^2 + x^3 + 3*x^2*Log[x] + E^(2*E^x)*(3 + x + 3*Log[x]) + E^E^x*(6*
x + 2*x^2 + 6*x*Log[x]) + E^E^x*(-3 + 3*E^x*x)*Log[x]*Log[Log[x]/2] + ((6*
x^2 + 2*x^3)*Log[x] + 3*x^2*Log[x]^2 + E^(2*E^x)*((6 + 2*x)*Log[x] + 3*Log
[x]^2) + E^E^x*((12*x + 4*x^2)*Log[x] + 6*x*Log[x]^2))*Log[Log[x]/2]*Log[L
og[Log[x]/2]])/((3*E^(2*E^x)*Log[x] + 6*E^E^x*x*Log[x] + 3*x^2*Log[x])*Log
[Log[x]/2]),x]
```

3.941.

$$\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}\left(6x+2x^2+6x\log(x)\right)+e^{e^x}(-3+3e^xx)\log(x)\log\left(\frac{\log(x)}{2}\right)+\left(\left(6x^2+2x^3\right)\log(x)+3x^2\log^2(x)+e^{2e^x}\cdots}{\left(3e^{2e^x}\log(x)+6e^{e^x}x\log(x)+3x^2\log(x)\right)\log\left(\frac{\log(x)}{2}\right)\cdots}$$

output
```
$Aborted
```

3.941.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.941.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94

$$\left(x\ln\left(x\right)+\frac{x^{2}}{3}+x\right)\ln\left(\ln\left(\frac{\ln\left(x\right)}{2}\right)\right)-\frac{x}{x+{\mathrm e}^{{\mathrm e}^{x}}}$$

input
```
int((((3*ln(x)^2+(2*x+6)*ln(x))*exp(exp(x))^2+(6*x*ln(x)^2+(4*x^2+12*x)*ln
(x))*exp(exp(x))+3*x^2*ln(x)^2+(2*x^3+6*x^2)*ln(x))*ln(1/2*ln(x))*ln(ln(1/
2*ln(x)))+(3*exp(x)*x-3)*ln(x)*exp(exp(x))*ln(1/2*ln(x))+(3*ln(x)+3+x)*exp
(exp(x))^2+(6*x*ln(x)+2*x^2+6*x)*exp(exp(x))+3*x^2*ln(x)+x^3+3*x^2)/(3*ln(
x)*exp(exp(x))^2+6*x*ln(x)*exp(exp(x))+3*x^2*ln(x))/ln(1/2*ln(x)),x)
```

output
```
(x*ln(x)+1/3*x^2+x)*ln(ln(1/2*ln(x)))-x/(x+exp(exp(x)))
```

3.941.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.62

$$\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}(6x+2x^2+6x\log(x))+e^{e^x}(-3+3e^xx)\log(x)\log\left(\right.}{(3e^2}$$

$$=\frac{\left(x^{3}+3\,x^{2}\log\left(x\right)+3\,x^{2}+\left(x^{2}+3\,x\log\left(x\right)+3\,x\right)e^{\left(e^{x}\right)}\right)\log\left(\log\left(\frac{1}{2}\,\log\left(x\right)\right)\right)-3\,x}{3\,\left(x+e^{\left(e^{x}\right)}\right)}$$

3.941.

$$\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}(6x+2x^2+6x\log(x))+e^{e^x}(-3+3e^xx)\log(x)\log\left(\frac{\log(x)}{2}\right)+\left((6x^2+2x^3)\log(x)+3x^2\log^2(x)+e^{2e^x}\right.}{(3e^{2e^x}\log(x)+6e^{e^x}x\log(x)+3x^2\log(x))\log\left(\frac{\log(x)}{\right.}}$$

input
```
integrate((((3*log(x)^2+(2*x+6)*log(x))*exp(exp(x))^2+(6*x*log(x)^2+(4*x^2
+12*x)*log(x))*exp(exp(x))+3*x^2*log(x)^2+(2*x^3+6*x^2)*log(x))*log(1/2*lo
g(x))*log(log(1/2*log(x)))+(3*exp(x)*x-3)*log(x)*exp(exp(x))*log(1/2*log(x
))+(3*log(x)+3+x)*exp(exp(x))^2+(6*x*log(x)+2*x^2+6*x)*exp(exp(x))+3*x^2*l
og(x)+x^3+3*x^2)/(3*log(x)*exp(exp(x))^2+6*x*log(x)*exp(exp(x))+3*x^2*log(
x))/log(1/2*log(x)),x, algorithm=\
```

output
```
1/3*((x^3 + 3*x^2*log(x) + 3*x^2 + (x^2 + 3*x*log(x) + 3*x)*e^(e^x))*log(l
og(1/2*log(x))) - 3*x)/(x + e^(e^x))
```

3.941.6 Sympy [A] (verification not implemented)

Time = 1.18 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.84

$$\int \frac{3x^2 + x^3 + 3x^2\log(x) + e^{2e^x}(3 + x + 3\log(x)) + e^{e^x}(6x + 2x^2 + 6x\log(x)) + e^{e^x}(-3 + 3e^x x)\log(x)\log\left(\right.}{(3e^{2}}$$

$$= -\frac{x}{x + e^{e^x}} + \left(\frac{x^2}{3} + x\log(x) + x\right)\log\left(\log\left(\frac{\log(x)}{2}\right)\right)$$

input
```
integrate((((3*ln(x)**2+(2*x+6)*ln(x))*exp(exp(x))**2+(6*x*ln(x)**2+(4*x**
2+12*x)*ln(x))*exp(exp(x))+3*x**2*ln(x)**2+(2*x**3+6*x**2)*ln(x))*ln(1/2*l
n(x))*ln(ln(1/2*ln(x)))+(3*exp(x)*x-3)*ln(x)*exp(exp(x))*ln(1/2*ln(x))+(3*
ln(x)+3+x)*exp(exp(x))**2+(6*x*ln(x)+2*x**2+6*x)*exp(exp(x))+3*x**2*ln(x)+
x**3+3*x**2)/(3*ln(x)*exp(exp(x))**2+6*x*ln(x)*exp(exp(x))+3*x**2*ln(x))/l
n(1/2*ln(x)),x)
```

output
```
-x/(x + exp(exp(x))) + (x**2/3 + x*log(x) + x)*log(log(log(x)/2))
```

3.941.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(27) = 54.

Time = 0.35 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.72

$$\int \frac{3x^2 + x^3 + 3x^2\log(x) + e^{2e^x}(3 + x + 3\log(x)) + e^{e^x}(6x + 2x^2 + 6x\log(x)) + e^{e^x}(-3 + 3e^x x)\log(x)\log\left(\right.}{(3e^{2}}$$

$$= \frac{\left(x^3 + 3\,x^2\log(x) + 3\,x^2 + (x^2 + 3\,x\log(x) + 3\,x)e^{(e^x)}\right)\log(-\log(2) + \log(\log(x))) - 3\,x}{3\,(x + e^{(e^x)})}$$

3.941. $\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}(6x+2x^2+6x\log(x))+e^{e^x}(-3+3e^x x)\log(x)\log\left(\frac{\log(x)}{2}\right)+\left((6x^2+2x^3)\log(x)+3x^2\log^2(x)+e^{2e^x}\right.}{(3e^{2e^x}\log(x)+6e^{e^x}x\log(x)+3x^2\log(x))\log\left(\frac{\log(x)}{2}\right.}$

input
```
integrate((((3*log(x)^2+(2*x+6)*log(x))*exp(exp(x))^2+(6*x*log(x)^2+(4*x^2
+12*x)*log(x))*exp(exp(x))+3*x^2*log(x)^2+(2*x^3+6*x^2)*log(x))*log(1/2*lo
g(x))*log(log(1/2*log(x)))+(3*exp(x)*x-3)*log(x)*exp(exp(x))*log(1/2*log(x
))+(3*log(x)+3+x)*exp(exp(x))^2+(6*x*log(x)+2*x^2+6*x)*exp(exp(x))+3*x^2*l
og(x)+x^3+3*x^2)/(3*log(x)*exp(exp(x))^2+6*x*log(x)*exp(exp(x))+3*x^2*log(
x))/log(1/2*log(x)),x, algorithm=\
```

output
```
1/3*((x^3 + 3*x^2*log(x) + 3*x^2 + (x^2 + 3*x*log(x) + 3*x)*e^(e^x))*log(-
log(2) + log(log(x))) - 3*x)/(x + e^(e^x))
```

3.941.8 Giac [F(-1)]

Timed out.

$$\int \frac{3x^2 + x^3 + 3x^2\log(x) + e^{2e^x}(3 + x + 3\log(x)) + e^{e^x}(6x + 2x^2 + 6x\log(x)) + e^{e^x}(-3 + 3e^x x)\log(x)\log(\ldots}{(3e^2\ldots}$$

= Timed out

input
```
integrate((((3*log(x)^2+(2*x+6)*log(x))*exp(exp(x))^2+(6*x*log(x)^2+(4*x^2
+12*x)*log(x))*exp(exp(x))+3*x^2*log(x)^2+(2*x^3+6*x^2)*log(x))*log(1/2*lo
g(x))*log(log(1/2*log(x)))+(3*exp(x)*x-3)*log(x)*exp(exp(x))*log(1/2*log(x
))+(3*log(x)+3+x)*exp(exp(x))^2+(6*x*log(x)+2*x^2+6*x)*exp(exp(x))+3*x^2*l
og(x)+x^3+3*x^2)/(3*log(x)*exp(exp(x))^2+6*x*log(x)*exp(exp(x))+3*x^2*log(
x))/log(1/2*log(x)),x, algorithm=\
```

output
```
Timed out
```

3.941.9 Mupad [B] (verification not implemented)

Time = 15.53 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.25

$$\int \frac{3x^2 + x^3 + 3x^2\log(x) + e^{2e^x}(3 + x + 3\log(x)) + e^{e^x}(6x + 2x^2 + 6x\log(x)) + e^{e^x}(-3 + 3e^x x)\log(x)\log(\ldots}{(3e^2\ldots}$$

$$= \ln\left(\ln\left(\frac{\ln(x)}{2}\right)\right)\left(\frac{x^3 + 6x^2}{3x} - x + x\ln(x)\right) - \frac{x}{x + e^{e^x}}$$

3.941.

$$\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}(6x+2x^2+6x\log(x))+e^{e^x}(-3+3e^x x)\log(x)\log\left(\frac{\log(x)}{2}\right)+\left((6x^2+2x^3)\log(x)+3x^2\log^2(x)+e^{2e^x}\ldots\right.}{(3e^{2e^x}\log(x)+6e^{e^x}x\log(x)+3x^2\log(x))\log\left(\frac{\log(x)}{2}\right)\ldots}$$

input
```
int((3*x^2*log(x) + exp(2*exp(x))*(x + 3*log(x) + 3) + exp(exp(x))*(6*x +
6*x*log(x) + 2*x^2) + 3*x^2 + x^3 + log(log(log(x)/2))*log(log(x)/2)*(log(
x)*(6*x^2 + 2*x^3) + 3*x^2*log(x)^2 + exp(2*exp(x))*(3*log(x)^2 + log(x)*(
2*x + 6)) + exp(exp(x))*(6*x*log(x)^2 + log(x)*(12*x + 4*x^2))) + exp(exp(
x))*log(log(x)/2)*log(x)*(3*x*exp(x) - 3))/(log(log(x)/2)*(3*x^2*log(x) +
3*exp(2*exp(x))*log(x) + 6*x*exp(exp(x))*log(x))),x)
```

output
```
log(log(log(x)/2))*((6*x^2 + x^3)/(3*x) - x + x*log(x)) - x/(x + exp(exp(x
)))
```

3.941.

$$\int \frac{3x^2+x^3+3x^2\log(x)+e^{2e^x}(3+x+3\log(x))+e^{e^x}\left(6x+2x^2+6x\log(x)\right)+e^{e^x}\left(-3+3e^x x\right)\log(x)\log\left(\frac{\log(x)}{2}\right)+\left(\left(6x^2+2x^3\right)\log(x)+3x^2\log^2(x)+e^{2e^x}\right.}{\left(3e^{2e^x}\log(x)+6e^{e^x}x\log(x)+3x^2\log(x)\right)\log\left(\frac{\log(x)}{2}\right.}$$

3.942 $\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}(32-48x+34x^2-10x^3+x^4)}{16-8x+x^2} dx$

3.942.1 Optimal result

Integrand size = 57, antiderivative size = 34

$$\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}(32-48x+34x^2-10x^3+x^4)}{16-8x+x^2} dx = x\left(2-x-\left(1+3e^{\frac{2}{x}-x}+\frac{2}{4-x}\right)x\right)$$

output
```
(2-x*(1+exp(ln(3*exp(2/x))-x)+2/(-x+4))-x)*x
```

3.942.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.38

$$\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}(32-48x+34x^2-10x^3+x^4)}{16-8x+x^2} dx = \frac{32}{-4+x}-12(-4+x)-2(-4+x)^2+\frac{3e^{\frac{2}{x}-x}(2+x^2)}{-1-\frac{2}{x^2}}$$

input
```
Integrate[(32 - 96*x + 36*x^2 - 4*x^3 + 3*E^(2/x - x)*(32 - 48*x + 34*x^2
- 10*x^3 + x^4))/(16 - 8*x + x^2),x]
```

output
```
32/(-4 + x) - 12*(-4 + x) - 2*(-4 + x)^2 + (3*E^(2/x - x)*(2 + x^2))/(-1 -
 2/x^2)
```

3.942.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.32, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.070, Rules used = {7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^3+36x^2+3e^{\frac{2}{x}-x}\left(x^4-10x^3+34x^2-48x+32\right)-96x+32}{x^2-8x+16}dx$$
$$\Big\downarrow \text{7277}$$
$$4\int \frac{-4x^3+36x^2-96x+3e^{\frac{2}{x}-x}\left(x^4-10x^3+34x^2-48x+32\right)+32}{4(4-x)^2}dx$$
$$\Big\downarrow \text{27}$$
$$\int \frac{-4x^3+36x^2+3e^{\frac{2}{x}-x}\left(x^4-10x^3+34x^2-48x+32\right)-96x+32}{(4-x)^2}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(-\frac{4x^3}{(x-4)^2}+\frac{36x^2}{(x-4)^2}+3e^{\frac{2}{x}-x}\left(x^2-2x+2\right)-\frac{96x}{(x-4)^2}+\frac{32}{(x-4)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-2x^2-\frac{3e^{\frac{2}{x}-x}\left(x^2+2\right)}{\frac{2}{x^2}+1}+4x-\frac{32}{4-x}$$

input
```
Int[(32 - 96*x + 36*x^2 - 4*x^3 + 3*E^(2/x - x)*(32 - 48*x + 34*x^2 - 10*x
^3 + x^4))/(16 - 8*x + x^2),x]
```

output
```
-32/(4 - x) + 4*x - 2*x^2 - (3*E^(2/x - x)*(2 + x^2))/(1 + 2/x^2)
```

3.942.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.942.4 Maple [A] (verified)

Time = 2.31 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06

method	result	size
default	$-{\mathrm e}^{\ln\left(3\,{\mathrm e}^{\frac{2}{x}}\right)-x} x^{2}-2 x^{2}+4 x +\frac{32}{x -4}$	36
parts	$-{\mathrm e}^{\ln\left(3\,{\mathrm e}^{\frac{2}{x}}\right)-x} x^{2}-2 x^{2}+4 x +\frac{32}{x -4}$	36
parallelrisch	$-\frac{4\,{\mathrm e}^{\ln\left(3\,{\mathrm e}^{\frac{2}{x}}\right)-x} x^{5}+8 x^{5}-16\,{\mathrm e}^{\ln\left(3\,{\mathrm e}^{\frac{2}{x}}\right)-x} x^{4}-48 x^{4}+128 x^{2}}{4 x^{2} \left(x -4\right)}$	65

input
```
int(((x^4-10*x^3+34*x^2-48*x+32)*exp(ln(3*exp(2/x))-x)-4*x^3+36*x^2-96*x+3
2)/(x^2-8*x+16),x,method=_RETURNVERBOSE)
```

output
```
-exp(ln(3*exp(2/x))-x)*x^2-2*x^2+4*x+32/(x-4)
```

3.942. $\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}\left(32-48x+34x^2-10x^3+x^4\right)}{16-8x+x^2}\,dx$

3.942.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.41

$$\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}(32-48x+34x^2-10x^3+x^4)}{16-8x+x^2}\,dx$$
$$= -\frac{2\,x^3-12\,x^2+(x^3-4\,x^2)e^{\left(-\frac{x^2-x\log(3)-2}{x}\right)}+16\,x-32}{x-4}$$

input
```
integrate(((x^4-10*x^3+34*x^2-48*x+32)*exp(log(3*exp(2/x))-x)-4*x^3+36*x^2
-96*x+32)/(x^2-8*x+16),x, algorithm=\
```

output
```
-(2*x^3 - 12*x^2 + (x^3 - 4*x^2)*e^(-(x^2 - x*log(3) - 2)/x) + 16*x - 32)/
(x - 4)
```

3.942.6 Sympy [A] (verification not implemented)

Time = 4.56 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.76

$$\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}(32-48x+34x^2-10x^3+x^4)}{16-8x+x^2}\,dx$$
$$= -3x^2e^{\frac{2}{x}}e^{-x}-2x^2+4x+\frac{32}{x-4}$$

input
```
integrate(((x**4-10*x**3+34*x**2-48*x+32)*exp(ln(3*exp(2/x))-x)-4*x**3+36*
x**2-96*x+32)/(x**2-8*x+16),x)
```

output
```
-3*x**2*exp(2/x)*exp(-x) - 2*x**2 + 4*x + 32/(x - 4)
```

3.942.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}(32-48x+34x^2-10x^3+x^4)}{16-8x+x^2}\,dx$$
$$= -3\,x^2e^{\left(-x+\frac{2}{x}\right)}-2\,x^2+4\,x+\frac{32}{x-4}$$

input
```
integrate(((x^4-10*x^3+34*x^2-48*x+32)*exp(log(3*exp(2/x))-x)-4*x^3+36*x^2
-96*x+32)/(x^2-8*x+16),x, algorithm=\
```

output
```
-3*x^2*e^(-x + 2/x) - 2*x^2 + 4*x + 32/(x - 4)
```

3.942.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.59

$$\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}(32-48x+34x^2-10x^3+x^4)}{16-8x+x^2}\,dx$$
$$= -\frac{3\,x^3e^{\left(-\frac{x^2-2}{x}\right)}+2\,x^3-12\,x^2e^{\left(-\frac{x^2-2}{x}\right)}-12\,x^2+16\,x-32}{x-4}$$

input
```
integrate(((x^4-10*x^3+34*x^2-48*x+32)*exp(log(3*exp(2/x))-x)-4*x^3+36*x^2
-96*x+32)/(x^2-8*x+16),x, algorithm=\
```

output
```
-(3*x^3*e^(-(x^2 - 2)/x) + 2*x^3 - 12*x^2*e^(-(x^2 - 2)/x) - 12*x^2 + 16*x
 - 32)/(x - 4)
```

3.942.9 Mupad [B] (verification not implemented)

Time = 15.74 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int \frac{32-96x+36x^2-4x^3+3e^{\frac{2}{x}-x}(32-48x+34x^2-10x^3+x^4)}{16-8x+x^2}\,dx$$
$$= 4\,x-3\,x^2\,\mathrm{e}^{\frac{2}{x}-x}+\frac{32}{x-4}-2\,x^2$$

input
```
int((36*x^2 - 96*x - 4*x^3 + exp(log(3*exp(2/x)) - x)*(34*x^2 - 48*x - 10*
x^3 + x^4 + 32) + 32)/(x^2 - 8*x + 16),x)
```

output
```
4*x - 3*x^2*exp(2/x - x) + 32/(x - 4) - 2*x^2
```

3.943 $\int \frac{((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+((15x^2-3x^3)\log(4)+x}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(}$

3.943.1 Optimal result

Integrand size = 124, antiderivative size = 31

$$\int \frac{((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+((15x^2-3x^3)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(-5x^2+x^3)\log^2(4)\log^2(5-x}$$
$$=\left(6-\frac{\log(x)}{x\left(-\frac{x^2}{\log(4)}+\log(5-x)\right)}\right)\log(\log(2))$$

output
```
(6-ln(x)/x/(ln(5-x)-1/2*x^2/ln(2)))*ln(ln(2))
```

3.943.2 Mathematica [A] (verified)

Time = 6.06 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81

$$\int \frac{((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+((15x^2-3x^3)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(-5x^2+x^3)\log^2(4)\log^2(5-x}$$
$$=\frac{\log(4)\log(x)\log(\log(2))}{x^3-x\log(4)\log(5-x)}$$

input
```
Integrate[(((-5*x^2 + x^3)*Log[4] + (5 - x)*Log[4]^2*Log[5 - x] + ((15*x^2
 - 3*x^3)*Log[4] + x*Log[4]^2 + (-5 + x)*Log[4]^2*Log[5 - x])*Log[x])*Log[
Log[2]])/(-5*x^6 + x^7 + (10*x^4 - 2*x^5)*Log[4]*Log[5 - x] + (-5*x^2 + x^
3)*Log[4]^2*Log[5 - x]^2),x]
```

output
```
(Log[4]*Log[x]*Log[Log[2]])/(x^3 - x*Log[4]*Log[5 - x])
```

3.943.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(\log(2))\left(\left(\left(15x^2-3x^3\right)\log(4)+x\log^2(4)+(x-5)\log^2(4)\log(5-x)\right)\log(x)+\left(x^3-5x^2\right)\log(4)+(5-x)\right.}{x^7-5x^6+\left(10x^4-2x^5\right)\log(4)\log(5-x)+\left(x^3-5x^2\right)\log^2(4)\log^2(5-x)}$$

$$\Big\downarrow 27$$

$$\log(\log(2))\int \frac{\log(4)\left(5x^2-x^3\right)-(5-x)\log^2(4)\log(5-x)-\left(\log^2(4)x-(5-x)\log^2(4)\log(5-x)+3\left(5x^2-x^3\right.\right.}{-x^7+5x^6+\left(5x^2-x^3\right)\log^2(4)\log^2(5-x)-2\left(5x^4-x^5\right)\log(4)\log(5-x)}$$

$$\Big\downarrow 7239$$

$$\log(\log(2))\int \frac{\log(4)\left(-((x-5)\log(4)\log(5-x)(\log(x)-1))-x\left((x-5)x+\left(-3x^2+15x+\log(4)\right)\log(x)\right)\right)}{(5-x)\left(x^3-x\log(4)\log(5-x)\right)^2}dx$$

$$\Big\downarrow 27$$

$$\log(4)\log(\log(2))\int -\frac{(5-x)\log(4)\log(5-x)(1-\log(x))-x\left((5-x)x-\left(-3x^2+15x+\log(4)\right)\log(x)\right)}{(5-x)\left(x^3-x\log(4)\log(5-x)\right)^2}dx$$

$$\Big\downarrow 25$$

$$-\log(4)\log(\log(2))\int \frac{(5-x)\log(4)\log(5-x)(1-\log(x))-x\left((5-x)x-\left(-3x^2+15x+\log(4)\right)\log(x)\right)}{(5-x)\left(x^3-x\log(4)\log(5-x)\right)^2}dx$$

$$\Big\downarrow 7293$$

$$-\log(4)\log(\log(2))\int \left(\frac{\left(3x^3-15x^2-\log(4)\log(5-x)x-\log(4)x+5\log(4)\log(5-x)\right)\log(x)}{(x-5)x^2\left(x^2-\log(4)\log(5-x)\right)^2}-\frac{1}{x^2\left(x^2-\log(\right.}\right.$$

$$\Big\downarrow 7299$$

$$-\log(4)\log(\log(2))\int \left(\frac{\left(3x^3-15x^2-\log(4)\log(5-x)x-\log(4)x+5\log(4)\log(5-x)\right)\log(x)}{(x-5)x^2\left(x^2-\log(4)\log(5-x)\right)^2}-\frac{1}{x^2\left(x^2-\log(\right.}\right.$$

3.943.

$$\int \frac{\left(\left(-5x^2+x^3\right)\log(4)+(5-x)\log^2(4)\log(5-x)+\left(\left(15x^2-3x^3\right)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log(5-x)\right)\log(x)\right)\log(\log(2))}{-5x^6+x^7+\left(10x^4-2x^5\right)\log(4)\log(5-x)+\left(-5x^2+x^3\right)\log^2(4)\log^2(5-x)}\,dx$$

input
```
Int[(((-5*x^2 + x^3)*Log[4] + (5 - x)*Log[4]^2*Log[5 - x] + ((15*x^2 - 3*x
^3)*Log[4] + x*Log[4]^2 + (-5 + x)*Log[4]^2*Log[5 - x])*Log[x])*Log[Log[2]
])/(-5*x^6 + x^7 + (10*x^4 - 2*x^5)*Log[4]*Log[5 - x] + (-5*x^2 + x^3)*Log
[4]^2*Log[5 - x]^2),x]
```

output
```
$Aborted
```

3.943.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.943.4 Maple [A] (verified)

Time = 7.40 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

method	result	size
risch	$-\frac{2\ln(\ln(2))\ln(2)\ln(x)}{x(2\ln(2)\ln(5-x)-x^2)}$	31
parallelrisch	$-\frac{2\ln(\ln(2))\ln(2)\ln(x)}{x(2\ln(2)\ln(5-x)-x^2)}$	31

3.943.
$\int \frac{((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+((15x^2-3x^3)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log(5-x))\log(x))\log(\log(2))}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(-5x^2+x^3)\log^2(4)\log^2(5-x)}\,dx$

input
```
int(((4*(-5+x)*ln(2)^2*ln(5-x)+4*x*ln(2)^2+2*(-3*x^3+15*x^2)*ln(2))*ln(x)+
4*(5-x)*ln(2)^2*ln(5-x)+2*(x^3-5*x^2)*ln(2))*ln(ln(2))/(4*(x^3-5*x^2)*ln(2
)^2*ln(5-x)^2+2*(-2*x^5+10*x^4)*ln(2)*ln(5-x)+x^7-5*x^6),x,method=_RETURNV
ERBOSE)
```

output
```
-2*ln(ln(2))*ln(2)/x*ln(x)/(2*ln(2)*ln(5-x)-x^2)
```

3.943.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{\left((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+\left((15x^2-3x^3)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log\right.\right.}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(-5x^2+x^3)\log^2(4)\log^2(5-x}$$

$$=\frac{2\log(2)\log(x)\log(\log(2))}{x^3-2x\log(2)\log(-x+5)}$$

input
```
integrate(((4*(-5+x)*log(2)^2*log(5-x)+4*x*log(2)^2+2*(-3*x^3+15*x^2)*log(
2))*log(x)+4*(5-x)*log(2)^2*log(5-x)+2*(x^3-5*x^2)*log(2))*log(log(2))/(4*
(x^3-5*x^2)*log(2)^2*log(5-x)^2+2*(-2*x^5+10*x^4)*log(2)*log(5-x)+x^7-5*x^
6),x, algorithm=\
```

output
```
2*log(2)*log(x)*log(log(2))/(x^3 - 2*x*log(2)*log(-x + 5))
```

3.943.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.94

$$\int \frac{\left((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+\left((15x^2-3x^3)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log\right.\right.}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(-5x^2+x^3)\log^2(4)\log^2(5-x}$$

$$=-\frac{2\log(2)\log(x)\log(\log(2))}{-x^3+2x\log(2)\log(5-x)}$$

input
```
integrate(((4*(-5+x)*ln(2)**2*ln(5-x)+4*x*ln(2)**2+2*(-3*x**3+15*x**2)*ln(
2))*ln(x)+4*(5-x)*ln(2)**2*ln(5-x)+2*(x**3-5*x**2)*ln(2))*ln(ln(2))/(4*(x*
*3-5*x**2)*ln(2)**2*ln(5-x)**2+2*(-2*x**5+10*x**4)*ln(2)*ln(5-x)+x**7-5*x*
*6),x)
```

output
```
-2*log(2)*log(x)*log(log(2))/(-x**3 + 2*x*log(2)*log(5 - x))
```

3.943.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+((15x^2-3x^3)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(-5x^2+x^3)\log^2(4)\log^2(5-x}$$
$$= \frac{2\,\log(2)\log(x)\log(\log(2))}{x^3-2\,x\log(2)\log(-x+5)}$$

input
```
integrate(((4*(-5+x)*log(2)^2*log(5-x)+4*x*log(2)^2+2*(-3*x^3+15*x^2)*log(
2))*log(x)+4*(5-x)*log(2)^2*log(5-x)+2*(x^3-5*x^2)*log(2))*log(log(2))/(4*
(x^3-5*x^2)*log(2)^2*log(5-x)^2+2*(-2*x^5+10*x^4)*log(2)*log(5-x)+x^7-5*x^
6),x, algorithm=\
```

output
```
2*log(2)*log(x)*log(log(2))/(x^3 - 2*x*log(2)*log(-x + 5))
```

3.943.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+((15x^2-3x^3)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(-5x^2+x^3)\log^2(4)\log^2(5-x}$$
$$= \frac{2\,\log(2)\log(x)\log(\log(2))}{x^3-2\,x\log(2)\log(-x+5)}$$

input
```
integrate(((4*(-5+x)*log(2)^2*log(5-x)+4*x*log(2)^2+2*(-3*x^3+15*x^2)*log(
2))*log(x)+4*(5-x)*log(2)^2*log(5-x)+2*(x^3-5*x^2)*log(2))*log(log(2))/(4*
(x^3-5*x^2)*log(2)^2*log(5-x)^2+2*(-2*x^5+10*x^4)*log(2)*log(5-x)+x^7-5*x^
6),x, algorithm=\
```

output
```
2*log(2)*log(x)*log(log(2))/(x^3 - 2*x*log(2)*log(-x + 5))
```

3.943.9 Mupad [F(-1)]

Timed out.

$$\int \frac{((-5x^2+x^3)\log(4)+(5-x)\log^2(4)\log(5-x)+((15x^2-3x^3)\log(4)+x\log^2(4)+(-5+x)\log^2(4)\log(5-x))\log(x))\log(\log(2))}{-5x^6+x^7+(10x^4-2x^5)\log(4)\log(5-x)+(-5x^2+x^3)\log^2(4)\log^2(5-x)}\,dx$$
$$=\int \frac{\ln(\ln(2))\left(2\ln(2)\left(5x^2-x^3\right)-\ln(x)\left(2\ln(2)\left(15x^2-3x^3\right)+4x\ln(2)^2+4\ln(2)^2\ln(5-x)(x-5)\right)+4\ln(2)^2\ln(5-x)(x-5)\right)}{5x^6-x^7-2\ln(2)\ln(5-x)\left(10x^4-2x^5\right)+4\ln(2)^2\ln(5-x)^2\left(5x^2-x^3\right)}\,dx$$

input
```
int((log(log(2))*(2*log(2)*(5*x^2 - x^3) - log(x)*(2*log(2)*(15*x^2 - 3*x^
3) + 4*x*log(2)^2 + 4*log(2)^2*log(5 - x)*(x - 5)) + 4*log(2)^2*log(5 - x)
*(x - 5)))/(5*x^6 - x^7 - 2*log(2)*log(5 - x)*(10*x^4 - 2*x^5) + 4*log(2)^
2*log(5 - x)^2*(5*x^2 - x^3)),x)
```

output
```
int((log(log(2))*(2*log(2)*(5*x^2 - x^3) - log(x)*(2*log(2)*(15*x^2 - 3*x^
3) + 4*x*log(2)^2 + 4*log(2)^2*log(5 - x)*(x - 5)) + 4*log(2)^2*log(5 - x)
*(x - 5)))/(5*x^6 - x^7 - 2*log(2)*log(5 - x)*(10*x^4 - 2*x^5) + 4*log(2)^
2*log(5 - x)^2*(5*x^2 - x^3)), x)
```

3.944 $\int \frac{1}{8}e^{\frac{1}{8}\left(-96+24e^{5x}-x\right)}\left(-1+120e^{5x}\right)\,dx$

3.944.1 Optimal result

Integrand size = 31, antiderivative size = 19

$$\int \frac{1}{8}e^{\frac{1}{8}\left(-96+24e^{5x}-x\right)}\left(-1+120e^{5x}\right)\,dx=e^{-3\left(4-e^{5x}\right)-\frac{x}{8}}$$

output
```
exp(3*exp(5*x)-1/8*x-12)
```

3.944.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{1}{8}e^{\frac{1}{8}\left(-96+24e^{5x}-x\right)}\left(-1+120e^{5x}\right)\,dx=e^{-12+3e^{5x}-\frac{x}{8}}$$

input
```
Integrate[(E^((-96 + 24*E^(5*x) - x)/8)*(-1 + 120*E^(5*x)))/8,x]
```

output
```
E^(-12 + 3*E^(5*x) - x/8)
```

3.944.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.097, Rules used = {27, 25, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{8} e^{\frac{1}{8}\left(-x+24 e^{5 x}-96\right)}\left(120 e^{5 x}-1\right) \, dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{8} \int -e^{\frac{1}{8}\left(-x+24 e^{5 x}-96\right)}\left(1-120 e^{5 x}\right) dx$$

$$\Big\downarrow \; 25$$

$$-\frac{1}{8} \int e^{\frac{1}{8}\left(-x+24 e^{5 x}-96\right)}\left(1-120 e^{5 x}\right) dx$$

$$\Big\downarrow \; 7257$$

$$e^{\frac{1}{8}\left(-x+24 e^{5 x}-96\right)}$$

input
```
Int[(E^((-96 + 24*E^(5*x) - x)/8)*(-1 + 120*E^(5*x)))/8,x]
```

output
```
E^((-96 + 24*E^(5*x) - x)/8)
```

3.944.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.944.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

method	result	size
norman	$e^{3\,e^{5x}-\frac{x}{8}-12}$	13
risch	$e^{3\,e^{5x}-\frac{x}{8}-12}$	13
parallelrisch	$e^{3\,e^{5x}-\frac{x}{8}-12}$	13

input
```
int(1/8*(120*exp(5*x)-1)*exp(3*exp(5*x)-1/8*x-12),x,method=_RETURNVERBOSE)
```

output
```
exp(3*exp(5*x)-1/8*x-12)
```

3.944.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{1}{8}e^{\frac{1}{8}\left(-96+24e^{5x}-x\right)}\left(-1+120e^{5x}\right)\,dx=e^{\left(-\frac{1}{8}\,x+3\,e^{(5\,x)}-12\right)}$$

input
```
integrate(1/8*(120*exp(5*x)-1)*exp(3*exp(5*x)-1/8*x-12),x, algorithm=\
```

output
```
e^(-1/8*x + 3*e^(5*x) - 12)
```

3.944.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{1}{8}e^{\frac{1}{8}\left(-96+24e^{5x}-x\right)}\left(-1+120e^{5x}\right)\,dx=e^{-\frac{x}{8}+3e^{5x}-12}$$

input
```
integrate(1/8*(120*exp(5*x)-1)*exp(3*exp(5*x)-1/8*x-12),x)
```

output
```
exp(-x/8 + 3*exp(5*x) - 12)
```

3.944.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{1}{8}e^{\frac{1}{8}\left(-96+24e^{5x}-x\right)}\left(-1+120e^{5x}\right)\,dx = e^{\left(-\frac{1}{8}\,x+3\,e^{(5\,x)}-12\right)}$$

input
```
integrate(1/8*(120*exp(5*x)-1)*exp(3*exp(5*x)-1/8*x-12),x, algorithm=\
```

output
```
e^(-1/8*x + 3*e^(5*x) - 12)
```

3.944.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{1}{8}e^{\frac{1}{8}\left(-96+24e^{5x}-x\right)}\left(-1+120e^{5x}\right)\,dx = e^{\left(-\frac{1}{8}\,x+3\,e^{(5\,x)}-12\right)}$$

input
```
integrate(1/8*(120*exp(5*x)-1)*exp(3*exp(5*x)-1/8*x-12),x, algorithm=\
```

output
```
e^(-1/8*x + 3*e^(5*x) - 12)
```

3.944.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \frac{1}{8}e^{\frac{1}{8}\left(-96+24e^{5x}-x\right)}\left(-1+120e^{5x}\right)\,dx = \mathrm{e}^{3\,\mathrm{e}^{5\,x}}\,\mathrm{e}^{-\frac{x}{8}}\,\mathrm{e}^{-12}$$

input
```
int((exp(3*exp(5*x) - x/8 - 12)*(120*exp(5*x) - 1))/8,x)
```

output
```
exp(3*exp(5*x))*exp(-x/8)*exp(-12)
```

3.945 $\int \frac{4+x+2x^2-2e^{x^2}x^2}{x}\,dx$

3.945.1 Optimal result

Integrand size = 22, antiderivative size = 25

$$\int \frac{4+x+2x^2-2e^{x^2}x^2}{x}\,dx = -2+3e^3-e^{x^2}+x^2+\log\left(e^x x^4\right)$$

output
```
x^2-2-exp(x^2)+exp(3+ln(3))+ln(exp(x)*x^4)
```

3.945.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{4+x+2x^2-2e^{x^2}x^2}{x}\,dx = -e^{x^2}+x+\log\left(e^{x^2}\right)+4\log(x)$$

input
```
Integrate[(4 + x + 2*x^2 - 2*E^x^2*x^2)/x,x]
```

output
```
-E^x^2 + x + Log[E^x^2] + 4*Log[x]
```

3.945.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.64, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2e^{x^2}x^2+2x^2+x+4}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2x^2+x+4}{x}-2e^{x^2}x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^2-e^{x^2}+x+4\log(x)$$

input
```
Int[(4 + x + 2*x^2 - 2*E^x^2*x^2)/x,x]
```

output
```
-E^x^2 + x + x^2 + 4*Log[x]
```

3.945.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.945.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.64

method	result	size
default	$x^2+x+4\ln(x)-e^{x^2}$	16
norman	$x^2+x+4\ln(x)-e^{x^2}$	16
risch	$x^2+x+4\ln(x)-e^{x^2}$	16
parallelrisch	$x^2+x+4\ln(x)-e^{x^2}$	16
parts	$x^2+x+4\ln(x)-e^{x^2}$	16

input
```
int((-2*x^2*exp(x^2)+2*x^2+x+4)/x,x,method=_RETURNVERBOSE)
```

output
```
x^2+x+4*ln(x)-exp(x^2)
```

3.945.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{4+x+2x^2-2e^{x^2}x^2}{x}\,dx = x^2+x-e^{(x^2)}+4\log(x)$$

input
```
integrate((-2*x^2*exp(x^2)+2*x^2+x+4)/x,x, algorithm=\
```

output
```
x^2 + x - e^(x^2) + 4*log(x)
```

3.945.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.56

$$\int \frac{4+x+2x^2-2e^{x^2}x^2}{x}\,dx = x^2+x-e^{x^2}+4\log(x)$$

input
```
integrate((-2*x**2*exp(x**2)+2*x**2+x+4)/x,x)
```

output
```
x**2 + x - exp(x**2) + 4*log(x)
```

3.945.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{4+x+2x^2-2e^{x^2}x^2}{x}\,dx = x^2+x-e^{(x^2)}+4\,\log(x)$$

input
```
integrate((-2*x^2*exp(x^2)+2*x^2+x+4)/x,x, algorithm=\
```

output
```
x^2 + x - e^(x^2) + 4*log(x)
```

3.945.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{4+x+2x^2-2e^{x^2}x^2}{x}\,dx = x^2+x-e^{(x^2)}+4\,\log(x)$$

input
```
integrate((-2*x^2*exp(x^2)+2*x^2+x+4)/x,x, algorithm=\
```

output
```
x^2 + x - e^(x^2) + 4*log(x)
```

3.945.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{4+x+2x^2-2e^{x^2}x^2}{x}\,dx = x-\mathrm{e}^{x^2}+4\,\ln(x)+x^2$$

input
```
int((x - 2*x^2*exp(x^2) + 2*x^2 + 4)/x,x)
```

output
```
x - exp(x^2) + 4*log(x) + x^2
```

3.946 $\int \frac{1}{10}e^{-136-x}(1-2\log(4)+(1-x)\log(x))\,dx$

3.946.1 Optimal result

Integrand size = 25, antiderivative size = 21

$$\int \frac{1}{10}e^{-136-x}(1-2\log(4)+(1-x)\log(x))\,dx=\frac{1}{5}e^{-136-x}\left(\log(4)+\frac{1}{2}x\log(x)\right)$$

output
```
1/5*(1/2*x*ln(x)+2*ln(2))/exp(x+136)
```

3.946.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{1}{10}e^{-136-x}(1-2\log(4)+(1-x)\log(x))\,dx=\frac{1}{10}e^{-136-x}(\log(16)+x\log(x))$$

input
```
Integrate[(E^(-136 - x)*(1 - 2*Log[4] + (1 - x)*Log[x]))/10,x]
```

output
```
(E^(-136 - x)*(Log[16] + x*Log[x]))/10
```

3.946.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 53 vs. 2(21) = 42.

Time = 0.29 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.52, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{10}e^{-x-136}((1-x)\log(x)+1-2\log(4))\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{10}\int e^{-x-136}((1-x)\log(x)-2\log(4)+1)dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{10}\int \left(e^{-x-136}(1-2\log(4))-e^{-x-136}(x-1)\log(x)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{10}\left(e^{-x-136}+e^{-x-136}\log(x)-e^{-x-136}(1-x)\log(x)-e^{-x-136}(1-\log(16))\right)$$

input
```
Int[(E^(-136 - x)*(1 - 2*Log[4] + (1 - x)*Log[x]))/10,x]
```

output
```
(E^(-136 - x) - E^(-136 - x)*(1 - Log[16]) + E^(-136 - x)*Log[x] - E^(-136
 - x)*(1 - x)*Log[x])/10
```

3.946.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.946.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

method	result	size
norman	$\left(\frac{x\ln(x)}{10}+\frac{2\ln(2)}{5}\right)\mathrm{e}^{-x-136}$	18
parallelrisch	$\frac{(x\ln(x)+4\ln(2))\mathrm{e}^{-x-136}}{10}$	18
risch	$\frac{x\,\mathrm{e}^{-x-136}\ln(x)}{10}+\frac{2\ln(2)\mathrm{e}^{-x-136}}{5}$	23

input
```
int(1/10*((1-x)*ln(x)-4*ln(2)+1)/exp(x+136),x,method=_RETURNVERBOSE)
```

output
```
(1/10*x*ln(x)+2/5*ln(2))/exp(x+136)
```

3.946.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int \frac{1}{10}e^{-136-x}(1-2\log(4)+(1-x)\log(x))\,dx=\frac{1}{10}\,xe^{(-x-136)}\log{(x)}+\frac{2}{5}\,e^{(-x-136)}\log{(2)}$$

input
```
integrate(1/10*((1-x)*log(x)-4*log(2)+1)/exp(x+136),x, algorithm=\
```

output
```
1/10*x*e^(-x - 136)*log(x) + 2/5*e^(-x - 136)*log(2)
```

3.946.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{1}{10}e^{-136-x}(1-2\log(4)+(1-x)\log(x))\,dx=\frac{(x\log{(x)}+4\log{(2)})\,e^{-x-136}}{10}$$

input
```
integrate(1/10*((1-x)*ln(x)-4*ln(2)+1)/exp(x+136),x)
```

output
```
(x*log(x) + 4*log(2))*exp(-x - 136)/10
```

3.946.7 Maxima [F]

$$\int \frac{1}{10}e^{-136-x}(1-2\log(4)+(1-x)\log(x))\,dx$$
$$= \int -\frac{1}{10}\,((x-1)\log(x)+4\log(2)-1)e^{(-x-136)}\,dx$$

input
```
integrate(1/10*((1-x)*log(x)-4*log(2)+1)/exp(x+136),x, algorithm=\
```

output
```
1/10*(x + 1)*e^(-x - 136)*log(x) + 1/10*Ei(-x)*e^(-136) + 2/5*e^(-x - 136)
*log(2) - 1/10*e^(-x - 136)*log(x) - 1/10*e^(-x - 136) - 1/10*integrate((x
 + 1)*e^(-x - 136)/x, x)
```

3.946.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{1}{10}e^{-136-x}(1-2\log(4)+(1-x)\log(x))\,dx = \frac{1}{10}\left(xe^{(-x)}\log(x)+4\,e^{(-x)}\log(2)\right)e^{(-136)}$$

input
```
integrate(1/10*((1-x)*log(x)-4*log(2)+1)/exp(x+136),x, algorithm=\
```

output
```
1/10*(x*e^(-x)*log(x) + 4*e^(-x)*log(2))*e^(-136)
```

3.946.9 Mupad [B] (verification not implemented)

Time = 14.64 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{1}{10}e^{-136-x}(1-2\log(4)+(1-x)\log(x))\,dx = \mathrm{e}^{-x-136}\left(\frac{\ln(16)}{10}+\frac{x\ln(x)}{10}\right)$$

input
```
int(-exp(- x - 136)*((2*log(2))/5 + (log(x)*(x - 1))/10 - 1/10),x)
```

output
```
exp(- x - 136)*(log(16)/10 + (x*log(x))/10)
```

3.947 $\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}\left(-6x^2-22x^3-24x^4-8x^5+\left(6x^2+21x^3+28x^4+12x^5\right)\log(x^2)+\left(-8-32x-32x^2\right)\log^2(x^2)\right)}{\left(4x^3+16x^4+16x^5\right)\log^2(x^2)}$

3.947.1 Optimal result

Integrand size = 121, antiderivative size = 33

$$\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}\left(-6x^2-22x^3-24x^4-8x^5+\left(6x^2+21x^3+28x^4+12x^5\right)\log(x^2)+\left(-8-32x-32x^2\right)\log^2(x^2)\right)}{\left(4x^3+16x^4+16x^5\right)\log^2(x^2)}\,dx = \frac{e^{\frac{x\left(2x+x^2+\frac{x}{1+2x}\right)}{4\log(x^2)}}}{x^2}$$

output
```
exp(1/4*x/ln(x^2)*(x/(1+2*x)+x^2+2*x))/x^2
```

3.947.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

$$\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}\left(-6x^2-22x^3-24x^4-8x^5+\left(6x^2+21x^3+28x^4+12x^5\right)\log(x^2)+\left(-8-32x-32x^2\right)\log^2(x^2)\right)}{\left(4x^3+16x^4+16x^5\right)\log^2(x^2)}\,dx = \frac{e^{\frac{x^2\left(3+5x+2x^2\right)}{4(1+2x)\log(x^2)}}}{x^2}$$

3.947. $\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}\left(-6x^2-22x^3-24x^4-8x^5+\left(6x^2+21x^3+28x^4+12x^5\right)\log(x^2)+\left(-8-32x-32x^2\right)\log^2(x^2)\right)}{\left(4x^3+16x^4+16x^5\right)\log^2(x^2)}\,dx$

input
```
Integrate[(E^((3*x^2 + 5*x^3 + 2*x^4)/((4 + 8*x)*Log[x^2]))*(-6*x^2 - 22*x
^3 - 24*x^4 - 8*x^5 + (6*x^2 + 21*x^3 + 28*x^4 + 12*x^5)*Log[x^2] + (-8 -
32*x - 32*x^2)*Log[x^2]^2))/((4*x^3 + 16*x^4 + 16*x^5)*Log[x^2]^2),x]
```

output
```
E^((x^2*(3 + 5*x + 2*x^2))/(4*(1 + 2*x)*Log[x^2]))/x^2
```

3.947.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 197 vs. $2(33) = 66$.

Time = 1.30 (sec) , antiderivative size = 197, normalized size of antiderivative = 5.97, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.025$, Rules used = {2026, 2007, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{2x^4+5x^3+3x^2}{(8x+4)\log(x^2)}}\left(-8x^5-24x^4-22x^3-6x^2+\left(-32x^2-32x-8\right)\log^2\left(x^2\right)+\left(12x^5+28x^4+21x^3+6x^2\right)\log\left(x^2\right)\right)}{\left(16x^5+16x^4+4x^3\right)\log^2\left(x^2\right)}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{\frac{2x^4+5x^3+3x^2}{(8x+4)\log(x^2)}}\left(-8x^5-24x^4-22x^3-6x^2+\left(-32x^2-32x-8\right)\log^2\left(x^2\right)+\left(12x^5+28x^4+21x^3+6x^2\right)\log\left(x^2\right)\right)}{x^3\left(16x^2+16x+4\right)\log^2\left(x^2\right)}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{e^{\frac{2x^4+5x^3+3x^2}{(8x+4)\log(x^2)}}\left(-8x^5-24x^4-22x^3-6x^2+\left(-32x^2-32x-8\right)\log^2\left(x^2\right)+\left(12x^5+28x^4+21x^3+6x^2\right)\log\left(x^2\right)\right)}{x^3(4x+2)^2\log^2\left(x^2\right)}$$

$$\Big\downarrow \text{2726}$$

$$\frac{\left(8x^5+24x^4+22x^3+6x^2-\left(12x^5+28x^4+21x^3+6x^2\right)\log\left(x^2\right)\right)\exp\left(\frac{2x^4+5x^3+3x^2}{4(2x+1)\log(x^2)}\right)}{x^3(2x+1)^2\left(-\frac{8x^3+15x^2+6x}{(2x+1)\log(x^2)}+\frac{2(2x^4+5x^3+3x^2)}{x(2x+1)\log^2(x^2)}+\frac{2(2x^4+5x^3+3x^2)}{(2x+1)^2\log(x^2)}\right)\log^2\left(x^2\right)}$$

input
```
Int[(E^((3*x^2 + 5*x^3 + 2*x^4)/((4 + 8*x)*Log[x^2]))*(-6*x^2 - 22*x^3 - 2
4*x^4 - 8*x^5 + (6*x^2 + 21*x^3 + 28*x^4 + 12*x^5)*Log[x^2] + (-8 - 32*x -
 32*x^2)*Log[x^2]^2))/((4*x^3 + 16*x^4 + 16*x^5)*Log[x^2]^2),x]
```

output
```
(E^((3*x^2 + 5*x^3 + 2*x^4)/(4*(1 + 2*x)*Log[x^2]))*(6*x^2 + 22*x^3 + 24*x
^4 + 8*x^5 - (6*x^2 + 21*x^3 + 28*x^4 + 12*x^5)*Log[x^2]))/(x^3*(1 + 2*x)^
2*((2*(3*x^2 + 5*x^3 + 2*x^4))/(x*(1 + 2*x)*Log[x^2]^2) - (6*x + 15*x^2 +
8*x^3)/((1 + 2*x)*Log[x^2]) + (2*(3*x^2 + 5*x^3 + 2*x^4))/((1 + 2*x)^2*Log
[x^2]))*Log[x^2]^2)
```

3.947.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.947.4 Maple [A] (verified)

Time = 1.94 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

method	result	size
risch	$\frac{e^{\frac{x^2(3+2x)(1+x)}{4(1+2x)\ln\left(x^2\right)}}}{x^2}$	32
parallelrisch	$\frac{e^{\frac{x^2\left(2x^2+5x+3\right)}{(8x+4)\ln\left(x^2\right)}}}{x^2}$	33

input
```
int(((-32*x^2-32*x-8)*ln(x^2)^2+(12*x^5+28*x^4+21*x^3+6*x^2)*ln(x^2)-8*x^5
-24*x^4-22*x^3-6*x^2)*exp((2*x^4+5*x^3+3*x^2)/(8*x+4)/ln(x^2))/(16*x^5+16*
x^4+4*x^3)/ln(x^2)^2,x,method=_RETURNVERBOSE)
```

output
```
1/x^2*exp(1/4*x^2*(3+2*x)*(1+x)/(1+2*x)/ln(x^2))
```

3.947. $\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log\left(x^2\right)}}\left(-6x^2-22x^3-24x^4-8x^5+\left(6x^2+21x^3+28x^4+12x^5\right)\log\left(x^2\right)+\left(-8-32x-32x^2\right)\log^2\left(x^2\right)\right)}{\left(4x^3+16x^4+16x^5\right)\log^2\left(x^2\right)}\,dx$

3.947.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

$$\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}\left(-6x^2-22x^3-24x^4-8x^5+\left(6x^2+21x^3+28x^4+12x^5\right)\log\left(x^2\right)+\left(-8-32x-32x^2\right)\log}{\left(4x^3+16x^4+16x^5\right)\log^2\left(x^2\right)}$$

$$=\frac{e^{\left(\frac{2x^4+5x^3+3x^2}{4(2x+1)\log(x^2)}\right)}}{x^2}$$

input
```
integrate(((-32*x^2-32*x-8)*log(x^2)^2+(12*x^5+28*x^4+21*x^3+6*x^2)*log(x^
2)-8*x^5-24*x^4-22*x^3-6*x^2)*exp((2*x^4+5*x^3+3*x^2)/(8*x+4)/log(x^2))/(1
6*x^5+16*x^4+4*x^3)/log(x^2)^2,x, algorithm=\
```

output
```
e^(1/4*(2*x^4 + 5*x^3 + 3*x^2)/((2*x + 1)*log(x^2)))/x^2
```

3.947.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}\left(-6x^2-22x^3-24x^4-8x^5+\left(6x^2+21x^3+28x^4+12x^5\right)\log\left(x^2\right)+\left(-8-32x-32x^2\right)\log}{\left(4x^3+16x^4+16x^5\right)\log^2\left(x^2\right)}$$

= Exception raised: TypeError

input
```
integrate(((-32*x**2-32*x-8)*ln(x**2)**2+(12*x**5+28*x**4+21*x**3+6*x**2)*
ln(x**2)-8*x**5-24*x**4-22*x**3-6*x**2)*exp((2*x**4+5*x**3+3*x**2)/(8*x+4)
/ln(x**2))/(16*x**5+16*x**4+4*x**3)/ln(x**2)**2,x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.947.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}\left(-6x^2-22x^3-24x^4-8x^5+(6x^2+21x^3+28x^4+12x^5)\log(x^2)+(-8-32x-32x^2)\log^2(x^2)\right)}{(4x^3+16x^4+16x^5)\log^2(x^2)}$$
= Exception raised: RuntimeError

input
```
integrate(((-32*x^2-32*x-8)*log(x^2)^2+(12*x^5+28*x^4+21*x^3+6*x^2)*log(x^
2)-8*x^5-24*x^4-22*x^3-6*x^2)*exp((2*x^4+5*x^3+3*x^2)/(8*x+4)/log(x^2))/(1
6*x^5+16*x^4+4*x^3)/log(x^2)^2,x, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.947.8 Giac [A] (verification not implemented)

Time = 0.86 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.12

$$\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}\left(-6x^2-22x^3-24x^4-8x^5+(6x^2+21x^3+28x^4+12x^5)\log(x^2)+(-8-32x-32x^2)\log^2(x^2)\right)}{(4x^3+16x^4+16x^5)\log^2(x^2)}$$
$$= \frac{e^{\left(\frac{2x^4+5x^3+3x^2}{4\left(2x\log(x^2)+\log(x^2)\right)}\right)}}{x^2}$$

input
```
integrate(((-32*x^2-32*x-8)*log(x^2)^2+(12*x^5+28*x^4+21*x^3+6*x^2)*log(x^
2)-8*x^5-24*x^4-22*x^3-6*x^2)*exp((2*x^4+5*x^3+3*x^2)/(8*x+4)/log(x^2))/(1
6*x^5+16*x^4+4*x^3)/log(x^2)^2,x, algorithm=\
```

output
```
e^(1/4*(2*x^4 + 5*x^3 + 3*x^2)/(2*x*log(x^2) + log(x^2)))/x^2
```

3.947.9 Mupad [B] (verification not implemented)

Time = 14.23 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.09

$$\int \frac{e^{\frac{3x^2+5x^3+2x^4}{(4+8x)\log(x^2)}}\left(-6x^2-22x^3-24x^4-8x^5+(6x^2+21x^3+28x^4+12x^5)\log(x^2)+(-8-32x-32x^2)\log}{(4x^3+16x^4+16x^5)\log^2(x^2)}$$

$$=\frac{\mathrm{e}^{\frac{x^4}{2\left(\ln\left(x^2\right)+2x\ln\left(x^2\right)\right)}}\,\mathrm{e}^{\frac{3x^2}{4\left(\ln\left(x^2\right)+2x\ln\left(x^2\right)\right)}}\,\mathrm{e}^{\frac{5x^3}{4\left(\ln\left(x^2\right)+2x\ln\left(x^2\right)\right)}}}{x^2}$$

input
```
int(-(exp((3*x^2 + 5*x^3 + 2*x^4)/(log(x^2)*(8*x + 4)))*(log(x^2)^2*(32*x
+ 32*x^2 + 8) + 6*x^2 + 22*x^3 + 24*x^4 + 8*x^5 - log(x^2)*(6*x^2 + 21*x^3
 + 28*x^4 + 12*x^5)))/(log(x^2)^2*(4*x^3 + 16*x^4 + 16*x^5)),x)
```

output
```
(exp(x^4/(2*(log(x^2) + 2*x*log(x^2))))*exp((3*x^2)/(4*(log(x^2) + 2*x*log
(x^2))))*exp((5*x^3)/(4*(log(x^2) + 2*x*log(x^2)))))/x^2
```

3.948 $\int \frac{-12+e^x(-3+x)-3x^4\log(100)}{x^4\log(100)}\,dx$

3.948.1 Optimal result

Integrand size = 24, antiderivative size = 18

$$\int \frac{-12+e^x(-3+x)-3x^4\log(100)}{x^4\log(100)}\,dx = -3-3x+\frac{4+e^x}{x^3\log(100)}$$

output
```
1/2*(exp(x)+4)/x^3/ln(10)-3*x-3
```

3.948.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

$$\int \frac{-12+e^x(-3+x)-3x^4\log(100)}{x^4\log(100)}\,dx = \frac{\frac{4}{x^3}+\frac{e^x}{x^3}-3x\log(100)}{\log(100)}$$

input
```
Integrate[(-12 + E^x*(-3 + x) - 3*x^4*Log[100])/(x^4*Log[100]),x]
```

output
```
(4/x^3 + E^x/x^3 - 3*x*Log[100])/Log[100]
```

3.948.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^4\log(100)+e^x(x-3)-12}{x^4\log(100)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\int -\frac{3\log(100)x^4+e^x(3-x)+12}{x^4}dx}{\log(100)}$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{\int \frac{3\log(100)x^4+e^x(3-x)+12}{x^4}dx}{\log(100)}$$

$$\Big\downarrow \text{ 2010}$$

$$-\frac{\int \left(\frac{3(\log(100)x^4+4)}{x^4}-\frac{e^x(x-3)}{x^4}\right)dx}{\log(100)}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{-\frac{e^x}{x^3}-\frac{4}{x^3}+3x\log(100)}{\log(100)}$$

input
```
Int[(-12 + E^x*(-3 + x) - 3*x^4*Log[100])/(x^4*Log[100]),x]
```

output
```
-((-4/x^3 - E^x/x^3 + 3*x*Log[100])/Log[100])
```

3.948.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.948.4 Maple [A] (verified)

Time = 0.40 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

method	result	size
parallelrisch	$-\frac{6x^4\ln(10)-4-e^x}{2\ln(10)x^3}$	23
default	$\frac{\frac{4}{x^3}+\frac{e^x}{x^3}-6\ln(10)x}{2\ln(10)}$	24
norman	$\frac{-3x^4+\frac{2}{\ln(10)}+\frac{e^x}{2\ln(10)}}{x^3}$	25
parts	$-3x+\frac{2}{\ln(10)x^3}+\frac{e^x}{2\ln(10)x^3}$	25
risch	$-\frac{3x\ln(2)}{\ln(2)+\ln(5)}-\frac{3x\ln(5)}{\ln(2)+\ln(5)}+\frac{2}{(\ln(2)+\ln(5))x^3}+\frac{e^x}{2(\ln(2)+\ln(5))x^3}$	52

input
```
int(1/2*((-3+x)*exp(x)-6*x^4*ln(10)-12)/x^4/ln(10),x,method=_RETURNVERBOSE
)
```

output
```
-1/2/ln(10)*(6*x^4*ln(10)-4-exp(x))/x^3
```

3.948.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{-12+e^x(-3+x)-3x^4\log(100)}{x^4\log(100)}\,dx = -\frac{6\,x^4\log(10)-e^x-4}{2\,x^3\log(10)}$$

input
```
integrate(1/2*((-3+x)*exp(x)-6*x^4*log(10)-12)/x^4/log(10),x, algorithm=\
```

output
```
-1/2*(6*x^4*log(10) - e^x - 4)/(x^3*log(10))
```

3.948.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.44

$$\int \frac{-12+e^x(-3+x)-3x^4\log(100)}{x^4\log(100)}\,dx = \frac{-3x\log(10)+\frac{2}{x^3}}{\log(10)} + \frac{e^x}{2x^3\log(10)}$$

input
```
integrate(1/2*((-3+x)*exp(x)-6*x**4*ln(10)-12)/x**4/ln(10),x)
```

output
```
(-3*x*log(10) + 2/x**3)/log(10) + exp(x)/(2*x**3*log(10))
```

3.948.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.61

$$\int \frac{-12+e^x(-3+x)-3x^4\log(100)}{x^4\log(100)}\,dx = -\frac{6\,x\log(10)-\frac{4}{x^3}+\Gamma(-2,-x)+3\,\Gamma(-3,-x)}{2\,\log(10)}$$

input
```
integrate(1/2*((-3+x)*exp(x)-6*x^4*log(10)-12)/x^4/log(10),x, algorithm=\
```

output
```
-1/2*(6*x*log(10) - 4/x^3 + gamma(-2, -x) + 3*gamma(-3, -x))/log(10)
```

3.948.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{-12+e^x(-3+x)-3x^4\log(100)}{x^4\log(100)}\,dx = -\frac{6\,x^4\log(10)-e^x-4}{2\,x^3\log(10)}$$

input
```
integrate(1/2*((-3+x)*exp(x)-6*x^4*log(10)-12)/x^4/log(10),x, algorithm=\
```

output
```
-1/2*(6*x^4*log(10) - e^x - 4)/(x^3*log(10))
```

3.948.9 Mupad [B] (verification not implemented)

Time = 13.33 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{-12+e^x(-3+x)-3x^4\log(100)}{x^4\log(100)}\,dx = \frac{\frac{e^x}{2}+2}{x^3\,\ln(10)}-3\,x$$

input
```
int(-(3*x^4*log(10) - (exp(x)*(x - 3))/2 + 6)/(x^4*log(10)),x)
```

output
```
(exp(x)/2 + 2)/(x^3*log(10)) - 3*x
```

3.949 $\int \frac{5+4e^8-e^8\log(x)}{5e^8}\,dx$

3.949.1 Optimal result

Integrand size = 21, antiderivative size = 18

$$\int \frac{5+4e^8-e^8\log(x)}{5e^8}\,dx = x+\frac{x}{e^8}+\frac{1}{5}(5-x\log(x))$$

output
```
x/exp(4)^2+x-1/5*x*ln(x)+1
```

3.949.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{5+4e^8-e^8\log(x)}{5e^8}\,dx = x+\frac{x}{e^8}-\frac{1}{5}x\log(x)$$

input
```
Integrate[(5 + 4*E^8 - E^8*Log[x])/(5*E^8),x]
```

output
```
x + x/E^8 - (x*Log[x])/5
```

3.949.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.67, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^8 \log(x)+4e^8+5}{5e^8}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \left(-e^8 \log(x)+4e^8+5\right)dx}{5e^8}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\left(5+4e^8\right)x+e^8x-e^8x\log(x)}{5e^8}$$

input
```
Int[(5 + 4*E^8 - E^8*Log[x])/(5*E^8),x]
```

output
```
(E^8*x + (5 + 4*E^8)*x - E^8*x*Log[x])/(5*E^8)
```

3.949.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.949.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

method	result	size
risch	$-\frac{x\ln(x)}{5}+x+x\,\mathrm{e}^{-8}$	12
parts	$\frac{(4\,\mathrm{e}^{8}+5)\,\mathrm{e}^{-8}x}{5}-\frac{x\ln(x)}{5}+\frac{x}{5}$	25
norman	$\left((\mathrm{e}^{8}+1)\,\mathrm{e}^{-4}x-\frac{x\,\mathrm{e}^{4}\ln(x)}{5}\right)\mathrm{e}^{-4}$	26
default	$\frac{\mathrm{e}^{-8}(5x+4x\,\mathrm{e}^{8}-\mathrm{e}^{8}(x\ln(x)-x))}{5}$	32
parallelrisch	$\frac{\mathrm{e}^{-8}(-\mathrm{e}^{8}(x\ln(x)-x)+(4\,\mathrm{e}^{8}+5)\,x)}{5}$	32

input
```
int(1/5*(-exp(4)^2*ln(x)+4*exp(4)^2+5)/exp(4)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/5*x*ln(x)+x+x*exp(-8)
```

3.949.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{5+4e^8-e^8\log(x)}{5e^8}\,dx=-\frac{1}{5}\left(xe^8\log\left(x\right)-5\,xe^8-5\,x\right)e^{(-8)}$$

input
```
integrate(1/5*(-exp(4)^2*log(x)+4*exp(4)^2+5)/exp(4)^2,x, algorithm=\
```

output
```
-1/5*(x*e^8*log(x) - 5*x*e^8 - 5*x)*e^(-8)
```

3.949.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{5+4e^8-e^8\log(x)}{5e^8}\,dx=-\frac{x\log\left(x\right)}{5}+\frac{x(1+e^8)}{e^8}$$

input
```
integrate(1/5*(-exp(4)**2*ln(x)+4*exp(4)**2+5)/exp(4)**2,x)
```

output
```
-x*log(x)/5 + x*(1 + exp(8))*exp(-8)
```

3.949.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33

$$\int \frac{5+4e^8-e^8\log(x)}{5e^8}\,dx = -\frac{1}{5}\left((x\log\left(x\right)-x)e^8-4\,xe^8-5\,x\right)e^{(-8)}$$

input
```
integrate(1/5*(-exp(4)^2*log(x)+4*exp(4)^2+5)/exp(4)^2,x, algorithm=\
```

output
```
-1/5*((x*log(x) - x)*e^8 - 4*x*e^8 - 5*x)*e^(-8)
```

3.949.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33

$$\int \frac{5+4e^8-e^8\log(x)}{5e^8}\,dx = -\frac{1}{5}\left((x\log\left(x\right)-x)e^8-4\,xe^8-5\,x\right)e^{(-8)}$$

input
```
integrate(1/5*(-exp(4)^2*log(x)+4*exp(4)^2+5)/exp(4)^2,x, algorithm=\
```

output
```
-1/5*((x*log(x) - x)*e^8 - 4*x*e^8 - 5*x)*e^(-8)
```

3.949.9 Mupad [B] (verification not implemented)

Time = 13.37 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.72

$$\int \frac{5+4e^8-e^8\log(x)}{5e^8}\,dx = \frac{x\left(5\,\mathrm{e}^{-8}-\ln\left(x\right)+5\right)}{5}$$

input
```
int(exp(-8)*((4*exp(8))/5 - (exp(8)*log(x))/5 + 1),x)
```

output
```
(x*(5*exp(-8) - log(x) + 5))/5
```

3.950 $\int \frac{1}{4} e^{1-e^x+x} x(8+4x-4e^x x)\,dx$

3.950.1 Optimal result

Integrand size = 26, antiderivative size = 14

$$\int \frac{1}{4} e^{1-e^x+x} x(8+4x-4e^x x)\,dx = e^{1-e^x+x} x^2$$

output
```
4*exp(ln(1/4*x^2)+1-exp(x)+x)
```

3.950.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{1}{4} e^{1-e^x+x} x(8+4x-4e^x x)\,dx = e^{1-e^x+x} x^2$$

input
```
Integrate[(E^(1 - E^x + x)*x*(8 + 4*x - 4*E^x*x))/4,x]
```

output
```
E^(1 - E^x + x)*x^2
```

3.950.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 29 vs. 2(14) = 28.

Time = 0.20 (sec) , antiderivative size = 29, normalized size of antiderivative = 2.07, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115, Rules used = {27, 27, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}e^{x-e^x+1}x(-4e^x x+4x+8)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int 4e^{x-e^x+1}x(-e^x x+x+2)\,dx$$

$$\Big\downarrow \text{27}$$

$$\int e^{x-e^x+1}x(-e^x x+x+2)\,dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{e^{x-e^x+1}x(x-e^x x)}{1-e^x}$$

input
```
Int[(E^(1 - E^x + x)*x*(8 + 4*x - 4*E^x*x))/4,x]
```

output
```
(E^(1 - E^x + x)*x*(x - E^x*x))/(1 - E^x)
```

3.950.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.950.4 Maple [A] (verified)

Time = 0.88 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.21

method	result	size
default	$4\,\mathrm{e}^{\ln\left(\frac{x^2}{4}\right)+1-\mathrm{e}^x+x}$	17
norman	$4\,\mathrm{e}^{\ln\left(\frac{x^2}{4}\right)+1-\mathrm{e}^x+x}$	17
parallelrisch	$4\,\mathrm{e}^{\ln\left(\frac{x^2}{4}\right)+1-\mathrm{e}^x+x}$	17
risch	$x^2\mathrm{e}^{1-\frac{i\pi\,\mathrm{csgn}\left(ix^2\right)^3}{2}+i\pi\,\mathrm{csgn}\left(ix^2\right)^2\mathrm{csgn}(ix)-\frac{i\pi\,\mathrm{csgn}(ix)^2\,\mathrm{csgn}\left(ix^2\right)}{2}-\mathrm{e}^x+x}$	62

input
```
int((-4*exp(x)*x+4*x+8)*exp(ln(1/4*x^2)+1-exp(x)+x)/x,x,method=_RETURNVERB
OSE)
```

output
```
4*exp(ln(1/4*x^2)+1-exp(x)+x)
```

3.950.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.14

$$\int \frac{1}{4}e^{1-e^x+x}x(8+4x-4e^x x)\,dx = 4\,e^{\left(x-e^x+\log\left(\frac{1}{4}\,x^2\right)+1\right)}$$

input
```
integrate((-4*exp(x)*x+4*x+8)*exp(log(1/4*x^2)+1-exp(x)+x)/x,x, algorithm=
\
```

output
```
4*e^(x - e^x + log(1/4*x^2) + 1)
```

3.950.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{1}{4}e^{1-e^x+x}x(8+4x-4e^x x)\,dx = x^2e^{x-e^x+1}$$

input
```
integrate((-4*exp(x)*x+4*x+8)*exp(ln(1/4*x**2)+1-exp(x)+x)/x,x)
```

output
```
x**2*exp(x - exp(x) + 1)
```

3.950.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.86

$$\int \frac{1}{4}e^{1-e^x+x}x(8+4x-4e^x x)\,dx = x^2e^{(x-e^x+1)}$$

input
```
integrate((-4*exp(x)*x+4*x+8)*exp(log(1/4*x^2)+1-exp(x)+x)/x,x, algorithm=
\
```

output
```
x^2*e^(x - e^x + 1)
```

3.950.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.86

$$\int \frac{1}{4}e^{1-e^x+x}x(8+4x-4e^x x)\,dx = x^2e^{(x-e^x+1)}$$

input
```
integrate((-4*exp(x)*x+4*x+8)*exp(log(1/4*x^2)+1-exp(x)+x)/x,x, algorithm=
\
```

output
```
x^2*e^(x - e^x + 1)
```

3.950.9 Mupad [B] (verification not implemented)

Time = 13.43 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{1}{4}e^{1-e^x+x}x(8+4x-4e^x x)\,dx = x^2\,\mathrm{e}\,\mathrm{e}^{-\mathrm{e}^x}\,\mathrm{e}^x$$

input
```
int((exp(x + log(x^2/4) - exp(x) + 1)*(4*x - 4*x*exp(x) + 8))/x,x)
```

output
```
x^2*exp(1)*exp(-exp(x))*exp(x)
```

3.951 $\int \frac{e^{-x^2 \log\left(x^2\right)+2x \log\left(x^2\right) \log\left(4+20x+25x^2\right)-\log\left(x^2\right) \log^2\left(4+20x+25x^2\right)} \left(-2 \ldots\right.}{\ldots}$

3.951.1 Optimal result

Integrand size = 148, antiderivative size = 24

$$\int \frac{e^{-x^2 \log(x^2)+2x \log(x^2) \log(4+20x+25x^2)-\log(x^2) \log^2(4+20x+25x^2)} \left(-2-5x-4x^2-10x^3+(16x^2-10x^3) \log(x^2) \ldots\right.}{2x^2+5x \ldots}$$

$$= \frac{(x^2)^{-(-x+\log((2+5x)^2))^2}}{x}$$

output
```
exp(-(ln((2+5*x)^2)-x)^2*ln(x^2))/x
```

3.951.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^{-x^2 \log(x^2)+2x \log(x^2) \log(4+20x+25x^2)-\log(x^2) \log^2(4+20x+25x^2)} \left(-2-5x-4x^2-10x^3+(16x^2-10x^3) \log(x^2) \ldots\right.}{2x^2+5x \ldots}$$

$$= \frac{(x^2)^{-(x-\log((2+5x)^2))^2}}{x}$$

input
```
Integrate[(E^(-(x^2*Log[x^2]) + 2*x*Log[x^2]*Log[4 + 20*x + 25*x^2] - Log[
x^2]*Log[4 + 20*x + 25*x^2]^2)*(-2 - 5*x - 4*x^2 - 10*x^3 + (16*x^2 - 10*x
^3)*Log[x^2] + (8*x + 20*x^2 + (-16*x + 10*x^2)*Log[x^2])*Log[4 + 20*x + 2
5*x^2] + (-4 - 10*x)*Log[4 + 20*x + 25*x^2]^2))/(2*x^2 + 5*x^3),x]
```


$$\int \frac{e^{-x^2 \log\left(x^2\right)+2x \log\left(x^2\right) \log\left(4+20x+25x^2\right)-\log\left(x^2\right) \log^2\left(4+20x+25x^2\right)} \left(-2-5x-4x^2-10x^3+(16x^2-10x^3) \log(x^2)+(8x+20x^2+(-16x+10x^2) \log(\ldots\right.}{2x^2+5x^3}$$

output
```
1/(x*(x^2)^(x - Log[(2 + 5*x)^2])^2)
```

3.951.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 247 vs. $2(24) = 48$.

Time = 1.44 (sec) , antiderivative size = 247, normalized size of antiderivative = 10.29, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.014$, Rules used = {2026, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-10x^3-4x^2+(-10x-4)\log^2(25x^2+20x+4)+(20x^2+(10x^2-16x)\log(x^2)+8x)\log(25x^2+20x+4$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(-10x^3-4x^2+(-10x-4)\log^2(25x^2+20x+4)+(20x^2+(10x^2-16x)\log(x^2)+8x)\log(25x^2+20x+4$$

$$\Big\downarrow \text{2726}$$

$$\frac{(x^2)^{-x^2-\log^2(25x^2+20x+4)+2x\log(25x^2+20x+4)-1}(5x^3+2x^2+(5x+2)\log^2(25x^2+20x+4)-(10x^2-(8x-5x^2)}{(5x+2)\left(\frac{\log^2(25x^2+20x+4)}{x}+\frac{10(5x+2)\log(x^2)\log(25x^2+20x+4)}{25x^2+20x+4}-\log(x^2)\log(25x^2+20x+4)-2\log(25x^2$$

input
```
Int[(E^(-(x^2*Log[x^2]) + 2*x*Log[x^2]*Log[4 + 20*x + 25*x^2] - Log[x^2]*L
og[4 + 20*x + 25*x^2]^2)*(-2 - 5*x - 4*x^2 - 10*x^3 + (16*x^2 - 10*x^3)*Lo
g[x^2] + (8*x + 20*x^2 + (-16*x + 10*x^2)*Log[x^2])*Log[4 + 20*x + 25*x^2]
 + (-4 - 10*x)*Log[4 + 20*x + 25*x^2]^2))/(2*x^2 + 5*x^3),x]
```

output
```
((x^2)^(-1 - x^2 + 2*x*Log[4 + 20*x + 25*x^2] - Log[4 + 20*x + 25*x^2]^2)*
(2*x^2 + 5*x^3 - (8*x^2 - 5*x^3)*Log[x^2] - (4*x + 10*x^2 - (8*x - 5*x^2)*
Log[x^2])*Log[4 + 20*x + 25*x^2] + (2 + 5*x)*Log[4 + 20*x + 25*x^2]^2))/((
2 + 5*x)*(x + x*Log[x^2] - (10*x*(2 + 5*x)*Log[x^2])/(4 + 20*x + 25*x^2) -
 2*Log[4 + 20*x + 25*x^2] - Log[x^2]*Log[4 + 20*x + 25*x^2] + (10*(2 + 5*x
)*Log[x^2]*Log[4 + 20*x + 25*x^2])/(4 + 20*x + 25*x^2) + Log[4 + 20*x + 25
*x^2]^2/x))
```

3.951.

$$\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)+(8x+20x^2+(-16x+10x^2)\log($$
$$2x^2+5x^3$$

3.951.3.1 Defintions of rubi rules used

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.951.4 Maple [A] (verified)

Time = 2.90 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.79

method	result
parallelrisch	$\frac{e^{-\ln\left(x^2\right)\left(\ln\left(25x^2+20x+4\right)^2-2\ln\left(25x^2+20x+4\right)x+x^2\right)}}{x}$
risch	$\frac{e^{-\frac{\left(4\ln(x)-i\pi\,\mathrm{csgn}(ix)^2\,\mathrm{csgn}\left(ix^2\right)+2i\pi\,\mathrm{csgn}\left(ix^2\right)^2\mathrm{csgn}(ix)-i\pi\,\mathrm{csgn}\left(ix^2\right)^3\right)\left(i\pi\,\mathrm{csgn}\left(i\left(x+\frac{2}{5}\right)^2\right)^3-2i\pi\,\mathrm{csgn}\left(i\left(x+\frac{2}{5}\right)^2\right)^2\mathrm{csgn}\left(i\left(x+\frac{2}{5}\right)\right.\right.}{8}}}{x}$

input
```
int(((-10*x-4)*ln(25*x^2+20*x+4)^2+((10*x^2-16*x)*ln(x^2)+20*x^2+8*x)*ln(2
5*x^2+20*x+4)+(-10*x^3+16*x^2)*ln(x^2)-10*x^3-4*x^2-5*x-2)*exp(-ln(x^2)*ln
(25*x^2+20*x+4)^2+2*x*ln(x^2)*ln(25*x^2+20*x+4)-x^2*ln(x^2))/(5*x^3+2*x^2)
,x,method=_RETURNVERBOSE)
```

output
```
exp(-ln(x^2)*(ln(25*x^2+20*x+4)^2-2*ln(25*x^2+20*x+4)*x+x^2))/x
```

3.951.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. 2(24) = 48.

Time = 0.26 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.17

$$\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}\left(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)-\cdots\right)}{2x^2+5x\cdots}$$
$$=\frac{e^{\left(-x^2\log(x^2)+2\,x\log(25\,x^2+20\,x+4)\log(x^2)-\log(25\,x^2+20\,x+4)^2\log(x^2)\right)}}{x}$$

3.951.

$$\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}\left(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)+(8x+20x^2+(-16x+10x^2)\log(\cdots\right.}{2x^2+5x^3}$$

input
```
integrate(((-10*x-4)*log(25*x^2+20*x+4)^2+((10*x^2-16*x)*log(x^2)+20*x^2+8
*x)*log(25*x^2+20*x+4)+(-10*x^3+16*x^2)*log(x^2)-10*x^3-4*x^2-5*x-2)*exp(-
log(x^2)*log(25*x^2+20*x+4)^2+2*x*log(x^2)*log(25*x^2+20*x+4)-x^2*log(x^2)
)/(5*x^3+2*x^2),x, algorithm=\
```

output
```
e^(-x^2*log(x^2) + 2*x*log(25*x^2 + 20*x + 4)*log(x^2) - log(25*x^2 + 20*x
 + 4)^2*log(x^2))/x
```

3.951.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(20) = 40.

Time = 0.35 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.04

$$\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}\left(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)\right.}{2x^2+5x}$$
$$= \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(25x^2+20x+4)-\log(x^2)\log(25x^2+20x+4)^2}}{x}$$

input
```
integrate(((-10*x-4)*ln(25*x**2+20*x+4)**2+((10*x**2-16*x)*ln(x**2)+20*x**
2+8*x)*ln(25*x**2+20*x+4)+(-10*x**3+16*x**2)*ln(x**2)-10*x**3-4*x**2-5*x-2
)*exp(-ln(x**2)*ln(25*x**2+20*x+4)**2+2*x*ln(x**2)*ln(25*x**2+20*x+4)-x**2
*ln(x**2))/(5*x**3+2*x**2),x)
```

output
```
exp(-x**2*log(x**2) + 2*x*log(x**2)*log(25*x**2 + 20*x + 4) - log(x**2)*lo
g(25*x**2 + 20*x + 4)**2)/x
```

3.951.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.50

$$\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}\left(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)\right.}{2x^2+5x}$$
$$= \frac{e^{\left(-2x^2\log(x)+8x\log(5x+2)\log(x)-8\log(5x+2)^2\log(x)\right)}}{x}$$

3.951. $\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}\left(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)+(8x+20x^2+(-16x+10x^2)\log(\right.}{2x^2+5x^3}$

input
```
integrate((((-10*x-4)*log(25*x^2+20*x+4)^2+((10*x^2-16*x)*log(x^2)+20*x^2+8
*x)*log(25*x^2+20*x+4)+(-10*x^3+16*x^2)*log(x^2)-10*x^3-4*x^2-5*x-2)*exp(-
log(x^2)*log(25*x^2+20*x+4)^2+2*x*log(x^2)*log(25*x^2+20*x+4)-x^2*log(x^2)
)/(5*x^3+2*x^2),x, algorithm=\
```

output
```
e^(-2*x^2*log(x) + 8*x*log(5*x + 2)*log(x) - 8*log(5*x + 2)^2*log(x))/x
```

3.951.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. $2(24) = 48$.

Time = 2.23 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.17

$$\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}\left(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)\right.}{2x^2+5x}$$

$$= \frac{e^{\left(-x^2\log(x^2)+2\,x\log(25\,x^2+20\,x+4)\log(x^2)-\log(25\,x^2+20\,x+4)^2\log(x^2)\right)}}{x}$$

input
```
integrate((((-10*x-4)*log(25*x^2+20*x+4)^2+((10*x^2-16*x)*log(x^2)+20*x^2+8
*x)*log(25*x^2+20*x+4)+(-10*x^3+16*x^2)*log(x^2)-10*x^3-4*x^2-5*x-2)*exp(-
log(x^2)*log(25*x^2+20*x+4)^2+2*x*log(x^2)*log(25*x^2+20*x+4)-x^2*log(x^2)
)/(5*x^3+2*x^2),x, algorithm=\
```

output
```
e^(-x^2*log(x^2) + 2*x*log(25*x^2 + 20*x + 4)*log(x^2) - log(25*x^2 + 20*x
 + 4)^2*log(x^2))/x
```

3.951.9 Mupad [B] (verification not implemented)

Time = 14.75 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.08

$$\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}\left(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)\right.}{2x^2+5x}$$

$$= \frac{(x^2)^{2\,x\,\ln(25\,x^2+20\,x+4)}}{x\,(x^2)^{x^2}\,(x^2)^{\ln(25\,x^2+20\,x+4)^2}}$$

input
```
int(-(exp(2*x*log(x^2)*log(20*x + 25*x^2 + 4) - log(x^2)*log(20*x + 25*x^2
 + 4)^2 - x^2*log(x^2))*(5*x - log(x^2)*(16*x^2 - 10*x^3) - log(20*x + 25*
x^2 + 4)*(8*x - log(x^2)*(16*x - 10*x^2) + 20*x^2) + log(20*x + 25*x^2 + 4
)^2*(10*x + 4) + 4*x^2 + 10*x^3 + 2))/(2*x^2 + 5*x^3),x)
```

3.951.

$$\int \frac{e^{-x^2\log(x^2)+2x\log(x^2)\log(4+20x+25x^2)-\log(x^2)\log^2(4+20x+25x^2)}(-2-5x-4x^2-10x^3+(16x^2-10x^3)\log(x^2)+(8x+20x^2+(-16x+10x^2)\log(}{2x^2+5x^3}$$

output
```
(x^2)^(2*x*log(20*x + 25*x^2 + 4))/(x*(x^2)^(x^2)*(x^2)^(log(20*x + 25*x^2
 + 4)^2))
```

3.951.

$$\int \frac{e^{-x^2 \log(x^2)+2x \log(x^2) \log(4+20x+25x^2)-\log(x^2) \log^2(4+20x+25x^2)} \left(-2-5x-4x^2-10x^3+(16x^2-10x^3) \log(x^2)+(8x+20x^2+(-16x+10x^2) \log(\right.}{2x^2+5x^3}$$

3.952 $\int \frac{11x+10x^2+(10+10x)\log(-3x)}{x}\,dx$

3.952.1 Optimal result

Integrand size = 23, antiderivative size = 13

$$\int \frac{11x+10x^2+(10+10x)\log(-3x)}{x}\,dx=-4+x+5(x+\log(-3x))^2$$

output
```
x-4+5*(x+ln(-3*x))^2
```

3.952.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.69

$$\int \frac{11x+10x^2+(10+10x)\log(-3x)}{x}\,dx=x+5x^2+10x\log(-3x)+5\log^2(-3x)$$

input
```
Integrate[(11*x + 10*x^2 + (10 + 10*x)*Log[-3*x])/x,x]
```

output
```
x + 5*x^2 + 10*x*Log[-3*x] + 5*Log[-3*x]^2
```

3.952.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.69, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{10x^2+11x+(10x+10)\log(-3x)}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(10x+\frac{10(x+1)\log(-3x)}{x}+11\right)dx$$

$$\Big\downarrow \text{2009}$$

$$5x^2+x+5\log^2(-3x)+10x\log(-3x)$$

input
```
Int[(11*x + 10*x^2 + (10 + 10*x)*Log[-3*x])/x,x]
```

output
```
x + 5*x^2 + 10*x*Log[-3*x] + 5*Log[-3*x]^2
```

3.952.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.952.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.77

method	result	size
derivativedivides	$10\ln\left(-3x\right)x+x+5x^{2}+5\ln\left(-3x\right)^{2}$	23
default	$10\ln\left(-3x\right)x+x+5x^{2}+5\ln\left(-3x\right)^{2}$	23
norman	$10\ln\left(-3x\right)x+x+5x^{2}+5\ln\left(-3x\right)^{2}$	23
risch	$10\ln\left(-3x\right)x+x+5x^{2}+5\ln\left(-3x\right)^{2}$	23
parallelrisch	$10\ln\left(-3x\right)x+x+5x^{2}+5\ln\left(-3x\right)^{2}$	23
parts	$10\ln\left(-3x\right)x+x+5x^{2}+5\ln\left(-3x\right)^{2}$	23

input
```
int(((10*x+10)*ln(-3*x)+10*x^2+11*x)/x,x,method=_RETURNVERBOSE)
```

output
```
10*ln(-3*x)*x+x+5*x^2+5*ln(-3*x)^2
```

3.952.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.69

$$\int \frac{11x+10x^2+(10+10x)\log(-3x)}{x}\,dx=5\,x^{2}+10\,x\log\left(-3\,x\right)+5\,\log\left(-3\,x\right)^{2}+x$$

input
```
integrate(((10*x+10)*log(-3*x)+10*x^2+11*x)/x,x, algorithm=\
```

output
```
5*x^2 + 10*x*log(-3*x) + 5*log(-3*x)^2 + x
```

3.952.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 26, normalized size of antiderivative = 2.00

$$\int \frac{11x+10x^2+(10+10x)\log(-3x)}{x}\,dx=5x^{2}+10x\log\left(-3x\right)+x+5\log\left(-3x\right)^{2}$$

input
```
integrate(((10*x+10)*ln(-3*x)+10*x**2+11*x)/x,x)
```

output
```
5*x**2 + 10*x*log(-3*x) + x + 5*log(-3*x)**2
```

3.952.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.69

$$\int \frac{11x + 10x^2 + (10 + 10x)\log(-3x)}{x}\,dx = 5\,x^2 + 10\,x\log\left(-3\,x\right) + 5\,\log\left(-3\,x\right)^2 + x$$

input
```
integrate(((10*x+10)*log(-3*x)+10*x^2+11*x)/x,x, algorithm=\
```

output
```
5*x^2 + 10*x*log(-3*x) + 5*log(-3*x)^2 + x
```

3.952.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.69

$$\int \frac{11x + 10x^2 + (10 + 10x)\log(-3x)}{x}\,dx = 5\,x^2 + 10\,x\log\left(-3\,x\right) + 5\,\log\left(-3\,x\right)^2 + x$$

input
```
integrate(((10*x+10)*log(-3*x)+10*x^2+11*x)/x,x, algorithm=\
```

output
```
5*x^2 + 10*x*log(-3*x) + 5*log(-3*x)^2 + x
```

3.952.9 Mupad [B] (verification not implemented)

Time = 14.81 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.69

$$\int \frac{11x + 10x^2 + (10 + 10x)\log(-3x)}{x}\,dx = 5\,x^2 + 10\,x\,\ln\left(-3\,x\right) + x + 5\ln\left(-3\,x\right)^2$$

input
```
int((11*x + 10*x^2 + log(-3*x)*(10*x + 10))/x,x)
```

output
```
x + 10*x*log(-3*x) + 5*log(-3*x)^2 + 5*x^2
```

3.953 $\int e^{-\frac{x^2+\left(16x+4x^2\right)\log^2(x)+\left(64+36x+4x^2\right)\log^4(x)}{4\log^4(x)}}\left(e^5\left(-2x^2+2x^3\right)\log\left(x-\right.\right.$

3.953.1 Optimal result

Integrand size = 207, antiderivative size = 32

$$\int \frac{e^{-\frac{x^2+\left(16x+4x^2\right)\log^2(x)+\left(64+36x+4x^2\right)\log^4(x)}{4\log^4(x)}}\left(e^5(-2x^2+2x^3)\log\left(x-x^2\right)+e^5(x^2-x^3)\log(x)\log\left(x-x^2\right)+e^5(-\right.}{}$$

$$=e^{5-x-\left(4+x+\frac{x}{2\log^2(x)}\right)^2}\log\left(x-x^2\right)$$

output
```
exp(5)/exp((1/2*x/ln(x)^2+4+x)^2+x)*ln(-x^2+x)
```

3.953.2 Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.28

$$\int \frac{e^{-\frac{x^2+\left(16x+4x^2\right)\log^2(x)+\left(64+36x+4x^2\right)\log^4(x)}{4\log^4(x)}}\left(e^5(-2x^2+2x^3)\log\left(x-x^2\right)+e^5(x^2-x^3)\log(x)\log\left(x-x^2\right)+e^5(-\right.}{}$$

$$=e^{-11-9x-x^2-\frac{x^2}{4\log^4(x)}-\frac{x(4+x)}{\log^2(x)}}\log(-((-1+x)x))$$

3.953.
$$\int \frac{e^{-\frac{x^2+\left(16x+4x^2\right)\log^2(x)+\left(64+36x+4x^2\right)\log^4(x)}{4\log^4(x)}}\left(e^5\left(-2x^2+2x^3\right)\log\left(x-x^2\right)+e^5\left(x^2-x^3\right)\log(x)\log\left(x-x^2\right)+e^5\left(-16x+12x^2+4x^3\right)\log^2(x)\log\left(x-\right.\right.}{}$$

input
```
Integrate[(E^5*(-2*x^2 + 2*x^3)*Log[x - x^2] + E^5*(x^2 - x^3)*Log[x]*Log[
x - x^2] + E^5*(-16*x + 12*x^2 + 4*x^3)*Log[x]^2*Log[x - x^2] + E^5*(8*x -
 4*x^2 - 4*x^3)*Log[x]^3*Log[x - x^2] + Log[x]^5*(E^5*(-2 + 4*x) + E^5*(18
*x - 14*x^2 - 4*x^3)*Log[x - x^2]))/(E^((x^2 + (16*x + 4*x^2)*Log[x]^2 + (
64 + 36*x + 4*x^2)*Log[x]^4)/(4*Log[x]^4))*(-2*x + 2*x^2)*Log[x]^5),x]
```

output
```
E^(-11 - 9*x - x^2 - x^2/(4*Log[x]^4) - (x*(4 + x))/Log[x]^2)*Log[-((-1 +
x)*x)]
```

3.953.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\left(e^5\left(-4x^3-14x^2+18x\right)\log\left(x-x^2\right)+e^5(4x-2)\right)\log^5(x)+e^5\left(-4x^3-4x^2+8x\right)\log\left(x-x^2\right)\log^3(x)+e^5(\cdots}{\cdots}$$

$$\Big\downarrow \ 2026$$

$$\int \frac{\left(\left(e^5\left(-4x^3-14x^2+18x\right)\log\left(x-x^2\right)+e^5(4x-2)\right)\log^5(x)+e^5\left(-4x^3-4x^2+8x\right)\log\left(x-x^2\right)\log^3(x)+e^5(\cdots}{\cdots}$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{(2x-1)\exp\left(5-\frac{x^2+\left(4x^2+36x+64\right)\log^4(x)+\left(4x^2+16x\right)\log^2(x)}{4\log^4(x)}\right)}{(x-1)x}+\frac{\left(2x-4x\log^5(x)-18\log^5(x)-4x\log^3(x)-8\log\cdots\right.}{\cdots}\right.$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{(2x-1)\exp\left(-x^2-\frac{x^2}{4\log^4(x)}-9x-\frac{(x+4)x}{\log^2(x)}-11\right)}{(x-1)x}+\frac{\left(2x-4x\log^5(x)-18\log^5(x)-4x\log^3(x)-8\log^3(x)\cdots\right.}{\cdots}\right.$$

$$\Big\downarrow \ 7299$$

$$\int \left(\frac{(2x-1)\exp\left(-x^2-\frac{x^2}{4\log^4(x)}-9x-\frac{(x+4)x}{\log^2(x)}-11\right)}{(x-1)x}+\frac{\left(2x-4x\log^5(x)-18\log^5(x)-4x\log^3(x)-8\log^3(x)\cdots\right.}{\cdots}\right.$$

input
```
Int[(E^5*(-2*x^2 + 2*x^3)*Log[x - x^2] + E^5*(x^2 - x^3)*Log[x]*Log[x - x^
2] + E^5*(-16*x + 12*x^2 + 4*x^3)*Log[x]^2*Log[x - x^2] + E^5*(8*x - 4*x^2
 - 4*x^3)*Log[x]^3*Log[x - x^2] + Log[x]^5*(E^5*(-2 + 4*x) + E^5*(18*x - 1
4*x^2 - 4*x^3)*Log[x - x^2]))/(E^((x^2 + (16*x + 4*x^2)*Log[x]^2 + (64 + 3
6*x + 4*x^2)*Log[x]^4)/(4*Log[x]^4))*(-2*x + 2*x^2)*Log[x]^5),x]
```

output
```
$Aborted
```

3.953.3.1 Defintions of rubi rules used

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.953.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.20 (sec) , antiderivative size = 172, normalized size of antiderivative = 5.38

$$\left(-i e^{5} \pi \operatorname{csgn}\left(i x(-1+x)\right)^{2}+\frac{i e^{5} \pi \operatorname{csgn}\left(i x(-1+x)\right)^{3}}{2}+\frac{i e^{5} \pi \operatorname{csgn}\left(i x(-1+x)\right)^{2} \operatorname{csgn}\left(i x\right)}{2}+\frac{i e^{5} \pi \operatorname{csgn}\left(i x(\right.}{}$$

input
```
int((((-4*x^3-14*x^2+18*x)*exp(5)*ln(-x^2+x)+(4*x-2)*exp(5))*ln(x)^5+(-4*x
^3-4*x^2+8*x)*exp(5)*ln(-x^2+x)*ln(x)^3+(4*x^3+12*x^2-16*x)*exp(5)*ln(-x^2
+x)*ln(x)^2+(-x^3+x^2)*exp(5)*ln(-x^2+x)*ln(x)+(2*x^3-2*x^2)*exp(5)*ln(-x^
2+x))/(2*x^2-2*x)/ln(x)^5/exp(1/4*((4*x^2+36*x+64)*ln(x)^4+(4*x^2+16*x)*ln
(x)^2+x^2)/ln(x)^4),x)
```

3.953.

$$\int \frac{e^{-\frac{x^2+\left(16x+4x^2\right)\log^2(x)+\left(64+36x+4x^2\right)\log^4(x)}{4\log^4(x)}}\left(e^5\left(-2x^2+2x^3\right)\log\left(x-x^2\right)+e^5\left(x^2-x^3\right)\log(x)\log\left(x-x^2\right)+e^5\left(-16x+12x^2+4x^3\right)\log^2(x)\log\left(x-\right.\right.}{\left(-2x+2x^2\right)\log^5(x)}$$

output
```
(-I*exp(5)*Pi*csgn(I*x*(-1+x))^2+1/2*I*exp(5)*Pi*csgn(I*x*(-1+x))^3+1/2*I*
exp(5)*Pi*csgn(I*x*(-1+x))^2*csgn(I*x)+1/2*I*exp(5)*Pi*csgn(I*x*(-1+x))^2*
csgn(I*(-1+x))-1/2*I*exp(5)*Pi*csgn(I*x*(-1+x))*csgn(I*x)*csgn(I*(-1+x))+I
*exp(5)*Pi+exp(5)*ln(x)+exp(5)*ln(-1+x))*exp(-1/4*(4*x^2*ln(x)^4+36*x*ln(x
)^4+64*ln(x)^4+4*x^2*ln(x)^2+16*x*ln(x)^2+x^2)/ln(x)^4)
```

3.953.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.53

$$\int \frac{e^{-\frac{x^2+(16x+4x^2)\log^2(x)+(64+36x+4x^2)\log^4(x)}{4\log^4(x)}}\left(e^5(-2x^2+2x^3)\log(x-x^2)+e^5(x^2-x^3)\log(x)\log(x-x^2)+e^5(-\right.}{}$$

$$= e^{\left(-\frac{4\left(x^2+9x+16\right)\log(x)^4+4\left(x^2+4x\right)\log(x)^2+x^2}{4\log(x)^4}+5\right)}\log\left(-x^2+x\right)$$

input
```
integrate((((-4*x^3-14*x^2+18*x)*exp(5)*log(-x^2+x)+(4*x-2)*exp(5))*log(x)
^5+(-4*x^3-4*x^2+8*x)*exp(5)*log(-x^2+x)*log(x)^3+(4*x^3+12*x^2-16*x)*exp(
5)*log(-x^2+x)*log(x)^2+(-x^3+x^2)*exp(5)*log(-x^2+x)*log(x)+(2*x^3-2*x^2)
*exp(5)*log(-x^2+x))/(2*x^2-2*x)/log(x)^5/exp(1/4*((4*x^2+36*x+64)*log(x)^
4+(4*x^2+16*x)*log(x)^2+x^2)/log(x)^4),x, algorithm=\
```

output
```
e^(-1/4*(4*(x^2 + 9*x + 16)*log(x)^4 + 4*(x^2 + 4*x)*log(x)^2 + x^2)/log(x
)^4 + 5)*log(-x^2 + x)
```

3.953.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^{-\frac{x^2+(16x+4x^2)\log^2(x)+(64+36x+4x^2)\log^4(x)}{4\log^4(x)}}\left(e^5(-2x^2+2x^3)\log(x-x^2)+e^5(x^2-x^3)\log(x)\log(x-x^2)+e^5(-\right.}{}$$

$$= \text{Timed out}$$

input
```
integrate((((-4*x**3-14*x**2+18*x)*exp(5)*ln(-x**2+x)+(4*x-2)*exp(5))*ln(x
)**5+(-4*x**3-4*x**2+8*x)*exp(5)*ln(-x**2+x)*ln(x)**3+(4*x**3+12*x**2-16*x
)*exp(5)*ln(-x**2+x)*ln(x)**2+(-x**3+x**2)*exp(5)*ln(-x**2+x)*ln(x)+(2*x**
3-2*x**2)*exp(5)*ln(-x**2+x))/(2*x**2-2*x)/ln(x)**5/exp(1/4*((4*x**2+36*x+
64)*ln(x)**4+(4*x**2+16*x)*ln(x)**2+x**2)/ln(x)**4),x)
```

3.953.

$$\int \frac{e^{-\frac{x^2+(16x+4x^2)\log^2(x)+(64+36x+4x^2)\log^4(x)}{4\log^4(x)}}\left(e^5(-2x^2+2x^3)\log(x-x^2)+e^5(x^2-x^3)\log(x)\log(x-x^2)+e^5(-16x+12x^2+4x^3)\log^2(x)\log(x-\right.}{}$$

output
```
Timed out
```

3.953.7 Maxima [A] (verification not implemented)

Time = 0.47 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.44

$$\int \frac{e^{-\frac{x^2+(16x+4x^2)\log^2(x)+(64+36x+4x^2)\log^4(x)}{4\log^4(x)}}\left(e^5(-2x^2+2x^3)\log(x-x^2)+e^5(x^2-x^3)\log(x)\log(x-x^2)+e^5(-$$

$$= (\log(x) + \log(-x+1))e^{\left(-x^2-9\,x-\frac{x^2}{\log(x)^2}-\frac{4\,x}{\log(x)^2}-\frac{x^2}{4\,\log(x)^4}-11\right)}$$

input
```
integrate((((-4*x^3-14*x^2+18*x)*exp(5)*log(-x^2+x)+(4*x-2)*exp(5))*log(x)
^5+(-4*x^3-4*x^2+8*x)*exp(5)*log(-x^2+x)*log(x)^3+(4*x^3+12*x^2-16*x)*exp(
5)*log(-x^2+x)*log(x)^2+(-x^3+x^2)*exp(5)*log(-x^2+x)*log(x)+(2*x^3-2*x^2)
*exp(5)*log(-x^2+x))/(2*x^2-2*x)/log(x)^5/exp(1/4*((4*x^2+36*x+64)*log(x)^
4+(4*x^2+16*x)*log(x)^2+x^2)/log(x)^4),x, algorithm=\
```

output
```
(log(x) + log(-x + 1))*e^(-x^2 - 9*x - x^2/log(x)^2 - 4*x/log(x)^2 - 1/4*x
^2/log(x)^4 - 11)
```

3.953.8 Giac [F]

$$\int \frac{e^{-\frac{x^2+(16x+4x^2)\log^2(x)+(64+36x+4x^2)\log^4(x)}{4\log^4(x)}}\left(e^5(-2x^2+2x^3)\log(x-x^2)+e^5(x^2-x^3)\log(x)\log(x-x^2)+e^5(-$$

$$= \int -\frac{(4\,(x^3+x^2-2\,x)e^5\log(-x^2+x)\log(x)^3+2\,((2\,x^3+7\,x^2-9\,x)e^5\log(-x^2+x)-(2\,x-1)e^5)\log$$

input
```
integrate((((-4*x^3-14*x^2+18*x)*exp(5)*log(-x^2+x)+(4*x-2)*exp(5))*log(x)
^5+(-4*x^3-4*x^2+8*x)*exp(5)*log(-x^2+x)*log(x)^3+(4*x^3+12*x^2-16*x)*exp(
5)*log(-x^2+x)*log(x)^2+(-x^3+x^2)*exp(5)*log(-x^2+x)*log(x)+(2*x^3-2*x^2)
*exp(5)*log(-x^2+x))/(2*x^2-2*x)/log(x)^5/exp(1/4*((4*x^2+36*x+64)*log(x)^
4+(4*x^2+16*x)*log(x)^2+x^2)/log(x)^4),x, algorithm=\
```

output
```
undef
```

3.953.

$$\int \frac{e^{-\frac{x^2+(16x+4x^2)\log^2(x)+(64+36x+4x^2)\log^4(x)}{4\log^4(x)}}\left(e^5(-2x^2+2x^3)\log(x-x^2)+e^5(x^2-x^3)\log(x)\log(x-x^2)+e^5(-16x+12x^2+4x^3)\log^2(x)\log(x-$$

3.953.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-\frac{x^2+(16x+4x^2)\log^2(x)+(64+36x+4x^2)\log^4(x)}{4\log^4(x)}}\left(e^5(-2x^2+2x^3)\log(x-x^2)+e^5(x^2-x^3)\log(x)\log(x-x^2)+e^5(-\right.}{}$$

$$= \int -\frac{e^{-\frac{\frac{\ln(x)^2(4x^2+16x)}{4}+\frac{\ln(x)^4(4x^2+36x+64)}{4}+\frac{x^2}{4}}{\ln(x)^4}}\left((e^5(4x-2)-e^5\ln(x-x^2)(4x^3+14x^2-18x))\ln(x)^5-e^5\ln\right.}{}$$

input
```
int(-(exp(-((log(x)^2*(16*x + 4*x^2))/4 + (log(x)^4*(36*x + 4*x^2 + 64))/4
 + x^2/4)/log(x)^4)*(log(x)^5*(exp(5)*(4*x - 2) - exp(5)*log(x - x^2)*(14*
x^2 - 18*x + 4*x^3)) - exp(5)*log(x - x^2)*(2*x^2 - 2*x^3) - exp(5)*log(x
- x^2)*log(x)^3*(4*x^2 - 8*x + 4*x^3) + exp(5)*log(x - x^2)*log(x)^2*(12*x
^2 - 16*x + 4*x^3) + exp(5)*log(x - x^2)*log(x)*(x^2 - x^3)))/(log(x)^5*(2
*x - 2*x^2)),x)
```

output
```
int(-(exp(-((log(x)^2*(16*x + 4*x^2))/4 + (log(x)^4*(36*x + 4*x^2 + 64))/4
 + x^2/4)/log(x)^4)*(log(x)^5*(exp(5)*(4*x - 2) - exp(5)*log(x - x^2)*(14*
x^2 - 18*x + 4*x^3)) - exp(5)*log(x - x^2)*(2*x^2 - 2*x^3) - exp(5)*log(x
- x^2)*log(x)^3*(4*x^2 - 8*x + 4*x^3) + exp(5)*log(x - x^2)*log(x)^2*(12*x
^2 - 16*x + 4*x^3) + exp(5)*log(x - x^2)*log(x)*(x^2 - x^3)))/(log(x)^5*(2
*x - 2*x^2)), x)
```

3.954 $\int \frac{-10x-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}$

3.954.1 Optimal result

Integrand size = 74, antiderivative size = 23

$$\int \frac{-10x-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\,dx = -5+x^2\left(15-\frac{5}{\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\right)$$

output
```
(15-5/ln(5*ln(100/2401/x^2)))*x^2-5
```

3.954.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{-10x-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\,dx = 15x^2-\frac{5x^2}{\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)}$$

input
```
Integrate[(-10*x - 10*x*Log[100/(2401*x^2)]*Log[5*Log[100/(2401*x^2)]] + 3
0*x*Log[100/(2401*x^2)]*Log[5*Log[100/(2401*x^2)]]^2)/(Log[100/(2401*x^2)]
*Log[5*Log[100/(2401*x^2)]]^2),x]
```

output
```
15*x^2 - (5*x^2)/Log[5*Log[100/(2401*x^2)]]
```

3.954.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)-10x}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{10x\left(3\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)-\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)-1\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}dx$$

$$\Big\downarrow \text{27}$$

$$10\int -\frac{x\left(-3\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)+\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+1\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}dx$$

$$\Big\downarrow \text{25}$$

$$-10\int \frac{x\left(-3\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)+\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+1\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}dx$$

$$\Big\downarrow \text{7239}$$

$$-10\int x\left(\frac{1}{\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)}-3+\frac{1}{\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)\log\left(\frac{100}{2401x^2}\right)}\right)dx$$

$$\Big\downarrow \text{2010}$$

$$-10\int \left(\frac{x}{\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)}+\frac{x}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}-3x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-10\left(\frac{1}{2}\text{Subst}\left(\int \frac{1}{\log\left(\frac{100}{2401x}\right)\log^2\left(5\log\left(\frac{100}{2401x}\right)\right)}dx,x,x^2\right)+\frac{1}{2}\text{Subst}\left(\int \frac{1}{\log\left(5\log\left(\frac{100}{2401x}\right)\right)}dx,x,x^2\right)-\frac{3x^2}{2}\right)$$

input
```
Int[(-10*x - 10*x*Log[100/(2401*x^2)]*Log[5*Log[100/(2401*x^2)]] + 30*x*Lo
g[100/(2401*x^2)]*Log[5*Log[100/(2401*x^2)]]^2)/(Log[100/(2401*x^2)]*Log[5
*Log[100/(2401*x^2)]]^2),x]
```

3.954. $\int \frac{-10x-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}dx$

output
```
$Aborted
```

3.954.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.954.4 Maple [A] (verified)

Time = 5.58 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

method	result	size
norman	$\frac{-5x^2+15x^2\ln\left(5\ln\left(\frac{100}{2401x^2}\right)\right)}{\ln\left(5\ln\left(\frac{100}{2401x^2}\right)\right)}$	33
parallelrisch	$\frac{-5x^2+15x^2\ln\left(5\ln\left(\frac{100}{2401x^2}\right)\right)}{\ln\left(5\ln\left(\frac{100}{2401x^2}\right)\right)}$	33

3.954. $\int \frac{-10x-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\,dx$

input
```
int((30*x*ln(100/2401/x^2)*ln(5*ln(100/2401/x^2))^2-10*x*ln(100/2401/x^2)*
ln(5*ln(100/2401/x^2))-10*x)/ln(100/2401/x^2)/ln(5*ln(100/2401/x^2))^2,x,m
ethod=_RETURNVERBOSE)
```

output
```
(-5*x^2+15*x^2*ln(5*ln(100/2401/x^2)))/ln(5*ln(100/2401/x^2))
```

3.954.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

$$\int \frac{-10x-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\,dx$$
$$=\frac{5\left(3\,x^2\log\left(5\,\log\left(\frac{100}{2401\,x^2}\right)\right)-x^2\right)}{\log\left(5\,\log\left(\frac{100}{2401\,x^2}\right)\right)}$$

input
```
integrate((30*x*log(100/2401/x^2)*log(5*log(100/2401/x^2))^2-10*x*log(100/
2401/x^2)*log(5*log(100/2401/x^2))-10*x)/log(100/2401/x^2)/log(5*log(100/2
401/x^2))^2,x, algorithm=\
```

output
```
5*(3*x^2*log(5*log(100/2401/x^2)) - x^2)/log(5*log(100/2401/x^2))
```

3.954.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{-10x-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\,dx$$
$$=15x^2-\frac{5x^2}{\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)}$$

input
```
integrate((30*x*ln(100/2401/x**2)*ln(5*ln(100/2401/x**2))**2-10*x*ln(100/2
401/x**2)*ln(5*ln(100/2401/x**2))-10*x)/ln(100/2401/x**2)/ln(5*ln(100/2401
/x**2))**2,x)
```

output
```
15*x**2 - 5*x**2/log(5*log(100/(2401*x**2)))
```

3.954.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.30 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.87

$$\int \frac{-10x - 10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right) + 30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\,dx = 15\,x^2 - \frac{10\,x^2}{2i\,\pi + 2\,\log(5) + 2\,\log(2) + 2\,\log(2\,\log(7) - \log(5) - \log(2) + \log(x))}$$

input
```
integrate((30*x*log(100/2401/x^2)*log(5*log(100/2401/x^2))^2-10*x*log(100/
2401/x^2)*log(5*log(100/2401/x^2))-10*x)/log(100/2401/x^2)/log(5*log(100/2
401/x^2))^2,x, algorithm=\
```

output
```
15*x^2 - 10*x^2/(2*I*pi + 2*log(5) + 2*log(2) + 2*log(2*log(7) - log(5) -
log(2) + log(x)))
```

3.954.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 79 vs. 2(20) = 40.

Time = 0.44 (sec) , antiderivative size = 79, normalized size of antiderivative = 3.43

$$\int \frac{-10x - 10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right) + 30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\,dx = 15\,x^2 - \frac{5\,x^2\log\left(\frac{100}{2401\,x^2}\right)}{2\,\log(5)^2 + 2\,\log(5)\log(2) - \log(5)\log(2401\,x^2) + 2\,\log(5)\log\left(\log\left(\frac{100}{2401\,x^2}\right)\right) + 2\,\log(2)\log\left(\log\left(\frac{1}{240}\right.\right.}$$

input
```
integrate((30*x*log(100/2401/x^2)*log(5*log(100/2401/x^2))^2-10*x*log(100/
2401/x^2)*log(5*log(100/2401/x^2))-10*x)/log(100/2401/x^2)/log(5*log(100/2
401/x^2))^2,x, algorithm=\
```

output
```
15*x^2 - 5*x^2*log(100/2401/x^2)/(2*log(5)^2 + 2*log(5)*log(2) - log(5)*lo
g(2401*x^2) + 2*log(5)*log(log(100/2401/x^2)) + 2*log(2)*log(log(100/2401/
x^2)) - log(2401*x^2)*log(log(100/2401/x^2)))
```

3.954.9 Mupad [B] (verification not implemented)

Time = 17.97 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{-10x-10x\log\left(\frac{100}{2401x^2}\right)\log\left(5\log\left(\frac{100}{2401x^2}\right)\right)+30x\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}{\log\left(\frac{100}{2401x^2}\right)\log^2\left(5\log\left(\frac{100}{2401x^2}\right)\right)}\,dx$$
$$= 15\,x^2-\frac{5\,x^2}{\ln\left(5\,\ln\left(\frac{100}{2401\,x^2}\right)\right)}$$

input
```
int(-(10*x - 30*x*log(5*log(100/(2401*x^2)))^2*log(100/(2401*x^2)) + 10*x*
log(5*log(100/(2401*x^2)))*log(100/(2401*x^2)))/(log(5*log(100/(2401*x^2))
)^2*log(100/(2401*x^2))),x)
```

output
```
15*x^2 - (5*x^2)/log(5*log(100/(2401*x^2)))
```

3.955 $\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5(11x^2+6x^3+x^4)}{9x^2+6x^3+x^4}\,dx$

3.955.1 Optimal result

Integrand size = 55, antiderivative size = 29

$$\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5(11x^2+6x^3+x^4)}{9x^2+6x^3+x^4}\,dx = -3+\frac{12}{x}-e^5\left(-x+\frac{2}{3+x}\right)-4(x+\log(3))$$

output
```
12/x-4*ln(3)-4*x-3-exp(5)*(2/(3+x)-x)
```

3.955.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5(11x^2+6x^3+x^4)}{9x^2+6x^3+x^4}\,dx = \frac{12}{x}+\left(-4+e^5\right)x-\frac{2e^5}{3+x}$$

input
```
Integrate[(-108 - 72*x - 48*x^2 - 24*x^3 - 4*x^4 + E^5*(11*x^2 + 6*x^3 + x
^4))/(9*x^2 + 6*x^3 + x^4),x]
```

output
```
12/x + (-4 + E^5)*x - (2*E^5)/(3 + x)
```

3.955.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.073$, Rules used = {2026, 2007, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^4-24x^3-48x^2+e^5(x^4+6x^3+11x^2)-72x-108}{x^4+6x^3+9x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-4x^4-24x^3-48x^2+e^5(x^4+6x^3+11x^2)-72x-108}{x^2(x^2+6x+9)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-4x^4-24x^3-48x^2+e^5(x^4+6x^3+11x^2)-72x-108}{x^2(x+3)^2}dx$$

$$\Big\downarrow \text{2123}$$

$$\int \left(-\frac{12}{x^2}+\frac{2e^5}{(x+3)^2}-4\left(1-\frac{e^5}{4}\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\left(\left(4-e^5\right)x\right)-\frac{2e^5}{x+3}+\frac{12}{x}$$

input
```
Int[(-108 - 72*x - 48*x^2 - 24*x^3 - 4*x^4 + E^5*(11*x^2 + 6*x^3 + x^4))/(
9*x^2 + 6*x^3 + x^4),x]
```

output
```
12/x - (4 - E^5)*x - (2*E^5)/(3 + x)
```

3.955.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

3.955.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

method	result	size
default	$x\,\mathrm{e}^{5}-4x+\frac{12}{x}-\frac{2\,\mathrm{e}^{5}}{3+x}$	23
norman	$\frac{\left(\mathrm{e}^{5}-4\right)x^{3}+36+\left(-11\,\mathrm{e}^{5}+48\right)x}{(3+x)x}$	28
risch	$x\,\mathrm{e}^{5}-4x+\frac{\left(-2\,\mathrm{e}^{5}+12\right)x+36}{(3+x)x}$	28
gosper	$\frac{x^{3}\mathrm{e}^{5}-4x^{3}-11x\,\mathrm{e}^{5}+48x+36}{x(3+x)}$	31
parallelrisch	$\frac{x^{3}\mathrm{e}^{5}-4x^{3}-11x\,\mathrm{e}^{5}+48x+36}{x(3+x)}$	31

input
```
int((((x^4+6*x^3+11*x^2)*exp(5)-4*x^4-24*x^3-48*x^2-72*x-108)/(x^4+6*x^3+9*
x^2),x,method=_RETURNVERBOSE)
```

output
```
x*exp(5)-4*x+12/x-2*exp(5)/(3+x)
```

3.955. $\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5\left(11x^2+6x^3+x^4\right)}{9x^2+6x^3+x^4}\,dx$

3.955.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45

$$\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5(11x^2+6x^3+x^4)}{9x^2+6x^3+x^4}\,dx = -\frac{4\,x^3+12\,x^2-(x^3+3\,x^2-2\,x)e^5-12\,x-36}{x^2+3\,x}$$

input
```
integrate(((x^4+6*x^3+11*x^2)*exp(5)-4*x^4-24*x^3-48*x^2-72*x-108)/(x^4+6*
x^3+9*x^2),x, algorithm=\
```

output
```
-(4*x^3 + 12*x^2 - (x^3 + 3*x^2 - 2*x)*e^5 - 12*x - 36)/(x^2 + 3*x)
```

3.955.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

$$\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5(11x^2+6x^3+x^4)}{9x^2+6x^3+x^4}\,dx = -x\left(4-e^5\right)-\frac{x(-12+2e^5)-36}{x^2+3x}$$

input
```
integrate(((x**4+6*x**3+11*x**2)*exp(5)-4*x**4-24*x**3-48*x**2-72*x-108)/(
x**4+6*x**3+9*x**2),x)
```

output
```
-x*(4 - exp(5)) - (x*(-12 + 2*exp(5)) - 36)/(x**2 + 3*x)
```

3.955.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5(11x^2+6x^3+x^4)}{9x^2+6x^3+x^4}\,dx = x\left(e^5-4\right)-\frac{2\,(x(e^5-6)-18)}{x^2+3\,x}$$

input
```
integrate(((x^4+6*x^3+11*x^2)*exp(5)-4*x^4-24*x^3-48*x^2-72*x-108)/(x^4+6*
x^3+9*x^2),x, algorithm=\
```

output
```
x*(e^5 - 4) - 2*(x*(e^5 - 6) - 18)/(x^2 + 3*x)
```

3.955.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5(11x^2+6x^3+x^4)}{9x^2+6x^3+x^4}\,dx = xe^5-4\,x-\frac{2\,(xe^5-6\,x-18)}{x^2+3\,x}$$

input
```
integrate(((x^4+6*x^3+11*x^2)*exp(5)-4*x^4-24*x^3-48*x^2-72*x-108)/(x^4+6*
x^3+9*x^2),x, algorithm=\
```

output
```
x*e^5 - 4*x - 2*(x*e^5 - 6*x - 18)/(x^2 + 3*x)
```

3.955.9 Mupad [B] (verification not implemented)

Time = 14.31 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{-108-72x-48x^2-24x^3-4x^4+e^5(11x^2+6x^3+x^4)}{9x^2+6x^3+x^4}\,dx = x\,\left(\mathrm{e}^5-4\right)-\frac{x\,(2\,\mathrm{e}^5-12)-36}{x\,(x+3)}$$

input
```
int(-(72*x - exp(5)*(11*x^2 + 6*x^3 + x^4) + 48*x^2 + 24*x^3 + 4*x^4 + 108
)/(9*x^2 + 6*x^3 + x^4),x)
```

output
```
x*(exp(5) - 4) - (x*(2*exp(5) - 12) - 36)/(x*(x + 3))
```

3.956 $\int \frac{e^5(-4-x)-40x+19x^2+2x^3+e^5\log(2)}{-e^5x-5x^2+2x^3+e^5\log(2)}\,dx$

3.956.1 Optimal result

Integrand size = 55, antiderivative size = 28

$$\int \frac{e^5(-4-x)-40x+19x^2+2x^3+e^5\log(2)}{-e^5x-5x^2+2x^3+e^5\log(2)}\,dx = x+2\log\left(\left(x-\frac{x(x+x(-6+2x))}{e^5}-\log(2)\right)^2\right)$$

output
```
x+2*ln((x-ln(2)-x/exp(5)*(x+x*(2*x-6)))^2)
```

3.956.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{e^5(-4-x)-40x+19x^2+2x^3+e^5\log(2)}{-e^5x-5x^2+2x^3+e^5\log(2)}\,dx = x+4\log\left(e^5x+5x^2-2x^3-e^5\log(2)\right)$$

input
```
Integrate[(E^5*(-4 - x) - 40*x + 19*x^2 + 2*x^3 + E^5*Log[2])/(-(E^5*x) -
5*x^2 + 2*x^3 + E^5*Log[2]),x]
```

output
```
x + 4*Log[E^5*x + 5*x^2 - 2*x^3 - E^5*Log[2]]
```

3.956.3 Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.055, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3+19x^2-40x+e^5(-x-4)+e^5\log(2)}{2x^3-5x^2-e^5x+e^5\log(2)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-2x^3-19x^2+\left(40+e^5\right)x+e^5(4-\log(2))}{-2x^3+5x^2+e^5x-e^5\log(2)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4\left(-6x^2+10x+e^5\right)}{-2x^3+5x^2+e^5x-e^5\log(2)}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$4\log\left(-2x^3+5x^2+e^5x-e^5\log(2)\right)+x$$

input
```
Int[(E^5*(-4 - x) - 40*x + 19*x^2 + 2*x^3 + E^5*Log[2])/(-(E^5*x) - 5*x^2
+ 2*x^3 + E^5*Log[2]),x]
```

output
```
x + 4*Log[E^5*x + 5*x^2 - 2*x^3 - E^5*Log[2]]
```

3.956.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.956.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

method	result	size
parallelrisch	$x+4\ln\left(\frac{\mathrm{e}^{5}\ln(2)}{2}-\frac{x\,\mathrm{e}^{5}}{2}+x^{3}-\frac{5x^{2}}{2}\right)$	26
default	$x+4\ln\left(\mathrm{e}^{5}\ln\left(2\right)-x\,\mathrm{e}^{5}+2x^{3}-5x^{2}\right)$	27
norman	$x+4\ln\left(\mathrm{e}^{5}\ln\left(2\right)-x\,\mathrm{e}^{5}+2x^{3}-5x^{2}\right)$	27
risch	$x+4\ln\left(\mathrm{e}^{5}\ln\left(2\right)-x\,\mathrm{e}^{5}+2x^{3}-5x^{2}\right)$	27

input
```
int((exp(5)*ln(2)+(-4-x)*exp(5)+2*x^3+19*x^2-40*x)/(exp(5)*ln(2)-x*exp(5)+
2*x^3-5*x^2),x,method=_RETURNVERBOSE)
```

output
```
x+4*ln(1/2*exp(5)*ln(2)-1/2*x*exp(5)+x^3-5/2*x^2)
```

3.956.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^5(-4-x)-40x+19x^2+2x^3+e^5\log(2)}{-e^5x-5x^2+2x^3+e^5\log(2)}\,dx = x+4\,\log\left(2\,x^{3}-5\,x^{2}-xe^{5}+e^{5}\log\left(2\right)\right)$$

input
```
integrate((exp(5)*log(2)+(-4-x)*exp(5)+2*x^3+19*x^2-40*x)/(exp(5)*log(2)-x
*exp(5)+2*x^3-5*x^2),x, algorithm=\
```

output
```
x + 4*log(2*x^3 - 5*x^2 - x*e^5 + e^5*log(2))
```

3.956.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^5(-4-x)-40x+19x^2+2x^3+e^5\log(2)}{-e^5x-5x^2+2x^3+e^5\log(2)}\,dx = x+4\log\left(2x^{3}-5x^{2}-xe^{5}+e^{5}\log\left(2\right)\right)$$

input
```
integrate((exp(5)*ln(2)+(-4-x)*exp(5)+2*x**3+19*x**2-40*x)/(exp(5)*ln(2)-x
*exp(5)+2*x**3-5*x**2),x)
```

output
```
x + 4*log(2*x**3 - 5*x**2 - x*exp(5) + exp(5)*log(2))
```

3.956.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^5(-4-x)-40x+19x^2+2x^3+e^5\log(2)}{-e^5x-5x^2+2x^3+e^5\log(2)}\,dx = x+4\,\log\left(2\,x^3-5\,x^2-xe^5+e^5\log\left(2\right)\right)$$

input
```
integrate((exp(5)*log(2)+(-4-x)*exp(5)+2*x^3+19*x^2-40*x)/(exp(5)*log(2)-x
*exp(5)+2*x^3-5*x^2),x, algorithm=\
```

output
```
x + 4*log(2*x^3 - 5*x^2 - x*e^5 + e^5*log(2))
```

3.956.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{e^5(-4-x)-40x+19x^2+2x^3+e^5\log(2)}{-e^5x-5x^2+2x^3+e^5\log(2)}\,dx = x+4\,\log\left(\left|2\,x^3-5\,x^2-xe^5+e^5\log\left(2\right)\right|\right)$$

input
```
integrate((exp(5)*log(2)+(-4-x)*exp(5)+2*x^3+19*x^2-40*x)/(exp(5)*log(2)-x
*exp(5)+2*x^3-5*x^2),x, algorithm=\
```

output
```
x + 4*log(abs(2*x^3 - 5*x^2 - x*e^5 + e^5*log(2)))
```

3.956.9 Mupad [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^5(-4-x)-40x+19x^2+2x^3+e^5\log(2)}{-e^5x-5x^2+2x^3+e^5\log(2)}\,dx = x+4\,\ln\left(2\,x^3-5\,x^2-\mathrm{e}^5\,x+\mathrm{e}^5\,\ln\left(2\right)\right)$$

input
```
int((exp(5)*log(2) - 40*x - exp(5)*(x + 4) + 19*x^2 + 2*x^3)/(exp(5)*log(2
) - x*exp(5) - 5*x^2 + 2*x^3),x)
```

output
```
x + 4*log(exp(5)*log(2) - x*exp(5) - 5*x^2 + 2*x^3)
```

3.957 $\int \frac{14e^5+63x+42x^2+(-63x-84x^2)\log(x)-6e^5x\log^2(x)}{7e^5x\log^2(x)}\,dx$

3.957.1 Optimal result

Integrand size = 50, antiderivative size = 25

$$\int \frac{14e^5+63x+42x^2+(-63x-84x^2)\log(x)-6e^5x\log^2(x)}{7e^5x\log^2(x)}\,dx = -\frac{6x}{7}-\frac{2+\frac{3x(3+2x)}{e^5}}{\log(x)}$$

output
```
-6/7*x-(2+3*x*(3+2*x)/exp(5))/ln(x)
```

3.957.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{14e^5+63x+42x^2+(-63x-84x^2)\log(x)-6e^5x\log^2(x)}{7e^5x\log^2(x)}\,dx = -\frac{6x}{7}+\frac{-2e^5-9x-6x^2}{e^5\log(x)}$$

input
```
Integrate[(14*E^5 + 63*x + 42*x^2 + (-63*x - 84*x^2)*Log[x] - 6*E^5*x*Log[
x]^2)/(7*E^5*x*Log[x]^2),x]
```

output
```
(-6*x)/7 + (-2*E^5 - 9*x - 6*x^2)/(E^5*Log[x])
```

3.957.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{42x^2+(-84x^2-63x)\log(x)+63x-6e^5x\log^2(x)+14e^5}{7e^5x\log^2(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \frac{42x^2-6e^5\log^2(x)x+63x-21(4x^2+3x)\log(x)+14e^5}{x\log^2(x)}dx}{7e^5}$$

$$\Big\downarrow \text{7293}$$

$$\frac{\int \left(-\frac{21(4x+3)}{\log(x)}+\frac{7(6x^2+9x+2e^5)}{x\log^2(x)}-6e^5\right)dx}{7e^5}$$

$$\Big\downarrow \text{2009}$$

$$\frac{7\int \frac{6x^2+9x+2e^5}{x\log^2(x)}dx-84\,\text{ExpIntegralEi}(2\log(x))-63\,\text{LogIntegral}(x)-6e^5x}{7e^5}$$

input
```
Int[(14*E^5 + 63*x + 42*x^2 + (-63*x - 84*x^2)*Log[x] - 6*E^5*x*Log[x]^2)/
(7*E^5*x*Log[x]^2),x]
```

output
```
$Aborted
```

3.957.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.957.4 Maple [A] (verified)

Time = 0.31 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

method	result
risch	$-\frac{6x}{7}-\frac{\mathrm{e}^{-5}(6x^2+2\,\mathrm{e}^5+9x)}{\ln(x)}$
norman	$\frac{-2-9x\,\mathrm{e}^{-5}-\frac{6x\ln(x)}{7}-6x^2\mathrm{e}^{-5}}{\ln(x)}$
parallelrisch	$-\frac{\mathrm{e}^{-5}(6x\,\mathrm{e}^5\ln(x)+42x^2+14\,\mathrm{e}^5+63x)}{7\ln(x)}$
default	$\frac{\mathrm{e}^{-5}\left(-6x\,\mathrm{e}^5-\frac{42x^2}{\ln(x)}-\frac{14\,\mathrm{e}^5}{\ln(x)}-\frac{63x}{\ln(x)}\right)}{7}$
parts	$-\frac{6x}{7}+\mathrm{e}^{-5}\left(-\frac{6x^2}{\ln(x)}-12\,\mathrm{Ei}_1(-2\ln(x))-\frac{2\,\mathrm{e}^5}{\ln(x)}-\frac{9x}{\ln(x)}-9\,\mathrm{Ei}_1(-\ln(x))\right)-3\,\mathrm{e}^{-5}(-3\,\mathrm{Ei}_1(-$

input
```
int(1/7*(-6*x*exp(5)*ln(x)^2+(-84*x^2-63*x)*ln(x)+14*exp(5)+42*x^2+63*x)/x
/exp(5)/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
-6/7*x-exp(-5)*(6*x^2+2*exp(5)+9*x)/ln(x)
```

3.957.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{14e^5+63x+42x^2+(-63x-84x^2)\log(x)-6e^5x\log^2(x)}{7e^5x\log^2(x)}\,dx = -\frac{(6\,xe^5\log(x)+42\,x^2+63\,x+14\,e^5)e^{(-5)}}{7\,\log(x)}$$

input
```
integrate(1/7*(-6*x*exp(5)*log(x)^2+(-84*x^2-63*x)*log(x)+14*exp(5)+42*x^2
+63*x)/x/exp(5)/log(x)^2,x, algorithm=\
```

output
```
-1/7*(6*x*e^5*log(x) + 42*x^2 + 63*x + 14*e^5)*e^(-5)/log(x)
```

3.957.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{14e^5+63x+42x^2+(-63x-84x^2)\log(x)-6e^5x\log^2(x)}{7e^5x\log^2(x)}\,dx = -\frac{6x}{7}+\frac{-6x^2-9x-2e^5}{e^5\log{(x)}}$$

input
```
integrate(1/7*(-6*x*exp(5)*ln(x)**2+(-84*x**2-63*x)*ln(x)+14*exp(5)+42*x**
2+63*x)/x/exp(5)/ln(x)**2,x)
```

output
```
-6*x/7 + (-6*x**2 - 9*x - 2*exp(5))*exp(-5)/log(x)
```

3.957.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.24 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.84

$$\int \frac{14e^5+63x+42x^2+(-63x-84x^2)\log(x)-6e^5x\log^2(x)}{7e^5x\log^2(x)}\,dx = -\frac{1}{7}\left(6\,xe^5+\frac{14\,e^5}{\log{(x)}}+84\,\mathrm{Ei}(2\,\log{(x)})+63\,\mathrm{Ei}(\log{(x)})-63\,\Gamma(-1,-\log{(x)})-84\,\Gamma(-1,-2\,\log{(x)})\right)e^{(}$$

input
```
integrate(1/7*(-6*x*exp(5)*log(x)^2+(-84*x^2-63*x)*log(x)+14*exp(5)+42*x^2
+63*x)/x/exp(5)/log(x)^2,x, algorithm=\
```

output
```
-1/7*(6*x*e^5 + 14*e^5/log(x) + 84*Ei(2*log(x)) + 63*Ei(log(x)) - 63*gamma
(-1, -log(x)) - 84*gamma(-1, -2*log(x)))*e^(-5)
```

3.957.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{14e^5+63x+42x^2+(-63x-84x^2)\log(x)-6e^5x\log^2(x)}{7e^5x\log^2(x)}\,dx = -\frac{(6\,xe^5\log{(x)}+42\,x^2+63\,x+14\,e^5)e^{(-5)}}{7\,\log{(x)}}$$

input
```
integrate(1/7*(-6*x*exp(5)*log(x)^2+(-84*x^2-63*x)*log(x)+14*exp(5)+42*x^2
+63*x)/x/exp(5)/log(x)^2,x, algorithm=\
```

output
```
-1/7*(6*x*e^5*log(x) + 42*x^2 + 63*x + 14*e^5)*e^(-5)/log(x)
```

3.957.9 Mupad [B] (verification not implemented)

Time = 14.74 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{14e^5 + 63x + 42x^2 + (-63x - 84x^2)\log(x) - 6e^5x\log^2(x)}{7e^5x\log^2(x)}\,dx$$
$$= -\frac{6\,x}{7} - \frac{6\,e^{-5}\,x^2 + 9\,e^{-5}\,x + 2}{\ln{(x)}}$$

input
```
int((exp(-5)*(9*x + 2*exp(5) - (log(x)*(63*x + 84*x^2))/7 + 6*x^2 - (6*x*e
xp(5)*log(x)^2)/7))/(x*log(x)^2),x)
```

output
```
- (6*x)/7 - (9*x*exp(-5) + 6*x^2*exp(-5) + 2)/log(x)
```

3.958 $\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(9$

3.958.1 Optimal result

Integrand size = 117, antiderivative size = 33

$$\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)}{(3x^3+x^4)\log^2(x)} = \frac{3\left(\frac{2(e^2+x)}{\log(x)}-\frac{\left(5+e^{e^x}\right)\log(3+x)}{x}\right)}{x}$$

output
```
3/x*(2/ln(x)*(x+exp(2))-ln(3+x)/x*(exp(exp(x))+5))
```

3.958.2 Mathematica [A] (verified)

Time = 1.20 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)}{(3x^3+x^4)\log^2(x)} = -\frac{3\left(-2x(e^2+x)+\left(5+e^{e^x}\right)\log(x)\log(3+x)\right)}{x^2\log(x)}$$

input
```
Integrate[(-18*x^2 - 6*x^3 + E^2*(-18*x - 6*x^2) + E^2*(-18*x - 6*x^2)*Log
[x] - 15*x*Log[x]^2 + (90 + 30*x)*Log[x]^2*Log[3 + x] + E^E^x*(-3*x*Log[x]
^2 + (18 + 6*x + E^x*(-9*x - 3*x^2))*Log[x]^2*Log[3 + x]))/((3*x^3 + x^4)*
Log[x]^2),x]
```

3.958.

$$\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+e^{e^x}\left(-3x\log^2(x)+(18+6x+e^x(-9x-3x^2))\log^2\right.}{(3x^3+x^4)\log^2(x)}$$

output
```
(-3*(-2*x*(E^2 + x) + (5 + E^E^x)*Log[x]*Log[3 + x]))/(x^2*Log[x])
```

3.958.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x^3-18x^2+e^2\left(-6x^2-18x\right)+e^{e^x}\left(\left(e^x\left(-3x^2-9x\right)+6x+18\right)\log^2(x)\log(x+3)-3x\log^2(x)\right)+e^2\left(-6x^2\right.}{\left(x^4+3x^3\right)\log^2(x)}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-6x^3-18x^2+e^2\left(-6x^2-18x\right)+e^{e^x}\left(\left(e^x\left(-3x^2-9x\right)+6x+18\right)\log^2(x)\log(x+3)-3x\log^2(x)\right)+e^2\left(-6x^2\right.}{x^3(x+3)\log^2(x)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{18e^{e^x}\log(x+3)}{x^3(x+3)}+\frac{30\log(x+3)}{x^3}-\frac{3e^{e^x}}{x^2(x+3)}-\frac{15}{x^2(x+3)}-\frac{6e^2}{x^2\log^2(x)}+\frac{6e^{e^x}\log(x+3)}{x^2(x+3)}-\frac{3e^{x+e^x}\log(x+}{x^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$-6\int \frac{\int \frac{e^{e^x}}{x^3}dx}{x+3}dx+6\log(x+3)\int \frac{e^{e^x}}{x^3}dx-\int \frac{e^{e^x}}{x^2}dx+3\int \frac{\int \frac{e^{x+e^x}}{x^2}dx}{x+3}dx-3\log(x+3)\int \frac{e^{x+e^x}}{x^2}dx+\frac{1}{3}\int \frac{e^{e^x}}{x}dx-\frac{1}{3}\int \frac{e^{e^x}}{x+3}dx-6\int \frac{1}{(x+3)\log^2(x)}dx-18\int \frac{1}{x(x+3)\log^2(x)}dx-\frac{15\log(x+3)}{x^2}+\frac{6e^2}{x\log(x)}$$

input
```
Int[(-18*x^2 - 6*x^3 + E^2*(-18*x - 6*x^2) + E^2*(-18*x - 6*x^2)*Log[x] -
15*x*Log[x]^2 + (90 + 30*x)*Log[x]^2*Log[3 + x] + E^E^x*(-3*x*Log[x]^2 + (
18 + 6*x + E^x*(-9*x - 3*x^2))*Log[x]^2*Log[3 + x]))/((3*x^3 + x^4)*Log[x]
^2),x]
```

output
```
$Aborted
```

3.958.
$$\int \frac{-18x^2-6x^3+e^2\left(-18x-6x^2\right)+e^2\left(-18x-6x^2\right)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+e^{e^x}\left(-3x\log^2(x)+\left(18+6x+e^x\left(-9x-3x^2\right)\right)\log^2\right.}{\left(3x^3+x^4\right)\log^2(x)}$$

3.958.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.958.4 Maple [A] (verified)

Time = 272.62 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

method	result	size
risch	$-\frac{15\ln(3+x)}{x^2}+\frac{6x+6\,\mathrm{e}^2}{x\ln(x)}-\frac{3\ln(3+x)\mathrm{e}^{\mathrm{e}^x}}{x^2}$	36
parallelrisch	$\frac{-3\ln(x)\ln(3+x)\mathrm{e}^{\mathrm{e}^x}+6\,\mathrm{e}^2x+6x^2-15\ln(x)\ln(3+x)}{x^2\ln(x)}$	39

input
```
int(((((-3*x^2-9*x)*exp(x)+18+6*x)*ln(x)^2*ln(3+x)-3*x*ln(x)^2)*exp(exp(x)
)+(30*x+90)*ln(x)^2*ln(3+x)-15*x*ln(x)^2+(-6*x^2-18*x)*exp(2)*ln(x)+(-6*x^
2-18*x)*exp(2)-6*x^3-18*x^2)/(x^4+3*x^3)/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
-15/x^2*ln(3+x)+6/x*(x+exp(2))/ln(x)-3/x^2*ln(3+x)*exp(exp(x))
```

3.958.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.15

$$\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+}{(3x^3+x^4)\log^2(x)}$$
$$=-\frac{3\left(e^{\left(e^{x}\right)}\log\left(x+3\right)\log\left(x\right)-2\,x^2-2\,xe^2+5\,\log\left(x+3\right)\log\left(x\right)\right)}{x^2\log\left(x\right)}$$

3.958.
$$\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+e^{e^x}\left(-3x\log^2(x)+(18+6x+e^x(-9x-3x^2))\log^2\right.}{(3x^3+x^4)\log^2(x)}$$

input
```
integrate(((((-3*x^2-9*x)*exp(x)+18+6*x)*log(x)^2*log(3+x)-3*x*log(x)^2)*e
xp(exp(x))+(30*x+90)*log(x)^2*log(3+x)-15*x*log(x)^2+(-6*x^2-18*x)*exp(2)*
log(x)+(-6*x^2-18*x)*exp(2)-6*x^3-18*x^2)/(x^4+3*x^3)/log(x)^2,x, algorith
m=\
```

output
```
-3*(e^(e^x)*log(x + 3)*log(x) - 2*x^2 - 2*x*e^2 + 5*log(x + 3)*log(x))/(x^
2*log(x))
```

3.958.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.12

$$\int \frac{-18x^2 - 6x^3 + e^2(-18x - 6x^2) + e^2(-18x - 6x^2)\log(x) - 15x\log^2(x) + (90 + 30x)\log^2(x)\log(3 + x)}{(3x^3 + x^4)\log^2(x)}$$

$$= \frac{6x + 6e^2}{x\log(x)} - \frac{3e^{e^x}\log(x + 3)}{x^2} - \frac{15\log(x + 3)}{x^2}$$

input
```
integrate(((((-3*x**2-9*x)*exp(x)+18+6*x)*ln(x)**2*ln(3+x)-3*x*ln(x)**2)*e
xp(exp(x))+(30*x+90)*ln(x)**2*ln(3+x)-15*x*ln(x)**2+(-6*x**2-18*x)*exp(2)*
ln(x)+(-6*x**2-18*x)*exp(2)-6*x**3-18*x**2)/(x**4+3*x**3)/ln(x)**2,x)
```

output
```
(6*x + 6*exp(2))/(x*log(x)) - 3*exp(exp(x))*log(x + 3)/x**2 - 15*log(x + 3
)/x**2
```

3.958.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.15

$$\int \frac{-18x^2 - 6x^3 + e^2(-18x - 6x^2) + e^2(-18x - 6x^2)\log(x) - 15x\log^2(x) + (90 + 30x)\log^2(x)\log(3 + x)}{(3x^3 + x^4)\log^2(x)}$$

$$= -\frac{3\left(e^{(e^x)}\log(x + 3)\log(x) - 2x^2 - 2xe^2 + 5\log(x + 3)\log(x)\right)}{x^2\log(x)}$$

input
```
integrate(((((-3*x^2-9*x)*exp(x)+18+6*x)*log(x)^2*log(3+x)-3*x*log(x)^2)*e
xp(exp(x))+(30*x+90)*log(x)^2*log(3+x)-15*x*log(x)^2+(-6*x^2-18*x)*exp(2)*
log(x)+(-6*x^2-18*x)*exp(2)-6*x^3-18*x^2)/(x^4+3*x^3)/log(x)^2,x, algorith
m=\
```

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$$\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+e^{e^x}\left(-3x\log^2(x)+\left(18+6x+e^x\left(-9x-3x^2\right)\right)\log^2\right.}{(3x^3+x^4)\log^2(x)}$$

output
```
-3*(e^(e^x)*log(x + 3)*log(x) - 2*x^2 - 2*x*e^2 + 5*log(x + 3)*log(x))/(x^
2*log(x))
```

3.958.8 Giac [F]

$$\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+}{(3x^3+x^4)\log^2(x)}$$
$$=\int \frac{3\left(10\,(x+3)\log\left(x+3\right)\log\left(x\right)^2-2\,x^3-2\,(x^2+3\,x)e^2\log\left(x\right)-5\,x\log\left(x\right)^2-6\,x^2-2\,(x^2+3\,x)e^2-\right.}{(x^4+3\,x^3)\log\left(x\right)^2}$$

input
```
integrate(((((-3*x^2-9*x)*exp(x)+18+6*x)*log(x)^2*log(3+x)-3*x*log(x)^2)*e
xp(exp(x))+(30*x+90)*log(x)^2*log(3+x)-15*x*log(x)^2+(-6*x^2-18*x)*exp(2)*
log(x)+(-6*x^2-18*x)*exp(2)-6*x^3-18*x^2)/(x^4+3*x^3)/log(x)^2,x, algorith
m=\
```

output
```
integrate(3*(10*(x + 3)*log(x + 3)*log(x)^2 - 2*x^3 - 2*(x^2 + 3*x)*e^2*lo
g(x) - 5*x*log(x)^2 - 6*x^2 - 2*(x^2 + 3*x)*e^2 - (((x^2 + 3*x)*e^x - 2*x
- 6)*log(x + 3)*log(x)^2 + x*log(x)^2)*e^(e^x))/((x^4 + 3*x^3)*log(x)^2),
x)
```

3.958.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+}{(3x^3+x^4)\log^2(x)}$$
$$=\int -\frac{15\,x\ln\left(x\right)^2+\mathrm{e}^2\left(6\,x^2+18\,x\right)+18\,x^2+6\,x^3+\mathrm{e}^{\mathrm{e}^x}\left(3\,x\ln\left(x\right)^2-\ln\left(x+3\right)\,\ln\left(x\right)^2\left(6\,x-\mathrm{e}^x\left(3\,x^2+9\,x\right)\right.\right.}{\ln\left(x\right)^2\,\left(x^4+3\,x^3\right)}$$

input
```
int(-(15*x*log(x)^2 + exp(2)*(18*x + 6*x^2) + 18*x^2 + 6*x^3 + exp(exp(x))
*(3*x*log(x)^2 - log(x + 3)*log(x)^2*(6*x - exp(x)*(9*x + 3*x^2) + 18)) +
exp(2)*log(x)*(18*x + 6*x^2) - log(x + 3)*log(x)^2*(30*x + 90))/(log(x)^2*
(3*x^3 + x^4)),x)
```

3.958. $\int \frac{-18x^2-6x^3+e^2(-18x-6x^2)+e^2(-18x-6x^2)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+e^{e^x}(-3x\log^2(x)+(18+6x+e^x(-9x-3x^2))\log^2}{(3x^3+x^4)\log^2(x)}$

output
```
int(-(15*x*log(x)^2 + exp(2)*(18*x + 6*x^2) + 18*x^2 + 6*x^3 + exp(exp(x))
*(3*x*log(x)^2 - log(x + 3)*log(x)^2*(6*x - exp(x)*(9*x + 3*x^2) + 18)) +
exp(2)*log(x)*(18*x + 6*x^2) - log(x + 3)*log(x)^2*(30*x + 90))/(log(x)^2*
(3*x^3 + x^4)), x)
```

3.958.

$$\int \frac{-18x^2-6x^3+e^2\left(-18x-6x^2\right)+e^2\left(-18x-6x^2\right)\log(x)-15x\log^2(x)+(90+30x)\log^2(x)\log(3+x)+e^{e^x}\left(-3x\log^2(x)+\left(18+6x+e^x\left(-9x-3x^2\right)\right)\log^2\right.}{\left(3x^3+x^4\right)\log^2(x)}$$

3.959 $\int \frac{}{-x^4-9x^3\log(3)-27x^2\log^2(3)-27x\log^3(3)+(-15x^3\log(3)+(-90x^2}$

3.959.1 Optimal result

Integrand size = 177, antiderivative size = 20

$$\int \frac{}{-x^4-9x^3\log(3)-27x^2\log^2(3)-27x\log^3(3)+\left(-15x^3\log(3)+\left(-90x^2+3x^3\right)\log^2(3)+\left(-135x+18\right.\right.}$$
$$=\frac{16}{(x+\log(3)(3+(5-\log(3))\log(x)))^2}$$

output
```
16/(((5-ln(3))*ln(x)+3)*ln(3)+x)^2
```

3.959.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{}{-x^4-9x^3\log(3)-27x^2\log^2(3)-27x\log^3(3)+\left(-15x^3\log(3)+\left(-90x^2+3x^3\right)\log^2(3)+\left(-135x+18\right.\right.}$$
$$=\frac{16}{(x+\log(27)-(-5+\log(3))\log(3)\log(x))^2}$$

input
```
Integrate[(32*x + 160*Log[3] - 32*Log[3]^2)/(-x^4 - 9*x^3*Log[3] - 27*x^2*
Log[3]^2 - 27*x*Log[3]^3 + (-15*x^3*Log[3] + (-90*x^2 + 3*x^3)*Log[3]^2 +
(-135*x + 18*x^2)*Log[3]^3 + 27*x*Log[3]^4)*Log[x] + (-75*x^2*Log[3]^2 + (
-225*x + 30*x^2)*Log[3]^3 + (90*x - 3*x^2)*Log[3]^4 - 9*x*Log[3]^5)*Log[x]
^2 + (-125*x*Log[3]^3 + 75*x*Log[3]^4 - 15*x*Log[3]^5 + x*Log[3]^6)*Log[x]
^3),x]
```

output
```
16/(x + Log[27] - (-5 + Log[3])*Log[3]*Log[x])^2
```

3.959.3 Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.023$, Rules used = {7239, 27, 25, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{}{-x^4-9x^3\log(3)-27x^2\log^2(3)+\left(\left(90x-3x^2\right)\log^4(3)+\left(30x^2-225x\right)\log^3(3)-75x^2\log^2(3)-9x\log^5(3)\right)\log}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{32((\log(3)-5)\log(3)-x)}{x(x-(\log(3)-5)\log(3)\log(x)+\log(27))^3}dx$$

$$\Big\downarrow \text{27}$$

$$32\int -\frac{x+(5-\log(3))\log(3)}{x(x+(5-\log(3))\log(3)\log(x)+\log(27))^3}dx$$

$$\Big\downarrow \text{25}$$

$$-32\int \frac{x+(5-\log(3))\log(3)}{x(x+(5-\log(3))\log(3)\log(x)+\log(27))^3}dx$$

$$\Big\downarrow \text{7237}$$

$$\frac{16}{(x+(5-\log(3))\log(3)\log(x)+\log(27))^2}$$

input
```
Int[(32*x + 160*Log[3] - 32*Log[3]^2)/(-x^4 - 9*x^3*Log[3] - 27*x^2*Log[3]
^2 - 27*x*Log[3]^3 + (-15*x^3*Log[3] + (-90*x^2 + 3*x^3)*Log[3]^2 + (-135*
x + 18*x^2)*Log[3]^3 + 27*x*Log[3]^4)*Log[x] + (-75*x^2*Log[3]^2 + (-225*x
 + 30*x^2)*Log[3]^3 + (90*x - 3*x^2)*Log[3]^4 - 9*x*Log[3]^5)*Log[x]^2 + (
-125*x*Log[3]^3 + 75*x*Log[3]^4 - 15*x*Log[3]^5 + x*Log[3]^6)*Log[x]^3),x]
```

output
```
16/(x + Log[27] + (5 - Log[3])*Log[3]*Log[x])^2
```

3.959.

$$\int \frac{32x+160\log(3)-32\log}{-x^4-9x^3\log(3)-27x^2\log^2(3)-27x\log^3(3)+\left(-15x^3\log(3)+\left(-90x^2+3x^3\right)\log^2(3)+\left(-135x+18x^2\right)\log^3(3)+27x\log^4(3)\right)\log(x)+\left(-75x^2\log^2(3\right.}$$

3.959.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.959.4 Maple [A] (verified)

Time = 3.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30

method	result
default	$\frac{16}{\left(\ln(3)^{2}\ln(x)-5\ln(3)\ln(x)-3\ln(3)-x\right)^{2}}$
norman	$\frac{16}{\left(\ln(3)^{2}\ln(x)-5\ln(3)\ln(x)-3\ln(3)-x\right)^{2}}$
risch	$\frac{16}{\left(\ln(3)^{2}\ln(x)-5\ln(3)\ln(x)-3\ln(3)-x\right)^{2}}$
parallelrisch	$\frac{16}{\ln(x)^{2}\ln(3)^{4}-10\ln(3)^{3}\ln(x)^{2}-6\ln(x)\ln(3)^{3}-2x\ln(x)\ln(3)^{2}+25\ln(3)^{2}\ln(x)^{2}+30\ln(3)^{2}\ln(x)+10x\ln(3)\ln(x)+9\ln(3)^{2}+6x}$ [cut off]

input
```
int((-32*ln(3)^2+160*ln(3)+32*x)/((x*ln(3)^6-15*x*ln(3)^5+75*x*ln(3)^4-125
*x*ln(3)^3)*ln(x)^3+(-9*x*ln(3)^5+(-3*x^2+90*x)*ln(3)^4+(30*x^2-225*x)*ln(
3)^3-75*x^2*ln(3)^2)*ln(x)^2+(27*x*ln(3)^4+(18*x^2-135*x)*ln(3)^3+(3*x^3-9
0*x^2)*ln(3)^2-15*x^3*ln(3))*ln(x)-27*x*ln(3)^3-27*x^2*ln(3)^2-9*x^3*ln(3)
-x^4),x,method=_RETURNVERBOSE)
```

output
```
16/(ln(3)^2*ln(x)-5*ln(3)*ln(x)-3*ln(3)-x)^2
```

3.959.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(20) = 40$.

Time = 0.27 (sec) , antiderivative size = 65, normalized size of antiderivative = 3.25

$$\int \frac{}{-x^4 - 9x^3\log(3) - 27x^2\log^2(3) - 27x\log^3(3) + (-15x^3\log(3) + (-90x^2 + 3x^3)\log^2(3) + (-135x + 18}$$
$$= \frac{16}{(\log(3)^4 - 10\log(3)^3 + 25\log(3)^2)\log(x)^2 + x^2 + 6x\log(3) + 9\log(3)^2 - 2((x-15)\log(3)^2 + 3\log}$$

input
```
integrate((-32*log(3)^2+160*log(3)+32*x)/((x*log(3)^6-15*x*log(3)^5+75*x*l
og(3)^4-125*x*log(3)^3)*log(x)^3+(-9*x*log(3)^5+(-3*x^2+90*x)*log(3)^4+(30
*x^2-225*x)*log(3)^3-75*x^2*log(3)^2)*log(x)^2+(27*x*log(3)^4+(18*x^2-135*
x)*log(3)^3+(3*x^3-90*x^2)*log(3)^2-15*x^3*log(3))*log(x)-27*x*log(3)^3-27
*x^2*log(3)^2-9*x^3*log(3)-x^4),x, algorithm=\
```

output
```
16/((log(3)^4 - 10*log(3)^3 + 25*log(3)^2)*log(x)^2 + x^2 + 6*x*log(3) + 9
*log(3)^2 - 2*((x - 15)*log(3)^2 + 3*log(3)^3 - 5*x*log(3))*log(x))
```

3.959.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(17) = 34$.

Time = 0.22 (sec) , antiderivative size = 73, normalized size of antiderivative = 3.65

$$\int \frac{}{-x^4 - 9x^3\log(3) - 27x^2\log^2(3) - 27x\log^3(3) + (-15x^3\log(3) + (-90x^2 + 3x^3)\log^2(3) + (-135x + 18}$$
$$= \frac{16}{x^2 + 6x\log(3) + (-2x\log(3)^2 + 10x\log(3) - 6\log(3)^3 + 30\log(3)^2)\log(x) + (-10\log(3)^3 + \log(3)^4}$$

input
```
integrate((-32*ln(3)**2+160*ln(3)+32*x)/((x*ln(3)**6-15*x*ln(3)**5+75*x*ln
(3)**4-125*x*ln(3)**3)*ln(x)**3+(-9*x*ln(3)**5+(-3*x**2+90*x)*ln(3)**4+(30
*x**2-225*x)*ln(3)**3-75*x**2*ln(3)**2)*ln(x)**2+(27*x*ln(3)**4+(18*x**2-1
35*x)*ln(3)**3+(3*x**3-90*x**2)*ln(3)**2-15*x**3*ln(3))*ln(x)-27*x*ln(3)**
3-27*x**2*ln(3)**2-9*x**3*ln(3)-x**4),x)
```

output
```
16/(x**2 + 6*x*log(3) + (-2*x*log(3)**2 + 10*x*log(3) - 6*log(3)**3 + 30*l
og(3)**2)*log(x) + (-10*log(3)**3 + log(3)**4 + 25*log(3)**2)*log(x)**2 +
9*log(3)**2)
```

3.959.

$$\int \frac{32x + 160\log(3) - 32\log}{-x^4 - 9x^3\log(3) - 27x^2\log^2(3) - 27x\log^3(3) + (-15x^3\log(3) + (-90x^2 + 3x^3)\log^2(3) + (-135x + 18x^2)\log^3(3) + 27x\log^4(3))\log(x) + (-75x^2\log^2(3)}$$

3.959.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. $2(20) = 40$.

Time = 0.34 (sec) , antiderivative size = 69, normalized size of antiderivative = 3.45

$$\int \frac{}{-x^4 - 9x^3\log(3) - 27x^2\log^2(3) - 27x\log^3(3) + (-15x^3\log(3) + (-90x^2 + 3x^3)\log^2(3) + (-135x + 18}$$

$$= \frac{16}{(\log(3)^4 - 10\log(3)^3 + 25\log(3)^2)\log(x)^2 + x^2 + 6x\log(3) + 9\log(3)^2 - 2(3\log(3)^3 + (\log(3)^2 - 5}$$

input
```
integrate((-32*log(3)^2+160*log(3)+32*x)/((x*log(3)^6-15*x*log(3)^5+75*x*l
og(3)^4-125*x*log(3)^3)*log(x)^3+(-9*x*log(3)^5+(-3*x^2+90*x)*log(3)^4+(30
*x^2-225*x)*log(3)^3-75*x^2*log(3)^2)*log(x)^2+(27*x*log(3)^4+(18*x^2-135*
x)*log(3)^3+(3*x^3-90*x^2)*log(3)^2-15*x^3*log(3))*log(x)-27*x*log(3)^3-27
*x^2*log(3)^2-9*x^3*log(3)-x^4),x, algorithm=\
```

output
```
16/((log(3)^4 - 10*log(3)^3 + 25*log(3)^2)*log(x)^2 + x^2 + 6*x*log(3) + 9
*log(3)^2 - 2*(3*log(3)^3 + (log(3)^2 - 5*log(3))*x - 15*log(3)^2)*log(x))
```

3.959.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 206 vs. $2(20) = 40$.

Time = 0.29 (sec) , antiderivative size = 206, normalized size of antiderivative = 10.30

$$\int \frac{}{-x^4 - 9x^3\log(3) - 27x^2\log^2(3) - 27x\log^3(3) + (-15x^3\log(3) + (-90x^2 + 3x^3)\log^2(3) + (-135x + 18}$$

$$= \frac{}{\log(3)^6\log(x)^2 - x\log(3)^4\log(x)^2 - 15\log(3)^5\log(x)^2 - 2x\log(3)^4\log(x) - 6\log(3)^5\log(x) + 10x}$$

input
```
integrate((-32*log(3)^2+160*log(3)+32*x)/((x*log(3)^6-15*x*log(3)^5+75*x*l
og(3)^4-125*x*log(3)^3)*log(x)^3+(-9*x*log(3)^5+(-3*x^2+90*x)*log(3)^4+(30
*x^2-225*x)*log(3)^3-75*x^2*log(3)^2)*log(x)^2+(27*x*log(3)^4+(18*x^2-135*
x)*log(3)^3+(3*x^3-90*x^2)*log(3)^2-15*x^3*log(3))*log(x)-27*x*log(3)^3-27
*x^2*log(3)^2-9*x^3*log(3)-x^4),x, algorithm=\
```

output
```
16*(log(3)^2 - x - 5*log(3))/(log(3)^6*log(x)^2 - x*log(3)^4*log(x)^2 - 15
*log(3)^5*log(x)^2 - 2*x*log(3)^4*log(x) - 6*log(3)^5*log(x) + 10*x*log(3)
^3*log(x)^2 + 75*log(3)^4*log(x)^2 + 2*x^2*log(3)^2*log(x) + 26*x*log(3)^3
*log(x) + 60*log(3)^4*log(x) - 25*x*log(3)^2*log(x)^2 - 125*log(3)^3*log(x
)^2 + x^2*log(3)^2 + 6*x*log(3)^3 + 9*log(3)^4 - 10*x^2*log(3)*log(x) - 80
*x*log(3)^2*log(x) - 150*log(3)^3*log(x) - x^3 - 11*x^2*log(3) - 39*x*log(
3)^2 - 45*log(3)^3)
```

3.959.9 Mupad [F(-1)]

Timed out.

$$\int \frac{}{-x^4 - 9x^3\log(3) - 27x^2\log^2(3) - 27x\log^3(3) + \left(-15x^3\log(3) + \left(-90x^2 + 3x^3\right)\log^2(3) + \left(-135x + 18x\right.\right.}$$

$$= \int -\frac{}{27\,x^2\ln\left(3\right)^2 + \ln\left(x\right)\,\left(\ln\left(3\right)^3\,\left(135\,x - 18\,x^2\right) + 15\,x^3\,\ln\left(3\right) - 27\,x\ln\left(3\right)^4 + \ln\left(3\right)^2\,\left(90\,x^2 - 3\,x^3\right)\right) + \ln}$$

input
```
int(-(32*x + 160*log(3) - 32*log(3)^2)/(27*x^2*log(3)^2 + log(x)*(log(3)^3
*(135*x - 18*x^2) + 15*x^3*log(3) - 27*x*log(3)^4 + log(3)^2*(90*x^2 - 3*x
^3)) + log(x)^3*(125*x*log(3)^3 - 75*x*log(3)^4 + 15*x*log(3)^5 - x*log(3)
^6) + 27*x*log(3)^3 + 9*x^3*log(3) + x^4 + log(x)^2*(75*x^2*log(3)^2 - log
(3)^4*(90*x - 3*x^2) + log(3)^3*(225*x - 30*x^2) + 9*x*log(3)^5)),x)
```

output
```
int(-(32*x + 160*log(3) - 32*log(3)^2)/(27*x^2*log(3)^2 + log(x)*(log(3)^3
*(135*x - 18*x^2) + 15*x^3*log(3) - 27*x*log(3)^4 + log(3)^2*(90*x^2 - 3*x
^3)) + log(x)^3*(125*x*log(3)^3 - 75*x*log(3)^4 + 15*x*log(3)^5 - x*log(3)
^6) + 27*x*log(3)^3 + 9*x^3*log(3) + x^4 + log(x)^2*(75*x^2*log(3)^2 - log
(3)^4*(90*x - 3*x^2) + log(3)^3*(225*x - 30*x^2) + 9*x*log(3)^5)), x)
```

3.960 $\int \frac{35x+8e^2x+7x^2+26x^3+(-5x-e^2x-2x^2-3x^3)\log(x)+e^3x(5-17x+2x\log(x))}{x}$

3.960.1 Optimal result

Integrand size = 62, antiderivative size = 29

$$\int \frac{35x+8e^2x+7x^2+26x^3+(-5x-e^2x-2x^2-3x^3)\log(x)+e^3x(5-17x+2x\log(x))}{x}\,dx = \left(-5-e^2-x+e^3x-x^2\right)(5+x(-9+\log(x)))$$

output
```
(5+(ln(x)-9)*x)*(exp(3+ln(x))-5-exp(2)-x^2-x)
```

3.960.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 70 vs. 2(29) = 58.

Time = 0.02 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.41

$$\int \frac{35x+8e^2x+7x^2+26x^3+(-5x-e^2x-2x^2-3x^3)\log(x)+e^3x(5-17x+2x\log(x))}{x}\,dx = 40x+9e^2x+5e^3x+4x^2-9e^3x^2+9x^3-5x\log(x) - e^2x\log(x)-x^2\log(x)+e^3x^2\log(x)-x^3\log(x)$$

input
```
Integrate[(35*x + 8*E^2*x + 7*x^2 + 26*x^3 + (-5*x - E^2*x - 2*x^2 - 3*x^3
)*Log[x] + E^3*x*(5 - 17*x + 2*x*Log[x]))/x,x]
```

output
```
40*x + 9*E^2*x + 5*E^3*x + 4*x^2 - 9*E^3*x^2 + 9*x^3 - 5*x*Log[x] - E^2*x*
Log[x] - x^2*Log[x] + E^3*x^2*Log[x] - x^3*Log[x]
```

3.960.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 85 vs. 2(29) = 58.

Time = 0.29 (sec) , antiderivative size = 85, normalized size of antiderivative = 2.93, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.048$, Rules used = {6, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{26x^3+7x^2+(-3x^3-2x^2-e^2x-5x)\log(x)+8e^2x+35x+e^3x(-17x+2x\log(x)+5)}{x}\,dx$$
$$\Big\downarrow 6$$
$$\int \frac{26x^3+7x^2+(-3x^3-2x^2-e^2x-5x)\log(x)+(35+8e^2)\,x+e^3x(-17x+2x\log(x)+5)}{x}dx$$
$$\Big\downarrow 2010$$
$$\int \left(26x^2+(-3x^2-2(1-e^3)\,x-e^2-5)\log(x)+7\left(1-\frac{17e^3}{7}\right)x+35\left(1+\frac{1}{35}e^2(8+5e)\right)\right)dx$$
$$\Big\downarrow 2009$$
$$9x^3+x^3(-\log(x))+\frac{1}{2}(1-e^3)\,x^2+\frac{1}{2}(7-17e^3)\,x^2-(1-e^3)\,x^2\log(x)+(35+e^2(8+5e))\,x+(5+e^2)\,x-(5+e^2)\,x\log(x)$$

input
```
Int[(35*x + 8*E^2*x + 7*x^2 + 26*x^3 + (-5*x - E^2*x - 2*x^2 - 3*x^3)*Log[
x] + E^3*x*(5 - 17*x + 2*x*Log[x]))/x,x]
```

output
```
(5 + E^2)*x + (35 + E^2*(8 + 5*E))*x + ((7 - 17*E^3)*x^2)/2 + ((1 - E^3)*x
^2)/2 + 9*x^3 - (5 + E^2)*x*Log[x] - (1 - E^3)*x^2*Log[x] - x^3*Log[x]
```

3.960.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.960.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.93

method	result
norman	$(4-9\,\mathrm{e}^{3})\,x^{2}+(40+9\,\mathrm{e}^{2}+5\,\mathrm{e}^{3})\,x+(-\mathrm{e}^{2}-5)\,x\ln(x)+(\mathrm{e}^{3}-1)\,x^{2}\ln(x)+9x^{3}-x^{3}\ln(x)$
risch	$(x^{2}\mathrm{e}^{3}-\mathrm{e}^{2}x-x^{3}-x^{2}-5x)\ln(x)-9x^{2}\mathrm{e}^{3}+5x\,\mathrm{e}^{3}+9\,\mathrm{e}^{2}x+9x^{3}+4x^{2}+40x$
default	$40x+\mathrm{e}^{3}(x^{2}\ln(x)-9x^{2}+5x)-x^{3}\ln(x)+9x^{3}-\mathrm{e}^{2}(x\ln(x)-x)-x^{2}\ln(x)+4x^{2}-5x\ln$
parts	$40x+\mathrm{e}^{3}(x^{2}\ln(x)-9x^{2}+5x)-x^{3}\ln(x)+9x^{3}-\mathrm{e}^{2}(x\ln(x)-x)-x^{2}\ln(x)+4x^{2}-5x\ln$
parallelrisch	$-\frac{x^{5}\ln(x)+x^{3}\mathrm{e}^{2}\ln(x)-9x^{5}+x^{4}\ln(x)-\mathrm{e}^{3+\ln(x)}\ln(x)x^{3}-9x^{3}\mathrm{e}^{2}-4x^{4}+5x^{3}\ln(x)+9x^{3}\mathrm{e}^{3+\ln(x)}-40x^{3}-5\,\mathrm{e}^{3+\ln(x)}x^{2}}{x^{2}}$

input
```
int(((2*x*ln(x)-17*x+5)*exp(3+ln(x))+(-exp(2)*x-3*x^3-2*x^2-5*x)*ln(x)+8*e
xp(2)*x+26*x^3+7*x^2+35*x)/x,x,method=_RETURNVERBOSE)
```

output
```
(4-9*exp(3))*x^2+(40+9*exp(2)+5*exp(3))*x+(-exp(2)-5)*x*ln(x)+(exp(3)-1)*x
^2*ln(x)+9*x^3-x^3*ln(x)
```

3.960.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. 2(25) = 50.

Time = 0.27 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.97

$$\int \frac{35x+8e^2x+7x^2+26x^3+(-5x-e^2x-2x^2-3x^3)\log(x)+e^3x(5-17x+2x\log(x))}{x}\,dx$$
$$=9\,x^{3}+4\,x^{2}-\left(9\,x^{2}-5\,x\right)e^{3}+9\,xe^{2}-\left(x^{3}-x^{2}e^{3}+x^{2}+xe^{2}+5\,x\right)\log\left(x\right)+40\,x$$

input
```
integrate(((2*x*log(x)-17*x+5)*exp(3+log(x))+(-exp(2)*x-3*x^3-2*x^2-5*x)*l
og(x)+8*exp(2)*x+26*x^3+7*x^2+35*x)/x,x, algorithm=\
```

output
```
9*x^3 + 4*x^2 - (9*x^2 - 5*x)*e^3 + 9*x*e^2 - (x^3 - x^2*e^3 + x^2 + x*e^2
 + 5*x)*log(x) + 40*x
```

3.960.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(22) = 44$.

Time = 0.08 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.83

$$\int \frac{35x + 8e^2x + 7x^2 + 26x^3 + (-5x - e^2x - 2x^2 - 3x^3)\log(x) + e^3x(5 - 17x + 2x\log(x))}{x} \, dx$$
$$= 9x^3 + x^2 \cdot \left(4 - 9e^3\right) + x\left(40 + 9e^2 + 5e^3\right) + \left(-x^3 - x^2 + x^2e^3 - xe^2 - 5x\right)\log\left(x\right)$$

input
```
integrate(((2*x*ln(x)-17*x+5)*exp(3+ln(x))+(-exp(2)*x-3*x**3-2*x**2-5*x)*l
n(x)+8*exp(2)*x+26*x**3+7*x**2+35*x)/x,x)
```

output
```
9*x**3 + x**2*(4 - 9*exp(3)) + x*(40 + 9*exp(2) + 5*exp(3)) + (-x**3 - x**
2 + x**2*exp(3) - x*exp(2) - 5*x)*log(x)
```

3.960.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 79 vs. $2(25) = 50$.

Time = 0.20 (sec) , antiderivative size = 79, normalized size of antiderivative = 2.72

$$\int \frac{35x + 8e^2x + 7x^2 + 26x^3 + (-5x - e^2x - 2x^2 - 3x^3)\log(x) + e^3x(5 - 17x + 2x\log(x))}{x} \, dx$$
$$= -x^3\log\left(x\right) + 9\,x^3 - \frac{17}{2}\,x^2e^3 - x^2\log\left(x\right) + 4\,x^2 + \frac{1}{2}\left(2\,x^2\log\left(x\right) - x^2\right)e^3 + 5\,xe^3 - \left(x\log\left(x\right) - x\right)e^2 + 8\,xe^2 - 5\,x\log\left(x\right) + 40\,x$$

input
```
integrate(((2*x*log(x)-17*x+5)*exp(3+log(x))+(-exp(2)*x-3*x^3-2*x^2-5*x)*l
og(x)+8*exp(2)*x+26*x^3+7*x^2+35*x)/x,x, algorithm=\
```

output
```
-x^3*log(x) + 9*x^3 - 17/2*x^2*e^3 - x^2*log(x) + 4*x^2 + 1/2*(2*x^2*log(x
) - x^2)*e^3 + 5*x*e^3 - (x*log(x) - x)*e^2 + 8*x*e^2 - 5*x*log(x) + 40*x
```

3.960.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(25) = 50$.

Time = 0.28 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.24

$$\int \frac{35x + 8e^2x + 7x^2 + 26x^3 + (-5x - e^2x - 2x^2 - 3x^3)\log(x) + e^3x(5 - 17x + 2x\log(x))}{x}\,dx$$
$$= -x^3\log(x) + x^2e^3\log(x) + 9x^3 - 9x^2e^3 - x^2\log(x) - xe^2\log(x) + 4x^2 + 5xe^3 + 9xe^2 - 5x\log(x) + 40x$$

input
```
integrate((((2*x*log(x)-17*x+5)*exp(3+log(x))+(-exp(2)*x-3*x^3-2*x^2-5*x)*l
og(x)+8*exp(2)*x+26*x^3+7*x^2+35*x)/x,x, algorithm=\
```

output
```
-x^3*log(x) + x^2*e^3*log(x) + 9*x^3 - 9*x^2*e^3 - x^2*log(x) - x*e^2*log(
x) + 4*x^2 + 5*x*e^3 + 9*x*e^2 - 5*x*log(x) + 40*x
```

3.960.9 Mupad [B] (verification not implemented)

Time = 15.19 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.62

$$\int \frac{35x + 8e^2x + 7x^2 + 26x^3 + (-5x - e^2x - 2x^2 - 3x^3)\log(x) + e^3x(5 - 17x + 2x\log(x))}{x}\,dx$$
$$= x^2\left(\ln(x)\left(e^3 - 1\right) - 9e^3 + 4\right) - x^3\left(\ln(x) - 9\right) + x\left(9e^2 + 5e^3 - \ln(x)\left(e^2 + 5\right) + 40\right)$$

input
```
int((35*x - log(x)*(5*x + x*exp(2) + 2*x^2 + 3*x^3) + 8*x*exp(2) + 7*x^2 +
 26*x^3 + exp(log(x) + 3)*(2*x*log(x) - 17*x + 5))/x,x)
```

output
```
x^2*(log(x)*(exp(3) - 1) - 9*exp(3) + 4) - x^3*(log(x) - 9) + x*(9*exp(2)
+ 5*exp(3) - log(x)*(exp(2) + 5) + 40)
```

3.961 $\int \frac{-4+4e^3-4e^{e^x}x^4+e^{e^x}(40x^3+10e^xx^4)\log\left(1-e^3+e^{e^x}x^4\right)}{5-5e^3+5e^{e^x}x^4}\,dx$

3.961.1 Optimal result

Integrand size = 74, antiderivative size = 26

$$\int \frac{-4+4e^3-4e^{e^x}x^4+e^{e^x}(40x^3+10e^xx^4)\log\left(1-e^3+e^{e^x}x^4\right)}{5-5e^3+5e^{e^x}x^4}\,dx = -4-\frac{4x}{5}+\log^2\left(1-e^3+e^{e^x}x^4\right)$$

output
```
-4/5*x-4+ln(x^4*exp(exp(x))-exp(3)+1)^2
```

3.961.2 Mathematica [A] (verified)

Time = 0.62 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{-4+4e^3-4e^{e^x}x^4+e^{e^x}(40x^3+10e^xx^4)\log\left(1-e^3+e^{e^x}x^4\right)}{5-5e^3+5e^{e^x}x^4}\,dx = \frac{1}{5}\left(-4x+5\log^2\left(1-e^3+e^{e^x}x^4\right)\right)$$

input
```
Integrate[(-4 + 4*E^3 - 4*E^E^x*x^4 + E^E^x*(40*x^3 + 10*E^x*x^4)*Log[1 -
E^3 + E^E^x*x^4])/(5 - 5*E^3 + 5*E^E^x*x^4),x]
```

output
```
(-4*x + 5*Log[1 - E^3 + E^E^x*x^4]^2)/5
```

3.961.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4e^{e^x}x^4 + e^{e^x}(10e^x x^4 + 40x^3)\log(e^{e^x}x^4 - e^3 + 1) + 4e^3 - 4}{5e^{e^x}x^4 - 5e^3 + 5}\,dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-4e^{e^x}x^4 + e^{e^x}(10e^x x^4 + 40x^3)\log(e^{e^x}x^4 - e^3 + 1) - 4(1 - e^3)}{5(e^{e^x}x^4 - e^3 + 1)}\,dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{5}\int -\frac{2(2e^{e^x}x^4 - 5e^{e^x}(e^x x^4 + 4x^3)\log(e^{e^x}x^4 - e^3 + 1) + 2(1 - e^3))}{e^{e^x}x^4 - e^3 + 1}\,dx$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{2}{5}\int \frac{2e^{e^x}x^4 - 5e^{e^x}(e^x x^4 + 4x^3)\log(e^{e^x}x^4 - e^3 + 1) + 2(1 - e^3)}{e^{e^x}x^4 - e^3 + 1}\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{2}{5}\int \left(\frac{2(-e^{e^x}x^4 + 10e^{e^x}\log(e^{e^x}x^4 - e^3 + 1)x^3 + e^3 - 1)}{-e^{e^x}x^4 + e^3 - 1} - \frac{5e^{x+e^x}x^4\log(e^{e^x}x^4 - e^3 + 1)}{e^{e^x}x^4 - e^3 + 1}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{2}{5}\left(5\int \frac{e^{x+e^x}x^4\int \frac{e^{x+e^x}x^4}{e^{e^x}x^4 - e^3 + 1}dx}{e^{e^x}x^4 - e^3 + 1}dx - 20(1 - e^3)\log(e^{e^x}x^4 - e^3 + 1)\int \frac{1}{x(-e^{e^x}x^4 + e^3 - 1)}dx - 5\log(e^{e^x}x^4 - \right.$$

input
```
Int[(-4 + 4*E^3 - 4*E^E^x*x^4 + E^E^x*(40*x^3 + 10*E^x*x^4)*Log[1 - E^3 +
E^E^x*x^4])/(5 - 5*E^3 + 5*E^E^x*x^4),x]
```

output
```
$Aborted
```

3.961.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.961.4 Maple [A] (verified)

Time = 222.63 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.81

method	result	size
risch	$-\frac{4x}{5}+\ln\left(x^{4}{\mathrm e}^{{\mathrm e}^{x}}-{\mathrm e}^{3}+1\right)^{2}$	21
parallelrisch	$-\frac{4x}{5}+\ln\left(x^{4}{\mathrm e}^{{\mathrm e}^{x}}-{\mathrm e}^{3}+1\right)^{2}$	21

input
```
int(((10*exp(x)*x^4+40*x^3)*exp(exp(x))*ln(x^4*exp(exp(x))-exp(3)+1)-4*x^4
*exp(exp(x))+4*exp(3)-4)/(5*x^4*exp(exp(x))-5*exp(3)+5),x,method=_RETURNVE
RBOSE)
```

output
```
-4/5*x+ln(x^4*exp(exp(x))-exp(3)+1)^2
```

3.961.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{-4+4e^3-4e^{e^x}x^4+e^{e^x}(40x^3+10e^x x^4)\log\left(1-e^3+e^{e^x}x^4\right)}{5-5e^3+5e^{e^x}x^4}\,dx = \log\left(x^4e^{(e^x)}-e^3+1\right)^2-\frac{4}{5}\,x$$

input
```
integrate(((10*exp(x)*x^4+40*x^3)*exp(exp(x))*log(x^4*exp(exp(x))-exp(3)+1
)-4*x^4*exp(exp(x))+4*exp(3)-4)/(5*x^4*exp(exp(x))-5*exp(3)+5),x, algorith
m=\
```

output
```
log(x^4*e^(e^x) - e^3 + 1)^2 - 4/5*x
```

3.961.6 Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{-4+4e^3-4e^{e^x}x^4+e^{e^x}(40x^3+10e^x x^4)\log\left(1-e^3+e^{e^x}x^4\right)}{5-5e^3+5e^{e^x}x^4}\,dx = -\frac{4x}{5}+\log\left(x^4e^{e^x}-e^3+1\right)^2$$

input
```
integrate(((10*exp(x)*x**4+40*x**3)*exp(exp(x))*ln(x**4*exp(exp(x))-exp(3)
+1)-4*x**4*exp(exp(x))+4*exp(3)-4)/(5*x**4*exp(exp(x))-5*exp(3)+5),x)
```

output
```
-4*x/5 + log(x**4*exp(exp(x)) - exp(3) + 1)**2
```

3.961.7 Maxima [F]

$$\int \frac{-4+4e^3-4e^{e^x}x^4+e^{e^x}(40x^3+10e^x x^4)\log\left(1-e^3+e^{e^x}x^4\right)}{5-5e^3+5e^{e^x}x^4}\,dx = \int -\frac{2\left(2\,x^4e^{(e^x)}-5\,(x^4e^x+4\,x^3)e^{(e^x)}\log\left(x^4e^{(e^x)}-e^3+1\right)-2\,e^3+2\right)}{5\left(x^4e^{(e^x)}-e^3+1\right)}\,dx$$

input
```
integrate(((10*exp(x)*x^4+40*x^3)*exp(exp(x))*log(x^4*exp(exp(x))-exp(3)+1
)-4*x^4*exp(exp(x))+4*exp(3)-4)/(5*x^4*exp(exp(x))-5*exp(3)+5),x, algorith
m=\
```

output
```
-2/5*integrate((2*x^4*e^(e^x) - 5*(x^4*e^x + 4*x^3)*e^(e^x)*log(x^4*e^(e^x
) - e^3 + 1) - 2*e^3 + 2)/(x^4*e^(e^x) - e^3 + 1), x)
```

3.961.8 Giac [F]

$$\int \frac{-4+4e^3-4e^{e^x}x^4+e^{e^x}(40x^3+10e^xx^4)\log\left(1-e^3+e^{e^x}x^4\right)}{5-5e^3+5e^{e^x}x^4}\,dx$$
$$=\int -\frac{2\left(2\,x^4e^{(e^x)}-5\,(x^4e^x+4\,x^3)e^{(e^x)}\log\left(x^4e^{(e^x)}-e^3+1\right)-2\,e^3+2\right)}{5\left(x^4e^{(e^x)}-e^3+1\right)}\,dx$$

input
```
integrate(((10*exp(x)*x^4+40*x^3)*exp(exp(x))*log(x^4*exp(exp(x))-exp(3)+1
)-4*x^4*exp(exp(x))+4*exp(3)-4)/(5*x^4*exp(exp(x))-5*exp(3)+5),x, algorith
m=\
```

output
```
integrate(-2/5*(2*x^4*e^(e^x) - 5*(x^4*e^x + 4*x^3)*e^(e^x)*log(x^4*e^(e^x
) - e^3 + 1) - 2*e^3 + 2)/(x^4*e^(e^x) - e^3 + 1), x)
```

3.961.9 Mupad [B] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{-4+4e^3-4e^{e^x}x^4+e^{e^x}(40x^3+10e^xx^4)\log\left(1-e^3+e^{e^x}x^4\right)}{5-5e^3+5e^{e^x}x^4}\,dx$$
$$=\ln\left(x^4\,\mathrm{e}^{\mathrm{e}^x}-\mathrm{e}^3+1\right)^2-\frac{4\,x}{5}$$

input
```
int((4*exp(3) - 4*x^4*exp(exp(x)) + log(x^4*exp(exp(x)) - exp(3) + 1)*exp(
exp(x))*(10*x^4*exp(x) + 40*x^3) - 4)/(5*x^4*exp(exp(x)) - 5*exp(3) + 5),x
)
```

output
```
log(x^4*exp(exp(x)) - exp(3) + 1)^2 - (4*x)/5
```

3.962 $\int \frac{10x+2x^2+2\sqrt[3]{e}x^2+4e^{2/3}x^2+\left(-10x-x^2+\sqrt[3]{e}(-20x-4x^2)\right)\log(x^2)+(25+10x+x^2)\log^2(x^2)}{4e^{2/3}x^2+\sqrt[3]{e}(-20x-4x^2)\log(x^2)+(25+10x+x^2)\log^2(x^2)}\,dx$

3.962.1 Optimal result

Integrand size = 121, antiderivative size = 27

$$\int \frac{10x+2x^2+2\sqrt[3]{e}x^2+4e^{2/3}x^2+\left(-10x-x^2+\sqrt[3]{e}(-20x-4x^2)\right)\log(x^2)+(25+10x+x^2)\log^2(x^2)}{4e^{2/3}x^2+\sqrt[3]{e}(-20x-4x^2)\log(x^2)+(25+10x+x^2)\log^2(x^2)}\,dx$$
$$-4+x+\frac{x}{2\sqrt[3]{e}-\frac{(5+x)\log(x^2)}{x}}$$

output
```
x+x/(2*exp(1/3)-ln(x^2)/x*(5+x))-4
```

3.962.2 Mathematica [A] (verified)

Time = 0.61 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{10x+2x^2+2\sqrt[3]{e}x^2+4e^{2/3}x^2+\left(-10x-x^2+\sqrt[3]{e}(-20x-4x^2)\right)\log(x^2)+(25+10x+x^2)\log^2(x^2)}{4e^{2/3}x^2+\sqrt[3]{e}(-20x-4x^2)\log(x^2)+(25+10x+x^2)\log^2(x^2)}\,dx$$
$$+\frac{x^2}{2\sqrt[3]{e}x-(5+x)\log(x^2)}$$

input
```
Integrate[(10*x + 2*x^2 + 2*E^(1/3)*x^2 + 4*E^(2/3)*x^2 + (-10*x - x^2 + E
^(1/3)*(-20*x - 4*x^2))*Log[x^2] + (25 + 10*x + x^2)*Log[x^2]^2)/(4*E^(2/3
)*x^2 + E^(1/3)*(-20*x - 4*x^2)*Log[x^2] + (25 + 10*x + x^2)*Log[x^2]^2),x
]
```

output
```
x + x^2/(2*E^(1/3)*x - (5 + x)*Log[x^2])
```

3.962.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4e^{2/3}x^2+2\sqrt[3]{e}x^2+2x^2+\left(x^2+10x+25\right)\log^2\left(x^2\right)+\left(-x^2+\sqrt[3]{e}(-4x^2-20x)-10x\right)\log\left(x^2\right)+10x}{4e^{2/3}x^2+\left(x^2+10x+25\right)\log^2\left(x^2\right)+\sqrt[3]{e}\left(-4x^2-20x\right)\log\left(x^2\right)}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{4e^{2/3}x^2+\left(2+2\sqrt[3]{e}\right)x^2+\left(x^2+10x+25\right)\log^2\left(x^2\right)+\left(-x^2+\sqrt[3]{e}(-4x^2-20x)-10x\right)\log\left(x^2\right)+10x}{4e^{2/3}x^2+\left(x^2+10x+25\right)\log^2\left(x^2\right)+\sqrt[3]{e}\left(-4x^2-20x\right)\log\left(x^2\right)}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{\left(2+2\sqrt[3]{e}+4e^{2/3}\right)x^2+\left(x^2+10x+25\right)\log^2\left(x^2\right)+\left(-x^2+\sqrt[3]{e}(-4x^2-20x)-10x\right)\log\left(x^2\right)+10x}{4e^{2/3}x^2+\left(x^2+10x+25\right)\log^2\left(x^2\right)+\sqrt[3]{e}\left(-4x^2-20x\right)\log\left(x^2\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{\left(2+2\sqrt[3]{e}+4e^{2/3}\right)x^2+\left(x^2+10x+25\right)\log^2\left(x^2\right)+\left(-x^2+\sqrt[3]{e}(-4x^2-20x)-10x\right)\log\left(x^2\right)+10x}{\left(x\left(-\log\left(x^2\right)\right)-5\log\left(x^2\right)+2\sqrt[3]{e}x\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{x(x+10)}{(x+5)\left(x\left(-\log\left(x^2\right)\right)-5\log\left(x^2\right)+2\sqrt[3]{e}x\right)}+\frac{2x\left(x^2+5\left(2-\sqrt[3]{e}\right)x+25\right)}{(x+5)\left(x\left(-\log\left(x^2\right)\right)-5\log\left(x^2\right)+2\sqrt[3]{e}x\right)^2}+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$50\sqrt[3]{e}\int \frac{1}{\left(-\log\left(x^2\right)x+2\sqrt[3]{e}x-5\log\left(x^2\right)\right)^2}dx+10\left(1-\sqrt[3]{e}\right)\int \frac{x}{\left(-\log\left(x^2\right)x+2\sqrt[3]{e}x-5\log\left(x^2\right)\right)^2}dx+2\int \frac{x^2}{\left(-\log\left(x^2\right)x+2\sqrt[3]{e}x-5\log\left(x^2\right)\right)^2}dx-250\sqrt[3]{e}\int \frac{1}{(x+5)\left(-\log\left(x^2\right)x+2\sqrt[3]{e}x-5\log\left(x^2\right)\right)^2}dx+5\int \frac{1}{-\log\left(x^2\right)x+2\sqrt[3]{e}x-5\log\left(x^2\right)}dx+\int \frac{x}{-\log\left(x^2\right)x+2\sqrt[3]{e}x-5\log\left(x^2\right)}dx-25\int \frac{1}{(x+5)\left(-\log\left(x^2\right)x+2\sqrt[3]{e}x-5\log\left(x^2\right)\right)}dx+x$$

input
```
Int[(10*x + 2*x^2 + 2*E^(1/3)*x^2 + 4*E^(2/3)*x^2 + (-10*x - x^2 + E^(1/3)
*(-20*x - 4*x^2))*Log[x^2] + (25 + 10*x + x^2)*Log[x^2]^2)/(4*E^(2/3)*x^2
+ E^(1/3)*(-20*x - 4*x^2)*Log[x^2] + (25 + 10*x + x^2)*Log[x^2]^2),x]
```

output
```
$Aborted
```

3.962.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.962.4 Maple [A] (verified)

Time = 3.58 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

method	result	size
risch	$x+\frac{x^{2}}{2 x \,{\mathrm e}^{\frac{1}{3}}-x \ln \left(x^{2}\right)-5 \ln \left(x^{2}\right)}$	28
norman	$\frac{25 \ln \left(x^{2}\right)-10 x \,{\mathrm e}^{\frac{1}{3}}+\left(2 \,{\mathrm e}^{\frac{1}{3}}+1\right) x^{2}-x^{2} \ln \left(x^{2}\right)}{2 x \,{\mathrm e}^{\frac{1}{3}}-x \ln \left(x^{2}\right)-5 \ln \left(x^{2}\right)}$	54
parallelrisch	$-\frac{-4 x^{2} {\mathrm e}^{\frac{1}{3}}+2 x^{2} \ln \left(x^{2}\right)+20 x \,{\mathrm e}^{\frac{1}{3}}-2 x^{2}-50 \ln \left(x^{2}\right)}{2 \left(2 x \,{\mathrm e}^{\frac{1}{3}}-x \ln \left(x^{2}\right)-5 \ln \left(x^{2}\right)\right)}$	57

input
```
int(((x^2+10*x+25)*ln(x^2)^2+((-4*x^2-20*x)*exp(1/3)-x^2-10*x)*ln(x^2)+4*x
^2*exp(1/3)^2+2*x^2*exp(1/3)+2*x^2+10*x)/((x^2+10*x+25)*ln(x^2)^2+(-4*x^2-
20*x)*exp(1/3)*ln(x^2)+4*x^2*exp(1/3)^2),x,method=_RETURNVERBOSE)
```

output
```
x+x^2/(2*x*exp(1/3)-x*ln(x^2)-5*ln(x^2))
```

3.962.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56

$$\int \frac{10x + 2x^2 + 2\sqrt[3]{e}x^2 + 4e^{2/3}x^2 + \left(-10x - x^2 + \sqrt[3]{e}(-20x - 4x^2)\right)\log\left(x^2\right) + (25 + 10x + x^2)\log^2\left(x^2\right)}{4e^{2/3}x^2 + \sqrt[3]{e}\left(-20x - 4x^2\right)\log\left(x^2\right) + (25 + 10x + x^2)\log^2\left(x^2\right)}\,dx$$

input
```
integrate(((x^2+10*x+25)*log(x^2)^2+((-4*x^2-20*x)*exp(1/3)-x^2-10*x)*log(
x^2)+4*x^2*exp(1/3)^2+2*x^2*exp(1/3)+2*x^2+10*x)/((x^2+10*x+25)*log(x^2)^2
+(-4*x^2-20*x)*exp(1/3)*log(x^2)+4*x^2*exp(1/3)^2),x, algorithm=\
```

output
```
(2*x^2*e^(1/3) + x^2 - (x^2 + 5*x)*log(x^2))/(2*x*e^(1/3) - (x + 5)*log(x^
2))
```

3.962.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{10x + 2x^2 + 2\sqrt[3]{e}x^2 + 4e^{2/3}x^2 + \left(-10x - x^2 + \sqrt[3]{e}(-20x - 4x^2)\right)\log\left(x^2\right) + (25 + 10x + x^2)\log^2\left(x^2\right)}{4e^{2/3}x^2 + \sqrt[3]{e}\left(-20x - 4x^2\right)\log\left(x^2\right) + (25 + 10x + x^2)\log^2\left(x^2\right)}\,dx$$
$$-\frac{x^2}{-2xe^{\frac{1}{3}} + (x + 5)\log\left(x^2\right)} + x$$

input
```
integrate(((x**2+10*x+25)*ln(x**2)**2+((-4*x**2-20*x)*exp(1/3)-x**2-10*x)*
ln(x**2)+4*x**2*exp(1/3)**2+2*x**2*exp(1/3)+2*x**2+10*x)/((x**2+10*x+25)*l
n(x**2)**2+(-4*x**2-20*x)*exp(1/3)*ln(x**2)+4*x**2*exp(1/3)**2),x)
```

output
```
-x**2/(-2*x*exp(1/3) + (x + 5)*log(x**2)) + x
```

3.962.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{10x+2x^2+2\sqrt[3]{e}x^2+4e^{2/3}x^2+\left(-10x-x^2+\sqrt[3]{e}(-20x-4x^2)\right)\log\left(x^2\right)+\left(25+10x+x^2\right)\log^2\left(x^2\right)}{4e^{2/3}x^2+\sqrt[3]{e}\left(-20x-4x^2\right)\log\left(x^2\right)+\left(25+10x+x^2\right)\log^2\left(x^2\right)}\,dx$$

input
```
integrate((((x^2+10*x+25)*log(x^2)^2+((-4*x^2-20*x)*exp(1/3)-x^2-10*x)*log(
x^2)+4*x^2*exp(1/3)^2+2*x^2*exp(1/3)+2*x^2+10*x)/((x^2+10*x+25)*log(x^2)^2
+(-4*x^2-20*x)*exp(1/3)*log(x^2)+4*x^2*exp(1/3)^2),x, algorithm=\
```

output
```
Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is un
defined.
```

3.962.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(24) = 48$.

Time = 0.32 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.81

$$\int \frac{10x+2x^2+2\sqrt[3]{e}x^2+4e^{2/3}x^2+\left(-10x-x^2+\sqrt[3]{e}(-20x-4x^2)\right)\log\left(x^2\right)+\left(25+10x+x^2\right)\log^2\left(x^2\right)}{4e^{2/3}x^2+\sqrt[3]{e}\left(-20x-4x^2\right)\log\left(x^2\right)+\left(25+10x+x^2\right)\log^2\left(x^2\right)}\,dx$$

input
```
integrate((((x^2+10*x+25)*log(x^2)^2+((-4*x^2-20*x)*exp(1/3)-x^2-10*x)*log(
x^2)+4*x^2*exp(1/3)^2+2*x^2*exp(1/3)+2*x^2+10*x)/((x^2+10*x+25)*log(x^2)^2
+(-4*x^2-20*x)*exp(1/3)*log(x^2)+4*x^2*exp(1/3)^2),x, algorithm=\
```

output
```
(2*x^2*e^(1/3) - x^2*log(x^2) + x^2 - 5*x*log(x^2))/(2*x*e^(1/3) - x*log(x
^2) - 5*log(x^2))
```

3.962.9 Mupad [B] (verification not implemented)

Time = 15.88 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.70

$$\int \frac{10x+2x^2+2\sqrt[3]{e}x^2+4e^{2/3}x^2+\left(-10x-x^2+\sqrt[3]{e}(-20x-4x^2)\right)\log\left(x^2\right)+\left(25+10x+x^2\right)\log^2\left(x^2\right)}{4e^{2/3}x^2+\sqrt[3]{e}\left(-20x-4x^2\right)\log\left(x^2\right)+\left(25+10x+x^2\right)\log^2\left(x^2\right)}\,dx$$

input
```
int((10*x + log(x^2)^2*(10*x + x^2 + 25) + 2*x^2*exp(1/3) + 4*x^2*exp(2/3)
 + 2*x^2 - log(x^2)*(10*x + exp(1/3)*(20*x + 4*x^2) + x^2))/(log(x^2)^2*(1
0*x + x^2 + 25) + 4*x^2*exp(2/3) - log(x^2)*exp(1/3)*(20*x + 4*x^2)),x)
```

output
```
(25*log(x^2)*exp(1/3) + 10*x*log(x^2) - 10*x*exp(2/3) + 2*x^2*log(x^2) - 4
*x^2*exp(1/3) - 2*x^2 + 5*x*log(x^2)*exp(1/3))/(2*(5*log(x^2) + x*log(x^2)
 - 2*x*exp(1/3)))
```

3.962. $$\int \frac{10x+2x^2+2\sqrt[3]{e}x^2+4e^{2/3}x^2+\left(-10x-x^2+\sqrt[3]{e}(-20x-4x^2)\right)\log(x^2)+(25+10x+x^2)\log^2(x^2)}{4e^{2/3}x^2+\sqrt[3]{e}(-20x-4x^2)\log(x^2)+(25+10x+x^2)\log^2(x^2)}\,dx$$

3.963 $\int \frac{-50x+10e^3x+32000x^4-38400x^5+16800x^6-3200x^7+225x^8}{e^3}\,dx$

3.963.1 Optimal result

Integrand size = 39, antiderivative size = 29

$$\int \frac{-50x+10e^3x+32000x^4-38400x^5+16800x^6-3200x^7+225x^8}{e^3}\,dx = 5\left(x^2-5\left(16-\frac{x(-x+(-4+x)^4x^4)}{e^3}\right)\right)$$

output
```
5*x^2-400+25*exp(-3)*x*((x-4)^4*x^4-x)
```

3.963.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.28

$$\int \frac{-50x+10e^3x+32000x^4-38400x^5+16800x^6-3200x^7+225x^8}{e^3}\,dx = 5x^2\left(1+\frac{5(-1+256x^3-256x^4+96x^5-16x^6+x^7)}{e^3}\right)$$

input
```
Integrate[(-50*x + 10*E^3*x + 32000*x^4 - 38400*x^5 + 16800*x^6 - 3200*x^7
 + 225*x^8)/E^3,x]
```

output
```
5*x^2*(1 + (5*(-1 + 256*x^3 - 256*x^4 + 96*x^5 - 16*x^6 + x^7))/E^3)
```

3.963.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {6, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{225x^8-3200x^7+16800x^6-38400x^5+32000x^4+10e^3x-50x}{e^3}dx$$

$$\Big\downarrow \text{6}$$

$$\int \frac{225x^8-3200x^7+16800x^6-38400x^5+32000x^4+\left(10e^3-50\right)x}{e^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \left(225x^8-3200x^7+16800x^6-38400x^5+32000x^4-10\left(5-e^3\right)x\right)dx}{e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{25x^9-400x^8+2400x^7-6400x^6+6400x^5-5\left(5-e^3\right)x^2}{e^3}$$

input
```
Int[(-50*x + 10*E^3*x + 32000*x^4 - 38400*x^5 + 16800*x^6 - 3200*x^7 + 225
*x^8)/E^3,x]
```

output
```
(-5*(5 - E^3)*x^2 + 6400*x^5 - 6400*x^6 + 2400*x^7 - 400*x^8 + 25*x^9)/E^3
```

3.963.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.963.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

method	result	size
gosper	$5(5x^7-80x^6+480x^5-1280x^4+1280x^3+e^3-5)\,x^2e^{-3}$	39
default	$5\,e^{-3}\left(5x^9-80x^8+480x^7-1280x^6+1280x^5+\frac{(2\,e^3-10)x^2}{2}\right)$	44
parallelrisch	$e^{-3}(25x^9-400x^8+2400x^7-6400x^6+6400x^5+5x^2e^3-25x^2)$	44
risch	$25\,e^{-3}x^9-400\,e^{-3}x^8+2400\,e^{-3}x^7-6400\,e^{-3}x^6+6400\,e^{-3}x^5+5x^2-25\,e^{-3}x^2$	49
norman	$6400\,e^{-3}x^5-6400\,e^{-3}x^6+2400\,e^{-3}x^7-400\,e^{-3}x^8+25\,e^{-3}x^9+5(e^3-5)\,e^{-3}x^2$	60

input
```
int((10*x*exp(3)+225*x^8-3200*x^7+16800*x^6-38400*x^5+32000*x^4-50*x)/exp(
3),x,method=_RETURNVERBOSE)
```

output
```
5*(5*x^7-80*x^6+480*x^5-1280*x^4+1280*x^3+exp(3)-5)*x^2/exp(3)
```

3.963.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.41

$$\int \frac{-50x+10e^3x+32000x^4-38400x^5+16800x^6-3200x^7+225x^8}{e^3}\,dx$$
$$=5\left(5\,x^9-80\,x^8+480\,x^7-1280\,x^6+1280\,x^5+x^2e^3-5\,x^2\right)e^{(-3)}$$

input
```
integrate((10*x*exp(3)+225*x^8-3200*x^7+16800*x^6-38400*x^5+32000*x^4-50*x
)/exp(3),x, algorithm=\
```

output
```
5*(5*x^9 - 80*x^8 + 480*x^7 - 1280*x^6 + 1280*x^5 + x^2*e^3 - 5*x^2)*e^(-3
)
```

3.963.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(22) = 44$.

Time = 0.02 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.86

$$\int \frac{-50x + 10e^3x + 32000x^4 - 38400x^5 + 16800x^6 - 3200x^7 + 225x^8}{e^3} \, dx$$
$$= \frac{25x^9}{e^3} - \frac{400x^8}{e^3} + \frac{2400x^7}{e^3} - \frac{6400x^6}{e^3} + \frac{6400x^5}{e^3} + \frac{x^2(-25 + 5e^3)}{e^3}$$

input
```
integrate((10*x*exp(3)+225*x**8-3200*x**7+16800*x**6-38400*x**5+32000*x**4
-50*x)/exp(3),x)
```

output
```
25*x**9*exp(-3) - 400*x**8*exp(-3) + 2400*x**7*exp(-3) - 6400*x**6*exp(-3)
 + 6400*x**5*exp(-3) + x**2*(-25 + 5*exp(3))*exp(-3)
```

3.963.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.41

$$\int \frac{-50x + 10e^3x + 32000x^4 - 38400x^5 + 16800x^6 - 3200x^7 + 225x^8}{e^3} \, dx$$
$$= 5 \left(5 x^9 - 80 x^8 + 480 x^7 - 1280 x^6 + 1280 x^5 + x^2 e^3 - 5 x^2\right) e^{(-3)}$$

input
```
integrate((10*x*exp(3)+225*x^8-3200*x^7+16800*x^6-38400*x^5+32000*x^4-50*x
)/exp(3),x, algorithm=\
```

output
```
5*(5*x^9 - 80*x^8 + 480*x^7 - 1280*x^6 + 1280*x^5 + x^2*e^3 - 5*x^2)*e^(-3
)
```

3.963.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.41

$$\int \frac{-50x + 10e^3x + 32000x^4 - 38400x^5 + 16800x^6 - 3200x^7 + 225x^8}{e^3}\,dx$$
$$= 5\left(5\,x^9 - 80\,x^8 + 480\,x^7 - 1280\,x^6 + 1280\,x^5 + x^2e^3 - 5\,x^2\right)e^{(-3)}$$

input
```
integrate((10*x*exp(3)+225*x^8-3200*x^7+16800*x^6-38400*x^5+32000*x^4-50*x
)/exp(3),x, algorithm=\
```

output
```
5*(5*x^9 - 80*x^8 + 480*x^7 - 1280*x^6 + 1280*x^5 + x^2*e^3 - 5*x^2)*e^(-3
)
```

3.963.9 Mupad [B] (verification not implemented)

Time = 15.12 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.69

$$\int \frac{-50x + 10e^3x + 32000x^4 - 38400x^5 + 16800x^6 - 3200x^7 + 225x^8}{e^3}\,dx$$
$$= 25\,\mathrm{e}^{-3}\,x^9 - 400\,\mathrm{e}^{-3}\,x^8 + 2400\,\mathrm{e}^{-3}\,x^7 - 6400\,\mathrm{e}^{-3}\,x^6 + 6400\,\mathrm{e}^{-3}\,x^5 + \frac{\mathrm{e}^{-3}\,(10\,\mathrm{e}^3 - 50)\,x^2}{2}$$

input
```
int(exp(-3)*(10*x*exp(3) - 50*x + 32000*x^4 - 38400*x^5 + 16800*x^6 - 3200
*x^7 + 225*x^8),x)
```

output
```
6400*x^5*exp(-3) - 6400*x^6*exp(-3) + 2400*x^7*exp(-3) - 400*x^8*exp(-3) +
 25*x^9*exp(-3) + (x^2*exp(-3)*(10*exp(3) - 50))/2
```

3.964 $\int \frac{e^{2x}(-16-24x-12x^2+4x^3)}{128+128x+8x^2-20x^3-2x^4+x^5}\,dx$

3.964.1 Optimal result

Integrand size = 46, antiderivative size = 22

$$\int \frac{e^{2x}(-16-24x-12x^2+4x^3)}{128+128x+8x^2-20x^3-2x^4+x^5}\,dx = \frac{2e^{2x}}{(-4+x)\left(4+\frac{4}{x}+x\right)}$$

output
```
2*exp(x)^2/(4+x+4/x)/(x-4)
```

3.964.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{e^{2x}(-16-24x-12x^2+4x^3)}{128+128x+8x^2-20x^3-2x^4+x^5}\,dx = \frac{2e^{2x}x}{(-4+x)(2+x)^2}$$

input
```
Integrate[(E^(2*x)*(-16 - 24*x - 12*x^2 + 4*x^3))/(128 + 128*x + 8*x^2 - 2
0*x^3 - 2*x^4 + x^5),x]
```

output
```
(2*E^(2*x)*x)/((-4 + x)*(2 + x)^2)
```

3.964.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 45 vs. $2(22) = 44$.

Time = 0.66 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.05, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$, Rules used = {2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}(4x^3-12x^2-24x-16)}{x^5-2x^4-20x^3+8x^2+128x+128}\,dx$$

$$\Big\downarrow \; 2463$$

$$\int \left(-\frac{e^{2x}(4x^3-12x^2-24x-16)}{432(x-4)}+\frac{e^{2x}(4x^3-12x^2-24x-16)}{432(x+2)}+\frac{e^{2x}(4x^3-12x^2-24x-16)}{216(x-4)^2}+\frac{e^{2x}(4x^3-1\right.$$

$$\Big\downarrow \; 2009$$

$$-\frac{2e^{2x}}{9(x+2)}+\frac{2e^{2x}}{3(x+2)^2}-\frac{2e^{2x}}{9(4-x)}$$

input
```
Int[(E^(2*x)*(-16 - 24*x - 12*x^2 + 4*x^3))/(128 + 128*x + 8*x^2 - 20*x^3
- 2*x^4 + x^5),x]
```

output
```
(-2*E^(2*x))/(9*(4 - x)) + (2*E^(2*x))/(3*(2 + x)^2) - (2*E^(2*x))/(9*(2 +
 x))
```

3.964.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.964.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

method	result	size
gosper	$\frac{2\,\mathrm{e}^{2x}x}{x^3-12x-16}$	18
norman	$\frac{2x\,\mathrm{e}^{2x}}{(x-4)(2+x)^2}$	18
risch	$\frac{2x\,\mathrm{e}^{2x}}{(x-4)(2+x)^2}$	18
parallelrisch	$\frac{2\,\mathrm{e}^{2x}x}{x^3-12x-16}$	18
default	$-\frac{2\,\mathrm{e}^{2x}}{9(2+x)}+\frac{2\,\mathrm{e}^{2x}}{9(x-4)}+\frac{2\,\mathrm{e}^{2x}}{3(2+x)^2}$	35

input
```
int((4*x^3-12*x^2-24*x-16)*exp(x)^2/(x^5-2*x^4-20*x^3+8*x^2+128*x+128),x,m
ethod=_RETURNVERBOSE)
```

output
```
2*exp(x)^2*x/(x^3-12*x-16)
```

3.964.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{e^{2x}(-16-24x-12x^2+4x^3)}{128+128x+8x^2-20x^3-2x^4+x^5}\,dx=\frac{2\,xe^{(2\,x)}}{x^3-12\,x-16}$$

input
```
integrate((4*x^3-12*x^2-24*x-16)*exp(x)^2/(x^5-2*x^4-20*x^3+8*x^2+128*x+12
8),x, algorithm=\
```

output
```
2*x*e^(2*x)/(x^3 - 12*x - 16)
```

3.964.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{e^{2x}(-16-24x-12x^2+4x^3)}{128+128x+8x^2-20x^3-2x^4+x^5}\,dx = \frac{2xe^{2x}}{x^3-12x-16}$$

input
```
integrate((4*x**3-12*x**2-24*x-16)*exp(x)**2/(x**5-2*x**4-20*x**3+8*x**2+1
28*x+128),x)
```

output
```
2*x*exp(2*x)/(x**3 - 12*x - 16)
```

3.964.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{e^{2x}(-16-24x-12x^2+4x^3)}{128+128x+8x^2-20x^3-2x^4+x^5}\,dx = \frac{2\,xe^{(2\,x)}}{x^3-12\,x-16}$$

input
```
integrate((4*x^3-12*x^2-24*x-16)*exp(x)^2/(x^5-2*x^4-20*x^3+8*x^2+128*x+12
8),x, algorithm=\
```

output
```
2*x*e^(2*x)/(x^3 - 12*x - 16)
```

3.964.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{e^{2x}(-16-24x-12x^2+4x^3)}{128+128x+8x^2-20x^3-2x^4+x^5}\,dx = \frac{2\,xe^{(2\,x)}}{x^3-12\,x-16}$$

input
```
integrate((4*x^3-12*x^2-24*x-16)*exp(x)^2/(x^5-2*x^4-20*x^3+8*x^2+128*x+12
8),x, algorithm=\
```

output
```
2*x*e^(2*x)/(x^3 - 12*x - 16)
```

3.964.9 Mupad [B] (verification not implemented)

Time = 15.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{e^{2x}(-16-24x-12x^2+4x^3)}{128+128x+8x^2-20x^3-2x^4+x^5}\,dx = \frac{2\,x\,e^{2\,x}}{(x+2)^2\,(x-4)}$$

input
```
int(-(exp(2*x)*(24*x + 12*x^2 - 4*x^3 + 16))/(128*x + 8*x^2 - 20*x^3 - 2*x
^4 + x^5 + 128),x)
```

output
```
(2*x*exp(2*x))/((x + 2)^2*(x - 4))
```

3.965 $\int \left(36-24e^5+18x+\left(72+32e^{10}+e^5(-96-80x)\right.\right.$

3.965.1 Optimal result

Integrand size = 198, antiderivative size = 28

$$\begin{aligned}\int & \left(36-24e^5+18x+\left(72+32e^{10}+e^5(-96-80x)+120x+36x^2\right)\log(4)\right.\\ &+\left(72x+32e^{10}x+72x^2+16x^3+e^5\left(-96x-48x^2\right)\right)\log^2(4)\\ &+e^{2x}\left(2e^{10}+e^{10}(2+4x)\log(4)+e^{10}\left(2x+2x^2\right)\log^2(4)\right)\\ &+e^x\left(8e^{10}+e^5(-18-6x)+\left(e^{10}(16+16x)+e^5\left(-24-44x-10x^2\right)\right)\log(4)\right.\\ &\left.\left.+\left(e^{10}\left(16x+8x^2\right)+e^5\left(-24x-24x^2-4x^3\right)\right)\log^2(4)\right)\right)\,dx=\left(x\right.\\ &\left.+x\left(-e^5(4+e^x)+2(3+x)\right)\left(\frac{1}{x}+\log(4)\right)\right)^2\end{aligned}$$

output
```
(x*(2*x+6-exp(5)*(exp(x)+4))*(2*ln(2)+1/x)+x)^2
```

3.965.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 147 vs. 2(28) = 56.

Time = 6.22 (sec) , antiderivative size = 147, normalized size of antiderivative = 5.25

$$\int \left(36-24e^5+18x+\left(72+32e^{10}+e^5(-96-80x)+120x+36x^2\right)\log(4)+\left(72x+32e^{10}x+72x^2+16x^3+e^5\left(-96x-48x^2\right)\right)\log^2(4)+e^{2x}\left(2e^{10}+e^{10}(2+4x)\log(4)+e^{10}\left(2x+2x^2\right)\log^2(4)\right)+e^x\left(8e^{10}+e^5(-18-6x)+\left(e^{10}(16+16x)+e^5\left(-24-44x-10x^2\right)\right)\log(4)+\left(e^{10}\left(16x+8x^2\right)+e^5\left(-24x-24x^2-4x^3\right)\right)\log^2(4)\right)\right)dx = e^{2(5+x)}(1+x\log(4))^2+8e^{10+x}(1+x\log(4))^2+16e^{10}x\log(4)(2+x\log(4))-8e^5x\left(3+12\log(4)+2x^2\log^2(4)+x\log(4)(5+6\log(4))\right)-2e^{5+x}(1+x\log(4))\left(6+x^2\log(16)+3x(1+\log(16))\right)+x\left(36+72\log(4)+4x^3\log^2(4)+x\left(9+60\log(4)+36\log^2(4)\right)+12x^2\log(4)(1+\log(16))\right)$$

input
```
Integrate[36 - 24*E^5 + 18*x + (72 + 32*E^10 + E^5*(-96 - 80*x) + 120*x +
36*x^2)*Log[4] + (72*x + 32*E^10*x + 72*x^2 + 16*x^3 + E^5*(-96*x - 48*x^2
))*Log[4]^2 + E^(2*x)*(2*E^10 + E^10*(2 + 4*x)*Log[4] + E^10*(2*x + 2*x^2)
*Log[4]^2) + E^x*(8*E^10 + E^5*(-18 - 6*x) + (E^10*(16 + 16*x) + E^5*(-24
- 44*x - 10*x^2))*Log[4] + (E^10*(16*x + 8*x^2) + E^5*(-24*x - 24*x^2 - 4*
x^3))*Log[4]^2),x]
```

output
```
E^(2*(5 + x))*(1 + x*Log[4])^2 + 8*E^(10 + x)*(1 + x*Log[4])^2 + 16*E^10*x
*Log[4]*(2 + x*Log[4]) - 8*E^5*x*(3 + 12*Log[4] + 2*x^2*Log[4]^2 + x*Log[4
]*(5 + 6*Log[4])) - 2*E^(5 + x)*(1 + x*Log[4])*(6 + x^2*Log[16] + 3*x*(1 +
 Log[16])) + x*(36 + 72*Log[4] + 4*x^3*Log[4]^2 + x*(9 + 60*Log[4] + 36*Lo
g[4]^2) + 12*x^2*Log[4]*(1 + Log[16]))
```

3.965.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 414 vs. 2(28) = 56.

Time = 0.81 (sec) , antiderivative size = 414, normalized size of antiderivative = 14.79, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.005, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{2x}\left(e^{10}\left(2x^2+2x\right)\log^2(4)+e^{10}(4x+2)\log(4)+2e^{10}\right)+\left(36x^2+120x+e^5(-80x-96)+32e^{10}+72\right)\log(4)\right.$$

3.965.
$\int \left(36-24e^5+18x+\left(72+32e^{10}+e^5(-96-80x)+120x+36x^2\right)\log(4)+\left(72x+32e^{10}x+72x^2+16x^3\right.\right.$

$\downarrow$ 2009

$$4x^4\log^2(4)-4e^{x+5}x^3\log^2(4)-16e^5x^3\log^2(4)+24x^3\log^2(4)+12x^3\log(4)+9x^2+12e^{x+5}x^2\log^2(4)+e^{2x+10}x^2\log^2(4)+4(9+4e^{10})x^2\log^2(4)-8(3-e^5)e^{x+5}x^2\log^2(4)-48e^5x^2\log^2(4)-10e^{x+5}x^2\log(4)+60x^2\log(4)+12(3-2e^5)x+6e^{x+5}+8e^{x+10}+e^{2x+10}-6e^{x+5}(x+3)-24e^{x+5}x\log^2(4)+16(3-e^5)e^{x+5}x\log^2(4)-8(3-2e^5)e^{x+5}x\log^2(4)+24e^{x+5}\log^2(4)-16(3-e^5)e^{x+5}\log^2(4)+8(3-2e^5)e^{x+5}\log^2(4)+20e^{x+5}x\log(4)+8(9+4e^{10})x\log(4)-4(11-4e^5)e^{x+5}x\log(4)-20e^{x+5}\log(4)-e^{2x+10}\log(4)-\frac{8}{5}e^5(5x+6)^2\log(4)+e^{2x+10}(2x+1)\log(4)-8(3-2e^5)e^{x+5}\log(4)+4(11-4e^5)e^{x+5}\log(4)$$

input
```
Int[36 - 24*E^5 + 18*x + (72 + 32*E^10 + E^5*(-96 - 80*x) + 120*x + 36*x^2
)*Log[4] + (72*x + 32*E^10*x + 72*x^2 + 16*x^3 + E^5*(-96*x - 48*x^2))*Log
[4]^2 + E^(2*x)*(2*E^10 + E^10*(2 + 4*x)*Log[4] + E^10*(2*x + 2*x^2)*Log[4
]^2) + E^x*(8*E^10 + E^5*(-18 - 6*x) + (E^10*(16 + 16*x) + E^5*(-24 - 44*x
 - 10*x^2))*Log[4] + (E^10*(16*x + 8*x^2) + E^5*(-24*x - 24*x^2 - 4*x^3))*
Log[4]^2),x]
```

output
```
6*E^(5 + x) + 8*E^(10 + x) + E^(10 + 2*x) + 12*(3 - 2*E^5)*x + 9*x^2 - 6*E
^(5 + x)*(3 + x) - 20*E^(5 + x)*Log[4] - E^(10 + 2*x)*Log[4] + 4*E^(5 + x)
*(11 - 4*E^5)*Log[4] - 8*E^(5 + x)*(3 - 2*E^5)*Log[4] + 20*E^(5 + x)*x*Log
[4] - 4*E^(5 + x)*(11 - 4*E^5)*x*Log[4] + 8*(9 + 4*E^10)*x*Log[4] + 60*x^2
*Log[4] - 10*E^(5 + x)*x^2*Log[4] + 12*x^3*Log[4] + E^(10 + 2*x)*(1 + 2*x)
*Log[4] - (8*E^5*(6 + 5*x)^2*Log[4])/5 + 24*E^(5 + x)*Log[4]^2 + 8*E^(5 +
x)*(3 - 2*E^5)*Log[4]^2 - 16*E^(5 + x)*(3 - E^5)*Log[4]^2 - 24*E^(5 + x)*x
*Log[4]^2 - 8*E^(5 + x)*(3 - 2*E^5)*x*Log[4]^2 + 16*E^(5 + x)*(3 - E^5)*x*
Log[4]^2 - 48*E^5*x^2*Log[4]^2 + 12*E^(5 + x)*x^2*Log[4]^2 + E^(10 + 2*x)*
x^2*Log[4]^2 - 8*E^(5 + x)*(3 - E^5)*x^2*Log[4]^2 + 4*(9 + 4*E^10)*x^2*Log
[4]^2 + 24*x^3*Log[4]^2 - 16*E^5*x^3*Log[4]^2 - 4*E^(5 + x)*x^3*Log[4]^2 +
 4*x^4*Log[4]^2
```

3.965.

$\int (36-24e^5+18x+(72+32e^{10}+e^5(-96-80x)+120x+36x^2)\log(4)+(72x+32e^{10}x+72x^2+16x^3$

3.965.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.965.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 215 vs. 2(27) = 54.

Time = 0.51 (sec) , antiderivative size = 216, normalized size of antiderivative = 7.71

method	result
risch	$\left(4\,\mathrm{e}^{10}\ln\left(2\right)^{2}x^{2}+4x\,\mathrm{e}^{10}\ln\left(2\right)+\mathrm{e}^{10}\right)\mathrm{e}^{2x}+\left(32\,\mathrm{e}^{10}\ln\left(2\right)^{2}x^{2}-16\,\mathrm{e}^{5}\ln\left(2\right)^{2}x^{3}-48x^{2}\mathrm{e}^{5}\ln\left(2\right)\right.$
default	$36x+\mathrm{e}^{10}\mathrm{e}^{2x}+4\ln\left(2\right)\mathrm{e}^{10}\mathrm{e}^{2x}x+4\ln\left(2\right)^{2}\mathrm{e}^{10}\mathrm{e}^{2x}x^{2}-6x\,\mathrm{e}^{5}\mathrm{e}^{x}+32\,\mathrm{e}^{x}\ln\left(2\right)^{2}\mathrm{e}^{10}x^{2}-16\,\mathrm{e}^{5}\mathrm{e}^{x}\ln$
norman	$\left(-12\,\mathrm{e}^{5}+8\,\mathrm{e}^{10}\right)\mathrm{e}^{x}+\left(-64\,\mathrm{e}^{5}\ln\left(2\right)^{2}+96\ln\left(2\right)^{2}+24\ln\left(2\right)\right)x^{3}+\left(36-192\,\mathrm{e}^{5}\ln\left(2\right)+64\,\mathrm{e}^{1}\right.$
parallelrisch	$-192x\,\mathrm{e}^{5}\ln\left(2\right)-80x^{2}\mathrm{e}^{5}\ln\left(2\right)+16x^{4}\ln\left(2\right)^{2}+96x^{3}\ln\left(2\right)^{2}+144x^{2}\ln\left(2\right)^{2}+144x\ln\left(2\right)+$
parts	$36x-192x\,\mathrm{e}^{5}\ln\left(2\right)-80x^{2}\mathrm{e}^{5}\ln\left(2\right)+16x^{4}\ln\left(2\right)^{2}+96x^{3}\ln\left(2\right)^{2}+144x^{2}\ln\left(2\right)^{2}+144x\ln\left(2\right.$

input
```
int((4*(2*x^2+2*x)*exp(5)^2*ln(2)^2+2*(4*x+2)*exp(5)^2*ln(2)+2*exp(5)^2)*e
xp(x)^2+(4*((8*x^2+16*x)*exp(5)^2+(-4*x^3-24*x^2-24*x)*exp(5))*ln(2)^2+2*(
(16*x+16)*exp(5)^2+(-10*x^2-44*x-24)*exp(5))*ln(2)+8*exp(5)^2+(-6*x-18)*ex
p(5))*exp(x)+4*(32*x*exp(5)^2+(-48*x^2-96*x)*exp(5)+16*x^3+72*x^2+72*x)*ln
(2)^2+2*(32*exp(5)^2+(-80*x-96)*exp(5)+36*x^2+120*x+72)*ln(2)-24*exp(5)+18
*x+36,x,method=_RETURNVERBOSE)
```

output
```
(4*exp(10)*ln(2)^2*x^2+4*x*exp(10)*ln(2)+exp(10))*exp(2*x)+(32*exp(10)*ln(
2)^2*x^2-16*exp(5)*ln(2)^2*x^3-48*x^2*exp(5)*ln(2)^2+32*x*exp(10)*ln(2)-20
*x^2*exp(5)*ln(2)-48*x*exp(5)*ln(2)+8*exp(10)-6*x*exp(5)-12*exp(5))*exp(x)
+16*x^4*ln(2)^2-64*exp(5)*ln(2)^2*x^3+96*x^3*ln(2)^2-192*x^2*exp(5)*ln(2)^
2+64*exp(10)*ln(2)^2*x^2+144*x^2*ln(2)^2+64*x*exp(10)*ln(2)-80*x^2*exp(5)*
ln(2)+24*x^3*ln(2)-192*x*exp(5)*ln(2)+120*x^2*ln(2)+144*x*ln(2)-24*x*exp(5
)+9*x^2+36*x
```

3.965.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 182 vs. $2(28) = 56$.

Time = 0.28 (sec) , antiderivative size = 182, normalized size of antiderivative = 6.50

$$\int \left(36-24e^5+18x+\left(72+32e^{10}+e^5(-96-80x)+120x+36x^2\right)\log(4) + \left(72x+32e^{10}x+72x^2+16x^3+e^5\left(-96x-48x^2\right)\right)\log^2(4) + e^{2x}\left(2e^{10}+e^{10}(2+4x)\log(4)+e^{10}\left(2x+2x^2\right)\log^2(4)\right) + e^x\left(8e^{10}+e^5(-18-6x)+\left(e^{10}(16+16x)+e^5\left(-24-44x-10x^2\right)\right)\log(4) + \left(e^{10}\left(16x+8x^2\right)+e^5\left(-24x-24x^2-4x^3\right)\right)\log^2(4)\right)\right)\,dx$$
$$= 16\left(x^4+6x^3+4x^2e^{10}+9x^2-4\left(x^3+3x^2\right)e^5\right)\log(2)^2 + 9x^2-24xe^5+\left(4x^2e^{10}\log(2)^2+4xe^{10}\log(2)+e^{10}\right)e^{(2x)} + 2\left(8\left(2x^2e^{10}-\left(x^3+3x^2\right)e^5\right)\log(2)^2-3(x+2)e^5+2\left(8xe^{10}-\left(5x^2+12x\right)e^5\right)\log(2)+4e^{10}\right)e^x + 8\left(3x^3+15x^2+8xe^{10}-2\left(5x^2+12x\right)e^5+18x\right)\log(2)+36x$$

input
```
integrate((4*(2*x^2+2*x)*exp(5)^2*log(2)^2+2*(4*x+2)*exp(5)^2*log(2)+2*exp
(5)^2)*exp(x)^2+(4*((8*x^2+16*x)*exp(5)^2+(-4*x^3-24*x^2-24*x)*exp(5))*log
(2)^2+2*((16*x+16)*exp(5)^2+(-10*x^2-44*x-24)*exp(5))*log(2)+8*exp(5)^2+(-
6*x-18)*exp(5))*exp(x)+4*(32*x*exp(5)^2+(-48*x^2-96*x)*exp(5)+16*x^3+72*x^
2+72*x)*log(2)^2+2*(32*exp(5)^2+(-80*x-96)*exp(5)+36*x^2+120*x+72)*log(2)-
24*exp(5)+18*x+36,x, algorithm=\
```

output
```
16*(x^4 + 6*x^3 + 4*x^2*e^10 + 9*x^2 - 4*(x^3 + 3*x^2)*e^5)*log(2)^2 + 9*x
^2 - 24*x*e^5 + (4*x^2*e^10*log(2)^2 + 4*x*e^10*log(2) + e^10)*e^(2*x) + 2
*(8*(2*x^2*e^10 - (x^3 + 3*x^2)*e^5)*log(2)^2 - 3*(x + 2)*e^5 + 2*(8*x*e^1
0 - (5*x^2 + 12*x)*e^5)*log(2) + 4*e^10)*e^x + 8*(3*x^3 + 15*x^2 + 8*x*e^1
0 - 2*(5*x^2 + 12*x)*e^5 + 18*x)*log(2) + 36*x
```

3.965.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 236 vs. $2(26) = 52$.

Time = 0.20 (sec) , antiderivative size = 236, normalized size of antiderivative = 8.43

$$\int \left(36-24e^5+18x+\left(72+32e^{10}+e^5(-96-80x)+120x+36x^2\right)\log(4)+\left(72x+32e^{10}x+72x^2+16x^3+e^5\left(-96x-48x^2\right)\right)\log^2(4)+e^{2x}\left(2e^{10}+e^{10}(2+4x)\log(4)+e^{10}\left(2x+2x^2\right)\log^2(4)\right)+e^x\left(8e^{10}+e^5(-18-6x)+\left(e^{10}(16+16x)+e^5\left(-24-44x-10x^2\right)\right)\log(4)+\left(e^{10}\left(16x+8x^2\right)+e^5\left(-24x-24x^2-4x^3\right)\right)\log^2(4)\right)\right)dx = 16x^4\log(2)^2+x^3\left(-64e^5\log(2)^2+24\log(2)+96\log(2)^2\right)+x^2\left(-192e^5\log(2)^2-80e^5\log(2)+9+144\log(2)^2+120\log(2)+64e^{10}\log(2)^2\right)+x\left(-192e^5\log(2)-24e^5+36+144\log(2)+64e^{10}\log(2)\right)+\left(4x^2e^{10}\log(2)^2+4xe^{10}\log(2)+e^{10}\right)e^{2x}+\left(-16x^3e^5\log(2)^2-48x^2e^5\log(2)^2-20x^2e^5\log(2)+32x^2e^{10}\log(2)^2-48xe^5\log(2)-6xe^5+32xe^{10}\log(2)-12e^5+8e^{10}\right)e^x$$

input
```
integrate((4*(2*x**2+2*x)*exp(5)**2*ln(2)**2+2*(4*x+2)*exp(5)**2*ln(2)+2*e
xp(5)**2)*exp(x)**2+(4*((8*x**2+16*x)*exp(5)**2+(-4*x**3-24*x**2-24*x)*exp
(5))*ln(2)**2+2*((16*x+16)*exp(5)**2+(-10*x**2-44*x-24)*exp(5))*ln(2)+8*ex
p(5)**2+(-6*x-18)*exp(5))*exp(x)+4*(32*x*exp(5)**2+(-48*x**2-96*x)*exp(5)+
16*x**3+72*x**2+72*x)*ln(2)**2+2*(32*exp(5)**2+(-80*x-96)*exp(5)+36*x**2+1
20*x+72)*ln(2)-24*exp(5)+18*x+36,x)
```

output
```
16*x**4*log(2)**2 + x**3*(-64*exp(5)*log(2)**2 + 24*log(2) + 96*log(2)**2)
 + x**2*(-192*exp(5)*log(2)**2 - 80*exp(5)*log(2) + 9 + 144*log(2)**2 + 12
0*log(2) + 64*exp(10)*log(2)**2) + x*(-192*exp(5)*log(2) - 24*exp(5) + 36
+ 144*log(2) + 64*exp(10)*log(2)) + (4*x**2*exp(10)*log(2)**2 + 4*x*exp(10
)*log(2) + exp(10))*exp(2*x) + (-16*x**3*exp(5)*log(2)**2 - 48*x**2*exp(5)
*log(2)**2 - 20*x**2*exp(5)*log(2) + 32*x**2*exp(10)*log(2)**2 - 48*x*exp(
5)*log(2) - 6*x*exp(5) + 32*x*exp(10)*log(2) - 12*exp(5) + 8*exp(10))*exp(
x)
```

3.965.

$\int (36-24e^5+18x+(72+32e^{10}+e^5(-96-80x)+120x+36x^2)\log(4)+(72x+32e^{10}x+72x^2+16x^3$ -

3.965.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 188 vs. $2(28) = 56$.

Time = 0.27 (sec) , antiderivative size = 188, normalized size of antiderivative = 6.71

$$\int (36 - 24e^5 + 18x + (72 + 32e^{10} + e^5(-96 - 80x) + 120x + 36x^2) \log(4) + (72x + 32e^{10}x + 72x^2 + 16x^3 + e^5(-96x - 48x^2)) \log^2(4) + e^{2x}(2e^{10} + e^{10}(2 + 4x) \log(4) + e^{10}(2x + 2x^2) \log^2(4)) + e^x(8e^{10} + e^5(-18 - 6x) + (e^{10}(16 + 16x) + e^5(-24 - 44x - 10x^2)) \log(4) + (e^{10}(16x + 8x^2) + e^5(-24x - 24x^2 - 4x^3)) \log^2(4))) \, dx$$
$$= 16 (x^4 + 6x^3 + 4x^2e^{10} + 9x^2 - 4(x^3 + 3x^2)e^5) \log(2)^2 + 9x^2 - 24xe^5 + (4x^2e^{10} \log(2)^2 + 4xe^{10} \log(2) + e^{10})e^{(2x)} - 2(8x^3e^5 \log(2)^2 - 2(8e^{10} \log(2)^2 - (12 \log(2)^2 + 5 \log(2))e^5)x^2 + (3(8 \log(2) + 1)e^5 - 16e^{10} \log(2$$
$$+ 8(3x^3 + 15x^2 + 8xe^{10} - 2(5x^2 + 12x)e^5 + 18x) \log(2) + 36x$$

input

```
integrate((4*(2*x^2+2*x)*exp(5)^2*log(2)^2+2*(4*x+2)*exp(5)^2*log(2)+2*exp
(5)^2)*exp(x)^2+(4*((8*x^2+16*x)*exp(5)^2+(-4*x^3-24*x^2-24*x)*exp(5))*log
(2)^2+2*((16*x+16)*exp(5)^2+(-10*x^2-44*x-24)*exp(5))*log(2)+8*exp(5)^2+(-
6*x-18)*exp(5))*exp(x)+4*(32*x*exp(5)^2+(-48*x^2-96*x)*exp(5)+16*x^3+72*x^
2+72*x)*log(2)^2+2*(32*exp(5)^2+(-80*x-96)*exp(5)+36*x^2+120*x+72)*log(2)-
24*exp(5)+18*x+36,x, algorithm=\
```

output

```
16*(x^4 + 6*x^3 + 4*x^2*e^10 + 9*x^2 - 4*(x^3 + 3*x^2)*e^5)*log(2)^2 + 9*x
^2 - 24*x*e^5 + (4*x^2*e^10*log(2)^2 + 4*x*e^10*log(2) + e^10)*e^(2*x) - 2
*(8*x^3*e^5*log(2)^2 - 2*(8*e^10*log(2)^2 - (12*log(2)^2 + 5*log(2))*e^5)*
x^2 + (3*(8*log(2) + 1)*e^5 - 16*e^10*log(2))*x - 4*e^10 + 6*e^5)*e^x + 8*
(3*x^3 + 15*x^2 + 8*x*e^10 - 2*(5*x^2 + 12*x)*e^5 + 18*x)*log(2) + 36*x
```

3.965.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 176 vs. $2(28) = 56$.

Time = 0.28 (sec) , antiderivative size = 176, normalized size of antiderivative = 6.29

$$\int \left(36-24e^5+18x+\left(72+32e^{10}+e^5(-96-80x)+120x+36x^2\right)\log(4)+\left(72x+32e^{10}x+72x^2+16x^3+e^5\left(-96x-48x^2\right)\right)\log^2(4)+e^{2x}\left(2e^{10}+e^{10}(2+4x)\log(4)+e^{10}\left(2x+2x^2\right)\log^2(4)\right)+e^x\left(8e^{10}+e^5(-18-6x)+\left(e^{10}(16+16x)+e^5\left(-24-44x-10x^2\right)\right)\log(4)+\left(e^{10}\left(16x+8x^2\right)+e^5\left(-24x-24x^2-4x^3\right)\right)\log^2(4)\right)\right)\,dx = 16\left(x^4+6x^3+4x^2e^{10}+9x^2-4\left(x^3+3x^2\right)e^5\right)\log(2)^2+9x^2-24xe^5+\left(4x^2\log(2)^2+4x\log(2)+1\right)e^{(2x+10)}+8\left(4x^2\log(2)^2+4x\log(2)+1\right)e^{(x+10)}-2\left(8x^3\log(2)^2+24x^2\log(2)^2+10x^2\log(2)+24x\log(2)+3x+6\right)e^{(x+5)}+8\left(3x^3+15x^2+8xe^{10}-2\left(5x^2+12x\right)e^5+18x\right)\log(2)+36x$$

input
```
integrate((4*(2*x^2+2*x)*exp(5)^2*log(2)^2+2*(4*x+2)*exp(5)^2*log(2)+2*exp
(5)^2)*exp(x)^2+(4*((8*x^2+16*x)*exp(5)^2+(-4*x^3-24*x^2-24*x)*exp(5))*log
(2)^2+2*((16*x+16)*exp(5)^2+(-10*x^2-44*x-24)*exp(5))*log(2)+8*exp(5)^2+(-
6*x-18)*exp(5))*exp(x)+4*(32*x*exp(5)^2+(-48*x^2-96*x)*exp(5)+16*x^3+72*x^
2+72*x)*log(2)^2+2*(32*exp(5)^2+(-80*x-96)*exp(5)+36*x^2+120*x+72)*log(2)-
24*exp(5)+18*x+36,x, algorithm=\
```

output
```
16*(x^4 + 6*x^3 + 4*x^2*e^10 + 9*x^2 - 4*(x^3 + 3*x^2)*e^5)*log(2)^2 + 9*x
^2 - 24*x*e^5 + (4*x^2*log(2)^2 + 4*x*log(2) + 1)*e^(2*x + 10) + 8*(4*x^2*
log(2)^2 + 4*x*log(2) + 1)*e^(x + 10) - 2*(8*x^3*log(2)^2 + 24*x^2*log(2)^
2 + 10*x^2*log(2) + 24*x*log(2) + 3*x + 6)*e^(x + 5) + 8*(3*x^3 + 15*x^2 +
 8*x*e^10 - 2*(5*x^2 + 12*x)*e^5 + 18*x)*log(2) + 36*x
```

3.965.

$\int (36-24e^5+18x+(72+32e^{10}+e^5(-96-80x)+120x+36x^2)\log(4)+(72x+32e^{10}x+72x^2+16x^3$ -

3.965.9 Mupad [B] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 189, normalized size of antiderivative = 6.75

$$\int \left(36-24e^5+18x+\left(72+32e^{10}+e^5(-96-80x)+120x+36x^2\right)\log(4)+\left(72x+32e^{10}x+72x^2+16x^3+e^5\left(-96x-48x^2\right)\right)\log^2(4)+e^{2x}\left(2e^{10}+e^{10}(2+4x)\log(4)+e^{10}\left(2x+2x^2\right)\log^2(4)\right)+e^x\left(8e^{10}+e^5(-18-6x)+\left(e^{10}(16+16x)+e^5\left(-24-44x-10x^2\right)\right)\log(4)+\left(e^{10}\left(16x+8x^2\right)+e^5\left(-24x-24x^2-4x^3\right)\right)\log^2(4)\right)\right)\,dx = \mathrm{e}^{2x+10}+16x^4\ln(2)^2+x\left(144\ln(2)-24\mathrm{e}^5-192\mathrm{e}^5\ln(2)+64\mathrm{e}^{10}\ln(2)+36\right)+\mathrm{e}^{x+5}\left(8\mathrm{e}^5-12\right)+x^2\left(120\ln(2)-80\mathrm{e}^5\ln(2)-192\mathrm{e}^5\ln(2)^2+64\mathrm{e}^{10}\ln(2)^2+144\ln(2)^2+9\right)-16x^3\mathrm{e}^{x+5}\ln(2)^2-2x\mathrm{e}^{x+5}\left(24\ln(2)-16\mathrm{e}^5\ln(2)+3\right)+4x^2\mathrm{e}^{2x+10}\ln(2)^2+4x\mathrm{e}^{2x+10}\ln(2)+8x^3\ln(2)\left(12\ln(2)-8\mathrm{e}^5\ln(2)+3\right)-4x^2\mathrm{e}^{x+5}\ln(2)\left(12\ln(2)-8\mathrm{e}^5\ln(2)+5\right)$$

input
```
int(18*x - 24*exp(5) + exp(2*x)*(2*exp(10) + 2*exp(10)*log(2)*(4*x + 2) +
4*exp(10)*log(2)^2*(2*x + 2*x^2)) + 4*log(2)^2*(72*x - exp(5)*(96*x + 48*x
^2) + 32*x*exp(10) + 72*x^2 + 16*x^3) + exp(x)*(8*exp(10) + 4*log(2)^2*(ex
p(10)*(16*x + 8*x^2) - exp(5)*(24*x + 24*x^2 + 4*x^3)) - 2*log(2)*(exp(5)*
(44*x + 10*x^2 + 24) - exp(10)*(16*x + 16)) - exp(5)*(6*x + 18)) + 2*log(2
)*(120*x + 32*exp(10) + 36*x^2 - exp(5)*(80*x + 96) + 72) + 36,x)
```

output
```
exp(2*x + 10) + 16*x^4*log(2)^2 + x*(144*log(2) - 24*exp(5) - 192*exp(5)*l
og(2) + 64*exp(10)*log(2) + 36) + exp(x + 5)*(8*exp(5) - 12) + x^2*(120*lo
g(2) - 80*exp(5)*log(2) - 192*exp(5)*log(2)^2 + 64*exp(10)*log(2)^2 + 144*
log(2)^2 + 9) - 16*x^3*exp(x + 5)*log(2)^2 - 2*x*exp(x + 5)*(24*log(2) - 1
6*exp(5)*log(2) + 3) + 4*x^2*exp(2*x + 10)*log(2)^2 + 4*x*exp(2*x + 10)*lo
g(2) + 8*x^3*log(2)*(12*log(2) - 8*exp(5)*log(2) + 3) - 4*x^2*exp(x + 5)*l
og(2)*(12*log(2) - 8*exp(5)*log(2) + 5)
```

3.966 $\int \frac{\left(-4e^x x+e^{x+x^2}(4x+8x^2)\right)\log^3\left(e^x-e^{x+x^2}\right)+\left(4e^x-4e^{x+x^2}\right)\log^4\left(e^x-e^{x+x^2}\right)}{-e^x x^5+e^{x+x^2}x^5}$

3.966.1 Optimal result

Integrand size = 97, antiderivative size = 20

$$\int \frac{\left(-4e^x x+e^{x+x^2}(4x+8x^2)\right)\log^3\left(e^x-e^{x+x^2}\right)+\left(4e^x-4e^{x+x^2}\right)\log^4\left(e^x-e^{x+x^2}\right)}{-e^x x^5+e^{x+x^2}x^5}\,dx = \frac{\log^4\left(e^x-e^{x+x^2}\right)}{x^4}$$

output
```
ln(-exp(x^2+x)+exp(1/2*x)^2)^4/x^4
```

3.966.2 Mathematica [A] (verified)

Time = 0.34 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{\left(-4e^x x+e^{x+x^2}(4x+8x^2)\right)\log^3\left(e^x-e^{x+x^2}\right)+\left(4e^x-4e^{x+x^2}\right)\log^4\left(e^x-e^{x+x^2}\right)}{-e^x x^5+e^{x+x^2}x^5}\,dx = -1+\frac{\log^4\left(-e^x\left(-1+e^{x^2}\right)\right)}{x^4}$$

input
```
Integrate[((-4*E^x*x + E^(x + x^2)*(4*x + 8*x^2))*Log[E^x - E^(x + x^2)]^3
 + (4*E^x - 4*E^(x + x^2))*Log[E^x - E^(x + x^2)]^4)/(-(E^x*x^5) + E^(x +
x^2)*x^5),x]
```

output
```
-1 + Log[-(E^x*(-1 + E^x^2))]^4/x^4
```

3.966.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(4e^x-4e^{x^2+x}\right)\log^4\left(e^x-e^{x^2+x}\right)+\left(e^{x^2+x}\left(8x^2+4x\right)-4e^xx\right)\log^3\left(e^x-e^{x^2+x}\right)}{e^{x^2+x}x^5-e^xx^5}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{4\log^3\left(-e^x\left(e^{x^2}-1\right)\right)\left(-2e^{x^2}x^2-e^{x^2}x+e^{x^2}\log\left(-e^x\left(e^{x^2}-1\right)\right)-\log\left(-e^x\left(e^{x^2}-1\right)\right)+x\right)}{\left(1-e^{x^2}\right)x^5}dx$$

$$\Big\downarrow \text{27}$$

$$4\int \frac{\log^3\left(e^x\left(1-e^{x^2}\right)\right)\left(-2e^{x^2}x^2-e^{x^2}x+x+e^{x^2}\log\left(e^x\left(1-e^{x^2}\right)\right)-\log\left(e^x\left(1-e^{x^2}\right)\right)\right)}{\left(1-e^{x^2}\right)x^5}dx$$

$$\Big\downarrow \text{7293}$$

$$4\int \left(\frac{\left(2x^2+x-\log\left(-e^x\left(-1+e^{x^2}\right)\right)\right)\log^3\left(-e^x\left(-1+e^{x^2}\right)\right)}{x^5}+\frac{2\log^3\left(-e^x\left(-1+e^{x^2}\right)\right)}{\left(-1+e^{x^2}\right)x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$4\left(-\int \frac{\log^4\left(-e^x\left(-1+e^{x^2}\right)\right)}{x^5}dx+\int \frac{\log^3\left(-e^x\left(-1+e^{x^2}\right)\right)}{x^4}dx+2\int \frac{\log^3\left(-e^x\left(-1+e^{x^2}\right)\right)}{x^3}dx+2\int \frac{\log^3\left(-\right.}{\left(-\right.}\right.$$

input
```
Int[((-4*E^x*x + E^(x + x^2)*(4*x + 8*x^2))*Log[E^x - E^(x + x^2)]^3 + (4*
E^x - 4*E^(x + x^2))*Log[E^x - E^(x + x^2)]^4)/(-(E^x*x^5) + E^(x + x^2)*x
^5),x]
```

output
```
$Aborted
```

3.966.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.966.4 Maple [A] (verified)

Time = 2.29 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
risch	$\frac{\ln\left(-\mathrm{e}^{(1+x)x}+\mathrm{e}^{x}\right)^{4}}{x^{4}}$	19
parallelrisch	$\frac{\ln\left(-\mathrm{e}^{x^{2}+x}+\mathrm{e}^{x}\right)^{4}}{x^{4}}$	23

input
```
int(((-4*exp(x^2+x)+4*exp(1/2*x)^2)*ln(-exp(x^2+x)+exp(1/2*x)^2)^4+((8*x^2
+4*x)*exp(x^2+x)-4*x*exp(1/2*x)^2)*ln(-exp(x^2+x)+exp(1/2*x)^2)^3)/(x^5*ex
p(x^2+x)-x^5*exp(1/2*x)^2),x,method=_RETURNVERBOSE)
```

output
```
ln(-exp((1+x)*x)+exp(x))^4/x^4
```

3.966.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{\left(-4e^x x + e^{x+x^2}(4x+8x^2)\right)\log^3\left(e^x - e^{x+x^2}\right) + \left(4e^x - 4e^{x+x^2}\right)\log^4\left(e^x - e^{x+x^2}\right)}{-e^x x^5 + e^{x+x^2} x^5}\,dx = \frac{\log\left(-e^{(x^2+x)} + e^x\right)^4}{x^4}$$

input
```
integrate(((-4*exp(x^2+x)+4*exp(1/2*x)^2)*log(-exp(x^2+x)+exp(1/2*x)^2)^4+
((8*x^2+4*x)*exp(x^2+x)-4*x*exp(1/2*x)^2)*log(-exp(x^2+x)+exp(1/2*x)^2)^3)
/(x^5*exp(x^2+x)-x^5*exp(1/2*x)^2),x, algorithm=\
```

output
```
log(-e^(x^2 + x) + e^x)^4/x^4
```

3.966.6 Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{\left(-4e^x x + e^{x+x^2}(4x+8x^2)\right)\log^3\left(e^x - e^{x+x^2}\right) + \left(4e^x - 4e^{x+x^2}\right)\log^4\left(e^x - e^{x+x^2}\right)}{-e^x x^5 + e^{x+x^2} x^5}\,dx = \frac{\log\left(e^x - e^{x^2+x}\right)^4}{x^4}$$

input
```
integrate(((-4*exp(x**2+x)+4*exp(1/2*x)**2)*ln(-exp(x**2+x)+exp(1/2*x)**2)
**4+((8*x**2+4*x)*exp(x**2+x)-4*x*exp(1/2*x)**2)*ln(-exp(x**2+x)+exp(1/2*x
)**2)**3)/(x**5*exp(x**2+x)-x**5*exp(1/2*x)**2),x)
```

output
```
log(exp(x) - exp(x**2 + x))**4/x**4
```

3.966.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. 2(18) = 36.

Time = 0.24 (sec) , antiderivative size = 60, normalized size of antiderivative = 3.00

$$\int \frac{\left(-4e^x x + e^{x+x^2}(4x+8x^2)\right)\log^3\left(e^x - e^{x+x^2}\right) + \left(4e^x - 4e^{x+x^2}\right)\log^4\left(e^x - e^{x+x^2}\right)}{-e^x x^5 + e^{x+x^2}x^5}\,dx$$
$$= \frac{4\,x^3\log\left(-e^{(x^2)}+1\right) + 6\,x^2\log\left(-e^{(x^2)}+1\right)^2 + 4\,x\log\left(-e^{(x^2)}+1\right)^3 + \log\left(-e^{(x^2)}+1\right)^4}{x^4}$$

input
```
integrate(((-4*exp(x^2+x)+4*exp(1/2*x)^2)*log(-exp(x^2+x)+exp(1/2*x)^2)^4+
((8*x^2+4*x)*exp(x^2+x)-4*x*exp(1/2*x)^2)*log(-exp(x^2+x)+exp(1/2*x)^2)^3)
/(x^5*exp(x^2+x)-x^5*exp(1/2*x)^2),x, algorithm=\
```

output
```
(4*x^3*log(-e^(x^2) + 1) + 6*x^2*log(-e^(x^2) + 1)^2 + 4*x*log(-e^(x^2) +
1)^3 + log(-e^(x^2) + 1)^4)/x^4
```

3.966.8 Giac [A] (verification not implemented)

Time = 1.48 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{\left(-4e^x x + e^{x+x^2}(4x+8x^2)\right)\log^3\left(e^x - e^{x+x^2}\right) + \left(4e^x - 4e^{x+x^2}\right)\log^4\left(e^x - e^{x+x^2}\right)}{-e^x x^5 + e^{x+x^2}x^5}\,dx$$
$$= \frac{\log\left(-e^{(x^2+x)} + e^x\right)^4}{x^4}$$

input
```
integrate(((-4*exp(x^2+x)+4*exp(1/2*x)^2)*log(-exp(x^2+x)+exp(1/2*x)^2)^4+
((8*x^2+4*x)*exp(x^2+x)-4*x*exp(1/2*x)^2)*log(-exp(x^2+x)+exp(1/2*x)^2)^3)
/(x^5*exp(x^2+x)-x^5*exp(1/2*x)^2),x, algorithm=\
```

output
```
log(-e^(x^2 + x) + e^x)^4/x^4
```

3.966.9 Mupad [B] (verification not implemented)

Time = 15.10 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{\left(-4e^x x+e^{x+x^2}\left(4x+8x^2\right)\right)\log^3\left(e^x-e^{x+x^2}\right)+\left(4e^x-4e^{x+x^2}\right)\log^4\left(e^x-e^{x+x^2}\right)}{-e^x x^5+e^{x+x^2}x^5}\,dx$$
$$=\frac{\ln\left(\mathrm{e}^x-\mathrm{e}^{x^2}\,\mathrm{e}^x\right)^4}{x^4}$$

input
```
int((log(exp(x) - exp(x + x^2))^3*(4*x*exp(x) - exp(x + x^2)*(4*x + 8*x^2)
) + log(exp(x) - exp(x + x^2))^4*(4*exp(x + x^2) - 4*exp(x)))/(x^5*exp(x)
- x^5*exp(x + x^2)),x)
```

output
```
log(exp(x) - exp(x^2)*exp(x))^4/x^4
```

3.967 $\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3}$

3.967.1 Optimal result

Integrand size = 90, antiderivative size = 31

$$\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3+4x^4)}\,dx = 16+\frac{4}{1+\frac{-x+\frac{x}{-5+e^x(5+2x)}}{x^2}}$$

output
```
4/((x/((5+2*x)*exp(x)-5)-x)/x^2+1)+16
```

3.967.2 Mathematica [A] (verified)

Time = 4.10 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.13

$$\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3+4x^4)}\,dx = -\frac{4(6-e^x(5+2x))}{6-5x+e^x(-5+3x+2x^2)}$$

input
```
Integrate[(-120 + E^(2*x)*(-100 - 80*x - 16*x^2) + E^x*(220 + 116*x + 8*x^
2))/(36 - 60*x + 25*x^2 + E^x*(-60 + 86*x - 6*x^2 - 20*x^3) + E^(2*x)*(25
- 30*x - 11*x^2 + 12*x^3 + 4*x^4)),x]
```

output
```
(-4*(6 - E^x*(5 + 2*x)))/(6 - 5*x + E^x*(-5 + 3*x + 2*x^2))
```

3.967.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}(-16x^2-80x-100)+e^x(8x^2+116x+220)-120}{25x^2+e^x(-20x^3-6x^2+86x-60)+e^{2x}(4x^4+12x^3-11x^2-30x+25)-60x+36}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{4\left(e^x(2x^2+29x+55)-e^{2x}(2x+5)^2-30\right)}{\left(e^x(2x^2+3x-5)-5x+6\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$4\int -\frac{e^{2x}(2x+5)^2-e^x(2x^2+29x+55)+30}{\left(-5x-e^x(-2x^2-3x+5)+6\right)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-4\int \frac{e^{2x}(2x+5)^2-e^x(2x^2+29x+55)+30}{\left(-5x-e^x(-2x^2-3x+5)+6\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-4\int \left(-\frac{2x^3+7x^2+5}{(x-1)^2(2x+5)(2e^xx^2+3e^xx-5x-5e^x+6)}-\frac{x(10x^3+13x^2-67x+37)}{(x-1)^2(2x+5)(2e^xx^2+3e^xx-5x-5e^x+6)^2}+\right.$$

$$\Big\downarrow \text{2009}$$

$$-4\left(-4\int \frac{1}{(2e^xx^2+3e^xx-5x-5e^x+6)^2}dx+\int \frac{1}{(x-1)^2(2e^xx^2+3e^xx-5x-5e^x+6)^2}dx+\frac{16}{7}\int \frac{}{(x-1)(2}\right.$$

input
```
Int[(-120 + E^(2*x)*(-100 - 80*x - 16*x^2) + E^x*(220 + 116*x + 8*x^2))/(3
6 - 60*x + 25*x^2 + E^x*(-60 + 86*x - 6*x^2 - 20*x^3) + E^(2*x)*(25 - 30*x
 - 11*x^2 + 12*x^3 + 4*x^4)),x]
```

output
```
$Aborted
```

3.967.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.967.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.16

method	result	size
norman	$\frac{20\,\mathrm{e}^{x}+8\,\mathrm{e}^{x} x-24}{2\,\mathrm{e}^{x} x^{2}+3\,\mathrm{e}^{x} x-5\,\mathrm{e}^{x}-5x+6}$	36
parallelrisch	$\frac{-48+16\,\mathrm{e}^{x} x+40\,\mathrm{e}^{x}}{4\,\mathrm{e}^{x} x^{2}+6\,\mathrm{e}^{x} x-10\,\mathrm{e}^{x}-10x+12}$	37
risch	$\frac{4}{-1+x}-\frac{4x}{(-1+x)(2\,\mathrm{e}^{x} x^{2}+3\,\mathrm{e}^{x} x-5\,\mathrm{e}^{x}-5x+6)}$	40

input
```
int(((-16*x^2-80*x-100)*exp(x)^2+(8*x^2+116*x+220)*exp(x)-120)/((4*x^4+12*
x^3-11*x^2-30*x+25)*exp(x)^2+(-20*x^3-6*x^2+86*x-60)*exp(x)+25*x^2-60*x+36
),x,method=_RETURNVERBOSE)
```

output
```
(20*exp(x)+8*exp(x)*x-24)/(2*exp(x)*x^2+3*exp(x)*x-5*exp(x)-5*x+6)
```

3.967. $\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3+4x^4)}\,dx$

3.967.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3+4x^4)}\,dx = \frac{4\,((2\,x+5)e^x-6)}{(2\,x^2+3\,x-5)e^x-5\,x+6}$$

input
```
integrate(((-16*x^2-80*x-100)*exp(x)^2+(8*x^2+116*x+220)*exp(x)-120)/((4*x
^4+12*x^3-11*x^2-30*x+25)*exp(x)^2+(-20*x^3-6*x^2+86*x-60)*exp(x)+25*x^2-6
0*x+36),x, algorithm=\
```

output
```
4*((2*x + 5)*e^x - 6)/((2*x^2 + 3*x - 5)*e^x - 5*x + 6)
```

3.967.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3+4x^4)}\,dx = -\frac{4x}{-5x^2+11x+(2x^3+x^2-8x+5)\,e^x-6}+\frac{4}{x-1}$$

input
```
integrate(((-16*x**2-80*x-100)*exp(x)**2+(8*x**2+116*x+220)*exp(x)-120)/((
4*x**4+12*x**3-11*x**2-30*x+25)*exp(x)**2+(-20*x**3-6*x**2+86*x-60)*exp(x)
+25*x**2-60*x+36),x)
```

output
```
-4*x/(-5*x**2 + 11*x + (2*x**3 + x**2 - 8*x + 5)*exp(x) - 6) + 4/(x - 1)
```

3.967.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3+4x^4)}\,dx = \frac{4\,((2\,x+5)e^x-6)}{(2\,x^2+3\,x-5)e^x-5\,x+6}$$

input
```
integrate(((-16*x^2-80*x-100)*exp(x)^2+(8*x^2+116*x+220)*exp(x)-120)/((4*x
^4+12*x^3-11*x^2-30*x+25)*exp(x)^2+(-20*x^3-6*x^2+86*x-60)*exp(x)+25*x^2-6
0*x+36),x, algorithm=\
```

output
```
4*((2*x + 5)*e^x - 6)/((2*x^2 + 3*x - 5)*e^x - 5*x + 6)
```

3.967.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.16

$$\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3+4x^4)}\,dx = \frac{4\,(2\,xe^x+5\,e^x-6)}{2\,x^2e^x+3\,xe^x-5\,x-5\,e^x+6}$$

input
```
integrate(((-16*x^2-80*x-100)*exp(x)^2+(8*x^2+116*x+220)*exp(x)-120)/((4*x
^4+12*x^3-11*x^2-30*x+25)*exp(x)^2+(-20*x^3-6*x^2+86*x-60)*exp(x)+25*x^2-6
0*x+36),x, algorithm=\
```

output
```
4*(2*x*e^x + 5*e^x - 6)/(2*x^2*e^x + 3*x*e^x - 5*x - 5*e^x + 6)
```

3.967.9 Mupad [B] (verification not implemented)

Time = 15.31 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.16

$$\int \frac{-120+e^{2x}(-100-80x-16x^2)+e^x(220+116x+8x^2)}{36-60x+25x^2+e^x(-60+86x-6x^2-20x^3)+e^{2x}(25-30x-11x^2+12x^3+4x^4)}\,dx = \frac{4\,(5\,e^x+2\,x\,e^x-6)}{2\,x^2\,e^x-5\,e^x-5\,x+3\,x\,e^x+6}$$

input
```
int(-(exp(2*x)*(80*x + 16*x^2 + 100) - exp(x)*(116*x + 8*x^2 + 220) + 120)
/(exp(2*x)*(12*x^3 - 11*x^2 - 30*x + 4*x^4 + 25) - 60*x + 25*x^2 - exp(x)*
(6*x^2 - 86*x + 20*x^3 + 60) + 36),x)
```

output
```
(4*(5*exp(x) + 2*x*exp(x) - 6))/(2*x^2*exp(x) - 5*exp(x) - 5*x + 3*x*exp(x
) + 6)
```

3.968 $\int \frac{1}{25}\left(10x+16x^3+e^{4x}(6x^5+4x^6)+12x^2\log(2)+2x$

3.968.1 Optimal result

Integrand size = 75, antiderivative size = 27

$$\int \frac{1}{25}\left(10x+16x^3+e^{4x}\left(6x^5+4x^6\right)+12x^2\log(2)+2x\log^2(2)+e^{2x}\left(-20x^4-8x^5+\left(-8x^3-4x^4\right)\log(2)\right)\right)\,dx=\frac{1}{25}x^2\left(5+\left(2x-e^{2x}x^2+\log(2)\right)^2\right)$$

output
```
x^2*(1/5+1/25*(ln(2)-exp(x)^2*x^2+2*x)^2)
```

3.968.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.93

$$\int \frac{1}{25}\left(10x+16x^3+e^{4x}\left(6x^5+4x^6\right)+12x^2\log(2)+2x\log^2(2)+e^{2x}\left(-20x^4-8x^5+\left(-8x^3-4x^4\right)\log(2)\right)\right)\,dx=\frac{1}{75}x^2\left(12x^2+3e^{4x}x^4-6e^{2x}x^2(2x+\log(2))+3\left(5+\log^2(2)\right)+2x\log(64)\right)$$

input
```
Integrate[(10*x + 16*x^3 + E^(4*x)*(6*x^5 + 4*x^6) + 12*x^2*Log[2] + 2*x*L
og[2]^2 + E^(2*x)*(-20*x^4 - 8*x^5 + (-8*x^3 - 4*x^4)*Log[2]))/25,x]
```

output
```
(x^2*(12*x^2 + 3*E^(4*x)*x^4 - 6*E^(2*x)*x^2*(2*x + Log[2]) + 3*(5 + Log[2
]^2) + 2*x*Log[64]))/75
```

3.968.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 58 vs. $2(27) = 54$.

Time = 0.52 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.15, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.040$, Rules used = {6, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{25}\left(16x^3+12x^2\log(2)+e^{4x}\left(4x^6+6x^5\right)+e^{2x}\left(-8x^5-20x^4+\left(-4x^4-8x^3\right)\log(2)\right)+10x+2x\log^2(2)\right)dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{1}{25}\left(16x^3+12x^2\log(2)+e^{4x}\left(4x^6+6x^5\right)+e^{2x}\left(-8x^5-20x^4+\left(-4x^4-8x^3\right)\log(2)\right)+x\left(10+2\log^2(2)\right)\right)dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{25}\int \left(16x^3+12\log(2)x^2+2\left(5+\log^2(2)\right)x+2e^{4x}\left(2x^6+3x^5\right)-4e^{2x}\left(2x^5+5x^4+\left(x^4+2x^3\right)\log(2)\right)\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{25}\left(e^{4x}x^6-4e^{2x}x^5+4x^4-2e^{2x}x^4\log(2)+4x^3\log(2)+x^2\left(5+\log^2(2)\right)\right)$$

input
```
Int[(10*x + 16*x^3 + E^(4*x)*(6*x^5 + 4*x^6) + 12*x^2*Log[2] + 2*x*Log[2]^
2 + E^(2*x)*(-20*x^4 - 8*x^5 + (-8*x^3 - 4*x^4)*Log[2]))/25,x]
```

output
```
(4*x^4 - 4*E^(2*x)*x^5 + E^(4*x)*x^6 + 4*x^3*Log[2] - 2*E^(2*x)*x^4*Log[2]
 + x^2*(5 + Log[2]^2))/25
```

3.968.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.968.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(25) = 50.

Time = 0.32 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.07

method	result	size
risch	$\frac{e^{4x}x^6}{25}+\frac{(-2x^4\ln(2)-4x^5)e^{2x}}{25}+\frac{x^2\ln(2)^2}{25}+\frac{4x^3\ln(2)}{25}+\frac{4x^4}{25}+\frac{x^2}{5}$	56
default	$\frac{e^{4x}x^6}{25}-\frac{2\ln(2)e^{2x}x^4}{25}-\frac{4x^5e^{2x}}{25}+\frac{x^2\ln(2)^2}{25}+\frac{4x^3\ln(2)}{25}+\frac{4x^4}{25}+\frac{x^2}{5}$	57
parallelrisch	$\frac{e^{4x}x^6}{25}-\frac{2\ln(2)e^{2x}x^4}{25}-\frac{4x^5e^{2x}}{25}+\frac{x^2\ln(2)^2}{25}+\frac{4x^3\ln(2)}{25}+\frac{4x^4}{25}+\frac{x^2}{5}$	57
parts	$\frac{e^{4x}x^6}{25}-\frac{2\ln(2)e^{2x}x^4}{25}-\frac{4x^5e^{2x}}{25}+\frac{x^2\ln(2)^2}{25}+\frac{4x^3\ln(2)}{25}+\frac{4x^4}{25}+\frac{x^2}{5}$	57

input
```
int(1/25*(4*x^6+6*x^5)*exp(x)^4+1/25*((-4*x^4-8*x^3)*ln(2)-8*x^5-20*x^4)*e
xp(x)^2+2/25*x*ln(2)^2+12/25*x^2*ln(2)+16/25*x^3+2/5*x,x,method=_RETURNVER
BOSE)
```

output
```
1/25*exp(4*x)*x^6+1/25*(-2*x^4*ln(2)-4*x^5)*exp(2*x)+1/25*x^2*ln(2)^2+4/25
*x^3*ln(2)+4/25*x^4+1/5*x^2
```

3.968.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(25) = 50.

Time = 0.27 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.00

$$\int \frac{1}{25}\left(10x+16x^3+e^{4x}\left(6x^5+4x^6\right)+12x^2\log(2)+2x\log^2(2)+e^{2x}\left(-20x^4-8x^5+\left(-8x^3-4x^4\right)\log(2)\right)\right)\,dx=\frac{1}{25}\,x^6e^{(4\,x)}+\frac{4}{25}\,x^4+\frac{4}{25}\,x^3\log\left(2\right)+\frac{1}{25}\,x^2\log\left(2\right)^2+\frac{1}{5}\,x^2-\frac{2}{25}\left(2\,x^5+x^4\log\left(2\right)\right)e^{(2\,x)}$$

input
```
integrate(1/25*(4*x^6+6*x^5)*exp(x)^4+1/25*((-4*x^4-8*x^3)*log(2)-8*x^5-20
*x^4)*exp(x)^2+2/25*x*log(2)^2+12/25*x^2*log(2)+16/25*x^3+2/5*x,x, algorit
hm=\
```

output
```
1/25*x^6*e^(4*x) + 4/25*x^4 + 4/25*x^3*log(2) + 1/25*x^2*log(2)^2 + 1/5*x^
2 - 2/25*(2*x^5 + x^4*log(2))*e^(2*x)
```

3.968.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. $2(24) = 48$.

Time = 0.12 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.26

$$\int \frac{1}{25}\left(10x+16x^3+e^{4x}\left(6x^5+4x^6\right)+12x^2\log(2)+2x\log^2(2)+e^{2x}\left(-20x^4-8x^5+\left(-8x^3-4x^4\right)\log(2)\right)\right)\,dx=\frac{x^6e^{4x}}{25}+\frac{4x^4}{25}+\frac{4x^3\log(2)}{25}+x^2\left(\frac{\log(2)^2}{25}+\frac{1}{5}\right)+\frac{\left(-100x^5-50x^4\log(2)\right)e^{2x}}{625}$$

input
```
integrate(1/25*(4*x**6+6*x**5)*exp(x)**4+1/25*((-4*x**4-8*x**3)*ln(2)-8*x*
*5-20*x**4)*exp(x)**2+2/25*x*ln(2)**2+12/25*x**2*ln(2)+16/25*x**3+2/5*x,x)
```

output
```
x**6*exp(4*x)/25 + 4*x**4/25 + 4*x**3*log(2)/25 + x**2*(log(2)**2/25 + 1/5
) + (-100*x**5 - 50*x**4*log(2))*exp(2*x)/625
```

3.968.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(25) = 50$.

Time = 0.27 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.00

$$\int \frac{1}{25}\left(10x+16x^3+e^{4x}\left(6x^5+4x^6\right)+12x^2\log(2)+2x\log^2(2)+e^{2x}\left(-20x^4-8x^5+\left(-8x^3-4x^4\right)\log(2)\right)\right)\,dx=\frac{1}{25}\,x^6e^{(4\,x)}+\frac{4}{25}\,x^4+\frac{4}{25}\,x^3\log(2)+\frac{1}{25}\,x^2\log(2)^2+\frac{1}{5}\,x^2-\frac{2}{25}\,\left(2\,x^5+x^4\log(2)\right)e^{(2\,x)}$$

input
```
integrate(1/25*(4*x^6+6*x^5)*exp(x)^4+1/25*((-4*x^4-8*x^3)*log(2)-8*x^5-20
*x^4)*exp(x)^2+2/25*x*log(2)^2+12/25*x^2*log(2)+16/25*x^3+2/5*x,x, algorit
hm=\
```

output
```
1/25*x^6*e^(4*x) + 4/25*x^4 + 4/25*x^3*log(2) + 1/25*x^2*log(2)^2 + 1/5*x^
2 - 2/25*(2*x^5 + x^4*log(2))*e^(2*x)
```

3.968.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(25) = 50.

Time = 0.28 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.00

$$\int \frac{1}{25}\left(10x+16x^3+e^{4x}\left(6x^5+4x^6\right)+12x^2\log(2)+2x\log^2(2)+e^{2x}\left(-20x^4-8x^5+\left(-8x^3-4x^4\right)\log(2)\right)\right)\,dx=\frac{1}{25}\,x^6e^{(4\,x)}+\frac{4}{25}\,x^4+\frac{4}{25}\,x^3\log\left(2\right)+\frac{1}{25}\,x^2\log\left(2\right)^2+\frac{1}{5}\,x^2-\frac{2}{25}\,\left(2\,x^5+x^4\log\left(2\right)\right)e^{(2\,x)}$$

input
```
integrate(1/25*(4*x^6+6*x^5)*exp(x)^4+1/25*((-4*x^4-8*x^3)*log(2)-8*x^5-20
*x^4)*exp(x)^2+2/25*x*log(2)^2+12/25*x^2*log(2)+16/25*x^3+2/5*x,x, algorit
hm=\
```

output
```
1/25*x^6*e^(4*x) + 4/25*x^4 + 4/25*x^3*log(2) + 1/25*x^2*log(2)^2 + 1/5*x^
2 - 2/25*(2*x^5 + x^4*log(2))*e^(2*x)
```

3.968.9 Mupad [B] (verification not implemented)

Time = 15.15 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.00

$$\int \frac{1}{25}\left(10x+16x^3+e^{4x}\left(6x^5+4x^6\right)+12x^2\log(2)+2x\log^2(2)+e^{2x}\left(-20x^4-8x^5+\left(-8x^3-4x^4\right)\log(2)\right)\right)\,dx=\frac{x^6\,\mathrm{e}^{4\,x}}{25}-\frac{4\,x^5\,\mathrm{e}^{2\,x}}{25}+\frac{x^3\,\ln\left(16\right)}{25}+x^2\,\left(\frac{{\ln\left(2\right)}^2}{25}+\frac{1}{5}\right)+\frac{4\,x^4}{25}-\frac{x^4\,\mathrm{e}^{2\,x}\,\ln\left(4\right)}{25}$$

input
```
int((2*x)/5 - (exp(2*x)*(log(2)*(8*x^3 + 4*x^4) + 20*x^4 + 8*x^5))/25 + (e
xp(4*x)*(6*x^5 + 4*x^6))/25 + (2*x*log(2)^2)/25 + (12*x^2*log(2))/25 + (16
*x^3)/25,x)
```

output
```
(x^6*exp(4*x))/25 - (4*x^5*exp(2*x))/25 + (x^3*log(16))/25 + x^2*(log(2)^2
/25 + 1/5) + (4*x^4)/25 - (x^4*exp(2*x)*log(4))/25
```

3.968. $\int \frac{1}{25}\left(10x+16x^3+e^{4x}(6x^5+4x^6)+12x^2\log(2)+2x\log^2(2)+e^{2x}(-20x^4-8x^5+(-8x^3-4x^4)\log(2))\right)$ d

3.969 $\int \frac{e^x(2+6x-x^2)+2e^x x\log(x)}{2e^3x}\,dx$

3.969.1 Optimal result

Integrand size = 33, antiderivative size = 18

$$\int \frac{e^x(2+6x-x^2)+2e^x x\log(x)}{2e^3x}\,dx = e^{-3+x}\left(\frac{7-x}{2}+\log(x)\right)$$

output
```
(ln(x)-1/2*x+7/2)*exp(x)/exp(3)
```

3.969.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{e^x(2+6x-x^2)+2e^x x\log(x)}{2e^3x}\,dx = \frac{1}{2}e^{-3+x}(7-x+2\log(x))$$

input
```
Integrate[(E^x*(2 + 6*x - x^2) + 2*E^x*x*Log[x])/(2*E^3*x),x]
```

output
```
(E^(-3 + x)*(7 - x + 2*Log[x]))/2
```

3.969.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.44, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(-x^2+6x+2)+2e^x x\log(x)}{2e^3x}\,dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int \frac{e^x(-x^2+6x+2)+2e^x x\log(x)}{x}dx}{2e^3}$$

$$\Big\downarrow \; 2010$$

$$\frac{\int \left(-e^x x+6e^x+2e^x\log(x)+\frac{2e^x}{x}\right)dx}{2e^3}$$

$$\Big\downarrow \; 2009$$

$$\frac{-e^x x+7e^x+2e^x\log(x)}{2e^3}$$

input
```
Int[(E^x*(2 + 6*x - x^2) + 2*E^x*x*Log[x])/(2*E^3*x),x]
```

output
```
(7*E^x - E^x*x + 2*E^x*Log[x])/(2*E^3)
```

3.969.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.969.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

method	result	size
risch	$\ln(x)\,\mathrm{e}^{-3+x}-\frac{(-7+x)\mathrm{e}^{-3+x}}{2}$	18
parallelrisch	$\frac{\mathrm{e}^{-3}(-\mathrm{e}^{x}x+2\,\mathrm{e}^{x}\ln(x)+7\,\mathrm{e}^{x})}{2}$	23
norman	$\mathrm{e}^{x}\mathrm{e}^{-3}\ln(x)+\frac{7\,\mathrm{e}^{-3}\mathrm{e}^{x}}{2}-\frac{\mathrm{e}^{-3}\mathrm{e}^{x}x}{2}$	28

input
```
int(1/2*(2*x*exp(x)*ln(x)+(-x^2+6*x+2)*exp(x))/x/exp(3),x,method=_RETURNVE
RBOSE)
```

output
```
ln(x)*exp(-3+x)-1/2*(-7+x)*exp(-3+x)
```

3.969.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{e^x(2+6x-x^2)+2e^x x\log(x)}{2e^3x}\,dx=-\frac{1}{2}\left((x-7)e^x-2\,e^x\log(x)\right)e^{(-3)}$$

input
```
integrate(1/2*(2*x*exp(x)*log(x)+(-x^2+6*x+2)*exp(x))/x/exp(3),x, algorith
m=\
```

output
```
-1/2*((x - 7)*e^x - 2*e^x*log(x))*e^(-3)
```

3.969.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{e^x(2+6x-x^2)+2e^x x\log(x)}{2e^3x}\,dx=\frac{(-x+2\log(x)+7)\,e^x}{2e^3}$$

input
```
integrate(1/2*(2*x*exp(x)*ln(x)+(-x**2+6*x+2)*exp(x))/x/exp(3),x)
```

output
```
(-x + 2*log(x) + 7)*exp(-3)*exp(x)/2
```

3.969.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{e^x(2+6x-x^2)+2e^x x\log(x)}{2e^3x}\,dx = -\frac{1}{2}\left((x-1)e^x - 2\,e^x\log{(x)} - 6\,e^x\right)e^{(-3)}$$

input
```
integrate(1/2*(2*x*exp(x)*log(x)+(-x^2+6*x+2)*exp(x))/x/exp(3),x, algorith
m=\
```

output
```
-1/2*((x - 1)*e^x - 2*e^x*log(x) - 6*e^x)*e^(-3)
```

3.969.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{e^x(2+6x-x^2)+2e^x x\log(x)}{2e^3x}\,dx = -\frac{1}{2}\left(xe^x - 2\,e^x\log{(x)} - 7\,e^x\right)e^{(-3)}$$

input
```
integrate(1/2*(2*x*exp(x)*log(x)+(-x^2+6*x+2)*exp(x))/x/exp(3),x, algorith
m=\
```

output
```
-1/2*(x*e^x - 2*e^x*log(x) - 7*e^x)*e^(-3)
```

3.969.9 Mupad [B] (verification not implemented)

Time = 15.35 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

$$\int \frac{e^x(2+6x-x^2)+2e^x x\log(x)}{2e^3x}\,dx = \mathrm{e}^{x-3}\left(\ln{(x)} - \frac{x}{2} + \frac{7}{2}\right)$$

input
```
int((exp(-3)*((exp(x)*(6*x - x^2 + 2))/2 + x*exp(x)*log(x)))/x,x)
```

output
```
exp(x - 3)*(log(x) - x/2 + 7/2)
```

3.970 $\int \frac{-4x^2+4900x^5-125x^6+(196-8x+6125x^4-150x^5)\log(5)}{x^2+2x\log(5)+\log^2(5)}\,dx$

3.970.1 Optimal result

Integrand size = 50, antiderivative size = 22

$$\int \frac{-4x^2+4900x^5-125x^6+(196-8x+6125x^4-150x^5)\log(5)}{x^2+2x\log(5)+\log^2(5)}\,dx = 2+\frac{(49-x)x(4+25x^4)}{x+\log(5)}$$

output
```
2+(49-x)/(ln(5)+x)*(25*x^4+4)*x
```

3.970.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 89 vs. 2(22) = 44.

Time = 0.05 (sec) , antiderivative size = 89, normalized size of antiderivative = 4.05

$$\int \frac{-4x^2+4900x^5-125x^6+(196-8x+6125x^4-150x^5)\log(5)}{x^2+2x\log(5)+\log^2(5)}\,dx = \frac{1225x^5-25x^6+x^2\left(-4-375\log^4(5)+125\log^3(5)\log(125)\right)-x\log(5)\left(4+625\log^4(5)-25\log^3(5)(-4\right.}{x+\log(5)}$$

input
```
Integrate[(-4*x^2 + 4900*x^5 - 125*x^6 + (196 - 8*x + 6125*x^4 - 150*x^5)*
Log[5])/(x^2 + 2*x*Log[5] + Log[5]^2),x]
```

output
```
(1225*x^5 - 25*x^6 + x^2*(-4 - 375*Log[5]^4 + 125*Log[5]^3*Log[125]) - x*L
og[5]*(4 + 625*Log[5]^4 - 25*Log[5]^3*(-49 + 8*Log[125])) - Log[5]*(196 +
625*Log[5]^5 - 25*Log[5]^4*(-49 + 8*Log[125]) + Log[625]))/(x + Log[5])
```

3.970.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 80 vs. 2(22) = 44.

Time = 0.34 (sec) , antiderivative size = 80, normalized size of antiderivative = 3.64, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.060$, Rules used = {2007, 2389, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-125x^6+4900x^5-4x^2+\left(-150x^5+6125x^4-8x+196\right)\log(5)}{x^2+2x\log(5)+\log^2(5)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-125x^6+4900x^5-4x^2+\left(-150x^5+6125x^4-8x+196\right)\log(5)}{(x+\log(5))^2}dx$$

$$\Big\downarrow \text{2389}$$

$$\int \left(-125x^4+100x^3(49+\log(5))-75x^2\log(5)(49+\log(5))+50x\log^2(5)(49+\log(5))+\frac{\log(5)\left(196+25\log^5(5\right.}{(x\right.}$$

$$\Big\downarrow \text{2009}$$

$$-25x^5+25x^4(49+\log(5))-25x^3\log(5)(49+\log(5))+25x^2\log^2(5)(49+\log(5))-x\left(4+25\log^3(5)(49+\log(5))\right)-\frac{\log(5)\left(196+25\log^5(5)+1225\log^4(5)+\log(625)\right)}{x+\log(5)}$$

input
```
Int[(-4*x^2 + 4900*x^5 - 125*x^6 + (196 - 8*x + 6125*x^4 - 150*x^5)*Log[5]
)/(x^2 + 2*x*Log[5] + Log[5]^2),x]
```

output
```
-25*x^5 + 25*x^4*(49 + Log[5]) - 25*x^3*Log[5]*(49 + Log[5]) + 25*x^2*Log[
5]^2*(49 + Log[5]) - x*(4 + 25*Log[5]^3*(49 + Log[5])) - (Log[5]*(196 + 12
25*Log[5]^4 + 25*Log[5]^5 + Log[625]))/(x + Log[5])
```

3.970.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2389
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

3.970.4 Maple [A] (verified)

Time = 1.69 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

method	result
norman	$\frac{-4x^2+1225x^5-25x^6-196\ln(5)}{\ln(5)+x}$
parallelrisch	$\frac{-4x^2+1225x^5-25x^6-196\ln(5)}{\ln(5)+x}$
gosper	$-\frac{25x^6-1225x^5+4x^2+196\ln(5)}{\ln(5)+x}$
default	$-25x\ln(5)^4+25x^2\ln(5)^3-25x^3\ln(5)^2+25x^4\ln(5)-25x^5-1225x\ln(5)^3+1225x^2\ln($
risch	$-25x\ln(5)^4+25x^2\ln(5)^3-25x^3\ln(5)^2+25x^4\ln(5)-25x^5-1225x\ln(5)^3+1225x^2\ln($
meijerg	$\ln(5)^4(-150\ln(5)+4900)\left(-\frac{x\left(-\frac{3x^4}{\ln(5)^4}+\frac{5x^3}{\ln(5)^3}-\frac{10x^2}{\ln(5)^2}+\frac{30x}{\ln(5)}+60\right)}{12\ln(5)\left(1+\frac{x}{\ln(5)}\right)}+5\ln\left(1+\frac{x}{\ln(5)}\right)\right)+6125\ln($

input
```
int(((-150*x^5+6125*x^4-8*x+196)*ln(5)-125*x^6+4900*x^5-4*x^2)/(ln(5)^2+2*
x*ln(5)+x^2),x,method=_RETURNVERBOSE)
```

output
```
(-4*x^2+1225*x^5-25*x^6-196*ln(5))/(ln(5)+x)
```

3.970.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. 2(21) = 42.

Time = 0.28 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.68

$$\int \frac{-4x^2 + 4900x^5 - 125x^6 + (196 - 8x + 6125x^4 - 150x^5)\log(5)}{x^2 + 2x\log(5) + \log^2(5)}\,dx =$$
$$-\frac{25\,x^6 + 25\,(x + 49)\log(5)^5 + 25\,\log(5)^6 - 1225\,x^5 + 1225\,x\log(5)^4 + 4\,x^2 + 4\,(x + 49)\log(5) + 4\,\log}{x + \log(5)}$$

input
```
integrate(((-150*x^5+6125*x^4-8*x+196)*log(5)-125*x^6+4900*x^5-4*x^2)/(log
(5)^2+2*x*log(5)+x^2),x, algorithm=\
```

output
```
-(25*x^6 + 25*(x + 49)*log(5)^5 + 25*log(5)^6 - 1225*x^5 + 1225*x*log(5)^4
 + 4*x^2 + 4*(x + 49)*log(5) + 4*log(5)^2)/(x + log(5))
```

3.970.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 99 vs. 2(17) = 34.

Time = 0.18 (sec) , antiderivative size = 99, normalized size of antiderivative = 4.50

$$\int \frac{-4x^2 + 4900x^5 - 125x^6 + (196 - 8x + 6125x^4 - 150x^5)\log(5)}{x^2 + 2x\log(5) + \log^2(5)}\,dx$$
$$= -25x^5 - x^4(-1225 - 25\log(5)) - x^3 \cdot \left(25\log(5)^2 + 1225\log(5)\right)$$
$$- x^2\left(-1225\log(5)^2 - 25\log(5)^3\right) - x\left(4 + 25\log(5)^4 + 1225\log(5)^3\right)$$
$$- \frac{4\log(5)^2 + 196\log(5) + 25\log(5)^6 + 1225\log(5)^5}{x + \log(5)}$$

input
```
integrate(((-150*x**5+6125*x**4-8*x+196)*ln(5)-125*x**6+4900*x**5-4*x**2)/
(ln(5)**2+2*x*ln(5)+x**2),x)
```

output
```
-25*x**5 - x**4*(-1225 - 25*log(5)) - x**3*(25*log(5)**2 + 1225*log(5)) -
x**2*(-1225*log(5)**2 - 25*log(5)**3) - x*(4 + 25*log(5)**4 + 1225*log(5)*
*3) - (4*log(5)**2 + 196*log(5) + 25*log(5)**6 + 1225*log(5)**5)/(x + log(
5))
```

3.970.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. $2(21) = 42$.

Time = 0.18 (sec) , antiderivative size = 93, normalized size of antiderivative = 4.23

$$\int \frac{-4x^2 + 4900x^5 - 125x^6 + (196 - 8x + 6125x^4 - 150x^5)\log(5)}{x^2 + 2x\log(5) + \log^2(5)}\,dx$$
$$= -25\,x^5 + 25\,x^4(\log(5) + 49) - 25\left(\log(5)^2 + 49\,\log(5)\right)x^3 + 25\left(\log(5)^3 + 49\,\log(5)^2\right)x^2 - \left(25\,\log(5)^4 + 1225\,\log(5)^3 + 4\right)x - \frac{25\,\log(5)^6 + 1225\,\log(5)^5 + 4\,\log(5)^2 + 196\,\log(5)}{x + \log(5)}$$

input
```
integrate(((-150*x^5+6125*x^4-8*x+196)*log(5)-125*x^6+4900*x^5-4*x^2)/(log
(5)^2+2*x*log(5)+x^2),x, algorithm=\
```

output
```
-25*x^5 + 25*x^4*(log(5) + 49) - 25*(log(5)^2 + 49*log(5))*x^3 + 25*(log(5
)^3 + 49*log(5)^2)*x^2 - (25*log(5)^4 + 1225*log(5)^3 + 4)*x - (25*log(5)^
6 + 1225*log(5)^5 + 4*log(5)^2 + 196*log(5))/(x + log(5))
```

3.970.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 100 vs. $2(21) = 42$.

Time = 0.26 (sec) , antiderivative size = 100, normalized size of antiderivative = 4.55

$$\int \frac{-4x^2 + 4900x^5 - 125x^6 + (196 - 8x + 6125x^4 - 150x^5)\log(5)}{x^2 + 2x\log(5) + \log^2(5)}\,dx$$
$$= -25\,x^5 + 25\,x^4\log(5) - 25\,x^3\log(5)^2 + 25\,x^2\log(5)^3 - 25\,x\log(5)^4 + 1225\,x^4 - 1225\,x^3\log(5) + 1225\,x^2\log(5)^2 - 1225\,x\log(5)^3 - 4\,x - \frac{25\,\log(5)^6 + 1225\,\log(5)^5 + 4\,\log(5)^2 + 196\,\log(5)}{x + \log(5)}$$

input
```
integrate(((-150*x^5+6125*x^4-8*x+196)*log(5)-125*x^6+4900*x^5-4*x^2)/(log
(5)^2+2*x*log(5)+x^2),x, algorithm=\
```

output
```
-25*x^5 + 25*x^4*log(5) - 25*x^3*log(5)^2 + 25*x^2*log(5)^3 - 25*x*log(5)^
4 + 1225*x^4 - 1225*x^3*log(5) + 1225*x^2*log(5)^2 - 1225*x*log(5)^3 - 4*x
 - (25*log(5)^6 + 1225*log(5)^5 + 4*log(5)^2 + 196*log(5))/(x + log(5))
```

3.970.9 Mupad [B] (verification not implemented)

Time = 14.44 (sec) , antiderivative size = 185, normalized size of antiderivative = 8.41

$$\int \frac{-4x^2+4900x^5-125x^6+(196-8x+6125x^4-150x^5)\log(5)}{x^2+2x\log(5)+\log^2(5)}\,dx$$
$$= x^4 (25 \ln(5) + 1225) - x \left(\ln(5)^2 \left(6125 \ln(5) + 125 \ln(5)^2 - 2 \ln(5) (100 \ln(5) + 4900)\right) - 2 \ln(5) \left(2 \ln(5) \left(6125 \ln(5) + 125 \ln(5)^2 - 2 \ln(5) (100 \ln(5) + 4900)\right) + \ln(5)^2 (100 \ln(5) + 4900)\right) + 4\right) - x^2 \left(\ln(5) \left(6125 \ln(5) + 125 \ln(5)^2 - 2 \ln(5) (100 \ln(5) + 4900)\right) + \frac{\ln(5)^2 (100 \ln(5) + 4900)}{2}\right) + x^3 \left(\frac{6125 \ln(5)}{3} + \frac{125 \ln(5)^2}{3} - \frac{2 \ln(5) (100 \ln(5) + 4900)}{3}\right) - \frac{196 \ln(5) + \ln(5) \ln(625) + 1225 \ln(5)^5 + 25 \ln(5)^6}{x + \ln(5)} - 25 x^5$$

input
```
int(-(log(5)*(8*x - 6125*x^4 + 150*x^5 - 196) + 4*x^2 - 4900*x^5 + 125*x^6
)/(2*x*log(5) + log(5)^2 + x^2),x)
```

output
```
x^4*(25*log(5) + 1225) - x*(log(5)^2*(6125*log(5) + 125*log(5)^2 - 2*log(5
)*(100*log(5) + 4900)) - 2*log(5)*(2*log(5)*(6125*log(5) + 125*log(5)^2 -
2*log(5)*(100*log(5) + 4900)) + log(5)^2*(100*log(5) + 4900)) + 4) - x^2*(
log(5)*(6125*log(5) + 125*log(5)^2 - 2*log(5)*(100*log(5) + 4900)) + (log(
5)^2*(100*log(5) + 4900))/2) + x^3*((6125*log(5))/3 + (125*log(5)^2)/3 - (
2*log(5)*(100*log(5) + 4900))/3) - (196*log(5) + log(5)*log(625) + 1225*lo
g(5)^5 + 25*log(5)^6)/(x + log(5)) - 25*x^5
```

3.971 $\int \left(131+44x+2e^{\frac{1}{3}(1+3x^2)}x+3x^2\right)\,dx$

3.971.1 Optimal result

Integrand size = 26, antiderivative size = 20

$$\int \left(131+44x+2e^{\frac{1}{3}(1+3x^2)}x+3x^2\right)\,dx=e^{\frac{1}{3}+x^2}+x+x\left(9+(11+x)^2\right)$$

output
```
exp(x^2+1/3)+x+x*(9+(11+x)^2)
```

3.971.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.40

$$\int \left(131+44x+2e^{\frac{1}{3}(1+3x^2)}x+3x^2\right)\,dx=e^{\frac{1}{3}+x^2}+131x+x^3+22\log\left(e^{\frac{1}{3}+x^2}\right)$$

input
```
Integrate[131 + 44*x + 2*E^((1 + 3*x^2)/3)*x + 3*x^2,x]
```

output
```
E^(1/3 + x^2) + 131*x + x^3 + 22*Log[E^(1/3 + x^2)]
```

3.971.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.038, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(3x^2+2e^{\frac{1}{3}\left(3x^2+1\right)}x+44x+131\right) \, dx$$

$$\Big\downarrow \text{ 2009}$$

$$x^3+22x^2+e^{x^2+\frac{1}{3}}+131x$$

input
```
Int[131 + 44*x + 2*E^((1 + 3*x^2)/3)*x + 3*x^2,x]
```

output
```
E^(1/3 + x^2) + 131*x + 22*x^2 + x^3
```

3.971.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.971.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
default	$x^{3}+22 x^{2}+131 x +{\mathrm e}^{x^{2}+\frac{1}{3}}$	19
norman	$x^{3}+22 x^{2}+131 x +{\mathrm e}^{x^{2}+\frac{1}{3}}$	19
risch	$x^{3}+22 x^{2}+131 x +{\mathrm e}^{x^{2}+\frac{1}{3}}$	19
parallelrisch	$x^{3}+22 x^{2}+131 x +{\mathrm e}^{x^{2}+\frac{1}{3}}$	19
parts	$x^{3}+22 x^{2}+131 x +{\mathrm e}^{x^{2}+\frac{1}{3}}$	19

input
```
int(2*x*exp(x^2+1/3)+3*x^2+44*x+131,x,method=_RETURNVERBOSE)
```

output
```
x^3+22*x^2+131*x+exp(x^2+1/3)
```

3.971.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \left(131+44x+2e^{\frac{1}{3}(1+3x^2)}x+3x^2\right) dx = x^3+22\,x^2+131\,x+e^{\left(x^2+\frac{1}{3}\right)}$$

input
```
integrate(2*x*exp(x^2+1/3)+3*x^2+44*x+131,x, algorithm=\
```

output
```
x^3 + 22*x^2 + 131*x + e^(x^2 + 1/3)
```

3.971.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(131+44x+2e^{\frac{1}{3}(1+3x^2)}x+3x^2\right) dx = x^3+22x^2+131x+e^{x^2+\frac{1}{3}}$$

input
```
integrate(2*x*exp(x**2+1/3)+3*x**2+44*x+131,x)
```

output
```
x**3 + 22*x**2 + 131*x + exp(x**2 + 1/3)
```

3.971.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \left(131+44x+2e^{\frac{1}{3}(1+3x^2)}x+3x^2\right) dx = x^3+22\,x^2+131\,x+e^{\left(x^2+\frac{1}{3}\right)}$$

input
```
integrate(2*x*exp(x^2+1/3)+3*x^2+44*x+131,x, algorithm=\
```

output
```
x^3 + 22*x^2 + 131*x + e^(x^2 + 1/3)
```

3.971.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \left(131+44x+2e^{\frac{1}{3}(1+3x^2)}x+3x^2\right)\,dx = x^3+22\,x^2+131\,x+e^{\left(x^2+\frac{1}{3}\right)}$$

input
```
integrate(2*x*exp(x^2+1/3)+3*x^2+44*x+131,x, algorithm=\
```

output
```
x^3 + 22*x^2 + 131*x + e^(x^2 + 1/3)
```

3.971.9 Mupad [B] (verification not implemented)

Time = 14.96 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \left(131+44x+2e^{\frac{1}{3}(1+3x^2)}x+3x^2\right)\,dx = 131\,x+\mathrm{e}^{x^2+\frac{1}{3}}+22\,x^2+x^3$$

input
```
int(44*x + 2*x*exp(x^2 + 1/3) + 3*x^2 + 131,x)
```

output
```
131*x + exp(x^2 + 1/3) + 22*x^2 + x^3
```

3.972 $\int \frac{15-15x+30x^2+e^{2x}(-3-3x-6x^2+6x^3)}{1+x-2x^2-2x^3+x^4+x^5}\,dx$

3.972.1 Optimal result

Integrand size = 53, antiderivative size = 28

$$\int \frac{15-15x+30x^2+e^{2x}(-3-3x-6x^2+6x^3)}{1+x-2x^2-2x^3+x^4+x^5}\,dx=-3+\frac{3(-5+e^{2x})}{x+x^2-\frac{x+x^2}{x^2}}$$

output
```
3/(x^2-(x^2+x)/x^2+x)*(exp(x)^2-5)-3
```

3.972.2 Mathematica [A] (verified)

Time = 2.42 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{15-15x+30x^2+e^{2x}(-3-3x-6x^2+6x^3)}{1+x-2x^2-2x^3+x^4+x^5}\,dx=\frac{3(-5+e^{2x})\,x}{(-1+x)(1+x)^2}$$

input
```
Integrate[(15 - 15*x + 30*x^2 + E^(2*x)*(-3 - 3*x - 6*x^2 + 6*x^3))/(1 + x
 - 2*x^2 - 2*x^3 + x^4 + x^5),x]
```

output
```
(3*(-5 + E^(2*x))*x)/((-1 + x)*(1 + x)^2)
```

3.972.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 113 vs. 2(28) = 56.

Time = 1.04 (sec) , antiderivative size = 113, normalized size of antiderivative = 4.04, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.038, Rules used = {2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{30x^2+e^{2x}\left(6x^3-6x^2-3x-3\right)-15x+15}{x^5+x^4-2x^3-2x^2+x+1}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(-\frac{3\left(30x^2+e^{2x}\left(6x^3-6x^2-3x-3\right)-15x+15\right)}{8\left(x^2-1\right)}+\frac{30x^2+e^{2x}\left(6x^3-6x^2-3x-3\right)-15x+15}{8(x-1)^2}+\frac{30x^2+e\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{135\text{arctanh}(x)}{8}-\frac{15x^2}{8(x+1)^2}+\frac{45}{16}\log\left(1-x^2\right)-\frac{3e^{2x}}{4(1-x)}+\frac{15}{4(1-x)}-\frac{3e^{2x}}{4(x+1)}+\frac{3e^{2x}}{2(x+1)^2}-\frac{45}{8(x+1)^2}+\frac{45}{8}\log(1-x)-\frac{45}{4}\log(x+1)$$

input
```
Int[(15 - 15*x + 30*x^2 + E^(2*x)*(-3 - 3*x - 6*x^2 + 6*x^3))/(1 + x - 2*x
^2 - 2*x^3 + x^4 + x^5),x]
```

output
```
15/(4*(1 - x)) - (3*E^(2*x))/(4*(1 - x)) - 45/(8*(1 + x)^2) + (3*E^(2*x))/
(2*(1 + x)^2) - (15*x^2)/(8*(1 + x)^2) - (3*E^(2*x))/(4*(1 + x)) + (135*Ar
cTanh[x])/8 + (45*Log[1 - x])/8 - (45*Log[1 + x])/4 + (45*Log[1 - x^2])/16
```

3.972.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.972.4 Maple [A] (verified)

Time = 0.54 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

method	result	size
norman	$\frac{-15x+3x\,e^{2x}}{(-1+x)(1+x)^2}$	23
parallelrisch	$\frac{-15x+3x\,e^{2x}}{x^3+x^2-x-1}$	26
risch	$-\frac{15x}{x^3+x^2-x-1}+\frac{3x\,e^{2x}}{(-1+x)(1+x)^2}$	35
default	$-\frac{15}{2(1+x)^2}+\frac{15}{4(1+x)}-\frac{15}{4(-1+x)}-\frac{3\,e^{2x}}{4(1+x)}+\frac{3\,e^{2x}}{4(-1+x)}+\frac{3\,e^{2x}}{2(1+x)^2}$	56
parts	$-\frac{15}{2(1+x)^2}+\frac{15}{4(1+x)}-\frac{15}{4(-1+x)}-\frac{3\,e^{2x}}{4(1+x)}+\frac{3\,e^{2x}}{4(-1+x)}+\frac{3\,e^{2x}}{2(1+x)^2}$	56

input
```
int(((6*x^3-6*x^2-3*x-3)*exp(x)^2+30*x^2-15*x+15)/(x^5+x^4-2*x^3-2*x^2+x+1
),x,method=_RETURNVERBOSE)
```

output
```
(-15*x+3*x*exp(x)^2)/(-1+x)/(1+x)^2
```

3.972.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{15-15x+30x^2+e^{2x}(-3-3x-6x^2+6x^3)}{1+x-2x^2-2x^3+x^4+x^5}\,dx=\frac{3\left(xe^{(2\,x)}-5\,x\right)}{x^3+x^2-x-1}$$

input
```
integrate(((6*x^3-6*x^2-3*x-3)*exp(x)^2+30*x^2-15*x+15)/(x^5+x^4-2*x^3-2*x
^2+x+1),x, algorithm=\
```

output
```
3*(x*e^(2*x) - 5*x)/(x^3 + x^2 - x - 1)
```

3.972.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int \frac{15-15x+30x^2+e^{2x}(-3-3x-6x^2+6x^3)}{1+x-2x^2-2x^3+x^4+x^5}\,dx = \frac{3xe^{2x}}{x^3+x^2-x-1} - \frac{15x}{x^3+x^2-x-1}$$

input
```
integrate(((6*x**3-6*x**2-3*x-3)*exp(x)**2+30*x**2-15*x+15)/(x**5+x**4-2*x
**3-2*x**2+x+1),x)
```

output
```
3*x*exp(2*x)/(x**3 + x**2 - x - 1) - 15*x/(x**3 + x**2 - x - 1)
```

3.972.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 90 vs. $2(27) = 54$.

Time = 0.23 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.21

$$\int \frac{15-15x+30x^2+e^{2x}(-3-3x-6x^2+6x^3)}{1+x-2x^2-2x^3+x^4+x^5}\,dx = \frac{3\,xe^{(2\,x)}}{x^3+x^2-x-1} - \frac{15\,(3\,x^2+3\,x-2)}{8\,(x^3+x^2-x-1)} + \frac{15\,(x^2+x+2)}{8\,(x^3+x^2-x-1)} + \frac{15\,(x^2-3\,x-2)}{4\,(x^3+x^2-x-1)}$$

input
```
integrate(((6*x^3-6*x^2-3*x-3)*exp(x)^2+30*x^2-15*x+15)/(x^5+x^4-2*x^3-2*x
^2+x+1),x, algorithm=\
```

output
```
3*x*e^(2*x)/(x^3 + x^2 - x - 1) - 15/8*(3*x^2 + 3*x - 2)/(x^3 + x^2 - x -
1) + 15/8*(x^2 + x + 2)/(x^3 + x^2 - x - 1) + 15/4*(x^2 - 3*x - 2)/(x^3 +
x^2 - x - 1)
```

3.972.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{15-15x+30x^2+e^{2x}(-3-3x-6x^2+6x^3)}{1+x-2x^2-2x^3+x^4+x^5}\,dx = \frac{3\,(xe^{(2\,x)}-5\,x)}{x^3+x^2-x-1}$$

input
```
integrate(((6*x^3-6*x^2-3*x-3)*exp(x)^2+30*x^2-15*x+15)/(x^5+x^4-2*x^3-2*x
^2+x+1),x, algorithm=\
```

output
```
3*(x*e^(2*x) - 5*x)/(x^3 + x^2 - x - 1)
```

3.972.9 Mupad [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{15-15x+30x^2+e^{2x}(-3-3x-6x^2+6x^3)}{1+x-2x^2-2x^3+x^4+x^5}\,dx = -\frac{x\,(3\,e^{2\,x}-15)}{-x^3-x^2+x+1}$$

input
```
int(-(15*x + exp(2*x)*(3*x + 6*x^2 - 6*x^3 + 3) - 30*x^2 - 15)/(x - 2*x^2
- 2*x^3 + x^4 + x^5 + 1),x)
```

output
```
-(x*(3*exp(2*x) - 15))/(x - x^2 - x^3 + 1)
```

3.973 $\int \frac{8+e^{21x}(-16x-152x^2+336x^3)}{1-4x+4x^2} \, dx$

3.973.1 Optimal result

Integrand size = 35, antiderivative size = 21

$$\int \frac{8+e^{21x}(-16x-152x^2+336x^3)}{1-4x+4x^2} \, dx = \frac{2(-1+2e^{21x}x^2)}{-\frac{1}{2}+x}$$

output
```
(2*x^2*exp(21*x)-1)/(1/2*x-1/4)
```

3.973.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{8+e^{21x}(-16x-152x^2+336x^3)}{1-4x+4x^2} \, dx = \frac{4-8e^{21x}x^2}{1-2x}$$

input
```
Integrate[(8 + E^(21*x)*(-16*x - 152*x^2 + 336*x^3))/(1 - 4*x + 4*x^2),x]
```

output
```
(4 - 8*E^(21*x)*x^2)/(1 - 2*x)
```

3.973.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 49 vs. $2(21) = 42$.

Time = 0.48 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.33, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.114$, Rules used = {7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{21x}(336x^3-152x^2-16x)+8}{4x^2-4x+1}dx$$

$$\Big\downarrow \text{7277}$$

$$16\int \frac{1-e^{21x}(-42x^3+19x^2+2x)}{2(1-2x)^2}dx$$

$$\Big\downarrow \text{27}$$

$$8\int \frac{1-e^{21x}(-42x^3+19x^2+2x)}{(1-2x)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$8\int \left(\frac{e^{21x}x(42x^2-19x-2)}{(2x-1)^2}+\frac{1}{(2x-1)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$8\left(\frac{1}{2}e^{21x}x+\frac{e^{21x}}{4}-\frac{e^{21x}}{4(1-2x)}+\frac{1}{2(1-2x)}\right)$$

input
```
Int[(8 + E^(21*x)*(-16*x - 152*x^2 + 336*x^3))/(1 - 4*x + 4*x^2),x]
```

output
```
8*(E^(21*x)/4 + 1/(2*(1 - 2*x)) - E^(21*x)/(4*(1 - 2*x)) + (E^(21*x)*x)/2)
```

3.973.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.973.4 Maple [A] (verified)

Time = 1.34 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

method	result	size
norman	$\frac{8x^2 e^{21x}-4}{-1+2x}$	20
parallelrisch	$\frac{16x^2 e^{21x}-8}{4x-2}$	21
risch	$-\frac{2}{x-\frac{1}{2}}+\frac{8x^2 e^{21x}}{-1+2x}$	25
derivativedivides	$-\frac{84}{42x-21}+\frac{21\,e^{21x}}{21x-\frac{21}{2}}+2\,e^{21x}+4\,e^{21x}x$	37
default	$-\frac{84}{42x-21}+\frac{21\,e^{21x}}{21x-\frac{21}{2}}+2\,e^{21x}+4\,e^{21x}x$	37
parts	$-\frac{4}{-1+2x}+\frac{21\,e^{21x}}{21x-\frac{21}{2}}+2\,e^{21x}+4\,e^{21x}x$	37

input
```
int(((336*x^3-152*x^2-16*x)*exp(21*x)+8)/(4*x^2-4*x+1),x,method=_RETURNVER
BOSE)
```

output
```
(8*x^2*exp(21*x)-4)/(-1+2*x)
```

3.973.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{8+e^{21x}(-16x-152x^2+336x^3)}{1-4x+4x^2}\,dx = \frac{4\left(2\,x^2e^{(21\,x)}-1\right)}{2\,x-1}$$

input
```
integrate(((336*x^3-152*x^2-16*x)*exp(21*x)+8)/(4*x^2-4*x+1),x, algorithm=
\
```

output
```
4*(2*x^2*e^(21*x) - 1)/(2*x - 1)
```

3.973.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{8+e^{21x}(-16x-152x^2+336x^3)}{1-4x+4x^2}\,dx = \frac{8x^2e^{21x}}{2x-1}-\frac{8}{4x-2}$$

input
```
integrate(((336*x**3-152*x**2-16*x)*exp(21*x)+8)/(4*x**2-4*x+1),x)
```

output
```
8*x**2*exp(21*x)/(2*x - 1) - 8/(4*x - 2)
```

3.973.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

$$\int \frac{8+e^{21x}(-16x-152x^2+336x^3)}{1-4x+4x^2}\,dx = \frac{8\,x^2e^{(21\,x)}}{2\,x-1}-\frac{4}{2\,x-1}$$

input
```
integrate(((336*x^3-152*x^2-16*x)*exp(21*x)+8)/(4*x^2-4*x+1),x, algorithm=
\
```

output
```
8*x^2*e^(21*x)/(2*x - 1) - 4/(2*x - 1)
```

3.973.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{8+e^{21x}(-16x-152x^2+336x^3)}{1-4x+4x^2}\,dx = \frac{4\left(2\,x^2e^{(21\,x)}-1\right)}{2\,x-1}$$

input
```
integrate(((336*x^3-152*x^2-16*x)*exp(21*x)+8)/(4*x^2-4*x+1),x, algorithm=
\
```

output
```
4*(2*x^2*e^(21*x) - 1)/(2*x - 1)
```

3.973.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{8+e^{21x}(-16x-152x^2+336x^3)}{1-4x+4x^2}\,dx = \frac{8\,x\,(x\,\mathrm{e}^{21\,x}-1)}{2\,x-1}$$

input
```
int(-(exp(21*x)*(16*x + 152*x^2 - 336*x^3) - 8)/(4*x^2 - 4*x + 1),x)
```

output
```
(8*x*(x*exp(21*x) - 1))/(2*x - 1)
```

3.974 $\int \frac{-17-10x+9x^2}{9-17x-5x^2+3x^3} \, dx$

3.974.1 Optimal result

Integrand size = 28, antiderivative size = 22

$$\int \frac{-17-10x+9x^2}{9-17x-5x^2+3x^3} \, dx = \log \left(2\left(3-x+x\left(2+x^2-\frac{5(4+x)}{3}\right)\right)\right)$$

output
```
ln(2*(-5/3*x-14/3+x^2)*x-2*x+6)
```

3.974.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{-17-10x+9x^2}{9-17x-5x^2+3x^3} \, dx = \log \left(9-17x-5x^2+3x^3\right)$$

input
```
Integrate[(-17 - 10*x + 9*x^2)/(9 - 17*x - 5*x^2 + 3*x^3),x]
```

output
```
Log[9 - 17*x - 5*x^2 + 3*x^3]
```

3.974.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.036, Rules used = {2020}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{9x^2-10x-17}{3x^3-5x^2-17x+9}\,dx$$

$$\Big\downarrow \ 2020$$

$$\log\left(3x^3-5x^2-17x+9\right)$$

input
```
Int[(-17 - 10*x + 9*x^2)/(9 - 17*x - 5*x^2 + 3*x^3),x]
```

output
```
Log[9 - 17*x - 5*x^2 + 3*x^3]
```

3.974.3.1 Defintions of rubi rules used

rule 2020
```
Int[(Pp_)/(Qq_), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x]}, Si
mp[Coeff[Pp, x, p]*(Log[RemoveContent[Qq, x]]/(q*Coeff[Qq, x, q])), x] /; E
qQ[p, q - 1] && EqQ[Pp, Simplify[(Coeff[Pp, x, p]/(q*Coeff[Qq, x, q]))*D[Qq
, x]]]] /; PolyQ[Pp, x] && PolyQ[Qq, x]
```

3.974.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

method	result	size
parallelrisch	$\ln\left(x^3-\frac{5}{3}x^2-\frac{17}{3}x+3\right)$	15
derivativedivides	$\ln\left(3x^3-5x^2-17x+9\right)$	17
default	$\ln\left(3x^3-5x^2-17x+9\right)$	17
norman	$\ln\left(3x^3-5x^2-17x+9\right)$	17
risch	$\ln\left(3x^3-5x^2-17x+9\right)$	17

input
```
int((9*x^2-10*x-17)/(3*x^3-5*x^2-17*x+9),x,method=_RETURNVERBOSE)
```

output
```
ln(x^3-5/3*x^2-17/3*x+3)
```

3.974.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{-17-10x+9x^2}{9-17x-5x^2+3x^3}\,dx = \log\left(3\,x^3-5\,x^2-17\,x+9\right)$$

input
```
integrate((9*x^2-10*x-17)/(3*x^3-5*x^2-17*x+9),x, algorithm=\
```

output
```
log(3*x^3 - 5*x^2 - 17*x + 9)
```

3.974.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{-17-10x+9x^2}{9-17x-5x^2+3x^3}\,dx = \log\left(3x^3-5x^2-17x+9\right)$$

input
```
integrate((9*x**2-10*x-17)/(3*x**3-5*x**2-17*x+9),x)
```

output
```
log(3*x**3 - 5*x**2 - 17*x + 9)
```

3.974.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{-17-10x+9x^2}{9-17x-5x^2+3x^3}\,dx = \log\left(3\,x^3-5\,x^2-17\,x+9\right)$$

input
```
integrate((9*x^2-10*x-17)/(3*x^3-5*x^2-17*x+9),x, algorithm=\
```

output
```
log(3*x^3 - 5*x^2 - 17*x + 9)
```

3.974.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{-17-10x+9x^2}{9-17x-5x^2+3x^3}\,dx = \log\left(\left|3\,x^3-5\,x^2-17\,x+9\right|\right)$$

input
```
integrate((9*x^2-10*x-17)/(3*x^3-5*x^2-17*x+9),x, algorithm=\
```

output
```
log(abs(3*x^3 - 5*x^2 - 17*x + 9))
```

3.974.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{-17-10x+9x^2}{9-17x-5x^2+3x^3}\,dx = \ln\left(3\,x^3-5\,x^2-17\,x+9\right)$$

input
```
int((10*x - 9*x^2 + 17)/(17*x + 5*x^2 - 3*x^3 - 9),x)
```

output
```
log(3*x^3 - 5*x^2 - 17*x + 9)
```

3.975 $\int e^e(2+e^4)\,dx$

3.975.1 Optimal result

Integrand size = 9, antiderivative size = 18

$$\int e^e\left(2+e^4\right)\,dx=4+e^e\left(2+e^4\right)x+2\log\left(\frac{4}{3}\right)$$

output
```
(2+exp(4))*x*exp(exp(1))+4-2*ln(3/4)
```

3.975.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int e^e\left(2+e^4\right)\,dx=2e^ex+e^{4+e}x$$

input
```
Integrate[E^E*(2 + E^4),x]
```

output
```
2*E^E*x + E^(4 + E)*x
```

3.975.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.56, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^e \left(2+e^4\right) \, dx$$
$$\Big\downarrow \; 24$$
$$e^e \left(2+e^4\right) x$$

input
```
Int[E^E*(2 + E^4),x]
```

output
```
E^E*(2 + E^4)*x
```

3.975.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.975.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.56

method	result	size
default	$\left(2+{\mathrm e}^{4}\right) x \,{\mathrm e}^{{\mathrm e}}$	10
parallelrisch	$\left(2+{\mathrm e}^{4}\right) x \,{\mathrm e}^{{\mathrm e}}$	10
norman	$\left(2 \,{\mathrm e}^{{\mathrm e}}+{\mathrm e}^{{\mathrm e}} {\mathrm e}^{4}\right) x$	15
risch	${\mathrm e}^{4} {\mathrm e}^{{\mathrm e}} x +2 x \,{\mathrm e}^{{\mathrm e}}$	15

input
```
int((2+exp(4))*exp(exp(1)),x,method=_RETURNVERBOSE)
```

output
```
(2+exp(4))*x*exp(exp(1))
```

3.975.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

$$\int e^e(2+e^4)\,dx = (xe^4 + 2\,x)e^e$$

input
```
integrate((2+exp(4))*exp(exp(1)),x, algorithm=\
```

output
```
(x*e^4 + 2*x)*e^e
```

3.975.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.56

$$\int e^e(2+e^4)\,dx = x(2+e^4)\,e^e$$

input
```
integrate((2+exp(4))*exp(exp(1)),x)
```

output
```
x*(2 + exp(4))*exp(E)
```

3.975.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.50

$$\int e^e(2+e^4)\,dx = x(e^4+2)e^e$$

input
```
integrate((2+exp(4))*exp(exp(1)),x, algorithm=\
```

output
```
x*(e^4 + 2)*e^e
```

3.975.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.50

$$\int e^e(2+e^4)\, dx = x(e^4+2)e^e$$

input
```
integrate((2+exp(4))*exp(exp(1)),x, algorithm=\
```

output
```
x*(e^4 + 2)*e^e
```

3.975.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.50

$$\int e^e(2+e^4)\, dx = x\,\mathrm{e}^{\mathrm{e}}\,(\mathrm{e}^4+2)$$

input
```
int(exp(exp(1))*(exp(4) + 2),x)
```

output
```
x*exp(exp(1))*(exp(4) + 2)
```

3.976 $\int \frac{-24+8e^6+e^{2x}+2x-x^2}{24-8e^6+e^{2x}+x^2} \, dx$

3.976.1 Optimal result

Integrand size = 38, antiderivative size = 22

$$\int \frac{-24+8e^6+e^{2x}+2x-x^2}{24-8e^6+e^{2x}+x^2} \, dx = \log \left(e^x+e^{-x}\left(-8\left(-3+e^6\right)+x^2\right)\right)$$

output
```
ln(exp(x)+(x^2-8*exp(3)^2+24)/exp(x))
```

3.976.2 Mathematica [A] (verified)

Time = 0.65 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-24+8e^6+e^{2x}+2x-x^2}{24-8e^6+e^{2x}+x^2} \, dx = -x+\log \left(24-8e^6+e^{2x}+x^2\right)$$

input
```
Integrate[(-24 + 8*E^6 + E^(2*x) + 2*x - x^2)/(24 - 8*E^6 + E^(2*x) + x^2)
,x]
```

output
```
-x + Log[24 - 8*E^6 + E^(2*x) + x^2]
```

3.976.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2+2x+e^{2x}+8e^6-24}{x^2+e^{2x}-8e^6+24}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-x^2+2x+e^{2x}-24\left(1-\frac{e^6}{3}\right)}{x^2+e^{2x}+24\left(1-\frac{e^6}{3}\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2\left(-x^2+x-8\left(3-e^6\right)\right)}{x^2+e^{2x}+24\left(1-\frac{e^6}{3}\right)}+1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2\int \frac{x^2}{-x^2-e^{2x}-24\left(1-\frac{e^6}{3}\right)}dx-16\left(3-e^6\right)\int \frac{1}{x^2+e^{2x}+24\left(1-\frac{e^6}{3}\right)}dx+2\int \frac{x}{x^2+e^{2x}+24\left(1-\frac{e^6}{3}\right)}dx+x$$

input
```
Int[(-24 + 8*E^6 + E^(2*x) + 2*x - x^2)/(24 - 8*E^6 + E^(2*x) + x^2),x]
```

output
```
$Aborted
```

3.976.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.976.4 Maple [A] (verified)

Time = 0.98 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

method	result	size
risch	$-x+\ln\left(\mathrm{e}^{2x}-8\,\mathrm{e}^{6}+x^{2}+24\right)$	19
parallelrisch	$-x+\ln\left(\mathrm{e}^{2x}-8\,\mathrm{e}^{6}+x^{2}+24\right)$	21
norman	$-x+\ln\left(-\mathrm{e}^{2x}+8\,\mathrm{e}^{6}-x^{2}-24\right)$	25

input
```
int((exp(x)^2+8*exp(3)^2-x^2+2*x-24)/(exp(x)^2-8*exp(3)^2+x^2+24),x,method
=_RETURNVERBOSE)
```

output
```
-x+ln(exp(2*x)-8*exp(6)+x^2+24)
```

3.976.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-24+8e^6+e^{2x}+2x-x^2}{24-8e^6+e^{2x}+x^2}\,dx = -x+\log\left(x^{2}-8\,e^{6}+e^{(2\,x)}+24\right)$$

input
```
integrate((exp(x)^2+8*exp(3)^2-x^2+2*x-24)/(exp(x)^2-8*exp(3)^2+x^2+24),x,
 algorithm=\
```

output
```
-x + log(x^2 - 8*e^6 + e^(2*x) + 24)
```

3.976.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{-24+8e^6+e^{2x}+2x-x^2}{24-8e^6+e^{2x}+x^2}\,dx = -x+\log\left(x^{2}+e^{2x}-8e^{6}+24\right)$$

input
```
integrate((exp(x)**2+8*exp(3)**2-x**2+2*x-24)/(exp(x)**2-8*exp(3)**2+x**2+
24),x)
```

output
```
-x + log(x**2 + exp(2*x) - 8*exp(6) + 24)
```

3.976.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-24+8e^6+e^{2x}+2x-x^2}{24-8e^6+e^{2x}+x^2}\,dx = -x+\log\left(x^2-8\,e^6+e^{(2\,x)}+24\right)$$

input
```
integrate((exp(x)^2+8*exp(3)^2-x^2+2*x-24)/(exp(x)^2-8*exp(3)^2+x^2+24),x,
 algorithm=\
```

output
```
-x + log(x^2 - 8*e^6 + e^(2*x) + 24)
```

3.976.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{-24+8e^6+e^{2x}+2x-x^2}{24-8e^6+e^{2x}+x^2}\,dx = -x+\log\left(-x^2+8\,e^6-e^{(2\,x)}-24\right)$$

input
```
integrate((exp(x)^2+8*exp(3)^2-x^2+2*x-24)/(exp(x)^2-8*exp(3)^2+x^2+24),x,
 algorithm=\
```

output
```
-x + log(-x^2 + 8*e^6 - e^(2*x) - 24)
```

3.976.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-24+8e^6+e^{2x}+2x-x^2}{24-8e^6+e^{2x}+x^2}\,dx = \ln\left(\mathrm{e}^{2\,x}-8\,\mathrm{e}^6+x^2+24\right)-x$$

input
```
int((2*x + exp(2*x) + 8*exp(6) - x^2 - 24)/(exp(2*x) - 8*exp(6) + x^2 + 24
),x)
```

output
```
log(exp(2*x) - 8*exp(6) + x^2 + 24) - x
```

3.977 $\int \frac{6+6x^3-6\log(x)}{x^2}\,dx$

3.977.1 Optimal result

Integrand size = 15, antiderivative size = 17

$$\int \frac{6+6x^3-6\log(x)}{x^2}\,dx = 3\left(4-e+x^2+\frac{2\log(x)}{x}\right)$$

output
```
12+6*ln(x)/x-3*exp(1)+3*x^2
```

3.977.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{6+6x^3-6\log(x)}{x^2}\,dx = 3x^2+\frac{6\log(x)}{x}$$

input
```
Integrate[(6 + 6*x^3 - 6*Log[x])/x^2,x]
```

output
```
3*x^2 + (6*Log[x])/x
```

3.977.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^3-6\log(x)+6}{x^2}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{6(x^3+1)}{x^2}-\frac{6\log(x)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$3x^2+\frac{6\log(x)}{x}$$

input
```
Int[(6 + 6*x^3 - 6*Log[x])/x^2,x]
```

output
```
3*x^2 + (6*Log[x])/x
```

3.977.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.977.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

method	result	size
default	$3x^{2}+\frac{6 \ln \left(x \right)}{x}$	14
risch	$3x^{2}+\frac{6 \ln \left(x \right)}{x}$	14
parts	$3x^{2}+\frac{6 \ln \left(x \right)}{x}$	14
norman	$\frac{3x^{3}+6 \ln \left(x \right)}{x}$	15
parallelrisch	$\frac{3x^{3}+6 \ln \left(x \right)}{x}$	15

input
```
int((-6*ln(x)+6*x^3+6)/x^2,x,method=_RETURNVERBOSE)
```

output
```
3*x^2+6*ln(x)/x
```

3.977.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{6+6x^3-6\log(x)}{x^2}\,dx=\frac{3\left(x^{3}+2\,\log\left(x\right)\right)}{x}$$

input
```
integrate((-6*log(x)+6*x^3+6)/x^2,x, algorithm=\
```

output
```
3*(x^3 + 2*log(x))/x
```

3.977.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.59

$$\int \frac{6+6x^3-6\log(x)}{x^2}\,dx=3x^{2}+\frac{6\log\left(x\right)}{x}$$

input
```
integrate((-6*ln(x)+6*x**3+6)/x**2,x)
```

output
```
3*x**2 + 6*log(x)/x
```

3.977.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{6+6x^3-6\log(x)}{x^2}\,dx = 3\,x^2 + \frac{6\,\log\left(x\right)}{x}$$

input
```
integrate((-6*log(x)+6*x^3+6)/x^2,x, algorithm=\
```

output
```
3*x^2 + 6*log(x)/x
```

3.977.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{6+6x^3-6\log(x)}{x^2}\,dx = 3\,x^2 + \frac{6\,\log\left(x\right)}{x}$$

input
```
integrate((-6*log(x)+6*x^3+6)/x^2,x, algorithm=\
```

output
```
3*x^2 + 6*log(x)/x
```

3.977.9 Mupad [B] (verification not implemented)

Time = 14.42 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{6+6x^3-6\log(x)}{x^2}\,dx = \frac{6\,\ln\left(x\right)}{x} + 3\,x^2$$

input
```
int((6*x^3 - 6*log(x) + 6)/x^2,x)
```

output
```
(6*log(x))/x + 3*x^2
```

3.978 $\int \frac{80+16x^2+e^{2x}x^4+e^x(40x+22x^2+10x^3)}{16x^2+8e^xx^3+e^{2x}x^4}\,dx$

3.978.1 Optimal result

Integrand size = 60, antiderivative size = 20

$$\int \frac{80+16x^2+e^{2x}x^4+e^x(40x+22x^2+10x^3)}{16x^2+8e^xx^3+e^{2x}x^4}\,dx=1+x+\frac{-2-\frac{20}{x}}{4+e^xx}$$

output
```
(-2-20/x)/(exp(x)*x+4)+x+1
```

3.978.2 Mathematica [A] (verified)

Time = 2.09 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{80+16x^2+e^{2x}x^4+e^x(40x+22x^2+10x^3)}{16x^2+8e^xx^3+e^{2x}x^4}\,dx=x-\frac{2(10+x)}{x(4+e^xx)}$$

input
```
Integrate[(80 + 16*x^2 + E^(2*x)*x^4 + E^x*(40*x + 22*x^2 + 10*x^3))/(16*x
^2 + 8*E^x*x^3 + E^(2*x)*x^4),x]
```

output
```
x - (2*(10 + x))/(x*(4 + E^x*x))
```

3.978.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}x^4+16x^2+e^x\left(10x^3+22x^2+40x\right)+80}{e^{2x}x^4+8e^xx^3+16x^2}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{2x}x^4+16x^2+e^x\left(10x^3+22x^2+40x\right)+80}{x^2\left(e^xx+4\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{8\left(x^2+11x+10\right)}{x^2\left(e^xx+4\right)^2}+\frac{2\left(x^2+11x+20\right)}{x^2\left(e^xx+4\right)}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-80\int \frac{1}{x^2\left(e^xx+4\right)^2}dx+40\int \frac{1}{x^2\left(e^xx+4\right)}dx-8\int \frac{1}{\left(e^xx+4\right)^2}dx-88\int \frac{1}{x\left(e^xx+4\right)^2}dx+2\int \frac{1}{e^xx+4}dx+22\int \frac{1}{x\left(e^xx+4\right)}dx+x$$

input
```
Int[(80 + 16*x^2 + E^(2*x)*x^4 + E^x*(40*x + 22*x^2 + 10*x^3))/(16*x^2 + 8
*E^x*x^3 + E^(2*x)*x^4),x]
```

output
```
$Aborted
```

3.978.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.978.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
risch	$x-\frac{2(x+10)}{x(\mathrm{e}^{x} x+4)}$	19
norman	$\frac{-20-2x+\mathrm{e}^{x} x^{3}+4x^{2}}{x(\mathrm{e}^{x} x+4)}$	29
parallelrisch	$\frac{-20-2x+\mathrm{e}^{x} x^{3}+4x^{2}}{x(\mathrm{e}^{x} x+4)}$	29

input
```
int((exp(x)^2*x^4+(10*x^3+22*x^2+40*x)*exp(x)+16*x^2+80)/(exp(x)^2*x^4+8*e
xp(x)*x^3+16*x^2),x,method=_RETURNVERBOSE)
```

output
```
x-2*(x+10)/x/(exp(x)*x+4)
```

3.978.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{80+16x^2+e^{2x}x^4+e^x(40x+22x^2+10x^3)}{16x^2+8e^xx^3+e^{2x}x^4}\,dx=\frac{x^3e^x+4\,x^2-2\,x-20}{x^2e^x+4\,x}$$

input
```
integrate((exp(x)^2*x^4+(10*x^3+22*x^2+40*x)*exp(x)+16*x^2+80)/(exp(x)^2*x
^4+8*exp(x)*x^3+16*x^2),x, algorithm=\
```

output
```
(x^3*e^x + 4*x^2 - 2*x - 20)/(x^2*e^x + 4*x)
```

3.978.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{80+16x^2+e^{2x}x^4+e^x(40x+22x^2+10x^3)}{16x^2+8e^xx^3+e^{2x}x^4}\,dx=x+\frac{-2x-20}{x^2e^x+4x}$$

input
```
integrate((exp(x)**2*x**4+(10*x**3+22*x**2+40*x)*exp(x)+16*x**2+80)/(exp(x
)**2*x**4+8*exp(x)*x**3+16*x**2),x)
```

output
```
x + (-2*x - 20)/(x**2*exp(x) + 4*x)
```

3.978.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{80+16x^2+e^{2x}x^4+e^x(40x+22x^2+10x^3)}{16x^2+8e^xx^3+e^{2x}x^4}\,dx=\frac{x^3e^x+4\,x^2-2\,x-20}{x^2e^x+4\,x}$$

input
```
integrate((exp(x)^2*x^4+(10*x^3+22*x^2+40*x)*exp(x)+16*x^2+80)/(exp(x)^2*x
^4+8*exp(x)*x^3+16*x^2),x, algorithm=\
```

output
```
(x^3*e^x + 4*x^2 - 2*x - 20)/(x^2*e^x + 4*x)
```

3.978.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{80+16x^2+e^{2x}x^4+e^x(40x+22x^2+10x^3)}{16x^2+8e^xx^3+e^{2x}x^4}\,dx=\frac{x^3e^x+4\,x^2-2\,x-20}{x^2e^x+4\,x}$$

input
```
integrate((exp(x)^2*x^4+(10*x^3+22*x^2+40*x)*exp(x)+16*x^2+80)/(exp(x)^2*x
^4+8*exp(x)*x^3+16*x^2),x, algorithm=\
```

output
```
(x^3*e^x + 4*x^2 - 2*x - 20)/(x^2*e^x + 4*x)
```

3.978.9 Mupad [B] (verification not implemented)

Time = 16.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{80+16x^2+e^{2x}x^4+e^x(40x+22x^2+10x^3)}{16x^2+8e^xx^3+e^{2x}x^4}\,dx=x-\frac{2\,x+20}{x\,\left(x\,\mathrm{e}^x+4\right)}$$

input
```
int((x^4*exp(2*x) + 16*x^2 + exp(x)*(40*x + 22*x^2 + 10*x^3) + 80)/(8*x^3*
exp(x) + x^4*exp(2*x) + 16*x^2),x)
```

output
```
x - (2*x + 20)/(x*(x*exp(x) + 4))
```

3.979 $\int \frac{5+20x+19x^2+6x^3+e(-1-4x-2x^2)}{-5x-8x^2-3x^3+e(x+x^2)}\,dx$

3.979.1 Optimal result

Integrand size = 51, antiderivative size = 29

$$\int \frac{5+20x+19x^2+6x^3+e(-1-4x-2x^2)}{-5x-8x^2-3x^3+e\,(x+x^2)}\,dx = 4-2(3+e^2+x)+\log\left(\frac{5-\frac{e+2x}{1+x}}{x}\right)$$

output
```
-2+ln((5-(exp(1)+2*x)/(1+x))/x)-2*exp(2)-2*x
```

3.979.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \frac{5+20x+19x^2+6x^3+e(-1-4x-2x^2)}{-5x-8x^2-3x^3+e\,(x+x^2)}\,dx = -2x-\log(x)-\log(1+x)+\log(5-e+3x)$$

input
```
Integrate[(5 + 20*x + 19*x^2 + 6*x^3 + E*(-1 - 4*x - 2*x^2))/(-5*x - 8*x^2
 - 3*x^3 + E*(x + x^2)),x]
```

output
```
-2*x - Log[x] - Log[1 + x] + Log[5 - E + 3*x]
```

3.979.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {2026, 2159, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^3+19x^2+e\left(-2x^2-4x-1\right)+20x+5}{-3x^3-8x^2+e\left(x^2+x\right)-5x}dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{6x^3+19x^2+e\left(-2x^2-4x-1\right)+20x+5}{x\left(-3x^2-(8-e)x+e-5\right)}dx$$
$$\Big\downarrow \text{2159}$$
$$\int \left(\frac{1}{-x-1}-\frac{1}{x}-\frac{3}{-3x+e-5}-2\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-2x-\log(x)-\log(x+1)+\log(3x-e+5)$$

input
```
Int[(5 + 20*x + 19*x^2 + 6*x^3 + E*(-1 - 4*x - 2*x^2))/(-5*x - 8*x^2 - 3*x
^3 + E*(x + x^2)),x]
```

output
```
-2*x - Log[x] - Log[1 + x] + Log[5 - E + 3*x]
```

3.979.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2159
```
Int[(Pq_)*((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p
_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*Pq*(a + b*x + c*x^2)^p, x
], x] /; FreeQ[{a, b, c, d, e, m}, x] && PolyQ[Pq, x] && IGtQ[p, -2]
```

3.979.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

method	result	size
norman	$-2x-\ln(x)-\ln(1+x)+\ln(-3x+\mathrm{e}-5)$	23
risch	$-2x+\ln(3x-\mathrm{e}+5)-\ln(x^2+x)$	23
parallelrisch	$-2x-\ln(x)-\ln(1+x)+\ln\left(x-\frac{\mathrm{e}}{3}+\frac{5}{3}\right)$	23
default	$-2x-\ln(x)-\ln(1+x)+\ln(3x-\mathrm{e}+5)$	25

input
```
int(((-2*x^2-4*x-1)*exp(1)+6*x^3+19*x^2+20*x+5)/((x^2+x)*exp(1)-3*x^3-8*x^
2-5*x),x,method=_RETURNVERBOSE)
```

output
```
-2*x-ln(x)-ln(1+x)+ln(-3*x+exp(1)-5)
```

3.979.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{5+20x+19x^2+6x^3+e(-1-4x-2x^2)}{-5x-8x^2-3x^3+e(x+x^2)}\,dx = -2\,x-\log\left(x^2+x\right)+\log\left(3\,x-e+5\right)$$

input
```
integrate(((-2*x^2-4*x-1)*exp(1)+6*x^3+19*x^2+20*x+5)/((x^2+x)*exp(1)-3*x^
3-8*x^2-5*x),x, algorithm=\
```

output
```
-2*x - log(x^2 + x) + log(3*x - e + 5)
```

3.979.6 Sympy [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{5+20x+19x^2+6x^3+e(-1-4x-2x^2)}{-5x-8x^2-3x^3+e(x+x^2)}\,dx = -2x-\log\left(x^2+x\right)+\log\left(x-\frac{e}{3}+\frac{5}{3}\right)$$

input
```
integrate(((-2*x**2-4*x-1)*exp(1)+6*x**3+19*x**2+20*x+5)/((x**2+x)*exp(1)-
3*x**3-8*x**2-5*x),x)
```

output
```
-2*x - log(x**2 + x) + log(x - E/3 + 5/3)
```

3.979.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

$$\int \frac{5+20x+19x^2+6x^3+e(-1-4x-2x^2)}{-5x-8x^2-3x^3+e\,(x+x^2)}\,dx = -2\,x+\log\left(3\,x-e+5\right)-\log\left(x+1\right)-\log\left(x\right)$$

input
```
integrate(((-2*x^2-4*x-1)*exp(1)+6*x^3+19*x^2+20*x+5)/((x^2+x)*exp(1)-3*x^
3-8*x^2-5*x),x, algorithm=\
```

output
```
-2*x + log(3*x - e + 5) - log(x + 1) - log(x)
```

3.979.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{5+20x+19x^2+6x^3+e(-1-4x-2x^2)}{-5x-8x^2-3x^3+e\,(x+x^2)}\,dx = -2\,x+\log\left(|3\,x-e+5|\right)-\log\left(|x+1|\right)-\log\left(|x|\right)$$

input
```
integrate(((-2*x^2-4*x-1)*exp(1)+6*x^3+19*x^2+20*x+5)/((x^2+x)*exp(1)-3*x^
3-8*x^2-5*x),x, algorithm=\
```

output
```
-2*x + log(abs(3*x - e + 5)) - log(abs(x + 1)) - log(abs(x))
```

3.979.9 Mupad [B] (verification not implemented)

Time = 15.19 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{5+20x+19x^2+6x^3+e(-1-4x-2x^2)}{-5x-8x^2-3x^3+e\,(x+x^2)}\,dx = \ln\left(x-\frac{\mathrm{e}}{3}+\frac{5}{3}\right)-2\,x-\ln\left(x\,\left(x+1\right)\right)$$

input
```
int(-(20*x - exp(1)*(4*x + 2*x^2 + 1) + 19*x^2 + 6*x^3 + 5)/(5*x - exp(1)*
(x + x^2) + 8*x^2 + 3*x^3),x)
```

output
```
log(x - exp(1)/3 + 5/3) - 2*x - log(x*(x + 1))
```

3.980 $\int \frac{-4x\log(x)+(e^2+x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)}{(e^2x+x^2)\log(x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{e^4+2e^2x+x^2}\right)\right)}\,d$

3.980.1 Optimal result

Integrand size = 95, antiderivative size = 24

$$\int \frac{-4x\log(x)+(e^2+x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)}{(e^2x+x^2)\log(x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{e^4+2e^2x+x^2}\right)\right)}\,dx = 3+\log\left(2\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{(e^2+x)^2}\right)\right)\right)$$

output
```
ln(2*ln(1/5*ln(3/(x+exp(2))^2)^2*ln(x)))+3
```

3.980.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{-4x\log(x)+(e^2+x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)}{(e^2x+x^2)\log(x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{e^4+2e^2x+x^2}\right)\right)}\,dx = \log\left(\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{(e^2+x)^2}\right)\right)\right)$$

input
```
Integrate[(-4*x*Log[x] + (E^2 + x)*Log[3/(E^4 + 2*E^2*x + x^2)])/((E^2*x +
 x^2)*Log[x]*Log[3/(E^4 + 2*E^2*x + x^2)]*Log[(Log[x]*Log[3/(E^4 + 2*E^2*x
 + x^2)]^2)/5]),x]
```

output
```
Log[Log[(Log[x]*Log[3/(E^2 + x)^2]^2)/5]]
```

3.980.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x+e^2)\log\left(\frac{3}{x^2+2e^2x+e^4}\right)-4x\log(x)}{(x^2+e^2x)\log(x)\log\left(\frac{3}{x^2+2e^2x+e^4}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{x^2+2e^2x+e^4}\right)\right)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(x+e^2)\log\left(\frac{3}{x^2+2e^2x+e^4}\right)-4x\log(x)}{x(x+e^2)\log(x)\log\left(\frac{3}{x^2+2e^2x+e^4}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{x^2+2e^2x+e^4}\right)\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4x\log(x)-x\log\left(\frac{3}{(x+e^2)^2}\right)-e^2\log\left(\frac{3}{(x+e^2)^2}\right)}{e^2(x+e^2)\log(x)\log\left(\frac{3}{(x+e^2)^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{(x+e^2)^2}\right)\right)}+\frac{-4x\log(x)+x\log\left(\frac{3}{(x+e^2)^2}\right)+e^2\log\left(\frac{}{(x+\right.}{e^2x\log(x)\log\left(\frac{3}{(x+e^2)^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{}{(x\right.}\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{1}{x\log(x)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{(x+e^2)^2}\right)\right)}dx-4\int \frac{1}{(x+e^2)\log\left(\frac{3}{(x+e^2)^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{(x+e^2)^2}\right)\right)}dx$$

input
```
Int[(-4*x*Log[x] + (E^2 + x)*Log[3/(E^4 + 2*E^2*x + x^2)])/((E^2*x + x^2)*
Log[x]*Log[3/(E^4 + 2*E^2*x + x^2)]*Log[(Log[x]*Log[3/(E^4 + 2*E^2*x + x^2
)]^2)/5]),x]
```

output
```
$Aborted
```

3.980.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.980.4 Maple [A] (verified)

Time = 94.45 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

method	result	size
parallelrisch	$\ln\left(\ln\left(\frac{\ln\left(\frac{3}{2\,{\mathrm e}^{2} x +x^{2}+{\mathrm e}^{4}}\right)^{2} \ln\left(x \right)}{5}\right)\right)$	27
risch	Expression too large to display	1123

input
```
int((-4*x*ln(x)+(x+exp(2))*ln(3/(exp(2)^2+2*exp(2)*x+x^2)))/(exp(2)*x+x^2)
/ln(3/(exp(2)^2+2*exp(2)*x+x^2))/ln(x)/ln(1/5*ln(3/(exp(2)^2+2*exp(2)*x+x^
2))^2*ln(x)),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(1/5*ln(3/(exp(2)^2+2*exp(2)*x+x^2))^2*ln(x)))
```

3.980.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{-4x\log(x)+(e^2+x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)}{(e^2x+x^2)\log(x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{e^4+2e^2x+x^2}\right)\right)}\,dx$$
$$=\log\left(\log\left(\frac{1}{5}\,\log\left(x\right)\log\left(\frac{3}{x^2+2\,xe^2+e^4}\right)^2\right)\right)$$

input
```
integrate((-4*x*log(x)+(x+exp(2))*log(3/(exp(2)^2+2*exp(2)*x+x^2)))/(exp(2
)*x+x^2)/log(3/(exp(2)^2+2*exp(2)*x+x^2))/log(x)/log(1/5*log(3/(exp(2)^2+2
*exp(2)*x+x^2))^2*log(x)),x, algorithm=\
```

output
```
log(log(1/5*log(x)*log(3/(x^2 + 2*x*e^2 + e^4))^2))
```

3.980.6 Sympy [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{-4x\log(x)+(e^2+x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)}{(e^2x+x^2)\log(x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{e^4+2e^2x+x^2}\right)\right)}\,dx = \log\left(\log\left(\frac{\log(x)\log\left(\frac{3}{x^2+2xe^2+e^4}\right)^2}{5}\right)\right)$$

input
```
integrate((-4*x*ln(x)+(x+exp(2))*ln(3/(exp(2)**2+2*exp(2)*x+x**2)))/(exp(2
)*x+x**2)/ln(3/(exp(2)**2+2*exp(2)*x+x**2))/ln(x)/ln(1/5*ln(3/(exp(2)**2+2
*exp(2)*x+x**2))**2*ln(x)),x)
```

output
```
log(log(log(x)*log(3/(x**2 + 2*x*exp(2) + exp(4)))**2/5))
```

3.980.7 Maxima [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{-4x\log(x)+(e^2+x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)}{(e^2x+x^2)\log(x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{e^4+2e^2x+x^2}\right)\right)}\,dx = \log\left(-\frac{1}{2}\log(5)+\log\left(-\log(3)+2\log\left(x+e^2\right)\right)+\frac{1}{2}\log(\log(x))\right)$$

input
```
integrate((-4*x*log(x)+(x+exp(2))*log(3/(exp(2)^2+2*exp(2)*x+x^2)))/(exp(2
)*x+x^2)/log(3/(exp(2)^2+2*exp(2)*x+x^2))/log(x)/log(1/5*log(3/(exp(2)^2+2
*exp(2)*x+x^2))^2*log(x)),x, algorithm=\
```

output
```
log(-1/2*log(5) + log(-log(3) + 2*log(x + e^2)) + 1/2*log(log(x)))
```

3.980.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. 2(21) = 42.

Time = 1.89 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.08

$$\int \frac{-4x\log(x)+(e^2+x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)}{(e^2x+x^2)\log(x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{e^4+2e^2x+x^2}\right)\right)}\,dx$$
$$= \log\left(-\log(5)+\log\left(\log(3)^2\log(x)-2\log(3)\log\left(x^2+2xe^2+e^4\right)\log(x) + \log\left(x^2+2xe^2+e^4\right)^2\log(x)\right)\right)$$

input
```
integrate((-4*x*log(x)+(x+exp(2))*log(3/(exp(2)^2+2*exp(2)*x+x^2)))/(exp(2
)*x+x^2)/log(3/(exp(2)^2+2*exp(2)*x+x^2))/log(x)/log(1/5*log(3/(exp(2)^2+2
*exp(2)*x+x^2))^2*log(x)),x, algorithm=\
```

output
```
log(-log(5) + log(log(3)^2*log(x) - 2*log(3)*log(x^2 + 2*x*e^2 + e^4)*log(
x) + log(x^2 + 2*x*e^2 + e^4)^2*log(x)))
```

3.980.9 Mupad [B] (verification not implemented)

Time = 19.32 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{-4x\log(x)+(e^2+x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)}{(e^2x+x^2)\log(x)\log\left(\frac{3}{e^4+2e^2x+x^2}\right)\log\left(\frac{1}{5}\log(x)\log^2\left(\frac{3}{e^4+2e^2x+x^2}\right)\right)}\,dx = \ln\left(\ln\left(\frac{\ln\left(\frac{3}{x^2+2\,e^2\,x+e^4}\right)^2\,\ln(x)}{5}\right)\right)$$

input
```
int((log(3/(exp(4) + 2*x*exp(2) + x^2))*(x + exp(2)) - 4*x*log(x))/(log(3/
(exp(4) + 2*x*exp(2) + x^2))*log((log(3/(exp(4) + 2*x*exp(2) + x^2))^2*log
(x))/5)*log(x)*(x*exp(2) + x^2)),x)
```

output
```
log(log((log(3/(exp(4) + 2*x*exp(2) + x^2))^2*log(x))/5))
```

3.981 $\int \frac{-400+24920x+4996x^2+250x^3+(80-4992x-500x^2)\log(4)+(-4+25}{100+20x+x^2+(-20-}$

3.981.1 Optimal result

Integrand size = 93, antiderivative size = 32

$$\int \frac{-400+24920x+4996x^2+250x^3+(80-4992x-500x^2)\log(4)+(-4+250x)\log^2(4)+e^x(-10+490}{100+20x+x^2+(-20-2x)\log(4)+\log^2(4)}$$

$$=x\left(1+\frac{(-x+25x^2)\left(5+\frac{e^x}{10+x-\log(4)}\right)}{x}\right)$$

output
```
x*((25*x^2-x)/x*(exp(x)/(10+x-2*ln(2))+5)+1)
```

3.981.2 Mathematica [A] (verified)

Time = 5.07 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.78

$$\int \frac{-400+24920x+4996x^2+250x^3+(80-4992x-500x^2)\log(4)+(-4+250x)\log^2(4)+e^x(-10+490}{100+20x+x^2+(-20-2x)\log(4)+\log^2(4)}$$

$$=x\left(-4+125x+\frac{e^x(-1+25x)}{10+x-\log(4)}\right)$$

input
```
Integrate[(-400 + 24920*x + 4996*x^2 + 250*x^3 + (80 - 4992*x - 500*x^2)*L
og[4] + (-4 + 250*x)*Log[4]^2 + E^x*(-10 + 490*x + 274*x^2 + 25*x^3 + (1 -
 49*x - 25*x^2)*Log[4]))/(100 + 20*x + x^2 + (-20 - 2*x)*Log[4] + Log[4]^2
),x]
```

output
```
x*(-4 + 125*x + (E^x*(-1 + 25*x))/(10 + x - Log[4]))
```

3.981.3 Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.75, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.022, Rules used = {7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{250x^3+4996x^2+\left(-500x^2-4992x+80\right)\log(4)+e^x\left(25x^3+274x^2+\left(-25x^2-49x+1\right)\log(4)+490x-10\right.}{x^2+20x+(-2x-20)\log(4)+100+\log^2(4)}$$

$$\Big\downarrow \text{7239}$$

$$\int \left(\frac{e^x\left(25x^3+x^2(274-25\log(4))+49x(10-\log(4))-10+\log(4)\right)}{(x+10-\log(4))^2}+250x-4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$125x^2+25e^x x-4x-25e^x+\frac{e^x(251-25\log(4))(10-\log(4))}{x+10-\log(4)}-2e^x(113-25\log(2))$$

input
```
Int[(-400 + 24920*x + 4996*x^2 + 250*x^3 + (80 - 4992*x - 500*x^2)*Log[4]
+ (-4 + 250*x)*Log[4]^2 + E^x*(-10 + 490*x + 274*x^2 + 25*x^3 + (1 - 49*x
- 25*x^2)*Log[4]))/(100 + 20*x + x^2 + (-20 - 2*x)*Log[4] + Log[4]^2),x]
```

output
```
-25*E^x - 4*x + 25*E^x*x + 125*x^2 - 2*E^x*(113 - 25*Log[2]) + (E^x*(251 -
 25*Log[4])*(10 - Log[4]))/(10 + x - Log[4])
```

3.981.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.981.4 Maple [A] (verified)

Time = 1.44 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.59

method	result	size
norman	$\frac{(250\ln(2)-1246)x^2+e^x x-125x^3-25\,e^x x^2-16\ln(2)^2+160\ln(2)-400}{2\ln(2)-x-10}$	51
parallelrisch	$-\frac{-250x^2\ln(2)+125x^3+25\,e^x x^2+16\ln(2)^2+400+1246x^2-e^x x-160\ln(2)}{2\ln(2)-x-10}$	55
parts	$125x^2-4x+\frac{100\,e^x\ln(2)^2}{10+x-2\ln(2)}-251\,e^x+25\,e^x x+50\,e^x\ln(2)+\frac{2510\,e^x}{10+x-2\ln(2)}-\frac{1002\ln(2)e^x}{10+x-2\ln(2)}$	70
default	Expression too large to display	711

input
```
int(((2*(-25*x^2-49*x+1)*ln(2)+25*x^3+274*x^2+490*x-10)*exp(x)+4*(250*x-4)
*ln(2)^2+2*(-500*x^2-4992*x+80)*ln(2)+250*x^3+4996*x^2+24920*x-400)/(4*ln(
2)^2+2*(-2*x-20)*ln(2)+x^2+20*x+100),x,method=_RETURNVERBOSE)
```

output
```
((250*ln(2)-1246)*x^2+exp(x)*x-125*x^3-25*exp(x)*x^2-16*ln(2)^2+160*ln(2)-
400)/(2*ln(2)-x-10)
```

3.981.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.53

$$\int \frac{-400+24920x+4996x^2+250x^3+(80-4992x-500x^2)\log(4)+(-4+250x)\log^2(4)+e^x(-10+49}{100+20x+x^2+(-20-2x)\log(4)+\log^2(4)}$$
$$=\frac{125\,x^3+1246\,x^2+(25\,x^2-x)e^x-2\,(125\,x^2-4\,x)\log(2)-40\,x}{x-2\,\log(2)+10}$$

input
```
integrate(((2*(-25*x^2-49*x+1)*log(2)+25*x^3+274*x^2+490*x-10)*exp(x)+4*(2
50*x-4)*log(2)^2+2*(-500*x^2-4992*x+80)*log(2)+250*x^3+4996*x^2+24920*x-40
0)/(4*log(2)^2+2*(-2*x-20)*log(2)+x^2+20*x+100),x, algorithm=\
```

output
```
(125*x^3 + 1246*x^2 + (25*x^2 - x)*e^x - 2*(125*x^2 - 4*x)*log(2) - 40*x)/
(x - 2*log(2) + 10)
```

3.981.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{-400+24920x+4996x^2+250x^3+(80-4992x-500x^2)\log(4)+(-4+250x)\log^2(4)+e^x(-10+490}{100+20x+x^2+(-20-2x)\log(4)+\log^2(4)}$$

$$=125x^2-4x+\frac{(25x^2-x)\,e^x}{x-2\log{(2)}+10}$$

input
```
integrate(((2*(-25*x**2-49*x+1)*ln(2)+25*x**3+274*x**2+490*x-10)*exp(x)+4*
(250*x-4)*ln(2)**2+2*(-500*x**2-4992*x+80)*ln(2)+250*x**3+4996*x**2+24920*
x-400)/(4*ln(2)**2+2*(-2*x-20)*ln(2)+x**2+20*x+100),x)
```

output
```
125*x**2 - 4*x + (25*x**2 - x)*exp(x)/(x - 2*log(2) + 10)
```

3.981.7 Maxima [F]

$$\int \frac{-400+24920x+4996x^2+250x^3+(80-4992x-500x^2)\log(4)+(-4+250x)\log^2(4)+e^x(-10+490}{100+20x+x^2+(-20-2x)\log(4)+\log^2(4)}$$

$$=\int \frac{250\,x^3+8\,(125\,x-2)\log{(2)}^2+4996\,x^2+(25\,x^3+274\,x^2-2\,(25\,x^2+49\,x-1)\log{(2)}+490\,x-10)}{x^2-4\,(x+10)\log{(2)}+4\,\log{(2)}^2+20\,x+100}$$

input
```
integrate(((2*(-25*x^2-49*x+1)*log(2)+25*x^3+274*x^2+490*x-10)*exp(x)+4*(2
50*x-4)*log(2)^2+2*(-500*x^2-4992*x+80)*log(2)+250*x^3+4996*x^2+24920*x-40
0)/(4*log(2)^2+2*(-2*x-20)*log(2)+x^2+20*x+100),x, algorithm=\
```

3.981. $\int \frac{-400+24920x+4996x^2+250x^3+(80-4992x-500x^2)\log(4)+(-4+250x)\log^2(4)+e^x(-10+490x+274x^2+25x^3+(1-49x-25x^2)\log(4))}{100+20x+x^2+(-20-2x)\log(4)+\log^2(4)}\,dx$

output
```
-1000*(2*(log(2) - 5)/(x - 2*log(2) + 10) - log(x - 2*log(2) + 10))*log(2)
^2 + 125*x^2 + 1000*x*(log(2) - 5) - 2*(log(2) - 5)*integrate(e^x/(x^2 - 4
*x*(log(2) - 5) + 4*log(2)^2 - 40*log(2) + 100), x) - 1000*(4*(log(2) - 5)
*log(x - 2*log(2) + 10) + x - 4*(log(2)^2 - 10*log(2) + 25)/(x - 2*log(2)
+ 10))*log(2) + 9984*(2*(log(2) - 5)/(x - 2*log(2) + 10) - log(x - 2*log(2
) + 10))*log(2) - 8*e^(-10)*exp_integral_e(2, -x + 2*log(2) - 10)*log(2)/(
x - 2*log(2) + 10) + 3000*(log(2)^2 - 10*log(2) + 25)*log(x - 2*log(2) + 1
0) + 19984*(log(2) - 5)*log(x - 2*log(2) + 10) + 4996*x + (25*x^2 - x)*e^x
/(x - 2*log(2) + 10) + 40*e^(-10)*exp_integral_e(2, -x + 2*log(2) - 10)/(x
 - 2*log(2) + 10) + 16*log(2)^2/(x - 2*log(2) + 10) - 2000*(log(2)^3 - 15*
log(2)^2 + 75*log(2) - 125)/(x - 2*log(2) + 10) - 19984*(log(2)^2 - 10*log
(2) + 25)/(x - 2*log(2) + 10) - 49840*(log(2) - 5)/(x - 2*log(2) + 10) - 1
60*log(2)/(x - 2*log(2) + 10) + 400/(x - 2*log(2) + 10) + 24920*log(x - 2*
log(2) + 10)
```

3.981.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.50

$$\int \frac{-400 + 24920x + 4996x^2 + 250x^3 + (80 - 4992x - 500x^2)\log(4) + (-4 + 250x)\log^2(4) + e^x(-10 + 490}{100 + 20x + x^2 + (-20 - 2x)\log(4) + \log^2(4)}$$
$$= \frac{125\,x^3 + 25\,x^2e^x - 250\,x^2\log(2) + 1246\,x^2 - xe^x + 8\,x\log(2) - 40\,x}{x - 2\,\log(2) + 10}$$

input
```
integrate(((2*(-25*x^2-49*x+1)*log(2)+25*x^3+274*x^2+490*x-10)*exp(x)+4*(2
50*x-4)*log(2)^2+2*(-500*x^2-4992*x+80)*log(2)+250*x^3+4996*x^2+24920*x-40
0)/(4*log(2)^2+2*(-2*x-20)*log(2)+x^2+20*x+100),x, algorithm=\
```

output
```
(125*x^3 + 25*x^2*e^x - 250*x^2*log(2) + 1246*x^2 - x*e^x + 8*x*log(2) - 4
0*x)/(x - 2*log(2) + 10)
```

3.981.
$\int \frac{-400+24920x+4996x^2+250x^3+(80-4992x-500x^2)\log(4)+(-4+250x)\log^2(4)+e^x(-10+490x+274x^2+25x^3+(1-49x-25x^2)\log(4))}{100+20x+x^2+(-20-2x)\log(4)+\log^2(4)}\,dx$

3.981.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-400 + 24920x + 4996x^2 + 250x^3 + (80 - 4992x - 500x^2)\log(4) + (-4 + 250x)\log^2(4) + e^x(-10 + 490}{100 + 20x + x^2 + (-20 - 2x)\log(4) + \log^2(4)}$$

$$= \int \frac{24920\,x + \mathrm{e}^x\,(490\,x - 2\,\ln(2)\,(25\,x^2 + 49\,x - 1) + 274\,x^2 + 25\,x^3 - 10) - 2\,\ln(2)\,(500\,x^2 + 4992\,x -}{20\,x - 2\,\ln(2)\,(2\,x + 20) + 4\,\ln(2)^2 + x^2 + 100}$$

input
```
int((24920*x + exp(x)*(490*x - 2*log(2)*(49*x + 25*x^2 - 1) + 274*x^2 + 25
*x^3 - 10) - 2*log(2)*(4992*x + 500*x^2 - 80) + 4*log(2)^2*(250*x - 4) + 4
996*x^2 + 250*x^3 - 400)/(20*x - 2*log(2)*(2*x + 20) + 4*log(2)^2 + x^2 +
100),x)
```

output
```
int((24920*x + exp(x)*(490*x - 2*log(2)*(49*x + 25*x^2 - 1) + 274*x^2 + 25
*x^3 - 10) - 2*log(2)*(4992*x + 500*x^2 - 80) + 4*log(2)^2*(250*x - 4) + 4
996*x^2 + 250*x^3 - 400)/(20*x - 2*log(2)*(2*x + 20) + 4*log(2)^2 + x^2 +
100), x)
```

3.982 $\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+}{}$

3.982.1 Optimal result

Integrand size = 782, antiderivative size = 36

$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x(11250x-1350x^3-180x^4}{}$$

$$=9x^2\left(5-\log\left(\left(2-e^x-\frac{4}{-5-x+\log(3)}-\log(5)\right)^2\right)\right)^2$$

output
```
9*(5-ln((2-exp(x)-ln(5)-4/(ln(3)-5-x))^2))^2*x^2
```


$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x(11250x-1350x^3-180x^4+(-4500x+900x^2+360x^3)\log(3)+(450x-180}{}$$

3.982.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 104 vs. 2(36) = 72.

Time = 0.46 (sec) , antiderivative size = 104, normalized size of antiderivative = 2.89

$$\int \frac{-31500x - 11520x^2 - 900x^3 + (10800x + 1800x^2)\log(3) - 900x\log^2(3) + e^x(11250x - 1350x^3 - 180x^4}{}$$

$$= 18\left(\frac{25x^2}{2} - 5x^2\log\left(\frac{(-14 + e^x(5 + x - \log(3)) + x(-2 + \log(5)) - \log(3)\log(5) + \log(28125))^2}{(5 + x - \log(3))^2}\right) + \frac{1}{2}x^2\log^2\left(\frac{(-14 + e^x(5 + x - \log(3)) + x(-2 + \log(5)) - \log(3)\log(5) + \log(28125))^2}{(5 + x - \log(3))^2}\right)\right)$$

input
```
Integrate[(-31500*x - 11520*x^2 - 900*x^3 + (10800*x + 1800*x^2)*Log[3] -
900*x*Log[3]^2 + E^x*(11250*x - 1350*x^3 - 180*x^4 + (-4500*x + 900*x^2 +
360*x^3)*Log[3] + (450*x - 180*x^2)*Log[3]^2) + (11250*x + 4500*x^2 + 450*
x^3 + (-4500*x - 900*x^2)*Log[3] + 450*x*Log[3]^2)*Log[5] + (12600*x + 446
4*x^2 + 360*x^3 + (-4320*x - 720*x^2)*Log[3] + 360*x*Log[3]^2 + E^x*(-4500
*x - 900*x^2 + 180*x^3 + 36*x^4 + (1800*x - 72*x^3)*Log[3] + (-180*x + 36*
x^2)*Log[3]^2) + (-4500*x - 1800*x^2 - 180*x^3 + (1800*x + 360*x^2)*Log[3]
 - 180*x*Log[3]^2)*Log[5])*Log[(196 + 56*x + 4*x^2 + (-56 - 8*x)*Log[3] +
4*Log[3]^2 + E^(2*x)*(25 + 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2) + (
-140 - 48*x - 4*x^2 + (48 + 8*x)*Log[3] - 4*Log[3]^2)*Log[5] + (25 + 10*x
+ x^2 + (-10 - 2*x)*Log[3] + Log[3]^2)*Log[5]^2 + E^x*(-140 - 48*x - 4*x^2
 + (48 + 8*x)*Log[3] - 4*Log[3]^2 + (50 + 20*x + 2*x^2 + (-20 - 4*x)*Log[3
] + 2*Log[3]^2)*Log[5]))/(25 + 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2)
] + (-1260*x - 432*x^2 - 36*x^3 + (432*x + 72*x^2)*Log[3] - 36*x*Log[3]^2
+ E^x*(450*x + 180*x^2 + 18*x^3 + (-180*x - 36*x^2)*Log[3] + 18*x*Log[3]^2
) + (450*x + 180*x^2 + 18*x^3 + (-180*x - 36*x^2)*Log[3] + 18*x*Log[3]^2)*
Log[5])*Log[(196 + 56*x + 4*x^2 + (-56 - 8*x)*Log[3] + 4*Log[3]^2 + E^(2*x
)*(25 + 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2) + (-140 - 48*x - 4*x^2
 + (48 + 8*x)*Log[3] - 4*Log[3]^2)*Log[5] + (25 + 10*x + x^2 + (-10 - 2*x)
*Log[3] + Log[3]^2)*Log[5]^2 + E^x*(-140 - 48*x - 4*x^2 + (48 + 8*x)*Log[3
] - 4*Log[3]^2 + (50 + 20*x + 2*x^2 + (-20 - 4*x)*Log[3] + 2*Log[3]^2)*Log
[5]))/(25 + 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2)]^2)/(-70 - 24*x -
2*x^2 + (24 + 4*x)*Log[3] - 2*Log[3]^2 + E^x*(25 + 10*x + x^2 + (-10 - 2*x
)*Log[3] + Log[3]^2) + (25 + 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2)*L
og[5]),x]
```

3.982.

$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x(11250x-1350x^3-180x^4+(-4500x+900x^2+360x^3)\log(3)+(450x-180}{}$$

output
```
18*((25*x^2)/2 - 5*x^2*Log[(-14 + E^x*(5 + x - Log[3]) + x*(-2 + Log[5]) -
 Log[3]*Log[5] + Log[28125])^2/(5 + x - Log[3])^2] + (x^2*Log[(-14 + E^x*(
5 + x - Log[3]) + x*(-2 + Log[5]) - Log[3]*Log[5] + Log[28125])^2/(5 + x -
 Log[3])^2]^2)/2)
```

3.982.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-900x^3-11520x^2+\left(1800x^2+10800x\right)\log(3)+\left(-36x^3-432x^2+\left(72x^2+432x\right)\log(3)+e^x\left(18x^3+180x^2\right.\right.}{}$$

$$\Big\downarrow \; 6$$

$$\int \frac{-900x^3-11520x^2+\left(1800x^2+10800x\right)\log(3)+\left(-36x^3-432x^2+\left(72x^2+432x\right)\log(3)+e^x\left(18x^3+180x^2\right.\right.}{}$$

$$\Big\downarrow \; 7239$$

$$\int \frac{18x\Big(-50x^2+2\left(-5x^2(\log(5)-2)+2x(62+5\log(3)(\log(5)-2)-25\log(5)\right)+e^x(x-5)(x+5-\log(3))^2-5}{}$$

$$\Big\downarrow \; 27$$

$$18\int \frac{x\Big(50x^2+640x-5e^x(5-2x)(x-\log(3)+5)^2+(x-\log(3)+5)\left((2-\log(5))x-e^x(x-\log(3)+5)-\log\right.}{}$$

$$\Big\downarrow \; 7292$$

$$18\int \frac{x\Big(-50x^2-640x+5e^x(5-2x)(x-\log(3)+5)^2-(x-\log(3)+5)\left((2-\log(5))x-e^x(x-\log(3)+5)-\log\right.}{}$$

$$\Big\downarrow \; 7293$$

$$18\int\Bigg(\frac{\left(4\left(1-\frac{\log(5)}{2}\right)\log\left(\frac{((-2+\log(5))x+e^x(x-\log(3)+5)+\log(28125)-\log(3)\log(5)-14)^2}{(x-\log(3)+5)^2}\right)x^2-20\left(1-\frac{\log(5)}{2}\right)x^2+48(1+\right.}{}$$

3.982.

$$\int \frac{-31500x-11520x^2-900x^3+\left(10800x+1800x^2\right)\log(3)-900x\log^2(3)+e^x\left(11250x-1350x^3-180x^4+\left(-4500x+900x^2+360x^3\right)\log(3)+\left(450x-180x\right.\right.}{}$$

$$\Big\downarrow \text{7299}$$

$$18\int \left(\frac{\left(4\left(1-\frac{\log(5)}{2}\right)\log\left(\frac{((-2+\log(5))x+e^x(x-\log(3)+5)+\log(28125)-\log(3)\log(5)-14)^2}{(x-\log(3)+5)^2}\right)x^2-20\left(1-\frac{\log(5)}{2}\right)x^2+48(1+\right.}{}\right.$$

input
```
Int[(-31500*x - 11520*x^2 - 900*x^3 + (10800*x + 1800*x^2)*Log[3] - 900*x*
Log[3]^2 + E^x*(11250*x - 1350*x^3 - 180*x^4 + (-4500*x + 900*x^2 + 360*x^
3)*Log[3] + (450*x - 180*x^2)*Log[3]^2) + (11250*x + 4500*x^2 + 450*x^3 +
(-4500*x - 900*x^2)*Log[3] + 450*x*Log[3]^2)*Log[5] + (12600*x + 4464*x^2
+ 360*x^3 + (-4320*x - 720*x^2)*Log[3] + 360*x*Log[3]^2 + E^x*(-4500*x - 9
00*x^2 + 180*x^3 + 36*x^4 + (1800*x - 72*x^3)*Log[3] + (-180*x + 36*x^2)*L
og[3]^2) + (-4500*x - 1800*x^2 - 180*x^3 + (1800*x + 360*x^2)*Log[3] - 180
*x*Log[3]^2)*Log[5])*Log[(196 + 56*x + 4*x^2 + (-56 - 8*x)*Log[3] + 4*Log[
3]^2 + E^(2*x)*(25 + 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2) + (-140 -
 48*x - 4*x^2 + (48 + 8*x)*Log[3] - 4*Log[3]^2)*Log[5] + (25 + 10*x + x^2
+ (-10 - 2*x)*Log[3] + Log[3]^2)*Log[5]^2 + E^x*(-140 - 48*x - 4*x^2 + (48
 + 8*x)*Log[3] - 4*Log[3]^2 + (50 + 20*x + 2*x^2 + (-20 - 4*x)*Log[3] + 2*
Log[3]^2)*Log[5]))/(25 + 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2)] + (-
1260*x - 432*x^2 - 36*x^3 + (432*x + 72*x^2)*Log[3] - 36*x*Log[3]^2 + E^x*
(450*x + 180*x^2 + 18*x^3 + (-180*x - 36*x^2)*Log[3] + 18*x*Log[3]^2) + (4
50*x + 180*x^2 + 18*x^3 + (-180*x - 36*x^2)*Log[3] + 18*x*Log[3]^2)*Log[5]
)*Log[(196 + 56*x + 4*x^2 + (-56 - 8*x)*Log[3] + 4*Log[3]^2 + E^(2*x)*(25
+ 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2) + (-140 - 48*x - 4*x^2 + (48
 + 8*x)*Log[3] - 4*Log[3]^2)*Log[5] + (25 + 10*x + x^2 + (-10 - 2*x)*Log[3
] + Log[3]^2)*Log[5]^2 + E^x*(-140 - 48*x - 4*x^2 + (48 + 8*x)*Log[3] - 4*
Log[3]^2 + (50 + 20*x + 2*x^2 + (-20 - 4*x)*Log[3] + 2*Log[3]^2)*Log[5]))/
(25 + 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2)]^2)/(-70 - 24*x - 2*x^2
+ (24 + 4*x)*Log[3] - 2*Log[3]^2 + E^x*(25 + 10*x + x^2 + (-10 - 2*x)*Log[
3] + Log[3]^2) + (25 + 10*x + x^2 + (-10 - 2*x)*Log[3] + Log[3]^2)*Log[5])
,x]
```

output
```
$Aborted
```

3.982.

$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x\left(11250x-1350x^3-180x^4+(-4500x+900x^2+360x^3)\log(3)+(450x-180x\right.}{}$$

3.982.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.982.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1103 vs. 2(35) = 70.

Time = 6.99 (sec) , antiderivative size = 1104, normalized size of antiderivative = 30.67

method	result	size
parallelrisch	Expression too large to display	1104
risch	Expression too large to display	6974

3.982.

$$\int \frac{-31500x-11520x^2-900x^3+\left(10800x+1800x^2\right)\log(3)-900x\log^2(3)+e^x\left(11250x-1350x^3-180x^4+\left(-4500x+900x^2+360x^3\right)\log(3)+\left(450x-180x\right.\right.}{}$$

input
```
int((((18*x*ln(3)^2+(-36*x^2-180*x)*ln(3)+18*x^3+180*x^2+450*x)*exp(x)+(18
*x*ln(3)^2+(-36*x^2-180*x)*ln(3)+18*x^3+180*x^2+450*x)*ln(5)-36*x*ln(3)^2+
(72*x^2+432*x)*ln(3)-36*x^3-432*x^2-1260*x)*ln(((ln(3)^2+(-2*x-10)*ln(3)+x
^2+10*x+25)*exp(x)^2+((2*ln(3)^2+(-4*x-20)*ln(3)+2*x^2+20*x+50)*ln(5)-4*ln
(3)^2+(8*x+48)*ln(3)-4*x^2-48*x-140)*exp(x)+(ln(3)^2+(-2*x-10)*ln(3)+x^2+1
0*x+25)*ln(5)^2+(-4*ln(3)^2+(8*x+48)*ln(3)-4*x^2-48*x-140)*ln(5)+4*ln(3)^2
+(-8*x-56)*ln(3)+4*x^2+56*x+196)/(ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25))^2+
(((36*x^2-180*x)*ln(3)^2+(-72*x^3+1800*x)*ln(3)+36*x^4+180*x^3-900*x^2-450
0*x)*exp(x)+(-180*x*ln(3)^2+(360*x^2+1800*x)*ln(3)-180*x^3-1800*x^2-4500*x
)*ln(5)+360*x*ln(3)^2+(-720*x^2-4320*x)*ln(3)+360*x^3+4464*x^2+12600*x)*ln
(((ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*exp(x)^2+((2*ln(3)^2+(-4*x-20)*ln(
3)+2*x^2+20*x+50)*ln(5)-4*ln(3)^2+(8*x+48)*ln(3)-4*x^2-48*x-140)*exp(x)+(l
n(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*ln(5)^2+(-4*ln(3)^2+(8*x+48)*ln(3)-4*x
^2-48*x-140)*ln(5)+4*ln(3)^2+(-8*x-56)*ln(3)+4*x^2+56*x+196)/(ln(3)^2+(-2*
x-10)*ln(3)+x^2+10*x+25))+((-180*x^2+450*x)*ln(3)^2+(360*x^3+900*x^2-4500*
x)*ln(3)-180*x^4-1350*x^3+11250*x)*exp(x)+(450*x*ln(3)^2+(-900*x^2-4500*x)
*ln(3)+450*x^3+4500*x^2+11250*x)*ln(5)-900*x*ln(3)^2+(1800*x^2+10800*x)*ln
(3)-900*x^3-11520*x^2-31500*x)/((ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*exp(
x)+(ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*ln(5)-2*ln(3)^2+(4*x+24)*ln(3)-2*
x^2-24*x-70),x,method=_RETURNVERBOSE)
```

output
```
9*ln(((ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*exp(x)^2+((2*ln(3)^2+(-4*x-20)
*ln(3)+2*x^2+20*x+50)*ln(5)-4*ln(3)^2+(8*x+48)*ln(3)-4*x^2-48*x-140)*exp(x
)+(ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*ln(5)^2+(-4*ln(3)^2+(8*x+48)*ln(3)
-4*x^2-48*x-140)*ln(5)+4*ln(3)^2+(-8*x-56)*ln(3)+4*x^2+56*x+196)/(ln(3)^2-
2*x*ln(3)+x^2-10*ln(3)+10*x+25))^2*x^2+1080*ln(3)^2*ln(x+5-ln(3))-1080*ln(
3)^2*ln(-ln(3)*exp(x)+exp(x)*x-ln(3)*ln(5)+x*ln(5)+5*exp(x)+5*ln(5)+2*ln(3
)-2*x-14)+540*ln(3)^2*ln(((ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*exp(x)^2+(
(2*ln(3)^2+(-4*x-20)*ln(3)+2*x^2+20*x+50)*ln(5)-4*ln(3)^2+(8*x+48)*ln(3)-4
*x^2-48*x-140)*exp(x)+(ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*ln(5)^2+(-4*ln
(3)^2+(8*x+48)*ln(3)-4*x^2-48*x-140)*ln(5)+4*ln(3)^2+(-8*x-56)*ln(3)+4*x^2
+56*x+196)/(ln(3)^2-2*x*ln(3)+x^2-10*ln(3)+10*x+25))-90*ln(((ln(3)^2+(-2*x
-10)*ln(3)+x^2+10*x+25)*exp(x)^2+((2*ln(3)^2+(-4*x-20)*ln(3)+2*x^2+20*x+50
)*ln(5)-4*ln(3)^2+(8*x+48)*ln(3)-4*x^2-48*x-140)*exp(x)+(ln(3)^2+(-2*x-10)
*ln(3)+x^2+10*x+25)*ln(5)^2+(-4*ln(3)^2+(8*x+48)*ln(3)-4*x^2-48*x-140)*ln(
5)+4*ln(3)^2+(-8*x-56)*ln(3)+4*x^2+56*x+196)/(ln(3)^2-2*x*ln(3)+x^2-10*ln(
3)+10*x+25))*x^2-1350*ln(3)^2-10800*ln(3)*ln(x+5-ln(3))+10800*ln(3)*ln(-ln
(3)*exp(x)+exp(x)*x-ln(3)*ln(5)+x*ln(5)+5*exp(x)+5*ln(5)+2*ln(3)-2*x-14)-5
400*ln(3)*ln(((ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*exp(x)^2+((2*ln(3)^2+(
-4*x-20)*ln(3)+2*x^2+20*x+50)*ln(5)-4*ln(3)^2+(8*x+48)*ln(3)-4*x^2-48*x-14
0)*exp(x)+(ln(3)^2+(-2*x-10)*ln(3)+x^2+10*x+25)*ln(5)^2+(-4*ln(3)^2+(8*...
```

3.982.

$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x\left(11250x-1350x^3-180x^4+(-4500x+900x^2+360x^3)\log(3)+(450x-180x\ldots\right.}{}$$

3.982.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 352 vs. $2(33) = 66$.

Time = 0.29 (sec) , antiderivative size = 352, normalized size of antiderivative = 9.78

$$\int \frac{-31500x - 11520x^2 - 900x^3 + (10800x + 1800x^2)\log(3) - 900x\log^2(3) + e^x(11250x - 1350x^3 - 180x^4}{}$$

$$= 9\,x^2 \log\left(\frac{\left(x^2 - 2\,(x+5)\log(3) + \log(3)^2 + 10\,x + 25\right)\log(5)^2 + 4\,x^2 + \left(x^2 - 2\,(x+5)\log(3) + \log(3)^2\right.}{}\right.$$
$$-90\,x^2 \log\left(\frac{\left(x^2 - 2\,(x+5)\log(3) + \log(3)^2 + 10\,x + 25\right)\log(5)^2 + 4\,x^2 + \left(x^2 - 2\,(x+5)\log(3) + \log\right.}{}\right.$$
$$+ 225\,x^2$$

input
```
integrate((((18*x*log(3)^2+(-36*x^2-180*x)*log(3)+18*x^3+180*x^2+450*x)*ex
p(x)+(18*x*log(3)^2+(-36*x^2-180*x)*log(3)+18*x^3+180*x^2+450*x)*log(5)-36
*x*log(3)^2+(72*x^2+432*x)*log(3)-36*x^3-432*x^2-1260*x)*log(((log(3)^2+(-
2*x-10)*log(3)+x^2+10*x+25)*exp(x)^2+((2*log(3)^2+(-4*x-20)*log(3)+2*x^2+2
0*x+50)*log(5)-4*log(3)^2+(8*x+48)*log(3)-4*x^2-48*x-140)*exp(x)+(log(3)^2
+(-2*x-10)*log(3)+x^2+10*x+25)*log(5)^2+(-4*log(3)^2+(8*x+48)*log(3)-4*x^2
-48*x-140)*log(5)+4*log(3)^2+(-8*x-56)*log(3)+4*x^2+56*x+196)/(log(3)^2+(-
2*x-10)*log(3)+x^2+10*x+25))^2+(((36*x^2-180*x)*log(3)^2+(-72*x^3+1800*x)*
log(3)+36*x^4+180*x^3-900*x^2-4500*x)*exp(x)+(-180*x*log(3)^2+(360*x^2+180
0*x)*log(3)-180*x^3-1800*x^2-4500*x)*log(5)+360*x*log(3)^2+(-720*x^2-4320*
x)*log(3)+360*x^3+4464*x^2+12600*x)*log(((log(3)^2+(-2*x-10)*log(3)+x^2+10
*x+25)*exp(x)^2+((2*log(3)^2+(-4*x-20)*log(3)+2*x^2+20*x+50)*log(5)-4*log(
3)^2+(8*x+48)*log(3)-4*x^2-48*x-140)*exp(x)+(log(3)^2+(-2*x-10)*log(3)+x^2
+10*x+25)*log(5)^2+(-4*log(3)^2+(8*x+48)*log(3)-4*x^2-48*x-140)*log(5)+4*l
og(3)^2+(-8*x-56)*log(3)+4*x^2+56*x+196)/(log(3)^2+(-2*x-10)*log(3)+x^2+10
*x+25))+((-180*x^2+450*x)*log(3)^2+(360*x^3+900*x^2-4500*x)*log(3)-180*x^4
-1350*x^3+11250*x)*exp(x)+(450*x*log(3)^2+(-900*x^2-4500*x)*log(3)+450*x^3
+4500*x^2+11250*x)*log(5)-900*x*log(3)^2+(1800*x^2+10800*x)*log(3)-900*x^3
-11520*x^2-31500*x)/((log(3)^2+(-2*x-10)*log(3)+x^2+10*x+25)*exp(x)+(log(3
)^2+(-2*x-10)*log(3)+x^2+10*x+25)*log(5)-2*log(3)^2+(4*x+24)*log(3)-2*x^2-
24*x-70),x, algorithm=\
```


$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x(11250x-1350x^3-180x^4+(-4500x+900x^2+360x^3)\log(3)+(450x-180x}{}$$

output
```
9*x^2*log(((x^2 - 2*(x + 5)*log(3) + log(3)^2 + 10*x + 25)*log(5)^2 + 4*x^
2 + (x^2 - 2*(x + 5)*log(3) + log(3)^2 + 10*x + 25)*e^(2*x) - 2*(2*x^2 - (
x^2 - 2*(x + 5)*log(3) + log(3)^2 + 10*x + 25)*log(5) - 4*(x + 6)*log(3) +
 2*log(3)^2 + 24*x + 70)*e^x - 4*(x^2 - 2*(x + 6)*log(3) + log(3)^2 + 12*x
 + 35)*log(5) - 8*(x + 7)*log(3) + 4*log(3)^2 + 56*x + 196)/(x^2 - 2*(x +
5)*log(3) + log(3)^2 + 10*x + 25))^2 - 90*x^2*log(((x^2 - 2*(x + 5)*log(3)
 + log(3)^2 + 10*x + 25)*log(5)^2 + 4*x^2 + (x^2 - 2*(x + 5)*log(3) + log(
3)^2 + 10*x + 25)*e^(2*x) - 2*(2*x^2 - (x^2 - 2*(x + 5)*log(3) + log(3)^2
+ 10*x + 25)*log(5) - 4*(x + 6)*log(3) + 2*log(3)^2 + 24*x + 70)*e^x - 4*(
x^2 - 2*(x + 6)*log(3) + log(3)^2 + 12*x + 35)*log(5) - 8*(x + 7)*log(3) +
 4*log(3)^2 + 56*x + 196)/(x^2 - 2*(x + 5)*log(3) + log(3)^2 + 10*x + 25))
 + 225*x^2
```

3.982.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 413 vs. $2(27) = 54$.

Time = 1.42 (sec) , antiderivative size = 413, normalized size of antiderivative = 11.47

$$\int \frac{-31500x - 11520x^2 - 900x^3 + (10800x + 1800x^2)\log(3) - 900x\log^2(3) + e^x\left(11250x - 1350x^3 - 180x^4\right.}{}$$

$$= 9x^2\log\left(\frac{4x^2 + 56x + (-8x - 56)\log(3) + \left(-4x^2 - 48x + (8x + 48)\log(3) - 140 - 4\log(3)^2\right)\log(5) +}{}\right.$$

$$-90x^2\log\left(\frac{4x^2 + 56x + (-8x - 56)\log(3) + \left(-4x^2 - 48x + (8x + 48)\log(3) - 140 - 4\log(3)^2\right)\log(5}{}\right.$$

$$+ 225x^2$$

$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x\left(11250x-1350x^3-180x^4+(-4500x+900x^2+360x^3)\log(3)+(450x-180x\right.}{}$$

input
```
integrate((((18*x*ln(3)**2+(-36*x**2-180*x)*ln(3)+18*x**3+180*x**2+450*x)*
exp(x)+(18*x*ln(3)**2+(-36*x**2-180*x)*ln(3)+18*x**3+180*x**2+450*x)*ln(5)
-36*x*ln(3)**2+(72*x**2+432*x)*ln(3)-36*x**3-432*x**2-1260*x)*ln(((ln(3)**
2+(-2*x-10)*ln(3)+x**2+10*x+25)*exp(x)**2+((2*ln(3)**2+(-4*x-20)*ln(3)+2*x
**2+20*x+50)*ln(5)-4*ln(3)**2+(8*x+48)*ln(3)-4*x**2-48*x-140)*exp(x)+(ln(3
)**2+(-2*x-10)*ln(3)+x**2+10*x+25)*ln(5)**2+(-4*ln(3)**2+(8*x+48)*ln(3)-4*
x**2-48*x-140)*ln(5)+4*ln(3)**2+(-8*x-56)*ln(3)+4*x**2+56*x+196)/(ln(3)**2
+(-2*x-10)*ln(3)+x**2+10*x+25))**2+(((36*x**2-180*x)*ln(3)**2+(-72*x**3+18
00*x)*ln(3)+36*x**4+180*x**3-900*x**2-4500*x)*exp(x)+(-180*x*ln(3)**2+(360
*x**2+1800*x)*ln(3)-180*x**3-1800*x**2-4500*x)*ln(5)+360*x*ln(3)**2+(-720*
x**2-4320*x)*ln(3)+360*x**3+4464*x**2+12600*x)*ln(((ln(3)**2+(-2*x-10)*ln(
3)+x**2+10*x+25)*exp(x)**2+((2*ln(3)**2+(-4*x-20)*ln(3)+2*x**2+20*x+50)*ln
(5)-4*ln(3)**2+(8*x+48)*ln(3)-4*x**2-48*x-140)*exp(x)+(ln(3)**2+(-2*x-10)*
ln(3)+x**2+10*x+25)*ln(5)**2+(-4*ln(3)**2+(8*x+48)*ln(3)-4*x**2-48*x-140)*
ln(5)+4*ln(3)**2+(-8*x-56)*ln(3)+4*x**2+56*x+196)/(ln(3)**2+(-2*x-10)*ln(3
)+x**2+10*x+25))+((-180*x**2+450*x)*ln(3)**2+(360*x**3+900*x**2-4500*x)*ln
(3)-180*x**4-1350*x**3+11250*x)*exp(x)+(450*x*ln(3)**2+(-900*x**2-4500*x)*
ln(3)+450*x**3+4500*x**2+11250*x)*ln(5)-900*x*ln(3)**2+(1800*x**2+10800*x)
*ln(3)-900*x**3-11520*x**2-31500*x)/((ln(3)**2+(-2*x-10)*ln(3)+x**2+10*x+2
5)*exp(x)+(ln(3)**2+(-2*x-10)*ln(3)+x**2+10*x+25)*ln(5)-2*ln(3)**2+(4*x+24
)*ln(3)-2*x**2-24*x-70),x)
```

output
```
9*x**2*log((4*x**2 + 56*x + (-8*x - 56)*log(3) + (-4*x**2 - 48*x + (8*x +
48)*log(3) - 140 - 4*log(3)**2)*log(5) + (x**2 + 10*x + (-2*x - 10)*log(3)
 + log(3)**2 + 25)*exp(2*x) + (x**2 + 10*x + (-2*x - 10)*log(3) + log(3)**
2 + 25)*log(5)**2 + (-4*x**2 - 48*x + (8*x + 48)*log(3) + (2*x**2 + 20*x +
 (-4*x - 20)*log(3) + 2*log(3)**2 + 50)*log(5) - 140 - 4*log(3)**2)*exp(x)
 + 4*log(3)**2 + 196)/(x**2 + 10*x + (-2*x - 10)*log(3) + log(3)**2 + 25))
**2 - 90*x**2*log((4*x**2 + 56*x + (-8*x - 56)*log(3) + (-4*x**2 - 48*x +
(8*x + 48)*log(3) - 140 - 4*log(3)**2)*log(5) + (x**2 + 10*x + (-2*x - 10)
*log(3) + log(3)**2 + 25)*exp(2*x) + (x**2 + 10*x + (-2*x - 10)*log(3) + l
og(3)**2 + 25)*log(5)**2 + (-4*x**2 - 48*x + (8*x + 48)*log(3) + (2*x**2 +
 20*x + (-4*x - 20)*log(3) + 2*log(3)**2 + 50)*log(5) - 140 - 4*log(3)**2)
*exp(x) + 4*log(3)**2 + 196)/(x**2 + 10*x + (-2*x - 10)*log(3) + log(3)**2
 + 25)) + 225*x**2
```

3.982.

$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x(11250x-1350x^3-180x^4+(-4500x+900x^2+360x^3)\log(3)+(450x-180x}{}$$

3.982.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 124 vs. $2(33) = 66$.

Time = 0.44 (sec) , antiderivative size = 124, normalized size of antiderivative = 3.44

$$\int \frac{-31500x - 11520x^2 - 900x^3 + (10800x + 1800x^2)\log(3) - 900x\log^2(3) + e^x(11250x - 1350x^3 - 180x^4}{}$$

$$\begin{aligned}
&= 36\,x^2 \log\left(x(\log(5) - 2) + (x - \log(3) + 5)e^x - (\log(3) - 5)\log(5) + 2\,\log(3) - 14\right)^2 \\
&\quad + 36\,x^2 \log(x - \log(3) + 5)^2 + 180\,x^2 \log(x - \log(3) + 5) + 225\,x^2 \\
&\quad - 36\left(2\,x^2 \log(x - \log(3) + 5) + 5\,x^2\right)\log\left(x(\log(5) - 2) + (x - \log(3) + 5)e^x \right. \\
&\qquad \left. - (\log(3) - 5)\log(5) + 2\,\log(3) - 14\right)
\end{aligned}$$

input
```
integrate((((18*x*log(3)^2+(-36*x^2-180*x)*log(3)+18*x^3+180*x^2+450*x)*ex
p(x)+(18*x*log(3)^2+(-36*x^2-180*x)*log(3)+18*x^3+180*x^2+450*x)*log(5)-36
*x*log(3)^2+(72*x^2+432*x)*log(3)-36*x^3-432*x^2-1260*x)*log(((log(3)^2+(-
2*x-10)*log(3)+x^2+10*x+25)*exp(x)^2+((2*log(3)^2+(-4*x-20)*log(3)+2*x^2+2
0*x+50)*log(5)-4*log(3)^2+(8*x+48)*log(3)-4*x^2-48*x-140)*exp(x)+(log(3)^2
+(-2*x-10)*log(3)+x^2+10*x+25)*log(5)^2+(-4*log(3)^2+(8*x+48)*log(3)-4*x^2
-48*x-140)*log(5)+4*log(3)^2+(-8*x-56)*log(3)+4*x^2+56*x+196)/(log(3)^2+(-
2*x-10)*log(3)+x^2+10*x+25))^2+(((36*x^2-180*x)*log(3)^2+(-72*x^3+1800*x)*
log(3)+36*x^4+180*x^3-900*x^2-4500*x)*exp(x)+(-180*x*log(3)^2+(360*x^2+180
0*x)*log(3)-180*x^3-1800*x^2-4500*x)*log(5)+360*x*log(3)^2+(-720*x^2-4320*
x)*log(3)+360*x^3+4464*x^2+12600*x)*log(((log(3)^2+(-2*x-10)*log(3)+x^2+10
*x+25)*exp(x)^2+((2*log(3)^2+(-4*x-20)*log(3)+2*x^2+20*x+50)*log(5)-4*log(
3)^2+(8*x+48)*log(3)-4*x^2-48*x-140)*exp(x)+(log(3)^2+(-2*x-10)*log(3)+x^2
+10*x+25)*log(5)^2+(-4*log(3)^2+(8*x+48)*log(3)-4*x^2-48*x-140)*log(5)+4*l
og(3)^2+(-8*x-56)*log(3)+4*x^2+56*x+196)/(log(3)^2+(-2*x-10)*log(3)+x^2+10
*x+25))+((-180*x^2+450*x)*log(3)^2+(360*x^3+900*x^2-4500*x)*log(3)-180*x^4
-1350*x^3+11250*x)*exp(x)+(450*x*log(3)^2+(-900*x^2-4500*x)*log(3)+450*x^3
+4500*x^2+11250*x)*log(5)-900*x*log(3)^2+(1800*x^2+10800*x)*log(3)-900*x^3
-11520*x^2-31500*x)/((log(3)^2+(-2*x-10)*log(3)+x^2+10*x+25)*exp(x)+(log(3
)^2+(-2*x-10)*log(3)+x^2+10*x+25)*log(5)-2*log(3)^2+(4*x+24)*log(3)-2*x^2-
24*x-70),x, algorithm=\
```

output
```
36*x^2*log(x*(log(5) - 2) + (x - log(3) + 5)*e^x - (log(3) - 5)*log(5) + 2
*log(3) - 14)^2 + 36*x^2*log(x - log(3) + 5)^2 + 180*x^2*log(x - log(3) +
5) + 225*x^2 - 36*(2*x^2*log(x - log(3) + 5) + 5*x^2)*log(x*(log(5) - 2) +
 (x - log(3) + 5)*e^x - (log(3) - 5)*log(5) + 2*log(3) - 14)
```

3.982.

$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x(11250x-1350x^3-180x^4+(-4500x+900x^2+360x^3)\log(3)+(450x-180x}{}$$

3.982.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 830 vs. $2(33) = 66$.

Time = 76.99 (sec) , antiderivative size = 830, normalized size of antiderivative = 23.06

$$\int \frac{-31500x - 11520x^2 - 900x^3 + (10800x + 1800x^2)\log(3) - 900x\log^2(3) + e^x(11250x - 1350x^3 - 180x^4}{}$$

= Too large to display

input
```
integrate((((18*x*log(3)^2+(-36*x^2-180*x)*log(3)+18*x^3+180*x^2+450*x)*ex
p(x)+(18*x*log(3)^2+(-36*x^2-180*x)*log(3)+18*x^3+180*x^2+450*x)*log(5)-36
*x*log(3)^2+(72*x^2+432*x)*log(3)-36*x^3-432*x^2-1260*x)*log(((log(3)^2+(-
2*x-10)*log(3)+x^2+10*x+25)*exp(x)^2+((2*log(3)^2+(-4*x-20)*log(3)+2*x^2+2
0*x+50)*log(5)-4*log(3)^2+(8*x+48)*log(3)-4*x^2-48*x-140)*exp(x)+(log(3)^2
+(-2*x-10)*log(3)+x^2+10*x+25)*log(5)^2+(-4*log(3)^2+(8*x+48)*log(3)-4*x^2
-48*x-140)*log(5)+4*log(3)^2+(-8*x-56)*log(3)+4*x^2+56*x+196)/(log(3)^2+(-
2*x-10)*log(3)+x^2+10*x+25))^2+(((36*x^2-180*x)*log(3)^2+(-72*x^3+1800*x)*
log(3)+36*x^4+180*x^3-900*x^2-4500*x)*exp(x)+(-180*x*log(3)^2+(360*x^2+180
0*x)*log(3)-180*x^3-1800*x^2-4500*x)*log(5)+360*x*log(3)^2+(-720*x^2-4320*
x)*log(3)+360*x^3+4464*x^2+12600*x)*log(((log(3)^2+(-2*x-10)*log(3)+x^2+10
*x+25)*exp(x)^2+((2*log(3)^2+(-4*x-20)*log(3)+2*x^2+20*x+50)*log(5)-4*log(
3)^2+(8*x+48)*log(3)-4*x^2-48*x-140)*exp(x)+(log(3)^2+(-2*x-10)*log(3)+x^2
+10*x+25)*log(5)^2+(-4*log(3)^2+(8*x+48)*log(3)-4*x^2-48*x-140)*log(5)+4*l
og(3)^2+(-8*x-56)*log(3)+4*x^2+56*x+196)/(log(3)^2+(-2*x-10)*log(3)+x^2+10
*x+25))+((-180*x^2+450*x)*log(3)^2+(360*x^3+900*x^2-4500*x)*log(3)-180*x^4
-1350*x^3+11250*x)*exp(x)+(450*x*log(3)^2+(-900*x^2-4500*x)*log(3)+450*x^3
+4500*x^2+11250*x)*log(5)-900*x*log(3)^2+(1800*x^2+10800*x)*log(3)-900*x^3
-11520*x^2-31500*x)/((log(3)^2+(-2*x-10)*log(3)+x^2+10*x+25)*exp(x)+(log(3
)^2+(-2*x-10)*log(3)+x^2+10*x+25)*log(5)-2*log(3)^2+(4*x+24)*log(3)-2*x^2-
24*x-70),x, algorithm=\
```


$$\int \frac{-31500x - 11520x^2 - 900x^3 + (10800x + 1800x^2)\log(3) - 900x\log^2(3) + e^x(11250x - 1350x^3 - 180x^4 + (-4500x + 900x^2 + 360x^3)\log(3) + (450x - 180x}{}$$

output
```
9*x^2*log(2*x^2*e^x*log(5) + x^2*log(5)^2 - 4*x*e^x*log(5)*log(3) - 2*x*lo
g(5)^2*log(3) + 2*e^x*log(5)*log(3)^2 + log(5)^2*log(3)^2 + x^2*e^(2*x) -
4*x^2*e^x - 4*x^2*log(5) + 20*x*e^x*log(5) + 10*x*log(5)^2 - 2*x*e^(2*x)*l
og(3) + 8*x*e^x*log(3) + 8*x*log(5)*log(3) - 20*e^x*log(5)*log(3) - 10*log
(5)^2*log(3) + e^(2*x)*log(3)^2 - 4*e^x*log(3)^2 - 4*log(5)*log(3)^2 + 4*x
^2 + 10*x*e^(2*x) - 48*x*e^x - 48*x*log(5) + 50*e^x*log(5) + 25*log(5)^2 -
 8*x*log(3) - 10*e^(2*x)*log(3) + 48*e^x*log(3) + 48*log(5)*log(3) + 4*log
(3)^2 + 56*x + 25*e^(2*x) - 140*e^x - 140*log(5) - 56*log(3) + 196)^2 - 18
*x^2*log(2*x^2*e^x*log(5) + x^2*log(5)^2 - 4*x*e^x*log(5)*log(3) - 2*x*log
(5)^2*log(3) + 2*e^x*log(5)*log(3)^2 + log(5)^2*log(3)^2 + x^2*e^(2*x) - 4
*x^2*e^x - 4*x^2*log(5) + 20*x*e^x*log(5) + 10*x*log(5)^2 - 2*x*e^(2*x)*lo
g(3) + 8*x*e^x*log(3) + 8*x*log(5)*log(3) - 20*e^x*log(5)*log(3) - 10*log(
5)^2*log(3) + e^(2*x)*log(3)^2 - 4*e^x*log(3)^2 - 4*log(5)*log(3)^2 + 4*x^
2 + 10*x*e^(2*x) - 48*x*e^x - 48*x*log(5) + 50*e^x*log(5) + 25*log(5)^2 -
8*x*log(3) - 10*e^(2*x)*log(3) + 48*e^x*log(3) + 48*log(5)*log(3) + 4*log(
3)^2 + 56*x + 25*e^(2*x) - 140*e^x - 140*log(5) - 56*log(3) + 196)*log(x^2
 - 2*x*log(3) + log(3)^2 + 10*x - 10*log(3) + 25) + 9*x^2*log(x^2 - 2*x*lo
g(3) + log(3)^2 + 10*x - 10*log(3) + 25)^2 - 90*x^2*log(2*x^2*e^x*log(5) +
 x^2*log(5)^2 - 4*x*e^x*log(5)*log(3) - 2*x*log(5)^2*log(3) + 2*e^x*log(5)
*log(3)^2 + log(5)^2*log(3)^2 + x^2*e^(2*x) - 4*x^2*e^x - 4*x^2*log(5) ...
```

3.982.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-31500x - 11520x^2 - 900x^3 + (10800x + 1800x^2)\log(3) - 900x\log^2(3) + e^x(11250x - 1350x^3 - 180x^4 \cdots}{\cdots}$$

= Too large to display

input
```
int((31500*x + log((56*x - log(3)*(8*x + 56) + log(5)^2*(10*x - log(3)*(2*
x + 10) + log(3)^2 + x^2 + 25) - exp(x)*(48*x - log(3)*(8*x + 48) - log(5)
*(20*x - log(3)*(4*x + 20) + 2*log(3)^2 + 2*x^2 + 50) + 4*log(3)^2 + 4*x^2
 + 140) - log(5)*(48*x - log(3)*(8*x + 48) + 4*log(3)^2 + 4*x^2 + 140) + e
xp(2*x)*(10*x - log(3)*(2*x + 10) + log(3)^2 + x^2 + 25) + 4*log(3)^2 + 4*
x^2 + 196)/(10*x - log(3)*(2*x + 10) + log(3)^2 + x^2 + 25))^2*(1260*x - l
og(3)*(432*x + 72*x^2) - log(5)*(450*x - log(3)*(180*x + 36*x^2) + 18*x*lo
g(3)^2 + 180*x^2 + 18*x^3) + 36*x*log(3)^2 - exp(x)*(450*x - log(3)*(180*x
 + 36*x^2) + 18*x*log(3)^2 + 180*x^2 + 18*x^3) + 432*x^2 + 36*x^3) - log(3
)*(10800*x + 1800*x^2) - log(5)*(11250*x - log(3)*(4500*x + 900*x^2) + 450
*x*log(3)^2 + 4500*x^2 + 450*x^3) + 900*x*log(3)^2 + 11520*x^2 + 900*x^3 -
 log((56*x - log(3)*(8*x + 56) + log(5)^2*(10*x - log(3)*(2*x + 10) + log(
3)^2 + x^2 + 25) - exp(x)*(48*x - log(3)*(8*x + 48) - log(5)*(20*x - log(3
)*(4*x + 20) + 2*log(3)^2 + 2*x^2 + 50) + 4*log(3)^2 + 4*x^2 + 140) - log(
5)*(48*x - log(3)*(8*x + 48) + 4*log(3)^2 + 4*x^2 + 140) + exp(2*x)*(10*x
- log(3)*(2*x + 10) + log(3)^2 + x^2 + 25) + 4*log(3)^2 + 4*x^2 + 196)/(10
*x - log(3)*(2*x + 10) + log(3)^2 + x^2 + 25))*(12600*x - log(3)*(4320*x +
 720*x^2) - log(5)*(4500*x - log(3)*(1800*x + 360*x^2) + 180*x*log(3)^2 +
1800*x^2 + 180*x^3) + 360*x*log(3)^2 + 4464*x^2 + 360*x^3 - exp(x)*(4500*x
 - log(3)*(1800*x - 72*x^3) + log(3)^2*(180*x - 36*x^2) + 900*x^2 - 180*x^
3 - 36*x^4)) - exp(x)*(11250*x + log(3)*(900*x^2 - 4500*x + 360*x^3) + log
(3)^2*(450*x - 180*x^2) - 1350*x^3 - 180*x^4))/(24*x - log(3)*(4*x + 24) -
 exp(x)*(10*x - log(3)*(2*x + 10) + log(3)^2 + x^2 + 25) - log(5)*(10*x -
log(3)*(2*x + 10) + log(3)^2 + x^2 + 25) + 2*log(3)^2 + 2*x^2 + 70),x)
```

3.982.

$$\int \frac{-31500x-11520x^2-900x^3+\left(10800x+1800x^2\right)\log(3)-900x\log^2(3)+e^x\left(11250x-1350x^3-180x^4+\left(-4500x+900x^2+360x^3\right)\log(3)+\left(450x-180x\right.\right.}{}$$

output
```
int((31500*x + log((56*x - log(3)*(8*x + 56) + log(5)^2*(10*x - log(3)*(2*
x + 10) + log(3)^2 + x^2 + 25) - exp(x)*(48*x - log(3)*(8*x + 48) - log(5)
*(20*x - log(3)*(4*x + 20) + 2*log(3)^2 + 2*x^2 + 50) + 4*log(3)^2 + 4*x^2
 + 140) - log(5)*(48*x - log(3)*(8*x + 48) + 4*log(3)^2 + 4*x^2 + 140) + e
xp(2*x)*(10*x - log(3)*(2*x + 10) + log(3)^2 + x^2 + 25) + 4*log(3)^2 + 4*
x^2 + 196)/(10*x - log(3)*(2*x + 10) + log(3)^2 + x^2 + 25))^2*(1260*x - l
og(3)*(432*x + 72*x^2) - log(5)*(450*x - log(3)*(180*x + 36*x^2) + 18*x*lo
g(3)^2 + 180*x^2 + 18*x^3) + 36*x*log(3)^2 - exp(x)*(450*x - log(3)*(180*x
 + 36*x^2) + 18*x*log(3)^2 + 180*x^2 + 18*x^3) + 432*x^2 + 36*x^3) - log(3
)*(10800*x + 1800*x^2) - log(5)*(11250*x - log(3)*(4500*x + 900*x^2) + 450
*x*log(3)^2 + 4500*x^2 + 450*x^3) + 900*x*log(3)^2 + 11520*x^2 + 900*x^3 -
 log((56*x - log(3)*(8*x + 56) + log(5)^2*(10*x - log(3)*(2*x + 10) + log(
3)^2 + x^2 + 25) - exp(x)*(48*x - log(3)*(8*x + 48) - log(5)*(20*x - log(3
)*(4*x + 20) + 2*log(3)^2 + 2*x^2 + 50) + 4*log(3)^2 + 4*x^2 + 140) - log(
5)*(48*x - log(3)*(8*x + 48) + 4*log(3)^2 + 4*x^2 + 140) + exp(2*x)*(10*x
- log(3)*(2*x + 10) + log(3)^2 + x^2 + 25) + 4*log(3)^2 + 4*x^2 + 196)/(10
*x - log(3)*(2*x + 10) + log(3)^2 + x^2 + 25))*(12600*x - log(3)*(4320*x +
 720*x^2) - log(5)*(4500*x - log(3)*(1800*x + 360*x^2) + 180*x*log(3)^2 +
1800*x^2 + 180*x^3) + 360*x*log(3)^2 + 4464*x^2 + 360*x^3 - exp(x)*(4500*x
 - log(3)*(1800*x - 72*x^3) + log(3)^2*(180*x - 36*x^2) + 900*x^2 - 180...
```

3.982.

$$\int \frac{-31500x-11520x^2-900x^3+(10800x+1800x^2)\log(3)-900x\log^2(3)+e^x\left(11250x-1350x^3-180x^4+\left(-4500x+900x^2+360x^3\right)\log(3)+\left(450x-180\ldots\right.\right.}{\ldots}$$

3.983 $\int \frac{-1+4x+x^2-x\log(x}{-9x^3-3x^4+3x^3\log(x)+(-18x^2-6x^3+6x^2\log(x))\log\left(\frac{1}{5}(3+x-\log(x\right.}$

3.983.1 Optimal result

Integrand size = 94, antiderivative size = 22

$$\int \frac{-1+4x+x^2-x\log(x)}{-9x^3-3x^4+3x^3\log(x)+(-18x^2-6x^3+6x^2\log(x))\log\left(\frac{1}{5}(3+x-\log(x))\right)+(-9x-3x^2+3x\log(x}$$

$$=25+\frac{1}{3\left(x+\log\left(\frac{1}{5}(3+x-\log(x))\right)\right)}$$

output
```
25+4/3/(4*x+4*ln(-1/5*ln(x)+3/5+1/5*x))
```

3.983.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-1+4x+x^2-x\log(x)}{-9x^3-3x^4+3x^3\log(x)+(-18x^2-6x^3+6x^2\log(x))\log\left(\frac{1}{5}(3+x-\log(x))\right)+(-9x-3x^2+3x\log(x}$$

$$=\frac{1}{3\left(x+\log\left(\frac{1}{5}(3+x-\log(x))\right)\right)}$$

input
```
Integrate[(-1 + 4*x + x^2 - x*Log[x])/(-9*x^3 - 3*x^4 + 3*x^3*Log[x] + (-1
8*x^2 - 6*x^3 + 6*x^2*Log[x])*Log[(3 + x - Log[x])/5] + (-9*x - 3*x^2 + 3*
x*Log[x])*Log[(3 + x - Log[x])/5]^2),x]
```

output
```
1/(3*(x + Log[(3 + x - Log[x])/5]))
```

3.983. $\int \frac{-1+4x+x^2-x\log(x)}{-9x^3-3x^4+3x^3\log(x)+(-18x^2-6x^3+6x^2\log(x))\log\left(\frac{1}{5}(3+x-\log(x))\right)+(-9x-3x^2+3x\log(x))\log^2\left(\frac{1}{5}(3+x-\log(x))\right)}\,dx$

3.983.3 Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.032$, Rules used = {7239, 27, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+4x-x\log(x)-1}{-3x^4-9x^3+3x^3\log(x)+(-3x^2-9x+3x\log(x))\log^2\left(\frac{1}{5}(x-\log(x)+3)\right)+(-6x^3-18x^2+6x^2\log(x))\log$$

$$\Big\downarrow 7239$$

$$\int \frac{-x^2-4x+x\log(x)+1}{3x(x-\log(x)+3)\left(x+\log\left(\frac{1}{5}(x-\log(x)+3)\right)\right)^2}dx$$

$$\Big\downarrow 27$$

$$\frac{1}{3}\int \frac{-x^2+\log(x)x-4x+1}{x(x-\log(x)+3)\left(x+\log\left(\frac{1}{5}(x-\log(x)+3)\right)\right)^2}dx$$

$$\Big\downarrow 7237$$

$$\frac{1}{3\left(x+\log\left(\frac{1}{5}(x-\log(x)+3)\right)\right)}$$

input
```
Int[(-1 + 4*x + x^2 - x*Log[x])/(-9*x^3 - 3*x^4 + 3*x^3*Log[x] + (-18*x^2
- 6*x^3 + 6*x^2*Log[x])*Log[(3 + x - Log[x])/5] + (-9*x - 3*x^2 + 3*x*Log[
x])*Log[(3 + x - Log[x])/5]^2),x]
```

output
```
1/(3*(x + Log[(3 + x - Log[x])/5]))
```

3.983.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.983.4 Maple [A] (verified)

Time = 1.40 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

method	result	size
risch	$\frac{1}{3\ln\left(-\frac{\ln(x)}{5}+\frac{3}{5}+\frac{x}{5}\right)+3x}$	17
parallelrisch	$\frac{1}{3\ln\left(-\frac{\ln(x)}{5}+\frac{3}{5}+\frac{x}{5}\right)+3x}$	17
default	$-\frac{1}{3(\ln(5)-x-\ln(-\ln(x)+3+x))}$	21

input
```
int((-x*ln(x)+x^2+4*x-1)/((3*x*ln(x)-3*x^2-9*x)*ln(-1/5*ln(x)+3/5+1/5*x)^2
+(6*x^2*ln(x)-6*x^3-18*x^2)*ln(-1/5*ln(x)+3/5+1/5*x)+3*x^3*ln(x)-3*x^4-9*x
^3),x,method=_RETURNVERBOSE)
```

output
```
1/3/(ln(-1/5*ln(x)+3/5+1/5*x)+x)
```

3.983.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{-1+4x+x^2-x\log(x)}{-9x^3-3x^4+3x^3\log(x)+(-18x^2-6x^3+6x^2\log(x))\log\left(\frac{1}{5}(3+x-\log(x))\right)+(-9x-3x^2+3x\log(x)) \log^2\left(\frac{1}{5}(3+x-\log(x))\right)}\,dx = \frac{1}{3\left(x+\log\left(\frac{1}{5}\,x-\frac{1}{5}\,\log\left(x\right)+\frac{3}{5}\right)\right)}$$

input
```
integrate((-x*log(x)+x^2+4*x-1)/((3*x*log(x)-3*x^2-9*x)*log(-1/5*log(x)+3/
5+1/5*x)^2+(6*x^2*log(x)-6*x^3-18*x^2)*log(-1/5*log(x)+3/5+1/5*x)+3*x^3*lo
g(x)-3*x^4-9*x^3),x, algorithm=\
```

output
```
1/3/(x + log(1/5*x - 1/5*log(x) + 3/5))
```

3.983.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{-1+4x+x^2-x\log(x)}{-9x^3-3x^4+3x^3\log(x)+\left(-18x^2-6x^3+6x^2\log(x)\right)\log\left(\frac{1}{5}(3+x-\log(x))\right)+\left(-9x-3x^2+3x\log(x\right.}$$
$$=\frac{1}{3x+3\log\left(\frac{x}{5}-\frac{\log(x)}{5}+\frac{3}{5}\right)}$$

input
```
integrate((-x*ln(x)+x**2+4*x-1)/((3*x*ln(x)-3*x**2-9*x)*ln(-1/5*ln(x)+3/5+
1/5*x)**2+(6*x**2*ln(x)-6*x**3-18*x**2)*ln(-1/5*ln(x)+3/5+1/5*x)+3*x**3*ln
(x)-3*x**4-9*x**3),x)
```

output
```
1/(3*x + 3*log(x/5 - log(x)/5 + 3/5))
```

3.983.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-1+4x+x^2-x\log(x)}{-9x^3-3x^4+3x^3\log(x)+\left(-18x^2-6x^3+6x^2\log(x)\right)\log\left(\frac{1}{5}(3+x-\log(x))\right)+\left(-9x-3x^2+3x\log(x\right.}$$
$$=\frac{1}{3\left(x-\log(5)+\log(x-\log(x)+3)\right)}$$

input
```
integrate((-x*log(x)+x^2+4*x-1)/((3*x*log(x)-3*x^2-9*x)*log(-1/5*log(x)+3/
5+1/5*x)^2+(6*x^2*log(x)-6*x^3-18*x^2)*log(-1/5*log(x)+3/5+1/5*x)+3*x^3*lo
g(x)-3*x^4-9*x^3),x, algorithm=\
```

output
```
1/3/(x - log(5) + log(x - log(x) + 3))
```

3.983.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-1+4x+x^2-x\log(x)}{-9x^3-3x^4+3x^3\log(x)+(-18x^2-6x^3+6x^2\log(x))\log\left(\frac{1}{5}(3+x-\log(x))\right)+(-9x-3x^2+3x\log(x)$$

$$=\frac{1}{3\left(x-\log\left(5\right)+\log\left(x-\log\left(x\right)+3\right)\right)}$$

input
```
integrate((-x*log(x)+x^2+4*x-1)/((3*x*log(x)-3*x^2-9*x)*log(-1/5*log(x)+3/
5+1/5*x)^2+(6*x^2*log(x)-6*x^3-18*x^2)*log(-1/5*log(x)+3/5+1/5*x)+3*x^3*lo
g(x)-3*x^4-9*x^3),x, algorithm=\
```

output
```
1/3/(x - log(5) + log(x - log(x) + 3))
```

3.983.9 Mupad [B] (verification not implemented)

Time = 15.90 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-1+4x+x^2-x\log(x)}{-9x^3-3x^4+3x^3\log(x)+(-18x^2-6x^3+6x^2\log(x))\log\left(\frac{1}{5}(3+x-\log(x))\right)+(-9x-3x^2+3x\log(x)$$

$$=\frac{1}{3\left(x+\ln\left(\frac{x}{5}-\frac{\ln(x)}{5}+\frac{3}{5}\right)\right)}$$

input
```
int(-(4*x - x*log(x) + x^2 - 1)/(log(x/5 - log(x)/5 + 3/5)*(18*x^2 - 6*x^2
*log(x) + 6*x^3) - 3*x^3*log(x) + log(x/5 - log(x)/5 + 3/5)^2*(9*x - 3*x*l
og(x) + 3*x^2) + 9*x^3 + 3*x^4),x)
```

output
```
1/(3*(x + log(x/5 - log(x)/5 + 3/5)))
```

3.984 $\int \left(18+2x+e^3(-18-42x-6x^2)+e^6(4x+10x^2\right.$ -

3.984.1 Optimal result

Integrand size = 73, antiderivative size = 18

$$\int \left(18+2x+e^3\left(-18-42x-6x^2\right)+e^6\left(4x+10x^2+4x^3\right)+\left(e^3(18+4x)+e^6\left(-6x-6x^2\right)\right)\log(x)+2e^6x\log^2(x)\right)\,dx=\left(9+x-e^3x(2+x-\log(x))\right)^2$$

output
```
(9+x-exp(3)*(2-ln(x)+x)*x)^2
```

3.984.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 101 vs. 2(18) = 36.

Time = 0.02 (sec) , antiderivative size = 101, normalized size of antiderivative = 5.61

$$\int \left(18+2x+e^3\left(-18-42x-6x^2\right)+e^6\left(4x+10x^2+4x^3\right)+\left(e^3(18+4x)+e^6\left(-6x-6x^2\right)\right)\log(x)+2e^6x\log^2(x)\right)\,dx=18x-36e^3x+x^2-22e^3x^2+4e^6x^2-2e^3x^3+4e^6x^3+e^6x^4+18e^3x\log(x)+2e^3x^2\log(x)-4e^6x^2\log(x)-2e^6x^3\log(x)+e^6x^2\log^2(x)$$

input
```
Integrate[18 + 2*x + E^3*(-18 - 42*x - 6*x^2) + E^6*(4*x + 10*x^2 + 4*x^3)
 + (E^3*(18 + 4*x) + E^6*(-6*x - 6*x^2))*Log[x] + 2*E^6*x*Log[x]^2,x]
```

output
```
18*x - 36*E^3*x + x^2 - 22*E^3*x^2 + 4*E^6*x^2 - 2*E^3*x^3 + 4*E^6*x^3 + E
^6*x^4 + 18*E^3*x*Log[x] + 2*E^3*x^2*Log[x] - 4*E^6*x^2*Log[x] - 2*E^6*x^3
*Log[x] + E^6*x^2*Log[x]^2
```

3.984.
$\int \left(18+2x+e^3(-18-42x-6x^2)+e^6(4x+10x^2+4x^3)+(e^3(18+4x)+e^6(-6x-6x^2))\log(x)+2e^6x\,\mathrm{l}\right.$

3.984.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 126 vs. 2(18) = 36.

Time = 0.27 (sec) , antiderivative size = 126, normalized size of antiderivative = 7.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.014$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^3\left(-6x^2-42x-18\right)+\left(e^6\left(-6x^2-6x\right)+e^3(4x+18)\right)\log(x)+e^6\left(4x^3+10x^2+4x\right)+2x+2e^6x\log^2(x)+\right.$$

$$\Big\downarrow \, 2009$$

$$e^6x^4+4e^6x^3-2e^3x^3-2e^6x^3\log(x)-\frac{1}{2}e^3\left(2-3e^3\right)x^2+\frac{5e^6x^2}{2}-21e^3x^2+x^2+e^6x^2\log^2(x)+ e^3\left(2-3e^3\right)x^2\log(x)-e^6x^2\log(x)-36e^3x+18x+18e^3x\log(x)$$

input
```
Int[18 + 2*x + E^3*(-18 - 42*x - 6*x^2) + E^6*(4*x + 10*x^2 + 4*x^3) + (E^
3*(18 + 4*x) + E^6*(-6*x - 6*x^2))*Log[x] + 2*E^6*x*Log[x]^2,x]
```

output
```
18*x - 36*E^3*x + x^2 - 21*E^3*x^2 + (5*E^6*x^2)/2 - (E^3*(2 - 3*E^3)*x^2)
/2 - 2*E^3*x^3 + 4*E^6*x^3 + E^6*x^4 + 18*E^3*x*Log[x] - E^6*x^2*Log[x] +
E^3*(2 - 3*E^3)*x^2*Log[x] - 2*E^6*x^3*Log[x] + E^6*x^2*Log[x]^2
```

3.984.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.984.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 90 vs. 2(17) = 34.

Time = 0.22 (sec) , antiderivative size = 91, normalized size of antiderivative = 5.06

method	result
risch	$e^6x^2\ln(x)^2 - 2x^3e^6\ln(x) + e^6x^4 - 4\ln(x)e^6x^2 + 4x^3e^6 + 2\ln(x)e^3x^2 + 4x^2e^6 - 2x^3e^3 + 1$
norman	$e^6x^4 + (18 - 36e^3)x + (4e^6 - 2e^3)x^3 + (1 + 4e^6 - 22e^3)x^2 + e^6x^2\ln(x)^2 + (-4e^6 + 2e^3$
parallelrisch	$e^6x^2\ln(x)^2 - 2x^3e^6\ln(x) + e^6x^4 - 4\ln(x)e^6x^2 + 4x^3e^6 + 2\ln(x)e^3x^2 + 4x^2e^6 - 2x^3e^3 + 1$
default	$18x - 6e^6\left(\frac{x^3\ln(x)}{3} - \frac{x^3}{9}\right) - 6e^6\left(\frac{x^2\ln(x)}{2} - \frac{x^2}{4}\right) + 4e^3\left(\frac{x^2\ln(x)}{2} - \frac{x^2}{4}\right) + 18e^3(x\ln(x) - x) + 6$
parts	$18x - 6e^6\left(\frac{x^3\ln(x)}{3} - \frac{x^3}{9}\right) - 6e^6\left(\frac{x^2\ln(x)}{2} - \frac{x^2}{4}\right) + 4e^3\left(\frac{x^2\ln(x)}{2} - \frac{x^2}{4}\right) + 18e^3(x\ln(x) - x) + x$

input
```
int(2*x*exp(3)^2*ln(x)^2+((-6*x^2-6*x)*exp(3)^2+(4*x+18)*exp(3))*ln(x)+(4*
x^3+10*x^2+4*x)*exp(3)^2+(-6*x^2-42*x-18)*exp(3)+2*x+18,x,method=_RETURNVE
RBOSE)
```

output
```
exp(6)*x^2*ln(x)^2-2*x^3*exp(6)*ln(x)+exp(6)*x^4-4*ln(x)*exp(6)*x^2+4*x^3*
exp(6)+2*ln(x)*exp(3)*x^2+4*x^2*exp(6)-2*x^3*exp(3)+18*x*exp(3)*ln(x)-22*x
^2*exp(3)-36*x*exp(3)+x^2+18*x
```

3.984.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. $2(18) = 36$.

Time = 0.28 (sec) , antiderivative size = 78, normalized size of antiderivative = 4.33

$$\int \left(18+2x+e^3(-18-42x-6x^2)+e^6(4x+10x^2+4x^3)+(e^3(18+4x)+e^6(-6x-6x^2))\log(x) + 2e^6x\log^2(x)\right) dx = x^2e^6\log(x)^2 + x^2 + (x^4+4x^3+4x^2)e^6 - 2(x^3+11x^2+18x)e^3 - 2((x^3+2x^2)e^6 - (x^2+9x)e^3)\log(x) + 18x$$

input
```
integrate(2*x*exp(3)^2*log(x)^2+((-6*x^2-6*x)*exp(3)^2+(4*x+18)*exp(3))*lo
g(x)+(4*x^3+10*x^2+4*x)*exp(3)^2+(-6*x^2-42*x-18)*exp(3)+2*x+18,x, algorit
hm=\
```

output
```
x^2*e^6*log(x)^2 + x^2 + (x^4 + 4*x^3 + 4*x^2)*e^6 - 2*(x^3 + 11*x^2 + 18*
x)*e^3 - 2*((x^3 + 2*x^2)*e^6 - (x^2 + 9*x)*e^3)*log(x) + 18*x
```

3.984.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 90 vs. $2(15) = 30$.

Time = 0.13 (sec) , antiderivative size = 90, normalized size of antiderivative = 5.00

$$\int \left(18+2x+e^3\left(-18-42x-6x^2\right)+e^6\left(4x+10x^2+4x^3\right)+\left(e^3(18+4x)+e^6\left(-6x-6x^2\right)\right)\log(x)+2e^6x\log^2(x)\right)dx = x^4e^6+x^3\left(-2e^3+4e^6\right)+x^2e^6\log(x)^2+x^2\left(-22e^3+1+4e^6\right)+x\left(18-36e^3\right)+\left(-2x^3e^6-4x^2e^6+2x^2e^3+18xe^3\right)\log(x)$$

input
```
integrate(2*x*exp(3)**2*ln(x)**2+((-6*x**2-6*x)*exp(3)**2+(4*x+18)*exp(3))
*ln(x)+(4*x**3+10*x**2+4*x)*exp(3)**2+(-6*x**2-42*x-18)*exp(3)+2*x+18,x)
```

output
```
x**4*exp(6) + x**3*(-2*exp(3) + 4*exp(6)) + x**2*exp(6)*log(x)**2 + x**2*(
-22*exp(3) + 1 + 4*exp(6)) + x*(18 - 36*exp(3)) + (-2*x**3*exp(6) - 4*x**2
*exp(6) + 2*x**2*exp(3) + 18*x*exp(3))*log(x)
```

3.984.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 120 vs. $2(18) = 36$.

Time = 0.19 (sec) , antiderivative size = 120, normalized size of antiderivative = 6.67

$$\int \left(18+2x+e^3\left(-18-42x-6x^2\right)+e^6\left(4x+10x^2+4x^3\right)+\left(e^3(18+4x)+e^6\left(-6x-6x^2\right)\right)\log(x)+2e^6x\log^2(x)\right)dx = \frac{1}{2}\left(2\log(x)^2-2\log(x)+1\right)x^2e^6+\frac{2}{3}x^3e^6+\frac{1}{2}x^2\left(3e^6-2e^3\right)+x^2+\frac{1}{3}\left(3x^4+10x^3+6x^2\right)e^6-\left(2x^3+21x^2+18x\right)e^3-18xe^3-\left(\left(2x^3+3x^2\right)e^6-2\left(x^2+9x\right)e^3\right)\log(x)+18x$$

input
```
integrate(2*x*exp(3)^2*log(x)^2+((-6*x^2-6*x)*exp(3)^2+(4*x+18)*exp(3))*lo
g(x)+(4*x^3+10*x^2+4*x)*exp(3)^2+(-6*x^2-42*x-18)*exp(3)+2*x+18,x, algorit
hm=\
```

output
```
1/2*(2*log(x)^2 - 2*log(x) + 1)*x^2*e^6 + 2/3*x^3*e^6 + 1/2*x^2*(3*e^6 - 2
*e^3) + x^2 + 1/3*(3*x^4 + 10*x^3 + 6*x^2)*e^6 - (2*x^3 + 21*x^2 + 18*x)*e
^3 - 18*x*e^3 - ((2*x^3 + 3*x^2)*e^6 - 2*(x^2 + 9*x)*e^3)*log(x) + 18*x
```

3.984.
$\int \left(18+2x+e^3(-18-42x-6x^2)+e^6(4x+10x^2+4x^3)+(e^3(18+4x)+e^6(-6x-6x^2))\log(x)+2e^6x\,\mathrm{l}\right.$

3.984.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 129 vs. $2(18) = 36$.

Time = 0.28 (sec) , antiderivative size = 129, normalized size of antiderivative = 7.17

$$\int \left(18+2x+e^3\left(-18-42x-6x^2\right)+e^6\left(4x+10x^2+4x^3\right)+\left(e^3(18+4x)+e^6\left(-6x-6x^2\right)\right)\log(x)+2e^6x\log^2(x)\right)\,dx = -2\,x^3e^6\log\left(x\right)+\frac{2}{3}\,x^3e^6-3\,x^2e^6\log\left(x\right)+2\,x^2e^3\log\left(x\right)+\frac{3}{2}\,x^2e^6-x^2e^3+18\,xe^3\log\left(x\right)+x^2+\frac{1}{3}\left(3\,x^4+10\,x^3+6\,x^2\right)e^6+\frac{1}{2}\left(2\,x^2\log\left(x\right)^2-2\,x^2\log\left(x\right)+x^2\right)e^6-\left(2\,x^3+21\,x^2+18\,x\right)e^3-18\,xe^3+18\,x$$

input
```
integrate(2*x*exp(3)^2*log(x)^2+((-6*x^2-6*x)*exp(3)^2+(4*x+18)*exp(3))*lo
g(x)+(4*x^3+10*x^2+4*x)*exp(3)^2+(-6*x^2-42*x-18)*exp(3)+2*x+18,x, algorit
hm=\
```

output
```
-2*x^3*e^6*log(x) + 2/3*x^3*e^6 - 3*x^2*e^6*log(x) + 2*x^2*e^3*log(x) + 3/
2*x^2*e^6 - x^2*e^3 + 18*x*e^3*log(x) + x^2 + 1/3*(3*x^4 + 10*x^3 + 6*x^2)
*e^6 + 1/2*(2*x^2*log(x)^2 - 2*x^2*log(x) + x^2)*e^6 - (2*x^3 + 21*x^2 + 1
8*x)*e^3 - 18*x*e^3 + 18*x
```

3.984.9 Mupad [B] (verification not implemented)

Time = 15.22 (sec) , antiderivative size = 74, normalized size of antiderivative = 4.11

$$\int \left(18+2x+e^3\left(-18-42x-6x^2\right)+e^6\left(4x+10x^2+4x^3\right)+\left(e^3(18+4x)+e^6\left(-6x-6x^2\right)\right)\log(x)+2e^6x\log^2(x)\right)\,dx = x^2\left(\mathrm{e}^6\ln\left(x\right)^2+\left(2\,\mathrm{e}^3-4\,\mathrm{e}^6\right)\,\ln\left(x\right)-22\,\mathrm{e}^3+4\,\mathrm{e}^6+1\right)+x^4\,\mathrm{e}^6+x\left(18\,\mathrm{e}^3\,\ln\left(x\right)-36\,\mathrm{e}^3+18\right)-x^3\left(2\,\mathrm{e}^3-4\,\mathrm{e}^6+2\,\mathrm{e}^6\,\ln\left(x\right)\right)$$

input
```
int(2*x - exp(3)*(42*x + 6*x^2 + 18) + exp(6)*(4*x + 10*x^2 + 4*x^3) - log
(x)*(exp(6)*(6*x + 6*x^2) - exp(3)*(4*x + 18)) + 2*x*exp(6)*log(x)^2 + 18,
x)
```

output
```
x^2*(4*exp(6) - 22*exp(3) + exp(6)*log(x)^2 + log(x)*(2*exp(3) - 4*exp(6))
 + 1) + x^4*exp(6) + x*(18*exp(3)*log(x) - 36*exp(3) + 18) - x^3*(2*exp(3)
 - 4*exp(6) + 2*exp(6)*log(x))
```

3.985 $\int \left(98-196x+e^{4x^2}\left(98+784x^2\right)\right)\,dx$

3.985.1 Optimal result

Integrand size = 20, antiderivative size = 17

$$\int \left(98-196x+e^{4x^2}\left(98+784x^2\right)\right)\,dx=98\left(x+\left(e^{4x^2}-x\right)x\right)$$

output
```
98*x+98*(exp(4*x^2)-x)*x
```

3.985.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \left(98-196x+e^{4x^2}\left(98+784x^2\right)\right)\,dx=98\left(x+e^{4x^2}x-x^2\right)$$

input
```
Integrate[98 - 196*x + E^(4*x^2)*(98 + 784*x^2),x]
```

output
```
98*(x + E^(4*x^2)*x - x^2)
```

3.985.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.050, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{4x^2}(784x^2+98)-196x+98\right) dx$$

$$\Big\downarrow \text{ 2009}$$

$$-98x^2+98e^{4x^2}x+98x$$

input
```
Int[98 - 196*x + E^(4*x^2)*(98 + 784*x^2),x]
```

output
```
98*x + 98*E^(4*x^2)*x - 98*x^2
```

3.985.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.985.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

method	result	size
default	$98x-98x^2+98x\,\mathrm{e}^{4x^2}$	19
norman	$98x-98x^2+98x\,\mathrm{e}^{4x^2}$	19
risch	$98x-98x^2+98x\,\mathrm{e}^{4x^2}$	19
parallelrisch	$98x-98x^2+98x\,\mathrm{e}^{4x^2}$	19
parts	$98x-98x^2+98x\,\mathrm{e}^{4x^2}$	19

input
```
int((784*x^2+98)*exp(4*x^2)-196*x+98,x,method=_RETURNVERBOSE)
```

output
```
98*x+98*x*exp(x^2)^4-98*x^2
```

3.985.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \left(98-196x+e^{4x^2}\left(98+784x^2\right)\right)\,dx=-98\,x^2+98\,xe^{\left(4\,x^2\right)}+98\,x$$

input
```
integrate((784*x^2+98)*exp(4*x^2)-196*x+98,x, algorithm=\
```

output
```
-98*x^2 + 98*x*e^(4*x^2) + 98*x
```

3.985.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \left(98-196x+e^{4x^2}\left(98+784x^2\right)\right)\,dx=-98x^2+98xe^{4x^2}+98x$$

input
```
integrate((784*x**2+98)*exp(4*x**2)-196*x+98,x)
```

output
```
-98*x**2 + 98*x*exp(4*x**2) + 98*x
```

3.985.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \left(98-196x+e^{4x^2}\left(98+784x^2\right)\right)\,dx=-98\,x^2+98\,xe^{\left(4\,x^2\right)}+98\,x$$

input
```
integrate((784*x^2+98)*exp(4*x^2)-196*x+98,x, algorithm=\
```

output
```
-98*x^2 + 98*x*e^(4*x^2) + 98*x
```

3.985.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

$$\int \left(98-196x+e^{4x^2}\left(98+784x^2\right)\right)\,dx=-98\,x^2+98\,xe^{\left(4\,x^2\right)}+98\,x$$

input
```
integrate((784*x^2+98)*exp(4*x^2)-196*x+98,x, algorithm=\
```

output
```
-98*x^2 + 98*x*e^(4*x^2) + 98*x
```

3.985.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \left(98-196x+e^{4x^2}\left(98+784x^2\right)\right)\,dx=98\,x\,\left(\mathrm{e}^{4\,x^2}-x+1\right)$$

input
```
int(exp(4*x^2)*(784*x^2 + 98) - 196*x + 98,x)
```

output
```
98*x*(exp(4*x^2) - x + 1)
```

3.986 $\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx$

3.986.1 Optimal result

Integrand size = 84, antiderivative size = 26

$$\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx = 5-e^{\frac{2x}{5(5+x)\left(e^5-\log(4)\right)^2}}$$

output
```
5-exp(1/2*x/(exp(5)-2*ln(2))^2/(25/4+5/4*x))
```

3.986.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx = -e^{\frac{2x}{5(5+x)\left(e^5-\log(4)\right)^2}}$$

input
```
Integrate[(-2*E^((2*x)/(E^10*(25 + 5*x) + E^5*(-50 - 10*x)*Log[4] + (25 +
5*x)*Log[4]^2)))/(E^10*(25 + 10*x + x^2) + E^5*(-50 - 20*x - 2*x^2)*Log[4]
 + (25 + 10*x + x^2)*Log[4]^2),x]
```

output
```
-E^((2*x)/(5*(5 + x)*(E^5 - Log[4])^2))
```

3.986.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {6, 27, 6, 25, 25, 27, 2007, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{2 \exp \left(\frac{2x}{e^{10}(5x+25)+(5x+25)\log^2(4)+e^5(-10x-50)\log(4)}\right)}{e^{10}\left(x^2+10x+25\right)+\left(x^2+10x+25\right)\log^2(4)+e^5\left(-2x^2-20x-50\right)\log(4)}dx$$

$$\Big\downarrow \; 6$$

$$\int -\frac{2 \exp \left(\frac{2x}{e^{10}(5x+25)+(5x+25)\log^2(4)+e^5(-10x-50)\log(4)}\right)}{\left(x^2+10x+25\right)\left(e^{10}+\log^2(4)\right)+e^5\left(-2x^2-20x-50\right)\log(4)}dx$$

$$\Big\downarrow \; 27$$

$$-2\int -\frac{\exp \left(\frac{2x}{5\left(\log^2(4)(x+5)-2e^5\log(4)(x+5)+e^{10}(x+5)\right)}\right)}{2e^5\left(x^2+10x+25\right)\log(4)-\left(x^2+10x+25\right)\left(e^{10}+\log^2(4)\right)}dx$$

$$\Big\downarrow \; 6$$

$$-2\int -\frac{\exp \left(\frac{2x}{5\left(\log^2(4)(x+5)-2e^5\log(4)(x+5)+e^{10}(x+5)\right)}\right)}{\left(x^2+10x+25\right)\left(-e^{10}+2e^5\log(4)-\log^2(4)\right)}dx$$

$$\Big\downarrow \; 25$$

$$2\int -\frac{\exp \left(\frac{2x}{5\left(\log^2(4)(x+5)-2e^5\log(4)(x+5)+e^{10}(x+5)\right)}\right)}{\left(x^2+10x+25\right)\left(e^5-\log(4)\right)^2}dx$$

$$\Big\downarrow \; 25$$

$$-2\int \frac{\exp \left(\frac{2x}{5\left(\log^2(4)(x+5)-2e^5\log(4)(x+5)+e^{10}(x+5)\right)}\right)}{\left(x^2+10x+25\right)\left(e^5-\log(4)\right)^2}dx$$

$$\Big\downarrow \; 27$$

$$-\frac{2\int \frac{\exp \left(\frac{2x}{5\left(\log^2(4)(x+5)-2e^5\log(4)(x+5)+e^{10}(x+5)\right)}\right)}{x^2+10x+25}dx}{\left(e^5-\log(4)\right)^2}$$

$$\Big\downarrow \; 2007$$

3.986. $\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx$

$$-\frac{2\int \frac{\exp\left(\frac{2x}{5\left(\log^2(4)(x+5)-2e^5\log(4)(x+5)+e^{10}(x+5)\right)}\right)}{(x+5)^2}dx}{(e^5-\log(4))^2}$$

$$\Big\downarrow \text{7257}$$

$$-\exp\left(\frac{2x}{5\left(e^{10}(x+5)+(x+5)\log^2(4)-2e^5(x+5)\log(4)\right)}\right)$$

input
```
Int[(-2*E^((2*x)/(E^10*(25 + 5*x) + E^5*(-50 - 10*x)*Log[4] + (25 + 5*x)*L
og[4]^2)))/(E^10*(25 + 10*x + x^2) + E^5*(-50 - 20*x - 2*x^2)*Log[4] + (25
 + 10*x + x^2)*Log[4]^2),x]
```

output
```
-E^((2*x)/(5*(E^10*(5 + x) - 2*E^5*(5 + x)*Log[4] + (5 + x)*Log[4]^2)))
```

3.986.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
 + (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.986. $\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx$

3.986.4 Maple [A] (verified)

Time = 2.00 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

method	result
risch	$-e^{\frac{2x}{5(5+x)\left(-4e^{5}\ln(2)+4\ln(2)^{2}+e^{10}\right)}}$
gosper	$-e^{\frac{2x}{5\left(x e^{10}-4x e^{5}\ln(2)+4x\ln(2)^{2}+5e^{10}-20e^{5}\ln(2)+20\ln(2)^{2}\right)}}$
derivativedivides	$\frac{25\left(4e^{5}\ln(2)-4\ln(2)^{2}-e^{10}\right)\left(\frac{e^{10}}{25}-\frac{4e^{5}\ln(2)}{25}+\frac{4\ln(2)^{2}}{25}\right)e^{-\frac{2}{\left(-4e^{5}\ln(2)+4\ln(2)^{2}+e^{10}\right)(5+x)}+\frac{2}{5\left(-4e^{5}\ln(2)+4\ln(2)^{2}+e^{10}\right)}}}{\left(-4e^{5}\ln(2)+4\ln(2)^{2}+e^{10}\right)^{2}}$
default	$\frac{25\left(4e^{5}\ln(2)-4\ln(2)^{2}-e^{10}\right)\left(\frac{e^{10}}{25}-\frac{4e^{5}\ln(2)}{25}+\frac{4\ln(2)^{2}}{25}\right)e^{-\frac{2}{\left(-4e^{5}\ln(2)+4\ln(2)^{2}+e^{10}\right)(5+x)}+\frac{2}{5\left(-4e^{5}\ln(2)+4\ln(2)^{2}+e^{10}\right)}}}{\left(-4e^{5}\ln(2)+4\ln(2)^{2}+e^{10}\right)^{2}}$
norman	$\frac{(-5e^{5}+10\ln(2))e^{\frac{2x}{4(25+5x)\ln(2)^{2}+2(-10x-50)e^{5}\ln(2)+(25+5x)e^{10}}}+(-e^{5}+2\ln(2))x\,e^{\frac{2x}{4(25+5x)\ln(2)^{2}+2(-10x-50)e^{5}\ln(2)+}}}{(5+x)(e^{5}-2\ln(2))}$
parallelrisch	$-\frac{e^{10}e^{\frac{2x}{5\left(x e^{10}-4x e^{5}\ln(2)+4x\ln(2)^{2}+5e^{10}-20e^{5}\ln(2)+20\ln(2)^{2}\right)}}-4e^{5}\ln(2)e^{\frac{2x}{5\left(x e^{10}-4x e^{5}\ln(2)+4x\ln(2)^{2}+5e^{10}-20e^{5}\ln(2)-\right.}}}{-4e^{5}\ln(2)+4\ln(2)^{2}+e^{10}}$

input
```
int(-2*exp(2*x/(4*(25+5*x)*ln(2)^2+2*(-10*x-50)*exp(5)*ln(2)+(25+5*x)*exp(
5)^2))/(4*(x^2+10*x+25)*ln(2)^2+2*(-2*x^2-20*x-50)*exp(5)*ln(2)+(x^2+10*x+
25)*exp(5)^2),x,method=_RETURNVERBOSE)
```

output
```
-exp(2/5*x/(5+x)/(-4*exp(5)*ln(2)+4*ln(2)^2+exp(10)))
```

3.986.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^{5}(-50-10x)\log(4)+(25+5x)\log^{2}(4)}}}{e^{10}(25+10x+x^{2})+e^{5}(-50-20x-2x^{2})\log(4)+(25+10x+x^{2})\log^{2}(4)}\,dx$$
$$=-e^{\left(-\frac{2x}{5\left(4(x+5)e^{5}\log(2)-4(x+5)\log(2)^{2}-(x+5)e^{10}\right)}\right)}$$

input
```
integrate(-2*exp(2*x/(4*(25+5*x)*log(2)^2+2*(-10*x-50)*exp(5)*log(2)+(25+5
*x)*exp(5)^2))/(4*(x^2+10*x+25)*log(2)^2+2*(-2*x^2-20*x-50)*exp(5)*log(2)+
(x^2+10*x+25)*exp(5)^2),x, algorithm=\
```

output
```
-e^(-2/5*x/(4*(x + 5)*e^5*log(2) - 4*(x + 5)*log(2)^2 - (x + 5)*e^10))
```

3.986.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx$$
$$= -e^{\frac{2x}{(-20x-100)e^5\log(2)+(5x+25)e^{10}+(20x+100)\log(2)^2}}$$

input
```
integrate(-2*exp(2*x/(4*(25+5*x)*ln(2)**2+2*(-10*x-50)*exp(5)*ln(2)+(25+5*
x)*exp(5)**2))/(4*(x**2+10*x+25)*ln(2)**2+2*(-2*x**2-20*x-50)*exp(5)*ln(2)
+(x**2+10*x+25)*exp(5)**2),x)
```

output
```
-exp(2*x/((-20*x - 100)*exp(5)*log(2) + (5*x + 25)*exp(10) + (20*x + 100)*
log(2)**2))
```

3.986.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. 2(22) = 44.

Time = 0.30 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.50

$$\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx$$
$$= -e^{\left(\frac{2}{\left(4e^5\log(2)-4\log(2)^2-e^{10}\right)x+20e^5\log(2)-20\log(2)^2-5e^{10}}-\frac{2}{5\left(4e^5\log(2)-4\log(2)^2-e^{10}\right)}\right)}$$

input
```
integrate(-2*exp(2*x/(4*(25+5*x)*log(2)^2+2*(-10*x-50)*exp(5)*log(2)+(25+5
*x)*exp(5)^2))/(4*(x^2+10*x+25)*log(2)^2+2*(-2*x^2-20*x-50)*exp(5)*log(2)+
(x^2+10*x+25)*exp(5)^2),x, algorithm=\
```

output
```
-e^(2/((4*e^5*log(2) - 4*log(2)^2 - e^10)*x + 20*e^5*log(2) - 20*log(2)^2
- 5*e^10) - 2/5/(4*e^5*log(2) - 4*log(2)^2 - e^10))
```

3.986.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 161 vs. $2(22) = 44$.

Time = 0.29 (sec) , antiderivative size = 161, normalized size of antiderivative = 6.19

$$\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx$$
$$= \frac{4\,e^{\left(-\frac{2\,x}{5\,\left(4\,xe^5\log(2)-4\,x\log(2)^2-xe^{10}+20\,e^5\log(2)-20\,\log(2)^2-5\,e^{10}\right)}\right)}\log(2)^2-4\,e^{\left(-\frac{2\,x}{5\,\left(4\,xe^5\log(2)-4\,x\log(2)^2-xe^{10}+20\,e^5\log(2)-20\,\log(2)^2-\right.}\right.}}{4\,e^5\log(2)-4\,\log(2)^2-e^{10}}$$

input
```
integrate(-2*exp(2*x/(4*(25+5*x)*log(2)^2+2*(-10*x-50)*exp(5)*log(2)+(25+5
*x)*exp(5)^2))/(4*(x^2+10*x+25)*log(2)^2+2*(-2*x^2-20*x-50)*exp(5)*log(2)+
(x^2+10*x+25)*exp(5)^2),x, algorithm=\
```

output
```
(4*e^(-2/5*x/(4*x*e^5*log(2) - 4*x*log(2)^2 - x*e^10 + 20*e^5*log(2) - 20*
log(2)^2 - 5*e^10))*log(2)^2 - 4*e^(-2/5*x/(4*x*e^5*log(2) - 4*x*log(2)^2
- x*e^10 + 20*e^5*log(2) - 20*log(2)^2 - 5*e^10) + 5)*log(2) + e^(-2/5*x/(
4*x*e^5*log(2) - 4*x*log(2)^2 - x*e^10 + 20*e^5*log(2) - 20*log(2)^2 - 5*e
^10) + 10))/(4*e^5*log(2) - 4*log(2)^2 - e^10)
```

3.986.9 Mupad [B] (verification not implemented)

Time = 14.82 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.69

$$\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx$$
$$= -e^{\frac{2\,x}{25\,e^{10}-100\,e^5\,\ln(2)+5\,x\,e^{10}+20\,x\ln(2)^2+100\ln(2)^2-20\,x\,e^5\,\ln(2)}}$$

input
```
int(-(2*exp((2*x)/(4*log(2)^2*(5*x + 25) + exp(10)*(5*x + 25) - 2*exp(5)*l
og(2)*(10*x + 50))))/(4*log(2)^2*(10*x + x^2 + 25) + exp(10)*(10*x + x^2 +
 25) - 2*exp(5)*log(2)*(20*x + 2*x^2 + 50)),x)
```

output
```
-exp((2*x)/(25*exp(10) - 100*exp(5)*log(2) + 5*x*exp(10) + 20*x*log(2)^2 +
 100*log(2)^2 - 20*x*exp(5)*log(2)))
```

3.986. $\int -\frac{2e^{\frac{2x}{e^{10}(25+5x)+e^5(-50-10x)\log(4)+(25+5x)\log^2(4)}}}{e^{10}(25+10x+x^2)+e^5(-50-20x-2x^2)\log(4)+(25+10x+x^2)\log^2(4)}\,dx$

3.987 $\int \frac{-8x^4-2x^5+(x+x^2)\log(1+x)+(-2-3x-x^2)\log^2(1+x)}{2x^5}\,dx$

3.987.1 Optimal result

Integrand size = 45, antiderivative size = 28

$$\int \frac{-8x^4-2x^5+(x+x^2)\log(1+x)+(-2-3x-x^2)\log^2(1+x)}{2x^5}\,dx = -x+\log\left(\frac{4}{x^4}\right)+\frac{(1+x)^2\log^2(1+x)}{4x^4}$$

output
```
1/4*(1+x)^2/x^4*ln(1+x)^2+ln(4/x^4)-x
```

3.987.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{-8x^4-2x^5+(x+x^2)\log(1+x)+(-2-3x-x^2)\log^2(1+x)}{2x^5}\,dx = \frac{-4x^5-16x^4\log(x)+(1+x)^2\log^2(1+x)}{4x^4}$$

input
```
Integrate[(-8*x^4 - 2*x^5 + (x + x^2)*Log[1 + x] + (-2 - 3*x - x^2)*Log[1
+ x]^2)/(2*x^5),x]
```

output
```
(-4*x^5 - 16*x^4*Log[x] + (1 + x)^2*Log[1 + x]^2)/(4*x^4)
```

3.987.3 Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.71, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.089, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^5-8x^4+(-x^2-3x-2)\log^2(x+1)+(x^2+x)\log(x+1)}{2x^5}\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int -\frac{2x^5+8x^4+(x^2+3x+2)\log^2(x+1)-(x^2+x)\log(x+1)}{x^5}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{2}\int \frac{2x^5+8x^4+(x^2+3x+2)\log^2(x+1)-(x^2+x)\log(x+1)}{x^5}dx$$

$$\Big\downarrow \text{2010}$$

$$-\frac{1}{2}\int \left(\frac{(x+1)(x+2)\log^2(x+1)}{x^5}-\frac{(x+1)\log(x+1)}{x^4}+\frac{2(x+4)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(\frac{\log^2(x+1)}{2x^4}+\frac{\log^2(x+1)}{x^3}+\frac{\log^2(x+1)}{2x^2}-2x-8\log(x)\right)$$

input
```
Int[(-8*x^4 - 2*x^5 + (x + x^2)*Log[1 + x] + (-2 - 3*x - x^2)*Log[1 + x]^2
)/(2*x^5),x]
```

output
```
(-2*x - 8*Log[x] + Log[1 + x]^2/(2*x^4) + Log[1 + x]^2/x^3 + Log[1 + x]^2/
(2*x^2))/2
```

3.987.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.987.4 Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

method	result
risch	$\frac{(x^2+2x+1)\ln(1+x)^2}{4x^4}-x-4\ln(x)$
norman	$\frac{-x^5+\frac{\ln(1+x)^2}{4}+\frac{x\ln(1+x)^2}{2}+\frac{x^2\ln(1+x)^2}{4}}{x^4}-4\ln(x)$
parallelrisch	$-\frac{16x^4\ln(x)+4x^5-4x^4-x^2\ln(1+x)^2-2x\ln(1+x)^2-\ln(1+x)^2}{4x^4}$
parts	$-x-4\ln(x)-\frac{1}{12x^2}-\frac{1}{12x}-\frac{\ln(1+x)(1+x)\left((1+x)^2-3x\right)}{6x^3}+\frac{\ln(1+x)(1+x)(-1+x)}{4x^2}+\frac{\frac{x^2}{12}+\frac{x^3}{12}+\frac{\ln(1+x)^2}{4}}{}$
derivativedivides	$-\frac{1}{12x}-4\ln(x)-\frac{1}{12x^2}-\frac{\ln(1+x)(1+x)\left((1+x)^2-3x\right)}{6x^3}+\frac{\ln(1+x)(1+x)(-1+x)}{4x^2}-1-x+\frac{-\frac{(1+x)^2}{3}+\frac{1}{6}}{}$
default	$-\frac{1}{12x}-4\ln(x)-\frac{1}{12x^2}-\frac{\ln(1+x)(1+x)\left((1+x)^2-3x\right)}{6x^3}+\frac{\ln(1+x)(1+x)(-1+x)}{4x^2}-1-x+\frac{-\frac{(1+x)^2}{3}+\frac{1}{6}}{}$

input
```
int(1/2*((-x^2-3*x-2)*ln(1+x)^2+(x^2+x)*ln(1+x)-2*x^5-8*x^4)/x^5,x,method=
_RETURNVERBOSE)
```

output
```
1/4*(x^2+2*x+1)/x^4*ln(1+x)^2-x-4*ln(x)
```

3.987.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{-8x^4-2x^5+(x+x^2)\log(1+x)+(-2-3x-x^2)\log^2(1+x)}{2x^5}\,dx = -\frac{4\,x^5+16\,x^4\log\left(x\right)-\left(x^2+2\,x+1\right)\log\left(x+1\right)^2}{4\,x^4}$$

input
```
integrate(1/2*((-x^2-3*x-2)*log(1+x)^2+(x^2+x)*log(1+x)-2*x^5-8*x^4)/x^5,x
, algorithm=\
```

output
```
-1/4*(4*x^5 + 16*x^4*log(x) - (x^2 + 2*x + 1)*log(x + 1)^2)/x^4
```

3.987.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{-8x^4-2x^5+(x+x^2)\log(1+x)+(-2-3x-x^2)\log^2(1+x)}{2x^5}\,dx = -x-4\log\left(x\right)+\frac{\left(x^2+2x+1\right)\log\left(x+1\right)^2}{4x^4}$$

input
```
integrate(1/2*((-x**2-3*x-2)*ln(1+x)**2+(x**2+x)*ln(1+x)-2*x**5-8*x**4)/x*
*5,x)
```

output
```
-x - 4*log(x) + (x**2 + 2*x + 1)*log(x + 1)**2/(4*x**4)
```

3.987.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. 2(26) = 52.

Time = 0.25 (sec) , antiderivative size = 93, normalized size of antiderivative = 3.32

$$\begin{aligned}\int \frac{-8x^4-2x^5+(x+x^2)\log(1+x)+(-2-3x-x^2)\log^2(1+x)}{2x^5}\,dx &= -x+\frac{2\,x-1}{12\,x^2}-\frac{1}{4\,x}-\frac{\log\left(x+1\right)}{4\,x^2}-\frac{\log\left(x+1\right)}{6\,x^3} \\ &\quad+\frac{x^3+3\left(x^2+2\,x+1\right)\log\left(x+1\right)^2+x^2-\left(x^4-3\,x^2-2\,x\right)\log\left(x+1\right)}{12\,x^4} \\ &\quad+\frac{1}{12}\,\log\left(x+1\right)-4\,\log\left(x\right)\end{aligned}$$

input
```
integrate(1/2*((-x^2-3*x-2)*log(1+x)^2+(x^2+x)*log(1+x)-2*x^5-8*x^4)/x^5,x
, algorithm=\
```

output
```
-x + 1/12*(2*x - 1)/x^2 - 1/4/x - 1/4*log(x + 1)/x^2 - 1/6*log(x + 1)/x^3
+ 1/12*(x^3 + 3*(x^2 + 2*x + 1)*log(x + 1)^2 + x^2 - (x^4 - 3*x^2 - 2*x)*l
og(x + 1))/x^4 + 1/12*log(x + 1) - 4*log(x)
```

3.987.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{-8x^4-2x^5+(x+x^2)\log(1+x)+(-2-3x-x^2)\log^2(1+x)}{2x^5}\,dx$$
$$=-x+\frac{(x^2+2\,x+1)\log{(x+1)}^2}{4\,x^4}-4\,\log{(x)}$$

input
```
integrate(1/2*((-x^2-3*x-2)*log(1+x)^2+(x^2+x)*log(1+x)-2*x^5-8*x^4)/x^5,x
, algorithm=\
```

output
```
-x + 1/4*(x^2 + 2*x + 1)*log(x + 1)^2/x^4 - 4*log(x)
```

3.987.9 Mupad [B] (verification not implemented)

Time = 13.77 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int \frac{-8x^4-2x^5+(x+x^2)\log(1+x)+(-2-3x-x^2)\log^2(1+x)}{2x^5}\,dx$$
$$=\frac{\frac{x^2\ln(x+1)^2}{4}+\frac{x\ln(x+1)^2}{2}+\frac{\ln(x+1)^2}{4}}{x^4}-4\,\ln{(x)}-x$$

input
```
int(-((log(x + 1)^2*(3*x + x^2 + 2))/2 - (log(x + 1)*(x + x^2))/2 + 4*x^4
+ x^5)/x^5,x)
```

output
```
((x*log(x + 1)^2)/2 + log(x + 1)^2/4 + (x^2*log(x + 1)^2)/4)/x^4 - 4*log(x
) - x
```

3.988 $\int e^{-x-3x^3+3x\log(x)+2x\log(3x)-x\log^2(3x)}\left(4-9x^2+3\log(x\right.$

3.988.1 Optimal result

Integrand size = 52, antiderivative size = 28

$$\int e^{-x-3x^3+3x\log(x)+2x\log(3x)-x\log^2(3x)}\left(4-9x^2+3\log(x)-\log^2(3x)\right)\,dx = e^{x\left(3x\left(-x+\frac{\log(x)}{x}\right)-(-1+\log(3x))^2\right)}$$

output
```
exp((x*(3*ln(x)/x-3*x)-(ln(3*x)-1)^2)*x)
```

3.988.2 Mathematica [F]

$$\int e^{-x-3x^3+3x\log(x)+2x\log(3x)-x\log^2(3x)}\left(4-9x^2+3\log(x)-\log^2(3x)\right)\,dx = \int e^{-x-3x^3+3x\log(x)+2x\log(3x)-x\log^2(3x)}\left(4-9x^2+3\log(x)-\log^2(3x)\right)\,dx$$

input
```
Integrate[E^(-x - 3*x^3 + 3*x*Log[x] + 2*x*Log[3*x] - x*Log[3*x]^2)*(4 - 9
*x^2 + 3*Log[x] - Log[3*x]^2),x]
```

output
```
Integrate[E^(-x - 3*x^3 + 3*x*Log[x] + 2*x*Log[3*x] - x*Log[3*x]^2)*(4 - 9
*x^2 + 3*Log[x] - Log[3*x]^2), x]
```

3.988.3 Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.019$, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-9x^2-\log^2(3x)+3\log(x)+4\right)\exp\left(-3x^3-x-x\log^2(3x)+3x\log(x)+2x\log(3x)\right)\,dx$$

$$\Big\downarrow \text{7257}$$

$$3^{2x}x^{5x}e^{-3x^3-x-x\log^2(3x)}$$

input
```
Int[E^(-x - 3*x^3 + 3*x*Log[x] + 2*x*Log[3*x] - x*Log[3*x]^2)*(4 - 9*x^2 +
 3*Log[x] - Log[3*x]^2),x]
```

output
```
3^(2*x)*E^(-x - 3*x^3 - x*Log[3*x]^2)*x^(5*x)
```

3.988.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.988.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

method	result	size
parallelrisch	$e^{x\left(-\ln(3x)^2-3x^2+3\ln(x)+2\ln(3x)-1\right)}$	29
derivativedivides	$e^{-x\ln(3x)^2+2x\ln(3x)+3x\ln(x)-3x^3-x}$	32
default	$e^{-x\ln(3x)^2+2x\ln(3x)+3x\ln(x)-3x^3-x}$	32
risch	$x^{3x}x^{-2x\ln(3)}x^{2x}9^{x}e^{-x\left(\ln(x)^2+\ln(3)^2+3x^2+1\right)}$	41

input
```
int((-ln(3*x)^2+3*ln(x)-9*x^2+4)*exp(-x*ln(3*x)^2+2*x*ln(3*x)+3*x*ln(x)-3*
x^3-x),x,method=_RETURNVERBOSE)
```

output
```
exp(x*(-ln(3*x)^2-3*x^2+3*ln(x)+2*ln(3*x)-1))
```

3.988.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int e^{-x-3x^3+3x\log(x)+2x\log(3x)-x\log^2(3x)}\left(4-9x^2+3\log(x)-\log^2(3x)\right)\,dx$$
$$=e^{\left(-3\,x^3-x\log(3)^2-x\log(x)^2+2\,x\log(3)-(2\,x\log(3)-5\,x)\log(x)-x\right)}$$

input
```
integrate((-log(3*x)^2+3*log(x)-9*x^2+4)*exp(-x*log(3*x)^2+2*x*log(3*x)+3*
x*log(x)-3*x^3-x),x, algorithm=\
```

output
```
e^(-3*x^3 - x*log(3)^2 - x*log(x)^2 + 2*x*log(3) - (2*x*log(3) - 5*x)*log(
x) - x)
```

3.988.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int e^{-x-3x^3+3x\log(x)+2x\log(3x)-x\log^2(3x)}\left(4-9x^2+3\log(x)-\log^2(3x)\right)\,dx$$
$$=e^{-3x^3-x(\log(x)+\log(3))^2+2x(\log(x)+\log(3))+3x\log(x)-x}$$

input
```
integrate((-ln(3*x)**2+3*ln(x)-9*x**2+4)*exp(-x*ln(3*x)**2+2*x*ln(3*x)+3*x
*ln(x)-3*x**3-x),x)
```

output
```
exp(-3*x**3 - x*(log(x) + log(3))**2 + 2*x*(log(x) + log(3)) + 3*x*log(x)
- x)
```

3.988.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int e^{-x-3x^3+3x\log(x)+2x\log(3x)-x\log^2(3x)}\left(4-9x^2+3\log(x)-\log^2(3x)\right)\,dx$$
$$=e^{\left(-3\,x^3-x\log(3\,x)^2+2\,x\log(3\,x)+3\,x\log(x)-x\right)}$$

input
```
integrate((-log(3*x)^2+3*log(x)-9*x^2+4)*exp(-x*log(3*x)^2+2*x*log(3*x)+3*
x*log(x)-3*x^3-x),x, algorithm=\
```

output
```
e^(-3*x^3 - x*log(3*x)^2 + 2*x*log(3*x) + 3*x*log(x) - x)
```

3.988.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.11

$$\int e^{-x-3x^3+3x\log(x)+2x\log(3x)-x\log^2(3x)}\left(4-9x^2+3\log(x)-\log^2(3x)\right)\,dx$$
$$=e^{\left(-3\,x^3-x\log(3\,x)^2+2\,x\log(3\,x)+3\,x\log(x)-x\right)}$$

input
```
integrate((-log(3*x)^2+3*log(x)-9*x^2+4)*exp(-x*log(3*x)^2+2*x*log(3*x)+3*
x*log(x)-3*x^3-x),x, algorithm=\
```

output
```
e^(-3*x^3 - x*log(3*x)^2 + 2*x*log(3*x) + 3*x*log(x) - x)
```

3.988.9 Mupad [B] (verification not implemented)

Time = 13.93 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int e^{-x-3x^3+3x\log(x)+2x\log(3x)-x\log^2(3x)}\left(4-9x^2+3\log(x)-\log^2(3x)\right)\,dx$$
$$=9^x\,x^{5\,x-2\,x\,\ln(3)}\,\mathrm{e}^{-x\ln(3)^2}\,\mathrm{e}^{-x}\,\mathrm{e}^{-x\ln(x)^2}\,\mathrm{e}^{-3\,x^3}$$

input
```
int(exp(2*x*log(3*x) - x - x*log(3*x)^2 + 3*x*log(x) - 3*x^3)*(3*log(x) -
log(3*x)^2 - 9*x^2 + 4),x)
```

output
```
9^x*x^(5*x - 2*x*log(3))*exp(-x*log(3)^2)*exp(-x)*exp(-x*log(x)^2)*exp(-3*
x^3)
```

3.989 $\int \frac{e^{-x}(2048x-128x^2+(1920x^2-128x^3)\log(x)+(8192+7168x-256x^2-$

$(256x^2-32x^3+x^4)\log^2(x)$

3.989.1 Optimal result

Integrand size = 79, antiderivative size = 31

$$\int \frac{e^{-x}(2048x-128x^2+(1920x^2-128x^3)\log(x)+(8192+7168x-256x^2-288x^3+33x^4-x^5)\log^2(x))}{(256x^2-32x^3+x^4)\log^2(x)}$$

$$= e^{-x}\left(x+\frac{8\left(4+\frac{x}{\log(x)}\right)}{-x+\frac{x^2}{16}}\right)$$

output
```
(8*(4+x/ln(x))/(1/16*x^2-x)+x)/exp(x)
```

3.989.2 Mathematica [A] (verified)

Time = 4.78 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.19

$$\int \frac{e^{-x}(2048x-128x^2+(1920x^2-128x^3)\log(x)+(8192+7168x-256x^2-288x^3+33x^4-x^5)\log^2(x))}{(256x^2-32x^3+x^4)\log^2(x)}$$

$$= e^{-x}\left(\frac{32}{-16+x}-\frac{32}{x}+x\right)+\frac{128e^{-x}}{(-16+x)\log(x)}$$

input
```
Integrate[(2048*x - 128*x^2 + (1920*x^2 - 128*x^3)*Log[x] + (8192 + 7168*x
 - 256*x^2 - 288*x^3 + 33*x^4 - x^5)*Log[x]^2)/(E^x*(256*x^2 - 32*x^3 + x^
4)*Log[x]^2),x]
```

output
```
(32/(-16 + x) - 32/x + x)/E^x + 128/(E^x*(-16 + x)*Log[x])
```

3.989.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(-128x^2+\left(1920x^2-128x^3\right)\log(x)+\left(-x^5+33x^4-288x^3-256x^2+7168x+8192\right)\log^2(x)+2048x\right)}{\left(x^4-32x^3+256x^2\right)\log^2(x)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{-x}\left(-128x^2+\left(1920x^2-128x^3\right)\log(x)+\left(-x^5+33x^4-288x^3-256x^2+7168x+8192\right)\log^2(x)+2048x\right)}{x^2\left(x^2-32x+256\right)\log^2(x)}dx$$

$$\Big\downarrow \text{7277}$$

$$4\int \frac{e^{-x}\left(-128x^2+2048x+\left(-x^5+33x^4-288x^3-256x^2+7168x+8192\right)\log^2(x)+128\left(15x^2-x^3\right)\log(x)\right)}{4(16-x)^2x^2\log^2(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\int \frac{e^{-x}\left(-128x^2+128\left(15x^2-x^3\right)\log(x)+\left(-x^5+33x^4-288x^3-256x^2+7168x+8192\right)\log^2(x)+2048x\right)}{(16-x)^2x^2\log^2(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{-x}\left(-x^5+33x^4-288x^3-256x^2+7168x+8192\right)}{(x-16)^2x^2}-\frac{128e^{-x}}{(x-16)x\log^2(x)}-\frac{128e^{-x}(x-15)}{(x-16)^2\log(x)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-8\int \frac{e^{-x}}{(x-16)\log^2(x)}dx+8\int \frac{e^{-x}}{x\log^2(x)}dx-128\int \frac{e^{-x}}{(x-16)^2\log(x)}dx-128\int \frac{e^{-x}}{(x-16)\log(x)}dx+e^{-x}x-\frac{32e^{-x}}{16-x}-\frac{32e^{-x}}{x}$$

input
```
Int[(2048*x - 128*x^2 + (1920*x^2 - 128*x^3)*Log[x] + (8192 + 7168*x - 256
*x^2 - 288*x^3 + 33*x^4 - x^5)*Log[x]^2)/(E^x*(256*x^2 - 32*x^3 + x^4)*Log
[x]^2),x]
```

output
```
$Aborted
```

3.989.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.989.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.29

method	result	size
risch	$\frac{(x^3-16x^2+512)\,\mathrm{e}^{-x}}{x(x-16)}+\frac{128\,\mathrm{e}^{-x}}{(x-16)\ln(x)}$	40
parallelrisch	$\frac{(16x^3\ln(x)-256x^2\ln(x)+2048x+8192\ln(x))\,\mathrm{e}^{-x}}{16x\ln(x)(x-16)}$	41

input
```
int(((-x^5+33*x^4-288*x^3-256*x^2+7168*x+8192)*ln(x)^2+(-128*x^3+1920*x^2)
*ln(x)-128*x^2+2048*x)/(x^4-32*x^3+256*x^2)/exp(x)/ln(x)^2,x,method=_RETUR
NVERBOSE)
```

output
```
(x^3-16*x^2+512)/x/(x-16)*exp(-x)+128*exp(-x)/(x-16)/ln(x)
```

3.989. $\int \frac{e^{-x}(2048x-128x^2+(1920x^2-128x^3)\log(x)+(8192+7168x-256x^2-288x^3+33x^4-x^5)\log^2(x))}{(256x^2-32x^3+x^4)\log^2(x)}\,dx$

3.989.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.26

$$\int \frac{e^{-x}(2048x-128x^2+(1920x^2-128x^3)\log(x)+(8192+7168x-256x^2-288x^3+33x^4-x^5)\log^2(x))}{(256x^2-32x^3+x^4)\log^2(x)} = \frac{(x^3-16\,x^2+512)e^{(-x)}\log(x)+128\,xe^{(-x)}}{(x^2-16\,x)\log(x)}$$

input
```
integrate((((-x^5+33*x^4-288*x^3-256*x^2+7168*x+8192)*log(x)^2+(-128*x^3+19
20*x^2)*log(x)-128*x^2+2048*x)/(x^4-32*x^3+256*x^2)/exp(x)/log(x)^2,x, alg
orithm=\
```

output
```
((x^3 - 16*x^2 + 512)*e^(-x)*log(x) + 128*x*e^(-x))/((x^2 - 16*x)*log(x))
```

3.989.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(19) = 38.

Time = 0.14 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.26

$$\int \frac{e^{-x}(2048x-128x^2+(1920x^2-128x^3)\log(x)+(8192+7168x-256x^2-288x^3+33x^4-x^5)\log^2(x))}{(256x^2-32x^3+x^4)\log^2(x)} = \frac{(x^3\log(x)-16x^2\log(x)+128x+512\log(x))\,e^{-x}}{x^2\log(x)-16x\log(x)}$$

input
```
integrate((((-x**5+33*x**4-288*x**3-256*x**2+7168*x+8192)*ln(x)**2+(-128*x*
*3+1920*x**2)*ln(x)-128*x**2+2048*x)/(x**4-32*x**3+256*x**2)/exp(x)/ln(x)*
*2,x)
```

output
```
(x**3*log(x) - 16*x**2*log(x) + 128*x + 512*log(x))*exp(-x)/(x**2*log(x) -
 16*x*log(x))
```

3.989.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.13

$$\int \frac{e^{-x}\left(2048x-128x^2+(1920x^2-128x^3)\log(x)+(8192+7168x-256x^2-288x^3+33x^4-x^5)\log^2(x)\right)}{(256x^2-32x^3+x^4)\log^2(x)} = \frac{((x^3-16x^2+512)\log(x)+128x)e^{(-x)}}{(x^2-16x)\log(x)}$$

input
```
integrate((((-x^5+33*x^4-288*x^3-256*x^2+7168*x+8192)*log(x)^2+(-128*x^3+19
20*x^2)*log(x)-128*x^2+2048*x)/(x^4-32*x^3+256*x^2)/exp(x)/log(x)^2,x, alg
orithm=\
```

output
```
((x^3 - 16*x^2 + 512)*log(x) + 128*x)*e^(-x)/((x^2 - 16*x)*log(x))
```

3.989.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.68

$$\int \frac{e^{-x}\left(2048x-128x^2+(1920x^2-128x^3)\log(x)+(8192+7168x-256x^2-288x^3+33x^4-x^5)\log^2(x)\right)}{(256x^2-32x^3+x^4)\log^2(x)} = \frac{x^3e^{(-x)}\log(x)-16x^2e^{(-x)}\log(x)+128xe^{(-x)}+512e^{(-x)}\log(x)}{x^2\log(x)-16x\log(x)}$$

input
```
integrate((((-x^5+33*x^4-288*x^3-256*x^2+7168*x+8192)*log(x)^2+(-128*x^3+19
20*x^2)*log(x)-128*x^2+2048*x)/(x^4-32*x^3+256*x^2)/exp(x)/log(x)^2,x, alg
orithm=\
```

output
```
(x^3*e^(-x)*log(x) - 16*x^2*e^(-x)*log(x) + 128*x*e^(-x) + 512*e^(-x)*log(
x))/(x^2*log(x) - 16*x*log(x))
```

3.989.9 Mupad [B] (verification not implemented)

Time = 14.90 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.16

$$\int \frac{e^{-x}\left(2048x-128x^2+\left(1920x^2-128x^3\right)\log(x)+\left(8192+7168x-256x^2-288x^3+33x^4-x^5\right)\log^2(x)\right)}{\left(256x^2-32x^3+x^4\right)\log^2(x)}$$
$$= x\,\mathrm{e}^{-x}+\frac{128\,x\,\mathrm{e}^{-x}+512\,\mathrm{e}^{-x}\,\ln\left(x\right)}{x\,\ln\left(x\right)\,\left(x-16\right)}$$

input
```
int((exp(-x)*(2048*x + log(x)*(1920*x^2 - 128*x^3) + log(x)^2*(7168*x - 25
6*x^2 - 288*x^3 + 33*x^4 - x^5 + 8192) - 128*x^2))/(log(x)^2*(256*x^2 - 32
*x^3 + x^4)),x)
```

output
```
x*exp(-x) + (128*x*exp(-x) + 512*exp(-x)*log(x))/(x*log(x)*(x - 16))
```

3.990 $\int \frac{\frac{48}{e}+12e^3x+9x^5}{4x^3}\,dx$

3.990.1 Optimal result

Integrand size = 24, antiderivative size = 28

$$\int \frac{\frac{48}{e}+12e^3x+9x^5}{4x^3}\,dx=3\left(-\frac{e^3}{x}+\frac{-\frac{2}{e}+\frac{x^5}{4}}{x^2}\right)$$

output
```
3*(1/4*x^5-exp(ln(2)-1))/x^2-3*exp(3)/x
```

3.990.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{\frac{48}{e}+12e^3x+9x^5}{4x^3}\,dx=\frac{3\left(-\frac{8}{x^2}-\frac{4e^4}{x}+ex^3\right)}{4e}$$

input
```
Integrate[(48/E + 12*E^3*x + 9*x^5)/(4*x^3),x]
```

output
```
(3*(-8/x^2 - (4*E^4)/x + E*x^3))/(4*E)
```

3.990.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{9x^5+12e^3x+\frac{48}{e}}{4x^3}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{4}\int \frac{3\left(3x^5+4e^3x+\frac{16}{e}\right)}{x^3}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{3}{4}\int \frac{3x^5+4e^3x+\frac{16}{e}}{x^3}dx$$
$$\Big\downarrow \text{2010}$$
$$\frac{3}{4}\int \left(3x^2+\frac{4e^3}{x^2}+\frac{16}{ex^3}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{3}{4}\left(x^3-\frac{8}{ex^2}-\frac{4e^3}{x}\right)$$

input
```
Int[(48/E + 12*E^3*x + 9*x^5)/(4*x^3),x]
```

output
```
(3*(-8/(E*x^2) - (4*E^3)/x + x^3))/4
```

3.990.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.990.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

method	result	size
risch	$-\frac{3\left(-x^{5}+8\,{\mathrm e}^{-1}+4 x\,{\mathrm e}^{3}\right)}{4 x^{2}}$	21
norman	$\frac{\frac{3 x^{5}}{4}-6\,{\mathrm e}^{-1}-3 x\,{\mathrm e}^{3}}{x^{2}}$	22
gosper	$-\frac{3\left(-x^{5}+4 x\,{\mathrm e}^{3}+4\,{\mathrm e}^{\ln\left(2\right)-1}\right)}{4 x^{2}}$	24
default	$\frac{3 x^{3}}{4}-\frac{3\,{\mathrm e}^{3}}{x}-\frac{3\,{\mathrm e}^{\ln\left(2\right)-1}}{x^{2}}$	24
parallelrisch	$-\frac{-3 x^{5}+12 x\,{\mathrm e}^{3}+12\,{\mathrm e}^{\ln\left(2\right)-1}}{4 x^{2}}$	24

input
```
int(1/4*(24*exp(ln(2)-1)+12*x*exp(3)+9*x^5)/x^3,x,method=_RETURNVERBOSE)
```

output
```
-3/4*(-x^5+8*exp(-1)+4*x*exp(3))/x^2
```

3.990.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{\frac{48}{e}+12e^3x+9x^5}{4x^3}\,dx=\frac{3\,\left(x^{5} e^{\left(3\,\log\left(2\right)-3\right)}-32\,x-4\,e^{\left(4\,\log\left(2\right)-4\right)}\right)e^{\left(-3\,\log\left(2\right)+3\right)}}{4\,x^{2}}$$

input
```
integrate(1/4*(24*exp(log(2)-1)+12*x*exp(3)+9*x^5)/x^3,x, algorithm=\
```

output
```
3/4*(x^5*e^(3*log(2) - 3) - 32*x - 4*e^(4*log(2) - 4))*e^(-3*log(2) + 3)/x
^2
```

3.990.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{\frac{48}{e}+12e^3x+9x^5}{4x^3}\,dx=\frac{3ex^3+\frac{-12xe^4-24}{x^2}}{4e}$$

input
```
integrate(1/4*(24*exp(ln(2)-1)+12*x*exp(3)+9*x**5)/x**3,x)
```

output
```
(3*E*x**3 + (-12*x*exp(4) - 24)/x**2)*exp(-1)/4
```

3.990.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{\frac{48}{e}+12e^3x+9x^5}{4x^3}\,dx=\frac{3}{4}\,x^3-\frac{3\,(xe^4+2)e^{(-1)}}{x^2}$$

input
```
integrate(1/4*(24*exp(log(2)-1)+12*x*exp(3)+9*x^5)/x^3,x, algorithm=\
```

output
```
3/4*x^3 - 3*(x*e^4 + 2)*e^(-1)/x^2
```

3.990.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{\frac{48}{e}+12e^3x+9x^5}{4x^3}\,dx=\frac{3}{4}\,x^3-\frac{3\left(xe^3+e^{(\log(2)-1)}\right)}{x^2}$$

input
```
integrate(1/4*(24*exp(log(2)-1)+12*x*exp(3)+9*x^5)/x^3,x, algorithm=\
```

output
```
3/4*x^3 - 3*(x*e^3 + e^(log(2) - 1))/x^2
```

3.990.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{\frac{48}{e} + 12e^3x + 9x^5}{4x^3}\,dx = \frac{3\,x^3}{4} - \frac{\mathrm{e}^{-1}\,(3\,x\,\mathrm{e}^4 + 6)}{x^2}$$

input
```
int((6*exp(log(2) - 1) + 3*x*exp(3) + (9*x^5)/4)/x^3,x)
```

output
```
(3*x^3)/4 - (exp(-1)*(3*x*exp(4) + 6))/x^2
```

3.991 $\int \frac{e^{\frac{-1+25x+16x^3+10e^xx^3+100x^4}{10x^3+5e^xx^3}}(6-100x+200x^4+e^x(3-49x-25x^2+104$

3.991.1 Optimal result

Integrand size = 103, antiderivative size = 27

$$\int \frac{e^{\frac{-1+25x+16x^3+10e^xx^3+100x^4}{10x^3+5e^xx^3}}(6-100x+200x^4+e^x(3-49x-25x^2+104x^4-100x^5))}{20x^4+20e^xx^4+5e^{2x}x^4}\,dx = e^{2+\frac{\left(4+\frac{1}{x^3}\right)\left(5-\frac{1}{5x}\right)x}{2+e^x}}$$

output
```
exp(2+(1/x^3+4)/(exp(x)+2)*(5-1/5/x)*x)
```

3.991.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int \frac{e^{\frac{-1+25x+16x^3+10e^xx^3+100x^4}{10x^3+5e^xx^3}}(6-100x+200x^4+e^x(3-49x-25x^2+104x^4-100x^5))}{20x^4+20e^xx^4+5e^{2x}x^4}\,dx = e^{2+\frac{-1+25x-4x^3+100x^4}{5(2+e^x)x^3}}$$

input
```
Integrate[(E^((-1 + 25*x + 16*x^3 + 10*E^x*x^3 + 100*x^4)/(10*x^3 + 5*E^x*
x^3))*(6 - 100*x + 200*x^4 + E^x*(3 - 49*x - 25*x^2 + 104*x^4 - 100*x^5)))
/(20*x^4 + 20*E^x*x^4 + 5*E^(2*x)*x^4),x]
```

output
```
E^(2 + (-1 + 25*x - 4*x^3 + 100*x^4)/(5*(2 + E^x)*x^3))
```

3.991.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(200x^4+e^x\left(-100x^5+104x^4-25x^2-49x+3\right)-100x+6\right)\exp\left(\frac{100x^4+10e^xx^3+16x^3+25x-1}{5e^xx^3+10x^3}\right)}{20e^xx^4+5e^{2x}x^4+20x^4}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{\left(200x^4+e^x\left(-100x^5+104x^4-25x^2-49x+3\right)-100x+6\right)\exp\left(\frac{100x^4+10e^xx^3+16x^3+25x-1}{5(e^x+2)x^3}\right)}{5\left(e^x+2\right)^2x^4}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{5}\int \frac{\exp\left(-\frac{-100x^4-10e^xx^3-16x^3-25x+1}{5(2+e^x)x^3}\right)\left(200x^4-100x+e^x\left(-100x^5+104x^4-25x^2-49x+3\right)+6\right)}{\left(2+e^x\right)^2x^4}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{5}\int \left(\frac{2\exp\left(-\frac{-100x^4-10e^xx^3-16x^3-25x+1}{5(2+e^x)x^3}\right)\left(100x^4-4x^3+25x-1\right)}{\left(2+e^x\right)^2x^3}-\frac{\exp\left(-\frac{-100x^4-10e^xx^3-16x^3-25x+1}{5(2+e^x)x^3}\right)\left(100x^5\right.}{\left(2+e^x\right)x^4}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{5}\left(-8\int \frac{\exp\left(-\frac{-100x^4-10e^xx^3-16x^3-25x+1}{5(2+e^x)x^3}\right)}{\left(2+e^x\right)^2}dx+104\int \frac{\exp\left(-\frac{-100x^4-10e^xx^3-16x^3-25x+1}{5(2+e^x)x^3}\right)}{2+e^x}dx+3\int \frac{\exp\left(-\frac{-100x\right.}{(}\right.$$

input
```
Int[(E^((-1 + 25*x + 16*x^3 + 10*E^x*x^3 + 100*x^4)/(10*x^3 + 5*E^x*x^3))*
(6 - 100*x + 200*x^4 + E^x*(3 - 49*x - 25*x^2 + 104*x^4 - 100*x^5)))/(20*x
^4 + 20*E^x*x^4 + 5*E^(2*x)*x^4),x]
```

output
```
$Aborted
```

3.991. $\int \frac{e^{\frac{-1+25x+16x^3+10e^xx^3+100x^4}{10x^3+5e^xx^3}}\left(6-100x+200x^4+e^x\left(3-49x-25x^2+104x^4-100x^5\right)\right)}{20x^4+20e^xx^4+5e^{2x}x^4}dx$

3.991.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.991.4 Maple [A] (verified)

Time = 2.10 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

method	result	size
risch	$\mathrm{e}^{\frac{10\,\mathrm{e}^{x} x^{3}+100 x^{4}+16 x^{3}+25 x -1}{5 x^{3} \left(\mathrm{e}^{x}+2\right)}}$	35
parallelrisch	$\mathrm{e}^{\frac{10\,\mathrm{e}^{x} x^{3}+100 x^{4}+16 x^{3}+25 x -1}{5 x^{3} \left(\mathrm{e}^{x}+2\right)}}$	35

input
```
int(((-100*x^5+104*x^4-25*x^2-49*x+3)*exp(x)+200*x^4-100*x+6)*exp((10*exp(
x)*x^3+100*x^4+16*x^3+25*x-1)/(5*exp(x)*x^3+10*x^3))/(5*exp(x)^2*x^4+20*ex
p(x)*x^4+20*x^4),x,method=_RETURNVERBOSE)
```

output
```
exp(1/5*(10*exp(x)*x^3+100*x^4+16*x^3+25*x-1)/x^3/(exp(x)+2))
```

3.991. $\int \frac{e^{\frac{-1+25x+16x^3+10e^x x^3+100x^4}{10x^3+5e^x x^3}}\left(6-100x+200x^4+e^x\left(3-49x-25x^2+104x^4-100x^5\right)\right)}{20x^4+20e^x x^4+5e^{2x}x^4}\,dx$

3.991.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44

$$\int \frac{e^{\frac{-1+25x+16x^3+10e^x x^3+100x^4}{10x^3+5e^x x^3}}(6-100x+200x^4+e^x(3-49x-25x^2+104x^4-100x^5))}{20x^4+20e^x x^4+5e^{2x}x^4}\,dx$$
$$= e^{\left(\frac{100\,x^4+10\,x^3e^x+16\,x^3+25\,x-1}{5\,\left(x^3e^x+2\,x^3\right)}\right)}$$

input
```
integrate((((-100*x^5+104*x^4-25*x^2-49*x+3)*exp(x)+200*x^4-100*x+6)*exp((1
0*exp(x)*x^3+100*x^4+16*x^3+25*x-1)/(5*exp(x)*x^3+10*x^3))/(5*exp(x)^2*x^4
+20*exp(x)*x^4+20*x^4),x, algorithm=\
```

output
```
e^(1/5*(100*x^4 + 10*x^3*e^x + 16*x^3 + 25*x - 1)/(x^3*e^x + 2*x^3))
```

3.991.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{e^{\frac{-1+25x+16x^3+10e^x x^3+100x^4}{10x^3+5e^x x^3}}(6-100x+200x^4+e^x(3-49x-25x^2+104x^4-100x^5))}{20x^4+20e^x x^4+5e^{2x}x^4}\,dx$$
$$= e^{\frac{100x^4+10x^3e^x+16x^3+25x-1}{5x^3e^x+10x^3}}$$

input
```
integrate((((-100*x**5+104*x**4-25*x**2-49*x+3)*exp(x)+200*x**4-100*x+6)*ex
p((10*exp(x)*x**3+100*x**4+16*x**3+25*x-1)/(5*exp(x)*x**3+10*x**3))/(5*exp
(x)**2*x**4+20*exp(x)*x**4+20*x**4),x)
```

output
```
exp((100*x**4 + 10*x**3*exp(x) + 16*x**3 + 25*x - 1)/(5*x**3*exp(x) + 10*x
**3))
```

3.991.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(22) = 44.

Time = 0.41 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.26

$$\int \frac{e^{\frac{-1+25x+16x^3+10e^x x^3+100x^4}{10x^3+5e^x x^3}}\left(6-100x+200x^4+e^x\left(3-49x-25x^2+104x^4-100x^5\right)\right)}{20x^4+20e^x x^4+5e^{2x}x^4}\,dx$$
$$= e^{\left(\frac{20\,x}{e^x+2}+\frac{2\,e^x}{e^x+2}-\frac{1}{5\,\left(x^3e^x+2\,x^3\right)}+\frac{5}{x^2e^x+2\,x^2}+\frac{16}{5\,(e^x+2)}\right)}$$

input
```
integrate((((-100*x^5+104*x^4-25*x^2-49*x+3)*exp(x)+200*x^4-100*x+6)*exp((1
0*exp(x)*x^3+100*x^4+16*x^3+25*x-1)/(5*exp(x)*x^3+10*x^3))/(5*exp(x)^2*x^4
+20*exp(x)*x^4+20*x^4),x, algorithm=\
```

output
```
e^(20*x/(e^x + 2) + 2*e^x/(e^x + 2) - 1/5/(x^3*e^x + 2*x^3) + 5/(x^2*e^x +
 2*x^2) + 16/5/(e^x + 2))
```

3.991.8 Giac [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{-1+25x+16x^3+10e^x x^3+100x^4}{10x^3+5e^x x^3}}\left(6-100x+200x^4+e^x\left(3-49x-25x^2+104x^4-100x^5\right)\right)}{20x^4+20e^x x^4+5e^{2x}x^4}\,dx$$
$$= \text{Exception raised: TypeError}$$

input
```
integrate((((-100*x^5+104*x^4-25*x^2-49*x+3)*exp(x)+200*x^4-100*x+6)*exp((1
0*exp(x)*x^3+100*x^4+16*x^3+25*x-1)/(5*exp(x)*x^3+10*x^3))/(5*exp(x)^2*x^4
+20*exp(x)*x^4+20*x^4),x, algorithm=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:Unable to divide, perhaps due to ro
unding error%%%{1000000000000,[1,29]%%%}+%%%{-2200000000000,[1,28]%%%}+%%%
{13360000
```

3.991.9 Mupad [B] (verification not implemented)

Time = 15.16 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.52

$$\int \frac{e^{\frac{-1+25x+16x^3+10e^x x^3+100x^4}{10x^3+5e^x x^3}}(6-100x+200x^4+e^x(3-49x-25x^2+104x^4-100x^5))}{20x^4+20e^x x^4+5e^{2x}x^4}\,dx$$
$$= e^{\frac{2\,e^x}{e^x+2}}\,e^{\frac{16}{5\,e^x+10}}\,e^{\frac{5}{x^2\,e^x+2\,x^2}}\,e^{-\frac{1}{5\,x^3\,e^x+10\,x^3}}\,e^{\frac{20\,x}{e^x+2}}$$

input
```
int(-(exp((25*x + 10*x^3*exp(x) + 16*x^3 + 100*x^4 - 1)/(5*x^3*exp(x) + 10
*x^3))*(100*x + exp(x)*(49*x + 25*x^2 - 104*x^4 + 100*x^5 - 3) - 200*x^4 -
 6))/(20*x^4*exp(x) + 5*x^4*exp(2*x) + 20*x^4),x)
```

output
```
exp((2*exp(x))/(exp(x) + 2))*exp(16/(5*exp(x) + 10))*exp(5/(x^2*exp(x) + 2
*x^2))*exp(-1/(5*x^3*exp(x) + 10*x^3))*exp((20*x)/(exp(x) + 2))
```

3.992 $\int 3e^x\,dx$

3.992.1 Optimal result

Integrand size = 5, antiderivative size = 10

$$\int 3e^x\,dx = 8 + e^3 + 3e^x$$

output
```
8+exp(3)+3*exp(x)
```

3.992.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

$$\int 3e^x\,dx = 3e^x$$

input
```
Integrate[3*E^x,x]
```

output
```
3*E^x
```

3.992.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.400, Rules used = {27, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int 3e^x\,dx$$

$$\Big\downarrow \text{27}$$

$$3\int e^x dx$$

$$\Big\downarrow \text{2624}$$

$$3e^x$$

input
```
Int[3*E^x,x]
```

output
```
3*E^x
```

3.992.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

3.992.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.50

method	result	size
gosper	$3\,\mathrm{e}^{x}$	5
lookup	$3\,\mathrm{e}^{x}$	5
derivativedivides	$3\,\mathrm{e}^{x}$	5
default	$3\,\mathrm{e}^{x}$	5
norman	$3\,\mathrm{e}^{x}$	5
risch	$3\,\mathrm{e}^{x}$	5
parallelrisch	$3\,\mathrm{e}^{x}$	5
parts	$3\,\mathrm{e}^{x}$	5
meijerg	$-3+3\,\mathrm{e}^{x}$	7

input
```
int(3*exp(x),x,method=_RETURNVERBOSE)
```

output
```
3*exp(x)
```

3.992.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int 3e^{x}\,dx = 3\,e^{x}$$

input
```
integrate(3*exp(x),x, algorithm=\
```

output
```
3*e^x
```

3.992.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.30

$$\int 3e^x\,dx = 3e^x$$

input
```
integrate(3*exp(x),x)
```

output
```
3*exp(x)
```

3.992.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int 3e^x\,dx = 3\,e^x$$

input
```
integrate(3*exp(x),x, algorithm=\
```

output
```
3*e^x
```

3.992.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int 3e^x\,dx = 3\,e^x$$

input
```
integrate(3*exp(x),x, algorithm=\
```

output
```
3*e^x
```

3.992.9 Mupad [B] (verification not implemented)

Time = 0.01 (sec) , antiderivative size = 4, normalized size of antiderivative = 0.40

$$\int 3e^x\,dx = 3\,\mathrm{e}^x$$

input
```
int(3*exp(x),x)
```

output
```
3*exp(x)
```

3.993 $\int \frac{-2+25i\pi}{-1+25i\pi}\,dx$

3.993.1 Optimal result

Integrand size = 17, antiderivative size = 14

$$\int \frac{-2+25i\pi}{-1+25i\pi}\,dx = -7+x+\frac{x}{1-25i\pi}$$

output
```
x/(1-25*I*Pi)+x-7
```

3.993.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 28, normalized size of antiderivative = 2.00

$$\int \frac{-2+25i\pi}{-1+25i\pi}\,dx = -\frac{2x}{-1+25i\pi}+\frac{25i\pi x}{-1+25i\pi}$$

input
```
Integrate[(-2 + (25*I)*Pi)/(-1 + (25*I)*Pi),x]
```

output
```
(-2*x)/(-1 + (25*I)*Pi) + ((25*I)*Pi*x)/(-1 + (25*I)*Pi)
```

3.993.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.29, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2+25 i \pi}{-1+25 i \pi} \, dx$$

$$\Big\downarrow \; 24$$

$$\frac{(25 \pi+2 i) x}{25 \pi+i}$$

input
```
Int[(-2 + (25*I)*Pi)/(-1 + (25*I)*Pi),x]
```

output
```
((2*I + 25*Pi)*x)/(I + 25*Pi)
```

3.993.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.993.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.21

method	result	size
default	$\frac{(25 i \pi -2) x}{25 i \pi -1}$	17
parallelrisch	$\frac{(25 i \pi -2) x}{25 i \pi -1}$	17
norman	$\frac{(625 \pi^{2}+25 i \pi +2) x}{625 \pi^{2}+1}$	23
risch	$\frac{25 i x \pi}{25 i \pi -1}-\frac{2 x}{25 i \pi -1}$	26

input
```
int((25*I*Pi-2)/(25*I*Pi-1),x,method=_RETURNVERBOSE)
```

output
```
(25*I*Pi-2)/(25*I*Pi-1)*x
```

3.993.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{-2+25i\pi}{-1+25i\pi}\,dx = \frac{(25\,\pi+2i)x}{25\,\pi+i}$$

input
```
integrate((25*I*pi-2)/(25*I*pi-1),x, algorithm=\
```

output
```
(25*pi + 2*I)*x/(25*pi + I)
```

3.993.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{-2+25i\pi}{-1+25i\pi}\,dx = \frac{x(-2+25i\pi)}{-1+25i\pi}$$

input
```
integrate((25*I*pi-2)/(25*I*pi-1),x)
```

output
```
x*(-2 + 25*I*pi)/(-1 + 25*I*pi)
```

3.993.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{-2+25i\pi}{-1+25i\pi}\,dx = \frac{(25i\,\pi-2)x}{25i\,\pi-1}$$

input
```
integrate((25*I*pi-2)/(25*I*pi-1),x, algorithm=\
```

output
```
(25*I*pi - 2)*x/(25*I*pi - 1)
```

3.993.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00

$$\int \frac{-2+25i\pi}{-1+25i\pi}\,dx = \frac{(25i\,\pi-2)x}{25i\,\pi-1}$$

input
```
integrate((25*I*pi-2)/(25*I*pi-1),x, algorithm=\
```

output
```
(25*I*pi - 2)*x/(25*I*pi - 1)
```

3.993.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.14

$$\int \frac{-2+25i\pi}{-1+25i\pi}\,dx = \frac{x\,(-2+\Pi\,25\mathrm{i})}{-1+\Pi\,25\mathrm{i}}$$

input
```
int((Pi*25i - 2)/(Pi*25i - 1),x)
```

output
```
(x*(Pi*25i - 2))/(Pi*25i - 1)
```

3.994 $\int (-20 - e - 10x)\, dx$

3.994.1 Optimal result

Integrand size = 8, antiderivative size = 11

$$\int (-20 - e - 10x)\, dx = (-4 - x)(e + 5x)$$

output
```
(5*x+exp(1))*(-4-x)
```

3.994.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.18

$$\int (-20 - e - 10x)\, dx = -20x - ex - 5x^2$$

input
```
Integrate[-20 - E - 10*x,x]
```

output
```
-20*x - E*x - 5*x^2
```

3.994.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.09, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (-10x-e-20)\,dx$$

$$\Big\downarrow \; 17$$

$$-\frac{1}{20}(10x+e+20)^2$$

input
```
Int[-20 - E - 10*x,x]
```

output
```
-1/20*(20 + E + 10*x)^2
```

3.994.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.994.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.00

method	result	size
gosper	$-x(5x+\mathrm{e}+20)$	11
default	$-x\,\mathrm{e}-5x^2-20x$	15
norman	$(-\mathrm{e}-20)\,x-5x^2$	15
risch	$-x\,\mathrm{e}-5x^2-20x$	15
parallelrisch	$(-\mathrm{e}-20)\,x-5x^2$	15
parts	$-x\,\mathrm{e}-5x^2-20x$	15

input
```
int(-exp(1)-10*x-20,x,method=_RETURNVERBOSE)
```

output
```
-x*(5*x+exp(1)+20)
```

3.994.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.27

$$\int (-20 - e - 10x)\, dx = -5\, x^2 - xe - 20\, x$$

input
```
integrate(-exp(1)-10*x-20,x, algorithm=\
```

output
```
-5*x^2 - x*e - 20*x
```

3.994.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.09

$$\int (-20 - e - 10x)\, dx = -5x^2 + x(-20 - e)$$

input
```
integrate(-exp(1)-10*x-20,x)
```

output
```
-5*x**2 + x*(-20 - E)
```

3.994.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.27

$$\int (-20 - e - 10x)\, dx = -5\, x^2 - xe - 20\, x$$

input
```
integrate(-exp(1)-10*x-20,x, algorithm=\
```

output
```
-5*x^2 - x*e - 20*x
```

3.994.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.27

$$\int (-20-e-10x)\,dx = -5\,x^2 - xe - 20\,x$$

input
```
integrate(-exp(1)-10*x-20,x, algorithm=\
```

output
```
-5*x^2 - x*e - 20*x
```

3.994.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.18

$$\int (-20-e-10x)\,dx = -5\,x^2 + (-\mathrm{e} - 20)\;x$$

input
```
int(- 10*x - exp(1) - 20,x)
```

output
```
- x*(exp(1) + 20) - 5*x^2
```

3.995 $\int (3e^x - 8x^7)\, dx$

3.995.1 Optimal result

Integrand size = 11, antiderivative size = 12

$$\int \left(3e^x - 8x^7\right) dx = 4 + 3e^x - x^8$$

output
```
3*exp(x)-x^8+4
```

3.995.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \left(3e^x - 8x^7\right) dx = 3e^x - x^8$$

input
```
Integrate[3*E^x - 8*x^7,x]
```

output
```
3*E^x - x^8
```

3.995.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(3e^x-8x^7\right) \, dx$$

$$\Big\downarrow \text{2009}$$

$$3e^x-x^8$$

input
```
Int[3*E^x - 8*x^7,x]
```

output
```
3*E^x - x^8
```

3.995.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.995.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

method	result	size
default	$-x^{8}+3\,{\mathrm e}^{x}$	11
norman	$-x^{8}+3\,{\mathrm e}^{x}$	11
risch	$-x^{8}+3\,{\mathrm e}^{x}$	11
parallelrisch	$-x^{8}+3\,{\mathrm e}^{x}$	11
parts	$-x^{8}+3\,{\mathrm e}^{x}$	11

input
```
int(3*exp(x)-8*x^7,x,method=_RETURNVERBOSE)
```

output
```
-x^8+3*exp(x)
```

3.995.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int (3e^x - 8x^7) \, dx = -x^8 + 3\, e^x$$

input
```
integrate(3*exp(x)-8*x^7,x, algorithm=\
```

output
```
-x^8 + 3*e^x
```

3.995.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.58

$$\int (3e^x - 8x^7) \, dx = -x^8 + 3e^x$$

input
```
integrate(3*exp(x)-8*x**7,x)
```

output
```
-x**8 + 3*exp(x)
```

3.995.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int (3e^x - 8x^7) \, dx = -x^8 + 3\, e^x$$

input
```
integrate(3*exp(x)-8*x^7,x, algorithm=\
```

output
```
-x^8 + 3*e^x
```

3.995.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \left(3e^x - 8x^7\right) \, dx = -x^8 + 3\,e^x$$

input
```
integrate(3*exp(x)-8*x^7,x, algorithm=\
```

output
```
-x^8 + 3*e^x
```

3.995.9 Mupad [B] (verification not implemented)

Time = 14.00 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \left(3e^x - 8x^7\right) \, dx = 3\,\mathrm{e}^x - x^8$$

input
```
int(3*exp(x) - 8*x^7,x)
```

output
```
3*exp(x) - x^8
```

3.996 $\int \frac{1}{25}(25-15ex^2-24x^3)\,dx$

3.996.1 Optimal result

Integrand size = 17, antiderivative size = 24

$$\int \frac{1}{25}(25-15ex^2-24x^3)\,dx = x+x^2-x\left(x+\frac{1}{5}x^2\left(e+\frac{6x}{5}\right)\right)$$

output
```
x^2-(x+1/5*x^2*(6/5*x+exp(1)))*x+x
```

3.996.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{1}{25}(25-15ex^2-24x^3)\,dx = x-\frac{ex^3}{5}-\frac{6x^4}{25}$$

input
```
Integrate[(25 - 15*E*x^2 - 24*x^3)/25,x]
```

output
```
x - (E*x^3)/5 - (6*x^4)/25
```

3.996.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{25}\left(-24x^3-15ex^2+25\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{25}\int \left(-24x^3-15ex^2+25\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{25}\left(-6x^4-5ex^3+25x\right)$$

input
```
Int[(25 - 15*E*x^2 - 24*x^3)/25,x]
```

output
```
(25*x - 5*E*x^3 - 6*x^4)/25
```

3.996.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.996.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

method	result	size
default	$-\frac{x^3 e}{5}-\frac{6x^4}{25}+x$	15
norman	$-\frac{x^3 e}{5}-\frac{6x^4}{25}+x$	15
risch	$-\frac{x^3 e}{5}-\frac{6x^4}{25}+x$	15
parallelrisch	$-\frac{x^3 e}{5}-\frac{6x^4}{25}+x$	15
parts	$-\frac{x^3 e}{5}-\frac{6x^4}{25}+x$	15
gosper	$-\frac{x(5x^2 e+6x^3-25)}{25}$	18

input
```
int(-3/5*x^2*exp(1)-24/25*x^3+1,x,method=_RETURNVERBOSE)
```

output
```
-1/5*x^3*exp(1)-6/25*x^4+x
```

3.996.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.58

$$\int \frac{1}{25}\left(25-15ex^2-24x^3\right)\,dx=-\frac{6}{25}\,x^4-\frac{1}{5}\,x^3e+x$$

input
```
integrate(-3/5*x^2*exp(1)-24/25*x^3+1,x, algorithm=\
```

output
```
-6/25*x^4 - 1/5*x^3*e + x
```

3.996.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{1}{25}\left(25-15ex^2-24x^3\right)\,dx=-\frac{6x^4}{25}-\frac{ex^3}{5}+x$$

input
```
integrate(-3/5*x**2*exp(1)-24/25*x**3+1,x)
```

output
```
-6*x**4/25 - E*x**3/5 + x
```

3.996.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.58

$$\int \frac{1}{25}\left(25-15ex^2-24x^3\right)\,dx=-\frac{6}{25}\,x^4-\frac{1}{5}\,x^3e+x$$

input
```
integrate(-3/5*x^2*exp(1)-24/25*x^3+1,x, algorithm=\
```

output
```
-6/25*x^4 - 1/5*x^3*e + x
```

3.996.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.58

$$\int \frac{1}{25}\left(25-15ex^2-24x^3\right)\,dx=-\frac{6}{25}\,x^4-\frac{1}{5}\,x^3e+x$$

input
```
integrate(-3/5*x^2*exp(1)-24/25*x^3+1,x, algorithm=\
```

output
```
-6/25*x^4 - 1/5*x^3*e + x
```

3.996.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.58

$$\int \frac{1}{25}\left(25-15ex^2-24x^3\right)\,dx=-\frac{6\,x^4}{25}-\frac{\mathrm{e}\,x^3}{5}+x$$

input
```
int(1 - (24*x^3)/25 - (3*x^2*exp(1))/5,x)
```

output
```
x - (x^3*exp(1))/5 - (6*x^4)/25
```

3.997 $\int \frac{-6-12e^{2x}+x+e^{e^2+x}(-5+12e^{2x}+x)}{-5+12e^{2x}+x}\,dx$

3.997.1 Optimal result

Integrand size = 41, antiderivative size = 22

$$\int \frac{-6-12e^{2x}+x+e^{e^2+x}(-5+12e^{2x}+x)}{-5+12e^{2x}+x}\,dx = e^{e^2+x}+x-\log\left(-5+12e^{2x}+x\right)$$

output
```
x-ln(12*exp(x)^2+x-5)+exp(x+exp(2))
```

3.997.2 Mathematica [A] (verified)

Time = 0.50 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-6-12e^{2x}+x+e^{e^2+x}(-5+12e^{2x}+x)}{-5+12e^{2x}+x}\,dx = e^{e^2+x}+x-\log\left(5-12e^{2x}-x\right)$$

input
```
Integrate[(-6 - 12*E^(2*x) + x + E^(E^2 + x)*(-5 + 12*E^(2*x) + x))/(-5 +
12*E^(2*x) + x),x]
```

output
```
E^(E^2 + x) + x - Log[5 - 12*E^(2*x) - x]
```

3.997.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x-12e^{2x}+e^{x+e^2}\left(x+12e^{2x}-5\right)-6}{x+12e^{2x}-5}\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2x-11}{x+12e^{2x}-5}+e^{x+e^2}-1\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-11\int \frac{1}{x+12e^{2x}-5}dx+2\int \frac{x}{x+12e^{2x}-5}dx-x+e^{x+e^2}$$

input
```
Int[(-6 - 12*E^(2*x) + x + E^(E^2 + x)*(-5 + 12*E^(2*x) + x))/(-5 + 12*E^(
2*x) + x),x]
```

output
```
$Aborted
```

3.997.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.997.4 Maple [A] (verified)

Time = 0.29 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

method	result	size
risch	$\mathrm{e}^{x+\mathrm{e}^2}+x-\ln\left(\mathrm{e}^{2x}+\frac{x}{12}-\frac{5}{12}\right)$	20
parallelrisch	$x-\ln\left(12\,\mathrm{e}^{2x}+x-5\right)+\mathrm{e}^{x+\mathrm{e}^2}$	20
norman	$x+\mathrm{e}^{\mathrm{e}^2}\mathrm{e}^{x}-\ln\left(12\,\mathrm{e}^{2x}+x-5\right)$	21

input
```
int(((12*exp(x)^2+x-5)*exp(x+exp(2))-12*exp(x)^2+x-6)/(12*exp(x)^2+x-5),x,
method=_RETURNVERBOSE)
```

output
```
exp(x+exp(2))+x-ln(exp(2*x)+1/12*x-5/12)
```

3.997.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.41

$$\int \frac{-6-12e^{2x}+x+e^{e^2+x}(-5+12e^{2x}+x)}{-5+12e^{2x}+x}\,dx$$
$$= x+e^{(x+e^2)}-\log\left((x-5)e^{(2\,e^2)}+12\,e^{(2\,x+2\,e^2)}\right)$$

input
```
integrate(((12*exp(x)^2+x-5)*exp(x+exp(2))-12*exp(x)^2+x-6)/(12*exp(x)^2+x
-5),x, algorithm=\
```

output
```
x + e^(x + e^2) - log((x - 5)*e^(2*e^2) + 12*e^(2*x + 2*e^2))
```

3.997.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

$$\int \frac{-6-12e^{2x}+x+e^{e^2+x}(-5+12e^{2x}+x)}{-5+12e^{2x}+x}\,dx = x+\sqrt{e^{2x}}e^{e^2}-\log\left(\frac{x}{12}+e^{2x}-\frac{5}{12}\right)$$

input
```
integrate(((12*exp(x)**2+x-5)*exp(x+exp(2))-12*exp(x)**2+x-6)/(12*exp(x)**
2+x-5),x)
```

output
```
x + sqrt(exp(2*x))*exp(exp(2)) - log(x/12 + exp(2*x) - 5/12)
```

3.997.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{-6-12e^{2x}+x+e^{e^2+x}(-5+12e^{2x}+x)}{-5+12e^{2x}+x}\,dx = x+e^{(x+e^2)}-\log\left(\frac{1}{12}\,x+e^{(2\,x)}-\frac{5}{12}\right)$$

input
```
integrate(((12*exp(x)^2+x-5)*exp(x+exp(2))-12*exp(x)^2+x-6)/(12*exp(x)^2+x
-5),x, algorithm=\
```

output
```
x + e^(x + e^2) - log(1/12*x + e^(2*x) - 5/12)
```

3.997.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(19) = 38$.

Time = 0.29 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.23

$$\int \frac{-6-12e^{2x}+x+e^{e^2+x}(-5+12e^{2x}+x)}{-5+12e^{2x}+x}\,dx$$
$$= x+e^2+e^{(x+e^2)}-\log\left(-(x+e^2)e^{(2\,e^2)}-12\,e^{(2\,x+2\,e^2)}+5\,e^{(2\,e^2)}+e^{(2\,e^2+2)}\right)$$

input
```
integrate(((12*exp(x)^2+x-5)*exp(x+exp(2))-12*exp(x)^2+x-6)/(12*exp(x)^2+x
-5),x, algorithm=\
```

output
```
x + e^2 + e^(x + e^2) - log(-(x + e^2)*e^(2*e^2) - 12*e^(2*x + 2*e^2) + 5*
e^(2*e^2) + e^(2*e^2 + 2))
```

3.997.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-6-12e^{2x}+x+e^{e^2+x}(-5+12e^{2x}+x)}{-5+12e^{2x}+x}\,dx = x-\ln\left(x+12\,\mathrm{e}^{2\,x}-5\right)+\mathrm{e}^{\mathrm{e}^2}\,\mathrm{e}^x$$

input
```
int((x - 12*exp(2*x) + exp(x + exp(2))*(x + 12*exp(2*x) - 5) - 6)/(x + 12*
exp(2*x) - 5),x)
```

output
```
x - log(x + 12*exp(2*x) - 5) + exp(exp(2))*exp(x)
```

3.998 $\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+\right.}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}(x^2\right.}$

3.998.1 Optimal result

Integrand size = 149, antiderivative size = 27

$$\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}(x^2+\right.}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right.}$$
$$=\frac{e^x}{\log\left(\frac{x^2}{16}+(-1+x)^2\log\left(\frac{x}{5}\right)\right)}$$

output
```
exp(x)/ln((-1+x)^2*ln(1/5*x)+1/16*x^2)
```

3.998.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

$$\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}(x^2+\right.}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right.}$$
$$=\frac{e^x}{\log\left(\frac{1}{16}\left(x^2+16(-1+x)^2\log\left(\frac{x}{5}\right)\right)\right)}$$

input
```
Integrate[(E^x*(-16 + 32*x - 18*x^2) + E^x*(32*x - 32*x^2)*Log[x/5] + (E^x
*x^3 + E^x*(16*x - 32*x^2 + 16*x^3)*Log[x/5])*Log[(x^2 + (16 - 32*x + 16*x
^2)*Log[x/5])/16])/((x^3 + (16*x - 32*x^2 + 16*x^3)*Log[x/5])*Log[(x^2 + (
16 - 32*x + 16*x^2)*Log[x/5])/16]^2),x]
```

3.998. $\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right)}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right)}\,dx$

output
```
E^x/Log[(x^2 + 16*(-1 + x)^2*Log[x/5])/16]
```

3.998.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(-18x^2+32x-16\right)+e^x\left(32x-32x^2\right)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x\left(16x^3-32x^2+16x\right)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}\left(x^2+\left(16x\right.\right.\right.}{\left(x^3+\left(16x^3-32x^2+16x\right)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+\left(16x^2-32x+16\right)\log\left(\frac{x}{5}\right)\right)\right)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int\left(-\frac{18e^xx}{\left(x^2+16x^2\log\left(\frac{x}{5}\right)-32x\log\left(\frac{x}{5}\right)+16\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+16(x-1)^2\log\left(\frac{x}{5}\right)\right)\right)}-\frac{}{\left(x^2+16x^2\log\left(\frac{x}{5}\right)-\right.}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^x\left(-18x^2+16(x-1)x\log\left(\frac{x}{5}\right)\left((x-1)\log\left(\frac{1}{16}\left(x^2+16(x-1)^2\log\left(\frac{x}{5}\right)\right)\right)-2\right)+x^3\log\left(\frac{1}{16}\left(x^2+16(x-1)^2\log\right.\right.\right.}{x\left(x^2+16(x-1)^2\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+16(x-1)^2\log\left(\frac{x}{5}\right)\right)\right)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int\left(\frac{e^x}{\log\left(\frac{1}{16}\left(x^2+16(x-1)^2\log\left(\frac{x}{5}\right)\right)\right)}-\frac{2e^x\left(9x^2+16x^2\log\left(\frac{x}{5}\right)-16x-16x\log\left(\frac{x}{5}\right)+8\right)}{x\left(x^2+16x^2\log\left(\frac{x}{5}\right)-32x\log\left(\frac{x}{5}\right)+16\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+16(x-1\right.\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$160\text{Subst}\left(\int \frac{e^{5x}}{\left(25x^2+16(5x-1)^2\log(x)\right)\log^2\left(\frac{1}{16}\left(25x^2+16(5x-1)^2\log(x)\right)\right)}dx,x,\frac{x}{5}\right)+160\text{Subst}\left(\int \frac{e^{5x}\log(x)}{\left(25x^2+16(5x-1)^2\log(x)\right)\log^2\left(\frac{1}{16}\left(25x^2+16(5x-1)^2\log(x)\right)\right)}dx,x,\frac{x}{5}\right)+5\text{Subst}\left(\int \frac{e^{5x}}{\log\left(\frac{1}{16}\left(25x^2+16(5x-1)^2\log(x)\right)\right)}dx,x,\frac{x}{5}\right)-16\int \frac{e^x}{x\left(16\log\left(\frac{x}{5}\right)(x-1)^2+x^2\right)\log^2\left(\frac{1}{16}\left(16\log\left(\frac{x}{5}\right)(x-1)^2+x^2\right)\right)}dx-18\int \frac{e^xx}{\left(16\log\left(\frac{x}{5}\right)(x-1)^2+x^2\right)\log^2\left(\frac{1}{16}\left(16\log\left(\frac{x}{5}\right)(x-1)^2+x^2\right)\right)}dx-32\int \frac{e^xx\log\left(\frac{x}{5}\right)}{\left(16\log\left(\frac{x}{5}\right)(x-1)^2+x^2\right)\log^2\left(\frac{1}{16}\left(16\log\left(\frac{x}{5}\right)(x-1)^2+x^2\right)\right)}dx$$

3.998. $\int \frac{e^x\left(-16+32x-18x^2\right)+e^x\left(32x-32x^2\right)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x\left(16x-32x^2+16x^3\right)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}\left(x^2+\left(16-32x+16x^2\right)\log\left(\frac{x}{5}\right)\right)\right)}{\left(x^3+\left(16x-32x^2+16x^3\right)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+\left(16-32x+16x^2\right)\log\left(\frac{x}{5}\right)\right)\right)}\,dx$

input
```
Int[(E^x*(-16 + 32*x - 18*x^2) + E^x*(32*x - 32*x^2)*Log[x/5] + (E^x*x^3 +
 E^x*(16*x - 32*x^2 + 16*x^3)*Log[x/5])*Log[(x^2 + (16 - 32*x + 16*x^2)*Lo
g[x/5])/16])/((x^3 + (16*x - 32*x^2 + 16*x^3)*Log[x/5])*Log[(x^2 + (16 - 3
2*x + 16*x^2)*Log[x/5])/16]^2),x]
```

output
```
$Aborted
```

3.998.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.998.4 Maple [A] (verified)

Time = 4.56 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

method	result	size
risch	$\frac{{\mathrm e}^{x}}{\ln\left(\frac{\left(16 x^{2}-32 x +16\right) \ln\left(\frac{x}{5}\right)}{16}+\frac{x^{2}}{16}\right)}$	29
parallelrisch	$\frac{{\mathrm e}^{x}}{\ln\left(\frac{\left(16 x^{2}-32 x +16\right) \ln\left(\frac{x}{5}\right)}{16}+\frac{x^{2}}{16}\right)}$	29

input
```
int((((16*x^3-32*x^2+16*x)*exp(x)*ln(1/5*x)+exp(x)*x^3)*ln(1/16*(16*x^2-32
*x+16)*ln(1/5*x)+1/16*x^2)+(-32*x^2+32*x)*exp(x)*ln(1/5*x)+(-18*x^2+32*x-1
6)*exp(x))/((16*x^3-32*x^2+16*x)*ln(1/5*x)+x^3)/ln(1/16*(16*x^2-32*x+16)*l
n(1/5*x)+1/16*x^2)^2,x,method=_RETURNVERBOSE)
```

output
```
exp(x)/ln(1/16*(16*x^2-32*x+16)*ln(1/5*x)+1/16*x^2)
```

3.998.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}(x^2+\right.}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right.}$$
$$=\frac{e^x}{\log\left(\frac{1}{16}x^2+(x^2-2x+1)\log\left(\frac{1}{5}x\right)\right)}$$

input
```
integrate((((16*x^3-32*x^2+16*x)*exp(x)*log(1/5*x)+exp(x)*x^3)*log(1/16*(1
6*x^2-32*x+16)*log(1/5*x)+1/16*x^2)+(-32*x^2+32*x)*exp(x)*log(1/5*x)+(-18*
x^2+32*x-16)*exp(x))/((16*x^3-32*x^2+16*x)*log(1/5*x)+x^3)/log(1/16*(16*x^
2-32*x+16)*log(1/5*x)+1/16*x^2)^2,x, algorithm=\
```

output
```
e^x/log(1/16*x^2 + (x^2 - 2*x + 1)*log(1/5*x))
```

3.998.6 Sympy [A] (verification not implemented)

Time = 0.51 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}(x^2+\right.}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right.}$$
$$=\frac{e^x}{\log\left(\frac{x^2}{16}+(x^2-2x+1)\log\left(\frac{x}{5}\right)\right)}$$

input
```
integrate((((16*x**3-32*x**2+16*x)*exp(x)*ln(1/5*x)+exp(x)*x**3)*ln(1/16*(
16*x**2-32*x+16)*ln(1/5*x)+1/16*x**2)+(-32*x**2+32*x)*exp(x)*ln(1/5*x)+(-1
8*x**2+32*x-16)*exp(x))/((16*x**3-32*x**2+16*x)*ln(1/5*x)+x**3)/ln(1/16*(1
6*x**2-32*x+16)*ln(1/5*x)+1/16*x**2)**2,x)
```

output
```
exp(x)/log(x**2/16 + (x**2 - 2*x + 1)*log(x/5))
```

3.998. $\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right)}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right)}\,dx$

3.998.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(22) = 44$.

Time = 0.35 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.74

$$\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}(x^2+\right.}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right.}$$
$$= -\frac{e^x}{4\log(2)-\log(-x^2(16\log(5)-1)+32x\log(5)+16(x^2-2x+1)\log(x)-16\log(5))}$$

input
```
integrate((((16*x^3-32*x^2+16*x)*exp(x)*log(1/5*x)+exp(x)*x^3)*log(1/16*(1
6*x^2-32*x+16)*log(1/5*x)+1/16*x^2)+(-32*x^2+32*x)*exp(x)*log(1/5*x)+(-18*
x^2+32*x-16)*exp(x))/((16*x^3-32*x^2+16*x)*log(1/5*x)+x^3)/log(1/16*(16*x^
2-32*x+16)*log(1/5*x)+1/16*x^2)^2,x, algorithm=\
```

output
```
-e^x/(4*log(2) - log(-x^2*(16*log(5) - 1) + 32*x*log(5) + 16*(x^2 - 2*x +
1)*log(x) - 16*log(5)))
```

3.998.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1234 vs. $2(22) = 44$.

Time = 0.61 (sec) , antiderivative size = 1234, normalized size of antiderivative = 45.70

$$\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}(x^2+\right.}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right.}$$
= Too large to display

input
```
integrate((((16*x^3-32*x^2+16*x)*exp(x)*log(1/5*x)+exp(x)*x^3)*log(1/16*(1
6*x^2-32*x+16)*log(1/5*x)+1/16*x^2)+(-32*x^2+32*x)*exp(x)*log(1/5*x)+(-18*
x^2+32*x-16)*exp(x))/((16*x^3-32*x^2+16*x)*log(1/5*x)+x^3)/log(1/16*(16*x^
2-32*x+16)*log(1/5*x)+1/16*x^2)^2,x, algorithm=\
```

3.998. $\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right)}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right)}\,dx$

output
```
-(256*x^4*e^x*log(5)*log(1/5*x) - 256*x^4*e^x*log(1/5*x)*log(x) + 16*x^4*e
^x*log(5) - 144*x^4*e^x*log(1/5*x) - 768*x^3*e^x*log(5)*log(1/5*x) - 16*x^
4*e^x*log(x) + 768*x^3*e^x*log(1/5*x)*log(x) - 9*x^4*e^x - 16*x^3*e^x*log(
5) + 544*x^3*e^x*log(1/5*x) + 768*x^2*e^x*log(5)*log(1/5*x) + 16*x^3*e^x*l
og(x) - 768*x^2*e^x*log(1/5*x)*log(x) + 16*x^3*e^x - 784*x^2*e^x*log(1/5*x
) - 256*x*e^x*log(5)*log(1/5*x) + 256*x*e^x*log(1/5*x)*log(x) - 8*x^2*e^x
+ 512*x*e^x*log(1/5*x) - 128*e^x*log(1/5*x))/(1024*x^4*log(5)*log(2)*log(1
/5*x) - 256*x^4*log(5)*log(16*x^2*log(1/5*x) + x^2 - 32*x*log(1/5*x) + 16*
log(1/5*x))*log(1/5*x) - 1024*x^4*log(2)*log(1/5*x)*log(x) + 256*x^4*log(1
6*x^2*log(1/5*x) + x^2 - 32*x*log(1/5*x) + 16*log(1/5*x))*log(1/5*x)*log(x
) + 576*x^4*log(5)*log(2) - 144*x^4*log(5)*log(16*x^2*log(1/5*x) + x^2 - 3
2*x*log(1/5*x) + 16*log(1/5*x)) - 64*x^4*log(2)*log(1/5*x) - 3072*x^3*log(
5)*log(2)*log(1/5*x) + 16*x^4*log(16*x^2*log(1/5*x) + x^2 - 32*x*log(1/5*x
) + 16*log(1/5*x))*log(1/5*x) + 768*x^3*log(5)*log(16*x^2*log(1/5*x) + x^2
 - 32*x*log(1/5*x) + 16*log(1/5*x))*log(1/5*x) - 576*x^4*log(2)*log(x) + 1
44*x^4*log(16*x^2*log(1/5*x) + x^2 - 32*x*log(1/5*x) + 16*log(1/5*x))*log(
x) + 3072*x^3*log(2)*log(1/5*x)*log(x) - 768*x^3*log(16*x^2*log(1/5*x) + x
^2 - 32*x*log(1/5*x) + 16*log(1/5*x))*log(1/5*x)*log(x) - 36*x^4*log(2) -
2176*x^3*log(5)*log(2) + 9*x^4*log(16*x^2*log(1/5*x) + x^2 - 32*x*log(1/5*
x) + 16*log(1/5*x)) + 544*x^3*log(5)*log(16*x^2*log(1/5*x) + x^2 - 32*x...
```

3.998.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^x(-16+32x-18x^2)+e^x(32x-32x^2)\log\left(\frac{x}{5}\right)+\left(e^xx^3+e^x(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log\left(\frac{1}{16}\left(x^2+\right.\right.}{\left(x^3+(16x-32x^2+16x^3)\log\left(\frac{x}{5}\right)\right)\log^2\left(\frac{1}{16}\left(x^2+(16-32x+16x^2)\log\left(\frac{x}{5}\right)\right)\right)}$$
$= \text{Hanged}$

input
```
int((log((log(x/5)*(16*x^2 - 32*x + 16))/16 + x^2/16)*(x^3*exp(x) + log(x/
5)*exp(x)*(16*x - 32*x^2 + 16*x^3)) - exp(x)*(18*x^2 - 32*x + 16) + log(x/
5)*exp(x)*(32*x - 32*x^2))/(log((log(x/5)*(16*x^2 - 32*x + 16))/16 + x^2/1
6)^2*(log(x/5)*(16*x - 32*x^2 + 16*x^3) + x^3)),x)
```

output
```
\text{Hanged}
```

3.999 $\int \frac{-5+(8ex-8x^2)\log(x)+(8ex-12x^2)\log^2(x)}{-5x+(4ex^2-4x^3)\log^2(x)}\,dx$

3.999.1 Optimal result

Integrand size = 54, antiderivative size = 19

$$\int \frac{-5+(8ex-8x^2)\log(x)+(8ex-12x^2)\log^2(x)}{-5x+(4ex^2-4x^3)\log^2(x)}\,dx = \log\left(x+\frac{4}{5}x^2(-e+x)\log^2(x)\right)$$

output
```
ln(x+4/5*ln(x)^2*x^2*(x-exp(1)))
```

3.999.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 41 vs. 2(19) = 38.

Time = 0.33 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.16

$$\int \frac{-5+(8ex-8x^2)\log(x)+(8ex-12x^2)\log^2(x)}{-5x+(4ex^2-4x^3)\log^2(x)}\,dx$$
$$= \log(e-x)+2\log(x)-\log((e-x)x)+\log\left(5-4ex\log^2(x)+4x^2\log^2(x)\right)$$

input
```
Integrate[(-5 + (8*E*x - 8*x^2)*Log[x] + (8*E*x - 12*x^2)*Log[x]^2)/(-5*x
+ (4*E*x^2 - 4*x^3)*Log[x]^2),x]
```

output
```
Log[E - x] + 2*Log[x] - Log[(E - x)*x] + Log[5 - 4*E*x*Log[x]^2 + 4*x^2*Lo
g[x]^2]
```

3.999.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(8ex-12x^2)\log^2(x)+(8ex-8x^2)\log(x)-5}{(4ex^2-4x^3)\log^2(x)-5x}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{8x^3\log(x)-16ex^2\log(x)-10x+8e^2x\log(x)+5e}{x(x-e)\left(4x^2\log^2(x)-4ex\log^2(x)+5\right)}+\frac{2e-3x}{(e-x)x}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{10\int \frac{1}{-4x^2\log^2(x)+4ex\log^2(x)-5}dx}{e}-5\int \frac{1}{(e-x)\left(-4x^2\log^2(x)+4ex\log^2(x)-5\right)}dx+8e\int \frac{\log(x)}{-4x^2\log^2(x)+4ex\log^2(x)-5}dx-24\int \frac{x\log(x)}{-4x^2\log^2(x)+4ex\log^2(x)-5}dx-\frac{10\int \frac{1}{4x^2\log^2(x)-4ex\log^2(x)+5}dx}{e}-5\int \frac{1}{x\left(4x^2\log^2(x)-4ex\log^2(x)+5\right)}dx-16\int \frac{x\log(x)}{4x^2\log^2(x)-4ex\log^2(x)+5}dx+\log(e-x)+2\log(x)$$

input
```
Int[(-5 + (8*E*x - 8*x^2)*Log[x] + (8*E*x - 12*x^2)*Log[x]^2)/(-5*x + (4*E
*x^2 - 4*x^3)*Log[x]^2),x]
```

output
```
$Aborted
```

3.999.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.999.4 Maple [A] (verified)

Time = 1.76 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

method	result	size
parallelrisch	$\ln\left(-\ln(x)^2 x\,\mathrm{e}+x^2\ln(x)^2+\frac{5}{4}\right)+\ln(x)$	24
default	$\ln(x)+\ln\left(4\ln(x)^2 x\,\mathrm{e}-4x^2\ln(x)^2-5\right)$	25
norman	$\ln(x)+\ln\left(4\ln(x)^2 x\,\mathrm{e}-4x^2\ln(x)^2-5\right)$	25
risch	$2\ln(x)+\ln(x-\mathrm{e})+\ln\left(\ln(x)^2-\frac{5}{4x(\mathrm{e}-x)}\right)$	32

input
```
int(((8*x*exp(1)-12*x^2)*ln(x)^2+(8*x*exp(1)-8*x^2)*ln(x)-5)/((4*x^2*exp(1
)-4*x^3)*ln(x)^2-5*x),x,method=_RETURNVERBOSE)
```

output
```
ln(-ln(x)^2*x*exp(1)+x^2*ln(x)^2+5/4)+ln(x)
```

3.999.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. 2(18) = 36.

Time = 0.28 (sec) , antiderivative size = 43, normalized size of antiderivative = 2.26

$$\int \frac{-5+(8ex-8x^2)\log(x)+(8ex-12x^2)\log^2(x)}{-5x+(4ex^2-4x^3)\log^2(x)}\,dx$$
$$=\log(x-e)+2\log(x)+\log\left(-\frac{4(x^2-xe)\log(x)^2+5}{x^2-xe}\right)$$

input
```
integrate(((8*x*exp(1)-12*x^2)*log(x)^2+(8*x*exp(1)-8*x^2)*log(x)-5)/((4*x
^2*exp(1)-4*x^3)*log(x)^2-5*x),x, algorithm=\
```

output
```
log(x - e) + 2*log(x) + log(-(4*(x^2 - x*e)*log(x)^2 + 5)/(x^2 - x*e))
```

3.999.6 Sympy [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.63

$$\int \frac{-5+(8ex-8x^2)\log(x)+(8ex-12x^2)\log^2(x)}{-5x+(4ex^2-4x^3)\log^2(x)}\,dx$$
$$= 2\log(x)+\log(x-e)+\log\left(\log(x)^2+\frac{5}{4x^2-4ex}\right)$$

input
```
integrate(((8*x*exp(1)-12*x**2)*ln(x)**2+(8*x*exp(1)-8*x**2)*ln(x)-5)/((4*
x**2*exp(1)-4*x**3)*ln(x)**2-5*x),x)
```

output
```
2*log(x) + log(x - E) + log(log(x)**2 + 5/(4*x**2 - 4*E*x))
```

3.999.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. 2(18) = 36.

Time = 0.23 (sec) , antiderivative size = 43, normalized size of antiderivative = 2.26

$$\int \frac{-5+(8ex-8x^2)\log(x)+(8ex-12x^2)\log^2(x)}{-5x+(4ex^2-4x^3)\log^2(x)}\,dx$$
$$= \log(x-e)+2\log(x)+\log\left(\frac{4(x^2-xe)\log(x)^2+5}{4(x^2-xe)}\right)$$

input
```
integrate(((8*x*exp(1)-12*x^2)*log(x)^2+(8*x*exp(1)-8*x^2)*log(x)-5)/((4*x
^2*exp(1)-4*x^3)*log(x)^2-5*x),x, algorithm=\
```

output
```
log(x - e) + 2*log(x) + log(1/4*(4*(x^2 - x*e)*log(x)^2 + 5)/(x^2 - x*e))
```

3.999.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{-5+(8ex-8x^2)\log(x)+(8ex-12x^2)\log^2(x)}{-5x+(4ex^2-4x^3)\log^2(x)}\,dx$$
$$= \log\left(-4\,x^2\log\left(x\right)^2+4\,xe\log\left(x\right)^2-5\right)+\log\left(x\right)$$

input
```
integrate(((8*x*exp(1)-12*x^2)*log(x)^2+(8*x*exp(1)-8*x^2)*log(x)-5)/((4*x
^2*exp(1)-4*x^3)*log(x)^2-5*x),x, algorithm=\
```

output
```
log(-4*x^2*log(x)^2 + 4*x*e*log(x)^2 - 5) + log(x)
```

3.999.9 Mupad [B] (verification not implemented)

Time = 15.73 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{-5+(8ex-8x^2)\log(x)+(8ex-12x^2)\log^2(x)}{-5x+(4ex^2-4x^3)\log^2(x)}\,dx$$
$$= \ln\left(4\,x^2\ln\left(x\right)^2-4\,\mathrm{e}\,x\ln\left(x\right)^2+5\right)+\ln\left(x\right)$$

input
```
int(-(log(x)*(8*x*exp(1) - 8*x^2) + log(x)^2*(8*x*exp(1) - 12*x^2) - 5)/(5
*x - log(x)^2*(4*x^2*exp(1) - 4*x^3)),x)
```

output
```
log(4*x^2*log(x)^2 - 4*x*exp(1)*log(x)^2 + 5) + log(x)
```

3.1000 $\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log\right.}{2x\log^5}$

3.1000.1 Optimal result

Integrand size = 88, antiderivative size = 27

$$\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log^2(x)+5x\log^5(x)+\left(-64\log^4(2)-48\log^2\right.\right.}{2x\log^5(x)}$$

$$=\frac{1}{2}e^{\left(3+\frac{4\log^2(2)}{\log^2(x)}\right)^2}(5x+\log(\log(5)))$$

output
```
1/2*(5*x+ln(ln(5)))*exp((4*ln(2)^2/ln(x)^2+3)^2)
```

3.1000.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log^2(x)+5x\log^5(x)+\left(-64\log^4(2)-48\log^2\right.\right.}{2x\log^5(x)}$$

$$=\frac{1}{2}e^{\frac{\left(4\log^2(2)+3\log^2(x)\right)^2}{\log^4(x)}}(5x+\log(\log(5)))$$

input
```
Integrate[(E^((16*Log[2]^4 + 24*Log[2]^2*Log[x]^2 + 9*Log[x]^4)/Log[x]^4)*
(-320*x*Log[2]^4 - 240*x*Log[2]^2*Log[x]^2 + 5*x*Log[x]^5 + (-64*Log[2]^4
- 48*Log[2]^2*Log[x]^2)*Log[Log[5]]))/(2*x*Log[x]^5),x]
```

output
```
(E^((4*Log[2]^2 + 3*Log[x]^2)^2/Log[x]^4)*(5*x + Log[Log[5]]))/2
```

3.1000.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 141 vs. 2(27) = 54.

Time = 0.67 (sec) , antiderivative size = 141, normalized size of antiderivative = 5.22, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034, Rules used = {27, 25, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(5x\log^5(x)-320x\log^4(2)-240x\log^2(2)\log^2(x)+\log(\log(5))\left(-48\log^2(2)\log^2(x)-64\log^4(2)\right)\right)\exp\left(\frac{9\log^4(x}{}\right.}{2x\log^5(x)}$$

$\Big\downarrow$ 27

$$\frac{1}{2}\int -\frac{\exp\left(\frac{9\log^4(x)+24\log^2(2)\log^2(x)+16\log^4(2)}{\log^4(x)}\right)\left(-5x\log^5(x)+240x\log^2(2)\log^2(x)+16\left(3\log^2(2)\log^2(x)+4\log^4(\right.\right.}{x\log^5(x)}$$

$\Big\downarrow$ 25

$$-\frac{1}{2}\int \frac{\exp\left(\frac{9\log^4(x)+24\log^2(2)\log^2(x)+16\log^4(2)}{\log^4(x)}\right)\left(-5x\log^5(x)+240x\log^2(2)\log^2(x)+16\left(3\log^2(2)\log^2(x)+4\log^4(\right.\right.}{x\log^5(x)}$$

$\Big\downarrow$ 2726

$$-\frac{2\left(20x\log^4(2)+15x\log^2(2)\log^2(x)+\log(\log(5))\left(3\log^2(2)\log^2(x)+4\log^4(2)\right)\right)\exp\left(\frac{9\log^4(x)+24\log^2(2)\log^2(x)+16}{\log^4(x)}\right.}{x\log^5(x)\left(\frac{3\left(\frac{3\log^3(x)}{x}+\frac{4\log^2(2)\log(x)}{x}\right)}{\log^4(x)}-\frac{9\log^4(x)+24\log^2(2)\log^2(x)+16\log^4(2)}{x\log^5(x)}\right)}$$

input
```
Int[(E^((16*Log[2]^4 + 24*Log[2]^2*Log[x]^2 + 9*Log[x]^4)/Log[x]^4)*(-320*
x*Log[2]^4 - 240*x*Log[2]^2*Log[x]^2 + 5*x*Log[x]^5 + (-64*Log[2]^4 - 48*L
og[2]^2*Log[x]^2)*Log[Log[5]]))/(2*x*Log[x]^5),x]
```

3.1000. $\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log^2(x)+5x\log^5(x)+\left(-64\log^4(2)-48\log^2(2)\log^2(x)\right)\log(\log(5))\right)}{2x\log^5(x)}\,dx$

output
```
(-2*E^((16*Log[2]^4 + 24*Log[2]^2*Log[x]^2 + 9*Log[x]^4)/Log[x]^4)*(20*x*L
og[2]^4 + 15*x*Log[2]^2*Log[x]^2 + (4*Log[2]^4 + 3*Log[2]^2*Log[x]^2)*Log[
Log[5]]))/(x*Log[x]^5*((3*((4*Log[2]^2*Log[x])/x + (3*Log[x]^3)/x))/Log[x]
^4 - (16*Log[2]^4 + 24*Log[2]^2*Log[x]^2 + 9*Log[x]^4)/(x*Log[x]^5)))
```

3.1000.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.1000.4 Maple [A] (verified)

Time = 9.62 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

method	result	size
risch	$\frac{(5x+\ln(\ln(5)))\,e^{\frac{\left(3\ln(x)^2+4\ln(2)^2\right)^2}{\ln(x)^4}}}{2}$	31
parallelrisch	$\frac{\ln(\ln(5))\,e^{\frac{9\ln(x)^4+24\ln(2)^2\ln(x)^2+16\ln(2)^4}{\ln(x)^4}}}{2}+\frac{5\,e^{\frac{9\ln(x)^4+24\ln(2)^2\ln(x)^2+16\ln(2)^4}{\ln(x)^4}}\,x}{2}$	68

input
```
int(1/2*((-48*ln(2)^2*ln(x)^2-64*ln(2)^4)*ln(ln(5))+5*x*ln(x)^5-240*x*ln(2
)^2*ln(x)^2-320*x*ln(2)^4)*exp((9*ln(x)^4+24*ln(2)^2*ln(x)^2+16*ln(2)^4)/l
n(x)^4)/x/ln(x)^5,x,method=_RETURNVERBOSE)
```

output
```
1/2*(5*x+ln(ln(5)))*exp((3*ln(x)^2+4*ln(2)^2)^2/ln(x)^4)
```

3.1000.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.41

$$\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log^2(x)+5x\log^5(x)+\left(-64\log^4(2)-48\log^2(\right.\right.}{2x\log^5(x)}$$
$$= \frac{1}{2}\left(5\,x+\log\left(\log\left(5\right)\right)\right)e^{\left(\frac{16\,\log(2)^4+24\,\log(2)^2\,\log(x)^2+9\,\log(x)^4}{\log(x)^4}\right)}$$

input
```
integrate(1/2*((-48*log(2)^2*log(x)^2-64*log(2)^4)*log(log(5))+5*x*log(x)^
5-240*x*log(2)^2*log(x)^2-320*x*log(2)^4)*exp((9*log(x)^4+24*log(2)^2*log(
x)^2+16*log(2)^4)/log(x)^4)/x/log(x)^5,x, algorithm=\
```

output
```
1/2*(5*x + log(log(5)))*e^((16*log(2)^4 + 24*log(2)^2*log(x)^2 + 9*log(x)^
4)/log(x)^4)
```

3.1000.6 Sympy [A] (verification not implemented)

Time = 1.12 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.52

$$\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log^2(x)+5x\log^5(x)+\left(-64\log^4(2)-48\log^2(\right.\right.}{2x\log^5(x)}$$
$$= \frac{\left(5x+\log\left(\log\left(5\right)\right)\right)e^{\frac{9\log\left(x\right)^4+24\log\left(2\right)^2\log\left(x\right)^2+16\log\left(2\right)^4}{\log\left(x\right)^4}}}{2}$$

input
```
integrate(1/2*((-48*ln(2)**2*ln(x)**2-64*ln(2)**4)*ln(ln(5))+5*x*ln(x)**5-
240*x*ln(2)**2*ln(x)**2-320*x*ln(2)**4)*exp((9*ln(x)**4+24*ln(2)**2*ln(x)*
*2+16*ln(2)**4)/ln(x)**4)/x/ln(x)**5,x)
```

output
```
(5*x + log(log(5)))*exp((9*log(x)**4 + 24*log(2)**2*log(x)**2 + 16*log(2)*
*4)/log(x)**4)/2
```


$$\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log^2(x)+5x\log^5(x)+\left(-64\log^4(2)-48\log^2(2)\log^2(x)\right)\log(\log(5))\right)}{2x\log^5(x)}\,dx$$

3.1000.7 Maxima [F]

$$\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log^2(x)+5x\log^5(x)+\left(-64\log^4(2)-48\log^2(\right.\right.}{2x\log^5(x)}$$

$$=\int \frac{\left(5\,x\log\left(x\right)^5-320\,x\log\left(2\right)^4-240\,x\log\left(2\right)^2\log\left(x\right)^2-16\left(4\,\log\left(2\right)^4+3\,\log\left(2\right)^2\log\left(x\right)^2\right)\log\left(\log\left(5\right)\right)\right.}{2\,x\log\left(x\right)^5}$$

input
```
integrate(1/2*((-48*log(2)^2*log(x)^2-64*log(2)^4)*log(log(5))+5*x*log(x)^
5-240*x*log(2)^2*log(x)^2-320*x*log(2)^4)*exp((9*log(x)^4+24*log(2)^2*log(
x)^2+16*log(2)^4)/log(x)^4)/x/log(x)^5,x, algorithm=\
```

output
```
1/2*integrate((5*x*log(x)^5 - 320*x*log(2)^4 - 240*x*log(2)^2*log(x)^2 - 1
6*(4*log(2)^4 + 3*log(2)^2*log(x)^2)*log(log(5)))*e^((16*log(2)^4 + 24*log
(2)^2*log(x)^2 + 9*log(x)^4)/log(x)^4)/(x*log(x)^5), x)
```

3.1000.8 Giac [F]

$$\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log^2(x)+5x\log^5(x)+\left(-64\log^4(2)-48\log^2(\right.\right.}{2x\log^5(x)}$$

$$=\int \frac{\left(5\,x\log\left(x\right)^5-320\,x\log\left(2\right)^4-240\,x\log\left(2\right)^2\log\left(x\right)^2-16\left(4\,\log\left(2\right)^4+3\,\log\left(2\right)^2\log\left(x\right)^2\right)\log\left(\log\left(5\right)\right)\right.}{2\,x\log\left(x\right)^5}$$

input
```
integrate(1/2*((-48*log(2)^2*log(x)^2-64*log(2)^4)*log(log(5))+5*x*log(x)^
5-240*x*log(2)^2*log(x)^2-320*x*log(2)^4)*exp((9*log(x)^4+24*log(2)^2*log(
x)^2+16*log(2)^4)/log(x)^4)/x/log(x)^5,x, algorithm=\
```

output
```
undef
```

3.1000.9 Mupad [B] (verification not implemented)

Time = 15.57 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.11

$$\int \frac{e^{\frac{16\log^4(2)+24\log^2(2)\log^2(x)+9\log^4(x)}{\log^4(x)}}\left(-320x\log^4(2)-240x\log^2(2)\log^2(x)+5x\log^5(x)+\left(-64\log^4(2)-48\log^2(\right.\right.}{2x\log^5(x)}$$
$$=\frac{e^9\,e^{\frac{16\ln(2)^4}{\ln(x)^4}}\,e^{\frac{24\ln(2)^2}{\ln(x)^2}}\,\ln(\ln(5))}{2}+\frac{5\,x\,e^9\,e^{\frac{16\ln(2)^4}{\ln(x)^4}}\,e^{\frac{24\ln(2)^2}{\ln(x)^2}}}{2}$$

input
```
int(-(exp((9*log(x)^4 + 24*log(2)^2*log(x)^2 + 16*log(2)^4)/log(x)^4)*(log
(log(5))*(48*log(2)^2*log(x)^2 + 64*log(2)^4) - 5*x*log(x)^5 + 320*x*log(2
)^4 + 240*x*log(2)^2*log(x)^2))/(2*x*log(x)^5),x)
```

output
```
(exp(9)*exp((16*log(2)^4)/log(x)^4)*exp((24*log(2)^2)/log(x)^2)*log(log(5)
))/2 + (5*x*exp(9)*exp((16*log(2)^4)/log(x)^4)*exp((24*log(2)^2)/log(x)^2)
)/2
```

3.1001 $\int \frac{e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}\left(-3x^4+e^{e^{x^2}-x-4x^4}\left(-1-x+2e^{x^2}x^2-16x^4\right)\right)}{x^2}\,dx$

3.1001.1 Optimal result

Integrand size = 75, antiderivative size = 28

$$\int \frac{e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}\left(-3x^4+e^{e^{x^2}-x-4x^4}\left(-1-x+2e^{x^2}x^2-16x^4\right)\right)}{x^2}\,dx = e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}$$

output
```
exp((exp(exp(x^2)-4*x^4-x)-x^4)/x)
```

3.1001.2 Mathematica [A] (verified)

Time = 5.13 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}\left(-3x^4+e^{e^{x^2}-x-4x^4}\left(-1-x+2e^{x^2}x^2-16x^4\right)\right)}{x^2}\,dx = e^{\frac{e^{e^{x^2}-x-4x^4}}{x}-x^3}$$

input
```
Integrate[(E^((E^(E^x^2 - x - 4*x^4) - x^4)/x)*(-3*x^4 + E^(E^x^2 - x - 4*
x^4)*(-1 - x + 2*E^x^2*x^2 - 16*x^4)))/x^2,x]
```

output
```
E^(E^(E^x^2 - x - 4*x^4)/x - x^3)
```

3.1001. $\int \frac{e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}\left(-3x^4+e^{e^{x^2}-x-4x^4}\left(-1-x+2e^{x^2}x^2-16x^4\right)\right)}{x^2}\,dx$

3.1001.3 Rubi [A] (verified)

Time = 0.84 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.013$, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{e^{-4x^4+e^{x^2}-x}-x^4}{x}}\left(e^{-4x^4+e^{x^2}-x}\left(-16x^4+2e^{x^2}x^2-x-1\right)-3x^4\right)}{x^2}dx$$

$$\Big\downarrow \text{7257}$$

$$e^{\frac{e^{-4x^4+e^{x^2}-x}-x^4}{x}}$$

input
```
Int[(E^((E^(E^x^2 - x - 4*x^4) - x^4)/x)*(-3*x^4 + E^(E^x^2 - x - 4*x^4)*(
-1 - x + 2*E^x^2*x^2 - 16*x^4)))/x^2,x]
```

output
```
E^((E^(E^x^2 - x - 4*x^4) - x^4)/x)
```

3.1001.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.1001.4 Maple [A] (verified)

Time = 1.50 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

method	result	size
parallelrisch	$\mathrm{e}^{\frac{{\mathrm{e}}^{{\mathrm{e}}^{x^{2}}-4 x^{4}-x}-x^{4}}{x}}$	26
risch	$\mathrm{e}^{-\frac{-{\mathrm{e}}^{{\mathrm{e}}^{x^{2}}-4 x^{4}-x}+x^{4}}{x}}$	27

input
```
int(((2*x^2*exp(x^2)-16*x^4-x-1)*exp(exp(x^2)-4*x^4-x)-3*x^4)*exp((exp(exp
(x^2)-4*x^4-x)-x^4)/x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
exp((exp(exp(x^2)-4*x^4-x)-x^4)/x)
```

3.1001.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}\left(-3x^4+e^{e^{x^2}-x-4x^4}\left(-1-x+2e^{x^2}x^2-16x^4\right)\right)}{x^2}\,dx=e^{\left(-\frac{x^4-e^{\left(-4x^4-x+e^{\left(x^2\right)}\right)}}{x}\right)}$$

input
```
integrate(((2*x^2*exp(x^2)-16*x^4-x-1)*exp(exp(x^2)-4*x^4-x)-3*x^4)*exp((e
xp(exp(x^2)-4*x^4-x)-x^4)/x)/x^2,x, algorithm=\
```

output
```
e^(-(x^4 - e^(-4*x^4 - x + e^(x^2)))/x)
```

3.1001.6 Sympy [A] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}\left(-3x^4+e^{e^{x^2}-x-4x^4}\left(-1-x+2e^{x^2}x^2-16x^4\right)\right)}{x^2}\,dx=e^{\frac{-x^4+e^{-4x^4-x+e^{x^2}}}{x}}$$

input
```
integrate(((2*x**2*exp(x**2)-16*x**4-x-1)*exp(exp(x**2)-4*x**4-x)-3*x**4)*
exp((exp(exp(x**2)-4*x**4-x)-x**4)/x)/x**2,x)
```

output
```
exp((-x**4 + exp(-4*x**4 - x + exp(x**2)))/x)
```

3.1001.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}\left(-3x^4+e^{e^{x^2}-x-4x^4}\left(-1-x+2e^{x^2}x^2-16x^4\right)\right)}{x^2}\,dx=e^{\left(-x^3+\frac{e^{\left(-4x^4-x+e^{\left(x^2\right)}\right)}}{x}\right)}$$

input
```
integrate(((2*x^2*exp(x^2)-16*x^4-x-1)*exp(exp(x^2)-4*x^4-x)-3*x^4)*exp((e
xp(exp(x^2)-4*x^4-x)-x^4)/x)/x^2,x, algorithm=\
```

output
```
e^(-x^3 + e^(-4*x^4 - x + e^(x^2))/x)
```

3.1001.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}\left(-3x^4+e^{e^{x^2}-x-4x^4}\left(-1-x+2e^{x^2}x^2-16x^4\right)\right)}{x^2}\,dx=e^{\left(-x^3+\frac{e^{\left(-4\,x^4-x+e^{\left(x^2\right)}\right)}}{x}\right)}$$

input
```
integrate(((2*x^2*exp(x^2)-16*x^4-x-1)*exp(exp(x^2)-4*x^4-x)-3*x^4)*exp((e
xp(exp(x^2)-4*x^4-x)-x^4)/x)/x^2,x, algorithm=\
```

output
```
e^(-x^3 + e^(-4*x^4 - x + e^(x^2))/x)
```

3.1001.9 Mupad [B] (verification not implemented)

Time = 16.38 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{e^{e^{x^2}-x-4x^4}-x^4}{x}}\left(-3x^4+e^{e^{x^2}-x-4x^4}\left(-1-x+2e^{x^2}x^2-16x^4\right)\right)}{x^2}\,dx=\mathrm{e}^{\frac{\mathrm{e}^{-x}\,\mathrm{e}^{-4\,x^4}\,\mathrm{e}^{\mathrm{e}^{x^2}}}{x}}\,\mathrm{e}^{-x^3}$$

input
```
int(-(exp((exp(exp(x^2) - x - 4*x^4) - x^4)/x)*(3*x^4 + exp(exp(x^2) - x -
 4*x^4)*(x - 2*x^2*exp(x^2) + 16*x^4 + 1)))/x^2,x)
```

output
```
exp((exp(-x)*exp(-4*x^4)*exp(exp(x^2)))/x)*exp(-x^3)
```

3.1002 $\int \frac{-92-570x-356x^2+24x^3+32x^4+2x^5+(8+52x+44x^2-4x^3-4x^4) \log$

3.1002.1 Optimal result

Integrand size = 66, antiderivative size = 21

$$\int \frac{-92-570x-356x^2+24x^3+32x^4+2x^5+(8+52x+44x^2-4x^3-4x^4)\log(x)}{x+3x^2+3x^3+x^4}\,dx = \left(-15-x-\frac{8x}{x+x^2}+2\log(x)\right)^2$$

output
```
(-15-8*x/(x^2+x)+2*ln(x)-x)^2
```

3.1002.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 48 vs. 2(21) = 42.

Time = 0.08 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.29

$$\int \frac{-92-570x-356x^2+24x^3+32x^4+2x^5+(8+52x+44x^2-4x^3-4x^4)\log(x)}{x+3x^2+3x^3+x^4}\,dx = 2\left(15x+\frac{x^2}{2}+\frac{32}{(1+x)^2}+\frac{16(7-\log(x))}{1+x}-30\log(x)-2x\log(x)+2\log^2(x)\right)$$

input
```
Integrate[(-92 - 570*x - 356*x^2 + 24*x^3 + 32*x^4 + 2*x^5 + (8 + 52*x + 4
4*x^2 - 4*x^3 - 4*x^4)*Log[x])/(x + 3*x^2 + 3*x^3 + x^4),x]
```

output
```
2*(15*x + x^2/2 + 32/(1 + x)^2 + (16*(7 - Log[x]))/(1 + x) - 30*Log[x] - 2
*x*Log[x] + 2*Log[x]^2)
```

3.1002.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 52 vs. 2(21) = 42.

Time = 0.83 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.48, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.106, Rules used = {2026, 2007, 7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^5+32x^4+24x^3-356x^2+\left(-4x^4-4x^3+44x^2+52x+8\right)\log(x)-570x-92}{x^4+3x^3+3x^2+x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{2x^5+32x^4+24x^3-356x^2+\left(-4x^4-4x^3+44x^2+52x+8\right)\log(x)-570x-92}{x\left(x^3+3x^2+3x+1\right)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{2x^5+32x^4+24x^3-356x^2+\left(-4x^4-4x^3+44x^2+52x+8\right)\log(x)-570x-92}{x(x+1)^3}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{2\left(-x^3+11x+2\right)\left(-x^2-16x+2x\log(x)+2\log(x)-23\right)}{x(x+1)^3}dx$$

$$\Big\downarrow \text{27}$$

$$2\int -\frac{\left(-x^3+11x+2\right)\left(x^2-2\log(x)x+16x-2\log(x)+23\right)}{x(x+1)^3}dx$$

$$\Big\downarrow \text{25}$$

$$-2\int \frac{\left(-x^3+11x+2\right)\left(x^2-2\log(x)x+16x-2\log(x)+23\right)}{x(x+1)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$-2\int \left(\frac{2\log(x)\left(x^3-11x-2\right)}{x(x+1)^2}-\frac{x\left(x^3-11x-2\right)}{(x+1)^3}-\frac{23\left(x^3-11x-2\right)}{x(x+1)^3}-\frac{16\left(x^3-11x-2\right)}{(x+1)^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-2\left(-\frac{x^2}{2}-15x-\frac{112}{x+1}-\frac{32}{(x+1)^2}-2\log^2(x)-\frac{16x\log(x)}{x+1}+2x\log(x)+46\log(x)\right)$$

3.1002. $\int \frac{-92-570x-356x^2+24x^3+32x^4+2x^5+\left(8+52x+44x^2-4x^3-4x^4\right)\log(x)}{x+3x^2+3x^3+x^4}dx$

input
```
Int[(-92 - 570*x - 356*x^2 + 24*x^3 + 32*x^4 + 2*x^5 + (8 + 52*x + 44*x^2
- 4*x^3 - 4*x^4)*Log[x])/(x + 3*x^2 + 3*x^3 + x^4),x]
```

output
```
-2*(-15*x - x^2/2 - 32/(1 + x)^2 - 112/(1 + x) + 46*Log[x] + 2*x*Log[x] -
(16*x*Log[x])/(1 + x) - 2*Log[x]^2)
```

3.1002.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1002.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. 2(21) = 42.

Time = 0.19 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.24

method	result	size
default	$x^2+30x-92\ln(x)+\frac{64}{(1+x)^2}+\frac{224}{1+x}-4x\ln(x)+4\ln(x)^2+\frac{32\ln(x)x}{1+x}$	47
parts	$x^2+30x-92\ln(x)+\frac{64}{(1+x)^2}+\frac{224}{1+x}-4x\ln(x)+4\ln(x)^2+\frac{32\ln(x)x}{1+x}$	47
norman	$\frac{x^4-92\ln(x)+132x-156x\ln(x)-68x^2\ln(x)+32x^3+4\ln(x)^2+8x\ln(x)^2+4x^2\ln(x)^2-4x^3\ln(x)+227}{(1+x)^2}$	65
risch	$4\ln(x)^2-\frac{4(x^2+x+8)\ln(x)}{1+x}-\frac{-x^4+60x^2\ln(x)-32x^3+120x\ln(x)-61x^2+60\ln(x)-254x-288}{(1+x)^2}$	66
parallelrisch	$\frac{x^4-92\ln(x)+132x-156x\ln(x)-68x^2\ln(x)+32x^3+4\ln(x)^2+8x\ln(x)^2+4x^2\ln(x)^2-4x^3\ln(x)+227}{x^2+2x+1}$	70

input
```
int(((-4*x^4-4*x^3+44*x^2+52*x+8)*ln(x)+2*x^5+32*x^4+24*x^3-356*x^2-570*x-
92)/(x^4+3*x^3+3*x^2+x),x,method=_RETURNVERBOSE)
```

output
```
x^2+30*x-92*ln(x)+64/(1+x)^2+224/(1+x)-4*x*ln(x)+4*ln(x)^2+32*ln(x)*x/(1+x
)
```

3.1002.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. 2(19) = 38.

Time = 0.27 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.86

$$\int \frac{-92-570x-356x^2+24x^3+32x^4+2x^5+(8+52x+44x^2-4x^3-4x^4)\log(x)}{x+3x^2+3x^3+x^4}\,dx = \frac{x^4+32\,x^3+4\,(x^2+2\,x+1)\log(x)^2+61\,x^2-4\,(x^3+17\,x^2+39\,x+23)\log(x)+254\,x+288}{x^2+2\,x+1}$$

input
```
integrate((((-4*x^4-4*x^3+44*x^2+52*x+8)*log(x)+2*x^5+32*x^4+24*x^3-356*x^2
-570*x-92)/(x^4+3*x^3+3*x^2+x),x, algorithm=\
```

output
```
(x^4 + 32*x^3 + 4*(x^2 + 2*x + 1)*log(x)^2 + 61*x^2 - 4*(x^3 + 17*x^2 + 39
*x + 23)*log(x) + 254*x + 288)/(x^2 + 2*x + 1)
```

3.1002.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(17) = 34.

Time = 0.12 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.33

$$\int \frac{-92-570x-356x^2+24x^3+32x^4+2x^5+(8+52x+44x^2-4x^3-4x^4)\log(x)}{x+3x^2+3x^3+x^4}\,dx$$
$$= x^2+30x+\frac{224x+288}{x^2+2x+1}+4\log(x)^2-60\log(x)+\frac{(-4x^2-4x-32)\log(x)}{x+1}$$

input
```
integrate(((-4*x**4-4*x**3+44*x**2+52*x+8)*ln(x)+2*x**5+32*x**4+24*x**3-35
6*x**2-570*x-92)/(x**4+3*x**3+3*x**2+x),x)
```

output
```
x**2 + 30*x + (224*x + 288)/(x**2 + 2*x + 1) + 4*log(x)**2 - 60*log(x) + (
-4*x**2 - 4*x - 32)*log(x)/(x + 1)
```

3.1002.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 137 vs. 2(19) = 38.

Time = 0.26 (sec) , antiderivative size = 137, normalized size of antiderivative = 6.52

$$\int \frac{-92-570x-356x^2+24x^3+32x^4+2x^5+(8+52x+44x^2-4x^3-4x^4)\log(x)}{x+3x^2+3x^3+x^4}\,dx$$
$$= x^2+26x+\frac{8x+7}{x^2+2x+1}-\frac{16(6x+5)}{x^2+2x+1}+\frac{12(4x+3)}{x^2+2x+1}-\frac{46(2x+3)}{x^2+2x+1}+\frac{178(2x+1)}{x^2+2x+1}$$
$$+\frac{4\left((x+1)\log(x)^2+x^2-(x^2+x+8)\log(x)+x\right)}{x+1}+\frac{285}{x^2+2x+1}-60\log(x)$$

input
```
integrate(((-4*x^4-4*x^3+44*x^2+52*x+8)*log(x)+2*x^5+32*x^4+24*x^3-356*x^2
-570*x-92)/(x^4+3*x^3+3*x^2+x),x, algorithm=\
```

output
```
x^2 + 26*x + (8*x + 7)/(x^2 + 2*x + 1) - 16*(6*x + 5)/(x^2 + 2*x + 1) + 12
*(4*x + 3)/(x^2 + 2*x + 1) - 46*(2*x + 3)/(x^2 + 2*x + 1) + 178*(2*x + 1)/
(x^2 + 2*x + 1) + 4*((x + 1)*log(x)^2 + x^2 - (x^2 + x + 8)*log(x) + x)/(x
 + 1) + 285/(x^2 + 2*x + 1) - 60*log(x)
```

3.1002.8 Giac [F]

$$\int \frac{-92-570x-356x^2+24x^3+32x^4+2x^5+(8+52x+44x^2-4x^3-4x^4)\log(x)}{x+3x^2+3x^3+x^4}\,dx$$
$$=\int \frac{2\,(x^5+16\,x^4+12\,x^3-178\,x^2-2\,(x^4+x^3-11\,x^2-13\,x-2)\log{(x)}-285\,x-46)}{x^4+3\,x^3+3\,x^2+x}\,dx$$

input
```
integrate(((-4*x^4-4*x^3+44*x^2+52*x+8)*log(x)+2*x^5+32*x^4+24*x^3-356*x^2
-570*x-92)/(x^4+3*x^3+3*x^2+x),x, algorithm=\
```

output
```
integrate(2*(x^5 + 16*x^4 + 12*x^3 - 178*x^2 - 2*(x^4 + x^3 - 11*x^2 - 13*
x - 2)*log(x) - 285*x - 46)/(x^4 + 3*x^3 + 3*x^2 + x), x)
```

3.1002.9 Mupad [B] (verification not implemented)

Time = 16.01 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.10

$$\int \frac{-92-570x-356x^2+24x^3+32x^4+2x^5+(8+52x+44x^2-4x^3-4x^4)\log(x)}{x+3x^2+3x^3+x^4}\,dx$$
$$=4\ln{(x)}^2-60\,\ln{(x)}-x\,(4\,\ln{(x)}-30)-\frac{32\,\ln{(x)}+x\,(32\,\ln{(x)}-224)-288}{(x+1)^2}+x^2$$

input
```
int((log(x)*(52*x + 44*x^2 - 4*x^3 - 4*x^4 + 8) - 570*x - 356*x^2 + 24*x^3
 + 32*x^4 + 2*x^5 - 92)/(x + 3*x^2 + 3*x^3 + x^4),x)
```

output
```
4*log(x)^2 - 60*log(x) - x*(4*log(x) - 30) - (32*log(x) + x*(32*log(x) - 2
24) - 288)/(x + 1)^2 + x^2
```

3.1003 $\int \frac{-103^{2/5}+6\sqrt[5]{3}e^{x/5}x^3+1960x^4+e^{x/5}(-840x^4-84x^5)+e^{2x/5}(90x^4}{5x^3}$

3.1003.1 Optimal result

Integrand size = 75, antiderivative size = 28

$$\int \frac{-103^{2/5}+6\sqrt[5]{3}e^{x/5}x^3+1960x^4+e^{x/5}(-840x^4-84x^5)+e^{2x/5}(90x^4+18x^5)}{5x^3}\,dx = \Big(-5+3(-3+e^{x/5})+$$

output
```
x^2*(3^(1/5)/x^2+3*exp(1/5*x)-14)^2
```

3.1003.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.00

$$\int \frac{-103^{2/5}+6\sqrt[5]{3}e^{x/5}x^3+1960x^4+e^{x/5}(-840x^4-84x^5)+e^{2x/5}(90x^4+18x^5)}{5x^3}\,dx = \frac{2}{5}\left(\frac{5\ 3^{2/5}}{2x^2}+490x^2+\frac{45}{2}\right.$$

input
```
Integrate[(-10*3^(2/5) + 6*3^(1/5)*E^(x/5)*x^3 + 1960*x^4 + E^(x/5)*(-840*
x^4 - 84*x^5) + E^((2*x)/5)*(90*x^4 + 18*x^5))/(5*x^3),x]
```

output
```
(2*((5*3^(2/5))/(2*x^2) + 490*x^2 + (45*E^((2*x)/5)*x^2)/2 + 15*E^(x/5)*(3
^(1/5) - 14*x^2)))/5
```

3.1003.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 62 vs. $2(28) = 56$.

Time = 0.36 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.21, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.053$, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1960x^4 + 6\sqrt[5]{3}e^{x/5}x^3 + e^{x/5}(-84x^5 - 840x^4) + e^{2x/5}(18x^5 + 90x^4) - 10\ 3^{2/5}}{5x^3} \, dx$$

$$\Big\downarrow \, 27$$

$$\frac{1}{5}\int -\frac{2\left(-980x^4 - 3\sqrt[5]{3}e^{x/5}x^3 - 9e^{2x/5}(x^5 + 5x^4) + 42e^{x/5}(x^5 + 10x^4) + 5\ 3^{2/5}\right)}{x^3}dx$$

$$\Big\downarrow \, 27$$

$$-\frac{2}{5}\int \frac{-980x^4 - 3\sqrt[5]{3}e^{x/5}x^3 - 9e^{2x/5}(x^5 + 5x^4) + 42e^{x/5}(x^5 + 10x^4) + 5\ 3^{2/5}}{x^3}dx$$

$$\Big\downarrow \, 2010$$

$$-\frac{2}{5}\int \left(-9e^{2x/5}x(x+5) - 3e^{x/5}\left(-14x^2 - 140x + \sqrt[5]{3}\right) + \frac{5(3^{2/5} - 196x^4)}{x^3}\right)dx$$

$$\Big\downarrow \, 2009$$

$$-\frac{2}{5}\left(210e^{x/5}x^2 - \frac{45}{2}e^{2x/5}x^2 - 490x^2 - \frac{5\ 3^{2/5}}{2x^2} - 15\sqrt[5]{3}e^{x/5}\right)$$

input
```
Int[(-10*3^(2/5) + 6*3^(1/5)*E^(x/5)*x^3 + 1960*x^4 + E^(x/5)*(-840*x^4 -
84*x^5) + E^((2*x)/5)*(90*x^4 + 18*x^5))/(5*x^3),x]
```

output
```
(-2*(-15*3^(1/5)*E^(x/5) - (5*3^(2/5))/(2*x^2) - 490*x^2 + 210*E^(x/5)*x^2
 - (45*E^((2*x)/5)*x^2)/2))/5
```

3.1003. $\int \frac{-10 3^{2/5}+6\sqrt[5]{3}e^{x/5}x^3+1960x^4+e^{x/5}(-840x^4-84x^5)+e^{2x/5}(90x^4+18x^5)}{5x^3}\,dx$

3.1003.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1003.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

method	result	size
risch	$196x^2+\frac{3^{\frac{2}{5}}}{x^2}+9x^2{\mathrm e}^{\frac{2x}{5}}+\frac{\left(30\,3^{\frac{1}{5}}-420x^2\right){\mathrm e}^{\frac{x}{5}}}{5}$	40
derivativedivides	$196x^2+\frac{3^{\frac{2}{5}}}{x^2}-84\,{\mathrm e}^{\frac{x}{5}}x^2+9x^2{\mathrm e}^{\frac{2x}{5}}+6\,{\mathrm e}^{\frac{x}{5}}3^{\frac{1}{5}}$	43
default	$196x^2+\frac{3^{\frac{2}{5}}}{x^2}-84\,{\mathrm e}^{\frac{x}{5}}x^2+9x^2{\mathrm e}^{\frac{2x}{5}}+6\,{\mathrm e}^{\frac{x}{5}}3^{\frac{1}{5}}$	43
parts	$196x^2+\frac{3^{\frac{2}{5}}}{x^2}-84\,{\mathrm e}^{\frac{x}{5}}x^2+9x^2{\mathrm e}^{\frac{2x}{5}}+6\,{\mathrm e}^{\frac{x}{5}}3^{\frac{1}{5}}$	43
norman	$\frac{-84x^4{\mathrm e}^{\frac{x}{5}}+9x^4{\mathrm e}^{\frac{2x}{5}}+6x^2{\mathrm e}^{\frac{x}{5}}3^{\frac{1}{5}}+196x^4+3^{\frac{2}{5}}}{x^2}$	46
parallelrisch	$\frac{30x^2{\mathrm e}^{\frac{x}{5}}3^{\frac{1}{5}}-420x^4{\mathrm e}^{\frac{x}{5}}+45x^4{\mathrm e}^{\frac{2x}{5}}+5\,3^{\frac{2}{5}}+980x^4}{5x^2}$	49

input
```
int(1/5*(-10*3^(2/5)+6*x^3*exp(1/5*x)*3^(1/5)+(18*x^5+90*x^4)*exp(1/5*x)^2
+(-84*x^5-840*x^4)*exp(1/5*x)+1960*x^4)/x^3,x,method=_RETURNVERBOSE)
```

output
```
196*x^2+3^(2/5)/x^2+9*x^2*exp(2/5*x)+1/5*(30*3^(1/5)-420*x^2)*exp(1/5*x)
```

3.1003.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.50

$$\int \frac{-10 3^{2/5}+6\sqrt[5]{3}e^{x/5}x^3+1960x^4+e^{x/5}(-840x^4-84x^5)+e^{2x/5}(90x^4+18x^5)}{5x^3}\,dx = \frac{9\,x^4e^{\left(\frac{2}{5}\,x\right)}+196\,x^4-$$

input
```
integrate(1/5*(-10*3^(2/5)+6*x^3*exp(1/5*x)*3^(1/5)+(18*x^5+90*x^4)*exp(1/
5*x)^2+(-84*x^5-840*x^4)*exp(1/5*x)+1960*x^4)/x^3,x, algorithm=\
```

output
```
(9*x^4*e^(2/5*x) + 196*x^4 - 6*(14*x^4 - 3^(1/5)*x^2)*e^(1/5*x) + 3^(2/5))
/x^2
```

3.1003.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(20) = 40.

Time = 0.20 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int \frac{-10 3^{2/5}+6\sqrt[5]{3}e^{x/5}x^3+1960x^4+e^{x/5}(-840x^4-84x^5)+e^{2x/5}(90x^4+18x^5)}{5x^3}\,dx = 9x^2e^{\frac{2x}{5}} + 196x^2 + \left(-84x^2+6\cdot\sqrt[5]{3}\right)e^{\frac{x}{5}} + \frac{3^{\frac{2}{5}}}{x^2}$$

input
```
integrate(1/5*(-10*3**(2/5)+6*x**3*exp(1/5*x)*3**(1/5)+(18*x**5+90*x**4)*e
xp(1/5*x)**2+(-84*x**5-840*x**4)*exp(1/5*x)+1960*x**4)/x**3,x)
```

output
```
9*x**2*exp(2*x/5) + 196*x**2 + (-84*x**2 + 6*3**(1/5))*exp(x/5) + 3**(2/5)
/x**2
```

3.1003.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(21) = 42.

Time = 0.27 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.57

$$\int \frac{-10 3^{2/5}+6\sqrt[5]{3}e^{x/5}x^3+1960x^4+e^{x/5}(-840x^4-84x^5)+e^{2x/5}(90x^4+18x^5)}{5x^3}\,dx = 196\,x^2 + \frac{9}{2}\left(2\,x^2-10\,x+25\right)e^{\left(\frac{2}{5}\,x\right)} + \frac{45}{2}\left(2\,x-5\right)e^{\left(\frac{2}{5}\,x\right)} - 84\left(x^2-10\,x+50\right)e^{\left(\frac{1}{5}\,x\right)} - 840\left(x-5\right)e^{\left(\frac{1}{5}\,x\right)} + 6\cdot 3^{\frac{1}{5}}e^{\left(\frac{1}{5}\,x\right)} + \frac{3^{\frac{2}{5}}}{x^2}$$

input
```
integrate(1/5*(-10*3^(2/5)+6*x^3*exp(1/5*x)*3^(1/5)+(18*x^5+90*x^4)*exp(1/
5*x)^2+(-84*x^5-840*x^4)*exp(1/5*x)+1960*x^4)/x^3,x, algorithm=\
```

output
```
196*x^2 + 9/2*(2*x^2 - 10*x + 25)*e^(2/5*x) + 45/2*(2*x - 5)*e^(2/5*x) - 8
4*(x^2 - 10*x + 50)*e^(1/5*x) - 840*(x - 5)*e^(1/5*x) + 6*3^(1/5)*e^(1/5*x
) + 3^(2/5)/x^2
```

3.1003.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. 2(21) = 42.

Time = 0.28 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.54

$$\int \frac{-10 3^{2/5}+6\sqrt[5]{3}e^{x/5}x^3+1960x^4+e^{x/5}(-840x^4-84x^5)+e^{2x/5}(90x^4+18x^5)}{5x^3}\,dx = \frac{9\,x^4e^{\left(\frac{2}{5}\,x\right)}-84\,x^4e^{\left(\frac{1}{5}\,x\right)}$$

input
```
integrate(1/5*(-10*3^(2/5)+6*x^3*exp(1/5*x)*3^(1/5)+(18*x^5+90*x^4)*exp(1/
5*x)^2+(-84*x^5-840*x^4)*exp(1/5*x)+1960*x^4)/x^3,x, algorithm=\
```

output
```
(9*x^4*e^(2/5*x) - 84*x^4*e^(1/5*x) + 196*x^4 + 6*3^(1/5)*x^2*e^(1/5*x) +
3^(2/5))/x^2
```

3.1003.9 Mupad [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{-10 3^{2/5}+6\sqrt[5]{3}e^{x/5}x^3+1960x^4+e^{x/5}(-840x^4-84x^5)+e^{2x/5}(90x^4+18x^5)}{5x^3}\,dx = \frac{3^{2/5}}{x^2} + x^2\left(9\,\mathrm{e}^{\frac{2\,x}{5}}-84\,\mathrm{e}^{x/5}+196\right)+6\,3^{1/5}\,\mathrm{e}^{x/5}$$

input
```
int(((exp((2*x)/5)*(90*x^4 + 18*x^5))/5 - 2*3^(2/5) - (exp(x/5)*(840*x^4 +
 84*x^5))/5 + 392*x^4 + (6*3^(1/5)*x^3*exp(x/5))/5)/x^3,x)
```

output
```
3^(2/5)/x^2 + x^2*(9*exp((2*x)/5) - 84*exp(x/5) + 196) + 6*3^(1/5)*exp(x/5
)
```

3.1004 $\int \frac{486x+\log(2)\left(-238-\log\left(\frac{5}{2}\right)\right)}{81\log(2)}\,dx$

3.1004.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{486x+\log(2)\left(-238-\log\left(\frac{5}{2}\right)\right)}{81\log(2)}\,dx = x\left(-3+\frac{3x}{\log(2)}+\frac{1}{81}\left(5-\log\left(\frac{5}{2}\right)\right)\right)$$

output
```
(-238/81+1/81*ln(2/5)+3*x/ln(2))*x
```

3.1004.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{486x+\log(2)\left(-238-\log\left(\frac{5}{2}\right)\right)}{81\log(2)}\,dx = \frac{3x^2}{\log(2)}+\frac{1}{81}x\left(-238-\log\left(\frac{5}{2}\right)\right)$$

input
```
Integrate[(486*x + Log[2]*(-238 - Log[5/2]))/(81*Log[2]),x]
```

output
```
(3*x^2)/Log[2] + (x*(-238 - Log[5/2]))/81
```

3.1004.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{486x+\log(2)\left(-238-\log\left(\frac{5}{2}\right)\right)}{81\log(2)}dx$$

$$\Big\downarrow \text{ 17}$$

$$\frac{\left(486x-\log(2)\left(238+\log\left(\frac{5}{2}\right)\right)\right)^2}{78732\log(2)}$$

input
```
Int[(486*x + Log[2]*(-238 - Log[5/2]))/(81*Log[2]),x]
```

output
```
(486*x - Log[2]*(238 + Log[5/2]))^2/(78732*Log[2])
```

3.1004.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.1004.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

method	result	size
gosper	$\frac{x\left(\ln(2)\ln\left(\frac{2}{5}\right)-238\ln(2)+243x\right)}{81\ln(2)}$	21
parallelrisch	$\frac{243x^2+\left(\ln\left(\frac{2}{5}\right)-238\right)\ln(2)x}{81\ln(2)}$	21
norman	$\left(-\frac{\ln(5)}{81}+\frac{\ln(2)}{81}-\frac{238}{81}\right)x+\frac{3x^2}{\ln(2)}$	23
default	$\frac{x\ln(2)\ln\left(\frac{2}{5}\right)-238x\ln(2)+243x^2}{81\ln(2)}$	24
risch	$-\frac{x\ln(5)}{81}+\frac{x\ln(2)}{81}-\frac{238x}{81}+\frac{3x^2}{\ln(2)}$	24

input
```
int(1/81*((ln(2/5)-238)*ln(2)+486*x)/ln(2),x,method=_RETURNVERBOSE)
```

output
```
1/81*x*(ln(2)*ln(2/5)-238*ln(2)+243*x)/ln(2)
```

3.1004.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{486x+\log(2)\left(-238-\log\left(\frac{5}{2}\right)\right)}{81\log(2)}\,dx=\frac{243\,x^2+\left(x\log\left(\frac{2}{5}\right)-238\,x\right)\log\left(2\right)}{81\,\log\left(2\right)}$$

input
```
integrate(1/81*((log(2/5)-238)*log(2)+486*x)/log(2),x, algorithm=\
```

output
```
1/81*(243*x^2 + (x*log(2/5) - 238*x)*log(2))/log(2)
```

3.1004.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{486x+\log(2)\left(-238-\log\left(\frac{5}{2}\right)\right)}{81\log(2)}\,dx=\frac{3x^2}{\log\left(2\right)}+x\left(-\frac{238}{81}-\frac{\log\left(5\right)}{81}+\frac{\log\left(2\right)}{81}\right)$$

input
```
integrate(1/81*((ln(2/5)-238)*ln(2)+486*x)/ln(2),x)
```

output
```
3*x**2/log(2) + x*(-238/81 - log(5)/81 + log(2)/81)
```

3.1004.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{486x+\log(2)\left(-238-\log\left(\frac{5}{2}\right)\right)}{81\log(2)}\,dx=\frac{x\left(\log\left(\frac{2}{5}\right)-238\right)\log\left(2\right)+243\,x^2}{81\,\log\left(2\right)}$$

input
```
integrate(1/81*((log(2/5)-238)*log(2)+486*x)/log(2),x, algorithm=\
```

output
```
1/81*(x*(log(2/5) - 238)*log(2) + 243*x^2)/log(2)
```

3.1004.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{486x + \log(2)\left(-238 - \log\left(\frac{5}{2}\right)\right)}{81\log(2)}\,dx = \frac{x\left(\log\left(\frac{2}{5}\right) - 238\right)\log\left(2\right) + 243\,x^2}{81\,\log\left(2\right)}$$

input
```
integrate(1/81*((log(2/5)-238)*log(2)+486*x)/log(2),x, algorithm=\
```

output
```
1/81*(x*(log(2/5) - 238)*log(2) + 243*x^2)/log(2)
```

3.1004.9 Mupad [B] (verification not implemented)

Time = 17.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{486x + \log(2)\left(-238 - \log\left(\frac{5}{2}\right)\right)}{81\log(2)}\,dx = \frac{\left(6\,x + \frac{\ln(2)\,\left(\ln\left(\frac{2}{5}\right)-238\right)}{81}\right)^2}{12\,\ln\left(2\right)}$$

input
```
int((6*x + (log(2)*(log(2/5) - 238))/81)/log(2),x)
```

output
```
(6*x + (log(2)*(log(2/5) - 238))/81)^2/(12*log(2))
```

3.1005 $\int \frac{(90-45x)\log(2-x)+(12800x^5+1600x^6+50x^7)\log(\log(2-x))+(-6$ ... $}{(-18+9x)\log$ ...

3.1005.1 Optimal result

Integrand size = 90, antiderivative size = 25

$$\int \frac{(90-45x)\log(2-x)+(12800x^5+1600x^6+50x^7)\log(\log(2-x))+(-64000x^4+22400x^5+4450x^6+}{(-18+9x)\log(2-x)}$$

$$= x\left(-5+\frac{25}{9}x^4(16+x)^2\log^2(\log(2-x))\right)$$

output
```
(25/9*ln(ln(2-x))^2*x^4*(x+16)^2-5)*x
```

3.1005.2 Mathematica [F]

$$\int \frac{(90-45x)\log(2-x)+(12800x^5+1600x^6+50x^7)\log(\log(2-x))+(-64000x^4+22400x^5+4450x^6+}{(-18+9x)\log(2-x)}$$

$$= \int \frac{(90-45x)\log(2-x)+(12800x^5+1600x^6+50x^7)\log(\log(2-x))+(-64000x^4+22400x^5+4450x^6}{(-18+9x)\log(2-x)}$$

input
```
Integrate[((90 - 45*x)*Log[2 - x] + (12800*x^5 + 1600*x^6 + 50*x^7)*Log[Lo
g[2 - x]] + (-64000*x^4 + 22400*x^5 + 4450*x^6 + 175*x^7)*Log[2 - x]*Log[L
og[2 - x]]^2)/((-18 + 9*x)*Log[2 - x]),x]
```

output
```
Integrate[((90 - 45*x)*Log[2 - x] + (12800*x^5 + 1600*x^6 + 50*x^7)*Log[Lo
g[2 - x]] + (-64000*x^4 + 22400*x^5 + 4450*x^6 + 175*x^7)*Log[2 - x]*Log[L
og[2 - x]]^2)/((-18 + 9*x)*Log[2 - x]), x]
```

3.1005.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(50x^7+1600x^6+12800x^5)\log(\log(2-x))+(175x^7+4450x^6+22400x^5-64000x^4)\log(2-x)\log^2(\log(2-}{(9x-18)\log(2-x)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{50(x+16)^2x^5\log(\log(2-x))}{9(x-2)\log(2-x)}+\frac{25}{9}(x+16)(7x+80)x^4\log^2(\log(2-x))-5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-28800\text{Subst}\left(\int \frac{\log(\log(x))}{\log(x)}dx,x,2-x\right)+\frac{175}{9}\int x^6\log^2(\log(2-x))dx+\frac{50}{9}\int \frac{x^6\log(\log(2-x))}{\log(2-x)}dx+\frac{1600}{3}\int x^5\log^2(\log(2-x))dx+\frac{1700}{9}\int \frac{x^5\log(\log(2-x))}{\log(2-x)}dx+\frac{32000}{9}\int x^4\log^2(\log(2-x))dx+1800\int \frac{x^4\log(\log(2-x))}{\log(2-x)}dx+3600\int \frac{x^3\log(\log(2-x))}{\log(2-x)}dx+7200\int \frac{x^2\log(\log(2-x))}{\log(2-x)}dx+14400\int \frac{x\log(\log(2-x))}{\log(2-x)}dx-5x+28800\log^2(\log(2-x))$$

input
```
Int[((90 - 45*x)*Log[2 - x] + (12800*x^5 + 1600*x^6 + 50*x^7)*Log[Log[2 -
x]] + (-64000*x^4 + 22400*x^5 + 4450*x^6 + 175*x^7)*Log[2 - x]*Log[Log[2 -
 x]]^2)/((-18 + 9*x)*Log[2 - x]),x]
```

output
```
$Aborted
```

3.1005.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1005.4 Maple [A] (verified)

Time = 1.51 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

method	result	size
risch	$\left(\frac{25}{9}x^{7}+\frac{800}{9}x^{6}+\frac{6400}{9}x^{5}\right)\ln\left(\ln\left(2-x\right)\right)^{2}-5x$	31
parallelrisch	$\frac{25\ln(\ln(2-x))^{2}x^{7}}{9}+\frac{800\ln(\ln(2-x))^{2}x^{6}}{9}+\frac{6400\ln(\ln(2-x))^{2}x^{5}}{9}-5-5x$	48

input
```
int(((175*x^7+4450*x^6+22400*x^5-64000*x^4)*ln(2-x)*ln(ln(2-x))^2+(50*x^7+
1600*x^6+12800*x^5)*ln(ln(2-x))+(-45*x+90)*ln(2-x))/(9*x-18)/ln(2-x),x,met
hod=_RETURNVERBOSE)
```

output
```
(25/9*x^7+800/9*x^6+6400/9*x^5)*ln(ln(2-x))^2-5*x
```

3.1005.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int\frac{(90-45x)\log(2-x)+(12800x^5+1600x^6+50x^7)\log(\log(2-x))+(-64000x^4+22400x^5+4450x^6+}{(-18+9x)\log(2-x)}$$
$$=\frac{25}{9}\left(x^{7}+32\,x^{6}+256\,x^{5}\right)\log\left(\log\left(-x+2\right)\right)^{2}-5\,x$$

input
```
integrate(((175*x^7+4450*x^6+22400*x^5-64000*x^4)*log(2-x)*log(log(2-x))^2
+(50*x^7+1600*x^6+12800*x^5)*log(log(2-x))+(-45*x+90)*log(2-x))/(9*x-18)/l
og(2-x),x, algorithm=\
```

output
```
25/9*(x^7 + 32*x^6 + 256*x^5)*log(log(-x + 2))^2 - 5*x
```

3.1005.6 Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.24

$$\int\frac{(90-45x)\log(2-x)+(12800x^5+1600x^6+50x^7)\log(\log(2-x))+(-64000x^4+22400x^5+4450x^6+}{(-18+9x)\log(2-x)}$$
$$=-5x+\left(\frac{25x^{7}}{9}+\frac{800x^{6}}{9}+\frac{6400x^{5}}{9}\right)\log\left(\log\left(2-x\right)\right)^{2}$$

input
```
integrate(((175*x**7+4450*x**6+22400*x**5-64000*x**4)*ln(2-x)*ln(ln(2-x))*
*2+(50*x**7+1600*x**6+12800*x**5)*ln(ln(2-x))+(-45*x+90)*ln(2-x))/(9*x-18)
/ln(2-x),x)
```

output
```
-5*x + (25*x**7/9 + 800*x**6/9 + 6400*x**5/9)*log(log(2 - x))**2
```

3.1005.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.72

$$\int \frac{(90-45x)\log(2-x)+(12800x^5+1600x^6+50x^7)\log(\log(2-x))+(-64000x^4+22400x^5+4450x^6+}{(-18+9x)\log(2-x)}$$
$$=\frac{25}{9}\left(x^7+32\,x^6+256\,x^5\right)\log\left(\log\left(-x+2\right)\right)^2-5\,x-10\,\log\left(x-2\right)+10\,\log\left(-x+2\right)$$

input
```
integrate(((175*x^7+4450*x^6+22400*x^5-64000*x^4)*log(2-x)*log(log(2-x))^2
+(50*x^7+1600*x^6+12800*x^5)*log(log(2-x))+(-45*x+90)*log(2-x))/(9*x-18)/l
og(2-x),x, algorithm=\
```

output
```
25/9*(x^7 + 32*x^6 + 256*x^5)*log(log(-x + 2))^2 - 5*x - 10*log(x - 2) + 1
0*log(-x + 2)
```

3.1005.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{(90-45x)\log(2-x)+(12800x^5+1600x^6+50x^7)\log(\log(2-x))+(-64000x^4+22400x^5+4450x^6+}{(-18+9x)\log(2-x)}$$
$$=\frac{25}{9}\left(x^7+32\,x^6+256\,x^5\right)\log\left(\log\left(-x+2\right)\right)^2-5\,x$$

input
```
integrate(((175*x^7+4450*x^6+22400*x^5-64000*x^4)*log(2-x)*log(log(2-x))^2
+(50*x^7+1600*x^6+12800*x^5)*log(log(2-x))+(-45*x+90)*log(2-x))/(9*x-18)/l
og(2-x),x, algorithm=\
```

output
```
25/9*(x^7 + 32*x^6 + 256*x^5)*log(log(-x + 2))^2 - 5*x
```

3.1005.9 Mupad [B] (verification not implemented)

Time = 16.98 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

$$\int \frac{(90-45x)\log(2-x)+(12800x^5+1600x^6+50x^7)\log(\log(2-x))+(-64000x^4+22400x^5+4450x^6+}{(-18+9x)\log(2-x)}$$

$$=\ln(\ln(2-x))^2\left(\frac{25\,x^7}{9}+\frac{800\,x^6}{9}+\frac{6400\,x^5}{9}\right)-5\,x$$

input
```
int((log(log(2 - x))*(12800*x^5 + 1600*x^6 + 50*x^7) - log(2 - x)*(45*x -
90) + log(log(2 - x))^2*log(2 - x)*(22400*x^5 - 64000*x^4 + 4450*x^6 + 175
*x^7))/(log(2 - x)*(9*x - 18)),x)
```

output
```
log(log(2 - x))^2*((6400*x^5)/9 + (800*x^6)/9 + (25*x^7)/9) - 5*x
```

3.1006 $\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x\right.}{}$

3.1006.1 Optimal result

Integrand size = 166, antiderivative size = 31

$$\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x-20x^2)\right)\log\left(\frac{3}{x}\right)+x\log^2\left(\frac{3}{x}\right)+\left(2e^{-}\right.}{}$$

$$=x\left(e^{-2-6x+x^2}-\log\left(\frac{3}{x}\right)\right)^2\left(\frac{5}{x}+\log(x)\right)$$

output
```
x*(ln(x)+5/x)*(exp(x^2-6*x-2)-ln(3/x))^2
```

3.1006.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.19

$$\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x-20x^2)\right)\log\left(\frac{3}{x}\right)+x\log^2\left(\frac{3}{x}\right)+\left(2e^{-}\right.}{}$$

$$=e^{-4-12x}\left(e^{x^2}-e^{2+6x}\log\left(\frac{3}{x}\right)\right)^2(5+x\log(x))$$

input
```
Integrate[(10*E^(-2 - 6*x + x^2) + E^(-4 - 12*x + 2*x^2)*(-59*x + 20*x^2)
+ (-10 + E^(-2 - 6*x + x^2)*(58*x - 20*x^2))*Log[3/x] + x*Log[3/x]^2 + (2*
E^(-2 - 6*x + x^2)*x + E^(-4 - 12*x + 2*x^2)*(x - 12*x^2 + 4*x^3) + (-2*x
+ E^(-2 - 6*x + x^2)*(-2*x + 12*x^2 - 4*x^3))*Log[3/x] + x*Log[3/x]^2)*Log
[x])/x,x]
```

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$$\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x-20x^2)\right)\log\left(\frac{3}{x}\right)+x\log^2\left(\frac{3}{x}\right)+\left(2e^{-2-6x+x^2}x+e^{-4-12x+2x^2}(x-12x^2+4x^3)\right.}{x}$$

output
```
E^(-4 - 12*x)*(E^x^2 - E^(2 + 6*x)*Log[3/x])^2*(5 + x*Log[x])
```

3.1006.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{10e^{x^2-6x-2}+e^{2x^2-12x-4}(20x^2-59x)+\left(e^{x^2-6x-2}(58x-20x^2)-10\right)\log\left(\frac{3}{x}\right)+\left(2e^{x^2-6x-2}x+e^{2x^2-12x-4}(4x\right.}{x}$$

$$\Big\downarrow \text{2010}$$

$$\int \left(e^{2x^2-12x-4}(4x^2\log(x)+20x-12x\log(x)+\log(x)-59)-\frac{2e^{x^2-6x-2}(2x^3\log\left(\frac{3}{x}\right)\log(x)+10x^2\log\left(\frac{3}{x}\right)-6x\right.}{}$$

$$\Big\downarrow \text{2009}$$

$$-3\int \frac{e^{2x^2-12x-4}}{x}dx+12\int \frac{\int \frac{e^{x^2-6x-2}}{x}dx}{x}dx-\frac{12\int \frac{\int \frac{e^{x^2-6x+9}}{x}dx}{x}dx}{e^{11}}+6\log\left(\frac{3}{x}\right)\int \frac{e^{x^2-6x-2}}{x}dx-\frac{6\log\left(\frac{3}{x}\right)\int \frac{e^{x^2-6x+9}}{x}dx}{e^{11}}-6\log(x)\int \frac{e^{x^2-6x-2}}{x}dx+\frac{6\log(x)\int \frac{e^{x^2-6x+9}}{x}dx}{e^{11}}+\frac{3\int \frac{e^{2(x-3)^2}}{x}dx}{e^{22}}+5e^{2x^2-12x-4}-10e^{x^2-6x-2}\log\left(\frac{3}{x}\right)-2e^{x^2-6x-2}x\log(x)\log\left(\frac{3}{x}\right)+e^{2x^2-12x-4}x\log(x)+x\log(x)\log^2\left(\frac{3}{x}\right)+5\log^2\left(\frac{3}{x}\right)$$

input
```
Int[(10*E^(-2 - 6*x + x^2) + E^(-4 - 12*x + 2*x^2)*(-59*x + 20*x^2) + (-10
 + E^(-2 - 6*x + x^2)*(58*x - 20*x^2))*Log[3/x] + x*Log[3/x]^2 + (2*E^(-2
- 6*x + x^2)*x + E^(-4 - 12*x + 2*x^2)*(x - 12*x^2 + 4*x^3) + (-2*x + E^(-
2 - 6*x + x^2)*(-2*x + 12*x^2 - 4*x^3))*Log[3/x] + x*Log[3/x]^2)*Log[x])/x
,x]
```

output
```
$Aborted
```

3.1006.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1006.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 88 vs. 2(30) = 60.

Time = 6.08 (sec) , antiderivative size = 89, normalized size of antiderivative = 2.87

method	result
parallelrisch	$-2\ln\left(\frac{3}{x}\right) e^{x^2-6x-2}\ln(x)x+5\ln\left(\frac{3}{x}\right)^2+\ln\left(\frac{3}{x}\right)^2\ln(x)x+\ln(x)e^{2x^2-12x-4}x+5e^{2x^2-12x-4}$ –
risch	$x\ln(x)^3+\left(5-2x\ln(3)+2x e^{x^2-6x-2}\right)\ln(x)^2+\left(x\ln(3)^2+e^{2x^2-12x-4}x-2e^{x^2-6x-2}\ln(3\right.$

input
```
int(((x*ln(3/x)^2+((-4*x^3+12*x^2-2*x)*exp(x^2-6*x-2)-2*x)*ln(3/x)+(4*x^3-
12*x^2+x)*exp(x^2-6*x-2)^2+2*x*exp(x^2-6*x-2))*ln(x)+x*ln(3/x)^2+((-20*x^2
+58*x)*exp(x^2-6*x-2)-10)*ln(3/x)+(20*x^2-59*x)*exp(x^2-6*x-2)^2+10*exp(x^
2-6*x-2))/x,x,method=_RETURNVERBOSE)
```

output
```
-2*ln(3/x)*exp(x^2-6*x-2)*ln(x)*x+5*ln(3/x)^2+ln(3/x)^2*ln(x)*x+exp(x^2-6*
x-2)^2*ln(x)*x+5*exp(x^2-6*x-2)^2-10*ln(3/x)*exp(x^2-6*x-2)
```

3.1006.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 96 vs. 2(30) = 60.

Time = 0.27 (sec) , antiderivative size = 96, normalized size of antiderivative = 3.10

$$\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x-20x^2)\right)\log\left(\frac{3}{x}\right)+x\log^2\left(\frac{3}{x}\right)+\left(2e^{-}\right.}{}$$

$$=-x\log\left(\frac{3}{x}\right)^3+\left(2\,xe^{(x^2-6\,x-2)}+x\log(3)+5\right)\log\left(\frac{3}{x}\right)^2+(x\log(3)+5)e^{(2\,x^2-12\,x-4)}-\left(xe^{(2\,x^2-12\,x-4)}+2\,(x\log(3)+5)e^{(x^2-6\,x-2)}\right)\log\left(\frac{3}{x}\right)$$

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$$\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x-20x^2)\right)\log\left(\frac{3}{x}\right)+x\log^2\left(\frac{3}{x}\right)+\left(2e^{-2-6x+x^2}x+e^{-4-12x+2x^2}(x-12x^2+4x^3)\right.}{x}$$

input
```
integrate(((x*log(3/x)^2+((-4*x^3+12*x^2-2*x)*exp(x^2-6*x-2)-2*x)*log(3/x)
+(4*x^3-12*x^2+x)*exp(x^2-6*x-2)^2+2*x*exp(x^2-6*x-2))*log(x)+x*log(3/x)^2
+((-20*x^2+58*x)*exp(x^2-6*x-2)-10)*log(3/x)+(20*x^2-59*x)*exp(x^2-6*x-2)^
2+10*exp(x^2-6*x-2))/x,x, algorithm=\
```

output
```
-x*log(3/x)^3 + (2*x*e^(x^2 - 6*x - 2) + x*log(3) + 5)*log(3/x)^2 + (x*log
(3) + 5)*e^(2*x^2 - 12*x - 4) - (x*e^(2*x^2 - 12*x - 4) + 2*(x*log(3) + 5)
*e^(x^2 - 6*x - 2))*log(3/x)
```

3.1006.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(24) = 48$.

Time = 0.41 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.06

$$\int \frac{10e^{-2-6x+x^2} + e^{-4-12x+2x^2}(-59x + 20x^2) + \left(-10 + e^{-2-6x+x^2}(58x - 20x^2)\right)\log\left(\frac{3}{x}\right) + x\log^2\left(\frac{3}{x}\right) + \left(2e^{-}\right.}{}$$

$$= x\log(x)^3 + x\log(3)^2\log(x) + (-2x\log(3) + 5)\log(x)^2 + (x\log(x) + 5)e^{2x^2-12x-4} + \left(2x\log(x)^2 - 2x\log(3)\log(x) + 10\log(x) - 10\log(3)\right)e^{x^2-6x-2} - 10\log(3)\log(x)$$

input
```
integrate(((x*ln(3/x)**2+((-4*x**3+12*x**2-2*x)*exp(x**2-6*x-2)-2*x)*ln(3/
x)+(4*x**3-12*x**2+x)*exp(x**2-6*x-2)**2+2*x*exp(x**2-6*x-2))*ln(x)+x*ln(3
/x)**2+((-20*x**2+58*x)*exp(x**2-6*x-2)-10)*ln(3/x)+(20*x**2-59*x)*exp(x**
2-6*x-2)**2+10*exp(x**2-6*x-2))/x,x)
```

output
```
x*log(x)**3 + x*log(3)**2*log(x) + (-2*x*log(3) + 5)*log(x)**2 + (x*log(x)
 + 5)*exp(2*x**2 - 12*x - 4) + (2*x*log(x)**2 - 2*x*log(3)*log(x) + 10*log
(x) - 10*log(3))*exp(x**2 - 6*x - 2) - 10*log(3)*log(x)
```

3.1006.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 155 vs. $2(30) = 60$.

Time = 0.34 (sec) , antiderivative size = 155, normalized size of antiderivative = 5.00

$$\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x-20x^2)\right)\log\left(\frac{3}{x}\right)+x\log^2\left(\frac{3}{x}\right)+\left(2e^{-}\right.}{}$$

$$= x\log\left(\frac{3}{x}\right)^2 + \left((x\log(x)+5)e^{(2x^2)}+2\left(xe^2\log(x)^2-5e^2\log(3)-\left(xe^2\log(3)-5e^2\right)\log(x)\right)e^{(x^2+6x)}-\left(x(2\log(3\right.\right. + 2x\log\left(\frac{3}{x}\right)+5\log\left(\frac{3}{x}\right)^2+2x$$

input
```
integrate(((x*log(3/x)^2+((-4*x^3+12*x^2-2*x)*exp(x^2-6*x-2)-2*x)*log(3/x)
+(4*x^3-12*x^2+x)*exp(x^2-6*x-2)^2+2*x*exp(x^2-6*x-2))*log(x)+x*log(3/x)^2
+((-20*x^2+58*x)*exp(x^2-6*x-2)-10)*log(3/x)+(20*x^2-59*x)*exp(x^2-6*x-2)^
2+10*exp(x^2-6*x-2))/x,x, algorithm=\
```

output
```
x*log(3/x)^2 + ((x*log(x) + 5)*e^(2*x^2) + 2*(x*e^2*log(x)^2 - 5*e^2*log(3
) - (x*e^2*log(3) - 5*e^2)*log(x))*e^(x^2 + 6*x) - (x*(2*log(3) + 1)*e^4*l
og(x)^2 - x*e^4*log(x)^3 - (log(3)^2 + 2*log(3) + 2)*x*e^4*log(x) + (log(3
)^2 + 2*log(3) + 2)*x*e^4)*e^(12*x))*e^(-12*x - 4) + 2*x*log(3/x) + 5*log(
3/x)^2 + 2*x
```

3.1006.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 135 vs. 2(30) = 60.

Time = 0.31 (sec) , antiderivative size = 135, normalized size of antiderivative = 4.35

$$\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x-20x^2)\right)\log\left(\frac{3}{x}\right)+x\log^2\left(\frac{3}{x}\right)+\left(2e^{-}\right.}{}$$

$$= \left(xe^6\log(3)^2\log(x)-2xe^6\log(3)\log(x)^2+xe^6\log(x)^3-2xe^{(x^2-6x+4)}\log(3)\log(x)+2xe^{(x^2-6x+4)}\log\right.$$

input
```
integrate(((x*log(3/x)^2+((-4*x^3+12*x^2-2*x)*exp(x^2-6*x-2)-2*x)*log(3/x)
+(4*x^3-12*x^2+x)*exp(x^2-6*x-2)^2+2*x*exp(x^2-6*x-2))*log(x)+x*log(3/x)^2
+((-20*x^2+58*x)*exp(x^2-6*x-2)-10)*log(3/x)+(20*x^2-59*x)*exp(x^2-6*x-2)^
2+10*exp(x^2-6*x-2))/x,x, algorithm=\
```

output
```
(x*e^6*log(3)^2*log(x) - 2*x*e^6*log(3)*log(x)^2 + x*e^6*log(x)^3 - 2*x*e^
(x^2 - 6*x + 4)*log(3)*log(x) + 2*x*e^(x^2 - 6*x + 4)*log(x)^2 + x*e^(2*x^
2 - 12*x + 2)*log(x) - 10*e^6*log(3)*log(x) + 5*e^6*log(x)^2 - 10*e^(x^2 -
 6*x + 4)*log(3) + 10*e^(x^2 - 6*x + 4)*log(x) + 5*e^(2*x^2 - 12*x + 2))*e
^(-6)
```

3.1006.9 Mupad [F(-1)]

Timed out.

$$\int \frac{10e^{-2-6x+x^2}+e^{-4-12x+2x^2}(-59x+20x^2)+\left(-10+e^{-2-6x+x^2}(58x-20x^2)\right)\log\left(\frac{3}{x}\right)+x\log^2\left(\frac{3}{x}\right)+\left(2e^{\cdot}\right.}{}$$

$$=\int \frac{10\,\mathrm{e}^{x^2-6\,x-2}-\mathrm{e}^{2\,x^2-12\,x-4}\,(59\,x-20\,x^2)+\ln\left(\frac{3}{x}\right)\,\left(\mathrm{e}^{x^2-6\,x-2}\,(58\,x-20\,x^2)-10\right)+x\ln\left(\frac{3}{x}\right)^2+\ln(x)\,\left(\right.}{}$$

input
```
int((10*exp(x^2 - 6*x - 2) - exp(2*x^2 - 12*x - 4)*(59*x - 20*x^2) + log(3
/x)*(exp(x^2 - 6*x - 2)*(58*x - 20*x^2) - 10) + x*log(3/x)^2 + log(x)*(2*x
*exp(x^2 - 6*x - 2) + exp(2*x^2 - 12*x - 4)*(x - 12*x^2 + 4*x^3) - log(3/x
)*(2*x + exp(x^2 - 6*x - 2)*(2*x - 12*x^2 + 4*x^3)) + x*log(3/x)^2))/x,x)
```

output
```
int((10*exp(x^2 - 6*x - 2) - exp(2*x^2 - 12*x - 4)*(59*x - 20*x^2) + log(3
/x)*(exp(x^2 - 6*x - 2)*(58*x - 20*x^2) - 10) + x*log(3/x)^2 + log(x)*(2*x
*exp(x^2 - 6*x - 2) + exp(2*x^2 - 12*x - 4)*(x - 12*x^2 + 4*x^3) - log(3/x
)*(2*x + exp(x^2 - 6*x - 2)*(2*x - 12*x^2 + 4*x^3)) + x*log(3/x)^2))/x, x)
```

3.1007 $\int \frac{2+4\log(x)}{x\log(x)}\,dx$

3.1007.1 Optimal result

Integrand size = 14, antiderivative size = 10

$$\int \frac{2+4\log(x)}{x\log(x)}\,dx = \log\left(16x^4\log^2(x)\right)$$

output
```
ln(16*x^4*ln(x)^2)
```

3.1007.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{2+4\log(x)}{x\log(x)}\,dx = 4\log(x)+2\log(\log(x))$$

input
```
Integrate[(2 + 4*Log[x])/(x*Log[x]),x]
```

output
```
4*Log[x] + 2*Log[Log[x]]
```

3.1007.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {2812, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4\log(x)+2}{x\log(x)}dx$$

$$\Big\downarrow \text{ 2812}$$

$$\int \frac{2(2\log(x)+1)}{\log(x)}d\log(x)$$

$$\Big\downarrow \text{ 27}$$

$$2\int \frac{2\log(x)+1}{\log(x)}d\log(x)$$

$$\Big\downarrow \text{ 49}$$

$$2\int \left(2+\frac{1}{\log(x)}\right)d\log(x)$$

$$\Big\downarrow \text{ 2009}$$

$$2(2\log(x)+\log(\log(x)))$$

input
```
Int[(2 + 4*Log[x])/(x*Log[x]),x]
```

output
```
2*(2*Log[x] + Log[Log[x]])
```

3.1007.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2812
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.) + Log[(c_.)*(x_)^(n
_.)]*(e_.))^(q_.))/(x_), x_Symbol] :> Simp[1/n   Subst[Int[(a + b*x)^p*(d +
 e*x)^q, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x]
```

3.1007.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.10

method	result	size
derivativedivides	$4\ln(x)+2\ln(\ln(x))$	11
default	$4\ln(x)+2\ln(\ln(x))$	11
norman	$4\ln(x)+2\ln(\ln(x))$	11
risch	$4\ln(x)+2\ln(\ln(x))$	11
parallelrisch	$4\ln(x)+2\ln(\ln(x))$	11
parts	$4\ln(x)+2\ln(\ln(x))$	11

input
```
int((4*ln(x)+2)/x/ln(x),x,method=_RETURNVERBOSE)
```

output
```
4*ln(x)+2*ln(ln(x))
```

3.1007.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{2+4\log(x)}{x\log(x)}\,dx = 4\,\log(x) + 2\,\log(\log(x))$$

input
```
integrate((4*log(x)+2)/x/log(x),x, algorithm=\
```

output
```
4*log(x) + 2*log(log(x))
```

3.1007.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{2+4\log(x)}{x\log(x)}\,dx = 4\log(x) + 2\log(\log(x))$$

input
```
integrate((4*ln(x)+2)/x/ln(x),x)
```

output
```
4*log(x) + 2*log(log(x))
```

3.1007.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{2+4\log(x)}{x\log(x)}\,dx = 4\,\log(x) + 2\,\log(\log(x))$$

input
```
integrate((4*log(x)+2)/x/log(x),x, algorithm=\
```

output
```
4*log(x) + 2*log(log(x))
```

3.1007.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.10

$$\int \frac{2+4\log(x)}{x\log(x)}\,dx = 4\,\log(x) + 2\,\log(|\log(x)|)$$

input
```
integrate((4*log(x)+2)/x/log(x),x, algorithm=\
```

output
```
4*log(x) + 2*log(abs(log(x)))
```

3.1007.9 Mupad [B] (verification not implemented)

Time = 16.37 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{2+4\log(x)}{x\log(x)}\,dx = 2\,\ln\left(\ln\left(x\right)\right)+4\,\ln\left(x\right)$$

input
```
int((4*log(x) + 2)/(x*log(x)),x)
```

output
```
2*log(log(x)) + 4*log(x)
```

3.1008 $\int \frac{-1-80x^8}{10x} dx$

3.1008.1 Optimal result

Integrand size = 14, antiderivative size = 13

$$\int \frac{-1-80x^8}{10x} dx = 1 - x^8 - \frac{\log(x)}{10}$$

output
```
-1/10*ln(x)+1-x^8
```

3.1008.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{-1-80x^8}{10x} dx = -x^8 - \frac{\log(x)}{10}$$

input
```
Integrate[(-1 - 80*x^8)/(10*x),x]
```

output
```
-x^8 - Log[x]/10
```

3.1008.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.08, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {27, 25, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-80x^8-1}{10x} \, dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{10} \int -\frac{80x^8+1}{x}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{10} \int \frac{80x^8+1}{x}dx$$

$$\Big\downarrow \text{802}$$

$$-\frac{1}{10} \int \left(80x^7+\frac{1}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{10}\left(-10x^8-\log(x)\right)$$

input
```
Int[(-1 - 80*x^8)/(10*x),x]
```

output
```
(-10*x^8 - Log[x])/10
```

3.1008.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1008.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

method	result	size
default	$-x^{8}-\frac{\ln\left(x\right)}{10}$	11
norman	$-x^{8}-\frac{\ln\left(x\right)}{10}$	11
risch	$-x^{8}-\frac{\ln\left(x\right)}{10}$	11
parallelrisch	$-x^{8}-\frac{\ln\left(x\right)}{10}$	11

input
```
int(1/10*(-80*x^8-1)/x,x,method=_RETURNVERBOSE)
```

output
```
-x^8-1/10*ln(x)
```

3.1008.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int \frac{-1-80x^8}{10x}\,dx=-x^8-\frac{1}{10}\log\left(x\right)$$

input
```
integrate(1/10*(-80*x^8-1)/x,x, algorithm=\
```

output
```
-x^8 - 1/10*log(x)
```

3.1008.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.62

$$\int \frac{-1-80x^8}{10x}\,dx = -x^8 - \frac{\log(x)}{10}$$

input
```
integrate(1/10*(-80*x**8-1)/x,x)
```

output
```
-x**8 - log(x)/10
```

3.1008.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{-1-80x^8}{10x}\,dx = -x^8 - \frac{1}{80}\log(x^8)$$

input
```
integrate(1/10*(-80*x^8-1)/x,x, algorithm=\
```

output
```
-x^8 - 1/80*log(x^8)
```

3.1008.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{-1-80x^8}{10x}\,dx = -x^8 - \frac{1}{80}\log(x^8)$$

input
```
integrate(1/10*(-80*x^8-1)/x,x, algorithm=\
```

output
```
-x^8 - 1/80*log(x^8)
```

3.1008.9 Mupad [B] (verification not implemented)

Time = 16.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int \frac{-1-80x^8}{10x}\,dx = -\frac{\ln(x)}{10} - x^8$$

input
```
int(-(8*x^8 + 1/10)/x,x)
```

output
```
- log(x)/10 - x^8
```

3.1009 $\int \frac{1}{2}e^{-6-x}(10-e-2x+x^2)\,dx$

3.1009.1 Optimal result

Integrand size = 22, antiderivative size = 19

$$\int \frac{1}{2}e^{-6-x}(10-e-2x+x^2)\,dx = \frac{1}{2}e^{-6-x}(-10+e-x^2)$$

output
```
1/2/exp(3)*(exp(1)-x^2-10)/exp(3+x)
```

3.1009.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{1}{2}e^{-6-x}(10-e-2x+x^2)\,dx = \frac{1}{2}e^{-6-x}(-10+e-x^2)$$

input
```
Integrate[(E^(-6 - x)*(10 - E - 2*x + x^2))/2,x]
```

output
```
(E^(-6 - x)*(-10 + E - x^2))/2
```

3.1009.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.63, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$, Rules used = {27, 2626, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}e^{-x-6}\left(x^2-2x-e+10\right)\,dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2}\int e^{-x-6}\left(x^2-2x-e+10\right)dx$$

$$\Big\downarrow \ 2626$$

$$\frac{1}{2}\int \left(e^{-x-6}x^2-2e^{-x-6}x+10\left(1-\frac{e}{10}\right)e^{-x-6}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{2}\left(-e^{-x-6}x^2-(10-e)e^{-x-6}\right)$$

input
```
Int[(E^(-6 - x)*(10 - E - 2*x + x^2))/2,x]
```

output
```
(-((10 - E)*E^(-6 - x)) - E^(-6 - x)*x^2)/2
```

3.1009.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2626
```
Int[(F_)^(v_)*(Px_), x_Symbol] :> Int[ExpandIntegrand[F^v, Px, x], x] /; Fr
eeQ[F, x] && PolynomialQ[Px, x] && LinearQ[v, x] &&  !TrueQ[$UseGamma]
```

3.1009.4 Maple [A] (verified)

Time = 0.61 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

method	result	size
risch	$\frac{(\mathrm{e}-x^2-10)\,\mathrm{e}^{-x-6}}{2}$	18
gosper	$\frac{\mathrm{e}^{-3}(\mathrm{e}-x^2-10)\,\mathrm{e}^{-3-x}}{2}$	22
parallelrisch	$\frac{\mathrm{e}^{-3}(\mathrm{e}-x^2-10)\,\mathrm{e}^{-3-x}}{2}$	22
norman	$\left(-\frac{\mathrm{e}^{-3}x^2}{2}+\frac{\mathrm{e}^{-3}(\mathrm{e}-10)}{2}\right)\mathrm{e}^{-3-x}$	28
derivativedivides	$\frac{\mathrm{e}^{-3}\left(-\mathrm{e}^{-3-x}(3+x)^2+6\,\mathrm{e}^{-3-x}(3+x)-19\,\mathrm{e}^{-3-x}+\mathrm{e}^{-3-x}\mathrm{e}\right)}{2}$	49
default	$\frac{\mathrm{e}^{-3}\left(-\mathrm{e}^{-3-x}(3+x)^2+6\,\mathrm{e}^{-3-x}(3+x)-19\,\mathrm{e}^{-3-x}+\mathrm{e}^{-3-x}\mathrm{e}\right)}{2}$	49

input
```
int(1/2*(-exp(1)+x^2-2*x+10)/exp(3)/exp(3+x),x,method=_RETURNVERBOSE)
```

output
```
1/2*(exp(1)-x^2-10)*exp(-x-6)
```

3.1009.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{1}{2}e^{-6-x}\left(10-e-2x+x^2\right)\,dx=-\frac{1}{2}\left(x^2-e+10\right)e^{(-x-6)}$$

input
```
integrate(1/2*(-exp(1)+x^2-2*x+10)/exp(3)/exp(3+x),x, algorithm=\
```

output
```
-1/2*(x^2 - e + 10)*e^(-x - 6)
```

3.1009.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{1}{2}e^{-6-x}\left(10-e-2x+x^2\right)\,dx=\frac{\left(-x^2-10+e\right)e^{-x-3}}{2e^3}$$

input
```
integrate(1/2*(-exp(1)+x**2-2*x+10)/exp(3)/exp(3+x),x)
```

output
```
(-x**2 - 10 + E)*exp(-3)*exp(-x - 3)/2
```

3.1009.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. 2(17) = 34.

Time = 0.21 (sec) , antiderivative size = 43, normalized size of antiderivative = 2.26

$$\int \frac{1}{2}e^{-6-x}\left(10-e-2x+x^2\right)\,dx=-\frac{1}{2}\left(x^2+2\,x+2\right)e^{(-x-6)}+(x+1)e^{(-x-6)}+\frac{1}{2}\,e^{(-x-5)}-5\,e^{(-x-6)}$$

input
```
integrate(1/2*(-exp(1)+x^2-2*x+10)/exp(3)/exp(3+x),x, algorithm=\
```

output
```
-1/2*(x^2 + 2*x + 2)*e^(-x - 6) + (x + 1)*e^(-x - 6) + 1/2*e^(-x - 5) - 5*
e^(-x - 6)
```

3.1009.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \frac{1}{2}e^{-6-x}\left(10-e-2x+x^2\right)\,dx=-\frac{1}{2}\left((x+6)^2-12\,x-26\right)e^{(-x-6)}+\frac{1}{2}\,e^{(-x-5)}$$

input
```
integrate(1/2*(-exp(1)+x^2-2*x+10)/exp(3)/exp(3+x),x, algorithm=\
```

output
```
-1/2*((x + 6)^2 - 12*x - 26)*e^(-x - 6) + 1/2*e^(-x - 5)
```

3.1009.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{1}{2}e^{-6-x}(10-e-2x+x^2)\,dx = -\mathrm{e}^{-x-6}\left(\frac{x^2}{2}-\frac{\mathrm{e}}{2}+5\right)$$

input
```
int(-exp(-3)*exp(- x - 3)*(x + exp(1)/2 - x^2/2 - 5),x)
```

output
```
-exp(- x - 6)*(x^2/2 - exp(1)/2 + 5)
```

3.1010 $\int \frac{18x+(-2160+876x-90x^2)\log\left(\frac{24-5x}{-5+x}\right)+(1440-588x+60x^2)\log^2\left(\right.}{(120x^3-49x^4+5x^5)}$

3.1010.1 Optimal result

Integrand size = 125, antiderivative size = 27

$$\int \frac{18x+(-2160+876x-90x^2)\log\left(\frac{24-5x}{-5+x}\right)+(1440-588x+60x^2)\log^2\left(\frac{24-5x}{-5+x}\right)+(-240+98x-10x^2+}{(120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}$$

$$=\frac{19}{4}+x+\frac{\left(1-\frac{3}{\log\left(-5+\frac{1}{5-x}\right)}\right)^2}{x^2}$$

output
```
(1-3/ln(1/(5-x)-5))^2/x^2+19/4+x
```

3.1010.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.59

$$\int \frac{18x+(-2160+876x-90x^2)\log\left(\frac{24-5x}{-5+x}\right)+(1440-588x+60x^2)\log^2\left(\frac{24-5x}{-5+x}\right)+(-240+98x-10x^2+}{(120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}$$

$$=\frac{1}{x^2}+x+\frac{9}{x^2\log^2\left(\frac{24-5x}{-5+x}\right)}-\frac{6}{x^2\log\left(\frac{24-5x}{-5+x}\right)}$$

input
```
Integrate[(18*x + (-2160 + 876*x - 90*x^2)*Log[(24 - 5*x)/(-5 + x)] + (144
0 - 588*x + 60*x^2)*Log[(24 - 5*x)/(-5 + x)]^2 + (-240 + 98*x - 10*x^2 + 1
20*x^3 - 49*x^4 + 5*x^5)*Log[(24 - 5*x)/(-5 + x)]^3)/((120*x^3 - 49*x^4 +
5*x^5)*Log[(24 - 5*x)/(-5 + x)]^3),x]
```

3.1010.

$$\int \frac{18x+(-2160+876x-90x^2)\log\left(\frac{24-5x}{-5+x}\right)+(1440-588x+60x^2)\log^2\left(\frac{24-5x}{-5+x}\right)+(-240+98x-10x^2+120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}{(120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}\,dx$$

output
```
x^(-2) + x + 9/(x^2*Log[(24 - 5*x)/(-5 + x)]^2) - 6/(x^2*Log[(24 - 5*x)/(-
5 + x)])
```

3.1010.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(60x^2-588x+1440)\log^2\left(\frac{24-5x}{x-5}\right)+(-90x^2+876x-2160)\log\left(\frac{24-5x}{x-5}\right)+(5x^5-49x^4+120x^3-10x^2+98}{(5x^5-49x^4+120x^3)\log^3\left(\frac{24-5x}{x-5}\right)}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(60x^2-588x+1440)\log^2\left(\frac{24-5x}{x-5}\right)+(-90x^2+876x-2160)\log\left(\frac{24-5x}{x-5}\right)+(5x^5-49x^4+120x^3-10x^2+98}{x^3(5x^2-49x+120)\log^3\left(\frac{24-5x}{x-5}\right)}$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{x^3-2}{x^3}+\frac{12}{x^3\log\left(\frac{24-5x}{x-5}\right)}+\frac{18}{(x-5)x^2(5x-24)\log^3\left(\frac{24-5x}{x-5}\right)}-\frac{6(15x^2-146x+360)}{(x-5)x^3(5x-24)\log^2\left(\frac{24-5x}{x-5}\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$12\int \frac{1}{x^3\log\left(\frac{24-5x}{x-5}\right)}dx+18\int \frac{1}{(x-5)x^2(5x-24)\log^3\left(\frac{24-5x}{x-5}\right)}dx-6\int \frac{15x^2-146x+360}{(x-5)x^3(5x-24)\log^2\left(\frac{24-5x}{x-5}\right)}dx+\frac{1}{x^2}+x$$

input
```
Int[(18*x + (-2160 + 876*x - 90*x^2)*Log[(24 - 5*x)/(-5 + x)] + (1440 - 58
8*x + 60*x^2)*Log[(24 - 5*x)/(-5 + x)]^2 + (-240 + 98*x - 10*x^2 + 120*x^3
 - 49*x^4 + 5*x^5)*Log[(24 - 5*x)/(-5 + x)]^3)/((120*x^3 - 49*x^4 + 5*x^5)
*Log[(24 - 5*x)/(-5 + x)]^3),x]
```

output
```
$Aborted
```

3.1010. $\int \frac{18x+(-2160+876x-90x^2)\log\left(\frac{24-5x}{-5+x}\right)+(1440-588x+60x^2)\log^2\left(\frac{24-5x}{-5+x}\right)+(-240+98x-10x^2+120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}{(120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}dx$

3.1010.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.1010.4 Maple [A] (verified)

Time = 61.33 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.70

method	result	size
risch	$\frac{x^3+1}{x^2}-\frac{3\left(2\ln\left(\frac{-5x+24}{-5+x}\right)-3\right)}{x^2\ln\left(\frac{-5x+24}{-5+x}\right)^2}$	46
norman	$\frac{9+\ln\left(\frac{-5x+24}{-5+x}\right)^2+x^3\ln\left(\frac{-5x+24}{-5+x}\right)^2-6\ln\left(\frac{-5x+24}{-5+x}\right)}{x^2\ln\left(\frac{-5x+24}{-5+x}\right)^2}$	67
parallelrisch	$-\frac{-225-25\ln\left(-\frac{5x-24}{-5+x}\right)^2x^3-490\ln\left(-\frac{5x-24}{-5+x}\right)^2x^2-25\ln\left(-\frac{5x-24}{-5+x}\right)^2+150\ln\left(-\frac{5x-24}{-5+x}\right)}{25\ln\left(-\frac{5x-24}{-5+x}\right)^2x^2}$	95

input
```
int(((5*x^5-49*x^4+120*x^3-10*x^2+98*x-240)*ln((-5*x+24)/(-5+x))^3+(60*x^2
-588*x+1440)*ln((-5*x+24)/(-5+x))^2+(-90*x^2+876*x-2160)*ln((-5*x+24)/(-5+
x))+18*x)/(5*x^5-49*x^4+120*x^3)/ln((-5*x+24)/(-5+x))^3,x,method=_RETURNVE
RBOSE)
```

output
```
(x^3+1)/x^2-3/x^2*(2*ln((-5*x+24)/(-5+x))-3)/ln((-5*x+24)/(-5+x))^2
```

3.1010.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(25) = 50$.

Time = 0.26 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.11

$$\int \frac{18x+(-2160+876x-90x^2)\log\left(\frac{24-5x}{-5+x}\right)+(1440-588x+60x^2)\log^2\left(\frac{24-5x}{-5+x}\right)+(-240+98x-10x^2+120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}{(120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}\,dx$$
$$= \frac{(x^3+1)\log\left(-\frac{5x-24}{x-5}\right)^2 - 6\log\left(-\frac{5x-24}{x-5}\right)+9}{x^2\log\left(-\frac{5x-24}{x-5}\right)^2}$$

input
```
integrate(((5*x^5-49*x^4+120*x^3-10*x^2+98*x-240)*log((-5*x+24)/(-5+x))^3+
(60*x^2-588*x+1440)*log((-5*x+24)/(-5+x))^2+(-90*x^2+876*x-2160)*log((-5*x
+24)/(-5+x))+18*x)/(5*x^5-49*x^4+120*x^3)/log((-5*x+24)/(-5+x))^3,x, algor
ithm=\
```

output
```
((x^3 + 1)*log(-(5*x - 24)/(x - 5))^2 - 6*log(-(5*x - 24)/(x - 5)) + 9)/(x
^2*log(-(5*x - 24)/(x - 5))^2)
```

3.1010.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{18x+(-2160+876x-90x^2)\log\left(\frac{24-5x}{-5+x}\right)+(1440-588x+60x^2)\log^2\left(\frac{24-5x}{-5+x}\right)+(-240+98x-10x^2+120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}{(120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}\,dx$$
$$= x + \frac{9-6\log\left(\frac{24-5x}{x-5}\right)}{x^2\log\left(\frac{24-5x}{x-5}\right)^2} + \frac{1}{x^2}$$

input
```
integrate(((5*x**5-49*x**4+120*x**3-10*x**2+98*x-240)*ln((-5*x+24)/(-5+x))
**3+(60*x**2-588*x+1440)*ln((-5*x+24)/(-5+x))**2+(-90*x**2+876*x-2160)*ln(
(-5*x+24)/(-5+x))+18*x)/(5*x**5-49*x**4+120*x**3)/ln((-5*x+24)/(-5+x))**3,
x)
```

output
```
x + (9 - 6*log((24 - 5*x)/(x - 5)))/(x**2*log((24 - 5*x)/(x - 5))**2) + x*
*(-2)
```

3.1010.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(25) = 50$.

Time = 0.24 (sec) , antiderivative size = 95, normalized size of antiderivative = 3.52

$$\int \frac{18x + (-2160 + 876x - 90x^2)\log\left(\frac{24-5x}{-5+x}\right) + (1440 - 588x + 60x^2)\log^2\left(\frac{24-5x}{-5+x}\right) + (-240 + 98x - 10x^2 +}{(120x^3 - 49x^4 + 5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}$$
$$= \frac{(x^3+1)\log(x-5)^2 + (x^3+1)\log(-5x+24)^2 - 2\left((x^3+1)\log(x-5)+3\right)\log(-5x+24) + 6\log(x}{x^2\log(x-5)^2 - 2x^2\log(x-5)\log(-5x+24) + x^2\log(-5x+24)^2}$$

input
```
integrate(((5*x^5-49*x^4+120*x^3-10*x^2+98*x-240)*log((-5*x+24)/(-5+x))^3+
(60*x^2-588*x+1440)*log((-5*x+24)/(-5+x))^2+(-90*x^2+876*x-2160)*log((-5*x
+24)/(-5+x))+18*x)/(5*x^5-49*x^4+120*x^3)/log((-5*x+24)/(-5+x))^3,x, algor
ithm=\
```

output
```
((x^3 + 1)*log(x - 5)^2 + (x^3 + 1)*log(-5*x + 24)^2 - 2*((x^3 + 1)*log(x
- 5) + 3)*log(-5*x + 24) + 6*log(x - 5) + 9)/(x^2*log(x - 5)^2 - 2*x^2*log
(x - 5)*log(-5*x + 24) + x^2*log(-5*x + 24)^2)
```

3.1010.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 235 vs. $2(25) = 50$.

Time = 0.39 (sec) , antiderivative size = 235, normalized size of antiderivative = 8.70

$$\int \frac{18x + (-2160 + 876x - 90x^2)\log\left(\frac{24-5x}{-5+x}\right) + (1440 - 588x + 60x^2)\log^2\left(\frac{24-5x}{-5+x}\right) + (-240 + 98x - 10x^2 +}{(120x^3 - 49x^4 + 5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}$$
$$= -\frac{3\left(\frac{2(5x-24)^2\log\left(-\frac{5x-24}{x-5}\right)}{(x-5)^2} - \frac{20(5x-24)\log\left(-\frac{5x-24}{x-5}\right)}{x-5} - \frac{3(5x-24)^2}{(x-5)^2} + \frac{30(5x-24)}{x-5} + 50\log\left(-\frac{5x-24}{x-5}\right) - 75\right)}{\frac{25(5x-24)^2\log\left(-\frac{5x-24}{x-5}\right)^2}{(x-5)^2} - \frac{240(5x-24)\log\left(-\frac{5x-24}{x-5}\right)^2}{x-5} + 576\log\left(-\frac{5x-24}{x-5}\right)^2}$$
$$- \frac{\frac{10(5x-24)}{x-5} - 49}{25\left(\frac{25(5x-24)^2}{(x-5)^2} - \frac{240(5x-24)}{x-5} + 576\right)} + \frac{1}{\frac{5x-24}{x-5} - 5}$$

input
```
integrate(((5*x^5-49*x^4+120*x^3-10*x^2+98*x-240)*log((-5*x+24)/(-5+x))^3+
(60*x^2-588*x+1440)*log((-5*x+24)/(-5+x))^2+(-90*x^2+876*x-2160)*log((-5*x
+24)/(-5+x))+18*x)/(5*x^5-49*x^4+120*x^3)/log((-5*x+24)/(-5+x))^3,x, algor
ithm=\
```

output
```
-3*(2*(5*x - 24)^2*log(-(5*x - 24)/(x - 5))/(x - 5)^2 - 20*(5*x - 24)*log(
-(5*x - 24)/(x - 5))/(x - 5) - 3*(5*x - 24)^2/(x - 5)^2 + 30*(5*x - 24)/(x
 - 5) + 50*log(-(5*x - 24)/(x - 5)) - 75)/(25*(5*x - 24)^2*log(-(5*x - 24)
/(x - 5))^2/(x - 5)^2 - 240*(5*x - 24)*log(-(5*x - 24)/(x - 5))^2/(x - 5)
+ 576*log(-(5*x - 24)/(x - 5))^2) - 1/25*(10*(5*x - 24)/(x - 5) - 49)/(25*
(5*x - 24)^2/(x - 5)^2 - 240*(5*x - 24)/(x - 5) + 576) + 1/((5*x - 24)/(x
- 5) - 5)
```

3.1010.9 Mupad [B] (verification not implemented)

Time = 18.19 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.59

$$\int \frac{18x+(-2160+876x-90x^2)\log\left(\frac{24-5x}{-5+x}\right)+(1440-588x+60x^2)\log^2\left(\frac{24-5x}{-5+x}\right)+(-240+98x-10x^2+\ldots}{(120x^3-49x^4+5x^5)\log^3\left(\frac{24-5x}{-5+x}\right)}$$

$$=x+150\,\ln\left(\frac{5\,x-24}{x-5}\right)-\frac{6}{x^2\,\ln\left(-\frac{5\,x-24}{x-5}\right)}+\frac{9}{x^2\ln\left(-\frac{5\,x-24}{x-5}\right)^2}+\frac{1}{x^2}+\mathrm{atan}(x\,10\mathrm{i}-49\mathrm{i})\;300\mathrm{i}$$

input
```
int((18*x - log(-(5*x - 24)/(x - 5))*(90*x^2 - 876*x + 2160) + log(-(5*x -
 24)/(x - 5))^3*(98*x - 10*x^2 + 120*x^3 - 49*x^4 + 5*x^5 - 240) + log(-(5
*x - 24)/(x - 5))^2*(60*x^2 - 588*x + 1440))/(log(-(5*x - 24)/(x - 5))^3*(
120*x^3 - 49*x^4 + 5*x^5)),x)
```

output
```
x + 150*log((5*x - 24)/(x - 5)) + atan(x*10i - 49i)*300i - 6/(x^2*log(-(5*
x - 24)/(x - 5))) + 9/(x^2*log(-(5*x - 24)/(x - 5))^2) + 1/x^2
```

3.1011 $\int \frac{e^x x - x^2 + (e^x(-3+x) + 3x - x^2)\log(x) + (x^2 - e^x x^2)\log(x)\log\left(-10e^{\ldots}\right.}{(3e^{2x}x^2 - 6e^x x^3 + 3x^4)\log(x)\log\left(-10e^{\ldots}\right.}$

3.1011.1 Optimal result

Integrand size = 118, antiderivative size = 27

$$\int \frac{e^x x - x^2 + (e^x(-3+x) + 3x - x^2)\log(x) + (x^2 - e^x x^2)\log(x)\log\left(-10e^{3/x}x\log(x)\right)\log\left(\log\left(-10e^{3/x}x\right.\right.}{(3e^{2x}x^2 - 6e^x x^3 + 3x^4)\log(x)\log\left(-10e^{3/x}x\log(x)\right)}$$

output
```
1/3*ln(ln(-10*x*exp(3/x)*ln(x)))/(exp(x)-x)
```

3.1011.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{e^x x - x^2 + (e^x(-3+x) + 3x - x^2)\log(x) + (x^2 - e^x x^2)\log(x)\log\left(-10e^{3/x}x\log(x)\right)\log\left(\log\left(-10e^{3/x}x\right.\right.}{(3e^{2x}x^2 - 6e^x x^3 + 3x^4)\log(x)\log\left(-10e^{3/x}x\log(x)\right)}$$

input
```
Integrate[(E^x*x - x^2 + (E^x*(-3 + x) + 3*x - x^2)*Log[x] + (x^2 - E^x*x^
2)*Log[x]*Log[-10*E^(3/x)*x*Log[x]]*Log[Log[-10*E^(3/x)*x*Log[x]]])/((3*E^
(2*x)*x^2 - 6*E^x*x^3 + 3*x^4)*Log[x]*Log[-10*E^(3/x)*x*Log[x]]),x]
```

output
```
Log[Log[-10*E^(3/x)*x*Log[x]]]/(3*(E^x - x))
```

3.1011.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2+\left(-x^2+3x+e^x(x-3)\right)\log(x)+\left(x^2-e^xx^2\right)\log(x)\log\left(-10e^{3/x}x\log(x)\right)\log\left(\log\left(-10e^{3/x}x\log(x)\right)\right)+}{\left(3x^4-6e^xx^3+3e^{2x}x^2\right)\log(x)\log\left(-10e^{3/x}x\log(x)\right)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-x^2+\left(-x^2+3x+e^x(x-3)\right)\log(x)+\left(x^2-e^xx^2\right)\log(x)\log\left(-10e^{3/x}x\log(x)\right)\log\left(\log\left(-10e^{3/x}x\log(x)\right)\right)+}{3\left(e^x-x\right)^2x^2\log(x)\log\left(-10e^{3/x}x\log(x)\right)}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\int \frac{-x^2+e^xx-\left(x^2-3x+e^x(3-x)\right)\log(x)+\left(x^2-e^xx^2\right)\log(x)\log\left(-10e^{3/x}x\log(x)\right)\log\left(\log\left(-10e^{3/x}x\log\right.\right.}{\left(e^x-x\right)^2x^2\log(x)\log\left(-10e^{3/x}x\log(x)\right)}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{3}\int \left(-\frac{(x-1)\log\left(\log\left(-10e^{3/x}x\log(x)\right)\right)}{\left(e^x-x\right)^2}-\frac{\log(x)\log\left(-10e^{3/x}x\log(x)\right)\log\left(\log\left(-10e^{3/x}x\log(x)\right)\right)x^2-\log(x}{\left(e^x-x\right)x^2\log(x)\log\left(-10e^{3/x}x\log(x)\right)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(-3\int \frac{1}{\left(e^x-x\right)x^2\log\left(-10e^{3/x}x\log(x)\right)}dx+\int \frac{1}{\left(e^x-x\right)x\log\left(-10e^{3/x}x\log(x)\right)}dx+\int \frac{1}{\left(e^x-x\right)x\log(x)\log\left(\right.}\right.$$

input
```
Int[(E^x*x - x^2 + (E^x*(-3 + x) + 3*x - x^2)*Log[x] + (x^2 - E^x*x^2)*Log
[x]*Log[-10*E^(3/x)*x*Log[x]]*Log[Log[-10*E^(3/x)*x*Log[x]]])/((3*E^(2*x)*
x^2 - 6*E^x*x^3 + 3*x^4)*Log[x]*Log[-10*E^(3/x)*x*Log[x]]),x]
```

output
```
$Aborted
```

3.1011.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1011.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.44 (sec) , antiderivative size = 195, normalized size of antiderivative = 7.22

$$-\frac{\ln\left(\ln(2)+\ln(5)+i\pi+\ln(x)+\ln\left(\mathrm{e}^{\frac{3}{x}}\right)+\ln(\ln(x))-\frac{i\pi\,\mathrm{csgn}\left(i\mathrm{e}^{\frac{3}{x}}\ln(x)\right)\left(-\mathrm{csgn}\left(i\mathrm{e}^{\frac{3}{x}}\ln(x)\right)+\mathrm{csgn}\left(i\mathrm{e}^{\frac{3}{x}}\right)\right)\left(-\mathrm{csgn}\left(i\mathrm{e}\right.\right.}{2}$$

input
```
int(((-exp(x)*x^2+x^2)*ln(x)*ln(-10*x*exp(3/x)*ln(x))*ln(ln(-10*x*exp(3/x)
*ln(x)))+((-3+x)*exp(x)-x^2+3*x)*ln(x)+exp(x)*x-x^2)/(3*exp(x)^2*x^2-6*exp
(x)*x^3+3*x^4)/ln(x)/ln(-10*x*exp(3/x)*ln(x)),x)
```

output
```
-1/3/(x-exp(x))*ln(ln(2)+ln(5)+I*Pi+ln(x)+ln(exp(3/x))+ln(ln(x))-1/2*I*Pi*
csgn(I*exp(3/x)*ln(x))*(-csgn(I*exp(3/x)*ln(x))+csgn(I*exp(3/x)))*(-csgn(I
*exp(3/x)*ln(x))+csgn(I*ln(x)))-1/2*I*Pi*csgn(I*x*exp(3/x)*ln(x))*(-csgn(I
*x*exp(3/x)*ln(x))+csgn(I*x))*(-csgn(I*x*exp(3/x)*ln(x))+csgn(I*exp(3/x)*l
n(x)))+I*Pi*csgn(I*x*exp(3/x)*ln(x))^2*(csgn(I*x*exp(3/x)*ln(x))-1))
```

3.1011.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{e^x x - x^2 + (e^x(-3+x) + 3x - x^2)\log(x) + (x^2 - e^x x^2)\log(x)\log\left(-10e^{3/x}x\log(x)\right)\log\left(\log\left(-10e^{3/x}x\right.\right.}{(3e^{2x}x^2 - 6e^x x^3 + 3x^4)\log(x)\log\left(-10e^{3/x}x\log(x)\right)}$$

$$-\frac{\log\left(\log\left(-10\,xe^{\frac{3}{x}}\log\left(x\right)\right)\right)}{3\left(x-e^x\right)}$$

input
```
integrate((((-exp(x)*x^2+x^2)*log(x)*log(-10*x*exp(3/x)*log(x))*log(log(-10
*x*exp(3/x)*log(x)))+((-3+x)*exp(x)-x^2+3*x)*log(x)+exp(x)*x-x^2)/(3*exp(x
)^2*x^2-6*exp(x)*x^3+3*x^4)/log(x)/log(-10*x*exp(3/x)*log(x)),x, algorithm
=\
```

output
```
-1/3*log(log(-10*x*e^(3/x)*log(x)))/(x - e^x)
```

3.1011.6 Sympy [A] (verification not implemented)

Time = 1.45 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{e^x x - x^2 + (e^x(-3+x) + 3x - x^2)\log(x) + (x^2 - e^x x^2)\log(x)\log\left(-10e^{3/x}x\log(x)\right)\log\left(\log\left(-10e^{3/x}x\right.\right.}{(3e^{2x}x^2 - 6e^x x^3 + 3x^4)\log(x)\log\left(-10e^{3/x}x\log(x)\right)}$$

$$-\frac{\log\left(\log\left(-10xe^{\frac{3}{x}}\log\left(x\right)\right)\right)}{3x-3e^x}$$

input
```
integrate((((-exp(x)*x**2+x**2)*ln(x)*ln(-10*x*exp(3/x)*ln(x))*ln(ln(-10*x*
exp(3/x)*ln(x)))+((-3+x)*exp(x)-x**2+3*x)*ln(x)+exp(x)*x-x**2)/(3*exp(x)**
2*x**2-6*exp(x)*x**3+3*x**4)/ln(x)/ln(-10*x*exp(3/x)*ln(x)),x)
```

output
```
-log(log(-10*x*exp(3/x)*log(x)))/(3*x - 3*exp(x))
```

3.1011.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{e^x x - x^2 + (e^x(-3+x) + 3x - x^2)\log(x) + (x^2 - e^x x^2)\log(x)\log\left(-10e^{3/x} x \log(x)\right)\log\left(\log\left(-10e^{3/x} x\right.\right.}{(3e^{2x}x^2 - 6e^x x^3 + 3x^4)\log(x)\log\left(-10e^{3/x} x \log(x)\right)}$$
$$-\frac{\log\left(x(\log(5) + \log(2)) + x\log(x) + x\log(-\log(x)) + 3\right) - \log(x)}{3(x - e^x)}$$

input
```
integrate((((-exp(x)*x^2+x^2)*log(x)*log(-10*x*exp(3/x)*log(x))*log(log(-10
*x*exp(3/x)*log(x)))+((-3+x)*exp(x)-x^2+3*x)*log(x)+exp(x)*x-x^2)/(3*exp(x
)^2*x^2-6*exp(x)*x^3+3*x^4)/log(x)/log(-10*x*exp(3/x)*log(x)),x, algorithm
=\
```

output
```
-1/3*(log(x*(log(5) + log(2)) + x*log(x) + x*log(-log(x)) + 3) - log(x))/(
x - e^x)
```

3.1011.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{e^x x - x^2 + (e^x(-3+x) + 3x - x^2)\log(x) + (x^2 - e^x x^2)\log(x)\log\left(-10e^{3/x} x \log(x)\right)\log\left(\log\left(-10e^{3/x} x\right.\right.}{(3e^{2x}x^2 - 6e^x x^3 + 3x^4)\log(x)\log\left(-10e^{3/x} x \log(x)\right)}$$
$$-\frac{\log\left(x\log(x) + x\log(-10\log(x)) + 3\right) - \log(x)}{3(x - e^x)}$$

input
```
integrate((((-exp(x)*x^2+x^2)*log(x)*log(-10*x*exp(3/x)*log(x))*log(log(-10
*x*exp(3/x)*log(x)))+((-3+x)*exp(x)-x^2+3*x)*log(x)+exp(x)*x-x^2)/(3*exp(x
)^2*x^2-6*exp(x)*x^3+3*x^4)/log(x)/log(-10*x*exp(3/x)*log(x)),x, algorithm
=\
```

output
```
-1/3*(log(x*log(x) + x*log(-10*log(x)) + 3) - log(x))/(x - e^x)
```

3.1011.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^x x - x^2 + (e^x(-3+x) + 3x - x^2)\log(x) + (x^2 - e^x x^2)\log(x)\log\left(-10e^{3/x}x\log(x)\right)\log\left(\log\left(-10e^{3/x}x\right.\right.}{(3e^{2x}x^2 - 6e^x x^3 + 3x^4)\log(x)\log\left(-10e^{3/x}x\log(x)\right)}$$

input
```
int((x*exp(x) + log(x)*(3*x + exp(x)*(x - 3) - x^2) - x^2 - log(log(-10*x*
exp(3/x)*log(x)))*log(-10*x*exp(3/x)*log(x))*log(x)*(x^2*exp(x) - x^2))/(l
og(-10*x*exp(3/x)*log(x))*log(x)*(3*x^2*exp(2*x) - 6*x^3*exp(x) + 3*x^4)),
x)
```

output
```
int((x*exp(x) + log(x)*(3*x + exp(x)*(x - 3) - x^2) - x^2 - log(log(-10*x*
exp(3/x)*log(x)))*log(-10*x*exp(3/x)*log(x))*log(x)*(x^2*exp(x) - x^2))/(l
og(-10*x*exp(3/x)*log(x))*log(x)*(3*x^2*exp(2*x) - 6*x^3*exp(x) + 3*x^4)),
 x)
```

3.1012 $\int \frac{16}{x^2} \, dx$

3.1012.1 Optimal result

Integrand size = 5, antiderivative size = 14

$$\int \frac{16}{x^2} \, dx = \frac{-16 + \frac{8x}{9e^3}}{x}$$

output
```
1/x*(-16+8/9*x/exp(3))
```

3.1012.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.36

$$\int \frac{16}{x^2} \, dx = -\frac{16}{x}$$

input
```
Integrate[16/x^2,x]
```

output
```
-16/x
```

3.1012.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.36, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16}{x^2} \, dx$$

$$\Big\downarrow \text{15}$$

$$-\frac{16}{x}$$

input
```
Int[16/x^2,x]
```

output
```
-16/x
```

3.1012.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.1012.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.43

method	result	size
gosper	$-\frac{16}{x}$	6
default	$-\frac{16}{x}$	6
norman	$-\frac{16}{x}$	6
risch	$-\frac{16}{x}$	6
parallelrisch	$-\frac{16}{x}$	6

input
```
int(16/x^2,x,method=_RETURNVERBOSE)
```

output
```
-16/x
```

3.1012.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.36

$$\int \frac{16}{x^2}\,dx = -\frac{16}{x}$$

input
```
integrate(16/x^2,x, algorithm=\
```

output
```
-16/x
```

3.1012.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 3, normalized size of antiderivative = 0.21

$$\int \frac{16}{x^2}\,dx = -\frac{16}{x}$$

input
```
integrate(16/x**2,x)
```

output
```
-16/x
```

3.1012.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.36

$$\int \frac{16}{x^2}\,dx = -\frac{16}{x}$$

input
```
integrate(16/x^2,x, algorithm=\
```

output
```
-16/x
```

3.1012.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.36

$$\int \frac{16}{x^2} \, dx = -\frac{16}{x}$$

input
```
integrate(16/x^2,x, algorithm=\
```

output
```
-16/x
```

3.1012.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.36

$$\int \frac{16}{x^2} \, dx = -\frac{16}{x}$$

input
```
int(16/x^2,x)
```

output
```
-16/x
```

3.1013 $\int \frac{-5700-3020x-400x^2+(-76-40x)\log(2x)}{361x^2+190x^3+25x^4}\,dx$

3.1013.1 Optimal result

Integrand size = 39, antiderivative size = 24

$$\int \frac{-5700-3020x-400x^2+(-76-40x)\log(2x)}{361x^2+190x^3+25x^4}\,dx = \frac{16}{x}-\frac{4\log(2x)}{x(1-5(4+x))}$$

output
```
16/x-4*ln(2*x)/x/(-19-5*x)
```

3.1013.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-5700-3020x-400x^2+(-76-40x)\log(2x)}{361x^2+190x^3+25x^4}\,dx = \frac{4(76+20x+\log(2x))}{19x+5x^2}$$

input
```
Integrate[(-5700 - 3020*x - 400*x^2 + (-76 - 40*x)*Log[2*x])/(361*x^2 + 19
0*x^3 + 25*x^4),x]
```

output
```
(4*(76 + 20*x + Log[2*x]))/(19*x + 5*x^2)
```

3.1013.3 Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.103, Rules used = {2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-400x^2-3020x+(-40x-76)\log(2x)-5700}{25x^4+190x^3+361x^2}\,dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-400x^2-3020x+(-40x-76)\log(2x)-5700}{x^2\left(25x^2+190x+361\right)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-400x^2-3020x+(-40x-76)\log(2x)-5700}{x^2(5x+19)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{20(4x+15)}{x^2(5x+19)}-\frac{4(10x+19)\log(2x)}{x^2(5x+19)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{16}{x}-\frac{20\log(x)}{361}+\frac{4\log(2x)}{19x}+\frac{100x\log(2x)}{361(5x+19)}$$

input
```
Int[(-5700 - 3020*x - 400*x^2 + (-76 - 40*x)*Log[2*x])/(361*x^2 + 190*x^3
+ 25*x^4),x]
```

output
```
16/x - (20*Log[x])/361 + (4*Log[2*x])/(19*x) + (100*x*Log[2*x])/(361*(19 +
 5*x))
```

3.1013.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1013.4 Maple [A] (verified)

Time = 0.53 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

method	result	size
norman	$\frac{304+80x+4\ln(2x)}{x(5x+19)}$	23
risch	$\frac{4\ln(2x)}{x(5x+19)}+\frac{16}{x}$	23
parallelrisch	$\frac{1520+400x+20\ln(2x)}{5x(5x+19)}$	24
derivativedivides	$\frac{16}{x}-\frac{20\ln(2x)}{361}+\frac{4\ln(2x)}{19x}+\frac{200\ln(2x)x}{361(10x+38)}$	36
default	$\frac{16}{x}-\frac{20\ln(2x)}{361}+\frac{4\ln(2x)}{19x}+\frac{200\ln(2x)x}{361(10x+38)}$	36
parts	$\frac{20\ln(5x+19)}{361}+\frac{16}{x}-\frac{20\ln(x)}{361}-\frac{20\ln(10x+38)}{361}+\frac{200\ln(2x)x}{361(10x+38)}+\frac{4\ln(2x)}{19x}$	50

input
```
int(((-40*x-76)*ln(2*x)-400*x^2-3020*x-5700)/(25*x^4+190*x^3+361*x^2),x,me
thod=_RETURNVERBOSE)
```

output
```
(304+80*x+4*ln(2*x))/x/(5*x+19)
```

3.1013.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-5700-3020x-400x^2+(-76-40x)\log(2x)}{361x^2+190x^3+25x^4}\,dx=\frac{4\,(20\,x+\log(2\,x)+76)}{5\,x^2+19\,x}$$

input
```
integrate(((-40*x-76)*log(2*x)-400*x^2-3020*x-5700)/(25*x^4+190*x^3+361*x^
2),x, algorithm=\
```

output
```
4*(20*x + log(2*x) + 76)/(5*x^2 + 19*x)
```

3.1013.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{-5700-3020x-400x^2+(-76-40x)\log(2x)}{361x^2+190x^3+25x^4}\,dx=\frac{4\log(2x)}{5x^2+19x}+\frac{16}{x}$$

input
```
integrate(((-40*x-76)*ln(2*x)-400*x**2-3020*x-5700)/(25*x**4+190*x**3+361*
x**2),x)
```

output
```
4*log(2*x)/(5*x**2 + 19*x) + 16/x
```

3.1013.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(22) = 44.

Time = 0.32 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.25

$$\int \frac{-5700-3020x-400x^2+(-76-40x)\log(2x)}{361x^2+190x^3+25x^4}\,dx$$
$$=\frac{300\,(10\,x+19)}{19\,(5\,x^2+19\,x)}+\frac{4\,(5\,x+19\,\log(2)+19\,\log(x)+19)}{19\,(5\,x^2+19\,x)}-\frac{1500}{19\,(5\,x+19)}$$

input
```
integrate(((-40*x-76)*log(2*x)-400*x^2-3020*x-5700)/(25*x^4+190*x^3+361*x^
2),x, algorithm=\
```

output
```
300/19*(10*x + 19)/(5*x^2 + 19*x) + 4/19*(5*x + 19*log(2) + 19*log(x) + 19
)/(5*x^2 + 19*x) - 1500/19/(5*x + 19)
```

3.1013.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{-5700-3020x-400x^2+(-76-40x)\log(2x)}{361x^2+190x^3+25x^4}\,dx = -\frac{4}{19}\left(\frac{5}{5\,x+19}-\frac{1}{x}\right)\log\left(2\,x\right)+\frac{16}{x}$$

input
```
integrate((((-40*x-76)*log(2*x)-400*x^2-3020*x-5700)/(25*x^4+190*x^3+361*x^
2),x, algorithm=\
```

output
```
-4/19*(5/(5*x + 19) - 1/x)*log(2*x) + 16/x
```

3.1013.9 Mupad [B] (verification not implemented)

Time = 16.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04

$$\int \frac{-5700-3020x-400x^2+(-76-40x)\log(2x)}{361x^2+190x^3+25x^4}\,dx = \frac{4\left(19\,\ln\left(2\,x\right)-100\,x^2+1444\right)}{19\,x\,\left(5\,x+19\right)}$$

input
```
int(-(3020*x + 400*x^2 + log(2*x)*(40*x + 76) + 5700)/(361*x^2 + 190*x^3 +
 25*x^4),x)
```

output
```
(4*(19*log(2*x) - 100*x^2 + 1444))/(19*x*(5*x + 19))
```

3.1014 $\int \frac{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6+e^x(104-200x-$ $\frac{}{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625}$

3.1014.1 Optimal result

Integrand size = 87, antiderivative size = 34

$$\int \frac{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6+e^x(104-200x-27x^2+76x^3-25x^4)}{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6}\,dx$$
$$=-1+x+\frac{e^x x}{(-x+25x^2)\left(-1+\frac{x^2}{2-x}\right)}$$

output
```
x+x/(25*x^2-x)/(x^2/(2-x)-1)*exp(x)-1
```

3.1014.2 Mathematica [A] (verified)

Time = 1.16 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.82

$$\int \frac{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6+e^x(104-200x-27x^2+76x^3-25x^4)}{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6}\,dx$$
$$=x+\frac{e^x(2-x)}{2-51x+24x^2+25x^3}$$

input
```
Integrate[(4 - 204*x + 2697*x^2 - 2348*x^3 - 1974*x^4 + 1200*x^5 + 625*x^6
 + E^x*(104 - 200*x - 27*x^2 + 76*x^3 - 25*x^4))/(4 - 204*x + 2697*x^2 - 2
348*x^3 - 1974*x^4 + 1200*x^5 + 625*x^6),x]
```

output
```
x + (E^x*(2 - x))/(2 - 51*x + 24*x^2 + 25*x^3)
```

3.1014.3 Rubi [A] (verified)

Time = 1.83 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.24, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.023$, Rules used = {2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{625x^6+1200x^5-1974x^4-2348x^3+2697x^2+e^x(-25x^4+76x^3-27x^2-200x+104)-204x+4}{625x^6+1200x^5-1974x^4-2348x^3+2697x^2-204x+4}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(-\frac{11(625x^6+1200x^5-1974x^4-2348x^3+2697x^2+e^x(-25x^4+76x^3-27x^2-200x+104)-204x+4)}{20736(x-1)}+\right.$$

$$\Big\downarrow \text{2009}$$

$$x+\frac{1225e^x}{1224(1-25x)}-\frac{e^x}{72(1-x)}+\frac{4e^x}{153(x+2)}$$

input
```
Int[(4 - 204*x + 2697*x^2 - 2348*x^3 - 1974*x^4 + 1200*x^5 + 625*x^6 + E^x
*(104 - 200*x - 27*x^2 + 76*x^3 - 25*x^4))/(4 - 204*x + 2697*x^2 - 2348*x^
3 - 1974*x^4 + 1200*x^5 + 625*x^6),x]
```

output
```
(1225*E^x)/(1224*(1 - 25*x)) - E^x/(72*(1 - x)) + x + (4*E^x)/(153*(2 + x)
)
```

3.1014.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.1014.4 Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

method	result	size
risch	$x-\frac{(-2+x)e^{x}}{25x^{3}+24x^{2}-51x+2}$	27
default	$x+\frac{4\,e^{x}}{153(2+x)}-\frac{49\,e^{x}}{1224\left(x-\frac{1}{25}\right)}+\frac{e^{x}}{-72+72x}$	30
parts	$x+\frac{4\,e^{x}}{153(2+x)}-\frac{49\,e^{x}}{1224\left(x-\frac{1}{25}\right)}+\frac{e^{x}}{-72+72x}$	30
norman	$\frac{-\frac{1851x^{2}}{25}+\frac{1274x}{25}+25x^{4}-e^{x}x+2\,e^{x}-\frac{48}{25}}{25x^{3}+24x^{2}-51x+2}$	43
parallelrisch	$\frac{625x^{4}-48-1851x^{2}-25\,e^{x}x+1274x+50\,e^{x}}{625x^{3}+600x^{2}-1275x+50}$	44

input
```
int(((-25*x^4+76*x^3-27*x^2-200*x+104)*exp(x)+625*x^6+1200*x^5-1974*x^4-23
48*x^3+2697*x^2-204*x+4)/(625*x^6+1200*x^5-1974*x^4-2348*x^3+2697*x^2-204*
x+4),x,method=_RETURNVERBOSE)
```

output
```
x-(-2+x)/(25*x^3+24*x^2-51*x+2)*exp(x)
```

3.1014.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.29

$$\int \frac{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6+e^x(104-200x-27x^2+76x^3-25x^4)}{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6}\,dx = \frac{25\,x^{4}+24\,x^{3}-51\,x^{2}-(x-2)e^{x}+2\,x}{25\,x^{3}+24\,x^{2}-51\,x+2}$$

input
```
integrate(((-25*x^4+76*x^3-27*x^2-200*x+104)*exp(x)+625*x^6+1200*x^5-1974*
x^4-2348*x^3+2697*x^2-204*x+4)/(625*x^6+1200*x^5-1974*x^4-2348*x^3+2697*x^
2-204*x+4),x, algorithm=\
```

output
```
(25*x^4 + 24*x^3 - 51*x^2 - (x - 2)*e^x + 2*x)/(25*x^3 + 24*x^2 - 51*x + 2
)
```

3.1014.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.65

$$\int \frac{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6+e^x(104-200x-27x^2+76x^3-25x^4)}{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6}\,dx$$
$$= x+\frac{(2-x)\,e^x}{25x^3+24x^2-51x+2}$$

input
```
integrate(((-25*x**4+76*x**3-27*x**2-200*x+104)*exp(x)+625*x**6+1200*x**5-
1974*x**4-2348*x**3+2697*x**2-204*x+4)/(625*x**6+1200*x**5-1974*x**4-2348*
x**3+2697*x**2-204*x+4),x)
```

output
```
x + (2 - x)*exp(x)/(25*x**3 + 24*x**2 - 51*x + 2)
```

3.1014.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 229 vs. 2(32) = 64.

Time = 0.24 (sec) , antiderivative size = 229, normalized size of antiderivative = 6.74

$$\int \frac{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6+e^x(104-200x-27x^2+76x^3-25x^4)}{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6}\,dx$$
$$= x-\frac{(x-2)e^x}{25\,x^3+24\,x^2-51\,x+2}-\frac{285481771\,x^2-240455729\,x+9161458}{6242400\,(25\,x^3+24\,x^2-51\,x+2)}$$
$$+\frac{4580729\,x^2-7021771\,x+273542}{130050\,(25\,x^3+24\,x^2-51\,x+2)}+\frac{329\,(136771\,x^2-51929\,x+1858)}{1040400\,(25\,x^3+24\,x^2-51\,x+2)}$$
$$-\frac{4075\,x^2+4687\,x-5294}{62424\,(25\,x^3+24\,x^2-51\,x+2)}-\frac{899\,(2275\,x^2+1255\,x-62)}{83232\,(25\,x^3+24\,x^2-51\,x+2)}$$
$$-\frac{587\,(929\,x^2-4579\,x+182)}{62424\,(25\,x^3+24\,x^2-51\,x+2)}+\frac{775\,x^2+3019\,x-326}{1224\,(25\,x^3+24\,x^2-51\,x+2)}$$

input
```
integrate(((-25*x^4+76*x^3-27*x^2-200*x+104)*exp(x)+625*x^6+1200*x^5-1974*
x^4-2348*x^3+2697*x^2-204*x+4)/(625*x^6+1200*x^5-1974*x^4-2348*x^3+2697*x^
2-204*x+4),x, algorithm=\
```

output
```
x - (x - 2)*e^x/(25*x^3 + 24*x^2 - 51*x + 2) - 1/6242400*(285481771*x^2 -
240455729*x + 9161458)/(25*x^3 + 24*x^2 - 51*x + 2) + 1/130050*(4580729*x^
2 - 7021771*x + 273542)/(25*x^3 + 24*x^2 - 51*x + 2) + 329/1040400*(136771
*x^2 - 51929*x + 1858)/(25*x^3 + 24*x^2 - 51*x + 2) - 1/62424*(4075*x^2 +
4687*x - 5294)/(25*x^3 + 24*x^2 - 51*x + 2) - 899/83232*(2275*x^2 + 1255*x
 - 62)/(25*x^3 + 24*x^2 - 51*x + 2) - 587/62424*(929*x^2 - 4579*x + 182)/(
25*x^3 + 24*x^2 - 51*x + 2) + 1/1224*(775*x^2 + 3019*x - 326)/(25*x^3 + 24
*x^2 - 51*x + 2)
```

3.1014.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.35

$$\int \frac{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6+e^x(104-200x-27x^2+76x^3-25x^4)}{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6}\,dx$$
$$=\frac{25\,x^4+24\,x^3-51\,x^2-xe^x+2\,x+2\,e^x}{25\,x^3+24\,x^2-51\,x+2}$$

input
```
integrate(((-25*x^4+76*x^3-27*x^2-200*x+104)*exp(x)+625*x^6+1200*x^5-1974*
x^4-2348*x^3+2697*x^2-204*x+4)/(625*x^6+1200*x^5-1974*x^4-2348*x^3+2697*x^
2-204*x+4),x, algorithm=\
```

output
```
(25*x^4 + 24*x^3 - 51*x^2 - x*e^x + 2*x + 2*e^x)/(25*x^3 + 24*x^2 - 51*x +
 2)
```

3.1014.9 Mupad [B] (verification not implemented)

Time = 16.69 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

$$\int \frac{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6+e^x(104-200x-27x^2+76x^3-25x^4)}{4-204x+2697x^2-2348x^3-1974x^4+1200x^5+625x^6}\,dx$$
$$=x+\frac{2\,\mathrm{e}^x-x\,\mathrm{e}^x}{(25\,x-1)\,(x-1)\,(x+2)}$$

input
```
int(-(204*x + exp(x)*(200*x + 27*x^2 - 76*x^3 + 25*x^4 - 104) - 2697*x^2 +
 2348*x^3 + 1974*x^4 - 1200*x^5 - 625*x^6 - 4)/(2697*x^2 - 204*x - 2348*x^
3 - 1974*x^4 + 1200*x^5 + 625*x^6 + 4),x)
```

output
```
x + (2*exp(x) - x*exp(x))/((25*x - 1)*(x - 1)*(x + 2))
```

3.1015 $\int \frac{-2x^6+(-8x^3+2e^{-4+x}x^4+4x^6)\log(x)+(8x^3+e^{-4+x}(-4x^4-2x^5))}{x^3\log^3(x)}$

3.1015.1 Optimal result

Integrand size = 100, antiderivative size = 25

$$\int \frac{-2x^6+(-8x^3+2e^{-4+x}x^4+4x^6)\log(x)+(8x^3+e^{-4+x}(-4x^4-2x^5))\log^2(x)+(-32+2e^{-8+2x}x^3+e^{-}}{x^3\log^3(x)}$$

$$=-1+\left(e^{-4+x}-\frac{4+\frac{x^3}{\log(x)}}{x}\right)^2$$

output
```
(exp(x-4)-(4+x^3/ln(x))/x)^2-1
```

3.1015.2 Mathematica [A] (verified)

Time = 0.55 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \frac{-2x^6+(-8x^3+2e^{-4+x}x^4+4x^6)\log(x)+(8x^3+e^{-4+x}(-4x^4-2x^5))\log^2(x)+(-32+2e^{-8+2x}x^3+e^{-}}{x^3\log^3(x)}$$

$$=\frac{(e^4x^3+(4e^4-e^xx)\log(x))^2}{e^8x^2\log^2(x)}$$

input
```
Integrate[(-2*x^6 + (-8*x^3 + 2*E^(-4 + x)*x^4 + 4*x^6)*Log[x] + (8*x^3 +
E^(-4 + x)*(-4*x^4 - 2*x^5))*Log[x]^2 + (-32 + 2*E^(-8 + 2*x)*x^3 + E^(-4
+ x)*(8*x - 8*x^2))*Log[x]^3)/(x^3*Log[x]^3),x]
```

output
```
(E^4*x^3 + (4*E^4 - E^x*x)*Log[x])^2/(E^8*x^2*Log[x]^2)
```

3.1015.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 56 vs. 2(25) = 50.

Time = 1.43 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.24, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.020, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^6+\left(2e^{2x-8}x^3+e^{x-4}\left(8x-8x^2\right)-32\right)\log^3(x)+\left(4x^6+2e^{x-4}x^4-8x^3\right)\log(x)+\left(8x^3+e^{x-4}\left(-2x^5-4x^4\right.\right.}{x^3\log^3(x)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2\left(-x^6+2x^6\log(x)+4x^3\log^2(x)-4x^3\log(x)-16\log^3(x)\right)}{x^3\log^3(x)}-\frac{2e^{x-4}\left(x^4\log(x)-x^3+2x^3\log(x)+4x\log^2(\right.}{x^2\log^2(x)}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{x^4}{\log^2(x)}+\frac{16}{x^2}-\frac{2e^{x-4}\left(x^4\log(x)+4x\log^2(x)\right)}{x^2\log^2(x)}+e^{2x-8}+\frac{8x}{\log(x)}$$

input
```
Int[(-2*x^6 + (-8*x^3 + 2*E^(-4 + x)*x^4 + 4*x^6)*Log[x] + (8*x^3 + E^(-4
+ x)*(-4*x^4 - 2*x^5))*Log[x]^2 + (-32 + 2*E^(-8 + 2*x)*x^3 + E^(-4 + x)*(
8*x - 8*x^2))*Log[x]^3)/(x^3*Log[x]^3),x]
```

output
```
E^(-8 + 2*x) + 16/x^2 + x^4/Log[x]^2 + (8*x)/Log[x] - (2*E^(-4 + x)*(x^4*L
og[x] + 4*x*Log[x]^2))/(x^2*Log[x]^2)
```

3.1015.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1015.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.92

method	result	size
risch	$\frac{x^{2} \mathrm{e}^{2 x -8}-8 x \,\mathrm{e}^{x -4}+16}{x^{2}}+\frac{x \left(x^{3}-2 x \,\mathrm{e}^{x -4} \ln \left(x \right)+8 \ln \left(x \right)\right)}{\ln \left(x \right)^{2}}$	48
parallelrisch	$\frac{-2 \ln \left(x \right) \mathrm{e}^{x -4} x^{4}+x^{6}+\ln \left(x \right)^{2} \mathrm{e}^{2 x -8} x^{2}-8 \ln \left(x \right)^{2} \mathrm{e}^{x -4} x +8 x^{3} \ln \left(x \right)+16 \ln \left(x \right)^{2}}{\ln \left(x \right)^{2} x^{2}}$	62

input
```
int(((2*x^3*exp(x-4)^2+(-8*x^2+8*x)*exp(x-4)-32)*ln(x)^3+((-2*x^5-4*x^4)*e
xp(x-4)+8*x^3)*ln(x)^2+(2*x^4*exp(x-4)+4*x^6-8*x^3)*ln(x)-2*x^6)/x^3/ln(x)
^3,x,method=_RETURNVERBOSE)
```

output
```
(x^2*exp(2*x-8)-8*x*exp(x-4)+16)/x^2+x*(x^3-2*x*exp(x-4)*ln(x)+8*ln(x))/ln
(x)^2
```

3.1015.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(25) = 50.

Time = 0.27 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.16

$$\int \frac{-2x^6+(-8x^3+2e^{-4+x}x^4+4x^6)\log(x)+(8x^3+e^{-4+x}(-4x^4-2x^5))\log^2(x)+(-32+2e^{-8+2x}x^3+e^{-}}{x^3\log^3(x)}$$
$$=\frac{x^{6}+\left(x^{2} e^{\left(2 \, x - 8\right)} - 8 \, x e^{\left(x - 4\right)} + 16\right)} \log\left(x\right)^{2} - 2 \, \left(x^{4} e^{\left(x - 4\right)} - 4 \, x^{3}\right)} \log\left(x\right)}{x^{2} \log\left(x\right)^{2}}$$

input
```
integrate(((2*x^3*exp(x-4)^2+(-8*x^2+8*x)*exp(x-4)-32)*log(x)^3+((-2*x^5-4
*x^4)*exp(x-4)+8*x^3)*log(x)^2+(2*x^4*exp(x-4)+4*x^6-8*x^3)*log(x)-2*x^6)/
x^3/log(x)^3,x, algorithm=\
```

output
```
(x^6 + (x^2*e^(2*x - 8) - 8*x*e^(x - 4) + 16)*log(x)^2 - 2*(x^4*e^(x - 4)
- 4*x^3)*log(x))/(x^2*log(x)^2)
```

3.1015.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(17) = 34.

Time = 0.15 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{-2x^6+(-8x^3+2e^{-4+x}x^4+4x^6)\log(x)+(8x^3+e^{-4+x}(-4x^4-2x^5))\log^2(x)+(-32+2e^{-8+2x}x^3+e^{-}}{x^3\log^3(x)}$$
$$=\frac{x^4+8x\log(x)}{\log(x)^2}+\frac{xe^{2x-8}\log(x)+(-2x^3-8\log(x))e^{x-4}}{x\log(x)}+\frac{16}{x^2}$$

input
```
integrate(((2*x**3*exp(x-4)**2+(-8*x**2+8*x)*exp(x-4)-32)*ln(x)**3+((-2*x*
*5-4*x**4)*exp(x-4)+8*x**3)*ln(x)**2+(2*x**4*exp(x-4)+4*x**6-8*x**3)*ln(x)
-2*x**6)/x**3/ln(x)**3,x)
```

output
```
(x**4 + 8*x*log(x))/log(x)**2 + (x*exp(2*x - 8)*log(x) + (-2*x**3 - 8*log(
x))*exp(x - 4))/(x*log(x)) + 16/x**2
```

3.1015.7 Maxima [F]

$$\int \frac{-2x^6+(-8x^3+2e^{-4+x}x^4+4x^6)\log(x)+(8x^3+e^{-4+x}(-4x^4-2x^5))\log^2(x)+(-32+2e^{-8+2x}x^3+e^{-}}{x^3\log^3(x)}$$
$$=\int -\frac{2\left(x^6-\left(x^3e^{(2x-8)}-4\left(x^2-x\right)e^{(x-4)}-16\right)\log(x)^3-\left(4x^3-\left(x^5+2x^4\right)e^{(x-4)}\right)\log(x)^2-\left(2x^6+x^{}\right.}{x^3\log(x)^3}$$

input
```
integrate(((2*x^3*exp(x-4)^2+(-8*x^2+8*x)*exp(x-4)-32)*log(x)^3+((-2*x^5-4
*x^4)*exp(x-4)+8*x^3)*log(x)^2+(2*x^4*exp(x-4)+4*x^6-8*x^3)*log(x)-2*x^6)/
x^3/log(x)^3,x, algorithm=\
```

output
```
-8*Ei(x)*e^(-4) + 8*e^(-4)*gamma(-1, -x) - 2*x^2*e^(x - 4)/log(x) + 16/x^2
 + e^(2*x - 8) - 8*gamma(-1, -log(x)) + 16*gamma(-1, -4*log(x)) + 32*gamma
(-2, -4*log(x)) + 8*integrate(1/log(x), x)
```

3.1015.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. 2(25) = 50.

Time = 0.36 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.80

$$\int \frac{-2x^6 + (-8x^3 + 2e^{-4+x}x^4 + 4x^6)\log(x) + (8x^3 + e^{-4+x}(-4x^4 - 2x^5))\log^2(x) + (-32 + 2e^{-8+2x}x^3 + e^{-}}{x^3\log^3(x)}$$
$$= \frac{\left(x^6e^{12} - 2\,x^4e^{(x+8)}\log(x) + 8\,x^3e^{12}\log(x) + x^2e^{(2\,x+4)}\log(x)^2 - 8\,xe^{(x+8)}\log(x)^2 + 16\,e^{12}\log(x)^2\right)e^{(-12)}}{x^2\log(x)^2}$$

input
```
integrate(((2*x^3*exp(x-4)^2+(-8*x^2+8*x)*exp(x-4)-32)*log(x)^3+((-2*x^5-4
*x^4)*exp(x-4)+8*x^3)*log(x)^2+(2*x^4*exp(x-4)+4*x^6-8*x^3)*log(x)-2*x^6)/
x^3/log(x)^3,x, algorithm=\
```

output
```
(x^6*e^12 - 2*x^4*e^(x + 8)*log(x) + 8*x^3*e^12*log(x) + x^2*e^(2*x + 4)*l
og(x)^2 - 8*x*e^(x + 8)*log(x)^2 + 16*e^12*log(x)^2)*e^(-12)/(x^2*log(x)^2
)
```

3.1015.9 Mupad [B] (verification not implemented)

Time = 15.98 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \frac{-2x^6 + (-8x^3 + 2e^{-4+x}x^4 + 4x^6)\log(x) + (8x^3 + e^{-4+x}(-4x^4 - 2x^5))\log^2(x) + (-32 + 2e^{-8+2x}x^3 + e^{-}}{x^3\log^3(x)}$$
$$= \mathrm{e}^{2\,x-8} + \frac{8\,x}{\ln(x)} - \frac{8\,\mathrm{e}^{x-4}}{x} + \frac{x^4}{\ln(x)^2} + \frac{16}{x^2} - \frac{2\,x^2\,\mathrm{e}^{x-4}}{\ln(x)}$$

input
```
int((log(x)*(2*x^4*exp(x - 4) - 8*x^3 + 4*x^6) - log(x)^2*(exp(x - 4)*(4*x
^4 + 2*x^5) - 8*x^3) - 2*x^6 + log(x)^3*(exp(x - 4)*(8*x - 8*x^2) + 2*x^3*
exp(2*x - 8) - 32))/(x^3*log(x)^3),x)
```

output
```
exp(2*x - 8) + (8*x)/log(x) - (8*exp(x - 4))/x + x^4/log(x)^2 + 16/x^2 - (
2*x^2*exp(x - 4))/log(x)
```

3.1016 $\int \frac{2e^4+6x\log(9)}{e^4}\,dx$

3.1016.1 Optimal result

Integrand size = 15, antiderivative size = 15

$$\int \frac{2e^4+6x\log(9)}{e^4}\,dx=-5+2x+\frac{3x^2\log(9)}{e^4}$$

output
```
6*ln(3)*x^2/exp(2)^2-5+2*x
```

3.1016.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{2e^4+6x\log(9)}{e^4}\,dx=2x+\frac{3x^2\log(9)}{e^4}$$

input
```
Integrate[(2*E^4 + 6*x*Log[9])/E^4,x]
```

output
```
2*x + (3*x^2*Log[9])/E^4
```

3.1016.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x\log(9)+2e^4}{e^4}\,dx$$
$$\Big\downarrow \; 17$$
$$\frac{\left(3x\log(9)+e^4\right)^2}{3e^4\log(9)}$$

input
```
Int[(2*E^4 + 6*x*Log[9])/E^4,x]
```

output
```
(E^4 + 3*x*Log[9])^2/(3*E^4*Log[9])
```

3.1016.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.1016.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

method	result	size
risch	$2x+6\ln(3)\,x^2\mathrm{e}^{-4}$	14
gosper	$2x(\mathrm{e}^4+3x\ln(3))\,\mathrm{e}^{-4}$	18
default	$2\,\mathrm{e}^{-4}(3x^2\ln(3)+x\,\mathrm{e}^4)$	21
parallelrisch	$\mathrm{e}^{-4}(2x\,\mathrm{e}^4+6x^2\ln(3))$	21
norman	$(2\,\mathrm{e}^2x+6\,\mathrm{e}^{-2}\ln(3)\,x^2)\,\mathrm{e}^{-2}$	23

input
```
int((12*x*ln(3)+2*exp(2)^2)/exp(2)^2,x,method=_RETURNVERBOSE)
```

output
```
2*x+6*ln(3)*x^2*exp(-4)
```

3.1016.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \frac{2e^4 + 6x\log(9)}{e^4}\,dx = 2\left(3\,x^2\log\left(3\right) + xe^4\right)e^{(-4)}$$

input
```
integrate((12*x*log(3)+2*exp(2)^2)/exp(2)^2,x, algorithm=\
```

output
```
2*(3*x^2*log(3) + x*e^4)*e^(-4)
```

3.1016.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{2e^4 + 6x\log(9)}{e^4}\,dx = \frac{6x^2\log\left(3\right)}{e^4} + 2x$$

input
```
integrate((12*x*ln(3)+2*exp(2)**2)/exp(2)**2,x)
```

output
```
6*x**2*exp(-4)*log(3) + 2*x
```

3.1016.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \frac{2e^4 + 6x\log(9)}{e^4}\,dx = 2\left(3\,x^2\log\left(3\right) + xe^4\right)e^{(-4)}$$

input
```
integrate((12*x*log(3)+2*exp(2)^2)/exp(2)^2,x, algorithm=\
```

output
```
2*(3*x^2*log(3) + x*e^4)*e^(-4)
```

3.1016.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \frac{2e^4 + 6x\log(9)}{e^4}\,dx = 2\left(3\,x^2\log\left(3\right) + xe^4\right)e^{(-4)}$$

input
```
integrate((12*x*log(3)+2*exp(2)^2)/exp(2)^2,x, algorithm=\
```

output
```
2*(3*x^2*log(3) + x*e^4)*e^(-4)
```

3.1016.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int \frac{2e^4 + 6x\log(9)}{e^4}\,dx = \frac{\mathrm{e}^{-4}\left(\mathrm{e}^4 + 6\,x\,\ln\left(3\right)\right)^2}{6\,\ln\left(3\right)}$$

input
```
int(exp(-4)*(2*exp(4) + 12*x*log(3)),x)
```

output
```
(exp(-4)*(exp(4) + 6*x*log(3))^2)/(6*log(3))
```

3.1017 $\int \frac{e^4+2x^2+20e^{20x}x^2}{x^2}\,dx$

3.1017.1 Optimal result

Integrand size = 23, antiderivative size = 18

$$\int \frac{e^4+2x^2+20e^{20x}x^2}{x^2}\,dx = -1+e^{20x}-\frac{e^4}{x}+2x$$

output
```
exp(20*x)+2*x-1-exp(4)/x
```

3.1017.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{e^4+2x^2+20e^{20x}x^2}{x^2}\,dx = e^{20x}-\frac{e^4}{x}+2x$$

input
```
Integrate[(E^4 + 2*x^2 + 20*E^(20*x)*x^2)/x^2,x]
```

output
```
E^(20*x) - E^4/x + 2*x
```

3.1017.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{20e^{20x}x^2+2x^2+e^4}{x^2}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2x^2+e^4}{x^2}+20e^{20x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2x+e^{20x}-\frac{e^4}{x}$$

input
```
Int[(E^4 + 2*x^2 + 20*E^(20*x)*x^2)/x^2,x]
```

output
```
E^(20*x) - E^4/x + 2*x
```

3.1017.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1017.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

method	result	size
derivativedivides	$2x-\frac{{\mathrm e}^{4}}{x}+{\mathrm e}^{20x}$	16
default	$2x-\frac{{\mathrm e}^{4}}{x}+{\mathrm e}^{20x}$	16
risch	$2x-\frac{{\mathrm e}^{4}}{x}+{\mathrm e}^{20x}$	16
parts	$2x-\frac{{\mathrm e}^{4}}{x}+{\mathrm e}^{20x}$	16
norman	$\frac{x\,{\mathrm e}^{20x}+2x^{2}-{\mathrm e}^{4}}{x}$	21
parallelrisch	$-\frac{-x\,{\mathrm e}^{20x}-2x^{2}+{\mathrm e}^{4}}{x}$	21

input
```
int((20*x^2*exp(20*x)+exp(4)+2*x^2)/x^2,x,method=_RETURNVERBOSE)
```

output
```
2*x-exp(4)/x+exp(20*x)
```

3.1017.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{e^4+2x^2+20e^{20x}x^2}{x^2}\,dx=\frac{2\,x^{2}+xe^{\left(20\,x\right)}-e^{4}}{x}$$

input
```
integrate((20*x^2*exp(20*x)+exp(4)+2*x^2)/x^2,x, algorithm=\
```

output
```
(2*x^2 + x*e^(20*x) - e^4)/x
```

3.1017.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.67

$$\int \frac{e^4+2x^2+20e^{20x}x^2}{x^2}\,dx=2x+e^{20x}-\frac{e^{4}}{x}$$

input
```
integrate((20*x**2*exp(20*x)+exp(4)+2*x**2)/x**2,x)
```

output
```
2*x + exp(20*x) - exp(4)/x
```

3.1017.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{e^4 + 2x^2 + 20e^{20x}x^2}{x^2} \, dx = 2\,x - \frac{e^4}{x} + e^{(20\,x)}$$

input
```
integrate((20*x^2*exp(20*x)+exp(4)+2*x^2)/x^2,x, algorithm=\
```

output
```
2*x - e^4/x + e^(20*x)
```

3.1017.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{e^4 + 2x^2 + 20e^{20x}x^2}{x^2} \, dx = \frac{2\,x^2 + xe^{(20\,x)} - e^4}{x}$$

input
```
integrate((20*x^2*exp(20*x)+exp(4)+2*x^2)/x^2,x, algorithm=\
```

output
```
(2*x^2 + x*e^(20*x) - e^4)/x
```

3.1017.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{e^4 + 2x^2 + 20e^{20x}x^2}{x^2} \, dx = 2\,x + \mathrm{e}^{20\,x} - \frac{\mathrm{e}^4}{x}$$

input
```
int((exp(4) + 20*x^2*exp(20*x) + 2*x^2)/x^2,x)
```

output
```
2*x + exp(20*x) - exp(4)/x
```

3.1018 $\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}\left(36+12x-12\log\right.\right.}{e^{15+6x+x^2+(-6-2x)\log\left(1\right.}}$

3.1018.1 Optimal result

Integrand size = 128, antiderivative size = 26

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})}\right.}{e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x}$$
$$=5+\log^2\left(e^{6+(3+x-\log(16e^{-2x}))^2}+x\right)$$

output
```
5+ln(exp(6+(x+3-ln(16/exp(x)^2))^2)+x)^2
```

3.1018.2 Mathematica [A] (verified)

Time = 0.54 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.46

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})}\right.}{e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x}$$
$$=\log^2\left(e^{15+6x+x^2-2(3+x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x\right)$$

input
```
Integrate[((2 + E^(15 + 6*x + x^2 + (-6 - 2*x)*Log[16/E^(2*x)] + Log[16/E^
(2*x)]^2)*(36 + 12*x - 12*Log[16/E^(2*x)]))*Log[E^(15 + 6*x + x^2 + (-6 -
2*x)*Log[16/E^(2*x)] + Log[16/E^(2*x)]^2) + x])/(E^(15 + 6*x + x^2 + (-6 -
 2*x)*Log[16/E^(2*x)] + Log[16/E^(2*x)]^2) + x),x]
```

3.1018.

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}+x\right)}{e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}}\,dx$$

output
```
Log[E^(15 + 6*x + x^2 - 2*(3 + x)*Log[16/E^(2*x)] + Log[16/E^(2*x)]^2) + x
]^2
```

3.1018.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\left(12x-12\log\left(16e^{-2x}\right)+36\right)\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)+(-2x-6)\log\left(16e^{-2x}\right)+15\right)+2\right)\log\left(\exp\left(x^2\right.\right.}{\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)+(-2x-6)\log\left(16e^{-2x}\right)+1\right.}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \Bigg(12\left(x-\log\left(16e^{-2x}\right)+3\right)\log\left(\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)-2(x+3)\log\left(16e^{-2x}\right)+15\right)+x\right)-\frac{2^{8x+25}\left(e^{-2\right.}}{}$$

$$\Big\downarrow \text{ 2009}$$

$$36\int \log\left(x+\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)-2(x+3)\log\left(16e^{-2x}\right)+15\right)\right)dx+$$
$$12\int x\log\left(x+\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)-2(x+3)\log\left(16e^{-2x}\right)+15\right)\right)dx+$$
$$\int \frac{2^{8x+25}\left(e^{-2x}\right)^{2x}\log\left(x+\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)-2(x+3)\log\left(16e^{-2x}\right)+15\right)\right)}{256^{x+3}x\left(e^{-2x}\right)^{2x}+e^{x^2+18x+\log^2\left(16e^{-2x}\right)+15}}dx-$$
$$9\int \frac{2^{8x+26}\left(e^{-2x}\right)^{2x}x\log\left(x+\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)-2(x+3)\log\left(16e^{-2x}\right)+15\right)\right)}{256^{x+3}\left(e^{-2x}\right)^{2x}+e^{x^2+18x+\log^2\left(16e^{-2x}\right)+15}}dx-$$
$$3\int \frac{2^{8x+26}\left(e^{-2x}\right)^{2x}x^2\log\left(x+\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)-2(x+3)\log\left(16e^{-2x}\right)+15\right)\right)}{256^{x+3}x\left(e^{-2x}\right)^{2x}+e^{x^2+18x+\log^2\left(16e^{-2x}\right)+15}}dx-$$
$$12\int \log\left(16e^{-2x}\right)\log\left(x+\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)-2(x+3)\log\left(16e^{-2x}\right)+15\right)\right)dx+$$
$$3\int \frac{2^{8x+26}\left(e^{-2x}\right)^{2x}x\log\left(16e^{-2x}\right)\log\left(x+\exp\left(x^2+6x+\log^2\left(16e^{-2x}\right)-2(x+3)\log\left(16e^{-2x}\right)+15\right)\right)}{256^{x+3}x\left(e^{-2x}\right)^{2x}+e^{x^2+18x+\log^2\left(16e^{-2x}\right)+15}}dx$$

input
```
Int[((2 + E^(15 + 6*x + x^2 + (-6 - 2*x)*Log[16/E^(2*x)] + Log[16/E^(2*x)]
^2)*(36 + 12*x - 12*Log[16/E^(2*x)]))*Log[E^(15 + 6*x + x^2 + (-6 - 2*x)*L
og[16/E^(2*x)] + Log[16/E^(2*x)]^2) + x])/(E^(15 + 6*x + x^2 + (-6 - 2*x)*
Log[16/E^(2*x)] + Log[16/E^(2*x)]^2) + x),x]
```

output
```
$Aborted
```

3.1018.

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}\left(36+12x-12\log\left(16e^{-2x}\right)\right)\right)\log\left(e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}+x\right)}{e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}}dx$$

3.1018.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1018.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\ln\left(\mathrm{e}^{\ln\left(16\,\mathrm{e}^{-2x}\right)^{2}+(-2x-6)\ln\left(16\,\mathrm{e}^{-2x}\right)+x^{2}+6x+15}+x\right)^{2}$$

input
```
int(((-12*ln(16/exp(x)^2)+12*x+36)*exp(ln(16/exp(x)^2)^2+(-2*x-6)*ln(16/ex
p(x)^2)+x^2+6*x+15)+2)*ln(exp(ln(16/exp(x)^2)^2+(-2*x-6)*ln(16/exp(x)^2)+x
^2+6*x+15)+x)/(exp(ln(16/exp(x)^2)^2+(-2*x-6)*ln(16/exp(x)^2)+x^2+6*x+15)+
x),x)
```

output
```
ln(exp(ln(16/exp(x)^2)^2+(-2*x-6)*ln(16/exp(x)^2)+x^2+6*x+15)+x)^2
```

3.1018.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})}\right.}{e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x}$$
$$=\log\left(x+e^{\left(9\,x^2-24\,(x+1)\log(2)+16\,\log(2)^2+18\,x+15\right)}\right)^2$$

input
```
integrate(((-12*log(16/exp(x)^2)+12*x+36)*exp(log(16/exp(x)^2)^2+(-2*x-6)*
log(16/exp(x)^2)+x^2+6*x+15)+2)*log(exp(log(16/exp(x)^2)^2+(-2*x-6)*log(16
/exp(x)^2)+x^2+6*x+15)+x)/(exp(log(16/exp(x)^2)^2+(-2*x-6)*log(16/exp(x)^2
)+x^2+6*x+15)+x),x, algorithm=\
```

output
```
log(x + e^(9*x^2 - 24*(x + 1)*log(2) + 16*log(2)^2 + 18*x + 15))^2
```

3.1018.6 Sympy [F(-1)]

Timed out.

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x\right)}{e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x}\,dx$$
$= \text{Timed out}$

input
```
integrate(((-12*ln(16/exp(x)**2)+12*x+36)*exp(ln(16/exp(x)**2)**2+(-2*x-6)
*ln(16/exp(x)**2)+x**2+6*x+15)+2)*ln(exp(ln(16/exp(x)**2)**2+(-2*x-6)*ln(1
6/exp(x)**2)+x**2+6*x+15)+x)/(exp(ln(16/exp(x)**2)**2+(-2*x-6)*ln(16/exp(x
)**2)+x**2+6*x+15)+x),x)
```

output
```
Timed out
```

3.1018.7 Maxima [F]

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x\right)}{e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x}\,dx$$
$$= \int \frac{2\left(6\left(x-\log\left(16\,e^{(-2\,x)}\right)+3\right)e^{\left(x^2-2\,(x+3)\log\left(16\,e^{(-2\,x)}\right)+\log\left(16\,e^{(-2\,x)}\right)^2+6\,x+15\right)}+1\right)\log\left(x+e^{\left(x^2-2\,(x+3)\log\left(16\,e^{(-2\,x)}\right)+\log\left(16\,e^{(-2\,x)}\right)^2+6\,x+15\right)}\right)}{x+e^{\left(x^2-2\,(x+3)\log\left(16\,e^{(-2\,x)}\right)+\log\left(16\,e^{(-2\,x)}\right)^2+6\,x+15\right)}}$$

input
```
integrate(((-12*log(16/exp(x)^2)+12*x+36)*exp(log(16/exp(x)^2)^2+(-2*x-6)*
log(16/exp(x)^2)+x^2+6*x+15)+2)*log(exp(log(16/exp(x)^2)^2+(-2*x-6)*log(16
/exp(x)^2)+x^2+6*x+15)+x)/(exp(log(16/exp(x)^2)^2+(-2*x-6)*log(16/exp(x)^2
)+x^2+6*x+15)+x),x, algorithm=\
```

output
```
2*integrate((6*(x - log(16*e^(-2*x)) + 3)*e^(x^2 - 2*(x + 3)*log(16*e^(-2*
x)) + log(16*e^(-2*x))^2 + 6*x + 15) + 1)*log(x + e^(x^2 - 2*(x + 3)*log(1
6*e^(-2*x)) + log(16*e^(-2*x))^2 + 6*x + 15))/(x + e^(x^2 - 2*(x + 3)*log(
16*e^(-2*x)) + log(16*e^(-2*x))^2 + 6*x + 15)), x)
```

3.1018.8 Giac [F]

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})}\right.}{e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x}$$

$$=\int \frac{2\left(6\left(x-\log\left(16\,e^{(-2\,x)}\right)+3\right)e^{\left(x^2-2\,(x+3)\log\left(16\,e^{(-2\,x)}\right)+\log\left(16\,e^{(-2\,x)}\right)^2+6\,x+15\right)}+1\right)\log\left(x+e^{\left(x^2-2\,(x+3)\log(\right.}\right.}{x+e^{\left(x^2-2\,(x+3)\log\left(16\,e^{(-2\,x)}\right)+\log\left(16\,e^{(-2\,x)}\right)^2+6\,x+15\right)}}$$

input
```
integrate(((-12*log(16/exp(x)^2)+12*x+36)*exp(log(16/exp(x)^2)^2+(-2*x-6)*
log(16/exp(x)^2)+x^2+6*x+15)+2)*log(exp(log(16/exp(x)^2)^2+(-2*x-6)*log(16
/exp(x)^2)+x^2+6*x+15)+x)/(exp(log(16/exp(x)^2)^2+(-2*x-6)*log(16/exp(x)^2
)+x^2+6*x+15)+x),x, algorithm=\
```

output
```
integrate(2*(6*(x - log(16*e^(-2*x)) + 3)*e^(x^2 - 2*(x + 3)*log(16*e^(-2*
x)) + log(16*e^(-2*x))^2 + 6*x + 15) + 1)*log(x + e^(x^2 - 2*(x + 3)*log(1
6*e^(-2*x)) + log(16*e^(-2*x))^2 + 6*x + 15))/(x + e^(x^2 - 2*(x + 3)*log(
16*e^(-2*x)) + log(16*e^(-2*x))^2 + 6*x + 15)), x)
```

3.1018.9 Mupad [B] (verification not implemented)

Time = 16.29 (sec) , antiderivative size = 118, normalized size of antiderivative = 4.54

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})}\right.}{e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x}$$

$$=576\ln(2)^2x^2-48\ln(2)\,x\,\ln\left(16777216\,2^{24\,x}\,x+\mathrm{e}^{18\,x}\,\mathrm{e}^{15}\,\mathrm{e}^{16\ln(2)^2}\,\mathrm{e}^{9\,x^2}\right)$$
$$+1152\ln(2)^2x+\ln\left(16777216\,2^{24\,x}\,x+\mathrm{e}^{18\,x}\,\mathrm{e}^{15}\,\mathrm{e}^{16\ln(2)^2}\,\mathrm{e}^{9\,x^2}\right)^2$$
$$-48\ln(2)\ln\left(16777216\,2^{24\,x}\,x+\mathrm{e}^{18\,x}\,\mathrm{e}^{15}\,\mathrm{e}^{16\ln(2)^2}\,\mathrm{e}^{9\,x^2}\right)$$

input
```
int((log(x + exp(6*x + log(16*exp(-2*x))^2 - log(16*exp(-2*x))*(2*x + 6) +
 x^2 + 15))*(exp(6*x + log(16*exp(-2*x))^2 - log(16*exp(-2*x))*(2*x + 6) +
 x^2 + 15)*(12*x - 12*log(16*exp(-2*x)) + 36) + 2))/(x + exp(6*x + log(16*
exp(-2*x))^2 - log(16*exp(-2*x))*(2*x + 6) + x^2 + 15)),x)
```

3.1018.

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}(36+12x-12\log(16e^{-2x}))\right)\log\left(e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}+x\right)}{e^{15+6x+x^2+(-6-2x)\log(16e^{-2x})+\log^2(16e^{-2x})}+x}\,dx$$

output
```
576*x^2*log(2)^2 + log(16777216*2^(24*x)*x + exp(18*x)*exp(15)*exp(16*log(
2)^2)*exp(9*x^2))^2 + 1152*x*log(2)^2 - 48*log(16777216*2^(24*x)*x + exp(1
8*x)*exp(15)*exp(16*log(2)^2)*exp(9*x^2))*log(2) - 48*x*log(16777216*2^(24
*x)*x + exp(18*x)*exp(15)*exp(16*log(2)^2)*exp(9*x^2))*log(2)
```

3.1018.

$$\int \frac{\left(2+e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}\left(36+12x-12\log\left(16e^{-2x}\right)\right)\right)\log\left(e^{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)}+x\right)}{15+6x+x^2+(-6-2x)\log\left(16e^{-2x}\right)+\log^2\left(16e^{-2x}\right)} \, dx$$

3.1019 $\int \frac{-9+e^{2x^2}(-4+16e)-8x-4x^2+e^{x^2}(13+e(-72-32x)+8x-10x^2)+e}{81x^2+16e^{2x^2}x^2+72x^3+16x^4+e^{x^2}(-72x^2-32x^3)}$

3.1019.1 Optimal result

Integrand size = 106, antiderivative size = 34

$$\int \frac{-9+e^{2x^2}(-4+16e)-8x-4x^2+e^{x^2}(13+e(-72-32x)+8x-10x^2)+e(81+72x+16x^2)}{81x^2+16e^{2x^2}x^2+72x^3+16x^4+e^{x^2}(-72x^2-32x^3)}\,dx$$
$$=\frac{-e+x-\frac{x}{x-5\left(x+\frac{x}{1-e^{x^2}+x}\right)}}{x}$$

output
```
(x-exp(1)-x/(-4*x-5*x/(1-exp(x^2)+x)))/x
```

3.1019.2 Mathematica [A] (verified)

Time = 5.49 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.82

$$\int \frac{-9+e^{2x^2}(-4+16e)-8x-4x^2+e^{x^2}(13+e(-72-32x)+8x-10x^2)+e(81+72x+16x^2)}{81x^2+16e^{2x^2}x^2+72x^3+16x^4+e^{x^2}(-72x^2-32x^3)}\,dx$$
$$=\frac{1-4e+\frac{5}{-9+4e^{x^2}-4x}}{4x}$$

input
```
Integrate[(-9 + E^(2*x^2)*(-4 + 16*E) - 8*x - 4*x^2 + E^x^2*(13 + E*(-72 -
 32*x) + 8*x - 10*x^2) + E*(81 + 72*x + 16*x^2))/(81*x^2 + 16*E^(2*x^2)*x^
2 + 72*x^3 + 16*x^4 + E^x^2*(-72*x^2 - 32*x^3)),x]
```

output
```
(1 - 4*E + 5/(-9 + 4*E^x^2 - 4*x))/(4*x)
```

3.1019.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^2+e^{x^2}\left(-10x^2+8x+e(-32x-72)+13\right)+e\left(16x^2+72x+81\right)+(16e-4)e^{2x^2}-8x-9}{16x^4+72x^3+16e^{2x^2}x^2+81x^2+e^{x^2}\left(-32x^3-72x^2\right)}dx$$
$$\Big\downarrow \text{ 7292}$$
$$\int \frac{-4x^2+e^{x^2}\left(-10x^2+8x+e(-32x-72)+13\right)+e\left(16x^2+72x+81\right)+(16e-4)e^{2x^2}-8x-9}{x^2\left(-4e^{x^2}+4x+9\right)^2}dx$$
$$\Big\downarrow \text{ 7293}$$
$$\int \left(-\frac{5\left(2x^2+1\right)}{4\left(4e^{x^2}-4x-9\right)x^2}-\frac{5\left(4x^2+9x-2\right)}{2x\left(-4e^{x^2}+4x+9\right)^2}+\frac{4e-1}{4x^2}\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$-\frac{45}{2}\int \frac{1}{\left(-4x+4e^{x^2}-9\right)^2}dx-\frac{5}{2}\int \frac{1}{-4x+4e^{x^2}-9}dx-\frac{5}{4}\int \frac{1}{\left(-4x+4e^{x^2}-9\right)x^2}dx-10\int \frac{x}{\left(-4x+4e^{x^2}-9\right)^2}dx+5\int \frac{1}{x\left(4x-4e^{x^2}+9\right)^2}dx+\frac{1-4e}{4x}$$

input
```
Int[(-9 + E^(2*x^2)*(-4 + 16*E) - 8*x - 4*x^2 + E^x^2*(13 + E*(-72 - 32*x)
 + 8*x - 10*x^2) + E*(81 + 72*x + 16*x^2))/(81*x^2 + 16*E^(2*x^2)*x^2 + 72
*x^3 + 16*x^4 + E^x^2*(-72*x^2 - 32*x^3)),x]
```

output
```
$Aborted
```

3.1019.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1019.4 Maple [A] (verified)

Time = 0.40 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.94

method	result	size
risch	$-\frac{\mathrm{e}}{x}+\frac{1}{4x}-\frac{5}{4x\left(4x-4\,\mathrm{e}^{x^2}+9\right)}$	32
norman	$\frac{(4\,\mathrm{e}-1)\mathrm{e}^{x^2}+(-4\,\mathrm{e}+1)x+1-9\,\mathrm{e}}{x\left(4x-4\,\mathrm{e}^{x^2}+9\right)}$	43
parallelrisch	$-\frac{-4+16x\,\mathrm{e}-16\,\mathrm{e}\,\mathrm{e}^{x^2}+36\,\mathrm{e}-4x+4\,\mathrm{e}^{x^2}}{4x\left(4x-4\,\mathrm{e}^{x^2}+9\right)}$	47

input
```
int(((16*exp(1)-4)*exp(x^2)^2+((-32*x-72)*exp(1)-10*x^2+8*x+13)*exp(x^2)+(
16*x^2+72*x+81)*exp(1)-4*x^2-8*x-9)/(16*x^2*exp(x^2)^2+(-32*x^3-72*x^2)*ex
p(x^2)+16*x^4+72*x^3+81*x^2),x,method=_RETURNVERBOSE)
```

output
```
-exp(1)/x+1/4/x-5/4/x/(4*x-4*exp(x^2)+9)
```

3.1019.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.32

$$\int \frac{-9+e^{2x^2}(-4+16e)-8x-4x^2+e^{x^2}(13+e(-72-32x)+8x-10x^2)+e(81+72x+16x^2)}{81x^2+16e^{2x^2}x^2+72x^3+16x^4+e^{x^2}\left(-72x^2-32x^3\right)}\,dx$$
$$=-\frac{(4\,x+9)e-(4\,e-1)e^{(x^2)}-x-1}{4\,x^2-4\,xe^{(x^2)}+9\,x}$$

input
```
integrate(((16*exp(1)-4)*exp(x^2)^2+((-32*x-72)*exp(1)-10*x^2+8*x+13)*exp(
x^2)+(16*x^2+72*x+81)*exp(1)-4*x^2-8*x-9)/(16*x^2*exp(x^2)^2+(-32*x^3-72*x
^2)*exp(x^2)+16*x^4+72*x^3+81*x^2),x, algorithm=\
```

output
```
-((4*x + 9)*e - (4*e - 1)*e^(x^2) - x - 1)/(4*x^2 - 4*x*e^(x^2) + 9*x)
```

3.1019.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.76

$$\int \frac{-9+e^{2x^2}(-4+16e)-8x-4x^2+e^{x^2}(13+e(-72-32x)+8x-10x^2)+e(81+72x+16x^2)}{81x^2+16e^{2x^2}x^2+72x^3+16x^4+e^{x^2}(-72x^2-32x^3)}\,dx$$
$$=\frac{5}{-16x^2+16xe^{x^2}-36x}-\frac{-\frac{1}{4}+e}{x}$$

input
```
integrate(((16*exp(1)-4)*exp(x**2)**2+((-32*x-72)*exp(1)-10*x**2+8*x+13)*e
xp(x**2)+(16*x**2+72*x+81)*exp(1)-4*x**2-8*x-9)/(16*x**2*exp(x**2)**2+(-32
*x**3-72*x**2)*exp(x**2)+16*x**4+72*x**3+81*x**2),x)
```

output
```
5/(-16*x**2 + 16*x*exp(x**2) - 36*x) - (-1/4 + E)/x
```

3.1019.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.35

$$\int \frac{-9+e^{2x^2}(-4+16e)-8x-4x^2+e^{x^2}(13+e(-72-32x)+8x-10x^2)+e(81+72x+16x^2)}{81x^2+16e^{2x^2}x^2+72x^3+16x^4+e^{x^2}(-72x^2-32x^3)}\,dx$$
$$=-\frac{x(4\,e-1)-(4\,e-1)e^{(x^2)}+9\,e-1}{4\,x^2-4\,xe^{(x^2)}+9\,x}$$

input
```
integrate(((16*exp(1)-4)*exp(x^2)^2+((-32*x-72)*exp(1)-10*x^2+8*x+13)*exp(
x^2)+(16*x^2+72*x+81)*exp(1)-4*x^2-8*x-9)/(16*x^2*exp(x^2)^2+(-32*x^3-72*x
^2)*exp(x^2)+16*x^4+72*x^3+81*x^2),x, algorithm=\
```

output
```
-(x*(4*e - 1) - (4*e - 1)*e^(x^2) + 9*e - 1)/(4*x^2 - 4*x*e^(x^2) + 9*x)
```

3.1019.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.35

$$\int \frac{-9+e^{2x^2}(-4+16e)-8x-4x^2+e^{x^2}(13+e(-72-32x)+8x-10x^2)+e(81+72x+16x^2)}{81x^2+16e^{2x^2}x^2+72x^3+16x^4+e^{x^2}(-72x^2-32x^3)}\,dx$$
$$=-\frac{4\,xe-x+9\,e-4\,e^{(x^2+1)}+e^{(x^2)}-1}{4\,x^2-4\,xe^{(x^2)}+9\,x}$$

input
```
integrate(((16*exp(1)-4)*exp(x^2)^2+((-32*x-72)*exp(1)-10*x^2+8*x+13)*exp(
x^2)+(16*x^2+72*x+81)*exp(1)-4*x^2-8*x-9)/(16*x^2*exp(x^2)^2+(-32*x^3-72*x
^2)*exp(x^2)+16*x^4+72*x^3+81*x^2),x, algorithm=\
```

output
```
-(4*x*e - x + 9*e - 4*e^(x^2 + 1) + e^(x^2) - 1)/(4*x^2 - 4*x*e^(x^2) + 9*
x)
```

3.1019.9 Mupad [B] (verification not implemented)

Time = 15.69 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.74

$$\int \frac{-9+e^{2x^2}(-4+16e)-8x-4x^2+e^{x^2}(13+e(-72-32x)+8x-10x^2)+e(81+72x+16x^2)}{81x^2+16e^{2x^2}x^2+72x^3+16x^4+e^{x^2}\left(-72x^2-32x^3\right)}\,dx$$
$$=\frac{x^2\left(\frac{16\,\mathrm{e}}{9}-\frac{4}{9}\right)-9\,\mathrm{e}+\mathrm{e}^{x^2}\left(4\,\mathrm{e}-1\right)-x\,\mathrm{e}^{x^2}\left(\frac{16\,\mathrm{e}}{9}-\frac{4}{9}\right)+1}{9\,x-4\,x\,\mathrm{e}^{x^2}+4\,x^2}$$

input
```
int(-(8*x - exp(x^2)*(8*x - 10*x^2 - exp(1)*(32*x + 72) + 13) - exp(2*x^2)
*(16*exp(1) - 4) - exp(1)*(72*x + 16*x^2 + 81) + 4*x^2 + 9)/(16*x^2*exp(2*
x^2) - exp(x^2)*(72*x^2 + 32*x^3) + 81*x^2 + 72*x^3 + 16*x^4),x)
```

output
```
(x^2*((16*exp(1))/9 - 4/9) - 9*exp(1) + exp(x^2)*(4*exp(1) - 1) - x*exp(x^
2)*((16*exp(1))/9 - 4/9) + 1)/(9*x - 4*x*exp(x^2) + 4*x^2)
```

3.1020 $\int \frac{-5x^2+2x^3+(-4x+2x^2)\log(-2+x)}{-8x^2+4x^3+(-8x+4x^2)\log(-2+x)+(-2+x)\log^2(-2+x)}\,dx$

3.1020.1 Optimal result

Integrand size = 63, antiderivative size = 20

$$\int \frac{-5x^2+2x^3+(-4x+2x^2)\log(-2+x)}{-8x^2+4x^3+(-8x+4x^2)\log(-2+x)+(-2+x)\log^2(-2+x)}\,dx = 5+\log\left(\frac{9}{4}\right)+\frac{x^2}{2x+\log(-2+x)}$$

output
```
x^2/(2*x+ln(-2+x))+ln(9/4)+5
```

3.1020.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-5x^2+2x^3+(-4x+2x^2)\log(-2+x)}{-8x^2+4x^3+(-8x+4x^2)\log(-2+x)+(-2+x)\log^2(-2+x)}\,dx = \frac{x^2}{2x+\log(-2+x)}$$

input
```
Integrate[(-5*x^2 + 2*x^3 + (-4*x + 2*x^2)*Log[-2 + x])/(-8*x^2 + 4*x^3 +
(-8*x + 4*x^2)*Log[-2 + x] + (-2 + x)*Log[-2 + x]^2),x]
```

output
```
x^2/(2*x + Log[-2 + x])
```

3.1020.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3-5x^2+(2x^2-4x)\log(x-2)}{4x^3-8x^2+(4x^2-8x)\log(x-2)+(x-2)\log^2(x-2)}dx$$
$$\Big\downarrow \text{ 7239}$$
$$\int \frac{x(-x(2x-5)-2(x-2)\log(x-2))}{(2-x)(2x+\log(x-2))^2}dx$$
$$\Big\downarrow \text{ 7293}$$
$$\int \left(\frac{2x}{2x+\log(x-2)}-\frac{x^2(2x-3)}{(x-2)(2x+\log(x-2))^2}\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$-2\int \frac{x^2}{(2x+\log(x-2))^2}dx-2\int \frac{1}{(2x+\log(x-2))^2}dx-4\int \frac{1}{(x-2)(2x+\log(x-2))^2}dx-\int \frac{x}{(2x+\log(x-2))^2}dx+2\int \frac{x}{2x+\log(x-2)}dx$$

input
```
Int[(-5*x^2 + 2*x^3 + (-4*x + 2*x^2)*Log[-2 + x])/(-8*x^2 + 4*x^3 + (-8*x
+ 4*x^2)*Log[-2 + x] + (-2 + x)*Log[-2 + x]^2),x]
```

output
```
$Aborted
```

3.1020.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1020.4 Maple [A] (verified)

Time = 1.40 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

method	result	size
norman	$\frac{x^{2}}{2x+\ln \left(-2+x\right)}$	15
risch	$\frac{x^{2}}{2x+\ln \left(-2+x\right)}$	15
parallelrisch	$\frac{x^{2}}{2x+\ln \left(-2+x\right)}$	15
derivativedivides	$\frac{\left(-2+x\right)^{2}-4+4x}{2x+\ln \left(-2+x\right)}$	22
default	$\frac{\left(-2+x\right)^{2}-4+4x}{2x+\ln \left(-2+x\right)}$	22

input
```
int(((2*x^2-4*x)*ln(-2+x)+2*x^3-5*x^2)/((-2+x)*ln(-2+x)^2+(4*x^2-8*x)*ln(-
2+x)+4*x^3-8*x^2),x,method=_RETURNVERBOSE)
```

output
```
x^2/(2*x+ln(-2+x))
```

3.1020.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-5x^2+2x^3+(-4x+2x^2)\log(-2+x)}{-8x^2+4x^3+(-8x+4x^2)\log(-2+x)+(-2+x)\log^2(-2+x)}\,dx=\frac{x^2}{2\,x+\log\left(x-2\right)}$$

input
```
integrate(((2*x^2-4*x)*log(-2+x)+2*x^3-5*x^2)/((-2+x)*log(-2+x)^2+(4*x^2-8
*x)*log(-2+x)+4*x^3-8*x^2),x, algorithm=\
```

output
```
x^2/(2*x + log(x - 2))
```

3.1020.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int \frac{-5x^2+2x^3+(-4x+2x^2)\log(-2+x)}{-8x^2+4x^3+(-8x+4x^2)\log(-2+x)+(-2+x)\log^2(-2+x)}\,dx = \frac{x^2}{2x+\log(x-2)}$$

input
```
integrate(((2*x**2-4*x)*ln(-2+x)+2*x**3-5*x**2)/((-2+x)*ln(-2+x)**2+(4*x**
2-8*x)*ln(-2+x)+4*x**3-8*x**2),x)
```

output
```
x**2/(2*x + log(x - 2))
```

3.1020.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-5x^2+2x^3+(-4x+2x^2)\log(-2+x)}{-8x^2+4x^3+(-8x+4x^2)\log(-2+x)+(-2+x)\log^2(-2+x)}\,dx = \frac{x^2}{2\,x+\log(x-2)}$$

input
```
integrate(((2*x^2-4*x)*log(-2+x)+2*x^3-5*x^2)/((-2+x)*log(-2+x)^2+(4*x^2-8
*x)*log(-2+x)+4*x^3-8*x^2),x, algorithm=\
```

output
```
x^2/(2*x + log(x - 2))
```

3.1020.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-5x^2+2x^3+(-4x+2x^2)\log(-2+x)}{-8x^2+4x^3+(-8x+4x^2)\log(-2+x)+(-2+x)\log^2(-2+x)}\,dx = \frac{x^2}{2\,x+\log(x-2)}$$

input
```
integrate(((2*x^2-4*x)*log(-2+x)+2*x^3-5*x^2)/((-2+x)*log(-2+x)^2+(4*x^2-8
*x)*log(-2+x)+4*x^3-8*x^2),x, algorithm=\
```

output
```
x^2/(2*x + log(x - 2))
```

3.1020.9 Mupad [B] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{-5x^2+2x^3+(-4x+2x^2)\log(-2+x)}{-8x^2+4x^3+(-8x+4x^2)\log(-2+x)+(-2+x)\log^2(-2+x)}\,dx=\frac{x^2}{2\,x+\ln\left(x-2\right)}$$

input
```
int((log(x - 2)*(4*x - 2*x^2) + 5*x^2 - 2*x^3)/(log(x - 2)*(8*x - 4*x^2) +
 8*x^2 - 4*x^3 - log(x - 2)^2*(x - 2)),x)
```

output
```
x^2/(2*x + log(x - 2))
```

3.1021 $\int \frac{-64x+32e^{2x}x+\left(-64x+e^{2x}\left(32x+64x^2\right)\right)\log(x)+\left(-128x+64e^{2x}x\right)\log(x)\log\left(\left(2x-e^{2x}x\right)\log(x)\right)}{\left(-2+e^{2x}\right)\log(x)}\,dx$

3.1021.1 Optimal result

Integrand size = 79, antiderivative size = 19

$$\int \frac{-64x+32e^{2x}x+\left(-64x+e^{2x}\left(32x+64x^2\right)\right)\log(x)+\left(-128x+64e^{2x}x\right)\log(x)\log\left(\left(2x-e^{2x}x\right)\log(x)\right)}{\left(-2+e^{2x}\right)\log(x)}\,dx$$
$$=32x^2\log\left(\left(2-e^{2x}\right)x\log(x)\right)$$

output
```
32*ln(ln(x)*(-exp(x)^2+2)*x)*x^2
```

3.1021.2 Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{-64x+32e^{2x}x+\left(-64x+e^{2x}\left(32x+64x^2\right)\right)\log(x)+\left(-128x+64e^{2x}x\right)\log(x)\log\left(\left(2x-e^{2x}x\right)\log(x)\right)}{\left(-2+e^{2x}\right)\log(x)}\,dx$$
$$=32x^2\log\left(-\left(\left(-2+e^{2x}\right)x\log(x)\right)\right)$$

input
```
Integrate[(-64*x + 32*E^(2*x)*x + (-64*x + E^(2*x)*(32*x + 64*x^2))*Log[x]
 + (-128*x + 64*E^(2*x)*x)*Log[x]*Log[(2*x - E^(2*x)*x)*Log[x]])/((-2 + E^
(2*x))*Log[x]),x]
```

output
```
32*x^2*Log[-((-2 + E^(2*x))*x*Log[x])]
```

3.1021.3 Rubi [A] (verified)

Time = 1.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.025, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{2x}\left(64x^2+32x\right)-64x\right)\log(x)+32e^{2x}x-64x+\left(64e^{2x}x-128x\right)\log(x)\log\left(\left(2x-e^{2x}x\right)\log(x)\right)}{\left(e^{2x}-2\right)\log(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{128x^2}{e^{2x}-2}+\frac{32x\left(2x\log(x)+2\log\left(-\left(\left(e^{2x}-2\right)x\log(x)\right)\right)\log(x)+\log(x)+1\right)}{\log(x)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$32x^2\log\left(\left(2-e^{2x}\right)x\log(x)\right)$$

input
```
Int[(-64*x + 32*E^(2*x)*x + (-64*x + E^(2*x)*(32*x + 64*x^2))*Log[x] + (-1
28*x + 64*E^(2*x)*x)*Log[x]*Log[(2*x - E^(2*x)*x)*Log[x]])/((-2 + E^(2*x))
*Log[x]),x]
```

output
```
32*x^2*Log[(2 - E^(2*x))*x*Log[x]]
```

3.1021.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1021.4 Maple [A] (verified)

Time = 2.15 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

method	result
parallelrisch	$32\ln\left(\left(-x\,\mathrm{e}^{2x}+2x\right)\ln\left(x\right)\right)x^{2}$
risch	$32x^{2}\ln\left(\mathrm{e}^{2x}-2\right)+32x^{2}\ln\left(\ln\left(x\right)\right)+16i\pi\,x^{2}\,\mathrm{csgn}\left(i\ln\left(x\right)\left(\mathrm{e}^{2x}-2\right)\right)\mathrm{csgn}\left(ix\ln\left(x\right)\left(\mathrm{e}^{2x}-2\right)\right.$

input
```
int(((64*x*exp(x)^2-128*x)*ln(x)*ln((-x*exp(x)^2+2*x)*ln(x))+((64*x^2+32*x
)*exp(x)^2-64*x)*ln(x)+32*x*exp(x)^2-64*x)/(exp(x)^2-2)/ln(x),x,method=_RE
TURNVERBOSE)
```

output
```
32*ln((-x*exp(x)^2+2*x)*ln(x))*x^2
```

3.1021.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int\frac{-64x+32e^{2x}x+(-64x+e^{2x}(32x+64x^2))\log(x)+(-128x+64e^{2x}x)\log(x)\log\left((2x-e^{2x}x)\log(x)\right)}{(-2+e^{2x})\log(x)}\,d$$
$$=32\,x^{2}\log\left(-\left(xe^{(2\,x)}-2\,x\right)\log\left(x\right)\right)$$

input
```
integrate(((64*x*exp(x)^2-128*x)*log(x)*log((-x*exp(x)^2+2*x)*log(x))+((64
*x^2+32*x)*exp(x)^2-64*x)*log(x)+32*x*exp(x)^2-64*x)/(exp(x)^2-2)/log(x),x
, algorithm=\
```

output
```
32*x^2*log(-(x*e^(2*x) - 2*x)*log(x))
```

3.1021.6 Sympy [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int\frac{-64x+32e^{2x}x+(-64x+e^{2x}(32x+64x^2))\log(x)+(-128x+64e^{2x}x)\log(x)\log\left((2x-e^{2x}x)\log(x)\right)}{(-2+e^{2x})\log(x)}\,d$$
$$=32x^{2}\log\left(\left(-xe^{2x}+2x\right)\log\left(x\right)\right)$$

input
```
integrate(((64*x*exp(x)**2-128*x)*ln(x)*ln((-x*exp(x)**2+2*x)*ln(x))+((64*
x**2+32*x)*exp(x)**2-64*x)*ln(x)+32*x*exp(x)**2-64*x)/(exp(x)**2-2)/ln(x),
x)
```

output
```
32*x**2*log((-x*exp(2*x) + 2*x)*log(x))
```

3.1021.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.58

$$\int \frac{-64x + 32e^{2x}x + (-64x + e^{2x}(32x + 64x^2))\log(x) + (-128x + 64e^{2x}x)\log(x)\log((2x - e^{2x}x)\log(x))}{(-2 + e^{2x})\log(x)}\,dx$$
$$= 32\,x^2\log(x) + 32\,x^2\log\left(-e^{(2\,x)} + 2\right) + 32\,x^2\log(\log(x))$$

input
```
integrate(((64*x*exp(x)^2-128*x)*log(x)*log((-x*exp(x)^2+2*x)*log(x))+((64
*x^2+32*x)*exp(x)^2-64*x)*log(x)+32*x*exp(x)^2-64*x)/(exp(x)^2-2)/log(x),x
, algorithm=\
```

output
```
32*x^2*log(x) + 32*x^2*log(-e^(2*x) + 2) + 32*x^2*log(log(x))
```

3.1021.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \frac{-64x + 32e^{2x}x + (-64x + e^{2x}(32x + 64x^2))\log(x) + (-128x + 64e^{2x}x)\log(x)\log((2x - e^{2x}x)\log(x))}{(-2 + e^{2x})\log(x)}\,dx$$
$$= 32\,x^2\log\left(-e^{(2\,x)}\log(x) + 2\,\log(x)\right) + 32\,x^2\log(x)$$

input
```
integrate(((64*x*exp(x)^2-128*x)*log(x)*log((-x*exp(x)^2+2*x)*log(x))+((64
*x^2+32*x)*exp(x)^2-64*x)*log(x)+32*x*exp(x)^2-64*x)/(exp(x)^2-2)/log(x),x
, algorithm=\
```

output
```
32*x^2*log(-e^(2*x)*log(x) + 2*log(x)) + 32*x^2*log(x)
```

3.1021.9 Mupad [B] (verification not implemented)

Time = 15.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \frac{-64x+32e^{2x}x+(-64x+e^{2x}(32x+64x^2))\log(x)+(-128x+64e^{2x}x)\log(x)\log((2x-e^{2x}x)\log(x))}{(-2+e^{2x})\log(x)}\,dx$$
$$=32\,x^2\,\ln\left(\ln\left(x\right)\,\left(2\,x-x\,\mathrm{e}^{2\,x}\right)\right)$$

input
```
int(-(64*x - 32*x*exp(2*x) + log(x)*(64*x - exp(2*x)*(32*x + 64*x^2)) + lo
g(x)*log(log(x)*(2*x - x*exp(2*x)))*(128*x - 64*x*exp(2*x)))/(log(x)*(exp(
2*x) - 2)),x)
```

output
```
32*x^2*log(log(x)*(2*x - x*exp(2*x)))
```

3.1022 $\int \frac{-16x^4+8x^4\log(x)+(-8+2x^4+(8-2x^4)\log(x))\log(-4+x^4)}{e(-4+x^4)\log^2(-4+x^4)}\,dx$

3.1022.1 Optimal result

Integrand size = 56, antiderivative size = 18

$$\int \frac{-16x^4+8x^4\log(x)+(-8+2x^4+(8-2x^4)\log(x))\log(-4+x^4)}{e(-4+x^4)\log^2(-4+x^4)}\,dx = -\frac{2x(-2+\log(x))}{e\log(-4+x^4)}$$

output
```
-2*x/exp(1)/ln(x^4-4)*(ln(x)-2)
```

3.1022.2 Mathematica [A] (verified)

Time = 0.48 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{-16x^4+8x^4\log(x)+(-8+2x^4+(8-2x^4)\log(x))\log(-4+x^4)}{e(-4+x^4)\log^2(-4+x^4)}\,dx = -\frac{2x(-2+\log(x))}{e\log(-4+x^4)}$$

input
```
Integrate[(-16*x^4 + 8*x^4*Log[x] + (-8 + 2*x^4 + (8 - 2*x^4)*Log[x])*Log[
-4 + x^4])/(E*(-4 + x^4)*Log[-4 + x^4]^2),x]
```

output
```
(-2*x*(-2 + Log[x]))/(E*Log[-4 + x^4])
```

3.1022.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-16x^4+8x^4\log(x)+\left(2x^4+\left(8-2x^4\right)\log(x)-8\right)\log\left(x^4-4\right)}{e\left(x^4-4\right)\log^2\left(x^4-4\right)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\int \frac{2\left(-4\log(x)x^4+8x^4+\left(-x^4-\left(4-x^4\right)\log(x)+4\right)\log\left(x^4-4\right)\right)}{\left(4-x^4\right)\log^2\left(x^4-4\right)}dx}{e}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{2\int \frac{-4\log(x)x^4+8x^4+\left(-x^4-\left(4-x^4\right)\log(x)+4\right)\log\left(x^4-4\right)}{\left(4-x^4\right)\log^2\left(x^4-4\right)}dx}{e}$$

$$\Big\downarrow \text{ 7276}$$

$$\frac{2\int \left(\frac{4(\log(x)-2)x^4}{\left(x^4-4\right)\log^2\left(x^4-4\right)}+\frac{1-\log(x)}{\log\left(x^4-4\right)}\right)dx}{e}$$

$$\Big\downarrow \text{ 2009}$$

$$2\left(-8\int \frac{1}{\log^2(x^4-4)}dx+4\int \frac{\log(x)}{\log^2(x^4-4)}dx-i\sqrt{2}\int \frac{\log(x)}{\left(i\sqrt{2}-x\right)\log^2(x^4-4)}dx-\sqrt{2}\int \frac{\log(x)}{\left(\sqrt{2}-x\right)\log^2(x^4-4)}dx-i\sqrt{2}\int \frac{\log}{\left(x+i\sqrt{2}\right)}\right.$$

input
```
Int[(-16*x^4 + 8*x^4*Log[x] + (-8 + 2*x^4 + (8 - 2*x^4)*Log[x])*Log[-4 + x
^4])/(E*(-4 + x^4)*Log[-4 + x^4]^2),x]
```

output
```
$Aborted
```

3.1022.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.1022.4 Maple [A] (verified)

Time = 4.78 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

method	result	size
risch	$-\frac{2x\,\mathrm{e}^{-1}(\ln(x)-2)}{\ln(x^4-4)}$	18
parallelrisch	$\frac{\mathrm{e}^{-1}(-16x\ln(x)+32x)}{8\ln(x^4-4)}$	24

input
```
int((((-2*x^4+8)*ln(x)+2*x^4-8)*ln(x^4-4)+8*x^4*ln(x)-16*x^4)/(x^4-4)/exp(
1)/ln(x^4-4)^2,x,method=_RETURNVERBOSE)
```

output
```
-2*x*exp(-1)/ln(x^4-4)*(ln(x)-2)
```

3.1022.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{-16x^4+8x^4\log(x)+(-8+2x^4+(8-2x^4)\log(x))\log(-4+x^4)}{e(-4+x^4)\log^2(-4+x^4)}\,dx = -\frac{2\,(x\log(x)-2\,x)e^{(-1)}}{\log(x^4-4)}$$

input
```
integrate((((-2*x^4+8)*log(x)+2*x^4-8)*log(x^4-4)+8*x^4*log(x)-16*x^4)/(x^
4-4)/exp(1)/log(x^4-4)^2,x, algorithm=\
```

output
```
-2*(x*log(x) - 2*x)*e^(-1)/log(x^4 - 4)
```

3.1022.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{-16x^4+8x^4\log(x)+(-8+2x^4+(8-2x^4)\log(x))\log(-4+x^4)}{e(-4+x^4)\log^2(-4+x^4)}\,dx=\frac{-2x\log(x)+4x}{e\log(x^4-4)}$$

input
```
integrate((((-2*x**4+8)*ln(x)+2*x**4-8)*ln(x**4-4)+8*x**4*ln(x)-16*x**4)/(
x**4-4)/exp(1)/ln(x**4-4)**2,x)
```

output
```
(-2*x*log(x) + 4*x)*exp(-1)/log(x**4 - 4)
```

3.1022.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{-16x^4+8x^4\log(x)+(-8+2x^4+(8-2x^4)\log(x))\log(-4+x^4)}{e(-4+x^4)\log^2(-4+x^4)}\,dx$$
$$=-\frac{2\,(x\log(x)-2\,x)e^{(-1)}}{\log(x^2+2)+\log(x^2-2)}$$

input
```
integrate((((-2*x^4+8)*log(x)+2*x^4-8)*log(x^4-4)+8*x^4*log(x)-16*x^4)/(x^
4-4)/exp(1)/log(x^4-4)^2,x, algorithm=\
```

output
```
-2*(x*log(x) - 2*x)*e^(-1)/(log(x^2 + 2) + log(x^2 - 2))
```

3.1022.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{-16x^4+8x^4\log(x)+(-8+2x^4+(8-2x^4)\log(x))\log(-4+x^4)}{e(-4+x^4)\log^2(-4+x^4)}\,dx$$
$$=-\frac{2\,(x\log(x)-2\,x)e^{(-1)}}{\log(x^4-4)}$$

input
```
integrate((((-2*x^4+8)*log(x)+2*x^4-8)*log(x^4-4)+8*x^4*log(x)-16*x^4)/(x^
4-4)/exp(1)/log(x^4-4)^2,x, algorithm=\
```

output
```
-2*(x*log(x) - 2*x)*e^(-1)/log(x^4 - 4)
```

3.1022.9 Mupad [B] (verification not implemented)

Time = 17.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{-16x^4 + 8x^4 \log(x) + (-8 + 2x^4 + (8 - 2x^4) \log(x)) \log(-4 + x^4)}{e(-4 + x^4) \log^2(-4 + x^4)} dx$$
$$= -\frac{2 x e^{-1} (\ln(x) - 2)}{\ln(x^4 - 4)}$$

input
```
int(-(exp(-1)*(log(x^4 - 4)*(log(x)*(2*x^4 - 8) - 2*x^4 + 8) - 8*x^4*log(x
) + 16*x^4))/(log(x^4 - 4)^2*(x^4 - 4)),x)
```

output
```
-(2*x*exp(-1)*(log(x) - 2))/log(x^4 - 4)
```

3.1023 $\int \frac{-2x^3+e^{\frac{e^x}{x}}(3x-3x^2+e^x(3-4x+x^2))}{-9x^3+3x^4+e^{\frac{e^x}{x}}(-9x^2+3x^3)}\,dx$

3.1023.1 Optimal result

Integrand size = 72, antiderivative size = 25

$$\int \frac{-2x^3+e^{\frac{e^x}{x}}(3x-3x^2+e^x(3-4x+x^2))}{-9x^3+3x^4+e^{\frac{e^x}{x}}(-9x^2+3x^3)}\,dx = -\frac{1}{3}\log\left(\frac{(-3+x)^2x}{e^{\frac{e^x}{x}}+x}\right)$$

output
```
-1/3*ln(x*(-3+x)^2/(x+exp(exp(x)/x)))
```

3.1023.2 Mathematica [A] (verified)

Time = 0.69 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{-2x^3+e^{\frac{e^x}{x}}(3x-3x^2+e^x(3-4x+x^2))}{-9x^3+3x^4+e^{\frac{e^x}{x}}(-9x^2+3x^3)}\,dx = \frac{1}{3}\left(-2\log(3-x)-\log(x)+\log\left(e^{\frac{e^x}{x}}+x\right)\right)$$

input
```
Integrate[(-2*x^3 + E^(E^x/x)*(3*x - 3*x^2 + E^x*(3 - 4*x + x^2)))/(-9*x^3
 + 3*x^4 + E^(E^x/x)*(-9*x^2 + 3*x^3)),x]
```

output
```
(-2*Log[3 - x] - Log[x] + Log[E^(E^x/x) + x])/3
```

3.1023.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{e^x}{x}}\left(-3x^2+e^x\left(x^2-4x+3\right)+3x\right)-2x^3}{3x^4-9x^3+e^{\frac{e^x}{x}}\left(3x^3-9x^2\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{2x^3-e^{\frac{e^x}{x}}\left(-3x^2+e^x\left(x^2-4x+3\right)+3x\right)}{3(3-x)x^2\left(x+e^{\frac{e^x}{x}}\right)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{3}\int \frac{2x^3-e^{\frac{e^x}{x}}\left(-3x^2+3x+e^x\left(x^2-4x+3\right)\right)}{(3-x)x^2\left(x+e^{\frac{e^x}{x}}\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{3}\int \left(\frac{e^{x+\frac{e^x}{x}}(x-1)}{x^2\left(x+e^{\frac{e^x}{x}}\right)}-\frac{2x^2+3e^{\frac{e^x}{x}}x-3e^{\frac{e^x}{x}}}{(x-3)x\left(x+e^{\frac{e^x}{x}}\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{3}\left(-\int \frac{e^{x+\frac{e^x}{x}}}{x^2\left(x+e^{\frac{e^x}{x}}\right)}dx+\int \frac{1}{x+e^{\frac{e^x}{x}}}dx+\int \frac{e^{x+\frac{e^x}{x}}}{x\left(x+e^{\frac{e^x}{x}}\right)}dx-2\log(3-x)-\log(x)\right)$$

input
```
Int[(-2*x^3 + E^(E^x/x)*(3*x - 3*x^2 + E^x*(3 - 4*x + x^2)))/(-9*x^3 + 3*x
^4 + E^(E^x/x)*(-9*x^2 + 3*x^3)),x]
```

output
```
$Aborted
```

3.1023.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1023.4 Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

method	result	size
norman	$-\frac{\ln(x)}{3}-\frac{2\ln(-3+x)}{3}+\frac{\ln\left(x+\mathrm{e}^{\frac{\mathrm{e}^{x}}{x}}\right)}{3}$	24
risch	$-\frac{\ln(x)}{3}-\frac{2\ln(-3+x)}{3}+\frac{\ln\left(x+\mathrm{e}^{\frac{\mathrm{e}^{x}}{x}}\right)}{3}$	24
parallelrisch	$-\frac{\ln(x)}{3}-\frac{2\ln(-3+x)}{3}+\frac{\ln\left(x+\mathrm{e}^{\frac{\mathrm{e}^{x}}{x}}\right)}{3}$	24

input
```
int((((x^2-4*x+3)*exp(x)-3*x^2+3*x)*exp(exp(x)/x)-2*x^3)/((3*x^3-9*x^2)*ex
p(exp(x)/x)+3*x^4-9*x^3),x,method=_RETURNVERBOSE)
```

output
```
-1/3*ln(x)-2/3*ln(-3+x)+1/3*ln(x+exp(exp(x)/x))
```

3.1023.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-2x^3+e^{\frac{e^x}{x}}(3x-3x^2+e^x(3-4x+x^2))}{-9x^3+3x^4+e^{\frac{e^x}{x}}(-9x^2+3x^3)}\,dx = \frac{1}{3}\log\left(x+e^{\left(\frac{e^x}{x}\right)}\right)-\frac{2}{3}\log(x-3)-\frac{1}{3}\log(x)$$

input
```
integrate((((x^2-4*x+3)*exp(x)-3*x^2+3*x)*exp(exp(x)/x)-2*x^3)/((3*x^3-9*x
^2)*exp(exp(x)/x)+3*x^4-9*x^3),x, algorithm=\
```

output
```
1/3*log(x + e^(e^x/x)) - 2/3*log(x - 3) - 1/3*log(x)
```

3.1023.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{-2x^3+e^{\frac{e^x}{x}}(3x-3x^2+e^x(3-4x+x^2))}{-9x^3+3x^4+e^{\frac{e^x}{x}}(-9x^2+3x^3)}\,dx = -\frac{\log(x)}{3}-\frac{2\log(x-3)}{3}+\frac{\log\left(x+e^{\frac{e^x}{x}}\right)}{3}$$

input
```
integrate((((x**2-4*x+3)*exp(x)-3*x**2+3*x)*exp(exp(x)/x)-2*x**3)/((3*x**3
-9*x**2)*exp(exp(x)/x)+3*x**4-9*x**3),x)
```

output
```
-log(x)/3 - 2*log(x - 3)/3 + log(x + exp(exp(x)/x))/3
```

3.1023.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-2x^3+e^{\frac{e^x}{x}}(3x-3x^2+e^x(3-4x+x^2))}{-9x^3+3x^4+e^{\frac{e^x}{x}}(-9x^2+3x^3)}\,dx = \frac{1}{3}\log\left(x+e^{\left(\frac{e^x}{x}\right)}\right)-\frac{2}{3}\log(x-3)-\frac{1}{3}\log(x)$$

input
```
integrate(((((x^2-4*x+3)*exp(x)-3*x^2+3*x)*exp(exp(x)/x)-2*x^3)/((3*x^3-9*x
^2)*exp(exp(x)/x)+3*x^4-9*x^3),x, algorithm=\
```

output
```
1/3*log(x + e^(e^x/x)) - 2/3*log(x - 3) - 1/3*log(x)
```

3.1023.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{-2x^3 + e^{\frac{e^x}{x}}(3x - 3x^2 + e^x(3 - 4x + x^2))}{-9x^3 + 3x^4 + e^{\frac{e^x}{x}}(-9x^2 + 3x^3)}\,dx = -\frac{1}{3}x + \frac{1}{3}\log\left(xe^x + e^{\left(\frac{x^2+e^x}{x}\right)}\right) - \frac{2}{3}\log(x-3) - \frac{1}{3}\log(x)$$

input
```
integrate(((((x^2-4*x+3)*exp(x)-3*x^2+3*x)*exp(exp(x)/x)-2*x^3)/((3*x^3-9*x
^2)*exp(exp(x)/x)+3*x^4-9*x^3),x, algorithm=\
```

output
```
-1/3*x + 1/3*log(x*e^x + e^((x^2 + e^x)/x)) - 2/3*log(x - 3) - 1/3*log(x)
```

3.1023.9 Mupad [B] (verification not implemented)

Time = 19.19 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-2x^3 + e^{\frac{e^x}{x}}(3x - 3x^2 + e^x(3 - 4x + x^2))}{-9x^3 + 3x^4 + e^{\frac{e^x}{x}}(-9x^2 + 3x^3)}\,dx = \frac{\ln\left(x + \mathrm{e}^{\frac{\mathrm{e}^x}{x}}\right)}{3} - \frac{2\ln(x-3)}{3} - \frac{\ln(x)}{3}$$

input
```
int(-(exp(exp(x)/x)*(3*x + exp(x)*(x^2 - 4*x + 3) - 3*x^2) - 2*x^3)/(exp(e
xp(x)/x)*(9*x^2 - 3*x^3) + 9*x^3 - 3*x^4),x)
```

output
```
log(x + exp(exp(x)/x))/3 - (2*log(x - 3))/3 - log(x)/3
```

3.1024 $\int \frac{e^{\frac{4+x+x^2}{x}}(32-4x-7x^2+x^3+(-8+2x^2)\log(2))}{2x^2}\,dx$

3.1024.1 Optimal result

Integrand size = 42, antiderivative size = 20

$$\int \frac{e^{\frac{4+x+x^2}{x}}(32-4x-7x^2+x^3+(-8+2x^2)\log(2))}{2x^2}\,dx = e^{1+\frac{4}{x}+x}\left(-4+\frac{x}{2}+\log(2)\right)$$

output
```
(1/2*x-4+ln(2))*exp(1+4/x+x)
```

3.1024.2 Mathematica [F]

$$\int \frac{e^{\frac{4+x+x^2}{x}}(32-4x-7x^2+x^3+(-8+2x^2)\log(2))}{2x^2}\,dx = \int \frac{e^{\frac{4+x+x^2}{x}}(32-4x-7x^2+x^3+(-8+2x^2)\log(2))}{2x^2}\,dx$$

input
```
Integrate[(E^((4 + x + x^2)/x)*(32 - 4*x - 7*x^2 + x^3 + (-8 + 2*x^2)*Log[
2]))/(2*x^2),x]
```

output
```
Integrate[(E^((4 + x + x^2)/x)*(32 - 4*x - 7*x^2 + x^3 + (-8 + 2*x^2)*Log[
2]))/x^2, x]/2
```

3.1024.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{x^2+x+4}{x}}\left(x^3-7x^2+\left(2x^2-8\right)\log(2)-4x+32\right)}{2x^2}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{2}\int \frac{e^{\frac{x^2+x+4}{x}}\left(x^3-7x^2-4x-2\left(4-x^2\right)\log(2)+32\right)}{x^2}dx$$
$$\Big\downarrow \text{7292}$$
$$\frac{1}{2}\int \frac{e^{x+1+\frac{4}{x}}\left(x^3-(7-\log(4))x^2-4x+8(4-\log(2))\right)}{x^2}dx$$
$$\Big\downarrow \text{7293}$$
$$\frac{1}{2}\int \left(e^{x+1+\frac{4}{x}}x-7e^{x+1+\frac{4}{x}}\left(1-\frac{2\log(2)}{7}\right)-\frac{4e^{x+1+\frac{4}{x}}}{x}-\frac{8e^{x+1+\frac{4}{x}}(-4+\log(2))}{x^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{1}{2}\left(8(4-\log(2))\int \frac{e^{x+1+\frac{4}{x}}}{x^2}dx-4\int \frac{e^{x+1+\frac{4}{x}}}{x}dx+\int e^{x+1+\frac{4}{x}}xdx-\left((7-\log(4))\int e^{x+1+\frac{4}{x}}dx\right)\right)$$

input
```
Int[(E^((4 + x + x^2)/x)*(32 - 4*x - 7*x^2 + x^3 + (-8 + 2*x^2)*Log[2]))/(
2*x^2),x]
```

output
```
$Aborted
```

3.1024.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1024.4 Maple [A] (verified)

Time = 0.90 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

method	result	size
gosper	$\frac{{\mathrm e}^{\frac{x^{2}+x+4}{x}} \left(x+2 \ln \left(2\right)-8\right)}{2}$	21
risch	$\frac{{\mathrm e}^{\frac{x^{2}+x+4}{x}} \left(x+2 \ln \left(2\right)-8\right)}{2}$	21
norman	$\frac{x \left(\ln \left(2\right)-4\right) {\mathrm e}^{\frac{x^{2}+x+4}{x}}+\frac{x^{2} {\mathrm e}^{\frac{x^{2}+x+4}{x}}}{2}}{x}$	39
parallelrisch	${\mathrm e}^{\frac{x^{2}+x+4}{x}} \ln \left(2\right)+\frac{{\mathrm e}^{\frac{x^{2}+x+4}{x}} x}{2}-4 \,{\mathrm e}^{\frac{x^{2}+x+4}{x}}$	43

input
```
int(1/2*((2*x^2-8)*ln(2)+x^3-7*x^2-4*x+32)*exp((x^2+x+4)/x)/x^2,x,method=_
RETURNVERBOSE)
```

output
```
1/2*exp((x^2+x+4)/x)*(x+2*ln(2)-8)
```

3.1024.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{4+x+x^2}{x}} \left(32-4 x-7 x^2+x^3+\left(-8+2 x^2\right) \log (2)\right)}{2 x^2} \, dx=\frac{1}{2} \, {\left(x + 2 \, \log \left(2\right) - 8\right)} e^{\left(\frac{x^{2} + x + 4}{x}\right)}$$

input
```
integrate(1/2*((2*x^2-8)*log(2)+x^3-7*x^2-4*x+32)*exp((x^2+x+4)/x)/x^2,x,
algorithm=\
```

output
```
1/2*(x + 2*log(2) - 8)*e^((x^2 + x + 4)/x)
```

3.1024.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{e^{\frac{4+x+x^2}{x}}\left(32-4x-7x^2+x^3+\left(-8+2x^2\right)\log(2)\right)}{2x^2}\,dx = \frac{\left(x-8+2\log\left(2\right)\right)e^{\frac{x^2+x+4}{x}}}{2}$$

input
```
integrate(1/2*((2*x**2-8)*ln(2)+x**3-7*x**2-4*x+32)*exp((x**2+x+4)/x)/x**2
,x)
```

output
```
(x - 8 + 2*log(2))*exp((x**2 + x + 4)/x)/2
```

3.1024.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{e^{\frac{4+x+x^2}{x}}\left(32-4x-7x^2+x^3+\left(-8+2x^2\right)\log(2)\right)}{2x^2}\,dx = \frac{1}{2}\left(xe+2\left(\log\left(2\right)-4\right)e\right)e^{\left(x+\frac{4}{x}\right)}$$

input
```
integrate(1/2*((2*x^2-8)*log(2)+x^3-7*x^2-4*x+32)*exp((x^2+x+4)/x)/x^2,x,
algorithm=\
```

output
```
1/2*(x*e + 2*(log(2) - 4)*e)*e^(x + 4/x)
```

3.1024.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. 2(18) = 36.

Time = 0.27 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.10

$$\int \frac{e^{\frac{4+x+x^2}{x}}\left(32-4x-7x^2+x^3+\left(-8+2x^2\right)\log(2)\right)}{2x^2}\,dx = \frac{1}{2}\,xe^{\left(\frac{x^2+x+4}{x}\right)}+e^{\left(\frac{x^2+x+4}{x}\right)}\log\left(2\right)-4\,e^{\left(\frac{x^2+x+4}{x}\right)}$$

input
```
integrate(1/2*((2*x^2-8)*log(2)+x^3-7*x^2-4*x+32)*exp((x^2+x+4)/x)/x^2,x,
algorithm=\
```

output
```
1/2*x*e^((x^2 + x + 4)/x) + e^((x^2 + x + 4)/x)*log(2) - 4*e^((x^2 + x + 4
)/x)
```

3.1024.9 Mupad [B] (verification not implemented)

Time = 18.85 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{e^{\frac{4+x+x^2}{x}} \left(32-4x-7x^2+x^3+\left(-8+2x^2\right) \log(2)\right)}{2x^2} \, dx = \mathrm{e}^{x+\frac{4}{x}+1} \left(\frac{x}{2}+\ln\left(2\right)-4\right)$$

input
```
int((exp((x + x^2 + 4)/x)*(log(2)*(2*x^2 - 8) - 4*x - 7*x^2 + x^3 + 32))/(
2*x^2),x)
```

output
```
exp(x + 4/x + 1)*(x/2 + log(2) - 4)
```

3.1025 $\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4\cdots}{x}\right.}{(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x\cdots}{}\right.}$

3.1025.1 Optimal result

Integrand size = 166, antiderivative size = 27

$$\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\log\left(\log\left(\frac{-e^x x+e^5(-1+4x\cdots}{x}\right.\right.}{(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)}$$
$$= x\log\left(\log\left(-e^x+e^5\left(4-e^3-\frac{1}{x}+x\right)\right)\right)$$

output
```
x*ln(ln(exp(5)*(x+4-exp(3)-1/x)-exp(x)))
```

3.1025.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\log\left(\log\left(\frac{-e^x x+e^5(-1+4x\cdots}{x}\right.\right.}{(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)}$$
$$= x\log\left(\log\left(-e^8-e^x+e^5\left(4-\frac{1}{x}+x\right)\right)\right)$$

3.1025.

$$\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\log\left(\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\right)}{\cdots}\,dx$$

input
```
Integrate[(E^x*x^2 + E^5*(-1 - x^2) + (E^x*x + E^5*(1 - 4*x + E^3*x - x^2)
)*Log[(-(E^x*x) + E^5*(-1 + 4*x - E^3*x + x^2))/x]*Log[Log[(-(E^x*x) + E^5
*(-1 + 4*x - E^3*x + x^2))/x]])/((E^x*x + E^5*(1 - 4*x + E^3*x - x^2))*Log
[(-(E^x*x) + E^5*(-1 + 4*x - E^3*x + x^2))/x]),x]
```

output
```
x*Log[Log[-E^8 - E^x + E^5*(4 - x^(-1) + x)]]
```

3.1025.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x^2+e^5(-x^2-1)+(e^5(-x^2+e^3x-4x+1)+e^x x)\log\left(\frac{e^5(x^2-e^3x+4x-1)-e^x x}{x}\right)\log\left(\log\left(\frac{e^5(x^2-e^3x+4x-1)-e^x x}{x}\right.\right.}{(e^5(-x^2+e^3x-4x+1)+e^x x)\log\left(\frac{e^5(x^2-e^3x+4x-1)-e^x x}{x}\right)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^x x^2+e^5(-x^2-1)+(e^5(-x^2+e^3x-4x+1)+e^x x)\log\left(\frac{e^5(x^2-e^3x+4x-1)-e^x x}{x}\right)\log\left(\log\left(\frac{e^5(x^2-e^3x+4x-1)-e^x x}{x}\right.\right.}{(e^5(-x^2+e^3x-4x+1)+e^x x)\log\left(\frac{e^5(x^2-e^3x+4x-1)}{x}-e^x\right)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{e^5(x^3+(3-e^3)x^2-x-1)}{\left(-e^5x^2+e^x x-4e^5\left(1-\frac{e^3}{4}\right)x+e^5\right)\log\left(e^5\left(x-\frac{1}{x}+4\right)-e^x-e^8\right)}+\frac{x+\log\left(e^5\left(x-\frac{1}{x}+4\right)-e^x-e^8\right)\log}{\log\left(e^5\left(x-\frac{1}{x}+\right.\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$e^5(3-e^3)\int \frac{x^2}{\left(-e^5x^2+e^x x-4e^5\left(1-\frac{e^3}{4}\right)x+e^5\right)\log\left(e^5\left(x+4-\frac{1}{x}\right)-e^x-e^8\right)}dx+ e^5\int \frac{1}{\left(e^5x^2-e^x x+4e^5\left(1-\frac{e^3}{4}\right)x-e^5\right)\log\left(e^5\left(x+4-\frac{1}{x}\right)-e^x-e^8\right)}dx+ e^5\int \frac{x}{\left(e^5x^2-e^x x+4e^5\left(1-\frac{e^3}{4}\right)x-e^5\right)\log\left(e^5\left(x+4-\frac{1}{x}\right)-e^x-e^8\right)}dx+ e^5\int \frac{x^3}{\left(-e^5x^2+e^x x-4e^5\left(1-\frac{e^3}{4}\right)x+e^5\right)\log\left(e^5\left(x+4-\frac{1}{x}\right)-e^x-e^8\right)}dx+ \int \frac{x}{\log\left(e^5\left(x+4-\frac{1}{x}\right)-e^x-e^8\right)}dx+\int \log\left(\log\left(e^5\left(x+4-\frac{1}{x}\right)-e^x-e^8\right)\right)dx$$

3.1025.

$$\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\log\left(\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\right)}{\ldots}dx$$

input
```
Int[(E^x*x^2 + E^5*(-1 - x^2) + (E^x*x + E^5*(1 - 4*x + E^3*x - x^2))*Log[
(-(E^x*x) + E^5*(-1 + 4*x - E^3*x + x^2))/x]*Log[Log[(-(E^x*x) + E^5*(-1 +
 4*x - E^3*x + x^2))/x]])/((E^x*x + E^5*(1 - 4*x + E^3*x - x^2))*Log[(-(E^
x*x) + E^5*(-1 + 4*x - E^3*x + x^2))/x]),x]
```

output
```
$Aborted
```

3.1025.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1025.4 Maple [A] (verified)

Time = 16.68 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

method	result
parallelrisch	$\ln\left(\ln\left(\frac{-e^{x} x+\left(-x\,e^{3}+x^{2}+4x-1\right) e^{5}}{x}\right)\right) x$
risch	$x \ln\left(i\pi - \ln(x) + \ln\left(e^{x} x + \left(x\,e^{3} - x^{2} - 4x + 1\right) e^{5}\right) - \frac{i\pi\,\mathrm{csgn}\left(\frac{i\left(e^{x} x+\left(x\,e^{3}-x^{2}-4x+1\right) e^{5}\right)}{x}\right)\left(-\mathrm{csgn}\left(\right.\right.}{}\right.$

input
```
int(((exp(x)*x+(x*exp(3)-x^2-4*x+1)*exp(5))*ln((-exp(x)*x+(-x*exp(3)+x^2+4
*x-1)*exp(5))/x)*ln(ln((-exp(x)*x+(-x*exp(3)+x^2+4*x-1)*exp(5))/x))+exp(x)
*x^2+(-x^2-1)*exp(5))/(exp(x)*x+(x*exp(3)-x^2-4*x+1)*exp(5))/ln((-exp(x)*x
+(-x*exp(3)+x^2+4*x-1)*exp(5))/x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln((-exp(x)*x+(-x*exp(3)+x^2+4*x-1)*exp(5))/x))*x
```

3.1025.

$$\int \frac{e^{x} x^{2}+e^{5}\left(-1-x^{2}\right)+\left(e^{x} x+e^{5}\left(1-4x+e^{3} x-x^{2}\right)\right) \log\left(\frac{-e^{x} x+e^{5}\left(-1+4x-e^{3} x+x^{2}\right)}{x}\right) \log\left(\log\left(\frac{-e^{x} x+e^{5}\left(-1+4x-e^{3} x+x^{2}\right)}{x}\right)\right)}{\cdots}\,dx$$

3.1025.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\Big(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\Big)\log\Big(\log\Big(\frac{-e^x x+e^5(-1+4x}{x}}{(e^x x+e^5(1-4x+e^3x-x^2))\log\Big(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\Big)}$$
$$= x\log\left(\log\left(-\frac{xe^8-(x^2+4\,x-1)e^5+xe^x}{x}\right)\right)$$

input
```
integrate(((exp(x)*x+(x*exp(3)-x^2-4*x+1)*exp(5))*log((-exp(x)*x+(-x*exp(3
)+x^2+4*x-1)*exp(5))/x)*log(log((-exp(x)*x+(-x*exp(3)+x^2+4*x-1)*exp(5))/x
))+exp(x)*x^2+(-x^2-1)*exp(5))/(exp(x)*x+(x*exp(3)-x^2-4*x+1)*exp(5))/log(
(-exp(x)*x+(-x*exp(3)+x^2+4*x-1)*exp(5))/x),x, algorithm=\
```

output
```
x*log(log(-(x*e^8 - (x^2 + 4*x - 1)*e^5 + x*e^x)/x))
```

3.1025.6 Sympy [A] (verification not implemented)

Time = 4.97 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\Big(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\Big)\log\Big(\log\Big(\frac{-e^x x+e^5(-1+4x}{x}}{(e^x x+e^5(1-4x+e^3x-x^2))\log\Big(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\Big)}$$
$$= x\log\left(\log\left(\frac{-xe^x+(x^2-xe^3+4x-1)\,e^5}{x}\right)\right)$$

input
```
integrate(((exp(x)*x+(x*exp(3)-x**2-4*x+1)*exp(5))*ln((-exp(x)*x+(-x*exp(3
)+x**2+4*x-1)*exp(5))/x)*ln(ln((-exp(x)*x+(-x*exp(3)+x**2+4*x-1)*exp(5))/x
))+exp(x)*x**2+(-x**2-1)*exp(5))/(exp(x)*x+(x*exp(3)-x**2-4*x+1)*exp(5))/l
n((-exp(x)*x+(-x*exp(3)+x**2+4*x-1)*exp(5))/x),x)
```

output
```
x*log(log((-x*exp(x) + (x**2 - x*exp(3) + 4*x - 1)*exp(5))/x))
```

3.1025.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

$$\int \frac{e^x x^2 + e^5(-1-x^2) + (e^x x + e^5(1-4x+e^3x-x^2)) \log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right) \log\left(\log\left(\frac{-e^x x+e^5(-1+4x}{x}\right.\right.}{(e^x x + e^5(1-4x+e^3x-x^2)) \log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)}$$
$$= x \log\left(\log\left(x^2e^5 - x(e^8 - 4e^5) - xe^x - e^5\right) - \log(x)\right)$$

input
```
integrate(((exp(x)*x+(x*exp(3)-x^2-4*x+1)*exp(5))*log((-exp(x)*x+(-x*exp(3
)+x^2+4*x-1)*exp(5))/x)*log(log((-exp(x)*x+(-x*exp(3)+x^2+4*x-1)*exp(5))/x
))+exp(x)*x^2+(-x^2-1)*exp(5))/(exp(x)*x+(x*exp(3)-x^2-4*x+1)*exp(5))/log(
(-exp(x)*x+(-x*exp(3)+x^2+4*x-1)*exp(5))/x),x, algorithm=\
```

output
```
x*log(log(x^2*e^5 - x*(e^8 - 4*e^5) - x*e^x - e^5) - log(x))
```

3.1025.8 Giac [F]

$$\int \frac{e^x x^2 + e^5(-1-x^2) + (e^x x + e^5(1-4x+e^3x-x^2)) \log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right) \log\left(\log\left(\frac{-e^x x+e^5(-1+4x}{x}\right.\right.}{(e^x x + e^5(1-4x+e^3x-x^2)) \log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)}$$
$$= \int -\frac{x^2e^x - ((x^2 - xe^3 + 4x - 1)e^5 - xe^x) \log\left(\frac{(x^2-xe^3+4x-1)e^5-xe^x}{x}\right) \log\left(\log\left(\frac{(x^2-xe^3+4x-1)e^5-xe^x}{x}\right)\right) - (x}{((x^2 - xe^3 + 4x - 1)e^5 - xe^x) \log\left(\frac{(x^2-xe^3+4x-1)e^5-xe^x}{x}\right)}$$

input
```
integrate(((exp(x)*x+(x*exp(3)-x^2-4*x+1)*exp(5))*log((-exp(x)*x+(-x*exp(3
)+x^2+4*x-1)*exp(5))/x)*log(log((-exp(x)*x+(-x*exp(3)+x^2+4*x-1)*exp(5))/x
))+exp(x)*x^2+(-x^2-1)*exp(5))/(exp(x)*x+(x*exp(3)-x^2-4*x+1)*exp(5))/log(
(-exp(x)*x+(-x*exp(3)+x^2+4*x-1)*exp(5))/x),x, algorithm=\
```

output
```
integrate(-(x^2*e^x - ((x^2 - x*e^3 + 4*x - 1)*e^5 - x*e^x)*log(((x^2 - x*
e^3 + 4*x - 1)*e^5 - x*e^x)/x)*log(log(((x^2 - x*e^3 + 4*x - 1)*e^5 - x*e^
x)/x)) - (x^2 + 1)*e^5)/(((x^2 - x*e^3 + 4*x - 1)*e^5 - x*e^x)*log(((x^2 -
 x*e^3 + 4*x - 1)*e^5 - x*e^x)/x)), x)
```

3.1025.

$$\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2)) \log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right) \log\left(\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\right)}{\cdots}\,dx$$

3.1025.9 Mupad [B] (verification not implemented)

Time = 19.90 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\log\left(\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)\right)}{(e^x x+e^5\left(1-4x+e^3x-x^2\right))\log\left(\frac{-e^x x+e^5(-1+4x-e^3x+x^2)}{x}\right)}$$
$$= x\ \ln\left(\ln\left(\frac{\mathrm{e}^5\left(4\,x-x\,\mathrm{e}^3+x^2-1\right)-x\,\mathrm{e}^x}{x}\right)\right)$$

input
```
int((exp(5)*(x^2 + 1) - x^2*exp(x) + log(log((exp(5)*(4*x - x*exp(3) + x^2
 - 1) - x*exp(x))/x))*log((exp(5)*(4*x - x*exp(3) + x^2 - 1) - x*exp(x))/x
)*(exp(5)*(4*x - x*exp(3) + x^2 - 1) - x*exp(x)))/(log((exp(5)*(4*x - x*ex
p(3) + x^2 - 1) - x*exp(x))/x)*(exp(5)*(4*x - x*exp(3) + x^2 - 1) - x*exp(
x))),x)
```

output
```
x*log(log((exp(5)*(4*x - x*exp(3) + x^2 - 1) - x*exp(x))/x))
```

3.1025.

$$\int \frac{e^x x^2+e^5(-1-x^2)+(e^x x+e^5(1-4x+e^3x-x^2))\log\left(\frac{-e^x x+e^5\left(-1+4x-e^3x+x^2\right)}{x}\right)\log\left(\log\left(\frac{-e^x x+e^5\left(-1+4x-e^3x+x^2\right)}{x}\right)\right)}{\ldots}\,dx$$

3.1026 $\int \frac{1}{4}\left(20-e^{x/4}+e^{4x}(4+16x)+e^{3x}(-144-432x)\log(3)\right.$

3.1026.1 Optimal result

Integrand size = 95, antiderivative size = 27

$$\int \frac{1}{4}\left(20-e^{x/4}+e^{4x}(4+16x)+e^{3x}(-144-432x)\log(3)+1296\log^2(3)\right.$$
$$+26244\log^4(3)+e^{2x}\left(16+32x+(1944+3888x)\log^2(3)\right)$$
$$\left.+e^x\left((-288-288x)\log(3)+(-11664-11664x)\log^3(3)\right)\right)\,dx=$$
$$-e^{x/4}+x+x\left(2+(e^x-9\log(3))^2\right)^2$$

output
```
((exp(x)-9*ln(3))^2+2)^2*x-exp(1/4*x)+x
```

3.1026.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 76 vs. 2(27) = 54.

Time = 0.07 (sec) , antiderivative size = 76, normalized size of antiderivative = 2.81

$$\int \frac{1}{4}\left(20-e^{x/4}+e^{4x}(4+16x)+e^{3x}(-144-432x)\log(3)+1296\log^2(3)\right.$$
$$+26244\log^4(3)+e^{2x}\left(16+32x+(1944+3888x)\log^2(3)\right)$$
$$\left.+e^x\left((-288-288x)\log(3)+(-11664-11664x)\log^3(3)\right)\right)\,dx=$$
$$-e^{x/4}+5x+e^{4x}x-36e^{3x}x\log(3)+324x\log^2(3)+6561x\log^4(3)$$
$$-36e^xx\log(3)\left(2+81\log^2(3)\right)+2e^{2x}x\left(2+243\log^2(3)\right)$$

input
```
Integrate[(20 - E^(x/4) + E^(4*x)*(4 + 16*x) + E^(3*x)*(-144 - 432*x)*Log[
3] + 1296*Log[3]^2 + 26244*Log[3]^4 + E^(2*x)*(16 + 32*x + (1944 + 3888*x)
*Log[3]^2) + E^x*((-288 - 288*x)*Log[3] + (-11664 - 11664*x)*Log[3]^3))/4,
x]
```

output
```
-E^(x/4) + 5*x + E^(4*x)*x - 36*E^(3*x)*x*Log[3] + 324*x*Log[3]^2 + 6561*x
*Log[3]^4 - 36*E^x*x*Log[3]*(2 + 81*Log[3]^2) + 2*E^(2*x)*x*(2 + 243*Log[3
]^2)
```

3.1026.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 140 vs. $2(27) = 54$.

Time = 0.31 (sec) , antiderivative size = 140, normalized size of antiderivative = 5.19, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.021$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}\left(-e^{x/4}+e^{4x}(16x+4)+e^{x}\left((-11664x-11664)\log^{3}(3)+(-288x-288)\log(3)\right)+e^{2x}\left(32x+(3888x+1944\right.\right.$$

$$\Big\downarrow \; 27$$

$$\frac{1}{4}\int\left(-144e^{3x}\log(3)(3x+1)-e^{x/4}+4e^{4x}(4x+1)+8e^{2x}\left(4x+243(2x+1)\log^{2}(3)+2\right)-144e^{x}\left(81\log^{3}(3)(x+\right.\right.$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{4}\left(16e^{2x}x-4e^{x/4}-e^{4x}+e^{4x}(4x+1)+144e^{x}\log(3)\left(2+81\log^{2}(3)\right)-144e^{x}(x+1)\log(3)\left(2+81\log^{2}(3)\right)-97\right.$$

input
```
Int[(20 - E^(x/4) + E^(4*x)*(4 + 16*x) + E^(3*x)*(-144 - 432*x)*Log[3] + 1
296*Log[3]^2 + 26244*Log[3]^4 + E^(2*x)*(16 + 32*x + (1944 + 3888*x)*Log[3
]^2) + E^x*((-288 - 288*x)*Log[3] + (-11664 - 11664*x)*Log[3]^3))/4,x]
```

output
```
(-4*E^(x/4) - E^(4*x) + 16*E^(2*x)*x + E^(4*x)*(1 + 4*x) + 48*E^(3*x)*Log[
3] - 48*E^(3*x)*(1 + 3*x)*Log[3] - 972*E^(2*x)*Log[3]^2 + 972*E^(2*x)*(1 +
 2*x)*Log[3]^2 + 144*E^x*Log[3]*(2 + 81*Log[3]^2) - 144*E^x*(1 + x)*Log[3]
*(2 + 81*Log[3]^2) + 4*x*(5 + 324*Log[3]^2 + 6561*Log[3]^4))/4
```

3.1026.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1026.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. 2(23) = 46.

Time = 0.27 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.59

method	result
risch	$x\,\mathrm{e}^{4x} - 36\ln(3)\,\mathrm{e}^{3x}x + 2\left(243\ln(3)^2 + 2\right)x\,\mathrm{e}^{2x} - 36\ln(3)\left(81\ln(3)^2 + 2\right)x\,\mathrm{e}^{x} - \mathrm{e}^{\frac{x}{4}} + 6561x$
parallelrisch	$x\,\mathrm{e}^{4x} - 36\ln(3)\,\mathrm{e}^{3x}x + 486\ln(3)^2\,\mathrm{e}^{2x}x + 4x\,\mathrm{e}^{2x} - 2916\,\mathrm{e}^{x}\ln(3)^3\,x - 72x\ln(3)\,\mathrm{e}^{x} - \mathrm{e}^{\frac{x}{4}} + (6$
default	$-2916\,\mathrm{e}^{x}\ln(3)^3\,x + 6561x\ln(3)^4 + 486\ln(3)^2\,\mathrm{e}^{2x}x - 72x\ln(3)\,\mathrm{e}^{x} + 324x\ln(3)^2 - 36\ln(3$
parts	$-2916\,\mathrm{e}^{x}\ln(3)^3\,x + 6561x\ln(3)^4 + 486\ln(3)^2\,\mathrm{e}^{2x}x - 72x\ln(3)\,\mathrm{e}^{x} + 324x\ln(3)^2 - 36\ln(3$

input
```
int(1/4*(16*x+4)*exp(x)^4+1/4*(-432*x-144)*ln(3)*exp(x)^3+1/4*((3888*x+194
4)*ln(3)^2+32*x+16)*exp(x)^2+1/4*((-11664*x-11664)*ln(3)^3+(-288*x-288)*ln
(3))*exp(x)-1/4*exp(1/4*x)+6561*ln(3)^4+324*ln(3)^2+5,x,method=_RETURNVERB
OSE)
```

output
```
x*exp(x)^4-36*ln(3)*exp(x)^3*x+2*(243*ln(3)^2+2)*x*exp(x)^2-36*ln(3)*(81*l
n(3)^2+2)*x*exp(x)-exp(1/4*x)+6561*x*ln(3)^4+324*x*ln(3)^2+5*x
```

3.1026.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. 2(23) = 46.

Time = 0.27 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.70

$$\int \frac{1}{4}\left(20-e^{x/4}+e^{4x}(4+16x)+e^{3x}(-144-432x)\log(3)+1296\log^2(3)+26244\log^4(3)+e^{2x}\left(16+32x+(1944+3888x)\log^2(3)\right)+e^x\left((-288-288x)\log(3)+(-11664-11664x)\log^3(3)\right)\right)\,dx = 6561\,x\log(3)^4-36\,xe^{(3\,x)}\log(3)+324\,x\log(3)^2+xe^{(4\,x)}+2\left(243\,x\log(3)^2+2\,x\right)e^{(2\,x)}-36\left(81\,x\log(3)^3+2\,x\log(3)\right)e^x+5\,x-e^{\left(\frac{1}{4}\,x\right)}$$

input
```
integrate(1/4*(16*x+4)*exp(x)^4+1/4*(-432*x-144)*log(3)*exp(x)^3+1/4*((388
8*x+1944)*log(3)^2+32*x+16)*exp(x)^2+1/4*((-11664*x-11664)*log(3)^3+(-288*
x-288)*log(3))*exp(x)-1/4*exp(1/4*x)+6561*log(3)^4+324*log(3)^2+5,x, algor
ithm=\
```

output
```
6561*x*log(3)^4 - 36*x*e^(3*x)*log(3) + 324*x*log(3)^2 + x*e^(4*x) + 2*(24
3*x*log(3)^2 + 2*x)*e^(2*x) - 36*(81*x*log(3)^3 + 2*x*log(3))*e^x + 5*x -
e^(1/4*x)
```

3.1026.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. 2(20) = 40.

Time = 0.20 (sec) , antiderivative size = 76, normalized size of antiderivative = 2.81

$$\int \frac{1}{4}\left(20-e^{x/4}+e^{4x}(4+16x)+e^{3x}(-144-432x)\log(3)+1296\log^2(3)+26244\log^4(3)+e^{2x}\left(16+32x+(1944+3888x)\log^2(3)\right)+e^x\left((-288-288x)\log(3)+(-11664-11664x)\log^3(3)\right)\right)\,dx = xe^{4x}-36xe^{3x}\log(3)+x\left(5+324\log(3)^2+6561\log(3)^4\right)+\left(4x+486x\log(3)^2\right)e^{2x}+\left(-2916x\log(3)^3-72x\log(3)\right)e^x-e^{\frac{x}{4}}$$

input
```
integrate(1/4*(16*x+4)*exp(x)**4+1/4*(-432*x-144)*ln(3)*exp(x)**3+1/4*((38
88*x+1944)*ln(3)**2+32*x+16)*exp(x)**2+1/4*((-11664*x-11664)*ln(3)**3+(-28
8*x-288)*ln(3))*exp(x)-1/4*exp(1/4*x)+6561*ln(3)**4+324*ln(3)**2+5,x)
```

output
```
x*exp(4*x) - 36*x*exp(3*x)*log(3) + x*(5 + 324*log(3)**2 + 6561*log(3)**4)
 + (4*x + 486*x*log(3)**2)*exp(2*x) + (-2916*x*log(3)**3 - 72*x*log(3))*ex
p(x) - exp(x/4)
```

3.1026.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. $2(23) = 46$.

Time = 0.28 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.59

$$\int \frac{1}{4}\left(20 - e^{x/4} + e^{4x}(4+16x) + e^{3x}(-144-432x)\log(3) + 1296\log^2(3) + 26244\log^4(3) + e^{2x}\left(16+32x+(1944+3888x)\log^2(3)\right) + e^x\left((-288-288x)\log(3) + (-11664-11664x)\log^3(3)\right)\right)\,dx = 6561\,x\log(3)^4 + 2\left(243\,\log(3)^2+2\right)xe^{(2\,x)} - 36\left(81\,\log(3)^3+2\,\log(3)\right)xe^x - 36\,xe^{(3\,x)}\log(3) + 324\,x\log(3)^2 + xe^{(4\,x)} + 5\,x - e^{\left(\frac{1}{4}\,x\right)}$$

input
```
integrate(1/4*(16*x+4)*exp(x)^4+1/4*(-432*x-144)*log(3)*exp(x)^3+1/4*((388
8*x+1944)*log(3)^2+32*x+16)*exp(x)^2+1/4*((-11664*x-11664)*log(3)^3+(-288*
x-288)*log(3))*exp(x)-1/4*exp(1/4*x)+6561*log(3)^4+324*log(3)^2+5,x, algor
ithm=\
```

output
```
6561*x*log(3)^4 + 2*(243*log(3)^2 + 2)*x*e^(2*x) - 36*(81*log(3)^3 + 2*log
(3))*x*e^x - 36*x*e^(3*x)*log(3) + 324*x*log(3)^2 + x*e^(4*x) + 5*x - e^(1
/4*x)
```

3.1026.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(23) = 46$.

Time = 0.27 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.70

$$\int \frac{1}{4}\left(20 - e^{x/4} + e^{4x}(4+16x) + e^{3x}(-144-432x)\log(3) + 1296\log^2(3) + 26244\log^4(3) + e^{2x}\left(16+32x+(1944+3888x)\log^2(3)\right) + e^x\left((-288-288x)\log(3) + (-11664-11664x)\log^3(3)\right)\right)\,dx = 6561\,x\log(3)^4 - 36\,xe^{(3\,x)}\log(3) + 324\,x\log(3)^2 + xe^{(4\,x)} + 2\left(243\,x\log(3)^2+2\,x\right)e^{(2\,x)} - 36\left(81\,x\log(3)^3+2\,x\log(3)\right)e^x + 5\,x - e^{\left(\frac{1}{4}\,x\right)}$$

3.1026.
$\int \frac{1}{4}\left(20 - e^{x/4} + e^{4x}(4+16x) + e^{3x}(-144-432x)\log(3) + 1296\log^2(3) + 26244\log^4(3) + e^{2x}(16+32x+\right.$

input
```
integrate(1/4*(16*x+4)*exp(x)^4+1/4*(-432*x-144)*log(3)*exp(x)^3+1/4*((388
8*x+1944)*log(3)^2+32*x+16)*exp(x)^2+1/4*((-11664*x-11664)*log(3)^3+(-288*
x-288)*log(3))*exp(x)-1/4*exp(1/4*x)+6561*log(3)^4+324*log(3)^2+5,x, algor
ithm=\
```

output
```
6561*x*log(3)^4 - 36*x*e^(3*x)*log(3) + 324*x*log(3)^2 + x*e^(4*x) + 2*(24
3*x*log(3)^2 + 2*x)*e^(2*x) - 36*(81*x*log(3)^3 + 2*x*log(3))*e^x + 5*x -
e^(1/4*x)
```

3.1026.9 Mupad [B] (verification not implemented)

Time = 18.98 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.52

$$\int \frac{1}{4}\left(20-e^{x/4}+e^{4x}(4+16x)+e^{3x}(-144-432x)\log(3)+1296\log^2(3)+26244\log^4(3)+e^{2x}\left(16+32x+(1944+3888x)\log^2(3)\right)+e^x\left((-288-288x)\log(3)+(-11664-11664x)\log^3(3)\right)\right)\,dx = x\,e^{4\,x}-e^{x/4}+x\,\left(324\,\ln\left(3\right)^2+6561\,\ln\left(3\right)^4+5\right)-36\,x\,e^{3\,x}\,\ln\left(3\right)+\frac{x\,e^{2\,x}\,\left(1944\,\ln\left(3\right)^2+16\right)}{4}-36\,x\,e^x\,\ln\left(3\right)\,\left(81\,\ln\left(3\right)^2+2\right)$$

input
```
int((exp(2*x)*(32*x + log(3)^2*(3888*x + 1944) + 16))/4 - (exp(x)*(log(3)*
(288*x + 288) + log(3)^3*(11664*x + 11664)))/4 - exp(x/4)/4 + 324*log(3)^2
 + 6561*log(3)^4 + (exp(4*x)*(16*x + 4))/4 - (exp(3*x)*log(3)*(432*x + 144
))/4 + 5,x)
```

output
```
x*exp(4*x) - exp(x/4) + x*(324*log(3)^2 + 6561*log(3)^4 + 5) - 36*x*exp(3*
x)*log(3) + (x*exp(2*x)*(1944*log(3)^2 + 16))/4 - 36*x*exp(x)*log(3)*(81*l
og(3)^2 + 2)
```

3.1026.

$\int \frac{1}{4}\left(20-e^{x/4}+e^{4x}(4+16x)+e^{3x}(-144-432x)\log(3)+1296\log^2(3)+26244\log^4(3)+e^{2x}\left(16+32x+\right.\right.$

3.1027 $\int \frac{18x-6x^2+54x^6+e^x(-12x+2x^2-x^3-36x^6)+e^{2x}(2x+6x^6)+(-18+}{9x-6e^x x+e^{2x}x}$

3.1027.1 Optimal result

Integrand size = 100, antiderivative size = 30

$$\int \frac{18x-6x^2+54x^6+e^x(-12x+2x^2-x^3-36x^6)+e^{2x}(2x+6x^6)+(-18+e^x(12-12x)+18x+e^{2x}(-}{9x-6e^x x+e^{2x}x}$$
$$=3+\frac{x^2}{-3+e^x}+x(x+x^5)-(-x+\log(x))^2$$

output
```
x^2/(exp(x)-3)+3-(ln(x)-x)^2+(x^5+x)*x
```

3.1027.2 Mathematica [A] (verified)

Time = 1.62 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{18x-6x^2+54x^6+e^x(-12x+2x^2-x^3-36x^6)+e^{2x}(2x+6x^6)+(-18+e^x(12-12x)+18x+e^{2x}(-}{9x-6e^x x+e^{2x}x}$$
$$=\frac{x^2}{-3+e^x}+x^6+2x\log(x)-\log^2(x)$$

input
```
Integrate[(18*x - 6*x^2 + 54*x^6 + E^x*(-12*x + 2*x^2 - x^3 - 36*x^6) + E^
(2*x)*(2*x + 6*x^6) + (-18 + E^x*(12 - 12*x) + 18*x + E^(2*x)*(-2 + 2*x))*
Log[x])/(9*x - 6*E^x*x + E^(2*x)*x),x]
```

output
```
x^2/(-3 + E^x) + x^6 + 2*x*Log[x] - Log[x]^2
```

3.1027.3 Rubi [A] (verified)

Time = 1.35 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.030, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{54x^6+e^{2x}\left(6x^6+2x\right)-6x^2+e^x\left(-36x^6-x^3+2x^2-12x\right)+18x+\left(e^x(12-12x)+18x+e^{2x}(2x-2)-18\right)}{-6e^xx+e^{2x}x+9x}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{54x^6+e^{2x}\left(6x^6+2x\right)-6x^2+e^x\left(-36x^6-x^3+2x^2-12x\right)+18x+\left(e^x(12-12x)+18x+e^{2x}(2x-2)-18\right)}{\left(3-e^x\right)^2x}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2\left(3x^6+x+x\log(x)-\log(x)\right)}{x}-\frac{3x^2}{\left(e^x-3\right)^2}-\frac{(x-2)x}{e^x-3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^6-\frac{x^2}{3-e^x}-\log^2(x)+2x\log(x)$$

input
```
Int[(18*x - 6*x^2 + 54*x^6 + E^x*(-12*x + 2*x^2 - x^3 - 36*x^6) + E^(2*x)*
(2*x + 6*x^6) + (-18 + E^x*(12 - 12*x) + 18*x + E^(2*x)*(-2 + 2*x))*Log[x]
)/(9*x - 6*E^x*x + E^(2*x)*x),x]
```

output
```
-(x^2/(3 - E^x)) + x^6 + 2*x*Log[x] - Log[x]^2
```

3.1027.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1027.4 Maple [A] (verified)

Time = 0.63 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.20

method	result	size
risch	$-\ln(x)^2+2x\ln(x)+\frac{x^2(\mathrm{e}^x x^4-3x^4+1)}{\mathrm{e}^x-3}$	36
parallelrisch	$-\frac{-x^6\mathrm{e}^x+3x^6+\mathrm{e}^x\ln(x)^2-2x\,\mathrm{e}^x\ln(x)-3\ln(x)^2+6x\ln(x)-x^2}{\mathrm{e}^x-3}$	52

input
```
int((((-2+2*x)*exp(x)^2+(-12*x+12)*exp(x)+18*x-18)*ln(x)+(6*x^6+2*x)*exp(x
)^2+(-36*x^6-x^3+2*x^2-12*x)*exp(x)+54*x^6-6*x^2+18*x)/(x*exp(x)^2-6*exp(x
)*x+9*x),x,method=_RETURNVERBOSE)
```

output
```
-ln(x)^2+2*x*ln(x)+x^2*(exp(x)*x^4-3*x^4+1)/(exp(x)-3)
```

3.1027.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.47

$$\int \frac{18x-6x^2+54x^6+e^x(-12x+2x^2-x^3-36x^6)+e^{2x}(2x+6x^6)+(-18+e^x(12-12x)+18x+e^{2x}(-}{9x-6e^x x+e^{2x}x}$$
$$=\frac{x^6e^x-3\,x^6-(e^x-3)\log(x)^2+x^2+2\,(xe^x-3\,x)\log(x)}{e^x-3}$$

input
```
integrate((((-2+2*x)*exp(x)^2+(-12*x+12)*exp(x)+18*x-18)*log(x)+(6*x^6+2*x
)*exp(x)^2+(-36*x^6-x^3+2*x^2-12*x)*exp(x)+54*x^6-6*x^2+18*x)/(x*exp(x)^2-
6*exp(x)*x+9*x),x, algorithm=\
```

output
```
(x^6*e^x - 3*x^6 - (e^x - 3)*log(x)^2 + x^2 + 2*(x*e^x - 3*x)*log(x))/(e^x
 - 3)
```

3.1027.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.73

$$\int \frac{18x - 6x^2 + 54x^6 + e^x(-12x + 2x^2 - x^3 - 36x^6) + e^{2x}(2x + 6x^6) + (-18 + e^x(12 - 12x) + 18x + e^{2x}(-}{9x - 6e^x x + e^{2x} x}$$

$$= x^6 + \frac{x^2}{e^x - 3} + 2x\log(x) - \log(x)^2$$

input
```
integrate((((-2+2*x)*exp(x)**2+(-12*x+12)*exp(x)+18*x-18)*ln(x)+(6*x**6+2*
x)*exp(x)**2+(-36*x**6-x**3+2*x**2-12*x)*exp(x)+54*x**6-6*x**2+18*x)/(x*ex
p(x)**2-6*exp(x)*x+9*x),x)
```

output
```
x**6 + x**2/(exp(x) - 3) + 2*x*log(x) - log(x)**2
```

3.1027.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. 2(29) = 58.

Time = 0.22 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.47

$$\int \frac{18x - 6x^2 + 54x^6 + e^x(-12x + 2x^2 - x^3 - 36x^6) + e^{2x}(2x + 6x^6) + (-18 + e^x(12 - 12x) + 18x + e^{2x}(-}{9x - 6e^x x + e^{2x} x}$$

$$= -\frac{3\,x^6 - x^2 - \left(x^6 + 2\,x\log(x) - \log(x)^2 - 2\,x\right)e^x + 6\,x\log(x) - 3\,\log(x)^2 - 6\,x - 6}{e^x - 3} + \frac{2\,(xe^x - 3\,x - 3)}{e^x - 3}$$

input
```
integrate((((-2+2*x)*exp(x)^2+(-12*x+12)*exp(x)+18*x-18)*log(x)+(6*x^6+2*x
)*exp(x)^2+(-36*x^6-x^3+2*x^2-12*x)*exp(x)+54*x^6-6*x^2+18*x)/(x*exp(x)^2-
6*exp(x)*x+9*x),x, algorithm=\
```

output
```
-(3*x^6 - x^2 - (x^6 + 2*x*log(x) - log(x)^2 - 2*x)*e^x + 6*x*log(x) - 3*l
og(x)^2 - 6*x - 6)/(e^x - 3) + 2*(x*e^x - 3*x - 3)/(e^x - 3)
```

3.1027.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.60

$$\int \frac{18x-6x^2+54x^6+e^x(-12x+2x^2-x^3-36x^6)+e^{2x}(2x+6x^6)+(-18+e^x(12-12x)+18x+e^{2x}(-}{9x-6e^xx+e^{2x}x}$$
$$=\frac{x^6e^x-3\,x^6+2\,xe^x\log(x)-e^x\log(x)^2+x^2-6\,x\log(x)+3\,\log(x)^2}{e^x-3}$$

input
```
integrate((((-2+2*x)*exp(x)^2+(-12*x+12)*exp(x)+18*x-18)*log(x)+(6*x^6+2*x
)*exp(x)^2+(-36*x^6-x^3+2*x^2-12*x)*exp(x)+54*x^6-6*x^2+18*x)/(x*exp(x)^2-
6*exp(x)*x+9*x),x, algorithm=\
```

output
```
(x^6*e^x - 3*x^6 + 2*x*e^x*log(x) - e^x*log(x)^2 + x^2 - 6*x*log(x) + 3*lo
g(x)^2)/(e^x - 3)
```

3.1027.9 Mupad [B] (verification not implemented)

Time = 17.71 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.83

$$\int \frac{18x-6x^2+54x^6+e^x(-12x+2x^2-x^3-36x^6)+e^{2x}(2x+6x^6)+(-18+e^x(12-12x)+18x+e^{2x}(-}{9x-6e^xx+e^{2x}x}$$
$$=2\,x\,\ln(x)-\ln(x)^2+\frac{x^2}{e^x-3}+x^6$$

input
```
int((18*x + exp(2*x)*(2*x + 6*x^6) - exp(x)*(12*x - 2*x^2 + x^3 + 36*x^6)
+ log(x)*(18*x - exp(x)*(12*x - 12) + exp(2*x)*(2*x - 2) - 18) - 6*x^2 + 5
4*x^6)/(9*x + x*exp(2*x) - 6*x*exp(x)),x)
```

output
```
2*x*log(x) - log(x)^2 + x^2/(exp(x) - 3) + x^6
```

3.1028 $\int \frac{-10+e^{2x}(-40+80x)+40\log(3)}{1+16e^{4x}+e^{2x}(8-32\log(3))-8\log(3)+16\log^2(3)}\,dx$

3.1028.1 Optimal result

Integrand size = 51, antiderivative size = 26

$$\int \frac{-10+e^{2x}(-40+80x)+40\log(3)}{1+16e^{4x}+e^{2x}(8-32\log(3))-8\log(3)+16\log^2(3)}\,dx = 4+\frac{10x^2}{-x+4x\left(-e^{2x}+\log(3)\right)}$$

output
```
10/(x*(4*ln(3)-4*exp(x)^2)-x)*x^2+4
```

3.1028.2 Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.69

$$\int \frac{-10+e^{2x}(-40+80x)+40\log(3)}{1+16e^{4x}+e^{2x}(8-32\log(3))-8\log(3)+16\log^2(3)}\,dx = -\frac{10x}{1+4e^{2x}-\log(81)}$$

input
```
Integrate[(-10 + E^(2*x)*(-40 + 80*x) + 40*Log[3])/(1 + 16*E^(4*x) + E^(2*
x)*(8 - 32*Log[3]) - 8*Log[3] + 16*Log[3]^2),x]
```

output
```
(-10*x)/(1 + 4*E^(2*x) - Log[81])
```

3.1028.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.99 (sec) , antiderivative size = 210, normalized size of antiderivative = 8.08, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$, Rules used = {7292, 7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}(80x-40)-10+40\log(3)}{16e^{4x}+e^{2x}(8-32\log(3))+1+16\log^2(3)-8\log(3)}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{e^{2x}(80x-40)-10(1-4\log(3))}{(4e^{2x}+1-4\log(3))^2}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{10(8e^{2x}x-4e^{2x}-1+\log(81))}{(4e^{2x}+1-4\log(3))^2}dx$$
$$\Big\downarrow \text{27}$$
$$10\int -\frac{-8e^{2x}x+4e^{2x}-\log(81)+1}{(1+4e^{2x}-4\log(3))^2}dx$$
$$\Big\downarrow \text{25}$$
$$-10\int \frac{-8e^{2x}x+4e^{2x}-\log(81)+1}{(1+4e^{2x}-4\log(3))^2}dx$$
$$\Big\downarrow \text{7293}$$
$$-10\int \left(\frac{2x(1-\log(81))}{(1+4e^{2x}-4\log(3))^2}-\frac{2x-1}{1+4e^{2x}-4\log(3)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-10\left(-\frac{\text{PolyLog}\left(2,-\frac{4e^{2x}}{1-4\log(3)}\right)}{2(1-\log(81))}+\frac{\text{PolyLog}\left(2,-\frac{4e^{2x}}{1-4\log(3)}\right)}{2(1-4\log(3))}+\frac{x^2}{1-\log(81)}-\frac{(1-2x)^2}{4(1-4\log(3))}-\frac{(1-2x)\log\left(\frac{4}{1-4}\right.}{2(1-4\log}\right.$$

input
```
Int[(-10 + E^(2*x)*(-40 + 80*x) + 40*Log[3])/(1 + 16*E^(4*x) + E^(2*x)*(8
- 32*Log[3]) - 8*Log[3] + 16*Log[3]^2),x]
```

output
```
-10*(-1/4*(1 - 2*x)^2/(1 - 4*Log[3]) + x/(1 + 4*E^(2*x) - 4*Log[3]) - x/(1
 - Log[81]) + x^2/(1 - Log[81]) - ((1 - 2*x)*Log[1 + (4*E^(2*x))/(1 - 4*Lo
g[3])])/(2*(1 - 4*Log[3])) - (x*Log[1 + (4*E^(2*x))/(1 - 4*Log[3])])/(1 -
Log[81]) + Log[1 + 4*E^(2*x) - 4*Log[3]]/(2*(1 - Log[81])) + PolyLog[2, (-
4*E^(2*x))/(1 - 4*Log[3])]/(2*(1 - 4*Log[3])) - PolyLog[2, (-4*E^(2*x))/(1
 - 4*Log[3])]/(2*(1 - Log[81])))
```

3.1028.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1028.4 Maple [A] (verified)

Time = 1.38 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.69

method	result
norman	$\frac{10x}{-4\,\mathrm{e}^{2x}+4\ln(3)-1}$
risch	$\frac{10x}{-4\,\mathrm{e}^{2x}+4\ln(3)-1}$
parallelrisch	$\frac{10x}{-4\,\mathrm{e}^{2x}+4\ln(3)-1}$
default	$-\frac{10\ln(\mathrm{e}^{x})}{(-1+4\ln(3))^{2}}-\frac{40\left(-\frac{\ln\left(4\,\mathrm{e}^{2x}-4\ln(3)+1\right)}{8}-\frac{\frac{\ln(3)}{2}-\frac{1}{8}}{4\,\mathrm{e}^{2x}-4\ln(3)+1}\right)}{(-1+4\ln(3))^{2}}+\frac{5}{4\,\mathrm{e}^{2x}-4\ln(3)+1}+40\ln(3)\left(\frac{\ln(\mathrm{e}^{x})}{(-1+4\ln(3))^{2}}+\right.$

input
```
int(((80*x-40)*exp(x)^2+40*ln(3)-10)/(16*exp(x)^4+(-32*ln(3)+8)*exp(x)^2+1
6*ln(3)^2-8*ln(3)+1),x,method=_RETURNVERBOSE)
```

output
```
10*x/(-4*exp(x)^2+4*ln(3)-1)
```

3.1028.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

$$\int \frac{-10+e^{2x}(-40+80x)+40\log(3)}{1+16e^{4x}+e^{2x}(8-32\log(3))-8\log(3)+16\log^2(3)}\,dx=-\frac{10\,x}{4\,e^{(2\,x)}-4\,\log\left(3\right)+1}$$

input
```
integrate(((80*x-40)*exp(x)^2+40*log(3)-10)/(16*exp(x)^4+(-32*log(3)+8)*ex
p(x)^2+16*log(3)^2-8*log(3)+1),x, algorithm=\
```

output
```
-10*x/(4*e^(2*x) - 4*log(3) + 1)
```

3.1028.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

$$\int \frac{-10+e^{2x}(-40+80x)+40\log(3)}{1+16e^{4x}+e^{2x}(8-32\log(3))-8\log(3)+16\log^2(3)}\,dx=-\frac{10x}{4e^{2x}-4\log\left(3\right)+1}$$

input
```
integrate(((80*x-40)*exp(x)**2+40*ln(3)-10)/(16*exp(x)**4+(-32*ln(3)+8)*ex
p(x)**2+16*ln(3)**2-8*ln(3)+1),x)
```

output
```
-10*x/(4*exp(2*x) - 4*log(3) + 1)
```

3.1028.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 224 vs. 2(23) = 46.

Time = 0.28 (sec) , antiderivative size = 224, normalized size of antiderivative = 8.62

$$\int \frac{-10+e^{2x}(-40+80x)+40\log(3)}{1+16e^{4x}+e^{2x}(8-32\log(3))-8\log(3)+16\log^2(3)}\,dx$$
$$=20\left(\frac{2\,x}{16\,\log(3)^2-8\,\log(3)+1}-\frac{\log\left(4\,e^{(2\,x)}-4\,\log(3)+1\right)}{16\,\log(3)^2-8\,\log(3)+1}-\frac{1}{4\,(4\,\log(3)-1)e^{(2\,x)}-16\,\log(3)^2+8\,\mathrm{lo}\right.$$
$$-\frac{40\,xe^{(2\,x)}}{4\,(4\,\log(3)-1)e^{(2\,x)}-16\,\log(3)^2+8\,\log(3)-1}-\frac{10\,x}{16\,\log(3)^2-8\,\log(3)+1}$$
$$+\frac{5\,\log\left(4\,e^{(2\,x)}-4\,\log(3)+1\right)}{16\,\log(3)^2-8\,\log(3)+1}+\frac{5\,\log\left(e^{(2\,x)}-\log(3)+\frac{1}{4}\right)}{4\,\log(3)-1}$$
$$+\frac{5}{4\,(4\,\log(3)-1)e^{(2\,x)}-16\,\log(3)^2+8\,\log(3)-1}+\frac{5}{4\,e^{(2\,x)}-4\,\log(3)+1}$$

input
```
integrate(((80*x-40)*exp(x)^2+40*log(3)-10)/(16*exp(x)^4+(-32*log(3)+8)*ex
p(x)^2+16*log(3)^2-8*log(3)+1),x, algorithm=\
```

output
```
20*(2*x/(16*log(3)^2 - 8*log(3) + 1) - log(4*e^(2*x) - 4*log(3) + 1)/(16*l
og(3)^2 - 8*log(3) + 1) - 1/(4*(4*log(3) - 1)*e^(2*x) - 16*log(3)^2 + 8*lo
g(3) - 1))*log(3) - 40*x*e^(2*x)/(4*(4*log(3) - 1)*e^(2*x) - 16*log(3)^2 +
 8*log(3) - 1) - 10*x/(16*log(3)^2 - 8*log(3) + 1) + 5*log(4*e^(2*x) - 4*l
og(3) + 1)/(16*log(3)^2 - 8*log(3) + 1) + 5*log(e^(2*x) - log(3) + 1/4)/(4
*log(3) - 1) + 5/(4*(4*log(3) - 1)*e^(2*x) - 16*log(3)^2 + 8*log(3) - 1) +
 5/(4*e^(2*x) - 4*log(3) + 1)
```

3.1028.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 139 vs. 2(23) = 46.

Time = 0.27 (sec) , antiderivative size = 139, normalized size of antiderivative = 5.35

$$\int \frac{-10+e^{2x}(-40+80x)+40\log(3)}{1+16e^{4x}+e^{2x}(8-32\log(3))-8\log(3)+16\log^2(3)}\,dx =$$
$$-\frac{5\left(8\,x\log(3)+4\,e^{(2\,x)}\log\left(4\,e^{(2\,x)}-4\,\log(3)+1\right)-4\,\log(3)\log\left(4\,e^{(2\,x)}-4\,\log(3)+1\right)-4\,e^{(2\,x)}\log\left(\right.\right.}{16\,e^{(2\,x)}\,\mathrm{log}}$$

input
```
integrate(((80*x-40)*exp(x)^2+40*log(3)-10)/(16*exp(x)^4+(-32*log(3)+8)*ex
p(x)^2+16*log(3)^2-8*log(3)+1),x, algorithm=\
```

output
```
-5*(8*x*log(3) + 4*e^(2*x)*log(4*e^(2*x) - 4*log(3) + 1) - 4*log(3)*log(4*
e^(2*x) - 4*log(3) + 1) - 4*e^(2*x)*log(-4*e^(2*x) + 4*log(3) - 1) + 4*log
(3)*log(-4*e^(2*x) + 4*log(3) - 1) - 2*x + log(4*e^(2*x) - 4*log(3) + 1) -
 log(-4*e^(2*x) + 4*log(3) - 1))/(16*e^(2*x)*log(3) - 16*log(3)^2 - 4*e^(2
*x) + 8*log(3) - 1)
```

3.1028.9 Mupad [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.65

$$\int \frac{-10+e^{2x}(-40+80x)+40\log(3)}{1+16e^{4x}+e^{2x}(8-32\log(3))-8\log(3)+16\log^2(3)}\,dx=-\frac{10\,x}{4\,\mathrm{e}^{2\,x}-\ln\left(81\right)+1}$$

input
```
int((40*log(3) + exp(2*x)*(80*x - 40) - 10)/(16*exp(4*x) - 8*log(3) - exp(
2*x)*(32*log(3) - 8) + 16*log(3)^2 + 1),x)
```

output
```
-(10*x)/(4*exp(2*x) - log(81) + 1)
```

3.1029 $\int \frac{25+25x+e^{1-x^6}(4+4x-24x^7)-24e^{1-x^6}x^6\log(x)}{4x}\,dx$

3.1029.1 Optimal result

Integrand size = 48, antiderivative size = 20

$$\int \frac{25+25x+e^{1-x^6}(4+4x-24x^7)-24e^{1-x^6}x^6\log(x)}{4x}\,dx = 1+\left(\frac{25}{4}+e^{1-x^6}\right)(x+\log(x))$$

output
```
(25/4+exp(-x^6+1))*(x+ln(x))+1
```

3.1029.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30

$$\int \frac{25+25x+e^{1-x^6}(4+4x-24x^7)-24e^{1-x^6}x^6\log(x)}{4x}\,dx = \frac{1}{4}e^{-x^6}\left(4e+25e^{x^6}\right)(x+\log(x))$$

input
```
Integrate[(25 + 25*x + E^(1 - x^6)*(4 + 4*x - 24*x^7) - 24*E^(1 - x^6)*x^6
*Log[x])/(4*x),x]
```

output
```
((4*E + 25*E^x^6)*(x + Log[x]))/(4*E^x^6)
```

3.1029.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-24e^{1-x^6}x^6\log(x)+e^{1-x^6}(-24x^7+4x+4)+25x+25}{4x}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int \frac{-24e^{1-x^6}\log(x)x^6+25x+4e^{1-x^6}(-6x^7+x+1)+25}{x}dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{4}\int \left(\frac{25(x+1)}{x}-\frac{4e^{1-x^6}(6x^7+6\log(x)x^6-x-1)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(\frac{4e^{1-x^6}(x^7+x^6\log(x))}{x^6}+25x+25\log(x)\right)$$

input
```
Int[(25 + 25*x + E^(1 - x^6)*(4 + 4*x - 24*x^7) - 24*E^(1 - x^6)*x^6*Log[x
])/(4*x),x]
```

output
```
(25*x + 25*Log[x] + (4*E^(1 - x^6)*(x^7 + x^6*Log[x]))/x^6)/4
```

3.1029.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1029.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.50

method	result	size
parallelrisch	$e^{-x^6+1}\ln(x)+\frac{25\ln(x)}{4}+\frac{25x}{4}+e^{-x^6+1}x$	30
risch	$e^{-(-1+x)(1+x)(x^2+x+1)(x^2-x+1)}\ln(x)+\frac{25\ln(x)}{4}+\frac{25x}{4}+e^{-(-1+x)(1+x)(x^2+x+1)(x^2-x+1)}x$	60

input
```
int(1/4*(-24*x^6*exp(-x^6+1)*ln(x)+(-24*x^7+4*x+4)*exp(-x^6+1)+25*x+25)/x,
x,method=_RETURNVERBOSE)
```

output
```
exp(-x^6+1)*ln(x)+25/4*ln(x)+25/4*x+exp(-x^6+1)*x
```

3.1029.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.50

$$\int \frac{25+25x+e^{1-x^6}(4+4x-24x^7)-24e^{1-x^6}x^6\log(x)}{4x}\,dx$$
$$= xe^{(-x^6+1)}+\frac{1}{4}\left(4\,e^{(-x^6+1)}+25\right)\log(x)+\frac{25}{4}\,x$$

input
```
integrate(1/4*(-24*x^6*exp(-x^6+1)*log(x)+(-24*x^7+4*x+4)*exp(-x^6+1)+25*x
+25)/x,x, algorithm=\
```

output
```
x*e^(-x^6 + 1) + 1/4*(4*e^(-x^6 + 1) + 25)*log(x) + 25/4*x
```

3.1029.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{25+25x+e^{1-x^6}(4+4x-24x^7)-24e^{1-x^6}x^6\log(x)}{4x}\,dx$$
$$=\frac{25x}{4}+(x+\log(x))\,e^{1-x^6}+\frac{25\log(x)}{4}$$

input
```
integrate(1/4*(-24*x**6*exp(-x**6+1)*ln(x)+(-24*x**7+4*x+4)*exp(-x**6+1)+2
5*x+25)/x,x)
```

output
```
25*x/4 + (x + log(x))*exp(1 - x**6) + 25*log(x)/4
```

3.1029.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.50

$$\int \frac{25+25x+e^{1-x^6}(4+4x-24x^7)-24e^{1-x^6}x^6\log(x)}{4x}\,dx$$
$$=\frac{x^7e\Gamma\left(\frac{7}{6},x^6\right)}{(x^6)^{\frac{7}{6}}}-\frac{xe\Gamma\left(\frac{1}{6},x^6\right)}{6\,(x^6)^{\frac{1}{6}}}+e^{(-x^6+1)}\log(x)+\frac{25}{4}\,x+\frac{25}{4}\,\log(x)$$

input
```
integrate(1/4*(-24*x^6*exp(-x^6+1)*log(x)+(-24*x^7+4*x+4)*exp(-x^6+1)+25*x
+25)/x,x, algorithm=\
```

output
```
x^7*e*gamma(7/6, x^6)/(x^6)^(7/6) - 1/6*x*e*gamma(1/6, x^6)/(x^6)^(1/6) +
e^(-x^6 + 1)*log(x) + 25/4*x + 25/4*log(x)
```

3.1029.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{25+25x+e^{1-x^6}(4+4x-24x^7)-24e^{1-x^6}x^6\log(x)}{4x}\,dx = xe^{(-x^6+1)}+e^{(-x^6+1)}\log(x)+\frac{25}{4}\,x+\frac{25}{4}\,\log(x)$$

input
```
integrate(1/4*(-24*x^6*exp(-x^6+1)*log(x)+(-24*x^7+4*x+4)*exp(-x^6+1)+25*x
+25)/x,x, algorithm=\
```

output
```
x*e^(-x^6 + 1) + e^(-x^6 + 1)*log(x) + 25/4*x + 25/4*log(x)
```

3.1029.9 Mupad [F(-1)]

Timed out.

$$\int \frac{25+25x+e^{1-x^6}(4+4x-24x^7)-24e^{1-x^6}x^6\log(x)}{4x}\,dx = \int \frac{\frac{25\,x}{4}+\frac{e^{1-x^6}\,(-24\,x^7+4\,x+4)}{4}-6\,x^6\,e^{1-x^6}\,\ln(x)+\frac{25}{4}}{x}\,dx$$

input
```
int(((25*x)/4 + (exp(1 - x^6)*(4*x - 24*x^7 + 4))/4 - 6*x^6*exp(1 - x^6)*l
og(x) + 25/4)/x,x)
```

output
```
int(((25*x)/4 + (exp(1 - x^6)*(4*x - 24*x^7 + 4))/4 - 6*x^6*exp(1 - x^6)*l
og(x) + 25/4)/x, x)
```

3.1030 $\int \frac{1144x^3+168x^4-48x^5-39754x^6-29862x^7-5292x^8+504x^9+144x^{10}}{3087x^6+2646x^7+756}$

3.1030.1 Optimal result

Integrand size = 172, antiderivative size = 24

$$\int \frac{1144x^3+168x^4-48x^5-39754x^6-29862x^7-5292x^8+504x^9+144x^{10}+(168x-24x^2-2288x^3-1}{3087x^6+2646x^7+756x^8+72x^9+(1323x^4+756x^5}$$

$$=\left(7-x-\frac{4}{3\left(7+2x+\frac{\log(x)}{x^2}\right)}\right)^2$$

output
```
(7-4/(6*x+3*ln(x)/x^2+21)-x)^2
```

3.1030.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 49 vs. 2(24) = 48.

Time = 0.08 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.04

$$\int \frac{1144x^3+168x^4-48x^5-39754x^6-29862x^7-5292x^8+504x^9+144x^{10}+(168x-24x^2-2288x^3-1}{3087x^6+2646x^7+756x^8+72x^9+(1323x^4+756x^5}$$

$$=\frac{1}{9}x\left(-126+9x+\frac{16x^3}{(x^2(7+2x)+\log(x))^2}+\frac{24(-7+x)x}{x^2(7+2x)+\log(x)}\right)$$

$\int \frac{1144x^3+168x^4-48x^5-39754x^6-29862x^7-5292x^8+504x^9+144x^{10}+(168x-24x^2-2288x^3-18186x^4-7794x^5+216x^7)\log(x)+(-336x-2574x^2}{3087x^6+2646x^7+756x^8+72x^9+(1323x^4+756x^5+108x^6)\log(x)+(189x^2+54x^3)\log^2(x)+9\log^3(x)}$

input
```
Integrate[(1144*x^3 + 168*x^4 - 48*x^5 - 39754*x^6 - 29862*x^7 - 5292*x^8
+ 504*x^9 + 144*x^10 + (168*x - 24*x^2 - 2288*x^3 - 18186*x^4 - 7794*x^5 +
 216*x^7)*Log[x] + (-336*x - 2574*x^2 - 378*x^3 + 108*x^4)*Log[x]^2 + (-12
6 + 18*x)*Log[x]^3)/(3087*x^6 + 2646*x^7 + 756*x^8 + 72*x^9 + (1323*x^4 +
756*x^5 + 108*x^6)*Log[x] + (189*x^2 + 54*x^3)*Log[x]^2 + 9*Log[x]^3),x]
```

output
```
(x*(-126 + 9*x + (16*x^3)/(x^2*(7 + 2*x) + Log[x])^2 + (24*(-7 + x)*x)/(x^
2*(7 + 2*x) + Log[x])))/9
```

3.1030.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{144x^{10}+504x^9-5292x^8-29862x^7-39754x^6-48x^5+168x^4+1144x^3+\left(108x^4-378x^3-2574x^2-336x\right)}{72x^9+756x^8+2646x^7+3087x^6+\left(54x^3+189x^2\right)\log^2(x)+}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{144x^{10}+504x^9-5292x^8-29862x^7-39754x^6-48x^5+168x^4+1144x^3+\left(108x^4-378x^3-2574x^2-336x\right)}{9\left(2x^3+7x^2+\log(\right.}$$

$$\Big\downarrow \ 27$$

$$\frac{1}{9}\int \frac{2\left(72x^{10}+252x^9-2646x^8-14931x^7-19877x^6-24x^5+84x^4+572x^3-9(7-x)\log^3(x)-3\left(-18x^4+63\right.\right.}{\left(2x^3+7x^2+\log(x)\right)}$$

$$\Big\downarrow \ 27$$

$$\frac{2}{9}\int \frac{72x^{10}+252x^9-2646x^8-14931x^7-19877x^6-24x^5+84x^4+572x^3-9(7-x)\log^3(x)-3\left(-18x^4+63x^3\right.}{\left(2x^3+7x^2+\log(x)\right)^3}$$

$$\Big\downarrow \ 7293$$

$$\frac{2}{9}\int \left(\frac{16\left(-6x^3-14x^2-1\right)x^3}{\left(2x^3+7x^2+\log(x)\right)^3}+\frac{12(3x-14)x}{2x^3+7x^2+\log(x)}-\frac{4\left(18x^4-84x^3-302x^2+3x-21\right)x}{\left(2x^3+7x^2+\log(x)\right)^2}+9(x-7)\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{2}{9}\left(-16\int \frac{x^3}{\left(2x^3+7x^2+\log(x)\right)^3}dx+84\int \frac{x}{\left(2x^3+7x^2+\log(x)\right)^2}dx-12\int \frac{x^2}{\left(2x^3+7x^2+\log(x)\right)^2}dx+1208\int\right.$$

3.1030. $\int \frac{1144x^3+168x^4-48x^5-39754x^6-29862x^7-5292x^8+504x^9+144x^{10}+\left(168x-24x^2-2288x^3-18186x^4-7794x^5+216x^7\right)\log(x)+\left(-336x-2574x^2\right.}{3087x^6+2646x^7+756x^8+72x^9+\left(1323x^4+756x^5+108x^6\right)\log(x)+\left(189x^2+54x^3\right)\log^2(x)+9\log^3(x)}$

input
```
Int[(1144*x^3 + 168*x^4 - 48*x^5 - 39754*x^6 - 29862*x^7 - 5292*x^8 + 504*
x^9 + 144*x^10 + (168*x - 24*x^2 - 2288*x^3 - 18186*x^4 - 7794*x^5 + 216*x
^7)*Log[x] + (-336*x - 2574*x^2 - 378*x^3 + 108*x^4)*Log[x]^2 + (-126 + 18
*x)*Log[x]^3)/(3087*x^6 + 2646*x^7 + 756*x^8 + 72*x^9 + (1323*x^4 + 756*x^
5 + 108*x^6)*Log[x] + (189*x^2 + 54*x^3)*Log[x]^2 + 9*Log[x]^3),x]
```

output
```
$Aborted
```

3.1030.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1030.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. $2(23) = 46$.

Time = 1.49 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.21

method	result	siz
risch	$x^2 - 14x + \frac{8(6x^4-21x^3-145x^2+3x\ln(x)-21\ln(x))x^2}{9(2x^3+7x^2+\ln(x))^2}$	53
default	$x^2 - 14x - \frac{4\left(126x^5+6x^3\ln(x)+437x^4+84x^2\ln(x)+3\ln(x)^2\right)}{9(2x^3+7x^2+\ln(x))^2}$	56
parallelrisch	$\frac{36x^5\ln(x)-126x\ln(x)^2-378x^4\ln(x)+9x^2\ln(x)^2-252x^7+36x^8-3039x^6-6342x^5-1160x^4-1740x^3\ln(x)-168x^2\ln(x)}{36x^6+252x^5+441x^4+36x^3\ln(x)+126x^2\ln(x)+9\ln(x)^2}$	10

input
```
int(((18*x-126)*ln(x)^3+(108*x^4-378*x^3-2574*x^2-336*x)*ln(x)^2+(216*x^7-
7794*x^5-18186*x^4-2288*x^3-24*x^2+168*x)*ln(x)+144*x^10+504*x^9-5292*x^8-
29862*x^7-39754*x^6-48*x^5+168*x^4+1144*x^3)/(9*ln(x)^3+(54*x^3+189*x^2)*l
n(x)^2+(108*x^6+756*x^5+1323*x^4)*ln(x)+72*x^9+756*x^8+2646*x^7+3087*x^6),
x,method=_RETURNVERBOSE)
```

output
```
x^2-14*x+8/9*(6*x^4-21*x^3-145*x^2+3*x*ln(x)-21*ln(x))*x^2/(2*x^3+7*x^2+ln
(x))^2
```

3.1030.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 103 vs. $2(24) = 48$.

Time = 0.25 (sec) , antiderivative size = 103, normalized size of antiderivative = 4.29

$$\int \frac{1144x^3 + 168x^4 - 48x^5 - 39754x^6 - 29862x^7 - 5292x^8 + 504x^9 + 144x^{10} + (168x - 24x^2 - 2288x^3 - 1}{3087x^6 + 2646x^7 + 756x^8 + 72x^9 + (1323x^4 + 756x^5}$$

$$= \frac{36\,x^8 - 252\,x^7 - 3039\,x^6 - 6342\,x^5 - 1160\,x^4 + 9\,(x^2 - 14\,x)\log(x)^2 + 6\,(6\,x^5 - 63\,x^4 - 290\,x^3 - 28\,x^2)}{9\,(4\,x^6 + 28\,x^5 + 49\,x^4 + 2\,(2\,x^3 + 7\,x^2)\log(x) + \log(x)^2)}$$

input
```
integrate(((18*x-126)*log(x)^3+(108*x^4-378*x^3-2574*x^2-336*x)*log(x)^2+(
216*x^7-7794*x^5-18186*x^4-2288*x^3-24*x^2+168*x)*log(x)+144*x^10+504*x^9-
5292*x^8-29862*x^7-39754*x^6-48*x^5+168*x^4+1144*x^3)/(9*log(x)^3+(54*x^3+
189*x^2)*log(x)^2+(108*x^6+756*x^5+1323*x^4)*log(x)+72*x^9+756*x^8+2646*x^
7+3087*x^6),x, algorithm=\
```

output
```
1/9*(36*x^8 - 252*x^7 - 3039*x^6 - 6342*x^5 - 1160*x^4 + 9*(x^2 - 14*x)*lo
g(x)^2 + 6*(6*x^5 - 63*x^4 - 290*x^3 - 28*x^2)*log(x))/(4*x^6 + 28*x^5 + 4
9*x^4 + 2*(2*x^3 + 7*x^2)*log(x) + log(x)^2)
```

3.1030.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. $2(19) = 38$.

Time = 0.13 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.92

$$\int \frac{1144x^3 + 168x^4 - 48x^5 - 39754x^6 - 29862x^7 - 5292x^8 + 504x^9 + 144x^{10} + (168x - 24x^2 - 2288x^3 - 1}{3087x^6 + 2646x^7 + 756x^8 + 72x^9 + (1323x^4 + 756x^5}$$
$$= x^2 - 14x + \frac{48x^6 - 168x^5 - 1160x^4 + (24x^3 - 168x^2)\log(x)}{36x^6 + 252x^5 + 441x^4 + (36x^3 + 126x^2)\log(x) + 9\log(x)^2}$$

input
```
integrate(((18*x-126)*ln(x)**3+(108*x**4-378*x**3-2574*x**2-336*x)*ln(x)**
2+(216*x**7-7794*x**5-18186*x**4-2288*x**3-24*x**2+168*x)*ln(x)+144*x**10+
504*x**9-5292*x**8-29862*x**7-39754*x**6-48*x**5+168*x**4+1144*x**3)/(9*ln
(x)**3+(54*x**3+189*x**2)*ln(x)**2+(108*x**6+756*x**5+1323*x**4)*ln(x)+72*
x**9+756*x**8+2646*x**7+3087*x**6),x)
```

output
```
x**2 - 14*x + (48*x**6 - 168*x**5 - 1160*x**4 + (24*x**3 - 168*x**2)*log(x
))/(36*x**6 + 252*x**5 + 441*x**4 + (36*x**3 + 126*x**2)*log(x) + 9*log(x)
**2)
```

3.1030.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 103 vs. $2(24) = 48$.

Time = 0.24 (sec) , antiderivative size = 103, normalized size of antiderivative = 4.29

$$\int \frac{1144x^3 + 168x^4 - 48x^5 - 39754x^6 - 29862x^7 - 5292x^8 + 504x^9 + 144x^{10} + (168x - 24x^2 - 2288x^3 - 1}{3087x^6 + 2646x^7 + 756x^8 + 72x^9 + (1323x^4 + 756x^5}$$
$$= \frac{36\,x^8 - 252\,x^7 - 3039\,x^6 - 6342\,x^5 - 1160\,x^4 + 9\,(x^2 - 14\,x)\log(x)^2 + 6\,(6\,x^5 - 63\,x^4 - 290\,x^3 - 28\,x^2)}{9\,(4\,x^6 + 28\,x^5 + 49\,x^4 + 2\,(2\,x^3 + 7\,x^2)\log(x) + \log(x)^2)}$$

input
```
integrate(((18*x-126)*log(x)^3+(108*x^4-378*x^3-2574*x^2-336*x)*log(x)^2+(
216*x^7-7794*x^5-18186*x^4-2288*x^3-24*x^2+168*x)*log(x)+144*x^10+504*x^9-
5292*x^8-29862*x^7-39754*x^6-48*x^5+168*x^4+1144*x^3)/(9*log(x)^3+(54*x^3+
189*x^2)*log(x)^2+(108*x^6+756*x^5+1323*x^4)*log(x)+72*x^9+756*x^8+2646*x^
7+3087*x^6),x, algorithm=\
```

output
```
1/9*(36*x^8 - 252*x^7 - 3039*x^6 - 6342*x^5 - 1160*x^4 + 9*(x^2 - 14*x)*lo
g(x)^2 + 6*(6*x^5 - 63*x^4 - 290*x^3 - 28*x^2)*log(x))/(4*x^6 + 28*x^5 + 4
9*x^4 + 2*(2*x^3 + 7*x^2)*log(x) + log(x)^2)
```

3.1030.

$$\int \frac{1144x^3+168x^4-48x^5-39754x^6-29862x^7-5292x^8+504x^9+144x^{10}+(168x-24x^2-2288x^3-18186x^4-7794x^5+216x^7)\log(x)+(-336x-2574x^2}{3087x^6+2646x^7+756x^8+72x^9+(1323x^4+756x^5+108x^6)\log(x)+(189x^2+54x^3)\log^2(x)+9\log^3(x)}$$

3.1030.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. $2(24) = 48$.

Time = 0.29 (sec) , antiderivative size = 75, normalized size of antiderivative = 3.12

$$\int \frac{1144x^3 + 168x^4 - 48x^5 - 39754x^6 - 29862x^7 - 5292x^8 + 504x^9 + 144x^{10} + (168x - 24x^2 - 2288x^3 - 1}{3087x^6 + 2646x^7 + 756x^8 + 72x^9 + (1323x^4 + 756x^5}$$
$$= x^2 - 14\,x + \frac{8\,(6\,x^6 - 21\,x^5 - 145\,x^4 + 3\,x^3\log(x) - 21\,x^2\log(x))}{9\,(4\,x^6 + 28\,x^5 + 49\,x^4 + 4\,x^3\log(x) + 14\,x^2\log(x) + \log(x)^2)}$$

input
```
integrate(((18*x-126)*log(x)^3+(108*x^4-378*x^3-2574*x^2-336*x)*log(x)^2+(
216*x^7-7794*x^5-18186*x^4-2288*x^3-24*x^2+168*x)*log(x)+144*x^10+504*x^9-
5292*x^8-29862*x^7-39754*x^6-48*x^5+168*x^4+1144*x^3)/(9*log(x)^3+(54*x^3+
189*x^2)*log(x)^2+(108*x^6+756*x^5+1323*x^4)*log(x)+72*x^9+756*x^8+2646*x^
7+3087*x^6),x, algorithm=\
```

output
```
x^2 - 14*x + 8/9*(6*x^6 - 21*x^5 - 145*x^4 + 3*x^3*log(x) - 21*x^2*log(x))
/(4*x^6 + 28*x^5 + 49*x^4 + 4*x^3*log(x) + 14*x^2*log(x) + log(x)^2)
```

3.1030.9 Mupad [F(-1)]

Timed out.

$$\int \frac{1144x^3 + 168x^4 - 48x^5 - 39754x^6 - 29862x^7 - 5292x^8 + 504x^9 + 144x^{10} + (168x - 24x^2 - 2288x^3 - 1}{3087x^6 + 2646x^7 + 756x^8 + 72x^9 + (1323x^4 + 756x^5}$$
$$= \int -\frac{\ln(x)^2\,(-108\,x^4 + 378\,x^3 + 2574\,x^2 + 336\,x) + \ln(x)\,(-216\,x^7 + 7794\,x^5 + 18186\,x^4 + 2288\,x^3 + 24\,x^2}{9\ln(x)^3 + \ln(x)\,(108\,x^6 + 756\,x^5 + 1323\,x^4) + \ln}$$

input
```
int(-(log(x)^2*(336*x + 2574*x^2 + 378*x^3 - 108*x^4) + log(x)*(24*x^2 - 1
68*x + 2288*x^3 + 18186*x^4 + 7794*x^5 - 216*x^7) - 1144*x^3 - 168*x^4 + 4
8*x^5 + 39754*x^6 + 29862*x^7 + 5292*x^8 - 504*x^9 - 144*x^10 - log(x)^3*(
18*x - 126))/(9*log(x)^3 + log(x)*(1323*x^4 + 756*x^5 + 108*x^6) + log(x)^
2*(189*x^2 + 54*x^3) + 3087*x^6 + 2646*x^7 + 756*x^8 + 72*x^9),x)
```

3.1030. $\int \frac{1144x^3+168x^4-48x^5-39754x^6-29862x^7-5292x^8+504x^9+144x^{10}+(168x-24x^2-2288x^3-18186x^4-7794x^5+216x^7)\log(x)+(-336x-2574x^2}{3087x^6+2646x^7+756x^8+72x^9+(1323x^4+756x^5+108x^6)\log(x)+(189x^2+54x^3)\log^2(x)+9\log^3(x)}$

output
```
int(-(log(x)^2*(336*x + 2574*x^2 + 378*x^3 - 108*x^4) + log(x)*(24*x^2 - 1
68*x + 2288*x^3 + 18186*x^4 + 7794*x^5 - 216*x^7) - 1144*x^3 - 168*x^4 + 4
8*x^5 + 39754*x^6 + 29862*x^7 + 5292*x^8 - 504*x^9 - 144*x^10 - log(x)^3*(
18*x - 126))/(9*log(x)^3 + log(x)*(1323*x^4 + 756*x^5 + 108*x^6) + log(x)^
2*(189*x^2 + 54*x^3) + 3087*x^6 + 2646*x^7 + 756*x^8 + 72*x^9), x)
```

3.1030.

$$\int \frac{1144x^3+168x^4-48x^5-39754x^6-29862x^7-5292x^8+504x^9+144x^{10}+(168x-24x^2-2288x^3-18186x^4-7794x^5+216x^7)\log(x)+(-336x-2574x^2}{3087x^6+2646x^7+756x^8+72x^9+(1323x^4+756x^5+108x^6)\log(x)+(189x^2+54x^3)\log^2(x)+9\log^3(x)}$$

3.1031 $\int \frac{15200-12683x+3758x^2-471x^3+21x^4+(-190+73x-7x^2)\log\left(\frac{-38+7x}{-5+x}\right)}{190-73x+7x^2}\,dx$

3.1031.1 Optimal result

Integrand size = 56, antiderivative size = 29

$$\int \frac{15200-12683x+3758x^2-471x^3+21x^4+(-190+73x-7x^2)\log\left(\frac{-38+7x}{-5+x}\right)}{190-73x+7x^2}\,dx = -4-x+(9-x)^2x-x\log\left(7+\frac{3}{5-x}\right)$$

output
```
(9-x)^2*x-x-4-ln(7+3/(5-x))*x
```

3.1031.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.83

$$\int \frac{15200-12683x+3758x^2-471x^3+21x^4+(-190+73x-7x^2)\log\left(\frac{-38+7x}{-5+x}\right)}{190-73x+7x^2}\,dx = 80x-18x^2+x^3-\frac{38}{7}\log(38-7x)+\frac{38}{7}\log(5-x)-\frac{1}{7}(-38+7x)\log\left(\frac{-38+7x}{-5+x}\right)$$

input
```
Integrate[(15200 - 12683*x + 3758*x^2 - 471*x^3 + 21*x^4 + (-190 + 73*x -
7*x^2)*Log[(-38 + 7*x)/(-5 + x)])/(190 - 73*x + 7*x^2),x]
```

output
```
80*x - 18*x^2 + x^3 - (38*Log[38 - 7*x])/7 + (38*Log[5 - x])/7 - ((-38 + 7
*x)*Log[(-38 + 7*x)/(-5 + x)])/7
```

3.1031.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.90, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.036, Rules used = {7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{21x^4-471x^3+3758x^2+\left(-7x^2+73x-190\right)\log\left(\frac{7x-38}{x-5}\right)-12683x+15200}{7x^2-73x+190}dx$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{3758x^2}{7x^2-73x+190}-\frac{12683x}{7x^2-73x+190}+\frac{15200}{7x^2-73x+190}+\frac{21x^4}{7x^2-73x+190}-\frac{471x^3}{7x^2-73x+190}-\log\left(\frac{7x-}{x-}\right.\right.$$

$$\Big\downarrow \text{2009}$$

$$x^3-18x^2+80x-\frac{38}{7}\log(38-7x)+\frac{1}{7}(38-7x)\log\left(\frac{38-7x}{5-x}\right)+\frac{38}{7}\log(5-x)$$

input
```
Int[(15200 - 12683*x + 3758*x^2 - 471*x^3 + 21*x^4 + (-190 + 73*x - 7*x^2)
*Log[(-38 + 7*x)/(-5 + x)])/(190 - 73*x + 7*x^2),x]
```

output
```
80*x - 18*x^2 + x^3 - (38*Log[38 - 7*x])/7 + ((38 - 7*x)*Log[(38 - 7*x)/(5
 - x)])/7 + (38*Log[5 - x])/7
```

3.1031.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.1031.4 Maple [A] (verified)

Time = 2.14 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

method	result
norman	$x^3+80x-18x^2-\ln\left(\frac{7x-38}{-5+x}\right)x$
risch	$x^3+80x-18x^2-\ln\left(\frac{7x-38}{-5+x}\right)x$
parallelrisch	$x^3+\frac{36186}{7}-18x^2-\ln\left(\frac{7x-38}{-5+x}\right)x+80x$
derivativedivides	$-\frac{\ln\left(7-\frac{3}{-5+x}\right)\left(7-\frac{3}{-5+x}\right)(-5+x)}{7}+(-5+x)^3-3(-5+x)^2+125-25x-\frac{38\ln\left(7-\frac{3}{-5+x}\right)}{7}$
default	$-\frac{\ln\left(7-\frac{3}{-5+x}\right)\left(7-\frac{3}{-5+x}\right)(-5+x)}{7}+(-5+x)^3-3(-5+x)^2+125-25x-\frac{38\ln\left(7-\frac{3}{-5+x}\right)}{7}$
parts	$x^3-18x^2+80x+5\ln(-5+x)-\frac{38\ln(7x-38)}{7}-\frac{3\ln\left(-\frac{3}{-5+x}\right)}{7}-\frac{\ln\left(7-\frac{3}{-5+x}\right)\left(7-\frac{3}{-5+x}\right)(-5+x)}{7}$

input
```
int(((-7*x^2+73*x-190)*ln((7*x-38)/(-5+x))+21*x^4-471*x^3+3758*x^2-12683*x
+15200)/(7*x^2-73*x+190),x,method=_RETURNVERBOSE)
```

output
```
x^3+80*x-18*x^2-ln((7*x-38)/(-5+x))*x
```

3.1031.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{15200-12683x+3758x^2-471x^3+21x^4+(-190+73x-7x^2)\log\left(\frac{-38+7x}{-5+x}\right)}{190-73x+7x^2}\,dx$$
$$= x^3-18\,x^2-x\log\left(\frac{7\,x-38}{x-5}\right)+80\,x$$

input
```
integrate(((-7*x^2+73*x-190)*log((7*x-38)/(-5+x))+21*x^4-471*x^3+3758*x^2-
12683*x+15200)/(7*x^2-73*x+190),x, algorithm=\
```

output
```
x^3 - 18*x^2 - x*log((7*x - 38)/(x - 5)) + 80*x
```

3.1031.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

$$\int \frac{15200-12683x+3758x^2-471x^3+21x^4+(-190+73x-7x^2)\log\left(\frac{-38+7x}{-5+x}\right)}{190-73x+7x^2}\,dx$$
$$= x^3-18x^2-x\log\left(\frac{7x-38}{x-5}\right)+80x$$

input
```
integrate(((-7*x**2+73*x-190)*ln((7*x-38)/(-5+x))+21*x**4-471*x**3+3758*x*
*2-12683*x+15200)/(7*x**2-73*x+190),x)
```

output
```
x**3 - 18*x**2 - x*log((7*x - 38)/(x - 5)) + 80*x
```

3.1031.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 115 vs. 2(25) = 50.

Time = 0.24 (sec) , antiderivative size = 115, normalized size of antiderivative = 3.97

$$\int \frac{15200-12683x+3758x^2-471x^3+21x^4+(-190+73x-7x^2)\log\left(\frac{-38+7x}{-5+x}\right)}{190-73x+7x^2}\,dx$$
$$= x^3-18\,x^2-\frac{1}{21}\,(21\,x+1330\,\log(x-5)-114)\log(7\,x-38)$$
$$+\frac{190}{3}\,\log(7\,x-38)^2+(x-5)\log(x-5)-\frac{190}{3}\,\log(7\,x-38)\log(x-5)$$
$$+\frac{190}{3}\,\log(x-5)^2-\frac{190}{3}\,(\log(7\,x-38)-\log(x-5))\log\left(\frac{7\,x}{x-5}-\frac{38}{x-5}\right)$$
$$+80\,x-\frac{38}{7}\,\log(7\,x-38)+5\,\log(x-5)$$

input
```
integrate(((-7*x^2+73*x-190)*log((7*x-38)/(-5+x))+21*x^4-471*x^3+3758*x^2-
12683*x+15200)/(7*x^2-73*x+190),x, algorithm=\
```

output
```
x^3 - 18*x^2 - 1/21*(21*x + 1330*log(x - 5) - 114)*log(7*x - 38) + 190/3*l
og(7*x - 38)^2 + (x - 5)*log(x - 5) - 190/3*log(7*x - 38)*log(x - 5) + 190
/3*log(x - 5)^2 - 190/3*(log(7*x - 38) - log(x - 5))*log(7*x/(x - 5) - 38/
(x - 5)) + 80*x - 38/7*log(7*x - 38) + 5*log(x - 5)
```

3.1031.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 117 vs. 2(25) = 50.

Time = 0.28 (sec) , antiderivative size = 117, normalized size of antiderivative = 4.03

$$\int \frac{15200-12683x+3758x^2-471x^3+21x^4+(-190+73x-7x^2)\log\left(\frac{-38+7x}{-5+x}\right)}{190-73x+7x^2}\,dx$$
$$=\frac{3\left(\frac{25\,(7\,x-38)^2}{(x-5)^2}-\frac{359\,(7\,x-38)}{x-5}+1279\right)}{\frac{(7\,x-38)^3}{(x-5)^3}-\frac{21\,(7\,x-38)^2}{(x-5)^2}+\frac{147\,(7\,x-38)}{x-5}-343}+\frac{3\,\log\left(\frac{7\,x-38}{x-5}\right)}{\frac{7\,x-38}{x-5}-7}-5\,\log\left(\frac{7\,x-38}{x-5}\right)$$

input
```
integrate((((-7*x^2+73*x-190)*log((7*x-38)/(-5+x))+21*x^4-471*x^3+3758*x^2-
12683*x+15200)/(7*x^2-73*x+190),x, algorithm=\
```

output
```
3*(25*(7*x - 38)^2/(x - 5)^2 - 359*(7*x - 38)/(x - 5) + 1279)/((7*x - 38)^
3/(x - 5)^3 - 21*(7*x - 38)^2/(x - 5)^2 + 147*(7*x - 38)/(x - 5) - 343) +
3*log((7*x - 38)/(x - 5))/((7*x - 38)/(x - 5) - 7) - 5*log((7*x - 38)/(x -
 5))
```

3.1031.9 Mupad [B] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{15200-12683x+3758x^2-471x^3+21x^4+(-190+73x-7x^2)\log\left(\frac{-38+7x}{-5+x}\right)}{190-73x+7x^2}\,dx$$
$$=80\,x-x\,\ln\left(\frac{7\,x-38}{x-5}\right)-18\,x^2+x^3$$

input
```
int(-(12683*x + log((7*x - 38)/(x - 5))*(7*x^2 - 73*x + 190) - 3758*x^2 +
471*x^3 - 21*x^4 - 15200)/(7*x^2 - 73*x + 190),x)
```

output
```
80*x - x*log((7*x - 38)/(x - 5)) - 18*x^2 + x^3
```

3.1032 $\int \frac{-4x^2+(-5+4x)\log(3)}{-5x^2+5x\log(3)}\,dx$

3.1032.1 Optimal result

Integrand size = 28, antiderivative size = 21

$$\int \frac{-4x^2+(-5+4x)\log(3)}{-5x^2+5x\log(3)}\,dx=\frac{1}{5}(-5+4x)+\log\left(\frac{x-\log(3)}{x}\right)$$

output
```
ln((-ln(3)+x)/x)+4/5*x-1
```

3.1032.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-4x^2+(-5+4x)\log(3)}{-5x^2+5x\log(3)}\,dx=\frac{4x}{5}-\log(x)+\log(x-\log(3))$$

input
```
Integrate[(-4*x^2 + (-5 + 4*x)*Log[3])/(-5*x^2 + 5*x*Log[3]),x]
```

output
```
(4*x)/5 - Log[x] + Log[x - Log[3]]
```

3.1032.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 44 vs. 2(21) = 42.

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.10, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2026, 2082, 1195, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(4x-5)\log(3)-4x^2}{5x\log(3)-5x^2}\,dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(4x-5)\log(3)-4x^2}{x(\log(243)-5x)}dx$$

$$\Big\downarrow \text{2082}$$

$$\int \frac{-4x^2+4x\log(3)-5\log(3)}{x(\log(243)-5x)}dx$$

$$\Big\downarrow \text{1195}$$

$$\int \left(-\frac{1}{x}+\frac{4\log^2(243)+5\log(3)(25-4\log(243))}{5\log(243)(5x-\log(243))}+\frac{4}{5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{4x}{5}+\frac{\left(4\log^2(243)+5\log(3)(25-4\log(243))\right)\log(5x-\log(243))}{25\log(243)}-\log(x)$$

input
```
Int[(-4*x^2 + (-5 + 4*x)*Log[3])/(-5*x^2 + 5*x*Log[3]),x]
```

output
```
(4*x)/5 - Log[x] + ((5*Log[3]*(25 - 4*Log[243]) + 4*Log[243]^2)*Log[5*x -
Log[243]])/(25*Log[243])
```

3.1032.3.1 Defintions of rubi rules used

rule 1195
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_.) + (b_.)*(x
_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(f +
 g*x)^n*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x
] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2082
```
Int[(u_)^(m_.)*(v_)^(n_.)*(w_)^(p_.), x_Symbol] :> Int[ExpandToSum[u, x]^m*
ExpandToSum[v, x]^n*ExpandToSum[w, x]^p, x] /; FreeQ[{m, n, p}, x] && Linea
rQ[{u, v}, x] && QuadraticQ[w, x] &&  !(LinearMatchQ[{u, v}, x] && Quadrati
cMatchQ[w, x])
```

3.1032.4 Maple [A] (verified)

Time = 1.43 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

method	result	size
default	$\frac{4x}{5}-\ln\left(x\right)+\ln\left(-\ln\left(3\right)+x\right)$	16
norman	$\frac{4x}{5}-\ln\left(x\right)+\ln\left(\ln\left(3\right)-x\right)$	16
risch	$\frac{4x}{5}-\ln\left(x\right)+\ln\left(-\ln\left(3\right)+x\right)$	16
parallelrisch	$\frac{4x}{5}-\ln\left(x\right)+\ln\left(-\ln\left(3\right)+x\right)$	16
meijerg	$-\ln\left(x\right)+\ln\left(\ln\left(3\right)\right)-i\pi+\ln\left(1-\frac{x}{\ln(3)}\right)-\frac{4\ln(3)\ln\left(1-\frac{x}{\ln(3)}\right)}{5}-\frac{4\ln(3)\left(-\frac{x}{\ln(3)}-\ln\left(1-\frac{x}{\ln(3)}\right)\right)}{5}$	61

input
```
int(((-5+4*x)*ln(3)-4*x^2)/(5*x*ln(3)-5*x^2),x,method=_RETURNVERBOSE)
```

output
```
4/5*x-ln(x)+ln(-ln(3)+x)
```

3.1032.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \frac{-4x^2 + (-5 + 4x) \log(3)}{-5x^2 + 5x \log(3)} \, dx = \frac{4}{5} \, x + \log \left(x - \log \left(3\right)\right) - \log \left(x\right)$$

input
```
integrate(((-5+4*x)*log(3)-4*x^2)/(5*x*log(3)-5*x^2),x, algorithm=\
```

output
```
4/5*x + log(x - log(3)) - log(x)
```

3.1032.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.67

$$\int \frac{-4x^2 + (-5 + 4x) \log(3)}{-5x^2 + 5x \log(3)} \, dx = \frac{4x}{5} - \log \left(x\right) + \log \left(x - \log \left(3\right)\right)$$

input
```
integrate(((-5+4*x)*ln(3)-4*x**2)/(5*x*ln(3)-5*x**2),x)
```

output
```
4*x/5 - log(x) + log(x - log(3))
```

3.1032.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.71

$$\int \frac{-4x^2 + (-5 + 4x) \log(3)}{-5x^2 + 5x \log(3)} \, dx = \frac{4}{5} \, x + \log \left(x - \log \left(3\right)\right) - \log \left(x\right)$$

input
```
integrate(((-5+4*x)*log(3)-4*x^2)/(5*x*log(3)-5*x^2),x, algorithm=\
```

output
```
4/5*x + log(x - log(3)) - log(x)
```

3.1032.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-4x^2+(-5+4x)\log(3)}{-5x^2+5x\log(3)}\,dx = \frac{4}{5}\,x + \log\left(|x-\log\left(3\right)|\right) - \log\left(|x|\right)$$

input
```
integrate(((-5+4*x)*log(3)-4*x^2)/(5*x*log(3)-5*x^2),x, algorithm=\
```

output
```
4/5*x + log(abs(x - log(3))) - log(abs(x))
```

3.1032.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

$$\int \frac{-4x^2+(-5+4x)\log(3)}{-5x^2+5x\log(3)}\,dx = \frac{4\,x}{5} - 2\,\mathrm{atanh}\left(\frac{2\,x}{\ln\left(3\right)} - 1\right)$$

input
```
int((log(3)*(4*x - 5) - 4*x^2)/(5*x*log(3) - 5*x^2),x)
```

output
```
(4*x)/5 - 2*atanh((2*x)/log(3) - 1)
```

3.1033 $\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^x x+4e^{2x}x-32e^x x\log(\ldots)}{e^{2x}x-8e^x x\log(6x)+16x\log^2(6x)}$

3.1033.1 Optimal result

Integrand size = 109, antiderivative size = 18

$$\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^x x+4e^{2x}x-32e^x x\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^x x\log(6x)+16x\log^2(6x)}\,dx = 8e^{x+\frac{1}{e^x-4\log(6x)}}$$

output
```
4*exp(1/(exp(x)-4*ln(6*x))+ln(2)+x)
```

3.1033.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^x x+4e^{2x}x-32e^x x\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^x x\log(6x)+16x\log^2(6x)}\,dx = 8e^{x+\frac{1}{e^x-4\log(6x)}}$$

input
```
Integrate[(E^((-1 + E^x*(-x - Log[2]) + (4*x + 4*Log[2])*Log[6*x])/(-E^x +
 4*Log[6*x]))*(16 - 4*E^x*x + 4*E^(2*x)*x - 32*E^x*x*Log[6*x] + 64*x*Log[6
*x]^2))/(E^(2*x)*x - 8*E^x*x*Log[6*x] + 16*x*Log[6*x]^2),x]
```

output
```
8*E^(x + (E^x - 4*Log[6*x])^(-1))
```

3.1033. $\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^x x+4e^{2x}x-32e^x x\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^x x\log(6x)+16x\log^2(6x)}\,dx$

3.1033.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-4e^x x+4e^{2x}x+64x\log^2(6x)-32e^x x\log(6x)+16\right)\exp\left(\frac{e^x(-x-\log(2))+(4x+4\log(2))\log(6x)-1}{4\log(6x)-e^x}\right)}{e^{2x}x+16x\log^2(6x)-8e^x x\log(6x)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{4\left(-e^x x+e^{2x}x+16x\log^2(6x)-8e^x x\log(6x)+4\right)\exp\left(\frac{e^x(-x-\log(2))+(4x+4\log(2))\log(6x)-1}{4\log(6x)-e^x}\right)}{x\left(e^x-4\log(6x)\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$4\int \frac{6^{-\frac{4x+4\log(2)}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{-\frac{4x+4\log(2)}{e^x-4\log(6x)}-1}\left(16x\log^2(6x)-8e^x x\log(6x)-e^x x+e^{2x}x+4\right)}{\left(e^x-4\log(6x)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$4\int \left(-\frac{2^{2-\frac{4x+4\log(2)}{e^x-4\log(6x)}}3^{-\frac{4x+4\log(2)}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}(x\log(6x)-1)x^{-\frac{4x+4\log(2)}{e^x-4\log(6x)}-1}}{\left(e^x-4\log(6x)\right)^2}+6^{-\frac{4x+4\log(2)}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{-\frac{4x+4\log}{e^x-4\log}}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^x x\log(6x)-e^x x+e^{2x}x+4\right)}{\left(e^x-4\log(6x)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$4\int \left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-2^{2-\frac{4}{e^x}}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^x x\log(6x)-e^x x+e^{2x}x+4\right)}{\left(e^x-4\log(6x)\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$4\int\left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$4\int\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{\left(e^x-4\log(6x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$4\int\left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$4\int\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{\left(e^x-4\log(6x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$4\int\left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$4\int\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{\left(e^x-4\log(6x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$4\int\left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$4\int\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{\left(e^x-4\log(6x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

3.1033. $$\int\frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^xx+4e^{2x}x-32e^xx\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^xx\log(6x)+16x\log^2(6x)}dx$$

$$4\int \left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$\big\downarrow$ 7239

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{(e^x-4\log(6x))^2}dx$$

$\big\downarrow$ 7293

$$4\int \left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$\big\downarrow$ 7239

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{(e^x-4\log(6x))^2}dx$$

$\big\downarrow$ 7293

$$4\int \left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$\big\downarrow$ 7239

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{(e^x-4\log(6x))^2}dx$$

$\big\downarrow$ 7293

$$4\int \left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$\big\downarrow$ 7239

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{(e^x-4\log(6x))^2}dx$$

$\big\downarrow$ 7293

3.1033. $$\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^xx+4e^{2x}x-32e^xx\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^xx\log(6x)+16x\log^2(6x)}\,dx$$

$$4\int \left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{(e^x-4\log(6x))^2}dx$$

$$\Big\downarrow \text{7293}$$

$$4\int \left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{(e^x-4\log(6x))^2}dx$$

$$\Big\downarrow \text{7293}$$

$$4\int \left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{(e^x-4\log(6x))^2}dx$$

$$\Big\downarrow \text{7293}$$

$$4\int \left(6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}-\frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}+1}}{e^x-4\log(6x)}-\frac{2^{2-\frac{4}{e^x}}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$4\int \frac{6^{-\frac{4(x+\log(2))}{e^x-4\log(6x)}}e^{\frac{e^x(x+\log(2))+1}{e^x-4\log(6x)}}x^{\frac{-4x-e^x+4\log(x)+\log(81)}{e^x-4\log(6x)}}\left(16x\log^2(6x)-8e^xx\log(6x)-e^xx+e^{2x}x+4\right)}{(e^x-4\log(6x))^2}dx$$

3.1033. $\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^xx+4e^{2x}x-32e^xx\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^xx\log(6x)+16x\log^2(6x)}\,dx$

input
```
Int[(E^((-1 + E^x*(-x - Log[2]) + (4*x + 4*Log[2])*Log[6*x])/(-E^x + 4*Log
[6*x]))*(16 - 4*E^x*x + 4*E^(2*x)*x - 32*E^x*x*Log[6*x] + 64*x*Log[6*x]^2)
)/(E^(2*x)*x - 8*E^x*x*Log[6*x] + 16*x*Log[6*x]^2),x]
```

output
```
$Aborted
```

3.1033.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1033.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. $2(18) = 36$.

Time = 1.70 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.33

method	result	size
risch	$4\,{\mathrm e}^{\frac{{\mathrm e}^{x} \ln \left(2\right)+{\mathrm e}^{x} x -4 \ln \left(6 x \right) \ln \left(2\right)-4 x \ln \left(6 x \right)+1}{{\mathrm e}^{x}-4 \ln \left(6 x \right)}}$	42
parallelrisch	$4\,{\mathrm e}^{\frac{-\left(4 \ln \left(2\right)+4 x \right) \ln \left(6 x \right)-\left(-x -\ln \left(2\right)\right) {\mathrm e}^{x}+1}{{\mathrm e}^{x}-4 \ln \left(6 x \right)}}$	44

input
```
int((64*x*ln(6*x)^2-32*x*exp(x)*ln(6*x)+4*x*exp(x)^2-4*exp(x)*x+16)*exp(((
4*ln(2)+4*x)*ln(6*x)+(-x-ln(2))*exp(x)-1)/(4*ln(6*x)-exp(x)))/(16*x*ln(6*x
)^2-8*x*exp(x)*ln(6*x)+x*exp(x)^2),x,method=_RETURNVERBOSE)
```

output
```
4*exp((exp(x)*ln(2)+exp(x)*x-4*ln(6*x)*ln(2)-4*x*ln(6*x)+1)/(exp(x)-4*ln(6
*x)))
```

3.1033.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.89

$$\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^xx+4e^{2x}x-32e^xx\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^xx\log(6x)+16x\log^2(6x)}\,dx$$
$$=4\,e^{\left(\frac{(x+\log(2))e^x-4\,(x+\log(2))\log(6\,x)+1}{e^x-4\,\log(6\,x)}\right)}$$

input
```
integrate((64*x*log(6*x)^2-32*x*exp(x)*log(6*x)+4*x*exp(x)^2-4*exp(x)*x+16
)*exp(((4*log(2)+4*x)*log(6*x)+(-x-log(2))*exp(x)-1)/(4*log(6*x)-exp(x)))/
(16*x*log(6*x)^2-8*x*exp(x)*log(6*x)+x*exp(x)^2),x, algorithm=\
```

output
```
4*e^(((x + log(2))*e^x - 4*(x + log(2))*log(6*x) + 1)/(e^x - 4*log(6*x)))
```

3.1033.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. 2(15) = 30.

Time = 0.52 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.06

$$\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^xx+4e^{2x}x-32e^xx\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^xx\log(6x)+16x\log^2(6x)}\,dx$$
$$=4e^{\frac{(-x-\log(2))e^x+(4x+4\log(2))\log(6x)-1}{-e^x+4\log(6x)}}$$

input
```
integrate((64*x*ln(6*x)**2-32*x*exp(x)*ln(6*x)+4*x*exp(x)**2-4*exp(x)*x+16
)*exp(((4*ln(2)+4*x)*ln(6*x)+(-x-ln(2))*exp(x)-1)/(4*ln(6*x)-exp(x)))/(16*
x*ln(6*x)**2-8*x*exp(x)*ln(6*x)+x*exp(x)**2),x)
```

output
```
4*exp(((-x - log(2))*exp(x) + (4*x + 4*log(2))*log(6*x) - 1)/(-exp(x) + 4*
log(6*x)))
```

3.1033.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 199 vs. $2(18) = 36$.

Time = 0.63 (sec) , antiderivative size = 199, normalized size of antiderivative = 11.06

$$\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^xx+4e^{2x}x-32e^xx\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^xx\log(6x)+16x\log^2(6x)}\,dx$$
$$=4\,e^{\left(\frac{xe^x}{e^x-4\,\log(3)-4\,\log(2)-4\,\log(x)}-\frac{4\,x\log(3)}{e^x-4\,\log(3)-4\,\log(2)-4\,\log(x)}-\frac{4\,x\log(2)}{e^x-4\,\log(3)-4\,\log(2)-4\,\log(x)}+\frac{e^x\,\log(2)}{e^x-4\,\log(3)-4\,\log(2)-4\,\log(x)}-\frac{4\,\log(3)\log}{e^x-4\,\log(3)-4\,\log}\right.}$$

input
```
integrate((64*x*log(6*x)^2-32*x*exp(x)*log(6*x)+4*x*exp(x)^2-4*exp(x)*x+16
)*exp(((4*log(2)+4*x)*log(6*x)+(-x-log(2))*exp(x)-1)/(4*log(6*x)-exp(x)))/
(16*x*log(6*x)^2-8*x*exp(x)*log(6*x)+x*exp(x)^2),x, algorithm=\
```

output
```
4*e^(x*e^x/(e^x - 4*log(3) - 4*log(2) - 4*log(x)) - 4*x*log(3)/(e^x - 4*lo
g(3) - 4*log(2) - 4*log(x)) - 4*x*log(2)/(e^x - 4*log(3) - 4*log(2) - 4*lo
g(x)) + e^x*log(2)/(e^x - 4*log(3) - 4*log(2) - 4*log(x)) - 4*log(3)*log(2
)/(e^x - 4*log(3) - 4*log(2) - 4*log(x)) - 4*log(2)^2/(e^x - 4*log(3) - 4*
log(2) - 4*log(x)) - 4*x*log(x)/(e^x - 4*log(3) - 4*log(2) - 4*log(x)) - 4
*log(2)*log(x)/(e^x - 4*log(3) - 4*log(2) - 4*log(x)) + 1/(e^x - 4*log(3)
- 4*log(2) - 4*log(x)))
```

3.1033.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(18) = 36$.

Time = 1.14 (sec) , antiderivative size = 56, normalized size of antiderivative = 3.11

$$\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^xx+4e^{2x}x-32e^xx\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^xx\log(6x)+16x\log^2(6x)}\,dx$$
$$=4\,e^{\left(\frac{xe^x-4\,x\log(2)+e^x\,\log(2)-4\,\log(2)^2-4\,x\log(3\,x)-4\,\log(2)\log(3\,x)+1}{e^x-4\,\log(2)-4\,\log(3\,x)}\right)}$$

input
```
integrate((64*x*log(6*x)^2-32*x*exp(x)*log(6*x)+4*x*exp(x)^2-4*exp(x)*x+16
)*exp(((4*log(2)+4*x)*log(6*x)+(-x-log(2))*exp(x)-1)/(4*log(6*x)-exp(x)))/
(16*x*log(6*x)^2-8*x*exp(x)*log(6*x)+x*exp(x)^2),x, algorithm=\
```

output
```
4*e^((x*e^x - 4*x*log(2) + e^x*log(2) - 4*log(2)^2 - 4*x*log(3*x) - 4*log(
2)*log(3*x) + 1)/(e^x - 4*log(2) - 4*log(3*x)))
```

3.1033.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{\frac{-1+e^x(-x-\log(2))+(4x+4\log(2))\log(6x)}{-e^x+4\log(6x)}}\left(16-4e^xx+4e^{2x}x-32e^xx\log(6x)+64x\log^2(6x)\right)}{e^{2x}x-8e^xx\log(6x)+16x\log^2(6x)}\,dx$$
$$=\int \frac{\mathrm{e}^{-\frac{\mathrm{e}^x\,(x+\ln(2))-\ln(6\,x)\,(4\,x+4\,\ln(2))+1}{4\,\ln(6\,x)-\mathrm{e}^x}}\,\left(64\,x\ln\left(6\,x\right)^2-32\,x\,\mathrm{e}^x\,\ln\left(6\,x\right)+4\,x\,\mathrm{e}^{2\,x}-4\,x\,\mathrm{e}^x+16\right)}{16\,x\ln\left(6\,x\right)^2-8\,x\,\mathrm{e}^x\,\ln\left(6\,x\right)+x\,\mathrm{e}^{2\,x}}\,dx$$

input
```
int((exp(-(exp(x)*(x + log(2)) - log(6*x)*(4*x + 4*log(2)) + 1)/(4*log(6*x
) - exp(x)))*(4*x*exp(2*x) + 64*x*log(6*x)^2 - 4*x*exp(x) - 32*x*log(6*x)*
exp(x) + 16))/(x*exp(2*x) + 16*x*log(6*x)^2 - 8*x*log(6*x)*exp(x)),x)
```

output
```
int((exp(-(exp(x)*(x + log(2)) - log(6*x)*(4*x + 4*log(2)) + 1)/(4*log(6*x
) - exp(x)))*(4*x*exp(2*x) + 64*x*log(6*x)^2 - 4*x*exp(x) - 32*x*log(6*x)*
exp(x) + 16))/(x*exp(2*x) + 16*x*log(6*x)^2 - 8*x*log(6*x)*exp(x)), x)
```

3.1034 $\int \frac{e^{9e^{\frac{2(-4x-x^2)}{6-3x+3\log(x)}}+\frac{2(-4x-x^2)}{6-3x+3\log(x)}}(-24-18x+6x^2+(-24-12x)\log(x))}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}$

3.1034.1 Optimal result

Integrand size = 92, antiderivative size = 23

$$\int \frac{e^{9e^{\frac{2(-4x-x^2)}{6-3x+3\log(x)}}+\frac{2(-4x-x^2)}{6-3x+3\log(x)}}(-24-18x+6x^2+(-24-12x)\log(x))}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}\,dx=e^{9e^{\frac{2x(4+x)}{3(-2+x-\log(x))}}}$$

output
```
exp(9*exp((4+x)*x/(3*x-3*ln(x)-6))^2)
```

3.1034.2 Mathematica [A] (verified)

Time = 5.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{e^{9e^{\frac{2(-4x-x^2)}{6-3x+3\log(x)}}+\frac{2(-4x-x^2)}{6-3x+3\log(x)}}(-24-18x+6x^2+(-24-12x)\log(x))}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}\,dx=e^{9e^{-\frac{2x(4+x)}{3(2-x+\log(x))}}}$$

input
```
Integrate[(E^(9*E^((2*(-4*x - x^2))/(6 - 3*x + 3*Log[x])) + (2*(-4*x - x^2
))/(6 - 3*x + 3*Log[x]))*(-24 - 18*x + 6*x^2 + (-24 - 12*x)*Log[x]))/(4 -
4*x + x^2 + (4 - 2*x)*Log[x] + Log[x]^2),x]
```

output
```
E^(9/E^((2*x*(4 + x))/(3*(2 - x + Log[x]))))
```

3.1034.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(6x^2-18x+(-12x-24)\log(x)-24\right)\exp\left(\frac{2(-x^2-4x)}{-3x+3\log(x)+6}+9e^{\frac{2(-x^2-4x)}{-3x+3\log(x)+6}}\right)}{x^2-4x+\log^2(x)+(4-2x)\log(x)+4}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{6\left(x^2-3x-2x\log(x)-4\log(x)-4\right)\exp\left(\frac{2(-x^2-4x)}{-3x+3\log(x)+6}+9e^{\frac{2(-x^2-4x)}{-3x+3\log(x)+6}}\right)}{(-x+\log(x)+2)^2}dx$$

$$\Big\downarrow \text{27}$$

$$6\int -\frac{\exp\left(9e^{-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}}-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}\right)\left(-x^2+2\log(x)x+3x+4\log(x)+4\right)}{(-x+\log(x)+2)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-6\int \frac{\exp\left(9e^{-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}}-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}\right)\left(-x^2+2\log(x)x+3x+4\log(x)+4\right)}{(-x+\log(x)+2)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-6\int \left(\frac{\exp\left(9e^{-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}}-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}\right)(x^2+3x-4)}{(x-\log(x)-2)^2}-\frac{2\exp\left(9e^{-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}}-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}\right)(x+}{x-\log(x)-2}\right.$$

$$\Big\downarrow \text{2009}$$

$$-6\left(-4\int \frac{\exp\left(9e^{-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}}-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}\right)}{(x-\log(x)-2)^2}dx+3\int \frac{\exp\left(9e^{-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}}-\frac{2(x^2+4x)}{3(-x+\log(x)+2)}\right)x}{(x-\log(x)-2)^2}dx+\int \right.$$

3.1034. $\int \frac{e^{9e^{\frac{2(-4x-x^2)}{6-3x+3\log(x)}}+\frac{2(-4x-x^2)}{6-3x+3\log(x)}}\left(-24-18x+6x^2+(-24-12x)\log(x)\right)}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}dx$

input
```
Int[(E^(9*E^((2*(-4*x - x^2))/(6 - 3*x + 3*Log[x])) + (2*(-4*x - x^2))/(6
- 3*x + 3*Log[x]))*(-24 - 18*x + 6*x^2 + (-24 - 12*x)*Log[x]))/(4 - 4*x +
x^2 + (4 - 2*x)*Log[x] + Log[x]^2),x]
```

output
```
$Aborted
```

3.1034.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1034.4 Maple [A] (verified)

Time = 28.12 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

method	result	size
risch	$e^{9\,e^{-\frac{2(4+x)x}{3(2+\ln(x)-x)}}}$	20

input
```
int(((-12*x-24)*ln(x)+6*x^2-18*x-24)*exp((-x^2-4*x)/(3*ln(x)-3*x+6))^2*exp
(9*exp((-x^2-4*x)/(3*ln(x)-3*x+6))^2)/(ln(x)^2+(4-2*x)*ln(x)+x^2-4*x+4),x,
method=_RETURNVERBOSE)
```

output
```
exp(9*exp(-2/3*(4+x)*x/(2+ln(x)-x)))
```

3.1034. $\int \frac{e^{9e^{\frac{2(-4x-x^2)}{6-3x+3\log(x)}}+\frac{2(-4x-x^2)}{6-3x+3\log(x)}}(-24-18x+6x^2+(-24-12x)\log(x))}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}\,dx$

3.1034.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(19) = 38$.

Time = 0.27 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.96

$$\int \frac{e^{9e^{\frac{2\left(-4x-x^2\right)}{6-3x+3\log(x)}}+\frac{2\left(-4x-x^2\right)}{6-3x+3\log(x)}}\left(-24-18x+6x^2+(-24-12x)\log(x)\right)}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}\,dx$$
$$= e^{\left(\frac{2\,x^2+27\,(x-\log(x)-2)e^{\left(\frac{2\,\left(x^2+4\,x\right)}{3\,(x-\log(x)-2)}\right)}+8\,x}{3\,(x-\log(x)-2)}-\frac{2\,\left(x^2+4\,x\right)}{3\,(x-\log(x)-2)}\right)}$$

input
```
integrate(((-12*x-24)*log(x)+6*x^2-18*x-24)*exp((-x^2-4*x)/(3*log(x)-3*x+6
))^2*exp(9*exp((-x^2-4*x)/(3*log(x)-3*x+6))^2)/(log(x)^2+(4-2*x)*log(x)+x^
2-4*x+4),x, algorithm=\
```

output
```
e^(1/3*(2*x^2 + 27*(x - log(x) - 2)*e^(2/3*(x^2 + 4*x)/(x - log(x) - 2)) +
 8*x)/(x - log(x) - 2) - 2/3*(x^2 + 4*x)/(x - log(x) - 2))
```

3.1034.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{e^{9e^{\frac{2\left(-4x-x^2\right)}{6-3x+3\log(x)}}+\frac{2\left(-4x-x^2\right)}{6-3x+3\log(x)}}\left(-24-18x+6x^2+(-24-12x)\log(x)\right)}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}\,dx$$
$$= \text{Exception raised: TypeError}$$

input
```
integrate(((-12*x-24)*ln(x)+6*x**2-18*x-24)*exp((-x**2-4*x)/(3*ln(x)-3*x+6
))**2*exp(9*exp((-x**2-4*x)/(3*ln(x)-3*x+6))**2)/(ln(x)**2+(4-2*x)*ln(x)+x
**2-4*x+4),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.1034.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(19) = 38$.

Time = 0.55 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.22

$$\int \frac{e^{9e^{\frac{2(-4x-x^2)}{6-3x+3\log(x)}}+\frac{2(-4x-x^2)}{6-3x+3\log(x)}}(-24-18x+6x^2+(-24-12x)\log(x))}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}\,dx = e^{\left(9\,x^{\frac{2}{3}}e^{\left(\frac{2}{3}\,x+\frac{2\,\log(x)^2}{3\,(x-\log(x)-2)}+\frac{16\,\log(x)}{3\,(x-\log(x)-2)}+\frac{8}{x-\log(x)-2}+4\right)}\right)}$$

input
```
integrate((((-12*x-24)*log(x)+6*x^2-18*x-24)*exp((-x^2-4*x)/(3*log(x)-3*x+6
))^2*exp(9*exp((-x^2-4*x)/(3*log(x)-3*x+6))^2)/(log(x)^2+(4-2*x)*log(x)+x^
2-4*x+4),x, algorithm=\
```

output
```
e^(9*x^(2/3)*e^(2/3*x + 2/3*log(x)^2/(x - log(x) - 2) + 16/3*log(x)/(x - l
og(x) - 2) + 8/(x - log(x) - 2) + 4))
```

3.1034.8 Giac [F]

$$\int \frac{e^{9e^{\frac{2(-4x-x^2)}{6-3x+3\log(x)}}+\frac{2(-4x-x^2)}{6-3x+3\log(x)}}(-24-18x+6x^2+(-24-12x)\log(x))}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}\,dx = \int \frac{6\,(x^2-2\,(x+2)\log\left(x\right)-3\,x-4)e^{\left(\frac{2\,(x^2+4\,x)}{3\,(x-\log(x)-2)}+9\,e^{\left(\frac{2\,(x^2+4\,x)}{3\,(x-\log(x)-2)}\right)}\right)}}{x^2-2\,(x-2)\log\left(x\right)+\log\left(x\right)^2-4\,x+4}\,dx$$

input
```
integrate((((-12*x-24)*log(x)+6*x^2-18*x-24)*exp((-x^2-4*x)/(3*log(x)-3*x+6
))^2*exp(9*exp((-x^2-4*x)/(3*log(x)-3*x+6))^2)/(log(x)^2+(4-2*x)*log(x)+x^
2-4*x+4),x, algorithm=\
```

output
```
integrate(6*(x^2 - 2*(x + 2)*log(x) - 3*x - 4)*e^(2/3*(x^2 + 4*x)/(x - log
(x) - 2) + 9*e^(2/3*(x^2 + 4*x)/(x - log(x) - 2)))/(x^2 - 2*(x - 2)*log(x)
 + log(x)^2 - 4*x + 4), x)
```

3.1034.9 Mupad [B] (verification not implemented)

Time = 17.71 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{e^{9e^{\frac{2\left(-4x-x^2\right)}{6-3x+3\log(x)}}+\frac{2\left(-4x-x^2\right)}{6-3x+3\log(x)}}\left(-24-18x+6x^2+(-24-12x)\log(x)\right)}{4-4x+x^2+(4-2x)\log(x)+\log^2(x)}\,dx = \mathrm{e}^{9\,\mathrm{e}^{-\frac{2\,x^2+8\,x}{3\,\ln(x)-3\,x+6}}}$$

input
```
int(-(exp(9*exp(-(2*(4*x + x^2))/(3*log(x) - 3*x + 6)))*exp(-(2*(4*x + x^2
))/(3*log(x) - 3*x + 6))*(18*x + log(x)*(12*x + 24) - 6*x^2 + 24))/(log(x)
^2 - 4*x - log(x)*(2*x - 4) + x^2 + 4),x)
```

output
```
exp(9*exp(-(8*x + 2*x^2)/(3*log(x) - 3*x + 6)))
```

3.1035 $\int e^{-2x+e^{-2x}(x^2+2e^xx^3+e^{2x}x^4+(-10x^2-2x^3+e^x(-10x^3-2x^4)) \log$

3.1035.1 Optimal result

Integrand size = 227, antiderivative size = 27

$$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x\left(6x^2-2x^3\right)+\left(-20x-4x^2+e^x\left(-20x^2-4x^3\right)\right)\log(x)+\left(-20x+14x^2+4x^3+e^x\left(-30x^2+2x^3+2x^4\right)\right)\log^2(x)+\left(100x+40x^2+4x^3\right)\log^3(x)+\left(50x-20x^2-16x^3-2x^4\right)\log^4(x)\right)\,dx=e^{x^2\left(x-e^{-x}\left(-1+(5+x)\log^2(x)\right)\right)^2}$$

output
```
exp(x^2*(x-((5+x)*ln(x)^2-1)/exp(x))^2)
```

3.1035.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x\left(6x^2-2x^3\right)+\left(-20x-4x^2+e^x\left(-20x^2-4x^3\right)\right)\log(x)+\left(-20x+14x^2+4x^3+e^x\left(-30x^2+2x^3+2x^4\right)\right)\log^2(x)+\left(100x+40x^2+4x^3\right)\log^3(x)+\left(50x-20x^2-16x^3-2x^4\right)\log^4(x)\right)\,dx=e^{e^{-2x}x^2\left(1+e^xx-(5+x)\log^2(x)\right)^2}$$

input
```
Integrate[E^(-2*x + (x^2 + 2*E^x*x^3 + E^(2*x)*x^4 + (-10*x^2 - 2*x^3 + E^
x*(-10*x^3 - 2*x^4))*Log[x]^2 + (25*x^2 + 10*x^3 + x^4)*Log[x]^4)/E^(2*x))
*(2*x - 2*x^2 + 4*E^(2*x)*x^3 + E^x*(6*x^2 - 2*x^3) + (-20*x - 4*x^2 + E^x
*(-20*x^2 - 4*x^3))*Log[x] + (-20*x + 14*x^2 + 4*x^3 + E^x*(-30*x^2 + 2*x^
3 + 2*x^4))*Log[x]^2 + (100*x + 40*x^2 + 4*x^3)*Log[x]^3 + (50*x - 20*x^2
- 16*x^3 - 2*x^4)*Log[x]^4),x]
```

output
```
E^((x^2*(1 + E^x*x - (5 + x)*Log[x]^2)^2)/E^(2*x))
```

3.1035.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(4e^{2x}x^3-2x^2+e^x\left(6x^2-2x^3\right)+\left(4x^3+40x^2+100x\right)\log^3(x)+\left(-4x^2+e^x\left(-4x^3-20x^2\right)-20x\right)\log(x)+\left(\right.$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-2x\left(x^3+8x^2+10x-25\right)\log^4(x)\exp\left(e^{-2x}\left(e^{2x}x^4+2e^x x^3+x^2+\left(x^4+10x^3+25x^2\right)\log^4(x)+\left(-2x^3-10\right.\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$\int 2x\left(e^x\left(2e^x-1\right)x^2-\left(\left(x^3+8x^2+10x-25\right)\log^4(x)\right)+\left(e^x x^3+\left(e^x+2\right)x^2+\left(7-15e^x\right)x-10\right)\log^2(x)+\left(3e^{\right.}\right.$$

$$\Big\downarrow \text{27}$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x-e^{2x}\left(2-x^3\right)\right)\right)x\left(\left(-x^3-8x^2-10x\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x-e^{2x}\left(2-x^3\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow 7239$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$$\Big\downarrow 7293$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow 7239$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$$\Big\downarrow 7293$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow 7239$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$$\Big\downarrow 7293$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow 7239$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$$\Big\downarrow 7293$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow 7239$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^x x+1\right)\log^2(x)+2e^x x^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

3.1035.

$$\int e^{-2x+e^{-2x}\left(x^2+2e^x x^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x(6x^2-\right.$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow \text{7239}$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$$\Big\downarrow \text{7239}$$

3.1035.

$$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x(6x^2-\right.$$

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$\big\downarrow$ 7293

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$\big\downarrow$ 7239

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$\big\downarrow$ 7293

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

$\big\downarrow$ 7239

$$2\int \exp\left(e^{-2x}x\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)\right)x\left(-\left(\left(x^3+8x^2+10\right.\right.\right.$$

$\big\downarrow$ 7293

$$2\int \left(2\exp\left(e^{-2x}\left(x(x+5)^2\log^4(x)-2x(x+5)\left(e^xx+1\right)\log^2(x)+2e^xx^2+x+e^{2x}\left(x^3-2\right)\right)x+2x\right)x^3+\exp\left(e\right.$$

input
```
Int[E^(-2*x + (x^2 + 2*E^x*x^3 + E^(2*x)*x^4 + (-10*x^2 - 2*x^3 + E^x*(-10
*x^3 - 2*x^4))*Log[x]^2 + (25*x^2 + 10*x^3 + x^4)*Log[x]^4)/E^(2*x))*(2*x
- 2*x^2 + 4*E^(2*x)*x^3 + E^x*(6*x^2 - 2*x^3) + (-20*x - 4*x^2 + E^x*(-20*
x^2 - 4*x^3))*Log[x] + (-20*x + 14*x^2 + 4*x^3 + E^x*(-30*x^2 + 2*x^3 + 2*
x^4))*Log[x]^2 + (100*x + 40*x^2 + 4*x^3)*Log[x]^3 + (50*x - 20*x^2 - 16*x
^3 - 2*x^4)*Log[x]^4),x]
```

output
```
$Aborted
```

3.1035.

$$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x(6x^2-\right.$$

3.1035.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1035.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. $2(25) = 50$.

Time = 5.09 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.78

method	result	size
parallelrisch	$e^{\left((x^4+10x^3+25x^2)\ln(x)^4+((-2x^4-10x^3)e^x-2x^3-10x^2)\ln(x)^2+e^{2x}x^4+2e^x x^3+x^2\right)e^{-2x}}$	75
risch	$e^{-x^2\left(-x^2\ln(x)^4-10x\ln(x)^4+2x^2e^x\ln(x)^2-25\ln(x)^4+10x\,e^x\ln(x)^2+2x\ln(x)^2-e^{2x}x^2+10\ln(x)^2-2\,e^x x-1\right)e^{-2x}}$	82

input
```
int(((-2*x^4-16*x^3-20*x^2+50*x)*ln(x)^4+(4*x^3+40*x^2+100*x)*ln(x)^3+((2*
x^4+2*x^3-30*x^2)*exp(x)+4*x^3+14*x^2-20*x)*ln(x)^2+((-4*x^3-20*x^2)*exp(x
)-4*x^2-20*x)*ln(x)+4*exp(x)^2*x^3+(-2*x^3+6*x^2)*exp(x)-2*x^2+2*x)*exp(((
x^4+10*x^3+25*x^2)*ln(x)^4+((-2*x^4-10*x^3)*exp(x)-2*x^3-10*x^2)*ln(x)^2+e
xp(x)^2*x^4+2*exp(x)*x^3+x^2)/exp(x)^2)/exp(x)^2,x,method=_RETURNVERBOSE)
```

output
```
exp(((x^4+10*x^3+25*x^2)*ln(x)^4+((-2*x^4-10*x^3)*exp(x)-2*x^3-10*x^2)*ln(
x)^2+exp(x)^2*x^4+2*exp(x)*x^3+x^2)/exp(x)^2)
```

3.1035.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 79 vs. $2(26) = 52$.

Time = 0.26 (sec) , antiderivative size = 79, normalized size of antiderivative = 2.93

$$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x\left(6x^2-2x^3\right)+\left(-20x-4x^2+e^x\left(-20x^2-4x^3\right)\right)\log(x)+\left(-20x+14x^2+4x^3+e^x\left(-30x^2+2x^3+2x^4\right)\right)\log^2(x)+\left(100x+40x^2+4x^3\right)\log^3(x)+\left(50x-20x^2-16x^3-2x^4\right)\log^4(x)\right)dx = e^{\left(\left(\left(x^4+10\,x^3+25\,x^2\right)\log(x)^4+2\,x^3e^x-2\,\left(x^3+5\,x^2+\left(x^4+5\,x^3\right)e^x\right)\log(x)^2+x^2+\left(x^4-2\,x\right)e^{(2\,x)}\right)e^{(-2\,x)}+2\,x\right)}$$

input
```
integrate(((-2*x^4-16*x^3-20*x^2+50*x)*log(x)^4+(4*x^3+40*x^2+100*x)*log(x
)^3+((2*x^4+2*x^3-30*x^2)*exp(x)+4*x^3+14*x^2-20*x)*log(x)^2+((-4*x^3-20*x
^2)*exp(x)-4*x^2-20*x)*log(x)+4*exp(x)^2*x^3+(-2*x^3+6*x^2)*exp(x)-2*x^2+2
*x)*exp(((x^4+10*x^3+25*x^2)*log(x)^4+((-2*x^4-10*x^3)*exp(x)-2*x^3-10*x^2
)*log(x)^2+exp(x)^2*x^4+2*exp(x)*x^3+x^2)/exp(x)^2)/exp(x)^2,x, algorithm=
\
```

output
```
e^(((x^4 + 10*x^3 + 25*x^2)*log(x)^4 + 2*x^3*e^x - 2*(x^3 + 5*x^2 + (x^4 +
 5*x^3)*e^x)*log(x)^2 + x^2 + (x^4 - 2*x)*e^(2*x))*e^(-2*x) + 2*x)
```

3.1035.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. $2(20) = 40$.

Time = 1.00 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.78

$$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x\left(6x^2-2x^3\right)+\left(-20x-4x^2+e^x\left(-20x^2-4x^3\right)\right)\log(x)+\left(-20x+14x^2+4x^3+e^x\left(-30x^2+2x^3+2x^4\right)\right)\log^2(x)+\left(100x+40x^2+4x^3\right)\log^3(x)+\left(50x-20x^2-16x^3-2x^4\right)\log^4(x)\right)dx = e^{\left(x^4e^{2x}+2x^3e^x+x^2+\left(-2x^3-10x^2+\left(-2x^4-10x^3\right)e^x\right)\log{(x)}^2+\left(x^4+10x^3+25x^2\right)\log{(x)}^4\right)e^{-2x}}$$

input
```
integrate(((-2*x**4-16*x**3-20*x**2+50*x)*ln(x)**4+(4*x**3+40*x**2+100*x)*
ln(x)**3+((2*x**4+2*x**3-30*x**2)*exp(x)+4*x**3+14*x**2-20*x)*ln(x)**2+((-
4*x**3-20*x**2)*exp(x)-4*x**2-20*x)*ln(x)+4*exp(x)**2*x**3+(-2*x**3+6*x**2
)*exp(x)-2*x**2+2*x)*exp(((x**4+10*x**3+25*x**2)*ln(x)**4+((-2*x**4-10*x**
3)*exp(x)-2*x**3-10*x**2)*ln(x)**2+exp(x)**2*x**4+2*exp(x)*x**3+x**2)/exp(
x)**2)/exp(x)**2,x)
```

output
```
exp((x**4*exp(2*x) + 2*x**3*exp(x) + x**2 + (-2*x**3 - 10*x**2 + (-2*x**4
- 10*x**3)*exp(x))*log(x)**2 + (x**4 + 10*x**3 + 25*x**2)*log(x)**4)*exp(-
2*x))
```

3.1035.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 112 vs. $2(26) = 52$.

Time = 0.67 (sec) , antiderivative size = 112, normalized size of antiderivative = 4.15

$$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x\left(6x^2-2x^3\right)+\left(-20x-4x^2+e^x\left(-20x^2-4x^3\right)\right)\log(x)+\left(-20x+14x^2+4x^3+e^x\left(-30x^2+2x^3+2x^4\right)\right)\log^2(x)+\left(100x+40x^2+4x^3\right)\log^3(x)+\left(50x-20x^2-16x^3-2x^4\right)\log^4(x)\right)\,dx$$
$$= e^{\left(x^4e^{(-2x)}\log(x)^4+10x^3e^{(-2x)}\log(x)^4-2x^4e^{(-x)}\log(x)^2+25x^2e^{(-2x)}\log(x)^4-10x^3e^{(-x)}\log(x)^2-2x^3e^{(-2x)}\log(x)^2-10x^2e^{(-2x)}\log(x)^2\right.}$$

input
```
integrate(((-2*x^4-16*x^3-20*x^2+50*x)*log(x)^4+(4*x^3+40*x^2+100*x)*log(x
)^3+((2*x^4+2*x^3-30*x^2)*exp(x)+4*x^3+14*x^2-20*x)*log(x)^2+((-4*x^3-20*x
^2)*exp(x)-4*x^2-20*x)*log(x)+4*exp(x)^2*x^3+(-2*x^3+6*x^2)*exp(x)-2*x^2+2
*x)*exp(((x^4+10*x^3+25*x^2)*log(x)^4+((-2*x^4-10*x^3)*exp(x)-2*x^3-10*x^2
)*log(x)^2+exp(x)^2*x^4+2*exp(x)*x^3+x^2)/exp(x)^2)/exp(x)^2,x, algorithm=
\
```

output
```
e^(x^4*e^(-2*x)*log(x)^4 + 10*x^3*e^(-2*x)*log(x)^4 - 2*x^4*e^(-x)*log(x)^
2 + 25*x^2*e^(-2*x)*log(x)^4 - 10*x^3*e^(-x)*log(x)^2 - 2*x^3*e^(-2*x)*log
(x)^2 - 10*x^2*e^(-2*x)*log(x)^2 + x^4 + 2*x^3*e^(-x) + x^2*e^(-2*x))
```

3.1035.

$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x(6x^2-\right.$

3.1035.8 Giac [F]

$$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2\right.$$
$$+4e^{2x}x^3+e^x\left(6x^2-2x^3\right)+\left(-20x-4x^2+e^x\left(-20x^2-4x^3\right)\right)\log(x)$$
$$+\left(-20x+14x^2+4x^3+e^x\left(-30x^2+2x^3+2x^4\right)\right)\log^2(x)$$
$$\left.+\left(100x+40x^2+4x^3\right)\log^3(x)+\left(50x-20x^2-16x^3-2x^4\right)\log^4(x)\right)\,dx$$
$$=\int -2\left(\left(x^4+8\,x^3+10\,x^2-25\,x\right)\log\left(x\right)^4-2\,x^3e^{(2\,x)}-2\left(x^3+10\,x^2+25\,x\right)\log\left(x\right)^3-\left(2\,x^3+7\,x^2+\left(x\right.\right.\right.$$

input
```
integrate(((-2*x^4-16*x^3-20*x^2+50*x)*log(x)^4+(4*x^3+40*x^2+100*x)*log(x
)^3+((2*x^4+2*x^3-30*x^2)*exp(x)+4*x^3+14*x^2-20*x)*log(x)^2+((-4*x^3-20*x
^2)*exp(x)-4*x^2-20*x)*log(x)+4*exp(x)^2*x^3+(-2*x^3+6*x^2)*exp(x)-2*x^2+2
*x)*exp(((x^4+10*x^3+25*x^2)*log(x)^4+((-2*x^4-10*x^3)*exp(x)-2*x^3-10*x^2
)*log(x)^2+exp(x)^2*x^4+2*exp(x)*x^3+x^2)/exp(x)^2)/exp(x)^2,x, algorithm=
\
```

output
```
integrate(-2*((x^4 + 8*x^3 + 10*x^2 - 25*x)*log(x)^4 - 2*x^3*e^(2*x) - 2*(
x^3 + 10*x^2 + 25*x)*log(x)^3 - (2*x^3 + 7*x^2 + (x^4 + x^3 - 15*x^2)*e^x
- 10*x)*log(x)^2 + x^2 + (x^3 - 3*x^2)*e^x + 2*(x^2 + (x^3 + 5*x^2)*e^x +
5*x)*log(x) - x)*e^((x^4*e^(2*x) + (x^4 + 10*x^3 + 25*x^2)*log(x)^4 + 2*x^
3*e^x - 2*(x^3 + 5*x^2 + (x^4 + 5*x^3)*e^x)*log(x)^2 + x^2)*e^(-2*x) - 2*x
), x)
```

3.1035.9 Mupad [B] (verification not implemented)

Time = 17.64 (sec) , antiderivative size = 121, normalized size of antiderivative = 4.48

$$\int e^{-2x+e^{-2x}\left(x^2+2e^xx^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2\right.$$
$$+4e^{2x}x^3+e^x\left(6x^2-2x^3\right)+\left(-20x-4x^2+e^x\left(-20x^2-4x^3\right)\right)\log(x)$$
$$+\left(-20x+14x^2+4x^3+e^x\left(-30x^2+2x^3+2x^4\right)\right)\log^2(x)$$
$$\left.+\left(100x+40x^2+4x^3\right)\log^3(x)+\left(50x-20x^2-16x^3-2x^4\right)\log^4(x)\right)\,dx$$
$$=\mathrm{e}^{-2\,x^3\,\mathrm{e}^{-2\,x}\,\ln(x)^2}\,\mathrm{e}^{-2\,x^4\,\mathrm{e}^{-x}\,\ln(x)^2}\,\mathrm{e}^{x^4\,\mathrm{e}^{-2\,x}\,\ln(x)^4}\,\mathrm{e}^{-10\,x^2\,\mathrm{e}^{-2\,x}\,\ln(x)^2}\,\mathrm{e}^{-10\,x^3\,\mathrm{e}^{-x}\,\ln(x)^2}\,\mathrm{e}^{10\,x^3\,\mathrm{e}^{-2\,x}\,\ln(x)^4}\,\mathrm{e}^{25\,x^2\,\mathrm{e}^{-2\,x}\,\ln(x)^4}\,\mathrm{e}^{x^4}\,\mathrm{e}^{x}$$

input
```
int(exp(-2*x)*exp(exp(-2*x)*(2*x^3*exp(x) + log(x)^4*(25*x^2 + 10*x^3 + x^
4) + x^4*exp(2*x) - log(x)^2*(exp(x)*(10*x^3 + 2*x^4) + 10*x^2 + 2*x^3) +
x^2))*(2*x + exp(x)*(6*x^2 - 2*x^3) + log(x)^3*(100*x + 40*x^2 + 4*x^3) +
4*x^3*exp(2*x) - log(x)^4*(20*x^2 - 50*x + 16*x^3 + 2*x^4) + log(x)^2*(exp
(x)*(2*x^3 - 30*x^2 + 2*x^4) - 20*x + 14*x^2 + 4*x^3) - log(x)*(20*x + exp
(x)*(20*x^2 + 4*x^3) + 4*x^2) - 2*x^2),x)
```

output
```
exp(-2*x^3*exp(-2*x)*log(x)^2)*exp(-2*x^4*exp(-x)*log(x)^2)*exp(x^4*exp(-2
*x)*log(x)^4)*exp(-10*x^2*exp(-2*x)*log(x)^2)*exp(-10*x^3*exp(-x)*log(x)^2
)*exp(10*x^3*exp(-2*x)*log(x)^4)*exp(25*x^2*exp(-2*x)*log(x)^4)*exp(x^4)*e
xp(x^2*exp(-2*x))*exp(2*x^3*exp(-x))
```

3.1035.

$\int e^{-2x+e^{-2x}\left(x^2+2e^x x^3+e^{2x}x^4+\left(-10x^2-2x^3+e^x\left(-10x^3-2x^4\right)\right)\log^2(x)+\left(25x^2+10x^3+x^4\right)\log^4(x)\right)}\left(2x-2x^2+4e^{2x}x^3+e^x(6x^2-\right.$

3.1036 $\int \frac{-12x^2+36x\log^2(2)+(-36-36x)\log^4(2)+(-24x^2+(24x+24x^2)\log^2(2))\log(x)+(-4x^2-4x^3)\log^2(x)}{9x^3\log^4(2)-6x^4\log^2(2)\log(x)+x^5\log^2(x)}\,dx$

3.1036.1 Optimal result

Integrand size = 94, antiderivative size = 29

$$\int \frac{-12x^2+36x\log^2(2)+(-36-36x)\log^4(2)+\left(-24x^2+(24x+24x^2)\log^2(2)\right)\log(x)+(-4x^2-4x^3)\log^2(x)}{9x^3\log^4(2)-6x^4\log^2(2)\log(x)+x^5\log^2(x)}\,dx = 4+\frac{4\left(\frac{1}{2}+x-\frac{x}{\log^2(2)-\frac{1}{3}x\log(x)}\right)}{x^2}$$

output
```
4*(1/2+x-x/(ln(2)^2-1/3*x*ln(x)))/x^2+4
```

3.1036.2 Mathematica [A] (verified)

Time = 0.42 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{-12x^2+36x\log^2(2)+(-36-36x)\log^4(2)+\left(-24x^2+(24x+24x^2)\log^2(2)\right)\log(x)+(-4x^2-4x^3)\log^2(x)}{9x^3\log^4(2)-6x^4\log^2(2)\log(x)+x^5\log^2(x)}\,dx = -\frac{2\left(-1+x\left(-2-\frac{6}{-3\log^2(2)+x\log(x)}\right)\right)}{x^2}$$

input
```
Integrate[(-12*x^2 + 36*x*Log[2]^2 + (-36 - 36*x)*Log[2]^4 + (-24*x^2 + (2
4*x + 24*x^2)*Log[2]^2)*Log[x] + (-4*x^2 - 4*x^3)*Log[x]^2)/(9*x^3*Log[2]^
4 - 6*x^4*Log[2]^2*Log[x] + x^5*Log[x]^2),x]
```

output
```
(-2*(-1 + x*(-2 - 6/(-3*Log[2]^2 + x*Log[x]))))/x^2
```

3.1036.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-12x^2+((24x^2+24x)\log^2(2)-24x^2)\log(x)+(-4x^3-4x^2)\log^2(x)+(-36x-36)\log^4(2)+36x\log^2(2)}{x^5\log^2(x)-6x^4\log^2(2)\log(x)+9x^3\log^4(2)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-12x^2+((24x^2+24x)\log^2(2)-24x^2)\log(x)+(-4x^3-4x^2)\log^2(x)+(-36x-36)\log^4(2)+36x\log^2(2)}{x^3\left(3\log^2(2)-x\log(x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{4(x+1)}{x^3}-\frac{24}{x^2\left(x\log(x)-3\log^2(2)\right)}-\frac{12\left(x+3\log^2(2)\right)}{x^2\left(x\log(x)-3\log^2(2)\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-36\log^2(2)\int \frac{1}{x^2\left(x\log(x)-3\log^2(2)\right)^2}dx-24\int \frac{1}{x^2\left(x\log(x)-3\log^2(2)\right)}dx-12\int \frac{1}{x\left(x\log(x)-3\log^2(2)\right)^2}dx+\frac{2(x+1)^2}{x^2}$$

input
```
Int[(-12*x^2 + 36*x*Log[2]^2 + (-36 - 36*x)*Log[2]^4 + (-24*x^2 + (24*x +
24*x^2)*Log[2]^2)*Log[x] + (-4*x^2 - 4*x^3)*Log[x]^2)/(9*x^3*Log[2]^4 - 6*
x^4*Log[2]^2*Log[x] + x^5*Log[x]^2),x]
```

output
```
$Aborted
```

3.1036.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1036.4 Maple [A] (verified)

Time = 1.90 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

method	result	size
risch	$\frac{4x+2}{x^2}-\frac{12}{x\left(3\ln(2)^2-x\ln(x)\right)}$	31
default	$-\frac{4\left(\left(3-3\ln(2)^2\right)x+x^2\ln(x)-\frac{3\ln(2)^2}{2}+\frac{x\ln(x)}{2}\right)}{x^2\left(3\ln(2)^2-x\ln(x)\right)}$	48
norman	$\frac{\left(12\ln(2)^2-12\right)x-4x^2\ln(x)+6\ln(2)^2-2x\ln(x)}{x^2\left(3\ln(2)^2-x\ln(x)\right)}$	48
parallelrisch	$\frac{12x\ln(2)^2-4x^2\ln(x)+6\ln(2)^2-2x\ln(x)-12x}{x^2\left(3\ln(2)^2-x\ln(x)\right)}$	48

input
```
int(((-4*x^3-4*x^2)*ln(x)^2+((24*x^2+24*x)*ln(2)^2-24*x^2)*ln(x)+(-36*x-36
)*ln(2)^4+36*x*ln(2)^2-12*x^2)/(x^5*ln(x)^2-6*x^4*ln(2)^2*ln(x)+9*x^3*ln(2
)^4),x,method=_RETURNVERBOSE)
```

output
```
2*(1+2*x)/x^2-12/x/(3*ln(2)^2-x*ln(x))
```

3.1036.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.62

$$\int \frac{-12x^2+36x\log^2(2)+(-36-36x)\log^4(2)+\left(-24x^2+(24x+24x^2)\log^2(2)\right)\log(x)+(-4x^2-4x^3)\log^2(x)}{9x^3\log^4(2)-6x^4\log^2(2)\log(x)+x^5\log^2(x)}$$
$$=\frac{2\left(3\left(2x+1\right)\log\left(2\right)^2-\left(2x^2+x\right)\log\left(x\right)-6x\right)}{3x^2\log\left(2\right)^2-x^3\log\left(x\right)}$$

input
```
integrate(((-4*x^3-4*x^2)*log(x)^2+((24*x^2+24*x)*log(2)^2-24*x^2)*log(x)+
(-36*x-36)*log(2)^4+36*x*log(2)^2-12*x^2)/(x^5*log(x)^2-6*x^4*log(2)^2*log
(x)+9*x^3*log(2)^4),x, algorithm=\
```

output
```
2*(3*(2*x + 1)*log(2)^2 - (2*x^2 + x)*log(x) - 6*x)/(3*x^2*log(2)^2 - x^3*
log(x))
```

3.1036.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{-12x^2+36x\log^2(2)+(-36-36x)\log^4(2)+\left(-24x^2+(24x+24x^2)\log^2(2)\right)\log(x)+(-4x^2-4x^3)\log}{9x^3\log^4(2)-6x^4\log^2(2)\log(x)+x^5\log^2(x)}$$
$$= \frac{12}{x^2\log(x)-3x\log(2)^2}-\frac{-4x-2}{x^2}$$

input
```
integrate(((-4*x**3-4*x**2)*ln(x)**2+((24*x**2+24*x)*ln(2)**2-24*x**2)*ln(
x)+(-36*x-36)*ln(2)**4+36*x*ln(2)**2-12*x**2)/(x**5*ln(x)**2-6*x**4*ln(2)*
*2*ln(x)+9*x**3*ln(2)**4),x)
```

output
```
12/(x**2*log(x) - 3*x*log(2)**2) - (-4*x - 2)/x**2
```

3.1036.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.66

$$\int \frac{-12x^2+36x\log^2(2)+(-36-36x)\log^4(2)+\left(-24x^2+(24x+24x^2)\log^2(2)\right)\log(x)+(-4x^2-4x^3)\log}{9x^3\log^4(2)-6x^4\log^2(2)\log(x)+x^5\log^2(x)}$$
$$= \frac{2\left(6\left(\log(2)^2-1\right)x+3\log(2)^2-(2x^2+x)\log(x)\right)}{3x^2\log(2)^2-x^3\log(x)}$$

input
```
integrate(((-4*x^3-4*x^2)*log(x)^2+((24*x^2+24*x)*log(2)^2-24*x^2)*log(x)+
(-36*x-36)*log(2)^4+36*x*log(2)^2-12*x^2)/(x^5*log(x)^2-6*x^4*log(2)^2*log
(x)+9*x^3*log(2)^4),x, algorithm=\
```

output
```
2*(6*(log(2)^2 - 1)*x + 3*log(2)^2 - (2*x^2 + x)*log(x))/(3*x^2*log(2)^2 -
 x^3*log(x))
```

3.1036.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{-12x^2+36x\log^2(2)+(-36-36x)\log^4(2)+\left(-24x^2+\left(24x+24x^2\right)\log^2(2)\right)\log(x)+\left(-4x^2-4x^3\right)\log^2(x)}{9x^3\log^4(2)-6x^4\log^2(2)\log(x)+x^5\log^2(x)}$$
$$=-\frac{12}{3\,x\log\left(2\right)^2-x^2\log\left(x\right)}+\frac{2\left(2\,x+1\right)}{x^2}$$

input
```
integrate((((-4*x^3-4*x^2)*log(x)^2+((24*x^2+24*x)*log(2)^2-24*x^2)*log(x)+
(-36*x-36)*log(2)^4+36*x*log(2)^2-12*x^2)/(x^5*log(x)^2-6*x^4*log(2)^2*log
(x)+9*x^3*log(2)^4),x, algorithm=\
```

output
```
-12/(3*x*log(2)^2 - x^2*log(x)) + 2*(2*x + 1)/x^2
```

3.1036.9 Mupad [B] (verification not implemented)

Time = 18.26 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.55

$$\int \frac{-12x^2+36x\log^2(2)+(-36-36x)\log^4(2)+\left(-24x^2+\left(24x+24x^2\right)\log^2(2)\right)\log(x)+\left(-4x^2-4x^3\right)\log^2(x)}{9x^3\log^4(2)-6x^4\log^2(2)\log(x)+x^5\log^2(x)}$$
$$=\frac{4\,x^2\,\ln\left(x\right)+x\,\left(2\,\ln\left(x\right)-12\ln\left(2\right)^2+12\right)-6\ln\left(2\right)^2}{x^2\,\left(x\,\ln\left(x\right)-3\ln\left(2\right)^2\right)}$$

input
```
int(-(log(2)^4*(36*x + 36) + log(x)^2*(4*x^2 + 4*x^3) - log(x)*(log(2)^2*(
24*x + 24*x^2) - 24*x^2) - 36*x*log(2)^2 + 12*x^2)/(9*x^3*log(2)^4 + x^5*l
og(x)^2 - 6*x^4*log(2)^2*log(x)),x)
```

output
```
(4*x^2*log(x) + x*(2*log(x) - 12*log(2)^2 + 12) - 6*log(2)^2)/(x^2*(x*log(
x) - 3*log(2)^2))
```

3.1037 $\int \frac{9-24x}{e^3(9x^2-24x^3+16x^4)} \, dx$

3.1037.1 Optimal result

Integrand size = 27, antiderivative size = 15

$$\int \frac{9-24x}{e^3 (9x^2-24x^3+16x^4)} \, dx = \frac{3}{e^3 x(-3+4x)}$$

output
```
3/x/exp(3)/(-3+4*x)
```

3.1037.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{9-24x}{e^3 (9x^2-24x^3+16x^4)} \, dx = \frac{3}{e^3 x(-3+4x)}$$

input
```
Integrate[(9 - 24*x)/(E^3*(9*x^2 - 24*x^3 + 16*x^4)),x]
```

output
```
3/(E^3*x*(-3 + 4*x))
```

3.1037.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {27, 27, 1979, 1184, 27, 83}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{9-24x}{e^3 (16x^4-24x^3+9x^2)} \, dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int \frac{3(3-8x)}{16x^4-24x^3+9x^2}dx}{e^3}$$

$$\Big\downarrow \; 27$$

$$\frac{3\int \frac{3-8x}{16x^4-24x^3+9x^2}dx}{e^3}$$

$$\Big\downarrow \; 1979$$

$$\frac{3\int \frac{3-8x}{x^2(16x^2-24x+9)}dx}{e^3}$$

$$\Big\downarrow \; 1184$$

$$\frac{48\int \frac{3-8x}{16(3-4x)^2x^2}dx}{e^3}$$

$$\Big\downarrow \; 27$$

$$\frac{3\int \frac{3-8x}{(3-4x)^2x^2}dx}{e^3}$$

$$\Big\downarrow \; 83$$

$$-\frac{3}{e^3(3-4x)x}$$

input
```
Int[(9 - 24*x)/(E^3*(9*x^2 - 24*x^3 + 16*x^4)),x]
```

output
```
-3/(E^3*(3 - 4*x)*x)
```

3.1037.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 83
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] /; FreeQ[{a, b, c, d, e, f, n, p}, x] && NeQ[n + p + 2, 0] && EqQ[a*d*f
*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)), 0]
```

rule 1184
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_) + (b_.)*(x_
) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/c^p   Int[(d + e*x)^m*(f + g*x
)^n*(b/2 + c*x)^(2*p), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x] && E
qQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 1979
```
Int[((c_.)*(x_)^(j_.) + (b_.)*(x_)^(n_.) + (a_.)*(x_)^(q_.))^(p_.)*((A_) +
(B_.)*(x_)^(r_.)), x_Symbol] :> Int[x^(p*q)*(A + B*x^(n - q))*(a + b*x^(n -
 q) + c*x^(2*(n - q)))^p, x] /; FreeQ[{a, b, c, A, B, n, q}, x] && EqQ[r, n
 - q] && EqQ[j, 2*n - q] && IntegerQ[p] && PosQ[n - q]
```

3.1037.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{3\,\mathrm{e}^{-3}}{x(-3+4x)}$	15
gosper	$\frac{3\,\mathrm{e}^{-3}}{x(-3+4x)}$	17
norman	$\frac{3\,\mathrm{e}^{-3}}{x(-3+4x)}$	17
parallelrisch	$\frac{3\,\mathrm{e}^{-3}}{x(-3+4x)}$	17
default	$3\,\mathrm{e}^{-3}\left(-\frac{1}{3x}+\frac{4}{3(-3+4x)}\right)$	22

input
```
int((-24*x+9)/(16*x^4-24*x^3+9*x^2)/exp(3),x,method=_RETURNVERBOSE)
```

output
```
3/x*exp(-3)/(-3+4*x)
```

3.1037.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{9-24x}{e^3 (9x^2-24x^3+16x^4)} \, dx = \frac{3 \, e^{(-3)}}{4 \, x^2 - 3 \, x}$$

input
```
integrate((-24*x+9)/(16*x^4-24*x^3+9*x^2)/exp(3),x, algorithm=\
```

output
```
3*e^(-3)/(4*x^2 - 3*x)
```

3.1037.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{9-24x}{e^3 (9x^2-24x^3+16x^4)} \, dx = \frac{3}{4x^2e^3 - 3xe^3}$$

input
```
integrate((-24*x+9)/(16*x**4-24*x**3+9*x**2)/exp(3),x)
```

output
```
3/(4*x**2*exp(3) - 3*x*exp(3))
```

3.1037.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{9-24x}{e^3 (9x^2-24x^3+16x^4)} \, dx = \frac{3 \, e^{(-3)}}{4 \, x^2 - 3 \, x}$$

input
```
integrate((-24*x+9)/(16*x^4-24*x^3+9*x^2)/exp(3),x, algorithm=\
```

output
```
3*e^(-3)/(4*x^2 - 3*x)
```

3.1037.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{9-24x}{e^3(9x^2-24x^3+16x^4)}\,dx = \frac{3\,e^{(-3)}}{4\,x^2-3\,x}$$

input
```
integrate((-24*x+9)/(16*x^4-24*x^3+9*x^2)/exp(3),x, algorithm=\
```

output
```
3*e^(-3)/(4*x^2 - 3*x)
```

3.1037.9 Mupad [B] (verification not implemented)

Time = 17.77 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{9-24x}{e^3(9x^2-24x^3+16x^4)}\,dx = \frac{3\,\mathrm{e}^{-3}}{x\,(4\,x-3)}$$

input
```
int(-(exp(-3)*(24*x - 9))/(9*x^2 - 24*x^3 + 16*x^4),x)
```

output
```
(3*exp(-3))/(x*(4*x - 3))
```

3.1038 $\int \left(1-4x^3+4x^2\log(x)+6x^2\log^2(x)-4x\log^3(x)\right.$

3.1038.1 Optimal result

Integrand size = 37, antiderivative size = 18

$$\int \left(1-4x^3+4x^2\log(x)+6x^2\log^2(x)-4x\log^3(x)-2x\log^4(x)\right)\,dx = -8+x-x^2\left(-x+\log^2(x)\right)^2$$

output
```
x-8-x^2*(ln(x)^2-x)^2
```

3.1038.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39

$$\int \left(1-4x^3+4x^2\log(x)+6x^2\log^2(x)-4x\log^3(x)-2x\log^4(x)\right)\,dx = x-x^4+2x^3\log^2(x)-x^2\log^4(x)$$

input
```
Integrate[1 - 4*x^3 + 4*x^2*Log[x] + 6*x^2*Log[x]^2 - 4*x*Log[x]^3 - 2*x*L
og[x]^4,x]
```

output
```
x - x^4 + 2*x^3*Log[x]^2 - x^2*Log[x]^4
```

3.1038.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.027$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-4x^3+6x^2\log^2(x)+4x^2\log(x)-2x\log^4(x)-4x\log^3(x)+1\right)\,dx$$

$$\Big\downarrow \text{2009}$$

$$-x^4+2x^3\log^2(x)-x^2\log^4(x)+x$$

input
```
Int[1 - 4*x^3 + 4*x^2*Log[x] + 6*x^2*Log[x]^2 - 4*x*x*Log[x]^3 - 2*x*x*Log[x]^
4,x]
```

output
```
x - x^4 + 2*x^3*Log[x]^2 - x^2*Log[x]^4
```

3.1038.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1038.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.44

method	result	size
default	$-x^4+x-x^2\ln(x)^4+2x^3\ln(x)^2$	26
norman	$-x^4+x-x^2\ln(x)^4+2x^3\ln(x)^2$	26
risch	$-x^4+x-x^2\ln(x)^4+2x^3\ln(x)^2$	26
parallelrisch	$-x^4+x-x^2\ln(x)^4+2x^3\ln(x)^2$	26
parts	$-x^4+x-x^2\ln(x)^4+2x^3\ln(x)^2$	26

input
```
int(-2*x*x*ln(x)^4-4*x*x*ln(x)^3+6*x^2*ln(x)^2+4*x^2*ln(x)-4*x^3+1,x,method=_R
ETURNVERBOSE)
```

output
```
-x^4+x-x^2*ln(x)^4+2*x^3*ln(x)^2
```

3.1038.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39

$$\int \left(1-4x^3+4x^2\log(x)+6x^2\log^2(x)-4x\log^3(x)-2x\log^4(x)\right)\,dx$$
$$=-x^2\log\left(x\right)^4+2\,x^3\log\left(x\right)^2-x^4+x$$

input
```
integrate(-2*x*log(x)^4-4*x*log(x)^3+6*x^2*log(x)^2+4*x^2*log(x)-4*x^3+1,x
, algorithm=\
```

output
```
-x^2*log(x)^4 + 2*x^3*log(x)^2 - x^4 + x
```

3.1038.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \left(1-4x^3+4x^2\log(x)+6x^2\log^2(x)-4x\log^3(x)-2x\log^4(x)\right)\,dx$$
$$=-x^4+2x^3\log\left(x\right)^2-x^2\log\left(x\right)^4+x$$

input
```
integrate(-2*x*ln(x)**4-4*x*ln(x)**3+6*x**2*ln(x)**2+4*x**2*ln(x)-4*x**3+1
,x)
```

output
```
-x**4 + 2*x**3*log(x)**2 - x**2*log(x)**4 + x
```

3.1038.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 88 vs. 2(18) = 36.

Time = 0.19 (sec) , antiderivative size = 88, normalized size of antiderivative = 4.89

$$\int \left(1-4x^3+4x^2\log(x)+6x^2\log^2(x)-4x\log^3(x)-2x\log^4(x)\right)\,dx$$
$$=\frac{2}{9}\left(9\log(x)^2-6\log(x)+2\right)x^3-x^4+\frac{4}{3}x^3\log(x)$$
$$-\frac{1}{2}\left(2\log(x)^4-4\log(x)^3+6\log(x)^2-6\log(x)+3\right)x^2$$
$$-\frac{1}{2}\left(4\log(x)^3-6\log(x)^2+6\log(x)-3\right)x^2-\frac{4}{9}x^3+x$$

input
```
integrate(-2*x*log(x)^4-4*x*log(x)^3+6*x^2*log(x)^2+4*x^2*log(x)-4*x^3+1,x
, algorithm=\
```

output
```
2/9*(9*log(x)^2 - 6*log(x) + 2)*x^3 - x^4 + 4/3*x^3*log(x) - 1/2*(2*log(x)
^4 - 4*log(x)^3 + 6*log(x)^2 - 6*log(x) + 3)*x^2 - 1/2*(4*log(x)^3 - 6*log
(x)^2 + 6*log(x) - 3)*x^2 - 4/9*x^3 + x
```

3.1038.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39

$$\int \left(1-4x^3+4x^2\log(x)+6x^2\log^2(x)-4x\log^3(x)-2x\log^4(x)\right)\,dx$$
$$=-x^2\log(x)^4+2x^3\log(x)^2-x^4+x$$

input
```
integrate(-2*x*log(x)^4-4*x*log(x)^3+6*x^2*log(x)^2+4*x^2*log(x)-4*x^3+1,x
, algorithm=\
```

output
```
-x^2*log(x)^4 + 2*x^3*log(x)^2 - x^4 + x
```

3.1038.9 Mupad [B] (verification not implemented)

Time = 16.99 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39

$$\int \left(1-4x^3+4x^2\log(x)+6x^2\log^2(x)-4x\log^3(x)-2x\log^4(x)\right)\,dx$$
$$=-x^4+2\,x^3\ln\left(x\right)^2-x^2\ln\left(x\right)^4+x$$

input
```
int(4*x^2*log(x) - 4*x*log(x)^3 - 2*x*log(x)^4 + 6*x^2*log(x)^2 - 4*x^3 +
1,x)
```

output
```
x + 2*x^3*log(x)^2 - x^2*log(x)^4 - x^4
```

3.1039 $\int \frac{(-20+12x+(4-2x)\log(e^{8+x}))\log\left(\frac{1}{5}e^{-x}(-10x^2+2x^2\log(e^{8+x}))\right)}{-5x+x\log(e^{8+x})}$

3.1039.1 Optimal result

Integrand size = 59, antiderivative size = 23

$$\int \frac{(-20+12x+(4-2x)\log(e^{8+x}))\log\left(\frac{1}{5}e^{-x}(-10x^2+2x^2\log(e^{8+x}))\right)}{-5x+x\log(e^{8+x})}\,dx = \log^2\left(\frac{2}{5}e^{-x}x^2(-5+\log(e^{8+x}))\right)$$

output
```
ln(2/5*(ln(exp(3)*exp(5+x))-5)*x^2/exp(x))^2
```

3.1039.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{(-20+12x+(4-2x)\log(e^{8+x}))\log\left(\frac{1}{5}e^{-x}(-10x^2+2x^2\log(e^{8+x}))\right)}{-5x+x\log(e^{8+x})}\,dx = \log^2\left(\frac{2}{5}e^{-x}x^2(-5+\log(e^{8+x}))\right)$$

input
```
Integrate[((-20 + 12*x + (4 - 2*x)*Log[E^(8 + x)])*Log[(-10*x^2 + 2*x^2*Lo
g[E^(8 + x)])/(5*E^x)])/(-5*x + x*Log[E^(8 + x)]),x]
```

output
```
Log[(2*x^2*(-5 + Log[E^(8 + x)]))/(5*E^x)]^2
```

3.1039.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(12x+(4-2x)\log(e^{x+8})-20)\log\left(\frac{1}{5}e^{-x}\left(2x^2\log(e^{x+8})-10x^2\right)\right)}{x\log(e^{x+8})-5x}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(-12x-(4-2x)\log(e^{x+8})+20)\log\left(\frac{2}{5}e^{-x}x^2(\log(e^{x+8})-5)\right)}{5x-x\log(e^{x+8})}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4\log(e^{x+8})\log\left(\frac{2}{5}e^{-x}x^2(\log(e^{x+8})-5)\right)}{x(\log(e^{x+8})-5)}-\frac{2\log(e^{x+8})\log\left(\frac{2}{5}e^{-x}x^2(\log(e^{x+8})-5)\right)}{\log(e^{x+8})-5}-\frac{20\log\left(\frac{2}{5}e^{-x}x^2(\log\right.}{x(\log(e^{x+8}}\right.$$

$$\Big\downarrow \text{2009}$$

$$12\int \frac{\log\left(\frac{2}{5}e^{-x}x^2(\log(e^{x+8})-5)\right)}{\log(e^{x+8})-5}dx-20\int \frac{\log\left(\frac{2}{5}e^{-x}x^2(\log(e^{x+8})-5)\right)}{x(\log(e^{x+8})-5)}dx-$$
$$2\int \frac{\log(e^{x+8})\log\left(\frac{2}{5}e^{-x}x^2(\log(e^{x+8})-5)\right)}{\log(e^{x+8})-5}dx+4\int \frac{\log(e^{x+8})\log\left(\frac{2}{5}e^{-x}x^2(\log(e^{x+8})-5)\right)}{x(\log(e^{x+8})-5)}dx$$

input
```
Int[((-20 + 12*x + (4 - 2*x)*Log[E^(8 + x)])*Log[(-10*x^2 + 2*x^2*Log[E^(8
 + x)])/(5*E^x)])/(-5*x + x*Log[E^(8 + x)]),x]
```

output
```
$Aborted
```

3.1039.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1039.4 Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

method	result
parallelrisch	$\ln\left(\frac{2(\ln(e^3 e^{5+x})-5)x^2 e^{-x}}{5}\right)^2$
default	$4\ln\left(\frac{(2x^2\ln(e^3e^{5+x})-10x^2)e^{-x}}{5}\right)\ln(x)+2\ln\left(\frac{(2x^2\ln(e^3e^{5+x})-10x^2)e^{-x}}{5}\right)\ln(\ln(e^3e^{5+x})-5)-2\ln($

input
```
int(((4-2*x)*ln(exp(3)*exp(5+x))+12*x-20)*ln(1/5*(2*x^2*ln(exp(3)*exp(5+x)
)-10*x^2)/exp(x))/(x*ln(exp(3)*exp(5+x))-5*x),x,method=_RETURNVERBOSE)
```

output
```
ln(2/5*(ln(exp(3)*exp(5+x))-5)*x^2/exp(x))^2
```

3.1039.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{(-20+12x+(4-2x)\log(e^{8+x}))\log\left(\frac{1}{5}e^{-x}(-10x^2+2x^2\log(e^{8+x}))\right)}{-5x+x\log(e^{8+x})}\,dx$$
$$=\log\left(\frac{2}{5}\left(x^3+3\,x^2\right)e^{(-x)}\right)^2$$

input
```
integrate(((4-2*x)*log(exp(3)*exp(5+x))+12*x-20)*log(1/5*(2*x^2*log(exp(3)
*exp(5+x))-10*x^2)/exp(x))/(x*log(exp(3)*exp(5+x))-5*x),x, algorithm=\
```

output
```
log(2/5*(x^3 + 3*x^2)*e^(-x))^2
```

3.1039.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(-20+12x+(4-2x)\log(e^{8+x}))\log\left(\frac{1}{5}e^{-x}(-10x^2+2x^2\log(e^{8+x}))\right)}{-5x+x\log(e^{8+x})}\,dx=\text{Timed out}$$

input
```
integrate(((4-2*x)*ln(exp(3)*exp(5+x))+12*x-20)*ln(1/5*(2*x**2*ln(exp(3)*e
xp(5+x))-10*x**2)/exp(x))/(x*ln(exp(3)*exp(5+x))-5*x),x)
```

output
```
Timed out
```

3.1039.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. $2(19) = 38$.

Time = 0.23 (sec) , antiderivative size = 78, normalized size of antiderivative = 3.39

$$\int \frac{(-20+12x+(4-2x)\log(e^{8+x}))\log\left(\frac{1}{5}e^{-x}(-10x^2+2x^2\log(e^{8+x}))\right)}{-5x+x\log(e^{8+x})}\,dx$$
$$= -x^2 - 2(x - \log(x+3) - 2\log(x))\log\left(\frac{2}{5}\left((x+8)x^2 - 5x^2\right)e^{(-x)}\right) + 2(x - 2\log(x) + 3)\log(x+3) - \log(x+3)^2 + 4x\log(x) - 4\log(x)^2 - 6\log(x+3)$$

input
```
integrate(((4-2*x)*log(exp(3)*exp(5+x))+12*x-20)*log(1/5*(2*x^2*log(exp(3)
*exp(5+x))-10*x^2)/exp(x))/(x*log(exp(3)*exp(5+x))-5*x),x, algorithm=\
```

output
```
-x^2 - 2*(x - log(x + 3) - 2*log(x))*log(2/5*((x + 8)*x^2 - 5*x^2)*e^(-x))
 + 2*(x - 2*log(x) + 3)*log(x + 3) - log(x + 3)^2 + 4*x*log(x) - 4*log(x)^
2 - 6*log(x + 3)
```

3.1039.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{(-20+12x+(4-2x)\log(e^{8+x}))\log\left(\frac{1}{5}e^{-x}(-10x^2+2x^2\log(e^{8+x}))\right)}{-5x+x\log(e^{8+x})}\,dx = \log\left(\frac{2}{5}x^3e^{(-x)} + \frac{6}{5}x^2e^{(-x)}\right)^2$$

input
```
integrate(((4-2*x)*log(exp(3)*exp(5+x))+12*x-20)*log(1/5*(2*x^2*log(exp(3)
*exp(5+x))-10*x^2)/exp(x))/(x*log(exp(3)*exp(5+x))-5*x),x, algorithm=\
```

output
```
log(2/5*x^3*e^(-x) + 6/5*x^2*e^(-x))^2
```

3.1039.9 Mupad [B] (verification not implemented)

Time = 18.07 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{(-20+12x+(4-2x)\log(e^{8+x}))\log\left(\frac{1}{5}e^{-x}(-10x^2+2x^2\log(e^{8+x}))\right)}{-5x+x\log(e^{8+x})}\,dx$$
$$=\left(x-\ln\left(\frac{2\,x^2\,(x+8)}{5}-2\,x^2\right)\right)^2$$

input
```
int((log(exp(-x)*((2*x^2*log(exp(x + 5)*exp(3)))/5 - 2*x^2))*(log(exp(x +
5)*exp(3))*(2*x - 4) - 12*x + 20))/(5*x - x*log(exp(x + 5)*exp(3))),x)
```

output
```
(x - log((2*x^2*(x + 8))/5 - 2*x^2))^2
```

3.1040 $\int \frac{}{46875+37500x-84375x^2+48750x^3-13875x^4+2160x^5-177x^6+6x^7}$

3.1040.1 Optimal result

Integrand size = 383, antiderivative size = 28

$$\int \frac{}{46875+37500x-84375x^2+48750x^3-13875x^4+2160x^5-177x^6+6x^7+(5625x+6750x^2-7650x^3}$$

$$=\log\left(3+e^{\frac{81x^2}{\left((5-x)^2+x\log(2+4x)\right)^2}}\right)$$

output
```
ln(3+exp(x^2/(1/9*ln(4*x+2)*x+1/9*(5-x)^2)^2))
```

3.1040.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{}{46875+37500x-84375x^2+48750x^3-13875x^4+2160x^5-177x^6+6x^7+(5625x+6750x^2-7650x^3}$$

$$=\log\left(3+e^{\frac{81x^2}{\left((-5+x)^2+x\log(2+4x)\right)^2}}\right)$$

3.1040.

$\int$

input
```
Integrate[(E^((81*x^2)/(625 - 500*x + 150*x^2 - 20*x^3 + x^4 + (50*x - 20*
x^2 + 2*x^3)*Log[2 + 4*x] + x^2*Log[2 + 4*x]^2))*(4050*x + 8100*x^2 - 486*
x^3 - 324*x^4))/(46875 + 37500*x - 84375*x^2 + 48750*x^3 - 13875*x^4 + 216
0*x^5 - 177*x^6 + 6*x^7 + (5625*x + 6750*x^2 - 7650*x^3 + 2520*x^4 - 351*x
^5 + 18*x^6)*Log[2 + 4*x] + (225*x^2 + 360*x^3 - 171*x^4 + 18*x^5)*Log[2 +
 4*x]^2 + (3*x^3 + 6*x^4)*Log[2 + 4*x]^3 + E^((81*x^2)/(625 - 500*x + 150*
x^2 - 20*x^3 + x^4 + (50*x - 20*x^2 + 2*x^3)*Log[2 + 4*x] + x^2*Log[2 + 4*
x]^2))*(15625 + 12500*x - 28125*x^2 + 16250*x^3 - 4625*x^4 + 720*x^5 - 59*
x^6 + 2*x^7 + (1875*x + 2250*x^2 - 2550*x^3 + 840*x^4 - 117*x^5 + 6*x^6)*L
og[2 + 4*x] + (75*x^2 + 120*x^3 - 57*x^4 + 6*x^5)*Log[2 + 4*x]^2 + (x^3 +
2*x^4)*Log[2 + 4*x]^3)),x]
```

output
```
Log[3 + E^((81*x^2)/((-5 + x)^2 + x*Log[2 + 4*x])^2)]
```

3.1040.3 Rubi [A] (verified)

Time = 4.84 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.010$, Rules used = {2029, 7239, 27, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{}{(2x^7-59x^6+720x^5-4625x^4+16250x^3-28125x^2+(2x^4+x^3)\log^3(4x+2)+(6x^5-57x^4+120x^3+75x^2}$$

$$\Big\downarrow \text{2029}$$

$$\int \frac{}{(2x^7-59x^6+720x^5-4625x^4+16250x^3-28125x^2+(2x^4+x^3)\log^3(4x+2)+(6x^5-57x^4+120x^3+75x^2}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{162x(-2x^3-3x^2+50x+25)e^{\frac{81x^2}{((x-5)^2+x\log(4x+2))^2}}}{(2x+1)\left(e^{\frac{81x^2}{((x-5)^2+x\log(4x+2))^2}}+3\right)((x-5)^2+x\log(4x+2))^3}dx$$

$$\Big\downarrow \text{27}$$

3.1040.

$$\int$$

$$162\int \frac{e^{\frac{81x^2}{\left((x-5)^2+x\log(4x+2)\right)^2}}x\left(-2x^3-3x^2+50x+25\right)}{\left(3+e^{\frac{81x^2}{\left((x-5)^2+x\log(4x+2)\right)^2}}\right)(2x+1)\left((x-5)^2+x\log(4x+2)\right)^3}dx$$

$$\Big\downarrow \text{7235}$$

$$\log\left(e^{\frac{81x^2}{\left((x-5)^2+x\log(4x+2)\right)^2}}+3\right)$$

input
```
Int[(E^((81*x^2)/(625 - 500*x + 150*x^2 - 20*x^3 + x^4 + (50*x - 20*x^2 +
2*x^3)*Log[2 + 4*x] + x^2*Log[2 + 4*x]^2))*(4050*x + 8100*x^2 - 486*x^3 -
324*x^4))/(46875 + 37500*x - 84375*x^2 + 48750*x^3 - 13875*x^4 + 2160*x^5
- 177*x^6 + 6*x^7 + (5625*x + 6750*x^2 - 7650*x^3 + 2520*x^4 - 351*x^5 + 1
8*x^6)*Log[2 + 4*x] + (225*x^2 + 360*x^3 - 171*x^4 + 18*x^5)*Log[2 + 4*x]^
2 + (3*x^3 + 6*x^4)*Log[2 + 4*x]^3 + E^((81*x^2)/(625 - 500*x + 150*x^2 -
20*x^3 + x^4 + (50*x - 20*x^2 + 2*x^3)*Log[2 + 4*x] + x^2*Log[2 + 4*x]^2))
*(15625 + 12500*x - 28125*x^2 + 16250*x^3 - 4625*x^4 + 720*x^5 - 59*x^6 +
2*x^7 + (1875*x + 2250*x^2 - 2550*x^3 + 840*x^4 - 117*x^5 + 6*x^6)*Log[2 +
 4*x] + (75*x^2 + 120*x^3 - 57*x^4 + 6*x^5)*Log[2 + 4*x]^2 + (x^3 + 2*x^4)
*Log[2 + 4*x]^3)),x]
```

output
```
Log[3 + E^((81*x^2)/((-5 + x)^2 + x*Log[2 + 4*x])^2)]
```

3.1040.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2029
```
Int[(Fx_.)*((d_.)*(x_)^(q_.) + (a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.) + (c_.)*
(x_)^(t_.))^(p_.), x_Symbol] :> Int[x^(p*r)*(a + b*x^(s - r) + c*x^(t - r)
+ d*x^(q - r))^p*Fx, x] /; FreeQ[{a, b, c, d, r, s, t, q}, x] && IntegerQ[p
] && PosQ[s - r] && PosQ[t - r] && PosQ[q - r] &&  !(EqQ[p, 1] && EqQ[u, 1]
)
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.1040.

$\int$

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1040.4 Maple [A] (verified)

Time = 32.72 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

method	result	size
risch	$\ln\left(\mathrm{e}^{\frac{81x^2}{\left(\ln(4x+2)x+x^2-10x+25\right)^2}}+3\right)$	28
parallelrisch	$\ln\left(\mathrm{e}^{\frac{81x^2}{x^2\ln(4x+2)^2+2\ln(4x+2)x^3+x^4-20\ln(4x+2)x^2-20x^3+50\ln(4x+2)x+150x^2-500x+625}}+3\right)$	73

input
```
int((-324*x^4-486*x^3+8100*x^2+4050*x)*exp(81*x^2/(x^2*ln(4*x+2)^2+(2*x^3-
20*x^2+50*x)*ln(4*x+2)+x^4-20*x^3+150*x^2-500*x+625))/(((2*x^4+x^3)*ln(4*x
+2)^3+(6*x^5-57*x^4+120*x^3+75*x^2)*ln(4*x+2)^2+(6*x^6-117*x^5+840*x^4-255
0*x^3+2250*x^2+1875*x)*ln(4*x+2)+2*x^7-59*x^6+720*x^5-4625*x^4+16250*x^3-2
8125*x^2+12500*x+15625)*exp(81*x^2/(x^2*ln(4*x+2)^2+(2*x^3-20*x^2+50*x)*ln
(4*x+2)+x^4-20*x^3+150*x^2-500*x+625))+(6*x^4+3*x^3)*ln(4*x+2)^3+(18*x^5-1
71*x^4+360*x^3+225*x^2)*ln(4*x+2)^2+(18*x^6-351*x^5+2520*x^4-7650*x^3+6750
*x^2+5625*x)*ln(4*x+2)+6*x^7-177*x^6+2160*x^5-13875*x^4+48750*x^3-84375*x^
2+37500*x+46875),x,method=_RETURNVERBOSE)
```

output
```
ln(exp(81*x^2/(ln(4*x+2)*x+x^2-10*x+25)^2)+3)
```

3.1040.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(25) = 50.

Time = 0.25 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.18

$$\int \frac{}{46875+37500x-84375x^2+48750x^3-13875x^4+2160x^5-177x^6+6x^7+(5625x+6750x^2-7650x^3}$$

$$= \log\left(e^{\left(\frac{81\,x^2}{x^4+x^2\log(4\,x+2)^2-20\,x^3+150\,x^2+2\,\left(x^3-10\,x^2+25\,x\right)\log(4\,x+2)-500\,x+625}\right)}+3\right)$$

3.1040.

$\int$

input
```
integrate((-324*x^4-486*x^3+8100*x^2+4050*x)*exp(81*x^2/(x^2*log(4*x+2)^2+
(2*x^3-20*x^2+50*x)*log(4*x+2)+x^4-20*x^3+150*x^2-500*x+625))/(((2*x^4+x^3
)*log(4*x+2)^3+(6*x^5-57*x^4+120*x^3+75*x^2)*log(4*x+2)^2+(6*x^6-117*x^5+8
40*x^4-2550*x^3+2250*x^2+1875*x)*log(4*x+2)+2*x^7-59*x^6+720*x^5-4625*x^4+
16250*x^3-28125*x^2+12500*x+15625)*exp(81*x^2/(x^2*log(4*x+2)^2+(2*x^3-20*
x^2+50*x)*log(4*x+2)+x^4-20*x^3+150*x^2-500*x+625))+(6*x^4+3*x^3)*log(4*x+
2)^3+(18*x^5-171*x^4+360*x^3+225*x^2)*log(4*x+2)^2+(18*x^6-351*x^5+2520*x^
4-7650*x^3+6750*x^2+5625*x)*log(4*x+2)+6*x^7-177*x^6+2160*x^5-13875*x^4+48
750*x^3-84375*x^2+37500*x+46875),x, algorithm=\
```

output
```
log(e^(81*x^2/(x^4 + x^2*log(4*x + 2)^2 - 20*x^3 + 150*x^2 + 2*(x^3 - 10*x
^2 + 25*x)*log(4*x + 2) - 500*x + 625)) + 3)
```

3.1040.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(26) = 52$.

Time = 1.94 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.14

$$\int \frac{}{46875 + 37500x - 84375x^2 + 48750x^3 - 13875x^4 + 2160x^5 - 177x^6 + 6x^7 + (5625x + 6750x^2 - 7650x^3}$$

$$= \log\left(e^{\frac{81x^2}{x^4 - 20x^3 + x^2\log(4x+2)^2 + 150x^2 - 500x + (2x^3 - 20x^2 + 50x)\log(4x+2) + 625}} + 3\right)$$

input
```
integrate((-324*x**4-486*x**3+8100*x**2+4050*x)*exp(81*x**2/(x**2*ln(4*x+2
)**2+(2*x**3-20*x**2+50*x)*ln(4*x+2)+x**4-20*x**3+150*x**2-500*x+625))/(((
2*x**4+x**3)*ln(4*x+2)**3+(6*x**5-57*x**4+120*x**3+75*x**2)*ln(4*x+2)**2+(
6*x**6-117*x**5+840*x**4-2550*x**3+2250*x**2+1875*x)*ln(4*x+2)+2*x**7-59*x
**6+720*x**5-4625*x**4+16250*x**3-28125*x**2+12500*x+15625)*exp(81*x**2/(x
**2*ln(4*x+2)**2+(2*x**3-20*x**2+50*x)*ln(4*x+2)+x**4-20*x**3+150*x**2-500
*x+625))+(6*x**4+3*x**3)*ln(4*x+2)**3+(18*x**5-171*x**4+360*x**3+225*x**2)
*ln(4*x+2)**2+(18*x**6-351*x**5+2520*x**4-7650*x**3+6750*x**2+5625*x)*ln(4
*x+2)+6*x**7-177*x**6+2160*x**5-13875*x**4+48750*x**3-84375*x**2+37500*x+4
6875),x)
```

output
```
log(exp(81*x**2/(x**4 - 20*x**3 + x**2*log(4*x + 2)**2 + 150*x**2 - 500*x
+ (2*x**3 - 20*x**2 + 50*x)*log(4*x + 2) + 625)) + 3)
```

3.1040.

$$\int$$

3.1040.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 555 vs. $2(25) = 50$.

Time = 0.62 (sec) , antiderivative size = 555, normalized size of antiderivative = 19.82

$$\int \frac{}{46875 + 37500x - 84375x^2 + 48750x^3 - 13875x^4 + 2160x^5 - 177x^6 + 6x^7 + (5625x + 6750x^2 - 7650x^3}$$
$= \text{Too large to display}$

input
```
integrate((-324*x^4-486*x^3+8100*x^2+4050*x)*exp(81*x^2/(x^2*log(4*x+2)^2+
(2*x^3-20*x^2+50*x)*log(4*x+2)+x^4-20*x^3+150*x^2-500*x+625))/(((2*x^4+x^3
)*log(4*x+2)^3+(6*x^5-57*x^4+120*x^3+75*x^2)*log(4*x+2)^2+(6*x^6-117*x^5+8
40*x^4-2550*x^3+2250*x^2+1875*x)*log(4*x+2)+2*x^7-59*x^6+720*x^5-4625*x^4+
16250*x^3-28125*x^2+12500*x+15625)*exp(81*x^2/(x^2*log(4*x+2)^2+(2*x^3-20*
x^2+50*x)*log(4*x+2)+x^4-20*x^3+150*x^2-500*x+625))+(6*x^4+3*x^3)*log(4*x+
2)^3+(18*x^5-171*x^4+360*x^3+225*x^2)*log(4*x+2)^2+(18*x^6-351*x^5+2520*x^
4-7650*x^3+6750*x^2+5625*x)*log(4*x+2)+6*x^7-177*x^6+2160*x^5-13875*x^4+48
750*x^3-84375*x^2+37500*x+46875),x, algorithm=\
```

output
```
-81*x*log(2*x + 1)/(x^4 + 2*x^3*(log(2) - 10) + x^2*log(2*x + 1)^2 + (log(
2)^2 - 20*log(2) + 150)*x^2 + 50*x*(log(2) - 10) + 2*(x^3 + x^2*(log(2) -
10) + 25*x)*log(2*x + 1) + 625) + log(1/3*(3*e^(81*x*log(2)/(x^4 + 2*x^3*(
log(2) + log(2*x + 1) - 10) + (log(2)^2 + 2*(log(2) - 10)*log(2*x + 1) + l
og(2*x + 1)^2 - 20*log(2) + 150)*x^2 + 50*x*(log(2) + log(2*x + 1) - 10) +
 625) + 81*x*log(2*x + 1)/(x^4 + 2*x^3*(log(2) + log(2*x + 1) - 10) + (log
(2)^2 + 2*(log(2) - 10)*log(2*x + 1) + log(2*x + 1)^2 - 20*log(2) + 150)*x
^2 + 50*x*(log(2) + log(2*x + 1) - 10) + 625) + 2025/(x^4 + 2*x^3*(log(2)
+ log(2*x + 1) - 10) + (log(2)^2 + 2*(log(2) - 10)*log(2*x + 1) + log(2*x
+ 1)^2 - 20*log(2) + 150)*x^2 + 50*x*(log(2) + log(2*x + 1) - 10) + 625))
+ e^(810*x/(x^4 + 2*x^3*(log(2) + log(2*x + 1) - 10) + (log(2)^2 + 2*(log(
2) - 10)*log(2*x + 1) + log(2*x + 1)^2 - 20*log(2) + 150)*x^2 + 50*x*(log(
2) + log(2*x + 1) - 10) + 625) + 81/(x^2 + x*(log(2) + log(2*x + 1) - 10)
+ 25)))*e^(-81*x*log(2)/(x^4 + 2*x^3*(log(2) + log(2*x + 1) - 10) + (log(2
)^2 + 2*(log(2) - 10)*log(2*x + 1) + log(2*x + 1)^2 - 20*log(2) + 150)*x^2
 + 50*x*(log(2) + log(2*x + 1) - 10) + 625) - 2025/(x^4 + 2*x^3*(log(2) +
log(2*x + 1) - 10) + (log(2)^2 + 2*(log(2) - 10)*log(2*x + 1) + log(2*x +
1)^2 - 20*log(2) + 150)*x^2 + 50*x*(log(2) + log(2*x + 1) - 10) + 625)))
```

3.1040.

$$\int$$

3.1040.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(25) = 50$.

Time = 3.76 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.57

$$\int \frac{}{46875 + 37500x - 84375x^2 + 48750x^3 - 13875x^4 + 2160x^5 - 177x^6 + 6x^7 + (5625x + 6750x^2 - 7650x^3}$$
$$= \log\left(e^{\left(\frac{81\,x^2}{x^4+2\,x^3\log(4\,x+2)+x^2\log(4\,x+2)^2-20\,x^3-20\,x^2\log(4\,x+2)+150\,x^2+50\,x\log(4\,x+2)-500\,x+625}\right)}+3\right)$$

input
```
integrate((-324*x^4-486*x^3+8100*x^2+4050*x)*exp(81*x^2/(x^2*log(4*x+2)^2+
(2*x^3-20*x^2+50*x)*log(4*x+2)+x^4-20*x^3+150*x^2-500*x+625))/((((2*x^4+x^3
)*log(4*x+2)^3+(6*x^5-57*x^4+120*x^3+75*x^2)*log(4*x+2)^2+(6*x^6-117*x^5+8
40*x^4-2550*x^3+2250*x^2+1875*x)*log(4*x+2)+2*x^7-59*x^6+720*x^5-4625*x^4+
16250*x^3-28125*x^2+12500*x+15625)*exp(81*x^2/(x^2*log(4*x+2)^2+(2*x^3-20*
x^2+50*x)*log(4*x+2)+x^4-20*x^3+150*x^2-500*x+625))+(6*x^4+3*x^3)*log(4*x+
2)^3+(18*x^5-171*x^4+360*x^3+225*x^2)*log(4*x+2)^2+(18*x^6-351*x^5+2520*x^
4-7650*x^3+6750*x^2+5625*x)*log(4*x+2)+6*x^7-177*x^6+2160*x^5-13875*x^4+48
750*x^3-84375*x^2+37500*x+46875),x, algorithm=\
```

output
```
log(e^(81*x^2/(x^4 + 2*x^3*log(4*x + 2) + x^2*log(4*x + 2)^2 - 20*x^3 - 20
*x^2*log(4*x + 2) + 150*x^2 + 50*x*log(4*x + 2) - 500*x + 625)) + 3)
```

3.1040.9 Mupad [B] (verification not implemented)

Time = 18.39 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.57

$$\int \frac{}{46875 + 37500x - 84375x^2 + 48750x^3 - 13875x^4 + 2160x^5 - 177x^6 + 6x^7 + (5625x + 6750x^2 - 7650x^3}$$
$$= \ln\left(\mathrm{e}^{\frac{81\,x^2}{x^4+2\,x^3\,\ln(4\,x+2)-20\,x^3+x^2\,\ln(4\,x+2)^2-20\,x^2\,\ln(4\,x+2)+150\,x^2+50\,x\,\ln(4\,x+2)-500\,x+625}}+3\right)$$

3.1040.

$$\int$$

input
```
int((exp((81*x^2)/(x^2*log(4*x + 2)^2 - 500*x + log(4*x + 2)*(50*x - 20*x^
2 + 2*x^3) + 150*x^2 - 20*x^3 + x^4 + 625))*(4050*x + 8100*x^2 - 486*x^3 -
 324*x^4))/(37500*x + log(4*x + 2)^3*(3*x^3 + 6*x^4) + log(4*x + 2)*(5625*
x + 6750*x^2 - 7650*x^3 + 2520*x^4 - 351*x^5 + 18*x^6) + log(4*x + 2)^2*(2
25*x^2 + 360*x^3 - 171*x^4 + 18*x^5) - 84375*x^2 + 48750*x^3 - 13875*x^4 +
 2160*x^5 - 177*x^6 + 6*x^7 + exp((81*x^2)/(x^2*log(4*x + 2)^2 - 500*x + l
og(4*x + 2)*(50*x - 20*x^2 + 2*x^3) + 150*x^2 - 20*x^3 + x^4 + 625))*(1250
0*x + log(4*x + 2)*(1875*x + 2250*x^2 - 2550*x^3 + 840*x^4 - 117*x^5 + 6*x
^6) + log(4*x + 2)^2*(75*x^2 + 120*x^3 - 57*x^4 + 6*x^5) + log(4*x + 2)^3*
(x^3 + 2*x^4) - 28125*x^2 + 16250*x^3 - 4625*x^4 + 720*x^5 - 59*x^6 + 2*x^
7 + 15625) + 46875),x)
```

output
```
log(exp((81*x^2)/(x^2*log(4*x + 2)^2 - 500*x + 50*x*log(4*x + 2) + 150*x^2
 - 20*x^3 + x^4 - 20*x^2*log(4*x + 2) + 2*x^3*log(4*x + 2) + 625)) + 3)
```

3.1040.

$\int$

3.1041 $\int \frac{16-3x-16x^3+3x^4+(-48+6x+3x^4)\log(x)}{5x^4}\,dx$

3.1041.1 Optimal result

Integrand size = 35, antiderivative size = 27

$$\int \frac{16-3x-16x^3+3x^4+(-48+6x+3x^4)\log(x)}{5x^4}\,dx = -1+\frac{(1+3(5-x))\left(\frac{1}{x^2}-x\right)\log(x)}{5x}$$

output
```
1/5*(1/x^2-x)*ln(x)/x*(-3*x+16)-1
```

3.1041.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{16-3x-16x^3+3x^4+(-48+6x+3x^4)\log(x)}{5x^4}\,dx = -\frac{16\log(x)}{5}+\frac{16\log(x)}{5x^3}-\frac{3\log(x)}{5x^2}+\frac{3}{5}x\log(x)$$

input
```
Integrate[(16 - 3*x - 16*x^3 + 3*x^4 + (-48 + 6*x + 3*x^4)*Log[x])/(5*x^4)
,x]
```

output
```
(-16*Log[x])/5 + (16*Log[x])/(5*x^3) - (3*Log[x])/(5*x^2) + (3*x*Log[x])/5
```

3.1041.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.086, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^4+(3x^4+6x-48)\log(x)-16x^3-3x+16}{5x^4}dx$$
$$\Big\downarrow \text{ 27}$$
$$\frac{1}{5}\int \frac{3x^4-16x^3-3x-3(-x^4-2x+16)\log(x)+16}{x^4}dx$$
$$\Big\downarrow \text{ 2010}$$
$$\frac{1}{5}\int \left(\frac{3x^4-16x^3-3x+16}{x^4}+\frac{3(x^4+2x-16)\log(x)}{x^4}\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$\frac{1}{5}\left(\frac{16\log(x)}{x^3}-\frac{3\log(x)}{x^2}+3x\log(x)-16\log(x)\right)$$

input
```
Int[(16 - 3*x - 16*x^3 + 3*x^4 + (-48 + 6*x + 3*x^4)*Log[x])/(5*x^4),x]
```

output
```
(-16*Log[x] + (16*Log[x])/x^3 - (3*Log[x])/x^2 + 3*x*Log[x])/5
```

3.1041.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1041.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

method	result	size
risch	$\frac{(3x^4-3x+16)\ln(x)}{5x^3}-\frac{16\ln(x)}{5}$	23
default	$\frac{3x\ln(x)}{5}-\frac{16\ln(x)}{5}-\frac{3\ln(x)}{5x^2}+\frac{16\ln(x)}{5x^3}$	25
parts	$\frac{3x\ln(x)}{5}-\frac{16\ln(x)}{5}-\frac{3\ln(x)}{5x^2}+\frac{16\ln(x)}{5x^3}$	25
norman	$\frac{-\frac{16x^3\ln(x)}{5}-\frac{3x\ln(x)}{5}+\frac{3x^4\ln(x)}{5}+\frac{16\ln(x)}{5}}{x^3}$	29
parallelrisch	$-\frac{-3x^4\ln(x)+16x^3\ln(x)+3x\ln(x)-16\ln(x)}{5x^3}$	30

input
```
int(1/5*((3*x^4+6*x-48)*ln(x)+3*x^4-16*x^3-3*x+16)/x^4,x,method=_RETURNVER
BOSE)
```

output
```
1/5*(3*x^4-3*x+16)/x^3*ln(x)-16/5*ln(x)
```

3.1041.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{16-3x-16x^3+3x^4+(-48+6x+3x^4)\log(x)}{5x^4}\,dx = \frac{(3\,x^4-16\,x^3-3\,x+16)\log{(x)}}{5\,x^3}$$

input
```
integrate(1/5*((3*x^4+6*x-48)*log(x)+3*x^4-16*x^3-3*x+16)/x^4,x, algorithm
=\
```

output
```
1/5*(3*x^4 - 16*x^3 - 3*x + 16)*log(x)/x^3
```

3.1041.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{16-3x-16x^3+3x^4+(-48+6x+3x^4)\log(x)}{5x^4}\,dx$$
$$=-\frac{16\log{(x)}}{5}+\frac{(3x^4-3x+16)\log{(x)}}{5x^3}$$

input
```
integrate(1/5*((3*x**4+6*x-48)*ln(x)+3*x**4-16*x**3-3*x+16)/x**4,x)
```

output
```
-16*log(x)/5 + (3*x**4 - 3*x + 16)*log(x)/(5*x**3)
```

3.1041.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{16-3x-16x^3+3x^4+(-48+6x+3x^4)\log(x)}{5x^4}\,dx$$
$$=\frac{3}{5}\,x\log{(x)}-\frac{3\,\log{(x)}}{5\,x^2}+\frac{16\,\log{(x)}}{5\,x^3}-\frac{16}{5}\,\log{(x)}$$

input
```
integrate(1/5*((3*x^4+6*x-48)*log(x)+3*x^4-16*x^3-3*x+16)/x^4,x, algorithm
=\
```

output
```
3/5*x*log(x) - 3/5*log(x)/x^2 + 16/5*log(x)/x^3 - 16/5*log(x)
```

3.1041.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{16-3x-16x^3+3x^4+(-48+6x+3x^4)\log(x)}{5x^4}\,dx$$
$$=\frac{1}{5}\left(3\,x-\frac{3\,x-16}{x^3}\right)\log{(x)}-\frac{16}{5}\,\log{(x)}$$

input
```
integrate(1/5*((3*x^4+6*x-48)*log(x)+3*x^4-16*x^3-3*x+16)/x^4,x, algorithm
=\
```

output
```
1/5*(3*x - (3*x - 16)/x^3)*log(x) - 16/5*log(x)
```

3.1041.9 Mupad [B] (verification not implemented)

Time = 18.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{16-3x-16x^3+3x^4+(-48+6x+3x^4)\log(x)}{5x^4}\,dx = -\frac{\ln(x)\,\left(-3\,x^4+16\,x^3+3\,x-16\right)}{5\,x^3}$$

input
```
int(((log(x)*(6*x + 3*x^4 - 48))/5 - (3*x)/5 - (16*x^3)/5 + (3*x^4)/5 + 16
/5)/x^4,x)
```

output
```
-(log(x)*(3*x + 16*x^3 - 3*x^4 - 16))/(5*x^3)
```

3.1042 $\int \frac{\frac{6}{e^3}+\left(6+\frac{12x}{e^3}\right)\log(x)+\frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx$

3.1042.1 Optimal result

Integrand size = 35, antiderivative size = 17

$$\int \frac{\frac{6}{e^3}+\left(6+\frac{12x}{e^3}\right)\log(x)+\frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx=\frac{3}{2}x\left(2+\frac{2(x+\log(\log(x)))}{e^3}\right)$$

output
```
3/2*(2+exp(ln(2)-3)*(ln(ln(x))+x))*x
```

3.1042.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

$$\int \frac{\frac{6}{e^3}+\left(6+\frac{12x}{e^3}\right)\log(x)+\frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx=\frac{3e^3x+3x^2+3x\log(\log(x))}{e^3}$$

input
```
Integrate[(6/E^3 + (6 + (12*x)/E^3)*Log[x] + (6*Log[x]*Log[Log[x]])/E^3)/(
2*Log[x]),x]
```

output
```
(3*E^3*x + 3*x^2 + 3*x*Log[Log[x]])/E^3
```

3.1042.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.171, Rules used = {27, 27, 7292, 27, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\frac{12x}{e^3}+6\right)\log(x)+\frac{6\log(\log(x))\log(x)}{e^3}+\frac{6}{e^3}}{2\log(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int \frac{6\left(\frac{(2x+e^3)\log(x)}{e^3}+\frac{\log(\log(x))\log(x)}{e^3}+\frac{1}{e^3}\right)}{\log(x)}dx$$

$$\Big\downarrow \text{27}$$

$$3\int \frac{\frac{(2x+e^3)\log(x)}{e^3}+\frac{\log(\log(x))\log(x)}{e^3}+\frac{1}{e^3}}{\log(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$3\int \frac{2x\log(x)+\log(\log(x))\log(x)+e^3\log(x)+1}{e^3\log(x)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{3\int \frac{2x\log(x)+\log(\log(x))\log(x)+e^3\log(x)+1}{\log(x)}dx}{e^3}$$

$$\Big\downarrow \text{7239}$$

$$\frac{3\int \left(2x+\log(\log(x))+\frac{1}{\log(x)}+e^3\right)dx}{e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{3(x^2+e^3x+x\log(\log(x)))}{e^3}$$

input
```
Int[(6/E^3 + (6 + (12*x)/E^3)*Log[x] + (6*Log[x]*Log[Log[x]])/E^3)/(2*Log[
x]),x]
```

output
```
(3*(E^3*x + x^2 + x*Log[Log[x]]))/E^3
```

3.1042. $\int \frac{\frac{6}{e^3}+\left(6+\frac{12x}{e^3}\right)\log(x)+\frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}dx$

3.1042.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1042.4 Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

method	result	size
risch	$3\,\mathrm{e}^{-3}x^{2}+3\,\mathrm{e}^{-3}x\ln\left(\ln\left(x\right)\right)+3x$	20
norman	$3\,\mathrm{e}^{-3}x^{2}+3\,\mathrm{e}^{-3}x\ln\left(\ln\left(x\right)\right)+3x$	24
parallelrisch	$\frac{3\,\mathrm{e}^{\ln(2)-3}x^{2}}{2}+\frac{3\,\mathrm{e}^{\ln(2)-3}x\ln(\ln(x))}{2}+3x$	26
default	$3x+3\,\mathrm{e}^{-3}x^{2}-3\,\mathrm{e}^{-3}\,\mathrm{Ei}_{1}\left(-\ln\left(x\right)\right)+3\,\mathrm{e}^{-3}\left(x\ln\left(\ln\left(x\right)\right)+\mathrm{Ei}_{1}\left(-\ln\left(x\right)\right)\right)$	38
parts	$3x+\frac{3\,\mathrm{e}^{\ln(2)-3}x^{2}}{2}-\frac{3\,\mathrm{e}^{\ln(2)-3}\,\mathrm{Ei}_{1}(-\ln(x))}{2}+\frac{3\,\mathrm{e}^{\ln(2)-3}(x\ln(\ln(x))+\mathrm{Ei}_{1}(-\ln(x)))}{2}$	47

input
```
int(1/2*(3*exp(ln(2)-3)*ln(x)*ln(ln(x))+(6*x*exp(ln(2)-3)+6)*ln(x)+3*exp(l
n(2)-3))/ln(x),x,method=_RETURNVERBOSE)
```

output
```
3*exp(-3)*x^2+3*exp(-3)*x*ln(ln(x))+3*x
```

3.1042. $\int \frac{\frac{6}{e^3}+\left(6+\frac{12x}{e^3}\right)\log(x)+\frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx$

3.1042.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.47

$$\int \frac{\frac{6}{e^3} + \left(6 + \frac{12x}{e^3}\right)\log(x) + \frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx = \frac{3}{2}\,x^2e^{(\log(2)-3)} + \frac{3}{2}\,xe^{(\log(2)-3)}\log\left(\log\left(x\right)\right) + 3\,x$$

input
```
integrate(1/2*(3*exp(log(2)-3)*log(x)*log(log(x))+(6*x*exp(log(2)-3)+6)*lo
g(x)+3*exp(log(2)-3))/log(x),x, algorithm=\
```

output
```
3/2*x^2*e^(log(2) - 3) + 3/2*x*e^(log(2) - 3)*log(log(x)) + 3*x
```

3.1042.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

$$\int \frac{\frac{6}{e^3} + \left(6 + \frac{12x}{e^3}\right)\log(x) + \frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx = \frac{3x^2}{e^3} + \frac{3x\log\left(\log\left(x\right)\right)}{e^3} + 3x$$

input
```
integrate(1/2*(3*exp(ln(2)-3)*ln(x)*ln(ln(x))+(6*x*exp(ln(2)-3)+6)*ln(x)+3
*exp(ln(2)-3))/ln(x),x)
```

output
```
3*x**2*exp(-3) + 3*x*exp(-3)*log(log(x)) + 3*x
```

3.1042.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.21 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.94

$$\begin{aligned}\int \frac{\frac{6}{e^3} + \left(6 + \frac{12x}{e^3}\right)\log(x) + \frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx &= 3\,x^2e^{(-3)} \\ &\quad + 3\left(x\log\left(\log\left(x\right)\right) - \mathrm{Ei}(\log\left(x\right))\right)e^{(-3)} \\ &\quad + 3\,\mathrm{Ei}(\log\left(x\right))\,e^{(-3)} + 3\,x\end{aligned}$$

input
```
integrate(1/2*(3*exp(log(2)-3)*log(x)*log(log(x))+(6*x*exp(log(2)-3)+6)*lo
g(x)+3*exp(log(2)-3))/log(x),x, algorithm=\
```

output
```
3*x^2*e^(-3) + 3*(x*log(log(x)) - Ei(log(x)))*e^(-3) + 3*Ei(log(x))*e^(-3)
 + 3*x
```

3.1042.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{\frac{6}{e^3} + \left(6 + \frac{12x}{e^3}\right)\log(x) + \frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx = 3\,x^2e^{(-3)} + 3\,xe^{(-3)}\log\left(\log\left(x\right)\right) + 3\,x$$

input
```
integrate(1/2*(3*exp(log(2)-3)*log(x)*log(log(x))+(6*x*exp(log(2)-3)+6)*lo
g(x)+3*exp(log(2)-3))/log(x),x, algorithm=\
```

output
```
3*x^2*e^(-3) + 3*x*e^(-3)*log(log(x)) + 3*x
```

3.1042.9 Mupad [B] (verification not implemented)

Time = 17.62 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

$$\int \frac{\frac{6}{e^3} + \left(6 + \frac{12x}{e^3}\right)\log(x) + \frac{6\log(x)\log(\log(x))}{e^3}}{2\log(x)}\,dx = 3\,x\,\mathrm{e}^{-3}\left(x + \ln\left(\ln\left(x\right)\right) + \mathrm{e}^3\right)$$

input
```
int(((3*exp(log(2) - 3))/2 + (log(x)*(6*x*exp(log(2) - 3) + 6))/2 + (3*log
(log(x))*exp(log(2) - 3)*log(x))/2)/log(x),x)
```

output
```
3*x*exp(-3)*(x + log(log(x)) + exp(3))
```

3.1043 $\int \frac{-90-5x+4x^3+(-180+13x+x^2)\log\left(\frac{5}{x}\right)}{4x^3+(18x+x^2)\log\left(\frac{5}{x}\right)}\,dx$

3.1043.1 Optimal result

Integrand size = 48, antiderivative size = 23

$$\int \frac{-90-5x+4x^3+(-180+13x+x^2)\log\left(\frac{5}{x}\right)}{4x^3+(18x+x^2)\log\left(\frac{5}{x}\right)}\,dx = -4+x+5\left(1+\log\left(4+\frac{(18+x)\log\left(\frac{5}{x}\right)}{x^2}\right)\right)$$

output
```
x+1+5*ln(4+(18+x)*ln(5/x)/x^2)
```

3.1043.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{-90-5x+4x^3+(-180+13x+x^2)\log\left(\frac{5}{x}\right)}{4x^3+(18x+x^2)\log\left(\frac{5}{x}\right)}\,dx = x-10\log(x)+5\log\left(4x^2+18\log\left(\frac{5}{x}\right)+x\log\left(\frac{5}{x}\right)\right)$$

input
```
Integrate[(-90 - 5*x + 4*x^3 + (-180 + 13*x + x^2)*Log[5/x])/(4*x^3 + (18*
x + x^2)*Log[5/x]),x]
```

output
```
x - 10*Log[x] + 5*Log[4*x^2 + 18*Log[5/x] + x*Log[5/x]]
```

3.1043.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^3+\left(x^2+13x-180\right)\log\left(\frac{5}{x}\right)-5x-90}{4x^3+\left(x^2+18x\right)\log\left(\frac{5}{x}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x^2+13x-180}{x(x+18)}+\frac{5\left(4x^3+143x^2-36x-324\right)}{x(x+18)\left(4x^2+x\log\left(\frac{5}{x}\right)+18\log\left(\frac{5}{x}\right)\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$355\int \frac{1}{4x^2+\log\left(\frac{5}{x}\right)x+18\log\left(\frac{5}{x}\right)}dx-90\int \frac{1}{x\left(4x^2+\log\left(\frac{5}{x}\right)x+18\log\left(\frac{5}{x}\right)\right)}dx+20\int \frac{x}{4x^2+\log\left(\frac{5}{x}\right)x+18\log\left(\frac{5}{x}\right)}dx-6480\int \frac{1}{(x+18)\left(4x^2+\log\left(\frac{5}{x}\right)x+18\log\left(\frac{5}{x}\right)\right)}dx+x-10\log(x)+5\log(x+18)$$

input
```
Int[(-90 - 5*x + 4*x^3 + (-180 + 13*x + x^2)*Log[5/x])/(4*x^3 + (18*x + x^
2)*Log[5/x]),x]
```

output
```
$Aborted
```

3.1043.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1043.4 Maple [A] (verified)

Time = 1.75 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

method	result	size
derivativedivides	$x+5\ln\left(\frac{450\ln\left(\frac{5}{x}\right)}{x^2}+\frac{25\ln\left(\frac{5}{x}\right)}{x}+100\right)$	30
default	$x+5\ln\left(\frac{450\ln\left(\frac{5}{x}\right)}{x^2}+\frac{25\ln\left(\frac{5}{x}\right)}{x}+100\right)$	30
risch	$x+5\ln\left(18+x\right)-10\ln\left(x\right)+5\ln\left(\ln\left(\frac{5}{x}\right)+\frac{4x^2}{18+x}\right)$	33
parallelrisch	$5\ln\left(x^2+\frac{x\ln\left(\frac{5}{x}\right)}{4}+\frac{9\ln\left(\frac{5}{x}\right)}{2}\right)+x+10\ln\left(\frac{5}{x}\right)$	35
norman	$x+10\ln\left(\frac{5}{x}\right)+5\ln\left(x\ln\left(\frac{5}{x}\right)+4x^2+18\ln\left(\frac{5}{x}\right)\right)$	36

input
```
int(((x^2+13*x-180)*ln(5/x)+4*x^3-5*x-90)/((x^2+18*x)*ln(5/x)+4*x^3),x,met
hod=_RETURNVERBOSE)
```

output
```
x+5*ln(450*ln(5/x)/x^2+25*ln(5/x)/x+100)
```

3.1043.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.61

$$\int \frac{-90-5x+4x^3+(-180+13x+x^2)\log\left(\frac{5}{x}\right)}{4x^3+(18x+x^2)\log\left(\frac{5}{x}\right)}\,dx$$
$$= x+5\,\log\left(x+18\right)-10\,\log\left(x\right)+5\,\log\left(\frac{4\,x^2+(x+18)\log\left(\frac{5}{x}\right)}{x+18}\right)$$

input
```
integrate(((x^2+13*x-180)*log(5/x)+4*x^3-5*x-90)/((x^2+18*x)*log(5/x)+4*x^
3),x, algorithm=\
```

output
```
x + 5*log(x + 18) - 10*log(x) + 5*log((4*x^2 + (x + 18)*log(5/x))/(x + 18)
)
```

3.1043.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{-90-5x+4x^3+(-180+13x+x^2)\log\left(\frac{5}{x}\right)}{4x^3+(18x+x^2)\log\left(\frac{5}{x}\right)}\,dx$$
$$= x - 10\log(x) + 5\log(x+18) + 5\log\left(\frac{4x^2}{x+18} + \log\left(\frac{5}{x}\right)\right)$$

input
```
integrate(((x**2+13*x-180)*ln(5/x)+4*x**3-5*x-90)/((x**2+18*x)*ln(5/x)+4*x
**3),x)
```

output
```
x - 10*log(x) + 5*log(x + 18) + 5*log(4*x**2/(x + 18) + log(5/x))
```

3.1043.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 43 vs. 2(21) = 42.

Time = 0.31 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.87

$$\int \frac{-90-5x+4x^3+(-180+13x+x^2)\log\left(\frac{5}{x}\right)}{4x^3+(18x+x^2)\log\left(\frac{5}{x}\right)}\,dx$$
$$= x + 5\log(x+18) - 10\log(x) + 5\log\left(-\frac{4x^2 + x\log(5) - (x+18)\log(x) + 18\log(5)}{x+18}\right)$$

input
```
integrate(((x^2+13*x-180)*log(5/x)+4*x^3-5*x-90)/((x^2+18*x)*log(5/x)+4*x^
3),x, algorithm=\
```

output
```
x + 5*log(x + 18) - 10*log(x) + 5*log(-(4*x^2 + x*log(5) - (x + 18)*log(x)
 + 18*log(5))/(x + 18))
```

3.1043.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{-90-5x+4x^3+(-180+13x+x^2)\log\left(\frac{5}{x}\right)}{4x^3+(18x+x^2)\log\left(\frac{5}{x}\right)}\,dx = x+5\,\log\left(\frac{25\,\log\left(\frac{5}{x}\right)}{x}+\frac{450\,\log\left(\frac{5}{x}\right)}{x^2}+100\right)$$

input
```
integrate((((x^2+13*x-180)*log(5/x)+4*x^3-5*x-90)/((x^2+18*x)*log(5/x)+4*x^
3),x, algorithm=\
```

output
```
x + 5*log(25*log(5/x)/x + 450*log(5/x)/x^2 + 100)
```

3.1043.9 Mupad [B] (verification not implemented)

Time = 15.43 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.91

$$\int \frac{-90-5x+4x^3+(-180+13x+x^2)\log\left(\frac{5}{x}\right)}{4x^3+(18x+x^2)\log\left(\frac{5}{x}\right)}\,dx = 5\,\ln\left(\frac{9\,\ln\left(\frac{5}{x}\right)}{2}+\frac{x\,\ln\left(\frac{5}{x}\right)}{4}+x^2\right)+\frac{x^3+10\,x^2\,\ln\left(\frac{5}{x}\right)}{x^2}$$

input
```
int(-(5*x - log(5/x)*(13*x + x^2 - 180) - 4*x^3 + 90)/(log(5/x)*(18*x + x^
2) + 4*x^3),x)
```

output
```
5*log((9*log(5/x))/2 + (x*log(5/x))/4 + x^2) + (x^3 + 10*x^2*log(5/x))/x^2
```

3.1044 $\int (2-4x+4e^2x+6x^2)\, dx$

3.1044.1 Optimal result

Integrand size = 16, antiderivative size = 19

$$\int (2-4x+4e^2x+6x^2)\, dx = 2x(1+x+e^2x-(2-x)x)$$

output
```
2*x*(x-(2-x)*x+1+exp(2)*x)
```

3.1044.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

$$\int (2-4x+4e^2x+6x^2)\, dx = 2x-2x^2+2e^2x^2+2x^3$$

input
```
Integrate[2 - 4*x + 4*E^2*x + 6*x^2,x]
```

output
```
2*x - 2*x^2 + 2*E^2*x^2 + 2*x^3
```

3.1044.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {6, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(6x^2+4e^2x-4x+2\right) \, dx$$
$$\Big\downarrow \; 6$$
$$\int \left(6x^2+\left(4e^2-4\right)x+2\right)dx$$
$$\Big\downarrow \; 2009$$
$$2x^3-2\left(1-e^2\right)x^2+2x$$

input
```
Int[2 - 4*x + 4*E^2*x + 6*x^2,x]
```

output
```
2*x - 2*(1 - E^2)*x^2 + 2*x^3
```

3.1044.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1044.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

method	result	size
gosper	$2x(e^2x + x^2 - x + 1)$	16
norman	$(2e^2 - 2)x^2 + 2x + 2x^3$	20
default	$2x^2e^2 + 2x^3 - 2x^2 + 2x$	22
risch	$2x^2e^2 + 2x^3 - 2x^2 + 2x$	22
parallelrisch	$2x^2e^2 + 2x^3 - 2x^2 + 2x$	22
parts	$2x^2e^2 + 2x^3 - 2x^2 + 2x$	22

input
```
int(4*exp(2)*x+6*x^2-4*x+2,x,method=_RETURNVERBOSE)
```

output
```
2*x*(exp(2)*x+x^2-x+1)
```

3.1044.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int (2 - 4x + 4e^2x + 6x^2) \, dx = 2x^3 + 2x^2e^2 - 2x^2 + 2x$$

input
```
integrate(4*exp(2)*x+6*x^2-4*x+2,x, algorithm=\
```

output
```
2*x^3 + 2*x^2*e^2 - 2*x^2 + 2*x
```

3.1044.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int (2 - 4x + 4e^2x + 6x^2) \, dx = 2x^3 + x^2(-2 + 2e^2) + 2x$$

input
```
integrate(4*exp(2)*x+6*x**2-4*x+2,x)
```

output
```
2*x**3 + x**2*(-2 + 2*exp(2)) + 2*x
```

3.1044.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int \left(2-4x+4e^2x+6x^2\right)\,dx = 2\,x^3+2\,x^2e^2-2\,x^2+2\,x$$

input
```
integrate(4*exp(2)*x+6*x^2-4*x+2,x, algorithm=\
```

output
```
2*x^3 + 2*x^2*e^2 - 2*x^2 + 2*x
```

3.1044.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int \left(2-4x+4e^2x+6x^2\right)\,dx = 2\,x^3+2\,x^2e^2-2\,x^2+2\,x$$

input
```
integrate(4*exp(2)*x+6*x^2-4*x+2,x, algorithm=\
```

output
```
2*x^3 + 2*x^2*e^2 - 2*x^2 + 2*x
```

3.1044.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \left(2-4x+4e^2x+6x^2\right)\,dx = 2\,x^3+\left(2\,\mathrm{e}^2-2\right)\,x^2+2\,x$$

input
```
int(4*x*exp(2) - 4*x + 6*x^2 + 2,x)
```

output
```
2*x + x^2*(2*exp(2) - 2) + 2*x^3
```

3.1045 $\int \frac{-50e^{25-50x}x^2-2\log(x)+\log^2(x)}{x^2}\,dx$

3.1045.1 Optimal result

Integrand size = 25, antiderivative size = 20

$$\int \frac{-50e^{25-50x}x^2-2\log(x)+\log^2(x)}{x^2}\,dx = 3+e^{25(1-2x)}-\frac{\log^2(x)}{x}$$

output
```
exp(-50*x+25)+3-ln(x)^2/x
```

3.1045.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{-50e^{25-50x}x^2-2\log(x)+\log^2(x)}{x^2}\,dx = e^{25-50x}-\frac{\log^2(x)}{x}$$

input
```
Integrate[(-50*E^(25 - 50*x)*x^2 - 2*Log[x] + Log[x]^2)/x^2,x]
```

output
```
E^(25 - 50*x) - Log[x]^2/x
```

3.1045.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.35, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-50e^{25-50x}x^2+\log^2(x)-2\log(x)}{x^2}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{(\log(x)-2)\log(x)}{x^2}-50e^{25-50x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$e^{25-50x}+\frac{(2-\log(x))\log(x)}{x}-\frac{2\log(x)}{x}$$

input
```
Int[(-50*E^(25 - 50*x)*x^2 - 2*Log[x] + Log[x]^2)/x^2,x]
```

output
```
E^(25 - 50*x) - (2*Log[x])/x + ((2 - Log[x])*Log[x])/x
```

3.1045.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1045.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

method	result	size
default	$-\frac{\ln(x)^2}{x}+\mathrm{e}^{-50x+25}$	17
risch	$-\frac{\ln(x)^2}{x}+\mathrm{e}^{-50x+25}$	17
parts	$-\frac{\ln(x)^2}{x}+\mathrm{e}^{-50x+25}$	17
norman	$\frac{x\,\mathrm{e}^{-50x+25}-\ln(x)^2}{x}$	20
parallelrisch	$-\frac{\ln(x)^2-x\,\mathrm{e}^{-50x+25}}{x}$	20

input
```
int((ln(x)^2-2*ln(x)-50*x^2*exp(-50*x+25))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-ln(x)^2/x+exp(-50*x+25)
```

3.1045.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-50e^{25-50x}x^2-2\log(x)+\log^2(x)}{x^2}\,dx=\frac{xe^{(-50\,x+25)}-\log\left(x\right)^2}{x}$$

input
```
integrate((log(x)^2-2*log(x)-50*x^2*exp(-50*x+25))/x^2,x, algorithm=\
```

output
```
(x*e^(-50*x + 25) - log(x)^2)/x
```

3.1045.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int \frac{-50e^{25-50x}x^2-2\log(x)+\log^2(x)}{x^2}\,dx=e^{25-50x}-\frac{\log\left(x\right)^2}{x}$$

input
```
integrate((ln(x)**2-2*ln(x)-50*x**2*exp(-50*x+25))/x**2,x)
```

output
```
exp(25 - 50*x) - log(x)**2/x
```

3.1045.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.70

$$\int \frac{-50e^{25-50x}x^2-2\log(x)+\log^2(x)}{x^2}\,dx = -\frac{\log(x)^2+2\,\log(x)+2}{x} + \frac{2\,\log(x)}{x} + \frac{2}{x} + e^{(-50\,x+25)}$$

input
```
integrate((log(x)^2-2*log(x)-50*x^2*exp(-50*x+25))/x^2,x, algorithm=\
```

output
```
-(log(x)^2 + 2*log(x) + 2)/x + 2*log(x)/x + 2/x + e^(-50*x + 25)
```

3.1045.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-50e^{25-50x}x^2-2\log(x)+\log^2(x)}{x^2}\,dx = \frac{xe^{(-50\,x+25)}-\log(x)^2}{x}$$

input
```
integrate((log(x)^2-2*log(x)-50*x^2*exp(-50*x+25))/x^2,x, algorithm=\
```

output
```
(x*e^(-50*x + 25) - log(x)^2)/x
```

3.1045.9 Mupad [B] (verification not implemented)

Time = 15.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{-50e^{25-50x}x^2-2\log(x)+\log^2(x)}{x^2}\,dx = \mathrm{e}^{-50\,x}\,\mathrm{e}^{25} - \frac{\ln(x)^2}{x}$$

input
```
int(-(2*log(x) - log(x)^2 + 50*x^2*exp(25 - 50*x))/x^2,x)
```

output
```
exp(-50*x)*exp(25) - log(x)^2/x
```

3.1046 $\int \frac{1}{2}(-2 - x \log(2)) \, dx$

3.1046.1 Optimal result

Integrand size = 11, antiderivative size = 24

$$\int \frac{1}{2}(-2 - x \log(2)) \, dx = 1 - x - \frac{1}{4} \log(2) \log \left(3e^{x^2} \left(1 + e^6\right)\right)$$

output
```
1-x-1/4*ln(3*(1+exp(6))*exp(x^2))*ln(2)
```

3.1046.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{1}{2}(-2 - x \log(2)) \, dx = -x - \frac{1}{4} x^2 \log(2)$$

input
```
Integrate[(-2 - x*Log[2])/2,x]
```

output
```
-x - (x^2*Log[2])/4
```

3.1046.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.67, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}(x(-\log(2))-2)\,dx$$

$$\Big\downarrow \; 17$$

$$-\frac{(x\log(2)+2)^2}{4\log(2)}$$

input
```
Int[(-2 - x*Log[2])/2,x]
```

output
```
-1/4*(2 + x*Log[2])^2/Log[2]
```

3.1046.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.1046.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.42

method	result	size
gosper	$-\frac{x(x\ln(2)+4)}{4}$	10
default	$-\frac{x^2\ln(2)}{4}-x$	12
norman	$-\frac{x^2\ln(2)}{4}-x$	12
risch	$-\frac{x^2\ln(2)}{4}-x$	12
parallelrisch	$-\frac{x^2\ln(2)}{4}-x$	12
parts	$-\frac{x^2\ln(2)}{4}-x$	12

input
```
int(-1/2*x*ln(2)-1,x,method=_RETURNVERBOSE)
```

output
```
-1/4*x*(x*ln(2)+4)
```

3.1046.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.46

$$\int \frac{1}{2}(-2 - x\log(2))\,dx = -\frac{1}{4}\,x^2\log{(2)} - x$$

input
```
integrate(-1/2*x*log(2)-1,x, algorithm=\
```

output
```
-1/4*x^2*log(2) - x
```

3.1046.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.42

$$\int \frac{1}{2}(-2 - x\log(2))\,dx = -\frac{x^2\log{(2)}}{4} - x$$

input
```
integrate(-1/2*x*ln(2)-1,x)
```

output
```
-x**2*log(2)/4 - x
```

3.1046.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.46

$$\int \frac{1}{2}(-2 - x\log(2))\,dx = -\frac{1}{4}\,x^2\log{(2)} - x$$

input
```
integrate(-1/2*x*log(2)-1,x, algorithm=\
```

output
```
-1/4*x^2*log(2) - x
```

3.1046.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.46

$$\int \frac{1}{2}(-2 - x\log(2))\,dx = -\frac{1}{4}\,x^2\log(2) - x$$

input
```
integrate(-1/2*x*log(2)-1,x, algorithm=\
```

output
```
-1/4*x^2*log(2) - x
```

3.1046.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.46

$$\int \frac{1}{2}(-2 - x\log(2))\,dx = -\frac{\ln(2)\,x^2}{4} - x$$

input
```
int(- (x*log(2))/2 - 1,x)
```

output
```
- x - (x^2*log(2))/4
```

3.1047 $\int \frac{1}{5} e^{\frac{1}{5}\left(-6x+6x^2+5x^3\right)}\left(-6+12x+15x^2\right) \, dx$

3.1047.1 Optimal result

Integrand size = 34, antiderivative size = 24

$$\int \frac{1}{5} e^{\frac{1}{5}\left(-6x+6x^2+5x^3\right)}\left(-6+12x+15x^2\right) \, dx = e^{\frac{1}{5}(-x-x(5+4x-5x(2+x)))}$$

output
```
exp(-1/5*x*(5-5*x*(2+x)+4*x)-1/5*x)
```

3.1047.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{1}{5} e^{\frac{1}{5}\left(-6x+6x^2+5x^3\right)}\left(-6+12x+15x^2\right) \, dx = e^{\frac{1}{5}x\left(-6+6x+5x^2\right)}$$

input
```
Integrate[(E^((-6*x + 6*x^2 + 5*x^3)/5)*(-6 + 12*x + 15*x^2))/5,x]
```

output
```
E^((x*(-6 + 6*x + 5*x^2))/5)
```

3.1047.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.088, Rules used = {27, 27, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5} e^{\frac{1}{5}\left(5 x^3+6 x^2-6 x\right)} \left(15 x^2+12 x-6\right) \, dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{5} \int -3 e^{\frac{1}{5}\left(5 x^3+6 x^2-6 x\right)} \left(-5 x^2-4 x+2\right) dx$$

$$\Big\downarrow \; 27$$

$$-\frac{3}{5} \int e^{\frac{1}{5}\left(5 x^3+6 x^2-6 x\right)} \left(-5 x^2-4 x+2\right) dx$$

$$\Big\downarrow \; 7257$$

$$e^{\frac{1}{5}\left(5 x^3+6 x^2-6 x\right)}$$

input
```
Int[(E^((-6*x + 6*x^2 + 5*x^3)/5)*(-6 + 12*x + 15*x^2))/5,x]
```

output
```
E^((-6*x + 6*x^2 + 5*x^3)/5)
```

3.1047.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.1047.4 Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.58

method	result	size
gosper	$e^{x^3+\frac{6}{5}x^2-\frac{6}{5}x}$	14
default	$e^{x^3+\frac{6}{5}x^2-\frac{6}{5}x}$	14
norman	$e^{x^3+\frac{6}{5}x^2-\frac{6}{5}x}$	14
parallelrisch	$e^{x^3+\frac{6}{5}x^2-\frac{6}{5}x}$	14
risch	$e^{\frac{x\left(5x^2+6x-6\right)}{5}}$	15

input
```
int(1/5*(15*x^2+12*x-6)*exp(x^3+6/5*x^2-6/5*x),x,method=_RETURNVERBOSE)
```

output
```
exp(x^3+6/5*x^2-6/5*x)
```

3.1047.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{1}{5}e^{\frac{1}{5}\left(-6x+6x^2+5x^3\right)}\left(-6+12x+15x^2\right)\,dx=e^{\left(x^3+\frac{6}{5}\,x^2-\frac{6}{5}\,x\right)}$$

input
```
integrate(1/5*(15*x^2+12*x-6)*exp(x^3+6/5*x^2-6/5*x),x, algorithm=\
```

output
```
e^(x^3 + 6/5*x^2 - 6/5*x)
```

3.1047.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{1}{5}e^{\frac{1}{5}\left(-6x+6x^2+5x^3\right)}\left(-6+12x+15x^2\right)\,dx=e^{x^3+\frac{6x^2}{5}-\frac{6x}{5}}$$

input
```
integrate(1/5*(15*x**2+12*x-6)*exp(x**3+6/5*x**2-6/5*x),x)
```

output
```
exp(x**3 + 6*x**2/5 - 6*x/5)
```

3.1047.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{1}{5}e^{\frac{1}{5}(-6x+6x^2+5x^3)}\left(-6+12x+15x^2\right)\,dx = e^{\left(x^3+\frac{6}{5}\,x^2-\frac{6}{5}\,x\right)}$$

input
```
integrate(1/5*(15*x^2+12*x-6)*exp(x^3+6/5*x^2-6/5*x),x, algorithm=\
```

output
```
e^(x^3 + 6/5*x^2 - 6/5*x)
```

3.1047.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.54

$$\int \frac{1}{5}e^{\frac{1}{5}(-6x+6x^2+5x^3)}\left(-6+12x+15x^2\right)\,dx = e^{\left(x^3+\frac{6}{5}\,x^2-\frac{6}{5}\,x\right)}$$

input
```
integrate(1/5*(15*x^2+12*x-6)*exp(x^3+6/5*x^2-6/5*x),x, algorithm=\
```

output
```
e^(x^3 + 6/5*x^2 - 6/5*x)
```

3.1047.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.62

$$\int \frac{1}{5}e^{\frac{1}{5}(-6x+6x^2+5x^3)}\left(-6+12x+15x^2\right)\,dx = \mathrm{e}^{-\frac{6\,x}{5}}\,\mathrm{e}^{x^3}\,\mathrm{e}^{\frac{6\,x^2}{5}}$$

input
```
int((exp((6*x^2)/5 - (6*x)/5 + x^3)*(12*x + 15*x^2 - 6))/5,x)
```

output
```
exp(-(6*x)/5)*exp(x^3)*exp((6*x^2)/5)
```

3.1048 $\int \left(\left(45-15 x^2\right) \log (2)-15 x^2 \log (2) \log \left(x^3\right)\right) \, dx$

3.1048.1 Optimal result

Integrand size = 22, antiderivative size = 18

$$\int \left(\left(45-15 x^2\right) \log (2)-15 x^2 \log (2) \log \left(x^3\right)\right) \, dx=\frac{5}{2} x \log (2) \left(18-2 x^2 \log \left(x^3\right)\right)$$

output
```
5/2*x*(18-2*x^2*ln(x^3))*ln(2)
```

3.1048.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \left(\left(45-15 x^2\right) \log (2)-15 x^2 \log (2) \log \left(x^3\right)\right) \, dx=45 x \log (2)-5 x^3 \log (2) \log \left(x^3\right)$$

input
```
Integrate[(45 - 15*x^2)*Log[2] - 15*x^2*Log[2]*Log[x^3],x]
```

output
```
45*x*Log[2] - 5*x^3*Log[2]*Log[x^3]
```

3.1048.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\left(45-15x^2\right)\log(2)-15x^2\log(2)\log\left(x^3\right)\right)\,dx$$

$$\Big\downarrow \ 2009$$

$$45x\log(2)-5x^3\log(2)\log\left(x^3\right)$$

input
```
Int[(45 - 15*x^2)*Log[2] - 15*x^2*Log[2]*Log[x^3],x]
```

output
```
45*x*Log[2] - 5*x^3*Log[2]*Log[x^3]
```

3.1048.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1048.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

method	result	size
norman	$45x\ln(2)-5\ln(2)x^3\ln(x^3)$	18
risch	$45x\ln(2)-5\ln(2)x^3\ln(x^3)$	18
parallelrisch	$45x\ln(2)-5\ln(2)x^3\ln(x^3)$	18
default	$15\ln(2)\left(-\frac{1}{3}x^3+3x\right)-5\ln(2)x^3\ln(x^3)+5x^3\ln(2)$	33
parts	$-15\ln(2)\left(\frac{1}{3}x^3-3x\right)-5\ln(2)x^3\ln(x^3)+5x^3\ln(2)$	33

input
```
int(-15*x^2*ln(2)*ln(x^3)+(-15*x^2+45)*ln(2),x,method=_RETURNVERBOSE)
```

output
```
45*x*ln(2)-5*ln(2)*x^3*ln(x^3)
```

3.1048.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \left(\left(45-15x^2\right)\log(2)-15x^2\log(2)\log\left(x^3\right)\right)\,dx=-5\,x^3\log\left(2\right)\log\left(x^3\right)+45\,x\log\left(2\right)$$

input
```
integrate(-15*x^2*log(2)*log(x^3)+(-15*x^2+45)*log(2),x, algorithm=\
```

output
```
-5*x^3*log(2)*log(x^3) + 45*x*log(2)
```

3.1048.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \left(\left(45-15x^2\right)\log(2)-15x^2\log(2)\log\left(x^3\right)\right)\,dx=-5x^3\log\left(2\right)\log\left(x^3\right)+45x\log\left(2\right)$$

input
```
integrate(-15*x**2*ln(2)*ln(x**3)+(-15*x**2+45)*ln(2),x)
```

output
```
-5*x**3*log(2)*log(x**3) + 45*x*log(2)
```

3.1048.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.67

$$\int \left(\left(45-15x^2\right)\log(2)-15x^2\log(2)\log\left(x^3\right)\right)\,dx$$
$$=-5\left(x^3\log\left(x^3\right)-x^3\right)\log\left(2\right)-5\left(x^3-9\,x\right)\log\left(2\right)$$

input
```
integrate(-15*x^2*log(2)*log(x^3)+(-15*x^2+45)*log(2),x, algorithm=\
```

output
```
-5*(x^3*log(x^3) - x^3)*log(2) - 5*(x^3 - 9*x)*log(2)
```

3.1048.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.67

$$\int \left((45-15x^2)\log(2) - 15x^2\log(2)\log\left(x^3\right)\right)\,dx$$
$$= -5\left(x^3\log\left(x^3\right) - x^3\right)\log\left(2\right) - 5\left(x^3 - 9\,x\right)\log\left(2\right)$$

input
```
integrate(-15*x^2*log(2)*log(x^3)+(-15*x^2+45)*log(2),x, algorithm=\
```

output
```
-5*(x^3*log(x^3) - x^3)*log(2) - 5*(x^3 - 9*x)*log(2)
```

3.1048.9 Mupad [B] (verification not implemented)

Time = 15.43 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \left((45-15x^2)\log(2) - 15x^2\log(2)\log\left(x^3\right)\right)\,dx = -5\,x\,\ln\left(2\right)\,\left(x^2\,\ln\left(x^3\right) - 9\right)$$

input
```
int(- log(2)*(15*x^2 - 45) - 15*x^2*log(x^3)*log(2),x)
```

output
```
-5*x*log(2)*(x^2*log(x^3) - 9)
```

3.1049 $\int \frac{4+32x+15x^2-150x^3-125x^4}{1+6x+27x^2+68x^3+135x^4+150x^5+125x^6} dx$

3.1049.1 Optimal result

Integrand size = 53, antiderivative size = 18

$$\int \frac{4+32x+15x^2-150x^3-125x^4}{1+6x+27x^2+68x^3+135x^4+150x^5+125x^6} dx = \frac{x}{\left(x+\frac{1}{x+\log(e^{2+4x})}\right)^2}$$

output
```
x/(1/(x+ln(exp(1+2*x)^2))+x)^2
```

3.1049.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{4+32x+15x^2-150x^3-125x^4}{1+6x+27x^2+68x^3+135x^4+150x^5+125x^6} dx = \frac{x(2+5x)^2}{(1+2x+5x^2)^2}$$

input
```
Integrate[(4 + 32*x + 15*x^2 - 150*x^3 - 125*x^4)/(1 + 6*x + 27*x^2 + 68*x
^3 + 135*x^4 + 150*x^5 + 125*x^6),x]
```

output
```
(x*(2 + 5*x)^2)/(1 + 2*x + 5*x^2)^2
```

3.1049.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 62 vs. $2(18) = 36$.

Time = 0.28 (sec) , antiderivative size = 62, normalized size of antiderivative = 3.44, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.038, Rules used = {2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-125x^4-150x^3+15x^2+32x+4}{125x^6+150x^5+135x^4+68x^3+27x^2+6x+1}\,dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{21-10x}{(5x^2+2x+1)^2}-\frac{5}{5x^2+2x+1}+\frac{4(5x-3)}{(5x^2+2x+1)^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{15(5x+1)}{8(5x^2+2x+1)}+\frac{115x+31}{8(5x^2+2x+1)}-\frac{5x+2}{(5x^2+2x+1)^2}$$

input
```
Int[(4 + 32*x + 15*x^2 - 150*x^3 - 125*x^4)/(1 + 6*x + 27*x^2 + 68*x^3 + 1
35*x^4 + 150*x^5 + 125*x^6),x]
```

output
```
-((2 + 5*x)/(1 + 2*x + 5*x^2)^2) - (15*(1 + 5*x))/(8*(1 + 2*x + 5*x^2)) +
(31 + 115*x)/(8*(1 + 2*x + 5*x^2))
```

3.1049.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.1049.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.56

method	result	size
norman	$\frac{25x^3+20x^2+4x}{(5x^2+2x+1)^2}$	28
default	$-\frac{25\left(-x^3-\frac{4}{5}x^2-\frac{4}{25}x\right)}{(5x^2+2x+1)^2}$	29
gosper	$\frac{x(2+5x)^2}{25x^4+20x^3+14x^2+4x+1}$	32
risch	$\frac{x^3+\frac{4}{5}x^2+\frac{4}{25}x}{x^4+\frac{4}{5}x^3+\frac{14}{25}x^2+\frac{4}{25}x+\frac{1}{25}}$	34
parallelrisch	$\frac{25x^3+20x^2+4x}{25x^4+20x^3+14x^2+4x+1}$	38

input
```
int((-125*x^4-150*x^3+15*x^2+32*x+4)/(125*x^6+150*x^5+135*x^4+68*x^3+27*x^
2+6*x+1),x,method=_RETURNVERBOSE)
```

output
```
(25*x^3+20*x^2+4*x)/(5*x^2+2*x+1)^2
```

3.1049.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. 2(17) = 34.

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.06

$$\int \frac{4+32x+15x^2-150x^3-125x^4}{1+6x+27x^2+68x^3+135x^4+150x^5+125x^6}\,dx = \frac{25\,x^3+20\,x^2+4\,x}{25\,x^4+20\,x^3+14\,x^2+4\,x+1}$$

input
```
integrate((-125*x^4-150*x^3+15*x^2+32*x+4)/(125*x^6+150*x^5+135*x^4+68*x^3
+27*x^2+6*x+1),x, algorithm=\
```

output
```
(25*x^3 + 20*x^2 + 4*x)/(25*x^4 + 20*x^3 + 14*x^2 + 4*x + 1)
```

3.1049.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. $2(15) = 30$.

Time = 0.07 (sec) , antiderivative size = 36, normalized size of antiderivative = 2.00

$$\int \frac{4+32x+15x^2-150x^3-125x^4}{1+6x+27x^2+68x^3+135x^4+150x^5+125x^6}\,dx = -\frac{-25x^3-20x^2-4x}{25x^4+20x^3+14x^2+4x+1}$$

input
```
integrate((-125*x**4-150*x**3+15*x**2+32*x+4)/(125*x**6+150*x**5+135*x**4+
68*x**3+27*x**2+6*x+1),x)
```

output
```
-(-25*x**3 - 20*x**2 - 4*x)/(25*x**4 + 20*x**3 + 14*x**2 + 4*x + 1)
```

3.1049.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(17) = 34$.

Time = 0.20 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.06

$$\int \frac{4+32x+15x^2-150x^3-125x^4}{1+6x+27x^2+68x^3+135x^4+150x^5+125x^6}\,dx = \frac{25\,x^3+20\,x^2+4\,x}{25\,x^4+20\,x^3+14\,x^2+4\,x+1}$$

input
```
integrate((-125*x^4-150*x^3+15*x^2+32*x+4)/(125*x^6+150*x^5+135*x^4+68*x^3
+27*x^2+6*x+1),x, algorithm=\
```

output
```
(25*x^3 + 20*x^2 + 4*x)/(25*x^4 + 20*x^3 + 14*x^2 + 4*x + 1)
```

3.1049.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{4+32x+15x^2-150x^3-125x^4}{1+6x+27x^2+68x^3+135x^4+150x^5+125x^6}\,dx = \frac{25\,x^3+20\,x^2+4\,x}{(5\,x^2+2\,x+1)^2}$$

input
```
integrate((-125*x^4-150*x^3+15*x^2+32*x+4)/(125*x^6+150*x^5+135*x^4+68*x^3
+27*x^2+6*x+1),x, algorithm=\
```

output
```
(25*x^3 + 20*x^2 + 4*x)/(5*x^2 + 2*x + 1)^2
```

3.1049.9 Mupad [B] (verification not implemented)

Time = 14.99 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{4+32x+15x^2-150x^3-125x^4}{1+6x+27x^2+68x^3+135x^4+150x^5+125x^6}\,dx = \frac{x\,(5\,x+2)^2}{(5\,x^2+2\,x+1)^2}$$

input
```
int((32*x + 15*x^2 - 150*x^3 - 125*x^4 + 4)/(6*x + 27*x^2 + 68*x^3 + 135*x
^4 + 150*x^5 + 125*x^6 + 1),x)
```

output
```
(x*(5*x + 2)^2)/(2*x + 5*x^2 + 1)^2
```

3.1050 $\int \frac{-6-7x+27x^2-9x^3+x^4-2x\log(x^2)}{-81x+72x^2-9x^3-5x^4+x^5+(-3x+x^2)\log(x^2)}\,dx$

3.1050.1 Optimal result

Integrand size = 62, antiderivative size = 16

$$\int \frac{-6-7x+27x^2-9x^3+x^4-2x\log(x^2)}{-81x+72x^2-9x^3-5x^4+x^5+(-3x+x^2)\log(x^2)}\,dx = \log\left(4+x+\frac{-9+\log(x^2)}{(-3+x)^2}\right)$$

output
```
ln(x+4+(ln(x^2)-9)/(-3+x)^2)
```

3.1050.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.69

$$\int \frac{-6-7x+27x^2-9x^3+x^4-2x\log(x^2)}{-81x+72x^2-9x^3-5x^4+x^5+(-3x+x^2)\log(x^2)}\,dx = -2\log(3-x)+\log\left(27-15x-2x^2+x^3+\log(x^2)\right)$$

input
```
Integrate[(-6 - 7*x + 27*x^2 - 9*x^3 + x^4 - 2*x*Log[x^2])/(-81*x + 72*x^2
 - 9*x^3 - 5*x^4 + x^5 + (-3*x + x^2)*Log[x^2]),x]
```

output
```
-2*Log[3 - x] + Log[27 - 15*x - 2*x^2 + x^3 + Log[x^2]]
```

3.1050.3 Rubi [A] (verified)

Time = 0.77 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.69, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.048, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4-9x^3+27x^2-2x\log(x^2)-7x-6}{x^5-5x^4-9x^3+72x^2+(x^2-3x)\log(x^2)-81x}dx$$
$$\Big\downarrow \text{ 7292}$$
$$\int \frac{-x^4+9x^3-27x^2+2x\log(x^2)+7x+6}{(3-x)x(x^3-2x^2+\log(x^2)-15x+27)}dx$$
$$\Big\downarrow \text{ 7293}$$
$$\int \left(\frac{3x^3-4x^2-15x+2}{x(x^3-2x^2+\log(x^2)-15x+27)}-\frac{2}{x-3}\right)dx$$
$$\Big\downarrow \text{ 2009}$$
$$\log(x^3-2x^2+\log(x^2)-15x+27)-2\log(3-x)$$

input
```
Int[(-6 - 7*x + 27*x^2 - 9*x^3 + x^4 - 2*x*Log[x^2])/(-81*x + 72*x^2 - 9*x
^3 - 5*x^4 + x^5 + (-3*x + x^2)*Log[x^2]),x]
```

output
```
-2*Log[3 - x] + Log[27 - 15*x - 2*x^2 + x^3 + Log[x^2]]
```

3.1050.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1050.4 Maple [A] (verified)

Time = 1.36 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.62

method	result	size
norman	$-2\ln\left(-3+x\right)+\ln\left(x^{3}-2x^{2}-15x+\ln\left(x^{2}\right)+27\right)$	26
risch	$-2\ln\left(-3+x\right)+\ln\left(x^{3}-2x^{2}-15x+\ln\left(x^{2}\right)+27\right)$	26
parallelrisch	$-2\ln\left(-3+x\right)+\ln\left(x^{3}-2x^{2}-15x+\ln\left(x^{2}\right)+27\right)$	26

input
```
int((-2*x*ln(x^2)+x^4-9*x^3+27*x^2-7*x-6)/((x^2-3*x)*ln(x^2)+x^5-5*x^4-9*x
^3+72*x^2-81*x),x,method=_RETURNVERBOSE)
```

output
```
-2*ln(-3+x)+ln(x^3-2*x^2-15*x+ln(x^2)+27)
```

3.1050.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.56

$$\int \frac{-6-7x+27x^2-9x^3+x^4-2x\log\left(x^2\right)}{-81x+72x^2-9x^3-5x^4+x^5+\left(-3x+x^2\right)\log\left(x^2\right)}\,dx = \log\left(x^{3}-2\,x^{2}-15\,x+\log\left(x^{2}\right)+27\right)-2\,\log\left(x-3\right)$$

input
```
integrate((-2*x*log(x^2)+x^4-9*x^3+27*x^2-7*x-6)/((x^2-3*x)*log(x^2)+x^5-5
*x^4-9*x^3+72*x^2-81*x),x, algorithm=\
```

output
```
log(x^3 - 2*x^2 - 15*x + log(x^2) + 27) - 2*log(x - 3)
```

3.1050.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.62

$$\int \frac{-6-7x+27x^2-9x^3+x^4-2x\log\left(x^2\right)}{-81x+72x^2-9x^3-5x^4+x^5+\left(-3x+x^2\right)\log\left(x^2\right)}\,dx = -2\log\left(x-3\right)+\log\left(x^{3}-2x^{2}-15x+\log\left(x^{2}\right)+27\right)$$

input
```
integrate((-2*x*ln(x**2)+x**4-9*x**3+27*x**2-7*x-6)/((x**2-3*x)*ln(x**2)+x
**5-5*x**4-9*x**3+72*x**2-81*x),x)
```

output
```
-2*log(x - 3) + log(x**3 - 2*x**2 - 15*x + log(x**2) + 27)
```

3.1050.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.56

$$\int \frac{-6-7x+27x^2-9x^3+x^4-2x\log(x^2)}{-81x+72x^2-9x^3-5x^4+x^5+(-3x+x^2)\log(x^2)}\,dx = \log\left(\frac{1}{2}\,x^3-x^2-\frac{15}{2}\,x+\log(x)+\frac{27}{2}\right)-2\,\log(x-3)$$

input
```
integrate((-2*x*log(x^2)+x^4-9*x^3+27*x^2-7*x-6)/((x^2-3*x)*log(x^2)+x^5-5
*x^4-9*x^3+72*x^2-81*x),x, algorithm=\
```

output
```
log(1/2*x^3 - x^2 - 15/2*x + log(x) + 27/2) - 2*log(x - 3)
```

3.1050.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.56

$$\int \frac{-6-7x+27x^2-9x^3+x^4-2x\log(x^2)}{-81x+72x^2-9x^3-5x^4+x^5+(-3x+x^2)\log(x^2)}\,dx = \log\left(x^3-2\,x^2-15\,x+\log\left(x^2\right)+27\right)-2\,\log(x-3)$$

input
```
integrate((-2*x*log(x^2)+x^4-9*x^3+27*x^2-7*x-6)/((x^2-3*x)*log(x^2)+x^5-5
*x^4-9*x^3+72*x^2-81*x),x, algorithm=\
```

output
```
log(x^3 - 2*x^2 - 15*x + log(x^2) + 27) - 2*log(x - 3)
```

3.1050.9 Mupad [B] (verification not implemented)

Time = 15.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.56

$$\int \frac{-6-7x+27x^2-9x^3+x^4-2x\log\left(x^2\right)}{-81x+72x^2-9x^3-5x^4+x^5+(-3x+x^2)\log\left(x^2\right)}\,dx = \ln\left(\ln\left(x^2\right)-15\,x-2\,x^2+x^3+27\right)-2\,\ln\left(x-3\right)$$

input
```
int((7*x + 2*x*log(x^2) - 27*x^2 + 9*x^3 - x^4 + 6)/(81*x + log(x^2)*(3*x
- x^2) - 72*x^2 + 9*x^3 + 5*x^4 - x^5),x)
```

output
```
log(log(x^2) - 15*x - 2*x^2 + x^3 + 27) - 2*log(x - 3)
```

3.1051 $\int \frac{1+\log(x)+(x-x^2-x^3-4x^4-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\log(\log(\log(-x\log(x))))}{(x^2-x^3-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\log(\log(\log(-x\log(x))))}\,dx$

3.1051.1 Optimal result

Integrand size = 126, antiderivative size = 23

$$\int \frac{1+\log(x)+(x-x^2-x^3-4x^4-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\log(\log(\log(-x\log(x))))}{(x^2-x^3-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\log(\log(\log(-x\log(x))))}\,dx = x+\log\left(-x+x^2+x^4-\log(\log(\log(-x\log(x))))\right)$$

output
```
ln(x^2+x^4-x-ln(ln(ln(-x*ln(x)))))+x
```

3.1051.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{1+\log(x)+(x-x^2-x^3-4x^4-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\log(\log(\log(-x\log(x))))}{(x^2-x^3-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\log(\log(\log(-x\log(x))))}\,dx = x+\log\left(-x+x^2+x^4-\log(\log(\log(-x\log(x))))\right)$$

input
```
Integrate[(1 + Log[x] + (x - x^2 - x^3 - 4*x^4 - x^5)*Log[x]*Log[-(x*Log[x
])]*Log[Log[-(x*Log[x])]] + x*Log[x]*Log[-(x*Log[x])]*Log[Log[-(x*Log[x])]
]*Log[Log[Log[-(x*Log[x])]]])/((x^2 - x^3 - x^5)*Log[x]*Log[-(x*Log[x])]*L
og[Log[-(x*Log[x])]] + x*Log[x]*Log[-(x*Log[x])]*Log[Log[-(x*Log[x])]]*Log
[Log[Log[-(x*Log[x])]]]),x]
```

output
```
x + Log[-x + x^2 + x^4 - Log[Log[Log[-(x*Log[x])]]]]
```

3.1051.3 Rubi [A] (verified)

Time = 2.52 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.024$, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-x^5-4x^4-x^3-x^2+x)\log(-x\log(x))\log(\log(-x\log(x)))\log(x)+x\log(-x\log(x))\log(\log(-x\log(x)))\log}{(-x^5-x^3+x^2)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(\log(-x}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{(-x^5-4x^4-x^3-x^2+x)\log(-x\log(x))\log(\log(-x\log(x)))\log(x)+x\log(-x\log(x))\log(\log(-x\log(x)))\log}{x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\left(-x^4-x^2+x+\log(\log(\log(-x\log\right.}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4x^4\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+2x^2\log(x)\log(-x\log(x))\log(\log(-x\log(x)))-x\log(x)\log(}{x\log(x)\log(-x\log(x))\log(\log(-x\log(x)))\left(x^4+x^2-x-\log(\log(\log(-x\log\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$\log\left(-x^4-x^2+x+\log(\log(\log(-x\log(x))))\right)+x$$

input
```
Int[(1 + Log[x] + (x - x^2 - x^3 - 4*x^4 - x^5)*Log[x]*Log[-(x*Log[x])]*Lo
g[Log[-(x*Log[x])]] + x*Log[x]*Log[-(x*Log[x])]*Log[Log[-(x*Log[x])]]*Log[
Log[Log[-(x*Log[x])]]])/((x^2 - x^3 - x^5)*Log[x]*Log[-(x*Log[x])]*Log[Log
[-(x*Log[x])]] + x*Log[x]*Log[-(x*Log[x])]*Log[Log[-(x*Log[x])]]*Log[Log[L
og[-(x*Log[x])]]]),x]
```

output
```
x + Log[x - x^2 - x^4 + Log[Log[Log[-(x*Log[x])]]]]
```

3.1051.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1051.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.01 (sec) , antiderivative size = 92, normalized size of antiderivative = 4.00

$$x+\ln\left(-x^4-x^2+x+\ln\left(\ln\left(i\pi+\ln(x)+\ln(\ln(x))-\frac{i\pi\ \mathrm{csgn}(ix\ln(x))\left(-\mathrm{csgn}(ix\ln(x))+\mathrm{csgn}(ix)\right)\right.}{2}\right.\right.\right.$$

input
```
int((x*ln(x)*ln(-x*ln(x))*ln(ln(-x*ln(x)))*ln(ln(ln(-x*ln(x))))+(-x^5-4*x^
4-x^3-x^2+x)*ln(x)*ln(-x*ln(x))*ln(ln(-x*ln(x)))+ln(x)+1)/(x*ln(x)*ln(-x*l
n(x))*ln(ln(-x*ln(x)))*ln(ln(ln(-x*ln(x))))+(-x^5-x^3+x^2)*ln(x)*ln(-x*ln(
x))*ln(ln(-x*ln(x)))),x)
```

output
```
x+ln(-x^4-x^2+x+ln(ln(I*Pi+ln(x)+ln(ln(x))-1/2*I*Pi*csgn(I*x*ln(x))*(-csgn
(I*x*ln(x))+csgn(I*x))*(-csgn(I*x*ln(x))+csgn(I*ln(x)))+I*Pi*csgn(I*x*ln(x
))^2*(csgn(I*x*ln(x))-1))))
```

3.1051.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{1+\log(x)+(x-x^2-x^3-4x^4-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x)}{(x^2-x^3-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-}$$
$$=x+\log\left(-x^4-x^2+x+\log\left(\log\left(\log\left(-x\log\left(x\right)\right)\right)\right)\right)$$

input
```
integrate((x*log(x)*log(-x*log(x))*log(log(-x*log(x)))*log(log(log(-x*log(
x))))+(-x^5-4*x^4-x^3-x^2+x)*log(x)*log(-x*log(x))*log(log(-x*log(x)))+log
(x)+1)/(x*log(x)*log(-x*log(x))*log(log(-x*log(x)))*log(log(log(-x*log(x))
))+(-x^5-x^3+x^2)*log(x)*log(-x*log(x))*log(log(-x*log(x)))),x, algorithm=
\
```

output
```
x + log(-x^4 - x^2 + x + log(log(log(-x*log(x)))))
```

3.1051.6 Sympy [A] (verification not implemented)

Time = 0.62 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{1+\log(x)+(x-x^2-x^3-4x^4-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x}{(x^2-x^3-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-}$$
$$= x+\log\left(-x^4-x^2+x+\log\left(\log\left(\log\left(-x\log\left(x\right)\right)\right)\right)\right)$$

input
```
integrate((x*ln(x)*ln(-x*ln(x))*ln(ln(-x*ln(x)))*ln(ln(ln(-x*ln(x))))+(-x*
*5-4*x**4-x**3-x**2+x)*ln(x)*ln(-x*ln(x))*ln(ln(-x*ln(x)))+ln(x)+1)/(x*ln(
x)*ln(-x*ln(x))*ln(ln(-x*ln(x)))*ln(ln(ln(-x*ln(x))))+(-x**5-x**3+x**2)*ln
(x)*ln(-x*ln(x))*ln(ln(-x*ln(x)))),x)
```

output
```
x + log(-x**4 - x**2 + x + log(log(log(-x*log(x)))))
```

3.1051.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1+\log(x)+(x-x^2-x^3-4x^4-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x}{(x^2-x^3-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-}$$
$$= x+\log\left(-x^4-x^2+x+\log\left(\log\left(\log\left(x\right)+\log\left(-\log\left(x\right)\right)\right)\right)\right)$$

input
```
integrate((x*log(x)*log(-x*log(x))*log(log(-x*log(x)))*log(log(log(-x*log(
x))))+(-x^5-4*x^4-x^3-x^2+x)*log(x)*log(-x*log(x))*log(log(-x*log(x)))+log
(x)+1)/(x*log(x)*log(-x*log(x))*log(log(-x*log(x)))*log(log(log(-x*log(x))
))+(-x^5-x^3+x^2)*log(x)*log(-x*log(x))*log(log(-x*log(x)))),x, algorithm=
\
```

output
```
x + log(-x^4 - x^2 + x + log(log(log(x) + log(-log(x)))))
```

3.1051.8 Giac [A] (verification not implemented)

Time = 5.06 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1+\log(x)+(x-x^2-x^3-4x^4-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x}{(x^2-x^3-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-}$$
$$= x+\log\left(-x^4-x^2+x+\log\left(\log\left(\log\left(x\right)+\log\left(-\log\left(x\right)\right)\right)\right)\right)$$

input
```
integrate((x*log(x)*log(-x*log(x))*log(log(-x*log(x)))*log(log(log(-x*log(
x))))+(-x^5-4*x^4-x^3-x^2+x)*log(x)*log(-x*log(x))*log(log(-x*log(x)))+log
(x)+1)/(x*log(x)*log(-x*log(x))*log(log(-x*log(x)))*log(log(log(-x*log(x))
))+(-x^5-x^3+x^2)*log(x)*log(-x*log(x))*log(log(-x*log(x)))),x, algorithm=
\
```

output
```
x + log(-x^4 - x^2 + x + log(log(log(x) + log(-log(x)))))
```

3.1051.9 Mupad [F(-1)]

Timed out.

$$\int \frac{1+\log(x)+(x-x^2-x^3-4x^4-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x}{(x^2-x^3-x^5)\log(x)\log(-x\log(x))\log(\log(-x\log(x)))+x\log(x)\log(-x\log(x))\log(\log(-}$$
$$= -\int \frac{\ln(x)-\ln(-x\,\ln(x))\,\ln(\ln(-x\,\ln(x)))\,\ln(x)\,\left(x^5+4\,x^4+x^3+x^2-x\right)+x\,\ln(\ln(\ln(-x\,\ln(x))}{\ln(-x\,\ln(x))\,\ln(\ln(-x\,\ln(x)))\,\ln(x)\,\left(x^5+x^3-x^2\right)-x\,\ln(\ln(\ln(-x\,\ln(x))))\,\ln(-}$$

input
```
int(-(log(x) - log(-x*log(x))*log(log(-x*log(x)))*log(x)*(x^2 - x + x^3 +
4*x^4 + x^5) + x*log(log(log(-x*log(x))))*log(-x*log(x))*log(log(-x*log(x)
))*log(x) + 1)/(log(-x*log(x))*log(log(-x*log(x)))*log(x)*(x^3 - x^2 + x^5
) - x*log(log(log(-x*log(x))))*log(-x*log(x))*log(log(-x*log(x)))*log(x)),
x)
```

output
```
-int((log(x) - log(-x*log(x))*log(log(-x*log(x)))*log(x)*(x^2 - x + x^3 +
4*x^4 + x^5) + x*log(log(log(-x*log(x))))*log(-x*log(x))*log(log(-x*log(x)
))*log(x) + 1)/(log(-x*log(x))*log(log(-x*log(x)))*log(x)*(x^3 - x^2 + x^5
) - x*log(log(log(-x*log(x))))*log(-x*log(x))*log(log(-x*log(x)))*log(x)),
 x)
```

3.1052 $\int \frac{e^{-x}\left(e^x\left(4-36x^2\right)+e^{4+2x}\left(x^2+x^3\right)\right)}{4x^2}\,dx$

3.1052.1 Optimal result

Integrand size = 39, antiderivative size = 29

$$\int \frac{e^{-x}(e^x(4-36x^2)+e^{4+2x}(x^2+x^3))}{4x^2}\,dx=1+\left(\frac{e^{4+x}}{4}-\left(4+\frac{1-x}{x}\right)^2\right)x$$

output
```
x*(1/4*exp(2+x)^2/exp(x)-(4+(1-x)/x)^2)+1
```

3.1052.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.66

$$\int \frac{e^{-x}(e^x(4-36x^2)+e^{4+2x}(x^2+x^3))}{4x^2}\,dx=-\frac{1}{x}-9x+\frac{1}{4}e^{4+x}x$$

input
```
Integrate[(E^x*(4 - 36*x^2) + E^(4 + 2*x)*(x^2 + x^3))/(4*E^x*x^2),x]
```

output
```
-x^(-1) - 9*x + (E^(4 + x)*x)/4
```

3.1052.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {27, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(e^x\left(4-36x^2\right)+e^{2x+4}\left(x^3+x^2\right)\right)}{4x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int \frac{e^{-x}\left(4e^x\left(1-9x^2\right)+e^{2x+4}\left(x^3+x^2\right)\right)}{x^2}dx$$

$$\Big\downarrow \text{7239}$$

$$\frac{1}{4}\int \left(4\left(\frac{1}{x^2}-9\right)+e^{x+4}(x+1)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(-36x-e^{x+4}+e^{x+4}(x+1)-\frac{4}{x}\right)$$

input
```
Int[(E^x*(4 - 36*x^2) + E^(4 + 2*x)*(x^2 + x^3))/(4*E^x*x^2),x]
```

output
```
(-E^(4 + x) - 4/x - 36*x + E^(4 + x)*(1 + x))/4
```

3.1052.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1052.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.59

method	result	size
risch	$-9x-\frac{1}{x}+\frac{x\,\mathrm{e}^{4+x}}{4}$	17
parallelrisch	$\frac{\left(\mathrm{e}^{4+2x}x^{2}-36\,\mathrm{e}^{x}x^{2}-4\,\mathrm{e}^{x}\right)\mathrm{e}^{-x}}{4x}$	32
default	$-9x+\frac{\mathrm{e}^{4}\mathrm{e}^{x}}{4}+\frac{\mathrm{e}^{4}\left(\mathrm{e}^{x}x-\mathrm{e}^{x}\right)}{4}-\frac{1}{x}$	33
parts	$-9x+\frac{\mathrm{e}^{4}\mathrm{e}^{x}}{4}+\frac{\mathrm{e}^{4}\left(\mathrm{e}^{x}x-\mathrm{e}^{x}\right)}{4}-\frac{1}{x}$	33
norman	$\frac{\left(-9\,\mathrm{e}^{x}x^{2}+\frac{\mathrm{e}^{4}\mathrm{e}^{2x}x^{2}}{4}-\mathrm{e}^{x}\right)\mathrm{e}^{-x}}{x}$	34

input
```
int(1/4*((x^3+x^2)*exp(2+x)^2+(-36*x^2+4)*exp(x))/exp(x)/x^2,x,method=_RET
URNVERBOSE)
```

output
```
-9*x-1/x+1/4*x*exp(4+x)
```

3.1052.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{e^{-x}(e^{x}(4-36x^{2})+e^{4+2x}(x^{2}+x^{3}))}{4x^{2}}\,dx=\frac{x^{2}e^{(x+4)}-36\,x^{2}-4}{4\,x}$$

input
```
integrate(1/4*((x^3+x^2)*exp(2+x)^2+(-36*x^2+4)*exp(x))/exp(x)/x^2,x, algo
rithm=\
```

output
```
1/4*(x^2*e^(x + 4) - 36*x^2 - 4)/x
```

3.1052.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.52

$$\int \frac{e^{-x}(e^x(4-36x^2)+e^{4+2x}(x^2+x^3))}{4x^2}\,dx = \frac{xe^4e^x}{4} - 9x - \frac{1}{x}$$

input
```
integrate(1/4*((x**3+x**2)*exp(2+x)**2+(-36*x**2+4)*exp(x))/exp(x)/x**2,x)
```

output
```
x*exp(4)*exp(x)/4 - 9*x - 1/x
```

3.1052.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{e^{-x}(e^x(4-36x^2)+e^{4+2x}(x^2+x^3))}{4x^2}\,dx = \frac{1}{4}\left(xe^4-e^4\right)e^x - 9\,x - \frac{1}{x} + \frac{1}{4}\,e^{(x+4)}$$

input
```
integrate(1/4*((x^3+x^2)*exp(2+x)^2+(-36*x^2+4)*exp(x))/exp(x)/x^2,x, algo
rithm=\
```

output
```
1/4*(x*e^4 - e^4)*e^x - 9*x - 1/x + 1/4*e^(x + 4)
```

3.1052.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{e^{-x}(e^x(4-36x^2)+e^{4+2x}(x^2+x^3))}{4x^2}\,dx = \frac{x^2e^{(x+4)} - 36\,x^2 - 4}{4\,x}$$

input
```
integrate(1/4*((x^3+x^2)*exp(2+x)^2+(-36*x^2+4)*exp(x))/exp(x)/x^2,x, algo
rithm=\
```

output
```
1/4*(x^2*e^(x + 4) - 36*x^2 - 4)/x
```

3.1052.9 Mupad [B] (verification not implemented)

Time = 15.59 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.55

$$\int \frac{e^{-x}(e^x(4-36x^2)+e^{4+2x}(x^2+x^3))}{4x^2}\,dx = x\left(\frac{e^{x+4}}{4}-9\right)-\frac{1}{x}$$

input
```
int((exp(-x)*((exp(2*x + 4)*(x^2 + x^3))/4 - (exp(x)*(36*x^2 - 4))/4))/x^2
,x)
```

output
```
x*(exp(x + 4)/4 - 9) - 1/x
```

3.1053 $\int \frac{1}{2}(-4+4x+(-1+x)\log(9))\,dx$

3.1053.1 Optimal result

Integrand size = 15, antiderivative size = 20

$$\int \frac{1}{2}(-4+4x+(-1+x)\log(9))\,dx=\frac{1}{4}\left(-7+e^4+(1-x)^2\right)(4+\log(9))$$

output
```
(2*ln(3)+4)*(1/4*exp(4)+1/4*(1-x)^2-7/4)
```

3.1053.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{1}{2}(-4+4x+(-1+x)\log(9))\,dx=\frac{1}{2}\left(-x+\frac{x^2}{2}\right)(4+\log(9))$$

input
```
Integrate[(-4 + 4*x + (-1 + x)*Log[9])/2,x]
```

output
```
((-x + x^2/2)*(4 + Log[9]))/2
```

3.1053.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}(4x+(x-1)\log(9)-4)\,dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{2}\int (-\log(9)(1-x)+4x-4)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{2}\left(2x^2-4x+\frac{1}{2}(1-x)^2\log(9)\right)$$

input
```
Int[(-4 + 4*x + (-1 + x)*Log[9])/2,x]
```

output
```
(-4*x + 2*x^2 + ((1 - x)^2*Log[9])/2)/2
```

3.1053.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1053.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.55

method	result	size
gosper	$\frac{(2+\ln(3))(-2+x)x}{2}$	11
default	$(2+\ln(3))\left(\frac{1}{2}x^2-x\right)$	15
norman	$(-\ln(3)-2)x+\left(\frac{\ln(3)}{2}+1\right)x^2$	20
risch	$\frac{x^2\ln(3)}{2}-x\ln(3)+x^2-2x$	20
parallelrisch	$\frac{x^2\ln(3)}{2}-x\ln(3)+x^2-2x$	20
parts	$\frac{x^2\ln(3)}{2}-x\ln(3)+x^2-2x$	20

input
```
int((-1+x)*ln(3)+2*x-2,x,method=_RETURNVERBOSE)
```

output
```
1/2*(2+ln(3))*(-2+x)*x
```

3.1053.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{1}{2}(-4+4x+(-1+x)\log(9))\,dx = x^2+\frac{1}{2}\left(x^2-2\,x\right)\log(3)-2\,x$$

input
```
integrate((-1+x)*log(3)+2*x-2,x, algorithm=\
```

output
```
x^2 + 1/2*(x^2 - 2*x)*log(3) - 2*x
```

3.1053.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{1}{2}(-4+4x+(-1+x)\log(9))\,dx = x^2\left(\frac{\log(3)}{2}+1\right)+x(-2-\log(3))$$

input
```
integrate((-1+x)*ln(3)+2*x-2,x)
```

output
```
x**2*(log(3)/2 + 1) + x*(-2 - log(3))
```

3.1053.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{1}{2}(-4+4x+(-1+x)\log(9))\,dx = x^2+\frac{1}{2}\left(x^2-2\,x\right)\log\left(3\right)-2\,x$$

input
```
integrate((-1+x)*log(3)+2*x-2,x, algorithm=\
```

output
```
x^2 + 1/2*(x^2 - 2*x)*log(3) - 2*x
```

3.1053.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{1}{2}(-4+4x+(-1+x)\log(9))\,dx = x^2+\frac{1}{2}\left(x^2-2\,x\right)\log\left(3\right)-2\,x$$

input
```
integrate((-1+x)*log(3)+2*x-2,x, algorithm=\
```

output
```
x^2 + 1/2*(x^2 - 2*x)*log(3) - 2*x
```

3.1053.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int \frac{1}{2}(-4+4x+(-1+x)\log(9))\,dx = \frac{x\left(\ln\left(3\right)+2\right)\,\left(x-2\right)}{2}$$

input
```
int(2*x + log(3)*(x - 1) - 2,x)
```

output
```
(x*(log(3) + 2)*(x - 2))/2
```

3.1054 $\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}\,dx$

3.1054.1 Optimal result

Integrand size = 39, antiderivative size = 22

$$\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}\,dx = -e^{-4+\frac{2}{x^2}}+\frac{1}{ex}+2x$$

output
```
2*x+x/exp(ln(x^2)+1)-exp(2/x^2-4)
```

3.1054.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}\,dx = -e^{-4+\frac{2}{x^2}}+\frac{1}{ex}+2x$$

input
```
Integrate[(-x^3 + E*x^2*(4*E^((2 - 4*x^2)/x^2) + 2*x^3))/(E*x^5),x]
```

output
```
-E^(-4 + 2/x^2) + 1/(E*x) + 2*x
```

3.1054.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.103, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{ex^2\left(2x^3+4e^{\frac{2-4x^2}{x^2}}\right)-x^3}{ex^5}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int -\frac{x^3-2ex^2\left(x^3+2e^{\frac{2(1-2x^2)}{x^2}}\right)}{x^5}dx}{e}$$

$$\Big\downarrow \ 25$$

$$-\frac{\int \frac{x^3-2ex^2\left(x^3+2e^{\frac{2(1-2x^2)}{x^2}}\right)}{x^5}dx}{e}$$

$$\Big\downarrow \ 2010$$

$$-\frac{\int \left(\frac{1-2ex^2}{x^2}-\frac{4e^{\frac{2}{x^2}-3}}{x^3}\right)dx}{e}$$

$$\Big\downarrow \ 2009$$

$$-\frac{e^{\frac{2}{x^2}-3}-2ex-\frac{1}{x}}{e}$$

input
```
Int[(-x^3 + E*x^2*(4*E^((2 - 4*x^2)/x^2) + 2*x^3))/(E*x^5),x]
```

output
```
-((E^(-3 + 2/x^2) - x^(-1) - 2*E*x)/E)
```

3.1054. $\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}dx$

3.1054.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1054.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

method	result	size
default	$2x+\frac{{\mathrm e}^{-1}}{x}-{\mathrm e}^{\frac{-4x^{2}+2}{x^{2}}}$	30
parts	$2x+\frac{{\mathrm e}^{-1}}{x}-{\mathrm e}^{\frac{-4x^{2}+2}{x^{2}}}$	30
norman	$\frac{{\mathrm e}^{-1} x^{3}+2x^{5}-x^{4} {\mathrm e}^{\frac{-4x^{2}+2}{x^{2}}}}{x^{4}}$	36
parallelrisch	$\frac{\left(4\,{\mathrm e}^{\ln \left(x^{2}\right)+1} x^{7}-2\,{\mathrm e}^{-\frac{2\left(2x^{2}-1\right)}{x^{2}}} {\mathrm e}^{\ln \left(x^{2}\right)+1} x^{6}+2x^{7}\right) {\mathrm e}^{-1}}{2x^{8}}$	58

input
```
int(((4*exp((-4*x^2+2)/x^2)+2*x^3)*exp(ln(x^2)+1)-x^3)/x^3/exp(ln(x^2)+1),
x,method=_RETURNVERBOSE)
```

output
```
2*x+x/exp(ln(x^2)+1)-exp((-4*x^2+2)/x^2)
```

3.1054.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.50

$$\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}\,dx=\frac{\left(2\,x^2e-xe^{\left(-\frac{2\,\left(2\,x^2-1\right)}{x^2}+1\right)}+1\right)e^{(-1)}}{x}$$

input
```
integrate(((4*exp((-4*x^2+2)/x^2)+2*x^3)*exp(log(x^2)+1)-x^3)/x^3/exp(log(
x^2)+1),x, algorithm=\
```

output
```
(2*x^2*e - x*e^(-2*(2*x^2 - 1)/x^2 + 1) + 1)*e^(-1)/x
```

3.1054.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}\,dx=\frac{2ex+\frac{1}{x}}{e}-e^{\frac{2-4x^2}{x^2}}$$

input
```
integrate(((4*exp((-4*x**2+2)/x**2)+2*x**3)*exp(ln(x**2)+1)-x**3)/x**3/exp
(ln(x**2)+1),x)
```

output
```
(2*E*x + 1/x)*exp(-1) - exp((2 - 4*x**2)/x**2)
```

3.1054.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}\,dx=\left(2\,xe+\frac{1}{x}-e^{\left(\frac{2}{x^2}-3\right)}\right)e^{(-1)}$$

input
```
integrate(((4*exp((-4*x^2+2)/x^2)+2*x^3)*exp(log(x^2)+1)-x^3)/x^3/exp(log(
x^2)+1),x, algorithm=\
```

output
```
(2*x*e + 1/x - e^(2/x^2 - 3))*e^(-1)
```

3.1054.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}\,dx=\frac{(2\,x^2e+1)e^{(-1)}}{x}-e^{\left(\frac{2}{x^2}-4\right)}$$

input
```
integrate(((4*exp((-4*x^2+2)/x^2)+2*x^3)*exp(log(x^2)+1)-x^3)/x^3/exp(log(
x^2)+1),x, algorithm=\
```

output
```
(2*x^2*e + 1)*e^(-1)/x - e^(2/x^2 - 4)
```

3.1054.9 Mupad [B] (verification not implemented)

Time = 15.49 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-x^3+ex^2\left(4e^{\frac{2-4x^2}{x^2}}+2x^3\right)}{ex^5}\,dx=2\,x-\mathrm{e}^{-4}\,\mathrm{e}^{\frac{2}{x^2}}+\frac{\mathrm{e}^{-1}}{x}$$

input
```
int((exp(- log(x^2) - 1)*(exp(log(x^2) + 1)*(4*exp(-(4*x^2 - 2)/x^2) + 2*x
^3) - x^3))/x^3,x)
```

output
```
2*x - exp(-4)*exp(2/x^2) + exp(-1)/x
```

3.1055 $\int \left(-4+\log(5)+e^{\sqrt{e}(-2+2x)}\left(8\sqrt{e}-2\sqrt{e}\log(5)\right)\right)$

3.1055.1 Optimal result

Integrand size = 35, antiderivative size = 24

$$\int \left(-4+\log(5)+e^{\sqrt{e}(-2+2x)}\left(8\sqrt{e}-2\sqrt{e}\log(5)\right)\right)\,dx=\left(\frac{1}{2}-e^{2\sqrt{e}(-1+x)}+x\right)(-4+\log(5))$$

output
```
(x-exp(2*(-1+x)*exp(1/2))+1/2)*(ln(5)-4)
```

3.1055.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \left(-4+\log(5)+e^{\sqrt{e}(-2+2x)}\left(8\sqrt{e}-2\sqrt{e}\log(5)\right)\right)\,dx=-\left(\left(e^{-2\sqrt{e}+2\sqrt{e}x}-x\right)(-4+\log(5))\right)$$

input
```
Integrate[-4 + Log[5] + E^(Sqrt[E]*(-2 + 2*x))*(8*Sqrt[E] - 2*Sqrt[E]*Log[
5]),x]
```

output
```
-((E^(-2*Sqrt[E] + 2*Sqrt[E]*x) - x)*(-4 + Log[5]))
```

3.1055.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.029$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{\sqrt{e}(2x-2)}(8\sqrt{e}-2\sqrt{e}\log(5))-4+\log(5)\right)\,dx$$

$$\Big\downarrow \; 2009$$

$$e^{-2\sqrt{e}(1-x)}(4-\log(5))-x(4-\log(5))$$

input
```
Int[-4 + Log[5] + E^(Sqrt[E]*(-2 + 2*x))*(8*Sqrt[E] - 2*Sqrt[E]*Log[5]),x]
```

output
```
(4 - Log[5])/E^(2*Sqrt[E]*(1 - x)) - x*(4 - Log[5])
```

3.1055.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1055.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

method	result	size
norman	$(-\ln(5)+4)\,\mathrm{e}^{(-2+2x)\mathrm{e}^{\frac{1}{2}}}+(\ln(5)-4)\,x$	24
risch	$-\mathrm{e}^{2(-1+x)\mathrm{e}^{\frac{1}{2}}}\ln(5)+x\ln(5)+4\,\mathrm{e}^{2(-1+x)\mathrm{e}^{\frac{1}{2}}}-4x$	31
default	$-4x-\mathrm{e}^{(-2+2x)\mathrm{e}^{\frac{1}{2}}}\ln(5)+4\,\mathrm{e}^{(-2+2x)\mathrm{e}^{\frac{1}{2}}}+x\ln(5)$	33
parts	$-4x-\mathrm{e}^{(-2+2x)\mathrm{e}^{\frac{1}{2}}}\ln(5)+4\,\mathrm{e}^{(-2+2x)\mathrm{e}^{\frac{1}{2}}}+x\ln(5)$	33
parallelrisch	$\frac{\left(-2\,\mathrm{e}^{\frac{1}{2}}\ln(5)+8\,\mathrm{e}^{\frac{1}{2}}\right)\mathrm{e}^{-\frac{1}{2}}\,\mathrm{e}^{(-2+2x)\mathrm{e}^{\frac{1}{2}}}}{2}+(\ln(5)-4)\,x$	34
derivativedivides	$\frac{\mathrm{e}^{-\frac{1}{2}}(\ln(5)-4)\left(-2\,\mathrm{e}^{\frac{1}{2}}\,\mathrm{e}^{(-2+2x)\mathrm{e}^{\frac{1}{2}}}+\ln\left(\mathrm{e}^{(-2+2x)\mathrm{e}^{\frac{1}{2}}}\right)\right)}{2}$	35

input
```
int((-2*exp(1/2)*ln(5)+8*exp(1/2))*exp((-2+2*x)*exp(1/2))+ln(5)-4,x,method
=_RETURNVERBOSE)
```

output
```
(-ln(5)+4)*exp((-2+2*x)*exp(1/2))+(ln(5)-4)*x
```

3.1055.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \left(-4+\log(5)+e^{\sqrt{e}(-2+2x)}\left(8\sqrt{e}-2\sqrt{e}\log(5)\right)\right)\,dx$$
$$= -(\log(5)-4)e^{\left(2\,(x-1)e^{\frac{1}{2}}\right)} + x\log(5) - 4\,x$$

input
```
integrate((-2*exp(1/2)*log(5)+8*exp(1/2))*exp((-2+2*x)*exp(1/2))+log(5)-4,
x, algorithm=\
```

output
```
-(log(5) - 4)*e^(2*(x - 1)*e^(1/2)) + x*log(5) - 4*x
```

3.1055.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \left(-4+\log(5)+e^{\sqrt{e}(-2+2x)}\left(8\sqrt{e}-2\sqrt{e}\log(5)\right)\right)\,dx = x(-4+\log(5))+(4-\log(5))\,e^{(2x-2)e^{\frac{1}{2}}}$$

input
```
integrate((-2*exp(1/2)*ln(5)+8*exp(1/2))*exp((-2+2*x)*exp(1/2))+ln(5)-4,x)
```

output
```
x*(-4 + log(5)) + (4 - log(5))*exp((2*x - 2)*exp(1/2))
```

3.1055.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.25

$$\int \left(-4+\log(5)+e^{\sqrt{e}(-2+2x)}\left(8\sqrt{e}-2\sqrt{e}\log(5)\right)\right)\,dx$$
$$=-\left(e^{\frac{1}{2}}\log\left(5\right)-4\,e^{\frac{1}{2}}\right)e^{\left(2\,(x-1)e^{\frac{1}{2}}-\frac{1}{2}\right)}+x\log\left(5\right)-4\,x$$

input
```
integrate((-2*exp(1/2)*log(5)+8*exp(1/2))*exp((-2+2*x)*exp(1/2))+log(5)-4,
x, algorithm=\
```

output
```
-(e^(1/2)*log(5) - 4*e^(1/2))*e^(2*(x - 1)*e^(1/2) - 1/2) + x*log(5) - 4*x
```

3.1055.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.25

$$\int \left(-4+\log(5)+e^{\sqrt{e}(-2+2x)}\left(8\sqrt{e}-2\sqrt{e}\log(5)\right)\right)\,dx$$
$$=-\left(e^{\frac{1}{2}}\log\left(5\right)-4\,e^{\frac{1}{2}}\right)e^{\left(2\,(x-1)e^{\frac{1}{2}}-\frac{1}{2}\right)}+x\log\left(5\right)-4\,x$$

input
```
integrate((-2*exp(1/2)*log(5)+8*exp(1/2))*exp((-2+2*x)*exp(1/2))+log(5)-4,
x, algorithm=\
```

output
```
-(e^(1/2)*log(5) - 4*e^(1/2))*e^(2*(x - 1)*e^(1/2) - 1/2) + x*log(5) - 4*x
```

3.1055.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.75

$$\int \left(-4+\log(5)+e^{\sqrt{e}(-2+2x)}\left(8\sqrt{e}-2\sqrt{e}\log(5)\right)\right)\,dx=\left(x-\mathrm{e}^{\sqrt{\mathrm{e}}\,(2\,x-2)}\right)\,\left(\ln\left(5\right)-4\right)$$

input
```
int(log(5) + exp(exp(1/2)*(2*x - 2))*(8*exp(1/2) - 2*exp(1/2)*log(5)) - 4,
x)
```

output
```
(x - exp(exp(1/2)*(2*x - 2)))*(log(5) - 4)
```

3.1056 $\int \frac{677x^2+x^3+e^{-1+x}(676-675x-x^2)}{676x^2+x^3}\,dx$

3.1056.1 Optimal result

Integrand size = 37, antiderivative size = 17

$$\int \frac{677x^2+x^3+e^{-1+x}(676-675x-x^2)}{676x^2+x^3}\,dx = 1-\frac{e^{-1+x}}{x}+x+\log(676+x)$$

output
```
1+ln(676+x)-exp(-1+x)/x+x
```

3.1056.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

$$\int \frac{677x^2+x^3+e^{-1+x}(676-675x-x^2)}{676x^2+x^3}\,dx = \frac{-\frac{e^x}{x}+ex+e\log(676+x)}{e}$$

input
```
Integrate[(677*x^2 + x^3 + E^(-1 + x)*(676 - 675*x - x^2))/(676*x^2 + x^3)
,x]
```

output
```
(-(E^x/x) + E*x + E*Log[676 + x])/E
```

3.1056.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.081, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3+677x^2+e^{x-1}(-x^2-675x+676)}{x^3+676x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{x^3+677x^2+e^{x-1}(-x^2-675x+676)}{x^2(x+676)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x+677}{x+676}-\frac{e^{x-1}(x-1)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x-\frac{e^{x-1}}{x}+\log(x+676)$$

input
```
Int[(677*x^2 + x^3 + E^(-1 + x)*(676 - 675*x - x^2))/(676*x^2 + x^3),x]
```

output
```
-(E^(-1 + x)/x) + x + Log[676 + x]
```

3.1056.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1056.4 Maple [A] (verified)

Time = 1.63 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

method	result	size
risch	$x+\ln(676+x)-\frac{e^{-1+x}}{x}$	16
parts	$x+\ln(676+x)-\frac{e^{-1+x}}{x}$	16
derivativedivides	$-1+x+\ln(676+x)-\frac{e^{-1+x}}{x}$	17
default	$-1+x+\ln(676+x)-\frac{e^{-1+x}}{x}$	17
norman	$\frac{x^2-e^{-1+x}}{x}+\ln(676+x)$	20
parallelrisch	$\frac{\ln(676+x)x+x^2-e^{-1+x}}{x}$	21

input
```
int(((-x^2-675*x+676)*exp(-1+x)+x^3+677*x^2)/(x^3+676*x^2),x,method=_RETUR
NVERBOSE)
```

output
```
x+ln(676+x)-exp(-1+x)/x
```

3.1056.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

$$\int \frac{677x^2+x^3+e^{-1+x}(676-675x-x^2)}{676x^2+x^3}\,dx=\frac{x^2+x\log(x+676)-e^{(x-1)}}{x}$$

input
```
integrate(((-x^2-675*x+676)*exp(-1+x)+x^3+677*x^2)/(x^3+676*x^2),x, algori
thm=\
```

output
```
(x^2 + x*log(x + 676) - e^(x - 1))/x
```

3.1056.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

$$\int \frac{677x^2+x^3+e^{-1+x}(676-675x-x^2)}{676x^2+x^3}\,dx = x+\log{(x+676)}-\frac{e^{x-1}}{x}$$

input
```
integrate(((-x**2-675*x+676)*exp(-1+x)+x**3+677*x**2)/(x**3+676*x**2),x)
```

output
```
x + log(x + 676) - exp(x - 1)/x
```

3.1056.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{677x^2+x^3+e^{-1+x}(676-675x-x^2)}{676x^2+x^3}\,dx = x-\frac{e^{(x-1)}}{x}+\log{(x+676)}$$

input
```
integrate(((-x^2-675*x+676)*exp(-1+x)+x^3+677*x^2)/(x^3+676*x^2),x, algori
thm=\
```

output
```
x - e^(x - 1)/x + log(x + 676)
```

3.1056.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.47

$$\int \frac{677x^2+x^3+e^{-1+x}(676-675x-x^2)}{676x^2+x^3}\,dx = \frac{(x^2e+xe\log{(x+676)}-e^x)e^{(-1)}}{x}$$

input
```
integrate(((-x^2-675*x+676)*exp(-1+x)+x^3+677*x^2)/(x^3+676*x^2),x, algori
thm=\
```

output
```
(x^2*e + x*e*log(x + 676) - e^x)*e^(-1)/x
```

3.1056.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.18

$$\int \frac{677x^2 + x^3 + e^{-1+x}(676 - 675x - x^2)}{676x^2 + x^3}\,dx = \ln(x + 676) - \frac{e^{x-1} - x^2}{x}$$

input
```
int((677*x^2 - exp(x - 1)*(675*x + x^2 - 676) + x^3)/(676*x^2 + x^3),x)
```

output
```
log(x + 676) - (exp(x - 1) - x^2)/x
```

3.1057 $\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8\right.\right.}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)-}$

3.1057.1 Optimal result

Integrand size = 131, antiderivative size = 26

$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)\right.}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}$$
$$=e^{e^{8x}+\frac{\log(5)}{-1-e^x+\frac{3}{\log(2)}}}$$

output
```
exp(exp(4*x)^2+ln(5)/(-1+3/ln(2)-exp(x)))
```

3.1057.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)\right.}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}$$
$$=e^{e^{8x}-\frac{\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}$$

input
```
Integrate[(E^((E^(8*x)*(-3 + Log[2] + E^x*Log[2]) - Log[2]*Log[5])/(-3 + L
og[2] + E^x*Log[2]))*(E^(8*x)*(72 - 48*Log[2] + 8*Log[2]^2 + 8*E^(2*x)*Log
[2]^2 + E^x*(-48*Log[2] + 16*Log[2]^2)) + E^x*Log[2]^2*Log[5]))/(9 - 6*Log
[2] + Log[2]^2 + E^(2*x)*Log[2]^2 + E^x*(-6*Log[2] + 2*Log[2]^2)),x]
```

3.1057.

$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)+e^x\log^2(2)\log(5)\right)}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}\,dx$$

output
```
E^(E^(8*x) - (Log[2]*Log[5])/(-3 + Log[2] + E^x*Log[2]))
```

3.1057.3 Rubi [A] (verified)

Time = 0.80 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.015, Rules used = {2720, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{8x}\left(8e^{2x}\log^2(2)+e^x\left(16\log^2(2)-48\log(2)\right)+72+8\log^2(2)-48\log(2)\right)+e^x\log^2(2)\log(5)\right)\exp\left(\frac{e^{8x}(e^x\log(2}{e^x}\right.}{e^{2x}\log^2(2)+e^x\left(2\log^2(2)-6\log(2)\right)+9+\log^2(2)-6\log(2)}$$

$$\Big\downarrow \text{2720}$$

$$\int \frac{e^{e^{8x}}2^{\frac{\log(5)}{-e^x\log(2)+3-\log(2)}}\left(8e^{9x}\log^2(2)+8e^{7x}(3-\log(2))^2-16e^{8x}(3-\log(2))\log(2)+\log^2(2)\log(5)\right)}{(-e^x\log(2)+3-\log(2))^2}de^x$$

$$\Big\downarrow \text{2726}$$

$$e^{e^{8x}}2^{\frac{\log(5)}{-e^x\log(2)+3-\log(2)}}$$

input
```
Int[(E^((E^(8*x)*(-3 + Log[2] + E^x*Log[2]) - Log[2]*Log[5])/(-3 + Log[2]
+ E^x*Log[2]))*(E^(8*x)*(72 - 48*Log[2] + 8*Log[2]^2 + 8*E^(2*x)*Log[2]^2
+ E^x*(-48*Log[2] + 16*Log[2]^2)) + E^x*Log[2]^2*Log[5]))/(9 - 6*Log[2] +
Log[2]^2 + E^(2*x)*Log[2]^2 + E^x*(-6*Log[2] + 2*Log[2]^2)),x]
```

output
```
2^(Log[5]/(3 - Log[2] - E^x*Log[2]))*E^E^(8*x)
```

3.1057.
$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)+e^x\log^2(2)\log(5)\right)}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}\,dx$$

3.1057.3.1 Defintions of rubi rules used

rule 2720
```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ
[{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))
*(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.1057.4 Maple [A] (verified)

Time = 9.30 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

method	result	size
parallelrisch	$e^{\frac{\left(e^{x} \ln \left(2\right)+\ln \left(2\right)-3\right) e^{8 x}-\ln \left(2\right) \ln \left(5\right)}{e^{x} \ln \left(2\right)+\ln \left(2\right)-3}}$	37
risch	$e^{-\frac{\ln \left(2\right) \ln \left(5\right)-\ln \left(2\right) e^{9 x}-\ln \left(2\right) e^{8 x}+3 e^{8 x}}{e^{x} \ln \left(2\right)+\ln \left(2\right)-3}}$	43

input
```
int(((8*ln(2)^2*exp(x)^2+(16*ln(2)^2-48*ln(2))*exp(x)+8*ln(2)^2-48*ln(2)+7
2)*exp(4*x)^2+ln(2)^2*ln(5)*exp(x))*exp(((exp(x)*ln(2)+ln(2)-3)*exp(4*x)^2
-ln(2)*ln(5))/(exp(x)*ln(2)+ln(2)-3))/(ln(2)^2*exp(x)^2+(2*ln(2)^2-6*ln(2)
)*exp(x)+ln(2)^2-6*ln(2)+9),x,method=_RETURNVERBOSE)
```

output
```
exp(((exp(x)*ln(2)+ln(2)-3)*exp(4*x)^2-ln(2)*ln(5))/(exp(x)*ln(2)+ln(2)-3)
)
```

3.1057.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)\right.}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}$$
$$= e^{\left(\frac{(\log(2)-3)e^{(8x)}+e^{(9x)}\log(2)-\log(5)\log(2)}{e^x\log(2)+\log(2)-3}\right)}$$

input
```
integrate(((8*log(2)^2*exp(x)^2+(16*log(2)^2-48*log(2))*exp(x)+8*log(2)^2-
48*log(2)+72)*exp(4*x)^2+log(2)^2*log(5)*exp(x))*exp(((exp(x)*log(2)+log(2
)-3)*exp(4*x)^2-log(2)*log(5))/(exp(x)*log(2)+log(2)-3))/(log(2)^2*exp(x)^
2+(2*log(2)^2-6*log(2))*exp(x)+log(2)^2-6*log(2)+9),x, algorithm=\
```

output
```
e^(((log(2) - 3)*e^(8*x) + e^(9*x)*log(2) - log(5)*log(2))/(e^x*log(2) + l
og(2) - 3))
```

3.1057.6 Sympy [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)\right.}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}$$
$$= e^{\frac{\left(e^x\log(2)-3+\log(2)\right)e^{8x}-\log(2)\log(5)}{e^x\log(2)-3+\log(2)}}$$

input
```
integrate(((8*ln(2)**2*exp(x)**2+(16*ln(2)**2-48*ln(2))*exp(x)+8*ln(2)**2-
48*ln(2)+72)*exp(4*x)**2+ln(2)**2*ln(5)*exp(x))*exp(((exp(x)*ln(2)+ln(2)-3
)*exp(4*x)**2-ln(2)*ln(5))/(exp(x)*ln(2)+ln(2)-3))/(ln(2)**2*exp(x)**2+(2*
ln(2)**2-6*ln(2))*exp(x)+ln(2)**2-6*ln(2)+9),x)
```

output
```
exp(((exp(x)*log(2) - 3 + log(2))*exp(8*x) - log(2)*log(5))/(exp(x)*log(2)
 - 3 + log(2)))
```

3.1057.7 Maxima [A] (verification not implemented)

Time = 1.61 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)\right.}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}$$
$$= e^{\left(-\frac{\log(5)\log(2)}{e^x\log(2)+\log(2)-3}+e^{(8x)}\right)}$$

input
```
integrate(((8*log(2)^2*exp(x)^2+(16*log(2)^2-48*log(2))*exp(x)+8*log(2)^2-
48*log(2)+72)*exp(4*x)^2+log(2)^2*log(5)*exp(x))*exp(((exp(x)*log(2)+log(2
)-3)*exp(4*x)^2-log(2)*log(5))/(exp(x)*log(2)+log(2)-3))/(log(2)^2*exp(x)^
2+(2*log(2)^2-6*log(2))*exp(x)+log(2)^2-6*log(2)+9),x, algorithm=\
```

3.1057.

$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)+e^x\log^2(2)\log(5)\right)}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}\,dx$$

output
```
e^(-log(5)*log(2)/(e^x*log(2) + log(2) - 3) + e^(8*x))
```

3.1057.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(23) = 46$.

Time = 0.44 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.77

$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)\right.}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}$$

$$= e^{\left(\frac{e^{(9x)}\log(2)}{e^x\log(2)+\log(2)-3}+\frac{e^{(8x)}\log(2)}{e^x\log(2)+\log(2)-3}-\frac{\log(5)\log(2)}{e^x\log(2)+\log(2)-3}-\frac{3e^{(8x)}}{e^x\log(2)+\log(2)-3}\right)}$$

input
```
integrate(((8*log(2)^2*exp(x)^2+(16*log(2)^2-48*log(2))*exp(x)+8*log(2)^2-
48*log(2)+72)*exp(4*x)^2+log(2)^2*log(5)*exp(x))*exp(((exp(x)*log(2)+log(2
)-3)*exp(4*x)^2-log(2)*log(5))/(exp(x)*log(2)+log(2)-3))/(log(2)^2*exp(x)^
2+(2*log(2)^2-6*log(2))*exp(x)+log(2)^2-6*log(2)+9),x, algorithm=\
```

output
```
e^(e^(9*x)*log(2)/(e^x*log(2) + log(2) - 3) + e^(8*x)*log(2)/(e^x*log(2) +
 log(2) - 3) - log(5)*log(2)/(e^x*log(2) + log(2) - 3) - 3*e^(8*x)/(e^x*lo
g(2) + log(2) - 3))
```

3.1057.9 Mupad [B] (verification not implemented)

Time = 16.71 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.81

$$\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)\right.}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}$$

$$= e^{\frac{\ln(2)\left(e^{8x}+e^{9x}-\ln(5)\right)}{\ln(2)+e^x\ln(2)-3}}\,e^{-\frac{3e^{8x}}{\ln(2)+e^x\ln(2)-3}}$$

input
```
int((exp((exp(8*x)*(log(2) + exp(x)*log(2) - 3) - log(2)*log(5))/(log(2) +
 exp(x)*log(2) - 3))*(exp(8*x)*(8*exp(2*x)*log(2)^2 - 48*log(2) - exp(x)*(
48*log(2) - 16*log(2)^2) + 8*log(2)^2 + 72) + exp(x)*log(2)^2*log(5)))/(ex
p(2*x)*log(2)^2 - 6*log(2) - exp(x)*(6*log(2) - 2*log(2)^2) + log(2)^2 + 9
),x)
```

output
```
exp((log(2)*(exp(8*x) + exp(9*x) - log(5)))/(log(2) + exp(x)*log(2) - 3))*
exp(-(3*exp(8*x))/(log(2) + exp(x)*log(2) - 3))
```

3.1057. $\int \frac{e^{\frac{e^{8x}(-3+\log(2)+e^x\log(2))-\log(2)\log(5)}{-3+\log(2)+e^x\log(2)}}\left(e^{8x}\left(72-48\log(2)+8\log^2(2)+8e^{2x}\log^2(2)+e^x\left(-48\log(2)+16\log^2(2)\right)\right)+e^x\log^2(2)\log(5)\right)}{9-6\log(2)+\log^2(2)+e^{2x}\log^2(2)+e^x\left(-6\log(2)+2\log^2(2)\right)}\,dx$

3.1058 $\int \frac{9x^2+26e^x x^2-6x^3-6x^4+e^{2x}(-13+26x)}{x^2}\,dx$

3.1058.1 Optimal result

Integrand size = 39, antiderivative size = 29

$$\int \frac{9x^2+26e^x x^2-6x^3-6x^4+e^{2x}(-13+26x)}{x^2}\,dx = 4-x+x\left(-3+\frac{13(e^x+x)^2}{x^2}-x(3+2x)\right)$$

output
```
4+x*(13*(exp(x)+x)^2/x^2-x*(3+2*x)-3)-x
```

3.1058.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int \frac{9x^2+26e^x x^2-6x^3-6x^4+e^{2x}(-13+26x)}{x^2}\,dx = 26e^x+\frac{13e^{2x}}{x}+9x-3x^2-2x^3$$

input
```
Integrate[(9*x^2 + 26*E^x*x^2 - 6*x^3 - 6*x^4 + E^(2*x)*(-13 + 26*x))/x^2,
x]
```

output
```
26*E^x + (13*E^(2*x))/x + 9*x - 3*x^2 - 2*x^3
```

3.1058.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.051, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x^4-6x^3+26e^x x^2+9x^2+e^{2x}(26x-13)}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{13e^{2x}(2x-1)}{x^2}-3\left(2x^2+2x-3\right)+26e^x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-2x^3-3x^2+9x+26e^x+\frac{13e^{2x}}{x}$$

input
```
Int[(9*x^2 + 26*E^x*x^2 - 6*x^3 - 6*x^4 + E^(2*x)*(-13 + 26*x))/x^2,x]
```

output
```
26*E^x + (13*E^(2*x))/x + 9*x - 3*x^2 - 2*x^3
```

3.1058.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1058.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

method	result	size
default	$-2x^{3}-3x^{2}+9x+\frac{13\,{\mathrm e}^{2 x}}{x}+26\,{\mathrm e}^{x}$	28
risch	$-2x^{3}-3x^{2}+9x+\frac{13\,{\mathrm e}^{2 x}}{x}+26\,{\mathrm e}^{x}$	28
parts	$-2x^{3}-3x^{2}+9x+\frac{13\,{\mathrm e}^{2 x}}{x}+26\,{\mathrm e}^{x}$	28
norman	$\frac{-2x^{4}-3x^{3}+26\,{\mathrm e}^{x} x+9x^{2}+13\,{\mathrm e}^{2 x}}{x}$	32
parallelrisch	$-\frac{2x^{4}+3x^{3}-9x^{2}-26\,{\mathrm e}^{x} x-13\,{\mathrm e}^{2 x}}{x}$	33

input
```
int(((26*x-13)*exp(x)^2+26*exp(x)*x^2-6*x^4-6*x^3+9*x^2)/x^2,x,method=_RET
URNVERBOSE)
```

output
```
-2*x^3-3*x^2+9*x+13*exp(x)^2/x+26*exp(x)
```

3.1058.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \frac{9x^2+26e^xx^2-6x^3-6x^4+e^{2x}(-13+26x)}{x^2}\,dx=-\frac{2\,x^{4}+3\,x^{3}-9\,x^{2}-26\,xe^{x}-13\,e^{\left(2\,x\right)}}{x}$$

input
```
integrate(((26*x-13)*exp(x)^2+26*exp(x)*x^2-6*x^4-6*x^3+9*x^2)/x^2,x, algo
rithm=\
```

output
```
-(2*x^4 + 3*x^3 - 9*x^2 - 26*x*e^x - 13*e^(2*x))/x
```

3.1058.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{9x^2+26e^xx^2-6x^3-6x^4+e^{2x}(-13+26x)}{x^2}\,dx=-2x^{3}-3x^{2}+9x+\frac{26xe^{x}+13e^{2x}}{x}$$

input
```
integrate(((26*x-13)*exp(x)**2+26*exp(x)*x**2-6*x**4-6*x**3+9*x**2)/x**2,x
)
```

output
```
-2*x**3 - 3*x**2 + 9*x + (26*x*exp(x) + 13*exp(2*x))/x
```

3.1058.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.24 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{9x^2 + 26e^x x^2 - 6x^3 - 6x^4 + e^{2x}(-13 + 26x)}{x^2}\, dx$$
$$= -2\,x^3 - 3\,x^2 + 9\,x + 26\,\mathrm{Ei}(2\,x) + 26\,e^x - 26\,\Gamma(-1, -2\,x)$$

input
```
integrate(((26*x-13)*exp(x)^2+26*exp(x)*x^2-6*x^4-6*x^3+9*x^2)/x^2,x, algo
rithm=\
```

output
```
-2*x^3 - 3*x^2 + 9*x + 26*Ei(2*x) + 26*e^x - 26*gamma(-1, -2*x)
```

3.1058.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \frac{9x^2 + 26e^x x^2 - 6x^3 - 6x^4 + e^{2x}(-13 + 26x)}{x^2}\, dx = -\frac{2\,x^4 + 3\,x^3 - 9\,x^2 - 26\,xe^x - 13\,e^{(2\,x)}}{x}$$

input
```
integrate(((26*x-13)*exp(x)^2+26*exp(x)*x^2-6*x^4-6*x^3+9*x^2)/x^2,x, algo
rithm=\
```

output
```
-(2*x^4 + 3*x^3 - 9*x^2 - 26*x*e^x - 13*e^(2*x))/x
```

3.1058.9 Mupad [B] (verification not implemented)

Time = 15.69 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{9x^2+26e^xx^2-6x^3-6x^4+e^{2x}(-13+26x)}{x^2}\,dx = 9\,x+26\,\mathrm{e}^x+\frac{13\,\mathrm{e}^{2\,x}}{x}-3\,x^2-2\,x^3$$

input
```
int((26*x^2*exp(x) + exp(2*x)*(26*x - 13) + 9*x^2 - 6*x^3 - 6*x^4)/x^2,x)
```

output
```
9*x + 26*exp(x) + (13*exp(2*x))/x - 3*x^2 - 2*x^3
```

3.1059 $\int \frac{-3125+20625x-49125x^2+49775x^3-19650x^4+3300x^5-200x^6+e^{10}}{125x^2-825x^3+1965x^4-1991x^5+786x^6-132x^7+8x}$

3.1059.1 Optimal result

Integrand size = 83, antiderivative size = 27

$$\int \frac{-3125+20625x-49125x^2+49775x^3-19650x^4+3300x^5-200x^6+e^{10}(-5+33x-10x^2)}{125x^2-825x^3+1965x^4-1991x^5+786x^6-132x^7+8x^8}\,dx = \frac{25+\frac{e^{10}}{(1-2x)^2(5-x)^2}-x}{x}$$

output
```
(25-x+exp(5)^2/(1-2*x)^2/(5-x)^2)/x
```

3.1059.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{-3125+20625x-49125x^2+49775x^3-19650x^4+3300x^5-200x^6+e^{10}(-5+33x-10x^2)}{125x^2-825x^3+1965x^4-1991x^5+786x^6-132x^7+8x^8}\,dx = \frac{e^{10}+25(5-11x+2x^2)^2}{x(5-11x+2x^2)^2}$$

input
```
Integrate[(-3125 + 20625*x - 49125*x^2 + 49775*x^3 - 19650*x^4 + 3300*x^5
- 200*x^6 + E^10*(-5 + 33*x - 10*x^2))/(125*x^2 - 825*x^3 + 1965*x^4 - 199
1*x^5 + 786*x^6 - 132*x^7 + 8*x^8),x]
```

output
```
(E^10 + 25*(5 - 11*x + 2*x^2)^2)/(x*(5 - 11*x + 2*x^2)^2)
```

3.1059.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 69 vs. $2(27) = 54$.

Time = 0.45 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.56, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.036$, Rules used = {2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-200x^6 + 3300x^5 - 19650x^4 + 49775x^3 - 49125x^2 + e^{10}(-10x^2 + 33x - 5) + 20625x - 3125}{8x^8 - 132x^7 + 786x^6 - 1991x^5 + 1965x^4 - 825x^3 + 125x^2} \, dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{-200x^6 + 3300x^5 - 19650x^4 + 49775x^3 - 49125x^2 + e^{10}(-10x^2 + 33x - 5) + 20625x - 3125}{x^2 (8x^6 - 132x^5 + 786x^4 - 1991x^3 + 1965x^2 - 825x + 125)} dx$$

$$\Big\downarrow \text{ 2462}$$

$$\int \left(\frac{-625 - e^{10}}{25x^2} + \frac{112e^{10}}{729(2x-1)^2} - \frac{32e^{10}}{81(2x-1)^3} + \frac{29e^{10}}{18225(x-5)^2} - \frac{2e^{10}}{405(x-5)^3} \right) dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{29e^{10}}{18225(5-x)} + \frac{625 + e^{10}}{25x} + \frac{e^{10}}{405(5-x)^2} + \frac{56e^{10}}{729(1-2x)} + \frac{8e^{10}}{81(1-2x)^2}$$

input
```
Int[(-3125 + 20625*x - 49125*x^2 + 49775*x^3 - 19650*x^4 + 3300*x^5 - 200*
x^6 + E^10*(-5 + 33*x - 10*x^2))/(125*x^2 - 825*x^3 + 1965*x^4 - 1991*x^5
+ 786*x^6 - 132*x^7 + 8*x^8),x]
```

output
```
(8*E^10)/(81*(1 - 2*x)^2) + (56*E^10)/(729*(1 - 2*x)) + E^10/(405*(5 - x)^
2) + (29*E^10)/(18225*(5 - x)) + (625 + E^10)/(25*x)
```

3.1059.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /; !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] && !BinomialQ[Px, x] && !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.1059.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.52

method	result	size
norman	$\frac{100x^4-1100x^3+e^{10}+3525x^2-2750x+625}{x(2x^2-11x+5)^2}$	41
gosper	$\frac{100x^4-1100x^3+e^{10}+3525x^2-2750x+625}{x(4x^4-44x^3+141x^2-110x+25)}$	51
risch	$\frac{100x^4-1100x^3+e^{10}+3525x^2-2750x+625}{x(4x^4-44x^3+141x^2-110x+25)}$	52
default	$\frac{8\,e^{10}}{81(-1+2x)^2}-\frac{56\,e^{10}}{729(-1+2x)}-\frac{-\frac{e^{10}}{25}-25}{x}+\frac{e^{10}}{405(-5+x)^2}-\frac{29\,e^{10}}{18225(-5+x)}$	53
parallelrisch	$\frac{15625+11000x^5-118500x^4+360250x^3+25\,e^{10}-214375x^2}{25x(4x^4-44x^3+141x^2-110x+25)}$	56

input
```
int(((-10*x^2+33*x-5)*exp(5)^2-200*x^6+3300*x^5-19650*x^4+49775*x^3-49125*
x^2+20625*x-3125)/(8*x^8-132*x^7+786*x^6-1991*x^5+1965*x^4-825*x^3+125*x^2
),x,method=_RETURNVERBOSE)
```

output
```
(100*x^4-1100*x^3+exp(5)^2+3525*x^2-2750*x+625)/x/(2*x^2-11*x+5)^2
```

3.1059.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(24) = 48$.

Time = 0.25 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.81

$$\int \frac{-3125 + 20625x - 49125x^2 + 49775x^3 - 19650x^4 + 3300x^5 - 200x^6 + e^{10}(-5 + 33x - 10x^2)}{125x^2 - 825x^3 + 1965x^4 - 1991x^5 + 786x^6 - 132x^7 + 8x^8} \, dx$$
$$= \frac{100\,x^4 - 1100\,x^3 + 3525\,x^2 - 2750\,x + e^{10} + 625}{4\,x^5 - 44\,x^4 + 141\,x^3 - 110\,x^2 + 25\,x}$$

input
```
integrate((((-10*x^2+33*x-5)*exp(5)^2-200*x^6+3300*x^5-19650*x^4+49775*x^3-
49125*x^2+20625*x-3125)/(8*x^8-132*x^7+786*x^6-1991*x^5+1965*x^4-825*x^3+1
25*x^2),x, algorithm=\
```

output
```
(100*x^4 - 1100*x^3 + 3525*x^2 - 2750*x + e^10 + 625)/(4*x^5 - 44*x^4 + 14
1*x^3 - 110*x^2 + 25*x)
```

3.1059.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(19) = 38$.

Time = 0.52 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.78

$$\int \frac{-3125 + 20625x - 49125x^2 + 49775x^3 - 19650x^4 + 3300x^5 - 200x^6 + e^{10}(-5 + 33x - 10x^2)}{125x^2 - 825x^3 + 1965x^4 - 1991x^5 + 786x^6 - 132x^7 + 8x^8} \, dx$$
$$= -\frac{-100x^4 + 1100x^3 - 3525x^2 + 2750x - e^{10} - 625}{4x^5 - 44x^4 + 141x^3 - 110x^2 + 25x}$$

input
```
integrate((((-10*x**2+33*x-5)*exp(5)**2-200*x**6+3300*x**5-19650*x**4+49775
*x**3-49125*x**2+20625*x-3125)/(8*x**8-132*x**7+786*x**6-1991*x**5+1965*x*
*4-825*x**3+125*x**2),x)
```

output
```
-(-100*x**4 + 1100*x**3 - 3525*x**2 + 2750*x - exp(10) - 625)/(4*x**5 - 44
*x**4 + 141*x**3 - 110*x**2 + 25*x)
```

3.1059.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. $2(24) = 48$.

Time = 0.20 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.81

$$\int \frac{-3125 + 20625x - 49125x^2 + 49775x^3 - 19650x^4 + 3300x^5 - 200x^6 + e^{10}(-5 + 33x - 10x^2)}{125x^2 - 825x^3 + 1965x^4 - 1991x^5 + 786x^6 - 132x^7 + 8x^8}\,dx$$
$$= \frac{100\,x^4 - 1100\,x^3 + 3525\,x^2 - 2750\,x + e^{10} + 625}{4\,x^5 - 44\,x^4 + 141\,x^3 - 110\,x^2 + 25\,x}$$

input
```
integrate(((-10*x^2+33*x-5)*exp(5)^2-200*x^6+3300*x^5-19650*x^4+49775*x^3-
49125*x^2+20625*x-3125)/(8*x^8-132*x^7+786*x^6-1991*x^5+1965*x^4-825*x^3+1
25*x^2),x, algorithm=\
```

output
```
(100*x^4 - 1100*x^3 + 3525*x^2 - 2750*x + e^10 + 625)/(4*x^5 - 44*x^4 + 14
1*x^3 - 110*x^2 + 25*x)
```

3.1059.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.78

$$\int \frac{-3125 + 20625x - 49125x^2 + 49775x^3 - 19650x^4 + 3300x^5 - 200x^6 + e^{10}(-5 + 33x - 10x^2)}{125x^2 - 825x^3 + 1965x^4 - 1991x^5 + 786x^6 - 132x^7 + 8x^8}\,dx$$
$$= \frac{e^{10} + 625}{25\,x} - \frac{4\,x^3e^{10} - 44\,x^2e^{10} + 141\,xe^{10} - 110\,e^{10}}{25\,(2\,x^2 - 11\,x + 5)^2}$$

input
```
integrate(((-10*x^2+33*x-5)*exp(5)^2-200*x^6+3300*x^5-19650*x^4+49775*x^3-
49125*x^2+20625*x-3125)/(8*x^8-132*x^7+786*x^6-1991*x^5+1965*x^4-825*x^3+1
25*x^2),x, algorithm=\
```

output
```
1/25*(e^10 + 625)/x - 1/25*(4*x^3*e^10 - 44*x^2*e^10 + 141*x*e^10 - 110*e^
10)/(2*x^2 - 11*x + 5)^2
```

3.1059.9 Mupad [B] (verification not implemented)

Time = 15.97 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.96

$$\int \frac{-3125+20625x-49125x^2+49775x^3-19650x^4+3300x^5-200x^6+e^{10}(-5+33x-10x^2)}{125x^2-825x^3+1965x^4-1991x^5+786x^6-132x^7+8x^8}\,dx$$
$$=\frac{8\,\mathrm{e}^{10}}{81\,(2\,x-1)^2}-\frac{56\,\mathrm{e}^{10}}{729\,(2\,x-1)}+\frac{\frac{\mathrm{e}^{10}}{25}+25}{x}-\frac{29\,\mathrm{e}^{10}}{18225\,(x-5)}+\frac{\mathrm{e}^{10}}{405\,(x-5)^2}$$

input
```
int(-(exp(10)*(10*x^2 - 33*x + 5) - 20625*x + 49125*x^2 - 49775*x^3 + 1965
0*x^4 - 3300*x^5 + 200*x^6 + 3125)/(125*x^2 - 825*x^3 + 1965*x^4 - 1991*x^
5 + 786*x^6 - 132*x^7 + 8*x^8),x)
```

output
```
(8*exp(10))/(81*(2*x - 1)^2) - (56*exp(10))/(729*(2*x - 1)) + (exp(10)/25
+ 25)/x - (29*exp(10))/(18225*(x - 5)) + exp(10)/(405*(x - 5)^2)
```

3.1060 $\int e^{\frac{1}{2}e^2(8x-x^2)}(3+e^2(12x-3x^2))\,dx$

3.1060.1 Optimal result

Integrand size = 34, antiderivative size = 20

$$\int e^{\frac{1}{2}e^2(8x-x^2)}\left(3+e^2\left(12x-3x^2\right)\right)\,dx=-20+3e^{\frac{1}{2}e^2(8-x)x}x$$

output
```
3*exp(1/2*(8-x)*exp(2)*x)*x-20
```

3.1060.2 Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int e^{\frac{1}{2}e^2(8x-x^2)}\left(3+e^2\left(12x-3x^2\right)\right)\,dx=3e^{-\frac{1}{2}e^2(-8+x)x}x$$

input
```
Integrate[E^((E^2*(8*x - x^2))/2)*(3 + E^2*(12*x - 3*x^2)),x]
```

output
```
(3*x)/E^((E^2*(-8 + x)*x)/2)
```

3.1060.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{\frac{1}{2}e^2(8x-x^2)}\left(e^2\left(12x-3x^2\right)+3\right)\,dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{3e^{\frac{1}{2}e^2(8x-x^2)}\left(4x-x^2\right)}{4-x}$$

input
```
Int[E^((E^2*(8*x - x^2))/2)*(3 + E^2*(12*x - 3*x^2)),x]
```

output
```
(3*E^((E^2*(8*x - x^2))/2)*(4*x - x^2))/(4 - x)
```

3.1060.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.1060.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

method	result
gosper	$3\,\mathrm{e}^{-\frac{x(-8+x)\mathrm{e}^{2}}{2}} x$
risch	$3\,\mathrm{e}^{-\frac{x(-8+x)\mathrm{e}^{2}}{2}} x$
norman	$3x\,\mathrm{e}^{\frac{\left(-x^{2}+8x\right)\mathrm{e}^{2}}{2}}$
parallelrisch	$3x\,\mathrm{e}^{\frac{\left(-x^{2}+8x\right)\mathrm{e}^{2}}{2}}$
default	$\frac{3\sqrt{\pi}\,\mathrm{e}^{8\,\mathrm{e}^{2}}\mathrm{e}^{-1}\sqrt{2}\,\operatorname{erf}\left(\frac{\mathrm{e}\sqrt{2}\,x}{2}-2\,\mathrm{e}^{2}\mathrm{e}^{-1}\sqrt{2}\right)}{2} - 3\,\mathrm{e}^{2}\left(-\mathrm{e}^{-2}x\,\mathrm{e}^{-\frac{x^{2}\mathrm{e}^{2}}{2}+4\,\mathrm{e}^{2}x} - 4\,\mathrm{e}^{-2}\mathrm{e}^{-\frac{x^{2}\mathrm{e}^{2}}{2}+4\,\mathrm{e}^{2}x} + 8\sqrt{\pi}\,\mathrm{e}^{8\,\mathrm{e}^{2}}\mathrm{e}^{-1}\right.$
parts	$-\frac{3\sqrt{\pi}\,\mathrm{e}^{8\,\mathrm{e}^{2}}\mathrm{e}^{-1}\sqrt{2}\,\operatorname{erf}\left(\frac{\mathrm{e}\sqrt{2}\,x}{2}-2\,\mathrm{e}^{2}\mathrm{e}^{-1}\sqrt{2}\right)\mathrm{e}^{2}x^{2}}{2} + 6\sqrt{\pi}\,\mathrm{e}^{8\,\mathrm{e}^{2}}\mathrm{e}^{-1}\sqrt{2}\,\operatorname{erf}\left(\frac{\mathrm{e}\sqrt{2}\,x}{2} - 2\,\mathrm{e}^{2}\mathrm{e}^{-1}\sqrt{2}\right)\mathrm{e}^{2}x + \frac{3\sqrt{\pi}\,\mathrm{e}^{8}}{}$

input
```
int(((-3*x^2+12*x)*exp(2)+3)*exp(1/2*(-x^2+8*x)*exp(2)),x,method=_RETURNVE
RBOSE)
```

output
```
3*exp(-1/2*x*(-8+x)*exp(2))*x
```

3.1060.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int e^{\frac{1}{2}e^{2}(8x-x^{2})}\left(3+e^{2}\left(12x-3x^{2}\right)\right)\,dx = 3\,xe^{\left(-\frac{1}{2}\,(x^{2}-8\,x)e^{2}\right)}$$

input
```
integrate(((-3*x^2+12*x)*exp(2)+3)*exp(1/2*(-x^2+8*x)*exp(2)),x, algorithm
=\
```

output
```
3*x*e^(-1/2*(x^2 - 8*x)*e^2)
```

3.1060.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int e^{\frac{1}{2}e^2(8x-x^2)}\left(3+e^2\left(12x-3x^2\right)\right)\,dx=3xe^{\left(-\frac{x^2}{2}+4x\right)e^2}$$

input
```
integrate(((-3*x**2+12*x)*exp(2)+3)*exp(1/2*(-x**2+8*x)*exp(2)),x)
```

output
```
3*x*exp((-x**2/2 + 4*x)*exp(2))
```

3.1060.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.35 (sec) , antiderivative size = 311, normalized size of antiderivative = 15.55

$$\int e^{\frac{1}{2}e^2(8x-x^2)}\left(3+e^2\left(12x-3x^2\right)\right)\,dx=\frac{3}{2}\sqrt{2}\sqrt{\pi}\,\mathrm{erf}\left(\frac{1}{2}\sqrt{2}xe-2\sqrt{2}e\right)e^{\left(8e^2-1\right)}+\frac{24\sqrt{\frac{1}{2}}\left(\frac{2\sqrt{2}\sqrt{\frac{1}{2}}\sqrt{\pi}(xe^2-4e^2)\left(\mathrm{erf}\left(\sqrt{\frac{1}{2}}\sqrt{(xe^2-4e^2)^2e^{(-1)}}\right)-1\right)e^3}{\sqrt{(xe^2-4e^2)^2}(-e^2)^{\frac{3}{2}}}-\frac{\sqrt{\frac{1}{2}}e^{\left(-\frac{1}{2}(xe^2-4e^2)^2e^{(-2)}+2\right)}}{(-e^2)^{\frac{3}{2}}}\right)e^{\left(8e^2+2\right)}}{\sqrt{-e^2}}-\frac{6\sqrt{\frac{1}{2}}\left(\frac{\sqrt{2}\sqrt{\frac{1}{2}}(xe^2-4e^2)^3e^3\Gamma\left(\frac{3}{2},\frac{1}{2}(xe^2-4e^2)^2e^{(-2)}\right)}{\left((xe^2-4e^2)^2\right)^{\frac{3}{2}}(-e^2)^{\frac{5}{2}}}-\frac{8\sqrt{2}\sqrt{\frac{1}{2}}\sqrt{\pi}(xe^2-4e^2)\left(\mathrm{erf}\left(\sqrt{\frac{1}{2}}\sqrt{(xe^2-4e^2)^2e^{(-1)}}\right)-1\right)e^5}{\sqrt{(xe^2-4e^2)^2}(-e^2)^{\frac{5}{2}}}+\frac{8\sqrt{\frac{1}{2}}e^{\left(-\cdots\right)}}{\cdots}\right)}{\sqrt{-e^2}}$$

input
```
integrate(((-3*x^2+12*x)*exp(2)+3)*exp(1/2*(-x^2+8*x)*exp(2)),x, algorithm
=\
```

output
```
3/2*sqrt(2)*sqrt(pi)*erf(1/2*sqrt(2)*x*e - 2*sqrt(2)*e)*e^(8*e^2 - 1) + 24
*sqrt(1/2)*(2*sqrt(2)*sqrt(1/2)*sqrt(pi)*(x*e^2 - 4*e^2)*(erf(sqrt(1/2)*sq
rt((x*e^2 - 4*e^2)^2)*e^(-1)) - 1)*e^3/(sqrt((x*e^2 - 4*e^2)^2)*(-e^2)^(3/
2)) - sqrt(1/2)*e^(-1/2*(x*e^2 - 4*e^2)^2*e^(-2) + 2)/(-e^2)^(3/2))*e^(8*e
^2 + 2)/sqrt(-e^2) - 6*sqrt(1/2)*(sqrt(2)*sqrt(1/2)*(x*e^2 - 4*e^2)^3*e^3*
gamma(3/2, 1/2*(x*e^2 - 4*e^2)^2*e^(-2))/(((x*e^2 - 4*e^2)^2)^(3/2)*(-e^2)
^(5/2)) - 8*sqrt(2)*sqrt(1/2)*sqrt(pi)*(x*e^2 - 4*e^2)*(erf(sqrt(1/2)*sqrt
((x*e^2 - 4*e^2)^2)*e^(-1)) - 1)*e^5/(sqrt((x*e^2 - 4*e^2)^2)*(-e^2)^(5/2)
) + 8*sqrt(1/2)*e^(-1/2*(x*e^2 - 4*e^2)^2*e^(-2) + 4)/(-e^2)^(5/2))*e^(8*e
^2 + 2)/sqrt(-e^2)
```

3.1060.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int e^{\frac{1}{2}e^2(8x-x^2)}\left(3+e^2\left(12x-3x^2\right)\right)\,dx=3\,xe^{\left(-\frac{1}{2}\,x^2e^2+4\,xe^2\right)}$$

input
```
integrate(((-3*x^2+12*x)*exp(2)+3)*exp(1/2*(-x^2+8*x)*exp(2)),x, algorithm
=\
```

output
```
3*x*e^(-1/2*x^2*e^2 + 4*x*e^2)
```

3.1060.9 Mupad [B] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int e^{\frac{1}{2}e^2(8x-x^2)}\left(3+e^2\left(12x-3x^2\right)\right)\,dx=3\,x\,\mathrm{e}^{-\frac{x^2\,\mathrm{e}^2}{2}}\,\mathrm{e}^{4\,x\,\mathrm{e}^2}$$

input
```
int(exp((exp(2)*(8*x - x^2))/2)*(exp(2)*(12*x - 3*x^2) + 3),x)
```

output
```
3*x*exp(-(x^2*exp(2))/2)*exp(4*x*exp(2))
```

3.1061 $\int \frac{e^{\frac{-2e^{1+x}-4x+e(8+16x)}{x}}\left(-8e+e^{1+x}(2-2x)\right)-x^2}{x^2}\,dx$

3.1061.1 Optimal result

Integrand size = 50, antiderivative size = 25

$$\int \frac{e^{\frac{-2e^{1+x}-4x+e(8+16x)}{x}}\left(-8e+e^{1+x}(2-2x)\right)-x^2}{x^2}\,dx = e^{-4-2e\left(-8-\frac{4}{x}+\frac{e^x}{x}\right)}-x$$

output
```
exp(-2*exp(1)*(exp(x)/x-4/x-8)-4)-x
```

3.1061.2 Mathematica [A] (verified)

Time = 0.56 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{e^{\frac{-2e^{1+x}-4x+e(8+16x)}{x}}\left(-8e+e^{1+x}(2-2x)\right)-x^2}{x^2}\,dx = e^{-4+16e+\frac{8e}{x}-\frac{2e^{1+x}}{x}}-x$$

input
```
Integrate[(E^((-2*E^(1 + x) - 4*x + E*(8 + 16*x))/x)*(-8*E + E^(1 + x)*(2
- 2*x)) - x^2)/x^2,x]
```

output
```
E^(-4 + 16*E + (8*E)/x - (2*E^(1 + x))/x) - x
```

3.1061.3 Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.040, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-4x-2e^{x+1}+e(16x+8)}{x}}\left(e^{x+1}(2-2x)-8e\right)-x^2}{x^2}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2e^{-\frac{2e^{x+1}}{x}+\frac{8e}{x}-3\left(1-\frac{16e}{3}\right)}\left(-e^x x+e^x-4\right)}{x^2}-1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$e^{-\frac{2e^{x+1}}{x}+\frac{8e}{x}-4(1-4e)}-x$$

input
```
Int[(E^((-2*E^(1 + x) - 4*x + E*(8 + 16*x))/x)*(-8*E + E^(1 + x)*(2 - 2*x)
) - x^2)/x^2,x]
```

output
```
E^(-4*(1 - 4*E) + (8*E)/x - (2*E^(1 + x))/x) - x
```

3.1061.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1061.4 Maple [A] (verified)

Time = 0.67 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

method	result	size
parallelrisch	$-x+\mathrm{e}^{\frac{-2\,\mathrm{e}\,\mathrm{e}^{x}+(16x+8)\mathrm{e}-4x}{x}}$	28
risch	$-x+\mathrm{e}^{\frac{16x\,\mathrm{e}+8\,\mathrm{e}-2\,\mathrm{e}^{1+x}-4x}{x}}$	30
norman	$\frac{x\,\mathrm{e}^{\frac{-2\,\mathrm{e}\,\mathrm{e}^{x}+(16x+8)\mathrm{e}-4x}{x}}-x^{2}}{x}$	36

input
```
int((((2-2*x)*exp(1)*exp(x)-8*exp(1))*exp((-2*exp(1)*exp(x)+(16*x+8)*exp(1
)-4*x)/x)-x^2)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-x+exp((-2*exp(1)*exp(x)+(16*x+8)*exp(1)-4*x)/x)
```

3.1061.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{e^{\frac{-2e^{1+x}-4x+e(8+16x)}{x}}\left(-8e+e^{1+x}(2-2x)\right)-x^2}{x^2}\,dx=-x+e^{\left(\frac{2\left(4\,(2\,x+1)e-2\,x-e^{(x+1)}\right)}{x}\right)}$$

input
```
integrate((((2-2*x)*exp(1)*exp(x)-8*exp(1))*exp((-2*exp(1)*exp(x)+(16*x+8)
*exp(1)-4*x)/x)-x^2)/x^2,x, algorithm=\
```

output
```
-x + e^(2*(4*(2*x + 1)*e - 2*x - e^(x + 1))/x)
```

3.1061.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{-2e^{1+x}-4x+e(8+16x)}{x}}\left(-8e+e^{1+x}(2-2x)\right)-x^2}{x^2}\,dx=-x+e^{\frac{-4x+e(16x+8)-2ee^{x}}{x}}$$

input
```
integrate((((2-2*x)*exp(1)*exp(x)-8*exp(1))*exp((-2*exp(1)*exp(x)+(16*x+8)
*exp(1)-4*x)/x)-x**2)/x**2,x)
```

output
```
-x + exp((-4*x + E*(16*x + 8) - 2*E*exp(x))/x)
```

3.1061.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{e^{\frac{-2e^{1+x}-4x+e(8+16x)}{x}}\left(-8e+e^{1+x}(2-2x)\right)-x^2}{x^2}\,dx=-x+e^{\left(\frac{8\,e}{x}-\frac{2\,e^{(x+1)}}{x}+16\,e-4\right)}$$

input
```
integrate((((2-2*x)*exp(1)*exp(x)-8*exp(1))*exp((-2*exp(1)*exp(x)+(16*x+8)
*exp(1)-4*x)/x)-x^2)/x^2,x, algorithm=\
```

output
```
-x + e^(8*e/x - 2*e^(x + 1)/x + 16*e - 4)
```

3.1061.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{e^{\frac{-2e^{1+x}-4x+e(8+16x)}{x}}\left(-8e+e^{1+x}(2-2x)\right)-x^2}{x^2}\,dx=-x+e^{\left(\frac{8\,e}{x}-\frac{2\,e^{(x+1)}}{x}+16\,e-4\right)}$$

input
```
integrate((((2-2*x)*exp(1)*exp(x)-8*exp(1))*exp((-2*exp(1)*exp(x)+(16*x+8)
*exp(1)-4*x)/x)-x^2)/x^2,x, algorithm=\
```

output
```
-x + e^(8*e/x - 2*e^(x + 1)/x + 16*e - 4)
```

3.1061.9 Mupad [B] (verification not implemented)

Time = 17.08 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

$$\int \frac{e^{\frac{-2e^{1+x}-4x+e(8+16x)}{x}}\left(-8e+e^{1+x}(2-2x)\right)-x^2}{x^2}\,dx=\mathrm{e}^{\frac{8\,\mathrm{e}}{x}}\,\mathrm{e}^{16\,\mathrm{e}}\,\mathrm{e}^{-4}\,\mathrm{e}^{-\frac{2\,\mathrm{e}\,\mathrm{e}^x}{x}}-x$$

input
```
int(-(exp(-(4*x + 2*exp(1)*exp(x) - exp(1)*(16*x + 8))/x)*(8*exp(1) + exp(
1)*exp(x)*(2*x - 2)) + x^2)/x^2,x)
```

output
```
exp((8*exp(1))/x)*exp(16*exp(1))*exp(-4)*exp(-(2*exp(1)*exp(x))/x) - x
```

3.1062 $\int \frac{-6-369x+149x^2-15x^3+(12+369x-15x^3)\log(x)\log(\log(x))}{x^3\log(x)}\,dx$

3.1062.1 Optimal result

Integrand size = 39, antiderivative size = 29

$$\int \frac{-6-369x+149x^2-15x^3+(12+369x-15x^3)\log(x)\log(\log(x))}{x^3\log(x)}\,dx = \frac{\left(6-3\left(5(5-x)^2+\frac{2}{x}\right)-x\right)\log(\log(x))}{x}$$

output
```
ln(ln(x))/x*(6-15*(5-x)^2-6/x-x)
```

3.1062.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{-6-369x+149x^2-15x^3+(12+369x-15x^3)\log(x)\log(\log(x))}{x^3\log(x)}\,dx = 149\log(\log(x))-\frac{6\log(\log(x))}{x^2}-\frac{369\log(\log(x))}{x}-15x\log(\log(x))$$

input
```
Integrate[(-6 - 369*x + 149*x^2 - 15*x^3 + (12 + 369*x - 15*x^3)*Log[x]*Lo
g[Log[x]])/(x^3*Log[x]),x]
```

output
```
149*Log[Log[x]] - (6*Log[Log[x]])/x^2 - (369*Log[Log[x]])/x - 15*x*Log[Log
[x]]
```

3.1062.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-15x^3+(-15x^3+369x+12)\log(x)\log(\log(x))+149x^2-369x-6}{x^3\log(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{-15x^3+149x^2-369x-6}{x^3\log(x)}-\frac{3(5x^3-123x-4)\log(\log(x))}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{-15x^3+149x^2-369x-6}{x^3\log(x)}dx+6\,\text{ExpIntegralEi}(-2\log(x))+369\,\text{ExpIntegralEi}(-\log(x))+15\,\text{LogIntegral}(x)-\frac{6\log(\log(x))}{x^2}-15x\log(\log(x))-\frac{369\log(\log(x))}{x}$$

input
```
Int[(-6 - 369*x + 149*x^2 - 15*x^3 + (12 + 369*x - 15*x^3)*Log[x]*Log[Log[
x]])/(x^3*Log[x]),x]
```

output
```
$Aborted
```

3.1062.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1062.4 Maple [A] (verified)

Time = 1.20 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

method	result	size
risch	$-\frac{3(5x^3+123x+2)\ln(\ln(x))}{x^2}+149\ln(\ln(x))$	25
default	$-3\left(5x+\frac{123}{x}+\frac{2}{x^2}\right)\ln(\ln(x))+149\ln(\ln(x))$	26
parts	$-3\left(5x+\frac{123}{x}+\frac{2}{x^2}\right)\ln(\ln(x))+149\ln(\ln(x))$	26
parallelrisch	$-\frac{15\ln(\ln(x))x^3-149x^2\ln(\ln(x))+369x\ln(\ln(x))+6\ln(\ln(x))}{x^2}$	34

input
```
int(((-15*x^3+369*x+12)*ln(x)*ln(ln(x))-15*x^3+149*x^2-369*x-6)/x^3/ln(x),
x,method=_RETURNVERBOSE)
```

output
```
-3*(5*x^3+123*x+2)/x^2*ln(ln(x))+149*ln(ln(x))
```

3.1062.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \frac{-6-369x+149x^2-15x^3+(12+369x-15x^3)\log(x)\log(\log(x))}{x^3\log(x)}\,dx$$
$$= -\frac{(15\,x^3-149\,x^2+369\,x+6)\log(\log(x))}{x^2}$$

input
```
integrate(((-15*x^3+369*x+12)*log(x)*log(log(x))-15*x^3+149*x^2-369*x-6)/x
^3/log(x),x, algorithm=\
```

output
```
-(15*x^3 - 149*x^2 + 369*x + 6)*log(log(x))/x^2
```

3.1062.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{-6-369x+149x^2-15x^3+(12+369x-15x^3)\log(x)\log(\log(x))}{x^3\log(x)}\,dx$$
$$=149\log\left(\log\left(x\right)\right)+\frac{\left(-15x^3-369x-6\right)\log\left(\log\left(x\right)\right)}{x^2}$$

input
```
integrate(((-15*x**3+369*x+12)*ln(x)*ln(ln(x))-15*x**3+149*x**2-369*x-6)/x
**3/ln(x),x)
```

output
```
149*log(log(x)) + (-15*x**3 - 369*x - 6)*log(log(x))/x**2
```

3.1062.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{-6-369x+149x^2-15x^3+(12+369x-15x^3)\log(x)\log(\log(x))}{x^3\log(x)}\,dx$$
$$=-15\,x\log\left(\log\left(x\right)\right)-\frac{369\,\log\left(\log\left(x\right)\right)}{x}-\frac{6\,\log\left(\log\left(x\right)\right)}{x^2}+149\,\log\left(\log\left(x\right)\right)$$

input
```
integrate(((-15*x^3+369*x+12)*log(x)*log(log(x))-15*x^3+149*x^2-369*x-6)/x
^3/log(x),x, algorithm=\
```

output
```
-15*x*log(log(x)) - 369*log(log(x))/x - 6*log(log(x))/x^2 + 149*log(log(x)
)
```

3.1062.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

$$\int \frac{-6-369x+149x^2-15x^3+(12+369x-15x^3)\log(x)\log(\log(x))}{x^3\log(x)}\,dx$$
$$=-3\left(5\,x+\frac{123\,x+2}{x^2}\right)\log\left(\log\left(x\right)\right)+149\,\log\left(\log\left(x\right)\right)$$

input
```
integrate(((-15*x^3+369*x+12)*log(x)*log(log(x))-15*x^3+149*x^2-369*x-6)/x
^3/log(x),x, algorithm=\
```

output
```
-3*(5*x + (123*x + 2)/x^2)*log(log(x)) + 149*log(log(x))
```

3.1062.9 Mupad [B] (verification not implemented)

Time = 16.04 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \frac{-6-369x+149x^2-15x^3+(12+369x-15x^3)\log(x)\log(\log(x))}{x^3\log(x)}\,dx$$
$$= -\frac{\ln(\ln(x))\,(15\,x^3-149\,x^2+369\,x+6)}{x^2}$$

input
```
int(-(369*x - 149*x^2 + 15*x^3 - log(log(x))*log(x)*(369*x - 15*x^3 + 12)
+ 6)/(x^3*log(x)),x)
```

output
```
-(log(log(x))*(369*x - 149*x^2 + 15*x^3 + 6))/x^2
```

3.1063 $\int \frac{1}{24}(25 + 24e^x) \, dx$

3.1063.1 Optimal result

Integrand size = 11, antiderivative size = 9

$$\int \frac{1}{24}(25 + 24e^x) \, dx = e^x + \frac{25x}{24}$$

output
```
25/24*x+exp(x)
```

3.1063.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{1}{24}(25 + 24e^x) \, dx = e^x + \frac{25x}{24}$$

input
```
Integrate[(25 + 24*E^x)/24,x]
```

output
```
E^x + (25*x)/24
```

3.1063.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.44, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{24}(24e^x + 25)\,dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{24}\int (25 + 24e^x)\,dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{24}(25x + 24e^x)$$

input
```
Int[(25 + 24*E^x)/24,x]
```

output
```
(24*E^x + 25*x)/24
```

3.1063.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1063.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.78

method	result	size
default	$\frac{25x}{24}+\mathrm{e}^{x}$	7
norman	$\frac{25x}{24}+\mathrm{e}^{x}$	7
risch	$\frac{25x}{24}+\mathrm{e}^{x}$	7
parallelrisch	$\frac{25x}{24}+\mathrm{e}^{x}$	7
parts	$\frac{25x}{24}+\mathrm{e}^{x}$	7
derivativedivides	$\mathrm{e}^{x}+\frac{25\ln(\mathrm{e}^{x})}{24}$	9

input
```
int(exp(x)+25/24,x,method=_RETURNVERBOSE)
```

output
```
25/24*x+exp(x)
```

3.1063.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.67

$$\int \frac{1}{24}(25+24e^x)\,dx=\frac{25}{24}\,x+e^x$$

input
```
integrate(exp(x)+25/24,x, algorithm=\
```

output
```
25/24*x + e^x
```

3.1063.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.78

$$\int \frac{1}{24}(25+24e^x)\,dx=\frac{25x}{24}+e^x$$

input
```
integrate(exp(x)+25/24,x)
```

output
```
25*x/24 + exp(x)
```

3.1063.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.67

$$\int \frac{1}{24}(25+24e^x)\,dx = \frac{25}{24}\,x + e^x$$

input
```
integrate(exp(x)+25/24,x, algorithm=\
```

output
```
25/24*x + e^x
```

3.1063.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.67

$$\int \frac{1}{24}(25+24e^x)\,dx = \frac{25}{24}\,x + e^x$$

input
```
integrate(exp(x)+25/24,x, algorithm=\
```

output
```
25/24*x + e^x
```

3.1063.9 Mupad [B] (verification not implemented)

Time = 15.62 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.67

$$\int \frac{1}{24}(25+24e^x)\,dx = \frac{25\,x}{24} + \mathrm{e}^x$$

input
```
int(exp(x) + 25/24,x)
```

output
```
(25*x)/24 + exp(x)
```

3.1064 $\int \frac{e^{3-e^{625}-x}\left(-1+2x+e^{-3+e^{625}+x}x^2+(-1-x)\log\left(\frac{e^{2x}}{x}\right)\right)}{x^2}\,dx$

3.1064.1 Optimal result

Integrand size = 49, antiderivative size = 28

$$\int \frac{e^{3-e^{625}-x}\left(-1+2x+e^{-3+e^{625}+x}x^2+(-1-x)\log\left(\frac{e^{2x}}{x}\right)\right)}{x^2}\,dx=x+\frac{e^{3-e^{625}-x}\log\left(\frac{e^{2x}}{x}\right)}{x}$$

output
```
x+ln(exp(x)^2/x)/exp(exp(625)+x-3)/x
```

3.1064.2 Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{e^{3-e^{625}-x}\left(-1+2x+e^{-3+e^{625}+x}x^2+(-1-x)\log\left(\frac{e^{2x}}{x}\right)\right)}{x^2}\,dx=x+\frac{e^{3-e^{625}-x}\log\left(\frac{e^{2x}}{x}\right)}{x}$$

input
```
Integrate[(E^(3 - E^625 - x)*(-1 + 2*x + E^(-3 + E^625 + x)*x^2 + (-1 - x)
*Log[E^(2*x)/x]))/x^2,x]
```

output
```
x + (E^(3 - E^625 - x)*Log[E^(2*x)/x])/x
```

3.1064.3 Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.041, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x-e^{625}+3}\left(e^{x+e^{625}-3}x^2+2x+(-x-1)\log\left(\frac{e^{2x}}{x}\right)-1\right)}{x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{-x-e^{625}+3}\left(2x+x\left(-\log\left(\frac{e^{2x}}{x}\right)\right)-\log\left(\frac{e^{2x}}{x}\right)-1\right)}{x^2}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x+\frac{e^{-x-e^{625}+3}\log\left(\frac{e^{2x}}{x}\right)}{x}$$

input
```
Int[(E^(3 - E^625 - x)*(-1 + 2*x + E^(-3 + E^625 + x)*x^2 + (-1 - x)*Log[E
^(2*x)/x]))/x^2,x]
```

output
```
x + (E^(3 - E^625 - x)*Log[E^(2*x)/x])/x
```

3.1064.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1064.4 Maple [A] (verified)

Time = 0.59 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result
default	$x+\frac{\ln\left(\frac{e^{2x}}{x}\right)e^{-e^{625}-x+3}}{x}$
parts	$x+\frac{\ln\left(\frac{e^{2x}}{x}\right)e^{-e^{625}-x+3}}{x}$
norman	$\frac{\left(e^{x}x^{2}+e^{-e^{625}}e^{3}\ln\left(\frac{e^{2x}}{x}\right)\right)e^{-x}}{x}$
parallelrisch	$\frac{\left(\ln\left(e^{e^{625}+x-3}\right)x\,e^{e^{625}+x-3}+\ln\left(\frac{e^{2x}}{x}\right)\right)e^{-e^{625}-x+3}}{x}$
risch	$\frac{2\ln(e^{x})e^{-e^{625}-x+3}}{x}$ − (−2x²e^{e^{625}+x−3} + iπ csgn(ie^{2x}/x)³ − iπ csgn(ie^{2x}/x)² csgn(ie^{2x}) − iπ csgn(ie^{2x}/x)² csgn(i/x) + iπ csgn(

input
```
int(((-1-x)*ln(exp(x)^2/x)+x^2*exp(exp(625)+x-3)+2*x-1)/x^2/exp(exp(625)+x
-3),x,method=_RETURNVERBOSE)
```

output
```
x+ln(exp(x)^2/x)/exp(exp(625)+x-3)/x
```

3.1064.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{e^{3-e^{625}-x}\left(-1+2x+e^{-3+e^{625}+x}x^2+(-1-x)\log\left(\frac{e^{2x}}{x}\right)\right)}{x^2}\,dx = \frac{\left(x^2e^{\left(x+e^{625}-3\right)}+\log\left(\frac{e^{(2\,x)}}{x}\right)\right)e^{\left(-x-e^{625}+3\right)}}{x}$$

input
```
integrate(((-1-x)*log(exp(x)^2/x)+x^2*exp(exp(625)+x-3)+2*x-1)/x^2/exp(exp
(625)+x-3),x, algorithm=\
```

output
```
(x^2*e^(x + e^625 - 3) + log(e^(2*x)/x))*e^(-x - e^625 + 3)/x
```

3.1064.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{e^{3-e^{625}-x}\left(-1+2x+e^{-3+e^{625}+x}x^2+(-1-x)\log\left(\frac{e^{2x}}{x}\right)\right)}{x^2}\,dx = x+\frac{e^3\log\left(\frac{e^{2x}}{x}\right)}{x\sqrt{e^{2x}}e^{e^{625}}}$$

input
```
integrate(((-1-x)*ln(exp(x)**2/x)+x**2*exp(exp(625)+x-3)+2*x-1)/x**2/exp(e
xp(625)+x-3),x)
```

output
```
x + exp(3)*exp(-exp(625))*log(exp(2*x)/x)/(x*sqrt(exp(2*x)))
```

3.1064.7 Maxima [F]

$$\int \frac{e^{3-e^{625}-x}\left(-1+2x+e^{-3+e^{625}+x}x^2+(-1-x)\log\left(\frac{e^{2x}}{x}\right)\right)}{x^2}\,dx$$
$$= \int \frac{\left(x^2e^{\left(x+e^{625}-3\right)}-(x+1)\log\left(\frac{e^{(2x)}}{x}\right)+2x-1\right)e^{\left(-x-e^{625}+3\right)}}{x^2}\,dx$$

input
```
integrate(((-1-x)*log(exp(x)^2/x)+x^2*exp(exp(625)+x-3)+2*x-1)/x^2/exp(exp
(625)+x-3),x, algorithm=\
```

output
```
2*Ei(-x)*e^(-e^625 + 3) + e^(-e^625 + 3)*gamma(-1, x) + x - e^(-x - e^625
+ 3)*log(x)/x - integrate((2*x^2*e^3 + 2*x*e^3 - e^3)*e^(-x - e^625)/x^2,
x)
```

3.1064.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{e^{3-e^{625}-x}\left(-1+2x+e^{-3+e^{625}+x}x^2+(-1-x)\log\left(\frac{e^{2x}}{x}\right)\right)}{x^2}\,dx$$
$$= \frac{x^2+2\,xe^{\left(-x-e^{625}+3\right)}-e^{\left(-x-e^{625}+3\right)}\log\left(x\right)}{x}$$

input
```
integrate((((-1-x)*log(exp(x)^2/x)+x^2*exp(exp(625)+x-3)+2*x-1)/x^2/exp(exp
(625)+x-3),x, algorithm=\
```

output
```
(x^2 + 2*x*e^(-x - e^625 + 3) - e^(-x - e^625 + 3)*log(x))/x
```

3.1064.9 Mupad [B] (verification not implemented)

Time = 16.51 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{e^{3-e^{625}-x}\left(-1+2x+e^{-3+e^{625}+x}x^2+(-1-x)\log\left(\frac{e^{2x}}{x}\right)\right)}{x^2}\,dx$$
$$= x+2\,\mathrm{e}^{-\mathrm{e}^{625}}\,\mathrm{e}^{-x}\,\mathrm{e}^{3}+\frac{\ln\left(\frac{1}{x}\right)\,\mathrm{e}^{-\mathrm{e}^{625}}\,\mathrm{e}^{-x}\,\mathrm{e}^{3}}{x}$$

input
```
int((exp(3 - exp(625) - x)*(2*x - log(exp(2*x)/x)*(x + 1) + x^2*exp(x + ex
p(625) - 3) - 1))/x^2,x)
```

output
```
x + 2*exp(-exp(625))*exp(-x)*exp(3) + (log(1/x)*exp(-exp(625))*exp(-x)*exp
(3))/x
```

3.1065 $\int \frac{-240x\log^2(x)+(480e^3-480x)\log(x)\log(-e^3+x)}{e^3x-x^2}\,dx$

3.1065.1 Optimal result

Integrand size = 42, antiderivative size = 25

$$\int \frac{-240x\log^2(x)+(480e^3-480x)\log(x)\log(-e^3+x)}{e^3x-x^2}\,dx = -e^2+240\log^2(x)\log\left(\left(1-\frac{e^3}{x}\right)x\right)$$

output
```
240*ln(x)^2*ln(x*(1-exp(3)/x))-exp(2)
```

3.1065.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.56

$$\int \frac{-240x\log^2(x)+(480e^3-480x)\log(x)\log(-e^3+x)}{e^3x-x^2}\,dx = 240\log^2(x)\log(-e^3+x)$$

input
```
Integrate[(-240*x*Log[x]^2 + (480*E^3 - 480*x)*Log[x]*Log[-E^3 + x])/(E^3*
x - x^2),x]
```

output
```
240*Log[x]^2*Log[-E^3 + x]
```

3.1065.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.56, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(480e^3-480x)\log(x)\log(x-e^3)-240x\log^2(x)}{e^3x-x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(480e^3-480x)\log(x)\log(x-e^3)-240x\log^2(x)}{(e^3-x)\,x}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{480\log(x)\log(x-e^3)}{x}-\frac{240\log^2(x)}{e^3-x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$240\log^2(x)\log(x-e^3)$$

input
```
Int[(-240*x*Log[x]^2 + (480*E^3 - 480*x)*Log[x]*Log[-E^3 + x])/(E^3*x - x^
2),x]
```

output
```
240*Log[x]^2*Log[-E^3 + x]
```

3.1065.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1065.4 Maple [A] (verified)

Time = 1.52 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.56

method	result	size
default	$240 \ln \left(x - e^{3}\right) \ln \left(x\right)^{2}$	14
risch	$240 \ln \left(x - e^{3}\right) \ln \left(x\right)^{2}$	14
parts	$240 \ln \left(x - e^{3}\right) \ln \left(x\right)^{2}$	14

input
```
int((-240*x*ln(x)^2+(480*exp(3)-480*x)*ln(x-exp(3))*ln(x))/(x*exp(3)-x^2),
x,method=_RETURNVERBOSE)
```

output
```
240*ln(x-exp(3))*ln(x)^2
```

3.1065.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.52

$$\int \frac{-240x \log^2(x) + (480e^3 - 480x) \log(x) \log(-e^3 + x)}{e^3 x - x^2} \, dx = 240 \log\left(x - e^3\right) \log(x)^2$$

input
```
integrate((-240*x*log(x)^2+(480*exp(3)-480*x)*log(x-exp(3))*log(x))/(x*exp
(3)-x^2),x, algorithm=\
```

output
```
240*log(x - e^3)*log(x)^2
```

3.1065.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.48

$$\int \frac{-240x \log^2(x) + (480e^3 - 480x) \log(x) \log(-e^3 + x)}{e^3 x - x^2} \, dx = 240 \log(x)^2 \log\left(x - e^3\right)$$

input
```
integrate((-240*x*ln(x)**2+(480*exp(3)-480*x)*ln(x-exp(3))*ln(x))/(x*exp(3
)-x**2),x)
```

output
```
240*log(x)**2*log(x - exp(3))
```

3.1065.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.52

$$\int \frac{-240x\log^2(x) + (480e^3 - 480x)\log(x)\log(-e^3 + x)}{e^3x - x^2}\,dx = 240\,\log\left(x - e^3\right)\log\left(x\right)^2$$

input
```
integrate((-240*x*log(x)^2+(480*exp(3)-480*x)*log(x-exp(3))*log(x))/(x*exp
(3)-x^2),x, algorithm=\
```

output
```
240*log(x - e^3)*log(x)^2
```

3.1065.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.52

$$\int \frac{-240x\log^2(x) + (480e^3 - 480x)\log(x)\log(-e^3 + x)}{e^3x - x^2}\,dx = 240\,\log\left(x - e^3\right)\log\left(x\right)^2$$

input
```
integrate((-240*x*log(x)^2+(480*exp(3)-480*x)*log(x-exp(3))*log(x))/(x*exp
(3)-x^2),x, algorithm=\
```

output
```
240*log(x - e^3)*log(x)^2
```

3.1065.9 Mupad [B] (verification not implemented)

Time = 16.40 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.52

$$\int \frac{-240x\log^2(x) + (480e^3 - 480x)\log(x)\log(-e^3 + x)}{e^3x - x^2}\,dx = 240\,\ln\left(x - \mathrm{e}^3\right)\,\ln\left(x\right)^2$$

input
```
int(-(240*x*log(x)^2 + log(x - exp(3))*log(x)*(480*x - 480*exp(3)))/(x*exp
(3) - x^2),x)
```

output
```
240*log(x - exp(3))*log(x)^2
```

3.1066 $\int \frac{-17+e^x(6x+4x^2+e^5(2+4x))\log(2)+e^x(2x+2e^5x+2x^2)\log(2)\log($

3.1066.1 Optimal result

Integrand size = 56, antiderivative size = 27

$$\int \frac{-17+e^x(6x+4x^2+e^5(2+4x))\log(2)+e^x(2x+2e^5x+2x^2)\log(2)\log(x)}{3x}\,dx = \left(5+\frac{2}{3}\left(1-e^x\left(e^5+x\right)\log(2)\right)\right)(-2-\log(x))$$

output
```
(-ln(x)-2)*(17/3-2/3*exp(x)*ln(2)*(exp(5)+x))
```

3.1066.2 Mathematica [A] (verified)

Time = 0.38 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{-17+e^x(6x+4x^2+e^5(2+4x))\log(2)+e^x(2x+2e^5x+2x^2)\log(2)\log(x)}{3x}\,dx = \frac{1}{3}\left(e^x\left(e^5+x\right)\log(16)+\left(-17+e^{5+x}\log(4)+e^x x\log(4)\right)\log(x)\right)$$

input
```
Integrate[(-17 + E^x*(6*x + 4*x^2 + E^5*(2 + 4*x))*Log[2] + E^x*(2*x + 2*E
^5*x + 2*x^2)*Log[2]*Log[x])/(3*x),x]
```

output
```
(E^x*(E^5 + x)*Log[16] + (-17 + E^(5 + x)*Log[4] + E^x*x*Log[4])*Log[x])/3
```

3.1066.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 62 vs. $2(27) = 54$.

Time = 0.50 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.30, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(4x^2+6x+e^5(4x+2))\log(2)+e^x(2x^2+2e^5x+2x)\log(2)\log(x)-17}{3x}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\int -\frac{-2e^x\log(2)\left(2x^2+3x+e^5(2x+1)\right)-2e^x\left(x^2+e^5x+x\right)\log(2)\log(x)+17}{x}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{3}\int \frac{-2e^x\log(2)\left(2x^2+3x+e^5(2x+1)\right)-2e^x\left(x^2+e^5x+x\right)\log(2)\log(x)+17}{x}dx$$

$$\Big\downarrow \text{2010}$$

$$-\frac{1}{3}\int \left(\frac{2e^x\log(2)\left(-\log(x)x^2-2x^2-\left(1+e^5\right)\log(x)x-3\left(1+\frac{2e^5}{3}\right)x-e^5\right)}{x}+\frac{17}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(4e^xx\log(2)-2e^x\log(2)\log(x)+2e^x\left(x+e^5+1\right)\log(2)\log(x)-17\log(x)-6e^x\log(2)+2\left(3+2e^5\right)e^x\log(2)\right)$$

input
```
Int[(-17 + E^x*(6*x + 4*x^2 + E^5*(2 + 4*x))*Log[2] + E^x*(2*x + 2*E^5*x +
 2*x^2)*Log[2]*Log[x])/(3*x),x]
```

output
```
(-6*E^x*Log[2] + 2*E^x*(3 + 2*E^5)*Log[2] + 4*E^x*x*Log[2] - 17*Log[x] - 2
*E^x*Log[2]*Log[x] + 2*E^x*(1 + E^5 + x)*Log[2]*Log[x])/3
```

3.1066.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1066.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

method	result	size
risch	$\frac{2\ln(2)\left(e^{5}+x\right)e^{x}\ln(x)}{3}+\frac{4\ln(2)e^{5+x}}{3}+\frac{4x\ln(2)e^{x}}{3}-\frac{17\ln(x)}{3}$	33
default	$\frac{4\,e^{5}e^{x}\ln(2)}{3}+\frac{4x\ln(2)e^{x}}{3}+\frac{2\,e^{5}\ln(2)e^{x}\ln(x)}{3}+\frac{2x\ln(2)e^{x}\ln(x)}{3}-\frac{17\ln(x)}{3}$	40
norman	$\frac{4\,e^{5}e^{x}\ln(2)}{3}+\frac{4x\ln(2)e^{x}}{3}+\frac{2\,e^{5}\ln(2)e^{x}\ln(x)}{3}+\frac{2x\ln(2)e^{x}\ln(x)}{3}-\frac{17\ln(x)}{3}$	40
parallelrisch	$\frac{4\,e^{5}e^{x}\ln(2)}{3}+\frac{4x\ln(2)e^{x}}{3}+\frac{2\,e^{5}\ln(2)e^{x}\ln(x)}{3}+\frac{2x\ln(2)e^{x}\ln(x)}{3}-\frac{17\ln(x)}{3}$	40
parts	$\frac{4\,e^{5}e^{x}\ln(2)}{3}+\frac{4x\ln(2)e^{x}}{3}+\frac{2\,e^{5}\ln(2)e^{x}\ln(x)}{3}+\frac{2x\ln(2)e^{x}\ln(x)}{3}-\frac{17\ln(x)}{3}$	40

input
```
int(1/3*((2*x*exp(5)+2*x^2+2*x)*ln(2)*exp(x)*ln(x)+((4*x+2)*exp(5)+4*x^2+6
*x)*ln(2)*exp(x)-17)/x,x,method=_RETURNVERBOSE)
```

output
```
2/3*ln(2)*(exp(5)+x)*exp(x)*ln(x)+4/3*ln(2)*exp(5+x)+4/3*x*ln(2)*exp(x)-17
/3*ln(x)
```

3.1066.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{-17 + e^x(6x + 4x^2 + e^5(2 + 4x))\log(2) + e^x(2x + 2e^5x + 2x^2)\log(2)\log(x)}{3x}\,dx$$
$$= \frac{4}{3}\left(x + e^5\right)e^x\log\left(2\right) + \frac{1}{3}\left(2\left(x + e^5\right)e^x\log\left(2\right) - 17\right)\log\left(x\right)$$

input
```
integrate(1/3*((2*x*exp(5)+2*x^2+2*x)*log(2)*exp(x)*log(x)+((4*x+2)*exp(5)
+4*x^2+6*x)*log(2)*exp(x)-17)/x,x, algorithm=\
```

output
```
4/3*(x + e^5)*e^x*log(2) + 1/3*(2*(x + e^5)*e^x*log(2) - 17)*log(x)
```

3.1066.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.78

$$\int \frac{-17 + e^x(6x + 4x^2 + e^5(2 + 4x))\log(2) + e^x(2x + 2e^5x + 2x^2)\log(2)\log(x)}{3x}\,dx$$
$$= \frac{\left(2x\log\left(2\right)\log\left(x\right) + 4x\log\left(2\right) + 2e^5\log\left(2\right)\log\left(x\right) + 4e^5\log\left(2\right)\right)e^x}{3} - \frac{17\log\left(x\right)}{3}$$

input
```
integrate(1/3*((2*x*exp(5)+2*x**2+2*x)*ln(2)*exp(x)*ln(x)+((4*x+2)*exp(5)+
4*x**2+6*x)*ln(2)*exp(x)-17)/x,x)
```

output
```
(2*x*log(2)*log(x) + 4*x*log(2) + 2*exp(5)*log(2)*log(x) + 4*exp(5)*log(2)
)*exp(x)/3 - 17*log(x)/3
```

3.1066.7 Maxima [F]

$$\int \frac{-17 + e^x(6x + 4x^2 + e^5(2 + 4x))\log(2) + e^x(2x + 2e^5x + 2x^2)\log(2)\log(x)}{3x}\,dx$$
$$= \int \frac{2\left(x^2 + xe^5 + x\right)e^x\log\left(2\right)\log\left(x\right) + 2\left(2\,x^2 + (2\,x + 1)e^5 + 3\,x\right)e^x\log\left(2\right) - 17}{3\,x}\,dx$$

input
```
integrate(1/3*((2*x*exp(5)+2*x^2+2*x)*log(2)*exp(x)*log(x)+((4*x+2)*exp(5)
+4*x^2+6*x)*log(2)*exp(x)-17)/x,x, algorithm=\
```

output
```
2/3*Ei(x)*e^5*log(2) + 4/3*(x - 1)*e^x*log(2) + 2/3*(x*log(2) + e^5*log(2)
 - log(2))*e^x*log(x) + 2/3*e^x*log(2)*log(x) - 2/3*Ei(x)*log(2) + 4/3*e^(
x + 5)*log(2) + 2*e^x*log(2) - 1/3*integrate(2*(x*log(2) + e^5*log(2) - lo
g(2))*e^x/x, x) - 17/3*log(x)
```

3.1066.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. $2(18) = 36$.

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44

$$\int \frac{-17+e^x(6x+4x^2+e^5(2+4x))\log(2)+e^x(2x+2e^5x+2x^2)\log(2)\log(x)}{3x}\,dx$$
$$= \frac{2}{3}\,xe^x\log(2)\log(x)+\frac{4}{3}\,xe^x\log(2)+\frac{2}{3}\,e^{(x+5)}\log(2)\log(x)+\frac{4}{3}\,e^{(x+5)}\log(2)-\frac{17}{3}\,\log(x)$$

input
```
integrate(1/3*((2*x*exp(5)+2*x^2+2*x)*log(2)*exp(x)*log(x)+((4*x+2)*exp(5)
+4*x^2+6*x)*log(2)*exp(x)-17)/x,x, algorithm=\
```

output
```
2/3*x*e^x*log(2)*log(x) + 4/3*x*e^x*log(2) + 2/3*e^(x + 5)*log(2)*log(x) +
 4/3*e^(x + 5)*log(2) - 17/3*log(x)
```

3.1066.9 Mupad [B] (verification not implemented)

Time = 16.25 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44

$$\int \frac{-17+e^x(6x+4x^2+e^5(2+4x))\log(2)+e^x(2x+2e^5x+2x^2)\log(2)\log(x)}{3x}\,dx$$
$$= \frac{4\,e^{x+5}\,\ln(2)}{3}-\frac{17\,\ln(x)}{3}+\frac{4\,x\,e^x\,\ln(2)}{3}+\frac{2\,e^{x+5}\,\ln(2)\,\ln(x)}{3}+\frac{2\,x\,e^x\,\ln(2)\,\ln(x)}{3}$$

input
```
int(((exp(x)*log(2)*(6*x + 4*x^2 + exp(5)*(4*x + 2)))/3 + (exp(x)*log(2)*l
og(x)*(2*x + 2*x*exp(5) + 2*x^2))/3 - 17/3)/x,x)
```

output
```
(4*exp(x + 5)*log(2))/3 - (17*log(x))/3 + (4*x*exp(x)*log(2))/3 + (2*exp(x
 + 5)*log(2)*log(x))/3 + (2*x*exp(x)*log(2)*log(x))/3
```

3.1067 $\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+(150$

3.1067.1 Optimal result

Integrand size = 99, antiderivative size = 26

$$\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+\left(150x^2+300e^3x^2\right)\log(4)+75x^2\log^2(4)+e^{2x}\left(-20x-20x^2+e^3\left(-40x-40x^2\right)+\left(-20x-20x^2\right)\log(4)\right)\right)\,dx=x\left(-e^{2x}+5\left(x+2e^3x+x\log(4)\right)\right)^2$$

output
```
(10*x*ln(2)+10*x*exp(3)+5*x-exp(2*x))^2*x
```

3.1067.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+\left(150x^2+300e^3x^2\right)\log(4)+75x^2\log^2(4)+e^{2x}\left(-20x-20x^2+e^3\left(-40x-40x^2\right)+\left(-20x-20x^2\right)\log(4)\right)\right)\,dx=x\left(e^{2x}-10e^3x-5x(1+\log(4))\right)^2$$

input
```
Integrate[75*x^2 + 300*E^3*x^2 + 300*E^6*x^2 + E^(4*x)*(1 + 4*x) + (150*x^
2 + 300*E^3*x^2)*Log[4] + 75*x^2*Log[4]^2 + E^(2*x)*(-20*x - 20*x^2 + E^3*
(-40*x - 40*x^2) + (-20*x - 20*x^2)*Log[4]),x]
```

output
```
x*(E^(2*x) - 10*E^3*x - 5*x*(1 + Log[4]))^2
```

3.1067.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 89 vs. $2(26) = 52$.

Time = 0.31 (sec) , antiderivative size = 89, normalized size of antiderivative = 3.42, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.040$, Rules used = {6, 6, 6, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(300e^6x^2+300e^3x^2+75x^2+75x^2\log^2(4)+e^{2x}\left(-20x^2+e^3\left(-40x^2-40x\right)+\left(-20x^2-20x\right)\log(4)-20x\right)+\right.$$

$$\Big\downarrow 6$$

$$\int \left(\left(75+300e^3\right)x^2+300e^6x^2+75x^2\log^2(4)+e^{2x}\left(-20x^2+e^3\left(-40x^2-40x\right)+\left(-20x^2-20x\right)\log(4)-20x\right)+\right.$$

$$\Big\downarrow 6$$

$$\int \left(\left(75+300e^3+300e^6\right)x^2+75x^2\log^2(4)+e^{2x}\left(-20x^2+e^3\left(-40x^2-40x\right)+\left(-20x^2-20x\right)\log(4)-20x\right)+(\right.$$

$$\Big\downarrow 6$$

$$\int \left(x^2\left(75+300e^3+300e^6+75\log^2(4)\right)+e^{2x}\left(-20x^2+e^3\left(-40x^2-40x\right)+\left(-20x^2-20x\right)\log(4)-20x\right)+(300\right.$$

$$\Big\downarrow 2009$$

$$25x^3\left(1+4e^3+4e^6+\log^2(4)\right)+50\left(1+2e^3\right)x^3\log(4)-10e^{2x}x^2-10e^{2x+3}x^2\left(2+\frac{\log(4)}{e^3}\right)-\frac{e^{4x}}{4}+\frac{1}{4}e^{4x}(4x+1)$$

input
```
Int[75*x^2 + 300*E^3*x^2 + 300*E^6*x^2 + E^(4*x)*(1 + 4*x) + (150*x^2 + 30
0*E^3*x^2)*Log[4] + 75*x^2*Log[4]^2 + E^(2*x)*(-20*x - 20*x^2 + E^3*(-40*x
 - 40*x^2) + (-20*x - 20*x^2)*Log[4]),x]
```

output
```
-1/4*E^(4*x) - 10*E^(2*x)*x^2 + (E^(4*x)*(1 + 4*x))/4 + 50*(1 + 2*E^3)*x^3
*Log[4] - 10*E^(3 + 2*x)*x^2*(2 + Log[4]/E^3) + 25*x^3*(1 + 4*E^3 + 4*E^6
+ Log[4]^2)
```

3.1067.
$\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+\left(150x^2+300e^3x^2\right)\log(4)+75x^2\log^2(4)+e^{2x}(-20x-20x^2\right.$

3.1067.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1067.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(24) = 48$.

Time = 0.68 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.31

method	result
norman	$x\,e^{4x} + \left(100\ln(2)^2 + 200\,e^3\ln(2) + 100\,e^6 + 100\ln(2) + 100\,e^3 + 25\right)x^3 + (-20\ln(2)$
risch	$x\,e^{4x} - 10(2\ln(2) + 2\,e^3 + 1)\,x^2 e^{2x} + 100x^3\ln(2)^2 + 200\ln(2)\,x^3 e^3 + 100x^3\ln(2) + 10$
derivativedivides	$100\ln(2)\,x^3(2\,e^3 + 1) + 25x^3 + 100x^3 e^3 + 100x^3 e^6 + 100x^3\ln(2)^2 + x\,e^{4x} - 10\,e^{2x}x^2 -$
default	$100\ln(2)\,x^3(2\,e^3 + 1) + 25x^3 + 100x^3 e^3 + 100x^3 e^6 + 100x^3\ln(2)^2 + x\,e^{4x} - 10\,e^{2x}x^2 -$
parallelrisch	$100x^3\ln(2)^2 + 200\ln(2)\,x^3 e^3 - 20\ln(2)\,e^{2x}x^2 + 100x^3\ln(2) - 20x^2 e^3 e^{2x} + 100x^3 e^3 +$
parts	$100x^3\ln(2)^2 + 200\ln(2)\,x^3 e^3 - 20\ln(2)\,e^{2x}x^2 + 100x^3\ln(2) - 20x^2 e^3 e^{2x} + 100x^3 e^3 +$

input
```
int((1+4*x)*exp(2*x)^2+(2*(-20*x^2-20*x)*ln(2)+(-40*x^2-40*x)*exp(3)-20*x^
2-20*x)*exp(2*x)+300*x^2*ln(2)^2+2*(300*x^2*exp(3)+150*x^2)*ln(2)+300*x^2*
exp(3)^2+300*x^2*exp(3)+75*x^2,x,method=_RETURNVERBOSE)
```

output
```
x*exp(2*x)^2+(100*ln(2)^2+200*exp(3)*ln(2)+100*exp(3)^2+100*ln(2)+100*exp(
3)+25)*x^3+(-20*ln(2)-20*exp(3)-10)*x^2*exp(2*x)
```

3.1067.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. 2(24) = 48.

Time = 0.26 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.85

$$\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+\left(150x^2+300e^3x^2\right)\log(4)+75x^2\log^2(4)+e^{2x}\left(-20x-20x^2+e^3\left(-40x-40x^2\right)+\left(-20x-20x^2\right)\log(4)\right)\right)\,dx = 100\,x^3\log(2)^2+100\,x^3e^6+100\,x^3e^3+25\,x^3+xe^{(4\,x)}-10\,\left(2\,x^2e^3+2\,x^2\log(2)+x^2\right)e^{(2\,x)}+100\,\left(2\,x^3e^3+x^3\right)\log(2)$$

input
```
integrate((1+4*x)*exp(2*x)^2+(2*(-20*x^2-20*x)*log(2)+(-40*x^2-40*x)*exp(3
)-20*x^2-20*x)*exp(2*x)+300*x^2*log(2)^2+2*(300*x^2*exp(3)+150*x^2)*log(2)
+300*x^2*exp(3)^2+300*x^2*exp(3)+75*x^2,x, algorithm=\
```

output
```
100*x^3*log(2)^2 + 100*x^3*e^6 + 100*x^3*e^3 + 25*x^3 + x*e^(4*x) - 10*(2*
x^2*e^3 + 2*x^2*log(2) + x^2)*e^(2*x) + 100*(2*x^3*e^3 + x^3)*log(2)
```

3.1067.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 70 vs. 2(24) = 48.

Time = 0.13 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.69

$$\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+\left(150x^2+300e^3x^2\right)\log(4)+75x^2\log^2(4)+e^{2x}\left(-20x-20x^2+e^3\left(-40x-40x^2\right)+\left(-20x-20x^2\right)\log(4)\right)\right)\,dx = x^3\cdot\left(25+100\log(2)^2+100\log(2)+100e^3+200e^3\log(2)+100e^6\right)+xe^{4x}+\left(-20x^2e^3-20x^2\log(2)-10x^2\right)e^{2x}$$

input
```
integrate((1+4*x)*exp(2*x)**2+(2*(-20*x**2-20*x)*ln(2)+(-40*x**2-40*x)*exp
(3)-20*x**2-20*x)*exp(2*x)+300*x**2*ln(2)**2+2*(300*x**2*exp(3)+150*x**2)*
ln(2)+300*x**2*exp(3)**2+300*x**2*exp(3)+75*x**2,x)
```

output
```
x**3*(25 + 100*log(2)**2 + 100*log(2) + 100*exp(3) + 200*exp(3)*log(2) + 1
00*exp(6)) + x*exp(4*x) + (-20*x**2*exp(3) - 20*x**2*log(2) - 10*x**2)*exp
(2*x)
```

3.1067. $\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+\left(150x^2+300e^3x^2\right)\log(4)+75x^2\log^2(4)+e^{2x}\left(-20x-20x^2\right.\right.$

3.1067.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. 2(24) = 48.

Time = 0.29 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.65

$$\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+\left(150x^2+300e^3x^2\right)\log(4)+75x^2\log^2(4)+e^{2x}\left(-20x-20x^2+e^3\left(-40x-40x^2\right)+\left(-20x-20x^2\right)\log(4)\right)\right)\,dx=100\,x^3\log\left(2\right)^2+100\,x^3e^6+100\,x^3e^3-10\,x^2\left(2\,e^3+2\,\log\left(2\right)+1\right)e^{(2\,x)}+25\,x^3+xe^{(4\,x)}+100\,\left(2\,x^3e^3+x^3\right)\log\left(2\right)$$

input
```
integrate((1+4*x)*exp(2*x)^2+(2*(-20*x^2-20*x)*log(2)+(-40*x^2-40*x)*exp(3
)-20*x^2-20*x)*exp(2*x)+300*x^2*log(2)^2+2*(300*x^2*exp(3)+150*x^2)*log(2)
+300*x^2*exp(3)^2+300*x^2*exp(3)+75*x^2,x, algorithm=\
```

output
```
100*x^3*log(2)^2 + 100*x^3*e^6 + 100*x^3*e^3 - 10*x^2*(2*e^3 + 2*log(2) +
1)*e^(2*x) + 25*x^3 + x*e^(4*x) + 100*(2*x^3*e^3 + x^3)*log(2)
```

3.1067.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. 2(24) = 48.

Time = 0.28 (sec) , antiderivative size = 78, normalized size of antiderivative = 3.00

$$\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+\left(150x^2+300e^3x^2\right)\log(4)+75x^2\log^2(4)+e^{2x}\left(-20x-20x^2+e^3\left(-40x-40x^2\right)+\left(-20x-20x^2\right)\log(4)\right)\right)\,dx=100\,x^3\log\left(2\right)^2+100\,x^3e^6+100\,x^3e^3+25\,x^3-20\,x^2e^{(2\,x+3)}+xe^{(4\,x)}-10\,\left(2\,x^2\log\left(2\right)+x^2\right)e^{(2\,x)}+100\,\left(2\,x^3e^3+x^3\right)\log\left(2\right)$$

input
```
integrate((1+4*x)*exp(2*x)^2+(2*(-20*x^2-20*x)*log(2)+(-40*x^2-40*x)*exp(3
)-20*x^2-20*x)*exp(2*x)+300*x^2*log(2)^2+2*(300*x^2*exp(3)+150*x^2)*log(2)
+300*x^2*exp(3)^2+300*x^2*exp(3)+75*x^2,x, algorithm=\
```

output
```
100*x^3*log(2)^2 + 100*x^3*e^6 + 100*x^3*e^3 + 25*x^3 - 20*x^2*e^(2*x + 3)
 + x*e^(4*x) - 10*(2*x^2*log(2) + x^2)*e^(2*x) + 100*(2*x^3*e^3 + x^3)*log
(2)
```

3.1067.9 Mupad [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \left(75x^2+300e^3x^2+300e^6x^2+e^{4x}(1+4x)+\left(150x^2+300e^3x^2\right)\log(4)+75x^2\log^2(4)+e^{2x}\left(-20x-20x^2+e^3\left(-40x-40x^2\right)+\left(-20x-20x^2\right)\log(4)\right)\right)\,dx=x\,\left(5\,x-{\mathrm{e}}^{2\,x}+10\,x\,{\mathrm{e}}^3+10\,x\,\ln\left(2\right)\right)^2$$

input
```
int(300*x^2*log(2)^2 - exp(2*x)*(20*x + exp(3)*(40*x + 40*x^2) + 2*log(2)*
(20*x + 20*x^2) + 20*x^2) + 300*x^2*exp(3) + 300*x^2*exp(6) + exp(4*x)*(4*
x + 1) + 75*x^2 + 2*log(2)*(300*x^2*exp(3) + 150*x^2),x)
```

output
```
x*(5*x - exp(2*x) + 10*x*exp(3) + 10*x*log(2))^2
```

3.1068 $\int \left(2+e^{-2e^x+2x}\left(2e^2-2e^{2+x}\right)-2x\right)\,dx$

3.1068.1 Optimal result

Integrand size = 30, antiderivative size = 21

$$\int \left(2+e^{-2e^x+2x}\left(2e^2-2e^{2+x}\right)-2x\right)\,dx=e^{2-2e^x+2x}+2x-x^2$$

output
```
2*x-x^2+exp(1)^2*exp(x-exp(x))^2
```

3.1068.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \left(2+e^{-2e^x+2x}\left(2e^2-2e^{2+x}\right)-2x\right)\,dx=e^{2-2e^x+2x}+2x-x^2$$

input
```
Integrate[2 + E^(-2*E^x + 2*x)*(2*E^2 - 2*E^(2 + x)) - 2*x,x]
```

output
```
E^(2 - 2*E^x + 2*x) + 2*x - x^2
```

3.1068.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.033, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{2x-2e^x}\left(2e^2-2e^{x+2}\right)-2x+2\right) dx$$

$$\Big\downarrow \text{2009}$$

$$-x^2+2x+e^{2x-2e^x+2}$$

input
```
Int[2 + E^(-2*E^x + 2*x)*(2*E^2 - 2*E^(2 + x)) - 2*x,x]
```

output
```
E^(2 - 2*E^x + 2*x) + 2*x - x^2
```

3.1068.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1068.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

method	result	size
risch	$2x-x^2+\mathrm{e}^{2-2\,\mathrm{e}^x+2x}$	20
norman	$2x-x^2+\mathrm{e}^2\mathrm{e}^{-2\,\mathrm{e}^x+2x}$	24
parallelrisch	$2x-x^2+\mathrm{e}^2\mathrm{e}^{-2\,\mathrm{e}^x+2x}$	24
default	$2x+2\,\mathrm{e}^2\left(-\frac{\mathrm{e}^x\mathrm{e}^{-2\,\mathrm{e}^x}}{2}-\frac{\mathrm{e}^{-2\,\mathrm{e}^x}}{4}\right)-2\,\mathrm{e}^2\left(-\frac{\mathrm{e}^{2x}\mathrm{e}^{-2\,\mathrm{e}^x}}{2}-\frac{\mathrm{e}^x\mathrm{e}^{-2\,\mathrm{e}^x}}{2}-\frac{\mathrm{e}^{-2\,\mathrm{e}^x}}{4}\right)-x^2$	67
parts	$2x+2\,\mathrm{e}^2\left(-\frac{\mathrm{e}^x\mathrm{e}^{-2\,\mathrm{e}^x}}{2}-\frac{\mathrm{e}^{-2\,\mathrm{e}^x}}{4}\right)-2\,\mathrm{e}^2\left(-\frac{\mathrm{e}^{2x}\mathrm{e}^{-2\,\mathrm{e}^x}}{2}-\frac{\mathrm{e}^x\mathrm{e}^{-2\,\mathrm{e}^x}}{2}-\frac{\mathrm{e}^{-2\,\mathrm{e}^x}}{4}\right)-x^2$	67

input
```
int((-2*exp(1)^2*exp(x)+2*exp(1)^2)*exp(x-exp(x))^2-2*x+2,x,method=_RETURN
VERBOSE)
```

output
```
2*x-x^2+exp(2-2*exp(x)+2*x)
```

3.1068.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29

$$\int \left(2+e^{-2e^x+2x}\left(2e^2-2e^{2+x}\right)-2x\right)\,dx=-x^2+2\,x+e^{\left(2\,\left(xe^2-e^{(x+2)}\right)e^{(-2)}+2\right)}$$

input
```
integrate((-2*exp(1)^2*exp(x)+2*exp(1)^2)*exp(x-exp(x))^2-2*x+2,x, algorit
hm=\
```

output
```
-x^2 + 2*x + e^(2*(x*e^2 - e^(x + 2))*e^(-2) + 2)
```

3.1068.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \left(2+e^{-2e^x+2x}\left(2e^2-2e^{2+x}\right)-2x\right)\,dx=-x^2+2x+e^2e^{2x-2e^x}$$

input
```
integrate((-2*exp(1)**2*exp(x)+2*exp(1)**2)*exp(x-exp(x))**2-2*x+2,x)
```

output
```
-x**2 + 2*x + exp(2)*exp(2*x - 2*exp(x))
```

3.1068.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \left(2+e^{-2e^x+2x}\left(2e^2-2e^{2+x}\right)-2x\right)\,dx=-x^2+2\,x+e^{\left(2\,x-2\,e^x+2\right)}$$

input
```
integrate((-2*exp(1)^2*exp(x)+2*exp(1)^2)*exp(x-exp(x))^2-2*x+2,x, algorit
hm=\
```

output
```
-x^2 + 2*x + e^(2*x - 2*e^x + 2)
```

3.1068.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \left(2+e^{-2e^x+2x}\left(2e^2-2e^{2+x}\right)-2x\right)\,dx=-x^2+2\,x+e^{\left(2\,x-2\,e^x+2\right)}$$

input
```
integrate((-2*exp(1)^2*exp(x)+2*exp(1)^2)*exp(x-exp(x))^2-2*x+2,x, algorit
hm=\
```

output
```
-x^2 + 2*x + e^(2*x - 2*e^x + 2)
```

3.1068.9 Mupad [B] (verification not implemented)

Time = 15.67 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \left(2+e^{-2e^x+2x}\left(2e^2-2e^{2+x}\right)-2x\right)\,dx=2\,x-x^2+\mathrm{e}^{2\,x}\,\mathrm{e}^2\,\mathrm{e}^{-2\,\mathrm{e}^x}$$

input
```
int(exp(2*x - 2*exp(x))*(2*exp(2) - 2*exp(2)*exp(x)) - 2*x + 2,x)
```

output
```
2*x - x^2 + exp(2*x)*exp(2)*exp(-2*exp(x))
```

3.1069 $\int \frac{300-60x-25x^2-3x^3}{-300x+12x^2-25x^3+x^4} \, dx$

3.1069.1 Optimal result

Integrand size = 35, antiderivative size = 16

$$\int \frac{300-60x-25x^2-3x^3}{-300x+12x^2-25x^3+x^4} \, dx = \log \left(\frac{\frac{12}{x}+x}{(25-x)^4} \right)$$

output
```
ln((12/x+x)/(-x+25)^4)
```

3.1069.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.19

$$\int \frac{300-60x-25x^2-3x^3}{-300x+12x^2-25x^3+x^4} \, dx = -4\log(25-x) - \log(x) + \log\left(12+x^2\right)$$

input
```
Integrate[(300 - 60*x - 25*x^2 - 3*x^3)/(-300*x + 12*x^2 - 25*x^3 + x^4),x
]
```

output
```
-4*Log[25 - x] - Log[x] + Log[12 + x^2]
```

3.1069.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.19, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.086, Rules used = {2026, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^3-25x^2-60x+300}{x^4-25x^3+12x^2-300x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-3x^3-25x^2-60x+300}{x(x^3-25x^2+12x-300)}dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{2x}{x^2+12}-\frac{4}{x-25}-\frac{1}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log\left(x^2+12\right)-4\log(25-x)-\log(x)$$

input
```
Int[(300 - 60*x - 25*x^2 - 3*x^3)/(-300*x + 12*x^2 - 25*x^3 + x^4),x]
```

output
```
-4*Log[25 - x] - Log[x] + Log[12 + x^2]
```

3.1069.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /; !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] && !BinomialQ[Px, x] && !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.1069.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

method	result	size
default	$-\ln(x)-4\ln(x-25)+\ln(x^2+12)$	18
norman	$-\ln(x)-4\ln(x-25)+\ln(x^2+12)$	18
risch	$-\ln(x)-4\ln(x-25)+\ln(x^2+12)$	18
parallelrisch	$-\ln(x)-4\ln(x-25)+\ln(x^2+12)$	18

input
```
int((-3*x^3-25*x^2-60*x+300)/(x^4-25*x^3+12*x^2-300*x),x,method=_RETURNVER
BOSE)
```

output
```
-ln(x)-4*ln(x-25)+ln(x^2+12)
```

3.1069.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{300-60x-25x^2-3x^3}{-300x+12x^2-25x^3+x^4}\,dx=\log\left(x^2+12\right)-4\,\log\left(x-25\right)-\log\left(x\right)$$

input
```
integrate((-3*x^3-25*x^2-60*x+300)/(x^4-25*x^3+12*x^2-300*x),x, algorithm=
\
```

output
```
log(x^2 + 12) - 4*log(x - 25) - log(x)
```

3.1069.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{300-60x-25x^2-3x^3}{-300x+12x^2-25x^3+x^4}\,dx=-\log\left(x\right)-4\log\left(x-25\right)+\log\left(x^2+12\right)$$

input
```
integrate((-3*x**3-25*x**2-60*x+300)/(x**4-25*x**3+12*x**2-300*x),x)
```

output
```
-log(x) - 4*log(x - 25) + log(x**2 + 12)
```

3.1069.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{300-60x-25x^2-3x^3}{-300x+12x^2-25x^3+x^4}\,dx = \log\left(x^2+12\right)-4\,\log\left(x-25\right)-\log\left(x\right)$$

input
```
integrate((-3*x^3-25*x^2-60*x+300)/(x^4-25*x^3+12*x^2-300*x),x, algorithm=
\
```

output
```
log(x^2 + 12) - 4*log(x - 25) - log(x)
```

3.1069.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.19

$$\int \frac{300-60x-25x^2-3x^3}{-300x+12x^2-25x^3+x^4}\,dx = \log\left(x^2+12\right)-4\,\log\left(|x-25|\right)-\log\left(|x|\right)$$

input
```
integrate((-3*x^3-25*x^2-60*x+300)/(x^4-25*x^3+12*x^2-300*x),x, algorithm=
\
```

output
```
log(x^2 + 12) - 4*log(abs(x - 25)) - log(abs(x))
```

3.1069.9 Mupad [B] (verification not implemented)

Time = 16.37 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{300-60x-25x^2-3x^3}{-300x+12x^2-25x^3+x^4}\,dx = \ln\left(x^2+12\right)-4\,\ln\left(x-25\right)-\ln\left(x\right)$$

input
```
int((60*x + 25*x^2 + 3*x^3 - 300)/(300*x - 12*x^2 + 25*x^3 - x^4),x)
```

output
```
log(x^2 + 12) - 4*log(x - 25) - log(x)
```

3.1070 $\int \frac{6+x^2+2x^3}{x^2} \, dx$

3.1070.1 Optimal result

Integrand size = 14, antiderivative size = 19

$$\int \frac{6+x^2+2x^3}{x^2} \, dx = -1-\frac{6}{x}+x+x^2-\frac{2}{\log \left(\frac{5}{3}\right)}$$

output
```
x-2/ln(5/3)+x^2-6/x-1
```

3.1070.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53

$$\int \frac{6+x^2+2x^3}{x^2} \, dx = -\frac{6}{x}+x+x^2$$

input
```
Integrate[(6 + x^2 + 2*x^3)/x^2,x]
```

output
```
-6/x + x + x^2
```

3.1070.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3+x^2+6}{x^2} \, dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{6}{x^2}+2x+1\right) dx$$

$$\Big\downarrow \text{2009}$$

$$x^2+x-\frac{6}{x}$$

input
```
Int[(6 + x^2 + 2*x^3)/x^2,x]
```

output
```
-6/x + x + x^2
```

3.1070.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1070.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.58

method	result	size
default	$x+x^{2}-\frac{6}{x}$	11
risch	$x+x^{2}-\frac{6}{x}$	11
gosper	$\frac{x^{3}+x^{2}-6}{x}$	13
norman	$\frac{x^{3}+x^{2}-6}{x}$	13
parallelrisch	$\frac{x^{3}+x^{2}-6}{x}$	13

input
```
int((2*x^3+x^2+6)/x^2,x,method=_RETURNVERBOSE)
```

output
```
x+x^2-6/x
```

3.1070.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{6+x^2+2x^3}{x^2}\,dx = \frac{x^3+x^2-6}{x}$$

input
```
integrate((2*x^3+x^2+6)/x^2,x, algorithm=\
```

output
```
(x^3 + x^2 - 6)/x
```

3.1070.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.37

$$\int \frac{6+x^2+2x^3}{x^2}\,dx = x^2+x-\frac{6}{x}$$

input
```
integrate((2*x**3+x**2+6)/x**2,x)
```

output
```
x**2 + x - 6/x
```

3.1070.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53

$$\int \frac{6+x^2+2x^3}{x^2}\,dx = x^2+x-\frac{6}{x}$$

input
```
integrate((2*x^3+x^2+6)/x^2,x, algorithm=\
```

output
```
x^2 + x - 6/x
```

3.1070.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53

$$\int \frac{6+x^2+2x^3}{x^2}\,dx = x^2+x-\frac{6}{x}$$

input
```
integrate((2*x^3+x^2+6)/x^2,x, algorithm=\
```

output
```
x^2 + x - 6/x
```

3.1070.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{6+x^2+2x^3}{x^2}\,dx = \frac{x^3+x^2-6}{x}$$

input
```
int((x^2 + 2*x^3 + 6)/x^2,x)
```

output
```
(x^2 + x^3 - 6)/x
```

3.1071 $\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4} dx$

3.1071.1 Optimal result

Integrand size = 70, antiderivative size = 23

$$\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4} dx = e^{3+\frac{2e}{x(-4+4x)}}+x-\log(x)$$

output
```
exp(3+2/x/(-4+4*x)*exp(1))+x-ln(x)
```

3.1071.2 Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.22

$$\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4} dx = e^{3+\frac{e}{2(-1+x)}-\frac{e}{2x}}+x-\log(x)$$

input
```
Integrate[(E^(1 + (E - 6*x + 6*x^2)/(-2*x + 2*x^2))*(1 - 2*x) - 2*x + 6*x^
2 - 6*x^3 + 2*x^4)/(2*x^2 - 4*x^3 + 2*x^4),x]
```

output
```
E^(3 + E/(2*(-1 + x)) - E/(2*x)) + x - Log[x]
```

3.1071.3 Rubi [A] (verified)

Time = 1.78 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {2026, 7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4-6x^3+6x^2+e^{\frac{6x^2-6x+e}{2x^2-2x}+1}(1-2x)-2x}{2x^4-4x^3+2x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{2x^4-6x^3+6x^2+e^{\frac{6x^2-6x+e}{2x^2-2x}+1}(1-2x)-2x}{x^2(2x^2-4x+2)}dx$$

$$\Big\downarrow \text{7277}$$

$$8\int \frac{2x^4-6x^3+6x^2-2x+e^{1-\frac{6x^2-6x+e}{2(x-x^2)}}(1-2x)}{16(1-x)^2x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int \frac{2x^4-6x^3+6x^2-2x+e^{1-\frac{6x^2-6x+e}{2(x-x^2)}}(1-2x)}{(1-x)^2x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{2}\int \left(\frac{2x^2}{(x-1)^2}-\frac{6x}{(x-1)^2}+\frac{6}{(x-1)^2}-\frac{2}{(x-1)^2x}-\frac{e^{4+\frac{e}{2(x-1)x}}(2x-1)}{(x-1)^2x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(2x+2e^{3-\frac{e}{2(1-x)x}}-2\log(x)\right)$$

input
```
Int[(E^(1 + (E - 6*x + 6*x^2)/(-2*x + 2*x^2))*(1 - 2*x) - 2*x + 6*x^2 - 6*
x^3 + 2*x^4)/(2*x^2 - 4*x^3 + 2*x^4),x]
```

output
```
(2*E^(3 - E/(2*(1 - x)*x)) + 2*x - 2*Log[x])/2
```

3.1071. $\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4}dx$

3.1071.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1071.4 Maple [A] (verified)

Time = 1.24 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

method	result	size
risch	$x-\ln \left(x \right)+{\mathrm e}^{\frac{{\mathrm e}+6 x^{2}-6 x}{2 x \left(-1+x \right)}}$	29
parallelrisch	$x-\ln \left(x \right)+{\mathrm e}^{\frac{{\mathrm e}+6 x^{2}-6 x}{2 x \left(-1+x \right)}}+4$	30
parts	$x-\ln \left(x \right)+\frac{x^{2} {\mathrm e}^{\frac{{\mathrm e}+6 x^{2}-6 x}{2 x^{2}-2 x}}-x \,{\mathrm e}^{\frac{{\mathrm e}+6 x^{2}-6 x}{2 x^{2}-2 x}}}{\left(-1+x \right) x}$	72
norman	$\frac{x^{3}+x^{2} {\mathrm e}^{\frac{{\mathrm e}+6 x^{2}-6 x}{2 x^{2}-2 x}}-x -x \,{\mathrm e}^{\frac{{\mathrm e}+6 x^{2}-6 x}{2 x^{2}-2 x}}}{x \left(-1+x \right)}-\ln \left(x \right)$	77

input
```
int(((1-2*x)*exp(1)*exp((exp(1)+6*x^2-6*x)/(2*x^2-2*x))+2*x^4-6*x^3+6*x^2-
2*x)/(2*x^4-4*x^3+2*x^2),x,method=_RETURNVERBOSE)
```

3.1071. $\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4}\,dx$

output
```
x-ln(x)+exp(1/2*(exp(1)+6*x^2-6*x)/x/(-1+x))
```

3.1071.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.61

$$\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4}\,dx = \left(xe - e\log\left(x\right) + e^{\left(\frac{8\,x^2-8\,x+e}{2\,\left(x^2-x\right)}\right)}\right)e^{(-1)}$$

input
```
integrate(((1-2*x)*exp(1)*exp((exp(1)+6*x^2-6*x)/(2*x^2-2*x))+2*x^4-6*x^3+
6*x^2-2*x)/(2*x^4-4*x^3+2*x^2),x, algorithm=\
```

output
```
(x*e - e*log(x) + e^(1/2*(8*x^2 - 8*x + e)/(x^2 - x)))*e^(-1)
```

3.1071.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4}\,dx = x + e^{\frac{6x^2-6x+e}{2x^2-2x}} - \log\left(x\right)$$

input
```
integrate(((1-2*x)*exp(1)*exp((exp(1)+6*x**2-6*x)/(2*x**2-2*x))+2*x**4-6*x
**3+6*x**2-2*x)/(2*x**4-4*x**3+2*x**2),x)
```

output
```
x + exp((6*x**2 - 6*x + E)/(2*x**2 - 2*x)) - log(x)
```

3.1071.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4}\,dx = x + e^{\left(\frac{e}{2\,(x-1)}-\frac{e}{2\,x}+3\right)} - \log\left(x\right)$$

input
```
integrate(((1-2*x)*exp(1)*exp((exp(1)+6*x^2-6*x)/(2*x^2-2*x))+2*x^4-6*x^3+
6*x^2-2*x)/(2*x^4-4*x^3+2*x^2),x, algorithm=\
```

output
```
x + e^(1/2*e/(x - 1) - 1/2*e/x + 3) - log(x)
```

3.1071.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(21) = 42$.

Time = 0.31 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.09

$$\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4}\,dx = x+e^{\left(\frac{4x^2}{x^2-x}-\frac{4x}{x^2-x}+\frac{e}{2(x^2-x)}-1\right)}-\log(x)$$

input
```
integrate(((1-2*x)*exp(1)*exp((exp(1)+6*x^2-6*x)/(2*x^2-2*x))+2*x^4-6*x^3+
6*x^2-2*x)/(2*x^4-4*x^3+2*x^2),x, algorithm=\
```

output
```
x + e^(4*x^2/(x^2 - x) - 4*x/(x^2 - x) + 1/2*e/(x^2 - x) - 1) - log(x)
```

3.1071.9 Mupad [B] (verification not implemented)

Time = 17.24 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.39

$$\int \frac{e^{1+\frac{e-6x+6x^2}{-2x+2x^2}}(1-2x)-2x+6x^2-6x^3+2x^4}{2x^2-4x^3+2x^4}\,dx = x-\ln(x)+e^{\frac{6x}{2x-2x^2}}\,e^{-\frac{6x^2}{2x-2x^2}}\,e^{-\frac{e}{2x-2x^2}}$$

input
```
int(-(2*x - 6*x^2 + 6*x^3 - 2*x^4 + exp(-(exp(1) - 6*x + 6*x^2)/(2*x - 2*x
^2))*exp(1)*(2*x - 1))/(2*x^2 - 4*x^3 + 2*x^4),x)
```

output
```
x - log(x) + exp((6*x)/(2*x - 2*x^2))*exp(-(6*x^2)/(2*x - 2*x^2))*exp(-exp
(1)/(2*x - 2*x^2))
```

3.1072

$$\int \frac{-700+e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}\left(25-170x+32x^2-25x\right.}{19600-1400e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}+25e^{\frac{2}{25}\left(-125+145x-16\right.}}$$

3.1072.1 Optimal result

Integrand size = 98, antiderivative size = 28

$$\int \frac{-700+e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}\left(25-170x+32x^2-25x\log(3x)\right)}{19600-1400e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}+25e^{\frac{2}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}}\,dx = \frac{x}{-28+e^{4-\left(-3+\frac{4x}{5}\right)^2+x+x\log(3x)}}$$

output
```
x/(exp(x+4+x*ln(3*x)-(4/5*x-3)^2)-28)
```

3.1072.2 Mathematica [F]

$$\int \frac{-700+e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}\left(25-170x+32x^2-25x\log(3x)\right)}{19600-1400e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}+25e^{\frac{2}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}}\,dx = \int \frac{-700+e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}\left(25-170x+32x^2-25x\log(3x)\right)}{19600-1400e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}+25e^{\frac{2}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}}\,dx$$

input
```
Integrate[(-700 + E^((-125 + 145*x - 16*x^2 + 25*x*Log[3*x])/25)*(25 - 170
*x + 32*x^2 - 25*x*Log[3*x]))/(19600 - 1400*E^((-125 + 145*x - 16*x^2 + 25
*x*Log[3*x])/25) + 25*E^((2*(-125 + 145*x - 16*x^2 + 25*x*Log[3*x]))/25)),
x]
```

output
```
Integrate[(-700 + E^((-125 + 145*x - 16*x^2 + 25*x*Log[3*x])/25)*(25 - 170
*x + 32*x^2 - 25*x*Log[3*x]))/(19600 - 1400*E^((-125 + 145*x - 16*x^2 + 25
*x*Log[3*x])/25) + 25*E^((2*(-125 + 145*x - 16*x^2 + 25*x*Log[3*x]))/25)),
 x]
```

3.1072.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{1}{25}\left(-16x^2+145x+25x\log(3x)-125\right)}\left(32x^2-170x-25x\log(3x)+25\right)-700}{-1400e^{\frac{1}{25}\left(-16x^2+145x+25x\log(3x)-125\right)}+25e^{\frac{2}{25}\left(-16x^2+145x+25x\log(3x)-125\right)}+19600}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{\frac{32x^2}{25}+10}\left(e^{\frac{1}{25}\left(-16x^2+145x+25x\log(3x)-125\right)}\left(32x^2-170x-25x\log(3x)+25\right)-700\right)}{25\left(28e^{\frac{16x^2}{25}+5}-3^xe^{29x/5}x^x\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{25}\int -\frac{e^{\frac{32x^2}{25}+10}\left(700-3^xe^{\frac{1}{25}\left(-16x^2+145x-125\right)}x^x\left(32x^2-25\log(3x)x-170x+25\right)\right)}{\left(28e^{\frac{16x^2}{25}+5}-3^xe^{29x/5}x^x\right)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{25}\int \frac{e^{\frac{32x^2}{25}+10}\left(700-3^xe^{\frac{1}{25}\left(-16x^2+145x-125\right)}x^x\left(32x^2-25\log(3x)x-170x+25\right)\right)}{\left(28e^{\frac{16x^2}{25}+5}-3^xe^{29x/5}x^x\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{25}\int \left(\frac{e^{\frac{16x^2}{25}+5}\left(32x^2-25\log(3x)x-170x+25\right)}{28e^{\frac{16x^2}{25}+5}-3^xe^{29x/5}x^x}-\frac{28e^{\frac{32x^2}{25}+10}x(32x-25\log(3x)-170)}{\left(3^xe^{29x/5}x^x-28e^{\frac{16x^2}{25}+5}\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{25}\left(-4760\int \frac{e^{\frac{32x^2}{25}+10}x}{\left(3^xe^{29x/5}x^x-28e^{\frac{16x^2}{25}+5}\right)^2}dx+896\int \frac{e^{\frac{32x^2}{25}+10}x^2}{\left(3^xe^{29x/5}x^x-28e^{\frac{16x^2}{25}+5}\right)^2}dx+25\int \frac{e^{\frac{16x^2}{25}+5}}{3^xe^{29x/5}x^x-28e^{\frac{16x^2}{25}}}\right.$$

input
```
Int[(-700 + E^((-125 + 145*x - 16*x^2 + 25*x*Log[3*x])/25)*(25 - 170*x + 3
2*x^2 - 25*x*Log[3*x]))/(19600 - 1400*E^((-125 + 145*x - 16*x^2 + 25*x*Log
[3*x])/25) + 25*E^((2*(-125 + 145*x - 16*x^2 + 25*x*Log[3*x]))/25)),x]
```

output
```
$Aborted
```

3.1072.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1072.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result	size
norman	$\frac{x}{{\mathrm e}^{x \ln \left(3 x \right)-\frac{16 x^{2}}{25}+\frac{29 x}{5}-5}-28}$	24
risch	$\frac{x}{\left(3 x \right)^{x} {\mathrm e}^{-5-\frac{16}{25} x^{2}+\frac{29}{5} x}-28}$	24
parallelrisch	$\frac{x}{{\mathrm e}^{x \ln \left(3 x \right)-\frac{16 x^{2}}{25}+\frac{29 x}{5}-5}-28}$	24

input
```
int(((-25*x*ln(3*x)+32*x^2-170*x+25)*exp(x*ln(3*x)-16/25*x^2+29/5*x-5)-700
)/(25*exp(x*ln(3*x)-16/25*x^2+29/5*x-5)^2-1400*exp(x*ln(3*x)-16/25*x^2+29/
5*x-5)+19600),x,method=_RETURNVERBOSE)
```

output
```
x/(exp(x*ln(3*x)-16/25*x^2+29/5*x-5)-28)
```

3.1072.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{-700+e^{\frac{1}{25}(-125+145x-16x^2+25x\log(3x))}(25-170x+32x^2-25x\log(3x))}{19600-1400e^{\frac{1}{25}(-125+145x-16x^2+25x\log(3x))}+25e^{\frac{2}{25}(-125+145x-16x^2+25x\log(3x))}}\,dx = \frac{x}{e^{\left(-\frac{16}{25}\,x^2+x\log(3\,x)+\frac{29}{5}\,x-5\right)}-28}$$

input
```
integrate(((-25*x*log(3*x)+32*x^2-170*x+25)*exp(x*log(3*x)-16/25*x^2+29/5*
x-5)-700)/(25*exp(x*log(3*x)-16/25*x^2+29/5*x-5)^2-1400*exp(x*log(3*x)-16/
25*x^2+29/5*x-5)+19600),x, algorithm=\
```

output
```
x/(e^(-16/25*x^2 + x*log(3*x) + 29/5*x - 5) - 28)
```

3.1072.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{-700+e^{\frac{1}{25}(-125+145x-16x^2+25x\log(3x))}(25-170x+32x^2-25x\log(3x))}{19600-1400e^{\frac{1}{25}(-125+145x-16x^2+25x\log(3x))}+25e^{\frac{2}{25}(-125+145x-16x^2+25x\log(3x))}}\,dx = \frac{x}{e^{-\frac{16x^2}{25}+x\log(3x)+\frac{29x}{5}-5}-28}$$

input
```
integrate(((-25*x*ln(3*x)+32*x**2-170*x+25)*exp(x*ln(3*x)-16/25*x**2+29/5*
x-5)-700)/(25*exp(x*ln(3*x)-16/25*x**2+29/5*x-5)**2-1400*exp(x*ln(3*x)-16/
25*x**2+29/5*x-5)+19600),x)
```

output
```
x/(exp(-16*x**2/25 + x*log(3*x) + 29*x/5 - 5) - 28)
```

3.1072.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

$$\int \frac{-700+e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}(25-170x+32x^2-25x\log(3x))}{19600-1400e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}+25e^{\frac{2}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}}\,dx$$
$$= -\frac{xe^{\left(\frac{16}{25}\,x^2+5\right)}}{28\,e^{\left(\frac{16}{25}\,x^2+5\right)}-e^{\left(x\log(3)+x\log(x)+\frac{29}{5}\,x\right)}}$$

input
```
integrate(((-25*x*log(3*x)+32*x^2-170*x+25)*exp(x*log(3*x)-16/25*x^2+29/5*
x-5)-700)/(25*exp(x*log(3*x)-16/25*x^2+29/5*x-5)^2-1400*exp(x*log(3*x)-16/
25*x^2+29/5*x-5)+19600),x, algorithm=\
```

output
```
-x*e^(16/25*x^2 + 5)/(28*e^(16/25*x^2 + 5) - e^(x*log(3) + x*log(x) + 29/5
*x))
```

3.1072.8 Giac [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{-700+e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}(25-170x+32x^2-25x\log(3x))}{19600-1400e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}+25e^{\frac{2}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}}\,dx$$
$$= -\frac{xe^5}{28\,e^5-e^{\left(-\frac{16}{25}\,x^2+x\log(3\,x)+\frac{29}{5}\,x\right)}}$$

input
```
integrate(((-25*x*log(3*x)+32*x^2-170*x+25)*exp(x*log(3*x)-16/25*x^2+29/5*
x-5)-700)/(25*exp(x*log(3*x)-16/25*x^2+29/5*x-5)^2-1400*exp(x*log(3*x)-16/
25*x^2+29/5*x-5)+19600),x, algorithm=\
```

output
```
-x*e^5/(28*e^5 - e^(-16/25*x^2 + x*log(3*x) + 29/5*x))
```

3.1072.9 Mupad [B] (verification not implemented)

Time = 22.50 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.82

$$\int \frac{-700+e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}(25-170x+32x^2-25x\log(3x))}{19600-1400e^{\frac{1}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}+25e^{\frac{2}{25}\left(-125+145x-16x^2+25x\log(3x)\right)}}\,dx = \frac{170\,x+25\,x\,\ln\left(3\,x\right)-32\,x^2}{\left(\mathrm{e}^{-\frac{16\,x^2}{25}+\frac{29\,x}{5}-5}\,{\left(3\,x\right)}^x-28\right)\,\left(25\,\ln\left(3\,x\right)-32\,x+170\right)}$$

input

```
int(-(exp((29*x)/5 + x*log(3*x) - (16*x^2)/25 - 5)*(170*x + 25*x*log(3*x)
- 32*x^2 - 25) + 700)/(25*exp((58*x)/5 + 2*x*log(3*x) - (32*x^2)/25 - 10)
- 1400*exp((29*x)/5 + x*log(3*x) - (16*x^2)/25 - 5) + 19600),x)
```

output

```
(170*x + 25*x*log(3*x) - 32*x^2)/((exp((29*x)/5 - (16*x^2)/25 - 5)*(3*x)^x
 - 28)*(25*log(3*x) - 32*x + 170))
```

3.1073 $\int \frac{-x^2-x^3+x^4+x^5+(-2x-2x^2+2x^3+2x^4)\log(4)+(-1-x+x^2+x^3)\,\mathrm{l}}{}$

3.1073.1 Optimal result

Integrand size = 249, antiderivative size = 26

$$\int \frac{-x^2-x^3+x^4+x^5+(-2x-2x^2+2x^3+2x^4)\log(4)+(-1-x+x^2+x^3)\log^2(4)+e^x(-2x^2-4x^3-}{}$$
$$=\frac{(1+x)^2(x+\log(4))^2}{\log(2x+e^{-x}x)}$$

output
```
(x+2*ln(2))^2/ln(x/exp(x)+2*x)*(1+x)^2
```

3.1073.2 Mathematica [A] (verified)

Time = 2.70 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{-x^2-x^3+x^4+x^5+(-2x-2x^2+2x^3+2x^4)\log(4)+(-1-x+x^2+x^3)\log^2(4)+e^x(-2x^2-4x^3-}{}$$
$$=\frac{(1+x)^2(x+\log(4))^2}{\log((2+e^{-x})\,x)}$$

input
```
Integrate[(-x^2 - x^3 + x^4 + x^5 + (-2*x - 2*x^2 + 2*x^3 + 2*x^4)*Log[4]
+ (-1 - x + x^2 + x^3)*Log[4]^2 + E^x*(-2*x^2 - 4*x^3 - 2*x^4 + (-4*x - 8*
x^2 - 4*x^3)*Log[4] + (-2 - 4*x - 2*x^2)*Log[4]^2) + (2*x^2 + 6*x^3 + 4*x^
4 + (2*x + 8*x^2 + 6*x^3)*Log[4] + (2*x + 2*x^2)*Log[4]^2 + E^x*(4*x^2 + 1
2*x^3 + 8*x^4 + (4*x + 16*x^2 + 12*x^3)*Log[4] + (4*x + 4*x^2)*Log[4]^2))*
Log[(x + 2*E^x*x)/E^x])/((x + 2*E^x*x)*Log[(x + 2*E^x*x)/E^x]^2),x]
```

output
```
((1 + x)^2*(x + Log[4])^2)/Log[(2 + E^(-x))*x]
```

3.1073.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5+x^4-x^3-x^2+\left(x^3+x^2-x-1\right)\log^2(4)+e^x\left(-2x^4-4x^3-2x^2+\left(-2x^2-4x-2\right)\log^2(4)+\left(-4x^3-\right.\right.}{}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{(x+1)(x+\log(4))\left((x+1)\left(x-2e^x-1\right)(x+\log(4))+2(2e^x+1)x(2x+1+\log(4))\log\left(\left(e^{-x}+2\right)x\right)\right)}{(2e^xx+x)\log^2\left(e^{-x}x+2x\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{(x+1)\left(-x^2+4x^2\log\left(\left(e^{-x}+2\right)x\right)+2x(1+\log(4))\log\left(\left(e^{-x}+2\right)x\right)-x(1+\log(4))-\log(4)\right)(x+\log(4))}{x\log^2\left(e^{-x}x+2x\right)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{x^4}{(1+2e^x)\log^2\left(e^{-x}x+2x\right)}dx-\int \frac{x^3}{\log^2\left(e^{-x}x+2x\right)}dx+2(1+\log(4))\int \frac{x^3}{(1+2e^x)\log^2\left(e^{-x}x+2x\right)}dx+4\int \frac{x^3}{\log\left(e^{-x}x+2x\right)}dx-2(1+\log(4))\int \frac{x^2}{\log^2\left(e^{-x}x+2x\right)}dx+\left(1+\log^2(4)+\log(256)\right)\int \frac{x^2}{(1+2e^x)\log^2\left(e^{-x}x+2x\right)}dx+6(1+\log(4))\int \frac{x^2}{\log\left(e^{-x}x+2x\right)}dx-2\log(4)(1+\log(4))\int \frac{1}{\log^2\left(e^{-x}x+2x\right)}dx+\log^2(4)\int \frac{1}{(1+2e^x)\log^2\left(e^{-x}x+2x\right)}dx-\log^2(4)\int \frac{1}{x\log^2\left(e^{-x}x+2x\right)}dx-(1+\log(4))^2\int \frac{x}{\log^2\left(e^{-x}x+2x\right)}dx-2\log(4)\int \frac{x}{\log^2\left(e^{-x}x+2x\right)}dx+2\log(4)(1+\log(4))\int \frac{x}{(1+2e^x)\log^2\left(e^{-x}x+2x\right)}dx+2\log(4)(1+\log(4))\int \frac{1}{\log\left(e^{-x}x+2x\right)}dx+2(1+\log(4))^2\int \frac{x}{\log\left(e^{-x}x+2x\right)}dx+4\log(4)\int \frac{x}{\log\left(e^{-x}x+2x\right)}dx$$

input
```
Int[(-x^2 - x^3 + x^4 + x^5 + (-2*x - 2*x^2 + 2*x^3 + 2*x^4)*Log[4] + (-1
- x + x^2 + x^3)*Log[4]^2 + E^x*(-2*x^2 - 4*x^3 - 2*x^4 + (-4*x - 8*x^2 -
4*x^3)*Log[4] + (-2 - 4*x - 2*x^2)*Log[4]^2) + (2*x^2 + 6*x^3 + 4*x^4 + (2
*x + 8*x^2 + 6*x^3)*Log[4] + (2*x + 2*x^2)*Log[4]^2 + E^x*(4*x^2 + 12*x^3
+ 8*x^4 + (4*x + 16*x^2 + 12*x^3)*Log[4] + (4*x + 4*x^2)*Log[4]^2))*Log[(x
 + 2*E^x*x)/E^x])/((x + 2*E^x*x)*Log[(x + 2*E^x*x)/E^x]^2),x]
```

output
```
$Aborted
```

3.1073.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1073.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. $2(27) = 54$.

Time = 1.57 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.88

method	result
parallelrisch	$\frac{16x^2\ln(2)^2+16x^3\ln(2)+4x^4+32x\ln(2)^2+32x^2\ln(2)+8x^3+16\ln(2)^2+16x\ln(2)+4x^2}{4\ln(x(2\,e^x+1)e^{-x})}$
risch	$\overline{2\ln(2)+2\ln(x)-2\ln(e^x)+2\ln\left(\frac{1}{2}+e^x\right)-i\pi\,\mathrm{csgn}\left(i e^{-x}\left(\frac{1}{2}+e^x\right)\right)^3-i\pi\mathrm{csgn}\left(i x\left(\frac{1}{2}+e^x\right)e^{-x}\right)^3+i\pi\,\mathrm{csgn}\left(i e^{-x}\left(\frac{1}{2}+e^x\right)\right)^2\mathrm{csgn}\left(i e^{-x}\right)}$

input
```
int((((4*(4*x^2+4*x)*ln(2)^2+2*(12*x^3+16*x^2+4*x)*ln(2)+8*x^4+12*x^3+4*x^
2)*exp(x)+4*(2*x^2+2*x)*ln(2)^2+2*(6*x^3+8*x^2+2*x)*ln(2)+4*x^4+6*x^3+2*x^
2)*ln((2*exp(x)*x+x)/exp(x))+(4*(-2*x^2-4*x-2)*ln(2)^2+2*(-4*x^3-8*x^2-4*x
)*ln(2)-2*x^4-4*x^3-2*x^2)*exp(x)+4*(x^3+x^2-x-1)*ln(2)^2+2*(2*x^4+2*x^3-2
*x^2-2*x)*ln(2)+x^5+x^4-x^3-x^2)/(2*exp(x)*x+x)/ln((2*exp(x)*x+x)/exp(x))^
2,x,method=_RETURNVERBOSE)
```

3.1073.

$$\int \frac{-x^2-x^3+x^4+x^5+\left(-2x-2x^2+2x^3+2x^4\right)\log(4)+\left(-1-x+x^2+x^3\right)\log^2(4)+e^x\left(-2x^2-4x^3-2x^4+\left(-4x-8x^2-4x^3\right)\log(4)+\left(-2-4x-2x^2\right)\log^2(4\right.}{(x+2e^x x)\,\mathrm{lo}}$$

output
```
1/4*(16*x^2*ln(2)^2+16*x^3*ln(2)+4*x^4+32*x*ln(2)^2+32*x^2*ln(2)+8*x^3+16*
ln(2)^2+16*x*ln(2)+4*x^2)/ln(x*(2*exp(x)+1)/exp(x))
```

3.1073.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(27) = 54$.

Time = 0.26 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.15

$$\int \frac{-x^2-x^3+x^4+x^5+(-2x-2x^2+2x^3+2x^4)\log(4)+(-1-x+x^2+x^3)\log^2(4)+e^x(-2x^2-4x^3-}{}$$

$$= \frac{x^4+2\,x^3+4\,(x^2+2\,x+1)\log(2)^2+x^2+4\,(x^3+2\,x^2+x)\log(2)}{\log((2\,xe^x+x)e^{(-x)})}$$

input
```
integrate((((4*(4*x^2+4*x)*log(2)^2+2*(12*x^3+16*x^2+4*x)*log(2)+8*x^4+12*
x^3+4*x^2)*exp(x)+4*(2*x^2+2*x)*log(2)^2+2*(6*x^3+8*x^2+2*x)*log(2)+4*x^4+
6*x^3+2*x^2)*log((2*exp(x)*x+x)/exp(x))+(4*(-2*x^2-4*x-2)*log(2)^2+2*(-4*x
^3-8*x^2-4*x)*log(2)-2*x^4-4*x^3-2*x^2)*exp(x)+4*(x^3+x^2-x-1)*log(2)^2+2*
(2*x^4+2*x^3-2*x^2-2*x)*log(2)+x^5+x^4-x^3-x^2)/(2*exp(x)*x+x)/log((2*exp(
x)*x+x)/exp(x))^2,x, algorithm=\
```

output
```
(x^4 + 2*x^3 + 4*(x^2 + 2*x + 1)*log(2)^2 + x^2 + 4*(x^3 + 2*x^2 + x)*log(
2))/log((2*x*e^x + x)*e^(-x))
```

3.1073.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(22) = 44$.

Time = 0.14 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.81

$$\int \frac{-x^2-x^3+x^4+x^5+(-2x-2x^2+2x^3+2x^4)\log(4)+(-1-x+x^2+x^3)\log^2(4)+e^x(-2x^2-4x^3-}{}$$

$$= \frac{x^4+2x^3+4x^3\log(2)+x^2+4x^2\log(2)^2+8x^2\log(2)+4x\log(2)+8x\log(2)^2+4\log(2)^2}{\log((2xe^x+x)\,e^{-x})}$$

input
```
integrate((((4*(4*x**2+4*x)*ln(2)**2+2*(12*x**3+16*x**2+4*x)*ln(2)+8*x**4+
12*x**3+4*x**2)*exp(x)+4*(2*x**2+2*x)*ln(2)**2+2*(6*x**3+8*x**2+2*x)*ln(2)
+4*x**4+6*x**3+2*x**2)*ln((2*exp(x)*x+x)/exp(x))+(4*(-2*x**2-4*x-2)*ln(2)*
*2+2*(-4*x**3-8*x**2-4*x)*ln(2)-2*x**4-4*x**3-2*x**2)*exp(x)+4*(x**3+x**2-
x-1)*ln(2)**2+2*(2*x**4+2*x**3-2*x**2-2*x)*ln(2)+x**5+x**4-x**3-x**2)/(2*e
xp(x)*x+x)/ln((2*exp(x)*x+x)/exp(x))**2,x)
```

output
```
(x**4 + 2*x**3 + 4*x**3*log(2) + x**2 + 4*x**2*log(2)**2 + 8*x**2*log(2) +
 4*x*log(2) + 8*x*log(2)**2 + 4*log(2)**2)/log((2*x*exp(x) + x)*exp(-x))
```

3.1073.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(27) = 54$.

Time = 0.34 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.62

$$\int \frac{-x^2 - x^3 + x^4 + x^5 + (-2x - 2x^2 + 2x^3 + 2x^4)\log(4) + (-1 - x + x^2 + x^3)\log^2(4) + e^x(-2x^2 - 4x^3 -}{}$$
$$= -\frac{x^4 + 2\,x^3(2\,\log(2) + 1) + \left(4\,\log(2)^2 + 8\,\log(2) + 1\right)x^2 + 4\left(2\,\log(2)^2 + \log(2)\right)x + 4\,\log(2)^2}{x - \log(x) - \log(2\,e^x + 1)}$$

input
```
integrate((((4*(4*x^2+4*x)*log(2)^2+2*(12*x^3+16*x^2+4*x)*log(2)+8*x^4+12*
x^3+4*x^2)*exp(x)+4*(2*x^2+2*x)*log(2)^2+2*(6*x^3+8*x^2+2*x)*log(2)+4*x^4+
6*x^3+2*x^2)*log((2*exp(x)*x+x)/exp(x))+(4*(-2*x^2-4*x-2)*log(2)^2+2*(-4*x
^3-8*x^2-4*x)*log(2)-2*x^4-4*x^3-2*x^2)*exp(x)+4*(x^3+x^2-x-1)*log(2)^2+2*
(2*x^4+2*x^3-2*x^2-2*x)*log(2)+x^5+x^4-x^3-x^2)/(2*exp(x)*x+x)/log((2*exp(
x)*x+x)/exp(x))^2,x, algorithm=\
```

output
```
-(x^4 + 2*x^3*(2*log(2) + 1) + (4*log(2)^2 + 8*log(2) + 1)*x^2 + 4*(2*log(
2)^2 + log(2))*x + 4*log(2)^2)/(x - log(x) - log(2*e^x + 1))
```

3.1073.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. $2(27) = 54$.

Time = 0.37 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.65

$$\int \frac{-x^2 - x^3 + x^4 + x^5 + (-2x - 2x^2 + 2x^3 + 2x^4)\log(4) + (-1 - x + x^2 + x^3)\log^2(4) + e^x(-2x^2 - 4x^3 -}{}$$

$$= \frac{x^4 + 4x^3\log(2) + 4x^2\log(2)^2 + 2x^3 + 8x^2\log(2) + 8x\log(2)^2 + x^2 + 4x\log(2) + 4\log(2)^2}{\log((2xe^x + x)e^{(-x)})}$$

input
```
integrate((((4*(4*x^2+4*x)*log(2)^2+2*(12*x^3+16*x^2+4*x)*log(2)+8*x^4+12*
x^3+4*x^2)*exp(x)+4*(2*x^2+2*x)*log(2)^2+2*(6*x^3+8*x^2+2*x)*log(2)+4*x^4+
6*x^3+2*x^2)*log((2*exp(x)*x+x)/exp(x))+(4*(-2*x^2-4*x-2)*log(2)^2+2*(-4*x
^3-8*x^2-4*x)*log(2)-2*x^4-4*x^3-2*x^2)*exp(x)+4*(x^3+x^2-x-1)*log(2)^2+2*
(2*x^4+2*x^3-2*x^2-2*x)*log(2)+x^5+x^4-x^3-x^2)/(2*exp(x)*x+x)/log((2*exp(
x)*x+x)/exp(x))^2,x, algorithm=\
```

output
```
(x^4 + 4*x^3*log(2) + 4*x^2*log(2)^2 + 2*x^3 + 8*x^2*log(2) + 8*x*log(2)^2
 + x^2 + 4*x*log(2) + 4*log(2)^2)/log((2*x*e^x + x)*e^(-x))
```

3.1073.9 Mupad [B] (verification not implemented)

Time = 19.19 (sec) , antiderivative size = 259, normalized size of antiderivative = 9.96

$$\int \frac{-x^2 - x^3 + x^4 + x^5 + (-2x - 2x^2 + 2x^3 + 2x^4)\log(4) + (-1 - x + x^2 + x^3)\log^2(4) + e^x(-2x^2 - 4x^3 -}{}$$

$$= x^3(12\ln(2) + 6) + x^2\left(16\ln(2) + 8\ln(2)^2 + 2\right)$$

$$+ \frac{4x^2\ln(2)^2 + 4x\ln(2) + 8x\ln(2)^2 + 8x^2\ln(2) + 4x^3\ln(2) + 4\ln(2)^2 + x^2 + 2x^3 + x^4 - \frac{2x\ln(e^{-x}(x+}{}}{\ln(e^{-x}(x + 2xe^x))}$$

$$+ x\left(\ln(16) + 8\ln(2)^2\right) + 4x^4$$

$$- \frac{2\left(8x^2\ln(2)^2 + 4x^3\ln(2)^2 - 4x^4\ln(2)^2 + 4x^2\ln(2) + 14x^3\ln(2) + 4x^4\ln(2) - 6x^5\ln(2) + 2x^3 +\right.}{(x-2)(2e^x - x + 1)}$$

input
```
int(-(exp(x)*(2*log(2)*(4*x + 8*x^2 + 4*x^3) + 4*log(2)^2*(4*x + 2*x^2 + 2
) + 2*x^2 + 4*x^3 + 2*x^4) - log(exp(-x)*(x + 2*x*exp(x)))*(exp(x)*(2*log(
2)*(4*x + 16*x^2 + 12*x^3) + 4*log(2)^2*(4*x + 4*x^2) + 4*x^2 + 12*x^3 + 8
*x^4) + 2*log(2)*(2*x + 8*x^2 + 6*x^3) + 4*log(2)^2*(2*x + 2*x^2) + 2*x^2
+ 6*x^3 + 4*x^4) + 4*log(2)^2*(x - x^2 - x^3 + 1) + 2*log(2)*(2*x + 2*x^2
- 2*x^3 - 2*x^4) + x^2 + x^3 - x^4 - x^5)/(log(exp(-x)*(x + 2*x*exp(x)))^2
*(x + 2*x*exp(x))),x)
```

output
```
x^3*(12*log(2) + 6) + x^2*(16*log(2) + 8*log(2)^2 + 2) + (4*x^2*log(2)^2 +
 4*x*log(2) + 8*x*log(2)^2 + 8*x^2*log(2) + 4*x^3*log(2) + 4*log(2)^2 + x^
2 + 2*x^3 + x^4 - (2*x*log(exp(-x)*(x + 2*x*exp(x)))*(2*exp(x) + 1)*(x + 1
)*(x + log(4) + x*log(64) + 4*log(2)^2 + 2*x^2))/(2*exp(x) - x + 1))/log(e
xp(-x)*(x + 2*x*exp(x))) + x*(log(16) + 8*log(2)^2) + 4*x^4 - (2*(8*x^2*lo
g(2)^2 + 4*x^3*log(2)^2 - 4*x^4*log(2)^2 + 4*x^2*log(2) + 14*x^3*log(2) +
4*x^4*log(2) - 6*x^5*log(2) + 2*x^3 + 5*x^4 + x^5 - 2*x^6))/((x - 2)*(2*ex
p(x) - x + 1))
```

3.1073.

$$\int \frac{-x^2-x^3+x^4+x^5+(-2x-2x^2+2x^3+2x^4)\log(4)+(-1-x+x^2+x^3)\log^2(4)+e^x(-2x^2-4x^3-2x^4+(-4x-8x^2-4x^3)\log(4)+(-2-4x-2x^2)\log^2(\ldots}{(x+2e^x x)\,\mathrm{l}\ldots}$$

3.1074 $\int \frac{16\left(4-12e^{16}x\right)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{\left(4-12e^{16}x\right)^4\left(10x-30e^{16}x^2\right)}{81e^{64}x^4}+\frac{\left(4-12e^{16}x\right)^8}{6561e}\right.}$

3.1074.1 Optimal result

Integrand size = 98, antiderivative size = 25

$$\int \frac{16(4-12e^{16}x)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{(4-12e^{16}x)^4(10x-30e^{16}x^2)}{81e^{64}x^4}+\frac{(4-12e^{16}x)^8(-x+3e^{16}x^2)}{6561e^{128}x^8}\right)}\,dx = \frac{4}{5-\left(-4+\frac{4}{3e^{16}x}\right)^4}+\log(15)$$

output
```
ln(15)+4/(5-(4/3/x/exp(16)-4)^4)
```

3.1074.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 62 vs. 2(25) = 50.

Time = 0.04 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.48

$$\int \frac{16(4-12e^{16}x)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{(4-12e^{16}x)^4(10x-30e^{16}x^2)}{81e^{64}x^4}+\frac{(4-12e^{16}x)^8(-x+3e^{16}x^2)}{6561e^{128}x^8}\right)}\,dx = \frac{1024(1-12e^{16}x+54e^{32}x^2-108e^{48}x^3)}{251\,(256-3072e^{16}x+13824e^{32}x^2-27648e^{48}x^3+20331e^{64}x^4)}$$

input
```
Integrate[(16*(4 - 12*E^16*x)^4)/(81*E^64*x^4*(-25*x + 75*E^16*x^2 + ((4 -
 12*E^16*x)^4*(10*x - 30*E^16*x^2))/(81*E^64*x^4) + ((4 - 12*E^16*x)^8*(-x
 + 3*E^16*x^2))/(6561*E^128*x^8))),x]
```

output
```
(1024*(1 - 12*E^16*x + 54*E^32*x^2 - 108*E^48*x^3))/(251*(256 - 3072*E^16*
x + 13824*E^32*x^2 - 27648*E^48*x^3 + 20331*E^64*x^4))
```

3.1074.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 193 vs. $2(25) = 50$.

Time = 1.39 (sec) , antiderivative size = 193, normalized size of antiderivative = 7.72, number of steps used = 13, number of rules used = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.133$, Rules used = {27, 27, 7239, 27, 2527, 27, 2029, 2527, 27, 2029, 2527, 27, 2021}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{16\left(4-12e^{16}x\right)^4}{81e^{64}x^4\left(75e^{16}x^2+\frac{(3e^{16}x^2-x)(4-12e^{16}x)^8}{6561e^{128}x^8}+\frac{(10x-30e^{16}x^2)(4-12e^{16}x)^4}{81e^{64}x^4}-25x\right)}dx$$

$$\Big\downarrow 27$$

$$\frac{16\int -\frac{1679616\left(1-3e^{16}x\right)^4}{x^4\left(\frac{65536\left(x-3e^{16}x^2\right)\left(1-3e^{16}x\right)^8}{e^{128}x^8}-\frac{207360\left(x-3e^{16}x^2\right)\left(1-3e^{16}x\right)^4}{e^{64}x^4}-492075e^{16}x^2+164025x\right)}dx}{81e^{64}}$$

$$\Big\downarrow 27$$

$$-\frac{331776\int \frac{\left(1-3e^{16}x\right)^4}{x^4\left(\frac{65536\left(x-3e^{16}x^2\right)\left(1-3e^{16}x\right)^8}{e^{128}x^8}-\frac{207360\left(x-3e^{16}x^2\right)\left(1-3e^{16}x\right)^4}{e^{64}x^4}-492075e^{16}x^2+164025x\right)}dx}{e^{64}}$$

$$\Big\downarrow 7239$$

$$-\frac{331776\int \frac{e^{128}x^3\left(1-3e^{16}x\right)^3}{(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256)^2}dx}{e^{64}}$$

$$\Big\downarrow 27$$

$$-331776e^{64}\int \frac{x^3\left(1-3e^{16}x\right)^3}{(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256)^2}dx$$

$$\Big\downarrow 2527$$

$$-331776e^{64}\left(\frac{x^3}{753e^{16}\left(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256\right)}-\frac{\int \frac{81\left(-6777e^{96}x^5+6867e^{80}x^4-22}{\left(20331e^{64}x^4-27648e^{48}x^3+13824e^{}}}{20331e^{64}}\right.$$

$$\Big\downarrow 27$$

$$-331776e^{64}\left(\frac{x^3}{753e^{16}\left(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256\right)}-\frac{\int \frac{-6777e^{96}x^5+6867e^{80}x^4-229}{\left(20331e^{64}x^4-27648e^{48}x^3+13824e^{}}}{251e^{64}}\right.$$

$$\Big\downarrow 2029$$

$$-331776e^{64}\left(\frac{x^3}{753e^{16}\left(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256\right)}-\frac{\int \frac{x^2\left(-6777e^{96}x^3+6867e^{80}x^2-\right.}{\left(20331e^{64}x^4-27648e^{48}x^3+13824e^{}}}{251e^{64}}\right.$$

$$\Big\downarrow 2527$$

$$-331776e^{64}\left(\frac{x^3}{753e^{16}\left(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256\right)}-\frac{\frac{e^{32}x^2}{6(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}}}{}\right.$$

$$\Big\downarrow 27$$

$$-331776e^{64}\left(\frac{x^3}{753e^{16}\left(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256\right)}-\frac{\frac{e^{32}x^2}{6(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}}}{}\right.$$

$$\Big\downarrow 2029$$

$$-331776e^{64}\left(\frac{x^3}{753e^{16}\left(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256\right)}-\frac{\frac{e^{32}x^2}{6(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}}}{}\right.$$

$$\Big\downarrow 2527$$

3.1074. $$\int \frac{16\left(4-12e^{16}x\right)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{\left(4-12e^{16}x\right)^4\left(10x-30e^{16}x^2\right)}{81e^{64}x^4}+\frac{\left(4-12e^{16}x\right)^8\left(-x+3e^{16}x^2\right)}{6561e^{128}x^8}\right)}\,dx$$

$$-331776e^{64}\left(\frac{x^3}{753e^{16}(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256)}-\frac{\frac{e^{32}x^2}{6(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}}}{}\right.$$

$$\Big\downarrow 27$$

$$-331776e^{64}\left(\frac{x^3}{753e^{16}(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256)}-\frac{\frac{e^{32}x^2}{6(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}}}{}\right.$$

$$\Big\downarrow 2021$$

$$-331776e^{64}\left(\frac{x^3}{753e^{16}(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}x^2-3072e^{16}x+256)}-\frac{\frac{e^{32}x^2}{6(20331e^{64}x^4-27648e^{48}x^3+13824e^{32}}}{}\right.$$

input
```
Int[(16*(4 - 12*E^16*x)^4)/(81*E^64*x^4*(-25*x + 75*E^16*x^2 + ((4 - 12*E^
16*x)^4*(10*x - 30*E^16*x^2))/(81*E^64*x^4) + ((4 - 12*E^16*x)^8*(-x + 3*E
^16*x^2))/(6561*E^128*x^8))),x]
```

output
```
-331776*E^64*(x^3/(753*E^16*(256 - 3072*E^16*x + 13824*E^32*x^2 - 27648*E^
48*x^3 + 20331*E^64*x^4)) - ((E^32*x^2)/(6*(256 - 3072*E^16*x + 13824*E^32
*x^2 - 27648*E^48*x^3 + 20331*E^64*x^4)) - (-1/108*E^64/(256 - 3072*E^16*x
 + 13824*E^32*x^2 - 27648*E^48*x^3 + 20331*E^64*x^4) + (E^80*x)/(9*(256 -
3072*E^16*x + 13824*E^32*x^2 - 27648*E^48*x^3 + 20331*E^64*x^4)))/(3*E^64)
)/(251*E^64))
```

3.1074. $$\int \frac{16(4-12e^{16}x)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{(4-12e^{16}x)^4(10x-30e^{16}x^2)}{81e^{64}x^4}+\frac{(4-12e^{16}x)^8(-x+3e^{16}x^2)}{6561e^{128}x^8}\right)}\,dx$$

3.1074.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2021
```
Int[(Pp_)*(Qq_)^(m_.), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x
]}, Simp[Coeff[Pp, x, p]*x^(p - q + 1)*(Qq^(m + 1)/((p + m*q + 1)*Coeff[Qq,
 x, q])), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp
, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])]] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

rule 2029
```
Int[(Fx_.)*((d_.)*(x_)^(q_.) + (a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.) + (c_.)*
(x_)^(t_.))^(p_.), x_Symbol] :> Int[x^(p*r)*(a + b*x^(s - r) + c*x^(t - r)
+ d*x^(q - r))^p*Fx, x] /; FreeQ[{a, b, c, d, r, s, t, q}, x] && IntegerQ[p
] && PosQ[s - r] && PosQ[t - r] && PosQ[q - r] &&  !(EqQ[p, 1] && EqQ[u, 1]
)
```

rule 2527
```
Int[(Pm_)*(Qn_)^(p_.), x_Symbol] :> With[{m = Expon[Pm, x], n = Expon[Qn, x
]}, Simp[Coeff[Pm, x, m]*x^(m - n + 1)*(Qn^(p + 1)/((m + n*p + 1)*Coeff[Qn,
 x, n])), x] + Simp[1/((m + n*p + 1)*Coeff[Qn, x, n])   Int[ExpandToSum[(m
+ n*p + 1)*Coeff[Qn, x, n]*Pm - Coeff[Pm, x, m]*x^(m - n)*((m - n + 1)*Qn +
 (p + 1)*x*D[Qn, x]), x]*Qn^p, x], x] /; LtQ[1, n, m + 1] && m + n*p + 1 <
0] /; FreeQ[p, x] && PolyQ[Pm, x] && PolyQ[Qn, x] && LtQ[p, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1074. $\int \frac{16(4-12e^{16}x)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{(4-12e^{16}x)^4(10x-30e^{16}x^2)}{81e^{64}x^4}+\frac{(4-12e^{16}x)^8(-x+3e^{16}x^2)}{6561e^{128}x^8}\right)}\,dx$

3.1074.4 Maple [A] (verified)

Time = 2.01 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.84

method	result
norman	$-\frac{324\,\mathrm{e}^{64} x^{4}}{20331 x^{4} \mathrm{e}^{64}-27648\,\mathrm{e}^{48} x^{3}+13824 x^{2} \mathrm{e}^{32}-3072 x\,\mathrm{e}^{16}+256}$
parallelrisch	$-\frac{324\,\mathrm{e}^{64} x^{4}}{20331 x^{4} \mathrm{e}^{64}-27648\,\mathrm{e}^{48} x^{3}+13824 x^{2} \mathrm{e}^{32}-3072 x\,\mathrm{e}^{16}+256}$
risch	$\frac{16\,\mathrm{e}^{-64}\left(-\frac{6912\,\mathrm{e}^{112} x^{3}}{63001}+\frac{3456\,\mathrm{e}^{96} x^{2}}{63001}-\frac{768\,\mathrm{e}^{80} x}{63001}+\frac{64\,\mathrm{e}^{64}}{63001}\right)}{81\left(x^{4} \mathrm{e}^{64}-\frac{1024\,\mathrm{e}^{48} x^{3}}{753}+\frac{512 x^{2} \mathrm{e}^{32}}{753}-\frac{1024 x\,\mathrm{e}^{16}}{6777}+\frac{256}{20331}\right)}$
gosper	$-\frac{1024\left(108\,\mathrm{e}^{48} x^{3}-54 x^{2} \mathrm{e}^{32}+12 x\,\mathrm{e}^{16}-1\right)}{251\left(20331 x^{4} \mathrm{e}^{64}-27648\,\mathrm{e}^{48} x^{3}+13824 x^{2} \mathrm{e}^{32}-3072 x\,\mathrm{e}^{16}+256\right)}$
default	$13824\,\mathrm{e}^{64}\left(\sum_{\_R=\mathrm{RootOf}\left(413349561\_Z^{8} \mathrm{e}^{128}-1124222976\,\mathrm{e}^{112}\_Z^{7}+1326523392\,\mathrm{e}^{96}\_Z^{6}-889325568\,\mathrm{e}^{80}\_Z^{5}+371381760\right.}\right.$

input
```
int(16/81*(-12*x*exp(16)+4)^4/x^4/exp(16)^4/(1/6561*(3*x^2*exp(16)-x)*(-12
*x*exp(16)+4)^8/x^8/exp(16)^8+1/81*(-30*x^2*exp(16)+10*x)*(-12*x*exp(16)+4
)^4/x^4/exp(16)^4+75*x^2*exp(16)-25*x),x,method=_RETURNVERBOSE)
```

output
```
-324*exp(16)^4*x^4/(20331*x^4*exp(16)^4-27648*exp(16)^3*x^3+13824*exp(16)^
2*x^2-3072*x*exp(16)+256)
```

3.1074.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(21) = 42$.

Time = 0.25 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{16(4-12e^{16}x)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{(4-12e^{16}x)^4(10x-30e^{16}x^2)}{81e^{64}x^4}+\frac{(4-12e^{16}x)^8(-x+3e^{16}x^2)}{6561e^{128}x^8}\right)}\,dx$$
$$= -\frac{1024\left(108\,x^{3}e^{48}-54\,x^{2}e^{32}+12\,xe^{16}-1\right)}{251\left(20331\,x^{4}e^{64}-27648\,x^{3}e^{48}+13824\,x^{2}e^{32}-3072\,xe^{16}+256\right)}$$

input
```
integrate(16/81*(-12*x*exp(16)+4)^4/x^4/exp(16)^4/(1/6561*(3*x^2*exp(16)-x
)*(-12*x*exp(16)+4)^8/x^8/exp(16)^8+1/81*(-30*x^2*exp(16)+10*x)*(-12*x*exp
(16)+4)^4/x^4/exp(16)^4+75*x^2*exp(16)-25*x),x, algorithm=\
```

output
```
-1024/251*(108*x^3*e^48 - 54*x^2*e^32 + 12*x*e^16 - 1)/(20331*x^4*e^64 - 2
7648*x^3*e^48 + 13824*x^2*e^32 - 3072*x*e^16 + 256)
```

3.1074.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(17) = 34.

Time = 0.73 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.32

$$\int \frac{16(4-12e^{16}x)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{(4-12e^{16}x)^4(10x-30e^{16}x^2)}{81e^{64}x^4}+\frac{(4-12e^{16}x)^8(-x+3e^{16}x^2)}{6561e^{128}x^8}\right)}\,dx = \frac{-110592x^3e^{48}+55296x^2e^{32}-12288xe^{16}+1024}{5103081x^4e^{64}-6939648x^3e^{48}+3469824x^2e^{32}-771072xe^{16}+64256}$$

input
```
integrate(16/81*(-12*x*exp(16)+4)**4/x**4/exp(16)**4/(1/6561*(3*x**2*exp(1
6)-x)*(-12*x*exp(16)+4)**8/x**8/exp(16)**8+1/81*(-30*x**2*exp(16)+10*x)*(-
12*x*exp(16)+4)**4/x**4/exp(16)**4+75*x**2*exp(16)-25*x),x)
```

output
```
(-110592*x**3*exp(48) + 55296*x**2*exp(32) - 12288*x*exp(16) + 1024)/(5103
081*x**4*exp(64) - 6939648*x**3*exp(48) + 3469824*x**2*exp(32) - 771072*x*
exp(16) + 64256)
```

3.1074.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(21) = 42.

Time = 0.29 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.32

$$\int \frac{16(4-12e^{16}x)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{(4-12e^{16}x)^4(10x-30e^{16}x^2)}{81e^{64}x^4}+\frac{(4-12e^{16}x)^8(-x+3e^{16}x^2)}{6561e^{128}x^8}\right)}\,dx = -\frac{1024\,(108\,x^3e^{112}-54\,x^2e^{96}+12\,xe^{80}-e^{64})e^{(-64)}}{251\,(20331\,x^4e^{64}-27648\,x^3e^{48}+13824\,x^2e^{32}-3072\,xe^{16}+256)}$$

input
```
integrate(16/81*(-12*x*exp(16)+4)^4/x^4/exp(16)^4/(1/6561*(3*x^2*exp(16)-x
)*(-12*x*exp(16)+4)^8/x^8/exp(16)^8+1/81*(-30*x^2*exp(16)+10*x)*(-12*x*exp
(16)+4)^4/x^4/exp(16)^4+75*x^2*exp(16)-25*x),x, algorithm=\
```

output
```
-1024/251*(108*x^3*e^112 - 54*x^2*e^96 + 12*x*e^80 - e^64)*e^(-64)/(20331*
x^4*e^64 - 27648*x^3*e^48 + 13824*x^2*e^32 - 3072*x*e^16 + 256)
```

3.1074.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(21) = 42$.

Time = 0.28 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.32

$$\int \frac{16(4-12e^{16}x)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{(4-12e^{16}x)^4(10x-30e^{16}x^2)}{81e^{64}x^4}+\frac{(4-12e^{16}x)^8(-x+3e^{16}x^2)}{6561e^{128}x^8}\right)}\,dx$$
$$= -\frac{1024\left(108\,x^3e^{112}-54\,x^2e^{96}+12\,xe^{80}-e^{64}\right)e^{(-64)}}{251\left(20331\,x^4e^{64}-27648\,x^3e^{48}+13824\,x^2e^{32}-3072\,xe^{16}+256\right)}$$

input
```
integrate(16/81*(-12*x*exp(16)+4)^4/x^4/exp(16)^4/(1/6561*(3*x^2*exp(16)-x
)*(-12*x*exp(16)+4)^8/x^8/exp(16)^8+1/81*(-30*x^2*exp(16)+10*x)*(-12*x*exp
(16)+4)^4/x^4/exp(16)^4+75*x^2*exp(16)-25*x),x, algorithm=\
```

output
```
-1024/251*(108*x^3*e^112 - 54*x^2*e^96 + 12*x*e^80 - e^64)*e^(-64)/(20331*
x^4*e^64 - 27648*x^3*e^48 + 13824*x^2*e^32 - 3072*x*e^16 + 256)
```

3.1074.9 Mupad [B] (verification not implemented)

Time = 17.39 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{16(4-12e^{16}x)^4}{81e^{64}x^4\left(-25x+75e^{16}x^2+\frac{(4-12e^{16}x)^4(10x-30e^{16}x^2)}{81e^{64}x^4}+\frac{(4-12e^{16}x)^8(-x+3e^{16}x^2)}{6561e^{128}x^8}\right)}\,dx$$
$$= -\frac{\frac{110592\,\mathrm{e}^{48}\,x^3}{251}-\frac{55296\,\mathrm{e}^{32}\,x^2}{251}+\frac{12288\,\mathrm{e}^{16}\,x}{251}-\frac{1024}{251}}{20331\,\mathrm{e}^{64}\,x^4-27648\,\mathrm{e}^{48}\,x^3+13824\,\mathrm{e}^{32}\,x^2-3072\,\mathrm{e}^{16}\,x+256}$$

input
```
int(-(16*exp(-64)*(12*x*exp(16) - 4)^4)/(81*x^4*(25*x - 75*x^2*exp(16) + (
exp(-128)*(x - 3*x^2*exp(16))*(12*x*exp(16) - 4)^8)/(6561*x^8) - (exp(-64)
*(12*x*exp(16) - 4)^4*(10*x - 30*x^2*exp(16)))/(81*x^4))),x)
```

output
```
-((12288*x*exp(16))/251 - (55296*x^2*exp(32))/251 + (110592*x^3*exp(48))/2
51 - 1024/251)/(13824*x^2*exp(32) - 3072*x*exp(16) - 27648*x^3*exp(48) + 2
0331*x^4*exp(64) + 256)
```

3.1075 $\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{-5+x}(-x-x^2)+e^{-2+x}(x+x^2+\log(2))\right)}{x}\,dx$

3.1075.1 Optimal result

Integrand size = 45, antiderivative size = 23

$$\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{-5+x}(-x-x^2)+e^{-2+x}(x+x^2+\log(2))\right)}{x}\,dx=-e^{-5+x}x+2^{-1/x}e^{-2+x}x$$

output
```
x*exp(-2+x)/exp(ln(2)/x)-x*exp(-5+x)
```

3.1075.2 Mathematica [A] (verified)

Time = 0.39 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{-5+x}(-x-x^2)+e^{-2+x}(x+x^2+\log(2))\right)}{x}\,dx=e^{-5+x}\left(-1+2^{-1/x}e^3\right)x$$

input
```
Integrate[(2^x^(-1)*E^(-5 + x)*(-x - x^2) + E^(-2 + x)*(x + x^2 + Log[2]))
/(2^x^(-1)*x),x]
```

output
```
E^(-5 + x)*(-1 + E^3/2^x^(-1))*x
```

3.1075.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{x-5}\left(-x^2-x\right)+e^{x-2}\left(x^2+x+\log(2)\right)\right)}{x}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(-e^{x-5}x+2^{-1/x}e^{x-2}x-e^{x-5}+2^{-1/x}e^{x-2}+\frac{2^{-1/x}e^{x-2}\log(2)}{x}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\int 2^{-1/x}e^{x-2}dx+\int 2^{-1/x}e^{x-2}xdx+\log(2)\int \frac{2^{-1/x}e^{x-2}}{x}dx-e^{x-5}x$$

input
```
Int[(2^x^(-1)*E^(-5 + x)*(-x - x^2) + E^(-2 + x)*(x + x^2 + Log[2]))/(2^x^
(-1)*x),x]
```

output
```
$Aborted
```

3.1075.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1075.4 Maple [A] (verified)

Time = 2.32 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

method	result	size
risch	$-x\,\mathrm{e}^{-5+x}+2^{-\frac{1}{x}}x\,\mathrm{e}^{-2+x}$	22
parts	$-\mathrm{e}^{-5+x}(-5+x)-5\,\mathrm{e}^{-5+x}+x\,\mathrm{e}^{-2+x}\mathrm{e}^{-\frac{\ln(2)}{x}}$	32
norman	$\left(x\,\mathrm{e}^{3}\mathrm{e}^{-5+x}-\mathrm{e}^{-5+x}\mathrm{e}^{\frac{\ln(2)}{x}}x\right)\mathrm{e}^{-\frac{\ln(2)}{x}}$	34
parallelrisch	$-\frac{\left(\mathrm{e}^{-5+x}\mathrm{e}^{\frac{\ln(2)}{x}}x^{2}-x^{2}\mathrm{e}^{-2+x}\right)\mathrm{e}^{-\frac{\ln(2)}{x}}}{x}$	40

input
```
int(((-x^2-x)*exp(-5+x)*exp(ln(2)/x)+(ln(2)+x^2+x)*exp(-2+x))/x/exp(ln(2)/
x),x,method=_RETURNVERBOSE)
```

output
```
-x*exp(-5+x)+1/(2^(1/x))*x*exp(-2+x)
```

3.1075.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{-5+x}(-x-x^2)+e^{-2+x}(x+x^2+\log(2))\right)}{x}\,dx=-\frac{\left(2^{\left(\frac{1}{x}\right)}xe^{(x-2)}-xe^{(x+1)}\right)e^{(-3)}}{2^{\left(\frac{1}{x}\right)}}$$

input
```
integrate(((-x^2-x)*exp(-5+x)*exp(log(2)/x)+(log(2)+x^2+x)*exp(-2+x))/x/ex
p(log(2)/x),x, algorithm=\
```

output
```
-(2^(1/x)*x*e^(x - 2) - x*e^(x + 1))*e^(-3)/2^(1/x)
```

3.1075.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{-5+x}(-x-x^2)+e^{-2+x}(x+x^2+\log(2))\right)}{x}\,dx=\left(-xe^{\frac{\log(2)}{x}}+xe^{3}\right)e^{-\frac{\log(2)}{x}}e^{x-5}$$

input
```
integrate(((-x**2-x)*exp(-5+x)*exp(ln(2)/x)+(ln(2)+x**2+x)*exp(-2+x))/x/ex
p(ln(2)/x),x)
```

output
```
(-x*exp(log(2)/x) + x*exp(3))*exp(-log(2)/x)*exp(x - 5)
```

3.1075.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{-5+x}(-x-x^2)+e^{-2+x}(x+x^2+\log(2))\right)}{x}\,dx = xe^{\left(x-\frac{\log(2)}{x}-2\right)} - (x-1)e^{(x-5)} - e^{(x-5)}$$

input
```
integrate(((-x^2-x)*exp(-5+x)*exp(log(2)/x)+(log(2)+x^2+x)*exp(-2+x))/x/ex
p(log(2)/x),x, algorithm=\
```

output
```
x*e^(x - log(2)/x - 2) - (x - 1)*e^(x - 5) - e^(x - 5)
```

3.1075.8 Giac [F]

$$\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{-5+x}(-x-x^2)+e^{-2+x}(x+x^2+\log(2))\right)}{x}\,dx = \int -\frac{(x^2+x)2^{\left(\frac{1}{x}\right)}e^{(x-5)} - (x^2+x+\log{(2)})e^{(x}}{2^{\left(\frac{1}{x}\right)}x}$$

input
```
integrate(((-x^2-x)*exp(-5+x)*exp(log(2)/x)+(log(2)+x^2+x)*exp(-2+x))/x/ex
p(log(2)/x),x, algorithm=\
```

output
```
integrate(-((x^2 + x)*2^(1/x)*e^(x - 5) - (x^2 + x + log(2))*e^(x - 2))/(2
^(1/x)*x), x)
```

3.1075.9 Mupad [B] (verification not implemented)

Time = 17.58 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{-5+x}(-x-x^2)+e^{-2+x}(x+x^2+\log(2))\right)}{x}\,dx = -x\,e^{x}\left(e^{-5}-\frac{e^{-2}}{2^{1/x}}\right)$$

input
```
int((exp(-log(2)/x)*(exp(x - 2)*(x + log(2) + x^2) - exp(log(2)/x)*exp(x -
 5)*(x + x^2)))/x,x)
```

output
```
-x*exp(x)*(exp(-5) - exp(-2)/2^(1/x))
```

3.1075. $\int \frac{2^{-1/x}\left(2^{\frac{1}{x}}e^{-5+x}(-x-x^2)+e^{-2+x}(x+x^2+\log(2))\right)}{x}\,dx$

3.1076 $\int \frac{e^{-4+\frac{25+115x-49x^2+5x^3+\left(25-10x+x^2\right)\log\left(x^2\right)}{e^4}}\left(100+190x-192x^2+30\ldots\right.}{x}$

3.1076.1 Optimal result

Integrand size = 69, antiderivative size = 24

$$\int \frac{e^{-4+\frac{25+115x-49x^2+5x^3+\left(25-10x+x^2\right)\log\left(x^2\right)}{e^4}}\left(100+190x-192x^2+30x^3+(-20x+4x^2)\log(x^2)\right)}{x}\,dx = 2e^{\frac{(5-x)^2\left(1+5x+\log\left(x^2\right)\right)}{e^4}}$$

output
```
2*exp((1+ln(x^2)+5*x)*(5-x)^2/exp(4))
```

3.1076.2 Mathematica [A] (verified)

Time = 1.51 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

$$\int \frac{e^{-4+\frac{25+115x-49x^2+5x^3+\left(25-10x+x^2\right)\log\left(x^2\right)}{e^4}}\left(100+190x-192x^2+30x^3+(-20x+4x^2)\log(x^2)\right)}{x}\,dx = 2e^{\frac{(-5+x)^2(1+5x)}{e^4}}\left(x^2\right)^{\frac{(-5+x)^2}{e^4}}$$

input
```
Integrate[(E^(-4 + (25 + 115*x - 49*x^2 + 5*x^3 + (25 - 10*x + x^2)*Log[x^
2])/E^4)*(100 + 190*x - 192*x^2 + 30*x^3 + (-20*x + 4*x^2)*Log[x^2]))/x,x]
```

output
```
2*E^(((-5 + x)^2*(1 + 5*x))/E^4)*(x^2)^((-5 + x)^2/E^4)
```

3.1076.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(30x^3-192x^2+(4x^2-20x)\log(x^2)+190x+100)\exp\left(\frac{5x^3-49x^2+(x^2-10x+25)\log(x^2)+115x+25}{e^4}-4\right)}{x}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{2(5-x)(-15x^2-2x\log(x^2)+21x+10)\exp\left(\frac{5x^3-49x^2+(x^2-10x+25)\log(x^2)+115x+25}{e^4}-4\right)}{x}dx$$

$$\Big\downarrow \ 27$$

$$2\int \frac{\exp\left(\frac{5x^3-49x^2+115x+(x^2-10x+25)\log(x^2)+25}{e^4}-4\right)(5-x)(-15x^2-2\log(x^2)x+21x+10)}{x}dx$$

$$\Big\downarrow \ 7293$$

$$2\int \left(\frac{\exp\left(\frac{5x^3-49x^2+115x+(x^2-10x+25)\log(x^2)+25}{e^4}-4\right)(15x^3-96x^2+95x+50)}{x}+2\exp\left(\frac{5x^3-49x^2+115x+(\right.\right.$$

$$\Big\downarrow \ 2009$$

$$2\left(95\int \exp\left(\frac{5x^3-49x^2+115x+(x^2-10x+25)\log(x^2)+25}{e^4}-4\right)dx+50\int \frac{\exp\left(\frac{5x^3-49x^2+115x+(x^2-10x+2}{e^4}\right.}{x}\right.$$

input
```
Int[(E^(-4 + (25 + 115*x - 49*x^2 + 5*x^3 + (25 - 10*x + x^2)*Log[x^2])/E^
4)*(100 + 190*x - 192*x^2 + 30*x^3 + (-20*x + 4*x^2)*Log[x^2]))/x,x]
```

output
```
$Aborted
```

3.1076.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1076.4 Maple [A] (verified)

Time = 0.97 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

method	result	size
risch	$2\,\mathrm{e}^{(-5+x)^{2}(1+\ln(x^{2})+5x)\mathrm{e}^{-4}}$	21
default	$2\,\mathrm{e}^{((x^{2}-10x+25)\ln(x^{2})+5x^{3}-49x^{2}+115x+25)\mathrm{e}^{-4}}$	37
norman	$2\,\mathrm{e}^{((x^{2}-10x+25)\ln(x^{2})+5x^{3}-49x^{2}+115x+25)\mathrm{e}^{-4}}$	37
parallelrisch	$2\,\mathrm{e}^{((x^{2}-10x+25)\ln(x^{2})+5x^{3}-49x^{2}+115x+25)\mathrm{e}^{-4}}$	37

input
```
int(((4*x^2-20*x)*ln(x^2)+30*x^3-192*x^2+190*x+100)*exp(((x^2-10*x+25)*ln(
x^2)+5*x^3-49*x^2+115*x+25)/exp(4))/x/exp(4),x,method=_RETURNVERBOSE)
```

output
```
2*exp((-5+x)^2*(1+ln(x^2)+5*x)*exp(-4))
```

3.1076. $\int \frac{e^{-4+\frac{25+115x-49x^2+5x^3+\left(25-10x+x^2\right)\log\left(x^2\right)}{e^4}}\left(100+190x-192x^2+30x^3+\left(-20x+4x^2\right)\log\left(x^2\right)\right)}{x}\,dx$

3.1076.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{e^{-4+\frac{25+115x-49x^2+5x^3+(25-10x+x^2)\log(x^2)}{e^4}}(100+190x-192x^2+30x^3+(-20x+4x^2)\log(x^2))}{x}\,dx = 2\,e^{\left((5\,x^3-49\,x^2+(x^2-10\,x+25)\log(x^2)+115\,x-4\,e^4+25)e^{(-4)}+4\right)}$$

input
```
integrate(((4*x^2-20*x)*log(x^2)+30*x^3-192*x^2+190*x+100)*exp(((x^2-10*x+
25)*log(x^2)+5*x^3-49*x^2+115*x+25)/exp(4))/x/exp(4),x, algorithm=\
```

output
```
2*e^((5*x^3 - 49*x^2 + (x^2 - 10*x + 25)*log(x^2) + 115*x - 4*e^4 + 25)*e^
(-4) + 4)
```

3.1076.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{e^{-4+\frac{25+115x-49x^2+5x^3+(25-10x+x^2)\log(x^2)}{e^4}}(100+190x-192x^2+30x^3+(-20x+4x^2)\log(x^2))}{x}\,dx = 2e^{\frac{5x^3-49x^2+115x+(x^2-10x+25)\log(x^2)+25}{e^4}}$$

input
```
integrate(((4*x**2-20*x)*ln(x**2)+30*x**3-192*x**2+190*x+100)*exp(((x**2-1
0*x+25)*ln(x**2)+5*x**3-49*x**2+115*x+25)/exp(4))/x/exp(4),x)
```

output
```
2*exp((5*x**3 - 49*x**2 + 115*x + (x**2 - 10*x + 25)*log(x**2) + 25)*exp(-
4))
```

3.1076.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(20) = 40.

Time = 0.52 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.04

$$\int \frac{e^{-4+\frac{25+115x-49x^2+5x^3+(25-10x+x^2)\log(x^2)}{e^4}}(100+190x-192x^2+30x^3+(-20x+4x^2)\log(x^2))}{x}\,dx = 2\,e^{\left(5\,x^3e^{(-4)}+2\,x^2e^{(-4)}\log(x)-49\,x^2e^{(-4)}-20\,xe^{(-4)}\log(x)+115\,xe^{(-4)}+50\,e^{(-4)}\log(x)+25\,e^{(-4)}\right)}$$

input
```
integrate(((4*x^2-20*x)*log(x^2)+30*x^3-192*x^2+190*x+100)*exp(((x^2-10*x+
25)*log(x^2)+5*x^3-49*x^2+115*x+25)/exp(4))/x/exp(4),x, algorithm=\
```

output
```
2*e^(5*x^3*e^(-4) + 2*x^2*e^(-4)*log(x) - 49*x^2*e^(-4) - 20*x*e^(-4)*log(
x) + 115*x*e^(-4) + 50*e^(-4)*log(x) + 25*e^(-4))
```

3.1076.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(20) = 40$.

Time = 0.32 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.25

$$\int \frac{e^{-4+\frac{25+115x-49x^2+5x^3+(25-10x+x^2)\log(x^2)}{e^4}}(100+190x-192x^2+30x^3+(-20x+4x^2)\log(x^2))}{x}\,dx$$
$$= 2\,e^{\left(5\,x^{3}e^{(-4)}+x^{2}e^{(-4)}\log\left(x^{2}\right)-49\,x^{2}e^{(-4)}-10\,xe^{(-4)}\log\left(x^{2}\right)+115\,xe^{(-4)}+25\,e^{(-4)}\log\left(x^{2}\right)+25\,e^{(-4)}\right)}$$

input
```
integrate(((4*x^2-20*x)*log(x^2)+30*x^3-192*x^2+190*x+100)*exp(((x^2-10*x+
25)*log(x^2)+5*x^3-49*x^2+115*x+25)/exp(4))/x/exp(4),x, algorithm=\
```

output
```
2*e^(5*x^3*e^(-4) + x^2*e^(-4)*log(x^2) - 49*x^2*e^(-4) - 10*x*e^(-4)*log(
x^2) + 115*x*e^(-4) + 25*e^(-4)*log(x^2) + 25*e^(-4))
```

3.1076.9 Mupad [B] (verification not implemented)

Time = 17.34 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.83

$$\int \frac{e^{-4+\frac{25+115x-49x^2+5x^3+(25-10x+x^2)\log(x^2)}{e^4}}(100+190x-192x^2+30x^3+(-20x+4x^2)\log(x^2))}{x}\,dx$$
$$= 2\,\mathrm{e}^{5\,x^3\,\mathrm{e}^{-4}}\,\mathrm{e}^{-49\,x^2\,\mathrm{e}^{-4}}\,\mathrm{e}^{25\,\mathrm{e}^{-4}}\,\mathrm{e}^{115\,x\,\mathrm{e}^{-4}}\,{\left(x^2\right)}^{\mathrm{e}^{-4}\,\left(x^2-10\,x+25\right)}$$

input
```
int((exp(-4)*exp(exp(-4)*(115*x + log(x^2)*(x^2 - 10*x + 25) - 49*x^2 + 5*
x^3 + 25))*(190*x - log(x^2)*(20*x - 4*x^2) - 192*x^2 + 30*x^3 + 100))/x,x
)
```

output
```
2*exp(5*x^3*exp(-4))*exp(-49*x^2*exp(-4))*exp(25*exp(-4))*exp(115*x*exp(-4
))*(x^2)^(exp(-4)*(x^2 - 10*x + 25))
```

3.1077 $\int \frac{e^{-1-x}x\left(150x-39x^2-36x^3-3x^4+e\left(500-500x-260x^2-20x^3\right)\right)}{\left(25+12x+x^2\right)\left(25x+12x^2+x^3\right)}\,dx$

3.1077.1 Optimal result

Integrand size = 69, antiderivative size = 31

$$\int \frac{e^{-1-x}x(150x-39x^2-36x^3-3x^4+e(500-500x-260x^2-20x^3))}{(25+12x+x^2)(25x+12x^2+x^3)}\,dx = \frac{e^{-x}\left(20+\frac{3x}{e}\right)}{4+\frac{-2x+(5+x)^2}{x}}$$

output
```
(3*x/exp(1)+20)/exp(ln(((5+x)^2-2*x)/x+4)+x)
```

3.1077.2 Mathematica [A] (verified)

Time = 3.60 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{e^{-1-x}x(150x-39x^2-36x^3-3x^4+e(500-500x-260x^2-20x^3))}{(25+12x+x^2)(25x+12x^2+x^3)}\,dx = \frac{e^{-1-x}x(20e+3x)}{25+12x+x^2}$$

input
```
Integrate[(E^(-1 - x)*x*(150*x - 39*x^2 - 36*x^3 - 3*x^4 + E*(500 - 500*x
- 260*x^2 - 20*x^3)))/((25 + 12*x + x^2)*(25*x + 12*x^2 + x^3)),x]
```

output
```
(E^(-1 - x)*x*(20*E + 3*x))/(25 + 12*x + x^2)
```

3.1077.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 1.61 (sec) , antiderivative size = 510, normalized size of antiderivative = 16.45, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.058, Rules used = {9, 7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x-1}x\left(-3x^4-36x^3-39x^2+e\left(-20x^3-260x^2-500x+500\right)+150x\right)}{\left(x^2+12x+25\right)\left(x^3+12x^2+25x\right)}dx$$

$$\Big\downarrow \; 9$$

$$\int \frac{e^{-x-1}\left(-3x^4-36x^3-39x^2+20e\left(-x^3-13x^2-25x+25\right)+150x\right)}{\left(x^2+12x+25\right)^2}dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{e^{-x-1}\left(-3x^4-4(9+5e)x^3-13(3+20e)x^2+50(3-10e)x+500e\right)}{\left(x^2+12x+25\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{2e^{-x-1}(-3(47-40e)x-50(9-10e))}{\left(x^2+12x+25\right)^2}+\frac{e^{-x-1}(4(9-5e)x-20e+111)}{x^2+12x+25}-3e^{-x-1}\right)dx$$

$$\Big\downarrow \; 2009$$

$$-\frac{25(9-10e)e^{5+\sqrt{11}}\,\text{ExpIntegralEi}\left(-x-\sqrt{11}-6\right)}{11\sqrt{11}}+\frac{25}{11}(9-10e)e^{5+\sqrt{11}}\,\text{ExpIntegralEi}\left(-x-\sqrt{11}-6\right)-\frac{3}{22}\left(6+\sqrt{11}\right)(47-40e)e^{5+\sqrt{11}}\,\text{ExpIntegralEi}\left(-x-\sqrt{11}-6\right)+\frac{9(47-40e)e^{5+\sqrt{11}}\,\text{ExpIntegralEi}\left(-x-\sqrt{11}-6\right)}{11\sqrt{11}}+\frac{1}{22}\left(5\sqrt{11}(21-20e)+44(9-5e)\right)e^{5+\sqrt{11}}\,\text{ExpIntegralEi}\left(-x-\sqrt{11}-6\right)+\frac{25(9-10e)e^{5-\sqrt{11}}\,\text{ExpIntegralEi}\left(-x+\sqrt{11}-6\right)}{11\sqrt{11}}+\frac{25}{11}(9-10e)e^{5-\sqrt{11}}\,\text{ExpIntegralEi}\left(-x+\sqrt{11}-6\right)-\frac{3}{22}\left(6-\sqrt{11}\right)(47-40e)e^{5-\sqrt{11}}\,\text{ExpIntegralEi}\left(-x+\sqrt{11}-6\right)-\frac{9(47-40e)e^{5-\sqrt{11}}\,\text{ExpIntegralEi}\left(-x+\sqrt{11}-6\right)}{11\sqrt{11}}-\frac{1}{22}\left(5\sqrt{11}(21-20e)-44(9-5e)\right)e^{5-\sqrt{11}}\,\text{ExpIntegralEi}\left(-x+\sqrt{11}-6\right)+3e^{-x-1}+\frac{25(9-10e)e^{-x-1}}{11\left(x-\sqrt{11}+6\right)}-\frac{3(6-\sqrt{11})\,(47-40e)e^{-x-1}}{22\left(x-\sqrt{11}+6\right)}+\frac{25(9-10e)e^{-x-1}}{11\left(x+\sqrt{11}+6\right)}-\frac{3(6+\sqrt{11})\,(47-40e)e^{-x-1}}{22\left(x+\sqrt{11}+6\right)}$$

input
```
Int[(E^(-1 - x)*x*(150*x - 39*x^2 - 36*x^3 - 3*x^4 + E*(500 - 500*x - 260*
x^2 - 20*x^3)))/((25 + 12*x + x^2)*(25*x + 12*x^2 + x^3)),x]
```

output
```
3*E^(-1 - x) - (3*(6 - Sqrt[11])*(47 - 40*E)*E^(-1 - x))/(22*(6 - Sqrt[11]
 + x)) + (25*(9 - 10*E)*E^(-1 - x))/(11*(6 - Sqrt[11] + x)) - (3*(6 + Sqrt
[11])*(47 - 40*E)*E^(-1 - x))/(22*(6 + Sqrt[11] + x)) + (25*(9 - 10*E)*E^(
-1 - x))/(11*(6 + Sqrt[11] + x)) + ((5*Sqrt[11]*(21 - 20*E) + 44*(9 - 5*E)
)*E^(5 + Sqrt[11])*ExpIntegralEi[-6 - Sqrt[11] - x])/22 + (9*(47 - 40*E)*E
^(5 + Sqrt[11])*ExpIntegralEi[-6 - Sqrt[11] - x])/(11*Sqrt[11]) - (3*(6 +
Sqrt[11])*(47 - 40*E)*E^(5 + Sqrt[11])*ExpIntegralEi[-6 - Sqrt[11] - x])/2
2 + (25*(9 - 10*E)*E^(5 + Sqrt[11])*ExpIntegralEi[-6 - Sqrt[11] - x])/11 -
 (25*(9 - 10*E)*E^(5 + Sqrt[11])*ExpIntegralEi[-6 - Sqrt[11] - x])/(11*Sqr
t[11]) - ((5*Sqrt[11]*(21 - 20*E) - 44*(9 - 5*E))*E^(5 - Sqrt[11])*ExpInte
gralEi[-6 + Sqrt[11] - x])/22 - (9*(47 - 40*E)*E^(5 - Sqrt[11])*ExpIntegra
lEi[-6 + Sqrt[11] - x])/(11*Sqrt[11]) - (3*(6 - Sqrt[11])*(47 - 40*E)*E^(5
 - Sqrt[11])*ExpIntegralEi[-6 + Sqrt[11] - x])/22 + (25*(9 - 10*E)*E^(5 -
Sqrt[11])*ExpIntegralEi[-6 + Sqrt[11] - x])/11 + (25*(9 - 10*E)*E^(5 - Sqr
t[11])*ExpIntegralEi[-6 + Sqrt[11] - x])/(11*Sqrt[11])
```

3.1077. $\int \frac{e^{-1-x}x\left(150x-39x^2-36x^3-3x^4+e\left(500-500x-260x^2-20x^3\right)\right)}{\left(25+12x+x^2\right)\left(25x+12x^2+x^3\right)}\,dx$

3.1077.3.1 Defintions of rubi rules used

rule 9
```
Int[(u_.)*(Px_)^(p_.)*((e_.)*(x_))^(m_.), x_Symbol] :> With[{r = Expon[Px,
x, Min]}, Simp[1/e^(p*r)   Int[u*(e*x)^(m + p*r)*ExpandToSum[Px/x^r, x]^p,
x], x] /; IGtQ[r, 0]] /; FreeQ[{e, m}, x] && PolyQ[Px, x] && IntegerQ[p] &&
  !MonomialQ[Px, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1077.4 Maple [A] (verified)

Time = 1.45 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

method	result
risch	$\frac{x(20\,\mathrm{e}+3x)\mathrm{e}^{-1-x}}{x^2+12x+25}$
norman	$\frac{(3\,\mathrm{e}^{-1}x+20)\,x\,\mathrm{e}^{-x}}{x^2+12x+25}$
gosper	$\frac{(20\,\mathrm{e}+3x)x\,\mathrm{e}^{-x}\mathrm{e}^{-1}}{x^2+12x+25}$
parallelrisch	$\frac{(20\,\mathrm{e}+3x)x\,\mathrm{e}^{-x}\mathrm{e}^{-1}}{x^2+12x+25}$
default	$\mathrm{e}^{-1}\left(-\frac{75\,\mathrm{e}^{-x}(-6x-25)}{11(x^2+12x+25)}-\frac{39\,\mathrm{e}^{-x}(-47x-150)}{22(x^2+12x+25)}+\frac{18\,\mathrm{e}^{-x}(-414x-1175)}{11(x^2+12x+25)}+3\,\mathrm{e}^{-x}-\frac{3\,\mathrm{e}^{-x}(-3793x-10350)}{22(x^2+12x+25)}+500\right.$

input
```
int(((-20*x^3-260*x^2-500*x+500)*exp(1)-3*x^4-36*x^3-39*x^2+150*x)/(x^3+12
*x^2+25*x)/exp(1)/exp(ln((x^2+12*x+25)/x)+x),x,method=_RETURNVERBOSE)
```

output
```
x/(x^2+12*x+25)*(20*exp(1)+3*x)*exp(-1-x)
```

3.1077.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.97

$$\int \frac{e^{-1-x}x(150x-39x^2-36x^3-3x^4+e(500-500x-260x^2-20x^3))}{(25+12x+x^2)(25x+12x^2+x^3)}\,dx$$
$$=(3\,x+20\,e)e^{\left(-x-\log\left(\frac{x^2+12\,x+25}{x}\right)-1\right)}$$

input
```
integrate(((-20*x^3-260*x^2-500*x+500)*exp(1)-3*x^4-36*x^3-39*x^2+150*x)/(
x^3+12*x^2+25*x)/exp(1)/exp(log((x^2+12*x+25)/x)+x),x, algorithm=\
```

output
```
(3*x + 20*e)*e^(-x - log((x^2 + 12*x + 25)/x) - 1)
```

3.1077.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{e^{-1-x}x(150x-39x^2-36x^3-3x^4+e(500-500x-260x^2-20x^3))}{(25+12x+x^2)(25x+12x^2+x^3)}\,dx$$
$$=\frac{(3x^2+20ex)\,e^{-x}}{ex^2+12ex+25e}$$

input
```
integrate(((-20*x**3-260*x**2-500*x+500)*exp(1)-3*x**4-36*x**3-39*x**2+150
*x)/(x**3+12*x**2+25*x)/exp(1)/exp(ln((x**2+12*x+25)/x)+x),x)
```

output
```
(3*x**2 + 20*E*x)*exp(-x)/(E*x**2 + 12*E*x + 25*E)
```

3.1077.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{e^{-1-x}x(150x-39x^2-36x^3-3x^4+e(500-500x-260x^2-20x^3))}{(25+12x+x^2)(25x+12x^2+x^3)}\,dx=\frac{(3\,x^2+20\,xe)e^{(-x)}}{x^2e+12\,xe+25\,e}$$

input
```
integrate(((-20*x^3-260*x^2-500*x+500)*exp(1)-3*x^4-36*x^3-39*x^2+150*x)/(
x^3+12*x^2+25*x)/exp(1)/exp(log((x^2+12*x+25)/x)+x),x, algorithm=\
```

output
```
(3*x^2 + 20*x*e)*e^(-x)/(x^2*e + 12*x*e + 25*e)
```

3.1077.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.23

$$\int \frac{e^{-1-x}x(150x-39x^2-36x^3-3x^4+e(500-500x-260x^2-20x^3))}{(25+12x+x^2)(25x+12x^2+x^3)}\,dx = \frac{3\,x^2e^{(-x)}+20\,xe^{(-x+1)}}{x^2e+12\,xe+25\,e}$$

input
```
integrate((((-20*x^3-260*x^2-500*x+500)*exp(1)-3*x^4-36*x^3-39*x^2+150*x)/(
x^3+12*x^2+25*x)/exp(1)/exp(log((x^2+12*x+25)/x)+x),x, algorithm=\
```

output
```
(3*x^2*e^(-x) + 20*x*e^(-x + 1))/(x^2*e + 12*x*e + 25*e)
```

3.1077.9 Mupad [B] (verification not implemented)

Time = 16.73 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{e^{-1-x}x(150x-39x^2-36x^3-3x^4+e(500-500x-260x^2-20x^3))}{(25+12x+x^2)(25x+12x^2+x^3)}\,dx = \frac{x\,\mathrm{e}^{-x}\,\mathrm{e}^{-1}\,(3\,x+20\,\mathrm{e})}{x^2+12\,x+25}$$

input
```
int(-(exp(-1)*exp(- x - log((12*x + x^2 + 25)/x))*(exp(1)*(500*x + 260*x^2
 + 20*x^3 - 500) - 150*x + 39*x^2 + 36*x^3 + 3*x^4))/(25*x + 12*x^2 + x^3)
,x)
```

output
```
(x*exp(-x)*exp(-1)*(3*x + 20*exp(1)))/(12*x + x^2 + 25)
```

3.1078 $\int \frac{-1+\log(3x)}{x\log(3x)}\,dx$

3.1078.1 Optimal result

Integrand size = 16, antiderivative size = 9

$$\int \frac{-1+\log(3x)}{x\log(3x)}\,dx = \log\left(\frac{x}{\log(3x)}\right)$$

output
```
ln(x/ln(3*x))
```

3.1078.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.11

$$\int \frac{-1+\log(3x)}{x\log(3x)}\,dx = \log(x)-\log(\log(3x))$$

input
```
Integrate[(-1 + Log[3*x])/(x*Log[3*x]),x]
```

output
```
Log[x] - Log[Log[3*x]]
```

3.1078.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.33, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {2812, 25, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(3x)-1}{x\log(3x)}dx$$
$$\Big\downarrow \text{2812}$$
$$\int -\frac{1-\log(3x)}{\log(3x)}d\log(3x)$$
$$\Big\downarrow \text{25}$$
$$-\int \frac{1-\log(3x)}{\log(3x)}d\log(3x)$$
$$\Big\downarrow \text{49}$$
$$-\int \left(\frac{1}{\log(3x)}-1\right)d\log(3x)$$
$$\Big\downarrow \text{2009}$$
$$\log(3x)-\log(\log(3x))$$

input
```
Int[(-1 + Log[3*x])/(x*Log[3*x]),x]
```

output
```
Log[3*x] - Log[Log[3*x]]
```

3.1078.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2812
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.) + Log[(c_.)*(x_)^(n
_.)]*(e_.))^(q_.))/(x_), x_Symbol] :> Simp[1/n   Subst[Int[(a + b*x)^p*(d +
 e*x)^q, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x]
```

3.1078.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.22

method	result	size
risch	$\ln(x) - \ln(\ln(3x))$	11
parts	$\ln(x) - \ln(\ln(3x))$	11
derivativedivides	$\ln(3x) - \ln(\ln(3x))$	13
default	$\ln(3x) - \ln(\ln(3x))$	13
norman	$\ln(3x) - \ln(\ln(3x))$	13
parallelrisch	$\ln(3x) - \ln(\ln(3x))$	13

input
```
int((ln(3*x)-1)/x/ln(3*x),x,method=_RETURNVERBOSE)
```

output
```
ln(x)-ln(ln(3*x))
```

3.1078.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.33

$$\int \frac{-1+\log(3x)}{x\log(3x)}\,dx = \log(3\,x) - \log(\log(3\,x))$$

input
```
integrate((log(3*x)-1)/x/log(3*x),x, algorithm=\
```

output
```
log(3*x) - log(log(3*x))
```

3.1078.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.89

$$\int \frac{-1+\log(3x)}{x\log(3x)}\,dx = \log{(x)} - \log{(\log{(3x)})}$$

input
```
integrate((ln(3*x)-1)/x/ln(3*x),x)
```

output
```
log(x) - log(log(3*x))
```

3.1078.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.33

$$\int \frac{-1+\log(3x)}{x\log(3x)}\,dx = \log{(3\,x)} - \log{(\log{(3\,x)})}$$

input
```
integrate((log(3*x)-1)/x/log(3*x),x, algorithm=\
```

output
```
log(3*x) - log(log(3*x))
```

3.1078.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.11

$$\int \frac{-1+\log(3x)}{x\log(3x)}\,dx = \log{(x)} - \log{(\log{(3\,x)})}$$

input
```
integrate((log(3*x)-1)/x/log(3*x),x, algorithm=\
```

output
```
log(x) - log(log(3*x))
```

3.1078.9 Mupad [B] (verification not implemented)

Time = 16.72 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.11

$$\int \frac{-1+\log(3x)}{x\log(3x)}\,dx=\ln\left(x\right)-\ln\left(\ln\left(3\,x\right)\right)$$

input
```
int((log(3*x) - 1)/(x*log(3*x)),x)
```

output
```
log(x) - log(log(3*x))
```

3.1079 $\int \frac{}{-1594323x^4+2657205x^5-1771470x^6+590490x^7-98415x^8+6561x^9}$

3.1079.1 Optimal result

Integrand size = 340, antiderivative size = 24

$$\int \frac{}{-1594323x^4+2657205x^5-1771470x^6+590490x^7-98415x^8+6561x^9+(-1594323x^3+2657205x^4-}$$
$$= \frac{(-2+8x)^2}{6561x^2(-3+x+\log(x+\log(x)))^4}$$

output
```
1/81*(8*x-2)^2/x^2/(x+ln(x+ln(x))-3)^2/(9*x+9*ln(x+ln(x))-27)^2
```

3.1079.2 Mathematica [A] (verified)

Time = 5.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{}{-1594323x^4+2657205x^5-1771470x^6+590490x^7-98415x^8+6561x^9+(-1594323x^3+2657205x^4-}$$
$$= \frac{4(-1+4x)^2}{6561x^2(-3+x+\log(x+\log(x)))^4}$$

input
```
Integrate[(-16 + 136*x - 248*x^2 - 96*x^3 - 256*x^4 + (24 - 120*x + 160*x^
2 - 256*x^3)*Log[x] + (-8*x + 32*x^2 + (-8 + 32*x)*Log[x])*Log[x + Log[x]]
)/(-1594323*x^4 + 2657205*x^5 - 1771470*x^6 + 590490*x^7 - 98415*x^8 + 656
1*x^9 + (-1594323*x^3 + 2657205*x^4 - 1771470*x^5 + 590490*x^6 - 98415*x^7
 + 6561*x^8)*Log[x] + (2657205*x^4 - 3542940*x^5 + 1771470*x^6 - 393660*x^
7 + 32805*x^8 + (2657205*x^3 - 3542940*x^4 + 1771470*x^5 - 393660*x^6 + 32
805*x^7)*Log[x])*Log[x + Log[x]] + (-1771470*x^4 + 1771470*x^5 - 590490*x^
6 + 65610*x^7 + (-1771470*x^3 + 1771470*x^4 - 590490*x^5 + 65610*x^6)*Log[
x])*Log[x + Log[x]]^2 + (590490*x^4 - 393660*x^5 + 65610*x^6 + (590490*x^3
 - 393660*x^4 + 65610*x^5)*Log[x])*Log[x + Log[x]]^3 + (-98415*x^4 + 32805
*x^5 + (-98415*x^3 + 32805*x^4)*Log[x])*Log[x + Log[x]]^4 + (6561*x^4 + 65
61*x^3*Log[x])*Log[x + Log[x]]^5),x]
```

output
```
(4*(-1 + 4*x)^2)/(6561*x^2*(-3 + x + Log[x + Log[x]])^4)
```

3.1079.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{}{6561x^9-98415x^8+590490x^7-1771470x^6+2657205x^5-1594323x^4+\left(6561x^4+6561x^3\log(x)\right)\log^5(x+\log(x))}$$

$\Big\downarrow$ 7239

$$\int \frac{8(1-4x)\left(-8x^3-5x^2-\log(x)\left(8x^2-3x-\log(x+\log(x))+3\right)-9x+x\log(x+\log(x))+2\right)}{6561x^3(x+\log(x))(-x-\log(x+\log(x))+3)^5}dx$$

$\Big\downarrow$ 27

$$\frac{8\int \frac{(1-4x)\left(-8x^3-5x^2+\log(x+\log(x))x-9x-\log(x)\left(8x^2-3x-\log(x+\log(x))+3\right)+2\right)}{x^3(x+\log(x))(-x-\log(x+\log(x))+3)^5}dx}{6561}$$

$\Big\downarrow$ 7293

$$\frac{8\int \left(\frac{4x-1}{x^3(x+\log(x+\log(x))-3)^4}-\frac{2(4x-1)^2\left(x^2+\log(x)x+x+1\right)}{x^3(x+\log(x))(x+\log(x+\log(x))-3)^5}\right)dx}{6561}$$

$\Big\downarrow$ 2009

$$\frac{8\left(-2\int \frac{1}{x^3(x+\log(x))(x+\log(x+\log(x))-3)^5}dx-\int \frac{1}{x^3(x+\log(x+\log(x))-3)^4}dx+14\int \frac{1}{x^2(x+\log(x))(x+\log(x+\log(x))-3)^5}dx-2\int\right.}{}$$

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$$\int \frac{}{-1594323x^4+2657205x^5-1771470x^6+590490x^7-98415x^8+6561x^9+\left(-1594323x^3+2657205x^4-1771470x^5+590490x^6-98415x^7+6561x^8\right)\log(}$$

input
```
Int[(-16 + 136*x - 248*x^2 - 96*x^3 - 256*x^4 + (24 - 120*x + 160*x^2 - 25
6*x^3)*Log[x] + (-8*x + 32*x^2 + (-8 + 32*x)*Log[x])*Log[x + Log[x]])/(-15
94323*x^4 + 2657205*x^5 - 1771470*x^6 + 590490*x^7 - 98415*x^8 + 6561*x^9
+ (-1594323*x^3 + 2657205*x^4 - 1771470*x^5 + 590490*x^6 - 98415*x^7 + 656
1*x^8)*Log[x] + (2657205*x^4 - 3542940*x^5 + 1771470*x^6 - 393660*x^7 + 32
805*x^8 + (2657205*x^3 - 3542940*x^4 + 1771470*x^5 - 393660*x^6 + 32805*x^
7)*Log[x])*Log[x + Log[x]] + (-1771470*x^4 + 1771470*x^5 - 590490*x^6 + 65
610*x^7 + (-1771470*x^3 + 1771470*x^4 - 590490*x^5 + 65610*x^6)*Log[x])*Lo
g[x + Log[x]]^2 + (590490*x^4 - 393660*x^5 + 65610*x^6 + (590490*x^3 - 393
660*x^4 + 65610*x^5)*Log[x])*Log[x + Log[x]]^3 + (-98415*x^4 + 32805*x^5 +
 (-98415*x^3 + 32805*x^4)*Log[x])*Log[x + Log[x]]^4 + (6561*x^4 + 6561*x^3
*Log[x])*Log[x + Log[x]]^5),x]
```

output
```
$Aborted
```

3.1079.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1079.4 Maple [A] (verified)

Time = 13.38 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

method	result
default	$\frac{\frac{64}{6561}x^2-\frac{32}{6561}x+\frac{4}{6561}}{x^2(x+\ln(x+\ln(x))-3)^4}$
risch	$\frac{\frac{64}{6561}x^2-\frac{32}{6561}x+\frac{4}{6561}}{x^2(x+\ln(x+\ln(x))-3)^4}$
parallelrisch	$\frac{512x^2-256x+32}{52488x^2\left(x^4+4\ln(x+\ln(x))x^3+6x^2\ln(x+\ln(x))^2+4\ln(x+\ln(x))^3x+\ln(x+\ln(x))^4-12x^3-36\ln(x+\ln(x))x^2-36x\ln(x+\ln(x)\right.}$

input
```
int((((32*x-8)*ln(x)+32*x^2-8*x)*ln(x+ln(x))+(-256*x^3+160*x^2-120*x+24)*l
n(x)-256*x^4-96*x^3-248*x^2+136*x-16)/((6561*x^3*ln(x)+6561*x^4)*ln(x+ln(x
))^5+((32805*x^4-98415*x^3)*ln(x)+32805*x^5-98415*x^4)*ln(x+ln(x))^4+((656
10*x^5-393660*x^4+590490*x^3)*ln(x)+65610*x^6-393660*x^5+590490*x^4)*ln(x+
ln(x))^3+((65610*x^6-590490*x^5+1771470*x^4-1771470*x^3)*ln(x)+65610*x^7-5
90490*x^6+1771470*x^5-1771470*x^4)*ln(x+ln(x))^2+((32805*x^7-393660*x^6+17
71470*x^5-3542940*x^4+2657205*x^3)*ln(x)+32805*x^8-393660*x^7+1771470*x^6-
3542940*x^5+2657205*x^4)*ln(x+ln(x))+(6561*x^8-98415*x^7+590490*x^6-177147
0*x^5+2657205*x^4-1594323*x^3)*ln(x)+6561*x^9-98415*x^8+590490*x^7-1771470
*x^6+2657205*x^5-1594323*x^4),x,method=_RETURNVERBOSE)
```

output
```
4/6561*(16*x^2-8*x+1)/x^2/(x+ln(x+ln(x))-3)^4
```

3.1079.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 116 vs. 2(22) = 44.

Time = 0.27 (sec) , antiderivative size = 116, normalized size of antiderivative = 4.83

$$\int \frac{}{-1594323x^4+2657205x^5-1771470x^6+590490x^7-98415x^8+6561x^9+(-1594323x^3+2657205x^4-}$$
$$=\frac{4\,(16\,x^2-8\,x+1)}{6561\,\left(x^6+x^2\log\left(x+\log\left(x\right)\right)^4-12\,x^5+54\,x^4+4\,(x^3-3\,x^2)\log\left(x+\log\left(x\right)\right)^3-108\,x^3+6\,(x^4-6\,x^3\right.}$$

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$$\int \frac{}{-1594323x^4+2657205x^5-1771470x^6+590490x^7-98415x^8+6561x^9+(-1594323x^3+2657205x^4-1771470x^5+590490x^6-98415x^7+6561x^8)\log(}$$

input
```
integrate((((32*x-8)*log(x)+32*x^2-8*x)*log(x+log(x))+(-256*x^3+160*x^2-12
0*x+24)*log(x)-256*x^4-96*x^3-248*x^2+136*x-16)/((6561*x^3*log(x)+6561*x^4
)*log(x+log(x))^5+((32805*x^4-98415*x^3)*log(x)+32805*x^5-98415*x^4)*log(x
+log(x))^4+((65610*x^5-393660*x^4+590490*x^3)*log(x)+65610*x^6-393660*x^5+
590490*x^4)*log(x+log(x))^3+((65610*x^6-590490*x^5+1771470*x^4-1771470*x^3
)*log(x)+65610*x^7-590490*x^6+1771470*x^5-1771470*x^4)*log(x+log(x))^2+((3
2805*x^7-393660*x^6+1771470*x^5-3542940*x^4+2657205*x^3)*log(x)+32805*x^8-
393660*x^7+1771470*x^6-3542940*x^5+2657205*x^4)*log(x+log(x))+(6561*x^8-98
415*x^7+590490*x^6-1771470*x^5+2657205*x^4-1594323*x^3)*log(x)+6561*x^9-98
415*x^8+590490*x^7-1771470*x^6+2657205*x^5-1594323*x^4),x, algorithm=\
```

output
```
4/6561*(16*x^2 - 8*x + 1)/(x^6 + x^2*log(x + log(x))^4 - 12*x^5 + 54*x^4 +
 4*(x^3 - 3*x^2)*log(x + log(x))^3 - 108*x^3 + 6*(x^4 - 6*x^3 + 9*x^2)*log
(x + log(x))^2 + 81*x^2 + 4*(x^5 - 9*x^4 + 27*x^3 - 27*x^2)*log(x + log(x)
))
```

3.1079.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 117 vs. $2(37) = 74$.

Time = 0.30 (sec) , antiderivative size = 117, normalized size of antiderivative = 4.88

$$\int \frac{}{-1594323x^4 + 2657205x^5 - 1771470x^6 + 590490x^7 - 98415x^8 + 6561x^9 + (-1594323x^3 + 2657205x^4 -}$$

$$= \frac{}{6561x^6 - 78732x^5 + 354294x^4 - 708588x^3 + 6561x^2\log\left(x + \log\left(x\right)\right)^4 + 531441x^2 + (26244x^3 - 78732x^2}$$

input
```
integrate((((32*x-8)*ln(x)+32*x**2-8*x)*ln(x+ln(x))+(-256*x**3+160*x**2-12
0*x+24)*ln(x)-256*x**4-96*x**3-248*x**2+136*x-16)/((6561*x**3*ln(x)+6561*x
**4)*ln(x+ln(x))**5+((32805*x**4-98415*x**3)*ln(x)+32805*x**5-98415*x**4)*
ln(x+ln(x))**4+((65610*x**5-393660*x**4+590490*x**3)*ln(x)+65610*x**6-3936
60*x**5+590490*x**4)*ln(x+ln(x))**3+((65610*x**6-590490*x**5+1771470*x**4-
1771470*x**3)*ln(x)+65610*x**7-590490*x**6+1771470*x**5-1771470*x**4)*ln(x
+ln(x))**2+((32805*x**7-393660*x**6+1771470*x**5-3542940*x**4+2657205*x**3
)*ln(x)+32805*x**8-393660*x**7+1771470*x**6-3542940*x**5+2657205*x**4)*ln(
x+ln(x))+(6561*x**8-98415*x**7+590490*x**6-1771470*x**5+2657205*x**4-15943
23*x**3)*ln(x)+6561*x**9-98415*x**8+590490*x**7-1771470*x**6+2657205*x**5-
1594323*x**4),x)
```

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$$\int \frac{}{-1594323x^4+2657205x^5-1771470x^6+590490x^7-98415x^8+6561x^9+(-1594323x^3+2657205x^4-1771470x^5+590490x^6-98415x^7+6561x^8)\log(}$$

output
```
(64*x**2 - 32*x + 4)/(6561*x**6 - 78732*x**5 + 354294*x**4 - 708588*x**3 +
 6561*x**2*log(x + log(x))**4 + 531441*x**2 + (26244*x**3 - 78732*x**2)*lo
g(x + log(x))**3 + (39366*x**4 - 236196*x**3 + 354294*x**2)*log(x + log(x)
)**2 + (26244*x**5 - 236196*x**4 + 708588*x**3 - 708588*x**2)*log(x + log(
x)))
```

3.1079.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 116 vs. 2(22) = 44.

Time = 0.42 (sec) , antiderivative size = 116, normalized size of antiderivative = 4.83

$$\int \frac{}{-1594323x^4 + 2657205x^5 - 1771470x^6 + 590490x^7 - 98415x^8 + 6561x^9 + (-1594323x^3 + 2657205x^4 -}$$

$$= \frac{4\,(16\,x^2 - 8\,x + 1)}{6561\,\left(x^6 + x^2\log\left(x + \log\left(x\right)\right)^4 - 12\,x^5 + 54\,x^4 + 4\,(x^3 - 3\,x^2)\log\left(x + \log\left(x\right)\right)^3 - 108\,x^3 + 6\,(x^4 - 6\,x^3 -}$$

input
```
integrate((((32*x-8)*log(x)+32*x^2-8*x)*log(x+log(x))+(-256*x^3+160*x^2-12
0*x+24)*log(x)-256*x^4-96*x^3-248*x^2+136*x-16)/((6561*x^3*log(x)+6561*x^4
)*log(x+log(x))^5+((32805*x^4-98415*x^3)*log(x)+32805*x^5-98415*x^4)*log(x
+log(x))^4+((65610*x^5-393660*x^4+590490*x^3)*log(x)+65610*x^6-393660*x^5+
590490*x^4)*log(x+log(x))^3+((65610*x^6-590490*x^5+1771470*x^4-1771470*x^3
)*log(x)+65610*x^7-590490*x^6+1771470*x^5-1771470*x^4)*log(x+log(x))^2+((3
2805*x^7-393660*x^6+1771470*x^5-3542940*x^4+2657205*x^3)*log(x)+32805*x^8-
393660*x^7+1771470*x^6-3542940*x^5+2657205*x^4)*log(x+log(x))+(6561*x^8-98
415*x^7+590490*x^6-1771470*x^5+2657205*x^4-1594323*x^3)*log(x)+6561*x^9-98
415*x^8+590490*x^7-1771470*x^6+2657205*x^5-1594323*x^4),x, algorithm=\
```

output
```
4/6561*(16*x^2 - 8*x + 1)/(x^6 + x^2*log(x + log(x))^4 - 12*x^5 + 54*x^4 +
 4*(x^3 - 3*x^2)*log(x + log(x))^3 - 108*x^3 + 6*(x^4 - 6*x^3 + 9*x^2)*log
(x + log(x))^2 + 81*x^2 + 4*(x^5 - 9*x^4 + 27*x^3 - 27*x^2)*log(x + log(x)
))
```

3.1079.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 432 vs. 2(22) = 44.

Time = 1.47 (sec) , antiderivative size = 432, normalized size of antiderivative = 18.00

$$\int \frac{}{-1594323x^4 + 2657205x^5 - 1771470x^6 + 590490x^7 - 98415x^8 + 6561x^9 + (-1594323x^3 + 2657205x^4 -}$$
= Too large to display

input
```
integrate((((32*x-8)*log(x)+32*x^2-8*x)*log(x+log(x))+(-256*x^3+160*x^2-12
0*x+24)*log(x)-256*x^4-96*x^3-248*x^2+136*x-16)/((6561*x^3*log(x)+6561*x^4
)*log(x+log(x))^5+((32805*x^4-98415*x^3)*log(x)+32805*x^5-98415*x^4)*log(x
+log(x))^4+((65610*x^5-393660*x^4+590490*x^3)*log(x)+65610*x^6-393660*x^5+
590490*x^4)*log(x+log(x))^3+((65610*x^6-590490*x^5+1771470*x^4-1771470*x^3
)*log(x)+65610*x^7-590490*x^6+1771470*x^5-1771470*x^4)*log(x+log(x))^2+((3
2805*x^7-393660*x^6+1771470*x^5-3542940*x^4+2657205*x^3)*log(x)+32805*x^8-
393660*x^7+1771470*x^6-3542940*x^5+2657205*x^4)*log(x+log(x))+(6561*x^8-98
415*x^7+590490*x^6-1771470*x^5+2657205*x^4-1594323*x^3)*log(x)+6561*x^9-98
415*x^8+590490*x^7-1771470*x^6+2657205*x^5-1594323*x^4),x, algorithm=\
```

output
```
4/6561*(16*x^4 + 16*x^3*log(x) + 8*x^3 - 8*x^2*log(x) + 9*x^2 + x*log(x) -
 7*x + 1)/(x^8 + 4*x^7*log(x + log(x)) + 6*x^6*log(x + log(x))^2 + 4*x^5*l
og(x + log(x))^3 + x^4*log(x + log(x))^4 + x^7*log(x) + 4*x^6*log(x + log(
x))*log(x) + 6*x^5*log(x + log(x))^2*log(x) + 4*x^4*log(x + log(x))^3*log(
x) + x^3*log(x + log(x))^4*log(x) - 11*x^7 - 32*x^6*log(x + log(x)) - 30*x
^5*log(x + log(x))^2 - 8*x^4*log(x + log(x))^3 + x^3*log(x + log(x))^4 - 1
2*x^6*log(x) - 36*x^5*log(x + log(x))*log(x) - 36*x^4*log(x + log(x))^2*lo
g(x) - 12*x^3*log(x + log(x))^3*log(x) + 43*x^6 + 76*x^5*log(x + log(x)) +
 24*x^4*log(x + log(x))^2 - 8*x^3*log(x + log(x))^3 + x^2*log(x + log(x))^
4 + 54*x^5*log(x) + 108*x^4*log(x + log(x))*log(x) + 54*x^3*log(x + log(x)
)^2*log(x) - 66*x^5 - 36*x^4*log(x + log(x)) + 18*x^3*log(x + log(x))^2 -
12*x^2*log(x + log(x))^3 - 108*x^4*log(x) - 108*x^3*log(x + log(x))*log(x)
 + 27*x^4 + 54*x^2*log(x + log(x))^2 + 81*x^3*log(x) - 27*x^3 - 108*x^2*lo
g(x + log(x)) + 81*x^2)
```

3.1079.9 Mupad [F(-1)]

Timed out.

$$\int \frac{}{-1594323x^4 + 2657205x^5 - 1771470x^6 + 590490x^7 - 98415x^8 + 6561x^9 + (-1594323x^3 + 2657205x^4 -}$$
$$= \int - \frac{}{\ln(x + \ln(x))^3 \left(\ln(x) \left(65610\,x^5 - 393660\,x^4 + 590490\,x^3\right) + 590490\,x^4 - 393660\,x^5 + 65610\,x^6\right) + \ln(}$$

input
```
int(-(248*x^2 - log(x + log(x))*(log(x)*(32*x - 8) - 8*x + 32*x^2) - 136*x
 + 96*x^3 + 256*x^4 + log(x)*(120*x - 160*x^2 + 256*x^3 - 24) + 16)/(log(x
 + log(x))^3*(log(x)*(590490*x^3 - 393660*x^4 + 65610*x^5) + 590490*x^4 -
393660*x^5 + 65610*x^6) + log(x + log(x))^5*(6561*x^3*log(x) + 6561*x^4) -
 log(x + log(x))^2*(log(x)*(1771470*x^3 - 1771470*x^4 + 590490*x^5 - 65610
*x^6) + 1771470*x^4 - 1771470*x^5 + 590490*x^6 - 65610*x^7) + log(x + log(
x))*(log(x)*(2657205*x^3 - 3542940*x^4 + 1771470*x^5 - 393660*x^6 + 32805*
x^7) + 2657205*x^4 - 3542940*x^5 + 1771470*x^6 - 393660*x^7 + 32805*x^8) -
 log(x + log(x))^4*(log(x)*(98415*x^3 - 32805*x^4) + 98415*x^4 - 32805*x^5
) - 1594323*x^4 + 2657205*x^5 - 1771470*x^6 + 590490*x^7 - 98415*x^8 + 656
1*x^9 - log(x)*(1594323*x^3 - 2657205*x^4 + 1771470*x^5 - 590490*x^6 + 984
15*x^7 - 6561*x^8)),x)
```

output
```
int(-(248*x^2 - log(x + log(x))*(log(x)*(32*x - 8) - 8*x + 32*x^2) - 136*x
 + 96*x^3 + 256*x^4 + log(x)*(120*x - 160*x^2 + 256*x^3 - 24) + 16)/(log(x
 + log(x))^3*(log(x)*(590490*x^3 - 393660*x^4 + 65610*x^5) + 590490*x^4 -
393660*x^5 + 65610*x^6) + log(x + log(x))^5*(6561*x^3*log(x) + 6561*x^4) -
 log(x + log(x))^2*(log(x)*(1771470*x^3 - 1771470*x^4 + 590490*x^5 - 65610
*x^6) + 1771470*x^4 - 1771470*x^5 + 590490*x^6 - 65610*x^7) + log(x + log(
x))*(log(x)*(2657205*x^3 - 3542940*x^4 + 1771470*x^5 - 393660*x^6 + 32805*
x^7) + 2657205*x^4 - 3542940*x^5 + 1771470*x^6 - 393660*x^7 + 32805*x^8) -
 log(x + log(x))^4*(log(x)*(98415*x^3 - 32805*x^4) + 98415*x^4 - 32805*x^5
) - 1594323*x^4 + 2657205*x^5 - 1771470*x^6 + 590490*x^7 - 98415*x^8 + 656
1*x^9 - log(x)*(1594323*x^3 - 2657205*x^4 + 1771470*x^5 - 590490*x^6 + 984
15*x^7 - 6561*x^8)), x)
```

3.1079.
$\int \frac{}{-1594323x^4+2657205x^5-1771470x^6+590490x^7-98415x^8+6561x^9+(-1594323x^3+2657205x^4-1771470x^5+590490x^6-98415x^7+6561x^8)\log(}$

3.1080 $\int \frac{-2+44x+2\log(x^2)}{-3x+11x^2+x\log(x^2)}\,dx$

3.1080.1 Optimal result

Integrand size = 29, antiderivative size = 21

$$\int \frac{-2+44x+2\log(x^2)}{-3x+11x^2+x\log(x^2)}\,dx = \log\left(\left(-4x^2+2x\left(-3+13x+\log\left(x^2\right)\right)\right)^2\right)$$

output
```
ln((2*(13*x-3+ln(x^2))*x-4*x^2)^2)
```

3.1080.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-2+44x+2\log(x^2)}{-3x+11x^2+x\log(x^2)}\,dx = 2\left(\log(x)+\log\left(3-11x-\log\left(x^2\right)\right)\right)$$

input
```
Integrate[(-2 + 44*x + 2*Log[x^2])/(-3*x + 11*x^2 + x*Log[x^2]),x]
```

output
```
2*(Log[x] + Log[3 - 11*x - Log[x^2]])
```

3.1080.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.034$, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2\log(x^2)+44x-2}{11x^2+x\log(x^2)-3x}\,dx$$

$$\Big\downarrow \text{7235}$$

$$2\log\left(-11x^2-x\log(x^2)+3x\right)$$

input
```
Int[(-2 + 44*x + 2*Log[x^2])/(-3*x + 11*x^2 + x*Log[x^2]),x]
```

output
```
2*Log[3*x - 11*x^2 - x*Log[x^2]]
```

3.1080.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.1080.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

method	result	size
norman	$\ln(x^2)+2\ln(11x-3+\ln(x^2))$	18
risch	$2\ln(x)+2\ln(11x-3+\ln(x^2))$	18
parallelrisch	$\ln(x^2)+2\ln\left(x-\frac{3}{11}+\frac{\ln(x^2)}{11}\right)$	18
default	$2\ln(x\ln(x^2)+11x^2-3x)$	19

input
```
int((2*ln(x^2)+44*x-2)/(x*ln(x^2)+11*x^2-3*x),x,method=_RETURNVERBOSE)
```

output
```
ln(x^2)+2*ln(11*x-3+ln(x^2))
```

3.1080.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-2+44x+2\log(x^2)}{-3x+11x^2+x\log(x^2)}\,dx = \log\left(x^2\right) + 2\,\log\left(11\,x + \log\left(x^2\right) - 3\right)$$

input
```
integrate((2*log(x^2)+44*x-2)/(x*log(x^2)+11*x^2-3*x),x, algorithm=\
```

output
```
log(x^2) + 2*log(11*x + log(x^2) - 3)
```

3.1080.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-2+44x+2\log(x^2)}{-3x+11x^2+x\log(x^2)}\,dx = 2\log(x) + 2\log\left(11x + \log\left(x^2\right) - 3\right)$$

input
```
integrate((2*ln(x**2)+44*x-2)/(x*ln(x**2)+11*x**2-3*x),x)
```

output
```
2*log(x) + 2*log(11*x + log(x**2) - 3)
```

3.1080.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{-2+44x+2\log(x^2)}{-3x+11x^2+x\log(x^2)}\,dx = 2\,\log\left(11\,x^2 + x\log\left(x^2\right) - 3\,x\right)$$

input
```
integrate((2*log(x^2)+44*x-2)/(x*log(x^2)+11*x^2-3*x),x, algorithm=\
```

output
```
2*log(11*x^2 + x*log(x^2) - 3*x)
```

3.1080.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-2+44x+2\log(x^2)}{-3x+11x^2+x\log(x^2)}\,dx = 2\,\log\left(11\,x+\log\left(x^2\right)-3\right)+2\,\log\left(x\right)$$

input
```
integrate((2*log(x^2)+44*x-2)/(x*log(x^2)+11*x^2-3*x),x, algorithm=\
```

output
```
2*log(11*x + log(x^2) - 3) + 2*log(x)
```

3.1080.9 Mupad [B] (verification not implemented)

Time = 17.42 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-2+44x+2\log(x^2)}{-3x+11x^2+x\log(x^2)}\,dx = \ln\left(x^2\right)+2\,\ln\left(11\,x+\ln\left(x^2\right)-3\right)$$

input
```
int((44*x + 2*log(x^2) - 2)/(x*log(x^2) - 3*x + 11*x^2),x)
```

output
```
log(x^2) + 2*log(11*x + log(x^2) - 3)
```

3.1081 $\int \frac{e^x(1-2x-4x^2)+e^x(-4-5x)\log(x)+(e^x(x^2+x^3)+e^x(x+x^2)\log(x)}{(x^2+x^3+(x+x^2)\log(x))\log^2\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}$

3.1081.1 Optimal result

Integrand size = 108, antiderivative size = 23

$$\int \frac{e^x(1-2x-4x^2)+e^x(-4-5x)\log(x)+(e^x(x^2+x^3)+e^x(x+x^2)\log(x))\log\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}{(x^2+x^3+(x+x^2)\log(x))\log^2\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}\,dx = \frac{e^x}{\log\left(\frac{10x^3(x+x^2)}{x+\log(x)}\right)}$$

output
```
exp(x)/ln(10*x^3*(x^2+x)/(x+ln(x)))
```

3.1081.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{e^x(1-2x-4x^2)+e^x(-4-5x)\log(x)+(e^x(x^2+x^3)+e^x(x+x^2)\log(x))\log\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}{(x^2+x^3+(x+x^2)\log(x))\log^2\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}\,dx = \frac{e^x}{\log\left(\frac{10x^4(1+x)}{x+\log(x)}\right)}$$

input
```
Integrate[(E^x*(1 - 2*x - 4*x^2) + E^x*(-4 - 5*x)*Log[x] + (E^x*(x^2 + x^3
) + E^x*(x + x^2)*Log[x])*Log[(10*x^4 + 10*x^5)/(x + Log[x])])/((x^2 + x^3
 + (x + x^2)*Log[x])*Log[(10*x^4 + 10*x^5)/(x + Log[x])]^2),x]
```

output
```
E^x/Log[(10*x^4*(1 + x))/(x + Log[x])]
```

3.1081.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(-4x^2-2x+1\right)+\left(e^x\left(x^2+x\right)\log(x)+e^x\left(x^3+x^2\right)\right)\log\left(\frac{10x^5+10x^4}{x+\log(x)}\right)+e^x(-5x-4)\log(x)}{\left(x^3+x^2+\left(x^2+x\right)\log(x)\right)\log^2\left(\frac{10x^5+10x^4}{x+\log(x)}\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^x\left(-4x^2-2x+1\right)+\left(e^x\left(x^2+x\right)\log(x)+e^x\left(x^3+x^2\right)\right)\log\left(\frac{10x^5+10x^4}{x+\log(x)}\right)+e^x(-5x-4)\log(x)}{x(x+1)(x+\log(x))\log^2\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^x\left(x\log(x)\log\left(\frac{10x^4(x+1)}{x+\log(x)}\right)-4x^2+x^3\log\left(\frac{10x^4(x+1)}{x+\log(x)}\right)+x^2\log(x)\log\left(\frac{10x^4(x+1)}{x+\log(x)}\right)+x^2\log\left(\frac{10x^4(x+1)}{x+\log(x)}\right)-2x\right.}{x(x+\log(x))\log^2\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{e^x\left(\log(x)\left((x+1)x\log\left(\frac{10x^4(x+1)}{x+\log(x)}\right)-5x-4\right)-4x^2+(x+1)x^2\log\left(\frac{10x^4(x+1)}{x+\log(x)}\right)-2x+1\right)}{x(x+1)(x+\log(x))\log^2\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^x}{\log\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}+\frac{e^x\left(-4x^2-2x-5x\log(x)-4\log(x)+1\right)}{x(x+1)(x+\log(x))\log^2\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-4\int \frac{e^x}{(x+\log(x))\log^2\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}dx+\int \frac{e^x}{x(x+\log(x))\log^2\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}dx+\int \frac{e^x}{(x+1)(x+\log(x))\log^2\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}dx-4\int \frac{e^x\log(x)}{x(x+\log(x))\log^2\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}dx-\int \frac{e^x\log(x)}{(x+1)(x+\log(x))\log^2\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}dx+\int \frac{e^x}{\log\left(\frac{10x^4(x+1)}{x+\log(x)}\right)}dx$$

input
```
Int[(E^x*(1 - 2*x - 4*x^2) + E^x*(-4 - 5*x)*Log[x] + (E^x*(x^2 + x^3) + E^
x*(x + x^2)*Log[x])*Log[(10*x^4 + 10*x^5)/(x + Log[x])])/((x^2 + x^3 + (x
+ x^2)*Log[x])*Log[(10*x^4 + 10*x^5)/(x + Log[x])]^2),x]
```

output
```
$Aborted
```

3.1081.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1081.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 51.94 (sec) , antiderivative size = 441, normalized size of antiderivative = 19.17

method	result
risch	$\frac{}{\pi \operatorname{csgn}(ix^3)\operatorname{csgn}(ix^4)\operatorname{csgn}(ix)+2i\ln(1+x)+2i\ln(2)+2i\ln(5)+\pi \operatorname{csgn}(ix^2)^3+\pi \operatorname{csgn}(ix^4)\operatorname{csgn}\left(\frac{i(1+x)}{x+\ln(x)}\right)\operatorname{csgn}\left(\frac{ix^4(1+x)}{x+\ln(x)}\right)+\pi \operatorname{csgn}\left(\right.}$

input
```
int((((x^2+x)*exp(x)*ln(x)+(x^3+x^2)*exp(x))*ln((10*x^5+10*x^4)/(x+ln(x)))
+(-5*x-4)*exp(x)*ln(x)+(-4*x^2-2*x+1)*exp(x))/((x^2+x)*ln(x)+x^3+x^2)/ln((
10*x^5+10*x^4)/(x+ln(x)))^2,x,method=_RETURNVERBOSE)
```

output
```
2*I*exp(x)/(Pi*csgn(I*x^3)*csgn(I*x^4)*csgn(I*x)+2*I*ln(1+x)+2*I*ln(2)+2*I
*ln(5)+Pi*csgn(I*x^2)^3+Pi*csgn(I*x^4)*csgn(I*(1+x)/(x+ln(x)))*csgn(I*x^4/
(x+ln(x))*(1+x))+Pi*csgn(I/(x+ln(x)))*csgn(I*(1+x)/(x+ln(x)))*csgn(I*(1+x)
)-Pi*csgn(I*x^3)*csgn(I*x^4)^2-Pi*csgn(I*x^4)^2*csgn(I*x)+8*I*ln(x)+Pi*csg
n(I*x)^2*csgn(I*x^2)-2*Pi*csgn(I*x)*csgn(I*x^2)^2+Pi*csgn(I*x^4)^3+Pi*csgn
(I*x^4/(x+ln(x))*(1+x))^3-Pi*csgn(I/(x+ln(x)))*csgn(I*(1+x)/(x+ln(x)))^2-P
i*csgn(I*(1+x)/(x+ln(x)))^2*csgn(I*(1+x))-Pi*csgn(I*x^4)*csgn(I*x^4/(x+ln(
x))*(1+x))^2-Pi*csgn(I*(1+x)/(x+ln(x)))*csgn(I*x^4/(x+ln(x))*(1+x))^2-Pi*c
sgn(I*x)*csgn(I*x^3)^2-Pi*csgn(I*x^2)*csgn(I*x^3)^2+Pi*csgn(I*(1+x)/(x+ln(
x)))^3+Pi*csgn(I*x)*csgn(I*x^2)*csgn(I*x^3)-2*I*ln(x+ln(x))+Pi*csgn(I*x^3)
^3)
```

3.1081.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{e^x(1-2x-4x^2)+e^x(-4-5x)\log(x)+(e^x(x^2+x^3)+e^x(x+x^2)\log(x))\log\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}{(x^2+x^3+(x+x^2)\log(x))\log^2\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}\,dx$$
$$=\frac{e^x}{\log\left(\frac{10(x^5+x^4)}{x+\log(x)}\right)}$$

input
```
integrate((((x^2+x)*exp(x)*log(x)+(x^3+x^2)*exp(x))*log((10*x^5+10*x^4)/(x
+log(x)))+(-5*x-4)*exp(x)*log(x)+(-4*x^2-2*x+1)*exp(x))/((x^2+x)*log(x)+x^
3+x^2)/log((10*x^5+10*x^4)/(x+log(x)))^2,x, algorithm=\
```

output
```
e^x/log(10*(x^5 + x^4)/(x + log(x)))
```

3.1081.6 Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{e^x(1-2x-4x^2)+e^x(-4-5x)\log(x)+(e^x(x^2+x^3)+e^x(x+x^2)\log(x))\log\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}{(x^2+x^3+(x+x^2)\log(x))\log^2\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}\,dx$$
$$=\frac{e^x}{\log\left(\frac{10x^5+10x^4}{x+\log(x)}\right)}$$

input
```
integrate((((x**2+x)*exp(x)*ln(x)+(x**3+x**2)*exp(x))*ln((10*x**5+10*x**4)
/(x+ln(x)))+(-5*x-4)*exp(x)*ln(x)+(-4*x**2-2*x+1)*exp(x))/((x**2+x)*ln(x)+
x**3+x**2)/ln((10*x**5+10*x**4)/(x+ln(x)))**2,x)
```

output
```
exp(x)/log((10*x**5 + 10*x**4)/(x + log(x)))
```

3.1081.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{e^x(1-2x-4x^2)+e^x(-4-5x)\log(x)+(e^x(x^2+x^3)+e^x(x+x^2)\log(x))\log\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}{(x^2+x^3+(x+x^2)\log(x))\log^2\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}\,dx$$
$$=\frac{e^x}{\log(5)+\log(2)-\log(x+\log(x))+\log(x+1)+4\log(x)}$$

input
```
integrate((((x^2+x)*exp(x)*log(x)+(x^3+x^2)*exp(x))*log((10*x^5+10*x^4)/(x
+log(x)))+(-5*x-4)*exp(x)*log(x)+(-4*x^2-2*x+1)*exp(x))/((x^2+x)*log(x)+x^
3+x^2)/log((10*x^5+10*x^4)/(x+log(x)))^2,x, algorithm=\
```

output
```
e^x/(log(5) + log(2) - log(x + log(x)) + log(x + 1) + 4*log(x))
```

3.1081.8 Giac [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{e^x(1-2x-4x^2)+e^x(-4-5x)\log(x)+(e^x(x^2+x^3)+e^x(x+x^2)\log(x))\log\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}{(x^2+x^3+(x+x^2)\log(x))\log^2\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}\,dx$$
$$=\frac{e^x}{\log(10x+10)-\log(x+\log(x))+4\log(x)}$$

input
```
integrate((((x^2+x)*exp(x)*log(x)+(x^3+x^2)*exp(x))*log((10*x^5+10*x^4)/(x
+log(x)))+(-5*x-4)*exp(x)*log(x)+(-4*x^2-2*x+1)*exp(x))/((x^2+x)*log(x)+x^
3+x^2)/log((10*x^5+10*x^4)/(x+log(x)))^2,x, algorithm=\
```

output
```
e^x/(log(10*x + 10) - log(x + log(x)) + 4*log(x))
```

3.1081.9 Mupad [B] (verification not implemented)

Time = 17.33 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{e^x(1-2x-4x^2)+e^x(-4-5x)\log(x)+(e^x(x^2+x^3)+e^x(x+x^2)\log(x))\log\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}{(x^2+x^3+(x+x^2)\log(x))\log^2\left(\frac{10x^4+10x^5}{x+\log(x)}\right)}\,dx$$
$$=\frac{e^x}{\ln\left(\frac{10x^5+10x^4}{x+\ln(x)}\right)}$$

input
```
int(-(exp(x)*(2*x + 4*x^2 - 1) - log((10*x^4 + 10*x^5)/(x + log(x)))*(exp(
x)*(x^2 + x^3) + exp(x)*log(x)*(x + x^2)) + exp(x)*log(x)*(5*x + 4))/(log(
(10*x^4 + 10*x^5)/(x + log(x)))^2*(x^2 + x^3 + log(x)*(x + x^2))),x)
```

output
```
exp(x)/log((10*x^4 + 10*x^5)/(x + log(x)))
```

3.1082 $\int \frac{e^{\frac{1}{25}\left(25x^2+10x\log\left(\log\left(x^2\right)\right)+\log^2\left(\log\left(x^2\right)\right)\right)}\left(60x+20x^2+\left(-25x+150x\right.\right.}{\left(225x+150x^2+2\right.}$

3.1082.1 Optimal result

Integrand size = 103, antiderivative size = 21

$$\int \frac{e^{\frac{1}{25}(25x^2+10x\log(\log(x^2))+\log^2(\log(x^2)))}(60x+20x^2+(-25x+150x^2+50x^3)\log(x^2)+(12+4x+(30x+10\ldots}{(225x+150x^2+25x^3)\log(x^2)}$$

$$=\frac{e^{\left(x+\frac{1}{5}\log(\log(x^2))\right)^2}}{3+x}$$

output
```
exp((x+1/5*ln(ln(x^2)))^2)/(3+x)
```

3.1082.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.57

$$\int \frac{e^{\frac{1}{25}(25x^2+10x\log(\log(x^2))+\log^2(\log(x^2)))}(60x+20x^2+(-25x+150x^2+50x^3)\log(x^2)+(12+4x+(30x+10\ldots}{(225x+150x^2+25x^3)\log(x^2)}$$

$$=\frac{e^{x^2+\frac{1}{25}\log^2(\log(x^2))}\log^{\frac{2x}{5}}(x^2)}{3+x}$$

input
```
Integrate[(E^((25*x^2 + 10*x*Log[Log[x^2]] + Log[Log[x^2]]^2)/25)*(60*x +
20*x^2 + (-25*x + 150*x^2 + 50*x^3)*Log[x^2] + (12 + 4*x + (30*x + 10*x^2)
*Log[x^2])*Log[Log[x^2]]))/((225*x + 150*x^2 + 25*x^3)*Log[x^2]),x]
```

output
```
(E^(x^2 + Log[Log[x^2]]^2/25)*Log[x^2]^((2*x)/5))/(3 + x)
```

3.1082.
$\int \frac{e^{\frac{1}{25}\left(25x^2+10x\log\left(\log\left(x^2\right)\right)+\log^2\left(\log\left(x^2\right)\right)\right)}\left(60x+20x^2+(-25x+150x^2+50x^3)\log(x^2)+(12+4x+(30x+10x^2)\log(x^2))\log(\log(x^2))\right)}{(225x+150x^2+25x^3)\log(x^2)}\,dx$

3.1082.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(20x^2+\left(\left(10x^2+30x\right)\log\left(x^2\right)+4x+12\right)\log\left(\log\left(x^2\right)\right)+\left(50x^3+150x^2-25x\right)\log\left(x^2\right)+60x\right)\exp\left(\frac{1}{25}\left(25x\right.\right.}{\left(25x^3+150x^2+225x\right)\log\left(x^2\right)}$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{\left(20x^2+\left(\left(10x^2+30x\right)\log\left(x^2\right)+4x+12\right)\log\left(\log\left(x^2\right)\right)+\left(50x^3+150x^2-25x\right)\log\left(x^2\right)+60x\right)\exp\left(\frac{1}{25}\left(25x\right.\right.}{x\left(25x^2+150x+225\right)\log\left(x^2\right)}$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{\left(20x^2+\left(\left(10x^2+30x\right)\log\left(x^2\right)+4x+12\right)\log\left(\log\left(x^2\right)\right)+\left(50x^3+150x^2-25x\right)\log\left(x^2\right)+60x\right)\exp\left(\frac{1}{25}\left(25x\right.\right.}{x(5x+15)^2\log\left(x^2\right)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{\frac{1}{25}\left(\log\left(\log\left(x^2\right)\right)+5x\right)^2}\left(20x^2+\left(\left(10x^2+30x\right)\log\left(x^2\right)+4x+12\right)\log\left(\log\left(x^2\right)\right)+\left(50x^3+150x^2-25x\right)\log\left(x^2\right)\right.}{x(5x+15)^2\log\left(x^2\right)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{e^{\frac{1}{25}\left(\log\left(\log\left(x^2\right)\right)+5x\right)^2}\left(10x^2\log\left(x^2\right)+30x\log\left(x^2\right)-5\log\left(x^2\right)+4x+12\right)}{5(x+3)^2\log\left(x^2\right)}+\frac{2e^{\frac{1}{25}\left(\log\left(\log\left(x^2\right)\right)+5x\right)^2}\left(5x\log\left(x^2\right)\right.}{25x(x+3)\log\left(x\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$2\int e^{\frac{1}{25}\left(5x+\log\left(\log\left(x^2\right)\right)\right)^2}dx-\int \frac{e^{\frac{1}{25}\left(5x+\log\left(\log\left(x^2\right)\right)\right)^2}}{(x+3)^2}dx-6\int \frac{e^{\frac{1}{25}\left(5x+\log\left(\log\left(x^2\right)\right)\right)^2}}{x+3}dx+\frac{4}{5}\int \frac{e^{\frac{1}{25}\left(5x+\log\left(\log\left(x^2\right)\right)\right)^2}}{(x+3)\log\left(x^2\right)}dx+\frac{2}{5}\int \frac{e^{\frac{1}{25}\left(5x+\log\left(\log\left(x^2\right)\right)\right)^2}\log\left(\log\left(x^2\right)\right)}{x+3}dx+\frac{4}{75}\int \frac{e^{\frac{1}{25}\left(5x+\log\left(\log\left(x^2\right)\right)\right)^2}\log\left(\log\left(x^2\right)\right)}{x\log\left(x^2\right)}dx-\frac{4}{75}\int \frac{e^{\frac{1}{25}\left(5x+\log\left(\log\left(x^2\right)\right)\right)^2}\log\left(\log\left(x^2\right)\right)}{(x+3)\log\left(x^2\right)}dx$$

input
```
Int[(E^((25*x^2 + 10*x*Log[Log[x^2]] + Log[Log[x^2]]^2)/25)*(60*x + 20*x^2
 + (-25*x + 150*x^2 + 50*x^3)*Log[x^2] + (12 + 4*x + (30*x + 10*x^2)*Log[x
^2])*Log[Log[x^2]]))/((225*x + 150*x^2 + 25*x^3)*Log[x^2]),x]
```

output
```
$Aborted
```

3.1082.

$$\int \frac{e^{\frac{1}{25}\left(25x^2+10x\log\left(\log\left(x^2\right)\right)+\log^2\left(\log\left(x^2\right)\right)\right)}\left(60x+20x^2+\left(-25x+150x^2+50x^3\right)\log\left(x^2\right)+\left(12+4x+\left(30x+10x^2\right)\log\left(x^2\right)\right)\log\left(\log\left(x^2\right)\right)\right)}{\left(225x+150x^2+25x^3\right)\log\left(x^2\right)}dx$$

3.1082.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1082.4 Maple [A] (verified)

Time = 1.13 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.38

method	result	size
parallelrisch	$\frac{e^{\frac{\ln\left(\ln\left(x^2\right)\right)^2}{25}+\frac{2x\ln\left(\ln\left(x^2\right)\right)}{5}+x^2}}{3+x}$	29

input
```
int((((10*x^2+30*x)*ln(x^2)+4*x+12)*ln(ln(x^2))+(50*x^3+150*x^2-25*x)*ln(x
^2)+20*x^2+60*x)*exp(1/25*ln(ln(x^2))^2+2/5*x*ln(ln(x^2))+x^2)/(25*x^3+150
*x^2+225*x)/ln(x^2),x,method=_RETURNVERBOSE)
```

output
```
exp(1/25*ln(ln(x^2))^2+2/5*x*ln(ln(x^2))+x^2)/(3+x)
```

3.1082.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33

$$\int \frac{e^{\frac{1}{25}(25x^2+10x\log(\log(x^2))+\log^2(\log(x^2)))}(60x+20x^2+(-25x+150x^2+50x^3)\log(x^2)+(12+4x+(30x+10x^2)\log(x^2))\log(\log(x^2)))}{(225x+150x^2+25x^3)\log(x^2)}\,dx = \frac{e^{\left(x^2+\frac{2}{5}x\log(\log(x^2))+\frac{1}{25}\log(\log(x^2))^2\right)}}{x+3}$$

input
```
integrate((((10*x^2+30*x)*log(x^2)+4*x+12)*log(log(x^2))+(50*x^3+150*x^2-2
5*x)*log(x^2)+20*x^2+60*x)*exp(1/25*log(log(x^2))^2+2/5*x*log(log(x^2))+x^
2)/(25*x^3+150*x^2+225*x)/log(x^2),x, algorithm=\
```

output
```
e^(x^2 + 2/5*x*log(log(x^2)) + 1/25*log(log(x^2))^2)/(x + 3)
```

3.1082.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.38

$$\int \frac{e^{\frac{1}{25}(25x^2+10x\log(\log(x^2))+\log^2(\log(x^2)))}(60x+20x^2+(-25x+150x^2+50x^3)\log(x^2)+(12+4x+(30x+10x^2)\log(x^2))\log(\log(x^2)))}{(225x+150x^2+25x^3)\log(x^2)}\,dx = \frac{e^{x^2+\frac{2x\log\left(\log\left(x^2\right)\right)}{5}+\frac{\log\left(\log\left(x^2\right)\right)^2}{25}}}{x+3}$$

input
```
integrate((((10*x**2+30*x)*ln(x**2)+4*x+12)*ln(ln(x**2))+(50*x**3+150*x**2
-25*x)*ln(x**2)+20*x**2+60*x)*exp(1/25*ln(ln(x**2))**2+2/5*x*ln(ln(x**2))+
x**2)/(25*x**3+150*x**2+225*x)/ln(x**2),x)
```

output
```
exp(x**2 + 2*x*log(log(x**2))/5 + log(log(x**2))**2/25)/(x + 3)
```

3.1082.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. $2(20) = 40$.

Time = 0.39 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.00

$$\int \frac{e^{\frac{1}{25}(25x^2+10x\log(\log(x^2))+\log^2(\log(x^2)))}(60x+20x^2+(-25x+150x^2+50x^3)\log(x^2)+(12+4x+(30x+10\ldots}{(225x+150x^2+25x^3)\log(x^2)} = \frac{e^{\left(x^2+\frac{2}{5}\,x\log(2)+\frac{1}{25}\,\log(2)^2+\frac{2}{5}\,x\log(\log(x))+\frac{2}{25}\,\log(2)\log(\log(x))+\frac{1}{25}\,\log(\log(x))^2\right)}}{x+3}$$

input
```
integrate((((10*x^2+30*x)*log(x^2)+4*x+12)*log(log(x^2))+(50*x^3+150*x^2-2
5*x)*log(x^2)+20*x^2+60*x)*exp(1/25*log(log(x^2))^2+2/5*x*log(log(x^2))+x^
2)/(25*x^3+150*x^2+225*x)/log(x^2),x, algorithm=\
```

output
```
e^(x^2 + 2/5*x*log(2) + 1/25*log(2)^2 + 2/5*x*log(log(x)) + 2/25*log(2)*lo
g(log(x)) + 1/25*log(log(x))^2)/(x + 3)
```

3.1082.8 Giac [F]

$$\int \frac{e^{\frac{1}{25}(25x^2+10x\log(\log(x^2))+\log^2(\log(x^2)))}(60x+20x^2+(-25x+150x^2+50x^3)\log(x^2)+(12+4x+(30x+10\ldots}{(225x+150x^2+25x^3)\log(x^2)} = \int \frac{(20\,x^2+25\,(2\,x^3+6\,x^2-x)\log(x^2)+2\,(5\,(x^2+3\,x)\log(x^2)+2\,x+6)\log(\log(x^2))+60\,x)e^{\left(x^2+\frac{2}{5}\,x\,\mathrm{l}\ldots\right.}}{25\,(x^3+6\,x^2+9\,x)\log(x^2)}$$

input
```
integrate((((10*x^2+30*x)*log(x^2)+4*x+12)*log(log(x^2))+(50*x^3+150*x^2-2
5*x)*log(x^2)+20*x^2+60*x)*exp(1/25*log(log(x^2))^2+2/5*x*log(log(x^2))+x^
2)/(25*x^3+150*x^2+225*x)/log(x^2),x, algorithm=\
```

output
```
undef
```

3.1082.9 Mupad [B] (verification not implemented)

Time = 17.22 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33

$$\int \frac{e^{\frac{1}{25}\left(25x^2+10x\log(\log(x^2))+\log^2(\log(x^2))\right)}\left(60x+20x^2+(-25x+150x^2+50x^3)\log(x^2)+(12+4x+(30x+10x^2)\log(x^2))\log(\log(x^2))\right)}{(225x+150x^2+25x^3)\log(x^2)}\,dx$$

$$= \frac{\ln(x^2)^{\frac{2x}{5}}\,e^{x^2}\,e^{\frac{\ln(\ln(x^2))^2}{25}}}{x+3}$$

input
```
int((exp(log(log(x^2))^2/25 + (2*x*log(log(x^2)))/5 + x^2)*(60*x + log(x^2
)*(150*x^2 - 25*x + 50*x^3) + log(log(x^2))*(4*x + log(x^2)*(30*x + 10*x^2
) + 12) + 20*x^2))/(log(x^2)*(225*x + 150*x^2 + 25*x^3)),x)
```

output
```
(log(x^2)^((2*x)/5)*exp(x^2)*exp(log(log(x^2))^2/25))/(x + 3)
```

3.1083 $\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2 \ldots\right.}{x^5}$

3.1083.1 Optimal result

Integrand size = 122, antiderivative size = 30

$$\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2+8e^{50}x^2+e^{25}(-12ex+8x^3)+(4ex^2-4e^{25}x^3 \ldots\right.}{x^5}$$
$$= 3-e^{\left(-\frac{e}{x^2}+\frac{2e^{25}}{x}-\log(x^2)\right)^2}+x$$

output
```
x-exp((2*exp(25)/x-ln(x^2)-exp(1)/x^2)^2)+3
```

3.1083.2 Mathematica [A] (verified)

Time = 6.19 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.80

$$\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2+8e^{50}x^2+e^{25}(-12ex+8x^3)+(4ex^2-4e^{25}x^3 \ldots\right.}{x^5}$$
$$= x-e^{\frac{e^2}{x^4}-\frac{4e^{26}}{x^3}+\frac{4e^{50}}{x^2}+\log^2(x^2)}\left(x^2\right)^{-\frac{2e\left(-1+2e^{24}x\right)}{x^2}}$$

input
```
Integrate[(x^5 + E^((E^2 - 4*E^26*x + 4*E^50*x^2 + (2*E*x^2 - 4*E^25*x^3)*
Log[x^2] + x^4*Log[x^2]^2)/x^4)*(4*E^2 - 4*E*x^2 + 8*E^50*x^2 + E^25*(-12*
E*x + 8*x^3) + (4*E*x^2 - 4*E^25*x^3 - 4*x^4)*Log[x^2]))/x^5,x]
```

3.1083.

$$\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2+8e^{50}x^2+e^{25}\left(-12ex+8x^3\right)+\left(4ex^2-4e^{25}x^3-4x^4\right)\log\left(x^2\right)\right)}{x^5}\,dx$$

output
```
x - E^(E^2/x^4 - (4*E^26)/x^3 + (4*E^50)/x^2 + Log[x^2]^2)/(x^2)^((2*E*(-1
 + 2*E^24*x))/x^2)
```

3.1083.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{25}\left(8x^3-12ex\right)+8e^{50}x^2-4ex^2+\left(-4x^4-4e^{25}x^3+4ex^2\right)\log\left(x^2\right)+4e^2\right)\exp\left(\frac{4e^{50}x^2+x^4\log^2\left(x^2\right)+\left(2ex^2-4e^{25}x\right.}{x^4}\right.}{x^5}$$

$$\Big\downarrow \ 2010$$

$$\int \left(\frac{4\left(-x^2-e^{25}x+e\right)\left(x^2\right)^{\frac{2e-4e^{25}x}{x^2}}e^{\frac{e^2\left(1-2e^{24}x\right)^2}{x^4}+\log^2\left(x^2\right)}\left(x^2\log\left(x^2\right)-2e^{25}x+e\right)}{x^5}+1\right)dx$$

$$\Big\downarrow \ 2009$$

$$-12\int \frac{e^{\frac{e^2\left(1-2e^{24}x\right)^2}{x^4}+\log^2\left(x^2\right)+26}\left(x^2\right)^{\frac{2e-4e^{25}x}{x^2}}}{x^4}dx+8\int e^{\frac{e^2\left(1-2e^{24}x\right)^2}{x^4}+\log^2\left(x^2\right)+25}\left(x^2\right)^{\frac{2e-4e^{25}x}{x^2}-1}dx-4\int \frac{e^{\frac{e^2\left(1-2e^{24}x\right)^2}{x^4}+\log^2\left(x^2\right)}\left(x^2\right)^{\frac{2e-4e^{25}x}{x^2}}\log\left(x^2\right)}{x}dx-4\int e^{\frac{e^2\left(1-2e^{24}x\right)^2}{x^4}+\log^2\left(x^2\right)+25}\left(x^2\right)^{\frac{2e-4e^{25}x}{x^2}-1}\log\left(x^2\right)dx+4\int \frac{e^{\frac{e^2\left(1-2e^{24}x\right)^2}{x^4}+\log^2\left(x^2\right)+2}\left(x^2\right)^{\frac{2e-4e^{25}x}{x^2}}}{x^5}dx-4\left(1-2e^{49}\right)\int \frac{e^{\frac{e^2\left(1-2e^{24}x\right)^2}{x^4}+\log^2\left(x^2\right)+1}\left(x^2\right)^{\frac{2e-4e^{25}x}{x^2}}}{x^3}dx+4\int \frac{e^{\frac{e^2\left(1-2e^{24}x\right)^2}{x^4}+\log^2\left(x^2\right)+1}\left(x^2\right)^{\frac{2e-4e^{25}x}{x^2}}\log\left(x^2\right)}{x^3}dx+x$$

input
```
Int[(x^5 + E^((E^2 - 4*E^26*x + 4*E^50*x^2 + (2*E*x^2 - 4*E^25*x^3)*Log[x^
2] + x^4*Log[x^2]^2)/x^4)*(4*E^2 - 4*E*x^2 + 8*E^50*x^2 + E^25*(-12*E*x +
8*x^3) + (4*E*x^2 - 4*E^25*x^3 - 4*x^4)*Log[x^2]))/x^5,x]
```

output
```
$Aborted
```

3.1083.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1083.4 Maple [A] (verified)

Time = 10.15 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.90

method	result	size
risch	$x-\left(x^{2}\right)^{-\frac{4\,{\mathrm e}^{25}}{x}} \left(x^{2}\right)^{\frac{2\,{\mathrm e}}{x^{2}}} {\mathrm e}^{\frac{x^{4} \ln\left(x^{2}\right)^{2}+4 x^{2} {\mathrm e}^{50}-4 x\,{\mathrm e}^{26}+{\mathrm e}^{2}}{x^{4}}}$	57
parallelrisch	$x-{\mathrm e}^{\frac{x^{4} \ln\left(x^{2}\right)^{2}+\left(-4 x^{3} {\mathrm e}^{25}+2 x^{2} {\mathrm e}\right) \ln\left(x^{2}\right)+4 x^{2} {\mathrm e}^{50}-4 x\,{\mathrm e}\,{\mathrm e}^{25}+{\mathrm e}^{2}}{x^{4}}}$	61

input
```
int((((-4*x^3*exp(25)+4*x^2*exp(1)-4*x^4)*ln(x^2)+8*x^2*exp(25)^2+(-12*x*e
xp(1)+8*x^3)*exp(25)+4*exp(1)^2-4*x^2*exp(1))*exp((x^4*ln(x^2)^2+(-4*x^3*e
xp(25)+2*x^2*exp(1))*ln(x^2)+4*x^2*exp(25)^2-4*x*exp(1)*exp(25)+exp(1)^2)/
x^4)+x^5)/x^5,x,method=_RETURNVERBOSE)
```

output
```
x-(x^2)^(-4*exp(25)/x)*(x^2)^(2*exp(1)/x^2)*exp((x^4*ln(x^2)^2+4*x^2*exp(5
0)-4*x*exp(26)+exp(2))/x^4)
```

3.1083.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.83

$$\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2+8e^{50}x^2+e^{25}(-12ex+8x^3)+(4ex^2-4e^{25}x^3\right.}{x^5}$$

$$=x-e^{\left(\frac{x^{4} \log\left(x^{2}\right)^{2}+4 \, x^{2} e^{50}-4 \, x e^{26}-2 \, \left(2 \, x^{3} e^{25}-x^{2} e\right) \log\left(x^{2}\right)+e^{2}}{x^{4}}\right)}$$

$$\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2+8e^{50}x^2+e^{25}\left(-12ex+8x^3\right)+\left(4ex^2-4e^{25}x^3-4x^4\right)\log\left(x^2\right)\right)}{x^5}\,dx$$

input
```
integrate((((-4*x^3*exp(25)+4*x^2*exp(1)-4*x^4)*log(x^2)+8*x^2*exp(25)^2+(
-12*x*exp(1)+8*x^3)*exp(25)+4*exp(1)^2-4*x^2*exp(1))*exp((x^4*log(x^2)^2+(
-4*x^3*exp(25)+2*x^2*exp(1))*log(x^2)+4*x^2*exp(25)^2-4*x*exp(1)*exp(25)+e
xp(1)^2)/x^4)+x^5)/x^5,x, algorithm=\
```

output
```
x - e^((x^4*log(x^2)^2 + 4*x^2*e^50 - 4*x*e^26 - 2*(2*x^3*e^25 - x^2*e)*lo
g(x^2) + e^2)/x^4)
```

3.1083.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. 2(24) = 48.

Time = 0.33 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.87

$$\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2+8e^{50}x^2+e^{25}(-12ex+8x^3)+(4ex^2-4e^{25}x^3\right.}{x^5}$$
$$=x-e^{\frac{x^4\log\left(x^2\right)^2+4x^2e^{50}-4xe^{26}+\left(-4x^3e^{25}+2ex^2\right)\log\left(x^2\right)+e^2}{x^4}}$$

input
```
integrate((((-4*x**3*exp(25)+4*x**2*exp(1)-4*x**4)*ln(x**2)+8*x**2*exp(25)
**2+(-12*x*exp(1)+8*x**3)*exp(25)+4*exp(1)**2-4*x**2*exp(1))*exp((x**4*ln(
x**2)**2+(-4*x**3*exp(25)+2*x**2*exp(1))*ln(x**2)+4*x**2*exp(25)**2-4*x*ex
p(1)*exp(25)+exp(1)**2)/x**4)+x**5)/x**5,x)
```

output
```
x - exp((x**4*log(x**2)**2 + 4*x**2*exp(50) - 4*x*exp(26) + (-4*x**3*exp(2
5) + 2*E*x**2)*log(x**2) + exp(2))/x**4)
```

3.1083.7 Maxima [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.67

$$\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2+8e^{50}x^2+e^{25}(-12ex+8x^3)+(4ex^2-4e^{25}x^3\right.}{x^5}$$
$$=x-e^{\left(4\log(x)^2-\frac{8e^{25}\log(x)}{x}+\frac{4e\log(x)}{x^2}+\frac{4e^{50}}{x^2}-\frac{4e^{26}}{x^3}+\frac{e^2}{x^4}\right)}$$

input
```
integrate((((-4*x^3*exp(25)+4*x^2*exp(1)-4*x^4)*log(x^2)+8*x^2*exp(25)^2+(
-12*x*exp(1)+8*x^3)*exp(25)+4*exp(1)^2-4*x^2*exp(1))*exp((x^4*log(x^2)^2+(
-4*x^3*exp(25)+2*x^2*exp(1))*log(x^2)+4*x^2*exp(25)^2-4*x*exp(1)*exp(25)+e
xp(1)^2)/x^4)+x^5)/x^5,x, algorithm=\
```

output
```
x - e^(4*log(x)^2 - 8*e^25*log(x)/x + 4*e*log(x)/x^2 + 4*e^50/x^2 - 4*e^26
/x^3 + e^2/x^4)
```

3.1083.8 Giac [F]

$$\int \frac{x^5 + e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}(4e^2-4ex^2+8e^{50}x^2+e^{25}(-12ex+8x^3)+(4ex^2-4e^{25}x^3}{x^5}$$

$$=\int \frac{x^5+4\,(2\,x^2e^{50}-x^2e+(2\,x^3-3\,xe)e^{25}-(x^4+x^3e^{25}-x^2e)\log\left(x^2\right)+e^2)e^{\left(\frac{x^4\log\left(x^2\right)^2+4\,x^2e^{50}-4\,xe^{26}-2\,\left(2\,x^3\right.}{x^4}\right.}}{x^5}$$

input
```
integrate((((-4*x^3*exp(25)+4*x^2*exp(1)-4*x^4)*log(x^2)+8*x^2*exp(25)^2+(
-12*x*exp(1)+8*x^3)*exp(25)+4*exp(1)^2-4*x^2*exp(1))*exp((x^4*log(x^2)^2+(
-4*x^3*exp(25)+2*x^2*exp(1))*log(x^2)+4*x^2*exp(25)^2-4*x*exp(1)*exp(25)+e
xp(1)^2)/x^4)+x^5)/x^5,x, algorithm=\
```

output
```
integrate((x^5 + 4*(2*x^2*e^50 - x^2*e + (2*x^3 - 3*x*e)*e^25 - (x^4 + x^3
*e^25 - x^2*e)*log(x^2) + e^2)*e^((x^4*log(x^2)^2 + 4*x^2*e^50 - 4*x*e^26
- 2*(2*x^3*e^25 - x^2*e)*log(x^2) + e^2)/x^4))/x^5, x)
```

3.1083.9 Mupad [B] (verification not implemented)

Time = 17.02 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.93

$$\int \frac{x^5 + e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}(4e^2-4ex^2+8e^{50}x^2+e^{25}(-12ex+8x^3)+(4ex^2-4e^{25}x^3}{x^5}$$

$$=x-\frac{\mathrm{e}^{\frac{\mathrm{e}^2}{x^4}}\,\mathrm{e}^{-\frac{4\,\mathrm{e}^{26}}{x^3}}\,\mathrm{e}^{\frac{4\,\mathrm{e}^{50}}{x^2}}\,\mathrm{e}^{\ln\left(x^2\right)^2}\,{\left(x^2\right)}^{\frac{2\,\mathrm{e}}{x^2}}}{{\left(x^2\right)}^{\frac{4\,\mathrm{e}^{25}}{x}}}$$

3.1083.

$$\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2+8e^{50}x^2+e^{25}\left(-12ex+8x^3\right)+\left(4ex^2-4e^{25}x^3-4x^4\right)\log\left(x^2\right)\right)}{x^5}\,dx$$

input
```
int(-(exp((exp(2) + log(x^2)*(2*x^2*exp(1) - 4*x^3*exp(25)) - 4*x*exp(26)
+ 4*x^2*exp(50) + x^4*log(x^2)^2)/x^4)*(log(x^2)*(4*x^3*exp(25) - 4*x^2*ex
p(1) + 4*x^4) - 4*exp(2) + exp(25)*(12*x*exp(1) - 8*x^3) + 4*x^2*exp(1) -
8*x^2*exp(50)) - x^5)/x^5,x)
```

output
```
x - (exp(exp(2)/x^4)*exp(-(4*exp(26))/x^3)*exp((4*exp(50))/x^2)*exp(log(x^
2)^2)*(x^2)^((2*exp(1))/x^2))/(x^2)^((4*exp(25))/x)
```

3.1083.

$$\int \frac{x^5+e^{\frac{e^2-4e^{26}x+4e^{50}x^2+\left(2ex^2-4e^{25}x^3\right)\log\left(x^2\right)+x^4\log^2\left(x^2\right)}{x^4}}\left(4e^2-4ex^2+8e^{50}x^2+e^{25}\left(-12ex+8x^3\right)+\left(4ex^2-4e^{25}x^3-4x^4\right)\log\left(x^2\right)\right)}{x^5}\,dx$$

3.1084 $\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-\cdots}\right.\right.$

3.1084.1 Optimal result

Integrand size = 137, antiderivative size = 36

$$\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}\left(4x+3x^2+(2+2x)\log(3)\right)\right)\right)\right)\,dx$$
$$=-e^{-e^{-e^{\frac{1}{2}(-2-x)x(x+\log(3))}+x}+2x}+2x$$

output
```
2*x-exp(2*x-exp(x-exp(x*(ln(3)+x)*(-1-1/2*x))))
```

3.1084.2 Mathematica [F]

$$\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}\left(4x+3x^2+(2+2x)\log(3)\right)\right)\right)\right)\,dx$$
$$=\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}\left(4x+3x^2+(2+2x)\log(3)\right)\right)\right)\right)\,dx$$

3.1084.

$\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}\right.\right.\right.$

input
```
Integrate[(4 + E^(-E^(-E^((-2*x^2 - x^3 + (-2*x - x^2)*Log[3])/2) + x) + 2
*x)*(-4 + E^(-E^((-2*x^2 - x^3 + (-2*x - x^2)*Log[3])/2) + x)*(2 + E^((-2*
x^2 - x^3 + (-2*x - x^2)*Log[3])/2)*(4*x + 3*x^2 + (2 + 2*x)*Log[3]))))/2,
x]
```

output
```
Integrate[4 + E^(-E^(-E^((-2*x^2 - x^3 + (-2*x - x^2)*Log[3])/2) + x) + 2*
x)*(-4 + E^(-E^((-2*x^2 - x^3 + (-2*x - x^2)*Log[3])/2) + x)*(2 + E^((-2*x
^2 - x^3 + (-2*x - x^2)*Log[3])/2)*(4*x + 3*x^2 + (2 + 2*x)*Log[3]))), x]/
2
```

3.1084.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}\left(\exp\left(2x-\exp\left(x-\exp\left(\frac{1}{2}(-x^3-2x^2+(-x^2-2x)\log(3))\right)\right)\right)\left(\exp\left(x-\exp\left(\frac{1}{2}(-x^3-2x^2+(-x^2\right.\right.\right.\right.$$

$$\Big\downarrow 27$$

$$\frac{1}{2}\int\left(4-\exp\left(2x-\exp\left(x-3^{\frac{1}{2}(-x^2-2x)}e^{\frac{1}{2}(-x^3-2x^2)}\right)\right)\left(4-\exp\left(x-3^{\frac{1}{2}(-x^2-2x)}e^{\frac{1}{2}(-x^3-2x^2)}\right)\left(3^{\frac{1}{2}(-x^2-2x)}e^{\frac{1}{2}(-\right.\right.\right.$$

$$\Big\downarrow 7293$$

$$\frac{1}{2}\int\left(3^{-\frac{1}{2}x(x+2)}\exp\left(-\frac{1}{2}(x+2)x^2+2x-3^{-\frac{1}{2}x(x+2)}e^{-\frac{1}{2}x^2(x+2)}-\exp\left(x-3^{-\frac{1}{2}x(x+2)}e^{-\frac{1}{2}x^2(x+2)}\right)\right)\left(3e^xx^2+4e\right.\right.$$

$$\Big\downarrow 7293$$

$$\frac{1}{2}\int\left(3^{-\frac{1}{2}x(x+2)}\exp\left(-\frac{1}{2}x(x^2+2x-4)-3^{-\frac{1}{2}x(x+2)}e^{-\frac{1}{2}x^2(x+2)}-\exp\left(x-3^{-\frac{1}{2}x(x+2)}e^{-\frac{1}{2}x^2(x+2)}\right)\right)\left(3e^xx^2+4e\right.\right.$$

$$\Big\downarrow 7299$$

$$\frac{1}{2}\int\left(3^{-\frac{1}{2}x(x+2)}\exp\left(-\frac{1}{2}x(x^2+2x-4)-3^{-\frac{1}{2}x(x+2)}e^{-\frac{1}{2}x^2(x+2)}-\exp\left(x-3^{-\frac{1}{2}x(x+2)}e^{-\frac{1}{2}x^2(x+2)}\right)\right)\left(3e^xx^2+4e\right.\right.$$

input
```
Int[(4 + E^(-E^(-E^((-2*x^2 - x^3 + (-2*x - x^2)*Log[3])/2) + x) + 2*x)*(-
4 + E^(-E^((-2*x^2 - x^3 + (-2*x - x^2)*Log[3])/2) + x)*(2 + E^((-2*x^2 -
x^3 + (-2*x - x^2)*Log[3])/2)*(4*x + 3*x^2 + (2 + 2*x)*Log[3]))))/2,x]
```

3.1084.
$\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}\right.\right.\right.$

output
```
$Aborted
```

3.1084.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.1084.4 Maple [A] (verified)

Time = 1.85 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.00

method	result	size
risch	$2x-\mathrm{e}^{-\mathrm{e}^{-3^{-\frac{x(2+x)}{2}}\mathrm{e}^{-\frac{x^{2}(2+x)}{2}}+x}+2x}$	36
default	$2x-\mathrm{e}^{-\mathrm{e}^{-\mathrm{e}^{\frac{\left(-x^{2}-2x\right)\ln(3)}{2}-\frac{x^{3}}{2}-x^{2}}+x}+2x}$	44
norman	$2x-\mathrm{e}^{-\mathrm{e}^{-\mathrm{e}^{\frac{\left(-x^{2}-2x\right)\ln(3)}{2}-\frac{x^{3}}{2}-x^{2}}+x}+2x}$	44
parallelrisch	$2x-\mathrm{e}^{-\mathrm{e}^{-\mathrm{e}^{\frac{\left(-x^{2}-2x\right)\ln(3)}{2}-\frac{x^{3}}{2}-x^{2}}+x}+2x}$	44
parts	$2x-\mathrm{e}^{-\mathrm{e}^{-\mathrm{e}^{\frac{\left(-x^{2}-2x\right)\ln(3)}{2}-\frac{x^{3}}{2}-x^{2}}+x}+2x}$	44

input
```
int(1/2*((((2+2*x)*ln(3)+3*x^2+4*x)*exp(1/2*(-x^2-2*x)*ln(3)-1/2*x^3-x^2)+
2)*exp(-exp(1/2*(-x^2-2*x)*ln(3)-1/2*x^3-x^2)+x)-4)*exp(-exp(-exp(1/2*(-x^
2-2*x)*ln(3)-1/2*x^3-x^2)+x)+2*x)+2,x,method=_RETURNVERBOSE)
```

output
```
2*x-exp(-exp(-3^(-1/2*x*(2+x))*exp(-1/2*x^2*(2+x))+x)+2*x)
```

3.1084.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.14

$$\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}\left(4x+3x^2+(2+2x)\log(3)\right)\right)\right)\right)dx = 2\,x-e^{\left(2\,x-e^{\left(x-e^{\left(-\frac{1}{2}\,x^3-x^2-\frac{1}{2}\,\left(x^2+2\,x\right)\log(3)\right)}\right)}\right)}$$

input
```
integrate(1/2*((((2+2*x)*log(3)+3*x^2+4*x)*exp(1/2*(-x^2-2*x)*log(3)-1/2*x
^3-x^2)+2)*exp(-exp(1/2*(-x^2-2*x)*log(3)-1/2*x^3-x^2)+x)-4)*exp(-exp(-exp
(1/2*(-x^2-2*x)*log(3)-1/2*x^3-x^2)+x)+2*x)+2,x, algorithm=\
```

output
```
2*x - e^(2*x - e^(x - e^(-1/2*x^3 - x^2 - 1/2*(x^2 + 2*x)*log(3))))
```

3.1084.6 Sympy [A] (verification not implemented)

Time = 1.45 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.89

$$\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}\left(4x+3x^2+(2+2x)\log(3)\right)\right)\right)\right)dx = 2x-e^{2x-e^{x-e^{-\frac{x^3}{2}-x^2+\left(-\frac{x^2}{2}-x\right)\log(3)}}}$$

input
```
integrate(1/2*((((2+2*x)*ln(3)+3*x**2+4*x)*exp(1/2*(-x**2-2*x)*ln(3)-1/2*x
**3-x**2)+2)*exp(-exp(1/2*(-x**2-2*x)*ln(3)-1/2*x**3-x**2)+x)-4)*exp(-exp(
-exp(1/2*(-x**2-2*x)*ln(3)-1/2*x**3-x**2)+x)+2*x)+2,x)
```

output
```
2*x - exp(2*x - exp(x - exp(-x**3/2 - x**2 + (-x**2/2 - x)*log(3))))
```

3.1084.7 Maxima [A] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.17

$$\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+(-2x-x^2)\log(3)\right)}\left(4x+3x^2+(2+2x)\log(3)\right)\right)\right)\right)\,dx = 2\,x-e^{\left(2\,x-e^{\left(x-e^{\left(-\frac{1}{2}\,x^3-\frac{1}{2}\,x^2\log(3)-x^2-x\log(3)\right)}\right)}\right)}$$

input
```
integrate(1/2*((((2+2*x)*log(3)+3*x^2+4*x)*exp(1/2*(-x^2-2*x)*log(3)-1/2*x
^3-x^2)+2)*exp(-exp(1/2*(-x^2-2*x)*log(3)-1/2*x^3-x^2)+x)-4)*exp(-exp(-exp
(1/2*(-x^2-2*x)*log(3)-1/2*x^3-x^2)+x)+2*x)+2,x, algorithm=\
```

output
```
2*x - e^(2*x - e^(x - e^(-1/2*x^3 - 1/2*x^2*log(3) - x^2 - x*log(3))))
```

3.1084.8 Giac [A] (verification not implemented)

Time = 0.72 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.17

$$\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+(-2x-x^2)\log(3)\right)}\left(4x+3x^2+(2+2x)\log(3)\right)\right)\right)\right)\,dx = 2\,x-e^{\left(2\,x-e^{\left(x-e^{\left(-\frac{1}{2}\,x^3-\frac{1}{2}\,x^2\log(3)-x^2-x\log(3)\right)}\right)}\right)}$$

input
```
integrate(1/2*((((2+2*x)*log(3)+3*x^2+4*x)*exp(1/2*(-x^2-2*x)*log(3)-1/2*x
^3-x^2)+2)*exp(-exp(1/2*(-x^2-2*x)*log(3)-1/2*x^3-x^2)+x)-4)*exp(-exp(-exp
(1/2*(-x^2-2*x)*log(3)-1/2*x^3-x^2)+x)+2*x)+2,x, algorithm=\
```

output
```
2*x - e^(2*x - e^(x - e^(-1/2*x^3 - 1/2*x^2*log(3) - x^2 - x*log(3))))
```

3.1084.9 Mupad [B] (verification not implemented)

Time = 16.26 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.17

$$\int \frac{1}{2}\left(4+e^{-e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}+2x}\left(-4+e^{-e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}+x}\left(2+e^{\frac{1}{2}\left(-2x^2-x^3+\left(-2x-x^2\right)\log(3)\right)}\left(4x+3x^2+(2+2x)\log(3)\right)\right)\right)\right)\,dx$$

$$=2\,x-\mathrm{e}^{2\,x}\,\mathrm{e}^{-\mathrm{e}^{-\frac{\mathrm{e}^{-x^2}}{3^x\,\sqrt{\mathrm{e}^{x^3}}\,\sqrt{3^{x^2}}}}\,\mathrm{e}^{x}}$$

input
```
int((exp(2*x - exp(x - exp(- x^2 - x^3/2 - (log(3)*(2*x + x^2))/2)))*(exp(
x - exp(- x^2 - x^3/2 - (log(3)*(2*x + x^2))/2))*(exp(- x^2 - x^3/2 - (log
(3)*(2*x + x^2))/2)*(4*x + log(3)*(2*x + 2) + 3*x^2) + 2) - 4))/2 + 2,x)
```

output
```
2*x - exp(2*x)*exp(-exp(-exp(-x^2)/(3^x*exp(x^3)^(1/2)*(3^(x^2))^(1/2)))*e
xp(x))
```

3.1085 $\int \frac{-5x^2+x^3+e^x(3+8x)}{-x^3+e^x(x+2x^2)}\,dx$

3.1085.1 Optimal result

Integrand size = 38, antiderivative size = 20

$$\int \frac{-5x^2+x^3+e^x(3+8x)}{-x^3+e^x(x+2x^2)}\,dx = \log\left(4x^3\left(-1-2x+e^{-x}x^2\right)\right)$$

output
```
ln(4*x^3*(-1+x^2/exp(x)-2*x))
```

3.1085.2 Mathematica [A] (verified)

Time = 2.53 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{-5x^2+x^3+e^x(3+8x)}{-x^3+e^x(x+2x^2)}\,dx = -x+3\log(x)+\log\left(e^x+2e^x x-x^2\right)$$

input
```
Integrate[(-5*x^2 + x^3 + E^x*(3 + 8*x))/(-x^3 + E^x*(x + 2*x^2)),x]
```

output
```
-x + 3*Log[x] + Log[E^x + 2*E^x*x - x^2]
```

3.1085.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3-5x^2+e^x(8x+3)}{e^x(2x^2+x)-x^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{8x+3}{x(2x+1)}-\frac{x(2x^2-x-2)}{(2x+1)(x^2-2e^x x-e^x)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{1}{2}\int \frac{1}{-x^2+2e^x x+e^x}dx+\int \frac{x}{x^2-2e^x x-e^x}dx-\int \frac{x^2}{x^2-2e^x x-e^x}dx-\frac{1}{2}\int \frac{1}{(2x+1)(x^2-2e^x x-e^x)}dx+3\log(x)+\log(2x+1)$$

input
```
Int[(-5*x^2 + x^3 + E^x*(3 + 8*x))/(-x^3 + E^x*(x + 2*x^2)),x]
```

output
```
$Aborted
```

3.1085.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1085.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

method	result	size
norman	$-x+3\ln(x)+\ln(x^2-2\,\mathrm{e}^x x-\mathrm{e}^x)$	23
parallelrisch	$-x+3\ln(x)+\ln(x^2-2\,\mathrm{e}^x x-\mathrm{e}^x)$	23
risch	$3\ln(x)+\ln(1+2x)-x+\ln\left(\mathrm{e}^x-\frac{x^2}{1+2x}\right)$	31

input
```
int(((8*x+3)*exp(x)+x^3-5*x^2)/((2*x^2+x)*exp(x)-x^3),x,method=_RETURNVERB
OSE)
```

output
```
-x+3*ln(x)+ln(x^2-2*exp(x)*x-exp(x))
```

3.1085.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.85

$$\int \frac{-5x^2+x^3+e^x(3+8x)}{-x^3+e^x(x+2x^2)}\,dx = -x+\log(2x+1)+3\log(x)+\log\left(-\frac{x^2-(2x+1)e^x}{2x+1}\right)$$

input
```
integrate(((8*x+3)*exp(x)+x^3-5*x^2)/((2*x^2+x)*exp(x)-x^3),x, algorithm=\
```

output
```
-x + log(2*x + 1) + 3*log(x) + log(-(x^2 - (2*x + 1)*e^x)/(2*x + 1))
```

3.1085.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30

$$\int \frac{-5x^2+x^3+e^x(3+8x)}{-x^3+e^x(x+2x^2)}\,dx = -x+3\log(x)+\log\left(x+\frac{1}{2}\right)+\log\left(-\frac{x^2}{2x+1}+e^x\right)$$

input
```
integrate(((8*x+3)*exp(x)+x**3-5*x**2)/((2*x**2+x)*exp(x)-x**3),x)
```

output
```
-x + 3*log(x) + log(x + 1/2) + log(-x**2/(2*x + 1) + exp(x))
```

3.1085.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.85

$$\int \frac{-5x^2+x^3+e^x(3+8x)}{-x^3+e^x(x+2x^2)}\,dx = -x+\log(2x+1)+3\log(x)+\log\left(-\frac{x^2-(2x+1)e^x}{2x+1}\right)$$

input
```
integrate(((8*x+3)*exp(x)+x^3-5*x^2)/((2*x^2+x)*exp(x)-x^3),x, algorithm=\
```

output
```
-x + log(2*x + 1) + 3*log(x) + log(-(x^2 - (2*x + 1)*e^x)/(2*x + 1))
```

3.1085.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{-5x^2+x^3+e^x(3+8x)}{-x^3+e^x(x+2x^2)}\,dx=-x+\log\left(-x^2+2\,xe^x+e^x\right)+3\,\log\left(x\right)$$

input
```
integrate(((8*x+3)*exp(x)+x^3-5*x^2)/((2*x^2+x)*exp(x)-x^3),x, algorithm=\
```

output
```
-x + log(-x^2 + 2*x*e^x + e^x) + 3*log(x)
```

3.1085.9 Mupad [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{-5x^2+x^3+e^x(3+8x)}{-x^3+e^x(x+2x^2)}\,dx=\ln\left(x^2-2\,x\,\mathrm{e}^x-\mathrm{e}^x\right)-x+3\,\ln\left(x\right)$$

input
```
int((exp(x)*(8*x + 3) - 5*x^2 + x^3)/(exp(x)*(x + 2*x^2) - x^3),x)
```

output
```
log(x^2 - 2*x*exp(x) - exp(x)) - x + 3*log(x)
```

3.1086 $\int e^{-x}\left(3e^x x^2+e^{e^{-x}\left(3x^3+e^x\left(-3x-3x^3\right)\right)}\left(9x^4-3x^5+e^x\right.\right.$

3.1086.1 Optimal result

Integrand size = 72, antiderivative size = 31

$$\int e^{-x}\left(3e^x x^2+e^{e^{-x}\left(3x^3+e^x\left(-3x-3x^3\right)\right)}\left(9x^4-3x^5+e^x\left(2x-3x^2-9x^4\right)\right)\right)\,dx = -4+x^2\left(e^{3\left(-x+x^2\left(-x+e^{-x}x\right)\right)}+x\right)$$

output
```
(x+exp(3*x^2*(x/exp(x)-x)-3*x))*x^2-4
```

3.1086.2 Mathematica [A] (verified)

Time = 5.15 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81

$$\int e^{-x}\left(3e^x x^2+e^{e^{-x}\left(3x^3+e^x\left(-3x-3x^3\right)\right)}\left(9x^4-3x^5+e^x\left(2x-3x^2-9x^4\right)\right)\right)\,dx = x^2\left(e^{-3x+\left(-3+3e^{-x}\right)x^3}+x\right)$$

input
```
Integrate[(3*E^x*x^2 + E^((3*x^3 + E^x*(-3*x - 3*x^3))/E^x)*(9*x^4 - 3*x^5
 + E^x*(2*x - 3*x^2 - 9*x^4)))/E^x,x]
```

output
```
x^2*(E^(-3*x + (-3 + 3/E^x)*x^3) + x)
```

3.1086.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-x}\left(\left(-3x^5+9x^4+e^x\left(-9x^4-3x^2+2x\right)\right)\exp\left(e^{-x}\left(3x^3+e^x\left(-3x^3-3x\right)\right)\right)+3e^xx^2\right)dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(3x^2-e^{-3\left(\left(1-e^{-x}\right)x^2+1\right)x-x}x\left(3x^4+9e^xx^3-9x^3+3e^xx-2e^x\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\int e^{-3x\left(\left(1-e^{-x}\right)x^2+1\right)}xdx-3\int e^{-3x\left(\left(1-e^{-x}\right)x^2+1\right)}x^2dx-3\int e^{-3\left(\left(1-e^{-x}\right)x^2+1\right)x-x}x^5dx-9\int e^{-3x\left(\left(1-e^{-x}\right)x^2+1\right)}x^4dx+9\int e^{-3\left(\left(1-e^{-x}\right)x^2+1\right)x-x}x^4dx+x^3$$

input
```
Int[(3*E^x*x^2 + E^((3*x^3 + E^x*(-3*x - 3*x^3))/E^x)*(9*x^4 - 3*x^5 + E^x
*(2*x - 3*x^2 - 9*x^4)))/E^x,x]
```

output
```
$Aborted
```

3.1086.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1086.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

method	result	size
risch	$x^3+x^2\mathrm{e}^{-3x\left(\mathrm{e}^x x^2-x^2+\mathrm{e}^x\right)\mathrm{e}^{-x}}$	31
parallelrisch	$x^3+x^2\mathrm{e}^{\left(\left(-3x^3-3x\right)\mathrm{e}^x+3x^3\right)\mathrm{e}^{-x}}$	33
norman	$\left(\mathrm{e}^x x^3+\mathrm{e}^x x^2\mathrm{e}^{\left(\left(-3x^3-3x\right)\mathrm{e}^x+3x^3\right)\mathrm{e}^{-x}}\right)\mathrm{e}^{-x}$	43

input
```
int((((-9*x^4-3*x^2+2*x)*exp(x)-3*x^5+9*x^4)*exp(((-3*x^3-3*x)*exp(x)+3*x^
3)/exp(x))+3*exp(x)*x^2)/exp(x),x,method=_RETURNVERBOSE)
```

output
```
x^3+x^2*exp(-3*x*(exp(x)*x^2-x^2+exp(x))*exp(-x))
```

3.1086.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.90

$$\int e^{-x}\left(3e^xx^2+e^{e^{-x}\left(3x^3+e^x\left(-3x-3x^3\right)\right)}\left(9x^4-3x^5+e^x\left(2x-3x^2-9x^4\right)\right)\right)\,dx$$
$$=x^3+x^2e^{\left(3\left(x^3-\left(x^3+x\right)e^x\right)e^{(-x)}\right)}$$

input
```
integrate((((-9*x^4-3*x^2+2*x)*exp(x)-3*x^5+9*x^4)*exp(((-3*x^3-3*x)*exp(x
)+3*x^3)/exp(x))+3*exp(x)*x^2)/exp(x),x, algorithm=\
```

output
```
x^3 + x^2*e^(3*(x^3 - (x^3 + x)*e^x)*e^(-x))
```

3.1086.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.94

$$\int e^{-x}\left(3e^xx^2+e^{e^{-x}\left(3x^3+e^x\left(-3x-3x^3\right)\right)}\left(9x^4-3x^5+e^x\left(2x-3x^2-9x^4\right)\right)\right)\,dx$$
$$=x^3+x^2e^{\left(3x^3+\left(-3x^3-3x\right)e^x\right)e^{-x}}$$

input
```
integrate((((-9*x**4-3*x**2+2*x)*exp(x)-3*x**5+9*x**4)*exp(((-3*x**3-3*x)*
exp(x)+3*x**3)/exp(x))+3*exp(x)*x**2)/exp(x),x)
```

output
```
x**3 + x**2*exp((3*x**3 + (-3*x**3 - 3*x)*exp(x))*exp(-x))
```

3.1086.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int e^{-x}\left(3e^xx^2+e^{e^{-x}(3x^3+e^x(-3x-3x^3))}\left(9x^4-3x^5+e^x\left(2x-3x^2-9x^4\right)\right)\right)\,dx$$
$$=x^3+x^2e^{\left(3\,x^3e^{(-x)}-3\,x^3-3\,x\right)}$$

input
```
integrate((((-9*x^4-3*x^2+2*x)*exp(x)-3*x^5+9*x^4)*exp(((-3*x^3-3*x)*exp(x
)+3*x^3)/exp(x))+3*exp(x)*x^2)/exp(x),x, algorithm=\
```

output
```
x^3 + x^2*e^(3*x^3*e^(-x) - 3*x^3 - 3*x)
```

3.1086.8 Giac [F]

$$\int e^{-x}\left(3e^xx^2+e^{e^{-x}(3x^3+e^x(-3x-3x^3))}\left(9x^4-3x^5+e^x\left(2x-3x^2-9x^4\right)\right)\right)\,dx$$
$$=\int\left(3\,x^2e^x-\left(3\,x^5-9\,x^4+\left(9\,x^4+3\,x^2-2\,x\right)e^x\right)e^{\left(3\,\left(x^3-\left(x^3+x\right)e^x\right)e^{(-x)}\right)}\right)e^{(-x)}\,dx$$

input
```
integrate((((-9*x^4-3*x^2+2*x)*exp(x)-3*x^5+9*x^4)*exp(((-3*x^3-3*x)*exp(x
)+3*x^3)/exp(x))+3*exp(x)*x^2)/exp(x),x, algorithm=\
```

output
```
integrate((3*x^2*e^x - (3*x^5 - 9*x^4 + (9*x^4 + 3*x^2 - 2*x)*e^x)*e^(3*(x
^3 - (x^3 + x)*e^x)*e^(-x)))*e^(-x), x)
```

3.1086.9 Mupad [B] (verification not implemented)

Time = 17.37 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.90

$$\int e^{-x}\left(3e^xx^2+e^{e^{-x}(3x^3+e^x(-3x-3x^3))}\left(9x^4-3x^5+e^x\left(2x-3x^2-9x^4\right)\right)\right)\,dx$$
$$=x^3+x^2\,\mathrm{e}^{-3\,x}\,\mathrm{e}^{-3\,x^3}\,\mathrm{e}^{3\,x^3\,\mathrm{e}^{-x}}$$

input
```
int(exp(-x)*(3*x^2*exp(x) - exp(-exp(-x)*(exp(x)*(3*x + 3*x^3) - 3*x^3))*(
3*x^5 - 9*x^4 + exp(x)*(3*x^2 - 2*x + 9*x^4))),x)
```

output
```
x^3 + x^2*exp(-3*x)*exp(-3*x^3)*exp(3*x^3*exp(-x))
```

3.1087 $\int \frac{-15x+e^3x(-12+138x+54x^2)}{5x}\,dx$

3.1087.1 Optimal result

Integrand size = 26, antiderivative size = 22

$$\int \frac{-15x+e^3x(-12+138x+54x^2)}{5x}\,dx = -3x+3e^3x(4+x)\left(\frac{1}{5}(-1+x)+x\right)$$

output
```
3*(4+x)*(6/5*x-1/5)*exp(3+ln(x))-3*x
```

3.1087.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.45

$$\int \frac{-15x+e^3x(-12+138x+54x^2)}{5x}\,dx = -3x-\frac{12e^3x}{5}+\frac{69e^3x^2}{5}+\frac{18e^3x^3}{5}$$

input
```
Integrate[(-15*x + E^3*x*(-12 + 138*x + 54*x^2))/(5*x),x]
```

output
```
-3*x - (12*E^3*x)/5 + (69*E^3*x^2)/5 + (18*E^3*x^3)/5
```

3.1087.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115, Rules used = {9, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^3x(54x^2+138x-12)-15x}{5x}dx$$

$$\Big\downarrow \; 9$$

$$\int -\frac{3}{5}\left(-18e^3x^2-46e^3x+4e^3+5\right)dx$$

$$\Big\downarrow \; 27$$

$$-\frac{3}{5}\int \left(-18e^3x^2-46e^3x+4e^3+5\right)dx$$

$$\Big\downarrow \; 2009$$

$$-\frac{3}{5}\left(-6e^3x^3-23e^3x^2+\left(5+4e^3\right)x\right)$$

input
```
Int[(-15*x + E^3*x*(-12 + 138*x + 54*x^2))/(5*x),x]
```

output
```
(-3*((5 + 4*E^3)*x - 23*E^3*x^2 - 6*E^3*x^3))/5
```

3.1087.3.1 Defintions of rubi rules used

rule 9
```
Int[(u_.)*(Px_)^(p_.)*((e_.)*(x_))^(m_.), x_Symbol] :> With[{r = Expon[Px,
x, Min]}, Simp[1/e^(p*r)   Int[u*(e*x)^(m + p*r)*ExpandToSum[Px/x^r, x]^p,
x], x] /; IGtQ[r, 0]] /; FreeQ[{e, m}, x] && PolyQ[Px, x] && IntegerQ[p] &&
  !MonomialQ[Px, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1087.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

method	result	size
norman	$\left(-\frac{12\,\mathrm{e}^{3}}{5}-3\right)x+\frac{69x^{2}\mathrm{e}^{3}}{5}+\frac{18x^{3}\mathrm{e}^{3}}{5}$	24
risch	$\frac{18x^{3}\mathrm{e}^{3}}{5}+\frac{69x^{2}\mathrm{e}^{3}}{5}-\frac{12x\,\mathrm{e}^{3}}{5}-3x$	24
default	$-3x+\frac{\frac{18x^{4}\mathrm{e}^{3+\ln(x)}}{5}+\frac{69x^{3}\mathrm{e}^{3+\ln(x)}}{5}-\frac{12\,\mathrm{e}^{3+\ln(x)}x^{2}}{5}}{x^{2}}$	41
parts	$-3x+\frac{\frac{18x^{4}\mathrm{e}^{3+\ln(x)}}{5}+\frac{69x^{3}\mathrm{e}^{3+\ln(x)}}{5}-\frac{12\,\mathrm{e}^{3+\ln(x)}x^{2}}{5}}{x^{2}}$	41
parallelrisch	$-\frac{-18x^{4}\mathrm{e}^{3+\ln(x)}-69x^{3}\mathrm{e}^{3+\ln(x)}+15x^{3}+12\,\mathrm{e}^{3+\ln(x)}x^{2}}{5x^{2}}$	42

input
```
int(1/5*((54*x^2+138*x-12)*exp(3+ln(x))-15*x)/x,x,method=_RETURNVERBOSE)
```

output
```
(-12/5*exp(3)-3)*x+69/5*x^2*exp(3)+18/5*x^3*exp(3)
```

3.1087.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{-15x+e^3x(-12+138x+54x^2)}{5x}\,dx=\frac{3}{5}\left(6\,x^{3}+23\,x^{2}-4\,x\right)e^{3}-3\,x$$

input
```
integrate(1/5*((54*x^2+138*x-12)*exp(3+log(x))-15*x)/x,x, algorithm=\
```

output
```
3/5*(6*x^3 + 23*x^2 - 4*x)*e^3 - 3*x
```

3.1087.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.41

$$\int \frac{-15x+e^3x(-12+138x+54x^2)}{5x}\,dx=\frac{18x^{3}e^{3}}{5}+\frac{69x^{2}e^{3}}{5}+x\left(-\frac{12e^{3}}{5}-3\right)$$

input
```
integrate(1/5*((54*x**2+138*x-12)*exp(3+ln(x))-15*x)/x,x)
```

output
```
18*x**3*exp(3)/5 + 69*x**2*exp(3)/5 + x*(-12*exp(3)/5 - 3)
```

3.1087.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-15x + e^3x(-12 + 138x + 54x^2)}{5x}\,dx = \frac{18}{5}\,x^3e^3 + \frac{69}{5}\,x^2e^3 - \frac{3}{5}\,x\left(4\,e^3 + 5\right)$$

input
```
integrate(1/5*((54*x^2+138*x-12)*exp(3+log(x))-15*x)/x,x, algorithm=\
```

output
```
18/5*x^3*e^3 + 69/5*x^2*e^3 - 3/5*x*(4*e^3 + 5)
```

3.1087.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{-15x + e^3x(-12 + 138x + 54x^2)}{5x}\,dx = \frac{18}{5}\,x^3e^3 + \frac{69}{5}\,x^2e^3 - \frac{12}{5}\,xe^3 - 3\,x$$

input
```
integrate(1/5*((54*x^2+138*x-12)*exp(3+log(x))-15*x)/x,x, algorithm=\
```

output
```
18/5*x^3*e^3 + 69/5*x^2*e^3 - 12/5*x*e^3 - 3*x
```

3.1087.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-15x + e^3x(-12 + 138x + 54x^2)}{5x}\,dx = \frac{18\,e^3\,x^3}{5} + \frac{69\,e^3\,x^2}{5} + \left(-\frac{12\,e^3}{5} - 3\right)\,x$$

input
```
int(-(3*x - (exp(log(x) + 3)*(138*x + 54*x^2 - 12))/5)/x,x)
```

output
```
(69*x^2*exp(3))/5 + (18*x^3*exp(3))/5 - x*((12*exp(3))/5 + 3)
```

3.1088 $\int \frac{e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}(2-2\log(x)+3\log^2(x))}{-6\log^2(x)+2e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\log^2(x)}\,dx$

3.1088.1 Optimal result

Integrand size = 100, antiderivative size = 33

$$\int \frac{e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\left(2-2\log(x)+3\log^2(x)\right)}{-6\log^2(x)+2e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\log^2(x)}\,dx=\log\left(3-\frac{e^{4-i\pi+\frac{3x}{2}-\frac{x}{\log(x)}}}{-1+2e}\right)$$

output
```
ln(3-exp(4+3/2*x-x/ln(x)-ln(-2*exp(1)+1)))
```

3.1088.2 Mathematica [A] (verified)

Time = 1.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.42

$$\begin{aligned}&\int \frac{e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\left(2-2\log(x)+3\log^2(x)\right)}{-6\log^2(x)+2e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\log^2(x)}\,dx\\&=\frac{1}{2}\left(2\log\left(e^{4+\frac{3x}{2}}+6e^{1+\frac{x}{\log(x)}}-3e^{\frac{x}{\log(x)}}\right)-\frac{2x}{\log(x)}\right)\end{aligned}$$

input
```
Integrate[(E^((-2*x + (8 + 3*x - 2*(I*Pi + Log[-1 + 2*E]))*Log[x])/(2*Log[
x]))*(2 - 2*Log[x] + 3*Log[x]^2))/(-6*Log[x]^2 + 2*E^((-2*x + (8 + 3*x - 2
*(I*Pi + Log[-1 + 2*E]))*Log[x])/(2*Log[x]))*Log[x]^2),x]
```

output
```
(2*Log[E^(4 + (3*x)/2) + 6*E^(1 + x/Log[x]) - 3*E^(x/Log[x])] - (2*x)/Log[
x])/2
```

3.1088.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(3\log^2(x)-2\log(x)+2)\exp\left(\frac{-2x+(3x+8-2(\log(2e-1)+i\pi))\log(x)}{2\log(x)}\right)}{-6\log^2(x)+2\log^2(x)\exp\left(\frac{-2x+(3x+8-2(\log(2e-1)+i\pi))\log(x)}{2\log(x)}\right)}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{\frac{3x}{2}+4}(3\log^2(x)-2\log(x)+2)}{2\left(e^{\frac{3x}{2}+4}+3(2e-1)e^{\frac{x}{\log(x)}}\right)\log^2(x)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int \frac{e^{\frac{3x}{2}+4}(3\log^2(x)-2\log(x)+2)}{\left(e^{\frac{3x}{2}+4}-3(1-2e)e^{\frac{x}{\log(x)}}\right)\log^2(x)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{2}\int \left(\frac{2e^{\frac{3x}{2}+4}}{\left(-e^{\frac{3x}{2}+4}-6\left(1-\frac{1}{2e}\right)e^{\frac{x}{\log(x)}+1}\right)\log(x)}+\frac{3e^{\frac{3x}{2}+4}}{e^{\frac{3x}{2}+4}+6\left(1-\frac{1}{2e}\right)e^{\frac{x}{\log(x)}+1}}+\frac{2e^{\frac{3x}{2}+4}}{\log^2(x)\left(e^{\frac{3x}{2}+4}+6\left(1-\frac{1}{2e}\right)e^{\frac{x}{\log(x)}}\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{2}\left(2\int \frac{e^{\frac{3x}{2}+4}}{\left(e^{\frac{3x}{2}+4}+6\left(1-\frac{1}{2e}\right)e^{\frac{x}{\log(x)}+1}\right)\log^2(x)}dx+3\int \frac{e^{\frac{3x}{2}+4}}{e^{\frac{3x}{2}+4}+6\left(1-\frac{1}{2e}\right)e^{\frac{x}{\log(x)}+1}}dx+2\int \frac{e^{\frac{3x}{2}}}{\left(-e^{\frac{3x}{2}+4}-6\left(1-\frac{1}{2}\right.\right.}\right.$$

input
```
Int[(E^((-2*x + (8 + 3*x - 2*(I*Pi + Log[-1 + 2*E]))*Log[x])/(2*Log[x]))*(
2 - 2*Log[x] + 3*Log[x]^2))/(-6*Log[x]^2 + 2*E^((-2*x + (8 + 3*x - 2*(I*Pi
 + Log[-1 + 2*E]))*Log[x])/(2*Log[x]))*Log[x]^2),x]
```

output
```
$Aborted
```

3.1088. $\int \frac{e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}(2-2\log(x)+3\log^2(x))}{-6\log^2(x)+2e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\log^2(x)}dx$

3.1088.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1088.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

method	result	size
norman	$\ln\left(\mathrm{e}^{\frac{(-2\ln(-2\,\mathrm{e}+1)+3x+8)\ln(x)-2x}{2\ln(x)}}-3\right)$	32
parallelrisch	$\ln\left(\mathrm{e}^{\frac{(-2\ln(-2\,\mathrm{e}+1)+3x+8)\ln(x)-2x}{2\ln(x)}}-3\right)$	32
risch	$\frac{3x}{2}-\frac{x}{\ln(x)}-\frac{(-2\ln(-2\,\mathrm{e}+1)+3x+8)\ln(x)-2x}{2\ln(x)}+\ln\left(\frac{\mathrm{e}^{\frac{3x\ln(x)+8\ln(x)-2x}{2\ln(x)}}}{-2\,\mathrm{e}+1}-3\right)$	71

input
```
int((3*ln(x)^2-2*ln(x)+2)*exp(1/2*((-2*ln(-2*exp(1)+1)+3*x+8)*ln(x)-2*x)/l
n(x))/(2*ln(x)^2*exp(1/2*((-2*ln(-2*exp(1)+1)+3*x+8)*ln(x)-2*x)/ln(x))-6*l
n(x)^2),x,method=_RETURNVERBOSE)
```

output
```
ln(exp(1/2*((-2*ln(-2*exp(1)+1)+3*x+8)*ln(x)-2*x)/ln(x))-3)
```

3.1088.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.94

$$\int \frac{e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\left(2-2\log(x)+3\log^2(x)\right)}{-6\log^2(x)+2e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\log^2(x)}\,dx$$
$$=\log\left(e^{\left(\frac{(3\,x-2\,\log(-2\,e+1)+8)\log(x)-2\,x}{2\,\log(x)}\right)}-3\right)$$

input
```
integrate((3*log(x)^2-2*log(x)+2)*exp(1/2*((-2*log(-2*exp(1)+1)+3*x+8)*log
(x)-2*x)/log(x))/(2*log(x)^2*exp(1/2*((-2*log(-2*exp(1)+1)+3*x+8)*log(x)-2
*x)/log(x))-6*log(x)^2),x, algorithm=\
```

output
```
log(e^(1/2*((3*x - 2*log(-2*e + 1) + 8)*log(x) - 2*x)/log(x)) - 3)
```

3.1088.6 Sympy [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.09

$$\int \frac{e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\left(2-2\log(x)+3\log^2(x)\right)}{-6\log^2(x)+2e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\log^2(x)}\,dx$$
$$=-\frac{x}{\log(x)}+\log\left(e^{\frac{x}{\log(x)}}+\frac{e^4}{-3e^{-\frac{3x}{2}}+6ee^{-\frac{3x}{2}}}\right)$$

input
```
integrate((3*ln(x)**2-2*ln(x)+2)*exp(1/2*((-2*ln(-2*exp(1)+1)+3*x+8)*ln(x)
-2*x)/ln(x))/(2*ln(x)**2*exp(1/2*((-2*ln(-2*exp(1)+1)+3*x+8)*ln(x)-2*x)/ln
(x))-6*ln(x)**2),x)
```

output
```
-x/log(x) + log(exp(x/log(x)) + exp(4)/(-3*exp(-3*x/2) + 6*E*exp(-3*x/2)))
```

3.1088.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.24

$$\int \frac{e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}(2-2\log(x)+3\log^2(x))}{-6\log^2(x)+2e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\log^2(x)}\,dx = -\frac{x}{\log(x)}+\log\left(\frac{3(2e-1)e^{\frac{x}{\log(x)}}+e^{\left(\frac{3}{2}x+4\right)}}{3(2e-1)}\right)$$

input
```
integrate((3*log(x)^2-2*log(x)+2)*exp(1/2*((-2*log(-2*exp(1)+1)+3*x+8)*log
(x)-2*x)/log(x))/(2*log(x)^2*exp(1/2*((-2*log(-2*exp(1)+1)+3*x+8)*log(x)-2
*x)/log(x))-6*log(x)^2),x, algorithm=\
```

output
```
-x/log(x) + log(1/3*(3*(2*e - 1)*e^(x/log(x)) + e^(3/2*x + 4))/(2*e - 1))
```

3.1088.8 Giac [F(-2)]

Exception generated.

$$\int \frac{e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}(2-2\log(x)+3\log^2(x))}{-6\log^2(x)+2e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\log^2(x)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((3*log(x)^2-2*log(x)+2)*exp(1/2*((-2*log(-2*exp(1)+1)+3*x+8)*log
(x)-2*x)/log(x))/(2*log(x)^2*exp(1/2*((-2*log(-2*exp(1)+1)+3*x+8)*log(x)-2
*x)/log(x))-6*log(x)^2),x, algorithm=\
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:Unable to divide, perhaps due to ro
unding error%%%{-128,[0,11,0]%%%} / %%%{256,[0,11,0]%%%} Error: Bad Argume
nt Value
```

3.1088.9 Mupad [B] (verification not implemented)

Time = 17.45 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.82

$$\int \frac{e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\left(2-2\log(x)+3\log^2(x)\right)}{-6\log^2(x)+2e^{\frac{-2x+(8+3x-2(i\pi+\log(-1+2e)))\log(x)}{2\log(x)}}\log^2(x)}\,dx = \ln\left(-\frac{e^4\,e^{-\frac{x}{\ln(x)}}\,\left(e^x\right)^{3/2}}{2\,e-1}-3\right)$$

input
```
int(-(exp(-(x - (log(x)*(3*x - 2*log(1 - 2*exp(1)) + 8))/2)/log(x))*(3*log
(x)^2 - 2*log(x) + 2))/(6*log(x)^2 - 2*exp(-(x - (log(x)*(3*x - 2*log(1 -
2*exp(1)) + 8))/2)/log(x))*log(x)^2),x)
```

output
```
log(- (exp(4)*exp(-x/log(x))*exp(x)^(3/2))/(2*exp(1) - 1) - 3)
```

3.1089 $\int \frac{-1-2x}{2x-2x^2+x\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)}\,dx$

3.1089.1 Optimal result

Integrand size = 31, antiderivative size = 20

$$\int \frac{-1-2x}{2x-2x^2+x\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)}\,dx=-1+\log\left(2-2x+\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)\right)$$

output
```
ln(ln(4/5*ln(ln(ln(5)))/x)+2-2*x)-1
```

3.1089.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{-1-2x}{2x-2x^2+x\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)}\,dx=\log\left(2-2x+\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)\right)$$

input
```
Integrate[(-1 - 2*x)/(2*x - 2*x^2 + x*Log[(4*Log[Log[Log[5]]])/(5*x)]),x]
```

output
```
Log[2 - 2*x + Log[(4*Log[Log[Log[5]]])/(5*x)]]
```

3.1089.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x-1}{-2x^2+2x+x\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{1}{x\left(2x-\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)-2\right)}+\frac{2}{2x-\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)-2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\int \frac{1}{2x-\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)-2}dx+\int \frac{1}{x\left(2x-\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)-2\right)}dx$$

input
```
Int[(-1 - 2*x)/(2*x - 2*x^2 + x*Log[(4*Log[Log[Log[5]]])/(5*x)]),x]
```

output
```
$Aborted
```

3.1089.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1089.4 Maple [A] (verified)

Time = 1.74 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

method	result
risch	$\ln\left(\ln\left(\frac{4\ln(\ln(\ln(5)))}{5x}\right)+2-2x\right)$
parallelrisch	$\ln\left(-\frac{\ln\left(\frac{4\ln(\ln(\ln(5)))}{5x}\right)}{2}-1+x\right)$
norman	$\ln\left(2x-\ln\left(\frac{4\ln(\ln(\ln(5)))}{5x}\right)-2\right)$
derivativedivides	$-\ln\left(\frac{4\ln(\ln(\ln(5)))}{5x}\right)+\ln\left(-\frac{4\ln\left(\frac{4\ln(\ln(\ln(5)))}{5x}\right)\ln(\ln(\ln(5)))}{x}+8\ln(\ln(\ln(5)))-\frac{8\ln(\ln(\ln(5)))}{x}\right)$
default	$-\ln\left(\frac{4\ln(\ln(\ln(5)))}{5x}\right)+\ln\left(-\frac{4\ln\left(\frac{4\ln(\ln(\ln(5)))}{5x}\right)\ln(\ln(\ln(5)))}{x}+8\ln(\ln(\ln(5)))-\frac{8\ln(\ln(\ln(5)))}{x}\right)$

input
```
int((-1-2*x)/(x*ln(4/5*ln(ln(ln(5)))/x)-2*x^2+2*x),x,method=_RETURNVERBOSE
)
```

output
```
ln(ln(4/5*ln(ln(ln(5)))/x)+2-2*x)
```

3.1089.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{-1-2x}{2x-2x^2+x\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)}\,dx=\log\left(-2\,x+\log\left(\frac{4\,\log\left(\log\left(\log\left(5\right)\right)\right)}{5\,x}\right)+2\right)$$

input
```
integrate((-1-2*x)/(x*log(4/5*log(log(log(5)))/x)-2*x^2+2*x),x, algorithm=
\
```

output
```
log(-2*x + log(4/5*log(log(log(5)))/x) + 2)
```

3.1089.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-1-2x}{2x-2x^2+x\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)}\,dx = \log\left(-2x+\log\left(\frac{4\log\left(\log\left(\log\left(5\right)\right)\right)}{5x}\right)+2\right)$$

input
```
integrate((-1-2*x)/(x*ln(4/5*ln(ln(ln(5)))/x)-2*x**2+2*x),x)
```

output
```
log(-2*x + log(4*log(log(log(5)))/(5*x)) + 2)
```

3.1089.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{-1-2x}{2x-2x^2+x\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)}\,dx = \log\left(2\,x+\log\left(5\right)-2\,\log\left(2\right)+\log\left(x\right)-\log\left(\log\left(\log\left(\log\left(5\right)\right)\right)\right)-2\right)$$

input
```
integrate((-1-2*x)/(x*log(4/5*log(log(log(5)))/x)-2*x^2+2*x),x, algorithm=
\
```

output
```
log(2*x + log(5) - 2*log(2) + log(x) - log(log(log(log(5)))) - 2)
```

3.1089.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 65 vs. $2(18) = 36$.

Time = 0.28 (sec) , antiderivative size = 65, normalized size of antiderivative = 3.25

$$\int \frac{-1-2x}{2x-2x^2+x\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)}\,dx$$
$$= \frac{\log\left(-\frac{4\,\log\left(\frac{4\,\log(\log(\log(5)))}{5\,x}\right)\log(\log(\log(5)))}{x}-\frac{8\,\log(\log(\log(5)))}{x}+8\,\log\left(\log\left(\log\left(5\right)\right)\right)\right)\log\left(\log\left(\log\left(5\right)\right)\right)-\log\left(\frac{4\,\log}{}\right.}{\log\left(\log\left(\log\left(5\right)\right)\right)}$$

input
```
integrate((-1-2*x)/(x*log(4/5*log(log(log(5)))/x)-2*x^2+2*x),x, algorithm=
\
```

output
```
(log(-4*log(4/5*log(log(log(5)))/x)*log(log(log(5)))/x - 8*log(log(log(5))
)/x + 8*log(log(log(5))))*log(log(log(5))) - log(4/5*log(log(log(5)))/x)*l
og(log(log(5))))/log(log(log(5)))
```

3.1089.9 Mupad [B] (verification not implemented)

Time = 17.43 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{-1-2x}{2x-2x^2+x\log\left(\frac{4\log(\log(\log(5)))}{5x}\right)}\,dx = \ln\left(x-\frac{\ln\left(-\ln\left(\ln\left(\ln\left(5\right)\right)\right)\right)}{2}-\ln\left(2\right)+\frac{\ln\left(5\right)}{2}-\frac{\ln\left(-\frac{1}{x}\right)}{2}-1\right)$$

input
```
int(-(2*x + 1)/(2*x + x*log((4*log(log(log(5))))/(5*x)) - 2*x^2),x)
```

output
```
log(x - log(-log(log(log(5))))/2 - log(2) + log(5)/2 - log(-1/x)/2 - 1)
```

3.1090 $\int \frac{e^{-\frac{x^2}{1+3x+e^{4x}x-x^2-x^3}}\left(-2x-3x^2-x^4+e^{4x}\left(-x^2+4x^3\right)\right)}{1+6x+7x^2+e^{8x}x^2-8x^3-5x^4+2x^5+x^6+e^{4x}\left(2x+6x^2-2x^3-2x^4\right)} dx$

3.1090.1 Optimal result

Integrand size = 127, antiderivative size = 24

$$\int \frac{e^{-\frac{x^2}{1+3x+e^{4x}x-x^2-x^3}}\left(-2x-3x^2-x^4+e^{4x}(-x^2+4x^3)\right)}{1+6x+7x^2+e^{8x}x^2-8x^3-5x^4+2x^5+x^6+e^{4x}\left(2x+6x^2-2x^3-2x^4\right)} dx = e^{\frac{x}{-3-e^{4x}-\frac{1}{x}+x+x^2}}$$

output
```
exp(x/(x^2-1/x+x-exp(4*x)-3))
```

3.1090.2 Mathematica [A] (verified)

Time = 1.90 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{e^{-\frac{x^2}{1+3x+e^{4x}x-x^2-x^3}}\left(-2x-3x^2-x^4+e^{4x}(-x^2+4x^3)\right)}{1+6x+7x^2+e^{8x}x^2-8x^3-5x^4+2x^5+x^6+e^{4x}\left(2x+6x^2-2x^3-2x^4\right)} dx = e^{\frac{x^2}{-1-\left(3+e^{4x}\right)x+x^2+x^3}}$$

input
```
Integrate[(-2*x - 3*x^2 - x^4 + E^(4*x)*(-x^2 + 4*x^3))/(E^(x^2/(1 + 3*x + 
 E^(4*x)*x - x^2 - x^3))*(1 + 6*x + 7*x^2 + E^(8*x)*x^2 - 8*x^3 - 5*x^4 + 
2*x^5 + x^6 + E^(4*x)*(2*x + 6*x^2 - 2*x^3 - 2*x^4))),x]
```

output
```
E^(x^2/(-1 - (3 + E^(4*x))*x + x^2 + x^3))
```

3.1090.3 Rubi [A] (verified)

Time = 0.98 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.008, Rules used = {7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-\frac{x^2}{-x^3-x^2+e^{4x}x+3x+1}}\left(-x^4-3x^2+e^{4x}\left(4x^3-x^2\right)-2x\right)}{x^6+2x^5-5x^4-8x^3+e^{8x}x^2+7x^2+e^{4x}\left(-2x^4-2x^3+6x^2+2x\right)+6x+1}dx$$

$$\Big\downarrow \text{7257}$$

$$e^{-\frac{x^2}{-x^3-x^2+e^{4x}x+3x+1}}$$

input
```
Int[(-2*x - 3*x^2 - x^4 + E^(4*x)*(-x^2 + 4*x^3))/(E^(x^2/(1 + 3*x + E^(4*
x)*x - x^2 - x^3))*(1 + 6*x + 7*x^2 + E^(8*x)*x^2 - 8*x^3 - 5*x^4 + 2*x^5
+ x^6 + E^(4*x)*(2*x + 6*x^2 - 2*x^3 - 2*x^4))),x]
```

output
```
E^(-(x^2/(1 + 3*x + E^(4*x)*x - x^2 - x^3)))
```

3.1090.3.1 Defintions of rubi rules used

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

3.1090.4 Maple [A] (verified)

Time = 3.85 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

method	result	size
risch	$\mathrm{e}^{\frac{x^2}{-x\,\mathrm{e}^{4x}+x^3+x^2-3x-1}}$	26
parallelrisch	$\mathrm{e}^{-\frac{x^2}{x\,\mathrm{e}^{4x}-x^3-x^2+3x+1}}$	30

input
```
int(((4*x^3-x^2)*exp(4*x)-x^4-3*x^2-2*x)*exp(-x^2/(x*exp(4*x)-x^3-x^2+3*x+
1))/(x^2*exp(4*x)^2+(-2*x^4-2*x^3+6*x^2+2*x)*exp(4*x)+x^6+2*x^5-5*x^4-8*x^
3+7*x^2+6*x+1),x,method=_RETURNVERBOSE)
```

output
```
exp(x^2/(-x*exp(4*x)+x^3+x^2-3*x-1))
```

3.1090.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04

$$\int \frac{e^{-\frac{x^2}{1+3x+e^{4x}x-x^2-x^3}}\left(-2x-3x^2-x^4+e^{4x}(-x^2+4x^3)\right)}{1+6x+7x^2+e^{8x}x^2-8x^3-5x^4+2x^5+x^6+e^{4x}\left(2x+6x^2-2x^3-2x^4\right)}\,dx = e^{\left(\frac{x^2}{x^3+x^2-xe^{(4x)}-3x-1}\right)}$$

input
```
integrate(((4*x^3-x^2)*exp(4*x)-x^4-3*x^2-2*x)*exp(-x^2/(x*exp(4*x)-x^3-x^
2+3*x+1))/(x^2*exp(4*x)^2+(-2*x^4-2*x^3+6*x^2+2*x)*exp(4*x)+x^6+2*x^5-5*x^
4-8*x^3+7*x^2+6*x+1),x, algorithm=\
```

output
```
e^(x^2/(x^3 + x^2 - x*e^(4*x) - 3*x - 1))
```

3.1090.6 Sympy [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{e^{-\frac{x^2}{1+3x+e^{4x}x-x^2-x^3}}\left(-2x-3x^2-x^4+e^{4x}(-x^2+4x^3)\right)}{1+6x+7x^2+e^{8x}x^2-8x^3-5x^4+2x^5+x^6+e^{4x}\left(2x+6x^2-2x^3-2x^4\right)}\,dx = e^{-\frac{x^2}{-x^3-x^2+xe^{4x}+3x+1}}$$

input
```
integrate(((4*x**3-x**2)*exp(4*x)-x**4-3*x**2-2*x)*exp(-x**2/(x*exp(4*x)-x
**3-x**2+3*x+1))/(x**2*exp(4*x)**2+(-2*x**4-2*x**3+6*x**2+2*x)*exp(4*x)+x*
*6+2*x**5-5*x**4-8*x**3+7*x**2+6*x+1),x)
```

output
```
exp(-x**2/(-x**3 - x**2 + x*exp(4*x) + 3*x + 1))
```

3.1090.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04

$$\int \frac{e^{-\frac{x^2}{1+3x+e^{4x}x-x^2-x^3}}(-2x-3x^2-x^4+e^{4x}(-x^2+4x^3))}{1+6x+7x^2+e^{8x}x^2-8x^3-5x^4+2x^5+x^6+e^{4x}(2x+6x^2-2x^3-2x^4)}\,dx$$
$$= e^{\left(\frac{x^2}{x^3+x^2-xe^{(4x)}-3x-1}\right)}$$

input
```
integrate(((4*x^3-x^2)*exp(4*x)-x^4-3*x^2-2*x)*exp(-x^2/(x*exp(4*x)-x^3-x^
2+3*x+1))/(x^2*exp(4*x)^2+(-2*x^4-2*x^3+6*x^2+2*x)*exp(4*x)+x^6+2*x^5-5*x^
4-8*x^3+7*x^2+6*x+1),x, algorithm=\
```

output
```
e^(x^2/(x^3 + x^2 - x*e^(4*x) - 3*x - 1))
```

3.1090.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04

$$\int \frac{e^{-\frac{x^2}{1+3x+e^{4x}x-x^2-x^3}}(-2x-3x^2-x^4+e^{4x}(-x^2+4x^3))}{1+6x+7x^2+e^{8x}x^2-8x^3-5x^4+2x^5+x^6+e^{4x}(2x+6x^2-2x^3-2x^4)}\,dx$$
$$= e^{\left(\frac{x^2}{x^3+x^2-xe^{(4x)}-3x-1}\right)}$$

input
```
integrate(((4*x^3-x^2)*exp(4*x)-x^4-3*x^2-2*x)*exp(-x^2/(x*exp(4*x)-x^3-x^
2+3*x+1))/(x^2*exp(4*x)^2+(-2*x^4-2*x^3+6*x^2+2*x)*exp(4*x)+x^6+2*x^5-5*x^
4-8*x^3+7*x^2+6*x+1),x, algorithm=\
```

output
```
e^(x^2/(x^3 + x^2 - x*e^(4*x) - 3*x - 1))
```

3.1090.9 Mupad [B] (verification not implemented)

Time = 16.12 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{e^{-\frac{x^2}{1+3x+e^{4x}x-x^2-x^3}}(-2x-3x^2-x^4+e^{4x}(-x^2+4x^3))}{1+6x+7x^2+e^{8x}x^2-8x^3-5x^4+2x^5+x^6+e^{4x}(2x+6x^2-2x^3-2x^4)}\,dx$$
$$= \mathrm{e}^{-\frac{x^2}{x\,(\mathrm{e}^{4\,x}+3)-x^2-x^3+1}}$$

input
```
int(-(exp(-x^2/(3*x + x*exp(4*x) - x^2 - x^3 + 1))*(2*x + exp(4*x)*(x^2 -
4*x^3) + 3*x^2 + x^4))/(6*x + x^2*exp(8*x) + exp(4*x)*(2*x + 6*x^2 - 2*x^3
 - 2*x^4) + 7*x^2 - 8*x^3 - 5*x^4 + 2*x^5 + x^6 + 1),x)
```

output
```
exp(-x^2/(x*(exp(4*x) + 3) - x^2 - x^3 + 1))
```

3.1090. $\int \frac{e^{-\frac{x^2}{1+3x+e^{4x}x-x^2-x^3}}\left(-2x-3x^2-x^4+e^{4x}\left(-x^2+4x^3\right)\right)}{1+6x+7x^2+e^{8x}x^2-8x^3-5x^4+2x^5+x^6+e^{4x}\left(2x+6x^2-2x^3-2x^4\right)}\,dx$

3.1091 $\int \frac{e^{2x}(-4+2x-4x^2+4x^3+2x^5+e^{4x}(-2x^2+6x^3)+e^{2x}(6x-8x^2+2x^3-$

x^5

3.1091.1 Optimal result

Integrand size = 81, antiderivative size = 37

$$\int \frac{e^{2x}(-4+2x-4x^2+4x^3+2x^5+e^{4x}(-2x^2+6x^3)+e^{2x}(6x-8x^2+2x^3-8x^4))\left(3-\log^2(3)\right)^2}{x^5}\,dx = \frac{e^{2x}\left(e^{2x}-\frac{1+x^2}{x}\right)^2\left(3-\log^2(3)\right)^2}{x^2}$$

output
```
(exp(x)^2-1/x*(x^2+1))^2/x^2*exp(ln(-ln(3)^2+3)+x)^2
```

3.1091.2 Mathematica [A] (verified)

Time = 3.33 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.86

$$\int \frac{e^{2x}(-4+2x-4x^2+4x^3+2x^5+e^{4x}(-2x^2+6x^3)+e^{2x}(6x-8x^2+2x^3-8x^4))\left(3-\log^2(3)\right)^2}{x^5}\,dx = \frac{e^{2x}(1-e^{2x}x+x^2)^2\left(-3+\log^2(3)\right)^2}{x^4}$$

input
```
Integrate[(E^(2*x)*(-4 + 2*x - 4*x^2 + 4*x^3 + 2*x^5 + E^(4*x)*(-2*x^2 + 6
*x^3) + E^(2*x)*(6*x - 8*x^2 + 2*x^3 - 8*x^4))*(3 - Log[3]^2)^2)/x^5,x]
```

output
```
(E^(2*x)*(1 - E^(2*x)*x + x^2)^2*(-3 + Log[3]^2)^2)/x^4
```

3.1091.3 Rubi [A] (verified)

Time = 1.24 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.049$, Rules used = {27, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}\left(2x^5+4x^3-4x^2+e^{4x}\left(6x^3-2x^2\right)+e^{2x}\left(-8x^4+2x^3-8x^2+6x\right)+2x-4\right)\left(3-\log^2(3)\right)^2}{x^5}dx$$

$$\Big\downarrow \text{27}$$

$$\left(3-\log^2(3)\right)^2\int -\frac{2e^{2x}\left(-x^5-2x^3+2x^2-x+e^{4x}\left(x^2-3x^3\right)-e^{2x}\left(-4x^4+x^3-4x^2+3x\right)+2\right)}{x^5}dx$$

$$\Big\downarrow \text{27}$$

$$-2\left(3-\log^2(3)\right)^2\int \frac{e^{2x}\left(-x^5-2x^3+2x^2-x+e^{4x}\left(x^2-3x^3\right)-e^{2x}\left(-4x^4+x^3-4x^2+3x\right)+2\right)}{x^5}dx$$

$$\Big\downarrow \text{7293}$$

$$-2\left(3-\log^2(3)\right)^2\int \left(-\frac{e^{6x}(3x-1)}{x^3}+\frac{e^{4x}\left(4x^3-x^2+4x-3\right)}{x^4}+\frac{e^{2x}\left(-x^5-2x^3+2x^2-x+2\right)}{x^5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-2\left(-\frac{e^{2x}}{2x^4}+\frac{e^{4x}}{x^3}-\frac{e^{2x}}{x^2}-\frac{e^{6x}}{2x^2}-\frac{e^{2x}}{2}+\frac{e^{4x}}{x}\right)\left(3-\log^2(3)\right)^2$$

input
```
Int[(E^(2*x)*(-4 + 2*x - 4*x^2 + 4*x^3 + 2*x^5 + E^(4*x)*(-2*x^2 + 6*x^3)
+ E^(2*x)*(6*x - 8*x^2 + 2*x^3 - 8*x^4))*(3 - Log[3]^2)^2)/x^5,x]
```

output
```
-2*(-1/2*E^(2*x) - E^(2*x)/(2*x^4) + E^(4*x)/x^3 - E^(2*x)/x^2 - E^(6*x)/(
2*x^2) + E^(4*x)/x)*(3 - Log[3]^2)^2
```

3.1091.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1091.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. 2(35) = 70.

Time = 0.36 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.95

method	result
risch	$\frac{\left(-\ln(3)^2+3\right)^2 e^{6x}}{x^2}-\frac{2\left(-\ln(3)^2+3\right)^2 (x^2+1)e^{4x}}{x^3}+\frac{\left(-\ln(3)^2+3\right)^2 (x^4+2x^2+1)e^{2x}}{x^4}$
parallelrisch	$\frac{\left(\ln(3)^2-3\right)^2 e^{2x}e^{4x}x^2-2\left(\ln(3)^2-3\right)^2 \left(e^{2x}\right)^2 x^3+\left(\ln(3)^2-3\right)^2 e^{2x}x^4-2\left(\ln(3)^2-3\right)^2 \left(e^{2x}\right)^2 x+2\left(\ln(3)^2-3\right)^2 e^{2x}x^2+\left(\ln(3)^2-\right.}{x^4}$
parts	$\frac{2\left(\ln(3)^2-3\right)^2 e^{2x}}{x^2}+\frac{\left(\ln(3)^2-3\right)^2 e^{2x}}{x^4}+\left(\ln(3)^2-3\right)^2 e^{2x}-\frac{18\,e^{4x}}{x^3}-\frac{18\,e^{4x}}{x}+\frac{12\,e^{4x}\ln(3)^2}{x^3}+\frac{12\,e^{4x}\ln(3)^2}{x}-$
default	Expression too large to display

input
```
int(((6*x^3-2*x^2)*exp(x)^4+(-8*x^4+2*x^3-8*x^2+6*x)*exp(x)^2+2*x^5+4*x^3-
4*x^2+2*x-4)*exp(ln(-ln(3)^2+3)+x)^2/x^5,x,method=_RETURNVERBOSE)
```

output
```
(-ln(3)^2+3)^2/x^2*exp(6*x)-2*(-ln(3)^2+3)^2*(x^2+1)/x^3*exp(4*x)+(-ln(3)^
2+3)^2*(x^4+2*x^2+1)/x^4*exp(2*x)
```

3.1091.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 205 vs. 2(38) = 76.

Time = 0.25 (sec) , antiderivative size = 205, normalized size of antiderivative = 5.54

$$\int \frac{e^{2x}(-4+2x-4x^2+4x^3+2x^5+e^{4x}(-2x^2+6x^3)+e^{2x}(6x-8x^2+2x^3-8x^4))\left(3-\log^2(3)\right)^2}{x^5}\,dx$$

$$= \frac{x^2e^{\left(6\,x+6\,\log\left(-\log(3)^2+3\right)\right)} - 2\left(\left(x^3+x\right)\log(3)^4 + 9\,x^3 - 6\left(x^3+x\right)\log(3)^2 + 9\,x\right)e^{\left(4\,x+4\,\log\left(-\log(3)^2+3\right)\right)} + (}{x^4\log(3}$$

input
```
integrate((((6*x^3-2*x^2)*exp(x)^4+(-8*x^4+2*x^3-8*x^2+6*x)*exp(x)^2+2*x^5+
4*x^3-4*x^2+2*x-4)*exp(log(-log(3)^2+3)+x)^2/x^5,x, algorithm=\
```

output
```
(x^2*e^(6*x + 6*log(-log(3)^2 + 3)) - 2*((x^3 + x)*log(3)^4 + 9*x^3 - 6*(x
^3 + x)*log(3)^2 + 9*x)*e^(4*x + 4*log(-log(3)^2 + 3)) + ((x^4 + 2*x^2 + 1
)*log(3)^8 - 12*(x^4 + 2*x^2 + 1)*log(3)^6 + 54*(x^4 + 2*x^2 + 1)*log(3)^4
 + 81*x^4 - 108*(x^4 + 2*x^2 + 1)*log(3)^2 + 162*x^2 + 81)*e^(2*x + 2*log(
-log(3)^2 + 3)))/(x^4*log(3)^8 - 12*x^4*log(3)^6 + 54*x^4*log(3)^4 - 108*x
^4*log(3)^2 + 81*x^4)
```

3.1091.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 165 vs. 2(29) = 58.

Time = 0.21 (sec) , antiderivative size = 165, normalized size of antiderivative = 4.46

$$\int \frac{e^{2x}(-4+2x-4x^2+4x^3+2x^5+e^{4x}(-2x^2+6x^3)+e^{2x}(6x-8x^2+2x^3-8x^4))\left(3-\log^2(3)\right)^2}{x^5}\,dx$$

$$= \frac{\left(-6x^7\log(3)^2 + x^7\log(3)^4 + 9x^7\right)e^{6x} + \left(-18x^8 - 2x^8\log(3)^4 + 12x^8\log(3)^2 - 18x^6 - 2x^6\log(3)^4 + 12\right.}{}$$

input
```
integrate((((6*x**3-2*x**2)*exp(x)**4+(-8*x**4+2*x**3-8*x**2+6*x)*exp(x)**2
+2*x**5+4*x**3-4*x**2+2*x-4)*exp(ln(-ln(3)**2+3)+x)**2/x**5,x)
```

output
```
((-6*x**7*log(3)**2 + x**7*log(3)**4 + 9*x**7)*exp(6*x) + (-18*x**8 - 2*x*
*8*log(3)**4 + 12*x**8*log(3)**2 - 18*x**6 - 2*x**6*log(3)**4 + 12*x**6*lo
g(3)**2)*exp(4*x) + (-6*x**9*log(3)**2 + x**9*log(3)**4 + 9*x**9 - 12*x**7
*log(3)**2 + 2*x**7*log(3)**4 + 18*x**7 - 6*x**5*log(3)**2 + x**5*log(3)**
4 + 9*x**5)*exp(2*x))/x**9
```

3.1091.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.25 (sec) , antiderivative size = 86, normalized size of antiderivative = 2.32

$$\int \frac{e^{2x}(-4+2x-4x^2+4x^3+2x^5+e^{4x}(-2x^2+6x^3)+e^{2x}(6x-8x^2+2x^3-8x^4))\left(3-\log^2(3)\right)^2}{x^5}\,dx$$
$$= -\left(\log(3)^2-3\right)^2\left(8\,\mathrm{Ei}(4\,x)-e^{(2\,x)}-8\,\Gamma(-1,-2\,x)-8\,\Gamma(-1,-4\,x)-36\,\Gamma(-1,-6\,x)-16\,\Gamma(-2,-2\,x)\right.$$

input
```
integrate(((6*x^3-2*x^2)*exp(x)^4+(-8*x^4+2*x^3-8*x^2+6*x)*exp(x)^2+2*x^5+
4*x^3-4*x^2+2*x-4)*exp(log(-log(3)^2+3)+x)^2/x^5,x, algorithm=\
```

output
```
-(log(3)^2 - 3)^2*(8*Ei(4*x) - e^(2*x) - 8*gamma(-1, -2*x) - 8*gamma(-1, -
4*x) - 36*gamma(-1, -6*x) - 16*gamma(-2, -2*x) - 128*gamma(-2, -4*x) - 72*
gamma(-2, -6*x) - 16*gamma(-3, -2*x) - 384*gamma(-3, -4*x) - 64*gamma(-4,
-2*x))
```

3.1091.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 197 vs. 2(38) = 76.

Time = 0.28 (sec) , antiderivative size = 197, normalized size of antiderivative = 5.32

$$\int \frac{e^{2x}(-4+2x-4x^2+4x^3+2x^5+e^{4x}(-2x^2+6x^3)+e^{2x}(6x-8x^2+2x^3-8x^4))\left(3-\log^2(3)\right)^2}{x^5}\,dx$$
$$= \frac{x^4e^{(2\,x)}\log(3)^4-2\,x^3e^{(4\,x)}\log(3)^4-6\,x^4e^{(2\,x)}\log(3)^2+x^2e^{(6\,x)}\log(3)^4+2\,x^2e^{(2\,x)}\log(3)^4+12\,x^3e^{(4\,x)}\log\ldots}{}$$

input
```
integrate(((6*x^3-2*x^2)*exp(x)^4+(-8*x^4+2*x^3-8*x^2+6*x)*exp(x)^2+2*x^5+
4*x^3-4*x^2+2*x-4)*exp(log(-log(3)^2+3)+x)^2/x^5,x, algorithm=\
```

output
```
(x^4*e^(2*x)*log(3)^4 - 2*x^3*e^(4*x)*log(3)^4 - 6*x^4*e^(2*x)*log(3)^2 +
x^2*e^(6*x)*log(3)^4 + 2*x^2*e^(2*x)*log(3)^4 + 12*x^3*e^(4*x)*log(3)^2 -
2*x*e^(4*x)*log(3)^4 + 9*x^4*e^(2*x) - 6*x^2*e^(6*x)*log(3)^2 - 12*x^2*e^(
2*x)*log(3)^2 + e^(2*x)*log(3)^4 - 18*x^3*e^(4*x) + 12*x*e^(4*x)*log(3)^2
+ 9*x^2*e^(6*x) + 18*x^2*e^(2*x) - 6*e^(2*x)*log(3)^2 - 18*x*e^(4*x) + 9*e
^(2*x))/x^4
```

3.1091.9 Mupad [B] (verification not implemented)

Time = 16.49 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.81

$$\int \frac{e^{2x}(-4+2x-4x^2+4x^3+2x^5+e^{4x}(-2x^2+6x^3)+e^{2x}(6x-8x^2+2x^3-8x^4))\left(3-\log^2(3)\right)^2}{x^5}\,dx$$
$$=\frac{\mathrm{e}^{2\,x}\,\left(\ln\left(3\right)^2-3\right)^2\,\left(x^2-x\,\mathrm{e}^{2\,x}+1\right)^2}{x^4}$$

input
```
int((exp(2*x + 2*log(3 - log(3)^2))*(2*x - exp(4*x)*(2*x^2 - 6*x^3) + exp(
2*x)*(6*x - 8*x^2 + 2*x^3 - 8*x^4) - 4*x^2 + 4*x^3 + 2*x^5 - 4))/x^5,x)
```

output
```
(exp(2*x)*(log(3)^2 - 3)^2*(x^2 - x*exp(2*x) + 1)^2)/x^4
```

3.1092 $\int \frac{282-48x+2x^2+\left(-24x+26x^2-2x^3+\left(24x-26x^2+2x^3\right)\log\left(\frac{1-2x+x^2}{x^2}\right)\right)\log\left(-1+\log\left(\frac{1-2x+x^2}{x^2}\right)\right)}{x-x^2+\left(-x+x^2\right)\log\left(\frac{1-2x+x^2}{x^2}\right)}\,dx$

3.1092.1 Optimal result

Integrand size = 100, antiderivative size = 21

$$\int \frac{282-48x+2x^2+\left(-24x+26x^2-2x^3+\left(24x-26x^2+2x^3\right)\log\left(\frac{1-2x+x^2}{x^2}\right)\right)\log\left(-1+\log\left(\frac{1-2x+x^2}{x^2}\right)\right)}{x-x^2+\left(-x+x^2\right)\log\left(\frac{1-2x+x^2}{x^2}\right)}\,dx$$
$$=\left(-3+(12-x)^2\right)\log\left(-1+\log\left(\left(-1+\frac{1}{x}\right)^2\right)\right)$$

output
```
ln(ln((1/x-1)^2)-1)*((12-x)^2-3)
```

3.1092.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 43 vs. 2(21) = 42.

Time = 0.22 (sec) , antiderivative size = 43, normalized size of antiderivative = 2.05

$$\int \frac{282-48x+2x^2+\left(-24x+26x^2-2x^3+\left(24x-26x^2+2x^3\right)\log\left(\frac{1-2x+x^2}{x^2}\right)\right)\log\left(-1+\log\left(\frac{1-2x+x^2}{x^2}\right)\right)}{x-x^2+\left(-x+x^2\right)\log\left(\frac{1-2x+x^2}{x^2}\right)}\,dx$$
$$=2\left(\frac{141}{2}\log\left(1-\log\left(\frac{(-1+x)^2}{x^2}\right)\right)+\frac{1}{2}(-24+x)x\log\left(-1+\log\left(\frac{(-1+x)^2}{x^2}\right)\right)\right)$$

input
```
Integrate[(282 - 48*x + 2*x^2 + (-24*x + 26*x^2 - 2*x^3 + (24*x - 26*x^2 +
 2*x^3)*Log[(1 - 2*x + x^2)/x^2])*Log[-1 + Log[(1 - 2*x + x^2)/x^2]])/(x -
 x^2 + (-x + x^2)*Log[(1 - 2*x + x^2)/x^2]),x]
```

output
```
2*((141*Log[1 - Log[(-1 + x)^2/x^2]])/2 + ((-24 + x)*x*Log[-1 + Log[(-1 +
x)^2/x^2]])/2)
```

3.1092.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+\left(-2x^3+26x^2+\left(2x^3-26x^2+24x\right)\log\left(\frac{x^2-2x+1}{x^2}\right)-24x\right)\log\left(\log\left(\frac{x^2-2x+1}{x^2}\right)-1\right)-48x+282}{-x^2+\left(x^2-x\right)\log\left(\frac{x^2-2x+1}{x^2}\right)+x}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{2x^2+\left(-2x^3+26x^2+\left(2x^3-26x^2+24x\right)\log\left(\frac{x^2-2x+1}{x^2}\right)-24x\right)\log\left(\log\left(\frac{x^2-2x+1}{x^2}\right)-1\right)-48x+282}{(1-x)x\left(1-\log\left(\frac{(x-1)^2}{x^2}\right)\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2\left(x^2-24x+141\right)}{(x-1)x\left(\log\left(\frac{(x-1)^2}{x^2}\right)-1\right)}+2(x-12)\log\left(\log\left(\frac{(x-1)^2}{x^2}\right)-1\right)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$2\int \frac{1}{\log\left(\frac{(x-1)^2}{x^2}\right)-1}dx+236\int \frac{1}{(x-1)\left(\log\left(\frac{(x-1)^2}{x^2}\right)-1\right)}dx-282\int \frac{1}{x\left(\log\left(\frac{(x-1)^2}{x^2}\right)-1\right)}dx-24\int \log\left(\log\left(\frac{(x-1)^2}{x^2}\right)-1\right)dx+2\int x\log\left(\log\left(\frac{(x-1)^2}{x^2}\right)-1\right)dx$$

input
```
Int[(282 - 48*x + 2*x^2 + (-24*x + 26*x^2 - 2*x^3 + (24*x - 26*x^2 + 2*x^3
)*Log[(1 - 2*x + x^2)/x^2])*Log[-1 + Log[(1 - 2*x + x^2)/x^2]])/(x - x^2 +
 (-x + x^2)*Log[(1 - 2*x + x^2)/x^2]),x]
```

output
```
$Aborted
```

3.1092. $\int \frac{282-48x+2x^2+\left(-24x+26x^2-2x^3+\left(24x-26x^2+2x^3\right)\log\left(\frac{1-2x+x^2}{x^2}\right)\right)\log\left(-1+\log\left(\frac{1-2x+x^2}{x^2}\right)\right)}{x-x^2+\left(-x+x^2\right)\log\left(\frac{1-2x+x^2}{x^2}\right)}dx$

3.1092.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1092.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(21) = 42$.

Time = 1.65 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.81

method	result	size
parallelrisch	$\ln\left(\ln\left(\frac{x^2-2x+1}{x^2}\right)-1\right)x^2-24\ln\left(\ln\left(\frac{x^2-2x+1}{x^2}\right)-1\right)x+141\ln\left(\ln\left(\frac{x^2-2x+1}{x^2}\right)-1\right)$	59

input
```
int((((2*x^3-26*x^2+24*x)*ln((x^2-2*x+1)/x^2)-2*x^3+26*x^2-24*x)*ln(ln((x^
2-2*x+1)/x^2)-1)+2*x^2-48*x+282)/((x^2-x)*ln((x^2-2*x+1)/x^2)-x^2+x),x,met
hod=_RETURNVERBOSE)
```

output
```
ln(ln((x^2-2*x+1)/x^2)-1)*x^2-24*ln(ln((x^2-2*x+1)/x^2)-1)*x+141*ln(ln((x^
2-2*x+1)/x^2)-1)
```

3.1092.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

$$\int \frac{282-48x+2x^2+\left(-24x+26x^2-2x^3+(24x-26x^2+2x^3)\log\left(\frac{1-2x+x^2}{x^2}\right)\right)\log\left(-1+\log\left(\frac{1-2x+x^2}{x^2}\right)\right)}{x-x^2+(-x+x^2)\log\left(\frac{1-2x+x^2}{x^2}\right)}$$
$$=\left(x^2-24x+141\right)\log\left(\log\left(\frac{x^2-2x+1}{x^2}\right)-1\right)$$

input
```
integrate((((2*x^3-26*x^2+24*x)*log((x^2-2*x+1)/x^2)-2*x^3+26*x^2-24*x)*lo
g(log((x^2-2*x+1)/x^2)-1)+2*x^2-48*x+282)/((x^2-x)*log((x^2-2*x+1)/x^2)-x^
2+x),x, algorithm=\
```

output
```
(x^2 - 24*x + 141)*log(log((x^2 - 2*x + 1)/x^2) - 1)
```

3.1092.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(17) = 34$.

Time = 0.37 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.19

$$\int \frac{282-48x+2x^2+\left(-24x+26x^2-2x^3+(24x-26x^2+2x^3)\log\left(\frac{1-2x+x^2}{x^2}\right)\right)\log\left(-1+\log\left(\frac{1-2x+x^2}{x^2}\right)\right)}{x-x^2+(-x+x^2)\log\left(\frac{1-2x+x^2}{x^2}\right)}$$
$$=\left(x^2-24x+\frac{23}{6}\right)\log\left(\log\left(\frac{x^2-2x+1}{x^2}\right)-1\right)+\frac{823\log\left(\log\left(\frac{x^2-2x+1}{x^2}\right)-1\right)}{6}$$

input
```
integrate((((2*x**3-26*x**2+24*x)*ln((x**2-2*x+1)/x**2)-2*x**3+26*x**2-24*
x)*ln(ln((x**2-2*x+1)/x**2)-1)+2*x**2-48*x+282)/((x**2-x)*ln((x**2-2*x+1)/
x**2)-x**2+x),x)
```

output
```
(x**2 - 24*x + 23/6)*log(log((x**2 - 2*x + 1)/x**2) - 1) + 823*log(log((x*
*2 - 2*x + 1)/x**2) - 1)/6
```

3.1092.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.67

$$\int \frac{282-48x+2x^2+\left(-24x+26x^2-2x^3+(24x-26x^2+2x^3)\log\left(\frac{1-2x+x^2}{x^2}\right)\right)\log\left(-1+\log\left(\frac{1-2x+x^2}{x^2}\right)\right)}{x-x^2+(-x+x^2)\log\left(\frac{1-2x+x^2}{x^2}\right)}$$
$$=\left(x^2-24\,x\right)\log\left(2\,\log\left(x-1\right)-2\,\log\left(x\right)-1\right)+141\,\log\left(\log\left(x-1\right)-\log\left(x\right)-\frac{1}{2}\right)$$

input
```
integrate((((2*x^3-26*x^2+24*x)*log((x^2-2*x+1)/x^2)-2*x^3+26*x^2-24*x)*lo
g(log((x^2-2*x+1)/x^2)-1)+2*x^2-48*x+282)/((x^2-x)*log((x^2-2*x+1)/x^2)-x^
2+x),x, algorithm=\
```

output
```
(x^2 - 24*x)*log(2*log(x - 1) - 2*log(x) - 1) + 141*log(log(x - 1) - log(x
) - 1/2)
```

3.1092.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(19) = 38$.

Time = 0.62 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.14

$$\int \frac{282-48x+2x^2+\left(-24x+26x^2-2x^3+(24x-26x^2+2x^3)\log\left(\frac{1-2x+x^2}{x^2}\right)\right)\log\left(-1+\log\left(\frac{1-2x+x^2}{x^2}\right)\right)}{x-x^2+(-x+x^2)\log\left(\frac{1-2x+x^2}{x^2}\right)}$$
$$=\left(x^2-24\,x\right)\log\left(\log\left(\frac{x^2-2\,x+1}{x^2}\right)-1\right)+141\,\log\left(\log\left(x^2-2\,x+1\right)-\log\left(x^2\right)-1\right)$$

input
```
integrate((((2*x^3-26*x^2+24*x)*log((x^2-2*x+1)/x^2)-2*x^3+26*x^2-24*x)*lo
g(log((x^2-2*x+1)/x^2)-1)+2*x^2-48*x+282)/((x^2-x)*log((x^2-2*x+1)/x^2)-x^
2+x),x, algorithm=\
```

output
```
(x^2 - 24*x)*log(log((x^2 - 2*x + 1)/x^2) - 1) + 141*log(log(x^2 - 2*x + 1
) - log(x^2) - 1)
```

3.1092.9 Mupad [B] (verification not implemented)

Time = 15.85 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

$$\int \frac{282-48x+2x^2+\left(-24x+26x^2-2x^3+(24x-26x^2+2x^3)\log\left(\frac{1-2x+x^2}{x^2}\right)\right)\log\left(-1+\log\left(\frac{1-2x+x^2}{x^2}\right)\right)}{x-x^2+(-x+x^2)\log\left(\frac{1-2x+x^2}{x^2}\right)}$$
$$=\ln\left(\ln\left(\frac{x^2-2\,x+1}{x^2}\right)-1\right)\,\left(x^2-24\,x+141\right)$$

input
```
int((48*x + log(log((x^2 - 2*x + 1)/x^2) - 1)*(24*x - log((x^2 - 2*x + 1)/
x^2)*(24*x - 26*x^2 + 2*x^3) - 26*x^2 + 2*x^3) - 2*x^2 - 282)/(log((x^2 -
2*x + 1)/x^2)*(x - x^2) - x + x^2),x)
```

output
```
log(log((x^2 - 2*x + 1)/x^2) - 1)*(x^2 - 24*x + 141)
```

3.1093 $\int \frac{36e^{2e^x}x^2+e^{e^x}(-3e^{2x}x^2+e^x(-6x+3x^2))}{4e^{2x}+e^{e^x+x}(-96x+4x^2)+e^{2e^x}(576x^2-48x^3+x^4)}\,dx$

3.1093.1 Optimal result

Integrand size = 93, antiderivative size = 29

$$\int \frac{36e^{2e^x}x^2+e^{e^x}(-3e^{2x}x^2+e^x(-6x+3x^2))}{4e^{2x}+e^{e^x+x}(-96x+4x^2)+e^{2e^x}(576x^2-48x^3+x^4)}\,dx=\frac{x}{16-x+\frac{1}{3}\left(-\frac{4e^{-e^x+x}}{x}+x\right)}$$

output
```
x/(16-2/3*x-4/3/x*exp(x)/exp(exp(x)))
```

3.1093.2 Mathematica [A] (verified)

Time = 0.95 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \frac{36e^{2e^x}x^2+e^{e^x}(-3e^{2x}x^2+e^x(-6x+3x^2))}{4e^{2x}+e^{e^x+x}(-96x+4x^2)+e^{2e^x}(576x^2-48x^3+x^4)}\,dx=\frac{3\left(e^x-12e^{e^x}x\right)}{2e^x+e^{e^x}(-24+x)x}$$

input
```
Integrate[(36*E^(2*E^x)*x^2 + E^E^x*(-3*E^(2*x)*x^2 + E^x*(-6*x + 3*x^2)))
/(4*E^(2*x) + E^(E^x + x)*(-96*x + 4*x^2) + E^(2*E^x)*(576*x^2 - 48*x^3 +
x^4)),x]
```

output
```
(3*(E^x - 12*E^E^x*x))/(2*E^x + E^E^x*(-24 + x)*x)
```

3.1093.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{36e^{2e^x}x^2+e^{e^x}\left(e^x\left(3x^2-6x\right)-3e^{2x}x^2\right)}{e^{x+e^x}\left(4x^2-96x\right)+e^{2e^x}\left(x^4-48x^3+576x^2\right)+4e^{2x}}\,dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{3e^{e^x}x\left(e^x(x-2)+12e^{e^x}x-e^{2x}x\right)}{\left(e^{e^x}(x-24)x+2e^x\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$3\int -\frac{e^{e^x}x\left(e^x(2-x)-12e^{e^x}x+e^{2x}x\right)}{\left(2e^x-e^{e^x}(24-x)x\right)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-3\int \frac{e^{e^x}x\left(e^x(2-x)-12e^{e^x}x+e^{2x}x\right)}{\left(2e^x-e^{e^x}(24-x)x\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-3\int \left(\frac{1}{4}e^{e^x}x^2+\frac{e^{2e^x}\left(e^{e^x}x^4-48e^{e^x}x^3+576e^{e^x}x^2+2x^2-52x+48\right)x^2}{4\left(e^{e^x}x^2-24e^{e^x}x+2e^x\right)^2}-\frac{e^{e^x}\left(e^{e^x}x^3-24e^{e^x}x^2+x-2\right)x}{2\left(e^{e^x}x^2-24e^{e^x}x+2e^x\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-3\left(\frac{1}{4}\int e^{e^x}x^2dx+12\int \frac{e^{2e^x}x^2}{\left(e^{e^x}x^2-24e^{e^x}x+2e^x\right)^2}dx+\int \frac{e^{e^x}x}{e^{e^x}x^2-24e^{e^x}x+2e^x}dx-\frac{1}{2}\int \frac{e^{e^x}x^2}{e^{e^x}x^2-24e^{e^x}x+2e^x}d\right.$$

input
```
Int[(36*E^(2*E^x)*x^2 + E^E^x*(-3*E^(2*x)*x^2 + E^x*(-6*x + 3*x^2)))/(4*E^
(2*x) + E^(E^x + x)*(-96*x + 4*x^2) + E^(2*E^x)*(576*x^2 - 48*x^3 + x^4)),
x]
```

output
```
$Aborted
```

3.1093.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1093.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

method	result	size
parallelrisch	$\frac{-36x\,e^{e^{x}}+3\,e^{x}}{e^{e^{x}}x^{2}-24x\,e^{e^{x}}+2\,e^{x}}$	33
risch	$-\frac{36}{x-24}+\frac{3x\,e^{x}}{(x-24)\left(e^{e^{x}}x^{2}-24x\,e^{e^{x}}+2\,e^{x}\right)}$	39

input
```
int((36*x^2*exp(exp(x))^2+(-3*exp(x)^2*x^2+(3*x^2-6*x)*exp(x))*exp(exp(x))
)/((x^4-48*x^3+576*x^2)*exp(exp(x))^2+(4*x^2-96*x)*exp(x)*exp(exp(x))+4*ex
p(x)^2),x,method=_RETURNVERBOSE)
```

output
```
(-36*x*exp(exp(x))+3*exp(x))/(exp(exp(x))*x^2-24*x*exp(exp(x))+2*exp(x))
```

3.1093.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \frac{36e^{2e^x}x^2 + e^{e^x}(-3e^{2x}x^2 + e^x(-6x + 3x^2))}{4e^{2x} + e^{e^x+x}(-96x + 4x^2) + e^{2e^x}(576x^2 - 48x^3 + x^4)}\,dx = -\frac{3\left(12\,xe^{(x+e^x)} - e^{(2\,x)}\right)}{(x^2 - 24\,x)e^{(x+e^x)} + 2\,e^{(2\,x)}}$$

input
```
integrate((36*x^2*exp(exp(x))^2+(-3*exp(x)^2*x^2+(3*x^2-6*x)*exp(x))*exp(e
xp(x)))/((x^4-48*x^3+576*x^2)*exp(exp(x))^2+(4*x^2-96*x)*exp(x)*exp(exp(x)
)+4*exp(x)^2),x, algorithm=\
```

output
```
-3*(12*x*e^(x + e^x) - e^(2*x))/((x^2 - 24*x)*e^(x + e^x) + 2*e^(2*x))
```

3.1093.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.34

$$\int \frac{36e^{2e^x}x^2 + e^{e^x}(-3e^{2x}x^2 + e^x(-6x + 3x^2))}{4e^{2x} + e^{e^x+x}(-96x + 4x^2) + e^{2e^x}(576x^2 - 48x^3 + x^4)}\,dx = \frac{3xe^x}{2xe^x + (x^3 - 48x^2 + 576x)\,e^{e^x} - 48e^x} - \frac{36}{x - 24}$$

input
```
integrate((36*x**2*exp(exp(x))**2+(-3*exp(x)**2*x**2+(3*x**2-6*x)*exp(x))*
exp(exp(x)))/((x**4-48*x**3+576*x**2)*exp(exp(x))**2+(4*x**2-96*x)*exp(x)*
exp(exp(x))+4*exp(x)**2),x)
```

output
```
3*x*exp(x)/(2*x*exp(x) + (x**3 - 48*x**2 + 576*x)*exp(exp(x)) - 48*exp(x))
 - 36/(x - 24)
```

3.1093.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{36e^{2e^x}x^2 + e^{e^x}(-3e^{2x}x^2 + e^x(-6x + 3x^2))}{4e^{2x} + e^{e^x+x}(-96x + 4x^2) + e^{2e^x}(576x^2 - 48x^3 + x^4)}\,dx = -\frac{3\left(12\,xe^{(e^x)} - e^x\right)}{(x^2 - 24\,x)e^{(e^x)} + 2\,e^x}$$

input
```
integrate((36*x^2*exp(exp(x))^2+(-3*exp(x)^2*x^2+(3*x^2-6*x)*exp(x))*exp(e
xp(x)))/((x^4-48*x^3+576*x^2)*exp(exp(x))^2+(4*x^2-96*x)*exp(x)*exp(exp(x)
)+4*exp(x)^2),x, algorithm=\
```

output
```
-3*(12*x*e^(e^x) - e^x)/((x^2 - 24*x)*e^(e^x) + 2*e^x)
```

3.1093.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

$$\int \frac{36e^{2e^x}x^2+e^{e^x}(-3e^{2x}x^2+e^x(-6x+3x^2))}{4e^{2x}+e^{e^x+x}(-96x+4x^2)+e^{2e^x}(576x^2-48x^3+x^4)}\,dx=-\frac{3\left(12\,xe^{\left(e^x\right)}-e^x\right)}{x^2e^{\left(e^x\right)}-24\,xe^{\left(e^x\right)}+2\,e^x}$$

input
```
integrate((36*x^2*exp(exp(x))^2+(-3*exp(x)^2*x^2+(3*x^2-6*x)*exp(x))*exp(e
xp(x)))/((x^4-48*x^3+576*x^2)*exp(exp(x))^2+(4*x^2-96*x)*exp(x)*exp(exp(x)
)+4*exp(x)^2),x, algorithm=\
```

output
```
-3*(12*x*e^(e^x) - e^x)/(x^2*e^(e^x) - 24*x*e^(e^x) + 2*e^x)
```

3.1093.9 Mupad [F(-1)]

Timed out.

$$\int \frac{36e^{2e^x}x^2+e^{e^x}(-3e^{2x}x^2+e^x(-6x+3x^2))}{4e^{2x}+e^{e^x+x}(-96x+4x^2)+e^{2e^x}(576x^2-48x^3+x^4)}\,dx=-\int \frac{e^{e^x}\,\left(3\,x^2\,e^{2\,x}+e^x\,\left(6\,x-3\,x^2\right)\right)-36\,x^2\,e^{2\,e^x}}{4\,e^{2\,x}+e^{2\,e^x}\,\left(x^4-48\,x^3+576\,x^2\right)-e^{x+e^x}\,\left(96\,x-4\,x^2\right)}\,dx$$

input
```
int(-(exp(exp(x))*(3*x^2*exp(2*x) + exp(x)*(6*x - 3*x^2)) - 36*x^2*exp(2*e
xp(x)))/(4*exp(2*x) + exp(2*exp(x))*(576*x^2 - 48*x^3 + x^4) - exp(exp(x))
*exp(x)*(96*x - 4*x^2)),x)
```

output
```
-int((exp(exp(x))*(3*x^2*exp(2*x) + exp(x)*(6*x - 3*x^2)) - 36*x^2*exp(2*e
xp(x)))/(4*exp(2*x) + exp(2*exp(x))*(576*x^2 - 48*x^3 + x^4) - exp(x + exp
(x))*(96*x - 4*x^2)), x)
```

3.1094 $\int \frac{9-9e^5-9x\log^2(x)}{x\log^2(x)}\,dx$

3.1094.1 Optimal result

Integrand size = 22, antiderivative size = 23

$$\int \frac{9-9e^5-9x\log^2(x)}{x\log^2(x)}\,dx = 9\left(8-x+\log(2)-\log(3)+\frac{-1+e^5}{\log(x)}\right)$$

output
```
9*ln(2)+72+9*(exp(5)-1)/ln(x)-9*x-9*ln(3)
```

3.1094.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{9-9e^5-9x\log^2(x)}{x\log^2(x)}\,dx = -9x-\frac{9}{\log(x)}+\frac{9e^5}{\log(x)}$$

input
```
Integrate[(9 - 9*E^5 - 9*x*Log[x]^2)/(x*Log[x]^2),x]
```

output
```
-9*x - 9/Log[x] + (9*E^5)/Log[x]
```

3.1094.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {7292, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-9x\log^2(x)-9e^5+9}{x\log^2(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{9\left(-x\log^2(x)-e^5+1\right)}{x\log^2(x)}dx$$

$$\Big\downarrow \text{27}$$

$$9\int \frac{-x\log^2(x)-e^5+1}{x\log^2(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$9\int \left(\frac{1-e^5}{x\log^2(x)}-1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$9\left(-x-\frac{1-e^5}{\log(x)}\right)$$

input
```
Int[(9 - 9*E^5 - 9*x*Log[x]^2)/(x*Log[x]^2),x]
```

output
```
9*(-x - (1 - E^5)/Log[x])
```

3.1094.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1094.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

method	result	size
norman	$\frac{-9x\ln(x)-9+9\,\mathrm{e}^{5}}{\ln(x)}$	17
parallelrisch	$\frac{-9x\ln(x)-9+9\,\mathrm{e}^{5}}{\ln(x)}$	17
parts	$-9x-\frac{-9\,\mathrm{e}^{5}+9}{\ln(x)}$	17
default	$-9x+\frac{9\,\mathrm{e}^{5}}{\ln(x)}-\frac{9}{\ln(x)}$	19
risch	$-9x+\frac{9\,\mathrm{e}^{5}}{\ln(x)}-\frac{9}{\ln(x)}$	19

input
```
int((-9*x*ln(x)^2-9*exp(5)+9)/x/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
(-9*x*ln(x)-9+9*exp(5))/ln(x)
```

3.1094.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

$$\int \frac{9-9e^5-9x\log^2(x)}{x\log^2(x)}\,dx = -\frac{9\,(x\log(x)-e^5+1)}{\log(x)}$$

input
```
integrate((-9*x*log(x)^2-9*exp(5)+9)/x/log(x)^2,x, algorithm=\
```

output
```
-9*(x*log(x) - e^5 + 1)/log(x)
```

3.1094.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.52

$$\int \frac{9-9e^5-9x\log^2(x)}{x\log^2(x)}\,dx = -9x + \frac{-9+9e^5}{\log(x)}$$

input
```
integrate((-9*x*ln(x)**2-9*exp(5)+9)/x/ln(x)**2,x)
```

output
```
-9*x + (-9 + 9*exp(5))/log(x)
```

3.1094.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \frac{9-9e^5-9x\log^2(x)}{x\log^2(x)}\,dx = -9\,x + \frac{9\,e^5}{\log(x)} - \frac{9}{\log(x)}$$

input
```
integrate((-9*x*log(x)^2-9*exp(5)+9)/x/log(x)^2,x, algorithm=\
```

output
```
-9*x + 9*e^5/log(x) - 9/log(x)
```

3.1094.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70

$$\int \frac{9-9e^5-9x\log^2(x)}{x\log^2(x)}\,dx = -\frac{9\,(x\log(x)-e^5+1)}{\log(x)}$$

input
```
integrate((-9*x*log(x)^2-9*exp(5)+9)/x/log(x)^2,x, algorithm=\
```

output
```
-9*(x*log(x) - e^5 + 1)/log(x)
```

3.1094.9 Mupad [B] (verification not implemented)

Time = 13.92 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{9-9e^5-9x\log^2(x)}{x\log^2(x)}\,dx = \frac{9\,e^5-9}{\ln(x)}-9\,x$$

input
```
int(-(9*exp(5) + 9*x*log(x)^2 - 9)/(x*log(x)^2),x)
```

output
```
(9*exp(5) - 9)/log(x) - 9*x
```

3.1095 $\int \frac{-5-6x+48e^2x^2}{-1-e+\log(5)}\,dx$

3.1095.1 Optimal result

Integrand size = 23, antiderivative size = 28

$$\int \frac{-5-6x+48e^2x^2}{-1-e+\log(5)}\,dx = \frac{x(5-x+4(x-4e^2x^2))}{1+e-\log(5)}$$

output
```
(3*x-16*x^2*exp(1)^2+5)/(-ln(5)+1+exp(1))*x
```

3.1095.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{-5-6x+48e^2x^2}{-1-e+\log(5)}\,dx = \frac{5x+3x^2-16e^2x^3}{1+e-\log(5)}$$

input
```
Integrate[(-5 - 6*x + 48*E^2*x^2)/(-1 - E + Log[5]),x]
```

output
```
(5*x + 3*x^2 - 16*E^2*x^3)/(1 + E - Log[5])
```

3.1095.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{48e^2x^2-6x-5}{-1-e+\log(5)}\,dx$$

$$\Big\downarrow \; 27$$

$$-\frac{\int \left(48e^2x^2-6x-5\right)dx}{1+e-\log(5)}$$

$$\Big\downarrow \; 2009$$

$$-\frac{16e^2x^3-3x^2-5x}{1+e-\log(5)}$$

input
```
Int[(-5 - 6*x + 48*E^2*x^2)/(-1 - E + Log[5]),x]
```

output
```
-((-5*x - 3*x^2 + 16*E^2*x^3)/(1 + E - Log[5]))
```

3.1095.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1095.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

method	result	size
gosper	$-\frac{x(16x^2e^2-3x-5)}{-\ln(5)+1+e}$	28
default	$\frac{16x^3e^2-3x^2-5x}{\ln(5)-e-1}$	30
parallelrisch	$\frac{16x^3e^2-3x^2-5x}{\ln(5)-e-1}$	30
risch	$\frac{16x^3e^2}{\ln(5)-e-1}-\frac{3x^2}{\ln(5)-e-1}-\frac{5x}{\ln(5)-e-1}$	47
norman	$\frac{5x}{-\ln(5)+1+e}+\frac{3x^2}{-\ln(5)+1+e}-\frac{16e^2x^3}{-\ln(5)+1+e}$	49

input
```
int((48*x^2*exp(1)^2-6*x-5)/(ln(5)-exp(1)-1),x,method=_RETURNVERBOSE)
```

output
```
-x*(16*x^2*exp(1)^2-3*x-5)/(-ln(5)+1+exp(1))
```

3.1095.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{-5-6x+48e^2x^2}{-1-e+\log(5)}\,dx=-\frac{16\,x^3e^2-3\,x^2-5\,x}{e-\log(5)+1}$$

input
```
integrate((48*x^2*exp(1)^2-6*x-5)/(log(5)-exp(1)-1),x, algorithm=\
```

output
```
-(16*x^3*e^2 - 3*x^2 - 5*x)/(e - log(5) + 1)
```

3.1095.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.46

$$\int \frac{-5-6x+48e^2x^2}{-1-e+\log(5)}\,dx=-\frac{16x^3e^2}{-\log(5)+1+e}+\frac{3x^2}{-\log(5)+1+e}+\frac{5x}{-\log(5)+1+e}$$

input
```
integrate((48*x**2*exp(1)**2-6*x-5)/(ln(5)-exp(1)-1),x)
```

output
```
-16*x**3*exp(2)/(-log(5) + 1 + E) + 3*x**2/(-log(5) + 1 + E) + 5*x/(-log(5
) + 1 + E)
```

3.1095.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{-5-6x+48e^2x^2}{-1-e+\log(5)}\,dx = -\frac{16\,x^3e^2-3\,x^2-5\,x}{e-\log\left(5\right)+1}$$

input
```
integrate((48*x^2*exp(1)^2-6*x-5)/(log(5)-exp(1)-1),x, algorithm=\
```

output
```
-(16*x^3*e^2 - 3*x^2 - 5*x)/(e - log(5) + 1)
```

3.1095.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{-5-6x+48e^2x^2}{-1-e+\log(5)}\,dx = -\frac{16\,x^3e^2-3\,x^2-5\,x}{e-\log\left(5\right)+1}$$

input
```
integrate((48*x^2*exp(1)^2-6*x-5)/(log(5)-exp(1)-1),x, algorithm=\
```

output
```
-(16*x^3*e^2 - 3*x^2 - 5*x)/(e - log(5) + 1)
```

3.1095.9 Mupad [B] (verification not implemented)

Time = 13.77 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{-5-6x+48e^2x^2}{-1-e+\log(5)}\,dx = \frac{x\left(-16\,\mathrm{e}^2\,x^2+3\,x+5\right)}{\mathrm{e}-\ln\left(5\right)+1}$$

input
```
int((6*x - 48*x^2*exp(2) + 5)/(exp(1) - log(5) + 1),x)
```

output
```
(x*(3*x - 16*x^2*exp(2) + 5))/(exp(1) - log(5) + 1)
```

3.1096 $\int \frac{}{(8000x+4800x^2+960x^3+44x^4-4x^5+(6000x+2400x^2+240x^3-5x^4)}$

3.1096.1 Optimal result

Integrand size = 303, antiderivative size = 28

$$\int \frac{8000+4800x+960x^2-}{(8000x+4800x^2+960x^3+44x^4-4x^5+(6000x+2400x^2+240x^3-5x^4)\log(x)+(1500x+300x^2)\log}$$

$$=\log\left(\log\left(\frac{\left(x-\frac{x^4}{(-x+5(4+x+\log(x)))^2}\right)^2}{x}\right)\right)$$

output
```
ln(ln((x-x^4/(4*x+20+5*ln(x))^2)^2/x))
```

3.1096.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.64

$$\int \frac{8000+4800x+960x^2-}{(8000x+4800x^2+960x^3+44x^4-4x^5+(6000x+2400x^2+240x^3-5x^4)\log(x)+(1500x+300x^2)\log}$$

$$=\log\left(\log\left(\frac{x(400+160x+16x^2-x^3+40(5+x)\log(x)+25\log^2(x))^2}{(4(5+x)+5\log(x))^4}\right)\right)$$

3.1096.
$$\int \frac{8000+4800x+960x^2-56x^3-12x^4+(6000+2400x}{(8000x+4800x^2+960x^3+44x^4-4x^5+(6000x+2400x^2+240x^3-5x^4)\log(x)+(1500x+300x^2)\log^2(x)+125x\log^3(x))\log\left(\frac{160000x+128000x^2+38400}{}\right.}$$

input
```
Integrate[(8000 + 4800*x + 960*x^2 - 56*x^3 - 12*x^4 + (6000 + 2400*x + 24
0*x^2 - 35*x^3)*Log[x] + (1500 + 300*x)*Log[x]^2 + 125*Log[x]^3)/((8000*x
+ 4800*x^2 + 960*x^3 + 44*x^4 - 4*x^5 + (6000*x + 2400*x^2 + 240*x^3 - 5*x
^4)*Log[x] + (1500*x + 300*x^2)*Log[x]^2 + 125*x*Log[x]^3)*Log[(160000*x +
 128000*x^2 + 38400*x^3 + 4320*x^4 - 64*x^5 - 32*x^6 + x^7 + (160000*x + 9
6000*x^2 + 19200*x^3 + 880*x^4 - 80*x^5)*Log[x] + (60000*x + 24000*x^2 + 2
400*x^3 - 50*x^4)*Log[x]^2 + (10000*x + 2000*x^2)*Log[x]^3 + 625*x*Log[x]^
4)/(160000 + 128000*x + 38400*x^2 + 5120*x^3 + 256*x^4 + (160000 + 96000*x
 + 19200*x^2 + 1280*x^3)*Log[x] + (60000 + 24000*x + 2400*x^2)*Log[x]^2 +
(10000 + 2000*x)*Log[x]^3 + 625*Log[x]^4)]),x]
```

output
```
Log[Log[(x*(400 + 160*x + 16*x^2 - x^3 + 40*(5 + x)*Log[x] + 25*Log[x]^2)^
2)/(4*(5 + x) + 5*Log[x])^4]]
```

3.1096.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-12x^4 - 56x^3 + 960x^2 + \cdots}{\left(-4x^5 + 44x^4 + 960x^3 + 4800x^2 + (300x^2 + 1500x)\log^2(x) + (-5x^4 + 240x^3 + 2400x^2 + 6000x)\log(x) + 800\cdots\right.}$$

$\Big\downarrow$ 7239

$$\int \frac{12x^4 + 56x^3 - 960x^2 + 5\left(7x^3 - 48x^2 - 480x - 1200\right)\log(x) - 4800x - 125\log^3(x\cdots}{x\left(5\left(x^3 - 48x^2 - 480x - 1200\right)\log(x) + 4\left(x^4 - 11x^3 - 240x^2 - 1200x - 2000\right) - 125\log^3(x) - 300(x+5)\log\cdots\right.}$$

$\Big\downarrow$ 7293

$$\int \left(\frac{12x^3}{\left(4x^4 + 5\log(x)x^3 - 44x^3 - 240\log(x)x^2 - 960x^2 - 300\log^2(x)x - 2400\log(x)x - 4800x - 125\log^3(x) - 15\cdots\right.}\right.$$

$\Big\downarrow$ 2009

$$-4800\int \frac{1}{\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)\right.}$$

$$8000\int \frac{1}{x\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)\right.}$$

$$960\int \frac{x}{\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)-1\right.}$$

$$56\int \frac{x^2}{\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)-15\right.}$$

$$12\int \frac{x^3}{\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)-15\right.}$$

$$6000\int \frac{\log(x)}{x\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)\right.}$$

$$240\int \frac{x\log(x)}{\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)-1\right.}$$

$$35\int \frac{x^2\log(x)}{\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)-15\right.}$$

$$1500\int \frac{\log^2(x)}{x\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)\right.}$$

$$125\int \frac{\log^3(x)}{x\left(4x^4+5\log(x)x^3-44x^3-240\log(x)x^2-960x^2-300\log^2(x)x-2400\log(x)x-4800x-125\log^3(x)-\right.}$$

$$2400\int \frac{\log(x)}{\left(-4x^4-5\log(x)x^3+44x^3+240\log(x)x^2+960x^2+300\log^2(x)x+2400\log(x)x+4800x+125\log^3(x)\right.}$$

$$300\int \frac{\log^2(x)}{\left(-4x^4-5\log(x)x^3+44x^3+240\log(x)x^2+960x^2+300\log^2(x)x+2400\log(x)x+4800x+125\log^3(x)+\right.}$$

3.1096.

$$\int \frac{8000+4800x+960x^2-56x^3-12x^4+(6000+2400x\cdots}{(8000x+4800x^2+960x^3+44x^4-4x^5+(6000x+2400x^2+240x^3-5x^4)\log(x)+(1500x+300x^2)\log^2(x)+125x\log^3(x))\log\left(\frac{160000x+128000x^2+38400\cdots}{\cdots}\right.}$$

input
```
Int[(8000 + 4800*x + 960*x^2 - 56*x^3 - 12*x^4 + (6000 + 2400*x + 240*x^2
- 35*x^3)*Log[x] + (1500 + 300*x)*Log[x]^2 + 125*Log[x]^3)/((8000*x + 4800
*x^2 + 960*x^3 + 44*x^4 - 4*x^5 + (6000*x + 2400*x^2 + 240*x^3 - 5*x^4)*Lo
g[x] + (1500*x + 300*x^2)*Log[x]^2 + 125*x*Log[x]^3)*Log[(160000*x + 12800
0*x^2 + 38400*x^3 + 4320*x^4 - 64*x^5 - 32*x^6 + x^7 + (160000*x + 96000*x
^2 + 19200*x^3 + 880*x^4 - 80*x^5)*Log[x] + (60000*x + 24000*x^2 + 2400*x^
3 - 50*x^4)*Log[x]^2 + (10000*x + 2000*x^2)*Log[x]^3 + 625*x*Log[x]^4)/(16
0000 + 128000*x + 38400*x^2 + 5120*x^3 + 256*x^4 + (160000 + 96000*x + 192
00*x^2 + 1280*x^3)*Log[x] + (60000 + 24000*x + 2400*x^2)*Log[x]^2 + (10000
 + 2000*x)*Log[x]^3 + 625*Log[x]^4)]),x]
```

output
```
$Aborted
```

3.1096.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1096.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 193 vs. 2(26) = 52.

Time = 15.14 (sec) , antiderivative size = 194, normalized size of antiderivative = 6.93

method	result
parallelrisch	$\ln\left(\ln\left(\frac{625x\ln(x)^4+(2000x^2+10000x)\ln(x)^3+(-50x^4+2400x^3+24000x^2+60000x)\ln(x)^2+(-80x^5+880x^4+19200x^3+9\cdots}{625\ln(x)^4+2000x\ln(x)^3+2400x^2\ln(x)^2+1280x^3\ln(x)+256x^4+10000\ln(x)^3+24000x\ln(x)^2+19200x^2\ln(x)+5\cdots}\right.\right.$
default	Expression too large to display
risch	Expression too large to display

input
```
int((125*ln(x)^3+(300*x+1500)*ln(x)^2+(-35*x^3+240*x^2+2400*x+6000)*ln(x)-
12*x^4-56*x^3+960*x^2+4800*x+8000)/(125*x*ln(x)^3+(300*x^2+1500*x)*ln(x)^2
+(-5*x^4+240*x^3+2400*x^2+6000*x)*ln(x)-4*x^5+44*x^4+960*x^3+4800*x^2+8000
*x)/ln((625*x*ln(x)^4+(2000*x^2+10000*x)*ln(x)^3+(-50*x^4+2400*x^3+24000*x
^2+60000*x)*ln(x)^2+(-80*x^5+880*x^4+19200*x^3+96000*x^2+160000*x)*ln(x)+x
^7-32*x^6-64*x^5+4320*x^4+38400*x^3+128000*x^2+160000*x)/(625*ln(x)^4+(200
0*x+10000)*ln(x)^3+(2400*x^2+24000*x+60000)*ln(x)^2+(1280*x^3+19200*x^2+96
000*x+160000)*ln(x)+256*x^4+5120*x^3+38400*x^2+128000*x+160000)),x,method=
_RETURNVERBOSE)
```

output
```
ln(ln((625*x*ln(x)^4+(2000*x^2+10000*x)*ln(x)^3+(-50*x^4+2400*x^3+24000*x^
2+60000*x)*ln(x)^2+(-80*x^5+880*x^4+19200*x^3+96000*x^2+160000*x)*ln(x)+x^
7-32*x^6-64*x^5+4320*x^4+38400*x^3+128000*x^2+160000*x)/(625*ln(x)^4+2000*
x*ln(x)^3+2400*x^2*ln(x)^2+1280*x^3*ln(x)+256*x^4+10000*ln(x)^3+24000*x*ln
(x)^2+19200*x^2*ln(x)+5120*x^3+60000*ln(x)^2+96000*x*ln(x)+38400*x^2+16000
0*ln(x)+128000*x+160000)))
```

3.1096.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 172 vs. $2(27) = 54$.

Time = 0.26 (sec) , antiderivative size = 172, normalized size of antiderivative = 6.14

$$\int \frac{8000 + 4800x + 960x^2 - }{(8000x + 4800x^2 + 960x^3 + 44x^4 - 4x^5 + (6000x + 2400x^2 + 240x^3 - 5x^4)\log(x) + (1500x + 300x^2)\log}$$

$$= \log\left(\log\left(\frac{x^7 - 32\,x^6 - 64\,x^5 + 625\,x\log(x)^4 + 4320\,x^4 + 2000\,(x^2 + 5\,x)\log(x)^3 + 38400\,x^3 - 50\,(x^4 -}{256\,x^4 + 2000\,(x+5)\log(x)^3 + 625\,\log(x)^4 + 5120\,x^3 + 2400\,(x^2 + 10\,x}\right.\right.$$

input
```
integrate((125*log(x)^3+(300*x+1500)*log(x)^2+(-35*x^3+240*x^2+2400*x+6000
)*log(x)-12*x^4-56*x^3+960*x^2+4800*x+8000)/(125*x*log(x)^3+(300*x^2+1500*
x)*log(x)^2+(-5*x^4+240*x^3+2400*x^2+6000*x)*log(x)-4*x^5+44*x^4+960*x^3+4
800*x^2+8000*x)/log((625*x*log(x)^4+(2000*x^2+10000*x)*log(x)^3+(-50*x^4+2
400*x^3+24000*x^2+60000*x)*log(x)^2+(-80*x^5+880*x^4+19200*x^3+96000*x^2+1
60000*x)*log(x)+x^7-32*x^6-64*x^5+4320*x^4+38400*x^3+128000*x^2+160000*x)/
(625*log(x)^4+(2000*x+10000)*log(x)^3+(2400*x^2+24000*x+60000)*log(x)^2+(1
280*x^3+19200*x^2+96000*x+160000)*log(x)+256*x^4+5120*x^3+38400*x^2+128000
*x+160000)),x, algorithm=\
```

3.1096.

$$\int \frac{8000+4800x+960x^2-56x^3-12x^4+(6000+2400x}{(8000x+4800x^2+960x^3+44x^4-4x^5+(6000x+2400x^2+240x^3-5x^4)\log(x)+(1500x+300x^2)\log^2(x)+125x\log^3(x))\log\left(\frac{160000x+128000x^2+38400}{}\right.}$$

output
```
log(log((x^7 - 32*x^6 - 64*x^5 + 625*x*log(x)^4 + 4320*x^4 + 2000*(x^2 + 5
*x)*log(x)^3 + 38400*x^3 - 50*(x^4 - 48*x^3 - 480*x^2 - 1200*x)*log(x)^2 +
 128000*x^2 - 80*(x^5 - 11*x^4 - 240*x^3 - 1200*x^2 - 2000*x)*log(x) + 160
000*x)/(256*x^4 + 2000*(x + 5)*log(x)^3 + 625*log(x)^4 + 5120*x^3 + 2400*(
x^2 + 10*x + 25)*log(x)^2 + 38400*x^2 + 1280*(x^3 + 15*x^2 + 75*x + 125)*l
og(x) + 128000*x + 160000)))
```

3.1096.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 178 vs. $2(22) = 44$.

Time = 3.08 (sec) , antiderivative size = 178, normalized size of antiderivative = 6.36

$$\int \frac{8000 + 4800x + 960x^2 -}{(8000x + 4800x^2 + 960x^3 + 44x^4 - 4x^5 + (6000x + 2400x^2 + 240x^3 - 5x^4)\log(x) + (1500x + 300x^2)\log}$$

$$= \log\left(\log\left(\frac{x^7 - 32x^6 - 64x^5 + 4320x^4 + 38400x^3 + 128000x^2 + 625x\log(x)^4 + 160000x + (2000x^2 + 100}{256x^4 + 5120x^3 + 38400x^2 + 128000x + (2000x + 10000)\log(x)^3 + (2400}\right.\right.$$

input
```
integrate((125*ln(x)**3+(300*x+1500)*ln(x)**2+(-35*x**3+240*x**2+2400*x+60
00)*ln(x)-12*x**4-56*x**3+960*x**2+4800*x+8000)/(125*x*ln(x)**3+(300*x**2+
1500*x)*ln(x)**2+(-5*x**4+240*x**3+2400*x**2+6000*x)*ln(x)-4*x**5+44*x**4+
960*x**3+4800*x**2+8000*x)/ln((625*x*ln(x)**4+(2000*x**2+10000*x)*ln(x)**3
+(-50*x**4+2400*x**3+24000*x**2+60000*x)*ln(x)**2+(-80*x**5+880*x**4+19200
*x**3+96000*x**2+160000*x)*ln(x)+x**7-32*x**6-64*x**5+4320*x**4+38400*x**3
+128000*x**2+160000*x)/(625*ln(x)**4+(2000*x+10000)*ln(x)**3+(2400*x**2+24
000*x+60000)*ln(x)**2+(1280*x**3+19200*x**2+96000*x+160000)*ln(x)+256*x**4
+5120*x**3+38400*x**2+128000*x+160000)),x)
```

output
```
log(log((x**7 - 32*x**6 - 64*x**5 + 4320*x**4 + 38400*x**3 + 128000*x**2 +
 625*x*log(x)**4 + 160000*x + (2000*x**2 + 10000*x)*log(x)**3 + (-50*x**4
+ 2400*x**3 + 24000*x**2 + 60000*x)*log(x)**2 + (-80*x**5 + 880*x**4 + 192
00*x**3 + 96000*x**2 + 160000*x)*log(x))/(256*x**4 + 5120*x**3 + 38400*x**
2 + 128000*x + (2000*x + 10000)*log(x)**3 + (2400*x**2 + 24000*x + 60000)*
log(x)**2 + (1280*x**3 + 19200*x**2 + 96000*x + 160000)*log(x) + 625*log(x
)**4 + 160000)))
```

3.1096.7 Maxima [A] (verification not implemented)

Time = 9.55 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.68

$$\int \frac{8000 + 4800x + 960x^2 -}{(8000x + 4800x^2 + 960x^3 + 44x^4 - 4x^5 + (6000x + 2400x^2 + 240x^3 - 5x^4)\log(x) + (1500x + 300x^2)\log}$$

$$= \log\left(\log\left(-x^3 + 16\,x^2 + 40\,(x+5)\log(x) + 25\,\log(x)^2 + 160\,x + 400\right) - 2\,\log(4\,x + 5\,\log(x) + 20) + \frac{1}{2}\,\log(x)\right)$$

input
```
integrate((125*log(x)^3+(300*x+1500)*log(x)^2+(-35*x^3+240*x^2+2400*x+6000
)*log(x)-12*x^4-56*x^3+960*x^2+4800*x+8000)/(125*x*log(x)^3+(300*x^2+1500*
x)*log(x)^2+(-5*x^4+240*x^3+2400*x^2+6000*x)*log(x)-4*x^5+44*x^4+960*x^3+4
800*x^2+8000*x)/log((625*x*log(x)^4+(2000*x^2+10000*x)*log(x)^3+(-50*x^4+2
400*x^3+24000*x^2+60000*x)*log(x)^2+(-80*x^5+880*x^4+19200*x^3+96000*x^2+1
60000*x)*log(x)+x^7-32*x^6-64*x^5+4320*x^4+38400*x^3+128000*x^2+160000*x)/
(625*log(x)^4+(2000*x+10000)*log(x)^3+(2400*x^2+24000*x+60000)*log(x)^2+(1
280*x^3+19200*x^2+96000*x+160000)*log(x)+256*x^4+5120*x^3+38400*x^2+128000
*x+160000)),x, algorithm=\
```

output
```
log(log(-x^3 + 16*x^2 + 40*(x + 5)*log(x) + 25*log(x)^2 + 160*x + 400) - 2
*log(4*x + 5*log(x) + 20) + 1/2*log(x))
```

3.1096.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 202 vs. $2(27) = 54$.

Time = 3.50 (sec) , antiderivative size = 202, normalized size of antiderivative = 7.21

$$\int \frac{8000 + 4800x + 960x^2 -}{(8000x + 4800x^2 + 960x^3 + 44x^4 - 4x^5 + (6000x + 2400x^2 + 240x^3 - 5x^4)\log(x) + (1500x + 300x^2)\log}$$

$$= \log\left(-\log\left(x^6 - 32\,x^5 - 80\,x^4\log(x) - 50\,x^3\log(x)^2 - 64\,x^4 + 880\,x^3\log(x) + 2400\,x^2\log(x)^2 + 2000\,x\log(x)^3 + 625\,\log(x)^4 + 4320\,x^3 + 19200\,x^2\log(x) + 24000\,x\log(x)^2 + 10000\,\log(x)^3 + 38400\,x^2 + 96000\,x\log(x) + 60000\,\log(x)^2 + 128000\,x + 160000\,\log(x) + 160000\right) + \log\left(256\,x^4 + 1280\,x^3\log(x) + 2400\,x^2\log(x)^2 + 2000\,x\log(x)^3 + 625\,\log(x)^4 + 5120\,x^3 + 19200\,x^2\log(x) + 24000\,x\log(x)^2 + 10000\,\log(x)^3 + 38400\,x^2 + 96000\,x\log(x) + 60000\,\log(x)^2 + 128000\,x + 160000\,\log(x) + 160000\right) - \log(x)\right)$$

3.1096.

$$\int \frac{8000+4800x+960x^2-56x^3-12x^4+(6000+2400x}{(8000x+4800x^2+960x^3+44x^4-4x^5+(6000x+2400x^2+240x^3-5x^4)\log(x)+(1500x+300x^2)\log^2(x)+125x\log^3(x))\log\left(\frac{160000x+128000x^2+38400}{}\right.}$$

input
```
integrate((125*log(x)^3+(300*x+1500)*log(x)^2+(-35*x^3+240*x^2+2400*x+6000
)*log(x)-12*x^4-56*x^3+960*x^2+4800*x+8000)/(125*x*log(x)^3+(300*x^2+1500*
x)*log(x)^2+(-5*x^4+240*x^3+2400*x^2+6000*x)*log(x)-4*x^5+44*x^4+960*x^3+4
800*x^2+8000*x)/log((625*x*log(x)^4+(2000*x^2+10000*x)*log(x)^3+(-50*x^4+2
400*x^3+24000*x^2+60000*x)*log(x)^2+(-80*x^5+880*x^4+19200*x^3+96000*x^2+1
60000*x)*log(x)+x^7-32*x^6-64*x^5+4320*x^4+38400*x^3+128000*x^2+160000*x)/
(625*log(x)^4+(2000*x+10000)*log(x)^3+(2400*x^2+24000*x+60000)*log(x)^2+(1
280*x^3+19200*x^2+96000*x+160000)*log(x)+256*x^4+5120*x^3+38400*x^2+128000
*x+160000)),x, algorithm=\
```

output
```
log(-log(x^6 - 32*x^5 - 80*x^4*log(x) - 50*x^3*log(x)^2 - 64*x^4 + 880*x^3
*log(x) + 2400*x^2*log(x)^2 + 2000*x*log(x)^3 + 625*log(x)^4 + 4320*x^3 +
19200*x^2*log(x) + 24000*x*log(x)^2 + 10000*log(x)^3 + 38400*x^2 + 96000*x
*log(x) + 60000*log(x)^2 + 128000*x + 160000*log(x) + 160000) + log(256*x^
4 + 1280*x^3*log(x) + 2400*x^2*log(x)^2 + 2000*x*log(x)^3 + 625*log(x)^4 +
 5120*x^3 + 19200*x^2*log(x) + 24000*x*log(x)^2 + 10000*log(x)^3 + 38400*x
^2 + 96000*x*log(x) + 60000*log(x)^2 + 128000*x + 160000*log(x) + 160000)
- log(x))
```

3.1096.9 Mupad [B] (verification not implemented)

Time = 16.19 (sec) , antiderivative size = 178, normalized size of antiderivative = 6.36

$$\int \frac{8000 + 4800x + 960x^2 -}{(8000x + 4800x^2 + 960x^3 + 44x^4 - 4x^5 + (6000x + 2400x^2 + 240x^3 - 5x^4)\log(x) + (1500x + 300x^2)\log}$$

$$= \ln\left(\ln\left(\frac{160000\,x + \ln(x)^3\,(2000\,x^2 + 10000\,x) + 625\,x\ln(x)^4 + \ln(x)\,(-80\,x^5 + 880\,x^4 + 19200\,x^3 + 96}{128000\,x + \ln(x)^2\,(2400\,x^2 + 24000\,x + 60000) + 625\ln(x)^4 + 38400\,x^2 +}\right.\right.$$

input
```
int((4800*x + 125*log(x)^3 + 960*x^2 - 56*x^3 - 12*x^4 + log(x)^2*(300*x +
 1500) + log(x)*(2400*x + 240*x^2 - 35*x^3 + 6000) + 8000)/(log((160000*x
+ log(x)^3*(10000*x + 2000*x^2) + 625*x*log(x)^4 + log(x)*(160000*x + 9600
0*x^2 + 19200*x^3 + 880*x^4 - 80*x^5) + log(x)^2*(60000*x + 24000*x^2 + 24
00*x^3 - 50*x^4) + 128000*x^2 + 38400*x^3 + 4320*x^4 - 64*x^5 - 32*x^6 + x
^7)/(128000*x + log(x)^2*(24000*x + 2400*x^2 + 60000) + 625*log(x)^4 + 384
00*x^2 + 5120*x^3 + 256*x^4 + log(x)^3*(2000*x + 10000) + log(x)*(96000*x
+ 19200*x^2 + 1280*x^3 + 160000) + 160000))*(8000*x + log(x)^2*(1500*x + 3
00*x^2) + 125*x*log(x)^3 + log(x)*(6000*x + 2400*x^2 + 240*x^3 - 5*x^4) +
4800*x^2 + 960*x^3 + 44*x^4 - 4*x^5)),x)
```

3.1096.

$$\int \frac{8000+4800x+960x^2-56x^3-12x^4+(6000+2400x}{(8000x+4800x^2+960x^3+44x^4-4x^5+(6000x+2400x^2+240x^3-5x^4)\log(x)+(1500x+300x^2)\log^2(x)+125x\log^3(x))\log\left(\frac{160000x+128000x^2+38400}{}\right.}$$

output
```
log(log((160000*x + log(x)^3*(10000*x + 2000*x^2) + 625*x*log(x)^4 + log(x
)*(160000*x + 96000*x^2 + 19200*x^3 + 880*x^4 - 80*x^5) + log(x)^2*(60000*
x + 24000*x^2 + 2400*x^3 - 50*x^4) + 128000*x^2 + 38400*x^3 + 4320*x^4 - 6
4*x^5 - 32*x^6 + x^7)/(128000*x + log(x)^2*(24000*x + 2400*x^2 + 60000) +
625*log(x)^4 + 38400*x^2 + 5120*x^3 + 256*x^4 + log(x)^3*(2000*x + 10000)
+ log(x)*(96000*x + 19200*x^2 + 1280*x^3 + 160000) + 160000)))
```

3.1096.

$$\int \frac{8000+4800x+960x^2-56x^3-12x^4+(6000+2400x\cdots}{(8000x+4800x^2+960x^3+44x^4-4x^5+(6000x+2400x^2+240x^3-5x^4)\log(x)+(1500x+300x^2)\log^2(x)+125x\log^3(x))\log\left(\frac{160000x+128000x^2+38400\cdots}{\cdots}\right)}$$

3.1097 $\int \frac{e^{2+2x}(216+180x+36x^2)+e^{3+}}{1728+e^{1+x}(2592+2160x+432x^2)+e^{2+2x}(1296+2160x+1332x^2+36}$

3.1097.1 Optimal result

Integrand size = 127, antiderivative size = 23

$$\int \frac{e^{2+2x}(216+180x+36x^2)+e^{3+3x}(-24-36x-18x^2-3x^3)}{1728+e^{1+x}(2592+2160x+432x^2)+e^{2+2x}(1296+2160x+1332x^2+360x^3+36x^4)+e^{3+3x}(216+54}$$
$$=\frac{3}{2\left(3+x+\frac{12e^{-1-x}}{2+x}\right)^2}$$

output
```
3/2/(12/exp(1+x)/(2+x)+3+x)^2
```

3.1097.2 Mathematica [A] (verified)

Time = 11.86 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.48

$$\int \frac{e^{2+2x}(216+180x+36x^2)+e^{3+3x}(-24-36x-18x^2-3x^3)}{1728+e^{1+x}(2592+2160x+432x^2)+e^{2+2x}(1296+2160x+1332x^2+360x^3+36x^4)+e^{3+3x}(216+54}$$
$$=\frac{3e^{2+2x}(2+x)^2}{2\left(12+e^{1+x}(6+5x+x^2)\right)^2}$$

input
```
Integrate[(E^(2 + 2*x)*(216 + 180*x + 36*x^2) + E^(3 + 3*x)*(-24 - 36*x -
18*x^2 - 3*x^3))/(1728 + E^(1 + x)*(2592 + 2160*x + 432*x^2) + E^(2 + 2*x)
*(1296 + 2160*x + 1332*x^2 + 360*x^3 + 36*x^4) + E^(3 + 3*x)*(216 + 540*x
+ 558*x^2 + 305*x^3 + 93*x^4 + 15*x^5 + x^6)),x]
```

output
```
(3*E^(2 + 2*x)*(2 + x)^2)/(2*(12 + E^(1 + x)*(6 + 5*x + x^2))^2)
```

3.1097.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x+2}(36x^2+180x+216)+e^{3x+3}(-3x^3-18x^2-36x-24)}{e^{x+1}(432x^2+2160x+2592)+e^{2x+2}(36x^4+360x^3+1332x^2+2160x+1296)+e^{3x+3}(x^6+15x^5+93x^4+3}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{3e^{2x+2}(x+2)\left(12(x+3)-e^{x+1}(x+2)^2\right)}{\left(e^{x+1}\left(x^2+5x+6\right)+12\right)^3}dx$$

$$\Big\downarrow \text{27}$$

$$3\int -\frac{e^{2x+2}(x+2)\left(e^{x+1}(x+2)^2-12(x+3)\right)}{\left(e^{x+1}\left(x^2+5x+6\right)+12\right)^3}dx$$

$$\Big\downarrow \text{25}$$

$$-3\int \frac{e^{2x+2}(x+2)\left(e^{x+1}(x+2)^2-12(x+3)\right)}{\left(e^{x+1}\left(x^2+5x+6\right)+12\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$-3\int \left(\frac{e^{2x+2}(x+2)^2}{(x+3)\left(e^{x+1}x^2+5e^{x+1}x+6e^{x+1}+12\right)^2}-\frac{12e^{2x+2}\left(x^3+9x^2+25x+22\right)}{(x+3)\left(e^{x+1}x^2+5e^{x+1}x+6e^{x+1}+12\right)^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-3\left(-84\int \frac{e^{2x+2}}{\left(e^{x+1}x^2+5e^{x+1}x+6e^{x+1}+12\right)^3}dx-72\int \frac{e^{2x+2}x}{\left(e^{x+1}x^2+5e^{x+1}x+6e^{x+1}+12\right)^3}dx-12\int \frac{}{\left(e^{x+1}x^2+5\right.}\right.$$

input
```
Int[(E^(2 + 2*x)*(216 + 180*x + 36*x^2) + E^(3 + 3*x)*(-24 - 36*x - 18*x^2
 - 3*x^3))/(1728 + E^(1 + x)*(2592 + 2160*x + 432*x^2) + E^(2 + 2*x)*(1296
 + 2160*x + 1332*x^2 + 360*x^3 + 36*x^4) + E^(3 + 3*x)*(216 + 540*x + 558*
x^2 + 305*x^3 + 93*x^4 + 15*x^5 + x^6)),x]
```

output
```
$Aborted
```

3.1097.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1097.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. $2(20) = 40$.

Time = 1.44 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

method	result	size
risch	$\frac{3(x^2+4x+4)\,\mathrm{e}^{2+2x}}{2(x^2\mathrm{e}^{1+x}+5x\,\mathrm{e}^{1+x}+6\,\mathrm{e}^{1+x}+12)^2}$	42
norman	$\frac{6\,\mathrm{e}^{2+2x}+6x\,\mathrm{e}^{2+2x}+\frac{3x^2\mathrm{e}^{2+2x}}{2}}{(x^2\mathrm{e}^{1+x}+5x\,\mathrm{e}^{1+x}+6\,\mathrm{e}^{1+x}+12)^2}$	56
parallelrisch	$\frac{3x^2\mathrm{e}^{2+2x}+12x\,\mathrm{e}^{2+2x}+12\,\mathrm{e}^{2+2x}}{2x^4\mathrm{e}^{2+2x}+20x^3\mathrm{e}^{2+2x}+74x^2\mathrm{e}^{2+2x}+48x^2\mathrm{e}^{1+x}+120x\,\mathrm{e}^{2+2x}+240x\,\mathrm{e}^{1+x}+72\,\mathrm{e}^{2+2x}+288\,\mathrm{e}^{1+x}+288}$	107

input
```
int(((-3*x^3-18*x^2-36*x-24)*exp(1+x)^3+(36*x^2+180*x+216)*exp(1+x)^2)/((x
^6+15*x^5+93*x^4+305*x^3+558*x^2+540*x+216)*exp(1+x)^3+(36*x^4+360*x^3+133
2*x^2+2160*x+1296)*exp(1+x)^2+(432*x^2+2160*x+2592)*exp(1+x)+1728),x,metho
d=_RETURNVERBOSE)
```

output
```
3/2*(x^2+4*x+4)*exp(2+2*x)/(x^2*exp(1+x)+5*x*exp(1+x)+6*exp(1+x)+12)^2
```

3.1097.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(20) = 40$.

Time = 0.26 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.57

$$\int \frac{e^{2+2x}(216+180x+36x^2)+e^{3+3x}(-24-36x-18x^2-3x^3)}{1728+e^{1+x}(2592+2160x+432x^2)+e^{2+2x}(1296+2160x+1332x^2+360x^3+36x^4)+e^{3+3x}(216+54}$$
$$= \frac{3\,(x^2+4\,x+4)e^{(2\,x+2)}}{2\,((x^4+10\,x^3+37\,x^2+60\,x+36)e^{(2\,x+2)}+24\,(x^2+5\,x+6)e^{(x+1)}+144)}$$

input
```
integrate(((-3*x^3-18*x^2-36*x-24)*exp(1+x)^3+(36*x^2+180*x+216)*exp(1+x)^
2)/((x^6+15*x^5+93*x^4+305*x^3+558*x^2+540*x+216)*exp(1+x)^3+(36*x^4+360*x
^3+1332*x^2+2160*x+1296)*exp(1+x)^2+(432*x^2+2160*x+2592)*exp(1+x)+1728),x
, algorithm=\
```

output
```
3/2*(x^2 + 4*x + 4)*e^(2*x + 2)/((x^4 + 10*x^3 + 37*x^2 + 60*x + 36)*e^(2*
x + 2) + 24*(x^2 + 5*x + 6)*e^(x + 1) + 144)
```

3.1097.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 100 vs. $2(19) = 38$.

Time = 0.30 (sec) , antiderivative size = 100, normalized size of antiderivative = 4.35

$$\int \frac{e^{2+2x}(216+180x+36x^2)+e^{3+3x}(-24-36x-18x^2-3x^3)}{1728+e^{1+x}(2592+2160x+432x^2)+e^{2+2x}(1296+2160x+1332x^2+360x^3+36x^4)+e^{3+3x}(216+54}$$
$$= \frac{(-36x^2-180x-216)\,e^{x+1}-216}{144x^2+864x+(24x^4+264x^3+1080x^2+1944x+1296)\,e^{x+1}+(x^6+16x^5+106x^4+372x^3+729x^2+}$$
$$+\frac{3}{2x^2+12x+18}$$

input
```
integrate(((-3*x**3-18*x**2-36*x-24)*exp(1+x)**3+(36*x**2+180*x+216)*exp(1
+x)**2)/((x**6+15*x**5+93*x**4+305*x**3+558*x**2+540*x+216)*exp(1+x)**3+(3
6*x**4+360*x**3+1332*x**2+2160*x+1296)*exp(1+x)**2+(432*x**2+2160*x+2592)*
exp(1+x)+1728),x)
```

output
```
((-36*x**2 - 180*x - 216)*exp(x + 1) - 216)/(144*x**2 + 864*x + (24*x**4 +
 264*x**3 + 1080*x**2 + 1944*x + 1296)*exp(x + 1) + (x**6 + 16*x**5 + 106*
x**4 + 372*x**3 + 729*x**2 + 756*x + 324)*exp(2*x + 2) + 1296) + 3/(2*x**2
 + 12*x + 18)
```

3.1097.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. $2(20) = 40$.

Time = 0.28 (sec) , antiderivative size = 81, normalized size of antiderivative = 3.52

$$\int \frac{e^{2+2x}(216+180x+36x^2)+e^{3+3x}(-24-36x-18x^2-3x^3)}{1728+e^{1+x}(2592+2160x+432x^2)+e^{2+2x}(1296+2160x+1332x^2+360x^3+36x^4)+e^{3+3x}(216+54\ldots}$$
$$= \frac{3(x^2e^2+4xe^2+4e^2)e^{(2x)}}{2((x^4e^2+10x^3e^2+37x^2e^2+60xe^2+36e^2)e^{(2x)}+24(x^2e+5xe+6e)e^x+144)}$$

input
```
integrate(((-3*x^3-18*x^2-36*x-24)*exp(1+x)^3+(36*x^2+180*x+216)*exp(1+x)^
2)/((x^6+15*x^5+93*x^4+305*x^3+558*x^2+540*x+216)*exp(1+x)^3+(36*x^4+360*x
^3+1332*x^2+2160*x+1296)*exp(1+x)^2+(432*x^2+2160*x+2592)*exp(1+x)+1728),x
, algorithm=\
```

output
```
3/2*(x^2*e^2 + 4*x*e^2 + 4*e^2)*e^(2*x)/((x^4*e^2 + 10*x^3*e^2 + 37*x^2*e^
2 + 60*x*e^2 + 36*e^2)*e^(2*x) + 24*(x^2*e + 5*x*e + 6*e)*e^x + 144)
```

3.1097.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 105 vs. $2(20) = 40$.

Time = 0.31 (sec) , antiderivative size = 105, normalized size of antiderivative = 4.57

$$\int \frac{e^{2+2x}(216+180x+36x^2)+e^{3+3x}(-24-36x-18x^2-3x^3)}{1728+e^{1+x}(2592+2160x+432x^2)+e^{2+2x}(1296+2160x+1332x^2+360x^3+36x^4)+e^{3+3x}(216+54\ldots}$$
$$= \frac{3\left(x^2e^{(2x+2)}+4xe^{(2x+2)}+4e^{(2x+2)}\right)}{2(x^4e^{(2x+2)}+10x^3e^{(2x+2)}+37x^2e^{(2x+2)}+24x^2e^{(x+1)}+60xe^{(2x+2)}+120xe^{(x+1)}+36e^{(2x+2)}+144e^{(x\ldots}$$

input
```
integrate(((-3*x^3-18*x^2-36*x-24)*exp(1+x)^3+(36*x^2+180*x+216)*exp(1+x)^
2)/((x^6+15*x^5+93*x^4+305*x^3+558*x^2+540*x+216)*exp(1+x)^3+(36*x^4+360*x
^3+1332*x^2+2160*x+1296)*exp(1+x)^2+(432*x^2+2160*x+2592)*exp(1+x)+1728),x
, algorithm=\
```

output
```
3/2*(x^2*e^(2*x + 2) + 4*x*e^(2*x + 2) + 4*e^(2*x + 2))/(x^4*e^(2*x + 2) +
 10*x^3*e^(2*x + 2) + 37*x^2*e^(2*x + 2) + 24*x^2*e^(x + 1) + 60*x*e^(2*x
+ 2) + 120*x*e^(x + 1) + 36*e^(2*x + 2) + 144*e^(x + 1) + 144)
```

3.1097.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{2+2x}(216+180x+36x^2)+e^{3+3x}(-24-36x-18x^2-3x^3)}{1728+e^{1+x}(2592+2160x+432x^2)+e^{2+2x}(1296+2160x+1332x^2+360x^3+36x^4)+e^{3+3x}(216+5$$
$$=\int \frac{e^{2x+2}(36x^2+180x+216)-e^{3x+3}(3x^3+18x^2+36x}{e^{x+1}(432x^2+2160x+2592)+e^{2x+2}(36x^4+360x^3+1332x^2+2160x+1296)+e^{3x+3}(x^6+15x$$

input
```
int((exp(2*x + 2)*(180*x + 36*x^2 + 216) - exp(3*x + 3)*(36*x + 18*x^2 + 3
*x^3 + 24))/(exp(x + 1)*(2160*x + 432*x^2 + 2592) + exp(2*x + 2)*(2160*x +
 1332*x^2 + 360*x^3 + 36*x^4 + 1296) + exp(3*x + 3)*(540*x + 558*x^2 + 305
*x^3 + 93*x^4 + 15*x^5 + x^6 + 216) + 1728),x)
```

output
```
int((exp(2*x + 2)*(180*x + 36*x^2 + 216) - exp(3*x + 3)*(36*x + 18*x^2 + 3
*x^3 + 24))/(exp(x + 1)*(2160*x + 432*x^2 + 2592) + exp(2*x + 2)*(2160*x +
 1332*x^2 + 360*x^3 + 36*x^4 + 1296) + exp(3*x + 3)*(540*x + 558*x^2 + 305
*x^3 + 93*x^4 + 15*x^5 + x^6 + 216) + 1728), x)
```

3.1097.
$$\int \frac{e^{2+2x}(216+180x+36x^2)+e^{3+3x}(-24-36x-18x^2-3x^3)}{1728+e^{1+x}(2592+2160x+432x^2)+e^{2+2x}(1296+2160x+1332x^2+360x^3+36x^4)+e^{3+3x}(216+540x+558x^2+305x^3+93x^4+15x^5+x^6)}\,dx$$

3.1098 $\int \frac{-1387+573x+812x^2-199x^3-190x^4+9x^5+17x^6+2x^7}{-630+251x+376x^2-85x^3-89x^4+3x^5+8x^6+x^7} dx$

3.1098.1 Optimal result

Integrand size = 71, antiderivative size = 20

$$\int \frac{-1387+573x+812x^2-199x^3-190x^4+9x^5+17x^6+2x^7}{-630+251x+376x^2-85x^3-89x^4+3x^5+8x^6+x^7} dx = 2x+\log\left(5+x+\frac{1}{(5-x-x^2)^2}\right)$$

output
```
ln(x+1/(-x^2-x+5)^2+5)+2*x
```

3.1098.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.95

$$\int \frac{-1387+573x+812x^2-199x^3-190x^4+9x^5+17x^6+2x^7}{-630+251x+376x^2-85x^3-89x^4+3x^5+8x^6+x^7} dx = 2x-2\log\left(5-x-x^2\right)+\log\left(126-25x-55x^2+x^3+7x^4+x^5\right)$$

input
```
Integrate[(-1387 + 573*x + 812*x^2 - 199*x^3 - 190*x^4 + 9*x^5 + 17*x^6 +
2*x^7)/(-630 + 251*x + 376*x^2 - 85*x^3 - 89*x^4 + 3*x^5 + 8*x^6 + x^7),x]
```

output
```
2*x - 2*Log[5 - x - x^2] + Log[126 - 25*x - 55*x^2 + x^3 + 7*x^4 + x^5]
```

3.1098.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.95, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$, Rules used = {2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^7+17x^6+9x^5-190x^4-199x^3+812x^2+573x-1387}{x^7+8x^6+3x^5-89x^4-85x^3+376x^2+251x-630} \, dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(-\frac{2(2x+1)}{x^2+x-5}+\frac{5x^4+28x^3+3x^2-110x-25}{x^5+7x^4+x^3-55x^2-25x+126}+2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-2\log\left(-x^2-x+5\right)+\log\left(x^5+7x^4+x^3-55x^2-25x+126\right)+2x$$

input
```
Int[(-1387 + 573*x + 812*x^2 - 199*x^3 - 190*x^4 + 9*x^5 + 17*x^6 + 2*x^7)
/(-630 + 251*x + 376*x^2 - 85*x^3 - 89*x^4 + 3*x^5 + 8*x^6 + x^7),x]
```

output
```
2*x - 2*Log[5 - x - x^2] + Log[126 - 25*x - 55*x^2 + x^3 + 7*x^4 + x^5]
```

3.1098.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.1098.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

method	result	size
default	$2x+\ln \left(x^{5}+7 x^{4}+x^{3}-55 x^{2}-25 x +126\right)-2 \ln \left(x^{2}+x -5\right)$	36
norman	$2x+\ln \left(x^{5}+7 x^{4}+x^{3}-55 x^{2}-25 x +126\right)-2 \ln \left(x^{2}+x -5\right)$	36
risch	$2x+\ln \left(x^{5}+7 x^{4}+x^{3}-55 x^{2}-25 x +126\right)-2 \ln \left(x^{2}+x -5\right)$	36
parallelrisch	$2x+\ln \left(x^{5}+7 x^{4}+x^{3}-55 x^{2}-25 x +126\right)-2 \ln \left(x^{2}+x -5\right)$	36

input
```
int((2*x^7+17*x^6+9*x^5-190*x^4-199*x^3+812*x^2+573*x-1387)/(x^7+8*x^6+3*x
^5-89*x^4-85*x^3+376*x^2+251*x-630),x,method=_RETURNVERBOSE)
```

output
```
2*x+ln(x^5+7*x^4+x^3-55*x^2-25*x+126)-2*ln(x^2+x-5)
```

3.1098.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. 2(16) = 32.

Time = 0.30 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.75

$$\int \frac{-1387+573x+812x^2-199x^3-190x^4+9x^5+17x^6+2x^7}{-630+251x+376x^2-85x^3-89x^4+3x^5+8x^6+x^7}\,dx$$
$$= 2\,x + \log\left(x^5 + 7\,x^4 + x^3 - 55\,x^2 - 25\,x + 126\right) - 2\,\log\left(x^2 + x - 5\right)$$

input
```
integrate((2*x^7+17*x^6+9*x^5-190*x^4-199*x^3+812*x^2+573*x-1387)/(x^7+8*x
^6+3*x^5-89*x^4-85*x^3+376*x^2+251*x-630),x, algorithm=\
```

output
```
2*x + log(x^5 + 7*x^4 + x^3 - 55*x^2 - 25*x + 126) - 2*log(x^2 + x - 5)
```

3.1098.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. $2(17) = 34$.

Time = 0.09 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

$$\int \frac{-1387+573x+812x^2-199x^3-190x^4+9x^5+17x^6+2x^7}{-630+251x+376x^2-85x^3-89x^4+3x^5+8x^6+x^7}\,dx = 2x-2\log\left(x^2+x-5\right)+\log\left(x^5+7x^4+x^3-55x^2-25x+126\right)$$

input
```
integrate((2*x**7+17*x**6+9*x**5-190*x**4-199*x**3+812*x**2+573*x-1387)/(x
**7+8*x**6+3*x**5-89*x**4-85*x**3+376*x**2+251*x-630),x)
```

output
```
2*x - 2*log(x**2 + x - 5) + log(x**5 + 7*x**4 + x**3 - 55*x**2 - 25*x + 12
6)
```

3.1098.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. $2(16) = 32$.

Time = 0.22 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.75

$$\int \frac{-1387+573x+812x^2-199x^3-190x^4+9x^5+17x^6+2x^7}{-630+251x+376x^2-85x^3-89x^4+3x^5+8x^6+x^7}\,dx = 2\,x+\log\left(x^5+7\,x^4+x^3-55\,x^2-25\,x+126\right)-2\,\log\left(x^2+x-5\right)$$

input
```
integrate((2*x^7+17*x^6+9*x^5-190*x^4-199*x^3+812*x^2+573*x-1387)/(x^7+8*x
^6+3*x^5-89*x^4-85*x^3+376*x^2+251*x-630),x, algorithm=\
```

output
```
2*x + log(x^5 + 7*x^4 + x^3 - 55*x^2 - 25*x + 126) - 2*log(x^2 + x - 5)
```

3.1098.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(16) = 32$.

Time = 0.28 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.85

$$\int \frac{-1387+573x+812x^2-199x^3-190x^4+9x^5+17x^6+2x^7}{-630+251x+376x^2-85x^3-89x^4+3x^5+8x^6+x^7}\,dx = 2\,x+\log\left(\left|x^5+7\,x^4+x^3-55\,x^2-25\,x+126\right|\right)-2\,\log\left(\left|x^2+x-5\right|\right)$$

input
```
integrate((2*x^7+17*x^6+9*x^5-190*x^4-199*x^3+812*x^2+573*x-1387)/(x^7+8*x
^6+3*x^5-89*x^4-85*x^3+376*x^2+251*x-630),x, algorithm=\
```

output
```
2*x + log(abs(x^5 + 7*x^4 + x^3 - 55*x^2 - 25*x + 126)) - 2*log(abs(x^2 +
x - 5))
```

3.1098.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.75

$$\int \frac{-1387+573x+812x^2-199x^3-190x^4+9x^5+17x^6+2x^7}{-630+251x+376x^2-85x^3-89x^4+3x^5+8x^6+x^7}\,dx$$
$$=2\,x-2\,\ln\left(x^2+x-5\right)+\ln\left(x^5+7\,x^4+x^3-55\,x^2-25\,x+126\right)$$

input
```
int((573*x + 812*x^2 - 199*x^3 - 190*x^4 + 9*x^5 + 17*x^6 + 2*x^7 - 1387)/
(251*x + 376*x^2 - 85*x^3 - 89*x^4 + 3*x^5 + 8*x^6 + x^7 - 630),x)
```

output
```
2*x - 2*log(x + x^2 - 5) + log(x^3 - 55*x^2 - 25*x + 7*x^4 + x^5 + 126)
```

3.1099 $\int \frac{-4+4x+7x^2-8x^3-2x^4-e^{2x}x^4+4x^5-x^6+e^x(-4x^2+2x^3+4x^4-2x^5}{}$

3.1099.1 Optimal result

Integrand size = 266, antiderivative size = 27

$$\int \frac{-4+4x+7x^2-8x^3-2x^4-e^{2x}x^4+4x^5-x^6+e^x(-4x^2+2x^3+4x^4-2x^5)+(4-4x-7x^2+8x^3+}{(4-4x-7x^2+8x^3}$$
$$=x+\frac{x}{2-x+x^2(-2+e^x+x)}+\frac{x}{\log(x)}$$

output
```
x+x/ln(x)+x/(2-x+(x-2+exp(x))*x^2)
```

3.1099.2 Mathematica [A] (verified)

Time = 6.70 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.19

$$\int \frac{-4+4x+7x^2-8x^3-2x^4-e^{2x}x^4+4x^5-x^6+e^x(-4x^2+2x^3+4x^4-2x^5)+(4-4x-7x^2+8x^3+}{(4-4x-7x^2+8x^3}$$
$$=x+\frac{x}{2-x-2x^2+e^xx^2+x^3}+\frac{x}{\log(x)}$$

input
```
Integrate[(-4 + 4*x + 7*x^2 - 8*x^3 - 2*x^4 - E^(2*x)*x^4 + 4*x^5 - x^6 +
E^x*(-4*x^2 + 2*x^3 + 4*x^4 - 2*x^5) + (4 - 4*x - 7*x^2 + 8*x^3 + 2*x^4 +
E^(2*x)*x^4 - 4*x^5 + x^6 + E^x*(4*x^2 - 2*x^3 - 4*x^4 + 2*x^5))*Log[x] +
(6 - 4*x - 5*x^2 + 6*x^3 + 2*x^4 + E^(2*x)*x^4 - 4*x^5 + x^6 + E^x*(3*x^2
- 3*x^3 - 4*x^4 + 2*x^5))*Log[x]^2)/((4 - 4*x - 7*x^2 + 8*x^3 + 2*x^4 + E^
(2*x)*x^4 - 4*x^5 + x^6 + E^x*(4*x^2 - 2*x^3 - 4*x^4 + 2*x^5))*Log[x]^2),x
]
```

3.1099.
$\int \frac{-4+4x+7x^2-8x^3-2x^4-e^{2x}x^4+4x^5-x^6+e^x(-4x^2+2x^3+4x^4-2x^5)+(4-4x-7x^2+8x^3+2x^4+e^{2x}x^4-4x^5+x^6+e^x(4x^2-2x^3-4x^4+2x^5))\log(x}{(4-4x-7x^2+8x^3+2x^4+e^{2x}x^4-4x^5+x^6+e^x(4x^2-2x^3-4x^4+2x^5))\log}$

output
```
x + x/(2 - x - 2*x^2 + E^x*x^2 + x^3) + x/Log[x]
```

3.1099.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^6+4x^5-e^{2x}x^4-2x^4-8x^3+7x^2+e^x\left(-2x^5+4x^4+2x^3-4x^2\right)+\left(x^6-4x^5+e^{2x}x^4+2x^4+6x^3-5x^2\right.}{\left(x^6-4x^5+e^{2x}x^4+2x^4\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \left(\frac{x^6+2(e^x-2)x^5+\left(-4e^x+e^{2x}+2\right)x^4-3(e^x-2)x^3+(3e^x-5)x^2-4x+6}{\left(x^3+(e^x-2)x^2-x+2\right)^2}-\frac{1}{\log^2(x)}+\frac{1}{\log(x)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$4\int \frac{1}{\left(x^3+e^xx^2-2x^2-x+2\right)^2}dx+\int \frac{x}{\left(x^3+e^xx^2-2x^2-x+2\right)^2}dx-\int \frac{x^2}{\left(x^3+e^xx^2-2x^2-x+2\right)^2}dx-3\int \frac{x^3}{\left(x^3+e^xx^2-2x^2-x+2\right)^2}dx-\int \frac{1}{x^3+e^xx^2-2x^2-x+2}dx-\int \frac{x}{x^3+e^xx^2-2x^2-x+2}dx+\int \frac{x^4}{\left(x^3+e^xx^2-2x^2-x+2\right)^2}dx+x+\frac{x}{\log(x)}$$

input
```
Int[(-4 + 4*x + 7*x^2 - 8*x^3 - 2*x^4 - E^(2*x)*x^4 + 4*x^5 - x^6 + E^x*(-
4*x^2 + 2*x^3 + 4*x^4 - 2*x^5) + (4 - 4*x - 7*x^2 + 8*x^3 + 2*x^4 + E^(2*x
)*x^4 - 4*x^5 + x^6 + E^x*(4*x^2 - 2*x^3 - 4*x^4 + 2*x^5))*Log[x] + (6 - 4
*x - 5*x^2 + 6*x^3 + 2*x^4 + E^(2*x)*x^4 - 4*x^5 + x^6 + E^x*(3*x^2 - 3*x^
3 - 4*x^4 + 2*x^5))*Log[x]^2)/((4 - 4*x - 7*x^2 + 8*x^3 + 2*x^4 + E^(2*x)*
x^4 - 4*x^5 + x^6 + E^x*(4*x^2 - 2*x^3 - 4*x^4 + 2*x^5))*Log[x]^2),x]
```

output
```
$Aborted
```

3.1099.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1099.4 Maple [A] (verified)

Time = 0.80 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.85

method	result	size
risch	$\frac{x\left(x^{3}+{\mathrm e}^{x} x^{2}-2 x^{2}-x+3\right)}{{\mathrm e}^{x} x^{2}+x^{3}-2 x^{2}-x+2}+\frac{x}{\ln \left(x \right)}$	50
parallelrisch	$\frac{2 x+x^{4} \ln \left(x \right)+{\mathrm e}^{x} x^{3}+3 x \ln \left(x \right)+x^{3} {\mathrm e}^{x} \ln \left(x \right)+x^{4}-2 x^{3}-x^{2}-2 x^{3} \ln \left(x \right)-x^{2} \ln \left(x \right)}{\ln \left(x \right) \left({\mathrm e}^{x} x^{2}+x^{3}-2 x^{2}-x+2\right)}$	83

input
```
int(((exp(x)^2*x^4+(2*x^5-4*x^4-3*x^3+3*x^2)*exp(x)+x^6-4*x^5+2*x^4+6*x^3-
5*x^2-4*x+6)*ln(x)^2+(exp(x)^2*x^4+(2*x^5-4*x^4-2*x^3+4*x^2)*exp(x)+x^6-4*
x^5+2*x^4+8*x^3-7*x^2-4*x+4)*ln(x)-exp(x)^2*x^4+(-2*x^5+4*x^4+2*x^3-4*x^2)
*exp(x)-x^6+4*x^5-2*x^4-8*x^3+7*x^2+4*x-4)/(exp(x)^2*x^4+(2*x^5-4*x^4-2*x^
3+4*x^2)*exp(x)+x^6-4*x^5+2*x^4+8*x^3-7*x^2-4*x+4)/ln(x)^2,x,method=_RETUR
NVERBOSE)
```

output
```
x*(x^3+exp(x)*x^2-2*x^2-x+3)/(exp(x)*x^2+x^3-2*x^2-x+2)+x/ln(x)
```

3.1099.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. 2(26) = 52.

Time = 0.27 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.78

$$\int \frac{-4+4x+7x^2-8x^3-2x^4-e^{2x}x^4+4x^5-x^6+e^x(-4x^2+2x^3+4x^4-2x^5)+(4-4x-7x^2+8x^3+}{(4-4x-7x^2+8x^3}$$

$$=\frac{x^4+x^3e^x-2\,x^3-x^2+(x^4+x^3e^x-2\,x^3-x^2+3\,x)\log(x)+2\,x}{(x^3+x^2e^x-2\,x^2-x+2)\log(x)}$$

input
```
integrate(((exp(x)^2*x^4+(2*x^5-4*x^4-3*x^3+3*x^2)*exp(x)+x^6-4*x^5+2*x^4+
6*x^3-5*x^2-4*x+6)*log(x)^2+(exp(x)^2*x^4+(2*x^5-4*x^4-2*x^3+4*x^2)*exp(x)
+x^6-4*x^5+2*x^4+8*x^3-7*x^2-4*x+4)*log(x)-exp(x)^2*x^4+(-2*x^5+4*x^4+2*x^
3-4*x^2)*exp(x)-x^6+4*x^5-2*x^4-8*x^3+7*x^2+4*x-4)/(exp(x)^2*x^4+(2*x^5-4*
x^4-2*x^3+4*x^2)*exp(x)+x^6-4*x^5+2*x^4+8*x^3-7*x^2-4*x+4)/log(x)^2,x, alg
orithm=\
```

output
```
(x^4 + x^3*e^x - 2*x^3 - x^2 + (x^4 + x^3*e^x - 2*x^3 - x^2 + 3*x)*log(x)
+ 2*x)/((x^3 + x^2*e^x - 2*x^2 - x + 2)*log(x))
```

3.1099.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{-4+4x+7x^2-8x^3-2x^4-e^{2x}x^4+4x^5-x^6+e^x(-4x^2+2x^3+4x^4-2x^5)+(4-4x-7x^2+8x^3+}{(4-4x-7x^2+8x^3}$$

$$=x+\frac{x}{\log{(x)}}+\frac{x}{x^3+x^2e^x-2x^2-x+2}$$

input
```
integrate(((exp(x)**2*x**4+(2*x**5-4*x**4-3*x**3+3*x**2)*exp(x)+x**6-4*x**
5+2*x**4+6*x**3-5*x**2-4*x+6)*ln(x)**2+(exp(x)**2*x**4+(2*x**5-4*x**4-2*x*
*3+4*x**2)*exp(x)+x**6-4*x**5+2*x**4+8*x**3-7*x**2-4*x+4)*ln(x)-exp(x)**2*
x**4+(-2*x**5+4*x**4+2*x**3-4*x**2)*exp(x)-x**6+4*x**5-2*x**4-8*x**3+7*x**
2+4*x-4)/(exp(x)**2*x**4+(2*x**5-4*x**4-2*x**3+4*x**2)*exp(x)+x**6-4*x**5+
2*x**4+8*x**3-7*x**2-4*x+4)/ln(x)**2,x)
```

output
```
x + x/log(x) + x/(x**3 + x**2*exp(x) - 2*x**2 - x + 2)
```

3.1099.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 78 vs. 2(26) = 52.

Time = 0.30 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.89

$$\int \frac{-4+4x+7x^2-8x^3-2x^4-e^{2x}x^4+4x^5-x^6+e^x(-4x^2+2x^3+4x^4-2x^5)+(4-4x-7x^2+8x^3+}{(4-4x-7x^2+8x^3}$$

$$=\frac{x^4-2x^3-x^2+(x^3\log{(x)}+x^3)e^x+(x^4-2x^3-x^2+3x)\log{(x)}+2x}{x^2e^x\log{(x)}+(x^3-2x^2-x+2)\log{(x)}}$$

input
```
integrate(((exp(x)^2*x^4+(2*x^5-4*x^4-3*x^3+3*x^2)*exp(x)+x^6-4*x^5+2*x^4+
6*x^3-5*x^2-4*x+6)*log(x)^2+(exp(x)^2*x^4+(2*x^5-4*x^4-2*x^3+4*x^2)*exp(x)
+x^6-4*x^5+2*x^4+8*x^3-7*x^2-4*x+4)*log(x)-exp(x)^2*x^4+(-2*x^5+4*x^4+2*x^
3-4*x^2)*exp(x)-x^6+4*x^5-2*x^4-8*x^3+7*x^2+4*x-4)/(exp(x)^2*x^4+(2*x^5-4*
x^4-2*x^3+4*x^2)*exp(x)+x^6-4*x^5+2*x^4+8*x^3-7*x^2-4*x+4)/log(x)^2,x, alg
orithm=\
```

output
```
(x^4 - 2*x^3 - x^2 + (x^3*log(x) + x^3)*e^x + (x^4 - 2*x^3 - x^2 + 3*x)*lo
g(x) + 2*x)/(x^2*e^x*log(x) + (x^3 - 2*x^2 - x + 2)*log(x))
```

3.1099.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 90 vs. $2(26) = 52$.

Time = 0.38 (sec) , antiderivative size = 90, normalized size of antiderivative = 3.33

$$\int \frac{-4+4x+7x^2-8x^3-2x^4-e^{2x}x^4+4x^5-x^6+e^x(-4x^2+2x^3+4x^4-2x^5)+(4-4x-7x^2+8x^3+}{(4-4x-7x^2+8x^3}$$

$$= \frac{x^4\log(x)+x^3e^x\log(x)+x^4+x^3e^x-2\,x^3\log(x)-2\,x^3-x^2\log(x)-x^2+3\,x\log(x)+2\,x}{x^3\log(x)+x^2e^x\log(x)-2\,x^2\log(x)-x\log(x)+2\,\log(x)}$$

input
```
integrate(((exp(x)^2*x^4+(2*x^5-4*x^4-3*x^3+3*x^2)*exp(x)+x^6-4*x^5+2*x^4+
6*x^3-5*x^2-4*x+6)*log(x)^2+(exp(x)^2*x^4+(2*x^5-4*x^4-2*x^3+4*x^2)*exp(x)
+x^6-4*x^5+2*x^4+8*x^3-7*x^2-4*x+4)*log(x)-exp(x)^2*x^4+(-2*x^5+4*x^4+2*x^
3-4*x^2)*exp(x)-x^6+4*x^5-2*x^4-8*x^3+7*x^2+4*x-4)/(exp(x)^2*x^4+(2*x^5-4*
x^4-2*x^3+4*x^2)*exp(x)+x^6-4*x^5+2*x^4+8*x^3-7*x^2-4*x+4)/log(x)^2,x, alg
orithm=\
```

output
```
(x^4*log(x) + x^3*e^x*log(x) + x^4 + x^3*e^x - 2*x^3*log(x) - 2*x^3 - x^2*
log(x) - x^2 + 3*x*log(x) + 2*x)/(x^3*log(x) + x^2*e^x*log(x) - 2*x^2*log(
x) - x*log(x) + 2*log(x))
```

3.1099.9 Mupad [B] (verification not implemented)

Time = 14.94 (sec) , antiderivative size = 76, normalized size of antiderivative = 2.81

$$\int \frac{-4+4x+7x^2-8x^3-2x^4-e^{2x}x^4+4x^5-x^6+e^x(-4x^2+2x^3+4x^4-2x^5)+(4-4x-7x^2+8x^3+}{(4-4x-7x^2+8x^3}$$
$$= \frac{x\,(3\,\ln(x)-x+x^2\,e^x-2\,x^2\,\ln(x)+x^3\,\ln(x)-x\,\ln(x)-2\,x^2+x^3+x^2\,e^x\,\ln(x)+2)}{\ln(x)\,\left(x^2\,e^x-x-2\,x^2+x^3+2\right)}$$

input
```
int(-(x^4*exp(2*x) - log(x)*(x^4*exp(2*x) - 4*x + exp(x)*(4*x^2 - 2*x^3 -
4*x^4 + 2*x^5) - 7*x^2 + 8*x^3 + 2*x^4 - 4*x^5 + x^6 + 4) - 4*x + exp(x)*(
4*x^2 - 2*x^3 - 4*x^4 + 2*x^5) - log(x)^2*(x^4*exp(2*x) - 4*x + exp(x)*(3*
x^2 - 3*x^3 - 4*x^4 + 2*x^5) - 5*x^2 + 6*x^3 + 2*x^4 - 4*x^5 + x^6 + 6) -
7*x^2 + 8*x^3 + 2*x^4 - 4*x^5 + x^6 + 4)/(log(x)^2*(x^4*exp(2*x) - 4*x + e
xp(x)*(4*x^2 - 2*x^3 - 4*x^4 + 2*x^5) - 7*x^2 + 8*x^3 + 2*x^4 - 4*x^5 + x^
6 + 4)),x)
```

output
```
(x*(3*log(x) - x + x^2*exp(x) - 2*x^2*log(x) + x^3*log(x) - x*log(x) - 2*x
^2 + x^3 + x^2*exp(x)*log(x) + 2))/(log(x)*(x^2*exp(x) - x - 2*x^2 + x^3 +
 2))
```

3.1100 $\int \frac{1}{2e^2} dx$

3.1100.1 Optimal result

Integrand size = 7, antiderivative size = 8

$$\int \frac{1}{2e^2} dx = \frac{x}{2e^2}$$

output
```
1/2*x/exp(1)^2
```

3.1100.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 8, normalized size of antiderivative = 1.00

$$\int \frac{1}{2e^2} dx = \frac{x}{2e^2}$$

input
```
Integrate[1/(2*E^2),x]
```

output
```
x/(2*E^2)
```

3.1100.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 8, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2e^2} \, dx$$
$$\Big\downarrow \; 24$$
$$\frac{x}{2e^2}$$

input
```
Int[1/(2*E^2),x]
```

output
```
x/(2*E^2)
```

3.1100.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.1100.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.75

method	result	size
risch	$\frac{x\,\mathrm{e}^{-2}}{2}$	6
default	$\frac{x\,\mathrm{e}^{-2}}{2}$	8
norman	$\frac{x\,\mathrm{e}^{-2}}{2}$	8
parallelrisch	$\frac{x\,\mathrm{e}^{-2}}{2}$	8

input
```
int(1/2/exp(1)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*x*exp(-2)
```

3.1100.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.62

$$\int \frac{1}{2e^2} \, dx = \frac{1}{2} \, x e^{(-2)}$$

input
```
integrate(1/2/exp(1)^2,x, algorithm=\
```

output
```
1/2*x*e^(-2)
```

3.1100.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.62

$$\int \frac{1}{2e^2} \, dx = \frac{x}{2e^2}$$

input
```
integrate(1/2/exp(1)**2,x)
```

output
```
x*exp(-2)/2
```

3.1100.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.62

$$\int \frac{1}{2e^2} \, dx = \frac{1}{2} \, x e^{(-2)}$$

input
```
integrate(1/2/exp(1)^2,x, algorithm=\
```

output
```
1/2*x*e^(-2)
```

3.1100.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.62

$$\int \frac{1}{2e^2}\,dx = \frac{1}{2}\,xe^{(-2)}$$

input
```
integrate(1/2/exp(1)^2,x, algorithm=\
```

output
```
1/2*x*e^(-2)
```

3.1100.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.62

$$\int \frac{1}{2e^2}\,dx = \frac{x\,\mathrm{e}^{-2}}{2}$$

input
```
int(exp(-2)/2,x)
```

output
```
(x*exp(-2))/2
```

3.1101 $\int \frac{-2e^{25/12}-e^{25/12}\log(8)}{x^2}\,dx$

3.1101.1 Optimal result

Integrand size = 21, antiderivative size = 20

$$\int \frac{-2e^{25/12}-e^{25/12}\log(8)}{x^2}\,dx = \frac{x\log(3)+e^{25/12}(2+x+\log(8))}{x}$$

output
```
(exp(25/12)*(3*ln(2)+2+x)+x*ln(3))/x
```

3.1101.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

$$\int \frac{-2e^{25/12}-e^{25/12}\log(8)}{x^2}\,dx = \frac{e^{25/12}(2+\log(8))}{x}$$

input
```
Integrate[(-2*E^(25/12) - E^(25/12)*Log[8])/x^2,x]
```

output
```
(E^(25/12)*(2 + Log[8]))/x
```

3.1101.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.048, Rules used = {15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2e^{25/12}-e^{25/12}\log(8)}{x^2}\,dx$$

$$\Big\downarrow \; 15$$

$$\frac{e^{25/12}(2+\log(8))}{x}$$

input
```
Int[(-2*E^(25/12) - E^(25/12)*Log[8])/x^2,x]
```

output
```
(E^(25/12)*(2 + Log[8]))/x
```

3.1101.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.1101.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.65

method	result	size
gosper	$\frac{e^{\frac{25}{12}}(3\ln(2)+2)}{x}$	13
norman	$\frac{3\,e^{\frac{25}{12}}\ln(2)+2\,e^{\frac{25}{12}}}{x}$	16
default	$-\frac{-3\,e^{\frac{25}{12}}\ln(2)-2\,e^{\frac{25}{12}}}{x}$	17
parallelrisch	$-\frac{-3\,e^{\frac{25}{12}}\ln(2)-2\,e^{\frac{25}{12}}}{x}$	17
risch	$\frac{3\,e^{\frac{25}{12}}\ln(2)}{x}+\frac{2\,e^{\frac{25}{12}}}{x}$	18

input
```
int((-3*exp(25/12)*ln(2)-2*exp(25/12))/x^2,x,method=_RETURNVERBOSE)
```

output
```
exp(25/12)*(3*ln(2)+2)/x
```

3.1101.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-2e^{25/12} - e^{25/12} \log(8)}{x^2} \, dx = \frac{3 \, e^{\frac{25}{12}} \log\left(2\right) + 2 \, e^{\frac{25}{12}}}{x}$$

input
```
integrate((-3*exp(25/12)*log(2)-2*exp(25/12))/x^2,x, algorithm=\
```

output
```
(3*e^(25/12)*log(2) + 2*e^(25/12))/x
```

3.1101.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{-2e^{25/12} - e^{25/12} \log(8)}{x^2} \, dx = -\frac{-3e^{\frac{25}{12}} \log\left(2\right) - 2e^{\frac{25}{12}}}{x}$$

input
```
integrate((-3*exp(25/12)*ln(2)-2*exp(25/12))/x**2,x)
```

output
```
-(-3*exp(25/12)*log(2) - 2*exp(25/12))/x
```

3.1101.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-2e^{25/12} - e^{25/12} \log(8)}{x^2} \, dx = \frac{3 \, e^{\frac{25}{12}} \log\left(2\right) + 2 \, e^{\frac{25}{12}}}{x}$$

input
```
integrate((-3*exp(25/12)*log(2)-2*exp(25/12))/x^2,x, algorithm=\
```

output
```
(3*e^(25/12)*log(2) + 2*e^(25/12))/x
```

3.1101.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{-2e^{25/12}-e^{25/12}\log(8)}{x^2}\,dx=\frac{3\,e^{\frac{25}{12}}\log{(2)}+2\,e^{\frac{25}{12}}}{x}$$

input
```
integrate((-3*exp(25/12)*log(2)-2*exp(25/12))/x^2,x, algorithm=\
```

output
```
(3*e^(25/12)*log(2) + 2*e^(25/12))/x
```

3.1101.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int \frac{-2e^{25/12}-e^{25/12}\log(8)}{x^2}\,dx=\frac{\mathrm{e}^{25/12}\,(\ln{(8)}+2)}{x}$$

input
```
int(-(2*exp(25/12) + 3*exp(25/12)*log(2))/x^2,x)
```

output
```
(exp(25/12)*(log(8) + 2))/x
```

3.1102 $\int \frac{-2e^x x+(-4-e^x)\log(16+8e^x+e^{2x})}{4+e^x}\,dx$

3.1102.1 Optimal result

Integrand size = 36, antiderivative size = 15

$$\int \frac{-2e^x x+(-4-e^x)\log(16+8e^x+e^{2x})}{4+e^x}\,dx = -5+\log(5)-x\log\left((4+e^x)^2\right)$$

output
```
-5-x*ln((exp(x)+4)^2)+ln(5)
```

3.1102.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.06 (sec) , antiderivative size = 56, normalized size of antiderivative = 3.73

$$\begin{aligned}&\int \frac{-2e^x x+(-4-e^x)\log(16+8e^x+e^{2x})}{4+e^x}\,dx\\&=-2x\log\left(1+\frac{e^x}{4}\right)-\log\left(-\frac{e^x}{4}\right)\log\left((4+e^x)^2\right)\\&\quad-2\,\text{PolyLog}\left(2,-\frac{e^x}{4}\right)-2\,\text{PolyLog}\left(2,\frac{1}{4}(4+e^x)\right)\end{aligned}$$

input
```
Integrate[(-2*E^x*x + (-4 - E^x)*Log[16 + 8*E^x + E^(2*x)])/(4 + E^x),x]
```

output
```
-2*x*Log[1 + E^x/4] - Log[-1/4*E^x]*Log[(4 + E^x)^2] - 2*PolyLog[2, -1/4*E
^x] - 2*PolyLog[2, (4 + E^x)/4]
```

3.1102.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.35 (sec) , antiderivative size = 56, normalized size of antiderivative = 3.73, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-e^x-4)\log\left(8e^x+e^{2x}+16\right)-2e^xx}{e^x+4}\,dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{8x}{e^x+4}-2x-\log\left(\left(e^x+4\right)^2\right)\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-2\,\text{PolyLog}\left(2,-\frac{e^x}{4}\right)-2\,\text{PolyLog}\left(2,1+\frac{e^x}{4}\right)-2x\log\left(\frac{e^x}{4}+1\right)-\log\left(-\frac{e^x}{4}\right)\log\left(\left(e^x+4\right)^2\right)$$

input
```
Int[(-2*E^x*x + (-4 - E^x)*Log[16 + 8*E^x + E^(2*x)])/(4 + E^x),x]
```

output
```
-2*x*Log[1 + E^x/4] - Log[-1/4*E^x]*Log[(4 + E^x)^2] - 2*PolyLog[2, -1/4*E
^x] - 2*PolyLog[2, 1 + E^x/4]
```

3.1102.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1102.4 Maple [A] (verified)

Time = 0.47 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result
norman	$-x\ln\left(8\,\mathrm{e}^{x}+\mathrm{e}^{2x}+16\right)$
parallelrisch	$-x\ln\left(8\,\mathrm{e}^{x}+\mathrm{e}^{2x}+16\right)$
default	$-2x\ln\left(1+\frac{\mathrm{e}^{x}}{4}\right)-\left(\ln\left(\left(\mathrm{e}^{x}+4\right)^{2}\right)-2\ln\left(\mathrm{e}^{x}+4\right)\right)\ln\left(\mathrm{e}^{x}\right)-2\left(\ln\left(\mathrm{e}^{x}+4\right)-\ln\left(1+\frac{\mathrm{e}^{x}}{4}\right)\right)\ln\left(-\right.$
risch	$-2\ln\left(\mathrm{e}^{x}+4\right)x+\frac{ix\pi\,\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+4\right)^{2}\right)\left(\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+4\right)^{2}\right)^{2}-2\,\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+4\right)^{2}\right)\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+4\right)\right)+\mathrm{csgn}\left(i\left(\mathrm{e}^{x}+4\right)\right)^{2}\right)}{2}$

input
```
int(((-4-exp(x))*ln(exp(x)^2+8*exp(x)+16)-2*exp(x)*x)/(exp(x)+4),x,method=
_RETURNVERBOSE)
```

output
```
-x*ln(exp(x)^2+8*exp(x)+16)
```

3.1102.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{-2e^{x}x+(-4-e^{x})\log\left(16+8e^{x}+e^{2x}\right)}{4+e^{x}}\,dx=-x\log\left(e^{(2\,x)}+8\,e^{x}+16\right)$$

input
```
integrate(((-4-exp(x))*log(exp(x)^2+8*exp(x)+16)-2*exp(x)*x)/(exp(x)+4),x,
 algorithm=\
```

output
```
-x*log(e^(2*x) + 8*e^x + 16)
```

3.1102.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{-2e^{x}x+(-4-e^{x})\log\left(16+8e^{x}+e^{2x}\right)}{4+e^{x}}\,dx=-x\log\left(e^{2x}+8e^{x}+16\right)$$

input
```
integrate(((-4-exp(x))*ln(exp(x)**2+8*exp(x)+16)-2*exp(x)*x)/(exp(x)+4),x)
```

output
```
-x*log(exp(2*x) + 8*exp(x) + 16)
```

3.1102.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int \frac{-2e^x x + (-4 - e^x) \log (16 + 8e^x + e^{2x})}{4 + e^x} \, dx = -2 \, x \log (e^x + 4)$$

input
```
integrate(((-4-exp(x))*log(exp(x)^2+8*exp(x)+16)-2*exp(x)*x)/(exp(x)+4),x,
 algorithm=\
```

output
```
-2*x*log(e^x + 4)
```

3.1102.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{-2e^x x + (-4 - e^x) \log (16 + 8e^x + e^{2x})}{4 + e^x} \, dx = -x \log \left(e^{(2\,x)} + 8\,e^x + 16\right)$$

input
```
integrate(((-4-exp(x))*log(exp(x)^2+8*exp(x)+16)-2*exp(x)*x)/(exp(x)+4),x,
 algorithm=\
```

output
```
-x*log(e^(2*x) + 8*e^x + 16)
```

3.1102.9 Mupad [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.67

$$\int \frac{-2e^x x + (-4 - e^x) \log (16 + 8e^x + e^{2x})}{4 + e^x} \, dx = -x \, \ln \left((\mathrm{e}^x + 4)^2\right)$$

input
```
int(-(2*x*exp(x) + log(exp(2*x) + 8*exp(x) + 16)*(exp(x) + 4))/(exp(x) + 4
),x)
```

output
```
-x*log((exp(x) + 4)^2)
```

3.1103 $\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+(64-128x+32}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+(128-128x+32}$

3.1103.1 Optimal result

Integrand size = 375, antiderivative size = 24

$$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+(64-128x+32x^2+108x^4-64x^5+8x^6)}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+(128-128x+32x^2+64x^4-48x^5+8x^6)} = x+\frac{x}{-2+x+\frac{x^4(-4+x+\log(x))}{(2+\log(5))^2}}$$

output
```
x+x/(x+x^4/(2+ln(5))^2*(x+ln(x)-4)-2)
```

3.1103.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.79

$$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+(64-128x+32x^2+108x^4-64x^5+8x^6)}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+(128-128x+32x^2+64x^4-48x^5+8x^6)} = x+\frac{x(2+\log(5))^2}{-4x^4+x^5-2(2+\log(5))^2+x(2+\log(5))^2+x^4\log(x)}$$

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$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+(64-128x+32x^2+108x^4-64x^5+8x^6)\log(5)+(48-96x+24x^2+27x^4-16x^5+2x^6)\log^2(5)+}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+(128-128x+32x^2+64x^4-48x^5+8x^6)\log(5)+(96-96x+24x^2+16x^4-12x^5+2x^6)\log^2(5)+}$

input
```
Integrate[(32 - 64*x + 16*x^2 + 108*x^4 - 64*x^5 + 8*x^6 + 16*x^8 - 8*x^9
+ x^10 + (64 - 128*x + 32*x^2 + 108*x^4 - 64*x^5 + 8*x^6)*Log[5] + (48 - 9
6*x + 24*x^2 + 27*x^4 - 16*x^5 + 2*x^6)*Log[5]^2 + (16 - 32*x + 8*x^2)*Log
[5]^3 + (2 - 4*x + x^2)*Log[5]^4 + (-28*x^4 + 8*x^5 - 8*x^8 + 2*x^9 + (-28
*x^4 + 8*x^5)*Log[5] + (-7*x^4 + 2*x^5)*Log[5]^2)*Log[x] + x^8*Log[x]^2)/(
64 - 64*x + 16*x^2 + 64*x^4 - 48*x^5 + 8*x^6 + 16*x^8 - 8*x^9 + x^10 + (12
8 - 128*x + 32*x^2 + 64*x^4 - 48*x^5 + 8*x^6)*Log[5] + (96 - 96*x + 24*x^2
 + 16*x^4 - 12*x^5 + 2*x^6)*Log[5]^2 + (32 - 32*x + 8*x^2)*Log[5]^3 + (4 -
 4*x + x^2)*Log[5]^4 + (-16*x^4 + 8*x^5 - 8*x^8 + 2*x^9 + (-16*x^4 + 8*x^5
)*Log[5] + (-4*x^4 + 2*x^5)*Log[5]^2)*Log[x] + x^8*Log[x]^2),x]
```

output
```
x + (x*(2 + Log[5])^2)/(-4*x^4 + x^5 - 2*(2 + Log[5])^2 + x*(2 + Log[5])^2
 + x^4*Log[x])
```

3.1103.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^{10}-8x^9+16x^8+x^8\log^2(x)+8x^6-64x^5+108x^4+16x^2+(x^2-4x+2)\log^4(5)+(8x^2-32x+16)\log^3(}{x^{10}-8x^9+16x^8+x^8\log^2(x)+8x^6-48x^5+64x^4+16x^2+(x^2-4x+4)\log^4(5)+(8x^2-32x+32)\log^3(}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{x^{10}-8x^9+16x^8+x^8\log^2(x)+2x^6(2+\log(5))^2-16x^5(2+\log(5))^2+27x^4(2+\log(5))^2+x^2(2+\log(5))^4+}{(-x^5+4x^4-x^4\log(x)-x(2+\log(5)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{(2+\log(5))^2\left(-x^5-x^4+12x\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)-32\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)\right)}{\left(-x^5+4x^4-x^4\log(x)-4x\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)+8\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)\right)^2}+\frac{}{-x^5+4x^4-x^4 \text{l}}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-8(2+\log(5))^4\int \frac{1}{\left(-x^5-\log(x)x^4+4x^4-4\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)x+8\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)\right)^2}dx+$$

$$3(2+\log(5))^4\int \frac{x}{\left(-x^5-\log(x)x^4+4x^4-4\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)x+8\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)\right)^2}dx-$$

$$(2+\log(5))^2\int \frac{x^4}{\left(-x^5-\log(x)x^4+4x^4-4\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)x+8\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)\right)^2}dx-$$

$$(2+\log(5))^2\int \frac{x^5}{\left(-x^5-\log(x)x^4+4x^4-4\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)x+8\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)\right)^2}dx+$$

$$3(2+\log(5))^2\int \frac{1}{-x^5-\log(x)x^4+4x^4-4\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)x+8\left(1+\frac{1}{4}\log(5)(4+\log(5))\right)}dx+$$

$$x$$

input
```
Int[(32 - 64*x + 16*x^2 + 108*x^4 - 64*x^5 + 8*x^6 + 16*x^8 - 8*x^9 + x^10
 + (64 - 128*x + 32*x^2 + 108*x^4 - 64*x^5 + 8*x^6)*Log[5] + (48 - 96*x +
24*x^2 + 27*x^4 - 16*x^5 + 2*x^6)*Log[5]^2 + (16 - 32*x + 8*x^2)*Log[5]^3
+ (2 - 4*x + x^2)*Log[5]^4 + (-28*x^4 + 8*x^5 - 8*x^8 + 2*x^9 + (-28*x^4 +
 8*x^5)*Log[5] + (-7*x^4 + 2*x^5)*Log[5]^2)*Log[x] + x^8*Log[x]^2)/(64 - 6
4*x + 16*x^2 + 64*x^4 - 48*x^5 + 8*x^6 + 16*x^8 - 8*x^9 + x^10 + (128 - 12
8*x + 32*x^2 + 64*x^4 - 48*x^5 + 8*x^6)*Log[5] + (96 - 96*x + 24*x^2 + 16*
x^4 - 12*x^5 + 2*x^6)*Log[5]^2 + (32 - 32*x + 8*x^2)*Log[5]^3 + (4 - 4*x +
 x^2)*Log[5]^4 + (-16*x^4 + 8*x^5 - 8*x^8 + 2*x^9 + (-16*x^4 + 8*x^5)*Log[
5] + (-4*x^4 + 2*x^5)*Log[5]^2)*Log[x] + x^8*Log[x]^2),x]
```

output
```
$Aborted
```

3.1103.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

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$$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+\left(64-128x+32x^2+108x^4-64x^5+8x^6\right)\log(5)+\left(48-96x+24x^2+27x^4-16x^5+2x^6\right)\log^2(5)+}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+\left(128-128x+32x^2+64x^4-48x^5+8x^6\right)\log(5)+\left(96-96x+24x^2+16x^4-12x^5+2x^6\right)\log^2(5)+}$$

3.1103.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(24) = 48$.

Time = 2.62 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.38

method	result	size
default	$x+\frac{\left(\ln(5)^2+4\ln(5)+4\right)x}{x^4\ln(x)+x^5-4x^4+x\ln(5)^2-2\ln(5)^2+4x\ln(5)-8\ln(5)+4x-8}$	57
risch	$x+\frac{\left(\ln(5)^2+4\ln(5)+4\right)x}{x^4\ln(x)+x^5-4x^4+x\ln(5)^2-2\ln(5)^2+4x\ln(5)-8\ln(5)+4x-8}$	57
parallelrisch	$\frac{-4x+x^5\ln(x)-4x\ln(5)+x^2\ln(5)^2-x\ln(5)^2+4x^2\ln(5)+x^6-4x^5+4x^2}{x^4\ln(x)+x^5-4x^4+x\ln(5)^2-2\ln(5)^2+4x\ln(5)-8\ln(5)+4x-8}$	94

input
```
int((x^8*ln(x)^2+((2*x^5-7*x^4)*ln(5)^2+(8*x^5-28*x^4)*ln(5)+2*x^9-8*x^8+8
*x^5-28*x^4)*ln(x)+(x^2-4*x+2)*ln(5)^4+(8*x^2-32*x+16)*ln(5)^3+(2*x^6-16*x
^5+27*x^4+24*x^2-96*x+48)*ln(5)^2+(8*x^6-64*x^5+108*x^4+32*x^2-128*x+64)*l
n(5)+x^10-8*x^9+16*x^8+8*x^6-64*x^5+108*x^4+16*x^2-64*x+32)/(x^8*ln(x)^2+(
(2*x^5-4*x^4)*ln(5)^2+(8*x^5-16*x^4)*ln(5)+2*x^9-8*x^8+8*x^5-16*x^4)*ln(x)
+(x^2-4*x+4)*ln(5)^4+(8*x^2-32*x+32)*ln(5)^3+(2*x^6-12*x^5+16*x^4+24*x^2-9
6*x+96)*ln(5)^2+(8*x^6-48*x^5+64*x^4+32*x^2-128*x+128)*ln(5)+x^10-8*x^9+16
*x^8+8*x^6-48*x^5+64*x^4+16*x^2-64*x+64),x,method=_RETURNVERBOSE)
```

output
```
x+(ln(5)^2+4*ln(5)+4)*x/(x^4*ln(x)+x^5-4*x^4+x*ln(5)^2-2*ln(5)^2+4*x*ln(5)
-8*ln(5)+4*x-8)
```

3.1103.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(24) = 48$.

Time = 0.26 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.46

$$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+\left(64-128x+32x^2+108x^4-64x^5+8x^6\right)}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+\left(128-128x+32x^2+64x^4-48x^5+8x^6\right)}$$
$$=\frac{x^6+x^5\log(x)-4x^5+(x^2-x)\log(5)^2+4x^2+4(x^2-x)\log(5)-4x}{x^5+x^4\log(x)-4x^4+(x-2)\log(5)^2+4(x-2)\log(5)+4x-8}$$

input
```
integrate((x^8*log(x)^2+((2*x^5-7*x^4)*log(5)^2+(8*x^5-28*x^4)*log(5)+2*x^
9-8*x^8+8*x^5-28*x^4)*log(x)+(x^2-4*x+2)*log(5)^4+(8*x^2-32*x+16)*log(5)^3
+(2*x^6-16*x^5+27*x^4+24*x^2-96*x+48)*log(5)^2+(8*x^6-64*x^5+108*x^4+32*x^
2-128*x+64)*log(5)+x^10-8*x^9+16*x^8+8*x^6-64*x^5+108*x^4+16*x^2-64*x+32)/
(x^8*log(x)^2+((2*x^5-4*x^4)*log(5)^2+(8*x^5-16*x^4)*log(5)+2*x^9-8*x^8+8*
x^5-16*x^4)*log(x)+(x^2-4*x+4)*log(5)^4+(8*x^2-32*x+32)*log(5)^3+(2*x^6-12
*x^5+16*x^4+24*x^2-96*x+96)*log(5)^2+(8*x^6-48*x^5+64*x^4+32*x^2-128*x+128
)*log(5)+x^10-8*x^9+16*x^8+8*x^6-48*x^5+64*x^4+16*x^2-64*x+64),x, algorith
m=\
```

output
```
(x^6 + x^5*log(x) - 4*x^5 + (x^2 - x)*log(5)^2 + 4*x^2 + 4*(x^2 - x)*log(5
) - 4*x)/(x^5 + x^4*log(x) - 4*x^4 + (x - 2)*log(5)^2 + 4*(x - 2)*log(5) +
 4*x - 8)
```

3.1103.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(22) = 44$.

Time = 0.31 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.62

$$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+(64-128x+32x^2+108x^4-64x^5+8x^6)}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+(128-128x+32x^2+64x^4-48x^5+8x^6)}$$
$$= x + \frac{x\log(5)^2 + 4x + 4x\log(5)}{x^5 + x^4\log(x) - 4x^4 + x\log(5)^2 + 4x + 4x\log(5) - 8\log(5) - 8 - 2\log(5)^2}$$

input
```
integrate((x**8*ln(x)**2+((2*x**5-7*x**4)*ln(5)**2+(8*x**5-28*x**4)*ln(5)+
2*x**9-8*x**8+8*x**5-28*x**4)*ln(x)+(x**2-4*x+2)*ln(5)**4+(8*x**2-32*x+16)
*ln(5)**3+(2*x**6-16*x**5+27*x**4+24*x**2-96*x+48)*ln(5)**2+(8*x**6-64*x**
5+108*x**4+32*x**2-128*x+64)*ln(5)+x**10-8*x**9+16*x**8+8*x**6-64*x**5+108
*x**4+16*x**2-64*x+32)/(x**8*ln(x)**2+((2*x**5-4*x**4)*ln(5)**2+(8*x**5-16
*x**4)*ln(5)+2*x**9-8*x**8+8*x**5-16*x**4)*ln(x)+(x**2-4*x+4)*ln(5)**4+(8*
x**2-32*x+32)*ln(5)**3+(2*x**6-12*x**5+16*x**4+24*x**2-96*x+96)*ln(5)**2+(
8*x**6-48*x**5+64*x**4+32*x**2-128*x+128)*ln(5)+x**10-8*x**9+16*x**8+8*x**
6-48*x**5+64*x**4+16*x**2-64*x+64),x)
```

output
```
x + (x*log(5)**2 + 4*x + 4*x*log(5))/(x**5 + x**4*log(x) - 4*x**4 + x*log(
5)**2 + 4*x + 4*x*log(5) - 8*log(5) - 8 - 2*log(5)**2)
```

3.1103. $\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+(64-128x+32x^2+108x^4-64x^5+8x^6)\log(5)+(48-96x+24x^2+27x^4-16x^5+2x^6)\log^2(5)+}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+(128-128x+32x^2+64x^4-48x^5+8x^6)\log(5)+(96-96x+24x^2+16x^4-12x^5+2x^6)\log^2(5)+}$

3.1103.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. 2(24) = 48.

Time = 0.39 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.46

$$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+(64-128x+32x^2+108x^4-64x^5+8x^6)}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+(128-128x+32x^2+64x^4-48x^5+8x^6)}$$
$$=\frac{x^6+x^5\log(x)-4x^5+\left(\log(5)^2+4\log(5)+4\right)x^2-\left(\log(5)^2+4\log(5)+4\right)x}{x^5+x^4\log(x)-4x^4+\left(\log(5)^2+4\log(5)+4\right)x-2\log(5)^2-8\log(5)-8}$$

input
```
integrate((x^8*log(x)^2+((2*x^5-7*x^4)*log(5)^2+(8*x^5-28*x^4)*log(5)+2*x^
9-8*x^8+8*x^5-28*x^4)*log(x)+(x^2-4*x+2)*log(5)^4+(8*x^2-32*x+16)*log(5)^3
+(2*x^6-16*x^5+27*x^4+24*x^2-96*x+48)*log(5)^2+(8*x^6-64*x^5+108*x^4+32*x^
2-128*x+64)*log(5)+x^10-8*x^9+16*x^8+8*x^6-64*x^5+108*x^4+16*x^2-64*x+32)/
(x^8*log(x)^2+((2*x^5-4*x^4)*log(5)^2+(8*x^5-16*x^4)*log(5)+2*x^9-8*x^8+8*
x^5-16*x^4)*log(x)+(x^2-4*x+4)*log(5)^4+(8*x^2-32*x+32)*log(5)^3+(2*x^6-12
*x^5+16*x^4+24*x^2-96*x+96)*log(5)^2+(8*x^6-48*x^5+64*x^4+32*x^2-128*x+128
)*log(5)+x^10-8*x^9+16*x^8+8*x^6-48*x^5+64*x^4+16*x^2-64*x+64),x, algorith
m=\
```

output
```
(x^6 + x^5*log(x) - 4*x^5 + (log(5)^2 + 4*log(5) + 4)*x^2 - (log(5)^2 + 4*
log(5) + 4)*x)/(x^5 + x^4*log(x) - 4*x^4 + (log(5)^2 + 4*log(5) + 4)*x - 2
*log(5)^2 - 8*log(5) - 8)
```

3.1103.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. 2(24) = 48.

Time = 0.33 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.50

$$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+(64-128x+32x^2+108x^4-64x^5+8x^6)}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+(128-128x+32x^2+64x^4-48x^5+8x^6)}$$
$$=x+\frac{x\log(5)^2+4x\log(5)+4x}{x^5+x^4\log(x)-4x^4+x\log(5)^2+4x\log(5)-2\log(5)^2+4x-8\log(5)-8}$$

input
```
integrate((x^8*log(x)^2+((2*x^5-7*x^4)*log(5)^2+(8*x^5-28*x^4)*log(5)+2*x^
9-8*x^8+8*x^5-28*x^4)*log(x)+(x^2-4*x+2)*log(5)^4+(8*x^2-32*x+16)*log(5)^3
+(2*x^6-16*x^5+27*x^4+24*x^2-96*x+48)*log(5)^2+(8*x^6-64*x^5+108*x^4+32*x^
2-128*x+64)*log(5)+x^10-8*x^9+16*x^8+8*x^6-64*x^5+108*x^4+16*x^2-64*x+32)/
(x^8*log(x)^2+((2*x^5-4*x^4)*log(5)^2+(8*x^5-16*x^4)*log(5)+2*x^9-8*x^8+8*
x^5-16*x^4)*log(x)+(x^2-4*x+4)*log(5)^4+(8*x^2-32*x+32)*log(5)^3+(2*x^6-12
*x^5+16*x^4+24*x^2-96*x+96)*log(5)^2+(8*x^6-48*x^5+64*x^4+32*x^2-128*x+128
)*log(5)+x^10-8*x^9+16*x^8+8*x^6-48*x^5+64*x^4+16*x^2-64*x+64),x, algorith
m=\
```

output
```
x + (x*log(5)^2 + 4*x*log(5) + 4*x)/(x^5 + x^4*log(x) - 4*x^4 + x*log(5)^2
 + 4*x*log(5) - 2*log(5)^2 + 4*x - 8*log(5) - 8)
```

3.1103.9 Mupad [F(-1)]

Timed out.

$$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+(64-128x+32x^2+108x^4-64x^5+8x^6)}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+(128-128x+32x^2+64x^4-48x^5+8x^6)}$$
$$=\int \frac{\ln(5)^4(x^2-4x+2)-\ln(x)\left(\ln(5)(28x^4-8x^5)+28x^4-8x^5+8x^8-2x^9+\ln(5)^2(7x^4-2x^5)\right)}{\ln(5)^4(x^2-4x+4)-\ln(x)\left(\ln(5)(16x^4-8x^5)+16x^4-8x^5+8x^8-2x^9+\ln(5)^2(4x^4-2x^5)\right)}$$

input
```
int((log(5)^4*(x^2 - 4*x + 2) - log(x)*(log(5)*(28*x^4 - 8*x^5) + 28*x^4 -
 8*x^5 + 8*x^8 - 2*x^9 + log(5)^2*(7*x^4 - 2*x^5)) - 64*x + log(5)^2*(24*x
^2 - 96*x + 27*x^4 - 16*x^5 + 2*x^6 + 48) + x^8*log(x)^2 + log(5)^3*(8*x^2
 - 32*x + 16) + 16*x^2 + 108*x^4 - 64*x^5 + 8*x^6 + 16*x^8 - 8*x^9 + x^10
+ log(5)*(32*x^2 - 128*x + 108*x^4 - 64*x^5 + 8*x^6 + 64) + 32)/(log(5)^4*
(x^2 - 4*x + 4) - log(x)*(log(5)*(16*x^4 - 8*x^5) + 16*x^4 - 8*x^5 + 8*x^8
 - 2*x^9 + log(5)^2*(4*x^4 - 2*x^5)) - 64*x + log(5)^2*(24*x^2 - 96*x + 16
*x^4 - 12*x^5 + 2*x^6 + 96) + x^8*log(x)^2 + log(5)^3*(8*x^2 - 32*x + 32)
+ 16*x^2 + 64*x^4 - 48*x^5 + 8*x^6 + 16*x^8 - 8*x^9 + x^10 + log(5)*(32*x^
2 - 128*x + 64*x^4 - 48*x^5 + 8*x^6 + 128) + 64),x)
```

output
```
int((log(5)^4*(x^2 - 4*x + 2) - log(x)*(log(5)*(28*x^4 - 8*x^5) + 28*x^4 -
 8*x^5 + 8*x^8 - 2*x^9 + log(5)^2*(7*x^4 - 2*x^5)) - 64*x + log(5)^2*(24*x
^2 - 96*x + 27*x^4 - 16*x^5 + 2*x^6 + 48) + x^8*log(x)^2 + log(5)^3*(8*x^2
 - 32*x + 16) + 16*x^2 + 108*x^4 - 64*x^5 + 8*x^6 + 16*x^8 - 8*x^9 + x^10
+ log(5)*(32*x^2 - 128*x + 108*x^4 - 64*x^5 + 8*x^6 + 64) + 32)/(log(5)^4*
(x^2 - 4*x + 4) - log(x)*(log(5)*(16*x^4 - 8*x^5) + 16*x^4 - 8*x^5 + 8*x^8
 - 2*x^9 + log(5)^2*(4*x^4 - 2*x^5)) - 64*x + log(5)^2*(24*x^2 - 96*x + 16
*x^4 - 12*x^5 + 2*x^6 + 96) + x^8*log(x)^2 + log(5)^3*(8*x^2 - 32*x + 32)
+ 16*x^2 + 64*x^4 - 48*x^5 + 8*x^6 + 16*x^8 - 8*x^9 + x^10 + log(5)*(32*x^
2 - 128*x + 64*x^4 - 48*x^5 + 8*x^6 + 128) + 64), x)
```

3.1103.

$$\int \frac{32-64x+16x^2+108x^4-64x^5+8x^6+16x^8-8x^9+x^{10}+\left(64-128x+32x^2+108x^4-64x^5+8x^6\right)\log(5)+\left(48-96x+24x^2+27x^4-16x^5+2x^6\right)\log^2(5)+}{64-64x+16x^2+64x^4-48x^5+8x^6+16x^8-8x^9+x^{10}+\left(128-128x+32x^2+64x^4-48x^5+8x^6\right)\log(5)+\left(96-96x+24x^2+16x^4-12x^5+2x^6\right)\log^2(5)+(}$$

3.1104 $\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25}}}{81x+450x^2+805x^3+518x^4+}$

3.1104.1 Optimal result

Integrand size = 173, antiderivative size = 30

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}(6-50x-40x}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+(-54x-1}$$
$$=x+2\left(e^{\frac{1}{x(5+x)^2+3(3-\log(x))}}+x-\log(x)\right)$$

output
```
3*x+2*exp(1/(x*(5+x)^2+9-3*ln(x)))-2*ln(x)
```

3.1104.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}(6-50x-40x}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+(-54x-1}$$
$$=2e^{\frac{1}{9+25x+10x^2+x^3-3\log(x)}}+3x-2\log(x)$$

input
```
Integrate[(-162 - 657*x - 260*x^2 + 1379*x^3 + 1254*x^4 + 410*x^5 + 58*x^6
 + 3*x^7 + (6 - 50*x - 40*x^2 - 6*x^3)/E^(-9 - 25*x - 10*x^2 - x^3 + 3*Log
[x])^(-1) + (108 + 138*x - 330*x^2 - 168*x^3 - 18*x^4)*Log[x] + (-18 + 27*
x)*Log[x]^2)/(81*x + 450*x^2 + 805*x^3 + 518*x^4 + 150*x^5 + 20*x^6 + x^7
+ (-54*x - 150*x^2 - 60*x^3 - 6*x^4)*Log[x] + 9*x*Log[x]^2),x]
```

3.1104.

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}(6-50x-40x^2-6x^3)+(108+138x-330x^2-168x^3-18x^4}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+(-54x-150x^2-60x^3-6x^4)\log(x)+9x\log^2(x)}$$

output
```
2*E^(9 + 25*x + 10*x^2 + x^3 - 3*Log[x])^(-1) + 3*x - 2*Log[x]
```

3.1104.3 Rubi [A] (verified)

Time = 7.35 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.017, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^7+58x^6+410x^5+1254x^4+1379x^3-260x^2+\left(-6x^3-40x^2-50x+6\right)e^{-\frac{1}{-x^3-10x^2-25x+3\log(x)-9}}+\left(-18x^4\right.}{x^7+20x^6+150x^5+518x^4+805x^3+450x^2+\left(-6x^4-60x^3-150x^2\right.}$$

$$\Big\downarrow 7292$$

$$\int \frac{3x^7+58x^6+410x^5+1254x^4+1379x^3-260x^2+\left(-6x^3-40x^2-50x+6\right)e^{-\frac{1}{-x^3-10x^2-25x+3\log(x)-9}}+\left(-18x^4\right.}{x\left(x^3+10x^2+25x-3\log(x)+9\right)^2}$$

$$\Big\downarrow 7293$$

$$\int \left(\frac{9(3x-2)\log^2(x)}{x\left(x^3+10x^2+25x-3\log(x)+9\right)^2}+\frac{1254x^3}{\left(x^3+10x^2+25x-3\log(x)+9\right)^2}+\frac{1379x^2}{\left(x^3+10x^2+25x-3\log(x)+9\right.}\right.$$

$$\Big\downarrow 2009$$

$$2e^{\frac{1}{x^3+10x^2+25x-3\log(x)+9}}+3x-2\log(x)$$

input
```
Int[(-162 - 657*x - 260*x^2 + 1379*x^3 + 1254*x^4 + 410*x^5 + 58*x^6 + 3*x
^7 + (6 - 50*x - 40*x^2 - 6*x^3)/E^(-9 - 25*x - 10*x^2 - x^3 + 3*Log[x])^(
-1) + (108 + 138*x - 330*x^2 - 168*x^3 - 18*x^4)*Log[x] + (-18 + 27*x)*Log
[x]^2)/(81*x + 450*x^2 + 805*x^3 + 518*x^4 + 150*x^5 + 20*x^6 + x^7 + (-54
*x - 150*x^2 - 60*x^3 - 6*x^4)*Log[x] + 9*x*Log[x]^2),x]
```

output
```
2*E^(9 + 25*x + 10*x^2 + x^3 - 3*Log[x])^(-1) + 3*x - 2*Log[x]
```


$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}\left(6-50x-40x^2-6x^3\right)+\left(108+138x-330x^2-168x^3-18x^4\right.}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+\left(-54x-150x^2-60x^3-6x^4\right)\log(x)+9x\log^2(x)}$$

3.1104.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1104.4 Maple [A] (verified)

Time = 17.92 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.17

method	result	size
risch	$3x-2\ln\left(x\right)+2\,\mathrm{e}^{-\frac{1}{3\ln(x)-x^{3}-10x^{2}-25x-9}}$	35
parallelrisch	$3x-2\ln\left(x\right)+2\,\mathrm{e}^{-\frac{1}{3\ln(x)-x^{3}-10x^{2}-25x-9}}$	35

input
```
int(((-6*x^3-40*x^2-50*x+6)*exp(-1/(3*ln(x)-x^3-10*x^2-25*x-9))+(27*x-18)*
ln(x)^2+(-18*x^4-168*x^3-330*x^2+138*x+108)*ln(x)+3*x^7+58*x^6+410*x^5+125
4*x^4+1379*x^3-260*x^2-657*x-162)/(9*x*ln(x)^2+(-6*x^4-60*x^3-150*x^2-54*x
)*ln(x)+x^7+20*x^6+150*x^5+518*x^4+805*x^3+450*x^2+81*x),x,method=_RETURNV
ERBOSE)
```

output
```
3*x-2*ln(x)+2*exp(-1/(3*ln(x)-x^3-10*x^2-25*x-9))
```

3.1104.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}\left(6-50x-40x\right.}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+\left(-54x-1\right.}$$
$$=3\,x+2\,e^{\left(\frac{1}{x^{3}+10\,x^{2}+25\,x-3\,\log\left(x\right)+9}\right)}-2\,\log\left(x\right)$$

input
```
integrate(((-6*x^3-40*x^2-50*x+6)*exp(-1/(3*log(x)-x^3-10*x^2-25*x-9))+(27
*x-18)*log(x)^2+(-18*x^4-168*x^3-330*x^2+138*x+108)*log(x)+3*x^7+58*x^6+41
0*x^5+1254*x^4+1379*x^3-260*x^2-657*x-162)/(9*x*log(x)^2+(-6*x^4-60*x^3-15
0*x^2-54*x)*log(x)+x^7+20*x^6+150*x^5+518*x^4+805*x^3+450*x^2+81*x),x, alg
orithm=\
```

output
```
3*x + 2*e^(1/(x^3 + 10*x^2 + 25*x - 3*log(x) + 9)) - 2*log(x)
```

3.1104.6 Sympy [A] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}(6-50x-40x}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+(-54x-1}$$
$$= 3x-2\log{(x)}+2e^{-\frac{1}{-x^3-10x^2-25x+3\log{(x)}-9}}$$

input
```
integrate(((-6*x**3-40*x**2-50*x+6)*exp(-1/(3*ln(x)-x**3-10*x**2-25*x-9))+
(27*x-18)*ln(x)**2+(-18*x**4-168*x**3-330*x**2+138*x+108)*ln(x)+3*x**7+58*
x**6+410*x**5+1254*x**4+1379*x**3-260*x**2-657*x-162)/(9*x*ln(x)**2+(-6*x*
*4-60*x**3-150*x**2-54*x)*ln(x)+x**7+20*x**6+150*x**5+518*x**4+805*x**3+45
0*x**2+81*x),x)
```

output
```
3*x - 2*log(x) + 2*exp(-1/(-x**3 - 10*x**2 - 25*x + 3*log(x) - 9))
```

3.1104.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(26) = 52$.

Time = 0.26 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.77

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}(6-50x-40x}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+(-54x-1}$$
$$= \left(3\,xe^{\left(-\frac{1}{x^3+10\,x^2+25\,x-3\,\log(x)+9}\right)}+2\right)e^{\left(\frac{1}{x^3+10\,x^2+25\,x-3\,\log(x)+9}\right)}-2\,\log{(x)}$$

input
```
integrate(((-6*x^3-40*x^2-50*x+6)*exp(-1/(3*log(x)-x^3-10*x^2-25*x-9))+(27
*x-18)*log(x)^2+(-18*x^4-168*x^3-330*x^2+138*x+108)*log(x)+3*x^7+58*x^6+41
0*x^5+1254*x^4+1379*x^3-260*x^2-657*x-162)/(9*x*log(x)^2+(-6*x^4-60*x^3-15
0*x^2-54*x)*log(x)+x^7+20*x^6+150*x^5+518*x^4+805*x^3+450*x^2+81*x),x, alg
orithm=\
```

output
```
(3*x*e^(-1/(x^3 + 10*x^2 + 25*x - 3*log(x) + 9)) + 2)*e^(1/(x^3 + 10*x^2 +
 25*x - 3*log(x) + 9)) - 2*log(x)
```

3.1104.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}(6-50x-40x}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+(-54x-1}$$

$$= 3\,x + 2\,e^{\left(\frac{1}{x^3+10\,x^2+25\,x-3\,\log(x)+9}\right)} - 2\,\log(x)$$

input
```
integrate(((-6*x^3-40*x^2-50*x+6)*exp(-1/(3*log(x)-x^3-10*x^2-25*x-9))+(27
*x-18)*log(x)^2+(-18*x^4-168*x^3-330*x^2+138*x+108)*log(x)+3*x^7+58*x^6+41
0*x^5+1254*x^4+1379*x^3-260*x^2-657*x-162)/(9*x*log(x)^2+(-6*x^4-60*x^3-15
0*x^2-54*x)*log(x)+x^7+20*x^6+150*x^5+518*x^4+805*x^3+450*x^2+81*x),x, alg
orithm=\
```

output
```
3*x + 2*e^(1/(x^3 + 10*x^2 + 25*x - 3*log(x) + 9)) - 2*log(x)
```

3.1104.9 Mupad [B] (verification not implemented)

Time = 14.78 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}(6-50x-40x}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+(-54x-1}$$

$$= 3\,x + 2\,e^{\frac{1}{25\,x-3\,\ln(x)+10\,x^2+x^3+9}} - 2\,\ln(x)$$

input
```
int((1379*x^3 - log(x)*(330*x^2 - 138*x + 168*x^3 + 18*x^4 - 108) - exp(1/
(25*x - 3*log(x) + 10*x^2 + x^3 + 9))*(50*x + 40*x^2 + 6*x^3 - 6) - 260*x^
2 - 657*x + 1254*x^4 + 410*x^5 + 58*x^6 + 3*x^7 + log(x)^2*(27*x - 18) - 1
62)/(81*x + 9*x*log(x)^2 - log(x)*(54*x + 150*x^2 + 60*x^3 + 6*x^4) + 450*
x^2 + 805*x^3 + 518*x^4 + 150*x^5 + 20*x^6 + x^7),x)
```

3.1104.

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}(6-50x-40x^2-6x^3)+(108+138x-330x^2-168x^3-18x^4}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+(-54x-150x^2-60x^3-6x^4)\log(x)+9x\log^2(x)}$$

output
```
3*x + 2*exp(1/(25*x - 3*log(x) + 10*x^2 + x^3 + 9)) - 2*log(x)
```

3.1104.

$$\int \frac{-162-657x-260x^2+1379x^3+1254x^4+410x^5+58x^6+3x^7+e^{-\frac{1}{-9-25x-10x^2-x^3+3\log(x)}}\left(6-50x-40x^2-6x^3\right)+\left(108+138x-330x^2-168x^3-18x^4\right.}{81x+450x^2+805x^3+518x^4+150x^5+20x^6+x^7+\left(-54x-150x^2-60x^3-6x^4\right)\log(x)+9x\log^2(x)}$$

3.1105 $\int \frac{-5+x}{-3+x} \, dx$

3.1105.1 Optimal result

Integrand size = 9, antiderivative size = 15

$$\int \frac{-5+x}{-3+x} \, dx = x - 2\log(-3+x) - \frac{10}{\log(\log(2))}$$

output
```
x-2*ln(-3+x)-10/ln(ln(2))
```

3.1105.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int \frac{-5+x}{-3+x} \, dx = x - 2\log(-3+x)$$

input
```
Integrate[(-5 + x)/(-3 + x),x]
```

output
```
x - 2*Log[-3 + x]
```

3.1105.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.67, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x-5}{x-3}\,dx$$

$$\Big\downarrow \; 49$$

$$\int \left(1-\frac{2}{x-3}\right)dx$$

$$\Big\downarrow \; 2009$$

$$x-2\log(3-x)$$

input
```
Int[(-5 + x)/(-3 + x),x]
```

output
```
x - 2*Log[3 - x]
```

3.1105.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1105.4 Maple [A] (verified)

Time = 1.02 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.60

method	result	size
default	$x - 2\ln\left(-3 + x\right)$	9
norman	$x - 2\ln\left(-3 + x\right)$	9
risch	$x - 2\ln\left(-3 + x\right)$	9
parallelrisch	$x - 2\ln\left(-3 + x\right)$	9
meijerg	$-2\ln\left(1 - \frac{x}{3}\right) + x$	11

input
```
int((-5+x)/(-3+x),x,method=_RETURNVERBOSE)
```

output
```
x-2*ln(-3+x)
```

3.1105.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int \frac{-5 + x}{-3 + x}\,dx = x - 2\,\log\left(x - 3\right)$$

input
```
integrate((-5+x)/(-3+x),x, algorithm=\
```

output
```
x - 2*log(x - 3)
```

3.1105.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.47

$$\int \frac{-5 + x}{-3 + x}\,dx = x - 2\log\left(x - 3\right)$$

input
```
integrate((-5+x)/(-3+x),x)
```

output
```
x - 2*log(x - 3)
```

3.1105.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int \frac{-5+x}{-3+x}\,dx = x - 2\,\log\left(x-3\right)$$

input
```
integrate((-5+x)/(-3+x),x, algorithm=\
```

output
```
x - 2*log(x - 3)
```

3.1105.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.60

$$\int \frac{-5+x}{-3+x}\,dx = x - 2\,\log\left(|x-3|\right)$$

input
```
integrate((-5+x)/(-3+x),x, algorithm=\
```

output
```
x - 2*log(abs(x - 3))
```

3.1105.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.53

$$\int \frac{-5+x}{-3+x}\,dx = x - 2\,\ln\left(x-3\right)$$

input
```
int((x - 5)/(x - 3),x)
```

output
```
x - 2*log(x - 3)
```

3.1106

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4\cdots\right.\right.}{4+4x+x^2}$$

3.1106.1 Optimal result

Integrand size = 182, antiderivative size = 28

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4\cdots\right.\right.}{4+4x+x^2} = x\left(2+e^{3e^{\left(25^{\frac{1}{2+\frac{x}{3+x}}}+x\right)^2}}+x\right)$$

output
```
(2+exp(3*exp((exp(2*ln(5)/(x/(3+x)+2))+x)^2))+x)*x
```

3.1106.2 Mathematica [A] (verified)

Time = 0.50 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4\cdots\right.\right.}{4+4x+x^2} = x\left(2+e^{3e^{\left(5^{\frac{2(3+x)}{3(2+x)}}+x\right)^2}}+x\right)$$

3.1106.

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4-2\ 25^{\frac{2(3+x)}{6+3x}}x\log(25)+25^{\frac{3+x}{6+3x}}(24x\cdots\right.\right.}{}$$

input
```
Integrate[(8 + 16*x + 10*x^2 + 2*x^3 + E^(3*E^(25^((2*(3 + x))/(6 + 3*x))
+ 2*25^((3 + x)/(6 + 3*x))*x + x^2))*(4 + 4*x + x^2 + E^(25^((2*(3 + x))/(
6 + 3*x)) + 2*25^((3 + x)/(6 + 3*x))*x + x^2)*(24*x^2 + 24*x^3 + 6*x^4 - 2
*25^((2*(3 + x))/(6 + 3*x))*x*Log[25] + 25^((3 + x)/(6 + 3*x))*(24*x + 24*
x^2 + 6*x^3 - 2*x^2*Log[25]))))/(4 + 4*x + x^2),x]
```

output
```
x*(2 + E^(3*E^(5^((2*(3 + x))/(3*(2 + x))) + x)^2) + x)
```

3.1106.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\exp\left(3\exp\left(x^2+2\ 25^{\frac{x+3}{3x+6}}x+25^{\frac{2(x+3)}{3x+6}}\right)\right)\left(\exp\left(x^2+2\ 25^{\frac{x+3}{3x+6}}x+25^{\frac{2(x+3)}{3x+6}}\right)\left(6x^4+24x^3+24x^2+25^{\frac{x+3}{3x+6}}(6\right.\right.}{x^2+4x+4}$$

$\big\downarrow$ 2007

$$\int \frac{\exp\left(3\exp\left(x^2+2\ 25^{\frac{x+3}{3x+6}}x+25^{\frac{2(x+3)}{3x+6}}\right)\right)\left(\exp\left(x^2+2\ 25^{\frac{x+3}{3x+6}}x+25^{\frac{2(x+3)}{3x+6}}\right)\left(6x^4+24x^3+24x^2+25^{\frac{x+3}{3x+6}}(6\right.\right.}{(x+2)^2}$$

$\big\downarrow$ 7293

$$\int \left(\frac{2\left(x+5^{\frac{2x}{3(x+2)}+\frac{2}{x+2}}\right)x\exp\left(\left(x+5^{\frac{2x}{3(x+2)}+\frac{2}{x+2}}\right)^2+3e^{\left(x+5^{\frac{2x}{3(x+2)}+\frac{2}{x+2}}\right)^2}\right)\left(3x^2+12x-5^{\frac{2x}{3(x+2)}+\frac{2}{x+2}}\log(25)+\right.}{(x+2)^2}\right.$$

$\big\downarrow$ 7299

$$\int \left(\frac{2\left(x+5^{\frac{2x}{3(x+2)}+\frac{2}{x+2}}\right)x\exp\left(\left(x+5^{\frac{2x}{3(x+2)}+\frac{2}{x+2}}\right)^2+3e^{\left(x+5^{\frac{2x}{3(x+2)}+\frac{2}{x+2}}\right)^2}\right)\left(3x^2+12x-5^{\frac{2x}{3(x+2)}+\frac{2}{x+2}}\log(25)+\right.}{(x+2)^2}\right.$$

3.1106.

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4-2\ 25^{\frac{2(3+x)}{6+3x}}x\log(25)+25^{\frac{3+x}{6+3x}}(24x\right.\right.}{}$$

input
```
Int[(8 + 16*x + 10*x^2 + 2*x^3 + E^(3*E^(25^((2*(3 + x))/(6 + 3*x)) + 2*25
^((3 + x)/(6 + 3*x))*x + x^2))*(4 + 4*x + x^2 + E^(25^((2*(3 + x))/(6 + 3*
x)) + 2*25^((3 + x)/(6 + 3*x))*x + x^2)*(24*x^2 + 24*x^3 + 6*x^4 - 2*25^((
2*(3 + x))/(6 + 3*x))*x*Log[25] + 25^((3 + x)/(6 + 3*x))*(24*x + 24*x^2 +
6*x^3 - 2*x^2*Log[25]))))/(4 + 4*x + x^2),x]
```

output
```
$Aborted
```

3.1106.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.1106.4 Maple [A] (verified)

Time = 17.63 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

method	result	size
risch	$x^2+x\,\mathrm{e}^{3\,\mathrm{e}^{\left(5^{\frac{2+\frac{2x}{3}}{2+x}}+x\right)^2}}+2x$	30
parallelrisch	$x^2+\mathrm{e}^{3\,\mathrm{e}^{\mathrm{e}^{\frac{4(3+x)\ln(5)}{3(2+x)}}+2x\,\mathrm{e}^{\frac{2(3+x)\ln(5)}{3(2+x)}}+x^2}}x+2x-40$	50

input
```
int((((-4*x*ln(5)*exp(2*(3+x)*ln(5)/(6+3*x))^2+(-4*x^2*ln(5)+6*x^3+24*x^2+
24*x)*exp(2*(3+x)*ln(5)/(6+3*x))+6*x^4+24*x^3+24*x^2)*exp(exp(2*(3+x)*ln(5
)/(6+3*x))^2+2*x*exp(2*(3+x)*ln(5)/(6+3*x))+x^2)+x^2+4*x+4)*exp(3*exp(exp(
2*(3+x)*ln(5)/(6+3*x))^2+2*x*exp(2*(3+x)*ln(5)/(6+3*x))+x^2))+2*x^3+10*x^2
+16*x+8)/(x^2+4*x+4),x,method=_RETURNVERBOSE)
```

3.1106.

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4-2\ 25^{\frac{2(3+x)}{6+3x}}x\log(25)+25^{\frac{3+x}{6+3x}}(24x\right.\right.}{}$$

output
```
x^2+x*exp(3*exp((5^(2/3*(3+x)/(2+x))+x)^2))+2*x
```

3.1106.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.57

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4\right.\right.}{4+4x+x^2}$$

$$= x^2 + xe^{\left(3\,e^{\left(2\cdot 5^{\frac{2\,(x+3)}{3\,(x+2)}}x+x^2+5^{\frac{4\,(x+3)}{3\,(x+2)}}\right)}\right)} + 2\,x$$

input
```
integrate(((((-4*x*log(5)*exp(2*(3+x)*log(5)/(6+3*x))^2+(-4*x^2*log(5)+6*x^
3+24*x^2+24*x)*exp(2*(3+x)*log(5)/(6+3*x))+6*x^4+24*x^3+24*x^2)*exp(exp(2*
(3+x)*log(5)/(6+3*x))^2+2*x*exp(2*(3+x)*log(5)/(6+3*x))+x^2)+x^2+4*x+4)*ex
p(3*exp(exp(2*(3+x)*log(5)/(6+3*x))^2+2*x*exp(2*(3+x)*log(5)/(6+3*x))+x^2)
)+2*x^3+10*x^2+16*x+8)/(x^2+4*x+4),x, algorithm=\
```

output
```
x^2 + x*e^(3*e^(2*5^(2/3*(x + 3)/(x + 2))*x + x^2 + 5^(4/3*(x + 3)/(x + 2)
))) + 2*x
```

3.1106.6 Sympy [F(-1)]

Timed out.

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4\right.\right.}{4+4x+x^2}$$

= Timed out

input
```
integrate(((((-4*x*ln(5)*exp(2*(3+x)*ln(5)/(6+3*x))**2+(-4*x**2*ln(5)+6*x**
3+24*x**2+24*x)*exp(2*(3+x)*ln(5)/(6+3*x))+6*x**4+24*x**3+24*x**2)*exp(exp
(2*(3+x)*ln(5)/(6+3*x))**2+2*x*exp(2*(3+x)*ln(5)/(6+3*x))+x**2)+x**2+4*x+4
)*exp(3*exp(exp(2*(3+x)*ln(5)/(6+3*x))**2+2*x*exp(2*(3+x)*ln(5)/(6+3*x))+x
**2))+2*x**3+10*x**2+16*x+8)/(x**2+4*x+4),x)
```

output
```
Timed out
```

3.1106.

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4-2\ 25^{\frac{2(3+x)}{6+3x}}x\log(25)+25^{\frac{3+x}{6+3x}}(24x\right.\right.}{}$$

3.1106.7 Maxima [F]

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4\right.\right.}{4+4x+x^2}$$

$$=\int \frac{2\,x^3+10\,x^2+\left(x^2+2\left(3\,x^4+12\,x^3-2\cdot 5^{\frac{4\,(x+3)}{3\,(x+2)}}x\log(5)+(3\,x^3-2\,x^2\log(5)+12\,x^2+12\,x)5^{\frac{2\,(x+3)}{3\,(x+2)}}\right.\right.}{x^2+4\,x+4}$$

input
```
integrate((((-4*x*log(5)*exp(2*(3+x)*log(5)/(6+3*x))^2+(-4*x^2*log(5)+6*x^
3+24*x^2+24*x)*exp(2*(3+x)*log(5)/(6+3*x))+6*x^4+24*x^3+24*x^2)*exp(exp(2*
(3+x)*log(5)/(6+3*x))^2+2*x*exp(2*(3+x)*log(5)/(6+3*x))+x^2)+x^2+4*x+4)*ex
p(3*exp(exp(2*(3+x)*log(5)/(6+3*x))^2+2*x*exp(2*(3+x)*log(5)/(6+3*x))+x^2)
)+2*x^3+10*x^2+16*x+8)/(x^2+4*x+4),x, algorithm=\
```

output
```
x^2 + x*e^(3*e^(2*5^(2/3)*5^(2/3/(x + 2))*x + x^2 + 5*5^(1/3)*5^(4/3/(x +
2)))) + 2*x - integrate(0, x)
```

3.1106.8 Giac [F]

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4\right.\right.}{4+4x+x^2}$$

$$=\int \frac{2\,x^3+10\,x^2+\left(x^2+2\left(3\,x^4+12\,x^3-2\cdot 5^{\frac{4\,(x+3)}{3\,(x+2)}}x\log(5)+(3\,x^3-2\,x^2\log(5)+12\,x^2+12\,x)5^{\frac{2\,(x+3)}{3\,(x+2)}}\right.\right.}{x^2+4\,x+4}$$

input
```
integrate((((-4*x*log(5)*exp(2*(3+x)*log(5)/(6+3*x))^2+(-4*x^2*log(5)+6*x^
3+24*x^2+24*x)*exp(2*(3+x)*log(5)/(6+3*x))+6*x^4+24*x^3+24*x^2)*exp(exp(2*
(3+x)*log(5)/(6+3*x))^2+2*x*exp(2*(3+x)*log(5)/(6+3*x))+x^2)+x^2+4*x+4)*ex
p(3*exp(exp(2*(3+x)*log(5)/(6+3*x))^2+2*x*exp(2*(3+x)*log(5)/(6+3*x))+x^2)
)+2*x^3+10*x^2+16*x+8)/(x^2+4*x+4),x, algorithm=\
```

3.1106.

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4-2\ 25^{\frac{2(3+x)}{6+3x}}x\log(25)+25^{\frac{3+x}{6+3x}}(24x\right.\right.}{}$$

output
```
integrate((2*x^3 + 10*x^2 + (x^2 + 2*(3*x^4 + 12*x^3 - 2*5^(4/3*(x + 3)/(x
 + 2))*x*log(5) + (3*x^3 - 2*x^2*log(5) + 12*x^2 + 12*x)*5^(2/3*(x + 3)/(x
 + 2)) + 12*x^2)*e^(2*5^(2/3*(x + 3)/(x + 2))*x + x^2 + 5^(4/3*(x + 3)/(x
+ 2))) + 4*x + 4)*e^(3*e^(2*5^(2/3*(x + 3)/(x + 2))*x + x^2 + 5^(4/3*(x +
3)/(x + 2)))) + 16*x + 8)/(x^2 + 4*x + 4), x)
```

3.1106.9 Mupad [B] (verification not implemented)

Time = 15.64 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.61

$$\int \frac{8+16x+10x^2+2x^3+e^{3e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}}\left(4+4x+x^2+e^{25^{\frac{2(3+x)}{6+3x}}+2\ 25^{\frac{3+x}{6+3x}}x+x^2}\left(24x^2+24x^3+6x^4\right.\right.}{4+4x+x^2}$$

$$= x\left(x+\mathrm{e}^{3\,\mathrm{e}^{2\,5^{\frac{2\,(x+3)}{3\,(x+2)}}\,x}\,\mathrm{e}^{5^{\frac{4\,(x+3)}{3\,(x+2)}}}\,\mathrm{e}^{x^2}}+2\right)$$

input
```
int((16*x + exp(3*exp(exp((4*log(5)*(x + 3))/(3*x + 6)) + 2*x*exp((2*log(5
)*(x + 3))/(3*x + 6)) + x^2))*(4*x + exp(exp((4*log(5)*(x + 3))/(3*x + 6))
 + 2*x*exp((2*log(5)*(x + 3))/(3*x + 6)) + x^2)*(exp((2*log(5)*(x + 3))/(3
*x + 6))*(24*x - 4*x^2*log(5) + 24*x^2 + 6*x^3) + 24*x^2 + 24*x^3 + 6*x^4
- 4*x*exp((4*log(5)*(x + 3))/(3*x + 6))*log(5)) + x^2 + 4) + 10*x^2 + 2*x^
3 + 8)/(4*x + x^2 + 4),x)
```

output
```
x*(x + exp(3*exp(2*5^((2*(x + 3))/(3*(x + 2)))*x)*exp(5^((4*(x + 3))/(3*(x
 + 2))))*exp(x^2)) + 2)
```

3.1107 $\int e^{\frac{3x-9ex-3x^3+(3ex+x^3)\log(x^2)}{-9e+3e\log(x^2)}} \frac{(-20x+36x^3+e(36+36x)+(e(-24-$

$9e-6e\log(x^2)+e\log$

3.1107.1 Optimal result

Integrand size = 121, antiderivative size = 32

$$\int \frac{e^{\frac{3x-9ex-3x^3+(3ex+x^3)\log(x^2)}{-9e+3e\log(x^2)}}\left(-20x+36x^3+e(36+36x)+(e(-24-24x)+4x-24x^3)\log(x^2)+(4x^3+e(\right.}{9e-6e\log(x^2)+e\log^2(x^2)}$$

$$=4e^{x-\frac{-\frac{x^3}{3}+\frac{x}{3-\log(x^2)}}{e}}x$$

output
```
4*exp(x-(x/(3-ln(x^2))-1/3*x^3)/exp(1))*x
```

3.1107.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.38

$$\int \frac{e^{\frac{3x-9ex-3x^3+(3ex+x^3)\log(x^2)}{-9e+3e\log(x^2)}}\left(-20x+36x^3+e(36+36x)+(e(-24-24x)+4x-24x^3)\log(x^2)+(4x^3+e(\right.}{9e-6e\log(x^2)+e\log^2(x^2)}$$

$$=4e^{\frac{x\left(-3\left(-1+3e+x^2\right)+\left(3e+x^2\right)\log\left(x^2\right)\right)}{3e\left(-3+\log\left(x^2\right)\right)}}x$$

3.1107.

$$\int \frac{e^{\frac{3x-9ex-3x^3+(3ex+x^3)\log(x^2)}{-9e+3e\log(x^2)}}\left(-20x+36x^3+e(36+36x)+(e(-24-24x)+4x-24x^3)\log(x^2)+(4x^3+e(4+4x))\log^2(x^2)\right)}{\ldots}\,dx$$

input
```
Integrate[(E^((3*x - 9*E*x - 3*x^3 + (3*E*x + x^3)*Log[x^2])/(-9*E + 3*E*L
og[x^2]))*(-20*x + 36*x^3 + E*(36 + 36*x) + (E*(-24 - 24*x) + 4*x - 24*x^3
)*Log[x^2] + (4*x^3 + E*(4 + 4*x))*Log[x^2]^2))/(9*E - 6*E*Log[x^2] + E*Lo
g[x^2]^2),x]
```

output
```
4*E^((x*(-3*(-1 + 3*E + x^2) + (3*E + x^2)*Log[x^2]))/(3*E*(-3 + Log[x^2])
))*x
```

3.1107.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(36x^3 + (4x^3 + e(4x+4))\log^2(x^2) + (-24x^3 + 4x + e(-24x-24))\log(x^2) - 20x + e(36x+36))\exp\left(\frac{-3x^3}{\cdots}\right.}{e\log^2(x^2) - 6e\log(x^2) + 9e}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{(36x^3 + (4x^3 + e(4x+4))\log^2(x^2) + (-24x^3 + 4x + e(-24x-24))\log(x^2) - 20x + e(36x+36))\exp\left(\frac{-3x^3}{\cdots}\right.}{(3-\log(x^2))^2}$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{4x\exp\left(\frac{-3x^3+(x^3+3ex)\log(x^2)+3(1-3e)x}{3e(\log(x^2)-3)}-1\right)}{\log(x^2)-3} - \frac{8x\exp\left(\frac{-3x^3+(x^3+3ex)\log(x^2)+3(1-3e)x}{3e(\log(x^2)-3)}-1\right)}{(\log(x^2)-3)^2} + 4(x^3+ex+e)\,e\cdots\right.$$

$$\Big\downarrow \ 2009$$

$$4\int \exp\left(\frac{-3x^3+3(1-3e)x+(x^3+3ex)\log(x^2)}{3e(\log(x^2)-3)}\right)dx + 4\int \exp\left(\frac{-3x^3+3(1-3e)x+(x^3+3ex)\log(x^2)}{3e(\log(x^2)-3)}\right)xdx + 4\int \exp\left(\frac{-3x^3+3(1-3e)x+(x^3+3ex)\log(x^2)}{3e(\log(x^2)-3)}-1\right)x^3dx - 8\int \frac{\exp\left(\frac{-3x^3+3(1-3e)x+(x^3+3ex)\log(x^2)}{3e(\log(x^2)-3)}-1\right)x}{(\log(x^2)-3)^2}dx + 4\int \frac{\exp\left(\frac{-3x^3+3(1-3e)x+(x^3+3ex)\log(x^2)}{3e(\log(x^2)-3)}-1\right)x}{\log(x^2)-3}dx$$

3.1107.

$$\int e^{\frac{3x-9ex-3x^3+(3ex+x^3)\log(x^2)}{-9e+3e\log(x^2)}}(-20x+36x^3+e(36+36x)+(e(-24-24x)+4x-24x^3)\log(x^2)+(4x^3+e(4+4x))\log^2(x^2))\,dx$$

input
```
Int[(E^((3*x - 9*E*x - 3*x^3 + (3*E*x + x^3)*Log[x^2])/(-9*E + 3*E*Log[x^2
]))*(-20*x + 36*x^3 + E*(36 + 36*x) + (E*(-24 - 24*x) + 4*x - 24*x^3)*Log[
x^2] + (4*x^3 + E*(4 + 4*x))*Log[x^2]^2))/(9*E - 6*E*Log[x^2] + E*Log[x^2]
^2),x]
```

output
```
$Aborted
```

3.1107.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1107.4 Maple [A] (verified)

Time = 3.88 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.41

method	result	size
risch	$4x\,\mathrm{e}^{\frac{x\left(x^{2}\ln\left(x^{2}\right)+3\,\mathrm{e}\ln\left(x^{2}\right)-3x^{2}-9\,\mathrm{e}+3\right)\mathrm{e}^{-1}}{3\ln\left(x^{2}\right)-9}}$	45
parallelrisch	$4\,\mathrm{e}^{\frac{\left(\left(3x\,\mathrm{e}+x^{3}\right)\ln\left(x^{2}\right)-9x\,\mathrm{e}-3x^{3}+3x\right)\mathrm{e}^{-1}}{3\ln\left(x^{2}\right)-9}}\,x$	47

input
```
int((((4+4*x)*exp(1)+4*x^3)*ln(x^2)^2+((-24*x-24)*exp(1)-24*x^3+4*x)*ln(x^
2)+(36*x+36)*exp(1)+36*x^3-20*x)*exp(((3*x*exp(1)+x^3)*ln(x^2)-9*x*exp(1)-
3*x^3+3*x)/(3*exp(1)*ln(x^2)-9*exp(1)))/(exp(1)*ln(x^2)^2-6*exp(1)*ln(x^2)
+9*exp(1)),x,method=_RETURNVERBOSE)
```

output
```
4*x*exp(1/3*x*(x^2*ln(x^2)+3*exp(1)*ln(x^2)-3*x^2-9*exp(1)+3)*exp(-1)/(ln(
x^2)-3))
```

3.1107.

$$\int e^{\frac{3x-9ex-3x^3+\left(3ex+x^3\right)\log\left(x^2\right)}{-9e+3e\log\left(x^2\right)}}\left(-20x+36x^3+e(36+36x)+\left(e(-24-24x)+4x-24x^3\right)\log\left(x^2\right)+\left(4x^3+e(4+4x)\right)\log^2\left(x^2\right)\right)\,dx$$

3.1107.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.53

$$\int \frac{e^{\frac{3x-9ex-3x^3+\left(3ex+x^3\right)\log\left(x^2\right)}{-9e+3e\log\left(x^2\right)}}\left(-20x+36x^3+e(36+36x)+\left(e(-24-24x)+4x-24x^3\right)\log\left(x^2\right)+\left(4x^3+e(\right.\right.}{9e-6e\log\left(x^2\right)+e\log^2\left(x^2\right)}$$
$$=4\,xe^{\left(-\frac{3\,x^3+9\,xe-\left(x^3+3\,xe\right)\log\left(x^2\right)-3\,x}{3\,\left(e\log\left(x^2\right)-3\,e\right)}\right)}$$

input
```
integrate((((4+4*x)*exp(1)+4*x^3)*log(x^2)^2+((-24*x-24)*exp(1)-24*x^3+4*x
)*log(x^2)+(36*x+36)*exp(1)+36*x^3-20*x)*exp(((3*x*exp(1)+x^3)*log(x^2)-9*
x*exp(1)-3*x^3+3*x)/(3*exp(1)*log(x^2)-9*exp(1)))/(exp(1)*log(x^2)^2-6*exp
(1)*log(x^2)+9*exp(1)),x, algorithm=\
```

output
```
4*x*e^(-1/3*(3*x^3 + 9*x*e - (x^3 + 3*x*e)*log(x^2) - 3*x)/(e*log(x^2) - 3
*e))
```

3.1107.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(22) = 44.

Time = 4.71 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.53

$$\int \frac{e^{\frac{3x-9ex-3x^3+\left(3ex+x^3\right)\log\left(x^2\right)}{-9e+3e\log\left(x^2\right)}}\left(-20x+36x^3+e(36+36x)+\left(e(-24-24x)+4x-24x^3\right)\log\left(x^2\right)+\left(4x^3+e(\right.\right.}{9e-6e\log\left(x^2\right)+e\log^2\left(x^2\right)}$$
$$=4xe^{\frac{-3x^3-9ex+3x+\left(x^3+3ex\right)\log\left(x^2\right)}{3e\log\left(x^2\right)-9e}}$$

input
```
integrate((((4+4*x)*exp(1)+4*x**3)*ln(x**2)**2+((-24*x-24)*exp(1)-24*x**3+
4*x)*ln(x**2)+(36*x+36)*exp(1)+36*x**3-20*x)*exp(((3*x*exp(1)+x**3)*ln(x**
2)-9*x*exp(1)-3*x**3+3*x)/(3*exp(1)*ln(x**2)-9*exp(1)))/(exp(1)*ln(x**2)**
2-6*exp(1)*ln(x**2)+9*exp(1)),x)
```

output
```
4*x*exp((-3*x**3 - 9*E*x + 3*x + (x**3 + 3*E*x)*log(x**2))/(3*E*log(x**2)
- 9*E))
```

3.1107.

$$\int \frac{e^{\frac{3x-9ex-3x^3+\left(3ex+x^3\right)\log\left(x^2\right)}{-9e+3e\log\left(x^2\right)}}\left(-20x+36x^3+e(36+36x)+\left(e(-24-24x)+4x-24x^3\right)\log\left(x^2\right)+\left(4x^3+e(4+4x)\right)\log^2\left(x^2\right)\right)}{\ldots}\,dx$$

3.1107.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. $2(25) = 50$.

Time = 0.37 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.56

$$\int \frac{e^{\frac{3x-9ex-3x^3+(3ex+x^3)\log(x^2)}{-9e+3e\log(x^2)}}\left(-20x+36x^3+e(36+36x)+(e(-24-24x)+4x-24x^3)\log(x^2)+(4x^3+e(\right.}{9e-6e\log(x^2)+e\log^2(x^2)}$$

$$= 4\,xe^{\left(\frac{2\,x^3\log(x)}{3\,(2\,e\log(x)-3\,e)}-\frac{x^3}{2\,e\log(x)-3\,e}+\frac{2\,x\log(x)}{2\,\log(x)-3}+\frac{x}{2\,e\log(x)-3\,e}-\frac{3\,x}{2\,\log(x)-3}\right)}$$

input
```
integrate((((4+4*x)*exp(1)+4*x^3)*log(x^2)^2+((-24*x-24)*exp(1)-24*x^3+4*x
)*log(x^2)+(36*x+36)*exp(1)+36*x^3-20*x)*exp(((3*x*exp(1)+x^3)*log(x^2)-9*
x*exp(1)-3*x^3+3*x)/(3*exp(1)*log(x^2)-9*exp(1)))/(exp(1)*log(x^2)^2-6*exp
(1)*log(x^2)+9*exp(1)),x, algorithm=\
```

output
```
4*x*e^(2/3*x^3*log(x)/(2*e*log(x) - 3*e) - x^3/(2*e*log(x) - 3*e) + 2*x*lo
g(x)/(2*log(x) - 3) + x/(2*e*log(x) - 3*e) - 3*x/(2*log(x) - 3))
```

3.1107.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(25) = 50$.

Time = 1.36 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.59

$$\int \frac{e^{\frac{3x-9ex-3x^3+(3ex+x^3)\log(x^2)}{-9e+3e\log(x^2)}}\left(-20x+36x^3+e(36+36x)+(e(-24-24x)+4x-24x^3)\log(x^2)+(4x^3+e(\right.}{9e-6e\log(x^2)+e\log^2(x^2)}$$

$$= 4\,xe^{\left(\frac{x^3\log(x^2)-3\,x^3+3\,xe\log(x^2)-9\,xe+3\,x}{3\,(e\log(x^2)-3\,e)}\right)}$$

input
```
integrate((((4+4*x)*exp(1)+4*x^3)*log(x^2)^2+((-24*x-24)*exp(1)-24*x^3+4*x
)*log(x^2)+(36*x+36)*exp(1)+36*x^3-20*x)*exp(((3*x*exp(1)+x^3)*log(x^2)-9*
x*exp(1)-3*x^3+3*x)/(3*exp(1)*log(x^2)-9*exp(1)))/(exp(1)*log(x^2)^2-6*exp
(1)*log(x^2)+9*exp(1)),x, algorithm=\
```

output
```
4*x*e^(1/3*(x^3*log(x^2) - 3*x^3 + 3*x*e*log(x^2) - 9*x*e + 3*x)/(e*log(x^
2) - 3*e))
```

3.1107.

$$\int e^{\frac{3x-9ex-3x^3+(3ex+x^3)\log(x^2)}{-9e+3e\log(x^2)}}\left(-20x+36x^3+e(36+36x)+(e(-24-24x)+4x-24x^3)\log(x^2)+(4x^3+e(4+4x))\log^2(x^2)\right)\,dx$$

3.1107.9 Mupad [B] (verification not implemented)

Time = 15.17 (sec) , antiderivative size = 95, normalized size of antiderivative = 2.97

$$\int \frac{e^{\frac{3x-9ex-3x^3+\left(3ex+x^3\right)\log\left(x^2\right)}{-9e+3e\log\left(x^2\right)}}\left(-20x+36x^3+e(36+36x)+\left(e(-24-24x)+4x-24x^3\right)\log\left(x^2\right)+\left(4x^3+e(\right.\right.}{9e-6e\log\left(x^2\right)+e\log^2\left(x^2\right)}$$

$$=\frac{4\,x\,\mathrm{e}^{\frac{3\,x^3}{9\,\mathrm{e}-3\,\ln\left(x^2\right)\,\mathrm{e}}}\,\mathrm{e}^{\frac{9\,x\,\mathrm{e}}{9\,\mathrm{e}-3\,\ln\left(x^2\right)\,\mathrm{e}}}\,\mathrm{e}^{-\frac{3\,x}{9\,\mathrm{e}-3\,\ln\left(x^2\right)\,\mathrm{e}}}}{\left(x^2\right)^{\frac{x^3+3\,\mathrm{e}\,x}{3\,\left(3\,\mathrm{e}-\ln\left(x^2\right)\,\mathrm{e}\right)}}}$$

input
```
int((exp(-(3*x + log(x^2)*(3*x*exp(1) + x^3) - 9*x*exp(1) - 3*x^3)/(9*exp(
1) - 3*log(x^2)*exp(1)))*(log(x^2)^2*(4*x^3 + exp(1)*(4*x + 4)) - log(x^2)
*(24*x^3 - 4*x + exp(1)*(24*x + 24)) - 20*x + 36*x^3 + exp(1)*(36*x + 36))
)/(9*exp(1) - 6*log(x^2)*exp(1) + log(x^2)^2*exp(1)),x)
```

output
```
(4*x*exp((3*x^3)/(9*exp(1) - 3*log(x^2)*exp(1)))*exp((9*x*exp(1))/(9*exp(1
) - 3*log(x^2)*exp(1)))*exp(-(3*x)/(9*exp(1) - 3*log(x^2)*exp(1))))/(x^2)^
((3*x*exp(1) + x^3)/(3*(3*exp(1) - log(x^2)*exp(1))))
```

3.1108 $\int \left(5-2x-2e^{x^2}x\right) dx$

3.1108.1 Optimal result

Integrand size = 13, antiderivative size = 20

$$\int \left(5-2x-2e^{x^2}x\right) dx = 4+e^6-e^{x^2}+x+(4-x)x$$

output
```
(-x+4)*x+exp(6)+4-exp(x^2)+x
```

3.1108.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \left(5-2x-2e^{x^2}x\right) dx = -e^{x^2}+5x-\log\left(e^{x^2}\right)$$

input
```
Integrate[5 - 2*x - 2*E^x^2*x,x]
```

output
```
-E^x^2 + 5*x - Log[E^x^2]
```

3.1108.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-2e^{x^2}x-2x+5\right) dx$$

$$\Big\downarrow \text{2009}$$

$$-x^2-e^{x^2}+5x$$

input
```
Int[5 - 2*x - 2*E^x^2*x,x]
```

output
```
-E^x^2 + 5*x - x^2
```

3.1108.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1108.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result	size
default	$-x^2+5x-{\rm e}^{x^2}$	16
norman	$-x^2+5x-{\rm e}^{x^2}$	16
risch	$-x^2+5x-{\rm e}^{x^2}$	16
parallelrisch	$-x^2+5x-{\rm e}^{x^2}$	16
parts	$-x^2+5x-{\rm e}^{x^2}$	16

input
```
int(-2*exp(x^2)*x-2*x+5,x,method=_RETURNVERBOSE)
```

output
```
-x^2+5*x-exp(x^2)
```

3.1108.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \left(5-2x-2e^{x^2}x\right)\,dx=-x^2+5\,x-e^{\left(x^2\right)}$$

input
```
integrate(-2*exp(x^2)*x-2*x+5,x, algorithm=\
```

output
```
-x^2 + 5*x - e^(x^2)
```

3.1108.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.50

$$\int \left(5-2x-2e^{x^2}x\right)\,dx=-x^2+5x-e^{x^2}$$

input
```
integrate(-2*exp(x**2)*x-2*x+5,x)
```

output
```
-x**2 + 5*x - exp(x**2)
```

3.1108.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \left(5-2x-2e^{x^2}x\right)\,dx=-x^2+5\,x-e^{\left(x^2\right)}$$

input
```
integrate(-2*exp(x^2)*x-2*x+5,x, algorithm=\
```

output
```
-x^2 + 5*x - e^(x^2)
```

3.1108.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \left(5-2x-2e^{x^2}x\right)\,dx=-x^2+5\,x-e^{(x^2)}$$

input
```
integrate(-2*exp(x^2)*x-2*x+5,x, algorithm=\
```

output
```
-x^2 + 5*x - e^(x^2)
```

3.1108.9 Mupad [B] (verification not implemented)

Time = 14.32 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \left(5-2x-2e^{x^2}x\right)\,dx=5\,x-\mathrm{e}^{x^2}-x^2$$

input
```
int(5 - 2*x*exp(x^2) - 2*x,x)
```

output
```
5*x - exp(x^2) - x^2
```

3.1109 $\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}\right.\right.}{2x}$

3.1109.1 Optimal result

Integrand size = 100, antiderivative size = 24

$$\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log\right.}{2x}$$
$$=\frac{1}{2}e^{e^{\frac{1}{4}+x}}\left(-5+(3-x+\log(x))^2\right)$$

output
```
1/2*((3-x+ln(x))^2-5)*exp(exp(x+1/4))
```

3.1109.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.38

$$\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log\right.}{2x}$$
$$=\frac{1}{2}e^{e^{\frac{1}{4}+x}}\left(4-6x+x^2+(6-2x)\log(x)+\log^2(x)\right)$$

input
```
Integrate[(E^E^((1 + 4*x)/4)*(6 - 8*x + 2*x^2 + E^((1 + 4*x)/4)*(4*x - 6*x
^2 + x^3) + (2 - 2*x + E^((1 + 4*x)/4)*(6*x - 2*x^2))*Log[x] + E^((1 + 4*x
)/4)*x*Log[x]^2))/(2*x),x]
```

output
```
(E^E^(1/4 + x)*(4 - 6*x + x^2 + (6 - 2*x)*Log[x] + Log[x]^2))/2
```

3.1109.
$\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log^2(x)\right)}{2x}\,dx$

3.1109.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^{\frac{1}{4}(4x+1)}}\left(2x^2+\left(e^{\frac{1}{4}(4x+1)}(6x-2x^2)-2x+2\right)\log(x)+e^{\frac{1}{4}(4x+1)}(x^3-6x^2+4x)-8x+e^{\frac{1}{4}(4x+1)}x\log^2(x)+6\right.}{2x}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int \frac{e^{e^{\frac{1}{4}(4x+1)}}\left(2x^2+e^{\frac{1}{4}(4x+1)}\log^2(x)x-8x+e^{\frac{1}{4}(4x+1)}(x^3-6x^2+4x)+2\left(-x+e^{\frac{1}{4}(4x+1)}(3x-x^2)+1\right)\log(x)\right.}{x}$$

$$\Big\downarrow \text{7292}$$

$$\frac{1}{2}\int \frac{e^{e^{x+\frac{1}{4}}}\left(2x^2+e^{\frac{1}{4}(4x+1)}\log^2(x)x-8x+e^{\frac{1}{4}(4x+1)}(x^3-6x^2+4x)+2\left(-x+e^{\frac{1}{4}(4x+1)}(3x-x^2)+1\right)\log(x)+6\right.}{x}$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{2}\int \left(\frac{2e^{e^{x+\frac{1}{4}}}(x-1)(x-\log(x)-3)}{x}+e^{x+e^{x+\frac{1}{4}}+\frac{1}{4}}\left(x^2-2\log(x)x-6x+\log^2(x)+6\log(x)+4\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(2\int \frac{\text{ExpIntegralEi}\left(e^{x+\frac{1}{4}}\right)}{x}dx+\int e^{x+e^{x+\frac{1}{4}}+\frac{1}{4}}x^2dx+2\int e^{e^{x+\frac{1}{4}}}xdx-6\int e^{x+e^{x+\frac{1}{4}}+\frac{1}{4}}xdx-2\int \frac{\int \frac{e^{e^{x+\frac{1}{4}}}}{x}dx}{x}dx\right.$$

input
```
Int[(E^E^((1 + 4*x)/4)*(6 - 8*x + 2*x^2 + E^((1 + 4*x)/4)*(4*x - 6*x^2 + x
^3) + (2 - 2*x + E^((1 + 4*x)/4)*(6*x - 2*x^2))*Log[x] + E^((1 + 4*x)/4)*x
*Log[x]^2))/(2*x),x]
```

output
```
$Aborted
```

3.1109. $\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log^2(x)\right)}{2x}dx$

3.1109.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1109.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

method	result	size
risch	$\frac{\left(x^{2}-2 x \ln \left(x \right)+\ln \left(x \right)^{2}-6 x +6 \ln \left(x \right)+4\right) {\mathrm e}^{{\mathrm e}^{x +\frac{1}{4}}}}{2}$	29
parallelrisch	$\frac{{\mathrm e}^{{\mathrm e}^{x +\frac{1}{4}}} x^{2}}{2}-\ln \left(x \right) {\mathrm e}^{{\mathrm e}^{x +\frac{1}{4}}} x +\frac{{\mathrm e}^{{\mathrm e}^{x +\frac{1}{4}}} \ln \left(x \right)^{2}}{2}-3 x \,{\mathrm e}^{{\mathrm e}^{x +\frac{1}{4}}}+3 \ln \left(x \right) {\mathrm e}^{{\mathrm e}^{x +\frac{1}{4}}}+2 \,{\mathrm e}^{{\mathrm e}^{x +\frac{1}{4}}}$	57

input
```
int(1/2*(x*exp(x+1/4)*ln(x)^2+((-2*x^2+6*x)*exp(x+1/4)-2*x+2)*ln(x)+(x^3-6
*x^2+4*x)*exp(x+1/4)+2*x^2-8*x+6)*exp(exp(x+1/4))/x,x,method=_RETURNVERBOS
E)
```

output
```
1/2*(x^2-2*x*ln(x)+ln(x)^2-6*x+6*ln(x)+4)*exp(exp(x+1/4))
```

3.1109.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log}{2x}$$

$$=\frac{1}{2}\left(x^2-2\,(x-3)\log{(x)}+\log{(x)}^2-6\,x+4\right)e^{\left(e^{\left(x+\frac{1}{4}\right)}\right)}$$

input
```
integrate(1/2*(x*exp(x+1/4)*log(x)^2+((-2*x^2+6*x)*exp(x+1/4)-2*x+2)*log(x
)+(x^3-6*x^2+4*x)*exp(x+1/4)+2*x^2-8*x+6)*exp(exp(x+1/4))/x,x, algorithm=\
```

output
```
1/2*(x^2 - 2*(x - 3)*log(x) + log(x)^2 - 6*x + 4)*e^(e^(x + 1/4))
```

3.1109.6 Sympy [A] (verification not implemented)

Time = 31.09 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.42

$$\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log}{2x}$$

$$=\frac{\left(x^2-2x\log{(x)}-6x+\log{(x)}^2+6\log{(x)}+4\right)e^{e^{x+\frac{1}{4}}}}{2}$$

input
```
integrate(1/2*(x*exp(x+1/4)*ln(x)**2+((-2*x**2+6*x)*exp(x+1/4)-2*x+2)*ln(x
)+(x**3-6*x**2+4*x)*exp(x+1/4)+2*x**2-8*x+6)*exp(exp(x+1/4))/x,x)
```

output
```
(x**2 - 2*x*log(x) - 6*x + log(x)**2 + 6*log(x) + 4)*exp(exp(x + 1/4))/2
```

3.1109.7 Maxima [F]

$$\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log}{2x}$$

$$=\int \frac{\left(xe^{\left(x+\frac{1}{4}\right)}\log{(x)}^2+2\,x^2+(x^3-6\,x^2+4\,x)e^{\left(x+\frac{1}{4}\right)}-2\left((x^2-3\,x)e^{\left(x+\frac{1}{4}\right)}+x-1\right)\log{(x)}-8\,x+6\right)e}{2\,x}$$

input
```
integrate(1/2*(x*exp(x+1/4)*log(x)^2+((-2*x^2+6*x)*exp(x+1/4)-2*x+2)*log(x
)+(x^3-6*x^2+4*x)*exp(x+1/4)+2*x^2-8*x+6)*exp(exp(x+1/4))/x,x, algorithm=\
```

output
```
1/2*(x^2 - 2*(x - 3)*log(x) + log(x)^2 - 6*x + 4)*e^(e^(x + 1/4)) - 4*Ei(e
^(x + 1/4)) + 4*integrate(e^(e^(x + 1/4)), x)
```

3.1109.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(18) = 36$.

Time = 0.28 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.33

$$\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log$$

$$= \frac{1}{2}x^2e^{\left(e^{\left(x+\frac{1}{4}\right)}\right)} - xe^{\left(e^{\left(x+\frac{1}{4}\right)}\right)}\log(x) + \frac{1}{2}e^{\left(e^{\left(x+\frac{1}{4}\right)}\right)}\log(x)^2 - 3xe^{\left(e^{\left(x+\frac{1}{4}\right)}\right)} + 3e^{\left(e^{\left(x+\frac{1}{4}\right)}\right)}\log(x) + 2e^{\left(e^{\left(x+\frac{1}{4}\right)}\right)}$$

input
```
integrate(1/2*(x*exp(x+1/4)*log(x)^2+((-2*x^2+6*x)*exp(x+1/4)-2*x+2)*log(x
)+(x^3-6*x^2+4*x)*exp(x+1/4)+2*x^2-8*x+6)*exp(exp(x+1/4))/x,x, algorithm=\
```

output
```
1/2*x^2*e^(e^(x + 1/4)) - x*e^(e^(x + 1/4))*log(x) + 1/2*e^(e^(x + 1/4))*l
og(x)^2 - 3*x*e^(e^(x + 1/4)) + 3*e^(e^(x + 1/4))*log(x) + 2*e^(e^(x + 1/4
))
```

3.1109.9 Mupad [B] (verification not implemented)

Time = 15.18 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log$$

$$= \mathrm{e}^{\mathrm{e}^{1/4}\,\mathrm{e}^x}\left(\frac{x^2}{2} - x\,\ln(x) - 3\,x + \frac{\ln(x)^2}{2} + 3\,\ln(x) + 2\right)$$

input
```
int((exp(exp(x + 1/4))*(log(x)*(exp(x + 1/4)*(6*x - 2*x^2) - 2*x + 2) - 8*
x + 2*x^2 + exp(x + 1/4)*(4*x - 6*x^2 + x^3) + x*exp(x + 1/4)*log(x)^2 + 6
))/(2*x),x)
```

output
```
exp(exp(1/4)*exp(x))*(3*log(x) - 3*x + log(x)^2/2 - x*log(x) + x^2/2 + 2)
```

3.1109.

$$\int \frac{e^{e^{\frac{1}{4}(1+4x)}}\left(6-8x+2x^2+e^{\frac{1}{4}(1+4x)}(4x-6x^2+x^3)+\left(2-2x+e^{\frac{1}{4}(1+4x)}(6x-2x^2)\right)\log(x)+e^{\frac{1}{4}(1+4x)}x\log^2(x)\right)}{2x}\,dx$$

3.1110 $\int \frac{-2+e^8(-14-4x)}{e^8} dx$

3.1110.1 Optimal result

Integrand size = 15, antiderivative size = 19

$$\int \frac{-2+e^8(-14-4x)}{e^8} dx = \frac{2(3-x)x\left(7+\frac{1}{e^8}+x\right)}{-3+x}$$

output
```
2*x/(-3+x)*(x+exp(-4)^2+7)*(-x+3)
```

3.1110.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{-2+e^8(-14-4x)}{e^8} dx = -14x-\frac{2x}{e^8}-2x^2$$

input
```
Integrate[(-2 + E^8*(-14 - 4*x))/E^8,x]
```

output
```
-14*x - (2*x)/E^8 - 2*x^2
```

3.1110.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^8(-4x-14)-2}{e^8} \, dx$$

$$\Big\downarrow \; 27$$

$$\frac{\int \left(-2e^8(2x+7)-2\right)dx}{e^8}$$

$$\Big\downarrow \; 2009$$

$$\frac{-\frac{1}{2}e^8(2x+7)^2-2x}{e^8}$$

input
```
Int[(-2 + E^8*(-14 - 4*x))/E^8,x]
```

output
```
(-2*x - (E^8*(7 + 2*x)^2)/2)/E^8
```

3.1110.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1110.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

method	result	size
risch	$-2x^{2}-14x-2x\,{\mathrm e}^{-8}$	15
gosper	$-2x\left(x\,{\mathrm e}^{8}+7\,{\mathrm e}^{8}+1\right){\mathrm e}^{-8}$	22
parallelrisch	${\mathrm e}^{-8}\left({\mathrm e}^{8}\left(-2x^{2}-14x\right)-2x\right)$	24
default	${\mathrm e}^{-8}\left(-2x^{2}{\mathrm e}^{8}-14x\,{\mathrm e}^{8}-2x\right)$	26
norman	$\left(-2x^{2}{\mathrm e}^{4}-2\left(7\,{\mathrm e}^{8}+1\right){\mathrm e}^{-4}x\right){\mathrm e}^{-4}$	29

input
```
int(((-4*x-14)*exp(4)^2-2)/exp(4)^2,x,method=_RETURNVERBOSE)
```

output
```
-2*x^2-14*x-2*x*exp(-8)
```

3.1110.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{-2+e^8(-14-4x)}{e^8}\,dx = -2\left(\left(x^{2}+7\,x\right)e^{8}+x\right)e^{(-8)}$$

input
```
integrate(((-4*x-14)*exp(4)^2-2)/exp(4)^2,x, algorithm=\
```

output
```
-2*((x^2 + 7*x)*e^8 + x)*e^(-8)
```

3.1110.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \frac{-2+e^8(-14-4x)}{e^8}\,dx = -2x^{2}+\frac{x\left(-14e^{8}-2\right)}{e^{8}}$$

input
```
integrate(((-4*x-14)*exp(4)**2-2)/exp(4)**2,x)
```

output
```
-2*x**2 + x*(-14*exp(8) - 2)*exp(-8)
```

3.1110.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{-2+e^8(-14-4x)}{e^8}\,dx = -2\left((x^2+7\,x)e^8+x\right)e^{(-8)}$$

input
```
integrate(((-4*x-14)*exp(4)^2-2)/exp(4)^2,x, algorithm=\
```

output
```
-2*((x^2 + 7*x)*e^8 + x)*e^(-8)
```

3.1110.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{-2+e^8(-14-4x)}{e^8}\,dx = -2\left((x^2+7\,x)e^8+x\right)e^{(-8)}$$

input
```
integrate(((-4*x-14)*exp(4)^2-2)/exp(4)^2,x, algorithm=\
```

output
```
-2*((x^2 + 7*x)*e^8 + x)*e^(-8)
```

3.1110.9 Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \frac{-2+e^8(-14-4x)}{e^8}\,dx = -\frac{\mathrm{e}^{-16}\left(\mathrm{e}^8\,(4\,x+14)+2\right)^2}{8}$$

input
```
int(-exp(-8)*(exp(8)*(4*x + 14) + 2),x)
```

output
```
-(exp(-16)*(exp(8)*(4*x + 14) + 2)^2)/8
```

3.1111 $\int \frac{32e^{8x}x+2x^4+\left(-120x^3-6x^4+e^{8x}\left(3840-15168x-768x^2\right)+\left(40x^3+\right.\right.}{\left(-60x^4-3x^5+e^{8x}\left(-960x-48x^2\right)+\left(20x^4+x^5+e^{8\right.\right.}}$

3.1111.1 Optimal result

Integrand size = 168, antiderivative size = 31

$$\int \frac{32e^{8x}x+2x^4+\left(-120x^3-6x^4+e^{8x}(3840-15168x-768x^2)+(40x^3+2x^4+e^{8x}(-1280+5056x+25\right.}{\left(-60x^4-3x^5+e^{8x}\left(-960x-48x^2\right)+\left(20x^4+x^5+e^{8x}\left(320x+16x^2\right)\right)\log\left(\frac{3}{20+x}\right)\right)\log}$$
$$=2\log\left(\frac{\frac{16e^{8x}}{x^2}+x}{\log\left(3-\log\left(\frac{3}{20+x}\right)\right)}\right)$$

output
```
2*ln((16*exp(4*x)^2/x^2+x)/ln(-ln(3/(20+x))+3))
```

3.1111.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.13

$$\int \frac{32e^{8x}x+2x^4+\left(-120x^3-6x^4+e^{8x}(3840-15168x-768x^2)+(40x^3+2x^4+e^{8x}(-1280+5056x+25\right.}{\left(-60x^4-3x^5+e^{8x}\left(-960x-48x^2\right)+\left(20x^4+x^5+e^{8x}\left(320x+16x^2\right)\right)\log\left(\frac{3}{20+x}\right)\right)\log}$$
$$=2\left(-2\log(x)+\log\left(16e^{8x}+x^3\right)-\log\left(\log\left(3-\log\left(\frac{3}{20+x}\right)\right)\right)\right)$$

3.1111.
$\int \frac{32e^{8x}x+2x^4+\left(-120x^3-6x^4+e^{8x}(3840-15168x-768x^2)+(40x^3+2x^4+e^{8x}(-1280+5056x+256x^2))\log\left(\frac{3}{20+x}\right)\right)\log\left(3-\log\left(\frac{3}{20+x}\right)\right)}{\left(-60x^4-3x^5+e^{8x}(-960x-48x^2)+(20x^4+x^5+e^{8x}(320x+16x^2))\log\left(\frac{3}{20+x}\right)\right)\log\left(3-\log\left(\frac{3}{20+x}\right)\right)}\,dx$

input
```
Integrate[(32*E^(8*x)*x + 2*x^4 + (-120*x^3 - 6*x^4 + E^(8*x)*(3840 - 1516
8*x - 768*x^2) + (40*x^3 + 2*x^4 + E^(8*x)*(-1280 + 5056*x + 256*x^2))*Log
[3/(20 + x)])*Log[3 - Log[3/(20 + x)]])/((-60*x^4 - 3*x^5 + E^(8*x)*(-960*
x - 48*x^2) + (20*x^4 + x^5 + E^(8*x)*(320*x + 16*x^2))*Log[3/(20 + x)])*L
og[3 - Log[3/(20 + x)]]),x]
```

output
```
2*(-2*Log[x] + Log[16*E^(8*x) + x^3] - Log[Log[3 - Log[3/(20 + x)]]])
```

3.1111.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4+\left(-6x^4-120x^3+e^{8x}\left(-768x^2-15168x+3840\right)+\left(2x^4+40x^3+e^{8x}\left(256x^2+5056x-1280\right)\right)\log\left(\frac{3}{x+2}\right.\right.}{\left(-3x^5-60x^4+e^{8x}\left(-48x^2-960x\right)+\left(x^5+20x^4+e^{8x}\left(16x^2+320x\right)\right)\log\left(\frac{3}{x+20}\right)\right)\log\left(3\right.}$$

$$\Big\downarrow \; 7292$$

$$\int \frac{-2x^4-\left(-6x^4-120x^3+e^{8x}\left(-768x^2-15168x+3840\right)+\left(2x^4+40x^3+e^{8x}\left(256x^2+5056x-1280\right)\right)\log\left(\frac{3}{x}\right.\right.}{x(x+20)\left(x^3+16e^{8x}\right)\left(3-\log\left(\frac{3}{x+20}\right)\right)\log\left(3-\log\left(\frac{3}{x+20}\right)\right)}$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{2\left(8x^2\log\left(\frac{3}{x+20}\right)\log\left(3-\log\left(\frac{3}{x+20}\right)\right)-24x^2\log\left(3-\log\left(\frac{3}{x+20}\right)\right)+x+158x\log\left(\frac{3}{x+20}\right)\log\left(3-\log\left(\frac{3}{x+}\right.\right.\right.}{x(x+20)\left(\log\left(\frac{3}{x+20}\right)-3\right)}\right.$$

$$\Big\downarrow \; 2009$$

$$-16\int \frac{x^3}{x^3+16e^{8x}}dx+6\int \frac{x^2}{x^3+16e^{8x}}dx+16x-4\log(x)-2\log\left(\log\left(3-\log\left(\frac{3}{x+20}\right)\right)\right)$$

input
```
Int[(32*E^(8*x)*x + 2*x^4 + (-120*x^3 - 6*x^4 + E^(8*x)*(3840 - 15168*x -
768*x^2) + (40*x^3 + 2*x^4 + E^(8*x)*(-1280 + 5056*x + 256*x^2))*Log[3/(20
 + x)])*Log[3 - Log[3/(20 + x)]])/((-60*x^4 - 3*x^5 + E^(8*x)*(-960*x - 48
*x^2) + (20*x^4 + x^5 + E^(8*x)*(320*x + 16*x^2))*Log[3/(20 + x)])*Log[3 -
 Log[3/(20 + x)]]),x]
```

output
```
$Aborted
```

3.1111.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1111.4 Maple [A] (verified)

Time = 12.36 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.06

method	result	size
risch	$-4\ln\left(x\right)+2\ln\left(\frac{x^{3}}{16}+{\mathrm e}^{8 x}\right)-2\ln\left(\ln\left(-\ln\left(3\right)+\ln\left(20+x\right)+3\right)\right)$	33
parallelrisch	$-4\ln\left(x\right)-2\ln\left(\ln\left(-\ln\left(\frac{3}{20+x}\right)+3\right)\right)+2\ln\left(x^{3}+16\,{\mathrm e}^{8 x}\right)$	37

input
```
int(((((256*x^2+5056*x-1280)*exp(4*x)^2+2*x^4+40*x^3)*ln(3/(20+x))+(-768*x
^2-15168*x+3840)*exp(4*x)^2-6*x^4-120*x^3)*ln(-ln(3/(20+x))+3)+32*x*exp(4*
x)^2+2*x^4)/((((16*x^2+320*x)*exp(4*x)^2+x^5+20*x^4)*ln(3/(20+x))+(-48*x^2-
960*x)*exp(4*x)^2-3*x^5-60*x^4)/ln(-ln(3/(20+x))+3),x,method=_RETURNVERBOS
E)
```

output
```
-4*ln(x)+2*ln(1/16*x^3+exp(8*x))-2*ln(ln(-ln(3)+ln(20+x)+3))
```

3.1111.

$$\int \frac{32e^{8x}x+2x^4+\left(-120x^3-6x^4+e^{8x}\left(3840-15168x-768x^2\right)+\left(40x^3+2x^4+e^{8x}\left(-1280+5056x+256x^2\right)\right)\log\left(\frac{3}{20+x}\right)\right)\log\left(3-\log\left(\frac{3}{20+x}\right)\right)}{\left(-60x^4-3x^5+e^{8x}\left(-960x-48x^2\right)+\left(20x^4+x^5+e^{8x}\left(320x+16x^2\right)\right)\log\left(\frac{3}{20+x}\right)\right)\log\left(3-\log\left(\frac{3}{20+x}\right)\right)}\,dx$$

3.1111.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{32e^{8x}x + 2x^4 + \left(-120x^3 - 6x^4 + e^{8x}(3840 - 15168x - 768x^2) + (40x^3 + 2x^4 + e^{8x}(-1280 + 5056x + 25\right.}{\left(-60x^4 - 3x^5 + e^{8x}\left(-960x - 48x^2\right) + \left(20x^4 + x^5 + e^{8x}\left(320x + 16x^2\right)\right)\log\left(\frac{3}{20+x}\right)\right) \mathrm{lo}}$$

$$= 2\log\left(x^3 + 16e^{(8x)}\right) - 4\log(x) - 2\log\left(\log\left(-\log\left(\frac{3}{x+20}\right) + 3\right)\right)$$

input
```
integrate(((((256*x^2+5056*x-1280)*exp(4*x)^2+2*x^4+40*x^3)*log(3/(20+x))+
(-768*x^2-15168*x+3840)*exp(4*x)^2-6*x^4-120*x^3)*log(-log(3/(20+x))+3)+32
*x*exp(4*x)^2+2*x^4)/((((16*x^2+320*x)*exp(4*x)^2+x^5+20*x^4)*log(3/(20+x))
+(-48*x^2-960*x)*exp(4*x)^2-3*x^5-60*x^4)/log(-log(3/(20+x))+3),x, algorit
hm=\
```

output
```
2*log(x^3 + 16*e^(8*x)) - 4*log(x) - 2*log(log(-log(3/(x + 20)) + 3))
```

3.1111.6 Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

$$\int \frac{32e^{8x}x + 2x^4 + \left(-120x^3 - 6x^4 + e^{8x}(3840 - 15168x - 768x^2) + (40x^3 + 2x^4 + e^{8x}(-1280 + 5056x + 25\right.}{\left(-60x^4 - 3x^5 + e^{8x}\left(-960x - 48x^2\right) + \left(20x^4 + x^5 + e^{8x}\left(320x + 16x^2\right)\right)\log\left(\frac{3}{20+x}\right)\right) \mathrm{lo}}$$

$$= -4\log(x) + 2\log\left(\frac{x^3}{16} + e^{8x}\right) - 2\log\left(\log\left(3 - \log\left(\frac{3}{x+20}\right)\right)\right)$$

input
```
integrate(((((256*x**2+5056*x-1280)*exp(4*x)**2+2*x**4+40*x**3)*ln(3/(20+x
))+(-768*x**2-15168*x+3840)*exp(4*x)**2-6*x**4-120*x**3)*ln(-ln(3/(20+x))+
3)+32*x*exp(4*x)**2+2*x**4)/((((16*x**2+320*x)*exp(4*x)**2+x**5+20*x**4)*ln
(3/(20+x))+(-48*x**2-960*x)*exp(4*x)**2-3*x**5-60*x**4)/ln(-ln(3/(20+x))+3
),x)
```

output
```
-4*log(x) + 2*log(x**3/16 + exp(8*x)) - 2*log(log(3 - log(3/(x + 20))))
```

3.1111.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.03

$$\int \frac{32e^{8x}x+2x^4+\left(-120x^3-6x^4+e^{8x}(3840-15168x-768x^2)+(40x^3+2x^4+e^{8x}(-1280+5056x+25}{\left(-60x^4-3x^5+e^{8x}\left(-960x-48x^2\right)+\left(20x^4+x^5+e^{8x}\left(320x+16x^2\right)\right)\log\left(\frac{3}{20+x}\right)\right)\,\mathrm{lo}}$$

$$=2\log\left(\frac{1}{16}x^3+e^{(8x)}\right)-4\log(x)-2\log\left(\log\left(-\log(3)+\log(x+20)+3\right)\right)$$

input
```
integrate((((((256*x^2+5056*x-1280)*exp(4*x)^2+2*x^4+40*x^3)*log(3/(20+x))+
(-768*x^2-15168*x+3840)*exp(4*x)^2-6*x^4-120*x^3)*log(-log(3/(20+x))+3)+32
*x*exp(4*x)^2+2*x^4)/(((16*x^2+320*x)*exp(4*x)^2+x^5+20*x^4)*log(3/(20+x))
+(-48*x^2-960*x)*exp(4*x)^2-3*x^5-60*x^4)/log(-log(3/(20+x))+3),x, algorit
hm=\
```

output
```
2*log(1/16*x^3 + e^(8*x)) - 4*log(x) - 2*log(log(-log(3) + log(x + 20) + 3
))
```

3.1111.8 Giac [A] (verification not implemented)

Time = 0.58 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{32e^{8x}x+2x^4+\left(-120x^3-6x^4+e^{8x}(3840-15168x-768x^2)+(40x^3+2x^4+e^{8x}(-1280+5056x+25}{\left(-60x^4-3x^5+e^{8x}\left(-960x-48x^2\right)+\left(20x^4+x^5+e^{8x}\left(320x+16x^2\right)\right)\log\left(\frac{3}{20+x}\right)\right)\,\mathrm{lo}}$$

$$=2\log\left(-x^3-16\,e^{(8x)}\right)-4\log(x)-2\log\left(\log\left(-\log(3)+\log(x+20)+3\right)\right)$$

input
```
integrate((((((256*x^2+5056*x-1280)*exp(4*x)^2+2*x^4+40*x^3)*log(3/(20+x))+
(-768*x^2-15168*x+3840)*exp(4*x)^2-6*x^4-120*x^3)*log(-log(3/(20+x))+3)+32
*x*exp(4*x)^2+2*x^4)/(((16*x^2+320*x)*exp(4*x)^2+x^5+20*x^4)*log(3/(20+x))
+(-48*x^2-960*x)*exp(4*x)^2-3*x^5-60*x^4)/log(-log(3/(20+x))+3),x, algorit
hm=\
```

output
```
2*log(-x^3 - 16*e^(8*x)) - 4*log(x) - 2*log(log(-log(3) + log(x + 20) + 3)
)
```

3.1111.9 Mupad [B] (verification not implemented)

Time = 0.90 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.10

$$\int \frac{32e^{8x}x+2x^4+\left(-120x^3-6x^4+e^{8x}(3840-15168x-768x^2)+(40x^3+2x^4+e^{8x}(-1280+5056x+25\right.}{\left(-60x^4-3x^5+e^{8x}\left(-960x-48x^2\right)+\left(20x^4+x^5+e^{8x}\left(320x+16x^2\right)\right)\log\left(\frac{3}{20+x}\right)\right) \mathrm{lc}}$$

$$= 2\,\ln\left(\mathrm{e}^{8\,x}+\frac{x^3}{16}\right)-2\,\ln\left(\ln\left(3-\ln\left(\frac{3}{x+20}\right)\right)\right)-4\,\ln\left(x\right)$$

input
```
int(-(32*x*exp(8*x) - log(3 - log(3/(x + 20)))*(exp(8*x)*(15168*x + 768*x^
2 - 3840) - log(3/(x + 20))*(exp(8*x)*(5056*x + 256*x^2 - 1280) + 40*x^3 +
 2*x^4) + 120*x^3 + 6*x^4) + 2*x^4)/(log(3 - log(3/(x + 20)))*(exp(8*x)*(9
60*x + 48*x^2) + 60*x^4 + 3*x^5 - log(3/(x + 20))*(exp(8*x)*(320*x + 16*x^
2) + 20*x^4 + x^5))),x)
```

output
```
2*log(exp(8*x) + x^3/16) - 2*log(log(3 - log(3/(x + 20)))) - 4*log(x)
```

3.1112 $\int \frac{-2e^{x+2e^{-x}\left(-2x+2x^2\right)}x-50e^xx^3+e^{e^{-x}\left(-2x+2x^2\right)}\left(-4x+12x^2-4x^3 ...}{e^{x+2e^{-x}\left(-2x+2x^2\right)}x^4+e^{x+e^{-x}\left(-2x+2x^2\right)}\left(4x^3-10x^5\right)+e^x\left(4x^2- ...}$

3.1112.1 Optimal result

Integrand size = 154, antiderivative size = 30

$$\int \frac{-2e^{x+2e^{-x}\left(-2x+2x^2\right)}x-50e^xx^3+e^{e^{-x}\left(-2x+2x^2\right)}\left(-4x+12x^2-4x^3+e^x\left(-2+20x^2\right)\right)}{e^{x+2e^{-x}\left(-2x+2x^2\right)}x^4+e^{x+e^{-x}\left(-2x+2x^2\right)}\left(4x^3-10x^5\right)+e^x\left(4x^2-20x^4+25x^6\right)}\,dx = \frac{1}{\frac{2}{-5+\frac{e^{e^{-x}x(-2+2x)}}{x}}+x^2}$$

output
```
1/(x^2+2/(exp((-2+2*x)*x/exp(x))/x-5))
```

3.1112.2 Mathematica [F]

$$\int \frac{-2e^{x+2e^{-x}\left(-2x+2x^2\right)}x-50e^xx^3+e^{e^{-x}\left(-2x+2x^2\right)}\left(-4x+12x^2-4x^3+e^x\left(-2+20x^2\right)\right)}{e^{x+2e^{-x}\left(-2x+2x^2\right)}x^4+e^{x+e^{-x}\left(-2x+2x^2\right)}\left(4x^3-10x^5\right)+e^x\left(4x^2-20x^4+25x^6\right)}\,dx = \int \frac{-2e^{x+2e^{-x}\left(-2x+2x^2\right)}x-50e^xx^3+e^{e^{-x}\left(-2x+2x^2\right)}\left(-4x+12x^2-4x^3+e^x\left(-2+20x^2\right)\right)}{e^{x+2e^{-x}\left(-2x+2x^2\right)}x^4+e^{x+e^{-x}\left(-2x+2x^2\right)}\left(4x^3-10x^5\right)+e^x\left(4x^2-20x^4+25x^6\right)}\,dx$$

input
```
Integrate[(-2*E^(x + (2*(-2*x + 2*x^2))/E^x)*x - 50*E^x*x^3 + E^((-2*x + 2
*x^2)/E^x)*(-4*x + 12*x^2 - 4*x^3 + E^x*(-2 + 20*x^2)))/(E^(x + (2*(-2*x +
 2*x^2))/E^x)*x^4 + E^(x + (-2*x + 2*x^2)/E^x)*(4*x^3 - 10*x^5) + E^x*(4*x
^2 - 20*x^4 + 25*x^6)),x]
```

output
```
Integrate[(-2*E^(x + (2*(-2*x + 2*x^2))/E^x)*x - 50*E^x*x^3 + E^((-2*x + 2
*x^2)/E^x)*(-4*x + 12*x^2 - 4*x^3 + E^x*(-2 + 20*x^2)))/(E^(x + (2*(-2*x +
 2*x^2))/E^x)*x^4 + E^(x + (-2*x + 2*x^2)/E^x)*(4*x^3 - 10*x^5) + E^x*(4*x
^2 - 20*x^4 + 25*x^6)), x]
```

3.1112.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-50e^x x^3 - 2e^{2e^{-x}(2x^2-2x)+x}x + e^{e^{-x}(2x^2-2x)}\left(-4x^3+12x^2+e^x\left(20x^2-2\right)-4x\right)}{e^{2e^{-x}(2x^2-2x)+x}x^4 + e^x\left(25x^6-20x^4+4x^2\right) + e^{e^{-x}(2x^2-2x)+x}\left(4x^3-10x^5\right)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{-e^{-x}(e^x-4)x}\left(-50e^x x^3 - 2e^{2e^{-x}(2x^2-2x)+x}x + e^{e^{-x}(2x^2-2x)}\left(-4x^3+12x^2+e^x\left(20x^2-2\right)-4x\right)\right)}{x^2\left(-5e^{2e^{-x}x}x^2 + e^{2e^{-x}x^2}x + 2e^{2e^{-x}x}\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2}{x^3} + \frac{2e^{-2e^{-x}x-e^{-x}(e^x-4)x}\left(2x^3-6x^2+2x-3e^x\right)}{x^3\left(5e^{2e^{-x}x}x^2 - e^{2e^{-x}x^2}x - 2e^{2e^{-x}x}\right)} - \frac{2e^{-e^{-x}(e^x-4)x}\left(10x^5-30x^4+6x^3+5e^x x^2+12x^2-4\right.}{x^3\left(5e^{2e^{-x}x}x^2 - e^{2e^{-x}x^2}x - 2e^{2e^{-x}x}\right)^2}\right.$$

$$\Big\downarrow \text{7292}$$

$$\int \left(-\frac{2}{x^3} + \frac{2e^{-e^{-x}(e^x-2)x}\left(2x^3-6x^2+2x-3e^x\right)}{x^3\left(5e^{2e^{-x}x}x^2 - e^{2e^{-x}x^2}x - 2e^{2e^{-x}x}\right)} - \frac{2e^{-e^{-x}(e^x-4)x}\left(10x^5-30x^4+6x^3+5e^x x^2+12x^2-4x+2e\right.}{x^3\left(5e^{2e^{-x}x}x^2 - e^{2e^{-x}x^2}x - 2e^{2e^{-x}x}\right)^2}\right.$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2}{x^3} - \frac{2e^{-x}\left(-2x^3+6x^2-2x+3e^x\right)}{x^3\left(5x^2-e^{2e^{-x}(x-1)x}x-2\right)} + \frac{2e^{-e^{-x}(e^x-4)x}\left(-10x^5+30x^4-6x^3-5e^x x^2-12x^2+4x-2e^x\right)}{x^3\left(-5e^{2e^{-x}x}x^2 + e^{2e^{-x}x^2}x + 2e^{2e^{-x}x}\right)^2}\right) d$$

$$\Big\downarrow \text{7299}$$

$$\int \left(-\frac{2}{x^3} - \frac{2e^{-x}\left(-2x^3+6x^2-2x+3e^x\right)}{x^3\left(5x^2-e^{2e^{-x}(x-1)x}x-2\right)} + \frac{2e^{-e^{-x}(e^x-4)x}\left(-10x^5+30x^4-6x^3-5e^x x^2-12x^2+4x-2e^x\right)}{x^3\left(-5e^{2e^{-x}x}x^2 + e^{2e^{-x}x^2}x + 2e^{2e^{-x}x}\right)^2}\right) d$$

3.1112. $\int \frac{-2e^{x+2e^{-x}\left(-2x+2x^2\right)}x-50e^x x^3+e^{e^{-x}\left(-2x+2x^2\right)}\left(-4x+12x^2-4x^3+e^x\left(-2+20x^2\right)\right)}{e^{x+2e^{-x}\left(-2x+2x^2\right)}x^4+e^{x+e^{-x}\left(-2x+2x^2\right)}\left(4x^3-10x^5\right)+e^x\left(4x^2-20x^4+25x^6\right)}\,dx$

input
```
Int[(-2*E^(x + (2*(-2*x + 2*x^2))/E^x)*x - 50*E^x*x^3 + E^((-2*x + 2*x^2)/
E^x)*(-4*x + 12*x^2 - 4*x^3 + E^x*(-2 + 20*x^2)))/(E^(x + (2*(-2*x + 2*x^2
))/E^x)*x^4 + E^(x + (-2*x + 2*x^2)/E^x)*(4*x^3 - 10*x^5) + E^x*(4*x^2 - 2
0*x^4 + 25*x^6)),x]
```

output
```
$Aborted
```

3.1112.3.1 Defintions of rubi rules used

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.1112.4 Maple [A] (verified)

Time = 0.61 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

method	result	size
risch	$\frac{1}{x^2}+\frac{2}{x^2\left(5x^2-\mathrm{e}^{2x(-1+x)\mathrm{e}^{-x}}x-2\right)}$	33
parallelrisch	$\frac{5x-\mathrm{e}^{\left(2x^2-2x\right)\mathrm{e}^{-x}}}{x\left(5x^2-x\,\mathrm{e}^{\left(2x^2-2x\right)\mathrm{e}^{-x}}-2\right)}$	53

input
```
int((-2*x*exp(x)*exp((2*x^2-2*x)/exp(x))^2+((20*x^2-2)*exp(x)-4*x^3+12*x^2
-4*x)*exp((2*x^2-2*x)/exp(x))-50*exp(x)*x^3)/(x^4*exp(x)*exp((2*x^2-2*x)/e
xp(x))^2+(-10*x^5+4*x^3)*exp(x)*exp((2*x^2-2*x)/exp(x))+(25*x^6-20*x^4+4*x
^2)*exp(x)),x,method=_RETURNVERBOSE)
```

output
```
1/x^2+2/x^2/(5*x^2-exp(2*x*(-1+x)*exp(-x))*x-2)
```

3.1112.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(27) = 54$.

Time = 0.26 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.27

$$\int \frac{-2e^{x+2e^{-x}(-2x+2x^2)}x-50e^xx^3+e^{e^{-x}(-2x+2x^2)}(-4x+12x^2-4x^3+e^x(-2+20x^2))}{e^{x+2e^{-x}(-2x+2x^2)}x^4+e^{x+e^{-x}(-2x+2x^2)}(4x^3-10x^5)+e^x(4x^2-20x^4+25x^6)}\,dx$$
$$= -\frac{5\,xe^x-e^{\left(\left(2\,x^2+xe^x-2\,x\right)e^{(-x)}\right)}}{x^2e^{\left(\left(2\,x^2+xe^x-2\,x\right)e^{(-x)}\right)}-\left(5\,x^3-2\,x\right)e^x}$$

input
```
integrate((-2*x*exp(x)*exp((2*x^2-2*x)/exp(x))^2+((20*x^2-2)*exp(x)-4*x^3+
12*x^2-4*x)*exp((2*x^2-2*x)/exp(x))-50*exp(x)*x^3)/(x^4*exp(x)*exp((2*x^2-
2*x)/exp(x))^2+(-10*x^5+4*x^3)*exp(x)*exp((2*x^2-2*x)/exp(x))+(25*x^6-20*x
^4+4*x^2)*exp(x)),x, algorithm=\
```

output
```
-(5*x*e^x - e^((2*x^2 + x*e^x - 2*x)*e^(-x)))/(x^2*e^((2*x^2 + x*e^x - 2*x
)*e^(-x)) - (5*x^3 - 2*x)*e^x)
```

3.1112.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{-2e^{x+2e^{-x}(-2x+2x^2)}x-50e^xx^3+e^{e^{-x}(-2x+2x^2)}(-4x+12x^2-4x^3+e^x(-2+20x^2))}{e^{x+2e^{-x}(-2x+2x^2)}x^4+e^{x+e^{-x}(-2x+2x^2)}(4x^3-10x^5)+e^x(4x^2-20x^4+25x^6)}\,dx$$
$$= -\frac{2}{-5x^4+x^3e^{(2x^2-2x)e^{-x}}+2x^2}+\frac{1}{x^2}$$

input
```
integrate((-2*x*exp(x)*exp((2*x**2-2*x)/exp(x))**2+((20*x**2-2)*exp(x)-4*x
**3+12*x**2-4*x)*exp((2*x**2-2*x)/exp(x))-50*exp(x)*x**3)/(x**4*exp(x)*exp
((2*x**2-2*x)/exp(x))**2+(-10*x**5+4*x**3)*exp(x)*exp((2*x**2-2*x)/exp(x))
+(25*x**6-20*x**4+4*x**2)*exp(x)),x)
```

output
```
-2/(-5*x**4 + x**3*exp((2*x**2 - 2*x)*exp(-x)) + 2*x**2) + x**(-2)
```

3.1112.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(27) = 54$.

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.07

$$\int \frac{-2e^{x+2e^{-x}(-2x+2x^2)}x-50e^xx^3+e^{e^{-x}(-2x+2x^2)}(-4x+12x^2-4x^3+e^x(-2+20x^2))}{e^{x+2e^{-x}(-2x+2x^2)}x^4+e^{x+e^{-x}(-2x+2x^2)}(4x^3-10x^5)+e^x(4x^2-20x^4+25x^6)}\,dx$$
$$= -\frac{5\,xe^{\left(2\,xe^{(-x)}\right)}-e^{\left(2\,x^2e^{(-x)}\right)}}{x^2e^{\left(2\,x^2e^{(-x)}\right)}-(5\,x^3-2\,x)e^{\left(2\,xe^{(-x)}\right)}}$$

input
```
integrate((-2*x*exp(x)*exp((2*x^2-2*x)/exp(x))^2+((20*x^2-2)*exp(x)-4*x^3+
12*x^2-4*x)*exp((2*x^2-2*x)/exp(x))-50*exp(x)*x^3)/(x^4*exp(x)*exp((2*x^2-
2*x)/exp(x))^2+(-10*x^5+4*x^3)*exp(x)*exp((2*x^2-2*x)/exp(x))+(25*x^6-20*x
^4+4*x^2)*exp(x)),x, algorithm=\
```

output
```
-(5*x*e^(2*x*e^(-x)) - e^(2*x^2*e^(-x)))/(x^2*e^(2*x^2*e^(-x)) - (5*x^3 -
2*x)*e^(2*x*e^(-x)))
```

3.1112.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 4292 vs. $2(27) = 54$.

Time = 0.45 (sec) , antiderivative size = 4292, normalized size of antiderivative = 143.07

$$\int \frac{-2e^{x+2e^{-x}(-2x+2x^2)}x-50e^xx^3+e^{e^{-x}(-2x+2x^2)}(-4x+12x^2-4x^3+e^x(-2+20x^2))}{e^{x+2e^{-x}(-2x+2x^2)}x^4+e^{x+e^{-x}(-2x+2x^2)}(4x^3-10x^5)+e^x(4x^2-20x^4+25x^6)}\,dx$$
$$= \text{Too large to display}$$

input
```
integrate((-2*x*exp(x)*exp((2*x^2-2*x)/exp(x))^2+((20*x^2-2)*exp(x)-4*x^3+
12*x^2-4*x)*exp((2*x^2-2*x)/exp(x))-50*exp(x)*x^3)/(x^4*exp(x)*exp((2*x^2-
2*x)/exp(x))^2+(-10*x^5+4*x^3)*exp(x)*exp((2*x^2-2*x)/exp(x))+(25*x^6-20*x
^4+4*x^2)*exp(x)),x, algorithm=\
```

output
```
(12500*x^15*e^(4*x*e^(-x) + 3/2*x) - 7500*x^14*e^(2*x^2*e^(-x) + 2*x*e^(-x
) + 3/2*x) - 75000*x^14*e^(4*x*e^(-x) + 3/2*x) + 1500*x^13*e^(4*x^2*e^(-x)
 + 3/2*x) + 45000*x^13*e^(2*x^2*e^(-x) + 2*x*e^(-x) + 3/2*x) + 117500*x^13
*e^(4*x*e^(-x) + 3/2*x) - 100*x^12*e^(6*x^2*e^(-x) - 2*x*e^(-x) + 3/2*x) -
 9000*x^12*e^(4*x^2*e^(-x) + 3/2*x) - 72500*x^12*e^(2*x^2*e^(-x) + 2*x*e^(
-x) + 3/2*x) + 12500*x^12*e^(4*x*e^(-x) + 5/2*x) + 45000*x^12*e^(4*x*e^(-x
) + 3/2*x) + 600*x^11*e^(6*x^2*e^(-x) - 2*x*e^(-x) + 3/2*x) + 14900*x^11*e
^(4*x^2*e^(-x) + 3/2*x) - 7500*x^11*e^(2*x^2*e^(-x) + 2*x*e^(-x) + 5/2*x)
- 15000*x^11*e^(2*x^2*e^(-x) + 2*x*e^(-x) + 3/2*x) - 37500*x^11*e^(4*x*e^(
-x) + 5/2*x) - 195500*x^11*e^(4*x*e^(-x) + 3/2*x) - 1020*x^10*e^(6*x^2*e^(
-x) - 2*x*e^(-x) + 3/2*x) + 1500*x^10*e^(4*x^2*e^(-x) + 5/2*x) + 600*x^10*
e^(4*x^2*e^(-x) + 3/2*x) + 22500*x^10*e^(2*x^2*e^(-x) + 2*x*e^(-x) + 5/2*x
) + 97700*x^10*e^(2*x^2*e^(-x) + 2*x*e^(-x) + 3/2*x) + 2500*x^10*e^(4*x*e^
(-x) + 5/2*x) + 48000*x^10*e^(4*x*e^(-x) + 3/2*x) - 100*x^9*e^(6*x^2*e^(-x
) - 2*x*e^(-x) + 5/2*x) + 120*x^9*e^(6*x^2*e^(-x) - 2*x*e^(-x) + 3/2*x) -
4500*x^9*e^(4*x^2*e^(-x) + 5/2*x) - 15540*x^9*e^(4*x^2*e^(-x) + 3/2*x) - 3
500*x^9*e^(2*x^2*e^(-x) + 2*x*e^(-x) + 5/2*x) - 31200*x^9*e^(2*x^2*e^(-x)
+ 2*x*e^(-x) + 3/2*x) + 3125*x^9*e^(4*x*e^(-x) + 7/2*x) + 30000*x^9*e^(4*x
*e^(-x) + 5/2*x) + 108800*x^9*e^(4*x*e^(-x) + 3/2*x) + 300*x^8*e^(6*x^2*e^
(-x) - 2*x*e^(-x) + 5/2*x) + 764*x^8*e^(6*x^2*e^(-x) - 2*x*e^(-x) + 3/2...
```

3.1112.9 Mupad [B] (verification not implemented)

Time = 14.84 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.37

$$\int \frac{-2e^{x+2e^{-x}(-2x+2x^2)}x-50e^xx^3+e^{e^{-x}(-2x+2x^2)}(-4x+12x^2-4x^3+e^x(-2+20x^2))}{e^{x+2e^{-x}(-2x+2x^2)}x^4+e^{x+e^{-x}(-2x+2x^2)}(4x^3-10x^5)+e^x(4x^2-20x^4+25x^6)}\,dx$$
$$=\frac{1}{x^2}-\frac{2}{2\,x^2-5\,x^4+x^3\,\mathrm{e}^{-2\,x\,\mathrm{e}^{-x}}\,\mathrm{e}^{2\,x^2\,\mathrm{e}^{-x}}}$$

input
```
int(-(50*x^3*exp(x) + exp(-exp(-x)*(2*x - 2*x^2))*(4*x - exp(x)*(20*x^2 -
2) - 12*x^2 + 4*x^3) + 2*x*exp(-2*exp(-x)*(2*x - 2*x^2))*exp(x))/(exp(x)*(
4*x^2 - 20*x^4 + 25*x^6) + exp(-exp(-x)*(2*x - 2*x^2))*exp(x)*(4*x^3 - 10*
x^5) + x^4*exp(-2*exp(-x)*(2*x - 2*x^2))*exp(x)),x)
```

output
```
1/x^2 - 2/(2*x^2 - 5*x^4 + x^3*exp(-2*x*exp(-x))*exp(2*x^2*exp(-x)))
```

3.1113 $\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx$

3.1113.1 Optimal result

Integrand size = 75, antiderivative size = 23

$$\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx=\frac{1}{2+e^{e^{2+\frac{e^2}{3}}(259-x)}}$$

output
```
1/(exp((-x+259)*exp(1/3*exp(2)+2))+2)
```

3.1113.2 Mathematica [A] (verified)

Time = 0.39 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx=-\frac{1}{2\left(1+2e^{e^{2+\frac{e^2}{3}}(-259+x)}\right)}$$

input
```
Integrate[E^((6 + E^2)/3 + E^((6 + E^2)/3)*(259 - x))/(4 + 4*E^(E^((6 + E^
2)/3)*(259 - x)) + E^(2*E^((6 + E^2)/3)*(259 - x))),x]
```

output
```
-1/2*1/(1 + 2*E^(E^(2 + E^2/3)*(-259 + x)))
```

3.1113. $\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx$

3.1113.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.48, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.027, Rules used = {2720, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\exp \left(e^{\frac{1}{3}(6+e^2)}(259-x)+\frac{1}{3}(6+e^2)\right)}{4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}+4} \, dx$$

$$\Big\downarrow \; 2720$$

$$-e^{-2-\frac{e^2}{3}}\int \frac{e^{2+\frac{e^2}{3}+259e^{2+\frac{e^2}{3}}}}{\left(2+e^{259e^{2+\frac{e^2}{3}}-e^{2+\frac{e^2}{3}}x}\right)^2}de^{-e^{2+\frac{e^2}{3}}x}$$

$$\Big\downarrow \; 17$$

$$\frac{1}{e^{259e^{2+\frac{e^2}{3}}-e^{2+\frac{e^2}{3}}x}+2}$$

input
```
Int[E^((6 + E^2)/3 + E^((6 + E^2)/3)*(259 - x))/(4 + 4*E^(E^((6 + E^2)/3)*
(259 - x)) + E^(2*E^((6 + E^2)/3)*(259 - x))),x]
```

output
```
(2 + E^(259*E^(2 + E^2/3) - E^(2 + E^2/3)*x))^(-1)
```

3.1113.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 2720
```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ
[{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))
*(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

3.1113.4 Maple [A] (verified)

Time = 0.41 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

method	result	size
risch	$\frac{1}{\mathrm{e}^{-(x-259)\,\mathrm{e}^{\frac{\mathrm{e}^2}{3}+2}}+2}$	18
derivativedivides	$\frac{1}{\mathrm{e}^{(-x+259)\,\mathrm{e}^{\frac{\mathrm{e}^2}{3}+2}}+2}$	19
default	$\frac{1}{\mathrm{e}^{(-x+259)\,\mathrm{e}^{\frac{\mathrm{e}^2}{3}+2}}+2}$	19
norman	$\frac{1}{\mathrm{e}^{(-x+259)\,\mathrm{e}^{\frac{\mathrm{e}^2}{3}+2}}+2}$	19
parallelrisch	$\frac{1}{\mathrm{e}^{(-x+259)\,\mathrm{e}^{\frac{\mathrm{e}^2}{3}+2}}+2}$	19

input
```
int(exp(1/3*exp(2)+2)*exp((-x+259)*exp(1/3*exp(2)+2))/(exp((-x+259)*exp(1/
3*exp(2)+2))^2+4*exp((-x+259)*exp(1/3*exp(2)+2))+4),x,method=_RETURNVERBOS
E)
```

output
```
1/(exp(-(x-259)*exp(1/3*exp(2)+2))+2)
```

3.1113.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(17) = 34.

Time = 0.25 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.70

$$\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx = \frac{e^{\left(\frac{1}{3}e^2+2\right)}}{e^{\left(-(x-259)e^{\left(\frac{1}{3}e^2+2\right)}+\frac{1}{3}e^2+2\right)}+2\,e^{\left(\frac{1}{3}e^2+2\right)}}$$

input
```
integrate(exp(1/3*exp(2)+2)*exp((-x+259)*exp(1/3*exp(2)+2))/(exp((-x+259)*
exp(1/3*exp(2)+2))^2+4*exp((-x+259)*exp(1/3*exp(2)+2))+4),x, algorithm=\
```

output
```
e^(1/3*e^2 + 2)/(e^(-(x - 259)*e^(1/3*e^2 + 2) + 1/3*e^2 + 2) + 2*e^(1/3*e
^2 + 2))
```

3.1113.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx=\frac{1}{e^{(259-x)e^{2+\frac{e^2}{3}}}+2}$$

input
```
integrate(exp(1/3*exp(2)+2)*exp((-x+259)*exp(1/3*exp(2)+2))/(exp((-x+259)*
exp(1/3*exp(2)+2))**2+4*exp((-x+259)*exp(1/3*exp(2)+2))+4),x)
```

output
```
1/(exp((259 - x)*exp(2 + exp(2)/3)) + 2)
```

3.1113.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx=\frac{1}{e^{\left(-xe^{\left(\frac{1}{3}e^2+2\right)}+259\,e^{\left(\frac{1}{3}e^2+2\right)}\right)}+2}$$

input
```
integrate(exp(1/3*exp(2)+2)*exp((-x+259)*exp(1/3*exp(2)+2))/(exp((-x+259)*
exp(1/3*exp(2)+2))^2+4*exp((-x+259)*exp(1/3*exp(2)+2))+4),x, algorithm=\
```

output
```
1/(e^(-x*e^(1/3*e^2 + 2) + 259*e^(1/3*e^2 + 2)) + 2)
```

3.1113.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. 2(17) = 34.

Time = 0.28 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.00

$$\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx=\frac{e^{\left(\frac{1}{3}e^2+2\right)}}{e^{\left(-xe^{\left(\frac{1}{3}e^2+2\right)}+\frac{1}{3}e^2+259\,e^{\left(\frac{1}{3}e^2+2\right)}+2\right)}+2\,e^{\left(\frac{1}{3}e^2+2\right)}}$$

input
```
integrate(exp(1/3*exp(2)+2)*exp((-x+259)*exp(1/3*exp(2)+2))/(exp((-x+259)*
exp(1/3*exp(2)+2))^2+4*exp((-x+259)*exp(1/3*exp(2)+2))+4),x, algorithm=\
```

output
```
e^(1/3*e^2 + 2)/(e^(-x*e^(1/3*e^2 + 2) + 1/3*e^2 + 259*e^(1/3*e^2 + 2) + 2
) + 2*e^(1/3*e^2 + 2))
```

3.1113. $\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx$

3.1113.9 Mupad [B] (verification not implemented)

Time = 16.84 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{e^{\frac{1}{3}(6+e^2)+e^{\frac{1}{3}(6+e^2)}(259-x)}}{4+4e^{e^{\frac{1}{3}(6+e^2)}(259-x)}+e^{2e^{\frac{1}{3}(6+e^2)}(259-x)}}\,dx=-\frac{1}{2\left(2\,e^{e^{\frac{e^2}{3}}\,e^2\,(x-259)}+1\right)}$$

input
```
int((exp(-exp(exp(2)/3 + 2)*(x - 259))*exp(exp(2)/3 + 2))/(4*exp(-exp(exp(
2)/3 + 2)*(x - 259)) + exp(-2*exp(exp(2)/3 + 2)*(x - 259)) + 4),x)
```

output
```
-1/(2*(2*exp(exp(exp(2)/3)*exp(2)*(x - 259)) + 1))
```

3.1114 $\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{e^2(-27+9x)}\,dx$

3.1114.1 Optimal result

Integrand size = 38, antiderivative size = 29

$$\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{e^2(-27+9x)}\,dx = -x+\frac{\log^2\left(\frac{\log(2)}{2(-3+x)\log(6)}\right)}{9e^2}$$

output
```
1/9/exp(1)^2*ln(1/2*ln(2)/(-3+x)/ln(6))^2-x
```

3.1114.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{e^2(-27+9x)}\,dx = -x+\frac{\log^2\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{9e^2}$$

input
```
Integrate[(E^2*(27 - 9*x) - 2*Log[Log[2]/((-6 + 2*x)*Log[6])])/(E^2*(-27 +
 9*x)),x]
```

output
```
-x + Log[Log[2]/((-6 + 2*x)*Log[6])]^2/(9*E^2)
```

3.1114.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.132, Rules used = {27, 27, 7281, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(2x-6)\log(6)}\right)}{e^2(9x-27)}\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int -\frac{9e^2(3-x)-2\log\left(-\frac{\log(2)}{2(3-x)\log(6)}\right)}{9(3-x)}dx}{e^2}$$

$$\Big\downarrow \text{27}$$

$$-\frac{\int \frac{9e^2(3-x)-2\log\left(-\frac{\log(2)}{2(3-x)\log(6)}\right)}{3-x}dx}{9e^2}$$

$$\Big\downarrow \text{7281}$$

$$\frac{\int \frac{9e^2(3-x)-2\log\left(-\frac{\log(2)}{2(3-x)\log(6)}\right)}{3-x}d(3-x)}{9e^2}$$

$$\Big\downarrow \text{2010}$$

$$\frac{\int \left(9e^2-\frac{2\log\left(-\frac{\log(2)}{(3-x)\log(36)}\right)}{3-x}\right)d(3-x)}{9e^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{9e^2(3-x)+\log^2\left(-\frac{\log(2)}{(3-x)\log(36)}\right)}{9e^2}$$

input
```
Int[(E^2*(27 - 9*x) - 2*Log[Log[2]/((-6 + 2*x)*Log[6])])/(E^2*(-27 + 9*x))
,x]
```

output
```
(9*E^2*(3 - x) + Log[-(Log[2]/((3 - x)*Log[36]))]^2)/(9*E^2)
```

3.1114. $\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{e^2(-27+9x)}\,dx$

3.1114.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 7281
```
Int[u_, x_Symbol] :> With[{lst = FunctionOfLinear[u, x]}, Simp[1/lst[[3]]
 Subst[Int[lst[[1]], x], x, lst[[2]] + lst[[3]]*x], x] /;  !FalseQ[lst]]
```

3.1114.4 Maple [A] (verified)

Time = 1.56 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

method	result	size
parts	$-x+\frac{{\mathrm e}^{-2} \ln \left(\frac{\ln \left(2\right)}{\left(2 x -6\right) \ln \left(6\right)}\right)^{2}}{9}$	28
risch	$-x+\frac{{\mathrm e}^{-2} \ln \left(\frac{\ln \left(2\right)}{\left(2 x -6\right) \left(\ln \left(2\right)+\ln \left(3\right)\right)}\right)^{2}}{9}$	29
default	$\frac{{\mathrm e}^{-2} \left(-9 \left(-3+x \right) {\mathrm e}^{2}+\ln \left(\frac{\ln \left(2\right)}{2 \left(-3+x \right) \ln \left(6\right)}\right)^{2}\right)}{9}$	33
derivativedivides	$-\frac{{\mathrm e}^{-2} \left(9 \left(-3+x \right) {\mathrm e}^{2}-\ln \left(\frac{\ln \left(2\right)}{2 \left(-3+x \right) \ln \left(6\right)}\right)^{2}\right)}{9}$	35
norman	$\left(-x \,{\mathrm e}+\frac{{\mathrm e}^{-1} \ln \left(\frac{\ln \left(2\right)}{\left(2 x -6\right) \ln \left(6\right)}\right)^{2}}{9}\right) {\mathrm e}^{-1}$	35

input
```
int((-2*ln(ln(2)/(2*x-6)/ln(6))+(-9*x+27)*exp(1)^2)/(9*x-27)/exp(1)^2,x,me
thod=_RETURNVERBOSE)
```

output
```
-x+1/9/exp(1)^2*ln(ln(2)/(2*x-6)/ln(6))^2
```

3.1114.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{e^2(-27+9x)}\,dx = -\frac{1}{9}\left(9\,xe^2-\log\left(\frac{\log(2)}{2\,(x-3)\log(6)}\right)^2\right)e^{(-2)}$$

input
```
integrate((-2*log(log(2)/(2*x-6)/log(6))+(-9*x+27)*exp(1)^2)/(9*x-27)/exp(
1)^2,x, algorithm=\
```

output
```
-1/9*(9*x*e^2 - log(1/2*log(2)/((x - 3)*log(6)))^2)*e^(-2)
```

3.1114.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{e^2(-27+9x)}\,dx = -x+\frac{\log\left(\frac{\log(2)}{(2x-6)\log(6)}\right)^2}{9e^2}$$

input
```
integrate((-2*ln(ln(2)/(2*x-6)/ln(6))+(-9*x+27)*exp(1)**2)/(9*x-27)/exp(1)
**2,x)
```

output
```
-x + exp(-2)*log(log(2)/((2*x - 6)*log(6)))**2/9
```

3.1114.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 105 vs. 2(24) = 48.

Time = 0.29 (sec) , antiderivative size = 105, normalized size of antiderivative = 3.62

$$\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{e^2(-27+9x)}\,dx =$$
$$-\frac{1}{9}\left(9\,(x+3\,\log(x-3))e^2-\left(\frac{2\,\log(2\,x\log(6)-6\,\log(6))\log(x-3)}{\log(6)}-\frac{\log(x-3)^2}{\log(3)+\log(2)}\right)\log(6)-2\right.$$

input
```
integrate((-2*log(log(2)/(2*x-6)/log(6))+(-9*x+27)*exp(1)^2)/(9*x-27)/exp(
1)^2,x, algorithm=\
```

output
```
-1/9*(9*(x + 3*log(x - 3))*e^2 - (2*log(2*x*log(6) - 6*log(6))*log(x - 3)/
log(6) - log(x - 3)^2/(log(3) + log(2)))*log(6) - 27*e^2*log(x - 3) + 2*lo
g(2*x*log(6) - 6*log(6))*log(x - 3) + 2*log(x - 3)*log(1/2*log(2)/(x*log(6
) - 3*log(6))))*e^(-2)
```

3.1114.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 145 vs. $2(24) = 48$.

Time = 0.28 (sec) , antiderivative size = 145, normalized size of antiderivative = 5.00

$$\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{e^2(-27+9x)}\,dx = \frac{\left(\frac{\log(3)\log(2)^2\log\left(\frac{\log(2)}{2\,(x\log(6)-3\,\log(6))}\right)^2}{x\log(6)-3\,\log(6)}+\frac{\log(2)^3\log\left(\frac{\log(2)}{2\,(x\log(6)-3\,\log(6))}\right)^2}{x\log(6)-3\,\log(6)}-9\,e^2\log(2)^2\right)e^{(-2)}\log(6)}{9\left(\frac{\log(3)^2\log(2)}{x\log(6)-3\,\log(6)}+\frac{2\,\log(3)\log(2)^2}{x\log(6)-3\,\log(6)}+\frac{\log(2)^3}{x\log(6)-3\,\log(6)}\right)\log(2)}$$

input
```
integrate((-2*log(log(2)/(2*x-6)/log(6))+(-9*x+27)*exp(1)^2)/(9*x-27)/exp(
1)^2,x, algorithm=\
```

output
```
1/9*(log(3)*log(2)^2*log(1/2*log(2)/(x*log(6) - 3*log(6)))^2/(x*log(6) - 3
*log(6)) + log(2)^3*log(1/2*log(2)/(x*log(6) - 3*log(6)))^2/(x*log(6) - 3*
log(6)) - 9*e^2*log(2)^2)*e^(-2)*log(6)/((log(3)^2*log(2)/(x*log(6) - 3*lo
g(6)) + 2*log(3)*log(2)^2/(x*log(6) - 3*log(6)) + log(2)^3/(x*log(6) - 3*l
og(6)))*log(2))
```

3.1114.9 Mupad [B] (verification not implemented)

Time = 0.63 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{e^2(27-9x)-2\log\left(\frac{\log(2)}{(-6+2x)\log(6)}\right)}{e^2(-27+9x)}\,dx = \frac{e^{-2}\ln\left(\frac{\ln(2)}{\ln(6)\,(2\,x-6)}\right)^2}{9} - x$$

input
```
int(-(exp(-2)*(2*log(log(2)/(log(6)*(2*x - 6))) + exp(2)*(9*x - 27)))/(9*x
 - 27),x)
```

output
```
(exp(-2)*log(log(2)/(log(6)*(2*x - 6)))^2)/9 - x
```

3.1115 $\int \frac{e^{1-2e^x+e^{2x}}(40+80e^x x-80e^{2x}x)}{225e^{2-4e^x+2e^{2x}}-540e^{1-2e^x+e^{2x}}x+324x^2}\,dx$

3.1115.1 Optimal result

Integrand size = 74, antiderivative size = 26

$$\int \frac{e^{1-2e^x+e^{2x}}(40+80e^x x-80e^{2x}x)}{225e^{2-4e^x+2e^{2x}}-540e^{1-2e^x+e^{2x}}x+324x^2}\,dx=\frac{4}{9\left(-3+\frac{5e^{(1-e^x)^2}}{2x}\right)}$$

output
```
4/9/(5/2*exp((1-exp(x))^2)/x-3)
```

3.1115.2 Mathematica [A] (verified)

Time = 0.83 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\int \frac{e^{1-2e^x+e^{2x}}(40+80e^x x-80e^{2x}x)}{225e^{2-4e^x+2e^{2x}}-540e^{1-2e^x+e^{2x}}x+324x^2}\,dx=\frac{40e^{1+e^{2x}}}{9\,(30e^{1+e^{2x}}-36e^{2e^x}x)}$$

input
```
Integrate[(E^(1 - 2*E^x + E^(2*x))*(40 + 80*E^x*x - 80*E^(2*x)*x))/(225*E^
(2 - 4*E^x + 2*E^(2*x)) - 540*E^(1 - 2*E^x + E^(2*x))*x + 324*x^2),x]
```

output
```
(40*E^(1 + E^(2*x)))/(9*(30*E^(1 + E^(2*x)) - 36*E^(2*E^x)*x))
```

3.1115.3 Rubi [A] (verified)

Time = 1.33 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.054$, Rules used = {7292, 27, 7262, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-2e^x+e^{2x}+1}\left(80e^x x-80e^{2x}x+40\right)}{324x^2-540e^{-2e^x+e^{2x}+1}x+225e^{-4e^x+2e^{2x}+2}}dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{40e^{(e^x-1)^2+4e^x}\left(2e^x x-2e^{2x}x+1\right)}{9\left(5e^{e^{2x}+1}-6e^{2e^x}x\right)^2}dx$$

$$\Big\downarrow \; 27$$

$$\frac{40}{9}\int \frac{e^{(-1+e^x)^2+4e^x}\left(2e^x x-2e^{2x}x+1\right)}{\left(5e^{1+e^{2x}}-6e^{2e^x}x\right)^2}dx$$

$$\Big\downarrow \; 7262$$

$$\frac{20}{27}\int \frac{1}{\left(1-\frac{5e^{1-2e^x+e^{2x}}}{6x}\right)^2}d\left(-\frac{e^{1-2e^x+e^{2x}}}{6x}\right)$$

$$\Big\downarrow \; 17$$

$$-\frac{4}{27\left(1-\frac{5e^{-2e^x+e^{2x}+1}}{6x}\right)}$$

input
```
Int[(E^(1 - 2*E^x + E^(2*x))*(40 + 80*E^x*x - 80*E^(2*x)*x))/(225*E^(2 - 4
*E^x + 2*E^(2*x)) - 540*E^(1 - 2*E^x + E^(2*x))*x + 324*x^2),x]
```

output
```
-4/(27*(1 - (5*E^(1 - 2*E^x + E^(2*x)))/(6*x)))
```

3.1115. $\int \frac{e^{1-2e^x+e^{2x}}\left(40+80e^x x-80e^{2x}x\right)}{225e^{2-4e^x+2e^{2x}}-540e^{1-2e^x+e^{2x}}x+324x^2}dx$

3.1115.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7262
```
Int[(u_)*((a_.)*(v_)^(p_.) + (b_.)*(w_)^(q_.))^(m_.), x_Symbol] :> With[{c
= Simplify[u/(p*w*D[v, x] - q*v*D[w, x])]}, Simp[c*p   Subst[Int[(b + a*x^p
)^m, x], x, v*w^(m*q + 1)], x] /; FreeQ[c, x]] /; FreeQ[{a, b, m, p, q}, x]
 && EqQ[p + q*(m*p + 1), 0] && IntegerQ[p] && IntegerQ[m]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1115.4 Maple [A] (verified)

Time = 0.70 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

method	result	size
risch	$-\frac{8x}{9\left(6x-5\,{\mathrm e}^{{\mathrm e}^{2x}-2\,{\mathrm e}^{x}+1}\right)}$	23
parallelrisch	$-\frac{8x}{9\left(6x-5\,{\mathrm e}^{{\mathrm e}^{2x}-2\,{\mathrm e}^{x}+1}\right)}$	23
norman	$-\frac{20\,{\mathrm e}^{{\mathrm e}^{2x}-2\,{\mathrm e}^{x}+1}}{27\left(6x-5\,{\mathrm e}^{{\mathrm e}^{2x}-2\,{\mathrm e}^{x}+1}\right)}$	33

input
```
int((-80*x*exp(x)^2+80*exp(x)*x+40)*exp(exp(x)^2-2*exp(x)+1)/(225*exp(exp(
x)^2-2*exp(x)+1)^2-540*x*exp(exp(x)^2-2*exp(x)+1)+324*x^2),x,method=_RETUR
NVERBOSE)
```

output
```
-8/9*x/(6*x-5*exp(exp(2*x)-2*exp(x)+1))
```

3.1115.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{e^{1-2e^x+e^{2x}}(40+80e^x x-80e^{2x}x)}{225e^{2-4e^x+2e^{2x}}-540e^{1-2e^x+e^{2x}}x+324x^2}\,dx = -\frac{8\,x}{9\,\left(6\,x-5\,e^{\left(e^{(2\,x)}-2\,e^x+1\right)}\right)}$$

input
```
integrate((-80*x*exp(x)^2+80*exp(x)*x+40)*exp(exp(x)^2-2*exp(x)+1)/(225*ex
p(exp(x)^2-2*exp(x)+1)^2-540*x*exp(exp(x)^2-2*exp(x)+1)+324*x^2),x, algori
thm=\
```

output
```
-8/9*x/(6*x - 5*e^(e^(2*x) - 2*e^x + 1))
```

3.1115.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{e^{1-2e^x+e^{2x}}(40+80e^x x-80e^{2x}x)}{225e^{2-4e^x+2e^{2x}}-540e^{1-2e^x+e^{2x}}x+324x^2}\,dx = \frac{8x}{-54x+45e^{e^{2x}-2e^x+1}}$$

input
```
integrate((-80*x*exp(x)**2+80*exp(x)*x+40)*exp(exp(x)**2-2*exp(x)+1)/(225*
exp(exp(x)**2-2*exp(x)+1)**2-540*x*exp(exp(x)**2-2*exp(x)+1)+324*x**2),x)
```

output
```
8*x/(-54*x + 45*exp(exp(2*x) - 2*exp(x) + 1))
```

3.1115.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{e^{1-2e^x+e^{2x}}(40+80e^x x-80e^{2x}x)}{225e^{2-4e^x+2e^{2x}}-540e^{1-2e^x+e^{2x}}x+324x^2}\,dx = -\frac{8\,xe^{(2\,e^x)}}{9\,\left(6\,xe^{(2\,e^x)}-5\,e^{\left(e^{(2\,x)}+1\right)}\right)}$$

input
```
integrate((-80*x*exp(x)^2+80*exp(x)*x+40)*exp(exp(x)^2-2*exp(x)+1)/(225*ex
p(exp(x)^2-2*exp(x)+1)^2-540*x*exp(exp(x)^2-2*exp(x)+1)+324*x^2),x, algori
thm=\
```

output
```
-8/9*x*e^(2*e^x)/(6*x*e^(2*e^x) - 5*e^(e^(2*x) + 1))
```

3.1115.8 Giac [F]

$$\int \frac{e^{1-2e^x+e^{2x}}(40+80e^x x-80e^{2x}x)}{225e^{2-4e^x+2e^{2x}}-540e^{1-2e^x+e^{2x}}x+324x^2}\,dx$$
$$=\int -\frac{40\left(2\,xe^{(2\,x)}-2\,xe^x-1\right)e^{\left(e^{(2\,x)}-2\,e^x+1\right)}}{9\left(36\,x^2-60\,xe^{\left(e^{(2\,x)}-2\,e^x+1\right)}+25\,e^{\left(2\,e^{(2\,x)}-4\,e^x+2\right)}\right)}\,dx$$

input
```
integrate((-80*x*exp(x)^2+80*exp(x)*x+40)*exp(exp(x)^2-2*exp(x)+1)/(225*ex
p(exp(x)^2-2*exp(x)+1)^2-540*x*exp(exp(x)^2-2*exp(x)+1)+324*x^2),x, algori
thm=\
```

output
```
integrate(-40/9*(2*x*e^(2*x) - 2*x*e^x - 1)*e^(e^(2*x) - 2*e^x + 1)/(36*x^
2 - 60*x*e^(e^(2*x) - 2*e^x + 1) + 25*e^(2*e^(2*x) - 4*e^x + 2)), x)
```

3.1115.9 Mupad [B] (verification not implemented)

Time = 17.53 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{e^{1-2e^x+e^{2x}}(40+80e^x x-80e^{2x}x)}{225e^{2-4e^x+2e^{2x}}-540e^{1-2e^x+e^{2x}}x+324x^2}\,dx=-\frac{8\,x}{9\,\left(6\,x-5\,\mathrm{e}\,\mathrm{e}^{\mathrm{e}^{2\,x}}\,\mathrm{e}^{-2\,\mathrm{e}^x}\right)}$$

input
```
int((exp(exp(2*x) - 2*exp(x) + 1)*(80*x*exp(x) - 80*x*exp(2*x) + 40))/(225
*exp(2*exp(2*x) - 4*exp(x) + 2) - 540*x*exp(exp(2*x) - 2*exp(x) + 1) + 324
*x^2),x)
```

output
```
-(8*x)/(9*(6*x - 5*exp(1)*exp(exp(2*x))*exp(-2*exp(x))))
```

3.1116 $\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-45824}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}}{51200000+51200000x+204}$

3.1116.1 Optimal result

Integrand size = 103, antiderivative size = 31

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-2864}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384}$$
$$=e^{2+3x+x^2-\left(-5-x+\frac{x^2}{256(5+x)^2}\right)^2}$$

output
```
exp(3*x+x^2+2-(1/256*x^2/(5+x)^2-5-x)^2)
```

3.1116.2 Mathematica [A] (verified)

Time = 1.28 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.16

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-2864}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384}$$
$$=e^{-\frac{942080000+1040384000x+455411200x^2+98920960x^3+10674689x^4+458240x^5}{65536(5+x)^4}}$$

input
```
Integrate[(E^((-942080000 - 1040384000*x - 455411200*x^2 - 98920960*x^3 -
10674689*x^4 - 458240*x^5)/(40960000 + 32768000*x + 9830400*x^2 + 1310720*
x^3 + 65536*x^4))*(-358400000 - 358240000*x - 143248000*x^2 - 28643205*x^3
 - 2864000*x^4 - 114560*x^5))/(51200000 + 51200000*x + 20480000*x^2 + 4096
000*x^3 + 409600*x^4 + 16384*x^5),x]
```

3.1116.

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-28643205x^3-2864000x^4-11}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384x^5}$$

output
```
E^(-1/65536*(942080000 + 1040384000*x + 455411200*x^2 + 98920960*x^3 + 106
74689*x^4 + 458240*x^5)/(5 + x)^4)
```

3.1116.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-114560x^5-2864000x^4-28643205x^3-143248000x^2-358240000x-358400000\right)\exp\left(\frac{-458240x^5-10674689x^4}{65536x^4+13}\right.}{16384x^5+409600x^4+4096000x^3+20480000x^2+51200000x+5120}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{\left(-114560x^5-2864000x^4-28643205x^3-143248000x^2-358240000x-358400000\right)\exp\left(\frac{-458240x^5-10674689x^4}{65536x^4+13}\right.}{\left(4\ 2^{4/5}x+20\ 2^{4/5}\right)^5}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{5\left(-22912x^5-572800x^4-5728641x^3-28649600x^2-71648000x-71680000\right)\exp\left(\frac{-458240x^5-10674689x^4-9892}{65536x^4+1310720x}\right.}{\left(4\ 2^{4/5}x+20\ 2^{4/5}\right)^5}$$

$$\Big\downarrow \text{27}$$

$$5\int -\frac{\exp\left(-\frac{458240x^5+10674689x^4+98920960x^3+455411200x^2+1040384000x+942080000}{65536(x^4+20x^3+150x^2+500x+625)}\right)\left(22912x^5+572800x^4+5728641x^3\right.}{16384(x+5)^5}$$

$$\Big\downarrow \text{27}$$

$$-\frac{5\int \frac{\exp\left(-\frac{458240x^5+10674689x^4+98920960x^3+455411200x^2+1040384000x+942080000}{65536\left(x^4+20x^3+150x^2+500x+625\right)}\right)\left(22912x^5+572800x^4+5728641x^3+28649600x^2+71648000x\right.}{(x+5)^5}}{16384}$$

$$\Big\downarrow \text{7293}$$

$$-\frac{5\int \left(22912\exp\left(-\frac{458240x^5+10674689x^4+98920960x^3+455411200x^2+1040384000x+942080000}{65536(x^4+20x^3+150x^2+500x+625)}\right)+\frac{641\exp\left(-\frac{458240x^5+10674689x^4+}{6553}\right.}{}\right.}{}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{5\left(22912\int \exp\left(-\frac{458240x^5+10674689x^4+98920960x^3+455411200x^2+1040384000x+942080000}{65536(x^4+20x^3+150x^2+500x+625)}\right)dx-125\int \frac{\exp\left(-\frac{458240x^5+10674}{}\right.}{}\right.}{}$$

input
```
Int[(E^((-942080000 - 1040384000*x - 455411200*x^2 - 98920960*x^3 - 106746
89*x^4 - 458240*x^5)/(40960000 + 32768000*x + 9830400*x^2 + 1310720*x^3 +
65536*x^4))*(-358400000 - 358240000*x - 143248000*x^2 - 28643205*x^3 - 286
4000*x^4 - 114560*x^5))/(51200000 + 51200000*x + 20480000*x^2 + 4096000*x^
3 + 409600*x^4 + 16384*x^5),x]
```

output
```
$Aborted
```

3.1116.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1116.

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}\left(-358400000-358240000x-143248000x^2-28643205x^3-2864000x^4-11\right.}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384x^5}$$

3.1116.4 Maple [A] (verified)

Time = 0.84 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.58

$$e^{-\frac{458240x^5+10674689x^4+98920960x^3+455411200x^2+1040384000x+942080000}{65536\left(x^4+20x^3+150x^2+500x+625\right)}}$$

input
```
int((-114560*x^5-2864000*x^4-28643205*x^3-143248000*x^2-358240000*x-358400
000)*exp((-458240*x^5-10674689*x^4-98920960*x^3-455411200*x^2-1040384000*x
-942080000)/(65536*x^4+1310720*x^3+9830400*x^2+32768000*x+40960000))/(1638
4*x^5+409600*x^4+4096000*x^3+20480000*x^2+51200000*x+51200000),x)
```

output
```
exp(-1/65536*(458240*x^5+10674689*x^4+98920960*x^3+455411200*x^2+104038400
0*x+942080000)/(x^4+20*x^3+150*x^2+500*x+625))
```

3.1116.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.55

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-2864}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384}$$
$$= e^{\left(-\frac{458240\,x^5+10674689\,x^4+98920960\,x^3+455411200\,x^2+1040384000\,x+942080000}{65536\,\left(x^4+20\,x^3+150\,x^2+500\,x+625\right)}\right)}$$

input
```
integrate((-114560*x^5-2864000*x^4-28643205*x^3-143248000*x^2-358240000*x-
358400000)*exp((-458240*x^5-10674689*x^4-98920960*x^3-455411200*x^2-104038
4000*x-942080000)/(65536*x^4+1310720*x^3+9830400*x^2+32768000*x+40960000))
/(16384*x^5+409600*x^4+4096000*x^3+20480000*x^2+51200000*x+51200000),x, al
gorithm=\
```

output
```
e^(-1/65536*(458240*x^5 + 10674689*x^4 + 98920960*x^3 + 455411200*x^2 + 10
40384000*x + 942080000)/(x^4 + 20*x^3 + 150*x^2 + 500*x + 625))
```

3.1116.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.55

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-2864}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384}$$
$$= e^{\frac{-458240x^5-10674689x^4-98920960x^3-455411200x^2-1040384000x-942080000}{65536x^4+1310720x^3+9830400x^2+32768000x+40960000}}$$

input
```
integrate((-114560*x**5-2864000*x**4-28643205*x**3-143248000*x**2-35824000
0*x-358400000)*exp((-458240*x**5-10674689*x**4-98920960*x**3-455411200*x**
2-1040384000*x-942080000)/(65536*x**4+1310720*x**3+9830400*x**2+32768000*x
+40960000))/(16384*x**5+409600*x**4+4096000*x**3+20480000*x**2+51200000*x+
51200000),x)
```

output
```
exp((-458240*x**5 - 10674689*x**4 - 98920960*x**3 - 455411200*x**2 - 10403
84000*x - 942080000)/(65536*x**4 + 1310720*x**3 + 9830400*x**2 + 32768000*
x + 40960000))
```

3.1116.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. $2(28) = 56$.

Time = 2.91 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.06

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-2864}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384}$$
$$= e^{\left(-\frac{895}{128}x-\frac{625}{65536\left(x^4+20x^3+150x^2+500x+625\right)}+\frac{125}{16384\left(x^3+15x^2+75x+125\right)}-\frac{75}{32768\left(x^2+10x+25\right)}+\frac{3205}{16384(x+5)}-\frac{1509889}{65536}\right)}$$

input
```
integrate((-114560*x^5-2864000*x^4-28643205*x^3-143248000*x^2-358240000*x-
358400000)*exp((-458240*x^5-10674689*x^4-98920960*x^3-455411200*x^2-104038
4000*x-942080000)/(65536*x^4+1310720*x^3+9830400*x^2+32768000*x+40960000))
/(16384*x^5+409600*x^4+4096000*x^3+20480000*x^2+51200000*x+51200000),x, al
gorithm=\
```

output
```
e^(-895/128*x - 625/65536/(x^4 + 20*x^3 + 150*x^2 + 500*x + 625) + 125/163
84/(x^3 + 15*x^2 + 75*x + 125) - 75/32768/(x^2 + 10*x + 25) + 3205/16384/(
x + 5) - 1509889/65536)
```

3.1116.

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-28643205x^3-2864000x^4-11}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384x^5}$$

3.1116.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 147 vs. $2(28) = 56$.

Time = 0.29 (sec) , antiderivative size = 147, normalized size of antiderivative = 4.74

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-2864\ldots}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384\ldots}$$

$$=e^{\left(-\frac{895\,x^5}{128\,(x^4+20\,x^3+150\,x^2+500\,x+625)}-\frac{10674689\,x^4}{65536\,(x^4+20\,x^3+150\,x^2+500\,x+625)}-\frac{193205\,x^3}{128\,(x^4+20\,x^3+150\,x^2+500\,x+625)}-\frac{889475\,x^2}{128\,(x^4+20\,x^3+150\,x^2+500\,x+625)}\ldots\right.}$$

input
```
integrate((-114560*x^5-2864000*x^4-28643205*x^3-143248000*x^2-358240000*x-
358400000)*exp((-458240*x^5-10674689*x^4-98920960*x^3-455411200*x^2-104038
4000*x-942080000)/(65536*x^4+1310720*x^3+9830400*x^2+32768000*x+40960000))
/(16384*x^5+409600*x^4+4096000*x^3+20480000*x^2+51200000*x+51200000),x, al
gorithm=\
```

output
```
e^(-895/128*x^5/(x^4 + 20*x^3 + 150*x^2 + 500*x + 625) - 10674689/65536*x^
4/(x^4 + 20*x^3 + 150*x^2 + 500*x + 625) - 193205/128*x^3/(x^4 + 20*x^3 +
150*x^2 + 500*x + 625) - 889475/128*x^2/(x^4 + 20*x^3 + 150*x^2 + 500*x +
625) - 15875*x/(x^4 + 20*x^3 + 150*x^2 + 500*x + 625) - 14375/(x^4 + 20*x^
3 + 150*x^2 + 500*x + 625))
```

3.1116.9 Mupad [B] (verification not implemented)

Time = 17.29 (sec) , antiderivative size = 160, normalized size of antiderivative = 5.16

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-2864\ldots}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384\ldots}$$

$$=e^{-\frac{15875\,x}{x^4+20\,x^3+150\,x^2+500\,x+625}}\,e^{-\frac{14375}{x^4+20\,x^3+150\,x^2+500\,x+625}}\,e^{-\frac{895\,x^5}{128\,x^4+2560\,x^3+19200\,x^2+64000\,x+80000}}\,e^{-\frac{193205\,x^3}{128\,x^4+2560\,x^3+19200\,x^2+64000\,x+8000\ldots}}$$

input
```
int(-(exp(-(1040384000*x + 455411200*x^2 + 98920960*x^3 + 10674689*x^4 + 4
58240*x^5 + 942080000)/(32768000*x + 9830400*x^2 + 1310720*x^3 + 65536*x^4
 + 40960000))*(358240000*x + 143248000*x^2 + 28643205*x^3 + 2864000*x^4 +
114560*x^5 + 358400000))/(51200000*x + 20480000*x^2 + 4096000*x^3 + 409600
*x^4 + 16384*x^5 + 51200000),x)
```

3.1116.

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}(-358400000-358240000x-143248000x^2-28643205x^3-2864000x^4-11\ldots}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384x^5}$$

output

```
exp(-(15875*x)/(500*x + 150*x^2 + 20*x^3 + x^4 + 625))*exp(-14375/(500*x +
 150*x^2 + 20*x^3 + x^4 + 625))*exp(-(895*x^5)/(64000*x + 19200*x^2 + 2560
*x^3 + 128*x^4 + 80000))*exp(-(193205*x^3)/(64000*x + 19200*x^2 + 2560*x^3
 + 128*x^4 + 80000))*exp(-(889475*x^2)/(64000*x + 19200*x^2 + 2560*x^3 + 1
28*x^4 + 80000))*exp(-(10674689*x^4)/(32768000*x + 9830400*x^2 + 1310720*x
^3 + 65536*x^4 + 40960000))
```

3.1116.

$$\int \frac{e^{\frac{-942080000-1040384000x-455411200x^2-98920960x^3-10674689x^4-458240x^5}{40960000+32768000x+9830400x^2+1310720x^3+65536x^4}}\left(-358400000-358240000x-143248000x^2-28643205x^3-2864000x^4-11\right.}{51200000+51200000x+20480000x^2+4096000x^3+409600x^4+16384x^5}$$

3.1117 $\int \frac{12x-24x^2+8x^3+3x^4+e^6(7-12x+3x^2+2x^3)+(26x-2}{-2+4x+4x^2-12x^3+5x^4+x^5+e^6(7x-13x^2+5x^3+x^4)+(-4+4x+13}$

3.1117.1 Optimal result

Integrand size = 206, antiderivative size = 26

$$\int \frac{12x-24x^2+8x^3+3x^4+e^6(7-12x+3x^2+2x^3)+(26x-22x^2-6x^3+e^6(14-10x}{-2+4x+4x^2-12x^3+5x^4+x^5+e^6(7x-13x^2+5x^3+x^4)+(-4+4x+13x^2-12x^3-2x^4+e^6(1}$$
$$=\log\left(-2+x\left((7+x)\left(e^6+x\right)+\frac{x}{-1+x-\log(3)}\right)\right)$$

output
```
ln(x*((exp(3)^2+x)*(x+7)+x/(x-ln(3)-1))-2)
```

3.1117.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 3 in optimal.

Time = 0.89 (sec) , antiderivative size = 1010, normalized size of antiderivative = 38.85

$$\int \frac{12x-24x^2+8x^3+3x^4+e^6(7-12x+3x^2+2x^3)+(26x-22x^2-6x^3+e^6(14-10x}{-2+4x+4x^2-12x^3+5x^4+x^5+e^6(7x-13x^2+5x^3+x^4)+(-4+4x+13x^2-12x^3-2x^4+e^6(1}$$
= Too large to display

input
```
Integrate[(12*x - 24*x^2 + 8*x^3 + 3*x^4 + E^6*(7 - 12*x + 3*x^2 + 2*x^3)
+ (26*x - 22*x^2 - 6*x^3 + E^6*(14 - 10*x - 4*x^2))*Log[3] + (14*x + 3*x^2
 + E^6*(7 + 2*x))*Log[3]^2)/(-2 + 4*x + 4*x^2 - 12*x^3 + 5*x^4 + x^5 + E^6
*(7*x - 13*x^2 + 5*x^3 + x^4) + (-4 + 4*x + 13*x^2 - 12*x^3 - 2*x^4 + E^6*
(14*x - 12*x^2 - 2*x^3))*Log[3] + (-2 + 7*x^2 + x^3 + E^6*(7*x + x^2))*Log
[3]^2),x]
```

output
```
-Log[-1 + x - Log[3]] + RootSum[1 + Log[3]^2 + Log[9] + 8*#1 + 8*E^6*#1 +
19*Log[3]*#1 + 9*E^6*Log[3]*#1 + 10*Log[3]^2*#1 + E^6*Log[3]^2*#1 + Log[3]
^3*#1 + 18*#1^2 + 9*E^6*#1^2 + 20*Log[3]*#1^2 + 3*Log[3]^2*#1^2 + E^6*Log[
9]*#1^2 + 10*#1^3 + E^6*#1^3 + Log[27]*#1^3 + #1^4 & , (8*Log[-1 + x - Log
[3] - #1] + 8*E^6*Log[-1 + x - Log[3] - #1] + 35*Log[3]*Log[-1 + x - Log[3
] - #1] + 25*E^6*Log[3]*Log[-1 + x - Log[3] - #1] + 56*Log[3]^2*Log[-1 + x
 - Log[3] - #1] + 27*E^6*Log[3]^2*Log[-1 + x - Log[3] - #1] + 40*Log[3]^3*
Log[-1 + x - Log[3] - #1] + 11*E^6*Log[3]^3*Log[-1 + x - Log[3] - #1] + 12
*Log[3]^4*Log[-1 + x - Log[3] - #1] + E^6*Log[3]^4*Log[-1 + x - Log[3] - #
1] + Log[3]^5*Log[-1 + x - Log[3] - #1] + 36*Log[-1 + x - Log[3] - #1]*#1
+ 18*E^6*Log[-1 + x - Log[3] - #1]*#1 + 76*Log[3]*Log[-1 + x - Log[3] - #1
]*#1 + 22*E^6*Log[3]*Log[-1 + x - Log[3] - #1]*#1 + 82*Log[3]^2*Log[-1 + x
 - Log[3] - #1]*#1 + 22*E^6*Log[3]^2*Log[-1 + x - Log[3] - #1]*#1 + 46*Log
[3]^3*Log[-1 + x - Log[3] - #1]*#1 + 4*E^6*Log[3]^3*Log[-1 + x - Log[3] -
#1]*#1 + 6*Log[3]^4*Log[-1 + x - Log[3] - #1]*#1 + 18*Log[9]*Log[-1 + x -
Log[3] - #1]*#1 + 9*E^6*Log[9]*Log[-1 + x - Log[3] - #1]*#1 + 20*Log[3]*Lo
g[9]*Log[-1 + x - Log[3] - #1]*#1 + 3*Log[3]^2*Log[9]*Log[-1 + x - Log[3]
- #1]*#1 + E^6*Log[9]^2*Log[-1 + x - Log[3] - #1]*#1 + 30*Log[-1 + x - Log
[3] - #1]*#1^2 + 3*E^6*Log[-1 + x - Log[3] - #1]*#1^2 + 29*Log[3]*Log[-1 +
 x - Log[3] - #1]*#1^2 + 36*Log[3]^2*Log[-1 + x - Log[3] - #1]*#1^2 + 3...
```

3.1117.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 68 vs. $2(26) = 52$.

Time = 0.58 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.62, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.010$, Rules used = {2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^4+8x^3-24x^2+\left(3x^2+14x+e^6(2x+7)\right)\log^2(3)+e^6\left(2x^3+3x^2-12x+7\right)+\left(-6x^3-22x^2\right.}{x^5+5x^4-12x^3+4x^2+\left(x^3+7x^2+e^6\left(x^2+7x\right)-2\right)\log^2(3)+e^6\left(x^4+5x^3-13x^2+7x\right)+\left(-2x^4-12x^3+\right.}$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{4x^3+3x^2\left(6+e^6-\log(3)\right)-2x\left(6-e^6(6-\log(3))+7\log(3)\right)-2-7e^6(1+\log(3))}{x^4+x^3\left(6+e^6-\log(3)\right)-x^2\left(6-e^6(6-\log(3))+7\log(3)\right)-x\left(2+7e^6(1+\log(3))\right)+2+\log(9)}+\frac{}{-x+}\right.$$

$$\Big\downarrow \text{2009}$$

3.1117. $\int \frac{12x-24x^2+8x^3+3x^4+e^6(7-12x+3x^2+2x^3)+(26x-22x^2-6x^3+e^6(14-10x-4x^2))\log(3)+(14x+3x^2+e^6(7+2x))\log^2(3)}{-2+4x+4x^2-12x^3+5x^4+x^5+e^6(7x-13x^2+5x^3+x^4)+(-4+4x+13x^2-12x^3-2x^4+e^6(14x-12x^2-2x^3))\log(3)+(-2+7x^2+x^3+e^6(7x+x^2))\log}$

$$\log\left(x^4 + x^3\left(6 + e^6 - \log(3)\right) - x^2\left(6 - e^6(6 - \log(3)) + 7\log(3)\right) - x\left(2 + 7e^6(1 + \log(3))\right) + 2 + \log(9)\right) - \log(-x + 1 + \log(3))$$

input
```
Int[(12*x - 24*x^2 + 8*x^3 + 3*x^4 + E^6*(7 - 12*x + 3*x^2 + 2*x^3) + (26*
x - 22*x^2 - 6*x^3 + E^6*(14 - 10*x - 4*x^2))*Log[3] + (14*x + 3*x^2 + E^6
*(7 + 2*x))*Log[3]^2)/(-2 + 4*x + 4*x^2 - 12*x^3 + 5*x^4 + x^5 + E^6*(7*x
- 13*x^2 + 5*x^3 + x^4) + (-4 + 4*x + 13*x^2 - 12*x^3 - 2*x^4 + E^6*(14*x
- 12*x^2 - 2*x^3))*Log[3] + (-2 + 7*x^2 + x^3 + E^6*(7*x + x^2))*Log[3]^2)
,x]
```

output
```
-Log[1 - x + Log[3]] + Log[2 + x^4 + x^3*(6 + E^6 - Log[3]) - x^2*(6 - E^6
*(6 - Log[3]) + 7*Log[3]) - x*(2 + 7*E^6*(1 + Log[3])) + Log[9]]
```

3.1117.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.1117.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(27) = 54$.

Time = 0.88 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.62

method	result
risch	$-\ln(1+\ln(3)-x)+\ln\left(x^4+(-\ln(3)+e^6+6)x^3+(-e^6\ln(3)-7\ln(3)+6e^6-6)x^2\right.$
default	$-\ln(x-\ln(3)-1)+\ln\left(-x^2e^6\ln(3)+x^3e^6-x^3\ln(3)+x^4-7xe^6\ln(3)+6x^2e^6-7x^2\right.$
parallelrisch	$-\ln(x-\ln(3)-1)+\ln\left(-x^2e^6\ln(3)+x^3e^6-x^3\ln(3)+x^4-7xe^6\ln(3)+6x^2e^6-7x^2\right.$
norman	$-\ln(1+\ln(3)-x)+\ln\left(x^2e^6\ln(3)-x^3e^6+x^3\ln(3)-x^4+7xe^6\ln(3)-6x^2e^6+7x^2\ln\right.$

3.1117.
$$\int \frac{12x-24x^2+8x^3+3x^4+e^6(7-12x+3x^2+2x^3)+(26x-22x^2-6x^3+e^6(14-10x-4x^2))\log(3)+(14x+3x^2+e^6(7+2x))\log^2(3)}{-2+4x+4x^2-12x^3+5x^4+x^5+e^6(7x-13x^2+5x^3+x^4)+(-4+4x+13x^2-12x^3-2x^4+e^6(14x-12x^2-2x^3))\log(3)+(-2+7x^2+x^3+e^6(7x+x^2))\log}$$

input
```
int((((2*x+7)*exp(3)^2+3*x^2+14*x)*ln(3)^2+((-4*x^2-10*x+14)*exp(3)^2-6*x^
3-22*x^2+26*x)*ln(3)+(2*x^3+3*x^2-12*x+7)*exp(3)^2+3*x^4+8*x^3-24*x^2+12*x
)/(((x^2+7*x)*exp(3)^2+x^3+7*x^2-2)*ln(3)^2+((-2*x^3-12*x^2+14*x)*exp(3)^2
-2*x^4-12*x^3+13*x^2+4*x-4)*ln(3)+(x^4+5*x^3-13*x^2+7*x)*exp(3)^2+x^5+5*x^
4-12*x^3+4*x^2+4*x-2),x,method=_RETURNVERBOSE)
```

output
```
-ln(1+ln(3)-x)+ln(x^4+(-ln(3)+exp(6)+6)*x^3+(-exp(6)*ln(3)-7*ln(3)+6*exp(6
)-6)*x^2+(-7*exp(6)*ln(3)-7*exp(6)-2)*x+2*ln(3)+2)
```

3.1117.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. 2(25) = 50.

Time = 0.28 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.65

$$\int \frac{12x - 24x^2 + 8x^3 + 3x^4 + e^6(7 - 12x + 3x^2 + 2x^3) + (26x - 22x^2 - 6x^3 + e^6(14 - 10x}{-2 + 4x + 4x^2 - 12x^3 + 5x^4 + x^5 + e^6 (7x - 13x^2 + 5x^3 + x^4) + (-4 + 4x + 13x^2 - 12x^3 - 2x^4 + e^6 (1}$$
$$= \log \left(x^4+6x^3-6x^2+\left(x^3+6x^2-7x\right)e^6-\left(x^3+7x^2+\left(x^2+7x\right)e^6-2\right)\log(3)-2x+2\right) - \log(x-\log(3)-1)$$

input
```
integrate((((2*x+7)*exp(3)^2+3*x^2+14*x)*log(3)^2+((-4*x^2-10*x+14)*exp(3)
^2-6*x^3-22*x^2+26*x)*log(3)+(2*x^3+3*x^2-12*x+7)*exp(3)^2+3*x^4+8*x^3-24*
x^2+12*x)/(((x^2+7*x)*exp(3)^2+x^3+7*x^2-2)*log(3)^2+((-2*x^3-12*x^2+14*x)
*exp(3)^2-2*x^4-12*x^3+13*x^2+4*x-4)*log(3)+(x^4+5*x^3-13*x^2+7*x)*exp(3)^
2+x^5+5*x^4-12*x^3+4*x^2+4*x-2),x, algorithm=\
```

output
```
log(x^4 + 6*x^3 - 6*x^2 + (x^3 + 6*x^2 - 7*x)*e^6 - (x^3 + 7*x^2 + (x^2 +
7*x)*e^6 - 2)*log(3) - 2*x + 2) - log(x - log(3) - 1)
```

3.1117.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. 2(20) = 40.

Time = 128.69 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.73

$$\int \frac{12x - 24x^2 + 8x^3 + 3x^4 + e^6(7 - 12x + 3x^2 + 2x^3) + (26x - 22x^2 - 6x^3 + e^6(14 - 10x}{-2 + 4x + 4x^2 - 12x^3 + 5x^4 + x^5 + e^6 (7x - 13x^2 + 5x^3 + x^4) + (-4 + 4x + 13x^2 - 12x^3 - 2x^4 + e^6 (1}$$
$$= -\log(x-\log(3)-1) + \log\left(x^4 + x^3\left(-\log(3)+6+e^6\right) + x^2\left(-e^6\log(3) - 7\log(3) - 6 + 6e^6\right) + x\left(-7e^6\log(3) - 7e^6 - 2\right) + \right.$$

3.1117.
$$\int \frac{12x-24x^2+8x^3+3x^4+e^6(7-12x+3x^2+2x^3)+(26x-22x^2-6x^3+e^6(14-10x-4x^2))\log(3)+(14x+3x^2+e^6(7+2x))\log^2(3)}{-2+4x+4x^2-12x^3+5x^4+x^5+e^6(7x-13x^2+5x^3+x^4)+(-4+4x+13x^2-12x^3-2x^4+e^6(14x-12x^2-2x^3))\log(3)+(-2+7x^2+x^3+e^6(7x+x^2))\log}$$

input
```
integrate((((2*x+7)*exp(3)**2+3*x**2+14*x)*ln(3)**2+((-4*x**2-10*x+14)*exp
(3)**2-6*x**3-22*x**2+26*x)*ln(3)+(2*x**3+3*x**2-12*x+7)*exp(3)**2+3*x**4+
8*x**3-24*x**2+12*x)/((((x**2+7*x)*exp(3)**2+x**3+7*x**2-2)*ln(3)**2+((-2*x
**3-12*x**2+14*x)*exp(3)**2-2*x**4-12*x**3+13*x**2+4*x-4)*ln(3)+(x**4+5*x*
*3-13*x**2+7*x)*exp(3)**2+x**5+5*x**4-12*x**3+4*x**2+4*x-2),x)
```

output
```
-log(x - log(3) - 1) + log(x**4 + x**3*(-log(3) + 6 + exp(6)) + x**2*(-exp
(6)*log(3) - 7*log(3) - 6 + 6*exp(6)) + x*(-7*exp(6)*log(3) - 7*exp(6) - 2
) + 2 + 2*log(3))
```

3.1117.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(25) = 50$.

Time = 0.22 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.54

$$\int \frac{12x - 24x^2 + 8x^3 + 3x^4 + e^6(7 - 12x + 3x^2 + 2x^3) + (26x - 22x^2 - 6x^3 + e^6(14 - 10x}{-2 + 4x + 4x^2 - 12x^3 + 5x^4 + x^5 + e^6(7x - 13x^2 + 5x^3 + x^4) + (-4 + 4x + 13x^2 - 12x^3 - 2x^4 + e^6(1}$$
$$= \log\left(x^4 + x^3\left(e^6 - \log(3) + 6\right) - \left(\left(e^6 + 7\right)\log(3) - 6e^6 + 6\right)x^2 - \left(7e^6\log(3) + 7e^6 + 2\right)x + 2\log(3) + 2\right) - \log(x - \log(3) - 1)$$

input
```
integrate((((2*x+7)*exp(3)^2+3*x^2+14*x)*log(3)^2+((-4*x^2-10*x+14)*exp(3)
^2-6*x^3-22*x^2+26*x)*log(3)+(2*x^3+3*x^2-12*x+7)*exp(3)^2+3*x^4+8*x^3-24*
x^2+12*x)/((((x^2+7*x)*exp(3)^2+x^3+7*x^2-2)*log(3)^2+((-2*x^3-12*x^2+14*x)
*exp(3)^2-2*x^4-12*x^3+13*x^2+4*x-4)*log(3)+(x^4+5*x^3-13*x^2+7*x)*exp(3)^
2+x^5+5*x^4-12*x^3+4*x^2+4*x-2),x, algorithm=\
```

output
```
log(x^4 + x^3*(e^6 - log(3) + 6) - ((e^6 + 7)*log(3) - 6*e^6 + 6)*x^2 - (7
*e^6*log(3) + 7*e^6 + 2)*x + 2*log(3) + 2) - log(x - log(3) - 1)
```

3.1117.8 Giac [F(-1)]

Timed out.

$$\int \frac{12x - 24x^2 + 8x^3 + 3x^4 + e^6(7 - 12x + 3x^2 + 2x^3) + (26x - 22x^2 - 6x^3 + e^6(14 - 10x}{-2 + 4x + 4x^2 - 12x^3 + 5x^4 + x^5 + e^6(7x - 13x^2 + 5x^3 + x^4) + (-4 + 4x + 13x^2 - 12x^3 - 2x^4 + e^6(1}$$
$$= \text{Timed out}$$

input
```
integrate((((2*x+7)*exp(3)^2+3*x^2+14*x)*log(3)^2+((-4*x^2-10*x+14)*exp(3)
^2-6*x^3-22*x^2+26*x)*log(3)+(2*x^3+3*x^2-12*x+7)*exp(3)^2+3*x^4+8*x^3-24*
x^2+12*x)/(((x^2+7*x)*exp(3)^2+x^3+7*x^2-2)*log(3)^2+((-2*x^3-12*x^2+14*x)
*exp(3)^2-2*x^4-12*x^3+13*x^2+4*x-4)*log(3)+(x^4+5*x^3-13*x^2+7*x)*exp(3)^
2+x^5+5*x^4-12*x^3+4*x^2+4*x-2),x, algorithm=\
```

output
```
Timed out
```

3.1117.9 Mupad [F(-1)]

Timed out.

$$\int \frac{12x-24x^2+8x^3+3x^4+e^6(7-12x+3x^2+2x^3)+(26x-22x^2-6x^3+e^6(14-10x}{-2+4x+4x^2-12x^3+5x^4+x^5+e^6(7x-13x^2+5x^3+x^4)+(-4+4x+13x^2-12x^3-2x^4+e^6(1}$$
$= \text{Hanged}$

input
```
int((12*x + exp(6)*(3*x^2 - 12*x + 2*x^3 + 7) + log(3)^2*(14*x + 3*x^2 + e
xp(6)*(2*x + 7)) - log(3)*(exp(6)*(10*x + 4*x^2 - 14) - 26*x + 22*x^2 + 6*
x^3) - 24*x^2 + 8*x^3 + 3*x^4)/(4*x - log(3)*(exp(6)*(12*x^2 - 14*x + 2*x^
3) - 4*x - 13*x^2 + 12*x^3 + 2*x^4 + 4) + exp(6)*(7*x - 13*x^2 + 5*x^3 + x
^4) + log(3)^2*(exp(6)*(7*x + x^2) + 7*x^2 + x^3 - 2) + 4*x^2 - 12*x^3 + 5
*x^4 + x^5 - 2),x)
```

output
```
\text{Hanged}
```

3.1118 $\int \frac{10x^2+2e^3x^3+2e^3\log(x)-e^3\log^2(x)}{2e^3x^2\log(2)}\,dx$

3.1118.1 Optimal result

Integrand size = 44, antiderivative size = 29

$$\int \frac{10x^2+2e^3x^3+2e^3\log(x)-e^3\log^2(x)}{2e^3x^2\log(2)}\,dx = e+\frac{1+\left(\frac{5}{e^3}+x\right)^2+\frac{\log^2(x)}{x}}{2\log(2)}$$

output
```
exp(1)+1/2*(1+(x+5/exp(3))^2+ln(x)^2/x)/ln(2)
```

3.1118.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{10x^2+2e^3x^3+2e^3\log(x)-e^3\log^2(x)}{2e^3x^2\log(2)}\,dx = \frac{10x+e^3x^2+\frac{e^3\log^2(x)}{x}}{e^3\log(4)}$$

input
```
Integrate[(10*x^2 + 2*E^3*x^3 + 2*E^3*Log[x] - E^3*Log[x]^2)/(2*E^3*x^2*Lo
g[2]),x]
```

output
```
(10*x + E^3*x^2 + (E^3*Log[x]^2)/x)/(E^3*Log[4])
```

3.1118.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.24, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.068, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2e^3x^3+10x^2-e^3\log^2(x)+2e^3\log(x)}{2e^3x^2\log(2)}dx$$

$$\Big\downarrow \textbf{27}$$

$$\frac{\int \frac{2e^3x^3+10x^2-e^3\log^2(x)+2e^3\log(x)}{x^2}dx}{2e^3\log(2)}$$

$$\Big\downarrow \textbf{2010}$$

$$\frac{\int \left(-\frac{e^3\log^2(x)}{x^2}+\frac{2e^3\log(x)}{x^2}+2\left(e^3x+5\right)\right)dx}{2e^3\log(2)}$$

$$\Big\downarrow \textbf{2009}$$

$$\frac{\frac{(e^3x+5)^2}{e^3}+\frac{e^3\log^2(x)}{x}}{2e^3\log(2)}$$

input
```
Int[(10*x^2 + 2*E^3*x^3 + 2*E^3*Log[x] - E^3*Log[x]^2)/(2*E^3*x^2*Log[2]),
x]
```

output
```
((5 + E^3*x)^2/E^3 + (E^3*Log[x]^2)/x)/(2*E^3*Log[2])
```

3.1118.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1118.4 Maple [A] (verified)

Time = 0.43 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

method	result	size
risch	$\frac{\ln(x)^2}{2\ln(2)x}+\frac{x^2}{2\ln(2)}+\frac{5\,\mathrm{e}^{-3}x}{\ln(2)}$	33
parallelrisch	$\frac{\mathrm{e}^{-3}\left(x^3\mathrm{e}^3+\mathrm{e}^3\ln(x)^2+10x^2\right)}{2\ln(2)x}$	33
norman	$\frac{\frac{x^3}{2\ln(2)}+\frac{\ln(x)^2}{2\ln(2)}+\frac{5\,\mathrm{e}^{-3}x^2}{\ln(2)}}{x}$	38
default	$\frac{\mathrm{e}^{-3}\left(x^2\mathrm{e}^3-\mathrm{e}^3\left(-\frac{\ln(x)^2}{x}-\frac{2\ln(x)}{x}-\frac{2}{x}\right)+2\,\mathrm{e}^3\left(-\frac{\ln(x)}{x}-\frac{1}{x}\right)+10x\right)}{2\ln(2)}$	64
parts	$\frac{x^2}{2\ln(2)}+\frac{5\,\mathrm{e}^{-3}x}{\ln(2)}+\frac{-\frac{\ln(x)}{x}-\frac{1}{x}}{\ln(2)}-\frac{-\frac{\ln(x)^2}{x}-\frac{2\ln(x)}{x}-\frac{2}{x}}{2\ln(2)}$	68

input
```
int(1/2*(-exp(3)*ln(x)^2+2*ln(x)*exp(3)+2*x^3*exp(3)+10*x^2)/x^2/exp(3)/ln
(2),x,method=_RETURNVERBOSE)
```

output
```
1/2/ln(2)/x*ln(x)^2+1/2*x^2/ln(2)+5*exp(-3)/ln(2)*x
```

3.1118.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{10x^2+2e^3x^3+2e^3\log(x)-e^3\log^2(x)}{2e^3x^2\log(2)}\,dx=\frac{\left(x^3e^3+e^3\log\left(x\right)^2+10\,x^2\right)e^{(-3)}}{2\,x\log\left(2\right)}$$

input
```
integrate(1/2*(-exp(3)*log(x)^2+2*log(x)*exp(3)+2*x^3*exp(3)+10*x^2)/x^2/e
xp(3)/log(2),x, algorithm=\
```

output
```
1/2*(x^3*e^3 + e^3*log(x)^2 + 10*x^2)*e^(-3)/(x*log(2))
```

3.1118.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int \frac{10x^2+2e^3x^3+2e^3\log(x)-e^3\log^2(x)}{2e^3x^2\log(2)}\,dx=\frac{x^2}{2\log(2)}+\frac{5x}{e^3\log(2)}+\frac{\log(x)^2}{2x\log(2)}$$

input
```
integrate(1/2*(-exp(3)*ln(x)**2+2*ln(x)*exp(3)+2*x**3*exp(3)+10*x**2)/x**2
/exp(3)/ln(2),x)
```

output
```
x**2/(2*log(2)) + 5*x*exp(-3)/log(2) + log(x)**2/(2*x*log(2))
```

3.1118.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.66

$$\int \frac{10x^2+2e^3x^3+2e^3\log(x)-e^3\log^2(x)}{2e^3x^2\log(2)}\,dx$$
$$=\frac{\left(x^2e^3-2\left(\frac{\log(x)}{x}+\frac{1}{x}\right)e^3+10\,x+\frac{\left(\log(x)^2+2\,\log(x)+2\right)e^3}{x}\right)e^{(-3)}}{2\,\log(2)}$$

input
```
integrate(1/2*(-exp(3)*log(x)^2+2*log(x)*exp(3)+2*x^3*exp(3)+10*x^2)/x^2/e
xp(3)/log(2),x, algorithm=\
```

output
```
1/2*(x^2*e^3 - 2*(log(x)/x + 1/x)*e^3 + 10*x + (log(x)^2 + 2*log(x) + 2)*e
^3/x)*e^(-3)/log(2)
```

3.1118.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{10x^2+2e^3x^3+2e^3\log(x)-e^3\log^2(x)}{2e^3x^2\log(2)}\,dx=\frac{\left(x^3e^3+e^3\log(x)^2+10\,x^2\right)e^{(-3)}}{2\,x\log(2)}$$

input
```
integrate(1/2*(-exp(3)*log(x)^2+2*log(x)*exp(3)+2*x^3*exp(3)+10*x^2)/x^2/e
xp(3)/log(2),x, algorithm=\
```

output
```
1/2*(x^3*e^3 + e^3*log(x)^2 + 10*x^2)*e^(-3)/(x*log(2))
```

3.1118.9 Mupad [B] (verification not implemented)

Time = 16.69 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int \frac{10x^2+2e^3x^3+2e^3\log(x)-e^3\log^2(x)}{2e^3x^2\log(2)}\,dx = \frac{\ln\left(x\right)^2}{2\,x\,\ln\left(2\right)}+\frac{x\,\mathrm{e}^{-3}\,\left(x\,\mathrm{e}^3+10\right)}{2\,\ln\left(2\right)}$$

input
```
int((exp(-3)*(x^3*exp(3) - (exp(3)*log(x)^2)/2 + exp(3)*log(x) + 5*x^2))/(
x^2*log(2)),x)
```

output
```
log(x)^2/(2*x*log(2)) + (x*exp(-3)*(x*exp(3) + 10))/(2*log(2))
```

3.1119 $\int \frac{3x^2}{2\log(28)}\,dx$

3.1119.1 Optimal result

Integrand size = 11, antiderivative size = 11

$$\int \frac{3x^2}{2\log(28)}\,dx = \frac{x^3}{2\log(28)}$$

output
```
1/2*x^3/ln(28)
```

3.1119.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.00

$$\int \frac{3x^2}{2\log(28)}\,dx = \frac{x^3}{2\log(28)}$$

input
```
Integrate[(3*x^2)/(2*Log[28]),x]
```

output
```
x^3/(2*Log[28])
```

3.1119.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3x^2}{2\log(28)}\,dx$$

$$\Big\downarrow \ 15$$

$$\frac{x^3}{2\log(28)}$$

input
```
Int[(3*x^2)/(2*Log[28]),x]
```

output
```
x^3/(2*Log[28])
```

3.1119.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

3.1119.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

method	result	size
gosper	$\frac{x^3}{2\ln(28)}$	10
default	$\frac{x^3}{2\ln(28)}$	10
norman	$\frac{x^3}{2\ln(28)}$	10
parallelrisch	$\frac{x^3}{2\ln(28)}$	10
risch	$\frac{x^3}{4\ln(2)+2\ln(7)}$	15

input
```
int(3/2*x^2/ln(28),x,method=_RETURNVERBOSE)
```

output
```
1/2*x^3/ln(28)
```

3.1119.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.82

$$\int \frac{3x^2}{2\log(28)}\,dx = \frac{x^3}{2\,\log(28)}$$

input
```
integrate(3/2*x^2/log(28),x, algorithm=\
```

output
```
1/2*x^3/log(28)
```

3.1119.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.64

$$\int \frac{3x^2}{2\log(28)}\,dx = \frac{x^3}{2\log(28)}$$

input
```
integrate(3/2*x**2/ln(28),x)
```

output
```
x**3/(2*log(28))
```

3.1119.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.82

$$\int \frac{3x^2}{2\log(28)}\,dx = \frac{x^3}{2\,\log(28)}$$

input
```
integrate(3/2*x^2/log(28),x, algorithm=\
```

output
```
1/2*x^3/log(28)
```

3.1119.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.82

$$\int \frac{3x^2}{2\log(28)}\,dx = \frac{x^3}{2\,\log{(28)}}$$

input
```
integrate(3/2*x^2/log(28),x, algorithm=\
```

output
```
1/2*x^3/log(28)
```

3.1119.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.82

$$\int \frac{3x^2}{2\log(28)}\,dx = \frac{x^3}{2\,\ln{(28)}}$$

input
```
int((3*x^2)/(2*log(28)),x)
```

output
```
x^3/(2*log(28))
```

3.1120 $\int \frac{e^{11+x}(1+2\log(3))}{\log(3)}\,dx$

3.1120.1 Optimal result

Integrand size = 16, antiderivative size = 12

$$\int \frac{e^{11+x}(1+2\log(3))}{\log(3)}\,dx = e^{11+x}\left(2+\frac{1}{\log(3)}\right)$$

output
```
exp(11+ln(1/ln(3)+2)+x)
```

3.1120.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{e^{11+x}(1+2\log(3))}{\log(3)}\,dx = \frac{e^{11+x}(1+\log(9))}{\log(3)}$$

input
```
Integrate[(E^(11 + x)*(1 + 2*Log[3]))/Log[3],x]
```

output
```
(E^(11 + x)*(1 + Log[9]))/Log[3]
```

3.1120.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {27, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+11}(1+2\log(3))}{\log(3)}dx$$
$$\Big\downarrow \ 27$$
$$\frac{(1+\log(9))\int e^{x+11}dx}{\log(3)}$$
$$\Big\downarrow \ 2624$$
$$\frac{e^{x+11}(1+\log(9))}{\log(3)}$$

input
```
Int[(E^(11 + x)*(1 + 2*Log[3]))/Log[3],x]
```

output
```
(E^(11 + x)*(1 + Log[9]))/Log[3]
```

3.1120.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

3.1120.4 Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.42

method	result	size
gosper	$e^{\ln\left(\frac{2\ln(3)+1}{\ln(3)}\right)+11+x}$	17
derivativedivides	$e^{\ln\left(\frac{2\ln(3)+1}{\ln(3)}\right)+11+x}$	17
default	$e^{\ln\left(\frac{2\ln(3)+1}{\ln(3)}\right)+11+x}$	17
norman	$e^{\ln\left(\frac{2\ln(3)+1}{\ln(3)}\right)+11+x}$	17
risch	$2\,e^{11+x}+\frac{e^{11+x}}{\ln(3)}$	17
parallelrisch	$e^{\ln\left(\frac{2\ln(3)+1}{\ln(3)}\right)+11+x}$	17
meijerg	$-e^{\ln\left(\frac{2\ln(3)+1}{\ln(3)}\right)+11}(1-e^{x})$	24

input
```
int(exp(ln((2*ln(3)+1)/ln(3))+11+x),x,method=_RETURNVERBOSE)
```

output
```
exp(ln((2*ln(3)+1)/ln(3))+11+x)
```

3.1120.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.33

$$\int \frac{e^{11+x}(1+2\log(3))}{\log(3)}\,dx = e^{\left(x+\log\left(\frac{2\,\log(3)+1}{\log(3)}\right)+11\right)}$$

input
```
integrate(exp(log((2*log(3)+1)/log(3))+11+x),x, algorithm=\
```

output
```
e^(x + log((2*log(3) + 1)/log(3)) + 11)
```

3.1120.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{e^{11+x}(1+2\log(3))}{\log(3)}\,dx = \frac{(1+2\log(3))\,e^{x+11}}{\log(3)}$$

input
```
integrate(exp(ln((2*ln(3)+1)/ln(3))+11+x),x)
```

output
```
(1 + 2*log(3))*exp(x + 11)/log(3)
```

3.1120.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.25

$$\int \frac{e^{11+x}(1+2\log(3))}{\log(3)}\,dx = \frac{(2\,\log(3)+1)e^{(x+11)}}{\log(3)}$$

input
```
integrate(exp(log((2*log(3)+1)/log(3))+11+x),x, algorithm=\
```

output
```
(2*log(3) + 1)*e^(x + 11)/log(3)
```

3.1120.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.33

$$\int \frac{e^{11+x}(1+2\log(3))}{\log(3)}\,dx = e^{\left(x+\log\left(\frac{2\,\log(3)+1}{\log(3)}\right)+11\right)}$$

input
```
integrate(exp(log((2*log(3)+1)/log(3))+11+x),x, algorithm=\
```

output
```
e^(x + log((2*log(3) + 1)/log(3)) + 11)
```

3.1120.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.25

$$\int \frac{e^{11+x}(1+2\log(3))}{\log(3)}\,dx = \frac{\mathrm{e}^{11}\,\mathrm{e}^{x}\,(2\,\ln(3)+1)}{\ln(3)}$$

input
```
int(exp(x + log((2*log(3) + 1)/log(3)) + 11),x)
```

output
```
(exp(11)*exp(x)*(2*log(3) + 1))/log(3)
```

3.1121 $\int \frac{3+e^{5+x}(-18+6e+}{32+2e^2-16x+2x^2+e(-16+4x)+e^{5+x}(128+8e^2-64x+8x^2+e(-64}$

3.1121.1 Optimal result

Integrand size = 99, antiderivative size = 23

$$\int \frac{3+e^{5+x}(-18+6e+6x)}{32+2e^2-16x+2x^2+e(-16+4x)+e^{5+x}\left(128+8e^2-64x+8x^2+e(-64+16x)\right)+e^{10+2x}\left(128+8e\right.}$$
$$=\frac{3}{(2+4e^{5+x})\,(4-e-x)}$$

output
```
3/(4-x-exp(1))/(2+4*exp(5+x))
```

3.1121.2 Mathematica [A] (verified)

Time = 2.21 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{3+e^{5+x}(-18+6e+6x)}{32+2e^2-16x+2x^2+e(-16+4x)+e^{5+x}\left(128+8e^2-64x+8x^2+e(-64+16x)\right)+e^{10+2x}\left(128+8e\right.}$$
$$=-\frac{3}{2\,(1+2e^{5+x})\,(-4+e+x)}$$

input
```
Integrate[(3 + E^(5 + x)*(-18 + 6*E + 6*x))/(32 + 2*E^2 - 16*x + 2*x^2 + E
*(-16 + 4*x) + E^(5 + x)*(128 + 8*E^2 - 64*x + 8*x^2 + E*(-64 + 16*x)) + E
^(10 + 2*x)*(128 + 8*E^2 - 64*x + 8*x^2 + E*(-64 + 16*x))),x]
```

output
```
-3/(2*(1 + 2*E^(5 + x))*(-4 + E + x))
```

3.1121.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+5}(6x+6e-18)+3}{2x^2+e^{x+5}\left(8x^2-64x+e(16x-64)+8e^2+128\right)+e^{2x+10}\left(8x^2-64x+e(16x-64)+8e^2+128\right)-16x+e(}$$

$$\Big\downarrow \ 7239$$

$$\int \frac{6e^{x+5}(x-3)+6e^{x+6}+3}{2\left(2e^{x+5}+1\right)^2(-x-e+4)^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2}\int \frac{3\left(-2e^{x+5}(3-x)+2e^{x+6}+1\right)}{\left(1+2e^{x+5}\right)^2(-x-e+4)^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{3}{2}\int \frac{-2e^{x+5}(3-x)+2e^{x+6}+1}{\left(1+2e^{x+5}\right)^2(-x-e+4)^2}dx$$

$$\Big\downarrow \ 7293$$

$$\frac{3}{2}\int \left(\frac{x+e-3}{\left(1+2e^{x+5}\right)(x+e-4)^2}-\frac{1}{\left(1+2e^{x+5}\right)^2(x+e-4)}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{3}{2}\left(\int \frac{1}{\left(1+2e^{x+5}\right)(x+e-4)^2}dx-\int \frac{1}{\left(1+2e^{x+5}\right)^2(x+e-4)}dx+\int \frac{1}{\left(1+2e^{x+5}\right)(x+e-4)}dx\right)$$

input
```
Int[(3 + E^(5 + x)*(-18 + 6*E + 6*x))/(32 + 2*E^2 - 16*x + 2*x^2 + E*(-16
+ 4*x) + E^(5 + x)*(128 + 8*E^2 - 64*x + 8*x^2 + E*(-64 + 16*x)) + E^(10 +
 2*x)*(128 + 8*E^2 - 64*x + 8*x^2 + E*(-64 + 16*x))),x]
```

output
```
$Aborted
```

3.1121.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1121.4 Maple [A] (verified)

Time = 2.88 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

method	result	size
norman	$-\frac{3}{2(2\,\mathrm{e}^{5+x}+1)(x+\mathrm{e}-4)}$	20
risch	$-\frac{3}{2(2\,\mathrm{e}^{5+x}+1)(x+\mathrm{e}-4)}$	20
parallelrisch	$-\frac{3}{2(2\,\mathrm{e}^{5+x}+1)(x+\mathrm{e}-4)}$	20

input
```
int(((6*exp(1)+6*x-18)*exp(5+x)+3)/((8*exp(1)^2+(16*x-64)*exp(1)+8*x^2-64*
x+128)*exp(5+x)^2+(8*exp(1)^2+(16*x-64)*exp(1)+8*x^2-64*x+128)*exp(5+x)+2*
exp(1)^2+(4*x-16)*exp(1)+2*x^2-16*x+32),x,method=_RETURNVERBOSE)
```

output
```
-3/2/(2*exp(5+x)+1)/(x+exp(1)-4)
```

3.1121.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{3+e^{5+x}(-18+6e+6x)}{32+2e^2-16x+2x^2+e(-16+4x)+e^{5+x}\left(128+8e^2-64x+8x^2+e(-64+16x)\right)+e^{10+2x}\left(128+8e\right.}$$
$$=-\frac{3}{2\left(2\left(x+e-4\right)e^{(x+5)}+x+e-4\right)}$$

input
```
integrate(((6*exp(1)+6*x-18)*exp(5+x)+3)/((8*exp(1)^2+(16*x-64)*exp(1)+8*x
^2-64*x+128)*exp(5+x)^2+(8*exp(1)^2+(16*x-64)*exp(1)+8*x^2-64*x+128)*exp(5
+x)+2*exp(1)^2+(4*x-16)*exp(1)+2*x^2-16*x+32),x, algorithm=\
```

output
```
-3/2/(2*(x + e - 4)*e^(x + 5) + x + e - 4)
```

3.1121.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{3+e^{5+x}(-18+6e+6x)}{32+2e^2-16x+2x^2+e(-16+4x)+e^{5+x}\left(128+8e^2-64x+8x^2+e(-64+16x)\right)+e^{10+2x}\left(128+8e\right.}$$
$$=-\frac{3}{2x+\left(4x-16+4e\right)e^{x+5}-8+2e}$$

input
```
integrate(((6*exp(1)+6*x-18)*exp(5+x)+3)/((8*exp(1)**2+(16*x-64)*exp(1)+8*
x**2-64*x+128)*exp(5+x)**2+(8*exp(1)**2+(16*x-64)*exp(1)+8*x**2-64*x+128)*
exp(5+x)+2*exp(1)**2+(4*x-16)*exp(1)+2*x**2-16*x+32),x)
```

output
```
-3/(2*x + (4*x - 16 + 4*E)*exp(x + 5) - 8 + 2*E)
```

3.1121.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{3+e^{5+x}(-18+6e+6x)}{32+2e^2-16x+2x^2+e(-16+4x)+e^{5+x}\left(128+8e^2-64x+8x^2+e(-64+16x)\right)+e^{10+2x}\left(128+8e\right.}$$
$$=-\frac{3}{2\left(2\left(xe^5+e^6-4e^5\right)e^x+x+e-4\right)}$$

input
```
integrate(((6*exp(1)+6*x-18)*exp(5+x)+3)/((8*exp(1)^2+(16*x-64)*exp(1)+8*x
^2-64*x+128)*exp(5+x)^2+(8*exp(1)^2+(16*x-64)*exp(1)+8*x^2-64*x+128)*exp(5
+x)+2*exp(1)^2+(4*x-16)*exp(1)+2*x^2-16*x+32),x, algorithm=\
```

output
```
-3/2/(2*(x*e^5 + e^6 - 4*e^5)*e^x + x + e - 4)
```

3.1121.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \frac{3+e^{5+x}(-18+6e+6x)}{32+2e^2-16x+2x^2+e(-16+4x)+e^{5+x}\left(128+8e^2-64x+8x^2+e(-64+16x)\right)+e^{10+2x}(128+8e}$$
$$=-\frac{3}{2\left(2\left(x+5\right)e^{(x+5)}+x+e+2\,e^{(x+6)}-18\,e^{(x+5)}-4\right)}$$

input
```
integrate(((6*exp(1)+6*x-18)*exp(5+x)+3)/((8*exp(1)^2+(16*x-64)*exp(1)+8*x
^2-64*x+128)*exp(5+x)^2+(8*exp(1)^2+(16*x-64)*exp(1)+8*x^2-64*x+128)*exp(5
+x)+2*exp(1)^2+(4*x-16)*exp(1)+2*x^2-16*x+32),x, algorithm=\
```

output
```
-3/2/(2*(x + 5)*e^(x + 5) + x + e + 2*e^(x + 6) - 18*e^(x + 5) - 4)
```

3.1121.9 Mupad [B] (verification not implemented)

Time = 1.43 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.61

$$\int \frac{3+e^{5+x}(-18+6e+6x)}{32+2e^2-16x+2x^2+e(-16+4x)+e^{5+x}\left(128+8e^2-64x+8x^2+e(-64+16x)\right)+e^{10+2x}(128+8e}$$
$$=\frac{6\,\mathrm{e}^{x+5}+\frac{3\,x}{\mathrm{e}-4}+\frac{6\,x\,\mathrm{e}^{x+5}}{\mathrm{e}-4}}{2\,x-16\,\mathrm{e}^{x+5}+4\,\mathrm{e}^{x+6}+2\,\mathrm{e}+4\,x\,\mathrm{e}^{x+5}-8}$$

input
```
int((exp(x + 5)*(6*x + 6*exp(1) - 18) + 3)/(2*exp(2) - 16*x + exp(2*x + 10
)*(8*exp(2) - 64*x + 8*x^2 + exp(1)*(16*x - 64) + 128) + exp(x + 5)*(8*exp
(2) - 64*x + 8*x^2 + exp(1)*(16*x - 64) + 128) + 2*x^2 + exp(1)*(4*x - 16)
 + 32),x)
```

output
```
(6*exp(x + 5) + (3*x)/(exp(1) - 4) + (6*x*exp(x + 5))/(exp(1) - 4))/(2*x -
 16*exp(x + 5) + 4*exp(x + 6) + 2*exp(1) + 4*x*exp(x + 5) - 8)
```

3.1122 $\int \frac{(10-4x)(i\pi+\log(2))^2+e^{e^{3+x}+e^3x}(-2e^{3+x}x(i\pi+\log(2))^2+}{-125x^3+e^{3e^{3+x}+3e^3x}x^3+75x^4-15x^5+x^6+e^{2e^{3+x}+2e^3x}(-15x^3+3x}$

3.1122.1 Optimal result

Integrand size = 169, antiderivative size = 30

$$\int \frac{(10-4x)(i\pi+\log(2))^2+e^{e^{3+x}+e^3x}(-2e^{3+x}x(i\pi+\log(2))^2+(-2-2e^3x)(i\pi+\log(2))^2)}{-125x^3+e^{3e^{3+x}+3e^3x}x^3+75x^4-15x^5+x^6+e^{2e^{3+x}+2e^3x}(-15x^3+3x^4)+e^{e^{3+x}+e^3x}(75x^3-30x^4+3x^5)}$$
$$=\frac{(i\pi+\log(2))^2}{x^2\left(-5+e^{e^3(e^x+x)}+x\right)^2}$$

output
```
(ln(2)+I*Pi)^2/(exp((exp(x)+x)*exp(3))+x-5)^2/x^2
```

3.1122.2 Mathematica [A] (verified)

Time = 0.87 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

$$\int \frac{(10-4x)(i\pi+\log(2))^2+e^{e^{3+x}+e^3x}(-2e^{3+x}x(i\pi+\log(2))^2+(-2-2e^3x)(i\pi+\log(2))^2)}{-125x^3+e^{3e^{3+x}+3e^3x}x^3+75x^4-15x^5+x^6+e^{2e^{3+x}+2e^3x}(-15x^3+3x^4)+e^{e^{3+x}+e^3x}(75x^3-30x^4+3x^5)}$$
$$=-\frac{(\pi-i\log(2))^2}{x^2\left(-5+e^{e^{3+x}+e^3x}+x\right)^2}$$

input
```
Integrate[((10 - 4*x)*(I*Pi + Log[2])^2 + E^(E^(3 + x) + E^3*x)*(-2*E^(3 +
 x)*x*(I*Pi + Log[2])^2 + (-2 - 2*E^3*x)*(I*Pi + Log[2])^2))/(-125*x^3 + E
^(3*E^(3 + x) + 3*E^3*x)*x^3 + 75*x^4 - 15*x^5 + x^6 + E^(2*E^(3 + x) + 2*
E^3*x)*(-15*x^3 + 3*x^4) + E^(E^(3 + x) + E^3*x)*(75*x^3 - 30*x^4 + 3*x^5)
),x]
```

output
```
-((Pi - I*Log[2])^2/(x^2*(-5 + E^(E^(3 + x) + E^3*x) + x)^2))
```

3.1122.3 Rubi [A] (verified)

Time = 1.35 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.17, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.018$, Rules used = {7239, 27, 7238}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(10-4x)(\log(2)+i\pi)^2+e^{e^3x+e^{x+3}}\left(\left(-2e^3x-2\right)(\log(2)+i\pi)^2-2e^{x+3}x(\log(2)+i\pi)^2\right)}{x^6-15x^5+75x^4+e^{3e^3x+3e^{x+3}}x^3-125x^3+e^{2e^3x+2e^{x+3}}\left(3x^4-15x^3\right)+e^{e^3x+e^{x+3}}\left(3x^5-30x^4+75x^3\right)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2\left(-e^{e^3x+e^{x+3}+3}x-e^{e^3x+x+e^{x+3}+3}x-2x-e^{e^3(x+e^x)}+5\right)(\pi-i\log(2))^2}{\left(-x-e^{e^3(x+e^x)}+5\right)^3x^3}dx$$

$$\Big\downarrow \text{27}$$

$$2(\pi-i\log(2))^2\int \frac{-e^{e^3x+e^{x+3}+3}x-e^{e^3x+x+e^{x+3}+3}x-2x-e^{e^3(x+e^x)}+5}{\left(-x-e^{e^3(x+e^x)}+5\right)^3x^3}dx$$

$$\Big\downarrow \text{7238}$$

$$-\frac{(\pi-i\log(2))^2}{\left(-x-e^{e^3(x+e^x)}+5\right)^2x^2}$$

input
```
Int[((10 - 4*x)*(I*Pi + Log[2])^2 + E^(E^(3 + x) + E^3*x)*(-2*E^(3 + x)*x*
(I*Pi + Log[2])^2 + (-2 - 2*E^3*x)*(I*Pi + Log[2])^2))/(-125*x^3 + E^(3*E^
(3 + x) + 3*E^3*x)*x^3 + 75*x^4 - 15*x^5 + x^6 + E^(2*E^(3 + x) + 2*E^3*x)
*(-15*x^3 + 3*x^4) + E^(E^(3 + x) + E^3*x)*(75*x^3 - 30*x^4 + 3*x^5)),x]
```

output
```
-((Pi - I*Log[2])^2/((5 - E^(E^3*(E^x + x)) - x)^2*x^2))
```

3.1122.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7238
```
Int[(u_)*(y_)^(m_.)*(z_)^(n_.), x_Symbol] :> With[{q = DerivativeDivides[y*
z, u*z^(n - m), x]}, Simp[q*y^(m + 1)*(z^(m + 1)/(m + 1)), x] /;  !FalseQ[q
]] /; FreeQ[{m, n}, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1122.4 Maple [A] (verified)

Time = 2.03 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.23

method	result	size
risch	$-\frac{-2 i \pi \ln(2)+\pi^{2}-\ln(2)^{2}}{x^{2} \left({\mathrm e}^{{\mathrm e}^{3+x}+x \,{\mathrm e}^{3}}+x -5\right)^{2}}$	37
parallelrisch	$-\frac{-2 i \pi \ln(2)+\pi^{2}-\ln(2)^{2}}{x^{2} \left(x^{2}+2 \,{\mathrm e}^{\left({\mathrm e}^{x}+x \right) {\mathrm e}^{3}} x +{\mathrm e}^{2 \left({\mathrm e}^{x}+x \right) {\mathrm e}^{3}}-10 x -10 \,{\mathrm e}^{\left({\mathrm e}^{x}+x \right) {\mathrm e}^{3}}+25\right)}$	63

input
```
int(((-2*x*exp(3)*(ln(2)+I*Pi)^2*exp(x)+(-2*x*exp(3)-2)*(ln(2)+I*Pi)^2)*ex
p(exp(x)*exp(3)+x*exp(3))+(10-4*x)*(ln(2)+I*Pi)^2)/(x^3*exp(exp(x)*exp(3)+
x*exp(3))^3+(3*x^4-15*x^3)*exp(exp(x)*exp(3)+x*exp(3))^2+(3*x^5-30*x^4+75*
x^3)*exp(exp(x)*exp(3)+x*exp(3))+x^6-15*x^5+75*x^4-125*x^3),x,method=_RETU
RNVERBOSE)
```

output
```
-(-2*I*Pi*ln(2)+Pi^2-ln(2)^2)/x^2/(exp(exp(3+x)+x*exp(3))+x-5)^2
```

3.1122.5 Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(25) = 50$.

Time = 0.26 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.37

$$\int \frac{(10-4x)(i\pi+\log(2))^2+e^{e^{3+x}+e^3x}\left(-2e^{3+x}x(i\pi+\log(2))^2+(-2-2e^3x)\,(i\pi+\log(2))^2\right)}{-125x^3+e^{3e^{3+x}+3e^3x}x^3+75x^4-15x^5+x^6+e^{2e^{3+x}+2e^3x}\,(-15x^3+3x^4)+e^{e^{3+x}+e^3x}\,(75x^3-30x^4+3x^5)}$$
$$= -\frac{\pi^2-2i\,\pi\log(2)-\log(2)^2}{x^4-10\,x^3+x^2e^{\left(2\,xe^3+2\,e^{(x+3)}\right)}+25\,x^2+2\,(x^3-5\,x^2)e^{\left(xe^3+e^{(x+3)}\right)}}$$

input
```
integrate(((-2*x*exp(3)*(log(2)+I*pi)^2*exp(x)+(-2*x*exp(3)-2)*(log(2)+I*p
i)^2)*exp(exp(x)*exp(3)+x*exp(3))+(10-4*x)*(log(2)+I*pi)^2)/(x^3*exp(exp(x
)*exp(3)+x*exp(3))^3+(3*x^4-15*x^3)*exp(exp(x)*exp(3)+x*exp(3))^2+(3*x^5-3
0*x^4+75*x^3)*exp(exp(x)*exp(3)+x*exp(3))+x^6-15*x^5+75*x^4-125*x^3),x, al
gorithm=\
```

output
```
-(pi^2 - 2*I*pi*log(2) - log(2)^2)/(x^4 - 10*x^3 + x^2*e^(2*x*e^3 + 2*e^(x
 + 3)) + 25*x^2 + 2*(x^3 - 5*x^2)*e^(x*e^3 + e^(x + 3)))
```

3.1122.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(10-4x)(i\pi+\log(2))^2+e^{e^{3+x}+e^3x}\left(-2e^{3+x}x(i\pi+\log(2))^2+(-2-2e^3x)\,(i\pi+\log(2))^2\right)}{-125x^3+e^{3e^{3+x}+3e^3x}x^3+75x^4-15x^5+x^6+e^{2e^{3+x}+2e^3x}\,(-15x^3+3x^4)+e^{e^{3+x}+e^3x}\,(75x^3-30x^4+3x^5)}$$
$$= \text{Timed out}$$

input
```
integrate(((-2*x*exp(3)*(ln(2)+I*pi)**2*exp(x)+(-2*x*exp(3)-2)*(ln(2)+I*pi
)**2)*exp(exp(x)*exp(3)+x*exp(3))+(10-4*x)*(ln(2)+I*pi)**2)/(x**3*exp(exp(
x)*exp(3)+x*exp(3))**3+(3*x**4-15*x**3)*exp(exp(x)*exp(3)+x*exp(3))**2+(3*
x**5-30*x**4+75*x**3)*exp(exp(x)*exp(3)+x*exp(3))+x**6-15*x**5+75*x**4-125
*x**3),x)
```

output
```
Timed out
```

3.1122.7 Maxima [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(25) = 50$.

Time = 3.85 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.37

$$\int \frac{(10-4x)(i\pi+\log(2))^2+e^{e^{3+x}+e^3x}\left(-2e^{3+x}x(i\pi+\log(2))^2+\left(-2-2e^3x\right)(i\pi+\log(2))^2\right)}{-125x^3+e^{3e^{3+x}+3e^3x}x^3+75x^4-15x^5+x^6+e^{2e^{3+x}+2e^3x}\left(-15x^3+3x^4\right)+e^{e^{3+x}+e^3x}\left(75x^3-30x^4+3x^5\right)}$$
$$= -\frac{\pi^2-2i\,\pi\log(2)-\log(2)^2}{x^4-10\,x^3+x^2e^{\left(2\,xe^3+2\,e^{(x+3)}\right)}+25\,x^2+2\,(x^3-5\,x^2)e^{\left(xe^3+e^{(x+3)}\right)}}$$

input
```
integrate((((-2*x*exp(3)*(log(2)+I*pi)^2*exp(x)+(-2*x*exp(3)-2)*(log(2)+I*p
i)^2)*exp(exp(x)*exp(3)+x*exp(3))+(10-4*x)*(log(2)+I*pi)^2)/(x^3*exp(exp(x
)*exp(3)+x*exp(3))^3+(3*x^4-15*x^3)*exp(exp(x)*exp(3)+x*exp(3))^2+(3*x^5-3
0*x^4+75*x^3)*exp(exp(x)*exp(3)+x*exp(3))+x^6-15*x^5+75*x^4-125*x^3),x, al
gorithm=\
```

output
```
-(pi^2 - 2*I*pi*log(2) - log(2)^2)/(x^4 - 10*x^3 + x^2*e^(2*x*e^3 + 2*e^(x
 + 3)) + 25*x^2 + 2*(x^3 - 5*x^2)*e^(x*e^3 + e^(x + 3)))
```

3.1122.8 Giac [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 80 vs. $2(25) = 50$.

Time = 0.47 (sec) , antiderivative size = 80, normalized size of antiderivative = 2.67

$$\int \frac{(10-4x)(i\pi+\log(2))^2+e^{e^{3+x}+e^3x}\left(-2e^{3+x}x(i\pi+\log(2))^2+\left(-2-2e^3x\right)(i\pi+\log(2))^2\right)}{-125x^3+e^{3e^{3+x}+3e^3x}x^3+75x^4-15x^5+x^6+e^{2e^{3+x}+2e^3x}\left(-15x^3+3x^4\right)+e^{e^{3+x}+e^3x}\left(75x^3-30x^4+3x^5\right)}$$
$$= -\frac{\pi^2-2i\,\pi\log(2)-\log(2)^2}{x^4+2\,x^3e^{\left(xe^3+e^{(x+3)}\right)}-10\,x^3+x^2e^{\left(2\,xe^3+2\,e^{(x+3)}\right)}-10\,x^2e^{\left(xe^3+e^{(x+3)}\right)}+25\,x^2}$$

input
```
integrate((((-2*x*exp(3)*(log(2)+I*pi)^2*exp(x)+(-2*x*exp(3)-2)*(log(2)+I*p
i)^2)*exp(exp(x)*exp(3)+x*exp(3))+(10-4*x)*(log(2)+I*pi)^2)/(x^3*exp(exp(x
)*exp(3)+x*exp(3))^3+(3*x^4-15*x^3)*exp(exp(x)*exp(3)+x*exp(3))^2+(3*x^5-3
0*x^4+75*x^3)*exp(exp(x)*exp(3)+x*exp(3))+x^6-15*x^5+75*x^4-125*x^3),x, al
gorithm=\
```

output
```
-(pi^2 - 2*I*pi*log(2) - log(2)^2)/(x^4 + 2*x^3*e^(x*e^3 + e^(x + 3)) - 10
*x^3 + x^2*e^(2*x*e^3 + 2*e^(x + 3)) - 10*x^2*e^(x*e^3 + e^(x + 3)) + 25*x
^2)
```

3.1122.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(10-4x)(i\pi+\log(2))^2+e^{e^{3+x}+e^3x}\left(-2e^{3+x}x(i\pi+\log(2))^2+\left(-2-2e^3x\right)(i\pi+\log(2))^2\right)}{-125x^3+e^{3e^{3+x}+3e^3x}x^3+75x^4-15x^5+x^6+e^{2e^{3+x}+2e^3x}\left(-15x^3+3x^4\right)+e^{e^{3+x}+e^3x}\left(75x^3-30x^4+3x^5\right)}$$

$$= \int -\frac{e^{x\,e^3+e^3\,e^x}\left(\left(\ln(2)+\Pi\,1i\right)^2\left(2\,x\,e^3+2\right)+2\,x\,e^3\,e^x\left(\ln(2)+\Pi\,1i\right)^2\right)+\left(4\,x-10\right)\left(\ln(2)+\Pi\,1i\right)^2}{e^{x\,e^3+e^3\,e^x}\left(3\,x^5-30\,x^4+75\,x^3\right)-e^{2\,x\,e^3+2\,e^3\,e^x}\left(15\,x^3-3\,x^4\right)-125\,x^3+75\,x^4-15\,x^5+x^6+x^3\,e^{3\,x\,e^3+\dots}}$$

input
```
int(-(exp(x*exp(3) + exp(3)*exp(x))*((Pi*1i + log(2))^2*(2*x*exp(3) + 2) +
 2*x*exp(3)*exp(x)*(Pi*1i + log(2))^2) + (4*x - 10)*(Pi*1i + log(2))^2)/(e
xp(x*exp(3) + exp(3)*exp(x))*(75*x^3 - 30*x^4 + 3*x^5) - exp(2*x*exp(3) +
2*exp(3)*exp(x))*(15*x^3 - 3*x^4) - 125*x^3 + 75*x^4 - 15*x^5 + x^6 + x^3*
exp(3*x*exp(3) + 3*exp(3)*exp(x))),x)
```

output
```
int(-(exp(x*exp(3) + exp(3)*exp(x))*((Pi*1i + log(2))^2*(2*x*exp(3) + 2) +
 2*x*exp(3)*exp(x)*(Pi*1i + log(2))^2) + (4*x - 10)*(Pi*1i + log(2))^2)/(e
xp(x*exp(3) + exp(3)*exp(x))*(75*x^3 - 30*x^4 + 3*x^5) - exp(2*x*exp(3) +
2*exp(3)*exp(x))*(15*x^3 - 3*x^4) - 125*x^3 + 75*x^4 - 15*x^5 + x^6 + x^3*
exp(3*x*exp(3) + 3*exp(3)*exp(x))), x)
```

3.1123 $\int \frac{7x^2+(12+4x)\log^3(5x)\log(3+x)+\log^4(5x)(-x+(-3-x)\log(3+x))}{147x^2+49x^3+(-42x-14x^2)\log^4(5x)+(3+x)\log^8(5x)}$

3.1123.1 Optimal result

Integrand size = 83, antiderivative size = 20

$$\int \frac{7x^2+(12+4x)\log^3(5x)\log(3+x)+\log^4(5x)(-x+(-3-x)\log(3+x))}{147x^2+49x^3+(-42x-14x^2)\log^4(5x)+(3+x)\log^8(5x)}\,dx = \frac{x\log(3+x)}{7x-\log^4(5x)}$$

output
```
ln(3+x)/(7*x-ln(5*x)^4)*x
```

3.1123.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{7x^2+(12+4x)\log^3(5x)\log(3+x)+\log^4(5x)(-x+(-3-x)\log(3+x))}{147x^2+49x^3+(-42x-14x^2)\log^4(5x)+(3+x)\log^8(5x)}\,dx = \frac{x\log(3+x)}{7x-\log^4(5x)}$$

input
```
Integrate[(7*x^2 + (12 + 4*x)*Log[5*x]^3*Log[3 + x] + Log[5*x]^4*(-x + (-3
 - x)*Log[3 + x]))/(147*x^2 + 49*x^3 + (-42*x - 14*x^2)*Log[5*x]^4 + (3 +
x)*Log[5*x]^8),x]
```

output
```
(x*Log[3 + x])/(7*x - Log[5*x]^4)
```

3.1123.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{7x^2+((-x-3)\log(x+3)-x)\log^4(5x)+(4x+12)\log(x+3)\log^3(5x)}{49x^3+147x^2+(-14x^2-42x)\log^4(5x)+(x+3)\log^8(5x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{7x^2+((-x-3)\log(x+3)-x)\log^4(5x)+(4x+12)\log(x+3)\log^3(5x)}{(x+3)\left(7x-\log^4(5x)\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{x}{(x+3)\left(7x-\log^4(5x)\right)}-\frac{(\log(5x)-4)\log^3(5x)\log(x+3)}{\left(\log^4(5x)-7x\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{1}{7x-\log^4(5x)}dx-3\int \frac{1}{(x+3)\left(7x-\log^4(5x)\right)}dx-\int \frac{\log^4(5x)\log(x+3)}{\left(\log^4(5x)-7x\right)^2}dx+4\int \frac{\log^3(5x)\log(x+3)}{\left(\log^4(5x)-7x\right)^2}dx$$

input
```
Int[(7*x^2 + (12 + 4*x)*Log[5*x]^3*Log[3 + x] + Log[5*x]^4*(-x + (-3 - x)*
Log[3 + x]))/(147*x^2 + 49*x^3 + (-42*x - 14*x^2)*Log[5*x]^4 + (3 + x)*Log
[5*x]^8),x]
```

output
```
$Aborted
```

3.1123.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1123.4 Maple [A] (verified)

Time = 7.77 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

method	result	size
risch	$\frac{\ln(3+x)x}{7x-\ln(5x)^4}$	21
parallelrisch	$\frac{\ln(3+x)x}{7x-\ln(5x)^4}$	21

input
```
int((((-3-x)*ln(3+x)-x)*ln(5*x)^4+(4*x+12)*ln(3+x)*ln(5*x)^3+7*x^2)/((3+x)
*ln(5*x)^8+(-14*x^2-42*x)*ln(5*x)^4+49*x^3+147*x^2),x,method=_RETURNVERBOS
E)
```

output
```
ln(3+x)/(7*x-ln(5*x)^4)*x
```

3.1123.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{7x^2+(12+4x)\log^3(5x)\log(3+x)+\log^4(5x)(-x+(-3-x)\log(3+x))}{147x^2+49x^3+(-42x-14x^2)\log^4(5x)+(3+x)\log^8(5x)}\,dx = -\frac{x\log\left(x+3\right)}{\log\left(5\,x\right)^4-7\,x}$$

input
```
integrate((((-3-x)*log(3+x)-x)*log(5*x)^4+(4*x+12)*log(3+x)*log(5*x)^3+7*x
^2)/((3+x)*log(5*x)^8+(-14*x^2-42*x)*log(5*x)^4+49*x^3+147*x^2),x, algorit
hm=\
```

output
```
-x*log(x + 3)/(log(5*x)^4 - 7*x)
```

3.1123.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{7x^2+(12+4x)\log^3(5x)\log(3+x)+\log^4(5x)(-x+(-3-x)\log(3+x))}{147x^2+49x^3+(-42x-14x^2)\log^4(5x)+(3+x)\log^8(5x)}\,dx$$
$$= \text{Exception raised: TypeError}$$

input
```
integrate((((-3-x)*ln(3+x)-x)*ln(5*x)**4+(4*x+12)*ln(3+x)*ln(5*x)**3+7*x**
2)/((3+x)*ln(5*x)**8+(-14*x**2-42*x)*ln(5*x)**4+49*x**3+147*x**2),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.1123.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(19) = 38$.

Time = 0.31 (sec) , antiderivative size = 47, normalized size of antiderivative = 2.35

$$\int \frac{7x^2+(12+4x)\log^3(5x)\log(3+x)+\log^4(5x)(-x+(-3-x)\log(3+x))}{147x^2+49x^3+(-42x-14x^2)\log^4(5x)+(3+x)\log^8(5x)}\,dx$$
$$= -\frac{x\log(x+3)}{\log(5)^4+4\log(5)^3\log(x)+6\log(5)^2\log(x)^2+4\log(5)\log(x)^3+\log(x)^4-7x}$$

input
```
integrate((((-3-x)*log(3+x)-x)*log(5*x)^4+(4*x+12)*log(3+x)*log(5*x)^3+7*x
^2)/((3+x)*log(5*x)^8+(-14*x^2-42*x)*log(5*x)^4+49*x^3+147*x^2),x, algorit
hm=\
```

output
```
-x*log(x + 3)/(log(5)^4 + 4*log(5)^3*log(x) + 6*log(5)^2*log(x)^2 + 4*log(
5)*log(x)^3 + log(x)^4 - 7*x)
```

3.1123.8 Giac [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{7x^2+(12+4x)\log^3(5x)\log(3+x)+\log^4(5x)(-x+(-3-x)\log(3+x))}{147x^2+49x^3+(-42x-14x^2)\log^4(5x)+(3+x)\log^8(5x)}\,dx$$
$$= -\frac{(x+3)\log(x+3)-3\log(x+3)}{\log(5x)^4-7x}$$

input
```
integrate((((-3-x)*log(3+x)-x)*log(5*x)^4+(4*x+12)*log(3+x)*log(5*x)^3+7*x
^2)/((3+x)*log(5*x)^8+(-14*x^2-42*x)*log(5*x)^4+49*x^3+147*x^2),x, algorit
hm=\
```

output
```
-((x + 3)*log(x + 3) - 3*log(x + 3))/(log(5*x)^4 - 7*x)
```

3.1123.9 Mupad [B] (verification not implemented)

Time = 16.91 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{7x^2+(12+4x)\log^3(5x)\log(3+x)+\log^4(5x)(-x+(-3-x)\log(3+x))}{147x^2+49x^3+(-42x-14x^2)\log^4(5x)+(3+x)\log^8(5x)}\,dx$$
$$= \frac{x\ln(x+3)}{7x-\ln(5x)^4}$$

input
```
int((7*x^2 - log(5*x)^4*(x + log(x + 3)*(x + 3)) + log(5*x)^3*log(x + 3)*(
4*x + 12))/(147*x^2 - log(5*x)^4*(42*x + 14*x^2) + 49*x^3 + log(5*x)^8*(x
+ 3)),x)
```

output
```
(x*log(x + 3))/(7*x - log(5*x)^4)
```

3.1124 $\int \frac{}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}(-}$

3.1124.1 Optimal result

Integrand size = 163, antiderivative size = 21

$$\int \frac{e^x(18-18x}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}\left(-18750x^6-3125x^8\right)+e^{15}\left(4500\right.}$$
$$=\frac{3e^x}{x\left(6-5e^5x+x^2\right)^4}$$

output
```
3/x/(x^2-5*x*exp(5)+6)^4*exp(x)
```

3.1124.2 Mathematica [A] (verified)

Time = 2.00 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{e^x(18-18x}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}\left(-18750x^6-3125x^8\right)+e^{15}\left(4500\right.}$$
$$=\frac{3e^x}{x\left(6-5e^5x+x^2\right)^4}$$

input
```
Integrate[(E^x*(18 - 18*x + 27*x^2 - 3*x^3 + E^5*(-75*x + 15*x^2)))/(-7776
*x^2 - 6480*x^4 - 2160*x^6 + 3125*E^25*x^7 - 360*x^8 - 30*x^10 - x^12 + E^
20*(-18750*x^6 - 3125*x^8) + E^15*(45000*x^5 + 15000*x^7 + 1250*x^9) + E^1
0*(-54000*x^4 - 27000*x^6 - 4500*x^8 - 250*x^10) + E^5*(32400*x^3 + 21600*
x^5 + 5400*x^7 + 600*x^9 + 25*x^11)),x]
```

output
```
(3*E^x)/(x*(6 - 5*E^5*x + x^2)^4)
```

3.1124.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 23.69 (sec) , antiderivative size = 9038, normalized size of antiderivative = 430.38, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$, Rules used = {2026, 2463, 7239, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(-3x^3+27x^2 - \right.}{-x^{12}-30x^{10}-360x^8+3125e^{25}x^7-2160x^6-6480x^4-7776x^2+e^{20}\left(-3125x^8-18750x^6\right)+e^{15}\left(1250x^9+\right.}$$

$\Big\downarrow$ 2026

$$\int \frac{e^x\left(-3x^3+27x^2+e^5\right.}{x^2\left(-x^{10}+25e^5x^9-10\left(3+25e^{10}\right)x^8+50e^5\left(12+25e^{10}\right)x^7-5\left(72+900e^{10}+625e^{20}\right)x^6+25e^5\left(216+600e\right.\right.}$$

$\Big\downarrow$ 2463

$$\int\left(\frac{140e^x\left(-3x^3+27x^2+e^5\left(15x^2-75x\right)-18x+18\right)}{\left(25e^{10}-24\right)^{9/2}x^2\left(2x+\sqrt{25e^{10}-24}-5e^5\right)}+\frac{140e^x\left(-3x^3+27x^2+e^5\left(15x^2-75x\right)-18x+18\right)}{\left(25e^{10}-24\right)^{9/2}\left(-2x+\sqrt{25e^{10}-24}+5e^5\right)x^2}+\right.$$

$\Big\downarrow$ 7239

$$\int \frac{3e^x\left(x^3-\left(9+5e^5\right)x^2+\left(6+25e^5\right)x-6\right)}{x^2\left(x^2-5e^5x+6\right)^5}dx$$

$\Big\downarrow$ 27

$$3\int -\frac{e^x\left(-x^3+\left(9+5e^5\right)x^2-\left(6+25e^5\right)x+6\right)}{x^2\left(x^2-5e^5x+6\right)^5}dx$$

$\Big\downarrow$ 25

$$-3\int \frac{e^x\left(-x^3+\left(9+5e^5\right)x^2-\left(6+25e^5\right)x+6\right)}{x^2\left(x^2-5e^5x+6\right)^5}dx$$

$\Big\downarrow$ 7293

$$-3\int\left(\frac{e^x\left(-x+5e^5+1\right)}{1296\left(-x^2+5e^5x-6\right)}-\frac{e^x}{1296x}+\frac{e^x}{1296x^2}+\frac{e^x\left(\left(6+5e^5\right)x-25e^{10}-30e^5-6\right)}{1296\left(x^2-5e^5x+6\right)^2}+\frac{e^x\left(\left(3+5e^5\right)x-25e\right.}{108\left(x^2-5e^5\right.}\right.$$

$\downarrow$ 2009

input
```
Int[(E^x*(18 - 18*x + 27*x^2 - 3*x^3 + E^5*(-75*x + 15*x^2)))/(-7776*x^2 -
 6480*x^4 - 2160*x^6 + 3125*E^25*x^7 - 360*x^8 - 30*x^10 - x^12 + E^20*(-1
8750*x^6 - 3125*x^8) + E^15*(45000*x^5 + 15000*x^7 + 1250*x^9) + E^10*(-54
000*x^4 - 27000*x^6 - 4500*x^8 - 250*x^10) + E^5*(32400*x^3 + 21600*x^5 +
5400*x^7 + 600*x^9 + 25*x^11)),x]
```

output
```
-3*((8*E^x*(12 - 25*E^10))/(3*(-24 + 25*E^10)^(5/2)*(5*E^5 - Sqrt[-24 + 25
*E^10] - 2*x)^4) + (20*E^(5 + x)*(5*E^5 - Sqrt[-24 + 25*E^10]))/(3*(-24 +
25*E^10)^(5/2)*(5*E^5 - Sqrt[-24 + 25*E^10] - 2*x)^4) + (80*E^x*(12 - 25*E
^10))/(9*(24 - 25*E^10)^3*(5*E^5 - Sqrt[-24 + 25*E^10] - 2*x)^3) - (4*E^x*
(12 - 25*E^10))/(9*(-24 + 25*E^10)^(5/2)*(5*E^5 - Sqrt[-24 + 25*E^10] - 2*
x)^3) - (2*E^x*(2 + 10*E^5 + 25*E^10))/(9*(24 - 25*E^10)^2*(5*E^5 - Sqrt[-
24 + 25*E^10] - 2*x)^3) + (40*E^(5 + x)*(25*E^5 - 3*Sqrt[-24 + 25*E^10]))/
(9*(24 - 25*E^10)^3*(5*E^5 - Sqrt[-24 + 25*E^10] - 2*x)^3) + (E^x*(2 + 5*E
^5)*(5*E^5 - Sqrt[-24 + 25*E^10]))/(9*(24 - 25*E^10)^2*(5*E^5 - Sqrt[-24 +
 25*E^10] - 2*x)^3) - (10*E^(5 + x)*(5*E^5 - Sqrt[-24 + 25*E^10]))/(9*(-24
 + 25*E^10)^(5/2)*(5*E^5 - Sqrt[-24 + 25*E^10] - 2*x)^3) - (20*E^x*(12 - 2
5*E^10))/(9*(24 - 25*E^10)^3*(5*E^5 - Sqrt[-24 + 25*E^10] - 2*x)^2) + (20*
E^x*(12 - 25*E^10))/((-24 + 25*E^10)^(7/2)*(5*E^5 - Sqrt[-24 + 25*E^10] -
2*x)^2) + (E^x*(12 - 25*E^10))/(9*(-24 + 25*E^10)^(5/2)*(5*E^5 - Sqrt[-24
+ 25*E^10] - 2*x)^2) + (E^x*(2 + 10*E^5 + 25*E^10))/(18*(24 - 25*E^10)^2*(
5*E^5 - Sqrt[-24 + 25*E^10] - 2*x)^2) + (2*E^x*(2 + 10*E^5 + 25*E^10))/(3*
(-24 + 25*E^10)^(5/2)*(5*E^5 - Sqrt[-24 + 25*E^10] - 2*x)^2) - (E^x*(3 + 1
5*E^5 + 25*E^10))/(54*(-24 + 25*E^10)^(3/2)*(5*E^5 - Sqrt[-24 + 25*E^10] -
 2*x)^2) - (10*E^(5 + x)*(25*E^5 - 3*Sqrt[-24 + 25*E^10]))/(9*(24 - 25*E^1
0)^3*(5*E^5 - Sqrt[-24 + 25*E^10] - 2*x)^2) - (E^x*(2 + 5*E^5)*(5*E^5 -...
```

3.1124.

$$\int\frac{e^x\left(18-18x+27x^2-3x^3+e^5\left(-75x+15x^2\right)\right)}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}\left(-18750x^6-3125x^8\right)+e^{15}\left(45000x^5+15000x^7+1250x^9\right)+e^{10}\left(-54000x^4-27000\right.}$$

3.1124.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1124.4 Maple [A] (verified)

Time = 3.01 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

method	result
norman	$\frac{3\,\mathrm{e}^{x}}{x\left(5x\,\mathrm{e}^{5}-x^{2}-6\right)^{4}}$
gosper	$\frac{3\,\mathrm{e}^{x}}{x(625\,\mathrm{e}^{20}x^{4}-500x^{5}\mathrm{e}^{15}+150x^{6}\mathrm{e}^{10}-20x^{7}\mathrm{e}^{5}+x^{8}-3000x^{3}\mathrm{e}^{15}+1800x^{4}\mathrm{e}^{10}-360x^{5}\mathrm{e}^{5}+24x^{6}+5400x^{2}\mathrm{e}^{10}-2160x^{3}\mathrm{e}^{5}+216x^{4}-4320}$
parallelrisch	$\frac{3\,\mathrm{e}^{x}}{x(625\,\mathrm{e}^{20}x^{4}-500x^{5}\mathrm{e}^{15}+150x^{6}\mathrm{e}^{10}-20x^{7}\mathrm{e}^{5}+x^{8}-3000x^{3}\mathrm{e}^{15}+1800x^{4}\mathrm{e}^{10}-360x^{5}\mathrm{e}^{5}+24x^{6}+5400x^{2}\mathrm{e}^{10}-2160x^{3}\mathrm{e}^{5}+216x^{4}-4320}$
default	Expression too large to display

3.1124.

$$\int \frac{e^{x}\left(18-18x+27x^{2}-3x^{3}+e^{5}\left(-75x+15x^{2}\right)\right)}{-7776x^{2}-6480x^{4}-2160x^{6}+3125e^{25}x^{7}-360x^{8}-30x^{10}-x^{12}+e^{20}(-18750x^{6}-3125x^{8})+e^{15}(45000x^{5}+15000x^{7}+1250x^{9})+e^{10}(-54000x^{4}-27000}$$

input
```
int(((15*x^2-75*x)*exp(5)-3*x^3+27*x^2-18*x+18)*exp(x)/(3125*x^7*exp(5)^5+
(-3125*x^8-18750*x^6)*exp(5)^4+(1250*x^9+15000*x^7+45000*x^5)*exp(5)^3+(-2
50*x^10-4500*x^8-27000*x^6-54000*x^4)*exp(5)^2+(25*x^11+600*x^9+5400*x^7+2
1600*x^5+32400*x^3)*exp(5)-x^12-30*x^10-360*x^8-2160*x^6-6480*x^4-7776*x^2
),x,method=_RETURNVERBOSE)
```

output
```
3*exp(x)/x/(5*x*exp(5)-x^2-6)^4
```

3.1124.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 89 vs. $2(19) = 38$.

Time = 0.25 (sec) , antiderivative size = 89, normalized size of antiderivative = 4.24

$$\int \frac{e^x(18-18x}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}(-18750x^6-3125x^8)+e^{15}(4500}$$
$$=\frac{3e^x}{x^9+24x^7+625x^5e^{20}+216x^5+864x^3-500(x^6+6x^4)e^{15}+150(x^7+12x^5+36x^3)e^{10}-20(x^8+18}$$

input
```
integrate(((15*x^2-75*x)*exp(5)-3*x^3+27*x^2-18*x+18)*exp(x)/(3125*x^7*exp
(5)^5+(-3125*x^8-18750*x^6)*exp(5)^4+(1250*x^9+15000*x^7+45000*x^5)*exp(5)
^3+(-250*x^10-4500*x^8-27000*x^6-54000*x^4)*exp(5)^2+(25*x^11+600*x^9+5400
*x^7+21600*x^5+32400*x^3)*exp(5)-x^12-30*x^10-360*x^8-2160*x^6-6480*x^4-77
76*x^2),x, algorithm=\
```

output
```
3*e^x/(x^9 + 24*x^7 + 625*x^5*e^20 + 216*x^5 + 864*x^3 - 500*(x^6 + 6*x^4)
*e^15 + 150*(x^7 + 12*x^5 + 36*x^3)*e^10 - 20*(x^8 + 18*x^6 + 108*x^4 + 21
6*x^2)*e^5 + 1296*x)
```

3.1124.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 110 vs. $2(19) = 38$.

Time = 0.27 (sec) , antiderivative size = 110, normalized size of antiderivative = 5.24

$$\int \frac{e^x(18-18x}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}(-18750x^6-3125x^8)+e^{15}(4500}$$
$$=\frac{3e^x}{x^9-20x^8e^5+24x^7+150x^7e^{10}-500x^6e^{15}-360x^6e^5+216x^5+1800x^5e^{10}+625x^5e^{20}-3000x^4e^{15}-21}$$

3.1124.

$$\int \frac{e^x(18-18x+27x^2-3x^3+e^5(-75x+15x^2))}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}(-18750x^6-3125x^8)+e^{15}(45000x^5+15000x^7+1250x^9)+e^{10}(-54000x^4-27000}$$

input
```
integrate(((15*x**2-75*x)*exp(5)-3*x**3+27*x**2-18*x+18)*exp(x)/(3125*x**7
*exp(5)**5+(-3125*x**8-18750*x**6)*exp(5)**4+(1250*x**9+15000*x**7+45000*x
**5)*exp(5)**3+(-250*x**10-4500*x**8-27000*x**6-54000*x**4)*exp(5)**2+(25*
x**11+600*x**9+5400*x**7+21600*x**5+32400*x**3)*exp(5)-x**12-30*x**10-360*
x**8-2160*x**6-6480*x**4-7776*x**2),x)
```

output
```
3*exp(x)/(x**9 - 20*x**8*exp(5) + 24*x**7 + 150*x**7*exp(10) - 500*x**6*ex
p(15) - 360*x**6*exp(5) + 216*x**5 + 1800*x**5*exp(10) + 625*x**5*exp(20)
- 3000*x**4*exp(15) - 2160*x**4*exp(5) + 864*x**3 + 5400*x**3*exp(10) - 43
20*x**2*exp(5) + 1296*x)
```

3.1124.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 91 vs. 2(19) = 38.

Time = 0.25 (sec) , antiderivative size = 91, normalized size of antiderivative = 4.33

$$\int \frac{e^x(18-18x}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}\left(-18750x^6-3125x^8\right)+e^{15}\left(4500\right.}$$
$$=\frac{3\,e^x}{x^9-20\,x^8e^5+6\,x^7(25\,e^{10}+4)-20\,x^6(25\,e^{15}+18\,e^5)+x^5(625\,e^{20}+1800\,e^{10}+216)-120\,x^4(25\,e^{15}+1}$$

input
```
integrate(((15*x^2-75*x)*exp(5)-3*x^3+27*x^2-18*x+18)*exp(x)/(3125*x^7*exp
(5)^5+(-3125*x^8-18750*x^6)*exp(5)^4+(1250*x^9+15000*x^7+45000*x^5)*exp(5)
^3+(-250*x^10-4500*x^8-27000*x^6-54000*x^4)*exp(5)^2+(25*x^11+600*x^9+5400
*x^7+21600*x^5+32400*x^3)*exp(5)-x^12-30*x^10-360*x^8-2160*x^6-6480*x^4-77
76*x^2),x, algorithm=\
```

output
```
3*e^x/(x^9 - 20*x^8*e^5 + 6*x^7*(25*e^10 + 4) - 20*x^6*(25*e^15 + 18*e^5)
+ x^5*(625*e^20 + 1800*e^10 + 216) - 120*x^4*(25*e^15 + 18*e^5) + 216*x^3*
(25*e^10 + 4) - 4320*x^2*e^5 + 1296*x)
```

3.1124.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 216 vs. $2(19) = 38$.

Time = 0.37 (sec) , antiderivative size = 216, normalized size of antiderivative = 10.29

$$\int \frac{e^x(18-18x}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}(-18750x^6-3125x^8)+e^{15}(4500}$$
$$= -\frac{x^8e^x-20\,x^7e^{(x+5)}+150\,x^6e^{(x+10)}+24\,x^6e^x-500\,x^5e^{(x+15)}-360\,x^5e^{(x+5)}+625\,x^4e^{(x+20)}+1800\,x^4e^{(}}{432\,(x^9-20\,x^8e^5+150\,x^7e^{10}+24\,x^7-500\,x^6e^{15}-360\,x^6e^5+625\,x^5e^{20}+1800\,x^5}$$

input
```
integrate(((15*x^2-75*x)*exp(5)-3*x^3+27*x^2-18*x+18)*exp(x)/(3125*x^7*exp
(5)^5+(-3125*x^8-18750*x^6)*exp(5)^4+(1250*x^9+15000*x^7+45000*x^5)*exp(5)
^3+(-250*x^10-4500*x^8-27000*x^6-54000*x^4)*exp(5)^2+(25*x^11+600*x^9+5400
*x^7+21600*x^5+32400*x^3)*exp(5)-x^12-30*x^10-360*x^8-2160*x^6-6480*x^4-77
76*x^2),x, algorithm=\
```

output
```
-1/432*(x^8*e^x - 20*x^7*e^(x + 5) + 150*x^6*e^(x + 10) + 24*x^6*e^x - 500
*x^5*e^(x + 15) - 360*x^5*e^(x + 5) + 625*x^4*e^(x + 20) + 1800*x^4*e^(x +
 10) + 216*x^4*e^x - 3000*x^3*e^(x + 15) - 2160*x^3*e^(x + 5) + 5400*x^2*e
^(x + 10) + 864*x^2*e^x - 4320*x*e^(x + 5) - 1296*e^x)/(x^9 - 20*x^8*e^5 +
 150*x^7*e^10 + 24*x^7 - 500*x^6*e^15 - 360*x^6*e^5 + 625*x^5*e^20 + 1800*
x^5*e^10 + 216*x^5 - 3000*x^4*e^15 - 2160*x^4*e^5 + 5400*x^3*e^10 + 864*x^
3 - 4320*x^2*e^5 + 1296*x)
```

3.1124.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^x(18-18x}{-7776x^2-6480x^4-2160x^6+3125e^{25}x^7-360x^8-30x^{10}-x^{12}+e^{20}(-18750x^6-3125x^8)+e^{15}(4500}$$
$$= \text{Hanged}$$

input
```
int((exp(x)*(18*x + exp(5)*(75*x - 15*x^2) - 27*x^2 + 3*x^3 - 18))/(exp(20
)*(18750*x^6 + 3125*x^8) - exp(5)*(32400*x^3 + 21600*x^5 + 5400*x^7 + 600*
x^9 + 25*x^11) - 3125*x^7*exp(25) - exp(15)*(45000*x^5 + 15000*x^7 + 1250*
x^9) + 7776*x^2 + 6480*x^4 + 2160*x^6 + 360*x^8 + 30*x^10 + x^12 + exp(10)
*(54000*x^4 + 27000*x^6 + 4500*x^8 + 250*x^10)),x)
```

output
```
\text{Hanged}
```

3.1125 $\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96}{e^{4x}}$

3.1125.1 Optimal result

Integrand size = 174, antiderivative size = 23

$$\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96x^5+128x^6)+(-256-256x+}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log}$$

$$=\left(-16+\frac{4+\frac{8e^{-2x}}{x^2}}{x+\log(x)}\right)^2$$

output
```
((8/exp(x)^2/x^2+4)/(x+ln(x))-16)^2
```

3.1125.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96x^5+128x^6)+(-256-256x+}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log}$$

$$=\frac{16(2e^{-2x}+x^2)(2e^{-2x}+x^2-8x^2(x+\log(x)))}{x^4(x+\log(x))^2}$$

input
```
Integrate[(-128 - 384*x - 256*x^2 + E^(2*x)*(-128*x^2 + 640*x^4 + 512*x^5)
 + E^(4*x)*(-32*x^4 + 96*x^5 + 128*x^6) + (-256 - 256*x + E^(2*x)*(128*x^2
 + 1152*x^3 + 1024*x^4) + E^(4*x)*(128*x^4 + 128*x^5))*Log[x] + E^(2*x)*(5
12*x^2 + 512*x^3)*Log[x]^2)/(E^(4*x)*x^8 + 3*E^(4*x)*x^7*Log[x] + 3*E^(4*x
)*x^6*Log[x]^2 + E^(4*x)*x^5*Log[x]^3),x]
```

3.1125.

$$\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96x^5+128x^6)+(-256-256x+e^{2x}(128x^2+1152x^3+1024x^4)+e^{4x}(128x^4+128x}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log^2(x)+e^{4x}x^5\log^3(x)}$$

output
```
(16*(2/E^(2*x) + x^2)*(2/E^(2*x) + x^2 - 8*x^2*(x + Log[x])))/(x^4*(x + Lo
g[x])^2)
```

3.1125.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-256x^2+e^{2x}(512x^3+512x^2)\log^2(x)+e^{4x}(128x^6+96x^5-32x^4)+e^{2x}(512x^5+640x^4-128x^2)+(e^{4x}(128}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log^2(x)+}$$

$\downarrow$ 7292

$$\int \frac{32e^{-4x}(x+1)(4e^{4x}x^5+16e^{2x}x^4-e^{4x}x^4+4e^{4x}x^4\log(x)+4e^{2x}x^3+32e^{2x}x^3\log(x)-4e^{2x}x^2+16e^{2x}x^2\log^2(}{x^5(x+\log(x))^3}$$

$\downarrow$ 27

$$32\int -\frac{e^{-4x}(x+1)(-4e^{4x}x^5-16e^{2x}x^4+e^{4x}x^4-4e^{4x}\log(x)x^4-4e^{2x}x^3-32e^{2x}\log(x)x^3+4e^{2x}x^2-16e^{2x}\log^2}{x^5(x+\log(x))^3}$$

$\downarrow$ 25

$$-32\int \frac{e^{-4x}(x+1)(-4e^{4x}x^5-16e^{2x}x^4+e^{4x}x^4-4e^{4x}\log(x)x^4-4e^{2x}x^3-32e^{2x}\log(x)x^3+4e^{2x}x^2-16e^{2x}\log^2}{x^5(x+\log(x))^3}$$

$\downarrow$ 7293

$$-32\int \left(-\frac{(4x+4\log(x)-1)(x+1)}{x(x+\log(x))^3}-\frac{4e^{-2x}(4x^2+8\log(x)x+x+4\log^2(x)+\log(x)-1)(x+1)}{x^3(x+\log(x))^3}+\frac{8e^{-4x}\log}{x^5(x+}\right.$$

$\downarrow$ 2009

$$-32\left(4\int \frac{e^{-4x}}{x^5(x+\log(x))^3}dx+8\int \frac{e^{-4x}}{x^5(x+\log(x))^2}dx+4\int \frac{e^{-4x}}{x^4(x+\log(x))^3}dx+8\int \frac{e^{-4x}}{x^4(x+\log(x))^2}dx+4\int\right.$$

input
```
Int[(-128 - 384*x - 256*x^2 + E^(2*x)*(-128*x^2 + 640*x^4 + 512*x^5) + E^(
4*x)*(-32*x^4 + 96*x^5 + 128*x^6) + (-256 - 256*x + E^(2*x)*(128*x^2 + 115
2*x^3 + 1024*x^4) + E^(4*x)*(128*x^4 + 128*x^5))*Log[x] + E^(2*x)*(512*x^2
 + 512*x^3)*Log[x]^2)/(E^(4*x)*x^8 + 3*E^(4*x)*x^7*Log[x] + 3*E^(4*x)*x^6*
Log[x]^2 + E^(4*x)*x^5*Log[x]^3),x]
```

output
```
$Aborted
```

3.1125.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1125.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. $2(22) = 44$.

Time = 3.83 (sec) , antiderivative size = 76, normalized size of antiderivative = 3.30

method	result	size
risch	$-\frac{16\left(8\,{\mathrm e}^{4 x} x^{5}+8 \ln \left(x \right) {\mathrm e}^{4 x} x^{4}-{\mathrm e}^{4 x} x^{4}+16\,{\mathrm e}^{2 x} x^{3}+16 \ln \left(x \right) {\mathrm e}^{2 x} x^{2}-4\,{\mathrm e}^{2 x} x^{2}-4\right) {\mathrm e}^{-4 x}}{x^{4} \left(x +\ln \left(x \right)\right)^{2}}$	76
parallelrisch	$-\frac{\left(-128-32\,{\mathrm e}^{4 x} x^{4}-128\,{\mathrm e}^{2 x} x^{2}+256\,{\mathrm e}^{4 x} x^{5}+512\,{\mathrm e}^{2 x} x^{3}+512 \ln \left(x \right) {\mathrm e}^{2 x} x^{2}+256 \ln \left(x \right) {\mathrm e}^{4 x} x^{4}\right) {\mathrm e}^{-4 x}}{2 x^{4} \left(\ln \left(x \right)^{2}+2 x \ln \left(x \right)+x^{2}\right)}$	85

input
```
int(((512*x^3+512*x^2)*exp(x)^2*ln(x)^2+((128*x^5+128*x^4)*exp(x)^4+(1024*
x^4+1152*x^3+128*x^2)*exp(x)^2-256*x-256)*ln(x)+(128*x^6+96*x^5-32*x^4)*ex
p(x)^4+(512*x^5+640*x^4-128*x^2)*exp(x)^2-256*x^2-384*x-128)/(x^5*exp(x)^4
*ln(x)^3+3*x^6*exp(x)^4*ln(x)^2+3*x^7*exp(x)^4*ln(x)+x^8*exp(x)^4),x,metho
d=_RETURNVERBOSE)
```

output
```
-16*(8*exp(4*x)*x^5+8*ln(x)*exp(4*x)*x^4-exp(4*x)*x^4+16*exp(2*x)*x^3+16*l
n(x)*exp(2*x)*x^2-4*exp(2*x)*x^2-4)/x^4*exp(-4*x)/(x+ln(x))^2
```

3.1125.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. 2(24) = 48.

Time = 0.28 (sec) , antiderivative size = 93, normalized size of antiderivative = 4.04

$$\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96x^5+128x^6)+(-256-256x+}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log}$$
$$=-\frac{16\left((8x^5-x^4)e^{(4x)}+4(4x^3-x^2)e^{(2x)}+8\left(x^4e^{(4x)}+2x^2e^{(2x)}\right)\log(x)-4\right)}{x^6e^{(4x)}+2x^5e^{(4x)}\log(x)+x^4e^{(4x)}\log(x)^2}$$

input
```
integrate(((512*x^3+512*x^2)*exp(x)^2*log(x)^2+((128*x^5+128*x^4)*exp(x)^4
+(1024*x^4+1152*x^3+128*x^2)*exp(x)^2-256*x-256)*log(x)+(128*x^6+96*x^5-32
*x^4)*exp(x)^4+(512*x^5+640*x^4-128*x^2)*exp(x)^2-256*x^2-384*x-128)/(x^5*
exp(x)^4*log(x)^3+3*x^6*exp(x)^4*log(x)^2+3*x^7*exp(x)^4*log(x)+x^8*exp(x)
^4),x, algorithm=\
```

output
```
-16*((8*x^5 - x^4)*e^(4*x) + 4*(4*x^3 - x^2)*e^(2*x) + 8*(x^4*e^(4*x) + 2*
x^2*e^(2*x))*log(x) - 4)/(x^6*e^(4*x) + 2*x^5*e^(4*x)*log(x) + x^4*e^(4*x)
*log(x)^2)
```

3.1125.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 156 vs. 2(19) = 38.

Time = 0.27 (sec) , antiderivative size = 156, normalized size of antiderivative = 6.78

$$\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96x^5+128x^6)+(-256-256x+}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log}$$
$$=\frac{\left(64x^4+128x^3\log(x)+64x^2\log(x)^2\right)e^{-4x}+\left(-256x^7-768x^6\log(x)+64x^6-768x^5\log(x)^2+128x^5\mathrm{l}\right.}{x^{10}+4x^9\log(x)+6x^8\log(x)^2+4x^7\log(x)^3+x^6\log(x)^4}$$
$$+\frac{-128x-128\log(x)+16}{x^2+2x\log(x)+\log(x)^2}$$

input
```
integrate(((512*x**3+512*x**2)*exp(x)**2*ln(x)**2+((128*x**5+128*x**4)*exp
(x)**4+(1024*x**4+1152*x**3+128*x**2)*exp(x)**2-256*x-256)*ln(x)+(128*x**6
+96*x**5-32*x**4)*exp(x)**4+(512*x**5+640*x**4-128*x**2)*exp(x)**2-256*x**
2-384*x-128)/(x**5*exp(x)**4*ln(x)**3+3*x**6*exp(x)**4*ln(x)**2+3*x**7*exp
(x)**4*ln(x)+x**8*exp(x)**4),x)
```

output
```
((64*x**4 + 128*x**3*log(x) + 64*x**2*log(x)**2)*exp(-4*x) + (-256*x**7 -
768*x**6*log(x) + 64*x**6 - 768*x**5*log(x)**2 + 128*x**5*log(x) - 256*x**
4*log(x)**3 + 64*x**4*log(x)**2)*exp(-2*x))/(x**10 + 4*x**9*log(x) + 6*x**
8*log(x)**2 + 4*x**7*log(x)**3 + x**6*log(x)**4) + (-128*x - 128*log(x) +
16)/(x**2 + 2*x*log(x) + log(x)**2)
```

3.1125.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(24) = 48$.

Time = 0.26 (sec) , antiderivative size = 71, normalized size of antiderivative = 3.09

$$\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96x^5+128x^6)+(-256-256x+}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log}$$

$$= -\frac{16\left(8\,x^5+8\,x^4\log\left(x\right)-x^4+4\left(4\,x^3+4\,x^2\log\left(x\right)-x^2\right)e^{(-2\,x)}-4\,e^{(-4\,x)}\right)}{x^6+2\,x^5\log\left(x\right)+x^4\log\left(x\right)^2}$$

input
```
integrate(((512*x^3+512*x^2)*exp(x)^2*log(x)^2+((128*x^5+128*x^4)*exp(x)^4
+(1024*x^4+1152*x^3+128*x^2)*exp(x)^2-256*x-256)*log(x)+(128*x^6+96*x^5-32
*x^4)*exp(x)^4+(512*x^5+640*x^4-128*x^2)*exp(x)^2-256*x^2-384*x-128)/(x^5*
exp(x)^4*log(x)^3+3*x^6*exp(x)^4*log(x)^2+3*x^7*exp(x)^4*log(x)+x^8*exp(x)
^4),x, algorithm=\
```

output
```
-16*(8*x^5 + 8*x^4*log(x) - x^4 + 4*(4*x^3 + 4*x^2*log(x) - x^2)*e^(-2*x)
- 4*e^(-4*x))/(x^6 + 2*x^5*log(x) + x^4*log(x)^2)
```

3.1125.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. $2(24) = 48$.

Time = 0.29 (sec) , antiderivative size = 76, normalized size of antiderivative = 3.30

$$\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96x^5+128x^6)+(-256-256x+}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log}$$
$$= -\frac{16\left(8x^5+8x^4\log(x)-x^4+16x^3e^{(-2x)}+16x^2e^{(-2x)}\log(x)-4x^2e^{(-2x)}-4e^{(-4x)}\right)}{x^6+2x^5\log(x)+x^4\log(x)^2}$$

input
```
integrate(((512*x^3+512*x^2)*exp(x)^2*log(x)^2+((128*x^5+128*x^4)*exp(x)^4
+(1024*x^4+1152*x^3+128*x^2)*exp(x)^2-256*x-256)*log(x)+(128*x^6+96*x^5-32
*x^4)*exp(x)^4+(512*x^5+640*x^4-128*x^2)*exp(x)^2-256*x^2-384*x-128)/(x^5*
exp(x)^4*log(x)^3+3*x^6*exp(x)^4*log(x)^2+3*x^7*exp(x)^4*log(x)+x^8*exp(x)
^4),x, algorithm=\
```

output
```
-16*(8*x^5 + 8*x^4*log(x) - x^4 + 16*x^3*e^(-2*x) + 16*x^2*e^(-2*x)*log(x)
 - 4*x^2*e^(-2*x) - 4*e^(-4*x))/(x^6 + 2*x^5*log(x) + x^4*log(x)^2)
```

3.1125.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-128-384x-256x^2+e^{2x}(-128x^2+640x^4+512x^5)+e^{4x}(-32x^4+96x^5+128x^6)+(-256-256x+}{e^{4x}x^8+3e^{4x}x^7\log(x)+3e^{4x}x^6\log}$$
$$= -\int \frac{384\,x+\ln(x)\,\left(256\,x-\mathrm{e}^{4\,x}\,(128\,x^5+128\,x^4)-\mathrm{e}^{2\,x}\,(1024\,x^4+1152\,x^3+128\,x^2)+256\right)-\mathrm{e}^{4\,x}\,(128\,x}{x^8\,\mathrm{e}^{4\,x}+3\,x^7\,\mathrm{e}^{4\,x}\,\ln(x)+x^5\,\mathrm{e}}$$

input
```
int(-(384*x + log(x)*(256*x - exp(4*x)*(128*x^4 + 128*x^5) - exp(2*x)*(128
*x^2 + 1152*x^3 + 1024*x^4) + 256) - exp(4*x)*(96*x^5 - 32*x^4 + 128*x^6)
- exp(2*x)*(640*x^4 - 128*x^2 + 512*x^5) + 256*x^2 - exp(2*x)*log(x)^2*(51
2*x^2 + 512*x^3) + 128)/(x^8*exp(4*x) + 3*x^7*exp(4*x)*log(x) + x^5*exp(4*
x)*log(x)^3 + 3*x^6*exp(4*x)*log(x)^2),x)
```

output
```
-int((384*x + log(x)*(256*x - exp(4*x)*(128*x^4 + 128*x^5) - exp(2*x)*(128
*x^2 + 1152*x^3 + 1024*x^4) + 256) - exp(4*x)*(96*x^5 - 32*x^4 + 128*x^6)
- exp(2*x)*(640*x^4 - 128*x^2 + 512*x^5) + 256*x^2 - exp(2*x)*log(x)^2*(51
2*x^2 + 512*x^3) + 128)/(x^8*exp(4*x) + 3*x^7*exp(4*x)*log(x) + x^5*exp(4*
x)*log(x)^3 + 3*x^6*exp(4*x)*log(x)^2), x)
```

3.1126 $\int \frac{2e^x+e^x x\log(x^2)\log(\log(x^2))}{2x\log(x^2)}\,dx$

3.1126.1 Optimal result

Integrand size = 33, antiderivative size = 12

$$\int \frac{2e^x+e^x x\log(x^2)\log(\log(x^2))}{2x\log(x^2)}\,dx = \frac{1}{2}e^x\log\left(\log\left(x^2\right)\right)$$

output
```
1/2*exp(x)*ln(ln(x^2))
```

3.1126.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{2e^x+e^x x\log(x^2)\log(\log(x^2))}{2x\log(x^2)}\,dx = \frac{1}{2}e^x\log\left(\log\left(x^2\right)\right)$$

input
```
Integrate[(2*E^x + E^x*x*Log[x^2]*Log[Log[x^2]])/(2*x*Log[x^2]),x]
```

output
```
(E^x*Log[Log[x^2]])/2
```

3.1126.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {27, 7292, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x x \log(x^2) \log(\log(x^2)) + 2e^x}{2x \log(x^2)} \, dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{2} \int \frac{e^x x \log(x^2) \log(\log(x^2)) + 2e^x}{x \log(x^2)} dx$$

$$\Big\downarrow \ 7292$$

$$\frac{1}{2} \int \frac{e^x (x \log(x^2) \log(\log(x^2)) + 2)}{x \log(x^2)} dx$$

$$\Big\downarrow \ 2726$$

$$\frac{1}{2} e^x \log(\log(x^2))$$

input
```
Int[(2*E^x + E^x*x*Log[x^2]*Log[Log[x^2]])/(2*x*Log[x^2]),x]
```

output
```
(E^x*Log[Log[x^2]])/2
```

3.1126.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1126.4 Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

method	result	size
parallelrisch	$\frac{e^x \ln(\ln(x^2))}{2}$	10
risch	$\frac{e^x \ln\left(2\ln(x)-\frac{i\pi\ \text{csgn}\left(ix^2\right)\left(-\text{csgn}\left(ix^2\right)+\text{csgn}(ix)\right)^2}{2}\right)}{2}$	39

input
```
int(1/2*(x*exp(x)*ln(x^2)*ln(ln(x^2))+2*exp(x))/x/ln(x^2),x,method=_RETURN
VERBOSE)
```

output
```
1/2*exp(x)*ln(ln(x^2))
```

3.1126.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{2e^x + e^x x \log(x^2) \log(\log(x^2))}{2x \log(x^2)} \, dx = \frac{1}{2} e^x \log\left(\log\left(x^2\right)\right)$$

input
```
integrate(1/2*(x*exp(x)*log(x^2)*log(log(x^2))+2*exp(x))/x/log(x^2),x, alg
orithm=\
```

output
```
1/2*e^x*log(log(x^2))
```

3.1126.6 Sympy [A] (verification not implemented)

Time = 2.42 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{2e^x + e^x x \log(x^2) \log(\log(x^2))}{2x \log(x^2)} \, dx = \frac{e^x \log(\log(x^2))}{2}$$

input
```
integrate(1/2*(x*exp(x)*ln(x**2)*ln(ln(x**2))+2*exp(x))/x/ln(x**2),x)
```

output
```
exp(x)*log(log(x**2))/2
```

3.1126.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{2e^x + e^x x \log(x^2) \log(\log(x^2))}{2x\log(x^2)}\,dx = \frac{1}{2}\,e^x \log(2) + \frac{1}{2}\,e^x \log(\log(x))$$

input
```
integrate(1/2*(x*exp(x)*log(x^2)*log(log(x^2))+2*exp(x))/x/log(x^2),x, alg
orithm=\
```

output
```
1/2*e^x*log(2) + 1/2*e^x*log(log(x))
```

3.1126.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{2e^x + e^x x \log(x^2) \log(\log(x^2))}{2x\log(x^2)}\,dx = \frac{1}{2}\,e^x \log\left(\log\left(x^2\right)\right)$$

input
```
integrate(1/2*(x*exp(x)*log(x^2)*log(log(x^2))+2*exp(x))/x/log(x^2),x, alg
orithm=\
```

output
```
1/2*e^x*log(log(x^2))
```

3.1126.9 Mupad [B] (verification not implemented)

Time = 15.31 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

$$\int \frac{2e^x + e^x x \log(x^2) \log(\log(x^2))}{2x\log(x^2)}\,dx = \frac{e^x\ \ln(\ln(x^2))}{2}$$

input
```
int((exp(x) + (x*log(x^2)*exp(x)*log(log(x^2)))/2)/(x*log(x^2)),x)
```

output
```
(exp(x)*log(log(x^2)))/2
```

3.1127 $\int \frac{135x-7x^2-4x^3+e^3(10x-2x}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-}$

3.1127.1 Optimal result

Integrand size = 218, antiderivative size = 32

$$\int \frac{135x-7x^2-4x^3+e^3(10x-2x^2)+(-135x+44x^2+4x^3}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-34x^3-4x^4+e^3(300x-40x} = \frac{x}{-x+\frac{\log\left(x\left(-3+\frac{2(15+x)(e^3+x)}{x}\right)\right)}{-5+x}}$$

output
```
x/(ln(x*(2*(x+15)*(exp(3)+x)/x-3))/(-5+x)-x)
```

3.1127.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.03

$$\int \frac{135x-7x^2-4x^3+e^3(10x-2x^2)+(-135x+44x^2+4x^3}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-34x^3-4x^4+e^3(300x-40x} = \frac{(-5+x)x}{5x-x^2+\log(2e^3(15+x)+x(27+2x))}$$

input
```
Integrate[(135*x - 7*x^2 - 4*x^3 + E^3*(10*x - 2*x^2) + (-135*x + 44*x^2 +
 4*x^3 + E^3*(-150 + 50*x + 4*x^2))*Log[27*x + 2*x^2 + E^3*(30 + 2*x)])/(6
75*x^3 - 220*x^4 + 7*x^5 + 2*x^6 + E^3*(750*x^2 - 250*x^3 + 10*x^4 + 2*x^5
) + (270*x^2 - 34*x^3 - 4*x^4 + E^3*(300*x - 40*x^2 - 4*x^3))*Log[27*x + 2
*x^2 + E^3*(30 + 2*x)] + (27*x + 2*x^2 + E^3*(30 + 2*x))*Log[27*x + 2*x^2
+ E^3*(30 + 2*x)]^2),x]
```

3.1127.

$$\int \frac{135x-7x^2-4x^3+e^3(10x-2x^2)+(-135x+44x^2+4x^3+e^3(-150+50x+4x^2))\log(27x+2x^2+e^3(30+2x))}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-34x^3-4x^4+e^3(300x-40x^2-4x^3))\log(27x+2x^2+e^3(30+2x))+(27x+2x^2+e^3(}$$

output
```
((-5 + x)*x)/(5*x - x^2 + Log[2*E^3*(15 + x) + x*(27 + 2*x)])
```

3.1127.3 Rubi [A] (verified)

Time = 0.74 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.014$, Rules used = {7239, 7262, 17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^3-7x^2+e^3(10x-2x^2)+(4x^3+44x^2+e^3(4x^2+50x-1}{2x^6+7x^5-220x^4+675x^3+(2x^2+27x+e^3(2x+30))\log^2(2x^2+27x+e^3(2x+30))+(-4x^4-34x^3+270}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{(2x-5)\left(2e^3(x+15)+x(2x+27)\right)\log\left(2e^3(x+15)+x(2x+27)\right)-(x-5)x\left(4x+2e^3+27\right)}{\left(2x^2+\left(27+2e^3\right)x+30e^3\right)\left((x-5)x-\log\left(2e^3(x+15)+x(2x+27)\right)\right)^2}dx$$

$$\Big\downarrow \text{7262}$$

$$\int \frac{1}{\left(-\frac{(5-x)x}{\log(2e^3(x+15)+x(2x+27))}-1\right)^2}d\left(-\frac{(5-x)x}{\log\left(2e^3(x+15)+x(2x+27)\right)}\right)$$

$$\Big\downarrow \text{17}$$

$$\frac{1}{\frac{(5-x)x}{\log(2e^3(x+15)+x(2x+27))}+1}$$

input
```
Int[(135*x - 7*x^2 - 4*x^3 + E^3*(10*x - 2*x^2) + (-135*x + 44*x^2 + 4*x^3
 + E^3*(-150 + 50*x + 4*x^2))*Log[27*x + 2*x^2 + E^3*(30 + 2*x)])/(675*x^3
 - 220*x^4 + 7*x^5 + 2*x^6 + E^3*(750*x^2 - 250*x^3 + 10*x^4 + 2*x^5) + (2
70*x^2 - 34*x^3 - 4*x^4 + E^3*(300*x - 40*x^2 - 4*x^3))*Log[27*x + 2*x^2 +
 E^3*(30 + 2*x)] + (27*x + 2*x^2 + E^3*(30 + 2*x))*Log[27*x + 2*x^2 + E^3*
(30 + 2*x)]^2),x]
```

output
```
(1 + ((5 - x)*x)/Log[2*E^3*(15 + x) + x*(27 + 2*x)])^(-1)
```

3.1127.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7262
```
Int[(u_)*((a_.)*(v_)^(p_.) + (b_.)*(w_)^(q_.))^(m_.), x_Symbol] :> With[{c
= Simplify[u/(p*w*D[v, x] - q*v*D[w, x])]}, Simp[c*p   Subst[Int[(b + a*x^p
)^m, x], x, v*w^(m*q + 1)], x] /; FreeQ[c, x]] /; FreeQ[{a, b, m, p, q}, x]
 && EqQ[p + q*(m*p + 1), 0] && IntegerQ[p] && IntegerQ[m]
```

3.1127.4 Maple [A] (verified)

Time = 3.26 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.12

method	result	size
risch	$-\frac{(-5+x)x}{x^2-5x-\ln((2x+30)\mathrm{e}^3+2x^2+27x)}$	36
norman	$-\frac{\ln((2x+30)\mathrm{e}^3+2x^2+27x)}{x^2-5x-\ln((2x+30)\mathrm{e}^3+2x^2+27x)}$	50
parallelrisch	$\frac{(-900x^2\mathrm{e}^6+4500x\,\mathrm{e}^6)\mathrm{e}^{-6}}{900x^2-4500x-900\ln((2x+30)\mathrm{e}^3+2x^2+27x)}$	53

input
```
int((((4*x^2+50*x-150)*exp(3)+4*x^3+44*x^2-135*x)*ln((2*x+30)*exp(3)+2*x^2
+27*x)+(-2*x^2+10*x)*exp(3)-4*x^3-7*x^2+135*x)/(((2*x+30)*exp(3)+2*x^2+27*
x)*ln((2*x+30)*exp(3)+2*x^2+27*x)^2+((-4*x^3-40*x^2+300*x)*exp(3)-4*x^4-34
*x^3+270*x^2)*ln((2*x+30)*exp(3)+2*x^2+27*x)+(2*x^5+10*x^4-250*x^3+750*x^2
)*exp(3)+2*x^6+7*x^5-220*x^4+675*x^3),x,method=_RETURNVERBOSE)
```

output
```
-(-5+x)*x/(x^2-5*x-ln((2*x+30)*exp(3)+2*x^2+27*x))
```

3.1127.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.16

$$\int \frac{135x-7x^2-4x^3+e^3(10x-2x^2)+(-135x+44x^2+4x^3}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-34x^3-4x^4+e^3(300x-40x}$$
$$=-\frac{x^2-5\,x}{x^2-5\,x-\log\left(2\,x^2+2\,(x+15)e^3+27\,x\right)}$$

input
```
integrate((((4*x^2+50*x-150)*exp(3)+4*x^3+44*x^2-135*x)*log((2*x+30)*exp(3
)+2*x^2+27*x)+(-2*x^2+10*x)*exp(3)-4*x^3-7*x^2+135*x)/(((2*x+30)*exp(3)+2*
x^2+27*x)*log((2*x+30)*exp(3)+2*x^2+27*x)^2+((-4*x^3-40*x^2+300*x)*exp(3)-
4*x^4-34*x^3+270*x^2)*log((2*x+30)*exp(3)+2*x^2+27*x)+(2*x^5+10*x^4-250*x^
3+750*x^2)*exp(3)+2*x^6+7*x^5-220*x^4+675*x^3),x, algorithm=\
```

output
```
-(x^2 - 5*x)/(x^2 - 5*x - log(2*x^2 + 2*(x + 15)*e^3 + 27*x))
```

3.1127.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \frac{135x-7x^2-4x^3+e^3(10x-2x^2)+(-135x+44x^2+4x^3}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-34x^3-4x^4+e^3(300x-40x}$$
$$=\frac{x^2-5x}{-x^2+5x+\log\left(2x^2+27x+(2x+30)\,e^3\right)}$$

input
```
integrate((((4*x**2+50*x-150)*exp(3)+4*x**3+44*x**2-135*x)*ln((2*x+30)*exp
(3)+2*x**2+27*x)+(-2*x**2+10*x)*exp(3)-4*x**3-7*x**2+135*x)/(((2*x+30)*exp
(3)+2*x**2+27*x)*ln((2*x+30)*exp(3)+2*x**2+27*x)**2+((-4*x**3-40*x**2+300*
x)*exp(3)-4*x**4-34*x**3+270*x**2)*ln((2*x+30)*exp(3)+2*x**2+27*x)+(2*x**5
+10*x**4-250*x**3+750*x**2)*exp(3)+2*x**6+7*x**5-220*x**4+675*x**3),x)
```

output
```
(x**2 - 5*x)/(-x**2 + 5*x + log(2*x**2 + 27*x + (2*x + 30)*exp(3)))
```

3.1127.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.22

$$\int \frac{135x-7x^2-4x^3+e^3(10x-2x^2)+(-135x+44x^2+4x^3}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-34x^3-4x^4+e^3(300x-40x}$$
$$=-\frac{x^2-5\,x}{x^2-5\,x-\log\left(2\,x^2+x(2\,e^3+27)+30\,e^3\right)}$$

input
```
integrate((((4*x^2+50*x-150)*exp(3)+4*x^3+44*x^2-135*x)*log((2*x+30)*exp(3
)+2*x^2+27*x)+(-2*x^2+10*x)*exp(3)-4*x^3-7*x^2+135*x)/(((2*x+30)*exp(3)+2*
x^2+27*x)*log((2*x+30)*exp(3)+2*x^2+27*x)^2+((-4*x^3-40*x^2+300*x)*exp(3)-
4*x^4-34*x^3+270*x^2)*log((2*x+30)*exp(3)+2*x^2+27*x)+(2*x^5+10*x^4-250*x^
3+750*x^2)*exp(3)+2*x^6+7*x^5-220*x^4+675*x^3),x, algorithm=\
```

output
```
-(x^2 - 5*x)/(x^2 - 5*x - log(2*x^2 + x*(2*e^3 + 27) + 30*e^3))
```

3.1127.8 Giac [A] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.22

$$\int \frac{135x-7x^2-4x^3+e^3(10x-2x^2)+(-135x+44x^2+4x^3}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-34x^3-4x^4+e^3(300x-40x}$$
$$=-\frac{x^2-5\,x}{x^2-5\,x-\log\left(2\,x^2+2\,xe^3+27\,x+30\,e^3\right)}$$

input
```
integrate((((4*x^2+50*x-150)*exp(3)+4*x^3+44*x^2-135*x)*log((2*x+30)*exp(3
)+2*x^2+27*x)+(-2*x^2+10*x)*exp(3)-4*x^3-7*x^2+135*x)/(((2*x+30)*exp(3)+2*
x^2+27*x)*log((2*x+30)*exp(3)+2*x^2+27*x)^2+((-4*x^3-40*x^2+300*x)*exp(3)-
4*x^4-34*x^3+270*x^2)*log((2*x+30)*exp(3)+2*x^2+27*x)+(2*x^5+10*x^4-250*x^
3+750*x^2)*exp(3)+2*x^6+7*x^5-220*x^4+675*x^3),x, algorithm=\
```

output
```
-(x^2 - 5*x)/(x^2 - 5*x - log(2*x^2 + 2*x*e^3 + 27*x + 30*e^3))
```

3.1127.
$$\int \frac{135x-7x^2-4x^3+e^3(10x-2x^2)+(-135x+44x^2+4x^3+e^3(-150+50x+4x^2))\log(27x+2x^2+e^3(30+2x))}{675x^3-220x^4+7x^5+2x^6+e^3(750x^2-250x^3+10x^4+2x^5)+(270x^2-34x^3-4x^4+e^3(300x-40x^2-4x^3))\log(27x+2x^2+e^3(30+2x))+(27x+2x^2+e^3(}$$

3.1127.9 Mupad [F(-1)]

Timed out.

$$\int \frac{135x - 7x^2 - 4x^3 + e^3(10x - 2x^2) + (-135x + 44x^2 + 4x^3}{675x^3 - 220x^4 + 7x^5 + 2x^6 + e^3(750x^2 - 250x^3 + 10x^4 + 2x^5) + (270x^2 - 34x^3 - 4x^4 + e^3(300x - 40x}$$
$$= \int \frac{135\,x + \ln(27\,x + 2\,x^2 + e^3\,(2\,x + 30))\,(e^3\,(4\,x^2 + 50}{675\,x^3 - \ln(27\,x + 2\,x^2 + e^3\,(2\,x + 30))\,(e^3\,(4\,x^3 + 40\,x^2 - 300\,x) - 270\,x^2 + 34\,x^3 + 4\,x^4) - 220\,x^4 +}$$

input
```
int((135*x + log(27*x + 2*x^2 + exp(3)*(2*x + 30))*(exp(3)*(50*x + 4*x^2 -
 150) - 135*x + 44*x^2 + 4*x^3) + exp(3)*(10*x - 2*x^2) - 7*x^2 - 4*x^3)/(
675*x^3 - log(27*x + 2*x^2 + exp(3)*(2*x + 30))*(exp(3)*(40*x^2 - 300*x +
4*x^3) - 270*x^2 + 34*x^3 + 4*x^4) - 220*x^4 + 7*x^5 + 2*x^6 + log(27*x +
2*x^2 + exp(3)*(2*x + 30))^2*(27*x + 2*x^2 + exp(3)*(2*x + 30)) + exp(3)*(
750*x^2 - 250*x^3 + 10*x^4 + 2*x^5)),x)
```

output
```
int((135*x + log(27*x + 2*x^2 + exp(3)*(2*x + 30))*(exp(3)*(50*x + 4*x^2 -
 150) - 135*x + 44*x^2 + 4*x^3) + exp(3)*(10*x - 2*x^2) - 7*x^2 - 4*x^3)/(
675*x^3 - log(27*x + 2*x^2 + exp(3)*(2*x + 30))*(exp(3)*(40*x^2 - 300*x +
4*x^3) - 270*x^2 + 34*x^3 + 4*x^4) - 220*x^4 + 7*x^5 + 2*x^6 + log(27*x +
2*x^2 + exp(3)*(2*x + 30))^2*(27*x + 2*x^2 + exp(3)*(2*x + 30)) + exp(3)*(
750*x^2 - 250*x^3 + 10*x^4 + 2*x^5)), x)
```

3.1128 $\int \frac{3+(-25+24x+4x^2)\log(3)}{-9-3x+(12-17x+5x^2+4x^3)\log(3)}\,dx$

3.1128.1 Optimal result

Integrand size = 41, antiderivative size = 22

$$\int \frac{3+(-25+24x+4x^2)\log(3)}{-9-3x+(12-17x+5x^2+4x^3)\log(3)}\,dx=\log\left(\frac{4(-1+x)^2+x-\frac{3}{\log(3)}}{3+x}\right)$$

output
```
ln((x+4*(-1+x)^2-3/ln(3))/(3+x))
```

3.1128.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 154 vs. 2(22) = 44.

Time = 0.15 (sec) , antiderivative size = 154, normalized size of antiderivative = 7.00

$$\int \frac{3+(-25+24x+4x^2)\log(3)}{-9-3x+(12-17x+5x^2+4x^3)\log(3)}\,dx = \frac{-\frac{6\operatorname{arctanh}\left(\frac{-7\log(3)+2x\log(81)}{\sqrt{49\log^2(3)-4(-3+\log(81))\log(81)}}\right)(-1+7\log(3))(28\log^2(3)+17\log(3)\log(81)-6\log^2(81))}{\log(81)\sqrt{49\log^2(3)-4(-3+\log(81))\log(81)}}+2(3-61\log(3))\log(3+}{2(-3+21\log(3)+10\log(81))}$$

input
```
Integrate[(3 + (-25 + 24*x + 4*x^2)*Log[3])/(-9 - 3*x + (12 - 17*x + 5*x^2
 + 4*x^3)*Log[3]),x]
```

output
```
((-6*ArcTanh[(-7*Log[3] + 2*x*Log[81])/Sqrt[49*Log[3]^2 - 4*(-3 + Log[81])
*Log[81]]]*(-1 + 7*Log[3])*(28*Log[3]^2 + 17*Log[3]*Log[81] - 6*Log[81]^2)
)/(Log[81]*Sqrt[49*Log[3]^2 - 4*(-3 + Log[81])*Log[81]]) + 2*(3 - 61*Log[3
])*Log[3 + x] + ((84*Log[3]^2 - 3*Log[81] + Log[3]*(-12 + 101*Log[81]))*Lo
g[3 + 7*x*Log[3] - Log[81] - x^2*Log[81]])/Log[81])/(2*(-3 + 21*Log[3] + 1
0*Log[81]))
```

3.1128.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(4x^2+24x-25)\log(3)+3}{(4x^3+5x^2-17x+12)\log(3)-3x-9}\,dx$$

$$\Big\downarrow \text{2462}$$

$$\int \left(\frac{(8x-7)\log(3)}{x^2\log(81)-7x\log(3)-3+\log(81)}+\frac{1}{-x-3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\log\left(x^2(-\log(81))+7x\log(3)+3-\log(81)\right)-\log(x+3)$$

input
```
Int[(3 + (-25 + 24*x + 4*x^2)*Log[3])/(-9 - 3*x + (12 - 17*x + 5*x^2 + 4*x
^3)*Log[3]),x]
```

output
```
-Log[3 + x] + Log[3 + 7*x*Log[3] - Log[81] - x^2*Log[81]]
```

3.1128.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.1128.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.23

method	result	size
default	$\ln\left(4x^{2}\ln\left(3\right)-7x\ln\left(3\right)+4\ln\left(3\right)-3\right)-\ln\left(3+x\right)$	27
norman	$\ln\left(4x^{2}\ln\left(3\right)-7x\ln\left(3\right)+4\ln\left(3\right)-3\right)-\ln\left(3+x\right)$	27
risch	$-\ln\left(-3-x\right)+\ln\left(-4x^{2}\ln\left(3\right)+7x\ln\left(3\right)-4\ln\left(3\right)+3\right)$	29
parallelrisch	$\ln\left(\frac{4x^{2}\ln\left(3\right)-7x\ln\left(3\right)+4\ln\left(3\right)-3}{4\ln\left(3\right)}\right)-\ln\left(3+x\right)$	33

input
```
int(((4*x^2+24*x-25)*ln(3)+3)/((4*x^3+5*x^2-17*x+12)*ln(3)-3*x-9),x,method
=_RETURNVERBOSE)
```

output
```
ln(4*x^2*ln(3)-7*x*ln(3)+4*ln(3)-3)-ln(3+x)
```

3.1128.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{3+\left(-25+24x+4x^{2}\right)\log(3)}{-9-3x+\left(12-17x+5x^{2}+4x^{3}\right)\log(3)}\,dx = \log\left(\left(4\,x^{2}-7\,x+4\right)\log\left(3\right)-3\right)-\log\left(x+3\right)$$

input
```
integrate(((4*x^2+24*x-25)*log(3)+3)/((4*x^3+5*x^2-17*x+12)*log(3)-3*x-9),
x, algorithm=\
```

output
```
log((4*x^2 - 7*x + 4)*log(3) - 3) - log(x + 3)
```

3.1128.6 Sympy [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{3+(-25+24x+4x^2)\log(3)}{-9-3x+(12-17x+5x^2+4x^3)\log(3)}\,dx$$
$$= -\log{(x+3)} + \log{\left(x^2 - \frac{7x}{4} + \frac{-3+4\log{(3)}}{4\log{(3)}}\right)}$$

input
```
integrate(((4*x**2+24*x-25)*ln(3)+3)/((4*x**3+5*x**2-17*x+12)*ln(3)-3*x-9)
,x)
```

output
```
-log(x + 3) + log(x**2 - 7*x/4 + (-3 + 4*log(3))/(4*log(3)))
```

3.1128.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{3+(-25+24x+4x^2)\log(3)}{-9-3x+(12-17x+5x^2+4x^3)\log(3)}\,dx$$
$$= \log\left(4\,x^2\log\left(3\right) - 7\,x\log\left(3\right) + 4\,\log\left(3\right) - 3\right) - \log\left(x+3\right)$$

input
```
integrate(((4*x^2+24*x-25)*log(3)+3)/((4*x^3+5*x^2-17*x+12)*log(3)-3*x-9),
x, algorithm=\
```

output
```
log(4*x^2*log(3) - 7*x*log(3) + 4*log(3) - 3) - log(x + 3)
```

3.1128.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

$$\int \frac{3+(-25+24x+4x^2)\log(3)}{-9-3x+(12-17x+5x^2+4x^3)\log(3)}\,dx$$
$$= \log\left(\left|4\,x^2\log\left(3\right) - 7\,x\log\left(3\right) + 4\,\log\left(3\right) - 3\right|\right) - \log\left(\left|x+3\right|\right)$$

input
```
integrate(((4*x^2+24*x-25)*log(3)+3)/((4*x^3+5*x^2-17*x+12)*log(3)-3*x-9),
x, algorithm=\
```

output
```
log(abs(4*x^2*log(3) - 7*x*log(3) + 4*log(3) - 3)) - log(abs(x + 3))
```

3.1128.9 Mupad [B] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{3+(-25+24x+4x^2)\log(3)}{-9-3x+(12-17x+5x^2+4x^3)\log(3)}\,dx$$
$$= \ln\left(-8\,\ln(3)\,x^2+14\,\ln(3)\,x-8\,\ln(3)+6\right)-\ln(x+3)$$

input
```
int(-(log(3)*(24*x + 4*x^2 - 25) + 3)/(3*x - log(3)*(5*x^2 - 17*x + 4*x^3
+ 12) + 9),x)
```

output
```
log(14*x*log(3) - 8*log(3) - 8*x^2*log(3) + 6) - log(x + 3)
```

3.1129 $\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}(1-x-2e^{1+2x}x+8\log(x))\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}$

3.1129.1 Optimal result

Integrand size = 92, antiderivative size = 28

$$\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}(1-x-2e^{1+2x}x+8\log(x))\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}\,dx = \frac{e^{4\log^2(x)}x}{2+e^{e^{1+2x}+x}-x}$$

output
```
x*exp(ln(x)^2)^4/(exp(exp(1+2*x)+x)+2-x)
```

3.1129.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}(1-x-2e^{1+2x}x+8\log(x))\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}\,dx = \frac{e^{4\log^2(x)}x}{2+e^{e^{1+2x}+x}-x}$$

input
```
Integrate[(E^(4*Log[x]^2)*(2 + (16 - 8*x)*Log[x] + E^(E^(1 + 2*x) + x)*(1
- x - 2*E^(1 + 2*x)*x + 8*Log[x])))/(4 + E^(2*E^(1 + 2*x) + 2*x) + E^(E^(1
 + 2*x) + x)*(4 - 2*x) - 4*x + x^2),x]
```

output
```
(E^(4*Log[x]^2)*x)/(2 + E^(E^(1 + 2*x) + x) - x)
```

3.1129.3 Rubi [A] (verified)

Time = 12.13 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$, Rules used = {7292, 7293, 7239, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{4\log^2(x)}\left((16-8x)\log(x)+e^{x+e^{2x+1}}\left(-2e^{2x+1}x-x+8\log(x)+1\right)+2\right)}{x^2-4x+e^{2x+2e^{2x+1}}+e^{x+e^{2x+1}}(4-2x)+4}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{4\log^2(x)}\left((16-8x)\log(x)+e^{x+e^{2x+1}}\left(-2e^{2x+1}x-x+8\log(x)+1\right)+2\right)}{\left(-x+e^{x+e^{2x+1}}+2\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{\left(2ex^3-12ex^2+e^{2e^{2x+1}}x+24ex-3e^{2e^{2x+1}}-16e\right)xe^{4\log^2(x)-2e^{2x+1}}}{\left(-x+e^{x+e^{2x+1}}+2\right)^2}-\frac{e^{4\log^2(x)-2e^{2x+1}}\left(6ex^3-24ex^2+e^2\right.}{-x+}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{e^{4\log^2(x)}\left(-e^{x+e^{2x+1}}(x-1)-2e^{3x+e^{2x+1}+1}x+8\left(-x+e^{x+e^{2x+1}}+2\right)\log(x)+2\right)}{\left(-x+e^{x+e^{2x+1}}+2\right)^2}dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{xe^{4\log^2(x)}}{-x+e^{x+e^{2x+1}}+2}$$

input
```
Int[(E^(4*Log[x]^2)*(2 + (16 - 8*x)*Log[x] + E^(E^(1 + 2*x) + x)*(1 - x -
2*E^(1 + 2*x)*x + 8*Log[x])))/(4 + E^(2*E^(1 + 2*x) + 2*x) + E^(E^(1 + 2*x
) + x)*(4 - 2*x) - 4*x + x^2),x]
```

output
```
(E^(4*Log[x]^2)*x)/(2 + E^(E^(1 + 2*x) + x) - x)
```

3.1129. $\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}\left(1-x-2e^{1+2x}x+8\log(x)\right)\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}dx$

3.1129.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1129.4 Maple [A] (verified)

Time = 24.16 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

method	result	size
risch	$-\frac{x\,{\mathrm e}^{4 \ln \left(x \right)^{2}}}{x -{\mathrm e}^{{\mathrm e}^{1+2 x}+x}-2}$	27
parallelrisch	$-\frac{x\,{\mathrm e}^{4 \ln \left(x \right)^{2}}}{x -{\mathrm e}^{{\mathrm e}^{1+2 x}+x}-2}$	27

input
```
int(((8*ln(x)-2*x*exp(1+2*x)-x+1)*exp(exp(1+2*x)+x)+(-8*x+16)*ln(x)+2)*exp
(ln(x)^2)^4/(exp(exp(1+2*x)+x)^2+(4-2*x)*exp(exp(1+2*x)+x)+x^2-4*x+4),x,me
thod=_RETURNVERBOSE)
```

output
```
-x*exp(4*ln(x)^2)/(x-exp(exp(1+2*x)+x)-2)
```

3.1129.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}(1-x-2e^{1+2x}x+8\log(x))\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}\,dx$$
$$= -\frac{xe^{\left(4\,\log(x)^2\right)}}{x-e^{\left(x+e^{(2\,x+1)}\right)}-2}$$

input
```
integrate(((8*log(x)-2*x*exp(1+2*x)-x+1)*exp(exp(1+2*x)+x)+(-8*x+16)*log(x
)+2)*exp(log(x)^2)^4/(exp(exp(1+2*x)+x)^2+(4-2*x)*exp(exp(1+2*x)+x)+x^2-4*
x+4),x, algorithm=\
```

output
```
-x*e^(4*log(x)^2)/(x - e^(x + e^(2*x + 1)) - 2)
```

3.1129.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}(1-x-2e^{1+2x}x+8\log(x))\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}\,dx$$
$$= \frac{xe^{4\log{(x)}^2}}{-x+e^{x+e^{2x+1}}+2}$$

input
```
integrate(((8*ln(x)-2*x*exp(1+2*x)-x+1)*exp(exp(1+2*x)+x)+(-8*x+16)*ln(x)+
2)*exp(ln(x)**2)**4/(exp(exp(1+2*x)+x)**2+(4-2*x)*exp(exp(1+2*x)+x)+x**2-4
*x+4),x)
```

output
```
x*exp(4*log(x)**2)/(-x + exp(x + exp(2*x + 1)) + 2)
```

3.1129.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}(1-x-2e^{1+2x}x+8\log(x))\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}\,dx = -\frac{xe^{\left(4\,\log(x)^2\right)}}{x-e^{\left(x+e^{(2\,x+1)}\right)}-2}$$

input
```
integrate(((8*log(x)-2*x*exp(1+2*x)-x+1)*exp(exp(1+2*x)+x)+(-8*x+16)*log(x
)+2)*exp(log(x)^2)^4/(exp(exp(1+2*x)+x)^2+(4-2*x)*exp(exp(1+2*x)+x)+x^2-4*
x+4),x, algorithm=\
```

output
```
-x*e^(4*log(x)^2)/(x - e^(x + e^(2*x + 1)) - 2)
```

3.1129.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 146 vs. 2(26) = 52.

Time = 0.52 (sec) , antiderivative size = 146, normalized size of antiderivative = 5.21

$$\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}(1-x-2e^{1+2x}x+8\log(x))\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}\,dx = -\frac{x^2e^{\left(4\,\log(x)^2\right)}+2\,x^2e^{\left(4\,\log(x)^2+2\,x+1\right)}-3\,xe^{\left(4\,\log(x)^2\right)}-4\,xe^{\left(4\,\log(x)^2+2\,x+1\right)}}{2\,x^2e^{(2\,x+1)}+x^2-2\,xe^{\left(3\,x+e^{(2\,x+1)}+1\right)}-8\,xe^{(2\,x+1)}-xe^{\left(x+e^{(2\,x+1)}\right)}-5\,x+4\,e^{\left(3\,x+e^{(2\,x+1)}+1\right)}+8\,e^{(2\,x+1)}+}$$

input
```
integrate(((8*log(x)-2*x*exp(1+2*x)-x+1)*exp(exp(1+2*x)+x)+(-8*x+16)*log(x
)+2)*exp(log(x)^2)^4/(exp(exp(1+2*x)+x)^2+(4-2*x)*exp(exp(1+2*x)+x)+x^2-4*
x+4),x, algorithm=\
```

output
```
-(x^2*e^(4*log(x)^2) + 2*x^2*e^(4*log(x)^2 + 2*x + 1) - 3*x*e^(4*log(x)^2)
 - 4*x*e^(4*log(x)^2 + 2*x + 1))/(2*x^2*e^(2*x + 1) + x^2 - 2*x*e^(3*x + e
^(2*x + 1) + 1) - 8*x*e^(2*x + 1) - x*e^(x + e^(2*x + 1)) - 5*x + 4*e^(3*x
 + e^(2*x + 1) + 1) + 8*e^(2*x + 1) + 3*e^(x + e^(2*x + 1)) + 6)
```

3.1129.9 Mupad [B] (verification not implemented)

Time = 16.12 (sec) , antiderivative size = 91, normalized size of antiderivative = 3.25

$$\int \frac{e^{4\log^2(x)}\left(2+(16-8x)\log(x)+e^{e^{1+2x}+x}(1-x-2e^{1+2x}x+8\log(x))\right)}{4+e^{2e^{1+2x}+2x}+e^{e^{1+2x}+x}(4-2x)-4x+x^2}\,dx$$
$$=-\frac{x\left(3\,e^{4\ln(x)^2}+4\,e^{4\ln(x)^2+2\,x+1}-2\,x\,e^{4\ln(x)^2+2\,x+1}-x\,e^{4\ln(x)^2}\right)}{\left(e^{x+e^{2\,x}\,e}-x+2\right)\,\left(x-4\,e^{2\,x+1}+2\,x\,e^{2\,x+1}-3\right)}$$

input
```
int(-(exp(4*log(x)^2)*(log(x)*(8*x - 16) + exp(x + exp(2*x + 1))*(x - 8*lo
g(x) + 2*x*exp(2*x + 1) - 1) - 2))/(exp(2*x + 2*exp(2*x + 1)) - 4*x - exp(
x + exp(2*x + 1))*(2*x - 4) + x^2 + 4),x)
```

output
```
-(x*(3*exp(4*log(x)^2) + 4*exp(2*x + 4*log(x)^2 + 1) - 2*x*exp(2*x + 4*log
(x)^2 + 1) - x*exp(4*log(x)^2)))/((exp(x + exp(2*x)*exp(1)) - x + 2)*(x -
4*exp(2*x + 1) + 2*x*exp(2*x + 1) - 3))
```

3.1130 $\int \frac{1+\log(x)}{-2+x\log(x)}\,dx$

3.1130.1 Optimal result

Integrand size = 13, antiderivative size = 11

$$\int \frac{1+\log(x)}{-2+x\log(x)}\,dx = \log(2)+\log(2-x\log(x))$$

output
```
ln(2)+ln(2-x*ln(x))
```

3.1130.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.64

$$\int \frac{1+\log(x)}{-2+x\log(x)}\,dx = \log(-2+x\log(x))$$

input
```
Integrate[(1 + Log[x])/(-2 + x*Log[x]),x]
```

output
```
Log[-2 + x*Log[x]]
```

3.1130.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.73, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(x)+1}{x\log(x)-2}\,dx$$

$$\Big\downarrow \text{7235}$$

$$\log(2-x\log(x))$$

input
```
Int[(1 + Log[x])/(-2 + x*Log[x]),x]
```

output
```
Log[2 - x*Log[x]]
```

3.1130.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.1130.4 Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.73

method	result	size
derivativedivides	$\ln(x\ln(x)-2)$	8
default	$\ln(x\ln(x)-2)$	8
norman	$\ln(x\ln(x)-2)$	8
parallelrisch	$\ln(x\ln(x)-2)$	8
risch	$\ln(x)+\ln\left(\ln(x)-\frac{2}{x}\right)$	13

input
```
int((ln(x)+1)/(x*ln(x)-2),x,method=_RETURNVERBOSE)
```

output
```
ln(x*ln(x)-2)
```

3.1130.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.27

$$\int \frac{1+\log(x)}{-2+x\log(x)}\,dx = \log\left(x\right) + \log\left(\frac{x\log\left(x\right) - 2}{x}\right)$$

input
```
integrate((log(x)+1)/(x*log(x)-2),x, algorithm=\
```

output
```
log(x) + log((x*log(x) - 2)/x)
```

3.1130.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

$$\int \frac{1+\log(x)}{-2+x\log(x)}\,dx = \log\left(x\right) + \log\left(\log\left(x\right) - \frac{2}{x}\right)$$

input
```
integrate((ln(x)+1)/(x*ln(x)-2),x)
```

output
```
log(x) + log(log(x) - 2/x)
```

3.1130.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.64

$$\int \frac{1+\log(x)}{-2+x\log(x)}\,dx = \log\left(x\log\left(x\right) - 2\right)$$

input
```
integrate((log(x)+1)/(x*log(x)-2),x, algorithm=\
```

output
```
log(x*log(x) - 2)
```

3.1130.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.64

$$\int \frac{1+\log(x)}{-2+x\log(x)}\,dx = \log\left(x\log\left(x\right)-2\right)$$

input
```
integrate((log(x)+1)/(x*log(x)-2),x, algorithm=\
```

output
```
log(x*log(x) - 2)
```

3.1130.9 Mupad [B] (verification not implemented)

Time = 15.45 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.64

$$\int \frac{1+\log(x)}{-2+x\log(x)}\,dx = \ln\left(x\ \ln\left(x\right)-2\right)$$

input
```
int((log(x) + 1)/(x*log(x) - 2),x)
```

output
```
log(x*log(x) - 2)
```

3.1131 $\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+(2-2x^2+4x^2\log(x)+8x\log$

3.1131.1 Optimal result

Integrand size = 101, antiderivative size = 25

$$\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+\left(2-2x^2+4x^2\log(x)+8x\log^2(x)\right)\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}\,dx$$
$$=-7x+\log^2\left(1-x-\frac{-1+x^2}{4\log(x)}\right)$$

output
```
ln(1-x-1/4*(x^2-1)/ln(x))^2-7*x
```

3.1131.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+\left(2-2x^2+4x^2\log(x)+8x\log^2(x)\right)\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}\,dx$$
$$=-7x+\log^2\left(-\frac{(-1+x)(1+x+4\log(x))}{4\log(x)}\right)$$

input
```
Integrate[((7*x - 7*x^3)*Log[x] + (28*x - 28*x^2)*Log[x]^2 + (2 - 2*x^2 +
4*x^2*Log[x] + 8*x*Log[x]^2)*Log[(1 - x^2 + (4 - 4*x)*Log[x])/(4*Log[x])])
/((-x + x^3)*Log[x] + (-4*x + 4*x^2)*Log[x]^2),x]
```

output
```
-7*x + Log[-1/4*((-1 + x)*(1 + x + 4*Log[x]))/Log[x]]^2
```

3.1131.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+(-2x^2+4x^2\log(x)+8x\log^2(x)+2)\log\left(\frac{-x^2+(4-4x)\log(x)+1}{4\log(x)}\right)}{(x^3-x)\log(x)+(4x^2-4x)\log^2(x)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-(7x-7x^3)\log(x)-((28x-28x^2)\log^2(x))-(-2x^2+4x^2\log(x)+8x\log^2(x)+2)\log\left(\frac{-x^2+(4-4x)\log(x)+1}{4\log(x)}\right)}{(1-x)x\log(x)(x+4\log(x)+1)}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{2(-x^2+2x^2\log(x)+4x\log^2(x)+1)\log\left(-\frac{(x-1)(x+4\log(x)+1)}{4\log(x)}\right)}{(x-1)x\log(x)(x+4\log(x)+1)}-7\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$4\int \frac{\log\left(-\frac{(x-1)(x+4\log(x)+1)}{4\log(x)}\right)}{x+4\log(x)+1}dx+4\int \frac{\log\left(-\frac{(x-1)(x+4\log(x)+1)}{4\log(x)}\right)}{(x-1)(x+4\log(x)+1)}dx-2\int \frac{\log\left(-\frac{(x-1)(x+4\log(x)+1)}{4\log(x)}\right)}{\log(x)(x+4\log(x)+1)}dx-2\int \frac{\log\left(-\frac{(x-1)(x+4\log(x)+1)}{4\log(x)}\right)}{x\log(x)(x+4\log(x)+1)}dx+8\int \frac{\log(x)\log\left(-\frac{(x-1)(x+4\log(x)+1)}{4\log(x)}\right)}{(x-1)(x+4\log(x)+1)}dx-7x$$

input
```
Int[((7*x - 7*x^3)*Log[x] + (28*x - 28*x^2)*Log[x]^2 + (2 - 2*x^2 + 4*x^2*
Log[x] + 8*x*Log[x]^2)*Log[(1 - x^2 + (4 - 4*x)*Log[x])/(4*Log[x])])/((-x
+ x^3)*Log[x] + (-4*x + 4*x^2)*Log[x]^2),x]
```

output
```
$Aborted
```

3.1131. $\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+(2-2x^2+4x^2\log(x)+8x\log^2(x))\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}dx$

3.1131.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1131.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(23) = 46$.

Time = 4.49 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.04

method	result
default	$-7x-4\ln(2)\left(-\ln(\ln(x))+\ln(-1+x)+\ln(x+4\ln(x)+1)\right)+\ln\left(\frac{-4x\ln(x)-x^2+4\ln(x)+1}{\ln(x)}\right)^2$

input
```
int(((8*x*ln(x)^2+4*x^2*ln(x)-2*x^2+2)*ln(1/4*((4-4*x)*ln(x)-x^2+1)/ln(x))
+(-28*x^2+28*x)*ln(x)^2+(-7*x^3+7*x)*ln(x))/((4*x^2-4*x)*ln(x)^2+(x^3-x)*l
n(x)),x,method=_RETURNVERBOSE)
```

output
```
-7*x-4*ln(2)*(-ln(ln(x))+ln(-1+x)+ln(x+4*ln(x)+1))+ln((-4*x*ln(x)-x^2+4*ln
(x)+1)/ln(x))^2
```

3.1131.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+\left(2-2x^2+4x^2\log(x)+8x\log^2(x)\right)\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}\,dx$$
$$=\log\left(-\frac{x^2+4\,(x-1)\log(x)-1}{4\,\log(x)}\right)^2-7\,x$$

input
```
integrate(((8*x*log(x)^2+4*x^2*log(x)-2*x^2+2)*log(1/4*((4-4*x)*log(x)-x^2
+1)/log(x))+(-28*x^2+28*x)*log(x)^2+(-7*x^3+7*x)*log(x))/((4*x^2-4*x)*log(
x)^2+(x^3-x)*log(x)),x, algorithm=\
```

output
```
log(-1/4*(x^2 + 4*(x - 1)*log(x) - 1)/log(x))^2 - 7*x
```

3.1131.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+\left(2-2x^2+4x^2\log(x)+8x\log^2(x)\right)\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}\,dx$$
$$= -7x+\log\left(\frac{-\frac{x^2}{4}+\frac{(4-4x)\log(x)}{4}+\frac{1}{4}}{\log(x)}\right)^2$$

input
```
integrate(((8*x*ln(x)**2+4*x**2*ln(x)-2*x**2+2)*ln(1/4*((4-4*x)*ln(x)-x**2
+1)/ln(x))+(-28*x**2+28*x)*ln(x)**2+(-7*x**3+7*x)*ln(x))/((4*x**2-4*x)*ln(
x)**2+(x**3-x)*ln(x)),x)
```

output
```
-7*x + log((-x**2/4 + (4 - 4*x)*log(x)/4 + 1/4)/log(x))**2
```

3.1131.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. 2(23) = 46.

Time = 0.36 (sec) , antiderivative size = 76, normalized size of antiderivative = 3.04

$$\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+\left(2-2x^2+4x^2\log(x)+8x\log^2(x)\right)\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}\,dx$$
$$= -2\left(2\log(2)-\log(-x+1)+\log(\log(x))\right)\log(x+4\log(x)+1) + \log(x+4\log(x)+1)^2-2\left(2\log(2)+\log(\log(x))\right)\log(-x+1) + \log(-x+1)^2+4\log(2)\log(\log(x))+\log(\log(x))^2-7x$$

input
```
integrate(((8*x*log(x)^2+4*x^2*log(x)-2*x^2+2)*log(1/4*((4-4*x)*log(x)-x^2
+1)/log(x))+(-28*x^2+28*x)*log(x)^2+(-7*x^3+7*x)*log(x))/((4*x^2-4*x)*log(
x)^2+(x^3-x)*log(x)),x, algorithm=\
```

output
```
-2*(2*log(2) - log(-x + 1) + log(log(x)))*log(x + 4*log(x) + 1) + log(x +
4*log(x) + 1)^2 - 2*(2*log(2) + log(log(x)))*log(-x + 1) + log(-x + 1)^2 +
 4*log(2)*log(log(x)) + log(log(x))^2 - 7*x
```

3.1131.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 148 vs. $2(23) = 46$.

Time = 0.36 (sec) , antiderivative size = 148, normalized size of antiderivative = 5.92

$$\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+(2-2x^2+4x^2\log(x)+8x\log^2(x))\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}\,dx$$
$$= 2\left(\log\left(x+4\log\left(x\right)+1\right)+\log\left(x-1\right)-\log\left(\log\left(x\right)\right)\right)\log\left(-x^2-4\,x\log\left(x\right)+4\log\left(x\right)+1\right)-2\left(\log\left(x+4\log\left(x\right)+1\right)+\log\left(x-1\right)\right)\log\left(x+4\log\left(x\right)+1\right)-4\log\left(2\right)\log\left(x+4\log\left(x\right)+1\right)+2\log\left(x+4\log\left(x\right)+1\right)^2-4\log\left(2\right)\log\left(x-1\right)-\log\left(x-1\right)^2-2\log\left(x+4\log\left(x\right)+1\right)\log\left(-x-4\log\left(x\right)-1\right)+\log\left(-x-4\log\left(x\right)-1\right)^2+4\log\left(2\right)\log\left(\log\left(x\right)\right)+\log\left(\log\left(x\right)\right)^2-7\,x$$

input
```
integrate(((8*x*log(x)^2+4*x^2*log(x)-2*x^2+2)*log(1/4*((4-4*x)*log(x)-x^2
+1)/log(x))+(-28*x^2+28*x)*log(x)^2+(-7*x^3+7*x)*log(x))/((4*x^2-4*x)*log(
x)^2+(x^3-x)*log(x)),x, algorithm=\
```

output
```
2*(log(x + 4*log(x) + 1) + log(x - 1) - log(log(x)))*log(-x^2 - 4*x*log(x)
 + 4*log(x) + 1) - 2*(log(x + 4*log(x) + 1) + log(x - 1))*log(x + 4*log(x)
 + 1) - 4*log(2)*log(x + 4*log(x) + 1) + 2*log(x + 4*log(x) + 1)^2 - 4*log
(2)*log(x - 1) - log(x - 1)^2 - 2*log(x + 4*log(x) + 1)*log(-x - 4*log(x)
- 1) + log(-x - 4*log(x) - 1)^2 + 4*log(2)*log(log(x)) + log(log(x))^2 - 7
*x
```

3.1131.9 Mupad [B] (verification not implemented)

Time = 16.64 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.16

$$\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+(2-2x^2+4x^2\log(x)+8x\log^2(x))\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}\,dx$$
$$= \ln\left(-\frac{\frac{\ln(x)\,(4\,x-4)}{4}+\frac{x^2}{4}-\frac{1}{4}}{\ln\left(x\right)}\right)^2-7\,x$$

input
```
int(-(log(x)^2*(28*x - 28*x^2) + log(-((log(x)*(4*x - 4))/4 + x^2/4 - 1/4)
/log(x))*(8*x*log(x)^2 + 4*x^2*log(x) - 2*x^2 + 2) + log(x)*(7*x - 7*x^3))
/(log(x)^2*(4*x - 4*x^2) + log(x)*(x - x^3)),x)
```

output
```
log(-((log(x)*(4*x - 4))/4 + x^2/4 - 1/4)/log(x))^2 - 7*x
```

3.1131. $\int \frac{(7x-7x^3)\log(x)+(28x-28x^2)\log^2(x)+(2-2x^2+4x^2\log(x)+8x\log^2(x))\log\left(\frac{1-x^2+(4-4x)\log(x)}{4\log(x)}\right)}{(-x+x^3)\log(x)+(-4x+4x^2)\log^2(x)}\,dx$

3.1132 $\int \frac{-20x+12e^{x/5}x+\left(-60e^{x/5}+20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right.\right.}{}$

3.1132.1 Optimal result

Integrand size = 309, antiderivative size = 34

$$\int \frac{-20x+12e^{x/5}x+\left(-60e^{x/5}+20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\right.\right.\right.}{\left(60e^{x/5}-20x\right)\log\left(\frac{1}{4}\left(\right.\right.}$$

$$-\frac{x}{\log\left(\log\left(\log\left(\frac{1}{4}e^2\left(-3e^{x/5}+x\right)\log(2)\right)\right)\right)}$$

output
```
1/4*x-x/ln(ln(ln(1/4*(x-3*exp(1/5*x))*ln(2)*exp(2))))
```

3.1132.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00

$$\int \frac{-20x+12e^{x/5}x+\left(-60e^{x/5}+20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\right.\right.\right.}{\left(60e^{x/5}-20x\right)\log\left(\frac{1}{4}\left(\right.\right.}$$

$$-\frac{x}{\log\left(\log\left(2+\log\left(-3e^{x/5}+x\right)+\log\left(\frac{\log(2)}{4}\right)\right)\right)}$$

input
```
Integrate[(-20*x + 12*E^(x/5)*x + (-60*E^(x/5) + 20*x)*Log[(-3*E^(2 + x/5)
*Log[2] + E^2*x*Log[2])/4]*Log[Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/
4]]*Log[Log[Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/4]]] + (15*E^(x/5)
- 5*x)*Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/4]*Log[Log[(-3*E^(2 + x/
5)*Log[2] + E^2*x*Log[2])/4]]*Log[Log[Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*L
og[2])/4]]]^2)/((60*E^(x/5) - 20*x)*Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log
[2])/4]*Log[Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/4]]*Log[Log[Log[(-3
*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/4]]]^2),x]
```

output
```
x/4 - x/Log[Log[2 + Log[-3*E^(x/5) + x] + Log[Log[2]/4]]]
```

3.1132.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{12e^{x/5}x-20x+\left(15e^{x/5}-5x\right)\log\left(\frac{1}{4}\left(e^2x\log(2)-3e^{\frac{x}{5}+2}\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(e^2x\log(2)-3e^{\frac{x}{5}+2}\log(2)\right)\right)\right)}{\left(60e^{x/5}-20x\right)\log\left(\frac{1}{4}\left(e^2x\log\right.\right.}$$

$\big\downarrow$ 7239

$$\int \left(\frac{\left(3e^{x/5}-5\right)x}{5\left(3e^{x/5}-x\right)\left(\log\left(x-3e^{x/5}\right)+2\left(1+\frac{1}{2}\log\left(\frac{\log(2)}{4}\right)\right)\right)\log\left(\log\left(x-3e^{x/5}\right)+2\left(1+\frac{1}{2}\log\left(\frac{\log(2)}{4}\right)\right)\right)\log^2\left(\right.}\right.$$

$\big\downarrow$ 2009

$$-5\text{Subst}\left(\int\frac{1}{\log\left(\log\left(\log\left(5x-3e^x\right)+2\left(1+\frac{1}{2}\log\left(\frac{\log(2)}{4}\right)\right)\right)\right)}dx,x,\frac{x}{5}\right)+$$
$$\frac{1}{5}\int\frac{x^2}{\left(3e^{x/5}-x\right)\left(\log\left(x-3e^{x/5}\right)+2\left(1+\frac{1}{2}\log\left(\frac{\log(2)}{4}\right)\right)\right)\log\left(\log\left(x-3e^{x/5}\right)+2\left(1+\frac{1}{2}\log\left(\frac{\log(2)}{4}\right)\right)\right)\log^2\left(\log\right.}$$
$$\frac{1}{5}\int\frac{x}{\left(\log\left(x-3e^{x/5}\right)+2\left(1+\frac{1}{2}\log\left(\frac{\log(2)}{4}\right)\right)\right)\log\left(\log\left(x-3e^{x/5}\right)+2\left(1+\frac{1}{2}\log\left(\frac{\log(2)}{4}\right)\right)\right)\log^2\left(\log\left(\log\left(x-\right.\right.\right.}$$
$$\int\frac{x}{\left(x-3e^{x/5}\right)\left(\log\left(x-3e^{x/5}\right)+2\left(1+\frac{1}{2}\log\left(\frac{\log(2)}{4}\right)\right)\right)\log\left(\log\left(x-3e^{x/5}\right)+2\left(1+\frac{1}{2}\log\left(\frac{\log(2)}{4}\right)\right)\right)\log^2\left(\log\right.}$$
$$\frac{x}{4}$$

$$\int\frac{-20x+12e^{x/5}x+\left(-60e^{x/5}+20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\right)\log\left(\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2\right.\right.\right.\right.}{\left(60e^{x/5}-20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\right.\right.}$$

input
```
Int[(-20*x + 12*E^(x/5)*x + (-60*E^(x/5) + 20*x)*Log[(-3*E^(2 + x/5)*Log[2
] + E^2*x*Log[2])/4]*Log[Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/4]]*Lo
g[Log[Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/4]]] + (15*E^(x/5) - 5*x)
*Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/4]*Log[Log[(-3*E^(2 + x/5)*Log
[2] + E^2*x*Log[2])/4]]*Log[Log[Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])
/4]]]^2)/((60*E^(x/5) - 20*x)*Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/4
]*Log[Log[(-3*E^(2 + x/5)*Log[2] + E^2*x*Log[2])/4]]*Log[Log[Log[(-3*E^(2
+ x/5)*Log[2] + E^2*x*Log[2])/4]]]^2),x]
```

output
```
$Aborted
```

3.1132.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1132.4 Maple [A] (verified)

Time = 10.09 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

method	result	size
risch	$\frac{x}{4}-\frac{x}{\ln\left(\ln\left(\ln\left(-\frac{3\ln(2){\mathrm e}^{2+\frac{x}{5}}}{4}+\frac{x\,{\mathrm e}^{2}\ln(2)}{4}\right)\right)\right)}$	31
parallelrisch	$\frac{30\ln\left(\ln\left(\ln\left(-\frac{{\mathrm e}^{2}\ln(2)\left(3\,{\mathrm e}^{\frac{x}{5}}-x\right)}{4}\right)\right)\right)x-120x}{120\ln\left(\ln\left(\ln\left(-\frac{{\mathrm e}^{2}\ln(2)\left(3\,{\mathrm e}^{\frac{x}{5}}-x\right)}{4}\right)\right)\right)}$	50

input
```
int(((15*exp(1/5*x)-5*x)*ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2
))*ln(ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2)))*ln(ln(ln(-3/4*e
xp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2))))^2+(-60*exp(1/5*x)+20*x)*ln(-3
/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2))*ln(ln(-3/4*exp(2)*ln(2)*exp
(1/5*x)+1/4*x*exp(2)*ln(2)))*ln(ln(ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*e
xp(2)*ln(2))))+12*x*exp(1/5*x)-20*x)/(60*exp(1/5*x)-20*x)/ln(-3/4*exp(2)*l
n(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2))/ln(ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4
*x*exp(2)*ln(2)))/ln(ln(ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2)
)))^2,x,method=_RETURNVERBOSE)
```

output
```
1/4*x-x/ln(ln(ln(-3/4*ln(2)*exp(2+1/5*x)+1/4*x*exp(2)*ln(2))))
```

3.1132.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.53

$$\int \frac{-20x + 12e^{x/5}x + \left(-60e^{x/5} + 20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2) + e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2) + e^2x\right.\right.\right.}{\left(60e^{x/5} - 20x\right)\log\left(\frac{1}{4}\left(\right.\right.}$$

input
```
integrate(((15*exp(1/5*x)-5*x)*log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp
(2)*log(2))*log(log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2)))*lo
g(log(log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))))^2+(-60*exp(
1/5*x)+20*x)*log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))*log(lo
g(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2)))*log(log(log(-3/4*exp
(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))))+12*x*exp(1/5*x)-20*x)/(60*exp
(1/5*x)-20*x)/log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))/log(l
og(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2)))/log(log(log(-3/4*ex
p(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))))^2,x, algorithm=\
```

output
```
1/4*(x*log(log(log(1/4*x*e^2*log(2) - 3/4*e^(1/5*x + 2)*log(2)))) - 4*x)/l
og(log(log(1/4*x*e^2*log(2) - 3/4*e^(1/5*x + 2)*log(2))))
```

3.1132.6 Sympy [A] (verification not implemented)

Time = 7.64 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00

$$\int \frac{-20x+12e^{x/5}x+\left(-60e^{x/5}+20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\right.\right.\right.}{\left(60e^{x/5}-20x\right)\log\left(\frac{1}{4}\left(\right.\right.}$$

$$-\frac{x}{\log\left(\log\left(\log\left(\frac{xe^2\log(2)}{4}-\frac{3e^2e^{\frac{x}{5}}\log(2)}{4}\right)\right)\right)}$$

input
```
integrate(((15*exp(1/5*x)-5*x)*ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2
)*ln(2))*ln(ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2)))*ln(ln(ln(
-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2))))**2+(-60*exp(1/5*x)+20*x
)*ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2))*ln(ln(-3/4*exp(2)*ln
(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2)))*ln(ln(ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+
1/4*x*exp(2)*ln(2))))+12*x*exp(1/5*x)-20*x)/(60*exp(1/5*x)-20*x)/ln(-3/4*e
xp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2)*ln(2))/ln(ln(-3/4*exp(2)*ln(2)*exp(1/5
*x)+1/4*x*exp(2)*ln(2)))/ln(ln(ln(-3/4*exp(2)*ln(2)*exp(1/5*x)+1/4*x*exp(2
)*ln(2))))**2,x)
```

output
```
x/4 - x/log(log(log(x*exp(2)*log(2)/4 - 3*exp(2)*exp(x/5)*log(2)/4)))
```

3.1132.7 Maxima [A] (verification not implemented)

Time = 0.47 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.47

$$\int \frac{-20x+12e^{x/5}x+\left(-60e^{x/5}+20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\right.\right.\right.}{\left(60e^{x/5}-20x\right)\log\left(\frac{1}{4}\left(\right.\right.}$$

input
```
integrate(((15*exp(1/5*x)-5*x)*log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp
(2)*log(2))*log(log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2)))*lo
g(log(log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))))^2+(-60*exp(
1/5*x)+20*x)*log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))*log(lo
g(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2)))*log(log(log(-3/4*exp
(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))))+12*x*exp(1/5*x)-20*x)/(60*exp
(1/5*x)-20*x)/log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))/log(l
og(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2)))/log(log(log(-3/4*ex
p(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))))^2,x, algorithm=\
```

output
```
1/4*(x*log(log(-2*log(2) + log(x - 3*e^(1/5*x)) + log(log(2)) + 2)) - 4*x)
/log(log(-2*log(2) + log(x - 3*e^(1/5*x)) + log(log(2)) + 2))
```

3.1132.8 Giac [A] (verification not implemented)

Time = 0.67 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.47

$$\int \frac{-20x + 12e^{x/5}x + \left(-60e^{x/5} + 20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2) + e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2) + e^2x\right.\right.\right.}{\left(60e^{x/5} - 20x\right)\log\left(\frac{1}{4}\left(\right.\right.}$$

input
```
integrate(((15*exp(1/5*x)-5*x)*log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp
(2)*log(2))*log(log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2)))*lo
g(log(log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))))^2+(-60*exp(
1/5*x)+20*x)*log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))*log(lo
g(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2)))*log(log(log(-3/4*exp
(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))))+12*x*exp(1/5*x)-20*x)/(60*exp
(1/5*x)-20*x)/log(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))/log(l
og(-3/4*exp(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2)))/log(log(log(-3/4*ex
p(2)*log(2)*exp(1/5*x)+1/4*x*exp(2)*log(2))))^2,x, algorithm=\
```

output
```
1/4*(x*log(log(-2*log(2) + log(x - 3*e^(1/5*x)) + log(log(2)) + 2)) - 4*x)
/log(log(-2*log(2) + log(x - 3*e^(1/5*x)) + log(log(2)) + 2))
```

3.1132.9 Mupad [B] (verification not implemented)

Time = 20.77 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

$$\int \frac{-20x + 12e^{x/5}x + \left(-60e^{x/5} + 20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2) + e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2) + e^2x\right.\right.\right.}{\left(60e^{x/5} - 20x\right)\log\left(\frac{1}{4}\left(\right.\right.}$$

$$-\frac{x}{\ln\left(\ln\left(\ln\left(\frac{x\,\mathrm{e}^2\,\ln(2)}{4} - \frac{3\,\mathrm{e}^2\,\ln(2)\,{\left(\mathrm{e}^x\right)}^{1/5}}{4}\right)\right)\right)}$$

input
```
int((20*x - 12*x*exp(x/5) - log(log((x*exp(2)*log(2))/4 - (3*exp(x/5)*exp(
2)*log(2))/4))*log(log(log((x*exp(2)*log(2))/4 - (3*exp(x/5)*exp(2)*log(2)
)/4)))*log((x*exp(2)*log(2))/4 - (3*exp(x/5)*exp(2)*log(2))/4)*(20*x - 60*
exp(x/5)) + log(log((x*exp(2)*log(2))/4 - (3*exp(x/5)*exp(2)*log(2))/4))*l
og(log(log((x*exp(2)*log(2))/4 - (3*exp(x/5)*exp(2)*log(2))/4)))^2*log((x*
exp(2)*log(2))/4 - (3*exp(x/5)*exp(2)*log(2))/4)*(5*x - 15*exp(x/5)))/(log
(log((x*exp(2)*log(2))/4 - (3*exp(x/5)*exp(2)*log(2))/4))*log(log(log((x*e
xp(2)*log(2))/4 - (3*exp(x/5)*exp(2)*log(2))/4)))^2*log((x*exp(2)*log(2))/
4 - (3*exp(x/5)*exp(2)*log(2))/4)*(20*x - 60*exp(x/5))),x)
```

output
```
x/4 - x/log(log(log((x*exp(2)*log(2))/4 - (3*exp(2)*log(2)*exp(x)^(1/5))/4
)))
```

3.1132.

$$\int \frac{-20x+12e^{x/5}x+\left(-60e^{x/5}+20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\right)\log\left(\log\left(\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2\right.\right.\right.\right.}{\left(60e^{x/5}-20x\right)\log\left(\frac{1}{4}\left(-3e^{2+\frac{x}{5}}\log(2)+e^2x\log(2)\right)\right)\log\left(\log\left(\frac{1}{4}\right.\right.}$$

3.1133 $\int \frac{e^{5+2x}(3-2x)+2x^4-e^5x^4-e^xx^4}{x^4} dx$

3.1133.1 Optimal result

Integrand size = 39, antiderivative size = 31

$$\int \frac{e^{5+2x}(3-2x)+2x^4-e^5x^4-e^xx^4}{x^4} dx = 3-e^x+2x-\frac{e^5\left(\frac{e^{2x}}{x^2}+x^2\right)}{x}$$

output
```
3+2*x-exp(x)-exp(5)/x*(exp(x)^2/x^2+x^2)
```

3.1133.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87

$$\int \frac{e^{5+2x}(3-2x)+2x^4-e^5x^4-e^xx^4}{x^4} dx = -e^x-\frac{e^{5+2x}}{x^3}+2x-e^5x$$

input
```
Integrate[(E^(5 + 2*x)*(3 - 2*x) + 2*x^4 - E^5*x^4 - E^x*x^4)/x^4,x]
```

output
```
-E^x - E^(5 + 2*x)/x^3 + 2*x - E^5*x
```

3.1133.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.87, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {6, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-e^x x^4-e^5 x^4+2 x^4+e^{2 x+5} (3-2 x)}{x^4} \, dx$$
$$\Big\downarrow \text{6}$$
$$\int \frac{-e^x x^4+\left(2-e^5\right) x^4+e^{2 x+5} (3-2 x)}{x^4}dx$$
$$\Big\downarrow \text{2010}$$
$$\int \left(-\frac{e^{2 x+5} (2 x-3)}{x^4}-e^x+2 \left(1-\frac{e^5}{2}\right)\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{e^{2 x+5}}{x^3}+\left(2-e^5\right) x-e^x$$

input
```
Int[(E^(5 + 2*x)*(3 - 2*x) + 2*x^4 - E^5*x^4 - E^x*x^4)/x^4,x]
```

output
```
-E^x - E^(5 + 2*x)/x^3 + (2 - E^5)*x
```

3.1133.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1133.4 Maple [A] (verified)

Time = 1.13 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.81

method	result	s
risch	$-x\,\mathrm{e}^{5}+2x-\frac{\mathrm{e}^{5+2x}}{x^{3}}-\mathrm{e}^{x}$	[illegible]
parts	$2x-\frac{\mathrm{e}^{5}\mathrm{e}^{2x}}{x^{3}}-x\,\mathrm{e}^{5}-\mathrm{e}^{x}$	[illegible]
norman	$\frac{\left(2-\mathrm{e}^{5}\right)x^{4}-\mathrm{e}^{5}\mathrm{e}^{2x}-\mathrm{e}^{x}x^{3}}{x^{3}}$	[illegible]
parallelrisch	$-\frac{x^{4}\mathrm{e}^{5}-2x^{4}+\mathrm{e}^{x}x^{3}+\mathrm{e}^{5}\mathrm{e}^{2x}}{x^{3}}$	[illegible]
default	$2x+3\,\mathrm{e}^{5}\left(-\frac{\mathrm{e}^{2x}}{3x^{3}}-\frac{\mathrm{e}^{2x}}{3x^{2}}-\frac{2\,\mathrm{e}^{2x}}{3x}-\frac{4\,\mathrm{Ei}_{1}(-2x)}{3}\right)-2\,\mathrm{e}^{5}\left(-\frac{\mathrm{e}^{2x}}{2x^{2}}-\frac{\mathrm{e}^{2x}}{x}-2\,\mathrm{Ei}_{1}\left(-2x\right)\right)-x\,\mathrm{e}^{5}-\mathrm{e}^{x}$	[illegible]

input
```
int(((3-2*x)*exp(5)*exp(x)^2-exp(x)*x^4-x^4*exp(5)+2*x^4)/x^4,x,method=_RE
TURNVERBOSE)
```

output
```
-x*exp(5)+2*x-1/x^3*exp(5+2*x)-exp(x)
```

3.1133.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.94

$$\int \frac{e^{5+2x}(3-2x)+2x^4-e^5x^4-e^xx^4}{x^4}\,dx=-\frac{x^4e^5-2\,x^4+x^3e^x+e^{(2\,x+5)}}{x^3}$$

input
```
integrate(((3-2*x)*exp(5)*exp(x)^2-exp(x)*x^4-x^4*exp(5)+2*x^4)/x^4,x, alg
orithm=\
```

output
```
-(x^4*e^5 - 2*x^4 + x^3*e^x + e^(2*x + 5))/x^3
```

3.1133.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{e^{5+2x}(3-2x)+2x^4-e^5x^4-e^xx^4}{x^4}\,dx = x\left(2-e^5\right)+\frac{-x^3e^x-e^5e^{2x}}{x^3}$$

input
```
integrate(((3-2*x)*exp(5)*exp(x)**2-exp(x)*x**4-x**4*exp(5)+2*x**4)/x**4,x
)
```

output
```
x*(2 - exp(5)) + (-x**3*exp(x) - exp(5)*exp(2*x))/x**3
```

3.1133.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

$$\int \frac{e^{5+2x}(3-2x)+2x^4-e^5x^4-e^xx^4}{x^4}\,dx = -xe^5+8\,e^5\Gamma(-2,-2\,x)+24\,e^5\Gamma(-3,-2\,x)+2\,x-e^x$$

input
```
integrate(((3-2*x)*exp(5)*exp(x)^2-exp(x)*x^4-x^4*exp(5)+2*x^4)/x^4,x, alg
orithm=\
```

output
```
-x*e^5 + 8*e^5*gamma(-2, -2*x) + 24*e^5*gamma(-3, -2*x) + 2*x - e^x
```

3.1133.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.94

$$\int \frac{e^{5+2x}(3-2x)+2x^4-e^5x^4-e^xx^4}{x^4}\,dx = -\frac{x^4e^5-2\,x^4+x^3e^x+e^{(2\,x+5)}}{x^3}$$

input
```
integrate(((3-2*x)*exp(5)*exp(x)^2-exp(x)*x^4-x^4*exp(5)+2*x^4)/x^4,x, alg
orithm=\
```

output
```
-(x^4*e^5 - 2*x^4 + x^3*e^x + e^(2*x + 5))/x^3
```

3.1133.9 Mupad [B] (verification not implemented)

Time = 16.74 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.74

$$\int \frac{e^{5+2x}(3-2x)+2x^4-e^5x^4-e^xx^4}{x^4}\,dx=-\mathrm{e}^x-x\left(\mathrm{e}^5-2\right)-\frac{\mathrm{e}^{2\,x+5}}{x^3}$$

input
```
int(-(x^4*exp(x) + x^4*exp(5) - 2*x^4 + exp(2*x)*exp(5)*(2*x - 3))/x^4,x)
```

output
```
- exp(x) - x*(exp(5) - 2) - exp(2*x + 5)/x^3
```

3.1134 $\int \frac{-5x-4x^2+x^3+e^{7+x}(4+3x-x^2)+(-8-10x+3x^2+e^{7+x}(4x+3x^2-x^3))\log(x)+(-4-3x+x^2)\log(1+x)}{-4x-3x^2+x^3}\,dx$

3.1134.1 Optimal result

Integrand size = 89, antiderivative size = 27

$$\int \frac{-5x-4x^2+x^3+e^{7+x}(4+3x-x^2)+(-8-10x+3x^2+e^{7+x}(4x+3x^2-x^3))\log(x)+(-4-3x+x^2)\log(1+x)}{-4x-3x^2+x^3}\,dx = x-\log(4-x)+\log(x)\left(-e^{7+x}+\log(x)+\log(1+x)\right)$$

output
```
ln(x)*(ln(x)-exp(x+7)+ln(1+x))+x-ln(-x+4)
```

3.1134.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{-5x-4x^2+x^3+e^{7+x}(4+3x-x^2)+(-8-10x+3x^2+e^{7+x}(4x+3x^2-x^3))\log(x)+(-4-3x+x^2)\log(1+x)}{-4x-3x^2+x^3}\,dx = x-\log(4-x)-e^{7+x}\log(x)+\log^2(x)+\log(x)\log(1+x)$$

input
```
Integrate[(-5*x - 4*x^2 + x^3 + E^(7 + x)*(4 + 3*x - x^2) + (-8 - 10*x + 3
*x^2 + E^(7 + x)*(4*x + 3*x^2 - x^3))*Log[x] + (-4 - 3*x + x^2)*Log[1 + x]
)/(-4*x - 3*x^2 + x^3),x]
```

output
```
x - Log[4 - x] - E^(7 + x)*Log[x] + Log[x]^2 + Log[x]*Log[1 + x]
```

3.1134.3 Rubi [A] (verified)

Time = 1.05 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.034$, Rules used = {2026, 7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3-4x^2+e^{x+7}(-x^2+3x+4)+(x^2-3x-4)\log(x+1)+(3x^2+e^{x+7}(-x^3+3x^2+4x)-10x-8)\log(x)}{x^3-3x^2-4x}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{x^3-4x^2+e^{x+7}(-x^2+3x+4)+(x^2-3x-4)\log(x+1)+(3x^2+e^{x+7}(-x^3+3x^2+4x)-10x-8)\log(x)}{x(x^2-3x-4)}$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{x^2}{(x-4)(x+1)}-\frac{4x}{x^2-3x-4}-\frac{5}{x^2-3x-4}-\frac{10\log(x)}{x^2-3x-4}-\frac{8\log(x)}{(x^2-3x-4)x}+\frac{3x\log(x)}{(x-4)(x+1)}-\frac{e^{x+7}(x\log}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$x+\log^2(x)-e^{x+7}\log(x)+\log(x+1)\log(x)-2\log(4)\log(8-2x)-\log(4-x)+2\log(4)\log(x-4)$$

input
```
Int[(-5*x - 4*x^2 + x^3 + E^(7 + x)*(4 + 3*x - x^2) + (-8 - 10*x + 3*x^2 +
 E^(7 + x)*(4*x + 3*x^2 - x^3))*Log[x] + (-4 - 3*x + x^2)*Log[1 + x])/(-4*
x - 3*x^2 + x^3),x]
```

output
```
x - 2*Log[4]*Log[8 - 2*x] - Log[4 - x] + 2*Log[4]*Log[-4 + x] - E^(7 + x)*
Log[x] + Log[x]^2 + Log[x]*Log[1 + x]
```

3.1134.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.1134.4 Maple [A] (verified)

Time = 1.32 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

method	result	size
default	$x-\ln(x-4)-\ln(x)\,\mathrm{e}^{x+7}+\ln(x)^2+\ln(x)\ln(1+x)$	28
risch	$x-\ln(x-4)-\ln(x)\,\mathrm{e}^{x+7}+\ln(x)^2+\ln(x)\ln(1+x)$	28
parts	$x-\ln(x-4)-\ln(x)\,\mathrm{e}^{x+7}+\ln(x)^2+\ln(x)\ln(1+x)$	28
parallelrisch	$\ln(x)^2+\ln(x)\ln(1+x)-\ln(x)\,\mathrm{e}^{x+7}-\ln(x-4)+x-\frac{1}{2}$	29

input
```
int(((x^2-3*x-4)*ln(1+x)+((-x^3+3*x^2+4*x)*exp(x+7)+3*x^2-10*x-8)*ln(x)+(-
x^2+3*x+4)*exp(x+7)+x^3-4*x^2-5*x)/(x^3-3*x^2-4*x),x,method=_RETURNVERBOSE
)
```

output
```
x-ln(x-4)-ln(x)*exp(x+7)+ln(x)^2+ln(x)*ln(1+x)
```

3.1134.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{-5x-4x^2+x^3+e^{7+x}(4+3x-x^2)+(-8-10x+3x^2+e^{7+x}(4x+3x^2-x^3))\log(x)+(-4-3x+x^2)\log(1+x)}{-4x-3x^2+x^3}$$
$$=-e^{(x+7)}\log(x)+\log(x+1)\log(x)+\log(x)^2+x-\log(x-4)$$

input
```
integrate(((x^2-3*x-4)*log(1+x)+((-x^3+3*x^2+4*x)*exp(x+7)+3*x^2-10*x-8)*l
og(x)+(-x^2+3*x+4)*exp(x+7)+x^3-4*x^2-5*x)/(x^3-3*x^2-4*x),x, algorithm=\
```

output
```
-e^(x + 7)*log(x) + log(x + 1)*log(x) + log(x)^2 + x - log(x - 4)
```

3.1134.6 Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{-5x-4x^2+x^3+e^{7+x}(4+3x-x^2)+(-8-10x+3x^2+e^{7+x}(4x+3x^2-x^3))\log(x)+(-4-3x+x}{-4x-3x^2+x^3}$$
$$= x-e^{x+7}\log(x)+\log(x)^2+\log(x)\log(x+1)-\log(x-4)$$

input
```
integrate(((x**2-3*x-4)*ln(1+x)+((-x**3+3*x**2+4*x)*exp(x+7)+3*x**2-10*x-8
)*ln(x)+(-x**2+3*x+4)*exp(x+7)+x**3-4*x**2-5*x)/(x**3-3*x**2-4*x),x)
```

output
```
x - exp(x + 7)*log(x) + log(x)**2 + log(x)*log(x + 1) - log(x - 4)
```

3.1134.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{-5x-4x^2+x^3+e^{7+x}(4+3x-x^2)+(-8-10x+3x^2+e^{7+x}(4x+3x^2-x^3))\log(x)+(-4-3x+x}{-4x-3x^2+x^3}$$
$$= -e^{(x+7)}\log(x)+\log(x+1)\log(x)+\log(x)^2+x-\log(x-4)$$

input
```
integrate(((x^2-3*x-4)*log(1+x)+((-x^3+3*x^2+4*x)*exp(x+7)+3*x^2-10*x-8)*l
og(x)+(-x^2+3*x+4)*exp(x+7)+x^3-4*x^2-5*x)/(x^3-3*x^2-4*x),x, algorithm=\
```

output
```
-e^(x + 7)*log(x) + log(x + 1)*log(x) + log(x)^2 + x - log(x - 4)
```

3.1134.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{-5x-4x^2+x^3+e^{7+x}(4+3x-x^2)+(-8-10x+3x^2+e^{7+x}(4x+3x^2-x^3))\log(x)+(-4-3x+x}{-4x-3x^2+x^3}$$
$$= -e^{(x+7)}\log(x)+\log(x+1)\log(x)+\log(x)^2+x-\log(x-4)$$

input
```
integrate(((x^2-3*x-4)*log(1+x)+((-x^3+3*x^2+4*x)*exp(x+7)+3*x^2-10*x-8)*l
og(x)+(-x^2+3*x+4)*exp(x+7)+x^3-4*x^2-5*x)/(x^3-3*x^2-4*x),x, algorithm=\
```

output
```
-e^(x + 7)*log(x) + log(x + 1)*log(x) + log(x)^2 + x - log(x - 4)
```

3.1134.9 Mupad [B] (verification not implemented)

Time = 17.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{-5x-4x^2+x^3+e^{7+x}(4+3x-x^2)+(-8-10x+3x^2+e^{7+x}(4x+3x^2-x^3))\log(x)+(-4-3x+x}{-4x-3x^2+x^3}$$
$$= x-\ln(x-4)+\ln(x)^2-e^{x+7}\ln(x)+\ln(x+1)\ln(x)$$

input
```
int((5*x - exp(x + 7)*(3*x - x^2 + 4) + log(x + 1)*(3*x - x^2 + 4) + 4*x^2
 - x^3 + log(x)*(10*x - exp(x + 7)*(4*x + 3*x^2 - x^3) - 3*x^2 + 8))/(4*x
+ 3*x^2 - x^3),x)
```

output
```
x - log(x - 4) + log(x)^2 - exp(x + 7)*log(x) + log(x + 1)*log(x)
```

3.1135 $\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}(2+x^2-2x^3)\right)}{160+240x^2+120x^4+20x^6}\,dx$

3.1135.1 Optimal result

Integrand size = 85, antiderivative size = 32

$$\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}(2+x^2-2x^3)\right)}{160+240x^2+120x^4+20x^6}\,dx=-10+e^{\frac{2-\frac{1}{4}e^{-1-x+x^2}+x}{5\left(2+x^2\right)^2}}$$

output
```
exp(1/5*(2-1/4*exp(x^2-x-1)+x)/(x^2+2)^2)-10
```

3.1135.2 Mathematica [A] (verified)

Time = 5.24 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94

$$\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}(2+x^2-2x^3)\right)}{160+240x^2+120x^4+20x^6}\,dx=e^{\frac{8-e^{-1-x+x^2}+4x}{20\left(2+x^2\right)^2}}$$

input
```
Integrate[(E^((8 - E^(-1 - x + x^2) + 4*x)/(80 + 80*x^2 + 20*x^4))*(8 - 32
*x - 12*x^2 + E^(-1 - x + x^2)*(2 + x^2 - 2*x^3)))/(160 + 240*x^2 + 120*x^
4 + 20*x^6),x]
```

output
```
E^((8 - E^(-1 - x + x^2) + 4*x)/(20*(2 + x^2)^2))
```

3.1135.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{-e^{x^2-x-1}+4x+8}{20x^4+80x^2+80}}\left(-12x^2+e^{x^2-x-1}\left(-2x^3+x^2+2\right)-32x+8\right)}{20x^6+120x^4+240x^2+160}dx$$

$$\Big\downarrow \text{2070}$$

$$\int \frac{e^{\frac{-e^{x^2-x-1}+4x+8}{20x^4+80x^2+80}}\left(-12x^2+e^{x^2-x-1}\left(-2x^3+x^2+2\right)-32x+8\right)}{\left(2^{2/3}\sqrt[3]{5}x^2+2\ 2^{2/3}\sqrt[3]{5}\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{\left(2x^3-x^2-2\right)\exp\left(x^2+\frac{-e^{x^2-x-1}+4x+8}{20x^4+80x^2+80}-x-1\right)}{20\left(x^2+2\right)^3}-\frac{3e^{\frac{-e^{x^2-x-1}+4x+8}{20x^4+80x^2+80}}x^2}{5\left(x^2+2\right)^3}-\frac{8e^{\frac{-e^{x^2-x-1}+4x+8}{20x^4+80x^2+80}}x}{5\left(x^2+2\right)^3}+\frac{2e^{\frac{-e^{x^2-x-1}}{20x^4+80x^2}}}{5\left(x^2+2\right.}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{\left(e^{x^2}\left(-2x^3+x^2+2\right)-4e^{x+1}\left(3x^2+8x-2\right)\right)\exp\left(-\frac{20x^5+20x^4+80x^3+80x^2+e^{x^2-x-1}+76x+72}{20(x^2+2)^2}\right)}{20\left(x^2+2\right)^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{20}\int \frac{\exp\left(-\frac{20x^5+20x^4+80x^3+80x^2+76x+e^{x^2-x-1}+72}{20(x^2+2)^2}\right)\left(4e^{x+1}\left(-3x^2-8x+2\right)+e^{x^2}\left(-2x^3+x^2+2\right)\right)}{\left(x^2+2\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{20}\int \left(-\frac{4\exp\left(x-\frac{20x^5+20x^4+80x^3+80x^2+76x+e^{x^2-x-1}+72}{20(x^2+2)^2}+1\right)\left(3x^2+8x-2\right)}{\left(x^2+2\right)^3}-\frac{\exp\left(x^2-\frac{20x^5+20x^4+80x^3+80x^2+7}{20(x^2+2)^2}\right.}{(x^2+}\right.$$

$$\Big\downarrow \text{7292}$$

$$\frac{1}{20}\int \left(-\frac{4\exp\left(\frac{e^{-x-1}\left(4e^{x+1}x-e^{x^2}+8e^{x+1}\right)}{20(x^2+2)^2}\right)\left(3x^2+8x-2\right)}{\left(x^2+2\right)^3}-\frac{\exp\left(x^2-\frac{20x^5+20x^4+80x^3+80x^2+76x+e^{x^2-x-1}+72}{20(x^2+2)^2}\right)(2x}{\left(x^2+2\right)^3}\right.$$

3.1135. $\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}\left(2+x^2-2x^3\right)\right)}{160+240x^2+120x^4+20x^6}dx$

$$\Big\downarrow \ 7293$$

$$\frac{1}{20}\int \left(\frac{4\exp\left(\frac{e^{-x-1}\left(4e^{x+1}x-e^{x^2}+8e^{x+1}\right)}{20(x^2+2)^2}\right)(-3x^2-8x+2)}{(x^2+2)^3}+\frac{\exp\left(\frac{e^{-x-1}\left(20e^{x+1}x^6-20e^{x+1}x^5+60e^{x+1}x^4-80e^{x+1}x^3-76e\right.}{20(x^2+2)^2}\right.}{(x^2+2)^3}\right.$$

$$\Big\downarrow \ 7299$$

$$\frac{1}{20}\int \left(\frac{4\exp\left(\frac{e^{-x-1}\left(4e^{x+1}x-e^{x^2}+8e^{x+1}\right)}{20(x^2+2)^2}\right)(-3x^2-8x+2)}{(x^2+2)^3}+\frac{\exp\left(\frac{e^{-x-1}\left(20e^{x+1}x^6-20e^{x+1}x^5+60e^{x+1}x^4-80e^{x+1}x^3-76e\right.}{20(x^2+2)^2}\right.}{(x^2+2)^3}\right.$$

input
```
Int[(E^((8 - E^(-1 - x + x^2) + 4*x)/(80 + 80*x^2 + 20*x^4))*(8 - 32*x - 1
2*x^2 + E^(-1 - x + x^2)*(2 + x^2 - 2*x^3)))/(160 + 240*x^2 + 120*x^4 + 20
*x^6),x]
```

output
```
$Aborted
```

3.1135.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2070
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x^2, 0], Expon[Px
, x^2]], b = Rt[Coeff[Px, x^2, Expon[Px, x^2]], Expon[Px, x^2]]}, Int[u*(a
+ b*x^2)^(Expon[Px, x^2]*p), x] /; EqQ[Px, (a + b*x^2)^Expon[Px, x^2]]] /;
IntegerQ[p] && PolyQ[Px, x^2] && GtQ[Expon[Px, x^2], 1] && NeQ[Coeff[Px, x^
2, 0], 0]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1135. $\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}\left(2+x^2-2x^3\right)\right)}{160+240x^2+120x^4+20x^6}\,dx$

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.1135.4 Maple [A] (verified)

Time = 2.51 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.84

method	result	size
risch	$\mathrm{e}^{\frac{-\mathrm{e}^{x^2-x-1}+4x+8}{20\left(x^2+2\right)^2}}$	27
parallelrisch	$\mathrm{e}^{-\frac{\mathrm{e}^{x^2-x-1}-4x-8}{20\left(x^4+4x^2+4\right)}}$	30
norman	$\frac{x^4\mathrm{e}^{\frac{-\mathrm{e}^{x^2-x-1}+4x+8}{20x^4+80x^2+80}}+4x^2\mathrm{e}^{\frac{-\mathrm{e}^{x^2-x-1}+4x+8}{20x^4+80x^2+80}}+4\,\mathrm{e}^{\frac{-\mathrm{e}^{x^2-x-1}+4x+8}{20x^4+80x^2+80}}}{\left(x^2+2\right)^2}$	117

input
```
int(((-2*x^3+x^2+2)*exp(x^2-x-1)-12*x^2-32*x+8)*exp((-exp(x^2-x-1)+4*x+8)/
(20*x^4+80*x^2+80))/(20*x^6+120*x^4+240*x^2+160),x,method=_RETURNVERBOSE)
```

output
```
exp(1/20*(-exp(x^2-x-1)+4*x+8)/(x^2+2)^2)
```

3.1135.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}\left(2+x^2-2x^3\right)\right)}{160+240x^2+120x^4+20x^6}\,dx=e^{\left(\frac{4\,x-e^{\left(x^2-x-1\right)}+8}{20\,\left(x^4+4\,x^2+4\right)}\right)}$$

input
```
integrate(((-2*x^3+x^2+2)*exp(x^2-x-1)-12*x^2-32*x+8)*exp((-exp(x^2-x-1)+4
*x+8)/(20*x^4+80*x^2+80))/(20*x^6+120*x^4+240*x^2+160),x, algorithm=\
```

output
```
e^(1/20*(4*x - e^(x^2 - x - 1) + 8)/(x^4 + 4*x^2 + 4))
```

3.1135.6 Sympy [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}(2+x^2-2x^3)\right)}{160+240x^2+120x^4+20x^6}\,dx = e^{\frac{4x-e^{x^2-x-1}+8}{20x^4+80x^2+80}}$$

input
```
integrate(((-2*x**3+x**2+2)*exp(x**2-x-1)-12*x**2-32*x+8)*exp((-exp(x**2-x
-1)+4*x+8)/(20*x**4+80*x**2+80))/(20*x**6+120*x**4+240*x**2+160),x)
```

output
```
exp((4*x - exp(x**2 - x - 1) + 8)/(20*x**4 + 80*x**2 + 80))
```

3.1135.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(28) = 56.

Time = 0.40 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.91

$$\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}(2+x^2-2x^3)\right)}{160+240x^2+120x^4+20x^6}\,dx$$
$$= e^{\left(\frac{x}{5\,(x^4+4\,x^2+4)}-\frac{e^{(x^2-x)}}{20\,(x^4e+4\,x^2e+4\,e)}+\frac{2}{5\,(x^4+4\,x^2+4)}\right)}$$

input
```
integrate(((-2*x^3+x^2+2)*exp(x^2-x-1)-12*x^2-32*x+8)*exp((-exp(x^2-x-1)+4
*x+8)/(20*x^4+80*x^2+80))/(20*x^6+120*x^4+240*x^2+160),x, algorithm=\
```

output
```
e^(1/5*x/(x^4 + 4*x^2 + 4) - 1/20*e^(x^2 - x)/(x^4*e + 4*x^2*e + 4*e) + 2/
5/(x^4 + 4*x^2 + 4))
```

3.1135.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.69

$$\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}(2+x^2-2x^3)\right)}{160+240x^2+120x^4+20x^6}\,dx$$
$$= e^{\left(\frac{x}{5\left(x^4+4x^2+4\right)}-\frac{e^{\left(x^2-x-1\right)}}{20\left(x^4+4x^2+4\right)}+\frac{2}{5\left(x^4+4x^2+4\right)}\right)}$$

input
```
integrate((((-2*x^3+x^2+2)*exp(x^2-x-1)-12*x^2-32*x+8)*exp((-exp(x^2-x-1)+4
*x+8)/(20*x^4+80*x^2+80))/(20*x^6+120*x^4+240*x^2+160),x, algorithm=\
```

output
```
e^(1/5*x/(x^4 + 4*x^2 + 4) - 1/20*e^(x^2 - x - 1)/(x^4 + 4*x^2 + 4) + 2/5/
(x^4 + 4*x^2 + 4))
```

3.1135.9 Mupad [B] (verification not implemented)

Time = 16.21 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.97

$$\int \frac{e^{\frac{8-e^{-1-x+x^2}+4x}{80+80x^2+20x^4}}\left(8-32x-12x^2+e^{-1-x+x^2}(2+x^2-2x^3)\right)}{160+240x^2+120x^4+20x^6}\,dx$$
$$= e^{\frac{4x}{20x^4+80x^2+80}}\,e^{-\frac{e^{-x}\,e^{x^2}\,e^{-1}}{20x^4+80x^2+80}}\,e^{\frac{8}{20x^4+80x^2+80}}$$

input
```
int(-(exp((4*x - exp(x^2 - x - 1) + 8)/(80*x^2 + 20*x^4 + 80))*(32*x - exp
(x^2 - x - 1)*(x^2 - 2*x^3 + 2) + 12*x^2 - 8))/(240*x^2 + 120*x^4 + 20*x^6
 + 160),x)
```

output
```
exp((4*x)/(80*x^2 + 20*x^4 + 80))*exp(-(exp(-x)*exp(x^2)*exp(-1))/(80*x^2
+ 20*x^4 + 80))*exp(8/(80*x^2 + 20*x^4 + 80))
```

3.1136 $\int \frac{e^3(-1-x)\left(e^{-1+x}\left(-3e^{1-x}+x\right)\right)^{e^3}}{3e^{1-x}-x}\,dx$

3.1136.1 Optimal result

Integrand size = 45, antiderivative size = 13

$$\int \frac{e^3(-1-x)\left(e^{-1+x}\left(-3e^{1-x}+x\right)\right)^{e^3}}{3e^{1-x}-x}\,dx=\left(-3+e^{-1+x}x\right)^{e^3}$$

output
```
exp(exp(3)*ln(x/exp(1-x)-3))
```

3.1136.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int \frac{e^3(-1-x)\left(e^{-1+x}\left(-3e^{1-x}+x\right)\right)^{e^3}}{3e^{1-x}-x}\,dx=\left(-3+e^{-1+x}x\right)^{e^3}$$

input
```
Integrate[(E^3*(-1 - x)*(E^(-1 + x)*(-3*E^(1 - x) + x))^E^3)/(3*E^(1 - x)
 - x),x]
```

output
```
(-3 + E^(-1 + x)*x)^E^3
```

3.1136.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^3(-x-1)\left(e^{x-1}\left(x-3e^{1-x}\right)\right)^{e^3}}{3e^{1-x}-x}dx$$

$$\Big\downarrow \text{27}$$

$$e^3\int -\frac{\left(-e^{x-1}\left(3e^{1-x}-x\right)\right)^{e^3}(x+1)}{3e^{1-x}-x}dx$$

$$\Big\downarrow \text{25}$$

$$-e^3\int \frac{\left(-e^{x-1}\left(3e^{1-x}-x\right)\right)^{e^3}(x+1)}{3e^{1-x}-x}dx$$

$$\Big\downarrow \text{7270}$$

$$-e^3\left(e^{x-1}\right)^{-e^3}\left(3e^{1-x}-x\right)^{-e^3}\left(-e^{x-1}\left(3e^{1-x}-x\right)\right)^{e^3}\int \left(e^{x-1}\right)^{e^3}\left(3e^{1-x}-x\right)^{-1+e^3}(x+1)dx$$

$$\Big\downarrow \text{2717}$$

$$-e^{e^3(1-x)+3}\left(3e^{1-x}-x\right)^{-e^3}\left(-e^{x-1}\left(3e^{1-x}-x\right)\right)^{e^3}\int e^{-e^3(1-x)}\left(3e^{1-x}-x\right)^{-1+e^3}(x+1)dx$$

$$\Big\downarrow \text{7292}$$

$$-e^{e^3(1-x)+3}\left(3e^{1-x}-x\right)^{-e^3}\left(-e^{x-1}\left(3e^{1-x}-x\right)\right)^{e^3}\int e^{e^3x-e^3}\left(3e^{1-x}-x\right)^{-1+e^3}(x+1)dx$$

$$\Big\downarrow \text{7293}$$

$$-e^{e^3(1-x)+3}\left(3e^{1-x}-x\right)^{-e^3}\left(-e^{x-1}\left(3e^{1-x}-x\right)\right)^{e^3}\int \left(e^{e^3x-e^3}\left(3e^{1-x}-x\right)^{-1+e^3}+e^{e^3x-e^3}x\left(3e^{1-x}-x\right)^{-1+e^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-e^{e^3(1-x)+3}\left(3e^{1-x}-x\right)^{-e^3}\left(-e^{x-1}\left(3e^{1-x}-x\right)\right)^{e^3}\left(\int e^{e^3x-e^3}\left(3e^{1-x}-x\right)^{-1+e^3}dx+\int e^{e^3x-e^3}\left(3e^{1-x}-x\right)^{-1+e^3}\right.$$

input
```
Int[(E^3*(-1 - x)*(E^(-1 + x)*(-3*E^(1 - x) + x))^E^3)/(3*E^(1 - x) - x),x
]
```

output
```
$Aborted
```

3.1136. $\int \frac{e^3(-1-x)\left(e^{-1+x}\left(-3e^{1-x}+x\right)\right)^{e^3}}{3e^{1-x}-x}dx$

3.1136.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2717
```
Int[(u_.)*((a_.)*(F_)^(v_))^(n_), x_Symbol] :> Simp[(a*F^v)^n/F^(n*v)   Int
[u*F^(n*v), x], x] /; FreeQ[{F, a, n}, x] &&  !IntegerQ[n]
```

rule 7270
```
Int[(u_.)*((a_.)*(v_)^(m_.)*(w_)^(n_.))^(p_), x_Symbol] :> Simp[a^IntPart[p
]*((a*v^m*w^n)^FracPart[p]/(v^(m*FracPart[p])*w^(n*FracPart[p])))   Int[u*v
^(m*p)*w^(n*p), x], x] /; FreeQ[{a, m, n, p}, x] &&  !IntegerQ[p] &&  !Free
Q[v, x] &&  !FreeQ[w, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1136.4 Maple [A] (verified)

Time = 0.81 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.92

method	result
norman	$\mathrm{e}^{\mathrm{e}^{3} \ln\left(\left(-3\,\mathrm{e}^{1-x}+x\right)\mathrm{e}^{-1+x}\right)}$
parallelrisch	$\mathrm{e}^{\mathrm{e}^{3} \ln\left(-\left(3\,\mathrm{e}^{1-x}-x\right)\mathrm{e}^{-1+x}\right)}$
risch	$\left(\mathrm{e}^{1-x}\right)^{-\mathrm{e}^{3}} \left(-3\,\mathrm{e}^{1-x}+x\right)^{\mathrm{e}^{3}} \mathrm{e}^{-\frac{i\pi\,\mathrm{e}^{3}\,\mathrm{csgn}\left(i\left(-3\,\mathrm{e}^{1-x}+x\right)\mathrm{e}^{-1+x}\right)\left(-\mathrm{csgn}\left(i\left(-3\,\mathrm{e}^{1-x}+x\right)\mathrm{e}^{-1+x}\right)+\mathrm{csgn}\left(i\mathrm{e}^{-1+x}\right)\right)\left(-\mathrm{csgn}\left(i\left(-\right.\right.\right.}{2}}$

input
```
int((-1-x)*exp(3)*exp(exp(3)*ln((-3*exp(1-x)+x)/exp(1-x)))/(3*exp(1-x)-x),
x,method=_RETURNVERBOSE)
```

output
```
exp(exp(3)*ln((-3*exp(1-x)+x)/exp(1-x)))
```

3.1136.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{e^3(-1-x)\left(e^{-1+x}(-3e^{1-x}+x)\right)^{e^3}}{3e^{1-x}-x}\,dx = \left(xe^{(x-1)}-3\right)^{e^3}$$

input
```
integrate((-1-x)*exp(3)*exp(exp(3)*log((-3*exp(1-x)+x)/exp(1-x)))/(3*exp(1
-x)-x),x, algorithm=\
```

output
```
(x*e^(x - 1) - 3)^e^3
```

3.1136.6 Sympy [A] (verification not implemented)

Time = 9.90 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.15

$$\int \frac{e^3(-1-x)\left(e^{-1+x}(-3e^{1-x}+x)\right)^{e^3}}{3e^{1-x}-x}\,dx = \left(\left(x-3e^{1-x}\right)e^{x-1}\right)^{e^3}$$

input
```
integrate((-1-x)*exp(3)*exp(exp(3)*ln((-3*exp(1-x)+x)/exp(1-x)))/(3*exp(1-
x)-x),x)
```

output
```
((x - 3*exp(1 - x))*exp(x - 1))**exp(3)
```

3.1136.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.46

$$\int \frac{e^3(-1-x)\left(e^{-1+x}(-3e^{1-x}+x)\right)^{e^3}}{3e^{1-x}-x}\,dx = e^{\left(e^3\log(xe^x-3\,e)-e^3\right)}$$

input
```
integrate((-1-x)*exp(3)*exp(exp(3)*log((-3*exp(1-x)+x)/exp(1-x)))/(3*exp(1
-x)-x),x, algorithm=\
```

output
```
e^(e^3*log(x*e^x - 3*e) - e^3)
```

3.1136.8 Giac [F]

$$\int \frac{e^3(-1-x)\left(e^{-1+x}(-3e^{1-x}+x)\right)^{e^3}}{3e^{1-x}-x}\,dx = \int \frac{\left(\left(x-3\,e^{(-x+1)}\right)e^{(x-1)}\right)^{e^3}(x+1)e^3}{x-3\,e^{(-x+1)}}\,dx$$

input
```
integrate((-1-x)*exp(3)*exp(exp(3)*log((-3*exp(1-x)+x)/exp(1-x)))/(3*exp(1
-x)-x),x, algorithm=\
```

output
```
integrate(((x - 3*e^(-x + 1))*e^(x - 1))^e^3*(x + 1)*e^3/(x - 3*e^(-x + 1)
), x)
```

3.1136.9 Mupad [B] (verification not implemented)

Time = 15.88 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{e^3(-1-x)\left(e^{-1+x}(-3e^{1-x}+x)\right)^{e^3}}{3e^{1-x}-x}\,dx = \left(x\,\mathrm{e}^{x-1}-3\right)^{\mathrm{e}^3}$$

input
```
int((exp(3)*(exp(x - 1)*(x - 3*exp(1 - x)))^exp(3)*(x + 1))/(x - 3*exp(1 -
 x)),x)
```

output
```
(x*exp(x - 1) - 3)^exp(3)
```

3.1137 $\int \frac{-6\log(x)-3\log^2(x)}{-7+e^2}\,dx$

3.1137.1 Optimal result

Integrand size = 19, antiderivative size = 16

$$\int \frac{-6\log(x)-3\log^2(x)}{-7+e^2}\,dx = \frac{3x\log^2(x)}{7-e^2}$$

output
```
3*ln(x)^2/(7-exp(2))*x
```

3.1137.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{-6\log(x)-3\log^2(x)}{-7+e^2}\,dx = -\frac{3x\log^2(x)}{-7+e^2}$$

input
```
Integrate[(-6*Log[x] - 3*Log[x]^2)/(-7 + E^2),x]
```

output
```
(-3*x*Log[x]^2)/(-7 + E^2)
```

3.1137.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3\log^2(x)-6\log(x)}{e^2-7}\,dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{\int \left(-3\log^2(x)-6\log(x)\right)dx}{7-e^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{3x\log^2(x)}{7-e^2}$$

input
```
Int[(-6*Log[x] - 3*Log[x]^2)/(-7 + E^2),x]
```

output
```
(3*x*Log[x]^2)/(7 - E^2)
```

3.1137.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1137.4 Maple [A] (verified)

Time = 0.68 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

method	result	size
default	$-\frac{3x\ln(x)^2}{\mathrm{e}^2-7}$	14
norman	$-\frac{3x\ln(x)^2}{\mathrm{e}^2-7}$	14
risch	$-\frac{3x\ln(x)^2}{\mathrm{e}^2-7}$	14
parallelrisch	$-\frac{3x\ln(x)^2}{\mathrm{e}^2-7}$	14
parts	$-\frac{6(x\ln(x)-x)}{\mathrm{e}^2-7}-\frac{3\left(x\ln(x)^2-2x\ln(x)+2x\right)}{\mathrm{e}^2-7}$	41

input
```
int((-3*ln(x)^2-6*ln(x))/(exp(2)-7),x,method=_RETURNVERBOSE)
```

output
```
-3/(exp(2)-7)*x*ln(x)^2
```

3.1137.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-6\log(x)-3\log^2(x)}{-7+e^2}\,dx=-\frac{3\,x\log{(x)}^2}{e^2-7}$$

input
```
integrate((-3*log(x)^2-6*log(x))/(exp(2)-7),x, algorithm=\
```

output
```
-3*x*log(x)^2/(e^2 - 7)
```

3.1137.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.88

$$\int \frac{-6\log(x)-3\log^2(x)}{-7+e^2}\,dx=-\frac{3x\log{(x)}^2}{-7+e^2}$$

input
```
integrate((-3*ln(x)**2-6*ln(x))/(exp(2)-7),x)
```

output
```
-3*x*log(x)**2/(-7 + exp(2))
```

3.1137.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 29 vs. $2(13) = 26$.

Time = 0.20 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.81

$$\int \frac{-6\log(x) - 3\log^2(x)}{-7 + e^2}\,dx = -\frac{3\left(\left(\log\left(x\right)^2 - 2\log\left(x\right) + 2\right)x + 2\,x\log\left(x\right) - 2\,x\right)}{e^2 - 7}$$

input
```
integrate((-3*log(x)^2-6*log(x))/(exp(2)-7),x, algorithm=\
```

output
```
-3*((log(x)^2 - 2*log(x) + 2)*x + 2*x*log(x) - 2*x)/(e^2 - 7)
```

3.1137.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-6\log(x) - 3\log^2(x)}{-7 + e^2}\,dx = -\frac{3\,x\log\left(x\right)^2}{e^2 - 7}$$

input
```
integrate((-3*log(x)^2-6*log(x))/(exp(2)-7),x, algorithm=\
```

output
```
-3*x*log(x)^2/(e^2 - 7)
```

3.1137.9 Mupad [B] (verification not implemented)

Time = 15.67 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{-6\log(x) - 3\log^2(x)}{-7 + e^2}\,dx = -\frac{3\,x\ln\left(x\right)^2}{\mathrm{e}^2 - 7}$$

input
```
int(-(6*log(x) + 3*log(x)^2)/(exp(2) - 7),x)
```

output
```
-(3*x*log(x)^2)/(exp(2) - 7)
```

3.1138 $\int \frac{18x^3+e^{\frac{20+9x^2}{9x^2}}(-40+9x^2)}{9x^2}\,dx$

3.1138.1 Optimal result

Integrand size = 37, antiderivative size = 15

$$\int \frac{18x^3+e^{\frac{20+9x^2}{9x^2}}(-40+9x^2)}{9x^2}\,dx = x\left(e^{1+\frac{20}{9x^2}}+x\right)$$

output
```
(x+exp(20/9/x^2+1))*x
```

3.1138.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int \frac{18x^3+e^{\frac{20+9x^2}{9x^2}}(-40+9x^2)}{9x^2}\,dx = e^{1+\frac{20}{9x^2}}x+x^2$$

input
```
Integrate[(18*x^3 + E^((20 + 9*x^2)/(9*x^2))*(-40 + 9*x^2))/(9*x^2),x]
```

output
```
E^(1 + 20/(9*x^2))*x + x^2
```

3.1138.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.60, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.081, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{18x^3+e^{\frac{9x^2+20}{9x^2}}\left(9x^2-40\right)}{9x^2}dx$$

$$\Big\downarrow 27$$

$$\frac{1}{9}\int \frac{18x^3-e^{\frac{9x^2+20}{9x^2}}\left(40-9x^2\right)}{x^2}dx$$

$$\Big\downarrow 2010$$

$$\frac{1}{9}\int \left(18x+\frac{e^{1+\frac{20}{9x^2}}\left(9x^2-40\right)}{x^2}\right)dx$$

$$\Big\downarrow 2009$$

$$\frac{1}{9}\left(9x^2+9e^{\frac{20}{9x^2}+1}x\right)$$

input
```
Int[(18*x^3 + E^((20 + 9*x^2)/(9*x^2))*(-40 + 9*x^2))/(9*x^2),x]
```

output
```
(9*E^(1 + 20/(9*x^2))*x + 9*x^2)/9
```

3.1138.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1138.4 Maple [A] (verified)

Time = 0.66 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33

method	result	size
risch	$x^2+x\,\mathrm{e}^{\frac{9x^2+20}{9x^2}}$	20
parallelrisch	$x^2+x\,\mathrm{e}^{\frac{9x^2+20}{9x^2}}$	20
norman	$\frac{x^3+\mathrm{e}^{\frac{9x^2+20}{9x^2}}x^2}{x}$	26
derivativedivides	$x^2-\frac{2i\mathrm{e}\sqrt{\pi}\,\sqrt{5}\,\mathrm{erf}\left(\frac{2i\sqrt{5}}{3x}\right)}{3}-\mathrm{e}\left(-\mathrm{e}^{\frac{20}{9x^2}}x-\frac{2i\sqrt{\pi}\,\sqrt{5}\,\mathrm{erf}\left(\frac{2i\sqrt{5}}{3x}\right)}{3}\right)$	59
default	$x^2-\frac{2i\mathrm{e}\sqrt{\pi}\,\sqrt{5}\,\mathrm{erf}\left(\frac{2i\sqrt{5}}{3x}\right)}{3}-\mathrm{e}\left(-\mathrm{e}^{\frac{20}{9x^2}}x-\frac{2i\sqrt{\pi}\,\sqrt{5}\,\mathrm{erf}\left(\frac{2i\sqrt{5}}{3x}\right)}{3}\right)$	59
parts	$x^2-\frac{2i\mathrm{e}\sqrt{\pi}\,\sqrt{5}\,\mathrm{erf}\left(\frac{2i\sqrt{5}}{3x}\right)}{3}-\mathrm{e}\left(-\mathrm{e}^{\frac{20}{9x^2}}x-\frac{2i\sqrt{\pi}\,\sqrt{5}\,\mathrm{erf}\left(\frac{2i\sqrt{5}}{3x}\right)}{3}\right)$	59

input
```
int(1/9*((9*x^2-40)*exp(1/9*(9*x^2+20)/x^2)+18*x^3)/x^2,x,method=_RETURNVE
RBOSE)
```

output
```
x^2+x*exp(1/9*(9*x^2+20)/x^2)
```

3.1138.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.27

$$\int \frac{18x^3+e^{\frac{20+9x^2}{9x^2}}(-40+9x^2)}{9x^2}\,dx = x^2+xe^{\left(\frac{9\,x^2+20}{9\,x^2}\right)}$$

input
```
integrate(1/9*((9*x^2-40)*exp(1/9*(9*x^2+20)/x^2)+18*x^3)/x^2,x, algorithm
=\
```

output
```
x^2 + x*e^(1/9*(9*x^2 + 20)/x^2)
```

3.1138.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{18x^3 + e^{\frac{20+9x^2}{9x^2}}(-40+9x^2)}{9x^2}\,dx = x^2 + xe^{\frac{x^2+\frac{20}{9}}{x^2}}$$

input
```
integrate(1/9*((9*x**2-40)*exp(1/9*(9*x**2+20)/x**2)+18*x**3)/x**2,x)
```

output
```
x**2 + x*exp((x**2 + 20/9)/x**2)
```

3.1138.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 61, normalized size of antiderivative = 4.07

$$\int \frac{18x^3 + e^{\frac{20+9x^2}{9x^2}}(-40+9x^2)}{9x^2}\,dx = \frac{1}{3}\sqrt{5}x\sqrt{-\frac{1}{x^2}}e\Gamma\left(-\frac{1}{2}, -\frac{20}{9\,x^2}\right) + x^2 + \frac{2\sqrt{5}\sqrt{\pi}\left(\operatorname{erf}\left(\frac{2}{3}\sqrt{5}\sqrt{-\frac{1}{x^2}}\right) - 1\right)e}{3\,x\sqrt{-\frac{1}{x^2}}}$$

input
```
integrate(1/9*((9*x^2-40)*exp(1/9*(9*x^2+20)/x^2)+18*x^3)/x^2,x, algorithm
=\
```

output
```
1/3*sqrt(5)*x*sqrt(-1/x^2)*e*gamma(-1/2, -20/9/x^2) + x^2 + 2/3*sqrt(5)*sq
rt(pi)*(erf(2/3*sqrt(5)*sqrt(-1/x^2)) - 1)*e/(x*sqrt(-1/x^2))
```

3.1138.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.27

$$\int \frac{18x^3 + e^{\frac{20+9x^2}{9x^2}}(-40+9x^2)}{9x^2}\,dx = x^2 + xe^{\left(\frac{9\,x^2+20}{9\,x^2}\right)}$$

input
```
integrate(1/9*((9*x^2-40)*exp(1/9*(9*x^2+20)/x^2)+18*x^3)/x^2,x, algorithm
=\
```

output
```
x^2 + x*e^(1/9*(9*x^2 + 20)/x^2)
```

3.1138.9 Mupad [B] (verification not implemented)

Time = 15.31 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \frac{18x^3 + e^{\frac{20+9x^2}{9x^2}}(-40 + 9x^2)}{9x^2}\,dx = x\left(x + \mathrm{e}^{\frac{20}{9\,x^2}+1}\right)$$

input
```
int(((exp((x^2 + 20/9)/x^2)*(9*x^2 - 40))/9 + 2*x^3)/x^2,x)
```

output
```
x*(x + exp(20/(9*x^2) + 1))
```

3.1139 $\int \frac{e^{-x}\left(e^x(-5-8x)-6x+2x^2+\left(-6x-8e^x x+10x^2-2x^3\right)\log(x)\right)}{2x}\,dx$

3.1139.1 Optimal result

Integrand size = 53, antiderivative size = 23

$$\int \frac{e^{-x}\left(e^x(-5-8x)-6x+2x^2+\left(-6x-8e^x x+10x^2-2x^3\right)\log(x)\right)}{2x}\,dx = \left(-\frac{5}{2}-4x+e^{-x}\left(-3x+x^2\right)\right)\log(x)$$

output
```
((x^2-3*x)/exp(x)-5/2-4*x)*ln(x)
```

3.1139.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{e^{-x}\left(e^x(-5-8x)-6x+2x^2+\left(-6x-8e^x x+10x^2-2x^3\right)\log(x)\right)}{2x}\,dx = -\frac{5\log(x)}{2}+x\left(-4-3e^{-x}+e^{-x}x\right)\log(x)$$

input
```
Integrate[(E^x*(-5 - 8*x) - 6*x + 2*x^2 + (-6*x - 8*E^x*x + 10*x^2 - 2*x^3
)*Log[x])/(2*E^x*x),x]
```

output
```
(-5*Log[x])/2 + x*(-4 - 3/E^x + x/E^x)*Log[x]
```

3.1139.3 Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.57, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.075, Rules used = {27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(2x^2+\left(-2x^3+10x^2-8e^x x-6x\right)\log(x)-6x+e^x(-8x-5)\right)}{2x}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\int -\frac{e^{-x}\left(-2x^2+6x+e^x(8x+5)+2\left(x^3-5x^2+4e^x x+3x\right)\log(x)\right)}{x}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{2}\int \frac{e^{-x}\left(-2x^2+6x+e^x(8x+5)+2\left(x^3-5x^2+4e^x x+3x\right)\log(x)\right)}{x}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{2}\int \left(\frac{8\log(x)x+8x+5}{x}+2e^{-x}\left(\log(x)x^2-5\log(x)x-x+3\log(x)+3\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(2e^{-x}x^2\log(x)-6e^{-x}x\log(x)-8x\log(x)-5\log(x)\right)$$

input
```
Int[(E^x*(-5 - 8*x) - 6*x + 2*x^2 + (-6*x - 8*E^x*x + 10*x^2 - 2*x^3)*Log[
x])/(2*E^x*x),x]
```

output
```
(-5*Log[x] - 8*x*Log[x] - (6*x*Log[x])/E^x + (2*x^2*Log[x])/E^x)/2
```

3.1139.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1139.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

method	result	size
risch	$x(-4\,\mathrm{e}^{x}-3+x)\,\mathrm{e}^{-x}\ln\left(x\right)-\frac{5\ln\left(x\right)}{2}$	21
parts	$\left(x^{2}\ln\left(x\right)-3x\ln\left(x\right)\right)\mathrm{e}^{-x}-\frac{5\ln\left(x\right)}{2}-4x\ln\left(x\right)$	28
default	$\frac{\left(-6x\ln\left(x\right)+2x^{2}\ln\left(x\right)\right)\mathrm{e}^{-x}}{2}-\frac{5\ln\left(x\right)}{2}-4x\ln\left(x\right)$	30
norman	$\left(x^{2}\ln\left(x\right)-\frac{5\,\mathrm{e}^{x}\ln\left(x\right)}{2}-3x\ln\left(x\right)-4x\,\mathrm{e}^{x}\ln\left(x\right)\right)\mathrm{e}^{-x}$	31
parallelrisch	$\frac{\left(2x^{2}\ln\left(x\right)-8x\,\mathrm{e}^{x}\ln\left(x\right)-6x\ln\left(x\right)-5\,\mathrm{e}^{x}\ln\left(x\right)\right)\mathrm{e}^{-x}}{2}$	33

input
```
int(1/2*((-8*exp(x)*x-2*x^3+10*x^2-6*x)*ln(x)+(-8*x-5)*exp(x)+2*x^2-6*x)/e
xp(x)/x,x,method=_RETURNVERBOSE)
```

output
```
x*(-4*exp(x)-3+x)/exp(x)*ln(x)-5/2*ln(x)
```

3.1139.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int\frac{e^{-x}\left(e^{x}(-5-8x)-6x+2x^{2}+\left(-6x-8e^{x}x+10x^{2}-2x^{3}\right)\log(x)\right)}{2x}\,dx$$
$$=\frac{1}{2}\left(2\,x^{2}-(8\,x+5)e^{x}-6\,x\right)e^{(-x)}\log\left(x\right)$$

input
```
integrate(1/2*((-8*exp(x)*x-2*x^3+10*x^2-6*x)*log(x)+(-8*x-5)*exp(x)+2*x^2
-6*x)/exp(x)/x,x, algorithm=\
```

output
```
1/2*(2*x^2 - (8*x + 5)*e^x - 6*x)*e^(-x)*log(x)
```

3.1139.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{e^{-x}(e^x(-5-8x)-6x+2x^2+(-6x-8e^xx+10x^2-2x^3)\log(x))}{2x}\,dx$$
$$= -4x\log{(x)} + \left(x^2\log{(x)} - 3x\log{(x)}\right)e^{-x} - \frac{5\log{(x)}}{2}$$

input
```
integrate(1/2*((-8*exp(x)*x-2*x**3+10*x**2-6*x)*ln(x)+(-8*x-5)*exp(x)+2*x*
*2-6*x)/exp(x)/x,x)
```

output
```
-4*x*log(x) + (x**2*log(x) - 3*x*log(x))*exp(-x) - 5*log(x)/2
```

3.1139.7 Maxima [F]

$$\int \frac{e^{-x}(e^x(-5-8x)-6x+2x^2+(-6x-8e^xx+10x^2-2x^3)\log(x))}{2x}\,dx$$
$$= \int \frac{(2\,x^2-(8\,x+5)e^x-2\,(x^3-5\,x^2+4\,xe^x+3\,x)\log{(x)}-6\,x)e^{(-x)}}{2\,x}\,dx$$

input
```
integrate(1/2*((-8*exp(x)*x-2*x^3+10*x^2-6*x)*log(x)+(-8*x-5)*exp(x)+2*x^2
-6*x)/exp(x)/x,x, algorithm=\
```

output
```
(x^2 - 3*x - 3)*e^(-x)*log(x) - (x + 1)*e^(-x) - 4*x*log(x) + 3*e^(-x)*log
(x) - 3*Ei(-x) + 3*e^(-x) - 1/2*integrate(2*(x^2 - 3*x - 3)*e^(-x)/x, x) -
 5/2*log(x)
```

3.1139.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{e^{-x}(e^x(-5-8x)-6x+2x^2+(-6x-8e^xx+10x^2-2x^3)\log(x))}{2x}\,dx$$
$$= x^2e^{(-x)}\log{(x)} - 3\,xe^{(-x)}\log{(x)} - 4\,x\log{(x)} - \frac{5}{2}\log{(x)}$$

input
```
integrate(1/2*((-8*exp(x)*x-2*x^3+10*x^2-6*x)*log(x)+(-8*x-5)*exp(x)+2*x^2
-6*x)/exp(x)/x,x, algorithm=\
```

output
```
x^2*e^(-x)*log(x) - 3*x*e^(-x)*log(x) - 4*x*log(x) - 5/2*log(x)
```

3.1139.9 Mupad [B] (verification not implemented)

Time = 15.55 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{e^{-x}(e^x(-5-8x)-6x+2x^2+(-6x-8e^xx+10x^2-2x^3)\log(x))}{2x}\,dx$$
$$=-\frac{\ln(x)\ (8\,x+6\,x\,\mathrm{e}^{-x}-2\,x^2\,\mathrm{e}^{-x}+5)}{2}$$

input
```
int(-(exp(-x)*(3*x + (exp(x)*(8*x + 5))/2 + (log(x)*(6*x + 8*x*exp(x) - 10
*x^2 + 2*x^3))/2 - x^2))/x,x)
```

output
```
-(log(x)*(8*x + 6*x*exp(-x) - 2*x^2*exp(-x) + 5))/2
```

3.1140 $\int \frac{33-4x+12x^3+3\log\left(\frac{x^2}{2}\right)}{27x-2x^2+3x^4+3x\log\left(\frac{x^2}{2}\right)}\,dx$

3.1140.1 Optimal result

Integrand size = 48, antiderivative size = 22

$$\int \frac{33-4x+12x^3+3\log\left(\frac{x^2}{2}\right)}{27x-2x^2+3x^4+3x\log\left(\frac{x^2}{2}\right)}\,dx = \log\left(x\left(9+x\left(-\frac{2}{3}+x^2\right)+\log\left(\frac{x^2}{2}\right)\right)\right)$$

output
```
ln(x*(9+ln(1/2*x^2)+x*(x^2-2/3)))
```

3.1140.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{33-4x+12x^3+3\log\left(\frac{x^2}{2}\right)}{27x-2x^2+3x^4+3x\log\left(\frac{x^2}{2}\right)}\,dx = \log(x)+\log\left(27-2x+3x^3+3\log\left(\frac{x^2}{2}\right)\right)$$

input
```
Integrate[(33 - 4*x + 12*x^3 + 3*Log[x^2/2])/(27*x - 2*x^2 + 3*x^4 + 3*x*L
og[x^2/2]),x]
```

output
```
Log[x] + Log[27 - 2*x + 3*x^3 + 3*Log[x^2/2]]
```

3.1140.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.021, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{12x^3+3\log\left(\frac{x^2}{2}\right)-4x+33}{3x^4-2x^2+3x\log\left(\frac{x^2}{2}\right)+27x}dx$$

$$\Big\downarrow \text{ 7235}$$

$$\log\left(3x^4-2x^2+3x\log\left(\frac{x^2}{2}\right)+27x\right)$$

input
```
Int[(33 - 4*x + 12*x^3 + 3*Log[x^2/2])/(27*x - 2*x^2 + 3*x^4 + 3*x*Log[x^2
/2]),x]
```

output
```
Log[27*x - 2*x^2 + 3*x^4 + 3*x*Log[x^2/2]]
```

3.1140.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.1140.4 Maple [A] (verified)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

method	result	size
risch	$\ln(x)+\ln\left(x^3-\frac{2x}{3}+\ln\left(\frac{x^2}{2}\right)+9\right)$	19
derivativedivides	$\ln\left(3x\ln\left(\frac{x^2}{2}\right)+3x^4-2x^2+27x\right)$	25
default	$\ln\left(3x\ln\left(\frac{x^2}{2}\right)+3x^4-2x^2+27x\right)$	25
parallelrisch	$\frac{\ln\left(\frac{x^2}{2}\right)}{2}+\ln\left(x^3-\frac{2x}{3}+\ln\left(\frac{x^2}{2}\right)+9\right)$	25
norman	$\frac{\ln\left(\frac{x^2}{2}\right)}{2}+\ln\left(3x^3+3\ln\left(\frac{x^2}{2}\right)-2x+27\right)$	29

input
```
int((3*ln(1/2*x^2)+12*x^3-4*x+33)/(3*x*ln(1/2*x^2)+3*x^4-2*x^2+27*x),x,met
hod=_RETURNVERBOSE)
```

output
```
ln(x)+ln(x^3-2/3*x+ln(1/2*x^2)+9)
```

3.1140.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

$$\int \frac{33-4x+12x^3+3\log\left(\frac{x^2}{2}\right)}{27x-2x^2+3x^4+3x\log\left(\frac{x^2}{2}\right)}\,dx=\log\left(3\,x^3-2\,x+3\,\log\left(\frac{1}{2}\,x^2\right)+27\right)+\frac{1}{2}\,\log\left(\frac{1}{2}\,x^2\right)$$

input
```
integrate((3*log(1/2*x^2)+12*x^3-4*x+33)/(3*x*log(1/2*x^2)+3*x^4-2*x^2+27*
x),x, algorithm=\
```

output
```
log(3*x^3 - 2*x + 3*log(1/2*x^2) + 27) + 1/2*log(1/2*x^2)
```

3.1140.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{33-4x+12x^3+3\log\left(\frac{x^2}{2}\right)}{27x-2x^2+3x^4+3x\log\left(\frac{x^2}{2}\right)}\,dx = \log(x)+\log\left(x^3-\frac{2x}{3}+\log\left(\frac{x^2}{2}\right)+9\right)$$

input
```
integrate((3*ln(1/2*x**2)+12*x**3-4*x+33)/(3*x*ln(1/2*x**2)+3*x**4-2*x**2+
27*x),x)
```

output
```
log(x) + log(x**3 - 2*x/3 + log(x**2/2) + 9)
```

3.1140.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{33-4x+12x^3+3\log\left(\frac{x^2}{2}\right)}{27x-2x^2+3x^4+3x\log\left(\frac{x^2}{2}\right)}\,dx = \log\left(3\,x^4-2\,x^2+3\,x\log\left(\frac{1}{2}\,x^2\right)+27\,x\right)$$

input
```
integrate((3*log(1/2*x^2)+12*x^3-4*x+33)/(3*x*log(1/2*x^2)+3*x^4-2*x^2+27*
x),x, algorithm=\
```

output
```
log(3*x^4 - 2*x^2 + 3*x*log(1/2*x^2) + 27*x)
```

3.1140.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{33-4x+12x^3+3\log\left(\frac{x^2}{2}\right)}{27x-2x^2+3x^4+3x\log\left(\frac{x^2}{2}\right)}\,dx = \log\left(3\,x^3-2\,x+3\,\log\left(\frac{1}{2}\,x^2\right)+27\right)+\log(x)$$

input
```
integrate((3*log(1/2*x^2)+12*x^3-4*x+33)/(3*x*log(1/2*x^2)+3*x^4-2*x^2+27*
x),x, algorithm=\
```

output
```
log(3*x^3 - 2*x + 3*log(1/2*x^2) + 27) + log(x)
```

3.1140.9 Mupad [B] (verification not implemented)

Time = 15.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{33-4x+12x^3+3\log\left(\frac{x^2}{2}\right)}{27x-2x^2+3x^4+3x\log\left(\frac{x^2}{2}\right)}\,dx=\ln\left(\ln\left(\frac{x^2}{2}\right)-\frac{2\,x}{3}+x^3+9\right)+\frac{\ln\left(x^2\right)}{2}$$

input
```
int((3*log(x^2/2) - 4*x + 12*x^3 + 33)/(27*x + 3*x*x*log(x^2/2) - 2*x^2 + 3*
x^4),x)
```

output
```
log(log(x^2/2) - (2*x)/3 + x^3 + 9) + log(x^2)/2
```

3.1141 $\int \frac{6+x^2+(6+x^2)\log(24+4x^2)+\frac{e^{e^2+x}\left(-6+2x-x^2+(-6-x^2)\log(24+4x^2)\right)}{1+\log(24+4x^2)}}{6+x^2+(6+x^2)\log(24+4x^2)}$

3.1141.1 Optimal result

Integrand size = 87, antiderivative size = 27

$$\int \frac{6+x^2+(6+x^2)\log(24+4x^2)+\frac{e^{e^2+x}(-6+2x-x^2+(-6-x^2)\log(24+4x^2))}{1+\log(24+4x^2)}}{6+x^2+(6+x^2)\log(24+4x^2)}\,dx = x-\log(2)-\frac{e^{e^2+x}}{1+\log(4(6+x^2))}$$

output
```
x-exp(-ln(ln(4*x^2+24)+1)+x+exp(2))-ln(2)
```

3.1141.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

$$\int \frac{6+x^2+(6+x^2)\log(24+4x^2)+\frac{e^{e^2+x}(-6+2x-x^2+(-6-x^2)\log(24+4x^2))}{1+\log(24+4x^2)}}{6+x^2+(6+x^2)\log(24+4x^2)}\,dx = x-\frac{e^{e^2+x}}{1+\log(4(6+x^2))}$$

input
```
Integrate[(6 + x^2 + (6 + x^2)*Log[24 + 4*x^2] + (E^(E^2 + x)*(-6 + 2*x -
x^2 + (-6 - x^2)*Log[24 + 4*x^2]))/(1 + Log[24 + 4*x^2]))/(6 + x^2 + (6 +
x^2)*Log[24 + 4*x^2]),x]
```

output
```
x - E^(E^2 + x)/(1 + Log[4*(6 + x^2)])
```

3.1141.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 57 vs. 2(27) = 54.

Time = 1.25 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.11, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034, Rules used = {7292, 7276, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+(x^2+6)\log(4x^2+24)+\frac{e^{x+e^2}(-x^2+(-x^2-6)\log(4x^2+24)+2x-6)}{\log(4x^2+24)+1}+6}{x^2+(x^2+6)\log(4x^2+24)+6}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{x^2+(x^2+6)\log(4x^2+24)+\frac{e^{x+e^2}(-x^2+(-x^2-6)\log(4x^2+24)+2x-6)}{\log(4x^2+24)+1}+6}{(x^2+6)(\log(4(x^2+6))+1)}dx$$

$$\Big\downarrow \ 7276$$

$$\int \left(1-\frac{e^{x+e^2}\left(x^2+x^2\log\left(4(x^2+6)\right)+6\log\left(4(x^2+6)\right)-2x+6\right)}{(x^2+6)(\log(4(x^2+6))+1)^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$x-\frac{e^{x+e^2}\left(x^2+x^2\log\left(4(x^2+6)\right)+6\log\left(4(x^2+6)\right)+6\right)}{(x^2+6)(\log(4(x^2+6))+1)^2}$$

input
```
Int[(6 + x^2 + (6 + x^2)*Log[24 + 4*x^2] + (E^(E^2 + x)*(-6 + 2*x - x^2 +
(-6 - x^2)*Log[24 + 4*x^2]))/(1 + Log[24 + 4*x^2]))/(6 + x^2 + (6 + x^2)*L
og[24 + 4*x^2]),x]
```

output
```
x - (E^(E^2 + x)*(6 + x^2 + 6*Log[4*(6 + x^2)] + x^2*Log[4*(6 + x^2)]))/((
6 + x^2)*(1 + Log[4*(6 + x^2)])^2)
```

3.1141. $\int \frac{6+x^2+(6+x^2)\log(24+4x^2)+\frac{e^{e^2+x}\left(-6+2x-x^2+\left(-6-x^2\right)\log\left(24+4x^2\right)\right)}{1+\log\left(24+4x^2\right)}}{6+x^2+(6+x^2)\log(24+4x^2)}dx$

3.1141.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1141.4 Maple [A] (verified)

Time = 2.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

method	result	size
risch	$x-\frac{{\mathrm e}^{x+{\mathrm e}^{2}}}{\ln\left(4 x^{2}+24\right)+1}$	22
parallelrisch	$x-{\mathrm e}^{-\ln\left(\ln\left(4 x^{2}+24\right)+1\right)+x+{\mathrm e}^{2}}$	23
default	$x-\frac{{\mathrm e}^{x+{\mathrm e}^{2}}}{2 \ln\left(2\right)+\ln\left(x^{2}+6\right)+1}$	24

input
```
int((((-x^2-6)*ln(4*x^2+24)-x^2+2*x-6)*exp(-ln(ln(4*x^2+24)+1)+x+exp(2))+(
x^2+6)*ln(4*x^2+24)+x^2+6)/((x^2+6)*ln(4*x^2+24)+x^2+6),x,method=_RETURNVE
RBOSE)
```

output
```
x-1/(ln(4*x^2+24)+1)*exp(x+exp(2))
```

3.1141.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{6+x^2+(6+x^2)\log\left(24+4x^2\right)+\frac{e^{e^2+x}\left(-6+2x-x^2+\left(-6-x^2\right)\log\left(24+4x^2\right)\right)}{1+\log\left(24+4x^2\right)}}{6+x^2+(6+x^2)\log\left(24+4x^2\right)}\,dx$$
$$= x-e^{\left(x+e^{2}-\log\left(\log\left(4\,x^{2}+24\right)+1\right)\right)}$$

input
```
integrate((((-x^2-6)*log(4*x^2+24)-x^2+2*x-6)*exp(-log(log(4*x^2+24)+1)+x+
exp(2))+(x^2+6)*log(4*x^2+24)+x^2+6)/((x^2+6)*log(4*x^2+24)+x^2+6),x, algo
rithm=\
```

output
```
x - e^(x + e^2 - log(log(4*x^2 + 24) + 1))
```

3.1141.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{6+x^2+(6+x^2)\log(24+4x^2)+\frac{e^{e^2+x}(-6+2x-x^2+(-6-x^2)\log(24+4x^2))}{1+\log(24+4x^2)}}{6+x^2+(6+x^2)\log(24+4x^2)}\,dx = x-\frac{e^{x+e^2}}{\log(4x^2+24)+1}$$

input
```
integrate((((-x**2-6)*ln(4*x**2+24)-x**2+2*x-6)*exp(-ln(ln(4*x**2+24)+1)+x
+exp(2))+(x**2+6)*ln(4*x**2+24)+x**2+6)/((x**2+6)*ln(4*x**2+24)+x**2+6),x)
```

output
```
x - exp(x + exp(2))/(log(4*x**2 + 24) + 1)
```

3.1141.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44

$$\int \frac{6+x^2+(6+x^2)\log(24+4x^2)+\frac{e^{e^2+x}(-6+2x-x^2+(-6-x^2)\log(24+4x^2))}{1+\log(24+4x^2)}}{6+x^2+(6+x^2)\log(24+4x^2)}\,dx = \frac{x(2\log(2)+1)+x\log(x^2+6)-e^{(x+e^2)}}{2\log(2)+\log(x^2+6)+1}$$

input
```
integrate((((-x^2-6)*log(4*x^2+24)-x^2+2*x-6)*exp(-log(log(4*x^2+24)+1)+x+
exp(2))+(x^2+6)*log(4*x^2+24)+x^2+6)/((x^2+6)*log(4*x^2+24)+x^2+6),x, algo
rithm=\
```

output
```
(x*(2*log(2) + 1) + x*log(x^2 + 6) - e^(x + e^2))/(2*log(2) + log(x^2 + 6)
 + 1)
```

3.1141.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

$$\int \frac{6+x^2+\left(6+x^2\right)\log\left(24+4x^2\right)+\frac{e^{e^2+x}\left(-6+2x-x^2+\left(-6-x^2\right)\log\left(24+4x^2\right)\right)}{1+\log\left(24+4x^2\right)}}{6+x^2+\left(6+x^2\right)\log\left(24+4x^2\right)}\,dx = \frac{2\,x\log\left(2\right)+x\log\left(x^2+6\right)+x-e^{\left(x+e^2\right)}}{2\,\log\left(2\right)+\log\left(x^2+6\right)+1}$$

input
```
integrate((((-x^2-6)*log(4*x^2+24)-x^2+2*x-6)*exp(-log(log(4*x^2+24)+1)+x+
exp(2))+(x^2+6)*log(4*x^2+24)+x^2+6)/((x^2+6)*log(4*x^2+24)+x^2+6),x, algo
rithm=\
```

output
```
(2*x*log(2) + x*log(x^2 + 6) + x - e^(x + e^2))/(2*log(2) + log(x^2 + 6) +
 1)
```

3.1141.9 Mupad [B] (verification not implemented)

Time = 15.55 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{6+x^2+\left(6+x^2\right)\log\left(24+4x^2\right)+\frac{e^{e^2+x}\left(-6+2x-x^2+\left(-6-x^2\right)\log\left(24+4x^2\right)\right)}{1+\log\left(24+4x^2\right)}}{6+x^2+\left(6+x^2\right)\log\left(24+4x^2\right)}\,dx = x-\frac{\mathrm{e}^{\mathrm{e}^2}\,\mathrm{e}^x}{\ln\left(4\,x^2+24\right)+1}$$

input
```
int((log(4*x^2 + 24)*(x^2 + 6) - exp(x + exp(2) - log(log(4*x^2 + 24) + 1)
)*(log(4*x^2 + 24)*(x^2 + 6) - 2*x + x^2 + 6) + x^2 + 6)/(log(4*x^2 + 24)*
(x^2 + 6) + x^2 + 6),x)
```

output
```
x - (exp(exp(2))*exp(x))/(log(4*x^2 + 24) + 1)
```

3.1142 $\int \frac{-150000e^{10}x^2+390625x^3}{4096e^{30}-96000e^{20}x+750000e^{10}x^2-1953125x^3} dx$

3.1142.1 Optimal result

Integrand size = 42, antiderivative size = 17

$$\int \frac{-150000e^{10}x^2+390625x^3}{4096e^{30}-96000e^{20}x+750000e^{10}x^2-1953125x^3} dx = -\frac{5x}{\left(-5+\frac{16e^{10}}{25x}\right)^2}$$

output
```
-5*x/(16/25*exp(5)^2/x-5)^2
```

3.1142.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 40 vs. 2(17) = 34.

Time = 0.02 (sec) , antiderivative size = 40, normalized size of antiderivative = 2.35

$$\int \frac{-150000e^{10}x^2+390625x^3}{4096e^{30}-96000e^{20}x+750000e^{10}x^2-1953125x^3} dx = -\frac{-12288e^{30}+192000e^{20}x-750000e^{10}x^2+1953125x^3}{625\left(16e^{10}-125x\right)^2}$$

input
```
Integrate[(-150000*E^10*x^2 + 390625*x^3)/(4096*E^30 - 96000*E^20*x + 7500
00*E^10*x^2 - 1953125*x^3),x]
```

output
```
-1/625*(-12288*E^30 + 192000*E^20*x - 750000*E^10*x^2 + 1953125*x^3)/(16*E
^10 - 125*x)^2
```

3.1142.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.048, Rules used = {2007, 2021}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{390625x^3-150000e^{10}x^2}{-1953125x^3+750000e^{10}x^2-96000e^{20}x+4096e^{30}}dx$$
$$\Big\downarrow \text{2007}$$
$$\int \frac{390625x^3-150000e^{10}x^2}{(16e^{10}-125x)^3}dx$$
$$\Big\downarrow \text{2021}$$
$$-\frac{3125x^3}{(16e^{10}-125x)^2}$$

input
```
Int[(-150000*E^10*x^2 + 390625*x^3)/(4096*E^30 - 96000*E^20*x + 750000*E^1
0*x^2 - 1953125*x^3),x]
```

output
```
(-3125*x^3)/(16*E^10 - 125*x)^2
```

3.1142.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2021
```
Int[(Pp_)*(Qq_)^(m_.), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x
]}, Simp[Coeff[Pp, x, p]*x^(p - q + 1)*(Qq^(m + 1)/((p + m*q + 1)*Coeff[Qq,
 x, q])), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp
, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])]] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

3.1142.4 Maple [A] (verified)

Time = 0.45 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.06

method	result	size
norman	$-\frac{3125x^{3}}{\left(16\,\mathrm{e}^{10}-125x\right)^{2}}$	18
gosper	$-\frac{3125x^{3}}{256\,\mathrm{e}^{20}-4000x\,\mathrm{e}^{10}+15625x^{2}}$	27
parallelrisch	$-\frac{3125x^{3}}{256\,\mathrm{e}^{20}-4000x\,\mathrm{e}^{10}+15625x^{2}}$	27
risch	$-\frac{x}{5}+\frac{\frac{32\,\mathrm{e}^{30}}{625}-\frac{3x\,\mathrm{e}^{20}}{5}}{\mathrm{e}^{20}-\frac{125x\,\mathrm{e}^{10}}{8}+\frac{15625x^{2}}{256}}$	31
default	$-\frac{x}{5}-\frac{256\left(\sum_{\_R=\mathrm{RootOf}\left(-4096\,\mathrm{e}^{30}+96000\_Z\,\mathrm{e}^{20}-750000\_Z^{2}\mathrm{e}^{10}+1953125\_Z^{3}\right)}\frac{\left(-375\_R\,\mathrm{e}^{20}+16\,\mathrm{e}^{30}\right)\ln\left(x-\_R\right)}{256\,\mathrm{e}^{20}-4000\_R\,\mathrm{e}^{10}+15625\_R^{2}}\right)}{1875}$	67

input
```
int((-150000*x^2*exp(5)^2+390625*x^3)/(4096*exp(5)^6-96000*x*exp(5)^4+7500
00*x^2*exp(5)^2-1953125*x^3),x,method=_RETURNVERBOSE)
```

output
```
-3125*x^3/(16*exp(5)^2-125*x)^2
```

3.1142.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(14) = 28.

Time = 0.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.41

$$\int \frac{-150000e^{10}x^2+390625x^3}{4096e^{30}-96000e^{20}x+750000e^{10}x^2-1953125x^3}\,dx = -\frac{1953125\,x^{3}-500000\,x^{2}e^{10}+128000\,xe^{20}-8192\,e^{30}}{625\,\left(15625\,x^{2}-4000\,xe^{10}+256\,e^{20}\right)}$$

input
```
integrate((-150000*x^2*exp(5)^2+390625*x^3)/(4096*exp(5)^6-96000*x*exp(5)^
4+750000*x^2*exp(5)^2-1953125*x^3),x, algorithm=\
```

output
```
-1/625*(1953125*x^3 - 500000*x^2*e^10 + 128000*x*e^20 - 8192*e^30)/(15625*
x^2 - 4000*x*e^10 + 256*e^20)
```

3.1142.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 32 vs. $2(15) = 30$.

Time = 0.17 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.88

$$\int \frac{-150000e^{10}x^2 + 390625x^3}{4096e^{30} - 96000e^{20}x + 750000e^{10}x^2 - 1953125x^3}\,dx$$
$$= -\frac{x}{5} - \frac{96000xe^{20} - 8192e^{30}}{9765625x^2 - 2500000xe^{10} + 160000e^{20}}$$

input
```
integrate((-150000*x**2*exp(5)**2+390625*x**3)/(4096*exp(5)**6-96000*x*exp
(5)**4+750000*x**2*exp(5)**2-1953125*x**3),x)
```

output
```
-x/5 - (96000*x*exp(20) - 8192*exp(30))/(9765625*x**2 - 2500000*x*exp(10)
+ 160000*exp(20))
```

3.1142.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 33 vs. $2(14) = 28$.

Time = 0.19 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.94

$$\int \frac{-150000e^{10}x^2 + 390625x^3}{4096e^{30} - 96000e^{20}x + 750000e^{10}x^2 - 1953125x^3}\,dx$$
$$= -\frac{1}{5}x - \frac{256\,(375\,xe^{20} - 32\,e^{30})}{625\,(15625\,x^2 - 4000\,xe^{10} + 256\,e^{20})}$$

input
```
integrate((-150000*x^2*exp(5)^2+390625*x^3)/(4096*exp(5)^6-96000*x*exp(5)^
4+750000*x^2*exp(5)^2-1953125*x^3),x, algorithm=\
```

output
```
-1/5*x - 256/625*(375*x*e^20 - 32*e^30)/(15625*x^2 - 4000*x*e^10 + 256*e^2
0)
```

3.1142.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.53

$$\int \frac{-150000e^{10}x^2+390625x^3}{4096e^{30}-96000e^{20}x+750000e^{10}x^2-1953125x^3}\,dx=-\frac{1}{5}\,x-\frac{256\,(375\,xe^{20}-32\,e^{30})}{625\,(125\,x-16\,e^{10})^2}$$

input
```
integrate((-150000*x^2*exp(5)^2+390625*x^3)/(4096*exp(5)^6-96000*x*exp(5)^
4+750000*x^2*exp(5)^2-1953125*x^3),x, algorithm=\
```

output
```
-1/5*x - 256/625*(375*x*e^20 - 32*e^30)/(125*x - 16*e^10)^2
```

3.1142.9 Mupad [B] (verification not implemented)

Time = 15.34 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.47

$$\int \frac{-150000e^{10}x^2+390625x^3}{4096e^{30}-96000e^{20}x+750000e^{10}x^2-1953125x^3}\,dx=\frac{\frac{8192\,\mathrm{e}^{30}}{625}-\frac{768\,x\,\mathrm{e}^{20}}{5}}{(125\,x-16\,\mathrm{e}^{10})^2}-\frac{x}{5}$$

input
```
int(-(150000*x^2*exp(10) - 390625*x^3)/(4096*exp(30) - 96000*x*exp(20) + 7
50000*x^2*exp(10) - 1953125*x^3),x)
```

output
```
((8192*exp(30))/625 - (768*x*exp(20))/5)/(125*x - 16*exp(10))^2 - x/5
```

3.1143 $\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}$

3.1143.1 Optimal result

Integrand size = 148, antiderivative size = 30

$$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5)+e^{2x}(2-2x)\log^2(5)+\left(2x-2x^2\right)\log^2(2)\log^2(5)+e^x\left(\left(-2+2x^2\right)\log(5)+\left(-2+2x^2\right)\log(2)\log^2(5)\right)\right)\,dx=e^{-4+x-\left(x+x\left(-\frac{e^x}{x}+\log(2)\right)\log(5)\right)^2}(-1+x)$$

output
```
(-1+x)*exp(x-4-((ln(2)-exp(x)/x)*x*ln(5)+x)^2)
```

3.1143.2 Mathematica [F]

$$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5)+e^{2x}(2-2x)\log^2(5)+\left(2x-2x^2\right)\log^2(2)\log^2(5)+e^x\left(\left(-2+2x^2\right)\log(5)+\left(-2+2x^2\right)\log(2)\log^2(5)\right)\right)\,dx=\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5)+e^{2x}(2-2x)\log^2(5)+\left(2x-2x^2\right)\log^2(2)\log^2(5)+e^x\left(\left(-2+2x^2\right)\log(5)+\left(-2+2x^2\right)\log(2)\log^2(5)\right)\right)\,dx$$

input
```
Integrate[E^(-4 + x - x^2 - 2*x^2*Log[2]*Log[5] - E^(2*x)*Log[5]^2 - x^2*L
og[2]^2*Log[5]^2 + E^x*(2*x*Log[5] + 2*x*Log[2]*Log[5]^2))*(3*x - 2*x^2 +
(4*x - 4*x^2)*Log[2]*Log[5] + E^(2*x)*(2 - 2*x)*Log[5]^2 + (2*x - 2*x^2)*L
og[2]^2*Log[5]^2 + E^x*((-2 + 2*x^2)*Log[5] + (-2 + 2*x^2)*Log[2]*Log[5]^2
)),x]
```

output
```
Integrate[E^(-4 + x - x^2 - 2*x^2*Log[2]*Log[5] - E^(2*x)*Log[5]^2 - x^2*L
og[2]^2*Log[5]^2 + E^x*(2*x*Log[5] + 2*x*Log[2]*Log[5]^2))*(3*x - 2*x^2 +
(4*x - 4*x^2)*Log[2]*Log[5] + E^(2*x)*(2 - 2*x)*Log[5]^2 + (2*x - 2*x^2)*L
og[2]^2*Log[5]^2 + E^x*((-2 + 2*x^2)*Log[5] + (-2 + 2*x^2)*Log[2]*Log[5]^2
)), x]
```

3.1143.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-2x^2+e^x\left(\left(2x^2-2\right)\log(2)\log^2(5)+\left(2x^2-2\right)\log(5)\right)+\left(2x-2x^2\right)\log^2(2)\log^2(5)+\left(4x-4x^2\right)\log(2)\log(5$$

$$\Big\downarrow \text{ 7292}$$

$$\int \left(-2x^2+e^x\left(\left(2x^2-2\right)\log(2)\log^2(5)+\left(2x^2-2\right)\log(5)\right)+\left(4x-4x^2\right)\log(2)\log(5)\left(1+\frac{1}{2}\log(2)\log(5)\right)+3x$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-2x^2\exp\left(-\left(x^2(1+\log(2)\log(5)(2+\log(2)\log(5)))\right)+x+e^x\left(2x\log(2)\log^2(5)+2x\log(5)\right)-e^{2x}\log^2(5)-\right.\right.$$

$$\Big\downarrow \text{ 2009}$$

$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x\left(2x\log(5)+2x\log(2)\log^2(5)\right)}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5\right.$

$$-2\log(5)(1+\log(2)\log(5))\int \exp\left(-\left((1+\log(2)\log(5)(2+\log(2)\log(5)))x^2\right)+2x+e^x\left(2\log(2)\log^2(5)x+2\log(5)x\right)-e^{2x}\text{lo}\right.$$
$$2\log^2(5)\int \exp\left(-\left((1+\log(2)\log(5)(2+\log(2)\log(5)))x^2\right)+3x+e^x\left(2\log(2)\log^2(5)x+2\log(5)x\right)-e^{2x}\log^2(5\right.$$
$$2\log(2)\log(5)(2+\log(2)\log(5))\int \exp\left(-\left((1+\log(2)\log(5)(2+\log(2)\log(5)))x^2\right)+x+e^x\left(2\log(2)\log^2(5)x+2\log(5)x\right)-e^{2x}\text{log}\right.$$
$$3\int \exp\left(-\left((1+\log(2)\log(5)(2+\log(2)\log(5)))x^2\right)+x+e^x\left(2\log(2)\log^2(5)x+2\log(5)x\right)-e^{2x}\log^2(5)-4\right)xd$$
$$2\log^2(5)\int \exp\left(-\left((1+\log(2)\log(5)(2+\log(2)\log(5)))x^2\right)+3x+e^x\left(2\log(2)\log^2(5)x+2\log(5)x\right)-e^{2x}\log^2(5\right.$$
$$2\log(2)\log(5)(2+\log(2)\log(5))\int \exp\left(-\left((1+\log(2)\log(5)(2+\log(2)\log(5)))x^2\right)+x+e^x\left(2\log(2)\log^2(5)x+2\log(5)x\right)-e^{2x}\text{log}\right.$$
$$2\int \exp\left(-\left((1+\log(2)\log(5)(2+\log(2)\log(5)))x^2\right)+x+e^x\left(2\log(2)\log^2(5)x+2\log(5)x\right)-e^{2x}\log^2(5)-4\right)x^2$$
$$2\log(5)(1+\log(2)\log(5))\int \exp\left(-\left((1+\log(2)\log(5)(2+\log(2)\log(5)))x^2\right)+2x+e^x\left(2\log(2)\log^2(5)x+2\log(5)x\right)-e^{2x}\text{lo}\right.$$

input
```
Int[E^(-4 + x - x^2 - 2*x^2*Log[2]*Log[5] - E^(2*x)*Log[5]^2 - x^2*Log[2]^
2*Log[5]^2 + E^x*(2*x*Log[5] + 2*x*Log[2]*Log[5]^2))*(3*x - 2*x^2 + (4*x -
 4*x^2)*Log[2]*Log[5] + E^(2*x)*(2 - 2*x)*Log[5]^2 + (2*x - 2*x^2)*Log[2]^
2*Log[5]^2 + E^x*((-2 + 2*x^2)*Log[5] + (-2 + 2*x^2)*Log[2]*Log[5]^2)),x]
```

output
```
$Aborted
```

3.1143.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1143.
$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5\right.$

3.1143.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(28) = 56$.

Time = 0.95 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.03

method	result
risch	$(-1+x)\left(\frac{1}{4}\right)^{x^2\ln(5)} 4^{x\ln(5)^2 e^x} 25^{e^x x} e^{-x^2\ln(2)^2\ln(5)^2-4-\ln(5)^2 e^{2x}-x^2+x}$
norman	$x\,e^{-\ln(5)^2 e^{2x}+\left(2x\ln(2)\ln(5)^2+2x\ln(5)\right)e^x-x^2\ln(2)^2\ln(5)^2-2x^2\ln(2)\ln(5)-x^2+x-4} - e^{-\ln(5)^2 e^{2x}+\left(2x\ln(2)\ln(5)^2\right.}$
parallelrisch	$x\,e^{-\ln(5)^2 e^{2x}+\left(2x\ln(2)\ln(5)^2+2x\ln(5)\right)e^x-x^2\ln(2)^2\ln(5)^2-2x^2\ln(2)\ln(5)-x^2+x-4} - e^{-\ln(5)^2 e^{2x}+\left(2x\ln(2)\ln(5)^2\right.}$

input
```
int(((2-2*x)*ln(5)^2*exp(x)^2+((2*x^2-2)*ln(2)*ln(5)^2+(2*x^2-2)*ln(5))*ex
p(x)+(-2*x^2+2*x)*ln(2)^2*ln(5)^2+(-4*x^2+4*x)*ln(2)*ln(5)-2*x^2+3*x)*exp(
-ln(5)^2*exp(x)^2+(2*x*ln(2)*ln(5)^2+2*x*ln(5))*exp(x)-x^2*ln(2)^2*ln(5)^2
-2*x^2*ln(2)*ln(5)-x^2+x-4),x,method=_RETURNVERBOSE)
```

output
```
(-1+x)*(1/4)^(x^2*ln(5))*4^(x*ln(5)^2*exp(x))*25^(exp(x)*x)*exp(-x^2*ln(2)
^2*ln(5)^2-4-ln(5)^2*exp(2*x)-x^2+x)
```

3.1143.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.07

$$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x\left(2x\log(5)+2x\log(2)\log^2(5)\right)}\left(3x-2x^2 + \left(4x-4x^2\right)\log(2)\log(5)+e^{2x}(2-2x)\log^2(5)+\left(2x-2x^2\right)\log^2(2)\log^2(5) + e^x\left(\left(-2+2x^2\right)\log(5)+\left(-2+2x^2\right)\log(2)\log^2(5)\right)\right)\,dx = (x-1)e^{\left(-x^2\log(5)^2\log(2)^2-2\,x^2\log(5)\log(2)-e^{(2\,x)}\log(5)^2-x^2+2\,\left(x\log(5)^2\log(2)+x\log(5)\right)e^x+x-4\right)}$$

input
```
integrate(((2-2*x)*log(5)^2*exp(x)^2+((2*x^2-2)*log(2)*log(5)^2+(2*x^2-2)*
log(5))*exp(x)+(-2*x^2+2*x)*log(2)^2*log(5)^2+(-4*x^2+4*x)*log(2)*log(5)-2
*x^2+3*x)*exp(-log(5)^2*exp(x)^2+(2*x*log(2)*log(5)^2+2*x*log(5))*exp(x)-x
^2*log(2)^2*log(5)^2-2*x^2*log(2)*log(5)-x^2+x-4),x, algorithm=\
```

output
```
(x - 1)*e^(-x^2*log(5)^2*log(2)^2 - 2*x^2*log(5)*log(2) - e^(2*x)*log(5)^2
 - x^2 + 2*(x*log(5)^2*log(2) + x*log(5))*e^x + x - 4)
```

3.1143.
$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x\left(2x\log(5)+2x\log(2)\log^2(5)\right)}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5\right.$

3.1143.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. $2(24) = 48$.

Time = 0.37 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.27

$$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5)+e^{2x}(2-2x)\log^2(5)+\left(2x-2x^2\right)\log^2(2)\log^2(5)+e^x\left(\left(-2+2x^2\right)\log(5)+\left(-2+2x^2\right)\log(2)\log^2(5)\right)\right)\,dx=(x-1)\,e^{-2x^2\log(2)\log(5)-x^2\log(2)^2\log(5)^2-x^2+x+\left(2x\log(5)+2x\log(2)\log(5)^2\right)e^x-e^{2x}\log(5)^2-4}$$

input
```
integrate(((2-2*x)*ln(5)**2*exp(x)**2+((2*x**2-2)*ln(2)*ln(5)**2+(2*x**2-2
)*ln(5))*exp(x)+(-2*x**2+2*x)*ln(2)**2*ln(5)**2+(-4*x**2+4*x)*ln(2)*ln(5)-
2*x**2+3*x)*exp(-ln(5)**2*exp(x)**2+(2*x*ln(2)*ln(5)**2+2*x*ln(5))*exp(x)-
x**2*ln(2)**2*ln(5)**2-2*x**2*ln(2)*ln(5)-x**2+x-4),x)
```

output
```
(x - 1)*exp(-2*x**2*log(2)*log(5) - x**2*log(2)**2*log(5)**2 - x**2 + x +
(2*x*log(5) + 2*x*log(2)*log(5)**2)*exp(x) - exp(2*x)*log(5)**2 - 4)
```

3.1143.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(31) = 62$.

Time = 0.45 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.10

$$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5)+e^{2x}(2-2x)\log^2(5)+\left(2x-2x^2\right)\log^2(2)\log^2(5)+e^x\left(\left(-2+2x^2\right)\log(5)+\left(-2+2x^2\right)\log(2)\log^2(5)\right)\right)\,dx=(x-1)e^{\left(-x^2\log(5)^2\log(2)^2+2\,xe^x\log(5)^2\log(2)-2\,x^2\log(5)\log(2)+2\,xe^x\log(5)-e^{(2\,x)}\log(5)^2-x^2+x-4\right)}$$

input
```
integrate(((2-2*x)*log(5)^2*exp(x)^2+((2*x^2-2)*log(2)*log(5)^2+(2*x^2-2)*
log(5))*exp(x)+(-2*x^2+2*x)*log(2)^2*log(5)^2+(-4*x^2+4*x)*log(2)*log(5)-2
*x^2+3*x)*exp(-log(5)^2*exp(x)^2+(2*x*log(2)*log(5)^2+2*x*log(5))*exp(x)-x
^2*log(2)^2*log(5)^2-2*x^2*log(2)*log(5)-x^2+x-4),x, algorithm=\
```

output
```
(x - 1)*e^(-x^2*log(5)^2*log(2)^2 + 2*x*e^x*log(5)^2*log(2) - 2*x^2*log(5)
*log(2) + 2*x*e^x*log(5) - e^(2*x)*log(5)^2 - x^2 + x - 4)
```

3.1143.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 124 vs. $2(31) = 62$.

Time = 0.49 (sec) , antiderivative size = 124, normalized size of antiderivative = 4.13

$$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5)+e^{2x}(2-2x)\log^2(5)+\left(2x-2x^2\right)\log^2(2)\log^2(5)+e^x\left(\left(-2+2x^2\right)\log(5)+\left(-2+2x^2\right)\log(2)\log^2(5)\right)\right)\,dx$$
$$=\left(xe^{\left(-x^2\log(5)^2\log(2)^2+2\,xe^x\log(5)^2\log(2)-2\,x^2\log(5)\log(2)+2\,xe^x\log(5)-e^{(2\,x)}\log(5)^2-x^2+x\right)}-e^{\left(-x^2\log(5)^2\log(2)^2+2\,xe^x\log(5)^2\right.}$$

input
```
integrate(((2-2*x)*log(5)^2*exp(x)^2+((2*x^2-2)*log(2)*log(5)^2+(2*x^2-2)*
log(5))*exp(x)+(-2*x^2+2*x)*log(2)^2*log(5)^2+(-4*x^2+4*x)*log(2)*log(5)-2
*x^2+3*x)*exp(-log(5)^2*exp(x)^2+(2*x*log(2)*log(5)^2+2*x*log(5))*exp(x)-x
^2*log(2)^2*log(5)^2-2*x^2*log(2)*log(5)-x^2+x-4),x, algorithm=\
```

output
```
(x*e^(-x^2*log(5)^2*log(2)^2 + 2*x*e^x*log(5)^2*log(2) - 2*x^2*log(5)*log(
2) + 2*x*e^x*log(5) - e^(2*x)*log(5)^2 - x^2 + x) - e^(-x^2*log(5)^2*log(2
)^2 + 2*x*e^x*log(5)^2*log(2) - 2*x^2*log(5)*log(2) + 2*x*e^x*log(5) - e^(
2*x)*log(5)^2 - x^2 + x))*e^(-4)
```

3.1143.9 Mupad [B] (verification not implemented)

Time = 15.41 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.17

$$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5)+e^{2x}(2-2x)\log^2(5)+\left(2x-2x^2\right)\log^2(2)\log^2(5)+e^x\left(\left(-2+2x^2\right)\log(5)+\left(-2+2x^2\right)\log(2)\log^2(5)\right)\right)\,dx=\frac{2^{2\,x\,e^x\ln(5)^2}\,5^{2\,x\,e^x}\,e^{x-e^{2\,x}\ln(5)^2-x^2-x^2\ln(2)^2\ln(5)^2-4}\,(x-1)}{2^{2\,x^2\ln(5)}}$$

input
```
int(exp(x - exp(2*x)*log(5)^2 - x^2 + exp(x)*(2*x*log(5) + 2*x*log(2)*log(
5)^2) - 2*x^2*log(2)*log(5) - x^2*log(2)^2*log(5)^2 - 4)*(3*x + exp(x)*(lo
g(5)*(2*x^2 - 2) + log(2)*log(5)^2*(2*x^2 - 2)) - 2*x^2 + log(2)^2*log(5)^
2*(2*x - 2*x^2) - exp(2*x)*log(5)^2*(2*x - 2) + log(2)*log(5)*(4*x - 4*x^2
)),x)
```

output
```
(2^(2*x*exp(x)*log(5)^2)*5^(2*x*exp(x))*exp(x - exp(2*x)*log(5)^2 - x^2 -
x^2*log(2)^2*log(5)^2 - 4)*(x - 1))/2^(2*x^2*log(5))
```

3.1143.

$$\int e^{-4+x-x^2-2x^2\log(2)\log(5)-e^{2x}\log^2(5)-x^2\log^2(2)\log^2(5)+e^x(2x\log(5)+2x\log(2)\log^2(5))}\left(3x-2x^2+\left(4x-4x^2\right)\log(2)\log(5$$

3.1144

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\right.}{x\log(x)+\log(x)\log^2\left(\frac{}{\log}\right.}$$

3.1144.1 Optimal result

Integrand size = 88, antiderivative size = 22

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2\left(\right.}\right.}{x\log(x)+\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)}$$

$$=2x\log\left(\frac{2}{x\left(x+\log^2\left(\frac{4}{\log^2(x)}\right)\right)}\right)$$

output
```
2*x*ln(2/(x+ln(4/ln(x)^2)^2)/x)
```

3.1144.

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2\left(\frac{4}{\log^2(x)}\right)}\right)}{}$$

3.1144.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2\left(\frac{4}{\log^2(x)}\right)}\right)}{x\log(x)+\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)}$$

$$= 2x\log\left(\frac{2}{x\left(x+\log^2\left(\frac{4}{\log^2(x)}\right)\right)}\right)$$

input
```
Integrate[(-4*x*Log[x] + 8*Log[4/Log[x]^2] - 2*Log[x]*Log[4/Log[x]^2]^2 +
(2*x*Log[x] + 2*Log[x]*Log[4/Log[x]^2]^2)*Log[2/(x^2 + x*Log[4/Log[x]^2]^2
)])/(x*Log[x] + Log[x]*Log[4/Log[x]^2]^2),x]
```

output
```
2*x*Log[2/(x*(x + Log[4/Log[x]^2]^2))]
```

3.1144.3 Rubi [A] (verified)

Time = 1.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.034$, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+2x\log(x)\right)\log\left(\frac{2}{x^2+x\log^2\left(\frac{4}{\log^2(x)}\right)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+8\log\left(\frac{4}{\log^2(x)}\right)-4x\log}{\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+x\log(x)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\left(2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+2x\log(x)\right)\log\left(\frac{2}{x^2+x\log^2\left(\frac{4}{\log^2(x)}\right)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+8\log\left(\frac{4}{\log^2(x)}\right)-4x\log}{\log(x)\left(x+\log^2\left(\frac{4}{\log^2(x)}\right)\right)}$$

$$\Big\downarrow \text{7293}$$

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2\left(\frac{4}{\log^2(x)}\right)}\right)}{}$$

$$\int \left(2\log\left(\frac{2}{x\left(x+\log^2\left(\frac{4}{\log^2(x)}\right)\right)}\right)-\frac{2\left(\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)-4\log\left(\frac{4}{\log^2(x)}\right)+2x\log(x)\right)}{\log(x)\left(x+\log^2\left(\frac{4}{\log^2(x)}\right)\right)}\right)dx$$

$$\Big\downarrow \ 2009$$

$$2x\log\left(\frac{2}{x\left(x+\log^2\left(\frac{4}{\log^2(x)}\right)\right)}\right)$$

input
```
Int[(-4*x*Log[x] + 8*Log[4/Log[x]^2] - 2*Log[x]*Log[4/Log[x]^2]^2 + (2*x*L
og[x] + 2*Log[x]*Log[4/Log[x]^2]^2)*Log[2/(x^2 + x*Log[4/Log[x]^2]^2)])/(x
*Log[x] + Log[x]*Log[4/Log[x]^2]^2),x]
```

output
```
2*x*Log[2/(x*(x + Log[4/Log[x]^2]^2))]
```

3.1144.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1144.4 Maple [A] (verified)

Time = 13.81 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

method	result	size
parallelrisch	$2x\ln\left(\frac{2}{\left(x+\ln\left(\frac{4}{\ln(x)^2}\right)^2\right)x}\right)$	23
risch	Expression too large to display	2139

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2\left(\frac{4}{\log^2(x)}\right)}\right)}{\ldots}$$

input
```
int(((2*ln(x)*ln(4/ln(x)^2)^2+2*x*ln(x))*ln(2/(x*ln(4/ln(x)^2)^2+x^2))-2*l
n(x)*ln(4/ln(x)^2)^2+8*ln(4/ln(x)^2)-4*x*ln(x))/(ln(x)*ln(4/ln(x)^2)^2+x*l
n(x)),x,method=_RETURNVERBOSE)
```

output
```
2*x*ln(2/(x+ln(4/ln(x)^2)^2)/x)
```

3.1144.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2 \cdots}\right.}{x\log(x)+\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)}$$

$$=2\,x\log\left(\frac{2}{x\log\left(\frac{4}{\log(x)^2}\right)^2+x^2}\right)$$

input
```
integrate(((2*log(x)*log(4/log(x)^2)^2+2*x*log(x))*log(2/(x*log(4/log(x)^2
)^2+x^2))-2*log(x)*log(4/log(x)^2)^2+8*log(4/log(x)^2)-4*x*log(x))/(log(x)
*log(4/log(x)^2)^2+x*log(x)),x, algorithm=\
```

output
```
2*x*log(2/(x*log(4/log(x)^2)^2 + x^2))
```

3.1144.6 Sympy [A] (verification not implemented)

Time = 0.72 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2 \cdots}\right.}{x\log(x)+\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)}$$

$$=2x\log\left(\frac{2}{x^2+x\log\left(\frac{4}{\log(x)^2}\right)^2}\right)$$

input
```
integrate(((2*ln(x)*ln(4/ln(x)**2)**2+2*x*ln(x))*ln(2/(x*ln(4/ln(x)**2)**2
+x**2))-2*ln(x)*ln(4/ln(x)**2)**2+8*ln(4/ln(x)**2)-4*x*ln(x))/(ln(x)*ln(4/
ln(x)**2)**2+x*ln(x)),x)
```

output
```
2*x*log(2/(x**2 + x*log(4/log(x)**2)**2))
```

3.1144.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.68

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2}\right.}{x\log(x)+\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)}$$
$$= 2\,x\log\left(2\right) - 2\,x\log\left(4\,\log\left(2\right)^2 - 8\,\log\left(2\right)\log\left(\log\left(x\right)\right) + 4\,\log\left(\log\left(x\right)\right)^2 + x\right) - 2\,x\log\left(x\right)$$

input
```
integrate(((2*log(x)*log(4/log(x)^2)^2+2*x*log(x))*log(2/(x*log(4/log(x)^2
)^2+x^2))-2*log(x)*log(4/log(x)^2)^2+8*log(4/log(x)^2)-4*x*log(x))/(log(x)
*log(4/log(x)^2)^2+x*log(x)),x, algorithm=\
```

output
```
2*x*log(2) - 2*x*log(4*log(2)^2 - 8*log(2)*log(log(x)) + 4*log(log(x))^2 +
 x) - 2*x*log(x)
```

3.1144.8 Giac [A] (verification not implemented)

Time = 0.95 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.77

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2}\right.}{x\log(x)+\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)}$$
$$= 2\,x\log\left(2\right) - 2\,x\log\left(4\,\log\left(2\right)^2 - 4\,\log\left(2\right)\log\left(\log\left(x\right)^2\right) + \log\left(\log\left(x\right)^2\right)^2 + x\right) - 2\,x\log\left(x\right)$$

input
```
integrate(((2*log(x)*log(4/log(x)^2)^2+2*x*log(x))*log(2/(x*log(4/log(x)^2
)^2+x^2))-2*log(x)*log(4/log(x)^2)^2+8*log(4/log(x)^2)-4*x*log(x))/(log(x)
*log(4/log(x)^2)^2+x*log(x)),x, algorithm=\
```

output
```
2*x*log(2) - 2*x*log(4*log(2)^2 - 4*log(2)*log(log(x)^2) + log(log(x)^2)^2
 + x) - 2*x*log(x)
```

3.1144.9 Mupad [B] (verification not implemented)

Time = 16.99 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-4x\log(x)+8\log\left(\frac{4}{\log^2(x)}\right)-2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)+\left(2x\log(x)+2\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)\right)\log\left(\frac{2}{x^2+x\log^2}\right.}{x\log(x)+\log(x)\log^2\left(\frac{4}{\log^2(x)}\right)}$$

$$= 2\,x\left(\ln\left(\frac{1}{x^2+x\ln\left(\frac{4}{\ln(x)^2}\right)^2}\right)+\ln(2)\right)$$

input
```
int((8*log(4/log(x)^2) - 2*log(4/log(x)^2)^2*log(x) - 4*x*log(x) + log(2/(
x*log(4/log(x)^2)^2 + x^2))*(2*log(4/log(x)^2)^2*log(x) + 2*x*log(x)))/(lo
g(4/log(x)^2)^2*log(x) + x*log(x)),x)
```

output
```
2*x*(log(1/(x*log(4/log(x)^2)^2 + x^2)) + log(2))
```

3.1145 $\int \frac{x^2+e^{\frac{-25-9x-e^2x-e^xx+3x^2+x\log(x)}{x}}(25+x+3x^2-e^xx^2)}{x^2}\,dx$

3.1145.1 Optimal result

Integrand size = 57, antiderivative size = 26

$$\int \frac{x^2+e^{\frac{-25-9x-e^2x-e^xx+3x^2+x\log(x)}{x}}(25+x+3x^2-e^xx^2)}{x^2}\,dx = x+e^{-9-e^2-e^x-\frac{25}{x}+3x}x$$

output
```
x+exp(ln(x)-exp(2)-9-25/x+3*x-exp(x))
```

3.1145.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{x^2+e^{\frac{-25-9x-e^2x-e^xx+3x^2+x\log(x)}{x}}(25+x+3x^2-e^xx^2)}{x^2}\,dx = \left(1+e^{-9-e^2-e^x-\frac{25}{x}+3x}\right)x$$

input
```
Integrate[(x^2 + E^((-25 - 9*x - E^2*x - E^x*x + 3*x^2 + x*Log[x])/x)*(25
+ x + 3*x^2 - E^x*x^2))/x^2,x]
```

output
```
(1 + E^(-9 - E^2 - E^x - 25/x + 3*x))*x
```

3.1145.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 57 vs. 2(26) = 52.

Time = 0.37 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.19, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.035, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+\left(-e^x x^2+3 x^2+x+25\right) e^{\frac{3 x^2-e^x x-e^2 x-9 x+x \log (x)-25}{x}}}{x^2} \, dx$$

$$\Big\downarrow \ 2010$$

$$\int \left(\frac{e^{3 x-e^x-\frac{25}{x}-9\left(1+\frac{e^2}{9}\right)} \left(-e^x x^2+3 x^2+x+25\right)}{x}+1\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{e^{3 x-e^x-\frac{25}{x}-e^2-9} \left(-e^x x^2+3 x^2+25\right)}{\left(\frac{25}{x^2}-e^x+3\right) x}+x$$

input
```
Int[(x^2 + E^((-25 - 9*x - E^2*x - E^x*x + 3*x^2 + x*Log[x])/x)*(25 + x +
3*x^2 - E^x*x^2))/x^2,x]
```

output
```
x + (E^(-9 - E^2 - E^x - 25/x + 3*x)*(25 + 3*x^2 - E^x*x^2))/((3 - E^x + 2
5/x^2)*x)
```

3.1145.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1145.4 Maple [A] (verified)

Time = 1.86 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

method	result	size
risch	$x+x\,{\mathrm e}^{-\frac{{\mathrm e}^{2} x+{\mathrm e}^{x} x-3 x^{2}+9 x+25}{x}}$	29
parallelrisch	$x+{\mathrm e}^{-\frac{{\mathrm e}^{2} x-x \ln \left(x \right)+{\mathrm e}^{x} x-3 x^{2}+9 x+25}{x}}$	32
norman	$\frac{x^{2}+x\,{\mathrm e}^{\frac{x \ln \left(x \right)-{\mathrm e}^{x} x-{\mathrm e}^{2} x+3 x^{2}-9 x-25}{x}}}{x}$	40

input
```
int(((-exp(x)*x^2+3*x^2+x+25)*exp((x*ln(x)-exp(x)*x-exp(2)*x+3*x^2-9*x-25)
/x)+x^2)/x^2,x,method=_RETURNVERBOSE)
```

output
```
x+x*exp(-(exp(2)*x+exp(x)*x-3*x^2+9*x+25)/x)
```

3.1145.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{x^2+e^{\frac{-25-9x-e^2x-e^xx+3x^2+x\log(x)}{x}}\left(25+x+3x^2-e^xx^2\right)}{x^2}\,dx=x+e^{\left(\frac{3\,x^{2}-x e^{2}-x e^{x}+x \log\left(x\right)-9\,x-25}{x}\right)}$$

input
```
integrate(((-exp(x)*x^2+3*x^2+x+25)*exp((x*log(x)-exp(x)*x-exp(2)*x+3*x^2-
9*x-25)/x)+x^2)/x^2,x, algorithm=\
```

output
```
x + e^((3*x^2 - x*e^2 - x*e^x + x*log(x) - 9*x - 25)/x)
```

3.1145.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{x^2+e^{\frac{-25-9x-e^2x-e^xx+3x^2+x\log(x)}{x}}\left(25+x+3x^2-e^xx^2\right)}{x^2}\,dx=x+e^{\frac{3x^{2}-xe^{x}+x\log{\left(x \right)}-9x-xe^{2}-25}{x}}$$

input
```
integrate(((-exp(x)*x**2+3*x**2+x+25)*exp((x*ln(x)-exp(x)*x-exp(2)*x+3*x**
2-9*x-25)/x)+x**2)/x**2,x)
```

output
```
x + exp((3*x**2 - x*exp(x) + x*log(x) - 9*x - x*exp(2) - 25)/x)
```

3.1145.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{x^2+e^{\frac{-25-9x-e^2x-e^xx+3x^2+x\log(x)}{x}}(25+x+3x^2-e^xx^2)}{x^2}\,dx = xe^{\left(3\,x-\frac{25}{x}-e^2-e^x-9\right)}+x$$

input
```
integrate(((-exp(x)*x^2+3*x^2+x+25)*exp((x*log(x)-exp(x)*x-exp(2)*x+3*x^2-
9*x-25)/x)+x^2)/x^2,x, algorithm=\
```

output
```
x*e^(3*x - 25/x - e^2 - e^x - 9) + x
```

3.1145.8 Giac [F]

$$\int \frac{x^2+e^{\frac{-25-9x-e^2x-e^xx+3x^2+x\log(x)}{x}}(25+x+3x^2-e^xx^2)}{x^2}\,dx$$
$$= \int \frac{x^2-(x^2e^x-3\,x^2-x-25)e^{\left(\frac{3\,x^2-xe^2-xe^x+x\log(x)-9\,x-25}{x}\right)}}{x^2}\,dx$$

input
```
integrate(((-exp(x)*x^2+3*x^2+x+25)*exp((x*log(x)-exp(x)*x-exp(2)*x+3*x^2-
9*x-25)/x)+x^2)/x^2,x, algorithm=\
```

output
```
integrate((x^2 - (x^2*e^x - 3*x^2 - x - 25)*e^((3*x^2 - x*e^2 - x*e^x + x*
log(x) - 9*x - 25)/x))/x^2, x)
```

3.1145.9 Mupad [B] (verification not implemented)

Time = 15.53 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{x^2+e^{\frac{-25-9x-e^2x-e^xx+3x^2+x\log(x)}{x}}(25+x+3x^2-e^xx^2)}{x^2}\,dx = x+x\,\mathrm{e}^{-\mathrm{e}^2}\,\mathrm{e}^{3\,x}\,\mathrm{e}^{-9}\,\mathrm{e}^{-\frac{25}{x}}\,\mathrm{e}^{-\mathrm{e}^x}$$

input
```
int((exp(-(9*x + x*exp(2) + x*exp(x) - x*log(x) - 3*x^2 + 25)/x)*(x - x^2*
exp(x) + 3*x^2 + 25) + x^2)/x^2,x)
```

output
```
x + x*exp(-exp(2))*exp(3*x)*exp(-9)*exp(-25/x)*exp(-exp(x))
```

3.1146 $\int \frac{1}{5}(e^2(-18-4x)+6e^2\log(3))\,dx$

3.1146.1 Optimal result

Integrand size = 21, antiderivative size = 18

$$\int \frac{1}{5}\left(e^2(-18-4x)+6e^2\log(3)\right)\,dx=\frac{2}{5}e^2x(-x+3(-3+\log(3)))$$

output
```
2/5*x*exp(2)*(3*ln(3)-9-x)
```

3.1146.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{1}{5}\left(e^2(-18-4x)+6e^2\log(3)\right)\,dx=-\frac{2}{5}e^2\left(9x+x^2-3x\log(3)\right)$$

input
```
Integrate[(E^2*(-18 - 4*x) + 6*E^2*Log[3])/5,x]
```

output
```
(-2*E^2*(9*x + x^2 - 3*x*Log[3]))/5
```

3.1146.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5}\left(e^2(-4x-18)+6e^2\log(3)\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int \left(6e^2\log(3)-2e^2(2x+9)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(6e^2x\log(3)-\frac{1}{2}e^2(2x+9)^2\right)$$

input
```
Int[(E^2*(-18 - 4*x) + 6*E^2*Log[3])/5,x]
```

output
```
(-1/2*(E^2*(9 + 2*x)^2) + 6*E^2*x*Log[3])/5
```

3.1146.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1146.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

method	result	size
gosper	$\frac{2x\,\mathrm{e}^{2}\left(3\ln\left(3\right)-9-x\right)}{5}$	15
default	$\frac{2\,\mathrm{e}^{2}\left(3x\ln\left(3\right)-x^{2}-9x\right)}{5}$	19
risch	$\frac{6x\,\mathrm{e}^{2}\ln\left(3\right)}{5}-\frac{2x^{2}\mathrm{e}^{2}}{5}-\frac{18\,\mathrm{e}^{2}x}{5}$	21
parts	$\frac{6x\,\mathrm{e}^{2}\ln\left(3\right)}{5}-\frac{2x^{2}\mathrm{e}^{2}}{5}-\frac{18\,\mathrm{e}^{2}x}{5}$	21
norman	$\left(\frac{6\,\mathrm{e}^{2}\ln\left(3\right)}{5}-\frac{18\,\mathrm{e}^{2}}{5}\right)x-\frac{2x^{2}\mathrm{e}^{2}}{5}$	22
parallelrisch	$\frac{\mathrm{e}^{2}\left(-2x^{2}-18x\right)}{5}+\frac{6x\,\mathrm{e}^{2}\ln\left(3\right)}{5}$	22

input
```
int(6/5*exp(2)*ln(3)+1/5*(-4*x-18)*exp(2),x,method=_RETURNVERBOSE)
```

output
```
2/5*x*exp(2)*(3*ln(3)-9-x)
```

3.1146.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{1}{5}\left(e^2(-18-4x)+6e^2\log(3)\right)\,dx = \frac{6}{5}\,xe^{2}\log\left(3\right)-\frac{2}{5}\,\left(x^{2}+9\,x\right)e^{2}$$

input
```
integrate(6/5*exp(2)*log(3)+1/5*(-4*x-18)*exp(2),x, algorithm=\
```

output
```
6/5*x*e^2*log(3) - 2/5*(x^2 + 9*x)*e^2
```

3.1146.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.50

$$\int \frac{1}{5}\left(e^2(-18-4x)+6e^2\log(3)\right)\,dx = -\frac{2x^{2}e^{2}}{5}+x\left(-\frac{18e^{2}}{5}+\frac{6e^{2}\log\left(3\right)}{5}\right)$$

input
```
integrate(6/5*exp(2)*ln(3)+1/5*(-4*x-18)*exp(2),x)
```

output
```
-2*x**2*exp(2)/5 + x*(-18*exp(2)/5 + 6*exp(2)*log(3)/5)
```

3.1146.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{1}{5}\left(e^2(-18-4x)+6e^2\log(3)\right)\,dx=\frac{6}{5}\,xe^2\log\left(3\right)-\frac{2}{5}\,\left(x^2+9\,x\right)e^2$$

input
```
integrate(6/5*exp(2)*log(3)+1/5*(-4*x-18)*exp(2),x, algorithm=\
```

output
```
6/5*x*e^2*log(3) - 2/5*(x^2 + 9*x)*e^2
```

3.1146.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int \frac{1}{5}\left(e^2(-18-4x)+6e^2\log(3)\right)\,dx=\frac{6}{5}\,xe^2\log\left(3\right)-\frac{2}{5}\,\left(x^2+9\,x\right)e^2$$

input
```
integrate(6/5*exp(2)*log(3)+1/5*(-4*x-18)*exp(2),x, algorithm=\
```

output
```
6/5*x*e^2*log(3) - 2/5*(x^2 + 9*x)*e^2
```

3.1146.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{1}{5}\left(e^2(-18-4x)+6e^2\log(3)\right)\,dx=-\frac{\mathrm{e}^2\,\left(4\,x+18\right)\,\left(4\,x-12\,\ln\left(3\right)+18\right)}{40}$$

input
```
int((6*exp(2)*log(3))/5 - (exp(2)*(4*x + 18))/5,x)
```

output
```
-(exp(2)*(4*x + 18)*(4*x - 12*log(3) + 18))/40
```

3.1147 $\int \frac{-225-300\log(2)+(-60x+75\log(2))\log\left(49x^4\right)+\left(-4x^2+20x\log(2)\right)\log^2\left(49x^4\right)}{225x^2+60x^3\log\left(49x^4\right)+4x^4\log^2\left(49x^4\right)}$

3.1147.1 Optimal result

Integrand size = 74, antiderivative size = 28

$$\int \frac{-225-300\log(2)+(-60x+75\log(2))\log\left(49x^4\right)+\left(-4x^2+20x\log(2)\right)\log^2\left(49x^4\right)}{225x^2+60x^3\log\left(49x^4\right)+4x^4\log^2\left(49x^4\right)}\,dx = \frac{1-\frac{\log(2)}{\frac{2x}{5}+\frac{3}{\log\left(49x^4\right)}}}{x}$$

output
```
(1-ln(2)/(2/5*x+3/ln(49*x^4)))/x
```

3.1147.2 Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{-225-300\log(2)+(-60x+75\log(2))\log\left(49x^4\right)+\left(-4x^2+20x\log(2)\right)\log^2\left(49x^4\right)}{225x^2+60x^3\log\left(49x^4\right)+4x^4\log^2\left(49x^4\right)}\,dx = \frac{15+(2x-5\log(2))\log\left(49x^4\right)}{x\left(15+2x\log\left(49x^4\right)\right)}$$

input
```
Integrate[(-225 - 300*Log[2] + (-60*x + 75*Log[2])*Log[49*x^4] + (-4*x^2 +
 20*x*Log[2])*Log[49*x^4]^2)/(225*x^2 + 60*x^3*Log[49*x^4] + 4*x^4*Log[49*
x^4]^2),x]
```

output
```
(15 + (2*x - 5*Log[2])*Log[49*x^4])/(x*(15 + 2*x*Log[49*x^4]))
```

3.1147.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(75\log(2)-60x)\log\left(49x^4\right)+\left(20x\log(2)-4x^2\right)\log^2\left(49x^4\right)-225-300\log(2)}{4x^4\log^2\left(49x^4\right)+225x^2+60x^3\log\left(49x^4\right)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{(75\log(2)-60x)\log\left(49x^4\right)+\left(20x\log(2)-4x^2\right)\log^2\left(49x^4\right)-225\left(1+\frac{4\log(2)}{3}\right)}{x^2\left(2x\log\left(49x^4\right)+15\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{\log(32)-x}{x^3}-\frac{75(8x-15)\log(2)}{2x^3\left(2x\log\left(49x^4\right)+15\right)^2}-\frac{225\log(2)}{2x^3\left(2x\log\left(49x^4\right)+15\right)}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1125}{2}\log(2)\int \frac{1}{x^3\left(2x\log\left(49x^4\right)+15\right)^2}dx-\frac{225}{2}\log(2)\int \frac{1}{x^3\left(2x\log\left(49x^4\right)+15\right)}dx-300\log(2)\int \frac{1}{x^2\left(2x\log\left(49x^4\right)+15\right)^2}dx-\frac{(x-\log(32))^2}{2x^2\log(32)}$$

input
```
Int[(-225 - 300*Log[2] + (-60*x + 75*Log[2])*Log[49*x^4] + (-4*x^2 + 20*x*
Log[2])*Log[49*x^4]^2)/(225*x^2 + 60*x^3*Log[49*x^4] + 4*x^4*Log[49*x^4]^2
),x]
```

output
```
$Aborted
```

3.1147.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1147.4 Maple [A] (verified)

Time = 3.47 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

method	result	size
risch	$-\frac{5\ln(2)-2x}{2x^2}+\frac{75\ln(2)}{2x^2(2\ln(49x^4)x+15)}$	35
norman	$\frac{15+2\ln(49x^4)x-5\ln(49x^4)\ln(2)}{x(2\ln(49x^4)x+15)}$	39
default	$\frac{1}{x}+\frac{-5\ln(2)\ln(x^4)-10\ln(7)\ln(2)}{x(4x\ln(7)+2x\ln(x^4)+15)}$	40
parallelrisch	$\frac{60-20\ln(49x^4)\ln(2)+8\ln(49x^4)x}{4x(2\ln(49x^4)x+15)}$	40

input
```
int(((20*x*ln(2)-4*x^2)*ln(49*x^4)^2+(75*ln(2)-60*x)*ln(49*x^4)-300*ln(2)-
225)/(4*x^4*ln(49*x^4)^2+60*x^3*ln(49*x^4)+225*x^2),x,method=_RETURNVERBOS
E)
```

output
```
-1/2*(5*ln(2)-2*x)/x^2+75/2/x^2*ln(2)/(2*ln(49*x^4)*x+15)
```

3.1147.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{-225-300\log(2)+(-60x+75\log(2))\log(49x^4)+(-4x^2+20x\log(2))\log^2(49x^4)}{225x^2+60x^3\log(49x^4)+4x^4\log^2(49x^4)}\,dx = \frac{(2\,x-5\,\log(2))\log(49\,x^4)+15}{2\,x^2\log(49\,x^4)+15\,x}$$

input
```
integrate(((20*x*log(2)-4*x^2)*log(49*x^4)^2+(75*log(2)-60*x)*log(49*x^4)-
300*log(2)-225)/(4*x^4*log(49*x^4)^2+60*x^3*log(49*x^4)+225*x^2),x, algori
thm=\
```

output
```
((2*x - 5*log(2))*log(49*x^4) + 15)/(2*x^2*log(49*x^4) + 15*x)
```

3.1147.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.21

$$\int \frac{-225-300\log(2)+(-60x+75\log(2))\log(49x^4)+(-4x^2+20x\log(2))\log^2(49x^4)}{225x^2+60x^3\log(49x^4)+4x^4\log^2(49x^4)}\,dx = \frac{75\log(2)}{4x^3\log(49x^4)+30x^2}-\frac{-2x+5\log(2)}{2x^2}$$

input
```
integrate(((20*x*ln(2)-4*x**2)*ln(49*x**4)**2+(75*ln(2)-60*x)*ln(49*x**4)-
300*ln(2)-225)/(4*x**4*ln(49*x**4)**2+60*x**3*ln(49*x**4)+225*x**2),x)
```

output
```
75*log(2)/(4*x**3*log(49*x**4) + 30*x**2) - (-2*x + 5*log(2))/(2*x**2)
```

3.1147.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.64

$$\int \frac{-225-300\log(2)+(-60x+75\log(2))\log(49x^4)+(-4x^2+20x\log(2))\log^2(49x^4)}{225x^2+60x^3\log(49x^4)+4x^4\log^2(49x^4)}\,dx = \frac{4\,x\log(7)-10\,\log(7)\log(2)+4\,(2\,x-5\,\log(2))\log(x)+15}{4\,x^2\log(7)+8\,x^2\log(x)+15\,x}$$

input
```
integrate(((20*x*log(2)-4*x^2)*log(49*x^4)^2+(75*log(2)-60*x)*log(49*x^4)-
300*log(2)-225)/(4*x^4*log(49*x^4)^2+60*x^3*log(49*x^4)+225*x^2),x, algori
thm=\
```

output
```
(4*x*log(7) - 10*log(7)*log(2) + 4*(2*x - 5*log(2))*log(x) + 15)/(4*x^2*lo
g(7) + 8*x^2*log(x) + 15*x)
```

3.1147.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

$$\int \frac{-225-300\log(2)+(-60x+75\log(2))\log(49x^4)+(-4x^2+20x\log(2))\log^2(49x^4)}{225x^2+60x^3\log(49x^4)+4x^4\log^2(49x^4)}\,dx$$
$$=\frac{75\log(2)}{2\left(2x^3\log(49x^4)+15x^2\right)}+\frac{2x-5\log(2)}{2x^2}$$

input
```
integrate(((20*x*log(2)-4*x^2)*log(49*x^4)^2+(75*log(2)-60*x)*log(49*x^4)-
300*log(2)-225)/(4*x^4*log(49*x^4)^2+60*x^3*log(49*x^4)+225*x^2),x, algori
thm=\
```

output
```
75/2*log(2)/(2*x^3*log(49*x^4) + 15*x^2) + 1/2*(2*x - 5*log(2))/x^2
```

3.1147.9 Mupad [B] (verification not implemented)

Time = 16.83 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.36

$$\int \frac{-225-300\log(2)+(-60x+75\log(2))\log(49x^4)+(-4x^2+20x\log(2))\log^2(49x^4)}{225x^2+60x^3\log(49x^4)+4x^4\log^2(49x^4)}\,dx$$
$$=\frac{2x\ln(49x^4)-\ln(32)\ln(49x^4)+15}{x\left(2x\ln(49x^4)+15\right)}$$

input
```
int(-(300*log(2) + log(49*x^4)*(60*x - 75*log(2)) - log(49*x^4)^2*(20*x*lo
g(2) - 4*x^2) + 225)/(4*x^4*log(49*x^4)^2 + 225*x^2 + 60*x^3*log(49*x^4)),
x)
```

output
```
(2*x*log(49*x^4) - log(32)*log(49*x^4) + 15)/(x*(2*x*log(49*x^4) + 15))
```

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$$\int \frac{e^{-\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(e^{\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}} \cdots\right.}{\cdots}$$

3.1148.1 Optimal result

Integrand size = 223, antiderivative size = 32

$$\int \frac{e^{-\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(e^{\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(x^2\log(x)+2x\log^2(x)+\log^3(x)\right)+e^{e^{-\frac{-5x\cdots}{\cdots}}}\cdots\right.}{\cdots}$$

$$= e^{-2+e^{5-e^5-\frac{\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}x}+x$$

output
```
exp(-2+x/exp(ln(x/ln(x))/(x+ln(x))+exp(5)-5))+x
```

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$$e^{-\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\cdots$$

3.1148.2 Mathematica [A] (verified)

Time = 2.12 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.75

$$\int \frac{e^{-\frac{-5x+e^5x+(-5+e^5)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(e^{\frac{-5x+e^5x+(-5+e^5)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(x^2\log(x)+2x\log^2(x)+\log^3(x)\right)+e^{e^{-\frac{-5x}{}}}\right.}{}$$

$$= e^{-2+e^{-\frac{(-5+e^5)x}{x+\log(x)}+\frac{(5-e^5)\log(x)}{x+\log(x)}}x\left(\frac{x}{\log(x)}\right)^{-\frac{1}{x+\log(x)}}}+x$$

input
```
Integrate[(E^((-5*x + E^5*x + (-5 + E^5)*Log[x] + Log[x/Log[x]])/(x + Log[
x]))*(x^2*Log[x] + 2*x*Log[x]^2 + Log[x]^3) + E^((-2*E^((-5*x + E^5*x + (-
5 + E^5)*Log[x] + Log[x/Log[x]])/(x + Log[x])) + x)/E^((-5*x + E^5*x + (-5
 + E^5)*Log[x] + Log[x/Log[x]])/(x + Log[x])))*(x + (1 - x + x^2)*Log[x] +
 (-1 + 2*x)*Log[x]^2 + Log[x]^3 + (1 + x)*Log[x]*Log[x/Log[x]]))/(E^((-5*x
 + E^5*x + (-5 + E^5)*Log[x] + Log[x/Log[x]])/(x + Log[x]))*(x^2*Log[x] +
2*x*Log[x]^2 + Log[x]^3)),x]
```

output
```
E^(-2 + (E^(-(((-5 + E^5)*x)/(x + Log[x])) + ((5 - E^5)*Log[x])/(x + Log[x
]))*x)/(x/Log[x])^(x + Log[x])^(-1)) + x
```

3.1148.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\exp\left(-\frac{e^5x-5x+(e^5-5)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}\right)\left(\left(x^2\log(x)+\log^3(x)+2x\log^2(x)\right)\exp\left(\frac{e^5x-5x+(e^5-5)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}\right.\right.}{}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{\exp\left(-\frac{-5\left(1-\frac{e^5}{5}\right)x+(e^5-5)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}\right)\left(\left(x^2\log(x)+\log^3(x)+2x\log^2(x)\right)\exp\left(\frac{e^5x-5x+(e^5-5)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}\right.\right.}{}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\left(\frac{x}{\log(x)}\right)^{\frac{1}{x+\log(x)}} x^{\frac{e^5-5}{x+\log(x)}} \exp\left(\frac{(e^5-5)\,x}{x+\log(x)} - \frac{-5\left(1-\frac{e^5}{5}\right)x + (e^5-5)\log(x) + \log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}\right) + \frac{\left(x^2\log(x)\right.}{}\right.$$

$\downarrow$ 7239

$$\int \left(\frac{x^{\frac{5-e^5}{x+\log(x)}}\left(\left(x^2-x+(x+1)\log\left(\frac{x}{\log(x)}\right)+1\right)\log(x)+x+\log^3(x)+(2x-1)\log^2(x)\right)\left(\frac{x}{\log(x)}\right)^{-\frac{1}{x+\log(x)}}\exp\left(\right.}{\log(x)(x+\log(x))^2}\right.$$

$\downarrow$ 7293

$$\int \left(\frac{x^{\frac{5-e^5}{x+\log(x)}}\left(x^2\log(x)+x+\log^3(x)+2x\log^2(x)-\log^2(x)-x\log(x)+x\log\left(\frac{x}{\log(x)}\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)\log(\right.}{\log(x)(x}\right.$$

$\downarrow$ 7299

$$\int \left(\frac{x^{\frac{5-e^5}{x+\log(x)}}\left(x^2\log(x)+x+\log^3(x)+2x\log^2(x)-\log^2(x)-x\log(x)+x\log\left(\frac{x}{\log(x)}\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)\log(\right.}{\log(x)(x}\right.$$

input
```
Int[(E^((-5*x + E^5*x + (-5 + E^5)*Log[x] + Log[x/Log[x]])/(x + Log[x]))*(
x^2*Log[x] + 2*x*Log[x]^2 + Log[x]^3) + E^((-2*E^((-5*x + E^5*x + (-5 + E^
5)*Log[x] + Log[x/Log[x]])/(x + Log[x])) + x)/E^((-5*x + E^5*x + (-5 + E^5
)*Log[x] + Log[x/Log[x]])/(x + Log[x])))*(x + (1 - x + x^2)*Log[x] + (-1 +
 2*x)*Log[x]^2 + Log[x]^3 + (1 + x)*Log[x]*Log[x/Log[x]]))/(E^((-5*x + E^5
*x + (-5 + E^5)*Log[x] + Log[x/Log[x]])/(x + Log[x]))*(x^2*Log[x] + 2*x*Lo
g[x]^2 + Log[x]^3)),x]
```

output
```
$Aborted
```

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3.1148.3.1 Defintions of rubi rules used

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

rule 7299
```
Int[u_, x_] :> CannotIntegrate[u, x]
```

3.1148.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 90.03 (sec) , antiderivative size = 155, normalized size of antiderivative = 4.84

method	result
risch	$x+\mathrm{e}^{\left(x \ln(x)^{\frac{1}{x+\ln(x)}} x^{\frac{4}{x+\ln(x)}} \mathrm{e}^{-\frac{-i\pi \,\mathrm{csgn}\left(\frac{ix}{\ln(x)}\right)^{3}+i\pi \,\mathrm{csgn}\left(\frac{ix}{\ln(x)}\right)^{2} \mathrm{csgn}(ix)+i\pi \,\mathrm{csgn}\left(\frac{ix}{\ln(x)}\right)^{2} \mathrm{csgn}\left(\frac{i}{\ln(x)}\right)-i\pi \,\mathrm{csgn}\left(\frac{ix}{\ln(x)}\right) \mathrm{csg}}{2(x+\ln(x))}}$
parallelrisch	$\frac{8\ln(x)\ln(\ln(x))+4x\ln(x)+8x\ln(\ln(x))+8\ln(x)\ln\left(\frac{x}{\ln(x)}\right)-8\ln(x)^{2}+12x^{2}+12\ln(x)\mathrm{e}^{\left(-2\,\mathrm{e}^{\frac{\ln\left(\frac{x}{\ln(x)}\right)+\left(\mathrm{e}^{5}-5\right)\ln(x)+x\,\mathrm{e}^{5}-5x}{x+\ln(x)}}+}}{1}$

input
```
int((((1+x)*ln(x)*ln(x/ln(x))+ln(x)^3+(-1+2*x)*ln(x)^2+(x^2-x+1)*ln(x)+x)*
exp((-2*exp((ln(x/ln(x))+(exp(5)-5)*ln(x)+x*exp(5)-5*x)/(x+ln(x)))+x)/exp(
(ln(x/ln(x))+(exp(5)-5)*ln(x)+x*exp(5)-5*x)/(x+ln(x))))+(ln(x)^3+2*x*ln(x)
^2+x^2*ln(x))*exp((ln(x/ln(x))+(exp(5)-5)*ln(x)+x*exp(5)-5*x)/(x+ln(x))))/
(ln(x)^3+2*x*ln(x)^2+x^2*ln(x))/exp((ln(x/ln(x))+(exp(5)-5)*ln(x)+x*exp(5)
-5*x)/(x+ln(x))),x,method=_RETURNVERBOSE)
```

output
```
x+exp((x*ln(x)^(1/(x+ln(x)))*(x^(1/(x+ln(x))))^4*exp(-1/2*(-I*Pi*csgn(I*x/
ln(x))^3+I*Pi*csgn(I*x/ln(x))^2*csgn(I*x)+I*Pi*csgn(I*x/ln(x))^2*csgn(I/ln
(x))-I*Pi*csgn(I*x/ln(x))*csgn(I*x)*csgn(I/ln(x))+2*x*exp(5)-10*x)/(x+ln(x
)))-2*x^(1/(x+ln(x))*exp(5)))/(x^(1/(x+ln(x))*exp(5))))
```

3.1148.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. $2(29) = 58$.

Time = 0.27 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.16

$$\int \frac{e^{-\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(e^{\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(x^2\log(x)+2x\log^2(x)+\log^3(x)\right)+e^{-\frac{-5x}{\cdots}}\cdots\right)}{\cdots}$$

$$= x + e^{\left(\left(x-2\,e^{\left(\frac{xe^5+\left(e^5-5\right)\log(x)-5\,x+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}\right)}\right)e^{\left(-\frac{xe^5+\left(e^5-5\right)\log(x)-5\,x+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}\right)}\right)}$$

input
```
integrate((((1+x)*log(x)*log(x/log(x))+log(x)^3+(-1+2*x)*log(x)^2+(x^2-x+1
)*log(x)+x)*exp((-2*exp((log(x/log(x))+(exp(5)-5)*log(x)+x*exp(5)-5*x)/(x+
log(x)))+x)/exp((log(x/log(x))+(exp(5)-5)*log(x)+x*exp(5)-5*x)/(x+log(x)))
)+(log(x)^3+2*x*log(x)^2+x^2*log(x))*exp((log(x/log(x))+(exp(5)-5)*log(x)+
x*exp(5)-5*x)/(x+log(x))))/(log(x)^3+2*x*log(x)^2+x^2*log(x))/exp((log(x/l
og(x))+(exp(5)-5)*log(x)+x*exp(5)-5*x)/(x+log(x))),x, algorithm=\
```

output
```
x + e^((x - 2*e^((x*e^5 + (e^5 - 5)*log(x) - 5*x + log(x/log(x)))/(x + log
(x))))*e^(-(x*e^5 + (e^5 - 5)*log(x) - 5*x + log(x/log(x)))/(x + log(x))))
```

3.1148.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{e^{-\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(e^{\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(x^2\log(x)+2x\log^2(x)+\log^3(x)\right)+e^{e^{-\frac{-5x}{}}}\cdots\right.}{\cdots}$$

= Exception raised: TypeError

input
```
integrate((((1+x)*ln(x)*ln(x/ln(x))+ln(x)**3+(-1+2*x)*ln(x)**2+(x**2-x+1)*
ln(x)+x)*exp((-2*exp((ln(x/ln(x))+(exp(5)-5)*ln(x)+x*exp(5)-5*x)/(x+ln(x))
)+x)/exp((ln(x/ln(x))+(exp(5)-5)*ln(x)+x*exp(5)-5*x)/(x+ln(x))))+(ln(x)**3
+2*x*ln(x)**2+x**2*ln(x))*exp((ln(x/ln(x))+(exp(5)-5)*ln(x)+x*exp(5)-5*x)/
(x+ln(x))))/(ln(x)**3+2*x*ln(x)**2+x**2*ln(x))/exp((ln(x/ln(x))+(exp(5)-5)
*ln(x)+x*exp(5)-5*x)/(x+ln(x))),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.1148.7 Maxima [A] (verification not implemented)

Time = 1.07 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.19

$$\int \frac{e^{-\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(e^{\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(x^2\log(x)+2x\log^2(x)+\log^3(x)\right)+e^{e^{-\frac{-5x}{}}}\cdots\right.}{\cdots}$$

$$=\left(xe^2+e^{\left(xe^{\left(-\frac{\log(x)}{x+\log(x)}+\frac{\log(\log(x))}{x+\log(x)}-e^5+5\right)}\right)}\right)e^{(-2)}$$

input
```
integrate((((1+x)*log(x)*log(x/log(x))+log(x)^3+(-1+2*x)*log(x)^2+(x^2-x+1
)*log(x)+x)*exp((-2*exp((log(x/log(x))+(exp(5)-5)*log(x)+x*exp(5)-5*x)/(x+
log(x)))+x)/exp((log(x/log(x))+(exp(5)-5)*log(x)+x*exp(5)-5*x)/(x+log(x)))
)+(log(x)^3+2*x*log(x)^2+x^2*log(x))*exp((log(x/log(x))+(exp(5)-5)*log(x)+
x*exp(5)-5*x)/(x+log(x))))/(log(x)^3+2*x*log(x)^2+x^2*log(x))/exp((log(x/l
og(x))+(exp(5)-5)*log(x)+x*exp(5)-5*x)/(x+log(x))),x, algorithm=\
```

output
```
(x*e^2 + e^(x*e^(-log(x)/(x + log(x)) + log(log(x))/(x + log(x)) - e^5 + 5
)))*e^(-2)
```

3.1148.8 Giac [F]

$$\int \frac{e^{-\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(e^{\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(x^2\log(x)+2x\log^2(x)+\log^3(x)\right)+e^{e^{-\frac{-5x}{}}}\right.}{}$$

$$=\int \frac{\left(\left((2\,x-1)\log\left(x\right)^2+\log\left(x\right)^3+(x+1)\log\left(x\right)\log\left(\frac{x}{\log(x)}\right)+\left(x^2-x+1\right)\log\left(x\right)+x\right)e^{\left(\left(x-2\,e^{\left(\frac{xe^5+(}{}\right.}\right.\right.}\right.}{}$$

input
```
integrate((((1+x)*log(x)*log(x/log(x))+log(x)^3+(-1+2*x)*log(x)^2+(x^2-x+1
)*log(x)+x)*exp((-2*exp((log(x/log(x))+(exp(5)-5)*log(x)+x*exp(5)-5*x)/(x+
log(x)))+x)/exp((log(x/log(x))+(exp(5)-5)*log(x)+x*exp(5)-5*x)/(x+log(x)))
)+(log(x)^3+2*x*log(x)^2+x^2*log(x))*exp((log(x/log(x))+(exp(5)-5)*log(x)+
x*exp(5)-5*x)/(x+log(x))))/(log(x)^3+2*x*log(x)^2+x^2*log(x))/exp((log(x/l
og(x))+(exp(5)-5)*log(x)+x*exp(5)-5*x)/(x+log(x))),x, algorithm=\
```

output
```
undef
```

3.1148.

3.1148.9 Mupad [B] (verification not implemented)

Time = 17.84 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.12

$$\int \frac{e^{-\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(e^{\frac{-5x+e^5x+\left(-5+e^5\right)\log(x)+\log\left(\frac{x}{\log(x)}\right)}{x+\log(x)}}\left(x^2\log(x)+2x\log^2(x)+\log^3(x)\right)+e^{e^{-\frac{-5x}{}}}\right.}{}$$

$$=x+\mathrm{e}^{\frac{x\,x^{\frac{5}{x+\ln(x)}}\,\mathrm{e}^{\frac{5\,x}{x+\ln(x)}}\,\mathrm{e}^{-\frac{x\,\mathrm{e}^5}{x+\ln(x)}}}{x^{\frac{\mathrm{e}^5}{x+\ln(x)}}\,\left(\frac{x}{\ln(x)}\right)^{\frac{1}{x+\ln(x)}}}}\,\mathrm{e}^{-2}$$

input
```
int((exp(-(log(x/log(x)) - 5*x + log(x)*(exp(5) - 5) + x*exp(5))/(x + log(
x)))*(exp(exp(-(log(x/log(x)) - 5*x + log(x)*(exp(5) - 5) + x*exp(5))/(x +
 log(x)))*(x - 2*exp((log(x/log(x)) - 5*x + log(x)*(exp(5) - 5) + x*exp(5)
)/(x + log(x)))))*(x + log(x)^3 + log(x)*(x^2 - x + 1) + log(x)^2*(2*x - 1
) + log(x/log(x))*log(x)*(x + 1)) + exp((log(x/log(x)) - 5*x + log(x)*(exp
(5) - 5) + x*exp(5))/(x + log(x)))*(2*x*log(x)^2 + x^2*log(x) + log(x)^3))
)/(2*x*log(x)^2 + x^2*log(x) + log(x)^3),x)
```

output
```
x + exp((x*x^(5/(x + log(x)))*exp((5*x)/(x + log(x)))*exp(-(x*exp(5))/(x +
 log(x))))/(x^(exp(5)/(x + log(x)))*(x/log(x))^(1/(x + log(x)))))*exp(-2)
```

3.1149 $\int \frac{-2x^3+e^{2x}(32-50x+16x^2)+e^x(-32x+52x^2-16x^3)+(e^{2x}(-8+12x$

3.1149.1 Optimal result

Integrand size = 94, antiderivative size = 30

$$\int \frac{-2x^3+e^{2x}(32-50x+16x^2)+e^x(-32x+52x^2-16x^3)+(e^{2x}(-8+12x-4x^2)+e^x(8x-12x^2+4x^3$$
$$= \frac{2(e^x-x)^2(4-\log(16(3+3(1-x))))}{x^2}$$

output
```
2*(exp(x)-x)^2/x^2*(4-ln(-48*x+96))
```

3.1149.2 Mathematica [A] (verified)

Time = 0.70 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

$$\int \frac{-2x^3+e^{2x}(32-50x+16x^2)+e^x(-32x+52x^2-16x^3)+(e^{2x}(-8+12x-4x^2)+e^x(8x-12x^2+4x^3$$
$$= 2\left(-\log(2-x)-\frac{e^x(e^x-2x)(-4+\log(-48(-2+x)))}{x^2}\right)$$

input
```
Integrate[(-2*x^3 + E^(2*x)*(32 - 50*x + 16*x^2) + E^x*(-32*x + 52*x^2 - 1
6*x^3) + (E^(2*x)*(-8 + 12*x - 4*x^2) + E^x*(8*x - 12*x^2 + 4*x^3))*Log[96
 - 48*x])/(-2*x^3 + x^4),x]
```

output
```
2*(-Log[2 - x] - (E^x*(E^x - 2*x)*(-4 + Log[-48*(-2 + x)]))/x^2)
```

3.1149.
$\int \frac{-2x^3+e^{2x}(32-50x+16x^2)+e^x(-32x+52x^2-16x^3)+(e^{2x}(-8+12x-4x^2)+e^x(8x-12x^2+4x^3))\log(96-48x)}{-2x^3+x^4}\,dx$

3.1149.3 Rubi [A] (verified)

Time = 3.25 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.87, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {2026, 7292, 27, 25, 7239, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^3+e^{2x}(16x^2-50x+32)+e^x(-16x^3+52x^2-32x)+(e^{2x}(-4x^2+12x-8)+e^x(4x^3-12x^2+8x))\log}{x^4-2x^3}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-2x^3+e^{2x}(16x^2-50x+32)+e^x(-16x^3+52x^2-32x)+(e^{2x}(-4x^2+12x-8)+e^x(4x^3-12x^2+8x))\log}{(x-2)x^3}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{2(e^x-x)(-8e^xx^2-x^2+2e^xx^2\log(-48(x-2))+25e^xx-16e^x-6e^xx\log(-48(x-2))+4e^x\log(-48(x-2}{(2-x)x^3}$$

$$\Big\downarrow \text{27}$$

$$2\int -\frac{(e^x-x)(8e^xx^2-2e^x\log(48(2-x))x^2+x^2-25e^xx+6e^x\log(48(2-x))x+16e^x-4e^x\log(48(2-x)))}{(2-x)x^3}dx$$

$$\Big\downarrow \text{25}$$

$$-2\int \frac{(e^x-x)(8e^xx^2-2e^x\log(48(2-x))x^2+x^2-25e^xx+6e^x\log(48(2-x))x+16e^x-4e^x\log(48(2-x)))}{(2-x)x^3}dx$$

$$\Big\downarrow \text{7239}$$

$$-2\int \frac{(e^x-x)(x^2-e^x(-8x^2+25x-16)-2e^x(x^2-3x+2)\log(-48(x-2)))}{(2-x)x^3}dx$$

$$\Big\downarrow \text{7293}$$

$$-2\int \left(-\frac{2e^x(\log(-48(x-2))x^2-4x^2-3\log(-48(x-2))x+13x+2\log(-48(x-2))-8)}{(x-2)x^2}+\frac{e^{2x}(2\log(-48(x}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-2\left(-\frac{4e^{2x}}{x^2}+\frac{e^{2x}\log(96-48x)}{x^2}+\frac{8e^x}{x}-\frac{2e^x\log(96-48x)}{x}+\log(2-x)\right)$$

3.1149.
$\int \frac{-2x^3+e^{2x}(32-50x+16x^2)+e^x(-32x+52x^2-16x^3)+(e^{2x}(-8+12x-4x^2)+e^x(8x-12x^2+4x^3))\log(96-48x)}{-2x^3+x^4}\,dx$

input
```
Int[(-2*x^3 + E^(2*x)*(32 - 50*x + 16*x^2) + E^x*(-32*x + 52*x^2 - 16*x^3)
 + (E^(2*x)*(-8 + 12*x - 4*x^2) + E^x*(8*x - 12*x^2 + 4*x^3))*Log[96 - 48*
x])/(-2*x^3 + x^4),x]
```

output
```
-2*((-4*E^(2*x))/x^2 + (8*E^x)/x + (E^(2*x)*Log[96 - 48*x])/x^2 - (2*E^x*L
og[96 - 48*x])/x + Log[2 - x])
```

3.1149.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1149.
$$\int \frac{-2x^3+e^{2x}(32-50x+16x^2)+e^x(-32x+52x^2-16x^3)+(e^{2x}(-8+12x-4x^2)+e^x(8x-12x^2+4x^3))\log(96-48x)}{-2x^3+x^4}\,dx$$

3.1149.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. 2(23) = 46.

Time = 3.17 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.60

method	result	size
risch	$\frac{2\,\mathrm{e}^{x}(2x-\mathrm{e}^{x})\ln(-48x+96)}{x^{2}}-\frac{2(x^{2}\ln(-2+x)+8\,\mathrm{e}^{x}x-4\,\mathrm{e}^{2x})}{x^{2}}$	48
default	$\frac{-2\ln(-48x+96)\mathrm{e}^{2x}+8\,\mathrm{e}^{2x}}{x^{2}}+\frac{4\ln(-48x+96)\mathrm{e}^{x}-16\,\mathrm{e}^{x}}{x}-2\ln\left(-2+x\right)$	50
parallelrisch	$-\frac{8x^{2}\ln(-2+x)-16\,\mathrm{e}^{x}\ln(-48x+96)x+8\ln(-48x+96)\mathrm{e}^{2x}+64\,\mathrm{e}^{x}x-32\,\mathrm{e}^{2x}}{4x^{2}}$	50

input
```
int((((-4*x^2+12*x-8)*exp(x)^2+(4*x^3-12*x^2+8*x)*exp(x))*ln(-48*x+96)+(16
*x^2-50*x+32)*exp(x)^2+(-16*x^3+52*x^2-32*x)*exp(x)-2*x^3)/(x^4-2*x^3),x,m
ethod=_RETURNVERBOSE)
```

output
```
2*exp(x)*(2*x-exp(x))/x^2*ln(-48*x+96)-2*(x^2*ln(-2+x)+8*exp(x)*x-4*exp(2*
x))/x^2
```

3.1149.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.23

$$\int \frac{-2x^3+e^{2x}(32-50x+16x^2)+e^x(-32x+52x^2-16x^3)+(e^{2x}(-8+12x-4x^2)+e^x(8x-12x^2+4x^3}{-2x^3+x^4}$$
$$=-\frac{2\left(8\,xe^{x}+\left(x^{2}-2\,xe^{x}+e^{(2\,x)}\right)\log\left(-48\,x+96\right)-4\,e^{(2\,x)}\right)}{x^{2}}$$

input
```
integrate((((-4*x^2+12*x-8)*exp(x)^2+(4*x^3-12*x^2+8*x)*exp(x))*log(-48*x+
96)+(16*x^2-50*x+32)*exp(x)^2+(-16*x^3+52*x^2-32*x)*exp(x)-2*x^3)/(x^4-2*x
^3),x, algorithm=\
```

output
```
-2*(8*x*e^x + (x^2 - 2*x*e^x + e^(2*x))*log(-48*x + 96) - 4*e^(2*x))/x^2
```

3.1149.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(19) = 38$.

Time = 0.20 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.60

$$\int \frac{-2x^3 + e^{2x}(32 - 50x + 16x^2) + e^x(-32x + 52x^2 - 16x^3) + (e^{2x}(-8 + 12x - 4x^2) + e^x(8x - 12x^2 + 4x^3}{-2x^3 + x^4}$$

$$= -2\log(x-2) + \frac{(-2x\log(96-48x) + 8x)\,e^{2x} + (4x^2\log(96-48x) - 16x^2)\,e^x}{x^3}$$

input
```
integrate((((-4*x**2+12*x-8)*exp(x)**2+(4*x**3-12*x**2+8*x)*exp(x))*ln(-48
*x+96)+(16*x**2-50*x+32)*exp(x)**2+(-16*x**3+52*x**2-32*x)*exp(x)-2*x**3)/
(x**4-2*x**3),x)
```

output
```
-2*log(x - 2) + ((-2*x*log(96 - 48*x) + 8*x)*exp(2*x) + (4*x**2*log(96 - 4
8*x) - 16*x**2)*exp(x))/x**3
```

3.1149.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.33 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.10

$$\int \frac{-2x^3 + e^{2x}(32 - 50x + 16x^2) + e^x(-32x + 52x^2 - 16x^3) + (e^{2x}(-8 + 12x - 4x^2) + e^x(8x - 12x^2 + 4x^3}{-2x^3 + x^4}$$

$$= \frac{2\left(2\,(i\,\pi + \log(3) + 4\,\log(2) - 4)xe^x - (i\,\pi + \log(3) + 4\,\log(2) - 4)e^{(2\,x)} + \left(2\,xe^x - e^{(2\,x)}\right)\log(x-2)\right)}{x^2} - 2\,\log(x-2)$$

input
```
integrate((((-4*x^2+12*x-8)*exp(x)^2+(4*x^3-12*x^2+8*x)*exp(x))*log(-48*x+
96)+(16*x^2-50*x+32)*exp(x)^2+(-16*x^3+52*x^2-32*x)*exp(x)-2*x^3)/(x^4-2*x
^3),x, algorithm=\
```

output
```
2*(2*(I*pi + log(3) + 4*log(2) - 4)*x*e^x - (I*pi + log(3) + 4*log(2) - 4)
*e^(2*x) + (2*x*e^x - e^(2*x))*log(x - 2))/x^2 - 2*log(x - 2)
```

3.1149.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(21) = 42$.

Time = 0.28 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.57

$$\int \frac{-2x^3 + e^{2x}(32 - 50x + 16x^2) + e^x(-32x + 52x^2 - 16x^3) + (e^{2x}(-8 + 12x - 4x^2) + e^x(8x - 12x^2 + 4x^3}{-2x^3 + x^4}$$
$$= -\frac{2\left(x^2 \log\left(x-2\right) - 2\,xe^x \log\left(-48\,x + 96\right) + 8\,xe^x + e^{(2\,x)} \log\left(-48\,x + 96\right) - 4\,e^{(2\,x)}\right)}{x^2}$$

input
```
integrate((((-4*x^2+12*x-8)*exp(x)^2+(4*x^3-12*x^2+8*x)*exp(x))*log(-48*x+
96)+(16*x^2-50*x+32)*exp(x)^2+(-16*x^3+52*x^2-32*x)*exp(x)-2*x^3)/(x^4-2*x
^3),x, algorithm=\
```

output
```
-2*(x^2*log(x - 2) - 2*x*e^x*log(-48*x + 96) + 8*x*e^x + e^(2*x)*log(-48*x
 + 96) - 4*e^(2*x))/x^2
```

3.1149.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-2x^3 + e^{2x}(32 - 50x + 16x^2) + e^x(-32x + 52x^2 - 16x^3) + (e^{2x}(-8 + 12x - 4x^2) + e^x(8x - 12x^2 + 4x^3}{-2x^3 + x^4}$$
$$= \int \frac{\ln\left(96 - 48\,x\right)\,\left(\mathrm{e}^{2\,x}\,\left(4\,x^2 - 12\,x + 8\right) - \mathrm{e}^x\,\left(4\,x^3 - 12\,x^2 + 8\,x\right)\right) - \mathrm{e}^{2\,x}\,\left(16\,x^2 - 50\,x + 32\right) + 2\,x^3 + \mathrm{e}^x\,(1}{2\,x^3 - x^4}$$

input
```
int((log(96 - 48*x)*(exp(2*x)*(4*x^2 - 12*x + 8) - exp(x)*(8*x - 12*x^2 +
4*x^3)) - exp(2*x)*(16*x^2 - 50*x + 32) + 2*x^3 + exp(x)*(32*x - 52*x^2 +
16*x^3))/(2*x^3 - x^4),x)
```

output
```
int((log(96 - 48*x)*(exp(2*x)*(4*x^2 - 12*x + 8) - exp(x)*(8*x - 12*x^2 +
4*x^3)) - exp(2*x)*(16*x^2 - 50*x + 32) + 2*x^3 + exp(x)*(32*x - 52*x^2 +
16*x^3))/(2*x^3 - x^4), x)
```

3.1150 $\int \frac{32-512x-240x^2+128x^3+64x^4+e^{4x}(2-40x+53x^2+12x^3-44x^4-16x^5)}{32x-272x^2-16x^3+192x^4+64x^5+e^{4x}(2x-17x^2-x^3+12x^4+4x^5)}$

3.1150.1 Optimal result

Integrand size = 108, antiderivative size = 33

$$\int \frac{32-512x-240x^2+128x^3+64x^4+e^{4x}(2-40x+53x^2+12x^3-44x^4-16x^5)}{32x-272x^2-16x^3+192x^4+64x^5+e^{4x}(2x-17x^2-x^3+12x^4+4x^5)}\,dx = \log\left(\frac{5\left(4x^2-\frac{x}{2+x}\right)}{(16+e^{4x})(1-x)}\right)$$

output
```
ln((4*x^2-x/(2+x))/(1-x)/(1/5*exp(4*x)+16/5))
```

3.1150.2 Mathematica [A] (verified)

Time = 1.89 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.33

$$\int \frac{32-512x-240x^2+128x^3+64x^4+e^{4x}(2-40x+53x^2+12x^3-44x^4-16x^5)}{32x-272x^2-16x^3+192x^4+64x^5+e^{4x}(2x-17x^2-x^3+12x^4+4x^5)}\,dx = -4x-2\text{arctanh}\left(1+\frac{e^{4x}}{8}\right)+\log(x)+\log\left(1-8x-4x^2\right)-\log\left(2-x-x^2\right)$$

input
```
Integrate[(32 - 512*x - 240*x^2 + 128*x^3 + 64*x^4 + E^(4*x)*(2 - 40*x + 5
3*x^2 + 12*x^3 - 44*x^4 - 16*x^5))/(32*x - 272*x^2 - 16*x^3 + 192*x^4 + 64
*x^5 + E^(4*x)*(2*x - 17*x^2 - x^3 + 12*x^4 + 4*x^5)),x]
```

output
```
-4*x - 2*ArcTanh[1 + E^(4*x)/8] + Log[x] + Log[1 - 8*x - 4*x^2] - Log[2 -
x - x^2]
```

3.1150.3 Rubi [A] (verified)

Time = 3.53 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.15, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$, Rules used = {7292, 2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{64x^4+128x^3-240x^2+e^{4x}\left(-16x^5-44x^4+12x^3+53x^2-40x+2\right)-512x+32}{64x^5+192x^4-16x^3-272x^2+e^{4x}\left(4x^5+12x^4-x^3-17x^2+2x\right)+32x}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{64x^4+128x^3-240x^2+e^{4x}\left(-16x^5-44x^4+12x^3+53x^2-40x+2\right)-512x+32}{\left(e^{4x}+16\right)x\left(4x^4+12x^3-x^2-17x+2\right)}dx$$

$$\Big\downarrow \ 2463$$

$$\int \left(\frac{64x^4+128x^3-240x^2+e^{4x}\left(-16x^5-44x^4+12x^3+53x^2-40x+2\right)-512x+32}{33\left(e^{4x}+16\right)(x-1)x}+\frac{64x^4+128x^3-240x^2}{}\right.$$

$$\Big\downarrow \ 2009$$

$$\log\left(-4x^2-8x+1\right)-\log\left(e^{4x}+16\right)-\log(1-x)+\log(x)-\log(x+2)$$

input
```
Int[(32 - 512*x - 240*x^2 + 128*x^3 + 64*x^4 + E^(4*x)*(2 - 40*x + 53*x^2
+ 12*x^3 - 44*x^4 - 16*x^5))/(32*x - 272*x^2 - 16*x^3 + 192*x^4 + 64*x^5 +
 E^(4*x)*(2*x - 17*x^2 - x^3 + 12*x^4 + 4*x^5)),x]
```

output
```
-Log[16 + E^(4*x)] - Log[1 - x] + Log[x] - Log[2 + x] + Log[1 - 8*x - 4*x^
2]
```

3.1150.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1150.4 Maple [A] (verified)

Time = 0.67 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.03

method	result	size
parallelrisch	$\ln(x)-\ln(-1+x)-\ln(2+x)-\ln(\mathrm{e}^{4x}+16)+\ln\left(x^2+2x-\frac{1}{4}\right)$	34
risch	$-\ln(x^2+x-2)+\ln(4x^3+8x^2-x)-\ln(\mathrm{e}^{4x}+16)$	35
norman	$-\ln(-1+x)-\ln(2+x)-\ln(\mathrm{e}^{4x}+16)+\ln(x)+\ln(4x^2+8x-1)$	36

input
```
int(((-16*x^5-44*x^4+12*x^3+53*x^2-40*x+2)*exp(4*x)+64*x^4+128*x^3-240*x^2
-512*x+32)/((4*x^5+12*x^4-x^3-17*x^2+2*x)*exp(4*x)+64*x^5+192*x^4-16*x^3-2
72*x^2+32*x),x,method=_RETURNVERBOSE)
```

output
```
ln(x)-ln(-1+x)-ln(2+x)-ln(exp(4*x)+16)+ln(x^2+2*x-1/4)
```

3.1150.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.03

$$\int \frac{32-512x-240x^2+128x^3+64x^4+e^{4x}(2-40x+53x^2+12x^3-44x^4-16x^5)}{32x-272x^2-16x^3+192x^4+64x^5+e^{4x}(2x-17x^2-x^3+12x^4+4x^5)}\,dx$$
$$=\log\left(4\,x^3+8\,x^2-x\right)-\log\left(x^2+x-2\right)-\log\left(e^{(4\,x)}+16\right)$$

input
```
integrate(((-16*x^5-44*x^4+12*x^3+53*x^2-40*x+2)*exp(4*x)+64*x^4+128*x^3-2
40*x^2-512*x+32)/((4*x^5+12*x^4-x^3-17*x^2+2*x)*exp(4*x)+64*x^5+192*x^4-16
*x^3-272*x^2+32*x),x, algorithm=\
```

output
```
log(4*x^3 + 8*x^2 - x) - log(x^2 + x - 2) - log(e^(4*x) + 16)
```

3.1150.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.88

$$\int \frac{32-512x-240x^2+128x^3+64x^4+e^{4x}(2-40x+53x^2+12x^3-44x^4-16x^5)}{32x-272x^2-16x^3+192x^4+64x^5+e^{4x}(2x-17x^2-x^3+12x^4+4x^5)}\,dx$$
$$=-\log\left(e^{4x}+16\right)-\log\left(x^2+x-2\right)+\log\left(4x^3+8x^2-x\right)$$

input
```
integrate(((-16*x**5-44*x**4+12*x**3+53*x**2-40*x+2)*exp(4*x)+64*x**4+128*
x**3-240*x**2-512*x+32)/((4*x**5+12*x**4-x**3-17*x**2+2*x)*exp(4*x)+64*x**
5+192*x**4-16*x**3-272*x**2+32*x),x)
```

output
```
-log(exp(4*x) + 16) - log(x**2 + x - 2) + log(4*x**3 + 8*x**2 - x)
```

3.1150.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.06

$$\int \frac{32-512x-240x^2+128x^3+64x^4+e^{4x}(2-40x+53x^2+12x^3-44x^4-16x^5)}{32x-272x^2-16x^3+192x^4+64x^5+e^{4x}(2x-17x^2-x^3+12x^4+4x^5)}\,dx$$
$$=\log\left(4\,x^2+8\,x-1\right)-\log\left(x+2\right)-\log\left(x-1\right)+\log\left(x\right)-\log\left(e^{(4\,x)}+16\right)$$

input
```
integrate(((-16*x^5-44*x^4+12*x^3+53*x^2-40*x+2)*exp(4*x)+64*x^4+128*x^3-2
40*x^2-512*x+32)/((4*x^5+12*x^4-x^3-17*x^2+2*x)*exp(4*x)+64*x^5+192*x^4-16
*x^3-272*x^2+32*x),x, algorithm=\
```

output
```
log(4*x^2 + 8*x - 1) - log(x + 2) - log(x - 1) + log(x) - log(e^(4*x) + 16
)
```

3.1150.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{32-512x-240x^2+128x^3+64x^4+e^{4x}(2-40x+53x^2+12x^3-44x^4-16x^5)}{32x-272x^2-16x^3+192x^4+64x^5+e^{4x}(2x-17x^2-x^3+12x^4+4x^5)}\,dx$$
$$=\log\left(4\,x^2+8\,x-1\right)-\log\left(x^2+x-2\right)+\log\left(x\right)-\log\left(e^{(4\,x)}+16\right)$$

input
```
integrate(((-16*x^5-44*x^4+12*x^3+53*x^2-40*x+2)*exp(4*x)+64*x^4+128*x^3-2
40*x^2-512*x+32)/((4*x^5+12*x^4-x^3-17*x^2+2*x)*exp(4*x)+64*x^5+192*x^4-16
*x^3-272*x^2+32*x),x, algorithm=\
```

output
```
log(4*x^2 + 8*x - 1) - log(x^2 + x - 2) + log(x) - log(e^(4*x) + 16)
```

3.1150.9 Mupad [B] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{32-512x-240x^2+128x^3+64x^4+e^{4x}(2-40x+53x^2+12x^3-44x^4-16x^5)}{32x-272x^2-16x^3+192x^4+64x^5+e^{4x}\left(2x-17x^2-x^3+12x^4+4x^5\right)}\,dx$$
$$=\ln\left(x\left(4\,x^2+8\,x-1\right)\right)-\ln\left(x^2+x-2\right)-\ln\left(\mathrm{e}^{4\,x}+16\right)$$

input
```
int(-(512*x + exp(4*x)*(40*x - 53*x^2 - 12*x^3 + 44*x^4 + 16*x^5 - 2) + 24
0*x^2 - 128*x^3 - 64*x^4 - 32)/(32*x + exp(4*x)*(2*x - 17*x^2 - x^3 + 12*x
^4 + 4*x^5) - 272*x^2 - 16*x^3 + 192*x^4 + 64*x^5),x)
```

output
```
log(x*(8*x + 4*x^2 - 1)) - log(x + x^2 - 2) - log(exp(4*x) + 16)
```

3.1151 $\int \frac{64x^3+e^2(3+192x^3-40x^4+6x^5)}{4e^2}\,dx$

3.1151.1 Optimal result

Integrand size = 34, antiderivative size = 29

$$\int \frac{64x^3+e^2(3+192x^3-40x^4+6x^5)}{4e^2}\,dx=\frac{1}{4}x\left(3+x^3\left(x^2-4\left(-4+2\left(-4-\frac{2}{e^2}+x\right)\right)\right)\right)$$

output
```
1/4*(3+(x^2-8*x+16/exp(2)+48)*x^3)*x
```

3.1151.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

$$\int \frac{64x^3+e^2(3+192x^3-40x^4+6x^5)}{4e^2}\,dx=\frac{3x}{4}+\frac{4(1+3e^2)\,x^4}{e^2}-2x^5+\frac{x^6}{4}$$

input
```
Integrate[(64*x^3 + E^2*(3 + 192*x^3 - 40*x^4 + 6*x^5))/(4*E^2),x]
```

output
```
(3*x)/4 + (4*(1 + 3*E^2)*x^4)/E^2 - 2*x^5 + x^6/4
```

3.1151.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{64x^3+e^2(6x^5-40x^4+192x^3+3)}{4e^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int (64x^3+e^2(6x^5-40x^4+192x^3+3))dx}{4e^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^2x^6-8e^2x^5+48e^2x^4+16x^4+3e^2x}{4e^2}$$

input
```
Int[(64*x^3 + E^2*(3 + 192*x^3 - 40*x^4 + 6*x^5))/(4*E^2),x]
```

output
```
(3*E^2*x + 16*x^4 + 48*E^2*x^4 - 8*E^2*x^5 + E^2*x^6)/(4*E^2)
```

3.1151.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1151.4 Maple [A] (verified)

Time = 2.45 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

method	result	size
risch	$\frac{x^6}{4} - 2x^5 + 12x^4 + 4\,\mathrm{e}^{-2}x^4 + \frac{3x}{4}$	27
norman	$\frac{3x}{4} - 2x^5 + \frac{x^6}{4} + 4(3\,\mathrm{e}^2 + 1)\,\mathrm{e}^{-2}x^4$	30
gosper	$\frac{x(\mathrm{e}^2x^5 - 8x^4\mathrm{e}^2 + 48x^3\mathrm{e}^2 + 16x^3 + 3\,\mathrm{e}^2)\,\mathrm{e}^{-2}}{4}$	38
default	$\frac{\mathrm{e}^{-2}(x^6\mathrm{e}^2 - 8\,\mathrm{e}^2x^5 + 48x^4\mathrm{e}^2 + 16x^4 + 3\,\mathrm{e}^2x)}{4}$	38
parallelrisch	$\frac{\mathrm{e}^{-2}(x^6\mathrm{e}^2 - 8\,\mathrm{e}^2x^5 + 48x^4\mathrm{e}^2 + 16x^4 + 3\,\mathrm{e}^2x)}{4}$	38

input
```
int(1/4*((6*x^5-40*x^4+192*x^3+3)*exp(2)+64*x^3)/exp(2),x,method=_RETURNVE
RBOSE)
```

output
```
1/4*x^6-2*x^5+12*x^4+4*exp(-2)*x^4+3/4*x
```

3.1151.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{64x^3 + e^2(3 + 192x^3 - 40x^4 + 6x^5)}{4e^2}\,dx = \frac{1}{4}\left(16\,x^4 + \left(x^6 - 8\,x^5 + 48\,x^4 + 3\,x\right)e^2\right)e^{(-2)}$$

input
```
integrate(1/4*((6*x^5-40*x^4+192*x^3+3)*exp(2)+64*x^3)/exp(2),x, algorithm
=\
```

output
```
1/4*(16*x^4 + (x^6 - 8*x^5 + 48*x^4 + 3*x)*e^2)*e^(-2)
```

3.1151.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \frac{64x^3+e^2(3+192x^3-40x^4+6x^5)}{4e^2}\,dx=\frac{x^6}{4}-2x^5+\frac{x^4\cdot(4+12e^2)}{e^2}+\frac{3x}{4}$$

input
```
integrate(1/4*((6*x**5-40*x**4+192*x**3+3)*exp(2)+64*x**3)/exp(2),x)
```

output
```
x**6/4 - 2*x**5 + x**4*(4 + 12*exp(2))*exp(-2) + 3*x/4
```

3.1151.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{64x^3+e^2(3+192x^3-40x^4+6x^5)}{4e^2}\,dx=\frac{1}{4}\left(16\,x^4+\left(x^6-8\,x^5+48\,x^4+3\,x\right)e^2\right)e^{(-2)}$$

input
```
integrate(1/4*((6*x^5-40*x^4+192*x^3+3)*exp(2)+64*x^3)/exp(2),x, algorithm
=\
```

output
```
1/4*(16*x^4 + (x^6 - 8*x^5 + 48*x^4 + 3*x)*e^2)*e^(-2)
```

3.1151.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{64x^3+e^2(3+192x^3-40x^4+6x^5)}{4e^2}\,dx=\frac{1}{4}\left(16\,x^4+\left(x^6-8\,x^5+48\,x^4+3\,x\right)e^2\right)e^{(-2)}$$

input
```
integrate(1/4*((6*x^5-40*x^4+192*x^3+3)*exp(2)+64*x^3)/exp(2),x, algorithm
=\
```

output
```
1/4*(16*x^4 + (x^6 - 8*x^5 + 48*x^4 + 3*x)*e^2)*e^(-2)
```

3.1151.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

$$\int \frac{64x^3+e^2(3+192x^3-40x^4+6x^5)}{4e^2}\,dx=\frac{x^6}{4}-2\,x^5+\left(4\,\mathrm{e}^{-2}+12\right)\,x^4+\frac{3\,x}{4}$$

input
```
int(exp(-2)*((exp(2)*(192*x^3 - 40*x^4 + 6*x^5 + 3))/4 + 16*x^3),x)
```

output
```
(3*x)/4 + x^4*(4*exp(-2) + 12) - 2*x^5 + x^6/4
```

3.1152 $\int \frac{-3x+(48-144x+108x^2-24x^3+4e^5(-48+48x-12x^2))\log(x)+(-4$

3.1152.1 Optimal result

Integrand size = 71, antiderivative size = 28

$$\int \frac{-3x+(48-144x+108x^2-24x^3+4e^5(-48+48x-12x^2))\log(x)+(-48x+48x^2-12x^3)\log^2(x)}{4x-4x^2+x^3}\,dx$$
$$=4+\frac{3}{-2+x}-2\big(-3+3\big(4e^5+2x\big)\big)\log^2(x)$$

output
```
4+3/(-2+x)-2*(6*x+3*exp(2*ln(2)+5)-3)*ln(x)^2
```

3.1152.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{-3x+(48-144x+108x^2-24x^3+4e^5(-48+48x-12x^2))\log(x)+(-48x+48x^2-12x^3)\log^2(x)}{4x-4x^2+x^3}\,dx$$
$$=\frac{3}{-2+x}+6\big(1-4e^5\big)\log^2(x)-12x\log^2(x)$$

input
```
Integrate[(-3*x + (48 - 144*x + 108*x^2 - 24*x^3 + 4*E^5*(-48 + 48*x - 12*
x^2))*Log[x] + (-48*x + 48*x^2 - 12*x^3)*Log[x]^2)/(4*x - 4*x^2 + x^3),x]
```

output
```
3/(-2 + x) + 6*(1 - 4*E^5)*Log[x]^2 - 12*x*Log[x]^2
```

3.1152.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {2026, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-12x^3+48x^2-48x)\log^2(x)+(-24x^3+108x^2+4e^5(-12x^2+48x-48)-144x+48)\log(x)-3x}{x^3-4x^2+4x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(-12x^3+48x^2-48x)\log^2(x)+(-24x^3+108x^2+4e^5(-12x^2+48x-48)-144x+48)\log(x)-3x}{x(x^2-4x+4)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \left(-\frac{3}{(x-2)^2}-12\log^2(x)-\frac{12(2x+4e^5-1)\log(x)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3}{2-x}-12x\log^2(x)+6(1-4e^5)\log^2(x)$$

input
```
Int[(-3*x + (48 - 144*x + 108*x^2 - 24*x^3 + 4*E^5*(-48 + 48*x - 12*x^2))*
Log[x] + (-48*x + 48*x^2 - 12*x^3)*Log[x]^2)/(4*x - 4*x^2 + x^3),x]
```

output
```
-3/(2 - x) + 6*(1 - 4*E^5)*Log[x]^2 - 12*x*Log[x]^2
```

3.1152.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1152.4 Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

method	result	size
risch	$(-12x - 24\,\mathrm{e}^{5} + 6)\ln(x)^{2} + \frac{3}{-2+x}$	23
default	$\frac{3}{-2+x} - 12x\ln(x)^{2} - 24\,\mathrm{e}^{5}\ln(x)^{2} + 6\ln(x)^{2}$	30
parts	$\frac{3}{-2+x} - 12x\ln(x)^{2} - 24\,\mathrm{e}^{5}\ln(x)^{2} + 6\ln(x)^{2}$	30
norman	$\frac{(-12+48\,\mathrm{e}^{5})\ln(x)^{2}+(30-24\,\mathrm{e}^{5})x\ln(x)^{2}-12x^{2}\ln(x)^{2}+3}{-2+x}$	41
parallelrisch	$-\frac{6\ln(x)^{2}x\,\mathrm{e}^{2\ln(2)+5}+12x^{2}\ln(x)^{2}-12\ln(x)^{2}\mathrm{e}^{2\ln(2)+5}-30x\ln(x)^{2}-3+12\ln(x)^{2}}{-2+x}$	59

input
```
int(((-12*x^3+48*x^2-48*x)*ln(x)^2+((-12*x^2+48*x-48)*exp(2*ln(2)+5)-24*x^
3+108*x^2-144*x+48)*ln(x)-3*x)/(x^3-4*x^2+4*x),x,method=_RETURNVERBOSE)
```

output
```
(-12*x-24*exp(5)+6)*ln(x)^2+3/(-2+x)
```

3.1152.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{-3x + (48 - 144x + 108x^2 - 24x^3 + 4e^5(-48 + 48x - 12x^2))\log(x) + (-48x + 48x^2 - 12x^3)\log^2(x)}{4x - 4x^2 + x^3}\,dx$$
$$= -\frac{3\left(2\left(2\,x^2 + (x-2)e^{(2\,\log(2)+5)} - 5\,x + 2\right)\log(x)^2 - 1\right)}{x-2}$$

input
```
integrate(((-12*x^3+48*x^2-48*x)*log(x)^2+((-12*x^2+48*x-48)*exp(2*log(2)+
5)-24*x^3+108*x^2-144*x+48)*log(x)-3*x)/(x^3-4*x^2+4*x),x, algorithm=\
```

output
```
-3*(2*(2*x^2 + (x - 2)*e^(2*log(2) + 5) - 5*x + 2)*log(x)^2 - 1)/(x - 2)
```

3.1152.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{-3x+(48-144x+108x^2-24x^3+4e^5(-48+48x-12x^2))\log(x)+(-48x+48x^2-12x^3)\log^2(x)}{4x-4x^2+x^3}\,dx$$
$$= \left(-12x-24e^5+6\right)\log(x)^2+\frac{3}{x-2}$$

input
```
integrate(((-12*x**3+48*x**2-48*x)*ln(x)**2+((-12*x**2+48*x-48)*exp(2*ln(2
)+5)-24*x**3+108*x**2-144*x+48)*ln(x)-3*x)/(x**3-4*x**2+4*x),x)
```

output
```
(-12*x - 24*exp(5) + 6)*log(x)**2 + 3/(x - 2)
```

3.1152.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{-3x+(48-144x+108x^2-24x^3+4e^5(-48+48x-12x^2))\log(x)+(-48x+48x^2-12x^3)\log^2(x)}{4x-4x^2+x^3}\,dx$$
$$= -6\left(2x+4e^5-1\right)\log(x)^2+\frac{3}{x-2}$$

input
```
integrate(((-12*x^3+48*x^2-48*x)*log(x)^2+((-12*x^2+48*x-48)*exp(2*log(2)+
5)-24*x^3+108*x^2-144*x+48)*log(x)-3*x)/(x^3-4*x^2+4*x),x, algorithm=\
```

output
```
-6*(2*x + 4*e^5 - 1)*log(x)^2 + 3/(x - 2)
```

3.1152.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.71

$$\int \frac{-3x+(48-144x+108x^2-24x^3+4e^5(-48+48x-12x^2))\log(x)+(-48x+48x^2-12x^3)\log^2(x)}{4x-4x^2+x^3}\,dx$$
$$= -\frac{3\left(4x^2\log(x)^2+8xe^5\log(x)^2-10x\log(x)^2-16e^5\log(x)^2+4\log(x)^2-1\right)}{x-2}$$

input
```
integrate(((-12*x^3+48*x^2-48*x)*log(x)^2+((-12*x^2+48*x-48)*exp(2*log(2)+
5)-24*x^3+108*x^2-144*x+48)*log(x)-3*x)/(x^3-4*x^2+4*x),x, algorithm=\
```

output
```
-3*(4*x^2*log(x)^2 + 8*x*e^5*log(x)^2 - 10*x*log(x)^2 - 16*e^5*log(x)^2 +
4*log(x)^2 - 1)/(x - 2)
```

3.1152.9 Mupad [B] (verification not implemented)

Time = 15.49 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04

$$\int \frac{-3x + (48 - 144x + 108x^2 - 24x^3 + 4e^5(-48 + 48x - 12x^2))\log(x) + (-48x + 48x^2 - 12x^3)\log^2(x)}{4x - 4x^2 + x^3}\,dx$$
$$= \frac{3}{x-2} - 12\,x\ln(x)^2 - 24\,\mathrm{e}^5\ln(x)^2 + 6\ln(x)^2$$

input
```
int(-(3*x + log(x)*(144*x + exp(2*log(2) + 5)*(12*x^2 - 48*x + 48) - 108*x
^2 + 24*x^3 - 48) + log(x)^2*(48*x - 48*x^2 + 12*x^3))/(4*x - 4*x^2 + x^3)
,x)
```

output
```
3/(x - 2) - 12*x*log(x)^2 - 24*exp(5)*log(x)^2 + 6*log(x)^2
```

3.1153 $\int \left(4-2x+3x^2+e(-2+4x)\right)\,dx$

3.1153.1 Optimal result

Integrand size = 17, antiderivative size = 25

$$\int \left(4-2x+3x^2+e(-2+4x)\right)\,dx=e^4-e^{e^2}+(2e+x)\left(4-x+x^2\right)$$

output
```
(x^2-x+4)*(2*exp(1)+x)-exp(exp(2))+exp(4)
```

3.1153.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \left(4-2x+3x^2+e(-2+4x)\right)\,dx=4x-2ex-x^2+2ex^2+x^3$$

input
```
Integrate[4 - 2*x + 3*x^2 + E*(-2 + 4*x),x]
```

output
```
4*x - 2*E*x - x^2 + 2*E*x^2 + x^3
```

3.1153.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(3x^2-2x+e(4x-2)+4\right) \, dx$$
$$\Big\downarrow \; 2009$$
$$x^3-x^2+4x+\frac{1}{2}e(1-2x)^2$$

input
```
Int[4 - 2*x + 3*x^2 + E*(-2 + 4*x),x]
```

output
```
(E*(1 - 2*x)^2)/2 + 4*x - x^2 + x^3
```

3.1153.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1153.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

method	result	size
gosper	$x(2x\,\mathrm{e}+x^2-2\,\mathrm{e}-x+4)$	20
norman	$x^3+(2\,\mathrm{e}-1)\,x^2+(-2\,\mathrm{e}+4)\,x$	23
default	$2x^2\mathrm{e}+x^3-2x\,\mathrm{e}-x^2+4x$	25
risch	$2x^2\mathrm{e}+x^3-2x\,\mathrm{e}-x^2+4x$	25
parallelrisch	$2x^2\mathrm{e}+x^3-2x\,\mathrm{e}-x^2+4x$	25
parts	$2x^2\mathrm{e}+x^3-2x\,\mathrm{e}-x^2+4x$	25

input
```
int((4*x-2)*exp(1)+3*x^2-2*x+4,x,method=_RETURNVERBOSE)
```

output
```
x*(2*x*exp(1)+x^2-2*exp(1)-x+4)
```

3.1153.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \left(4-2x+3x^2+e(-2+4x)\right) \, dx = x^3 - x^2 + 2\left(x^2 - x\right)e + 4\,x$$

input
```
integrate((4*x-2)*exp(1)+3*x^2-2*x+4,x, algorithm=\
```

output
```
x^3 - x^2 + 2*(x^2 - x)*e + 4*x
```

3.1153.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \left(4-2x+3x^2+e(-2+4x)\right) \, dx = x^3 + x^2(-1+2e) + x(4-2e)$$

input
```
integrate((4*x-2)*exp(1)+3*x**2-2*x+4,x)
```

output
```
x**3 + x**2*(-1 + 2*E) + x*(4 - 2*E)
```

3.1153.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \left(4-2x+3x^2+e(-2+4x)\right) \, dx = x^3 - x^2 + 2\left(x^2 - x\right)e + 4\,x$$

input
```
integrate((4*x-2)*exp(1)+3*x^2-2*x+4,x, algorithm=\
```

output
```
x^3 - x^2 + 2*(x^2 - x)*e + 4*x
```

3.1153.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \left(4-2x+3x^2+e(-2+4x)\right)\,dx = x^3-x^2+2\left(x^2-x\right)e+4\,x$$

input
```
integrate((4*x-2)*exp(1)+3*x^2-2*x+4,x, algorithm=\
```

output
```
x^3 - x^2 + 2*(x^2 - x)*e + 4*x
```

3.1153.9 Mupad [B] (verification not implemented)

Time = 15.70 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \left(4-2x+3x^2+e(-2+4x)\right)\,dx = x^3+(2\,\mathrm{e}-1)\,x^2+(4-2\,\mathrm{e})\,x$$

input
```
int(3*x^2 - 2*x + exp(1)*(4*x - 2) + 4,x)
```

output
```
x^2*(2*exp(1) - 1) + x^3 - x*(2*exp(1) - 4)
```

3.1154 $\int \frac{e^{x/5}(e^4(-5+x)-10x+5x^2+x^3)-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}\,dx$

3.1154.1 Optimal result

Integrand size = 55, antiderivative size = 30

$$\int \frac{e^{x/5}(e^4(-5+x)-10x+5x^2+x^3)-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}\,dx=\frac{e^{x/5}\left(e^4-x\left(-x+\log\left(\frac{x^2}{4096}\right)\right)\right)}{x}$$

output
```
exp(1/5*x)/x*(exp(4)-x*(ln(1/4096*x^2)-x))
```

3.1154.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{e^{x/5}(e^4(-5+x)-10x+5x^2+x^3)-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}\,dx=\frac{e^{x/5}(e^4+x(x+6\log(4))-x\log(x^2))}{x}$$

input
```
Integrate[(E^(x/5)*(E^4*(-5 + x) - 10*x + 5*x^2 + x^3) - E^(x/5)*x^2*Log[x
^2/4096])/(5*x^2),x]
```

output
```
(E^(x/5)*(E^4 + x*(x + 6*Log[4]) - x*Log[x^2]))/x
```

3.1154.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.28 (sec) , antiderivative size = 80, normalized size of antiderivative = 2.67, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.073, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x/5}(x^3+5x^2-10x+e^4(x-5))-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{5}\int -\frac{e^{x/5}\log\left(\frac{x^2}{4096}\right)x^2+e^{x/5}(-x^3-5x^2+10x+e^4(5-x))}{x^2}dx$$

$$\Big\downarrow \ 25$$

$$-\frac{1}{5}\int \frac{e^{x/5}\log\left(\frac{x^2}{4096}\right)x^2+e^{x/5}(-x^3-5x^2+10x+e^4(5-x))}{x^2}dx$$

$$\Big\downarrow \ 2010$$

$$-\frac{1}{5}\int \left(-e^{x/5}x-5e^{x/5}+e^{x/5}\log\left(\frac{x^2}{4096}\right)-\frac{\left(1-\frac{10}{e^4}\right)e^{\frac{x}{5}+4}}{x}+\frac{5e^{\frac{x}{5}+4}}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{5}\left(-(10-e^4)\,\text{ExpIntegralEi}\left(\frac{x}{5}\right)-e^4\,\text{ExpIntegralEi}\left(\frac{x}{5}\right)+10\,\text{ExpIntegralEi}\left(\frac{x}{5}\right)-5e^{x/5}\log\left(\frac{x^2}{4096}\right)+5e^{x/5}\right.$$

input
```
Int[(E^(x/5)*(E^4*(-5 + x) - 10*x + 5*x^2 + x^3) - E^(x/5)*x^2*Log[x^2/409
6])/(5*x^2),x]
```

output
```
((5*E^(4 + x/5))/x + 5*E^(x/5)*x + 10*ExpIntegralEi[x/5] - E^4*ExpIntegral
Ei[x/5] - (10 - E^4)*ExpIntegralEi[x/5] - 5*E^(x/5)*Log[x^2/4096])/5
```

3.1154.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1154.4 Maple [A] (verified)

Time = 1.04 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

method	result	size
norman	$\frac{e^{4} e^{\frac{x}{5}}+e^{\frac{x}{5}} x^{2}-x\, e^{\frac{x}{5}} \ln\left(\frac{x^{2}}{4096}\right)}{x}$	34
parallelrisch	$\frac{5\, e^{\frac{x}{5}} x^{2}-5 x\, e^{\frac{x}{5}} \ln\left(\frac{x^{2}}{4096}\right)+5\, e^{4} e^{\frac{x}{5}}}{5 x}$	37
default	$\frac{5\, e^{\frac{x}{5}} x^{2}+5\, e^{4} e^{\frac{x}{5}}-5\left(\ln\left(\frac{x^{2}}{4096}\right)-2\ln(x)\right) x\, e^{\frac{x}{5}}-10\ln(x) e^{\frac{x}{5}} x}{5 x}$	51
risch	$-2\ln(x)\, e^{\frac{x}{5}}+\frac{\left(i\pi x\, \mathrm{csgn}(ix)^{2} \mathrm{csgn}(ix^{2})-2i\pi x\, \mathrm{csgn}(ix)\, \mathrm{csgn}(ix^{2})^{2}+i\pi x\, \mathrm{csgn}(ix^{2})^{3}+24x\ln(2)+2x^{2}+2\, e^{4}\right) e^{\frac{x}{5}}}{2x}$	86

input
```
int(1/5*(-x^2*exp(1/5*x)*ln(1/4096*x^2)+((-5+x)*exp(4)+x^3+5*x^2-10*x)*exp
(1/5*x))/x^2,x,method=_RETURNVERBOSE)
```

output
```
(exp(4)*exp(1/5*x)+exp(1/5*x)*x^2-x*exp(1/5*x)*ln(1/4096*x^2))/x
```

3.1154.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int \frac{e^{x/5}(e^4(-5+x)-10x+5x^2+x^3)-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}\,dx = -\frac{xe^{\left(\frac{1}{5}x\right)}\log\left(\frac{1}{4096}x^2\right)-(x^2+e^4)e^{\left(\frac{1}{5}x\right)}}{x}$$

input
```
integrate(1/5*(-x^2*exp(1/5*x)*log(1/4096*x^2)+((-5+x)*exp(4)+x^3+5*x^2-10
*x)*exp(1/5*x))/x^2,x, algorithm=\
```

output
```
-(x*e^(1/5*x)*log(1/4096*x^2) - (x^2 + e^4)*e^(1/5*x))/x
```

3.1154.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.67

$$\int \frac{e^{x/5}(e^4(-5+x)-10x+5x^2+x^3)-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}\,dx = \frac{\left(x^2-x\log\left(\frac{x^2}{4096}\right)+e^4\right)e^{\frac{x}{5}}}{x}$$

input
```
integrate(1/5*(-x**2*exp(1/5*x)*ln(1/4096*x**2)+((-5+x)*exp(4)+x**3+5*x**2
-10*x)*exp(1/5*x))/x**2,x)
```

output
```
(x**2 - x*log(x**2/4096) + exp(4))*exp(x/5)/x
```

3.1154.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.47

$$\int \frac{e^{x/5}(e^4(-5+x)-10x+5x^2+x^3)-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}\,dx = \frac{1}{5}\,\mathrm{Ei}\left(\frac{1}{5}\,x\right)e^4 + (x-5)e^{\left(\frac{1}{5}x\right)} - \frac{1}{5}\,e^4\Gamma\left(-1,-\frac{1}{5}\,x\right) - e^{\left(\frac{1}{5}x\right)}\log\left(\frac{1}{4096}\,x^2\right) + 5\,e^{\left(\frac{1}{5}x\right)}$$

input
```
integrate(1/5*(-x^2*exp(1/5*x)*log(1/4096*x^2)+((-5+x)*exp(4)+x^3+5*x^2-10
*x)*exp(1/5*x))/x^2,x, algorithm=\
```

output
```
1/5*Ei(1/5*x)*e^4 + (x - 5)*e^(1/5*x) - 1/5*e^4*gamma(-1, -1/5*x) - e^(1/5
*x)*log(1/4096*x^2) + 5*e^(1/5*x)
```

3.1154.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.07

$$\int \frac{e^{x/5}(e^4(-5+x)-10x+5x^2+x^3)-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}\,dx=\frac{x^2e^{\left(\frac{1}{5}x\right)}-xe^{\left(\frac{1}{5}x\right)}\log\left(\frac{1}{4096}x^2\right)+e^{\left(\frac{1}{5}x+4\right)}}{x}$$

input
```
integrate(1/5*(-x^2*exp(1/5*x)*log(1/4096*x^2)+((-5+x)*exp(4)+x^3+5*x^2-10
*x)*exp(1/5*x))/x^2,x, algorithm=\
```

output
```
(x^2*e^(1/5*x) - x*e^(1/5*x)*log(1/4096*x^2) + e^(1/5*x + 4))/x
```

3.1154.9 Mupad [B] (verification not implemented)

Time = 15.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{e^{x/5}(e^4(-5+x)-10x+5x^2+x^3)-e^{x/5}x^2\log\left(\frac{x^2}{4096}\right)}{5x^2}\,dx=e^{x/5}\left(x-\ln\left(\frac{x^2}{4096}\right)\right)+\frac{e^{\frac{x}{5}+4}}{x}$$

input
```
int(((exp(x/5)*(exp(4)*(x - 5) - 10*x + 5*x^2 + x^3))/5 - (x^2*exp(x/5)*lo
g(x^2/4096))/5)/x^2,x)
```

output
```
exp(x/5)*(x - log(x^2/4096)) + exp(x/5 + 4)/x
```

3.1155 $\int \frac{8-6x-x\log(4)}{-4x+6x^2+80x^3+x^2\log(4)}\,dx$

3.1155.1 Optimal result

Integrand size = 33, antiderivative size = 27

$$\int \frac{8-6x-x\log(4)}{-4x+6x^2+80x^3+x^2\log(4)}\,dx=\log\left(8\left(5+\frac{x+\frac{1}{4}(-4+2x+x\log(4))}{4x^2}\right)\right)$$

output
```
ln(2*(3/2*x+1/2*x*ln(2)-1)/x^2+40)
```

3.1155.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{8-6x-x\log(4)}{-4x+6x^2+80x^3+x^2\log(4)}\,dx=-2\log(x)+\log\left(4-6x-80x^2-x\log(4)\right)$$

input
```
Integrate[(8 - 6*x - x*Log[4])/(-4*x + 6*x^2 + 80*x^3 + x^2*Log[4]),x]
```

output
```
-2*Log[x] + Log[4 - 6*x - 80*x^2 - x*Log[4]]
```

3.1155.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.152$, Rules used = {6, 6, 1979, 1200, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x+x(-\log(4))+8}{80x^3+6x^2+x^2\log(4)-4x}dx$$
$$\Big\downarrow 6$$
$$\int \frac{x(-6-\log(4))+8}{80x^3+6x^2+x^2\log(4)-4x}dx$$
$$\Big\downarrow 6$$
$$\int \frac{x(-6-\log(4))+8}{80x^3+x^2(6+\log(4))-4x}dx$$
$$\Big\downarrow 1979$$
$$\int \frac{x(-6-\log(4))+8}{x\left(80x^2+x(6+\log(4))-4\right)}dx$$
$$\Big\downarrow 1200$$
$$\int \left(\frac{-160x-6-\log(4)}{-80x^2-x(6+\log(4))+4}-\frac{2}{x}\right)dx$$
$$\Big\downarrow 2009$$
$$\log\left(-80x^2-x(6+\log(4))+4\right)-2\log(x)$$

input
```
Int[(8 - 6*x - x*Log[4])/(-4*x + 6*x^2 + 80*x^3 + x^2*Log[4]),x]
```

output
```
-2*Log[x] + Log[4 - 80*x^2 - x*(6 + Log[4])]
```

3.1155.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 1200
```
Int[(((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.))/((a_.) + (b_.)*
(x_) + (c_.)*(x_)^2), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*((f + g*
x)^n/(a + b*x + c*x^2)), x], x] /; FreeQ[{a, b, c, d, e, f, g, m}, x] && In
tegersQ[n]
```

rule 1979
```
Int[((c_.)*(x_)^(j_.) + (b_.)*(x_)^(n_.) + (a_.)*(x_)^(q_.))^(p_.)*((A_) +
(B_.)*(x_)^(r_.)), x_Symbol] :> Int[x^(p*q)*(A + B*x^(n - q))*(a + b*x^(n -
 q) + c*x^(2*(n - q)))^p, x] /; FreeQ[{a, b, c, A, B, n, q}, x] && EqQ[r, n
 - q] && EqQ[j, 2*n - q] && IntegerQ[p] && PosQ[n - q]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1155.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

method	result	size
risch	$-2\ln(x)+\ln(-2+40x^2+x(3+\ln(2)))$	20
parallelrisch	$-2\ln(x)+\ln\left(\frac{x\ln(2)}{40}+x^2+\frac{3x}{40}-\frac{1}{20}\right)$	20
default	$\ln(x\ln(2)+40x^2+3x-2)-2\ln(x)$	21
norman	$\ln(x\ln(2)+40x^2+3x-2)-2\ln(x)$	21

input
```
int((-2*x*ln(2)-6*x+8)/(2*x^2*ln(2)+80*x^3+6*x^2-4*x),x,method=_RETURNVERB
OSE)
```

output
```
-2*ln(x)+ln(-2+40*x^2+x*(3+ln(2)))
```

3.1155.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{8-6x-x\log(4)}{-4x+6x^2+80x^3+x^2\log(4)}\,dx = \log\left(40\,x^2+x\log\left(2\right)+3\,x-2\right)-2\,\log\left(x\right)$$

input
```
integrate((-2*x*log(2)-6*x+8)/(2*x^2*log(2)+80*x^3+6*x^2-4*x),x, algorithm
=\
```

output
```
log(40*x^2 + x*log(2) + 3*x - 2) - 2*log(x)
```

3.1155.6 Sympy [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{8-6x-x\log(4)}{-4x+6x^2+80x^3+x^2\log(4)}\,dx = -2\log\left(x\right)+\log\left(x^2+x\left(\frac{\log\left(2\right)}{40}+\frac{3}{40}\right)-\frac{1}{20}\right)$$

input
```
integrate((-2*x*ln(2)-6*x+8)/(2*x**2*ln(2)+80*x**3+6*x**2-4*x),x)
```

output
```
-2*log(x) + log(x**2 + x*(log(2)/40 + 3/40) - 1/20)
```

3.1155.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.70

$$\int \frac{8-6x-x\log(4)}{-4x+6x^2+80x^3+x^2\log(4)}\,dx = \log\left(40\,x^2+x(\log\left(2\right)+3)-2\right)-2\,\log\left(x\right)$$

input
```
integrate((-2*x*log(2)-6*x+8)/(2*x^2*log(2)+80*x^3+6*x^2-4*x),x, algorithm
=\
```

output
```
log(40*x^2 + x*(log(2) + 3) - 2) - 2*log(x)
```

3.1155.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{8-6x-x\log(4)}{-4x+6x^2+80x^3+x^2\log(4)}\,dx=\log\left(\left|40\,x^2+x\log\left(2\right)+3\,x-2\right|\right)-2\,\log\left(\left|x\right|\right)$$

input
```
integrate((-2*x*log(2)-6*x+8)/(2*x^2*log(2)+80*x^3+6*x^2-4*x),x, algorithm
=\
```

output
```
log(abs(40*x^2 + x*log(2) + 3*x - 2)) - 2*log(abs(x))
```

3.1155.9 Mupad [B] (verification not implemented)

Time = 14.88 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

$$\int \frac{8-6x-x\log(4)}{-4x+6x^2+80x^3+x^2\log(4)}\,dx=\ln\left(6-3\,x\,\ln\left(2\right)-120\,x^2-9\,x\right)-2\,\ln\left(x\right)$$

input
```
int(-(6*x + 2*x*log(2) - 8)/(2*x^2*log(2) - 4*x + 6*x^2 + 80*x^3),x)
```

output
```
log(6 - 3*x*log(2) - 120*x^2 - 9*x) - 2*log(x)
```

3.1156 $\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^x x^3\right)\right)}{144x^3}\,dx$

3.1156.1 Optimal result

Integrand size = 68, antiderivative size = 24

$$\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^x x^3\right)\right)}{144x^3}\,dx=\left(\frac{1}{3}e^{2+\frac{e^2}{16x^2}}+e^x\right)^2$$

output
```
(exp(x)+1/3*exp(1/exp(ln(16*x^2)-2))*exp(2))^2
```

3.1156.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^x x^3\right)\right)}{144x^3}\,dx=\frac{1}{9}\left(e^{2+\frac{e^2}{16x^2}}+3e^x\right)^2$$

input
```
Integrate[(E^2*(-4*E^(4 + E^2/(8*x^2)) + 288*E^(-2 + 2*x)*x^3 + E^(E^2/(16
*x^2))*(-12*E^(2 + x) + 96*E^x*x^3)))/(144*x^3),x]
```

output
```
(E^(2 + E^2/(16*x^2)) + 3*E^x)^2/9
```

3.1156.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 49 vs. $2(24) = 48$.

Time = 0.35 (sec) , antiderivative size = 49, normalized size of antiderivative = 2.04, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.059$, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2\left(288e^{2x-2}x^3-4e^{\frac{e^2}{8x^2}+4}+e^{\frac{e^2}{16x^2}}\left(96e^xx^3-12e^{x+2}\right)\right)}{144x^3}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{144}e^2\int -\frac{4\left(-72e^{2x-2}x^3+e^{4+\frac{e^2}{8x^2}}+3e^{\frac{e^2}{16x^2}}\left(e^{x+2}-8e^xx^3\right)\right)}{x^3}dx$$

$$\Big\downarrow \ 27$$

$$-\frac{1}{36}e^2\int \frac{-72e^{2x-2}x^3+e^{4+\frac{e^2}{8x^2}}+3e^{\frac{e^2}{16x^2}}\left(e^{x+2}-8e^xx^3\right)}{x^3}dx$$

$$\Big\downarrow \ 2010$$

$$-\frac{1}{36}e^2\int \left(-\frac{3e^{x+\frac{e^2}{16x^2}}\left(8x^3-e^2\right)}{x^3}-72e^{2x-2}+\frac{e^{4+\frac{e^2}{8x^2}}}{x^3}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{1}{36}e^2\left(-4e^{\frac{e^2}{8x^2}+2}-24e^{\frac{e^2}{16x^2}+x}-36e^{2x-2}\right)$$

input
```
Int[(E^2*(-4*E^(4 + E^2/(8*x^2)) + 288*E^(-2 + 2*x)*x^3 + E^(E^2/(16*x^2))
*(-12*E^(2 + x) + 96*E^x*x^3)))/(144*x^3),x]
```

output
```
-1/36*(E^2*(-4*E^(2 + E^2/(8*x^2)) - 24*E^(E^2/(16*x^2) + x) - 36*E^(-2 +
2*x)))
```

3.1156. $\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^xx^3\right)\right)}{144x^3}dx$

3.1156.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1156.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(21) = 42$.

Time = 11.30 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.17

method	result	size
default	$\frac{2\,e^{2} e^{x} e^{\frac{e^{2}}{16 x^{2}}}}{3}+e^{2 x}+\frac{e^{4} e^{\frac{e^{2}}{8 x^{2}}}}{9}$	52
parts	$\frac{2\,e^{2} e^{x} e^{\frac{e^{2}}{16 x^{2}}}}{3}+e^{2 x}+\frac{e^{4} e^{\frac{e^{2}}{8 x^{2}}}}{9}$	52
parallelrisch	$\frac{\left(512\,e^{4} x^{6} e^{-4} e^{\frac{e^{2}}{8 x^{2}}}+3072\,e^{2} e^{x} x^{6} e^{-4} e^{\frac{e^{2}}{16 x^{2}}}+4608 x^{6} e^{2 x} e^{-4}\right) e^{4}}{4608 x^{6}}$	104
risch	$\frac{e^{-\frac{e^{2} e^{\frac{i \pi \,\mathrm{csgn}\left(i x^{2}\right)^{3}}{2}} e^{\frac{i \pi \,\mathrm{csgn}\left(i x\right)^{2} \mathrm{csgn}\left(i x^{2}\right)}{2}}-32 x^{2}}{8 x^{2}}}}{9}+\frac{2\,e^{-\frac{e^{2} e^{\frac{i \pi \,\mathrm{csgn}\left(i x^{2}\right)^{3}}{2}} e^{\frac{i \pi \,\mathrm{csgn}\left(i x\right)^{2} \mathrm{csgn}\left(i x^{2}\right)}{2}}-16 x^{3}-32 x^{2}}{16 x^{2}}}}{3}+e^{2 x}$	111

input
```
int(1/9*(-4*exp(2)^2*exp(1/exp(ln(16*x^2)-2))^2+(6*x*exp(2)*exp(x)*exp(ln(
16*x^2)-2)-12*exp(2)*exp(x))*exp(1/exp(ln(16*x^2)-2))+18*x*exp(x)^2*exp(ln
(16*x^2)-2))/x/exp(ln(16*x^2)-2),x,method=_RETURNVERBOSE)
```

output
```
2/3*exp(2)*exp(x)*exp(1/x^2/exp(-2+ln(16*x^2)-2*ln(x)))+exp(x)^2+1/9*exp(2
)^2*exp(1/exp(ln(16*x^2)-2))^2
```

3.1156. $\int \frac{e^{2}\left(-4 e^{4+\frac{e^{2}}{8 x^{2}}}+288 e^{-2+2 x} x^{3}+e^{\frac{e^{2}}{16 x^{2}}}\left(-12 e^{2+x}+96 e^{x} x^{3}\right)\right)}{144 x^{3}}\, dx$

3.1156.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(23) = 46.

Time = 0.27 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.42

$$\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^xx^3\right)\right)}{144x^3}\,dx = \frac{256\,x^4e^{\left(\frac{e^2}{8\,x^2}+4\right)}+96\,x^2e^{\left(x+\frac{e^2}{16\,x^2}+\log\left(16\,x^2\right)+2\right)}+9\,e^{\left(2\,x+2\,\log\left(16\,x^2\right)\right)}}{2304\,x^4}$$

input
```
integrate(1/9*(-4*exp(2)^2*exp(1/exp(log(16*x^2)-2))^2+(6*x*exp(2)*exp(x)*
exp(log(16*x^2)-2)-12*exp(2)*exp(x))*exp(1/exp(log(16*x^2)-2))+18*x*exp(x)
^2*exp(log(16*x^2)-2))/x/exp(log(16*x^2)-2),x, algorithm=\
```

output
```
1/2304*(256*x^4*e^(1/8*e^2/x^2 + 4) + 96*x^2*e^(x + 1/16*e^2/x^2 + log(16*
x^2) + 2) + 9*e^(2*x + 2*log(16*x^2)))/x^4
```

3.1156.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(19) = 38.

Time = 1.40 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^xx^3\right)\right)}{144x^3}\,dx = e^{2x}+\frac{2e^2e^xe^{\frac{e^2}{16x^2}}}{3}+\frac{e^4e^{\frac{e^2}{8x^2}}}{9}$$

input
```
integrate(1/9*(-4*exp(2)**2*exp(1/exp(ln(16*x**2)-2))**2+(6*x*exp(2)*exp(x
)*exp(ln(16*x**2)-2)-12*exp(2)*exp(x))*exp(1/exp(ln(16*x**2)-2))+18*x*exp(
x)**2*exp(ln(16*x**2)-2))/x/exp(ln(16*x**2)-2),x)
```

output
```
exp(2*x) + 2*exp(2)*exp(x)*exp(exp(2)/(16*x**2))/3 + exp(4)*exp(exp(2)/(8*
x**2))/9
```

3.1156. $\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^xx^3\right)\right)}{144x^3}\,dx$

3.1156.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^x x^3\right)\right)}{144x^3}\,dx$$
$$=\frac{1}{9}\left(3\left(3\,e^{(2\,x)}+2\,e^{\left(x+\frac{e^2}{16\,x^2}+2\right)}\right)e^{(-2)}+e^{\left(\frac{e^2}{8\,x^2}+2\right)}\right)e^2$$

input
```
integrate(1/9*(-4*exp(2)^2*exp(1/exp(log(16*x^2)-2))^2+(6*x*exp(2)*exp(x)*
exp(log(16*x^2)-2)-12*exp(2)*exp(x))*exp(1/exp(log(16*x^2)-2))+18*x*exp(x)
^2*exp(log(16*x^2)-2))/x/exp(log(16*x^2)-2),x, algorithm=\
```

output
```
1/9*(3*(3*e^(2*x) + 2*e^(x + 1/16*e^2/x^2 + 2))*e^(-2) + e^(1/8*e^2/x^2 +
2))*e^2
```

3.1156.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.58

$$\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^x x^3\right)\right)}{144x^3}\,dx$$
$$=e^{(2\,x)}+\frac{2}{3}\,e^{\left(\frac{16\,x^3+32\,x^2+e^2}{16\,x^2}\right)}+\frac{1}{9}\,e^{\left(\frac{e^2}{8\,x^2}+4\right)}$$

input
```
integrate(1/9*(-4*exp(2)^2*exp(1/exp(log(16*x^2)-2))^2+(6*x*exp(2)*exp(x)*
exp(log(16*x^2)-2)-12*exp(2)*exp(x))*exp(1/exp(log(16*x^2)-2))+18*x*exp(x)
^2*exp(log(16*x^2)-2))/x/exp(log(16*x^2)-2),x, algorithm=\
```

output
```
e^(2*x) + 2/3*e^(1/16*(16*x^3 + 32*x^2 + e^2)/x^2) + 1/9*e^(1/8*e^2/x^2 +
4)
```

3.1156.9 Mupad [B] (verification not implemented)

Time = 15.30 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{e^2\left(-4e^{4+\frac{e^2}{8x^2}}+288e^{-2+2x}x^3+e^{\frac{e^2}{16x^2}}\left(-12e^{2+x}+96e^xx^3\right)\right)}{144x^3}\,dx=\frac{\mathrm{e}^{-4}\left(3\,\mathrm{e}^{x+2}+\mathrm{e}^{\frac{\mathrm{e}^2}{16\,x^2}+4}\right)^2}{9}$$

input
```
int(-(exp(2 - log(16*x^2))*((exp(exp(2 - log(16*x^2)))*(12*exp(2)*exp(x) -
 6*x*exp(2)*exp(log(16*x^2) - 2)*exp(x)))/9 + (4*exp(4)*exp(2*exp(2 - log(
16*x^2))))/9 - 2*x*exp(2*x)*exp(log(16*x^2) - 2)))/x,x)
```

output
```
(exp(-4)*(3*exp(x + 2) + exp(exp(2)/(16*x^2) + 4))^2)/9
```

3.1157 $\int \frac{(-20-20x^2-5x^4)\log(3)+e^{-4e^x+4x+4x^2}(e^x(-32x-16x^3)\log(3)+(}{16+16x^2+4x^4}$

3.1157.1 Optimal result

Integrand size = 87, antiderivative size = 33

$$\int \frac{(-20-20x^2-5x^4)\log(3)+e^{-4e^x+4x+4x^2}(e^x(-32x-16x^3)\log(3)+(8+32x+60x^2+16x^3+32x^4)\log}{16+16x^2+4x^4}$$
$$=\left(-\frac{5x}{4}+\frac{e^{4(-e^x+x+x^2)}}{\frac{2}{x}+x}\right)\log(3)$$

output
```
ln(3)*(exp(-4*exp(x)+4*x^2+4*x)/(x+2/x)-5/4*x)
```

3.1157.2 Mathematica [A] (verified)

Time = 0.57 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{(-20-20x^2-5x^4)\log(3)+e^{-4e^x+4x+4x^2}(e^x(-32x-16x^3)\log(3)+(8+32x+60x^2+16x^3+32x^4)\log}{16+16x^2+4x^4}$$
$$=\frac{1}{4}x\left(-5+\frac{4e^{-4e^x+4x(1+x)}}{2+x^2}\right)\log(3)$$

input
```
Integrate[((-20 - 20*x^2 - 5*x^4)*Log[3] + E^(-4*E^x + 4*x + 4*x^2)*(E^x*(
-32*x - 16*x^3)*Log[3] + (8 + 32*x + 60*x^2 + 16*x^3 + 32*x^4)*Log[3]))/(1
6 + 16*x^2 + 4*x^4),x]
```

output
```
(x*(-5 + (4*E^(-4*E^x + 4*x*(1 + x)))/(2 + x^2))*Log[3])/4
```

3.1157.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-5x^4-20x^2-20)\log(3)+e^{4x^2+4x-4e^x}\left(e^x(-16x^3-32x)\log(3)+(32x^4+16x^3+60x^2+32x+8)\log(3)\right)}{4x^4+16x^2+16}\,d$$

$$\Big\downarrow \text{1380}$$

$$4\int -\frac{5\log(3)\left(x^4+4x^2+4\right)+4e^{4x^2+4x-4e^x}\left(4e^x\left(x^3+2x\right)\log(3)-\left(8x^4+4x^3+15x^2+8x+2\right)\log(3)\right)}{16\left(x^2+2\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{1}{4}\int \frac{5\log(3)\left(x^4+4x^2+4\right)+4e^{4x^2+4x-4e^x}\left(4e^x\left(x^3+2x\right)\log(3)-\left(8x^4+4x^3+15x^2+8x+2\right)\log(3)\right)}{\left(x^2+2\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{4}\int \left(\frac{4e^{-4(-x^2-x+e^x)}\log(3)\left(-8x^4+4e^xx^3-4x^3-15x^2+8e^xx-8x-2\right)}{\left(x^2+2\right)^2}+\log(243)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(32\log(3)\int e^{-4(-x^2-x+e^x)}dx-2\log(3)\int \frac{e^{-4(-x^2-x+e^x)}}{\left(i\sqrt{2}-x\right)^2}dx-16i\sqrt{2}\log(3)\int \frac{e^{-4(-x^2-x+e^x)}}{i\sqrt{2}-x}dx-8\log(3)\int \right.$$

input
```
Int[((-20 - 20*x^2 - 5*x^4)*Log[3] + E^(-4*E^x + 4*x + 4*x^2)*(E^x*(-32*x
- 16*x^3)*Log[3] + (8 + 32*x + 60*x^2 + 16*x^3 + 32*x^4)*Log[3]))/(16 + 16
*x^2 + 4*x^4),x]
```

output
```
$Aborted
```

3.1157.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1157.4 Maple [A] (verified)

Time = 1.34 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

method	result	size
risch	$-\frac{5x\ln(3)}{4}+\frac{\ln(3)x\,\mathrm{e}^{-4\,\mathrm{e}^{x}+4x^{2}+4x}}{x^{2}+2}$	32
norman	$\frac{x\ln(3)\mathrm{e}^{-4\,\mathrm{e}^{x}+4x^{2}+4x}-\frac{5x\ln(3)}{2}-\frac{5x^{3}\ln(3)}{4}}{x^{2}+2}$	40
parallelrisch	$-\frac{5x^{3}\ln(3)-4x\ln(3)\mathrm{e}^{-4\,\mathrm{e}^{x}+4x^{2}+4x}+10x\ln(3)}{4(x^{2}+2)}$	42

input
```
int((((-16*x^3-32*x)*ln(3)*exp(x)+(32*x^4+16*x^3+60*x^2+32*x+8)*ln(3))*exp
(-4*exp(x)+4*x^2+4*x)+(-5*x^4-20*x^2-20)*ln(3))/(4*x^4+16*x^2+16),x,method
=_RETURNVERBOSE)
```

output
```
-5/4*x*ln(3)+ln(3)*x/(x^2+2)*exp(-4*exp(x)+4*x^2+4*x)
```

3.1157.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.21

$$\int \frac{(-20-20x^2-5x^4)\log(3)+e^{-4e^x+4x+4x^2}(e^x(-32x-16x^3)\log(3)+(8+32x+60x^2+16x^3+32x^4)\log(3))}{16+16x^2+4x^4}\,dx = \frac{4\,xe^{\left(4\,x^2+4\,x-4\,e^x\right)}\log(3)-5\,(x^3+2\,x)\log(3)}{4\,(x^2+2)}$$

input
```
integrate((((-16*x^3-32*x)*log(3)*exp(x)+(32*x^4+16*x^3+60*x^2+32*x+8)*log
(3))*exp(-4*exp(x)+4*x^2+4*x)+(-5*x^4-20*x^2-20)*log(3))/(4*x^4+16*x^2+16)
,x, algorithm=\
```

output
```
1/4*(4*x*e^(4*x^2 + 4*x - 4*e^x)*log(3) - 5*(x^3 + 2*x)*log(3))/(x^2 + 2)
```

3.1157.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{(-20-20x^2-5x^4)\log(3)+e^{-4e^x+4x+4x^2}(e^x(-32x-16x^3)\log(3)+(8+32x+60x^2+16x^3+32x^4)\log(3))}{16+16x^2+4x^4}\,dx = -\frac{5x\log(3)}{4}+\frac{xe^{4x^2+4x-4e^x}\log(3)}{x^2+2}$$

input
```
integrate((((-16*x**3-32*x)*ln(3)*exp(x)+(32*x**4+16*x**3+60*x**2+32*x+8)*
ln(3))*exp(-4*exp(x)+4*x**2+4*x)+(-5*x**4-20*x**2-20)*ln(3))/(4*x**4+16*x*
*2+16),x)
```

output
```
-5*x*log(3)/4 + x*exp(4*x**2 + 4*x - 4*exp(x))*log(3)/(x**2 + 2)
```

3.1157.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 108 vs. 2(33) = 66.

Time = 0.36 (sec) , antiderivative size = 108, normalized size of antiderivative = 3.27

$$\int \frac{(-20-20x^2-5x^4)\log(3)+e^{-4e^x+4x+4x^2}(e^x(-32x-16x^3)\log(3)+(8+32x+60x^2+16x^3+32x^4)\log}{16+16x^2+4x^4}$$

$$= \frac{5}{8}\left(3\sqrt{2}\arctan\left(\frac{1}{2}\sqrt{2}x\right)-2x-\frac{2x}{x^2+2}\right)\log(3) - \frac{5}{8}\left(\sqrt{2}\arctan\left(\frac{1}{2}\sqrt{2}x\right)+\frac{2x}{x^2+2}\right)\log(3) - \frac{5}{4}\left(\sqrt{2}\arctan\left(\frac{1}{2}\sqrt{2}x\right)-\frac{2x}{x^2+2}\right)\log(3) + \frac{xe^{(4x^2+4x-4e^x)}\log(3)}{x^2+2}$$

input
```
integrate((((-16*x^3-32*x)*log(3)*exp(x)+(32*x^4+16*x^3+60*x^2+32*x+8)*log
(3))*exp(-4*exp(x)+4*x^2+4*x)+(-5*x^4-20*x^2-20)*log(3))/(4*x^4+16*x^2+16)
,x, algorithm=\
```

output
```
5/8*(3*sqrt(2)*arctan(1/2*sqrt(2)*x) - 2*x - 2*x/(x^2 + 2))*log(3) - 5/8*(
sqrt(2)*arctan(1/2*sqrt(2)*x) + 2*x/(x^2 + 2))*log(3) - 5/4*(sqrt(2)*arcta
n(1/2*sqrt(2)*x) - 2*x/(x^2 + 2))*log(3) + x*e^(4*x^2 + 4*x - 4*e^x)*log(3
)/(x^2 + 2)
```

3.1157.8 Giac [F]

$$\int \frac{(-20-20x^2-5x^4)\log(3)+e^{-4e^x+4x+4x^2}(e^x(-32x-16x^3)\log(3)+(8+32x+60x^2+16x^3+32x^4)\log}{16+16x^2+4x^4}$$

$$= \int -\frac{4(4(x^3+2x)e^x\log(3)-(8x^4+4x^3+15x^2+8x+2)\log(3))e^{(4x^2+4x-4e^x)}+5(x^4+4x^2+4)\log}{4(x^4+4x^2+4)}$$

input
```
integrate((((-16*x^3-32*x)*log(3)*exp(x)+(32*x^4+16*x^3+60*x^2+32*x+8)*log
(3))*exp(-4*exp(x)+4*x^2+4*x)+(-5*x^4-20*x^2-20)*log(3))/(4*x^4+16*x^2+16)
,x, algorithm=\
```

output
```
integrate(-1/4*(4*(4*(x^3 + 2*x)*e^x*log(3) - (8*x^4 + 4*x^3 + 15*x^2 + 8*
x + 2)*log(3))*e^(4*x^2 + 4*x - 4*e^x) + 5*(x^4 + 4*x^2 + 4)*log(3))/(x^4
+ 4*x^2 + 4), x)
```

3.1157.9 Mupad [B] (verification not implemented)

Time = 0.69 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{(-20-20x^2-5x^4)\log(3)+e^{-4e^x+4x+4x^2}(e^x(-32x-16x^3)\log(3)+(8+32x+60x^2+16x^3+32x^4)\log(3))}{16+16x^2+4x^4}$$
$$= \frac{x\,\mathrm{e}^{4\,x}\,\mathrm{e}^{4\,x^2}\,\mathrm{e}^{-4\,\mathrm{e}^x}\,\ln(3)}{x^2+2} - \frac{5\,x\,\ln(3)}{4}$$

input
```
int((exp(4*x - 4*exp(x) + 4*x^2)*(log(3)*(32*x + 60*x^2 + 16*x^3 + 32*x^4
+ 8) - exp(x)*log(3)*(32*x + 16*x^3)) - log(3)*(20*x^2 + 5*x^4 + 20))/(16*
x^2 + 4*x^4 + 16),x)
```

output
```
(x*exp(4*x)*exp(4*x^2)*exp(-4*exp(x))*log(3))/(x^2 + 2) - (5*x*log(3))/4
```

3.1158 $\int \frac{e^{x/4}(-128+16x)+e^{x/4}(-8+x)\log\left(\frac{\log(2)}{4}\right)}{4x^3}\,dx$

3.1158.1 Optimal result

Integrand size = 39, antiderivative size = 20

$$\int \frac{e^{x/4}(-128+16x)+e^{x/4}(-8+x)\log\left(\frac{\log(2)}{4}\right)}{4x^3}\,dx=\frac{e^{x/4}\left(16+\log\left(\frac{\log(2)}{4}\right)\right)}{x^2}$$

output
```
(16+ln(1/4*ln(2)))/x^2*exp(1/4*x)
```

3.1158.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{e^{x/4}(-128+16x)+e^{x/4}(-8+x)\log\left(\frac{\log(2)}{4}\right)}{4x^3}\,dx=\frac{e^{x/4}\left(16+\log\left(\frac{\log(2)}{4}\right)\right)}{x^2}$$

input
```
Integrate[(E^(x/4)*(-128 + 16*x) + E^(x/4)*(-8 + x)*Log[Log[2]/4])/(4*x^3)
,x]
```

output
```
(E^(x/4)*(16 + Log[Log[2]/4]))/x^2
```

3.1158.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.128$, Rules used = {27, 6, 25, 27, 2627}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x/4}(16x-128)+e^{x/4}(x-8)\log\left(\frac{\log(2)}{4}\right)}{4x^3}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\int -\frac{16e^{x/4}(8-x)+e^{x/4}\log\left(\frac{\log(2)}{4}\right)(8-x)}{x^3}dx$$

$$\Big\downarrow \text{6}$$

$$\frac{1}{4}\int -\frac{e^{x/4}(8-x)\left(16+\log\left(\frac{\log(2)}{4}\right)\right)}{x^3}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{4}\int \frac{e^{x/4}(8-x)\left(16+\log\left(\frac{\log(2)}{4}\right)\right)}{x^3}dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{1}{4}\left(16+\log\left(\frac{\log(2)}{4}\right)\right)\int \frac{e^{x/4}(8-x)}{x^3}dx$$

$$\Big\downarrow \text{2627}$$

$$\frac{e^{x/4}\left(16+\log\left(\frac{\log(2)}{4}\right)\right)}{x^2}$$

input
```
Int[(E^(x/4)*(-128 + 16*x) + E^(x/4)*(-8 + x)*Log[Log[2]/4])/(4*x^3),x]
```

output
```
(E^(x/4)*(16 + Log[Log[2]/4]))/x^2
```

3.1158.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2627
```
Int[(F_)^(v_)*((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_)), x_Symbol] :>
 Simp[g*(d + e*x)^(m + 1)*(F^v/(D[v, x]*e*Log[F])), x] /; FreeQ[{F, d, e, f
, g, m}, x] && LinearQ[v, x] && EqQ[e*g*(m + 1) - D[v, x]*(e*f - d*g)*Log[F
], 0]
```

3.1158.4 Maple [A] (verified)

Time = 1.02 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result
gosper	$\frac{\left(16+\ln\left(\frac{\ln(2)}{4}\right)\right){\mathrm e}^{\frac{x}{4}}}{x^{2}}$
norman	$\frac{\left(-2\ln(2)+\ln(\ln(2))+16\right){\mathrm e}^{\frac{x}{4}}}{x^{2}}$
risch	$-\frac{\left(2\ln(2)-\ln(\ln(2))-16\right){\mathrm e}^{\frac{x}{4}}}{x^{2}}$
parallelrisch	$\frac{4\,{\mathrm e}^{\frac{x}{4}}\ln\left(\frac{\ln(2)}{4}\right)+64\,{\mathrm e}^{\frac{x}{4}}}{4x^{2}}$
derivativedivides	$\frac{16\,{\mathrm e}^{\frac{x}{4}}}{x^{2}}+\frac{\ln(2)\left(-\frac{8\,{\mathrm e}^{\frac{x}{4}}}{x^{2}}-\frac{2\,{\mathrm e}^{\frac{x}{4}}}{x}-\frac{\mathrm{Ei}_{1}\left(-\frac{x}{4}\right)}{2}\right)}{4}-\frac{\ln(\ln(2))\left(-\frac{8\,{\mathrm e}^{\frac{x}{4}}}{x^{2}}-\frac{2\,{\mathrm e}^{\frac{x}{4}}}{x}-\frac{\mathrm{Ei}_{1}\left(-\frac{x}{4}\right)}{2}\right)}{8}-\frac{\ln(2)\left(-\frac{4\,{\mathrm e}^{\frac{x}{4}}}{x}-\mathrm{Ei}_{1}\left(-\frac{x}{4}\right)\right)}{8}-$
default	$\frac{16\,{\mathrm e}^{\frac{x}{4}}}{x^{2}}+\frac{\ln(2)\left(-\frac{8\,{\mathrm e}^{\frac{x}{4}}}{x^{2}}-\frac{2\,{\mathrm e}^{\frac{x}{4}}}{x}-\frac{\mathrm{Ei}_{1}\left(-\frac{x}{4}\right)}{2}\right)}{4}-\frac{\ln(\ln(2))\left(-\frac{8\,{\mathrm e}^{\frac{x}{4}}}{x^{2}}-\frac{2\,{\mathrm e}^{\frac{x}{4}}}{x}-\frac{\mathrm{Ei}_{1}\left(-\frac{x}{4}\right)}{2}\right)}{8}-\frac{\ln(2)\left(-\frac{4\,{\mathrm e}^{\frac{x}{4}}}{x}-\mathrm{Ei}_{1}\left(-\frac{x}{4}\right)\right)}{8}-$
meijerg	$-4\left(\frac{1}{4}+\frac{\ln\left(\frac{\ln(2)}{4}\right)}{64}\right)\left(\frac{4}{x}+1-\ln\left(x\right)+2\ln\left(2\right)-i\pi-\frac{2\left(2+\frac{x}{2}\right)}{x}+\frac{4\,{\mathrm e}^{\frac{x}{4}}}{x}+\ln\left(-\frac{x}{4}\right)+\mathrm{Ei}_{1}\left(-\frac{x}{4}\right.\right.$

input
```
int(1/4*((-8+x)*exp(1/4*x)*ln(1/4*ln(2))+(16*x-128)*exp(1/4*x))/x^3,x,meth
od=_RETURNVERBOSE)
```

output
```
(16+ln(1/4*ln(2)))/x^2*exp(1/4*x)
```

3.1158.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{e^{x/4}(-128+16x)+e^{x/4}(-8+x)\log\left(\frac{\log(2)}{4}\right)}{4x^3}\,dx = \frac{e^{\left(\frac{1}{4}\,x\right)}\log\left(\frac{1}{4}\,\log\left(2\right)\right)+16\,e^{\left(\frac{1}{4}\,x\right)}}{x^2}$$

input
```
integrate(1/4*((-8+x)*exp(1/4*x)*log(1/4*log(2))+(16*x-128)*exp(1/4*x))/x^
3,x, algorithm=\
```

output
```
(e^(1/4*x)*log(1/4*log(2)) + 16*e^(1/4*x))/x^2
```

3.1158.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{e^{x/4}(-128+16x)+e^{x/4}(-8+x)\log\left(\frac{\log(2)}{4}\right)}{4x^3}\,dx = \frac{\left(-2\log\left(2\right)+\log\left(\log\left(2\right)\right)+16\right)e^{\frac{x}{4}}}{x^2}$$

input
```
integrate(1/4*((-8+x)*exp(1/4*x)*ln(1/4*ln(2))+(16*x-128)*exp(1/4*x))/x**3
,x)
```

output
```
(-2*log(2) + log(log(2)) + 16)*exp(x/4)/x**2
```

3.1158.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.85

$$\int \frac{e^{x/4}(-128+16x)+e^{x/4}(-8+x)\log\left(\frac{\log(2)}{4}\right)}{4x^3}\,dx = \frac{1}{16}\,\Gamma\left(-1,-\frac{1}{4}\,x\right)\log\left(\frac{1}{4}\,\log\left(2\right)\right) + \frac{1}{8}\,\Gamma\left(-2,-\frac{1}{4}\,x\right)\log\left(\frac{1}{4}\,\log\left(2\right)\right)+\Gamma\left(-1,-\frac{1}{4}\,x\right)+2\,\Gamma\left(-2,-\frac{1}{4}\,x\right)$$

input
```
integrate(1/4*((-8+x)*exp(1/4*x)*log(1/4*log(2))+(16*x-128)*exp(1/4*x))/x^
3,x, algorithm=\
```

output
```
1/16*gamma(-1, -1/4*x)*log(1/4*log(2)) + 1/8*gamma(-2, -1/4*x)*log(1/4*log
(2)) + gamma(-1, -1/4*x) + 2*gamma(-2, -1/4*x)
```

3.1158.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{e^{x/4}(-128+16x)+e^{x/4}(-8+x)\log\left(\frac{\log(2)}{4}\right)}{4x^3}\,dx = -\frac{2\,e^{\left(\frac{1}{4}\,x\right)}\log(2)-e^{\left(\frac{1}{4}\,x\right)}\log(\log(2))-16\,e^{\left(\frac{1}{4}\,x\right)}}{x^2}$$

input
```
integrate(1/4*((-8+x)*exp(1/4*x)*log(1/4*log(2))+(16*x-128)*exp(1/4*x))/x^
3,x, algorithm=\
```

output
```
-(2*e^(1/4*x)*log(2) - e^(1/4*x)*log(log(2)) - 16*e^(1/4*x))/x^2
```

3.1158.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{e^{x/4}(-128+16x)+e^{x/4}(-8+x)\log\left(\frac{\log(2)}{4}\right)}{4x^3}\,dx = \frac{e^{x/4}\left(\ln\left(\frac{\ln(2)}{4}\right)+16\right)}{x^2}$$

input
```
int(((exp(x/4)*(16*x - 128))/4 + (log(log(2)/4)*exp(x/4)*(x - 8))/4)/x^3,x
)
```

output
```
(exp(x/4)*(log(log(2)/4) + 16))/x^2
```

3.1159 $\int \frac{-4-12x-12x^2-20x^3+(4x+8x^2+12x^3)\log\left(\frac{4}{x+x^2}\right)}{x}\,dx$

3.1159.1 Optimal result

Integrand size = 44, antiderivative size = 26

$$\int \frac{-4-12x-12x^2-20x^3+(4x+8x^2+12x^3)\log\left(\frac{4}{x+x^2}\right)}{x}\,dx = (1+x+x(x+x^2))\left(-4+4\log\left(\frac{4}{x(1+x)}\right)\right)$$

output
```
(4*ln(4/x/(1+x))-4)*(1+x*(x^2+x)+x)
```

3.1159.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{-4-12x-12x^2-20x^3+(4x+8x^2+12x^3)\log\left(\frac{4}{x+x^2}\right)}{x}\,dx = -4\log(x)-4\log(1+x)+4x(1+x+x^2)\left(-1+\log\left(\frac{4}{x+x^2}\right)\right)$$

input
```
Integrate[(-4 - 12*x - 12*x^2 - 20*x^3 + (4*x + 8*x^2 + 12*x^3)*Log[4/(x +
 x^2)])/x,x]
```

output
```
-4*Log[x] - 4*Log[1 + x] + 4*x*(1 + x + x^2)*(-1 + Log[4/(x + x^2)])
```

3.1159.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 131 vs. 2(26) = 52.

Time = 0.33 (sec) , antiderivative size = 131, normalized size of antiderivative = 5.04, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-20x^3-12x^2+(12x^3+8x^2+4x)\log\left(\frac{4}{x^2+x}\right)-12x-4}{x}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(4(3x^2+2x+1)\log\left(\frac{4}{x(x+1)}\right)-\frac{4(5x^3+3x^2+3x+1)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-4x^3-4x^3\log(x)-4x^3\log(x+1)+4x^3\left(\log(x)+\log\left(\frac{4}{x(x+1)}\right)+\log(x+1)\right)-4x^2-4x^2\log(x)-4x^2\log(x+1)+4x^2\left(\log(x)+\log\left(\frac{4}{x(x+1)}\right)+\log(x+1)\right)-4x-4x\log(x)+4x\left(\log(x)+\log\left(\frac{4}{x(x+1)}\right)+\log(x+1)\right)-4\log(x)-4(x+1)\log(x+1)$$

input
```
Int[(-4 - 12*x - 12*x^2 - 20*x^3 + (4*x + 8*x^2 + 12*x^3)*Log[4/(x + x^2)]
)/x,x]
```

output
```
-4*x - 4*x^2 - 4*x^3 - 4*Log[x] - 4*x*Log[x] - 4*x^2*Log[x] - 4*x^3*Log[x]
 - 4*x^2*Log[1 + x] - 4*x^3*Log[1 + x] - 4*(1 + x)*Log[1 + x] + 4*x*(Log[x
] + Log[4/(x*(1 + x))] + Log[1 + x]) + 4*x^2*(Log[x] + Log[4/(x*(1 + x))]
+ Log[1 + x]) + 4*x^3*(Log[x] + Log[4/(x*(1 + x))] + Log[1 + x])
```

3.1159.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1159.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.85

method	result
risch	$(4x^3+4x^2+4x)\ln\left(\frac{4}{x^2+x}\right)-4x^3-4x^2-4x-4\ln\left(x^2+x\right)$
norman	$-4x-4x^2-4x^3+4x\ln\left(\frac{4}{x^2+x}\right)+4x^2\ln\left(\frac{4}{x^2+x}\right)+4x^3\ln\left(\frac{4}{x^2+x}\right)+4\ln\left(\frac{4}{x^2+x}\right)$
parallelrisch	$4\ln\left(\frac{4}{x(1+x)}\right)x^3-4x^3+4\ln\left(\frac{4}{x(1+x)}\right)x^2+4-4x^2+4\ln\left(\frac{4}{x(1+x)}\right)x-4x+4\ln\left(\frac{4}{x(1+x)}\right)$
default	$4x^2\ln\left(\frac{1}{x(1+x)}\right)-4x^2+4x^3\ln\left(\frac{1}{x(1+x)}\right)-4x^3+4x\ln\left(\frac{1}{x(1+x)}\right)-4x-4\ln\left(1+x\right)+8\ln(2$
parts	$8x^2\ln(2)+8x^3\ln(2)+4x^2\ln\left(\frac{1}{x(1+x)}\right)-4x^2+4x^3\ln\left(\frac{1}{x(1+x)}\right)-4x^3+8x\ln(2)+4x\ln($

input
```
int(((12*x^3+8*x^2+4*x)*ln(4/(x^2+x))-20*x^3-12*x^2-12*x-4)/x,x,method=_RE
TURNVERBOSE)
```

output
```
(4*x^3+4*x^2+4*x)*ln(4/(x^2+x))-4*x^3-4*x^2-4*x-4*ln(x^2+x)
```

3.1159.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.35

$$\int \frac{-4-12x-12x^2-20x^3+(4x+8x^2+12x^3)\log\left(\frac{4}{x+x^2}\right)}{x}\,dx$$
$$=-4\,x^3-4\,x^2+4\left(x^3+x^2+x+1\right)\log\left(\frac{4}{x^2+x}\right)-4\,x$$

input
```
integrate(((12*x^3+8*x^2+4*x)*log(4/(x^2+x))-20*x^3-12*x^2-12*x-4)/x,x, al
gorithm=\
```

output
```
-4*x^3 - 4*x^2 + 4*(x^3 + x^2 + x + 1)*log(4/(x^2 + x)) - 4*x
```

3.1159.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. $2(20) = 40$.

Time = 0.11 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.62

$$\int \frac{-4-12x-12x^2-20x^3+(4x+8x^2+12x^3)\log\left(\frac{4}{x+x^2}\right)}{x}\,dx$$
$$= -4x^3-4x^2-4x+\left(4x^3+4x^2+4x\right)\log\left(\frac{4}{x^2+x}\right)-4\log\left(x^2+x\right)$$

input
```
integrate(((12*x**3+8*x**2+4*x)*ln(4/(x**2+x))-20*x**3-12*x**2-12*x-4)/x,x
)
```

output
```
-4*x**3 - 4*x**2 - 4*x + (4*x**3 + 4*x**2 + 4*x)*log(4/(x**2 + x)) - 4*log
(x**2 + x)
```

3.1159.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(25) = 50$.

Time = 0.19 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.58

$$\int \frac{-4-12x-12x^2-20x^3+(4x+8x^2+12x^3)\log\left(\frac{4}{x+x^2}\right)}{x}\,dx$$
$$= 4\,x^3\log\left(\frac{4}{x^2+x}\right)-4\,x^3+4\,x^2\log\left(\frac{4}{x^2+x}\right)-4\,x^2$$
$$+4\,x\log\left(\frac{4}{x^2+x}\right)-4\,x-4\,\log\left(x+1\right)-4\,\log\left(x\right)$$

input
```
integrate(((12*x^3+8*x^2+4*x)*log(4/(x^2+x))-20*x^3-12*x^2-12*x-4)/x,x, al
gorithm=\
```

output
```
4*x^3*log(4/(x^2 + x)) - 4*x^3 + 4*x^2*log(4/(x^2 + x)) - 4*x^2 + 4*x*log(
4/(x^2 + x)) - 4*x - 4*log(x + 1) - 4*log(x)
```

3.1159.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.69

$$\int \frac{-4-12x-12x^2-20x^3+(4x+8x^2+12x^3)\log\left(\frac{4}{x+x^2}\right)}{x}\,dx$$
$$= -4\,x^3-4\,x^2+4\,\left(x^3+x^2+x\right)\log\left(\frac{4}{x^2+x}\right)-4\,x-4\,\log\left(x+1\right)-4\,\log\left(x\right)$$

input
```
integrate(((12*x^3+8*x^2+4*x)*log(4/(x^2+x))-20*x^3-12*x^2-12*x-4)/x,x, al
gorithm=\
```

output
```
-4*x^3 - 4*x^2 + 4*(x^3 + x^2 + x)*log(4/(x^2 + x)) - 4*x - 4*log(x + 1) -
 4*log(x)
```

3.1159.9 Mupad [B] (verification not implemented)

Time = 14.62 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.42

$$\int \frac{-4-12x-12x^2-20x^3+(4x+8x^2+12x^3)\log\left(\frac{4}{x+x^2}\right)}{x}\,dx$$
$$= 4\,\ln\left(\frac{1}{x^2+x}\right)+x\,\left(4\,\ln\left(\frac{4}{x^2+x}\right)-4\right)$$
$$+x^2\,\left(4\,\ln\left(\frac{4}{x^2+x}\right)-4\right)+x^3\,\left(4\,\ln\left(\frac{4}{x^2+x}\right)-4\right)$$

input
```
int(-(12*x + 12*x^2 + 20*x^3 - log(4/(x + x^2))*(4*x + 8*x^2 + 12*x^3) + 4
)/x,x)
```

output
```
4*log(1/(x + x^2)) + x*(4*log(4/(x + x^2)) - 4) + x^2*(4*log(4/(x + x^2))
- 4) + x^3*(4*log(4/(x + x^2)) - 4)
```

3.1160 $\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)}{\left(8+48x+74x^2+12x^3+18x^4\right.}$

3.1160.1 Optimal result

Integrand size = 167, antiderivative size = 32

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+\right.}{\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4}{x}\right.\right.}$$

$$=x+\frac{x}{\left(x+\frac{2+x}{5}\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)}$$

output
```
x+x/(2/5+6/5*x)/ln(ln(16*ln(2)^4/x)+x^2+4)
```

3.1160.2 Mathematica [A] (verified)

Time = 0.81 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+\right.}{\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4}{x}\right.\right.}$$

$$=x+\frac{5x}{2(1+3x)\log\left(4+x^2+\log\left(\frac{1}{x}\right)+4\log(\log(4))\right)}$$

3.1160.

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4)}{x}\right)\right)\log^{\ldots}}{\ldots}$$

input
```
Integrate[(5 + 15*x - 10*x^2 - 30*x^3 + (20 + 5*x^2 + 5*Log[Log[4]^4/x])*L
og[4 + x^2 + Log[Log[4]^4/x]] + (8 + 48*x + 74*x^2 + 12*x^3 + 18*x^4 + (2
+ 12*x + 18*x^2)*Log[Log[4]^4/x])*Log[4 + x^2 + Log[Log[4]^4/x]]^2)/((8 +
48*x + 74*x^2 + 12*x^3 + 18*x^4 + (2 + 12*x + 18*x^2)*Log[Log[4]^4/x])*Log
[4 + x^2 + Log[Log[4]^4/x]]^2),x]
```

output
```
x + (5*x)/(2*(1 + 3*x)*Log[4 + x^2 + Log[x^(-1)] + 4*Log[Log[4]]])
```

3.1160.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-30x^3-10x^2+\left(5x^2+5\log\left(\frac{\log^4(4)}{x}\right)+20\right)\log\left(x^2+\log\left(\frac{\log^4(4)}{x}\right)+4\right)+\left(18x^4+12x^3+74x^2+\left(18x^2+1\right.\right.}{\left(18x^4+12x^3+74x^2+\left(18x^2+12x+2\right)\log\left(\frac{\log^4(4)}{x}\right)+48x+8\right)\log}$$

$$\Big\downarrow \text{7239}$$

$$\int \left(-\frac{5\left(2x^2-1\right)}{2(3x+1)\left(x^2+\log\left(\frac{1}{x}\right)+4(1+\log(\log(4)))\right)\log^2\left(x^2+\log\left(\frac{1}{x}\right)+4(1+\log(\log(4)))\right)}+\frac{}{2(3x+1)^2\log\left(x^2\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{5}{9}\int \frac{1}{\left(-x^2-\log\left(\frac{1}{x}\right)-4(1+\log(\log(4)))\right)\log^2\left(x^2+\log\left(\frac{1}{x}\right)+4(1+\log(\log(4)))\right)}dx-\frac{35}{18}\int \frac{1}{(-3x-1)\left(x^2+\log\left(\frac{1}{x}\right)+4(1+\log(\log(4)))\right)\log^2\left(x^2+\log\left(\frac{1}{x}\right)+4(1+\log(\log(4)))\right)}dx-\frac{5}{3}\int \frac{x}{\left(x^2+\log\left(\frac{1}{x}\right)+4(1+\log(\log(4)))\right)\log^2\left(x^2+\log\left(\frac{1}{x}\right)+4(1+\log(\log(4)))\right)}dx+\frac{5}{2}\int \frac{1}{(3x+1)^2\log\left(x^2+\log\left(\frac{1}{x}\right)+4(1+\log(\log(4)))\right)}dx+x$$

input
```
Int[(5 + 15*x - 10*x^2 - 30*x^3 + (20 + 5*x^2 + 5*Log[Log[4]^4/x])*Log[4 +
 x^2 + Log[Log[4]^4/x]] + (8 + 48*x + 74*x^2 + 12*x^3 + 18*x^4 + (2 + 12*x
 + 18*x^2)*Log[Log[4]^4/x])*Log[4 + x^2 + Log[Log[4]^4/x]]^2)/((8 + 48*x +
 74*x^2 + 12*x^3 + 18*x^4 + (2 + 12*x + 18*x^2)*Log[Log[4]^4/x])*Log[4 + x
^2 + Log[Log[4]^4/x]]^2),x]
```

output
```
$Aborted
```

3.1160.

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4)}{x}\right)\right)\log^2}{}$$

3.1160.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1160.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 89 vs. $2(29) = 58$.

Time = 190.87 (sec) , antiderivative size = 90, normalized size of antiderivative = 2.81

method	result	size
parallelrisch	$\frac{36 \ln\left(\ln\left(\frac{16 \ln(2)^4}{x}\right)+x^2+4\right) x^2-420 \ln\left(\ln\left(\frac{16 \ln(2)^4}{x}\right)+x^2+4\right) x+30 x-144 \ln\left(\ln\left(\frac{16 \ln(2)^4}{x}\right)+x^2+4\right)}{12(1+3x) \ln\left(\ln\left(\frac{16 \ln(2)^4}{x}\right)+x^2+4\right)}$	90

input
```
int((((18*x^2+12*x+2)*ln(16*ln(2)^4/x)+18*x^4+12*x^3+74*x^2+48*x+8)*ln(ln(
16*ln(2)^4/x)+x^2+4)^2+(5*ln(16*ln(2)^4/x)+5*x^2+20)*ln(ln(16*ln(2)^4/x)+x
^2+4)-30*x^3-10*x^2+15*x+5)/((18*x^2+12*x+2)*ln(16*ln(2)^4/x)+18*x^4+12*x^
3+74*x^2+48*x+8)/ln(ln(16*ln(2)^4/x)+x^2+4)^2,x,method=_RETURNVERBOSE)
```

output
```
1/12*(36*ln(ln(16*ln(2)^4/x)+x^2+4)*x^2-420*ln(ln(16*ln(2)^4/x)+x^2+4)*x+3
0*x-144*ln(ln(16*ln(2)^4/x)+x^2+4))/(1+3*x)/ln(ln(16*ln(2)^4/x)+x^2+4)
```

3.1160.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.75

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+\cdots\right.}{\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4\cdots}{x}\right.\right.}$$

$$= \frac{2\,(3\,x^2+x)\log\left(x^2+\log\left(\frac{16\,\log(2)^4}{x}\right)+4\right)+5\,x}{2\,(3\,x+1)\log\left(x^2+\log\left(\frac{16\,\log(2)^4}{x}\right)+4\right)}$$

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4)}{x}\right)\right)\log^{\cdots}}{\cdots}$$

input
```
integrate((((18*x^2+12*x+2)*log(16*log(2)^4/x)+18*x^4+12*x^3+74*x^2+48*x+8
)*log(log(16*log(2)^4/x)+x^2+4)^2+(5*log(16*log(2)^4/x)+5*x^2+20)*log(log(
16*log(2)^4/x)+x^2+4)-30*x^3-10*x^2+15*x+5)/((18*x^2+12*x+2)*log(16*log(2)
^4/x)+18*x^4+12*x^3+74*x^2+48*x+8)/log(log(16*log(2)^4/x)+x^2+4)^2,x, algo
rithm=\
```

output
```
1/2*(2*(3*x^2 + x)*log(x^2 + log(16*log(2)^4/x) + 4) + 5*x)/((3*x + 1)*log
(x^2 + log(16*log(2)^4/x) + 4))
```

3.1160.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+\cdots\right.}{\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4\cdots}{x}\right.\right.\cdots}$$

$$= x+\frac{5x}{(6x+2)\log\left(x^2+\log\left(\frac{16\log(2)^4}{x}\right)+4\right)}$$

input
```
integrate((((18*x**2+12*x+2)*ln(16*ln(2)**4/x)+18*x**4+12*x**3+74*x**2+48*
x+8)*ln(ln(16*ln(2)**4/x)+x**2+4)**2+(5*ln(16*ln(2)**4/x)+5*x**2+20)*ln(ln
(16*ln(2)**4/x)+x**2+4)-30*x**3-10*x**2+15*x+5)/((18*x**2+12*x+2)*ln(16*ln
(2)**4/x)+18*x**4+12*x**3+74*x**2+48*x+8)/ln(ln(16*ln(2)**4/x)+x**2+4)**2,
x)
```

output
```
x + 5*x/((6*x + 2)*log(x**2 + log(16*log(2)**4/x) + 4))
```

3.1160.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(30) = 60.

Time = 0.33 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.94

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+\cdots\right.}{\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4\cdots}{x}\right.\right.\cdots}$$

$$= \frac{2\,(3\,x^2+x)\log\left(x^2+4\,\log(2)-\log(x)+4\,\log(\log(2))+4\right)+5\,x}{2\,(3\,x+1)\log\left(x^2+4\,\log(2)-\log(x)+4\,\log(\log(2))+4\right)}$$

3.1160.

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4)}{x}\right)\right)\log^2\cdots}{\cdots}$$

input
```
integrate((((18*x^2+12*x+2)*log(16*log(2)^4/x)+18*x^4+12*x^3+74*x^2+48*x+8
)*log(log(16*log(2)^4/x)+x^2+4)^2+(5*log(16*log(2)^4/x)+5*x^2+20)*log(log(
16*log(2)^4/x)+x^2+4)-30*x^3-10*x^2+15*x+5)/((18*x^2+12*x+2)*log(16*log(2)
^4/x)+18*x^4+12*x^3+74*x^2+48*x+8)/log(log(16*log(2)^4/x)+x^2+4)^2,x, algo
rithm=\
```

output
```
1/2*(2*(3*x^2 + x)*log(x^2 + 4*log(2) - log(x) + 4*log(log(2)) + 4) + 5*x)
/((3*x + 1)*log(x^2 + 4*log(2) - log(x) + 4*log(log(2)) + 4))
```

3.1160.8 Giac [A] (verification not implemented)

Time = 0.52 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.53

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+\cdots\right.}{\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4}{x}\cdots\right.\right.}$$
$$= x + \frac{5x}{2\left(3x\log\left(x^2+4\log(2)-\log(x)+4\log(\log(2))+4\right)+\log\left(x^2+4\log(2)-\log(x)+4\log(\log(2))\cdots\right.\right.}$$

input
```
integrate((((18*x^2+12*x+2)*log(16*log(2)^4/x)+18*x^4+12*x^3+74*x^2+48*x+8
)*log(log(16*log(2)^4/x)+x^2+4)^2+(5*log(16*log(2)^4/x)+5*x^2+20)*log(log(
16*log(2)^4/x)+x^2+4)-30*x^3-10*x^2+15*x+5)/((18*x^2+12*x+2)*log(16*log(2)
^4/x)+18*x^4+12*x^3+74*x^2+48*x+8)/log(log(16*log(2)^4/x)+x^2+4)^2,x, algo
rithm=\
```

output
```
x + 5/2*x/(3*x*log(x^2 + 4*log(2) - log(x) + 4*log(log(2)) + 4) + log(x^2
+ 4*log(2) - log(x) + 4*log(log(2)) + 4))
```

3.1160.

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4)}{x}\right)\right)\log^2\cdots}{\cdots}$$

3.1160.9 Mupad [B] (verification not implemented)

Time = 15.22 (sec) , antiderivative size = 150, normalized size of antiderivative = 4.69

$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+\dots\right.}{\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4}{x}\right.\right.\dots}$$

$$= x-\frac{\frac{5x^3}{36}+\frac{5x}{9}}{-x^4-\frac{2x^3}{3}+\frac{7x^2}{18}+\frac{x}{3}+\frac{1}{18}}+\frac{\frac{5x}{2(3x+1)}-\frac{5x\ln\left(\ln\left(\frac{16\ln(2)^4}{x}\right)+x^2+4\right)\left(\ln\left(\frac{16\ln(2)^4}{x}\right)+x^2+4\right)}{2(3x+1)^2(2x^2-1)}}{\ln\left(\ln\left(\frac{16\ln(2)^4}{x}\right)+x^2+4\right)}$$
$$-\frac{5x\ln\left(\frac{16\ln(2)^4}{x}\right)}{36\left(-x^4-\frac{2x^3}{3}+\frac{7x^2}{18}+\frac{x}{3}+\frac{1}{18}\right)}$$

input
```
int((15*x + log(log((16*log(2)^4)/x) + x^2 + 4)*(5*log((16*log(2)^4)/x) +
5*x^2 + 20) - 10*x^2 - 30*x^3 + log(log((16*log(2)^4)/x) + x^2 + 4)^2*(48*
x + log((16*log(2)^4)/x)*(12*x + 18*x^2 + 2) + 74*x^2 + 12*x^3 + 18*x^4 +
8) + 5)/(log(log((16*log(2)^4)/x) + x^2 + 4)^2*(48*x + log((16*log(2)^4)/x
)*(12*x + 18*x^2 + 2) + 74*x^2 + 12*x^3 + 18*x^4 + 8)),x)
```

output
```
x - ((5*x)/9 + (5*x^3)/36)/(x/3 + (7*x^2)/18 - (2*x^3)/3 - x^4 + 1/18) + (
(5*x)/(2*(3*x + 1)) - (5*x*log(log((16*log(2)^4)/x) + x^2 + 4)*(log((16*lo
g(2)^4)/x) + x^2 + 4))/(2*(3*x + 1)^2*(2*x^2 - 1)))/log(log((16*log(2)^4)/
x) + x^2 + 4) - (5*x*log((16*log(2)^4)/x))/(36*(x/3 + (7*x^2)/18 - (2*x^3)
/3 - x^4 + 1/18))
```


$$\int \frac{5+15x-10x^2-30x^3+\left(20+5x^2+5\log\left(\frac{\log^4(4)}{x}\right)\right)\log\left(4+x^2+\log\left(\frac{\log^4(4)}{x}\right)\right)+\left(8+48x+74x^2+12x^3+18x^4+(2+12x+18x^2)\log\left(\frac{\log^4(4)}{x}\right)\right)\log^2\dots}{\dots}$$

3.1161 $\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+\left(40-530x+280x^2-545x^3+258x^4\right.}{}$

3.1161.1 Optimal result

Integrand size = 214, antiderivative size = 31

$$\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7)\log}{}$$

$$= x\left(\left(4+x^2\right)^2+\log(x)\right)\left(-x+\frac{\log\left(\log^2(x)\right)}{4-x+\log(x)}\right)$$

output
```
((x^2+4)^2+ln(x))*x*(ln(ln(x)^2)/(ln(x)-x+4)-x)
```

3.1161.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.23

$$\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7)\log}{}$$

$$= -\frac{x\left(\left(4+x^2\right)^2+\log(x)\right)\left((-4+x)x-x\log(x)+\log\left(\log^2(x)\right)\right)}{-4+x-\log(x)}$$

3.1161. $\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7)\log(x)+(2-296x+82x^2-258x^3+64x^4-48x^5+12x^6)\log}{(16-8x+x^2)\log(x)+(8}$

input
```
Integrate[(128 - 32*x + 64*x^2 - 16*x^3 + 8*x^4 - 2*x^5 + (40 - 530*x + 28
0*x^2 - 545*x^3 + 258*x^4 - 128*x^5 + 48*x^6 - 6*x^7)*Log[x] + (2 - 296*x
+ 82*x^2 - 258*x^3 + 64*x^4 - 48*x^5 + 12*x^6)*Log[x]^2 + (-49*x + 4*x^2 -
 32*x^3 - 6*x^5)*Log[x]^3 - 2*x*Log[x]^4 + ((52 - x + 88*x^2 - 16*x^3 + 19
*x^4 - 4*x^5)*Log[x] + (20 + 24*x^2 + 5*x^4)*Log[x]^2 + Log[x]^3)*Log[Log[
x]^2])/((16 - 8*x + x^2)*Log[x] + (8 - 2*x)*Log[x]^2 + Log[x]^3),x]
```

output
```
-((x*((4 + x^2)^2 + Log[x])*((-4 + x)*x - x*Log[x] + Log[Log[x]^2]))/(-4 +
 x - Log[x]))
```

3.1161.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^5+8x^4-16x^3+64x^2+\left(-6x^5-32x^3+4x^2-49x\right)\log^3(x)+\left(\left(5x^4+24x^2+20\right)\log^2(x)+\left(-4x^5+19x\right.\right.}{}$$

$\downarrow$ 7292

$$\int \frac{-2x^5+8x^4-16x^3+64x^2+\left(-6x^5-32x^3+4x^2-49x\right)\log^3(x)+\left(\left(5x^4+24x^2+20\right)\log^2(x)+\left(-4x^5+19x\right.\right.}{}$$

$\downarrow$ 7293

$$\int \left(-\frac{2x^5}{(x-\log(x)-4)^2\log(x)}+\frac{8x^4}{(x-\log(x)-4)^2\log(x)}-\frac{16x^3}{(x-\log(x)-4)^2\log(x)}+\frac{64x^2}{(x-\log(x)-4)^2\log(x)}\right.$$

$\downarrow$ 2009

$$\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+\left(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7\right)\log(x)+\left(2-296x+82x^2-258x^3+64x^4-48x^5+12x^6\right)\log}{\left(16-8x+x^2\right)\log(x)+(8}$$

$$-4\int \frac{x^5 \log \left(\log ^2(x)\right)}{(x-\log (x)-4)^2}dx-2\int \frac{x^5}{(x-4)^2 \log (x)}dx+19\int \frac{x^4 \log \left(\log ^2(x)\right)}{(x-\log (x)-4)^2}dx+5\int \frac{x^4 \log (x) \log \left(\log ^2(x)\right)}{(x-\log (x)-4)^2}dx+8\int \frac{x^4}{(x-4)^2 \log (x)}dx-16\int \frac{x^3 \log \left(\log ^2(x)\right)}{(x-\log (x)-4)^2}dx-2\int \frac{x^3}{x-\log (x)-4}dx-16\int \frac{x^3}{(x-4)^2 \log (x)}dx+88\int \frac{x^2 \log \left(\log ^2(x)\right)}{(x-\log (x)-4)^2}dx+24\int \frac{x^2 \log (x) \log \left(\log ^2(x)\right)}{(x-\log (x)-4)^2}dx-8\int \frac{x^2}{x-\log (x)-4}dx+64\int \frac{x^2}{(x-4)^2 \log (x)}dx+52\int \frac{\log \left(\log ^2(x)\right)}{(x-\log (x)-4)^2}dx-\int \frac{x \log \left(\log ^2(x)\right)}{(x-\log (x)-4)^2}dx+20\int \frac{\log (x) \log \left(\log ^2(x)\right)}{(-x+\log (x)+4)^2}dx+\int \frac{\log ^2(x) \log \left(\log ^2(x)\right)}{(-x+\log (x)+4)^2}dx-192\int \frac{1}{x-\log (x)-4}dx-800\int \frac{1}{(x-4)(x-\log (x)-4)}dx-48\int \frac{x}{x-\log (x)-4}dx+128\int \frac{1}{(x-4)^2 \log (x)}dx-32\int \frac{x}{(x-4)^2 \log (x)}dx+2\int \frac{1}{-x+\log (x)+4}dx-x^6-8x^4-16x^2-x^2 \log (x)$$

input
```
Int[(128 - 32*x + 64*x^2 - 16*x^3 + 8*x^4 - 2*x^5 + (40 - 530*x + 280*x^2
- 545*x^3 + 258*x^4 - 128*x^5 + 48*x^6 - 6*x^7)*Log[x] + (2 - 296*x + 82*x
^2 - 258*x^3 + 64*x^4 - 48*x^5 + 12*x^6)*Log[x]^2 + (-49*x + 4*x^2 - 32*x^
3 - 6*x^5)*Log[x]^3 - 2*x*Log[x]^4 + ((52 - x + 88*x^2 - 16*x^3 + 19*x^4 -
 4*x^5)*Log[x] + (20 + 24*x^2 + 5*x^4)*Log[x]^2 + Log[x]^3)*Log[Log[x]^2])
/((16 - 8*x + x^2)*Log[x] + (8 - 2*x)*Log[x]^2 + Log[x]^3),x]
```

output
```
$Aborted
```

3.1161.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1161. $\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+\left(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7\right)\log(x)+\left(2-296x+82x^2-258x^3+64x^4-48x^5+12x^6\right)\log}{\left(16-8x+x^2\right)\log(x)+(8}$

3.1161.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 114 vs. 2(31) = 62.

Time = 5.06 (sec) , antiderivative size = 115, normalized size of antiderivative = 3.71

method	result
parallelrisch	$\frac{x^6\ln(x)+8x^4\ln(x)+x^2\ln(x)^2-x\ln(x)\ln\left(\ln(x)^2\right)-x^7+4x^6-8x^5+32x^4-16x^3+64x^2-x^3\ln(x)+20x^2\ln(x)-\ln\left(\ln(x)^2\right)x^5-8}{-\ln(x)+x-4}$
risch	$-\frac{2x(x^4+8x^2+\ln(x)+16)\ln(\ln(x))}{-\ln(x)+x-4}-\frac{x\left(2i\pi\,\mathrm{csgn}(i\ln(x))\,\mathrm{csgn}\left(i\ln(x)^2\right)^2\ln(x)-16i\pi\,\mathrm{csgn}(i\ln(x))^2\,\mathrm{csgn}\left(i\ln(x)^2\right)+32i\pi\right.}{}$

input

```
int(((ln(x)^3+(5*x^4+24*x^2+20)*ln(x)^2+(-4*x^5+19*x^4-16*x^3+88*x^2-x+52)
*ln(x))*ln(ln(x)^2)-2*x*ln(x)^4+(-6*x^5-32*x^3+4*x^2-49*x)*ln(x)^3+(12*x^6
-48*x^5+64*x^4-258*x^3+82*x^2-296*x+2)*ln(x)^2+(-6*x^7+48*x^6-128*x^5+258*
x^4-545*x^3+280*x^2-530*x+40)*ln(x)-2*x^5+8*x^4-16*x^3+64*x^2-32*x+128)/(l
n(x)^3+(-2*x+8)*ln(x)^2+(x^2-8*x+16)*ln(x)),x,method=_RETURNVERBOSE)
```

output

```
(x^6*ln(x)+8*x^4*ln(x)+x^2*ln(x)^2-x*ln(x)*ln(ln(x)^2)-x^7+4*x^6-8*x^5+32*
x^4-16*x^3+64*x^2-x^3*ln(x)+20*x^2*ln(x)-ln(ln(x)^2)*x^5-8*x^3*ln(ln(x)^2)
-16*x*ln(ln(x)^2))/(-ln(x)+x-4)
```

3.1161.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. 2(30) = 60.

Time = 0.27 (sec) , antiderivative size = 94, normalized size of antiderivative = 3.03

$$\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7)\log}{}$$
$$= -\frac{x^7-4x^6+8x^5-32x^4-x^2\log(x)^2+16x^3-64x^2+(x^5+8x^3+x\log(x)+16x)\log\left(\log(x)^2\right)-(}{x-\log(x)-4}$$

input

```
integrate(((log(x)^3+(5*x^4+24*x^2+20)*log(x)^2+(-4*x^5+19*x^4-16*x^3+88*x
^2-x+52)*log(x))*log(log(x)^2)-2*x*log(x)^4+(-6*x^5-32*x^3+4*x^2-49*x)*log
(x)^3+(12*x^6-48*x^5+64*x^4-258*x^3+82*x^2-296*x+2)*log(x)^2+(-6*x^7+48*x^
6-128*x^5+258*x^4-545*x^3+280*x^2-530*x+40)*log(x)-2*x^5+8*x^4-16*x^3+64*x
^2-32*x+128)/(log(x)^3+(-2*x+8)*log(x)^2+(x^2-8*x+16)*log(x)),x, algorithm
=\
```

3.1161. $\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7)\log(x)+(2-296x+82x^2-258x^3+64x^4-48x^5+12x^6)\log}{(16-8x+x^2)\log(x)+(8}$

output
```
-(x^7 - 4*x^6 + 8*x^5 - 32*x^4 - x^2*log(x)^2 + 16*x^3 - 64*x^2 + (x^5 + 8
*x^3 + x*log(x) + 16*x)*log(log(x)^2) - (x^6 + 8*x^4 - x^3 + 20*x^2)*log(x
))/(x - log(x) - 4)
```

3.1161.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7)\,\mathrm{lo}}{}$$

= Exception raised: TypeError

input
```
integrate(((ln(x)**3+(5*x**4+24*x**2+20)*ln(x)**2+(-4*x**5+19*x**4-16*x**3
+88*x**2-x+52)*ln(x))*ln(ln(x)**2)-2*x*ln(x)**4+(-6*x**5-32*x**3+4*x**2-49
*x)*ln(x)**3+(12*x**6-48*x**5+64*x**4-258*x**3+82*x**2-296*x+2)*ln(x)**2+(
-6*x**7+48*x**6-128*x**5+258*x**4-545*x**3+280*x**2-530*x+40)*ln(x)-2*x**5
+8*x**4-16*x**3+64*x**2-32*x+128)/(ln(x)**3+(-2*x+8)*ln(x)**2+(x**2-8*x+16
)*ln(x)),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.1161.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 93 vs. $2(30) = 60$.

Time = 0.25 (sec) , antiderivative size = 93, normalized size of antiderivative = 3.00

$$\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7)\,\mathrm{lo}}{}$$

$$= -\frac{x^7-4\,x^6+8\,x^5-32\,x^4-x^2\log(x)^2+16\,x^3-64\,x^2-(x^6+8\,x^4-x^3+20\,x^2)\log(x)+2\,(x^5+8\,x^3}{x-\log(x)-4}$$

input
```
integrate(((log(x)^3+(5*x^4+24*x^2+20)*log(x)^2+(-4*x^5+19*x^4-16*x^3+88*x
^2-x+52)*log(x))*log(log(x)^2)-2*x*log(x)^4+(-6*x^5-32*x^3+4*x^2-49*x)*log
(x)^3+(12*x^6-48*x^5+64*x^4-258*x^3+82*x^2-296*x+2)*log(x)^2+(-6*x^7+48*x^
6-128*x^5+258*x^4-545*x^3+280*x^2-530*x+40)*log(x)-2*x^5+8*x^4-16*x^3+64*x
^2-32*x+128)/(log(x)^3+(-2*x+8)*log(x)^2+(x^2-8*x+16)*log(x)),x, algorithm
=\
```

3.1161.
$\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7)\log(x)+(2-296x+82x^2-258x^3+64x^4-48x^5+12x^6)\,\mathrm{lo}}{(16-8x+x^2)\log(x)+(8}$

output
```
-(x^7 - 4*x^6 + 8*x^5 - 32*x^4 - x^2*log(x)^2 + 16*x^3 - 64*x^2 - (x^6 + 8
*x^4 - x^3 + 20*x^2)*log(x) + 2*(x^5 + 8*x^3 + x*log(x) + 16*x)*log(log(x)
))/(x - log(x) - 4)
```

3.1161.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.84

$$\int \frac{128 - 32x + 64x^2 - 16x^3 + 8x^4 - 2x^5 + (40 - 530x + 280x^2 - 545x^3 + 258x^4 - 128x^5 + 48x^6 - 6x^7)\,\mathrm{lo}}{}$$

$$= -x^6 - 8\,x^4 - x^2\log(x) - 16\,x^2 + \left(x - \frac{x^5 + 8\,x^3 + x^2 + 12\,x}{x - \log(x) - 4}\right)\log\left(\log(x)^2\right)$$

input
```
integrate(((log(x)^3+(5*x^4+24*x^2+20)*log(x)^2+(-4*x^5+19*x^4-16*x^3+88*x
^2-x+52)*log(x))*log(log(x)^2)-2*x*log(x)^4+(-6*x^5-32*x^3+4*x^2-49*x)*log
(x)^3+(12*x^6-48*x^5+64*x^4-258*x^3+82*x^2-296*x+2)*log(x)^2+(-6*x^7+48*x^
6-128*x^5+258*x^4-545*x^3+280*x^2-530*x+40)*log(x)-2*x^5+8*x^4-16*x^3+64*x
^2-32*x+128)/(log(x)^3+(-2*x+8)*log(x)^2+(x^2-8*x+16)*log(x)),x, algorithm
=\
```

output
```
-x^6 - 8*x^4 - x^2*log(x) - 16*x^2 + (x - (x^5 + 8*x^3 + x^2 + 12*x)/(x -
log(x) - 4))*log(log(x)^2)
```

3.1161.9 Mupad [B] (verification not implemented)

Time = 14.70 (sec) , antiderivative size = 281, normalized size of antiderivative = 9.06

$$\int \frac{128 - 32x + 64x^2 - 16x^3 + 8x^4 - 2x^5 + (40 - 530x + 280x^2 - 545x^3 + 258x^4 - 128x^5 + 48x^6 - 6x^7)\,\mathrm{lo}}{}$$

$$= -34\ln(\ln(x)) - x^2\ln(x) - 16\,x^2 - 8\,x^4 - x^6$$

$$- \frac{\ln\left(\ln(x)^2\right)\left(\ln(x)^2\left(\frac{1}{x-1} - \frac{x}{x-1} + 1\right) - (x-4)\left(\frac{1}{x-1} - \frac{20\,x^5 - 25\,x^4 + 48\,x^3 - 72\,x^2 + x - 18}{x-1} + \frac{x-2}{x-1} - \frac{-25\,x^5 + 25\,x^4 - 7}{x-1}\right.\right.}{}$$

input
```
int(-(32*x - log(log(x)^2)*(log(x)^3 + log(x)^2*(24*x^2 + 5*x^4 + 20) - lo
g(x)*(x - 88*x^2 + 16*x^3 - 19*x^4 + 4*x^5 - 52)) + 2*x*log(x)^4 + log(x)^
3*(49*x - 4*x^2 + 32*x^3 + 6*x^5) + log(x)*(530*x - 280*x^2 + 545*x^3 - 25
8*x^4 + 128*x^5 - 48*x^6 + 6*x^7 - 40) - 64*x^2 + 16*x^3 - 8*x^4 + 2*x^5 -
 log(x)^2*(82*x^2 - 296*x - 258*x^3 + 64*x^4 - 48*x^5 + 12*x^6 + 2) - 128)
/(log(x)^3 + log(x)*(x^2 - 8*x + 16) - log(x)^2*(2*x - 8)),x)
```

output
```
- 34*log(log(x)) - x^2*log(x) - 16*x^2 - 8*x^4 - x^6 - (log(log(x)^2)*(log
(x)^2*(1/(x - 1) - x/(x - 1) + 1) - (x - 4)*(1/(x - 1) - (x - 72*x^2 + 48*
x^3 - 25*x^4 + 20*x^5 - 18)/(x - 1) + (x - 2)/(x - 1) - (72*x^2 - 72*x^3 +
 25*x^4 - 25*x^5)/(x - 1)) - log(x)*((x - 72*x^2 + 48*x^3 - 25*x^4 + 20*x^
5 - 18)/(x - 1) - 1/(x - 1) - (x - 2)/(x - 1) + (1/(x - 1) + 1)*(x - 4) +
(72*x^2 - 72*x^3 + 25*x^4 - 25*x^5)/(x - 1) + (x*(24*x^2 + 5*x^4 + 20))/(x
 - 1)) + (x*(x - 88*x^2 + 16*x^3 - 19*x^4 + 4*x^5 - 52))/(x - 1)))/(log(x)
 - x + 4)
```

3.1161.

$$\int \frac{128-32x+64x^2-16x^3+8x^4-2x^5+\left(40-530x+280x^2-545x^3+258x^4-128x^5+48x^6-6x^7\right)\log(x)+\left(2-296x+82x^2-258x^3+64x^4-48x^5+12x^6\right)\log}{(16-8x+x^2)\log(x)+(8}$$

3.1162 $\int \frac{4e^{10}-4e^x \log(5)}{\log(5)} \, dx$

3.1162.1 Optimal result

Integrand size = 18, antiderivative size = 17

$$\int \frac{4e^{10}-4e^x \log(5)}{\log(5)} \, dx = 4\left(-e^x+\frac{e^{10}x}{\log(5)}\right)$$

output
```
4*exp(10)/ln(5)*x-4*exp(x)
```

3.1162.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{4e^{10}-4e^x \log(5)}{\log(5)} \, dx = -4e^x+\frac{4e^{10}x}{\log(5)}$$

input
```
Integrate[(4*E^10 - 4*E^x*Log[5])/Log[5],x]
```

output
```
-4*E^x + (4*E^10*x)/Log[5]
```

3.1162.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4e^{10}-4e^x\log(5)}{\log(5)}dx$$
$$\Big\downarrow \text{ 27}$$
$$\frac{\int \left(4e^{10}-4e^x\log(5)\right)dx}{\log(5)}$$
$$\Big\downarrow \text{ 2009}$$
$$\frac{4e^{10}x-4e^x\log(5)}{\log(5)}$$

input
```
Int[(4*E^10 - 4*E^x*Log[5])/Log[5],x]
```

output
```
(4*E^10*x - 4*E^x*Log[5])/Log[5]
```

3.1162.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1162.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

method	result	size
norman	$\frac{4\,\mathrm{e}^{10} x}{\ln(5)} - 4\,\mathrm{e}^{x}$	15
risch	$\frac{4\,\mathrm{e}^{10} x}{\ln(5)} - 4\,\mathrm{e}^{x}$	15
parts	$\frac{4\,\mathrm{e}^{10} x}{\ln(5)} - 4\,\mathrm{e}^{x}$	15
default	$\frac{-4\,\mathrm{e}^{x} \ln(5)+4x\,\mathrm{e}^{10}}{\ln(5)}$	18
parallelrisch	$\frac{-4\,\mathrm{e}^{x} \ln(5)+4x\,\mathrm{e}^{10}}{\ln(5)}$	18
derivativedivides	$\frac{-4\,\mathrm{e}^{x} \ln(5)+4\,\mathrm{e}^{10} \ln(\mathrm{e}^{x})}{\ln(5)}$	20

input
```
int((-4*exp(x)*ln(5)+4*exp(10))/ln(5),x,method=_RETURNVERBOSE)
```

output
```
4*exp(10)/ln(5)*x-4*exp(x)
```

3.1162.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{4e^{10} - 4e^{x}\log(5)}{\log(5)}\,dx = \frac{4\left(xe^{10} - e^{x}\log\left(5\right)\right)}{\log\left(5\right)}$$

input
```
integrate((-4*exp(x)*log(5)+4*exp(10))/log(5),x, algorithm=\
```

output
```
4*(x*e^10 - e^x*log(5))/log(5)
```

3.1162.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{4e^{10} - 4e^x \log(5)}{\log(5)} \, dx = \frac{4xe^{10}}{\log(5)} - 4e^x$$

input
```
integrate((-4*exp(x)*ln(5)+4*exp(10))/ln(5),x)
```

output
```
4*x*exp(10)/log(5) - 4*exp(x)
```

3.1162.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{4e^{10} - 4e^x \log(5)}{\log(5)} \, dx = \frac{4(xe^{10} - e^x \log(5))}{\log(5)}$$

input
```
integrate((-4*exp(x)*log(5)+4*exp(10))/log(5),x, algorithm=\
```

output
```
4*(x*e^10 - e^x*log(5))/log(5)
```

3.1162.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{4e^{10} - 4e^x \log(5)}{\log(5)} \, dx = \frac{4(xe^{10} - e^x \log(5))}{\log(5)}$$

input
```
integrate((-4*exp(x)*log(5)+4*exp(10))/log(5),x, algorithm=\
```

output
```
4*(x*e^10 - e^x*log(5))/log(5)
```

3.1162.9 Mupad [B] (verification not implemented)

Time = 14.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{4e^{10} - 4e^x \log(5)}{\log(5)} \, dx = \frac{4\,x\,\mathrm{e}^{10}}{\ln(5)} - 4\,\mathrm{e}^x$$

input
```
int((4*exp(10) - 4*exp(x)*log(5))/log(5),x)
```

output
```
(4*x*exp(10))/log(5) - 4*exp(x)
```

3.1163 $\int \frac{-500x^3+500x^3\log(x)+(500x-500x^2)\log^2(x)+(-500x+750x^2)\log$

3.1163.1 Optimal result

Integrand size = 143, antiderivative size = 27

$$\int \frac{-500x^3+500x^3\log(x)+(500x-500x^2)\log^2(x)+(-500x+750x^2)\log^3(x)+128000e^{2e^{256x^2}+256x^2}x\log$$

$$=5\left(5-5\left(e^{e^{256x^2}}+x+\frac{x^2}{\log^2(x)}\right)\right)^2$$

output
```
5*(5-5*exp(exp(256*x^2))-5*x-5*x^2/ln(x)^2)^2
```

3.1163.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 62 vs. 2(27) = 54.

Time = 0.74 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.30

$$\int \frac{-500x^3+500x^3\log(x)+(500x-500x^2)\log^2(x)+(-500x+750x^2)\log^3(x)+128000e^{2e^{256x^2}+256x^2}x\log$$

$$=125\left(e^{2e^{256x^2}}+2e^{e^{256x^2}}(-1+x)+(-2+x)x+\frac{x^4}{\log^4(x)}+\frac{2x^2\left(-1+e^{e^{256x^2}}+x\right)}{\log^2(x)}\right)$$

3.1163.

$$\int \frac{-500x^3+500x^3\log(x)+(500x-500x^2)\log^2(x)+(-500x+750x^2)\log^3(x)+128000e^{2e^{256x^2}+256x^2}x\log^5(x)+(-250+250x)\log^5(x)+e^{e^{256x^2}}\left(-50\right.}{\log^5(x)}$$

input
```
Integrate[(-500*x^3 + 500*x^3*Log[x] + (500*x - 500*x^2)*Log[x]^2 + (-500*
x + 750*x^2)*Log[x]^3 + 128000*E^(2*E^(256*x^2) + 256*x^2)*x*Log[x]^5 + (-
250 + 250*x)*Log[x]^5 + E^E^(256*x^2)*(-500*x*Log[x]^2 + (500*x + 128000*E
^(256*x^2)*x^3)*Log[x]^3 + (250 + E^(256*x^2)*(-128000*x + 128000*x^2))*Lo
g[x]^5))/Log[x]^5,x]
```

output
```
125*(E^(2*E^(256*x^2)) + 2*E^E^(256*x^2)*(-1 + x) + (-2 + x)*x + x^4/Log[x
]^4 + (2*x^2*(-1 + E^E^(256*x^2) + x))/Log[x]^2)
```

3.1163.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-500x^3+500x^3\log(x)+128000e^{256x^2+2e^{256x^2}}x\log^5(x)+\left(750x^2-500x\right)\log^3(x)+\left(500x-500x^2\right)\log^2(x)+\dots}{\dots}$$

$\big\downarrow$ 7239

$$\int \frac{250\left(x^2+\left(e^{e^{256x^2}}+x-1\right)\log^2(x)\right)\left(\left(512e^{256x^2+e^{256x^2}}x+1\right)\log^3(x)-2x+2x\log(x)\right)}{\log^5(x)}dx$$

$\big\downarrow$ 27

$$250\int -\frac{\left(x^2-\left(-x-e^{e^{256x^2}}+1\right)\log^2(x)\right)\left(-\left(\left(512e^{256x^2+e^{256x^2}}x+1\right)\log^3(x)\right)-2x\log(x)+2x\right)}{\log^5(x)}dx$$

$\big\downarrow$ 25

$$-250\int \frac{\left(x^2-\left(-x-e^{e^{256x^2}}+1\right)\log^2(x)\right)\left(-\left(\left(512e^{256x^2+e^{256x^2}}x+1\right)\log^3(x)\right)-2x\log(x)+2x\right)}{\log^5(x)}dx$$

$\big\downarrow$ 7293

$$-250\int \left(-\frac{\left(\log^3(x)+2x\log(x)-2x\right)\left(x^2+\log^2(x)x+e^{e^{256x^2}}\log^2(x)-\log^2(x)\right)}{\log^5(x)}-\frac{512e^{256x^2+e^{256x^2}}x\left(x^2+\log\dots\right)}{\dots}\right)$$

$\big\downarrow$ 2009

$$-250\left(-\int e^{e^{256x^2}}dx-512\int e^{256x^2+e^{256x^2}}x^2dx+2\int \frac{e^{e^{256x^2}}x}{\log^3(x)}dx-2\int \frac{e^{e^{256x^2}}x}{\log^2(x)}dx-512\int \frac{e^{256x^2+e^{256x^2}}x^3}{\log^2(x)}dx-\right.$$

input
```
Int[(-500*x^3 + 500*x^3*Log[x] + (500*x - 500*x^2)*Log[x]^2 + (-500*x + 75
0*x^2)*Log[x]^3 + 128000*E^(2*E^(256*x^2) + 256*x^2)*x*Log[x]^5 + (-250 +
250*x)*Log[x]^5 + E^E^(256*x^2)*(-500*x*Log[x]^2 + (500*x + 128000*E^(256*
x^2)*x^3)*Log[x]^3 + (250 + E^(256*x^2)*(-128000*x + 128000*x^2))*Log[x]^5
))/Log[x]^5,x]
```

output
```
$Aborted
```

3.1163.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1163.

$$\int \frac{-500x^3+500x^3\log(x)+(500x-500x^2)\log^2(x)+(-500x+750x^2)\log^3(x)+128000e^{2e^{256x^2}+256x^2}x\log^5(x)+(-250+250x)\log^5(x)+e^{e^{256x^2}}\left(-50\right.}{\log^5(x)}$$

3.1163.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 75 vs. $2(27) = 54$.

Time = 1.90 (sec) , antiderivative size = 76, normalized size of antiderivative = 2.81

method	result
risch	$125x^2 - 250x + \frac{125x^2\left(2x\ln(x)^2+x^2-2\ln(x)^2\right)}{\ln(x)^4} + 125\,\mathrm{e}^{2\,\mathrm{e}^{256x^2}} + \frac{250\left(x\ln(x)^2+x^2-\ln(x)^2\right)\mathrm{e}^{\mathrm{e}^{256x^2}}}{\ln(x)^2}$
parallelrisch	$-\frac{-125x^2\ln(x)^4-250\ln(x)^4\mathrm{e}^{\mathrm{e}^{256x^2}}x-125\,\mathrm{e}^{2\,\mathrm{e}^{256x^2}}\ln(x)^4-250x^3\ln(x)^2-250\ln(x)^2\mathrm{e}^{\mathrm{e}^{256x^2}}x^2+250x\ln(x)^4+250\ln(x)^4\mathrm{e}^{\mathrm{e}^{25}}}{\ln(x)^4}$

input
```
int((128000*x*exp(256*x^2)*ln(x)^5*exp(exp(256*x^2))^2+(((128000*x^2-12800
0*x)*exp(256*x^2)+250)*ln(x)^5+(128000*x^3*exp(256*x^2)+500*x)*ln(x)^3-500
*x*ln(x)^2)*exp(exp(256*x^2))+(250*x-250)*ln(x)^5+(750*x^2-500*x)*ln(x)^3+
(-500*x^2+500*x)*ln(x)^2+500*x^3*ln(x)-500*x^3)/ln(x)^5,x,method=_RETURNVE
RBOSE)
```

output
```
125*x^2-250*x+125*x^2*(2*x*ln(x)^2+x^2-2*ln(x)^2)/ln(x)^4+125*exp(2*exp(25
6*x^2))+250*(x*ln(x)^2+x^2-ln(x)^2)/ln(x)^2*exp(exp(256*x^2))
```

3.1163.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 77 vs. $2(22) = 44$.

Time = 0.30 (sec) , antiderivative size = 77, normalized size of antiderivative = 2.85

$$\int \frac{-500x^3 + 500x^3\log(x) + (500x - 500x^2)\log^2(x) + (-500x + 750x^2)\log^3(x) + 128000e^{2e^{256x^2}+256x^2}x\log}{}$$

$$= \frac{125\left((x^2 - 2x)\log(x)^4 + e^{\left(2e^{(256x^2)}\right)}\log(x)^4 + x^4 + 2(x^3 - x^2)\log(x)^2 + 2\left((x-1)\log(x)^4 + x^2\log(x\right.\right.}{\log(x)^4}$$

input
```
integrate((128000*x*exp(256*x^2)*log(x)^5*exp(exp(256*x^2))^2+(((128000*x^
2-128000*x)*exp(256*x^2)+250)*log(x)^5+(128000*x^3*exp(256*x^2)+500*x)*log
(x)^3-500*x*log(x)^2)*exp(exp(256*x^2))+(250*x-250)*log(x)^5+(750*x^2-500*
x)*log(x)^3+(-500*x^2+500*x)*log(x)^2+500*x^3*log(x)-500*x^3)/log(x)^5,x,
algorithm=\
```

output
```
125*((x^2 - 2*x)*log(x)^4 + e^(2*e^(256*x^2))*log(x)^4 + x^4 + 2*(x^3 - x^
2)*log(x)^2 + 2*((x - 1)*log(x)^4 + x^2*log(x)^2)*e^(e^(256*x^2)))/log(x)^
4
```

3.1163.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 83 vs. $2(27) = 54$.

Time = 0.20 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.07

$$\int \frac{-500x^3 + 500x^3\log(x) + (500x - 500x^2)\log^2(x) + (-500x + 750x^2)\log^3(x) + 128000e^{2e^{256x^2}+256x^2}x\log^5}{}$$

$$= 125x^2 - 250x + \frac{125x^4 + (250x^3 - 250x^2)\log(x)^2}{\log(x)^4} + \frac{(250x^2 + 250x\log(x)^2 - 250\log(x)^2)\,e^{e^{256x^2}} + 125e^{2e^{256x^2}}\log(x)^2}{\log(x)^2}$$

input
```
integrate((128000*x*exp(256*x**2)*ln(x)**5*exp(exp(256*x**2))**2+(((128000
*x**2-128000*x)*exp(256*x**2)+250)*ln(x)**5+(128000*x**3*exp(256*x**2)+500
*x)*ln(x)**3-500*x*ln(x)**2)*exp(exp(256*x**2))+(250*x-250)*ln(x)**5+(750*
x**2-500*x)*ln(x)**3+(-500*x**2+500*x)*ln(x)**2+500*x**3*ln(x)-500*x**3)/l
n(x)**5,x)
```

output
```
125*x**2 - 250*x + (125*x**4 + (250*x**3 - 250*x**2)*log(x)**2)/log(x)**4
+ ((250*x**2 + 250*x*log(x)**2 - 250*log(x)**2)*exp(exp(256*x**2)) + 125*e
xp(2*exp(256*x**2))*log(x)**2)/log(x)**2
```

3.1163.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. $2(22) = 44$.

Time = 0.23 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.74

$$\int \frac{-500x^3 + 500x^3\log(x) + (500x - 500x^2)\log^2(x) + (-500x + 750x^2)\log^3(x) + 128000e^{2e^{256x^2}+256x^2}x\log^5}{}$$

$$= 125\,x^2 - 250\,x + \frac{125\left(e^{\left(2\,e^{\left(256\,x^2\right)}\right)}\log(x)^4 + x^4 + 2\,(x^3 - x^2)\log(x)^2 + 2\,\left((x-1)\log(x)^4 + x^2\log(x)^2\right)e^{\left(e^{\left(256\,x^2\right)}\right)}\right)}{\log(x)^4}$$

input
```
integrate((128000*x*exp(256*x^2)*log(x)^5*exp(exp(256*x^2))^2+(((128000*x^
2-128000*x)*exp(256*x^2)+250)*log(x)^5+(128000*x^3*exp(256*x^2)+500*x)*log
(x)^3-500*x*log(x)^2)*exp(exp(256*x^2))+(250*x-250)*log(x)^5+(750*x^2-500*
x)*log(x)^3+(-500*x^2+500*x)*log(x)^2+500*x^3*log(x)-500*x^3)/log(x)^5,x,
algorithm=\
```

output
```
125*x^2 - 250*x + 125*(e^(2*e^(256*x^2))*log(x)^4 + x^4 + 2*(x^3 - x^2)*lo
g(x)^2 + 2*((x - 1)*log(x)^4 + x^2*log(x)^2)*e^(e^(256*x^2)))/log(x)^4
```

3.1163.8 Giac [F]

$$\int \frac{-500x^3 + 500x^3\log(x) + (500x - 500x^2)\log^2(x) + (-500x + 750x^2)\log^3(x) + 128000e^{2e^{256x^2}+256x^2}x\log^5$$

$$= \int \frac{250\left(512\,xe^{\left(256\,x^2+2\,e^{\left(256\,x^2\right)}\right)}\log\left(x\right)^5 + (x-1)\log\left(x\right)^5 + 2\,x^3\log\left(x\right) + (3\,x^2-2\,x)\log\left(x\right)^3 - 2\,x^3 - 2$$

input
```
integrate((128000*x*exp(256*x^2)*log(x)^5*exp(exp(256*x^2))^2+(((128000*x^
2-128000*x)*exp(256*x^2)+250)*log(x)^5+(128000*x^3*exp(256*x^2)+500*x)*log
(x)^3-500*x*log(x)^2)*exp(exp(256*x^2))+(250*x-250)*log(x)^5+(750*x^2-500*
x)*log(x)^3+(-500*x^2+500*x)*log(x)^2+500*x^3*log(x)-500*x^3)/log(x)^5,x,
algorithm=\
```

output
```
integrate(250*(512*x*e^(256*x^2 + 2*e^(256*x^2))*log(x)^5 + (x - 1)*log(x)
^5 + 2*x^3*log(x) + (3*x^2 - 2*x)*log(x)^3 - 2*x^3 - 2*(x^2 - x)*log(x)^2
+ ((512*(x^2 - x)*e^(256*x^2) + 1)*log(x)^5 + 2*(256*x^3*e^(256*x^2) + x)*
log(x)^3 - 2*x*log(x)^2)*e^(e^(256*x^2)))/log(x)^5, x)
```

3.1163.9 Mupad [B] (verification not implemented)

Time = 14.79 (sec) , antiderivative size = 82, normalized size of antiderivative = 3.04

$$\int \frac{-500x^3 + 500x^3 \log(x) + (500x - 500x^2) \log^2(x) + (-500x + 750x^2) \log^3(x) + 128000e^{2e^{256x^2}+256x^2} x \log^5}{}$$

$$= 125\,\mathrm{e}^{2\,\mathrm{e}^{256\,x^2}} - 250\,\mathrm{e}^{\mathrm{e}^{256\,x^2}} - 250\,x - \frac{250\,x^2}{\ln(x)^2} + \frac{250\,x^3}{\ln(x)^2} + \frac{125\,x^4}{\ln(x)^4} + 125\,x^2 + 250\,x\,\mathrm{e}^{\mathrm{e}^{256\,x^2}} + \frac{250\,x^2\,\mathrm{e}^{\mathrm{e}^{256\,x^2}}}{\ln(x)^2}$$

input
```
int((log(x)^2*(500*x - 500*x^2) - log(x)^3*(500*x - 750*x^2) + 500*x^3*log
(x) - 500*x^3 + log(x)^5*(250*x - 250) - exp(exp(256*x^2))*(500*x*log(x)^2
 + log(x)^5*(exp(256*x^2)*(128000*x - 128000*x^2) - 250) - log(x)^3*(500*x
 + 128000*x^3*exp(256*x^2))) + 128000*x*exp(2*exp(256*x^2))*exp(256*x^2)*l
og(x)^5)/log(x)^5,x)
```

output
```
125*exp(2*exp(256*x^2)) - 250*exp(exp(256*x^2)) - 250*x - (250*x^2)/log(x)
^2 + (250*x^3)/log(x)^2 + (125*x^4)/log(x)^4 + 125*x^2 + 250*x*exp(exp(256
*x^2)) + (250*x^2*exp(exp(256*x^2)))/log(x)^2
```

3.1164 $\int (8x - 4x^3 - \log(x)) \, dx$

3.1164.1 Optimal result

Integrand size = 13, antiderivative size = 19

$$\int (8x - 4x^3 - \log(x)) \, dx = -9 + x - (2 - x^2)^2 - x \log(x)$$

output
```
x-9-(-x^2+2)^2-x*ln(x)
```

3.1164.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int (8x - 4x^3 - \log(x)) \, dx = x + 4x^2 - x^4 - x \log(x)$$

input
```
Integrate[8*x - 4*x^3 - Log[x],x]
```

output
```
x + 4*x^2 - x^4 - x*Log[x]
```

3.1164.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-4x^3+8x-\log(x)\right) \, dx$$

$$\Big\downarrow \text{ 2009}$$

$$-x^4+4x^2+x-x\log(x)$$

input
```
Int[8*x - 4*x^3 - Log[x],x]
```

output
```
x + 4*x^2 - x^4 - x*Log[x]
```

3.1164.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1164.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

method	result	size
default	$-x^{4}+4x^{2}+x-x\ln\left(x\right)$	18
norman	$-x^{4}+4x^{2}+x-x\ln\left(x\right)$	18
risch	$-x^{4}+4x^{2}+x-x\ln\left(x\right)$	18
parallelrisch	$-x^{4}+4x^{2}+x-x\ln\left(x\right)$	18
parts	$-x^{4}+4x^{2}+x-x\ln\left(x\right)$	18

input
```
int(-ln(x)-4*x^3+8*x,x,method=_RETURNVERBOSE)
```

output
```
-x^4+4*x^2+x-x*ln(x)
```

3.1164.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \left(8x - 4x^3 - \log(x)\right) \, dx = -x^4 + 4\,x^2 - x\log\left(x\right) + x$$

input
```
integrate(-log(x)-4*x^3+8*x,x, algorithm=\
```

output
```
-x^4 + 4*x^2 - x*log(x) + x
```

3.1164.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int \left(8x - 4x^3 - \log(x)\right) \, dx = -x^4 + 4x^2 - x\log\left(x\right) + x$$

input
```
integrate(-ln(x)-4*x**3+8*x,x)
```

output
```
-x**4 + 4*x**2 - x*log(x) + x
```

3.1164.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \left(8x - 4x^3 - \log(x)\right) \, dx = -x^4 + 4\,x^2 - x\log\left(x\right) + x$$

input
```
integrate(-log(x)-4*x^3+8*x,x, algorithm=\
```

output
```
-x^4 + 4*x^2 - x*log(x) + x
```

3.1164.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.89

$$\int \left(8x-4x^3-\log(x)\right)\,dx=-x^4+4\,x^2-x\log\left(x\right)+x$$

input
```
integrate(-log(x)-4*x^3+8*x,x, algorithm=\
```

output
```
-x^4 + 4*x^2 - x*log(x) + x
```

3.1164.9 Mupad [B] (verification not implemented)

Time = 14.13 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

$$\int \left(8x-4x^3-\log(x)\right)\,dx=x\left(4\,x-\ln\left(x\right)-x^3+1\right)$$

input
```
int(8*x - log(x) - 4*x^3,x)
```

output
```
x*(4*x - log(x) - x^3 + 1)
```

3.1165 $\int \frac{e^6(-42-64x-36x^2-8x^3)}{-125-75x+60x^2+29x^3-12x^4-3x^5+x^6+e^6(-45-69x-23x^2+8x^3}$

3.1165.1 Optimal result

Integrand size = 73, antiderivative size = 29

$$\int \frac{e^6(-42-64x-36x^2-8x^3)}{-125-75x+60x^2+29x^3-12x^4-3x^5+x^6+e^6(-45-69x-23x^2+8x^3+4x^4)}\,dx = \log\left(1+\frac{e^6(-3-2x)^2}{x^2\left(x-\frac{5+x}{x}\right)^2}\right)$$

output
```
ln(1+1/x^2/(x-1/x*(5+x))^2*exp(3)^2*(-2*x-3)^2)
```

3.1165.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 83 vs. 2(29) = 58.

Time = 0.07 (sec) , antiderivative size = 83, normalized size of antiderivative = 2.86

$$\int \frac{e^6(-42-64x-36x^2-8x^3)}{-125-75x+60x^2+29x^3-12x^4-3x^5+x^6+e^6(-45-69x-23x^2+8x^3+4x^4)}\,dx = -2e^6\left(\frac{\log(5+8(3+2x)-(3+2x)^2)}{e^6} - \frac{\log(25+80(3+2x)+54(3+2x)^2+16e^6(3+2x)^2-16(3+2x)^3+(3+2x)^4)}{2e^6}\right)$$

input
```
Integrate[(E^6*(-42 - 64*x - 36*x^2 - 8*x^3))/(-125 - 75*x + 60*x^2 + 29*x
^3 - 12*x^4 - 3*x^5 + x^6 + E^6*(-45 - 69*x - 23*x^2 + 8*x^3 + 4*x^4)),x]
```

output
```
-2*E^6*(Log[5 + 8*(3 + 2*x) - (3 + 2*x)^2]/E^6 - Log[25 + 80*(3 + 2*x) + 5
4*(3 + 2*x)^2 + 16*E^6*(3 + 2*x)^2 - 16*(3 + 2*x)^3 + (3 + 2*x)^4]/(2*E^6)
)
```

3.1165.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 65 vs. $2(29) = 58$.

Time = 0.35 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.24, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.055$, Rules used = {27, 27, 2462, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^6(-8x^3-36x^2-64x-42)}{x^6-3x^5-12x^4+29x^3+60x^2+e^6(4x^4+8x^3-23x^2-69x-45)-75x-125}dx$$

$$\Big\downarrow \text{27}$$

$$e^6\int \frac{2(4x^3+18x^2+32x+21)}{-x^6+3x^5+12x^4-29x^3-60x^2+75x+e^6(-4x^4-8x^3+23x^2+69x+45)+125}dx$$

$$\Big\downarrow \text{27}$$

$$2e^6\int \frac{4x^3+18x^2+32x+21}{-x^6+3x^5+12x^4-29x^3-60x^2+75x+e^6(-4x^4-8x^3+23x^2+69x+45)+125}dx$$

$$\Big\downarrow \text{2462}$$

$$2e^6\int \left(\frac{1-2x}{e^6(x^2-x-5)}+\frac{2x^3-3x^2-(9-4e^6)x+6e^6+5}{e^6(x^4-2x^3-(9-4e^6)x^2+2(5+6e^6)x+9e^6+25)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2e^6\left(\frac{\log(x^4-2x^3-(9-4e^6)x^2+2(5+6e^6)x+9e^6+25)}{2e^6}-\frac{\log(-x^2+x+5)}{e^6}\right)$$

input
```
Int[(E^6*(-42 - 64*x - 36*x^2 - 8*x^3))/(-125 - 75*x + 60*x^2 + 29*x^3 - 1
2*x^4 - 3*x^5 + x^6 + E^6*(-45 - 69*x - 23*x^2 + 8*x^3 + 4*x^4)),x]
```

output
```
2*E^6*(-(Log[5 + x - x^2]/E^6) + Log[25 + 9*E^6 + 2*(5 + 6*E^6)*x - (9 - 4
*E^6)*x^2 - 2*x^3 + x^4]/(2*E^6))
```

3.1165.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2462
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u*Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && GtQ
[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p, 0
] && RationalFunctionQ[u, x]
```

3.1165.4 Maple [A] (verified)

Time = 0.41 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.66

method	result	size
risch	$-2\ln\left(x^{2}-x-5\right)+\ln\left(-x^{4}+2x^{3}+\left(-4\,\mathrm{e}^{6}+9\right)x^{2}+\left(-12\,\mathrm{e}^{6}-10\right)x-9\,\mathrm{e}^{6}-25\right)$	48
norman	$-2\ln\left(x^{2}-x-5\right)+\ln\left(x^{4}+4x^{2}\mathrm{e}^{6}-2x^{3}+12x\,\mathrm{e}^{6}-9x^{2}+9\,\mathrm{e}^{6}+10x+25\right)$	54
parallelrisch	$-2\ln\left(x^{2}-x-5\right)+\ln\left(x^{4}+4x^{2}\mathrm{e}^{6}-2x^{3}+12x\,\mathrm{e}^{6}-9x^{2}+9\,\mathrm{e}^{6}+10x+25\right)$	54
default	$2\,\mathrm{e}^{6}\left(-\mathrm{e}^{-6}\ln\left(x^{2}-x-5\right)+\frac{\mathrm{e}^{-6}\ln\left(x^{4}+4x^{2}\mathrm{e}^{6}-2x^{3}+12x\,\mathrm{e}^{6}-9x^{2}+9\,\mathrm{e}^{6}+10x+25\right)}{2}\right)$	64

input
```
int((-8*x^3-36*x^2-64*x-42)*exp(3)^2/((4*x^4+8*x^3-23*x^2-69*x-45)*exp(3)^
2+x^6-3*x^5-12*x^4+29*x^3+60*x^2-75*x-125),x,method=_RETURNVERBOSE)
```

output
```
-2*ln(x^2-x-5)+ln(-x^4+2*x^3+(-4*exp(6)+9)*x^2+(-12*exp(6)-10)*x-9*exp(6)-
25)
```

3.1165.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.52

$$\int \frac{e^6(-42-64x-36x^2-8x^3)}{-125-75x+60x^2+29x^3-12x^4-3x^5+x^6+e^6(-45-69x-23x^2+8x^3+4x^4)}\,dx = \log\left(x^4-2\,x^3-9\,x^2+\left(4\,x^2+12\,x+9\right)e^6+10\,x+25\right)-2\,\log\left(x^2-x-5\right)$$

input
```
integrate((-8*x^3-36*x^2-64*x-42)*exp(3)^2/((4*x^4+8*x^3-23*x^2-69*x-45)*e
xp(3)^2+x^6-3*x^5-12*x^4+29*x^3+60*x^2-75*x-125),x, algorithm=\
```

output
```
log(x^4 - 2*x^3 - 9*x^2 + (4*x^2 + 12*x + 9)*e^6 + 10*x + 25) - 2*log(x^2
- x - 5)
```

3.1165.6 Sympy [A] (verification not implemented)

Time = 1.93 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.52

$$\int \frac{e^6(-42-64x-36x^2-8x^3)}{-125-75x+60x^2+29x^3-12x^4-3x^5+x^6+e^6(-45-69x-23x^2+8x^3+4x^4)}\,dx = -2\log\left(x^2-x-5\right)+\log\left(x^4-2x^3+x^2\left(-9+4e^6\right)+x\left(10+12e^6\right)+25+9e^6\right)$$

input
```
integrate((-8*x**3-36*x**2-64*x-42)*exp(3)**2/((4*x**4+8*x**3-23*x**2-69*x
-45)*exp(3)**2+x**6-3*x**5-12*x**4+29*x**3+60*x**2-75*x-125),x)
```

output
```
-2*log(x**2 - x - 5) + log(x**4 - 2*x**3 + x**2*(-9 + 4*exp(6)) + x*(10 +
12*exp(6)) + 25 + 9*exp(6))
```

3.1165.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.86

$$\int \frac{e^6(-42-64x-36x^2-8x^3)}{-125-75x+60x^2+29x^3-12x^4-3x^5+x^6+e^6(-45-69x-23x^2+8x^3+4x^4)}\,dx = \left(e^{(-6)}\log\left(x^4-2\,x^3+x^2\left(4\,e^6-9\right)+2\,x\left(6\,e^6+5\right)+9\,e^6+25\right)-2\,e^{(-6)}\log\left(x^2-x-5\right)\right)e^6$$

input
```
integrate((-8*x^3-36*x^2-64*x-42)*exp(3)^2/((4*x^4+8*x^3-23*x^2-69*x-45)*e
xp(3)^2+x^6-3*x^5-12*x^4+29*x^3+60*x^2-75*x-125),x, algorithm=\
```

output
```
(e^(-6)*log(x^4 - 2*x^3 + x^2*(4*e^6 - 9) + 2*x*(6*e^6 + 5) + 9*e^6 + 25)
- 2*e^(-6)*log(x^2 - x - 5))*e^6
```

3.1165.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.93

$$\int \frac{e^6(-42-64x-36x^2-8x^3)}{-125-75x+60x^2+29x^3-12x^4-3x^5+x^6+e^6(-45-69x-23x^2+8x^3+4x^4)}\,dx$$
$$=\left(e^{(-6)}\log\left(x^4-2x^3+4x^2e^6-9x^2+12xe^6+10x+9e^6+25\right)-2e^{(-6)}\log\left(\left|x^2-x-5\right|\right)\right)e^6$$

input
```
integrate((-8*x^3-36*x^2-64*x-42)*exp(3)^2/((4*x^4+8*x^3-23*x^2-69*x-45)*e
xp(3)^2+x^6-3*x^5-12*x^4+29*x^3+60*x^2-75*x-125),x, algorithm=\
```

output
```
(e^(-6)*log(x^4 - 2*x^3 + 4*x^2*e^6 - 9*x^2 + 12*x*e^6 + 10*x + 9*e^6 + 25
) - 2*e^(-6)*log(abs(x^2 - x - 5)))*e^6
```

3.1165.9 Mupad [B] (verification not implemented)

Time = 14.42 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.62

$$\int \frac{e^6(-42-64x-36x^2-8x^3)}{-125-75x+60x^2+29x^3-12x^4-3x^5+x^6+e^6(-45-69x-23x^2+8x^3+4x^4)}\,dx$$
$$=\ln\left(10x+9e^6+12xe^6+4x^2e^6-9x^2-2x^3+x^4+25\right)-2\ln\left(x^2-x-5\right)$$

input
```
int((exp(6)*(64*x + 36*x^2 + 8*x^3 + 42))/(75*x + exp(6)*(69*x + 23*x^2 -
8*x^3 - 4*x^4 + 45) - 60*x^2 - 29*x^3 + 12*x^4 + 3*x^5 - x^6 + 125),x)
```

output
```
log(10*x + 9*exp(6) + 12*x*exp(6) + 4*x^2*exp(6) - 9*x^2 - 2*x^3 + x^4 + 2
5) - 2*log(x^2 - x - 5)
```

3.1166 $\int \frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+(-25x+\cdots}{-50x+50x^2+50\cdots}$

3.1166.1 Optimal result

Integrand size = 148, antiderivative size = 24

$$\int \frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+\left(-25x+25x^2+25x^3\log(3)+(-5+10\cdots\right.}{-50x+50x^2+50x^3\log(3)+(-10+20x+20x^2\log(\cdots}$$
$$=\frac{1}{2}x\log\left(1+x\log(3)-\frac{1}{x+\frac{\log(625)}{5}}\right)$$

output
```
1/2*ln(x*ln(3)+1-1/(4/5*ln(5)+x))*x
```

3.1166.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.50

$$\int \frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+\left(-25x+25x^2+25x^3\log(3)+(-5+10\cdots\right.}{-50x+50x^2+50x^3\log(3)+(-10+20x+20x^2\log(\cdots}$$
$$=\frac{1}{2}x\log\left(\frac{-5+5x+5x^2\log(3)+(1+x\log(3))\log(625)}{5x+\log(625)}\right)$$

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$$\int \frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+\left(-25x+25x^2+25x^3\log(3)+\left(-5+10x+10x^2\log(3)\right)\log(625)+(1+x\log(3))\log^2(625)\cdots\right.}{-50x+50x^2+50x^3\log(3)+\left(-10+20x+20x^2\log(3)\right)\log(625)+(2+2x\log(3))\log^2(625)\cdots}$$

input
```
Integrate[(25*x + 25*x^3*Log[3] + 10*x^2*Log[3]*Log[625] + x*Log[3]*Log[62
5]^2 + (-25*x + 25*x^2 + 25*x^3*Log[3] + (-5 + 10*x + 10*x^2*Log[3])*Log[6
25] + (1 + x*Log[3])*Log[625]^2)*Log[(-5 + 5*x + 5*x^2*Log[3] + (1 + x*Log
[3])*Log[625])/(5*x + Log[625])])/(-50*x + 50*x^2 + 50*x^3*Log[3] + (-10 +
 20*x + 20*x^2*Log[3])*Log[625] + (2 + 2*x*Log[3])*Log[625]^2),x]
```

output
```
(x*Log[(-5 + 5*x + 5*x^2*Log[3] + (1 + x*Log[3])*Log[625])/(5*x + Log[625]
)])/2
```

3.1166.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 506 vs. $2(24) = 48$.

Time = 3.36 (sec) , antiderivative size = 506, normalized size of antiderivative = 21.08, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.020$, Rules used = {6, 2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{25x^3\log(3)+10x^2\log(3)\log(625)+\left(25x^3\log(3)+25x^2+\log(625)\left(10x^2\log(3)+10x-5\right)-25x+\log^2(625)\right.}{50x^3\log(3)+50x^2+\log(625)\left(20x^2\log(3)+20x-10\right)-5}$$

$$\Big\downarrow 6$$

$$\int \frac{25x^3\log(3)+10x^2\log(3)\log(625)+\left(25x^3\log(3)+25x^2+\log(625)\left(10x^2\log(3)+10x-5\right)-25x+\log^2(625)\right.}{50x^3\log(3)+50x^2+\log(625)\left(20x^2\log(3)+20x-10\right)-5}$$

$$\Big\downarrow 2463$$

$$\int \left(\frac{(x(-\log(3))-1)\left(25x^3\log(3)+10x^2\log(3)\log(625)+\left(25x^3\log(3)+25x^2+\log(625)\left(10x^2\log(3)+10x-\right.\right.\right.}{10\left(-5x^2\log(3)-x(5+\log(3)\right.}\right.$$

$$\Big\downarrow 2009$$

$$\int \frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+\left(-25x+25x^2+25x^3\log(3)+\left(-5+10x+10x^2\log(3)\right)\log(625)+(1+x\log(3))\log^2(625)\right.}{-50x+50x^2+50x^3\log(3)+\left(-10+20x+20x^2\log(3)\right)\log(625)+(2+2x\log(3))\log^2(625)}$$

$$\frac{\log(625)\sqrt{25+\log^2(3)\log^2(625)+10\log(3)(10-\log(625))}\,\mathrm{arctanh}\left(\frac{10x\log(3)+5+\log(3)\log(625)}{\sqrt{25+\log^2(3)\log^2(625)+10\log(3)(10-\log(625))}}\right)}{50\log(3)}+$$
$$\frac{(5-4\log(5))\sqrt{25+\log^2(3)\log^2(625)+10\log(3)(10-\log(625))}\,\mathrm{arctanh}\left(\frac{10x\log(3)+5+\log(3)\log(625)}{\sqrt{25+\log^2(3)\log^2(625)+10\log(3)(10-\log(625))}}\right)}{50\log(3)}$$
$$\frac{\sqrt{25+\log^2(3)\log^2(625)+10\log(3)(10-\log(625))}\,\mathrm{arctanh}\left(\frac{10x\log(3)+5+\log(3)\log(625)}{\sqrt{25+\log^2(3)\log^2(625)+10\log(3)(10-\log(625))}}\right)}{10\log(3)}+$$
$$\frac{1}{10}x\log(625)\log\left(-\frac{-5x^2\log(3)-x(5+\log(3)\log(625))+5-\log(625)}{5x+\log(625)}\right)+\frac{1}{10}x(5-$$
$$\log(625))\log\left(-\frac{-5x^2\log(3)-x(5+\log(3)\log(625))+5-\log(625)}{5x+\log(625)}\right)+$$
$$\frac{\log(625)(5+\log(3)\log(625))\log\left(-5x^2\log(3)-x(5+\log(3)\log(625))+5-\log(625)\right)}{100\log(3)}+$$
$$\frac{(5-4\log(5))(5+\log(3)\log(625))\log\left(-5x^2\log(3)-x(5+\log(3)\log(625))+5-\log(625)\right)}{100\log(3)}-$$
$$\frac{(5+\log(3)\log(625))\log\left(-5x^2\log(3)-x(5+\log(3)\log(625))+5-\log(625)\right)}{20\log(3)}+\frac{x}{2}-$$
$$\frac{1}{50}\log^2(625)\log(5x+\log(625))-\frac{1}{10}x\log(625)-\frac{1}{10}x(5-\log(625))-\frac{1}{50}(5-$$
$$4\log(5))\log(625)\log(5x+\log(625))+\frac{1}{10}\log(625)\log(5x+\log(625))$$

input
```
Int[(25*x + 25*x^3*Log[3] + 10*x^2*Log[3]*Log[625] + x*Log[3]*Log[625]^2 +
 (-25*x + 25*x^2 + 25*x^3*Log[3] + (-5 + 10*x + 10*x^2*Log[3])*Log[625] +
(1 + x*Log[3])*Log[625]^2)*Log[(-5 + 5*x + 5*x^2*Log[3] + (1 + x*Log[3])*L
og[625])/(5*x + Log[625])])/(-50*x + 50*x^2 + 50*x^3*Log[3] + (-10 + 20*x
+ 20*x^2*Log[3])*Log[625] + (2 + 2*x*Log[3])*Log[625]^2),x]
```

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$$\int\frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+(-25x+25x^2+25x^3\log(3)+(-5+10x+10x^2\log(3))\log(625)+(1+x\log(3))\log^2(625)}{-50x+50x^2+50x^3\log(3)+(-10+20x+20x^2\log(3))\log(625)+(2+2x\log(3))\log^2(625)}$$

output
```
x/2 - (x*(5 - Log[625]))/10 - (x*Log[625])/10 - (ArcTanh[(5 + 10*x*Log[3]
+ Log[3]*Log[625])/Sqrt[25 + 10*Log[3]*(10 - Log[625]) + Log[3]^2*Log[625]
^2]]*Sqrt[25 + 10*Log[3]*(10 - Log[625]) + Log[3]^2*Log[625]^2])/(10*Log[3
]) + (ArcTanh[(5 + 10*x*Log[3] + Log[3]*Log[625])/Sqrt[25 + 10*Log[3]*(10
- Log[625]) + Log[3]^2*Log[625]^2]]*(5 - 4*Log[5])*Sqrt[25 + 10*Log[3]*(10
 - Log[625]) + Log[3]^2*Log[625]^2])/(50*Log[3]) + (ArcTanh[(5 + 10*x*Log[
3] + Log[3]*Log[625])/Sqrt[25 + 10*Log[3]*(10 - Log[625]) + Log[3]^2*Log[6
25]^2]]*Log[625]*Sqrt[25 + 10*Log[3]*(10 - Log[625]) + Log[3]^2*Log[625]^2
])/(50*Log[3]) + (Log[625]*Log[5*x + Log[625]])/10 - ((5 - 4*Log[5])*Log[6
25]*Log[5*x + Log[625]])/50 - (Log[625]^2*Log[5*x + Log[625]])/50 - ((5 +
Log[3]*Log[625])*Log[5 - 5*x^2*Log[3] - Log[625] - x*(5 + Log[3]*Log[625])
])/(20*Log[3]) + ((5 - 4*Log[5])*(5 + Log[3]*Log[625])*Log[5 - 5*x^2*Log[3
] - Log[625] - x*(5 + Log[3]*Log[625])])/(100*Log[3]) + (Log[625]*(5 + Log
[3]*Log[625])*Log[5 - 5*x^2*Log[3] - Log[625] - x*(5 + Log[3]*Log[625])])/
(100*Log[3]) + (x*(5 - Log[625])*Log[-((5 - 5*x^2*Log[3] - Log[625] - x*(5
 + Log[3]*Log[625]))/(5*x + Log[625]))])/10 + (x*Log[625]*Log[-((5 - 5*x^2
*Log[3] - Log[625] - x*(5 + Log[3]*Log[625]))/(5*x + Log[625]))])/10
```

3.1166.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.1166.

$$\int \frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+\left(-25x+25x^2+25x^3\log(3)+\left(-5+10x+10x^2\log(3)\right)\log(625)+(1+x\log(3))\log^2(625)\right)}{-50x+50x^2+50x^3\log(3)+\left(-10+20x+20x^2\log(3)\right)\log(625)+(2+2x\log(3))\log^2(625)}$$

3.1166.4 Maple [A] (verified)

Time = 2.12 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.58

method	result
norman	$\frac{x \ln\left(\frac{4(x\ln(3)+1)\ln(5)+5x^2\ln(3)+5x-5}{4\ln(5)+5x}\right)}{2}$
risch	$\frac{x \ln\left(\frac{4(x\ln(3)+1)\ln(5)+5x^2\ln(3)+5x-5}{4\ln(5)+5x}\right)}{2}$
default	$\frac{\ln\left(\frac{4x\ln(3)\ln(5)+5x^2\ln(3)+4\ln(5)+5x-5}{4\ln(5)+5x}\right)x}{2}$
parts	$\frac{\ln\left(\frac{4x\ln(3)\ln(5)+5x^2\ln(3)+4\ln(5)+5x-5}{4\ln(5)+5x}\right)x}{2}$
parallelrisch	$\frac{160000\ln(3)^2\ln(5)^4 x\ln\left(\frac{4x\ln(3)\ln(5)+5x^2\ln(3)+4\ln(5)+5x-5}{4\ln(5)+5x}\right)-400000\ln(3)^2\ln(5)^3 x\ln\left(\frac{4x\ln(3)\ln(5)+5x^2\ln(3)+4\ln(5)+5x-5}{4\ln(5)+5x}\right.}{20000\ln(3)^2(4\ln(5)-5)^2\ln(5)^2}$

input
```
int(((16*(x*ln(3)+1)*ln(5)^2+4*(10*x^2*ln(3)+10*x-5)*ln(5)+25*x^3*ln(3)+25
*x^2-25*x)*ln((4*(x*ln(3)+1)*ln(5)+5*x^2*ln(3)+5*x-5)/(4*ln(5)+5*x))+16*x*
ln(3)*ln(5)^2+40*x^2*ln(3)*ln(5)+25*x^3*ln(3)+25*x)/(16*(2*x*ln(3)+2)*ln(5
)^2+4*(20*x^2*ln(3)+20*x-10)*ln(5)+50*x^3*ln(3)+50*x^2-50*x),x,method=_RET
URNVERBOSE)
```

output
```
1/2*x*ln((4*(x*ln(3)+1)*ln(5)+5*x^2*ln(3)+5*x-5)/(4*ln(5)+5*x))
```

3.1166.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+\left(-25x+25x^2+25x^3\log(3)+(-5+10\right.}{-50x+50x^2+50x^3\log(3)+(-10+20x+20x^2\log(}$$
$$=\frac{1}{2}\,x\log\left(\frac{5\,x^2\log(3)+4\,(x\log(3)+1)\log(5)+5\,x-5}{5\,x+4\,\log(5)}\right)$$

input
```
integrate(((16*(x*log(3)+1)*log(5)^2+4*(10*x^2*log(3)+10*x-5)*log(5)+25*x^
3*log(3)+25*x^2-25*x)*log((4*(x*log(3)+1)*log(5)+5*x^2*log(3)+5*x-5)/(4*lo
g(5)+5*x))+16*x*log(3)*log(5)^2+40*x^2*log(3)*log(5)+25*x^3*log(3)+25*x)/(
16*(2*x*log(3)+2)*log(5)^2+4*(20*x^2*log(3)+20*x-10)*log(5)+50*x^3*log(3)+
50*x^2-50*x),x, algorithm=\
```

output
```
1/2*x*log((5*x^2*log(3) + 4*(x*log(3) + 1)*log(5) + 5*x - 5)/(5*x + 4*log(
5)))
```

3.1166.6 Sympy [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{25x + 25x^3\log(3) + 10x^2\log(3)\log(625) + x\log(3)\log^2(625) + (-25x + 25x^2 + 25x^3\log(3) + (-5 + 10}{-50x + 50x^2 + 50x^3\log(3) + (-10 + 20x + 20x^2\log(}$$
$$= \frac{x\log\left(\frac{5x^2\log(3)+5x+(4x\log(3)+4)\log(5)-5}{5x+4\log(5)}\right)}{2}$$

input
```
integrate(((16*(x*ln(3)+1)*ln(5)**2+4*(10*x**2*ln(3)+10*x-5)*ln(5)+25*x**3
*ln(3)+25*x**2-25*x)*ln((4*(x*ln(3)+1)*ln(5)+5*x**2*ln(3)+5*x-5)/(4*ln(5)+
5*x))+16*x*ln(3)*ln(5)**2+40*x**2*ln(3)*ln(5)+25*x**3*ln(3)+25*x)/(16*(2*x
*ln(3)+2)*ln(5)**2+4*(20*x**2*ln(3)+20*x-10)*ln(5)+50*x**3*ln(3)+50*x**2-5
0*x),x)
```

output
```
x*log((5*x**2*log(3) + 5*x + (4*x*log(3) + 4)*log(5) - 5)/(5*x + 4*log(5))
)/2
```

3.1166.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 961 vs. 2(22) = 44.

Time = 0.39 (sec) , antiderivative size = 961, normalized size of antiderivative = 40.04

$$\int \frac{25x + 25x^3\log(3) + 10x^2\log(3)\log(625) + x\log(3)\log^2(625) + (-25x + 25x^2 + 25x^3\log(3) + (-5 + 10}{-50x + 50x^2 + 50x^3\log(3) + (-10 + 20x + 20x^2\log(}$$
= Too large to display

input
```
integrate(((16*(x*log(3)+1)*log(5)^2+4*(10*x^2*log(3)+10*x-5)*log(5)+25*x^
3*log(3)+25*x^2-25*x)*log((4*(x*log(3)+1)*log(5)+5*x^2*log(3)+5*x-5)/(4*lo
g(5)+5*x))+16*x*log(3)*log(5)^2+40*x^2*log(3)*log(5)+25*x^3*log(3)+25*x)/(
16*(2*x*log(3)+2)*log(5)^2+4*(20*x^2*log(3)+20*x-10)*log(5)+50*x^3*log(3)+
50*x^2-50*x),x, algorithm=\
```

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$$\int \frac{25x+25x^3\log(3)+10x^2\log(3)\log(625)+x\log(3)\log^2(625)+(-25x+25x^2+25x^3\log(3)+(-5+10x+10x^2\log(3))\log(625)+(1+x\log(3))\log^2(625)}{-50x+50x^2+50x^3\log(3)+(-10+20x+20x^2\log(3))\log(625)+(2+2x\log(3))\log^2(625)}$$

output
```
-8/125*(2*log(5)*log(5*x^2*log(3) + (4*log(5)*log(3) + 5)*x + 4*log(5) - 5
) - 4*log(5)*log(5*x + 4*log(5)) - (8*log(5)^2*log(3) - 10*log(5) + 25)*lo
g((10*x*log(3) + 4*log(5)*log(3) - sqrt(16*log(5)^2*log(3)^2 - 40*log(5)*l
og(3) + 100*log(3) + 25) + 5)/(10*x*log(3) + 4*log(5)*log(3) + sqrt(16*log
(5)^2*log(3)^2 - 40*log(5)*log(3) + 100*log(3) + 25) + 5))/sqrt(16*log(5)^
2*log(3)^2 - 40*log(5)*log(3) + 100*log(3) + 25))*log(5)^2*log(3) - 2/125*
(32*log(5)^2*log(5*x + 4*log(5)) - (16*log(5)^2*log(3) + 25)*log(5*x^2*log
(3) + (4*log(5)*log(3) + 5)*x + 4*log(5) - 5)/log(3) + (64*log(5)^3*log(3)
^2 - 80*log(5)^2*log(3) + 300*log(5)*log(3) + 125)*log((10*x*log(3) + 4*lo
g(5)*log(3) - sqrt(16*log(5)^2*log(3)^2 - 40*log(5)*log(3) + 100*log(3) +
25) + 5)/(10*x*log(3) + 4*log(5)*log(3) + sqrt(16*log(5)^2*log(3)^2 - 40*l
og(5)*log(3) + 100*log(3) + 25) + 5))/(sqrt(16*log(5)^2*log(3)^2 - 40*log(
5)*log(3) + 100*log(3) + 25)*log(3)))*log(5)*log(3) + 1/500*(128*log(5)^3*
log(5*x + 4*log(5)) + 250*x/log(3) - (64*log(5)^3*log(3)^2 + 200*log(5)*lo
g(3) + 125)*log(5*x^2*log(3) + (4*log(5)*log(3) + 5)*x + 4*log(5) - 5)/log
(3)^2 + (256*log(5)^4*log(3)^3 - 320*log(5)^3*log(3)^2 + 1600*log(5)^2*log
(3)^2 + 500*log(5)*log(3) + 1250*log(3) + 625)*log((10*x*log(3) + 4*log(5)
*log(3) - sqrt(16*log(5)^2*log(3)^2 - 40*log(5)*log(3) + 100*log(3) + 25)
+ 5)/(10*x*log(3) + 4*log(5)*log(3) + sqrt(16*log(5)^2*log(3)^2 - 40*log(5
)*log(3) + 100*log(3) + 25) + 5))/(sqrt(16*log(5)^2*log(3)^2 - 40*log(5...
```

3.1166.8 Giac [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{25x + 25x^3 \log(3) + 10x^2 \log(3) \log(625) + x \log(3) \log^2(625) + \left(-25x + 25x^2 + 25x^3 \log(3) + (-5 + 10\cdots\right.}{-50x + 50x^2 + 50x^3 \log(3) + (-10 + 20x + 20x^2 \log(\cdots}$$
$$= \frac{1}{2}\, x \log\left(5\,x^2 \log\left(3\right) + 4\,x \log\left(5\right) \log\left(3\right) + 5\,x + 4\,\log\left(5\right) - 5\right) - \frac{1}{2}\, x \log\left(5\,x + 4\,\log\left(5\right)\right)$$

input
```
integrate(((16*(x*log(3)+1)*log(5)^2+4*(10*x^2*log(3)+10*x-5)*log(5)+25*x^
3*log(3)+25*x^2-25*x)*log((4*(x*log(3)+1)*log(5)+5*x^2*log(3)+5*x-5)/(4*lo
g(5)+5*x))+16*x*log(3)*log(5)^2+40*x^2*log(3)*log(5)+25*x^3*log(3)+25*x)/(
16*(2*x*log(3)+2)*log(5)^2+4*(20*x^2*log(3)+20*x-10)*log(5)+50*x^3*log(3)+
50*x^2-50*x),x, algorithm=\
```

output
```
1/2*x*log(5*x^2*log(3) + 4*x*log(5)*log(3) + 5*x + 4*log(5) - 5) - 1/2*x*l
og(5*x + 4*log(5))
```

3.1166.9 Mupad [B] (verification not implemented)

Time = 32.46 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{25x + 25x^3\log(3) + 10x^2\log(3)\log(625) + x\log(3)\log^2(625) + \left(-25x + 25x^2 + 25x^3\log(3) + (-5 + 10\right.}{-50x + 50x^2 + 50x^3\log(3) + (-10 + 20x + 20x^2\log(}$$

$$= \frac{x\,\ln\left(\frac{5\,x+4\,\ln(5)\,(x\,\ln(3)+1)+5\,x^2\,\ln(3)-5}{5\,x+4\,\ln(5)}\right)}{2}$$

input
```
int((25*x + log((5*x + 4*log(5)*(x*log(3) + 1) + 5*x^2*log(3) - 5)/(5*x +
4*log(5)))*(25*x^3*log(3) - 25*x + 4*log(5)*(10*x + 10*x^2*log(3) - 5) + 1
6*log(5)^2*(x*log(3) + 1) + 25*x^2) + 25*x^3*log(3) + 16*x*log(3)*log(5)^2
 + 40*x^2*log(3)*log(5))/(50*x^3*log(3) - 50*x + 4*log(5)*(20*x + 20*x^2*l
og(3) - 10) + 16*log(5)^2*(2*x*log(3) + 2) + 50*x^2),x)
```

output
```
(x*log((5*x + 4*log(5)*(x*log(3) + 1) + 5*x^2*log(3) - 5)/(5*x + 4*log(5))
))/2
```

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$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}(4x^2+\ldots\right.}{(2x+x\log(x))\log^2(2x+x\log \ldots}$$

3.1167.1 Optimal result

Integrand size = 120, antiderivative size = 24

$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}(4x^2+6x^3+(2x^2+3x^3)\log(x))\log^2(2x+x\log(x \ldots\right.}{(2x+x\log(x))\log^2(2x+x\log(x))}$$
$$= -25+5e^{-5+\frac{1}{\log(x(2+\log(x)))}}+x(x+x^2)$$

output
```
x*(x^2+x)+5/exp(5-1/ln((ln(x)+2)*x))-25
```

3.1167.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}(4x^2+6x^3+(2x^2+3x^3)\log(x))\log^2(2x+x\log(x \ldots\right.}{(2x+x\log(x))\log^2(2x+x\log(x))}$$
$$= \frac{5e^{\frac{1}{\log(x(2+\log(x)))}}+e^5x^2(1+x)}{e^5}$$

input
```
Integrate[(-15 - 5*Log[x] + E^((-1 + 5*Log[2*x + x*Log[x]])/Log[2*x + x*Lo
g[x]])*(4*x^2 + 6*x^3 + (2*x^2 + 3*x^3)*Log[x])*Log[2*x + x*Log[x]]^2)/(E^
((-1 + 5*Log[2*x + x*Log[x]])/Log[2*x + x*Log[x]])*(2*x + x*Log[x])*Log[2*
x + x*Log[x]]^2),x]
```

3.1167.

$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}(4x^2+6x^3+(2x^2+3x^3)\log(x))\log^2(2x+x\log(x))\right)}{\ldots} dx$$

output
```
(5*E^Log[x*(2 + Log[x])]^(-1) + E^5*x^2*(1 + x))/E^5
```

3.1167.3 Rubi [A] (verified)

Time = 2.40 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.025$, Rules used = {3041, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\exp\left(-\frac{5\log(2x+x\log(x))-1}{\log(2x+x\log(x))}\right)\left(\left(6x^3+4x^2+\left(3x^3+2x^2\right)\log(x)\right)\log^2(2x+x\log(x))\exp\left(\frac{5\log(2x+x\log(x))-1}{\log(2x+x\log(x))}\right)-5\,l\right.}{(2x+x\log(x))\log^2(2x+x\log(x))}$$

$$\Big\downarrow \text{3041}$$

$$\int \frac{\exp\left(-\frac{5\log(2x+x\log(x))-1}{\log(2x+x\log(x))}\right)\left(\left(6x^3+4x^2+\left(3x^3+2x^2\right)\log(x)\right)\log^2(2x+x\log(x))\exp\left(\frac{5\log(2x+x\log(x))-1}{\log(2x+x\log(x))}\right)-5\,l\right.}{x(\log(x)+2)\log^2(2x+x\log(x))}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{5(-\log(x)-3)\exp\left(-\frac{5\log(2x+x\log(x))-1}{\log(2x+x\log(x))}\right)}{x(\log(x)+2)\log^2(2x+x\log(x))}+x(3x+2)\exp\left(-\frac{5\log(2x+x\log(x))-1}{\log(2x+x\log(x))}-\frac{1}{\log(x(\log(x)+2))}\right.\right.$$

$$\Big\downarrow \text{2009}$$

$$x^3+x^2+5e^{\frac{1}{\log(x(\log(x)+2))}-5}$$

input
```
Int[(-15 - 5*Log[x] + E^((-1 + 5*Log[2*x + x*Log[x]])/Log[2*x + x*Log[x]])
*(4*x^2 + 6*x^3 + (2*x^2 + 3*x^3)*Log[x])*Log[2*x + x*Log[x]]^2)/(E^((-1 +
 5*Log[2*x + x*Log[x]])/Log[2*x + x*Log[x]])*(2*x + x*Log[x])*Log[2*x + x*
Log[x]]^2),x]
```

output
```
5*E^(-5 + Log[x*(2 + Log[x])]^(-1)) + x^2 + x^3
```

3.1167.

$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(4x^2+6x^3+\left(2x^2+3x^3\right)\log(x)\right)\log^2(2x+x\log(x))\right)}{\cdots}\,dx$$

3.1167.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3041
```
Int[(u_.)*((a_.)*(x_)^(m_.) + Log[(c_.)*(x_)^(n_.)]^(q_.)*(b_.)*(x_)^(r_.))
^(p_.), x_Symbol] :> Int[u*x^(p*r)*(a*x^(m - r) + b*Log[c*x^n]^q)^p, x] /;
FreeQ[{a, b, c, m, n, p, q, r}, x] && IntegerQ[p]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1167.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 113 vs. $2(27) = 54$.

Time = 7.22 (sec) , antiderivative size = 114, normalized size of antiderivative = 4.75

method	result
parallelrisch	$\frac{\left(4\,\mathrm{e}^{\frac{5\ln((\ln(x)+2)x)-1}{\ln((\ln(x)+2)x)}}x^3\ln((\ln(x)+2)x)+4\ln((\ln(x)+2)x)\mathrm{e}^{\frac{5\ln((\ln(x)+2)x)-1}{\ln((\ln(x)+2)x)}}x^2+20\ln((\ln(x)+2)x)\right)\mathrm{e}^{-\frac{5\ln((\ln(x)+2)x)-1}{\ln((\ln(x)+2)x)}}}{4\ln((\ln(x)+2)x)}$
risch	$x^3+x^2+5\,\mathrm{e}^{-\frac{-5i\pi\,\mathrm{csgn}(ix(\ln(x)+2))^3+5i\pi\,\mathrm{csgn}(ix(\ln(x)+2))^2\,\mathrm{csgn}(ix)+5i\pi\,\mathrm{csgn}(ix(\ln(x)+2))^2\,\mathrm{csgn}(i(\ln(x)+2))-5i\pi\,\mathrm{csgn}(ix(\ln(x}{-i\pi\,\mathrm{csgn}(ix(\ln(x)+2))^3+i\pi\,\mathrm{csgn}(ix(\ln(x)+2))^2\,\mathrm{csgn}(ix)+i\pi\,\mathrm{csgn}(ix(\ln(x)+2))^2\,\mathrm{csgn}(i(\ln(x)+2))-i\pi\,\mathrm{csgn}(ix(\ln(x}}$

input
```
int((((3*x^3+2*x^2)*ln(x)+6*x^3+4*x^2)*ln(x*ln(x)+2*x)^2*exp((5*ln(x*ln(x)
+2*x)-1)/ln(x*ln(x)+2*x))-5*ln(x)-15)/(x*ln(x)+2*x)/ln(x*ln(x)+2*x)^2/exp(
(5*ln(x*ln(x)+2*x)-1)/ln(x*ln(x)+2*x)),x,method=_RETURNVERBOSE)
```

output
```
1/4*(4*exp((5*ln((ln(x)+2)*x)-1)/ln((ln(x)+2)*x))*x^3*ln((ln(x)+2)*x)+4*ln
((ln(x)+2)*x)*exp((5*ln((ln(x)+2)*x)-1)/ln((ln(x)+2)*x))*x^2+20*ln((ln(x)+
2)*x))/ln((ln(x)+2)*x)/exp((5*ln((ln(x)+2)*x)-1)/ln((ln(x)+2)*x))
```

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$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(4x^2+6x^3+\left(2x^2+3x^3\right)\log(x)\right)\log^2(2x+x\log(x))\right)}{\cdots}\,dx$$

3.1167.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. $2(23) = 46$.

Time = 0.30 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.67

$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}(4x^2+6x^3+(2x^2+3x^3)\log(x))\log^2(2x+x\log(x\right.}{(2x+x\log(x))\log^2(2x+x\log(x))}$$

$$= \left((x^3+x^2)e^{\left(\frac{5\log(x\log(x)+2x)-1}{\log(x\log(x)+2x)}\right)}+5\right)e^{\left(-\frac{5\log(x\log(x)+2x)-1}{\log(x\log(x)+2x)}\right)}$$

input
```
integrate((((3*x^3+2*x^2)*log(x)+6*x^3+4*x^2)*log(x*log(x)+2*x)^2*exp((5*l
og(x*log(x)+2*x)-1)/log(x*log(x)+2*x))-5*log(x)-15)/(x*log(x)+2*x)/log(x*l
og(x)+2*x)^2/exp((5*log(x*log(x)+2*x)-1)/log(x*log(x)+2*x)),x, algorithm=\
```

output
```
((x^3 + x^2)*e^((5*log(x*log(x) + 2*x) - 1)/log(x*log(x) + 2*x)) + 5)*e^(-
(5*log(x*log(x) + 2*x) - 1)/log(x*log(x) + 2*x))
```

3.1167.6 Sympy [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.33

$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}(4x^2+6x^3+(2x^2+3x^3)\log(x))\log^2(2x+x\log(x\right.}{(2x+x\log(x))\log^2(2x+x\log(x))}$$

$$= x^3+x^2+5e^{-\frac{5\log(x\log(x)+2x)-1}{\log(x\log(x)+2x)}}$$

input
```
integrate((((3*x**3+2*x**2)*ln(x)+6*x**3+4*x**2)*ln(x*ln(x)+2*x)**2*exp((5
*ln(x*ln(x)+2*x)-1)/ln(x*ln(x)+2*x))-5*ln(x)-15)/(x*ln(x)+2*x)/ln(x*ln(x)+
2*x)**2/exp((5*ln(x*ln(x)+2*x)-1)/ln(x*ln(x)+2*x)),x)
```

output
```
x**3 + x**2 + 5*exp(-(5*log(x*log(x) + 2*x) - 1)/log(x*log(x) + 2*x))
```

3.1167.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(23) = 46$.

Time = 0.40 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.46

$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(4x^2+6x^3+\left(2x^2+3x^3\right)\log(x)\right)\log^2(2x+x\log(x\right.}{(2x+x\log(x))\log^2(2x+x\log(x))}$$

$$= x^3+x^2+\frac{5\,e^{\left(\frac{1}{\log(x)+\log(\log(x)+2)}\right)}\log(x)}{e^5\log(x)+3\,e^5}+\frac{15\,e^{\left(\frac{1}{\log(x)+\log(\log(x)+2)}\right)}}{e^5\log(x)+3\,e^5}$$

input
```
integrate((((3*x^3+2*x^2)*log(x)+6*x^3+4*x^2)*log(x*log(x)+2*x)^2*exp((5*l
og(x*log(x)+2*x)-1)/log(x*log(x)+2*x))-5*log(x)-15)/(x*log(x)+2*x)/log(x*l
og(x)+2*x)^2/exp((5*log(x*log(x)+2*x)-1)/log(x*log(x)+2*x)),x, algorithm=\
```

output
```
x^3 + x^2 + 5*e^(1/(log(x) + log(log(x) + 2)))*log(x)/(e^5*log(x) + 3*e^5)
 + 15*e^(1/(log(x) + log(log(x) + 2)))/(e^5*log(x) + 3*e^5)
```

3.1167.8 Giac [F]

$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(4x^2+6x^3+\left(2x^2+3x^3\right)\log(x)\right)\log^2(2x+x\log(x\right.}{(2x+x\log(x))\log^2(2x+x\log(x))}$$

$$= \int \frac{\left(\left(6\,x^3+4\,x^2+\left(3\,x^3+2\,x^2\right)\log(x)\right)e^{\left(\frac{5\,\log(x\log(x)+2\,x)-1}{\log(x\log(x)+2\,x)}\right)}\log(x\log(x)+2\,x)^2-5\,\log(x)-15\right)e^{\left(-\frac{5\,\log(x}{\log(x}\right.}}{(x\log(x)+2\,x)\log(x\log(x)+2\,x)^2}$$

input
```
integrate((((3*x^3+2*x^2)*log(x)+6*x^3+4*x^2)*log(x*log(x)+2*x)^2*exp((5*l
og(x*log(x)+2*x)-1)/log(x*log(x)+2*x))-5*log(x)-15)/(x*log(x)+2*x)/log(x*l
og(x)+2*x)^2/exp((5*log(x*log(x)+2*x)-1)/log(x*log(x)+2*x)),x, algorithm=\
```

output
```
integrate(((6*x^3 + 4*x^2 + (3*x^3 + 2*x^2)*log(x))*e^((5*log(x*log(x) + 2
*x) - 1)/log(x*log(x) + 2*x))*log(x*log(x) + 2*x)^2 - 5*log(x) - 15)*e^(-(
5*log(x*log(x) + 2*x) - 1)/log(x*log(x) + 2*x))/((x*log(x) + 2*x)*log(x*lo
g(x) + 2*x)^2), x)
```

3.1167.9 Mupad [B] (verification not implemented)

Time = 14.05 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

$$\int \frac{e^{-\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}\left(-15-5\log(x)+e^{\frac{-1+5\log(2x+x\log(x))}{\log(2x+x\log(x))}}(4x^2+6x^3+(2x^2+3x^3)\log(x))\log^2(2x+x\log(x\right.}{(2x+x\log(x))\log^2(2x+x\log(x))}$$

$$= x^2 + x^3 + 5\,\mathrm{e}^{\frac{1}{\ln(2\,x+x\,\ln(x))}}\,\mathrm{e}^{-5}$$

input
```
int(-(exp(-(5*log(2*x + x*log(x)) - 1)/log(2*x + x*log(x)))*(5*log(x) - lo
g(2*x + x*log(x))^2*exp((5*log(2*x + x*log(x)) - 1)/log(2*x + x*log(x)))*(
log(x)*(2*x^2 + 3*x^3) + 4*x^2 + 6*x^3) + 15))/(log(2*x + x*log(x))^2*(2*x
 + x*log(x))),x)
```

output
```
x^2 + x^3 + 5*exp(1/log(2*x + x*log(x)))*exp(-5)
```

3.1168 $\int (-25 - 2e^2) \, dx$

3.1168.1 Optimal result

Integrand size = 7, antiderivative size = 14

$$\int (-25 - 2e^2) \, dx = 25(2 - x) - 2e^2 x$$

output
```
-25*x+50-2*x*exp(1)^2
```

3.1168.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int (-25 - 2e^2) \, dx = -25x - 2e^2 x$$

input
```
Integrate[-25 - 2*E^2,x]
```

output
```
-25*x - 2*E^2*x
```

3.1168.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-25-2e^2\right) dx$$

$$\Big\downarrow \text{24}$$

$$-\left(\left(25+2e^2\right)x\right)$$

input
```
Int[-25 - 2*E^2,x]
```

output
```
-((25 + 2*E^2)*x)
```

3.1168.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.1168.4 Maple [A] (verified)

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

method	result	size
risch	$-2\,\mathrm{e}^{2}x-25x$	10
default	$x(-2\,\mathrm{e}^{2}-25)$	11
norman	$x(-2\,\mathrm{e}^{2}-25)$	11
parallelrisch	$x(-2\,\mathrm{e}^{2}-25)$	11
parts	$-2\,\mathrm{e}^{2}x-25x$	12

input
```
int(-2*exp(1)^2-25,x,method=_RETURNVERBOSE)
```

output
```
-2*exp(2)*x-25*x
```

3.1168.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.64

$$\int (-25-2e^2)\,dx = -2\,xe^2 - 25\,x$$

input
```
integrate(-2*exp(1)^2-25,x, algorithm=\
```

output
```
-2*x*e^2 - 25*x
```

3.1168.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.57

$$\int (-25-2e^2)\,dx = x(-25-2e^2)$$

input
```
integrate(-2*exp(1)**2-25,x)
```

output
```
x*(-25 - 2*exp(2))
```

3.1168.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.64

$$\int (-25-2e^2)\,dx = -x(2\,e^2+25)$$

input
```
integrate(-2*exp(1)^2-25,x, algorithm=\
```

output
```
-x*(2*e^2 + 25)
```

3.1168.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.64

$$\int \left(-25-2e^2\right) \, dx = -x\left(2\, e^2+25\right)$$

input
```
integrate(-2*exp(1)^2-25,x, algorithm=\
```

output
```
-x*(2*e^2 + 25)
```

3.1168.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.64

$$\int \left(-25-2e^2\right) \, dx = -x\,\left(2\,\mathrm{e}^2+25\right)$$

input
```
int(- 2*exp(2) - 25,x)
```

output
```
-x*(2*exp(2) + 25)
```

3.1169 $\int \frac{2x^2+e^{3968-1512x+144x^2}x(1-1512x+288x^2)}{x}\,dx$

3.1169.1 Optimal result

Integrand size = 34, antiderivative size = 22

$$\int \frac{2x^2+e^{3968-1512x+144x^2}x(1-1512x+288x^2)}{x}\,dx=e^{-1+9(-9+3(-4+x)+x)^2}x+x^2$$

output
```
exp(ln(x)+3*(4*x-21)*(12*x-63)-1)+x^2
```

3.1169.2 Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{2x^2+e^{3968-1512x+144x^2}x(1-1512x+288x^2)}{x}\,dx=x\left(e^{8(496-189x+18x^2)}+x\right)$$

input
```
Integrate[(2*x^2 + E^(3968 - 1512*x + 144*x^2)*x*(1 - 1512*x + 288*x^2))/x
,x]
```

output
```
x*(E^(8*(496 - 189*x + 18*x^2)) + x)
```

3.1169.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.50, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+e^{144x^2-1512x+3968}\left(288x^2-1512x+1\right)x}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(e^{144x^2-1512x+3968}\left(288x^2-1512x+1\right)+2x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^2+\frac{e^{144x^2-1512x+3968}\left(21x-4x^2\right)}{21-4x}$$

input
```
Int[(2*x^2 + E^(3968 - 1512*x + 144*x^2)*x*(1 - 1512*x + 288*x^2))/x,x]
```

output
```
x^2 + (E^(3968 - 1512*x + 144*x^2)*(21*x - 4*x^2))/(21 - 4*x)
```

3.1169.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1169.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

method	result	size
default	$e^{\ln(x)+144x^2-1512x+3968}+x^2$	18
norman	$e^{\ln(x)+144x^2-1512x+3968}+x^2$	18
parallelrisch	$e^{\ln(x)+144x^2-1512x+3968}+x^2$	18
parts	$e^{\ln(x)+144x^2-1512x+3968}+x^2$	18
risch	$x\,e^{8(6x-31)(3x-16)}+x^2$	20

input
```
int(((288*x^2-1512*x+1)*exp(ln(x)+144*x^2-1512*x+3968)+2*x^2)/x,x,method=_
RETURNVERBOSE)
```

output
```
exp(ln(x)+144*x^2-1512*x+3968)+x^2
```

3.1169.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{2x^2+e^{3968-1512x+144x^2}x(1-1512x+288x^2)}{x}\,dx = x^2+e^{(144\,x^2-1512\,x+\log(x)+3968)}$$

input
```
integrate(((288*x^2-1512*x+1)*exp(log(x)+144*x^2-1512*x+3968)+2*x^2)/x,x,
algorithm=\
```

output
```
x^2 + e^(144*x^2 - 1512*x + log(x) + 3968)
```

3.1169.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

$$\int \frac{2x^2+e^{3968-1512x+144x^2}x(1-1512x+288x^2)}{x}\,dx = x^2+xe^{144x^2-1512x+3968}$$

input
```
integrate(((288*x**2-1512*x+1)*exp(ln(x)+144*x**2-1512*x+3968)+2*x**2)/x,x
)
```

output
```
x**2 + x*exp(144*x**2 - 1512*x + 3968)
```

3.1169.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.34 (sec) , antiderivative size = 153, normalized size of antiderivative = 6.95

$$\int \frac{2x^2+e^{3968-1512x+144x^2}x(1-1512x+288x^2)}{x}\,dx = -\frac{1}{24}i\,\sqrt{\pi}\operatorname{erf}\left(12i\,x-63i\right)e^{(-1)}+x^2$$
$$-\frac{1}{12}\left(\frac{(4\,x-21)^3\Gamma\left(\frac{3}{2},-9\,(4\,x-21)^2\right)}{\left(-(4\,x-21)^2\right)^{\frac{3}{2}}}-\frac{3969\,\sqrt{\pi}(4\,x-21)\left(\operatorname{erf}\left(3\,\sqrt{-(4\,x-21)^2}\right)-1\right)}{\sqrt{-(4\,x-21)^2}}-126\,e^{\left(9\,(4\ldots\right.}\right.$$
$$\left.-\frac{21}{4}\left(\frac{63\,\sqrt{\pi}(4\,x-21)\left(\operatorname{erf}\left(3\,\sqrt{-(4\,x-21)^2}\right)-1\right)}{\sqrt{-(4\,x-21)^2}}+e^{\left(9\,(4\,x-21)^2\right)}\right)e^{(-1)}\right.$$

input
```
integrate(((288*x^2-1512*x+1)*exp(log(x)+144*x^2-1512*x+3968)+2*x^2)/x,x,
algorithm=\
```

output
```
-1/24*I*sqrt(pi)*erf(12*I*x - 63*I)*e^(-1) + x^2 - 1/12*((4*x - 21)^3*gamm
a(3/2, -9*(4*x - 21)^2)/(-(4*x - 21)^2)^(3/2) - 3969*sqrt(pi)*(4*x - 21)*(
erf(3*sqrt(-(4*x - 21)^2)) - 1)/sqrt(-(4*x - 21)^2) - 126*e^(9*(4*x - 21)^
2))*e^(-1) - 21/4*(63*sqrt(pi)*(4*x - 21)*(erf(3*sqrt(-(4*x - 21)^2)) - 1)
/sqrt(-(4*x - 21)^2) + e^(9*(4*x - 21)^2))*e^(-1)
```

3.1169.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{2x^2+e^{3968-1512x+144x^2}x(1-1512x+288x^2)}{x}\,dx = x^2+xe^{\left(144\,x^2-1512\,x+3968\right)}$$

input
```
integrate(((288*x^2-1512*x+1)*exp(log(x)+144*x^2-1512*x+3968)+2*x^2)/x,x,
algorithm=\
```

output
```
x^2 + x*e^(144*x^2 - 1512*x + 3968)
```

3.1169.9 Mupad [B] (verification not implemented)

Time = 13.98 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{2x^2 + e^{3968-1512x+144x^2}x(1 - 1512x + 288x^2)}{x}\,dx = x^2 + x\,\mathrm{e}^{-1512\,x}\,\mathrm{e}^{3968}\,\mathrm{e}^{144\,x^2}$$

input
```
int((exp(log(x) - 1512*x + 144*x^2 + 3968)*(288*x^2 - 1512*x + 1) + 2*x^2)
/x,x)
```

output
```
x^2 + x*exp(-1512*x)*exp(3968)*exp(144*x^2)
```

3.1170 $\int \frac{32+e^4 x^2}{e^4 x^2} \, dx$

3.1170.1 Optimal result

Integrand size = 16, antiderivative size = 11

$$\int \frac{32+e^4 x^2}{e^4 x^2} \, dx = -1-\frac{32}{e^4 x}+x$$

output
```
x-32/exp(4)/x-1
```

3.1170.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

$$\int \frac{32+e^4 x^2}{e^4 x^2} \, dx = -\frac{32}{e^4 x}+x$$

input
```
Integrate[(32 + E^4*x^2)/(E^4*x^2),x]
```

output
```
-32/(E^4*x) + x
```

3.1170.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.36, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188, Rules used = {27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^4x^2+32}{e^4x^2}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{\int \frac{e^4x^2+32}{x^2}dx}{e^4}$$
$$\Big\downarrow \text{244}$$
$$\frac{\int \left(e^4+\frac{32}{x^2}\right)dx}{e^4}$$
$$\Big\downarrow \text{2009}$$
$$\frac{e^4x-\frac{32}{x}}{e^4}$$

input
```
Int[(32 + E^4*x^2)/(E^4*x^2),x]
```

output
```
(-32/x + E^4*x)/E^4
```

3.1170.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1170.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

method	result	size
risch	$x-\frac{32\,\mathrm{e}^{-4}}{x}$	10
norman	$\frac{x^{2}-32\,\mathrm{e}^{-4}}{x}$	15
default	$\mathrm{e}^{-4}\left(x\,\mathrm{e}^{4}-\frac{32}{x}\right)$	16
gosper	$\frac{\left(x^{2}\mathrm{e}^{4}-32\right)\mathrm{e}^{-4}}{x}$	17
parallelrisch	$\frac{\left(x^{2}\mathrm{e}^{4}-32\right)\mathrm{e}^{-4}}{x}$	17

input
```
int((x^2*exp(4)+32)/x^2/exp(4),x,method=_RETURNVERBOSE)
```

output
```
x-32*exp(-4)/x
```

3.1170.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.27

$$\int \frac{32+e^4x^2}{e^4x^2}\,dx=\frac{(x^2e^4-32)e^{(-4)}}{x}$$

input
```
integrate((x^2*exp(4)+32)/x^2/exp(4),x, algorithm=\
```

output
```
(x^2*e^4 - 32)*e^(-4)/x
```

3.1170.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.91

$$\int \frac{32+e^4x^2}{e^4x^2}\,dx=\frac{xe^4-\frac{32}{x}}{e^4}$$

input
```
integrate((x**2*exp(4)+32)/x**2/exp(4),x)
```

output
```
(x*exp(4) - 32/x)*exp(-4)
```

3.1170.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.18

$$\int \frac{32+e^4x^2}{e^4x^2}\,dx = \left(xe^4 - \frac{32}{x}\right)e^{(-4)}$$

input
```
integrate((x^2*exp(4)+32)/x^2/exp(4),x, algorithm=\
```

output
```
(x*e^4 - 32/x)*e^(-4)
```

3.1170.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.18

$$\int \frac{32+e^4x^2}{e^4x^2}\,dx = \left(xe^4 - \frac{32}{x}\right)e^{(-4)}$$

input
```
integrate((x^2*exp(4)+32)/x^2/exp(4),x, algorithm=\
```

output
```
(x*e^4 - 32/x)*e^(-4)
```

3.1170.9 Mupad [B] (verification not implemented)

Time = 14.11 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.82

$$\int \frac{32+e^4x^2}{e^4x^2}\,dx = x - \frac{32\,\mathrm{e}^{-4}}{x}$$

input
```
int((exp(-4)*(x^2*exp(4) + 32))/x^2,x)
```

output
```
x - (32*exp(-4))/x
```

3.1171 $\int \frac{9e^{10}x^3\log(4)+(-27-36x-18x^2)\log(5)+(18e^{10}x^2\log(4)-9x\log(5)$

$9x^3+6x^4+x^5+(18x^2+12x^3+2x^4)\log(x)+(9x+6x^2$

3.1171.1 Optimal result

Integrand size = 108, antiderivative size = 26

$$\int \frac{9e^{10}x^3\log(4)+(-27-36x-18x^2)\log(5)+(18e^{10}x^2\log(4)-9x\log(5))\log(x)+9e^{10}x\log(4)\log^2(x)}{9x^3+6x^4+x^5+(18x^2+12x^3+2x^4)\log(x)+(9x+6x^2+x^3)\log^2(x)}\,dx$$
$$=e-\frac{9\left(e^{10}\log(4)-\frac{\log(5)}{x+\log(x)}\right)}{3+x}$$

output
```
exp(1)-9*(2*exp(5)^2*ln(2)-ln(5)/(x+ln(x)))/(3+x)
```

3.1171.2 Mathematica [A] (verified)

Time = 5.07 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.27

$$\int \frac{9e^{10}x^3\log(4)+(-27-36x-18x^2)\log(5)+(18e^{10}x^2\log(4)-9x\log(5))\log(x)+9e^{10}x\log(4)\log^2(x)}{9x^3+6x^4+x^5+(18x^2+12x^3+2x^4)\log(x)+(9x+6x^2+x^3)\log^2(x)}\,dx$$
$$=\frac{9(-e^{10}x\log(4)+\log(5)-e^{10}\log(4)\log(x))}{(3+x)(x+\log(x))}$$

input
```
Integrate[(9*E^10*x^3*Log[4] + (-27 - 36*x - 18*x^2)*Log[5] + (18*E^10*x^2
*Log[4] - 9*x*Log[5])*Log[x] + 9*E^10*x*Log[4]*Log[x]^2)/(9*x^3 + 6*x^4 +
x^5 + (18*x^2 + 12*x^3 + 2*x^4)*Log[x] + (9*x + 6*x^2 + x^3)*Log[x]^2),x]
```

output
```
(9*(-(E^10*x*Log[4]) + Log[5] - E^10*Log[4]*Log[x]))/((3 + x)*(x + Log[x])
)
```

3.1171.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{9e^{10}x^3\log(4)+\left(18e^{10}x^2\log(4)-9x\log(5)\right)\log(x)+\left(-18x^2-36x-27\right)\log(5)+9e^{10}x\log(4)\log^2(x)}{x^5+6x^4+9x^3+(x^3+6x^2+9x)\log^2(x)+(2x^4+12x^3+18x^2)\log(x)}\,dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{9\left(e^{10}x^3\log(4)+e^{10}x^2\log(16)\log(x)-2x^2\log(5)+e^{10}x\log(4)\log^2(x)-x\log(5)\log(x)-4x\log(5)-3\log(5)\right)}{x(x+3)^2(x+\log(x))^2}$$

$$\Big\downarrow \text{ 27}$$

$$9\int \frac{e^{10}\log(4)x^3+e^{10}\log(16)\log(x)x^2-2\log(5)x^2+e^{10}\log(4)\log^2(x)x-\log(5)\log(x)x-4\log(5)x-3\log(5)}{x(x+3)^2(x+\log(x))^2}d$$

$$\Big\downarrow \text{ 7293}$$

$$9\int \left(-\frac{\log(5)(x+1)}{x(x+3)(x+\log(x))^2}-\frac{\log(5)}{(x+3)^2(x+\log(x))}+\frac{e^{10}\log(4)}{(x+3)^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$9\left(-\frac{1}{3}\log(5)\int \frac{1}{x(x+\log(x))^2}dx-\frac{2}{3}\log(5)\int \frac{1}{(x+3)(x+\log(x))^2}dx-\log(5)\int \frac{1}{(x+3)^2(x+\log(x))}dx-\frac{e^{10}}{x}\right.$$

input
```
Int[(9*E^10*x^3*Log[4] + (-27 - 36*x - 18*x^2)*Log[5] + (18*E^10*x^2*Log[4
] - 9*x*Log[5])*Log[x] + 9*E^10*x*Log[4]*Log[x]^2)/(9*x^3 + 6*x^4 + x^5 +
(18*x^2 + 12*x^3 + 2*x^4)*Log[x] + (9*x + 6*x^2 + x^3)*Log[x]^2),x]
```

output
```
$Aborted
```

3.1171.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1171.4 Maple [A] (verified)

Time = 2.35 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

method	result	size
risch	$-\frac{18\,\mathrm{e}^{10}\ln\left(2\right)}{3+x}+\frac{9\ln\left(5\right)}{\left(3+x\right)\left(x+\ln\left(x\right)\right)}$	28
default	$-\frac{18\,\mathrm{e}^{10}\ln\left(2\right)}{3+x}+\frac{9\ln\left(5\right)}{\left(3+x\right)\left(x+\ln\left(x\right)\right)}$	30
norman	$\frac{-18x\,\mathrm{e}^{10}\ln\left(2\right)-18\,\mathrm{e}^{10}\ln\left(2\right)\ln\left(x\right)+9\ln\left(5\right)}{x\ln\left(x\right)+x^{2}+3\ln\left(x\right)+3x}$	43
parallelrisch	$-\frac{18x\,\mathrm{e}^{10}\ln\left(2\right)+18\,\mathrm{e}^{10}\ln\left(2\right)\ln\left(x\right)-9\ln\left(5\right)}{x\ln\left(x\right)+x^{2}+3\ln\left(x\right)+3x}$	44

input
```
int((18*x*exp(5)^2*ln(2)*ln(x)^2+(-9*x*ln(5)+36*x^2*exp(5)^2*ln(2))*ln(x)+
(-18*x^2-36*x-27)*ln(5)+18*x^3*exp(5)^2*ln(2))/((x^3+6*x^2+9*x)*ln(x)^2+(2
*x^4+12*x^3+18*x^2)*ln(x)+x^5+6*x^4+9*x^3),x,method=_RETURNVERBOSE)
```

output
```
-18*exp(10)*ln(2)/(3+x)+9*ln(5)/(3+x)/(x+ln(x))
```

3.1171.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\int \frac{9e^{10}x^3\log(4)+(-27-36x-18x^2)\log(5)+(18e^{10}x^2\log(4)-9x\log(5))\log(x)+9e^{10}x\log(4)\log^2(x)}{9x^3+6x^4+x^5+(18x^2+12x^3+2x^4)\log(x)+(9x+6x^2+x^3)\log^2(x)}\,dx$$
$$=-\frac{9\,(2\,xe^{10}\log{(2)}+2\,e^{10}\log{(2)}\log{(x)}-\log{(5)})}{x^2+(x+3)\log{(x)}+3\,x}$$

input
```
integrate((18*x*exp(5)^2*log(2)*log(x)^2+(-9*x*log(5)+36*x^2*exp(5)^2*log(
2))*log(x)+(-18*x^2-36*x-27)*log(5)+18*x^3*exp(5)^2*log(2))/((x^3+6*x^2+9*
x)*log(x)^2+(2*x^4+12*x^3+18*x^2)*log(x)+x^5+6*x^4+9*x^3),x, algorithm=\
```

output
```
-9*(2*x*e^10*log(2) + 2*e^10*log(2)*log(x) - log(5))/(x^2 + (x + 3)*log(x)
 + 3*x)
```

3.1171.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{9e^{10}x^3\log(4)+(-27-36x-18x^2)\log(5)+(18e^{10}x^2\log(4)-9x\log(5))\log(x)+9e^{10}x\log(4)\log^2(x)}{9x^3+6x^4+x^5+(18x^2+12x^3+2x^4)\log(x)+(9x+6x^2+x^3)\log^2(x)}\,dx$$
$$=\frac{9\log{(5)}}{x^2+3x+(x+3)\log{(x)}}-\frac{18e^{10}\log{(2)}}{x+3}$$

input
```
integrate((18*x*exp(5)**2*ln(2)*ln(x)**2+(-9*x*ln(5)+36*x**2*exp(5)**2*ln(
2))*ln(x)+(-18*x**2-36*x-27)*ln(5)+18*x**3*exp(5)**2*ln(2))/((x**3+6*x**2+
9*x)*ln(x)**2+(2*x**4+12*x**3+18*x**2)*ln(x)+x**5+6*x**4+9*x**3),x)
```

output
```
9*log(5)/(x**2 + 3*x + (x + 3)*log(x)) - 18*exp(10)*log(2)/(x + 3)
```

3.1171.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.42

$$\int \frac{9e^{10}x^3 \log(4) + (-27 - 36x - 18x^2) \log(5) + (18e^{10}x^2 \log(4) - 9x \log(5)) \log(x) + 9e^{10}x \log(4) \log^2(x)}{9x^3 + 6x^4 + x^5 + (18x^2 + 12x^3 + 2x^4) \log(x) + (9x + 6x^2 + x^3) \log^2(x)} dx$$
$$= -\frac{9 (2 xe^{10} \log (2) + 2 e^{10} \log (2) \log (x) - \log (5))}{x^2 + (x + 3) \log (x) + 3 x}$$

input
```
integrate((18*x*exp(5)^2*log(2)*log(x)^2+(-9*x*log(5)+36*x^2*exp(5)^2*log(
2))*log(x)+(-18*x^2-36*x-27)*log(5)+18*x^3*exp(5)^2*log(2))/((x^3+6*x^2+9*
x)*log(x)^2+(2*x^4+12*x^3+18*x^2)*log(x)+x^5+6*x^4+9*x^3),x, algorithm=\
```

output
```
-9*(2*x*e^10*log(2) + 2*e^10*log(2)*log(x) - log(5))/(x^2 + (x + 3)*log(x)
 + 3*x)
```

3.1171.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.50

$$\int \frac{9e^{10}x^3 \log(4) + (-27 - 36x - 18x^2) \log(5) + (18e^{10}x^2 \log(4) - 9x \log(5)) \log(x) + 9e^{10}x \log(4) \log^2(x)}{9x^3 + 6x^4 + x^5 + (18x^2 + 12x^3 + 2x^4) \log(x) + (9x + 6x^2 + x^3) \log^2(x)} dx$$
$$= -\frac{9 (2 xe^{10} \log (2) + 2 e^{10} \log (2) \log (x) - \log (5))}{x^2 + x \log (x) + 3 x + 3 \log (x)}$$

input
```
integrate((18*x*exp(5)^2*log(2)*log(x)^2+(-9*x*log(5)+36*x^2*exp(5)^2*log(
2))*log(x)+(-18*x^2-36*x-27)*log(5)+18*x^3*exp(5)^2*log(2))/((x^3+6*x^2+9*
x)*log(x)^2+(2*x^4+12*x^3+18*x^2)*log(x)+x^5+6*x^4+9*x^3),x, algorithm=\
```

output
```
-9*(2*x*e^10*log(2) + 2*e^10*log(2)*log(x) - log(5))/(x^2 + x*log(x) + 3*x
 + 3*log(x))
```

3.1171.9 Mupad [B] (verification not implemented)

Time = 15.34 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{9e^{10}x^3\log(4)+(-27-36x-18x^2)\log(5)+(18e^{10}x^2\log(4)-9x\log(5))\log(x)+9e^{10}x\log(4)\log^2(x)}{9x^3+6x^4+x^5+(18x^2+12x^3+2x^4)\log(x)+(9x+6x^2+x^3)\log^2(x)}\,dx$$
$$=\frac{9\ln(5)}{(x+\ln(x))\ (x+3)}-\frac{18\,e^{10}\ \ln(2)}{x+3}$$

input
```
int(-(log(5)*(36*x + 18*x^2 + 27) + log(x)*(9*x*log(5) - 36*x^2*exp(10)*lo
g(2)) - 18*x^3*exp(10)*log(2) - 18*x*exp(10)*log(2)*log(x)^2)/(log(x)*(18*
x^2 + 12*x^3 + 2*x^4) + 9*x^3 + 6*x^4 + x^5 + log(x)^2*(9*x + 6*x^2 + x^3)
),x)
```

output
```
(9*log(5))/((x + log(x))*(x + 3)) - (18*exp(10)*log(2))/(x + 3)
```

3.1172 $\int \frac{-4x^2-4e^{x^2}x^3+\left(8x^2+e^{x^2}(2x+4x^3)+2x\log(8)\right)\log\left(e^{x^2}+2x+\log(8\right.}{\left(e\right.}$

3.1172.1 Optimal result

Integrand size = 151, antiderivative size = 22

$$\int \frac{-4x^2-4e^{x^2}x^3+\left(8x^2+e^{x^2}(2x+4x^3)+2x\log(8)\right)\log\left(e^{x^2}+2x+\log(8)\right)+\left(-4e^{x^2}x-8x^2-4x\log(\right.}{(e^{x^2}+2x+\log(8))\log^3\left(e^{x^2}+2\right.}$$
$$=\left(-x+\frac{x}{\log\left(e^{x^2}+2x+\log(8)\right)}\right)^2$$

output
```
(x/ln(exp(x^2)+3*ln(2)+2*x)-x)^2
```

3.1172.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 50 vs. 2(22) = 44.

Time = 0.06 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.27

$$\int \frac{-4x^2-4e^{x^2}x^3+\left(8x^2+e^{x^2}(2x+4x^3)+2x\log(8)\right)\log\left(e^{x^2}+2x+\log(8)\right)+\left(-4e^{x^2}x-8x^2-4x\log(\right.}{(e^{x^2}+2x+\log(8))\log^3\left(e^{x^2}+2\right.}$$
$$=2\left(\frac{x^2}{2}+\frac{x^2}{2\log^2\left(e^{x^2}+2x+\log(8)\right)}-\frac{x^2}{\log\left(e^{x^2}+2x+\log(8)\right)}\right)$$

3.1172.
$\int \frac{-4x^2-4e^{x^2}x^3+\left(8x^2+e^{x^2}(2x+4x^3)+2x\log(8)\right)\log\left(e^{x^2}+2x+\log(8)\right)+\left(-4e^{x^2}x-8x^2-4x\log(8)\right)\log^2\left(e^{x^2}+2x+\log(8)\right)+\left(2e^{x^2}x+4x^2+2x\log\right.}{\left(e^{x^2}+2x+\log(8)\right)\log^3\left(e^{x^2}+2x+\log(8)\right)}$

input
```
Integrate[(-4*x^2 - 4*E^x^2*x^3 + (8*x^2 + E^x^2*(2*x + 4*x^3) + 2*x*Log[8
])*Log[E^x^2 + 2*x + Log[8]] + (-4*E^x^2*x - 8*x^2 - 4*x*Log[8])*Log[E^x^2
 + 2*x + Log[8]]^2 + (2*E^x^2*x + 4*x^2 + 2*x*Log[8])*Log[E^x^2 + 2*x + Lo
g[8]]^3)/((E^x^2 + 2*x + Log[8])*Log[E^x^2 + 2*x + Log[8]]^3),x]
```

output
```
2*(x^2/2 + x^2/(2*Log[E^x^2 + 2*x + Log[8]]^2) - x^2/Log[E^x^2 + 2*x + Log
[8]])
```

3.1172.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^2+\left(4x^2+2e^{x^2}x+2x\log(8)\right)\log^3\left(e^{x^2}+2x+\log(8)\right)+\left(-8x^2-4e^{x^2}x-4x\log(8)\right)\log^2\left(e^{x^2}+2x+\log(8)\right)}{\left(e^{x^2}+2x+\log(8)\right)\log^3\left(e^{x^2}+2x+\log(8)\right)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2x\left(\log\left(e^{x^2}+2x+\log(8)\right)-1\right)\left(2x^2+\log^2\left(e^{x^2}+2x+\log(8)\right)-\log\left(e^{x^2}+2x+\log(8)\right)\right)}{\log^3\left(e^{x^2}+2x+\log(8)\right)}-\frac{4x^2\left(2x^2+\right.}{\left(e^{x^2}+\right.}\right.$$

$$\Big\downarrow \text{2009}$$

$$-4\int \frac{x^2}{\left(2x+e^{x^2}+\log(8)\right)\log^3\left(2x+e^{x^2}+\log(8)\right)}dx+2\int \frac{x}{\log^2\left(2x+e^{x^2}+\log(8)\right)}dx+4\int \frac{x^2}{\left(2x+e^{x^2}+\log(8)\right)\log^2\left(2x+e^{x^2}+\log(8)\right)}dx-4\int \frac{x}{\log\left(2x+e^{x^2}+\log(8)\right)}dx+8\int \frac{x^4}{\left(2x+e^{x^2}+\log(8)\right)\log^3\left(2x+e^{x^2}+\log(8)\right)}dx-8\int \frac{x^4}{\left(2x+e^{x^2}+\log(8)\right)\log^2\left(2x+e^{x^2}+\log(8)\right)}dx-4\int \frac{x^3}{\log^3\left(2x+e^{x^2}+\log(8)\right)}dx+4\log(8)\int \frac{x^3}{\left(2x+e^{x^2}+\log(8)\right)\log^3\left(2x+e^{x^2}+\log(8)\right)}dx+4\int \frac{x^3}{\log^2\left(2x+e^{x^2}+\log(8)\right)}dx-4\log(8)\int \frac{x^3}{\left(2x+e^{x^2}+\log(8)\right)\log^2\left(2x+e^{x^2}+\log(8)\right)}dx+x^2$$

3.1172.

$$\int \frac{-4x^2-4e^{x^2}x^3+\left(8x^2+e^{x^2}(2x+4x^3)+2x\log(8)\right)\log\left(e^{x^2}+2x+\log(8)\right)+\left(-4e^{x^2}x-8x^2-4x\log(8)\right)\log^2\left(e^{x^2}+2x+\log(8)\right)+\left(2e^{x^2}x+4x^2+2x\log\right.}{\left(e^{x^2}+2x+\log(8)\right)\log^3\left(e^{x^2}+2x+\log(8)\right)}$$

input
```
Int[(-4*x^2 - 4*E^x^2*x^3 + (8*x^2 + E^x^2*(2*x + 4*x^3) + 2*x*Log[8])*Log
[E^x^2 + 2*x + Log[8]] + (-4*E^x^2*x - 8*x^2 - 4*x*Log[8])*Log[E^x^2 + 2*x
 + Log[8]]^2 + (2*E^x^2*x + 4*x^2 + 2*x*Log[8])*Log[E^x^2 + 2*x + Log[8]]^
3)/((E^x^2 + 2*x + Log[8])*Log[E^x^2 + 2*x + Log[8]]^3),x]
```

output
```
$Aborted
```

3.1172.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1172.4 Maple [A] (verified)

Time = 0.95 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.91

method	result	size
risch	$x^2-\frac{\left(2\ln\left(\mathrm{e}^{x^2}+3\ln(2)+2x\right)-1\right)x^2}{\ln\left(\mathrm{e}^{x^2}+3\ln(2)+2x\right)^2}$	42
parallelrisch	$\frac{\ln\left(\mathrm{e}^{x^2}+3\ln(2)+2x\right)^2x^2-2\ln\left(\mathrm{e}^{x^2}+3\ln(2)+2x\right)x^2+x^2}{\ln\left(\mathrm{e}^{x^2}+3\ln(2)+2x\right)^2}$	58

input
```
int(((2*exp(x^2)*x+6*x*ln(2)+4*x^2)*ln(exp(x^2)+3*ln(2)+2*x)^3+(-4*exp(x^2
)*x-12*x*ln(2)-8*x^2)*ln(exp(x^2)+3*ln(2)+2*x)^2+((4*x^3+2*x)*exp(x^2)+6*x
*ln(2)+8*x^2)*ln(exp(x^2)+3*ln(2)+2*x)-4*x^3*exp(x^2)-4*x^2)/(exp(x^2)+3*l
n(2)+2*x)/ln(exp(x^2)+3*ln(2)+2*x)^3,x,method=_RETURNVERBOSE)
```

output
```
x^2-(2*ln(exp(x^2)+3*ln(2)+2*x)-1)*x^2/ln(exp(x^2)+3*ln(2)+2*x)^2
```

3.1172.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(22) = 44$.

Time = 0.26 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.59

$$\int \frac{-4x^2-4e^{x^2}x^3+\left(8x^2+e^{x^2}(2x+4x^3)+2x\log(8)\right)\log\left(e^{x^2}+2x+\log(8)\right)+\left(-4e^{x^2}x-8x^2-4x\log(\right.}{(e^{x^2}+2x+\log(8))\log^3\left(e^{x^2}+2\right.}$$

$$=\frac{x^2\log\left(2\,x+e^{(x^2)}+3\,\log(2)\right)^2-2\,x^2\log\left(2\,x+e^{(x^2)}+3\,\log(2)\right)+x^2}{\log\left(2\,x+e^{(x^2)}+3\,\log(2)\right)^2}$$

input
```
integrate(((2*exp(x^2)*x+6*x*log(2)+4*x^2)*log(exp(x^2)+3*log(2)+2*x)^3+(-
4*exp(x^2)*x-12*x*log(2)-8*x^2)*log(exp(x^2)+3*log(2)+2*x)^2+((4*x^3+2*x)*
exp(x^2)+6*x*log(2)+8*x^2)*log(exp(x^2)+3*log(2)+2*x)-4*x^3*exp(x^2)-4*x^2
)/(exp(x^2)+3*log(2)+2*x)/log(exp(x^2)+3*log(2)+2*x)^3,x, algorithm=\
```

output
```
(x^2*log(2*x + e^(x^2) + 3*log(2))^2 - 2*x^2*log(2*x + e^(x^2) + 3*log(2))
 + x^2)/log(2*x + e^(x^2) + 3*log(2))^2
```

3.1172.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. $2(19) = 38$.

Time = 0.16 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.91

$$\int \frac{-4x^2-4e^{x^2}x^3+\left(8x^2+e^{x^2}(2x+4x^3)+2x\log(8)\right)\log\left(e^{x^2}+2x+\log(8)\right)+\left(-4e^{x^2}x-8x^2-4x\log(\right.}{(e^{x^2}+2x+\log(8))\log^3\left(e^{x^2}+2\right.}$$

$$=x^2+\frac{-2x^2\log\left(2x+e^{x^2}+3\log(2)\right)+x^2}{\log\left(2x+e^{x^2}+3\log(2)\right)^2}$$

input
```
integrate(((2*exp(x**2)*x+6*x*ln(2)+4*x**2)*ln(exp(x**2)+3*ln(2)+2*x)**3+(
-4*exp(x**2)*x-12*x*ln(2)-8*x**2)*ln(exp(x**2)+3*ln(2)+2*x)**2+((4*x**3+2*
x)*exp(x**2)+6*x*ln(2)+8*x**2)*ln(exp(x**2)+3*ln(2)+2*x)-4*x**3*exp(x**2)-
4*x**2)/(exp(x**2)+3*ln(2)+2*x)/ln(exp(x**2)+3*ln(2)+2*x)**3,x)
```

output
```
x**2 + (-2*x**2*log(2*x + exp(x**2) + 3*log(2)) + x**2)/log(2*x + exp(x**2
) + 3*log(2))**2
```

3.1172.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(22) = 44$.

Time = 0.32 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.59

$$\int \frac{-4x^2 - 4e^{x^2}x^3 + \left(8x^2 + e^{x^2}(2x + 4x^3) + 2x\log(8)\right)\log\left(e^{x^2} + 2x + \log(8)\right) + \left(-4e^{x^2}x - 8x^2 - 4x\log(\right.}{(e^{x^2} + 2x + \log(8))\log^3(e^{x^2} + 2}$$
$$= \frac{x^2\log\left(2x + e^{(x^2)} + 3\log(2)\right)^2 - 2x^2\log\left(2x + e^{(x^2)} + 3\log(2)\right) + x^2}{\log\left(2x + e^{(x^2)} + 3\log(2)\right)^2}$$

input
```
integrate(((2*exp(x^2)*x+6*x*log(2)+4*x^2)*log(exp(x^2)+3*log(2)+2*x)^3+(-
4*exp(x^2)*x-12*x*log(2)-8*x^2)*log(exp(x^2)+3*log(2)+2*x)^2+((4*x^3+2*x)*
exp(x^2)+6*x*log(2)+8*x^2)*log(exp(x^2)+3*log(2)+2*x)-4*x^3*exp(x^2)-4*x^2
)/(exp(x^2)+3*log(2)+2*x)/log(exp(x^2)+3*log(2)+2*x)^3,x, algorithm=\
```

output
```
(x^2*log(2*x + e^(x^2) + 3*log(2))^2 - 2*x^2*log(2*x + e^(x^2) + 3*log(2))
 + x^2)/log(2*x + e^(x^2) + 3*log(2))^2
```

3.1172.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 57 vs. $2(22) = 44$.

Time = 0.71 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.59

$$\int \frac{-4x^2 - 4e^{x^2}x^3 + \left(8x^2 + e^{x^2}(2x + 4x^3) + 2x\log(8)\right)\log\left(e^{x^2} + 2x + \log(8)\right) + \left(-4e^{x^2}x - 8x^2 - 4x\log(\right.}{(e^{x^2} + 2x + \log(8))\log^3(e^{x^2} + 2}$$
$$= \frac{x^2\log\left(2x + e^{(x^2)} + 3\log(2)\right)^2 - 2x^2\log\left(2x + e^{(x^2)} + 3\log(2)\right) + x^2}{\log\left(2x + e^{(x^2)} + 3\log(2)\right)^2}$$

input
```
integrate(((2*exp(x^2)*x+6*x*log(2)+4*x^2)*log(exp(x^2)+3*log(2)+2*x)^3+(-
4*exp(x^2)*x-12*x*log(2)-8*x^2)*log(exp(x^2)+3*log(2)+2*x)^2+((4*x^3+2*x)*
exp(x^2)+6*x*log(2)+8*x^2)*log(exp(x^2)+3*log(2)+2*x)-4*x^3*exp(x^2)-4*x^2
)/(exp(x^2)+3*log(2)+2*x)/log(exp(x^2)+3*log(2)+2*x)^3,x, algorithm=\
```

output
```
(x^2*log(2*x + e^(x^2) + 3*log(2))^2 - 2*x^2*log(2*x + e^(x^2) + 3*log(2))
 + x^2)/log(2*x + e^(x^2) + 3*log(2))^2
```

3.1172.

$$\int \frac{-4x^2 - 4e^{x^2}x^3 + \left(8x^2 + e^{x^2}(2x + 4x^3) + 2x\log(8)\right)\log\left(e^{x^2} + 2x + \log(8)\right) + \left(-4e^{x^2}x - 8x^2 - 4x\log(8)\right)\log^2\left(e^{x^2} + 2x + \log(8)\right) + \left(2e^{x^2}x + 4x^2 + 2x\log\right.}{\left(e^{x^2} + 2x + \log(8)\right)\log^3\left(e^{x^2} + 2x + \log(8)\right)}$$

3.1172.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-4x^2-4e^{x^2}x^3+\left(8x^2+e^{x^2}(2x+4x^3)+2x\log(8)\right)\log\left(e^{x^2}+2x+\log(8)\right)+\left(-4e^{x^2}x-8x^2-4x\log(\right.}{(e^{x^2}+2x+\log(8))\log^3(e^{x^2}+2}$$
$$= -\int \frac{\ln\left(2x+e^{x^2}+3\ln(2)\right)^2\left(4xe^{x^2}+12x\ln(2)+8x^2\right)-\ln\left(2x+e^{x^2}+3\ln(2)\right)^3\left(2xe^{x^2}+6x\ln\right.}{\ln(2x+e^{x^2}+3\ln(2))^3\ (}$$

input
```
int(-(log(2*x + exp(x^2) + 3*log(2))^2*(4*x*exp(x^2) + 12*x*log(2) + 8*x^2
) - log(2*x + exp(x^2) + 3*log(2))^3*(2*x*exp(x^2) + 6*x*log(2) + 4*x^2) +
 4*x^3*exp(x^2) + 4*x^2 - log(2*x + exp(x^2) + 3*log(2))*(exp(x^2)*(2*x +
4*x^3) + 6*x*log(2) + 8*x^2))/(log(2*x + exp(x^2) + 3*log(2))^3*(2*x + exp
(x^2) + 3*log(2))),x)
```

output
```
-int((log(2*x + exp(x^2) + 3*log(2))^2*(4*x*exp(x^2) + 12*x*log(2) + 8*x^2
) - log(2*x + exp(x^2) + 3*log(2))^3*(2*x*exp(x^2) + 6*x*log(2) + 4*x^2) +
 4*x^3*exp(x^2) + 4*x^2 - log(2*x + exp(x^2) + 3*log(2))*(exp(x^2)*(2*x +
4*x^3) + 6*x*log(2) + 8*x^2))/(log(2*x + exp(x^2) + 3*log(2))^3*(2*x + exp
(x^2) + 3*log(2))), x)
```

3.1173 $\int \frac{34x^2+20x^3+14x^4+10x^5+e^x(-12+12x+11x^2+4x^3+5x^4)+(12+4x$

3.1173.1 Optimal result

Integrand size = 75, antiderivative size = 33

$$\int \frac{34x^2+20x^3+14x^4+10x^5+e^x(-12+12x+11x^2+4x^3+5x^4)+(12+4x^2)\log\left(\frac{1}{4}(3+x^2)\right)}{3x^2+x^4}\,dx = (4+5x)\left(2+\frac{e^x}{x}+x-\frac{\log\left(\frac{3}{4}+\frac{x^2}{4}\right)}{x}\right)$$

output
```
(4+5*x)*(exp(x)/x+2-ln(3/4+1/4*x^2)/x+x)
```

3.1173.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.28 (sec) , antiderivative size = 108, normalized size of antiderivative = 3.27

$$\int \frac{34x^2+20x^3+14x^4+10x^5+e^x(-12+12x+11x^2+4x^3+5x^4)+(12+4x^2)\log\left(\frac{1}{4}(3+x^2)\right)}{3x^2+x^4}\,dx = 5e^x+\frac{4e^x}{x}+14x+5x^2+\frac{8\arctan\left(\frac{x}{\sqrt{3}}\right)}{\sqrt{3}}-\frac{1}{3}\left(15-4i\sqrt{3}\right)\log\left(\sqrt{3}+ix\right) - \frac{1}{3}\left(15+4i\sqrt{3}\right)\log\left(i\sqrt{3}+x\right)-\frac{4\log\left(\frac{3}{4}+\frac{x^2}{4}\right)}{x}$$

input
```
Integrate[(34*x^2 + 20*x^3 + 14*x^4 + 10*x^5 + E^x*(-12 + 12*x + 11*x^2 +
4*x^3 + 5*x^4) + (12 + 4*x^2)*Log[(3 + x^2)/4])/(3*x^2 + x^4),x]
```

output
```
5*E^x + (4*E^x)/x + 14*x + 5*x^2 + (8*ArcTan[x/Sqrt[3]])/Sqrt[3] - ((15 -
(4*I)*Sqrt[3])*Log[Sqrt[3] + I*x])/3 - ((15 + (4*I)*Sqrt[3])*Log[I*Sqrt[3]
 + x])/3 - (4*Log[3/4 + x^2/4])/x
```

3.1173.3 Rubi [A] (verified)

Time = 0.88 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.42, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.040, Rules used = {2026, 7276, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{10x^5+14x^4+20x^3+34x^2+\left(4x^2+12\right)\log\left(\frac{1}{4}\left(x^2+3\right)\right)+e^x\left(5x^4+4x^3+11x^2+12x-12\right)}{x^4+3x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{10x^5+14x^4+20x^3+34x^2+\left(4x^2+12\right)\log\left(\frac{1}{4}\left(x^2+3\right)\right)+e^x\left(5x^4+4x^3+11x^2+12x-12\right)}{x^2\left(x^2+3\right)}dx$$

$$\Big\downarrow \text{7276}$$

$$\int \left(\frac{e^x\left(5x^2+4x-4\right)}{x^2}+\frac{2\left(5x^5+7x^4+10x^3+17x^2+2x^2\log\left(\frac{1}{4}\left(x^2+3\right)\right)+6\log\left(\frac{1}{4}\left(x^2+3\right)\right)\right)}{x^2\left(x^2+3\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$5x^2-5\log\left(x^2+3\right)-\frac{4\log\left(\frac{x^2}{4}+\frac{3}{4}\right)}{x}+14x+5e^x+\frac{4e^x}{x}$$

input
```
Int[(34*x^2 + 20*x^3 + 14*x^4 + 10*x^5 + E^x*(-12 + 12*x + 11*x^2 + 4*x^3
+ 5*x^4) + (12 + 4*x^2)*Log[(3 + x^2)/4])/(3*x^2 + x^4),x]
```

output
```
5*E^x + (4*E^x)/x + 14*x + 5*x^2 - (4*Log[3/4 + x^2/4])/x - 5*Log[3 + x^2]
```

3.1173.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.1173.4 Maple [A] (verified)

Time = 1.87 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.42

method	result	size
default	$\frac{4\,\mathrm{e}^{x}}{x}+5\,\mathrm{e}^{x}-\frac{4\ln\left(x^{2}+3\right)}{x}+\frac{8\ln\left(2\right)}{x}+5x^{2}+14x-5\ln\left(x^{2}+3\right)$	47
parts	$\frac{4\,\mathrm{e}^{x}}{x}+5\,\mathrm{e}^{x}-\frac{4\ln\left(x^{2}+3\right)}{x}+\frac{8\ln\left(2\right)}{x}+5x^{2}+14x-5\ln\left(x^{2}+3\right)$	47
parallelrisch	$-\frac{-30x^{3}+30\ln\left(x^{2}+3\right)x-84x^{2}-30\,\mathrm{e}^{x}x+45x-24\,\mathrm{e}^{x}+24\ln\left(\frac{3}{4}+\frac{x^{2}}{4}\right)}{6x}$	48
risch	$-\frac{4\ln\left(\frac{3}{4}+\frac{x^{2}}{4}\right)}{x}-\frac{-5x^{3}+5\ln\left(x^{2}+3\right)x-14x^{2}-5\,\mathrm{e}^{x}x-4\,\mathrm{e}^{x}}{x}$	49

input
```
int(((4*x^2+12)*ln(3/4+1/4*x^2)+(5*x^4+4*x^3+11*x^2+12*x-12)*exp(x)+10*x^5
+14*x^4+20*x^3+34*x^2)/(x^4+3*x^2),x,method=_RETURNVERBOSE)
```

output
```
4*exp(x)/x+5*exp(x)-4/x*ln(x^2+3)+8*ln(2)/x+5*x^2+14*x-5*ln(x^2+3)
```

3.1173.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.15

$$\int \frac{34x^2+20x^3+14x^4+10x^5+e^x(-12+12x+11x^2+4x^3+5x^4)+(12+4x^2)\log\left(\frac{1}{4}(3+x^2)\right)}{3x^2+x^4}\,dx$$
$$=\frac{5\,x^3+14\,x^2+(5\,x+4)e^x-(5\,x+4)\log\left(\frac{1}{4}\,x^2+\frac{3}{4}\right)}{x}$$

input
```
integrate(((4*x^2+12)*log(3/4+1/4*x^2)+(5*x^4+4*x^3+11*x^2+12*x-12)*exp(x)
+10*x^5+14*x^4+20*x^3+34*x^2)/(x^4+3*x^2),x, algorithm=\
```

output
```
(5*x^3 + 14*x^2 + (5*x + 4)*e^x - (5*x + 4)*log(1/4*x^2 + 3/4))/x
```

3.1173.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.18

$$\int \frac{34x^2+20x^3+14x^4+10x^5+e^x(-12+12x+11x^2+4x^3+5x^4)+(12+4x^2)\log\left(\frac{1}{4}(3+x^2)\right)}{3x^2+x^4}\,dx$$
$$=5x^2+14x-5\log\left(x^2+3\right)+\frac{(5x+4)\,e^x}{x}-\frac{4\log\left(\frac{x^2}{4}+\frac{3}{4}\right)}{x}$$

input
```
integrate(((4*x**2+12)*ln(3/4+1/4*x**2)+(5*x**4+4*x**3+11*x**2+12*x-12)*ex
p(x)+10*x**5+14*x**4+20*x**3+34*x**2)/(x**4+3*x**2),x)
```

output
```
5*x**2 + 14*x - 5*log(x**2 + 3) + (5*x + 4)*exp(x)/x - 4*log(x**2/4 + 3/4)
/x
```

3.1173.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.27

$$\int \frac{34x^2+20x^3+14x^4+10x^5+e^x(-12+12x+11x^2+4x^3+5x^4)+(12+4x^2)\log\left(\frac{1}{4}(3+x^2)\right)}{3x^2+x^4}\,dx$$
$$=5\,x^2+14\,x+\frac{(5\,x+4)e^x+8\,\log(2)-4\,\log\left(x^2+3\right)}{x}-5\,\log\left(x^2+3\right)$$

input
```
integrate(((4*x^2+12)*log(3/4+1/4*x^2)+(5*x^4+4*x^3+11*x^2+12*x-12)*exp(x)
+10*x^5+14*x^4+20*x^3+34*x^2)/(x^4+3*x^2),x, algorithm=\
```

output
```
5*x^2 + 14*x + ((5*x + 4)*e^x + 8*log(2) - 4*log(x^2 + 3))/x - 5*log(x^2 +
 3)
```

3.1173.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.30

$$\int \frac{34x^2+20x^3+14x^4+10x^5+e^x(-12+12x+11x^2+4x^3+5x^4)+(12+4x^2)\log\left(\frac{1}{4}(3+x^2)\right)}{3x^2+x^4}\,dx$$
$$=\frac{5\,x^3+14\,x^2+5\,xe^x-5\,x\log\left(x^2+3\right)+4\,e^x-4\,\log\left(\frac{1}{4}\,x^2+\frac{3}{4}\right)}{x}$$

input
```
integrate(((4*x^2+12)*log(3/4+1/4*x^2)+(5*x^4+4*x^3+11*x^2+12*x-12)*exp(x)
+10*x^5+14*x^4+20*x^3+34*x^2)/(x^4+3*x^2),x, algorithm=\
```

output
```
(5*x^3 + 14*x^2 + 5*x*e^x - 5*x*log(x^2 + 3) + 4*e^x - 4*log(1/4*x^2 + 3/4
))/x
```

3.1173.9 Mupad [B] (verification not implemented)

Time = 15.47 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.24

$$\int \frac{34x^2+20x^3+14x^4+10x^5+e^x(-12+12x+11x^2+4x^3+5x^4)+(12+4x^2)\log\left(\frac{1}{4}(3+x^2)\right)}{3x^2+x^4}\,dx$$
$$=14\,x-5\,\ln\left(x^2+3\right)-\frac{4\,\ln\left(\frac{x^2}{4}+\frac{3}{4}\right)}{x}+5\,x^2+\frac{\mathrm{e}^x\,(5\,x+4)}{x}$$

input
```
int((exp(x)*(12*x + 11*x^2 + 4*x^3 + 5*x^4 - 12) + 34*x^2 + 20*x^3 + 14*x^
4 + 10*x^5 + log(x^2/4 + 3/4)*(4*x^2 + 12))/(3*x^2 + x^4),x)
```

output
```
14*x - 5*log(x^2 + 3) - (4*log(x^2/4 + 3/4))/x + 5*x^2 + (exp(x)*(5*x + 4)
)/x
```

3.1174 $\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}(-2x+20x^3-112x^5+128x^7)}{-1+12x^2-48x^4+64x^6}\,dx$

3.1174.1 Optimal result

Integrand size = 60, antiderivative size = 28

$$\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}(-2x+20x^3-112x^5+128x^7)}{-1+12x^2-48x^4+64x^6}\,dx = e^{\frac{2x^2}{(1-4x^2)^2}}x^2 - \frac{\log(4)}{e}$$

output
```
exp(x^2/(-4*x^2+1)^2)^2*x^2-2*ln(2)/exp(1)
```

3.1174.2 Mathematica [A] (verified)

Time = 0.38 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}(-2x+20x^3-112x^5+128x^7)}{-1+12x^2-48x^4+64x^6}\,dx = e^{\frac{2x^2}{(1-4x^2)^2}}x^2$$

input
```
Integrate[(E^((2*x^2)/(1 - 8*x^2 + 16*x^4))*(-2*x + 20*x^3 - 112*x^5 + 128
*x^7))/(-1 + 12*x^2 - 48*x^4 + 64*x^6),x]
```

output
```
E^((2*x^2)/(1 - 4*x^2)^2)*x^2
```

3.1174.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{2x^2}{16x^4-8x^2+1}} \left(128x^7-112x^5+20x^3-2x\right)}{64x^6-48x^4+12x^2-1} \, dx$$

$$\Big\downarrow \text{ 2029}$$

$$\int \frac{e^{\frac{2x^2}{16x^4-8x^2+1}} x \left(128x^6-112x^4+20x^2-2\right)}{64x^6-48x^4+12x^2-1}dx$$

$$\Big\downarrow \text{ 2070}$$

$$\int \frac{e^{\frac{2x^2}{16x^4-8x^2+1}} x \left(128x^6-112x^4+20x^2-2\right)}{\left(4x^2-1\right)^3}dx$$

$$\Big\downarrow \text{ 7266}$$

$$\frac{1}{2} \int \frac{2e^{\frac{2x^2}{16x^4-8x^2+1}} \left(-64x^6+56x^4-10x^2+1\right)}{\left(1-4x^2\right)^3}dx^2$$

$$\Big\downarrow \text{ 27}$$

$$\int \frac{e^{\frac{2x^2}{16x^4-8x^2+1}} \left(-64x^6+56x^4-10x^2+1\right)}{\left(1-4x^2\right)^3}dx^2$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(e^{\frac{2x^2}{16x^4-8x^2+1}}-\frac{e^{\frac{2x^2}{16x^4-8x^2+1}}}{2 \left(4x^2-1\right)}-\frac{3e^{\frac{2x^2}{16x^4-8x^2+1}}}{2 \left(4x^2-1\right)^2}-\frac{e^{\frac{2x^2}{16x^4-8x^2+1}}}{\left(4x^2-1\right)^3}\right)dx^2$$

$$\Big\downarrow \text{ 2009}$$

$$\int e^{\frac{2x^2}{16x^4-8x^2+1}}dx^2-\int \frac{e^{\frac{2x^2}{16x^4-8x^2+1}}}{\left(4x^2-1\right)^3}dx^2-\frac{3}{2} \int \frac{e^{\frac{2x^2}{16x^4-8x^2+1}}}{\left(4x^2-1\right)^2}dx^2-\frac{1}{2} \int \frac{e^{\frac{2x^2}{16x^4-8x^2+1}}}{4x^2-1}dx^2$$

input
```
Int[(E^((2*x^2)/(1 - 8*x^2 + 16*x^4))*(-2*x + 20*x^3 - 112*x^5 + 128*x^7))
/(-1 + 12*x^2 - 48*x^4 + 64*x^6),x]
```

output
```
$Aborted
```

3.1174. $\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}} \left(-2x+20x^3-112x^5+128x^7\right)}{-1+12x^2-48x^4+64x^6} \, dx$

3.1174.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2029
```
Int[(Fx_.)*((d_.)*(x_)^(q_.) + (a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.) + (c_.)*
(x_)^(t_.))^(p_.), x_Symbol] :> Int[x^(p*r)*(a + b*x^(s - r) + c*x^(t - r)
+ d*x^(q - r))^p*Fx, x] /; FreeQ[{a, b, c, d, r, s, t, q}, x] && IntegerQ[p
] && PosQ[s - r] && PosQ[t - r] && PosQ[q - r] &&  !(EqQ[p, 1] && EqQ[u, 1]
)
```

rule 2070
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x^2, 0], Expon[Px
, x^2]], b = Rt[Coeff[Px, x^2, Expon[Px, x^2]], Expon[Px, x^2]]}, Int[u*(a
+ b*x^2)^(Expon[Px, x^2]*p), x] /; EqQ[Px, (a + b*x^2)^Expon[Px, x^2]]] /;
IntegerQ[p] && PolyQ[Px, x^2] && GtQ[Expon[Px, x^2], 1] && NeQ[Coeff[Px, x^
2, 0], 0]
```

rule 7266
```
Int[(u_)*(x_)^(m_.), x_Symbol] :> Simp[1/(m + 1)   Subst[Int[SubstFor[x^(m
+ 1), u, x], x], x, x^(m + 1)], x] /; FreeQ[m, x] && NeQ[m, -1] && Function
OfQ[x^(m + 1), u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1174. $\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}\left(-2x+20x^3-112x^5+128x^7\right)}{-1+12x^2-48x^4+64x^6}\,dx$

3.1174.4 Maple [A] (verified)

Time = 0.82 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

method	result	size
risch	$x^{2} {\mathrm e}^{\frac{2 x^{2}}{\left(-1+2 x \right)^{2} \left(1+2 x \right)^{2}}}$	25
gosper	$x^{2} {\mathrm e}^{\frac{2 x^{2}}{16 x^{4}-8 x^{2}+1}}$	26
parallelrisch	$x^{2} {\mathrm e}^{\frac{2 x^{2}}{16 x^{4}-8 x^{2}+1}}$	26
norman	$\frac{x^{2} {\mathrm e}^{\frac{2 x^{2}}{16 x^{4}-8 x^{2}+1}}-8 x^{4} {\mathrm e}^{\frac{2 x^{2}}{16 x^{4}-8 x^{2}+1}}+16 x^{6} {\mathrm e}^{\frac{2 x^{2}}{16 x^{4}-8 x^{2}+1}}}{\left(4 x^{2}-1\right)^{2}}$	89

input
```
int((128*x^7-112*x^5+20*x^3-2*x)*exp(x^2/(16*x^4-8*x^2+1))^2/(64*x^6-48*x^
4+12*x^2-1),x,method=_RETURNVERBOSE)
```

output
```
x^2*exp(2*x^2/(-1+2*x)^2/(1+2*x)^2)
```

3.1174.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}(-2x+20x^3-112x^5+128x^7)}{-1+12x^2-48x^4+64x^6}\,dx = x^2e^{\left(\frac{2\,x^2}{16\,x^4-8\,x^2+1}\right)}$$

input
```
integrate((128*x^7-112*x^5+20*x^3-2*x)*exp(x^2/(16*x^4-8*x^2+1))^2/(64*x^6
-48*x^4+12*x^2-1),x, algorithm=\
```

output
```
x^2*e^(2*x^2/(16*x^4 - 8*x^2 + 1))
```

3.1174.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}(-2x+20x^3-112x^5+128x^7)}{-1+12x^2-48x^4+64x^6}\,dx = x^2e^{\frac{2x^2}{16x^4-8x^2+1}}$$

input
```
integrate((128*x**7-112*x**5+20*x**3-2*x)*exp(x**2/(16*x**4-8*x**2+1))**2/
(64*x**6-48*x**4+12*x**2-1),x)
```

output
```
x**2*exp(2*x**2/(16*x**4 - 8*x**2 + 1))
```

3.1174.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.86

$$\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}(-2x+20x^3-112x^5+128x^7)}{-1+12x^2-48x^4+64x^6}\,dx = x^2 e^{\left(\frac{1}{8\,(4\,x^2+4\,x+1)}+\frac{1}{8\,(4\,x^2-4\,x+1)}-\frac{1}{8\,(2\,x+1)}+\frac{1}{8\,(2\,x-1)}\right)}$$

input
```
integrate((128*x^7-112*x^5+20*x^3-2*x)*exp(x^2/(16*x^4-8*x^2+1))^2/(64*x^6
-48*x^4+12*x^2-1),x, algorithm=\
```

output
```
x^2*e^(1/8/(4*x^2 + 4*x + 1) + 1/8/(4*x^2 - 4*x + 1) - 1/8/(2*x + 1) + 1/8
/(2*x - 1))
```

3.1174.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}(-2x+20x^3-112x^5+128x^7)}{-1+12x^2-48x^4+64x^6}\,dx = x^2 e^{\left(\frac{2\,x^2}{16\,x^4-8\,x^2+1}\right)}$$

input
```
integrate((128*x^7-112*x^5+20*x^3-2*x)*exp(x^2/(16*x^4-8*x^2+1))^2/(64*x^6
-48*x^4+12*x^2-1),x, algorithm=\
```

output
```
x^2*e^(2*x^2/(16*x^4 - 8*x^2 + 1))
```

3.1174.9 Mupad [B] (verification not implemented)

Time = 15.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{\frac{2x^2}{1-8x^2+16x^4}}(-2x+20x^3-112x^5+128x^7)}{-1+12x^2-48x^4+64x^6}\,dx = x^2\,\mathrm{e}^{\frac{2\,x^2}{16\,x^4-8\,x^2+1}}$$

input
```
int(-(exp((2*x^2)/(16*x^4 - 8*x^2 + 1))*(2*x - 20*x^3 + 112*x^5 - 128*x^7)
)/(12*x^2 - 48*x^4 + 64*x^6 - 1),x)
```

output
```
x^2*exp((2*x^2)/(16*x^4 - 8*x^2 + 1))
```

3.1175 $\int \frac{1-103x^2+50x^3-\log(x)}{x^2} dx$

3.1175.1 Optimal result

Integrand size = 20, antiderivative size = 27

$$\int \frac{1-103x^2+50x^3-\log(x)}{x^2} dx = 3+e^3+25(-2+x)^2-\frac{3x^2-\log(x)}{x}$$

output
```
5*(-2+x)*(5*x-10)-1/x*(3*x^2-ln(x))+exp(3)+3
```

3.1175.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.56

$$\int \frac{1-103x^2+50x^3-\log(x)}{x^2} dx = -103x+25x^2+\frac{\log(x)}{x}$$

input
```
Integrate[(1 - 103*x^2 + 50*x^3 - Log[x])/x^2,x]
```

output
```
-103*x + 25*x^2 + Log[x]/x
```

3.1175.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.56, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{50x^3-103x^2-\log(x)+1}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{50x^3-103x^2+1}{x^2}-\frac{\log(x)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$25x^2-103x+\frac{\log(x)}{x}$$

input
```
Int[(1 - 103*x^2 + 50*x^3 - Log[x])/x^2,x]
```

output
```
-103*x + 25*x^2 + Log[x]/x
```

3.1175.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1175.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.59

method	result	size
default	$25x^2 - 103x + \frac{\ln(x)}{x}$	16
risch	$25x^2 - 103x + \frac{\ln(x)}{x}$	16
parts	$25x^2 - 103x + \frac{\ln(x)}{x}$	16
norman	$\frac{-103x^2+25x^3+\ln(x)}{x}$	18
parallelrisch	$\frac{-103x^2+25x^3+\ln(x)}{x}$	18

input
```
int((-ln(x)+50*x^3-103*x^2+1)/x^2,x,method=_RETURNVERBOSE)
```

output
```
25*x^2-103*x+ln(x)/x
```

3.1175.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{1 - 103x^2 + 50x^3 - \log(x)}{x^2} \, dx = \frac{25 \, x^3 - 103 \, x^2 + \log{(x)}}{x}$$

input
```
integrate((-log(x)+50*x^3-103*x^2+1)/x^2,x, algorithm=\
```

output
```
(25*x^3 - 103*x^2 + log(x))/x
```

3.1175.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.44

$$\int \frac{1 - 103x^2 + 50x^3 - \log(x)}{x^2} \, dx = 25x^2 - 103x + \frac{\log{(x)}}{x}$$

input
```
integrate((-ln(x)+50*x**3-103*x**2+1)/x**2,x)
```

output
```
25*x**2 - 103*x + log(x)/x
```

3.1175.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.56

$$\int \frac{1-103x^2+50x^3-\log(x)}{x^2}\,dx = 25\,x^2-103\,x+\frac{\log\left(x\right)}{x}$$

input
```
integrate((-log(x)+50*x^3-103*x^2+1)/x^2,x, algorithm=\
```

output
```
25*x^2 - 103*x + log(x)/x
```

3.1175.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.56

$$\int \frac{1-103x^2+50x^3-\log(x)}{x^2}\,dx = 25\,x^2-103\,x+\frac{\log\left(x\right)}{x}$$

input
```
integrate((-log(x)+50*x^3-103*x^2+1)/x^2,x, algorithm=\
```

output
```
25*x^2 - 103*x + log(x)/x
```

3.1175.9 Mupad [B] (verification not implemented)

Time = 15.93 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.52

$$\int \frac{1-103x^2+50x^3-\log(x)}{x^2}\,dx = x\,(25\,x-103)+\frac{\ln\left(x\right)}{x}$$

input
```
int(-(log(x) + 103*x^2 - 50*x^3 - 1)/x^2,x)
```

output
```
x*(25*x - 103) + log(x)/x
```

3.1176 $\int \frac{-25x+e^{4x^2}(-50x^3-200x^5)-25x\log\left(e^{e^{4x^2}x^2}x\right)+(2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}$

3.1176.1 Optimal result

Integrand size = 91, antiderivative size = 33

$$\int \frac{-25x+e^{4x^2}(-50x^3-200x^5)-25x\log\left(e^{e^{4x^2}x^2}x\right)+(2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}\,dx = \frac{-9-\frac{1}{5x}+\frac{5}{\log\left(e^{e^{4x^2}x^2}x\right)}}{x}$$

output
```
(5/ln(x*exp(x^2*exp(x^2)^4))-1/5/x-9)/x
```

3.1176.2 Mathematica [A] (verified)

Time = 0.45 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.15

$$\int \frac{-25x+e^{4x^2}(-50x^3-200x^5)-25x\log\left(e^{e^{4x^2}x^2}x\right)+(2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}\,dx = \frac{1}{5}\left(-\frac{1}{x^2}-\frac{45}{x}+\frac{25}{x\log\left(e^{e^{4x^2}x^2}x\right)}\right)$$

3.1176. $\int \frac{-25x+e^{4x^2}(-50x^3-200x^5)-25x\log\left(e^{e^{4x^2}x^2}x\right)+(2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}\,dx$

input
```
Integrate[(-25*x + E^(4*x^2)*(-50*x^3 - 200*x^5) - 25*x*Log[E^(E^(4*x^2)*x
^2)*x] + (2 + 45*x)*Log[E^(E^(4*x^2)*x^2)*x]^2)/(5*x^3*Log[E^(E^(4*x^2)*x^
2)*x]^2),x]
```

output
```
(-x^(-2) - 45/x + 25/(x*Log[E^(E^(4*x^2)*x^2)*x]))/5
```

3.1176.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(45x+2)\log^2\left(e^{e^{4x^2}x^2}x\right)-25x\log\left(e^{e^{4x^2}x^2}x\right)+e^{4x^2}\left(-200x^5-50x^3\right)-25x}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int -\frac{-\left((45x+2)\log^2\left(e^{e^{4x^2}x^2}x\right)\right)+25x\log\left(e^{e^{4x^2}x^2}x\right)+25x+50e^{4x^2}\left(4x^5+x^3\right)}{x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}dx$$

$$\Big\downarrow \text{25}$$

$$-\frac{1}{5}\int \frac{-\left((45x+2)\log^2\left(e^{e^{4x^2}x^2}x\right)\right)+25x\log\left(e^{e^{4x^2}x^2}x\right)+25x+50e^{4x^2}\left(4x^5+x^3\right)}{x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{5}\int \left(\frac{50e^{4x^2}\left(4x^2+1\right)}{\log^2\left(e^{e^{4x^2}x^2}x\right)}+\frac{-45x\log^2\left(e^{e^{4x^2}x^2}x\right)-2\log^2\left(e^{e^{4x^2}x^2}x\right)+25x\log\left(e^{e^{4x^2}x^2}x\right)+25x}{x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(-50\int \frac{e^{4x^2}}{\log^2\left(e^{e^{4x^2}x^2}x\right)}dx-25\int \frac{1}{x^2\log^2\left(e^{e^{4x^2}x^2}x\right)}dx-200\int \frac{e^{4x^2}x^2}{\log^2\left(e^{e^{4x^2}x^2}x\right)}dx-25\int \frac{1}{x^2\log\left(e^{e^{4x^2}x^2}x\right)}d\right.$$

input
```
Int[(-25*x + E^(4*x^2)*(-50*x^3 - 200*x^5) - 25*x*Log[E^(E^(4*x^2)*x^2)*x]
 + (2 + 45*x)*Log[E^(E^(4*x^2)*x^2)*x]^2)/(5*x^3*Log[E^(E^(4*x^2)*x^2)*x]^
2),x]
```

output
```
$Aborted
```

3.1176.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1176.4 Maple [A] (verified)

Time = 2.11 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.79

method	result
parallelrisch	$\frac{-45x\ln\left(x\,e^{x^2 e^{4x^2}}\right)+25x-\ln\left(x\,e^{x^2 e^{4x^2}}\right)}{5x^2\ln\left(x\,e^{x^2 e^{4x^2}}\right)}$
risch	$-\frac{45x+1}{5x^2}-\frac{10i}{x\left(\pi\ \mathrm{csgn}\left(ie^{x^2 e^{4x^2}}\right)\mathrm{csgn}\left(ix\,e^{x^2 e^{4x^2}}\right)^2-\pi\ \mathrm{csgn}\left(ie^{x^2 e^{4x^2}}\right)\mathrm{csgn}\left(ix\,e^{x^2 e^{4x^2}}\right)\mathrm{csgn}(ix)-\pi\ \mathrm{csgn}\left(ix\,e^{x^2 e^{4x^2}}\right)^3+\right.}$

input
```
int(1/5*((45*x+2)*ln(x*exp(x^2*exp(x^2)^4))^2-25*x*ln(x*exp(x^2*exp(x^2)^4
))+(-200*x^5-50*x^3)*exp(x^2)^4-25*x)/x^3/ln(x*exp(x^2*exp(x^2)^4))^2,x,me
thod=_RETURNVERBOSE)
```

output
```
1/5/x^2*(-45*x*x*ln(x*exp(x^2*exp(x^2)^4))+25*x-ln(x*exp(x^2*exp(x^2)^4)))/l
n(x*exp(x^2*exp(x^2)^4))
```

3.1176.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.36

$$\int \frac{-25x+e^{4x^2}(-50x^3-200x^5)-25x\log\left(e^{e^{4x^2}x^2}x\right)+(2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}\,dx$$
$$=-\frac{(45\,x+1)\log\left(xe^{\left(x^2e^{\left(4\,x^2\right)}\right)}\right)-25\,x}{5\,x^2\log\left(xe^{\left(x^2e^{\left(4\,x^2\right)}\right)}\right)}$$

input
```
integrate(1/5*((45*x+2)*log(x*exp(x^2*exp(x^2)^4))^2-25*x*log(x*exp(x^2*ex
p(x^2)^4))+(-200*x^5-50*x^3)*exp(x^2)^4-25*x)/x^3/log(x*exp(x^2*exp(x^2)^4
))^2,x, algorithm=\
```

output
```
-1/5*((45*x + 1)*log(x*e^(x^2*e^(4*x^2))) - 25*x)/(x^2*log(x*e^(x^2*e^(4*x
^2))))
```

3.1176.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.88

$$\int \frac{-25x+e^{4x^2}(-50x^3-200x^5)-25x\log\left(e^{e^{4x^2}x^2}x\right)+(2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}\,dx$$
$$=\frac{5}{x\log\left(xe^{x^2e^{4x^2}}\right)}+\frac{-45x-1}{5x^2}$$

input
```
integrate(1/5*((45*x+2)*ln(x*exp(x**2*exp(x**2)**4))**2-25*x*ln(x*exp(x**2
*exp(x**2)**4))+(-200*x**5-50*x**3)*exp(x**2)**4-25*x)/x**3/ln(x*exp(x**2*
exp(x**2)**4))**2,x)
```

output
```
5/(x*log(x*exp(x**2*exp(4*x**2)))) + (-45*x - 1)/(5*x**2)
```

3.1176.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.91

$$\int \frac{-25x+e^{4x^2}(-50x^3-200x^5)-25x\log\left(e^{e^{4x^2}x^2}x\right)+(2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}\,dx$$
$$=\frac{5}{x^3e^{(4\,x^2)}+x\log\left(x\right)}-\frac{9}{x}-\frac{1}{5\,x^2}$$

input
```
integrate(1/5*((45*x+2)*log(x*exp(x^2*exp(x^2)^4))^2-25*x*log(x*exp(x^2*ex
p(x^2)^4))+(-200*x^5-50*x^3)*exp(x^2)^4-25*x)/x^3/log(x*exp(x^2*exp(x^2)^4
))^2,x, algorithm=\
```

output
```
5/(x^3*e^(4*x^2) + x*log(x)) - 9/x - 1/5/x^2
```

3.1176.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.61

$$\int \frac{-25x+e^{4x^2}(-50x^3-200x^5)-25x\log\left(e^{e^{4x^2}x^2}x\right)+(2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}\,dx$$
$$=-\frac{45\,x^3e^{(4\,x^2)}+x^2e^{(4\,x^2)}+45\,x\log\left(x\right)-25\,x+\log\left(x\right)}{5\left(x^4e^{(4\,x^2)}+x^2\log\left(x\right)\right)}$$

input
```
integrate(1/5*((45*x+2)*log(x*exp(x^2*exp(x^2)^4))^2-25*x*log(x*exp(x^2*ex
p(x^2)^4))+(-200*x^5-50*x^3)*exp(x^2)^4-25*x)/x^3/log(x*exp(x^2*exp(x^2)^4
))^2,x, algorithm=\
```

output
```
-1/5*(45*x^3*e^(4*x^2) + x^2*e^(4*x^2) + 45*x*log(x) - 25*x + log(x))/(x^4
*e^(4*x^2) + x^2*log(x))
```

3.1176.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-25x + e^{4x^2}(-50x^3 - 200x^5) - 25x\log\left(e^{e^{4x^2}x^2}x\right) + (2+45x)\log^2\left(e^{e^{4x^2}x^2}x\right)}{5x^3\log^2\left(e^{e^{4x^2}x^2}x\right)}\,dx$$
$$= -\int \frac{5\,x + 5\,x\,\ln\left(x\,e^{x^2\,e^{4\,x^2}}\right) - \frac{\ln\left(x\,e^{x^2\,e^{4\,x^2}}\right)^2\,(45\,x+2)}{5} + \frac{e^{4\,x^2}\,(200\,x^5+50\,x^3)}{5}}{x^3\,\ln\left(x\,e^{x^2\,e^{4\,x^2}}\right)^2}\,dx$$

input
```
int(-(5*x + 5*x*log(x*exp(x^2*exp(4*x^2))) - (log(x*exp(x^2*exp(4*x^2)))^2
*(45*x + 2))/5 + (exp(4*x^2)*(50*x^3 + 200*x^5))/5)/(x^3*log(x*exp(x^2*exp
(4*x^2)))^2),x)
```

output
```
-int((5*x + 5*x*log(x*exp(x^2*exp(4*x^2))) - (log(x*exp(x^2*exp(4*x^2)))^2
*(45*x + 2))/5 + (exp(4*x^2)*(50*x^3 + 200*x^5))/5)/(x^3*log(x*exp(x^2*exp
(4*x^2)))^2), x)
```

3.1177 $\int \left(-2+e^{x^4}(6x^2+8x^6+(-4x-8x^5)\log(4))\right)\,dx$

3.1177.1 Optimal result

Integrand size = 31, antiderivative size = 19

$$\int \left(-2+e^{x^4}\left(6x^2+8x^6+\left(-4x-8x^5\right)\log(4)\right)\right)\,dx=\left(2-2e^{x^4}x^2\right)(-x+\log(4))$$

output
```
(2-2*x^2*exp(x^4))*(2*ln(2)-x)
```

3.1177.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.07 (sec) , antiderivative size = 64, normalized size of antiderivative = 3.37

$$\int \left(-2+e^{x^4}\left(6x^2+8x^6+\left(-4x-8x^5\right)\log(4)\right)\right)\,dx$$
$$=-2x+\frac{3\sqrt[4]{-x^4}\,\Gamma\left(\frac{3}{4},-x^4\right)}{2x}-\frac{2\sqrt[4]{-x^4}\,\Gamma\left(\frac{7}{4},-x^4\right)}{x}-2e^{x^4}x^2\log(4)$$

input
```
Integrate[-2 + E^x^4*(6*x^2 + 8*x^6 + (-4*x - 8*x^5)*Log[4]),x]
```

output
```
-2*x + (3*(-x^4)^(1/4)*Gamma[3/4, -x^4])/(2*x) - (2*(-x^4)^(1/4)*Gamma[7/4
, -x^4])/x - 2*E^x^4*x^2*Log[4]
```

3.1177.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.25 (sec) , antiderivative size = 64, normalized size of antiderivative = 3.37, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.032, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{x^4}\left(8x^6+\left(-8x^5-4x\right)\log(4)+6x^2\right)-2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2x^7\Gamma\left(\frac{7}{4},-x^4\right)}{\left(-x^4\right)^{7/4}}-\frac{3x^3\Gamma\left(\frac{3}{4},-x^4\right)}{2\left(-x^4\right)^{3/4}}-2e^{x^4}x^2\log(4)-2x$$

input
```
Int[-2 + E^x^4*(6*x^2 + 8*x^6 + (-4*x - 8*x^5)*Log[4]),x]
```

output
```
-2*x - (3*x^3*Gamma[3/4, -x^4])/(2*(-x^4)^(3/4)) - (2*x^7*Gamma[7/4, -x^4]
)/(-x^4)^(7/4) - 2*E^x^4*x^2*Log[4]
```

3.1177.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1177.4 Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.21

method	result	size
risch	$\left(-4x^2\ln\left(2\right)+2x^3\right)\mathrm{e}^{x^4}-2x$	23
default	$-2x+2x^3\mathrm{e}^{x^4}-4x^2\ln\left(2\right)\mathrm{e}^{x^4}$	25
norman	$-2x+2x^3\mathrm{e}^{x^4}-4x^2\ln\left(2\right)\mathrm{e}^{x^4}$	25
parallelrisch	$-2x+2x^3\mathrm{e}^{x^4}-4x^2\ln\left(2\right)\mathrm{e}^{x^4}$	25
parts	$-2x+2x^3\mathrm{e}^{x^4}-4x^2\ln\left(2\right)\mathrm{e}^{x^4}$	25

input
```
int((2*(-8*x^5-4*x)*ln(2)+8*x^6+6*x^2)*exp(x^4)-2,x,method=_RETURNVERBOSE)
```

output
```
(-4*x^2*ln(2)+2*x^3)*exp(x^4)-2*x
```

3.1177.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int \left(-2+e^{x^4}\left(6x^2+8x^6+\left(-4x-8x^5\right)\log(4)\right)\right)\,dx = 2\left(x^3-2\,x^2\log\left(2\right)\right)e^{\left(x^4\right)}-2\,x$$

input
```
integrate((2*(-8*x^5-4*x)*log(2)+8*x^6+6*x^2)*exp(x^4)-2,x, algorithm=\
```

output
```
2*(x^3 - 2*x^2*log(2))*e^(x^4) - 2*x
```

3.1177.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.05

$$\int \left(-2+e^{x^4}\left(6x^2+8x^6+\left(-4x-8x^5\right)\log(4)\right)\right)\,dx = -2x+\left(2x^3-4x^2\log\left(2\right)\right)e^{x^4}$$

input
```
integrate((2*(-8*x**5-4*x)*ln(2)+8*x**6+6*x**2)*exp(x**4)-2,x)
```

output
```
-2*x + (2*x**3 - 4*x**2*log(2))*exp(x**4)
```

3.1177.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.24 (sec) , antiderivative size = 80, normalized size of antiderivative = 4.21

$$\begin{aligned}\int &\left(-2+e^{x^4}\left(6x^2+8x^6+\left(-4x-8x^5\right)\log(4)\right)\right)\,dx \\ &= -\frac{2\,x^7\Gamma\left(\frac{7}{4},-x^4\right)}{\left(-x^4\right)^{\frac{7}{4}}}-\frac{3\,x^3\Gamma\left(\frac{3}{4},-x^4\right)}{2\left(-x^4\right)^{\frac{3}{4}}}+2i\sqrt{\pi}\,\mathrm{erf}\left(i\,x^2\right)\log\left(2\right) \\ &\quad -2\left(2\,x^2e^{\left(x^4\right)}+i\sqrt{\pi}\,\mathrm{erf}\left(i\,x^2\right)\right)\log\left(2\right)-2\,x\end{aligned}$$

input
```
integrate((2*(-8*x^5-4*x)*log(2)+8*x^6+6*x^2)*exp(x^4)-2,x, algorithm=\
```

output
```
-2*x^7*gamma(7/4, -x^4)/(-x^4)^(7/4) - 3/2*x^3*gamma(3/4, -x^4)/(-x^4)^(3/
4) + 2*I*sqrt(pi)*erf(I*x^2)*log(2) - 2*(2*x^2*e^(x^4) + I*sqrt(pi)*erf(I*
x^2))*log(2) - 2*x
```

3.1177.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \left(-2+e^{x^4}\left(6x^2+8x^6+\left(-4x-8x^5\right)\log(4)\right)\right)\,dx=2\,x^3e^{\left(x^4\right)}-4\,x^2e^{\left(x^4\right)}\log\left(2\right)-2\,x$$

input
```
integrate((2*(-8*x^5-4*x)*log(2)+8*x^6+6*x^2)*exp(x^4)-2,x, algorithm=\
```

output
```
2*x^3*e^(x^4) - 4*x^2*e^(x^4)*log(2) - 2*x
```

3.1177.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \left(-2+e^{x^4}\left(6x^2+8x^6+\left(-4x-8x^5\right)\log(4)\right)\right)\,dx=2\,x^3\,\mathrm{e}^{x^4}-2\,x-4\,x^2\,\mathrm{e}^{x^4}\,\ln\left(2\right)$$

input
```
int(exp(x^4)*(6*x^2 - 2*log(2)*(4*x + 8*x^5) + 8*x^6) - 2,x)
```

output
```
2*x^3*exp(x^4) - 2*x - 4*x^2*exp(x^4)*log(2)
```

3.1178 $\int \frac{e^{e^x+x}x+\frac{e^{2+2\log^2(5x)}\left(-4e^{6+2e^4}+4e^{6+2e^4}\log(5x)\right)}{625x^4}}{x}\,dx$

3.1178.1 Optimal result

Integrand size = 60, antiderivative size = 27

$$\int \frac{e^{e^x+x}x+\frac{e^{2+2\log^2(5x)}\left(-4e^{6+2e^4}+4e^{6+2e^4}\log(5x)\right)}{625x^4}}{x}\,dx = e^{e^x}+e^{6+2e^4+2(1-\log(5x))^2}$$

output
```
exp(3)^2*exp((1-ln(5*x))^2)^2*exp(exp(4))^2+exp(exp(x))
```

3.1178.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{e^{e^x+x}x+\frac{e^{2+2\log^2(5x)}\left(-4e^{6+2e^4}+4e^{6+2e^4}\log(5x)\right)}{625x^4}}{x}\,dx = \frac{1}{625}\left(625e^{e^x}+\frac{e^{2(4+e^4+\log^2(5x))}}{x^4}\right)$$

input
```
Integrate[(E^(E^x + x)*x + (E^(2 + 2*Log[5*x]^2)*(-4*E^(6 + 2*E^4) + 4*E^(
6 + 2*E^4)*Log[5*x]))/(625*x^4))/x,x]
```

output
```
(625*E^E^x + E^(2*(4 + E^4 + Log[5*x]^2))/x^4)/625
```

3.1178.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.033$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\frac{e^{2\log^2(5x)+2}\left(4e^{6+2e^4}\log(5x)-4e^{6+2e^4}\right)}{625x^4}+e^{x+e^x}x}{x}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{4e^{2\left(\log^2(5x)+4\left(1+\frac{e^4}{4}\right)\right)}(\log(5x)-1)}{625x^5}+e^{x+e^x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^{2\left(\log^2(5x)+e^4+4\right)}}{625x^4}+e^{e^x}$$

input
```
Int[(E^(E^x + x)*x + (E^(2 + 2*Log[5*x]^2)*(-4*E^(6 + 2*E^4) + 4*E^(6 + 2*
E^4)*Log[5*x]))/(625*x^4))/x,x]
```

output
```
E^E^x + E^(2*(4 + E^4 + Log[5*x]^2))/(625*x^4)
```

3.1178.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1178.4 Maple [A] (verified)

Time = 1.94 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

method	result	size
risch	$\frac{e^{2 e^{4}+8+2 \ln(5x)^{2}}}{625x^{4}}+e^{e^{x}}$	25
default	$\frac{e^{6} e^{2 e^{4}} e^{2 \ln(5x)^{2}+2}}{625x^{4}}+e^{e^{x}}$	32
parallelrisch	$\frac{e^{6} e^{2 e^{4}} e^{2 \ln(5x)^{2}+2}}{625x^{4}}+e^{e^{x}}$	32
parts	$\frac{e^{6} e^{2 e^{4}} e^{2 \ln(5x)^{2}+2}}{625x^{4}}+e^{e^{x}}$	32

input
```
int(((4*exp(3)^2*exp(exp(4))^2*ln(5*x)-4*exp(3)^2*exp(exp(4))^2)*exp(ln(5*
x)^2-2*ln(5*x)+1)^2+x*exp(x)*exp(exp(x)))/x,x,method=_RETURNVERBOSE)
```

output
```
1/625/x^4*exp(2*exp(4)+8+2*ln(5*x)^2)+exp(exp(x))
```

3.1178.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int \frac{e^{e^{x}+x}x+\frac{e^{2+2\log^{2}(5x)}\left(-4e^{6+2e^{4}}+4e^{6+2e^{4}}\log(5x)\right)}{625x^{4}}}{x}\,dx = \left(e^{\left(2 \log(5 x)^{2}+x+2 e^{4}-4 \log(5 x)+8\right)}+e^{\left(x+e^{x}\right)}\right)e^{(-x)}$$

input
```
integrate(((4*exp(3)^2*exp(exp(4))^2*log(5*x)-4*exp(3)^2*exp(exp(4))^2)*ex
p(log(5*x)^2-2*log(5*x)+1)^2+x*exp(x)*exp(exp(x)))/x,x, algorithm=\
```

output
```
(e^(2*log(5*x)^2 + x + 2*e^4 - 4*log(5*x) + 8) + e^(x + e^x))*e^(-x)
```

3.1178.6 Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

$$\int \frac{e^{e^x+x}x+\frac{e^{2+2\log^2(5x)}\left(-4e^{6+2e^4}+4e^{6+2e^4}\log(5x)\right)}{625x^4}}{x}\,dx = e^{e^x}+\frac{e^6e^{2\log{(5x)}^2+2}e^{2e^4}}{625x^4}$$

input
```
integrate(((4*exp(3)**2*exp(exp(4))**2*ln(5*x)-4*exp(3)**2*exp(exp(4))**2)
*exp(ln(5*x)**2-2*ln(5*x)+1)**2+x*exp(x)*exp(exp(x)))/x,x)
```

output
```
exp(exp(x)) + exp(6)*exp(2*log(5*x)**2 + 2)*exp(2*exp(4))/(625*x**4)
```

3.1178.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.33 (sec) , antiderivative size = 119, normalized size of antiderivative = 4.41

$$\int \frac{e^{e^x+x}x+\frac{e^{2+2\log^2(5x)}\left(-4e^{6+2e^4}+4e^{6+2e^4}\log(5x)\right)}{625x^4}}{x}\,dx = i\sqrt{2}\sqrt{\pi}\,\mathrm{erf}\left(i\sqrt{2}\log(5x)-i\sqrt{2}\right)e^{(2e^4+6)} + \frac{1}{2}\sqrt{2}\left(\frac{2\sqrt{\pi}\left(\mathrm{erf}\left(\sqrt{2}\sqrt{-(\log(5x)-1)^2}\right)-1\right)(\log(5x)-1)}{\sqrt{-(\log(5x)-1)^2}}+\sqrt{2}e^{\left(2(\log(5x)-1)^2\right)}\right)e^{(2(e^2+2e+2)(e^2-2} + e^{(e^x)}$$

input
```
integrate(((4*exp(3)^2*exp(exp(4))^2*log(5*x)-4*exp(3)^2*exp(exp(4))^2)*ex
p(log(5*x)^2-2*log(5*x)+1)^2+x*exp(x)*exp(exp(x)))/x,x, algorithm=\
```

output
```
I*sqrt(2)*sqrt(pi)*erf(I*sqrt(2)*log(5*x) - I*sqrt(2))*e^(2*e^4 + 6) + 1/2
*sqrt(2)*(2*sqrt(pi)*(erf(sqrt(2)*sqrt(-(log(5*x) - 1)^2)) - 1)*(log(5*x)
- 1)/sqrt(-(log(5*x) - 1)^2) + sqrt(2)*e^(2*(log(5*x) - 1)^2))*e^(2*(e^2 +
 2*e + 2)*(e^2 - 2*e + 2) - 2) + e^(e^x)
```

3.1178.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{e^{e^x+x}x+\frac{e^{2+2\log^2(5x)}\left(-4e^{6+2e^4}+4e^{6+2e^4}\log(5x)\right)}{625x^4}}{x}\,dx = \frac{\left(625\,x^4e^{(x+e^x)}+e^{\left(2\,\log(5\,x)^2+x+2\,e^4+8\right)}\right)e^{(-x)}}{625\,x^4}$$

input
```
integrate(((4*exp(3)^2*exp(exp(4))^2*log(5*x)-4*exp(3)^2*exp(exp(4))^2)*ex
p(log(5*x)^2-2*log(5*x)+1)^2+x*exp(x)*exp(exp(x)))/x,x, algorithm=\
```

output
```
1/625*(625*x^4*e^(x + e^x) + e^(2*log(5*x)^2 + x + 2*e^4 + 8))*e^(-x)/x^4
```

3.1178.9 Mupad [B] (verification not implemented)

Time = 16.46 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{e^{e^x+x}x+\frac{e^{2+2\log^2(5x)}\left(-4e^{6+2e^4}+4e^{6+2e^4}\log(5x)\right)}{625x^4}}{x}\,dx = \mathrm{e}^{\mathrm{e}^x}+\frac{x^{4\,\ln(5)}\,\mathrm{e}^{2\ln(x)^2}\,\mathrm{e}^{2\,\mathrm{e}^4}\,\mathrm{e}^8\,\mathrm{e}^{2\ln(5)^2}}{625\,x^4}$$

input
```
int(-(exp(2*log(5*x)^2 - 4*log(5*x) + 2)*(4*exp(2*exp(4))*exp(6) - 4*log(5
*x)*exp(2*exp(4))*exp(6)) - x*exp(exp(x))*exp(x))/x,x)
```

output
```
exp(exp(x)) + (x^(4*log(5))*exp(2*log(x)^2)*exp(2*exp(4))*exp(8)*exp(2*log
(5)^2))/(625*x^4)
```

3.1179 $\int \frac{e^{-x^2}\left(8x-x^2+8x^3-2x^4+e^5(4+8x^2-2x^3)+e^{x^2}(-2e^{10}+6x^2+e^5(-4x+2x^2)+e^x(-8x+5x^2-x^3+e^5(-4+4x-x^2)))\right)}{e^{10}x^2+2e^5x^3+x^4}$

3.1179.1 Optimal result

Integrand size = 126, antiderivative size = 36

$$\int \frac{e^{-x^2}\left(8x-x^2+8x^3-2x^4+e^5(4+8x^2-2x^3)+e^{x^2}(-2e^{10}+6x^2+e^5(-4x+2x^2)+e^x(-8x+5x^2-x^3+e^5(-4+4x-x^2)))\right)}{e^{10}x^2+2e^5x^3+x^4}\,dx = \frac{2-\frac{(4-x)\left(-e^x+e^{-x^2}+2x\right)}{e^5+x}}{x}$$

output
```
(2-(2*x+1/exp(x^2)-exp(x))*(-x+4)/(exp(5)+x))/x
```

3.1179.2 Mathematica [A] (verified)

Time = 10.11 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.47

$$\int \frac{e^{-x^2}\left(8x-x^2+8x^3-2x^4+e^5(4+8x^2-2x^3)+e^{x^2}(-2e^{10}+6x^2+e^5(-4x+2x^2)+e^x(-8x+5x^2-x^3+e^5(-4+4x-x^2)))\right)}{e^{10}x^2+2e^5x^3+x^4}\,dx = \frac{e^{-x^2}\left(-4-e^{x+x^2}(-4+x)-2e^{5+x^2}(-1+x)+x-6e^{x^2}x\right)}{x\,(e^5+x)}$$

input
```
Integrate[(8*x - x^2 + 8*x^3 - 2*x^4 + E^5*(4 + 8*x^2 - 2*x^3) + E^x^2*(-2
*E^10 + 6*x^2 + E^5*(-4*x + 2*x^2) + E^x*(-8*x + 5*x^2 - x^3 + E^5*(-4 + 4
*x - x^2))))/(E^x^2*(E^10*x^2 + 2*E^5*x^3 + x^4)),x]
```

output
```
(-4 - E^(x + x^2)*(-4 + x) - 2*E^(5 + x^2)*(-1 + x) + x - 6*E^x^2*x)/(E^x^
2*x*(E^5 + x))
```

3.1179.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x^2}\left(-2x^4+8x^3-x^2+e^5\left(-2x^3+8x^2+4\right)+e^{x^2}\left(6x^2+e^5\left(2x^2-4x\right)+e^x\left(-x^3+5x^2+e^5\left(-x^2+4x-4\right)\right.\right.\right.}{x^4+2e^5x^3+e^{10}x^2}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{-x^2}\left(-2x^4+8x^3-x^2+e^5\left(-2x^3+8x^2+4\right)+e^{x^2}\left(6x^2+e^5\left(2x^2-4x\right)+e^x\left(-x^3+5x^2+e^5\left(-x^2+4x-4\right)\right.\right.\right.}{x^2\left(x^2+2e^5x+e^{10}\right)}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{e^{-x^2}\left(-2x^4+8x^3-x^2+e^5\left(-2x^3+8x^2+4\right)+e^{x^2}\left(6x^2+e^5\left(2x^2-4x\right)+e^x\left(-x^3+5x^2+e^5\left(-x^2+4x-4\right)\right.\right.\right.}{x^2\left(x+e^5\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2e^{-x^2}x^2}{\left(x+e^5\right)^2}+\frac{8e^{-x^2}x}{\left(x+e^5\right)^2}-\frac{e^{-x^2}}{\left(x+e^5\right)^2}+\frac{8e^{-x^2}}{\left(x+e^5\right)^2x}-\frac{2e^{5-x^2}\left(x^3-4x^2-2\right)}{\left(x+e^5\right)^2x^2}+\frac{-e^xx^3+6\left(1+\frac{e^5}{3}\right)x^2+5\left(1\right.}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-2e^5\int \frac{e^{-x^2}}{x+e^5}dx+8\int \frac{e^{-x^2}}{x+e^5}dx+2\left(4-e^{15}\right)\int \frac{e^{-x^2-10}}{x+e^5}dx-8\int \frac{e^{-x^2-10}}{x+e^5}dx+ 4e^5\left(2+4e^{10}+e^{15}\right)\int \frac{e^{-x^2-5}}{x+e^5}dx-16e^5\int \frac{e^{-x^2-5}}{x+e^5}dx-16e^5\int \frac{e^{5-x^2}}{x+e^5}dx+4\int \frac{e^{5-x^2}}{x+e^5}dx- 4e^5\int \frac{e^{10-x^2}}{x+e^5}dx-\frac{2\left(2+4e^{10}+e^{15}\right)\sqrt{\pi}\text{erf}(x)}{e^5}+2e^{10}\sqrt{\pi}\text{erf}(x)+8e^5\sqrt{\pi}\text{erf}(x)+\frac{4\sqrt{\pi}\text{erf}(x)}{e^5}- \frac{4e^{-x^2-5}}{x}+\frac{e^{-x^2}}{x+e^5}+\frac{8e^{-x^2-5}}{x+e^5}+\frac{8e^{5-x^2}}{x+e^5}+\frac{2e^{10-x^2}}{x+e^5}-\frac{2\left(2+4e^{10}+e^{15}\right)e^{-x^2-5}}{x+e^5}+\frac{4e^{x-5}}{x}+\frac{2}{x}- \frac{\left(4+e^5\right)e^{x-5}}{x+e^5}-\frac{2\left(4+e^5\right)}{x+e^5}$$

input
```
Int[(8*x - x^2 + 8*x^3 - 2*x^4 + E^5*(4 + 8*x^2 - 2*x^3) + E^x^2*(-2*E^10
+ 6*x^2 + E^5*(-4*x + 2*x^2) + E^x*(-8*x + 5*x^2 - x^3 + E^5*(-4 + 4*x - x
^2))))/(E^x^2*(E^10*x^2 + 2*E^5*x^3 + x^4)),x]
```

output
```
$Aborted
```

3.1179.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1179.4 Maple [A] (verified)

Time = 3.10 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.58

method	result
norman	$\frac{\left(-4+x+\left(-2\,\mathrm{e}^{5}-6\right)x\,\mathrm{e}^{x^{2}}+2\,\mathrm{e}^{5}\mathrm{e}^{x^{2}}+4\,\mathrm{e}^{x}\mathrm{e}^{x^{2}}-x\,\mathrm{e}^{x}\mathrm{e}^{x^{2}}\right)\mathrm{e}^{-x^{2}}}{x\left(\mathrm{e}^{5}+x\right)}$
risch	$\frac{\left(-2\,\mathrm{e}^{5}-6\right)x+2\,\mathrm{e}^{5}}{\left(\mathrm{e}^{5}+x\right)x}-\frac{\left(x-4\right)\mathrm{e}^{x}}{\left(\mathrm{e}^{5}+x\right)x}+\frac{\left(x-4\right)\mathrm{e}^{-x^{2}}}{\left(\mathrm{e}^{5}+x\right)x}$
parallelrisch	$\frac{\left(-4-2\,\mathrm{e}^{5}\mathrm{e}^{x^{2}}x-x\,\mathrm{e}^{x}\mathrm{e}^{x^{2}}+2\,\mathrm{e}^{5}\mathrm{e}^{x^{2}}-6\,\mathrm{e}^{x^{2}}x+4\,\mathrm{e}^{x}\mathrm{e}^{x^{2}}+x\right)\mathrm{e}^{-x^{2}}}{x\left(\mathrm{e}^{5}+x\right)}$
parts	$\frac{\left(-2\,\mathrm{e}^{5}-6\right)x+2\,\mathrm{e}^{5}}{\left(\mathrm{e}^{5}+x\right)x}-\frac{\mathrm{e}^{x}\mathrm{e}^{5}}{\mathrm{e}^{5}+x}+\left(1-\mathrm{e}^{5}\right)\mathrm{e}^{-\mathrm{e}^{5}}\operatorname{Ei}_{1}\left(-\mathrm{e}^{5}-x\right)-\mathrm{e}^{5}\left(-\frac{\mathrm{e}^{x}}{\mathrm{e}^{5}+x}-\mathrm{e}^{-\mathrm{e}^{5}}\operatorname{Ei}_{1}\left(-\mathrm{e}^{5}-x\right)\right)-\frac{5\,\mathrm{e}^{x}}{\mathrm{e}^{5}+}$

3.1179.

$$\int \frac{e^{-x^2}\left(8x-x^2+8x^3-2x^4+e^5\left(4+8x^2-2x^3\right)+e^{x^2}\left(-2e^{10}+6x^2+e^5\left(-4x+2x^2\right)+e^x\left(-8x+5x^2-x^3+e^5\left(-4+4x-x^2\right)\right)\right)\right)}{e^{10}x^2+2e^5x^3+x^4}\,dx$$

input
```
int(((((-x^2+4*x-4)*exp(5)-x^3+5*x^2-8*x)*exp(x)-2*exp(5)^2+(2*x^2-4*x)*ex
p(5)+6*x^2)*exp(x^2)+(-2*x^3+8*x^2+4)*exp(5)-2*x^4+8*x^3-x^2+8*x)/(x^2*exp
(5)^2+2*x^3*exp(5)+x^4)/exp(x^2),x,method=_RETURNVERBOSE)
```

output
```
(-4+x+(-2*exp(5)-6)*x*exp(x^2)+2*exp(5)*exp(x^2)+4*exp(x)*exp(x^2)-x*exp(x
)*exp(x^2))/x/(exp(5)+x)/exp(x^2)
```

3.1179.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.25

$$\int \frac{e^{-x^2}\left(8x-x^2+8x^3-2x^4+e^5(4+8x^2-2x^3)+e^{x^2}(-2e^{10}+6x^2+e^5(-4x+2x^2)+e^x(-8x+5x^2-x\right.}{e^{10}x^2+2e^5x^3+x^4}$$

$$= -\frac{\left((2(x-1)e^5+(x-4)e^x+6x)e^{(x^2)}-x+4\right)e^{(-x^2)}}{x^2+xe^5}$$

input
```
integrate(((((-x^2+4*x-4)*exp(5)-x^3+5*x^2-8*x)*exp(x)-2*exp(5)^2+(2*x^2-4
*x)*exp(5)+6*x^2)*exp(x^2)+(-2*x^3+8*x^2+4)*exp(5)-2*x^4+8*x^3-x^2+8*x)/(x
^2*exp(5)^2+2*x^3*exp(5)+x^4)/exp(x^2),x, algorithm=\
```

output
```
-((2*(x - 1)*e^5 + (x - 4)*e^x + 6*x)*e^(x^2) - x + 4)*e^(-x^2)/(x^2 + x*e
^5)
```

3.1179.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(24) = 48.

Time = 0.40 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.50

$$\int \frac{e^{-x^2}\left(8x-x^2+8x^3-2x^4+e^5(4+8x^2-2x^3)+e^{x^2}(-2e^{10}+6x^2+e^5(-4x+2x^2)+e^x(-8x+5x^2-x\right.}{e^{10}x^2+2e^5x^3+x^4}$$

$$= \frac{(4-x)\,e^x}{x^2+xe^5} + \frac{(x-4)\,e^{-x^2}}{x^2+xe^5} + \frac{x(-2e^5-6)+2e^5}{x^2+xe^5}$$

input
```
integrate(((((-x**2+4*x-4)*exp(5)-x**3+5*x**2-8*x)*exp(x)-2*exp(5)**2+(2*x
**2-4*x)*exp(5)+6*x**2)*exp(x**2)+(-2*x**3+8*x**2+4)*exp(5)-2*x**4+8*x**3-
x**2+8*x)/(x**2*exp(5)**2+2*x**3*exp(5)+x**4)/exp(x**2),x)
```

output
```
(4 - x)*exp(x)/(x**2 + x*exp(5)) + (x - 4)*exp(-x**2)/(x**2 + x*exp(5)) +
(x*(-2*exp(5) - 6) + 2*exp(5))/(x**2 + x*exp(5))
```

3.1179.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.14

$$\int \frac{e^{-x^2}\left(8x - x^2 + 8x^3 - 2x^4 + e^5(4 + 8x^2 - 2x^3) + e^{x^2}(-2e^{10} + 6x^2 + e^5(-4x + 2x^2) + e^x(-8x + 5x^2 - x$$
$$= -\frac{2\,x(e^5 + 3) - (x - 4)e^{(-x^2)} + (x - 4)e^x - 2\,e^5}{x^2 + xe^5}$$

input
```
integrate(((((-x^2+4*x-4)*exp(5)-x^3+5*x^2-8*x)*exp(x)-2*exp(5)^2+(2*x^2-4
*x)*exp(5)+6*x^2)*exp(x^2)+(-2*x^3+8*x^2+4)*exp(5)-2*x^4+8*x^3-x^2+8*x)/(x
^2*exp(5)^2+2*x^3*exp(5)+x^4)/exp(x^2),x, algorithm=\
```

output
```
-(2*x*(e^5 + 3) - (x - 4)*e^(-x^2) + (x - 4)*e^x - 2*e^5)/(x^2 + x*e^5)
```

3.1179.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(30) = 60.

Time = 0.29 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.83

$$\int \frac{e^{-x^2}\left(8x - x^2 + 8x^3 - 2x^4 + e^5(4 + 8x^2 - 2x^3) + e^{x^2}(-2e^{10} + 6x^2 + e^5(-4x + 2x^2) + e^x(-8x + 5x^2 - x$$
$$= -\frac{xe^{(x^2+x)} + 2\,xe^{(x^2+5)} + 6\,xe^{(x^2)} - x - 4\,e^{(x^2+x)} - 2\,e^{(x^2+5)} + 4}{x^2e^{(x^2)} + xe^{(x^2+5)}}$$

input
```
integrate(((((-x^2+4*x-4)*exp(5)-x^3+5*x^2-8*x)*exp(x)-2*exp(5)^2+(2*x^2-4
*x)*exp(5)+6*x^2)*exp(x^2)+(-2*x^3+8*x^2+4)*exp(5)-2*x^4+8*x^3-x^2+8*x)/(x
^2*exp(5)^2+2*x^3*exp(5)+x^4)/exp(x^2),x, algorithm=\
```

output
```
-(x*e^(x^2 + x) + 2*x*e^(x^2 + 5) + 6*x*e^(x^2) - x - 4*e^(x^2 + x) - 2*e^
(x^2 + 5) + 4)/(x^2*e^(x^2) + x*e^(x^2 + 5))
```

3.1179.9 Mupad [B] (verification not implemented)

Time = 16.44 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.36

$$\int \frac{e^{-x^2}\Big(8x - x^2 + 8x^3 - 2x^4 + e^5(4+8x^2-2x^3) + e^{x^2}(-2e^{10} + 6x^2 + e^5(-4x+2x^2) + e^x(-8x + 5x^2 - x}{e^{10}x^2 + 2e^5x^3 + x^4}$$
$$= -\frac{6\,x - 2\,\mathrm{e}^5 + 4\,\mathrm{e}^{-x^2} - 4\,\mathrm{e}^x + 2\,x\,\mathrm{e}^5 - x\,\mathrm{e}^{-x^2} + x\,\mathrm{e}^x}{x\,\left(x + \mathrm{e}^5\right)}$$

input
```
int((exp(-x^2)*(8*x - exp(x^2)*(2*exp(10) + exp(5)*(4*x - 2*x^2) + exp(x)*
(8*x + exp(5)*(x^2 - 4*x + 4) - 5*x^2 + x^3) - 6*x^2) + exp(5)*(8*x^2 - 2*
x^3 + 4) - x^2 + 8*x^3 - 2*x^4))/(2*x^3*exp(5) + x^2*exp(10) + x^4),x)
```

output
```
-(6*x - 2*exp(5) + 4*exp(-x^2) - 4*exp(x) + 2*x*exp(5) - x*exp(-x^2) + x*e
xp(x))/(x*(x + exp(5)))
```

3.1180 $\int \frac{6x-32x\log^2(2)}{-15+3x^2+(80-16x^2)\log^2(2)+3\log(9)}\,dx$

3.1180.1 Optimal result

Integrand size = 37, antiderivative size = 21

$$\int \frac{6x-32x\log^2(2)}{-15+3x^2+(80-16x^2)\log^2(2)+3\log(9)}\,dx=\log\left(\frac{1}{3}(-5+x^2)\left(3-16\log^2(2)\right)+\log(9)\right)$$

output
```
ln(1/3*(x^2-5)*(3-16*ln(2)^2)+2*ln(3))
```

3.1180.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{6x-32x\log^2(2)}{-15+3x^2+(80-16x^2)\log^2(2)+3\log(9)}\,dx$$
$$=\log\left(-15+80\log^2(2)+x^2\left(3-16\log^2(2)\right)+\log(729)\right)$$

input
```
Integrate[(6*x - 32*x*Log[2]^2)/(-15 + 3*x^2 + (80 - 16*x^2)*Log[2]^2 + 3*
Log[9]),x]
```

output
```
Log[-15 + 80*Log[2]^2 + x^2*(3 - 16*Log[2]^2) + Log[729]]
```

3.1180.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.081, Rules used = {6, 27, 2020}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x-32x\log^2(2)}{3x^2+(80-16x^2)\log^2(2)-15+3\log(9)}dx$$
$$\Big\downarrow \; 6$$
$$\int \frac{x(6-32\log^2(2))}{3x^2+(80-16x^2)\log^2(2)-15+3\log(9)}dx$$
$$\Big\downarrow \; 27$$
$$2(3-16\log^2(2))\int \frac{x}{3x^2-3(5-\log(9))+16(5-x^2)\log^2(2)}dx$$
$$\Big\downarrow \; 2020$$
$$\log\left(3x^2+16(5-x^2)\log^2(2)-3(5-\log(9))\right)$$

input
```
Int[(6*x - 32*x*Log[2]^2)/(-15 + 3*x^2 + (80 - 16*x^2)*Log[2]^2 + 3*Log[9]
),x]
```

output
```
Log[3*x^2 + 16*(5 - x^2)*Log[2]^2 - 3*(5 - Log[9])]
```

3.1180.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2020
```
Int[(Pp_)/(Qq_), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x]}, Si
mp[Coeff[Pp, x, p]*(Log[RemoveContent[Qq, x]]/(q*Coeff[Qq, x, q])), x] /; E
qQ[p, q - 1] && EqQ[Pp, Simplify[(Coeff[Pp, x, p]/(q*Coeff[Qq, x, q]))*D[Qq
, x]]]] /; PolyQ[Pp, x] && PolyQ[Qq, x]
```

3.1180.4 Maple [A] (verified)

Time = 2.14 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

method	result	size
derivativedivides	$\ln\left(6\ln\left(3\right)+\left(-16x^{2}+80\right)\ln\left(2\right)^{2}+3x^{2}-15\right)$	25
risch	$\ln\left(x^{2}\left(16\ln\left(2\right)^{2}-3\right)-80\ln\left(2\right)^{2}-6\ln\left(3\right)+15\right)$	26
default	$\ln\left(16x^{2}\ln\left(2\right)^{2}-80\ln\left(2\right)^{2}-3x^{2}-6\ln\left(3\right)+15\right)$	28
norman	$\ln\left(16x^{2}\ln\left(2\right)^{2}-80\ln\left(2\right)^{2}-3x^{2}-6\ln\left(3\right)+15\right)$	28
parallelrisch	$\ln\left(\frac{16x^{2}\ln(2)^{2}-80\ln(2)^{2}-3x^{2}-6\ln(3)+15}{16\ln(2)^{2}-3}\right)$	39
meijerg	$-\frac{\left(-32\ln(2)^{2}+6\right)\ln\left(1-\frac{x^{2}\left(16\ln(2)^{2}-3\right)}{80\ln(2)^{2}+6\ln(3)-15}\right)}{2\left(16\ln(2)^{2}-3\right)}$	51

input
```
int((-32*x*ln(2)^2+6*x)/(6*ln(3)+(-16*x^2+80)*ln(2)^2+3*x^2-15),x,method=_
RETURNVERBOSE)
```

output
```
ln(6*ln(3)+(-16*x^2+80)*ln(2)^2+3*x^2-15)
```

3.1180.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{6x-32x\log^{2}(2)}{-15+3x^{2}+(80-16x^{2})\log^{2}(2)+3\log(9)}\,dx$$
$$=\log\left(16\left(x^{2}-5\right)\log\left(2\right)^{2}-3\,x^{2}-6\,\log\left(3\right)+15\right)$$

input
```
integrate((-32*x*log(2)^2+6*x)/(6*log(3)+(-16*x^2+80)*log(2)^2+3*x^2-15),x
, algorithm=\
```

output
```
log(16*(x^2 - 5)*log(2)^2 - 3*x^2 - 6*log(3) + 15)
```

3.1180.6 Sympy [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.00

$$\int \frac{6x-32x\log^2(2)}{-15+3x^2+(80-16x^2)\log^2(2)+3\log(9)}\,dx = \frac{\left(-6+32\log{(2)}^2\right)\log\left(x^2\left(-3+16\log{(2)}^2\right)-80\log{(2)}^2-6\log{(3)}+15\right)}{2\left(-3+16\log{(2)}^2\right)}$$

input
```
integrate((-32*x*ln(2)**2+6*x)/(6*ln(3)+(-16*x**2+80)*ln(2)**2+3*x**2-15),
x)
```

output
```
(-6 + 32*log(2)**2)*log(x**2*(-3 + 16*log(2)**2) - 80*log(2)**2 - 6*log(3)
 + 15)/(2*(-3 + 16*log(2)**2))
```

3.1180.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{6x-32x\log^2(2)}{-15+3x^2+(80-16x^2)\log^2(2)+3\log(9)}\,dx = \log\left(16\left(x^2-5\right)\log{(2)}^2-3\,x^2-6\,\log{(3)}+15\right)$$

input
```
integrate((-32*x*log(2)^2+6*x)/(6*log(3)+(-16*x^2+80)*log(2)^2+3*x^2-15),x
, algorithm=\
```

output
```
log(16*(x^2 - 5)*log(2)^2 - 3*x^2 - 6*log(3) + 15)
```

3.1180.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.33

$$\int \frac{6x-32x\log^2(2)}{-15+3x^2+(80-16x^2)\log^2(2)+3\log(9)}\,dx = \log\left(\left|16\,x^2\log{(2)}^2-3\,x^2-80\,\log{(2)}^2-6\,\log{(3)}+15\right|\right)$$

input
```
integrate((-32*x*log(2)^2+6*x)/(6*log(3)+(-16*x^2+80)*log(2)^2+3*x^2-15),x
, algorithm=\
```

output
```
log(abs(16*x^2*log(2)^2 - 3*x^2 - 80*log(2)^2 - 6*log(3) + 15))
```

3.1180.9 Mupad [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

$$\int \frac{6x-32x\log^2(2)}{-15+3x^2+(80-16x^2)\log^2(2)+3\log(9)}\,dx \\ = \ln\left(\left(16\ln(2)^2-3\right)x^2-\ln(729)-80\ln(2)^2+15\right)$$

input
```
int((6*x - 32*x*log(2)^2)/(6*log(3) - log(2)^2*(16*x^2 - 80) + 3*x^2 - 15)
,x)
```

output
```
log(x^2*(16*log(2)^2 - 3) - log(729) - 80*log(2)^2 + 15)
```

3.1181 $\int \frac{1+x+e^{x+x^2}(-4x-8x^2)+e^{4+x}(2x+2x^2)+e^{2x+2x^2}(2x+4x^2)}{x}\,dx$

3.1181.1 Optimal result

Integrand size = 60, antiderivative size = 24

$$\int \frac{1+x+e^{x+x^2}(-4x-8x^2)+e^{4+x}(2x+2x^2)+e^{2x+2x^2}(2x+4x^2)}{x}\,dx = -4+\left(-2+e^{x+x^2}\right)^2+x+2e^{4+x}x+\log(x)$$

output
```
x+2*x*exp(4+x)+(exp(x^2+x)-2)^2-4+ln(x)
```

3.1181.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{1+x+e^{x+x^2}(-4x-8x^2)+e^{4+x}(2x+2x^2)+e^{2x+2x^2}(2x+4x^2)}{x}\,dx = -4e^{x(1+x)}+e^{2x(1+x)}+x+2e^{4+x}x+\log(x)$$

input
```
Integrate[(1 + x + E^(x + x^2)*(-4*x - 8*x^2) + E^(4 + x)*(2*x + 2*x^2) + 
E^(2*x + 2*x^2)*(2*x + 4*x^2))/x,x]
```

output
```
-4*E^(x*(1 + x)) + E^(2*x*(1 + x)) + x + 2*E^(4 + x)*x + Log[x]
```

3.1181.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.71, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.033, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^2+x}\left(-8x^2-4x\right)+e^{x+4}\left(2x^2+2x\right)+e^{2x^2+2x}\left(4x^2+2x\right)+x+1}{x}dx$$
$$\Big\downarrow \text{2010}$$
$$\int \left(-4e^{x^2+x}(2x+1)+2e^{2x(x+1)}(2x+1)+\frac{(x+1)\left(2e^{x+4}x+1\right)}{x}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-4e^{x^2+x}+e^{2x^2+2x}+x-2e^{x+4}+2e^{x+4}(x+1)+\log(x)$$

input
```
Int[(1 + x + E^(x + x^2)*(-4*x - 8*x^2) + E^(4 + x)*(2*x + 2*x^2) + E^(2*x
 + 2*x^2)*(2*x + 4*x^2))/x,x]
```

output
```
-2*E^(4 + x) - 4*E^(x + x^2) + E^(2*x + 2*x^2) + x + 2*E^(4 + x)*(1 + x) +
 Log[x]
```

3.1181.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1181.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

method	result	size
risch	$x+\mathrm{e}^{2(1+x)x}+2x\,\mathrm{e}^{4+x}-4\,\mathrm{e}^{(1+x)x}+\ln(x)$	27
norman	$x+\mathrm{e}^{2x^2+2x}+2x\,\mathrm{e}^{4+x}-4\,\mathrm{e}^{x^2+x}+\ln(x)$	28
parallelrisch	$x+\mathrm{e}^{2x^2+2x}+2x\,\mathrm{e}^{4+x}-4\,\mathrm{e}^{x^2+x}+\ln(x)$	28
parts	$x+\ln(x)+2\,\mathrm{e}^{4+x}(4+x)-8\,\mathrm{e}^{4+x}-4\,\mathrm{e}^{x^2+x}+\mathrm{e}^{2x^2+2x}$	36
default	$x+\ln(x)+2\,\mathrm{e}^{4}\mathrm{e}^{x}+2\,\mathrm{e}^{4}(\mathrm{e}^{x}x-\mathrm{e}^{x})-4\,\mathrm{e}^{x^2+x}+\mathrm{e}^{2x^2+2x}$	42

input
```
int(((4*x^2+2*x)*exp(x^2+x)^2+(-8*x^2-4*x)*exp(x^2+x)+(2*x^2+2*x)*exp(4+x)
+x+1)/x,x,method=_RETURNVERBOSE)
```

output
```
x+exp(2*(1+x)*x)+2*x*exp(4+x)-4*exp((1+x)*x)+ln(x)
```

3.1181.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{1+x+e^{x+x^2}(-4x-8x^2)+e^{4+x}(2x+2x^2)+e^{2x+2x^2}(2x+4x^2)}{x}\,dx$$
$$=2\,xe^{(x+4)}+x+e^{(2\,x^2+2\,x)}-4\,e^{(x^2+x)}+\log(x)$$

input
```
integrate(((4*x^2+2*x)*exp(x^2+x)^2+(-8*x^2-4*x)*exp(x^2+x)+(2*x^2+2*x)*ex
p(4+x)+x+1)/x,x, algorithm=\
```

output
```
2*x*e^(x + 4) + x + e^(2*x^2 + 2*x) - 4*e^(x^2 + x) + log(x)
```

3.1181.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

$$\int \frac{1+x+e^{x+x^2}(-4x-8x^2)+e^{4+x}(2x+2x^2)+e^{2x+2x^2}(2x+4x^2)}{x}\,dx = 2xe^{x+4}+x-4e^{x^2+x}+e^{2x^2+2x}+\log(x)$$

input
```
integrate(((4*x**2+2*x)*exp(x**2+x)**2+(-8*x**2-4*x)*exp(x**2+x)+(2*x**2+2
*x)*exp(4+x)+x+1)/x,x)
```

output
```
2*x*exp(x + 4) + x - 4*exp(x**2 + x) + exp(2*x**2 + 2*x) + log(x)
```

3.1181.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.33 (sec) , antiderivative size = 173, normalized size of antiderivative = 7.21

$$\begin{aligned}\int \frac{1+x+e^{x+x^2}(-4x-8x^2)+e^{4+x}(2x+2x^2)+e^{2x+2x^2}(2x+4x^2)}{x}\,dx &= -\frac{1}{2}i\sqrt{2}\sqrt{\pi}\,\mathrm{erf}\left(i\sqrt{2}x+\frac{1}{2}i\sqrt{2}\right)e^{\left(-\frac{1}{2}\right)}+2i\sqrt{\pi}\,\mathrm{erf}\left(ix+\frac{1}{2}i\right)e^{\left(-\frac{1}{4}\right)} \\ &\quad -\frac{1}{2}\sqrt{2}\left(\frac{\sqrt{\pi}(2x+1)\left(\mathrm{erf}\left(\sqrt{\frac{1}{2}}\sqrt{-(2x+1)^2}\right)-1\right)}{\sqrt{-(2x+1)^2}}-\sqrt{2}e^{\left(\frac{1}{2}(2x+1)^2\right)}\right)e^{\left(-\frac{1}{2}\right)} \\ &\quad +2\left(\frac{\sqrt{\pi}(2x+1)\left(\mathrm{erf}\left(\frac{1}{2}\sqrt{-(2x+1)^2}\right)-1\right)}{\sqrt{-(2x+1)^2}}-2e^{\left(\frac{1}{4}(2x+1)^2\right)}\right)e^{\left(-\frac{1}{4}\right)} \\ &\quad +2\left(xe^4-e^4\right)e^x+x+2e^{(x+4)}+\log(x)\end{aligned}$$

input
```
integrate(((4*x^2+2*x)*exp(x^2+x)^2+(-8*x^2-4*x)*exp(x^2+x)+(2*x^2+2*x)*ex
p(4+x)+x+1)/x,x, algorithm=\
```

output
```
-1/2*I*sqrt(2)*sqrt(pi)*erf(I*sqrt(2)*x + 1/2*I*sqrt(2))*e^(-1/2) + 2*I*sq
rt(pi)*erf(I*x + 1/2*I)*e^(-1/4) - 1/2*sqrt(2)*(sqrt(pi)*(2*x + 1)*(erf(sq
rt(1/2)*sqrt(-(2*x + 1)^2)) - 1)/sqrt(-(2*x + 1)^2) - sqrt(2)*e^(1/2*(2*x
+ 1)^2))*e^(-1/2) + 2*(sqrt(pi)*(2*x + 1)*(erf(1/2*sqrt(-(2*x + 1)^2)) - 1
)/sqrt(-(2*x + 1)^2) - 2*e^(1/4*(2*x + 1)^2))*e^(-1/4) + 2*(x*e^4 - e^4)*e
^x + x + 2*e^(x + 4) + log(x)
```

3.1181.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{1+x+e^{x+x^2}(-4x-8x^2)+e^{4+x}(2x+2x^2)+e^{2x+2x^2}(2x+4x^2)}{x}\,dx = 2\,xe^{(x+4)}+x+e^{\left(2\,x^2+2\,x\right)}-4\,e^{\left(x^2+x\right)}+\log\left(x\right)$$

input
```
integrate(((4*x^2+2*x)*exp(x^2+x)^2+(-8*x^2-4*x)*exp(x^2+x)+(2*x^2+2*x)*ex
p(4+x)+x+1)/x,x, algorithm=\
```

output
```
2*x*e^(x + 4) + x + e^(2*x^2 + 2*x) - 4*e^(x^2 + x) + log(x)
```

3.1181.9 Mupad [B] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{1+x+e^{x+x^2}(-4x-8x^2)+e^{4+x}(2x+2x^2)+e^{2x+2x^2}(2x+4x^2)}{x}\,dx = x-4\,\mathrm{e}^{x^2+x}+\mathrm{e}^{2\,x^2+2\,x}+\ln\left(x\right)+2\,x\,\mathrm{e}^{x+4}$$

input
```
int((x + exp(x + 4)*(2*x + 2*x^2) + exp(2*x + 2*x^2)*(2*x + 4*x^2) - exp(x
 + x^2)*(4*x + 8*x^2) + 1)/x,x)
```

output
```
x - 4*exp(x + x^2) + exp(2*x + 2*x^2) + log(x) + 2*x*exp(x + 4)
```

3.1182 $\int \frac{e^x(1-x)+(-4e^{2x}+e^x x)\log(e^{-x}(-4e^x+x))\log(\log(e^{-x}(-4e^x+x))}{(8e^x-2x)\log(e^{-x}(-4}$

3.1182.1 Optimal result

Integrand size = 114, antiderivative size = 24

$$\int \frac{e^x(1-x)+(-4e^{2x}+e^x x)\log\left(e^{-x}(-4e^x+x)\right)\log\left(\log\left(e^{-x}(-4e^x+x)\right)\right)+(8e^{2x}-2e^x x)\log\left(e^{-x}(-4e^x\right.}{(8e^x-2x)\log\left(e^{-x}\left(-4e^x+x\right)\right)}$$
$$=e^x\left(-\frac{1}{2}\log\left(\log\left(-4+e^{-x}x\right)\right)+\log(\log(\log(16)))\right)$$

output
```
(ln(ln(4*ln(2)))-1/2*ln(ln(x/exp(x)-4)))*exp(x)
```

3.1182.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04

$$\int \frac{e^x(1-x)+(-4e^{2x}+e^x x)\log\left(e^{-x}(-4e^x+x)\right)\log\left(\log\left(e^{-x}(-4e^x+x)\right)\right)+(8e^{2x}-2e^x x)\log\left(e^{-x}(-4e^x\right.}{(8e^x-2x)\log\left(e^{-x}\left(-4e^x+x\right)\right)}$$
$$=-\frac{1}{2}e^x\left(\log\left(\log\left(-4+e^{-x}x\right)\right)-2\log(\log(\log(16)))\right)$$

input
```
Integrate[(E^x*(1 - x) + (-4*E^(2*x) + E^x*x)*Log[(-4*E^x + x)/E^x]*Log[Lo
g[(-4*E^x + x)/E^x]] + (8*E^(2*x) - 2*E^x*x)*Log[(-4*E^x + x)/E^x]*Log[Log
[Log[16]]])/((8*E^x - 2*x)*Log[(-4*E^x + x)/E^x]),x]
```

output
```
-1/2*(E^x*(Log[Log[-4 + x/E^x]] - 2*Log[Log[Log[16]]]))
```

3.1182.3 Rubi [A] (verified)

Time = 1.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.035$, Rules used = {7292, 27, 7239, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(1-x)+\left(e^x x-4 e^{2x}\right)\log\left(e^{-x}(x-4e^x)\right)\log\left(\log\left(e^{-x}(x-4e^x)\right)\right)+\left(8e^{2x}-2e^x x\right)\log(\log(\log(16)))\log\left(e^{-x}\right.}{(8e^x-2x)\log\left(e^{-x}\left(x-4e^x\right)\right)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^x(1-x)+\left(e^x x-4 e^{2x}\right)\log\left(e^{-x}(x-4e^x)\right)\log\left(\log\left(e^{-x}(x-4e^x)\right)\right)+\left(8e^{2x}-2e^x x\right)\log(\log(\log(16)))\log\left(e^{-x}\right.}{2\left(4e^x-x\right)\log\left(e^{-x}\left(x-4e^x\right)\right)}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int \frac{e^x(1-x)-\left(4e^{2x}-e^x x\right)\log\left(-e^{-x}(4e^x-x)\right)\log\left(\log\left(-e^{-x}(4e^x-x)\right)\right)+2\left(4e^{2x}-e^x x\right)\log\left(-e^{-x}(4e^x-x)\right.}{(4e^x-x)\log\left(-e^{-x}\left(4e^x-x\right)\right)}$$

$$\Big\downarrow \text{ 7239}$$

$$\frac{1}{2}\int \frac{e^x\left(-x-(4e^x-x)\log\left(e^{-x}x-4\right)\left(\log\left(\log\left(e^{-x}x-4\right)\right)-2\log(\log(\log(16)))\right)+1\right)}{(4e^x-x)\log\left(e^{-x}x-4\right)}dx$$

$$\Big\downarrow \text{ 2726}$$

$$-\frac{1}{2}e^x\left(\log\left(\log\left(e^{-x}x-4\right)\right)-2\log(\log(\log(16)))\right)$$

input
```
Int[(E^x*(1 - x) + (-4*E^(2*x) + E^x*x)*Log[(-4*E^x + x)/E^x]*Log[Log[(-4*
E^x + x)/E^x]] + (8*E^(2*x) - 2*E^x*x)*Log[(-4*E^x + x)/E^x]*Log[Log[Log[1
6]]])/((8*E^x - 2*x)*Log[(-4*E^x + x)/E^x]),x]
```

output
```
-1/2*(E^x*(Log[Log[-4 + x/E^x]] - 2*Log[Log[Log[16]]]))
```

3.1182.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1182.4 Maple [A] (verified)

Time = 3.92 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

method	result
parallelrisch	$\ln\left(\ln\left(4\ln\left(2\right)\right)\right) {\mathrm e}^{x}-\frac{{\mathrm e}^{x} \ln\left(\ln\left(-\left(4 \,{\mathrm e}^{x}-x \right) {\mathrm e}^{-x}\right)\right)}{2}$
risch	$-\frac{{\mathrm e}^{x} \ln\left(-\ln\left({\mathrm e}^{x}\right)+\ln\left(-4 \,{\mathrm e}^{x}+x \right)+\frac{i \pi \,\mathrm{csgn}\left(i \left(4 \,{\mathrm e}^{x}-x \right) {\mathrm e}^{-x}\right) \left(\mathrm{csgn}\left(i \left(4 \,{\mathrm e}^{x}-x \right) {\mathrm e}^{-x}\right)+\mathrm{csgn}\left(i {\mathrm e}^{-x}\right)\right) \left(\mathrm{csgn}\left(i \left(4 \,{\mathrm e}^{x}-x \right) {\mathrm e}^{-x}\right)-\mathrm{csgn}\left(i \left(4 \,{\mathrm e}^{x}-x \right)\right)\right)}{2}\right.}{2}$

input
```
int(((-4*exp(x)^2+exp(x)*x)*ln((-4*exp(x)+x)/exp(x))*ln(ln((-4*exp(x)+x)/e
xp(x)))+(8*exp(x)^2-2*exp(x)*x)*ln((-4*exp(x)+x)/exp(x))*ln(ln(4*ln(2)))+(
1-x)*exp(x))/(8*exp(x)-2*x)/ln((-4*exp(x)+x)/exp(x)),x,method=_RETURNVERBO
SE)
```

output
```
ln(ln(4*ln(2)))*exp(x)-1/2*exp(x)*ln(ln(-(4*exp(x)-x)/exp(x)))
```

3.1182.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{e^x(1-x)+(-4e^{2x}+e^xx)\log(e^{-x}(-4e^x+x))\log(\log(e^{-x}(-4e^x+x)))+(8e^{2x}-2e^xx)\log(e^{-x}(-4e^x}{(8e^x-2x)\log(e^{-x}(-4e^x+x))}$$

$$=-\frac{1}{2}e^x\log\left(\log\left((x-4e^x)e^{(-x)}\right)\right)+e^x\log(\log(4\log(2)))$$

input
```
integrate(((-4*exp(x)^2+exp(x)*x)*log((-4*exp(x)+x)/exp(x))*log(log((-4*ex
p(x)+x)/exp(x)))+(8*exp(x)^2-2*exp(x)*x)*log((-4*exp(x)+x)/exp(x))*log(log
(4*log(2)))+(1-x)*exp(x))/(8*exp(x)-2*x)/log((-4*exp(x)+x)/exp(x)),x, algo
rithm=\
```

output
```
-1/2*e^x*log(log((x - 4*e^x)*e^(-x))) + e^x*log(log(4*log(2)))
```

3.1182.6 Sympy [F(-1)]

Timed out.

$$\int \frac{e^x(1-x)+(-4e^{2x}+e^xx)\log(e^{-x}(-4e^x+x))\log(\log(e^{-x}(-4e^x+x)))+(8e^{2x}-2e^xx)\log(e^{-x}(-4e^x}{(8e^x-2x)\log(e^{-x}(-4e^x+x))}$$

$$=\text{Timed out}$$

input
```
integrate(((-4*exp(x)**2+exp(x)*x)*ln((-4*exp(x)+x)/exp(x))*ln(ln((-4*exp(
x)+x)/exp(x)))+(8*exp(x)**2-2*exp(x)*x)*ln((-4*exp(x)+x)/exp(x))*ln(ln(4*l
n(2)))+(1-x)*exp(x))/(8*exp(x)-2*x)/ln((-4*exp(x)+x)/exp(x)),x)
```

output
```
Timed out
```

3.1182.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{e^x(1-x)+(-4e^{2x}+e^xx)\log(e^{-x}(-4e^x+x))\log(\log(e^{-x}(-4e^x+x)))+(8e^{2x}-2e^xx)\log(e^{-x}(-4e^x}{(8e^x-2x)\log(e^{-x}(-4e^x+x))}$$

$$=-\frac{1}{2}e^x\log(-x+\log(x-4e^x))+e^x\log(2\log(2)+\log(\log(2)))$$

3.1182. $\int \frac{e^x(1-x)+(-4e^{2x}+e^xx)\log(e^{-x}(-4e^x+x))\log(\log(e^{-x}(-4e^x+x)))+(8e^{2x}-2e^xx)\log(e^{-x}(-4e^x+x))\log(\log(\log(16)))}{(8e^x-2x)\log(e^{-x}(-4e^x+x))}\,dx$

input
```
integrate(((-4*exp(x)^2+exp(x)*x)*log((-4*exp(x)+x)/exp(x))*log(log((-4*ex
p(x)+x)/exp(x)))+(8*exp(x)^2-2*exp(x)*x)*log((-4*exp(x)+x)/exp(x))*log(log
(4*log(2)))+(1-x)*exp(x))/(8*exp(x)-2*x)/log((-4*exp(x)+x)/exp(x)),x, algo
rithm=\
```

output
```
-1/2*e^x*log(-x + log(x - 4*e^x)) + e^x*log(2*log(2) + log(log(2)))
```

3.1182.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.25

$$\int \frac{e^x(1-x)+(-4e^{2x}+e^xx)\log\left(e^{-x}(-4e^x+x)\right)\log\left(\log\left(e^{-x}(-4e^x+x)\right)\right)+(8e^{2x}-2e^xx)\log\left(e^{-x}(-4e^x\right.}{(8e^x-2x)\log\left(e^{-x}\left(-4e^x+x\right)\right)}$$
$$= e^x\log\left(2\log\left(2\right)+\log\left(\log\left(2\right)\right)\right)-\frac{1}{2}e^x\log\left(\log\left((x-4e^x)e^{(-x)}\right)\right)$$

input
```
integrate(((-4*exp(x)^2+exp(x)*x)*log((-4*exp(x)+x)/exp(x))*log(log((-4*ex
p(x)+x)/exp(x)))+(8*exp(x)^2-2*exp(x)*x)*log((-4*exp(x)+x)/exp(x))*log(log
(4*log(2)))+(1-x)*exp(x))/(8*exp(x)-2*x)/log((-4*exp(x)+x)/exp(x)),x, algo
rithm=\
```

output
```
e^x*log(2*log(2) + log(log(2))) - 1/2*e^x*log(log((x - 4*e^x)*e^(-x)))
```

3.1182.9 Mupad [B] (verification not implemented)

Time = 15.77 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{e^x(1-x)+(-4e^{2x}+e^xx)\log\left(e^{-x}(-4e^x+x)\right)\log\left(\log\left(e^{-x}(-4e^x+x)\right)\right)+(8e^{2x}-2e^xx)\log\left(e^{-x}(-4e^x\right.}{(8e^x-2x)\log\left(e^{-x}\left(-4e^x+x\right)\right)}$$
$$= -\frac{e^x\left(\ln\left(\ln\left(x\,e^{-x}-4\right)\right)-2\ln\left(2\ln\left(2\right)+\ln\left(\ln\left(2\right)\right)\right)\right)}{2}$$

input
```
int((exp(x)*(x - 1) + log(exp(-x)*(x - 4*exp(x)))*log(log(exp(-x)*(x - 4*e
xp(x))))*(4*exp(2*x) - x*exp(x)) - log(exp(-x)*(x - 4*exp(x)))*log(log(4*l
og(2)))*(8*exp(2*x) - 2*x*exp(x)))/(log(exp(-x)*(x - 4*exp(x)))*(2*x - 8*e
xp(x))),x)
```

output
```
-(exp(x)*(log(log(x*exp(-x) - 4)) - 2*log(2*log(2) + log(log(2)))))/2
```

3.1183 $\int \frac{48-120x+4x^2+(15-100x-5x^2)\log\left(\frac{9-120x+394x^2+40x^3+x^4}{x^4}\right)}{-15x^2+100x^3+5x^4}\,dx$

3.1183.1 Optimal result

Integrand size = 63, antiderivative size = 34

$$\int \frac{48-120x+4x^2+(15-100x-5x^2)\log\left(\frac{9-120x+394x^2+40x^3+x^4}{x^4}\right)}{-15x^2+100x^3+5x^4}\,dx = e^4-\frac{4+x}{5x}+\frac{\log\left(\left(-\frac{3}{x^2}+\frac{20+x}{x}\right)^2\right)}{x}$$

output
```
exp(4)-1/5*(4+x)/x+ln(((20+x)/x-3/x^2)^2)/x
```

3.1183.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

$$\int \frac{48-120x+4x^2+(15-100x-5x^2)\log\left(\frac{9-120x+394x^2+40x^3+x^4}{x^4}\right)}{-15x^2+100x^3+5x^4}\,dx = \frac{1}{5}\left(-\frac{4}{x}+\frac{5\log\left(\frac{(-3+20x+x^2)^2}{x^4}\right)}{x}\right)$$

input
```
Integrate[(48 - 120*x + 4*x^2 + (15 - 100*x - 5*x^2)*Log[(9 - 120*x + 394*
x^2 + 40*x^3 + x^4)/x^4])/(-15*x^2 + 100*x^3 + 5*x^4),x]
```

output
```
(-4/x + (5*Log[(-3 + 20*x + x^2)^2/x^4])/x)/5
```

3.1183.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.048, Rules used = {2026, 7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^2+\left(-5x^2-100x+15\right)\log\left(\frac{x^4+40x^3+394x^2-120x+9}{x^4}\right)-120x+48}{5x^4+100x^3-15x^2}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{4x^2+\left(-5x^2-100x+15\right)\log\left(\frac{x^4+40x^3+394x^2-120x+9}{x^4}\right)-120x+48}{x^2\left(5x^2+100x-15\right)}dx$$

$$\Big\downarrow \text{ 7279}$$

$$\int \left(\frac{4\left(x^2-30x+12\right)}{5x^2\left(x^2+20x-3\right)}-\frac{\log\left(\frac{\left(x^2+20x-3\right)^2}{x^4}\right)}{x^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{\log\left(\frac{\left(-x^2-20x+3\right)^2}{x^4}\right)}{x}-\frac{4}{5x}$$

input
```
Int[(48 - 120*x + 4*x^2 + (15 - 100*x - 5*x^2)*Log[(9 - 120*x + 394*x^2 +
40*x^3 + x^4)/x^4])/(-15*x^2 + 100*x^3 + 5*x^4),x]
```

output
```
-4/(5*x) + Log[(3 - 20*x - x^2)^2/x^4]/x
```

3.1183.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

3.1183.4 Maple [A] (verified)

Time = 0.43 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

method	result
norman	$\frac{-\frac{4}{5}+\ln\left(\frac{x^4+40x^3+394x^2-120x+9}{x^4}\right)}{x}$
parallelrisch	$-\frac{8-10\ln\left(\frac{x^4+40x^3+394x^2-120x+9}{x^4}\right)}{10x}$
derivativedivides	$-\frac{4}{5x}+\frac{\ln\left(1+\frac{394}{x^2}-\frac{120}{x^3}+\frac{40}{x}+\frac{9}{x^4}\right)}{x}$
default	$-\frac{4}{5x}+\frac{\ln\left(1+\frac{394}{x^2}-\frac{120}{x^3}+\frac{40}{x}+\frac{9}{x^4}\right)}{x}$
risch	$\frac{\ln\left(\frac{x^4+40x^3+394x^2-120x+9}{x^4}\right)}{x}-\frac{4}{5x}$
parts	$\frac{\ln\left(1+\frac{394}{x^2}-\frac{120}{x^3}+\frac{40}{x}+\frac{9}{x^4}\right)}{x}-\frac{4}{5x}-\frac{20\ln\left(\frac{3}{x^2}-\frac{20}{x}-1\right)}{3}+\frac{4\sqrt{103}\,\mathrm{arctanh}\left(\frac{\left(\frac{6}{x}-20\right)\sqrt{103}}{206}\right)}{3}-\frac{40\ln(x)}{3}+\frac{20\ln(x^2$

input
```
int(((-5*x^2-100*x+15)*ln((x^4+40*x^3+394*x^2-120*x+9)/x^4)+4*x^2-120*x+48
)/(5*x^4+100*x^3-15*x^2),x,method=_RETURNVERBOSE)
```

output
```
(-4/5+ln((x^4+40*x^3+394*x^2-120*x+9)/x^4))/x
```

3.1183.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.94

$$\int \frac{48-120x+4x^2+(15-100x-5x^2)\log\left(\frac{9-120x+394x^2+40x^3+x^4}{x^4}\right)}{-15x^2+100x^3+5x^4}\,dx = \frac{5\,\log\left(\frac{x^4+40\,x^3+394\,x^2-120\,x+9}{x^4}\right)-4}{5\,x}$$

input
```
integrate(((-5*x^2-100*x+15)*log((x^4+40*x^3+394*x^2-120*x+9)/x^4)+4*x^2-1
20*x+48)/(5*x^4+100*x^3-15*x^2),x, algorithm=\
```

output
```
1/5*(5*log((x^4 + 40*x^3 + 394*x^2 - 120*x + 9)/x^4) - 4)/x
```

3.1183.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{48-120x+4x^2+(15-100x-5x^2)\log\left(\frac{9-120x+394x^2+40x^3+x^4}{x^4}\right)}{-15x^2+100x^3+5x^4}\,dx = \frac{\log\left(\frac{x^4+40x^3+394x^2-120x+9}{x^4}\right)}{x}-\frac{4}{5x}$$

input
```
integrate(((-5*x**2-100*x+15)*ln((x**4+40*x**3+394*x**2-120*x+9)/x**4)+4*x
**2-120*x+48)/(5*x**4+100*x**3-15*x**2),x)
```

output
```
log((x**4 + 40*x**3 + 394*x**2 - 120*x + 9)/x**4)/x - 4/(5*x)
```

3.1183.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.53

$$\int \frac{48-120x+4x^2+(15-100x-5x^2)\log\left(\frac{9-120x+394x^2+40x^3+x^4}{x^4}\right)}{-15x^2+100x^3+5x^4}\,dx = -\frac{2\left((16\,x-3)\log\left(x^2+20\,x-3\right)-2\,(16\,x-3)\log\left(x\right)+6\right)}{3\,x} + \frac{16}{5\,x}+\frac{32}{3}\,\log\left(x^2+20\,x-3\right)-\frac{64}{3}\,\log\left(x\right)$$

input
```
integrate(((-5*x^2-100*x+15)*log((x^4+40*x^3+394*x^2-120*x+9)/x^4)+4*x^2-1
20*x+48)/(5*x^4+100*x^3-15*x^2),x, algorithm=\
```

output
```
-2/3*((16*x - 3)*log(x^2 + 20*x - 3) - 2*(16*x - 3)*log(x) + 6)/x + 16/5/x
 + 32/3*log(x^2 + 20*x - 3) - 64/3*log(x)
```

3.1183.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.97

$$\int \frac{48-120x+4x^2+(15-100x-5x^2)\log\left(\frac{9-120x+394x^2+40x^3+x^4}{x^4}\right)}{-15x^2+100x^3+5x^4}\,dx = \frac{\log\left(\frac{x^4+40\,x^3+394\,x^2-120\,x+9}{x^4}\right)}{x}-\frac{4}{5\,x}$$

input
```
integrate(((-5*x^2-100*x+15)*log((x^4+40*x^3+394*x^2-120*x+9)/x^4)+4*x^2-1
20*x+48)/(5*x^4+100*x^3-15*x^2),x, algorithm=\
```

output
```
log((x^4 + 40*x^3 + 394*x^2 - 120*x + 9)/x^4)/x - 4/5/x
```

3.1183.9 Mupad [B] (verification not implemented)

Time = 16.09 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{48-120x+4x^2+(15-100x-5x^2)\log\left(\frac{9-120x+394x^2+40x^3+x^4}{x^4}\right)}{-15x^2+100x^3+5x^4}\,dx = \frac{\ln\left(\frac{x^4+40\,x^3+394\,x^2-120\,x+9}{x^4}\right)-\frac{4}{5}}{x}$$

input
```
int(-(120*x - 4*x^2 + log((394*x^2 - 120*x + 40*x^3 + x^4 + 9)/x^4)*(100*x
 + 5*x^2 - 15) - 48)/(100*x^3 - 15*x^2 + 5*x^4),x)
```

output
```
(log((394*x^2 - 120*x + 40*x^3 + x^4 + 9)/x^4) - 4/5)/x
```

3.1184 $\int \frac{-18+24x+31x^2+6x^3+(45+10x)\log(9+2x)}{9+2x}\,dx$

3.1184.1 Optimal result

Integrand size = 35, antiderivative size = 20

$$\int \frac{-18+24x+31x^2+6x^3+(45+10x)\log(9+2x)}{9+2x}\,dx = -5-2x+x\left(x+x^2+5\log(9+2x)\right)$$

output
```
(x^2+x+5*ln(2*x+9))*x-5-2*x
```

3.1184.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-18+24x+31x^2+6x^3+(45+10x)\log(9+2x)}{9+2x}\,dx = -2x+x^2+x^3+5x\log(9+2x)$$

input
```
Integrate[(-18 + 24*x + 31*x^2 + 6*x^3 + (45 + 10*x)*Log[9 + 2*x])/(9 + 2*
x),x]
```

output
```
-2*x + x^2 + x^3 + 5*x*Log[9 + 2*x]
```

3.1184.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.75, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.057$, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^3+31x^2+24x+(10x+45)\log(2x+9)-18}{2x+9}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{6x^3+31x^2+24x-18}{2x+9}+5\log(2x+9)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^3+x^2-2x+\frac{5}{2}(2x+9)\log(2x+9)-\frac{45}{2}\log(2x+9)$$

input
```
Int[(-18 + 24*x + 31*x^2 + 6*x^3 + (45 + 10*x)*Log[9 + 2*x])/(9 + 2*x),x]
```

output
```
-2*x + x^2 + x^3 - (45*Log[9 + 2*x])/2 + (5*(9 + 2*x)*Log[9 + 2*x])/2
```

3.1184.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1184.4 Maple [A] (verified)

Time = 2.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

method	result	size
norman	$x^{2}+x^{3}-2x+5\ln\left(2x+9\right)x$	20
risch	$x^{2}+x^{3}-2x+5\ln\left(2x+9\right)x$	20
parallelrisch	$x^{3}-\frac{9}{4}+x^{2}+5\ln\left(2x+9\right)x-2x$	21
parts	$x^{3}+x^{2}-2x-\frac{45\ln(2x+9)}{2}+\frac{5(2x+9)\ln(2x+9)}{2}-\frac{45}{2}$	33
derivativedivides	$\frac{(2x+9)^{3}}{8}+\frac{5(2x+9)\ln(2x+9)}{2}+\frac{199x}{4}+\frac{1791}{8}-\frac{25(2x+9)^{2}}{8}-\frac{45\ln(2x+9)}{2}$	45
default	$\frac{(2x+9)^{3}}{8}+\frac{5(2x+9)\ln(2x+9)}{2}+\frac{199x}{4}+\frac{1791}{8}-\frac{25(2x+9)^{2}}{8}-\frac{45\ln(2x+9)}{2}$	45

input
```
int(((10*x+45)*ln(2*x+9)+6*x^3+31*x^2+24*x-18)/(2*x+9),x,method=_RETURNVER
BOSE)
```

output
```
x^2+x^3-2*x+5*ln(2*x+9)*x
```

3.1184.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-18+24x+31x^2+6x^3+(45+10x)\log(9+2x)}{9+2x}\,dx = x^{3}+x^{2}+5\,x\log\left(2\,x+9\right)-2\,x$$

input
```
integrate(((10*x+45)*log(2*x+9)+6*x^3+31*x^2+24*x-18)/(2*x+9),x, algorithm
=\
```

output
```
x^3 + x^2 + 5*x*log(2*x + 9) - 2*x
```

3.1184.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-18+24x+31x^2+6x^3+(45+10x)\log(9+2x)}{9+2x}\,dx = x^3+x^2+5x\log(2x+9)-2x$$

input
```
integrate(((10*x+45)*ln(2*x+9)+6*x**3+31*x**2+24*x-18)/(2*x+9),x)
```

output
```
x**3 + x**2 + 5*x*log(2*x + 9) - 2*x
```

3.1184.7 Maxima [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 40, normalized size of antiderivative = 2.00

$$\int \frac{-18+24x+31x^2+6x^3+(45+10x)\log(9+2x)}{9+2x}\,dx$$
$$= x^3+x^2+\frac{5}{2}\,(2\,x-9\,\log(2\,x+9))\log(2\,x+9)+\frac{45}{2}\,\log(2\,x+9)^2-2\,x$$

input
```
integrate(((10*x+45)*log(2*x+9)+6*x^3+31*x^2+24*x-18)/(2*x+9),x, algorithm
=\
```

output
```
x^3 + x^2 + 5/2*(2*x - 9*log(2*x + 9))*log(2*x + 9) + 45/2*log(2*x + 9)^2
- 2*x
```

3.1184.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-18+24x+31x^2+6x^3+(45+10x)\log(9+2x)}{9+2x}\,dx = x^3+x^2+5\,x\log(2\,x+9)-2\,x$$

input
```
integrate(((10*x+45)*log(2*x+9)+6*x^3+31*x^2+24*x-18)/(2*x+9),x, algorithm
=\
```

output
```
x^3 + x^2 + 5*x*log(2*x + 9) - 2*x
```

3.1184.9 Mupad [B] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-18+24x+31x^2+6x^3+(45+10x)\log(9+2x)}{9+2x}\,dx = x\,(5\,\ln\left(2\,x+9\right)-2)+x^2+x^3$$

input
```
int((24*x + log(2*x + 9)*(10*x + 45) + 31*x^2 + 6*x^3 - 18)/(2*x + 9),x)
```

output
```
x*(5*log(2*x + 9) - 2) + x^2 + x^3
```

3.1185 $\int \frac{e^x(1-x)+e^2(-20x+11x^2)+4e^2x^2\log(x)}{e^2x^2}\,dx$

3.1185.1 Optimal result

Integrand size = 40, antiderivative size = 26

$$\int \frac{e^x(1-x)+e^2(-20x+11x^2)+4e^2x^2\log(x)}{e^2x^2}\,dx = 3(-3+x)-\frac{e^{-2+x}}{x}+(-5+x)(4+4\log(x))$$

output
```
(4*ln(x)+4)*(-5+x)-exp(x)/exp(2)/x+3*x-9
```

3.1185.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{e^x(1-x)+e^2(-20x+11x^2)+4e^2x^2\log(x)}{e^2x^2}\,dx = -\frac{e^{-2+x}}{x}+7x-20\log(x)+4x\log(x)$$

input
```
Integrate[(E^x*(1 - x) + E^2*(-20*x + 11*x^2) + 4*E^2*x^2*Log[x])/(E^2*x^2
),x]
```

output
```
-(E^(-2 + x)/x) + 7*x - 20*Log[x] + 4*x*Log[x]
```

3.1185.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.075, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2\left(11x^2-20x\right)+4e^2x^2\log(x)+e^x(1-x)}{e^2x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \frac{4e^2\log(x)x^2+e^x(1-x)-e^2\left(20x-11x^2\right)}{x^2}dx}{e^2}$$

$$\Big\downarrow \text{2010}$$

$$\frac{\int \left(\frac{e^2(4\log(x)x+11x-20)}{x}-\frac{e^x(x-1)}{x^2}\right)dx}{e^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{7e^2x-\frac{e^x}{x}+4e^2x\log(x)-20e^2\log(x)}{e^2}$$

input
```
Int[(E^x*(1 - x) + E^2*(-20*x + 11*x^2) + 4*E^2*x^2*Log[x])/(E^2*x^2),x]
```

output
```
(-(E^x/x) + 7*E^2*x - 20*E^2*Log[x] + 4*E^2*x*Log[x])/E^2
```

3.1185.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1185.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

method	result	size
parts	$7x - 20\ln(x) - \frac{e^{x} e^{-2}}{x} + 4x\ln(x)$	25
risch	$-\frac{20x\ln(x) - 7x^2 - 4x^2\ln(x) + e^{-2+x}}{x}$	28
norman	$\frac{-20x\ln(x) + 7x^2 + 4x^2\ln(x) - e^{-2} e^{x}}{x}$	31
default	$e^{-2}\left(e^{2}(11x - 20\ln(x)) + 4\,e^{2}(x\ln(x) - x) - \frac{e^{x}}{x}\right)$	37
parallelrisch	$\frac{e^{-2}(4x^2 e^{2}\ln(x) + 7x^2 e^{2} - 20x\,e^{2}\ln(x) - e^{x})}{x}$	37

input
```
int((4*x^2*exp(2)*ln(x)+(1-x)*exp(x)+(11*x^2-20*x)*exp(2))/x^2/exp(2),x,me
thod=_RETURNVERBOSE)
```

output
```
7*x-20*ln(x)-exp(x)/exp(2)/x+4*x*ln(x)
```

3.1185.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{e^{x}(1-x) + e^{2}(-20x + 11x^2) + 4e^{2}x^2\log(x)}{e^{2}x^2}\,dx = \frac{(7\,x^2e^2 + 4\,(x^2 - 5\,x)e^2\log(x) - e^{x})e^{(-2)}}{x}$$

input
```
integrate((4*x^2*exp(2)*log(x)+(1-x)*exp(x)+(11*x^2-20*x)*exp(2))/x^2/exp(
2),x, algorithm=\
```

output
```
(7*x^2*e^2 + 4*(x^2 - 5*x)*e^2*log(x) - e^x)*e^(-2)/x
```

3.1185.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{e^x(1-x)+e^2(-20x+11x^2)+4e^2x^2\log(x)}{e^2x^2}\,dx = 4x\log(x)+7x-20\log(x)-\frac{e^x}{xe^2}$$

input
```
integrate((4*x**2*exp(2)*ln(x)+(1-x)*exp(x)+(11*x**2-20*x)*exp(2))/x**2/ex
p(2),x)
```

output
```
4*x*log(x) + 7*x - 20*log(x) - exp(-2)*exp(x)/x
```

3.1185.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.21 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{e^x(1-x)+e^2(-20x+11x^2)+4e^2x^2\log(x)}{e^2x^2}\,dx = \left(4\,(x\log(x)-x)e^2+11\,xe^2-20\,e^2\log(x)-\mathrm{Ei}(x)+\Gamma(-1,-x)\right)e^{(-2)}$$

input
```
integrate((4*x^2*exp(2)*log(x)+(1-x)*exp(x)+(11*x^2-20*x)*exp(2))/x^2/exp(
2),x, algorithm=\
```

output
```
(4*(x*log(x) - x)*e^2 + 11*x*e^2 - 20*e^2*log(x) - Ei(x) + gamma(-1, -x))*
e^(-2)
```

3.1185.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int \frac{e^x(1-x)+e^2(-20x+11x^2)+4e^2x^2\log(x)}{e^2x^2}\,dx = \frac{(4\,x^2e^2\log(x)+7\,x^2e^2-20\,xe^2\log(x)-e^x)e^{(-2)}}{x}$$

input
```
integrate((4*x^2*exp(2)*log(x)+(1-x)*exp(x)+(11*x^2-20*x)*exp(2))/x^2/exp(
2),x, algorithm=\
```

output
```
(4*x^2*e^2*log(x) + 7*x^2*e^2 - 20*x*e^2*log(x) - e^x)*e^(-2)/x
```

3.1185.9 Mupad [B] (verification not implemented)

Time = 15.89 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{e^x(1-x)+e^2(-20x+11x^2)+4e^2x^2\log(x)}{e^2x^2}\,dx = x\,(4\,\ln{(x)}+7)-\frac{\mathrm{e}^{x-2}}{x}-20\,\ln{(x)}$$

input
```
int(-(exp(-2)*(exp(x)*(x - 1) + exp(2)*(20*x - 11*x^2) - 4*x^2*exp(2)*log(
x)))/x^2,x)
```

output
```
x*(4*log(x) + 7) - exp(x - 2)/x - 20*log(x)
```

3.1186 $\int \frac{4x+e^{-x}\log(5)(-12-8x+(-4-4x)\log(x))}{4x^2+4x^2\log(x)+x^2\log^2(x)}\,dx$

3.1186.1 Optimal result

Integrand size = 49, antiderivative size = 25

$$\int \frac{4x+e^{-x}\log(5)(-12-8x+(-4-4x)\log(x))}{4x^2+4x^2\log(x)+x^2\log^2(x)}\,dx=\frac{2(-x+e^{-x}\log(5))}{x+\frac{1}{2}x\log(x)}$$

output
```
(exp(ln(ln(5))-x)-x)/(1/4*x*ln(x)+1/2*x)
```

3.1186.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{4x+e^{-x}\log(5)(-12-8x+(-4-4x)\log(x))}{4x^2+4x^2\log(x)+x^2\log^2(x)}\,dx=\frac{e^{-x}(-4e^x x+\log(625))}{x(2+\log(x))}$$

input
```
Integrate[(4*x + (Log[5]*(-12 - 8*x + (-4 - 4*x)*Log[x]))/E^x)/(4*x^2 + 4*
x^2*Log[x] + x^2*Log[x]^2),x]
```

output
```
(-4*E^x*x + Log[625])/(E^x*x*(2 + Log[x]))
```

3.1186.3 Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.40, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.061, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x+e^{-x}\log(5)(-8x+(-4x-4)\log(x)-12)}{4x^2+x^2\log^2(x)+4x^2\log(x)}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{4x+e^{-x}\log(5)(-8x+(-4x-4)\log(x)-12)}{x^2(\log(x)+2)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{4}{x(\log(x)+2)^2}-\frac{4e^{-x}\log(5)(2x+x\log(x)+\log(x)+3)}{x^2(\log(x)+2)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{4e^{-x}\log(5)(2x+x\log(x))}{x^2(\log(x)+2)^2}-\frac{4}{\log(x)+2}$$

input
```
Int[(4*x + (Log[5]*(-12 - 8*x + (-4 - 4*x)*Log[x]))/E^x)/(4*x^2 + 4*x^2*Lo
g[x] + x^2*Log[x]^2),x]
```

output
```
-4/(2 + Log[x]) + (4*Log[5]*(2*x + x*Log[x]))/(E^x*x^2*(2 + Log[x])^2)
```

3.1186.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1186.4 Maple [A] (verified)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

method	result	size
risch	$-\frac{4(x-\ln(5)\mathrm{e}^{-x})}{x(\ln(x)+2)}$	22
norman	$\frac{-4x+4\,\mathrm{e}^{\ln(\ln(5))-x}}{(\ln(x)+2)x}$	25
parallelrisch	$\frac{-4x+4\,\mathrm{e}^{\ln(\ln(5))-x}}{(\ln(x)+2)x}$	25
default	$\frac{4\,\mathrm{e}^{\ln(\ln(5))-x}}{x(\ln(x)+2)}-\frac{4}{\ln(x)+2}$	29
parts	$\frac{4\,\mathrm{e}^{\ln(\ln(5))-x}}{x(\ln(x)+2)}-\frac{4}{\ln(x)+2}$	29

input
```
int((((-4-4*x)*ln(x)-8*x-12)*exp(ln(ln(5))-x)+4*x)/(x^2*ln(x)^2+4*x^2*ln(x
)+4*x^2),x,method=_RETURNVERBOSE)
```

output
```
-4/x*(x-ln(5)*exp(-x))/(ln(x)+2)
```

3.1186.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{4x+e^{-x}\log(5)(-12-8x+(-4-4x)\log(x))}{4x^2+4x^2\log(x)+x^2\log^2(x)}\,dx=-\frac{4\left(x-e^{(-x+\log(\log(5)))}\right)}{x\log{(x)}+2\,x}$$

input
```
integrate((((-4-4*x)*log(x)-8*x-12)*exp(log(log(5))-x)+4*x)/(x^2*log(x)^2+
4*x^2*log(x)+4*x^2),x, algorithm=\
```

output
```
-4*(x - e^(-x + log(log(5))))/(x*log(x) + 2*x)
```

3.1186.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{4x+e^{-x}\log(5)(-12-8x+(-4-4x)\log(x))}{4x^2+4x^2\log(x)+x^2\log^2(x)}\,dx=-\frac{4}{\log(x)+2}+\frac{4e^{-x}\log(5)}{x\log(x)+2x}$$

input
```
integrate(((((-4-4*x)*ln(x)-8*x-12)*exp(ln(ln(5))-x)+4*x)/(x**2*ln(x)**2+4*
x**2*ln(x)+4*x**2),x)
```

output
```
-4/(log(x) + 2) + 4*exp(-x)*log(5)/(x*log(x) + 2*x)
```

3.1186.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{4x+e^{-x}\log(5)(-12-8x+(-4-4x)\log(x))}{4x^2+4x^2\log(x)+x^2\log^2(x)}\,dx=\frac{4\,e^{(-x)}\log(5)}{x\log(x)+2\,x}-\frac{4}{\log(x)+2}$$

input
```
integrate(((((-4-4*x)*log(x)-8*x-12)*exp(log(log(5))-x)+4*x)/(x^2*log(x)^2+
4*x^2*log(x)+4*x^2),x, algorithm=\
```

output
```
4*e^(-x)*log(5)/(x*log(x) + 2*x) - 4/(log(x) + 2)
```

3.1186.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{4x+e^{-x}\log(5)(-12-8x+(-4-4x)\log(x))}{4x^2+4x^2\log(x)+x^2\log^2(x)}\,dx=\frac{4\left(e^{(-x)}\log(5)-x\right)}{x\log(x)+2\,x}$$

input
```
integrate(((((-4-4*x)*log(x)-8*x-12)*exp(log(log(5))-x)+4*x)/(x^2*log(x)^2+
4*x^2*log(x)+4*x^2),x, algorithm=\
```

output
```
4*(e^(-x)*log(5) - x)/(x*log(x) + 2*x)
```

3.1186.9 Mupad [B] (verification not implemented)

Time = 17.03 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{4x+e^{-x}\log(5)(-12-8x+(-4-4x)\log(x))}{4x^2+4x^2\log(x)+x^2\log^2(x)}\,dx=\frac{4\,\mathrm{e}^{-x}\,(\ln(5)-x\,\mathrm{e}^{x})}{x\,(\ln(x)+2)}$$

input
```
int((4*x - exp(log(log(5)) - x)*(8*x + log(x)*(4*x + 4) + 12))/(4*x^2*log(
x) + x^2*log(x)^2 + 4*x^2),x)
```

output
```
(4*exp(-x)*(log(5) - x*exp(x)))/(x*(log(x) + 2))
```

3.1187 $\int \frac{-x^2+x^5+(x^2+x^3)\log(x)+(3x^3+3x^4+3x^2\log(x))\log\left(\frac{e^{-x}(x+x^2+\ldots}{x}\right.}{(x+x^2+\log(x))\log^2\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}$

3.1187.1 Optimal result

Integrand size = 84, antiderivative size = 23

$$\int \frac{-x^2+x^5+(x^2+x^3)\log(x)+(3x^3+3x^4+3x^2\log(x))\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}{(x+x^2+\log(x))\log^2\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}\,dx = \frac{x^3}{\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}$$

output
```
x^3/ln((ln(x)+x^2+x)/exp(x)/x)
```

3.1187.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{-x^2+x^5+(x^2+x^3)\log(x)+(3x^3+3x^4+3x^2\log(x))\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}{(x+x^2+\log(x))\log^2\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}\,dx = \frac{x^3}{\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}$$

3.1187. $\int \frac{-x^2+x^5+(x^2+x^3)\log(x)+(3x^3+3x^4+3x^2\log(x))\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}{(x+x^2+\log(x))\log^2\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}\,dx$

input
```
Integrate[(-x^2 + x^5 + (x^2 + x^3)*Log[x] + (3*x^3 + 3*x^4 + 3*x^2*Log[x]
)*Log[(x + x^2 + Log[x])/(E^x*x)])/((x + x^2 + Log[x])*Log[(x + x^2 + Log[
x])/(E^x*x)]^2),x]
```

output
```
x^3/Log[(x + x^2 + Log[x])/(E^x*x)]
```

3.1187.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5-x^2+\left(x^3+x^2\right)\log(x)+\left(3x^4+3x^3+3x^2\log(x)\right)\log\left(\frac{e^{-x}\left(x^2+x+\log(x)\right)}{x}\right)}{\left(x^2+x+\log(x)\right)\log^2\left(\frac{e^{-x}\left(x^2+x+\log(x)\right)}{x}\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{3x^2}{\log\left(\frac{e^{-x}\left(x^2+x+\log(x)\right)}{x}\right)}+\frac{x^2\left(x^3+x\log(x)+\log(x)-1\right)}{\left(x^2+x+\log(x)\right)\log^2\left(\frac{e^{-x}\left(x^2+x+\log(x)\right)}{x}\right)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\int \frac{x^2}{\left(x^2+x+\log(x)\right)\log^2\left(\frac{e^{-x}\left(x^2+x+\log(x)\right)}{x}\right)}dx+\int \frac{x^2\log(x)}{\left(x^2+x+\log(x)\right)\log^2\left(\frac{e^{-x}\left(x^2+x+\log(x)\right)}{x}\right)}dx+3\int \frac{x^2}{\log\left(\frac{e^{-x}\left(x^2+x+\log(x)\right)}{x}\right)}dx+\int \frac{x^5}{\left(x^2+x+\log(x)\right)\log^2\left(\frac{e^{-x}\left(x^2+x+\log(x)\right)}{x}\right)}dx+\int \frac{x^3\log(x)}{\left(x^2+x+\log(x)\right)\log^2\left(\frac{e^{-x}\left(x^2+x+\log(x)\right)}{x}\right)}dx$$

input
```
Int[(-x^2 + x^5 + (x^2 + x^3)*Log[x] + (3*x^3 + 3*x^4 + 3*x^2*Log[x])*Log[
(x + x^2 + Log[x])/(E^x*x)])/((x + x^2 + Log[x])*Log[(x + x^2 + Log[x])/(E
^x*x)]^2),x]
```

output
```
$Aborted
```

3.1187. $\int \frac{-x^2+x^5+\left(x^2+x^3\right)\log(x)+\left(3x^3+3x^4+3x^2\log(x)\right)\log\left(\frac{e^{-x}\left(x+x^2+\log(x)\right)}{x}\right)}{\left(x+x^2+\log(x)\right)\log^2\left(\frac{e^{-x}\left(x+x^2+\log(x)\right)}{x}\right)}dx$

3.1187.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1187.4 Maple [A] (verified)

Time = 1.82 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

method	result
parallelrisch	$\frac{x^{3}}{\ln\left(\frac{\left(\ln(x)+x^{2}+x\right){\mathrm e}^{-x}}{x}\right)}$
risch	$-\frac{}{\pi \,\mathrm{csgn}\left(i\left(\ln(x)+x^{2}+x\right)\right) \mathrm{csgn}\left(i\,{\mathrm e}^{-x}\left(\ln(x)+x^{2}+x\right)\right)^{2}-\pi \,\mathrm{csgn}\left(i\left(\ln(x)+x^{2}+x\right)\right) \mathrm{csgn}\left(i\,{\mathrm e}^{-x}\left(\ln(x)+x^{2}+x\right)\right) \mathrm{csgn}\left(i\,{\mathrm e}^{-x}\right)-\pi \,\mathrm{csgn}(}$

input
```
int(((3*x^2*ln(x)+3*x^4+3*x^3)*ln((ln(x)+x^2+x)/exp(x)/x)+(x^3+x^2)*ln(x)+
x^5-x^2)/(ln(x)+x^2+x)/ln((ln(x)+x^2+x)/exp(x)/x)^2,x,method=_RETURNVERBOS
E)
```

output
```
x^3/ln((ln(x)+x^2+x)/exp(x)/x)
```

3.1187.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{-x^2+x^5+(x^2+x^3)\log(x)+(3x^3+3x^4+3x^2\log(x))\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}{(x+x^2+\log(x))\log^2\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}\,dx$$
$$=\frac{x^3}{\log\left(\frac{(x^2+x)e^{(-x)}+e^{(-x)}\log(x)}{x}\right)}$$

input
```
integrate(((3*x^2*log(x)+3*x^4+3*x^3)*log((log(x)+x^2+x)/exp(x)/x)+(x^3+x^
2)*log(x)+x^5-x^2)/(log(x)+x^2+x)/log((log(x)+x^2+x)/exp(x)/x)^2,x, algori
thm=\
```

output
```
x^3/log(((x^2 + x)*e^(-x) + e^(-x)*log(x))/x)
```

3.1187.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \frac{-x^2+x^5+(x^2+x^3)\log(x)+(3x^3+3x^4+3x^2\log(x))\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}{(x+x^2+\log(x))\log^2\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}\,dx = \frac{x^3}{\log\left(\frac{(x^2+x+\log(x))e^{-x}}{x}\right)}$$

input
```
integrate(((3*x**2*ln(x)+3*x**4+3*x**3)*ln((ln(x)+x**2+x)/exp(x)/x)+(x**3+
x**2)*ln(x)+x**5-x**2)/(ln(x)+x**2+x)/ln((ln(x)+x**2+x)/exp(x)/x)**2,x)
```

output
```
x**3/log((x**2 + x + log(x))*exp(-x)/x)
```

3.1187.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{-x^2+x^5+(x^2+x^3)\log(x)+(3x^3+3x^4+3x^2\log(x))\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}{(x+x^2+\log(x))\log^2\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}\,dx = -\frac{x^3}{x-\log(x^2+x+\log(x))+\log(x)}$$

input
```
integrate(((3*x^2*log(x)+3*x^4+3*x^3)*log((log(x)+x^2+x)/exp(x)/x)+(x^3+x^
2)*log(x)+x^5-x^2)/(log(x)+x^2+x)/log((log(x)+x^2+x)/exp(x)/x)^2,x, algori
thm=\
```

output
```
-x^3/(x - log(x^2 + x + log(x)) + log(x))
```

3.1187.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{-x^2+x^5+(x^2+x^3)\log(x)+(3x^3+3x^4+3x^2\log(x))\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}{(x+x^2+\log(x))\log^2\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}\,dx$$
$$= -\frac{x^3}{x-\log\left(x^2+x+\log\left(x\right)\right)+\log\left(x\right)}$$

input
```
integrate(((3*x^2*log(x)+3*x^4+3*x^3)*log((log(x)+x^2+x)/exp(x)/x)+(x^3+x^
2)*log(x)+x^5-x^2)/(log(x)+x^2+x)/log((log(x)+x^2+x)/exp(x)/x)^2,x, algori
thm=\
```

output
```
-x^3/(x - log(x^2 + x + log(x)) + log(x))
```

3.1187.9 Mupad [B] (verification not implemented)

Time = 15.48 (sec) , antiderivative size = 156, normalized size of antiderivative = 6.78

$$\int \frac{-x^2+x^5+(x^2+x^3)\log(x)+(3x^3+3x^4+3x^2\log(x))\log\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}{(x+x^2+\log(x))\log^2\left(\frac{e^{-x}(x+x^2+\log(x))}{x}\right)}\,dx$$
$$= 3\,x+\frac{3}{x+1}-3\,x^2+\frac{x^3+\frac{3\,x^3\,\ln\left(\frac{\mathrm{e}^{-x}\,\left(x+\ln(x)+x^2\right)}{x}\right)\,\left(x+\ln(x)+x^2\right)}{\ln(x)+x\,\ln(x)+x^3-1}}{\ln\left(\frac{\mathrm{e}^{-x}\,\left(x+\ln(x)+x^2\right)}{x}\right)}$$
$$-\frac{3\,\left(4\,x^{10}+8\,x^9+7\,x^8+10\,x^7+6\,x^6+4\,x^5+x^4\right)}{\left(x+1\right)\,\left(\ln\left(x\right)\,\left(x+1\right)+x^3-1\right)\,\left(2\,x^5+3\,x^4+x^3+3\,x^2+x\right)}$$

input
```
int((log(x)*(x^2 + x^3) + log((exp(-x)*(x + log(x) + x^2))/x)*(3*x^2*log(x
) + 3*x^3 + 3*x^4) - x^2 + x^5)/(log((exp(-x)*(x + log(x) + x^2))/x)^2*(x
+ log(x) + x^2)),x)
```

output
```
3*x + 3/(x + 1) - 3*x^2 + (x^3 + (3*x^3*log((exp(-x)*(x + log(x) + x^2))/x
)*(x + log(x) + x^2))/(log(x) + x*log(x) + x^3 - 1))/log((exp(-x)*(x + log
(x) + x^2))/x) - (3*(x^4 + 4*x^5 + 6*x^6 + 10*x^7 + 7*x^8 + 8*x^9 + 4*x^10
))/((x + 1)*(log(x)*(x + 1) + x^3 - 1)*(x + 3*x^2 + x^3 + 3*x^4 + 2*x^5))
```

3.1188 $\int \frac{\left(-2x^2+e^2(12+8x)+\left(-10x^2+e^2(60+40x)\right)\log(5)\right)\log(\log(25))}{\left(4e^4-4e^2x+x^2\right)\log(5)}\,dx$

3.1188.1 Optimal result

Integrand size = 58, antiderivative size = 25

$$\int \frac{(-2x^2+e^2(12+8x)+(-10x^2+e^2(60+40x))\log(5))\log(\log(25))}{(4e^4-4e^2x+x^2)\log(5)}\,dx = \frac{x(3+x)\left(5+\frac{1}{\log(5)}\right)\log(\log(25))}{e^2-\frac{x}{2}}$$

output
```
ln(2*ln(5))*(5+1/ln(5))/(exp(2)-1/2*x)*x*(3+x)
```

3.1188.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60

$$\int \frac{(-2x^2+e^2(12+8x)+(-10x^2+e^2(60+40x))\log(5))\log(\log(25))}{(4e^4-4e^2x+x^2)\log(5)}\,dx = \frac{2\left(-x-\frac{2e^2(3+2e^2)}{-2e^2+x}\right)(1+5\log(5))\log(\log(25))}{\log(5)}$$

input
```
Integrate[((-2*x^2 + E^2*(12 + 8*x) + (-10*x^2 + E^2*(60 + 40*x))*Log[5])*
Log[Log[25]])/((4*E^4 - 4*E^2*x + x^2)*Log[5]),x]
```

output
```
(2*(-x - (2*E^2*(3 + 2*E^2))/(-2*E^2 + x))*(1 + 5*Log[5])*Log[Log[25]])/Lo
g[5]
```

3.1188.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.92, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121, Rules used = {27, 27, 2083, 1294, 25, 1107, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(\log(25))\left(-2x^2+\left(e^2(40x+60)-10x^2\right)\log(5)+e^2(8x+12)\right)}{\left(x^2-4e^2x+4e^4\right)\log(5)}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\log(\log(25))\int -\frac{2\left(x^2-2e^2(2x+3)+5\left(x^2-2e^2(2x+3)\right)\log(5)\right)}{x^2-4e^2x+4e^4}dx}{\log(5)}$$

$$\Big\downarrow \ 27$$

$$-\frac{2\log(\log(25))\int \frac{x^2-2e^2(2x+3)+5\left(x^2-2e^2(2x+3)\right)\log(5)}{x^2-4e^2x+4e^4}dx}{\log(5)}$$

$$\Big\downarrow \ 2083$$

$$-\frac{2\log(\log(25))\int \frac{(1+5\log(5))x^2-4e^2(1+5\log(5))x-6e^2(1+5\log(5))}{x^2-4e^2x+4e^4}dx}{\log(5)}$$

$$\Big\downarrow \ 1294$$

$$-\frac{2\log(\log(25))\int -\frac{-\left((1+5\log(5))x^2\right)+4e^2(1+5\log(5))x+6e^2(1+5\log(5))}{\left(2e^2-x\right)^2}dx}{\log(5)}$$

$$\Big\downarrow \ 25$$

$$\frac{2\log(\log(25))\int \frac{-\left((1+5\log(5))x^2\right)+4e^2(1+5\log(5))x+6e^2(1+5\log(5))}{\left(2e^2-x\right)^2}dx}{\log(5)}$$

$$\Big\downarrow \ 1107$$

$$\frac{2\log(\log(25))\int \left(-5\log(5)-1+\frac{2e^2\left(3+2e^2\right)(1+5\log(5))}{\left(2e^2-x\right)^2}\right)dx}{\log(5)}$$

$$\Big\downarrow \ 2009$$

$$\frac{2\log(\log(25))\left(\frac{2e^2\left(3+2e^2\right)(1+5\log(5))}{2e^2-x}-x(1+5\log(5))\right)}{\log(5)}$$

3.1188. $\int \frac{\left(-2x^2+e^2(12+8x)+\left(-10x^2+e^2(60+40x)\right)\log(5)\right)\log(\log(25))}{\left(4e^4-4e^2x+x^2\right)\log(5)}dx$

input
```
Int[((-2*x^2 + E^2*(12 + 8*x) + (-10*x^2 + E^2*(60 + 40*x))*Log[5])*Log[Lo
g[25]])/((4*E^4 - 4*E^2*x + x^2)*Log[5]),x]
```

output
```
(2*((2*E^2*(3 + 2*E^2)*(1 + 5*Log[5]))/(2*E^2 - x) - x*(1 + 5*Log[5]))*Log
[Log[25]])/Log[5]
```

3.1188.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1107
```
Int[((d_.) + (e_.)*(x_))^(m_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_
Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; F
reeQ[{a, b, c, d, e, m}, x] && EqQ[2*c*d - b*e, 0] && IGtQ[p, 0] &&  !(EqQ[
m, 3] && NeQ[p, 1])
```

rule 1294
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.)*((d_.) + (e_.)*(x_) + (f_.)*(x
_)^2)^(q_.), x_Symbol] :> Simp[1/c^p   Int[(b/2 + c*x)^(2*p)*(d + e*x + f*x
^2)^q, x], x] /; FreeQ[{a, b, c, d, e, f, q}, x] && EqQ[b^2 - 4*a*c, 0] &&
IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2083
```
Int[(u_)^(p_.)*(v_)^(q_.), x_Symbol] :> Int[ExpandToSum[u, x]^p*ExpandToSum
[v, x]^q, x] /; FreeQ[{p, q}, x] && QuadraticQ[{u, v}, x] &&  !QuadraticMat
chQ[{u, v}, x]
```

3.1188. $\int \frac{(-2x^2+e^2(12+8x)+(-10x^2+e^2(60+40x))\log(5))\log(\log(25))}{(4e^4-4e^2x+x^2)\log(5)}\,dx$

3.1188.4 Maple [A] (verified)

Time = 2.67 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

method	result
gosper	$\frac{2(x^2+6\,e^2)(5\ln(5)+1)\ln(2\ln(5))}{\ln(5)(2\,e^2-x)}$
parallelrisch	$\frac{\ln(2\ln(5))(10x^2\ln(5)+60\,e^2\ln(5)+2x^2+12\,e^2)}{\ln(5)(2\,e^2-x)}$
norman	$\frac{\frac{2(5\ln(2)\ln(5)+5\ln(5)\ln(\ln(5))+\ln(2)+\ln(\ln(5)))x^2}{\ln(5)}+\frac{12\,e^2(5\ln(2)\ln(5)+5\ln(5)\ln(\ln(5))+\ln(2)+\ln(\ln(5)))}{\ln(5)}}{2\,e^2-x}$
meijerg	$\frac{4(10\,e^2\ln(5)+2\,e^2)\ln(2\ln(5))\left(\frac{x\,e^{-2}}{2-x\,e^{-2}}+\ln\left(1-\frac{x\,e^{-2}}{2}\right)\right)}{\ln(5)}-\frac{8\,e^2\left(-\frac{5\ln(5)}{2}-\frac{1}{2}\right)\ln(2\ln(5))\left(-\frac{x\,e^{-2}\left(-\frac{3x\,e^{-2}}{2}+6\right)}{6\left(1-\frac{x\,e^{-2}}{2}\right)}-2\ln\left(1-\frac{x}{\right.\right.}}{\ln(5)}$
risch	$-10x\ln(2)-10x\ln(\ln(5))-\frac{2x\ln(2)}{\ln(5)}-\frac{2x\ln(\ln(5))}{\ln(5)}+\frac{30\,e^2\ln(2)}{e^2-\frac{x}{2}}+\frac{30\,e^2\ln(\ln(5))}{e^2-\frac{x}{2}}+\frac{20\,e^4\ln(2)}{e^2-\frac{x}{2}}+\frac{20\,e^4}{e}$

input
```
int((((40*x+60)*exp(2)-10*x^2)*ln(5)+(8*x+12)*exp(2)-2*x^2)*ln(2*ln(5))/(4
*exp(2)^2-4*exp(2)*x+x^2)/ln(5),x,method=_RETURNVERBOSE)
```

output
```
2*(x^2+6*exp(2))*(5*ln(5)+1)*ln(2*ln(5))/ln(5)/(2*exp(2)-x)
```

3.1188.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(25) = 50.

Time = 0.26 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{(-2x^2+e^2(12+8x)+(-10x^2+e^2(60+40x))\log(5))\log(\log(25))}{(4e^4-4e^2x+x^2)\log(5)}\,dx$$
$$=-\frac{2\left(x^2-2\,(x-3)e^2+5\left(x^2-2\,(x-3)e^2+4\,e^4\right)\log(5)+4\,e^4\right)\log(2\,\log(5))}{(x-2\,e^2)\log(5)}$$

input
```
integrate((((40*x+60)*exp(2)-10*x^2)*log(5)+(8*x+12)*exp(2)-2*x^2)*log(2*l
og(5))/(4*exp(2)^2-4*exp(2)*x+x^2)/log(5),x, algorithm=\
```

output
```
-2*(x^2 - 2*(x - 3)*e^2 + 5*(x^2 - 2*(x - 3)*e^2 + 4*e^4)*log(5) + 4*e^4)*
log(2*log(5))/((x - 2*e^2)*log(5))
```

3.1188.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 134 vs. 2(24) = 48.

Time = 0.44 (sec) , antiderivative size = 134, normalized size of antiderivative = 5.36

$$\int \frac{(-2x^2+e^2(12+8x)+(-10x^2+e^2(60+40x))\log(5))\log(\log(25))}{(4e^4-4e^2x+x^2)\log(5)}\,dx$$
$$= -x\left(\frac{2\log(\log(5))}{\log(5)}+\frac{2\log(2)}{\log(5)}+10\log(\log(5))+10\log(2)\right) - \frac{12e^2\log(\log(5))+12e^2\log(2)+8e^4\log(\log(5))+8e^4\log(2)+60e^2\log(5)\log(\log(5))+60e^2\log(2)}{x\log(5)-2e^2\log(5)}$$

input
```
integrate((((40*x+60)*exp(2)-10*x**2)*ln(5)+(8*x+12)*exp(2)-2*x**2)*ln(2*l
n(5))/(4*exp(2)**2-4*exp(2)*x+x**2)/ln(5),x)
```

output
```
-x*(2*log(log(5))/log(5) + 2*log(2)/log(5) + 10*log(log(5)) + 10*log(2)) -
 (12*exp(2)*log(log(5)) + 12*exp(2)*log(2) + 8*exp(4)*log(log(5)) + 8*exp(
4)*log(2) + 60*exp(2)*log(5)*log(log(5)) + 60*exp(2)*log(2)*log(5) + 40*ex
p(4)*log(5)*log(log(5)) + 40*exp(4)*log(2)*log(5))/(x*log(5) - 2*exp(2)*lo
g(5))
```

3.1188.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. 2(25) = 50.

Time = 0.18 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.08

$$\int \frac{(-2x^2+e^2(12+8x)+(-10x^2+e^2(60+40x))\log(5))\log(\log(25))}{(4e^4-4e^2x+x^2)\log(5)}\,dx$$
$$= -\frac{2\left(x(5\log(5)+1)+\frac{2\left(5\left(2e^4+3e^2\right)\log(5)+2e^4+3e^2\right)}{x-2e^2}\right)\log(2\log(5))}{\log(5)}$$

input
```
integrate((((40*x+60)*exp(2)-10*x^2)*log(5)+(8*x+12)*exp(2)-2*x^2)*log(2*l
og(5))/(4*exp(2)^2-4*exp(2)*x+x^2)/log(5),x, algorithm=\
```

output
```
-2*(x*(5*log(5) + 1) + 2*(5*(2*e^4 + 3*e^2)*log(5) + 2*e^4 + 3*e^2)/(x - 2
*e^2))*log(2*log(5))/log(5)
```

3.1188.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \frac{(-2x^2+e^2(12+8x)+(-10x^2+e^2(60+40x))\log(5))\log(\log(25))}{(4e^4-4e^2x+x^2)\log(5)}\,dx$$
$$= -\frac{2\left(5\,x\log\left(5\right)+x+\frac{2\,\left(10\,e^4\log\left(5\right)+15\,e^2\log\left(5\right)+2\,e^4+3\,e^2\right)}{x-2\,e^2}\right)\log\left(2\,\log\left(5\right)\right)}{\log\left(5\right)}$$

input
```
integrate((((40*x+60)*exp(2)-10*x^2)*log(5)+(8*x+12)*exp(2)-2*x^2)*log(2*l
og(5))/(4*exp(2)^2-4*exp(2)*x+x^2)/log(5),x, algorithm=\
```

output
```
-2*(5*x*log(5) + x + 2*(10*e^4*log(5) + 15*e^2*log(5) + 2*e^4 + 3*e^2)/(x
- 2*e^2))*log(2*log(5))/log(5)
```

3.1188.9 Mupad [B] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.68

$$\int \frac{(-2x^2+e^2(12+8x)+(-10x^2+e^2(60+40x))\log(5))\log(\log(25))}{(4e^4-4e^2x+x^2)\log(5)}\,dx$$
$$= -\frac{2\,\ln\left(2\,\ln\left(5\right)\right)\,\left(5\,\ln\left(5\right)+1\right)\,\left(x^2-2\,\mathrm{e}^2\,x+6\,\mathrm{e}^2+4\,\mathrm{e}^4\right)}{\ln\left(5\right)\,\left(x-2\,\mathrm{e}^2\right)}$$

input
```
int(-(log(2*log(5))*(log(5)*(10*x^2 - exp(2)*(40*x + 60)) + 2*x^2 - exp(2)
*(8*x + 12)))/(log(5)*(4*exp(4) - 4*x*exp(2) + x^2)),x)
```

output
```
-(2*log(2*log(5))*(5*log(5) + 1)*(6*exp(2) + 4*exp(4) - 2*x*exp(2) + x^2))
/(log(5)*(x - 2*exp(2)))
```

3.1189 $\int \frac{-1+4x+4x^2}{-2x^2+4x^3+e(-x+2x^2)+(-x+2x^2)\log(x)+(-2x+4x^2)\log(-1+2x)}\,dx$

3.1189.1 Optimal result

Integrand size = 63, antiderivative size = 16

$$\int \frac{-1+4x+4x^2}{-2x^2+4x^3+e\left(-x+2x^2\right)+\left(-x+2x^2\right)\log(x)+\left(-2x+4x^2\right)\log(-1+2x)}\,dx = \log(e+2x+\log(x)+2\log(-1+2x))$$

output
```
ln(2*ln(-1+2*x)+2*x+ln(x)+exp(1))
```

3.1189.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{-1+4x+4x^2}{-2x^2+4x^3+e\left(-x+2x^2\right)+\left(-x+2x^2\right)\log(x)+\left(-2x+4x^2\right)\log(-1+2x)}\,dx = \log(e+2x+\log(x)+2\log(-1+2x))$$

input
```
Integrate[(-1 + 4*x + 4*x^2)/(-2*x^2 + 4*x^3 + E*(-x + 2*x^2) + (-x + 2*x^
2)*Log[x] + (-2*x + 4*x^2)*Log[-1 + 2*x]),x]
```

output
```
Log[E + 2*x + Log[x] + 2*Log[-1 + 2*x]]
```

3.1189.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.032$, Rules used = {7292, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^2+4x-1}{4x^3-2x^2+e\left(2x^2-x\right)+\left(2x^2-x\right)\log(x)+\left(4x^2-2x\right)\log(2x-1)}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-4x^2-4x+1}{(1-2x)x(2x+\log(x)+2\log(2x-1)+e)}dx$$

$$\Big\downarrow \text{ 7235}$$

$$\log(2x+\log(x)+2\log(2x-1)+e)$$

input
```
Int[(-1 + 4*x + 4*x^2)/(-2*x^2 + 4*x^3 + E*(-x + 2*x^2) + (-x + 2*x^2)*Log
[x] + (-2*x + 4*x^2)*Log[-1 + 2*x]),x]
```

output
```
Log[E + 2*x + Log[x] + 2*Log[-1 + 2*x]]
```

3.1189.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1189.4 Maple [A] (verified)

Time = 8.67 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

method	result	size
default	$\ln(2\ln(-1+2x)+2x+\ln(x)+\mathrm{e})$	18
risch	$\ln\left(x+\frac{\mathrm{e}}{2}+\frac{\ln(x)}{2}+\ln(-1+2x)\right)$	18
parallelrisch	$\ln\left(x+\frac{\mathrm{e}}{2}+\frac{\ln(x)}{2}+\ln(-1+2x)\right)$	18

input
```
int((4*x^2+4*x-1)/((4*x^2-2*x)*ln(-1+2*x)+(2*x^2-x)*ln(x)+(2*x^2-x)*exp(1)
+4*x^3-2*x^2),x,method=_RETURNVERBOSE)
```

output
```
ln(2*ln(-1+2*x)+2*x+ln(x)+exp(1))
```

3.1189.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{-1+4x+4x^2}{-2x^2+4x^3+e(-x+2x^2)+(-x+2x^2)\log(x)+(-2x+4x^2)\log(-1+2x)}\,dx = \log(2\,x+e+2\,\log(2\,x-1)+\log(x))$$

input
```
integrate((4*x^2+4*x-1)/((4*x^2-2*x)*log(-1+2*x)+(2*x^2-x)*log(x)+(2*x^2-x
)*exp(1)+4*x^3-2*x^2),x, algorithm=\
```

output
```
log(2*x + e + 2*log(2*x - 1) + log(x))
```

3.1189.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.19

$$\int \frac{-1+4x+4x^2}{-2x^2+4x^3+e(-x+2x^2)+(-x+2x^2)\log(x)+(-2x+4x^2)\log(-1+2x)}\,dx = \log\left(x+\frac{\log(x)}{2}+\log(2x-1)+\frac{e}{2}\right)$$

input
```
integrate((4*x**2+4*x-1)/((4*x**2-2*x)*ln(-1+2*x)+(2*x**2-x)*ln(x)+(2*x**2
-x)*exp(1)+4*x**3-2*x**2),x)
```

output
```
log(x + log(x)/2 + log(2*x - 1) + E/2)
```

3.1189.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{-1+4x+4x^2}{-2x^2+4x^3+e(-x+2x^2)+(-x+2x^2)\log(x)+(-2x+4x^2)\log(-1+2x)}\,dx$$
$$= \log\left(x+\frac{1}{2}\,e+\log\left(2\,x-1\right)+\frac{1}{2}\,\log\left(x\right)\right)$$

input
```
integrate((4*x^2+4*x-1)/((4*x^2-2*x)*log(-1+2*x)+(2*x^2-x)*log(x)+(2*x^2-x
)*exp(1)+4*x^3-2*x^2),x, algorithm=\
```

output
```
log(x + 1/2*e + log(2*x - 1) + 1/2*log(x))
```

3.1189.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{-1+4x+4x^2}{-2x^2+4x^3+e(-x+2x^2)+(-x+2x^2)\log(x)+(-2x+4x^2)\log(-1+2x)}\,dx$$
$$= \log\left(2\,x+e+2\,\log\left(2\,x-1\right)+\log\left(x\right)\right)$$

input
```
integrate((4*x^2+4*x-1)/((4*x^2-2*x)*log(-1+2*x)+(2*x^2-x)*log(x)+(2*x^2-x
)*exp(1)+4*x^3-2*x^2),x, algorithm=\
```

output
```
log(2*x + e + 2*log(2*x - 1) + log(x))
```

3.1189.9 Mupad [B] (verification not implemented)

Time = 15.74 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{-1+4x+4x^2}{-2x^2+4x^3+e\left(-x+2x^2\right)+\left(-x+2x^2\right)\log(x)+\left(-2x+4x^2\right)\log(-1+2x)}\,dx$$
$$=\ln\left(2\,x+\mathrm{e}+2\,\ln\left(2\,x-1\right)+\ln\left(x\right)\right)$$

input
```
int(-(4*x + 4*x^2 - 1)/(log(x)*(x - 2*x^2) + log(2*x - 1)*(2*x - 4*x^2) +
exp(1)*(x - 2*x^2) + 2*x^2 - 4*x^3),x)
```

output
```
log(2*x + exp(1) + 2*log(2*x - 1) + log(x))
```

3.1190 $\int \frac{-40x-22x^2+2x^3+(8x+6x^2)\log(x^3)+(200+134x-4x^2+(-80-52$

3.1190.1 Optimal result

Integrand size = 124, antiderivative size = 20

$$\int \frac{-40x-22x^2+2x^3+(8x+6x^2)\log(x^3)+(200+134x-4x^2+(-80-52x+2x^2)\log(x^3)+(8+6x)}{4x+x^2}$$
$$=\left(x+\left(-5+\log\left(x^3\right)\right)\log\left(2x(4+x)^2\right)\right)^2$$

output
```
((ln(x^3)-5)*ln(2*(4+x)^2*x)+x)^2
```

3.1190.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{-40x-22x^2+2x^3+(8x+6x^2)\log(x^3)+(200+134x-4x^2+(-80-52x+2x^2)\log(x^3)+(8+6x)}{4x+x^2}$$
$$=\left(x+\left(-5+\log\left(x^3\right)\right)\log\left(2x(4+x)^2\right)\right)^2$$

input
```
Integrate[(-40*x - 22*x^2 + 2*x^3 + (8*x + 6*x^2)*Log[x^3] + (200 + 134*x
- 4*x^2 + (-80 - 52*x + 2*x^2)*Log[x^3] + (8 + 6*x)*Log[x^3]^2)*Log[32*x +
 16*x^2 + 2*x^3] + (-120 - 30*x + (24 + 6*x)*Log[x^3])*Log[32*x + 16*x^2 +
 2*x^3]^2)/(4*x + x^2),x]
```

output
```
(x + (-5 + Log[x^3])*Log[2*x*(4 + x)^2])^2
```

3.1190.
$\int \frac{-40x-22x^2+2x^3+(8x+6x^2)\log(x^3)+(200+134x-4x^2+(-80-52x+2x^2)\log(x^3)+(8+6x)\log^2(x^3))\log(32x+16x^2+2x^3)+(-120-30x+(24+}{4x+x^2}$

3.1190.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3-22x^2+((6x+24)\log(x^3)-30x-120)\log^2(2x^3+16x^2+32x)+((6x+8)\log^2(x^3)-4x^2+(2x^2-}{x^2+4x}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{2x^3-22x^2+((6x+24)\log(x^3)-30x-120)\log^2(2x^3+16x^2+32x)+((6x+8)\log^2(x^3)-4x^2+(2x^2-}{x(x+4)}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{6(\log(x^3)-5)\log^2(2x(x+4)^2)}{x}+\frac{2(3x\log^2(x^3)+4\log^2(x^3)-26x\log(x^3)-40\log(x^3)-2x^2+x^2\log(}{x(x+4)}\right.$$

$$\Big\downarrow \text{2009}$$

$$4\int \frac{\log^2(x^3)\log(2x(x+4)^2)}{x+4}dx+6\int \frac{(\log(x^3)-5)\log^2(2x(x+4)^2)}{x}dx-40\int \frac{\log(x)\log(x^3)}{x+4}dx-4\,\text{PolyLog}\left(2,-\frac{x}{4}\right)\log^2(x^3)+40\,\text{PolyLog}\left(2,-\frac{x}{4}\right)\log(x^3)+24\,\text{PolyLog}\left(3,-\frac{x}{4}\right)\log(x^3)-120\,\text{PolyLog}\left(3,-\frac{x}{4}\right)-240\,\text{PolyLog}\left(3,\frac{x+4}{4}\right)-72\,\text{PolyLog}\left(4,-\frac{x}{4}\right)+120\,\text{PolyLog}\left(2,-\frac{x}{4}\right)(\log(x)+\log((x+4)^2)-\log(2x(x+4)^2))+120\,\text{PolyLog}\left(2,\frac{x+4}{4}\right)\log((x+4)^2)-\frac{1}{54}\log^4(x^3)-\frac{4}{9}\log\left(\frac{x}{4}+1\right)\log^3(x^3)+\frac{2}{9}\log(2x(x+4)^2)\log^3(x^3)+\frac{10}{27}\log^3(x^3)+\frac{20}{3}\log\left(\frac{x}{4}+1\right)\log^2(x^3)-\frac{10}{3}\log(2x(x+4)^2)\log^2(x^3)-10\log^2((x+4)^2)\log(x^3)+40\log\left(\frac{x}{4}+1\right)(\log(x)+\log((x+4)^2)-\log(2x(x+4)^2))\log(x^3)+2x\log(2x(x+4)^2)\log(x^3)+x^2-25\log^2(x)-100\log^2(x+4)+30\log\left(-\frac{x}{4}\right)\log^2((x+4)^2)-100\log\left(\frac{x}{4}+1\right)\log(x)-100\log(4)\log(x)-10x\log(2x(x+4)^2)+50\log(x)\log(2x(x+4)^2)+100\log(x+4)\log(2x(x+4)^2)$$

input
```
Int[(-40*x - 22*x^2 + 2*x^3 + (8*x + 6*x^2)*Log[x^3] + (200 + 134*x - 4*x^
2 + (-80 - 52*x + 2*x^2)*Log[x^3] + (8 + 6*x)*Log[x^3]^2)*Log[32*x + 16*x^
2 + 2*x^3] + (-120 - 30*x + (24 + 6*x)*Log[x^3])*Log[32*x + 16*x^2 + 2*x^3
]^2)/(4*x + x^2),x]
```

3.1190.
$$\int \frac{-40x-22x^2+2x^3+(8x+6x^2)\log(x^3)+(200+134x-4x^2+(-80-52x+2x^2)\log(x^3)+(8+6x)\log^2(x^3))\log(32x+16x^2+2x^3)+(-120-30x+(24+}{4x+x^2}$$

output
```
$Aborted
```

3.1190.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1190.4 Maple [B] (warning: unable to verify)

result has leaf size over 500,000. Avoiding possible recursion issues.

Time = 691.84 (sec) , antiderivative size = 17841276, normalized size of antiderivative = 892063.80

method	result	size
risch	Expression too large to display	17841276

input
```
int((((24+6*x)*ln(x^3)-30*x-120)*ln(2*x^3+16*x^2+32*x)^2+((6*x+8)*ln(x^3)^
2+(2*x^2-52*x-80)*ln(x^3)-4*x^2+134*x+200)*ln(2*x^3+16*x^2+32*x)+(6*x^2+8*
x)*ln(x^3)+2*x^3-22*x^2-40*x)/(x^2+4*x),x,method=_RETURNVERBOSE)
```

output
```
result too large to display
```

3.1190.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. 2(20) = 40.

Time = 0.27 (sec) , antiderivative size = 63, normalized size of antiderivative = 3.15

$$\int \frac{-40x-22x^2+2x^3+(8x+6x^2)\log(x^3)+\left(200+134x-4x^2+(-80-52x+2x^2)\log(x^3)+(8+6x)\right.}{4x+x^2}$$

$$= \left(\log\left(x^3\right)^2 - 10\log\left(x^3\right) + 25\right)\log\left(2x^3 + 16x^2 + 32x\right)^2 + x^2 + 2\left(x\log\left(x^3\right) - 5x\right)\log\left(2x^3 + 16x^2 + 32x\right)$$

input
```
integrate((((24+6*x)*log(x^3)-30*x-120)*log(2*x^3+16*x^2+32*x)^2+((6*x+8)*
log(x^3)^2+(2*x^2-52*x-80)*log(x^3)-4*x^2+134*x+200)*log(2*x^3+16*x^2+32*x
)+(6*x^2+8*x)*log(x^3)+2*x^3-22*x^2-40*x)/(x^2+4*x),x, algorithm=\
```

output
```
(log(x^3)^2 - 10*log(x^3) + 25)*log(2*x^3 + 16*x^2 + 32*x)^2 + x^2 + 2*(x*
log(x^3) - 5*x)*log(2*x^3 + 16*x^2 + 32*x)
```

3.1190.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(19) = 38.

Time = 0.34 (sec) , antiderivative size = 61, normalized size of antiderivative = 3.05

$$\int \frac{-40x-22x^2+2x^3+(8x+6x^2)\log(x^3)+\left(200+134x-4x^2+(-80-52x+2x^2)\log(x^3)+(8+6x)\right.}{4x+x^2}$$

$$= x^2 + \left(2x\log\left(x^3\right) - 10x\right)\log\left(2x^3 + 16x^2 + 32x\right) + \left(\log\left(x^3\right)^2 - 10\log\left(x^3\right) + 25\right)\log\left(2x^3 + 16x^2 + 32x\right)^2$$

input
```
integrate((((24+6*x)*ln(x**3)-30*x-120)*ln(2*x**3+16*x**2+32*x)**2+((6*x+8
)*ln(x**3)**2+(2*x**2-52*x-80)*ln(x**3)-4*x**2+134*x+200)*ln(2*x**3+16*x**
2+32*x)+(6*x**2+8*x)*ln(x**3)+2*x**3-22*x**2-40*x)/(x**2+4*x),x)
```

output
```
x**2 + (2*x*log(x**3) - 10*x)*log(2*x**3 + 16*x**2 + 32*x) + (log(x**3)**2
 - 10*log(x**3) + 25)*log(2*x**3 + 16*x**2 + 32*x)**2
```

3.1190.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 146 vs. 2(20) = 40.

Time = 0.33 (sec) , antiderivative size = 146, normalized size of antiderivative = 7.30

$$\int \frac{-40x-22x^2+2x^3+(8x+6x^2)\log(x^3)+(200+134x-4x^2+(-80-52x+2x^2)\log(x^3)+(8+6x)}{4x+x^2}$$

$$= 6(3\log(2)-5)\log(x)^3+9\log(x)^4+4\left(9\log(x)^2-30\log(x)+25\right)\log(x+4)^2 + \left(9\log(2)^2+6x-60\log(2)+25\right)\log(x)^2+x^2-10x(\log(2)-3) +4\left(3(3\log(2)-10)\log(x)^2+9\log(x)^3+(3x-30\log(2)+25)\log(x)-5x+25\log(2)-20\right)\log(x+4)+2\left(x(3\log(2)-5)-15\log(2)^2+25\log(2)\right)\log(x)-30x+80\log(x+4)$$

input
```
integrate((((24+6*x)*log(x^3)-30*x-120)*log(2*x^3+16*x^2+32*x)^2+((6*x+8)*
log(x^3)^2+(2*x^2-52*x-80)*log(x^3)-4*x^2+134*x+200)*log(2*x^3+16*x^2+32*x
)+(6*x^2+8*x)*log(x^3)+2*x^3-22*x^2-40*x)/(x^2+4*x),x, algorithm=\
```

output
```
6*(3*log(2) - 5)*log(x)^3 + 9*log(x)^4 + 4*(9*log(x)^2 - 30*log(x) + 25)*l
og(x + 4)^2 + (9*log(2)^2 + 6*x - 60*log(2) + 25)*log(x)^2 + x^2 - 10*x*(l
og(2) - 3) + 4*(3*(3*log(2) - 10)*log(x)^2 + 9*log(x)^3 + (3*x - 30*log(2)
 + 25)*log(x) - 5*x + 25*log(2) - 20)*log(x + 4) + 2*(x*(3*log(2) - 5) - 1
5*log(2)^2 + 25*log(2))*log(x) - 30*x + 80*log(x + 4)
```

3.1190.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 109 vs. 2(20) = 40.

Time = 0.43 (sec) , antiderivative size = 109, normalized size of antiderivative = 5.45

$$\int \frac{-40x-22x^2+2x^3+(8x+6x^2)\log(x^3)+(200+134x-4x^2+(-80-52x+2x^2)\log(x^3)+(8+6x)}{4x+x^2}$$

$$= 9\log(x)^4+3\left(3\log(x)^2-10\log(x)\right)\log\left(2x^2+16x+32\right)^2 + (6x+25)\log(x)^2-30\log(x)^3+x^2 + 2\left(9\log(x)^3+3x\log(x)-30\log(x)^2-5x+50\log(x+4)+25\log(x)\right)\log\left(2x^2+16x+32\right)-100\log(x+4)^2-10x\log(x)$$

input
```
integrate((((24+6*x)*log(x^3)-30*x-120)*log(2*x^3+16*x^2+32*x)^2+((6*x+8)*
log(x^3)^2+(2*x^2-52*x-80)*log(x^3)-4*x^2+134*x+200)*log(2*x^3+16*x^2+32*x
)+(6*x^2+8*x)*log(x^3)+2*x^3-22*x^2-40*x)/(x^2+4*x),x, algorithm=\
```

output
```
9*log(x)^4 + 3*(3*log(x)^2 - 10*log(x))*log(2*x^2 + 16*x + 32)^2 + (6*x +
25)*log(x)^2 - 30*log(x)^3 + x^2 + 2*(9*log(x)^3 + 3*x*log(x) - 30*log(x)^
2 - 5*x + 50*log(x + 4) + 25*log(x))*log(2*x^2 + 16*x + 32) - 100*log(x +
4)^2 - 10*x*log(x)
```

3.1190.9 Mupad [B] (verification not implemented)

Time = 15.44 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.05

$$\int \frac{-40x - 22x^2 + 2x^3 + (8x + 6x^2)\log(x^3) + (200 + 134x - 4x^2 + (-80 - 52x + 2x^2)\log(x^3) + (8 + 6x)}{4x + x^2}$$
$$= \left(x - 5\ln\left(2x^3 + 16x^2 + 32x\right) + \ln\left(2x^3 + 16x^2 + 32x\right)\ln\left(x^3\right)\right)^2$$

input
```
int(-(40*x - log(x^3)*(8*x + 6*x^2) - log(32*x + 16*x^2 + 2*x^3)*(134*x -
log(x^3)*(52*x - 2*x^2 + 80) + log(x^3)^2*(6*x + 8) - 4*x^2 + 200) + 22*x^
2 - 2*x^3 + log(32*x + 16*x^2 + 2*x^3)^2*(30*x - log(x^3)*(6*x + 24) + 120
))/(4*x + x^2),x)
```

output
```
(x - 5*log(32*x + 16*x^2 + 2*x^3) + log(32*x + 16*x^2 + 2*x^3)*log(x^3))^2
```

3.1191 $\int \log \left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log($

3.1191.1 Optimal result

Integrand size = 30, antiderivative size = 34

$$\int \log \left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log(3))))\right)\,dx = x\log\left(\frac{5}{2}\left(2-\frac{1}{3}\log(\log(2))-e^3(i\pi+\log(4-\log(3)))\right)\right)$$

output
```
ln(-5/2*exp(3)*ln(-4+ln(3))-5/6*ln(ln(2))+5)*x
```

3.1191.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.94

$$\int \log \left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log(3))))\right)\,dx = x\log\left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log(3))))\right)$$

input
```
Integrate[Log[(30 - 5*Log[Log[2]] - 15*E^3*(I*Pi + Log[4 - Log[3]]))/6],x]
```

output
```
x*Log[(30 - 5*Log[Log[2]] - 15*E^3*(I*Pi + Log[4 - Log[3]]))/6]
```

3.1191.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.94, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.033, Rules used = {24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \log \left(\frac{1}{6}(30-5\log(\log(2))-15e^3(\log(4-\log(3))+i\pi))\right)dx$$

$$\Big\downarrow 24$$

$$x\log\left(\frac{5}{6}(6-\log(\log(2))-3e^3(\log(4-\log(3))+i\pi))\right)$$

input
```
Int[Log[(30 - 5*Log[Log[2]] - 15*E^3*(I*Pi + Log[4 - Log[3]]))/6],x]
```

output
```
x*Log[(5*(6 - Log[Log[2]] - 3*E^3*(I*Pi + Log[4 - Log[3]])))/6]
```

3.1191.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

3.1191.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.59

method	result	size
default	$\ln\left(-\frac{5\,\mathrm{e}^{3}\ln(-4+\ln(3))}{2}-\frac{5\ln(\ln(2))}{6}+5\right)x$	20
parallelrisch	$\ln\left(-\frac{5\,\mathrm{e}^{3}\ln(-4+\ln(3))}{2}-\frac{5\ln(\ln(2))}{6}+5\right)x$	20
parts	$\ln\left(-\frac{5\,\mathrm{e}^{3}\ln(-4+\ln(3))}{2}-\frac{5\ln(\ln(2))}{6}+5\right)x$	20
norman	$\left(\ln\left(\frac{5}{6}\right)+\ln\left(-3\,\mathrm{e}^{3}\ln\left(-4+\ln\left(3\right)\right)-\ln\left(\ln\left(2\right)\right)+6\right)\right)x$	23
risch	$x\ln\left(\frac{5}{6}\right)+x\ln\left(-3\,\mathrm{e}^{3}\ln\left(-4+\ln\left(3\right)\right)-\ln\left(\ln\left(2\right)\right)+6\right)$	25

input
```
int(ln(-5/2*exp(3)*ln(-4+ln(3))-5/6*ln(ln(2))+5),x,method=_RETURNVERBOSE)
```

output
```
ln(-5/2*exp(3)*ln(-4+ln(3))-5/6*ln(ln(2))+5)*x
```

3.1191.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.56

$$\int \log \left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log(3))))\right)\,dx$$
$$=x\log\left(-\frac{5}{2}\,e^3\log\left(\log\left(3\right)-4\right)-\frac{5}{6}\,\log\left(\log\left(2\right)\right)+5\right)$$

input
```
integrate(log(-5/2*exp(3)*log(-4+log(3))-5/6*log(log(2))+5),x, algorithm=\
```

output
```
x*log(-5/2*e^3*log(log(3) - 4) - 5/6*log(log(2)) + 5)
```

3.1191.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \log \left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log(3))))\right)\,dx$$
$$=x\log\left(-\frac{5\log\left(\log\left(2\right)\right)}{6}+5-\frac{5(\log\left(4-\log\left(3\right)\right)+i\pi)\,e^3}{2}\right)$$

input
```
integrate(ln(-5/2*exp(3)*ln(-4+ln(3))-5/6*ln(ln(2))+5),x)
```

output
```
x*log(-5*log(log(2))/6 + 5 - 5*(log(4 - log(3)) + I*pi)*exp(3)/2)
```

3.1191.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.56

$$\int \log \left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log(3))))\right)\,dx$$
$$=x\log\left(-\frac{5}{2}\,e^3\log\left(\log\left(3\right)-4\right)-\frac{5}{6}\,\log\left(\log\left(2\right)\right)+5\right)$$

input
```
integrate(log(-5/2*exp(3)*log(-4+log(3))-5/6*log(log(2))+5),x, algorithm=\
```

output
```
x*log(-5/2*e^3*log(log(3) - 4) - 5/6*log(log(2)) + 5)
```

3.1191.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.56

$$\int \log \left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log(3))))\right) dx$$
$$= x\log\left(-\frac{5}{2}e^3\log(\log(3)-4)-\frac{5}{6}\log(\log(2))+5\right)$$

input
```
integrate(log(-5/2*exp(3)*log(-4+log(3))-5/6*log(log(2))+5),x, algorithm=\
```

output
```
x*log(-5/2*e^3*log(log(3) - 4) - 5/6*log(log(2)) + 5)
```

3.1191.9 Mupad [B] (verification not implemented)

Time = 0.00 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.56

$$\int \log \left(\frac{1}{6}(30-5\log(\log(2))-15e^3(i\pi+\log(4-\log(3))))\right) dx$$
$$= x\ \ln\left(5-\frac{5\ \ln(\ln(3)-4)\ e^3}{2}-\frac{5\ \ln(\ln(2))}{6}\right)$$

input
```
int(log(5 - (5*log(log(3) - 4)*exp(3))/2 - (5*log(log(2)))/6),x)
```

output
```
x*log(5 - (5*log(log(3) - 4)*exp(3))/2 - (5*log(log(2)))/6)
```

3.1192 $\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2}\,dx$

3.1192.1 Optimal result

Integrand size = 23, antiderivative size = 25

$$\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2}\,dx=-\frac{4\left(6+x+\left(-e+e^{\frac{x^2}{2}}\right)x\right)}{3x}$$

output
```
-4/3*(6+x+x*(exp(1/2*x^2)-exp(1)))/x
```

3.1192.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2}\,dx=-\frac{4}{3}e^{\frac{x^2}{2}}-\frac{8}{x}$$

input
```
Integrate[(24 - 4*E^(x^2/2)*x^3)/(3*x^2),x]
```

output
```
(-4*E^(x^2/2))/3 - 8/x
```

3.1192.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {27, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\int \frac{4\left(6-e^{\frac{x^2}{2}}x^3\right)}{x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{4}{3}\int \frac{6-e^{\frac{x^2}{2}}x^3}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{4}{3}\int \left(\frac{6}{x^2}-e^{\frac{x^2}{2}}x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{4}{3}\left(-e^{\frac{x^2}{2}}-\frac{6}{x}\right)$$

input
```
Int[(24 - 4*E^(x^2/2)*x^3)/(3*x^2),x]
```

output
```
(4*(-E^(x^2/2) - 6/x))/3
```

3.1192.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1192.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

method	result	size
default	$-\frac{8}{x}-\frac{4\,{\mathrm e}^{\frac{x^{2}}{2}}}{3}$	15
risch	$-\frac{8}{x}-\frac{4\,{\mathrm e}^{\frac{x^{2}}{2}}}{3}$	15
parts	$-\frac{8}{x}-\frac{4\,{\mathrm e}^{\frac{x^{2}}{2}}}{3}$	15
norman	$\frac{-8-\frac{4 x\,{\mathrm e}^{\frac{x^{2}}{2}}}{3}}{x}$	16
parallelrisch	$-\frac{4 x\,{\mathrm e}^{\frac{x^{2}}{2}}+24}{3 x}$	17

input
```
int(1/3*(-4*x^3*exp(1/2*x^2)+24)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-8/x-4/3*exp(1/2*x^2)
```

3.1192.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2}\,dx = -\frac{4\left(xe^{\left(\frac{1}{2}\,x^2\right)}+6\right)}{3\,x}$$

input
```
integrate(1/3*(-4*x^3*exp(1/2*x^2)+24)/x^2,x, algorithm=\
```

output
```
-4/3*(x*e^(1/2*x^2) + 6)/x
```

3.1192.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.56

$$\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2}\,dx = -\frac{4e^{\frac{x^2}{2}}}{3}-\frac{8}{x}$$

input
```
integrate(1/3*(-4*x**3*exp(1/2*x**2)+24)/x**2,x)
```

output
```
-4*exp(x**2/2)/3 - 8/x
```

3.1192.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.56

$$\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2}\,dx = -\frac{8}{x}-\frac{4}{3}\,e^{\left(\frac{1}{2}\,x^2\right)}$$

input
```
integrate(1/3*(-4*x^3*exp(1/2*x^2)+24)/x^2,x, algorithm=\
```

output
```
-8/x - 4/3*e^(1/2*x^2)
```

3.1192.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2}\,dx = -\frac{4\left(xe^{\left(\frac{1}{2}x^2\right)}+6\right)}{3\,x}$$

input
```
integrate(1/3*(-4*x^3*exp(1/2*x^2)+24)/x^2,x, algorithm=\
```

output
```
-4/3*(x*e^(1/2*x^2) + 6)/x
```

3.1192.9 Mupad [B] (verification not implemented)

Time = 14.62 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.56

$$\int \frac{24-4e^{\frac{x^2}{2}}x^3}{3x^2}\,dx = -\frac{4\,\mathrm{e}^{\frac{x^2}{2}}}{3}-\frac{8}{x}$$

input
```
int(-((4*x^3*exp(x^2/2))/3 - 8)/x^2,x)
```

output
```
- (4*exp(x^2/2))/3 - 8/x
```

3.1193 $\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\ldots\right.$

3.1193.1 Optimal result

Integrand size = 122, antiderivative size = 22

$$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(2x^2-2e^{16}x^2-2x^3\right)\right)\log(x)\right)\,dx=e^{-e^{\left(-1+e^{16}+x\right)^2}}x^2(-2+\log(x))$$

output
```
(ln(x)-2)*x^2/exp(exp((exp(16)+x-1)^2))
```

3.1193.2 Mathematica [A] (verified)

Time = 5.35 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(2x^2-2e^{16}x^2-2x^3\right)\right)\log(x)\right)\,dx=e^{-e^{\left(-1+e^{16}+x\right)^2}}x^2(-2+\log(x))$$

input
```
Integrate[(-3*x + E^(1 + E^32 - 2*x + x^2 + E^16*(-2 + 2*x))*(-4*x^2 + 4*E
^16*x^2 + 4*x^3) + (2*x + E^(1 + E^32 - 2*x + x^2 + E^16*(-2 + 2*x))*(2*x^
2 - 2*E^16*x^2 - 2*x^3))*Log[x])/E^E^(1 + E^32 - 2*x + x^2 + E^16*(-2 + 2*
x)),x]
```

3.1193.
$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}(-4x^2+4e^{16}x^2+4x^3)+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+\ldots}\right.\right.$

output
```
(x^2*(-2 + Log[x]))/E^E^(-1 + E^16 + x)^2
```

3.1193.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-e^{x^2-2x+e^{16}(2x-2)+e^{32}+1}}\left(e^{x^2-2x+e^{16}(2x-2)+e^{32}+1}\left(4x^3+4e^{16}x^2-4x^2\right)+\left(e^{x^2-2x+e^{16}(2x-2)+e^{32}+1}\left(-2x^3-2e^{16}x^2\right.\right.\right.$$

$$\Big\downarrow \text{7292}$$

$$\int e^{-e^{x^2-2\left(1-e^{16}\right)x+\left(e^{16}-1\right)^2}}\left(e^{x^2-2x+e^{16}(2x-2)+e^{32}+1}\left(4x^3+4e^{16}x^2-4x^2\right)+\left(e^{x^2-2x+e^{16}(2x-2)+e^{32}+1}\left(-2x^3-2e^{16}x^2\right.\right.\right.$$

$$\Big\downarrow \text{7239}$$

$$\int e^{-e^{x^2-2\left(1-e^{16}\right)x+\left(e^{16}-1\right)^2}}x\left(4e^{\left(x+e^{16}-1\right)^2}x\left(x+e^{16}-1\right)+2\left(1-e^{\left(x+e^{16}-1\right)^2}x\left(x+e^{16}-1\right)\right)\log(x)-3\right)dx$$

$$\Big\downarrow \text{7293}$$

$$\int\left(2\left(-x-e^{16}+1\right)x^2\exp\left(x^2-e^{x^2-2\left(1-e^{16}\right)x+\left(e^{16}-1\right)^2}-2\left(1-e^{16}\right)x+\left(e^{16}-1\right)^2\right)(\log(x)-2)+e^{-e^{x^2-2\left(1-e^{16}\right.}}\right.$$

$$\Big\downarrow \text{2009}$$

$$2\int\frac{\int\exp\left((x-1)^2+2e^{16}(x-1)-e^{\left(x+e^{16}-1\right)^2}+e^{32}\right)x^3dx}{x}dx-4\left(1-e^{16}\right)\int\exp\left(x^2-2\left(1-e^{16}\right)x-e^{x^2-2\left(1-e^{16}\right)x+\left(-1+e^{16}\right)^2}+\left(-1+e^{16}\right)^2\right)x^2dx-2\left(1-e^{16}\right)\int\frac{\int\exp\left((x-1)^2+2e^{16}(x-1)-e^{\left(x+e^{16}-1\right)^2}+e^{32}\right)x^2dx}{x}dx+2\left(1-e^{16}\right)\log(x)\int\exp\left(x^2-2\left(1-e^{16}\right)x-e^{x^2-2\left(1-e^{16}\right)x+\left(-1+e^{16}\right)^2}+\left(-1+e^{16}\right)^2\right)x^2dx+4\int\exp\left(x^2-2\left(1-e^{16}\right)x-e^{x^2-2\left(1-e^{16}\right)x+\left(-1+e^{16}\right)^2}+\left(-1+e^{16}\right)^2\right)x^3dx-2\log(x)\int\exp\left(x^2-2\left(1-e^{16}\right)x-e^{x^2-2\left(1-e^{16}\right)x+\left(-1+e^{16}\right)^2}+\left(-1+e^{16}\right)^2\right)x^3dx-3\int e^{-e^{x^2-2\left(1-e^{16}\right)x+\left(-1+e^{16}\right)^2}}xdx-2\int\frac{\int e^{-e^{x^2-2\left(1-e^{16}\right)x+\left(-1+e^{16}\right)^2}}xdx}{x}dx+2\log(x)\int e^{-e^{x^2-2\left(1-e^{16}\right)x+\left(-1+e^{16}\right)^2}}xdx$$

3.1193.
$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+\right.\right.$

input
```
Int[(-3*x + E^(1 + E^32 - 2*x + x^2 + E^16*(-2 + 2*x))*(-4*x^2 + 4*E^16*x^
2 + 4*x^3) + (2*x + E^(1 + E^32 - 2*x + x^2 + E^16*(-2 + 2*x))*(2*x^2 - 2*
E^16*x^2 - 2*x^3))*Log[x])/E^E^(1 + E^32 - 2*x + x^2 + E^16*(-2 + 2*x)),x]
```

output
```
$Aborted
```

3.1193.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1193.4 Maple [A] (verified)

Time = 2.74 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.45

method	result	size
risch	$(\ln(x)-2)\, x^2 \mathrm{e}^{-\mathrm{e}^{2x\,\mathrm{e}^{16}+x^2-2\,\mathrm{e}^{16}+\mathrm{e}^{32}-2x+1}}$	32
parallelrisch	$(x^2\ln(x)-2x^2)\,\mathrm{e}^{-\mathrm{e}^{\mathrm{e}^{32}+(-2+2x)\mathrm{e}^{16}+x^2-2x+1}}$	38

input
```
int((((-2*x^2*exp(16)-2*x^3+2*x^2)*exp(exp(16)^2+(-2+2*x)*exp(16)+x^2-2*x+
1)+2*x)*ln(x)+(4*x^2*exp(16)+4*x^3-4*x^2)*exp(exp(16)^2+(-2+2*x)*exp(16)+x
^2-2*x+1)-3*x)/exp(exp(exp(16)^2+(-2+2*x)*exp(16)+x^2-2*x+1)),x,method=_RE
TURNVERBOSE)
```

output
```
(ln(x)-2)*x^2*exp(-exp(2*x*exp(16)+x^2-2*exp(16)+exp(32)-2*x+1))
```

3.1193.5 Fricas [F(-1)]

Timed out.

$$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(2x^2-2e^{16}x^2-2x^3\right)\right)\log(x)\right)\,dx=\text{Timed out}$$

input
```
integrate((((-2*x^2*exp(16)-2*x^3+2*x^2)*exp(exp(16)^2+(-2+2*x)*exp(16)+x^
2-2*x+1)+2*x)*log(x)+(4*x^2*exp(16)+4*x^3-4*x^2)*exp(exp(16)^2+(-2+2*x)*ex
p(16)+x^2-2*x+1)-3*x)/exp(exp(exp(16)^2+(-2+2*x)*exp(16)+x^2-2*x+1)),x, al
gorithm=\
```

output
```
Timed out
```

3.1193.6 Sympy [A] (verification not implemented)

Time = 35.21 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(2x^2-2e^{16}x^2-2x^3\right)\right)\log(x)\right)\,dx=\left(x^2\log{(x)}-2x^2\right)e^{-e^{x^2-2x+(2x-2)e^{16}+1+e^{32}}}$$

input
```
integrate((((-2*x**2*exp(16)-2*x**3+2*x**2)*exp(exp(16)**2+(-2+2*x)*exp(16
)+x**2-2*x+1)+2*x)*ln(x)+(4*x**2*exp(16)+4*x**3-4*x**2)*exp(exp(16)**2+(-2
+2*x)*exp(16)+x**2-2*x+1)-3*x)/exp(exp(exp(16)**2+(-2+2*x)*exp(16)+x**2-2*
x+1)),x)
```

output
```
(x**2*log(x) - 2*x**2)*exp(-exp(x**2 - 2*x + (2*x - 2)*exp(16) + 1 + exp(3
2)))
```

3.1193.7 Maxima [A] (verification not implemented)

Time = 0.83 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

$$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)\right.$$
$$\left.+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(2x^2-2e^{16}x^2-2x^3\right)\right)\log(x)\right)\,dx$$
$$=\left(x^2\log\left(x\right)-2\,x^2\right)e^{\left(-e^{\left(x^2+2\,xe^{16}-2\,x+e^{32}-2\,e^{16}+1\right)}\right)}$$

input
```
integrate((((-2*x^2*exp(16)-2*x^3+2*x^2)*exp(exp(16)^2+(-2+2*x)*exp(16)+x^
2-2*x+1)+2*x)*log(x)+(4*x^2*exp(16)+4*x^3-4*x^2)*exp(exp(16)^2+(-2+2*x)*ex
p(16)+x^2-2*x+1)-3*x)/exp(exp(exp(16)^2+(-2+2*x)*exp(16)+x^2-2*x+1)),x, al
gorithm=\
```

output
```
(x^2*log(x) - 2*x^2)*e^(-e^(x^2 + 2*x*e^16 - 2*x + e^32 - 2*e^16 + 1))
```

3.1193.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 121 vs. 2(19) = 38.

Time = 0.43 (sec) , antiderivative size = 121, normalized size of antiderivative = 5.50

$$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)\right.$$
$$\left.+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(2x^2-2e^{16}x^2-2x^3\right)\right)\log(x)\right)\,dx$$
$$=\left(x^2e^{\left(x^2+2\,xe^{16}-2\,x+e^{32}-2\,e^{16}-e^{\left(x^2+2\,xe^{16}-2\,x+e^{32}-2\,e^{16}+1\right)}+1\right)}\log\left(x\right)-2\,x^2e^{\left(x^2+2\,xe^{16}-2\,x+e^{32}-2\,e^{16}-e^{\left(x^2+2\,xe^{16}-2\,x+e^{32}\right.}}\right.$$

input
```
integrate((((-2*x^2*exp(16)-2*x^3+2*x^2)*exp(exp(16)^2+(-2+2*x)*exp(16)+x^
2-2*x+1)+2*x)*log(x)+(4*x^2*exp(16)+4*x^3-4*x^2)*exp(exp(16)^2+(-2+2*x)*ex
p(16)+x^2-2*x+1)-3*x)/exp(exp(exp(16)^2+(-2+2*x)*exp(16)+x^2-2*x+1)),x, al
gorithm=\
```

output
```
(x^2*e^(x^2 + 2*x*e^16 - 2*x + e^32 - 2*e^16 - e^(x^2 + 2*x*e^16 - 2*x + e
^32 - 2*e^16 + 1) + 1)*log(x) - 2*x^2*e^(x^2 + 2*x*e^16 - 2*x + e^32 - 2*e
^16 - e^(x^2 + 2*x*e^16 - 2*x + e^32 - 2*e^16 + 1) + 1))*e^(-x^2 - 2*x*e^1
6 + 2*x - e^32 + 2*e^16 - 1)
```

3.1193.

$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}(-4x^2+4e^{16}x^2+4x^3)+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+\right.\right.$

3.1193.9 Mupad [B] (verification not implemented)

Time = 15.14 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.59

$$\int e^{-e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}}\left(-3x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(-4x^2+4e^{16}x^2+4x^3\right)+\left(2x+e^{1+e^{32}-2x+x^2+e^{16}(-2+2x)}\left(2x^2-2e^{16}x^2-2x^3\right)\right)\log(x)\right)\,dx$$
$$=x^2\,\mathrm{e}^{-\mathrm{e}^{-2\,\mathrm{e}^{16}}\,\mathrm{e}^{-2\,x}\,\mathrm{e}^{x^2}\,\mathrm{e}\,\mathrm{e}^{2\,x\,\mathrm{e}^{16}}\,\mathrm{e}^{\mathrm{e}^{32}}}\,\left(\ln\left(x\right)-2\right)$$

input
```
int(exp(-exp(exp(32) - 2*x + x^2 + exp(16)*(2*x - 2) + 1))*(log(x)*(2*x -
exp(exp(32) - 2*x + x^2 + exp(16)*(2*x - 2) + 1)*(2*x^2*exp(16) - 2*x^2 +
2*x^3)) - 3*x + exp(exp(32) - 2*x + x^2 + exp(16)*(2*x - 2) + 1)*(4*x^2*ex
p(16) - 4*x^2 + 4*x^3)),x)
```

output
```
x^2*exp(-exp(-2*exp(16))*exp(-2*x)*exp(x^2)*exp(1)*exp(2*x*exp(16))*exp(ex
p(32)))*(log(x) - 2)
```

3.1194 $\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}(10x^2-2e^4x^2)}\,dx$

3.1194.1 Optimal result

Integrand size = 77, antiderivative size = 21

$$\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}\left(10x^2-2e^4x^2\right)}\,dx=\frac{9}{\left(5-e^4+e^{-2+2x}\right)x}$$

output
```
9/(exp(-2+2*x)-exp(4)+5)/x
```

3.1194.2 Mathematica [A] (verified)

Time = 0.61 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

$$\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}\left(10x^2-2e^4x^2\right)}\,dx=\frac{9e^2}{\left(5e^2-e^6+e^{2x}\right)x}$$

input
```
Integrate[(-45 + 9*E^4 + E^(-2 + 2*x)*(-9 - 18*x))/(25*x^2 - 10*E^4*x^2 +
E^8*x^2 + E^(-4 + 4*x)*x^2 + E^(-2 + 2*x)*(10*x^2 - 2*E^4*x^2)),x]
```

output
```
(9*E^2)/((5*E^2 - E^6 + E^(2*x))*x)
```

3.1194.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.29, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.078, Rules used = {6, 6, 7292, 27, 27, 7238}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x-2}(-18x-9)+9e^4-45}{e^{4x-4}x^2+e^8x^2-10e^4x^2+25x^2+e^{2x-2}\left(10x^2-2e^4x^2\right)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{e^{2x-2}(-18x-9)+9e^4-45}{e^{4x-4}x^2+\left(25-10e^4\right)x^2+e^8x^2+e^{2x-2}\left(10x^2-2e^4x^2\right)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{e^{2x-2}(-18x-9)+9e^4-45}{e^{4x-4}x^2+\left(25-10e^4+e^8\right)x^2+e^{2x-2}\left(10x^2-2e^4x^2\right)}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{e^4\left(e^{2x-2}(-18x-9)-45\left(1-\frac{e^4}{5}\right)\right)}{\left(e^{2x}+5e^2\left(1-\frac{e^4}{5}\right)\right)^2x^2}dx$$

$$\Big\downarrow \ 27$$

$$e^4\int -\frac{9\left(e^{2x-2}(2x+1)-e^4+5\right)}{\left(e^{2x}+e^2\left(5-e^4\right)\right)^2x^2}dx$$

$$\Big\downarrow \ 27$$

$$-9e^4\int \frac{e^{2x-2}(2x+1)-e^4+5}{\left(e^{2x}+e^2\left(5-e^4\right)\right)^2x^2}dx$$

$$\Big\downarrow \ 7238$$

$$\frac{9e^2}{\left(e^{2x}+e^2\left(5-e^4\right)\right)x}$$

input
```
Int[(-45 + 9*E^4 + E^(-2 + 2*x)*(-9 - 18*x))/(25*x^2 - 10*E^4*x^2 + E^8*x^
2 + E^(-4 + 4*x)*x^2 + E^(-2 + 2*x)*(10*x^2 - 2*E^4*x^2)),x]
```

output
```
(9*E^2)/((E^(2*x) + E^2*(5 - E^4))*x)
```

3.1194. $\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}(10x^2-2e^4x^2)}\,dx$

3.1194.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7238
```
Int[(u_)*(y_)^(m_.)*(z_)^(n_.), x_Symbol] :> With[{q = DerivativeDivides[y*
z, u*z^(n - m), x]}, Simp[q*y^(m + 1)*(z^(m + 1)/(m + 1)), x] /;  !FalseQ[q
]] /; FreeQ[{m, n}, x] && NeQ[m, -1]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1194.4 Maple [A] (verified)

Time = 162.33 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

method	result	size
norman	$-\frac{9}{x\left(\mathrm{e}^{4}-\mathrm{e}^{-2+2x}-5\right)}$	20
risch	$-\frac{9}{x\left(\mathrm{e}^{4}-\mathrm{e}^{-2+2x}-5\right)}$	20
parallelrisch	$-\frac{9}{x\left(\mathrm{e}^{4}-\mathrm{e}^{-2+2x}-5\right)}$	20

input
```
int(((-18*x-9)*exp(-2+2*x)+9*exp(4)-45)/(x^2*exp(-2+2*x)^2+(-2*x^2*exp(4)+
10*x^2)*exp(-2+2*x)+x^2*exp(4)^2-10*x^2*exp(4)+25*x^2),x,method=_RETURNVER
BOSE)
```

output
```
-9/x/(exp(4)-exp(-2+2*x)-5)
```

3.1194.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}\left(10x^2-2e^4x^2\right)}\,dx = -\frac{9}{xe^4-xe^{(2\,x-2)}-5\,x}$$

input
```
integrate(((-18*x-9)*exp(-2+2*x)+9*exp(4)-45)/(x^2*exp(-2+2*x)^2+(-2*x^2*e
xp(4)+10*x^2)*exp(-2+2*x)+x^2*exp(4)^2-10*x^2*exp(4)+25*x^2),x, algorithm=
\
```

output
```
-9/(x*e^4 - x*e^(2*x - 2) - 5*x)
```

3.1194.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}\left(10x^2-2e^4x^2\right)}\,dx = \frac{9}{xe^{2x-2}-xe^4+5x}$$

input
```
integrate(((-18*x-9)*exp(-2+2*x)+9*exp(4)-45)/(x**2*exp(-2+2*x)**2+(-2*x**
2*exp(4)+10*x**2)*exp(-2+2*x)+x**2*exp(4)**2-10*x**2*exp(4)+25*x**2),x)
```

output
```
9/(x*exp(2*x - 2) - x*exp(4) + 5*x)
```

3.1194.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}\left(10x^2-2e^4x^2\right)}\,dx = -\frac{9\,e^2}{x(e^6-5\,e^2)-xe^{(2\,x)}}$$

input
```
integrate(((-18*x-9)*exp(-2+2*x)+9*exp(4)-45)/(x^2*exp(-2+2*x)^2+(-2*x^2*e
xp(4)+10*x^2)*exp(-2+2*x)+x^2*exp(4)^2-10*x^2*exp(4)+25*x^2),x, algorithm=
\
```

output
```
-9*e^2/(x*(e^6 - 5*e^2) - x*e^(2*x))
```

3.1194.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.67

$$\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}(10x^2-2e^4x^2)}\,dx = -\frac{9}{(x-1)e^4-(x-1)e^{(2x-2)}-5x+e^4-e^{(2x-2)}}$$

input
```
integrate(((-18*x-9)*exp(-2+2*x)+9*exp(4)-45)/(x^2*exp(-2+2*x)^2+(-2*x^2*e
xp(4)+10*x^2)*exp(-2+2*x)+x^2*exp(4)^2-10*x^2*exp(4)+25*x^2),x, algorithm=
\
```

output
```
-9/((x - 1)*e^4 - (x - 1)*e^(2*x - 2) - 5*x + e^4 - e^(2*x - 2))
```

3.1194.9 Mupad [B] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-45+9e^4+e^{-2+2x}(-9-18x)}{25x^2-10e^4x^2+e^8x^2+e^{-4+4x}x^2+e^{-2+2x}(10x^2-2e^4x^2)}\,dx = \frac{9}{x\,(\mathrm{e}^{2x-2}-\mathrm{e}^4+5)}$$

input
```
int(-(exp(2*x - 2)*(18*x + 9) - 9*exp(4) + 45)/(x^2*exp(8) - 10*x^2*exp(4)
 - exp(2*x - 2)*(2*x^2*exp(4) - 10*x^2) + x^2*exp(4*x - 4) + 25*x^2),x)
```

output
```
9/(x*(exp(2*x - 2) - exp(4) + 5))
```

3.1195 $\int \frac{-2-x+2\log(-5x+x(i\pi+\log(3)))}{(4+4x+x^2)\log^2(-5x+x(i\pi+\log(3)))}\,dx$

3.1195.1 Optimal result

Integrand size = 50, antiderivative size = 21

$$\int \frac{-2-x+2\log(-5x+x(i\pi+\log(3)))}{(4+4x+x^2)\log^2(-5x+x(i\pi+\log(3)))}\,dx = \frac{x}{(2+x)\log(x(-5+i\pi+\log(3)))}$$

output
```
x/(2+x)/ln(x*(ln(3)+I*Pi-5))
```

3.1195.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{-2-x+2\log(-5x+x(i\pi+\log(3)))}{(4+4x+x^2)\log^2(-5x+x(i\pi+\log(3)))}\,dx = \frac{x}{(2+x)\log(x(-5+i\pi+\log(3)))}$$

input
```
Integrate[(-2 - x + 2*Log[-5*x + x*(I*Pi + Log[3])])/((4 + 4*x + x^2)*Log[
-5*x + x*(I*Pi + Log[3])]^2),x]
```

output
```
x/((2 + x)*Log[x*(-5 + I*Pi + Log[3])])
```

3.1195.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x+2\log(-5x+x(\log(3)+i\pi))-2}{(x^2+4x+4)\log^2(-5x+x(\log(3)+i\pi))}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-x+2\log(-5x+x(\log(3)+i\pi))-2}{(x+2)^2\log^2(-5x+x(\log(3)+i\pi))}dx$$

$$\Big\downarrow \text{2894}$$

$$\int \frac{-x+2\log(-5x+x(\log(3)+i\pi))-2}{(x+2)^2\log^2(-x(5-i\pi-\log(3)))}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{1}{(-x-2)\log^2(-x(5-i\pi-\log(3)))}+\frac{2}{(x+2)^2\log(-x(5-i\pi-\log(3)))}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{1}{(-x-2)\log^2(x(-5+i\pi+\log(3)))}dx+2\int \frac{1}{(x+2)^2\log(x(-5+i\pi+\log(3)))}dx$$

input
```
Int[(-2 - x + 2*Log[-5*x + x*(I*Pi + Log[3])])/((4 + 4*x + x^2)*Log[-5*x +
 x*(I*Pi + Log[3])]^2),x]
```

output
```
$Aborted
```

3.1195.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2894
```
Int[((a_.) + Log[(c_.)*(v_)^(n_.)]*(b_.))^(p_.)*(u_.), x_Symbol] :> Int[u*(
a + b*Log[c*ExpandToSum[v, x]^n])^p, x] /; FreeQ[{a, b, c, n, p}, x] && Lin
earQ[v, x] &&  !LinearMatchQ[v, x] &&  !(EqQ[n, 1] && MatchQ[c*v, (e_.)*((f
_) + (g_.)*x) /; FreeQ[{e, f, g}, x]])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1195.4 Maple [A] (verified)

Time = 15.40 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

method	result	size
parallelrisch	$\frac{x}{(2+x)\ln(x(\ln(3)+i\pi-5))}$	21
norman	$\frac{x}{(2+x)\ln(x(\ln(3)+i\pi)-5x)}$	24
risch	$\frac{x}{(2+x)\ln(x(\ln(3)+i\pi)-5x)}$	24

input
```
int((2*ln(x*(ln(3)+I*Pi)-5*x)-x-2)/(x^2+4*x+4)/ln(x*(ln(3)+I*Pi)-5*x)^2,x,
method=_RETURNVERBOSE)
```

output
```
x/(2+x)/ln(x*(ln(3)+I*Pi-5))
```

3.1195.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int \frac{-2-x+2\log(-5x+x(i\pi+\log(3)))}{(4+4x+x^2)\log^2(-5x+x(i\pi+\log(3)))}\,dx = \frac{x}{(x+2)\log\left((i\,\pi-5)x+x\log\left(3\right)\right)}$$

input
```
integrate((2*log(x*(log(3)+I*pi)-5*x)-x-2)/(x^2+4*x+4)/log(x*(log(3)+I*pi)
-5*x)^2,x, algorithm=\
```

output
```
x/((x + 2)*log((I*pi - 5)*x + x*log(3)))
```

3.1195.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{-2-x+2\log(-5x+x(i\pi+\log(3)))}{(4+4x+x^2)\log^2(-5x+x(i\pi+\log(3)))}\,dx = \frac{x}{(x+2)\log\left(-5x+x\log(3)+i\pi x\right)}$$

input
```
integrate((2*ln(x*(ln(3)+I*pi)-5*x)-x-2)/(x**2+4*x+4)/ln(x*(ln(3)+I*pi)-5*
x)**2,x)
```

output
```
x/((x + 2)*log(-5*x + x*log(3) + I*pi*x))
```

3.1195.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.48

$$\int \frac{-2-x+2\log(-5x+x(i\pi+\log(3)))}{(4+4x+x^2)\log^2(-5x+x(i\pi+\log(3)))}\,dx = \frac{x}{x\log\left(i\pi+\log(3)-5\right)+(x+2)\log(x)+2\log\left(i\pi+\log(3)-5\right)}$$

input
```
integrate((2*log(x*(log(3)+I*pi)-5*x)-x-2)/(x^2+4*x+4)/log(x*(log(3)+I*pi)
-5*x)^2,x, algorithm=\
```

output
```
x/(x*log(I*pi + log(3) - 5) + (x + 2)*log(x) + 2*log(I*pi + log(3) - 5))
```

3.1195.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.67

$$\int \frac{-2-x+2\log(-5x+x(i\pi+\log(3)))}{(4+4x+x^2)\log^2(-5x+x(i\pi+\log(3)))}\,dx = \frac{x}{x\log\left(i\pi x+x\log(3)-5x\right)+2\log\left(i\pi x+x\log(3)-5x\right)}$$

input
```
integrate((2*log(x*(log(3)+I*pi)-5*x)-x-2)/(x^2+4*x+4)/log(x*(log(3)+I*pi)
-5*x)^2,x, algorithm=\
```

output
```
x/(x*log(I*pi*x + x*log(3) - 5*x) + 2*log(I*pi*x + x*log(3) - 5*x))
```

3.1195.9 Mupad [B] (verification not implemented)

Time = 15.00 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{-2-x+2\log(-5x+x(i\pi+\log(3)))}{(4+4x+x^2)\log^2(-5x+x(i\pi+\log(3)))}\,dx=\frac{x}{\ln\left(x\ \left(\ln\left(3\right)-5+\Pi\,1\mathrm{i}\right)\right)\ \left(x+2\right)}$$

input
```
int(-(x - 2*log(x*(Pi*1i + log(3)) - 5*x) + 2)/(log(x*(Pi*1i + log(3)) - 5
*x)^2*(4*x + x^2 + 4)),x)
```

output
```
x/(log(x*(Pi*1i + log(3) - 5))*(x + 2))
```

3.1196 $\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx$

3.1196.1 Optimal result

Integrand size = 27, antiderivative size = 17

$$\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx = -\frac{e^4}{\log\left(-2+\frac{x^4}{225}\right)}$$

output
```
-exp(4)/ln(1/225*x^4-2)
```

3.1196.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx = -\frac{e^4}{\log\left(-2+\frac{x^4}{225}\right)}$$

input
```
Integrate[(4*E^4*x^3)/((-450 + x^4)*Log[(-450 + x^4)/225]^2),x]
```

output
```
-(E^4/Log[-2 + x^4/225])
```

3.1196.3 Rubi [A] (warning: unable to verify)

Time = 0.27 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.47, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.259$, Rules used = {27, 25, 2925, 2837, 25, 2739, 15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4e^4x^3}{(x^4-450)\log^2\left(\frac{1}{225}(x^4-450)\right)}dx$$

$$\Big\downarrow \text{27}$$

$$4e^4\int -\frac{x^3}{(450-x^4)\log^2\left(\frac{1}{225}(x^4-450)\right)}dx$$

$$\Big\downarrow \text{25}$$

$$-4e^4\int \frac{x^3}{(450-x^4)\log^2\left(\frac{1}{225}(x^4-450)\right)}dx$$

$$\Big\downarrow \text{2925}$$

$$-e^4\int \frac{1}{(450-x^4)\log^2\left(\frac{1}{225}(x^4-450)\right)}dx^4$$

$$\Big\downarrow \text{2837}$$

$$-e^4\int -\frac{1}{x^4\log^2\left(\frac{1}{225}(x^4-450)\right)}d(x^4-450)$$

$$\Big\downarrow \text{25}$$

$$e^4\int \frac{1}{x^4\log^2\left(\frac{1}{225}(x^4-450)\right)}d(x^4-450)$$

$$\Big\downarrow \text{2739}$$

$$e^4\int \frac{1}{x^8}d\log\left(\frac{1}{225}(x^4-450)\right)$$

$$\Big\downarrow \text{15}$$

$$-\frac{e^4}{x^4}$$

input
```
Int[(4*E^4*x^3)/((-450 + x^4)*Log[(-450 + x^4)/225]^2),x]
```

output
```
-(E^4/x^4)
```

3.1196.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2739
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Simp[1/(
b*n)   Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p}
, x]
```

rule 2837
```
Int[((a_.) + Log[(c_.)*((d_) + (e_.)*(x_))^(n_.)]*(b_.))^(p_.)*((f_) + (g_.
)*(x_))^(q_.), x_Symbol] :> Simp[1/e   Subst[Int[(f*(x/d))^q*(a + b*Log[c*x
^n])^p, x], x, d + e*x], x] /; FreeQ[{a, b, c, d, e, f, g, n, p, q}, x] &&
EqQ[e*f - d*g, 0]
```

rule 2925
```
Int[((a_.) + Log[(c_.)*((d_) + (e_.)*(x_)^(n_))^(p_.)]*(b_.))^(q_.)*(x_)^(m
_.)*((f_) + (g_.)*(x_)^(s_))^(r_.), x_Symbol] :> Simp[1/n   Subst[Int[x^(Si
mplify[(m + 1)/n] - 1)*(f + g*x^(s/n))^r*(a + b*Log[c*(d + e*x)^p])^q, x],
x, x^n], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, p, q, r, s}, x] && Integer
Q[r] && IntegerQ[s/n] && IntegerQ[Simplify[(m + 1)/n]] && (GtQ[(m + 1)/n, 0
] || IGtQ[q, 0])
```

3.1196. $\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx$

3.1196.4 Maple [A] (verified)

Time = 1.84 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

method	result	size
derivativedivides	$-\frac{e^{4}}{\ln\left(\frac{x^{4}}{225}-2\right)}$	15
default	$-\frac{e^{4}}{\ln\left(\frac{x^{4}}{225}-2\right)}$	15
norman	$-\frac{e^{4}}{\ln\left(\frac{x^{4}}{225}-2\right)}$	15
risch	$-\frac{e^{4}}{\ln\left(\frac{x^{4}}{225}-2\right)}$	15
parallelrisch	$-\frac{e^{4}}{\ln\left(\frac{x^{4}}{225}-2\right)}$	15

input
```
int(4*x^3*exp(4)/(x^4-450)/ln(1/225*x^4-2)^2,x,method=_RETURNVERBOSE)
```

output
```
-exp(4)/ln(1/225*x^4-2)
```

3.1196.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx = -\frac{e^4}{\log\left(\frac{1}{225}\,x^4-2\right)}$$

input
```
integrate(4*x^3*exp(4)/(x^4-450)/log(1/225*x^4-2)^2,x, algorithm=\
```

output
```
-e^4/log(1/225*x^4 - 2)
```

3.1196.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

$$\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx = -\frac{e^4}{\log\left(\frac{x^4}{225}-2\right)}$$

input
```
integrate(4*x**3*exp(4)/(x**4-450)/ln(1/225*x**4-2)**2,x)
```

output
```
-exp(4)/log(x**4/225 - 2)
```

3.1196.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.29

$$\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx = \frac{e^4}{2\log(5)+2\log(3)-\log(x^4-450)}$$

input
```
integrate(4*x^3*exp(4)/(x^4-450)/log(1/225*x^4-2)^2,x, algorithm=\
```

output
```
e^4/(2*log(5) + 2*log(3) - log(x^4 - 450))
```

3.1196.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx = -\frac{e^4}{\log\left(\frac{1}{225}x^4-2\right)}$$

input
```
integrate(4*x^3*exp(4)/(x^4-450)/log(1/225*x^4-2)^2,x, algorithm=\
```

output
```
-e^4/log(1/225*x^4 - 2)
```

3.1196.9 Mupad [B] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{4e^4x^3}{(-450+x^4)\log^2\left(\frac{1}{225}(-450+x^4)\right)}\,dx = -\frac{e^4}{\ln\left(\frac{x^4}{225}-2\right)}$$

input
```
int((4*x^3*exp(4))/(log(x^4/225 - 2)^2*(x^4 - 450)),x)
```

output
```
-exp(4)/log(x^4/225 - 2)
```

3.1197 $\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8\right.}{}$

3.1197.1 Optimal result

Integrand size = 125, antiderivative size = 22

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^xx^2)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}(-80\right.\right.}{x^{41}}$$

$$= e^{\left(2\left(-10+e^{3+e^{e^x}x}\right)+\log(x)\right)^2}$$

output
```
exp((2*exp(x*exp(exp(x))+3)-20+ln(x))^2)
```

3.1197.2 Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.91

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^xx^2)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}(-80\right.\right.}{x^{41}}$$

$$= e^{4\left(-10+e^{3+e^{e^x}x}\right)^2+\log^2(x)}x^{-40+4e^{3+e^{e^x}x}}$$

input
```
Integrate[(E^(400 + 4*E^(6 + 2*E^E^x*x) + Log[x]^2 + E^(3 + E^E^x*x)*(-80
+ 4*Log[x]))*(-40 + E^(6 + E^x + 2*E^E^x*x)*(8*x + 8*E^x*x^2) + 2*Log[x] +
 E^(3 + E^E^x*x)*(4 + E^E^x*(-80*x - 80*E^x*x^2 + (4*x + 4*E^x*x^2)*Log[x]
))))/x^41,x]
```

3.1197.

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^xx^2)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}\left(-80x-80e^xx^2+(4x+4e^xx^2)\log(x)\right.\right.\right.}{x^{41}}$$

output
```
E^(4*(-10 + E^(3 + E^E^x*x))^2 + Log[x]^2)*x^(-40 + 4*E^(3 + E^E^x*x))
```

3.1197.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 209 vs. $2(22) = 44$.

Time = 2.48 (sec) , antiderivative size = 209, normalized size of antiderivative = 9.50, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.008$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(e^{2e^{e^x}x+e^x+6}(8e^x x^2+8x)+e^{e^{e^x}x+3}\left(e^{e^x}\left(-80e^x x^2+\left(4e^x x^2+4x\right)\log(x)-80x\right)+4\right)+2\log(x)-40\right)\exp\left(4e\right.}{x^{41}}$$

$$\Big\downarrow \text{2726}$$

$$\frac{\left(4e^{2e^{e^x}x+e^x+6}\left(e^x x^2+x\right)+2e^{e^{e^x}x+3}\left(1-e^{e^x}\left(20e^x x^2-\left(e^x x^2+x\right)\log(x)+20x\right)\right)+\log(x)\right)\exp\left(4e^{2e^{e^x}x+6}+\log\right.}{x^{41}\left(4e^{2e^{e^x}x+6}\left(e^{x+e^x}x+e^{e^x}\right)+\frac{2e^{e^{e^x}x+3}}{x}-2e^{e^{e^x}x+3}\left(e^{x+e^x}x+e^{e^x}\right)(20-\log(x))+\right.}$$

input
```
Int[(E^(400 + 4*E^(6 + 2*E^E^x*x) + Log[x]^2 + E^(3 + E^E^x*x)*(-80 + 4*Lo
g[x]))*(-40 + E^(6 + E^x + 2*E^E^x*x)*(8*x + 8*E^x*x^2) + 2*Log[x] + E^(3
+ E^E^x*x)*(4 + E^E^x*(-80*x - 80*E^x*x^2 + (4*x + 4*E^x*x^2)*Log[x]))))/x
^41,x]
```

output
```
(E^(400 + 4*E^(6 + 2*E^E^x*x) - 4*E^(3 + E^E^x*x)*(20 - Log[x]) + Log[x]^2
)*(4*E^(6 + E^x + 2*E^E^x*x)*(x + E^x*x^2) + Log[x] + 2*E^(3 + E^E^x*x)*(1
 - E^E^x*(20*x + 20*E^x*x^2 - (x + E^x*x^2)*Log[x]))))/(x^41*((2*E^(3 + E^
E^x*x))/x + 4*E^(6 + 2*E^E^x*x)*(E^E^x + E^(E^x + x)*x) - 2*E^(3 + E^E^x*x
)*(E^E^x + E^(E^x + x)*x)*(20 - Log[x]) + Log[x]/x))
```

3.1197.

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^x x^2)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}\left(-80x-80e^x x^2+(4x+4e^x x^2)\log(x)\right.\right.\right.}{x^{41}}$$

3.1197.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.1197.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 38 vs. 2(17) = 34.

Time = 19.98 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.77

method	result	size
parallelrisch	$\mathrm{e}^{4\,\mathrm{e}^{2x\,\mathrm{e}^{\mathrm{e}^{x}}+6}+(4\ln(x)-80)\mathrm{e}^{x\,\mathrm{e}^{\mathrm{e}^{x}}+3}+\ln(x)^{2}-40\ln(x)+400}$	39
risch	$\frac{x^{4\,\mathrm{e}^{x\,\mathrm{e}^{\mathrm{e}^{x}}+3}}\,\mathrm{e}^{\ln(x)^{2}+400-80\,\mathrm{e}^{x\,\mathrm{e}^{\mathrm{e}^{x}}+3}+4\,\mathrm{e}^{2x\,\mathrm{e}^{\mathrm{e}^{x}}+6}}}{x^{40}}$	45

input
```
int(((8*exp(x)*x^2+8*x)*exp(exp(x))*exp(x*exp(exp(x))+3)^2+(((4*exp(x)*x^2
+4*x)*ln(x)-80*exp(x)*x^2-80*x)*exp(exp(x))+4)*exp(x*exp(exp(x))+3)+2*ln(x
)-40)*exp(4*exp(x*exp(exp(x))+3)^2+(4*ln(x)-80)*exp(x*exp(exp(x))+3)+ln(x)
^2-40*ln(x)+400)/x,x,method=_RETURNVERBOSE)
```

output
```
exp(4*exp(x*exp(exp(x))+3)^2+(4*ln(x)-80)*exp(x*exp(exp(x))+3)+ln(x)^2-40*
ln(x)+400)
```

3.1197.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 36 vs. 2(17) = 34.

Time = 0.25 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^x x^2)+2\log(x)+e^{3+e^{e^x}x}(4+e^{e^x}(-80\ldots\right.}{x^{41}}$$
$$= e^{\left(4\,(\log(x)-20)e^{\left(xe^{(e^x)}+3\right)}+\log(x)^2+4\,e^{\left(2\,xe^{(e^x)}+6\right)}-40\,\log(x)+400\right)}$$

input
```
integrate(((8*exp(x)*x^2+8*x)*exp(exp(x))*exp(x*exp(exp(x))+3)^2+(((4*exp(
x)*x^2+4*x)*log(x)-80*exp(x)*x^2-80*x)*exp(exp(x))+4)*exp(x*exp(exp(x))+3)
+2*log(x)-40)*exp(4*exp(x*exp(exp(x))+3)^2+(4*log(x)-80)*exp(x*exp(exp(x))
+3)+log(x)^2-40*log(x)+400)/x,x, algorithm=\
```


$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^x x^2)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}\left(-80x-80e^x x^2+(4x+4e^x x^2)\log(x)\ldots\right.\right.\right.}{x^{41}}$$

output
```
e^(4*(log(x) - 20)*e^(x*e^(e^x) + 3) + log(x)^2 + 4*e^(2*x*e^(e^x) + 6) -
40*log(x) + 400)
```

3.1197.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. $2(19) = 38$.

Time = 14.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.86

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^xx^2)+2\log(x)+e^{3+e^{e^x}x}(4+e^{e^x}(-80\right.}{x^{41}}$$
$$= \frac{e^{(4\log(x)-80)e^{xe^{e^x}+3}+4e^{2xe^{e^x}+6}+\log(x)^2+400}}{x^{40}}$$

input
```
integrate(((8*exp(x)*x**2+8*x)*exp(exp(x))*exp(x*exp(exp(x))+3)**2+(((4*ex
p(x)*x**2+4*x)*ln(x)-80*exp(x)*x**2-80*x)*exp(exp(x))+4)*exp(x*exp(exp(x))
+3)+2*ln(x)-40)*exp(4*exp(x*exp(exp(x))+3)**2+(4*ln(x)-80)*exp(x*exp(exp(x
))+3)+ln(x)**2-40*ln(x)+400)/x,x)
```

output
```
exp((4*log(x) - 80)*exp(x*exp(exp(x)) + 3) + 4*exp(2*x*exp(exp(x)) + 6) +
log(x)**2 + 400)/x**40
```

3.1197.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 44 vs. $2(17) = 34$.

Time = 0.43 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.00

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^xx^2)+2\log(x)+e^{3+e^{e^x}x}(4+e^{e^x}(-80\right.}{x^{41}}$$
$$= \frac{e^{\left(4\,e^{\left(xe^{\left(e^x\right)}+3\right)}\log(x)+\log(x)^2+4\,e^{\left(2\,xe^{\left(e^x\right)}+6\right)}-80\,e^{\left(xe^{\left(e^x\right)}+3\right)}+400\right)}}{x^{40}}$$

input
```
integrate(((8*exp(x)*x^2+8*x)*exp(exp(x))*exp(x*exp(exp(x))+3)^2+(((4*exp(
x)*x^2+4*x)*log(x)-80*exp(x)*x^2-80*x)*exp(exp(x))+4)*exp(x*exp(exp(x))+3)
+2*log(x)-40)*exp(4*exp(x*exp(exp(x))+3)^2+(4*log(x)-80)*exp(x*exp(exp(x))
+3)+log(x)^2-40*log(x)+400)/x,x, algorithm=\
```

output
```
e^(4*e^(x*e^(e^x) + 3)*log(x) + log(x)^2 + 4*e^(2*x*e^(e^x) + 6) - 80*e^(x
*e^(e^x) + 3) + 400)/x^40
```

3.1197.8 Giac [F]

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^xx^2)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}(-80\right.\right.}{x^{41}}$$

$$=\int \frac{2\left(4\,(x^2e^x+x)e^{\left(2\,xe^{(e^x)}+e^x+6\right)}-2\,\left((20\,x^2e^x-(x^2e^x+x)\log(x)+20\,x)e^{(e^x)}-1\right)e^{\left(xe^{(e^x)}+3\right)}+\log(x)\right.}{x}$$

input
```
integrate(((8*exp(x)*x^2+8*x)*exp(exp(x))*exp(x*exp(exp(x))+3)^2+(((4*exp(
x)*x^2+4*x)*log(x)-80*exp(x)*x^2-80*x)*exp(exp(x))+4)*exp(x*exp(exp(x))+3)
+2*log(x)-40)*exp(4*exp(x*exp(exp(x))+3)^2+(4*log(x)-80)*exp(x*exp(exp(x))
+3)+log(x)^2-40*log(x)+400)/x,x, algorithm=\
```

output
```
integrate(2*(4*(x^2*e^x + x)*e^(2*x*e^(e^x) + e^x + 6) - 2*((20*x^2*e^x -
(x^2*e^x + x)*log(x) + 20*x)*e^(e^x) - 1)*e^(x*e^(e^x) + 3) + log(x) - 20)
*e^(4*(log(x) - 20)*e^(x*e^(e^x) + 3) + log(x)^2 + 4*e^(2*x*e^(e^x) + 6) -
 40*log(x) + 400)/x, x)
```

3.1197.9 Mupad [B] (verification not implemented)

Time = 14.71 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.09

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^xx^2)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}(-80\right.\right.}{x^{41}}$$

$$=\frac{x^{4\,e^3\,e^{x\,e^{e^x}}}\,e^{400}\,e^{\ln(x)^2}\,e^{4\,e^6\,e^{2\,x\,e^{e^x}}}\,e^{-80\,e^3\,e^{x\,e^{e^x}}}}{x^{40}}$$

input
```
int((exp(4*exp(2*x*exp(exp(x)) + 6) - 40*log(x) + log(x)^2 + exp(x*exp(exp
(x)) + 3)*(4*log(x) - 80) + 400)*(2*log(x) - exp(x*exp(exp(x)) + 3)*(exp(e
xp(x))*(80*x + 80*x^2*exp(x) - log(x)*(4*x + 4*x^2*exp(x))) - 4) + exp(exp
(x))*exp(2*x*exp(exp(x)) + 6)*(8*x + 8*x^2*exp(x)) - 40))/x,x)
```

3.1197.

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}(8x+8e^xx^2)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}\left(-80x-80e^xx^2+(4x+4e^xx^2)\log(x)\right.\right.\right.}{x^{41}}$$

output
```
(x^(4*exp(3)*exp(x*exp(exp(x))))*exp(400)*exp(log(x)^2)*exp(4*exp(6)*exp(2
*x*exp(exp(x))))*exp(-80*exp(3)*exp(x*exp(exp(x)))))/x^40
```

3.1197.

$$\int \frac{e^{400+4e^{6+2e^{e^x}x}+\log^2(x)+e^{3+e^{e^x}x}(-80+4\log(x))}\left(-40+e^{6+e^x+2e^{e^x}x}\left(8x+8e^xx^2\right)+2\log(x)+e^{3+e^{e^x}x}\left(4+e^{e^x}\left(-80x-80e^xx^2+\left(4x+4e^xx^2\right)\log(x)\right.\right.\right.}{x^{41}}$$

3.1198 $\int \frac{-960x^2+1440x^2\log(x)}{\log^3(x)}\,dx$

3.1198.1 Optimal result

Integrand size = 18, antiderivative size = 9

$$\int \frac{-960x^2+1440x^2\log(x)}{\log^3(x)}\,dx=\frac{480x^3}{\log^2(x)}$$

output
```
480*x^3/ln(x)^2
```

3.1198.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{-960x^2+1440x^2\log(x)}{\log^3(x)}\,dx=\frac{480x^3}{\log^2(x)}$$

input
```
Integrate[(-960*x^2 + 1440*x^2*Log[x])/Log[x]^3,x]
```

output
```
(480*x^3)/Log[x]^2
```

3.1198.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.40 (sec) , antiderivative size = 102, normalized size of antiderivative = 11.33, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {3041, 2813, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1440x^2\log(x)-960x^2}{\log^3(x)}dx$$

$$\Big\downarrow \text{3041}$$

$$\int \frac{x^2(1440\log(x)-960)}{\log^3(x)}dx$$

$$\Big\downarrow \text{2813}$$

$$-1440\int \left(\frac{9\,\text{ExpIntegralEi}(3\log(x))}{2x}-\frac{x^2(3\log(x)+1)}{2\log^2(x)}\right)dx-2160(2-3\log(x))\,\text{ExpIntegralEi}(3\log(x))+\frac{240x^3(2-3\log(x))}{\log^2(x)}+\frac{720x^3(2-3\log(x))}{\log(x)}$$

$$\Big\downarrow \text{2009}$$

$$-1440\left(-\frac{3}{2}\text{ExpIntegralEi}(3\log(x))+9\log(x)\,\text{ExpIntegralEi}(3\log(x))-\frac{3}{2}(3\log(x)+1)\,\text{ExpIntegralEi}(3\log(x))\right. 2160(2-3\log(x))\,\text{ExpIntegralEi}(3\log(x))+\frac{240x^3(2-3\log(x))}{\log^2(x)}+\frac{720x^3(2-3\log(x))}{\log(x)}$$

input
```
Int[(-960*x^2 + 1440*x^2*Log[x])/Log[x]^3,x]
```

output
```
-2160*ExpIntegralEi[3*Log[x]]*(2 - 3*Log[x]) + (240*x^3*(2 - 3*Log[x]))/Lo
g[x]^2 + (720*x^3*(2 - 3*Log[x]))/Log[x] - 1440*(-3*x^3 - (3*ExpIntegralEi
[3*Log[x]])/2 + 9*ExpIntegralEi[3*Log[x]]*Log[x] - (3*ExpIntegralEi[3*Log[
x]]*(1 + 3*Log[x]))/2 + (x^3*(1 + 3*Log[x]))/(2*Log[x]))
```

3.1198.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2813
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.) + Log[(f_.)*(x_)^(r_
.)]*(e_.))*((g_.)*(x_))^(m_.), x_Symbol] :> With[{u = IntHide[(g*x)^m*(a +
b*Log[c*x^n])^p, x]}, Simp[(d + e*Log[f*x^r])   u, x] - Simp[e*r   Int[Simp
lifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c, d, e, f, g, m, n, p, r},
x] &&  !(EqQ[p, 1] && EqQ[a, 0] && NeQ[d, 0])
```

rule 3041
```
Int[(u_.)*((a_.)*(x_)^(m_.) + Log[(c_.)*(x_)^(n_.)]^(q_.)*(b_.)*(x_)^(r_.))
^(p_.), x_Symbol] :> Int[u*x^(p*r)*(a*x^(m - r) + b*Log[c*x^n]^q)^p, x] /;
FreeQ[{a, b, c, m, n, p, q, r}, x] && IntegerQ[p]
```

3.1198.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.11

method	result	size
default	$\frac{480x^{3}}{\ln\left(x\right)^{2}}$	10
norman	$\frac{480x^{3}}{\ln\left(x\right)^{2}}$	10
risch	$\frac{480x^{3}}{\ln\left(x\right)^{2}}$	10
parallelrisch	$\frac{480x^{3}}{\ln\left(x\right)^{2}}$	10
parts	$\frac{480x^{3}}{\ln\left(x\right)^{2}}$	10

input
```
int((1440*x^2*ln(x)-960*x^2)/ln(x)^3,x,method=_RETURNVERBOSE)
```

output
```
480*x^3/ln(x)^2
```

3.1198.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{-960x^2 + 1440x^2 \log(x)}{\log^3(x)}\, dx = \frac{480\, x^3}{\log{(x)}^2}$$

input
```
integrate((1440*x^2*log(x)-960*x^2)/log(x)^3,x, algorithm=\
```

output
```
480*x^3/log(x)^2
```

3.1198.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.89

$$\int \frac{-960x^2 + 1440x^2 \log(x)}{\log^3(x)}\, dx = \frac{480x^3}{\log{(x)}^2}$$

input
```
integrate((1440*x**2*ln(x)-960*x**2)/ln(x)**3,x)
```

output
```
480*x**3/log(x)**2
```

3.1198.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.89

$$\int \frac{-960x^2 + 1440x^2 \log(x)}{\log^3(x)}\, dx = 4320\,\Gamma(-1, -3\,\log{(x)}) + 8640\,\Gamma(-2, -3\,\log{(x)})$$

input
```
integrate((1440*x^2*log(x)-960*x^2)/log(x)^3,x, algorithm=\
```

output
```
4320*gamma(-1, -3*log(x)) + 8640*gamma(-2, -3*log(x))
```

3.1198.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{-960x^2 + 1440x^2 \log(x)}{\log^3(x)} \, dx = \frac{480 \, x^3}{\log{(x)}^2}$$

input
```
integrate((1440*x^2*log(x)-960*x^2)/log(x)^3,x, algorithm=\
```

output
```
480*x^3/log(x)^2
```

3.1198.9 Mupad [B] (verification not implemented)

Time = 14.78 (sec) , antiderivative size = 9, normalized size of antiderivative = 1.00

$$\int \frac{-960x^2 + 1440x^2 \log(x)}{\log^3(x)} \, dx = \frac{480 \, x^3}{\ln{(x)}^2}$$

input
```
int((1440*x^2*log(x) - 960*x^2)/log(x)^3,x)
```

output
```
(480*x^3)/log(x)^2
```

3.1199 $\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^{\cdots}}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+\cdots}$

3.1199.1 Optimal result

Integrand size = 175, antiderivative size = 28

$$\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x\cdots}}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+\cdots}}$$
$$= x+\frac{x^2}{5+e^3+e^{-x}\sqrt[3]{25-x}}$$

output
```
x^2/(exp(1/3*ln(-x+25)-x)+exp(3)+5)+x
```

3.1199.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 138 vs. 2(28) = 56.

Time = 11.22 (sec) , antiderivative size = 138, normalized size of antiderivative = 4.93

$$\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x\cdots}}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+\cdots}}$$
$$= \frac{x(25+e^{9+3x}-x-5e^{2x}\sqrt[3]{25-x}x-e^{3+2x}\sqrt[3]{25-x}x+e^x(25-x)^{2/3}x+25e^{3x}(5+x)+e^{6+3x}(15+x)+\cdots}{25+125e^{3x}+75e^{3+3x}+15e^{6+3x}+e^{9+3x}-x}$$

3.1199.
$$\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750-120x-70x^2+3x^3+e^3(-150\cdots}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750+30x+e^3(-150+6x))}$$

input
```
Integrate[(-1875 - 675*x + 30*x^2 + E^6*(-75 + 3*x) + E^((2*(-3*x + Log[25
 - x]))/3)*(-75 + 3*x) + E^3*(-750 - 120*x + 6*x^2) + E^((-3*x + Log[25 -
x])/3)*(-750 - 120*x - 70*x^2 + 3*x^3 + E^3*(-150 + 6*x)))/(-1875 + 75*x +
 E^6*(-75 + 3*x) + E^((2*(-3*x + Log[25 - x]))/3)*(-75 + 3*x) + E^3*(-750
+ 30*x) + E^((-3*x + Log[25 - x])/3)*(-750 + 30*x + E^3*(-150 + 6*x))),x]
```

output
```
(x*(25 + E^(9 + 3*x) - x - 5*E^(2*x)*(25 - x)^(1/3)*x - E^(3 + 2*x)*(25 -
x)^(1/3)*x + E^x*(25 - x)^(2/3)*x + 25*E^(3*x)*(5 + x) + E^(6 + 3*x)*(15 +
 x) + 5*E^(3 + 3*x)*(15 + 2*x)))/(25 + 125*E^(3*x) + 75*E^(3 + 3*x) + 15*E
^(6 + 3*x) + E^(9 + 3*x) - x)
```

3.1199.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{30x^2+e^3\left(6x^2-120x-750\right)+\left(3x^3-70x^2-120x+e^3(6x-150)-750\right)e^{\frac{1}{3}(\log(25-x)-3x)}-675x+e^6(3x-}{75x+e^6(3x-75)+e^3(30x-750)+(3x-75)e^{\frac{2}{3}(\log(25-x)-3x)}+\left(30x+e^3(6x-150)-750\right)e}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{2x}\left(-30x^2-e^3\left(6x^2-120x-750\right)-\left(3x^3-70x^2-120x+e^3(6x-150)-750\right)e^{\frac{1}{3}(\log(25-x)-3x)}+675x-e^6\right.}{3\left(\sqrt[3]{25-x}+5\left(1+\frac{e^3}{5}\right)e^x\right)^2(25-x)}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{3}\int \frac{e^{2x}\left(-30x^2+675x+3e^{-2x}(25-x)^{5/3}+3e^6(25-x)+6e^3\left(-x^2+20x+125\right)+e^{-x}\sqrt[3]{25-x}\left(-3x^3+70x^2\right.\right.}{\left(\sqrt[3]{25-x}+e^x\left(5+e^3\right)\right)^2(25-x)}$$

$$\Big\downarrow \text{ 7267}$$

$$-\int \frac{3e^{2(25-x)}(25-x)^{4/3}+6e^{53-x}(25-x)+6e^{53}(x+5)(25-x)^{2/3}+3e^{56}(25-x)^{2/3}+15e^{50}\left(55(25-x)^{2/3}-\right.}{\left(e^{25-x}\sqrt[3]{25-x}+e^{25}\left(5+e^3\right)\right)^2}$$

$$\Big\downarrow \text{ 7293}$$

$$-\int\left(\frac{e^{50}\left(5+e^3\right)\left(-3(25-x)-1\right)x^2}{\left(e^{25-x}\sqrt[3]{25-x}+5e^{25}\left(1+\frac{e^3}{5}\right)\right)^2\sqrt[3]{25-x}}+3(25-x)^{2/3}+\frac{e^{25}\left(3(25-x)^3-155(25-x)^2+1975(25-\right.}{\left(e^{25-x}\sqrt[3]{25-x}+5e^{25}\left(1+\frac{e^3}{5}\right)\right)\sqrt[3]{25}}\right.$$

$$\Big\downarrow \text{2009}$$

$$625e^{50}(5+e^3)\int \frac{1}{\left(e^{25-x}\sqrt[3]{25-x}+5e^{25}\left(1+\frac{e^3}{5}\right)\right)^2\sqrt[3]{25-x}}d\sqrt[3]{25-x}-$$
$$625e^{25}\int \frac{1}{\left(e^{25-x}\sqrt[3]{25-x}+5e^{25}\left(1+\frac{e^3}{5}\right)\right)\sqrt[3]{25-x}}d\sqrt[3]{25-x}+$$
$$1825e^{50}(5+e^3)\int \frac{(25-x)^{2/3}}{\left(e^{25-x}\sqrt[3]{25-x}+5e^{25}\left(1+\frac{e^3}{5}\right)\right)^2}d\sqrt[3]{25-x}-$$
$$1975e^{25}\int \frac{(25-x)^{2/3}}{e^{25-x}\sqrt[3]{25-x}+5e^{25}\left(1+\frac{e^3}{5}\right)}d\sqrt[3]{25-x}-$$
$$155e^{25}\int \frac{(25-x)^{5/3}}{-e^{25-x}\sqrt[3]{25-x}-5e^{25}\left(1+\frac{e^3}{5}\right)}d\sqrt[3]{25-x}-$$
$$149e^{50}(5+e^3)\int \frac{(25-x)^{5/3}}{\left(e^{25-x}\sqrt[3]{25-x}+5e^{25}\left(1+\frac{e^3}{5}\right)\right)^2}d\sqrt[3]{25-x}+$$
$$3e^{50}(5+e^3)\int \frac{(25-x)^{8/3}}{\left(e^{25-x}\sqrt[3]{25-x}+5e^{25}\left(1+\frac{e^3}{5}\right)\right)^2}d\sqrt[3]{25-x}-$$
$$3e^{25}\int \frac{(25-x)^{8/3}}{e^{25-x}\sqrt[3]{25-x}+5e^{25}\left(1+\frac{e^3}{5}\right)}d\sqrt[3]{25-x}+x-25$$

input
```
Int[(-1875 - 675*x + 30*x^2 + E^6*(-75 + 3*x) + E^((2*(-3*x + Log[25 - x])
)/3)*(-75 + 3*x) + E^3*(-750 - 120*x + 6*x^2) + E^((-3*x + Log[25 - x])/3)
*(-750 - 120*x - 70*x^2 + 3*x^3 + E^3*(-150 + 6*x)))/(-1875 + 75*x + E^6*(
-75 + 3*x) + E^((2*(-3*x + Log[25 - x]))/3)*(-75 + 3*x) + E^3*(-750 + 30*x
) + E^((-3*x + Log[25 - x])/3)*(-750 + 30*x + E^3*(-150 + 6*x))),x]
```

output
```
$Aborted
```

3.1199.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1199.4 Maple [A] (verified)

Time = 2.35 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

method	result	size
risch	$\frac{x^{2}}{\left(-x+25\right)^{\frac{1}{3}} {\mathrm e}^{-x}+{\mathrm e}^{3}+5}+x$	25
norman	$\frac{x^{2}+\left({\mathrm e}^{3}+5\right) x+{\mathrm e}^{\frac{\ln\left(-x+25\right)}{3}-x} x}{{\mathrm e}^{\frac{\ln\left(-x+25\right)}{3}-x}+{\mathrm e}^{3}+5}$	46
parallelrisch	$\frac{750+3 x \,{\mathrm e}^{3}+3 x^{2}+3 \,{\mathrm e}^{\frac{\ln\left(-x+25\right)}{3}-x} x+150 \,{\mathrm e}^{3}+15 x+150 \,{\mathrm e}^{\frac{\ln\left(-x+25\right)}{3}-x}}{3 \,{\mathrm e}^{\frac{\ln\left(-x+25\right)}{3}-x}+3 \,{\mathrm e}^{3}+15}$	72

input
```
int(((3*x-75)*exp(1/3*ln(-x+25)-x)^2+((6*x-150)*exp(3)+3*x^3-70*x^2-120*x-
750)*exp(1/3*ln(-x+25)-x)+(3*x-75)*exp(3)^2+(6*x^2-120*x-750)*exp(3)+30*x^
2-675*x-1875)/((3*x-75)*exp(1/3*ln(-x+25)-x)^2+((6*x-150)*exp(3)+30*x-750)
*exp(1/3*ln(-x+25)-x)+(3*x-75)*exp(3)^2+(30*x-750)*exp(3)+75*x-1875),x,met
hod=_RETURNVERBOSE)
```

output
```
x^2/((-x+25)^(1/3)*exp(-x)+exp(3)+5)+x
```


$$\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750-120x-70x^2+3x^3+e^3(-150}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750+30x+e^3(-150+6x))}$$

3.1199.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.64

$$\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x+}}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+}}$$
$$=\frac{x^2+xe^3+xe^{\left(-x+\frac{1}{3}\log(-x+25)\right)}+5x}{e^3+e^{\left(-x+\frac{1}{3}\log(-x+25)\right)}+5}$$

input
```
integrate(((3*x-75)*exp(1/3*log(-x+25)-x)^2+((6*x-150)*exp(3)+3*x^3-70*x^2
-120*x-750)*exp(1/3*log(-x+25)-x)+(3*x-75)*exp(3)^2+(6*x^2-120*x-750)*exp(
3)+30*x^2-675*x-1875)/((3*x-75)*exp(1/3*log(-x+25)-x)^2+((6*x-150)*exp(3)+
30*x-750)*exp(1/3*log(-x+25)-x)+(3*x-75)*exp(3)^2+(30*x-750)*exp(3)+75*x-1
875),x, algorithm=\
```

output
```
(x^2 + x*e^3 + x*e^(-x + 1/3*log(-x + 25)) + 5*x)/(e^3 + e^(-x + 1/3*log(-
x + 25)) + 5)
```

3.1199.6 Sympy [F(-1)]

Timed out.

$$\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x}}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+}}$$
$$= \text{Timed out}$$

input
```
integrate(((3*x-75)*exp(1/3*ln(-x+25)-x)**2+((6*x-150)*exp(3)+3*x**3-70*x*
*2-120*x-750)*exp(1/3*ln(-x+25)-x)+(3*x-75)*exp(3)**2+(6*x**2-120*x-750)*e
xp(3)+30*x**2-675*x-1875)/((3*x-75)*exp(1/3*ln(-x+25)-x)**2+((6*x-150)*exp
(3)+30*x-750)*exp(1/3*ln(-x+25)-x)+(3*x-75)*exp(3)**2+(30*x-750)*exp(3)+75
*x-1875),x)
```

output
```
Timed out
```

3.1199.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(25) = 50$.

Time = 0.24 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.25

$$\int \frac{-1875 - 675x + 30x^2 + e^6(-75 + 3x) + e^{\frac{2}{3}(-3x+\log(25-x))}(-75 + 3x) + e^3(-750 - 120x + 6x^2) + e^{\frac{1}{3}(-3x}}{-1875 + 75x + e^6(-75 + 3x) + e^{\frac{2}{3}(-3x+\log(25-x))}(-75 + 3x) + e^3(-750 + 30x) + e^{\frac{1}{3}(-3x+}}$$
$$= \frac{(x-25)^2e^{25} - (-x+25)^{\frac{4}{3}}e^{(-x+25)} + (x-25)(e^{28} + 55\,e^{25}) + 625\,e^{25}}{(-x+25)^{\frac{1}{3}}e^{(-x+25)} + e^{28} + 5\,e^{25}}$$

input
```
integrate(((3*x-75)*exp(1/3*log(-x+25)-x)^2+((6*x-150)*exp(3)+3*x^3-70*x^2
-120*x-750)*exp(1/3*log(-x+25)-x)+(3*x-75)*exp(3)^2+(6*x^2-120*x-750)*exp(
3)+30*x^2-675*x-1875)/((3*x-75)*exp(1/3*log(-x+25)-x)^2+((6*x-150)*exp(3)+
30*x-750)*exp(1/3*log(-x+25)-x)+(3*x-75)*exp(3)^2+(30*x-750)*exp(3)+75*x-1
875),x, algorithm=\
```

output
```
((x - 25)^2*e^25 - (-x + 25)^(4/3)*e^(-x + 25) + (x - 25)*(e^28 + 55*e^25)
 + 625*e^25)/((-x + 25)^(1/3)*e^(-x + 25) + e^28 + 5*e^25)
```

3.1199.8 Giac [F]

$$\int \frac{-1875 - 675x + 30x^2 + e^6(-75 + 3x) + e^{\frac{2}{3}(-3x+\log(25-x))}(-75 + 3x) + e^3(-750 - 120x + 6x^2) + e^{\frac{1}{3}(-3x}}{-1875 + 75x + e^6(-75 + 3x) + e^{\frac{2}{3}(-3x+\log(25-x))}(-75 + 3x) + e^3(-750 + 30x) + e^{\frac{1}{3}(-3x+}}$$
$$= \int \frac{30\,x^2 + 3\,(x-25)e^6 + 6\,(x^2 - 20\,x - 125)e^3 + (3\,x^3 - 70\,x^2 + 6\,(x-25)e^3 - 120\,x - 750)e^{(-x+\frac{1}{3}\,\log(-}}{3\,\Big((x-25)e^6 + 10\,(x-25)e^3 + 2\,((x-25)e^3 + 5\,x - 125)e^{(-x+\frac{1}{3}\,\log(-x+25))} + (x-2}$$

input
```
integrate(((3*x-75)*exp(1/3*log(-x+25)-x)^2+((6*x-150)*exp(3)+3*x^3-70*x^2
-120*x-750)*exp(1/3*log(-x+25)-x)+(3*x-75)*exp(3)^2+(6*x^2-120*x-750)*exp(
3)+30*x^2-675*x-1875)/((3*x-75)*exp(1/3*log(-x+25)-x)^2+((6*x-150)*exp(3)+
30*x-750)*exp(1/3*log(-x+25)-x)+(3*x-75)*exp(3)^2+(30*x-750)*exp(3)+75*x-1
875),x, algorithm=\
```

output
```
integrate(1/3*(30*x^2 + 3*(x - 25)*e^6 + 6*(x^2 - 20*x - 125)*e^3 + (3*x^3
 - 70*x^2 + 6*(x - 25)*e^3 - 120*x - 750)*e^(-x + 1/3*log(-x + 25)) + 3*(x
 - 25)*e^(-2*x + 2/3*log(-x + 25)) - 675*x - 1875)/((x - 25)*e^6 + 10*(x -
 25)*e^3 + 2*((x - 25)*e^3 + 5*x - 125)*e^(-x + 1/3*log(-x + 25)) + (x - 2
5)*e^(-2*x + 2/3*log(-x + 25)) + 25*x - 625), x)
```

3.1199. $\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750-120x-70x^2+3x^3+e^3(-150}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750+30x+e^3(-150+6x))}$

3.1199.9 Mupad [B] (verification not implemented)

Time = 15.13 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.14

$$\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x+\log(25-x))}\ldots}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+\log(25-x))}\ldots}$$
$$= x - \frac{76\,x^2\,e^3-3\,x^3\,e^3+380\,x^2-15\,x^3}{(3\,x-76)\,\left(e^3+5\right)\,\left(e^3+e^{-x}\,(25-x)^{1/3}+5\right)}$$

input
```
int(-(675*x + exp(3)*(120*x - 6*x^2 + 750) - exp((2*log(25 - x))/3 - 2*x)*
(3*x - 75) + exp(log(25 - x)/3 - x)*(120*x + 70*x^2 - 3*x^3 - exp(3)*(6*x
- 150) + 750) - 30*x^2 - exp(6)*(3*x - 75) + 1875)/(75*x + exp(log(25 - x)
/3 - x)*(30*x + exp(3)*(6*x - 150) - 750) + exp((2*log(25 - x))/3 - 2*x)*(
3*x - 75) + exp(6)*(3*x - 75) + exp(3)*(30*x - 750) - 1875),x)
```

output
```
x - (76*x^2*exp(3) - 3*x^3*exp(3) + 380*x^2 - 15*x^3)/((3*x - 76)*(exp(3)
+ 5)*(exp(3) + exp(-x)*(25 - x)^(1/3) + 5))
```

3.1199.

$$\int \frac{-1875-675x+30x^2+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750-120x+6x^2)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750-120x-70x^2+3x^3+e^3(-150\ldots}{-1875+75x+e^6(-75+3x)+e^{\frac{2}{3}(-3x+\log(25-x))}(-75+3x)+e^3(-750+30x)+e^{\frac{1}{3}(-3x+\log(25-x))}(-750+30x+e^3(-150+6x))}$$

3.1200 $\int \frac{x+2e^{e^{2x}+2x}x+\left(5-e^{e^{2x}}-x\right)\log\left(5-e^{e^{2x}}-x\right)}{\left(-5+e^{e^{2x}}+x\right)\log^2\left(5-e^{e^{2x}}-x\right)}\,dx$

3.1200.1 Optimal result

Integrand size = 76, antiderivative size = 28

$$\int \frac{x+2e^{e^{2x}+2x}x+\left(5-e^{e^{2x}}-x\right)\log\left(5-e^{e^{2x}}-x\right)}{\left(-5+e^{e^{2x}}+x\right)\log^2\left(5-e^{e^{2x}}-x\right)}\,dx=-e^{9/2}-\frac{x}{\log\left(5-e^{e^{2x}}-x\right)}$$

output
```
-x/ln(-exp(exp(x)^2)+5-x)-exp(9/2)
```

3.1200.2 Mathematica [A] (verified)

Time = 0.47 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.71

$$\int \frac{x+2e^{e^{2x}+2x}x+\left(5-e^{e^{2x}}-x\right)\log\left(5-e^{e^{2x}}-x\right)}{\left(-5+e^{e^{2x}}+x\right)\log^2\left(5-e^{e^{2x}}-x\right)}\,dx=-\frac{x}{\log\left(5-e^{e^{2x}}-x\right)}$$

input
```
Integrate[(x + 2*E^(E^(2*x) + 2*x)*x + (5 - E^E^(2*x) - x)*Log[5 - E^E^(2*
x) - x])/((-5 + E^E^(2*x) + x)*Log[5 - E^E^(2*x) - x]^2),x]
```

output
```
-(x/Log[5 - E^E^(2*x) - x])
```

3.1200.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2e^{2x+e^{2x}}x+x+\left(-x-e^{e^{2x}}+5\right)\log\left(-x-e^{e^{2x}}+5\right)}{\left(x+e^{e^{2x}}-5\right)\log^2\left(-x-e^{e^{2x}}+5\right)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2e^{2x+e^{2x}}x}{\left(x+e^{e^{2x}}-5\right)\log^2\left(-x-e^{e^{2x}}+5\right)}-\frac{-x+x\log\left(-x-e^{e^{2x}}+5\right)+e^{e^{2x}}\log\left(-x-e^{e^{2x}}+5\right)-5\log\left(-x-\right.}{\left(x+e^{e^{2x}}-5\right)\log^2\left(-x-e^{e^{2x}}+5\right)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{x}{\left(x+e^{e^{2x}}-5\right)\log^2\left(-x-e^{e^{2x}}+5\right)}dx+2\int \frac{e^{2x+e^{2x}}x}{\left(x+e^{e^{2x}}-5\right)\log^2\left(-x-e^{e^{2x}}+5\right)}dx-\int \frac{1}{\log\left(-x-e^{e^{2x}}+5\right)}dx$$

input
```
Int[(x + 2*E^(E^(2*x) + 2*x)*x + (5 - E^E^(2*x) - x)*Log[5 - E^E^(2*x) - x
])/((-5 + E^E^(2*x) + x)*Log[5 - E^E^(2*x) - x]^2),x]
```

output
```
$Aborted
```

3.1200.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1200.4 Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

method	result	size
risch	$-\frac{x}{\ln\left(-e^{e^{2x}}+5-x\right)}$	19
parallelrisch	$-\frac{x}{\ln\left(-e^{e^{2x}}+5-x\right)}$	19

input
```
int(((-exp(exp(x)^2)+5-x)*ln(-exp(exp(x)^2)+5-x)+2*x*exp(x)^2*exp(exp(x)^2
)+x)/(exp(exp(x)^2)+x-5)/ln(-exp(exp(x)^2)+5-x)^2,x,method=_RETURNVERBOSE)
```

output
```
-x/ln(-exp(exp(2*x))+5-x)
```

3.1200.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{x+2e^{e^{2x}+2x}x+\left(5-e^{e^{2x}}-x\right)\log\left(5-e^{e^{2x}}-x\right)}{\left(-5+e^{e^{2x}}+x\right)\log^2\left(5-e^{e^{2x}}-x\right)}\,dx = -\frac{x}{\log\left(-\left((x-5)e^{(2\,x)}+e^{\left(2\,x+e^{(2\,x)}\right)}\right)e^{(-2\,x)}\right)}$$

input
```
integrate(((-exp(exp(x)^2)+5-x)*log(-exp(exp(x)^2)+5-x)+2*x*exp(x)^2*exp(e
xp(x)^2)+x)/(exp(exp(x)^2)+x-5)/log(-exp(exp(x)^2)+5-x)^2,x, algorithm=\
```

output
```
-x/log(-((x - 5)*e^(2*x) + e^(2*x + e^(2*x)))*e^(-2*x))
```

3.1200.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.50

$$\int \frac{x+2e^{e^{2x}+2x}x+\left(5-e^{e^{2x}}-x\right)\log\left(5-e^{e^{2x}}-x\right)}{\left(-5+e^{e^{2x}}+x\right)\log^2\left(5-e^{e^{2x}}-x\right)}\,dx = -\frac{x}{\log\left(-x-e^{e^{2x}}+5\right)}$$

input
```
integrate(((-exp(exp(x)**2)+5-x)*ln(-exp(exp(x)**2)+5-x)+2*x*exp(x)**2*exp
(exp(x)**2)+x)/(exp(exp(x)**2)+x-5)/ln(-exp(exp(x)**2)+5-x)**2,x)
```

output
```
-x/log(-x - exp(exp(2*x)) + 5)
```

3.1200.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.64

$$\int \frac{x+2e^{e^{2x}+2x}x+\left(5-e^{e^{2x}}-x\right)\log\left(5-e^{e^{2x}}-x\right)}{\left(-5+e^{e^{2x}}+x\right)\log^2\left(5-e^{e^{2x}}-x\right)}\,dx=-\frac{x}{\log\left(-x-e^{\left(e^{(2x)}\right)}+5\right)}$$

input
```
integrate(((-exp(exp(x)^2)+5-x)*log(-exp(exp(x)^2)+5-x)+2*x*exp(x)^2*exp(e
xp(x)^2)+x)/(exp(exp(x)^2)+x-5)/log(-exp(exp(x)^2)+5-x)^2,x, algorithm=\
```

output
```
-x/log(-x - e^(e^(2*x)) + 5)
```

3.1200.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 281 vs. 2(23) = 46.

Time = 0.29 (sec) , antiderivative size = 281, normalized size of antiderivative = 10.04

$$\int \frac{x+2e^{e^{2x}+2x}x+\left(5-e^{e^{2x}}-x\right)\log\left(5-e^{e^{2x}}-x\right)}{\left(-5+e^{e^{2x}}+x\right)\log^2\left(5-e^{e^{2x}}-x\right)}\,dx=$$

$$-\frac{2\,xe^{\left(2\,x+e^{(2\,x)}\right)}\log\left(-\left(xe^{(2\,x)}-5\,e^{(2\,x)}+e^{\left(2\,x+e^{(2\,x)}\right)}\right)e^{(-2\,x)}\right)+4\,xe^{\left(4\,x+2\,e^{(2\,x)}\right)}\log\left(\cdots\right.}{4\,e^{\left(4\,x+2\,e^{(2\,x)}\right)}\log\left(-\left(xe^{(2\,x)}-5\,e^{(2\,x)}+e^{\left(2\,x+e^{(2\,x)}\right)}\right)e^{(-2\,x)}\right)\log\left(-x-e^{\left(e^{(2\,x)}\right)}+5\right)+4\,e^{\left(2\,x+e^{(2\,x)}\right)}\log\left(-\left(\cdots\right.\right.}$$

input
```
integrate(((-exp(exp(x)^2)+5-x)*log(-exp(exp(x)^2)+5-x)+2*x*exp(x)^2*exp(e
xp(x)^2)+x)/(exp(exp(x)^2)+x-5)/log(-exp(exp(x)^2)+5-x)^2,x, algorithm=\
```

output
```
-(2*x*e^(2*x + e^(2*x))*log(-(x*e^(2*x) - 5*e^(2*x) + e^(2*x + e^(2*x)))*e
^(-2*x)) + 4*x*e^(4*x + 2*e^(2*x))*log(-x - e^(e^(2*x)) + 5) + 2*x*e^(2*x
+ e^(2*x))*log(-x - e^(e^(2*x)) + 5) + x*log(-(x*e^(2*x) - 5*e^(2*x) + e^(
2*x + e^(2*x)))*e^(-2*x)))/(4*e^(4*x + 2*e^(2*x))*log(-(x*e^(2*x) - 5*e^(2
*x) + e^(2*x + e^(2*x)))*e^(-2*x))*log(-x - e^(e^(2*x)) + 5) + 4*e^(2*x +
e^(2*x))*log(-(x*e^(2*x) - 5*e^(2*x) + e^(2*x + e^(2*x)))*e^(-2*x))*log(-x
 - e^(e^(2*x)) + 5) + log(-(x*e^(2*x) - 5*e^(2*x) + e^(2*x + e^(2*x)))*e^(
-2*x))*log(-x - e^(e^(2*x)) + 5))
```

3.1200.9 Mupad [B] (verification not implemented)

Time = 14.37 (sec) , antiderivative size = 106, normalized size of antiderivative = 3.79

$$\int \frac{x+2e^{e^{2x}+2x}x+\left(5-e^{e^{2x}}-x\right)\log\left(5-e^{e^{2x}}-x\right)}{\left(-5+e^{e^{2x}}+x\right)\log^2\left(5-e^{e^{2x}}-x\right)}\,dx$$
$$= -\frac{e^{-2x}\left(x\,e^{2x}+e^{2x+e^{2x}}\ln\left(5-e^{e^{2x}}-x\right)-e^{2x}\,e^{e^{2x}}\ln\left(5-e^{e^{2x}}-x\right)+2\,x\,e^{2x}\,e^{2x+e^{2x}}\right)}{\ln\left(5-e^{e^{2x}}-x\right)\left(2\,e^{2x+e^{2x}}+1\right)}$$

input
```
int((x - log(5 - exp(exp(2*x)) - x)*(x + exp(exp(2*x)) - 5) + 2*x*exp(2*x)
*exp(exp(2*x)))/(log(5 - exp(exp(2*x)) - x)^2*(x + exp(exp(2*x)) - 5)),x)
```

output
```
-(exp(-2*x)*(x*exp(2*x) + exp(2*x + exp(2*x))*log(5 - exp(exp(2*x)) - x) -
 exp(2*x)*exp(exp(2*x))*log(5 - exp(exp(2*x)) - x) + 2*x*exp(2*x)*exp(2*x
+ exp(2*x))))/(log(5 - exp(exp(2*x)) - x)*(2*exp(2*x + exp(2*x)) + 1))
```

3.1201 $\int e^x(6+6x)\,dx$

3.1201.1 Optimal result

Integrand size = 9, antiderivative size = 15

$$\int e^x(6+6x)\,dx=-2-e^{e^8}+6e^x x$$

output
```
6*exp(x)*x-exp(exp(4)^2)-2
```

3.1201.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.40

$$\int e^x(6+6x)\,dx=6e^x x$$

input
```
Integrate[E^x*(6 + 6*x),x]
```

output
```
6*E^x*x
```

3.1201.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {2607, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^x(6x+6)\,dx$$

$$\Big\downarrow \text{2607}$$

$$6e^x(x+1)-6\int e^x dx$$

$$\Big\downarrow \text{2624}$$

$$6e^x(x+1)-6e^x$$

input
```
Int[E^x*(6 + 6*x),x]
```

output
```
-6*E^x + 6*E^x*(1 + x)
```

3.1201.3.1 Defintions of rubi rules used

rule 2607
```
Int[((b_.)*(F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m
_.), x_Symbol] :> Simp[(c + d*x)^m*((b*F^(g*(e + f*x)))^n/(f*g*n*Log[F])),
x] - Simp[d*(m/(f*g*n*Log[F]))   Int[(c + d*x)^(m - 1)*(b*F^(g*(e + f*x)))^
n, x], x] /; FreeQ[{F, b, c, d, e, f, g, n}, x] && GtQ[m, 0] && IntegerQ[2*
m] &&  !TrueQ[$UseGamma]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

3.1201.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.40

method	result	size
gosper	$6\,{\mathrm e}^{x} x$	6
default	$6\,{\mathrm e}^{x} x$	6
norman	$6\,{\mathrm e}^{x} x$	6
risch	$6\,{\mathrm e}^{x} x$	6
parallelrisch	$6\,{\mathrm e}^{x} x$	6
parts	$6\,{\mathrm e}^{x} x$	6
meijerg	$6\,{\mathrm e}^{x}-3(2-2x)\,{\mathrm e}^{x}$	15

input
```
int((6+6*x)*exp(x),x,method=_RETURNVERBOSE)
```

output
```
6*exp(x)*x
```

3.1201.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.33

$$\int e^x(6+6x)\,dx = 6\,xe^{x}$$

input
```
integrate((6+6*x)*exp(x),x, algorithm=\
```

output
```
6*x*e^x
```

3.1201.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.33

$$\int e^x(6+6x)\,dx = 6xe^{x}$$

input
```
integrate((6+6*x)*exp(x),x)
```

output
```
6*x*exp(x)
```

3.1201.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int e^x(6+6x)\,dx = 6\,(x-1)e^x + 6\,e^x$$

input
```
integrate((6+6*x)*exp(x),x, algorithm=\
```

output
```
6*(x - 1)*e^x + 6*e^x
```

3.1201.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.33

$$\int e^x(6+6x)\,dx = 6\,xe^x$$

input
```
integrate((6+6*x)*exp(x),x, algorithm=\
```

output
```
6*x*e^x
```

3.1201.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.33

$$\int e^x(6+6x)\,dx = 6\,x\,\mathrm{e}^x$$

input
```
int(exp(x)*(6*x + 6),x)
```

output
```
6*x*exp(x)
```

3.1202 $\int \frac{1}{5}(5+4x^3)\,dx$

3.1202.1 Optimal result

Integrand size = 11, antiderivative size = 20

$$\int \frac{1}{5}(5+4x^3)\,dx = -2-(-9+e)^2+e+x+\frac{1}{5}(-1+x^4)$$

output
```
x+exp(1)-(exp(1)-9)^2-11/5+1/5*x^4
```

3.1202.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.45

$$\int \frac{1}{5}(5+4x^3)\,dx = x+\frac{x^4}{5}$$

input
```
Integrate[(5 + 4*x^3)/5,x]
```

output
```
x + x^4/5
```

3.1202.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.55, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{5}\left(4x^3+5\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int \left(4x^3+5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(x^4+5x\right)$$

input
```
Int[(5 + 4*x^3)/5,x]
```

output
```
(5*x + x^4)/5
```

3.1202.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1202.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.40

method	result	size
default	$\frac{1}{5}x^4+x$	8
norman	$\frac{1}{5}x^4+x$	8
risch	$\frac{1}{5}x^4+x$	8
parallelrisch	$\frac{1}{5}x^4+x$	8
parts	$\frac{1}{5}x^4+x$	8
gosper	$\frac{x(x^3+5)}{5}$	9

input
```
int(4/5*x^3+1,x,method=_RETURNVERBOSE)
```

output
```
1/5*x^4+x
```

3.1202.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.35

$$\int \frac{1}{5}(5+4x^3)\,dx = \frac{1}{5}\,x^4+x$$

input
```
integrate(4/5*x^3+1,x, algorithm=\
```

output
```
1/5*x^4 + x
```

3.1202.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 5, normalized size of antiderivative = 0.25

$$\int \frac{1}{5}(5+4x^3)\,dx = \frac{x^4}{5}+x$$

input
```
integrate(4/5*x**3+1,x)
```

output
```
x**4/5 + x
```

3.1202.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.35

$$\int \frac{1}{5}\left(5+4x^3\right) dx = \frac{1}{5}x^4 + x$$

input
```
integrate(4/5*x^3+1,x, algorithm=\
```

output
```
1/5*x^4 + x
```

3.1202.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.35

$$\int \frac{1}{5}\left(5+4x^3\right) dx = \frac{1}{5}x^4 + x$$

input
```
integrate(4/5*x^3+1,x, algorithm=\
```

output
```
1/5*x^4 + x
```

3.1202.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.35

$$\int \frac{1}{5}\left(5+4x^3\right) dx = \frac{x^4}{5} + x$$

input
```
int((4*x^3)/5 + 1,x)
```

output
```
x + x^4/5
```

3.1203 $\int \frac{e^{\frac{1}{9}\left(225e\log^2\left(x^2\right)-150e\log\left(x^2\right)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-\right.\right.}{}$

3.1203.1 Optimal result

Integrand size = 136, antiderivative size = 29

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2(x^2)-150e\log(x^2)\log(\log(\frac{4-x}{4}))+25e\log^2(\log(\frac{4-x}{4}))\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(\right.\right.}{\left(-36x+9x^2\right)\log\left(\frac{4-x}{4}\right)}$$
$$=e^{25e\left(-\log(x^2)+\frac{1}{3}\log(\log(\frac{4-x}{4}))\right)^2}$$

output
```
exp(5*(1/3*ln(ln(-1/4*x+1))-ln(x^2))*(5/3*ln(ln(-1/4*x+1))-5*ln(x^2))*exp(
1))
```

3.1203.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2(x^2)-150e\log(x^2)\log(\log(\frac{4-x}{4}))+25e\log^2(\log(\frac{4-x}{4}))\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(\right.\right.}{\left(-36x+9x^2\right)\log\left(\frac{4-x}{4}\right)}$$
$$=e^{\frac{25}{9}e\left(-3\log(x^2)+\log(\log(1-\frac{x}{4}))\right)^2}$$

input
```
Integrate[(E^((225*E*Log[x^2]^2 - 150*E*Log[x^2]*Log[Log[(4 - x)/4]] + 25*
E*Log[Log[(4 - x)/4]]^2)/9)*((-150*E*x + E*(-3600 + 900*x)*Log[(4 - x)/4])
*Log[x^2] + (50*E*x + E*(1200 - 300*x)*Log[(4 - x)/4])*Log[Log[(4 - x)/4]]
))/((-36*x + 9*x^2)*Log[(4 - x)/4]),x]
```

3.1203.

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2\left(x^2\right)-150e\log\left(x^2\right)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(50ex+e(1200-300x)\log\left(\frac{4-x}{4}\right.\right.\right.}{\left(-36x+9x^2\right)\log\left(\frac{4-x}{4}\right)}$$

output
```
E^((25*E*(-3*Log[x^2] + Log[Log[1 - x/4]])^2)/9)
```

3.1203.3 Rubi [A] (verified)

Time = 3.10 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.037, Rules used = {2026, 7292, 27, 27, 7257}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\left(e(900x-3600)\log\left(\frac{4-x}{4}\right)-150ex\right)\log\left(x^2\right)+\left(50ex+e(1200-300x)\log\left(\frac{4-x}{4}\right)\right)\log\left(\log\left(\frac{4-x}{4}\right)\right)\right)\exp\left(\frac{1}{9}\left(22\right.\right.}{\left(9x^2-36x\right)\log\left(\frac{4-x}{4}\right)}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{\left(\left(e(900x-3600)\log\left(\frac{4-x}{4}\right)-150ex\right)\log\left(x^2\right)+\left(50ex+e(1200-300x)\log\left(\frac{4-x}{4}\right)\right)\log\left(\log\left(\frac{4-x}{4}\right)\right)\right)\exp\left(\frac{1}{9}\left(22\right.\right.}{x(9x-36)\log\left(\frac{4-x}{4}\right)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{50e^{\frac{25}{9}e\left(3\log\left(x^2\right)-\log\left(\log\left(1-\frac{x}{4}\right)\right)\right)^2+1}\left(x-6x\log\left(1-\frac{x}{4}\right)+24\log\left(1-\frac{x}{4}\right)\right)\left(3\log\left(x^2\right)-\log\left(\log\left(1-\frac{x}{4}\right)\right)\right)}{(36-9x)x\log\left(1-\frac{x}{4}\right)}dx$$

$$\Big\downarrow \text{27}$$

$$50\int \frac{e^{\frac{25}{9}e\left(3\log\left(x^2\right)-\log\left(\log\left(1-\frac{x}{4}\right)\right)\right)^2+1}\left(-6\log\left(1-\frac{x}{4}\right)x+x+24\log\left(1-\frac{x}{4}\right)\right)\left(3\log\left(x^2\right)-\log\left(\log\left(1-\frac{x}{4}\right)\right)\right)}{9(4-x)x\log\left(1-\frac{x}{4}\right)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{50}{9}\int \frac{e^{\frac{25}{9}e\left(3\log\left(x^2\right)-\log\left(\log\left(1-\frac{x}{4}\right)\right)\right)^2+1}\left(-6\log\left(1-\frac{x}{4}\right)x+x+24\log\left(1-\frac{x}{4}\right)\right)\left(3\log\left(x^2\right)-\log\left(\log\left(1-\frac{x}{4}\right)\right)\right)}{(4-x)x\log\left(1-\frac{x}{4}\right)}dx$$

$$\Big\downarrow \text{7257}$$

$$e^{\frac{25}{9}e\left(3\log\left(x^2\right)-\log\left(\log\left(1-\frac{x}{4}\right)\right)\right)^2}$$

3.1203.

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2\left(x^2\right)-150e\log\left(x^2\right)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(50ex+e(1200-300x)\log\left(\frac{4-x}{4}\right.\right.\right.}{\left(-36x+9x^2\right)\log\left(\frac{4-x}{4}\right)}$$

input
```
Int[(E^((225*E*Log[x^2]^2 - 150*E*Log[x^2]*Log[Log[(4 - x)/4]] + 25*E*Log[
Log[(4 - x)/4]]^2)/9)*((-150*E*x + E*(-3600 + 900*x)*Log[(4 - x)/4])*Log[x
^2] + (50*E*x + E*(1200 - 300*x)*Log[(4 - x)/4])*Log[Log[(4 - x)/4]]))/((-
36*x + 9*x^2)*Log[(4 - x)/4]),x]
```

output
```
E^((25*E*(3*Log[x^2] - Log[Log[1 - x/4]])^2)/9)
```

3.1203.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7257
```
Int[(F_)^(v_)*(u_), x_Symbol] :> With[{q = DerivativeDivides[v, u, x]}, Sim
p[q*(F^v/Log[F]), x] /;  !FalseQ[q]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1203.4 Maple [A] (verified)

Time = 85.54 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.28

method	result
parallelrisch	$\mathrm{e}^{\frac{25\,\mathrm{e}\left(9\ln\left(x^{2}\right)^{2}-6\ln\left(\ln\left(-\frac{x}{4}+1\right)\right)\ln\left(x^{2}\right)+\ln\left(\ln\left(-\frac{x}{4}+1\right)\right)^{2}\right)}{9}}$
risch	$\ln\left(-\frac{x}{4}+1\right)^{-\frac{50\,\mathrm{e}\left(-i\,\mathrm{csgn}\left(i x^{2}\right)\pi+i\pi\;\mathrm{csgn}\left(i x\right)+2\ln\left(x\right)\right)}{3}}\,x^{-100 i e\pi\;\mathrm{csgn}\left(i x^{2}\right)}\,x^{100 i e\pi\;\mathrm{csgn}\left(i x\right)}\,\mathrm{e}^{\frac{25\,\mathrm{e}\left(-9\pi^{2}\,\mathrm{csgn}\left(i x^{2}\right)^{6}+36\pi^{2}\right.}{}}$

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2\left(x^2\right)-150e\log\left(x^2\right)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(50ex+e(1200-300x)\log\left(\frac{4-x}{4}\right.\right.\right.}{\left(-36x+9x^2\right)\log\left(\frac{4-x}{4}\right)}$$

input
```
int((((-300*x+1200)*exp(1)*ln(-1/4*x+1)+50*x*exp(1))*ln(ln(-1/4*x+1))+((90
0*x-3600)*exp(1)*ln(-1/4*x+1)-150*x*exp(1))*ln(x^2))*exp(25/9*exp(1)*ln(ln
(-1/4*x+1))^2-50/3*exp(1)*ln(x^2)*ln(ln(-1/4*x+1))+25*exp(1)*ln(x^2)^2)/(9
*x^2-36*x)/ln(-1/4*x+1),x,method=_RETURNVERBOSE)
```

output
```
exp(25/9*exp(1)*(9*ln(x^2)^2-6*ln(ln(-1/4*x+1))*ln(x^2)+ln(ln(-1/4*x+1))^2
))
```

3.1203.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.38

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2(x^2)-150e\log(x^2)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(\right.\right.}{(-36x+9x^2)\log\left(\frac{4-x}{4}\right)}$$
$$= e^{\left(25\,e\log\left(x^2\right)^2-\frac{50}{3}\,e\log\left(x^2\right)\log\left(\log\left(-\frac{1}{4}\,x+1\right)\right)+\frac{25}{9}\,e\log\left(\log\left(-\frac{1}{4}\,x+1\right)\right)^2\right)}$$

input
```
integrate((((-300*x+1200)*exp(1)*log(-1/4*x+1)+50*x*exp(1))*log(log(-1/4*x
+1))+((900*x-3600)*exp(1)*log(-1/4*x+1)-150*x*exp(1))*log(x^2))*exp(25/9*e
xp(1)*log(log(-1/4*x+1))^2-50/3*exp(1)*log(x^2)*log(log(-1/4*x+1))+25*exp(
1)*log(x^2)^2)/(9*x^2-36*x)/log(-1/4*x+1),x, algorithm=\
```

output
```
e^(25*e*log(x^2)^2 - 50/3*e*log(x^2)*log(log(-1/4*x + 1)) + 25/9*e*log(log
(-1/4*x + 1))^2)
```

3.1203.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(24) = 48.

Time = 1.42 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.69

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2(x^2)-150e\log(x^2)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(\right.\right.}{(-36x+9x^2)\log\left(\frac{4-x}{4}\right)}$$
$$= e^{25e\log\left(x^2\right)^2-\frac{50e\log\left(x^2\right)\log\left(\log\left(1-\frac{x}{4}\right)\right)}{3}+\frac{25e\log\left(\log\left(1-\frac{x}{4}\right)\right)^2}{9}}$$

input
```
integrate((((-300*x+1200)*exp(1)*ln(-1/4*x+1)+50*x*exp(1))*ln(ln(-1/4*x+1)
)+((900*x-3600)*exp(1)*ln(-1/4*x+1)-150*x*exp(1))*ln(x**2))*exp(25/9*exp(1
)*ln(ln(-1/4*x+1))**2-50/3*exp(1)*ln(x**2)*ln(ln(-1/4*x+1))+25*exp(1)*ln(x
**2)**2)/(9*x**2-36*x)/ln(-1/4*x+1),x)
```

3.1203.

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2\left(x^2\right)-150e\log\left(x^2\right)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(50ex+e(1200-300x)\log\left(\frac{4-x}{4}\right)\right.\right.}{(-36x+9x^2)\log\left(\frac{4-x}{4}\right)}$$

output
```
exp(25*E*log(x**2)**2 - 50*E*log(x**2)*log(log(1 - x/4))/3 + 25*E*log(log(
1 - x/4))**2/9)
```

3.1203.7 Maxima [A] (verification not implemented)

Time = 0.70 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.59

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2(x^2)-150e\log(x^2)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log(x^2)+\left(\right.\right.}{(-36x+9x^2)\log\left(\frac{4-x}{4}\right)}$$

$$= e^{\left(100\,e\log(x)^2-\frac{100}{3}\,e\log(x)\log(-2\,\log(2)+\log(-x+4))+\frac{25}{9}\,e\log(-2\,\log(2)+\log(-x+4))^2\right)}$$

input
```
integrate((((-300*x+1200)*exp(1)*log(-1/4*x+1)+50*x*exp(1))*log(log(-1/4*x
+1))+((900*x-3600)*exp(1)*log(-1/4*x+1)-150*x*exp(1))*log(x^2))*exp(25/9*e
xp(1)*log(log(-1/4*x+1))^2-50/3*exp(1)*log(x^2)*log(log(-1/4*x+1))+25*exp(
1)*log(x^2)^2)/(9*x^2-36*x)/log(-1/4*x+1),x, algorithm=\
```

output
```
e^(100*e*log(x)^2 - 100/3*e*log(x)*log(-2*log(2) + log(-x + 4)) + 25/9*e*l
og(-2*log(2) + log(-x + 4))^2)
```

3.1203.8 Giac [A] (verification not implemented)

Time = 8.55 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.38

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2(x^2)-150e\log(x^2)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log(x^2)+\left(\right.\right.}{(-36x+9x^2)\log\left(\frac{4-x}{4}\right)}$$

$$= e^{\left(25\,e\log(x^2)^2-\frac{50}{3}\,e\log(x^2)\log\left(\log\left(-\frac{1}{4}\,x+1\right)\right)+\frac{25}{9}\,e\log\left(\log\left(-\frac{1}{4}\,x+1\right)\right)^2\right)}$$

input
```
integrate((((-300*x+1200)*exp(1)*log(-1/4*x+1)+50*x*exp(1))*log(log(-1/4*x
+1))+((900*x-3600)*exp(1)*log(-1/4*x+1)-150*x*exp(1))*log(x^2))*exp(25/9*e
xp(1)*log(log(-1/4*x+1))^2-50/3*exp(1)*log(x^2)*log(log(-1/4*x+1))+25*exp(
1)*log(x^2)^2)/(9*x^2-36*x)/log(-1/4*x+1),x, algorithm=\
```

output
```
e^(25*e*log(x^2)^2 - 50/3*e*log(x^2)*log(log(-1/4*x + 1)) + 25/9*e*log(log
(-1/4*x + 1))^2)
```

3.1203.

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2(x^2)-150e\log(x^2)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log(x^2)+\left(50ex+e(1200-300x)\log\left(\frac{4-x}{4}\right.\right.\right.}{(-36x+9x^2)\log\left(\frac{4-x}{4}\right)}$$

3.1203.9 Mupad [B] (verification not implemented)

Time = 14.68 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2(x^2)-150e\log(x^2)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(\right.\right.}{(-36x+9x^2)\log\left(\frac{4-x}{4}\right)}$$

$$= \mathrm{e}^{-\frac{50\ln\left(\ln\left(1-\frac{x}{4}\right)\right)\ln\left(x^2\right)\mathrm{e}}{3}}\,\mathrm{e}^{\frac{25\ln\left(\ln\left(1-\frac{x}{4}\right)\right)^2\mathrm{e}}{9}}\,\mathrm{e}^{25\ln\left(x^2\right)^2\mathrm{e}}$$

input
```
int(-(exp((25*log(log(1 - x/4))^2*exp(1))/9 + 25*log(x^2)^2*exp(1) - (50*l
og(log(1 - x/4))*log(x^2)*exp(1))/3)*(log(log(1 - x/4))*(50*x*exp(1) - exp
(1)*log(1 - x/4)*(300*x - 1200)) - log(x^2)*(150*x*exp(1) - exp(1)*log(1 -
 x/4)*(900*x - 3600))))/(log(1 - x/4)*(36*x - 9*x^2)),x)
```

output
```
exp(-(50*log(log(1 - x/4))*log(x^2)*exp(1))/3)*exp((25*log(log(1 - x/4))^2
*exp(1))/9)*exp(25*log(x^2)^2*exp(1))
```

3.1203.

$$\int \frac{e^{\frac{1}{9}\left(225e\log^2\left(x^2\right)-150e\log\left(x^2\right)\log\left(\log\left(\frac{4-x}{4}\right)\right)+25e\log^2\left(\log\left(\frac{4-x}{4}\right)\right)\right)}\left(\left(-150ex+e(-3600+900x)\log\left(\frac{4-x}{4}\right)\right)\log\left(x^2\right)+\left(50ex+e(1200-300x)\log\left(\frac{4-x}{4}\right)\right.\right.}{(-36x+9x^2)\log\left(\frac{4-x}{4}\right)}$$

3.1204 $\int \frac{-62181x^2-64827x^3+e^x(-882+1764x)}{4e^{3x}+e^{2x}(24x-588x^2)+e^x(36x^2-1764x^3+21609x^4)}\,dx$

3.1204.1 Optimal result

Integrand size = 66, antiderivative size = 27

$$\int \frac{-62181x^2-64827x^3+e^x(-882+1764x)}{4e^{3x}+e^{2x}(24x-588x^2)+e^x(36x^2-1764x^3+21609x^4)}\,dx=\frac{3e^{-x}}{x-\frac{2\left(\frac{e^x}{3}+x\right)}{49x}}$$

output
```
3/exp(x)/(x-2/49*(x+1/3*exp(x))/x)
```

3.1204.2 Mathematica [A] (verified)

Time = 1.77 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{-62181x^2-64827x^3+e^x(-882+1764x)}{4e^{3x}+e^{2x}(24x-588x^2)+e^x(36x^2-1764x^3+21609x^4)}\,dx=-\frac{441e^{-x}x}{2e^x+3(2-49x)x}$$

input
```
Integrate[(-62181*x^2 - 64827*x^3 + E^x*(-882 + 1764*x))/(4*E^(3*x) + E^(2
*x)*(24*x - 588*x^2) + E^x*(36*x^2 - 1764*x^3 + 21609*x^4)),x]
```

output
```
(-441*x)/(E^x*(2*E^x + 3*(2 - 49*x)*x))
```

3.1204.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-64827x^3-62181x^2+e^x(1764x-882)}{e^{2x}(24x-588x^2)+e^x(21609x^4-1764x^3+36x^2)+4e^{3x}}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{-x}(-64827x^3-62181x^2+e^x(1764x-882))}{(-147x^2+6x+2e^x)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{1323e^{-x}x(49x^2-100x+2)}{(147x^2-6x-2e^x)^2}-\frac{441e^{-x}(2x-1)}{147x^2-6x-2e^x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-441\int \frac{e^{-x}}{-147x^2+6x+2e^x}dx+2646\int \frac{e^{-x}x}{(147x^2-6x-2e^x)^2}dx-$$
$$132300\int \frac{e^{-x}x^2}{(147x^2-6x-2e^x)^2}dx-882\int \frac{e^{-x}x}{147x^2-6x-2e^x}dx+64827\int \frac{e^{-x}x^3}{(147x^2-6x-2e^x)^2}dx$$

input
```
Int[(-62181*x^2 - 64827*x^3 + E^x*(-882 + 1764*x))/(4*E^(3*x) + E^(2*x)*(2
4*x - 588*x^2) + E^x*(36*x^2 - 1764*x^3 + 21609*x^4)),x]
```

output
```
$Aborted
```

3.1204.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1204.4 Maple [A] (verified)

Time = 0.31 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.85

method	result	size
norman	$\frac{441x\,\mathrm{e}^{-x}}{147x^2-6x-2\,\mathrm{e}^x}$	23
parallelrisch	$\frac{441x\,\mathrm{e}^{-x}}{147x^2-6x-2\,\mathrm{e}^x}$	23
risch	$\frac{147\,\mathrm{e}^{-x}}{49x-2}+\frac{294}{(49x-2)(147x^2-6x-2\,\mathrm{e}^x)}$	39

input
```
int(((1764*x-882)*exp(x)-64827*x^3-62181*x^2)/(4*exp(x)^3+(-588*x^2+24*x)*
exp(x)^2+(21609*x^4-1764*x^3+36*x^2)*exp(x)),x,method=_RETURNVERBOSE)
```

output
```
441*x/exp(x)/(147*x^2-6*x-2*exp(x))
```

3.1204.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{-62181x^2-64827x^3+e^x(-882+1764x)}{4e^{3x}+e^{2x}(24x-588x^2)+e^x(36x^2-1764x^3+21609x^4)}\,dx=\frac{441\,x}{3\,(49\,x^2-2\,x)e^x-2\,e^{(2\,x)}}$$

input
```
integrate(((1764*x-882)*exp(x)-64827*x^3-62181*x^2)/(4*exp(x)^3+(-588*x^2+
24*x)*exp(x)^2+(21609*x^4-1764*x^3+36*x^2)*exp(x)),x, algorithm=\
```

output
```
441*x/(3*(49*x^2 - 2*x)*e^x - 2*e^(2*x))
```

3.1204.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{-62181x^2-64827x^3+e^x(-882+1764x)}{4e^{3x}+e^{2x}(24x-588x^2)+e^x(36x^2-1764x^3+21609x^4)}\,dx$$
$$=-\frac{7203}{-\frac{352947x^3}{2}+14406x^2-294x+(2401x-98)\,e^x}+\frac{147e^{-x}}{49x-2}$$

input
```
integrate(((1764*x-882)*exp(x)-64827*x**3-62181*x**2)/(4*exp(x)**3+(-588*x
**2+24*x)*exp(x)**2+(21609*x**4-1764*x**3+36*x**2)*exp(x)),x)
```

output
```
-7203/(-352947*x**3/2 + 14406*x**2 - 294*x + (2401*x - 98)*exp(x)) + 147*e
xp(-x)/(49*x - 2)
```

3.1204.7 Maxima [F]

$$\int \frac{-62181x^2 - 64827x^3 + e^x(-882 + 1764x)}{4e^{3x} + e^{2x}(24x - 588x^2) + e^x(36x^2 - 1764x^3 + 21609x^4)} \, dx$$
$$= \int \frac{441\,(147\,x^3 + 141\,x^2 - 2\,(2\,x - 1)e^x)}{12\,(49\,x^2 - 2\,x)e^{(2\,x)} - 9\,(2401\,x^4 - 196\,x^3 + 4\,x^2)e^x - 4\,e^{(3\,x)}} \, dx$$

input
```
integrate(((1764*x-882)*exp(x)-64827*x^3-62181*x^2)/(4*exp(x)^3+(-588*x^2+
24*x)*exp(x)^2+(21609*x^4-1764*x^3+36*x^2)*exp(x)),x, algorithm=\
```

output
```
441*integrate((147*x^3 + 141*x^2 - 2*(2*x - 1)*e^x)/(12*(49*x^2 - 2*x)*e^(
2*x) - 9*(2401*x^4 - 196*x^3 + 4*x^2)*e^x - 4*e^(3*x)), x)
```

3.1204.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{-62181x^2 - 64827x^3 + e^x(-882 + 1764x)}{4e^{3x} + e^{2x}(24x - 588x^2) + e^x(36x^2 - 1764x^3 + 21609x^4)} \, dx = \frac{441\,x}{147\,x^2e^x - 6\,xe^x - 2\,e^{(2\,x)}}$$

input
```
integrate(((1764*x-882)*exp(x)-64827*x^3-62181*x^2)/(4*exp(x)^3+(-588*x^2+
24*x)*exp(x)^2+(21609*x^4-1764*x^3+36*x^2)*exp(x)),x, algorithm=\
```

output
```
441*x/(147*x^2*e^x - 6*x*e^x - 2*e^(2*x))
```

3.1204.9 Mupad [B] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{-62181x^2-64827x^3+e^x(-882+1764x)}{4e^{3x}+e^{2x}(24x-588x^2)+e^x(36x^2-1764x^3+21609x^4)}\,dx=-\frac{441\,x}{2\,\mathrm{e}^{2\,x}+\mathrm{e}^{x}\,\left(6\,x-147\,x^2\right)}$$

input
```
int(-(62181*x^2 - exp(x)*(1764*x - 882) + 64827*x^3)/(4*exp(3*x) + exp(2*x
)*(24*x - 588*x^2) + exp(x)*(36*x^2 - 1764*x^3 + 21609*x^4)),x)
```

output
```
-(441*x)/(2*exp(2*x) + exp(x)*(6*x - 147*x^2))
```

3.1205 $\int \frac{e^{-2x}(180e^5\log(\log(x))+e^5(-180-180x)\log(x)\log^2(\log(x)))}{x^3\log(x)}\,dx$

3.1205.1 Optimal result

Integrand size = 38, antiderivative size = 17

$$\int \frac{e^{-2x}(180e^5\log(\log(x))+e^5(-180-180x)\log(x)\log^2(\log(x)))}{x^3\log(x)}\,dx=\frac{90e^{5-2x}\log^2(\log(x))}{x^2}$$

output
```
90/exp(x)^2*ln(ln(x))^2*exp(5)/x^2
```

3.1205.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{e^{-2x}(180e^5\log(\log(x))+e^5(-180-180x)\log(x)\log^2(\log(x)))}{x^3\log(x)}\,dx=\frac{90e^{5-2x}\log^2(\log(x))}{x^2}$$

input
```
Integrate[(180*E^5*Log[Log[x]] + E^5*(-180 - 180*x)*Log[x]*Log[Log[x]]^2)/
(E^(2*x)*x^3*Log[x]),x]
```

output
```
(90*E^(5 - 2*x)*Log[Log[x]]^2)/x^2
```

3.1205.3 Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.079, Rules used = {7292, 27, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-2x}\left(e^5(-180x-180)\log(x)\log^2(\log(x))+180e^5\log(\log(x))\right)}{x^3\log(x)}\,dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{180e^{5-2x}\log(\log(x))(-x\log(x)\log(\log(x))-\log(x)\log(\log(x))+1)}{x^3\log(x)}dx$$

$$\Big\downarrow \ 27$$

$$180\int \frac{e^{5-2x}\log(\log(x))(-x\log(x)\log(\log(x))-\log(x)\log(\log(x))+1)}{x^3\log(x)}dx$$

$$\Big\downarrow \ 2726$$

$$\frac{90e^{5-2x}\log^2(\log(x))}{x^2}$$

input
```
Int[(180*E^5*Log[Log[x]] + E^5*(-180 - 180*x)*Log[x]*Log[Log[x]]^2)/(E^(2*
x)*x^3*Log[x]),x]
```

output
```
(90*E^(5 - 2*x)*Log[Log[x]]^2)/x^2
```

3.1205.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1205.4 Maple [A] (verified)

Time = 29.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{90 \ln(\ln(x))^{2} e^{5-2x}}{x^{2}}$	17
parallelrisch	$\frac{90\, e^{-2x} \ln(\ln(x))^{2} e^{5}}{x^{2}}$	17

input
```
int(((-180*x-180)*exp(5)*ln(x)*ln(ln(x))^2+180*exp(5)*ln(ln(x)))/x^3/exp(x
)^2/ln(x),x,method=_RETURNVERBOSE)
```

output
```
90/x^2*ln(ln(x))^2*exp(5-2*x)
```

3.1205.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{e^{-2x}(180e^5 \log(\log(x)) + e^5(-180 - 180x) \log(x) \log^2(\log(x)))}{x^3 \log(x)}\, dx = \frac{90\, e^{(-2\,x+5)} \log\left(\log\left(x\right)\right)^{2}}{x^{2}}$$

input
```
integrate(((-180*x-180)*exp(5)*log(x)*log(log(x))^2+180*exp(5)*log(log(x))
)/x^3/exp(x)^2/log(x),x, algorithm=\
```

output
```
90*e^(-2*x + 5)*log(log(x))^2/x^2
```

3.1205.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{e^{-2x}(180e^5 \log(\log(x)) + e^5(-180 - 180x) \log(x) \log^2(\log(x)))}{x^3 \log(x)}\, dx = \frac{90e^{5}e^{-2x} \log\left(\log\left(x\right)\right)^{2}}{x^{2}}$$

input
```
integrate(((-180*x-180)*exp(5)*ln(x)*ln(ln(x))**2+180*exp(5)*ln(ln(x)))/x*
*3/exp(x)**2/ln(x),x)
```

output
```
90*exp(5)*exp(-2*x)*log(log(x))**2/x**2
```

3.1205.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{e^{-2x}(180e^5\log(\log(x))+e^5(-180-180x)\log(x)\log^2(\log(x)))}{x^3\log(x)}\,dx = \frac{90\,e^{(-2\,x+5)}\log\left(\log\left(x\right)\right)^2}{x^2}$$

input
```
integrate(((-180*x-180)*exp(5)*log(x)*log(log(x))^2+180*exp(5)*log(log(x))
)/x^3/exp(x)^2/log(x),x, algorithm=\
```

output
```
90*e^(-2*x + 5)*log(log(x))^2/x^2
```

3.1205.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{e^{-2x}(180e^5\log(\log(x))+e^5(-180-180x)\log(x)\log^2(\log(x)))}{x^3\log(x)}\,dx = \frac{90\,e^{(-2\,x+5)}\log\left(\log\left(x\right)\right)^2}{x^2}$$

input
```
integrate(((-180*x-180)*exp(5)*log(x)*log(log(x))^2+180*exp(5)*log(log(x))
)/x^3/exp(x)^2/log(x),x, algorithm=\
```

output
```
90*e^(-2*x + 5)*log(log(x))^2/x^2
```

3.1205.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-2x}\left(180e^5\log(\log(x))+e^5(-180-180x)\log(x)\log^2(\log(x))\right)}{x^3\log(x)}\,dx$$
$$=\int \frac{\mathrm{e}^{-2\,x}\,\left(180\,\ln\left(\ln\left(x\right)\right)\,\mathrm{e}^5-\ln\left(\ln\left(x\right)\right)^2\,\mathrm{e}^5\,\ln\left(x\right)\,\left(180\,x+180\right)\right)}{x^3\,\ln\left(x\right)}\,dx$$

input
```
int((exp(-2*x)*(180*log(log(x))*exp(5) - log(log(x))^2*exp(5)*log(x)*(180*
x + 180)))/(x^3*log(x)),x)
```

output
```
int((exp(-2*x)*(180*log(log(x))*exp(5) - log(log(x))^2*exp(5)*log(x)*(180*
x + 180)))/(x^3*log(x)), x)
```

3.1206 $\int \frac{-3969-1024e^{1024x/3969}}{3969}\,dx$

3.1206.1 Optimal result

Integrand size = 15, antiderivative size = 14

$$\int \frac{-3969-1024e^{1024x/3969}}{3969}\,dx = 4-e^{1024x/3969}-x$$

output
```
4-x-exp(1024/3969*x)
```

3.1206.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{-3969-1024e^{1024x/3969}}{3969}\,dx = -e^{1024x/3969}-x$$

input
```
Integrate[(-3969 - 1024*E^((1024*x)/3969))/3969,x]
```

output
```
-E^((1024*x)/3969) - x
```

3.1206.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.21, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.133$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-1024e^{1024x/3969}-3969}{3969}dx$$
$$\Big\downarrow \ 27$$
$$\frac{\int \left(-3969-1024e^{1024x/3969}\right)dx}{3969}$$
$$\Big\downarrow \ 2009$$
$$\frac{-3969x-3969e^{1024x/3969}}{3969}$$

input
```
Int[(-3969 - 1024*E^((1024*x)/3969))/3969,x]
```

output
```
(-3969*E^((1024*x)/3969) - 3969*x)/3969
```

3.1206.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1206.4 Maple [A] (verified)

Time = 0.65 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.79

method	result	size
default	$-x-{\mathrm e}^{\frac{1024 x}{3969}}$	11
norman	$-x-{\mathrm e}^{\frac{1024 x}{3969}}$	11
risch	$-x-{\mathrm e}^{\frac{1024 x}{3969}}$	11
parallelrisch	$-x-{\mathrm e}^{\frac{1024 x}{3969}}$	11
parts	$-x-{\mathrm e}^{\frac{1024 x}{3969}}$	11
derivativedivides	$-{\mathrm e}^{\frac{1024 x}{3969}}-\frac{3969 \ln \left({\mathrm e}^{\frac{1024 x}{3969}}\right)}{1024}$	15

input
```
int(-1024/3969*exp(1024/3969*x)-1,x,method=_RETURNVERBOSE)
```

output
```
-x-exp(1024/3969*x)
```

3.1206.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{-3969-1024e^{1024x/3969}}{3969}\,dx=-x-e^{\left(\frac{1024}{3969}\,x\right)}$$

input
```
integrate(-1024/3969*exp(1024/3969*x)-1,x, algorithm=\
```

output
```
-x - e^(1024/3969*x)
```

3.1206.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.57

$$\int \frac{-3969-1024e^{1024x/3969}}{3969}\,dx=-x-e^{\frac{1024x}{3969}}$$

input
```
integrate(-1024/3969*exp(1024/3969*x)-1,x)
```

output
```
-x - exp(1024*x/3969)
```

3.1206.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{-3969-1024e^{1024x/3969}}{3969}\,dx = -x - e^{\left(\frac{1024}{3969}\,x\right)}$$

input
```
integrate(-1024/3969*exp(1024/3969*x)-1,x, algorithm=\
```

output
```
-x - e^(1024/3969*x)
```

3.1206.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{-3969-1024e^{1024x/3969}}{3969}\,dx = -x - e^{\left(\frac{1024}{3969}\,x\right)}$$

input
```
integrate(-1024/3969*exp(1024/3969*x)-1,x, algorithm=\
```

output
```
-x - e^(1024/3969*x)
```

3.1206.9 Mupad [B] (verification not implemented)

Time = 13.88 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{-3969-1024e^{1024x/3969}}{3969}\,dx = -x - \mathrm{e}^{\frac{1024\,x}{3969}}$$

input
```
int(- (1024*exp((1024*x)/3969))/3969 - 1,x)
```

output
```
- x - exp((1024*x)/3969)
```

3.1207 $\int \frac{e^x(5-5x)+4x^2+4x^3-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)}{4x^2}\,dx$

3.1207.1 Optimal result

Integrand size = 41, antiderivative size = 29

$$\int \frac{e^x(5-5x)+4x^2+4x^3-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)}{4x^2}\,dx=-\frac{5e^x}{4x}+\frac{1}{2}x\left(x-\log\left(\frac{\log^2(2)}{x^2}\right)\right)$$

output
```
1/2*x*(x-ln(ln(2)^2/x^2))-5/4*exp(x)/x
```

3.1207.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \frac{e^x(5-5x)+4x^2+4x^3-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)}{4x^2}\,dx=-\frac{5e^x}{4x}+\frac{x^2}{2}-\frac{1}{2}x\log\left(\frac{\log^2(2)}{x^2}\right)$$

input
```
Integrate[(E^x*(5 - 5*x) + 4*x^2 + 4*x^3 - 2*x^2*Log[Log[2]^2/x^2])/(4*x^2
),x]
```

output
```
(-5*E^x)/(4*x) + x^2/2 - (x*Log[Log[2]^2/x^2])/2
```

3.1207.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.073, Rules used = {27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^3+4x^2-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)+e^x(5-5x)}{4x^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{4}\int \frac{4x^3-2\log\left(\frac{\log^2(2)}{x^2}\right)x^2+4x^2+5e^x(1-x)}{x^2}dx$$

$$\Big\downarrow \ 2010$$

$$\frac{1}{4}\int \left(2\left(2x-\log\left(\frac{\log^2(2)}{x^2}\right)+2\right)-\frac{5e^x(x-1)}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{4}\left(2x^2-2x\log\left(\frac{\log^2(2)}{x^2}\right)-\frac{5e^x}{x}\right)$$

input
```
Int[(E^x*(5 - 5*x) + 4*x^2 + 4*x^3 - 2*x^2*Log[Log[2]^2/x^2])/(4*x^2),x]
```

output
```
((-5*E^x)/x + 2*x^2 - 2*x*Log[Log[2]^2/x^2])/4
```

3.1207.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1207. $\int \frac{e^x(5-5x)+4x^2+4x^3-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)}{4x^2}dx$

3.1207.4 Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

method	result	size
default	$\frac{x^{2}}{2}-\frac{5\,\mathrm{e}^{x}}{4x}-\frac{x\ln\left(\frac{1}{x^{2}}\right)}{2}-x\ln\left(\ln\left(2\right)\right)$	27
parts	$\frac{x^{2}}{2}-\frac{5\,\mathrm{e}^{x}}{4x}-\frac{x\ln\left(\frac{1}{x^{2}}\right)}{2}-x\ln\left(\ln\left(2\right)\right)$	27
norman	$\frac{\frac{x^{3}}{2}-\frac{x^{2}\ln\left(\frac{\ln(2)^{2}}{x^{2}}\right)}{2}-\frac{5\,\mathrm{e}^{x}}{4}}{x}$	29
parallelrisch	$\frac{4x^{3}-4x^{2}\ln\left(\frac{\ln(2)^{2}}{x^{2}}\right)-10\,\mathrm{e}^{x}}{8x}$	30
risch	$x\ln\left(x\right)+\frac{-i\pi\,x^{2}\operatorname{csgn}(ix)^{2}\operatorname{csgn}(ix^{2})+2i\pi\,x^{2}\operatorname{csgn}(ix)\operatorname{csgn}(ix^{2})^{2}-i\pi\,x^{2}\operatorname{csgn}(ix^{2})^{3}-4x^{2}\ln(\ln(2))+2x^{3}-5\,\mathrm{e}^{x}}{4x}$	87

input
```
int(1/4*(-2*x^2*ln(ln(2)^2/x^2)+(-5*x+5)*exp(x)+4*x^3+4*x^2)/x^2,x,method=
_RETURNVERBOSE)
```

output
```
1/2*x^2-5/4*exp(x)/x-1/2*x*ln(1/x^2)-x*ln(ln(2))
```

3.1207.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int\frac{e^{x}(5-5x)+4x^{2}+4x^{3}-2x^{2}\log\left(\frac{\log^{2}(2)}{x^{2}}\right)}{4x^{2}}\,dx=\frac{2\,x^{3}-2\,x^{2}\log\left(\frac{\log(2)^{2}}{x^{2}}\right)-5\,e^{x}}{4\,x}$$

input
```
integrate(1/4*(-2*x^2*log(log(2)^2/x^2)+(-5*x+5)*exp(x)+4*x^3+4*x^2)/x^2,x
, algorithm=\
```

output
```
1/4*(2*x^3 - 2*x^2*log(log(2)^2/x^2) - 5*e^x)/x
```

3.1207.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{e^x(5-5x)+4x^2+4x^3-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)}{4x^2}\,dx=\frac{x^2}{2}-\frac{x\log\left(\frac{\log(2)^2}{x^2}\right)}{2}-\frac{5e^x}{4x}$$

input
```
integrate(1/4*(-2*x**2*ln(ln(2)**2/x**2)+(-5*x+5)*exp(x)+4*x**3+4*x**2)/x*
*2,x)
```

output
```
x**2/2 - x*log(log(2)**2/x**2)/2 - 5*exp(x)/(4*x)
```

3.1207.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.21 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00

$$\int \frac{e^x(5-5x)+4x^2+4x^3-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)}{4x^2}\,dx$$
$$=\frac{1}{2}\,x^2-\frac{1}{2}\,x\log\left(\frac{\log(2)^2}{x^2}\right)-\frac{5}{4}\,\mathrm{Ei}(x)+\frac{5}{4}\,\Gamma(-1,-x)$$

input
```
integrate(1/4*(-2*x^2*log(log(2)^2/x^2)+(-5*x+5)*exp(x)+4*x^3+4*x^2)/x^2,x
, algorithm=\
```

output
```
1/2*x^2 - 1/2*x*log(log(2)^2/x^2) - 5/4*Ei(x) + 5/4*gamma(-1, -x)
```

3.1207.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int \frac{e^x(5-5x)+4x^2+4x^3-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)}{4x^2}\,dx$$
$$=\frac{2\,x^3+2\,x^2\log\left(x^2\right)-4\,x^2\log\left(\log(2)\right)-5\,e^x}{4\,x}$$

input
```
integrate(1/4*(-2*x^2*log(log(2)^2/x^2)+(-5*x+5)*exp(x)+4*x^3+4*x^2)/x^2,x
, algorithm=\
```

output
```
1/4*(2*x^3 + 2*x^2*log(x^2) - 4*x^2*log(log(2)) - 5*e^x)/x
```

3.1207.9 Mupad [B] (verification not implemented)

Time = 13.87 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{e^x(5-5x)+4x^2+4x^3-2x^2\log\left(\frac{\log^2(2)}{x^2}\right)}{4x^2}\,dx = \frac{x^2}{2}-x\left(\frac{\ln\left(\frac{1}{x^2}\right)}{2}+\ln(\ln(2))\right)-\frac{5\,\mathrm{e}^x}{4\,x}$$

input
```
int(-((exp(x)*(5*x - 5))/4 + (x^2*log(log(2)^2/x^2))/2 - x^2 - x^3)/x^2,x)
```

output
```
x^2/2 - x*(log(1/x^2)/2 + log(log(2))) - (5*exp(x))/(4*x)
```

3.1208 $\int \frac{-2e^2x+e^2\log(4)+e^{\frac{32x}{e^2}}(-2e^2x-32x^2)\log(4)}{e^2\log(4)}\,dx$

3.1208.1 Optimal result

Integrand size = 44, antiderivative size = 24

$$\int \frac{-2e^2x+e^2\log(4)+e^{\frac{32x}{e^2}}(-2e^2x-32x^2)\log(4)}{e^2\log(4)}\,dx = x-e^{\frac{32x}{e^2}}x^2-\frac{x^2}{\log(4)}$$

output
```
x-exp(16*x/exp(1)^2)^2*x^2-1/2*x^2/ln(2)
```

3.1208.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-2e^2x+e^2\log(4)+e^{\frac{32x}{e^2}}(-2e^2x-32x^2)\log(4)}{e^2\log(4)}\,dx = x\left(1-e^{\frac{32x}{e^2}}x-\frac{x}{\log(4)}\right)$$

input
```
Integrate[(-2*E^2*x + E^2*Log[4] + E^((32*x)/E^2)*(-2*E^2*x - 32*x^2)*Log[
4])/(E^2*Log[4]),x]
```

output
```
x*(1 - E^((32*x)/E^2)*x - x/Log[4])
```

3.1208.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.71, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{32x}{e^2}}\left(-32x^2-2e^2x\right)\log(4)-2e^2x+e^2\log(4)}{e^2\log(4)}dx$$

$$\Big\downarrow \textbf{27}$$

$$\frac{\int \left(-2e^2x-2e^{\frac{32x}{e^2}}\left(16x^2+e^2x\right)\log(4)+e^2\log(4)\right)dx}{e^2\log(4)}$$

$$\Big\downarrow \textbf{2009}$$

$$\frac{-e^2x^2-e^{\frac{32x}{e^2}+2}x^2\log(4)+e^2x\log(4)}{e^2\log(4)}$$

input
```
Int[(-2*E^2*x + E^2*Log[4] + E^((32*x)/E^2)*(-2*E^2*x - 32*x^2)*Log[4])/(E
^2*Log[4]),x]
```

output
```
(-(E^2*x^2) + E^2*x*Log[4] - E^(2 + (32*x)/E^2)*x^2*Log[4])/(E^2*Log[4])
```

3.1208.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1208.4 Maple [A] (verified)

Time = 0.59 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.96

method	result	size
risch	$x-\frac{x^{2}}{2\ln(2)}-\mathrm{e}^{32x\,\mathrm{e}^{-2}}x^{2}$	23
derivativedivides	$\frac{256x\ln(2)-128x^{2}-256\ln(2)\mathrm{e}^{32x\,\mathrm{e}^{-2}}x^{2}}{256\ln(2)}$	35
norman	$\left(x\,\mathrm{e}-x^{2}\mathrm{e}\,\mathrm{e}^{32x\,\mathrm{e}^{-2}}-\frac{\mathrm{e}x^{2}}{2\ln(2)}\right)\mathrm{e}^{-1}$	39
default	$\frac{\mathrm{e}^{-2}\left(x\,\mathrm{e}^{2}\ln(2)-\mathrm{e}^{2}\ln(2)\mathrm{e}^{32x\,\mathrm{e}^{-2}}x^{2}-\frac{x^{2}\mathrm{e}^{2}}{2}\right)}{\ln(2)}$	49
parallelrisch	$\frac{\mathrm{e}^{-2}\left(-x^{2}\mathrm{e}^{2}-2\,\mathrm{e}^{2}\ln(2)\mathrm{e}^{32x\,\mathrm{e}^{-2}}x^{2}+2x\,\mathrm{e}^{2}\ln(2)\right)}{2\ln(2)}$	51
parts	$x-\frac{x^{2}}{2\ln(2)}-\frac{\mathrm{e}^{2}\left(\mathrm{e}^{2}\left(8x\,\mathrm{e}^{-2}\mathrm{e}^{32x\,\mathrm{e}^{-2}}-\frac{\mathrm{e}^{32x\,\mathrm{e}^{-2}}}{4}\right)+\mathrm{e}^{2}\left(128\,\mathrm{e}^{32x\,\mathrm{e}^{-2}}x^{2}\mathrm{e}^{-4}-8x\,\mathrm{e}^{-2}\mathrm{e}^{32x\,\mathrm{e}^{-2}}+\frac{\mathrm{e}^{32x\,\mathrm{e}^{-2}}}{4}\right)\right)}{128}$	108

input
```
int(1/2*(2*(-2*x*exp(1)^2-32*x^2)*ln(2)*exp(16*x/exp(1)^2)^2+2*exp(1)^2*ln
(2)-2*x*exp(1)^2)/exp(1)^2/ln(2),x,method=_RETURNVERBOSE)
```

output
```
x-1/2*x^2/ln(2)-exp(32*x*exp(-2))*x^2
```

3.1208.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int\frac{-2e^{2}x+e^{2}\log(4)+e^{\frac{32x}{e^{2}}}\left(-2e^{2}x-32x^{2}\right)\log(4)}{e^{2}\log(4)}\,dx$$
$$=-\frac{2\,x^{2}e^{\left(32\,xe^{(-2)}\right)}\log(2)+x^{2}-2\,x\log(2)}{2\,\log(2)}$$

input
```
integrate(1/2*(2*(-2*x*exp(1)^2-32*x^2)*log(2)*exp(16*x/exp(1)^2)^2+2*exp(
1)^2*log(2)-2*x*exp(1)^2)/exp(1)^2/log(2),x, algorithm=\
```

output
```
-1/2*(2*x^2*e^(32*x*e^(-2))*log(2) + x^2 - 2*x*log(2))/log(2)
```

3.1208.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{-2e^2x+e^2\log(4)+e^{\frac{32x}{e^2}}(-2e^2x-32x^2)\log(4)}{e^2\log(4)}\,dx = -x^2e^{\frac{32x}{e^2}}-\frac{x^2}{2\log(2)}+x$$

input
```
integrate(1/2*(2*(-2*x*exp(1)**2-32*x**2)*ln(2)*exp(16*x/exp(1)**2)**2+2*e
xp(1)**2*ln(2)-2*x*exp(1)**2)/exp(1)**2/ln(2),x)
```

output
```
-x**2*exp(32*x*exp(-2)) - x**2/(2*log(2)) + x
```

3.1208.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{-2e^2x+e^2\log(4)+e^{\frac{32x}{e^2}}(-2e^2x-32x^2)\log(4)}{e^2\log(4)}\,dx = -\frac{\left(2\,x^2e^{\left(32\,xe^{(-2)}+2\right)}\log(2)+x^2e^2-2\,xe^2\log(2)\right)e^{(-2)}}{2\,\log(2)}$$

input
```
integrate(1/2*(2*(-2*x*exp(1)^2-32*x^2)*log(2)*exp(16*x/exp(1)^2)^2+2*exp(
1)^2*log(2)-2*x*exp(1)^2)/exp(1)^2/log(2),x, algorithm=\
```

output
```
-1/2*(2*x^2*e^(32*x*e^(-2) + 2)*log(2) + x^2*e^2 - 2*x*e^2*log(2))*e^(-2)/
log(2)
```

3.1208.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. 2(22) = 44.

Time = 0.26 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.96

$$\int \frac{-2e^2x+e^2\log(4)+e^{\frac{32x}{e^2}}(-2e^2x-32x^2)\log(4)}{e^2\log(4)}\,dx =$$

$$-\frac{\left(256\,x^2e^2-512\,xe^2\log(2)+\left((32\,xe^2-e^4)e^{\left(2\,(16\,x+e^2)e^{(-2)}\right)}+(512\,x^2e^2-32\,xe^4+e^6)e^{\left(32\,xe^{(-2)}\right)}\right)\log(\right.}{512\,\log(2)}$$

input
```
integrate(1/2*(2*(-2*x*exp(1)^2-32*x^2)*log(2)*exp(16*x/exp(1)^2)^2+2*exp(
1)^2*log(2)-2*x*exp(1)^2)/exp(1)^2/log(2),x, algorithm=\
```

output
```
-1/512*(256*x^2*e^2 - 512*x*e^2*log(2) + ((32*x*e^2 - e^4)*e^(2*(16*x + e^
2)*e^(-2)) + (512*x^2*e^2 - 32*x*e^4 + e^6)*e^(32*x*e^(-2)))*log(2))*e^(-2
)/log(2)
```

3.1208.9 Mupad [B] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-2e^2x + e^2\log(4) + e^{\frac{32x}{e^2}}(-2e^2x - 32x^2)\log(4)}{e^2\log(4)}\,dx = x - \frac{x^2}{2\ln(2)} - x^2\,\mathrm{e}^{32\,x\,\mathrm{e}^{-2}}$$

input
```
int(-(exp(-2)*(x*exp(2) - exp(2)*log(2) + exp(32*x*exp(-2))*log(2)*(2*x*ex
p(2) + 32*x^2)))/log(2),x)
```

output
```
x - x^2/(2*log(2)) - x^2*exp(32*x*exp(-2))
```

3.1209 $\int \frac{-x+(-x+x^2)\log(x)+(-2x^2\log(x)+2x\log(x)\log(x\log(x)))\log(8x-8\log(x\log(x)))}{(-x\log(x)+\log(x)\log(x\log(x)))\log^2(8x-8\log(x\log(x)))}\,dx$

3.1209.1 Optimal result

Integrand size = 76, antiderivative size = 18

$$\int \frac{-x+(-x+x^2)\log(x)+(-2x^2\log(x)+2x\log(x)\log(x\log(x)))\log(8x-8\log(x\log(x)))}{(-x\log(x)+\log(x)\log(x\log(x)))\log^2(8x-8\log(x\log(x)))}\,dx = \frac{x^2}{\log(8(x-\log(x\log(x))))}$$

output
```
x^2/ln(-8*ln(x*ln(x))+8*x)
```

3.1209.2 Mathematica [A] (verified)

Time = 1.04 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{-x+(-x+x^2)\log(x)+(-2x^2\log(x)+2x\log(x)\log(x\log(x)))\log(8x-8\log(x\log(x)))}{(-x\log(x)+\log(x)\log(x\log(x)))\log^2(8x-8\log(x\log(x)))}\,dx = \frac{x^2}{\log(8(x-\log(x\log(x))))}$$

input
```
Integrate[(-x + (-x + x^2)*Log[x] + (-2*x^2*Log[x] + 2*x*Log[x]*Log[x*Log[
x]])*Log[8*x - 8*Log[x*Log[x]]])/((-(x*Log[x]) + Log[x]*Log[x*Log[x]])*Log
[8*x - 8*Log[x*Log[x]]]^2),x]
```

output
```
x^2/Log[8*(x - Log[x*Log[x]])]
```

3.1209.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x^2-x)\log(x)+(2x\log(x)\log(x\log(x))-2x^2\log(x))\log(8x-8\log(x\log(x)))-x}{(\log(x)\log(x\log(x))-x\log(x))\log^2(8x-8\log(x\log(x)))}dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{-(x^2-x)\log(x)-(2x\log(x)\log(x\log(x))-2x^2\log(x))\log(8x-8\log(x\log(x)))+x}{\log(x)(x-\log(x\log(x)))\log^2(8(x-\log(x\log(x))))}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(-\frac{x^2}{(x-\log(x\log(x)))\log^2(8(x-\log(x\log(x))))}+\frac{2x^2}{(x-\log(x\log(x)))\log(8(x-\log(x\log(x))))}+\frac{}{\log(x)(x-}\right.$$

$$\Big\downarrow \; 2009$$

$$-\int \frac{x^2}{(x-\log(x\log(x)))\log^2(8(x-\log(x\log(x))))}dx+ 2\int \frac{x^2}{(x-\log(x\log(x)))\log(8(x-\log(x\log(x))))}dx+ \int \frac{x}{(x-\log(x\log(x)))\log^2(8(x-\log(x\log(x))))}dx+ \int \frac{x}{\log(x)(x-\log(x\log(x)))\log^2(8(x-\log(x\log(x))))}dx- 2\int \frac{x\log(x\log(x))}{(x-\log(x\log(x)))\log(8(x-\log(x\log(x))))}dx$$

input
```
Int[(-x + (-x + x^2)*Log[x] + (-2*x^2*Log[x] + 2*x*Log[x]*Log[x*Log[x]])*L
og[8*x - 8*Log[x*Log[x]]])/((-(x*Log[x]) + Log[x]*Log[x*Log[x]])*Log[8*x -
 8*Log[x*Log[x]]]^2),x]
```

output
```
$Aborted
```

3.1209.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1209.4 Maple [F(-1)]

Timed out.

$$\int \frac{(2x\ln(x)\ln(x\ln(x))-2x^2\ln(x))\ln(-8\ln(x\ln(x))+8x)+\ln(x)(x^2-x)-x}{(\ln(x)\ln(x\ln(x))-x\ln(x))\ln(-8\ln(x\ln(x))+8x)^2}dx$$

input
```
int(((2*x*ln(x)*ln(x*ln(x))-2*x^2*ln(x))*ln(-8*ln(x*ln(x))+8*x)+ln(x)*(x^2
-x)-x)/(ln(x)*ln(x*ln(x))-x*ln(x))/ln(-8*ln(x*ln(x))+8*x)^2,x)
```

output
```
int(((2*x*ln(x)*ln(x*ln(x))-2*x^2*ln(x))*ln(-8*ln(x*ln(x))+8*x)+ln(x)*(x^2
-x)-x)/(ln(x)*ln(x*ln(x))-x*ln(x))/ln(-8*ln(x*ln(x))+8*x)^2,x)
```

3.1209.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{-x+(-x+x^2)\log(x)+(-2x^2\log(x)+2x\log(x)\log(x\log(x)))\log(8x-8\log(x\log(x)))}{(-x\log(x)+\log(x)\log(x\log(x)))\log^2(8x-8\log(x\log(x)))}\,dx$$
$$=\frac{x^2}{\log(8x-8\log(x\log(x)))}$$

input
```
integrate(((2*x*log(x)*log(x*log(x))-2*x^2*log(x))*log(-8*log(x*log(x))+8*
x)+log(x)*(x^2-x)-x)/(log(x)*log(x*log(x))-x*log(x))/log(-8*log(x*log(x))+
8*x)^2,x, algorithm=\
```

output
```
x^2/log(8*x - 8*log(x*log(x)))
```

3.1209.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{-x+(-x+x^2)\log(x)+(-2x^2\log(x)+2x\log(x)\log(x\log(x)))\log(8x-8\log(x\log(x)))}{(-x\log(x)+\log(x)\log(x\log(x)))\log^2(8x-8\log(x\log(x)))}\,dx$$
$$=\frac{x^2}{\log(8x-8\log(x\log(x)))}$$

input
```
integrate(((2*x*ln(x)*ln(x*ln(x))-2*x**2*ln(x))*ln(-8*ln(x*ln(x))+8*x)+ln(
x)*(x**2-x)-x)/(ln(x)*ln(x*ln(x))-x*ln(x))/ln(-8*ln(x*ln(x))+8*x)**2,x)
```

output
```
x**2/log(8*x - 8*log(x*log(x)))
```

3.1209.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.31 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33

$$\int \frac{-x+(-x+x^2)\log(x)+(-2x^2\log(x)+2x\log(x)\log(x\log(x)))\log(8x-8\log(x\log(x)))}{(-x\log(x)+\log(x)\log(x\log(x)))\log^2(8x-8\log(x\log(x)))}\,dx$$
$$=\frac{x^2}{i\pi+3\log(2)+\log(-x+\log(x)+\log(\log(x)))}$$

input
```
integrate(((2*x*log(x)*log(x*log(x))-2*x^2*log(x))*log(-8*log(x*log(x))+8*
x)+log(x)*(x^2-x)-x)/(log(x)*log(x*log(x))-x*log(x))/log(-8*log(x*log(x))+
8*x)^2,x, algorithm=\
```

output
```
x^2/(I*pi + 3*log(2) + log(-x + log(x) + log(log(x))))
```

3.1209.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{-x+(-x+x^2)\log(x)+(-2x^2\log(x)+2x\log(x)\log(x\log(x)))\log(8x-8\log(x\log(x)))}{(-x\log(x)+\log(x)\log(x\log(x)))\log^2(8x-8\log(x\log(x)))}\,dx$$
$$=\frac{x^2}{\log\left(8\,x-8\,\log\left(x\right)-8\,\log\left(\log\left(x\right)\right)\right)}$$

input
```
integrate((((2*x*log(x)*log(x*log(x))-2*x^2*log(x))*log(-8*log(x*log(x))+8*
x)+log(x)*(x^2-x)-x)/(log(x)*log(x*log(x))-x*log(x))/log(-8*log(x*log(x))+
8*x)^2,x, algorithm=\
```

output
```
x^2/log(8*x - 8*log(x) - 8*log(log(x)))
```

3.1209.9 Mupad [F(-1)]

Timed out.

$$\int \frac{-x+(-x+x^2)\log(x)+(-2x^2\log(x)+2x\log(x)\log(x\log(x)))\log(8x-8\log(x\log(x)))}{(-x\log(x)+\log(x)\log(x\log(x)))\log^2(8x-8\log(x\log(x)))}\,dx$$
$$=\int -\frac{x+\ln\left(x\right)\,\left(x-x^2\right)+\ln\left(8\,x-8\,\ln\left(x\,\ln\left(x\right)\right)\right)\,\left(2\,x^2\,\ln\left(x\right)-2\,x\,\ln\left(x\,\ln\left(x\right)\right)\,\ln\left(x\right)\right)}{{\ln\left(8\,x-8\,\ln\left(x\,\ln\left(x\right)\right)\right)}^2\,\left(\ln\left(x\,\ln\left(x\right)\right)\,\ln\left(x\right)-x\,\ln\left(x\right)\right)}\,dx$$

input
```
int(-(x + log(x)*(x - x^2) + log(8*x - 8*log(x*log(x)))*(2*x^2*log(x) - 2*
x*log(x*log(x))*log(x)))/(log(8*x - 8*log(x*log(x)))^2*(log(x*log(x))*log(
x) - x*log(x))),x)
```

output
```
int(-(x + log(x)*(x - x^2) + log(8*x - 8*log(x*log(x)))*(2*x^2*log(x) - 2*
x*log(x*log(x))*log(x)))/(log(8*x - 8*log(x*log(x)))^2*(log(x*log(x))*log(
x) - x*log(x))), x)
```

3.1210 $\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log\left(x^2\right)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log\left(x^2\right)\right)}{4x}\,dx$

3.1210.1 Optimal result

Integrand size = 65, antiderivative size = 23

$$\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log(x^2)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log(x^2)\right)}{4x}\,dx = e^{3+x\left(-8-e^{\frac{1}{4}/x}+\log(x^2)\right)}$$

output
```
exp(x*(ln(x^2)-8-exp(1/4/x)))*exp(3)
```

3.1210.2 Mathematica [A] (verified)

Time = 0.88 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log(x^2)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log(x^2)\right)}{4x}\,dx = e^{3-8x-e^{\frac{1}{4}/x}x}\left(x^2\right)^x$$

input
```
Integrate[(E^(-8*x - E^(1/(4*x))*x + x*Log[x^2])*(E^(3 + 1/(4*x))*(1 - 4*x
) - 24*E^3*x + 4*E^3*x*Log[x^2]))/(4*x),x]
```

output
```
E^(3 - 8*x - E^(1/(4*x))*x)*(x^2)^x
```

3.1210.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x\log(x^2)-e^{\frac{1}{4}/x}x-8x}\left(4e^3x\log\left(x^2\right)+e^{\frac{1}{4x}+3}(1-4x)-24e^3x\right)}{4x}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{4}\int \frac{e^{-e^{\frac{1}{4}/x}x-8x}\left(x^2\right)^x\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log\left(x^2\right)\right)}{x}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{4}\int \left(4e^{-e^{\frac{1}{4}/x}x-8x+3}\left(x^2\right)^x\left(\log\left(x^2\right)-6\right)-\frac{e^{-e^{\frac{1}{4}/x}x-8x+3+\frac{1}{4x}}\left(x^2\right)^x(4x-1)}{x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{4}\left(-24\int e^{-e^{\frac{1}{4}/x}x-8x+3}\left(x^2\right)^xdx-4\int e^{-e^{\frac{1}{4}/x}x-8x+3+\frac{1}{4x}}\left(x^2\right)^xdx+\int \frac{e^{-e^{\frac{1}{4}/x}x-8x+3+\frac{1}{4x}}\left(x^2\right)^x}{x}dx-8\int \frac{\int e^{3-(8}}{}\right.$$

input
```
Int[(E^(-8*x - E^(1/(4*x))*x + x*Log[x^2])*(E^(3 + 1/(4*x))*(1 - 4*x) - 24
*E^3*x + 4*E^3*x*Log[x^2]))/(4*x),x]
```

output
```
$Aborted
```

3.1210.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1210. $\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log\left(x^2\right)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log\left(x^2\right)\right)}{4x}dx$

3.1210.4 Maple [A] (verified)

Time = 3.20 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

method	result	size
parallelrisch	$\mathrm{e}^{x\left(\ln\left(x^{2}\right)-8-\mathrm{e}^{\frac{1}{4x}}\right)}\mathrm{e}^{3}$	21
default	$\mathrm{e}^{3}\mathrm{e}^{x\ln\left(x^{2}\right)-x\,\mathrm{e}^{\frac{1}{4x}}-8x}$	24
norman	$\mathrm{e}^{3}\mathrm{e}^{x\ln\left(x^{2}\right)-x\,\mathrm{e}^{\frac{1}{4x}}-8x}$	24
risch	$x^{2x}\mathrm{e}^{3-\frac{i\pi x\,\mathrm{csgn}\left(ix^{2}\right)^{3}}{2}+ix\,\mathrm{csgn}\left(ix^{2}\right)^{2}\pi\,\mathrm{csgn}(ix)-\frac{i\pi x\,\mathrm{csgn}(ix)^{2}\,\mathrm{csgn}\left(ix^{2}\right)}{2}-x\,\mathrm{e}^{\frac{1}{4x}}-8x}$	74

input
```
int(1/4*(4*x*exp(3)*ln(x^2)+(-4*x+1)*exp(3)*exp(1/4/x)-24*x*exp(3))*exp(x*
ln(x^2)-x*exp(1/4/x)-8*x)/x,x,method=_RETURNVERBOSE)
```

output
```
exp(x*(ln(x^2)-8-exp(1/4/x)))*exp(3)
```

3.1210.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.48

$$\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log\left(x^{2}\right)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^{3}x+4e^{3}x\log\left(x^{2}\right)\right)}{4x}\,dx$$
$$=e^{\left(\left(xe^{3}\log\left(x^{2}\right)-8\,xe^{3}-xe^{\left(\frac{12\,x+1}{4\,x}\right)}\right)e^{(-3)}+3\right)}$$

input
```
integrate(1/4*(4*x*exp(3)*log(x^2)+(-4*x+1)*exp(3)*exp(1/4/x)-24*x*exp(3))
*exp(x*log(x^2)-x*exp(1/4/x)-8*x)/x,x, algorithm=\
```

output
```
e^((x*e^3*log(x^2) - 8*x*e^3 - x*e^(1/4*(12*x + 1)/x))*e^(-3) + 3)
```

3.1210.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log(x^2)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log\left(x^2\right)\right)}{4x}\,dx=e^3e^{-xe^{\frac{1}{4x}}+x\log\left(x^2\right)-8x}$$

input
```
integrate(1/4*(4*x*exp(3)*ln(x**2)+(-4*x+1)*exp(3)*exp(1/4/x)-24*x*exp(3))
*exp(x*ln(x**2)-x*exp(1/4/x)-8*x)/x,x)
```

output
```
exp(3)*exp(-x*exp(1/(4*x)) + x*log(x**2) - 8*x)
```

3.1210.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log(x^2)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log\left(x^2\right)\right)}{4x}\,dx=e^{\left(-xe^{\left(\frac{1}{4x}\right)}+2x\log(x)-8x+3\right)}$$

input
```
integrate(1/4*(4*x*exp(3)*log(x^2)+(-4*x+1)*exp(3)*exp(1/4/x)-24*x*exp(3))
*exp(x*log(x^2)-x*exp(1/4/x)-8*x)/x,x, algorithm=\
```

output
```
e^(-x*e^(1/4/x) + 2*x*log(x) - 8*x + 3)
```

3.1210.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log(x^2)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log\left(x^2\right)\right)}{4x}\,dx=e^{\left(-xe^{\left(\frac{1}{4x}\right)}+x\log\left(x^2\right)-8x+3\right)}$$

input
```
integrate(1/4*(4*x*exp(3)*log(x^2)+(-4*x+1)*exp(3)*exp(1/4/x)-24*x*exp(3))
*exp(x*log(x^2)-x*exp(1/4/x)-8*x)/x,x, algorithm=\
```

output
```
e^(-x*e^(1/4/x) + x*log(x^2) - 8*x + 3)
```

3.1210.9 Mupad [B] (verification not implemented)

Time = 14.94 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{e^{-8x-e^{\frac{1}{4}/x}x+x\log(x^2)}\left(e^{3+\frac{1}{4x}}(1-4x)-24e^3x+4e^3x\log\left(x^2\right)\right)}{4x}\,dx = \mathrm{e}^{-8\,x}\,\mathrm{e}^3\,\mathrm{e}^{-x\,\mathrm{e}^{\frac{1}{4\,x}}}\,{\left(x^2\right)}^x$$

input
```
int(-(exp(x*log(x^2) - 8*x - x*exp(1/(4*x)))*(24*x*exp(3) - 4*x*log(x^2)*e
xp(3) + exp(3)*exp(1/(4*x))*(4*x - 1)))/(4*x),x)
```

output
```
exp(-8*x)*exp(3)*exp(-x*exp(1/(4*x)))*(x^2)^x
```

3.1211 $\int \frac{-4+3x+6x^2-3x^3+(-2+x)\log(2x-x^2)}{4-4x+x^2+2x^3-x^4+(-2x+x^2)\log(2x-x^2)}\,dx$

3.1211.1 Optimal result

Integrand size = 68, antiderivative size = 23

$$\int \frac{-4+3x+6x^2-3x^3+(-2+x)\log(2x-x^2)}{4-4x+x^2+2x^3-x^4+(-2x+x^2)\log(2x-x^2)}\,dx = \log\left(-2+x-x\left(x^2-\log\left(2x-x^2\right)\right)\right)$$

output
```
ln(x-(x^2-ln(-x^2+2*x))*x-2)
```

3.1211.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{-4+3x+6x^2-3x^3+(-2+x)\log(2x-x^2)}{4-4x+x^2+2x^3-x^4+(-2x+x^2)\log(2x-x^2)}\,dx = \log\left(2-x+x^3-x\log(-((-2+x)x))\right)$$

input
```
Integrate[(-4 + 3*x + 6*x^2 - 3*x^3 + (-2 + x)*Log[2*x - x^2])/(4 - 4*x +
x^2 + 2*x^3 - x^4 + (-2*x + x^2)*Log[2*x - x^2]),x]
```

output
```
Log[2 - x + x^3 - x*Log[-((-2 + x)*x)]]
```

3.1211.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029, Rules used = {7292, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^3+6x^2+(x-2)\log\left(2x-x^2\right)+3x-4}{-x^4+2x^3+x^2+\left(x^2-2x\right)\log\left(2x-x^2\right)-4x+4}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-3x^3+6x^2+(x-2)\log\left(2x-x^2\right)+3x-4}{(2-x)\left(x^3-x-x\log(-((x-2)x))+2\right)}dx$$

$$\Big\downarrow \text{ 7235}$$

$$\log\left(x^3-x-x\log((2-x)x)+2\right)$$

input
```
Int[(-4 + 3*x + 6*x^2 - 3*x^3 + (-2 + x)*Log[2*x - x^2])/(4 - 4*x + x^2 +
2*x^3 - x^4 + (-2*x + x^2)*Log[2*x - x^2]),x]
```

output
```
Log[2 - x + x^3 - x*Log[(2 - x)*x]]
```

3.1211.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1211.4 Maple [A] (verified)

Time = 2.33 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

method	result	size
norman	$\ln\left(x^3-\ln\left(-x^2+2x\right)x-x+2\right)$	23
parallelrisch	$\ln\left(x^3-\ln\left(-x^2+2x\right)x-x+2\right)$	23
risch	$\ln\left(x\right)+\ln\left(\ln\left(-x^2+2x\right)-\frac{x^3-x+2}{x}\right)$	29

input
```
int(((-2+x)*ln(-x^2+2*x)-3*x^3+6*x^2+3*x-4)/((x^2-2*x)*ln(-x^2+2*x)-x^4+2*
x^3+x^2-4*x+4),x,method=_RETURNVERBOSE)
```

output
```
ln(x^3-ln(-x^2+2*x)*x-x+2)
```

3.1211.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \frac{-4+3x+6x^2-3x^3+(-2+x)\log(2x-x^2)}{4-4x+x^2+2x^3-x^4+(-2x+x^2)\log(2x-x^2)}\,dx = \log(x)+\log\left(-\frac{x^3-x\log(-x^2+2x)-x+2}{x}\right)$$

input
```
integrate(((-2+x)*log(-x^2+2*x)-3*x^3+6*x^2+3*x-4)/((x^2-2*x)*log(-x^2+2*x
)-x^4+2*x^3+x^2-4*x+4),x, algorithm=\
```

output
```
log(x) + log(-(x^3 - x*log(-x^2 + 2*x) - x + 2)/x)
```

3.1211.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{-4+3x+6x^2-3x^3+(-2+x)\log(2x-x^2)}{4-4x+x^2+2x^3-x^4+(-2x+x^2)\log(2x-x^2)}\,dx = \log(x)+\log\left(\log(-x^2+2x)+\frac{-x^3+x-2}{x}\right)$$

input
```
integrate(((-2+x)*ln(-x**2+2*x)-3*x**3+6*x**2+3*x-4)/((x**2-2*x)*ln(-x**2+
2*x)-x**4+2*x**3+x**2-4*x+4),x)
```

output
```
log(x) + log(log(-x**2 + 2*x) + (-x**3 + x - 2)/x)
```

3.1211.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{-4+3x+6x^2-3x^3+(-2+x)\log(2x-x^2)}{4-4x+x^2+2x^3-x^4+(-2x+x^2)\log(2x-x^2)}\,dx = \log(x)+\log\left(-\frac{x^3-x\log(x)-x\log(-x+2)-x+2}{x}\right)$$

input
```
integrate(((-2+x)*log(-x^2+2*x)-3*x^3+6*x^2+3*x-4)/((x^2-2*x)*log(-x^2+2*x
)-x^4+2*x^3+x^2-4*x+4),x, algorithm=\
```

output
```
log(x) + log(-(x^3 - x*log(x) - x*log(-x + 2) - x + 2)/x)
```

3.1211.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

$$\int \frac{-4+3x+6x^2-3x^3+(-2+x)\log(2x-x^2)}{4-4x+x^2+2x^3-x^4+(-2x+x^2)\log(2x-x^2)}\,dx = \log\left(-x^3+x\log\left(-x^2+2\,x\right)+x-2\right)$$

input
```
integrate(((-2+x)*log(-x^2+2*x)-3*x^3+6*x^2+3*x-4)/((x^2-2*x)*log(-x^2+2*x
)-x^4+2*x^3+x^2-4*x+4),x, algorithm=\
```

output
```
log(-x^3 + x*log(-x^2 + 2*x) + x - 2)
```

3.1211.9 Mupad [B] (verification not implemented)

Time = 14.77 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \frac{-4+3x+6x^2-3x^3+(-2+x)\log(2x-x^2)}{4-4x+x^2+2x^3-x^4+(-2x+x^2)\log(2x-x^2)}\,dx$$
$$= \ln\left(\ln\left(2\,x-x^2\right)-\frac{2}{x}-x^2+1\right)+\ln\left(x\right)$$

input
```
int(-(3*x + log(2*x - x^2)*(x - 2) + 6*x^2 - 3*x^3 - 4)/(4*x + log(2*x - x
^2)*(2*x - x^2) - x^2 - 2*x^3 + x^4 - 4),x)
```

output
```
log(log(2*x - x^2) - 2/x - x^2 + 1) + log(x)
```

3.1212 $\int \frac{e^8+e^{2x}+150x^2-2e^4x^2+x^4+e^x\left(2e^4-75x-2x^2\right)}{e^8x+e^{2x}x-2e^4x^3+x^5+e^x\left(2e^4x-2x^3\right)}\,dx$

3.1212.1 Optimal result

Integrand size = 86, antiderivative size = 28

$$\int \frac{e^8+e^{2x}+150x^2-2e^4x^2+x^4+e^x(2e^4-75x-2x^2)}{e^8x+e^{2x}x-2e^4x^3+x^5+e^x\left(2e^4x-2x^3\right)}\,dx = 4+\frac{75}{e^4+e^x-x^2}-\log(4)-\log\left(\frac{1}{x}\right)$$

output
```
5/(1/15*exp(4)+1/15*exp(x)-1/15*x^2)-2*ln(2)+4-ln(1/x)
```

3.1212.2 Mathematica [A] (verified)

Time = 2.02 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{e^8+e^{2x}+150x^2-2e^4x^2+x^4+e^x(2e^4-75x-2x^2)}{e^8x+e^{2x}x-2e^4x^3+x^5+e^x\left(2e^4x-2x^3\right)}\,dx = \frac{75}{e^4+e^x-x^2}+\log(x)$$

input
```
Integrate[(E^8 + E^(2*x) + 150*x^2 - 2*E^4*x^2 + x^4 + E^x*(2*E^4 - 75*x -
 2*x^2))/(E^8*x + E^(2*x)*x - 2*E^4*x^3 + x^5 + E^x*(2*E^4*x - 2*x^3)),x]
```

output
```
75/(E^4 + E^x - x^2) + Log[x]
```

3.1212.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4-2e^4x^2+150x^2+e^x(-2x^2-75x+2e^4)+e^{2x}+e^8}{x^5-2e^4x^3+e^x(2e^4x-2x^3)+e^{2x}x+e^8x}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{x^4+(150-2e^4)x^2+e^x(-2x^2-75x+2e^4)+e^{2x}+e^8}{x^5-2e^4x^3+e^x(2e^4x-2x^3)+e^{2x}x+e^8x}dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{x^4+(150-2e^4)x^2+e^x(-2x^2-75x+2e^4)+e^{2x}+e^8}{x(-x^2+e^x+e^4)^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{75(-x^2+2x+e^4)}{(-x^2+e^x+e^4)^2}-\frac{75}{-x^2+e^x+e^4}+\frac{1}{x}\right)dx$$

$$\Big\downarrow \; 2009$$

$$75e^4\int \frac{1}{(-x^2+e^x+e^4)^2}dx-75\int \frac{1}{-x^2+e^x+e^4}dx+150\int \frac{x}{(x^2-e^x-e^4)^2}dx-75\int \frac{x^2}{(x^2-e^x-e^4)^2}dx+\log(x)$$

input
```
Int[(E^8 + E^(2*x) + 150*x^2 - 2*E^4*x^2 + x^4 + E^x*(2*E^4 - 75*x - 2*x^2
))/(E^8*x + E^(2*x)*x - 2*E^4*x^3 + x^5 + E^x*(2*E^4*x - 2*x^3)),x]
```

output
```
$Aborted
```

3.1212.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1212.4 Maple [A] (verified)

Time = 1.74 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.64

method	result	size
norman	$\frac{75}{-x^2+e^4+e^x}+\ln(x)$	18
risch	$\frac{75}{-x^2+e^4+e^x}+\ln(x)$	18
parallelrisch	$\frac{-x^2\ln(x)+e^4\ln(x)+e^x\ln(x)+75}{-x^2+e^4+e^x}$	33

input
```
int((exp(x)^2+(2*exp(4)-2*x^2-75*x)*exp(x)+exp(4)^2-2*x^2*exp(4)+x^4+150*x
^2)/(x*exp(x)^2+(2*x*exp(4)-2*x^3)*exp(x)+x*exp(4)^2-2*x^3*exp(4)+x^5),x,m
ethod=_RETURNVERBOSE)
```

output
```
75/(-x^2+exp(4)+exp(x))+ln(x)
```

3.1212.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int\frac{e^8+e^{2x}+150x^2-2e^4x^2+x^4+e^x(2e^4-75x-2x^2)}{e^8x+e^{2x}x-2e^4x^3+x^5+e^x\left(2e^4x-2x^3\right)}\,dx=\frac{(x^2-e^4-e^x)\log(x)-75}{x^2-e^4-e^x}$$

input
```
integrate((exp(x)^2+(2*exp(4)-2*x^2-75*x)*exp(x)+exp(4)^2-2*x^2*exp(4)+x^4
+150*x^2)/(x*exp(x)^2+(2*x*exp(4)-2*x^3)*exp(x)+x*exp(4)^2-2*x^3*exp(4)+x^
5),x, algorithm=\
```

output
```
((x^2 - e^4 - e^x)*log(x) - 75)/(x^2 - e^4 - e^x)
```

3.1212.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.50

$$\int \frac{e^8+e^{2x}+150x^2-2e^4x^2+x^4+e^x(2e^4-75x-2x^2)}{e^8x+e^{2x}x-2e^4x^3+x^5+e^x(2e^4x-2x^3)}\,dx=\log(x)+\frac{75}{-x^2+e^x+e^4}$$

input
```
integrate((exp(x)**2+(2*exp(4)-2*x**2-75*x)*exp(x)+exp(4)**2-2*x**2*exp(4)
+x**4+150*x**2)/(x*exp(x)**2+(2*x*exp(4)-2*x**3)*exp(x)+x*exp(4)**2-2*x**3
*exp(4)+x**5),x)
```

output
```
log(x) + 75/(-x**2 + exp(x) + exp(4))
```

3.1212.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{e^8+e^{2x}+150x^2-2e^4x^2+x^4+e^x(2e^4-75x-2x^2)}{e^8x+e^{2x}x-2e^4x^3+x^5+e^x(2e^4x-2x^3)}\,dx=-\frac{75}{x^2-e^4-e^x}+\log(x)$$

input
```
integrate((exp(x)^2+(2*exp(4)-2*x^2-75*x)*exp(x)+exp(4)^2-2*x^2*exp(4)+x^4
+150*x^2)/(x*exp(x)^2+(2*x*exp(4)-2*x^3)*exp(x)+x*exp(4)^2-2*x^3*exp(4)+x^
5),x, algorithm=\
```

output
```
-75/(x^2 - e^4 - e^x) + log(x)
```

3.1212.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.25

$$\int \frac{e^8+e^{2x}+150x^2-2e^4x^2+x^4+e^x(2e^4-75x-2x^2)}{e^8x+e^{2x}x-2e^4x^3+x^5+e^x(2e^4x-2x^3)}\,dx$$
$$=\frac{x^2\log(x)-e^4\log(x)-e^x\log(x)-75}{x^2-e^4-e^x}$$

input
```
integrate((exp(x)^2+(2*exp(4)-2*x^2-75*x)*exp(x)+exp(4)^2-2*x^2*exp(4)+x^4
+150*x^2)/(x*exp(x)^2+(2*x*exp(4)-2*x^3)*exp(x)+x*exp(4)^2-2*x^3*exp(4)+x^
5),x, algorithm=\
```

output
```
(x^2*log(x) - e^4*log(x) - e^x*log(x) - 75)/(x^2 - e^4 - e^x)
```

3.1212.9 Mupad [B] (verification not implemented)

Time = 14.97 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.61

$$\int \frac{e^8+e^{2x}+150x^2-2e^4x^2+x^4+e^x(2e^4-75x-2x^2)}{e^8x+e^{2x}x-2e^4x^3+x^5+e^x\left(2e^4x-2x^3\right)}\,dx=\ln\left(x\right)+\frac{75}{\mathrm{e}^4+\mathrm{e}^x-x^2}$$

input
```
int((exp(2*x) + exp(8) - exp(x)*(75*x - 2*exp(4) + 2*x^2) - 2*x^2*exp(4) +
 150*x^2 + x^4)/(exp(x)*(2*x*exp(4) - 2*x^3) + x*exp(2*x) + x*exp(8) - 2*x
^3*exp(4) + x^5),x)
```

output
```
log(x) + 75/(exp(4) + exp(x) - x^2)
```

3.1213 $\int \frac{12+1246x-622x^3+(-8-623x)\log(x)}{x^3}\,dx$

3.1213.1 Optimal result

Integrand size = 22, antiderivative size = 28

$$\int \frac{12+1246x-622x^3+(-8-623x)\log(x)}{x^3}\,dx = -5+x+\frac{(2(-2+x)-625x)\left(x+\frac{1-\log(x)}{x}\right)}{x}$$

output
```
x-5+(-623*x-4)/x*(x+(1-ln(x))/x)
```

3.1213.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{12+1246x-622x^3+(-8-623x)\log(x)}{x^3}\,dx = -\frac{4}{x^2}-\frac{623}{x}-622x+\frac{4\log(x)}{x^2}+\frac{623\log(x)}{x}$$

input
```
Integrate[(12 + 1246*x - 622*x^3 + (-8 - 623*x)*Log[x])/x^3,x]
```

output
```
-4/x^2 - 623/x - 622*x + (4*Log[x])/x^2 + (623*Log[x])/x
```

3.1213.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-622x^3+1246x+(-623x-8)\log(x)+12}{x^3}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-\frac{2(311x^3-623x-6)}{x^3}-\frac{(623x+8)\log(x)}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{4}{x^2}+\frac{(623x+8)^2\log(x)}{16x^2}-622x-\frac{623}{x}-\frac{388129\log(x)}{16}$$

input
```
Int[(12 + 1246*x - 622*x^3 + (-8 - 623*x)*Log[x])/x^3,x]
```

output
```
-4/x^2 - 623/x - 622*x - (388129*Log[x])/16 + ((8 + 623*x)^2*Log[x])/(16*x
^2)
```

3.1213.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1213.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

method	result	size
norman	$\frac{-4-623x-622x^{3}+623x\ln(x)+4\ln(x)}{x^{2}}$	24
parallelrisch	$\frac{-4-623x-622x^{3}+623x\ln(x)+4\ln(x)}{x^{2}}$	24
risch	$\frac{(623x+4)\ln(x)}{x^{2}}-\frac{622x^{3}+623x+4}{x^{2}}$	28
default	$-622x+\frac{623\ln(x)}{x}-\frac{623}{x}+\frac{4\ln(x)}{x^{2}}-\frac{4}{x^{2}}$	29
parts	$-622x+\frac{623\ln(x)}{x}-\frac{623}{x}+\frac{4\ln(x)}{x^{2}}-\frac{4}{x^{2}}$	29

input
```
int(((-623*x-8)*ln(x)-622*x^3+1246*x+12)/x^3,x,method=_RETURNVERBOSE)
```

output
```
(-4-623*x-622*x^3+623*x*ln(x)+4*ln(x))/x^2
```

3.1213.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{12+1246x-622x^3+(-8-623x)\log(x)}{x^3}\,dx=-\frac{622\,x^{3}-(623\,x+4)\log(x)+623\,x+4}{x^{2}}$$

input
```
integrate(((-623*x-8)*log(x)-622*x^3+1246*x+12)/x^3,x, algorithm=\
```

output
```
-(622*x^3 - (623*x + 4)*log(x) + 623*x + 4)/x^2
```

3.1213.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{12+1246x-622x^3+(-8-623x)\log(x)}{x^3}\,dx=-622x+\frac{(623x+4)\log(x)}{x^{2}}-\frac{623x+4}{x^{2}}$$

input
```
integrate(((-623*x-8)*ln(x)-622*x**3+1246*x+12)/x**3,x)
```

output
```
-622*x + (623*x + 4)*log(x)/x**2 - (623*x + 4)/x**2
```

3.1213.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

$$\int \frac{12+1246x-622x^3+(-8-623x)\log(x)}{x^3}\,dx$$
$$=-622\,x+\frac{623\,\log\left(x\right)}{x}-\frac{623}{x}+\frac{4\,\log\left(x\right)}{x^2}-\frac{4}{x^2}$$

input
```
integrate(((-623*x-8)*log(x)-622*x^3+1246*x+12)/x^3,x, algorithm=\
```

output
```
-622*x + 623*log(x)/x - 623/x + 4*log(x)/x^2 - 4/x^2
```

3.1213.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

$$\int \frac{12+1246x-622x^3+(-8-623x)\log(x)}{x^3}\,dx=-622\,x+\frac{(623\,x+4)\log\left(x\right)}{x^2}-\frac{623\,x+4}{x^2}$$

input
```
integrate(((-623*x-8)*log(x)-622*x^3+1246*x+12)/x^3,x, algorithm=\
```

output
```
-622*x + (623*x + 4)*log(x)/x^2 - (623*x + 4)/x^2
```

3.1213.9 Mupad [B] (verification not implemented)

Time = 14.77 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{12+1246x-622x^3+(-8-623x)\log(x)}{x^3}\,dx$$
$$=\frac{x\,\left(4\,\ln\left(x\right)-4\right)+x^2\,\left(623\,\ln\left(x\right)-623\right)}{x^3}-622\,x$$

input
```
int((1246*x - log(x)*(623*x + 8) - 622*x^3 + 12)/x^3,x)
```

output
```
(x*(4*log(x) - 4) + x^2*(623*log(x) - 623))/x^3 - 622*x
```

3.1214 $\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-60$

$(-64x+48x^2-12x^3+x^4)\log(x)$

3.1214.1 Optimal result

Integrand size = 70, antiderivative size = 24

$$\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-600x^2+50x^3)\log(\log(x))}{(-64x+48x^2-12x^3+x^4)\log(x)}\,dx$$
$$= -5-\frac{5}{(4-x)^2}+25\left(e^{e^3}+\log(\log(x))\right)^2$$

output
```
-5+5*(ln(ln(x))+exp(exp(3)))*(5*ln(ln(x))+5*exp(exp(3)))-5/(-x+4)^2
```

3.1214.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-600x^2+50x^3)\log(\log(x))}{(-64x+48x^2-12x^3+x^4)\log(x)}\,dx$$
$$= 10\left(-\frac{1}{2(-4+x)^2}+\frac{5}{2}\left(e^{e^3}+\log(\log(x))\right)^2\right)$$

input
```
Integrate[(E^E^3*(-3200 + 2400*x - 600*x^2 + 50*x^3) + 10*x*Log[x] + (-320
0 + 2400*x - 600*x^2 + 50*x^3)*Log[Log[x]])/((-64*x + 48*x^2 - 12*x^3 + x^
4)*Log[x]),x]
```

output
```
10*(-1/2*1/(-4 + x)^2 + (5*(E^E^3 + Log[Log[x]])^2)/2)
```

3.1214.3 Rubi [A] (verified)

Time = 0.84 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2026, 2007, 7239, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{e^3}(50x^3-600x^2+2400x-3200)+(50x^3-600x^2+2400x-3200)\log(\log(x))+10x\log(x)}{(x^4-12x^3+48x^2-64x)\log(x)}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{e^3}(50x^3-600x^2+2400x-3200)+(50x^3-600x^2+2400x-3200)\log(\log(x))+10x\log(x)}{x(x^3-12x^2+48x-64)\log(x)}dx$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{e^{e^3}(50x^3-600x^2+2400x-3200)+(50x^3-600x^2+2400x-3200)\log(\log(x))+10x\log(x)}{(x-4)^3x\log(x)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int 10\left(\frac{1}{(x-4)^3}+\frac{5\left(\log(\log(x))+e^{e^3}\right)}{x\log(x)}\right)dx$$

$$\Big\downarrow \text{27}$$

$$10\int \left(\frac{5\left(\log(\log(x))+e^{e^3}\right)}{x\log(x)}+\frac{1}{(x-4)^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$10\left(\frac{5}{2}\left(\log(\log(x))+e^{e^3}\right)^2-\frac{1}{2(4-x)^2}\right)$$

input
```
Int[(E^E^3*(-3200 + 2400*x - 600*x^2 + 50*x^3) + 10*x*Log[x] + (-3200 + 24
00*x - 600*x^2 + 50*x^3)*Log[Log[x]])/((-64*x + 48*x^2 - 12*x^3 + x^4)*Log
[x]),x]
```

output
```
10*(-1/2*1/(4 - x)^2 + (5*(E^E^3 + Log[Log[x]])^2)/2)
```

3.1214. $\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-600x^2+50x^3)\log(\log(x))}{(-64x+48x^2-12x^3+x^4)\log(x)}dx$

3.1214.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1214.4 Maple [A] (verified)

Time = 2.66 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

method	result	size
default	$25 \ln\left(\ln\left(x\right)\right)^{2}+50 \ln\left(\ln\left(x\right)\right) {\mathrm e}^{{\mathrm e}^{3}}-\frac{5}{\left(x -4\right)^{2}}$	24
parts	$25 \ln\left(\ln\left(x\right)\right)^{2}+50 \ln\left(\ln\left(x\right)\right) {\mathrm e}^{{\mathrm e}^{3}}-\frac{5}{\left(x -4\right)^{2}}$	24
risch	$25 \ln\left(\ln\left(x\right)\right)^{2}+\frac{50 \,{\mathrm e}^{{\mathrm e}^{3}} \ln\left(\ln\left(x\right)\right) x^{2}-400 \,{\mathrm e}^{{\mathrm e}^{3}} \ln\left(\ln\left(x\right)\right) x +800 \ln\left(\ln\left(x\right)\right) {\mathrm e}^{{\mathrm e}^{3}}-5}{x^{2}-8 x +16}$	51
parallelrisch	$\frac{50 \,{\mathrm e}^{{\mathrm e}^{3}} \ln\left(\ln\left(x\right)\right) x^{2}+25 x^{2} \ln\left(\ln\left(x\right)\right)^{2}-400 \,{\mathrm e}^{{\mathrm e}^{3}} \ln\left(\ln\left(x\right)\right) x -5-200 x \ln\left(\ln\left(x\right)\right)^{2}+800 \ln\left(\ln\left(x\right)\right) {\mathrm e}^{{\mathrm e}^{3}}+400 \ln\left(\ln\left(x\right)\right)^{2}}{x^{2}-8 x +16}$	67

input
```
int(((50*x^3-600*x^2+2400*x-3200)*ln(ln(x))+10*x*ln(x)+(50*x^3-600*x^2+240
0*x-3200)*exp(exp(3)))/(x^4-12*x^3+48*x^2-64*x)/ln(x),x,method=_RETURNVERB
OSE)
```

output
```
25*ln(ln(x))^2+50*ln(ln(x))*exp(exp(3))-5/(x-4)^2
```

3.1214.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(20) = 40.

Time = 0.24 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.88

$$\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-600x^2+50x^3)\log(\log(x))}{(-64x+48x^2-12x^3+x^4)\log(x)}\,dx$$
$$= \frac{5\left(10\,(x^2-8\,x+16)e^{(e^3)}\log\left(\log\left(x\right)\right)+5\,(x^2-8\,x+16)\log\left(\log\left(x\right)\right)^2-1\right)}{x^2-8\,x+16}$$

input
```
integrate((((50*x^3-600*x^2+2400*x-3200)*log(log(x))+10*x*log(x)+(50*x^3-60
0*x^2+2400*x-3200)*exp(exp(3)))/(x^4-12*x^3+48*x^2-64*x)/log(x),x, algorit
hm=\
```

output
```
5*(10*(x^2 - 8*x + 16)*e^(e^3)*log(log(x)) + 5*(x^2 - 8*x + 16)*log(log(x)
)^2 - 1)/(x^2 - 8*x + 16)
```

3.1214.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29

$$\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-600x^2+50x^3)\log(\log(x))}{(-64x+48x^2-12x^3+x^4)\log(x)}\,dx$$
$$= 25\log\left(\log\left(x\right)\right)^2+50e^{e^3}\log\left(\log\left(x\right)\right)-\frac{10}{2x^2-16x+32}$$

input
```
integrate((((50*x**3-600*x**2+2400*x-3200)*ln(ln(x))+10*x*ln(x)+(50*x**3-60
0*x**2+2400*x-3200)*exp(exp(3)))/(x**4-12*x**3+48*x**2-64*x)/ln(x),x)
```

output
```
25*log(log(x))**2 + 50*exp(exp(3))*log(log(x)) - 10/(2*x**2 - 16*x + 32)
```

3.1214.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(20) = 40$.

Time = 0.23 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.21

$$\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-600x^2+50x^3)\log(\log(x))}{(-64x+48x^2-12x^3+x^4)\log(x)}\,dx$$
$$= \frac{5\left(5\left(x^2-8x+16\right)\log\left(\log\left(x\right)\right)^2+10\left(x^2e^{\left(e^3\right)}-8\,xe^{\left(e^3\right)}+16\,e^{\left(e^3\right)}\right)\log\left(\log\left(x\right)\right)-1\right)}{x^2-8x+16}$$

input
```
integrate((((50*x^3-600*x^2+2400*x-3200)*log(log(x))+10*x*log(x)+(50*x^3-60
0*x^2+2400*x-3200)*exp(exp(3)))/(x^4-12*x^3+48*x^2-64*x)/log(x),x, algorit
hm=\
```

output
```
5*(5*(x^2 - 8*x + 16)*log(log(x))^2 + 10*(x^2*e^(e^3) - 8*x*e^(e^3) + 16*e
^(e^3))*log(log(x)) - 1)/(x^2 - 8*x + 16)
```

3.1214.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(20) = 40$.

Time = 0.27 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.79

$$\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-600x^2+50x^3)\log(\log(x))}{(-64x+48x^2-12x^3+x^4)\log(x)}\,dx$$
$$= \frac{5\left(10\,x^2e^{\left(e^3\right)}\log\left(\log\left(x\right)\right)+5\,x^2\log\left(\log\left(x\right)\right)^2-80\,xe^{\left(e^3\right)}\log\left(\log\left(x\right)\right)-40\,x\log\left(\log\left(x\right)\right)^2+160\,e^{\left(e^3\right)}\log\left(\right.\right.}{x^2-8x+16}$$

input
```
integrate((((50*x^3-600*x^2+2400*x-3200)*log(log(x))+10*x*log(x)+(50*x^3-60
0*x^2+2400*x-3200)*exp(exp(3)))/(x^4-12*x^3+48*x^2-64*x)/log(x),x, algorit
hm=\
```

output
```
5*(10*x^2*e^(e^3)*log(log(x)) + 5*x^2*log(log(x))^2 - 80*x*e^(e^3)*log(log
(x)) - 40*x*log(log(x))^2 + 160*e^(e^3)*log(log(x)) + 80*log(log(x))^2 - 1
)/(x^2 - 8*x + 16)
```

3.1214.9 Mupad [B] (verification not implemented)

Time = 15.93 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{e^{e^3}(-3200+2400x-600x^2+50x^3)+10x\log(x)+(-3200+2400x-600x^2+50x^3)\log(\log(x))}{(-64x+48x^2-12x^3+x^4)\log(x)}\,dx$$
$$= 50\,\ln(\ln(x))\,e^{e^3}-\frac{5}{x^2-8\,x+16}+25\ln(\ln(x))^2$$

input
```
int(-(log(log(x))*(2400*x - 600*x^2 + 50*x^3 - 3200) + 10*x*log(x) + exp(e
xp(3))*(2400*x - 600*x^2 + 50*x^3 - 3200))/(log(x)*(64*x - 48*x^2 + 12*x^3
 - x^4)),x)
```

output
```
50*log(log(x))*exp(exp(3)) - 5/(x^2 - 8*x + 16) + 25*log(log(x))^2
```

3.1215 $\int \frac{-6e^{-3+e}+e^{-6+2e}(4-4x+x^2)}{4+8x+4x^2+e^{-3+e}(-8x-4x^2+4x^3)+e^{-6+2e}(4x^2-4x^3+x^4)}\,dx$

3.1215.1 Optimal result

Integrand size = 79, antiderivative size = 24

$$\int \frac{-6e^{-3+e}+e^{-6+2e}(4-4x+x^2)}{4+8x+4x^2+e^{-3+e}(-8x-4x^2+4x^3)+e^{-6+2e}(4x^2-4x^3+x^4)}\,dx = \frac{1}{-x+e^{3-e}\left(1-\frac{3x}{-2+x}\right)}$$

output
```
1/((1-3*x/(-2+x))/exp(exp(1)-3)-x)
```

3.1215.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{-6e^{-3+e}+e^{-6+2e}(4-4x+x^2)}{4+8x+4x^2+e^{-3+e}(-8x-4x^2+4x^3)+e^{-6+2e}(4x^2-4x^3+x^4)}\,dx = \frac{e^e(2-x)}{e^e(-2+x)x+2e^3(1+x)}$$

input
```
Integrate[(-6*E^(-3 + E) + E^(-6 + 2*E)*(4 - 4*x + x^2))/(4 + 8*x + 4*x^2
+ E^(-3 + E)*(-8*x - 4*x^2 + 4*x^3) + E^(-6 + 2*E)*(4*x^2 - 4*x^3 + x^4)),
x]
```

output
```
(E^E*(2 - x))/(E^E*(-2 + x)*x + 2*E^3*(1 + x))
```

3.1215.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 119 vs. $2(24) = 48$.

Time = 0.52 (sec) , antiderivative size = 119, normalized size of antiderivative = 4.96, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.051$, Rules used = {2459, 1380, 2345, 24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2e-6}\left(x^2-4x+4\right)-6e^{e-3}}{4x^2+e^{e-3}\left(4x^3-4x^2-8x\right)+e^{2e-6}\left(x^4-4x^3+4x^2\right)+8x+4}dx$$

$$\Big\downarrow \text{2459}$$

$$\int \frac{e^{2e-6}\left(x+\frac{1}{4}e^{6-2e}\left(4e^{e-3}-4e^{2e-6}\right)\right)^2-2e^{e-6}\left(e^3+e^e\right)\left(x+\frac{1}{4}e^{6-2e}\left(4e^{e-3}-4e^{2e-6}\right)\right)+e^{2e-6}-4e^{e-3}}{e^{2e-6}\left(x+\frac{1}{4}e^{6-2e}\left(4e^{e-3}-4e^{2e-6}\right)\right)^4-2\left(1-4e^{e-3}+e^{2e-6}\right)\left(x+\frac{1}{4}e^{6-2e}\left(4e^{e-3}-4e^{2e-6}\right)\right)^2+e^{-2(3+e)}\left(e^6+e\right.}$$

$$\Big\downarrow \text{1380}$$

$$e^{2e-6}\int \frac{e^{-6+2e}\left(x+\frac{1}{4}e^{6-2e}\left(4e^{-3+e}-4e^{-6+2e}\right)\right)^2-2e^{-6+e}\left(e^3+e^e\right)\left(x+\frac{1}{4}e^{6-2e}\left(4e^{-3+e}-4e^{-6+2e}\right)\right)+e^{-6+2e}-}{\left(-e^{-6+2e}\left(x+\frac{1}{4}e^{6-2e}\left(4e^{-3+e}-4e^{-6+2e}\right)\right)^2+e^{-6+2e}-4e^{-3+e}+1\right)^2}$$

$$\Big\downarrow \text{2345}$$

$$e^{2e-6}\left(-\frac{\int 0d\left(x+\frac{1}{4}e^{6-2e}\left(4e^{-3+e}-4e^{-6+2e}\right)\right)}{2\left(1-4e^{e-3}+e^{2e-6}\right)}-\frac{e^{12-2e}\left(e^{e-12}\left(e^3+e^e\right)-e^{-2(6-e)}\left(x+\frac{1}{4}e^{6-2e}\left(4e^{e-3}-4e^{2e-6}\right)\right)\right)}{-e^{2e-6}\left(x+\frac{1}{4}e^{6-2e}\left(4e^{e-3}-4e^{2e-6}\right)\right)^2+e^{2e-6}-4e^{e-3}+1}\right.$$

$$\Big\downarrow \text{24}$$

$$-\frac{e^6\left(e^{e-12}\left(e^3+e^e\right)-e^{-2(6-e)}\left(x+\frac{1}{4}e^{6-2e}\left(4e^{e-3}-4e^{2e-6}\right)\right)\right)}{-e^{2e-6}\left(x+\frac{1}{4}e^{6-2e}\left(4e^{e-3}-4e^{2e-6}\right)\right)^2+e^{2e-6}-4e^{e-3}+1}$$

input
```
Int[(-6*E^(-3 + E) + E^(-6 + 2*E)*(4 - 4*x + x^2))/(4 + 8*x + 4*x^2 + E^(-
3 + E)*(-8*x - 4*x^2 + 4*x^3) + E^(-6 + 2*E)*(4*x^2 - 4*x^3 + x^4)),x]
```

output
```
-((E^6*(E^(-12 + E)*(E^3 + E^E) - ((E^(6 - 2*E)*(4*E^(-3 + E) - 4*E^(-6 +
2*E)))/4 + x)/E^(2*(6 - E))))/(1 - 4*E^(-3 + E) + E^(-6 + 2*E) - E^(-6 + 2
*E)*((E^(6 - 2*E)*(4*E^(-3 + E) - 4*E^(-6 + 2*E)))/4 + x)^2))
```

3.1215.3.1 Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2345
```
Int[(Pq_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q = PolynomialQuot
ient[Pq, a + b*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x,
 0], g = Coeff[PolynomialRemainder[Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b
*f*x)*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   In
t[(a + b*x^2)^(p + 1)*ExpandToSum[2*a*(p + 1)*Q + f*(2*p + 3), x], x], x]]
/; FreeQ[{a, b}, x] && PolyQ[Pq, x] && LtQ[p, -1]
```

rule 2459
```
Int[(Pn_)^(p_.)*(Qx_), x_Symbol] :> With[{S = Coeff[Pn, x, Expon[Pn, x] - 1
]/(Expon[Pn, x]*Coeff[Pn, x, Expon[Pn, x]])}, Subst[Int[ExpandToSum[Pn /. x
 -> x - S, x]^p*ExpandToSum[Qx /. x -> x - S, x], x], x, x + S] /; Binomial
Q[Pn /. x -> x - S, x] || (IntegerQ[Expon[Pn, x]/2] && TrinomialQ[Pn /. x -
> x - S, x])] /; FreeQ[p, x] && PolyQ[Pn, x] && GtQ[Expon[Pn, x], 2] && NeQ
[Coeff[Pn, x, Expon[Pn, x] - 1], 0] && PolyQ[Qx, x] &&  !(MonomialQ[Qx, x]
&& IGtQ[p, 0])
```

3.1215.4 Maple [A] (verified)

Time = 1.45 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.46

method	result
gosper	$-\frac{(-2+x)\mathrm{e}^{\mathrm{e}-3}}{\mathrm{e}^{\mathrm{e}-3}x^2-2x\,\mathrm{e}^{\mathrm{e}-3}+2x+2}$
risch	$\frac{-x\,\mathrm{e}^{\mathrm{e}-3}+2\,\mathrm{e}^{\mathrm{e}-3}}{\mathrm{e}^{\mathrm{e}-3}x^2-2x\,\mathrm{e}^{\mathrm{e}-3}+2x+2}$
parallelrisch	$-\frac{2\,\mathrm{e}^{2\,\mathrm{e}-6}x^2-4\,\mathrm{e}^{2\,\mathrm{e}-6}x+6x\,\mathrm{e}^{\mathrm{e}-3}}{2(\mathrm{e}^{\mathrm{e}-3}x^2-2x\,\mathrm{e}^{\mathrm{e}-3}+2x+2)}$
norman	$\frac{-\mathrm{e}^{2\,\mathrm{e}}\mathrm{e}^{-6}x^2+\left(2\,\mathrm{e}^{2\,\mathrm{e}}\mathrm{e}^{-6}-3\,\mathrm{e}^{\mathrm{e}}\mathrm{e}^{-3}\right)x}{\mathrm{e}^{\mathrm{e}-3}x^2-2x\,\mathrm{e}^{\mathrm{e}-3}+2x+2}$
default	$\frac{\mathrm{e}^{\mathrm{e}-3}\left(\sum_{\_R=\mathrm{RootOf}\left(4+\mathrm{e}^{2\,\mathrm{e}-6}\_Z^4-\left(4\,\mathrm{e}^{2\,\mathrm{e}-6}-4\,\mathrm{e}^{\mathrm{e}-3}\right)\_Z^3+\left(4\,\mathrm{e}^{2\,\mathrm{e}-6}-4\,\mathrm{e}^{\mathrm{e}-3}+4\right)\_Z^2-\left(8\,\mathrm{e}^{\mathrm{e}-3}-8\right)\_Z\right)}\frac{\left(\mathrm{e}^{\mathrm{e}-3}\_\ldots\right.}{2+\mathrm{e}^{2\,\mathrm{e}-6}\_R^3-3\,\mathrm{e}^{2\,\mathrm{e}-6}\_\ldots}\right.}{4}$

3.1215. $\int \frac{-6e^{-3+e}+e^{-6+2e}(4-4x+x^2)}{4+8x+4x^2+e^{-3+e}(-8x-4x^2+4x^3)+e^{-6+2e}(4x^2-4x^3+x^4)}\,dx$

input
```
int(((x^2-4*x+4)*exp(exp(1)-3)^2-6*exp(exp(1)-3))/((x^4-4*x^3+4*x^2)*exp(e
xp(1)-3)^2+(4*x^3-4*x^2-8*x)*exp(exp(1)-3)+4*x^2+8*x+4),x,method=_RETURNVE
RBOSE)
```

output
```
-(-2+x)*exp(exp(1)-3)/(exp(exp(1)-3)*x^2-2*x*exp(exp(1)-3)+2*x+2)
```

3.1215.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.25

$$\int \frac{-6e^{-3+e}+e^{-6+2e}(4-4x+x^2)}{4+8x+4x^2+e^{-3+e}\left(-8x-4x^2+4x^3\right)+e^{-6+2e}\left(4x^2-4x^3+x^4\right)}\,dx = -\frac{(x-2)e^{(e-3)}}{(x^2-2\,x)e^{(e-3)}+2\,x+2}$$

input
```
integrate(((x^2-4*x+4)*exp(exp(1)-3)^2-6*exp(exp(1)-3))/((x^4-4*x^3+4*x^2)
*exp(exp(1)-3)^2+(4*x^3-4*x^2-8*x)*exp(exp(1)-3)+4*x^2+8*x+4),x, algorithm
=\
```

output
```
-(x - 2)*e^(e - 3)/((x^2 - 2*x)*e^(e - 3) + 2*x + 2)
```

3.1215.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. $2(17) = 34$.

Time = 0.60 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{-6e^{-3+e}+e^{-6+2e}(4-4x+x^2)}{4+8x+4x^2+e^{-3+e}\left(-8x-4x^2+4x^3\right)+e^{-6+2e}\left(4x^2-4x^3+x^4\right)}\,dx = \frac{-xe^e+2e^e}{x^2e^e+x\left(-2e^e+2e^3\right)+2e^3}$$

input
```
integrate(((x**2-4*x+4)*exp(exp(1)-3)**2-6*exp(exp(1)-3))/((x**4-4*x**3+4*
x**2)*exp(exp(1)-3)**2+(4*x**3-4*x**2-8*x)*exp(exp(1)-3)+4*x**2+8*x+4),x)
```

output
```
(-x*exp(E) + 2*exp(E))/(x**2*exp(E) + x*(-2*exp(E) + 2*exp(3)) + 2*exp(3))
```

3.1215.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.58

$$\int \frac{-6e^{-3+e} + e^{-6+2e}(4 - 4x + x^2)}{4 + 8x + 4x^2 + e^{-3+e}\left(-8x - 4x^2 + 4x^3\right) + e^{-6+2e}\left(4x^2 - 4x^3 + x^4\right)}\, dx = -\frac{xe^e - 2\,e^e}{x^2e^e + 2\,x(e^3 - e^e) + 2\,e^3}$$

input
```
integrate(((x^2-4*x+4)*exp(exp(1)-3)^2-6*exp(exp(1)-3))/((x^4-4*x^3+4*x^2)
*exp(exp(1)-3)^2+(4*x^3-4*x^2-8*x)*exp(exp(1)-3)+4*x^2+8*x+4),x, algorithm
=\
```

output
```
-(x*e^e - 2*e^e)/(x^2*e^e + 2*x*(e^3 - e^e) + 2*e^3)
```

3.1215.8 Giac [F]

$$\int \frac{-6e^{-3+e} + e^{-6+2e}(4 - 4x + x^2)}{4 + 8x + 4x^2 + e^{-3+e}\left(-8x - 4x^2 + 4x^3\right) + e^{-6+2e}\left(4x^2 - 4x^3 + x^4\right)}\, dx = \int \frac{(x^2 - 4\,x + 4)e^{(2\,e-6)} - 6\,e^{(e-3)}}{4\,x^2 + (x^4 - 4\,x^3 + 4\,x^2)e^{(2\,e-6)} + 4\,(x^3 - x^2 - 2\,x)e^{(e-3)} + 8\,x + 4}\, dx$$

input
```
integrate(((x^2-4*x+4)*exp(exp(1)-3)^2-6*exp(exp(1)-3))/((x^4-4*x^3+4*x^2)
*exp(exp(1)-3)^2+(4*x^3-4*x^2-8*x)*exp(exp(1)-3)+4*x^2+8*x+4),x, algorithm
=\
```

output
```
integrate(((x^2 - 4*x + 4)*e^(2*e - 6) - 6*e^(e - 3))/(4*x^2 + (x^4 - 4*x^
3 + 4*x^2)*e^(2*e - 6) + 4*(x^3 - x^2 - 2*x)*e^(e - 3) + 8*x + 4), x)
```

3.1215.9 Mupad [B] (verification not implemented)

Time = 15.34 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.38

$$\int \frac{-6e^{-3+e} + e^{-6+2e}(4 - 4x + x^2)}{4 + 8x + 4x^2 + e^{-3+e}\left(-8x - 4x^2 + 4x^3\right) + e^{-6+2e}\left(4x^2 - 4x^3 + x^4\right)}\, dx = -\frac{x - 2}{x^2 + \left(2\,\mathrm{e}^{3-\mathrm{e}} - 2\right)\,x + 2\,\mathrm{e}^{3-\mathrm{e}}}$$

input
```
int(-(6*exp(exp(1) - 3) - exp(2*exp(1) - 6)*(x^2 - 4*x + 4))/(8*x - exp(ex
p(1) - 3)*(8*x + 4*x^2 - 4*x^3) + exp(2*exp(1) - 6)*(4*x^2 - 4*x^3 + x^4)
+ 4*x^2 + 4),x)
```

output
```
-(x - 2)/(2*exp(3 - exp(1)) + x*(2*exp(3 - exp(1)) - 2) + x^2)
```

3.1215. $\int \frac{-6e^{-3+e}+e^{-6+2e}(4-4x+x^2)}{4+8x+4x^2+e^{-3+e}(-8x-4x^2+4x^3)+e^{-6+2e}(4x^2-4x^3+x^4)}\,dx$

3.1216 $\int \frac{8+10x+e^{9+x}(4+5x)(-9x-5x^2)}{4x+5x^2} dx$

3.1216.1 Optimal result

Integrand size = 37, antiderivative size = 18

$$\int \frac{8+10x+e^{9+x}(4+5x)\left(-9x-5x^2\right)}{4x+5x^2} dx = 1-e^{9+x}(4+5x)+\log\left(x^2\right)$$

output
```
1+ln(x^2)-exp(ln(4+5*x)+x+9)
```

3.1216.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{8+10x+e^{9+x}(4+5x)\left(-9x-5x^2\right)}{4x+5x^2} dx = -e^x\left(4e^9+5e^9x\right)+2\log(x)$$

input
```
Integrate[(8 + 10*x + E^(9 + x)*(4 + 5*x)*(-9*x - 5*x^2))/(4*x + 5*x^2),x]
```

output
```
-(E^x*(4*E^9 + 5*E^9*x)) + 2*Log[x]
```

3.1216.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.081, Rules used = {2026, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x+9}(5x+4)\left(-5x^2-9x\right)+10x+8}{5x^2+4x}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{x+9}(5x+4)\left(-5x^2-9x\right)+10x+8}{x(5x+4)}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \left(\frac{2}{x}-e^{x+9}(5x+9)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-e^{x+9}(5x+9)+5e^{x+9}+2\log(x)$$

input
```
Int[(8 + 10*x + E^(9 + x)*(4 + 5*x)*(-9*x - 5*x^2))/(4*x + 5*x^2),x]
```

output
```
5*E^(9 + x) - E^(9 + x)*(9 + 5*x) + 2*Log[x]
```

3.1216.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1216.4 Maple [A] (verified)

Time = 1.48 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.89

method	result	size
risch	$2\ln(x)+(-5x-4)\,\mathrm{e}^{x+9}$	16
default	$2\ln(x)-\mathrm{e}^{\ln(4+5x)+x+9}$	18
norman	$2\ln(x)-\mathrm{e}^{\ln(4+5x)+x+9}$	18
parallelrisch	$2\ln(x)-\mathrm{e}^{\ln(4+5x)+x+9}$	18
parts	$2\ln(x)-\mathrm{e}^{\ln(4+5x)+x+9}$	18

input
```
int(((-5*x^2-9*x)*exp(ln(4+5*x)+x+9)+10*x+8)/(5*x^2+4*x),x,method=_RETURNV
ERBOSE)
```

output
```
2*ln(x)+(-5*x-4)*exp(x+9)
```

3.1216.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{8+10x+e^{9+x}(4+5x)\left(-9x-5x^2\right)}{4x+5x^2}\,dx = -e^{(x+\log(5x+4)+9)}+2\log(x)$$

input
```
integrate(((-5*x^2-9*x)*exp(log(4+5*x)+x+9)+10*x+8)/(5*x^2+4*x),x, algorit
hm=\
```

output
```
-e^(x + log(5*x + 4) + 9) + 2*log(x)
```

3.1216.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{8+10x+e^{9+x}(4+5x)\left(-9x-5x^2\right)}{4x+5x^2}\,dx = (-5x-4)\,e^{x+9}+2\log(x)$$

input
```
integrate(((-5*x**2-9*x)*exp(ln(4+5*x)+x+9)+10*x+8)/(5*x**2+4*x),x)
```

output
```
(-5*x - 4)*exp(x + 9) + 2*log(x)
```

3.1216.7 Maxima [F]

$$\int \frac{8+10x+e^{9+x}(4+5x)\left(-9x-5x^2\right)}{4x+5x^2}\,dx=\int -\frac{\left(5\,x^2+9\,x\right)e^{(x+\log(5\,x+4)+9)}-10\,x-8}{5\,x^2+4\,x}\,dx$$

input
```
integrate(((-5*x^2-9*x)*exp(log(4+5*x)+x+9)+10*x+8)/(5*x^2+4*x),x, algorit
hm=\
```

output
```
36/5*e^(41/5)*exp_integral_e(1, -x - 4/5) - 5*(5*x^2*e^9 + 8*x*e^9)*e^x/(5
*x + 4) + integrate(20*(5*x*e^9 + 8*e^9)*e^x/(25*x^2 + 40*x + 16), x) + 2*
log(x)
```

3.1216.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{8+10x+e^{9+x}(4+5x)\left(-9x-5x^2\right)}{4x+5x^2}\,dx=-5\,xe^{(x+9)}-4\,e^{(x+9)}+2\,\log\left(x\right)$$

input
```
integrate(((-5*x^2-9*x)*exp(log(4+5*x)+x+9)+10*x+8)/(5*x^2+4*x),x, algorit
hm=\
```

output
```
-5*x*e^(x + 9) - 4*e^(x + 9) + 2*log(x)
```

3.1216.9 Mupad [B] (verification not implemented)

Time = 15.31 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{8+10x+e^{9+x}(4+5x)\left(-9x-5x^2\right)}{4x+5x^2}\,dx=2\,\ln\left(x\right)-4\,\mathrm{e}^{x+9}-5\,x\,\mathrm{e}^{x+9}$$

input
```
int((10*x - exp(x + log(5*x + 4) + 9)*(9*x + 5*x^2) + 8)/(4*x + 5*x^2),x)
```

output
```
2*log(x) - 4*exp(x + 9) - 5*x*exp(x + 9)
```

3.1217 $\int \frac{-24+2x^2+10x^4}{-4x+5x^3} \, dx$

3.1217.1 Optimal result

Integrand size = 24, antiderivative size = 22

$$\int \frac{-24+2x^2+10x^4}{-4x+5x^3} \, dx = -4+x^2+\log \left(\frac{25x^4}{\left(-\frac{4}{5x}+x\right)^2}\right)$$

output
```
ln(25*x^4/(x-4/5/x)^2)+x^2-4
```

3.1217.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{-24+2x^2+10x^4}{-4x+5x^3} \, dx = 2\left(\frac{x^2}{2}+3\log(x)-\log \left(4-5x^2\right)\right)$$

input
```
Integrate[(-24 + 2*x^2 + 10*x^4)/(-4*x + 5*x^3),x]
```

output
```
2*(x^2/2 + 3*Log[x] - Log[4 - 5*x^2])
```

3.1217.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.208, Rules used = {2026, 1578, 27, 1195, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{10x^4+2x^2-24}{5x^3-4x} \, dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{10x^4+2x^2-24}{x(5x^2-4)}dx$$

$$\Big\downarrow \text{1578}$$

$$\frac{1}{2}\int \frac{2(-5x^4-x^2+12)}{x^2(4-5x^2)}dx^2$$

$$\Big\downarrow \text{27}$$

$$\int \frac{-5x^4-x^2+12}{x^2(4-5x^2)}dx^2$$

$$\Big\downarrow \text{1195}$$

$$\int \left(\frac{3}{x^2}-\frac{10}{5x^2-4}+1\right)dx^2$$

$$\Big\downarrow \text{2009}$$

$$x^2+3\log(x^2)-2\log(4-5x^2)$$

input
```
Int[(-24 + 2*x^2 + 10*x^4)/(-4*x + 5*x^3),x]
```

output
```
x^2 + 3*Log[x^2] - 2*Log[4 - 5*x^2]
```

3.1217.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1195
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_.) + (b_.)*(x
_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(f +
 g*x)^n*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x
] && IGtQ[p, 0]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

3.1217.4 Maple [A] (verified)

Time = 1.83 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

method	result	size
parallelrisch	$x^{2}+6\ln \left(x \right)-2\ln \left(x^{2}-\frac{4}{5}\right)$	17
default	$x^{2}-2\ln \left(5x^{2}-4\right)+6\ln \left(x \right)$	19
norman	$x^{2}-2\ln \left(5x^{2}-4\right)+6\ln \left(x \right)$	19
risch	$x^{2}-2\ln \left(5x^{2}-4\right)+6\ln \left(x \right)$	19
meijerg	$6\ln \left(x \right)+3\ln \left(5\right)-6\ln \left(2\right)+3 i \pi -2\ln \left(1-\frac{5 x^{2}}{4}\right)+x^{2}$	31

input
```
int((10*x^4+2*x^2-24)/(5*x^3-4*x),x,method=_RETURNVERBOSE)
```

output
```
x^2+6*ln(x)-2*ln(x^2-4/5)
```

3.1217.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-24+2x^2+10x^4}{-4x+5x^3}\,dx = x^2 - 2\,\log\left(5\,x^2-4\right) + 6\,\log\left(x\right)$$

input
```
integrate((10*x^4+2*x^2-24)/(5*x^3-4*x),x, algorithm=\
```

output
```
x^2 - 2*log(5*x^2 - 4) + 6*log(x)
```

3.1217.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{-24+2x^2+10x^4}{-4x+5x^3}\,dx = x^2 + 6\log\left(x\right) - 2\log\left(5x^2-4\right)$$

input
```
integrate((10*x**4+2*x**2-24)/(5*x**3-4*x),x)
```

output
```
x**2 + 6*log(x) - 2*log(5*x**2 - 4)
```

3.1217.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{-24+2x^2+10x^4}{-4x+5x^3}\,dx = x^2 - 2\,\log\left(5\,x^2-4\right) + 6\,\log\left(x\right)$$

input
```
integrate((10*x^4+2*x^2-24)/(5*x^3-4*x),x, algorithm=\
```

output
```
x^2 - 2*log(5*x^2 - 4) + 6*log(x)
```

3.1217.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{-24+2x^2+10x^4}{-4x+5x^3}\,dx = x^2+3\,\log\left(x^2\right)-2\,\log\left(\left|5\,x^2-4\right|\right)$$

input
```
integrate((10*x^4+2*x^2-24)/(5*x^3-4*x),x, algorithm=\
```

output
```
x^2 + 3*log(x^2) - 2*log(abs(5*x^2 - 4))
```

3.1217.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.73

$$\int \frac{-24+2x^2+10x^4}{-4x+5x^3}\,dx = 6\,\ln\left(x\right)-2\,\ln\left(x^2-\frac{4}{5}\right)+x^2$$

input
```
int(-(2*x^2 + 10*x^4 - 24)/(4*x - 5*x^3),x)
```

output
```
6*log(x) - 2*log(x^2 - 4/5) + x^2
```

3.1218 $\int \frac{-4x+8x\log(x)+20e^{13-x}\log^2(x)}{5e^3\log^2(x)}\,dx$

3.1218.1 Optimal result

Integrand size = 33, antiderivative size = 27

$$\int \frac{-4x+8x\log(x)+20e^{13-x}\log^2(x)}{5e^3\log^2(x)}\,dx = 4\left(5-e^{10-x}+\frac{x^2}{5e^3\log(x)}\right)$$

output
```
20+4/5*x^2/ln(x)/exp(3)-4*exp(10-x)
```

3.1218.2 Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{-4x+8x\log(x)+20e^{13-x}\log^2(x)}{5e^3\log^2(x)}\,dx = \frac{-20e^{13-x}+\frac{4x^2}{\log(x)}}{5e^3}$$

input
```
Integrate[(-4*x + 8*x*Log[x] + 20*E^(13 - x)*Log[x]^2)/(5*E^3*Log[x]^2),x]
```

output
```
(-20*E^(13 - x) + (4*x^2)/Log[x])/(5*E^3)
```

3.1218.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 0.37 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.44, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121, Rules used = {27, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x+20e^{13-x}\log^2(x)+8x\log(x)}{5e^3\log^2(x)}\,dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int -\frac{4(-5e^{13-x}\log^2(x)-2x\log(x)+x)}{\log^2(x)}dx}{5e^3}$$

$$\Big\downarrow \ 27$$

$$-\frac{4\int \frac{-5e^{13-x}\log^2(x)-2x\log(x)+x}{\log^2(x)}dx}{5e^3}$$

$$\Big\downarrow \ 7293$$

$$-\frac{4\int \left(\frac{x-2x\log(x)}{\log^2(x)}-5e^{13-x}\right)dx}{5e^3}$$

$$\Big\downarrow \ 2009$$

$$-\frac{4\Big(-2\,\text{ExpIntegralEi}(2\log(x))+2(1-2\log(x))\,\text{ExpIntegralEi}(2\log(x))+4\log(x)\,\text{ExpIntegralEi}(2\log(x))-2\ldots}{5e^3}$$

input
```
Int[(-4*x + 8*x*Log[x] + 20*E^(13 - x)*Log[x]^2)/(5*E^3*Log[x]^2),x]
```

output
```
(-4*(5*E^(13 - x) - 2*x^2 - 2*ExpIntegralEi[2*Log[x]] + 2*ExpIntegralEi[2*
Log[x]]*(1 - 2*Log[x]) - (x^2*(1 - 2*Log[x]))/Log[x] + 4*ExpIntegralEi[2*L
og[x]]*Log[x]))/(5*E^3)
```

3.1218.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1218.4 Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.78

method	result	size
risch	$-4\,\mathrm{e}^{10-x}+\frac{4x^{2}\mathrm{e}^{-3}}{5\ln\left(x\right)}$	21
default	$\frac{4\,\mathrm{e}^{-3}\left(\frac{x^{2}}{\ln\left(x\right)}-5\,\mathrm{e}^{3}\mathrm{e}^{10-x}\right)}{5}$	26
norman	$\frac{\frac{4\,\mathrm{e}^{-3}x^{2}}{5}-4\,\mathrm{e}^{10-x}\ln\left(x\right)}{\ln\left(x\right)}$	26
parallelrisch	$-\frac{\mathrm{e}^{-3}\left(20\,\mathrm{e}^{3}\ln\left(x\right)\mathrm{e}^{10-x}-4x^{2}\right)}{5\ln\left(x\right)}$	29
parts	$-\frac{4\,\mathrm{e}^{-3}\left(-\frac{x^{2}}{\ln\left(x\right)}-2\,\mathrm{Ei}_{1}\left(-2\ln\left(x\right)\right)\right)}{5}-\frac{8\,\mathrm{e}^{-3}\,\mathrm{Ei}_{1}\left(-2\ln\left(x\right)\right)}{5}-4\,\mathrm{e}^{10-x}$	46

input
```
int(1/5*(20*exp(3)*exp(10-x)*ln(x)^2+8*x*ln(x)-4*x)/exp(3)/ln(x)^2,x,metho
d=_RETURNVERBOSE)
```

output
```
-4*exp(10-x)+4/5*x^2/ln(x)*exp(-3)
```

3.1218.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{-4x+8x\log(x)+20e^{13-x}\log^2(x)}{5e^3\log^2(x)}\,dx = \frac{4\left(x^2-5\,e^{(-x+13)}\log(x)\right)e^{(-3)}}{5\,\log(x)}$$

input
```
integrate(1/5*(20*exp(3)*exp(10-x)*log(x)^2+8*x*log(x)-4*x)/exp(3)/log(x)^
2,x, algorithm=\
```

output
```
4/5*(x^2 - 5*e^(-x + 13)*log(x))*e^(-3)/log(x)
```

3.1218.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.70

$$\int \frac{-4x+8x\log(x)+20e^{13-x}\log^2(x)}{5e^3\log^2(x)}\,dx = \frac{4x^2}{5e^3\log(x)} - 4e^{10-x}$$

input
```
integrate(1/5*(20*exp(3)*exp(10-x)*ln(x)**2+8*x*ln(x)-4*x)/exp(3)/ln(x)**2
,x)
```

output
```
4*x**2*exp(-3)/(5*log(x)) - 4*exp(10 - x)
```

3.1218.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.22 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.04

$$\int \frac{-4x+8x\log(x)+20e^{13-x}\log^2(x)}{5e^3\log^2(x)}\,dx$$
$$= \frac{4}{5}\left(2\,\mathrm{Ei}(2\,\log(x)) - 5\,e^{(-x+13)} - 2\,\Gamma(-1,-2\,\log(x))\right)e^{(-3)}$$

input
```
integrate(1/5*(20*exp(3)*exp(10-x)*log(x)^2+8*x*log(x)-4*x)/exp(3)/log(x)^
2,x, algorithm=\
```

output
```
4/5*(2*Ei(2*log(x)) - 5*e^(-x + 13) - 2*gamma(-1, -2*log(x)))*e^(-3)
```

3.1218.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.81

$$\int \frac{-4x+8x\log(x)+20e^{13-x}\log^2(x)}{5e^3\log^2(x)}\,dx = \frac{4\left(x^2-5\,e^{(-x+13)}\log\left(x\right)\right)e^{(-3)}}{5\,\log\left(x\right)}$$

input
```
integrate(1/5*(20*exp(3)*exp(10-x)*log(x)^2+8*x*log(x)-4*x)/exp(3)/log(x)^
2,x, algorithm=\
```

output
```
4/5*(x^2 - 5*e^(-x + 13)*log(x))*e^(-3)/log(x)
```

3.1218.9 Mupad [B] (verification not implemented)

Time = 15.60 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{-4x+8x\log(x)+20e^{13-x}\log^2(x)}{5e^3\log^2(x)}\,dx = \frac{4\,x^2\,\mathrm{e}^{-3}}{5\,\ln\left(x\right)}-4\,\mathrm{e}^{-x}\,\mathrm{e}^{10}$$

input
```
int((exp(-3)*((8*x*log(x))/5 - (4*x)/5 + 4*exp(3)*exp(10 - x)*log(x)^2))/l
og(x)^2,x)
```

output
```
(4*x^2*exp(-3))/(5*log(x)) - 4*exp(-x)*exp(10)
```

3.1219 $\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3)\right.}{}$

3.1219.1 Optimal result

Integrand size = 262, antiderivative size = 38

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+}{}$$

$$=\left(-e^{4+x}+\frac{(i\pi+\log(3))^2}{4x^2\log^2\left(x-\log^2(x)\right)}\right)^2$$

output
```
(1/4*(ln(3)+I*Pi)^2/x^2/ln(-ln(x)^2+x)^2-exp(4+x))^2
```

3.1219.2 Mathematica [A] (verified)

Time = 0.52 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.37

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+}{}$$

$$=\frac{\left((\pi-i\log(3))^2+4e^{4+x}x^2\log^2\left(x-\log^2(x)\right)\right)^2}{16x^4\log^4\left(x-\log^2(x)\right)}$$

3.1219.
$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+\left(-4e^{4+x}x^3(i\pi+\log(3))^2+8e^{4+x}x^2(i\pi+\log(3))^2\right.}{\left(-4x^6+\right.}$

input
```
Integrate[(x*(I*Pi + Log[3])^4 - 2*(I*Pi + Log[3])^4*Log[x] + (x*(I*Pi + L
og[3])^4 - (I*Pi + Log[3])^4*Log[x]^2)*Log[x - Log[x]^2] + (-4*E^(4 + x)*x
^3*(I*Pi + Log[3])^2 + 8*E^(4 + x)*x^2*(I*Pi + Log[3])^2*Log[x])*Log[x - L
og[x]^2]^2 + (E^(4 + x)*(-4*x^3 + 2*x^4)*(I*Pi + Log[3])^2 + E^(4 + x)*(4*
x^2 - 2*x^3)*(I*Pi + Log[3])^2*Log[x]^2)*Log[x - Log[x]^2]^3 + (-8*E^(8 +
2*x)*x^6 + 8*E^(8 + 2*x)*x^5*Log[x]^2)*Log[x - Log[x]^2]^5)/((-4*x^6 + 4*x
^5*Log[x]^2)*Log[x - Log[x]^2]^5),x]
```

output
```
((Pi - I*Log[3])^2 + 4*E^(4 + x)*x^2*Log[x - Log[x]^2]^2)^2/(16*x^4*Log[x
- Log[x]^2]^4)
```

3.1219.3 Rubi [B] (verified)

Both result and optimal contain complex but leaf count is larger than twice the leaf count of optimal. 113 vs. 2(38) = 76.

Time = 8.85 (sec) , antiderivative size = 113, normalized size of antiderivative = 2.97, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.023$, Rules used = {3041, 7292, 27, 25, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(8e^{2x+8}x^5\log^2(x)-8e^{2x+8}x^6\right)\log^5\left(x-\log^2(x)\right)+\left(8e^{x+4}x^2(\log(3)+i\pi)^2\log(x)-4e^{x+4}x^3(\log(3)+i\pi)^2\right)\log$$

$$\Big\downarrow 3041$$

$$\int \frac{\left(8e^{2x+8}x^5\log^2(x)-8e^{2x+8}x^6\right)\log^5\left(x-\log^2(x)\right)+\left(8e^{x+4}x^2(\log(3)+i\pi)^2\log(x)-4e^{x+4}x^3(\log(3)+i\pi)^2\right)\log$$

$$\Big\downarrow 7292$$

$$\int \frac{\left(4e^{x+4}x^2\log^2\left(x-\log^2(x)\right)+\pi^2\left(1-\frac{\log(3)(\log(3)+2i\pi)}{\pi^2}\right)\right)\left(2e^{x+4}x^4\log^3\left(x-\log^2(x)\right)-2e^{x+4}x^3\log^2(x)\log^3\left(x\right.\right.}{}$$

$$\Big\downarrow 27$$

$$\frac{1}{4}\int -\frac{\left(4e^{x+4}x^2\log^2\left(x-\log^2(x)\right)+(\pi-i\log(3))^2\right)\left(-2e^{x+4}\log^3\left(x-\log^2(x)\right)x^4+2e^{x+4}\log^2(x)\log^3\left(x-\log^2\right.\right.}{x^5\left(x\right.}$$

3.1219.

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+\left(-4e^{4+x}x^3(i\pi+\log(3))^2+8e^{4+x}x^2(i\pi+\log(3))^2\right.}{\left(-4x^6+\right.}$$

$$\Big\downarrow 25$$

$$-\frac{1}{4}\int \frac{\left(4e^{x+4}x^2\log^2\left(x-\log^2(x)\right)+(\pi-i\log(3))^2\right)\left(-2e^{x+4}\log^3\left(x-\log^2(x)\right)x^4+2e^{x+4}\log^2(x)\log^3\left(x-\log^2\right.\right.}{x^5\left(x\right.}$$

$$\Big\downarrow 7293$$

$$-\frac{1}{4}\int \left(\frac{(\pi-i\log(3))^4\left(-\log\left(x-\log^2(x)\right)\log^2(x)-2\log(x)+x+x\log\left(x-\log^2(x)\right)\right)}{x^5\left(x-\log^2(x)\right)\log^5\left(x-\log^2(x)\right)}-8e^{2x+8}-\frac{2e^{x+4}(\pi-i\right.$$

$$\Big\downarrow 2009$$

$$\frac{1}{4}\left(\frac{(\pi-i\log(3))^4}{4x^4\log^4\left(x-\log^2(x)\right)}+\frac{2e^{x+4}(\pi-i\log(3))^2\left(x^2\log\left(x-\log^2(x)\right)-x\log^2(x)\log\left(x-\log^2(x)\right)\right)}{x^3\left(x-\log^2(x)\right)\log^3\left(x-\log^2(x)\right)}+4e^{2x+8}\right)$$

input
```
Int[(x*(I*Pi + Log[3])^4 - 2*(I*Pi + Log[3])^4*Log[x] + (x*(I*Pi + Log[3])
^4 - (I*Pi + Log[3])^4*Log[x]^2)*Log[x - Log[x]^2] + (-4*E^(4 + x)*x^3*(I*
Pi + Log[3])^2 + 8*E^(4 + x)*x^2*(I*Pi + Log[3])^2*Log[x])*Log[x - Log[x]^
2]^2 + (E^(4 + x)*(-4*x^3 + 2*x^4)*(I*Pi + Log[3])^2 + E^(4 + x)*(4*x^2 -
2*x^3)*(I*Pi + Log[3])^2*Log[x]^2)*Log[x - Log[x]^2]^3 + (-8*E^(8 + 2*x)*x
^6 + 8*E^(8 + 2*x)*x^5*Log[x]^2)*Log[x - Log[x]^2]^5)/((-4*x^6 + 4*x^5*Log
[x]^2)*Log[x - Log[x]^2]^5),x]
```

output
```
(4*E^(8 + 2*x) + (Pi - I*Log[3])^4/(4*x^4*Log[x - Log[x]^2]^4) + (2*E^(4 +
 x)*(Pi - I*Log[3])^2*(x^2*Log[x - Log[x]^2] - x*Log[x]^2*Log[x - Log[x]^2
]))/(x^3*(x - Log[x]^2)*Log[x - Log[x]^2]^3))/4
```

3.1219.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1219.

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+\left(-4e^{4+x}x^3(i\pi+\log(3))^2+8e^{4+x}x^2(i\pi+\log(3))^2\log\right.}{\left(-4x^6+\right.}$$

rule 3041
```
Int[(u_.)*((a_.)*(x_)^(m_.) + Log[(c_.)*(x_)^(n_.)]^(q_.)*(b_.)*(x_)^(r_.))
^(p_.), x_Symbol] :> Int[u*x^(p*r)*(a*x^(m - r) + b*Log[c*x^n]^q)^p, x] /;
FreeQ[{a, b, c, m, n, p, q, r}, x] && IntegerQ[p]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1219.4 Maple [B] (verified)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 127 vs. $2(34) = 68$.

Time = 0.15 (sec) , antiderivative size = 128, normalized size of antiderivative = 3.37

$$e^{2x+8} + \frac{-16i\pi \ln\left(-\ln(x)^2 + x\right)^2 e^{4+x} \ln(3)\, x^2 - 8\ln\left(-\ln(x)^2 + x\right)^2 e^{4+x} \ln(3)^2 x^2 + 8\pi^2 \ln\left(-\ln(x)^2 + x\right)}{16x^4 \ln\left(-\ln(x)^2 + x\right)^4}$$

input
```
int(((8*x^5*exp(4+x)^2*ln(x)^2-8*x^6*exp(4+x)^2)*ln(-ln(x)^2+x)^5+((-2*x^3
+4*x^2)*(ln(3)+I*Pi)^2*exp(4+x)*ln(x)^2+(2*x^4-4*x^3)*(ln(3)+I*Pi)^2*exp(4
+x))*ln(-ln(x)^2+x)^3+(8*x^2*(ln(3)+I*Pi)^2*exp(4+x)*ln(x)-4*x^3*(ln(3)+I*
Pi)^2*exp(4+x))*ln(-ln(x)^2+x)^2+(-(ln(3)+I*Pi)^4*ln(x)^2+x*(ln(3)+I*Pi)^4
)*ln(-ln(x)^2+x)-2*(ln(3)+I*Pi)^4*ln(x)+x*(ln(3)+I*Pi)^4)/(4*x^5*ln(x)^2-4
*x^6)/ln(-ln(x)^2+x)^5,x)
```

output
```
exp(2*x+8)+1/16*(-16*I*Pi*ln(-ln(x)^2+x)^2*exp(4+x)*ln(3)*x^2-8*ln(-ln(x)^
2+x)^2*exp(4+x)*ln(3)^2*x^2+8*Pi^2*ln(-ln(x)^2+x)^2*exp(4+x)*x^2+4*I*Pi*ln
(3)^3-4*I*Pi^3*ln(3)+ln(3)^4-6*Pi^2*ln(3)^2+Pi^4)/x^4/ln(-ln(x)^2+x)^4
```

3.1219.

$$\int \frac{x(i\pi+\log(3))^4 - 2(i\pi+\log(3))^4 \log(x) + \left(x(i\pi+\log(3))^4 - (i\pi+\log(3))^4 \log^2(x)\right) \log\left(x-\log^2(x)\right) + \left(-4e^{4+x}x^3(i\pi+\log(3))^2 + 8e^{4+x}x^2(i\pi+\log(3))^2 \right.}{\left(-4x^6+\right.}$$

3.1219.5 Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 111 vs. 2(34) = 68.

Time = 0.25 (sec) , antiderivative size = 111, normalized size of antiderivative = 2.92

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+}{}$$

$$=\frac{16\,x^4e^{(2\,x+8)}\log\left(-\log\left(x\right)^2+x\right)^4+\pi^4-4i\,\pi^3\log\left(3\right)-6\,\pi^2\log\left(3\right)^2+4i\,\pi\log\left(3\right)^3+\log\left(3\right)^4+8\left(\pi^2x^2-\right.}{16\,x^4\log\left(-\log\left(x\right)^2+x\right)^4}$$

input
```
integrate(((8*x^5*exp(4+x)^2*log(x)^2-8*x^6*exp(4+x)^2)*log(-log(x)^2+x)^5
+((-2*x^3+4*x^2)*(log(3)+I*pi)^2*exp(4+x)*log(x)^2+(2*x^4-4*x^3)*(log(3)+I
*pi)^2*exp(4+x))*log(-log(x)^2+x)^3+(8*x^2*(log(3)+I*pi)^2*exp(4+x)*log(x)
-4*x^3*(log(3)+I*pi)^2*exp(4+x))*log(-log(x)^2+x)^2+(-(log(3)+I*pi)^4*log(
x)^2+x*(log(3)+I*pi)^4)*log(-log(x)^2+x)-2*(log(3)+I*pi)^4*log(x)+x*(log(3
)+I*pi)^4)/(4*x^5*log(x)^2-4*x^6)/log(-log(x)^2+x)^5,x, algorithm=\
```

output
```
1/16*(16*x^4*e^(2*x + 8)*log(-log(x)^2 + x)^4 + pi^4 - 4*I*pi^3*log(3) - 6
*pi^2*log(3)^2 + 4*I*pi*log(3)^3 + log(3)^4 + 8*(pi^2*x^2 - 2*I*pi*x^2*log
(3) - x^2*log(3)^2)*e^(x + 4)*log(-log(x)^2 + x)^2)/(x^4*log(-log(x)^2 + x
)^4)
```

3.1219.6 Sympy [F(-1)]

Timed out.

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+}{}$$

= Timed out

input
```
integrate(((8*x**5*exp(4+x)**2*ln(x)**2-8*x**6*exp(4+x)**2)*ln(-ln(x)**2+x
)**5+((-2*x**3+4*x**2)*(ln(3)+I*pi)**2*exp(4+x)*ln(x)**2+(2*x**4-4*x**3)*(
ln(3)+I*pi)**2*exp(4+x))*ln(-ln(x)**2+x)**3+(8*x**2*(ln(3)+I*pi)**2*exp(4+
x)*ln(x)-4*x**3*(ln(3)+I*pi)**2*exp(4+x))*ln(-ln(x)**2+x)**2+(-(ln(3)+I*pi
)**4*ln(x)**2+x*(ln(3)+I*pi)**4)*ln(-ln(x)**2+x)-2*(ln(3)+I*pi)**4*ln(x)+x
*(ln(3)+I*pi)**4)/(4*x**5*ln(x)**2-4*x**6)/ln(-ln(x)**2+x)**5,x)
```

output
```
Timed out
```

3.1219.7 Maxima [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 104 vs. 2(34) = 68.

Time = 0.64 (sec) , antiderivative size = 104, normalized size of antiderivative = 2.74

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+}{}$$

$$=\frac{16\,x^4e^{(2\,x+8)}\log\left(-\log\left(x\right)^2+x\right)^4+8\left(\pi^2-2i\,\pi\log\left(3\right)-\log\left(3\right)^2\right)x^2e^{(x+4)}\log\left(-\log\left(x\right)^2+x\right)^2+\pi^4-4i}{16\,x^4\log\left(-\log\left(x\right)^2+x\right)^4}$$

input
```
integrate(((8*x^5*exp(4+x)^2*log(x)^2-8*x^6*exp(4+x)^2)*log(-log(x)^2+x)^5
+((-2*x^3+4*x^2)*(log(3)+I*pi)^2*exp(4+x)*log(x)^2+(2*x^4-4*x^3)*(log(3)+I
*pi)^2*exp(4+x))*log(-log(x)^2+x)^3+(8*x^2*(log(3)+I*pi)^2*exp(4+x)*log(x)
-4*x^3*(log(3)+I*pi)^2*exp(4+x))*log(-log(x)^2+x)^2+(-(log(3)+I*pi)^4*log(
x)^2+x*(log(3)+I*pi)^4)*log(-log(x)^2+x)-2*(log(3)+I*pi)^4*log(x)+x*(log(3
)+I*pi)^4)/(4*x^5*log(x)^2-4*x^6)/log(-log(x)^2+x)^5,x, algorithm=\
```

output
```
1/16*(16*x^4*e^(2*x + 8)*log(-log(x)^2 + x)^4 + 8*(pi^2 - 2*I*pi*log(3) -
log(3)^2)*x^2*e^(x + 4)*log(-log(x)^2 + x)^2 + pi^4 - 4*I*pi^3*log(3) - 6*
pi^2*log(3)^2 + 4*I*pi*log(3)^3 + log(3)^4)/(x^4*log(-log(x)^2 + x)^4)
```

3.1219.8 Giac [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 139 vs. 2(34) = 68.

Time = 2.44 (sec) , antiderivative size = 139, normalized size of antiderivative = 3.66

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+}{}$$

$$=\frac{16\,x^4e^{(2\,x+8)}\log\left(-\log\left(x\right)^2+x\right)^4+8\,\pi^2x^2e^{(x+4)}\log\left(-\log\left(x\right)^2+x\right)^2-16i\,\pi x^2e^{(x+4)}\log\left(3\right)\log\left(-\log\left(x\right)\right.}{16\,x^4\log\left(-\right.}$$

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+\left(-4e^{4+x}x^3(i\pi+\log(3))^2+8e^{4+x}x^2(i\pi+\log(3))^2\right.}{(-4x^6+}$$

input
```
integrate(((8*x^5*exp(4+x)^2*log(x)^2-8*x^6*exp(4+x)^2)*log(-log(x)^2+x)^5
+((-2*x^3+4*x^2)*(log(3)+I*pi)^2*exp(4+x)*log(x)^2+(2*x^4-4*x^3)*(log(3)+I
*pi)^2*exp(4+x))*log(-log(x)^2+x)^3+(8*x^2*(log(3)+I*pi)^2*exp(4+x)*log(x)
-4*x^3*(log(3)+I*pi)^2*exp(4+x))*log(-log(x)^2+x)^2+(-(log(3)+I*pi)^4*log(
x)^2+x*(log(3)+I*pi)^4)*log(-log(x)^2+x)-2*(log(3)+I*pi)^4*log(x)+x*(log(3
)+I*pi)^4)/(4*x^5*log(x)^2-4*x^6)/log(-log(x)^2+x)^5,x, algorithm=\
```

output
```
1/16*(16*x^4*e^(2*x + 8)*log(-log(x)^2 + x)^4 + 8*pi^2*x^2*e^(x + 4)*log(-
log(x)^2 + x)^2 - 16*I*pi*x^2*e^(x + 4)*log(3)*log(-log(x)^2 + x)^2 - 8*x^
2*e^(x + 4)*log(3)^2*log(-log(x)^2 + x)^2 + pi^4 - 4*I*pi^3*log(3) - 6*pi^
2*log(3)^2 + 4*I*pi*log(3)^3 + log(3)^4)/(x^4*log(-log(x)^2 + x)^4)
```

3.1219.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(i\pi+\log(3))^4-2(i\pi+\log(3))^4\log(x)+\left(x(i\pi+\log(3))^4-(i\pi+\log(3))^4\log^2(x)\right)\log\left(x-\log^2(x)\right)+$$

$= \text{Hanged}$

input
```
int(-(2*log(x)*(Pi*1i + log(3))^4 + log(x - log(x)^2)^2*(4*x^3*exp(x + 4)*
(Pi*1i + log(3))^2 - 8*x^2*exp(x + 4)*log(x)*(Pi*1i + log(3))^2) - x*(Pi*1
i + log(3))^4 + log(x - log(x)^2)^3*(exp(x + 4)*(Pi*1i + log(3))^2*(4*x^3
- 2*x^4) - exp(x + 4)*log(x)^2*(Pi*1i + log(3))^2*(4*x^2 - 2*x^3)) + log(x
 - log(x)^2)*(log(x)^2*(Pi*1i + log(3))^4 - x*(Pi*1i + log(3))^4) + log(x
- log(x)^2)^5*(8*x^6*exp(2*x + 8) - 8*x^5*exp(2*x + 8)*log(x)^2))/(log(x -
 log(x)^2)^5*(4*x^5*log(x)^2 - 4*x^6)),x)
```

output
```
\text{Hanged}
```

3.1220

$$\int \frac{e^{5+\frac{2x}{e^5}}\left(12+12x+3x^2\right)+e^5\left(12x^2+3e^2x^2+12x^3+3x^4+e\left(-16x^2-6x^3\right)\right.}{e^{5+\frac{2x}{e^5}}\left(12+12x+3x^2\right)+e^{5+\frac{x}{e^5}}\left(-24x-24x^2-6x^3+e\left(12x+\right.\right.}$$

3.1220.1 Optimal result

Integrand size = 214, antiderivative size = 30

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24\ldots}{e^{5+\frac{2x}{e^5}}\left(12+12x+3x^2\right)+e^{5+\frac{x}{e^5}}\left(-24x-24x^2-6x^3+e\left(12x+6x^2\right)\right)+e^5\left(12x^2+3e^2x^2+12\ldots\right.}$$
$$=x+\frac{4}{3+\frac{3ex}{\left(e^{\frac{x}{e^5}}-x\right)(2+x)}}$$

output
```
4/(3+3/(2+x)*x*exp(1)/(exp(x/exp(5))-x))+x
```

3.1220.2 Mathematica [A] (verified)

Time = 7.81 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24\ldots}{e^{5+\frac{2x}{e^5}}\left(12+12x+3x^2\right)+e^{5+\frac{x}{e^5}}\left(-24x-24x^2-6x^3+e\left(12x+6x^2\right)\right)+e^5\left(12x^2+3e^2x^2+12\ldots\right.}$$
$$=\frac{1}{3}x\left(3-\frac{4e}{ex+e^{\frac{x}{e^5}}(2+x)-x(2+x)}\right)$$

3.1220. $\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24x-24x^2-6x^3+e(-8+12x+6x^2)))}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-12x^2-6x^3))}\,dx$

input
```
Integrate[(E^(5 + (2*x)/E^5)*(12 + 12*x + 3*x^2) + E^5*(12*x^2 + 3*E^2*x^2
 + 12*x^3 + 3*x^4 + E*(-16*x^2 - 6*x^3)) + E^(x/E^5)*(E*(8*x + 4*x^2) + E^
5*(-24*x - 24*x^2 - 6*x^3 + E*(-8 + 12*x + 6*x^2))))/(E^(5 + (2*x)/E^5)*(1
2 + 12*x + 3*x^2) + E^(5 + x/E^5)*(-24*x - 24*x^2 - 6*x^3 + E*(12*x + 6*x^
2)) + E^5*(12*x^2 + 3*E^2*x^2 + 12*x^3 + 3*x^4 + E*(-12*x^2 - 6*x^3))),x]
```

output
```
(x*(3 - (4*E)/(E*x + E^(x/E^5)*(2 + x) - x*(2 + x))))/3
```

3.1220.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{2x}{e^5}+5}\left(3x^2+12x+12\right)+e^{\frac{x}{e^5}}\left(e\left(4x^2+8x\right)+e^5\left(-6x^3-24x^2+e\left(6x^2+12x-8\right)-24x\right)\right)+e^5\left(3x^4+12x^3+\right.}{e^{\frac{2x}{e^5}+5}\left(3x^2+12x+12\right)+e^{\frac{x}{e^5}+5}\left(-6x^3-24x^2+e\left(6x^2+12x\right)-24x\right)+e^5\left(3x^4+12x^3+3e^2x^2+1\right.}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^{\frac{2x}{e^5}+5}\left(3x^2+12x+12\right)+e^{\frac{x}{e^5}}\left(e\left(4x^2+8x\right)+e^5\left(-6x^3-24x^2+e\left(6x^2+12x-8\right)-24x\right)\right)+e^5\left(3x^4+12x^3+\right.}{3e^5\left(-x^2+e^{\frac{x}{e^5}}x-2\left(1-\frac{e}{2}\right)x+2e^{\frac{x}{e^5}}\right)^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\int \frac{3e^{\frac{2x}{e^5}+5}\left(x^2+4x+4\right)+e^5\left(3x^4+12x^3+3e^2x^2+12x^2-2e\left(3x^3+8x^2\right)\right)+2e^{\frac{x}{e^5}}\left(2e\left(x^2+2x\right)-e^5\left(3x^3+12x^2+12x+e\left(-3x^2-6x+4\right)\right)\right)}{\left(-x^2+e^{\frac{x}{e^5}}x-(2-e)x+2e^{\frac{x}{e^5}}\right)^2}dx}{3e^5}$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{\int \left(\frac{4e\left(x^2+2x-2e^5\right)}{(x+2)\left(-x^2+e^{\frac{x}{e^5}}x-2\left(1-\frac{e}{2}\right)x+2e^{\frac{x}{e^5}}\right)}+\frac{4ex\left(x^3+\left(4-e-e^5\right)x^2+2\left(2-e-2e^5\right)x-2(2-e)e^5\right)}{(x+2)\left(-x^2+e^{\frac{x}{e^5}}x-2\left(1-\frac{e}{2}\right)x+2e^{\frac{x}{e^5}}\right)^2}+3e^5\right)dx}{3e^5}$$

$$\Big\downarrow \text{ 2009}$$

$$8e^7\int \frac{1}{\left(-x^2+e^{\frac{x}{e^5}}x-2\left(1-\frac{e}{2}\right)x+2e^{\frac{x}{e^5}}\right)^2}dx+16e^7\int \frac{1}{(-x-2)\left(-x^2+e^{\frac{x}{e^5}}x-2\left(1-\frac{e}{2}\right)x+2e^{\frac{x}{e^5}}\right)^2}dx-8e^6\int \frac{x}{\left(-x^2+e^{\frac{x}{e^5}}x-2\left(1-\frac{e}{2}\right)x+2e^{\frac{x}{e^5}}\right.}$$

3.1220.

$$\int \frac{e^{5+\frac{2x}{e^5}}\left(12+12x+3x^2\right)+e^5\left(12x^2+3e^2x^2+12x^3+3x^4+e\left(-16x^2-6x^3\right)\right)+e^{\frac{x}{e^5}}\left(e\left(8x+4x^2\right)+e^5\left(-24x-24x^2-6x^3+e\left(-8+12x+6x^2\right)\right)\right)}{e^{5+\frac{2x}{e^5}}\left(12+12x+3x^2\right)+e^{5+\frac{x}{e^5}}\left(-24x-24x^2-6x^3+e\left(12x+6x^2\right)\right)+e^5\left(12x^2+3e^2x^2+12x^3+3x^4+e\left(-12x^2-6x^3\right)\right)}dx$$

input
```
Int[(E^(5 + (2*x)/E^5)*(12 + 12*x + 3*x^2) + E^5*(12*x^2 + 3*E^2*x^2 + 12*
x^3 + 3*x^4 + E*(-16*x^2 - 6*x^3)) + E^(x/E^5)*(E*(8*x + 4*x^2) + E^5*(-24
*x - 24*x^2 - 6*x^3 + E*(-8 + 12*x + 6*x^2))))/(E^(5 + (2*x)/E^5)*(12 + 12
*x + 3*x^2) + E^(5 + x/E^5)*(-24*x - 24*x^2 - 6*x^3 + E*(12*x + 6*x^2)) +
E^5*(12*x^2 + 3*E^2*x^2 + 12*x^3 + 3*x^4 + E*(-12*x^2 - 6*x^3))),x]
```

output
```
$Aborted
```

3.1220.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1220.4 Maple [A] (verified)

Time = 0.76 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.23

method	result	size
risch	$x-\frac{4x\,\mathrm{e}}{3\left(x\,\mathrm{e}-x^{2}+\mathrm{e}^{x\,\mathrm{e}^{-5}}x-2x+2\,\mathrm{e}^{x\,\mathrm{e}^{-5}}\right)}$	37
norman	$\frac{(2\,\mathrm{e}-4)\mathrm{e}^{x\,\mathrm{e}^{-5}}+\left(\mathrm{e}^{2}-\frac{16\,\mathrm{e}}{3}+4\right)x+\mathrm{e}^{x\,\mathrm{e}^{-5}}x^{2}+\mathrm{e}\,\mathrm{e}^{x\,\mathrm{e}^{-5}}x-x^{3}}{x\,\mathrm{e}-x^{2}+\mathrm{e}^{x\,\mathrm{e}^{-5}}x-2x+2\,\mathrm{e}^{x\,\mathrm{e}^{-5}}}$	89
parallelrisch	$\frac{\left(3x^{2}\mathrm{e}\,\mathrm{e}^{5}-3x^{3}\mathrm{e}^{5}+3\,\mathrm{e}^{5}\mathrm{e}^{x\,\mathrm{e}^{-5}}x^{2}-10x\,\mathrm{e}\,\mathrm{e}^{5}+12x\,\mathrm{e}^{5}-12\,\mathrm{e}^{x\,\mathrm{e}^{-5}}\mathrm{e}^{5}\right)\mathrm{e}^{-5}}{3x\,\mathrm{e}-3x^{2}+3\,\mathrm{e}^{x\,\mathrm{e}^{-5}}x-6x+6\,\mathrm{e}^{x\,\mathrm{e}^{-5}}}$	94

3.1220.
$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24x-24x^2-6x^3+e(-8+12x+6x^2)))}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-12x^2-6x^3))}\,dx$$

input
```
int(((3*x^2+12*x+12)*exp(5)*exp(x/exp(5))^2+(((6*x^2+12*x-8)*exp(1)-6*x^3-
24*x^2-24*x)*exp(5)+(4*x^2+8*x)*exp(1))*exp(x/exp(5))+(3*x^2*exp(1)^2+(-6*
x^3-16*x^2)*exp(1)+3*x^4+12*x^3+12*x^2)*exp(5))/((3*x^2+12*x+12)*exp(5)*ex
p(x/exp(5))^2+((6*x^2+12*x)*exp(1)-6*x^3-24*x^2-24*x)*exp(5)*exp(x/exp(5))
+(3*x^2*exp(1)^2+(-6*x^3-12*x^2)*exp(1)+3*x^4+12*x^3+12*x^2)*exp(5)),x,met
hod=_RETURNVERBOSE)
```

output
```
x-4/3*x*exp(1)/(x*exp(1)-x^2+exp(x*exp(-5))*x-2*x+2*exp(x*exp(-5)))
```

3.1220.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 79 vs. 2(28) = 56.

Time = 0.31 (sec) , antiderivative size = 79, normalized size of antiderivative = 2.63

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12}$$

$$= \frac{(3\,x^2-4\,x)e^6-3\,(x^3+2\,x^2)e^5+3\,(x^2+2\,x)e^{\left((x+5\,e^5)e^{(-5)}\right)}}{3\,\left(xe^6-(x^2+2\,x)e^5+(x+2)e^{\left((x+5\,e^5)e^{(-5)}\right)}\right)}$$

input
```
integrate(((3*x^2+12*x+12)*exp(5)*exp(x/exp(5))^2+(((6*x^2+12*x-8)*exp(1)-
6*x^3-24*x^2-24*x)*exp(5)+(4*x^2+8*x)*exp(1))*exp(x/exp(5))+(3*x^2*exp(1)^
2+(-6*x^3-16*x^2)*exp(1)+3*x^4+12*x^3+12*x^2)*exp(5))/((3*x^2+12*x+12)*exp
(5)*exp(x/exp(5))^2+((6*x^2+12*x)*exp(1)-6*x^3-24*x^2-24*x)*exp(5)*exp(x/e
xp(5))+(3*x^2*exp(1)^2+(-6*x^3-12*x^2)*exp(1)+3*x^4+12*x^3+12*x^2)*exp(5))
,x, algorithm=\
```

output
```
1/3*((3*x^2 - 4*x)*e^6 - 3*(x^3 + 2*x^2)*e^5 + 3*(x^2 + 2*x)*e^((x + 5*e^5
)*e^(-5)))/(x*e^6 - (x^2 + 2*x)*e^5 + (x + 2)*e^((x + 5*e^5)*e^(-5)))
```

3.1220.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.13

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24\ldots}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12\ldots}$$
$$= x - \frac{4ex}{-3x^2-6x+3ex+(3x+6)e^{\frac{x}{e^5}}}$$

input
```
integrate(((3*x**2+12*x+12)*exp(5)*exp(x/exp(5))**2+(((6*x**2+12*x-8)*exp(
1)-6*x**3-24*x**2-24*x)*exp(5)+(4*x**2+8*x)*exp(1))*exp(x/exp(5))+(3*x**2*
exp(1)**2+(-6*x**3-16*x**2)*exp(1)+3*x**4+12*x**3+12*x**2)*exp(5))/((3*x**
2+12*x+12)*exp(5)*exp(x/exp(5))**2+((6*x**2+12*x)*exp(1)-6*x**3-24*x**2-24
*x)*exp(5)*exp(x/exp(5))+(3*x**2*exp(1)**2+(-6*x**3-12*x**2)*exp(1)+3*x**4
+12*x**3+12*x**2)*exp(5)),x)
```

output
```
x - 4*E*x/(-3*x**2 - 6*x + 3*E*x + (3*x + 6)*exp(x*exp(-5)))
```

3.1220.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. 2(28) = 56.

Time = 0.30 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.97

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24\ldots}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12\ldots}$$
$$= \frac{3x^3-3x^2(e-2)+4xe-3(x^2+2x)e^{(xe^{(-5)})}}{3\left(x^2-x(e-2)-(x+2)e^{(xe^{(-5)})}\right)}$$

input
```
integrate(((3*x^2+12*x+12)*exp(5)*exp(x/exp(5))^2+(((6*x^2+12*x-8)*exp(1)-
6*x^3-24*x^2-24*x)*exp(5)+(4*x^2+8*x)*exp(1))*exp(x/exp(5))+(3*x^2*exp(1)^
2+(-6*x^3-16*x^2)*exp(1)+3*x^4+12*x^3+12*x^2)*exp(5))/((3*x^2+12*x+12)*exp
(5)*exp(x/exp(5))^2+((6*x^2+12*x)*exp(1)-6*x^3-24*x^2-24*x)*exp(5)*exp(x/e
xp(5))+(3*x^2*exp(1)^2+(-6*x^3-12*x^2)*exp(1)+3*x^4+12*x^3+12*x^2)*exp(5))
,x, algorithm=\
```

output
```
1/3*(3*x^3 - 3*x^2*(e - 2) + 4*x*e - 3*(x^2 + 2*x)*e^(x*e^(-5)))/(x^2 - x*
(e - 2) - (x + 2)*e^(x*e^(-5)))
```

3.1220.

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24x-24x^2-6x^3+e(-8+12x+6x^2)))}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-12x^2-6x^3))}\,dx$$

3.1220.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. 2(28) = 56.

Time = 0.66 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.73

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12}$$
$$= \frac{\left(3\,x^3e^{(-5)}-3\,x^2e^{(-4)}+6\,x^2e^{(-5)}-3\,x^2e^{(xe^{(-5)}-5)}+4\,xe^{(-4)}-6\,xe^{(xe^{(-5)}-5)}\right)e^5}{3\,\left(x^2-xe-xe^{(xe^{(-5)})}+2\,x-2\,e^{(xe^{(-5)})}\right)}$$

input
```
integrate(((3*x^2+12*x+12)*exp(5)*exp(x/exp(5))^2+(((6*x^2+12*x-8)*exp(1)-
6*x^3-24*x^2-24*x)*exp(5)+(4*x^2+8*x)*exp(1))*exp(x/exp(5))+(3*x^2*exp(1)^
2+(-6*x^3-16*x^2)*exp(1)+3*x^4+12*x^3+12*x^2)*exp(5))/((3*x^2+12*x+12)*exp
(5)*exp(x/exp(5))^2+((6*x^2+12*x)*exp(1)-6*x^3-24*x^2-24*x)*exp(5)*exp(x/e
xp(5))+(3*x^2*exp(1)^2+(-6*x^3-12*x^2)*exp(1)+3*x^4+12*x^3+12*x^2)*exp(5))
,x, algorithm=\
```

output
```
1/3*(3*x^3*e^(-5) - 3*x^2*e^(-4) + 6*x^2*e^(-5) - 3*x^2*e^(x*e^(-5) - 5) +
 4*x*e^(-4) - 6*x*e^(x*e^(-5) - 5))*e^5/(x^2 - x*e - x*e^(x*e^(-5)) + 2*x
- 2*e^(x*e^(-5)))
```

3.1220.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12}$$
$$= \int \frac{e^{x\,e^{-5}}\,(e\,(4\,x^2+8\,x)-e^5\,(24\,x-e\,(6\,x^2+12\,x-8)+24\,x^2+6\,x^3))+e^{2\,x\,e^{-5}+5}\,(3\,x^2+12\,x+12)+e^5}{e^{2\,x\,e^{-5}+5}\,(3\,x^2+12\,x+12)-e^{x\,e^{-5}+5}\,(24\,x-e\,(6\,x^2+12\,x)+24\,x^2+6\,x^3)+e^5\,(3\,x^2\,e^2-}$$

input
```
int((exp(x*exp(-5))*(exp(1)*(8*x + 4*x^2) - exp(5)*(24*x - exp(1)*(12*x +
6*x^2 - 8) + 24*x^2 + 6*x^3)) + exp(5)*(3*x^2*exp(2) - exp(1)*(16*x^2 + 6*
x^3) + 12*x^2 + 12*x^3 + 3*x^4) + exp(5)*exp(2*x*exp(-5))*(12*x + 3*x^2 +
12))/(exp(5)*(3*x^2*exp(2) - exp(1)*(12*x^2 + 6*x^3) + 12*x^2 + 12*x^3 + 3
*x^4) - exp(5)*exp(x*exp(-5))*(24*x - exp(1)*(12*x + 6*x^2) + 24*x^2 + 6*x
^3) + exp(5)*exp(2*x*exp(-5))*(12*x + 3*x^2 + 12)),x)
```

3.1220.

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24x-24x^2-6x^3+e(-8+12x+6x^2)))}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-12x^2-6x^3))}\,dx$$

output
```
int((exp(x*exp(-5))*(exp(1)*(8*x + 4*x^2) - exp(5)*(24*x - exp(1)*(12*x +
6*x^2 - 8) + 24*x^2 + 6*x^3)) + exp(2*x*exp(-5) + 5)*(12*x + 3*x^2 + 12) +
 exp(5)*(3*x^2*exp(2) - exp(1)*(16*x^2 + 6*x^3) + 12*x^2 + 12*x^3 + 3*x^4)
)/(exp(2*x*exp(-5) + 5)*(12*x + 3*x^2 + 12) - exp(x*exp(-5) + 5)*(24*x - e
xp(1)*(12*x + 6*x^2) + 24*x^2 + 6*x^3) + exp(5)*(3*x^2*exp(2) - exp(1)*(12
*x^2 + 6*x^3) + 12*x^2 + 12*x^3 + 3*x^4)), x)
```

3.1220.

$$\int \frac{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-16x^2-6x^3))+e^{\frac{x}{e^5}}(e(8x+4x^2)+e^5(-24x-24x^2-6x^3+e(-8+12x+6x^2)))}{e^{5+\frac{2x}{e^5}}(12+12x+3x^2)+e^{5+\frac{x}{e^5}}(-24x-24x^2-6x^3+e(12x+6x^2))+e^5(12x^2+3e^2x^2+12x^3+3x^4+e(-12x^2-6x^3))}\,dx$$

3.1221 $\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+(54-5\right.}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+(-10x}$

3.1221.1 Optimal result

Integrand size = 124, antiderivative size = 24

$$\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+(54-54x-108x^2)\log(3)+(1620+324x\right.}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+(-10x^7-2x^8-2x^9)\log(x)+x^7\log^2(}$$
$$=-3+\frac{3^{3+\frac{2}{5+x+x^2-\log(x)}}}{x^6}$$

output
```
27/x^6*exp(ln(3)/(5+x^2-ln(x)+x))^2-3
```

3.1221.2 Mathematica [F]

$$\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+(54-54x-108x^2)\log(3)+(1620+324x\right.}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+(-10x^7-2x^8-2x^9)\log(x)+x^7\log^2(}$$
$$=\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+(54-54x-108x^2)\log(3)+(1620+32\right.}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+(-10x^7-2x^8-2x^9)\log(x)+x^7\log}$$

input
```
Integrate[(-4050 - 1620*x - 1782*x^2 - 324*x^3 - 162*x^4 + (54 - 54*x - 10
8*x^2)*Log[3] + (1620 + 324*x + 324*x^2)*Log[x] - 162*Log[x]^2)/(3^(2/(-5
- x - x^2 + Log[x]))*(25*x^7 + 10*x^8 + 11*x^9 + 2*x^10 + x^11 + (-10*x^7
- 2*x^8 - 2*x^9)*Log[x] + x^7*Log[x]^2)),x]
```

3.1221.

$$\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+(54-54x-108x^2)\log(3)+(1620+324x+324x^2)\log(x)-162\log^2(x)\right)}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+(-10x^7-2x^8-2x^9)\log(x)+x^7\log^2(x)}\,dx$$

output
```
Integrate[(-4050 - 1620*x - 1782*x^2 - 324*x^3 - 162*x^4 + (54 - 54*x - 10
8*x^2)*Log[3] + (1620 + 324*x + 324*x^2)*Log[x] - 162*Log[x]^2)/(3^(2/(-5
- x - x^2 + Log[x]))*(25*x^7 + 10*x^8 + 11*x^9 + 2*x^10 + x^11 + (-10*x^7
- 2*x^8 - 2*x^9)*Log[x] + x^7*Log[x]^2)), x]
```

3.1221.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 104 vs. $2(24) = 48$.

Time = 0.41 (sec) , antiderivative size = 104, normalized size of antiderivative = 4.33, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.008$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{3^{-\frac{2}{-x^2-x+\log(x)-5}}\left(-162x^4-324x^3-1782x^2+\left(324x^2+324x+1620\right)\log(x)+\left(-108x^2-54x+54\right)\log(3)-1\right.}{x^{11}+2x^{10}+11x^9+10x^8+25x^7+x^7\log^2(x)+\left(-2x^9-2x^8-10x^7\right)\log(x)}$$

$$\Big\downarrow \text{2726}$$

$$-\frac{\left(-2x^2-x+1\right)3^{\frac{2}{x^2+x-\log(x)+5}+3}\left(x^2+x-\log(x)+5\right)^2}{\left(2x-\frac{1}{x}+1\right)\left(x^{11}+2x^{10}+11x^9+10x^8+25x^7+x^7\log^2(x)-2\left(x^9+x^8+5x^7\right)\log(x)\right)}$$

input
```
Int[(-4050 - 1620*x - 1782*x^2 - 324*x^3 - 162*x^4 + (54 - 54*x - 108*x^2)
*Log[3] + (1620 + 324*x + 324*x^2)*Log[x] - 162*Log[x]^2)/(3^(2/(-5 - x -
x^2 + Log[x]))*(25*x^7 + 10*x^8 + 11*x^9 + 2*x^10 + x^11 + (-10*x^7 - 2*x^
8 - 2*x^9)*Log[x] + x^7*Log[x]^2)),x]
```

output
```
-((3^(3 + 2/(5 + x + x^2 - Log[x]))*(1 - x - 2*x^2)*(5 + x + x^2 - Log[x])
^2)/((1 - x^(-1) + 2*x)*(25*x^7 + 10*x^8 + 11*x^9 + 2*x^10 + x^11 - 2*(5*x
^7 + x^8 + x^9)*Log[x] + x^7*Log[x]^2)))
```

3.1221.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.1221.4 Maple [A] (verified)

Time = 29.65 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{27\,3^{-\frac{2}{\ln(x)-x^{2}-x-5}}}{x^{6}}$	24
parallelrisch	$\frac{27\,{\mathrm e}^{-\frac{2\ln(3)}{\ln(x)-x^{2}-x-5}}}{x^{6}}$	27

input
```
int((-162*ln(x)^2+(324*x^2+324*x+1620)*ln(x)+(-108*x^2-54*x+54)*ln(3)-162*
x^4-324*x^3-1782*x^2-1620*x-4050)*exp(-ln(3)/(ln(x)-x^2-x-5))^2/(x^7*ln(x)
^2+(-2*x^9-2*x^8-10*x^7)*ln(x)+x^11+2*x^10+11*x^9+10*x^8+25*x^7),x,method=
_RETURNVERBOSE)
```

output
```
27/x^6*((1/3)^(1/(ln(x)-x^2-x-5)))^2
```

3.1221.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+(54-54x-108x^2)\log(3)+(1620+324x+324x^2)\log(x)-162\log^2(x)\right)}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+(-10x^7-2x^8-2x^9)\log(x)+x^7\log^2(x)}\,dx$$
$$=\frac{27\cdot 3^{\frac{2}{x^2+x-\log(x)+5}}}{x^6}$$

input
```
integrate((-162*log(x)^2+(324*x^2+324*x+1620)*log(x)+(-108*x^2-54*x+54)*lo
g(3)-162*x^4-324*x^3-1782*x^2-1620*x-4050)*exp(-log(3)/(log(x)-x^2-x-5))^2
/(x^7*log(x)^2+(-2*x^9-2*x^8-10*x^7)*log(x)+x^11+2*x^10+11*x^9+10*x^8+25*x
^7),x, algorithm=\
```

output
```
27*3^(2/(x^2 + x - log(x) + 5))/x^6
```

3.1221.6 Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+(54-54x-108x^2)\log(3)+(1620+324x\right.}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+(-10x^7-2x^8-2x^9)\log(x)+x^7\log^2(}$$

$$=\frac{27e^{-\frac{2\log(3)}{-x^2-x+\log(x)-5}}}{x^6}$$

input
```
integrate((-162*ln(x)**2+(324*x**2+324*x+1620)*ln(x)+(-108*x**2-54*x+54)*l
n(3)-162*x**4-324*x**3-1782*x**2-1620*x-4050)*exp(-ln(3)/(ln(x)-x**2-x-5))
**2/(x**7*ln(x)**2+(-2*x**9-2*x**8-10*x**7)*ln(x)+x**11+2*x**10+11*x**9+10
*x**8+25*x**7),x)
```

output
```
27*exp(-2*log(3)/(-x**2 - x + log(x) - 5))/x**6
```

3.1221.7 Maxima [F]

$$\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+(54-54x-108x^2)\log(3)+(1620+324x\right.}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+(-10x^7-2x^8-2x^9)\log(x)+x^7\log^2(}$$

$$=\int -\frac{54\left(3x^4+6x^3+33x^2+(2x^2+x-1)\log(3)-6(x^2+x+5)\log(x)+3\log(x)^2+30x+75\right)3^{\frac{}{x^2+}}}{x^{11}+2x^{10}+11x^9+x^7\log(x)^2+10x^8+25x^7-2(x^9+x^8+5x^7)\log(x)}$$

input
```
integrate((-162*log(x)^2+(324*x^2+324*x+1620)*log(x)+(-108*x^2-54*x+54)*lo
g(3)-162*x^4-324*x^3-1782*x^2-1620*x-4050)*exp(-log(3)/(log(x)-x^2-x-5))^2
/(x^7*log(x)^2+(-2*x^9-2*x^8-10*x^7)*log(x)+x^11+2*x^10+11*x^9+10*x^8+25*x
^7),x, algorithm=\
```

output
```
-27*3^(2/(x^2 + x - log(x) + 5))*log(3)/(2*x^8*log(3) + x^7*log(3) - x^6*l
og(3)) + 27*3^(2/(x^2 + x - log(x) + 5))*log(3)/(2*x^7*log(3) + x^6*log(3)
 - x^5*log(3)) + 54*3^(2/(x^2 + x - log(x) + 5))*log(3)/(2*x^6*log(3) + x^
5*log(3) - x^4*log(3)) + 2025*3^(2/(x^2 + x - log(x) + 5))/(2*x^8*log(3) +
 x^7*log(3) - x^6*log(3)) + 810*3^(2/(x^2 + x - log(x) + 5))/(2*x^7*log(3)
 + x^6*log(3) - x^5*log(3)) + 891*3^(2/(x^2 + x - log(x) + 5))/(2*x^6*log(
3) + x^5*log(3) - x^4*log(3)) + 162*3^(2/(x^2 + x - log(x) + 5))/(2*x^5*lo
g(3) + x^4*log(3) - x^3*log(3)) + 81*3^(2/(x^2 + x - log(x) + 5))/(2*x^4*l
og(3) + x^3*log(3) - x^2*log(3)) - 2*integrate(-81*(2*(x^2 + x + 5)*log(x)
 - log(x)^2)*3^(2/(x^2 + x - log(x) + 5))/(x^11 + 2*x^10 + 11*x^9 + x^7*lo
g(x)^2 + 10*x^8 + 25*x^7 - 2*(x^9 + x^8 + 5*x^7)*log(x)), x)
```

3.1221.8 Giac [F]

$$\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+\left(54-54x-108x^2\right)\log(3)+\left(1620+324x\right.\right.}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+\left(-10x^7-2x^8-2x^9\right)\log(x)+x^7\log^2(}$$

$$=\int -\frac{54\left(3\,x^4+6\,x^3+33\,x^2+\left(2\,x^2+x-1\right)\log\left(3\right)-6\left(x^2+x+5\right)\log\left(x\right)+3\,\log\left(x\right)^2+30\,x+75\right)3^{\frac{}{x^2+}}}{x^{11}+2\,x^{10}+11\,x^9+x^7\log\left(x\right)^2+10\,x^8+25\,x^7-2\left(x^9+x^8+5\,x^7\right)\log\left(x\right)}$$

input
```
integrate((-162*log(x)^2+(324*x^2+324*x+1620)*log(x)+(-108*x^2-54*x+54)*lo
g(3)-162*x^4-324*x^3-1782*x^2-1620*x-4050)*exp(-log(3)/(log(x)-x^2-x-5))^2
/(x^7*log(x)^2+(-2*x^9-2*x^8-10*x^7)*log(x)+x^11+2*x^10+11*x^9+10*x^8+25*x
^7),x, algorithm=\
```

output
```
integrate(-54*(3*x^4 + 6*x^3 + 33*x^2 + (2*x^2 + x - 1)*log(3) - 6*(x^2 +
x + 5)*log(x) + 3*log(x)^2 + 30*x + 75)*3^(2/(x^2 + x - log(x) + 5))/(x^11
 + 2*x^10 + 11*x^9 + x^7*log(x)^2 + 10*x^8 + 25*x^7 - 2*(x^9 + x^8 + 5*x^7
)*log(x)), x)
```

3.1221.9 Mupad [B] (verification not implemented)

Time = 16.37 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{3^{-\frac{2}{-5-x-x^2+\log(x)}}\left(-4050-1620x-1782x^2-324x^3-162x^4+\left(54-54x-108x^2\right)\log(3)+\left(1620+324x\right.\right.}{25x^7+10x^8+11x^9+2x^{10}+x^{11}+\left(-10x^7-2x^8-2x^9\right)\log(x)+x^7\log^2(\right.}$$

$$= \frac{27\, 3^{\frac{2}{x-\ln(x)+x^2+5}}}{x^6}$$

input
```
int(-(exp((2*log(3))/(x - log(x) + x^2 + 5))*(1620*x + log(3)*(54*x + 108*
x^2 - 54) + 162*log(x)^2 - log(x)*(324*x + 324*x^2 + 1620) + 1782*x^2 + 32
4*x^3 + 162*x^4 + 4050))/(x^7*log(x)^2 - log(x)*(10*x^7 + 2*x^8 + 2*x^9) +
 25*x^7 + 10*x^8 + 11*x^9 + 2*x^10 + x^11),x)
```

output
```
(27*3^(2/(x - log(x) + x^2 + 5)))/x^6
```

3.1222 $\int \frac{-2x+2e^{2/x}x+20x^3+12x^4+2x^5+e^{\frac{1}{x}}(-2-2x+12x^2+4x^3)+\left(2x-4e \ldots\right.}{e^{2/x}x+9x^3+6x^4+x^5+e^{\frac{1}{x}}(6x^2+2x^3)+\left(-2e^{\frac{1}{x}}x-6x^2- \ldots\right.}$

3.1222.1 Optimal result

Integrand size = 153, antiderivative size = 25

$$\int \frac{-2x+2e^{2/x}x+20x^3+12x^4+2x^5+e^{\frac{1}{x}}(-2-2x+12x^2+4x^3)+\left(2x-4e^{\frac{1}{x}}x-12x^2-4x^3\right)\log(x)+ \ldots}{e^{2/x}x+9x^3+6x^4+x^5+e^{\frac{1}{x}}(6x^2+2x^3)+\left(-2e^{\frac{1}{x}}x-6x^2-2x^3\right)\log(x)+x\log^2(x)}$$

output
```
2*x-4-2*x/(exp(1/x)+(3+x)*x-ln(x))
```

3.1222.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{-2x+2e^{2/x}x+20x^3+12x^4+2x^5+e^{\frac{1}{x}}(-2-2x+12x^2+4x^3)+\left(2x-4e^{\frac{1}{x}}x-12x^2-4x^3\right)\log(x)+ \ldots}{e^{2/x}x+9x^3+6x^4+x^5+e^{\frac{1}{x}}(6x^2+2x^3)+\left(-2e^{\frac{1}{x}}x-6x^2-2x^3\right)\log(x)+x\log^2(x)}$$

input
```
Integrate[(-2*x + 2*E^(2/x)*x + 20*x^3 + 12*x^4 + 2*x^5 + E^x^(-1)*(-2 - 2
*x + 12*x^2 + 4*x^3) + (2*x - 4*E^x^(-1)*x - 12*x^2 - 4*x^3)*Log[x] + 2*x*
Log[x]^2)/(E^(2/x)*x + 9*x^3 + 6*x^4 + x^5 + E^x^(-1)*(6*x^2 + 2*x^3) + (-
2*E^x^(-1)*x - 6*x^2 - 2*x^3)*Log[x] + x*Log[x]^2),x]
```

output
```
2*(x + x/(-E^x^(-1) - 3*x - x^2 + Log[x]))
```

3.1222.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^5+12x^4+20x^3+e^{\frac{1}{x}}\left(4x^3+12x^2-2x-2\right)+\left(-4x^3-12x^2-4e^{\frac{1}{x}}x+2x\right)\log(x)+2e^{2/x}x-2x+2x\log^2(}{x^5+6x^4+9x^3+e^{\frac{1}{x}}\left(2x^3+6x^2\right)+\left(-2x^3-6x^2-2e^{\frac{1}{x}}x\right)\log(x)+e^{2/x}x+x\log^2(x)}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{2x^5+12x^4+20x^3+e^{\frac{1}{x}}\left(4x^3+12x^2-2x-2\right)+\left(-4x^3-12x^2-4e^{\frac{1}{x}}x+2x\right)\log(x)+2e^{2/x}x-2x+2x\log^2(}{x\left(x^2+3x+e^{\frac{1}{x}}-\log(x)\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2(x+1)}{x\left(x^2+3x+e^{\frac{1}{x}}-\log(x)\right)}+\frac{2\left(2x^3+4x^2+2x-\log(x)\right)}{x\left(x^2+3x+e^{\frac{1}{x}}-\log(x)\right)^2}+2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$4\int \frac{1}{\left(x^2+3x+e^{\frac{1}{x}}-\log(x)\right)^2}dx+8\int \frac{x}{\left(x^2+3x+e^{\frac{1}{x}}-\log(x)\right)^2}dx+4\int \frac{x^2}{\left(x^2+3x+e^{\frac{1}{x}}-\log(x)\right)^2}dx-2\int \frac{1}{x^2+3x+e^{\frac{1}{x}}-\log(x)}dx-2\int \frac{1}{x\left(x^2+3x+e^{\frac{1}{x}}-\log(x)\right)}dx-2\int \frac{\log(x)}{x\left(x^2+3x+e^{\frac{1}{x}}-\log(x)\right)^2}dx+2x$$

input
```
Int[(-2*x + 2*E^(2/x)*x + 20*x^3 + 12*x^4 + 2*x^5 + E^x^(-1)*(-2 - 2*x + 1
2*x^2 + 4*x^3) + (2*x - 4*E^x^(-1)*x - 12*x^2 - 4*x^3)*Log[x] + 2*x*Log[x]
^2)/(E^(2/x)*x + 9*x^3 + 6*x^4 + x^5 + E^x^(-1)*(6*x^2 + 2*x^3) + (-2*E^x^
(-1)*x - 6*x^2 - 2*x^3)*Log[x] + x*Log[x]^2),x]
```

output
```
$Aborted
```

3.1222.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1222.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

method	result	size
risch	$2x-\frac{2x}{x^{2}+3x+{\mathrm e}^{\frac{1}{x}}-\ln\left(x\right)}$	25
parallelrisch	$\frac{2x^{3}+6x^{2}-2x\ln\left(x\right)+2x\,{\mathrm e}^{\frac{1}{x}}-2x}{x^{2}+3x+{\mathrm e}^{\frac{1}{x}}-\ln\left(x\right)}$	45

input
```
int((2*x*ln(x)^2+(-4*x*exp(1/x)-4*x^3-12*x^2+2*x)*ln(x)+2*x*exp(1/x)^2+(4*
x^3+12*x^2-2*x-2)*exp(1/x)+2*x^5+12*x^4+20*x^3-2*x)/(x*ln(x)^2+(-2*x*exp(1
/x)-2*x^3-6*x^2)*ln(x)+x*exp(1/x)^2+(2*x^3+6*x^2)*exp(1/x)+x^5+6*x^4+9*x^3
),x,method=_RETURNVERBOSE)
```

output
```
2*x-2*x/(x^2+3*x+exp(1/x)-ln(x))
```

3.1222.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.68

$$\int \frac{-2x+2e^{2/x}x+20x^3+12x^4+2x^5+e^{\frac{1}{x}}(-2-2x+12x^2+4x^3)+\left(2x-4e^{\frac{1}{x}}x-12x^2-4x^3\right)\log(x)+}{e^{2/x}x+9x^3+6x^4+x^5+e^{\frac{1}{x}}\left(6x^2+2x^3\right)+\left(-2e^{\frac{1}{x}}x-6x^2-2x^3\right)\log(x)+x\log^2(x)}$$

input
```
integrate((2*x*log(x)^2+(-4*x*exp(1/x)-4*x^3-12*x^2+2*x)*log(x)+2*x*exp(1/
x)^2+(4*x^3+12*x^2-2*x-2)*exp(1/x)+2*x^5+12*x^4+20*x^3-2*x)/(x*log(x)^2+(-
2*x*exp(1/x)-2*x^3-6*x^2)*log(x)+x*exp(1/x)^2+(2*x^3+6*x^2)*exp(1/x)+x^5+6
*x^4+9*x^3),x, algorithm=\
```

output
```
2*(x^3 + 3*x^2 + x*e^(1/x) - x*log(x) - x)/(x^2 + 3*x + e^(1/x) - log(x))
```

3.1222.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{-2x + 2e^{2/x}x + 20x^3 + 12x^4 + 2x^5 + e^{\frac{1}{x}}(-2 - 2x + 12x^2 + 4x^3) + \left(2x - 4e^{\frac{1}{x}}x - 12x^2 - 4x^3\right)\log(x) +}{e^{2/x}x + 9x^3 + 6x^4 + x^5 + e^{\frac{1}{x}}(6x^2 + 2x^3) + \left(-2e^{\frac{1}{x}}x - 6x^2 - 2x^3\right)\log(x) + x\log^2(x)}$$

$$- \frac{2x}{x^2 + 3x + e^{\frac{1}{x}} - \log(x)}$$

input
```
integrate((2*x*ln(x)**2+(-4*x*exp(1/x)-4*x**3-12*x**2+2*x)*ln(x)+2*x*exp(1
/x)**2+(4*x**3+12*x**2-2*x-2)*exp(1/x)+2*x**5+12*x**4+20*x**3-2*x)/(x*ln(x
)**2+(-2*x*exp(1/x)-2*x**3-6*x**2)*ln(x)+x*exp(1/x)**2+(2*x**3+6*x**2)*exp
(1/x)+x**5+6*x**4+9*x**3),x)
```

output
```
2*x - 2*x/(x**2 + 3*x + exp(1/x) - log(x))
```

3.1222.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.68

$$\int \frac{-2x + 2e^{2/x}x + 20x^3 + 12x^4 + 2x^5 + e^{\frac{1}{x}}(-2 - 2x + 12x^2 + 4x^3) + \left(2x - 4e^{\frac{1}{x}}x - 12x^2 - 4x^3\right)\log(x) +}{e^{2/x}x + 9x^3 + 6x^4 + x^5 + e^{\frac{1}{x}}(6x^2 + 2x^3) + \left(-2e^{\frac{1}{x}}x - 6x^2 - 2x^3\right)\log(x) + x\log^2(x)}$$

input
```
integrate((2*x*log(x)^2+(-4*x*exp(1/x)-4*x^3-12*x^2+2*x)*log(x)+2*x*exp(1/
x)^2+(4*x^3+12*x^2-2*x-2)*exp(1/x)+2*x^5+12*x^4+20*x^3-2*x)/(x*log(x)^2+(-
2*x*exp(1/x)-2*x^3-6*x^2)*log(x)+x*exp(1/x)^2+(2*x^3+6*x^2)*exp(1/x)+x^5+6
*x^4+9*x^3),x, algorithm=\
```

output
```
2*(x^3 + 3*x^2 + x*e^(1/x) - x*log(x) - x)/(x^2 + 3*x + e^(1/x) - log(x))
```

3.1222.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.68

$$\int \frac{-2x+2e^{2/x}x+20x^3+12x^4+2x^5+e^{\frac{1}{x}}(-2-2x+12x^2+4x^3)+\left(2x-4e^{\frac{1}{x}}x-12x^2-4x^3\right)\log(x)+}{e^{2/x}x+9x^3+6x^4+x^5+e^{\frac{1}{x}}\left(6x^2+2x^3\right)+\left(-2e^{\frac{1}{x}}x-6x^2-2x^3\right)\log(x)+x\log^2(x)}$$

input
```
integrate((2*x*log(x)^2+(-4*x*exp(1/x)-4*x^3-12*x^2+2*x)*log(x)+2*x*exp(1/
x)^2+(4*x^3+12*x^2-2*x-2)*exp(1/x)+2*x^5+12*x^4+20*x^3-2*x)/(x*log(x)^2+(-
2*x*exp(1/x)-2*x^3-6*x^2)*log(x)+x*exp(1/x)^2+(2*x^3+6*x^2)*exp(1/x)+x^5+6
*x^4+9*x^3),x, algorithm=\
```

output
```
2*(x^3 + 3*x^2 + x*e^(1/x) - x*log(x) - x)/(x^2 + 3*x + e^(1/x) - log(x))
```

3.1222.9 Mupad [B] (verification not implemented)

Time = 15.49 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{-2x+2e^{2/x}x+20x^3+12x^4+2x^5+e^{\frac{1}{x}}(-2-2x+12x^2+4x^3)+\left(2x-4e^{\frac{1}{x}}x-12x^2-4x^3\right)\log(x)+}{e^{2/x}x+9x^3+6x^4+x^5+e^{\frac{1}{x}}\left(6x^2+2x^3\right)+\left(-2e^{\frac{1}{x}}x-6x^2-2x^3\right)\log(x)+x\log^2(x)}$$
$$-\frac{2\,x}{3\,x+\mathrm{e}^{1/x}-\ln\left(x\right)+x^2}$$

input
```
int((2*x*log(x)^2 - 2*x - exp(1/x)*(2*x - 12*x^2 - 4*x^3 + 2) + 2*x*exp(2/
x) + 20*x^3 + 12*x^4 + 2*x^5 - log(x)*(4*x*exp(1/x) - 2*x + 12*x^2 + 4*x^3
))/(x*log(x)^2 - log(x)*(2*x*exp(1/x) + 6*x^2 + 2*x^3) + exp(1/x)*(6*x^2 +
 2*x^3) + x*exp(2/x) + 9*x^3 + 6*x^4 + x^5),x)
```

output
```
2*x - (2*x)/(3*x + exp(1/x) - log(x) + x^2)
```

3.1223 $\int \frac{-2-4x-5x^2-10x^3-\log(2)+(2+\log(2))\log(x)}{5x^2}\,dx$

3.1223.1 Optimal result

Integrand size = 33, antiderivative size = 30

$$\int \frac{-2-4x-5x^2-10x^3-\log(2)+(2+\log(2))\log(x)}{5x^2}\,dx = -4-x-x^2-\log(x)+\frac{(-2+x-\log(2))\log(x)}{5x}$$

output
```
1/5*(x-ln(2)-2)*ln(x)/x-x^2-x-ln(x)-4
```

3.1223.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.17

$$\int \frac{-2-4x-5x^2-10x^3-\log(2)+(2+\log(2))\log(x)}{5x^2}\,dx = -x-x^2-\frac{4\log(x)}{5}-\frac{2\log(x)}{5x}-\frac{\log(2)\log(x)}{5x}$$

input
```
Integrate[(-2 - 4*x - 5*x^2 - 10*x^3 - Log[2] + (2 + Log[2])*Log[x])/(5*x^
2),x]
```

output
```
-x - x^2 - (4*Log[x])/5 - (2*Log[x])/(5*x) - (Log[2]*Log[x])/(5*x)
```

3.1223.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.93, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121, Rules used = {27, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-10x^3-5x^2-4x+(2+\log(2))\log(x)-2-\log(2)}{5x^2}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{1}{5}\int -\frac{10x^3+5x^2+4x-(2+\log(2))\log(x)+\log(2)+2}{x^2}dx$$
$$\Big\downarrow \text{25}$$
$$-\frac{1}{5}\int \frac{10x^3+5x^2+4x-(2+\log(2))\log(x)+\log(2)+2}{x^2}dx$$
$$\Big\downarrow \text{2010}$$
$$-\frac{1}{5}\int \left(\frac{10x^3+5x^2+4x+\log(2)+2}{x^2}-\frac{(2+\log(2))\log(x)}{x^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{1}{5}\left(-5x^2-5x-4\log(x)-\frac{(2+\log(2))\log(x)}{x}\right)$$

input
```
Int[(-2 - 4*x - 5*x^2 - 10*x^3 - Log[2] + (2 + Log[2])*Log[x])/(5*x^2),x]
```

output
```
(-5*x - 5*x^2 - 4*Log[x] - ((2 + Log[2])*Log[x])/x)/5
```

3.1223.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1223.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.83

method	result	size
risch	$-\frac{(\ln(2)+2)\ln(x)}{5x}-x^{2}-x-\frac{4\ln(x)}{5}$	25
norman	$\frac{\left(-\frac{2}{5}-\frac{\ln(2)}{5}\right)\ln(x)-\frac{4x\ln(x)}{5}-x^{2}-x^{3}}{x}$	30
parallelrisch	$-\frac{5x^{3}+\ln(2)\ln(x)+5x^{2}+4x\ln(x)+2\ln(x)}{5x}$	31
parts	$-x-x^{2}+\frac{\ln(2)+2}{5x}-\frac{4\ln(x)}{5}+\left(\frac{2}{5}+\frac{\ln(2)}{5}\right)\left(-\frac{\ln(x)}{x}-\frac{1}{x}\right)$	43
default	$-x^{2}+\frac{\ln(2)\left(-\frac{\ln(x)}{x}-\frac{1}{x}\right)}{5}-x-\frac{2\ln(x)}{5x}+\frac{\ln(2)}{5x}-\frac{4\ln(x)}{5}$	45

input
```
int(1/5*((ln(2)+2)*ln(x)-ln(2)-10*x^3-5*x^2-4*x-2)/x^2,x,method=_RETURNVER
BOSE)
```

output
```
-1/5*(ln(2)+2)/x*ln(x)-x^2-x-4/5*ln(x)
```

3.1223.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{-2-4x-5x^2-10x^3-\log(2)+(2+\log(2))\log(x)}{5x^2}\,dx = -\frac{5\,x^{3}+5\,x^{2}+\left(4\,x+\log\left(2\right)+2\right)\log\left(x\right)}{5\,x}$$

input
```
integrate(1/5*((log(2)+2)*log(x)-log(2)-10*x^3-5*x^2-4*x-2)/x^2,x, algorit
hm=\
```

output
```
-1/5*(5*x^3 + 5*x^2 + (4*x + log(2) + 2)*log(x))/x
```

3.1223.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{-2-4x-5x^2-10x^3-\log(2)+(2+\log(2))\log(x)}{5x^2}\,dx = -x^2-x-\frac{4\log(x)}{5}+\frac{(-2-\log(2))\log(x)}{5x}$$

input
```
integrate(1/5*((ln(2)+2)*ln(x)-ln(2)-10*x**3-5*x**2-4*x-2)/x**2,x)
```

output
```
-x**2 - x - 4*log(x)/5 + (-2 - log(2))*log(x)/(5*x)
```

3.1223.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.37

$$\int \frac{-2-4x-5x^2-10x^3-\log(2)+(2+\log(2))\log(x)}{5x^2}\,dx = -x^2-\frac{1}{5}\left(\frac{\log(x)}{x}+\frac{1}{x}\right)\log(2)-x+\frac{\log(2)}{5\,x}-\frac{2\,\log(x)}{5\,x}-\frac{4}{5}\,\log(x)$$

input
```
integrate(1/5*((log(2)+2)*log(x)-log(2)-10*x^3-5*x^2-4*x-2)/x^2,x, algorit
hm=\
```

output
```
-x^2 - 1/5*(log(x)/x + 1/x)*log(2) - x + 1/5*log(2)/x - 2/5*log(x)/x - 4/5
*log(x)
```

3.1223.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{-2-4x-5x^2-10x^3-\log(2)+(2+\log(2))\log(x)}{5x^2}\,dx$$
$$= -x^2 - x - \frac{(\log(2)+2)\log(x)}{5\,x} - \frac{4}{5}\log(x)$$

input
```
integrate(1/5*((log(2)+2)*log(x)-log(2)-10*x^3-5*x^2-4*x-2)/x^2,x, algorit
hm=\
```

output
```
-x^2 - x - 1/5*(log(2) + 2)*log(x)/x - 4/5*log(x)
```

3.1223.9 Mupad [B] (verification not implemented)

Time = 15.42 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.80

$$\int \frac{-2-4x-5x^2-10x^3-\log(2)+(2+\log(2))\log(x)}{5x^2}\,dx$$
$$= -x - \frac{4\ln(x)}{5} - x^2 - \frac{\ln(x)\,(\ln(2)+2)}{5\,x}$$

input
```
int(-((4*x)/5 + log(2)/5 - (log(x)*(log(2) + 2))/5 + x^2 + 2*x^3 + 2/5)/x^
2,x)
```

output
```
- x - (4*log(x))/5 - x^2 - (log(x)*(log(2) + 2))/(5*x)
```

3.1224 $\int \frac{1-\log(10x\log(3))}{25x^2}\,dx$

3.1224.1 Optimal result

Integrand size = 17, antiderivative size = 13

$$\int \frac{1-\log(10x\log(3))}{25x^2}\,dx = \frac{\log(10x\log(3))}{25x}$$

output
```
1/25*ln(10*x*ln(3))/x
```

3.1224.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int \frac{1-\log(10x\log(3))}{25x^2}\,dx = \frac{\log(10x\log(3))}{25x}$$

input
```
Integrate[(1 - Log[10*x*Log[3]])/(25*x^2),x]
```

output
```
Log[10*x*Log[3]]/(25*x)
```

3.1224.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$, Rules used = {27, 2740}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1-\log(10x\log(3))}{25x^2}dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{25}\int \frac{1-\log(10x\log(3))}{x^2}dx$$

$$\Big\downarrow \ 2740$$

$$\frac{\log(10x\log(3))}{25x}$$

input
```
Int[(1 - Log[10*x*Log[3]])/(25*x^2),x]
```

output
```
Log[10*x*Log[3]]/(25*x)
```

3.1224.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2740
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[b*(d*x)^(m + 1)*(Log[c*x^n]/(d*(m + 1))), x] /; FreeQ[{a, b, c, d, m,
n}, x] && NeQ[m, -1] && EqQ[a*(m + 1) - b*n, 0]
```

3.1224.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

method	result	size
derivativedivides	$\frac{\ln(10x\ln(3))}{25x}$	12
default	$\frac{\ln(10x\ln(3))}{25x}$	12
norman	$\frac{\ln(10x\ln(3))}{25x}$	12
risch	$\frac{\ln(10x\ln(3))}{25x}$	12
parallelrisch	$\frac{\ln(10x\ln(3))}{25x}$	12
parts	$\frac{\ln(10x\ln(3))}{25x}$	12

input
```
int(1/25*(-ln(10*x*ln(3))+1)/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/25*ln(10*x*ln(3))/x
```

3.1224.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{1-\log(10x\log(3))}{25x^2}\,dx = \frac{\log\left(10\,x\log\left(3\right)\right)}{25\,x}$$

input
```
integrate(1/25*(-log(10*x*log(3))+1)/x^2,x, algorithm=\
```

output
```
1/25*log(10*x*log(3))/x
```

3.1224.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.77

$$\int \frac{1-\log(10x\log(3))}{25x^2}\,dx = \frac{\log\left(10x\log\left(3\right)\right)}{25x}$$

input
```
integrate(1/25*(-ln(10*x*ln(3))+1)/x**2,x)
```

output
```
log(10*x*log(3))/(25*x)
```

3.1224.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 30 vs. 2(11) = 22.

Time = 0.20 (sec) , antiderivative size = 30, normalized size of antiderivative = 2.31

$$\int \frac{1-\log(10x\log(3))}{25x^2}\,dx = \frac{1}{25}\left(\frac{\log(10\,x\log(3))+1}{x\log(3)} - \frac{1}{x\log(3)}\right)\log(3)$$

input
```
integrate(1/25*(-log(10*x*log(3))+1)/x^2,x, algorithm=\
```

output
```
1/25*((log(10*x*log(3)) + 1)/(x*log(3)) - 1/(x*log(3)))*log(3)
```

3.1224.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{1-\log(10x\log(3))}{25x^2}\,dx = \frac{\log(10\,x\log(3))}{25\,x}$$

input
```
integrate(1/25*(-log(10*x*log(3))+1)/x^2,x, algorithm=\
```

output
```
1/25*log(10*x*log(3))/x
```

3.1224.9 Mupad [B] (verification not implemented)

Time = 16.16 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int \frac{1-\log(10x\log(3))}{25x^2}\,dx = \frac{\ln(10)+\ln(\ln(3))+\ln(x)}{25\,x}$$

input
```
int(-(log(10*x*log(3))/25 - 1/25)/x^2,x)
```

output
```
(log(10) + log(log(3)) + log(x))/(25*x)
```

3.1225 $\int \frac{71+e^{18+12x+2x^2}+e^{9+6x+x^2}(17-6x-2x^2)+\left(17+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}{64+16e^{9+6x+x^2}+e^{18+12x+2x^2}+\left(16+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}\,dx$

3.1225.1 Optimal result

Integrand size = 106, antiderivative size = 17

$$\int \frac{71+e^{18+12x+2x^2}+e^{9+6x+x^2}(17-6x-2x^2)+\left(17+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}{64+16e^{9+6x+x^2}+e^{18+12x+2x^2}+(16+2e^{9+6x+x^2})\log(x)+\log^2(x)}\,dx = x+\frac{x}{8+e^{(3+x)^2}+\log(x)}$$

output
```
x+x/(ln(x)+8+exp((3+x)^2))
```

3.1225.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{71+e^{18+12x+2x^2}+e^{9+6x+x^2}(17-6x-2x^2)+\left(17+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}{64+16e^{9+6x+x^2}+e^{18+12x+2x^2}+(16+2e^{9+6x+x^2})\log(x)+\log^2(x)}\,dx = x\left(1+\frac{1}{8+e^{(3+x)^2}+\log(x)}\right)$$

input
```
Integrate[(71 + E^(18 + 12*x + 2*x^2) + E^(9 + 6*x + x^2)*(17 - 6*x - 2*x^
2) + (17 + 2*E^(9 + 6*x + x^2))*Log[x] + Log[x]^2)/(64 + 16*E^(9 + 6*x + x
^2) + E^(18 + 12*x + 2*x^2) + (16 + 2*E^(9 + 6*x + x^2))*Log[x] + Log[x]^2
),x]
```

output
```
x*(1 + (8 + E^(3 + x)^2 + Log[x])^(-1))
```

3.1225.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x^2+12x+18}+e^{x^2+6x+9}\left(-2x^2-6x+17\right)+\left(2e^{x^2+6x+9}+17\right)\log(x)+\log^2(x)+71}{16e^{x^2+6x+9}+e^{2x^2+12x+18}+\left(2e^{x^2+6x+9}+16\right)\log(x)+\log^2(x)+64}dx$$

$$\Big\downarrow \; 7239$$

$$\int \frac{e^{(x+3)^2}\left(-2x^2-6x+17\right)+e^{2(x+3)^2}+\log^2(x)+\left(2e^{(x+3)^2}+17\right)\log(x)+71}{\left(e^{(x+3)^2}+\log(x)+8\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(-\frac{2x^2+6x-1}{e^{(x+3)^2}+\log(x)+8}+\frac{16x^2+2x^2\log(x)+48x+6x\log(x)-1}{\left(e^{(x+3)^2}+\log(x)+8\right)^2}+1\right)dx$$

$$\Big\downarrow \; 2009$$

$$16\int \frac{x^2}{\left(\log(x)+e^{(x+3)^2}+8\right)^2}dx+2\int \frac{x^2\log(x)}{\left(\log(x)+e^{(x+3)^2}+8\right)^2}dx-2\int \frac{x^2}{\log(x)+e^{(x+3)^2}+8}dx-\int \frac{1}{\left(\log(x)+e^{(x+3)^2}+8\right)^2}dx+48\int \frac{x}{\left(\log(x)+e^{(x+3)^2}+8\right)^2}dx+6\int \frac{x\log(x)}{\left(\log(x)+e^{(x+3)^2}+8\right)^2}dx+\int \frac{1}{\log(x)+e^{(x+3)^2}+8}dx-6\int \frac{x}{\log(x)+e^{(x+3)^2}+8}dx+x$$

input
```
Int[(71 + E^(18 + 12*x + 2*x^2) + E^(9 + 6*x + x^2)*(17 - 6*x - 2*x^2) + (
17 + 2*E^(9 + 6*x + x^2))*Log[x] + Log[x]^2)/(64 + 16*E^(9 + 6*x + x^2) +
E^(18 + 12*x + 2*x^2) + (16 + 2*E^(9 + 6*x + x^2))*Log[x] + Log[x]^2),x]
```

output
```
$Aborted
```

3.1225.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1225.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

method	result	size
risch	$x+\frac{x}{\ln(x)+8+{\mathrm e}^{(3+x)^{2}}}$	17
parallelrisch	$\frac{x\ln(x)+{\mathrm e}^{x^{2}+6x+9}x+9x}{8+\ln(x)+{\mathrm e}^{x^{2}+6x+9}}$	36

input
```
int((ln(x)^2+(2*exp(x^2+6*x+9)+17)*ln(x)+exp(x^2+6*x+9)^2+(-2*x^2-6*x+17)*
exp(x^2+6*x+9)+71)/(ln(x)^2+(2*exp(x^2+6*x+9)+16)*ln(x)+exp(x^2+6*x+9)^2+1
6*exp(x^2+6*x+9)+64),x,method=_RETURNVERBOSE)
```

output
```
x+x/(ln(x)+8+exp((3+x)^2))
```

3.1225.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. 2(16) = 32.

Time = 0.28 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.06

$$\int \frac{71+e^{18+12x+2x^2}+e^{9+6x+x^2}(17-6x-2x^2)+\left(17+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}{64+16e^{9+6x+x^2}+e^{18+12x+2x^2}+(16+2e^{9+6x+x^2})\log(x)+\log^2(x)}\,dx =\frac{xe^{(x^2+6\,x+9)}+x\log{(x)}+9\,x}{e^{(x^2+6\,x+9)}+\log{(x)}+8}$$

input
```
integrate((log(x)^2+(2*exp(x^2+6*x+9)+17)*log(x)+exp(x^2+6*x+9)^2+(-2*x^2-
6*x+17)*exp(x^2+6*x+9)+71)/(log(x)^2+(2*exp(x^2+6*x+9)+16)*log(x)+exp(x^2+
6*x+9)^2+16*exp(x^2+6*x+9)+64),x, algorithm=\
```

output
```
(x*e^(x^2 + 6*x + 9) + x*log(x) + 9*x)/(e^(x^2 + 6*x + 9) + log(x) + 8)
```

3.1225.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{71+e^{18+12x+2x^2}+e^{9+6x+x^2}(17-6x-2x^2)+\left(17+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}{64+16e^{9+6x+x^2}+e^{18+12x+2x^2}+(16+2e^{9+6x+x^2})\log(x)+\log^2(x)}\,dx$$
$$= x+\frac{x}{e^{x^2+6x+9}+\log{(x)}+8}$$

input
```
integrate((ln(x)**2+(2*exp(x**2+6*x+9)+17)*ln(x)+exp(x**2+6*x+9)**2+(-2*x*
*2-6*x+17)*exp(x**2+6*x+9)+71)/(ln(x)**2+(2*exp(x**2+6*x+9)+16)*ln(x)+exp(
x**2+6*x+9)**2+16*exp(x**2+6*x+9)+64),x)
```

output
```
x + x/(exp(x**2 + 6*x + 9) + log(x) + 8)
```

3.1225.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. 2(16) = 32.

Time = 0.23 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.06

$$\int \frac{71+e^{18+12x+2x^2}+e^{9+6x+x^2}(17-6x-2x^2)+\left(17+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}{64+16e^{9+6x+x^2}+e^{18+12x+2x^2}+(16+2e^{9+6x+x^2})\log(x)+\log^2(x)}\,dx$$
$$= \frac{xe^{\left(x^2+6\,x+9\right)}+x\log{(x)}+9\,x}{e^{\left(x^2+6\,x+9\right)}+\log{(x)}+8}$$

input
```
integrate((log(x)^2+(2*exp(x^2+6*x+9)+17)*log(x)+exp(x^2+6*x+9)^2+(-2*x^2-
6*x+17)*exp(x^2+6*x+9)+71)/(log(x)^2+(2*exp(x^2+6*x+9)+16)*log(x)+exp(x^2+
6*x+9)^2+16*exp(x^2+6*x+9)+64),x, algorithm=\
```

output
```
(x*e^(x^2 + 6*x + 9) + x*log(x) + 9*x)/(e^(x^2 + 6*x + 9) + log(x) + 8)
```

3.1225.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 35 vs. 2(16) = 32.

Time = 0.33 (sec) , antiderivative size = 35, normalized size of antiderivative = 2.06

$$\int \frac{71+e^{18+12x+2x^2}+e^{9+6x+x^2}(17-6x-2x^2)+\left(17+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}{64+16e^{9+6x+x^2}+e^{18+12x+2x^2}+(16+2e^{9+6x+x^2})\log(x)+\log^2(x)}\,dx$$
$$=\frac{xe^{(x^2+6x+9)}+x\log(x)+9x}{e^{(x^2+6x+9)}+\log(x)+8}$$

input
```
integrate((log(x)^2+(2*exp(x^2+6*x+9)+17)*log(x)+exp(x^2+6*x+9)^2+(-2*x^2-
6*x+17)*exp(x^2+6*x+9)+71)/(log(x)^2+(2*exp(x^2+6*x+9)+16)*log(x)+exp(x^2+
6*x+9)^2+16*exp(x^2+6*x+9)+64),x, algorithm=\
```

output
```
(x*e^(x^2 + 6*x + 9) + x*log(x) + 9*x)/(e^(x^2 + 6*x + 9) + log(x) + 8)
```

3.1225.9 Mupad [B] (verification not implemented)

Time = 16.99 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.76

$$\int \frac{71+e^{18+12x+2x^2}+e^{9+6x+x^2}(17-6x-2x^2)+\left(17+2e^{9+6x+x^2}\right)\log(x)+\log^2(x)}{64+16e^{9+6x+x^2}+e^{18+12x+2x^2}+(16+2e^{9+6x+x^2})\log(x)+\log^2(x)}\,dx$$
$$=\frac{x\left(\mathrm{e}^{x^2+6x+9}+\ln(x)+9\right)}{\mathrm{e}^{x^2+6x+9}+\ln(x)+8}$$

input
```
int((exp(12*x + 2*x^2 + 18) - exp(6*x + x^2 + 9)*(6*x + 2*x^2 - 17) + log(
x)^2 + log(x)*(2*exp(6*x + x^2 + 9) + 17) + 71)/(16*exp(6*x + x^2 + 9) + e
xp(12*x + 2*x^2 + 18) + log(x)^2 + log(x)*(2*exp(6*x + x^2 + 9) + 16) + 64
),x)
```

output
```
(x*(exp(6*x + x^2 + 9) + log(x) + 9))/(exp(6*x + x^2 + 9) + log(x) + 8)
```

3.1226 $\int \frac{1+\left(-1-162x^2+216e^e x^2-108e^{2e}x^2+24e^{3e}x^2-2e^{4e}x^2\right)\log\left(\frac{1}{x}\right)}{x\log\left(\frac{1}{x}\right)}\,dx$

3.1226.1 Optimal result

Integrand size = 62, antiderivative size = 25

$$\int \frac{1+\left(-1-162x^2+216e^e x^2-108e^{2e}x^2+24e^{3e}x^2-2e^{4e}x^2\right)\log\left(\frac{1}{x}\right)}{x\log\left(\frac{1}{x}\right)}\,dx = -4-\left(3-e^e\right)^4x^2-\log\left(x\log\left(\frac{1}{x}\right)\right)$$

output
```
-4-ln(x*ln(1/x))-x^2*(3-exp(exp(1)))^4
```

3.1226.2 Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{1+\left(-1-162x^2+216e^e x^2-108e^{2e}x^2+24e^{3e}x^2-2e^{4e}x^2\right)\log\left(\frac{1}{x}\right)}{x\log\left(\frac{1}{x}\right)}\,dx = -\left(-3+e^e\right)^4x^2-\log(x)-\log\left(\log\left(\frac{1}{x}\right)\right)$$

input
```
Integrate[(1 + (-1 - 162*x^2 + 216*E^E*x^2 - 108*E^(2*E)*x^2 + 24*E^(3*E)*
x^2 - 2*E^(4*E)*x^2)*Log[x^(-1)])/(x*Log[x^(-1)]),x]
```

output
```
-((-3 + E^E)^4*x^2) - Log[x] - Log[Log[x^(-1)]]
```

3.1226.3 Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.048$, Rules used = {7239, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-2e^{4e}x^2 + 24e^{3e}x^2 - 108e^{2e}x^2 + 216e^e x^2 - 162x^2 - 1)\log\left(\frac{1}{x}\right) + 1}{x\log\left(\frac{1}{x}\right)} dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{-2(e^e-3)^4 x^2 + \frac{1}{\log\left(\frac{1}{x}\right)} - 1}{x} dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{-2(3-e^e)^4 x^2 - 1}{x} + \frac{1}{x\log\left(\frac{1}{x}\right)}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$-(3-e^e)^4 x^2 - \log(x) - \log\left(\log\left(\frac{1}{x}\right)\right)$$

input
```
Int[(1 + (-1 - 162*x^2 + 216*E^E*x^2 - 108*E^(2*E)*x^2 + 24*E^(3*E)*x^2 -
2*E^(4*E)*x^2)*Log[x^(-1)])/(x*Log[x^(-1)]),x]
```

output
```
-((3 - E^E)^4*x^2) - Log[x] - Log[Log[x^(-1)]]
```

3.1226.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1226.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.80

method	result	size
norman	$\ln\left(\frac{1}{x}\right)+\left(108\,\mathrm{e}^{\mathrm{e}}-\mathrm{e}^{4\,\mathrm{e}}+12\,\mathrm{e}^{3\,\mathrm{e}}-54\,\mathrm{e}^{2\,\mathrm{e}}-81\right)x^{2}-\ln\left(\ln\left(\frac{1}{x}\right)\right)$	45
parts	$-\ln\left(\ln\left(\frac{1}{x}\right)\right)-\frac{\left(-216\,\mathrm{e}^{\mathrm{e}}+2\,\mathrm{e}^{4\,\mathrm{e}}-24\,\mathrm{e}^{3\,\mathrm{e}}+108\,\mathrm{e}^{2\,\mathrm{e}}+162\right)x^{2}}{2}-\ln\left(x\right)$	46
derivativedivides	$-x^{2}\mathrm{e}^{4\,\mathrm{e}}+12x^{2}\mathrm{e}^{3\,\mathrm{e}}-54x^{2}\mathrm{e}^{2\,\mathrm{e}}+\ln\left(\frac{1}{x}\right)+108x^{2}\mathrm{e}^{\mathrm{e}}-\ln\left(\ln\left(\frac{1}{x}\right)\right)-81x^{2}$	56
default	$-x^{2}\mathrm{e}^{4\,\mathrm{e}}+12x^{2}\mathrm{e}^{3\,\mathrm{e}}-54x^{2}\mathrm{e}^{2\,\mathrm{e}}+\ln\left(\frac{1}{x}\right)+108x^{2}\mathrm{e}^{\mathrm{e}}-\ln\left(\ln\left(\frac{1}{x}\right)\right)-81x^{2}$	56
risch	$-x^{2}\mathrm{e}^{4\,\mathrm{e}}+12x^{2}\mathrm{e}^{3\,\mathrm{e}}-54x^{2}\mathrm{e}^{2\,\mathrm{e}}+108x^{2}\mathrm{e}^{\mathrm{e}}-81x^{2}-\ln\left(x\right)-\ln\left(\ln\left(\frac{1}{x}\right)\right)$	56
parallelrisch	$-x^{2}\mathrm{e}^{4\,\mathrm{e}}+12x^{2}\mathrm{e}^{3\,\mathrm{e}}-54x^{2}\mathrm{e}^{2\,\mathrm{e}}+\ln\left(\frac{1}{x}\right)+108x^{2}\mathrm{e}^{\mathrm{e}}-\ln\left(\ln\left(\frac{1}{x}\right)\right)-81x^{2}$	56

input
```
int(((-2*x^2*exp(exp(1))^4+24*x^2*exp(exp(1))^3-108*x^2*exp(exp(1))^2+216*
x^2*exp(exp(1))-162*x^2-1)*ln(1/x)+1)/x/ln(1/x),x,method=_RETURNVERBOSE)
```

output
```
ln(1/x)+(-exp(exp(1))^4+12*exp(exp(1))^3-54*exp(exp(1))^2+108*exp(exp(1))-
81)*x^2-ln(ln(1/x))
```

3.1226.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(23) = 46.

Time = 0.26 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.20

$$\int \frac{1+\left(-1-162x^2+216e^ex^2-108e^{2e}x^2+24e^{3e}x^2-2e^{4e}x^2\right)\log\left(\frac{1}{x}\right)}{x\log\left(\frac{1}{x}\right)}\,dx$$
$$=-x^2e^{(4\,e)}+12\,x^2e^{(3\,e)}-54\,x^2e^{(2\,e)}+108\,x^2e^e-81\,x^2+\log\left(\frac{1}{x}\right)-\log\left(\log\left(\frac{1}{x}\right)\right)$$

input
```
integrate(((-2*x^2*exp(exp(1))^4+24*x^2*exp(exp(1))^3-108*x^2*exp(exp(1))^
2+216*x^2*exp(exp(1))-162*x^2-1)*log(1/x)+1)/x/log(1/x),x, algorithm=\
```

output
```
-x^2*e^(4*e) + 12*x^2*e^(3*e) - 54*x^2*e^(2*e) + 108*x^2*e^e - 81*x^2 + lo
g(1/x) - log(log(1/x))
```

3.1226.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(22) = 44$.

Time = 0.12 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.84

$$\int \frac{1+(-1-162x^2+216e^ex^2-108e^{2e}x^2+24e^{3e}x^2-2e^{4e}x^2)\log\left(\frac{1}{x}\right)}{x\log\left(\frac{1}{x}\right)}\,dx$$
$$= -x^2\left(-12e^{3e}-108e^e+81+54e^{2e}+e^{4e}\right)-\log(x)-\log\left(\log\left(\frac{1}{x}\right)\right)$$

input
```
integrate(((-2*x**2*exp(exp(1))**4+24*x**2*exp(exp(1))**3-108*x**2*exp(exp
(1))**2+216*x**2*exp(exp(1))-162*x**2-1)*ln(1/x)+1)/x/ln(1/x),x)
```

output
```
-x**2*(-12*exp(3*E) - 108*exp(E) + 81 + 54*exp(2*E) + exp(4*E)) - log(x) -
 log(log(1/x))
```

3.1226.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(23) = 46$.

Time = 0.21 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{1+(-1-162x^2+216e^ex^2-108e^{2e}x^2+24e^{3e}x^2-2e^{4e}x^2)\log\left(\frac{1}{x}\right)}{x\log\left(\frac{1}{x}\right)}\,dx$$
$$= -x^2e^{(4\,e)}+12\,x^2e^{(3\,e)}-54\,x^2e^{(2\,e)}+108\,x^2e^e-81\,x^2-\log(x)-\log(\log(x))$$

input
```
integrate(((-2*x^2*exp(exp(1))^4+24*x^2*exp(exp(1))^3-108*x^2*exp(exp(1))^
2+216*x^2*exp(exp(1))-162*x^2-1)*log(1/x)+1)/x/log(1/x),x, algorithm=\
```

output
```
-x^2*e^(4*e) + 12*x^2*e^(3*e) - 54*x^2*e^(2*e) + 108*x^2*e^e - 81*x^2 - lo
g(x) - log(log(x))
```

3.1226.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(23) = 46$.

Time = 0.28 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{1+(-1-162x^2+216e^e x^2-108e^{2e}x^2+24e^{3e}x^2-2e^{4e}x^2)\log\left(\frac{1}{x}\right)}{x\log\left(\frac{1}{x}\right)}\,dx$$
$$= -x^2e^{(4\,e)} + 12\,x^2e^{(3\,e)} - 54\,x^2e^{(2\,e)} + 108\,x^2e^e - 81\,x^2 - \log(x) - \log(\log(x))$$

input
```
integrate(((-2*x^2*exp(exp(1))^4+24*x^2*exp(exp(1))^3-108*x^2*exp(exp(1))^
2+216*x^2*exp(exp(1))-162*x^2-1)*log(1/x)+1)/x/log(1/x),x, algorithm=\
```

output
```
-x^2*e^(4*e) + 12*x^2*e^(3*e) - 54*x^2*e^(2*e) + 108*x^2*e^e - 81*x^2 - lo
g(x) - log(log(x))
```

3.1226.9 Mupad [B] (verification not implemented)

Time = 16.23 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{1+(-1-162x^2+216e^e x^2-108e^{2e}x^2+24e^{3e}x^2-2e^{4e}x^2)\log\left(\frac{1}{x}\right)}{x\log\left(\frac{1}{x}\right)}\,dx$$
$$= \frac{x^2\ \ln\left(\frac{1}{x}\right) - x^4\left(\mathrm{e}^{\mathrm{e}}-3\right)^4}{x^2} - \ln\left(\ln\left(\frac{1}{x}\right)\right)$$

input
```
int(-(log(1/x)*(108*x^2*exp(2*exp(1)) - 216*x^2*exp(exp(1)) - 24*x^2*exp(3
*exp(1)) + 2*x^2*exp(4*exp(1)) + 162*x^2 + 1) - 1)/(x*log(1/x)),x)
```

output
```
(x^2*log(1/x) - x^4*(exp(exp(1)) - 3)^4)/x^2 - log(log(1/x))
```

3.1227 $\int (-8x + 16x^2) \log(3)\, dx$

3.1227.1 Optimal result

Integrand size = 12, antiderivative size = 23

$$\int (-8x + 16x^2) \log(3)\, dx = \frac{2}{3}(4 + 2(-2 + x)) \left(4 - \frac{3}{x}\right) x^2 \log(3)$$

output
```
4/3*ln(3)*x^3*(4-3/x)
```

3.1227.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int (-8x + 16x^2) \log(3)\, dx = 8\left(-\frac{x^2}{2} + \frac{2x^3}{3}\right) \log(3)$$

input
```
Integrate[(-8*x + 16*x^2)*Log[3],x]
```

output
```
8*(-1/2*x^2 + (2*x^3)/3)*Log[3]
```

3.1227.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.70, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (16x^2-8x)\log(3)\,dx$$

$$\Big\downarrow \text{27}$$

$$\log(3)\int (16x^2-8x)\,dx$$

$$\Big\downarrow \text{2009}$$

$$\left(\frac{16x^3}{3}-4x^2\right)\log(3)$$

input
```
Int[(-8*x + 16*x^2)*Log[3],x]
```

output
```
(-4*x^2 + (16*x^3)/3)*Log[3]
```

3.1227.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1227.4 Maple [A] (verified)

Time = 0.02 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.57

method	result	size
gosper	$\frac{4\ln(3)(-3+4x)x^2}{3}$	13
parallelrisch	$\ln(3)\left(\frac{16}{3}x^3-4x^2\right)$	15
default	$8\ln(3)\left(\frac{2}{3}x^3-\frac{1}{2}x^2\right)$	16
norman	$-4x^2\ln(3)+\frac{16x^3\ln(3)}{3}$	16
risch	$-4x^2\ln(3)+\frac{16x^3\ln(3)}{3}$	16

input
```
int((16*x^2-8*x)*ln(3),x,method=_RETURNVERBOSE)
```

output
```
4/3*ln(3)*(-3+4*x)*x^2
```

3.1227.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int(-8x+16x^2)\log(3)\,dx=\frac{4}{3}\left(4x^3-3x^2\right)\log(3)$$

input
```
integrate((16*x^2-8*x)*log(3),x, algorithm=\
```

output
```
4/3*(4*x^3 - 3*x^2)*log(3)
```

3.1227.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int(-8x+16x^2)\log(3)\,dx=\frac{16x^3\log(3)}{3}-4x^2\log(3)$$

input
```
integrate((16*x**2-8*x)*ln(3),x)
```

output
```
16*x**3*log(3)/3 - 4*x**2*log(3)
```

3.1227.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int (-8x+16x^2)\log(3)\,dx = \frac{4}{3}\left(4\,x^3-3\,x^2\right)\log\left(3\right)$$

input
```
integrate((16*x^2-8*x)*log(3),x, algorithm=\
```

output
```
4/3*(4*x^3 - 3*x^2)*log(3)
```

3.1227.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.65

$$\int (-8x+16x^2)\log(3)\,dx = \frac{4}{3}\left(4\,x^3-3\,x^2\right)\log\left(3\right)$$

input
```
integrate((16*x^2-8*x)*log(3),x, algorithm=\
```

output
```
4/3*(4*x^3 - 3*x^2)*log(3)
```

3.1227.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.52

$$\int (-8x+16x^2)\log(3)\,dx = \frac{4\,x^2\,\ln\left(3\right)\,\left(4\,x-3\right)}{3}$$

input
```
int(-log(3)*(8*x - 16*x^2),x)
```

output
```
(4*x^2*log(3)*(4*x - 3))/3
```

3.1228 $\int \frac{1}{3}(1+80x)\,dx$

3.1228.1 Optimal result

Integrand size = 9, antiderivative size = 21

$$\int \frac{1}{3}(1+80x)\,dx = 1+x+\frac{2}{3}\left(1-x+20x^2-\log(2)\right)$$

output
```
5/3-2/3*ln(2)+40/3*x^2+1/3*x
```

3.1228.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.52

$$\int \frac{1}{3}(1+80x)\,dx = \frac{1}{3}\left(x+40x^2\right)$$

input
```
Integrate[(1 + 80*x)/3,x]
```

output
```
(x + 40*x^2)/3
```

3.1228.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.52, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{3}(80x+1)\,dx$$

$$\Big\downarrow \text{17}$$

$$\frac{1}{480}(80x+1)^2$$

input
```
Int[(1 + 80*x)/3,x]
```

output
```
(1 + 80*x)^2/480
```

3.1228.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.1228.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.43

method	result	size
gosper	$\frac{x(40x+1)}{3}$	9
default	$\frac{40}{3}x^2+\frac{1}{3}x$	10
norman	$\frac{40}{3}x^2+\frac{1}{3}x$	10
risch	$\frac{40}{3}x^2+\frac{1}{3}x$	10
parallelrisch	$\frac{40}{3}x^2+\frac{1}{3}x$	10
parts	$\frac{40}{3}x^2+\frac{1}{3}x$	10

input
```
int(80/3*x+1/3,x,method=_RETURNVERBOSE)
```

output
```
1/3*x*(40*x+1)
```

3.1228.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.43

$$\int \frac{1}{3}(1+80x)\,dx = \frac{40}{3}\,x^2 + \frac{1}{3}\,x$$

input
```
integrate(80/3*x+1/3,x, algorithm=\
```

output
```
40/3*x^2 + 1/3*x
```

3.1228.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.38

$$\int \frac{1}{3}(1+80x)\,dx = \frac{40x^2}{3} + \frac{x}{3}$$

input
```
integrate(80/3*x+1/3,x)
```

output
```
40*x**2/3 + x/3
```

3.1228.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.43

$$\int \frac{1}{3}(1+80x)\,dx = \frac{40}{3}\,x^2 + \frac{1}{3}\,x$$

input
```
integrate(80/3*x+1/3,x, algorithm=\
```

output
```
40/3*x^2 + 1/3*x
```

3.1228.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.43

$$\int \frac{1}{3}(1+80x)\,dx = \frac{40}{3}\,x^2 + \frac{1}{3}\,x$$

input
```
integrate(80/3*x+1/3,x, algorithm=\
```

output
```
40/3*x^2 + 1/3*x
```

3.1228.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.38

$$\int \frac{1}{3}(1+80x)\,dx = \frac{x\,(40\,x+1)}{3}$$

input
```
int((80*x)/3 + 1/3,x)
```

output
```
(x*(40*x + 1))/3
```

3.1229 $\int \frac{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)+\left(2x^2-4x^2\log(4)+2x^2\log^2(4)\right)\log}{\left(x-2x\log(\right.}$

3.1229.1 Optimal result

Integrand size = 120, antiderivative size = 27

$$\int \frac{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)+\left(2x^2-4x^2\log(4)+2x^2\log^2(4)\right)\log\left(\frac{x}{2}\right)\log(x)+\left(2x^2-4x^2\log(4)\right.}{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)}$$

$$=x+x^2\log^2(x)+\frac{25\log^4\left(\log\left(\frac{x}{2}\right)\right)}{(-1+\log(4))^2}$$

output
```
625*ln(ln(1/2*x))^4/(10*ln(2)-5)^2+x+x^2*ln(x)^2
```

3.1229.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)+\left(2x^2-4x^2\log(4)+2x^2\log^2(4)\right)\log\left(\frac{x}{2}\right)\log(x)+\left(2x^2-4x^2\log(4)\right.}{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)}$$

$$=x+x^2\log^2(x)+\frac{25\log^4\left(\log\left(\frac{x}{2}\right)\right)}{(-1+\log(4))^2}$$

input
```
Integrate[((x - 2*x*Log[4] + x*Log[4]^2)*Log[x/2] + (2*x^2 - 4*x^2*Log[4]
+ 2*x^2*Log[4]^2)*Log[x/2]*Log[x] + (2*x^2 - 4*x^2*Log[4] + 2*x^2*Log[4]^2
)*Log[x/2]*Log[x]^2 + 100*Log[Log[x/2]]^3)/((x - 2*x*Log[4] + x*Log[4]^2)*
Log[x/2]),x]
```

output
```
x + x^2*Log[x]^2 + (25*Log[Log[x/2]]^4)/(-1 + Log[4])^2
```

3.1229.3 Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.74, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.042, Rules used = {6, 6, 27, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x^2+2x^2\log^2(4)-4x^2\log(4))\log\left(\frac{x}{2}\right)\log^2(x)+(2x^2+2x^2\log^2(4)-4x^2\log(4))\log\left(\frac{x}{2}\right)\log(x)+100\log^3(\text{lo}}{(x+x\log^2(4)-2x\log(4))\log\left(\frac{x}{2}\right)}$$

$$\Big\downarrow \ 6$$

$$\int \frac{(2x^2+2x^2\log^2(4)-4x^2\log(4))\log\left(\frac{x}{2}\right)\log^2(x)+(2x^2+2x^2\log^2(4)-4x^2\log(4))\log\left(\frac{x}{2}\right)\log(x)+100\log^3(\text{lo}}{(x\log^2(4)+x(1-2\log(4)))\log\left(\frac{x}{2}\right)}$$

$$\Big\downarrow \ 6$$

$$\int \frac{(2x^2+2x^2\log^2(4)-4x^2\log(4))\log\left(\frac{x}{2}\right)\log^2(x)+(2x^2+2x^2\log^2(4)-4x^2\log(4))\log\left(\frac{x}{2}\right)\log(x)+100\log^3(\text{lo}}{x\left(1+\log^2(4)-2\log(4)\right)\log\left(\frac{x}{2}\right)}$$

$$\Big\downarrow \ 27$$

$$\frac{\int \frac{100\log^3\left(\log\left(\frac{x}{2}\right)\right)+2\left(\log^2(4)x^2-2\log(4)x^2+x^2\right)\log\left(\frac{x}{2}\right)\log^2(x)+x(1-\log(4))^2\log\left(\frac{x}{2}\right)+2\left(\log^2(4)x^2-2\log(4)x^2+x^2\right)\log\left(\frac{x}{2}\right)\log(x)}{x\log\left(\frac{x}{2}\right)}dx}{(1-\log(4))^2}$$

$$\Big\downarrow \ 7239$$

$$\frac{\int \left(\frac{100\log^3\left(\log\left(\frac{x}{2}\right)\right)}{x\log\left(\frac{x}{2}\right)}+(-1+\log(4))^2\left(2x\log^2(x)+2x\log(x)+1\right)\right)dx}{(1-\log(4))^2}$$

$$\Big\downarrow \ 2009$$

$$\frac{x^2(1-\log(4))^2\log^2(x)+25\log^4\left(\log\left(\frac{x}{2}\right)\right)+x(1-\log(4))^2}{(1-\log(4))^2}$$

3.1229.
$\int \frac{(x-2x\log(4)+x\log^2(4))\log\left(\frac{x}{2}\right)+(2x^2-4x^2\log(4)+2x^2\log^2(4))\log\left(\frac{x}{2}\right)\log(x)+(2x^2-4x^2\log(4)+2x^2\log^2(4))\log\left(\frac{x}{2}\right)\log^2(x)+100\log^3\left(\log\left(\frac{x}{2}\right)\right.}{(x-2x\log(4)+x\log^2(4))\log\left(\frac{x}{2}\right)}$

input
```
Int[((x - 2*x*Log[4] + x*Log[4]^2)*Log[x/2] + (2*x^2 - 4*x^2*Log[4] + 2*x^
2*Log[4]^2)*Log[x/2]*Log[x] + (2*x^2 - 4*x^2*Log[4] + 2*x^2*Log[4]^2)*Log[
x/2]*Log[x]^2 + 100*Log[Log[x/2]]^3)/((x - 2*x*Log[4] + x*Log[4]^2)*Log[x/
2]),x]
```

output
```
(x*(1 - Log[4])^2 + x^2*(1 - Log[4])^2*Log[x]^2 + 25*Log[Log[x/2]]^4)/(1 -
 Log[4])^2
```

3.1229.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1229.4 Maple [A] (verified)

Time = 2.19 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

method	result	size
parts	$x+x^{2} \ln \left(x\right)^{2}+\frac{25 \ln \left(\ln \left(\frac{x}{2}\right)\right)^{4}}{4 \ln \left(2\right)^{2}-4 \ln \left(2\right)+1}$	34
default	$x+x^{2} \ln \left(x\right)^{2}+\frac{25 \ln \left(\ln \left(x\right)-\ln \left(2\right)\right)^{4}}{4 \ln \left(2\right)^{2}-4 \ln \left(2\right)+1}$	37
risch	$x+x^{2} \ln \left(x\right)^{2}+\frac{25 \ln \left(\ln \left(x\right)-\ln \left(2\right)\right)^{4}}{4 \ln \left(2\right)^{2}-4 \ln \left(2\right)+1}$	37
parallelrisch	$\frac{x+4 x \ln \left(2\right)^{2}-4 x \ln \left(2\right)+25 \ln \left(\ln \left(\frac{x}{2}\right)\right)^{4}+4 \ln \left(x\right)^{2} \ln \left(2\right)^{2} x^{2}-4 x^{2} \ln \left(2\right) \ln \left(x\right)^{2}+x^{2} \ln \left(x\right)^{2}}{4 \ln \left(2\right)^{2}-4 \ln \left(2\right)+1}$	71

input
```
int((100*ln(ln(1/2*x))^3+(8*x^2*ln(2)^2-8*x^2*ln(2)+2*x^2)*ln(1/2*x)*ln(x)
^2+(8*x^2*ln(2)^2-8*x^2*ln(2)+2*x^2)*ln(1/2*x)*ln(x)+(4*x*ln(2)^2-4*x*ln(2
)+x)*ln(1/2*x))/(4*x*ln(2)^2-4*x*ln(2)+x)/ln(1/2*x),x,method=_RETURNVERBOS
E)
```

output
```
x+x^2*ln(x)^2+25/(4*ln(2)^2-4*ln(2)+1)*ln(ln(1/2*x))^4
```

3.1229.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 119 vs. $2(27) = 54$.

Time = 0.28 (sec) , antiderivative size = 119, normalized size of antiderivative = 4.41

$$\int \frac{(x - 2x\log(4) + x\log^2(4))\log\left(\frac{x}{2}\right) + (2x^2 - 4x^2\log(4) + 2x^2\log^2(4))\log\left(\frac{x}{2}\right)\log(x) + (2x^2 - 4x^2\log(4)}{(x - 2x\log(4) + x\log^2(4))\log\left(\frac{x}{2}\right)}$$

$$= \frac{4\,x^2\log(2)^4 - 4\,x^2\log(2)^3 + 25\,\log\left(\log\left(\frac{1}{2}\,x\right)\right)^4 + (x^2 + 4\,x)\log(2)^2 + \left(4\,x^2\log(2)^2 - 4\,x^2\log(2) + x^2\right)\mathrm{l}}{4\,\log(2)^2 - 4\,\log(2) + 1}$$

input
```
integrate((100*log(log(1/2*x))^3+(8*x^2*log(2)^2-8*x^2*log(2)+2*x^2)*log(1
/2*x)*log(x)^2+(8*x^2*log(2)^2-8*x^2*log(2)+2*x^2)*log(1/2*x)*log(x)+(4*x*
log(2)^2-4*x*log(2)+x)*log(1/2*x))/(4*x*log(2)^2-4*x*log(2)+x)/log(1/2*x),
x, algorithm=\
```

output
```
(4*x^2*log(2)^4 - 4*x^2*log(2)^3 + 25*log(log(1/2*x))^4 + (x^2 + 4*x)*log(
2)^2 + (4*x^2*log(2)^2 - 4*x^2*log(2) + x^2)*log(1/2*x)^2 - 4*x*log(2) + 2
*(4*x^2*log(2)^3 - 4*x^2*log(2)^2 + x^2*log(2))*log(1/2*x) + x)/(4*log(2)^
2 - 4*log(2) + 1)
```

3.1229.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{(x - 2x\log(4) + x\log^2(4))\log\left(\frac{x}{2}\right) + (2x^2 - 4x^2\log(4) + 2x^2\log^2(4))\log\left(\frac{x}{2}\right)\log(x) + (2x^2 - 4x^2\log(4)}{(x - 2x\log(4) + x\log^2(4))\log\left(\frac{x}{2}\right)}$$

$$= x^2\log(x)^2 + x + \frac{25\log(\log(x) - \log(2))^4}{-4\log(2) + 1 + 4\log(2)^2}$$

3.1229. $\int \frac{(x-2x\log(4)+x\log^2(4))\log\left(\frac{x}{2}\right)+(2x^2-4x^2\log(4)+2x^2\log^2(4))\log\left(\frac{x}{2}\right)\log(x)+(2x^2-4x^2\log(4)+2x^2\log^2(4))\log\left(\frac{x}{2}\right)\log^2(x)+100\log^3\left(\log\left(\frac{x}{2}\right)\right.}{(x-2x\log(4)+x\log^2(4))\log\left(\frac{x}{2}\right)}$

input
```
integrate((100*ln(ln(1/2*x))**3+(8*x**2*ln(2)**2-8*x**2*ln(2)+2*x**2)*ln(1
/2*x)*ln(x)**2+(8*x**2*ln(2)**2-8*x**2*ln(2)+2*x**2)*ln(1/2*x)*ln(x)+(4*x*
ln(2)**2-4*x*ln(2)+x)*ln(1/2*x))/(4*x*ln(2)**2-4*x*ln(2)+x)/ln(1/2*x),x)
```

output
```
x**2*log(x)**2 + x + 25*log(log(x) - log(2))**4/(-4*log(2) + 1 + 4*log(2)*
*2)
```

3.1229.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 354 vs. $2(27) = 54$.

Time = 0.41 (sec) , antiderivative size = 354, normalized size of antiderivative = 13.11

$$\int \frac{(x-2x\log(4)+x\log^2(4))\log\left(\frac{x}{2}\right)+(2x^2-4x^2\log(4)+2x^2\log^2(4))\log\left(\frac{x}{2}\right)\log(x)+(2x^2-4x^2\log(4)}{(x-2x\log(4)+x\log^2(4))\log\left(\frac{x}{2}\right)}$$

$$= \frac{75\log\left(-\log(2)+\log(x)\right)^4}{4\log(2)^2-4\log(2)+1} - \frac{150\log\left(-\log(2)+\log(x)\right)^2\log\left(\log\left(\frac{1}{2}x\right)\right)^2}{4\log(2)^2-4\log(2)+1} + \frac{100\log\left(-\log(2)+\log(x)\right)\log\left(\log\left(\frac{1}{2}x\right)\right)^3}{4\log(2)^2-4\log(2)+1} + \frac{2\left(2x^2\log(x)^2-2x^2\log(x)+x^2\right)\log(2)^2}{4\log(2)^2-4\log(2)+1} + \frac{2\left(2x^2\log(x)-x^2\right)\log(2)^2}{4\log(2)^2-4\log(2)+1} + \frac{4x\log(2)^2}{4\log(2)^2-4\log(2)+1} - \frac{2\left(2x^2\log(x)^2-2x^2\log(x)+x^2\right)\log(2)}{4\log(2)^2-4\log(2)+1} - \frac{2\left(2x^2\log(x)-x^2\right)\log(2)}{4\log(2)^2-4\log(2)+1} - \frac{4x\log(2)}{4\log(2)^2-4\log(2)+1} + \frac{2x^2\log(x)^2-2x^2\log(x)+x^2}{2\left(4\log(2)^2-4\log(2)+1\right)} + \frac{2x^2\log(x)-x^2}{2\left(4\log(2)^2-4\log(2)+1\right)} + \frac{x}{4\log(2)^2-4\log(2)+1}$$

input
```
integrate((100*log(log(1/2*x))^3+(8*x^2*log(2)^2-8*x^2*log(2)+2*x^2)*log(1
/2*x)*log(x)^2+(8*x^2*log(2)^2-8*x^2*log(2)+2*x^2)*log(1/2*x)*log(x)+(4*x*
log(2)^2-4*x*log(2)+x)*log(1/2*x))/(4*x*log(2)^2-4*x*log(2)+x)/log(1/2*x),
x, algorithm=\
```

output
```
75*log(-log(2) + log(x))^4/(4*log(2)^2 - 4*log(2) + 1) - 150*log(-log(2) +
 log(x))^2*log(log(1/2*x))^2/(4*log(2)^2 - 4*log(2) + 1) + 100*log(-log(2)
 + log(x))*log(log(1/2*x))^3/(4*log(2)^2 - 4*log(2) + 1) + 2*(2*x^2*log(x)
^2 - 2*x^2*log(x) + x^2)*log(2)^2/(4*log(2)^2 - 4*log(2) + 1) + 2*(2*x^2*l
og(x) - x^2)*log(2)^2/(4*log(2)^2 - 4*log(2) + 1) + 4*x*log(2)^2/(4*log(2)
^2 - 4*log(2) + 1) - 2*(2*x^2*log(x)^2 - 2*x^2*log(x) + x^2)*log(2)/(4*log
(2)^2 - 4*log(2) + 1) - 2*(2*x^2*log(x) - x^2)*log(2)/(4*log(2)^2 - 4*log(
2) + 1) - 4*x*log(2)/(4*log(2)^2 - 4*log(2) + 1) + 1/2*(2*x^2*log(x)^2 - 2
*x^2*log(x) + x^2)/(4*log(2)^2 - 4*log(2) + 1) + 1/2*(2*x^2*log(x) - x^2)/
(4*log(2)^2 - 4*log(2) + 1) + x/(4*log(2)^2 - 4*log(2) + 1)
```

3.1229.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)+\left(2x^2-4x^2\log(4)+2x^2\log^2(4)\right)\log\left(\frac{x}{2}\right)\log(x)+\left(2x^2-4x^2\log(4)\right.}{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)}$$
$$=x^2\log\left(x\right)^2+\frac{25\,\log\left(-\log\left(2\right)+\log\left(x\right)\right)^4}{4\,\log\left(2\right)^2-4\,\log\left(2\right)+1}+x$$

input
```
integrate((100*log(log(1/2*x))^3+(8*x^2*log(2)^2-8*x^2*log(2)+2*x^2)*log(1
/2*x)*log(x)^2+(8*x^2*log(2)^2-8*x^2*log(2)+2*x^2)*log(1/2*x)*log(x)+(4*x*
log(2)^2-4*x*log(2)+x)*log(1/2*x))/(4*x*log(2)^2-4*x*log(2)+x)/log(1/2*x),
x, algorithm=\
```

output
```
x^2*log(x)^2 + 25*log(-log(2) + log(x))^4/(4*log(2)^2 - 4*log(2) + 1) + x
```

3.1229.9 Mupad [B] (verification not implemented)

Time = 15.89 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.15

$$\int \frac{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)+\left(2x^2-4x^2\log(4)+2x^2\log^2(4)\right)\log\left(\frac{x}{2}\right)\log(x)+\left(2x^2-4x^2\log(4)\right.}{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)}$$
$$=\frac{\left(8\ln\left(2\right)^2-\ln\left(256\right)+2\right)\,x^2\ln\left(x\right)^2}{2\,\left(4\ln\left(2\right)^2-\ln\left(16\right)+1\right)}+x+\frac{\ln\left(\ln\left(\frac{x}{2}\right)\right)^4}{4\,\left(\frac{\ln(2)^2}{25}-\frac{\ln(16)}{100}+\frac{1}{100}\right)}$$

input
```
int((100*log(log(x/2))^3 + log(x/2)*(x - 4*x*log(2) + 4*x*log(2)^2) + log(
x/2)*log(x)^2*(8*x^2*log(2)^2 - 8*x^2*log(2) + 2*x^2) + log(x/2)*log(x)*(8
*x^2*log(2)^2 - 8*x^2*log(2) + 2*x^2))/(log(x/2)*(x - 4*x*log(2) + 4*x*log
(2)^2)),x)
```

output
```
x + log(log(x/2))^4/(4*(log(2)^2/25 - log(16)/100 + 1/100)) + (x^2*log(x)^
2*(8*log(2)^2 - log(256) + 2))/(2*(4*log(2)^2 - log(16) + 1))
```

3.1229.

$$\int \frac{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)+\left(2x^2-4x^2\log(4)+2x^2\log^2(4)\right)\log\left(\frac{x}{2}\right)\log(x)+\left(2x^2-4x^2\log(4)+2x^2\log^2(4)\right)\log\left(\frac{x}{2}\right)\log^2(x)+100\log^3\left(\log\left(\frac{x}{2}\right)\right.}{\left(x-2x\log(4)+x\log^2(4)\right)\log\left(\frac{x}{2}\right)}$$

3.1230 $\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774}{395641+9e^2+e(3774-156x)-32708x+676x^2}$

3.1230.1 Optimal result

Integrand size = 61, antiderivative size = 24

$$\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}\,dx$$
$$=4-\frac{e^{-3+x}}{-7+e-\frac{26}{3}(-25+x)}-x$$

output
```
4-x-exp(-3+x)/(exp(1)+629/3-26/3*x)
```

3.1230.2 Mathematica [A] (verified)

Time = 0.57 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}\,dx$$
$$=\frac{-e^3x+\frac{3e^x}{-629-3e+26x}}{e^3}$$

input
```
Integrate[(-395641 - 9*E^2 + 32708*x - 676*x^2 + E^(-3 + x)*(-1965 - 9*E +
 78*x) + E*(-3774 + 156*x))/(395641 + 9*E^2 + E*(3774 - 156*x) - 32708*x +
 676*x^2),x]
```

output
```
(-(E^3*x) + (3*E^x)/(-629 - 3*E + 26*x))/E^3
```

3.1230.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 144 vs. 2(24) = 48.

Time = 0.94 (sec) , antiderivative size = 144, normalized size of antiderivative = 6.00, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.098, Rules used = {7292, 7277, 27, 7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-676x^2+32708x+e^{x-3}(78x-9e-1965)+e(156x-3774)-9e^2-395641}{676x^2-32708x+e(3774-156x)+9e^2+395641}dx$$

$$\Big\downarrow \ 7292$$

$$\int \frac{-676x^2+32708x+e^{x-3}(78x-9e-1965)+e(156x-3774)-395641\left(1+\frac{9e^2}{395641}\right)}{676x^2-52(629+3e)x+(629+3e)^2}dx$$

$$\Big\downarrow \ 7277$$

$$2704\int -\frac{676x^2-32708x+6e(629-26x)+3e^{x-3}(-26x+3e+655)+9e^2+395641}{2704(-26x+3e+629)^2}dx$$

$$\Big\downarrow \ 27$$

$$-\int \frac{676x^2-32708x+6e(629-26x)+3e^{x-3}(-26x+3e+655)+9e^2+395641}{(-26x+3e+629)^2}dx$$

$$\Big\downarrow \ 7292$$

$$-\int \frac{676x^2-32708x+6e(629-26x)+3e^{x-3}(-26x+3e+655)+395641\left(1+\frac{9e^2}{395641}\right)}{(-26x+3e+629)^2}dx$$

$$\Big\downarrow \ 7293$$

$$-\int \left(\frac{676x^2}{(-26x+3e+629)^2}-\frac{32708x}{(-26x+3e+629)^2}+\frac{3e^{x-3}(-26x+3e+655)}{(-26x+3e+629)^2}-\frac{6e(26x-629)}{(-26x+3e+629)^2}+\cdots\right.$$

$$\Big\downarrow \ 2009$$

$$-x-\frac{3e^{x-3}}{-26x+3e+629}-\frac{395641+9e^2}{26(-26x+3e+629)}-\frac{(629+3e)^2}{26(-26x+3e+629)}+\frac{629(629+3e)}{13(-26x+3e+629)}+\frac{9e^2}{13(-26x+3e+629)}-\frac{1}{13}(629+3e)\log(-26x+3e+629)+\frac{3}{13}e\log(-26x+3e+629)+\frac{629}{13}\log(-26x+3e+629)$$

3.1230. $\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}dx$

input
```
Int[(-395641 - 9*E^2 + 32708*x - 676*x^2 + E^(-3 + x)*(-1965 - 9*E + 78*x)
 + E*(-3774 + 156*x))/(395641 + 9*E^2 + E*(3774 - 156*x) - 32708*x + 676*x
^2),x]
```

output
```
(9*E^2)/(13*(629 + 3*E - 26*x)) - (3*E^(-3 + x))/(629 + 3*E - 26*x) + (629
*(629 + 3*E))/(13*(629 + 3*E - 26*x)) - (629 + 3*E)^2/(26*(629 + 3*E - 26*
x)) - (395641 + 9*E^2)/(26*(629 + 3*E - 26*x)) - x + (629*Log[629 + 3*E -
26*x])/13 + (3*E*Log[629 + 3*E - 26*x])/13 - ((629 + 3*E)*Log[629 + 3*E -
26*x])/13
```

3.1230.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1230. $\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}\,dx$

3.1230.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.50

method	result
norman	$\frac{26x^2-3\,\mathrm{e}^{-3+x}-\frac{395641}{26}-\frac{9\,\mathrm{e}^2}{26}-\frac{1887\,\mathrm{e}}{13}}{3\,\mathrm{e}-26x+629}$
parallelrisch	$-\frac{9\,\mathrm{e}^2+395641-676x^2+3774\,\mathrm{e}+78\,\mathrm{e}^{-3+x}}{26(3\,\mathrm{e}-26x+629)}$
parts	$-x-\frac{1731\,\mathrm{e}^{-3+x}}{26(3\,\mathrm{e}-26x+629)}+\frac{1731\,\mathrm{e}^{\frac{3\,\mathrm{e}}{26}+\frac{551}{26}}\,\mathrm{Ei}_1\left(\frac{629}{26}+\frac{3\,\mathrm{e}}{26}-x\right)}{676}+\frac{3\,\mathrm{e}^{-3+x}(551+3\,\mathrm{e})}{26(3\,\mathrm{e}-26x+629)}-78\left(\frac{577}{17576}+\frac{3\,\mathrm{e}}{17576}\right)\mathrm{e}^{\frac{3\,\mathrm{e}}{26}}$
derivativedivides	$-\frac{303601}{26(3\,\mathrm{e}-26x+629)}+\frac{\frac{303601}{13}+\frac{1653\,\mathrm{e}}{13}}{3\,\mathrm{e}-26x+629}+\frac{551\ln(3\,\mathrm{e}-26x+629)}{13}+\frac{26(-3+x)^2-\frac{9\,\mathrm{e}^2}{13}-\frac{3306\,\mathrm{e}}{13}-\frac{303601}{13}}{3\,\mathrm{e}-26x+629}+\left(-\frac{3\,\mathrm{e}}{13}-\right.$
default	$-\frac{303601}{26(3\,\mathrm{e}-26x+629)}+\frac{\frac{303601}{13}+\frac{1653\,\mathrm{e}}{13}}{3\,\mathrm{e}-26x+629}+\frac{551\ln(3\,\mathrm{e}-26x+629)}{13}+\frac{26(-3+x)^2-\frac{9\,\mathrm{e}^2}{13}-\frac{3306\,\mathrm{e}}{13}-\frac{303601}{13}}{3\,\mathrm{e}-26x+629}+\left(-\frac{3\,\mathrm{e}}{13}-\right.$

input
```
int(((-9*exp(1)+78*x-1965)*exp(-3+x)-9*exp(1)^2+(156*x-3774)*exp(1)-676*x^
2+32708*x-395641)/(9*exp(1)^2+(-156*x+3774)*exp(1)+676*x^2-32708*x+395641)
,x,method=_RETURNVERBOSE)
```

output
```
(26*x^2-3*exp(-3+x)-395641/26-9/26*exp(1)^2-1887/13*exp(1))/(3*exp(1)-26*x
+629)
```

3.1230.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.38

$$\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}\,dx$$
$$=-\frac{26\,x^2-3\,xe-629\,x-3\,e^{(x-3)}}{26\,x-3\,e-629}$$

input
```
integrate(((-9*exp(1)+78*x-1965)*exp(-3+x)-9*exp(1)^2+(156*x-3774)*exp(1)-
676*x^2+32708*x-395641)/(9*exp(1)^2+(-156*x+3774)*exp(1)+676*x^2-32708*x+3
95641),x, algorithm=\
```

output
```
-(26*x^2 - 3*x*e - 629*x - 3*e^(x - 3))/(26*x - 3*e - 629)
```

3.1230.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}\,dx = -x+\frac{3e^{x-3}}{26x-629-3e}$$

input
```
integrate(((-9*exp(1)+78*x-1965)*exp(-3+x)-9*exp(1)**2+(156*x-3774)*exp(1)
-676*x**2+32708*x-395641)/(9*exp(1)**2+(-156*x+3774)*exp(1)+676*x**2-32708
*x+395641),x)
```

output
```
-x + 3*exp(x - 3)/(26*x - 629 - 3*E)
```

3.1230.7 Maxima [F]

$$\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}\,dx = \int -\frac{676\,x^2-6\,(26\,x-629)e-3\,(26\,x-3\,e-655)e^{(x-3)}-32708\,x+9\,e^2+395641}{676\,x^2-6\,(26\,x-629)e-32708\,x+9\,e^2+395641}\,dx$$

input
```
integrate(((-9*exp(1)+78*x-1965)*exp(-3+x)-9*exp(1)^2+(156*x-3774)*exp(1)-
676*x^2+32708*x-395641)/(9*exp(1)^2+(-156*x+3774)*exp(1)+676*x^2-32708*x+3
95641),x, algorithm=\
```

output
```
-3/13*((3*e + 629)/(26*x - 3*e - 629) - log(26*x - 3*e - 629))*e - 1/13*(3
*e + 629)*log(26*x - 3*e - 629) - x + 78*x*e^x/(676*x^2*e^3 - 52*x*(3*e^4
+ 629*e^3) + 9*e^5 + 3774*e^4 + 395641*e^3) + 1965/26*e^(3/26*e + 551/26)*
exp_integral_e(2, -x + 3/26*e + 629/26)/(26*x - 3*e - 629) + 1/26*(9*e^2 +
 3774*e + 395641)/(26*x - 3*e - 629) - 629/13*(3*e + 629)/(26*x - 3*e - 62
9) + 9/26*e^2/(26*x - 3*e - 629) + 1887/13*e/(26*x - 3*e - 629) + 395641/2
6/(26*x - 3*e - 629) - integrate(3*(26*x*(3*e - 26) - 9*e^2 - 1965*e - 163
54)*e^x/(17576*x^3*e^3 - 2028*x^2*(3*e^4 + 629*e^3) + 78*x*(9*e^5 + 3774*e
^4 + 395641*e^3) - 27*e^6 - 16983*e^5 - 3560769*e^4 - 248858189*e^3), x) +
 629/13*log(26*x - 3*e - 629)
```

3.1230.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}\,dx$$
$$= -\frac{26\,x^2e^3-3\,xe^4-629\,xe^3-3\,e^x}{26\,xe^3-3\,e^4-629\,e^3}$$

input
```
integrate(((-9*exp(1)+78*x-1965)*exp(-3+x)-9*exp(1)^2+(156*x-3774)*exp(1)-
676*x^2+32708*x-395641)/(9*exp(1)^2+(-156*x+3774)*exp(1)+676*x^2-32708*x+3
95641),x, algorithm=\
```

output
```
-(26*x^2*e^3 - 3*x*e^4 - 629*x*e^3 - 3*e^x)/(26*x*e^3 - 3*e^4 - 629*e^3)
```

3.1230.9 Mupad [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{-395641-9e^2+32708x-676x^2+e^{-3+x}(-1965-9e+78x)+e(-3774+156x)}{395641+9e^2+e(3774-156x)-32708x+676x^2}\,dx$$
$$= -x-\frac{3\,\mathrm{e}^{-3}\,\mathrm{e}^x}{3\,\mathrm{e}-26\,x+629}$$

input
```
int(-(9*exp(2) - 32708*x + exp(x - 3)*(9*exp(1) - 78*x + 1965) + 676*x^2 -
 exp(1)*(156*x - 3774) + 395641)/(9*exp(2) - 32708*x + 676*x^2 - exp(1)*(1
56*x - 3774) + 395641),x)
```

output
```
- x - (3*exp(-3)*exp(x))/(3*exp(1) - 26*x + 629)
```

3.1231 $\int \frac{8e^5x^{14}+e^{4x}(16x^7-8x^8+e^5(-14x^6+8x^7))}{e^{8x}+8e^{4x}x^8+16x^{16}} dx$

3.1231.1 Optimal result

Integrand size = 65, antiderivative size = 25

$$\int \frac{8e^5x^{14}+e^{4x}(16x^7-8x^8+e^5(-14x^6+8x^7))}{e^{8x}+8e^{4x}x^8+16x^{16}} \, dx = -\frac{2(e^5-x)}{\left(4+\frac{e^{4x}}{x^8}\right)x}$$

output
```
-2/x/(exp(x)^4/x^8+4)*(exp(5)-x)
```

3.1231.2 Mathematica [A] (verified)

Time = 9.45 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{8e^5x^{14}+e^{4x}(16x^7-8x^8+e^5(-14x^6+8x^7))}{e^{8x}+8e^{4x}x^8+16x^{16}} \, dx = \frac{2(-e^5x^7+x^8)}{e^{4x}+4x^8}$$

input
```
Integrate[(8*E^5*x^14 + E^(4*x)*(16*x^7 - 8*x^8 + E^5*(-14*x^6 + 8*x^7)))/
(E^(8*x) + 8*E^(4*x)*x^8 + 16*x^16),x]
```

output
```
(2*(-(E^5*x^7) + x^8))/(E^(4*x) + 4*x^8)
```

3.1231.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8e^5x^{14}+e^{4x}\left(-8x^8+16x^7+e^5\left(8x^7-14x^6\right)\right)}{16x^{16}+8e^{4x}x^8+e^{8x}}dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{8e^5x^{14}+e^{4x}\left(-8x^8+16x^7+e^5\left(8x^7-14x^6\right)\right)}{\left(4x^8+e^{4x}\right)^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(-\frac{\left(e^5-x\right)(x-2)\left(x^2-e^x\right)x^4}{\left(2x^4-2e^xx^2+e^{2x}\right)^2}-\frac{\left(e^5-x\right)(x-2)\left(x^2+e^x\right)x^4}{\left(2x^4+2e^xx^2+e^{2x}\right)^2}+\frac{\left(e^x-2x^2\right)\left(x^2-\left(2+e^5\right)x+e^5\right)}{4\left(2x^4-2e^xx^2+e^{2x}\right)}+\frac{(-2x\right.$$

$$\Big\downarrow \; 2009$$

$$-2e^5\int \frac{e^xx^4}{\left(2x^4-2e^xx^2+e^{2x}\right)^2}dx+\left(2+e^5\right)\int \frac{e^xx^5}{\left(2x^4-2e^xx^2+e^{2x}\right)^2}dx+2e^5\int \frac{x^6}{\left(2x^4-2e^xx^2+e^{2x}\right)^2}dx-\int \frac{e^xx^6}{\left(2x^4-2e^xx^2+e^{2x}\right)^2}dx-\left(2+e^5\right)\int \frac{x^7}{\left(2x^4-2e^xx^2+e^{2x}\right)^2}dx+\int \frac{x^8}{\left(2x^4-2e^xx^2+e^{2x}\right)^2}dx+\frac{1}{4}e^5\int \frac{e^x}{2x^4-2e^xx^2+e^{2x}}dx-\frac{1}{4}\left(2+e^5\right)\int \frac{e^xx}{2x^4-2e^xx^2+e^{2x}}dx-\frac{1}{2}e^5\int \frac{x^2}{2x^4-2e^xx^2+e^{2x}}dx+\frac{1}{4}\int \frac{e^xx^2}{2x^4-2e^xx^2+e^{2x}}dx+\frac{1}{2}\left(2+e^5\right)\int \frac{x^3}{2x^4-2e^xx^2+e^{2x}}dx-\frac{1}{2}\int \frac{x^4}{2x^4-2e^xx^2+e^{2x}}dx+2e^5\int \frac{e^xx^4}{\left(2x^4+2e^xx^2+e^{2x}\right)^2}dx-\left(2+e^5\right)\int \frac{e^xx^5}{\left(2x^4+2e^xx^2+e^{2x}\right)^2}dx+2e^5\int \frac{x^6}{\left(2x^4+2e^xx^2+e^{2x}\right)^2}dx+\int \frac{e^xx^6}{\left(2x^4+2e^xx^2+e^{2x}\right)^2}dx-\left(2+e^5\right)\int \frac{x^7}{\left(2x^4+2e^xx^2+e^{2x}\right)^2}dx+\int \frac{x^8}{\left(2x^4+2e^xx^2+e^{2x}\right)^2}dx-\frac{1}{4}e^5\int \frac{e^x}{2x^4+2e^xx^2+e^{2x}}dx+\frac{1}{4}\left(2+e^5\right)\int \frac{e^xx}{2x^4+2e^xx^2+e^{2x}}dx-\frac{1}{2}e^5\int \frac{x^2}{2x^4+2e^xx^2+e^{2x}}dx-\frac{1}{4}\int \frac{e^xx^2}{2x^4+2e^xx^2+e^{2x}}dx+\frac{1}{2}\left(2+e^5\right)\int \frac{x^3}{2x^4+2e^xx^2+e^{2x}}dx-\frac{1}{2}\int \frac{x^4}{2x^4+2e^xx^2+e^{2x}}dx$$

input
```
Int[(8*E^5*x^14 + E^(4*x)*(16*x^7 - 8*x^8 + E^5*(-14*x^6 + 8*x^7)))/(E^(8*
x) + 8*E^(4*x)*x^8 + 16*x^16),x]
```

output
```
$Aborted
```

3.1231. $\int \frac{8e^5x^{14}+e^{4x}\left(16x^7-8x^8+e^5\left(-14x^6+8x^7\right)\right)}{e^{8x}+8e^{4x}x^8+16x^{16}}\,dx$

3.1231.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1231.4 Maple [A] (verified)

Time = 0.54 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

method	result	size
risch	$-\frac{2\left(e^{5}-x\right)x^{7}}{4x^{8}+e^{4x}}$	24
parallelrisch	$-\frac{2x^{7}e^{5}-2x^{8}}{4x^{8}+e^{4x}}$	28

input
```
int((((8*x^7-14*x^6)*exp(5)-8*x^8+16*x^7)*exp(x)^4+8*x^14*exp(5))/(exp(x)^
8+8*x^8*exp(x)^4+16*x^16),x,method=_RETURNVERBOSE)
```

output
```
-2*(exp(5)-x)*x^7/(4*x^8+exp(4*x))
```

3.1231.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{8e^5x^{14}+e^{4x}(16x^7-8x^8+e^5(-14x^6+8x^7))}{e^{8x}+8e^{4x}x^8+16x^{16}}\,dx=\frac{2\left(x^8-x^7e^5\right)}{4\,x^8+e^{(4\,x)}}$$

input
```
integrate((((8*x^7-14*x^6)*exp(5)-8*x^8+16*x^7)*exp(x)^4+8*x^14*exp(5))/(e
xp(x)^8+8*x^8*exp(x)^4+16*x^16),x, algorithm=\
```

output
```
2*(x^8 - x^7*e^5)/(4*x^8 + e^(4*x))
```

3.1231.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{8e^5x^{14} + e^{4x}(16x^7 - 8x^8 + e^5(-14x^6 + 8x^7))}{e^{8x} + 8e^{4x}x^8 + 16x^{16}}\,dx = \frac{2x^8 - 2x^7e^5}{4x^8 + e^{4x}}$$

input
```
integrate((((8*x**7-14*x**6)*exp(5)-8*x**8+16*x**7)*exp(x)**4+8*x**14*exp(
5))/(exp(x)**8+8*x**8*exp(x)**4+16*x**16),x)
```

output
```
(2*x**8 - 2*x**7*exp(5))/(4*x**8 + exp(4*x))
```

3.1231.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{8e^5x^{14} + e^{4x}(16x^7 - 8x^8 + e^5(-14x^6 + 8x^7))}{e^{8x} + 8e^{4x}x^8 + 16x^{16}}\,dx = \frac{2\,(x^8 - x^7e^5)}{4\,x^8 + e^{(4\,x)}}$$

input
```
integrate((((8*x^7-14*x^6)*exp(5)-8*x^8+16*x^7)*exp(x)^4+8*x^14*exp(5))/(e
xp(x)^8+8*x^8*exp(x)^4+16*x^16),x, algorithm=\
```

output
```
2*(x^8 - x^7*e^5)/(4*x^8 + e^(4*x))
```

3.1231.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{8e^5x^{14} + e^{4x}(16x^7 - 8x^8 + e^5(-14x^6 + 8x^7))}{e^{8x} + 8e^{4x}x^8 + 16x^{16}}\,dx = \frac{2\,(x^8 - x^7e^5)}{4\,x^8 + e^{(4\,x)}}$$

input
```
integrate((((8*x^7-14*x^6)*exp(5)-8*x^8+16*x^7)*exp(x)^4+8*x^14*exp(5))/(e
xp(x)^8+8*x^8*exp(x)^4+16*x^16),x, algorithm=\
```

output
```
2*(x^8 - x^7*e^5)/(4*x^8 + e^(4*x))
```

3.1231.9 Mupad [B] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.00

$$\int \frac{8e^5x^{14}+e^{4x}(16x^7-8x^8+e^5(-14x^6+8x^7))}{e^{8x}+8e^{4x}x^8+16x^{16}}\,dx=-\frac{2\,(2\,x^{14}\,e^5-x^{15}\,e^5-2\,x^{15}+x^{16})}{(2\,x^7-x^8)\,(e^{4\,x}+4\,x^8)}$$

input
```
int((8*x^14*exp(5) - exp(4*x)*(exp(5)*(14*x^6 - 8*x^7) - 16*x^7 + 8*x^8))/
(exp(8*x) + 8*x^8*exp(4*x) + 16*x^16),x)
```

output
```
-(2*(2*x^14*exp(5) - x^15*exp(5) - 2*x^15 + x^16))/((2*x^7 - x^8)*(exp(4*x
) + 4*x^8))
```

3.1232 $\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x}-x^6}\left(-e^{x^6}+e^{e^x}\left(e^xx-6x^6+(-e^{\cdots}\right.\right.}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}$

3.1232.1 Optimal result

Integrand size = 113, antiderivative size = 30

$$\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x}-x^6}\left(-e^{x^6}+e^{e^x}\left(e^xx-6x^6+\left(-e^x+6x^5\right)\log(\log(3))\right)\right)}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}\,dx = \frac{e^{e^{e^x}-x^6}-x+x^2}{x-\log(\log(3))}$$

output
```
(exp(exp(exp(x))/exp(x^6))+x^2-x)/(x-ln(ln(3)))
```

3.1232.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.40

$$\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x}-x^6}\left(-e^{x^6}+e^{e^x}\left(e^xx-6x^6+\left(-e^x+6x^5\right)\log(\log(3))\right)\right)}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}\,dx = \frac{e^{e^{e^x}-x^6}+x^2-x\log(\log(3))+(-1+\log(\log(3)))\log(\log(3))}{x-\log(\log(3))}$$

input
```
Integrate[(E^x^6*x^2 + E^x^6*(1 - 2*x)*Log[Log[3]] + E^E^(E^x - x^6)*(-E^x
^6 + E^E^x*(E^x*x - 6*x^6 + (-E^x + 6*x^5)*Log[Log[3]])))/(E^x^6*x^2 - 2*E
^x^6*x*Log[Log[3]] + E^x^6*Log[Log[3]]^2),x]
```

output
```
(E^E^(E^x - x^6) + x^2 - x*Log[Log[3]] + (-1 + Log[Log[3]])*Log[Log[3]])/(
x - Log[Log[3]])
```

3.1232.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x-x^6}}\left(e^{e^x}\left(-6x^6+\left(6x^5-e^x\right)\log(\log(3))+e^xx\right)-e^{x^6}\right)+e^{x^6}x^2}{e^{x^6}\log^2(\log(3))-2e^{x^6}x\log(\log(3))+e^{x^6}x^2}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{e^{-x^6}\left(e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x-x^6}}\left(e^{e^x}\left(-6x^6+\left(6x^5-e^x\right)\log(\log(3))+e^xx\right)-e^{x^6}\right)+e^{x^6}x^2\right)}{(x-\log(\log(3)))^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{-x^6+e^{e^x-x^6}+e^x}\left(e^x-6x^5\right)}{x-\log(\log(3))}+\frac{-e^{e^{e^x-x^6}}+x^2-2x\log(\log(3))+\log(\log(3))}{(x-\log(\log(3)))^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-6\log^5(\log(3))\int \frac{e^{-x^6+e^x+e^{e^x-x^6}}}{x-\log(\log(3))}dx-6\log^4(\log(3))\int e^{-x^6+e^x+e^{e^x-x^6}}dx-6\log^3(\log(3))\int e^{-x^6+e^x+e^{e^x-x^6}}xdx-\int \frac{e^{e^{e^x-x^6}}}{(x-\log(\log(3)))^2}dx+\int \frac{e^{-x^6+x+e^x+e^{e^x-x^6}}}{x-\log(\log(3))}dx-6\int e^{-x^6+e^x+e^{e^x-x^6}}x^4dx-6\log(\log(3))\int e^{-x^6+e^x+e^{e^x-x^6}}x^3dx-6\log^2(\log(3))\int e^{-x^6+e^x+e^{e^x-x^6}}x^2dx+x-\frac{(1-\log(\log(3)))\log(\log(3))}{x-\log(\log(3))}$$

input
```
Int[(E^x^6*x^2 + E^x^6*(1 - 2*x)*Log[Log[3]] + E^E^(E^x - x^6)*(-E^x^6 + E
^E^x*(E^x*x - 6*x^6 + (-E^x + 6*x^5)*Log[Log[3]])))/(E^x^6*x^2 - 2*E^x^6*x
*Log[Log[3]] + E^x^6*Log[Log[3]]^2),x]
```

output
```
$Aborted
```

3.1232.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1232.4 Maple [A] (verified)

Time = 230.60 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

method	result	size
parallelrisch	$\frac{-x^{2}+\ln(\ln(3))-{\mathrm e}^{{\mathrm e}^{{\mathrm e}^{x}} {\mathrm e}^{-x^{6}}}}{\ln(\ln(3))-x}$	33
risch	$x-\frac{\ln(\ln(3))^{2}}{\ln(\ln(3))-x}+\frac{\ln(\ln(3))}{\ln(\ln(3))-x}-\frac{{\mathrm e}^{{\mathrm e}^{{\mathrm e}^{x}-x^{6}}}}{\ln(\ln(3))-x}$	53

input
```
int(((((-exp(x)+6*x^5)*ln(ln(3))+exp(x)*x-6*x^6)*exp(exp(x))-exp(x^6))*exp
(exp(exp(x))/exp(x^6))+(1-2*x)*exp(x^6)*ln(ln(3))+x^2*exp(x^6))/(exp(x^6)*
ln(ln(3))^2-2*x*exp(x^6)*ln(ln(3))+x^2*exp(x^6)),x,method=_RETURNVERBOSE)
```

output
```
(-x^2+ln(ln(3))-exp(exp(exp(x))/exp(x^6)))/(ln(ln(3))-x)
```

3.1232.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.23

$$\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x-x^6}}\left(-e^{x^6}+e^{e^x}\left(e^xx-6x^6+\left(-e^x+6x^5\right)\log(\log(3))\right)\right)}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}\,dx$$
$$=\frac{x^2-(x+1)\log\left(\log\left(3\right)\right)+\log\left(\log\left(3\right)\right)^2+e^{\left(e^{\left(-x^6+e^x\right)}\right)}}{x-\log\left(\log\left(3\right)\right)}$$

input
```
integrate(((((-exp(x)+6*x^5)*log(log(3))+exp(x)*x-6*x^6)*exp(exp(x))-exp(x
^6))*exp(exp(exp(x))/exp(x^6))+(1-2*x)*exp(x^6)*log(log(3))+x^2*exp(x^6))/
(exp(x^6)*log(log(3))^2-2*x*exp(x^6)*log(log(3))+x^2*exp(x^6)),x, algorith
m=\
```

output
```
(x^2 - (x + 1)*log(log(3)) + log(log(3))^2 + e^(e^(-x^6 + e^x)))/(x - log(
log(3)))
```

3.1232.6 Sympy [A] (verification not implemented)

Time = 0.56 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.23

$$\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x-x^6}}\left(-e^{x^6}+e^{e^x}(e^xx-6x^6+(-e^x+6x^5)\log(\log(3)))\right)}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}\,dx$$
$$= x+\frac{e^{e^{-x^6}e^{e^x}}}{x-\log(\log(3))}+\frac{-\log(\log(3))+\log(\log(3))^2}{x-\log(\log(3))}$$

input
```
integrate(((((-exp(x)+6*x**5)*ln(ln(3))+exp(x)*x-6*x**6)*exp(exp(x))-exp(x
**6))*exp(exp(exp(x))/exp(x**6))+(1-2*x)*exp(x**6)*ln(ln(3))+x**2*exp(x**6
))/(exp(x**6)*ln(ln(3))**2-2*x*exp(x**6)*ln(ln(3))+x**2*exp(x**6)),x)
```

output
```
x + exp(exp(-x**6)*exp(exp(x)))/(x - log(log(3))) + (-log(log(3)) + log(lo
g(3))**2)/(x - log(log(3)))
```

3.1232.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 104 vs. 2(27) = 54.

Time = 0.34 (sec) , antiderivative size = 104, normalized size of antiderivative = 3.47

$$\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x-x^6}}\left(-e^{x^6}+e^{e^x}(e^xx-6x^6+(-e^x+6x^5)\log(\log(3)))\right)}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}\,dx$$
$$= 2\left(\frac{\log(\log(3))}{x-\log(\log(3))}-\log(x-\log(\log(3)))\right)\log(\log(3)) + 2\log(x-\log(\log(3)))\log(\log(3))+\frac{x^2-x\log(\log(3))-\log(\log(3))^2}{x-\log(\log(3))} + \frac{e^{\left(e^{\left(-x^6+e^x\right)}\right)}}{x-\log(\log(3))}-\frac{\log(\log(3))}{x-\log(\log(3))}$$

input
```
integrate(((((-exp(x)+6*x^5)*log(log(3))+exp(x)*x-6*x^6)*exp(exp(x))-exp(x
^6))*exp(exp(exp(x))/exp(x^6))+(1-2*x)*exp(x^6)*log(log(3))+x^2*exp(x^6))/
(exp(x^6)*log(log(3))^2-2*x*exp(x^6)*log(log(3))+x^2*exp(x^6)),x, algorith
m=\
```

output
```
2*(log(log(3))/(x - log(log(3))) - log(x - log(log(3))))*log(log(3)) + 2*l
og(x - log(log(3)))*log(log(3)) + (x^2 - x*log(log(3)) - log(log(3))^2)/(x
 - log(log(3))) + e^(e^(-x^6 + e^x))/(x - log(log(3))) - log(log(3))/(x -
log(log(3)))
```

3.1232.8 Giac [F]

$$\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x}-x^6}\left(-e^{x^6}+e^{e^x}\left(e^xx-6x^6+\left(-e^x+6x^5\right)\log(\log(3))\right)\right)}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}\,dx$$
$$=\int \frac{x^2e^{(x^6)}-(2\,x-1)e^{(x^6)}\log\left(\log\left(3\right)\right)-\left(\left(6\,x^6-xe^x-\left(6\,x^5-e^x\right)\log\left(\log\left(3\right)\right)\right)e^{(e^x)}+e^{(x^6)}\right)e^{\left(e^{\left(-x^6+e^x\right)}\right)}}{x^2e^{(x^6)}-2\,xe^{(x^6)}\log\left(\log\left(3\right)\right)+e^{(x^6)}\log\left(\log\left(3\right)\right)^2}$$

input
```
integrate(((((-exp(x)+6*x^5)*log(log(3))+exp(x)*x-6*x^6)*exp(exp(x))-exp(x
^6))*exp(exp(exp(x))/exp(x^6))+(1-2*x)*exp(x^6)*log(log(3))+x^2*exp(x^6))/
(exp(x^6)*log(log(3))^2-2*x*exp(x^6)*log(log(3))+x^2*exp(x^6)),x, algorith
m=\
```

output
```
integrate((x^2*e^(x^6) - (2*x - 1)*e^(x^6)*log(log(3)) - ((6*x^6 - x*e^x -
 (6*x^5 - e^x)*log(log(3)))*e^(e^x) + e^(x^6))*e^(e^(-x^6 + e^x)))/(x^2*e^
(x^6) - 2*x*e^(x^6)*log(log(3)) + e^(x^6)*log(log(3))^2), x)
```

3.1232.9 Mupad [B] (verification not implemented)

Time = 15.96 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.37

$$\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x}-x^6}\left(-e^{x^6}+e^{e^x}\left(e^xx-6x^6+\left(-e^x+6x^5\right)\log(\log(3))\right)\right)}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}\,dx$$
$$=\frac{\mathrm{e}^{\mathrm{e}^{\mathrm{e}^x}\,\mathrm{e}^{-x^6}}-\ln\left(\ln\left(3\right)\right)+{\ln\left(\ln\left(3\right)\right)}^2-x\,\ln\left(\ln\left(3\right)\right)+x^2}{x-\ln\left(\ln\left(3\right)\right)}$$

input
```
int(-(exp(exp(exp(x))*exp(-x^6))*(exp(x^6) + exp(exp(x))*(log(log(3))*(exp
(x) - 6*x^5) - x*exp(x) + 6*x^6)) - x^2*exp(x^6) + exp(x^6)*log(log(3))*(2
*x - 1))/(x^2*exp(x^6) + exp(x^6)*log(log(3))^2 - 2*x*exp(x^6)*log(log(3))
),x)
```

output
```
(exp(exp(exp(x))*exp(-x^6)) - log(log(3)) + log(log(3))^2 - x*log(log(3))
+ x^2)/(x - log(log(3)))
```

3.1232. $\int \frac{e^{x^6}x^2+e^{x^6}(1-2x)\log(\log(3))+e^{e^{e^x}-x^6}\left(-e^{x^6}+e^{e^x}\left(e^xx-6x^6+\left(-e^x+6x^5\right)\log(\log(3))\right)\right)}{e^{x^6}x^2-2e^{x^6}x\log(\log(3))+e^{x^6}\log^2(\log(3))}\,dx$

3.1233 $\int \frac{38x+2x^2+36\log(x)}{x^3+x^2\log(x)}\,dx$

3.1233.1 Optimal result

Integrand size = 26, antiderivative size = 29

$$\int \frac{38x+2x^2+36\log(x)}{x^3+x^2\log(x)}\,dx = \log\left(e^{-\frac{2\left(16+\frac{2(x-x^2)}{x}\right)}{x}}(x+\log(x))^2\right)$$

output
```
ln((x+ln(x))^2/exp((16+2*(-x^2+x)/x)/x)^2)
```

3.1233.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.45

$$\int \frac{38x+2x^2+36\log(x)}{x^3+x^2\log(x)}\,dx = -\frac{36}{x}+2\log(x+\log(x))$$

input
```
Integrate[(38*x + 2*x^2 + 36*Log[x])/(x^3 + x^2*Log[x]),x]
```

output
```
-36/x + 2*Log[x + Log[x]]
```

3.1233.3 Rubi [A] (verified)

Time = 0.48 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.45, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$, Rules used = {3041, 7292, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+38x+36\log(x)}{x^3+x^2\log(x)}dx$$
$$\Big\downarrow \text{3041}$$
$$\int \frac{2x^2+38x+36\log(x)}{x^2(x+\log(x))}dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{2(x^2+19x+18\log(x))}{x^2(x+\log(x))}dx$$
$$\Big\downarrow \text{27}$$
$$2\int \frac{x^2+19x+18\log(x)}{x^2(x+\log(x))}dx$$
$$\Big\downarrow \text{7293}$$
$$2\int \left(\frac{x+1}{x(x+\log(x))}+\frac{18}{x^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$2\left(\log(x+\log(x))-\frac{18}{x}\right)$$

input
```
Int[(38*x + 2*x^2 + 36*Log[x])/(x^3 + x^2*Log[x]),x]
```

output
```
2*(-18/x + Log[x + Log[x]])
```

3.1233.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3041
```
Int[(u_.)*((a_.)*(x_)^(m_.) + Log[(c_.)*(x_)^(n_.)]^(q_.)*(b_.)*(x_)^(r_.))
^(p_.), x_Symbol] :> Int[u*x^(p*r)*(a*x^(m - r) + b*Log[c*x^n]^q)^p, x] /;
FreeQ[{a, b, c, m, n, p, q, r}, x] && IntegerQ[p]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1233.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.48

method	result	size
default	$-\frac{36}{x}+2\ln\left(x+\ln\left(x\right)\right)$	14
norman	$-\frac{36}{x}+2\ln\left(x+\ln\left(x\right)\right)$	14
risch	$-\frac{36}{x}+2\ln\left(x+\ln\left(x\right)\right)$	14
parallelrisch	$\frac{2\ln(x+\ln(x))x-36}{x}$	15

input
```
int((36*ln(x)+2*x^2+38*x)/(x^2*ln(x)+x^3),x,method=_RETURNVERBOSE)
```

output
```
-36/x+2*ln(x+ln(x))
```

3.1233.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.48

$$\int \frac{38x + 2x^2 + 36\log(x)}{x^3 + x^2\log(x)}\,dx = \frac{2\,(x\log\left(x + \log\left(x\right)\right) - 18)}{x}$$

input
```
integrate((36*log(x)+2*x^2+38*x)/(x^2*log(x)+x^3),x, algorithm=\
```

output
```
2*(x*log(x + log(x)) - 18)/x
```

3.1233.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.34

$$\int \frac{38x + 2x^2 + 36\log(x)}{x^3 + x^2\log(x)}\,dx = 2\log\left(x + \log\left(x\right)\right) - \frac{36}{x}$$

input
```
integrate((36*ln(x)+2*x**2+38*x)/(x**2*ln(x)+x**3),x)
```

output
```
2*log(x + log(x)) - 36/x
```

3.1233.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.45

$$\int \frac{38x + 2x^2 + 36\log(x)}{x^3 + x^2\log(x)}\,dx = -\frac{36}{x} + 2\,\log\left(x + \log\left(x\right)\right)$$

input
```
integrate((36*log(x)+2*x^2+38*x)/(x^2*log(x)+x^3),x, algorithm=\
```

output
```
-36/x + 2*log(x + log(x))
```

3.1233.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.45

$$\int \frac{38x + 2x^2 + 36\log(x)}{x^3 + x^2\log(x)}\,dx = -\frac{36}{x} + 2\,\log\left(x + \log\left(x\right)\right)$$

input
```
integrate((36*log(x)+2*x^2+38*x)/(x^2*log(x)+x^3),x, algorithm=\
```

output
```
-36/x + 2*log(x + log(x))
```

3.1233.9 Mupad [B] (verification not implemented)

Time = 15.70 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.45

$$\int \frac{38x + 2x^2 + 36\log(x)}{x^3 + x^2\log(x)}\,dx = 2\,\ln\left(x + \ln\left(x\right)\right) - \frac{36}{x}$$

input
```
int((38*x + 36*log(x) + 2*x^2)/(x^2*log(x) + x^3),x)
```

output
```
2*log(x + log(x)) - 36/x
```

3.1234 $\int \frac{-4x+x^6(3+x)+x^3(3+2x)\log(2)+x\log^2(2)}{-4x+x^7+2x^4\log(2)+x\log^2(2)}\,dx$

3.1234.1 Optimal result

Integrand size = 51, antiderivative size = 20

$$\int \frac{-4x+x^6(3+x)+x^3(3+2x)\log(2)+x\log^2(2)}{-4x+x^7+2x^4\log(2)+x\log^2(2)}\,dx = 64+x+\frac{1}{2}\left(5+\log\left(-4+\left(x^3+\log(2)\right)^2\right)\right)$$

output
```
133/2+1/2*ln((x^3+ln(2))^2-4)+x
```

3.1234.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 3 in optimal.

Time = 0.03 (sec) , antiderivative size = 62, normalized size of antiderivative = 3.10

$$\int \frac{-4x+x^6(3+x)+x^3(3+2x)\log(2)+x\log^2(2)}{-4x+x^7+2x^4\log(2)+x\log^2(2)}\,dx = x+\frac{1}{3}\text{RootSum}\left[-4+\log^2(2)+\log(4)\#1^3+\#1^6\&,\frac{\log(8)\log(x-\#1)+3\log(x-\#1)\#1^3}{\log(4)+2\#1^3}\&\right]$$

input
```
Integrate[(-4*x + x^6*(3 + x) + x^3*(3 + 2*x)*Log[2] + x*Log[2]^2)/(-4*x +
 x^7 + 2*x^4*Log[2] + x*Log[2]^2),x]
```

output
```
x + RootSum[-4 + Log[2]^2 + Log[4]*#1^3 + #1^6 & , (Log[8]*Log[x - #1] + 3
*Log[x - #1]*#1^3)/(Log[4] + 2*#1^3) & ]/3
```

3.1234.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.35, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {6, 6, 2026, 9, 2322, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(x+3)x^6+(2x+3)x^3\log(2)-4x+x\log^2(2)}{x^7+2x^4\log(2)-4x+x\log^2(2)}\,dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{(x+3)x^6+(2x+3)x^3\log(2)-4x+x\log^2(2)}{x^7+2x^4\log(2)+x\left(\log^2(2)-4\right)}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{(x+3)x^6+(2x+3)x^3\log(2)+x\left(\log^2(2)-4\right)}{x^7+2x^4\log(2)+x\left(\log^2(2)-4\right)}dx$$

$$\Big\downarrow \ 2026$$

$$\int \frac{(x+3)x^6+(2x+3)x^3\log(2)+x\left(\log^2(2)-4\right)}{x\left(x^6+2x^3\log(2)-4+\log^2(2)\right)}dx$$

$$\Big\downarrow \ 9$$

$$\int \frac{-x^6-3x^5-2x^3\log(2)-3x^2\log(2)+4-\log^2(2)}{-x^6-2x^3\log(2)+4-\log^2(2)}dx$$

$$\Big\downarrow \ 2322$$

$$\int \left(\frac{x^2\left(-3x^3-3\log(2)\right)}{-x^6-2x^3\log(2)+4-\log^2(2)}+1\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{2}\log\left(-x^6-2x^3\log(2)+4-\log^2(2)\right)+x$$

input
```
Int[(-4*x + x^6*(3 + x) + x^3*(3 + 2*x)*Log[2] + x*Log[2]^2)/(-4*x + x^7 +
 2*x^4*Log[2] + x*Log[2]^2),x]
```

output
```
x + Log[4 - x^6 - 2*x^3*Log[2] - Log[2]^2]/2
```

3.1234.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 9
```
Int[(u_.)*(Px_)^(p_.)*((e_.)*(x_))^(m_.), x_Symbol] :> With[{r = Expon[Px,
x, Min]}, Simp[1/e^(p*r)   Int[u*(e*x)^(m + p*r)*ExpandToSum[Px/x^r, x]^p,
x], x] /; IGtQ[r, 0]] /; FreeQ[{e, m}, x] && PolyQ[Px, x] && IntegerQ[p] &&
  !MonomialQ[Px, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2322
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_) + (c_.)*(x_)^(n2_))^(p_), x_Symbol] :> Mo
dule[{q = Expon[Pq, x], j, k}, Int[Sum[x^j*Sum[Coeff[Pq, x, j + k*n]*x^(k*n
), {k, 0, (q - j)/n + 1}]*(a + b*x^n + c*x^(2*n))^p, {j, 0, n - 1}], x]] /;
 FreeQ[{a, b, c, p}, x] && EqQ[n2, 2*n] && PolyQ[Pq, x] && NeQ[b^2 - 4*a*c,
 0] && IGtQ[n, 0] &&  !PolyQ[Pq, x^n]
```

3.1234.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

method	result	size
risch	$x+\frac{\ln\left(x^{6}+2 x^{3} \ln(2)+\ln(2)^{2}-4\right)}{2}$	22
default	$x+\frac{\ln(x^{3}+\ln(2)+2)}{2}+\frac{\ln(x^{3}+\ln(2)-2)}{2}$	23
norman	$x+\frac{\ln(x^{3}+\ln(2)+2)}{2}+\frac{\ln(x^{3}+\ln(2)-2)}{2}$	23
parallelrisch	$x+\frac{\ln(x^{3}+\ln(2)+2)}{2}+\frac{\ln(x^{3}+\ln(2)-2)}{2}$	23

input
```
int(((3+x)*x^6+(3+2*x)*ln(2)*x^3+x*ln(2)^2-4*x)/(x^7+2*x^4*ln(2)+x*ln(2)^2
-4*x),x,method=_RETURNVERBOSE)
```

output
```
x+1/2*ln(x^6+2*x^3*ln(2)+ln(2)^2-4)
```

3.1234.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{-4x+x^6(3+x)+x^3(3+2x)\log(2)+x\log^2(2)}{-4x+x^7+2x^4\log(2)+x\log^2(2)}\,dx = x+\frac{1}{2}\log\left(x^6+2\,x^3\log(2)+\log(2)^2-4\right)$$

input
```
integrate(((3+x)*x^6+(3+2*x)*log(2)*x^3+x*log(2)^2-4*x)/(x^7+2*x^4*log(2)+
x*log(2)^2-4*x),x, algorithm=\
```

output
```
x + 1/2*log(x^6 + 2*x^3*log(2) + log(2)^2 - 4)
```

3.1234.6 Sympy [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{-4x+x^6(3+x)+x^3(3+2x)\log(2)+x\log^2(2)}{-4x+x^7+2x^4\log(2)+x\log^2(2)}\,dx = x+\frac{\log\left(x^6+2x^3\log(2)-4+\log(2)^2\right)}{2}$$

input
```
integrate(((3+x)*x**6+(3+2*x)*ln(2)*x**3+x*ln(2)**2-4*x)/(x**7+2*x**4*ln(2
)+x*ln(2)**2-4*x),x)
```

output
```
x + log(x**6 + 2*x**3*log(2) - 4 + log(2)**2)/2
```

3.1234.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{-4x+x^6(3+x)+x^3(3+2x)\log(2)+x\log^2(2)}{-4x+x^7+2x^4\log(2)+x\log^2(2)}\,dx = x+\frac{1}{2}\log\left(x^3+\log(2)+2\right)+\frac{1}{2}\log\left(x^3+\log(2)-2\right)$$

input
```
integrate(((3+x)*x^6+(3+2*x)*log(2)*x^3+x*log(2)^2-4*x)/(x^7+2*x^4*log(2)+
x*log(2)^2-4*x),x, algorithm=\
```

output
```
x + 1/2*log(x^3 + log(2) + 2) + 1/2*log(x^3 + log(2) - 2)
```

3.1234.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{-4x+x^6(3+x)+x^3(3+2x)\log(2)+x\log^2(2)}{-4x+x^7+2x^4\log(2)+x\log^2(2)}\,dx = x+\frac{1}{2}\log\left(\left|x^3+\log(2)+2\right|\right)+\frac{1}{2}\log\left(\left|x^3+\log(2)-2\right|\right)$$

input
```
integrate(((3+x)*x^6+(3+2*x)*log(2)*x^3+x*log(2)^2-4*x)/(x^7+2*x^4*log(2)+
x*log(2)^2-4*x),x, algorithm=\
```

output
```
x + 1/2*log(abs(x^3 + log(2) + 2)) + 1/2*log(abs(x^3 + log(2) - 2))
```

3.1234.9 Mupad [B] (verification not implemented)

Time = 15.79 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{-4x + x^6(3 + x) + x^3(3 + 2x) \log(2) + x \log^2(2)}{-4x + x^7 + 2x^4 \log(2) + x \log^2(2)} \, dx = x + \frac{\ln\left(x^6 + 2\,\ln(2)\,x^3 + \ln(2)^2 - 4\right)}{2}$$

input
```
int((x^6*(x + 3) - 4*x + x*log(2)^2 + x^3*log(2)*(2*x + 3))/(x*log(2)^2 -
4*x + 2*x^4*log(2) + x^7),x)
```

output
```
x + log(2*x^3*log(2) + log(2)^2 + x^6 - 4)/2
```

3.1235 $\int \frac{-2-2x+e^x(-6+x^2)}{1+2e^x+e^{2x}} \, dx$

3.1235.1 Optimal result

Integrand size = 29, antiderivative size = 21

$$\int \frac{-2-2x+e^x(-6+x^2)}{1+2e^x+e^{2x}} \, dx = \frac{5+e^x-2x-x^2}{1+e^x}$$

output
```
(exp(x)-x^2-2*x+5)/(exp(x)+1)
```

3.1235.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \frac{-2-2x+e^x(-6+x^2)}{1+2e^x+e^{2x}} \, dx = \frac{4-2x-x^2}{1+e^x}$$

input
```
Integrate[(-2 - 2*x + E^x*(-6 + x^2))/(1 + 2*E^x + E^(2*x)),x]
```

output
```
(4 - 2*x - x^2)/(1 + E^x)
```

3.1235.3 Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.52, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.103, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(x^2-6)-2x-2}{2e^x+e^{2x}+1}\,dx$$
$$\Big\downarrow \text{7292}$$
$$\int \frac{e^x(x^2-6)-2x-2}{(e^x+1)^2}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{x^2-6}{e^x+1}-\frac{x^2+2x-4}{(e^x+1)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{x^2}{e^x+1}-\frac{2x}{e^x+1}+\frac{4}{e^x+1}$$

input
```
Int[(-2 - 2*x + E^x*(-6 + x^2))/(1 + 2*E^x + E^(2*x)),x]
```

output
```
4/(1 + E^x) - (2*x)/(1 + E^x) - x^2/(1 + E^x)
```

3.1235.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1235.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

method	result	size
risch	$-\frac{x^2+2x-4}{e^x+1}$	17
parallelrisch	$-\frac{x^2+2x-4}{e^x+1}$	17
norman	$\frac{-x^2-2x+4}{e^x+1}$	18

input
```
int(((x^2-6)*exp(x)-2*x-2)/(exp(x)^2+2*exp(x)+1),x,method=_RETURNVERBOSE)
```

output
```
-(x^2+2*x-4)/(exp(x)+1)
```

3.1235.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

$$\int \frac{-2-2x+e^x(-6+x^2)}{1+2e^x+e^{2x}}\,dx = -\frac{x^2+2\,x-4}{e^x+1}$$

input
```
integrate(((x^2-6)*exp(x)-2*x-2)/(exp(x)^2+2*exp(x)+1),x, algorithm=\
```

output
```
-(x^2 + 2*x - 4)/(e^x + 1)
```

3.1235.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.57

$$\int \frac{-2-2x+e^x(-6+x^2)}{1+2e^x+e^{2x}}\,dx = \frac{-x^2-2x+4}{e^x+1}$$

input
```
integrate(((x**2-6)*exp(x)-2*x-2)/(exp(x)**2+2*exp(x)+1),x)
```

output
```
(-x**2 - 2*x + 4)/(exp(x) + 1)
```

3.1235.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.43

$$\int \frac{-2-2x+e^x(-6+x^2)}{1+2e^x+e^{2x}}\,dx=-2\,x-\frac{x^2-2\,xe^x-6}{e^x+1}-\frac{2}{e^x+1}$$

input
```
integrate(((x^2-6)*exp(x)-2*x-2)/(exp(x)^2+2*exp(x)+1),x, algorithm=\
```

output
```
-2*x - (x^2 - 2*x*e^x - 6)/(e^x + 1) - 2/(e^x + 1)
```

3.1235.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

$$\int \frac{-2-2x+e^x(-6+x^2)}{1+2e^x+e^{2x}}\,dx=-\frac{x^2+2\,x-4}{e^x+1}$$

input
```
integrate(((x^2-6)*exp(x)-2*x-2)/(exp(x)^2+2*exp(x)+1),x, algorithm=\
```

output
```
-(x^2 + 2*x - 4)/(e^x + 1)
```

3.1235.9 Mupad [B] (verification not implemented)

Time = 15.36 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.76

$$\int \frac{-2-2x+e^x(-6+x^2)}{1+2e^x+e^{2x}}\,dx=-\frac{x^2+2\,x-4}{\mathrm{e}^x+1}$$

input
```
int(-(2*x - exp(x)*(x^2 - 6) + 2)/(exp(2*x) + 2*exp(x) + 1),x)
```

output
```
-(2*x + x^2 - 4)/(exp(x) + 1)
```

3.1236 $\int \frac{20-20e^2+20ex-5x^2}{4e^2-4ex+x^2}\,dx$

3.1236.1 Optimal result

Integrand size = 32, antiderivative size = 22

$$\int \frac{20-20e^2+20ex-5x^2}{4e^2-4ex+x^2}\,dx = -4071+4\left(\frac{5}{2e-x}-x\right)-x$$

output
```
20/(2*exp(1)-x)-5*x-4071
```

3.1236.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.59

$$\int \frac{20-20e^2+20ex-5x^2}{4e^2-4ex+x^2}\,dx = -5\left(x+\frac{4}{-2e+x}\right)$$

input
```
Integrate[(20 - 20*E^2 + 20*E*x - 5*x^2)/(4*E^2 - 4*E*x + x^2),x]
```

output
```
-5*(x + 4/(-2*E + x))
```

3.1236.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {1294, 27, 1107, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-5x^2+20ex-20e^2+20}{x^2-4ex+4e^2} \, dx$$

$$\Big\downarrow \ 1294$$

$$\int \frac{5\left(-x^2+4ex+4\left(1-e^2\right)\right)}{(2e-x)^2}dx$$

$$\Big\downarrow \ 27$$

$$5\int \frac{-x^2+4ex+4\left(1-e^2\right)}{(2e-x)^2}dx$$

$$\Big\downarrow \ 1107$$

$$5\int \left(\frac{4}{(2e-x)^2}-1\right)dx$$

$$\Big\downarrow \ 2009$$

$$5\left(\frac{4}{2e-x}-x\right)$$

input
```
Int[(20 - 20*E^2 + 20*E*x - 5*x^2)/(4*E^2 - 4*E*x + x^2),x]
```

output
```
5*(4/(2*E - x) - x)
```

3.1236.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1107
```
Int[((d_.) + (e_.)*(x_))^(m_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_
Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; F
reeQ[{a, b, c, d, e, m}, x] && EqQ[2*c*d - b*e, 0] && IGtQ[p, 0] &&  !(EqQ[
m, 3] && NeQ[p, 1])
```

rule 1294
```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.)*((d_.) + (e_.)*(x_) + (f_.)*(x
_)^2)^(q_.), x_Symbol] :> Simp[1/c^p   Int[(b/2 + c*x)^(2*p)*(d + e*x + f*x
^2)^q, x], x] /; FreeQ[{a, b, c, d, e, f, q}, x] && EqQ[b^2 - 4*a*c, 0] &&
IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1236.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.68

method	result
risch	$-5x+\frac{10}{\mathrm{e}-\frac{x}{2}}$
norman	$\frac{5x^{2}+20-20\,\mathrm{e}^{2}}{2\,\mathrm{e}-x}$
gosper	$-\frac{5\left(-x^{2}-4+4\,\mathrm{e}^{2}\right)}{2\,\mathrm{e}-x}$
parallelrisch	$-\frac{20\,\mathrm{e}^{2}-20-5x^{2}}{2\,\mathrm{e}-x}$
meijerg	$-\frac{5x}{1-\frac{\mathrm{e}^{-1}x}{2}}+\frac{5\,\mathrm{e}^{-2}x}{1-\frac{\mathrm{e}^{-1}x}{2}}+20\,\mathrm{e}\left(\frac{\mathrm{e}^{-1}x}{2-\mathrm{e}^{-1}x}+\ln\left(1-\frac{\mathrm{e}^{-1}x}{2}\right)\right)+10\,\mathrm{e}\left(-\frac{x\,\mathrm{e}^{-1}\left(-\frac{3\,\mathrm{e}^{-1}x}{2}+6\right)}{6\left(1-\frac{\mathrm{e}^{-1}x}{2}\right)}-2\ln\left(1-\frac{\mathrm{e}^{-1}}{2}\right.\right.$

input
```
int((-20*exp(1)^2+20*x*exp(1)-5*x^2+20)/(4*exp(1)^2-4*x*exp(1)+x^2),x,meth
od=_RETURNVERBOSE)
```

output
```
-5*x+10/(exp(1)-1/2*x)
```

3.1236.5 Fricas [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{20-20e^2+20ex-5x^2}{4e^2-4ex+x^2}\,dx=-\frac{5\,(x^2-2\,xe+4)}{x-2\,e}$$

input
```
integrate((-20*exp(1)^2+20*x*exp(1)-5*x^2+20)/(4*exp(1)^2-4*x*exp(1)+x^2),
x, algorithm=\
```

output
```
-5*(x^2 - 2*x*e + 4)/(x - 2*e)
```

3.1236.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.55

$$\int \frac{20-20e^2+20ex-5x^2}{4e^2-4ex+x^2}\,dx=-5x-\frac{20}{x-2e}$$

input
```
integrate((-20*exp(1)**2+20*x*exp(1)-5*x**2+20)/(4*exp(1)**2-4*x*exp(1)+x*
*2),x)
```

output
```
-5*x - 20/(x - 2*E)
```

3.1236.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{20-20e^2+20ex-5x^2}{4e^2-4ex+x^2}\,dx=-5\,x-\frac{20}{x-2\,e}$$

input
```
integrate((-20*exp(1)^2+20*x*exp(1)-5*x^2+20)/(4*exp(1)^2-4*x*exp(1)+x^2),
x, algorithm=\
```

output
```
-5*x - 20/(x - 2*e)
```

3.1236.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{20-20e^2+20ex-5x^2}{4e^2-4ex+x^2}\,dx = -5\,x-\frac{20}{x-2\,e}$$

input
```
integrate((-20*exp(1)^2+20*x*exp(1)-5*x^2+20)/(4*exp(1)^2-4*x*exp(1)+x^2),
x, algorithm=\
```

output
```
-5*x - 20/(x - 2*e)
```

3.1236.9 Mupad [B] (verification not implemented)

Time = 14.59 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{20-20e^2+20ex-5x^2}{4e^2-4ex+x^2}\,dx = -5\,x-\frac{20}{x-2\,\mathrm{e}}$$

input
```
int(-(20*exp(2) - 20*x*exp(1) + 5*x^2 - 20)/(4*exp(2) - 4*x*exp(1) + x^2),
x)
```

output
```
- 5*x - 20/(x - 2*exp(1))
```

3.1237 $\int \left(-300e^4x - 100x^3 + (150e^4 + 150x^2)\log(4) - 50$

3.1237.1 Optimal result

Integrand size = 33, antiderivative size = 32

$$\int \left(-300e^4x-100x^3+\left(150e^4+150x^2\right)\log(4)-50x\log^2(4)\right)\,dx = 4+3e^{-e^2}-25x^2\left(-\frac{3e^4}{x}-x+\log(4)\right)^2$$

output
```
4-25*(2*ln(2)-3*exp(4)/x-x)^2*x^2+3/exp(exp(2))
```

3.1237.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.72

$$\int \left(-300e^4x-100x^3+\left(150e^4+150x^2\right)\log(4)-50x\log^2(4)\right)\,dx = -25x\left(6e^4+x(x-\log(4))\right)(x-\log(4))$$

input
```
Integrate[-300*E^4*x - 100*x^3 + (150*E^4 + 150*x^2)*Log[4] - 50*x*Log[4]^
2,x]
```

output
```
-25*x*(6*E^4 + x*(x - Log[4]))*(x - Log[4])
```

3.1237.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.12, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.061, Rules used = {6, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(-100x^3+\left(150x^2+150e^4\right)\log(4)-300e^4x-50x\log^2(4)\right)\,dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \left(-100x^3+\left(150x^2+150e^4\right)\log(4)+x\left(-300e^4-50\log^2(4)\right)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-25x^4+50x^3\log(4)-25x^2\left(6e^4+\log^2(4)\right)+150e^4x\log(4)$$

input
```
Int[-300*E^4*x - 100*x^3 + (150*E^4 + 150*x^2)*Log[4] - 50*x*Log[4]^2,x]
```

output
```
-25*x^4 + 150*E^4*x*Log[4] + 50*x^3*Log[4] - 25*x^2*(6*E^4 + Log[4]^2)
```

3.1237.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1237.4 Maple [A] (verified)

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.62

method	result	size
default	$-25(2x\ln(2)-x^2-3\,\mathrm{e}^4)^2$	20
gosper	$-25x\left(4x\ln(2)^2-4x^2\ln(2)+x^3-12\,\mathrm{e}^4\ln(2)+6x\,\mathrm{e}^4\right)$	33
norman	$\left(-100\ln(2)^2-150\,\mathrm{e}^4\right)x^2-25x^4+100x^3\ln(2)+300x\,\mathrm{e}^4\ln(2)$	36
risch	$-100x^2\ln(2)^2+100x^3\ln(2)+300x\,\mathrm{e}^4\ln(2)-150x^2\mathrm{e}^4-25x^4$	37
parallelrisch	$-100x^2\ln(2)^2+100x^3\ln(2)+300x\,\mathrm{e}^4\ln(2)-150x^2\mathrm{e}^4-25x^4$	37
parts	$-100x^2\ln(2)^2+100x^3\ln(2)+300x\,\mathrm{e}^4\ln(2)-150x^2\mathrm{e}^4-25x^4$	37

input
```
int(-200*x*ln(2)^2+2*(150*exp(4)+150*x^2)*ln(2)-300*x*exp(4)-100*x^3,x,met
hod=_RETURNVERBOSE)
```

output
```
-25*(2*x*ln(2)-x^2-3*exp(4))^2
```

3.1237.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.09

$$\int \left(-300e^4x-100x^3+\left(150e^4+150x^2\right)\log(4)-50x\log^2(4)\right)\,dx$$
$$=-25\,x^4-100\,x^2\log(2)^2-150\,x^2e^4+100\,\left(x^3+3\,xe^4\right)\log(2)$$

input
```
integrate(-200*x*log(2)^2+2*(150*exp(4)+150*x^2)*log(2)-300*x*exp(4)-100*x
^3,x, algorithm=\
```

output
```
-25*x^4 - 100*x^2*log(2)^2 - 150*x^2*e^4 + 100*(x^3 + 3*x*e^4)*log(2)
```

3.1237.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.22

$$\int \left(-300e^4x-100x^3+\left(150e^4+150x^2\right)\log(4)-50x\log^2(4)\right)\,dx$$
$$=-25x^4+100x^3\log(2)+x^2\left(-150e^4-100\log(2)^2\right)+300xe^4\log(2)$$

input
```
integrate(-200*x*ln(2)**2+2*(150*exp(4)+150*x**2)*ln(2)-300*x*exp(4)-100*x
**3,x)
```

output
```
-25*x**4 + 100*x**3*log(2) + x**2*(-150*exp(4) - 100*log(2)**2) + 300*x*ex
p(4)*log(2)
```

3.1237.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.09

$$\int \left(-300e^4x-100x^3+\left(150e^4+150x^2\right)\log(4)-50x\log^2(4)\right)\,dx$$
$$=-25\,x^4-100\,x^2\log\left(2\right)^2-150\,x^2e^4+100\,\left(x^3+3\,xe^4\right)\log\left(2\right)$$

input
```
integrate(-200*x*log(2)^2+2*(150*exp(4)+150*x^2)*log(2)-300*x*exp(4)-100*x
^3,x, algorithm=\
```

output
```
-25*x^4 - 100*x^2*log(2)^2 - 150*x^2*e^4 + 100*(x^3 + 3*x*e^4)*log(2)
```

3.1237.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.09

$$\int \left(-300e^4x-100x^3+\left(150e^4+150x^2\right)\log(4)-50x\log^2(4)\right)\,dx$$
$$=-25\,x^4-100\,x^2\log\left(2\right)^2-150\,x^2e^4+100\,\left(x^3+3\,xe^4\right)\log\left(2\right)$$

input
```
integrate(-200*x*log(2)^2+2*(150*exp(4)+150*x^2)*log(2)-300*x*exp(4)-100*x
^3,x, algorithm=\
```

output
```
-25*x^4 - 100*x^2*log(2)^2 - 150*x^2*e^4 + 100*(x^3 + 3*x*e^4)*log(2)
```

3.1237.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.12

$$\int \left(-300e^4x-100x^3+\left(150e^4+150x^2\right)\log(4)-50x\log^2(4)\right)\,dx$$
$$=-25\,x^4+100\,\ln\left(2\right)\,x^3+\left(-150\,\mathrm{e}^4-100\ln\left(2\right)^2\right)\,x^2+300\,\mathrm{e}^4\,\ln\left(2\right)\,x$$

input
```
int(2*log(2)*(150*exp(4) + 150*x^2) - 300*x*exp(4) - 200*x*log(2)^2 - 100*
x^3,x)
```

output
```
100*x^3*log(2) - x^2*(150*exp(4) + 100*log(2)^2) - 25*x^4 + 300*x*exp(4)*l
og(2)
```

3.1238 $\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}(6x+7x^2-2x^4)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx$

3.1238.1 Optimal result

Integrand size = 70, antiderivative size = 25

$$\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}(6x+7x^2-2x^4)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx = e^{\frac{x}{2(1+2x)\left(x+\frac{3+x}{x}\right)}}$$

output
```
exp(1/2*x/((3+x)/x+x)/(1+2*x))
```

3.1238.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}(6x+7x^2-2x^4)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx = e^{\frac{x^2}{6+14x+6x^2+4x^3}}$$

input
```
Integrate[(E^(x^2/(6 + 14*x + 6*x^2 + 4*x^3))*(6*x + 7*x^2 - 2*x^4))/(18 +
 84*x + 134*x^2 + 108*x^3 + 74*x^4 + 24*x^5 + 8*x^6),x]
```

output
```
E^(x^2/(6 + 14*x + 6*x^2 + 4*x^3))
```

3.1238.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}\left(-2x^4+7x^2+6x\right)}{8x^6+24x^5+74x^4+108x^3+134x^2+84x+18}dx$$

$$\Big\downarrow \text{2028}$$

$$\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}x\left(-2x^3+7x+6\right)}{8x^6+24x^5+74x^4+108x^3+134x^2+84x+18}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(-\frac{2e^{\frac{x^2}{4x^3+6x^2+14x+6}}x\left(-2x^3+7x+6\right)}{121\left(x^2+x+3\right)}+\frac{8e^{\frac{x^2}{4x^3+6x^2+14x+6}}x\left(-2x^3+7x+6\right)}{121(2x+1)^2}-\frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}x\left(-2x^3+7x+6\right)}{22\left(x^2+x+3\right)^2}\right)$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{11}\left(1-i\sqrt{11}\right)\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{\left(-2x+i\sqrt{11}-1\right)^2}dx-\frac{6}{11}\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{\left(-2x+i\sqrt{11}-1\right)^2}dx+\frac{5i\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{-2x+i\sqrt{11}-1}dx}{11\sqrt{11}}-\frac{1}{11}\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{(2x+1)^2}dx-\frac{1}{121}\left(22-15i\sqrt{11}\right)\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{2x-i\sqrt{11}+1}dx+\frac{2}{121}\left(11-5i\sqrt{11}\right)\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{2x-i\sqrt{11}+1}dx+\frac{1}{11}\left(1+i\sqrt{11}\right)\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{\left(2x+i\sqrt{11}+1\right)^2}dx-\frac{6}{11}\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{\left(2x+i\sqrt{11}+1\right)^2}dx-\frac{1}{121}\left(22+15i\sqrt{11}\right)\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{2x+i\sqrt{11}+1}dx+\frac{2}{121}\left(11+5i\sqrt{11}\right)\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{2x+i\sqrt{11}+1}dx+\frac{5i\int \frac{e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{2x+i\sqrt{11}+1}dx}{11\sqrt{11}}$$

input
```
Int[(E^(x^2/(6 + 14*x + 6*x^2 + 4*x^3))*(6*x + 7*x^2 - 2*x^4))/(18 + 84*x
+ 134*x^2 + 108*x^3 + 74*x^4 + 24*x^5 + 8*x^6),x]
```

output
```
$Aborted
```

3.1238. $\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}\left(6x+7x^2-2x^4\right)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx$

3.1238.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2028
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.) + (c_.)*(x_)^(t_.))^(p_.),
x_Symbol] :> Int[x^(p*r)*(a + b*x^(s - r) + c*x^(t - r))^p*Fx, x] /; FreeQ[
{a, b, c, r, s, t}, x] && IntegerQ[p] && PosQ[s - r] && PosQ[t - r] &&  !(E
qQ[p, 1] && EqQ[u, 1])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.1238.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

method	result	size
risch	$e^{\frac{x^2}{2(1+2x)\left(x^2+x+3\right)}}$	22
gosper	$e^{\frac{x^2}{4x^3+6x^2+14x+6}}$	24
parallelrisch	$e^{\frac{x^2}{4x^3+6x^2+14x+6}}$	24
norman	$\frac{7x\,e^{\frac{x^2}{4x^3+6x^2+14x+6}}+3x^2 e^{\frac{x^2}{4x^3+6x^2+14x+6}}+2x^3 e^{\frac{x^2}{4x^3+6x^2+14x+6}}+3\,e^{\frac{x^2}{4x^3+6x^2+14x+6}}}{2x^3+3x^2+7x+3}$	123

input
```
int((-2*x^4+7*x^2+6*x)*exp(x^2/(4*x^3+6*x^2+14*x+6))/(8*x^6+24*x^5+74*x^4+
108*x^3+134*x^2+84*x+18),x,method=_RETURNVERBOSE)
```

output
```
exp(1/2*x^2/(1+2*x)/(x^2+x+3))
```

3.1238. $\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}\left(6x+7x^2-2x^4\right)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx$

3.1238.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}(6x+7x^2-2x^4)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx = e^{\left(\frac{x^2}{2\,(2\,x^3+3\,x^2+7\,x+3)}\right)}$$

input
```
integrate((-2*x^4+7*x^2+6*x)*exp(x^2/(4*x^3+6*x^2+14*x+6))/(8*x^6+24*x^5+7
4*x^4+108*x^3+134*x^2+84*x+18),x, algorithm=\
```

output
```
e^(1/2*x^2/(2*x^3 + 3*x^2 + 7*x + 3))
```

3.1238.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}(6x+7x^2-2x^4)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx = e^{\frac{x^2}{4x^3+6x^2+14x+6}}$$

input
```
integrate((-2*x**4+7*x**2+6*x)*exp(x**2/(4*x**3+6*x**2+14*x+6))/(8*x**6+24
*x**5+74*x**4+108*x**3+134*x**2+84*x+18),x)
```

output
```
exp(x**2/(4*x**3 + 6*x**2 + 14*x + 6))
```

3.1238.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.28

$$\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}(6x+7x^2-2x^4)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx = e^{\left(\frac{5\,x}{22\,(x^2+x+3)}-\frac{3}{22\,(x^2+x+3)}+\frac{1}{22\,(2\,x+1)}\right)}$$

input
```
integrate((-2*x^4+7*x^2+6*x)*exp(x^2/(4*x^3+6*x^2+14*x+6))/(8*x^6+24*x^5+7
4*x^4+108*x^3+134*x^2+84*x+18),x, algorithm=\
```

output
```
e^(5/22*x/(x^2 + x + 3) - 3/22/(x^2 + x + 3) + 1/22/(2*x + 1))
```

3.1238.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}(6x+7x^2-2x^4)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx = e^{\left(\frac{x^2}{2\,(2\,x^3+3\,x^2+7\,x+3)}\right)}$$

input
```
integrate((-2*x^4+7*x^2+6*x)*exp(x^2/(4*x^3+6*x^2+14*x+6))/(8*x^6+24*x^5+7
4*x^4+108*x^3+134*x^2+84*x+18),x, algorithm=\
```

output
```
e^(1/2*x^2/(2*x^3 + 3*x^2 + 7*x + 3))
```

3.1238.9 Mupad [B] (verification not implemented)

Time = 15.50 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{e^{\frac{x^2}{6+14x+6x^2+4x^3}}(6x+7x^2-2x^4)}{18+84x+134x^2+108x^3+74x^4+24x^5+8x^6}\,dx = \mathrm{e}^{\frac{1}{22\,(2\,x+1)}+\frac{\frac{5\,x}{22}-\frac{3}{22}}{x^2+x+3}}$$

input
```
int((exp(x^2/(14*x + 6*x^2 + 4*x^3 + 6))*(6*x + 7*x^2 - 2*x^4))/(84*x + 13
4*x^2 + 108*x^3 + 74*x^4 + 24*x^5 + 8*x^6 + 18),x)
```

output
```
exp(1/(22*(2*x + 1)) + ((5*x)/22 - 3/22)/(x + x^2 + 3))
```

3.1239 $\int \frac{81x^2-66x^3+18x^4-2x^5+63x^6-30x^7+5x^8+e^x(-9x^2+7x^3-x^4-7x^6}{162+2e^{2x}-180x+86x^2-20x^3+2x^4+e^x(-36+20x-4x^2)}$

3.1239.1 Optimal result

Integrand size = 108, antiderivative size = 33

$$\int \frac{81x^2-66x^3+18x^4-2x^5+63x^6-30x^7+5x^8+e^x(-9x^2+7x^3-x^4-7x^6+x^7)}{162+2e^{2x}-180x+86x^2-20x^3+2x^4+e^x(-36+20x-4x^2)}\,dx$$
$$= -1+\frac{x^3(3-x+x^4)}{2\left(-e^x+(3-x)^2+x\right)}$$

output
```
1/2*x^3/(x-exp(x)+(-x+3)^2)*(x^4-x+3)-1
```

3.1239.2 Mathematica [A] (verified)

Time = 3.52 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.91

$$\int \frac{81x^2-66x^3+18x^4-2x^5+63x^6-30x^7+5x^8+e^x(-9x^2+7x^3-x^4-7x^6+x^7)}{162+2e^{2x}-180x+86x^2-20x^3+2x^4+e^x(-36+20x-4x^2)}\,dx$$
$$= \frac{x^3(3-x+x^4)}{2\left(9-e^x-5x+x^2\right)}$$

input
```
Integrate[(81*x^2 - 66*x^3 + 18*x^4 - 2*x^5 + 63*x^6 - 30*x^7 + 5*x^8 + E^
x*(-9*x^2 + 7*x^3 - x^4 - 7*x^6 + x^7))/(162 + 2*E^(2*x) - 180*x + 86*x^2
- 20*x^3 + 2*x^4 + E^x*(-36 + 20*x - 4*x^2)),x]
```

output
```
(x^3*(3 - x + x^4))/(2*(9 - E^x - 5*x + x^2))
```

3.1239.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5x^8-30x^7+63x^6-2x^5+18x^4-66x^3+81x^2+e^x(x^7-7x^6-x^4+7x^3-9x^2)}{2x^4-20x^3+86x^2+e^x(-4x^2+20x-36)-180x+2e^{2x}+162}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{5x^8-30x^7+63x^6-2x^5+18x^4-66x^3+81x^2+e^x(x^7-7x^6-x^4+7x^3-9x^2)}{2(x^2-5x-e^x+9)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int \frac{5x^8-30x^7+63x^6-2x^5+18x^4-66x^3+81x^2-e^x(-x^7+7x^6+x^4-7x^3+9x^2)}{(x^2-5x-e^x+9)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{2}\int \left(\frac{x^3(x^6-7x^5+14x^4-x^3+10x^2-35x+42)}{(x^2-5x-e^x+9)^2}-\frac{x^2(x^5-7x^4-x^2+7x-9)}{x^2-5x-e^x+9}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{2}\left(9\int \frac{x^2}{x^2-5x-e^x+9}dx+\int \frac{x^9}{(x^2-5x-e^x+9)^2}dx-7\int \frac{x^8}{(x^2-5x-e^x+9)^2}dx+14\int \frac{x^7}{(x^2-5x-e^x+9)}\right.$$

input
```
Int[(81*x^2 - 66*x^3 + 18*x^4 - 2*x^5 + 63*x^6 - 30*x^7 + 5*x^8 + E^x*(-9*
x^2 + 7*x^3 - x^4 - 7*x^6 + x^7))/(162 + 2*E^(2*x) - 180*x + 86*x^2 - 20*x
^3 + 2*x^4 + E^x*(-36 + 20*x - 4*x^2)),x]
```

output
```
$Aborted
```

3.1239.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1239.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.85

method	result	size
risch	$\frac{(x^4-x+3)x^3}{2x^2-10x-2\,e^x+18}$	28
parallelrisch	$\frac{x^7-x^4+3x^3}{2x^2-10x-2\,e^x+18}$	31
norman	$\frac{\frac{3}{2}x^3-\frac{1}{2}x^4+\frac{1}{2}x^7}{x^2-5x-e^x+9}$	32

input
```
int(((x^7-7*x^6-x^4+7*x^3-9*x^2)*exp(x)+5*x^8-30*x^7+63*x^6-2*x^5+18*x^4-6
6*x^3+81*x^2)/(2*exp(x)^2+(-4*x^2+20*x-36)*exp(x)+2*x^4-20*x^3+86*x^2-180*
x+162),x,method=_RETURNVERBOSE)
```

output
```
1/2*(x^4-x+3)*x^3/(x^2-5*x-exp(x)+9)
```

3.1239.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.91

$$\int \frac{81x^2-66x^3+18x^4-2x^5+63x^6-30x^7+5x^8+e^x(-9x^2+7x^3-x^4-7x^6+x^7)}{162+2e^{2x}-180x+86x^2-20x^3+2x^4+e^x\,(-36+20x-4x^2)}\,dx = \frac{x^7-x^4+3\,x^3}{2\,(x^2-5\,x-e^x+9)}$$

input
```
integrate(((x^7-7*x^6-x^4+7*x^3-9*x^2)*exp(x)+5*x^8-30*x^7+63*x^6-2*x^5+18
*x^4-66*x^3+81*x^2)/(2*exp(x)^2+(-4*x^2+20*x-36)*exp(x)+2*x^4-20*x^3+86*x^
2-180*x+162),x, algorithm=\
```

output
```
1/2*(x^7 - x^4 + 3*x^3)/(x^2 - 5*x - e^x + 9)
```

3.1239.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.79

$$\int \frac{81x^2-66x^3+18x^4-2x^5+63x^6-30x^7+5x^8+e^x(-9x^2+7x^3-x^4-7x^6+x^7)}{162+2e^{2x}-180x+86x^2-20x^3+2x^4+e^x\left(-36+20x-4x^2\right)}\,dx = \frac{-x^7+x^4-3x^3}{-2x^2+10x+2e^x-18}$$

input
```
integrate(((x**7-7*x**6-x**4+7*x**3-9*x**2)*exp(x)+5*x**8-30*x**7+63*x**6-
2*x**5+18*x**4-66*x**3+81*x**2)/(2*exp(x)**2+(-4*x**2+20*x-36)*exp(x)+2*x*
*4-20*x**3+86*x**2-180*x+162),x)
```

output
```
(-x**7 + x**4 - 3*x**3)/(-2*x**2 + 10*x + 2*exp(x) - 18)
```

3.1239.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.91

$$\int \frac{81x^2-66x^3+18x^4-2x^5+63x^6-30x^7+5x^8+e^x(-9x^2+7x^3-x^4-7x^6+x^7)}{162+2e^{2x}-180x+86x^2-20x^3+2x^4+e^x\left(-36+20x-4x^2\right)}\,dx = \frac{x^7-x^4+3\,x^3}{2\,(x^2-5\,x-e^x+9)}$$

input
```
integrate(((x^7-7*x^6-x^4+7*x^3-9*x^2)*exp(x)+5*x^8-30*x^7+63*x^6-2*x^5+18
*x^4-66*x^3+81*x^2)/(2*exp(x)^2+(-4*x^2+20*x-36)*exp(x)+2*x^4-20*x^3+86*x^
2-180*x+162),x, algorithm=\
```

output
```
1/2*(x^7 - x^4 + 3*x^3)/(x^2 - 5*x - e^x + 9)
```

3.1239.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.91

$$\int \frac{81x^2-66x^3+18x^4-2x^5+63x^6-30x^7+5x^8+e^x(-9x^2+7x^3-x^4-7x^6+x^7)}{162+2e^{2x}-180x+86x^2-20x^3+2x^4+e^x\left(-36+20x-4x^2\right)}\,dx = \frac{x^7-x^4+3\,x^3}{2\,(x^2-5\,x-e^x+9)}$$

input
```
integrate(((x^7-7*x^6-x^4+7*x^3-9*x^2)*exp(x)+5*x^8-30*x^7+63*x^6-2*x^5+18
*x^4-66*x^3+81*x^2)/(2*exp(x)^2+(-4*x^2+20*x-36)*exp(x)+2*x^4-20*x^3+86*x^
2-180*x+162),x, algorithm=\
```

output
```
1/2*(x^7 - x^4 + 3*x^3)/(x^2 - 5*x - e^x + 9)
```

3.1239.9 Mupad [B] (verification not implemented)

Time = 15.23 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \frac{81x^2-66x^3+18x^4-2x^5+63x^6-30x^7+5x^8+e^x(-9x^2+7x^3-x^4-7x^6+x^7)}{162+2e^{2x}-180x+86x^2-20x^3+2x^4+e^x\left(-36+20x-4x^2\right)}\,dx$$
$$=-\frac{x^7-x^4+3\,x^3}{10\,x+2\,\mathrm{e}^x-2\,x^2-18}$$

input
```
int(-(exp(x)*(9*x^2 - 7*x^3 + x^4 + 7*x^6 - x^7) - 81*x^2 + 66*x^3 - 18*x^
4 + 2*x^5 - 63*x^6 + 30*x^7 - 5*x^8)/(2*exp(2*x) - 180*x - exp(x)*(4*x^2 -
 20*x + 36) + 86*x^2 - 20*x^3 + 2*x^4 + 162),x)
```

output
```
-(3*x^3 - x^4 + x^7)/(10*x + 2*exp(x) - 2*x^2 - 18)
```

3.1240 $\int \frac{2+2e^{2x}+e^x(1+4x)+e^{3x^2}(6e^x x+12x^2)}{e^x+2x}\,dx$

3.1240.1 Optimal result

Integrand size = 48, antiderivative size = 22

$$\int \frac{2+2e^{2x}+e^x(1+4x)+e^{3x^2}(6e^x x+12x^2)}{e^x+2x}\,dx = -1+2e^x+e^{3x^2}+\log(e^x+2x)$$

output
```
2*exp(x)-1+exp(3*x^2)+ln(exp(x)+2*x)
```

3.1240.2 Mathematica [A] (verified)

Time = 1.30 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{2+2e^{2x}+e^x(1+4x)+e^{3x^2}(6e^x x+12x^2)}{e^x+2x}\,dx = 2e^x+e^{3x^2}+\log(e^x+2x)$$

input
```
Integrate[(2 + 2*E^(2*x) + E^x*(1 + 4*x) + E^(3*x^2)*(6*E^x*x + 12*x^2))/(
E^x + 2*x),x]
```

output
```
2*E^x + E^(3*x^2) + Log[E^x + 2*x]
```

3.1240.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{3x^2}(12x^2+6e^x x)+e^x(4x+1)+2e^{2x}+2}{2x+e^x}\,dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(6e^{3x^2}x+\frac{4e^x x+e^x+2e^{2x}+2}{2x+e^x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\int \frac{1}{2x+e^x}dx-2\int \frac{x}{2x+e^x}dx+e^{3x^2}+x+2e^x$$

input
```
Int[(2 + 2*E^(2*x) + E^x*(1 + 4*x) + E^(3*x^2)*(6*E^x*x + 12*x^2))/(E^x +
2*x),x]
```

output
```
$Aborted
```

3.1240.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1240.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

method	result	size
norman	$2\,\mathrm{e}^{x}+\mathrm{e}^{3x^{2}}+\ln\left(\mathrm{e}^{x}+2x\right)$	19
risch	$2\,\mathrm{e}^{x}+\mathrm{e}^{3x^{2}}+\ln\left(\mathrm{e}^{x}+2x\right)$	19
parallelrisch	$2\,\mathrm{e}^{x}+\ln\left(x+\frac{\mathrm{e}^{x}}{2}\right)+\mathrm{e}^{3x^{2}}$	19

input
```
int(((6*exp(x)*x+12*x^2)*exp(3*x^2)+2*exp(x)^2+(1+4*x)*exp(x)+2)/(exp(x)+2
*x),x,method=_RETURNVERBOSE)
```

output
```
2*exp(x)+exp(3*x^2)+ln(exp(x)+2*x)
```

3.1240.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{2+2e^{2x}+e^x(1+4x)+e^{3x^2}(6e^xx+12x^2)}{e^x+2x}\,dx = e^{\left(3\,x^2\right)}+2\,e^x+\log\left(2\,x+e^x\right)$$

input
```
integrate(((6*exp(x)*x+12*x^2)*exp(3*x^2)+2*exp(x)^2+(1+4*x)*exp(x)+2)/(ex
p(x)+2*x),x, algorithm=\
```

output
```
e^(3*x^2) + 2*e^x + log(2*x + e^x)
```

3.1240.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{2+2e^{2x}+e^x(1+4x)+e^{3x^2}(6e^xx+12x^2)}{e^x+2x}\,dx = 2e^x+e^{3x^2}+\log\left(2x+e^x\right)$$

input
```
integrate(((6*exp(x)*x+12*x**2)*exp(3*x**2)+2*exp(x)**2+(1+4*x)*exp(x)+2)/
(exp(x)+2*x),x)
```

output
```
2*exp(x) + exp(3*x**2) + log(2*x + exp(x))
```

3.1240.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{2+2e^{2x}+e^x(1+4x)+e^{3x^2}(6e^xx+12x^2)}{e^x+2x}\,dx = e^{(3\,x^2)}+2\,e^x+\log\left(2\,x+e^x\right)$$

input
```
integrate(((6*exp(x)*x+12*x^2)*exp(3*x^2)+2*exp(x)^2+(1+4*x)*exp(x)+2)/(ex
p(x)+2*x),x, algorithm=\
```

output
```
e^(3*x^2) + 2*e^x + log(2*x + e^x)
```

3.1240.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{2+2e^{2x}+e^x(1+4x)+e^{3x^2}(6e^xx+12x^2)}{e^x+2x}\,dx = e^{(3\,x^2)}+2\,e^x+\log\left(2\,x+e^x\right)$$

input
```
integrate(((6*exp(x)*x+12*x^2)*exp(3*x^2)+2*exp(x)^2+(1+4*x)*exp(x)+2)/(ex
p(x)+2*x),x, algorithm=\
```

output
```
e^(3*x^2) + 2*e^x + log(2*x + e^x)
```

3.1240.9 Mupad [B] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{2+2e^{2x}+e^x(1+4x)+e^{3x^2}(6e^xx+12x^2)}{e^x+2x}\,dx = \ln\left(2\,x+\mathrm{e}^x\right)+\mathrm{e}^{3\,x^2}+2\,\mathrm{e}^x$$

input
```
int((2*exp(2*x) + exp(3*x^2)*(6*x*exp(x) + 12*x^2) + exp(x)*(4*x + 1) + 2)
/(2*x + exp(x)),x)
```

output
```
log(2*x + exp(x)) + exp(3*x^2) + 2*exp(x)
```

3.1241 $\int \frac{e^{e^x+x^2}(4+2x-8x^2-2x^3+e^x(-4x-x^2))+e^{x^2}(-x^2+8x^3+2x^4+e^x(3}{16x^2+8x^3+x^4}$

3.1241.1 Optimal result

Integrand size = 102, antiderivative size = 34

$$\int \frac{e^{e^x+x^2}(4+2x-8x^2-2x^3+e^x(-4x-x^2))+e^{x^2}(-x^2+8x^3+2x^4+e^x(32-16x-78x^2-34x^3-4x^4}{16x^2+8x^3+x^4} = \frac{2e^{x^2}\left(-e^x+\frac{-e^{e^x}+x}{2(4+x)}\right)}{x}$$

output
```
2*exp(x^2)/x*(1/2*(x-exp(exp(x)))/(4+x)-exp(x))
```

3.1241.2 Mathematica [A] (verified)

Time = 3.79 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.94

$$\int \frac{e^{e^x+x^2}(4+2x-8x^2-2x^3+e^x(-4x-x^2))+e^{x^2}(-x^2+8x^3+2x^4+e^x(32-16x-78x^2-34x^3-4x^4}{16x^2+8x^3+x^4} = -\frac{e^{x^2}(e^{e^x}-x+2e^x(4+x))}{x(4+x)}$$

input
```
Integrate[(E^(E^x + x^2)*(4 + 2*x - 8*x^2 - 2*x^3 + E^x*(-4*x - x^2)) + E^
x^2*(-x^2 + 8*x^3 + 2*x^4 + E^x*(32 - 16*x - 78*x^2 - 34*x^3 - 4*x^4)))/(1
6*x^2 + 8*x^3 + x^4),x]
```

output
```
-((E^x^2*(E^E^x - x + 2*E^x*(4 + x)))/(x*(4 + x)))
```

3.1241.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^2+e^x}\left(-2x^3-8x^2+e^x\left(-x^2-4x\right)+2x+4\right)+e^{x^2}\left(2x^4+8x^3-x^2+e^x\left(-4x^4-34x^3-78x^2-16x+32\right)\right)}{x^4+8x^3+16x^2}d$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{e^{x^2+e^x}\left(-2x^3-8x^2+e^x\left(-x^2-4x\right)+2x+4\right)+e^{x^2}\left(2x^4+8x^3-x^2+e^x\left(-4x^4-34x^3-78x^2-16x+32\right)\right)}{x^2\left(x^2+8x+16\right)}d$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{e^{x^2+e^x}\left(-2x^3-8x^2+e^x\left(-x^2-4x\right)+2x+4\right)+e^{x^2}\left(2x^4+8x^3-x^2+e^x\left(-4x^4-34x^3-78x^2-16x+32\right)\right)}{x^2(x+4)^2}d$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{x^2}\left(4e^xx^4-2x^4+2e^{e^x}x^3+34e^xx^3-8x^3+8e^{e^x}x^2+78e^xx^2+e^{x+e^x}x^2+x^2-2e^{e^x}x+16e^xx+4e^{x+e^x}x-\right.}{32x}\right.$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{e^{x^2}\left(2x^4+8x^3-x^2-2e^x(x+4)^2\left(2x^2+x-1\right)-2e^{e^x}\left(x^3+4x^2-x-2\right)-e^{x+e^x}(x+4)x\right)}{x^2(x+4)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{2e^{x^2}x^2}{(x+4)^2}+\frac{8e^{x^2}x}{(x+4)^2}-\frac{e^{x^2}}{(x+4)^2}-\frac{2e^{x^2+e^x}\left(x^3+4x^2-x-2\right)}{(x+4)^2x^2}-\frac{e^{x^2+x}\left(4x^3+18x^2+e^{e^x}x+6x-8\right)}{(x+4)x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\int \frac{e^{x^2+e^x}}{x^2}dx-\frac{1}{4}\int \frac{e^{x^2+x+e^x}}{x}dx-\frac{1}{4}\int \frac{e^{x^2+e^x}}{(x+4)^2}dx-2\int \frac{e^{x^2+e^x}}{x+4}dx+\frac{1}{4}\int \frac{e^{x^2+x+e^x}}{x+4}dx-\frac{2e^{x^2+x}\left(2x^2+x\right)}{x^2(2x+1)}+\frac{e^{x^2}}{x+4}$$

input
```
Int[(E^(E^x + x^2)*(4 + 2*x - 8*x^2 - 2*x^3 + E^x*(-4*x - x^2)) + E^x^2*(-
x^2 + 8*x^3 + 2*x^4 + E^x*(32 - 16*x - 78*x^2 - 34*x^3 - 4*x^4)))/(16*x^2
+ 8*x^3 + x^4),x]
```

3.1241. $\int \frac{e^{e^x+x^2}\left(4+2x-8x^2-2x^3+e^x\left(-4x-x^2\right)\right)+e^{x^2}\left(-x^2+8x^3+2x^4+e^x\left(32-16x-78x^2-34x^3-4x^4\right)\right)}{16x^2+8x^3+x^4}dx$

output
```
$Aborted
```

3.1241.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1241.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.26

method	result	size
parallelrisch	$\frac{-2x\,\mathrm{e}^{x}\mathrm{e}^{x^{2}}+\mathrm{e}^{x^{2}}x-8\,\mathrm{e}^{x}\mathrm{e}^{x^{2}}-\mathrm{e}^{x^{2}}\mathrm{e}^{\mathrm{e}^{x}}}{x(4+x)}$	43
risch	$-\frac{(2\,\mathrm{e}^{x}x-x+8\,\mathrm{e}^{x})\mathrm{e}^{x^{2}}}{(4+x)x}-\frac{\mathrm{e}^{x^{2}+\mathrm{e}^{x}}}{x(4+x)}$	46

input
```
int((((-x^2-4*x)*exp(x)-2*x^3-8*x^2+2*x+4)*exp(x^2)*exp(exp(x))+((-4*x^4-3
4*x^3-78*x^2-16*x+32)*exp(x)+2*x^4+8*x^3-x^2)*exp(x^2))/(x^4+8*x^3+16*x^2)
,x,method=_RETURNVERBOSE)
```

output
```
(-2*x*exp(x)*exp(x^2)+exp(x^2)*x-8*exp(x)*exp(x^2)-exp(x^2)*exp(exp(x)))/x
/(4+x)
```

3.1241.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.03

$$\int \frac{e^{e^x+x^2}(4+2x-8x^2-2x^3+e^x(-4x-x^2))+e^{x^2}(-x^2+8x^3+2x^4+e^x(32-16x-78x^2-34x^3-4x^4}{16x^2+8x^3+x^4}$$
$$= -\frac{(2\,(x+4)e^x-x)e^{(x^2)}+e^{(x^2+e^x)}}{x^2+4\,x}$$

input
```
integrate((((-x^2-4*x)*exp(x)-2*x^3-8*x^2+2*x+4)*exp(x^2)*exp(exp(x))+((-4
*x^4-34*x^3-78*x^2-16*x+32)*exp(x)+2*x^4+8*x^3-x^2)*exp(x^2))/(x^4+8*x^3+1
6*x^2),x, algorithm=\
```

output
```
-((2*(x + 4)*e^x - x)*e^(x^2) + e^(x^2 + e^x))/(x^2 + 4*x)
```

3.1241.6 Sympy [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.21

$$\int \frac{e^{e^x+x^2}(4+2x-8x^2-2x^3+e^x(-4x-x^2))+e^{x^2}(-x^2+8x^3+2x^4+e^x(32-16x-78x^2-34x^3-4x^4}{16x^2+8x^3+x^4}$$
$$= \frac{(-2xe^x+x-8e^x)\,e^{x^2}}{x^2+4x}-\frac{e^{x^2}e^{e^x}}{x^2+4x}$$

input
```
integrate((((-x**2-4*x)*exp(x)-2*x**3-8*x**2+2*x+4)*exp(x**2)*exp(exp(x))+
((-4*x**4-34*x**3-78*x**2-16*x+32)*exp(x)+2*x**4+8*x**3-x**2)*exp(x**2))/(
x**4+8*x**3+16*x**2),x)
```

output
```
(-2*x*exp(x) + x - 8*exp(x))*exp(x**2)/(x**2 + 4*x) - exp(x**2)*exp(exp(x)
)/(x**2 + 4*x)
```

3.1241.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.03

$$\int \frac{e^{e^x+x^2}(4+2x-8x^2-2x^3+e^x(-4x-x^2))+e^{x^2}(-x^2+8x^3+2x^4+e^x(32-16x-78x^2-34x^3-4x^4}{16x^2+8x^3+x^4}$$
$$=-\frac{(2\,(x+4)e^x-x)e^{(x^2)}+e^{(x^2+e^x)}}{x^2+4\,x}$$

input
```
integrate(((((-x^2-4*x)*exp(x)-2*x^3-8*x^2+2*x+4)*exp(x^2)*exp(exp(x))+((-4
*x^4-34*x^3-78*x^2-16*x+32)*exp(x)+2*x^4+8*x^3-x^2)*exp(x^2))/(x^4+8*x^3+1
6*x^2),x, algorithm=\
```

output
```
-((2*(x + 4)*e^x - x)*e^(x^2) + e^(x^2 + e^x))/(x^2 + 4*x)
```

3.1241.8 Giac [F]

$$\int \frac{e^{e^x+x^2}(4+2x-8x^2-2x^3+e^x(-4x-x^2))+e^{x^2}(-x^2+8x^3+2x^4+e^x(32-16x-78x^2-34x^3-4x^4}{16x^2+8x^3+x^4}$$
$$=\int -\frac{(2\,x^3+8\,x^2+(x^2+4\,x)e^x-2\,x-4)e^{(x^2+e^x)}-(2\,x^4+8\,x^3-x^2-2\,(2\,x^4+17\,x^3+39\,x^2+8\,x-1}{x^4+8\,x^3+16\,x^2}$$

input
```
integrate(((((-x^2-4*x)*exp(x)-2*x^3-8*x^2+2*x+4)*exp(x^2)*exp(exp(x))+((-4
*x^4-34*x^3-78*x^2-16*x+32)*exp(x)+2*x^4+8*x^3-x^2)*exp(x^2))/(x^4+8*x^3+1
6*x^2),x, algorithm=\
```

output
```
integrate(-((2*x^3 + 8*x^2 + (x^2 + 4*x)*e^x - 2*x - 4)*e^(x^2 + e^x) - (2
*x^4 + 8*x^3 - x^2 - 2*(2*x^4 + 17*x^3 + 39*x^2 + 8*x - 16)*e^x)*e^(x^2))/
(x^4 + 8*x^3 + 16*x^2), x)
```

3.1241.9 Mupad [B] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.38

$$\int \frac{e^{e^x+x^2}(4+2x-8x^2-2x^3+e^x(-4x-x^2))+e^{x^2}(-x^2+8x^3+2x^4+e^x(32-16x-78x^2-34x^3-4x^4}{16x^2+8x^3+x^4}$$

$$= -\frac{e^{e^x+x^2}}{x^2+4\,x}-\frac{e^{x^2}\,\left(8\,e^x-x+2\,x\,e^x\right)}{x^2+4\,x}$$

input
```
int(-(exp(x^2)*(exp(x)*(16*x + 78*x^2 + 34*x^3 + 4*x^4 - 32) + x^2 - 8*x^3
 - 2*x^4) + exp(x^2)*exp(exp(x))*(exp(x)*(4*x + x^2) - 2*x + 8*x^2 + 2*x^3
 - 4))/(16*x^2 + 8*x^3 + x^4),x)
```

output
```
- exp(exp(x) + x^2)/(4*x + x^2) - (exp(x^2)*(8*exp(x) - x + 2*x*exp(x)))/(
4*x + x^2)
```

3.1242 $\int \frac{300+690x+204x^2+18x^3+e^x(-500-2150x-1215x^2-240x^3-15x^4)}{100+40x+}$

3.1242.1 Optimal result

Integrand size = 84, antiderivative size = 26

$$\int \frac{300+690x+204x^2+18x^3+e^x(-500-2150x-1215x^2-240x^3-15x^4)+(-300-120x-12x^2+e^x}{100+40x+4x^2}$$
$$=(-3+5e^x)\,x\left(-2-\frac{3x}{4}-\frac{x}{5+x}+\log(x)\right)$$

output
```
(5*exp(x)-3)*x*(-3/4*x-x/(5+x)+ln(x)-2)
```

3.1242.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 53 vs. 2(26) = 52.

Time = 1.14 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.04

$$\int \frac{300+690x+204x^2+18x^3+e^x(-500-2150x-1215x^2-240x^3-15x^4)+(-300-120x-12x^2+e^x}{100+40x+4x^2}$$
$$=\frac{1}{4}\left(36x+9x^2+\frac{300}{5+x}+e^x\left(100-60x-15x^2-\frac{500}{5+x}\right)+4(-3+5e^x)\,x\log(x)\right)$$

input
```
Integrate[(300 + 690*x + 204*x^2 + 18*x^3 + E^x*(-500 - 2150*x - 1215*x^2
- 240*x^3 - 15*x^4) + (-300 - 120*x - 12*x^2 + E^x*(500 + 700*x + 220*x^2
+ 20*x^3))*Log[x])/(100 + 40*x + 4*x^2),x]
```

output
```
(36*x + 9*x^2 + 300/(5 + x) + E^x*(100 - 60*x - 15*x^2 - 500/(5 + x)) + 4*
(-3 + 5*E^x)*x*Log[x])/4
```

3.1242.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 129 vs. 2(26) = 52.

Time = 1.45 (sec) , antiderivative size = 129, normalized size of antiderivative = 4.96, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.036$, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{18x^3+204x^2+\left(-12x^2+e^x\left(20x^3+220x^2+700x+500\right)-120x-300\right)\log(x)+e^x\left(-15x^4-240x^3-1215x\right.}{4x^2+40x+100}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{18x^3+204x^2+\left(-12x^2+e^x\left(20x^3+220x^2+700x+500\right)-120x-300\right)\log(x)+e^x\left(-15x^4-240x^3-1215x\right.}{(2x+10)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{9x^3}{2(x+5)^2}+\frac{51x^2}{(x+5)^2}-\frac{3x^2\log(x)}{(x+5)^2}-\frac{5e^x\left(3x^4+48x^3-4x^3\log(x)+243x^2-44x^2\log(x)+430x-140x\log\right.}{4(x+5)^2}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{15}{4}e^xx^2+\frac{9x^2}{4}+\frac{3x^2\log(x)}{x+5}-15e^xx+9x+25e^x-\frac{125e^x}{x+5}+\frac{75}{x+5}+\frac{15x\log(x)}{x+5}-6x\log(x)-5e^x\log(x)+5e^x(x+1)\log(x)-30\log\left(\frac{x}{5}+1\right)(\log(x)+1)+15\log\left(\frac{x}{5}+1\right)(2\log(x)+1)+15\log(x+5)$$

input
```
Int[(300 + 690*x + 204*x^2 + 18*x^3 + E^x*(-500 - 2150*x - 1215*x^2 - 240*
x^3 - 15*x^4) + (-300 - 120*x - 12*x^2 + E^x*(500 + 700*x + 220*x^2 + 20*x
^3))*Log[x])/(100 + 40*x + 4*x^2),x]
```

output
```
25*E^x + 9*x - 15*E^x*x + (9*x^2)/4 - (15*E^x*x^2)/4 + 75/(5 + x) - (125*E
^x)/(5 + x) - 5*E^x*Log[x] - 6*x*Log[x] + 5*E^x*(1 + x)*Log[x] + (15*x*Log
[x])/(5 + x) + (3*x^2*Log[x])/(5 + x) - 30*Log[1 + x/5]*(1 + Log[x]) + 15*
Log[1 + x/5]*(1 + 2*Log[x]) + 15*Log[5 + x]
```

3.1242.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1242.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 54 vs. 2(23) = 46.

Time = 0.26 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.12

method	result	size
risch	$(5\,\mathrm{e}^{x} x-3 x) \ln (x)-\frac{15\,\mathrm{e}^{x} x^{3}-9 x^{3}+135\,\mathrm{e}^{x} x^{2}-81 x^{2}+200\,\mathrm{e}^{x} x-180 x-300}{4(5+x)}$	55
parts	$\frac{-\frac{15\,\mathrm{e}^{x} x^{3}}{4}-50\,\mathrm{e}^{x} x-\frac{135\,\mathrm{e}^{x} x^{2}}{4}+5 x^{2} \mathrm{e}^{x} \ln (x)+25 x\,\mathrm{e}^{x} \ln (x)}{5+x}+\frac{9 x^{2}}{4}+9 x+\frac{75}{5+x}-3 x \ln (x)$	64
default	$\frac{-15\,\mathrm{e}^{x} x^{3}-200\,\mathrm{e}^{x} x-135\,\mathrm{e}^{x} x^{2}+20 x^{2} \mathrm{e}^{x} \ln (x)+100 x\,\mathrm{e}^{x} \ln (x)}{20+4 x}+\frac{9 x^{2}}{4}+9 x+\frac{75}{5+x}-3 x \ln (x)$	65
norman	$\frac{\frac{81 x^{2}}{4}+\frac{9 x^{3}}{4}-15 x \ln (x)-3 x^{2} \ln (x)-50\,\mathrm{e}^{x} x-\frac{135\,\mathrm{e}^{x} x^{2}}{4}-\frac{15\,\mathrm{e}^{x} x^{3}}{4}+25 x\,\mathrm{e}^{x} \ln (x)+5 x^{2} \mathrm{e}^{x} \ln (x)-150}{5+x}$	66
parallelrisch	$-\frac{75\,\mathrm{e}^{x} x^{3}-100 x^{2} \mathrm{e}^{x} \ln (x)-45 x^{3}+60 x^{2} \ln (x)+675\,\mathrm{e}^{x} x^{2}-500 x\,\mathrm{e}^{x} \ln (x)-405 x^{2}+300 x \ln (x)+1000\,\mathrm{e}^{x} x+3000}{20(5+x)}$	67

input
```
int((((20*x^3+220*x^2+700*x+500)*exp(x)-12*x^2-120*x-300)*ln(x)+(-15*x^4-2
40*x^3-1215*x^2-2150*x-500)*exp(x)+18*x^3+204*x^2+690*x+300)/(4*x^2+40*x+1
00),x,method=_RETURNVERBOSE)
```

output
```
(5*exp(x)*x-3*x)*ln(x)-1/4*(15*exp(x)*x^3-9*x^3+135*exp(x)*x^2-81*x^2+200*
exp(x)*x-180*x-300)/(5+x)
```

3.1242.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. $2(26) = 52$.

Time = 0.26 (sec) , antiderivative size = 64, normalized size of antiderivative = 2.46

$$\int \frac{300 + 690x + 204x^2 + 18x^3 + e^x(-500 - 2150x - 1215x^2 - 240x^3 - 15x^4) + (-300 - 120x - 12x^2 + e^{\cdots}}{100 + 40x + 4x^2}$$
$$= \frac{9\,x^3 + 81\,x^2 - 5\,(3\,x^3 + 27\,x^2 + 40\,x)e^x - 4\,(3\,x^2 - 5\,(x^2 + 5\,x)e^x + 15\,x)\log(x) + 180\,x + 300}{4\,(x + 5)}$$

input
```
integrate((((20*x^3+220*x^2+700*x+500)*exp(x)-12*x^2-120*x-300)*log(x)+(-1
5*x^4-240*x^3-1215*x^2-2150*x-500)*exp(x)+18*x^3+204*x^2+690*x+300)/(4*x^2
+40*x+100),x, algorithm=\
```

output
```
1/4*(9*x^3 + 81*x^2 - 5*(3*x^3 + 27*x^2 + 40*x)*e^x - 4*(3*x^2 - 5*(x^2 +
5*x)*e^x + 15*x)*log(x) + 180*x + 300)/(x + 5)
```

3.1242.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(22) = 44$.

Time = 0.23 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.23

$$\int \frac{300 + 690x + 204x^2 + 18x^3 + e^x(-500 - 2150x - 1215x^2 - 240x^3 - 15x^4) + (-300 - 120x - 12x^2 + e^{\cdots}}{100 + 40x + 4x^2}$$
$$= \frac{9x^2}{4} - 3x\log(x) + 9x + \frac{(-15x^3 + 20x^2\log(x) - 135x^2 + 100x\log(x) - 200x)\,e^x}{4x + 20} + \frac{75}{x + 5}$$

input
```
integrate((((20*x**3+220*x**2+700*x+500)*exp(x)-12*x**2-120*x-300)*ln(x)+(
-15*x**4-240*x**3-1215*x**2-2150*x-500)*exp(x)+18*x**3+204*x**2+690*x+300)
/(4*x**2+40*x+100),x)
```

output
```
9*x**2/4 - 3*x*log(x) + 9*x + (-15*x**3 + 20*x**2*log(x) - 135*x**2 + 100*
x*log(x) - 200*x)*exp(x)/(4*x + 20) + 75/(x + 5)
```

3.1242.7 Maxima [F]

$$\int \frac{300 + 690x + 204x^2 + 18x^3 + e^x(-500 - 2150x - 1215x^2 - 240x^3 - 15x^4) + (-300 - 120x - 12x^2 + e^x}{100 + 40x + 4x^2}$$
$$= \int \frac{18\,x^3 + 204\,x^2 - 5\,(3\,x^4 + 48\,x^3 + 243\,x^2 + 430\,x + 100)e^x - 4\,(3\,x^2 - 5\,(x^3 + 11\,x^2 + 35\,x + 25)e^x + 3}{4\,(x^2 + 10\,x + 25)}$$

input
```
integrate((((20*x^3+220*x^2+700*x+500)*exp(x)-12*x^2-120*x-300)*log(x)+(-1
5*x^4-240*x^3-1215*x^2-2150*x-500)*exp(x)+18*x^3+204*x^2+690*x+300)/(4*x^2
+40*x+100),x, algorithm=\
```

output
```
5*x*e^x*log(x) + 9/4*x^2 - 3*x*log(x) + 9*x + 125*e^(-5)*exp_integral_e(2,
 -x - 5)/(x + 5) + 75/(x + 5) - 1/4*integrate(5*(3*x^4 + 48*x^3 + 247*x^2
+ 470*x + 100)*e^x/(x^2 + 10*x + 25), x)
```

3.1242.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 69 vs. $2(26) = 52$.

Time = 0.29 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.65

$$\int \frac{300 + 690x + 204x^2 + 18x^3 + e^x(-500 - 2150x - 1215x^2 - 240x^3 - 15x^4) + (-300 - 120x - 12x^2 + e^x}{100 + 40x + 4x^2}$$
$$= -\frac{15\,x^3e^x - 20\,x^2e^x\log(x) - 9\,x^3 + 135\,x^2e^x + 12\,x^2\log(x) - 100\,xe^x\log(x) - 81\,x^2 + 200\,xe^x + 60\,x\,\mathrm{lo}}{4\,(x+5)}$$

input
```
integrate((((20*x^3+220*x^2+700*x+500)*exp(x)-12*x^2-120*x-300)*log(x)+(-1
5*x^4-240*x^3-1215*x^2-2150*x-500)*exp(x)+18*x^3+204*x^2+690*x+300)/(4*x^2
+40*x+100),x, algorithm=\
```

output
```
-1/4*(15*x^3*e^x - 20*x^2*e^x*log(x) - 9*x^3 + 135*x^2*e^x + 12*x^2*log(x)
 - 100*x*e^x*log(x) - 81*x^2 + 200*x*e^x + 60*x*log(x) - 180*x - 300)/(x +
 5)
```

3.1242.9 Mupad [B] (verification not implemented)

Time = 16.03 (sec) , antiderivative size = 52, normalized size of antiderivative = 2.00

$$\int \frac{300+690x+204x^2+18x^3+e^x(-500-2150x-1215x^2-240x^3-15x^4)+(-300-120x-12x^2+e^x}{100+40x+4x^2}$$

$$= 9\,x-\ln\left(x\right)\,\left(3\,x-5\,x\,\mathrm{e}^x\right)+\frac{75}{x+5}+\frac{9\,x^2}{4}-\frac{\mathrm{e}^x\,\left(\frac{15\,x^3}{4}+\frac{135\,x^2}{4}+50\,x\right)}{x+5}$$

input
```
int((690*x - exp(x)*(2150*x + 1215*x^2 + 240*x^3 + 15*x^4 + 500) - log(x)*
(120*x + 12*x^2 - exp(x)*(700*x + 220*x^2 + 20*x^3 + 500) + 300) + 204*x^2
 + 18*x^3 + 300)/(40*x + 4*x^2 + 100),x)
```

output
```
9*x - log(x)*(3*x - 5*x*exp(x)) + 75/(x + 5) + (9*x^2)/4 - (exp(x)*(50*x +
 (135*x^2)/4 + (15*x^3)/4))/(x + 5)
```

3.1243 $\int \frac{-24576+1152x^2+96x^3+e^{2x}(8192x+2560x^2-2560x^3+96x^4+64x^5)}{64+16x+x^2}$

3.1243.1 Optimal result

Integrand size = 53, antiderivative size = 26

$$\int \frac{-24576+1152x^2+96x^3+e^{2x}(8192x+2560x^2-2560x^3+96x^4+64x^5)}{64+16x+x^2}\,dx = 16(4-x)^2\left(3+\frac{2e^{2x}x^2}{8+x}\right)$$

output
```
4*(-x+4)*(-4*x+16)*(2*x^2*exp(2*x)/(x+8)+3)
```

3.1243.2 Mathematica [A] (verified)

Time = 0.93 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{-24576+1152x^2+96x^3+e^{2x}(8192x+2560x^2-2560x^3+96x^4+64x^5)}{64+16x+x^2}\,dx = \frac{16x(2e^{2x}(-4+x)^2x+3(-64+x^2))}{8+x}$$

input
```
Integrate[(-24576 + 1152*x^2 + 96*x^3 + E^(2*x)*(8192*x + 2560*x^2 - 2560*
x^3 + 96*x^4 + 64*x^5))/(64 + 16*x + x^2),x]
```

output
```
(16*x*(2*E^(2*x)*(-4 + x)^2*x + 3*(-64 + x^2)))/(8 + x)
```

3.1243.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 57 vs. 2(26) = 52.

Time = 0.53 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.19, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.057, Rules used = {2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{96x^3+1152x^2+e^{2x}(64x^5+96x^4-2560x^3+2560x^2+8192x)-24576}{x^2+16x+64}\,dx$$

$$\Big\downarrow \ 2007$$

$$\int \frac{96x^3+1152x^2+e^{2x}(64x^5+96x^4-2560x^3+2560x^2+8192x)-24576}{(x+8)^2}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{32e^{2x}x(2x^3+11x^2-36x-64)(x-4)}{(x+8)^2}+96(x-4)\right)dx$$

$$\Big\downarrow \ 2009$$

$$32e^{2x}x^3-512e^{2x}x^2+4608e^{2x}x-36864e^{2x}+48(4-x)^2+\frac{294912e^{2x}}{x+8}$$

input
```
Int[(-24576 + 1152*x^2 + 96*x^3 + E^(2*x)*(8192*x + 2560*x^2 - 2560*x^3 +
96*x^4 + 64*x^5))/(64 + 16*x + x^2),x]
```

output
```
-36864*E^(2*x) + 48*(4 - x)^2 + 4608*E^(2*x)*x - 512*E^(2*x)*x^2 + 32*E^(2
*x)*x^3 + (294912*E^(2*x))/(8 + x)
```

3.1243.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1243.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

method	result	size
risch	$48x^2 - 384x + \frac{32x^2(x^2-8x+16)\mathrm{e}^{2x}}{x+8}$	32
norman	$\frac{48x^3+512\,\mathrm{e}^{2x}x^2-256\,\mathrm{e}^{2x}x^3+32\,\mathrm{e}^{2x}x^4+24576}{x+8}$	41
parallelrisch	$\frac{48x^3+512\,\mathrm{e}^{2x}x^2-256\,\mathrm{e}^{2x}x^3+32\,\mathrm{e}^{2x}x^4+24576}{x+8}$	41
derivativedivides	$48x^2 - 384x + \frac{589824\,\mathrm{e}^{2x}}{2x+16} - 36864\,\mathrm{e}^{2x} + 4608x\,\mathrm{e}^{2x} - 512\,\mathrm{e}^{2x}x^2 + 32\,\mathrm{e}^{2x}x^3$	54
default	$48x^2 - 384x + \frac{589824\,\mathrm{e}^{2x}}{2x+16} - 36864\,\mathrm{e}^{2x} + 4608x\,\mathrm{e}^{2x} - 512\,\mathrm{e}^{2x}x^2 + 32\,\mathrm{e}^{2x}x^3$	54
parts	$48x^2 - 384x + \frac{589824\,\mathrm{e}^{2x}}{2x+16} - 36864\,\mathrm{e}^{2x} + 4608x\,\mathrm{e}^{2x} - 512\,\mathrm{e}^{2x}x^2 + 32\,\mathrm{e}^{2x}x^3$	54

input
```
int(((64*x^5+96*x^4-2560*x^3+2560*x^2+8192*x)*exp(2*x)+96*x^3+1152*x^2-245
76)/(x^2+16*x+64),x,method=_RETURNVERBOSE)
```

output
```
48*x^2-384*x+32*x^2*(x^2-8*x+16)/(x+8)*exp(2*x)
```

3.1243.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{-24576 + 1152x^2 + 96x^3 + e^{2x}(8192x + 2560x^2 - 2560x^3 + 96x^4 + 64x^5)}{64 + 16x + x^2}\,dx = \frac{16\left(3\,x^3 + 2\,(x^4 - 8\,x^3 + 16\,x^2)e^{(2\,x)} - 192\,x\right)}{x + 8}$$

input
```
integrate(((64*x^5+96*x^4-2560*x^3+2560*x^2+8192*x)*exp(2*x)+96*x^3+1152*x
^2-24576)/(x^2+16*x+64),x, algorithm=\
```

output
```
16*(3*x^3 + 2*(x^4 - 8*x^3 + 16*x^2)*e^(2*x) - 192*x)/(x + 8)
```

3.1243.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.19

$$\int \frac{-24576+1152x^2+96x^3+e^{2x}(8192x+2560x^2-2560x^3+96x^4+64x^5)}{64+16x+x^2}\,dx$$
$$=48x^2-384x+\frac{(32x^4-256x^3+512x^2)\,e^{2x}}{x+8}$$

input
```
integrate(((64*x**5+96*x**4-2560*x**3+2560*x**2+8192*x)*exp(2*x)+96*x**3+1
152*x**2-24576)/(x**2+16*x+64),x)
```

output
```
48*x**2 - 384*x + (32*x**4 - 256*x**3 + 512*x**2)*exp(2*x)/(x + 8)
```

3.1243.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int \frac{-24576+1152x^2+96x^3+e^{2x}(8192x+2560x^2-2560x^3+96x^4+64x^5)}{64+16x+x^2}\,dx$$
$$=48\,x^2-384\,x+\frac{32\,(x^4-8\,x^3+16\,x^2)e^{(2\,x)}}{x+8}$$

input
```
integrate(((64*x^5+96*x^4-2560*x^3+2560*x^2+8192*x)*exp(2*x)+96*x^3+1152*x
^2-24576)/(x^2+16*x+64),x, algorithm=\
```

output
```
48*x^2 - 384*x + 32*(x^4 - 8*x^3 + 16*x^2)*e^(2*x)/(x + 8)
```

3.1243.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.65

$$\int \frac{-24576+1152x^2+96x^3+e^{2x}(8192x+2560x^2-2560x^3+96x^4+64x^5)}{64+16x+x^2}\,dx$$
$$=\frac{16\left(2\,x^4e^{(2\,x)}-16\,x^3e^{(2\,x)}+3\,x^3+32\,x^2e^{(2\,x)}-192\,x\right)}{x+8}$$

input
```
integrate(((64*x^5+96*x^4-2560*x^3+2560*x^2+8192*x)*exp(2*x)+96*x^3+1152*x
^2-24576)/(x^2+16*x+64),x, algorithm=\
```

output
```
16*(2*x^4*e^(2*x) - 16*x^3*e^(2*x) + 3*x^3 + 32*x^2*e^(2*x) - 192*x)/(x +
8)
```

3.1243.9 Mupad [B] (verification not implemented)

Time = 14.84 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.54

$$\int \frac{-24576 + 1152x^2 + 96x^3 + e^{2x}(8192x + 2560x^2 - 2560x^3 + 96x^4 + 64x^5)}{64 + 16x + x^2} \, dx = \frac{16\,x\,(32\,x\,e^{2\,x} - 16\,x^2\,e^{2\,x} + 2\,x^3\,e^{2\,x} + 3\,x^2 - 192)}{x + 8}$$

input
```
int((exp(2*x)*(8192*x + 2560*x^2 - 2560*x^3 + 96*x^4 + 64*x^5) + 1152*x^2
+ 96*x^3 - 24576)/(16*x + x^2 + 64),x)
```

output
```
(16*x*(32*x*exp(2*x) - 16*x^2*exp(2*x) + 2*x^3*exp(2*x) + 3*x^2 - 192))/(x
 + 8)
```

3.1244 $\int \frac{-64-4x+x^2+32\log(2)-4\log^2(2)+4\log(2e^x)}{x^2}\,dx$

3.1244.1 Optimal result

Integrand size = 30, antiderivative size = 25

$$\int \frac{-64-4x+x^2+32\log(2)-4\log^2(2)+4\log(2e^x)}{x^2}\,dx = 5+x+\frac{4((4-\log(2))^2-\log(2e^x))}{x}$$

output
```
x+4/x*((4-ln(2))^2-ln(2*exp(x)))+5
```

3.1244.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

$$\int \frac{-64-4x+x^2+32\log(2)-4\log^2(2)+4\log(2e^x)}{x^2}\,dx = \frac{64}{x}+x-\frac{32\log(2)}{x}+\frac{4\log^2(2)}{x}-\frac{4\log(2e^x)}{x}$$

input
```
Integrate[(-64 - 4*x + x^2 + 32*Log[2] - 4*Log[2]^2 + 4*Log[2*E^x])/x^2,x]
```

output
```
64/x + x - (32*Log[2])/x + (4*Log[2]^2)/x - (4*Log[2*E^x])/x
```

3.1244.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2-4x+4\log(2e^x)-64-4\log^2(2)+32\log(2)}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{x^2-4x-4(4-\log(2))^2}{x^2}+\frac{4\log(2e^x)}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x-\frac{4\log(2e^x)}{x}+\frac{4(4-\log(2))^2}{x}$$

input
```
Int[(-64 - 4*x + x^2 + 32*Log[2] - 4*Log[2]^2 + 4*Log[2*E^x])/x^2,x]
```

output
```
x + (4*(4 - Log[2])^2)/x - (4*Log[2*E^x])/x
```

3.1244.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1244.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

method	result	size
parallelrisch	$\frac{64+4\ln(2)^{2}+x^{2}-32\ln(2)-4\ln(2\,\mathrm{e}^{x})}{x}$	27
default	$-\frac{4\ln(2\,\mathrm{e}^{x})}{x}+x+\frac{4\ln(2)^{2}-32\ln(2)+64}{x}$	29
risch	$-\frac{4\ln(\mathrm{e}^{x})}{x}+\frac{64+4\ln(2)^{2}+x^{2}-36\ln(2)}{x}$	29
parts	$-\frac{4\ln(2\,\mathrm{e}^{x})}{x}+x+\frac{4\ln(2)^{2}-32\ln(2)+64}{x}$	29
norman	$\frac{x\ln(2\,\mathrm{e}^{x})+64-4\ln(2\,\mathrm{e}^{x})+4\ln(2)^{2}-32\ln(2)}{x}$	31

input
```
int((4*ln(2*exp(x))-4*ln(2)^2+32*ln(2)+x^2-4*x-64)/x^2,x,method=_RETURNVER
BOSE)
```

output
```
(64+4*ln(2)^2+x^2-32*ln(2)-4*ln(2*exp(x)))/x
```

3.1244.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{-64-4x+x^2+32\log(2)-4\log^2(2)+4\log(2e^x)}{x^2}\,dx=\frac{x^2+4\,\log(2)^2-36\,\log(2)+64}{x}$$

input
```
integrate((4*log(2*exp(x))-4*log(2)^2+32*log(2)+x^2-4*x-64)/x^2,x, algorit
hm=\
```

output
```
(x^2 + 4*log(2)^2 - 36*log(2) + 64)/x
```

3.1244.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.60

$$\int \frac{-64-4x+x^2+32\log(2)-4\log^2(2)+4\log(2e^x)}{x^2}\,dx = x+\frac{-36\log(2)+4\log(2)^2+64}{x}$$

input
```
integrate((4*ln(2*exp(x))-4*ln(2)**2+32*ln(2)+x**2-4*x-64)/x**2,x)
```

output
```
x + (-36*log(2) + 4*log(2)**2 + 64)/x
```

3.1244.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{-64-4x+x^2+32\log(2)-4\log^2(2)+4\log(2e^x)}{x^2}\,dx$$
$$= x+\frac{4\log(2)^2}{x}-\frac{32\log(2)}{x}-\frac{4\log(2e^x)}{x}+\frac{64}{x}$$

input
```
integrate((4*log(2*exp(x))-4*log(2)^2+32*log(2)+x^2-4*x-64)/x^2,x, algorit
hm=\
```

output
```
x + 4*log(2)^2/x - 32*log(2)/x - 4*log(2*e^x)/x + 64/x
```

3.1244.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

$$\int \frac{-64-4x+x^2+32\log(2)-4\log^2(2)+4\log(2e^x)}{x^2}\,dx = x+\frac{4\left(\log(2)^2-9\log(2)+16\right)}{x}$$

input
```
integrate((4*log(2*exp(x))-4*log(2)^2+32*log(2)+x^2-4*x-64)/x^2,x, algorit
hm=\
```

output
```
x + 4*(log(2)^2 - 9*log(2) + 16)/x
```

3.1244.9 Mupad [B] (verification not implemented)

Time = 15.40 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.72

$$\int \frac{-64-4x+x^2+32\log(2)-4\log^2(2)+4\log(2e^x)}{x^2}\,dx = x+\frac{4\ln(2)^2-36\ln(2)+64}{x}$$

input
```
int(-(4*x - 32*log(2) - 4*log(2*exp(x)) + 4*log(2)^2 - x^2 + 64)/x^2,x)
```

output
```
x + (4*log(2)^2 - 36*log(2) + 64)/x
```

3.1245 $\int \frac{e^{-2x+\frac{e^{-2x}\left(9-10000e^{2x}x^2\right)}{10000x^2}}(-9-9x)}{5000x^3}\,dx$

3.1245.1 Optimal result

Integrand size = 42, antiderivative size = 16

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(9-10000e^{2x}x^2\right)}{10000x^2}}(-9-9x)}{5000x^3}\,dx=e^{-1+\frac{9e^{-2x}}{10000x^2}}$$

output
```
exp(9/10000/exp(x)^2/x^2-1)
```

3.1245.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(9-10000e^{2x}x^2\right)}{10000x^2}}(-9-9x)}{5000x^3}\,dx=e^{-1+\frac{9e^{-2x}}{10000x^2}}$$

input
```
Integrate[(E^(-2*x + (9 - 10000*E^(2*x)*x^2)/(10000*E^(2*x)*x^2))*(-9 - 9*
x))/(5000*x^3),x]
```

output
```
E^(-1 + 9/(10000*E^(2*x)*x^2))
```

3.1245.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-9x-9)\exp\left(\frac{e^{-2x}(9-10000e^{2x}x^2)}{10000x^2}-2x\right)}{5000x^3}dx$$
$$\Big\downarrow \text{27}$$
$$\frac{\int -\frac{9\exp\left(\frac{e^{-2x}(9-10000e^{2x}x^2)}{10000x^2}-2x\right)(x+1)}{x^3}dx}{5000}$$
$$\Big\downarrow \text{27}$$
$$-\frac{9\int \frac{\exp\left(\frac{e^{-2x}(9-10000e^{2x}x^2)}{10000x^2}-2x\right)(x+1)}{x^3}dx}{5000}$$
$$\Big\downarrow \text{7293}$$
$$-\frac{9\int \left(\frac{\exp\left(\frac{e^{-2x}(9-10000e^{2x}x^2)}{10000x^2}-2x\right)}{x^2}+\frac{\exp\left(\frac{e^{-2x}(9-10000e^{2x}x^2)}{10000x^2}-2x\right)}{x^3}\right)dx}{5000}$$
$$\Big\downarrow \text{2009}$$
$$-\frac{9\left(\int \frac{\exp\left(\frac{e^{-2x}(9-10000e^{2x}x^2)}{10000x^2}-2x\right)}{x^2}dx+\int \frac{\exp\left(\frac{e^{-2x}(9-10000e^{2x}x^2)}{10000x^2}-2x\right)}{x^3}dx\right)}{5000}$$

input
```
Int[(E^(-2*x + (9 - 10000*E^(2*x)*x^2)/(10000*E^(2*x)*x^2))*(-9 - 9*x))/(5
000*x^3),x]
```

output
```
$Aborted
```

3.1245. $\int \frac{e^{-2x+\frac{e^{-2x}(9-10000e^{2x}x^2)}{10000x^2}}(-9-9x)}{5000x^3}\,dx$

3.1245.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1245.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.38

method	result	size
norman	$e^{\frac{\left(-10000\,e^{2 x} x^{2}+9\right) e^{-2 x}}{10000 x^{2}}}$	22
risch	$e^{-\frac{\left(10000\,e^{2 x} x^{2}-9\right) e^{-2 x}}{10000 x^{2}}}$	22
parallelrisch	$e^{-\frac{\left(10000\,e^{2 x} x^{2}-9\right) e^{-2 x}}{10000 x^{2}}}$	22

input
```
int(1/5000*(-9*x-9)*exp(1/10000*(-10000*exp(x)^2*x^2+9)/exp(x)^2/x^2)/exp(
x)^2/x^3,x,method=_RETURNVERBOSE)
```

output
```
exp(1/10000*(-10000*exp(x)^2*x^2+9)/exp(x)^2/x^2)
```

3.1245.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. $2(12) = 24$.

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.94

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(9-10000e^{2x}x^2\right)}{10000x^2}}(-9-9x)}{5000x^3}\,dx = e^{\left(2\,x-\frac{\left(10000\,\left(2\,x^{3}+x^{2}\right)e^{\left(2\,x\right)}-9\right)e^{\left(-2\,x\right)}}{10000\,x^{2}}\right)}$$

input
```
integrate(1/5000*(-9*x-9)*exp(1/10000*(-10000*exp(x)^2*x^2+9)/exp(x)^2/x^2
)/exp(x)^2/x^3,x, algorithm=\
```

output
```
e^(2*x - 1/10000*(10000*(2*x^3 + x^2)*e^(2*x) - 9)*e^(-2*x)/x^2)
```

3.1245.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.25

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(9-10000e^{2x}x^2\right)}{10000x^2}}(-9-9x)}{5000x^3}\,dx = e^{\frac{\left(-x^2e^{2x}+\frac{9}{10000}\right)e^{-2x}}{x^2}}$$

input
```
integrate(1/5000*(-9*x-9)*exp(1/10000*(-10000*exp(x)**2*x**2+9)/exp(x)**2/
x**2)/exp(x)**2/x**3,x)
```

output
```
exp((-x**2*exp(2*x) + 9/10000)*exp(-2*x)/x**2)
```

3.1245.7 Maxima [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(9-10000e^{2x}x^2\right)}{10000x^2}}(-9-9x)}{5000x^3}\,dx = e^{\left(\frac{9\,e^{(-2\,x)}}{10000\,x^2}-1\right)}$$

input
```
integrate(1/5000*(-9*x-9)*exp(1/10000*(-10000*exp(x)^2*x^2+9)/exp(x)^2/x^2
)/exp(x)^2/x^3,x, algorithm=\
```

output
```
e^(9/10000*e^(-2*x)/x^2 - 1)
```

3.1245.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(9-10000e^{2x}x^2\right)}{10000x^2}}(-9-9x)}{5000x^3}\,dx = e^{\left(\frac{9\,e^{(-2\,x)}}{10000\,x^2}-1\right)}$$

input
```
integrate(1/5000*(-9*x-9)*exp(1/10000*(-10000*exp(x)^2*x^2+9)/exp(x)^2/x^2
)/exp(x)^2/x^3,x, algorithm=\
```

output
```
e^(9/10000*e^(-2*x)/x^2 - 1)
```

3.1245.9 Mupad [B] (verification not implemented)

Time = 16.01 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{e^{-2x+\frac{e^{-2x}\left(9-10000e^{2x}x^2\right)}{10000x^2}}(-9-9x)}{5000x^3}\,dx = e^{-1}\,e^{\frac{9\,e^{-2\,x}}{10000\,x^2}}$$

input
```
int(-(exp(-2*x)*exp(-(exp(-2*x)*(x^2*exp(2*x) - 9/10000))/x^2)*(9*x + 9))/
(5000*x^3),x)
```

output
```
exp(-1)*exp((9*exp(-2*x))/(10000*x^2))
```

3.1246 $\int \frac{-1+2x^2+4x^3}{x^2} \, dx$

3.1246.1 Optimal result

Integrand size = 16, antiderivative size = 16

$$\int \frac{-1+2x^2+4x^3}{x^2} \, dx = -5+\frac{1}{x}+2\left(4+e^{16}+x+x^2\right)$$

output
```
3+2*x+2*x^2+2*exp(16)+1/x
```

3.1246.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{-1+2x^2+4x^3}{x^2} \, dx = \frac{1}{x}+2x+2x^2$$

input
```
Integrate[(-1 + 2*x^2 + 4*x^3)/x^2,x]
```

output
```
x^(-1) + 2*x + 2*x^2
```

3.1246.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{4x^3+2x^2-1}{x^2} \, dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(-\frac{1}{x^2}+4x+2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2x^2+2x+\frac{1}{x}$$

input
```
Int[(-1 + 2*x^2 + 4*x^3)/x^2,x]
```

output
```
x^(-1) + 2*x + 2*x^2
```

3.1246.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1246.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

method	result	size
default	$2x^2+2x+\frac{1}{x}$	13
risch	$2x^2+2x+\frac{1}{x}$	13
gosper	$\frac{2x^3+2x^2+1}{x}$	17
norman	$\frac{2x^3+2x^2+1}{x}$	17
parallelrisch	$\frac{2x^3+2x^2+1}{x}$	17

input
```
int((4*x^3+2*x^2-1)/x^2,x,method=_RETURNVERBOSE)
```

output
```
2*x^2+2*x+1/x
```

3.1246.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{-1+2x^2+4x^3}{x^2}\,dx = \frac{2\,x^3+2\,x^2+1}{x}$$

input
```
integrate((4*x^3+2*x^2-1)/x^2,x, algorithm=\
```

output
```
(2*x^3 + 2*x^2 + 1)/x
```

3.1246.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int \frac{-1+2x^2+4x^3}{x^2}\,dx = 2x^2+2x+\frac{1}{x}$$

input
```
integrate((4*x**3+2*x**2-1)/x**2,x)
```

output
```
2*x**2 + 2*x + 1/x
```

3.1246.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{-1+2x^2+4x^3}{x^2}\,dx = 2\,x^2+2\,x+\frac{1}{x}$$

input
```
integrate((4*x^3+2*x^2-1)/x^2,x, algorithm=\
```

output
```
2*x^2 + 2*x + 1/x
```

3.1246.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{-1+2x^2+4x^3}{x^2}\,dx = 2\,x^2+2\,x+\frac{1}{x}$$

input
```
integrate((4*x^3+2*x^2-1)/x^2,x, algorithm=\
```

output
```
2*x^2 + 2*x + 1/x
```

3.1246.9 Mupad [B] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{-1+2x^2+4x^3}{x^2}\,dx = 2\,x+\frac{1}{x}+2\,x^2$$

input
```
int((2*x^2 + 4*x^3 - 1)/x^2,x)
```

output
```
2*x + 1/x + 2*x^2
```

3.1247 $\int \frac{e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+\cdots}{9-\cdots}}\cdots\right)}{-243+405x-270x^2+90x^3-15x^4+x^5+e^{\frac{2\left(2304+768x+64x^2\right)}{9-6x+x^2}}\left(-27x^2\cdots\right.}$

3.1247.1 Optimal result

Integrand size = 187, antiderivative size = 34

$$\int \frac{e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\left(27+6831x+1215x^2-\cdots\right.\right.}{-243+405x-270x^2+90x^3-15x^4+x^5+e^{\frac{2\left(2304+768x+64x^2\right)}{9-6x+x^2}}\left(-27x^2+27x^3-9x^4+x^5\right)+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\cdots}$$
$$=\frac{e^{2x}}{-3+x+e^{16\left(3+\frac{3+5x}{3-x}\right)^2}x}$$

output
```
exp(x)^2/(x+x*exp(4*(3+(3+5*x)/(-x+3))*(12+4*(3+5*x)/(-x+3)))-3)
```

3.1247.2 Mathematica [A] (verified)

Time = 5.15 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \frac{e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\left(27+6831x+1215x^2-\cdots\right.\right.}{-243+405x-270x^2+90x^3-15x^4+x^5+e^{\frac{2\left(2304+768x+64x^2\right)}{9-6x+x^2}}\left(-27x^2+27x^3-9x^4+x^5\right)+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\cdots}$$
$$=\frac{e^{2x}}{-3+x+e^{\frac{64(6+x)^2}{(-3+x)^2}}x}$$

3.1247.

$$e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\left(27+6831x+1215x^2-19x^3+2x^4\right)\right)$$

input
```
Integrate[(E^(2*x)*(189 - 243*x + 117*x^2 - 25*x^3 + 2*x^4 + E^((2304 + 76
8*x + 64*x^2)/(9 - 6*x + x^2))*(27 + 6831*x + 1215*x^2 - 19*x^3 + 2*x^4)))
/(-243 + 405*x - 270*x^2 + 90*x^3 - 15*x^4 + x^5 + E^((2*(2304 + 768*x + 6
4*x^2))/(9 - 6*x + x^2))*(-27*x^2 + 27*x^3 - 9*x^4 + x^5) + E^((2304 + 768
*x + 64*x^2)/(9 - 6*x + x^2))*(162*x - 216*x^2 + 108*x^3 - 24*x^4 + 2*x^5)
),x]
```

output
```
E^(2*x)/(-3 + x + E^((64*(6 + x)^2)/(-3 + x)^2)*x)
```

3.1247.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}\left(2x^4-25x^3+117x^2+e^{\frac{64x^2+768x+2304}{x^2-6x+9}}\left(2x^4-19x^3+1215x^2+6831x+27\right)-243x}{x^5-15x^4+90x^3-270x^2+e^{\frac{2\left(64x^2+768x+2304\right)}{x^2-6x+9}}\left(x^5-9x^4+27x^3-27x^2\right)+e^{\frac{64x^2+768x+2304}{x^2-6x+9}}\left(2x^5-24x^4+108x^3\right.}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{e^{2x}\left(-e^{\frac{64(x+6)^2}{(x-3)^2}}\left(2x^4-19x^3+1215x^2+6831x+27\right)-\left((2x-7)(x-3)^3\right)\right)}{(3-x)^3\left(-e^{\frac{64(x+6)^2}{(x-3)^2}}x-x+3\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{e^{2x}\left(2x^4-19x^3+1215x^2+6831x+27\right)}{(x-3)^3x\left(e^{\frac{64(x+6)^2}{(x-3)^2}}x+x-3\right)}-\frac{3e^{2x}\left(385x^2+2298x+9\right)}{(x-3)^2x\left(e^{\frac{64(x+6)^2}{(x-3)^2}}x+x-3\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

3.1247.

$$e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\left(27+6831x+1215x^2-19x^3+2x^4\right)\right)$$

$$-10368\int \frac{e^{2x}}{(x-3)^2\left(e^{\frac{64(x+6)^2}{(x-3)^2}}x+x-3\right)^2}dx-1152\int \frac{e^{2x}}{(x-3)\left(e^{\frac{64(x+6)^2}{(x-3)^2}}x+x-3\right)^2}dx-3\int \frac{e^{2x}}{x\left(e^{\frac{64(x+6)^2}{(x-3)^2}}x+x-3\right)^2}dx+2\int \frac{e^{2x}}{e^{\frac{64(x+6)^2}{(x-3)^2}}x+x-3}dx+10368\int \frac{e^{2x}}{(x-3)^3\left(e^{\frac{64(x+6)^2}{(x-3)^2}}x+x-3\right)}dx+1152\int \frac{e^{2x}}{(x-3)^2\left(e^{\frac{64(x+6)^2}{(x-3)^2}}x+x-3\right)}dx-\int \frac{e^{2x}}{x\left(e^{\frac{64(x+6)^2}{(x-3)^2}}x+x-3\right)}dx$$

input
```
Int[(E^(2*x)*(189 - 243*x + 117*x^2 - 25*x^3 + 2*x^4 + E^((2304 + 768*x +
64*x^2)/(9 - 6*x + x^2))*(27 + 6831*x + 1215*x^2 - 19*x^3 + 2*x^4)))/(-243
 + 405*x - 270*x^2 + 90*x^3 - 15*x^4 + x^5 + E^((2*(2304 + 768*x + 64*x^2)
)/(9 - 6*x + x^2))*(-27*x^2 + 27*x^3 - 9*x^4 + x^5) + E^((2304 + 768*x + 6
4*x^2)/(9 - 6*x + x^2))*(162*x - 216*x^2 + 108*x^3 - 24*x^4 + 2*x^5)),x]
```

output
```
$Aborted
```

3.1247.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1247.

$$e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\left(27+6831x+1215x^2-19x^3+2x^4\right)\right)$$

3.1247.4 Maple [A] (verified)

Time = 1.10 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.76

method	result	size
risch	$\frac{e^{2x}}{x\,e^{\frac{64(6+x)^2}{(-3+x)^2}}+x-3}$	26
parallelrisch	$\frac{e^{2x}}{x\,e^{\frac{64x^2+768x+2304}{x^2-6x+9}}+x-3}$	34

input
```
int((((2*x^4-19*x^3+1215*x^2+6831*x+27)*exp((64*x^2+768*x+2304)/(x^2-6*x+9)
)+2*x^4-25*x^3+117*x^2-243*x+189)*exp(x)^2/((x^5-9*x^4+27*x^3-27*x^2)*exp(
(64*x^2+768*x+2304)/(x^2-6*x+9))^2+(2*x^5-24*x^4+108*x^3-216*x^2+162*x)*ex
p((64*x^2+768*x+2304)/(x^2-6*x+9))+x^5-15*x^4+90*x^3-270*x^2+405*x-243),x,
method=_RETURNVERBOSE)
```

output
```
exp(2*x)/(x*exp(64*(6+x)^2/(-3+x)^2)+x-3)
```

3.1247.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.97

$$\int \frac{e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}(27+6831x+1215x^2-\right.}{-243+405x-270x^2+90x^3-15x^4+x^5+e^{\frac{2\left(2304+768x+64x^2\right)}{9-6x+x^2}}\left(-27x^2+27x^3-9x^4+x^5\right)+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}}$$
$$=\frac{e^{(2x)}}{xe^{\left(\frac{64\left(x^2+12x+36\right)}{x^2-6x+9}\right)}+x-3}$$

input
```
integrate((((2*x^4-19*x^3+1215*x^2+6831*x+27)*exp((64*x^2+768*x+2304)/(x^2-
6*x+9))+2*x^4-25*x^3+117*x^2-243*x+189)*exp(x)^2/((x^5-9*x^4+27*x^3-27*x^2
)*exp((64*x^2+768*x+2304)/(x^2-6*x+9))^2+(2*x^5-24*x^4+108*x^3-216*x^2+162
*x)*exp((64*x^2+768*x+2304)/(x^2-6*x+9))+x^5-15*x^4+90*x^3-270*x^2+405*x-2
43),x, algorithm=\
```

output
```
e^(2*x)/(x*e^(64*(x^2 + 12*x + 36)/(x^2 - 6*x + 9)) + x - 3)
```


$$e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}(27+6831x+1215x^2-19x^3+2x^4)\right)$$

3.1247.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}(27+6831x+1215x^2-\right.}{-243+405x-270x^2+90x^3-15x^4+x^5+e^{\frac{2\left(2304+768x+64x^2\right)}{9-6x+x^2}}(-27x^2+27x^3-9x^4+x^5)+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}}$$
$$=\frac{e^{2x}}{xe^{\frac{64x^2+768x+2304}{x^2-6x+9}}+x-3}$$

input
```
integrate((((2*x**4-19*x**3+1215*x**2+6831*x+27)*exp((64*x**2+768*x+2304)/(
x**2-6*x+9))+2*x**4-25*x**3+117*x**2-243*x+189)*exp(x)**2/((x**5-9*x**4+27
*x**3-27*x**2)*exp((64*x**2+768*x+2304)/(x**2-6*x+9))**2+(2*x**5-24*x**4+1
08*x**3-216*x**2+162*x)*exp((64*x**2+768*x+2304)/(x**2-6*x+9))+x**5-15*x**
4+90*x**3-270*x**2+405*x-243),x)
```

output
```
exp(2*x)/(x*exp((64*x**2 + 768*x + 2304)/(x**2 - 6*x + 9)) + x - 3)
```

3.1247.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00

$$\int \frac{e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}(27+6831x+1215x^2-\right.}{-243+405x-270x^2+90x^3-15x^4+x^5+e^{\frac{2\left(2304+768x+64x^2\right)}{9-6x+x^2}}(-27x^2+27x^3-9x^4+x^5)+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}}$$
$$=\frac{e^{(2x)}}{xe^{\left(\frac{5184}{x^2-6x+9}+\frac{1152}{x-3}+64\right)}+x-3}$$

input
```
integrate((((2*x^4-19*x^3+1215*x^2+6831*x+27)*exp((64*x^2+768*x+2304)/(x^2-
6*x+9))+2*x^4-25*x^3+117*x^2-243*x+189)*exp(x)^2/((x^5-9*x^4+27*x^3-27*x^2
)*exp((64*x^2+768*x+2304)/(x^2-6*x+9))^2+(2*x^5-24*x^4+108*x^3-216*x^2+162
*x)*exp((64*x^2+768*x+2304)/(x^2-6*x+9))+x^5-15*x^4+90*x^3-270*x^2+405*x-2
43),x, algorithm=\
```

output
```
e^(2*x)/(x*e^(5184/(x^2 - 6*x + 9) + 1152/(x - 3) + 64) + x - 3)
```

3.1247.

$$e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}(27+6831x+1215x^2-19x^3+2x^4)\right)$$

3.1247.8 Giac [A] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00

$$\int \frac{e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}(27+6831x+1215x^2-\right.}{-243+405x-270x^2+90x^3-15x^4+x^5+e^{\frac{2(2304+768x+64x^2)}{9-6x+x^2}}(-27x^2+27x^3-9x^4+x^5)+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}}$$
$$=\frac{e^{(2x)}}{xe^{\left(-\frac{192(x^2-12x)}{x^2-6x+9}+256\right)}+x-3}$$

input
```
integrate((((2*x^4-19*x^3+1215*x^2+6831*x+27)*exp((64*x^2+768*x+2304)/(x^2-
6*x+9))+2*x^4-25*x^3+117*x^2-243*x+189)*exp(x)^2/((x^5-9*x^4+27*x^3-27*x^2
)*exp((64*x^2+768*x+2304)/(x^2-6*x+9))^2+(2*x^5-24*x^4+108*x^3-216*x^2+162
*x)*exp((64*x^2+768*x+2304)/(x^2-6*x+9))+x^5-15*x^4+90*x^3-270*x^2+405*x-2
43),x, algorithm=\
```

output
```
e^(2*x)/(x*e^(-192*(x^2 - 12*x)/(x^2 - 6*x + 9) + 256) + x - 3)
```

3.1247.9 Mupad [B] (verification not implemented)

Time = 15.70 (sec) , antiderivative size = 116, normalized size of antiderivative = 3.41

$$\int \frac{e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}(27+6831x+1215x^2-\right.}{-243+405x-270x^2+90x^3-15x^4+x^5+e^{\frac{2(2304+768x+64x^2)}{9-6x+x^2}}(-27x^2+27x^3-9x^4+x^5)+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}}$$
$$=\frac{e^{2x}(385x^2+2298x+9)(x^3-9x^2+27x-27)^2}{(x-3)^2\left(x+x\,e^{\frac{768x}{x^2-6x+9}+\frac{2304}{x^2-6x+9}+\frac{64x^2}{x^2-6x+9}}-3\right)(385x^6-2322x^5-6777x^4+82404x^3-216513x^2+18}$$

input
```
int((exp(2*x)*(117*x^2 - 243*x - 25*x^3 + 2*x^4 + exp((768*x + 64*x^2 + 23
04)/(x^2 - 6*x + 9))*(6831*x + 1215*x^2 - 19*x^3 + 2*x^4 + 27) + 189))/(40
5*x + exp((768*x + 64*x^2 + 2304)/(x^2 - 6*x + 9))*(162*x - 216*x^2 + 108*
x^3 - 24*x^4 + 2*x^5) - exp((2*(768*x + 64*x^2 + 2304))/(x^2 - 6*x + 9))*(
27*x^2 - 27*x^3 + 9*x^4 - x^5) - 270*x^2 + 90*x^3 - 15*x^4 + x^5 - 243),x)
```

3.1247.

$$e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}(27+6831x+1215x^2-19x^3+2x^4)\right)$$

output
```
(exp(2*x)*(2298*x + 385*x^2 + 9)*(27*x - 9*x^2 + x^3 - 27)^2)/((x - 3)^2*(
x + x*exp((768*x)/(x^2 - 6*x + 9) + 2304/(x^2 - 6*x + 9) + (64*x^2)/(x^2 -
 6*x + 9)) - 3)*(185166*x - 216513*x^2 + 82404*x^3 - 6777*x^4 - 2322*x^5 +
 385*x^6 + 729))
```

3.1247.

$$e^{2x}\left(189-243x+117x^2-25x^3+2x^4+e^{\frac{2304+768x+64x^2}{9-6x+x^2}}\left(27+6831x+1215x^2-19x^3+2x^4\right)\right)$$

3.1248 $\int \frac{1}{-2e-2x+(e+x)\log(5e+5x)}\,dx$

3.1248.1 Optimal result

Integrand size = 21, antiderivative size = 16

$$\int \frac{1}{-2e-2x+(e+x)\log(5e+5x)}\,dx = \log\left(\frac{93}{7}\right)+\log(2-\log(5(e+x)))$$

output
```
ln(93/7)+ln(2-ln(5*exp(1)+5*x))
```

3.1248.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.56

$$\int \frac{1}{-2e-2x+(e+x)\log(5e+5x)}\,dx = \log(-2+\log(5(e+x)))$$

input
```
Integrate[(-2*E - 2*x + (E + x)*Log[5*E + 5*x])^(-1),x]
```

output
```
Log[-2 + Log[5*(E + x)]]
```

3.1248.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.69, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {7292, 2837, 25, 2739, 14}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{-2x+(x+e)\log(5x+5e)-2e}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{1}{(-x-e)(2-\log(5(x+e)))}dx$$

$$\Big\downarrow \text{2837}$$

$$\int -\frac{1}{(x+e)(2-\log(5(x+e)))}d(x+e)$$

$$\Big\downarrow \text{25}$$

$$-\int \frac{1}{(x+e)(2-\log(5(x+e)))}d(x+e)$$

$$\Big\downarrow \text{2739}$$

$$\int \frac{1}{2-\log(5(x+e))}d(2-\log(5(x+e)))$$

$$\Big\downarrow \text{14}$$

$$\log(2-\log(5(x+e)))$$

input
```
Int[(-2*E - 2*x + (E + x)*Log[5*E + 5*x])^(-1),x]
```

output
```
Log[2 - Log[5*(E + x)]]
```

3.1248.3.1 Defintions of rubi rules used

rule 14
```
Int[(a_.)/(x_), x_Symbol] :> Simp[a*Log[x], x] /; FreeQ[a, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2739
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Simp[1/(
b*n)   Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p}
, x]
```

rule 2837
```
Int[((a_.) + Log[(c_.)*((d_) + (e_.)*(x_))^(n_.)]*(b_.))^(p_.)*((f_) + (g_.
)*(x_))^(q_.), x_Symbol] :> Simp[1/e   Subst[Int[(f*(x/d))^q*(a + b*Log[c*x
^n])^p, x], x, d + e*x], x] /; FreeQ[{a, b, c, d, e, f, g, n, p, q}, x] &&
EqQ[e*f - d*g, 0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1248.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

method	result	size
derivativedivides	$\ln(\ln(5\,\mathrm{e}+5x)-2)$	13
default	$\ln(\ln(5\,\mathrm{e}+5x)-2)$	13
norman	$\ln(\ln(5\,\mathrm{e}+5x)-2)$	13
risch	$\ln(\ln(5\,\mathrm{e}+5x)-2)$	13
parallelrisch	$\ln(\ln(5\,\mathrm{e}+5x)-2)$	13

input
```
int(1/((x+exp(1))*ln(5*exp(1)+5*x)-2*exp(1)-2*x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(5*exp(1)+5*x)-2)
```

3.1248.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{1}{-2e-2x+(e+x)\log(5e+5x)}\,dx = \log\left(\log\left(5\,x+5\,e\right)-2\right)$$

input
```
integrate(1/((x+exp(1))*log(5*exp(1)+5*x)-2*exp(1)-2*x),x, algorithm=\
```

output
```
log(log(5*x + 5*e) - 2)
```

3.1248.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{1}{-2e-2x+(e+x)\log(5e+5x)}\,dx = \log\left(\log\left(5x+5e\right)-2\right)$$

input
```
integrate(1/((x+exp(1))*ln(5*exp(1)+5*x)-2*exp(1)-2*x),x)
```

output
```
log(log(5*x + 5*E) - 2)
```

3.1248.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int \frac{1}{-2e-2x+(e+x)\log(5e+5x)}\,dx = \log\left(\log\left(5\right)+\log\left(x+e\right)-2\right)$$

input
```
integrate(1/((x+exp(1))*log(5*exp(1)+5*x)-2*exp(1)-2*x),x, algorithm=\
```

output
```
log(log(5) + log(x + e) - 2)
```

3.1248.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{1}{-2e-2x+(e+x)\log(5e+5x)}\,dx = \log\left(\log\left(5\,x+5\,e\right)-2\right)$$

input
```
integrate(1/((x+exp(1))*log(5*exp(1)+5*x)-2*exp(1)-2*x),x, algorithm=\
```

output
```
log(log(5*x + 5*e) - 2)
```

3.1248.9 Mupad [B] (verification not implemented)

Time = 0.55 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{1}{-2e-2x+(e+x)\log(5e+5x)}\,dx = \ln\left(\ln\left(5\,x+5\,\mathrm{e}\right)-2\right)$$

input
```
int(-1/(2*x + 2*exp(1) - log(5*x + 5*exp(1))*(x + exp(1))),x)
```

output
```
log(log(5*x + 5*exp(1)) - 2)
```

3.1249 $\int \frac{618-164770x-24360x^2-33206x^3-4820x^4-240x^5-4x^6+e^{15}(20x+\ldots}{-8000+e^{15}+e^{10}(-60\ldots}$

3.1249.1 Optimal result

Integrand size = 139, antiderivative size = 21

$$\int \frac{618-164770x-24360x^2-33206x^3-4820x^4-240x^5-4x^6+e^{15}(20x+4x^3)+e^{10}(-1212x-60x^2-\ldots}{-8000+e^{15}+e^{10}(-60-3x)-1200x-60x^2-x^3+\ldots}$$
$$=3+\left(5+x^2+\frac{3}{20-e^5+x}\right)^2$$

output
```
3+(3/(20-exp(5)+x)+x^2+5)^2
```

3.1249.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 83 vs. 2(21) = 42.

Time = 0.09 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.95

$$\int \frac{618-164770x-24360x^2-33206x^3-4820x^4-240x^5-4x^6+e^{15}(20x+4x^3)+e^{10}(-1212x-60x^2-\ldots}{-8000+e^{15}+e^{10}(-60-3x)-1200x-60x^2-x^3+\ldots}$$
$$=-163880+80e^{15}-e^{20}+e^5\left(32394+\frac{240}{-20+e^5-x}\right)+6x+10x^2$$
$$+x^4+\frac{9}{(20-e^5+x)^2}+\frac{2430}{20-e^5+x}+e^{10}\left(-2410+\frac{6}{20-e^5+x}\right)$$

3.1249.
$\int \frac{618-164770x-24360x^2-33206x^3-4820x^4-240x^5-4x^6+e^{15}(20x+4x^3)+e^{10}(-1212x-60x^2-240x^3-12x^4)+e^5(-30+24480x+2418x^2+4860x^3\ldots}{-8000+e^{15}+e^{10}(-60-3x)-1200x-60x^2-x^3+e^5(1200+120x+3x^2)}$

input
```
Integrate[(618 - 164770*x - 24360*x^2 - 33206*x^3 - 4820*x^4 - 240*x^5 - 4
*x^6 + E^15*(20*x + 4*x^3) + E^10*(-1212*x - 60*x^2 - 240*x^3 - 12*x^4) +
E^5*(-30 + 24480*x + 2418*x^2 + 4860*x^3 + 480*x^4 + 12*x^5))/(-8000 + E^1
5 + E^10*(-60 - 3*x) - 1200*x - 60*x^2 - x^3 + E^5*(1200 + 120*x + 3*x^2))
,x]
```

output
```
-163880 + 80*E^15 - E^20 + E^5*(32394 + 240/(-20 + E^5 - x)) + 6*x + 10*x^
2 + x^4 + 9/(20 - E^5 + x)^2 + 2430/(20 - E^5 + x) + E^10*(-2410 + 6/(20 -
 E^5 + x))
```

3.1249.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 46 vs. $2(21) = 42$.

Time = 0.35 (sec) , antiderivative size = 46, normalized size of antiderivative = 2.19, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.022$, Rules used = {2007, 2389, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-4x^6-240x^5-4820x^4-33206x^3+e^{15}\left(4x^3+20x\right)-24360x^2+e^{10}\left(-12x^4-240x^3-60x^2-1212x\right)+e^5\left(\right.}{-x^3-60x^2+e^5\left(3x^2+120x+1200\right)-1200x+e^{10}(-3x-}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-4x^6-240x^5-4820x^4-33206x^3+e^{15}\left(4x^3+20x\right)-24360x^2+e^{10}\left(-12x^4-240x^3-60x^2-1212x\right)+e^5\left(\right.}{\left(-x+e^5-20\right)^3}$$

$$\Big\downarrow \text{2389}$$

$$\int \left(4x^3+20x-\frac{6\left(405-40e^5+e^{10}\right)}{\left(-x+e^5-20\right)^2}+\frac{18}{\left(-x+e^5-20\right)^3}+6\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^4+10x^2+6x+\frac{6\left(405-40e^5+e^{10}\right)}{x-e^5+20}+\frac{9}{\left(x-e^5+20\right)^2}$$

input
```
Int[(618 - 164770*x - 24360*x^2 - 33206*x^3 - 4820*x^4 - 240*x^5 - 4*x^6 +
 E^15*(20*x + 4*x^3) + E^10*(-1212*x - 60*x^2 - 240*x^3 - 12*x^4) + E^5*(-
30 + 24480*x + 2418*x^2 + 4860*x^3 + 480*x^4 + 12*x^5))/(-8000 + E^15 + E^
10*(-60 - 3*x) - 1200*x - 60*x^2 - x^3 + E^5*(1200 + 120*x + 3*x^2)),x]
```

output
```
6*x + 10*x^2 + x^4 + 9/(20 - E^5 + x)^2 + (6*(405 - 40*E^5 + E^10))/(20 -
E^5 + x)
```

3.1249.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2389
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

3.1249.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. 2(20) = 40.

Time = 0.12 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.90

method	result
risch	$x^4+10x^2+6x+\frac{(6\,e^{10}-240\,e^5+2430)x-6\,e^{15}+360\,e^{10}-7230\,e^5+48609}{e^{10}-2x\,e^5+x^2-40\,e^5+40x+400}$
norman	$\frac{x^6+(-20\,e^5+406)x^3+(-2\,e^5+40)x^5+(e^{10}-40\,e^5+410)x^4+(20\,e^{15}-1212\,e^{10}+24480\,e^5-164770)x-10\,e^{20}+806\,e^{15}-24360\,e}{(e^5-x-20)^2}$
default	$x^4+10x^2+6x-2\left(\sum_{\_R=\mathrm{RootOf}(\_Z^3+(-3\,e^5+60)\_Z^2+(-120\,e^5+3\,e^{10}+1200)\_Z-1200\,e^5+60\,e^{10}-e^{15}+8000)}\right.$
gosper	$-\frac{-x^4e^{10}+2x^5e^5-x^6+40x^4e^5-40x^5+10\,e^{20}-20x\,e^{15}+20x^3e^5-410x^4-806\,e^{15}+1212x\,e^{10}-406x^3+24360\,e^{10}-24480x\,e^5-3}{e^{10}-2x\,e^5+x^2-40\,e^5+40x+400}$
parallelrisch	$-\frac{-x^4e^{10}+2x^5e^5-x^6+40x^4e^5-40x^5+10\,e^{20}-20x\,e^{15}+20x^3e^5-410x^4-806\,e^{15}+1212x\,e^{10}-406x^3+24360\,e^{10}-24480x\,e^5-3}{e^{10}-2x\,e^5+x^2-40\,e^5+40x+400}$

3.1249.

$\int \frac{618-164770x-24360x^2-33206x^3-4820x^4-240x^5-4x^6+e^{15}(20x+4x^3)+e^{10}(-1212x-60x^2-240x^3-12x^4)+e^5(-30+24480x+2418x^2+4860x}{-8000+e^{15}+e^{10}(-60-3x)-1200x-60x^2-x^3+e^5(1200+120x+3x^2)}$

input
```
int(((4*x^3+20*x)*exp(5)^3+(-12*x^4-240*x^3-60*x^2-1212*x)*exp(5)^2+(12*x^
5+480*x^4+4860*x^3+2418*x^2+24480*x-30)*exp(5)-4*x^6-240*x^5-4820*x^4-3320
6*x^3-24360*x^2-164770*x+618)/(exp(5)^3+(-3*x-60)*exp(5)^2+(3*x^2+120*x+12
00)*exp(5)-x^3-60*x^2-1200*x-8000),x,method=_RETURNVERBOSE)
```

output
```
x^4+10*x^2+6*x+((6*exp(10)-240*exp(5)+2430)*x-6*exp(15)+360*exp(10)-7230*e
xp(5)+48609)/(exp(10)-2*x*exp(5)+x^2-40*exp(5)+40*x+400)
```

3.1249.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(20) = 40$.

Time = 0.28 (sec) , antiderivative size = 95, normalized size of antiderivative = 4.52

$$\int \frac{618 - 164770x - 24360x^2 - 33206x^3 - 4820x^4 - 240x^5 - 4x^6 + e^{15}(20x + 4x^3) + e^{10}(-1212x - 60x^2 -}{-8000 + e^{15} + e^{10}(-60 - 3x) - 1200x - 60x^2 - x^3 +}$$
$$= \frac{x^6 + 40\,x^5 + 410\,x^4 + 406\,x^3 + 4240\,x^2 + (x^4 + 10\,x^2 + 12\,x + 360)e^{10} - 2\,(x^5 + 20\,x^4 + 10\,x^3 + 206\,x^2 +}{x^2 - 2\,(x + 20)e^5 + 40\,x + e^{10} + 400}$$

input
```
integrate(((4*x^3+20*x)*exp(5)^3+(-12*x^4-240*x^3-60*x^2-1212*x)*exp(5)^2+
(12*x^5+480*x^4+4860*x^3+2418*x^2+24480*x-30)*exp(5)-4*x^6-240*x^5-4820*x^
4-33206*x^3-24360*x^2-164770*x+618)/(exp(5)^3+(-3*x-60)*exp(5)^2+(3*x^2+12
0*x+1200)*exp(5)-x^3-60*x^2-1200*x-8000),x, algorithm=\
```

output
```
(x^6 + 40*x^5 + 410*x^4 + 406*x^3 + 4240*x^2 + (x^4 + 10*x^2 + 12*x + 360)
*e^10 - 2*(x^5 + 20*x^4 + 10*x^3 + 206*x^2 + 240*x + 3615)*e^5 + 4830*x -
6*e^15 + 48609)/(x^2 - 2*(x + 20)*e^5 + 40*x + e^10 + 400)
```

3.1249.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 63 vs. $2(15) = 30$.

Time = 0.33 (sec) , antiderivative size = 63, normalized size of antiderivative = 3.00

$$\int \frac{618 - 164770x - 24360x^2 - 33206x^3 - 4820x^4 - 240x^5 - 4x^6 + e^{15}(20x + 4x^3) + e^{10}(-1212x - 60x^2 -}{-8000 + e^{15} + e^{10}(-60 - 3x) - 1200x - 60x^2 - x^3 +}$$
$$= x^4 + 10x^2 + 6x + \frac{x(-240e^5 + 2430 + 6e^{10}) - 6e^{15} - 7230e^5 + 48609 + 360e^{10}}{x^2 + x\,(40 - 2e^5) - 40e^5 + 400 + e^{10}}$$

3.1249.
$\int \frac{618-164770x-24360x^2-33206x^3-4820x^4-240x^5-4x^6+e^{15}(20x+4x^3)+e^{10}(-1212x-60x^2-240x^3-12x^4)+e^5(-30+24480x+2418x^2+4860x^3}{-8000+e^{15}+e^{10}(-60-3x)-1200x-60x^2-x^3+e^5(1200+120x+3x^2)}$

input
```
integrate(((4*x**3+20*x)*exp(5)**3+(-12*x**4-240*x**3-60*x**2-1212*x)*exp(
5)**2+(12*x**5+480*x**4+4860*x**3+2418*x**2+24480*x-30)*exp(5)-4*x**6-240*
x**5-4820*x**4-33206*x**3-24360*x**2-164770*x+618)/(exp(5)**3+(-3*x-60)*ex
p(5)**2+(3*x**2+120*x+1200)*exp(5)-x**3-60*x**2-1200*x-8000),x)
```

output
```
x**4 + 10*x**2 + 6*x + (x*(-240*exp(5) + 2430 + 6*exp(10)) - 6*exp(15) - 7
230*exp(5) + 48609 + 360*exp(10))/(x**2 + x*(40 - 2*exp(5)) - 40*exp(5) +
400 + exp(10))
```

3.1249.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 59 vs. $2(20) = 40$.

Time = 0.19 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.81

$$\int \frac{618 - 164770x - 24360x^2 - 33206x^3 - 4820x^4 - 240x^5 - 4x^6 + e^{15}(20x + 4x^3) + e^{10}(-1212x - 60x^2 -}{-8000 + e^{15} + e^{10}(-60 - 3x) - 1200x - 60x^2 - x^3 +}$$
$$= x^4 + 10\,x^2 + 6\,x + \frac{3\,(2\,x(e^{10} - 40\,e^5 + 405) - 2\,e^{15} + 120\,e^{10} - 2410\,e^5 + 16203)}{x^2 - 2\,x(e^5 - 20) + e^{10} - 40\,e^5 + 400}$$

input
```
integrate(((4*x^3+20*x)*exp(5)^3+(-12*x^4-240*x^3-60*x^2-1212*x)*exp(5)^2+
(12*x^5+480*x^4+4860*x^3+2418*x^2+24480*x-30)*exp(5)-4*x^6-240*x^5-4820*x^
4-33206*x^3-24360*x^2-164770*x+618)/(exp(5)^3+(-3*x-60)*exp(5)^2+(3*x^2+12
0*x+1200)*exp(5)-x^3-60*x^2-1200*x-8000),x, algorithm=\
```

output
```
x^4 + 10*x^2 + 6*x + 3*(2*x*(e^10 - 40*e^5 + 405) - 2*e^15 + 120*e^10 - 24
10*e^5 + 16203)/(x^2 - 2*x*(e^5 - 20) + e^10 - 40*e^5 + 400)
```

3.1249.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. $2(20) = 40$.

Time = 0.28 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.38

$$\int \frac{618 - 164770x - 24360x^2 - 33206x^3 - 4820x^4 - 240x^5 - 4x^6 + e^{15}(20x + 4x^3) + e^{10}(-1212x - 60x^2 -}{-8000 + e^{15} + e^{10}(-60 - 3x) - 1200x - 60x^2 - x^3 +}$$
$$= x^4 + 10\,x^2 + 6\,x + \frac{3\,(2\,xe^{10} - 80\,xe^5 + 810\,x - 2\,e^{15} + 120\,e^{10} - 2410\,e^5 + 16203)}{(x - e^5 + 20)^2}$$

3.1249.
$$\int \frac{618-164770x-24360x^2-33206x^3-4820x^4-240x^5-4x^6+e^{15}(20x+4x^3)+e^{10}(-1212x-60x^2-240x^3-12x^4)+e^5(-30+24480x+2418x^2+4860x^3}{-8000+e^{15}+e^{10}(-60-3x)-1200x-60x^2-x^3+e^5(1200+120x+3x^2)}$$

input
```
integrate(((4*x^3+20*x)*exp(5)^3+(-12*x^4-240*x^3-60*x^2-1212*x)*exp(5)^2+
(12*x^5+480*x^4+4860*x^3+2418*x^2+24480*x-30)*exp(5)-4*x^6-240*x^5-4820*x^
4-33206*x^3-24360*x^2-164770*x+618)/(exp(5)^3+(-3*x-60)*exp(5)^2+(3*x^2+12
0*x+1200)*exp(5)-x^3-60*x^2-1200*x-8000),x, algorithm=\
```

output
```
x^4 + 10*x^2 + 6*x + 3*(2*x*e^10 - 80*x*e^5 + 810*x - 2*e^15 + 120*e^10 -
2410*e^5 + 16203)/(x - e^5 + 20)^2
```

3.1249.9 Mupad [B] (verification not implemented)

Time = 14.68 (sec) , antiderivative size = 126, normalized size of antiderivative = 6.00

$$\int \frac{618-164770x-24360x^2-33206x^3-4820x^4-240x^5-4x^6+e^{15}(20x+4x^3)+e^{10}(-1212x-60x^2-\cdots}{-8000+e^{15}+e^{10}(-60-3x)-1200x-60x^2-x^3+\cdots}$$
$$= \frac{360\,e^{10}-7230\,e^5-6\,e^{15}+x\,(6\,e^{10}-240\,e^5+2430)+48609}{x^2+(40-2\,e^5)\,x-40\,e^5+e^{10}+400} - x^2\left(240\,e^5-6\,e^{10}+6\,(e^5-20)^2-2410\right)+x^4-x\Big(4860\,e^5-240\,e^{10}+4\,e^{15} - 4\,(e^5-20)^3+(3\,e^5-60)\,\left(480\,e^5-12\,e^{10}+12\,(e^5-20)^2-4820\right)-33206\Big)$$

input
```
int((164770*x - exp(15)*(20*x + 4*x^3) + exp(10)*(1212*x + 60*x^2 + 240*x^
3 + 12*x^4) - exp(5)*(24480*x + 2418*x^2 + 4860*x^3 + 480*x^4 + 12*x^5 - 3
0) + 24360*x^2 + 33206*x^3 + 4820*x^4 + 240*x^5 + 4*x^6 - 618)/(1200*x - e
xp(15) - exp(5)*(120*x + 3*x^2 + 1200) + 60*x^2 + x^3 + exp(10)*(3*x + 60)
 + 8000),x)
```

output
```
(360*exp(10) - 7230*exp(5) - 6*exp(15) + x*(6*exp(10) - 240*exp(5) + 2430)
 + 48609)/(exp(10) - 40*exp(5) + x^2 - x*(2*exp(5) - 40) + 400) - x^2*(240
*exp(5) - 6*exp(10) + 6*(exp(5) - 20)^2 - 2410) + x^4 - x*(4860*exp(5) - 2
40*exp(10) + 4*exp(15) - 4*(exp(5) - 20)^3 + (3*exp(5) - 60)*(480*exp(5) -
 12*exp(10) + 12*(exp(5) - 20)^2 - 4820) - 33206)
```

3.1250 $\int \frac{e^{2x^2+4e^{4x}x^2}\left(e^5\left(-18+36x^2\right)+e^{5+4x}\left(72x^2+144x^3\right)\right)}{x^3}\,dx$

3.1250.1 Optimal result

Integrand size = 53, antiderivative size = 22

$$\int \frac{e^{2x^2+4e^{4x}x^2}\left(e^5\left(-18+36x^2\right)+e^{5+4x}\left(72x^2+144x^3\right)\right)}{x^3}\,dx=\frac{9e^{5+2x\left(x+2e^{4x}x\right)}}{x^2}$$

output
```
9*exp(5)*exp((2*x*exp(4*x)+x)*x)^2/x^2
```

3.1250.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^{2x^2+4e^{4x}x^2}\left(e^5\left(-18+36x^2\right)+e^{5+4x}\left(72x^2+144x^3\right)\right)}{x^3}\,dx=\frac{9e^{5+\left(2+4e^{4x}\right)x^2}}{x^2}$$

input
```
Integrate[(E^(2*x^2 + 4*E^(4*x)*x^2)*(E^5*(-18 + 36*x^2) + E^(5 + 4*x)*(72
*x^2 + 144*x^3)))/x^3,x]
```

output
```
(9*E^(5 + (2 + 4*E^(4*x))*x^2))/x^2
```

3.1250.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 71 vs. $2(22) = 44$.

Time = 0.67 (sec) , antiderivative size = 71, normalized size of antiderivative = 3.23, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.075$, Rules used = {7292, 27, 25, 2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{4e^{4x}x^2+2x^2}\left(e^5\left(36x^2-18\right)+e^{4x+5}\left(144x^3+72x^2\right)\right)}{x^3}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{18e^{2\left(2e^{4x}+1\right)x^2+5}\left(8e^{4x}x^3+4e^{4x}x^2+2x^2-1\right)}{x^3}dx$$

$$\Big\downarrow \text{27}$$

$$18\int -\frac{e^{2\left(1+2e^{4x}\right)x^2+5}\left(-8e^{4x}x^3-4e^{4x}x^2-2x^2+1\right)}{x^3}dx$$

$$\Big\downarrow \text{25}$$

$$-18\int \frac{e^{2\left(1+2e^{4x}\right)x^2+5}\left(-8e^{4x}x^3-4e^{4x}x^2-2x^2+1\right)}{x^3}dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{9e^{2\left(2e^{4x}+1\right)x^2+5}\left(4e^{4x}x^3+2e^{4x}x^2+x^2\right)}{x^3\left(4e^{4x}x^2+\left(2e^{4x}+1\right)x\right)}$$

input
```
Int[(E^(2*x^2 + 4*E^(4*x)*x^2)*(E^5*(-18 + 36*x^2) + E^(5 + 4*x)*(72*x^2 +
 144*x^3)))/x^3,x]
```

output
```
(9*E^(5 + 2*(1 + 2*E^(4*x))*x^2)*(x^2 + 2*E^(4*x)*x^2 + 4*E^(4*x)*x^3))/(x
^3*((1 + 2*E^(4*x))*x + 4*E^(4*x)*x^2))
```

3.1250.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1250.4 Maple [A] (verified)

Time = 0.31 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

method	result	size
risch	$\frac{9\,{\mathrm e}^{4 x^{2} {\mathrm e}^{4 x}+2 x^{2}+5}}{x^{2}}$	23
parallelrisch	$\frac{9\,{\mathrm e}^{5} {\mathrm e}^{2 x^{2} \left(2\,{\mathrm e}^{4 x}+1\right)}}{x^{2}}$	23
norman	$\frac{9\,{\mathrm e}^{5} {\mathrm e}^{4 x^{2} {\mathrm e}^{4 x}+2 x^{2}}}{x^{2}}$	24

input
```
int(((144*x^3+72*x^2)*exp(5)*exp(4*x)+(36*x^2-18)*exp(5))*exp(2*x^2*exp(4*
x)+x^2)^2/x^3,x,method=_RETURNVERBOSE)
```

output
```
9/x^2*exp(4*x^2*exp(4*x)+2*x^2+5)
```

3.1250.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int \frac{e^{2x^2+4e^{4x}x^2}\left(e^5(-18+36x^2)+e^{5+4x}(72x^2+144x^3)\right)}{x^3}\,dx = \frac{9\,e^{\left(2\,\left(x^2e^5+2\,x^2e^{(4\,x+5)}\right)e^{(-5)}+5\right)}}{x^2}$$

input
```
integrate(((144*x^3+72*x^2)*exp(5)*exp(4*x)+(36*x^2-18)*exp(5))*exp(2*x^2*
exp(4*x)+x^2)^2/x^3,x, algorithm=\
```

output
```
9*e^(2*(x^2*e^5 + 2*x^2*e^(4*x + 5))*e^(-5) + 5)/x^2
```

3.1250.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{e^{2x^2+4e^{4x}x^2}\left(e^5(-18+36x^2)+e^{5+4x}(72x^2+144x^3)\right)}{x^3}\,dx = \frac{9e^5e^{4x^2e^{4x}+2x^2}}{x^2}$$

input
```
integrate(((144*x**3+72*x**2)*exp(5)*exp(4*x)+(36*x**2-18)*exp(5))*exp(2*x
**2*exp(4*x)+x**2)**2/x**3,x)
```

output
```
9*exp(5)*exp(4*x**2*exp(4*x) + 2*x**2)/x**2
```

3.1250.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^{2x^2+4e^{4x}x^2}\left(e^5(-18+36x^2)+e^{5+4x}(72x^2+144x^3)\right)}{x^3}\,dx = \frac{9\,e^{\left(4\,x^2e^{(4\,x)}+2\,x^2+5\right)}}{x^2}$$

input
```
integrate(((144*x^3+72*x^2)*exp(5)*exp(4*x)+(36*x^2-18)*exp(5))*exp(2*x^2*
exp(4*x)+x^2)^2/x^3,x, algorithm=\
```

output
```
9*e^(4*x^2*e^(4*x) + 2*x^2 + 5)/x^2
```

3.1250.8 Giac [F]

$$\int \frac{e^{2x^2+4e^{4x}x^2}(e^5(-18+36x^2)+e^{5+4x}(72x^2+144x^3))}{x^3}\,dx$$
$$=\int \frac{18\,\left((2\,x^2-1)e^5+4\,(2\,x^3+x^2)e^{(4\,x+5)}\right)e^{\left(4\,x^2e^{(4\,x)}+2\,x^2\right)}}{x^3}\,dx$$

input
```
integrate((((144*x^3+72*x^2)*exp(5)*exp(4*x)+(36*x^2-18)*exp(5))*exp(2*x^2*
exp(4*x)+x^2)^2/x^3,x, algorithm=\
```

output
```
integrate(18*((2*x^2 - 1)*e^5 + 4*(2*x^3 + x^2)*e^(4*x + 5))*e^(4*x^2*e^(4
*x) + 2*x^2)/x^3, x)
```

3.1250.9 Mupad [B] (verification not implemented)

Time = 14.75 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{e^{2x^2+4e^{4x}x^2}(e^5(-18+36x^2)+e^{5+4x}(72x^2+144x^3))}{x^3}\,dx=\frac{9\,\mathrm{e}^5\,\mathrm{e}^{2\,x^2}\,\mathrm{e}^{4\,x^2\,\mathrm{e}^{4\,x}}}{x^2}$$

input
```
int((exp(4*x^2*exp(4*x) + 2*x^2)*(exp(5)*(36*x^2 - 18) + exp(4*x)*exp(5)*(
72*x^2 + 144*x^3)))/x^3,x)
```

output
```
(9*exp(5)*exp(2*x^2)*exp(4*x^2*exp(4*x)))/x^2
```

3.1251 $\int e^{-x}(e^x + e^4(2 - 8x + 3x^2)) \, dx$

3.1251.1 Optimal result

Integrand size = 24, antiderivative size = 18

$$\int e^{-x}\left(e^x + e^4\left(2 - 8x + 3x^2\right)\right) \, dx = 6 + x - e^{4-x}x(-2 + 3x)$$

output
```
6-(-2+3*x)/exp(x)*x*exp(2)^2+x
```

3.1251.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

$$\int e^{-x}\left(e^x + e^4\left(2 - 8x + 3x^2\right)\right) \, dx = x + e^{-x}\left(2e^4x - 3e^4x^2\right)$$

input
```
Integrate[(E^x + E^4*(2 - 8*x + 3*x^2))/E^x,x]
```

output
```
x + (2*E^4*x - 3*E^4*x^2)/E^x
```

3.1251.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-x}\left(e^4\left(3x^2-8x+2\right)+e^x\right)\,dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(e^{4-x}\left(3x^2-8x+2\right)+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-3e^{4-x}x^2+2e^{4-x}x+x$$

input
```
Int[(E^x + E^4*(2 - 8*x + 3*x^2))/E^x,x]
```

output
```
x + 2*E^(4 - x)*x - 3*E^(4 - x)*x^2
```

3.1251.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1251.4 Maple [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

method	result	size
risch	$-3x^2\mathrm{e}^{-x+4}+2x\,\mathrm{e}^{-x+4}+x$	23
parts	$x+\mathrm{e}^4(2x\,\mathrm{e}^{-x}-3x^2\mathrm{e}^{-x})$	25
norman	$(\mathrm{e}^x x+2x\,\mathrm{e}^4-3x^2\mathrm{e}^4)\,\mathrm{e}^{-x}$	27
parallelrisch	$-(3x^2\mathrm{e}^4-2x\,\mathrm{e}^4-\mathrm{e}^x x)\,\mathrm{e}^{-x}$	29
default	$x-2\,\mathrm{e}^4\mathrm{e}^{-x}-8\,\mathrm{e}^4(-x\,\mathrm{e}^{-x}-\mathrm{e}^{-x})+3\,\mathrm{e}^4(-x^2\mathrm{e}^{-x}-2x\,\mathrm{e}^{-x}-2\,\mathrm{e}^{-x})$	62

input
```
int((exp(x)+(3*x^2-8*x+2)*exp(2)^2)/exp(x),x,method=_RETURNVERBOSE)
```

output
```
-3*x^2*exp(-x+4)+2*x*exp(-x+4)+x
```

3.1251.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33

$$\int e^{-x}\left(e^x+e^4\left(2-8x+3x^2\right)\right)\,dx=-\left(\left(3\,x^2-2\,x\right)e^4-xe^x\right)e^{(-x)}$$

input
```
integrate((exp(x)+(3*x^2-8*x+2)*exp(2)^2)/exp(x),x, algorithm=\
```

output
```
-((3*x^2 - 2*x)*e^4 - x*e^x)*e^(-x)
```

3.1251.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int e^{-x}\left(e^x+e^4\left(2-8x+3x^2\right)\right)\,dx=x+\left(-3x^2e^4+2xe^4\right)e^{-x}$$

input
```
integrate((exp(x)+(3*x**2-8*x+2)*exp(2)**2)/exp(x),x)
```

output
```
x + (-3*x**2*exp(4) + 2*x*exp(4))*exp(-x)
```

3.1251.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(17) = 34$.

Time = 0.20 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.50

$$\int e^{-x}\left(e^x+e^4\left(2-8x+3x^2\right)\right)\,dx = -3\left(x^2e^4+2\,xe^4+2\,e^4\right)e^{(-x)} + 8\left(xe^4+e^4\right)e^{(-x)}+x-2\,e^{(-x+4)}$$

input
```
integrate((exp(x)+(3*x^2-8*x+2)*exp(2)^2)/exp(x),x, algorithm=\
```

output
```
-3*(x^2*e^4 + 2*x*e^4 + 2*e^4)*e^(-x) + 8*(x*e^4 + e^4)*e^(-x) + x - 2*e^(
-x + 4)
```

3.1251.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.06

$$\int e^{-x}\left(e^x+e^4\left(2-8x+3x^2\right)\right)\,dx = -\left(3\,x^2-2\,x\right)e^{(-x+4)}+x$$

input
```
integrate((exp(x)+(3*x^2-8*x+2)*exp(2)^2)/exp(x),x, algorithm=\
```

output
```
-(3*x^2 - 2*x)*e^(-x + 4) + x
```

3.1251.9 Mupad [B] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int e^{-x}\left(e^x+e^4\left(2-8x+3x^2\right)\right)\,dx = x+2\,x\,\mathrm{e}^{4-x}-3\,x^2\,\mathrm{e}^{4-x}$$

input
```
int(exp(-x)*(exp(x) + exp(4)*(3*x^2 - 8*x + 2)),x)
```

output
```
x + 2*x*exp(4 - x) - 3*x^2*exp(4 - x)
```

3.1252 $\int \frac{1953125x^3-1953125x^4+781250x^5-156250x^6+15625x^7-625x^8+e^{3}}{-1953125x^3+1953125x^4-781250x^5+}$

3.1252.1 Optimal result

Integrand size = 110, antiderivative size = 23

$$\int \frac{1953125x^3-1953125x^4+781250x^5-156250x^6+15625x^7-625x^8+e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}}{-1953125x^3+1953125x^4-781250x^5+156250x^6-15625x^7+625x^8}$$

$$= -4+e^{\frac{\log^4(3)}{625(-5+x)^4x^2}}-x$$

output
```
exp(1/625*ln(3)^4/x^2/(-5+x)^4)-4-x
```

3.1252.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{1953125x^3-1953125x^4+781250x^5-156250x^6+15625x^7-625x^8+e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}}{-1953125x^3+1953125x^4-781250x^5+156250x^6-15625x^7+625x^8}$$

$$= e^{\frac{\log^4(3)}{625(-5+x)^4x^2}}-x$$

input
```
Integrate[(1953125*x^3 - 1953125*x^4 + 781250*x^5 - 156250*x^6 + 15625*x^7
 - 625*x^8 + E^(Log[3]^4/(390625*x^2 - 312500*x^3 + 93750*x^4 - 12500*x^5
+ 625*x^6))*(10 - 6*x)*Log[3]^4)/(-1953125*x^3 + 1953125*x^4 - 781250*x^5
+ 156250*x^6 - 15625*x^7 + 625*x^8),x]
```

output
```
E^(Log[3]^4/(625*(-5 + x)^4*x^2)) - x
```

3.1252.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 76 vs. $2(23) = 46$.

Time = 1.40 (sec) , antiderivative size = 76, normalized size of antiderivative = 3.30, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.036$, Rules used = {2026, 2007, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-625x^8+15625x^7-156250x^6+781250x^5-1953125x^4+1953125x^3+(10-6x)\log^4(3)e^{\frac{\log^4(3)}{625x^6-12500x^5+93750x^4-}}}{625x^8-15625x^7+156250x^6-781250x^5+1953125x^4-1953125x^3}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-625x^8+15625x^7-156250x^6+781250x^5-1953125x^4+1953125x^3+(10-6x)\log^4(3)e^{\frac{\log^4(3)}{625x^6-12500x^5+93750x^4-}}}{x^3\left(625x^5-15625x^4+156250x^3-781250x^2+1953125x-1953125\right)}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{-625x^8+15625x^7-156250x^6+781250x^5-1953125x^4+1953125x^3+(10-6x)\log^4(3)e^{\frac{\log^4(3)}{625x^6-12500x^5+93750x^4-}}}{x^3\left(5^{4/5}x-5\ 5^{4/5}\right)^5}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{x^5}{(x-5)^5}+\frac{25x^4}{(x-5)^5}-\frac{250x^3}{(x-5)^5}+\frac{1250x^2}{(x-5)^5}-\frac{2(3x-5)\log^4(3)e^{\frac{\log^4(3)}{625(x-5)^4x^2}}}{625(x-5)^5x^3}-\frac{3125x}{(x-5)^5}+\frac{3125}{(x-5)^5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{25x^4}{2(5-x)^4}+e^{\frac{\log^4(3)}{625(5-x)^4x^2}}-x+\frac{250}{5-x}-\frac{1875}{(5-x)^2}+\frac{6250}{(5-x)^3}-\frac{15625}{2(5-x)^4}$$

input
```
Int[(1953125*x^3 - 1953125*x^4 + 781250*x^5 - 156250*x^6 + 15625*x^7 - 625
*x^8 + E^(Log[3]^4/(390625*x^2 - 312500*x^3 + 93750*x^4 - 12500*x^5 + 625*
x^6))*(10 - 6*x)*Log[3]^4)/(-1953125*x^3 + 1953125*x^4 - 781250*x^5 + 1562
50*x^6 - 15625*x^7 + 625*x^8),x]
```

output
```
E^(Log[3]^4/(625*(5 - x)^4*x^2)) - 15625/(2*(5 - x)^4) + 6250/(5 - x)^3 -
1875/(5 - x)^2 + 250/(5 - x) - x + (25*x^4)/(2*(5 - x)^4)
```

3.1252.

$$\int \frac{1953125x^3-1953125x^4+781250x^5-156250x^6+15625x^7-625x^8+e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}(10-6x)\log^4(3)}{-1953125x^3+1953125x^4-781250x^5+156250x^6-15625x^7+625x^8}\,dx$$

3.1252.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1252.4 Maple [A] (verified)

Time = 1.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

method	result
risch	$-x+\mathrm{e}^{\frac{\ln(3)^4}{625x^2(-5+x)^4}}$
parallelrisch	$-x+\mathrm{e}^{\frac{\ln(3)^4}{625x^2\left(x^4-20x^3+150x^2-500x+625\right)}}-50$
parts	$-x+\frac{x^6\mathrm{e}^{\frac{\ln(3)^4}{625x^6-12500x^5+93750x^4-312500x^3+390625x^2}}+625x^2\mathrm{e}^{\frac{\ln(3)^4}{625x^6-12500x^5+93750x^4-312500x^3+390625x^2}}-500x^3\mathrm{e}^{625x^6-}$

input
```
int(((-6*x+10)*ln(3)^4*exp(ln(3)^4/(625*x^6-12500*x^5+93750*x^4-312500*x^3
+390625*x^2))-625*x^8+15625*x^7-156250*x^6+781250*x^5-1953125*x^4+1953125*
x^3)/(625*x^8-15625*x^7+156250*x^6-781250*x^5+1953125*x^4-1953125*x^3),x,m
ethod=_RETURNVERBOSE)
```

output
```
-x+exp(1/625*ln(3)^4/x^2/(-5+x)^4)
```

3.1252. $\int\frac{1953125x^3-1953125x^4+781250x^5-156250x^6+15625x^7-625x^8+e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}(10-6x)\log^4(3)}{-1953125x^3+1953125x^4-781250x^5+156250x^6-15625x^7+625x^8}\,dx$

3.1252.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.61

$$\int \frac{1953125x^3 - 1953125x^4 + 781250x^5 - 156250x^6 + 15625x^7 - 625x^8 + e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}}{-1953125x^3 + 1953125x^4 - 781250x^5 + 156250x^6 - 15625x^7 + 625x^8}$$

$$= -x + e^{\left(\frac{\log(3)^4}{625\left(x^6-20x^5+150x^4-500x^3+625x^2\right)}\right)}$$

input
```
integrate(((-6*x+10)*log(3)^4*exp(log(3)^4/(625*x^6-12500*x^5+93750*x^4-31
2500*x^3+390625*x^2))-625*x^8+15625*x^7-156250*x^6+781250*x^5-1953125*x^4+
1953125*x^3)/(625*x^8-15625*x^7+156250*x^6-781250*x^5+1953125*x^4-1953125*
x^3),x, algorithm=\
```

output
```
-x + e^(1/625*log(3)^4/(x^6 - 20*x^5 + 150*x^4 - 500*x^3 + 625*x^2))
```

3.1252.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.39

$$\int \frac{1953125x^3 - 1953125x^4 + 781250x^5 - 156250x^6 + 15625x^7 - 625x^8 + e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}}{-1953125x^3 + 1953125x^4 - 781250x^5 + 156250x^6 - 15625x^7 + 625x^8}$$

$$= -x + e^{\frac{\log(3)^4}{625x^6-12500x^5+93750x^4-312500x^3+390625x^2}}$$

input
```
integrate(((-6*x+10)*ln(3)**4*exp(ln(3)**4/(625*x**6-12500*x**5+93750*x**4
-312500*x**3+390625*x**2))-625*x**8+15625*x**7-156250*x**6+781250*x**5-195
3125*x**4+1953125*x**3)/(625*x**8-15625*x**7+156250*x**6-781250*x**5+19531
25*x**4-1953125*x**3),x)
```

output
```
-x + exp(log(3)**4/(625*x**6 - 12500*x**5 + 93750*x**4 - 312500*x**3 + 390
625*x**2))
```

3.1252.

$$\int \frac{1953125x^3-1953125x^4+781250x^5-156250x^6+15625x^7-625x^8+e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}(10-6x)\log^4(3)}{-1953125x^3+1953125x^4-781250x^5+156250x^6-15625x^7+625x^8}\,dx$$

3.1252.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 290 vs. 2(20) = 40.

Time = 0.44 (sec) , antiderivative size = 290, normalized size of antiderivative = 12.61

$$\int \frac{1953125x^3 - 1953125x^4 + 781250x^5 - 156250x^6 + 15625x^7 - 625x^8 + e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}}{-1953125x^3 + 1953125x^4 - 781250x^5 + 156250x^6 - 15625x^7 + 625x^8}$$

$$= -x - \frac{125\,(48\,x^3 - 540\,x^2 + 2200\,x - 3125)}{12\,(x^4 - 20\,x^3 + 150\,x^2 - 500\,x + 625)} + \frac{125\,(24\,x^3 - 300\,x^2 + 1300\,x - 1925)}{12\,(x^4 - 20\,x^3 + 150\,x^2 - 500\,x + 625)} + \frac{125\,(4\,x^3 - 30\,x^2 + 100\,x - 125)}{2\,(x^4 - 20\,x^3 + 150\,x^2 - 500\,x + 625)} - \frac{625\,(6\,x^2 - 20\,x + 25)}{6\,(x^4 - 20\,x^3 + 150\,x^2 - 500\,x + 625)} + \frac{3125\,(4\,x - 5)}{12\,(x^4 - 20\,x^3 + 150\,x^2 - 500\,x + 625)} - \frac{3125}{4\,(x^4 - 20\,x^3 + 150\,x^2 - 500\,x + 625)} + e^{\left(\frac{\log(3)^4}{15625\,(x^4-20\,x^3+150\,x^2-500\,x+625)} - \frac{2\,\log(3)^4}{78125\,(x^3-15\,x^2+75\,x-125)} + \frac{3\,\log(3)^4}{390625\,(x^2-10\,x+25)} - \frac{4\,\log(3)^4}{1953125\,(x-5)} + \frac{4\,\log(3)^4}{1953125\,x} + \frac{\log(3)^4}{390625\,x^2}\right)}$$

input
```
integrate(((-6*x+10)*log(3)^4*exp(log(3)^4/(625*x^6-12500*x^5+93750*x^4-31
2500*x^3+390625*x^2))-625*x^8+15625*x^7-156250*x^6+781250*x^5-1953125*x^4+
1953125*x^3)/(625*x^8-15625*x^7+156250*x^6-781250*x^5+1953125*x^4-1953125*
x^3),x, algorithm=\
```

output
```
-x - 125/12*(48*x^3 - 540*x^2 + 2200*x - 3125)/(x^4 - 20*x^3 + 150*x^2 - 5
00*x + 625) + 125/12*(24*x^3 - 300*x^2 + 1300*x - 1925)/(x^4 - 20*x^3 + 15
0*x^2 - 500*x + 625) + 125/2*(4*x^3 - 30*x^2 + 100*x - 125)/(x^4 - 20*x^3
+ 150*x^2 - 500*x + 625) - 625/6*(6*x^2 - 20*x + 25)/(x^4 - 20*x^3 + 150*x
^2 - 500*x + 625) + 3125/12*(4*x - 5)/(x^4 - 20*x^3 + 150*x^2 - 500*x + 62
5) - 3125/4/(x^4 - 20*x^3 + 150*x^2 - 500*x + 625) + e^(1/15625*log(3)^4/(
x^4 - 20*x^3 + 150*x^2 - 500*x + 625) - 2/78125*log(3)^4/(x^3 - 15*x^2 + 7
5*x - 125) + 3/390625*log(3)^4/(x^2 - 10*x + 25) - 4/1953125*log(3)^4/(x -
 5) + 4/1953125*log(3)^4/x + 1/390625*log(3)^4/x^2)
```

3.1252.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.61

$$\int \frac{1953125x^3 - 1953125x^4 + 781250x^5 - 156250x^6 + 15625x^7 - 625x^8 + e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}}{-1953125x^3 + 1953125x^4 - 781250x^5 + 156250x^6 - 15625x^7 + 625x^8}$$

$$= -x + e^{\left(\frac{\log(3)^4}{625\,(x^6-20\,x^5+150\,x^4-500\,x^3+625\,x^2)}\right)}$$

3.1252.

$$\int \frac{1953125x^3-1953125x^4+781250x^5-156250x^6+15625x^7-625x^8+e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}(10-6x)\log^4(3)}{-1953125x^3+1953125x^4-781250x^5+156250x^6-15625x^7+625x^8}\,dx$$

input
```
integrate(((-6*x+10)*log(3)^4*exp(log(3)^4/(625*x^6-12500*x^5+93750*x^4-31
2500*x^3+390625*x^2))-625*x^8+15625*x^7-156250*x^6+781250*x^5-1953125*x^4+
1953125*x^3)/(625*x^8-15625*x^7+156250*x^6-781250*x^5+1953125*x^4-1953125*
x^3),x, algorithm=\
```

output
```
-x + e^(1/625*log(3)^4/(x^6 - 20*x^5 + 150*x^4 - 500*x^3 + 625*x^2))
```

3.1252.9 Mupad [B] (verification not implemented)

Time = 14.78 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.65

$$\int \frac{1953125x^3 - 1953125x^4 + 781250x^5 - 156250x^6 + 15625x^7 - 625x^8 + e^{\frac{\log^4(3)}{390625x^2-312500x^3+93750x^4-12500x^5+625x^6}}}{-1953125x^3 + 1953125x^4 - 781250x^5 + 156250x^6 - 15625x^7 + 625x^8}$$

$$= e^{\frac{\ln(3)^4}{625\,x^6-12500\,x^5+93750\,x^4-312500\,x^3+390625\,x^2}} - x$$

input
```
int((1953125*x^4 - 1953125*x^3 - 781250*x^5 + 156250*x^6 - 15625*x^7 + 625
*x^8 + exp(log(3)^4/(390625*x^2 - 312500*x^3 + 93750*x^4 - 12500*x^5 + 625
*x^6))*log(3)^4*(6*x - 10))/(1953125*x^3 - 1953125*x^4 + 781250*x^5 - 1562
50*x^6 + 15625*x^7 - 625*x^8),x)
```

output
```
exp(log(3)^4/(390625*x^2 - 312500*x^3 + 93750*x^4 - 12500*x^5 + 625*x^6))
- x
```

3.1253 $\int \frac{1}{2}e^{\frac{1}{4}(-11+4e^x)}\left(1+e^{\frac{1}{4}(11-4e^x)}(20e^x+4e^{2x})+e^xx\right)d$

3.1253.1 Optimal result

Integrand size = 51, antiderivative size = 25

$$\int \frac{1}{2}e^{\frac{1}{4}(-11+4e^x)}\left(1+e^{\frac{1}{4}(11-4e^x)}(20e^x+4e^{2x})+e^xx\right)\,dx=(5+e^x)^2+\frac{1}{2}\left(-4+e^{-\frac{11}{4}+e^x}x\right)$$

output
```
1/2*x/exp(-exp(x)+11/4)-2+(exp(x)+5)^2
```

3.1253.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{1}{2}e^{\frac{1}{4}(-11+4e^x)}\left(1+e^{\frac{1}{4}(11-4e^x)}(20e^x+4e^{2x})+e^xx\right)\,dx=\frac{1}{2}\left(20e^x+2e^{2x}+e^{-\frac{11}{4}+e^x}x\right)$$

input
```
Integrate[(E^((-11 + 4*E^x)/4)*(1 + E^((11 - 4*E^x)/4)*(20*E^x + 4*E^(2*x)
) + E^x*x))/2,x]
```

output
```
(20*E^x + 2*E^(2*x) + E^(-11/4 + E^x)*x)/2
```

3.1253.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{2}e^{\frac{1}{4}(4e^x-11)}\left(e^{\frac{1}{4}(11-4e^x)}\left(20e^x+4e^{2x}\right)+e^xx+1\right)\,dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int e^{\frac{1}{4}(-11+4e^x)}\left(4e^{\frac{1}{4}(11-4e^x)}\left(5e^x+e^{2x}\right)+e^xx+1\right)dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{2}\int \left(4e^{\frac{1}{4}(-11+4e^x)-e^x+x+\frac{11}{4}}(5+e^x)+e^{\frac{1}{4}(-11+4e^x)}+e^{\frac{1}{4}(-11+4e^x)+x}x\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{2}\left(\int e^{\frac{1}{4}(4x+4e^x-11)}xdx+\frac{\text{ExpIntegralEi}\left(e^x\right)}{e^{11/4}}+2(e^x+5)^2\right)$$

input
```
Int[(E^((-11 + 4*E^x)/4)*(1 + E^((11 - 4*E^x)/4)*(20*E^x + 4*E^(2*x)) + E^
x*x))/2,x]
```

output
```
$Aborted
```

3.1253.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1253.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.72

method	result	size
risch	$\mathrm{e}^{2x}+10\,\mathrm{e}^{x}+\frac{x\,\mathrm{e}^{\mathrm{e}^{x}-\frac{11}{4}}}{2}$	18
norman	$\left(\mathrm{e}^{-\mathrm{e}^{x}+\frac{11}{4}}\mathrm{e}^{2x}+\frac{x}{2}+10\,\mathrm{e}^{x}\mathrm{e}^{-\mathrm{e}^{x}+\frac{11}{4}}\right)\mathrm{e}^{\mathrm{e}^{x}-\frac{11}{4}}$	38
parallelrisch	$\frac{\left(2\,\mathrm{e}^{-\mathrm{e}^{x}+\frac{11}{4}}\,\mathrm{e}^{2x}+20\,\mathrm{e}^{x}\mathrm{e}^{-\mathrm{e}^{x}+\frac{11}{4}}+x\right)\mathrm{e}^{\mathrm{e}^{x}-\frac{11}{4}}}{2}$	38

input
```
int(1/2*((4*exp(x)^2+20*exp(x))*exp(-exp(x)+11/4)+exp(x)*x+1)/exp(-exp(x)+
11/4),x,method=_RETURNVERBOSE)
```

output
```
exp(2*x)+10*exp(x)+1/2*x*exp(exp(x)-11/4)
```

3.1253.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

$$\int \frac{1}{2}e^{\frac{1}{4}(-11+4e^x)}\left(1+e^{\frac{1}{4}(11-4e^x)}\left(20e^x+4e^{2x}\right)+e^xx\right)\,dx=\frac{1}{2}\,xe^{\left(e^x-\frac{11}{4}\right)}+e^{(2\,x)}+10\,e^x$$

input
```
integrate(1/2*((4*exp(x)^2+20*exp(x))*exp(-exp(x)+11/4)+exp(x)*x+1)/exp(-e
xp(x)+11/4),x, algorithm=\
```

output
```
1/2*x*e^(e^x - 11/4) + e^(2*x) + 10*e^x
```

3.1253.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{1}{2}e^{\frac{1}{4}(-11+4e^x)}\left(1+e^{\frac{1}{4}(11-4e^x)}\left(20e^x+4e^{2x}\right)+e^xx\right)\,dx=\frac{xe^{e^x-\frac{11}{4}}}{2}+e^{2x}+10e^x$$

input
```
integrate(1/2*((4*exp(x)**2+20*exp(x))*exp(-exp(x)+11/4)+exp(x)*x+1)/exp(-
exp(x)+11/4),x)
```

output
```
x*exp(exp(x) - 11/4)/2 + exp(2*x) + 10*exp(x)
```

3.1253.7 Maxima [F]

$$\int \frac{1}{2}e^{\frac{1}{4}(-11+4e^x)}\left(1+e^{\frac{1}{4}(11-4e^x)}(20e^x+4e^{2x})+e^x x\right)\,dx$$
$$=\int \frac{1}{2}\left(xe^x+4\left(e^{(2x)}+5e^x\right)e^{\left(-e^x+\frac{11}{4}\right)}+1\right)e^{\left(e^x-\frac{11}{4}\right)}\,dx$$

input
```
integrate(1/2*((4*exp(x)^2+20*exp(x))*exp(-exp(x)+11/4)+exp(x)*x+1)/exp(-e
xp(x)+11/4),x, algorithm=\
```

output
```
1/2*Ei(e^x)*e^(-11/4) + 1/2*x*e^(e^x - 11/4) + e^(2*x) + 10*e^x - 1/2*inte
grate(e^(e^x - 11/4), x)
```

3.1253.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

$$\int \frac{1}{2}e^{\frac{1}{4}(-11+4e^x)}\left(1+e^{\frac{1}{4}(11-4e^x)}(20e^x+4e^{2x})+e^x x\right)\,dx=\frac{1}{2}\,xe^{\left(e^x-\frac{11}{4}\right)}+e^{(2\,x)}+10\,e^x$$

input
```
integrate(1/2*((4*exp(x)^2+20*exp(x))*exp(-exp(x)+11/4)+exp(x)*x+1)/exp(-e
xp(x)+11/4),x, algorithm=\
```

output
```
1/2*x*e^(e^x - 11/4) + e^(2*x) + 10*e^x
```

3.1253.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.68

$$\int \frac{1}{2}e^{\frac{1}{4}(-11+4e^x)}\left(1+e^{\frac{1}{4}(11-4e^x)}(20e^x+4e^{2x})+e^x x\right)\,dx=\mathrm{e}^{2\,x}+10\,\mathrm{e}^x+\frac{x\,\mathrm{e}^{\mathrm{e}^x}\,\mathrm{e}^{-\frac{11}{4}}}{2}$$

input
```
int(exp(exp(x) - 11/4)*((exp(11/4 - exp(x))*(4*exp(2*x) + 20*exp(x)))/2 +
(x*exp(x))/2 + 1/2),x)
```

output
```
exp(2*x) + 10*exp(x) + (x*exp(exp(x))*exp(-11/4))/2
```

3.1254 $\int e^x \, dx$

3.1254.1 Optimal result

Integrand size = 3, antiderivative size = 3

$$\int e^x \, dx = e^x$$

output
```
exp(x)
```

3.1254.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 3, normalized size of antiderivative = 1.00

$$\int e^x \, dx = e^x$$

input
```
Integrate[E^x,x]
```

output
```
E^x
```

3.1254.3 Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 3, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^x\,dx$$
$$\Big\downarrow \text{ 2624}$$
$$e^x$$

input
```
Int[E^x,x]
```

output
```
E^x
```

3.1254.3.1 Defintions of rubi rules used

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

3.1254.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 3, normalized size of antiderivative = 1.00

method	result	size
gosper	e^x	3
lookup	e^x	3
derivativedivides	e^x	3
default	e^x	3
norman	e^x	3
risch	e^x	3
parallelrisch	e^x	3
meijerg	$e^x - 1$	5

input
```
int(exp(x),x,method=_RETURNVERBOSE)
```

output
```
exp(x)
```

3.1254.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.67

$$\int e^x\,dx = e^x$$

input
```
integrate(exp(x),x, algorithm=\
```

output
```
e^x
```

3.1254.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.67

$$\int e^x\,dx = e^x$$

input
```
integrate(exp(x),x)
```

output
```
exp(x)
```

3.1254.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.67

$$\int e^x\,dx = e^x$$

input
```
integrate(exp(x),x, algorithm=\
```

output
```
e^x
```

3.1254.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.67

$$\int e^x \, dx = e^x$$

input
```
integrate(exp(x),x, algorithm=\
```

output
```
e^x
```

3.1254.9 Mupad [B] (verification not implemented)

Time = 0.01 (sec) , antiderivative size = 2, normalized size of antiderivative = 0.67

$$\int e^x \, dx = \mathrm{e}^x$$

input
```
int(exp(x),x)
```

output
```
exp(x)
```

3.1255 $\int e^{-e^4}\left(e^{4+e^4-x}(3-3x)+e^x(1+x)\right)\,dx$

3.1255.1 Optimal result

Integrand size = 32, antiderivative size = 22

$$\int e^{-e^4}\left(e^{4+e^4-x}(3-3x)+e^x(1+x)\right)\,dx=3e^{4-x}x+e^{-e^4+x}x$$

output
```
x/exp(exp(4)-x)+3*x*exp(4)/exp(x)
```

3.1255.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int e^{-e^4}\left(e^{4+e^4-x}(3-3x)+e^x(1+x)\right)\,dx=3e^{4-x}x+e^{-e^4+x}x$$

input
```
Integrate[(E^(4 + E^4 - x)*(3 - 3*x) + E^x*(1 + x))/E^E^4,x]
```

output
```
3*E^(4 - x)*x + E^(-E^4 + x)*x
```

3.1255.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 50 vs. $2(22) = 44$.

Time = 0.19 (sec) , antiderivative size = 50, normalized size of antiderivative = 2.27, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.062$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-e^4}\left(e^{-x+e^4+4}(3-3x)+e^x(x+1)\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$e^{-e^4}\int \left(3e^{-x+e^4+4}(1-x)+e^x(x+1)\right)\,dx$$

$$\Big\downarrow \text{2009}$$

$$e^{-e^4}\left(-3e^{-x+e^4+4}(1-x)+3e^{-x+e^4+4}-e^x+e^x(x+1)\right)$$

input
```
Int[(E^(4 + E^4 - x)*(3 - 3*x) + E^x*(1 + x))/E^E^4,x]
```

output
```
(3*E^(4 + E^4 - x) - E^x - 3*E^(4 + E^4 - x)*(1 - x) + E^x*(1 + x))/E^E^4
```

3.1255.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1255.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

method	result
risch	$e^{x-e^4}x+3x\,e^{-x+4}$
norman	$\left(x\,e^{-e^4}e^{2x}+3x\,e^4\right)e^{-x}$
parallelrisch	$\left(3\,e^4e^{e^4-x}x+e^xx\right)e^{-x}e^{x-e^4}$
parts	$e^4e^{x-e^4}-e^{x-e^4}(e^4-x)+3x\,e^4e^{-x}$
default	$e^{-e^4}e^x+e^{-e^4}(e^xx-e^x)-3\,e^4e^{-x}-3\,e^4(-x\,e^{-x}-e^{-x})$
meijerg	$-\frac{3\,e^{4+2\,e^4-x-x\,e^{-e^4}}e^{2x}\left(1-\frac{\left(-2x\,e^{-e^4}\left(1-2\,e^{e^4}\right)+2\right)e^{x\,e^{-e^4}\left(1-2\,e^{e^4}\right)}}{2}\right)}{\left(1-2\,e^{e^4}\right)^2}-\frac{3\,e^{4-x+e^4-x\,e^{-e^4}}e^{2x}\left(1-e^{x\,e^{-e^4}\left(1-2\,e^{e^4}\right)}\right)}{1-2\,e^{e^4}}$

input
```
int(((-3*x+3)*exp(4)*exp(exp(4)-x)+(1+x)*exp(x))/exp(x)/exp(exp(4)-x),x,me
thod=_RETURNVERBOSE)
```

output
```
exp(x-exp(4))*x+3*x*exp(-x+4)
```

3.1255.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int e^{-e^4}\left(e^{4+e^4-x}(3-3x)+e^x(1+x)\right)\,dx=\left(3\,xe^{\left(-2\,x+2\,e^4+12\right)}+xe^{\left(e^4+8\right)}\right)e^{\left(x-2\,e^4-8\right)}$$

input
```
integrate(((-3*x+3)*exp(4)*exp(exp(4)-x)+(1+x)*exp(x))/exp(x)/exp(exp(4)-x
),x, algorithm=\
```

output
```
(3*x*e^(-2*x + 2*e^4 + 12) + x*e^(e^4 + 8))*e^(x - 2*e^4 - 8)
```

3.1255.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int e^{-e^4}\left(e^{4+e^4-x}(3-3x)+e^x(1+x)\right)\,dx=\frac{xe^x+3xe^4e^{-x}e^{e^4}}{e^{e^4}}$$

input
```
integrate(((-3*x+3)*exp(4)*exp(exp(4)-x)+(1+x)*exp(x))/exp(x)/exp(exp(4)-x
),x)
```

output
```
(x*exp(x) + 3*x*exp(4)*exp(-x)*exp(exp(4)))*exp(-exp(4))
```

3.1255.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 40 vs. 2(19) = 38.

Time = 0.19 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.82

$$\int e^{-e^4}\left(e^{4+e^4-x}(3-3x)+e^x(1+x)\right)\,dx$$
$$=\left(3\left(xe^{(e^4+4)}+e^{(e^4+4)}\right)e^{(-x)}+xe^x-3\,e^{(-x+e^4+4)}\right)e^{(-e^4)}$$

input
```
integrate(((-3*x+3)*exp(4)*exp(exp(4)-x)+(1+x)*exp(x))/exp(x)/exp(exp(4)-x
),x, algorithm=\
```

output
```
(3*(x*e^(e^4 + 4) + e^(e^4 + 4))*e^(-x) + x*e^x - 3*e^(-x + e^4 + 4))*e^(-
e^4)
```

3.1255.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.68

$$\int e^{-e^4}\left(e^{4+e^4-x}(3-3x)+e^x(1+x)\right)\,dx=\left(xe^x+3\left(x-e^4\right)e^{(-x+e^4+4)}+3\,e^{(-x+e^4+8)}\right)e^{(-e^4)}$$

input
```
integrate(((-3*x+3)*exp(4)*exp(exp(4)-x)+(1+x)*exp(x))/exp(x)/exp(exp(4)-x
),x, algorithm=\
```

output
```
(x*e^x + 3*(x - e^4)*e^(-x + e^4 + 4) + 3*e^(-x + e^4 + 8))*e^(-e^4)
```

3.1255.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int e^{-e^4}\left(e^{4+e^4-x}(3-3x)+e^x(1+x)\right)\,dx=3\,x\,\mathrm{e}^{-x}\,\mathrm{e}^4+x\,\mathrm{e}^{-\mathrm{e}^4}\,\mathrm{e}^x$$

input
```
int(exp(x - exp(4))*exp(-x)*(exp(x)*(x + 1) - exp(exp(4) - x)*exp(4)*(3*x
- 3)),x)
```

output
```
3*x*exp(-x)*exp(4) + x*exp(-exp(4))*exp(x)
```

3.1256 $\int \frac{-\log(3)+\log(3)\log(x)\log(\log(x))+(-1+4\log(3)+\log(3)\log(4))\log(x)\log^2(\log(x))}{\log(x)\log^2(\log(x))}$

3.1256.1 Optimal result

Integrand size = 42, antiderivative size = 18

$$\int \frac{-\log(3)+\log(3)\log(x)\log(\log(x))+(-1+4\log(3)+\log(3)\log(4))\log(x)\log^2(\log(x))}{\log(x)\log^2(\log(x))}\,dx$$
$$=-5-x+x\log(3)\left(4+\log(4)+\frac{1}{\log(\log(x))}\right)$$

output
```
ln(3)*x*(4+2*ln(2)+1/ln(ln(x)))-5-x
```

3.1256.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.17

$$\int \frac{-\log(3)+\log(3)\log(x)\log(\log(x))+(-1+4\log(3)+\log(3)\log(4))\log(x)\log^2(\log(x))}{\log(x)\log^2(\log(x))}\,dx$$
$$=x(-1+\log(3)\log(4)+\log(81))+\frac{x\log(3)}{\log(\log(x))}$$

input
```
Integrate[(-Log[3] + Log[3]*Log[x]*Log[Log[x]] + (-1 + 4*Log[3] + Log[3]*L
og[4])*Log[x]*Log[Log[x]]^2)/(Log[x]*Log[Log[x]]^2),x]
```

output
```
x*(-1 + Log[3]*Log[4] + Log[81]) + (x*Log[3])/Log[Log[x]]
```

3.1256.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(-1+4\log(3)+\log(3)\log(4))\log(x)\log^2(\log(x))+\log(3)\log(x)\log(\log(x))-\log(3)}{\log(x)\log^2(\log(x))}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{\log(3)}{\log^2(\log(x))\log(x)}+\frac{\log(3)}{\log(\log(x))}-1+\log(81)+\log(3)\log(4)\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\log(3)\int \frac{1}{\log(x)\log^2(\log(x))}dx+\log(3)\int \frac{1}{\log(\log(x))}dx-(x(1-\log(3)\log(4)-\log(81)))$$

input
```
Int[(-Log[3] + Log[3]*Log[x]*Log[Log[x]] + (-1 + 4*Log[3] + Log[3]*Log[4])
*Log[x]*Log[Log[x]]^2)/(Log[x]*Log[Log[x]]^2),x]
```

output
```
$Aborted
```

3.1256.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1256.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.44

method	result	size
risch	$2x\ln(2)\ln(3)+4x\ln(3)-x+\frac{\ln(3)x}{\ln(\ln(x))}$	26
norman	$\frac{x\ln(3)+(2\ln(2)\ln(3)+4\ln(3)-1)x\ln(\ln(x))}{\ln(\ln(x))}$	29
default	$-x+\frac{x\ln(3)+4x\ln(3)\ln(\ln(x))}{\ln(\ln(x))}+2x\ln(2)\ln(3)$	31
parallelrisch	$\frac{2\ln(3)\ln(2)x\ln(\ln(x))+4x\ln(3)\ln(\ln(x))+x\ln(3)-x\ln(\ln(x))}{\ln(\ln(x))}$	36

input
```
int(((2*ln(2)*ln(3)+4*ln(3)-1)*ln(x)*ln(ln(x))^2+ln(3)*ln(x)*ln(ln(x))-ln(
3))/ln(x)/ln(ln(x))^2,x,method=_RETURNVERBOSE)
```

output
```
2*x*ln(2)*ln(3)+4*x*ln(3)-x+ln(3)*x/ln(ln(x))
```

3.1256.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.72

$$\int \frac{-\log(3)+\log(3)\log(x)\log(\log(x))+(-1+4\log(3)+\log(3)\log(4))\log(x)\log^2(\log(x))}{\log(x)\log^2(\log(x))}\,dx = \frac{x\log(3)+(2(x\log(2)+2x)\log(3)-x)\log(\log(x))}{\log(\log(x))}$$

input
```
integrate(((2*log(2)*log(3)+4*log(3)-1)*log(x)*log(log(x))^2+log(3)*log(x)
*log(log(x))-log(3))/log(x)/log(log(x))^2,x, algorithm=\
```

output
```
(x*log(3) + (2*(x*log(2) + 2*x)*log(3) - x)*log(log(x)))/log(log(x))
```

3.1256.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.44

$$\int \frac{-\log(3)+\log(3)\log(x)\log(\log(x))+(-1+4\log(3)+\log(3)\log(4))\log(x)\log^2(\log(x))}{\log(x)\log^2(\log(x))}\,dx$$
$$= x(-1+2\log{(2)}\log{(3)}+4\log{(3)})+\frac{x\log{(3)}}{\log{(\log{(x)})}}$$

input
```
integrate(((2*ln(2)*ln(3)+4*ln(3)-1)*ln(x)*ln(ln(x))**2+ln(3)*ln(x)*ln(ln(
x))-ln(3))/ln(x)/ln(ln(x))**2,x)
```

output
```
x*(-1 + 2*log(2)*log(3) + 4*log(3)) + x*log(3)/log(log(x))
```

3.1256.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39

$$\int \frac{-\log(3)+\log(3)\log(x)\log(\log(x))+(-1+4\log(3)+\log(3)\log(4))\log(x)\log^2(\log(x))}{\log(x)\log^2(\log(x))}\,dx$$
$$= 2\,x\log{(3)}\log{(2)}+4\,x\log{(3)}-x+\frac{x\log{(3)}}{\log{(\log{(x)})}}$$

input
```
integrate(((2*log(2)*log(3)+4*log(3)-1)*log(x)*log(log(x))^2+log(3)*log(x)
*log(log(x))-log(3))/log(x)/log(log(x))^2,x, algorithm=\
```

output
```
2*x*log(3)*log(2) + 4*x*log(3) - x + x*log(3)/log(log(x))
```

3.1256.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39

$$\int \frac{-\log(3)+\log(3)\log(x)\log(\log(x))+(-1+4\log(3)+\log(3)\log(4))\log(x)\log^2(\log(x))}{\log(x)\log^2(\log(x))}\,dx$$
$$= 2\,x\log{(3)}\log{(2)}+4\,x\log{(3)}-x+\frac{x\log{(3)}}{\log{(\log{(x)})}}$$

input
```
integrate(((2*log(2)*log(3)+4*log(3)-1)*log(x)*log(log(x))^2+log(3)*log(x)
*log(log(x))-log(3))/log(x)/log(log(x))^2,x, algorithm=\
```

output
```
2*x*log(3)*log(2) + 4*x*log(3) - x + x*log(3)/log(log(x))
```

3.1256.9 Mupad [B] (verification not implemented)

Time = 14.88 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33

$$\int \frac{-\log(3)+\log(3)\log(x)\log(\log(x))+(-1+4\log(3)+\log(3)\log(4))\log(x)\log^2(\log(x))}{\log(x)\log^2(\log(x))}\,dx$$
$$= x\,(4\,\ln(3)+2\,\ln(2)\,\ln(3)-1)+\frac{x\,\ln(3)}{\ln(\ln(x))}$$

input
```
int((log(log(x))*log(3)*log(x) - log(3) + log(log(x))^2*log(x)*(4*log(3) +
 2*log(2)*log(3) - 1))/(log(log(x))^2*log(x)),x)
```

output
```
x*(4*log(3) + 2*log(2)*log(3) - 1) + (x*log(3))/log(log(x))
```

3.1257 $\int \frac{816+5x-18x^2+x^3+(-96-7x+x^2)\log(x)}{384x-72x^2+3x^3+(-48x+3x^2)\log(x)}\,dx$

3.1257.1 Optimal result

Integrand size = 53, antiderivative size = 25

$$\int \frac{816+5x-18x^2+x^3+(-96-7x+x^2)\log(x)}{384x-72x^2+3x^3+(-48x+3x^2)\log(x)}\,dx = \log\left(\frac{4e^{x/3}(16-x)x^2}{-8+x+\log(x)}\right)$$

output
```
ln(4*(16-x)/(ln(x)-8+x)*x^2*exp(1/3*x))
```

3.1257.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

$$\int \frac{816+5x-18x^2+x^3+(-96-7x+x^2)\log(x)}{384x-72x^2+3x^3+(-48x+3x^2)\log(x)}\,dx = \frac{1}{3}(x+3\log(16-x)+6\log(x)-3\log(8-x-\log(x)))$$

input
```
Integrate[(816 + 5*x - 18*x^2 + x^3 + (-96 - 7*x + x^2)*Log[x])/(384*x - 7
2*x^2 + 3*x^3 + (-48*x + 3*x^2)*Log[x]),x]
```

output
```
(x + 3*Log[16 - x] + 6*Log[x] - 3*Log[8 - x - Log[x]])/3
```

3.1257.3 Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.075, Rules used = {7292, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3-18x^2+\left(x^2-7x-96\right)\log(x)+5x+816}{3x^3-72x^2+\left(3x^2-48x\right)\log(x)+384x}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{x^3-18x^2+\left(x^2-7x-96\right)\log(x)+5x+816}{3(16-x)x(-x-\log(x)+8)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\int \frac{x^3-18x^2+5x-\left(-x^2+7x+96\right)\log(x)+816}{(16-x)x(-x-\log(x)+8)}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{3}\int \left(\frac{x^2-7x-96}{(x-16)x}-\frac{3(x+1)}{x(x+\log(x)-8)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}(x+3\log(16-x)+6\log(x)-3\log(-x-\log(x)+8))$$

input
```
Int[(816 + 5*x - 18*x^2 + x^3 + (-96 - 7*x + x^2)*Log[x])/(384*x - 72*x^2
+ 3*x^3 + (-48*x + 3*x^2)*Log[x]),x]
```

output
```
(x + 3*Log[16 - x] + 6*Log[x] - 3*Log[8 - x - Log[x]])/3
```

3.1257.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1257.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

method	result	size
default	$2\ln(x)+\frac{x}{3}+\ln(x-16)-\ln(\ln(x)-8+x)$	21
norman	$2\ln(x)+\frac{x}{3}+\ln(x-16)-\ln(\ln(x)-8+x)$	21
risch	$2\ln(x)+\frac{x}{3}+\ln(x-16)-\ln(\ln(x)-8+x)$	21
parallelrisch	$2\ln(x)+\frac{x}{3}+\ln(x-16)-\ln(\ln(x)-8+x)$	21

input
```
int(((x^2-7*x-96)*ln(x)+x^3-18*x^2+5*x+816)/((3*x^2-48*x)*ln(x)+3*x^3-72*x
^2+384*x),x,method=_RETURNVERBOSE)
```

output
```
2*ln(x)+1/3*x+ln(x-16)-ln(ln(x)-8+x)
```

3.1257.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{816+5x-18x^2+x^3+(-96-7x+x^2)\log(x)}{384x-72x^2+3x^3+(-48x+3x^2)\log(x)}\,dx$$
$$=\frac{1}{3}\,x-\log\left(x+\log\left(x\right)-8\right)+\log\left(x-16\right)+2\,\log\left(x\right)$$

input
```
integrate(((x^2-7*x-96)*log(x)+x^3-18*x^2+5*x+816)/((3*x^2-48*x)*log(x)+3*
x^3-72*x^2+384*x),x, algorithm=\
```

output
```
1/3*x - log(x + log(x) - 8) + log(x - 16) + 2*log(x)
```

3.1257.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{816+5x-18x^2+x^3+(-96-7x+x^2)\log(x)}{384x-72x^2+3x^3+(-48x+3x^2)\log(x)}\,dx = \frac{x}{3}+2\log{(x)}+\log{(x-16)}-\log{(x+\log{(x)}-8)}$$

input
```
integrate(((x**2-7*x-96)*ln(x)+x**3-18*x**2+5*x+816)/((3*x**2-48*x)*ln(x)+
3*x**3-72*x**2+384*x),x)
```

output
```
x/3 + 2*log(x) + log(x - 16) - log(x + log(x) - 8)
```

3.1257.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{816+5x-18x^2+x^3+(-96-7x+x^2)\log(x)}{384x-72x^2+3x^3+(-48x+3x^2)\log(x)}\,dx = \frac{1}{3}\,x-\log{(x+\log{(x)}-8)}+\log{(x-16)}+2\,\log{(x)}$$

input
```
integrate(((x^2-7*x-96)*log(x)+x^3-18*x^2+5*x+816)/((3*x^2-48*x)*log(x)+3*
x^3-72*x^2+384*x),x, algorithm=\
```

output
```
1/3*x - log(x + log(x) - 8) + log(x - 16) + 2*log(x)
```

3.1257.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{816+5x-18x^2+x^3+(-96-7x+x^2)\log(x)}{384x-72x^2+3x^3+(-48x+3x^2)\log(x)}\,dx = \frac{1}{3}\,x+\log{(x-16)}+2\,\log{(x)}-\log{(-x-\log{(x)}+8)}$$

input
```
integrate(((x^2-7*x-96)*log(x)+x^3-18*x^2+5*x+816)/((3*x^2-48*x)*log(x)+3*
x^3-72*x^2+384*x),x, algorithm=\
```

output
```
1/3*x + log(x - 16) + 2*log(x) - log(-x - log(x) + 8)
```

3.1257.9 Mupad [B] (verification not implemented)

Time = 14.80 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{816+5x-18x^2+x^3+(-96-7x+x^2)\log(x)}{384x-72x^2+3x^3+(-48x+3x^2)\log(x)}\,dx$$
$$=\frac{x}{3}-\ln\left(x+\ln\left(x\right)-8\right)+\ln\left(x-16\right)+2\,\ln\left(x\right)$$

input
```
int((5*x - log(x)*(7*x - x^2 + 96) - 18*x^2 + x^3 + 816)/(384*x - log(x)*(
48*x - 3*x^2) - 72*x^2 + 3*x^3),x)
```

output
```
x/3 - log(x + log(x) - 8) + log(x - 16) + 2*log(x)
```

3.1258 $\int \frac{-95-60x+e^2(15+10x)+e^x\left(-19x-12x^2+e^2\left(3x+2x^2\right)\right)+e^x\left(-2-2\right.}{-6-57x-18x^2}$

3.1258.1 Optimal result

Integrand size = 125, antiderivative size = 29

$$\int \frac{-95-60x+e^2(15+10x)+e^x(-19x-12x^2+e^2(3x+2x^2))+e^x(-2-21x-25x^2-6x^3+e^2(3x+4}{-6-57x-18x^2+e^2\left(9x+3x^2\right)}$$

$$=-2+\frac{1}{3}(5+e^xx)\log\left(2+x+\left(6-e^2\right)x(3+x)\right)$$

output
```
1/3*ln(x+2+(3+x)*x*(6-exp(2)))*(exp(x)*x+5)-2
```

3.1258.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

$$\int \frac{-95-60x+e^2(15+10x)+e^x(-19x-12x^2+e^2(3x+2x^2))+e^x(-2-21x-25x^2-6x^3+e^2(3x+4}{-6-57x-18x^2+e^2\left(9x+3x^2\right)}$$

$$=\frac{1}{3}(5+e^xx)\log\left(2+\left(19-3e^2\right)x-\left(-6+e^2\right)x^2\right)$$

input
```
Integrate[(-95 - 60*x + E^2*(15 + 10*x) + E^x*(-19*x - 12*x^2 + E^2*(3*x +
 2*x^2)) + E^x*(-2 - 21*x - 25*x^2 - 6*x^3 + E^2*(3*x + 4*x^2 + x^3))*Log[
2 + 19*x + 6*x^2 + E^2*(-3*x - x^2)])/(-6 - 57*x - 18*x^2 + E^2*(9*x + 3*x
^2)),x]
```

output
```
((5 + E^x*x)*Log[2 + (19 - 3*E^2)*x - (-6 + E^2)*x^2])/3
```

3.1258.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 91 vs. $2(29) = 58$.

Time = 2.21 (sec) , antiderivative size = 91, normalized size of antiderivative = 3.14, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.024$, Rules used = {7292, 7279, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(-12x^2+e^2(2x^2+3x)-19x)+e^x(-6x^3-25x^2+e^2(x^3+4x^2+3x)-21x-2)\log(6x^2+e^2(-x^2-3x)}{-18x^2+e^2(3x^2+9x)-57x-6}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-e^x(-12x^2+e^2(2x^2+3x)-19x)-e^x(-6x^3-25x^2+e^2(x^3+4x^2+3x)-21x-2)\log(6x^2+e^2(-x^2-3}{3(6-e^2)x^2+3(19-3e^2)x+6}$$

$$\Big\downarrow \text{7279}$$

$$\int \left(\frac{5(2(6-e^2)x-3e^2+19)}{3((6-e^2)x^2+(19-3e^2)x+2)}+\frac{e^x\left(12\left(1-\frac{e^2}{6}\right)x^2+25\left(1-\frac{4e^2}{25}\right)x^2\log(6x^2-e^2(x+3)x+19x+2)+\right.}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{1}{3}e^x\log((6-e^2)x^2+(19-3e^2)x+2)+\frac{1}{3}e^x(x+1)\log((6-e^2)x^2+(19-3e^2)x+2)+\frac{5}{3}\log((6-e^2)x^2+(19-3e^2)x+2)$$

input
```
Int[(-95 - 60*x + E^2*(15 + 10*x) + E^x*(-19*x - 12*x^2 + E^2*(3*x + 2*x^2
)) + E^x*(-2 - 21*x - 25*x^2 - 6*x^3 + E^2*(3*x + 4*x^2 + x^3))*Log[2 + 19
*x + 6*x^2 + E^2*(-3*x - x^2)])/(-6 - 57*x - 18*x^2 + E^2*(9*x + 3*x^2)),x
]
```

output
```
(5*Log[2 + (19 - 3*E^2)*x + (6 - E^2)*x^2])/3 - (E^x*Log[2 + (19 - 3*E^2)*
x + (6 - E^2)*x^2])/3 + (E^x*(1 + x)*Log[2 + (19 - 3*E^2)*x + (6 - E^2)*x^
2])/3
```

3.1258.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7279
```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1258.4 Maple [A] (verified)

Time = 0.74 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.76

method	result
risch	$\frac{e^{x} x \ln\left(\left(-x^{2}-3 x\right) e^{2}+6 x^{2}+19 x +2\right)}{3}+\frac{5 \ln\left(\left(e^{2}-6\right) x^{2}+\left(3 e^{2}-19\right) x -2\right)}{3}$
default	$\frac{e^{x} x \ln\left(\left(-x^{2}-3 x\right) e^{2}+6 x^{2}+19 x +2\right)}{3}+\frac{5 \ln\left(x^{2} e^{2}+3 e^{2} x -6 x^{2}-19 x -2\right)}{3}$
parts	$\frac{e^{x} x \ln\left(\left(-x^{2}-3 x\right) e^{2}+6 x^{2}+19 x +2\right)}{3}+\frac{5 \ln\left(x^{2} e^{2}+3 e^{2} x -6 x^{2}-19 x -2\right)}{3}$
norman	$\frac{5 \ln\left(\left(-x^{2}-3 x\right) e^{2}+6 x^{2}+19 x +2\right)}{3}+\frac{e^{x} x \ln\left(\left(-x^{2}-3 x\right) e^{2}+6 x^{2}+19 x +2\right)}{3}$
parallelrisch	$\frac{e^{4} x e^{x} \ln\left(\left(-x^{2}-3 x\right) e^{2}+6 x^{2}+19 x +2\right)-12 e^{2} \ln\left(\left(-x^{2}-3 x\right) e^{2}+6 x^{2}+19 x +2\right) e^{x} x +5 e^{4} \ln\left(\left(-x^{2}-3 x\right) e^{2}+6 x^{2}+19 x +2\right)+36 e^{x} x}{3 \left(e^{2}-6\right)^{2}}$

input
```
int((((x^3+4*x^2+3*x)*exp(2)-6*x^3-25*x^2-21*x-2)*exp(x)*ln((-x^2-3*x)*exp
(2)+6*x^2+19*x+2)+((2*x^2+3*x)*exp(2)-12*x^2-19*x)*exp(x)+(10*x+15)*exp(2)
-60*x-95)/((3*x^2+9*x)*exp(2)-18*x^2-57*x-6),x,method=_RETURNVERBOSE)
```

output
```
1/3*exp(x)*x*ln((-x^2-3*x)*exp(2)+6*x^2+19*x+2)+5/3*ln((exp(2)-6)*x^2+(3*e
xp(2)-19)*x-2)
```

3.1258.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.03

$$\int \frac{-95-60x+e^2(15+10x)+e^x(-19x-12x^2+e^2(3x+2x^2))+e^x(-2-21x-25x^2-6x^3+e^2(3x+4}{-6-57x-18x^2+e^2\left(9x+3x^2\right)}$$

$$=\frac{1}{3}\left(xe^{x}+5\right)\log\left(6\,x^2-\left(x^2+3\,x\right)e^2+19\,x+2\right)$$

input
```
integrate((((x^3+4*x^2+3*x)*exp(2)-6*x^3-25*x^2-21*x-2)*exp(x)*log((-x^2-3
*x)*exp(2)+6*x^2+19*x+2)+((2*x^2+3*x)*exp(2)-12*x^2-19*x)*exp(x)+(10*x+15)
*exp(2)-60*x-95)/((3*x^2+9*x)*exp(2)-18*x^2-57*x-6),x, algorithm=\
```

output
```
1/3*(x*e^x + 5)*log(6*x^2 - (x^2 + 3*x)*e^2 + 19*x + 2)
```

3.1258.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(24) = 48.

Time = 2.65 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.83

$$\int \frac{-95-60x+e^2(15+10x)+e^x(-19x-12x^2+e^2(3x+2x^2))+e^x(-2-21x-25x^2-6x^3+e^2(3x+4}{-6-57x-18x^2+e^2\left(9x+3x^2\right)}$$

$$=\frac{xe^x\log\left(6x^2+19x+\left(-x^2-3x\right)e^2+2\right)}{3}+\frac{5\log\left(x^2(-6+e^2)+x(-19+3e^2)-2\right)}{3}$$

input
```
integrate((((x**3+4*x**2+3*x)*exp(2)-6*x**3-25*x**2-21*x-2)*exp(x)*ln((-x*
*2-3*x)*exp(2)+6*x**2+19*x+2)+((2*x**2+3*x)*exp(2)-12*x**2-19*x)*exp(x)+(1
0*x+15)*exp(2)-60*x-95)/((3*x**2+9*x)*exp(2)-18*x**2-57*x-6),x)
```

output
```
x*exp(x)*log(6*x**2 + 19*x + (-x**2 - 3*x)*exp(2) + 2)/3 + 5*log(x**2*(-6
+ exp(2)) + x*(-19 + 3*exp(2)) - 2)/3
```

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$$\int \frac{-95-60x+e^2(15+10x)+e^x\left(-19x-12x^2+e^2\left(3x+2x^2\right)\right)+e^x\left(-2-21x-25x^2-6x^3+e^2\left(3x+4x^2+x^3\right)\right)\log\left(2+19x+6x^2+e^2\left(-3x-x^2\right)\right)}{-6-57x-18x^2+e^2(9x+3x^2)}\,dx$$

3.1258.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 391 vs. $2(24) = 48$.

Time = 0.27 (sec) , antiderivative size = 391, normalized size of antiderivative = 13.48

$$\int \frac{-95-60x+e^2(15+10x)+e^x(-19x-12x^2+e^2(3x+2x^2))+e^x(-2-21x-25x^2-6x^3+e^2(3x+4x^2+x^3))\log(2+19x+6x^2+e^2(-3x-x^2))}{-6-57x-18x^2+e^2(9x+3x^2)}$$

$$= \frac{1}{3}xe^x\log\left(-x^2\left(e^2-6\right)-x\left(3e^2-19\right)+2\right) - \frac{5}{3}\left(\frac{(3e^2-19)\log\left(\frac{2x(e^2-6)-\sqrt{9e^4-106e^2+313}+3e^2-19}{2x(e^2-6)+\sqrt{9e^4-106e^2+313}+3e^2-19}\right)}{\sqrt{9e^4-106e^2+313}(e^2-6)} - \frac{\log\left(x^2(e^2-6)+x(3e^2-19)-2\right)}{e^2-6}\right)e^2 + \frac{5e^2\log\left(\frac{2x(e^2-6)-\sqrt{9e^4-106e^2+313}+3e^2-19}{2x(e^2-6)+\sqrt{9e^4-106e^2+313}+3e^2-19}\right)}{\sqrt{9e^4-106e^2+313}} - \frac{95\log\left(\frac{2x(e^2-6)-\sqrt{9e^4-106e^2+313}+3e^2-19}{2x(e^2-6)+\sqrt{9e^4-106e^2+313}+3e^2-19}\right)}{3\sqrt{9e^4-106e^2+313}} + \frac{10(3e^2-19)\log\left(\frac{2x(e^2-6)-\sqrt{9e^4-106e^2+313}+3e^2-19}{2x(e^2-6)+\sqrt{9e^4-106e^2+313}+3e^2-19}\right)}{\sqrt{9e^4-106e^2+313}(e^2-6)} - \frac{10\log\left(x^2(e^2-6)+x(3e^2-19)-2\right)}{e^2-6}$$

input
```
integrate((((x^3+4*x^2+3*x)*exp(2)-6*x^3-25*x^2-21*x-2)*exp(x)*log((-x^2-3
*x)*exp(2)+6*x^2+19*x+2)+((2*x^2+3*x)*exp(2)-12*x^2-19*x)*exp(x)+(10*x+15)
*exp(2)-60*x-95)/((3*x^2+9*x)*exp(2)-18*x^2-57*x-6),x, algorithm=\
```

output
```
1/3*x*e^x*log(-x^2*(e^2 - 6) - x*(3*e^2 - 19) + 2) - 5/3*((3*e^2 - 19)*log
((2*x*(e^2 - 6) - sqrt(9*e^4 - 106*e^2 + 313) + 3*e^2 - 19)/(2*x*(e^2 - 6)
 + sqrt(9*e^4 - 106*e^2 + 313) + 3*e^2 - 19))/(sqrt(9*e^4 - 106*e^2 + 313)
*(e^2 - 6)) - log(x^2*(e^2 - 6) + x*(3*e^2 - 19) - 2)/(e^2 - 6))*e^2 + 5*e
^2*log((2*x*(e^2 - 6) - sqrt(9*e^4 - 106*e^2 + 313) + 3*e^2 - 19)/(2*x*(e^
2 - 6) + sqrt(9*e^4 - 106*e^2 + 313) + 3*e^2 - 19))/sqrt(9*e^4 - 106*e^2 +
 313) - 95/3*log((2*x*(e^2 - 6) - sqrt(9*e^4 - 106*e^2 + 313) + 3*e^2 - 19
)/(2*x*(e^2 - 6) + sqrt(9*e^4 - 106*e^2 + 313) + 3*e^2 - 19))/sqrt(9*e^4 -
 106*e^2 + 313) + 10*(3*e^2 - 19)*log((2*x*(e^2 - 6) - sqrt(9*e^4 - 106*e^
2 + 313) + 3*e^2 - 19)/(2*x*(e^2 - 6) + sqrt(9*e^4 - 106*e^2 + 313) + 3*e^
2 - 19))/(sqrt(9*e^4 - 106*e^2 + 313)*(e^2 - 6)) - 10*log(x^2*(e^2 - 6) +
x*(3*e^2 - 19) - 2)/(e^2 - 6)
```

3.1258.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(24) = 48$.

Time = 0.35 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.83

$$\int \frac{-95-60x+e^2(15+10x)+e^x(-19x-12x^2+e^2(3x+2x^2))+e^x(-2-21x-25x^2-6x^3+e^2(3x+4}{-6-57x-18x^2+e^2\left(9x+3x^2\right)}$$
$$=\frac{1}{3}xe^x\log\left(-x^2e^2+6x^2-3xe^2+19x+2\right)+\frac{5}{3}\log\left(x^2e^2-6x^2+3xe^2-19x-2\right)$$

input
```
integrate((((x^3+4*x^2+3*x)*exp(2)-6*x^3-25*x^2-21*x-2)*exp(x)*log((-x^2-3
*x)*exp(2)+6*x^2+19*x+2)+((2*x^2+3*x)*exp(2)-12*x^2-19*x)*exp(x)+(10*x+15)
*exp(2)-60*x-95)/((3*x^2+9*x)*exp(2)-18*x^2-57*x-6),x, algorithm=\
```

output
```
1/3*x*e^x*log(-x^2*e^2 + 6*x^2 - 3*x*e^2 + 19*x + 2) + 5/3*log(x^2*e^2 - 6
*x^2 + 3*x*e^2 - 19*x - 2)
```

3.1258.9 Mupad [B] (verification not implemented)

Time = 16.35 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.69

$$\int \frac{-95-60x+e^2(15+10x)+e^x(-19x-12x^2+e^2(3x+2x^2))+e^x(-2-21x-25x^2-6x^3+e^2(3x+4}{-6-57x-18x^2+e^2\left(9x+3x^2\right)}$$
$$=\frac{5\ln\left(\left(e^2-6\right)x^2+\left(3e^2-19\right)x-2\right)}{3}+\frac{x\,e^x\,\ln\left(19x-e^2\left(x^2+3x\right)+6x^2+2\right)}{3}$$

input
```
int((60*x + exp(x)*(19*x - exp(2)*(3*x + 2*x^2) + 12*x^2) - exp(2)*(10*x +
 15) + exp(x)*log(19*x - exp(2)*(3*x + x^2) + 6*x^2 + 2)*(21*x - exp(2)*(3
*x + 4*x^2 + x^3) + 25*x^2 + 6*x^3 + 2) + 95)/(57*x - exp(2)*(9*x + 3*x^2)
 + 18*x^2 + 6),x)
```

output
```
(5*log(x*(3*exp(2) - 19) + x^2*(exp(2) - 6) - 2))/3 + (x*exp(x)*log(19*x -
 exp(2)*(3*x + x^2) + 6*x^2 + 2))/3
```

3.1258. $\int \frac{-95-60x+e^2(15+10x)+e^x\left(-19x-12x^2+e^2(3x+2x^2)\right)+e^x\left(-2-21x-25x^2-6x^3+e^2(3x+4x^2+x^3)\right)\log\left(2+19x+6x^2+e^2(-3x-x^2)\right)}{-6-57x-18x^2+e^2(9x+3x^2)}\,dx$

3.1259 $\int \frac{-6x+56x^2-2e^{3x/4}x^2-54x^3+18x^4-2x^5+e^{x/2}(18x^2-6x^3)+e^{x/4}(2x}{}$

3.1259.1 Optimal result

Integrand size = 545, antiderivative size = 28

$$\int \frac{-6x+56x^2-2e^{3x/4}x^2-54x^3+18x^4-2x^5+e^{x/2}(18x^2-6x^3)+e^{x/4}(2x-54x^2+36x^3-6x^4)+(-2x}{}$$

output
```
(x-1/(3+ln(x)-exp(1/4*x)-x)^2)*x*ln(5+x)
```

3.1259.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 75 vs. 2(28) = 56.

Time = 0.42 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.68

$$\int \frac{-6x+56x^2-2e^{3x/4}x^2-54x^3+18x^4-2x^5+e^{x/2}(18x^2-6x^3)+e^{x/4}(2x-54x^2+36x^3-6x^4)+(-2x}{}$$

$\int \frac{-6x+56x^2-2e^{3x/4}x^2-54x^3+18x^4-2x^5+e^{x/2}(18x^2-6x^3)+e^{x/4}(2x-54x^2+36x^3-6x^4)+(-2x+54x^2+6e^{x/2}x^2-36x^3+6x^4+e^{x/4}(-36x^2+12x}{270+e^{3x/4}}$

input
```
Integrate[(-6*x + 56*x^2 - 2*E^((3*x)/4)*x^2 - 54*x^3 + 18*x^4 - 2*x^5 + E
^(x/2)*(18*x^2 - 6*x^3) + E^(x/4)*(2*x - 54*x^2 + 36*x^3 - 6*x^4) + (-2*x
+ 54*x^2 + 6*E^(x/2)*x^2 - 36*x^3 + 6*x^4 + E^(x/4)*(-36*x^2 + 12*x^3))*Lo
g[x] + (18*x^2 - 6*E^(x/4)*x^2 - 6*x^3)*Log[x]^2 + 2*x^2*Log[x]^3 + (-10 +
 528*x - 434*x^2 + 72*x^3 + 16*x^4 - 4*x^5 + E^((3*x)/4)*(-20*x - 4*x^2) +
 E^(x/2)*(180*x - 24*x^2 - 12*x^3) + E^(x/4)*(10 - 543*x + 251*x^2 + 12*x^
3 - 12*x^4) + (-10 + 538*x - 252*x^2 - 12*x^3 + 12*x^4 + E^(x/2)*(60*x + 1
2*x^2) + E^(x/4)*(-360*x + 48*x^2 + 24*x^3))*Log[x] + (180*x - 24*x^2 - 12
*x^3 + E^(x/4)*(-60*x - 12*x^2))*Log[x]^2 + (20*x + 4*x^2)*Log[x]^3)*Log[5
 + x])/(270 + E^((3*x)/4)*(-10 - 2*x) - 216*x + 36*x^2 + 8*x^3 - 2*x^4 + E
^(x/2)*(90 - 12*x - 6*x^2) + E^(x/4)*(-270 + 126*x + 6*x^2 - 6*x^3) + (270
 - 126*x - 6*x^2 + 6*x^3 + E^(x/2)*(30 + 6*x) + E^(x/4)*(-180 + 24*x + 12*
x^2))*Log[x] + (90 + E^(x/4)*(-30 - 6*x) - 12*x - 6*x^2)*Log[x]^2 + (10 +
2*x)*Log[x]^3),x]
```

output
```
(x*(-1 + (-3 + E^(x/4))^2*x + 2*(-3 + E^(x/4))*x^2 + x^3 - 2*x*(-3 + E^(x/
4) + x)*Log[x] + x*Log[x]^2)*Log[5 + x])/(-3 + E^(x/4) + x - Log[x])^2
```

3.1259.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^5+18x^4-54x^3-2e^{3x/4}x^2+56x^2+2x^2\log^3(x)+e^{x/2}\left(18x^2-6x^3\right)+\left(-6x^3-6e^{x/4}x^2+18x^2\right)\log^2(x)}{}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{2\left(x\left(3x^3+6\left(e^{x/4}-3\right)x^2+3\left(e^{x/4}-3\right)^2x-1\right)+(x+5)\left(6x^3+12\left(e^{x/4}-3\right)x^2+6\left(e^{x/4}-3\right)^2x-1\right)\log(x}{}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int -\frac{-2x(x+2(x+5)\log(x+5))\log^3(x)-6\left(-x-e^{x/4}+3\right)x(x+2(x+5)\log(x+5))\log^2(x)+2\Big(x\Big(-3x^3}{}$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{1}{2}\int \frac{-2x(x+2(x+5)\log(x+5))\log^3(x)-6\left(-x-e^{x/4}+3\right)x(x+2(x+5)\log(x+5))\log^2(x)+2\Big(x\Big(-3x^3 -$$

$\downarrow$ 7293

$$-\frac{1}{2}\int\left(\frac{\left(x^2-\log(x)x-7x+4\right)\log(x+5)}{\left(x+e^{x/4}-\log(x)-3\right)^3}-\frac{2x(2\log(x+5)x+x+10\log(x+5))}{x+5}-\frac{\log(x+5)x^2+3\log(x+}{(x+5)\left(x+e^{x/4}\right.}\right.$$

$\downarrow$ 2009

$$\frac{1}{2}\left(-8\text{Subst}\left(\int\frac{1}{(4x+e^x-\log(4x)-3)^2}dx,x,\frac{x}{4}\right)+40\text{Subst}\left(\int\frac{1}{(4x+5)(4x+e^x-\log(4x)-3)^2}dx,x,\frac{x}{4}\right)-\right.$$

input
```
Int[(-6*x + 56*x^2 - 2*E^((3*x)/4)*x^2 - 54*x^3 + 18*x^4 - 2*x^5 + E^(x/2)
*(18*x^2 - 6*x^3) + E^(x/4)*(2*x - 54*x^2 + 36*x^3 - 6*x^4) + (-2*x + 54*x
^2 + 6*E^(x/2)*x^2 - 36*x^3 + 6*x^4 + E^(x/4)*(-36*x^2 + 12*x^3))*Log[x] +
 (18*x^2 - 6*E^(x/4)*x^2 - 6*x^3)*Log[x]^2 + 2*x^2*Log[x]^3 + (-10 + 528*x
 - 434*x^2 + 72*x^3 + 16*x^4 - 4*x^5 + E^((3*x)/4)*(-20*x - 4*x^2) + E^(x/
2)*(180*x - 24*x^2 - 12*x^3) + E^(x/4)*(10 - 543*x + 251*x^2 + 12*x^3 - 12
*x^4) + (-10 + 538*x - 252*x^2 - 12*x^3 + 12*x^4 + E^(x/2)*(60*x + 12*x^2)
 + E^(x/4)*(-360*x + 48*x^2 + 24*x^3))*Log[x] + (180*x - 24*x^2 - 12*x^3 +
 E^(x/4)*(-60*x - 12*x^2))*Log[x]^2 + (20*x + 4*x^2)*Log[x]^3)*Log[5 + x])
/(270 + E^((3*x)/4)*(-10 - 2*x) - 216*x + 36*x^2 + 8*x^3 - 2*x^4 + E^(x/2)
*(90 - 12*x - 6*x^2) + E^(x/4)*(-270 + 126*x + 6*x^2 - 6*x^3) + (270 - 126
*x - 6*x^2 + 6*x^3 + E^(x/2)*(30 + 6*x) + E^(x/4)*(-180 + 24*x + 12*x^2))*
Log[x] + (90 + E^(x/4)*(-30 - 6*x) - 12*x - 6*x^2)*Log[x]^2 + (10 + 2*x)*L
og[x]^3),x]
```

output
```
$Aborted
```

3.1259.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

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$$\int \frac{-6x+56x^2-2e^{3x/4}x^2-54x^3+18x^4-2x^5+e^{x/2}(18x^2-6x^3)+e^{x/4}(2x-54x^2+36x^3-6x^4)+(-2x+54x^2+6e^{x/2}x^2-36x^3+6x^4+e^{x/4}(-36x^2+12x}{270+e^{3x/4}}$$

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1259.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. $2(25) = 50$.

Time = 14.81 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.93

method	result
risch	$\frac{\left(x^3+2x^2 e^{\frac{x}{4}}-2x^2\ln(x)+x\,e^{\frac{x}{2}}-2\ln(x)e^{\frac{x}{4}}x+x\ln(x)^2-6x^2-6x\,e^{\frac{x}{4}}+6x\ln(x)+9x-1\right)x\ln(5+x)}{\left(x+e^{\frac{x}{4}}-\ln(x)-3\right)^2}$
parallelrisch	$\frac{-8\ln(x)e^{\frac{x}{4}}\ln(5+x)x^2+4\ln(5+x)x^4-24\ln(5+x)x^3+36\ln(5+x)x^2-4x\ln(5+x)+4\ln(x)^2\ln(5+x)x^2-8\ln(x)\ln(5+x)x^3+4\ln}{4x^2-8x\ln(x)+8x\,e^{\frac{x}{4}}+4\ln(x)^2-8\,e^{\frac{x}{4}}\ln(x)+4\,e^{\frac{x}{2}}-24x+24\ln(x)-}$

input
```
int((((4*x^2+20*x)*ln(x)^3+((-12*x^2-60*x)*exp(1/4*x)-12*x^3-24*x^2+180*x)
*ln(x)^2+((12*x^2+60*x)*exp(1/4*x)^2+(24*x^3+48*x^2-360*x)*exp(1/4*x)+12*x
^4-12*x^3-252*x^2+538*x-10)*ln(x)+(-4*x^2-20*x)*exp(1/4*x)^3+(-12*x^3-24*x
^2+180*x)*exp(1/4*x)^2+(-12*x^4+12*x^3+251*x^2-543*x+10)*exp(1/4*x)-4*x^5+
16*x^4+72*x^3-434*x^2+528*x-10)*ln(5+x)+2*x^2*ln(x)^3+(-6*x^2*exp(1/4*x)-6
*x^3+18*x^2)*ln(x)^2+(6*x^2*exp(1/4*x)^2+(12*x^3-36*x^2)*exp(1/4*x)+6*x^4-
36*x^3+54*x^2-2*x)*ln(x)-2*x^2*exp(1/4*x)^3+(-6*x^3+18*x^2)*exp(1/4*x)^2+(
-6*x^4+36*x^3-54*x^2+2*x)*exp(1/4*x)-2*x^5+18*x^4-54*x^3+56*x^2-6*x)/((2*x
+10)*ln(x)^3+((-6*x-30)*exp(1/4*x)-6*x^2-12*x+90)*ln(x)^2+((6*x+30)*exp(1/
4*x)^2+(12*x^2+24*x-180)*exp(1/4*x)+6*x^3-6*x^2-126*x+270)*ln(x)+(-2*x-10)
*exp(1/4*x)^3+(-6*x^2-12*x+90)*exp(1/4*x)^2+(-6*x^3+6*x^2+126*x-270)*exp(1
/4*x)-2*x^4+8*x^3+36*x^2-216*x+270),x,method=_RETURNVERBOSE)
```

output
```
(x^3+2*x^2*exp(1/4*x)-2*x^2*ln(x)+x*exp(1/2*x)-2*ln(x)*exp(1/4*x)*x+x*ln(x
)^2-6*x^2-6*x*exp(1/4*x)+6*x*ln(x)+9*x-1)*x/(x+exp(1/4*x)-ln(x)-3)^2*ln(5+
x)
```

3.1259.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 112 vs. $2(23) = 46$.

Time = 0.27 (sec) , antiderivative size = 112, normalized size of antiderivative = 4.00

$$\int \frac{-6x + 56x^2 - 2e^{3x/4}x^2 - 54x^3 + 18x^4 - 2x^5 + e^{x/2}(18x^2 - 6x^3) + e^{x/4}(2x - 54x^2 + 36x^3 - 6x^4) + (-2x}{}$$

input
```
integrate((((4*x^2+20*x)*log(x)^3+((-12*x^2-60*x)*exp(1/4*x)-12*x^3-24*x^2
+180*x)*log(x)^2+((12*x^2+60*x)*exp(1/4*x)^2+(24*x^3+48*x^2-360*x)*exp(1/4
*x)+12*x^4-12*x^3-252*x^2+538*x-10)*log(x)+(-4*x^2-20*x)*exp(1/4*x)^3+(-12
*x^3-24*x^2+180*x)*exp(1/4*x)^2+(-12*x^4+12*x^3+251*x^2-543*x+10)*exp(1/4*
x)-4*x^5+16*x^4+72*x^3-434*x^2+528*x-10)*log(5+x)+2*x^2*log(x)^3+(-6*x^2*e
xp(1/4*x)-6*x^3+18*x^2)*log(x)^2+(6*x^2*exp(1/4*x)^2+(12*x^3-36*x^2)*exp(1
/4*x)+6*x^4-36*x^3+54*x^2-2*x)*log(x)-2*x^2*exp(1/4*x)^3+(-6*x^3+18*x^2)*e
xp(1/4*x)^2+(-6*x^4+36*x^3-54*x^2+2*x)*exp(1/4*x)-2*x^5+18*x^4-54*x^3+56*x
^2-6*x)/((2*x+10)*log(x)^3+((-6*x-30)*exp(1/4*x)-6*x^2-12*x+90)*log(x)^2+(
(6*x+30)*exp(1/4*x)^2+(12*x^2+24*x-180)*exp(1/4*x)+6*x^3-6*x^2-126*x+270)*
log(x)+(-2*x-10)*exp(1/4*x)^3+(-6*x^2-12*x+90)*exp(1/4*x)^2+(-6*x^3+6*x^2+
126*x-270)*exp(1/4*x)-2*x^4+8*x^3+36*x^2-216*x+270),x, algorithm=\
```

output
```
(x^4 + x^2*log(x)^2 - 6*x^3 + x^2*e^(1/2*x) + 9*x^2 + 2*(x^3 - 3*x^2)*e^(1
/4*x) - 2*(x^3 + x^2*e^(1/4*x) - 3*x^2)*log(x) - x)*log(x + 5)/(x^2 + 2*(x
 - 3)*e^(1/4*x) - 2*(x + e^(1/4*x) - 3)*log(x) + log(x)^2 - 6*x + e^(1/2*x
) + 9)
```

3.1259.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(22) = 44$.

Time = 0.64 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.61

$$\int \frac{-6x + 56x^2 - 2e^{3x/4}x^2 - 54x^3 + 18x^4 - 2x^5 + e^{x/2}(18x^2 - 6x^3) + e^{x/4}(2x - 54x^2 + 36x^3 - 6x^4) + (-2x}{}$$

$$-\frac{x\log(x+5)}{x^2 - 2x\log(x) - 6x + (2x - 2\log(x) - 6)e^{\frac{x}{4}} + e^{\frac{x}{2}} + \log(x)^2 + 6\log(x) + 9} + \left(x^2 - \frac{25}{3}\right)\log(x+5) + \frac{25\log(3x+15)}{3}$$

input
```
integrate((((4*x**2+20*x)*ln(x)**3+((-12*x**2-60*x)*exp(1/4*x)-12*x**3-24*
x**2+180*x)*ln(x)**2+((12*x**2+60*x)*exp(1/4*x)**2+(24*x**3+48*x**2-360*x)
*exp(1/4*x)+12*x**4-12*x**3-252*x**2+538*x-10)*ln(x)+(-4*x**2-20*x)*exp(1/
4*x)**3+(-12*x**3-24*x**2+180*x)*exp(1/4*x)**2+(-12*x**4+12*x**3+251*x**2-
543*x+10)*exp(1/4*x)-4*x**5+16*x**4+72*x**3-434*x**2+528*x-10)*ln(5+x)+2*x
**2*ln(x)**3+(-6*x**2*exp(1/4*x)-6*x**3+18*x**2)*ln(x)**2+(6*x**2*exp(1/4*
x)**2+(12*x**3-36*x**2)*exp(1/4*x)+6*x**4-36*x**3+54*x**2-2*x)*ln(x)-2*x**
2*exp(1/4*x)**3+(-6*x**3+18*x**2)*exp(1/4*x)**2+(-6*x**4+36*x**3-54*x**2+2
*x)*exp(1/4*x)-2*x**5+18*x**4-54*x**3+56*x**2-6*x)/((2*x+10)*ln(x)**3+((-6
*x-30)*exp(1/4*x)-6*x**2-12*x+90)*ln(x)**2+((6*x+30)*exp(1/4*x)**2+(12*x**
2+24*x-180)*exp(1/4*x)+6*x**3-6*x**2-126*x+270)*ln(x)+(-2*x-10)*exp(1/4*x)
**3+(-6*x**2-12*x+90)*exp(1/4*x)**2+(-6*x**3+6*x**2+126*x-270)*exp(1/4*x)-
2*x**4+8*x**3+36*x**2-216*x+270),x)
```

output
```
-x*log(x + 5)/(x**2 - 2*x*log(x) - 6*x + (2*x - 2*log(x) - 6)*exp(x/4) + e
xp(x/2) + log(x)**2 + 6*log(x) + 9) + (x**2 - 25/3)*log(x + 5) + 25*log(3*
x + 15)/3
```

3.1259.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 121 vs. $2(23) = 46$.

Time = 0.46 (sec) , antiderivative size = 121, normalized size of antiderivative = 4.32

$$\int \frac{-6x + 56x^2 - 2e^{3x/4}x^2 - 54x^3 + 18x^4 - 2x^5 + e^{x/2}(18x^2 - 6x^3) + e^{x/4}(2x - 54x^2 + 36x^3 - 6x^4) + (-2x}{}$$

input
```
integrate((((4*x^2+20*x)*log(x)^3+((-12*x^2-60*x)*exp(1/4*x)-12*x^3-24*x^2
+180*x)*log(x)^2+((12*x^2+60*x)*exp(1/4*x)^2+(24*x^3+48*x^2-360*x)*exp(1/4
*x)+12*x^4-12*x^3-252*x^2+538*x-10)*log(x)+(-4*x^2-20*x)*exp(1/4*x)^3+(-12
*x^3-24*x^2+180*x)*exp(1/4*x)^2+(-12*x^4+12*x^3+251*x^2-543*x+10)*exp(1/4*
x)-4*x^5+16*x^4+72*x^3-434*x^2+528*x-10)*log(5+x)+2*x^2*log(x)^3+(-6*x^2*e
xp(1/4*x)-6*x^3+18*x^2)*log(x)^2+(6*x^2*exp(1/4*x)^2+(12*x^3-36*x^2)*exp(1
/4*x)+6*x^4-36*x^3+54*x^2-2*x)*log(x)-2*x^2*exp(1/4*x)^3+(-6*x^3+18*x^2)*e
xp(1/4*x)^2+(-6*x^4+36*x^3-54*x^2+2*x)*exp(1/4*x)-2*x^5+18*x^4-54*x^3+56*x
^2-6*x)/((2*x+10)*log(x)^3+((-6*x-30)*exp(1/4*x)-6*x^2-12*x+90)*log(x)^2+(
(6*x+30)*exp(1/4*x)^2+(12*x^2+24*x-180)*exp(1/4*x)+6*x^3-6*x^2-126*x+270)*
log(x)+(-2*x-10)*exp(1/4*x)^3+(-6*x^2-12*x+90)*exp(1/4*x)^2+(-6*x^3+6*x^2+
126*x-270)*exp(1/4*x)-2*x^4+8*x^3+36*x^2-216*x+270),x, algorithm=\
```

3.1259. $\int \frac{-6x+56x^2-2e^{3x/4}x^2-54x^3+18x^4-2x^5+e^{x/2}(18x^2-6x^3)+e^{x/4}(2x-54x^2+36x^3-6x^4)+(-2x+54x^2+6e^{x/2}x^2-36x^3+6x^4+e^{x/4}(-36x^2+12x}{270+e^{3x/4}}$

output
```
(x^2*e^(1/2*x)*log(x + 5) + 2*(x^3 - x^2*log(x) - 3*x^2)*e^(1/4*x)*log(x +
 5) + (x^4 + x^2*log(x)^2 - 6*x^3 + 9*x^2 - 2*(x^3 - 3*x^2)*log(x) - x)*lo
g(x + 5))/(x^2 + 2*(x - log(x) - 3)*e^(1/4*x) - 2*(x - 3)*log(x) + log(x)^
2 - 6*x + e^(1/2*x) + 9)
```

3.1259.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 282 vs. $2(23) = 46$.

Time = 0.83 (sec) , antiderivative size = 282, normalized size of antiderivative = 10.07

$$\int \frac{-6x + 56x^2 - 2e^{3x/4}x^2 - 54x^3 + 18x^4 - 2x^5 + e^{x/2}(18x^2 - 6x^3) + e^{x/4}(2x - 54x^2 + 36x^3 - 6x^4) + (-2\ldots}{}$$

input
```
integrate((((4*x^2+20*x)*log(x)^3+((-12*x^2-60*x)*exp(1/4*x)-12*x^3-24*x^2
+180*x)*log(x)^2+((12*x^2+60*x)*exp(1/4*x)^2+(24*x^3+48*x^2-360*x)*exp(1/4
*x)+12*x^4-12*x^3-252*x^2+538*x-10)*log(x)+(-4*x^2-20*x)*exp(1/4*x)^3+(-12
*x^3-24*x^2+180*x)*exp(1/4*x)^2+(-12*x^4+12*x^3+251*x^2-543*x+10)*exp(1/4*
x)-4*x^5+16*x^4+72*x^3-434*x^2+528*x-10)*log(5+x)+2*x^2*log(x)^3+(-6*x^2*e
xp(1/4*x)-6*x^3+18*x^2)*log(x)^2+(6*x^2*exp(1/4*x)^2+(12*x^3-36*x^2)*exp(1
/4*x)+6*x^4-36*x^3+54*x^2-2*x)*log(x)-2*x^2*exp(1/4*x)^3+(-6*x^3+18*x^2)*e
xp(1/4*x)^2+(-6*x^4+36*x^3-54*x^2+2*x)*exp(1/4*x)-2*x^5+18*x^4-54*x^3+56*x
^2-6*x)/((2*x+10)*log(x)^3+((-6*x-30)*exp(1/4*x)-6*x^2-12*x+90)*log(x)^2+(
(6*x+30)*exp(1/4*x)^2+(12*x^2+24*x-180)*exp(1/4*x)+6*x^3-6*x^2-126*x+270)*
log(x)+(-2*x-10)*exp(1/4*x)^3+(-6*x^2-12*x+90)*exp(1/4*x)^2+(-6*x^3+6*x^2+
126*x-270)*exp(1/4*x)-2*x^4+8*x^3+36*x^2-216*x+270),x, algorithm=\
```

output
```
(x^4*log(x + 5) + 2*x^3*e^(1/4*x)*log(x + 5) - 4*x^3*log(2)*log(x + 5) - 4
*x^2*e^(1/4*x)*log(2)*log(x + 5) + 4*x^2*log(2)^2*log(x + 5) - 2*x^3*log(1
/4*x)*log(x + 5) - 2*x^2*e^(1/4*x)*log(1/4*x)*log(x + 5) + 4*x^2*log(2)*lo
g(1/4*x)*log(x + 5) + x^2*log(1/4*x)^2*log(x + 5) - 6*x^3*log(x + 5) + x^2
*e^(1/2*x)*log(x + 5) - 6*x^2*e^(1/4*x)*log(x + 5) + 12*x^2*log(2)*log(x +
 5) + 6*x^2*log(1/4*x)*log(x + 5) + 9*x^2*log(x + 5) - x*log(x + 5))/(x^2
+ 2*x*e^(1/4*x) - 4*x*log(2) - 4*e^(1/4*x)*log(2) + 4*log(2)^2 - 2*x*log(1
/4*x) - 2*e^(1/4*x)*log(1/4*x) + 4*log(2)*log(1/4*x) + log(1/4*x)^2 - 6*x
+ e^(1/2*x) - 6*e^(1/4*x) + 12*log(2) + 6*log(1/4*x) + 9)
```

3.1259.9 Mupad [B] (verification not implemented)

Time = 15.92 (sec) , antiderivative size = 122, normalized size of antiderivative = 4.36

$$\int \frac{-6x+56x^2-2e^{3x/4}x^2-54x^3+18x^4-2x^5+e^{x/2}(18x^2-6x^3)+e^{x/4}(2x-54x^2+36x^3-6x^4)+(-2\cdots}{\cdots}$$

$$-\frac{\ln(x+5)\left(x-\frac{e^{x/2}\,(x^3+5\,x^2)}{x+5}-\frac{(x^3+5\,x^2)\,(\ln(x)-x+3)^2}{x+5}+\frac{2\,e^{x/4}\,(x^3+5\,x^2)\,(\ln(x)-x+3)}{x+5}\right)}{e^{x/2}-6\,x+6\,\ln(x)-e^{x/4}\,(2\,\ln(x)-2\,x+6)+\ln(x)^2-2\,x\,\ln(x)+x^2+9}$$

input
```
int(-(6*x - log(x + 5)*(528*x - exp((3*x)/4)*(20*x + 4*x^2) + log(x)^3*(20
*x + 4*x^2) - exp(x/2)*(24*x^2 - 180*x + 12*x^3) - log(x)^2*(exp(x/4)*(60*
x + 12*x^2) - 180*x + 24*x^2 + 12*x^3) + log(x)*(538*x + exp(x/2)*(60*x +
12*x^2) + exp(x/4)*(48*x^2 - 360*x + 24*x^3) - 252*x^2 - 12*x^3 + 12*x^4 -
 10) + exp(x/4)*(251*x^2 - 543*x + 12*x^3 - 12*x^4 + 10) - 434*x^2 + 72*x^
3 + 16*x^4 - 4*x^5 - 10) - exp(x/2)*(18*x^2 - 6*x^3) + 2*x^2*exp((3*x)/4)
- exp(x/4)*(2*x - 54*x^2 + 36*x^3 - 6*x^4) - 2*x^2*log(x)^3 - 56*x^2 + 54*
x^3 - 18*x^4 + 2*x^5 + log(x)^2*(6*x^2*exp(x/4) - 18*x^2 + 6*x^3) + log(x)
*(2*x + exp(x/4)*(36*x^2 - 12*x^3) - 6*x^2*exp(x/2) - 54*x^2 + 36*x^3 - 6*
x^4))/(exp(x/4)*(126*x + 6*x^2 - 6*x^3 - 270) - exp(x/2)*(12*x + 6*x^2 - 9
0) - 216*x + log(x)*(exp(x/4)*(24*x + 12*x^2 - 180) - 126*x + exp(x/2)*(6*
x + 30) - 6*x^2 + 6*x^3 + 270) - exp((3*x)/4)*(2*x + 10) + 36*x^2 + 8*x^3
- 2*x^4 + log(x)^3*(2*x + 10) - log(x)^2*(12*x + exp(x/4)*(6*x + 30) + 6*x
^2 - 90) + 270),x)
```

output
```
-(log(x + 5)*(x - (exp(x/2)*(5*x^2 + x^3))/(x + 5) - ((5*x^2 + x^3)*(log(x
) - x + 3)^2)/(x + 5) + (2*exp(x/4)*(5*x^2 + x^3)*(log(x) - x + 3))/(x + 5
)))/(exp(x/2) - 6*x + 6*log(x) - exp(x/4)*(2*log(x) - 2*x + 6) + log(x)^2
- 2*x*log(x) + x^2 + 9)
```

3.1260 $\int \frac{e^{2x}(-4x+4x^2)+e^x(-4x^2+4x^3)+e^{2x}(2e^{2x}-2x^2+4e^x x^2+4x^3)}{e^{4x}x^2-2e^{2x}x^3+x^4}\,dx$

3.1260.1 Optimal result

Integrand size = 89, antiderivative size = 25

$$\int \frac{e^{2x}(-4x+4x^2)+e^x(-4x^2+4x^3)+e^{2x}(2e^{2x}-2x^2+4e^x x^2+4x^3)}{e^{4x}x^2-2e^{2x}x^3+x^4}\,dx=\frac{2\left(1+\frac{e^x}{x}\right)^2x}{-e^{2x}+x}$$

output
```
2*x*(exp(x)/x+1)^2/(x-exp(2*x))
```

3.1260.2 Mathematica [A] (verified)

Time = 4.74 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{e^{2x}(-4x+4x^2)+e^x(-4x^2+4x^3)+e^{2x}(2e^{2x}-2x^2+4e^x x^2+4x^3)}{e^{4x}x^2-2e^{2x}x^3+x^4}\,dx=\frac{2(e^x+x)^2}{x\,(-e^{2x}+x)}$$

input
```
Integrate[(E^(2*x)*(-4*x + 4*x^2) + E^x*(-4*x^2 + 4*x^3) + E^(2*x)*(2*E^(2
*x) - 2*x^2 + 4*E^x*x^2 + 4*x^3))/(E^(4*x)*x^2 - 2*E^(2*x)*x^3 + x^4),x]
```

output
```
(2*(E^x + x)^2)/(x*(-E^(2*x) + x))
```

3.1260.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}(4x^2-4x)+e^x(4x^3-4x^2)+e^{2x}(4x^3+4e^xx^2-2x^2+2e^{2x})}{x^4-2e^{2x}x^3+e^{4x}x^2}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{2e^x(2e^xx^3+2x^3+e^xx^2+2e^{2x}x^2-2x^2-2e^xx+e^{3x})}{(e^{2x}-x)^2x^2}dx$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{e^x(2e^xx^3+2x^3+e^xx^2+2e^{2x}x^2-2x^2-2e^xx+e^{3x})}{(e^{2x}-x)^2x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$2\int \left(\frac{e^x(2x-1)(e^xx+2x+e^x)}{(e^{2x}-x)^2x}+\frac{e^x(2x^2+e^x)}{(e^{2x}-x)x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\left(\frac{1}{2}\int \frac{1}{(e^{2x}-x)x^2}dx+\int \frac{e^{2x}}{(e^{2x}-x)x^2}dx+\frac{1}{2}\int \frac{1}{(e^{2x}-x)^2}dx-2\int \frac{e^x}{(e^{2x}-x)^2}dx+\int \frac{1}{e^{2x}-x}dx+2\int \frac{e^x}{e^{2x}-\right.$$

input
```
Int[(E^(2*x)*(-4*x + 4*x^2) + E^x*(-4*x^2 + 4*x^3) + E^(2*x)*(2*E^(2*x) -
2*x^2 + 4*E^x*x^2 + 4*x^3))/(E^(4*x)*x^2 - 2*E^(2*x)*x^3 + x^4),x]
```

output
```
$Aborted
```

3.1260.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1260.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

method	result	size
risch	$-\frac{2}{x}+\frac{2x+4\,\mathrm{e}^{x}+2}{x-\mathrm{e}^{2x}}$	26
parallelrisch	$-\frac{-2x^{2}-4\,\mathrm{e}^{x}x-2\,\mathrm{e}^{2x}}{x\left(x-\mathrm{e}^{2x}\right)}$	33
norman	$\frac{2x\,\mathrm{e}^{2x}+2\,\mathrm{e}^{2x}+4\,\mathrm{e}^{x}x}{x\left(x-\mathrm{e}^{2x}\right)}$	34
parts	$\frac{2\,\mathrm{e}^{2x}}{x\left(x-\mathrm{e}^{2x}\right)}+\frac{4\,\mathrm{e}^{x}}{x-\mathrm{e}^{2x}}+\frac{2\,\mathrm{e}^{2x}}{x-\mathrm{e}^{2x}}$	51

input
```
int(((2*exp(x)^2+4*exp(x)*x^2+4*x^3-2*x^2)*exp(2*x)+(4*x^2-4*x)*exp(x)^2+(
4*x^3-4*x^2)*exp(x))/(x^2*exp(2*x)^2-2*exp(2*x)*x^3+x^4),x,method=_RETURNV
ERBOSE)
```

output
```
-2/x+2*(x+2*exp(x)+1)/(x-exp(2*x))
```

3.1260.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{e^{2x}(-4x+4x^2)+e^x(-4x^2+4x^3)+e^{2x}(2e^{2x}-2x^2+4e^xx^2+4x^3)}{e^{4x}x^2-2e^{2x}x^3+x^4}\,dx$$
$$=\frac{2\left(x^2+2\,xe^x+e^{(2\,x)}\right)}{x^2-xe^{(2\,x)}}$$

input
```
integrate(((2*exp(x)^2+4*exp(x)*x^2+4*x^3-2*x^2)*exp(2*x)+(4*x^2-4*x)*exp(
x)^2+(4*x^3-4*x^2)*exp(x))/(x^2*exp(2*x)^2-2*exp(2*x)*x^3+x^4),x, algorith
m=\
```

output
```
2*(x^2 + 2*x*e^x + e^(2*x))/(x^2 - x*e^(2*x))
```

3.1260.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{e^{2x}(-4x+4x^2)+e^x(-4x^2+4x^3)+e^{2x}(2e^{2x}-2x^2+4e^x x^2+4x^3)}{e^{4x}x^2-2e^{2x}x^3+x^4}\,dx = \frac{-2x-4e^x-2}{-x+e^{2x}}-\frac{2}{x}$$

input
```
integrate(((2*exp(x)**2+4*exp(x)*x**2+4*x**3-2*x**2)*exp(2*x)+(4*x**2-4*x)
*exp(x)**2+(4*x**3-4*x**2)*exp(x))/(x**2*exp(2*x)**2-2*exp(2*x)*x**3+x**4)
,x)
```

output
```
(-2*x - 4*exp(x) - 2)/(-x + exp(2*x)) - 2/x
```

3.1260.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{e^{2x}(-4x+4x^2)+e^x(-4x^2+4x^3)+e^{2x}(2e^{2x}-2x^2+4e^x x^2+4x^3)}{e^{4x}x^2-2e^{2x}x^3+x^4}\,dx = \frac{2\left(x^2+2\,xe^x+e^{(2\,x)}\right)}{x^2-xe^{(2\,x)}}$$

input
```
integrate(((2*exp(x)^2+4*exp(x)*x^2+4*x^3-2*x^2)*exp(2*x)+(4*x^2-4*x)*exp(
x)^2+(4*x^3-4*x^2)*exp(x))/(x^2*exp(2*x)^2-2*exp(2*x)*x^3+x^4),x, algorith
m=\
```

output
```
2*(x^2 + 2*x*e^x + e^(2*x))/(x^2 - x*e^(2*x))
```

3.1260.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(23) = 46.

Time = 0.28 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.48

$$\int \frac{e^{2x}(-4x+4x^2)+e^x(-4x^2+4x^3)+e^{2x}(2e^{2x}-2x^2+4e^xx^2+4x^3)}{e^{4x}x^2-2e^{2x}x^3+x^4}\,dx = \frac{2\left(x^3-x^2e^{(2x)}+4x^2e^x-4xe^{(3x)}+xe^{(2x)}-e^{(4x)}\right)}{x^3-2x^2e^{(2x)}+xe^{(4x)}}$$

input
```
integrate((((2*exp(x)^2+4*exp(x)*x^2+4*x^3-2*x^2)*exp(2*x)+(4*x^2-4*x)*exp(
x)^2+(4*x^3-4*x^2)*exp(x))/(x^2*exp(2*x)^2-2*exp(2*x)*x^3+x^4),x, algorith
m=\
```

output
```
2*(x^3 - x^2*e^(2*x) + 4*x^2*e^x - 4*x*e^(3*x) + x*e^(2*x) - e^(4*x))/(x^3
 - 2*x^2*e^(2*x) + x*e^(4*x))
```

3.1260.9 Mupad [B] (verification not implemented)

Time = 14.70 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.84

$$\int \frac{e^{2x}(-4x+4x^2)+e^x(-4x^2+4x^3)+e^{2x}(2e^{2x}-2x^2+4e^xx^2+4x^3)}{e^{4x}x^2-2e^{2x}x^3+x^4}\,dx = \frac{2\,(x+e^x)^2}{x\,(x-e^{2\,x})}$$

input
```
int(-(exp(2*x)*(4*x - 4*x^2) + exp(x)*(4*x^2 - 4*x^3) - exp(2*x)*(2*exp(2*
x) + 4*x^2*exp(x) - 2*x^2 + 4*x^3))/(x^2*exp(4*x) - 2*x^3*exp(2*x) + x^4),
x)
```

output
```
(2*(x + exp(x))^2)/(x*(x - exp(2*x)))
```

3.1261 $\int \frac{1}{4}e^{\frac{1}{4}(51x-17x\log(2)+e^x(-12x+4x\log(2)))}(51-17\log(2)+$

3.1261.1 Optimal result

Integrand size = 55, antiderivative size = 29

$$\int \frac{1}{4}e^{\frac{1}{4}(51x-17x\log(2)+e^x(-12x+4x\log(2)))}(51-17\log(2)+e^x(-12-12x+(4+4x)\log(2)))\,dx$$
$$=1+e^{\frac{1}{4}(x+(4+4(3-e^x))x)(3-\log(2))}$$

output
```
1+exp(((-4*exp(x)+16)*x+x)*(3/4-1/4*ln(2)))
```

3.1261.2 Mathematica [A] (verified)

Time = 0.60 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{1}{4}e^{\frac{1}{4}(51x-17x\log(2)+e^x(-12x+4x\log(2)))}(51-17\log(2)+e^x(-12-12x+(4+4x)\log(2)))\,dx$$
$$=2^{-17x/4}e^{\frac{51x}{4}+e^x x(-3+\log(2))}$$

input
```
Integrate[(E^((51*x - 17*x*Log[2] + E^x*(-12*x + 4*x*Log[2]))/4)*(51 - 17*
Log[2] + E^x*(-12 - 12*x + (4 + 4*x)*Log[2])))/4,x]
```

output
```
E^((51*x)/4 + E^x*x*(-3 + Log[2]))/2^((17*x)/4)
```

3.1261. $\int \frac{1}{4}e^{\frac{1}{4}(51x-17x\log(2)+e^x(-12x+4x\log(2)))}(51-17\log(2)+e^x(-12-12x+(4+4x)\log(2)))\,dx$

3.1261.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}(e^x(-12x+(4x+4)\log(2)-12)+51-17\log(2))\exp\left(\frac{1}{4}(51x-17x\log(2)+e^x(4x\log(2)-12x))\right)dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{4}\int 2^{-17x/4}e^{\frac{1}{4}(51x-e^x x(12-\log(16)))}(17(3-\log(2))-4e^x(3x-(x+1)\log(2)+3))\,dx$$

$$\Big\downarrow \text{ 7292}$$

$$\frac{1}{4}\int 2^{-17x/4}e^{\frac{1}{4}(51x-e^x x(12-\log(16)))}(-4e^x x-4e^x+17)(3-\log(2))dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{4}(3-\log(2))\int 2^{-17x/4}e^{\frac{1}{4}(51x-e^x x(12-\log(16)))}(-4e^x x-4e^x+17)\,dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{4}(3-\log(2))\int\left(-2^{2-\frac{17x}{4}}e^{x+\frac{1}{4}(51x-e^x x(12-\log(16)))}x-2^{2-\frac{17x}{4}}e^{x+\frac{1}{4}(51x-e^x x(12-\log(16)))}+17\,2^{-17x/4}e^{\frac{1}{4}(51x-e^x x(12-\log(16)))}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{4}(3-\log(2))\left(-\int 2^{2-\frac{17x}{4}}e^{\frac{1}{4}x\left(55-12e^x\left(1-\frac{\log(2)}{3}\right)\right)}dx+17\int 2^{-17x/4}e^{\frac{1}{4}(51x-e^x x(12-\log(16)))}dx-\int 2^{2-\frac{17x}{4}}e^{\frac{1}{4}x\left(55-12e^x\left(1-\frac{\log}{}\right.\right.}\right.$$

input
```
Int[(E^((51*x - 17*x*Log[2] + E^x*(-12*x + 4*x*Log[2]))/4)*(51 - 17*Log[2]
 + E^x*(-12 - 12*x + (4 + 4*x)*Log[2])))/4,x]
```

output
```
$Aborted
```

3.1261.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1261.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.72

method	result	size
parallelrisch	$\mathrm{e}^{\frac{x(4\,\mathrm{e}^{x}\ln(2)-17\ln(2)-12\,\mathrm{e}^{x}+51)}{4}}$	21
risch	$2^{-\frac{17x}{4}}\,2^{\mathrm{e}^{x}x}\mathrm{e}^{-\frac{3x(4\,\mathrm{e}^{x}-17)}{4}}$	23
norman	$\mathrm{e}^{\frac{(4x\ln(2)-12x)\mathrm{e}^{x}}{4}-\frac{17x\ln(2)}{4}+\frac{51x}{4}}$	24

input
```
int(1/4*(((4+4*x)*ln(2)-12*x-12)*exp(x)-17*ln(2)+51)*exp(1/4*(4*x*ln(2)-12
*x)*exp(x)-17/4*x*ln(2)+51/4*x),x,method=_RETURNVERBOSE)
```

output
```
exp(1/4*x*(4*exp(x)*ln(2)-17*ln(2)-12*exp(x)+51))
```

3.1261.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.72

$$\int \frac{1}{4}e^{\frac{1}{4}(51x-17x\log(2)+e^x(-12x+4x\log(2)))}(51-17\log(2)+e^x(-12-12x+(4+4x)\log(2)))\,dx = e^{\left((x\log(2)-3\,x)e^x-\frac{17}{4}\,x\log(2)+\frac{51}{4}\,x\right)}$$

input
```
integrate(1/4*(((4+4*x)*log(2)-12*x-12)*exp(x)-17*log(2)+51)*exp(1/4*(4*x*
log(2)-12*x)*exp(x)-17/4*x*log(2)+51/4*x),x, algorithm=\
```

output
```
e^((x*log(2) - 3*x)*e^x - 17/4*x*log(2) + 51/4*x)
```

3.1261.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{1}{4}e^{\frac{1}{4}(51x-17x\log(2)+e^x(-12x+4x\log(2)))}(51-17\log(2)+e^x(-12-12x+(4+4x)\log(2)))\,dx = e^{-\frac{17x\log(2)}{4}+\frac{51x}{4}+(-3x+x\log(2))e^x}$$

input
```
integrate(1/4*(((4+4*x)*ln(2)-12*x-12)*exp(x)-17*ln(2)+51)*exp(1/4*(4*x*ln
(2)-12*x)*exp(x)-17/4*x*ln(2)+51/4*x),x)
```

output
```
exp(-17*x*log(2)/4 + 51*x/4 + (-3*x + x*log(2))*exp(x))
```

3.1261.7 Maxima [F]

$$\int \frac{1}{4}e^{\frac{1}{4}(51x-17x\log(2)+e^x(-12x+4x\log(2)))}(51-17\log(2)+e^x(-12-12x+(4+4x)\log(2)))\,dx = \int \frac{1}{4}\,(4\,((x+1)\log(2)-3\,x-3)e^x-17\,\log(2)+51)e^{\left((x\log(2)-3\,x)e^x-\frac{17}{4}\,x\log(2)+\frac{51}{4}\,x\right)}\,dx$$

input
```
integrate(1/4*(((4+4*x)*log(2)-12*x-12)*exp(x)-17*log(2)+51)*exp(1/4*(4*x*
log(2)-12*x)*exp(x)-17/4*x*log(2)+51/4*x),x, algorithm=\
```

output
```
1/4*integrate((4*((x + 1)*log(2) - 3*x - 3)*e^x - 17*log(2) + 51)*e^((x*lo
g(2) - 3*x)*e^x - 17/4*x*log(2) + 51/4*x), x)
```

3.1261.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.72

$$\int \frac{1}{4}e^{\frac{1}{4}(51x-17x\log(2)+e^x(-12x+4x\log(2)))}(51-17\log(2)+e^x(-12-12x+(4+4x)\log(2)))\,dx$$
$$= e^{\left(xe^x\log(2)-3\,xe^x-\frac{17}{4}\,x\log(2)+\frac{51}{4}\,x\right)}$$

input
```
integrate(1/4*(((4+4*x)*log(2)-12*x-12)*exp(x)-17*log(2)+51)*exp(1/4*(4*x*
log(2)-12*x)*exp(x)-17/4*x*log(2)+51/4*x),x, algorithm=\
```

output
```
e^(x*e^x*log(2) - 3*x*e^x - 17/4*x*log(2) + 51/4*x)
```

3.1261.9 Mupad [B] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.72

$$\int \frac{1}{4}e^{\frac{1}{4}(51x-17x\log(2)+e^x(-12x+4x\log(2)))}(51-17\log(2)+e^x(-12-12x+(4+4x)\log(2)))\,dx$$
$$= 2^{x\,e^x-\frac{17\,x}{4}}\,e^{-3\,x\,e^x}\,e^{\frac{51\,x}{4}}$$

input
```
int(-(exp((51*x)/4 - (17*x*log(2))/4 - (exp(x)*(12*x - 4*x*log(2)))/4)*(17
*log(2) + exp(x)*(12*x - log(2)*(4*x + 4) + 12) - 51))/4,x)
```

output
```
2^(x*exp(x) - (17*x)/4)*exp(-3*x*exp(x))*exp((51*x)/4)
```

3.1262 $\int \frac{e^{x+x^2}(1-2x)+e^x(19880+282x+x^2)}{1626347584+4e^{2x^2}+45812608x+483936x^2+2272x^3+4x^4+e^{x^2}(161312+2272x+8x^2)}\,dx$

3.1262.1 Optimal result

Integrand size = 74, antiderivative size = 22

$$\int \frac{e^{x+x^2}(1-2x)+e^x(19880+282x+x^2)}{1626347584+4e^{2x^2}+45812608x+483936x^2+2272x^3+4x^4+e^{x^2}(161312+2272x+8x^2)}\,dx = \frac{e^x}{4\left(e^{x^2}+(-142-x)^2\right)}$$

output
```
exp(x)/(4*(-142-x)^2+4*exp(x^2))
```

3.1262.2 Mathematica [A] (verified)

Time = 2.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^{x+x^2}(1-2x)+e^x(19880+282x+x^2)}{1626347584+4e^{2x^2}+45812608x+483936x^2+2272x^3+4x^4+e^{x^2}(161312+2272x+8x^2)}\,dx = \frac{e^x}{4\left(20164+e^{x^2}+284x+x^2\right)}$$

input
```
Integrate[(E^(x + x^2)*(1 - 2*x) + E^x*(19880 + 282*x + x^2))/(1626347584
+ 4*E^(2*x^2) + 45812608*x + 483936*x^2 + 2272*x^3 + 4*x^4 + E^x^2*(161312
 + 2272*x + 8*x^2)),x]
```

output
```
E^x/(4*(20164 + E^x^2 + 284*x + x^2))
```

3.1262.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^2+x}(1-2x)+e^x\left(x^2+282x+19880\right)}{4x^4+2272x^3+483936x^2+4e^{2x^2}+e^{x^2}\left(8x^2+2272x+161312\right)+45812608x+1626347584}dx$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^x\left(x^2+e^{x^2}(1-2x)+282x+19880\right)}{4\left(e^{x^2}+(x+142)^2\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{4}\int \frac{e^x\left(x^2+282x+e^{x^2}(1-2x)+19880\right)}{\left((x+142)^2+e^{x^2}\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\frac{1}{4}\int \left(\frac{2e^x\left(x^3+284x^2+20163x-142\right)}{\left(x^2+284x+e^{x^2}+20164\right)^2}-\frac{e^x(2x-1)}{x^2+284x+e^{x^2}+20164}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{4}\left(-284\int \frac{e^x}{\left(x^2+284x+e^{x^2}+20164\right)^2}dx+40326\int \frac{e^x x}{\left(x^2+284x+e^{x^2}+20164\right)^2}dx+568\int \frac{e^x x^2}{\left(x^2+284x+e^{x^2}\right.}\right.$$

input
```
Int[(E^(x + x^2)*(1 - 2*x) + E^x*(19880 + 282*x + x^2))/(1626347584 + 4*E^
(2*x^2) + 45812608*x + 483936*x^2 + 2272*x^3 + 4*x^4 + E^x^2*(161312 + 227
2*x + 8*x^2)),x]
```

output
```
$Aborted
```

3.1262.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1262.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

method	result	size
norman	$\frac{e^{x}}{4x^{2}+4\,e^{x^{2}}+1136x+80656}$	19
risch	$\frac{e^{x}}{4x^{2}+4\,e^{x^{2}}+1136x+80656}$	19
parallelrisch	$\frac{e^{x}}{4x^{2}+4\,e^{x^{2}}+1136x+80656}$	19

input
```
int(((1-2*x)*exp(x)*exp(x^2)+(x^2+282*x+19880)*exp(x))/(4*exp(x^2)^2+(8*x^
2+2272*x+161312)*exp(x^2)+4*x^4+2272*x^3+483936*x^2+45812608*x+1626347584)
,x,method=_RETURNVERBOSE)
```

output
```
1/4*exp(x)/(x^2+exp(x^2)+284*x+20164)
```

3.1262.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.36

$$\int \frac{e^{x+x^2}(1-2x)+e^x(19880+282x+x^2)}{1626347584+4e^{2x^2}+45812608x+483936x^2+2272x^3+4x^4+e^{x^2}(161312+2272x+8x^2)}\,dx = \frac{e^{(x^2+x)}}{4\left((x^2+284\,x+20164)e^{(x^2)}+e^{(2\,x^2)}\right)}$$

input
```
integrate((((1-2*x)*exp(x)*exp(x^2)+(x^2+282*x+19880)*exp(x))/(4*exp(x^2)^2
+(8*x^2+2272*x+161312)*exp(x^2)+4*x^4+2272*x^3+483936*x^2+45812608*x+16263
47584),x, algorithm=\
```

output
```
1/4*e^(x^2 + x)/((x^2 + 284*x + 20164)*e^(x^2) + e^(2*x^2))
```

3.1262.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{e^{x+x^2}(1-2x)+e^x(19880+282x+x^2)}{1626347584+4e^{2x^2}+45812608x+483936x^2+2272x^3+4x^4+e^{x^2}(161312+2272x+8x^2)}\,dx = \frac{e^x}{4x^2+1136x+4e^{x^2}+80656}$$

input
```
integrate((((1-2*x)*exp(x)*exp(x**2)+(x**2+282*x+19880)*exp(x))/(4*exp(x**2
)**2+(8*x**2+2272*x+161312)*exp(x**2)+4*x**4+2272*x**3+483936*x**2+4581260
8*x+1626347584),x)
```

output
```
exp(x)/(4*x**2 + 1136*x + 4*exp(x**2) + 80656)
```

3.1262.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{e^{x+x^2}(1-2x)+e^x(19880+282x+x^2)}{1626347584+4e^{2x^2}+45812608x+483936x^2+2272x^3+4x^4+e^{x^2}(161312+2272x+8x^2)}\,dx = \frac{e^x}{4\left(x^2+284\,x+e^{(x^2)}+20164\right)}$$

input
```
integrate(((1-2*x)*exp(x)*exp(x^2)+(x^2+282*x+19880)*exp(x))/(4*exp(x^2)^2
+(8*x^2+2272*x+161312)*exp(x^2)+4*x^4+2272*x^3+483936*x^2+45812608*x+16263
47584),x, algorithm=\
```

output
```
1/4*e^x/(x^2 + 284*x + e^(x^2) + 20164)
```

3.1262.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{e^{x+x^2}(1-2x)+e^x(19880+282x+x^2)}{1626347584+4e^{2x^2}+45812608x+483936x^2+2272x^3+4x^4+e^{x^2}(161312+2272x+8x^2)}\,dx = \frac{e^x}{4\left(x^2+284\,x+e^{(x^2)}+20164\right)}$$

input
```
integrate(((1-2*x)*exp(x)*exp(x^2)+(x^2+282*x+19880)*exp(x))/(4*exp(x^2)^2
+(8*x^2+2272*x+161312)*exp(x^2)+4*x^4+2272*x^3+483936*x^2+45812608*x+16263
47584),x, algorithm=\
```

output
```
1/4*e^x/(x^2 + 284*x + e^(x^2) + 20164)
```

3.1262.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{x+x^2}(1-2x)+e^x(19880+282x+x^2)}{1626347584+4e^{2x^2}+45812608x+483936x^2+2272x^3+4x^4+e^{x^2}(161312+2272x+8x^2)}\,dx = \int \frac{\mathrm{e}^x\,\left(x^2+282\,x+19880\right)-\mathrm{e}^{x^2+x}\,\left(2\,x-1\right)}{45812608\,x+4\,\mathrm{e}^{2\,x^2}+\mathrm{e}^{x^2}\,\left(8\,x^2+2272\,x+161312\right)+483936\,x^2+2272\,x^3+4\,x^4+1626347584}\,dx$$

input
```
int((exp(x)*(282*x + x^2 + 19880) - exp(x^2)*exp(x)*(2*x - 1))/(45812608*x
 + 4*exp(2*x^2) + exp(x^2)*(2272*x + 8*x^2 + 161312) + 483936*x^2 + 2272*x
^3 + 4*x^4 + 1626347584),x)
```

output
```
int((exp(x)*(282*x + x^2 + 19880) - exp(x + x^2)*(2*x - 1))/(45812608*x +
4*exp(2*x^2) + exp(x^2)*(2272*x + 8*x^2 + 161312) + 483936*x^2 + 2272*x^3
+ 4*x^4 + 1626347584), x)
```

3.1263 $\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108 \cdots}{-507x^2+481x^3-\cdots}$

3.1263.1 Optimal result

Integrand size = 254, antiderivative size = 25

$$\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-2 \cdots}{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-\cdots}$$
$$= e^{\frac{1}{x\left(4-4x+3\left(3+\log\left((-3+x)^4\right)\right)\right)}}+x$$

output
```
x+exp(1/x/(-4*x+13+3*ln((-3+x)^4)))
```

3.1263.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-2 \cdots}{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-\cdots}$$
$$= e^{\frac{1}{x\left(13-4x+3\log\left((-3+x)^4\right)\right)}}+x$$

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$$\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-27x^2+9x^3)\log^2(81-108x+54x^2-12x^3+x^4)+e^{\frac{13x \cdots}{\cdots}}}{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-2 \cdots}$$

input
```
Integrate[(-507*x^2 + 481*x^3 - 152*x^4 + 16*x^5 + (-234*x^2 + 150*x^3 - 2
4*x^4)*Log[81 - 108*x + 54*x^2 - 12*x^3 + x^4] + (-27*x^2 + 9*x^3)*Log[81
- 108*x + 54*x^2 - 12*x^3 + x^4]^2 + E^(13*x - 4*x^2 + 3*x*Log[81 - 108*x
+ 54*x^2 - 12*x^3 + x^4])^(-1)*(39 - 49*x + 8*x^2 + (9 - 3*x)*Log[81 - 108
*x + 54*x^2 - 12*x^3 + x^4]))/(-507*x^2 + 481*x^3 - 152*x^4 + 16*x^5 + (-2
34*x^2 + 150*x^3 - 24*x^4)*Log[81 - 108*x + 54*x^2 - 12*x^3 + x^4] + (-27*
x^2 + 9*x^3)*Log[81 - 108*x + 54*x^2 - 12*x^3 + x^4]^2),x]
```

output
```
E^(1/(x*(13 - 4*x + 3*Log[(-3 + x)^4]))) + x
```

3.1263.3 Rubi [A] (verified)

Time = 4.29 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.012$, Rules used = {7292, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(8x^2 + (9-3x)\log(x^4-12x^3+54x^2-108x+81) - 49x + 39)\exp\left(\frac{1}{-4x^2+3x\log(x^4-12x^3+54x^2-108x+81)+13x}\right) \cdots}{16x^5 - 152x^4 + 481x^3 - 507x^2 + (9x^3-27x^2)\log^2(x \cdots}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{-(8x^2 + (9-3x)\log(x^4-12x^3+54x^2-108x+81) - 49x + 39)\exp\left(\frac{1}{-4x^2+3x\log(x^4-12x^3+54x^2-108x+81)+13x}\right) \cdots}{\cdots}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(\frac{16x^3}{(x-3)(4x-3\log((x-3)^4)-13)^2} - \frac{152x^2}{(x-3)(4x-3\log((x-3)^4)-13)^2} + \frac{e^{-\frac{1}{x(4x-3\log((x-3)^4)-13)}}(8x^2 - \cdots}{(x-3)x^2 \cdots}\right.$$

$$\Big\downarrow \text{2009}$$

$$x + e^{\frac{1}{x(-4x+3\log((x-3)^4)+13)}}$$

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$$\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-27x^2+9x^3)\log^2(81-108x+54x^2-12x^3+x^4)+e^{\overline{13x}\cdots}}{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-2\cdots}$$

input
```
Int[(-507*x^2 + 481*x^3 - 152*x^4 + 16*x^5 + (-234*x^2 + 150*x^3 - 24*x^4)
*Log[81 - 108*x + 54*x^2 - 12*x^3 + x^4] + (-27*x^2 + 9*x^3)*Log[81 - 108*
x + 54*x^2 - 12*x^3 + x^4]^2 + E^(13*x - 4*x^2 + 3*x*Log[81 - 108*x + 54*x
^2 - 12*x^3 + x^4])^(-1)*(39 - 49*x + 8*x^2 + (9 - 3*x)*Log[81 - 108*x + 5
4*x^2 - 12*x^3 + x^4]))/(-507*x^2 + 481*x^3 - 152*x^4 + 16*x^5 + (-234*x^2
 + 150*x^3 - 24*x^4)*Log[81 - 108*x + 54*x^2 - 12*x^3 + x^4] + (-27*x^2 +
9*x^3)*Log[81 - 108*x + 54*x^2 - 12*x^3 + x^4]^2),x]
```

output
```
E^(1/(x*(13 - 4*x + 3*Log[(-3 + x)^4]))) + x
```

3.1263.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1263.4 Maple [A] (verified)

Time = 3.64 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

method	result	size
parallelrisch	$x+{\mathrm e}^{\frac{1}{x \left(3 \ln \left(x^{4}-12 x^{3}+54 x^{2}-108 x +81\right)-4 x +13\right)}}$	36
risch	$x+{\mathrm e}^{-\frac{1}{x \left(-3 \ln \left(x^{4}-12 x^{3}+54 x^{2}-108 x +81\right)+4 x -13\right)}}$	37

input
```
int((((-3*x+9)*ln(x^4-12*x^3+54*x^2-108*x+81)+8*x^2-49*x+39)*exp(1/(3*x*ln
(x^4-12*x^3+54*x^2-108*x+81)-4*x^2+13*x))+(9*x^3-27*x^2)*ln(x^4-12*x^3+54*
x^2-108*x+81)^2+(-24*x^4+150*x^3-234*x^2)*ln(x^4-12*x^3+54*x^2-108*x+81)+1
6*x^5-152*x^4+481*x^3-507*x^2)/((9*x^3-27*x^2)*ln(x^4-12*x^3+54*x^2-108*x+
81)^2+(-24*x^4+150*x^3-234*x^2)*ln(x^4-12*x^3+54*x^2-108*x+81)+16*x^5-152*
x^4+481*x^3-507*x^2),x,method=_RETURNVERBOSE)
```

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$$\int \frac{-507x^2+481x^3-152x^4+16x^5+\left(-234x^2+150x^3-24x^4\right)\log\left(81-108x+54x^2-12x^3+x^4\right)+\left(-27x^2+9x^3\right)\log^2\left(81-108x+54x^2-12x^3+x^4\right)+e^{\frac{1}{13x \cdots}}}{-507x^2+481x^3-152x^4+16x^5+\left(-234x^2+150x^3-24x^4\right)\log\left(81-108x+54x^2-12x^3+x^4\right)+\left(-2 \cdots\right.}$$

output
```
x+exp(1/x/(3*ln(x^4-12*x^3+54*x^2-108*x+81)-4*x+13))
```

3.1263.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.52

$$\int \frac{-507x^2 + 481x^3 - 152x^4 + 16x^5 + (-234x^2 + 150x^3 - 24x^4)\log(81 - 108x + 54x^2 - 12x^3 + x^4) + (-2}{-507x^2 + 481x^3 - 152x^4 + 16x^5 + (-234x^2 + 150x^3 -}$$

$$= x + e^{\left(-\frac{1}{4x^2 - 3x\log\left(x^4 - 12x^3 + 54x^2 - 108x + 81\right) - 13x}\right)}$$

input
```
integrate((((-3*x+9)*log(x^4-12*x^3+54*x^2-108*x+81)+8*x^2-49*x+39)*exp(1/
(3*x*log(x^4-12*x^3+54*x^2-108*x+81)-4*x^2+13*x))+(9*x^3-27*x^2)*log(x^4-1
2*x^3+54*x^2-108*x+81)^2+(-24*x^4+150*x^3-234*x^2)*log(x^4-12*x^3+54*x^2-1
08*x+81)+16*x^5-152*x^4+481*x^3-507*x^2)/((9*x^3-27*x^2)*log(x^4-12*x^3+54
*x^2-108*x+81)^2+(-24*x^4+150*x^3-234*x^2)*log(x^4-12*x^3+54*x^2-108*x+81)
+16*x^5-152*x^4+481*x^3-507*x^2),x, algorithm=\
```

output
```
x + e^(-1/(4*x^2 - 3*x*log(x^4 - 12*x^3 + 54*x^2 - 108*x + 81) - 13*x))
```

3.1263.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{-507x^2 + 481x^3 - 152x^4 + 16x^5 + (-234x^2 + 150x^3 - 24x^4)\log(81 - 108x + 54x^2 - 12x^3 + x^4) + (-2}{-507x^2 + 481x^3 - 152x^4 + 16x^5 + (-234x^2 + 150x^3 -}$$

= Exception raised: TypeError

input
```
integrate((((-3*x+9)*ln(x**4-12*x**3+54*x**2-108*x+81)+8*x**2-49*x+39)*exp
(1/(3*x*ln(x**4-12*x**3+54*x**2-108*x+81)-4*x**2+13*x))+(9*x**3-27*x**2)*l
n(x**4-12*x**3+54*x**2-108*x+81)**2+(-24*x**4+150*x**3-234*x**2)*ln(x**4-1
2*x**3+54*x**2-108*x+81)+16*x**5-152*x**4+481*x**3-507*x**2)/((9*x**3-27*x
**2)*ln(x**4-12*x**3+54*x**2-108*x+81)**2+(-24*x**4+150*x**3-234*x**2)*ln(
x**4-12*x**3+54*x**2-108*x+81)+16*x**5-152*x**4+481*x**3-507*x**2),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```


$$\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-27x^2+9x^3)\log^2(81-108x+54x^2-12x^3+x^4)+e^{\overline{13x}}}{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-2}$$

3.1263.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(23) = 46.

Time = 0.25 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

$$\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-2}{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-}$$
$$= x+e^{\left(-\frac{4}{4\,x(12\,\log(x-3)+13)-144\,\log(x-3)^2-312\,\log(x-3)-169}+\frac{1}{x(12\,\log(x-3)+13)}\right)}$$

input
```
integrate((((-3*x+9)*log(x^4-12*x^3+54*x^2-108*x+81)+8*x^2-49*x+39)*exp(1/
(3*x*log(x^4-12*x^3+54*x^2-108*x+81)-4*x^2+13*x))+(9*x^3-27*x^2)*log(x^4-1
2*x^3+54*x^2-108*x+81)^2+(-24*x^4+150*x^3-234*x^2)*log(x^4-12*x^3+54*x^2-1
08*x+81)+16*x^5-152*x^4+481*x^3-507*x^2)/((9*x^3-27*x^2)*log(x^4-12*x^3+54
*x^2-108*x+81)^2+(-24*x^4+150*x^3-234*x^2)*log(x^4-12*x^3+54*x^2-108*x+81)
+16*x^5-152*x^4+481*x^3-507*x^2),x, algorithm=\
```

output
```
x + e^(-4/(4*x*(12*log(x - 3) + 13) - 144*log(x - 3)^2 - 312*log(x - 3) -
169) + 1/(x*(12*log(x - 3) + 13)))
```

3.1263.8 Giac [A] (verification not implemented)

Time = 2.41 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.52

$$\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-2}{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-}$$
$$= x+e^{\left(-\frac{1}{4\,x^2-3\,x\log\left(x^4-12\,x^3+54\,x^2-108\,x+81\right)-13\,x}\right)}$$

input
```
integrate((((-3*x+9)*log(x^4-12*x^3+54*x^2-108*x+81)+8*x^2-49*x+39)*exp(1/
(3*x*log(x^4-12*x^3+54*x^2-108*x+81)-4*x^2+13*x))+(9*x^3-27*x^2)*log(x^4-1
2*x^3+54*x^2-108*x+81)^2+(-24*x^4+150*x^3-234*x^2)*log(x^4-12*x^3+54*x^2-1
08*x+81)+16*x^5-152*x^4+481*x^3-507*x^2)/((9*x^3-27*x^2)*log(x^4-12*x^3+54
*x^2-108*x+81)^2+(-24*x^4+150*x^3-234*x^2)*log(x^4-12*x^3+54*x^2-108*x+81)
+16*x^5-152*x^4+481*x^3-507*x^2),x, algorithm=\
```

output
```
x + e^(-1/(4*x^2 - 3*x*log(x^4 - 12*x^3 + 54*x^2 - 108*x + 81) - 13*x))
```

3.1263.

$$\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-27x^2+9x^3)\log^2(81-108x+54x^2-12x^3+x^4)+e^{\frac{1}{13x}}}{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-2}$$

3.1263.9 Mupad [B] (verification not implemented)

Time = 14.24 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \frac{-507x^2 + 481x^3 - 152x^4 + 16x^5 + (-234x^2 + 150x^3 - 24x^4)\log(81 - 108x + 54x^2 - 12x^3 + x^4) + (-2}{-507x^2 + 481x^3 - 152x^4 + 16x^5 + (-234x^2 + 150x^3 -}$$
$$= x + e^{\frac{1}{13\,x+3\,x\,\ln\left(x^4-12\,x^3+54\,x^2-108\,x+81\right)-4\,x^2}}$$

input
```
int((exp(1/(13*x + 3*x*log(54*x^2 - 108*x - 12*x^3 + x^4 + 81) - 4*x^2))*(
49*x + log(54*x^2 - 108*x - 12*x^3 + x^4 + 81)*(3*x - 9) - 8*x^2 - 39) + l
og(54*x^2 - 108*x - 12*x^3 + x^4 + 81)*(234*x^2 - 150*x^3 + 24*x^4) + log(
54*x^2 - 108*x - 12*x^3 + x^4 + 81)^2*(27*x^2 - 9*x^3) + 507*x^2 - 481*x^3
 + 152*x^4 - 16*x^5)/(log(54*x^2 - 108*x - 12*x^3 + x^4 + 81)*(234*x^2 - 1
50*x^3 + 24*x^4) + log(54*x^2 - 108*x - 12*x^3 + x^4 + 81)^2*(27*x^2 - 9*x
^3) + 507*x^2 - 481*x^3 + 152*x^4 - 16*x^5),x)
```

output
```
x + exp(1/(13*x + 3*x*log(54*x^2 - 108*x - 12*x^3 + x^4 + 81) - 4*x^2))
```

3.1263.

$$\int \frac{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-27x^2+9x^3)\log^2(81-108x+54x^2-12x^3+x^4)+e^{\frac{13x}{}}}{-507x^2+481x^3-152x^4+16x^5+(-234x^2+150x^3-24x^4)\log(81-108x+54x^2-12x^3+x^4)+(-2}$$

3.1264 $\int \frac{9x^2+x^2\log(5)+(90x+18x^2+2x^2\log(5))\log\left(\frac{-45-9x-x\log(5)}{\log(5)}\right)}{45+9x+x\log(5)}\,dx$

3.1264.1 Optimal result

Integrand size = 57, antiderivative size = 20

$$\int \frac{9x^2+x^2\log(5)+(90x+18x^2+2x^2\log(5))\log\left(\frac{-45-9x-x\log(5)}{\log(5)}\right)}{45+9x+x\log(5)}\,dx = x^2\log\left(-x+\frac{9(-5-x)}{\log(5)}\right)$$

output
```
x^2*ln(9/ln(5)*(-x-5)-x)
```

3.1264.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{9x^2+x^2\log(5)+(90x+18x^2+2x^2\log(5))\log\left(\frac{-45-9x-x\log(5)}{\log(5)}\right)}{45+9x+x\log(5)}\,dx = x^2\log\left(-\frac{45+x(9+\log(5))}{\log(5)}\right)$$

input
```
Integrate[(9*x^2 + x^2*Log[5] + (90*x + 18*x^2 + 2*x^2*Log[5])*Log[(-45 - 
9*x - x*Log[5])/Log[5]])/(45 + 9*x + x*Log[5]),x]
```

output
```
x^2*Log[-((45 + x*(9 + Log[5]))/Log[5])]
```

3.1264.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.070, Rules used = {6, 6, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{9x^2+x^2\log(5)+\left(18x^2+2x^2\log(5)+90x\right)\log\left(\frac{-9x+x(-\log(5))-45}{\log(5)}\right)}{9x+x\log(5)+45}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{9x^2+x^2\log(5)+\left(18x^2+2x^2\log(5)+90x\right)\log\left(\frac{-9x+x(-\log(5))-45}{\log(5)}\right)}{x(9+\log(5))+45}dx$$

$$\Big\downarrow \ 6$$

$$\int \frac{x^2(9+\log(5))+\left(18x^2+2x^2\log(5)+90x\right)\log\left(\frac{-9x+x(-\log(5))-45}{\log(5)}\right)}{x(9+\log(5))+45}dx$$

$$\Big\downarrow \ 7293$$

$$\int \left(\frac{x^2(9+\log(5))}{x(9+\log(5))+45}+2x\log\left(-\frac{x(9+\log(5))}{\log(5)}-\frac{45}{\log(5)}\right)\right)dx$$

$$\Big\downarrow \ 2009$$

$$x^2\log\left(-\frac{x(9+\log(5))}{\log(5)}-\frac{45}{\log(5)}\right)$$

input
```
Int[(9*x^2 + x^2*Log[5] + (90*x + 18*x^2 + 2*x^2*Log[5])*Log[(-45 - 9*x -
x*Log[5])/Log[5]])/(45 + 9*x + x*Log[5]),x]
```

output
```
x^2*Log[-45/Log[5] - (x*(9 + Log[5]))/Log[5]]
```

3.1264.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1264.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

method	result
norman	$x^2 \ln\left(\frac{-x\ln(5)-9x-45}{\ln(5)}\right)$
risch	$x^2 \ln\left(\frac{-x\ln(5)-9x-45}{\ln(5)}\right)$
parallelrisch	$\ln\left(-\frac{x\ln(5)+9x+45}{\ln(5)}\right) x^2$
parts	$(\ln(5)+9)\left(\frac{\frac{x^2\ln(5)}{2}+\frac{9x^2}{2}-45x}{(\ln(5)+9)^2}+\frac{2025\ln(x\ln(5)+9x+45)}{(\ln(5)+9)^3}\right)+\frac{2\ln(5)^2\left(\frac{\left(\frac{(-\ln(5)-9)x}{\ln(5)}-\frac{45}{\ln(5)}\right)^2\ln\left(\frac{(-\ln(5)-}{\ln(5)}\right.}{2}\right.}{}$
derivativedivides	$\frac{\ln(5)\left(-\frac{2\ln(5)\left(\frac{\left(\frac{(-\ln(5)-9)x}{\ln(5)}-\frac{45}{\ln(5)}\right)^2\ln\left(\frac{(-\ln(5)-9)x}{\ln(5)}-\frac{45}{\ln(5)}\right)}{2}-\frac{\left(\frac{(-\ln(5)-9)x}{\ln(5)}-\frac{45}{\ln(5)}\right)^2}{4}\right)}{\ln(5)+9}-\frac{90\left(\left(\frac{(-\ln(5)-9)x}{\ln(5)}-\frac{45}{\ln(5)}\right)\right.}{}\right.}{}$
default	$\frac{\ln(5)\left(-\frac{2\ln(5)\left(\frac{\left(\frac{(-\ln(5)-9)x}{\ln(5)}-\frac{45}{\ln(5)}\right)^2\ln\left(\frac{(-\ln(5)-9)x}{\ln(5)}-\frac{45}{\ln(5)}\right)}{2}-\frac{\left(\frac{(-\ln(5)-9)x}{\ln(5)}-\frac{45}{\ln(5)}\right)^2}{4}\right)}{\ln(5)+9}-\frac{90\left(\left(\frac{(-\ln(5)-9)x}{\ln(5)}-\frac{45}{\ln(5)}\right)\right.}{}\right.}{}$

input
```
int(((2*x^2*ln(5)+18*x^2+90*x)*ln((-x*ln(5)-9*x-45)/ln(5))+x^2*ln(5)+9*x^2
)/(x*ln(5)+9*x+45),x,method=_RETURNVERBOSE)
```

output
```
x^2*ln((-x*ln(5)-9*x-45)/ln(5))
```

3.1264.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{9x^2+x^2\log(5)+(90x+18x^2+2x^2\log(5))\log\left(\frac{-45-9x-x\log(5)}{\log(5)}\right)}{45+9x+x\log(5)}\,dx = x^2\log\left(-\frac{x\log(5)+9\,x+45}{\log(5)}\right)$$

input
```
integrate(((2*x^2*log(5)+18*x^2+90*x)*log((-x*log(5)-9*x-45)/log(5))+x^2*l
og(5)+9*x^2)/(x*log(5)+9*x+45),x, algorithm=\
```

output
```
x^2*log(-(x*log(5) + 9*x + 45)/log(5))
```

3.1264.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{9x^2+x^2\log(5)+(90x+18x^2+2x^2\log(5))\log\left(\frac{-45-9x-x\log(5)}{\log(5)}\right)}{45+9x+x\log(5)}\,dx = x^2\log\left(\frac{-9x-x\log(5)-45}{\log(5)}\right)$$

input
```
integrate(((2*x**2*ln(5)+18*x**2+90*x)*ln((-x*ln(5)-9*x-45)/ln(5))+x**2*ln
(5)+9*x**2)/(x*ln(5)+9*x+45),x)
```

output
```
x**2*log((-9*x - x*log(5) - 45)/log(5))
```

3.1264.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 577 vs. $2(18) = 36$.

Time = 0.29 (sec) , antiderivative size = 577, normalized size of antiderivative = 28.85

$$\int \frac{9x^2 + x^2\log(5) + (90x + 18x^2 + 2x^2\log(5))\log\left(\frac{-45-9x-x\log(5)}{\log(5)}\right)}{45 + 9x + x\log(5)}\,dx = \text{Too large to display}$$

input
```
integrate(((2*x^2*log(5)+18*x^2+90*x)*log((-x*log(5)-9*x-45)/log(5))+x^2*l
og(5)+9*x^2)/(x*log(5)+9*x+45),x, algorithm=\
```

output
```
((x^2*(log(5) + 9) - 90*x)/(log(5)^2 + 18*log(5) + 81) + 4050*log(x*(log(5
) + 9) + 45)/(log(5)^3 + 27*log(5)^2 + 243*log(5) + 729))*log(5)*log(-x -
9*x/log(5) - 45/log(5)) + 1/2*((x^2*(log(5) + 9) - 90*x)/(log(5)^2 + 18*lo
g(5) + 81) + 4050*log(x*(log(5) + 9) + 45)/(log(5)^3 + 27*log(5)^2 + 243*l
og(5) + 729))*log(5) - 1/2*((log(5)^3 + 18*log(5)^2 + 81*log(5))*x^2 + 405
0*log(5)*log(x*(log(5) + 9) + 45)^2 - 270*(log(5)^2 + 9*log(5))*x + 12150*
log(5)*log(x*(log(5) + 9) + 45))*(9/log(5) + 1)*log(5)/(log(5)^4 + 36*log(
5)^3 + 486*log(5)^2 + 2916*log(5) + 6561) + 9*((x^2*(log(5) + 9) - 90*x)/(
log(5)^2 + 18*log(5) + 81) + 4050*log(x*(log(5) + 9) + 45)/(log(5)^3 + 27*
log(5)^2 + 243*log(5) + 729))*log(-x - 9*x/log(5) - 45/log(5)) + 90*(x/(lo
g(5) + 9) - 45*log(x*(log(5) + 9) + 45)/(log(5)^2 + 18*log(5) + 81))*log(-
x - 9*x/log(5) - 45/log(5)) - 9/2*((log(5)^3 + 18*log(5)^2 + 81*log(5))*x^
2 + 4050*log(5)*log(x*(log(5) + 9) + 45)^2 - 270*(log(5)^2 + 9*log(5))*x +
 12150*log(5)*log(x*(log(5) + 9) + 45))*(9/log(5) + 1)/(log(5)^4 + 36*log(
5)^3 + 486*log(5)^2 + 2916*log(5) + 6561) + 45*(45*log(5)*log(x*(log(5) +
9) + 45)^2 - 2*(log(5)^2 + 9*log(5))*x + 90*log(5)*log(x*(log(5) + 9) + 45
))*(9/log(5) + 1)/(log(5)^3 + 27*log(5)^2 + 243*log(5) + 729) + 9/2*(x^2*(
log(5) + 9) - 90*x)/(log(5)^2 + 18*log(5) + 81) + 18225*log(x*(log(5) + 9)
 + 45)/(log(5)^3 + 27*log(5)^2 + 243*log(5) + 729)
```

3.1264.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{9x^2 + x^2\log(5) + (90x + 18x^2 + 2x^2\log(5))\log\left(\frac{-45-9x-x\log(5)}{\log(5)}\right)}{45 + 9x + x\log(5)}\,dx$$
$$= x^2\log\left(-x\log(5) - 9\,x - 45\right) - x^2\log\left(\log(5)\right)$$

input
```
integrate(((2*x^2*log(5)+18*x^2+90*x)*log((-x*log(5)-9*x-45)/log(5))+x^2*l
og(5)+9*x^2)/(x*log(5)+9*x+45),x, algorithm=\
```

output
```
x^2*log(-x*log(5) - 9*x - 45) - x^2*log(log(5))
```

3.1264.9 Mupad [B] (verification not implemented)

Time = 14.71 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{9x^2 + x^2 \log(5) + (90x + 18x^2 + 2x^2 \log(5)) \log\left(\frac{-45-9x-x\log(5)}{\log(5)}\right)}{45 + 9x + x\log(5)} \, dx$$
$$= -x^2 \left(\ln\left(\ln\left(5\right)\right) - \ln\left(-9\,x - x\,\ln\left(5\right) - 45\right)\right)$$

input
```
int((log(-(9*x + x*log(5) + 45)/log(5))*(90*x + 2*x^2*log(5) + 18*x^2) + x
^2*log(5) + 9*x^2)/(9*x + x*log(5) + 45),x)
```

output
```
-x^2*(log(log(5)) - log(- 9*x - x*log(5) - 45))
```

3.1265 $\int \frac{e^{25/x}(-25-x)-x^2+e^{50/x}(x+8x^2)+e^{25/x}(-2x^2-16x^3)\log(x\log(3)) ...}{2e^{50/x}x-4e^{25/x}x^2\log(x\log(3))+2x^3\log^2(x \log ...}$

3.1265.1 Optimal result

Integrand size = 118, antiderivative size = 31

$$\int \frac{e^{25/x}(-25-x)-x^2+e^{50/x}(x+8x^2)+e^{25/x}(-2x^2-16x^3)\log(x\log(3))+(x^3+8x^4)\log^2(x\log(3))}{2e^{50/x}x-4e^{25/x}x^2\log(x\log(3))+2x^3\log^2(x\log(3))}\,dx$$

output
```
1/2*x+2*x^2+1/2/(ln(x*ln(3))-exp(25/x)/x)
```

3.1265.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.90

$$\int \frac{e^{25/x}(-25-x)-x^2+e^{50/x}(x+8x^2)+e^{25/x}(-2x^2-16x^3)\log(x\log(3))+(x^3+8x^4)\log^2(x\log(3))}{2e^{50/x}x-4e^{25/x}x^2\log(x\log(3))+2x^3\log^2(x\log(3))}\,dx$$
$$-\frac{1}{2}x\left(-1-4x+\frac{1}{e^{25/x}-x\log(x\log(3))}\right)$$

input
```
Integrate[(E^(25/x)*(-25 - x) - x^2 + E^(50/x)*(x + 8*x^2) + E^(25/x)*(-2*
x^2 - 16*x^3)*Log[x*Log[3]] + (x^3 + 8*x^4)*Log[x*Log[3]]^2)/(2*E^(50/x)*x
 - 4*E^(25/x)*x^2*Log[x*Log[3]] + 2*x^3*Log[x*Log[3]]^2),x]
```

output
```
-1/2*(x*(-1 - 4*x + (E^(25/x) - x*Log[x*Log[3]])^(-1)))
```

3.1265.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2+e^{50/x}(8x^2+x)+(8x^4+x^3)\log^2(x\log(3))+e^{25/x}(-16x^3-2x^2)\log(x\log(3))+e^{25/x}(-x-25)}{2x^3\log^2(x\log(3))-4e^{25/x}x^2\log(x\log(3))+2e^{50/x}x}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{-x^2+e^{50/x}(8x^2+x)+(8x^4+x^3)\log^2(x\log(3))+e^{25/x}(-16x^3-2x^2)\log(x\log(3))+e^{25/x}(-x-25)}{2x\left(e^{25/x}-x\log(x\log(3))\right)^2}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}\int -\frac{x^2-(8x^4+x^3)\log^2(x\log(3))+e^{25/x}(x+25)-e^{50/x}(8x^2+x)+2e^{25/x}(8x^3+x^2)\log(x\log(3))}{x\left(e^{25/x}-x\log(x\log(3))\right)^2}dx$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{1}{2}\int \frac{x^2-(8x^4+x^3)\log^2(x\log(3))+e^{25/x}(x+25)-e^{50/x}(8x^2+x)+2e^{25/x}(8x^3+x^2)\log(x\log(3))}{x\left(e^{25/x}-x\log(x\log(3))\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{1}{2}\int \left(-8x+\frac{\log(x\log(3))x+x+25\log(x\log(3))}{\left(e^{25/x}-x\log(x\log(3))\right)^2}-1-\frac{x+25}{\left(x\log(x\log(3))-e^{25/x}\right)x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{2}\left(-\int \frac{1}{e^{25/x}-x\log(x\log(3))}dx-\int \frac{x}{\left(x\log(x\log(3))-e^{25/x}\right)^2}dx-25\int \frac{\log(x\log(3))}{\left(x\log(x\log(3))-e^{25/x}\right)^2}dx-\int \frac{}{(x}\right.$$

input
```
Int[(E^(25/x)*(-25 - x) - x^2 + E^(50/x)*(x + 8*x^2) + E^(25/x)*(-2*x^2 -
16*x^3)*Log[x*Log[3]] + (x^3 + 8*x^4)*Log[x*Log[3]]^2)/(2*E^(50/x)*x - 4*E
^(25/x)*x^2*Log[x*Log[3]] + 2*x^3*Log[x*Log[3]]^2),x]
```

output
```
$Aborted
```

3.1265.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1265.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

method	result	size
risch	$2x^{2}+\frac{x}{2}+\frac{x}{2\ln\left(x\ln\left(3\right)\right)x-2\,{\mathrm e}^{\frac{25}{x}}}$	31
parallelrisch	$-\frac{-4x^{3}\ln\left(x\ln\left(3\right)\right)+4x^{2}{\mathrm e}^{\frac{25}{x}}-x^{2}\ln\left(x\ln\left(3\right)\right)+x\,{\mathrm e}^{\frac{25}{x}}-x}{2\left(\ln\left(x\ln\left(3\right)\right)x-{\mathrm e}^{\frac{25}{x}}\right)}$	64

input
```
int(((8*x^4+x^3)*ln(x*ln(3))^2+(-16*x^3-2*x^2)*exp(25/x)*ln(x*ln(3))+(8*x^
2+x)*exp(25/x)^2+(-x-25)*exp(25/x)-x^2)/(2*x^3*ln(x*ln(3))^2-4*x^2*exp(25/
x)*ln(x*ln(3))+2*x*exp(25/x)^2),x,method=_RETURNVERBOSE)
```

output
```
2*x^2+1/2*x+1/2*x/(ln(x*ln(3))*x-exp(25/x))
```

3.1265. $\int \frac{e^{25/x}(-25-x)-x^2+e^{50/x}(x+8x^2)+e^{25/x}(-2x^2-16x^3)\log(x\log(3))+(x^3+8x^4)\log^2(x\log(3))}{2e^{50/x}x-4e^{25/x}x^2\log(x\log(3))+2x^3\log^2(x\log(3))}\,dx$

3.1265.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.74

$$\int \frac{e^{25/x}(-25-x)-x^2+e^{50/x}(x+8x^2)+e^{25/x}(-2x^2-16x^3)\log(x\log(3))+(x^3+8x^4)\log^2(x\log(3))}{2e^{50/x}x-4e^{25/x}x^2\log(x\log(3))+2x^3\log^2(x\log(3))}\,dx = -\frac{(4x^2+x)e^{\frac{25}{x}}-(4x^3+x^2)\log(x\log(3))-x}{2\left(x\log(x\log(3))-e^{\frac{25}{x}}\right)}$$

input
```
integrate(((8*x^4+x^3)*log(x*log(3))^2+(-16*x^3-2*x^2)*exp(25/x)*log(x*log
(3))+(8*x^2+x)*exp(25/x)^2+(-x-25)*exp(25/x)-x^2)/(2*x^3*log(x*log(3))^2-4
*x^2*exp(25/x)*log(x*log(3))+2*x*exp(25/x)^2),x, algorithm=\
```

output
```
-1/2*((4*x^2 + x)*e^(25/x) - (4*x^3 + x^2)*log(x*log(3)) - x)/(x*log(x*log
(3)) - e^(25/x))
```

3.1265.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.84

$$\int \frac{e^{25/x}(-25-x)-x^2+e^{50/x}(x+8x^2)+e^{25/x}(-2x^2-16x^3)\log(x\log(3))+(x^3+8x^4)\log^2(x\log(3))}{2e^{50/x}x-4e^{25/x}x^2\log(x\log(3))+2x^3\log^2(x\log(3))}\,dx = +\frac{x}{2}-\frac{x}{-2x\log(x\log(3))+2e^{\frac{25}{x}}}$$

input
```
integrate(((8*x**4+x**3)*ln(x*ln(3))**2+(-16*x**3-2*x**2)*exp(25/x)*ln(x*l
n(3))+(8*x**2+x)*exp(25/x)**2+(-x-25)*exp(25/x)-x**2)/(2*x**3*ln(x*ln(3))*
*2-4*x**2*exp(25/x)*ln(x*ln(3))+2*x*exp(25/x)**2),x)
```

output
```
2*x**2 + x/2 - x/(-2*x*log(x*log(3)) + 2*exp(25/x))
```

3.1265.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(31) = 62$.

Time = 0.32 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.13

$$\int \frac{e^{25/x}(-25-x)-x^2+e^{50/x}(x+8x^2)+e^{25/x}(-2x^2-16x^3)\log(x\log(3))+(x^3+8x^4)\log^2(x\log(3))}{2e^{50/x}x-4e^{25/x}x^2\log(x\log(3))+2x^3\log^2(x\log(3))}\,dx$$

input
```
integrate(((8*x^4+x^3)*log(x*log(3))^2+(-16*x^3-2*x^2)*exp(25/x)*log(x*log
(3))+(8*x^2+x)*exp(25/x)^2+(-x-25)*exp(25/x)-x^2)/(2*x^3*log(x*log(3))^2-4
*x^2*exp(25/x)*log(x*log(3))+2*x*exp(25/x)^2),x, algorithm=\
```

output
```
1/2*(4*x^3*log(log(3)) + x^2*log(log(3)) - (4*x^2 + x)*e^(25/x) + (4*x^3 +
 x^2)*log(x) + x)/(x*log(x) + x*log(log(3)) - e^(25/x))
```

3.1265.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(31) = 62$.

Time = 0.30 (sec) , antiderivative size = 72, normalized size of antiderivative = 2.32

$$\int \frac{e^{25/x}(-25-x)-x^2+e^{50/x}(x+8x^2)+e^{25/x}(-2x^2-16x^3)\log(x\log(3))+(x^3+8x^4)\log^2(x\log(3))}{2e^{50/x}x-4e^{25/x}x^2\log(x\log(3))+2x^3\log^2(x\log(3))}\,dx$$

input
```
integrate(((8*x^4+x^3)*log(x*log(3))^2+(-16*x^3-2*x^2)*exp(25/x)*log(x*log
(3))+(8*x^2+x)*exp(25/x)^2+(-x-25)*exp(25/x)-x^2)/(2*x^3*log(x*log(3))^2-4
*x^2*exp(25/x)*log(x*log(3))+2*x*exp(25/x)^2),x, algorithm=\
```

output
```
1/2*(4*x^3*log(x) + 4*x^3*log(log(3)) - 4*x^2*e^(25/x) + x^2*log(x) + x^2*
log(log(3)) - x*e^(25/x) + x)/(x*log(x) + x*log(log(3)) - e^(25/x))
```

3.1265.9 Mupad [B] (verification not implemented)

Time = 15.83 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.87

$$\int \frac{e^{25/x}(-25-x)-x^2+e^{50/x}(x+8x^2)+e^{25/x}(-2x^2-16x^3)\log(x\log(3))+(x^3+8x^4)\log^2(x\log(3))}{2e^{50/x}x-4e^{25/x}x^2\log(x\log(3))+2x^3\log^2(x\log(3))}\,dx = -\frac{x\left(x\,\ln\left(x\,\ln\left(3\right)\right)-4\,x\,\mathrm{e}^{25/x}-\mathrm{e}^{25/x}+4\,x^2\,\ln\left(x\,\ln\left(3\right)\right)+1\right)}{2\,\left(\mathrm{e}^{25/x}-x\,\ln\left(x\,\ln\left(3\right)\right)\right)}$$

input
```
int(-(exp(25/x)*(x + 25) - exp(50/x)*(x + 8*x^2) + x^2 - log(x*log(3))^2*(
x^3 + 8*x^4) + exp(25/x)*log(x*log(3))*(2*x^2 + 16*x^3))/(2*x^3*log(x*log(
3))^2 + 2*x*exp(50/x) - 4*x^2*exp(25/x)*log(x*log(3))),x)
```

output
```
-(x*(x*log(x*log(3)) - 4*x*exp(25/x) - exp(25/x) + 4*x^2*log(x*log(3)) + 1
))/(2*(exp(25/x) - x*log(x*log(3))))
```

3.1266 $\int \frac{16-5\log(4)+e^x(-4-4x+(1+x)\log(4))}{12+4e^2+16x+(-3-e^2-5x)\log(4)+e^x(-4x+x\log(4))}\,dx$

3.1266.1 Optimal result

Integrand size = 59, antiderivative size = 27

$$\int \frac{16-5\log(4)+e^x(-4-4x+(1+x)\log(4))}{12+4e^2+16x+(-3-e^2-5x)\log(4)+e^x(-4x+x\log(4))}\,dx = \log\left(3+e^2+x+(4-e^x)\,x-\frac{4x}{4-\log(4)}\right)$$

output
```
ln(exp(2)-4*x/(4-2*ln(2))+3+x+x*(-exp(x)+4))
```

3.1266.2 Mathematica [A] (verified)

Time = 5.05 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.48

$$\int \frac{16-5\log(4)+e^x(-4-4x+(1+x)\log(4))}{12+4e^2+16x+(-3-e^2-5x)\log(4)+e^x(-4x+x\log(4))}\,dx = \log\left(12+4e^2+16x-4e^xx-3\log(4)-e^2\log(4)-5x\log(4)+e^xx\log(4)\right)$$

input
```
Integrate[(16 - 5*Log[4] + E^x*(-4 - 4*x + (1 + x)*Log[4]))/(12 + 4*E^2 +
16*x + (-3 - E^2 - 5*x)*Log[4] + E^x*(-4*x + x*Log[4])),x]
```

output
```
Log[12 + 4*E^2 + 16*x - 4*E^x*x - 3*Log[4] - E^2*Log[4] - 5*x*Log[4] + E^x
*x*Log[4]]
```

3.1266.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(-4x+(x+1)\log(4)-4)+16-5\log(4)}{16x+(-5x-e^2-3)\log(4)+e^x(x\log(4)-4x)+4e^2+12}\,dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{e^x(-4x+(x+1)\log(4)-4)+16\left(1-\frac{5\log(2)}{8}\right)}{16x+(-5x-e^2-3)\log(4)+e^x(x\log(4)-4x)+12\left(1+\frac{e^2}{3}\right)}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{-(x^2(16-5\log(4)))-x(12+e^2(4-\log(4))-\log(64))-12+\log(64)-e^2(4-\log(4))}{x\left(-4e^xx\left(1-\frac{\log(2)}{2}\right)+16x\left(1-\frac{5\log(2)}{8}\right)+12\left(1+\frac{1}{12}\left(-e^2(\log(4)-4)-3\log(4)\right)\right)\right)}+\frac{x+1}{x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-(12+e^2(4-\log(4))-\log(64))\int \frac{1}{x\left(-4e^x\left(1-\frac{\log(2)}{2}\right)x+16\left(1-\frac{5\log(2)}{8}\right)x+12\left(1+\frac{1}{12}\left(-e^2(-4+\log(4))-\right.\right.\right.}$$

$$(16-5\log(4))\int \frac{x}{-4e^x\left(1-\frac{\log(2)}{2}\right)x+16\left(1-\frac{5\log(2)}{8}\right)x+12\left(1+\frac{1}{12}\left(-e^2(-4+\log(4))-3\log(4)\right)\right)}dx+$$

$$(12+e^2(4-\log(4))-\log(64))\int \frac{1}{4e^x\left(1-\frac{\log(2)}{2}\right)x-16\left(1-\frac{5\log(2)}{8}\right)x-12\left(1+\frac{1}{12}\left(-e^2(-4+\log(4))-\log(6\right.\right.}$$

$$x+\log(x)$$

input
```
Int[(16 - 5*Log[4] + E^x*(-4 - 4*x + (1 + x)*Log[4]))/(12 + 4*E^2 + 16*x +
 (-3 - E^2 - 5*x)*Log[4] + E^x*(-4*x + x*Log[4])),x]
```

output
```
$Aborted
```

3.1266.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1266.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

method	result	size
norman	$\ln\left(-x\ln\left(2\right)\mathrm{e}^{x}+\mathrm{e}^{2}\ln\left(2\right)+5x\ln\left(2\right)+2\,\mathrm{e}^{x}x-2\,\mathrm{e}^{2}+3\ln\left(2\right)-8x-6\right)$	37
risch	$\ln\left(x\right)+\ln\left(\mathrm{e}^{x}-\frac{\mathrm{e}^{2}\ln(2)+5x\ln(2)-2\,\mathrm{e}^{2}+3\ln(2)-8x-6}{x(\ln(2)-2)}\right)$	42
parallelrisch	$\ln\left(-\frac{-x\ln(2)\mathrm{e}^{x}+\mathrm{e}^{2}\ln(2)+5x\ln(2)+2\,\mathrm{e}^{x}x-2\,\mathrm{e}^{2}+3\ln(2)-8x-6}{\ln(2)-2}\right)$	45

input
```
int(((2*ln(2)*(1+x)-4*x-4)*exp(x)-10*ln(2)+16)/((2*x*ln(2)-4*x)*exp(x)+2*(
-exp(2)-5*x-3)*ln(2)+4*exp(2)+16*x+12),x,method=_RETURNVERBOSE)
```

output
```
ln(-x*ln(2)*exp(x)+exp(2)*ln(2)+5*x*ln(2)+2*exp(x)*x-2*exp(2)+3*ln(2)-8*x-
6)
```

3.1266.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44

$$\int \frac{16-5\log(4)+e^x(-4-4x+(1+x)\log(4))}{12+4e^2+16x+(-3-e^2-5x)\log(4)+e^x(-4x+x\log(4))}\,dx$$
$$=\log\left(x\right)+\log\left(\frac{(x\log\left(2\right)-2\,x)e^{x}-(5\,x+e^{2}+3)\log\left(2\right)+8\,x+2\,e^{2}+6}{x}\right)$$

input
```
integrate(((2*log(2)*(1+x)-4*x-4)*exp(x)-10*log(2)+16)/((2*x*log(2)-4*x)*e
xp(x)+2*(-exp(2)-5*x-3)*log(2)+4*exp(2)+16*x+12),x, algorithm=\
```

output
```
log(x) + log(((x*log(2) - 2*x)*e^x - (5*x + e^2 + 3)*log(2) + 8*x + 2*e^2
+ 6)/x)
```

3.1266.6 Sympy [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \frac{16-5\log(4)+e^x(-4-4x+(1+x)\log(4))}{12+4e^2+16x+(-3-e^2-5x)\log(4)+e^x(-4x+x\log(4))}\,dx$$
$$=\log(x)+\log\left(e^x+\frac{-5x\log(2)+8x-e^2\log(2)-3\log(2)+6+2e^2}{-2x+x\log(2)}\right)$$

input
```
integrate(((2*ln(2)*(1+x)-4*x-4)*exp(x)-10*ln(2)+16)/((2*x*ln(2)-4*x)*exp(
x)+2*(-exp(2)-5*x-3)*ln(2)+4*exp(2)+16*x+12),x)
```

output
```
log(x) + log(exp(x) + (-5*x*log(2) + 8*x - exp(2)*log(2) - 3*log(2) + 6 +
2*exp(2))/(-2*x + x*log(2)))
```

3.1266.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(22) = 44.

Time = 0.32 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.67

$$\int \frac{16-5\log(4)+e^x(-4-4x+(1+x)\log(4))}{12+4e^2+16x+(-3-e^2-5x)\log(4)+e^x(-4x+x\log(4))}\,dx$$
$$=\log(x)+\log\left(\frac{x(\log(2)-2)e^x-x(5\log(2)-8)-(\log(2)-2)e^2-3\log(2)+6}{x(\log(2)-2)}\right)$$

input
```
integrate(((2*log(2)*(1+x)-4*x-4)*exp(x)-10*log(2)+16)/((2*x*log(2)-4*x)*e
xp(x)+2*(-exp(2)-5*x-3)*log(2)+4*exp(2)+16*x+12),x, algorithm=\
```

output
```
log(x) + log((x*(log(2) - 2)*e^x - x*(5*log(2) - 8) - (log(2) - 2)*e^2 - 3
*log(2) + 6)/(x*(log(2) - 2)))
```

3.1266.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{16-5\log(4)+e^x(-4-4x+(1+x)\log(4))}{12+4e^2+16x+(-3-e^2-5x)\log(4)+e^x(-4x+x\log(4))}\,dx$$
$$=\log\left(xe^x\log(2)-2\,xe^x-5\,x\log(2)-e^2\log(2)+8\,x+2\,e^2-3\,\log(2)+6\right)$$

input
```
integrate(((2*log(2)*(1+x)-4*x-4)*exp(x)-10*log(2)+16)/((2*x*log(2)-4*x)*e
xp(x)+2*(-exp(2)-5*x-3)*log(2)+4*exp(2)+16*x+12),x, algorithm=\
```

output
```
log(x*e^x*log(2) - 2*x*e^x - 5*x*log(2) - e^2*log(2) + 8*x + 2*e^2 - 3*log
(2) + 6)
```

3.1266.9 Mupad [B] (verification not implemented)

Time = 16.01 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{16-5\log(4)+e^x(-4-4x+(1+x)\log(4))}{12+4e^2+16x+(-3-e^2-5x)\log(4)+e^x(-4x+x\log(4))}\,dx$$
$$=\ln\left(16\,x+4\,\mathrm{e}^2-2\,\ln(2)\,\left(5\,x+\mathrm{e}^2+3\right)-\mathrm{e}^x\,(4\,x-2\,x\,\ln(2))+12\right)$$

input
```
int(-(10*log(2) + exp(x)*(4*x - 2*log(2)*(x + 1) + 4) - 16)/(16*x + 4*exp(
2) - 2*log(2)*(5*x + exp(2) + 3) - exp(x)*(4*x - 2*x*log(2)) + 12),x)
```

output
```
log(16*x + 4*exp(2) - 2*log(2)*(5*x + exp(2) + 3) - exp(x)*(4*x - 2*x*log(
2)) + 12)
```

3.1267 $\int \frac{10x+2x^2+e^3(8x+4x^2+2x^3)+(10+2x+e^3(8+4x+2x^2))\log(4+x+e^3(4+x^2))}{4+x+e^3(4+x^2)}\,dx$

3.1267.1 Optimal result

Integrand size = 75, antiderivative size = 17

$$\int \frac{10x+2x^2+e^3(8x+4x^2+2x^3)+(10+2x+e^3(8+4x+2x^2))\log(4+x+e^3(4+x^2))}{4+x+e^3(4+x^2)}\,dx = \left(x+\log\left(4+x+e^3(4+x^2)\right)\right)^2$$

output
```
(x+ln((x^2+4)*exp(3)+4+x))^2
```

3.1267.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{10x+2x^2+e^3(8x+4x^2+2x^3)+(10+2x+e^3(8+4x+2x^2))\log(4+x+e^3(4+x^2))}{4+x+e^3(4+x^2)}\,dx = \left(x+\log\left(4+x+e^3(4+x^2)\right)\right)^2$$

input
```
Integrate[(10*x + 2*x^2 + E^3*(8*x + 4*x^2 + 2*x^3) + (10 + 2*x + E^3*(8 +
 4*x + 2*x^2))*Log[4 + x + E^3*(4 + x^2)])/(4 + x + E^3*(4 + x^2)),x]
```

output
```
(x + Log[4 + x + E^3*(4 + x^2)])^2
```

3.1267.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.040, Rules used = {7292, 27, 7237}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^2+\left(e^3\left(2x^2+4x+8\right)+2x+10\right)\log\left(e^3\left(x^2+4\right)+x+4\right)+e^3\left(2x^3+4x^2+8x\right)+10x}{e^3\left(x^2+4\right)+x+4}dx$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{2\left(e^3x^2+\left(1+2e^3\right)x+4e^3+5\right)\left(\log\left(e^3\left(x^2+4\right)+x+4\right)+x\right)}{e^3x^2+x+4\left(1+e^3\right)}dx$$

$$\Big\downarrow \text{27}$$

$$2\int \frac{\left(e^3x^2+\left(1+2e^3\right)x+4e^3+5\right)\left(x+\log\left(x+e^3\left(x^2+4\right)+4\right)\right)}{e^3x^2+x+4\left(1+e^3\right)}dx$$

$$\Big\downarrow \text{7237}$$

$$\left(\log\left(e^3\left(x^2+4\right)+x+4\right)+x\right)^2$$

input
```
Int[(10*x + 2*x^2 + E^3*(8*x + 4*x^2 + 2*x^3) + (10 + 2*x + E^3*(8 + 4*x +
 2*x^2))*Log[4 + x + E^3*(4 + x^2)])/(4 + x + E^3*(4 + x^2)),x]
```

output
```
(x + Log[4 + x + E^3*(4 + x^2)])^2
```

3.1267.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7237
```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1267.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 33 vs. 2(16) = 32.

Time = 0.51 (sec) , antiderivative size = 34, normalized size of antiderivative = 2.00

method	result
norman	$x^2+\ln\left(\left(x^2+4\right)\mathrm{e}^3+4+x\right)^2+2x\ln\left(\left(x^2+4\right)\mathrm{e}^3+4+x\right)$
risch	$x^2+\ln\left(\left(x^2+4\right)\mathrm{e}^3+4+x\right)^2+2x\ln\left(\left(x^2+4\right)\mathrm{e}^3+4+x\right)$
parallelrisch	$\frac{\left(-8+2x^2\mathrm{e}^3+4\,\mathrm{e}^3\ln\left(x^2\mathrm{e}^3+4\,\mathrm{e}^3+x+4\right)x+2\ln\left(x^2\mathrm{e}^3+4\,\mathrm{e}^3+x+4\right)^2\mathrm{e}^3-8\,\mathrm{e}^3\right)\mathrm{e}^{-3}}{2}$
default	$x^2+2\ln\left(x^2\mathrm{e}^3+4\,\mathrm{e}^3+x+4\right)x+2\left(\sum_{\_\alpha=\mathrm{RootOf}\left(\_Z^2\mathrm{e}^3+4\,\mathrm{e}^3+\_Z+4\right)}\left(\ln\left(x-\_\alpha\right)\ln\left(x^2\mathrm{e}^3+4\,\mathrm{e}^3\right.\right.\right.$
parts	$x^2+2\ln\left(x^2\mathrm{e}^3+4\,\mathrm{e}^3+x+4\right)x+2\left(\sum_{\_\alpha=\mathrm{RootOf}\left(\_Z^2\mathrm{e}^3+4\,\mathrm{e}^3+\_Z+4\right)}\left(\ln\left(x-\_\alpha\right)\ln\left(x^2\mathrm{e}^3+4\,\mathrm{e}^3\right.\right.\right.$

input
```
int((((2*x^2+4*x+8)*exp(3)+2*x+10)*ln((x^2+4)*exp(3)+4+x)+(2*x^3+4*x^2+8*x
)*exp(3)+2*x^2+10*x)/((x^2+4)*exp(3)+4+x),x,method=_RETURNVERBOSE)
```

output
```
x^2+ln((x^2+4)*exp(3)+4+x)^2+2*x*ln((x^2+4)*exp(3)+4+x)
```

3.1267.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 33 vs. 2(16) = 32.

Time = 0.25 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.94

$$\int\frac{10x+2x^2+e^3(8x+4x^2+2x^3)+(10+2x+e^3(8+4x+2x^2))\log\left(4+x+e^3(4+x^2)\right)}{4+x+e^3\left(4+x^2\right)}\,dx$$
$$=x^2+2\,x\log\left(\left(x^2+4\right)e^3+x+4\right)+\log\left(\left(x^2+4\right)e^3+x+4\right)^2$$

input
```
integrate((((2*x^2+4*x+8)*exp(3)+2*x+10)*log((x^2+4)*exp(3)+4+x)+(2*x^3+4*
x^2+8*x)*exp(3)+2*x^2+10*x)/((x^2+4)*exp(3)+4+x),x, algorithm=\
```

output
```
x^2 + 2*x*log((x^2 + 4)*e^3 + x + 4) + log((x^2 + 4)*e^3 + x + 4)^2
```

3.1267.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 34 vs. $2(15) = 30$.

Time = 0.12 (sec) , antiderivative size = 34, normalized size of antiderivative = 2.00

$$\int \frac{10x+2x^2+e^3(8x+4x^2+2x^3)+(10+2x+e^3(8+4x+2x^2))\log(4+x+e^3(4+x^2))}{4+x+e^3(4+x^2)}\,dx$$
$$= x^2+2x\log\left(x+\left(x^2+4\right)e^3+4\right)+\log\left(x+\left(x^2+4\right)e^3+4\right)^2$$

input
```
integrate(((((2*x**2+4*x+8)*exp(3)+2*x+10)*ln((x**2+4)*exp(3)+4+x)+(2*x**3+
4*x**2+8*x)*exp(3)+2*x**2+10*x)/((x**2+4)*exp(3)+4+x),x)
```

output
```
x**2 + 2*x*log(x + (x**2 + 4)*exp(3) + 4) + log(x + (x**2 + 4)*exp(3) + 4)
**2
```

3.1267.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 439 vs. $2(16) = 32$.

Time = 0.48 (sec) , antiderivative size = 439, normalized size of antiderivative = 25.82

$$\int \frac{10x+2x^2+e^3(8x+4x^2+2x^3)+(10+2x+e^3(8+4x+2x^2))\log(4+x+e^3(4+x^2))}{4+x+e^3(4+x^2)}\,dx$$
$$= 2\sqrt{16e^6+16e^3-1}\arctan\left(\frac{2xe^3+1}{\sqrt{16e^6+16e^3-1}}\right)e^{(-3)}$$
$$-\frac{2(8e^6+8e^3-1)\arctan\left(\frac{2xe^3+1}{\sqrt{16e^6+16e^3-1}}\right)e^{(-6)}}{\sqrt{16e^6+16e^3-1}}$$
$$-\left(\left(4e^6+4e^3-1\right)e^{(-9)}\log\left(x^2e^3+x+4e^3+4\right)-\frac{2(12e^6+12e^3-1)\arctan\left(\frac{2xe^3+1}{\sqrt{16e^6+16e^3-1}}\right)e^{(-9)}}{\sqrt{16e^6+16e^3-1}}-\right.$$
$$-2\left(\frac{2(8e^6+8e^3-1)\arctan\left(\frac{2xe^3+1}{\sqrt{16e^6+16e^3-1}}\right)e^{(-6)}}{\sqrt{16e^6+16e^3-1}}-2xe^{(-3)}+e^{(-6)}\log\left(x^2e^3+x+4e^3+4\right)\right)e^3$$
$$+4\left(e^{(-3)}\log\left(x^2e^3+x+4e^3+4\right)-\frac{2\arctan\left(\frac{2xe^3+1}{\sqrt{16e^6+16e^3-1}}\right)e^{(-3)}}{\sqrt{16e^6+16e^3-1}}\right)e^3$$
$$+\left(e^3\log\left(x^2e^3+x+4e^3+4\right)^2-4xe^3+\left(2xe^3+1\right)\log\left(x^2e^3+x+4e^3+4\right)\right)e^{(-3)}$$
$$+2xe^{(-3)}+5e^{(-3)}\log\left(x^2e^3+x+4e^3+4\right)$$
$$-e^{(-6)}\log\left(x^2e^3+x+4e^3+4\right)-\frac{10\arctan\left(\frac{2xe^3+1}{\sqrt{16e^6+16e^3-1}}\right)e^{(-3)}}{\sqrt{16e^6+16e^3-1}}$$

input
```
integrate((((2*x^2+4*x+8)*exp(3)+2*x+10)*log((x^2+4)*exp(3)+4+x)+(2*x^3+4*
x^2+8*x)*exp(3)+2*x^2+10*x)/((x^2+4)*exp(3)+4+x),x, algorithm=\
```

output
```
2*sqrt(16*e^6 + 16*e^3 - 1)*arctan((2*x*e^3 + 1)/sqrt(16*e^6 + 16*e^3 - 1)
)*e^(-3) - 2*(8*e^6 + 8*e^3 - 1)*arctan((2*x*e^3 + 1)/sqrt(16*e^6 + 16*e^3
 - 1))*e^(-6)/sqrt(16*e^6 + 16*e^3 - 1) - ((4*e^6 + 4*e^3 - 1)*e^(-9)*log(
x^2*e^3 + x + 4*e^3 + 4) - 2*(12*e^6 + 12*e^3 - 1)*arctan((2*x*e^3 + 1)/sq
rt(16*e^6 + 16*e^3 - 1))*e^(-9)/sqrt(16*e^6 + 16*e^3 - 1) - (x^2*e^3 - 2*x
)*e^(-6))*e^3 - 2*(2*(8*e^6 + 8*e^3 - 1)*arctan((2*x*e^3 + 1)/sqrt(16*e^6
+ 16*e^3 - 1))*e^(-6)/sqrt(16*e^6 + 16*e^3 - 1) - 2*x*e^(-3) + e^(-6)*log(
x^2*e^3 + x + 4*e^3 + 4))*e^3 + 4*(e^(-3)*log(x^2*e^3 + x + 4*e^3 + 4) - 2
*arctan((2*x*e^3 + 1)/sqrt(16*e^6 + 16*e^3 - 1))*e^(-3)/sqrt(16*e^6 + 16*e
^3 - 1))*e^3 + (e^3*log(x^2*e^3 + x + 4*e^3 + 4)^2 - 4*x*e^3 + (2*x*e^3 +
1)*log(x^2*e^3 + x + 4*e^3 + 4))*e^(-3) + 2*x*e^(-3) + 5*e^(-3)*log(x^2*e^
3 + x + 4*e^3 + 4) - e^(-6)*log(x^2*e^3 + x + 4*e^3 + 4) - 10*arctan((2*x*
e^3 + 1)/sqrt(16*e^6 + 16*e^3 - 1))*e^(-3)/sqrt(16*e^6 + 16*e^3 - 1)
```

3.1267.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 37 vs. $2(16) = 32$.

Time = 0.28 (sec) , antiderivative size = 37, normalized size of antiderivative = 2.18

$$\int \frac{10x + 2x^2 + e^3(8x + 4x^2 + 2x^3) + (10 + 2x + e^3(8 + 4x + 2x^2)) \log(4 + x + e^3(4 + x^2))}{4 + x + e^3(4 + x^2)} \, dx$$
$$= x^2 + 2x \log\left(x^2e^3 + x + 4e^3 + 4\right) + \log\left(x^2e^3 + x + 4e^3 + 4\right)^2$$

input
```
integrate((((2*x^2+4*x+8)*exp(3)+2*x+10)*log((x^2+4)*exp(3)+4+x)+(2*x^3+4*
x^2+8*x)*exp(3)+2*x^2+10*x)/((x^2+4)*exp(3)+4+x),x, algorithm=\
```

output
```
x^2 + 2*x*log(x^2*e^3 + x + 4*e^3 + 4) + log(x^2*e^3 + x + 4*e^3 + 4)^2
```

3.1267.9 Mupad [B] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.94

$$\int \frac{10x + 2x^2 + e^3(8x + 4x^2 + 2x^3) + (10 + 2x + e^3(8 + 4x + 2x^2)) \log (4 + x + e^3(4 + x^2))}{4 + x + e^3 (4 + x^2)} \, dx$$
$$= \left(x + \ln \left(x + \mathrm{e}^3 \left(x^2 + 4\right) + 4\right)\right)^2$$

input
```
int((10*x + log(x + exp(3)*(x^2 + 4) + 4)*(2*x + exp(3)*(4*x + 2*x^2 + 8)
+ 10) + exp(3)*(8*x + 4*x^2 + 2*x^3) + 2*x^2)/(x + exp(3)*(x^2 + 4) + 4),x
)
```

output
```
(x + log(x + exp(3)*(x^2 + 4) + 4))^2
```

3.1268 $\int \frac{18-x-x^2}{6x+x^2} \, dx$

3.1268.1 Optimal result

Integrand size = 20, antiderivative size = 15

$$\int \frac{18-x-x^2}{6x+x^2} \, dx = \log \left(e^{-x} x^3 (6+x)^2\right)$$

output
```
ln((6+x)^2*x^3/exp(x))
```

3.1268.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{18-x-x^2}{6x+x^2} \, dx = -x+3 \log (x)+2 \log (6+x)$$

input
```
Integrate[(18 - x - x^2)/(6*x + x^2),x]
```

output
```
-x + 3*Log[x] + 2*Log[6 + x]
```

3.1268.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2026, 1195, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-x^2-x+18}{x^2+6x} \, dx$$
$$\Big\downarrow \; 2026$$
$$\int \frac{-x^2-x+18}{x(x+6)}dx$$
$$\Big\downarrow \; 1195$$
$$\int \left(\frac{2}{x+6}+\frac{3}{x}-1\right)dx$$
$$\Big\downarrow \; 2009$$
$$-x+3\log(x)+2\log(x+6)$$

input
```
Int[(18 - x - x^2)/(6*x + x^2),x]
```

output
```
-x + 3*Log[x] + 2*Log[6 + x]
```

3.1268.3.1 Defintions of rubi rules used

rule 1195
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_.) + (b_.)*(x
_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(f +
 g*x)^n*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x
] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

3.1268.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result	size
default	$-x+3\ln\left(x\right)+2\ln\left(6+x\right)$	15
norman	$-x+3\ln\left(x\right)+2\ln\left(6+x\right)$	15
risch	$-x+3\ln\left(x\right)+2\ln\left(6+x\right)$	15
parallelrisch	$-x+3\ln\left(x\right)+2\ln\left(6+x\right)$	15
meijerg	$3\ln\left(x\right)-3\ln\left(2\right)-3\ln\left(3\right)+2\ln\left(1+\frac{x}{6}\right)-x$	25

input
```
int((-x^2-x+18)/(x^2+6*x),x,method=_RETURNVERBOSE)
```

output
```
-x+3*ln(x)+2*ln(6+x)
```

3.1268.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{18-x-x^2}{6x+x^2}\,dx = -x+2\,\log\left(x+6\right)+3\,\log\left(x\right)$$

input
```
integrate((-x^2-x+18)/(x^2+6*x),x, algorithm=\
```

output
```
-x + 2*log(x + 6) + 3*log(x)
```

3.1268.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \frac{18-x-x^2}{6x+x^2}\,dx = -x+3\log\left(x\right)+2\log\left(x+6\right)$$

input
```
integrate((-x**2-x+18)/(x**2+6*x),x)
```

output
```
-x + 3*log(x) + 2*log(x + 6)
```

3.1268.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{18-x-x^2}{6x+x^2}\,dx = -x+2\,\log\left(x+6\right)+3\,\log\left(x\right)$$

input
```
integrate((-x^2-x+18)/(x^2+6*x),x, algorithm=\
```

output
```
-x + 2*log(x + 6) + 3*log(x)
```

3.1268.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \frac{18-x-x^2}{6x+x^2}\,dx = -x+2\,\log\left(|x+6|\right)+3\,\log\left(|x|\right)$$

input
```
integrate((-x^2-x+18)/(x^2+6*x),x, algorithm=\
```

output
```
-x + 2*log(abs(x + 6)) + 3*log(abs(x))
```

3.1268.9 Mupad [B] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{18-x-x^2}{6x+x^2}\,dx = 2\,\ln\left(x+6\right)-x+3\,\ln\left(x\right)$$

input
```
int(-(x + x^2 - 18)/(6*x + x^2),x)
```

output
```
2*log(x + 6) - x + 3*log(x)
```

3.1269 $\int \frac{e^4(-3+2x+x^2+4\log(x)-\log^2(x))(-12-6x-4x^2-6x^3-4x^4+(6-6$

$3x-2x^2-x^3-4x\log(x)+x\log^2(x)$

3.1269.1 Optimal result

Integrand size = 88, antiderivative size = 25

$$\int \frac{e^4(-3+2x+x^2+4\log(x)-\log^2(x))\left(-12-6x-4x^2-6x^3-4x^4+(6-6x^2)\log(x)+2x^2\log^2(x)\right)}{3x-2x^2-x^3-4x\log(x)+x\log^2(x)}$$
$$= e^4(3+x^2)\left(1-x-\log(x)\right)(-3-x+\log(x))$$

output
```
(x^2+3)*exp(ln((ln(x)-3-x)*(1-ln(x)-x))+4)
```

3.1269.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 60 vs. 2(25) = 50.

Time = 0.01 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.40

$$\int \frac{e^4(-3+2x+x^2+4\log(x)-\log^2(x))\left(-12-6x-4x^2-6x^3-4x^4+(6-6x^2)\log(x)+2x^2\log^2(x)\right)}{3x-2x^2-x^3-4x\log(x)+x\log^2(x)}$$
$$= 6e^4x+2e^4x^3+e^4x^4+12e^4\log(x)+4e^4x^2\log(x)-3e^4\log^2(x)-e^4x^2\log^2(x)$$

input
```
Integrate[(E^4*(-3 + 2*x + x^2 + 4*Log[x] - Log[x]^2)*(-12 - 6*x - 4*x^2 -
 6*x^3 - 4*x^4 + (6 - 6*x^2)*Log[x] + 2*x^2*Log[x]^2))/(3*x - 2*x^2 - x^3
- 4*x*Log[x] + x*Log[x]^2),x]
```

output
```
6*E^4*x + 2*E^4*x^3 + E^4*x^4 + 12*E^4*Log[x] + 4*E^4*x^2*Log[x] - 3*E^4*L
og[x]^2 - E^4*x^2*Log[x]^2
```

3.1269.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.045, Rules used = {27, 27, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^4 \left(x^2+2 x-\log ^2(x)+4 \log (x)-3\right) \left(-4 x^4-6 x^3-4 x^2+2 x^2 \log ^2(x)+\left(6-6 x^2\right) \log (x)-6 x-12\right)}{-x^3-2 x^2+3 x+x \log ^2(x)-4 x \log (x)} \, dx$$

$$\Big\downarrow \text{27}$$

$$e^4 \int \frac{2 \left(-x^2-2 x+\log ^2(x)-4 \log (x)+3\right) \left(2 x^4+3 x^3-\log ^2(x) x^2+2 x^2+3 x-3 \left(1-x^2\right) \log (x)+6\right)}{-x^3-2 x^2+\log ^2(x) x-4 \log (x) x+3 x}dx$$

$$\Big\downarrow \text{27}$$

$$2 e^4 \int \frac{\left(-x^2-2 x+\log ^2(x)-4 \log (x)+3\right) \left(2 x^4+3 x^3-\log ^2(x) x^2+2 x^2+3 x-3 \left(1-x^2\right) \log (x)+6\right)}{-x^3-2 x^2+\log ^2(x) x-4 \log (x) x+3 x}dx$$

$$\Big\downarrow \text{7239}$$

$$2 e^4 \int \left(2 x^3+3 x^2-\log ^2(x) x+2 x+3+\frac{3 \left(x^2-1\right) \log (x)}{x}+\frac{6}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2 e^4 \left(\frac{x^4}{2}+x^3-\frac{1}{2} x^2 \log ^2(x)+2 x^2 \log (x)+3 x-\frac{3 \log ^2(x)}{2}+6 \log (x)\right)$$

input
```
Int[(E^4*(-3 + 2*x + x^2 + 4*Log[x] - Log[x]^2)*(-12 - 6*x - 4*x^2 - 6*x^3
 - 4*x^4 + (6 - 6*x^2)*Log[x] + 2*x^2*Log[x]^2))/(3*x - 2*x^2 - x^3 - 4*x*
Log[x] + x*Log[x]^2),x]
```

output
```
2*E^4*(3*x + x^3 + x^4/2 + 6*Log[x] + 2*x^2*Log[x] - (3*Log[x]^2)/2 - (x^2
*Log[x]^2)/2)
```

3.1269.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1269.4 Maple [A] (verified)

Time = 5.92 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.68

method	result
default	$e^{4}\left(-x^{2}\ln\left(x\right)^{2}+4x^{2}\ln\left(x\right)+x^{4}+2x^{3}-3\ln\left(x\right)^{2}+6x+12\ln\left(x\right)\right)$
risch	$e^{4}(-x^{2}-3)\ln\left(x\right)^{2}+4x^{2}e^{4}\ln\left(x\right)+x^{4}e^{4}+2x^{3}e^{4}+6x\,e^{4}+12\,e^{4}\ln\left(x\right)$
parallelrisch	$\frac{-342\,e^{\ln\left(-\ln(x)^{2}+4\ln(x)+x^{2}+2x-3\right)+4}+384\ln(x)e^{\ln\left(-\ln(x)^{2}+4\ln(x)+x^{2}+2x-3\right)+4}+192\,e^{\ln\left(-\ln(x)^{2}+4\ln(x)+x^{2}+2x-3\right)+4}x+1}{}$

input
```
int((2*x^2*ln(x)^2+(-6*x^2+6)*ln(x)-4*x^4-6*x^3-4*x^2-6*x-12)*exp(ln(-ln(x
)^2+4*ln(x)+x^2+2*x-3)+4)/(x*ln(x)^2-4*x*ln(x)-x^3-2*x^2+3*x),x,method=_RE
TURNVERBOSE)
```

output
```
exp(4)*(-x^2*ln(x)^2+4*x^2*ln(x)+x^4+2*x^3-3*ln(x)^2+6*x+12*ln(x))
```

3.1269.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.60

$$\int \frac{e^4\left(-3+2x+x^2+4\log(x)-\log^2(x)\right)\left(-12-6x-4x^2-6x^3-4x^4+\left(6-6x^2\right)\log(x)+2x^2\log^2(x)\right)}{3x-2x^2-x^3-4x\log(x)+x\log^2(x)}\,d$$
$$=-\left(x^{2}+3\right)e^{4}\log\left(x\right)^{2}+4\left(x^{2}+3\right)e^{4}\log\left(x\right)+\left(x^{4}+2\,x^{3}+6\,x\right)e^{4}$$

input
```
integrate((2*x^2*log(x)^2+(-6*x^2+6)*log(x)-4*x^4-6*x^3-4*x^2-6*x-12)*exp(
log(-log(x)^2+4*log(x)+x^2+2*x-3)+4)/(x*log(x)^2-4*x*log(x)-x^3-2*x^2+3*x)
,x, algorithm=\
```

output
```
-(x^2 + 3)*e^4*log(x)^2 + 4*(x^2 + 3)*e^4*log(x) + (x^4 + 2*x^3 + 6*x)*e^4
```

3.1269.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(20) = 40$.

Time = 0.18 (sec) , antiderivative size = 60, normalized size of antiderivative = 2.40

$$\int \frac{e^4(-3+2x+x^2+4\log(x)-\log^2(x))\left(-12-6x-4x^2-6x^3-4x^4+(6-6x^2)\log(x)+2x^2\log^2(x)\right)}{3x-2x^2-x^3-4x\log(x)+x\log^2(x)}\,dx$$
$$= x^4e^4+2x^3e^4+4x^2e^4\log(x)+6xe^4+\left(-x^2e^4-3e^4\right)\log(x)^2+12e^4\log(x)$$

input
```
integrate((2*x**2*ln(x)**2+(-6*x**2+6)*ln(x)-4*x**4-6*x**3-4*x**2-6*x-12)*
exp(ln(-ln(x)**2+4*ln(x)+x**2+2*x-3)+4)/(x*ln(x)**2-4*x*ln(x)-x**3-2*x**2+
3*x),x)
```

output
```
x**4*exp(4) + 2*x**3*exp(4) + 4*x**2*exp(4)*log(x) + 6*x*exp(4) + (-x**2*e
xp(4) - 3*exp(4))*log(x)**2 + 12*exp(4)*log(x)
```

3.1269.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.40

$$\int \frac{e^4(-3+2x+x^2+4\log(x)-\log^2(x))\left(-12-6x-4x^2-6x^3-4x^4+(6-6x^2)\log(x)+2x^2\log^2(x)\right)}{3x-2x^2-x^3-4x\log(x)+x\log^2(x)}\,dx$$
$$= \left(x^4+2\,x^3-\left(x^2+3\right)\log(x)^2+4\left(x^2+3\right)\log(x)+6\,x\right)e^4$$

input
```
integrate((2*x^2*log(x)^2+(-6*x^2+6)*log(x)-4*x^4-6*x^3-4*x^2-6*x-12)*exp(
log(-log(x)^2+4*log(x)+x^2+2*x-3)+4)/(x*log(x)^2-4*x*log(x)-x^3-2*x^2+3*x)
,x, algorithm=\
```

output
```
(x^4 + 2*x^3 - (x^2 + 3)*log(x)^2 + 4*(x^2 + 3)*log(x) + 6*x)*e^4
```

3.1269.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(23) = 46$.

Time = 0.27 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.12

$$\int \frac{e^4(-3+2x+x^2+4\log(x)-\log^2(x))\,(-12-6x-4x^2-6x^3-4x^4+(6-6x^2)\log(x)+2x^2\log^2(x))}{3x-2x^2-x^3-4x\log(x)+x\log^2(x)}\,dx$$
$$= x^4e^4 - x^2e^4\log(x)^2 + 2x^3e^4 + 4x^2e^4\log(x) - 3e^4\log(x)^2 + 6xe^4 + 12e^4\log(x)$$

input
```
integrate((2*x^2*log(x)^2+(-6*x^2+6)*log(x)-4*x^4-6*x^3-4*x^2-6*x-12)*exp(
log(-log(x)^2+4*log(x)+x^2+2*x-3)+4)/(x*log(x)^2-4*x*log(x)-x^3-2*x^2+3*x)
,x, algorithm=\
```

output
```
x^4*e^4 - x^2*e^4*log(x)^2 + 2*x^3*e^4 + 4*x^2*e^4*log(x) - 3*e^4*log(x)^2
 + 6*x*e^4 + 12*e^4*log(x)
```

3.1269.9 Mupad [B] (verification not implemented)

Time = 15.35 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.64

$$\int \frac{e^4(-3+2x+x^2+4\log(x)-\log^2(x))\,(-12-6x-4x^2-6x^3-4x^4+(6-6x^2)\log(x)+2x^2\log^2(x))}{3x-2x^2-x^3-4x\log(x)+x\log^2(x)}\,dx$$
$$= \mathrm{e}^4\left(x^4+2x^3-x^2\ln(x)^2+4x^2\ln(x)+6x-3\ln(x)^2+12\ln(x)\right)$$

input
```
int((exp(log(2*x + 4*log(x) - log(x)^2 + x^2 - 3) + 4)*(6*x - 2*x^2*log(x)
^2 + 4*x^2 + 6*x^3 + 4*x^4 + log(x)*(6*x^2 - 6) + 12))/(4*x*log(x) - x*log
(x)^2 - 3*x + 2*x^2 + x^3),x)
```

output
```
exp(4)*(6*x + 12*log(x) + 4*x^2*log(x) - 3*log(x)^2 - x^2*log(x)^2 + 2*x^3
 + x^4)
```

3.1270 $\int \frac{-25+10x+4x^2+375x^4-150x^5+15x^6}{25x^2-10x^3+x^4} dx$

3.1270.1 Optimal result

Integrand size = 42, antiderivative size = 24

$$\int \frac{-25+10x+4x^2+375x^4-150x^5+15x^6}{25x^2-10x^3+x^4} dx = 1-e^4+\frac{1}{x}+\frac{x}{5-x}+5x^3$$

output
```
1/x-exp(4)+1+5*x^3+x/(5-x)
```

3.1270.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.67

$$\int \frac{-25+10x+4x^2+375x^4-150x^5+15x^6}{25x^2-10x^3+x^4} dx = -\frac{5}{-5+x}+\frac{1}{x}+5x^3$$

input
```
Integrate[(-25 + 10*x + 4*x^2 + 375*x^4 - 150*x^5 + 15*x^6)/(25*x^2 - 10*x
^3 + x^4),x]
```

output
```
-5/(-5 + x) + x^(-1) + 5*x^3
```

3.1270.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.75, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2026, 2159, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{15x^6-150x^5+375x^4+4x^2+10x-25}{x^4-10x^3+25x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{15x^6-150x^5+375x^4+4x^2+10x-25}{x^2(x^2-10x+25)}dx$$

$$\Big\downarrow \text{2159}$$

$$\int \left(15x^2-\frac{1}{x^2}+\frac{5}{(x-5)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$5x^3+\frac{5}{5-x}+\frac{1}{x}$$

input
```
Int[(-25 + 10*x + 4*x^2 + 375*x^4 - 150*x^5 + 15*x^6)/(25*x^2 - 10*x^3 + x
^4),x]
```

output
```
5/(5 - x) + x^(-1) + 5*x^3
```

3.1270.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2159
```
Int[(Pq_)*((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p
_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*Pq*(a + b*x + c*x^2)^p, x
], x] /; FreeQ[{a, b, c, d, e, m}, x] && PolyQ[Pq, x] && IGtQ[p, -2]
```

3.1270.4 Maple [A] (verified)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

method	result	size
default	$5x^3-\frac{5}{-5+x}+\frac{1}{x}$	17
risch	$5x^3+\frac{-4x-5}{(-5+x)x}$	21
gosper	$\frac{5x^5-25x^4-4x-5}{x(-5+x)}$	25
norman	$\frac{5x^5-25x^4-4x-5}{x(-5+x)}$	25
parallelrisch	$\frac{5x^5-25x^4-4x-5}{x(-5+x)}$	25

input
```
int((15*x^6-150*x^5+375*x^4+4*x^2+10*x-25)/(x^4-10*x^3+25*x^2),x,method=_R
ETURNVERBOSE)
```

output
```
5*x^3-5/(-5+x)+1/x
```

3.1270.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.04

$$\int \frac{-25+10x+4x^2+375x^4-150x^5+15x^6}{25x^2-10x^3+x^4}\,dx=\frac{5\,x^5-25\,x^4-4\,x-5}{x^2-5\,x}$$

input
```
integrate((15*x^6-150*x^5+375*x^4+4*x^2+10*x-25)/(x^4-10*x^3+25*x^2),x, al
gorithm=\
```

output
```
(5*x^5 - 25*x^4 - 4*x - 5)/(x^2 - 5*x)
```

3.1270.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.71

$$\int \frac{-25+10x+4x^2+375x^4-150x^5+15x^6}{25x^2-10x^3+x^4}\,dx = 5x^3+\frac{-4x-5}{x^2-5x}$$

input
```
integrate((15*x**6-150*x**5+375*x**4+4*x**2+10*x-25)/(x**4-10*x**3+25*x**2
),x)
```

output
```
5*x**3 + (-4*x - 5)/(x**2 - 5*x)
```

3.1270.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-25+10x+4x^2+375x^4-150x^5+15x^6}{25x^2-10x^3+x^4}\,dx = 5\,x^3-\frac{4\,x+5}{x^2-5\,x}$$

input
```
integrate((15*x^6-150*x^5+375*x^4+4*x^2+10*x-25)/(x^4-10*x^3+25*x^2),x, al
gorithm=\
```

output
```
5*x^3 - (4*x + 5)/(x^2 - 5*x)
```

3.1270.8 Giac [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{-25+10x+4x^2+375x^4-150x^5+15x^6}{25x^2-10x^3+x^4}\,dx = 5\,x^3-\frac{4\,x+5}{x^2-5\,x}$$

input
```
integrate((15*x^6-150*x^5+375*x^4+4*x^2+10*x-25)/(x^4-10*x^3+25*x^2),x, al
gorithm=\
```

output
```
5*x^3 - (4*x + 5)/(x^2 - 5*x)
```

3.1270.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{-25+10x+4x^2+375x^4-150x^5+15x^6}{25x^2-10x^3+x^4}\,dx = 5\,x^3-\frac{4\,x+5}{x\,\left(x-5\right)}$$

input
```
int((10*x + 4*x^2 + 375*x^4 - 150*x^5 + 15*x^6 - 25)/(25*x^2 - 10*x^3 + x^
4),x)
```

output
```
5*x^3 - (4*x + 5)/(x*(x - 5))
```

3.1271 $\int \frac{1+(-e^5x+2x^2)\log^2(x)}{x\log^2(x)}\,dx$

3.1271.1 Optimal result

Integrand size = 27, antiderivative size = 20

$$\int \frac{1+(-e^5x+2x^2)\log^2(x)}{x\log^2(x)}\,dx = 4+e^3-e^5x+x^2-\frac{1}{\log(x)}$$

output
```
4-x*exp(5)+exp(3)+x^2-1/ln(x)
```

3.1271.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{1+(-e^5x+2x^2)\log^2(x)}{x\log^2(x)}\,dx = -e^5x+x^2-\frac{1}{\log(x)}$$

input
```
Integrate[(1 + (-(E^5*x) + 2*x^2)*Log[x]^2)/(x*Log[x]^2),x]
```

output
```
-(E^5*x) + x^2 - Log[x]^(-1)
```

3.1271.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(2x^2-e^5x)\log^2(x)+1}{x\log^2(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(2x+\frac{1}{x\log^2(x)}-e^5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x^2-e^5x-\frac{1}{\log(x)}$$

input
```
Int[(1 + (-(E^5*x) + 2*x^2)*Log[x]^2)/(x*Log[x]^2),x]
```

output
```
-(E^5*x) + x^2 - Log[x]^(-1)
```

3.1271.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1271.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

method	result	size
default	$-x\,e^{5}+x^{2}-\frac{1}{\ln(x)}$	16
risch	$-x\,e^{5}+x^{2}-\frac{1}{\ln(x)}$	16
parts	$-x\,e^{5}+x^{2}-\frac{1}{\ln(x)}$	16
norman	$\frac{-1+x^{2}\ln(x)-x\,e^{5}\ln(x)}{\ln(x)}$	21
parallelrisch	$-\frac{x\,e^{5}\ln(x)-x^{2}\ln(x)+1}{\ln(x)}$	22

input
```
int(((-x*exp(5)+2*x^2)*ln(x)^2+1)/x/ln(x)^2,x,method=_RETURNVERBOSE)
```

output
```
-x*exp(5)+x^2-1/ln(x)
```

3.1271.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{1+(-e^5x+2x^2)\log^2(x)}{x\log^2(x)}\,dx = \frac{(x^2-xe^5)\log(x)-1}{\log(x)}$$

input
```
integrate(((-x*exp(5)+2*x^2)*log(x)^2+1)/x/log(x)^2,x, algorithm=\
```

output
```
((x^2 - x*e^5)*log(x) - 1)/log(x)
```

3.1271.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.60

$$\int \frac{1+(-e^5x+2x^2)\log^2(x)}{x\log^2(x)}\,dx = x^2-xe^5-\frac{1}{\log(x)}$$

input
```
integrate(((-x*exp(5)+2*x**2)*ln(x)**2+1)/x/ln(x)**2,x)
```

output
```
x**2 - x*exp(5) - 1/log(x)
```

3.1271.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{1 + (-e^5 x + 2x^2)\log^2(x)}{x\log^2(x)}\,dx = x^2 - xe^5 - \frac{1}{\log(x)}$$

input
```
integrate(((-x*exp(5)+2*x^2)*log(x)^2+1)/x/log(x)^2,x, algorithm=\
```

output
```
x^2 - x*e^5 - 1/log(x)
```

3.1271.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{1 + (-e^5 x + 2x^2)\log^2(x)}{x\log^2(x)}\,dx = \frac{x^2\log(x) - xe^5\log(x) - 1}{\log(x)}$$

input
```
integrate(((-x*exp(5)+2*x^2)*log(x)^2+1)/x/log(x)^2,x, algorithm=\
```

output
```
(x^2*log(x) - x*e^5*log(x) - 1)/log(x)
```

3.1271.9 Mupad [B] (verification not implemented)

Time = 15.60 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{1 + (-e^5 x + 2x^2)\log^2(x)}{x\log^2(x)}\,dx = x\left(x - \mathrm{e}^5\right) - \frac{1}{\ln(x)}$$

input
```
int(-(log(x)^2*(x*exp(5) - 2*x^2) - 1)/(x*log(x)^2),x)
```

output
```
x*(x - exp(5)) - 1/log(x)
```

3.1272 $\int \frac{6x^3-4x^2\log(2)+e^x\left(-16x^5+\left(-16x^3+32x^4\right)\log(2)+\left(20x^2-24x^3\right)\log\ldots}{x^2+e^x\left(8x^3-8x^2\log(2)+2\ldots\right.}$

3.1272.1 Optimal result

Integrand size = 191, antiderivative size = 26

$$\int \frac{6x^3-4x^2\log(2)+e^x\left(-16x^5+\left(-16x^3+32x^4\right)\log(2)+\left(20x^2-24x^3\right)\log^2(2)+\left(-8x+8x^2\right)\log^3(2)+\ldots}{x^2+e^x\left(8x^3-8x^2\log(2)+2x\log^2(2)\right)+e^{2x}\left(16x^4-32x^3\log\ldots\right.}$$

$$=-x^2+\frac{x}{e^x+\frac{x}{(2x-\log(2))^2}}$$

output
```
4*x/(4*exp(x)+4*x/(2*x-ln(2))^2)-x^2
```

3.1272.2 Mathematica [F]

$$\int \frac{6x^3-4x^2\log(2)+e^x\left(-16x^5+\left(-16x^3+32x^4\right)\log(2)+\left(20x^2-24x^3\right)\log^2(2)+\left(-8x+8x^2\right)\log^3(2)+\ldots}{x^2+e^x\left(8x^3-8x^2\log(2)+2x\log^2(2)\right)+e^{2x}\left(16x^4-32x^3\log\ldots\right.}$$

$$=\int \frac{6x^3-4x^2\log(2)+e^x\left(-16x^5+\left(-16x^3+32x^4\right)\log(2)+\left(20x^2-24x^3\right)\log^2(2)+\left(-8x+8x^2\right)\log^3(2)\ldots}{x^2+e^x\left(8x^3-8x^2\log(2)+2x\log^2(2)\right)+e^{2x}\left(16x^4-32x^3\ldots\right.}$$

input
```
Integrate[(6*x^3 - 4*x^2*Log[2] + E^x*(-16*x^5 + (-16*x^3 + 32*x^4)*Log[2]
 + (20*x^2 - 24*x^3)*Log[2]^2 + (-8*x + 8*x^2)*Log[2]^3 + (1 - x)*Log[2]^4
) + E^(2*x)*(-32*x^5 + 64*x^4*Log[2] - 48*x^3*Log[2]^2 + 16*x^2*Log[2]^3 -
 2*x*Log[2]^4))/(x^2 + E^x*(8*x^3 - 8*x^2*Log[2] + 2*x*Log[2]^2) + E^(2*x)
*(16*x^4 - 32*x^3*Log[2] + 24*x^2*Log[2]^2 - 8*x*Log[2]^3 + Log[2]^4)),x]
```

output
```
Integrate[(6*x^3 - 4*x^2*Log[2] + E^x*(-16*x^5 + (-16*x^3 + 32*x^4)*Log[2]
 + (20*x^2 - 24*x^3)*Log[2]^2 + (-8*x + 8*x^2)*Log[2]^3 + (1 - x)*Log[2]^4
) + E^(2*x)*(-32*x^5 + 64*x^4*Log[2] - 48*x^3*Log[2]^2 + 16*x^2*Log[2]^3 -
 2*x*Log[2]^4))/(x^2 + E^x*(8*x^3 - 8*x^2*Log[2] + 2*x*Log[2]^2) + E^(2*x)
*(16*x^4 - 32*x^3*Log[2] + 24*x^2*Log[2]^2 - 8*x*Log[2]^3 + Log[2]^4)), x]
```

3.1272.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{6x^3-4x^2\log(2)+e^x\left(-16x^5+\left(8x^2-8x\right)\log^3(2)+\left(32x^4-16x^3\right)\log(2)+\left(20x^2-24x^3\right)\log^2(2)+(1-x)\log\right.}{x^2+e^x\left(8x^3-8x^2\log(2)+2x\log^2(2)\right)+e^{2x}\left(16x^4-32x^3\log(2)+\right.}$$

$$\Big\downarrow \; 7292$$

$$\int \frac{6x^3-4x^2\log(2)+e^x\left(-16x^5+\left(8x^2-8x\right)\log^3(2)+\left(32x^4-16x^3\right)\log(2)+\left(20x^2-24x^3\right)\log^2(2)+(1-x)\log\right.}{\left(4e^xx^2+x+e^x\log^2(2)-4e^xx\log(\right.}$$

$$\Big\downarrow \; 7293$$

$$\int \left(-\frac{(x-1)(2x-\log(2))^2}{4e^xx^2+x+e^x\log^2(2)-4e^xx\log(2)}+\frac{x\left(4x^3+4x^2(1-\log(2))+x\log^2(2)-\log^2(2)\right)}{\left(4e^xx^2+x+e^x\log^2(2)-4e^xx\log(2)\right)^2}-2x\right)dx$$

$$\Big\downarrow \; 2009$$

$$-\log^2(2)\int \frac{x}{\left(4e^xx^2-4e^x\log(2)x+x+e^x\log^2(2)\right)^2}dx+\log^2(2)\int \frac{x^2}{\left(4e^xx^2-4e^x\log(2)x+x+e^x\log^2(2)\right)^2}dx+\log^2(2)\int \frac{1}{4e^xx^2-4e^x\log(2)x+x+e^x\log^2(2)}dx-\log(2)(4+\log(2))\int \frac{x}{4e^xx^2-4e^x\log(2)x+x+e^x\log^2(2)}dx+4(1+\log(2))\int \frac{x^2}{4e^xx^2-4e^x\log(2)x+x+e^x\log^2(2)}dx+4\int \frac{x^4}{\left(4e^xx^2-4e^x\log(2)x+x+e^x\log^2(2)\right)^2}dx+4(1-\log(2))\int \frac{x^3}{\left(4e^xx^2-4e^x\log(2)x+x+e^x\log^2(2)\right)^2}dx-4\int \frac{x^3}{4e^xx^2-4e^x\log(2)x+x+e^x\log^2(2)}dx-x^2$$

3.1272.
$$\int \frac{6x^3-4x^2\log(2)+e^x\left(-16x^5+\left(-16x^3+32x^4\right)\log(2)+\left(20x^2-24x^3\right)\log^2(2)+\left(-8x+8x^2\right)\log^3(2)+(1-x)\log^4(2)\right)+e^{2x}\left(-32x^5+64x^4\log(2)-48x^3\right.}{x^2+e^x\left(8x^3-8x^2\log(2)+2x\log^2(2)\right)+e^{2x}\left(16x^4-32x^3\log(2)+24x^2\log^2(2)-8x\log^3(2)+\log^4(2)\right)}$$

input
```
Int[(6*x^3 - 4*x^2*Log[2] + E^x*(-16*x^5 + (-16*x^3 + 32*x^4)*Log[2] + (20
*x^2 - 24*x^3)*Log[2]^2 + (-8*x + 8*x^2)*Log[2]^3 + (1 - x)*Log[2]^4) + E^
(2*x)*(-32*x^5 + 64*x^4*Log[2] - 48*x^3*Log[2]^2 + 16*x^2*Log[2]^3 - 2*x*L
og[2]^4))/(x^2 + E^x*(8*x^3 - 8*x^2*Log[2] + 2*x*Log[2]^2) + E^(2*x)*(16*x
^4 - 32*x^3*Log[2] + 24*x^2*Log[2]^2 - 8*x*Log[2]^3 + Log[2]^4)),x]
```

output
```
$Aborted
```

3.1272.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1272.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.62

method	result	size
risch	$-x^2+\frac{x(\ln(2)-2x)^2}{\ln(2)^2 e^x-4x\ln(2)e^x+4e^x x^2+x}$	42
norman	$\frac{\frac{5x\ln(2)^2}{4}+\frac{\ln(2)^4 e^x}{4}-\ln(2)^3 e^x x+3x^3-4x^2\ln(2)-4e^x x^4+4x^3\ln(2)e^x}{\ln(2)^2 e^x-4x\ln(2)e^x+4e^x x^2+x}$	80
parallelrisch	$\frac{\ln(2)^4 e^x-4\ln(2)^3 e^x x+16x^3\ln(2)e^x-16e^x x^4+5x\ln(2)^2-16x^2\ln(2)+12x^3}{4\ln(2)^2 e^x-16x\ln(2)e^x+16e^x x^2+4x}$	80

input
```
int(((-2*x*ln(2)^4+16*x^2*ln(2)^3-48*x^3*ln(2)^2+64*x^4*ln(2)-32*x^5)*exp(
x)^2+((1-x)*ln(2)^4+(8*x^2-8*x)*ln(2)^3+(-24*x^3+20*x^2)*ln(2)^2+(32*x^4-1
6*x^3)*ln(2)-16*x^5)*exp(x)-4*x^2*ln(2)+6*x^3)/((ln(2)^4-8*x*ln(2)^3+24*x^
2*ln(2)^2-32*x^3*ln(2)+16*x^4)*exp(x)^2+(2*x*ln(2)^2-8*x^2*ln(2)+8*x^3)*ex
p(x)+x^2),x,method=_RETURNVERBOSE)
```

output
```
-x^2+x*(ln(2)-2*x)^2/(ln(2)^2*exp(x)-4*x*ln(2)*exp(x)+4*exp(x)*x^2+x)
```

3.1272.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. 2(25) = 50.

Time = 0.26 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.58

$$\int \frac{6x^3 - 4x^2\log(2) + e^x\left(-16x^5 + (-16x^3 + 32x^4)\log(2) + (20x^2 - 24x^3)\log^2(2) + (-8x + 8x^2)\log^3(2) + \right.}{x^2 + e^x\left(8x^3 - 8x^2\log(2) + 2x\log^2(2)\right) + e^{2x}\left(16x^4 - 32x^3\,\mathrm{lo}\right.}$$
$$= \frac{3\,x^3 - 4\,x^2\log(2) + x\log(2)^2 - \left(4\,x^4 - 4\,x^3\log(2) + x^2\log(2)^2\right)e^x}{\left(4\,x^2 - 4\,x\log(2) + \log(2)^2\right)e^x + x}$$

input
```
integrate(((-2*x*log(2)^4+16*x^2*log(2)^3-48*x^3*log(2)^2+64*x^4*log(2)-32
*x^5)*exp(x)^2+((1-x)*log(2)^4+(8*x^2-8*x)*log(2)^3+(-24*x^3+20*x^2)*log(2
)^2+(32*x^4-16*x^3)*log(2)-16*x^5)*exp(x)-4*x^2*log(2)+6*x^3)/((log(2)^4-8
*x*log(2)^3+24*x^2*log(2)^2-32*x^3*log(2)+16*x^4)*exp(x)^2+(2*x*log(2)^2-8
*x^2*log(2)+8*x^3)*exp(x)+x^2),x, algorithm=\
```

output
```
(3*x^3 - 4*x^2*log(2) + x*log(2)^2 - (4*x^4 - 4*x^3*log(2) + x^2*log(2)^2)
*e^x)/((4*x^2 - 4*x*log(2) + log(2)^2)*e^x + x)
```

3.1272.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.69

$$\int \frac{6x^3 - 4x^2\log(2) + e^x\left(-16x^5 + (-16x^3 + 32x^4)\log(2) + (20x^2 - 24x^3)\log^2(2) + (-8x + 8x^2)\log^3(2) + \right.}{x^2 + e^x\left(8x^3 - 8x^2\log(2) + 2x\log^2(2)\right) + e^{2x}\left(16x^4 - 32x^3\,\mathrm{lo}\right.}$$
$$= -x^2 + \frac{4x^3 - 4x^2\log(2) + x\log(2)^2}{x + \left(4x^2 - 4x\log(2) + \log(2)^2\right)e^x}$$

input
```
integrate(((-2*x*ln(2)**4+16*x**2*ln(2)**3-48*x**3*ln(2)**2+64*x**4*ln(2)-
32*x**5)*exp(x)**2+((1-x)*ln(2)**4+(8*x**2-8*x)*ln(2)**3+(-24*x**3+20*x**2
)*ln(2)**2+(32*x**4-16*x**3)*ln(2)-16*x**5)*exp(x)-4*x**2*ln(2)+6*x**3)/((
ln(2)**4-8*x*ln(2)**3+24*x**2*ln(2)**2-32*x**3*ln(2)+16*x**4)*exp(x)**2+(2
*x*ln(2)**2-8*x**2*ln(2)+8*x**3)*exp(x)+x**2),x)
```

3.1272.

$$\int \frac{6x^3 - 4x^2\log(2) + e^x\left(-16x^5 + (-16x^3 + 32x^4)\log(2) + (20x^2 - 24x^3)\log^2(2) + (-8x + 8x^2)\log^3(2) + (1-x)\log^4(2)\right) + e^{2x}\left(-32x^5 + 64x^4\log(2) - 48x^3\right.}{x^2 + e^x\left(8x^3 - 8x^2\log(2) + 2x\log^2(2)\right) + e^{2x}\left(16x^4 - 32x^3\log(2) + 24x^2\log^2(2) - 8x\log^3(2) + \log^4(2)\right)}$$

output
```
-x**2 + (4*x**3 - 4*x**2*log(2) + x*log(2)**2)/(x + (4*x**2 - 4*x*log(2) +
 log(2)**2)*exp(x))
```

3.1272.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. 2(25) = 50.

Time = 0.35 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.58

$$\int \frac{6x^3 - 4x^2\log(2) + e^x\left(-16x^5 + (-16x^3 + 32x^4)\log(2) + (20x^2 - 24x^3)\log^2(2) + (-8x + 8x^2)\log^3(2) + \ldots}{x^2 + e^x\left(8x^3 - 8x^2\log(2) + 2x\log^2(2)\right) + e^{2x}\left(16x^4 - 32x^3 \ldots\right.}$$
$$= \frac{3\,x^3 - 4\,x^2\log(2) + x\log(2)^2 - \left(4\,x^4 - 4\,x^3\log(2) + x^2\log(2)^2\right)e^x}{\left(4\,x^2 - 4\,x\log(2) + \log(2)^2\right)e^x + x}$$

input
```
integrate(((-2*x*log(2)^4+16*x^2*log(2)^3-48*x^3*log(2)^2+64*x^4*log(2)-32
*x^5)*exp(x)^2+((1-x)*log(2)^4+(8*x^2-8*x)*log(2)^3+(-24*x^3+20*x^2)*log(2
)^2+(32*x^4-16*x^3)*log(2)-16*x^5)*exp(x)-4*x^2*log(2)+6*x^3)/((log(2)^4-8
*x*log(2)^3+24*x^2*log(2)^2-32*x^3*log(2)+16*x^4)*exp(x)^2+(2*x*log(2)^2-8
*x^2*log(2)+8*x^3)*exp(x)+x^2),x, algorithm=\
```

output
```
(3*x^3 - 4*x^2*log(2) + x*log(2)^2 - (4*x^4 - 4*x^3*log(2) + x^2*log(2)^2)
*e^x)/((4*x^2 - 4*x*log(2) + log(2)^2)*e^x + x)
```

3.1272.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. 2(25) = 50.

Time = 0.30 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.81

$$\int \frac{6x^3 - 4x^2\log(2) + e^x\left(-16x^5 + (-16x^3 + 32x^4)\log(2) + (20x^2 - 24x^3)\log^2(2) + (-8x + 8x^2)\log^3(2) + \ldots}{x^2 + e^x\left(8x^3 - 8x^2\log(2) + 2x\log^2(2)\right) + e^{2x}\left(16x^4 - 32x^3 \ldots\right.}$$
$$= -\frac{4\,x^4e^x - 4\,x^3e^x\log(2) + x^2e^x\log(2)^2 - 3\,x^3 + 4\,x^2\log(2) - x\log(2)^2}{4\,x^2e^x - 4\,xe^x\log(2) + e^x\log(2)^2 + x}$$

input
```
integrate(((-2*x*log(2)^4+16*x^2*log(2)^3-48*x^3*log(2)^2+64*x^4*log(2)-32
*x^5)*exp(x)^2+((1-x)*log(2)^4+(8*x^2-8*x)*log(2)^3+(-24*x^3+20*x^2)*log(2
)^2+(32*x^4-16*x^3)*log(2)-16*x^5)*exp(x)-4*x^2*log(2)+6*x^3)/((log(2)^4-8
*x*log(2)^3+24*x^2*log(2)^2-32*x^3*log(2)+16*x^4)*exp(x)^2+(2*x*log(2)^2-8
*x^2*log(2)+8*x^3)*exp(x)+x^2),x, algorithm=\
```

output
```
-(4*x^4*e^x - 4*x^3*e^x*log(2) + x^2*e^x*log(2)^2 - 3*x^3 + 4*x^2*log(2) -
 x*log(2)^2)/(4*x^2*e^x - 4*x*e^x*log(2) + e^x*log(2)^2 + x)
```

3.1272.9 Mupad [F(-1)]

Timed out.

$$\int \frac{6x^3-4x^2\log(2)+e^x\left(-16x^5+\left(-16x^3+32x^4\right)\log(2)+\left(20x^2-24x^3\right)\log^2(2)+\left(-8x+8x^2\right)\log^3(2)+\dots}{x^2+e^x\left(8x^3-8x^2\log(2)+2x\log^2(2)\right)+e^{2x}\left(16x^4-32x^3\log\dots\right.}$$
$$=\int -\frac{e^x\left(\ln(2)^4(x-1)+\ln(2)^3\left(8x-8x^2\right)+\ln(2)\left(16x^3-32x^4\right)+16x^5-\ln(2)^2\left(20x^2-24x^3\right)\right)+e^{2x}\dots}{e^x\left(8x^3-8\ln(2)x^2+2\ln(2)^2x\right)+e^{2x}\left(16x^4-32\ln(2)x\dots\right.}$$

input
```
int(-(exp(x)*(log(2)^4*(x - 1) + log(2)^3*(8*x - 8*x^2) + log(2)*(16*x^3 -
 32*x^4) + 16*x^5 - log(2)^2*(20*x^2 - 24*x^3)) + exp(2*x)*(48*x^3*log(2)^
2 - 16*x^2*log(2)^3 + 2*x*log(2)^4 - 64*x^4*log(2) + 32*x^5) + 4*x^2*log(2
) - 6*x^3)/(exp(x)*(2*x*log(2)^2 - 8*x^2*log(2) + 8*x^3) + exp(2*x)*(24*x^
2*log(2)^2 - 8*x*log(2)^3 - 32*x^3*log(2) + log(2)^4 + 16*x^4) + x^2),x)
```

output
```
int(-(exp(x)*(log(2)^4*(x - 1) + log(2)^3*(8*x - 8*x^2) + log(2)*(16*x^3 -
 32*x^4) + 16*x^5 - log(2)^2*(20*x^2 - 24*x^3)) + exp(2*x)*(48*x^3*log(2)^
2 - 16*x^2*log(2)^3 + 2*x*log(2)^4 - 64*x^4*log(2) + 32*x^5) + 4*x^2*log(2
) - 6*x^3)/(exp(x)*(2*x*log(2)^2 - 8*x^2*log(2) + 8*x^3) + exp(2*x)*(24*x^
2*log(2)^2 - 8*x*log(2)^3 - 32*x^3*log(2) + log(2)^4 + 16*x^4) + x^2), x)
```

3.1273 $\int \frac{2ex+e^x(2x-x^2)}{e^2\log(25)+e^{2x}\log(25)+2e^{1+x}\log(25)}\,dx$

3.1273.1 Optimal result

Integrand size = 45, antiderivative size = 15

$$\int \frac{2ex+e^x(2x-x^2)}{e^2\log(25)+e^{2x}\log(25)+2e^{1+x}\log(25)}\,dx=\frac{x^2}{(e+e^x)\log(25)}$$

output
```
1/2*x^2/ln(5)/(exp(1)+exp(x))
```

3.1273.2 Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{2ex+e^x(2x-x^2)}{e^2\log(25)+e^{2x}\log(25)+2e^{1+x}\log(25)}\,dx=\frac{x^2}{(e+e^x)\log(25)}$$

input
```
Integrate[(2*E*x + E^x*(2*x - x^2))/(E^2*Log[25] + E^(2*x)*Log[25] + 2*E^(
1 + x)*Log[25]),x]
```

output
```
x^2/((E + E^x)*Log[25])
```

3.1273.3 Rubi [A] (verified)

Time = 0.77 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.089, Rules used = {7239, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(2x-x^2)+2ex}{e^{2x}\log(25)+2e^{x+1}\log(25)+e^2\log(25)}\,dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2ex-e^x(x-2)x}{(e^x+e)^2\log(25)}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\int \frac{e^x(2-x)x+2ex}{(e+e^x)^2}dx}{\log(25)}$$

$$\Big\downarrow \text{7293}$$

$$\frac{\int \left(\frac{ex^2}{(e+e^x)^2}-\frac{(x-2)x}{e+e^x}\right)dx}{\log(25)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{x^2}{(e^x+e)\log(25)}$$

input
```
Int[(2*E*x + E^x*(2*x - x^2))/(E^2*Log[25] + E^(2*x)*Log[25] + 2*E^(1 + x)
*Log[25]),x]
```

output
```
x^2/((E + E^x)*Log[25])
```

3.1273.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1273.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

method	result	size
norman	$\frac{x^2}{2\ln(5)(\mathrm{e}+\mathrm{e}^x)}$	17
risch	$\frac{x^2}{2\ln(5)(\mathrm{e}+\mathrm{e}^x)}$	17
parallelrisch	$\frac{x^2}{2\ln(5)(\mathrm{e}+\mathrm{e}^x)}$	17

input
```
int(((-x^2+2*x)*exp(x)+2*x*exp(1))/(2*ln(5)*exp(x)^2+4*exp(1)*ln(5)*exp(x)
+2*exp(1)^2*ln(5)),x,method=_RETURNVERBOSE)
```

output
```
1/2*x^2/ln(5)/(exp(1)+exp(x))
```

3.1273.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47

$$\int \frac{2ex + e^x(2x - x^2)}{e^2\log(25) + e^{2x}\log(25) + 2e^{1+x}\log(25)}\,dx = \frac{x^2e}{2\left(e^2\log(5) + e^{(x+1)}\log(5)\right)}$$

input
```
integrate(((-x^2+2*x)*exp(x)+2*x*exp(1))/(2*log(5)*exp(x)^2+4*exp(1)*log(5
)*exp(x)+2*exp(1)^2*log(5)),x, algorithm=\
```

output
```
1/2*x^2*e/(e^2*log(5) + e^(x + 1)*log(5))
```

3.1273.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.27

$$\int \frac{2ex + e^x(2x - x^2)}{e^2\log(25) + e^{2x}\log(25) + 2e^{1+x}\log(25)}\,dx = \frac{x^2}{2e^x\log(5) + 2e\log(5)}$$

input
```
integrate(((-x**2+2*x)*exp(x)+2*x*exp(1))/(2*ln(5)*exp(x)**2+4*exp(1)*ln(5
)*exp(x)+2*exp(1)**2*ln(5)),x)
```

output
```
x**2/(2*exp(x)*log(5) + 2*E*log(5))
```

3.1273.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int \frac{2ex + e^x(2x - x^2)}{e^2\log(25) + e^{2x}\log(25) + 2e^{1+x}\log(25)}\,dx = \frac{x^2}{2\left(e\log(5) + e^x\log(5)\right)}$$

input
```
integrate(((-x^2+2*x)*exp(x)+2*x*exp(1))/(2*log(5)*exp(x)^2+4*exp(1)*log(5
)*exp(x)+2*exp(1)^2*log(5)),x, algorithm=\
```

output
```
1/2*x^2/(e*log(5) + e^x*log(5))
```

3.1273.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.20

$$\int \frac{2ex+e^x(2x-x^2)}{e^2\log(25)+e^{2x}\log(25)+2e^{1+x}\log(25)}\,dx = \frac{x^2}{2\,(e\log{(5)}+e^x\log{(5)})}$$

input
```
integrate(((-x^2+2*x)*exp(x)+2*x*exp(1))/(2*log(5)*exp(x)^2+4*exp(1)*log(5
)*exp(x)+2*exp(1)^2*log(5)),x, algorithm=\
```

output
```
1/2*x^2/(e*log(5) + e^x*log(5))
```

3.1273.9 Mupad [B] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \frac{2ex+e^x(2x-x^2)}{e^2\log(25)+e^{2x}\log(25)+2e^{1+x}\log(25)}\,dx = \frac{x^2}{2\,\ln{(5)}\,\left(\mathrm{e}+\mathrm{e}^x\right)}$$

input
```
int((2*x*exp(1) + exp(x)*(2*x - x^2))/(2*exp(2*x)*log(5) + 2*exp(2)*log(5)
 + 4*exp(1)*exp(x)*log(5)),x)
```

output
```
x^2/(2*log(5)*(exp(1) + exp(x)))
```

3.1274 $\int (1 - 2e^{1+2x}) \, dx$

3.1274.1 Optimal result

Integrand size = 11, antiderivative size = 12

$$\int (1 - 2e^{1+2x}) \, dx = 86 - e^{1+2x} + x$$

output
```
x+86-exp(1+2*x)
```

3.1274.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int (1 - 2e^{1+2x}) \, dx = -e^{1+2x} + x$$

input
```
Integrate[1 - 2*E^(1 + 2*x),x]
```

output
```
-E^(1 + 2*x) + x
```

3.1274.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (1-2e^{2x+1})\,dx$$
$$\Big\downarrow \text{2009}$$
$$x-e^{2x+1}$$

input
```
Int[1 - 2*E^(1 + 2*x),x]
```

output
```
-E^(1 + 2*x) + x
```

3.1274.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1274.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

method	result	size
default	$x-e^{1+2x}$	11
norman	$x-e^{1+2x}$	11
risch	$x-e^{1+2x}$	11
parallelrisch	$x-e^{1+2x}$	11
parts	$x-e^{1+2x}$	11
derivativedivides	$-e^{1+2x}+\frac{\ln(e^{1+2x})}{2}$	19

input
```
int(-2*exp(1+2*x)+1,x,method=_RETURNVERBOSE)
```

output
```
x-exp(1+2*x)
```

3.1274.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \left(1-2e^{1+2x}\right)\,dx = x - e^{(2\,x+1)}$$

input
```
integrate(-2*exp(1+2*x)+1,x, algorithm=\
```

output
```
x - e^(2*x + 1)
```

3.1274.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.58

$$\int \left(1-2e^{1+2x}\right)\,dx = x - e^{2x+1}$$

input
```
integrate(-2*exp(1+2*x)+1,x)
```

output
```
x - exp(2*x + 1)
```

3.1274.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \left(1-2e^{1+2x}\right)\,dx = x - e^{(2\,x+1)}$$

input
```
integrate(-2*exp(1+2*x)+1,x, algorithm=\
```

output
```
x - e^(2*x + 1)
```

3.1274.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \left(1-2e^{1+2x}\right) dx = x - e^{(2x+1)}$$

input
```
integrate(-2*exp(1+2*x)+1,x, algorithm=\
```

output
```
x - e^(2*x + 1)
```

3.1274.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \left(1-2e^{1+2x}\right) dx = x - e^{2x+1}$$

input
```
int(1 - 2*exp(2*x + 1),x)
```

output
```
x - exp(2*x + 1)
```

3.1275 $\int \frac{e^{-e^x}\left(\left(20+x^2\right)\log(2)+e^x\left(-20x+x^2+x^3\right)\log(2)\right)}{2000-200x-195x^2+10x^3+5x^4}\,dx$

3.1275.1 Optimal result

Integrand size = 55, antiderivative size = 26

$$\int \frac{e^{-e^x}\left(\left(20+x^2\right)\log(2)+e^x\left(-20x+x^2+x^3\right)\log(2)\right)}{2000-200x-195x^2+10x^3+5x^4}\,dx=\frac{e^{-e^x}x\log(2)}{5(4-x)(5+x)}$$

output
```
1/5*ln(2)/(5+x)/exp(exp(x))/(-x+4)*x
```

3.1275.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{e^{-e^x}\left(\left(20+x^2\right)\log(2)+e^x\left(-20x+x^2+x^3\right)\log(2)\right)}{2000-200x-195x^2+10x^3+5x^4}\,dx=-\frac{e^{-e^x}x\log(2)}{5\left(-20+x+x^2\right)}$$

input
```
Integrate[((20 + x^2)*Log[2] + E^x*(-20*x + x^2 + x^3)*Log[2])/(E^E^x*(200
0 - 200*x - 195*x^2 + 10*x^3 + 5*x^4)),x]
```

output
```
-1/5*(x*Log[2])/(E^E^x*(-20 + x + x^2))
```

3.1275.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-e^x}\left(\left(x^2+20\right)\log(2)+e^x\left(x^3+x^2-20x\right)\log(2)\right)}{5x^4+10x^3-195x^2-200x+2000}dx$$

$$\Big\downarrow \text{2463}$$

$$\int \left(-\frac{2e^{-e^x}\left(\left(x^2+20\right)\log(2)+e^x\left(x^3+x^2-20x\right)\log(2)\right)}{3645(x-4)}+\frac{2e^{-e^x}\left(\left(x^2+20\right)\log(2)+e^x\left(x^3+x^2-20x\right)\log(2)\right)}{3645(x+5)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{4}{45}\log(2)\int \frac{e^{-e^x}}{(x-4)^2}dx+\frac{4}{45}\log(2)\int \frac{e^{x-e^x}}{x-4}dx+\frac{1}{9}\log(2)\int \frac{e^{-e^x}}{(x+5)^2}dx+\frac{1}{9}\log(2)\int \frac{e^{x-e^x}}{x+5}dx$$

input
```
Int[((20 + x^2)*Log[2] + E^x*(-20*x + x^2 + x^3)*Log[2])/(E^E^x*(2000 - 20
0*x - 195*x^2 + 10*x^3 + 5*x^4)),x]
```

output
```
$Aborted
```

3.1275.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.1275.4 Maple [A] (verified)

Time = 0.31 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.73

method	result	size
norman	$-\frac{x\ln(2)\mathrm{e}^{-\mathrm{e}^{x}}}{5(x^{2}+x-20)}$	19
risch	$-\frac{x\ln(2)\mathrm{e}^{-\mathrm{e}^{x}}}{5(x^{2}+x-20)}$	19
parallelrisch	$-\frac{x\ln(2)\mathrm{e}^{-\mathrm{e}^{x}}}{5(x^{2}+x-20)}$	19

input
```
int(((x^3+x^2-20*x)*ln(2)*exp(x)+(x^2+20)*ln(2))/(5*x^4+10*x^3-195*x^2-200
*x+2000)/exp(exp(x)),x,method=_RETURNVERBOSE)
```

output
```
-1/5*x*ln(2)/(x^2+x-20)/exp(exp(x))
```

3.1275.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.69

$$\int \frac{e^{-e^x}((20+x^2)\log(2)+e^x(-20x+x^2+x^3)\log(2))}{2000-200x-195x^2+10x^3+5x^4}\,dx=-\frac{xe^{(-e^x)}\log(2)}{5(x^2+x-20)}$$

input
```
integrate(((x^3+x^2-20*x)*log(2)*exp(x)+(x^2+20)*log(2))/(5*x^4+10*x^3-195
*x^2-200*x+2000)/exp(exp(x)),x, algorithm=\
```

output
```
-1/5*x*e^(-e^x)*log(2)/(x^2 + x - 20)
```

3.1275.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.77

$$\int \frac{e^{-e^x}((20+x^2)\log(2)+e^x(-20x+x^2+x^3)\log(2))}{2000-200x-195x^2+10x^3+5x^4}\,dx=-\frac{xe^{-e^x}\log(2)}{5x^2+5x-100}$$

input
```
integrate(((x**3+x**2-20*x)*ln(2)*exp(x)+(x**2+20)*ln(2))/(5*x**4+10*x**3-
195*x**2-200*x+2000)/exp(exp(x)),x)
```

output
```
-x*exp(-exp(x))*log(2)/(5*x**2 + 5*x - 100)
```

3.1275.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.69

$$\int \frac{e^{-e^x}((20+x^2)\log(2)+e^x(-20x+x^2+x^3)\log(2))}{2000-200x-195x^2+10x^3+5x^4}\,dx = -\frac{xe^{(-e^x)}\log(2)}{5(x^2+x-20)}$$

input
```
integrate((((x^3+x^2-20*x)*log(2)*exp(x)+(x^2+20)*log(2))/(5*x^4+10*x^3-195
*x^2-200*x+2000)/exp(exp(x)),x, algorithm=\
```

output
```
-1/5*x*e^(-e^x)*log(2)/(x^2 + x - 20)
```

3.1275.8 Giac [F]

$$\int \frac{e^{-e^x}((20+x^2)\log(2)+e^x(-20x+x^2+x^3)\log(2))}{2000-200x-195x^2+10x^3+5x^4}\,dx = \int \frac{((x^3+x^2-20\,x)e^x\log(2)+(x^2+20)\log(2))e^{(-e^x)}}{5\,(x^4+2\,x^3-39\,x^2-40\,x+400)}\,dx$$

input
```
integrate((((x^3+x^2-20*x)*log(2)*exp(x)+(x^2+20)*log(2))/(5*x^4+10*x^3-195
*x^2-200*x+2000)/exp(exp(x)),x, algorithm=\
```

output
```
integrate(1/5*((x^3 + x^2 - 20*x)*e^x*log(2) + (x^2 + 20)*log(2))*e^(-e^x)
/(x^4 + 2*x^3 - 39*x^2 - 40*x + 400), x)
```

3.1275.9 Mupad [B] (verification not implemented)

Time = 16.33 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.85

$$\int \frac{e^{-e^x}((20+x^2)\log(2)+e^x(-20x+x^2+x^3)\log(2))}{2000-200x-195x^2+10x^3+5x^4}\,dx = -\frac{x\,\mathrm{e}^{-\mathrm{e}^x}\,\ln(2)}{5\,(x^2+x-20)}$$

input
```
int((exp(-exp(x))*(log(2)*(x^2 + 20) + exp(x)*log(2)*(x^2 - 20*x + x^3)))/
(10*x^3 - 195*x^2 - 200*x + 5*x^4 + 2000),x)
```

output
```
-(x*exp(-exp(x))*log(2))/(5*(x + x^2 - 20))
```

3.1276 $\int \left(16e^{2e^x+x}+e^{e^x+x}(64-16e-8\log(9))\right)\,dx$

3.1276.1 Optimal result

Integrand size = 29, antiderivative size = 21

$$\int \left(16e^{2e^x+x}+e^{e^x+x}(64-16e-8\log(9))\right)\,dx=2\left(2\left(4-e+e^{e^x}\right)-\log(9)\right)^2$$

output
```
2*(2*exp(exp(x))-2*exp(1)+8-2*ln(3))^2
```

3.1276.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \left(16e^{2e^x+x}+e^{e^x+x}(64-16e-8\log(9))\right)\,dx=8e^{e^x}\left(8-2e+e^{e^x}-\log(9)\right)$$

input
```
Integrate[16*E^(2*E^x + x) + E^(E^x + x)*(64 - 16*E - 8*Log[9]),x]
```

output
```
8*E^E^x*(8 - 2*E + E^E^x - Log[9])
```

3.1276.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(16e^{x+2e^x}+e^{x+e^x}(64-16e-8\log(9))\right) dx$$

$$\Big\downarrow \ 2009$$

$$8e^{2e^x}+8e^{e^x}(8-2e-\log(9))$$

input
```
Int[16*E^(2*E^x + x) + E^(E^x + x)*(64 - 16*E - 8*Log[9]),x]
```

output
```
8*E^(2*E^x) + 8*E^E^x*(8 - 2*E - Log[9])
```

3.1276.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1276.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

method	result	size
default	$(-16\ln(3)-16\,\mathrm{e}+64)\,\mathrm{e}^{\mathrm{e}^x}+8\,\mathrm{e}^{2\,\mathrm{e}^x}$	23
norman	$(-16\ln(3)-16\,\mathrm{e}+64)\,\mathrm{e}^{\mathrm{e}^x}+8\,\mathrm{e}^{2\,\mathrm{e}^x}$	23
derivativedivides	$-16\,\mathrm{e}^{\mathrm{e}^x}\ln(3)-16\,\mathrm{e}\,\mathrm{e}^{\mathrm{e}^x}+64\,\mathrm{e}^{\mathrm{e}^x}+8\,\mathrm{e}^{2\,\mathrm{e}^x}$	28
risch	$-16\,\mathrm{e}^{\mathrm{e}^x}\ln(3)-16\,\mathrm{e}\,\mathrm{e}^{\mathrm{e}^x}+64\,\mathrm{e}^{\mathrm{e}^x}+8\,\mathrm{e}^{2\,\mathrm{e}^x}$	28
parallelrisch	$-16\,\mathrm{e}^{\mathrm{e}^x}\ln(3)-16\,\mathrm{e}\,\mathrm{e}^{\mathrm{e}^x}+64\,\mathrm{e}^{\mathrm{e}^x}+8\,\mathrm{e}^{2\,\mathrm{e}^x}$	28

input
```
int(16*exp(x)*exp(exp(x))^2+(-16*ln(3)-16*exp(1)+64)*exp(x)*exp(exp(x)),x,
method=_RETURNVERBOSE)
```

output
```
(-16*ln(3)-16*exp(1)+64)*exp(exp(x))+8*exp(exp(x))^2
```

3.1276.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 33 vs. 2(15) = 30.

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.57

$$\int \left(16e^{2e^x+x}+e^{e^x+x}(64-16e-8\log(9))\right)\,dx$$
$$=-8\left(2\left(e+\log\left(3\right)-4\right)e^{\left(2\,x+e^x\right)}-e^{\left(2\,x+2\,e^x\right)}\right)e^{\left(-2\,x\right)}$$

input
```
integrate(16*exp(x)*exp(exp(x))^2+(-16*log(3)-16*exp(1)+64)*exp(x)*exp(exp
(x)),x, algorithm=\
```

output
```
-8*(2*(e + log(3) - 4)*e^(2*x + e^x) - e^(2*x + 2*e^x))*e^(-2*x)
```

3.1276.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \left(16e^{2e^x+x}+e^{e^x+x}(64-16e-8\log(9))\right)\,dx=8e^{2e^x}+\left(-16e-16\log\left(3\right)+64\right)e^{e^x}$$

input
```
integrate(16*exp(x)*exp(exp(x))**2+(-16*ln(3)-16*exp(1)+64)*exp(x)*exp(exp
(x)),x)
```

output
```
8*exp(2*exp(x)) + (-16*E - 16*log(3) + 64)*exp(exp(x))
```

3.1276.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \left(16e^{2e^x+x}+e^{e^x+x}(64-16e-8\log(9))\right)\,dx=-16\left(e+\log\left(3\right)-4\right)e^{\left(e^x\right)}+8\,e^{\left(2\,e^x\right)}$$

input
```
integrate(16*exp(x)*exp(exp(x))^2+(-16*log(3)-16*exp(1)+64)*exp(x)*exp(exp
(x)),x, algorithm=\
```

output
```
-16*(e + log(3) - 4)*e^(e^x) + 8*e^(2*e^x)
```

3.1276.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \left(16e^{2e^x+x}+e^{e^x+x}(64-16e-8\log(9))\right)\,dx=-16\,(e+\log{(3)}-4)e^{\left(e^x\right)}+8\,e^{\left(2\,e^x\right)}$$

input
```
integrate(16*exp(x)*exp(exp(x))^2+(-16*log(3)-16*exp(1)+64)*exp(x)*exp(exp
(x)),x, algorithm=\
```

output
```
-16*(e + log(3) - 4)*e^(e^x) + 8*e^(2*e^x)
```

3.1276.9 Mupad [B] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.86

$$\int \left(16e^{2e^x+x}+e^{e^x+x}(64-16e-8\log(9))\right)\,dx=8\,\mathrm{e}^{\mathrm{e}^x}\,\left(\mathrm{e}^{\mathrm{e}^x}-2\,\mathrm{e}-2\,\ln\left(3\right)+8\right)$$

input
```
int(16*exp(2*exp(x))*exp(x) - exp(exp(x))*exp(x)*(16*exp(1) + 16*log(3) -
64),x)
```

output
```
8*exp(exp(x))*(exp(exp(x)) - 2*exp(1) - 2*log(3) + 8)
```

3.1277 $\int \frac{3+e^5(-1-2x)+6x+e(1+2x)+e^x(1+2x)+2e^x x\log(-}{6x^2+2ex^2-2e^5x^2+2e^xx^2+(3x+ex-e^5x+e^xx)\log^2(-12-4e+4e^5-}$

3.1277.1 Optimal result

Integrand size = 141, antiderivative size = 25

$$\int \frac{3+e^5(-1-2x)+6x+e(1+2x)+e^x(1+2x)+2e^xx\log(-12-4e+4e^5-4e^x)}{6x^2+2ex^2-2e^5x^2+2e^xx^2+(3x+ex-e^5x+e^xx)\log^2(-12-4e+4e^5-4e^x)+(3x+ex-e^5x+e^x}$$
$$=\log\left(2x+\log^2\left(4\left(-3-e+e^5-e^x\right)\right)+\log(x)\right)$$

output
```
ln(ln(x)+ln(-4*exp(x)+4*exp(5)-4*exp(1)-12)^2+2*x)
```

3.1277.2 Mathematica [A] (verified)

Time = 1.09 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92

$$\int \frac{3+e^5(-1-2x)+6x+e(1+2x)+e^x(1+2x)+2e^xx\log(-12-4e+4e^5-4e^x)}{6x^2+2ex^2-2e^5x^2+2e^xx^2+(3x+ex-e^5x+e^xx)\log^2(-12-4e+4e^5-4e^x)+(3x+ex-e^5x+e^}$$
$$=\log\left(2x+\log^2\left(-4\left(3+e-e^5+e^x\right)\right)+\log(x)\right)$$

input
```
Integrate[(3 + E^5*(-1 - 2*x) + 6*x + E*(1 + 2*x) + E^x*(1 + 2*x) + 2*E^x*
x*Log[-12 - 4*E + 4*E^5 - 4*E^x])/(6*x^2 + 2*E*x^2 - 2*E^5*x^2 + 2*E^x*x^2
 + (3*x + E*x - E^5*x + E^x*x)*Log[-12 - 4*E + 4*E^5 - 4*E^x]^2 + (3*x + E
*x - E^5*x + E^x*x)*Log[x]),x]
```

output
```
Log[2*x + Log[-4*(3 + E - E^5 + E^x)]^2 + Log[x]]
```

3.1277.3 Rubi [A] (verified)

Time = 0.91 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.92, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.028, Rules used = {6, 6, 7292, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^5(-2x-1)+6x+e^x(2x+1)+e(2x+1)+2e^x x\log\left(-4e^x-12-4e+4e^5\right)+3}{2e^x x^2-2e^5x^2+2ex^2+6x^2+\left(e^x x-e^5x+ex+3x\right)\log^2\left(-4e^x-12-4e+4e^5\right)+\left(e^x x-e^5x+ex+3x\right)\log}$$

$$\Big\downarrow 6$$

$$\int \frac{e^5(-2x-1)+6x+e^x(2x+1)+e(2x+1)+2e^x x\log\left(-4e^x-12-4e+4e^5\right)+3}{2e^x x^2+(6+2e)x^2-2e^5x^2+\left(e^x x-e^5x+ex+3x\right)\log^2\left(-4e^x-12-4e+4e^5\right)+\left(e^x x-e^5x+ex+3x\right)\log(}$$

$$\Big\downarrow 6$$

$$\int \frac{e^5(-2x-1)+6x+e^x(2x+1)+e(2x+1)+2e^x x\log\left(-4e^x-12-4e+4e^5\right)+3}{2e^x x^2+\left(6+2e-2e^5\right)x^2+\left(e^x x-e^5x+ex+3x\right)\log^2\left(-4e^x-12-4e+4e^5\right)+\left(e^x x-e^5x+ex+3x\right)\log(x}$$

$$\Big\downarrow 7292$$

$$\int \frac{\left(1-\frac{1}{e^4}\right)e^5(-2x-1)+6x+e^x(2x+1)+2e^x x\log\left(-4e^x-12-4e+4e^5\right)+3}{\left(e^x+3\left(1-\frac{1}{3}e\left(e^4-1\right)\right)\right)x\left(2x+\log^2\left(-4\left(e^x+3+e-e^5\right)\right)+\log(x)\right)}dx$$

$$\Big\downarrow 7235$$

$$\log\left(2x+\log^2\left(-4(e^x+3+e-e^5)\right)+\log(x)\right)$$

input
```
Int[(3 + E^5*(-1 - 2*x) + 6*x + E*(1 + 2*x) + E^x*(1 + 2*x) + 2*E^x*x*Log[
-12 - 4*E + 4*E^5 - 4*E^x])/(6*x^2 + 2*E*x^2 - 2*E^5*x^2 + 2*E^x*x^2 + (3*
x + E*x - E^5*x + E^x*x)*Log[-12 - 4*E + 4*E^5 - 4*E^x]^2 + (3*x + E*x - E
^5*x + E^x*x)*Log[x]),x]
```

output
```
Log[2*x + Log[-4*(3 + E - E^5 + E^x)]^2 + Log[x]]
```

3.1277.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

3.1277.4 Maple [A] (verified)

Time = 5.40 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

method	result	size
risch	$\ln\left(\ln(x)+\ln\left(-4\,\mathrm{e}^{x}+4\,\mathrm{e}^{5}-4\,\mathrm{e}-12\right)^{2}+2x\right)$	25
parallelrisch	$\ln\left(\frac{\ln\left(-4\,\mathrm{e}^{x}+4\,\mathrm{e}^{5}-4\,\mathrm{e}-12\right)^{2}}{2}+x+\frac{\ln(x)}{2}\right)$	27

input
```
int((2*x*exp(x)*ln(-4*exp(x)+4*exp(5)-4*exp(1)-12)+(1+2*x)*exp(x)+(-1-2*x)
*exp(5)+(1+2*x)*exp(1)+6*x+3)/((exp(x)*x-x*exp(5)+x*exp(1)+3*x)*ln(-4*exp(
x)+4*exp(5)-4*exp(1)-12)^2+(exp(x)*x-x*exp(5)+x*exp(1)+3*x)*ln(x)+2*exp(x)
*x^2-2*x^2*exp(5)+2*x^2*exp(1)+6*x^2),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(x)+ln(-4*exp(x)+4*exp(5)-4*exp(1)-12)^2+2*x)
```

3.1277.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{3+e^5(-1-2x)+6x+e(1+2x)+e^x(1+2x)+2e^x x\log\left(-12-4e+4e^5-4e^x\right)}{6x^2+2ex^2-2e^5x^2+2e^xx^2+\left(3x+ex-e^5x+e^xx\right)\log^2\left(-12-4e+4e^5-4e^x\right)+\left(3x+ex-e^5x+e^xx\right)\log(x)}\,dx$$
$$=\log\left(\log\left(4\,e^5-4\,e-4\,e^x-12\right)^2+2\,x+\log(x)\right)$$

input
```
integrate((2*x*exp(x)*log(-4*exp(x)+4*exp(5)-4*exp(1)-12)+(1+2*x)*exp(x)+(
-1-2*x)*exp(5)+(1+2*x)*exp(1)+6*x+3)/((exp(x)*x-x*exp(5)+x*exp(1)+3*x)*log
(-4*exp(x)+4*exp(5)-4*exp(1)-12)^2+(exp(x)*x-x*exp(5)+x*exp(1)+3*x)*log(x)
+2*exp(x)*x^2-2*x^2*exp(5)+2*x^2*exp(1)+6*x^2),x, algorithm=\
```

output
```
log(log(4*e^5 - 4*e - 4*e^x - 12)^2 + 2*x + log(x))
```

3.1277.6 Sympy [A] (verification not implemented)

Time = 1.56 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{3+e^5(-1-2x)+6x+e(1+2x)+e^x(1+2x)+2e^xx\log\left(-12-4e+4e^5-4e^x\right)}{6x^2+2ex^2-2e^5x^2+2e^xx^2+(3x+ex-e^5x+e^xx)\log^2\left(-12-4e+4e^5-4e^x\right)+(3x+ex-e^5x+e^x$$
$$=\log\left(2x+\log(x)+\log\left(-4e^x-12-4e+4e^5\right)^2\right)$$

input
```
integrate((2*x*exp(x)*ln(-4*exp(x)+4*exp(5)-4*exp(1)-12)+(1+2*x)*exp(x)+(-
1-2*x)*exp(5)+(1+2*x)*exp(1)+6*x+3)/((exp(x)*x-x*exp(5)+x*exp(1)+3*x)*ln(-
4*exp(x)+4*exp(5)-4*exp(1)-12)**2+(exp(x)*x-x*exp(5)+x*exp(1)+3*x)*ln(x)+2
*exp(x)*x**2-2*x**2*exp(5)+2*x**2*exp(1)+6*x**2),x)
```

output
```
log(2*x + log(x) + log(-4*exp(x) - 12 - 4*E + 4*exp(5))**2)
```

3.1277.7 Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.36 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.28

$$\int \frac{3+e^5(-1-2x)+6x+e(1+2x)+e^x(1+2x)+2e^xx\log\left(-12-4e+4e^5-4e^x\right)}{6x^2+2ex^2-2e^5x^2+2e^xx^2+(3x+ex-e^5x+e^xx)\log^2\left(-12-4e+4e^5-4e^x\right)+(3x+ex-e^5x+e^x$$
$$=\log\left(-\pi^2+4i\pi\log(2)+4\log(2)^2-2(-i\pi-2\log(2))\log\left(-e^5+e+e^x+3\right)+\log\left(-e^5+e+e^x+3\right)^2+2x+\log(x)\right)$$

input
```
integrate((2*x*exp(x)*log(-4*exp(x)+4*exp(5)-4*exp(1)-12)+(1+2*x)*exp(x)+(
-1-2*x)*exp(5)+(1+2*x)*exp(1)+6*x+3)/((exp(x)*x-x*exp(5)+x*exp(1)+3*x)*log
(-4*exp(x)+4*exp(5)-4*exp(1)-12)^2+(exp(x)*x-x*exp(5)+x*exp(1)+3*x)*log(x)
+2*exp(x)*x^2-2*x^2*exp(5)+2*x^2*exp(1)+6*x^2),x, algorithm=\
```

output
```
log(-pi^2 + 4*I*pi*log(2) + 4*log(2)^2 - 2*(-I*pi - 2*log(2))*log(-e^5 + e
 + e^x + 3) + log(-e^5 + e + e^x + 3)^2 + 2*x + log(x))
```

3.1277.8 Giac [A] (verification not implemented)

Time = 0.46 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{3+e^5(-1-2x)+6x+e(1+2x)+e^x(1+2x)+2e^xx\log\left(-12-4e+4e^5-4e^x\right)}{6x^2+2ex^2-2e^5x^2+2e^xx^2+(3x+ex-e^5x+e^xx)\log^2\left(-12-4e+4e^5-4e^x\right)+(3x+ex-e^5x+e^x$$
$$= \log\left(\log\left(4\,e^5-4\,e-4\,e^x-12\right)^2+2\,x+\log\left(x\right)\right)$$

input
```
integrate((2*x*exp(x)*log(-4*exp(x)+4*exp(5)-4*exp(1)-12)+(1+2*x)*exp(x)+(
-1-2*x)*exp(5)+(1+2*x)*exp(1)+6*x+3)/((exp(x)*x-x*exp(5)+x*exp(1)+3*x)*log
(-4*exp(x)+4*exp(5)-4*exp(1)-12)^2+(exp(x)*x-x*exp(5)+x*exp(1)+3*x)*log(x)
+2*exp(x)*x^2-2*x^2*exp(5)+2*x^2*exp(1)+6*x^2),x, algorithm=\
```

output
```
log(log(4*e^5 - 4*e - 4*e^x - 12)^2 + 2*x + log(x))
```

3.1277.9 Mupad [B] (verification not implemented)

Time = 16.84 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{3+e^5(-1-2x)+6x+e(1+2x)+e^x(1+2x)+2e^xx\log\left(-12-4e+4e^5-4e^x\right)}{6x^2+2ex^2-2e^5x^2+2e^xx^2+(3x+ex-e^5x+e^xx)\log^2\left(-12-4e+4e^5-4e^x\right)+(3x+ex-e^5x+e^x$$
$$= \ln\left(\ln\left(4\,\mathrm{e}^5-4\,\mathrm{e}-4\,\mathrm{e}^x-12\right)^2+2\,x+\ln\left(x\right)\right)$$

input
```
int((6*x + exp(x)*(2*x + 1) + exp(1)*(2*x + 1) - exp(5)*(2*x + 1) + 2*x*ex
p(x)*log(4*exp(5) - 4*exp(1) - 4*exp(x) - 12) + 3)/(2*x^2*exp(x) + 2*x^2*e
xp(1) - 2*x^2*exp(5) + log(x)*(3*x + x*exp(1) - x*exp(5) + x*exp(x)) + log
(4*exp(5) - 4*exp(1) - 4*exp(x) - 12)^2*(3*x + x*exp(1) - x*exp(5) + x*exp
(x)) + 6*x^2),x)
```

output
```
log(2*x + log(x) + log(4*exp(5) - 4*exp(1) - 4*exp(x) - 12)^2)
```

3.1278 $\int \frac{3+2x}{1+3x+x^2} \, dx$

3.1278.1 Optimal result

Integrand size = 16, antiderivative size = 19

$$\int \frac{3+2x}{1+3x+x^2} \, dx = \log \left(\frac{1}{2}\left(1-x+x^2+\log \left(e^{4x}\right)\right)\right)$$

output
```
ln(1/2*ln(exp(x)^4)-1/2*x+1/2+1/2*x^2)
```

3.1278.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.47

$$\int \frac{3+2x}{1+3x+x^2} \, dx = \log \left(1+3x+x^2\right)$$

input
```
Integrate[(3 + 2*x)/(1 + 3*x + x^2),x]
```

output
```
Log[1 + 3*x + x^2]
```

3.1278.3 Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.47, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {1103}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x+3}{x^2+3x+1} \, dx$$
$$\Big\downarrow \; 1103$$
$$\log \left(x^2+3x+1\right)$$

input
```
Int[(3 + 2*x)/(1 + 3*x + x^2),x]
```

output
```
Log[1 + 3*x + x^2]
```

3.1278.3.1 Defintions of rubi rules used

rule 1103
```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[d*(Log[RemoveContent[a + b*x + c*x^2, x]]/b), x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

3.1278.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53

method	result	size
derivativedivides	$\ln \left(x^2+3x+1\right)$	10
default	$\ln \left(x^2+3x+1\right)$	10
norman	$\ln \left(x^2+3x+1\right)$	10
risch	$\ln \left(x^2+3x+1\right)$	10
parallelrisch	$\ln \left(x^2+3x+1\right)$	10

input
```
int((3+2*x)/(x^2+3*x+1),x,method=_RETURNVERBOSE)
```

output
```
ln(x^2+3*x+1)
```

3.1278.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.47

$$\int \frac{3+2x}{1+3x+x^2}\,dx = \log\left(x^2+3\,x+1\right)$$

input
```
integrate((3+2*x)/(x^2+3*x+1),x, algorithm=\
```

output
```
log(x^2 + 3*x + 1)
```

3.1278.6 Sympy [A] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.42

$$\int \frac{3+2x}{1+3x+x^2}\,dx = \log\left(x^2+3x+1\right)$$

input
```
integrate((3+2*x)/(x**2+3*x+1),x)
```

output
```
log(x**2 + 3*x + 1)
```

3.1278.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.47

$$\int \frac{3+2x}{1+3x+x^2}\,dx = \log\left(x^2+3\,x+1\right)$$

input
```
integrate((3+2*x)/(x^2+3*x+1),x, algorithm=\
```

output
```
log(x^2 + 3*x + 1)
```

3.1278.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.53

$$\int \frac{3+2x}{1+3x+x^2}\,dx = \log\left(\left|x^2+3\,x+1\right|\right)$$

input
```
integrate((3+2*x)/(x^2+3*x+1),x, algorithm=\
```

output
```
log(abs(x^2 + 3*x + 1))
```

3.1278.9 Mupad [B] (verification not implemented)

Time = 15.70 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.47

$$\int \frac{3+2x}{1+3x+x^2}\,dx = \ln\left(x^2+3\,x+1\right)$$

input
```
int((2*x + 3)/(3*x + x^2 + 1),x)
```

output
```
log(3*x + x^2 + 1)
```

3.1279 $\int \frac{-5+e^{4x^2+4x^3}(14x^2+112x^4+168x^5)}{x^2}\,dx$

3.1279.1 Optimal result

Integrand size = 36, antiderivative size = 20

$$\int \frac{-5+e^{4x^2+4x^3}(14x^2+112x^4+168x^5)}{x^2}\,dx = 5+\frac{5}{x}+14e^{4x(x+x^2)}x$$

output
```
5+5/x+14*exp(4*x*(x^2+x))*x
```

3.1279.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{-5+e^{4x^2+4x^3}(14x^2+112x^4+168x^5)}{x^2}\,dx = \frac{5}{x}+14e^{4x^2(1+x)}x$$

input
```
Integrate[(-5 + E^(4*x^2 + 4*x^3)*(14*x^2 + 112*x^4 + 168*x^5))/x^2,x]
```

output
```
5/x + 14*E^(4*x^2*(1 + x))*x
```

3.1279.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 41 vs. $2(20) = 40$.

Time = 0.20 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.05, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{4x^3+4x^2}\left(168x^5+112x^4+14x^2\right)-5}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(14e^{4x^2(x+1)}\left(12x^3+8x^2+1\right)-\frac{5}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{14e^{4x^2(x+1)}\left(3x^3+2x^2\right)}{x^2+2(x+1)x}+\frac{5}{x}$$

input
```
Int[(-5 + E^(4*x^2 + 4*x^3)*(14*x^2 + 112*x^4 + 168*x^5))/x^2,x]
```

output
```
5/x + (14*E^(4*x^2*(1 + x))*(2*x^2 + 3*x^3))/(x^2 + 2*x*(1 + x))
```

3.1279.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1279.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result	size
risch	$\frac{5}{x}+14x\,\mathrm{e}^{4x^2(1+x)}$	19
parts	$\frac{5}{x}+14x\,\mathrm{e}^{4x^3+4x^2}$	22
norman	$\frac{5+14\,\mathrm{e}^{4x^3+4x^2}x^2}{x}$	24
parallelrisch	$\frac{5+14\,\mathrm{e}^{4x^3+4x^2}x^2}{x}$	24

input
```
int(((168*x^5+112*x^4+14*x^2)*exp(4*x^3+4*x^2)-5)/x^2,x,method=_RETURNVERB
OSE)
```

output
```
5/x+14*x*exp(4*x^2*(1+x))
```

3.1279.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{-5+e^{4x^2+4x^3}(14x^2+112x^4+168x^5)}{x^2}\,dx=\frac{14\,x^2e^{\left(4\,x^3+4\,x^2\right)}+5}{x}$$

input
```
integrate(((168*x^5+112*x^4+14*x^2)*exp(4*x^3+4*x^2)-5)/x^2,x, algorithm=\
```

output
```
(14*x^2*e^(4*x^3 + 4*x^2) + 5)/x
```

3.1279.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{-5+e^{4x^2+4x^3}(14x^2+112x^4+168x^5)}{x^2}\,dx=14xe^{4x^3+4x^2}+\frac{5}{x}$$

input
```
integrate(((168*x**5+112*x**4+14*x**2)*exp(4*x**3+4*x**2)-5)/x**2,x)
```

output
```
14*x*exp(4*x**3 + 4*x**2) + 5/x
```

3.1279.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{-5+e^{4x^2+4x^3}(14x^2+112x^4+168x^5)}{x^2}\,dx = 14\,xe^{\left(4\,x^3+4\,x^2\right)}+\frac{5}{x}$$

input
```
integrate(((168*x^5+112*x^4+14*x^2)*exp(4*x^3+4*x^2)-5)/x^2,x, algorithm=\
```

output
```
14*x*e^(4*x^3 + 4*x^2) + 5/x
```

3.1279.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{-5+e^{4x^2+4x^3}(14x^2+112x^4+168x^5)}{x^2}\,dx = \frac{14\,x^2e^{\left(4\,x^3+4\,x^2\right)}+5}{x}$$

input
```
integrate(((168*x^5+112*x^4+14*x^2)*exp(4*x^3+4*x^2)-5)/x^2,x, algorithm=\
```

output
```
(14*x^2*e^(4*x^3 + 4*x^2) + 5)/x
```

3.1279.9 Mupad [B] (verification not implemented)

Time = 15.60 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{-5+e^{4x^2+4x^3}(14x^2+112x^4+168x^5)}{x^2}\,dx = 14\,x\,\mathrm{e}^{4\,x^3+4\,x^2}+\frac{5}{x}$$

input
```
int((exp(4*x^2 + 4*x^3)*(14*x^2 + 112*x^4 + 168*x^5) - 5)/x^2,x)
```

output
```
14*x*exp(4*x^2 + 4*x^3) + 5/x
```

3.1280 $\int \frac{-30x-2\log(105)-10x\log(x)}{x}\,dx$

3.1280.1 Optimal result

Integrand size = 17, antiderivative size = 15

$$\int \frac{-30x-2\log(105)-10x\log(x)}{x}\,dx = (-5x-\log(105))(4+2\log(x))$$

output
```
(2*ln(x)+4)*(-ln(105)-5*x)
```

3.1280.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{-30x-2\log(105)-10x\log(x)}{x}\,dx = -20x-10x\log(x)-2\log(105)\log(x)$$

input
```
Integrate[(-30*x - 2*Log[105] - 10*x*Log[x])/x,x]
```

output
```
-20*x - 10*x*Log[x] - 2*Log[105]*Log[x]
```

3.1280.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-30x-10x\log(x)-2\log(105)}{x}\,dx$$
$$\Big\downarrow \ 2010$$
$$\int \left(-\frac{2(15x+\log(105))}{x}-10\log(x)\right)dx$$
$$\Big\downarrow \ 2009$$
$$-20x-10x\log(x)-2\log(105)\log(x)$$

input
```
Int[(-30*x - 2*Log[105] - 10*x*Log[x])/x,x]
```

output
```
-20*x - 10*x*Log[x] - 2*Log[105]*Log[x]
```

3.1280.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1280.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

method	result	size
default	$-10x\ln(x)-20x-2\ln(105)\ln(x)$	16
norman	$-10x\ln(x)-20x-2\ln(105)\ln(x)$	16
parallelrisch	$-10x\ln(x)-20x-2\ln(105)\ln(x)$	16
parts	$-10x\ln(x)-20x-2\ln(105)\ln(x)$	16
risch	$-10x\ln(x)-2\ln(3)\ln(x)-2\ln(x)\ln(7)-2\ln(5)\ln(x)-20x$	28

input
```
int((-10*x*ln(x)-2*ln(105)-30*x)/x,x,method=_RETURNVERBOSE)
```

output
```
-10*x*ln(x)-20*x-2*ln(105)*ln(x)
```

3.1280.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{-30x-2\log(105)-10x\log(x)}{x}\,dx = -2\,(5\,x+\log(105))\log(x)-20\,x$$

input
```
integrate((-10*x*log(x)-2*log(105)-30*x)/x,x, algorithm=\
```

output
```
-2*(5*x + log(105))*log(x) - 20*x
```

3.1280.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.27

$$\int \frac{-30x-2\log(105)-10x\log(x)}{x}\,dx = -10x\log(x)-20x-2\log(105)\log(x)$$

input
```
integrate((-10*x*ln(x)-2*ln(105)-30*x)/x,x)
```

output
```
-10*x*log(x) - 20*x - 2*log(105)*log(x)
```

3.1280.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{-30x - 2\log(105) - 10x\log(x)}{x} \, dx = -10\,x\log{(x)} - 2\,\log{(105)}\log{(x)} - 20\,x$$

input
```
integrate((-10*x*log(x)-2*log(105)-30*x)/x,x, algorithm=\
```

output
```
-10*x*log(x) - 2*log(105)*log(x) - 20*x
```

3.1280.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{-30x - 2\log(105) - 10x\log(x)}{x} \, dx = -10\,x\log{(x)} - 2\,\log{(105)}\log{(x)} - 20\,x$$

input
```
integrate((-10*x*log(x)-2*log(105)-30*x)/x,x, algorithm=\
```

output
```
-10*x*log(x) - 2*log(105)*log(x) - 20*x
```

3.1280.9 Mupad [B] (verification not implemented)

Time = 16.48 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{-30x - 2\log(105) - 10x\log(x)}{x} \, dx = -20\,x - 2\,\ln{(105)}\,\ln{(x)} - 10\,x\,\ln{(x)}$$

input
```
int(-(30*x + 2*log(105) + 10*x*log(x))/x,x)
```

output
```
- 20*x - 2*log(105)*log(x) - 10*x*log(x)
```

3.1281 $\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+(2x-500x^2+100x^3+6250\ldots}{25-10x+x^2-6250x^4+1250x^5+390625x^8+(-500x^2+100x^3+62500\ldots}$

3.1281.1 Optimal result

Integrand size = 142, antiderivative size = 22

$$\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+(2x-500x^2+100x^3+62500x^6)\log(x)+(-10+3750x\ldots}{25-10x+x^2-6250x^4+1250x^5+390625x^8+(-500x^2+100x^3+62500x^6)\log(x)+(-10+2x+375\ldots}$$
$$=\frac{x}{1+\frac{x}{-5+(25x^2+\log(x))^2}}$$

output
```
x/(x/((ln(x)+25*x^2)^2-5)+1)
```

3.1281.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

$$\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+(2x-500x^2+100x^3+62500x^6)\log(x)+(-10+3750x\ldots}{25-10x+x^2-6250x^4+1250x^5+390625x^8+(-500x^2+100x^3+62500x^6)\log(x)+(-10+2x+375\ldots}$$
$$=x-\frac{x^2}{-5+x+625x^4+50x^2\log(x)+\log^2(x)}$$

input
```
Integrate[(25 + 50*x^3 - 6250*x^4 + 2500*x^5 + 390625*x^8 + (2*x - 500*x^2
 + 100*x^3 + 62500*x^6)*Log[x] + (-10 + 3750*x^4)*Log[x]^2 + 100*x^2*Log[x
]^3 + Log[x]^4)/(25 - 10*x + x^2 - 6250*x^4 + 1250*x^5 + 390625*x^8 + (-50
0*x^2 + 100*x^3 + 62500*x^6)*Log[x] + (-10 + 2*x + 3750*x^4)*Log[x]^2 + 10
0*x^2*Log[x]^3 + Log[x]^4),x]
```

3.1281. $\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+(2x-500x^2+100x^3+62500x^6)\log(x)+(-10+3750x^4)\log^2(x)+100x^2\log^3(x)+\log^4(x)}{25-10x+x^2-6250x^4+1250x^5+390625x^8+(-500x^2+100x^3+62500x^6)\log(x)+(-10+2x+3750x^4)\log^2(x)+100x^2\log^3(x)+\log^4(x)}\,dx$

output
```
x - x^2/(-5 + x + 625*x^4 + 50*x^2*Log[x] + Log[x]^2)
```

3.1281.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the the arrow. The rules definitions used are listed below.

$$\int \frac{390625x^8+2500x^5-6250x^4+\left(3750x^4-10\right)\log^2(x)+50x^3+100x^2\log^3(x)+\left(62500x^6+100x^3-500x^2\right.}{390625x^8+1250x^5-6250x^4+\left(3750x^4+2x-10\right)\log^2(x)+x^2+100x^2\log^3(x)+\left(62500x^6+100x^3-500x^2\right.}$$

$$\Big\downarrow \text{7292}$$

$$\int \frac{390625x^8+2500x^5-6250x^4+\left(3750x^4-10\right)\log^2(x)+50x^3+100x^2\log^3(x)+\left(62500x^6+100x^3-500x^2+\right.}{\left(-625x^4-50x^2\log(x)-x-\log^2(x)+5\right)^2}$$

$$\Big\downarrow \text{7293}$$

$$\int \left(-\frac{2x}{625x^4+50x^2\log(x)+x+\log^2(x)-5}+\frac{x\left(2500x^4+50x^2+100x^2\log(x)+x+2\log(x)\right)}{\left(625x^4+50x^2\log(x)+x+\log^2(x)-5\right)^2}+1\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\int \frac{x^2}{\left(625x^4+50\log(x)x^2+x+\log^2(x)-5\right)^2}dx+2\int \frac{x\log(x)}{\left(625x^4+50\log(x)x^2+x+\log^2(x)-5\right)^2}dx-2\int \frac{x}{625x^4+50\log(x)x^2+x+\log^2(x)-5}dx+2500\int \frac{x^5}{\left(625x^4+50\log(x)x^2+x+\log^2(x)-5\right)^2}dx+50\int \frac{x^3}{\left(625x^4+50\log(x)x^2+x+\log^2(x)-5\right)^2}dx+100\int \frac{x^3\log(x)}{\left(625x^4+50\log(x)x^2+x+\log^2(x)-5\right)^2}dx+x$$

input
```
Int[(25 + 50*x^3 - 6250*x^4 + 2500*x^5 + 390625*x^8 + (2*x - 500*x^2 + 100
*x^3 + 62500*x^6)*Log[x] + (-10 + 3750*x^4)*Log[x]^2 + 100*x^2*Log[x]^3 +
Log[x]^4)/(25 - 10*x + x^2 - 6250*x^4 + 1250*x^5 + 390625*x^8 + (-500*x^2
+ 100*x^3 + 62500*x^6)*Log[x] + (-10 + 2*x + 3750*x^4)*Log[x]^2 + 100*x^2*
Log[x]^3 + Log[x]^4),x]
```

3.1281.

$$\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+\left(2x-500x^2+100x^3+62500x^6\right)\log(x)+\left(-10+3750x^4\right)\log^2(x)+100x^2\log^3(x)+\log^4(x)}{25-10x+x^2-6250x^4+1250x^5+390625x^8+\left(-500x^2+100x^3+62500x^6\right)\log(x)+\left(-10+2x+3750x^4\right)\log^2(x)+100x^2\log^3(x)+\log^4(x)}\,dx$$

output
```
$Aborted
```

3.1281.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1281.4 Maple [A] (verified)

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.32

method	result	size
default	$x-\frac{x^{2}}{625x^{4}+50x^{2}\ln\left(x\right)+\ln\left(x\right)^{2}+x-5}$	29
risch	$x-\frac{x^{2}}{625x^{4}+50x^{2}\ln\left(x\right)+\ln\left(x\right)^{2}+x-5}$	29
parallelrisch	$\frac{625x^{5}+50x^{3}\ln\left(x\right)+x\ln\left(x\right)^{2}-5x}{625x^{4}+50x^{2}\ln\left(x\right)+\ln\left(x\right)^{2}+x-5}$	45

input
```
int((ln(x)^4+100*x^2*ln(x)^3+(3750*x^4-10)*ln(x)^2+(62500*x^6+100*x^3-500*
x^2+2*x)*ln(x)+390625*x^8+2500*x^5-6250*x^4+50*x^3+25)/(ln(x)^4+100*x^2*ln
(x)^3+(3750*x^4+2*x-10)*ln(x)^2+(62500*x^6+100*x^3-500*x^2)*ln(x)+390625*x
^8+1250*x^5-6250*x^4+x^2-10*x+25),x,method=_RETURNVERBOSE)
```

output
```
x-x^2/(625*x^4+50*x^2*ln(x)+ln(x)^2+x-5)
```

3.1281.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.00

$$\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+(2x-500x^2+100x^3+62500x^6)\log(x)+(-10+3750x^4)\log^2(x)+100x^2\log^3(x)+\log^4(x)}{25-10x+x^2-6250x^4+1250x^5+390625x^8+(-500x^2+100x^3+62500x^6)\log(x)+(-10+2x+3750x^4)\log^2(x)+100x^2\log^3(x)+\log^4(x)}\,dx = \frac{625\,x^5+50\,x^3\log(x)+x\log(x)^2-5\,x}{625\,x^4+50\,x^2\log(x)+\log(x)^2+x-5}$$

input
```
integrate((log(x)^4+100*x^2*log(x)^3+(3750*x^4-10)*log(x)^2+(62500*x^6+100
*x^3-500*x^2+2*x)*log(x)+390625*x^8+2500*x^5-6250*x^4+50*x^3+25)/(log(x)^4
+100*x^2*log(x)^3+(3750*x^4+2*x-10)*log(x)^2+(62500*x^6+100*x^3-500*x^2)*l
og(x)+390625*x^8+1250*x^5-6250*x^4+x^2-10*x+25),x, algorithm=\
```

output
```
(625*x^5 + 50*x^3*log(x) + x*log(x)^2 - 5*x)/(625*x^4 + 50*x^2*log(x) + lo
g(x)^2 + x - 5)
```

3.1281.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.18

$$\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+(2x-500x^2+100x^3+62500x^6)\log(x)+(-10+3750x^4)\log^2(x)+100x^2\log^3(x)+\log^4(x)}{25-10x+x^2-6250x^4+1250x^5+390625x^8+(-500x^2+100x^3+62500x^6)\log(x)+(-10+2x+3750x^4)\log^2(x)+100x^2\log^3(x)+\log^4(x)}\,dx = -\frac{x^2}{625x^4+50x^2\log(x)+x+\log(x)^2-5}+x$$

input
```
integrate((ln(x)**4+100*x**2*ln(x)**3+(3750*x**4-10)*ln(x)**2+(62500*x**6+
100*x**3-500*x**2+2*x)*ln(x)+390625*x**8+2500*x**5-6250*x**4+50*x**3+25)/(
ln(x)**4+100*x**2*ln(x)**3+(3750*x**4+2*x-10)*ln(x)**2+(62500*x**6+100*x**
3-500*x**2)*ln(x)+390625*x**8+1250*x**5-6250*x**4+x**2-10*x+25),x)
```

output
```
-x**2/(625*x**4 + 50*x**2*log(x) + x + log(x)**2 - 5) + x
```

3.1281.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.00

$$\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+(2x-500x^2+100x^3+62500x^6)\log(x)+(-10+3750x}{25-10x+x^2-6250x^4+1250x^5+390625x^8+(-500x^2+100x^3+62500x^6)\log(x)+(-10+2x+375}$$
$$=\frac{625\,x^5+50\,x^3\log(x)+x\log(x)^2-5\,x}{625\,x^4+50\,x^2\log(x)+\log(x)^2+x-5}$$

input
```
integrate((log(x)^4+100*x^2*log(x)^3+(3750*x^4-10)*log(x)^2+(62500*x^6+100
*x^3-500*x^2+2*x)*log(x)+390625*x^8+2500*x^5-6250*x^4+50*x^3+25)/(log(x)^4
+100*x^2*log(x)^3+(3750*x^4+2*x-10)*log(x)^2+(62500*x^6+100*x^3-500*x^2)*l
og(x)+390625*x^8+1250*x^5-6250*x^4+x^2-10*x+25),x, algorithm=\
```

output
```
(625*x^5 + 50*x^3*log(x) + x*log(x)^2 - 5*x)/(625*x^4 + 50*x^2*log(x) + lo
g(x)^2 + x - 5)
```

3.1281.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

$$\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+(2x-500x^2+100x^3+62500x^6)\log(x)+(-10+3750x}{25-10x+x^2-6250x^4+1250x^5+390625x^8+(-500x^2+100x^3+62500x^6)\log(x)+(-10+2x+375}$$
$$=x-\frac{x^2}{625\,x^4+50\,x^2\log(x)+\log(x)^2+x-5}$$

input
```
integrate((log(x)^4+100*x^2*log(x)^3+(3750*x^4-10)*log(x)^2+(62500*x^6+100
*x^3-500*x^2+2*x)*log(x)+390625*x^8+2500*x^5-6250*x^4+50*x^3+25)/(log(x)^4
+100*x^2*log(x)^3+(3750*x^4+2*x-10)*log(x)^2+(62500*x^6+100*x^3-500*x^2)*l
og(x)+390625*x^8+1250*x^5-6250*x^4+x^2-10*x+25),x, algorithm=\
```

output
```
x - x^2/(625*x^4 + 50*x^2*log(x) + log(x)^2 + x - 5)
```

3.1281.9 Mupad [B] (verification not implemented)

Time = 16.47 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.27

$$\int \frac{25+50x^3-6250x^4+2500x^5+390625x^8+(2x-500x^2+100x^3+62500x^6)\log(x)+(-10+3750x^4)\log^2(x)+100x^2\log^3(x)+\log^4(x)}{25-10x+x^2-6250x^4+1250x^5+390625x^8+(-500x^2+100x^3+62500x^6)\log(x)+(-10+2x+3750x^4)\log^2(x)+100x^2\log^3(x)+\log^4(x)}\,dx$$
$$= x-\frac{x^2}{625\,x^4+50\,x^2\,\ln\left(x\right)+x+{\ln\left(x\right)}^2-5}$$

input
```
int((log(x)*(2*x - 500*x^2 + 100*x^3 + 62500*x^6) + log(x)^2*(3750*x^4 - 1
0) + log(x)^4 + 100*x^2*log(x)^3 + 50*x^3 - 6250*x^4 + 2500*x^5 + 390625*x
^8 + 25)/(log(x)^2*(2*x + 3750*x^4 - 10) - 10*x + log(x)^4 + log(x)*(100*x
^3 - 500*x^2 + 62500*x^6) + 100*x^2*log(x)^3 + x^2 - 6250*x^4 + 1250*x^5 +
 390625*x^8 + 25),x)
```

output
```
x - x^2/(x + 50*x^2*log(x) + log(x)^2 + 625*x^4 - 5)
```

3.1282 $\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+(-15x^3+(-\cdots}{((8\cdots}$

3.1282.1 Optimal result

Integrand size = 179, antiderivative size = 27

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+\left(-120x^2+15x^3\right)\log(-8+x)+\cdots\right.}{\left(\left(8x^2-x^3\right)\log^2(-8+x)+(-8\cdots\right.}$$

$$=x-\frac{15x}{\log(-8+x)}+\frac{4}{\log\left(1-\frac{\log(2x)}{x}\right)}$$

output
```
x+4/ln(1-ln(2*x)/x)-15/ln(-8+x)*x
```

3.1282.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+\left(-120x^2+15x^3\right)\log(-8+x)+\cdots\right.}{\left(\left(8x^2-x^3\right)\log^2(-8+x)+(-8\cdots\right.}$$

$$=x-\frac{15x}{\log(-8+x)}+\frac{4}{\log\left(1-\frac{\log(2x)}{x}\right)}$$

input
```
Integrate[((32 - 4*x)*Log[-8 + x]^2 + (-32 + 4*x)*Log[-8 + x]^2*Log[2*x] +
 (-15*x^3 + (-120*x^2 + 15*x^3)*Log[-8 + x] + (8*x^2 - x^3)*Log[-8 + x]^2
+ (15*x^2 + (120*x - 15*x^2)*Log[-8 + x] + (-8*x + x^2)*Log[-8 + x]^2)*Log
[2*x])*Log[(x - Log[2*x])/x]^2)/(((8*x^2 - x^3)*Log[-8 + x]^2 + (-8*x + x^
2)*Log[-8 + x]^2*Log[2*x])*Log[(x - Log[2*x])/x]^2),x]
```

output
```
x - (15*x)/Log[-8 + x] + 4/Log[1 - Log[2*x]/x]
```

3.1282.3 Rubi [A] (verified)

Time = 0.86 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.011$, Rules used = {7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-15x^3+\left(15x^2+\left(x^2-8x\right)\log^2(x-8)+\left(120x-15x^2\right)\log(x-8)\right)\log(2x)+\left(8x^2-x^3\right)\log^2(x-8)+(15x\ldots}{\left(\left(x^2-8x\right)\log(2x)\log^2(x-8)+\left(8x^2-x^3\right)\ldots}$$

$$\Big\downarrow \text{7239}$$

$$\int \left(\frac{x^2\log^2\left(1-\frac{\log(2x)}{x}\right)-\log(2x)\left(x\log^2\left(1-\frac{\log(2x)}{x}\right)+4\right)+4}{x(x-\log(2x))\log^2\left(1-\frac{\log(2x)}{x}\right)}+\frac{15x}{(x-8)\log^2(x-8)}-\frac{15}{\log(x-8)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$x+\frac{15(8-x)}{\log(x-8)}-\frac{120}{\log(x-8)}+\frac{4}{\log\left(1-\frac{\log(2x)}{x}\right)}$$

input
```
Int[((32 - 4*x)*Log[-8 + x]^2 + (-32 + 4*x)*Log[-8 + x]^2*Log[2*x] + (-15*
x^3 + (-120*x^2 + 15*x^3)*Log[-8 + x] + (8*x^2 - x^3)*Log[-8 + x]^2 + (15*
x^2 + (120*x - 15*x^2)*Log[-8 + x] + (-8*x + x^2)*Log[-8 + x]^2)*Log[2*x])
*Log[(x - Log[2*x])/x]^2)/(((8*x^2 - x^3)*Log[-8 + x]^2 + (-8*x + x^2)*Log
[-8 + x]^2*Log[2*x])*Log[(x - Log[2*x])/x]^2),x]
```

output
```
x - 120/Log[-8 + x] + (15*(8 - x))/Log[-8 + x] + 4/Log[1 - Log[2*x]/x]
```

3.1282.

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+\left(-120x^2+15x^3\right)\log(-8+x)+\left(8x^2-x^3\right)\log^2(-8+x)+\left(15x^2+\left(120x-15x^2\right)\log(\ldots}{\left(\left(8x^2-x^3\right)\log^2(-8+x)+\left(-8x+x^2\right)\log^2(-8+x)\log(2x)\right)\log^2\left(\frac{x-\log(2x)}{x}\right)}$$

3.1282.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1282.4 Maple [A] (verified)

Time = 15.23 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.52

method	result	size
default	$x-\frac{15(-8+x)}{\ln(-8+x)}-\frac{120}{\ln(-8+x)}+\frac{4}{\ln\left(\frac{-\ln(2)-\ln(x)+x}{x}\right)}$	41
parts	$x-\frac{15(-8+x)}{\ln(-8+x)}-\frac{120}{\ln(-8+x)}+\frac{4}{\ln\left(\frac{-\ln(2)-\ln(x)+x}{x}\right)}$	41
parallelrisch	$\frac{16x\ln(-8+x)\ln\left(-\frac{\ln(2x)-x}{x}\right)-240\ln\left(-\frac{\ln(2x)-x}{x}\right)x+64\ln\left(-\frac{\ln(2x)-x}{x}\right)\ln(-8+x)+64\ln(-8+x)}{16\ln(-8+x)\ln\left(-\frac{\ln(2x)-x}{x}\right)}$	90

input
```
int(((((x^2-8*x)*ln(-8+x)^2+(-15*x^2+120*x)*ln(-8+x)+15*x^2)*ln(2*x)+(-x^3
+8*x^2)*ln(-8+x)^2+(15*x^3-120*x^2)*ln(-8+x)-15*x^3)*ln((x-ln(2*x))/x)^2+(
4*x-32)*ln(-8+x)^2*ln(2*x)+(-4*x+32)*ln(-8+x)^2)/((x^2-8*x)*ln(-8+x)^2*ln(
2*x)+(-x^3+8*x^2)*ln(-8+x)^2)/ln((x-ln(2*x))/x)^2,x,method=_RETURNVERBOSE)
```

output
```
x-15/ln(-8+x)*(-8+x)-120/ln(-8+x)+4/ln((-ln(2)-ln(x)+x)/x)
```

3.1282.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.96

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+\left(-120x^2+15x^3\right)\log(-8+x)+\right.}{\left(\left(8x^2-x^3\right)\log^2(-8+x)+(-8x\right.}$$

$$=\frac{(x\log(x-8)-15x)\log\left(\frac{x-\log(2x)}{x}\right)+4\log(x-8)}{\log(x-8)\log\left(\frac{x-\log(2x)}{x}\right)}$$

input
```
integrate(((((x^2-8*x)*log(-8+x)^2+(-15*x^2+120*x)*log(-8+x)+15*x^2)*log(2
*x)+(-x^3+8*x^2)*log(-8+x)^2+(15*x^3-120*x^2)*log(-8+x)-15*x^3)*log((x-log
(2*x))/x)^2+(4*x-32)*log(-8+x)^2*log(2*x)+(-4*x+32)*log(-8+x)^2)/((x^2-8*x
)*log(-8+x)^2*log(2*x)+(-x^3+8*x^2)*log(-8+x)^2)/log((x-log(2*x))/x)^2,x,
algorithm=\
```

output
```
((x*log(x - 8) - 15*x)*log((x - log(2*x))/x) + 4*log(x - 8))/(log(x - 8)*l
og((x - log(2*x))/x))
```

3.1282.6 Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.74

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+\left(-120x^2+15x^3\right)\log(-8+x)+\right.}{\left((8x^2-x^3)\log^2(-8+x)+(-8x\right.}$$

$$=x-\frac{15x}{\log(x-8)}+\frac{4}{\log\left(\frac{x-\log(2x)}{x}\right)}$$

input
```
integrate(((((x**2-8*x)*ln(-8+x)**2+(-15*x**2+120*x)*ln(-8+x)+15*x**2)*ln(
2*x)+(-x**3+8*x**2)*ln(-8+x)**2+(15*x**3-120*x**2)*ln(-8+x)-15*x**3)*ln((x
-ln(2*x))/x)**2+(4*x-32)*ln(-8+x)**2*ln(2*x)+(-4*x+32)*ln(-8+x)**2)/((x**2
-8*x)*ln(-8+x)**2*ln(2*x)+(-x**3+8*x**2)*ln(-8+x)**2)/ln((x-ln(2*x))/x)**2
,x)
```

output
```
x - 15*x/log(x - 8) + 4/log((x - log(2*x))/x)
```

3.1282.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 68 vs. 2(27) = 54.

Time = 0.37 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.52

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+\left(-120x^2+15x^3\right)\log(-8+x)+\right.}{\left((8x^2-x^3)\log^2(-8+x)+(-8x\right.}$$

$$=\frac{(x\log(x-8)-15\,x)\log(x-\log(2)-\log(x))-(x\log(x)-4)\log(x-8)+15\,x\log(x)}{\log(x-\log(2)-\log(x))\log(x-8)-\log(x-8)\log(x)}$$

3.1282.

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+\left(-120x^2+15x^3\right)\log(-8+x)+\left(8x^2-x^3\right)\log^2(-8+x)+\left(15x^2+\left(120x-15x^2\right)\log(\right.\right.}{\left((8x^2-x^3)\log^2(-8+x)+(-8x+x^2)\log^2(-8+x)\log(2x)\right)\log^2\left(\frac{x-\log(2x)}{x}\right)}$$

input
```
integrate(((((x^2-8*x)*log(-8+x)^2+(-15*x^2+120*x)*log(-8+x)+15*x^2)*log(2
*x)+(-x^3+8*x^2)*log(-8+x)^2+(15*x^3-120*x^2)*log(-8+x)-15*x^3)*log((x-log
(2*x))/x)^2+(4*x-32)*log(-8+x)^2*log(2*x)+(-4*x+32)*log(-8+x)^2)/((x^2-8*x
)*log(-8+x)^2*log(2*x)+(-x^3+8*x^2)*log(-8+x)^2)/log((x-log(2*x))/x)^2,x,
algorithm=\
```

output
```
((x*log(x - 8) - 15*x)*log(x - log(2) - log(x)) - (x*log(x) - 4)*log(x - 8
) + 15*x*log(x))/(log(x - log(2) - log(x))*log(x - 8) - log(x - 8)*log(x))
```

3.1282.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 235 vs. $2(27) = 54$.

Time = 0.62 (sec) , antiderivative size = 235, normalized size of antiderivative = 8.70

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+(-120x^2+15x^3)\log(-8+x)+\right.}{\left((8x^2-x^3)\log^2(-8+x)+(-8\right.}$$

$$= x + \frac{}{(x-8)\log(2x)\log(x-\log(2x))-\log(2)\log(2x)\log(x-\log(2x))-(x-8)\log(2x)\log(x)+\log} - \frac{15x}{\log(x-8)} - 8$$

input
```
integrate(((((x^2-8*x)*log(-8+x)^2+(-15*x^2+120*x)*log(-8+x)+15*x^2)*log(2
*x)+(-x^3+8*x^2)*log(-8+x)^2+(15*x^3-120*x^2)*log(-8+x)-15*x^3)*log((x-log
(2*x))/x)^2+(4*x-32)*log(-8+x)^2*log(2*x)+(-4*x+32)*log(-8+x)^2)/((x^2-8*x
)*log(-8+x)^2*log(2*x)+(-x^3+8*x^2)*log(-8+x)^2)/log((x-log(2*x))/x)^2,x,
algorithm=\
```

output
```
x + 4*((x - 8)*log(2) - log(2)*log(2*x) + (x - 8)*log(x) - log(2*x)*log(x)
 - x + 8*log(2) + log(2*x) + 8*log(x))/((x - 8)*log(2*x)*log(x - log(2*x))
 - log(2)*log(2*x)*log(x - log(2*x)) - (x - 8)*log(2*x)*log(x) + log(2)*lo
g(2*x)*log(x) - log(2*x)*log(x - log(2*x))*log(x) + log(2*x)*log(x)^2 - (x
 - 8)*log(x - log(2*x)) + log(2)*log(x - log(2*x)) + 8*log(2*x)*log(x - lo
g(2*x)) + (x - 8)*log(x) - log(2)*log(x) - 8*log(2*x)*log(x) + log(x - log
(2*x))*log(x) - log(x)^2 - 8*log(x - log(2*x)) + 8*log(x)) - 15*x/log(x -
8) - 8
```

3.1282.9 Mupad [B] (verification not implemented)

Time = 15.99 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+\left(-120x^2+15x^3\right)\log(-8+x)+\right.}{\left(\left(8x^2-x^3\right)\log^2(-8+x)+\left(-8x\right.\right.}$$

$$=\frac{4}{\ln\left(\frac{x-\ln(2\,x)}{x}\right)}-\frac{15\,x-\ln\left(x-8\right)\,\left(15\,x-120\right)}{\ln\left(x-8\right)}-14\,x$$

input
```
int(-(log(x - 8)^2*(4*x - 32) + log((x - log(2*x))/x)^2*(log(x - 8)*(120*x
^2 - 15*x^3) - log(2*x)*(log(x - 8)*(120*x - 15*x^2) - log(x - 8)^2*(8*x -
 x^2) + 15*x^2) - log(x - 8)^2*(8*x^2 - x^3) + 15*x^3) - log(2*x)*log(x -
8)^2*(4*x - 32))/(log((x - log(2*x))/x)^2*(log(x - 8)^2*(8*x^2 - x^3) - lo
g(2*x)*log(x - 8)^2*(8*x - x^2))),x)
```

output
```
4/log((x - log(2*x))/x) - (15*x - log(x - 8)*(15*x - 120))/log(x - 8) - 14
*x
```

3.1282.

$$\int \frac{(32-4x)\log^2(-8+x)+(-32+4x)\log^2(-8+x)\log(2x)+\left(-15x^3+\left(-120x^2+15x^3\right)\log(-8+x)+\left(8x^2-x^3\right)\log^2(-8+x)+\left(15x^2+\left(120x-15x^2\right)\log(\right.\right.}{\left(\left(8x^2-x^3\right)\log^2(-8+x)+\left(-8x+x^2\right)\log^2(-8+x)\log(2x)\right)\log^2\left(\frac{x-\log(2x)}{x}\right)}$$

3.1283 $\int \frac{5x^2+e^{2e^x+4x}(-1+4x+2e^xx)+8\log^7(x)-\log^8(x)+e^{e^x+2x}(8\log^3(x)$

3.1283.1 Optimal result

Integrand size = 78, antiderivative size = 27

$$\int \frac{5x^2+e^{2e^x+4x}(-1+4x+2e^xx)+8\log^7(x)-\log^8(x)+e^{e^x+2x}\left(8\log^3(x)+(-2+4x+2e^xx)\log^4(x)\right)}{x^2}\,dx$$
$$=x+4(4+x)+\frac{\left(e^{e^x+2x}+\log^4(x)\right)^2}{x}$$

output
```
(exp(exp(x)+2*x)+ln(x)^4)^2/x+16+5*x
```

3.1283.2 Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.48

$$\int \frac{5x^2+e^{2e^x+4x}(-1+4x+2e^xx)+8\log^7(x)-\log^8(x)+e^{e^x+2x}\left(8\log^3(x)+(-2+4x+2e^xx)\log^4(x)\right)}{x^2}\,dx$$
$$=\frac{e^{2e^x+4x}+5x^2+2e^{e^x+2x}\log^4(x)+\log^8(x)}{x}$$

input
```
Integrate[(5*x^2 + E^(2*E^x + 4*x)*(-1 + 4*x + 2*E^x*x) + 8*Log[x]^7 - Log
[x]^8 + E^(E^x + 2*x)*(8*Log[x]^3 + (-2 + 4*x + 2*E^x*x)*Log[x]^4))/x^2,x]
```

output
```
(E^(2*E^x + 4*x) + 5*x^2 + 2*E^(E^x + 2*x)*Log[x]^4 + Log[x]^8)/x
```

3.1283.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{5x^2+e^{4x+2e^x}(2e^xx+4x-1)-\log^8(x)+8\log^7(x)+e^{2x+e^x}\left((2e^xx+4x-2)\log^4(x)+8\log^3(x)\right)}{x^2}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{e^{2(2x+e^x)}(4x-1)}{x^2}+\frac{2e^{2x+e^x}(2x\log(x)-\log(x)+4)\log^3(x)}{x^2}+\frac{5x^2-\log^8(x)+8\log^7(x)}{x^2}+\frac{2e^{5x+2e^x}}{x}+\frac{2e^{3x+}}{}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\int \frac{e^{2(2x+e^x)}}{x^2}dx-2\int \frac{e^{2x+e^x}\log^4(x)}{x^2}dx+8\int \frac{e^{2x+e^x}\log^3(x)}{x^2}dx+4\int \frac{e^{2(2x+e^x)}}{x}dx+ 2\int \frac{e^{5x+2e^x}}{x}dx+4\int \frac{e^{2x+e^x}\log^4(x)}{x}dx+2\int \frac{e^{3x+e^x}\log^4(x)}{x}dx+5x+\frac{\log^8(x)}{x}$$

input
```
Int[(5*x^2 + E^(2*E^x + 4*x)*(-1 + 4*x + 2*E^x*x) + 8*Log[x]^7 - Log[x]^8
+ E^(E^x + 2*x)*(8*Log[x]^3 + (-2 + 4*x + 2*E^x*x)*Log[x]^4))/x^2,x]
```

output
```
$Aborted
```

3.1283.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1283.4 Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.37

method	result	size
parallelrisch	$\frac{\ln(x)^8+2\ln(x)^4 e^{e^x+2x}+5x^2+e^{2\,e^x+4x}}{x}$	37
risch	$\frac{\ln(x)^8}{x}+5x+\frac{e^{2\,e^x+4x}}{x}+\frac{2\ln(x)^4 e^{e^x+2x}}{x}$	42

input
```
int(((2*exp(x)*x+4*x-1)*exp(exp(x)+2*x)^2+((2*exp(x)*x+4*x-2)*ln(x)^4+8*ln
(x)^3)*exp(exp(x)+2*x)-ln(x)^8+8*ln(x)^7+5*x^2)/x^2,x,method=_RETURNVERBOS
E)
```

output
```
1/x*(ln(x)^8+2*ln(x)^4*exp(exp(x)+2*x)+5*x^2+exp(exp(x)+2*x)^2)
```

3.1283.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{5x^2+e^{2e^x+4x}(-1+4x+2e^xx)+8\log^7(x)-\log^8(x)+e^{e^x+2x}(8\log^3(x)+(-2+4x+2e^xx)\log^4(x))}{x^2}\,dx$$
$$=\frac{\log(x)^8+2\,e^{(2\,x+e^x)}\log(x)^4+5\,x^2+e^{(4\,x+2\,e^x)}}{x}$$

input
```
integrate(((2*exp(x)*x+4*x-1)*exp(exp(x)+2*x)^2+((2*exp(x)*x+4*x-2)*log(x)
^4+8*log(x)^3)*exp(exp(x)+2*x)-log(x)^8+8*log(x)^7+5*x^2)/x^2,x, algorithm
=\
```

output
```
(log(x)^8 + 2*e^(2*x + e^x)*log(x)^4 + 5*x^2 + e^(4*x + 2*e^x))/x
```

3.1283.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 41 vs. 2(20) = 40.

Time = 0.18 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.52

$$\int \frac{5x^2+e^{2e^x+4x}(-1+4x+2e^xx)+8\log^7(x)-\log^8(x)+e^{e^x+2x}(8\log^3(x)+(-2+4x+2e^xx)\log^4(x))}{x^2}\,dx$$
$$=5x+\frac{\log(x)^8}{x}+\frac{2xe^{2x+e^x}\log(x)^4+xe^{4x+2e^x}}{x^2}$$

input
```
integrate(((2*exp(x)*x+4*x-1)*exp(exp(x)+2*x)**2+((2*exp(x)*x+4*x-2)*ln(x)
**4+8*ln(x)**3)*exp(exp(x)+2*x)-ln(x)**8+8*ln(x)**7+5*x**2)/x**2,x)
```

output
```
5*x + log(x)**8/x + (2*x*exp(2*x + exp(x))*log(x)**4 + x*exp(4*x + 2*exp(x
)))/x**2
```

3.1283.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

$$\int \frac{5x^2 + e^{2e^x+4x}(-1+4x+2e^x x) + 8\log^7(x) - \log^8(x) + e^{e^x+2x}\left(8\log^3(x) + (-2+4x+2e^x x)\log^4(x)\right)}{x^2}\,dx$$
$$= 5\,x + \frac{\log\left(x\right)^8 + 2\,e^{\left(2\,x+e^x\right)}\log\left(x\right)^4 + e^{\left(4\,x+2\,e^x\right)}}{x}$$

input
```
integrate(((2*exp(x)*x+4*x-1)*exp(exp(x)+2*x)^2+((2*exp(x)*x+4*x-2)*log(x)
^4+8*log(x)^3)*exp(exp(x)+2*x)-log(x)^8+8*log(x)^7+5*x^2)/x^2,x, algorithm
=\
```

output
```
5*x + (log(x)^8 + 2*e^(2*x + e^x)*log(x)^4 + e^(4*x + 2*e^x))/x
```

3.1283.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.33

$$\int \frac{5x^2 + e^{2e^x+4x}(-1+4x+2e^x x) + 8\log^7(x) - \log^8(x) + e^{e^x+2x}\left(8\log^3(x) + (-2+4x+2e^x x)\log^4(x)\right)}{x^2}\,dx$$
$$= \frac{\log\left(x\right)^8 + 2\,e^{\left(2\,x+e^x\right)}\log\left(x\right)^4 + 5\,x^2 + e^{\left(4\,x+2\,e^x\right)}}{x}$$

input
```
integrate(((2*exp(x)*x+4*x-1)*exp(exp(x)+2*x)^2+((2*exp(x)*x+4*x-2)*log(x)
^4+8*log(x)^3)*exp(exp(x)+2*x)-log(x)^8+8*log(x)^7+5*x^2)/x^2,x, algorithm
=\
```

output
```
(log(x)^8 + 2*e^(2*x + e^x)*log(x)^4 + 5*x^2 + e^(4*x + 2*e^x))/x
```

3.1283.9 Mupad [B] (verification not implemented)

Time = 15.58 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.52

$$\int \frac{5x^2+e^{2e^x+4x}(-1+4x+2e^xx)+8\log^7(x)-\log^8(x)+e^{e^x+2x}\left(8\log^3(x)+(-2+4x+2e^xx)\log^4(x)\right)}{x^2}\,dx$$
$$=5\,x+\frac{\mathrm{e}^{4\,x+2\,\mathrm{e}^x}}{x}+\frac{\ln\left(x\right)^8}{x}+\frac{2\,\mathrm{e}^{2\,x+\mathrm{e}^x}\,\ln\left(x\right)^4}{x}$$

input
```
int((exp(4*x + 2*exp(x))*(4*x + 2*x*exp(x) - 1) + 8*log(x)^7 - log(x)^8 +
exp(2*x + exp(x))*(8*log(x)^3 + log(x)^4*(4*x + 2*x*exp(x) - 2)) + 5*x^2)/
x^2,x)
```

output
```
5*x + exp(4*x + 2*exp(x))/x + log(x)^8/x + (2*exp(2*x + exp(x))*log(x)^4)/
x
```

3.1284 $\int \frac{e^{\frac{-x-3x^2+x^2\log(2)+e^x(1+3x-x\log(2))}{x}}(-3x^2+x^2\log(2)+e^x(-1+x+3$

3.1284.1 Optimal result

Integrand size = 70, antiderivative size = 19

$$\int \frac{e^{\frac{-x-3x^2+x^2\log(2)+e^x(1+3x-x\log(2))}{x}}(-3x^2+x^2\log(2)+e^x(-1+x+3x^2-x^2\log(2)))}{x^2}\,dx = e^{(-e^x+x)\left(-3-\frac{1}{x}+\log(2)\right)}$$

output
```
exp((x-exp(x))*(ln(2)-1/x-3))
```

3.1284.2 Mathematica [A] (verified)

Time = 3.44 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{e^{\frac{-x-3x^2+x^2\log(2)+e^x(1+3x-x\log(2))}{x}}(-3x^2+x^2\log(2)+e^x(-1+x+3x^2-x^2\log(2)))}{x^2}\,dx = 2^x e^{-1-3x+e^x\left(3+\frac{1}{x}-\log(2)\right)}$$

input
```
Integrate[(E^((-x - 3*x^2 + x^2*Log[2] + E^x*(1 + 3*x - x*Log[2]))/x)*(-3*
x^2 + x^2*Log[2] + E^x*(-1 + x + 3*x^2 - x^2*Log[2])))/x^2,x]
```

output
```
2^x*E^(-1 - 3*x + E^x*(3 + x^(-1) - Log[2]))
```

3.1284.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-3x^2+x^2\log(2)+e^x\left(3x^2+x^2(-\log(2))+x-1\right)\right)\exp\left(\frac{-3x^2+x^2\log(2)-x+e^x(3x+x(-\log(2))+1)}{x}\right)}{x^2}dx$$

$$\Big\downarrow \; 6$$

$$\int \frac{\left(x^2(\log(2)-3)+e^x\left(3x^2+x^2(-\log(2))+x-1\right)\right)\exp\left(\frac{-3x^2+x^2\log(2)-x+e^x(3x+x(-\log(2))+1)}{x}\right)}{x^2}dx$$

$$\Big\downarrow \; 7292$$

$$\int \frac{\left(x^2(\log(2)-3)+e^x\left(3x^2+x^2(-\log(2))+x-1\right)\right)\exp\left(\frac{(x-e^x)(-(x(3-\log(2)))-1)}{x}\right)}{x^2}dx$$

$$\Big\downarrow \; 7293$$

$$\int \left(\frac{\left(x^2(3-\log(2))+x-1\right)\exp\left(x+\frac{(x-e^x)(-(x(3-\log(2)))-1)}{x}\right)}{x^2}-3\left(1-\frac{\log(2)}{3}\right)\exp\left(\frac{(x-e^x)\left(-(x(3-\log(2))\right.}{x}\right.\right.$$

$$\Big\downarrow \; 2009$$

$$-\int \frac{\exp\left(x+\frac{(x-e^x)(-((3-\log(2))x)-1)}{x}\right)}{x^2}dx+(3-\log(2))\int \exp\left(x+\frac{(x-e^x)\left(-((3-\log(2))x)-1\right)}{x}\right)dx+\int \frac{\exp\left(x+\frac{(x-e^x)(-((3-\log(2))x)-1)}{x}\right)}{x}dx-(3-\log(2))\int e^{\frac{(x-e^x)(-((3-\log(2))x)-1)}{x}}dx$$

input
```
Int[(E^((-x - 3*x^2 + x^2*Log[2] + E^x*(1 + 3*x - x*Log[2]))/x)*(-3*x^2 +
x^2*Log[2] + E^x*(-1 + x + 3*x^2 - x^2*Log[2])))/x^2,x]
```

output
```
$Aborted
```

3.1284.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1284.4 Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.16

method	result	size
risch	$\mathrm{e}^{-\frac{\left(\mathrm{e}^{x}-x\right)\left(x\ln\left(2\right)-3x-1\right)}{x}}$	22
norman	$\mathrm{e}^{\frac{\left(-x\ln\left(2\right)+3x+1\right)\mathrm{e}^{x}+x^{2}\ln\left(2\right)-3x^{2}-x}{x}}$	34
parallelrisch	$\mathrm{e}^{\frac{\left(-x\ln\left(2\right)+3x+1\right)\mathrm{e}^{x}+x^{2}\ln\left(2\right)-3x^{2}-x}{x}}$	34

input
```
int(((-x^2*ln(2)+3*x^2+x-1)*exp(x)+x^2*ln(2)-3*x^2)*exp(((-x*ln(2)+3*x+1)*
exp(x)+x^2*ln(2)-3*x^2-x)/x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
exp(-(exp(x)-x)*(x*ln(2)-3*x-1)/x)
```

3.1284.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.74

$$\int \frac{e^{\frac{-x-3x^2+x^2\log(2)+e^x(1+3x-x\log(2))}{x}}(-3x^2+x^2\log(2)+e^x(-1+x+3x^2-x^2\log(2)))}{x^2}\,dx$$
$$= e^{\left(\frac{x^2\log(2)-3\,x^2-(x\log(2)-3\,x-1)e^x-x}{x}\right)}$$

input
```
integrate(((-x^2*log(2)+3*x^2+x-1)*exp(x)+x^2*log(2)-3*x^2)*exp(((-x*log(2
)+3*x+1)*exp(x)+x^2*log(2)-3*x^2-x)/x)/x^2,x, algorithm=\
```

output
```
e^((x^2*log(2) - 3*x^2 - (x*log(2) - 3*x - 1)*e^x - x)/x)
```

3.1284.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 29 vs. $2(14) = 28$.

Time = 0.21 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.53

$$\int \frac{e^{\frac{-x-3x^2+x^2\log(2)+e^x(1+3x-x\log(2))}{x}}(-3x^2+x^2\log(2)+e^x(-1+x+3x^2-x^2\log(2)))}{x^2}\,dx$$
$$= e^{\frac{-3x^2+x^2\log(2)-x+(-x\log(2)+3x+1)e^x}{x}}$$

input
```
integrate(((-x**2*ln(2)+3*x**2+x-1)*exp(x)+x**2*ln(2)-3*x**2)*exp(((-x*ln(
2)+3*x+1)*exp(x)+x**2*ln(2)-3*x**2-x)/x)/x**2,x)
```

output
```
exp((-3*x**2 + x**2*log(2) - x + (-x*log(2) + 3*x + 1)*exp(x))/x)
```

3.1284.7 Maxima [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.37

$$\int \frac{e^{\frac{-x-3x^2+x^2\log(2)+e^x(1+3x-x\log(2))}{x}}(-3x^2+x^2\log(2)+e^x(-1+x+3x^2-x^2\log(2)))}{x^2}\,dx$$
$$= e^{\left(x\log(2)-e^x\log(2)-3\,x+\frac{e^x}{x}+3\,e^x-1\right)}$$

input
```
integrate((((-x^2*log(2)+3*x^2+x-1)*exp(x)+x^2*log(2)-3*x^2)*exp(((-x*log(2
)+3*x+1)*exp(x)+x^2*log(2)-3*x^2-x)/x)/x^2,x, algorithm=\
```

output
```
e^(x*log(2) - e^x*log(2) - 3*x + e^x/x + 3*e^x - 1)
```

3.1284.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.37

$$\int \frac{e^{\frac{-x-3x^2+x^2\log(2)+e^x(1+3x-x\log(2))}{x}}(-3x^2+x^2\log(2)+e^x(-1+x+3x^2-x^2\log(2)))}{x^2}\,dx$$
$$= e^{\left(x\log(2)-e^x\log(2)-3\,x+\frac{e^x}{x}+3\,e^x-1\right)}$$

input
```
integrate((((-x^2*log(2)+3*x^2+x-1)*exp(x)+x^2*log(2)-3*x^2)*exp(((-x*log(2
)+3*x+1)*exp(x)+x^2*log(2)-3*x^2-x)/x)/x^2,x, algorithm=\
```

output
```
e^(x*log(2) - e^x*log(2) - 3*x + e^x/x + 3*e^x - 1)
```

3.1284.9 Mupad [B] (verification not implemented)

Time = 15.83 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42

$$\int \frac{e^{\frac{-x-3x^2+x^2\log(2)+e^x(1+3x-x\log(2))}{x}}(-3x^2+x^2\log(2)+e^x(-1+x+3x^2-x^2\log(2)))}{x^2}\,dx$$
$$= 2^{x-\mathrm{e}^x}\,\mathrm{e}^{-3\,x}\,\mathrm{e}^{-1}\,\mathrm{e}^{\frac{\mathrm{e}^x}{x}}\,\mathrm{e}^{3\,\mathrm{e}^x}$$

input
```
int((exp(-(x - x^2*log(2) - exp(x)*(3*x - x*log(2) + 1) + 3*x^2)/x)*(x^2*l
og(2) - 3*x^2 + exp(x)*(x - x^2*log(2) + 3*x^2 - 1)))/x^2,x)
```

output
```
2^(x - exp(x))*exp(-3*x)*exp(-1)*exp(exp(x)/x)*exp(3*exp(x))
```

3.1285 $\int \frac{e^{e^{\frac{e^x\left(-1+e^4+20x\right)}{5x}}+x+\frac{e^x\left(-1+e^4+20x\right)}{5x}}\left(1+e^4(-1+x)-x+20x^2\right)}{5x^2}\,dx$

3.1285.1 Optimal result

Integrand size = 66, antiderivative size = 22

$$\int \frac{e^{e^{\frac{e^x\left(-1+e^4+20x\right)}{5x}}+x+\frac{e^x\left(-1+e^4+20x\right)}{5x}}\left(1+e^4(-1+x)-x+20x^2\right)}{5x^2}\,dx=e^{e^{e^x\left(4+\frac{-1+e^4}{5x}\right)}}$$

output
```
exp(exp(exp(x)*(1/5*(exp(4)-1)/x+4)))
```

3.1285.2 Mathematica [A] (verified)

Time = 5.07 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{e^{e^{\frac{e^x\left(-1+e^4+20x\right)}{5x}}+x+\frac{e^x\left(-1+e^4+20x\right)}{5x}}\left(1+e^4(-1+x)-x+20x^2\right)}{5x^2}\,dx=e^{e^{\frac{e^x\left(-1+e^4+20x\right)}{5x}}}$$

input
```
Integrate[(E^(E^((E^x*(-1 + E^4 + 20*x))/(5*x)) + x + (E^x*(-1 + E^4 + 20*
x))/(5*x))*(1 + E^4*(-1 + x) - x + 20*x^2))/(5*x^2),x]
```

output
```
E^E^((E^x*(-1 + E^4 + 20*x))/(5*x))
```

3.1285.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(20x^2 - x + e^4(x-1) + 1)\exp\left(x + e^{\frac{e^x(20x+e^4-1)}{5x}} + \frac{e^x(20x+e^4-1)}{5x}\right)}{5x^2}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\int \frac{\exp\left(-\frac{e^x(-20x-e^4+1)}{5x} + e^{-\frac{e^x(-20x-e^4+1)}{5x}} + x\right)(20x^2 - x - e^4(1-x) + 1)}{x^2}dx$$

$$\Big\downarrow \text{7292}$$

$$\frac{1}{5}\int \frac{\exp\left(-\frac{e^x(-20x-e^4+1)}{5x} + e^{-\frac{e^x(-20x-e^4+1)}{5x}} + x\right)(20x^2 - (1-e^4)x - e^4 + 1)}{x^2}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{1}{5}\int \left(20\exp\left(-\frac{e^x(-20x-e^4+1)}{5x} + e^{-\frac{e^x(-20x-e^4+1)}{5x}} + x\right) + \frac{\exp\left(-\frac{e^x(-20x-e^4+1)}{5x} + e^{-\frac{e^x(-20x-e^4+1)}{5x}} + x\right)(-$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left((1-e^4)\int \frac{\exp\left(-\frac{e^x(-20x-e^4+1)}{5x} + e^{-\frac{e^x(-20x-e^4+1)}{5x}} + x\right)}{x^2}dx + 20\int \exp\left(-\frac{e^x(-20x-e^4+1)}{5x} + e^{-\frac{e^x(-20x-e}{5x}}\right.\right.$$

input
```
Int[(E^(E^((E^x*(-1 + E^4 + 20*x))/(5*x)) + x + (E^x*(-1 + E^4 + 20*x))/(5
*x))*(1 + E^4*(-1 + x) - x + 20*x^2))/(5*x^2),x]
```

output
```
$Aborted
```

3.1285. $\int \frac{e^{e^{\frac{e^x(-1+e^4+20x)}{5x}}+x+\frac{e^x(-1+e^4+20x)}{5x}}(1+e^4(-1+x)-x+20x^2)}{5x^2}\,dx$

3.1285.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1285.4 Maple [A] (verified)

Time = 5.00 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

method	result	size
norman	$e^{e^{\frac{\left(e^{4}+20x-1\right)e^{x}}{5x}}}$	17
risch	$e^{e^{\frac{\left(e^{4}+20x-1\right)e^{x}}{5x}}}$	17
parallelrisch	$e^{e^{\frac{\left(e^{4}+20x-1\right)e^{x}}{5x}}}$	17

input
```
int(1/5*((-1+x)*exp(4)+20*x^2-x+1)*exp(x)*exp(1/5*(exp(4)+20*x-1)*exp(x)/x
)*exp(exp(1/5*(exp(4)+20*x-1)*exp(x)/x))/x^2,x,method=_RETURNVERBOSE)
```

output
```
exp(exp(1/5*(exp(4)+20*x-1)*exp(x)/x))
```

3.1285.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(16) = 32$.

Time = 0.25 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.64

$$\int \frac{e^{e^{\frac{e^x(-1+e^4+20x)}{5x}}+x+\frac{e^x(-1+e^4+20x)}{5x}}(1+e^4(-1+x)-x+20x^2)}{5x^2}\,dx = e^{\left(-x-\frac{(20\,x+e^4-1)e^x}{5\,x}+\frac{5\,x^2+(20\,x+e^4-1)e^x+5\,xe^{\left(\frac{(20\,x+e^4-1)e^x}{5\,x}\right)}}{5\,x}\right)}$$

input
```
integrate(1/5*((-1+x)*exp(4)+20*x^2-x+1)*exp(x)*exp(1/5*(exp(4)+20*x-1)*ex
p(x)/x)*exp(exp(1/5*(exp(4)+20*x-1)*exp(x)/x))/x^2,x, algorithm=\
```

output
```
e^(-x - 1/5*(20*x + e^4 - 1)*e^x/x + 1/5*(5*x^2 + (20*x + e^4 - 1)*e^x + 5
*x*e^(1/5*(20*x + e^4 - 1)*e^x/x))/x)
```

3.1285.6 Sympy [A] (verification not implemented)

Time = 0.73 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{e^{e^{\frac{e^x(-1+e^4+20x)}{5x}}+x+\frac{e^x(-1+e^4+20x)}{5x}}(1+e^4(-1+x)-x+20x^2)}{5x^2}\,dx = e^{e^{\frac{\left(4x-\frac{1}{5}+\frac{e^4}{5}\right)e^x}{x}}}$$

input
```
integrate(1/5*((-1+x)*exp(4)+20*x**2-x+1)*exp(x)*exp(1/5*(exp(4)+20*x-1)*e
xp(x)/x)*exp(exp(1/5*(exp(4)+20*x-1)*exp(x)/x))/x**2,x)
```

output
```
exp(exp((4*x - 1/5 + exp(4)/5)*exp(x)/x))
```

3.1285.7 Maxima [A] (verification not implemented)

Time = 0.56 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.05

$$\int \frac{e^{e^{\frac{e^x\left(-1+e^4+20x\right)}{5x}}+x+\frac{e^x\left(-1+e^4+20x\right)}{5x}}\left(1+e^4(-1+x)-x+20x^2\right)}{5x^2}\,dx = e^{\left(e^{\left(\frac{e^{(x+4)}}{5\,x}-\frac{e^x}{5\,x}+4\,e^x\right)}\right)}$$

input
```
integrate(1/5*((-1+x)*exp(4)+20*x^2-x+1)*exp(x)*exp(1/5*(exp(4)+20*x-1)*ex
p(x)/x)*exp(exp(1/5*(exp(4)+20*x-1)*exp(x)/x))/x^2,x, algorithm=\
```

output
```
e^(e^(1/5*e^(x + 4)/x - 1/5*e^x/x + 4*e^x))
```

3.1285.8 Giac [F]

$$\int \frac{e^{e^{\frac{e^x\left(-1+e^4+20x\right)}{5x}}+x+\frac{e^x\left(-1+e^4+20x\right)}{5x}}\left(1+e^4(-1+x)-x+20x^2\right)}{5x^2}\,dx$$
$$= \int \frac{(20\,x^2+(x-1)e^4-x+1)e^{\left(x+\frac{\left(20\,x+e^4-1\right)e^x}{5\,x}+e^{\left(\frac{\left(20\,x+e^4-1\right)e^x}{5\,x}\right)}\right)}}{5\,x^2}\,dx$$

input
```
integrate(1/5*((-1+x)*exp(4)+20*x^2-x+1)*exp(x)*exp(1/5*(exp(4)+20*x-1)*ex
p(x)/x)*exp(exp(1/5*(exp(4)+20*x-1)*exp(x)/x))/x^2,x, algorithm=\
```

output
```
integrate(1/5*(20*x^2 + (x - 1)*e^4 - x + 1)*e^(x + 1/5*(20*x + e^4 - 1)*e
^x/x + e^(1/5*(20*x + e^4 - 1)*e^x/x))/x^2, x)
```

3.1285.9 Mupad [B] (verification not implemented)

Time = 19.07 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.14

$$\int \frac{e^{e^{\frac{e^x\left(-1+e^4+20x\right)}{5x}}+x+\frac{e^x\left(-1+e^4+20x\right)}{5x}}\left(1+e^4(-1+x)-x+20x^2\right)}{5x^2}\,dx = \mathrm{e}^{\mathrm{e}^{-\frac{\mathrm{e}^x}{5\,x}}\,\mathrm{e}^{4\,\mathrm{e}^x}\,\mathrm{e}^{\frac{\mathrm{e}^4\,\mathrm{e}^x}{5\,x}}}$$

input
```
int((exp((exp(x)*(20*x + exp(4) - 1))/(5*x))*exp(exp((exp(x)*(20*x + exp(4
) - 1))/(5*x)))*exp(x)*(exp(4)*(x - 1) - x + 20*x^2 + 1))/(5*x^2),x)
```

output
```
exp(exp(-exp(x)/(5*x))*exp(4*exp(x))*exp((exp(4)*exp(x))/(5*x)))
```

3.1285. $\int \frac{e^{e^{\frac{e^x\left(-1+e^4+20x\right)}{5x}}+x+\frac{e^x\left(-1+e^4+20x\right)}{5x}}\left(1+e^4(-1+x)-x+20x^2\right)}{5x^2}\,dx$

3.1286 $\int \frac{40}{2916+972x+1053x^2+162x^3+81x^4+\left(648x+108x^2+108x^3\right)\log(4)+}$

3.1286.1 Optimal result

Integrand size = 117, antiderivative size = 27

$$\int \frac{405+810x+270\log(4)+(405+}{2916+972x+1053x^2+162x^3+81x^4+\left(648x+108x^2+108x^3\right)\log(4)+\left(108+18x+54x^2\right)\log^2(4)+}$$

$$=3-\frac{5}{6+\frac{x+\left(x+\frac{\log(4)}{3}\right)^2}{1+\log(5)}}$$

output
```
3-5/(6+((x+2/3*ln(2))^2+x)/(ln(5)+1))
```

3.1286.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 69 vs. 2(27) = 54.

Time = 0.05 (sec) , antiderivative size = 69, normalized size of antiderivative = 2.56

$$\int \frac{405+810x+270\log(4)+(405+}{2916+972x+1053x^2+162x^3+81x^4+\left(648x+108x^2+108x^3\right)\log(4)+\left(108+18x+54x^2\right)\log^2(4)+}$$

$$=\frac{15(1+\log(5))\left(207-6\log(4)+4\log^2(4)+216\log(5)-3\log(16)-2\log(4)\log(16)\right)}{\left(-69+4\log(4)-72\log(5)\right)\left(54+9x+9x^2+6x\log(4)+\log^2(4)+54\log(5)\right)}$$

3.1286. $\int \frac{405+810x+270\log(4)+(405+810x+270\log(4))\log(5)}{2916+972x+1053x^2+162x^3+81x^4+\left(648x+108x^2+108x^3\right)\log(4)+\left(108+18x+54x^2\right)\log^2(4)+12x\log^3(4)+\log^4(4)+\left(5832+972x+972x^2+648x\log\right.}$

input
```
Integrate[(405 + 810*x + 270*Log[4] + (405 + 810*x + 270*Log[4])*Log[5])/(
2916 + 972*x + 1053*x^2 + 162*x^3 + 81*x^4 + (648*x + 108*x^2 + 108*x^3)*L
og[4] + (108 + 18*x + 54*x^2)*Log[4]^2 + 12*x*Log[4]^3 + Log[4]^4 + (5832
+ 972*x + 972*x^2 + 648*x*Log[4] + 108*Log[4]^2)*Log[5] + 2916*Log[5]^2),x
]
```

output
```
(15*(1 + Log[5])*(207 - 6*Log[4] + 4*Log[4]^2 + 216*Log[5] - 3*Log[16] - 2
*Log[4]*Log[16]))/((-69 + 4*Log[4] - 72*Log[5])*(54 + 9*x + 9*x^2 + 6*x*Lo
g[4] + Log[4]^2 + 54*Log[5]))
```

3.1286.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.060$, Rules used = {6, 2459, 27, 27, 1380, 27, 241}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{810x + \log(5)(810x + 405 + 270\log(4)}{81x^4 + 162x^3 + 1053x^2 + \log(5)\left(972x^2 + 972x + 648x\log(4) + 5832 + 108\log^2(4)\right) + (54x^2 + 18x + 108)\log^2}$$

$$\Big\downarrow 6$$

$$\int \frac{810x + \log(5)(810x + 405 + 270\log(4)}{81x^4 + 162x^3 + 1053x^2 + \log(5)\left(972x^2 + 972x + 648x\log(4) + 5832 + 108\log^2(4)\right) + (54x^2 + 18x + 108)\log^2}$$

$$\Big\downarrow 2459$$

$$\int \frac{810(1+\log(5))\left(x + \frac{1}{324}(162 + 108\log(4))\right)}{81\left(x + \frac{1}{324}(162 + 108\log(4))\right)^4 + \frac{27}{2}(69 - 4\log(4) + 72\log(5))\left(x + \frac{1}{324}(162 + 108\log(4))\right)^2 + \frac{9}{16}(69 + 72\log(}$$

$$\Big\downarrow 27$$

$$810(1 + \log(5))\int \frac{16\left(x + \frac{1}{324}(162 + 108\log(4))\right)}{9\left(144\left(x + \frac{1}{324}(162 + 108\log(4))\right)^4 + 24(69 - 4\log(4) + 72\log(5))\left(x + \frac{1}{324}(162 + 108\log(4))\right)^2 + (-6\right.}$$

$$\Big\downarrow 27$$

$$\log(5))\int \frac{1440(1+ \\ x+\frac{1}{324}(162+108\log(4))}{144\left(x+\frac{1}{324}(162+108\log(4))\right)^4+24(69-4\log(4)+72\log(5))\left(x+\frac{1}{324}(162+108\log(4))\right)^2+(-69-$$

$$\Big\downarrow \; 1380$$

$$\log(5))\int \frac{207360(1+ \\ x+\frac{1}{324}(162+108\log(4))}{144\left(12\left(x+\frac{1}{324}(162+108\log(4))\right)^2+72\log(5)-4\log(4)+69\right)^2}d\left(x+\frac{1}{324}(162+108\log(4))\right)$$

$$\Big\downarrow \; 27$$

$$\log(5))\int \frac{1440(1+ \\ x+\frac{1}{324}(162+108\log(4))}{\left(12\left(x+\frac{1}{324}(162+108\log(4))\right)^2+72\log(5)-4\log(4)+69\right)^2}d\left(x+\frac{1}{324}(162+108\log(4))\right)$$

$$\Big\downarrow \; 241$$

$$-\frac{60(1+\log(5))}{12\left(x+\frac{1}{324}(162+108\log(4))\right)^2+69+72\log(5)-4\log(4)}$$

input
```
Int[(405 + 810*x + 270*Log[4] + (405 + 810*x + 270*Log[4])*Log[5])/(2916 +
 972*x + 1053*x^2 + 162*x^3 + 81*x^4 + (648*x + 108*x^2 + 108*x^3)*Log[4]
+ (108 + 18*x + 54*x^2)*Log[4]^2 + 12*x*Log[4]^3 + Log[4]^4 + (5832 + 972*
x + 972*x^2 + 648*x*Log[4] + 108*Log[4]^2)*Log[5] + 2916*Log[5]^2),x]
```

output
```
(-60*(1 + Log[5]))/(69 - 4*Log[4] + 12*(x + (162 + 108*Log[4])/324)^2 + 72
*Log[5])
```

3.1286.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

3.1286.

$$\int \frac{405+810x+270\log(4)+(405+810x+270\log(4))\log(5)}{2916+972x+1053x^2+162x^3+81x^4+(648x+108x^2+108x^3)\log(4)+(108+18x+54x^2)\log^2(4)+12x\log^3(4)+\log^4(4)+(5832+972x+972x^2+648x\log$$

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2459
```
Int[(Pn_)^(p_.)*(Qx_), x_Symbol] :> With[{S = Coeff[Pn, x, Expon[Pn, x] - 1
]/(Expon[Pn, x]*Coeff[Pn, x, Expon[Pn, x]])}, Subst[Int[ExpandToSum[Pn /. x
 -> x - S, x]^p*ExpandToSum[Qx /. x -> x - S, x], x], x, x + S] /; Binomial
Q[Pn /. x -> x - S, x] || (IntegerQ[Expon[Pn, x]/2] && TrinomialQ[Pn /. x -
> x - S, x])] /; FreeQ[p, x] && PolyQ[Pn, x] && GtQ[Expon[Pn, x], 2] && NeQ
[Coeff[Pn, x, Expon[Pn, x] - 1], 0] && PolyQ[Qx, x] &&  !(MonomialQ[Qx, x]
&& IGtQ[p, 0])
```

3.1286.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

method	result	size
gosper	$-\frac{45(\ln(5)+1)}{4\ln(2)^{2}+12x\ln(2)+9x^{2}+54\ln(5)+9x+54}$	34
norman	$\frac{-45-45\ln(5)}{4\ln(2)^{2}+12x\ln(2)+9x^{2}+54\ln(5)+9x+54}$	35
parallelrisch	$\frac{-405-405\ln(5)}{36\ln(2)^{2}+108x\ln(2)+81x^{2}+486\ln(5)+81x+486}$	36
risch	$-\frac{45\ln(5)}{4\left(\ln(2)^{2}+3x\ln(2)+\frac{9x^{2}}{4}+\frac{27\ln(5)}{2}+\frac{9x}{4}+\frac{27}{2}\right)}-\frac{45}{4\left(\ln(2)^{2}+3x\ln(2)+\frac{9x^{2}}{4}+\frac{27\ln(5)}{2}+\frac{9x}{4}+\frac{27}{2}\right)}$	58
default	$\frac{(135\ln(5)+135)\left(-648+(4\ln(2)+3)(12\ln(2)+9)-48\ln(2)^{2}-648\ln(5)\right)}{(-216\ln(2)+1944\ln(5)+1863)\left(4\ln(2)^{2}+12x\ln(2)+9x^{2}+54\ln(5)+9x+54\right)}$	72

input
```
int(((540*ln(2)+810*x+405)*ln(5)+540*ln(2)+810*x+405)/(2916*ln(5)^2+(432*l
n(2)^2+1296*x*ln(2)+972*x^2+972*x+5832)*ln(5)+16*ln(2)^4+96*x*ln(2)^3+4*(5
4*x^2+18*x+108)*ln(2)^2+2*(108*x^3+108*x^2+648*x)*ln(2)+81*x^4+162*x^3+105
3*x^2+972*x+2916),x,method=_RETURNVERBOSE)
```

output
```
-45*(ln(5)+1)/(4*ln(2)^2+12*x*ln(2)+9*x^2+54*ln(5)+9*x+54)
```

3.1286.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.22

$$\int \frac{405 + 810x + 270\log(4) + (405 + \cdots}{2916 + 972x + 1053x^2 + 162x^3 + 81x^4 + (648x + 108x^2 + 108x^3)\log(4) + (108 + 18x + 54x^2)\log^2(4) + \cdots}$$
$$= -\frac{45\,(\log(5) + 1)}{9\,x^2 + 12\,x\log(2) + 4\,\log(2)^2 + 9\,x + 54\,\log(5) + 54}$$

input
```
integrate(((540*log(2)+810*x+405)*log(5)+540*log(2)+810*x+405)/(2916*log(5
)^2+(432*log(2)^2+1296*x*log(2)+972*x^2+972*x+5832)*log(5)+16*log(2)^4+96*
x*log(2)^3+4*(54*x^2+18*x+108)*log(2)^2+2*(108*x^3+108*x^2+648*x)*log(2)+8
1*x^4+162*x^3+1053*x^2+972*x+2916),x, algorithm=\
```

output
```
-45*(log(5) + 1)/(9*x^2 + 12*x*log(2) + 4*log(2)^2 + 9*x + 54*log(5) + 54)
```

3.1286.6 Sympy [A] (verification not implemented)

Time = 0.87 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{405 + 810x + 270\log(4) + (405 + \cdots}{2916 + 972x + 1053x^2 + 162x^3 + 81x^4 + (648x + 108x^2 + 108x^3)\log(4) + (108 + 18x + 54x^2)\log^2(4) + \cdots}$$
$$= \frac{-45\log(5) - 45}{9x^2 + x\,(12\log(2) + 9) + 4\log(2)^2 + 54 + 54\log(5)}$$

input
```
integrate(((540*ln(2)+810*x+405)*ln(5)+540*ln(2)+810*x+405)/(2916*ln(5)**2
+(432*ln(2)**2+1296*x*ln(2)+972*x**2+972*x+5832)*ln(5)+16*ln(2)**4+96*x*ln
(2)**3+4*(54*x**2+18*x+108)*ln(2)**2+2*(108*x**3+108*x**2+648*x)*ln(2)+81*
x**4+162*x**3+1053*x**2+972*x+2916),x)
```

output
```
(-45*log(5) - 45)/(9*x**2 + x*(12*log(2) + 9) + 4*log(2)**2 + 54 + 54*log(
5))
```

3.1286.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.26

$$\int \frac{405+810x+270\log(4)+(405+}{2916+972x+1053x^2+162x^3+81x^4+(648x+108x^2+108x^3)\log(4)+(108+18x+54x^2)\log^2(4)+}$$
$$= -\frac{45\,(\log(5)+1)}{9\,x^2+3\,x(4\,\log(2)+3)+4\,\log(2)^2+54\,\log(5)+54}$$

input
```
integrate(((540*log(2)+810*x+405)*log(5)+540*log(2)+810*x+405)/(2916*log(5
)^2+(432*log(2)^2+1296*x*log(2)+972*x^2+972*x+5832)*log(5)+16*log(2)^4+96*
x*log(2)^3+4*(54*x^2+18*x+108)*log(2)^2+2*(108*x^3+108*x^2+648*x)*log(2)+8
1*x^4+162*x^3+1053*x^2+972*x+2916),x, algorithm=\
```

output
```
-45*(log(5) + 1)/(9*x^2 + 3*x*(4*log(2) + 3) + 4*log(2)^2 + 54*log(5) + 54
)
```

3.1286.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 71 vs. $2(29) = 58$.

Time = 0.27 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.63

$$\int \frac{405+810x+270\log(4)+(405+}{2916+972x+1053x^2+162x^3+81x^4+(648x+108x^2+108x^3)\log(4)+(108+18x+54x^2)\log^2(4)+}$$
$$= -\frac{45\,(\log(5)^2+2\,\log(5)+1)}{4\,\log(5)\log(2)^2+9\,x^2+3\,(3\,x^2+4\,x\log(2)+3\,x)\log(5)+54\,\log(5)^2+12\,x\log(2)+4\,\log(2)^2+9}$$

input
```
integrate(((540*log(2)+810*x+405)*log(5)+540*log(2)+810*x+405)/(2916*log(5
)^2+(432*log(2)^2+1296*x*log(2)+972*x^2+972*x+5832)*log(5)+16*log(2)^4+96*
x*log(2)^3+4*(54*x^2+18*x+108)*log(2)^2+2*(108*x^3+108*x^2+648*x)*log(2)+8
1*x^4+162*x^3+1053*x^2+972*x+2916),x, algorithm=\
```

output
```
-45*(log(5)^2 + 2*log(5) + 1)/(4*log(5)*log(2)^2 + 9*x^2 + 3*(3*x^2 + 4*x*
log(2) + 3*x)*log(5) + 54*log(5)^2 + 12*x*log(2) + 4*log(2)^2 + 9*x + 108*
log(5) + 54)
```

3.1286.
$$\int \frac{405+810x+270\log(4)+(405+810x+270\log(4))\log(5)}{2916+972x+1053x^2+162x^3+81x^4+(648x+108x^2+108x^3)\log(4)+(108+18x+54x^2)\log^2(4)+12x\log^3(4)+\log^4(4)+(5832+972x+972x^2+648x\,\mathrm{lo}}$$

3.1286.9 Mupad [B] (verification not implemented)

Time = 19.67 (sec) , antiderivative size = 2558, normalized size of antiderivative = 94.74

$$\int \frac{405 + 810x + 270\log(4) + (405 +}{2916 + 972x + 1053x^2 + 162x^3 + 81x^4 + (648x + 108x^2 + 108x^3)\log(4) + (108 + 18x + 54x^2)\log^2(4) +}$$
= Too large to display

input
```
int((810*x + 540*log(2) + log(5)*(810*x + 540*log(2) + 405) + 405)/(972*x
+ 2*log(2)*(648*x + 108*x^2 + 108*x^3) + 4*log(2)^2*(18*x + 54*x^2 + 108)
+ 96*x*log(2)^3 + log(5)*(972*x + 1296*x*log(2) + 432*log(2)^2 + 972*x^2 +
 5832) + 16*log(2)^4 + 2916*log(5)^2 + 1053*x^2 + 162*x^3 + 81*x^4 + 2916)
,x)
```

output
```
symsum(log(4009802061150*root(418066920000*log(2)*log(5)^3 - 9447840000*lo
g(2)^2*log(5) + 210804930000*log(2)*log(5)^4 - 2361960000*log(2)^2*log(5)^
4 + 42515280000*log(2)*log(5)^5 - 14171760000*log(2)^2*log(5)^2 - 94478400
00*log(2)^2*log(5)^3 + 414523980000*log(2)*log(5)^2 + 205490520000*log(2)*
log(5) - 2790397400625*log(5)^4 - 1069525012500*log(5) - 1131969330000*log
(5)^5 - 2361960000*log(2)^2 - 191318760000*log(5)^6 - 2712342003750*log(5)
^2 + 40743810000*log(2) - 3668271502500*log(5)^3 - 175707680625, z, k) + 3
486784401000*x + 2324522934000*log(2) + 5230176601500*log(5) + 48814981614
00*root(418066920000*log(2)*log(5)^3 - 9447840000*log(2)^2*log(5) + 210804
930000*log(2)*log(5)^4 - 2361960000*log(2)^2*log(5)^4 + 42515280000*log(2)
*log(5)^5 - 14171760000*log(2)^2*log(5)^2 - 9447840000*log(2)^2*log(5)^3 +
 414523980000*log(2)*log(5)^2 + 205490520000*log(2)*log(5) - 2790397400625
*log(5)^4 - 1069525012500*log(5) - 1131969330000*log(5)^5 - 2361960000*log
(2)^2 - 191318760000*log(5)^6 - 2712342003750*log(5)^2 + 40743810000*log(2
) - 3668271502500*log(5)^3 - 175707680625, z, k)*log(2) + 12203745403500*r
oot(418066920000*log(2)*log(5)^3 - 9447840000*log(2)^2*log(5) + 2108049300
00*log(2)*log(5)^4 - 2361960000*log(2)^2*log(5)^4 + 42515280000*log(2)*log
(5)^5 - 14171760000*log(2)^2*log(5)^2 - 9447840000*log(2)^2*log(5)^3 + 414
523980000*log(2)*log(5)^2 + 205490520000*log(2)*log(5) - 2790397400625*log
(5)^4 - 1069525012500*log(5) - 1131969330000*log(5)^5 - 2361960000*log(...
```

3.1287 $\int \left(10 \log^2(2)+\left(50 e^2+50 x\right) \log^4(2)\right) \, dx$

3.1287.1 Optimal result

Integrand size = 21, antiderivative size = 15

$$\int \left(10 \log^2(2)+\left(50 e^2+50 x\right) \log^4(2)\right) \, dx=\left(1+5\left(e^2+x\right) \log^2(2)\right)^2$$

output
```
(1+ln(2)^2*(5*x+5*exp(2)))^2
```

3.1287.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 30, normalized size of antiderivative = 2.00

$$\int \left(10 \log^2(2)+\left(50 e^2+50 x\right) \log^4(2)\right) \, dx=10 \left(x \log^2(2)+5 e^2 x \log^4(2)+\frac{5}{2} x^2 \log^4(2)\right)$$

input
```
Integrate[10*Log[2]^2 + (50*E^2 + 50*x)*Log[2]^4,x]
```

output
```
10*(x*Log[2]^2 + 5*E^2*x*Log[2]^4 + (5*x^2*Log[2]^4)/2)
```

3.1287.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.40, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.048, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\left(50x+50e^2\right)\log^4(2)+10\log^2(2)\right)\,dx$$

$$\Big\downarrow \text{ 2009}$$

$$25\left(x+e^2\right)^2\log^4(2)+10x\log^2(2)$$

input
```
Int[10*Log[2]^2 + (50*E^2 + 50*x)*Log[2]^4,x]
```

output
```
10*x*Log[2]^2 + 25*(E^2 + x)^2*Log[2]^4
```

3.1287.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1287.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.67

method	result	size
gosper	$5\ln(2)^2 x\left(10\,\mathrm{e}^2\ln(2)^2+5x\ln(2)^2+2\right)$	25
parallelrisch	$\ln(2)^4\left(50\,\mathrm{e}^2 x+25x^2\right)+10x\ln(2)^2$	25
default	$10\ln(2)^2\left(5x\,\mathrm{e}^2\ln(2)^2+\frac{5x^2\ln(2)^2}{2}+x\right)$	27
risch	$50\ln(2)^4\,\mathrm{e}^2 x+25x^2\ln(2)^4+10x\ln(2)^2$	27
parts	$50\ln(2)^4\,\mathrm{e}^2 x+25x^2\ln(2)^4+10x\ln(2)^2$	27
norman	$\left(50\ln(2)^4\,\mathrm{e}^2+10\ln(2)^2\right)x+25x^2\ln(2)^4$	28

input
```
int((50*exp(2)+50*x)*ln(2)^4+10*ln(2)^2,x,method=_RETURNVERBOSE)
```

output
```
5*ln(2)^2*x*(10*exp(2)*ln(2)^2+5*x*ln(2)^2+2)
```

3.1287.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.53

$$\int \left(10\log^2(2)+\left(50e^2+50x\right)\log^4(2)\right)\,dx=25\left(x^2+2\,xe^2\right)\log\left(2\right)^4+10\,x\log\left(2\right)^2$$

input
```
integrate((50*exp(2)+50*x)*log(2)^4+10*log(2)^2,x, algorithm=\
```

output
```
25*(x^2 + 2*x*e^2)*log(2)^4 + 10*x*log(2)^2
```

3.1287.6 Sympy [A] (verification not implemented)

Time = 0.03 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.80

$$\int \left(10\log^2(2)+\left(50e^2+50x\right)\log^4(2)\right)\,dx=25x^2\log\left(2\right)^4+x\left(10\log\left(2\right)^2+50e^2\log\left(2\right)^4\right)$$

input
```
integrate((50*exp(2)+50*x)*ln(2)**4+10*ln(2)**2,x)
```

output
```
25*x**2*log(2)**4 + x*(10*log(2)**2 + 50*exp(2)*log(2)**4)
```

3.1287.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.53

$$\int \left(10\log^2(2)+\left(50e^2+50x\right)\log^4(2)\right)\,dx=25\left(x^2+2\,xe^2\right)\log\left(2\right)^4+10\,x\log\left(2\right)^2$$

input
```
integrate((50*exp(2)+50*x)*log(2)^4+10*log(2)^2,x, algorithm=\
```

output
```
25*(x^2 + 2*x*e^2)*log(2)^4 + 10*x*log(2)^2
```

3.1287.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.53

$$\int \left(10 \log^2(2)+\left(50 e^2+50 x\right) \log^4(2)\right) \, dx=25 \left(x^2+2 \, x e^2\right) \log \left(2\right)^4+10 \, x \log \left(2\right)^2$$

input
```
integrate((50*exp(2)+50*x)*log(2)^4+10*log(2)^2,x, algorithm=\
```

output
```
25*(x^2 + 2*x*e^2)*log(2)^4 + 10*x*log(2)^2
```

3.1287.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.93

$$\int \left(10 \log^2(2)+\left(50 e^2+50 x\right) \log^4(2)\right) \, dx=\frac{\ln \left(2\right)^2\,\left(\ln \left(2\right)^2\,\left(50\,x+50\,{\mathrm{e}}^2\right)+20\right)\,\left(50\,x+50\,{\mathrm{e}}^2\right)}{100}$$

input
```
int(log(2)^4*(50*x + 50*exp(2)) + 10*log(2)^2,x)
```

output
```
(log(2)^2*(log(2)^2*(50*x + 50*exp(2)) + 20)*(50*x + 50*exp(2)))/100
```

3.1288 $\int \frac{8x^3-10ex^5+8x^3\log(9)+\left(4x^3-4ex^5+4x^3\log(9)\right)\log\left(-1+ex^2-\log(9)\right)}{1-ex^2+\log(9)}$

3.1288.1 Optimal result

Integrand size = 64, antiderivative size = 18

$$\int \frac{8x^3-10ex^5+8x^3\log(9)+(4x^3-4ex^5+4x^3\log(9))\log\left(-1+ex^2-\log(9)\right)}{1-ex^2+\log(9)}\,dx$$
$$= x^4\left(2+\log\left(-1+ex^2-\log(9)\right)\right)$$

output
```
x^4*(ln(-2*ln(3)+x^2*exp(1)-1)+2)
```

3.1288.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.39

$$\int \frac{8x^3-10ex^5+8x^3\log(9)+(4x^3-4ex^5+4x^3\log(9))\log\left(-1+ex^2-\log(9)\right)}{1-ex^2+\log(9)}\,dx$$
$$= 2\left(x^4+\frac{1}{2}x^4\log\left(-1+ex^2-\log(9)\right)\right)$$

input
```
Integrate[(8*x^3 - 10*E*x^5 + 8*x^3*Log[9] + (4*x^3 - 4*E*x^5 + 4*x^3*Log[
9])*Log[-1 + E*x^2 - Log[9]])/(1 - E*x^2 + Log[9]),x]
```

output
```
2*(x^4 + (x^4*Log[-1 + E*x^2 - Log[9]])/2)
```

3.1288.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.047, Rules used = {6, 7276, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-10ex^5+8x^3+8x^3\log(9)+\left(-4ex^5+4x^3+4x^3\log(9)\right)\log\left(ex^2-1-\log(9)\right)}{-ex^2+1+\log(9)}\,dx$$
$$\Big\downarrow \; 6$$
$$\int \frac{-10ex^5+x^3(8+8\log(9))+\left(-4ex^5+4x^3+4x^3\log(9)\right)\log\left(ex^2-1-\log(9)\right)}{-ex^2+1+\log(9)}dx$$
$$\Big\downarrow \; 7276$$
$$\int \left(4x^3\log\left(ex^2-1-\log(9)\right)+\frac{2x^3\left(5ex^2-4-4\log(9)\right)}{ex^2-1-\log(9)}\right)dx$$
$$\Big\downarrow \; 2009$$
$$2x^4+x^4\log\left(ex^2-1-\log(9)\right)$$

input
```
Int[(8*x^3 - 10*E*x^5 + 8*x^3*Log[9] + (4*x^3 - 4*E*x^5 + 4*x^3*Log[9])*Lo
g[-1 + E*x^2 - Log[9]])/(1 - E*x^2 + Log[9]),x]
```

output
```
2*x^4 + x^4*Log[-1 + E*x^2 - Log[9]]
```

3.1288.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7276
```
Int[(u_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> With[{v = RationalFunctionE
xpand[u/(a + b*x^n), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b}, x] && IGtQ
[n, 0]
```

3.1288.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.33

method	result
norman	$x^4\ln(-2\ln(3)+x^2\mathrm{e}-1)+2x^4$
risch	$x^4\ln(-2\ln(3)+x^2\mathrm{e}-1)+2x^4$
parallelrisch	$-\left(-\ln(-2\ln(3)+x^2\mathrm{e}-1)\mathrm{e}^2x^4-2x^4\mathrm{e}^2+2+8\ln(3)^2+8\ln(3)\right)\mathrm{e}^{-2}$
default	$x^4\ln(-2\ln(3)+x^2\mathrm{e}-1)-2\,\mathrm{e}\left(\frac{\mathrm{e}^{-2}\left(\frac{x^4\mathrm{e}}{2}+2x^2\ln(3)+x^2\right)}{2}+\frac{\mathrm{e}^{-2}\left(4\ln(3)^2+4\ln(3)+1\right)\mathrm{e}^{-1}\ln(-2\ln(3)+x^2\mathrm{e}-1)}{2}\right.$
parts	$x^4\ln(-2\ln(3)+x^2\mathrm{e}-1)-2\,\mathrm{e}\left(\frac{\mathrm{e}^{-2}\left(\frac{x^4\mathrm{e}}{2}+2x^2\ln(3)+x^2\right)}{2}+\frac{\mathrm{e}^{-2}\left(4\ln(3)^2+4\ln(3)+1\right)\mathrm{e}^{-1}\ln(-2\ln(3)+x^2\mathrm{e}-1)}{2}\right.$

input
```
int(((8*x^3*ln(3)-4*x^5*exp(1)+4*x^3)*ln(-2*ln(3)+x^2*exp(1)-1)+16*x^3*ln(
3)-10*x^5*exp(1)+8*x^3)/(2*ln(3)-x^2*exp(1)+1),x,method=_RETURNVERBOSE)
```

output
```
x^4*ln(-2*ln(3)+x^2*exp(1)-1)+2*x^4
```

3.1288.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

$$\int \frac{8x^3-10ex^5+8x^3\log(9)+(4x^3-4ex^5+4x^3\log(9))\log(-1+ex^2-\log(9))}{1-ex^2+\log(9)}\,dx$$
$$=x^4\log\left(x^2e-2\,\log(3)-1\right)+2\,x^4$$

input
```
integrate(((8*x^3*log(3)-4*x^5*exp(1)+4*x^3)*log(-2*log(3)+x^2*exp(1)-1)+1
6*x^3*log(3)-10*x^5*exp(1)+8*x^3)/(2*log(3)-x^2*exp(1)+1),x, algorithm=\
```

output
```
x^4*log(x^2*e - 2*log(3) - 1) + 2*x^4
```

3.1288.6 Sympy [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{8x^3 - 10ex^5 + 8x^3 \log(9) + (4x^3 - 4ex^5 + 4x^3 \log(9)) \log(-1 + ex^2 - \log(9))}{1 - ex^2 + \log(9)} \, dx$$
$$= x^4 \log \left(ex^2 - 2 \log(3) - 1\right) + 2x^4$$

input
```
integrate(((8*x**3*ln(3)-4*x**5*exp(1)+4*x**3)*ln(-2*ln(3)+x**2*exp(1)-1)+
16*x**3*ln(3)-10*x**5*exp(1)+8*x**3)/(2*ln(3)-x**2*exp(1)+1),x)
```

output
```
x**4*log(E*x**2 - 2*log(3) - 1) + 2*x**4
```

3.1288.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 467 vs. 2(19) = 38.

Time = 0.29 (sec) , antiderivative size = 467, normalized size of antiderivative = 25.94

$$\int \frac{8x^3 - 10ex^5 + 8x^3 \log(9) + (4x^3 - 4ex^5 + 4x^3 \log(9)) \log(-1 + ex^2 - \log(9))}{1 - ex^2 + \log(9)} \, dx$$
$$= \text{Too large to display}$$

input
```
integrate(((8*x^3*log(3)-4*x^5*exp(1)+4*x^3)*log(-2*log(3)+x^2*exp(1)-1)+1
6*x^3*log(3)-10*x^5*exp(1)+8*x^3)/(2*log(3)-x^2*exp(1)+1),x, algorithm=\
```

output
```
-4*x^2*e^(-1) + 2*(2*x^2*e + (2*log(3) + 1)*log(x^2*e - 2*log(3) - 1)^2 +
2*(2*log(3) + 1)*log(x^2*e - 2*log(3) - 1))*e^(-2)*log(3) + (2*(4*log(3)^2
 + 4*log(3) + 1)*e^(-3)*log(x^2*e - 2*log(3) - 1) + (x^4*e + 2*x^2*(2*log(
3) + 1))*e^(-2))*e*log(x^2*e - 2*log(3) - 1) - 4*(2*log(3) + 1)*e^(-2)*log
(x^2*e - 2*log(3) - 1) - 4*(x^2*e^(-1) + (2*log(3) + 1)*e^(-2)*log(x^2*e -
 2*log(3) - 1))*log(3)*log(x^2*e - 2*log(3) - 1) + 5/2*(2*(4*log(3)^2 + 4*
log(3) + 1)*e^(-3)*log(x^2*e - 2*log(3) - 1) + (x^4*e + 2*x^2*(2*log(3) +
1))*e^(-2))*e - 1/2*(x^4*e^2 + 6*x^2*(2*log(3) + 1)*e + 2*(4*log(3)^2 + 4*
log(3) + 1)*log(x^2*e - 2*log(3) - 1)^2 + 6*(4*log(3)^2 + 4*log(3) + 1)*lo
g(x^2*e - 2*log(3) - 1))*e^(-2) + (2*x^2*e + (2*log(3) + 1)*log(x^2*e - 2*
log(3) - 1)^2 + 2*(2*log(3) + 1)*log(x^2*e - 2*log(3) - 1))*e^(-2) - 8*(x^
2*e^(-1) + (2*log(3) + 1)*e^(-2)*log(x^2*e - 2*log(3) - 1))*log(3) - 2*(x^
2*e^(-1) + (2*log(3) + 1)*e^(-2)*log(x^2*e - 2*log(3) - 1))*log(x^2*e - 2*
log(3) - 1)
```

3.1288.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 181 vs. $2(19) = 38$.

Time = 0.28 (sec) , antiderivative size = 181, normalized size of antiderivative = 10.06

$$\int \frac{8x^3 - 10ex^5 + 8x^3\log(9) + (4x^3 - 4ex^5 + 4x^3\log(9))\log(-1 + ex^2 - \log(9))}{1 - ex^2 + \log(9)}\,dx$$
$$= \Big(4\,x^2e + \left(x^2e - 2\,\log\left(3\right) - 1\right)^2\log\left(x^2e - 2\,\log\left(3\right) - 1\right) + 4\left(x^2e - 2\,\log\left(3\right) - 1\right)\log\left(3\right)\log\left(x^2e - 2\,\log\right.$$

input
```
integrate(((8*x^3*log(3)-4*x^5*exp(1)+4*x^3)*log(-2*log(3)+x^2*exp(1)-1)+1
6*x^3*log(3)-10*x^5*exp(1)+8*x^3)/(2*log(3)-x^2*exp(1)+1),x, algorithm=\
```

output
```
(4*x^2*e + (x^2*e - 2*log(3) - 1)^2*log(x^2*e - 2*log(3) - 1) + 4*(x^2*e -
 2*log(3) - 1)*log(3)*log(x^2*e - 2*log(3) - 1) + 4*log(3)^2*log(x^2*e - 2
*log(3) - 1) + 2*(x^2*e - 2*log(3) - 1)^2 + 8*(x^2*e - 2*log(3) - 1)*log(3
) + 2*(x^2*e - 2*log(3) - 1)*log(x^2*e - 2*log(3) - 1) + 4*log(3)*log(x^2*
e - 2*log(3) - 1) - 8*log(3) + log(x^2*e - 2*log(3) - 1) - 4)*e^(-2)
```

3.1288.9 Mupad [B] (verification not implemented)

Time = 32.53 (sec) , antiderivative size = 156, normalized size of antiderivative = 8.67

$$\int \frac{8x^3 - 10ex^5 + 8x^3\log(9) + (4x^3 - 4ex^5 + 4x^3\log(9))\log(-1 + ex^2 - \log(9))}{1 - ex^2 + \log(9)}\,dx$$
$$\begin{aligned} &= x^4\,\ln\left(\mathrm{e}\,x^2 - 2\,\ln\left(3\right) - 1\right) - 4\,x^2\,\mathrm{e}^{-1} + 2\,x^4 - 8\,x^2\,\mathrm{e}^{-1}\,\ln\left(3\right) \\ &\quad - \ln\left(\mathrm{e}\,x^2 - \ln\left(9\right) - 1\right)\,\mathrm{e}^{-2}\left(4\,\ln\left(9\right) + 4\right) + \ln\left(\mathrm{e}\,x^2 - \ln\left(9\right) - 1\right)\,\mathrm{e}^{-2}\left(10\,\ln\left(9\right) + 5\ln\left(9\right)^2 + 5\right) \\ &\quad - \ln\left(\mathrm{e}\,x^2 - \ln\left(9\right) - 1\right)\,\mathrm{e}^{-2}\left(8\,\ln\left(3\right) + 8\,\ln\left(3\right)\,\ln\left(9\right)\right) \\ &\quad + 4\,x^2\,\mathrm{e}^{-1}\left(\ln\left(9\right) + 1\right) - \ln\left(\mathrm{e}\,x^2 - \ln\left(9\right) - 1\right)\,\mathrm{e}^{-2}\left(2\,\ln\left(9\right) + \ln\left(9\right)^2 + 1\right) \end{aligned}$$

input
```
int((log(x^2*exp(1) - 2*log(3) - 1)*(8*x^3*log(3) - 4*x^5*exp(1) + 4*x^3)
- 10*x^5*exp(1) + 16*x^3*log(3) + 8*x^3)/(2*log(3) - x^2*exp(1) + 1),x)
```

output
```
x^4*log(x^2*exp(1) - 2*log(3) - 1) - 4*x^2*exp(-1) + 2*x^4 - 8*x^2*exp(-1)
*log(3) - log(x^2*exp(1) - log(9) - 1)*exp(-2)*(4*log(9) + 4) + log(x^2*ex
p(1) - log(9) - 1)*exp(-2)*(10*log(9) + 5*log(9)^2 + 5) - log(x^2*exp(1) -
 log(9) - 1)*exp(-2)*(8*log(3) + 8*log(3)*log(9)) + 4*x^2*exp(-1)*(log(9)
+ 1) - log(x^2*exp(1) - log(9) - 1)*exp(-2)*(2*log(9) + log(9)^2 + 1)
```

3.1289 $\int \frac{-1-8x^2+\log(x)}{(-16x^2-8x^3-x\log(x)+4x^2\log(\log(5)))\log\left(\frac{-16x-8x^2-\log(x)+4x\log(\log(5))}{2x}\right)}\,dx$

3.1289.1 Optimal result

Integrand size = 65, antiderivative size = 21

$$\int \frac{-1-8x^2+\log(x)}{(-16x^2-8x^3-x\log(x)+4x^2\log(\log(5)))\log\left(\frac{-16x-8x^2-\log(x)+4x\log(\log(5))}{2x}\right)}\,dx = \log\left(\log\left(2\left(-4-2x-\frac{\log(x)}{4x}+\log(\log(5))\right)\right)\right)$$

output
```
ln(ln(-1/2*ln(x)/x-8-4*x+2*ln(ln(5))))
```

3.1289.2 Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{-1-8x^2+\log(x)}{(-16x^2-8x^3-x\log(x)+4x^2\log(\log(5)))\log\left(\frac{-16x-8x^2-\log(x)+4x\log(\log(5))}{2x}\right)}\,dx = \log\left(\log\left(-8-4x-\frac{\log(x)}{2x}+2\log(\log(5))\right)\right)$$

input
```
Integrate[(-1 - 8*x^2 + Log[x])/((-16*x^2 - 8*x^3 - x*Log[x] + 4*x^2*Log[L
og[5]])*Log[(-16*x - 8*x^2 - Log[x] + 4*x*Log[Log[5]])/(2*x)]),x]
```

output
```
Log[Log[-8 - 4*x - Log[x]/(2*x) + 2*Log[Log[5]]]]
```

3.1289.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.031, Rules used = {6, 7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-8x^2+\log(x)-1}{(-8x^3-16x^2+4x^2\log(\log(5))-x\log(x))\log\left(\frac{-8x^2-16x+4x\log(\log(5))-\log(x)}{2x}\right)}dx$$
$$\Big\downarrow \text{ 6}$$
$$\int \frac{-8x^2+\log(x)-1}{(-8x^3+x^2(4\log(\log(5))-16)-x\log(x))\log\left(\frac{-8x^2-16x+4x\log(\log(5))-\log(x)}{2x}\right)}dx$$
$$\Big\downarrow \text{ 7235}$$
$$\log\left(\log\left(-\frac{8x^2+16x-4x\log(\log(5))+\log(x)}{2x}\right)\right)$$

input
```
Int[(-1 - 8*x^2 + Log[x])/((-16*x^2 - 8*x^3 - x*Log[x] + 4*x^2*Log[Log[5]]
)*Log[(-16*x - 8*x^2 - Log[x] + 4*x*Log[Log[5]])/(2*x)]),x]
```

output
```
Log[Log[-1/2*(16*x + 8*x^2 + Log[x] - 4*x*Log[Log[5]])/x]]
```

3.1289.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.1289.4 Maple [A] (verified)

Time = 0.73 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

method	result
parallelrisch	$\ln\left(\ln\left(-\frac{-4x\ln(\ln(5))+8x^2+\ln(x)+16x}{2x}\right)\right)$
default	$\ln\left(\ln\left(2\right)-\ln\left(-\frac{-4x\ln(\ln(5))+8x^2+\ln(x)+16x}{x}\right)\right)$
risch	$\ln\left(\ln\left(x\ln\left(\ln\left(5\right)\right)-2x^2-4x-\frac{\ln(x)}{4}\right)-\frac{i\left(\pi\,\mathrm{csgn}\left(\frac{i}{x}\right)\mathrm{csgn}\left(i\left(-x\ln(\ln(5))+2x^2+4x+\frac{\ln(x)}{4}\right)\right)\mathrm{csgn}\left(\frac{i\left(-x\right.}{}\right.\right.}{}\right.$

input
```
int((ln(x)-8*x^2-1)/(4*ln(ln(5))*x^2-x*ln(x)-8*x^3-16*x^2)/ln(1/2*(4*x*ln(
ln(5))-ln(x)-8*x^2-16*x)/x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln(-1/2*(-4*x*ln(ln(5))+8*x^2+ln(x)+16*x)/x))
```

3.1289.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{-1-8x^2+\log(x)}{(-16x^2-8x^3-x\log(x)+4x^2\log(\log(5)))\log\left(\frac{-16x-8x^2-\log(x)+4x\log(\log(5))}{2x}\right)}\,dx$$
$$=\log\left(\log\left(-\frac{8\,x^2-4\,x\log\left(\log\left(5\right)\right)+16\,x+\log\left(x\right)}{2\,x}\right)\right)$$

input
```
integrate((log(x)-8*x^2-1)/(4*log(log(5))*x^2-x*log(x)-8*x^3-16*x^2)/log(1
/2*(4*x*log(log(5))-log(x)-8*x^2-16*x)/x),x, algorithm=\
```

output
```
log(log(-1/2*(8*x^2 - 4*x*log(log(5)) + 16*x + log(x))/x))
```

3.1289.6 Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.24

$$\int \frac{-1-8x^2+\log(x)}{(-16x^2-8x^3-x\log(x)+4x^2\log(\log(5)))\log\left(\frac{-16x-8x^2-\log(x)+4x\log(\log(5))}{2x}\right)}\,dx = \log\left(\log\left(\frac{-4x^2-8x+2x\log(\log(5))-\frac{\log(x)}{2}}{x}\right)\right)$$

input
```
integrate((ln(x)-8*x**2-1)/(4*ln(ln(5))*x**2-x*ln(x)-8*x**3-16*x**2)/ln(1/
2*(4*x*ln(ln(5))-ln(x)-8*x**2-16*x)/x),x)
```

output
```
log(log((-4*x**2 - 8*x + 2*x*log(log(5)) - log(x)/2)/x))
```

3.1289.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.38

$$\int \frac{-1-8x^2+\log(x)}{(-16x^2-8x^3-x\log(x)+4x^2\log(\log(5)))\log\left(\frac{-16x-8x^2-\log(x)+4x\log(\log(5))}{2x}\right)}\,dx = \log\left(-\log(2)+\log\left(-8x^2+4x(\log(\log(5))-4)-\log(x)\right)-\log(x)\right)$$

input
```
integrate((log(x)-8*x^2-1)/(4*log(log(5))*x^2-x*log(x)-8*x^3-16*x^2)/log(1
/2*(4*x*log(log(5))-log(x)-8*x^2-16*x)/x),x, algorithm=\
```

output
```
log(-log(2) + log(-8*x^2 + 4*x*(log(log(5)) - 4) - log(x)) - log(x))
```

3.1289.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.43

$$\int \frac{-1-8x^2+\log(x)}{(-16x^2-8x^3-x\log(x)+4x^2\log(\log(5)))\log\left(\frac{-16x-8x^2-\log(x)+4x\log(\log(5))}{2x}\right)}\,dx = \log\left(-\log(2)+\log\left(-8x^2+4x\log(\log(5))-16x-\log(x)\right)-\log(x)\right)$$

input
```
integrate((log(x)-8*x^2-1)/(4*log(log(5))*x^2-x*log(x)-8*x^3-16*x^2)/log(1
/2*(4*x*log(log(5))-log(x)-8*x^2-16*x)/x),x, algorithm=\
```

output
```
log(-log(2) + log(-8*x^2 + 4*x*log(log(5)) - 16*x - log(x)) - log(x))
```

3.1289.9 Mupad [B] (verification not implemented)

Time = 19.65 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{-1-8x^2+\log(x)}{(-16x^2-8x^3-x\log(x)+4x^2\log(\log(5)))\log\left(\frac{-16x-8x^2-\log(x)+4x\log(\log(5))}{2x}\right)}\,dx$$
$$=\ln\left(\ln\left(-\frac{16\,x+\ln(x)-4\,x\,\ln(\ln(5))+8\,x^2}{2\,x}\right)\right)$$

input
```
int((8*x^2 - log(x) + 1)/(log(-(8*x + log(x)/2 - 2*x*log(log(5)) + 4*x^2)/
x)*(x*log(x) - 4*x^2*log(log(5)) + 16*x^2 + 8*x^3)),x)
```

output
```
log(log(-(16*x + log(x) - 4*x*log(log(5)) + 8*x^2)/(2*x)))
```

3.1290 $\int \frac{3e^x+e^x(-3+6x-3x^2)\log\left(\frac{1-x}{x}\right)}{e(-x^2+x^3)\log^2\left(\frac{1-x}{x}\right)}\,dx$

3.1290.1 Optimal result

Integrand size = 57, antiderivative size = 18

$$\int \frac{3e^x+e^x(-3+6x-3x^2)\log\left(\frac{1-x}{x}\right)}{e\left(-x^2+x^3\right)\log^2\left(\frac{1-x}{x}\right)}\,dx=-\frac{3e^{-1+x}}{x\log\left(-1+\frac{1}{x}\right)}$$

output
```
-3*exp(x)/x/ln(1/x-1)/exp(1)
```

3.1290.2 Mathematica [A] (verified)

Time = 0.34 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

$$\int \frac{3e^x+e^x(-3+6x-3x^2)\log\left(\frac{1-x}{x}\right)}{e\left(-x^2+x^3\right)\log^2\left(\frac{1-x}{x}\right)}\,dx=-\frac{3e^{-1+x}}{x\log\left(-1+\frac{1}{x}\right)}$$

input
```
Integrate[(3*E^x + E^x*(-3 + 6*x - 3*x^2)*Log[(1 - x)/x])/(E*(-x^2 + x^3)*
Log[(1 - x)/x]^2),x]
```

output
```
(-3*E^(-1 + x))/(x*Log[-1 + x^(-1)])
```

3.1290.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x\left(-3x^2+6x-3\right)\log\left(\frac{1-x}{x}\right)+3e^x}{e\left(x^3-x^2\right)\log^2\left(\frac{1-x}{x}\right)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\int -\frac{3\left(e^x-e^x\left(x^2-2x+1\right)\log\left(\frac{1-x}{x}\right)\right)}{\left(x^2-x^3\right)\log^2\left(\frac{1-x}{x}\right)}dx}{e}$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{3\int \frac{e^x-e^x\left(x^2-2x+1\right)\log\left(\frac{1-x}{x}\right)}{\left(x^2-x^3\right)\log^2\left(\frac{1-x}{x}\right)}dx}{e}$$

$$\Big\downarrow \text{ 2026}$$

$$-\frac{3\int \frac{e^x-e^x\left(x^2-2x+1\right)\log\left(\frac{1-x}{x}\right)}{(1-x)x^2\log^2\left(\frac{1-x}{x}\right)}dx}{e}$$

$$\Big\downarrow \text{ 7292}$$

$$-\frac{3\int \frac{e^x-e^x\left(x^2-2x+1\right)\log\left(\frac{1-x}{x}\right)}{(1-x)x^2\log^2\left(\frac{1}{x}-1\right)}dx}{e}$$

$$\Big\downarrow \text{ 7293}$$

$$-\frac{3\int \left(\frac{e^x\left(\log\left(\frac{1}{x}-1\right)x^2-2\log\left(\frac{1}{x}-1\right)x+\log\left(\frac{1}{x}-1\right)-1\right)}{(x-1)\log^2\left(\frac{1}{x}-1\right)}-\frac{e^x\left(\log\left(\frac{1}{x}-1\right)x^2-2\log\left(\frac{1}{x}-1\right)x+\log\left(\frac{1}{x}-1\right)-1\right)}{x\log^2\left(\frac{1}{x}-1\right)}-\frac{e^x\left(\log\left(\frac{1}{x}-1\right)x^2-2\log\left(\frac{1}{x}-1\right)x+\log\right.}{x^2\log^2\left(\frac{1}{x}-1\right)}\right.}{e}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{3\left(\int \frac{e^x}{x^2\log^2\left(\frac{1}{x}-1\right)}dx-\int \frac{e^x}{x^2\log\left(\frac{1}{x}-1\right)}dx-\int \frac{e^x}{(x-1)\log^2\left(\frac{1}{x}-1\right)}dx+\int \frac{e^x}{x\log^2\left(\frac{1}{x}-1\right)}dx+\int \frac{e^x}{x\log\left(\frac{1}{x}-1\right)}dx\right)}{e}$$

input
```
Int[(3*E^x + E^x*(-3 + 6*x - 3*x^2)*Log[(1 - x)/x])/(E*(-x^2 + x^3)*Log[(1
 - x)/x]^2),x]
```

output
```
$Aborted
```

3.1290. $\int \frac{3e^x+e^x\left(-3+6x-3x^2\right)\log\left(\frac{1-x}{x}\right)}{e\left(-x^2+x^3\right)\log^2\left(\frac{1-x}{x}\right)}dx$

3.1290.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1290.4 Maple [A] (verified)

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28

method	result
parallelrisch	$-\frac{3\,\mathrm{e}^{-1}\mathrm{e}^{x}}{x\ln\left(-\frac{-1+x}{x}\right)}$
risch	$-\frac{6i e^{-1+x}}{\left(\pi\ \mathrm{csgn}\left(\frac{i}{x}\right)\mathrm{csgn}\left(i(-1+x)\right)\mathrm{csgn}\left(\frac{i(-1+x)}{x}\right)-\pi\ \mathrm{csgn}\left(\frac{i}{x}\right)\mathrm{csgn}\left(\frac{i(-1+x)}{x}\right)^{2}+2\pi\,\mathrm{csgn}\left(\frac{i(-1+x)}{x}\right)^{2}-\pi\ \mathrm{csgn}\left(i(-1+x)\right)\mathrm{csgn}\left(\frac{i(\cdots}{}\right.\right.}$

input
```
int(((-3*x^2+6*x-3)*exp(x)*ln((1-x)/x)+3*exp(x))/(x^3-x^2)/exp(1)/ln((1-x)
/x)^2,x,method=_RETURNVERBOSE)
```

output
```
-3/exp(1)*exp(x)/x/ln(-(-1+x)/x)
```

3.1290.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{3e^x + e^x(-3+6x-3x^2)\log\left(\frac{1-x}{x}\right)}{e\left(-x^2+x^3\right)\log^2\left(\frac{1-x}{x}\right)}\,dx = -\frac{3\,e^{(x-1)}}{x\log\left(-\frac{x-1}{x}\right)}$$

input
```
integrate(((-3*x^2+6*x-3)*exp(x)*log((1-x)/x)+3*exp(x))/(x^3-x^2)/exp(1)/l
og((1-x)/x)^2,x, algorithm=\
```

output
```
-3*e^(x - 1)/(x*log(-(x - 1)/x))
```

3.1290.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{3e^x + e^x(-3+6x-3x^2)\log\left(\frac{1-x}{x}\right)}{e\left(-x^2+x^3\right)\log^2\left(\frac{1-x}{x}\right)}\,dx = -\frac{3e^x}{ex\log\left(\frac{1-x}{x}\right)}$$

input
```
integrate(((-3*x**2+6*x-3)*exp(x)*ln((1-x)/x)+3*exp(x))/(x**3-x**2)/exp(1)
/ln((1-x)/x)**2,x)
```

output
```
-3*exp(-1)*exp(x)/(x*log((1 - x)/x))
```

3.1290.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{3e^x + e^x(-3+6x-3x^2)\log\left(\frac{1-x}{x}\right)}{e\left(-x^2+x^3\right)\log^2\left(\frac{1-x}{x}\right)}\,dx = \frac{3\,e^{(x-1)}}{x\log(x) - x\log(-x+1)}$$

input
```
integrate(((-3*x^2+6*x-3)*exp(x)*log((1-x)/x)+3*exp(x))/(x^3-x^2)/exp(1)/l
og((1-x)/x)^2,x, algorithm=\
```

output
```
3*e^(x - 1)/(x*log(x) - x*log(-x + 1))
```

3.1290.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{3e^x + e^x(-3 + 6x - 3x^2)\log\left(\frac{1-x}{x}\right)}{e\left(-x^2 + x^3\right)\log^2\left(\frac{1-x}{x}\right)}\,dx = -\frac{3\,e^{(x-1)}}{x\log\left(-\frac{x-1}{x}\right)}$$

input
```
integrate(((-3*x^2+6*x-3)*exp(x)*log((1-x)/x)+3*exp(x))/(x^3-x^2)/exp(1)/l
og((1-x)/x)^2,x, algorithm=\
```

output
```
-3*e^(x - 1)/(x*log(-(x - 1)/x))
```

3.1290.9 Mupad [B] (verification not implemented)

Time = 17.86 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{3e^x + e^x(-3 + 6x - 3x^2)\log\left(\frac{1-x}{x}\right)}{e\left(-x^2 + x^3\right)\log^2\left(\frac{1-x}{x}\right)}\,dx = -\frac{3\,\mathrm{e}^{-1}\,\mathrm{e}^{x}}{x\,\ln\left(-\frac{x-1}{x}\right)}$$

input
```
int(-(exp(-1)*(3*exp(x) - exp(x)*log(-(x - 1)/x)*(3*x^2 - 6*x + 3)))/(log(
-(x - 1)/x)^2*(x^2 - x^3)),x)
```

output
```
-(3*exp(-1)*exp(x))/(x*log(-(x - 1)/x))
```

3.1291 $\int \frac{e^{-2+e^{x+x^2}-6x+x^2}\left(1-6x+2x^2+e^{x+x^2}(x+2x^2)+\left(-6x+2x^2+e^{x+x^2}\right.\right.}{x}$

3.1291.1 Optimal result

Integrand size = 73, antiderivative size = 21

$$\int \frac{e^{-2+e^{x+x^2}-6x+x^2}\left(1-6x+2x^2+e^{x+x^2}(x+2x^2)+\left(-6x+2x^2+e^{x+x^2}(x+2x^2)\right)\log(x)\right)}{x}\,dx = e^{-2+e^{x+x^2}+(-6+x)x}(1+\log(x))$$

output
```
exp(x*(-6+x)-2+exp(x^2+x))*(ln(x)+1)
```

3.1291.2 Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.05

$$\int \frac{e^{-2+e^{x+x^2}-6x+x^2}\left(1-6x+2x^2+e^{x+x^2}(x+2x^2)+\left(-6x+2x^2+e^{x+x^2}(x+2x^2)\right)\log(x)\right)}{x}\,dx = e^{-2+e^{x+x^2}-6x+x^2}(1+\log(x))$$

input
```
Integrate[(E^(-2 + E^(x + x^2) - 6*x + x^2)*(1 - 6*x + 2*x^2 + E^(x + x^2)
*(x + 2*x^2) + (-6*x + 2*x^2 + E^(x + x^2)*(x + 2*x^2))*Log[x]))/x,x]
```

output
```
E^(-2 + E^(x + x^2) - 6*x + x^2)*(1 + Log[x])
```

3.1291.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 95 vs. $2(21) = 42$.

Time = 0.80 (sec) , antiderivative size = 95, normalized size of antiderivative = 4.52, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.014$, Rules used = {2726}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{x^2+e^{x^2+x}-6x-2}\left(2x^2+e^{x^2+x}(2x^2+x)+\left(2x^2+e^{x^2+x}(2x^2+x)-6x\right)\log(x)-6x+1\right)}{x}\,dx$$

$$\Big\downarrow \text{2726}$$

$$\frac{e^{x^2+e^{x^2+x}-6x-2}\left(-2x^2-e^{x^2+x}(2x^2+x)+\left(-2x^2-e^{x^2+x}(2x^2+x)+6x\right)\log(x)+6x\right)}{x\left(-e^{x^2+x}(2x+1)-2x+6\right)}$$

input
```
Int[(E^(-2 + E^(x + x^2) - 6*x + x^2)*(1 - 6*x + 2*x^2 + E^(x + x^2)*(x +
2*x^2) + (-6*x + 2*x^2 + E^(x + x^2)*(x + 2*x^2))*Log[x]))/x,x]
```

output
```
(E^(-2 + E^(x + x^2) - 6*x + x^2)*(6*x - 2*x^2 - E^(x + x^2)*(x + 2*x^2) +
 (6*x - 2*x^2 - E^(x + x^2)*(x + 2*x^2))*Log[x]))/(x*(6 - 2*x - E^(x + x^2
)*(1 + 2*x)))
```

3.1291.3.1 Defintions of rubi rules used

rule 2726
```
Int[(y_.)*(F_)^(u_)*((v_) + (w_)), x_Symbol] :> With[{z = v*(y/(Log[F]*D[u,
 x]))}, Simp[F^u*z, x] /; EqQ[D[z, x], w*y]] /; FreeQ[F, x]
```

3.1291.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

method	result	size
risch	$(\ln(x)+1)\,\mathrm{e}^{\mathrm{e}^{(1+x)x}+x^2-6x-2}$	21
parallelrisch	$\ln(x)\,\mathrm{e}^{\mathrm{e}^{x^2+x}+x^2-6x-2}+\mathrm{e}^{\mathrm{e}^{x^2+x}+x^2-6x-2}$	35

input
```
int((((2*x^2+x)*exp(x^2+x)+2*x^2-6*x)*ln(x)+(2*x^2+x)*exp(x^2+x)+2*x^2-6*x
+1)*exp(exp(x^2+x)+x^2-6*x-2)/x,x,method=_RETURNVERBOSE)
```

output
```
(ln(x)+1)*exp(exp((1+x)*x)+x^2-6*x-2)
```

3.1291.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{e^{-2+e^{x+x^2}-6x+x^2}\left(1-6x+2x^2+e^{x+x^2}(x+2x^2)+\left(-6x+2x^2+e^{x+x^2}(x+2x^2)\right)\log(x)\right)}{x}\,dx$$
$$=(\log(x)+1)e^{\left(x^2-6\,x+e^{\left(x^2+x\right)}-2\right)}$$

input
```
integrate((((2*x^2+x)*exp(x^2+x)+2*x^2-6*x)*log(x)+(2*x^2+x)*exp(x^2+x)+2*
x^2-6*x+1)*exp(exp(x^2+x)+x^2-6*x-2)/x,x, algorithm=\
```

output
```
(log(x) + 1)*e^(x^2 - 6*x + e^(x^2 + x) - 2)
```

3.1291.6 Sympy [A] (verification not implemented)

Time = 129.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{e^{-2+e^{x+x^2}-6x+x^2}\left(1-6x+2x^2+e^{x+x^2}(x+2x^2)+\left(-6x+2x^2+e^{x+x^2}(x+2x^2)\right)\log(x)\right)}{x}\,dx$$
$$=(\log(x)+1)\,e^{x^2-6x+e^{x^2+x}-2}$$

input
```
integrate((((2*x**2+x)*exp(x**2+x)+2*x**2-6*x)*ln(x)+(2*x**2+x)*exp(x**2+x
)+2*x**2-6*x+1)*exp(exp(x**2+x)+x**2-6*x-2)/x,x)
```

output
```
(log(x) + 1)*exp(x**2 - 6*x + exp(x**2 + x) - 2)
```

3.1291.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{e^{-2+e^{x+x^2}-6x+x^2}\left(1-6x+2x^2+e^{x+x^2}(x+2x^2)+\left(-6x+2x^2+e^{x+x^2}(x+2x^2)\right)\log(x)\right)}{x}\,dx$$
$$=(\log(x)+1)e^{\left(x^2-6\,x+e^{\left(x^2+x\right)}-2\right)}$$

input
```
integrate((((2*x^2+x)*exp(x^2+x)+2*x^2-6*x)*log(x)+(2*x^2+x)*exp(x^2+x)+2*
x^2-6*x+1)*exp(exp(x^2+x)+x^2-6*x-2)/x,x, algorithm=\
```

output
```
(log(x) + 1)*e^(x^2 - 6*x + e^(x^2 + x) - 2)
```

3.1291.8 Giac [F]

$$\int \frac{e^{-2+e^{x+x^2}-6x+x^2}\left(1-6x+2x^2+e^{x+x^2}(x+2x^2)+\left(-6x+2x^2+e^{x+x^2}(x+2x^2)\right)\log(x)\right)}{x}\,dx$$
$$=\int \frac{\left(2\,x^2+(2\,x^2+x)e^{\left(x^2+x\right)}+\left(2\,x^2+(2\,x^2+x)e^{\left(x^2+x\right)}-6\,x\right)\log(x)-6\,x+1\right)e^{\left(x^2-6\,x+e^{\left(x^2+x\right)}-2\right)}}{x}\,dx$$

input
```
integrate((((2*x^2+x)*exp(x^2+x)+2*x^2-6*x)*log(x)+(2*x^2+x)*exp(x^2+x)+2*
x^2-6*x+1)*exp(exp(x^2+x)+x^2-6*x-2)/x,x, algorithm=\
```

output
```
integrate((2*x^2 + (2*x^2 + x)*e^(x^2 + x) + (2*x^2 + (2*x^2 + x)*e^(x^2 +
 x) - 6*x)*log(x) - 6*x + 1)*e^(x^2 - 6*x + e^(x^2 + x) - 2)/x, x)
```

3.1291.9 Mupad [B] (verification not implemented)

Time = 17.50 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{e^{-2+e^{x+x^2}-6x+x^2}\left(1-6x+2x^2+e^{x+x^2}(x+2x^2)+\left(-6x+2x^2+e^{x+x^2}(x+2x^2)\right)\log(x)\right)}{x}\,dx$$
$$= e^{-6x}\,e^{x^2}\,e^{-2}\,e^{e^{x^2}\,e^{x}}\,(\ln(x)+1)$$

input
```
int((exp(exp(x + x^2) - 6*x + x^2 - 2)*(log(x)*(exp(x + x^2)*(x + 2*x^2) -
 6*x + 2*x^2) - 6*x + exp(x + x^2)*(x + 2*x^2) + 2*x^2 + 1))/x,x)
```

output
```
exp(-6*x)*exp(x^2)*exp(-2)*exp(exp(x^2)*exp(x))*(log(x) + 1)
```

3.1292 $\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x\right.}{-6x-6x^2+2x}$

3.1292.1 Optimal result

Integrand size = 137, antiderivative size = 20

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\log} = \left(x+\frac{1}{2}\log(-3-3x+\log(9))\right)^{e^{e^x}}$$

output
```
exp(exp(exp(x))*ln(1/2*ln(2*ln(3)-3*x-3)+x))
```

3.1292.2 Mathematica [F]

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\log} = \int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))}$$

input
```
Integrate[((2*x + Log[-3 - 3*x + Log[9]])^E^E^x*(E^E^x*(-9 - 6*x + 2*Log[9
]) + E^E^x*(E^x*(-6*x - 6*x^2 + 2*x*Log[9]) + E^x*(-3 - 3*x + Log[9])*Log[
-3 - 3*x + Log[9]])*Log[(2*x + Log[-3 - 3*x + Log[9]])/2]))/(2^E^E^x*(-6*x
 - 6*x^2 + 2*x*Log[9] + (-3 - 3*x + Log[9])*Log[-3 - 3*x + Log[9]])),x]
```

3.1292.

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-3-3x+\log(9))\log(-3-3x+\log(9)))\log\left(\frac{1}{2}(2x+\right.\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\log(-3-3x+\log(9))}$$

output
```
Integrate[((2*x + Log[-3 - 3*x + Log[9]])^E^E^x*(E^E^x*(-9 - 6*x + 2*Log[9
]) + E^E^x*(E^x*(-6*x - 6*x^2 + 2*x*Log[9]) + E^x*(-3 - 3*x + Log[9])*Log[
-3 - 3*x + Log[9]])*Log[(2*x + Log[-3 - 3*x + Log[9]])/2]))/(2^E^E^x*(-6*x
 - 6*x^2 + 2*x*Log[9] + (-3 - 3*x + Log[9])*Log[-3 - 3*x + Log[9]])), x]
```

3.1292.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3x-3+\log(9)))^{e^{e^x}}\left(e^{e^x}\left(e^x\left(-6x^2-6x+2x\log(9)\right)+e^x(-3x-3+\log(9))\log(-3x-3+\log\right.\right.}{-6x^2-6x+2x\log(9)+(-3x-3+\log(9))\log(-3x}$$

$$\Big\downarrow 6$$

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3x-3+\log(9)))^{e^{e^x}}\left(e^{e^x}\left(e^x\left(-6x^2-6x+2x\log(9)\right)+e^x(-3x-3+\log(9))\log(-3x-3+\log\right.\right.}{-6x^2+x(2\log(9)-6)+(-3x-3+\log(9))\log(-3x}$$

$$\Big\downarrow 7292$$

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3x-3+\log(9)))^{e^{e^x}-1}\left(-e^{e^x}\left(e^x\left(-6x^2-6x+2x\log(9)\right)+e^x(-3x-3+\log(9))\log(-3x-\right.\right.}{3x+3-\log(9)}$$

$$\Big\downarrow 7293$$

$$\int \left(2^{-e^{e^x}}e^{x+e^x}\log\left(\frac{1}{2}(2x+\log(-3x-3+\log(9)))\right)(2x+\log(-3x-3+\log(9)))^{e^{e^x}}+\frac{2^{-e^{e^x}}e^{e^x}(6x+9-2\log(}{3}\right.$$

$$\Big\downarrow 2009$$

$$\int 2^{1-e^{e^x}}e^{e^x}(2x+\log(-3x+\log(9)-3))^{-1+e^{e^x}}dx+3\int \frac{2^{-e^{e^x}}e^{e^x}(2x+\log(-3x+\log(9)-3))^{-1+e^{e^x}}}{3x-\log(9)+3}dx+\int 2^{-e^{e^x}}e^{x+e^x}(2x+\log(-3x+\log(9)-3))^{e^{e^x}}\log\left(\frac{1}{2}(2x+\log(-3x+\log(9)-3))\right)dx$$

input
```
Int[((2*x + Log[-3 - 3*x + Log[9]])^E^E^x*(E^E^x*(-9 - 6*x + 2*Log[9]) + E
^E^x*(E^x*(-6*x - 6*x^2 + 2*x*Log[9]) + E^x*(-3 - 3*x + Log[9])*Log[-3 - 3
*x + Log[9]])*Log[(2*x + Log[-3 - 3*x + Log[9]])/2]))/(2^E^E^x*(-6*x - 6*x
^2 + 2*x*Log[9] + (-3 - 3*x + Log[9])*Log[-3 - 3*x + Log[9]])),x]
```

3.1292.

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}\left(e^x\left(-6x-6x^2+2x\log(9)\right)+e^x(-3-3x+\log(9))\log(-3-3x+\log(9))\right)\log\left(\frac{1}{2}(2x+\right.\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\log(-3-3x+\log(9))}$$

output
```
$Aborted
```

3.1292.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] &&  !FreeQ[Fx, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1292.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\left(\frac{\ln\left(2\ln\left(3\right)-3x-3\right)}{2}+x\right)^{{\mathrm e}^{{\mathrm e}^{x}}}$$

input
```
int((((2*ln(3)-3*x-3)*exp(x)*ln(2*ln(3)-3*x-3)+(4*x*ln(3)-6*x^2-6*x)*exp(x
))*exp(exp(x))*ln(1/2*ln(2*ln(3)-3*x-3)+x)+(4*ln(3)-6*x-9)*exp(exp(x)))*ex
p(exp(exp(x))*ln(1/2*ln(2*ln(3)-3*x-3)+x))/((2*ln(3)-3*x-3)*ln(2*ln(3)-3*x
-3)+4*x*ln(3)-6*x^2-6*x),x)
```

output
```
(1/2*ln(2*ln(3)-3*x-3)+x)^exp(exp(x))
```

3.1292.

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}\left(e^x\left(-6x-6x^2+2x\log(9)\right)+e^x(-3-3x+\log(9))\log(-3-3x+\log(9))\right)\log\left(\frac{1}{2}(2x+\right.\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\log(-3-3x+\log(9))}$$

3.1292.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-3\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\,\mathrm{lo}}$$

$$= \left(x+\frac{1}{2}\log\left(-3\,x+2\,\log\left(3\right)-3\right)\right)^{e^{(e^x)}}$$

input
```
integrate((((2*log(3)-3*x-3)*exp(x)*log(2*log(3)-3*x-3)+(4*x*log(3)-6*x^2-
6*x)*exp(x))*exp(exp(x))*log(1/2*log(2*log(3)-3*x-3)+x)+(4*log(3)-6*x-9)*e
xp(exp(x)))*exp(exp(exp(x))*log(1/2*log(2*log(3)-3*x-3)+x))/((2*log(3)-3*x
-3)*log(2*log(3)-3*x-3)+4*x*log(3)-6*x^2-6*x),x, algorithm=\
```

output
```
(x + 1/2*log(-3*x + 2*log(3) - 3))^e^(e^x)
```

3.1292.6 Sympy [F(-1)]

Timed out.

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-3\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\,\mathrm{lo}}$$

$$= \text{Timed out}$$

input
```
integrate((((2*ln(3)-3*x-3)*exp(x)*ln(2*ln(3)-3*x-3)+(4*x*ln(3)-6*x**2-6*x
)*exp(x))*exp(exp(x))*ln(1/2*ln(2*ln(3)-3*x-3)+x)+(4*ln(3)-6*x-9)*exp(exp(
x)))*exp(exp(exp(x))*ln(1/2*ln(2*ln(3)-3*x-3)+x))/((2*ln(3)-3*x-3)*ln(2*ln
(3)-3*x-3)+4*x*ln(3)-6*x**2-6*x),x)
```

output
```
Timed out
```

3.1292.7 Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.40

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-3\ldots\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\log\ldots}$$
$$= e^{\left(-e^{\left(e^x\right)}\log(2)+e^{\left(e^x\right)}\log(2x+\log(-3x+2\log(3)-3))\right)}$$

input
```
integrate((((2*log(3)-3*x-3)*exp(x)*log(2*log(3)-3*x-3)+(4*x*log(3)-6*x^2-
6*x)*exp(x))*exp(exp(x))*log(1/2*log(2*log(3)-3*x-3)+x)+(4*log(3)-6*x-9)*e
xp(exp(x)))*exp(exp(exp(x))*log(1/2*log(2*log(3)-3*x-3)+x))/((2*log(3)-3*x
-3)*log(2*log(3)-3*x-3)+4*x*log(3)-6*x^2-6*x),x, algorithm=\
```

output
```
e^(-e^(e^x)*log(2) + e^(e^x)*log(2*x + log(-3*x + 2*log(3) - 3)))
```

3.1292.8 Giac [F]

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-3\ldots\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\log\ldots}$$
$$= \int \frac{(((3x-2\log(3)+3)e^x\log(-3x+2\log(3)-3)+2(3x^2-2x\log(3)+3x)e^x)e^{\left(e^x\right)}\log\left(x+\frac{1}{2}\log(\ldots\right.}{6x^2-4x\log(3)+(3x-2\log(3)+3)\log\ldots}$$

input
```
integrate((((2*log(3)-3*x-3)*exp(x)*log(2*log(3)-3*x-3)+(4*x*log(3)-6*x^2-
6*x)*exp(x))*exp(exp(x))*log(1/2*log(2*log(3)-3*x-3)+x)+(4*log(3)-6*x-9)*e
xp(exp(x)))*exp(exp(exp(x))*log(1/2*log(2*log(3)-3*x-3)+x))/((2*log(3)-3*x
-3)*log(2*log(3)-3*x-3)+4*x*log(3)-6*x^2-6*x),x, algorithm=\
```

output
```
sage0*x
```

3.1292.

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-3-3x+\log(9))\log(-3-3x+\log(9)))\log\left(\frac{1}{2}(2x+\ldots\right.\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\log(-3-3x+\log(9))}$$

3.1292.9 Mupad [B] (verification not implemented)

Time = 18.13 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.80

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-3\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\,\mathrm{lo}}$$

$$= \left(x+\frac{\ln\left(\ln\left(9\right)-3\,x-3\right)}{2}\right)^{\mathrm{e}^{\mathrm{e}^x}}$$

input
```
int((exp(log(x + log(2*log(3) - 3*x - 3)/2)*exp(exp(x)))*(exp(exp(x))*(6*x
 - 4*log(3) + 9) + log(x + log(2*log(3) - 3*x - 3)/2)*exp(exp(x))*(exp(x)*
(6*x - 4*x*log(3) + 6*x^2) + exp(x)*log(2*log(3) - 3*x - 3)*(3*x - 2*log(3
) + 3))))/(6*x - 4*x*log(3) + log(2*log(3) - 3*x - 3)*(3*x - 2*log(3) + 3)
 + 6*x^2),x)
```

output
```
(x + log(log(9) - 3*x - 3)/2)^exp(exp(x))
```

3.1292.

$$\int \frac{2^{-e^{e^x}}(2x+\log(-3-3x+\log(9)))^{e^{e^x}}\left(e^{e^x}(-9-6x+2\log(9))+e^{e^x}(e^x(-6x-6x^2+2x\log(9))+e^x(-3-3x+\log(9))\log(-3-3x+\log(9)))\log\left(\frac{1}{2}(2x+\right.}{-6x-6x^2+2x\log(9)+(-3-3x+\log(9))\log(-3-3x+\log(9))}$$

3.1293 $\int \frac{2048x^7+e^{32}(1-27x^2)}{e^{32}}\,dx$

3.1293.1 Optimal result

Integrand size = 21, antiderivative size = 15

$$\int \frac{2048x^7+e^{32}(1-27x^2)}{e^{32}}\,dx = x-9x^3+\frac{256x^8}{e^{32}}$$

output
```
256*x^8/exp(4)^8+x-9*x^3
```

3.1293.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \frac{2048x^7+e^{32}(1-27x^2)}{e^{32}}\,dx = x-9x^3+\frac{256x^8}{e^{32}}$$

input
```
Integrate[(2048*x^7 + E^32*(1 - 27*x^2))/E^32,x]
```

output
```
x - 9*x^3 + (256*x^8)/E^32
```

3.1293.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.53, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2048x^7+e^{32}(1-27x^2)}{e^{32}}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\int (2048x^7+e^{32}(1-27x^2))\,dx}{e^{32}}$$

$$\Big\downarrow \ 2009$$

$$\frac{256x^8-9e^{32}x^3+e^{32}x}{e^{32}}$$

input
```
Int[(2048*x^7 + E^32*(1 - 27*x^2))/E^32,x]
```

output
```
(E^32*x - 9*E^32*x^3 + 256*x^8)/E^32
```

3.1293.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1293.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

method	result	size
risch	$256x^8 e^{-32} + x - 9x^3$	15
default	$e^{-32}(-9 e^{32} x^3 + x e^{32} + 256x^8)$	27
parallelrisch	$e^{-32}(-9 e^{32} x^3 + x e^{32} + 256x^8)$	27
gosper	$-x(9 e^{32} x^2 - e^{32} - 256x^7) e^{-32}$	29
norman	$(e^{28} x + 256 e^{-4} x^8 - 9 e^{28} x^3) e^{-28}$	31

input
```
int(((-27*x^2+1)*exp(4)^8+2048*x^7)/exp(4)^8,x,method=_RETURNVERBOSE)
```

output
```
256*x^8*exp(-32)+x-9*x^3
```

3.1293.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47

$$\int \frac{2048x^7 + e^{32}(1-27x^2)}{e^{32}}\,dx = \left(256\,x^8 - \left(9\,x^3 - x\right)e^{32}\right)e^{(-32)}$$

input
```
integrate(((-27*x^2+1)*exp(4)^8+2048*x^7)/exp(4)^8,x, algorithm=\
```

output
```
(256*x^8 - (9*x^3 - x)*e^32)*e^(-32)
```

3.1293.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{2048x^7 + e^{32}(1-27x^2)}{e^{32}}\,dx = \frac{256x^8}{e^{32}} - 9x^3 + x$$

input
```
integrate(((-27*x**2+1)*exp(4)**8+2048*x**7)/exp(4)**8,x)
```

output
```
256*x**8*exp(-32) - 9*x**3 + x
```

3.1293.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47

$$\int \frac{2048x^7+e^{32}(1-27x^2)}{e^{32}}\,dx = \left(256\,x^8-\left(9\,x^3-x\right)e^{32}\right)e^{(-32)}$$

input
```
integrate(((-27*x^2+1)*exp(4)^8+2048*x^7)/exp(4)^8,x, algorithm=\
```

output
```
(256*x^8 - (9*x^3 - x)*e^32)*e^(-32)
```

3.1293.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.47

$$\int \frac{2048x^7+e^{32}(1-27x^2)}{e^{32}}\,dx = \left(256\,x^8-\left(9\,x^3-x\right)e^{32}\right)e^{(-32)}$$

input
```
integrate(((-27*x^2+1)*exp(4)^8+2048*x^7)/exp(4)^8,x, algorithm=\
```

output
```
(256*x^8 - (9*x^3 - x)*e^32)*e^(-32)
```

3.1293.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int \frac{2048x^7+e^{32}(1-27x^2)}{e^{32}}\,dx = 256\,\mathrm{e}^{-32}\,x^8-9\,x^3+x$$

input
```
int(-exp(-32)*(exp(32)*(27*x^2 - 1) - 2048*x^7),x)
```

output
```
x + 256*x^8*exp(-32) - 9*x^3
```

3.1294 $\int \frac{-560+840x+e^x(112-56x-84x^2)}{400x^2-600x^3+225x^4+e^x(-160x^2+240x^3-90x^4)+e^{2x}(16x^2-24x^3}$

3.1294.1 Optimal result

Integrand size = 80, antiderivative size = 25

$$\int \frac{-560+840x+e^x(112-56x-84x^2)}{400x^2-600x^3+225x^4+e^x(-160x^2+240x^3-90x^4)+e^{2x}(16x^2-24x^3+9x^4)}\,dx = \frac{28}{3(5-e^x)\left(\frac{4}{3}-x\right)x}$$

output
```
84/(45-9*exp(x))/(4/3-x)/x
```

3.1294.2 Mathematica [A] (verified)

Time = 1.16 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

$$\int \frac{-560+840x+e^x(112-56x-84x^2)}{400x^2-600x^3+225x^4+e^x(-160x^2+240x^3-90x^4)+e^{2x}(16x^2-24x^3+9x^4)}\,dx = \frac{28}{(-5+e^x)\,x(-4+3x)}$$

input
```
Integrate[(-560 + 840*x + E^x*(112 - 56*x - 84*x^2))/(400*x^2 - 600*x^3 + 
225*x^4 + E^x*(-160*x^2 + 240*x^3 - 90*x^4) + E^(2*x)*(16*x^2 - 24*x^3 + 9
*x^4)),x]
```

output
```
28/((-5 + E^x)*x*(-4 + 3*x))
```

3.1294.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^x(-84x^2-56x+112)+840x-560}{225x^4-600x^3+400x^2+e^x(-90x^4+240x^3-160x^2)+e^{2x}(9x^4-24x^3+16x^2)}dx$$

$$\Big\downarrow \textbf{7239}$$

$$\int \frac{28(-e^x(3x^2+2x-4)+30x-20)}{(5-e^x)^2(4-3x)^2x^2}dx$$

$$\Big\downarrow \textbf{27}$$

$$28\int -\frac{-30x-e^x(-3x^2-2x+4)+20}{(5-e^x)^2(4-3x)^2x^2}dx$$

$$\Big\downarrow \textbf{25}$$

$$-28\int \frac{-30x-e^x(-3x^2-2x+4)+20}{(5-e^x)^2(4-3x)^2x^2}dx$$

$$\Big\downarrow \textbf{7293}$$

$$-28\int \left(\frac{3x^2+2x-4}{(-5+e^x)x^2(3x-4)^2}+\frac{5}{(-5+e^x)^2x(3x-4)}\right)dx$$

$$\Big\downarrow \textbf{2009}$$

$$-28\left(-\frac{1}{4}\int \frac{1}{(-5+e^x)x^2}dx-\frac{5}{4}\int \frac{1}{(-5+e^x)^2x}dx-\frac{1}{4}\int \frac{1}{(-5+e^x)x}dx+\frac{9}{4}\int \frac{1}{(-5+e^x)(3x-4)^2}dx+\frac{15}{4}\int\right.$$

input
```
Int[(-560 + 840*x + E^x*(112 - 56*x - 84*x^2))/(400*x^2 - 600*x^3 + 225*x^
4 + E^x*(-160*x^2 + 240*x^3 - 90*x^4) + E^(2*x)*(16*x^2 - 24*x^3 + 9*x^4))
,x]
```

output
```
$Aborted
```

3.1294.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1294.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.76

method	result	size
norman	$\frac{28}{x(\mathrm{e}^{x}-5)(-4+3x)}$	19
risch	$\frac{28}{x(\mathrm{e}^{x}-5)(-4+3x)}$	19
parallelrisch	$\frac{28}{x(\mathrm{e}^{x}-5)(-4+3x)}$	19

input
```
int(((-84*x^2-56*x+112)*exp(x)+840*x-560)/((9*x^4-24*x^3+16*x^2)*exp(x)^2+
(-90*x^4+240*x^3-160*x^2)*exp(x)+225*x^4-600*x^3+400*x^2),x,method=_RETURN
VERBOSE)
```

output
```
28/x/(exp(x)-5)/(-4+3*x)
```

3.1294.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{-560+840x+e^x(112-56x-84x^2)}{400x^2-600x^3+225x^4+e^x(-160x^2+240x^3-90x^4)+e^{2x}(16x^2-24x^3+9x^4)}\,dx = -\frac{28}{15\,x^2-(3\,x^2-4\,x)e^x-20\,x}$$

input
```
integrate(((-84*x^2-56*x+112)*exp(x)+840*x-560)/((9*x^4-24*x^3+16*x^2)*exp
(x)^2+(-90*x^4+240*x^3-160*x^2)*exp(x)+225*x^4-600*x^3+400*x^2),x, algorit
hm=\
```

output
```
-28/(15*x^2 - (3*x^2 - 4*x)*e^x - 20*x)
```

3.1294.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.80

$$\int \frac{-560+840x+e^x(112-56x-84x^2)}{400x^2-600x^3+225x^4+e^x(-160x^2+240x^3-90x^4)+e^{2x}(16x^2-24x^3+9x^4)}\,dx = \frac{252}{-135x^2+180x+(27x^2-36x)\,e^x}$$

input
```
integrate(((-84*x**2-56*x+112)*exp(x)+840*x-560)/((9*x**4-24*x**3+16*x**2)
*exp(x)**2+(-90*x**4+240*x**3-160*x**2)*exp(x)+225*x**4-600*x**3+400*x**2)
,x)
```

output
```
252/(-135*x**2 + 180*x + (27*x**2 - 36*x)*exp(x))
```

3.1294.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{-560+840x+e^x(112-56x-84x^2)}{400x^2-600x^3+225x^4+e^x(-160x^2+240x^3-90x^4)+e^{2x}(16x^2-24x^3+9x^4)}\,dx = -\frac{28}{15\,x^2-(3\,x^2-4\,x)e^x-20\,x}$$

input
```
integrate(((-84*x^2-56*x+112)*exp(x)+840*x-560)/((9*x^4-24*x^3+16*x^2)*exp
(x)^2+(-90*x^4+240*x^3-160*x^2)*exp(x)+225*x^4-600*x^3+400*x^2),x, algorit
hm=\
```

output
```
-28/(15*x^2 - (3*x^2 - 4*x)*e^x - 20*x)
```

3.1294.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{-560+840x+e^x(112-56x-84x^2)}{400x^2-600x^3+225x^4+e^x\left(-160x^2+240x^3-90x^4\right)+e^{2x}\left(16x^2-24x^3+9x^4\right)}\,dx = \frac{28}{3\,x^2e^x-15\,x^2-4\,xe^x+20\,x}$$

input
```
integrate(((-84*x^2-56*x+112)*exp(x)+840*x-560)/((9*x^4-24*x^3+16*x^2)*exp
(x)^2+(-90*x^4+240*x^3-160*x^2)*exp(x)+225*x^4-600*x^3+400*x^2),x, algorit
hm=\
```

output
```
28/(3*x^2*e^x - 15*x^2 - 4*x*e^x + 20*x)
```

3.1294.9 Mupad [B] (verification not implemented)

Time = 16.71 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{-560+840x+e^x(112-56x-84x^2)}{400x^2-600x^3+225x^4+e^x\left(-160x^2+240x^3-90x^4\right)+e^{2x}\left(16x^2-24x^3+9x^4\right)}\,dx = -\frac{28\,(4\,x-3\,x^2)}{x^2\,(3\,x-4)^2\,\left(\mathrm{e}^x-5\right)}$$

input
```
int(-(exp(x)*(56*x + 84*x^2 - 112) - 840*x + 560)/(exp(2*x)*(16*x^2 - 24*x
^3 + 9*x^4) - exp(x)*(160*x^2 - 240*x^3 + 90*x^4) + 400*x^2 - 600*x^3 + 22
5*x^4),x)
```

output
```
-(28*(4*x - 3*x^2))/(x^2*(3*x - 4)^2*(exp(x) - 5))
```

3.1295 $\int e^{x^2}(1+2x+2x^2+e^8(2+4x^2))\,dx$

3.1295.1 Optimal result

Integrand size = 27, antiderivative size = 15

$$\int e^{x^2}\left(1+2x+2x^2+e^8\left(2+4x^2\right)\right)\,dx=e^{x^2}\left(1+x+2e^8x\right)$$

output
```
exp(ln(2*x*exp(4)^2+x+1)+x^2)
```

3.1295.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int e^{x^2}\left(1+2x+2x^2+e^8\left(2+4x^2\right)\right)\,dx=e^{x^2}\left(1+x+2e^8x\right)$$

input
```
Integrate[E^x^2*(1 + 2*x + 2*x^2 + E^8*(2 + 4*x^2)),x]
```

output
```
E^x^2*(1 + x + 2*E^8*x)
```

3.1295.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {2656, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{x^2} \left(2x^2+e^8 \left(4x^2+2\right)+2x+1\right) \, dx$$

$$\Big\downarrow \text{2656}$$

$$\int \left(2\left(1+2e^8\right) e^{x^2} x^2+2e^{x^2} x+\left(1+2e^8\right) e^{x^2}\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\left(1+2e^8\right) e^{x^2} x+e^{x^2}$$

input
```
Int[E^x^2*(1 + 2*x + 2*x^2 + E^8*(2 + 4*x^2)),x]
```

output
```
E^x^2 + E^x^2*(1 + 2*E^8)*x
```

3.1295.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2656
```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^(n_))*(Px_), x_Symbol] :> Int[
ExpandLinearProduct[F^(a + b*(c + d*x)^n), Px, c, d, x], x] /; FreeQ[{F, a,
 b, c, d, n}, x] && PolynomialQ[Px, x]
```

3.1295.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

method	result	size
risch	$(2x\,\mathrm{e}^{8}+x+1)\,\mathrm{e}^{x^{2}}$	14
gosper	$\mathrm{e}^{\ln(2x\,\mathrm{e}^{8}+x+1)+x^{2}}$	17
norman	$\mathrm{e}^{\ln(2x\,\mathrm{e}^{8}+x+1)+x^{2}}$	17
parallelrisch	$\mathrm{e}^{\ln(2x\,\mathrm{e}^{8}+x+1)+x^{2}}$	17
default	$\mathrm{e}^{x^{2}}x+\mathrm{e}^{x^{2}}+\mathrm{e}^{8}\sqrt{\pi}\,\operatorname{erfi}(x)+4\,\mathrm{e}^{8}\left(\frac{\mathrm{e}^{x^{2}}x}{2}-\frac{\sqrt{\pi}\,\operatorname{erfi}(x)}{4}\right)$	39

input
```
int(((4*x^2+2)*exp(4)^2+2*x^2+2*x+1)*exp(ln(2*x*exp(4)^2+x+1)+x^2)/(2*x*ex
p(4)^2+x+1),x,method=_RETURNVERBOSE)
```

output
```
(2*x*exp(8)+x+1)*exp(x^2)
```

3.1295.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int e^{x^2}\left(1+2x+2x^2+e^8\left(2+4x^2\right)\right)\,dx=e^{\left(x^2+\log\left(2\,xe^8+x+1\right)\right)}$$

input
```
integrate(((4*x^2+2)*exp(4)^2+2*x^2+2*x+1)*exp(log(2*x*exp(4)^2+x+1)+x^2)/
(2*x*exp(4)^2+x+1),x, algorithm=\
```

output
```
e^(x^2 + log(2*x*e^8 + x + 1))
```

3.1295.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.93

$$\int e^{x^2}\left(1+2x+2x^2+e^8\left(2+4x^2\right)\right)\,dx=\left(x+2xe^8+1\right)e^{x^2}$$

input
```
integrate(((4*x**2+2)*exp(4)**2+2*x**2+2*x+1)*exp(ln(2*x*exp(4)**2+x+1)+x*
*2)/(2*x*exp(4)**2+x+1),x)
```

output
```
(x + 2*x*exp(8) + 1)*exp(x**2)
```

3.1295.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33

$$\int e^{x^2}\left(1+2x+2x^2+e^8\left(2+4x^2\right)\right)\,dx=2\,xe^{\left(x^2+8\right)}+xe^{\left(x^2\right)}+e^{\left(x^2\right)}$$

input
```
integrate(((4*x^2+2)*exp(4)^2+2*x^2+2*x+1)*exp(log(2*x*exp(4)^2+x+1)+x^2)/
(2*x*exp(4)^2+x+1),x, algorithm=\
```

output
```
2*x*e^(x^2 + 8) + x*e^(x^2) + e^(x^2)
```

3.1295.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.33

$$\int e^{x^2}\left(1+2x+2x^2+e^8\left(2+4x^2\right)\right)\,dx=2\,xe^{\left(x^2+8\right)}+xe^{\left(x^2\right)}+e^{\left(x^2\right)}$$

input
```
integrate(((4*x^2+2)*exp(4)^2+2*x^2+2*x+1)*exp(log(2*x*exp(4)^2+x+1)+x^2)/
(2*x*exp(4)^2+x+1),x, algorithm=\
```

output
```
2*x*e^(x^2 + 8) + x*e^(x^2) + e^(x^2)
```

3.1295.9 Mupad [B] (verification not implemented)

Time = 0.64 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.87

$$\int e^{x^2}\left(1+2x+2x^2+e^8\left(2+4x^2\right)\right)\,dx=\mathrm{e}^{x^2}\,\left(x+2\,x\,\mathrm{e}^8+1\right)$$

input
```
int((exp(log(x + 2*x*exp(8) + 1) + x^2)*(2*x + exp(8)*(4*x^2 + 2) + 2*x^2
+ 1))/(x + 2*x*exp(8) + 1),x)
```

output
```
exp(x^2)*(x + 2*x*exp(8) + 1)
```

3.1296 $\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2 \cdots}{\cdots}$

3.1296.1 Optimal result

Integrand size = 235, antiderivative size = 34

$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10 \cdots}{50-75x-20x^2+35x^3+12x^4 \cdots}$$
$$= x-\frac{2x+\log(2+x)}{e^x+e^{-10+x}\left(-5+\frac{5}{x}-x\right)}$$

output
```
x-(ln(2+x)+2*x)/(exp(x)+(5/x-5-x)/exp(10-x))
```

3.1296.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.68

$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10 \cdots}{50-75x-20x^2+35x^3+12x^4 \cdots}$$
$$= \frac{e^{-x}x(2e^{10}x-e^{10+x}x+e^x(-5+5x+x^2)+e^{10}\log(2+x))}{-5-(-5+e^{10})x+x^2}$$

input
```
Integrate[(50 - 75*x - 20*x^2 + 35*x^3 + 12*x^4 + x^5 + E^20*(2*x^2 + x^3)
 + E^(10 - x)*(-45*x + 25*x^2 + x^3 - 14*x^4 - 2*x^5) + E^x*(E^(10 - x)*(2
0*x - 10*x^2 - 14*x^3 - 2*x^4) + E^(20 - 2*x)*(-5*x^2 + 2*x^3 + 2*x^4)) +
(E^(20 - x)*(2*x^2 + x^3) + E^(10 - x)*(-10 + 5*x - 7*x^2 - 8*x^3 - x^4))*
Log[2 + x])/(50 - 75*x - 20*x^2 + 35*x^3 + 12*x^4 + x^5 + E^20*(2*x^2 + x^
3) + E^10*(20*x - 10*x^2 - 14*x^3 - 2*x^4)),x]
```

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$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10-x}(20x-10x^2-14x^3-2x^4)+e^{20-2x}(-5x^2+2x^3+ \cdots}{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10}(20x-10x^2-14x^3-2x^4) \cdots}$$

output
```
(x*(2*E^10*x - E^(10 + x)*x + E^x*(-5 + 5*x + x^2) + E^10*Log[2 + x]))/(E^
x*(-5 - (-5 + E^10)*x + x^2))
```

3.1296.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 22.33 (sec) , antiderivative size = 4186, normalized size of antiderivative = 123.12, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.017$, Rules used = {2463, 7239, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5+12x^4+35x^3-20x^2+e^{20}\left(x^3+2x^2\right)+e^x\left(e^{10-x}\left(-2x^4-14x^3-10x^2+20x\right)+e^{20-2x}\left(2x^4+2x^3-5x^2\right)\right.}{x^5+12x^4+35x^3-20x^2+e^{20}\left(x^3+\right.}$$

$$\Big\downarrow \text{ 2463}$$

$$\int \left(\frac{x^5+12x^4+35x^3-20x^2+e^{20}\left(x^3+2x^2\right)+e^x\left(e^{10-x}\left(-2x^4-14x^3-10x^2+20x\right)+e^{20-2x}\left(2x^4+2x^3-5x^2\right.\right.}{(}\right.$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{e^{-x}\left(e^{x+20}(x+2)x^2+e^{20}\left(2x^2+2x-5\right)x^2+e^x(x+2)\left(x^2+5x-5\right)^2-2e^{x+10}\left(x^3+7x^2+5x-10\right)x-e^{10}\right.}{(x+2)\left(-x^2-\left(5-e^{10}\right)x-\right.}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{e^{20-x}\left(2x^2+2x-5\right)x^2}{(x+2)\left(-x^2-\left(5-e^{10}\right)x+5\right)^2}+\frac{e^{10-x}\left(-x^3-\left(6-e^{10}\right)x^2+5x-5\right)\log(x+2)}{\left(-x^2-\left(5-e^{10}\right)x+5\right)^2}+\frac{e^{10-x}\left(-2x^4-14x^3+\right.}{(x+2)\left(-x^2-(5-\right.}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$x+2e^{10-x}+$$

$$\frac{e^{\frac{1}{2}\left(25-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(594-462e^{10}+108e^{20}-8e^{30}+\frac{2915-4092e^{10}+1680e^{20}-276e^{30}+16e^{40}}{\sqrt{45-10e^{10}+e^{20}}}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-\right.\right.}{\left(11-2e^{10}\right)^2}$$

$$\frac{e^{\frac{1}{2}\left(45-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(123-44e^{10}+4e^{20}+\frac{2055-1109e^{10}+200e^{20}-12e^{30}}{\sqrt{45-10e^{10}+e^{20}}}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x-\sqrt{45-10e^{10}}\right.\right.}{\left(11-2e^{10}\right)^2}$$

$$\frac{e^{\frac{1}{2}\left(25-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(770+395e^{10}-318e^{20}+62e^{30}-4e^{40}\right)\left(5-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)\text{ExpIntegralEi}\left(\right.}{2\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)}$$

$$\frac{e^{\frac{1}{2}\left(45-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(755-380e^{10}+66e^{20}-4e^{30}\right)\left(5-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x-\right.\right.}{2\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)}$$

$$\frac{e^{\frac{1}{2}\left(25-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(1+\frac{10-e^{10}}{\sqrt{45-10e^{10}+e^{20}}}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x-\sqrt{45-10e^{10}+e^{20}}+e^{10}-5\right)\right)}{11-2e^{10}}+$$

$$\frac{e^{\frac{1}{2}\left(25-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(5-e^{10}\right)\left(770+395e^{10}-318e^{20}+62e^{30}-4e^{40}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x-\sqrt{45-10e^{10}}\right.\right.}{\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)^{3/2}}$$

$$\frac{10e^{\frac{1}{2}\left(25-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(55+44e^{10}-21e^{20}+2e^{30}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x-\sqrt{45-10e^{10}+e^{20}}+e^{10}-5\right)\right)}{\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)}$$

$$\frac{20e^{\frac{1}{2}\left(25-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(55+44e^{10}-21e^{20}+2e^{30}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x-\sqrt{45-10e^{10}+e^{20}}+e^{10}-5\right)\right)}{\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)^{3/2}}$$

$$\frac{e^{\frac{1}{2}\left(45-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(5-e^{10}\right)\left(755-380e^{10}+66e^{20}-4e^{30}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x-\sqrt{45-10e^{10}+e^{20}}+\right.\right.}{\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)^{3/2}}$$

$$\frac{10e^{\frac{1}{2}\left(45-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(65-23e^{10}+2e^{20}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x-\sqrt{45-10e^{10}+e^{20}}+e^{10}-5\right)\right)}{\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)}-$$

$$\frac{20e^{\frac{1}{2}\left(45-e^{10}+\sqrt{45-10e^{10}+e^{20}}\right)}\left(65-23e^{10}+2e^{20}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x-\sqrt{45-10e^{10}+e^{20}}+e^{10}-5\right)\right)}{\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)^{3/2}}+$$

$$\frac{e^{\frac{1}{2}\left(25-e^{10}-\sqrt{45-10e^{10}+e^{20}}\right)}\left(594-462e^{10}+108e^{20}-8e^{30}-\frac{2915-4092e^{10}+1680e^{20}-276e^{30}+16e^{40}}{\sqrt{45-10e^{10}+e^{20}}}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-\right.\right.}{\left(11-2e^{10}\right)^2}$$

$$\frac{e^{\frac{1}{2}\left(45-e^{10}-\sqrt{45-10e^{10}+e^{20}}\right)}\left(123-44e^{10}+4e^{20}-\frac{2055-1109e^{10}+200e^{20}-12e^{30}}{\sqrt{45-10e^{10}+e^{20}}}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x+\sqrt{45-10e^{10}}\right.\right.}{\left(11-2e^{10}\right)^2}$$

$$\frac{e^{\frac{1}{2}\left(25-e^{10}-\sqrt{45-10e^{10}+e^{20}}\right)}\left(770+395e^{10}-318e^{20}+62e^{30}-4e^{40}\right)\left(5-e^{10}-\sqrt{45-10e^{10}+e^{20}}\right)\text{ExpIntegralEi}\left(\right.}{2\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)}$$

$$\frac{e^{\frac{1}{2}\left(45-e^{10}-\sqrt{45-10e^{10}+e^{20}}\right)}\left(755-380e^{10}+66e^{20}-4e^{30}\right)\left(5-e^{10}-\sqrt{45-10e^{10}+e^{20}}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x+\right.\right.}{2\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)}$$

$$\frac{e^{\frac{1}{2}\left(25-e^{10}-\sqrt{45-10e^{10}+e^{20}}\right)}\left(1-\frac{10-e^{10}}{\sqrt{45-10e^{10}+e^{20}}}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x+\sqrt{45-10e^{10}+e^{20}}+e^{10}-5\right)\right)}{11-2e^{10}}-$$

$$\frac{e^{\frac{1}{2}\left(25-e^{10}-\sqrt{45-10e^{10}+e^{20}}\right)}\left(5-e^{10}\right)\left(770+395e^{10}-318e^{20}+62e^{30}-4e^{40}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x+\sqrt{45-10e^{10}}\right.\right.}{\left(11-2e^{10}\right)\left(45-10e^{10}+e^{20}\right)^{3/2}}$$

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$$10e^{\frac{1}{2}\left(25-e^{10}-\sqrt{45-10e^{10}+e^{20}}\right)}\left(55+44e^{10}-21e^{20}+2e^{30}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(-2x+\sqrt{45-10e^{10}+e^{20}}+e^{10}-5\right)\right)$$

$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}\left(2x^2+x^3\right)+e^{10-x}\left(-45x+25x^2+x^3-14x^4-2x^5\right)+e^x\left(e^{10-x}\left(20x-10x^2-14x^3-2x^4\right)+e^{20-2x}\left(-5x^2+2x^3+\right.\right.}{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}\left(2x^2+x^3\right)+e^{10}\left(20x-10x^2-14x^3-2x^4\right)}$$

input
```
Int[(50 - 75*x - 20*x^2 + 35*x^3 + 12*x^4 + x^5 + E^20*(2*x^2 + x^3) + E^(
10 - x)*(-45*x + 25*x^2 + x^3 - 14*x^4 - 2*x^5) + E^x*(E^(10 - x)*(20*x -
10*x^2 - 14*x^3 - 2*x^4) + E^(20 - 2*x)*(-5*x^2 + 2*x^3 + 2*x^4)) + (E^(20
 - x)*(2*x^2 + x^3) + E^(10 - x)*(-10 + 5*x - 7*x^2 - 8*x^3 - x^4))*Log[2
+ x])/(50 - 75*x - 20*x^2 + 35*x^3 + 12*x^4 + x^5 + E^20*(2*x^2 + x^3) + E
^10*(20*x - 10*x^2 - 14*x^3 - 2*x^4)),x]
```

output
```
2*E^(10 - x) + x + (20*E^(20 - x)*(65 - 23*E^10 + 2*E^20))/((11 - 2*E^10)*
(45 - 10*E^10 + E^20)*(5 - E^10 - Sqrt[45 - 10*E^10 + E^20] + 2*x)) - (20*
E^(10 - x)*(55 + 44*E^10 - 21*E^20 + 2*E^30))/((11 - 2*E^10)*(45 - 10*E^10
 + E^20)*(5 - E^10 - Sqrt[45 - 10*E^10 + E^20] + 2*x)) + (E^(20 - x)*(755
- 380*E^10 + 66*E^20 - 4*E^30)*(5 - E^10 - Sqrt[45 - 10*E^10 + E^20]))/((1
1 - 2*E^10)*(45 - 10*E^10 + E^20)*(5 - E^10 - Sqrt[45 - 10*E^10 + E^20] +
2*x)) - (E^(10 - x)*(770 + 395*E^10 - 318*E^20 + 62*E^30 - 4*E^40)*(5 - E^
10 - Sqrt[45 - 10*E^10 + E^20]))/((11 - 2*E^10)*(45 - 10*E^10 + E^20)*(5 -
 E^10 - Sqrt[45 - 10*E^10 + E^20] + 2*x)) + (20*E^(20 - x)*(65 - 23*E^10 +
 2*E^20))/((11 - 2*E^10)*(45 - 10*E^10 + E^20)*(5 - E^10 + Sqrt[45 - 10*E^
10 + E^20] + 2*x)) - (20*E^(10 - x)*(55 + 44*E^10 - 21*E^20 + 2*E^30))/((1
1 - 2*E^10)*(45 - 10*E^10 + E^20)*(5 - E^10 + Sqrt[45 - 10*E^10 + E^20] +
2*x)) + (E^(20 - x)*(755 - 380*E^10 + 66*E^20 - 4*E^30)*(5 - E^10 + Sqrt[4
5 - 10*E^10 + E^20]))/((11 - 2*E^10)*(45 - 10*E^10 + E^20)*(5 - E^10 + Sqr
t[45 - 10*E^10 + E^20] + 2*x)) - (E^(10 - x)*(770 + 395*E^10 - 318*E^20 +
62*E^30 - 4*E^40)*(5 - E^10 + Sqrt[45 - 10*E^10 + E^20]))/((11 - 2*E^10)*(
45 - 10*E^10 + E^20)*(5 - E^10 + Sqrt[45 - 10*E^10 + E^20] + 2*x)) - (20*E
^((45 - E^10 + Sqrt[45 - 10*E^10 + E^20])/2)*(65 - 23*E^10 + 2*E^20)*ExpIn
tegralEi[(-5 + E^10 - Sqrt[45 - 10*E^10 + E^20] - 2*x)/2])/((11 - 2*E^10)*
(45 - 10*E^10 + E^20)^(3/2)) + (10*E^((45 - E^10 + Sqrt[45 - 10*E^10 + ...
```

3.1296.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

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$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10-x}(20x-10x^2-14x^3-2x^4)+e^{20-2x}(-5x^2+2x^3+}{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10}(20x-10x^2-14x^3-2x^4)}$$

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1296.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 111 vs. $2(36) = 72$.

Time = 3.34 (sec) , antiderivative size = 112, normalized size of antiderivative = 3.29

method	result
parallelrisch	$\frac{1620-1800x+100\,\mathrm{e}^{10-x}\mathrm{e}^{x}+72\,\mathrm{e}^{10-x}x^{2}+36x^{3}-144x^{2}-56\,\mathrm{e}^{x}\mathrm{e}^{10-x}x^{2}+224\,\mathrm{e}^{10-x}x\,\mathrm{e}^{x}+36\,\mathrm{e}^{10-x}\ln(2+x)x+20x\,\mathrm{e}^{-2x+20}\mathrm{e}^{2x}}{-36\,\mathrm{e}^{10-x}x\,\mathrm{e}^{x}+36x^{2}+180x-180}$

input
```
int((((x^3+2*x^2)*exp(10-x)^2*exp(x)+(-x^4-8*x^3-7*x^2+5*x-10)*exp(10-x))*
ln(2+x)+(x^3+2*x^2)*exp(10-x)^2*exp(x)^2+((2*x^4+2*x^3-5*x^2)*exp(10-x)^2+
(-2*x^4-14*x^3-10*x^2+20*x)*exp(10-x))*exp(x)+(-2*x^5-14*x^4+x^3+25*x^2-45
*x)*exp(10-x)+x^5+12*x^4+35*x^3-20*x^2-75*x+50)/((x^3+2*x^2)*exp(10-x)^2*e
xp(x)^2+(-2*x^4-14*x^3-10*x^2+20*x)*exp(10-x)*exp(x)+x^5+12*x^4+35*x^3-20*
x^2-75*x+50),x,method=_RETURNVERBOSE)
```

output
```
1/36*(1620-1800*x+100*exp(10-x)*exp(x)+72*exp(10-x)*x^2+36*x^3-144*x^2-56*
exp(x)*exp(10-x)*x^2+224*exp(10-x)*x*exp(x)+36*exp(10-x)*ln(2+x)*x+20*x*ex
p(10-x)^2*exp(x)^2)/(-exp(10-x)*x*exp(x)+x^2+5*x-5)
```

3.1296.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.71

$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10}}{50-75x-20x^2+35x^3+12x^4}$$
$$=\frac{(2\,x^2e^{10}+xe^{10}\log\left(x+2\right)+(x^3-x^2e^{10}+5\,x^2-5\,x)e^x)e^{(-x)}}{x^2-xe^{10}+5\,x-5}$$

3.1296.
$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}\left(2x^2+x^3\right)+e^{10-x}\left(-45x+25x^2+x^3-14x^4-2x^5\right)+e^x\left(e^{10-x}\left(20x-10x^2-14x^3-2x^4\right)+e^{20-2x}\left(-5x^2+2x^3+\right.\right.}{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}\left(2x^2+x^3\right)+e^{10}\left(20x-10x^2-14x^3-2x^4\right)}$

input
```
integrate((((x^3+2*x^2)*exp(10-x)^2*exp(x)+(-x^4-8*x^3-7*x^2+5*x-10)*exp(1
0-x))*log(2+x)+(x^3+2*x^2)*exp(10-x)^2*exp(x)^2+((2*x^4+2*x^3-5*x^2)*exp(1
0-x)^2+(-2*x^4-14*x^3-10*x^2+20*x)*exp(10-x))*exp(x)+(-2*x^5-14*x^4+x^3+25
*x^2-45*x)*exp(10-x)+x^5+12*x^4+35*x^3-20*x^2-75*x+50)/((x^3+2*x^2)*exp(10
-x)^2*exp(x)^2+(-2*x^4-14*x^3-10*x^2+20*x)*exp(10-x)*exp(x)+x^5+12*x^4+35*
x^3-20*x^2-75*x+50),x, algorithm=\
```

output
```
(2*x^2*e^10 + x*e^10*log(x + 2) + (x^3 - x^2*e^10 + 5*x^2 - 5*x)*e^x)*e^(-
x)/(x^2 - x*e^10 + 5*x - 5)
```

3.1296.6 Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06

$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10}\cdots}{50-75x-20x^2+35x^3+12x^4\cdots}$$
$$= x+\frac{(2x^2e^{10}+xe^{10}\log{(x+2)})\,e^{-x}}{x^2-xe^{10}+5x-5}$$

input
```
integrate((((x**3+2*x**2)*exp(10-x)**2*exp(x)+(-x**4-8*x**3-7*x**2+5*x-10)
*exp(10-x))*ln(2+x)+(x**3+2*x**2)*exp(10-x)**2*exp(x)**2+((2*x**4+2*x**3-5
*x**2)*exp(10-x)**2+(-2*x**4-14*x**3-10*x**2+20*x)*exp(10-x))*exp(x)+(-2*x
**5-14*x**4+x**3+25*x**2-45*x)*exp(10-x)+x**5+12*x**4+35*x**3-20*x**2-75*x
+50)/((x**3+2*x**2)*exp(10-x)**2*exp(x)**2+(-2*x**4-14*x**3-10*x**2+20*x)*
exp(10-x)*exp(x)+x**5+12*x**4+35*x**3-20*x**2-75*x+50),x)
```

output
```
x + (2*x**2*exp(10) + x*exp(10)*log(x + 2))*exp(-x)/(x**2 - x*exp(10) + 5*
x - 5)
```

3.1296.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2515 vs. 2(31) = 62.

Time = 0.34 (sec) , antiderivative size = 2515, normalized size of antiderivative = 73.97

$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10}\cdots}{50-75x-20x^2+35x^3+12x^4\cdots}$$
= Too large to display

3.1296. $\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10-x}(20x-10x^2-14x^3-2x^4)+e^{20-2x}(-5x^2+2x^3+\cdots}{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10}(20x-10x^2-14x^3-2x^4)\cdots}$

input
```
integrate((((x^3+2*x^2)*exp(10-x)^2*exp(x)+(-x^4-8*x^3-7*x^2+5*x-10)*exp(1
0-x))*log(2+x)+(x^3+2*x^2)*exp(10-x)^2*exp(x)^2+((2*x^4+2*x^3-5*x^2)*exp(1
0-x)^2+(-2*x^4-14*x^3-10*x^2+20*x)*exp(10-x))*exp(x)+(-2*x^5-14*x^4+x^3+25
*x^2-45*x)*exp(10-x)+x^5+12*x^4+35*x^3-20*x^2-75*x+50)/((x^3+2*x^2)*exp(10
-x)^2*exp(x)^2+(-2*x^4-14*x^3-10*x^2+20*x)*exp(10-x)*exp(x)+x^5+12*x^4+35*
x^3-20*x^2-75*x+50),x, algorithm=\
```

output
```
(2*(2*e^30 - 30*e^20 + 135*e^10 - 350)*log((2*x - sqrt(e^20 - 10*e^10 + 45
) - e^10 + 5)/(2*x + sqrt(e^20 - 10*e^10 + 45) - e^10 + 5))/((4*e^40 - 84*
e^30 + 741*e^20 - 3190*e^10 + 5445)*sqrt(e^20 - 10*e^10 + 45)) - (x*(2*e^3
0 - 35*e^20 + 230*e^10 - 575) + 10*e^20 - 125*e^10 + 475)/(x^2*(2*e^30 - 3
1*e^20 + 200*e^10 - 495) - x*(2*e^40 - 41*e^30 + 355*e^20 - 1495*e^10 + 24
75) - 10*e^30 + 155*e^20 - 1000*e^10 + 2475) + 4*log(x^2 - x*(e^10 - 5) -
5)/(4*e^20 - 44*e^10 + 121) - 8*log(x + 2)/(4*e^20 - 44*e^10 + 121))*e^20
- 2*((2*e^30 - 50*e^20 + 355*e^10 - 955)*log((2*x - sqrt(e^20 - 10*e^10 +
45) - e^10 + 5)/(2*x + sqrt(e^20 - 10*e^10 + 45) - e^10 + 5))/((4*e^40 - 8
4*e^30 + 741*e^20 - 3190*e^10 + 5445)*sqrt(e^20 - 10*e^10 + 45)) + (x*(2*e
^20 - 25*e^10 + 95) + 10*e^10 - 100)/(x^2*(2*e^30 - 31*e^20 + 200*e^10 - 4
95) - x*(2*e^40 - 41*e^30 + 355*e^20 - 1495*e^10 + 2475) - 10*e^30 + 155*e
^20 - 1000*e^10 + 2475) + 2*log(x^2 - x*(e^10 - 5) - 5)/(4*e^20 - 44*e^10
+ 121) - 4*log(x + 2)/(4*e^20 - 44*e^10 + 121))*e^20 - ((4*e^20 - 44*e^10
+ 105)*log(x^2 - x*(e^10 - 5) - 5)/(4*e^20 - 44*e^10 + 121) + (4*e^50 - 10
4*e^40 + 1185*e^30 - 7295*e^20 + 23725*e^10 - 30475)*log((2*x - sqrt(e^20
- 10*e^10 + 45) - e^10 + 5)/(2*x + sqrt(e^20 - 10*e^10 + 45) - e^10 + 5))/
((4*e^40 - 84*e^30 + 741*e^20 - 3190*e^10 + 5445)*sqrt(e^20 - 10*e^10 + 45
)) - 2*(x*(2*e^40 - 45*e^30 + 415*e^20 - 1850*e^10 + 3350) + 10*e^30 - 175
*e^20 + 1150*e^10 - 2875)/(x^2*(2*e^30 - 31*e^20 + 200*e^10 - 495) - x*...
```

3.1296.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 115 vs. $2(31) = 62$.

Time = 0.34 (sec) , antiderivative size = 115, normalized size of antiderivative = 3.38

$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10}}{50-75x-20x^2+35x^3+12x^4}$$
$$=\frac{(x-10)^3-(x-10)^2e^{10}+2\,(x-10)^2e^{(-x+10)}+(x-10)e^{(-x+10)}\log{(x+2)}+25\,(x-10)^2-10\,(x-10}{(x-10)^2-(x-10)e^{10}+25\,x-1}$$

$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10-x}(20x-10x^2-14x^3-2x^4)+e^{20-2x}(-5x^2+2x^3+}{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10}(20x-10x^2-14x^3-2x^4)}$

input
```
integrate((((x^3+2*x^2)*exp(10-x)^2*exp(x)+(-x^4-8*x^3-7*x^2+5*x-10)*exp(1
0-x))*log(2+x)+(x^3+2*x^2)*exp(10-x)^2*exp(x)^2+((2*x^4+2*x^3-5*x^2)*exp(1
0-x)^2+(-2*x^4-14*x^3-10*x^2+20*x)*exp(10-x))*exp(x)+(-2*x^5-14*x^4+x^3+25
*x^2-45*x)*exp(10-x)+x^5+12*x^4+35*x^3-20*x^2-75*x+50)/((x^3+2*x^2)*exp(10
-x)^2*exp(x)^2+(-2*x^4-14*x^3-10*x^2+20*x)*exp(10-x)*exp(x)+x^5+12*x^4+35*
x^3-20*x^2-75*x+50),x, algorithm=\
```

output
```
((x - 10)^3 - (x - 10)^2*e^10 + 2*(x - 10)^2*e^(-x + 10) + (x - 10)*e^(-x
+ 10)*log(x + 2) + 25*(x - 10)^2 - 10*(x - 10)*e^10 + 40*(x - 10)*e^(-x +
10) + 10*e^(-x + 10)*log(x + 2) + 145*x + 200*e^(-x + 10) - 1450)/((x - 10
)^2 - (x - 10)*e^10 + 25*x - 10*e^10 - 105)
```

3.1296.9 Mupad [F(-1)]

Timed out.

$$\int \frac{50-75x-20x^2+35x^3+12x^4+x^5+e^{20}(2x^2+x^3)+e^{10-x}(-45x+25x^2+x^3-14x^4-2x^5)+e^x(e^{10}\cdots}{50-75x-20x^2+35x^3+12x^4\cdots}$$

$$= -\int -\frac{e^{20}\left(x^3+2\,x^2\right)-e^{10-x}\left(2\,x^5+14\,x^4-x^3-25\,x^2+45\,x\right)-75\,x-e^x\left(e^{10-x}\left(2\,x^4+14\,x^3+10\,x^2-20\,\cdots\right.\right.}{e^{20}\,\left(x^3+2\,x^2\right)-75\,x-e^{10}\,\left(\cdots\right.}$$

input
```
int(-(75*x + exp(10 - x)*(45*x - 25*x^2 - x^3 + 14*x^4 + 2*x^5) + exp(x)*(
exp(10 - x)*(10*x^2 - 20*x + 14*x^3 + 2*x^4) - exp(20 - 2*x)*(2*x^3 - 5*x^
2 + 2*x^4)) + log(x + 2)*(exp(10 - x)*(7*x^2 - 5*x + 8*x^3 + x^4 + 10) - e
xp(20 - 2*x)*exp(x)*(2*x^2 + x^3)) + 20*x^2 - 35*x^3 - 12*x^4 - x^5 - exp(
2*x)*exp(20 - 2*x)*(2*x^2 + x^3) - 50)/(35*x^3 - 20*x^2 - 75*x + 12*x^4 +
x^5 + exp(2*x)*exp(20 - 2*x)*(2*x^2 + x^3) - exp(10 - x)*exp(x)*(10*x^2 -
20*x + 14*x^3 + 2*x^4) + 50),x)
```

output
```
-int(-(exp(20)*(2*x^2 + x^3) - exp(10 - x)*(45*x - 25*x^2 - x^3 + 14*x^4 +
 2*x^5) - 75*x - exp(x)*(exp(10 - x)*(10*x^2 - 20*x + 14*x^3 + 2*x^4) - ex
p(20 - 2*x)*(2*x^3 - 5*x^2 + 2*x^4)) - 20*x^2 + 35*x^3 + 12*x^4 + x^5 + lo
g(x + 2)*(exp(20 - x)*(2*x^2 + x^3) - exp(10 - x)*(7*x^2 - 5*x + 8*x^3 + x
^4 + 10)) + 50)/(exp(20)*(2*x^2 + x^3) - 75*x - exp(10)*(10*x^2 - 20*x + 1
4*x^3 + 2*x^4) - 20*x^2 + 35*x^3 + 12*x^4 + x^5 + 50), x)
```

3.1297 $\int \frac{2\log(4)-\log(4)\log(x)}{x^2}\,dx$

3.1297.1 Optimal result

Integrand size = 15, antiderivative size = 13

$$\int \frac{2\log(4)-\log(4)\log(x)}{x^2}\,dx=\frac{\log(4)(-1-6x+\log(x))}{x}$$

output
```
2*ln(2)/x*(-6*x-1+ln(x))
```

3.1297.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

$$\int \frac{2\log(4)-\log(4)\log(x)}{x^2}\,dx=-\frac{\log(4)}{x}+\frac{\log(4)\log(x)}{x}$$

input
```
Integrate[(2*Log[4] - Log[4]*Log[x])/x^2,x]
```

output
```
-(Log[4]/x) + (Log[4]*Log[x])/x
```

3.1297.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.77, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2\log(4)-\log(4)\log(x)}{x^2}\,dx$$

$$\Big\downarrow \; 2741$$

$$\frac{\log(4)}{x}-\frac{2\log(4)-\log(4)\log(x)}{x}$$

input
```
Int[(2*Log[4] - Log[4]*Log[x])/x^2,x]
```

output
```
Log[4]/x - (2*Log[4] - Log[4]*Log[x])/x
```

3.1297.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

3.1297.4 Maple [A] (verified)

Time = 0.02 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

method	result	size
norman	$\frac{2\ln(2)\ln(x)-2\ln(2)}{x}$	16
parallelrisch	$\frac{2\ln(2)\ln(x)-2\ln(2)}{x}$	16
risch	$\frac{2\ln(2)\ln(x)}{x}-\frac{2\ln(2)}{x}$	18
default	$-2\ln\left(2\right)\left(-\frac{\ln(x)}{x}-\frac{1}{x}\right)-\frac{4\ln(2)}{x}$	26
parts	$-2\ln\left(2\right)\left(-\frac{\ln(x)}{x}-\frac{1}{x}\right)-\frac{4\ln(2)}{x}$	26

input
```
int((-2*ln(2)*ln(x)+4*ln(2))/x^2,x,method=_RETURNVERBOSE)
```

output
```
(2*ln(2)*ln(x)-2*ln(2))/x
```

3.1297.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.15

$$\int \frac{2\log(4) - \log(4)\log(x)}{x^2}\,dx = \frac{2\left(\log\left(2\right)\log\left(x\right) - \log\left(2\right)\right)}{x}$$

input
```
integrate((-2*log(2)*log(x)+4*log(2))/x^2,x, algorithm=\
```

output
```
2*(log(2)*log(x) - log(2))/x
```

3.1297.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.15

$$\int \frac{2\log(4) - \log(4)\log(x)}{x^2}\,dx = \frac{2\log\left(2\right)\log\left(x\right)}{x} - \frac{2\log\left(2\right)}{x}$$

input
```
integrate((-2*ln(2)*ln(x)+4*ln(2))/x**2,x)
```

output
```
2*log(2)*log(x)/x - 2*log(2)/x
```

3.1297.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.46

$$\int \frac{2\log(4) - \log(4)\log(x)}{x^2}\,dx = \frac{2\left(\log\left(x\right) + 1\right)\log\left(2\right)}{x} - \frac{4\,\log\left(2\right)}{x}$$

input
```
integrate((-2*log(2)*log(x)+4*log(2))/x^2,x, algorithm=\
```

output
```
2*(log(x) + 1)*log(2)/x - 4*log(2)/x
```

3.1297.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.31

$$\int \frac{2\log(4) - \log(4)\log(x)}{x^2}\,dx = \frac{2\,\log(2)\log(x)}{x} - \frac{2\,\log(2)}{x}$$

input
```
integrate((-2*log(2)*log(x)+4*log(2))/x^2,x, algorithm=\
```

output
```
2*log(2)*log(x)/x - 2*log(2)/x
```

3.1297.9 Mupad [B] (verification not implemented)

Time = 16.42 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{2\log(4) - \log(4)\log(x)}{x^2}\,dx = \frac{2\,\ln(2)\,\left(\ln(x) - 1\right)}{x}$$

input
```
int((4*log(2) - 2*log(2)*log(x))/x^2,x)
```

output
```
(2*log(2)*(log(x) - 1))/x
```

3.1298

$$\int \frac{e^{2x}\left(18+4x-4x^2+(3-2x)\log(3)+2\right.}{81-36x^2+4x^4+\left(18-18x-4x^2+4x^3\right)\log(3)+\left(1-2x+x^2\right)\log^2(3)+(}$$

3.1298.1 Optimal result

Integrand size = 95, antiderivative size = 23

$$\int \frac{e^{2x}(18+4x-4x^2+(3-2x)\log(3)+2\log(5))}{81-36x^2+4x^4+(18-18x-4x^2+4x^3)\log(3)+(1-2x+x^2)\log^2(3)+(18-4x^2+(2-2x)\log(3))} = \frac{e^{2x}}{9+\log(3)-x(2x+\log(3))+\log(5)}$$

output
```
exp(x)^2/(ln(3)+ln(5)+9-x*(2*x+ln(3)))
```

3.1298.2 Mathematica [A] (verified)

Time = 0.82 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{e^{2x}(18+4x-4x^2+(3-2x)\log(3)+2\log(5))}{81-36x^2+4x^4+(18-18x-4x^2+4x^3)\log(3)+(1-2x+x^2)\log^2(3)+(18-4x^2+(2-2x)\log(3))} = \frac{e^{2x}}{9-2x^2-x\log(3)+\log(15)}$$

input
```
Integrate[(E^(2*x)*(18 + 4*x - 4*x^2 + (3 - 2*x)*Log[3] + 2*Log[5]))/(81 -
 36*x^2 + 4*x^4 + (18 - 18*x - 4*x^2 + 4*x^3)*Log[3] + (1 - 2*x + x^2)*Log
[3]^2 + (18 - 4*x^2 + (2 - 2*x)*Log[3])*Log[5] + Log[5]^2),x]
```

output
```
E^(2*x)/(9 - 2*x^2 - x*Log[3] + Log[15])
```

3.1298.3 Rubi [C] (verified)

Result contains higher order function than in optimal. Order 4 vs. order 3 in optimal.

Time = 1.75 (sec) , antiderivative size = 730, normalized size of antiderivative = 31.74, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.021, Rules used = {2463, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{2x}\left(-4x^2+4x+(3-2x)\log(3)+18+2\log(5)\right)}{4x^4-36x^2+\left(x^2-2x+1\right)\log^2(3)+\log(5)\left(-4x^2+(2-2x)\log(3)+18\right)+\left(4x^3-4x^2-18x+18\right)\log(3)+8}$$

$$\Big\downarrow \ 2463$$

$$\int \left(\frac{16e^{2x}\left(-4x^2+4x+(3-2x)\log(3)+18+2\log(5)\right)}{\left(72+\log^2(3)+8\log(3)+8\log(5)\right)^{3/2}\left(-4x+\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}-\log(3)\right)}+\frac{}{\left(72+\log^2(\right.}\right.$$

$$\Big\downarrow \ 2009$$

$$\frac{2e^{\frac{1}{2}\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}}\left(2-\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(4x-\sqrt{72+8\log(3)}\right.\right.}{\sqrt{3}\left(72+\log^2(3)+8\log(3)+8\log(5)\right)}$$

$$\frac{2e^{\frac{1}{2}\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}}\text{ExpIntegralEi}\left(\frac{1}{2}\left(4x-\sqrt{72+8\log(3)+\log^2(3)+8\log(5)}+\log(3)\right)\right)}{\sqrt{3\left(72+\log^2(3)+8\log(3)+8\log(5)\right)}}-$$

$$\frac{4e^{\frac{1}{2}\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}}\text{ExpIntegralEi}\left(\frac{1}{2}\left(4x-\sqrt{72+8\log(3)+\log^2(3)+8\log(5)}+\log(3)\right)\right)}{\sqrt{3}\left(72+\log^2(3)+8\log(3)+8\log(5)\right)}+$$

$$\frac{2e^{-\frac{1}{2}\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}}\left(2+\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}\right)\text{ExpIntegralEi}\left(\frac{1}{2}\left(4x+\sqrt{72+8\log(3}\right.\right.}{\sqrt{3}\left(72+\log^2(3)+8\log(3)+8\log(5)\right)}$$

$$\frac{2e^{-\frac{1}{2}\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}}\text{ExpIntegralEi}\left(\frac{1}{2}\left(4x+\sqrt{72+8\log(3)+\log^2(3)+8\log(5)}+\log(3)\right)\right)}{\sqrt{3\left(72+\log^2(3)+8\log(3)+8\log(5)\right)}}-$$

$$\frac{4e^{-\frac{1}{2}\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}}\text{ExpIntegralEi}\left(\frac{1}{2}\left(4x+\sqrt{72+8\log(3)+\log^2(3)+8\log(5)}+\log(3)\right)\right)}{\sqrt{3}\left(72+\log^2(3)+8\log(3)+8\log(5)\right)}-$$

$$\frac{4e^{2x}}{\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}\left(4x-\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}+\log(3)\right)}+$$

$$\frac{4e^{2x}}{\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}\left(4x+\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}+\log(3)\right)}+$$

$$\frac{2e^{2x}\left(4+\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}-\log(3)\right)}{\left(72+\log^2(3)+8\log(3)+8\log(5)\right)^{3/2}}-$$

$$\frac{2e^{2x}\left(4-\sqrt{72+\log^2(3)+8\log(3)+8\log(5)}-\log(3)\right)}{\left(72+\log^2(3)+8\log(3)+8\log(5)\right)^{3/2}}-\frac{4e^{2x}}{72+\log^2(3)+8\log(3)+8\log(5)}$$

input
```
Int[(E^(2*x)*(18 + 4*x - 4*x^2 + (3 - 2*x)*Log[3] + 2*Log[5]))/(81 - 36*x^
2 + 4*x^4 + (18 - 18*x - 4*x^2 + 4*x^3)*Log[3] + (1 - 2*x + x^2)*Log[3]^2
+ (18 - 4*x^2 + (2 - 2*x)*Log[3])*Log[5] + Log[5]^2),x]
```

3.1298.

$$\int\frac{e^{2x}\left(18+4x-4x^2+(3-2x)\log(3)+2\log(5)\right)}{81-36x^2+4x^4+(18-18x-4x^2+4x^3)\log(3)+(1-2x+x^2)\log^2(3)+(18-4x^2+(2-2x)\log(3))\log(5)+\log^2(5)}\,dx$$

output
```
(-4*E^(2*x))/(72 + 8*Log[3] + Log[3]^2 + 8*Log[5]) - (4*E^(Sqrt[72 + 8*Log
[3] + Log[3]^2 + 8*Log[5]]/2)*ExpIntegralEi[(4*x + Log[3] - Sqrt[72 + 8*Lo
g[3] + Log[3]^2 + 8*Log[5]])/2])/(Sqrt[3]*(72 + 8*Log[3] + Log[3]^2 + 8*Lo
g[5])) - (4*ExpIntegralEi[(4*x + Log[3] + Sqrt[72 + 8*Log[3] + Log[3]^2 +
8*Log[5]])/2])/(Sqrt[3]*E^(Sqrt[72 + 8*Log[3] + Log[3]^2 + 8*Log[5]]/2)*(7
2 + 8*Log[3] + Log[3]^2 + 8*Log[5])) + (2*E^(Sqrt[72 + 8*Log[3] + Log[3]^2
 + 8*Log[5]]/2)*ExpIntegralEi[(4*x + Log[3] - Sqrt[72 + 8*Log[3] + Log[3]^
2 + 8*Log[5]])/2])/Sqrt[3*(72 + 8*Log[3] + Log[3]^2 + 8*Log[5])] - (2*ExpI
ntegralEi[(4*x + Log[3] + Sqrt[72 + 8*Log[3] + Log[3]^2 + 8*Log[5]])/2])/(
E^(Sqrt[72 + 8*Log[3] + Log[3]^2 + 8*Log[5]]/2)*Sqrt[3*(72 + 8*Log[3] + Lo
g[3]^2 + 8*Log[5])]) + (2*E^(Sqrt[72 + 8*Log[3] + Log[3]^2 + 8*Log[5]]/2)*
ExpIntegralEi[(4*x + Log[3] - Sqrt[72 + 8*Log[3] + Log[3]^2 + 8*Log[5]])/2
]*(2 - Sqrt[72 + 8*Log[3] + Log[3]^2 + 8*Log[5]]))/(Sqrt[3]*(72 + 8*Log[3]
 + Log[3]^2 + 8*Log[5])) - (2*E^(2*x)*(4 - Log[3] - Sqrt[72 + 8*Log[3] + L
og[3]^2 + 8*Log[5]]))/(72 + 8*Log[3] + Log[3]^2 + 8*Log[5])^(3/2) - (4*E^(
2*x))/(Sqrt[72 + 8*Log[3] + Log[3]^2 + 8*Log[5]]*(4*x + Log[3] - Sqrt[72 +
 8*Log[3] + Log[3]^2 + 8*Log[5]])) + (2*ExpIntegralEi[(4*x + Log[3] + Sqrt
[72 + 8*Log[3] + Log[3]^2 + 8*Log[5]])/2]*(2 + Sqrt[72 + 8*Log[3] + Log[3]
^2 + 8*Log[5]]))/(Sqrt[3]*E^(Sqrt[72 + 8*Log[3] + Log[3]^2 + 8*Log[5]]/2)*
(72 + 8*Log[3] + Log[3]^2 + 8*Log[5])) + (2*E^(2*x)*(4 - Log[3] + Sqrt[...
```

3.1298.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.1298.

$$\int \frac{e^{2x}\left(18+4x-4x^2+(3-2x)\log(3)+2\log(5)\right)}{81-36x^2+4x^4+\left(18-18x-4x^2+4x^3\right)\log(3)+\left(1-2x+x^2\right)\log^2(3)+\left(18-4x^2+(2-2x)\log(3)\right)\log(5)+\log^2(5)}\,dx$$

3.1298.4 Maple [A] (verified)

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

method	result
gosper	$\frac{e^{2x}}{-x\ln(3)-2x^2+\ln(5)+\ln(3)+9}$
norman	$\frac{e^{2x}}{-x\ln(3)-2x^2+\ln(5)+\ln(3)+9}$
parallelrisch	$\frac{e^{2x}}{-x\ln(3)-2x^2+\ln(5)+\ln(3)+9}$
default	$-\frac{36\,e^{2x}\ln(3)}{\left(\ln(3)^2+8\ln(5)+8\ln(3)+72\right)(-x\ln(3)-2x^2+\ln(5)+\ln(3)+9)}-\frac{e^{2x}\ln(3)^2}{\left(\ln(3)^2+8\ln(5)+8\ln(3)+72\right)(-x\ln(3)-2x^2+\ln(5)+\ln($

input
```
int((2*ln(5)+(3-2*x)*ln(3)-4*x^2+4*x+18)*exp(x)^2/(ln(5)^2+((2-2*x)*ln(3)-
4*x^2+18)*ln(5)+(x^2-2*x+1)*ln(3)^2+(4*x^3-4*x^2-18*x+18)*ln(3)+4*x^4-36*x
^2+81),x,method=_RETURNVERBOSE)
```

output
```
exp(x)^2/(-x*ln(3)-2*x^2+ln(5)+ln(3)+9)
```

3.1298.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{e^{2x}(18+4x-4x^2+(3-2x)\log(3)+2\log(5))}{81-36x^2+4x^4+(18-18x-4x^2+4x^3)\log(3)+(1-2x+x^2)\log^2(3)+(18-4x^2+(2-2x)\log(3))$$
$$=-\frac{e^{(2\,x)}}{2\,x^2+(x-1)\log(3)-\log(5)-9}$$

input
```
integrate((2*log(5)+(3-2*x)*log(3)-4*x^2+4*x+18)*exp(x)^2/(log(5)^2+((2-2*
x)*log(3)-4*x^2+18)*log(5)+(x^2-2*x+1)*log(3)^2+(4*x^3-4*x^2-18*x+18)*log(
3)+4*x^4-36*x^2+81),x, algorithm=\
```

output
```
-e^(2*x)/(2*x^2 + (x - 1)*log(3) - log(5) - 9)
```

3.1298.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.04

$$\int \frac{e^{2x}(18+4x-4x^2+(3-2x)\log(3)+2\log(5))}{81-36x^2+4x^4+(18-18x-4x^2+4x^3)\log(3)+(1-2x+x^2)\log^2(3)+(18-4x^2+(2-2x)\log(3))} = -\frac{e^{2x}}{2x^2+x\log(3)-9-\log(5)-\log(3)}$$

input
```
integrate((2*ln(5)+(3-2*x)*ln(3)-4*x**2+4*x+18)*exp(x)**2/(ln(5)**2+((2-2*
x)*ln(3)-4*x**2+18)*ln(5)+(x**2-2*x+1)*ln(3)**2+(4*x**3-4*x**2-18*x+18)*ln
(3)+4*x**4-36*x**2+81),x)
```

output
```
-exp(2*x)/(2*x**2 + x*log(3) - 9 - log(5) - log(3))
```

3.1298.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{e^{2x}(18+4x-4x^2+(3-2x)\log(3)+2\log(5))}{81-36x^2+4x^4+(18-18x-4x^2+4x^3)\log(3)+(1-2x+x^2)\log^2(3)+(18-4x^2+(2-2x)\log(3))} = -\frac{e^{(2x)}}{2x^2+x\log(3)-\log(5)-\log(3)-9}$$

input
```
integrate((2*log(5)+(3-2*x)*log(3)-4*x^2+4*x+18)*exp(x)^2/(log(5)^2+((2-2*
x)*log(3)-4*x^2+18)*log(5)+(x^2-2*x+1)*log(3)^2+(4*x^3-4*x^2-18*x+18)*log(
3)+4*x^4-36*x^2+81),x, algorithm=\
```

output
```
-e^(2*x)/(2*x^2 + x*log(3) - log(5) - log(3) - 9)
```

3.1298.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.17

$$\int \frac{e^{2x}(18+4x-4x^2+(3-2x)\log(3)+2\log(5))}{81-36x^2+4x^4+(18-18x-4x^2+4x^3)\log(3)+(1-2x+x^2)\log^2(3)+(18-4x^2+(2-2x)\log(3))}$$
$$= -\frac{e^{(2x)}}{2x^2+x\log(3)-\log(5)-\log(3)-9}$$

input
```
integrate((2*log(5)+(3-2*x)*log(3)-4*x^2+4*x+18)*exp(x)^2/(log(5)^2+((2-2*
x)*log(3)-4*x^2+18)*log(5)+(x^2-2*x+1)*log(3)^2+(4*x^3-4*x^2-18*x+18)*log(
3)+4*x^4-36*x^2+81),x, algorithm=\
```

output
```
-e^(2*x)/(2*x^2 + x*log(3) - log(5) - log(3) - 9)
```

3.1298.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{2x}(18+4x-4x^2+(3-2x)\log(3)+2\log(5))}{81-36x^2+4x^4+(18-18x-4x^2+4x^3)\log(3)+(1-2x+x^2)\log^2(3)+(18-4x^2+(2-2x)\log(3))}$$
$$= \int \frac{e^{2x}(4x+2\ln(5)-\ln(3)(2x-3)-4x^2+18)}{\ln(3)^2(x^2-2x+1)-\ln(5)(\ln(3)(2x-2)+4x^2-18)-\ln(3)(-4x^3+4x^2+18x-18)+\ln(5}$$

input
```
int((exp(2*x)*(4*x + 2*log(5) - log(3)*(2*x - 3) - 4*x^2 + 18))/(log(3)^2*
(x^2 - 2*x + 1) - log(5)*(log(3)*(2*x - 2) + 4*x^2 - 18) - log(3)*(18*x +
4*x^2 - 4*x^3 - 18) + log(5)^2 - 36*x^2 + 4*x^4 + 81),x)
```

output
```
int((exp(2*x)*(4*x + 2*log(5) - log(3)*(2*x - 3) - 4*x^2 + 18))/(log(3)^2*
(x^2 - 2*x + 1) - log(5)*(log(3)*(2*x - 2) + 4*x^2 - 18) - log(3)*(18*x +
4*x^2 - 4*x^3 - 18) + log(5)^2 - 36*x^2 + 4*x^4 + 81), x)
```

3.1299 $\int \frac{e^x(1-x)-x^2+20x^3+2e^{e^{x^2}+x^2}x^3+12x^4}{x^2}\,dx$

3.1299.1 Optimal result

Integrand size = 45, antiderivative size = 32

$$\int \frac{e^x(1-x)-x^2+20x^3+2e^{e^{x^2}+x^2}x^3+12x^4}{x^2}\,dx = e^{e^{x^2}}-x+\frac{-e^x+x}{x}+2x^2(5+2x)$$

output
```
2*(5+2*x)*x^2+(x-exp(x))/x+exp(exp(x^2))-x
```

3.1299.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.91

$$\int \frac{e^x(1-x)-x^2+20x^3+2e^{e^{x^2}+x^2}x^3+12x^4}{x^2}\,dx = e^{e^{x^2}}-\frac{e^x}{x}-x+10x^2+4x^3$$

input
```
Integrate[(E^x*(1 - x) - x^2 + 20*x^3 + 2*E^(E^x^2 + x^2)*x^3 + 12*x^4)/x^
2,x]
```

output
```
E^E^x^2 - E^x/x - x + 10*x^2 + 4*x^3
```

3.1299.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.91, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.044, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{12x^4+20x^3-x^2+2e^{x^2+e^{x^2}}x^3+e^x(1-x)}{x^2}\,dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(2e^{x^2+e^{x^2}}x+\frac{12x^4+20x^3-x^2-e^x x+e^x}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$4x^3+10x^2+e^{e^{x^2}}-x-\frac{e^x}{x}$$

input
```
Int[(E^x*(1 - x) - x^2 + 20*x^3 + 2*E^(E^x^2 + x^2)*x^3 + 12*x^4)/x^2,x]
```

output
```
E^E^x^2 - E^x/x - x + 10*x^2 + 4*x^3
```

3.1299.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1299.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.84

method	result	size
default	$-x-\frac{e^{x}}{x}+10x^{2}+4x^{3}+e^{e^{x^{2}}}$	27
risch	$-x-\frac{e^{x}}{x}+10x^{2}+4x^{3}+e^{e^{x^{2}}}$	27
parts	$-x-\frac{e^{x}}{x}+10x^{2}+4x^{3}+e^{e^{x^{2}}}$	27
parallelrisch	$\frac{4x^{4}+10x^{3}-x^{2}+e^{e^{x^{2}}}x-e^{x}}{x}$	32

input
```
int((2*x^3*exp(x^2)*exp(exp(x^2))+(1-x)*exp(x)+12*x^4+20*x^3-x^2)/x^2,x,me
thod=_RETURNVERBOSE)
```

output
```
-x-exp(x)/x+10*x^2+4*x^3+exp(exp(x^2))
```

3.1299.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.47

$$\int \frac{e^{x}(1-x)-x^{2}+20x^{3}+2e^{e^{x^{2}}+x^{2}}x^{3}+12x^{4}}{x^{2}}\,dx = \frac{\left(xe^{\left(x^{2}+e^{\left(x^{2}\right)}\right)}+\left(4\,x^{4}+10\,x^{3}-x^{2}-e^{x}\right)e^{\left(x^{2}\right)}\right)e^{\left(-x^{2}\right)}}{x}$$

input
```
integrate((2*x^3*exp(x^2)*exp(exp(x^2))+(1-x)*exp(x)+12*x^4+20*x^3-x^2)/x^
2,x, algorithm=\
```

output
```
(x*e^(x^2 + e^(x^2)) + (4*x^4 + 10*x^3 - x^2 - e^x)*e^(x^2))*e^(-x^2)/x
```

3.1299.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.69

$$\int \frac{e^x(1-x)-x^2+20x^3+2e^{e^{x^2}+x^2}x^3+12x^4}{x^2}\,dx=4x^3+10x^2-x+e^{e^{x^2}}-\frac{e^x}{x}$$

input
```
integrate((2*x**3*exp(x**2)*exp(exp(x**2))+(1-x)*exp(x)+12*x**4+20*x**3-x*
*2)/x**2,x)
```

output
```
4*x**3 + 10*x**2 - x + exp(exp(x**2)) - exp(x)/x
```

3.1299.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.24 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.88

$$\int \frac{e^x(1-x)-x^2+20x^3+2e^{e^{x^2}+x^2}x^3+12x^4}{x^2}\,dx$$
$$=4\,x^3+10\,x^2-x-\mathrm{Ei}(x)+e^{\left(e^{\left(x^2\right)}\right)}+\Gamma(-1,-x)$$

input
```
integrate((2*x^3*exp(x^2)*exp(exp(x^2))+(1-x)*exp(x)+12*x^4+20*x^3-x^2)/x^
2,x, algorithm=\
```

output
```
4*x^3 + 10*x^2 - x - Ei(x) + e^(e^(x^2)) + gamma(-1, -x)
```

3.1299.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.78

$$\int \frac{e^x(1-x)-x^2+20x^3+2e^{e^{x^2}+x^2}x^3+12x^4}{x^2}\,dx$$
$$=\frac{\left(4\,x^4e^{\left(x^2\right)}+10\,x^3e^{\left(x^2\right)}-x^2e^{\left(x^2\right)}+xe^{\left(x^2+e^{\left(x^2\right)}\right)}-e^{\left(x^2+x\right)}\right)e^{\left(-x^2\right)}}{x}$$

input
```
integrate((2*x^3*exp(x^2)*exp(exp(x^2))+(1-x)*exp(x)+12*x^4+20*x^3-x^2)/x^
2,x, algorithm=\
```

output
```
(4*x^4*e^(x^2) + 10*x^3*e^(x^2) - x^2*e^(x^2) + x*e^(x^2 + e^(x^2)) - e^(x
^2 + x))*e^(-x^2)/x
```

3.1299.9 Mupad [B] (verification not implemented)

Time = 17.13 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{e^x(1-x)-x^2+20x^3+2e^{e^{x^2}+x^2}x^3+12x^4}{x^2}\,dx = \mathrm{e}^{\mathrm{e}^{x^2}} - x - \frac{\mathrm{e}^x}{x} + 10\,x^2 + 4\,x^3$$

input
```
int((20*x^3 - x^2 - exp(x)*(x - 1) + 12*x^4 + 2*x^3*exp(x^2)*exp(exp(x^2))
)/x^2,x)
```

output
```
exp(exp(x^2)) - x - exp(x)/x + 10*x^2 + 4*x^3
```

3.1300 $\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}\left(-80-320x+32x^2+\left(-4-16x-16x^2\right)\log(5)\right)}{x^2+4x^3+4x^4}\,dx$

3.1300.1 Optimal result

Integrand size = 70, antiderivative size = 27

$$\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}\left(-80-320x+32x^2+\left(-4-16x-16x^2\right)\log(5)\right)}{x^2+4x^3+4x^4}\,dx = e^{\frac{4\left(2x+\frac{2(5-x)}{\frac{1}{2}+x}+\log(5)\right)}{x}}$$

output
```
exp(4*(2*x+ln(5)+2/(1/2+x)*(5-x))/x)
```

3.1300.2 Mathematica [A] (verified)

Time = 2.31 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.30

$$\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}\left(-80-320x+32x^2+\left(-4-16x-16x^2\right)\log(5)\right)}{x^2+4x^3+4x^4}\,dx = \frac{4\,625^{\frac{1}{x}}e^{\frac{80-8x+16x^2}{x+2x^2}}\log(5)}{\log(625)}$$

input
```
Integrate[(E^((80 - 8*x + 16*x^2 + (4 + 8*x)*Log[5])/(x + 2*x^2))*(-80 - 3
20*x + 32*x^2 + (-4 - 16*x - 16*x^2)*Log[5]))/(x^2 + 4*x^3 + 4*x^4),x]
```

output
```
(4*625^x^(-1)*E^((80 - 8*x + 16*x^2)/(x + 2*x^2))*Log[5])/Log[625]
```

3.1300. $\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}\left(-80-320x+32x^2+\left(-4-16x-16x^2\right)\log(5)\right)}{x^2+4x^3+4x^4}\,dx$

3.1300.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(32x^2+(-16x^2-16x-4)\log(5)-320x-80)\exp\left(\frac{16x^2-8x+(8x+4)\log(5)+80}{2x^2+x}\right)}{4x^4+4x^3+x^2}dx$$

$$\Big\downarrow \text{ 2026}$$

$$\int \frac{(32x^2+(-16x^2-16x-4)\log(5)-320x-80)\exp\left(\frac{16x^2-8x+(8x+4)\log(5)+80}{2x^2+x}\right)}{x^2(4x^2+4x+1)}dx$$

$$\Big\downarrow \text{ 2007}$$

$$\int \frac{(32x^2+(-16x^2-16x-4)\log(5)-320x-80)\exp\left(\frac{16x^2-8x+(8x+4)\log(5)+80}{2x^2+x}\right)}{x^2(2x+1)^2}dx$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{(16x^2(2-\log(5))-16x(20+\log(5))-4(20+\log(5)))\exp\left(\frac{16x^2-8x(1-\log(5))+80+\log(625)}{x(2x+1)}\right)}{x^2(2x+1)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{352\exp\left(\frac{16x^2-8x(1-\log(5))+80+\log(625)}{x(2x+1)}\right)}{(2x+1)^2}-\frac{4(20+\log(5))\exp\left(\frac{16x^2-8x(1-\log(5))+80+\log(625)}{x(2x+1)}\right)}{x^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$352\int \frac{\exp\left(\frac{16x^2-8(1-\log(5))x+\log(625)+80}{x(2x+1)}\right)}{(2x+1)^2}dx-4(20+\log(5))\int \frac{\exp\left(\frac{16x^2-8(1-\log(5))x+\log(625)+80}{x(2x+1)}\right)}{x^2}dx$$

input
```
Int[(E^((80 - 8*x + 16*x^2 + (4 + 8*x)*Log[5])/(x + 2*x^2))*(-80 - 320*x +
 32*x^2 + (-4 - 16*x - 16*x^2)*Log[5]))/(x^2 + 4*x^3 + 4*x^4),x]
```

output
```
$Aborted
```

3.1300. $\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}(-80-320x+32x^2+(-4-16x-16x^2)\log(5))}{x^2+4x^3+4x^4}dx$

3.1300.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1300.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.15

method	result	size
gosper	$\mathrm{e}^{\frac{8x\ln(5)+16x^2+4\ln(5)-8x+80}{(1+2x)x}}$	31
risch	$\mathrm{e}^{\frac{8x\ln(5)+16x^2+4\ln(5)-8x+80}{(1+2x)x}}$	31
parallelrisch	$\mathrm{e}^{\frac{(8x+4)\ln(5)+16x^2-8x+80}{(1+2x)x}}$	31
norman	$\frac{x\,\mathrm{e}^{\frac{(8x+4)\ln(5)+16x^2-8x+80}{2x^2+x}}+2x^2\mathrm{e}^{\frac{(8x+4)\ln(5)+16x^2-8x+80}{2x^2+x}}}{(1+2x)x}$	78

input
```
int(((-16*x^2-16*x-4)*ln(5)+32*x^2-320*x-80)*exp(((8*x+4)*ln(5)+16*x^2-8*x
+80)/(2*x^2+x))/(4*x^4+4*x^3+x^2),x,method=_RETURNVERBOSE)
```

output
```
exp(4*(2*x*ln(5)+4*x^2+ln(5)-2*x+20)/(1+2*x)/x)
```

3.1300. $\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}\left(-80-320x+32x^2+\left(-4-16x-16x^2\right)\log(5)\right)}{x^2+4x^3+4x^4}\,dx$

3.1300.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.11

$$\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}(-80-320x+32x^2+(-4-16x-16x^2)\log(5))}{x^2+4x^3+4x^4}\,dx = e^{\left(\frac{4\left(4x^2+(2x+1)\log(5)-2x+20\right)}{2x^2+x}\right)}$$

input
```
integrate((((-16*x^2-16*x-4)*log(5)+32*x^2-320*x-80)*exp(((8*x+4)*log(5)+16
*x^2-8*x+80)/(2*x^2+x))/(4*x^4+4*x^3+x^2),x, algorithm=\
```

output
```
e^(4*(4*x^2 + (2*x + 1)*log(5) - 2*x + 20)/(2*x^2 + x))
```

3.1300.6 Sympy [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

$$\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}(-80-320x+32x^2+(-4-16x-16x^2)\log(5))}{x^2+4x^3+4x^4}\,dx = e^{\frac{16x^2-8x+(8x+4)\log(5)+80}{2x^2+x}}$$

input
```
integrate((((-16*x**2-16*x-4)*ln(5)+32*x**2-320*x-80)*exp(((8*x+4)*ln(5)+16
*x**2-8*x+80)/(2*x**2+x))/(4*x**4+4*x**3+x**2),x)
```

output
```
exp((16*x**2 - 8*x + (8*x + 4)*log(5) + 80)/(2*x**2 + x))
```

3.1300.7 Maxima [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}(-80-320x+32x^2+(-4-16x-16x^2)\log(5))}{x^2+4x^3+4x^4}\,dx = e^{\left(\frac{4\log(5)}{x}-\frac{176}{2x+1}+\frac{80}{x}+8\right)}$$

input
```
integrate(((-16*x^2-16*x-4)*log(5)+32*x^2-320*x-80)*exp(((8*x+4)*log(5)+16
*x^2-8*x+80)/(2*x^2+x))/(4*x^4+4*x^3+x^2),x, algorithm=\
```

output
```
e^(4*log(5)/x - 176/(2*x + 1) + 80/x + 8)
```

3.1300.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(24) = 48$.

Time = 0.27 (sec) , antiderivative size = 66, normalized size of antiderivative = 2.44

$$\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}(-80-320x+32x^2+(-4-16x-16x^2)\log(5))}{x^2+4x^3+4x^4}\,dx = e^{\left(\frac{16\,x^2}{2\,x^2+x}+\frac{8\,x\log(5)}{2\,x^2+x}-\frac{8\,x}{2\,x^2+x}+\frac{4\,\log(5)}{2\,x^2+x}+\frac{80}{2\,x^2+x}\right)}$$

input
```
integrate(((-16*x^2-16*x-4)*log(5)+32*x^2-320*x-80)*exp(((8*x+4)*log(5)+16
*x^2-8*x+80)/(2*x^2+x))/(4*x^4+4*x^3+x^2),x, algorithm=\
```

output
```
e^(16*x^2/(2*x^2 + x) + 8*x*log(5)/(2*x^2 + x) - 8*x/(2*x^2 + x) + 4*log(5
)/(2*x^2 + x) + 80/(2*x^2 + x))
```

3.1300.9 Mupad [B] (verification not implemented)

Time = 17.96 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.44

$$\int \frac{e^{\frac{80-8x+16x^2+(4+8x)\log(5)}{x+2x^2}}(-80-320x+32x^2+(-4-16x-16x^2)\log(5))}{x^2+4x^3+4x^4}\,dx = 625^{1/x}\,\mathrm{e}^{\frac{80}{2\,x^2+x}}\,\mathrm{e}^{-\frac{8}{2\,x+1}}\,\mathrm{e}^{\frac{16\,x}{2\,x+1}}$$

input
```
int(-(exp((log(5)*(8*x + 4) - 8*x + 16*x^2 + 80)/(x + 2*x^2))*(320*x + log
(5)*(16*x + 16*x^2 + 4) - 32*x^2 + 80))/(x^2 + 4*x^3 + 4*x^4),x)
```

output
```
625^(1/x)*exp(80/(x + 2*x^2))*exp(-8/(2*x + 1))*exp((16*x)/(2*x + 1))
```

3.1301 $\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}\left(-9-6x+e^{4x}(18-12x-24x^2)+e^{8x}(\ldots\right.}{x^4\log^2(5)}$

3.1301.1 Optimal result

Integrand size = 91, antiderivative size = 28

$$\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}\left(-9-6x+e^{4x}(18-12x-24x^2)+e^{8x}(-9+18x+24x^2)-3x^4\log^2(5)\right)}{x^4\log^2(5)}\,dx$$
$$=3e^{-x+\frac{\left(-1+e^{4x}\right)^2(1+x)}{x^3\log^2(5)}}$$

output
```
3*exp((exp(4*x)-1)^2/x^3/ln(5)^2*(1+x))/exp(x)
```

3.1301.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.54

$$\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}\left(-9-6x+e^{4x}(18-12x-24x^2)+e^{8x}(-9+18x+24x^2)-3x^4\log^2(5)\right)}{x^4\log^2(5)}\,dx$$
$$=3e^{\frac{1+x-2e^{4x}(1+x)+e^{8x}(1+x)-x^4\log^2(5)}{x^3\log^2(5)}}$$

input
```
Integrate[(E^(-x + (1 + E^(4*x)*(-2 - 2*x) + x + E^(8*x)*(1 + x))/(x^3*Log
[5]^2))*(-9 - 6*x + E^(4*x)*(18 - 12*x - 24*x^2) + E^(8*x)*(-9 + 18*x + 24
*x^2) - 3*x^4*Log[5]^2))/(x^4*Log[5]^2),x]
```

3.1301. $\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}\left(-9-6x+e^{4x}(18-12x-24x^2)+e^{8x}(-9+18x+24x^2)-3x^4\log^2(5)\right)}{x^4\log^2(5)}\,dx$

output
```
3*E^((1 + x - 2*E^(4*x)*(1 + x) + E^(8*x)*(1 + x) - x^4*Log[5]^2)/(x^3*Log
[5]^2))
```

3.1301.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-3x^4\log^2(5)+e^{4x}\left(-24x^2-12x+18\right)+e^{8x}\left(24x^2+18x-9\right)-6x-9\right)\exp\left(\frac{e^{4x}(-2x-2)+x+e^{8x}(x+1)+1}{x^3\log^2(5)}-x\right)}{x^4\log^2(5)}$$

$$\Big\downarrow 27$$

$$\frac{\int -\frac{3\exp\left(\frac{x-2e^{4x}(x+1)+e^{8x}(x+1)+1}{x^3\log^2(5)}-x\right)\left(\log^2(5)x^4+2x+e^{8x}\left(-8x^2-6x+3\right)-2e^{4x}\left(-4x^2-2x+3\right)+3\right)}{x^4}dx}{\log^2(5)}$$

$$\Big\downarrow 27$$

$$-\frac{3\int \frac{\exp\left(\frac{x-2e^{4x}(x+1)+e^{8x}(x+1)+1}{x^3\log^2(5)}-x\right)\left(\log^2(5)x^4+2x+e^{8x}\left(-8x^2-6x+3\right)-2e^{4x}\left(-4x^2-2x+3\right)+3\right)}{x^4}dx}{\log^2(5)}$$

$$\Big\downarrow 7293$$

$$-\frac{3\int \left(\frac{2\exp\left(3x+\frac{x-2e^{4x}(x+1)+e^{8x}(x+1)+1}{\log^2(5)x^3}\right)\left(4x^2+2x-3\right)}{x^4}-\frac{\exp\left(7x+\frac{x-2e^{4x}(x+1)+e^{8x}(x+1)+1}{\log^2(5)x^3}\right)\left(8x^2+6x-3\right)}{x^4}+\frac{\exp\left(\frac{x-2e^{4x}(x+1)+e^{8x}(x+\cdots}{x^3\log^2(5)}\right.}{\cdots}\right.}{\log^2(5)}$$

$$\Big\downarrow 2009$$

$$-\frac{3\left(\log^2(5)\int \exp\left(\frac{x-2e^{4x}(x+1)+e^{8x}(x+1)+1}{x^3\log^2(5)}-x\right)dx+2\int \frac{\exp\left(\frac{x-2e^{4x}(x+1)+e^{8x}(x+1)+1}{x^3\log^2(5)}-x\right)}{x^3}dx+4\int \frac{\exp\left(3x+\frac{x-2e^{4x}(x+1)+\cdots}{\log^2(5\cdots}\right.}{x^3}\cdots\right.}{\cdots}$$

input
```
Int[(E^(-x + (1 + E^(4*x)*(-2 - 2*x) + x + E^(8*x)*(1 + x))/(x^3*Log[5]^2)
)*(-9 - 6*x + E^(4*x)*(18 - 12*x - 24*x^2) + E^(8*x)*(-9 + 18*x + 24*x^2)
- 3*x^4*Log[5]^2))/(x^4*Log[5]^2),x]
```

output
```
$Aborted
```

3.1301. $\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}\left(-9-6x+e^{4x}\left(18-12x-24x^2\right)+e^{8x}\left(-9+18x+24x^2\right)-3x^4\log^2(5)\right)}{x^4\log^2(5)}\,dx$

3.1301.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1301.4 Maple [A] (verified)

Time = 18.23 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.39

method	result	size
parallelrisch	$3\,\mathrm{e}^{\frac{(1+x)\mathrm{e}^{8x}+(-2-2x)\mathrm{e}^{4x}+x+1}{x^{3}\ln(5)^{2}}}\mathrm{e}^{-x}$	39
risch	$3\,\mathrm{e}^{-\frac{x^{4}\ln(5)^{2}+2x\,\mathrm{e}^{4x}-x\,\mathrm{e}^{8x}+2\,\mathrm{e}^{4x}-\mathrm{e}^{8x}-x-1}{x^{3}\ln(5)^{2}}}$	52

input
```
int(((24*x^2+18*x-9)*exp(4*x)^2+(-24*x^2-12*x+18)*exp(4*x)-3*x^4*ln(5)^2-6
*x-9)*exp(((1+x)*exp(4*x)^2+(-2-2*x)*exp(4*x)+x+1)/x^3/ln(5)^2)/x^4/ln(5)^
2/exp(x),x,method=_RETURNVERBOSE)
```

output
```
3*exp(((1+x)*exp(4*x)^2+(-2-2*x)*exp(4*x)+x+1)/x^3/ln(5)^2)/exp(x)
```

3.1301.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.54

$$\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}(-9-6x+e^{4x}(18-12x-24x^2)+e^{8x}(-9+18x+24x^2)-3x^4\log^2(5))}{x^4\log^2(5)}\,dx$$
$$= 3\,e^{\left(-\frac{x^4\log(5)^2-(x+1)e^{(8x)}+2(x+1)e^{(4x)}-x-1}{x^3\log(5)^2}\right)}$$

input
```
integrate(((24*x^2+18*x-9)*exp(4*x)^2+(-24*x^2-12*x+18)*exp(4*x)-3*x^4*log
(5)^2-6*x-9)*exp(((1+x)*exp(4*x)^2+(-2-2*x)*exp(4*x)+x+1)/x^3/log(5)^2)/x^
4/log(5)^2/exp(x),x, algorithm=\
```

output
```
3*e^(-(x^4*log(5)^2 - (x + 1)*e^(8*x) + 2*(x + 1)*e^(4*x) - x - 1)/(x^3*lo
g(5)^2))
```

3.1301.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

$$\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}\left(-9-6x+e^{4x}(18-12x-24x^2)+e^{8x}(-9+18x+24x^2)-3x^4\log^2(5)\right)}{x^4\log^2(5)}\,dx$$
$$=3e^{-x}e^{\frac{x+(-2x-2)e^{4x}+(x+1)e^{8x}+1}{x^3\log(5)^2}}$$

input
```
integrate(((24*x**2+18*x-9)*exp(4*x)**2+(-24*x**2-12*x+18)*exp(4*x)-3*x**4
*ln(5)**2-6*x-9)*exp(((1+x)*exp(4*x)**2+(-2-2*x)*exp(4*x)+x+1)/x**3/ln(5)*
*2)/x**4/ln(5)**2/exp(x),x)
```

output
```
3*exp(-x)*exp((x + (-2*x - 2)*exp(4*x) + (x + 1)*exp(8*x) + 1)/(x**3*log(5
)**2))
```

3.1301.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. 2(26) = 52.

Time = 0.43 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.61

$$\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}\left(-9-6x+e^{4x}(18-12x-24x^2)+e^{8x}(-9+18x+24x^2)-3x^4\log^2(5)\right)}{x^4\log^2(5)}\,dx$$
$$=3\,e^{\left(-x+\frac{e^{(8\,x)}}{x^2\log(5)^2}-\frac{2\,e^{(4\,x)}}{x^2\log(5)^2}+\frac{1}{x^2\log(5)^2}+\frac{e^{(8\,x)}}{x^3\log(5)^2}-\frac{2\,e^{(4\,x)}}{x^3\log(5)^2}+\frac{1}{x^3\log(5)^2}\right)}$$

input
```
integrate(((24*x^2+18*x-9)*exp(4*x)^2+(-24*x^2-12*x+18)*exp(4*x)-3*x^4*log
(5)^2-6*x-9)*exp(((1+x)*exp(4*x)^2+(-2-2*x)*exp(4*x)+x+1)/x^3/log(5)^2)/x^
4/log(5)^2/exp(x),x, algorithm=\
```

output
```
3*e^(-x + e^(8*x)/(x^2*log(5)^2) - 2*e^(4*x)/(x^2*log(5)^2) + 1/(x^2*log(5
)^2) + e^(8*x)/(x^3*log(5)^2) - 2*e^(4*x)/(x^3*log(5)^2) + 1/(x^3*log(5)^2
))
```

3.1301.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 73 vs. $2(26) = 52$.

Time = 0.51 (sec) , antiderivative size = 73, normalized size of antiderivative = 2.61

$$\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}\left(-9-6x+e^{4x}(18-12x-24x^2)+e^{8x}(-9+18x+24x^2)-3x^4\log^2(5)\right)}{x^4\log^2(5)}\,dx$$
$$= 3\,e^{\left(-x+\frac{e^{(8\,x)}}{x^2\log(5)^2}-\frac{2\,e^{(4\,x)}}{x^2\log(5)^2}+\frac{1}{x^2\log(5)^2}+\frac{e^{(8\,x)}}{x^3\log(5)^2}-\frac{2\,e^{(4\,x)}}{x^3\log(5)^2}+\frac{1}{x^3\log(5)^2}\right)}$$

input
```
integrate(((24*x^2+18*x-9)*exp(4*x)^2+(-24*x^2-12*x+18)*exp(4*x)-3*x^4*log
(5)^2-6*x-9)*exp(((1+x)*exp(4*x)^2+(-2-2*x)*exp(4*x)+x+1)/x^3/log(5)^2)/x^
4/log(5)^2/exp(x),x, algorithm=\
```

output
```
3*e^(-x + e^(8*x)/(x^2*log(5)^2) - 2*e^(4*x)/(x^2*log(5)^2) + 1/(x^2*log(5
)^2) + e^(8*x)/(x^3*log(5)^2) - 2*e^(4*x)/(x^3*log(5)^2) + 1/(x^3*log(5)^2
))
```

3.1301.9 Mupad [B] (verification not implemented)

Time = 16.61 (sec) , antiderivative size = 78, normalized size of antiderivative = 2.79

$$\int \frac{e^{-x+\frac{1+e^{4x}(-2-2x)+x+e^{8x}(1+x)}{x^3\log^2(5)}}\left(-9-6x+e^{4x}(18-12x-24x^2)+e^{8x}(-9+18x+24x^2)-3x^4\log^2(5)\right)}{x^4\log^2(5)}\,dx$$
$$= 3\,\mathrm{e}^{-x}\,\mathrm{e}^{\frac{1}{x^2\ln(5)^2}}\,\mathrm{e}^{\frac{1}{x^3\ln(5)^2}}\,\mathrm{e}^{-\frac{2\,\mathrm{e}^{4\,x}}{x^2\ln(5)^2}}\,\mathrm{e}^{-\frac{2\,\mathrm{e}^{4\,x}}{x^3\ln(5)^2}}\,\mathrm{e}^{\frac{\mathrm{e}^{8\,x}}{x^2\ln(5)^2}}\,\mathrm{e}^{\frac{\mathrm{e}^{8\,x}}{x^3\ln(5)^2}}$$

input
```
int(-(exp(-x)*exp((x + exp(8*x)*(x + 1) - exp(4*x)*(2*x + 2) + 1)/(x^3*log
(5)^2))*(6*x + 3*x^4*log(5)^2 + exp(4*x)*(12*x + 24*x^2 - 18) - exp(8*x)*(
18*x + 24*x^2 - 9) + 9))/(x^4*log(5)^2),x)
```

output
```
3*exp(-x)*exp(1/(x^2*log(5)^2))*exp(1/(x^3*log(5)^2))*exp(-(2*exp(4*x))/(x
^2*log(5)^2))*exp(-(2*exp(4*x))/(x^3*log(5)^2))*exp(exp(8*x)/(x^2*log(5)^2
))*exp(exp(8*x)/(x^3*log(5)^2))
```

3.1302 $\int \frac{12+e^{1-x}(}{27+27x+9x^2+x^3+e^{1-x}(9+6x+x^2)+(-9-6x-x^2)\log(2)+(-72+e}$

3.1302.1 Optimal result

Integrand size = 180, antiderivative size = 30

$$\int \frac{12+e^{1-x}(-12-4x)+4x+(-12-4e}{27+27x+9x^2+x^3+e^{1-x}(9+6x+x^2)+(-9-6x-x^2)\log(2)+(-72+e^{1-x}(-24-8x)-48x-8} = \frac{2}{-2+\frac{3+x}{2\log(3+e^{1-x}+x-\log(2))}}$$

output
```
2/(1/2*(3+x)/ln(exp(1-x)-ln(2)+3+x)-2)
```

3.1302.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int \frac{12+e^{1-x}(-12-4x)+4x+(-12-4e}{27+27x+9x^2+x^3+e^{1-x}(9+6x+x^2)+(-9-6x-x^2)\log(2)+(-72+e^{1-x}(-24-8x)-48x-8} = \frac{3+x}{3+x-4\log(3+e^{1-x}+x-\log(2))}$$

input
```
Integrate[(12 + E^(1 - x)*(-12 - 4*x) + 4*x + (-12 - 4*E^(1 - x) - 4*x + 4
*Log[2])*Log[3 + E^(1 - x) + x - Log[2]])/(27 + 27*x + 9*x^2 + x^3 + E^(1
- x)*(9 + 6*x + x^2) + (-9 - 6*x - x^2)*Log[2] + (-72 + E^(1 - x)*(-24 - 8
*x) - 48*x - 8*x^2 + (24 + 8*x)*Log[2])*Log[3 + E^(1 - x) + x - Log[2]] +
(48 + 16*E^(1 - x) + 16*x - 16*Log[2])*Log[3 + E^(1 - x) + x - Log[2]]^2),
x]
```

output
```
(3 + x)/(3 + x - 4*Log[3 + E^(1 - x) + x - Log[2]])
```

3.1302.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{1-x}(-4x-12)+4x+\left(-4x-4e^{1-x}-12+\right.}{x^3+9x^2+e^{1-x}\left(x^2+6x+9\right)+\left(-8x^2-48x+e^{1-x}(-8x-24)+(8x+24)\log(2)-72\right)\log\left(x+e^{1-x}+3-\right.}$$

$$\Big\downarrow \text{ 7239}$$

$$\int \frac{4(e^x-e)(x+3)-4(e^x(x+3-\log(2))+e)\log\left(x+e^{1-x}+3-\log(2)\right)}{(e^x(x+3-\log(2))+e)\left(x-4\log\left(x+e^{1-x}+3-\log(2)\right)+3\right)^2}dx$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(\frac{4e(x+3)(-x-4+\log(2))}{\left(e^xx+3e^x\left(1-\frac{\log(2)}{3}\right)+e\right)(x+3-\log(2))\left(x-4\log\left(x+e^{1-x}+3-\log(2)\right)+3\right)^2}+\frac{4\Big(x+x\big(-\log\left(x+\right.}{(x}\right.$$

$$\Big\downarrow \text{ 2009}$$

$$\int \frac{1}{\left(x-4\log\left(x+e^{1-x}-\log(2)+3\right)+3\right)^2}dx-\int \frac{x}{\left(x-4\log\left(x+e^{1-x}-\log(2)+3\right)+3\right)^2}dx+16e\int \frac{1}{\left(-e^xx-3e^x\left(1-\frac{\log(2)}{3}\right)-e\right)\left(x-4\log\left(x+e^{1-x}-\log(2)+3\right)+3\right)^2}dx+4e\int \frac{x}{\left(-e^xx-3e^x\left(1-\frac{\log(2)}{3}\right)-e\right)\left(x-4\log\left(x+e^{1-x}-\log(2)+3\right)+3\right)^2}dx+4\log(2)\int \frac{1}{(x-\log(2)+3)\left(x-4\log\left(x+e^{1-x}-\log(2)+3\right)+3\right)^2}dx+4e\log(2)\int \frac{1}{\left(-e^xx-3e^x\left(1-\frac{\log(2)}{3}\right)-e\right)(x-\log(2)+3)\left(x-4\log\left(x+e^{1-x}-\log(2)+3\right)+3\right)^2}dx+\int \frac{1}{x-4\log\left(x+e^{1-x}-\log(2)+3\right)+3}dx$$

input
```
Int[(12 + E^(1 - x)*(-12 - 4*x) + 4*x + (-12 - 4*E^(1 - x) - 4*x + 4*Log[2
])*Log[3 + E^(1 - x) + x - Log[2]])/(27 + 27*x + 9*x^2 + x^3 + E^(1 - x)*(
9 + 6*x + x^2) + (-9 - 6*x - x^2)*Log[2] + (-72 + E^(1 - x)*(-24 - 8*x) -
48*x - 8*x^2 + (24 + 8*x)*Log[2])*Log[3 + E^(1 - x) + x - Log[2]] + (48 +
16*E^(1 - x) + 16*x - 16*Log[2])*Log[3 + E^(1 - x) + x - Log[2]]^2),x]
```

3.1302.

$$\int \frac{12+e^{1-x}(-12-4x)+4x+\left(-12-4e^{1-x}-4x+4\log(2)\right)\log\left(3+e^{1-x}+x-\log(2)\right)}{27+27x+9x^2+x^3+e^{1-x}\left(9+6x+x^2\right)+\left(-9-6x-x^2\right)\log(2)+\left(-72+e^{1-x}(-24-8x)-48x-8x^2+(24+8x)\log(2)\right)\log\left(3+e^{1-x}+x-\log(2)\right)+\left(48+16e\right.}$$

output
```
$Aborted
```

3.1302.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1302.4 Maple [A] (verified)

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

method	result	size
risch	$\frac{3+x}{x-4\ln\left(\mathrm{e}^{1-x}-\ln\left(2\right)+3+x\right)+3}$	26
parallelrisch	$\frac{4x+12}{4x-16\ln\left(\mathrm{e}^{1-x}-\ln\left(2\right)+3+x\right)+12}$	29

input
```
int(((-4*exp(1-x)+4*ln(2)-4*x-12)*ln(exp(1-x)-ln(2)+3+x)+(-4*x-12)*exp(1-x
)+4*x+12)/((16*exp(1-x)-16*ln(2)+16*x+48)*ln(exp(1-x)-ln(2)+3+x)^2+((-8*x-
24)*exp(1-x)+(8*x+24)*ln(2)-8*x^2-48*x-72)*ln(exp(1-x)-ln(2)+3+x)+(x^2+6*x
+9)*exp(1-x)+(-x^2-6*x-9)*ln(2)+x^3+9*x^2+27*x+27),x,method=_RETURNVERBOSE
)
```

output
```
(3+x)/(x-4*ln(exp(1-x)-ln(2)+3+x)+3)
```

3.1302.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.83

$$\int \frac{12 + e^{1-x}(-12-4x) + 4x + (-12-4e}{27 + 27x + 9x^2 + x^3 + e^{1-x}(9 + 6x + x^2) + (-9 - 6x - x^2)\log(2) + (-72 + e^{1-x}(-24 - 8x) - 48x - 8} = \frac{x+3}{x - 4\log\left(x + e^{(-x+1)} - \log(2) + 3\right) + 3}$$

input
```
integrate(((-4*exp(1-x)+4*log(2)-4*x-12)*log(exp(1-x)-log(2)+3+x)+(-4*x-12
)*exp(1-x)+4*x+12)/((16*exp(1-x)-16*log(2)+16*x+48)*log(exp(1-x)-log(2)+3+
x)^2+((-8*x-24)*exp(1-x)+(8*x+24)*log(2)-8*x^2-48*x-72)*log(exp(1-x)-log(2
)+3+x)+(x^2+6*x+9)*exp(1-x)+(-x^2-6*x-9)*log(2)+x^3+9*x^2+27*x+27),x, algo
rithm=\
```

output
```
(x + 3)/(x - 4*log(x + e^(-x + 1) - log(2) + 3) + 3)
```

3.1302.6 Sympy [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.73

$$\int \frac{12 + e^{1-x}(-12-4x) + 4x + (-12-4e}{27 + 27x + 9x^2 + x^3 + e^{1-x}(9 + 6x + x^2) + (-9 - 6x - x^2)\log(2) + (-72 + e^{1-x}(-24 - 8x) - 48x - 8} = \frac{-x-3}{-x + 4\log\left(x + e^{1-x} - \log(2) + 3\right) - 3}$$

input
```
integrate(((-4*exp(1-x)+4*ln(2)-4*x-12)*ln(exp(1-x)-ln(2)+3+x)+(-4*x-12)*e
xp(1-x)+4*x+12)/((16*exp(1-x)-16*ln(2)+16*x+48)*ln(exp(1-x)-ln(2)+3+x)**2+
((-8*x-24)*exp(1-x)+(8*x+24)*ln(2)-8*x**2-48*x-72)*ln(exp(1-x)-ln(2)+3+x)+
(x**2+6*x+9)*exp(1-x)+(-x**2-6*x-9)*ln(2)+x**3+9*x**2+27*x+27),x)
```

output
```
(-x - 3)/(-x + 4*log(x + exp(1 - x) - log(2) + 3) - 3)
```

3.1302.7 Maxima [A] (verification not implemented)

Time = 0.46 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.90

$$\int \frac{12+e^{1-x}(-12-4x)+4x+(-12-4e}{27+27x+9x^2+x^3+e^{1-x}\left(9+6x+x^2\right)+\left(-9-6x-x^2\right)\log(2)+\left(-72+e^{1-x}(-24-8x)-48x-8\right.}$$
$$=\frac{x+3}{5\,x-4\,\log\left((x-\log\left(2\right)+3)e^{x}+e\right)+3}$$

input
```
integrate((((-4*exp(1-x)+4*log(2)-4*x-12)*log(exp(1-x)-log(2)+3+x)+(-4*x-12
)*exp(1-x)+4*x+12)/((16*exp(1-x)-16*log(2)+16*x+48)*log(exp(1-x)-log(2)+3+
x)^2+((-8*x-24)*exp(1-x)+(8*x+24)*log(2)-8*x^2-48*x-72)*log(exp(1-x)-log(2
)+3+x)+(x^2+6*x+9)*exp(1-x)+(-x^2-6*x-9)*log(2)+x^3+9*x^2+27*x+27),x, algo
rithm=\
```

output
```
(x + 3)/(5*x - 4*log((x - log(2) + 3)*e^x + e) + 3)
```

3.1302.8 Giac [A] (verification not implemented)

Time = 0.60 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.83

$$\int \frac{12+e^{1-x}(-12-4x)+4x+(-12-4e}{27+27x+9x^2+x^3+e^{1-x}\left(9+6x+x^2\right)+\left(-9-6x-x^2\right)\log(2)+\left(-72+e^{1-x}(-24-8x)-48x-8\right.}$$
$$=\frac{x+3}{x-4\,\log\left(x+e^{(-x+1)}-\log\left(2\right)+3\right)+3}$$

input
```
integrate((((-4*exp(1-x)+4*log(2)-4*x-12)*log(exp(1-x)-log(2)+3+x)+(-4*x-12
)*exp(1-x)+4*x+12)/((16*exp(1-x)-16*log(2)+16*x+48)*log(exp(1-x)-log(2)+3+
x)^2+((-8*x-24)*exp(1-x)+(8*x+24)*log(2)-8*x^2-48*x-72)*log(exp(1-x)-log(2
)+3+x)+(x^2+6*x+9)*exp(1-x)+(-x^2-6*x-9)*log(2)+x^3+9*x^2+27*x+27),x, algo
rithm=\
```

output
```
(x + 3)/(x - 4*log(x + e^(-x + 1) - log(2) + 3) + 3)
```

3.1302.9 Mupad [F(-1)]

Timed out.

$$\int \frac{12 + e^{1-x}(-12 - 4x) + 4x + (-12 - 4e}{27 + 27x + 9x^2 + x^3 + e^{1-x}(9 + 6x + x^2) + (-9 - 6x - x^2)\log(2) + (-72 + e^{1-x}(-24 - 8x) - 48x - 8}$$
$= \text{Hanged}$

input
```
int((4*x - log(x - log(2) + exp(1 - x) + 3)*(4*x - 4*log(2) + 4*exp(1 - x)
 + 12) - exp(1 - x)*(4*x + 12) + 12)/(27*x + exp(1 - x)*(6*x + x^2 + 9) +
log(x - log(2) + exp(1 - x) + 3)^2*(16*x - 16*log(2) + 16*exp(1 - x) + 48)
 - log(x - log(2) + exp(1 - x) + 3)*(48*x - log(2)*(8*x + 24) + exp(1 - x)
*(8*x + 24) + 8*x^2 + 72) + 9*x^2 + x^3 - log(2)*(6*x + x^2 + 9) + 27),x)
```

output
```
\text{Hanged}
```

3.1303 $\int \frac{2x^2-3x^3-6x^6+e^{\frac{5}{x^2}}(-10+2x^2)}{x} dx$

3.1303.1 Optimal result

Integrand size = 35, antiderivative size = 21

$$\int \frac{2x^2-3x^3-6x^6+e^{\frac{5}{x^2}}(-10+2x^2)}{x} dx = x^2\left(1+e^{\frac{5}{x^2}}-x-x^4\right)$$

output
```
x^2*(1+exp(5/x^2)-x^4-x)
```

3.1303.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

$$\int \frac{2x^2-3x^3-6x^6+e^{\frac{5}{x^2}}(-10+2x^2)}{x} dx = x^2+e^{\frac{5}{x^2}}x^2-x^3-x^6$$

input
```
Integrate[(2*x^2 - 3*x^3 - 6*x^6 + E^(5/x^2)*(-10 + 2*x^2))/x,x]
```

output
```
x^2 + E^(5/x^2)*x^2 - x^3 - x^6
```

3.1303.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.057$, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-6x^6-3x^3+2x^2+e^{\frac{5}{x^2}}\left(2x^2-10\right)}{x}dx$$

$$\Big\downarrow \text{2010}$$

$$\int \left(\frac{2e^{\frac{5}{x^2}}\left(x^2-5\right)}{x}-x\left(6x^4+3x-2\right)\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-x^6-x^3+e^{\frac{5}{x^2}}x^2+x^2$$

input
```
Int[(2*x^2 - 3*x^3 - 6*x^6 + E^(5/x^2)*(-10 + 2*x^2))/x,x]
```

output
```
x^2 + E^(5/x^2)*x^2 - x^3 - x^6
```

3.1303.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1303.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

method	result	size
derivativedivides	$x^2+e^{\frac{5}{x^2}}x^2-x^3-x^6$	25
default	$x^2+e^{\frac{5}{x^2}}x^2-x^3-x^6$	25
norman	$x^2+e^{\frac{5}{x^2}}x^2-x^3-x^6$	25
risch	$x^2+e^{\frac{5}{x^2}}x^2-x^3-x^6$	25
parallelrisch	$x^2+e^{\frac{5}{x^2}}x^2-x^3-x^6$	25
parts	$x^2+e^{\frac{5}{x^2}}x^2-x^3-x^6$	25

input
```
int(((2*x^2-10)*exp(5/x^2)-6*x^6-3*x^3+2*x^2)/x,x,method=_RETURNVERBOSE)
```

output
```
-x^6-x^3+x^2+exp(1/x^2)^5*x^2
```

3.1303.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{2x^2-3x^3-6x^6+e^{\frac{5}{x^2}}(-10+2x^2)}{x}\,dx = -x^6-x^3+x^2e^{\left(\frac{5}{x^2}\right)}+x^2$$

input
```
integrate(((2*x^2-10)*exp(5/x^2)-6*x^6-3*x^3+2*x^2)/x,x, algorithm=\
```

output
```
-x^6 - x^3 + x^2*e^(5/x^2) + x^2
```

3.1303.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{2x^2-3x^3-6x^6+e^{\frac{5}{x^2}}(-10+2x^2)}{x}\,dx = -x^6-x^3+x^2e^{\frac{5}{x^2}}+x^2$$

input
```
integrate(((2*x**2-10)*exp(5/x**2)-6*x**6-3*x**3+2*x**2)/x,x)
```

output
```
-x**6 - x**3 + x**2*exp(5/x**2) + x**2
```

3.1303.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.24 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.48

$$\int \frac{2x^2-3x^3-6x^6+e^{\frac{5}{x^2}}(-10+2x^2)}{x}\,dx = -x^6-x^3+x^2+5\,\mathrm{Ei}\left(\frac{5}{x^2}\right)-5\,\Gamma\left(-1,-\frac{5}{x^2}\right)$$

input
```
integrate(((2*x^2-10)*exp(5/x^2)-6*x^6-3*x^3+2*x^2)/x,x, algorithm=\
```

output
```
-x^6 - x^3 + x^2 + 5*Ei(5/x^2) - 5*gamma(-1, -5/x^2)
```

3.1303.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.14

$$\int \frac{2x^2-3x^3-6x^6+e^{\frac{5}{x^2}}(-10+2x^2)}{x}\,dx = -x^6-x^3+x^2e^{\left(\frac{5}{x^2}\right)}+x^2$$

input
```
integrate(((2*x^2-10)*exp(5/x^2)-6*x^6-3*x^3+2*x^2)/x,x, algorithm=\
```

output
```
-x^6 - x^3 + x^2*e^(5/x^2) + x^2
```

3.1303.9 Mupad [B] (verification not implemented)

Time = 18.88 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{2x^2-3x^3-6x^6+e^{\frac{5}{x^2}}(-10+2x^2)}{x}\,dx = -x^2\left(x-\mathrm{e}^{\frac{5}{x^2}}+x^4-1\right)$$

input
```
int((exp(5/x^2)*(2*x^2 - 10) + 2*x^2 - 3*x^3 - 6*x^6)/x,x)
```

output
```
-x^2*(x - exp(5/x^2) + x^4 - 1)
```

3.1304 $\int \frac{-2x^7+8x^7\log(x)+\left(1-2e^{-7+x^2}x\right)\log^3(x)}{\log^3(x)}\,dx$

3.1304.1 Optimal result

Integrand size = 35, antiderivative size = 19

$$\int \frac{-2x^7+8x^7\log(x)+\left(1-2e^{-7+x^2}x\right)\log^3(x)}{\log^3(x)}\,dx=-e^{-7+x^2}+x+\frac{x^8}{\log^2(x)}$$

output
```
x+x^8/ln(x)^2-exp(x^2-7)
```

3.1304.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

$$\int \frac{-2x^7+8x^7\log(x)+\left(1-2e^{-7+x^2}x\right)\log^3(x)}{\log^3(x)}\,dx=-e^{-7+x^2}+x+\frac{x^8}{\log^2(x)}$$

input
```
Integrate[(-2*x^7 + 8*x^7*Log[x] + (1 - 2*E^(-7 + x^2)*x)*Log[x]^3)/Log[x]
^3,x]
```

output
```
-E^(-7 + x^2) + x + x^8/Log[x]^2
```

3.1304.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.057, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-2x^7+8x^7\log(x)+\left(1-2e^{x^2-7}x\right)\log^3(x)}{\log^3(x)}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{-2x^7+8x^7\log(x)+\log^3(x)}{\log^3(x)}-2e^{x^2-7}x\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{x^8}{\log^2(x)}-e^{x^2-7}+x$$

input
```
Int[(-2*x^7 + 8*x^7*Log[x] + (1 - 2*E^(-7 + x^2)*x)*Log[x]^3)/Log[x]^3,x]
```

output
```
-E^(-7 + x^2) + x + x^8/Log[x]^2
```

3.1304.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1304.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

method	result	size
default	$x+\frac{x^{8}}{\ln \left(x \right)^{2}}-{\mathrm e}^{x^{2}-7}$	19
risch	$x+\frac{x^{8}}{\ln \left(x \right)^{2}}-{\mathrm e}^{x^{2}-7}$	19
parts	$x+\frac{x^{8}}{\ln \left(x \right)^{2}}-{\mathrm e}^{x^{2}-7}$	19
parallelrisch	$-\frac{-x^{8}+{\mathrm e}^{x^{2}-7} \ln \left(x \right)^{2}-x \ln \left(x \right)^{2}}{\ln \left(x \right)^{2}}$	31

input
```
int(((-2*x*exp(x^2-7)+1)*ln(x)^3+8*x^7*ln(x)-2*x^7)/ln(x)^3,x,method=_RETU
RNVERBOSE)
```

output
```
x+x^8/ln(x)^2-exp(x^2-7)
```

3.1304.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.26

$$\int \frac{-2x^7+8x^7\log(x)+\left(1-2e^{-7+x^2}x\right)\log^3(x)}{\log^3(x)}\,dx=\frac{x^{8}+\left(x-e^{\left(x^{2}-7\right)}\right)\log\left(x\right)^{2}}{\log\left(x\right)^{2}}$$

input
```
integrate(((-2*x*exp(x^2-7)+1)*log(x)^3+8*x^7*log(x)-2*x^7)/log(x)^3,x, al
gorithm=\
```

output
```
(x^8 + (x - e^(x^2 - 7))*log(x)^2)/log(x)^2
```

3.1304.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{-2x^7+8x^7\log(x)+\left(1-2e^{-7+x^2}x\right)\log^3(x)}{\log^3(x)}\,dx=\frac{x^{8}}{\log\left(x\right)^{2}}+x-e^{x^{2}-7}$$

input
```
integrate(((-2*x*exp(x**2-7)+1)*ln(x)**3+8*x**7*ln(x)-2*x**7)/ln(x)**3,x)
```

output
```
x**8/log(x)**2 + x - exp(x**2 - 7)
```

3.1304.7 Maxima [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 3.

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.37

$$\int \frac{-2x^7 + 8x^7 \log(x) + \left(1 - 2e^{-7+x^2}x\right)\log^3(x)}{\log^3(x)}\,dx$$
$$= x - e^{(x^2-7)} + 64\,\Gamma(-1, -8\,\log(x)) + 128\,\Gamma(-2, -8\,\log(x))$$

input
```
integrate(((-2*x*exp(x^2-7)+1)*log(x)^3+8*x^7*log(x)-2*x^7)/log(x)^3,x, al
gorithm=\
```

output
```
x - e^(x^2 - 7) + 64*gamma(-1, -8*log(x)) + 128*gamma(-2, -8*log(x))
```

3.1304.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.68

$$\int \frac{-2x^7 + 8x^7 \log(x) + \left(1 - 2e^{-7+x^2}x\right)\log^3(x)}{\log^3(x)}\,dx$$
$$= \frac{\left(x^8e^7 + xe^7\log(x)^2 - e^{(x^2)}\log(x)^2\right)e^{(-7)}}{\log(x)^2}$$

input
```
integrate(((-2*x*exp(x^2-7)+1)*log(x)^3+8*x^7*log(x)-2*x^7)/log(x)^3,x, al
gorithm=\
```

output
```
(x^8*e^7 + x*e^7*log(x)^2 - e^(x^2)*log(x)^2)*e^(-7)/log(x)^2
```

3.1304.9 Mupad [B] (verification not implemented)

Time = 18.96 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.95

$$\int \frac{-2x^7+8x^7\log(x)+\left(1-2e^{-7+x^2}x\right)\log^3(x)}{\log^3(x)}\,dx = x-\mathrm{e}^{x^2-7}+\frac{x^8}{\ln\left(x\right)^2}$$

input
```
int(-(log(x)^3*(2*x*exp(x^2 - 7) - 1) - 8*x^7*log(x) + 2*x^7)/log(x)^3,x)
```

output
```
x - exp(x^2 - 7) + x^8/log(x)^2
```

3.1305 $\int \frac{400x+800x^2-432x^3+48x^4+e^x(-400+160x-16x^2}{25x^4+70x^5+29x^6-28x^7+4x^8+e^{2x}(100-40x+4x^2)+e^x(-100x^2-1}$

3.1305.1 Optimal result

Integrand size = 103, antiderivative size = 32

$$\int \frac{400x+800x^2-432x^3+48x^4+e^x(-400+160x-16x^2)}{25x^4+70x^5+29x^6-28x^7+4x^8+e^{2x}(100-40x+4x^2)+e^x(-100x^2-120x^3+68x^4-8x^5)}\,dx = \frac{4}{e^x-\frac{x^2}{2}+x^2\left(-x+\frac{x}{5-x}\right)}$$

output
```
4/(exp(x)+(x/(5-x)-x)*x^2-1/2*x^2)
```

3.1305.2 Mathematica [A] (verified)

Time = 3.31 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94

$$\int \frac{400x+800x^2-432x^3+48x^4+e^x(-400+160x-16x^2)}{25x^4+70x^5+29x^6-28x^7+4x^8+e^{2x}(100-40x+4x^2)+e^x(-100x^2-120x^3+68x^4-8x^5)}\,dx = -\frac{8(-5+x)}{-2e^x(-5+x)+x^2(-5-7x+2x^2)}$$

input
```
Integrate[(400*x + 800*x^2 - 432*x^3 + 48*x^4 + E^x*(-400 + 160*x - 16*x^2
))/(25*x^4 + 70*x^5 + 29*x^6 - 28*x^7 + 4*x^8 + E^(2*x)*(100 - 40*x + 4*x^
2) + E^x*(-100*x^2 - 120*x^3 + 68*x^4 - 8*x^5)),x]
```

output
```
(-8*(-5 + x))/(-2*E^x*(-5 + x) + x^2*(-5 - 7*x + 2*x^2))
```

3.1305.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{48x^4-432x^3+800x^2+e^x(-16x^2+160x-400)+400x}{4x^8-28x^7+29x^6+70x^5+25x^4+e^{2x}(4x^2-40x+100)+e^x(-8x^5+68x^4-120x^3-100x^2)}dx$$
$$\Big\downarrow \text{7239}$$
$$\int \frac{16x(3x^3-27x^2+50x+25)-16e^x(x-5)^2}{((-2x^2+7x+5)x^2+2e^x(x-5))^2}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{8(x-5)}{2x^4-7x^3-5x^2-2e^xx+10e^x}-\frac{8x(2x^4-23x^3+84x^2-75x-50)}{(2x^4-7x^3-5x^2-2e^xx+10e^x)^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$40\int \frac{1}{-2x^4+7x^3+5x^2+2e^xx-10e^x}dx+400\int \frac{x}{(2x^4-7x^3-5x^2-2e^xx+10e^x)^2}dx+600\int \frac{x^2}{(2x^4-7x^3-5x^2-2e^xx+10e^x)^2}dx-672\int \frac{x^3}{(2x^4-7x^3-5x^2-2e^xx+10e^x)^2}dx+184\int \frac{x^4}{(2x^4-7x^3-5x^2-2e^xx+10e^x)^2}dx+8\int \frac{x}{2x^4-7x^3-5x^2-2e^xx+10e^x}dx-16\int \frac{x^5}{(2x^4-7x^3-5x^2-2e^xx+10e^x)^2}dx$$

input
```
Int[(400*x + 800*x^2 - 432*x^3 + 48*x^4 + E^x*(-400 + 160*x - 16*x^2))/(25
*x^4 + 70*x^5 + 29*x^6 - 28*x^7 + 4*x^8 + E^(2*x)*(100 - 40*x + 4*x^2) + E
^x*(-100*x^2 - 120*x^3 + 68*x^4 - 8*x^5)),x]
```

output
```
$Aborted
```

3.1305.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1305.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.03

method	result	size
risch	$-\frac{8(-5+x)}{2x^4-7x^3-5x^2-2\,e^x x+10\,e^x}$	33
norman	$\frac{40-8x}{2x^4-7x^3-5x^2-2\,e^x x+10\,e^x}$	34
parallelrisch	$-\frac{16x-80}{2(2x^4-7x^3-5x^2-2\,e^x x+10\,e^x)}$	35

input
```
int(((-16*x^2+160*x-400)*exp(x)+48*x^4-432*x^3+800*x^2+400*x)/((4*x^2-40*x
+100)*exp(x)^2+(-8*x^5+68*x^4-120*x^3-100*x^2)*exp(x)+4*x^8-28*x^7+29*x^6+
70*x^5+25*x^4),x,method=_RETURNVERBOSE)
```

output
```
-8*(-5+x)/(2*x^4-7*x^3-5*x^2-2*exp(x)*x+10*exp(x))
```

3.1305.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94

$$\int \frac{400x+800x^2-432x^3+48x^4+e^x(-400+160x-16x^2)}{25x^4+70x^5+29x^6-28x^7+4x^8+e^{2x}(100-40x+4x^2)+e^x(-100x^2-120x^3+68x^4-8x^5)}\,dx$$
$$= -\frac{8\,(x-5)}{2\,x^4-7\,x^3-5\,x^2-2\,(x-5)e^x}$$

input
```
integrate(((-16*x^2+160*x-400)*exp(x)+48*x^4-432*x^3+800*x^2+400*x)/((4*x^
2-40*x+100)*exp(x)^2+(-8*x^5+68*x^4-120*x^3-100*x^2)*exp(x)+4*x^8-28*x^7+2
9*x^6+70*x^5+25*x^4),x, algorithm=\
```

output
```
-8*(x - 5)/(2*x^4 - 7*x^3 - 5*x^2 - 2*(x - 5)*e^x)
```

3.1305.6 Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.84

$$\int \frac{400x+800x^2-432x^3+48x^4+e^x(-400+160x-16x^2)}{25x^4+70x^5+29x^6-28x^7+4x^8+e^{2x}(100-40x+4x^2)+e^x(-100x^2-120x^3+68x^4-8x^5)}\,dx = \frac{8x-40}{-2x^4+7x^3+5x^2+(2x-10)e^x}$$

input
```
integrate(((-16*x**2+160*x-400)*exp(x)+48*x**4-432*x**3+800*x**2+400*x)/((
4*x**2-40*x+100)*exp(x)**2+(-8*x**5+68*x**4-120*x**3-100*x**2)*exp(x)+4*x*
*8-28*x**7+29*x**6+70*x**5+25*x**4),x)
```

output
```
(8*x - 40)/(-2*x**4 + 7*x**3 + 5*x**2 + (2*x - 10)*exp(x))
```

3.1305.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94

$$\int \frac{400x+800x^2-432x^3+48x^4+e^x(-400+160x-16x^2)}{25x^4+70x^5+29x^6-28x^7+4x^8+e^{2x}(100-40x+4x^2)+e^x(-100x^2-120x^3+68x^4-8x^5)}\,dx = -\frac{8(x-5)}{2x^4-7x^3-5x^2-2(x-5)e^x}$$

input
```
integrate(((-16*x^2+160*x-400)*exp(x)+48*x^4-432*x^3+800*x^2+400*x)/((4*x^
2-40*x+100)*exp(x)^2+(-8*x^5+68*x^4-120*x^3-100*x^2)*exp(x)+4*x^8-28*x^7+2
9*x^6+70*x^5+25*x^4),x, algorithm=\
```

output
```
-8*(x - 5)/(2*x^4 - 7*x^3 - 5*x^2 - 2*(x - 5)*e^x)
```

3.1305.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

$$\int \frac{400x+800x^2-432x^3+48x^4+e^x(-400+160x-16x^2)}{25x^4+70x^5+29x^6-28x^7+4x^8+e^{2x}(100-40x+4x^2)+e^x(-100x^2-120x^3+68x^4-8x^5)}\,dx$$
$$= -\frac{8\,(x-5)}{2\,x^4-7\,x^3-5\,x^2-2\,xe^x+10\,e^x}$$

input
```
integrate(((-16*x^2+160*x-400)*exp(x)+48*x^4-432*x^3+800*x^2+400*x)/((4*x^
2-40*x+100)*exp(x)^2+(-8*x^5+68*x^4-120*x^3-100*x^2)*exp(x)+4*x^8-28*x^7+2
9*x^6+70*x^5+25*x^4),x, algorithm=\
```

output
```
-8*(x - 5)/(2*x^4 - 7*x^3 - 5*x^2 - 2*x*e^x + 10*e^x)
```

3.1305.9 Mupad [F(-1)]

Timed out.

$$\int \frac{400x+800x^2-432x^3+48x^4+e^x(-400+160x-16x^2)}{25x^4+70x^5+29x^6-28x^7+4x^8+e^{2x}(100-40x+4x^2)+e^x(-100x^2-120x^3+68x^4-8x^5)}\,dx$$
$$= \int \frac{400\,x-e^x\,(16\,x^2-160\,x+400)+800\,x^2-432\,x^3+48\,x^4}{e^{2\,x}\,(4\,x^2-40\,x+100)-e^x\,(8\,x^5-68\,x^4+120\,x^3+100\,x^2)+25\,x^4+70\,x^5+29\,x^6-28\,x^7+4\,x^8}\,dx$$

input
```
int((400*x - exp(x)*(16*x^2 - 160*x + 400) + 800*x^2 - 432*x^3 + 48*x^4)/(
exp(2*x)*(4*x^2 - 40*x + 100) - exp(x)*(100*x^2 + 120*x^3 - 68*x^4 + 8*x^5
) + 25*x^4 + 70*x^5 + 29*x^6 - 28*x^7 + 4*x^8),x)
```

output
```
int((400*x - exp(x)*(16*x^2 - 160*x + 400) + 800*x^2 - 432*x^3 + 48*x^4)/(
exp(2*x)*(4*x^2 - 40*x + 100) - exp(x)*(100*x^2 + 120*x^3 - 68*x^4 + 8*x^5
) + 25*x^4 + 70*x^5 + 29*x^6 - 28*x^7 + 4*x^8), x)
```

3.1306 $\int \frac{1}{4}e^{e^x}\left(-10+40x-20e^{2x}x+e^{\log^2(5)}(5+5e^x x)+\right.$

3.1306.1 Optimal result

Integrand size = 51, antiderivative size = 29

$$\int \frac{1}{4}e^{e^x}\left(-10+40x-20e^{2x}x+e^{\log^2(5)}(5+5e^x x)+e^x\left(-20-30x+20x^2\right)\right)\,dx$$
$$=-3+5e^{e^x}x\left(-e^x+\frac{1}{4}\left(-2+e^{\log^2(5)}\right)+x\right)$$

output
```
5*(x-1/2+1/4*exp(ln(5)^2)-exp(x))*x*exp(exp(x))-3
```

3.1306.2 Mathematica [A] (verified)

Time = 1.83 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{1}{4}e^{e^x}\left(-10+40x-20e^{2x}x+e^{\log^2(5)}(5+5e^x x)+e^x\left(-20-30x+20x^2\right)\right)\,dx$$
$$=\frac{5}{4}e^{e^x}x\left(-2-4e^x+e^{\log^2(5)}+4x\right)$$

input
```
Integrate[(E^E^x*(-10 + 40*x - 20*E^(2*x)*x + E^Log[5]^2*(5 + 5*E^x*x) + E
^x*(-20 - 30*x + 20*x^2)))/4,x]
```

output
```
(5*E^E^x*x*(-2 - 4*E^x + E^Log[5]^2 + 4*x))/4
```

3.1306.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4} e^{e^x} \left(e^x \left(20 x^2-30 x-20\right)-20 e^{2 x} x+40 x+\left(5 e^x x+5\right) e^{\log ^2(5)}-10\right) \, dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{4} \int -5 e^{e^x} \left(4 e^{2 x} x-8 x-e^{\log ^2(5)} \left(e^x x+1\right)+2 e^x \left(-2 x^2+3 x+2\right)+2\right) \, dx$$

$$\Big\downarrow \ 27$$

$$-\frac{5}{4} \int e^{e^x} \left(4 e^{2 x} x-8 x-e^{\log ^2(5)} \left(e^x x+1\right)+2 e^x \left(-2 x^2+3 x+2\right)+2\right) \, dx$$

$$\Big\downarrow \ 7293$$

$$-\frac{5}{4} \int \left(-8 e^{e^x} x+4 e^{2 x+e^x} x+2 e^{e^x}-e^{e^x+\log ^2(5)} \left(e^x x+1\right)-2 e^{x+e^x} \left(2 x^2-3 x-2\right)\right) \, dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{5}{4} \left(-4 \int e^{x+e^x} x^2 dx-8 \int e^{e^x} x dx+6 \int e^{x+e^x} x dx+4 \int e^{2 x+e^x} x dx+2 \text{ExpIntegralEi}\left(e^x\right)+4 e^{e^x}+x \left(-e^{e^x+\text{lo}}\right.\right.$$

input
```
Int[(E^E^x*(-10 + 40*x - 20*E^(2*x)*x + E^Log[5]^2*(5 + 5*E^x*x) + E^x*(-2
0 - 30*x + 20*x^2)))/4,x]
```

output
```
$Aborted
```

3.1306.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1306.4 Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

method	result	size
risch	$\frac{\left(5\,{\mathrm e}^{\ln\left(5\right)^{2}} x+20 x^{2}-20\,{\mathrm e}^{x} x-10 x\right) {\mathrm e}^{{\mathrm e}^{x}}}{4}$	28
norman	$\left(\frac{5\,{\mathrm e}^{\ln\left(5\right)^{2}}}{4}-\frac{5}{2}\right) x\,{\mathrm e}^{{\mathrm e}^{x}}+5\,{\mathrm e}^{{\mathrm e}^{x}} x^{2}-5 x\,{\mathrm e}^{x} {\mathrm e}^{{\mathrm e}^{x}}$	32
parallelrisch	$\frac{5 x\,{\mathrm e}^{{\mathrm e}^{x}} {\mathrm e}^{\ln\left(5\right)^{2}}}{4}+5\,{\mathrm e}^{{\mathrm e}^{x}} x^{2}-5 x\,{\mathrm e}^{x} {\mathrm e}^{{\mathrm e}^{x}}-\frac{5 x\,{\mathrm e}^{{\mathrm e}^{x}}}{2}$	35

input
```
int(1/4*((5*exp(x)*x+5)*exp(ln(5)^2)-20*x*exp(x)^2+(20*x^2-30*x-20)*exp(x)
+40*x-10)*exp(exp(x)),x,method=_RETURNVERBOSE)
```

output
```
1/4*(5*exp(ln(5)^2)*x+20*x^2-20*exp(x)*x-10*x)*exp(exp(x))
```

3.1306.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{1}{4}e^{e^x}\left(-10+40x-20e^{2x}x+e^{\log^2(5)}(5+5e^x x)+e^x\left(-20-30x+20x^2\right)\right)\,dx$$
$$=\frac{5}{4}\left(4\,x^2+xe^{\left(\log(5)^2\right)}-4\,xe^x-2\,x\right)e^{\left(e^x\right)}$$

input
```
integrate(1/4*((5*exp(x)*x+5)*exp(log(5)^2)-20*x*exp(x)^2+(20*x^2-30*x-20)
*exp(x)+40*x-10)*exp(exp(x)),x, algorithm=\
```

output
```
5/4*(4*x^2 + x*e^(log(5)^2) - 4*x*e^x - 2*x)*e^(e^x)
```

3.1306.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{1}{4}e^{e^x}\left(-10+40x-20e^{2x}x+e^{\log^2(5)}(5+5e^x x)+e^x\left(-20-30x+20x^2\right)\right)\,dx$$
$$=\frac{\left(20x^2-20xe^x-10x+5xe^{\log{(5)}^2}\right)e^{e^x}}{4}$$

input
```
integrate(1/4*((5*exp(x)*x+5)*exp(ln(5)**2)-20*x*exp(x)**2+(20*x**2-30*x-2
0)*exp(x)+40*x-10)*exp(exp(x)),x)
```

output
```
(20*x**2 - 20*x*exp(x) - 10*x + 5*x*exp(log(5)**2))*exp(exp(x))/4
```

3.1306.7 Maxima [F]

$$\int \frac{1}{4}e^{e^x}\left(-10+40x-20e^{2x}x+e^{\log^2(5)}(5+5e^x x)+e^x\left(-20-30x+20x^2\right)\right)\,dx$$
$$=\int \frac{5}{4}\left((xe^x+1)e^{\left(\log(5)^2\right)}-4\,xe^{(2\,x)}+2\left(2\,x^2-3\,x-2\right)e^x+8\,x-2\right)e^{(e^x)}\,dx$$

input
```
integrate(1/4*((5*exp(x)*x+5)*exp(log(5)^2)-20*x*exp(x)^2+(20*x^2-30*x-20)
*exp(x)+40*x-10)*exp(exp(x)),x, algorithm=\
```

output
```
5/4*(4*x^2 + x*(e^(log(5)^2) - 2) - 4*x*e^x)*e^(e^x) - 5/2*Ei(e^x) + 5/2*i
ntegrate(e^(e^x), x)
```

3.1306.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 46 vs. $2(22) = 44$.

Time = 0.26 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.59

$$\int \frac{1}{4}e^{e^x}\left(-10+40x-20e^{2x}x+e^{\log^2(5)}(5+5e^x x)+e^x\left(-20-30x+20x^2\right)\right)\,dx$$
$$=\frac{5}{4}\left(4\,x^2e^{(x+e^x)}+xe^{\left(\log(5)^2+x+e^x\right)}-4\,xe^{(2\,x+e^x)}-2\,xe^{(x+e^x)}\right)e^{(-x)}$$

input
```
integrate(1/4*((5*exp(x)*x+5)*exp(log(5)^2)-20*x*exp(x)^2+(20*x^2-30*x-20)
*exp(x)+40*x-10)*exp(exp(x)),x, algorithm=\
```

output
```
5/4*(4*x^2*e^(x + e^x) + x*e^(log(5)^2 + x + e^x) - 4*x*e^(2*x + e^x) - 2*
x*e^(x + e^x))*e^(-x)
```

3.1306.9 Mupad [B] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.69

$$\int \frac{1}{4}e^{e^x}\left(-10+40x-20e^{2x}x+e^{\log^2(5)}(5+5e^xx)+e^x\left(-20-30x+20x^2\right)\right)\,dx$$
$$=\frac{5\,x\,e^{e^x}\,\left(4\,x+e^{\ln(5)^2}-4\,e^x-2\right)}{4}$$

input
```
int(-(exp(exp(x))*(20*x*exp(2*x) - 40*x - exp(log(5)^2)*(5*x*exp(x) + 5) +
 exp(x)*(30*x - 20*x^2 + 20) + 10))/4,x)
```

output
```
(5*x*exp(exp(x))*(4*x + exp(log(5)^2) - 4*exp(x) - 2))/4
```

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$$\int \frac{e^{\frac{e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right)}{x}-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(180+119x-9x\right.}{81x^3+90x^4+25}$$

3.1307.1 Optimal result

Integrand size = 174, antiderivative size = 28

$$\int \frac{e^{\frac{e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right)}{x}-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(180+119x-9x^2+65x^3+25x^4+e^{\frac{20-9x^2-5x^3}{9x+5x^2}}(162x^3+180x^4\right.}{81x^3+90x^4+25x^5}$$

$$= e^{\frac{e^{x-\frac{5}{x+\frac{5}{4}x(1+x)}}}{x}+2x}$$

output
```
exp(1/x/exp(5/(5/4*(1+x)*x+x)-x)+2*x)
```

3.1307.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.14

$$\int \frac{e^{\frac{e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right)}{x}-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(180+119x-9x^2+65x^3+25x^4+e^{\frac{20-9x^2-5x^3}{9x+5x^2}}(162x^3+180x^4\right.}{81x^3+90x^4+25x^5}$$

$$= e^{\frac{e^{-\frac{20}{9x}+x+\frac{100}{9(9+5x)}}}{x}+2x}$$

3.1307.

$$e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right) \quad 20-9x^2-5x^3 \quad 20-9x^2-5x^3$$

input
```
Integrate[(E^((1 + 2*E^((20 - 9*x^2 - 5*x^3)/(9*x + 5*x^2))*x^2)/(E^((20 -
 9*x^2 - 5*x^3)/(9*x + 5*x^2))*x) - (20 - 9*x^2 - 5*x^3)/(9*x + 5*x^2))*(1
80 + 119*x - 9*x^2 + 65*x^3 + 25*x^4 + E^((20 - 9*x^2 - 5*x^3)/(9*x + 5*x^
2))*(162*x^3 + 180*x^4 + 50*x^5)))/(81*x^3 + 90*x^4 + 25*x^5),x]
```

output
```
E^(E^(-20/(9*x) + x + 100/(9*(9 + 5*x)))/x + 2*x)
```

3.1307.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(25x^4+65x^3-9x^2+e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}\left(50x^5+180x^4+162x^3\right)+119x+180\right)\exp\left(\frac{e^{-\frac{-5x^3-9x^2+20}{5x^2+9x}}\left(2e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}x \cdots\right.}{x}\cdots\right)}{25x^5+90x^4+81x^3}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{\left(25x^4+65x^3-9x^2+e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}\left(50x^5+180x^4+162x^3\right)+119x+180\right)\exp\left(\frac{e^{-\frac{-5x^3-9x^2+20}{5x^2+9x}}\left(2e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}x \cdots\right.}{x}\cdots\right)}{x^3\left(25x^2+90x+81\right)}$$

$$\Big\downarrow \text{2007}$$

$$\int \frac{\left(25x^4+65x^3-9x^2+e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}\left(50x^5+180x^4+162x^3\right)+119x+180\right)\exp\left(\frac{e^{-\frac{-5x^3-9x^2+20}{5x^2+9x}}\left(2e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}x \cdots\right.}{x}\cdots\right)}{x^3(5x+9)^2}$$

$$\Big\downarrow \text{7293}$$

$$e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right) \quad \frac{20-9x^2-5x^3}{\cdots} \quad \cdots \quad 20-9x^2-5x^3 \cdots$$

$$\int \left(\frac{25x \exp\left(\frac{e^{-\frac{-5x^3-9x^2+20}{5x^2+9x}}\left(2e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}x^2+1\right)}{x} - \frac{-5x^3-9x^2+20}{5x^2+9x}\right)}{(5x+9)^2} + 2\exp\left(\frac{e^{-\frac{-5x^3-9x^2+20}{5x^2+9x}}\left(2e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}x^2+1\right)}{x}\right.\right.$$

$\Big\downarrow$ 7239

$$\int \frac{\left(2e^{\frac{20}{5x^2+9x}}(5x+9)^2x^3 + e^x\left(25x^4+65x^3-9x^2+119x+180\right)\right)\exp\left(\frac{e^{x-\frac{20}{5x^2+9x}}}{x} + \frac{2(5x^3+9x^2-10)}{x(5x+9)}\right)}{x^3(5x+9)^2}dx$$

$\Big\downarrow$ 7293

$$\int \left(2\exp\left(\frac{e^{x-\frac{20}{5x^2+9x}}}{x} + \frac{2(5x^3+9x^2-10)}{x(5x+9)} + \frac{20}{x(5x+9)}\right) + \frac{(25x^4+65x^3-9x^2+119x+180)\exp\left(\frac{e^{x-\frac{20}{5x^2+9x}}}{x}\right.}{x^3(5x+9)^2}\right.$$

$\Big\downarrow$ 2009

$$\frac{20}{9}\int \frac{\exp\left(x + \frac{e^{x-\frac{20}{5x^2+9x}}}{x} + \frac{2(5x^3+9x^2-10)}{(5x+9)x}\right)}{x^3}dx - \int \frac{\exp\left(x + \frac{e^{x-\frac{20}{5x^2+9x}}}{x} + \frac{2(5x^3+9x^2-10)}{(5x+9)x}\right)}{x^2}dx + \frac{229}{729}\int \frac{\exp\left(x + \frac{e^{x-\frac{20}{5x^2+9x}}}{x} + \frac{2(5x^3+9x^2-10)}{(5x+9)x}\right)}{x}dx + \frac{2500}{81}\int \frac{\exp\left(x + \frac{e^{x-\frac{20}{5x^2+9x}}}{x} + \frac{2(5x^3+9x^2-10)}{(5x+9)x}\right)}{(5x+9)^2}dx + \frac{2500}{729}\int \frac{\exp\left(x + \frac{e^{x-\frac{20}{5x^2+9x}}}{x} + \frac{2(5x^3+9x^2-10)}{(5x+9)x}\right)}{5x+9}dx + 2\int e^{2x+\frac{e^{x-\frac{20}{5x^2+9x}}}{x}}dx$$

input
```
Int[(E^((1 + 2*E^((20 - 9*x^2 - 5*x^3)/(9*x + 5*x^2))*x^2)/(E^((20 - 9*x^2
 - 5*x^3)/(9*x + 5*x^2))*x) - (20 - 9*x^2 - 5*x^3)/(9*x + 5*x^2))*(180 + 1
19*x - 9*x^2 + 65*x^3 + 25*x^4 + E^((20 - 9*x^2 - 5*x^3)/(9*x + 5*x^2))*(1
62*x^3 + 180*x^4 + 50*x^5)))/(81*x^3 + 90*x^4 + 25*x^5),x]
```

3.1307.

$$e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right) \quad \frac{20-9x^2-5x^3}{} \qquad \frac{20-9x^2-5x^3}{}$$

output
```
$Aborted
```

3.1307.3.1 Defintions of rubi rules used

rule 2007
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{a = Rt[Coeff[Px, x, 0], Expon[Px,
x]], b = Rt[Coeff[Px, x, Expon[Px, x]], Expon[Px, x]]}, Int[u*(a + b*x)^(Ex
pon[Px, x]*p), x] /; EqQ[Px, (a + b*x)^Expon[Px, x]]] /; IntegerQ[p] && Pol
yQ[Px, x] && GtQ[Expon[Px, x], 1] && NeQ[Coeff[Px, x, 0], 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1307.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 61 vs. 2(28) = 56.

Time = 1.41 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.21

3.1307.

$e^{-\frac{20-9x^2-5x^3}{9x+5x^2}} \left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}} x^2\right) \quad 20-9x^2-5x^3 \quad \left(\quad 20-9x^2-5x^3 \right.$

method	result
risch	$e^{\frac{\left(2x^2 e^{-\frac{5x^3+9x^2-20}{x(5x+9)}}+1\right)e^{\frac{5x^3+9x^2-20}{x(5x+9)}}}{x}}$
parallelrisch	$\frac{22500x^2 e^{\frac{\left(2x^2 e^{-\frac{5x^3+9x^2-20}{x(5x+9)}}+1\right)e^{\frac{5x^3+9x^2-20}{x(5x+9)}}}{x}}+40500x\,e^{\frac{\left(2x^2 e^{-\frac{5x^3+9x^2-20}{x(5x+9)}}+1\right)e^{\frac{5x^3+9x^2-20}{x(5x+9)}}}{x}}}{4500x(5x+9)}$
norman	$\frac{\left(9x^2 e^{\frac{-5x^3-9x^2+20}{5x^2+9x}} e^{\frac{\left(2x^2 e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}+1\right)e^{-\frac{-5x^3-9x^2+20}{5x^2+9x}}}{x}}+5x^3 e^{\frac{-5x^3-9x^2+20}{5x^2+9x}} e^{\frac{\left(2x^2 e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}+1\right)e^{-\frac{-5x^3-9x^2+2}{5x^2+9x}}}{x}}\right.}{x^2(5x+9)}$

input
```
int(((50*x^5+180*x^4+162*x^3)*exp((-5*x^3-9*x^2+20)/(5*x^2+9*x))+25*x^4+65
*x^3-9*x^2+119*x+180)*exp((2*x^2*exp((-5*x^3-9*x^2+20)/(5*x^2+9*x))+1)/x/e
xp((-5*x^3-9*x^2+20)/(5*x^2+9*x)))/(25*x^5+90*x^4+81*x^3)/exp((-5*x^3-9*x^
2+20)/(5*x^2+9*x)),x,method=_RETURNVERBOSE)
```

output
```
exp((2*x^2*exp(-(5*x^3+9*x^2-20)/x/(5*x+9))+1)/x*exp((5*x^3+9*x^2-20)/x/(5
*x+9)))
```

3.1307.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. $2(26) = 52$.

Time = 0.27 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.93

$$\int \frac{e^{\frac{e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right)}{x}-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(180+119x-9x^2+65x^3+25x^4+e^{\frac{20-9x^2-5x^3}{9x+5x^2}}(162x^3+180x^4-\right.}{81x^3+90x^4+25x^5}$$

$$= e^{\left(\frac{15\,x^3+27\,x^2+(5\,x+9)e^{\left(\frac{5\,x^3+9\,x^2-20}{5\,x^2+9\,x}\right)}-20}{5\,x^2+9\,x}-\frac{5\,x^3+9\,x^2-20}{5\,x^2+9\,x}\right)}$$

input
```
integrate(((50*x^5+180*x^4+162*x^3)*exp((-5*x^3-9*x^2+20)/(5*x^2+9*x))+25*
x^4+65*x^3-9*x^2+119*x+180)*exp((2*x^2*exp((-5*x^3-9*x^2+20)/(5*x^2+9*x))+
1)/x/exp((-5*x^3-9*x^2+20)/(5*x^2+9*x)))/(25*x^5+90*x^4+81*x^3)/exp((-5*x^
3-9*x^2+20)/(5*x^2+9*x)),x, algorithm=\
```

3.1307.

$$e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right) \quad \frac{20-9x^2-5x^3}{} \qquad \frac{20-9x^2-5x^3}{}$$

output
```
e^((15*x^3 + 27*x^2 + (5*x + 9)*e^((5*x^3 + 9*x^2 - 20)/(5*x^2 + 9*x)) - 2
0)/(5*x^2 + 9*x) - (5*x^3 + 9*x^2 - 20)/(5*x^2 + 9*x))
```

3.1307.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. $2(22) = 44$.

Time = 0.43 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.89

$$\int \frac{e^{\frac{e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right)}{x}-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(180+119x-9x^2+65x^3+25x^4+e^{\frac{20-9x^2-5x^3}{9x+5x^2}}(162x^3+180x^4 -}{81x^3+90x^4+25x^5}$$

$$= e^{\frac{\left(2x^2e^{\frac{-5x^3-9x^2+20}{5x^2+9x}}+1\right)e^{-\frac{-5x^3-9x^2+20}{5x^2+9x}}}{x}}$$

input
```
integrate(((50*x**5+180*x**4+162*x**3)*exp((-5*x**3-9*x**2+20)/(5*x**2+9*x
))+25*x**4+65*x**3-9*x**2+119*x+180)*exp((2*x**2*exp((-5*x**3-9*x**2+20)/(
5*x**2+9*x))+1)/x/exp((-5*x**3-9*x**2+20)/(5*x**2+9*x)))/(25*x**5+90*x**4+
81*x**3)/exp((-5*x**3-9*x**2+20)/(5*x**2+9*x)),x)
```

output
```
exp((2*x**2*exp((-5*x**3 - 9*x**2 + 20)/(5*x**2 + 9*x)) + 1)*exp(-(-5*x**3
 - 9*x**2 + 20)/(5*x**2 + 9*x))/x)
```

3.1307.7 Maxima [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.93

$$\int \frac{e^{\frac{e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right)}{x}-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(180+119x-9x^2+65x^3+25x^4+e^{\frac{20-9x^2-5x^3}{9x+5x^2}}(162x^3+180x^4 -}{81x^3+90x^4+25x^5}$$

$$= e^{\left(2\,x+\frac{e^{\left(x+\frac{100}{9\,(5\,x+9)}-\frac{20}{9\,x}\right)}}{x}\right)}$$

input
```
integrate(((50*x^5+180*x^4+162*x^3)*exp((-5*x^3-9*x^2+20)/(5*x^2+9*x))+25*
x^4+65*x^3-9*x^2+119*x+180)*exp((2*x^2*exp((-5*x^3-9*x^2+20)/(5*x^2+9*x))+
1)/x/exp((-5*x^3-9*x^2+20)/(5*x^2+9*x)))/(25*x^5+90*x^4+81*x^3)/exp((-5*x^
3-9*x^2+20)/(5*x^2+9*x)),x, algorithm=\
```

output
```
e^(2*x + e^(x + 100/9/(5*x + 9) - 20/9/x)/x)
```

3.1307.8 Giac [F]

$$\int \frac{e^{\frac{e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right)}{x}-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(180+119x-9x^2+65x^3+25x^4+e^{\frac{20-9x^2-5x^3}{9x+5x^2}}(162x^3+180x^4\right.}{81x^3+90x^4+25x^5}$$

$$=\int \frac{\left(25\,x^4+65\,x^3-9\,x^2+2\,(25\,x^5+90\,x^4+81\,x^3)e^{\left(-\frac{5\,x^3+9\,x^2-20}{5\,x^2+9\,x}\right)}+119\,x+180\right)e^{\left(\frac{\left(2\,x^2e^{\left(-\frac{5\,x^3+9\,x^2-20}{5\,x^2+9\,x}\right)}+1\right.}{x}\right.}}{25\,x^5+90\,x^4+81\,x^3}$$

input
```
integrate((((50*x^5+180*x^4+162*x^3)*exp((-5*x^3-9*x^2+20)/(5*x^2+9*x))+25*
x^4+65*x^3-9*x^2+119*x+180)*exp((2*x^2*exp((-5*x^3-9*x^2+20)/(5*x^2+9*x))+
1)/x/exp((-5*x^3-9*x^2+20)/(5*x^2+9*x)))/(25*x^5+90*x^4+81*x^3)/exp((-5*x^
3-9*x^2+20)/(5*x^2+9*x)),x, algorithm=\
```

output
```
integrate((25*x^4 + 65*x^3 - 9*x^2 + 2*(25*x^5 + 90*x^4 + 81*x^3)*e^(-(5*x
^3 + 9*x^2 - 20)/(5*x^2 + 9*x)) + 119*x + 180)*e^((2*x^2*e^(-(5*x^3 + 9*x^
2 - 20)/(5*x^2 + 9*x)) + 1)*e^((5*x^3 + 9*x^2 - 20)/(5*x^2 + 9*x))/x + (5*
x^3 + 9*x^2 - 20)/(5*x^2 + 9*x))/(25*x^5 + 90*x^4 + 81*x^3), x)
```

3.1307.9 Mupad [B] (verification not implemented)

Time = 19.23 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.71

$$\int \frac{e^{\frac{e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right)}{x}-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(180+119x-9x^2+65x^3+25x^4+e^{\frac{20-9x^2-5x^3}{9x+5x^2}}(162x^3+180x^4\right.}{81x^3+90x^4+25x^5}$$

$$=\mathrm{e}^{\frac{\mathrm{e}^{\frac{5\,x^2}{5\,x+9}}\,\mathrm{e}^{-\frac{20}{5\,x^2+9\,x}}\,\mathrm{e}^{\frac{9\,x}{5\,x+9}}}{x}}\,\mathrm{e}^{2\,x}$$

3.1307.

$$e^{-\frac{20-9x^2-5x^3}{9x+5x^2}}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right) \quad 20-9x^2-5x^3 \quad 20-9x^2-5x^3$$

input
```
int((exp((9*x^2 + 5*x^3 - 20)/(9*x + 5*x^2))*exp((exp((9*x^2 + 5*x^3 - 20)
/(9*x + 5*x^2))*(2*x^2*exp(-(9*x^2 + 5*x^3 - 20)/(9*x + 5*x^2)) + 1))/x)*(
119*x + exp(-(9*x^2 + 5*x^3 - 20)/(9*x + 5*x^2))*(162*x^3 + 180*x^4 + 50*x
^5) - 9*x^2 + 65*x^3 + 25*x^4 + 180))/(81*x^3 + 90*x^4 + 25*x^5),x)
```

output
```
exp((exp((5*x^2)/(5*x + 9))*exp(-20/(9*x + 5*x^2))*exp((9*x)/(5*x + 9)))/x
)*exp(2*x)
```

3.1307.

$$e^{-\frac{20-9x^2-5x^3}{9x+5x^2}\left(1+2e^{\frac{20-9x^2-5x^3}{9x+5x^2}}x^2\right)} \quad \frac{20-9x^2-5x^3}{} \left(\quad \frac{20-9x^2-5x^3}{} \right.$$

3.1308 $\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192-$

3.1308.1 Optimal result

Integrand size = 122, antiderivative size = 32

$$\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x}{9+e^2+e(-6-2x)+6x+}$$

$$= 4x\left(\frac{5}{x}+x-\left(4+\frac{e^{-x}}{-3+e-x}\right)\log\left(x^2\right)\right)$$

output
```
4*x*(5/x-(1/(exp(1)-3-x)/exp(x)+4)*ln(x^2)+x)
```

3.1308.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.12

$$\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x}{9+e^2+e(-6-2x)+6x+}$$

$$= 4x^2-\frac{4x(12-4e-e^{-x}+4x)\log\left(x^2\right)}{3-e+x}$$

input
```
Integrate[(24 - 8*E + 8*x + E^x*(-288 - 120*x + 16*x^2 + 8*x^3 + E^2*(-32
+ 8*x) + E*(192 + 16*x - 16*x^2)) + (12 - 12*x - 4*x^2 + E*(-4 + 4*x) + E^
x*(-144 - 16*E^2 - 96*x - 16*x^2 + E*(96 + 32*x)))*Log[x^2])/(E^x*(9 + E^2
 + E*(-6 - 2*x) + 6*x + x^2)),x]
```

output
```
4*x^2 - (4*x*(12 - 4*E - E^(-x) + 4*x)*Log[x^2])/(3 - E + x)
```

3.1308.
$\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x-4x^2+e(-4+4x)+e^x(-144-16e^2-96x-16x^2+e(96}{9+e^2+e(-6-2x)+6x+x^2}$

3.1308.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(\left(-4x^2+e^x\left(-16x^2-96x+e(32x+96)-16e^2-144\right)-12x+e(4x-4)+12\right)\log\left(x^2\right)+e^x\left(8x^3+16x^2\right.\right.}{x^2+6x+e(-2x-6)+e^2+9}$$

$\Big\downarrow$ 7292

$$\int \frac{e^{-x}\left(\left(-4x^2+e^x\left(-16x^2-96x+e(32x+96)-16e^2-144\right)-12x+e(4x-4)+12\right)\log\left(x^2\right)+e^x\left(8x^3+16x^2\right.\right.}{x^2+2(3-e)x+(e-3)^2}$$

$\Big\downarrow$ 7277

$$4\int \frac{e^{-x}\left(2x-2e^x\left(-x^3-2x^2+15x+e^2(4-x)-2e\left(-x^2+x+12\right)+36\right)+\left(-x^2-3x-e(1-x)-4e^x\left(x^2+6\right.\right.\right.}{(x-e+3)^2}$$

$\Big\downarrow$ 7293

$$4\int \left(-\frac{e^{-x}\log\left(x^2\right)x^2}{(-x+e-3)^2}-\frac{3e^{-x}\log\left(x^2\right)x}{(-x+e-3)^2}+\frac{2e^{-x}x}{(-x+e-3)^2}+2\left(x-2\log\left(x^2\right)-4\right)+\frac{e^{1-x}(x-1)\log\left(x^2\right)}{(-x+e-3)^2}+\frac{3e^{-}}{(-x}\right.$$

$\Big\downarrow$ 2009

$$4\left(-2(5-e)e^{4-e}\int \frac{\text{ExpIntegralEi}(-x+e-3)}{x}dx-2(3-e)(5-e)e^{3-e}\int \frac{\text{ExpIntegralEi}(-x+e-3)}{x}dx+6(4\right.$$

input
```
Int[(24 - 8*E + 8*x + E^x*(-288 - 120*x + 16*x^2 + 8*x^3 + E^2*(-32 + 8*x)
 + E*(192 + 16*x - 16*x^2)) + (12 - 12*x - 4*x^2 + E*(-4 + 4*x) + E^x*(-14
4 - 16*E^2 - 96*x - 16*x^2 + E*(96 + 32*x)))*Log[x^2])/(E^x*(9 + E^2 + E*(
-6 - 2*x) + 6*x + x^2)),x]
```

output
```
$Aborted
```

3.1308. $\int \frac{e^{-x}\left(24-8e+8x+e^x\left(-288-120x+16x^2+8x^3+e^2(-32+8x)+e\left(192+16x-16x^2\right)\right)+\left(12-12x-4x^2+e(-4+4x)+e^x\left(-144-16e^2-96x-16x^2+e(96\right.\right.\right.}{9+e^2+e(-6-2x)+6x+x^2}$

3.1308.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1308.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 66 vs. $2(32) = 64$.

Time = 0.40 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.09

method	result
norman	$\frac{\left(\left(4\,\mathrm{e}-12\right)x^{2}\mathrm{e}^{x}+\left(-16\,\mathrm{e}+48\right)x\,\mathrm{e}^{x}\ln\left(x^{2}\right)-4x\ln\left(x^{2}\right)-4\,\mathrm{e}^{x}x^{3}+16x^{2}\mathrm{e}^{x}\ln\left(x^{2}\right)\right)\mathrm{e}^{-x}}{\mathrm{e}-3-x}$
parallelrisch	$-\frac{\left(-8x^{2}\mathrm{e}\,\mathrm{e}^{x}+32\,\mathrm{e}\,\mathrm{e}^{x}\ln\left(x^{2}\right)x+8\,\mathrm{e}^{x}x^{3}-32x^{2}\mathrm{e}^{x}\ln\left(x^{2}\right)+24\,\mathrm{e}^{x}x^{2}-96x\,\mathrm{e}^{x}\ln\left(x^{2}\right)+8x\ln\left(x^{2}\right)\right)\mathrm{e}^{-x}}{2\left(\mathrm{e}-3-x\right)}$
default	$\frac{4\left(x^{2}\left(\ln\left(x^{2}\right)-2\ln\left(x\right)\right)+\left(-\mathrm{e}\left(\ln\left(x^{2}\right)-2\ln\left(x\right)\right)+3\ln\left(x^{2}\right)-6\ln\left(x\right)\right)x+\left(-2\,\mathrm{e}+6\right)x\ln\left(x\right)+2x^{2}\ln\left(x\right)\right)\mathrm{e}^{-x}}{\left(\mathrm{e}-3-x\right)^{2}}+4x^{2}-16x\ln(x$
parts	$\frac{4\left(x^{2}\left(\ln\left(x^{2}\right)-2\ln\left(x\right)\right)+\left(-\mathrm{e}\left(\ln\left(x^{2}\right)-2\ln\left(x\right)\right)+3\ln\left(x^{2}\right)-6\ln\left(x\right)\right)x+\left(-2\,\mathrm{e}+6\right)x\ln\left(x\right)+2x^{2}\ln\left(x\right)\right)\mathrm{e}^{-x}}{\left(\mathrm{e}-3-x\right)^{2}}+4x^{2}-16x\ln(x$

input
```
int((((-16*exp(1)^2+(32*x+96)*exp(1)-16*x^2-96*x-144)*exp(x)+(-4+4*x)*exp(
1)-4*x^2-12*x+12)*ln(x^2)+((8*x-32)*exp(1)^2+(-16*x^2+16*x+192)*exp(1)+8*x
^3+16*x^2-120*x-288)*exp(x)-8*exp(1)+8*x+24)/(exp(1)^2+(-2*x-6)*exp(1)+x^2
+6*x+9)/exp(x),x,method=_RETURNVERBOSE)
```

output
```
((4*exp(1)-12)*x^2*exp(x)+(-16*exp(1)+48)*x*exp(x)*ln(x^2)-4*x*ln(x^2)-4*e
xp(x)*x^3+16*x^2*exp(x)*ln(x^2))/(exp(1)-3-x)/exp(x)
```


$\int \frac{e^{-x}\left(24-8e+8x+e^{x}\left(-288-120x+16x^{2}+8x^{3}+e^{2}(-32+8x)+e\left(192+16x-16x^{2}\right)\right)+\left(12-12x-4x^{2}+e(-4+4x)+e^{x}\left(-144-16e^{2}-96x-16x^{2}+e(96\right.\right.\right.}{9+e^{2}+e(-6-2x)+6x+x^{2}}$

3.1308.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.91

$$\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x}{9+e^2+e(-6-2x)+6x+}$$
$$=\frac{4\left((x^3-x^2e+3\,x^2)e^x-(4\,(x^2-xe+3\,x)e^x-x)\log\left(x^2\right)\right)e^{(-x)}}{x-e+3}$$

input
```
integrate((((-16*exp(1)^2+(32*x+96)*exp(1)-16*x^2-96*x-144)*exp(x)+(-4+4*x
)*exp(1)-4*x^2-12*x+12)*log(x^2)+((8*x-32)*exp(1)^2+(-16*x^2+16*x+192)*exp
(1)+8*x^3+16*x^2-120*x-288)*exp(x)-8*exp(1)+8*x+24)/(exp(1)^2+(-2*x-6)*exp
(1)+x^2+6*x+9)/exp(x),x, algorithm=\
```

output
```
4*((x^3 - x^2*e + 3*x^2)*e^x - (4*(x^2 - x*e + 3*x)*e^x - x)*log(x^2))*e^(
-x)/(x - e + 3)
```

3.1308.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x}{9+e^2+e(-6-2x)+6x+}$$
$$=4x^2-16x\log\left(x^2\right)+\frac{4xe^{-x}\log\left(x^2\right)}{x-e+3}$$

input
```
integrate((((-16*exp(1)**2+(32*x+96)*exp(1)-16*x**2-96*x-144)*exp(x)+(-4+4
*x)*exp(1)-4*x**2-12*x+12)*ln(x**2)+((8*x-32)*exp(1)**2+(-16*x**2+16*x+192
)*exp(1)+8*x**3+16*x**2-120*x-288)*exp(x)-8*exp(1)+8*x+24)/(exp(1)**2+(-2*
x-6)*exp(1)+x**2+6*x+9)/exp(x),x)
```

output
```
4*x**2 - 16*x*log(x**2) + 4*x*exp(-x)*log(x**2)/(x - E + 3)
```

3.1308.7 Maxima [F]

$$\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x}{9+e^2+e(-6-2x)+6x+}$$

$$=\int \frac{4\,(2\,(x^3+2\,x^2+(x-4)e^2-2\,(x^2-x-12)e-15\,x-36)e^x-(x^2-(x-1)e+4\,(x^2-2\,(x+3)e+}{x^2-2\,(x+3)e+6\,x+e^2+9}$$

input
```
integrate((((-16*exp(1)^2+(32*x+96)*exp(1)-16*x^2-96*x-144)*exp(x)+(-4+4*x
)*exp(1)-4*x^2-12*x+12)*log(x^2)+((8*x-32)*exp(1)^2+(-16*x^2+16*x+192)*exp
(1)+8*x^3+16*x^2-120*x-288)*exp(x)-8*exp(1)+8*x+24)/(exp(1)^2+(-2*x-6)*exp
(1)+x^2+6*x+9)/exp(x),x, algorithm=\
```

output
```
8*(e - 3)*integrate(e^(-x)/(x^2 - 2*x*(e - 3) + e^2 - 6*e + 9), x) + 8*e^(
-e + 4)*exp_integral_e(2, x - e + 3)/(x - e + 3) - 24*e^(-e + 3)*exp_integ
ral_e(2, x - e + 3)/(x - e + 3) + 4*(x^3 - x^2*(e - 3) + 2*x*e^(-x)*log(x)
 - 8*(x^2 - x*(e - 3))*log(x))/(x - e + 3)
```

3.1308.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.94

$$\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x}{9+e^2+e(-6-2x)+6x+}$$

$$=\frac{4\left(x^3-x^2e-4\,x^2\log\left(x^2\right)+4\,xe\log\left(x^2\right)+xe^{(-x)}\log\left(x^2\right)+3\,x^2-12\,x\log\left(x^2\right)\right)}{x-e+3}$$

input
```
integrate((((-16*exp(1)^2+(32*x+96)*exp(1)-16*x^2-96*x-144)*exp(x)+(-4+4*x
)*exp(1)-4*x^2-12*x+12)*log(x^2)+((8*x-32)*exp(1)^2+(-16*x^2+16*x+192)*exp
(1)+8*x^3+16*x^2-120*x-288)*exp(x)-8*exp(1)+8*x+24)/(exp(1)^2+(-2*x-6)*exp
(1)+x^2+6*x+9)/exp(x),x, algorithm=\
```

output
```
4*(x^3 - x^2*e - 4*x^2*log(x^2) + 4*x*e*log(x^2) + x*e^(-x)*log(x^2) + 3*x
^2 - 12*x*log(x^2))/(x - e + 3)
```

3.1308. $\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x-4x^2+e(-4+4x)+e^x(-144-16e^2-96x-16x^2+e(96}{9+e^2+e(-6-2x)+6x+x^2}$

3.1308.9 Mupad [F(-1)]

Timed out.

$$\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x}{9+e^2+e(-6-2x)+6x+}$$

$$=\int \frac{\mathrm{e}^{-x}\left(8\,x-8\,\mathrm{e}+\mathrm{e}^x\left(\mathrm{e}\left(-16\,x^2+16\,x+192\right)-120\,x+16\,x^2+8\,x^3+\mathrm{e}^2\left(8\,x-32\right)-288\right)-\ln\left(x^2\right)\left(12\right.\right.}{6\,x+\mathrm{e}^2+x^2-\mathrm{e}\left(2\,x+\right.}$$

input
```
int((exp(-x)*(8*x - 8*exp(1) + exp(x)*(exp(1)*(16*x - 16*x^2 + 192) - 120*
x + 16*x^2 + 8*x^3 + exp(2)*(8*x - 32) - 288) - log(x^2)*(12*x + exp(x)*(9
6*x + 16*exp(2) + 16*x^2 - exp(1)*(32*x + 96) + 144) + 4*x^2 - exp(1)*(4*x
 - 4) - 12) + 24))/(6*x + exp(2) + x^2 - exp(1)*(2*x + 6) + 9),x)
```

output
```
int((exp(-x)*(8*x - 8*exp(1) + exp(x)*(exp(1)*(16*x - 16*x^2 + 192) - 120*
x + 16*x^2 + 8*x^3 + exp(2)*(8*x - 32) - 288) - log(x^2)*(12*x + exp(x)*(9
6*x + 16*exp(2) + 16*x^2 - exp(1)*(32*x + 96) + 144) + 4*x^2 - exp(1)*(4*x
 - 4) - 12) + 24))/(6*x + exp(2) + x^2 - exp(1)*(2*x + 6) + 9), x)
```

3.1308. $\int \frac{e^{-x}(24-8e+8x+e^x(-288-120x+16x^2+8x^3+e^2(-32+8x)+e(192+16x-16x^2))+(12-12x-4x^2+e(-4+4x)+e^x(-144-16e^2-96x-16x^2+e(96}{9+e^2+e(-6-2x)+6x+x^2}$

3.1309 $\int \frac{e^{13}(5+3e^3-e^{3+3x}x)(10+6e^3+e^{3+3x}(-x+3x^2))}{x^2(-5x-3e^3x+e^{3+3x}x^2)}\,dx$

3.1309.1 Optimal result

Integrand size = 71, antiderivative size = 28

$$\int \frac{e^{13}(5+3e^3-e^{3+3x}x)\left(10+6e^3+e^{3+3x}(-x+3x^2)\right)}{x^2\left(-5x-3e^3x+e^{3+3x}x^2\right)}\,dx=\frac{e^{16}\left(-e^{3x}+\frac{3}{x}+\frac{5}{e^3x}\right)}{x}$$

output
```
exp(16+ln((3/x-exp(3*x)+5/x/exp(3))/x))
```

3.1309.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{13}(5+3e^3-e^{3+3x}x)\left(10+6e^3+e^{3+3x}(-x+3x^2)\right)}{x^2\left(-5x-3e^3x+e^{3+3x}x^2\right)}\,dx=-\frac{e^{13}(-5-3e^3+e^{3+3x}x)}{x^2}$$

input
```
Integrate[(E^13*(5 + 3*E^3 - E^(3 + 3*x)*x)*(10 + 6*E^3 + E^(3 + 3*x)*(-x
+ 3*x^2)))/(x^2*(-5*x - 3*E^3*x + E^(3 + 3*x)*x^2)),x]
```

output
```
-((E^13*(-5 - 3*E^3 + E^(3 + 3*x)*x))/x^2)
```

3.1309.3 Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.04, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.085$, Rules used = {6, 27, 25, 7239, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{13}\left(-e^{3x+3}x+3e^3+5\right)\left(e^{3x+3}\left(3x^2-x\right)+6e^3+10\right)}{x^2\left(e^{3x+3}x^2-3e^3x-5x\right)}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{e^{13}\left(-e^{3x+3}x+3e^3+5\right)\left(e^{3x+3}\left(3x^2-x\right)+6e^3+10\right)}{x^2\left(e^{3x+3}x^2+\left(-5-3e^3\right)x\right)}dx$$

$$\Big\downarrow \text{ 27}$$

$$e^{13}\int -\frac{\left(-e^{3x+3}x+3e^3+5\right)\left(2\left(5+3e^3\right)-e^{3x+3}\left(x-3x^2\right)\right)}{x^2\left(\left(5+3e^3\right)x-e^{3x+3}x^2\right)}dx$$

$$\Big\downarrow \text{ 25}$$

$$-e^{13}\int \frac{\left(-e^{3x+3}x+3e^3+5\right)\left(2\left(5+3e^3\right)-e^{3x+3}\left(x-3x^2\right)\right)}{x^2\left(\left(5+3e^3\right)x-e^{3x+3}x^2\right)}dx$$

$$\Big\downarrow \text{ 7239}$$

$$-e^{13}\int \frac{e^{3x+3}x(3x-1)+10\left(1+\frac{3e^3}{5}\right)}{x^3}dx$$

$$\Big\downarrow \text{ 2010}$$

$$-e^{13}\int \left(\frac{e^{3x+3}(3x-1)}{x^2}+\frac{2\left(5+3e^3\right)}{x^3}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-e^{13}\left(\frac{e^{3x+3}}{x}-\frac{5+3e^3}{x^2}\right)$$

input
```
Int[(E^13*(5 + 3*E^3 - E^(3 + 3*x)*x)*(10 + 6*E^3 + E^(3 + 3*x)*(-x + 3*x^
2)))/(x^2*(-5*x - 3*E^3*x + E^(3 + 3*x)*x^2)),x]
```

output
```
-(E^13*(-((5 + 3*E^3)/x^2) + E^(3 + 3*x)/x))
```

3.1309. $\int \frac{e^{13}\left(5+3e^3-e^{3+3x}x\right)\left(10+6e^3+e^{3+3x}\left(-x+3x^2\right)\right)}{x^2\left(-5x-3e^3x+e^{3+3x}x^2\right)}dx$

3.1309.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1309.4 Maple [A] (verified)

Time = 4.55 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00

method	result
norman	$\frac{\mathrm{e}^{-3}\mathrm{e}^{16}\left(3\,\mathrm{e}^{3}+5\right)-x\,\mathrm{e}^{16}\mathrm{e}^{3x}}{x^{2}}$
parallelrisch	$-\frac{\left(-9\,\mathrm{e}^{12}\mathrm{e}^{\ln\left(-\frac{\left(x\,\mathrm{e}^{3}\mathrm{e}^{3x}-3\,\mathrm{e}^{3}-5\right)\mathrm{e}^{-3}}{x^{2}}\right)+16}-30\,\mathrm{e}^{9}\mathrm{e}^{\ln\left(-\frac{\left(x\,\mathrm{e}^{3}\mathrm{e}^{3x}-3\,\mathrm{e}^{3}-5\right)\mathrm{e}^{-3}}{x^{2}}\right)+16}-25\,\mathrm{e}^{\ln\left(-\frac{\left(x\,\mathrm{e}^{3}\mathrm{e}^{3x}-3\,\mathrm{e}^{3}-5\right)\mathrm{e}^{-3}}{x^{2}}\right)+16}\mathrm{e}^{6}-\mathrm{e}\cdots}{(x\,\mathrm{e}\cdots}$
risch	$-\frac{\left(\mathrm{e}^{3x+3}x-3\,\mathrm{e}^{3}-5\right)\mathrm{e}^{13+\frac{i\pi\,\mathrm{csgn}\left(ix^{2}\right)^{3}}{2}-i\pi\,\mathrm{csgn}\left(ix^{2}\right)^{2}\mathrm{csgn}(ix)+\frac{i\pi\,\mathrm{csgn}\left(ix^{2}\right)\mathrm{csgn}(ix)^{2}}{2}-\frac{i\pi\,\mathrm{csgn}\left(i\left(-\mathrm{e}^{3x+3}x+3\,\mathrm{e}^{3}+5\right)\right)\mathrm{csgn}\left(\frac{i\left(-\mathrm{e}^{3x}\cdots\right.}{}\right.}{2}}}{\cdots}$

input
```
int(((3*x^2-x)*exp(3)*exp(3*x)+6*exp(3)+10)*exp(ln((-x*exp(3)*exp(3*x)+3*e
xp(3)+5)/x^2/exp(3))+16)/(x^2*exp(3)*exp(3*x)-3*x*exp(3)-5*x),x,method=_RE
TURNVERBOSE)
```

output
```
(1/exp(3)*exp(16)*(3*exp(3)+5)-x*exp(16)*exp(3*x))/x^2
```

3.1309.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{e^{13}(5+3e^3-e^{3+3x}x)\left(10+6e^3+e^{3+3x}(-x+3x^2)\right)}{x^2\left(-5x-3e^3x+e^{3+3x}x^2\right)}\,dx=-\frac{xe^{(3\,x+16)}-3\,e^{16}-5\,e^{13}}{x^2}$$

input
```
integrate(((3*x^2-x)*exp(3)*exp(3*x)+6*exp(3)+10)*exp(log((-x*exp(3)*exp(3
*x)+3*exp(3)+5)/x^2/exp(3))+16)/(x^2*exp(3)*exp(3*x)-3*x*exp(3)-5*x),x, al
gorithm=\
```

output
```
-(x*e^(3*x + 16) - 3*e^16 - 5*e^13)/x^2
```

3.1309.6 Sympy [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.96

$$\int \frac{e^{13}(5+3e^3-e^{3+3x}x)\left(10+6e^3+e^{3+3x}(-x+3x^2)\right)}{x^2\left(-5x-3e^3x+e^{3+3x}x^2\right)}\,dx=-\frac{e^{16}e^{3x}}{x}-\frac{-6e^{16}-10e^{13}}{2x^2}$$

input
```
integrate(((3*x**2-x)*exp(3)*exp(3*x)+6*exp(3)+10)*exp(ln((-x*exp(3)*exp(3
*x)+3*exp(3)+5)/x**2/exp(3))+16)/(x**2*exp(3)*exp(3*x)-3*x*exp(3)-5*x),x)
```

output
```
-exp(16)*exp(3*x)/x - (-6*exp(16) - 10*exp(13))/(2*x**2)
```

3.1309.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{e^{13}(5+3e^3-e^{3+3x}x)\left(10+6e^3+e^{3+3x}(-x+3x^2)\right)}{x^2\left(-5x-3e^3x+e^{3+3x}x^2\right)}\,dx=-\frac{\left(xe^{(3x+3)}-3e^3-5\right)e^{13}}{x^2}$$

input
```
integrate(((3*x^2-x)*exp(3)*exp(3*x)+6*exp(3)+10)*exp(log((-x*exp(3)*exp(3
*x)+3*exp(3)+5)/x^2/exp(3))+16)/(x^2*exp(3)*exp(3*x)-3*x*exp(3)-5*x),x, al
gorithm=\
```

output
```
-(x*e^(3*x + 3) - 3*e^3 - 5)*e^13/x^2
```

3.1309.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.79

$$\int \frac{e^{13}(5+3e^3-e^{3+3x}x)\left(10+6e^3+e^{3+3x}(-x+3x^2)\right)}{x^2\left(-5x-3e^3x+e^{3+3x}x^2\right)}\,dx=-\frac{xe^{(3x+16)}-3e^{16}-5e^{13}}{x^2}$$

input
```
integrate(((3*x^2-x)*exp(3)*exp(3*x)+6*exp(3)+10)*exp(log((-x*exp(3)*exp(3
*x)+3*exp(3)+5)/x^2/exp(3))+16)/(x^2*exp(3)*exp(3*x)-3*x*exp(3)-5*x),x, al
gorithm=\
```

output
```
-(x*e^(3*x + 16) - 3*e^16 - 5*e^13)/x^2
```

3.1309.9 Mupad [B] (verification not implemented)

Time = 19.53 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{e^{13}(5+3e^3-e^{3+3x}x)\left(10+6e^3+e^{3+3x}(-x+3x^2)\right)}{x^2\left(-5x-3e^3x+e^{3+3x}x^2\right)}\,dx=-\frac{x\,\mathrm{e}^{3x+16}-\mathrm{e}^{13}\left(3\,\mathrm{e}^3+5\right)}{x^2}$$

input
```
int(-(exp(log((exp(-3)*(3*exp(3) - x*exp(3*x)*exp(3) + 5))/x^2) + 16)*(6*e
xp(3) - exp(3*x)*exp(3)*(x - 3*x^2) + 10))/(5*x + 3*x*exp(3) - x^2*exp(3*x
)*exp(3)),x)
```

output
```
-(x*exp(3*x + 16) - exp(13)*(3*exp(3) + 5))/x^2
```

3.1310 $\int 90e^{2e^2+x}\,dx$

3.1310.1 Optimal result

Integrand size = 11, antiderivative size = 16

$$\int 90e^{2e^2+x}\,dx=45e^{2e^2}(3+2e^x)$$

output
```
45*(3+2*exp(x))*exp(exp(1)^2)^2
```

3.1310.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.69

$$\int 90e^{2e^2+x}\,dx=90e^{2e^2+x}$$

input
```
Integrate[90*E^(2*E^2 + x),x]
```

output
```
90*E^(2*E^2 + x)
```

3.1310.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.69, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {27, 2624}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int 90e^{x+2e^2}\,dx$$

$$\Big\downarrow \text{27}$$

$$90\int e^{x+2e^2}dx$$

$$\Big\downarrow \text{2624}$$

$$90e^{x+2e^2}$$

input
```
Int[90*E^(2*E^2 + x),x]
```

output
```
90*E^(2*E^2 + x)
```

3.1310.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2624
```
Int[((F_)^(v_))^(n_.), x_Symbol] :> Simp[(F^v)^n/(n*Log[F]*D[v, x]), x] /;
FreeQ[{F, n}, x] && LinearQ[v, x]
```

3.1310.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

method	result	size
risch	$90\,\mathrm{e}^{x+2\,\mathrm{e}^{2}}$	10
gosper	$90\,\mathrm{e}^{x}\mathrm{e}^{2\,\mathrm{e}^{2}}$	12
lookup	$90\,\mathrm{e}^{x}\mathrm{e}^{2\,\mathrm{e}^{2}}$	12
derivativedivides	$90\,\mathrm{e}^{x}\mathrm{e}^{2\,\mathrm{e}^{2}}$	12
default	$90\,\mathrm{e}^{x}\mathrm{e}^{2\,\mathrm{e}^{2}}$	12
norman	$90\,\mathrm{e}^{x}\mathrm{e}^{2\,\mathrm{e}^{2}}$	12
parallelrisch	$90\,\mathrm{e}^{x}\mathrm{e}^{2\,\mathrm{e}^{2}}$	12
parts	$90\,\mathrm{e}^{x}\mathrm{e}^{2\,\mathrm{e}^{2}}$	12
meijerg	$-90\,\mathrm{e}^{2\,\mathrm{e}^{2}}(1-\mathrm{e}^{x})$	14

input
```
int(90*exp(x)*exp(exp(1)^2)^2,x,method=_RETURNVERBOSE)
```

output
```
90*exp(x+2*exp(2))
```

3.1310.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.56

$$\int 90e^{2e^2+x}\,dx = 90\,e^{\left(x+2\,e^{2}\right)}$$

input
```
integrate(90*exp(x)*exp(exp(1)^2)^2,x, algorithm=\
```

output
```
90*e^(x + 2*e^2)
```

3.1310.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int 90e^{2e^2+x}\,dx = 90e^x e^{2e^2}$$

input
```
integrate(90*exp(x)*exp(exp(1)**2)**2,x)
```

output
```
90*exp(x)*exp(2*exp(2))
```

3.1310.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.56

$$\int 90e^{2e^2+x}\,dx = 90\,e^{\left(x+2\,e^2\right)}$$

input
```
integrate(90*exp(x)*exp(exp(1)^2)^2,x, algorithm=\
```

output
```
90*e^(x + 2*e^2)
```

3.1310.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.56

$$\int 90e^{2e^2+x}\,dx = 90\,e^{\left(x+2\,e^2\right)}$$

input
```
integrate(90*exp(x)*exp(exp(1)^2)^2,x, algorithm=\
```

output
```
90*e^(x + 2*e^2)
```

3.1310.9 Mupad [B] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.56

$$\int 90e^{2e^2+x}\,dx = 90\,\mathrm{e}^{2\,\mathrm{e}^2}\,\mathrm{e}^x$$

input
```
int(90*exp(2*exp(2))*exp(x),x)
```

output
```
90*exp(2*exp(2))*exp(x)
```

3.1311 $\int \frac{}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e\right.}$

3.1311.1 Optimal result

Integrand size = 290, antiderivative size = 28

$$\int \frac{-10e}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+\right.}$$
$$=1+\frac{1}{6-\left(e^{\frac{5x}{-e^5+2x}}+x\right)^2}$$

output
```
1/(6-(x+exp(5/(-exp(5)+2*x)*x))^2)+1
```

3.1311.2 Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

$$\int \frac{-10e}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+\right.}$$
$$=-\frac{1}{-6+e^{-\frac{10x}{e^5-2x}}+2e^{-\frac{5x}{e^5-2x}}x+x^2}$$

3.1311.

$$\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-2x}}\left(2e^{10}-1\right.}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+x^4\right)+e^5\left(-144x+48x^3-4x^5\right)+e^{-\frac{10x}{e^5-2x}}\left(-48x^2\right.}$$

input
```
Integrate[(-10*E^(5 - (10*x)/(E^5 - 2*x)) + 2*E^10*x - 8*E^5*x^2 + 8*x^3 +
 (2*E^10 - 18*E^5*x + 8*x^2)/E^((5*x)/(E^5 - 2*x)))/(144*x^2 - 48*x^4 + 4*
x^6 + (E^10 - 4*E^5*x + 4*x^2)/E^((20*x)/(E^5 - 2*x)) + (4*E^10*x - 16*E^5
*x^2 + 16*x^3)/E^((15*x)/(E^5 - 2*x)) + E^10*(36 - 12*x^2 + x^4) + E^5*(-1
44*x + 48*x^3 - 4*x^5) + (-48*x^2 + 24*x^4 + E^10*(-12 + 6*x^2) + E^5*(48*
x - 24*x^3))/E^((10*x)/(E^5 - 2*x)) + (-96*x^3 + 16*x^5 + E^10*(-24*x + 4*
x^3) + E^5*(96*x^2 - 16*x^4))/E^((5*x)/(E^5 - 2*x))),x]
```

output
```
-(-6 + E^((-10*x)/(E^5 - 2*x)) + (2*x)/E^((5*x)/(E^5 - 2*x)) + x^2)^(-1)
```

3.1311.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{8x^3-8e^5x^2+\cdots}{4x^6-48x^4+144x^2+e^{-\frac{20x}{e^5-2x}}\left(4x^2-4e^5x+e^{10}\right)+e^5\left(-4x^5+48x^3-144x\right)+e^{10}\left(x^4-12x^2+36\right)+e^{-\frac{15x}{e^5-2x}}\cdots}$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{2e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(4e^{\frac{5x}{e^5-2x}}x^2-4e^{\frac{5x}{e^5-2x}+5}x+e^{\frac{5x}{e^5-2x}+10}-5e^5\right)}{\left(e^5-2x\right)^2\left(e^{\frac{10x}{e^5-2x}}\left(x^2-6\right)+2e^{\frac{5x}{e^5-2x}}x+1\right)^2}dx$$

$$\Big\downarrow \text{27}$$

$$2\int -\frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{\left(e^5-2x\right)^2\left(2e^{\frac{5x}{e^5-2x}}x-e^{\frac{10x}{e^5-2x}}\left(6-x^2\right)+1\right)^2}dx$$

$$\Big\downarrow \text{25}$$

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{\left(e^5-2x\right)^2\left(2e^{\frac{5x}{e^5-2x}}x-e^{\frac{10x}{e^5-2x}}\left(6-x^2\right)+1\right)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-2\int\left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+\cdots}\right.}{\left(e^5-2x\right)^2\left(6-x^2\right)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

3.1311.

$$\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-2x}}\left(2e^{10}-1\cdots\right.}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+x^4\right)+e^5\left(-144x+48x^3-4x^5\right)+e^{-\frac{10x}{e^5-2x}}\left(-48x^2\cdots\right.}$$

$\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+}\right.}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+}\right.}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+}\right.}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\downarrow$ 7293

3.1311.

$$\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-2x}}\left(2e^{10}-1\right.}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}(e^{10}-4e^5x+4x^2)+e^{-\frac{15x}{e^5-2x}}(4e^{10}x-16e^5x^2+16x^3)+e^{10}(36-12x^2+x^4)+e^5(-144x+48x^3-4x^5)+e^{-\frac{10x}{e^5-2x}}(-48x^2}$$

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+\cdots}}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+\cdots}}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+\cdots}}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+\cdots}}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

3.1311.

$$\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-2x}}(2e^{10}-1\cdots}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}(e^{10}-4e^5x+4x^2)+e^{-\frac{15x}{e^5-2x}}(4e^{10}x-16e^5x^2+16x^3)+e^{10}(36-12x^2+x^4)+e^5(-144x+48x^3-4x^5)+e^{-\frac{10x}{e^5-2x}}(-48x^2\cdots}$$

$\Big\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+\dots}\right.}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\Big\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\Big\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+\dots}\right.}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\Big\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\Big\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+\dots}\right.}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\Big\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\Big\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+\dots}\right.}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\Big\downarrow$ 7239

3.1311.

$$\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-2x}}(2e^{10}-1\dots}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}(e^{10}-4e^5x+4x^2)+e^{-\frac{15x}{e^5-2x}}(4e^{10}x-16e^5x^2+16x^3)+e^{10}(36-12x^2+x^4)+e^5(-144x+48x^3-4x^5)+e^{-\frac{10x}{e^5-2x}}(-48x^2\dots}$$

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\big\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+}\right.}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

$\big\downarrow$ 7239

$$-2\int \frac{e^{\frac{10x}{e^5-2x}}\left(e^{\frac{5x}{e^5-2x}}x+1\right)\left(-4e^{\frac{5x}{e^5-2x}}x^2+4e^{\frac{5x}{e^5-2x}+5}x-e^{\frac{5x}{e^5-2x}+10}+5e^5\right)}{(e^5-2x)^2\left(2e^{\frac{5x}{e^5-2x}}x+e^{\frac{10x}{e^5-2x}}(x^2-6)+1\right)^2}dx$$

$\big\downarrow$ 7293

$$-2\int \left(\frac{e^{\frac{10x}{e^5-2x}}\left(-4e^{\frac{5x}{e^5-2x}}x^4-e^{\frac{5x}{e^5-2x}+5}x^3-4x^3-24e^{\frac{5x}{e^5-2x}}\left(1+\frac{e^{10}}{24}\right)x^2-e^5x^2+54e^{\frac{5x}{e^5-2x}+5}x-e^{10}x-6e^{\frac{5x}{e^5-2x}+}\right.}{(e^5-2x)^2(6-x^2)\left(e^{\frac{10x}{e^5-2x}}x^2+2e^{\frac{5x}{e^5-2x}}x-6e^{\frac{10x}{e^5-2x}}+1\right)^2}\right.$$

input
```
Int[(-10*E^(5 - (10*x)/(E^5 - 2*x)) + 2*E^10*x - 8*E^5*x^2 + 8*x^3 + (2*E^
10 - 18*E^5*x + 8*x^2)/E^((5*x)/(E^5 - 2*x)))/(144*x^2 - 48*x^4 + 4*x^6 +
(E^10 - 4*E^5*x + 4*x^2)/E^((20*x)/(E^5 - 2*x)) + (4*E^10*x - 16*E^5*x^2 +
 16*x^3)/E^((15*x)/(E^5 - 2*x)) + E^10*(36 - 12*x^2 + x^4) + E^5*(-144*x +
 48*x^3 - 4*x^5) + (-48*x^2 + 24*x^4 + E^10*(-12 + 6*x^2) + E^5*(48*x - 24
*x^3))/E^((10*x)/(E^5 - 2*x)) + (-96*x^3 + 16*x^5 + E^10*(-24*x + 4*x^3) +
 E^5*(96*x^2 - 16*x^4))/E^((5*x)/(E^5 - 2*x))),x]
```

output
```
$Aborted
```

3.1311.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

3.1311.

$$\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-2x}}(2e^{10}-1}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}(e^{10}-4e^5x+4x^2)+e^{-\frac{15x}{e^5-2x}}(4e^{10}x-16e^5x^2+16x^3)+e^{10}(36-12x^2+x^4)+e^5(-144x+48x^3-4x^5)+e^{-\frac{10x}{e^5-2x}}(-48x^2}$$

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1311.4 Maple [A] (verified)

Time = 1.34 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.32

method	result	size
risch	$-\frac{1}{e^{-\frac{10x}{e^5-2x}}+2\,e^{-\frac{5x}{e^5-2x}}x+x^2-6}$	37
parallelrisch	$-\frac{1}{e^{-\frac{10x}{e^5-2x}}+2\,e^{-\frac{5x}{e^5-2x}}x+x^2-6}$	39

input
```
int((-10*exp(5)*exp(-5*x/(exp(5)-2*x))^2+(2*exp(5)^2-18*x*exp(5)+8*x^2)*ex
p(-5*x/(exp(5)-2*x))+2*x*exp(5)^2-8*x^2*exp(5)+8*x^3)/((exp(5)^2-4*x*exp(5
)+4*x^2)*exp(-5*x/(exp(5)-2*x))^4+(4*x*exp(5)^2-16*x^2*exp(5)+16*x^3)*exp(
-5*x/(exp(5)-2*x))^3+((6*x^2-12)*exp(5)^2+(-24*x^3+48*x)*exp(5)+24*x^4-48*
x^2)*exp(-5*x/(exp(5)-2*x))^2+((4*x^3-24*x)*exp(5)^2+(-16*x^4+96*x^2)*exp(
5)+16*x^5-96*x^3)*exp(-5*x/(exp(5)-2*x))+(x^4-12*x^2+36)*exp(5)^2+(-4*x^5+
48*x^3-144*x)*exp(5)+4*x^6-48*x^4+144*x^2),x,method=_RETURNVERBOSE)
```

output
```
-1/(exp(-10*x/(exp(5)-2*x))+2*exp(-5*x/(exp(5)-2*x))*x+x^2-6)
```

3.1311.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

$$\int \frac{-10e}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+\right.}$$
$$= -\frac{1}{x^2+2\,xe^{\left(\frac{5\,x}{2\,x-e^5}\right)}+e^{\left(\frac{10\,x}{2\,x-e^5}\right)}-6}$$

input
```
integrate((-10*exp(5)*exp(-5*x/(exp(5)-2*x))^2+(2*exp(5)^2-18*x*exp(5)+8*x
^2)*exp(-5*x/(exp(5)-2*x))+2*x*exp(5)^2-8*x^2*exp(5)+8*x^3)/((exp(5)^2-4*x
*exp(5)+4*x^2)*exp(-5*x/(exp(5)-2*x))^4+(4*x*exp(5)^2-16*x^2*exp(5)+16*x^3
)*exp(-5*x/(exp(5)-2*x))^3+((6*x^2-12)*exp(5)^2+(-24*x^3+48*x)*exp(5)+24*x
^4-48*x^2)*exp(-5*x/(exp(5)-2*x))^2+((4*x^3-24*x)*exp(5)^2+(-16*x^4+96*x^2
)*exp(5)+16*x^5-96*x^3)*exp(-5*x/(exp(5)-2*x))+(x^4-12*x^2+36)*exp(5)^2+(-
4*x^5+48*x^3-144*x)*exp(5)+4*x^6-48*x^4+144*x^2),x, algorithm=\
```

output
```
-1/(x^2 + 2*x*e^(5*x/(2*x - e^5)) + e^(10*x/(2*x - e^5)) - 6)
```

3.1311.6 Sympy [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.29

$$\int \frac{-10e}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+\right.}$$
$$=-\frac{1}{x^2+2xe^{-\frac{5x}{-2x+e^5}}-6+e^{-\frac{10x}{-2x+e^5}}}$$

input
```
integrate((-10*exp(5)*exp(-5*x/(exp(5)-2*x))**2+(2*exp(5)**2-18*x*exp(5)+8
*x**2)*exp(-5*x/(exp(5)-2*x))+2*x*exp(5)**2-8*x**2*exp(5)+8*x**3)/((exp(5)
**2-4*x*exp(5)+4*x**2)*exp(-5*x/(exp(5)-2*x))**4+(4*x*exp(5)**2-16*x**2*ex
p(5)+16*x**3)*exp(-5*x/(exp(5)-2*x))**3+((6*x**2-12)*exp(5)**2+(-24*x**3+4
8*x)*exp(5)+24*x**4-48*x**2)*exp(-5*x/(exp(5)-2*x))**2+((4*x**3-24*x)*exp(
5)**2+(-16*x**4+96*x**2)*exp(5)+16*x**5-96*x**3)*exp(-5*x/(exp(5)-2*x))+(x
**4-12*x**2+36)*exp(5)**2+(-4*x**5+48*x**3-144*x)*exp(5)+4*x**6-48*x**4+14
4*x**2),x)
```

output
```
-1/(x**2 + 2*x*exp(-5*x/(-2*x + exp(5))) - 6 + exp(-10*x/(-2*x + exp(5))))
```

3.1311.

$$\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-2x}}\left(2e^{10}-1\right.}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+x^4\right)+e^5\left(-144x+48x^3-4x^5\right)+e^{-\frac{10x}{e^5-2x}}\left(-48x^2\right.}$$

3.1311.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.64

$$\int \frac{-10e}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+\right.}$$
$$=-\frac{1}{x^2+2\,xe^{\left(\frac{5\,e^5}{2\,(2\,x-e^5)}+\frac{5}{2}\right)}+e^{\left(\frac{5\,e^5}{2\,x-e^5}+5\right)}-6}$$

input
```
integrate((-10*exp(5)*exp(-5*x/(exp(5)-2*x))^2+(2*exp(5)^2-18*x*exp(5)+8*x
^2)*exp(-5*x/(exp(5)-2*x))+2*x*exp(5)^2-8*x^2*exp(5)+8*x^3)/((exp(5)^2-4*x
*exp(5)+4*x^2)*exp(-5*x/(exp(5)-2*x))^4+(4*x*exp(5)^2-16*x^2*exp(5)+16*x^3
)*exp(-5*x/(exp(5)-2*x))^3+((6*x^2-12)*exp(5)^2+(-24*x^3+48*x)*exp(5)+24*x
^4-48*x^2)*exp(-5*x/(exp(5)-2*x))^2+((4*x^3-24*x)*exp(5)^2+(-16*x^4+96*x^2
)*exp(5)+16*x^5-96*x^3)*exp(-5*x/(exp(5)-2*x))+(x^4-12*x^2+36)*exp(5)^2+(-
4*x^5+48*x^3-144*x)*exp(5)+4*x^6-48*x^4+144*x^2),x, algorithm=\
```

output
```
-1/(x^2 + 2*x*e^(5/2*e^5/(2*x - e^5) + 5/2) + e^(5*e^5/(2*x - e^5) + 5) -
6)
```

3.1311.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 219 vs. $2(26) = 52$.

Time = 9.32 (sec) , antiderivative size = 219, normalized size of antiderivative = 7.82

$$\int \frac{-10e}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+\right.}$$
$$=\frac{2\left(\frac{4\,xe^5}{2\,x-e^5}-\frac{4\,x^2e^5}{(2\,x-e^5)^2}-e^5\right)e^{(-5)}}{\frac{x^2e^{10}}{(2\,x-e^5)^2}-\frac{4\,xe^{\left(\frac{10\,x}{2\,x-e^5}\right)}}{2\,x-e^5}+\frac{4\,x^2e^{\left(\frac{10\,x}{2\,x-e^5}\right)}}{(2\,x-e^5)^2}-\frac{2\,xe^{\left(\frac{5\,x}{2\,x-e^5}+5\right)}}{2\,x-e^5}+\frac{4\,x^2e^{\left(\frac{5\,x}{2\,x-e^5}+5\right)}}{(2\,x-e^5)^2}+\frac{24\,x}{2\,x-e^5}-\frac{24\,x^2}{(2\,x-e^5)^2}+e^{\left(\frac{10\,x}{2\,x-e^5}\right)}-6}$$

input
```
integrate((-10*exp(5)*exp(-5*x/(exp(5)-2*x))^2+(2*exp(5)^2-18*x*exp(5)+8*x
^2)*exp(-5*x/(exp(5)-2*x))+2*x*exp(5)^2-8*x^2*exp(5)+8*x^3)/((exp(5)^2-4*x
*exp(5)+4*x^2)*exp(-5*x/(exp(5)-2*x))^4+(4*x*exp(5)^2-16*x^2*exp(5)+16*x^3
)*exp(-5*x/(exp(5)-2*x))^3+((6*x^2-12)*exp(5)^2+(-24*x^3+48*x)*exp(5)+24*x
^4-48*x^2)*exp(-5*x/(exp(5)-2*x))^2+((4*x^3-24*x)*exp(5)^2+(-16*x^4+96*x^2
)*exp(5)+16*x^5-96*x^3)*exp(-5*x/(exp(5)-2*x))+(x^4-12*x^2+36)*exp(5)^2+(-
4*x^5+48*x^3-144*x)*exp(5)+4*x^6-48*x^4+144*x^2),x, algorithm=\
```


$$\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-2x}}\left(2e^{10}-1\right.}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+x^4\right)+e^5\left(-144x+48x^3-4x^5\right)+e^{-\frac{10x}{e^5-2x}}\left(-48x^2\right.}$$

output
```
2*(4*x*e^5/(2*x - e^5) - 4*x^2*e^5/(2*x - e^5)^2 - e^5)*e^(-5)/(x^2*e^10/(
2*x - e^5)^2 - 4*x*e^(10*x/(2*x - e^5))/(2*x - e^5) + 4*x^2*e^(10*x/(2*x -
 e^5))/(2*x - e^5)^2 - 2*x*e^(5*x/(2*x - e^5) + 5)/(2*x - e^5) + 4*x^2*e^(
5*x/(2*x - e^5) + 5)/(2*x - e^5)^2 + 24*x/(2*x - e^5) - 24*x^2/(2*x - e^5)
^2 + e^(10*x/(2*x - e^5)) - 6)
```

3.1311.9 Mupad [B] (verification not implemented)

Time = 19.56 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.43

$$\int \frac{-10e}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}\left(36-12x^2+\right.}$$
$$=-\frac{1}{\mathrm{e}^{\frac{10\,x}{2\,x-\mathrm{e}^5}}+2\,x\,\mathrm{e}^{\frac{5\,x}{2\,x-\mathrm{e}^5}}+x^2-6}$$

input
```
int((2*x*exp(10) - 10*exp(5)*exp((10*x)/(2*x - exp(5))) + exp((5*x)/(2*x -
 exp(5)))*(2*exp(10) - 18*x*exp(5) + 8*x^2) - 8*x^2*exp(5) + 8*x^3)/(exp((
20*x)/(2*x - exp(5)))*(exp(10) - 4*x*exp(5) + 4*x^2) + exp(10)*(x^4 - 12*x
^2 + 36) + exp((10*x)/(2*x - exp(5)))*(exp(5)*(48*x - 24*x^3) + exp(10)*(6
*x^2 - 12) - 48*x^2 + 24*x^4) + exp((15*x)/(2*x - exp(5)))*(4*x*exp(10) -
16*x^2*exp(5) + 16*x^3) - exp(5)*(144*x - 48*x^3 + 4*x^5) - exp((5*x)/(2*x
 - exp(5)))*(exp(10)*(24*x - 4*x^3) - exp(5)*(96*x^2 - 16*x^4) + 96*x^3 -
16*x^5) + 144*x^2 - 48*x^4 + 4*x^6),x)
```

output
```
-1/(exp((10*x)/(2*x - exp(5))) + 2*x*exp((5*x)/(2*x - exp(5))) + x^2 - 6)
```

3.1311.

$$\int \frac{-10e^{5-\frac{10x}{e^5-2x}}+2e^{10}x-8e^5x^2+8x^3+e^{-\frac{5x}{e^5-2x}}\left(2e^{10}-1\right.}{144x^2-48x^4+4x^6+e^{-\frac{20x}{e^5-2x}}\left(e^{10}-4e^5x+4x^2\right)+e^{-\frac{15x}{e^5-2x}}\left(4e^{10}x-16e^5x^2+16x^3\right)+e^{10}(36-12x^2+x^4)+e^5(-144x+48x^3-4x^5)+e^{-\frac{10x}{e^5-2x}}(-48x^2}$$

3.1312 $\int \frac{1}{8}\left(8+e^{-2-e^x+x}(-8+8e^x)+x\right)\,dx$

3.1312.1 Optimal result

Integrand size = 25, antiderivative size = 22

$$\int \frac{1}{8}\left(8+e^{-2-e^x+x}(-8+8e^x)+x\right)\,dx=-4-e^{-2-e^x+x}+x+\frac{x^2}{16}$$

output
```
-4+x+1/16*x^2-exp(-exp(x)+x-2)
```

3.1312.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{1}{8}\left(8+e^{-2-e^x+x}(-8+8e^x)+x\right)\,dx=-e^{-2-e^x+x}+x+\frac{x^2}{16}$$

input
```
Integrate[(8 + E^(-2 - E^x + x)*(-8 + 8*E^x) + x)/8,x]
```

output
```
-E^(-2 - E^x + x) + x + x^2/16
```

3.1312.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 44, normalized size of antiderivative = 2.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{8}\left(e^{x-e^x-2}(8e^x-8)+x+8\right)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{8}\int \left(-8e^{x-e^x-2}(1-e^x)+x+8\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{8}\left(\frac{x^2}{2}+8x-8e^{-e^x-2}+8e^{-e^x-2}(1-e^x)\right)$$

input
```
Int[(8 + E^(-2 - E^x + x)*(-8 + 8*E^x) + x)/8,x]
```

output
```
(-8*E^(-2 - E^x) + 8*E^(-2 - E^x)*(1 - E^x) + 8*x + x^2/2)/8
```

3.1312.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1312.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

method	result	size
norman	$x+\frac{x^2}{16}-\mathrm{e}^{-\mathrm{e}^x+x-2}$	18
risch	$x+\frac{x^2}{16}-\mathrm{e}^{-\mathrm{e}^x+x-2}$	18
parallelrisch	$x+\frac{x^2}{16}-\mathrm{e}^{-\mathrm{e}^x+x-2}$	18
default	$x+\frac{x^2}{16}+\mathrm{e}^{-2}\left(-\mathrm{e}^{-\mathrm{e}^x}\mathrm{e}^x-\mathrm{e}^{-\mathrm{e}^x}\right)+\mathrm{e}^{-2}\mathrm{e}^{-\mathrm{e}^x}$	36
parts	$x+\frac{x^2}{16}+\mathrm{e}^{-2}\left(-\mathrm{e}^{-\mathrm{e}^x}\mathrm{e}^x-\mathrm{e}^{-\mathrm{e}^x}\right)+\mathrm{e}^{-2}\mathrm{e}^{-\mathrm{e}^x}$	36

input
```
int(1/8*(8*exp(x)-8)*exp(-exp(x)+x-2)+1/8*x+1,x,method=_RETURNVERBOSE)
```

output
```
x+1/16*x^2-exp(-exp(x)+x-2)
```

3.1312.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{1}{8}\left(8+e^{-2-e^x+x}(-8+8e^x)+x\right)\,dx=\frac{1}{16}\,x^2+x-e^{(x-e^x-2)}$$

input
```
integrate(1/8*(8*exp(x)-8)*exp(-exp(x)+x-2)+1/8*x+1,x, algorithm=\
```

output
```
1/16*x^2 + x - e^(x - e^x - 2)
```

3.1312.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.64

$$\int \frac{1}{8}\left(8+e^{-2-e^x+x}(-8+8e^x)+x\right)\,dx=\frac{x^2}{16}+x-e^{x-e^x-2}$$

input
```
integrate(1/8*(8*exp(x)-8)*exp(-exp(x)+x-2)+1/8*x+1,x)
```

output
```
x**2/16 + x - exp(x - exp(x) - 2)
```

3.1312.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{1}{8}\left(8+e^{-2-e^x+x}(-8+8e^x)+x\right)\,dx=\frac{1}{16}\,x^2+x-e^{(x-e^x-2)}$$

input
```
integrate(1/8*(8*exp(x)-8)*exp(-exp(x)+x-2)+1/8*x+1,x, algorithm=\
```

output
```
1/16*x^2 + x - e^(x - e^x - 2)
```

3.1312.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.77

$$\int \frac{1}{8}\left(8+e^{-2-e^x+x}(-8+8e^x)+x\right)\,dx=\frac{1}{16}\,x^2+x-e^{(x-e^x-2)}$$

input
```
integrate(1/8*(8*exp(x)-8)*exp(-exp(x)+x-2)+1/8*x+1,x, algorithm=\
```

output
```
1/16*x^2 + x - e^(x - e^x - 2)
```

3.1312.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{1}{8}\left(8+e^{-2-e^x+x}(-8+8e^x)+x\right)\,dx=x+\frac{x^2}{16}-\mathrm{e}^{-2}\,\mathrm{e}^{-\mathrm{e}^x}\,\mathrm{e}^x$$

input
```
int(x/8 + (exp(x - exp(x) - 2)*(8*exp(x) - 8))/8 + 1,x)
```

output
```
x + x^2/16 - exp(-2)*exp(-exp(x))*exp(x)
```

3.1313 $\int \frac{87+3x-87x^2-3x^3+(-87-6x-87x^2)\log(x)}{(1-2x^2+x^4)\log^2(x)}\,dx$

3.1313.1 Optimal result

Integrand size = 45, antiderivative size = 18

$$\int \frac{87+3x-87x^2-3x^3+(-87-6x-87x^2)\log(x)}{(1-2x^2+x^4)\log^2(x)}\,dx = \frac{3(29+x)}{\left(-\frac{1}{x}+x\right)\log(x)}$$

output
```
3/ln(x)/(x-1/x)*(x+29)
```

3.1313.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{87+3x-87x^2-3x^3+(-87-6x-87x^2)\log(x)}{(1-2x^2+x^4)\log^2(x)}\,dx = \frac{3x(29+x)}{(-1+x^2)\log(x)}$$

input
```
Integrate[(87 + 3*x - 87*x^2 - 3*x^3 + (-87 - 6*x - 87*x^2)*Log[x])/((1 -
2*x^2 + x^4)*Log[x]^2),x]
```

output
```
(3*x*(29 + x))/((-1 + x^2)*Log[x])
```

3.1313.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-3x^3-87x^2+\left(-87x^2-6x-87\right)\log(x)+3x+87}{\left(x^4-2x^2+1\right)\log^2(x)}dx$$

$$\Big\downarrow \text{1380}$$

$$\int \frac{3\left(-x^3-29x^2-\left(29x^2+2x+29\right)\log(x)+x+29\right)}{\left(1-x^2\right)^2\log^2(x)}dx$$

$$\Big\downarrow \text{27}$$

$$3\int \frac{-x^3-29x^2+x-\left(29x^2+2x+29\right)\log(x)+29}{\left(1-x^2\right)^2\log^2(x)}dx$$

$$\Big\downarrow \text{7293}$$

$$3\int \left(\frac{-x-29}{\left(x^2-1\right)\log^2(x)}+\frac{-29x^2-2x-29}{\left(x^2-1\right)^2\log(x)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$3\left(\int \frac{-x-29}{\left(x^2-1\right)\log^2(x)}dx+\int \frac{-29x^2-2x-29}{\left(x^2-1\right)^2\log(x)}dx\right)$$

input
```
Int[(87 + 3*x - 87*x^2 - 3*x^3 + (-87 - 6*x - 87*x^2)*Log[x])/((1 - 2*x^2
+ x^4)*Log[x]^2),x]
```

output
```
$Aborted
```

3.1313.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1380
```
Int[(u_)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> S
imp[1/c^p   Int[u*(b/2 + c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n, p}, x]
&& EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1313.4 Maple [A] (verified)

Time = 0.98 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.00

method	result	size
risch	$\frac{3x(x+29)}{(x^2-1)\ln(x)}$	18
norman	$\frac{3x^2+87x}{(x^2-1)\ln(x)}$	22
parallelrisch	$\frac{3x^2+87x}{(x^2-1)\ln(x)}$	22

input
```
int(((-87*x^2-6*x-87)*ln(x)-3*x^3-87*x^2+3*x+87)/(x^4-2*x^2+1)/ln(x)^2,x,m
ethod=_RETURNVERBOSE)
```

output
```
3*x*(x+29)/(x^2-1)/ln(x)
```

3.1313.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{87+3x-87x^2-3x^3+(-87-6x-87x^2)\log(x)}{(1-2x^2+x^4)\log^2(x)}\,dx = \frac{3\,(x^2+29\,x)}{(x^2-1)\log{(x)}}$$

input
```
integrate(((-87*x^2-6*x-87)*log(x)-3*x^3-87*x^2+3*x+87)/(x^4-2*x^2+1)/log(
x)^2,x, algorithm=\
```

output
```
3*(x^2 + 29*x)/((x^2 - 1)*log(x))
```

3.1313.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

$$\int \frac{87+3x-87x^2-3x^3+(-87-6x-87x^2)\log(x)}{(1-2x^2+x^4)\log^2(x)}\,dx = \frac{3x^2+87x}{(x^2-1)\log(x)}$$

input
```
integrate(((-87*x**2-6*x-87)*ln(x)-3*x**3-87*x**2+3*x+87)/(x**4-2*x**2+1)/
ln(x)**2,x)
```

output
```
(3*x**2 + 87*x)/((x**2 - 1)*log(x))
```

3.1313.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.11

$$\int \frac{87+3x-87x^2-3x^3+(-87-6x-87x^2)\log(x)}{(1-2x^2+x^4)\log^2(x)}\,dx = \frac{3(x^2+29x)}{(x^2-1)\log(x)}$$

input
```
integrate(((-87*x^2-6*x-87)*log(x)-3*x^3-87*x^2+3*x+87)/(x^4-2*x^2+1)/log(
x)^2,x, algorithm=\
```

output
```
3*(x^2 + 29*x)/((x^2 - 1)*log(x))
```

3.1313.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{87+3x-87x^2-3x^3+(-87-6x-87x^2)\log(x)}{(1-2x^2+x^4)\log^2(x)}\,dx = \frac{3(x^2+29x)}{x^2\log(x)-\log(x)}$$

input
```
integrate(((-87*x^2-6*x-87)*log(x)-3*x^3-87*x^2+3*x+87)/(x^4-2*x^2+1)/log(
x)^2,x, algorithm=\
```

output
```
3*(x^2 + 29*x)/(x^2*log(x) - log(x))
```

3.1313.9 Mupad [B] (verification not implemented)

Time = 17.13 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{87+3x-87x^2-3x^3+(-87-6x-87x^2)\log(x)}{(1-2x^2+x^4)\log^2(x)}\,dx = \frac{3\,x\,(x+29)}{\ln(x)\,\left(x^2-1\right)}$$

input
```
int(-(log(x)*(6*x + 87*x^2 + 87) - 3*x + 87*x^2 + 3*x^3 - 87)/(log(x)^2*(x
^4 - 2*x^2 + 1)),x)
```

output
```
(3*x*(x + 29))/(log(x)*(x^2 - 1))
```

3.1314 $\int \left(-e^{21}+e^{4+x}(-15-15x)+60x-e^{21}\log(x)\right)\,dx$

3.1314.1 Optimal result

Integrand size = 27, antiderivative size = 23

$$\int \left(-e^{21}+e^{4+x}(-15-15x)+60x-e^{21}\log(x)\right)\,dx=x\left(15\left(-e^{4+x}+2x\right)-e^{21}\log(x)\right)$$

output
```
(30*x-15*exp(4+x)-exp(21)*ln(x))*x
```

3.1314.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \left(-e^{21}+e^{4+x}(-15-15x)+60x-e^{21}\log(x)\right)\,dx=-15e^{4+x}x+30x^2-e^{21}x\log(x)$$

input
```
Integrate[-E^21 + E^(4 + x)*(-15 - 15*x) + 60*x - E^21*Log[x],x]
```

output
```
-15*E^(4 + x)*x + 30*x^2 - E^21*x*Log[x]
```

3.1314.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(e^{x+4}(-15x-15)+60x-e^{21}\log(x)-e^{21}\right)\,dx$$

$$\Big\downarrow \text{ 2009}$$

$$30x^2+15e^{x+4}-15e^{x+4}(x+1)-e^{21}x\log(x)$$

input
```
Int[-E^21 + E^(4 + x)*(-15 - 15*x) + 60*x - E^21*Log[x],x]
```

output
```
15*E^(4 + x) + 30*x^2 - 15*E^(4 + x)*(1 + x) - E^21*x*Log[x]
```

3.1314.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1314.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.91

method	result	size
norman	$30x^2-15x\,\mathrm{e}^{4+x}-x\,\mathrm{e}^{21}\ln(x)$	21
risch	$30x^2-15x\,\mathrm{e}^{4+x}-x\,\mathrm{e}^{21}\ln(x)$	21
parallelrisch	$30x^2-15x\,\mathrm{e}^{4+x}-x\,\mathrm{e}^{21}\ln(x)$	21
default	$-15\,\mathrm{e}^{4+x}(4+x)+60\,\mathrm{e}^{4+x}+30x^2-\mathrm{e}^{21}(x\ln(x)-x)-x\,\mathrm{e}^{21}$	39
parts	$-15\,\mathrm{e}^{4+x}(4+x)+60\,\mathrm{e}^{4+x}+30x^2-\mathrm{e}^{21}(x\ln(x)-x)-x\,\mathrm{e}^{21}$	39

input
```
int(-exp(21)*ln(x)+(-15*x-15)*exp(4+x)-exp(21)+60*x,x,method=_RETURNVERBOS
E)
```

output
```
30*x^2-15*x*exp(4+x)-x*exp(21)*ln(x)
```

3.1314.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \left(-e^{21}+e^{4+x}(-15-15x)+60x-e^{21}\log(x)\right)\,dx=-xe^{21}\log\left(x\right)+30\,x^2-15\,xe^{(x+4)}$$

input
```
integrate(-exp(21)*log(x)+(-15*x-15)*exp(4+x)-exp(21)+60*x,x, algorithm=\
```

output
```
-x*e^21*log(x) + 30*x^2 - 15*x*e^(x + 4)
```

3.1314.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \left(-e^{21}+e^{4+x}(-15-15x)+60x-e^{21}\log(x)\right)\,dx=30x^2-15xe^{x+4}-xe^{21}\log\left(x\right)$$

input
```
integrate(-exp(21)*ln(x)+(-15*x-15)*exp(4+x)-exp(21)+60*x,x)
```

output
```
30*x**2 - 15*x*exp(x + 4) - x*exp(21)*log(x)
```

3.1314.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \left(-e^{21}+e^{4+x}(-15-15x)+60x-e^{21}\log(x)\right)\,dx$$
$$=30\,x^2-(x\log\left(x\right)-x)e^{21}-xe^{21}-15\,xe^{(x+4)}$$

input
```
integrate(-exp(21)*log(x)+(-15*x-15)*exp(4+x)-exp(21)+60*x,x, algorithm=\
```

output
```
30*x^2 - (x*log(x) - x)*e^21 - x*e^21 - 15*x*e^(x + 4)
```

3.1314.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.30

$$\int \left(-e^{21}+e^{4+x}(-15-15x)+60x-e^{21}\log(x)\right)\,dx$$
$$=30\,x^2-(x\log(x)-x)e^{21}-xe^{21}-15\,xe^{(x+4)}$$

input
```
integrate(-exp(21)*log(x)+(-15*x-15)*exp(4+x)-exp(21)+60*x,x, algorithm=\
```

output
```
30*x^2 - (x*log(x) - x)*e^21 - x*e^21 - 15*x*e^(x + 4)
```

3.1314.9 Mupad [B] (verification not implemented)

Time = 16.43 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

$$\int \left(-e^{21}+e^{4+x}(-15-15x)+60x-e^{21}\log(x)\right)\,dx=-x\left(15\,\mathrm{e}^{x+4}-30\,x+\mathrm{e}^{21}\,\ln(x)\right)$$

input
```
int(60*x - exp(21) - exp(21)*log(x) - exp(x + 4)*(15*x + 15),x)
```

output
```
-x*(15*exp(x + 4) - 30*x + exp(21)*log(x))
```

3.1315 $\int \frac{4x+2e^{40}x^2+2x^4+e^{20}(-2-4x^3)}{e^{40}x^2-2e^{20}x^3+x^4}\,dx$

3.1315.1 Optimal result

Integrand size = 50, antiderivative size = 27

$$\int \frac{4x+2e^{40}x^2+2x^4+e^{20}(-2-4x^3)}{e^{40}x^2-2e^{20}x^3+x^4}\,dx=-\frac{e^{4/3}}{3}+2\left(\frac{1}{(e^{20}-x)\,x}+x\right)$$

output
```
2*x+2/x/(exp(5)^4-x)-1/3*exp(4/3)
```

3.1315.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{4x+2e^{40}x^2+2x^4+e^{20}(-2-4x^3)}{e^{40}x^2-2e^{20}x^3+x^4}\,dx=2\left(\frac{1}{e^{20}x}+x-\frac{1}{e^{20}\,(-e^{20}+x)}\right)$$

input
```
Integrate[(4*x + 2*E^40*x^2 + 2*x^4 + E^20*(-2 - 4*x^3))/(E^40*x^2 - 2*E^2
0*x^3 + x^4),x]
```

output
```
2*(1/(E^20*x) + x - 1/(E^20*(-E^20 + x)))
```

3.1315.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.060, Rules used = {2026, 2159, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^4+e^{20}\left(-4x^3-2\right)+2e^{40}x^2+4x}{x^4-2e^{20}x^3+e^{40}x^2}dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{2x^4+e^{20}\left(-4x^3-2\right)+2e^{40}x^2+4x}{x^2\left(x^2-2e^{20}x+e^{40}\right)}dx$$

$$\Big\downarrow \text{2159}$$

$$\int \left(-\frac{2}{e^{20}x^2}+\frac{2}{e^{20}\left(e^{20}-x\right)^2}+2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2x+\frac{2}{e^{20}\left(e^{20}-x\right)}+\frac{2}{e^{20}x}$$

input
```
Int[(4*x + 2*E^40*x^2 + 2*x^4 + E^20*(-2 - 4*x^3))/(E^40*x^2 - 2*E^20*x^3
+ x^4),x]
```

output
```
2/(E^20*(E^20 - x)) + 2/(E^20*x) + 2*x
```

3.1315.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] && !MonomialQ[Px, x] && (ILtQ[p, 0] || !PolyQ[u, x])
```

rule 2159
```
Int[(Pq_)*((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p
_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*Pq*(a + b*x + c*x^2)^p, x
], x] /; FreeQ[{a, b, c, d, e, m}, x] && PolyQ[Pq, x] && IGtQ[p, -2]
```

3.1315.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.67

method	result	size
risch	$2x+\frac{2}{x\left(\mathrm{e}^{20}-x\right)}$	18
gosper	$\frac{-2x^{3}+2+2\,\mathrm{e}^{40}x}{x\left(\mathrm{e}^{20}-x\right)}$	29
norman	$\frac{-2x^{3}+2+2\,\mathrm{e}^{40}x}{x\left(\mathrm{e}^{20}-x\right)}$	29
parallelrisch	$\frac{-2x^{3}+2+2\,\mathrm{e}^{40}x}{x\left(\mathrm{e}^{20}-x\right)}$	29

input
```
int((2*x^2*exp(5)^8+(-4*x^3-2)*exp(5)^4+2*x^4+4*x)/(x^2*exp(5)^8-2*x^3*exp
(5)^4+x^4),x,method=_RETURNVERBOSE)
```

output
```
2*x+2/x/(exp(20)-x)
```

3.1315.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.93

$$\int \frac{4x+2e^{40}x^2+2x^4+e^{20}(-2-4x^3)}{e^{40}x^2-2e^{20}x^3+x^4}\,dx=\frac{2\left(x^3-x^2e^{20}-1\right)}{x^2-xe^{20}}$$

input
```
integrate((2*x^2*exp(5)^8+(-4*x^3-2)*exp(5)^4+2*x^4+4*x)/(x^2*exp(5)^8-2*x
^3*exp(5)^4+x^4),x, algorithm=\
```

output
```
2*(x^3 - x^2*e^20 - 1)/(x^2 - x*e^20)
```

3.1315.6 Sympy [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.44

$$\int \frac{4x + 2e^{40}x^2 + 2x^4 + e^{20}(-2 - 4x^3)}{e^{40}x^2 - 2e^{20}x^3 + x^4}\,dx = 2x - \frac{2}{x^2 - xe^{20}}$$

input
```
integrate((2*x**2*exp(5)**8+(-4*x**3-2)*exp(5)**4+2*x**4+4*x)/(x**2*exp(5)
**8-2*x**3*exp(5)**4+x**4),x)
```

output
```
2*x - 2/(x**2 - x*exp(20))
```

3.1315.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{4x + 2e^{40}x^2 + 2x^4 + e^{20}(-2 - 4x^3)}{e^{40}x^2 - 2e^{20}x^3 + x^4}\,dx = 2\,x - \frac{2}{x^2 - xe^{20}}$$

input
```
integrate((2*x^2*exp(5)^8+(-4*x^3-2)*exp(5)^4+2*x^4+4*x)/(x^2*exp(5)^8-2*x
^3*exp(5)^4+x^4),x, algorithm=\
```

output
```
2*x - 2/(x^2 - x*e^20)
```

3.1315.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{4x + 2e^{40}x^2 + 2x^4 + e^{20}(-2 - 4x^3)}{e^{40}x^2 - 2e^{20}x^3 + x^4}\,dx = 2\,x - \frac{2}{x^2 - xe^{20}}$$

input
```
integrate((2*x^2*exp(5)^8+(-4*x^3-2)*exp(5)^4+2*x^4+4*x)/(x^2*exp(5)^8-2*x
^3*exp(5)^4+x^4),x, algorithm=\
```

output
```
2*x - 2/(x^2 - x*e^20)
```

3.1315.9 Mupad [B] (verification not implemented)

Time = 16.53 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.63

$$\int \frac{4x + 2e^{40}x^2 + 2x^4 + e^{20}(-2 - 4x^3)}{e^{40}x^2 - 2e^{20}x^3 + x^4}\,dx = 2\,x - \frac{2}{x\,\left(x - \mathrm{e}^{20}\right)}$$

input
```
int((4*x - exp(20)*(4*x^3 + 2) + 2*x^2*exp(40) + 2*x^4)/(x^2*exp(40) - 2*x
^3*exp(20) + x^4),x)
```

output
```
2*x - 2/(x*(x - exp(20)))
```

3.1316 $\int \frac{1}{125} e^{\frac{7500-9x^4}{2500}} \left(750 e^{\frac{-7500+9x^4}{2500}}-9x^3\right) \, dx$

3.1316.1 Optimal result

Integrand size = 38, antiderivative size = 18

$$\int \frac{1}{125} e^{\frac{7500-9x^4}{2500}} \left(750 e^{\frac{-7500+9x^4}{2500}}-9x^3\right) \, dx=-2+x+5\left(e^{3-\frac{9x^4}{2500}}+x\right)$$

output
```
5/exp(9/2500*x^4-3)+6*x-2
```

3.1316.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.94

$$\int \frac{1}{125} e^{\frac{7500-9x^4}{2500}} \left(750 e^{\frac{-7500+9x^4}{2500}}-9x^3\right) \, dx=5e^{3-\frac{9x^4}{2500}}+6x$$

input
```
Integrate[(E^((7500 - 9*x^4)/2500)*(750*E^((-7500 + 9*x^4)/2500) - 9*x^3))
/125,x]
```

output
```
5*E^(3 - (9*x^4)/2500) + 6*x
```

3.1316.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.28, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$, Rules used = {27, 27, 7239, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{125} e^{\frac{7500-9x^4}{2500}} \left(750 e^{\frac{9x^4-7500}{2500}} - 9x^3\right) \, dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{125} \int 3 e^{\frac{3\left(2500-3x^4\right)}{2500}} \left(250 e^{-\frac{3\left(2500-3x^4\right)}{2500}} - 3x^3\right) dx$$

$$\Big\downarrow \text{27}$$

$$\frac{3}{125} \int e^{\frac{3\left(2500-3x^4\right)}{2500}} \left(250 e^{-\frac{3\left(2500-3x^4\right)}{2500}} - 3x^3\right) dx$$

$$\Big\downarrow \text{7239}$$

$$\frac{3}{125} \int \left(250 - 3 e^{3-\frac{9x^4}{2500}} x^3\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{3}{125} \left(\frac{625}{3} e^{3-\frac{9x^4}{2500}} + 250x\right)$$

input
```
Int[(E^((7500 - 9*x^4)/2500)*(750*E^((-7500 + 9*x^4)/2500) - 9*x^3))/125,x
]
```

output
```
(3*((625*E^(3 - (9*x^4)/2500))/3 + 250*x))/125
```

3.1316.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

3.1316.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.83

method	result
risch	$6x+5\,\mathrm{e}^{-\frac{9x^4}{2500}+3}$
parts	$6x+5\,\mathrm{e}^{-\frac{9x^4}{2500}+3}$
default	$6x+5\,\mathrm{e}^{-\frac{9x^4}{2500}}\mathrm{e}^3$
norman	$\left(5+6x\,\mathrm{e}^{\frac{9x^4}{2500}-3}\right)\mathrm{e}^{-\frac{9x^4}{2500}+3}$
parallelrisch	$\frac{\left(750x\,\mathrm{e}^{\frac{9x^4}{2500}-3}+625\right)\mathrm{e}^{-\frac{9x^4}{2500}+3}}{125}$
meijerg	$-\frac{5\sqrt{3}\,\sqrt{2}\,(-1)^{\frac{3}{4}}\mathrm{e}^{-\frac{9x^4}{2500}+\frac{9x^4\mathrm{e}^3}{2500}}\left(\frac{\sqrt{2}\,x(-1)^{\frac{1}{4}}\left(-\mathrm{e}^3+1\right)^{\frac{1}{4}}\pi}{\left(-x^4\left(-\mathrm{e}^3+1\right)\right)^{\frac{1}{4}}\Gamma\left(\frac{3}{4}\right)}-\frac{(-1)^{\frac{1}{4}}x\left(-\mathrm{e}^3+1\right)^{\frac{1}{4}}\Gamma\left(\frac{1}{4},-\frac{9x^4\left(-\mathrm{e}^3+1\right)}{2500}\right)}{\left(-x^4\left(-\mathrm{e}^3+1\right)\right)^{\frac{1}{4}}}\right)}{2(-\mathrm{e}^3+1)^{\frac{1}{4}}}-5\,\mathrm{e}^{-\frac{9x^4}{2500}+\frac{9x^4\mathrm{e}^3}{2500}}\Big($

input
```
int(1/125*(750*exp(9/2500*x^4-3)-9*x^3)/exp(9/2500*x^4-3),x,method=_RETURN
VERBOSE)
```

output
```
6*x+5*exp(-9/2500*x^4+3)
```

3.1316.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.22

$$\int \frac{1}{125}e^{\frac{7500-9x^4}{2500}}\left(750e^{\frac{-7500+9x^4}{2500}}-9x^3\right)\,dx=\left(6\,xe^{\left(\frac{9}{2500}\,x^4-3\right)}+5\right)e^{\left(-\frac{9}{2500}\,x^4+3\right)}$$

input
```
integrate(1/125*(750*exp(9/2500*x^4-3)-9*x^3)/exp(9/2500*x^4-3),x, algorit
hm=\
```

output
```
(6*x*e^(9/2500*x^4 - 3) + 5)*e^(-9/2500*x^4 + 3)
```

3.1316.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{1}{125}e^{\frac{7500-9x^4}{2500}}\left(750e^{\frac{-7500+9x^4}{2500}}-9x^3\right)\,dx=6x+5e^{3-\frac{9x^4}{2500}}$$

input
```
integrate(1/125*(750*exp(9/2500*x**4-3)-9*x**3)/exp(9/2500*x**4-3),x)
```

output
```
6*x + 5*exp(3 - 9*x**4/2500)
```

3.1316.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{1}{125}e^{\frac{7500-9x^4}{2500}}\left(750e^{\frac{-7500+9x^4}{2500}}-9x^3\right)\,dx=6\,x+5\,e^{\left(-\frac{9}{2500}\,x^4+3\right)}$$

input
```
integrate(1/125*(750*exp(9/2500*x^4-3)-9*x^3)/exp(9/2500*x^4-3),x, algorit
hm=\
```

output
```
6*x + 5*e^(-9/2500*x^4 + 3)
```

3.1316.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{1}{125} e^{\frac{7500-9x^4}{2500}} \left(750 e^{\frac{-7500+9x^4}{2500}} - 9x^3\right) dx = 6\,x + 5\,e^{\left(-\frac{9}{2500}\,x^4+3\right)}$$

input
```
integrate(1/125*(750*exp(9/2500*x^4-3)-9*x^3)/exp(9/2500*x^4-3),x, algorit
hm=\
```

output
```
6*x + 5*e^(-9/2500*x^4 + 3)
```

3.1316.9 Mupad [B] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.78

$$\int \frac{1}{125} e^{\frac{7500-9x^4}{2500}} \left(750 e^{\frac{-7500+9x^4}{2500}} - 9x^3\right) dx = 6\,x + 5\,\mathrm{e}^{3-\frac{9\,x^4}{2500}}$$

input
```
int(exp(3 - (9*x^4)/2500)*(6*exp((9*x^4)/2500 - 3) - (9*x^3)/125),x)
```

output
```
6*x + 5*exp(3 - (9*x^4)/2500)
```

3.1317 $\int \frac{1}{4}(12e^{8+3x} + e^{2x}(e^4(-32+32x) + e^8(16+32x+$

3.1317.1 Optimal result

Integrand size = 101, antiderivative size = 30

$$\int \frac{1}{4}\left(12e^{8+3x} + e^{2x}\left(e^4(-32+32x) + e^8\left(16+32x+48x^2\right)\right) + e^x\left(-12-16x+16x^2 + e^4\left(12-128x+56x^2+48x^3\right) + e^8\left(-3+68x-32x^2+120x^3+36x^4\right)\right)\right) dx = e^x\left(-3 + 2x + e^4\left(\frac{3}{2} + e^x - x + 3x^2\right)\right)^2$$

output
```
(2*x-3+exp(4)*(exp(x)-x+3*x^2+3/2))^2*exp(x)
```

3.1317.2 Mathematica [A] (verified)

Time = 2.51 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.17

$$\int \frac{1}{4}\left(12e^{8+3x} + e^{2x}\left(e^4(-32+32x) + e^8\left(16+32x+48x^2\right)\right) + e^x\left(-12-16x+16x^2 + e^4\left(12-128x+56x^2+48x^3\right) + e^8\left(-3+68x-32x^2+120x^3+36x^4\right)\right)\right) dx = \frac{1}{4}e^x\left(-6 + 2e^{4+x} + 4x + e^4\left(3-2x+6x^2\right)\right)^2$$

input
```
Integrate[(12*E^(8 + 3*x) + E^(2*x)*(E^4*(-32 + 32*x) + E^8*(16 + 32*x + 4
8*x^2)) + E^x*(-12 - 16*x + 16*x^2 + E^4*(12 - 128*x + 56*x^2 + 48*x^3) +
E^8*(-3 + 68*x - 32*x^2 + 120*x^3 + 36*x^4)))/4,x]
```

output
```
(E^x*(-6 + 2*E^(4 + x) + 4*x + E^4*(3 - 2*x + 6*x^2))^2)/4
```

3.1317.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 167 vs. $2(30) = 60$.

Time = 0.57 (sec), antiderivative size = 167, normalized size of antiderivative = 5.57, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.020$, Rules used = {27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{4}\left(e^{2x}\left(e^8\left(48x^2+32x+16\right)+e^4(32x-32)\right)+e^x\left(16x^2+e^4\left(48x^3+56x^2-128x+12\right)+e^8\left(36x^4+120x^3-3\right.\right.\right.$$

$$\Big\downarrow \; 27$$

$$\frac{1}{4}\int\left(-16e^{2x}\left(2e^4(1-x)-e^8\left(3x^2+2x+1\right)\right)+12e^{3x+8}-e^x\left(-16x^2+16x-4e^4\left(12x^3+14x^2-32x+3\right)+e^8\right.\right.$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{4}\left(36e^{x+8}x^4+48e^{x+4}x^3-24e^{x+8}x^3+16e^xx^2-88e^{x+4}x^2+40e^{x+8}x^2+24e^{2x+8}x^2-48e^xx+48e^{x+4}x-12e^{x+8}\right.$$

input
```
Int[(12*E^(8 + 3*x) + E^(2*x)*(E^4*(-32 + 32*x) + E^8*(16 + 32*x + 48*x^2)
) + E^x*(-12 - 16*x + 16*x^2 + E^4*(12 - 128*x + 56*x^2 + 48*x^3) + E^8*(-
3 + 68*x - 32*x^2 + 120*x^3 + 36*x^4)))/4,x]
```

output
```
(36*E^x - 36*E^(4 + x) + 9*E^(8 + x) - 8*E^(4 + 2*x) + 12*E^(8 + 2*x) + 4*
E^(8 + 3*x) - 16*E^(4 + 2*x)*(1 - x) - 48*E^x*x + 48*E^(4 + x)*x - 12*E^(8
 + x)*x - 8*E^(8 + 2*x)*x + 16*E^x*x^2 - 88*E^(4 + x)*x^2 + 40*E^(8 + x)*x
^2 + 24*E^(8 + 2*x)*x^2 + 48*E^(4 + x)*x^3 - 24*E^(8 + x)*x^3 + 36*E^(8 +
x)*x^4)/4
```

3.1317.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1317.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 106 vs. $2(25) = 50$.

Time = 0.10 (sec) , antiderivative size = 107, normalized size of antiderivative = 3.57

method	result
risch	$e^{8+3x} + \frac{(24x^2 e^8 - 8x e^8 + 12 e^8 + 16x e^4 - 24 e^4) e^{2x}}{4} + \frac{(36x^4 e^8 - 24x^3 e^8 + 40x^2 e^8 + 48x^3 e^4 - 12x e^8 - 88x^2 e^4 + 9 e^8 + 48x e^4 + 1}{4}$
norman	$(3 e^8 - 6 e^4) e^{2x} + \left(9 + \frac{9 e^8}{4} - 9 e^4\right) e^x + e^8 e^{3x} + (-6 e^8 + 12 e^4) x^3 e^x + (-2 e^8 + 4 e^4) x e^{2x} +$
parallelrisch	$e^8 e^{3x} + 6 e^8 e^{2x} x^2 - 2 e^8 e^{2x} x + 3 e^8 e^{2x} + 4 e^4 e^{2x} x - 6 e^4 e^{2x} + 9 e^8 e^x x^4 - 6x^3 e^8 e^x + 10 e^8 e^x x^2$
meijerg	$-\frac{3 e^8 \left(2 - \frac{(12x^2 - 12x + 6) e^{2x}}{3}\right)}{2} + 2 e^4 (e^4 + 1) \left(1 - \frac{(-4x+2) e^{2x}}{2}\right) - (-8 e^8 + 14 e^4 + 4) \left(2 - \frac{(3x^2 - 6x + 6}{3}\right.$
default	$-4 e^4 e^{2x} + 2 e^8 e^{2x} + 8 e^4 \left(\frac{x e^{2x}}{2} - \frac{e^{2x}}{4}\right) + 8 e^8 \left(\frac{x e^{2x}}{2} - \frac{e^{2x}}{4}\right) + 12 e^8 \left(\frac{e^{2x} x^2}{2} - \frac{x e^{2x}}{2} + \frac{e^{2x}}{4}\right) - 12 e$
parts	$-4 e^4 e^{2x} + 2 e^8 e^{2x} + 8 e^4 \left(\frac{x e^{2x}}{2} - \frac{e^{2x}}{4}\right) + 8 e^8 \left(\frac{x e^{2x}}{2} - \frac{e^{2x}}{4}\right) + 12 e^8 \left(\frac{e^{2x} x^2}{2} - \frac{x e^{2x}}{2} + \frac{e^{2x}}{4}\right) - 12 e$

input
```
int(3*exp(4)^2*exp(x)^3+1/4*((48*x^2+32*x+16)*exp(4)^2+(32*x-32)*exp(4))*e
xp(x)^2+1/4*((36*x^4+120*x^3-32*x^2+68*x-3)*exp(4)^2+(48*x^3+56*x^2-128*x+
12)*exp(4)+16*x^2-16*x-12)*exp(x),x,method=_RETURNVERBOSE)
```

output
```
exp(8+3*x)+1/4*(24*x^2*exp(8)-8*x*exp(8)+12*exp(8)+16*x*exp(4)-24*exp(4))*
exp(2*x)+1/4*(36*x^4*exp(8)-24*x^3*exp(8)+40*x^2*exp(8)+48*x^3*exp(4)-12*x
*exp(8)-88*x^2*exp(4)+9*exp(8)+48*x*exp(4)+16*x^2-36*exp(4)-48*x+36)*exp(x
)
```

3.1317.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 91 vs. 2(28) = 56.

Time = 0.25 (sec) , antiderivative size = 91, normalized size of antiderivative = 3.03

$$\int \frac{1}{4}\left(12e^{8+3x}+e^{2x}\left(e^4(-32+32x)+e^8\left(16+32x+48x^2\right)\right)+e^x\left(-12-16x+16x^2+e^4\left(12-128x+56x^2+48x^3\right)+e^8\left(-3+68x-32x^2+120x^3+36x^4\right)\right)\right)\,dx = \left(\left(6\,x^2-2\,x+3\right)e^8+2\,(2\,x-3)e^4\right)e^{(2\,x)}+\frac{1}{4}\left(16\,x^2+\left(36\,x^4-24\,x^3+40\,x^2-12\,x+9\right)e^8+4\left(12\,x^3-22\,x^2+12\,x-9\right)e^4-48\,x+36\right)e^x+e^{(3\,x+8)}$$

input
```
integrate(3*exp(4)^2*exp(x)^3+1/4*((48*x^2+32*x+16)*exp(4)^2+(32*x-32)*exp
(4))*exp(x)^2+1/4*((36*x^4+120*x^3-32*x^2+68*x-3)*exp(4)^2+(48*x^3+56*x^2-
128*x+12)*exp(4)+16*x^2-16*x-12)*exp(x),x, algorithm=\
```

output
```
((6*x^2 - 2*x + 3)*e^8 + 2*(2*x - 3)*e^4)*e^(2*x) + 1/4*(16*x^2 + (36*x^4
- 24*x^3 + 40*x^2 - 12*x + 9)*e^8 + 4*(12*x^3 - 22*x^2 + 12*x - 9)*e^4 - 4
8*x + 36)*e^x + e^(3*x + 8)
```

3.1317.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 128 vs. 2(26) = 52.

Time = 0.16 (sec) , antiderivative size = 128, normalized size of antiderivative = 4.27

$$\int \frac{1}{4}\left(12e^{8+3x}+e^{2x}\left(e^4(-32+32x)+e^8\left(16+32x+48x^2\right)\right)+e^x\left(-12-16x+16x^2+e^4\left(12-128x+56x^2+48x^3\right)+e^8\left(-3+68x-32x^2+120x^3+36x^4\right)\right)\right)\,dx = \frac{\left(24x^2e^8-8xe^8+16xe^4-24e^4+12e^8\right)e^{2x}}{4}+\frac{\left(36x^4e^8-24x^3e^8+48x^3e^4-88x^2e^4+16x^2+40x^2e^8-12xe^8-48x+48xe^4-36e^4+36+9e^8\right)e^x}{4}+e^8e^{3x}$$

input
```
integrate(3*exp(4)**2*exp(x)**3+1/4*((48*x**2+32*x+16)*exp(4)**2+(32*x-32)
*exp(4))*exp(x)**2+1/4*((36*x**4+120*x**3-32*x**2+68*x-3)*exp(4)**2+(48*x*
*3+56*x**2-128*x+12)*exp(4)+16*x**2-16*x-12)*exp(x),x)
```

output
```
(24*x**2*exp(8) - 8*x*exp(8) + 16*x*exp(4) - 24*exp(4) + 12*exp(8))*exp(2*
x)/4 + (36*x**4*exp(8) - 24*x**3*exp(8) + 48*x**3*exp(4) - 88*x**2*exp(4)
+ 16*x**2 + 40*x**2*exp(8) - 12*x*exp(8) - 48*x + 48*x*exp(4) - 36*exp(4)
+ 36 + 9*exp(8))*exp(x)/4 + exp(8)*exp(3*x)
```

3.1317.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 227 vs. $2(28) = 56$.

Time = 0.20 (sec) , antiderivative size = 227, normalized size of antiderivative = 7.57

$$\int \frac{1}{4}\left(12e^{8+3x}+e^{2x}\left(e^4(-32+32x)+e^8\left(16+32x+48x^2\right)\right)+e^x\left(-12-16x+16x^2+e^4\left(12-128x+56x^2+48x^3\right)+e^8\left(-3+68x-32x^2+120x^3+36x^4\right)\right)\right)dx = \left(6\,x^2e^8-2\,x\left(e^8-2\,e^4\right)+3\,e^8-6\,e^4\right)e^{(2\,x)}+9\,\left(x^4e^8-4\,x^3e^8+12\,x^2e^8-24\,xe^8+24\,e^8\right)e^x+30\,\left(x^3e^8-3\,x^2e^8+6\,xe^8-6\,e^8\right)e^x+12\,\left(x^3e^4-3\,x^2e^4+6\,xe^4-6\,e^4\right)e^x-8\,\left(x^2e^8-2\,xe^8+2\,e^8\right)e^x+14\,\left(x^2e^4-2\,xe^4+2\,e^4\right)e^x+4\,\left(x^2-2\,x+2\right)e^x+17\,\left(xe^8-e^8\right)e^x-32\,\left(xe^4-e^4\right)e^x-4\,(x-1)e^x+e^{(3\,x+8)}-\frac{3}{4}\,e^{(x+8)}+3\,e^{(x+4)}-3\,e^x$$

input
```
integrate(3*exp(4)^2*exp(x)^3+1/4*((48*x^2+32*x+16)*exp(4)^2+(32*x-32)*exp
(4))*exp(x)^2+1/4*((36*x^4+120*x^3-32*x^2+68*x-3)*exp(4)^2+(48*x^3+56*x^2-
128*x+12)*exp(4)+16*x^2-16*x-12)*exp(x),x, algorithm=\
```

output
```
(6*x^2*e^8 - 2*x*(e^8 - 2*e^4) + 3*e^8 - 6*e^4)*e^(2*x) + 9*(x^4*e^8 - 4*x
^3*e^8 + 12*x^2*e^8 - 24*x*e^8 + 24*e^8)*e^x + 30*(x^3*e^8 - 3*x^2*e^8 + 6
*x*e^8 - 6*e^8)*e^x + 12*(x^3*e^4 - 3*x^2*e^4 + 6*x*e^4 - 6*e^4)*e^x - 8*(
x^2*e^8 - 2*x*e^8 + 2*e^8)*e^x + 14*(x^2*e^4 - 2*x*e^4 + 2*e^4)*e^x + 4*(x
^2 - 2*x + 2)*e^x + 17*(x*e^8 - e^8)*e^x - 32*(x*e^4 - e^4)*e^x - 4*(x - 1
)*e^x + e^(3*x + 8) - 3/4*e^(x + 8) + 3*e^(x + 4) - 3*e^x
```

3.1317.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 96 vs. 2(28) = 56.

Time = 0.26 (sec) , antiderivative size = 96, normalized size of antiderivative = 3.20

$$\int \frac{1}{4}\left(12e^{8+3x}+e^{2x}\left(e^4(-32+32x)+e^8\left(16+32x+48x^2\right)\right)+e^x\left(-12-16x+16x^2+e^4\left(12-128x+56x^2+48x^3\right)+e^8\left(-3+68x-32x^2+120x^3+36x^4\right)\right)\right)\,dx=\left(6\,x^2-2\,x+3\right)e^{(2\,x+8)}+2\,(2\,x-3)e^{(2\,x+4)}+\frac{1}{4}\,\left(36\,x^4-24\,x^3+40\,x^2-12\,x+9\right)e^{(x+8)}+\left(12\,x^3-22\,x^2+12\,x-9\right)e^{(x+4)}+\left(4\,x^2-12\,x+9\right)e^x+e^{(3\,x+8)}$$

input
```
integrate(3*exp(4)^2*exp(x)^3+1/4*((48*x^2+32*x+16)*exp(4)^2+(32*x-32)*exp
(4))*exp(x)^2+1/4*((36*x^4+120*x^3-32*x^2+68*x-3)*exp(4)^2+(48*x^3+56*x^2-
128*x+12)*exp(4)+16*x^2-16*x-12)*exp(x),x, algorithm=\
```

output
```
(6*x^2 - 2*x + 3)*e^(2*x + 8) + 2*(2*x - 3)*e^(2*x + 4) + 1/4*(36*x^4 - 24
*x^3 + 40*x^2 - 12*x + 9)*e^(x + 8) + (12*x^3 - 22*x^2 + 12*x - 9)*e^(x +
4) + (4*x^2 - 12*x + 9)*e^x + e^(3*x + 8)
```

3.1317.9 Mupad [B] (verification not implemented)

Time = 17.74 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.10

$$\int \frac{1}{4}\left(12e^{8+3x}+e^{2x}\left(e^4(-32+32x)+e^8\left(16+32x+48x^2\right)\right)+e^x\left(-12-16x+16x^2+e^4\left(12-128x+56x^2+48x^3\right)+e^8\left(-3+68x-32x^2+120x^3+36x^4\right)\right)\right)\,dx=\frac{\mathrm{e}^x\,{\left(4\,x+2\,\mathrm{e}^{x+4}+3\,\mathrm{e}^4-2\,x\,\mathrm{e}^4+6\,x^2\,\mathrm{e}^4-6\right)}^2}{4}$$

input
```
int(3*exp(3*x)*exp(8) + (exp(2*x)*(exp(8)*(32*x + 48*x^2 + 16) + exp(4)*(3
2*x - 32)))/4 + (exp(x)*(exp(4)*(56*x^2 - 128*x + 48*x^3 + 12) - 16*x + ex
p(8)*(68*x - 32*x^2 + 120*x^3 + 36*x^4 - 3) + 16*x^2 - 12))/4,x)
```

output
```
(exp(x)*(4*x + 2*exp(x + 4) + 3*exp(4) - 2*x*exp(4) + 6*x^2*exp(4) - 6)^2)
/4
```

3.1318 $\int \frac{\left(-208x-60x^2+108x^3-36x^4+4x^5\right)\log(2x)+\left(-60+164x-57x^2-15\right.}{\left(60x-164x^2+57x^3+\right.}$

3.1318.1 Optimal result

Integrand size = 152, antiderivative size = 25

$$\int \frac{\left(-208x-60x^2+108x^3-36x^4+4x^5\right)\log(2x)+\left(-60+164x-57x^2-15x^3+9x^4-x^5\right)\log\left(\frac{400-1920x\cdots}{\cdots}\right)}{\left(60x-164x^2+57x^3+15x^4-9x^5+x^6\right)\log^2(2x)}$$

$$=\frac{\log\left(\left(-4+\left(\frac{4}{3-x}+x\right)^2\right)^2\right)}{\log(2x)}$$

output
```
ln(((x+4/(-x+3))^2-4)^2)/ln(2*x)
```

3.1318.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

$$\int \frac{\left(-208x-60x^2+108x^3-36x^4+4x^5\right)\log(2x)+\left(-60+164x-57x^2-15x^3+9x^4-x^5\right)\log\left(\frac{400-1920x\cdots}{\cdots}\right)}{\left(60x-164x^2+57x^3+15x^4-9x^5+x^6\right)\log^2(2x)}$$

$$=\frac{\log\left(\frac{(-20+48x-3x^2-6x^3+x^4)^2}{(-3+x)^4}\right)}{\log(2x)}$$

3.1318.
$$\int \frac{\left(-208x-60x^2+108x^3-36x^4+4x^5\right)\log(2x)+\left(-60+164x-57x^2-15x^3+9x^4-x^5\right)\log\left(\frac{400-1920x+2424x^2-48x^3-607x^4+132x^5+30x^6-12x^7+x^8}{81-108x+54x^2-12x^3+x^4}\right)}{\left(60x-164x^2+57x^3+15x^4-9x^5+x^6\right)\log^2(2x)}\,dx$$

input
```
Integrate[((-208*x - 60*x^2 + 108*x^3 - 36*x^4 + 4*x^5)*Log[2*x] + (-60 +
164*x - 57*x^2 - 15*x^3 + 9*x^4 - x^5)*Log[(400 - 1920*x + 2424*x^2 - 48*x
^3 - 607*x^4 + 132*x^5 + 30*x^6 - 12*x^7 + x^8)/(81 - 108*x + 54*x^2 - 12*
x^3 + x^4)])/((60*x - 164*x^2 + 57*x^3 + 15*x^4 - 9*x^5 + x^6)*Log[2*x]^2)
,x]
```

output
```
Log[(-20 + 48*x - 3*x^2 - 6*x^3 + x^4)^2/(-3 + x)^4]/Log[2*x]
```

3.1318.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(4x^5-36x^4+108x^3-60x^2-208x)\log(2x)+(-x^5+9x^4-15x^3-57x^2+164x-60)\log\left(\frac{x^8-12x^7+30x^6+132\cdots}{x^4-\cdots}\right.}{(x^6-9x^5+15x^4+57x^3-164x^2+60x)\log^2(2x)}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{(4x^5-36x^4+108x^3-60x^2-208x)\log(2x)+(-x^5+9x^4-15x^3-57x^2+164x-60)\log\left(\frac{x^8-12x^7+30x^6+132\cdots}{x^4-\cdots}\right.}{x(x^5-9x^4+15x^3+57x^2-164x+60)\log^2(2x)}$$

$$\Big\downarrow \text{2463}$$

$$\int \left(\frac{(4x^5-36x^4+108x^3-60x^2-208x)\log(2x)+(-x^5+9x^4-15x^3-57x^2+164x-60)\log\left(\frac{x^8-12x^7+30x^6+\cdots}{x\cdots}\right.}{16(x-3)x\log^2(2x)}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\int \frac{(x-4)(x+1)\left(x^2-6x+13\right)}{(x-3)\log(2x)}dx+\frac{1}{16}\int \frac{(x-4)(x+1)(x+2)\left(x^2-6x+13\right)}{(x^2-5x+2)\log(2x)}dx-\frac{1}{16}\int \frac{(x-4)(x+1)(5x+14)\left(x^2-6x+13\right)}{(x^2-x-10)\log(2x)}dx-\int \frac{\log\left(\frac{(x^4-6x^3-3x^2+48x-20)^2}{(x-3)^4}\right)}{x\log^2(2x)}dx$$

input
```
Int[((-208*x - 60*x^2 + 108*x^3 - 36*x^4 + 4*x^5)*Log[2*x] + (-60 + 164*x
- 57*x^2 - 15*x^3 + 9*x^4 - x^5)*Log[(400 - 1920*x + 2424*x^2 - 48*x^3 - 6
07*x^4 + 132*x^5 + 30*x^6 - 12*x^7 + x^8)/(81 - 108*x + 54*x^2 - 12*x^3 +
x^4)])/((60*x - 164*x^2 + 57*x^3 + 15*x^4 - 9*x^5 + x^6)*Log[2*x]^2),x]
```

3.1318.

$$\int \frac{(-208x-60x^2+108x^3-36x^4+4x^5)\log(2x)+(-60+164x-57x^2-15x^3+9x^4-x^5)\log\left(\frac{400-1920x+2424x^2-48x^3-607x^4+132x^5+30x^6-12x^7+x^8}{81-108x+54x^2-12x^3+x^4}\right)}{(60x-164x^2+57x^3+15x^4-9x^5+x^6)\log^2(2x)}dx$$

output
```
$Aborted
```

3.1318.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2463
```
Int[(u_.)*(Px_)^(p_), x_Symbol] :> With[{Qx = Factor[Px]}, Int[ExpandIntegr
and[u, Qx^p, x], x] /;  !SumQ[NonfreeFactors[Qx, x]]] /; PolyQ[Px, x] && Gt
Q[Expon[Px, x], 2] &&  !BinomialQ[Px, x] &&  !TrinomialQ[Px, x] && ILtQ[p,
0]
```

3.1318.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(25) = 50$.

Time = 14.11 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.72

method	result
parallelrisch	$\frac{\ln\left(\frac{x^8-12x^7+30x^6+132x^5-607x^4-48x^3+2424x^2-1920x+400}{x^4-12x^3+54x^2-108x+81}\right)}{\ln(2x)}$
risch	$\frac{2\ln\left(x^4-6x^3-3x^2+48x-20\right)}{\ln(2x)} - \frac{i\pi\ \mathrm{csgn}(i(-3+x))\,\mathrm{csgn}\left(i(-3+x)^4\right)^2+i\pi\ \mathrm{csgn}(i(-3+x))\,\mathrm{csgn}\left(i(-3+x)^3\right)^2+2i\pi\ \mathrm{csgn}(i(-3$

input
```
int(((-x^5+9*x^4-15*x^3-57*x^2+164*x-60)*ln((x^8-12*x^7+30*x^6+132*x^5-607
*x^4-48*x^3+2424*x^2-1920*x+400)/(x^4-12*x^3+54*x^2-108*x+81))+(4*x^5-36*x
^4+108*x^3-60*x^2-208*x)*ln(2*x))/(x^6-9*x^5+15*x^4+57*x^3-164*x^2+60*x)/l
n(2*x)^2,x,method=_RETURNVERBOSE)
```

output
```
ln((x^8-12*x^7+30*x^6+132*x^5-607*x^4-48*x^3+2424*x^2-1920*x+400)/(x^4-12*
x^3+54*x^2-108*x+81))/ln(2*x)
```

3.1318.

$$\int \frac{\left(-208x-60x^2+108x^3-36x^4+4x^5\right)\log(2x)+\left(-60+164x-57x^2-15x^3+9x^4-x^5\right)\log\left(\frac{400-1920x+2424x^2-48x^3-607x^4+132x^5+30x^6-12x^7+x^8}{81-108x+54x^2-12x^3+x^4}\right)}{\left(60x-164x^2+57x^3+15x^4-9x^5+x^6\right)\log^2(2x)}\,dx$$

3.1318.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. 2(23) = 46.

Time = 0.25 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.68

$$\int \frac{(-208x-60x^2+108x^3-36x^4+4x^5)\log(2x)+(-60+164x-57x^2-15x^3+9x^4-x^5)\log\left(\frac{400-1920x\cdots}{\cdots}\right)}{(60x-164x^2+57x^3+15x^4-9x^5+x^6)\log^2(2x)}$$
$$= \frac{\log\left(\frac{x^8-12x^7+30x^6+132x^5-607x^4-48x^3+2424x^2-1920x+400}{x^4-12x^3+54x^2-108x+81}\right)}{\log(2x)}$$

input
```
integrate((((-x^5+9*x^4-15*x^3-57*x^2+164*x-60)*log((x^8-12*x^7+30*x^6+132*
x^5-607*x^4-48*x^3+2424*x^2-1920*x+400)/(x^4-12*x^3+54*x^2-108*x+81))+(4*x
^5-36*x^4+108*x^3-60*x^2-208*x)*log(2*x))/(x^6-9*x^5+15*x^4+57*x^3-164*x^2
+60*x)/log(2*x)^2,x, algorithm=\
```

output
```
log((x^8 - 12*x^7 + 30*x^6 + 132*x^5 - 607*x^4 - 48*x^3 + 2424*x^2 - 1920*
x + 400)/(x^4 - 12*x^3 + 54*x^2 - 108*x + 81))/log(2*x)
```

3.1318.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{(-208x-60x^2+108x^3-36x^4+4x^5)\log(2x)+(-60+164x-57x^2-15x^3+9x^4-x^5)\log\left(\frac{400-1920x\cdots}{\cdots}\right)}{(60x-164x^2+57x^3+15x^4-9x^5+x^6)\log^2(2x)}$$
= Exception raised: TypeError

input
```
integrate((((-x**5+9*x**4-15*x**3-57*x**2+164*x-60)*ln((x**8-12*x**7+30*x**
6+132*x**5-607*x**4-48*x**3+2424*x**2-1920*x+400)/(x**4-12*x**3+54*x**2-10
8*x+81))+(4*x**5-36*x**4+108*x**3-60*x**2-208*x)*ln(2*x))/(x**6-9*x**5+15*
x**4+57*x**3-164*x**2+60*x)/ln(2*x)**2,x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.1318.7 Maxima [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

$$\int \frac{(-208x-60x^2+108x^3-36x^4+4x^5)\log(2x)+(-60+164x-57x^2-15x^3+9x^4-x^5)\log\left(\frac{400-1920x}{}\right.}{(60x-164x^2+57x^3+15x^4-9x^5+x^6)\log^2(2x)}$$
$$=\frac{2\left(\log\left(x^2-x-10\right)+\log\left(x^2-5x+2\right)-2\log\left(x-3\right)\right)}{\log\left(2\right)+\log\left(x\right)}$$

input
```
integrate((((-x^5+9*x^4-15*x^3-57*x^2+164*x-60)*log((x^8-12*x^7+30*x^6+132*
x^5-607*x^4-48*x^3+2424*x^2-1920*x+400)/(x^4-12*x^3+54*x^2-108*x+81))+(4*x
^5-36*x^4+108*x^3-60*x^2-208*x)*log(2*x))/(x^6-9*x^5+15*x^4+57*x^3-164*x^2
+60*x)/log(2*x)^2,x, algorithm=\
```

output
```
2*(log(x^2 - x - 10) + log(x^2 - 5*x + 2) - 2*log(x - 3))/(log(2) + log(x)
)
```

3.1318.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 74 vs. 2(23) = 46.

Time = 0.50 (sec) , antiderivative size = 74, normalized size of antiderivative = 2.96

$$\int \frac{(-208x-60x^2+108x^3-36x^4+4x^5)\log(2x)+(-60+164x-57x^2-15x^3+9x^4-x^5)\log\left(\frac{400-1920x}{}\right.}{(60x-164x^2+57x^3+15x^4-9x^5+x^6)\log^2(2x)}$$
$$=\frac{\log\left(x^8-12x^7+30x^6+132x^5-607x^4-48x^3+2424x^2-1920x+400\right)}{\log\left(2x\right)}-\frac{\log\left(x^4-12x^3+54x^2-108x+81\right)}{\log\left(2x\right)}$$

input
```
integrate((((-x^5+9*x^4-15*x^3-57*x^2+164*x-60)*log((x^8-12*x^7+30*x^6+132*
x^5-607*x^4-48*x^3+2424*x^2-1920*x+400)/(x^4-12*x^3+54*x^2-108*x+81))+(4*x
^5-36*x^4+108*x^3-60*x^2-208*x)*log(2*x))/(x^6-9*x^5+15*x^4+57*x^3-164*x^2
+60*x)/log(2*x)^2,x, algorithm=\
```

output
```
log(x^8 - 12*x^7 + 30*x^6 + 132*x^5 - 607*x^4 - 48*x^3 + 2424*x^2 - 1920*x
 + 400)/log(2*x) - log(x^4 - 12*x^3 + 54*x^2 - 108*x + 81)/log(2*x)
```

3.1318.9 Mupad [B] (verification not implemented)

Time = 18.43 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.68

$$\int \frac{(-208x-60x^2+108x^3-36x^4+4x^5)\log(2x)+(-60+164x-57x^2-15x^3+9x^4-x^5)\log\left(\frac{400-1920x+2424x^2-48x^3-607x^4+132x^5+30x^6-12x^7+x^8}{81-108x+54x^2-12x^3+x^4}\right)}{(60x-164x^2+57x^3+15x^4-9x^5+x^6)\log^2(2x)}\,dx = \frac{\ln\left(\frac{x^8-12\,x^7+30\,x^6+132\,x^5-607\,x^4-48\,x^3+2424\,x^2-1920\,x+400}{x^4-12\,x^3+54\,x^2-108\,x+81}\right)}{\ln(2\,x)}$$

input
```
int(-(log((2424*x^2 - 1920*x - 48*x^3 - 607*x^4 + 132*x^5 + 30*x^6 - 12*x^
7 + x^8 + 400)/(54*x^2 - 108*x - 12*x^3 + x^4 + 81))*(57*x^2 - 164*x + 15*
x^3 - 9*x^4 + x^5 + 60) + log(2*x)*(208*x + 60*x^2 - 108*x^3 + 36*x^4 - 4*
x^5))/(log(2*x)^2*(60*x - 164*x^2 + 57*x^3 + 15*x^4 - 9*x^5 + x^6)),x)
```

output
```
log((2424*x^2 - 1920*x - 48*x^3 - 607*x^4 + 132*x^5 + 30*x^6 - 12*x^7 + x^
8 + 400)/(54*x^2 - 108*x - 12*x^3 + x^4 + 81))/log(2*x)
```

3.1319 $\int \frac{e^{-x}\left(-10+2x+\left(6x-x^2\right)\log\left(x^2\right)\right)}{x}\,dx$

3.1319.1 Optimal result

Integrand size = 28, antiderivative size = 19

$$\int \frac{e^{-x}\left(-10+2x+\left(6x-x^2\right)\log\left(x^2\right)\right)}{x}\,dx = 2-\log(259)+e^{-x}(-5+x)\log\left(x^2\right)$$

output
```
2+(-5+x)/exp(x)*ln(x^2)-ln(259)
```

3.1319.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.68

$$\int \frac{e^{-x}\left(-10+2x+\left(6x-x^2\right)\log\left(x^2\right)\right)}{x}\,dx = e^{-x}(-5+x)\log\left(x^2\right)$$

input
```
Integrate[(-10 + 2*x + (6*x - x^2)*Log[x^2])/(E^x*x),x]
```

output
```
((-5 + x)*Log[x^2])/E^x
```

3.1319.3 Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.42, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^{-x}\left(\left(6x-x^2\right)\log\left(x^2\right)+2x-10\right)}{x}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{2e^{-x}(x-5)}{x}-e^{-x}(x-6)\log\left(x^2\right)\right)dx$$
$$\Big\downarrow \text{2009}$$
$$e^{-x}\log\left(x^2\right)-e^{-x}(6-x)\log\left(x^2\right)$$

input
```
Int[(-10 + 2*x + (6*x - x^2)*Log[x^2])/(E^x*x),x]
```

output
```
Log[x^2]/E^x - ((6 - x)*Log[x^2])/E^x
```

3.1319.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1319.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.00

method	result
norman	$(x\ln(x^2)-5\ln(x^2))\,\mathrm{e}^{-x}$
parallelrisch	$-(-x\ln(x^2)+5\ln(x^2))\,\mathrm{e}^{-x}$
default	$(x(\ln(x^2)-2\ln(x))-5\ln(x^2)+2x\ln(x))\,\mathrm{e}^{-x}$
risch	$2(-5+x)\,\mathrm{e}^{-x}\ln(x)-\frac{i\pi\ \mathrm{csgn}(ix^2)\left(x\,\mathrm{csgn}(ix)^2-2x\ \mathrm{csgn}(ix)\,\mathrm{csgn}(ix^2)+x\,\mathrm{csgn}(ix^2)^2-5\,\mathrm{csgn}(ix)^2+10\ \mathrm{csgn}(ix^2)\ \mathrm{cs}\right.}{2}$

input
```
int(((-x^2+6*x)*ln(x^2)+2*x-10)/exp(x)/x,x,method=_RETURNVERBOSE)
```

output
```
(x*ln(x^2)-5*ln(x^2))/exp(x)
```

3.1319.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{e^{-x}(-10+2x+(6x-x^2)\log(x^2))}{x}\,dx=(x-5)e^{(-x)}\log(x^2)$$

input
```
integrate(((-x^2+6*x)*log(x^2)+2*x-10)/exp(x)/x,x, algorithm=\
```

output
```
(x - 5)*e^(-x)*log(x^2)
```

3.1319.6 Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int \frac{e^{-x}(-10+2x+(6x-x^2)\log(x^2))}{x}\,dx=\left(x\log\left(x^2\right)-5\log\left(x^2\right)\right)e^{-x}$$

input
```
integrate(((-x**2+6*x)*ln(x**2)+2*x-10)/exp(x)/x,x)
```

output
```
(x*log(x**2) - 5*log(x**2))*exp(-x)
```

3.1319.7 Maxima [F]

$$\int \frac{e^{-x}(-10+2x+(6x-x^2)\log(x^2))}{x}\,dx = \int -\frac{((x^2-6\,x)\log(x^2)-2\,x+10)e^{(-x)}}{x}\,dx$$

input
```
integrate(((-x^2+6*x)*log(x^2)+2*x-10)/exp(x)/x,x, algorithm=\
```

output
```
2*(x + 1)*e^(-x)*log(x) - 6*e^(-x)*log(x^2) + 2*Ei(-x) - 2*e^(-x) - integr
ate(2*(x + 1)*e^(-x)/x, x)
```

3.1319.8 Giac [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.11

$$\int \frac{e^{-x}(-10+2x+(6x-x^2)\log(x^2))}{x}\,dx = xe^{(-x)}\log\left(x^2\right)-5\,e^{(-x)}\log\left(x^2\right)$$

input
```
integrate(((-x^2+6*x)*log(x^2)+2*x-10)/exp(x)/x,x, algorithm=\
```

output
```
x*e^(-x)*log(x^2) - 5*e^(-x)*log(x^2)
```

3.1319.9 Mupad [B] (verification not implemented)

Time = 19.09 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.63

$$\int \frac{e^{-x}(-10+2x+(6x-x^2)\log(x^2))}{x}\,dx = \ln\left(x^2\right)\,\mathrm{e}^{-x}\,(x-5)$$

input
```
int((exp(-x)*(2*x + log(x^2)*(6*x - x^2) - 10))/x,x)
```

output
```
log(x^2)*exp(-x)*(x - 5)
```

3.1320 $\int \frac{-e^{25-x}\log(3)+(8-2x)\log(3)}{-13+e^{25-x}+8x-x^2}\,dx$

3.1320.1 Optimal result

Integrand size = 40, antiderivative size = 33

$$\int \frac{-e^{25-x}\log(3)+(8-2x)\log(3)}{-13+e^{25-x}+8x-x^2}\,dx = \log(3)\log\left(\frac{1}{2}\left(-4+\frac{1}{3}\left(e^{25-x}-(1-x)^2\right)\right)+x\right)$$

output
```
ln(1/6*exp(-x+25)-1/6*(1-x)^2-2+x)*ln(3)
```

3.1320.2 Mathematica [A] (verified)

Time = 1.46 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.30

$$\int \frac{-e^{25-x}\log(3)+(8-2x)\log(3)}{-13+e^{25-x}+8x-x^2}\,dx = \log(3)\left(2\text{arctanh}\left(1-26e^{-25+x}+16e^{-25+x}x-2e^{-25+x}x^2\right)+\log\left(13-8x+x^2\right)\right)$$

input
```
Integrate[(-(E^(25 - x)*Log[3]) + (8 - 2*x)*Log[3])/(-13 + E^(25 - x) + 8*
x - x^2),x]
```

output
```
Log[3]*(2*ArcTanh[1 - 26*E^(-25 + x) + 16*E^(-25 + x)*x - 2*E^(-25 + x)*x^
2] + Log[13 - 8*x + x^2])
```

3.1320.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.64, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.025, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(8-2x)\log(3)-e^{25-x}\log(3)}{-x^2+8x+e^{25-x}-13}\,dx$$

$$\Big\downarrow \text{7235}$$

$$\log(3)\log\left(x^2-8x-e^{25-x}+13\right)$$

input
```
Int[(-(E^(25 - x)*Log[3]) + (8 - 2*x)*Log[3])/(-13 + E^(25 - x) + 8*x - x^
2),x]
```

output
```
Log[3]*Log[13 - E^(25 - x) - 8*x + x^2]
```

3.1320.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.1320.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.64

method	result	size
norman	$\ln(3)\ln\left(x^2-8x-e^{-x+25}+13\right)$	21
parallelrisch	$\ln(3)\ln\left(x^2-8x-e^{-x+25}+13\right)$	21
risch	$\ln(3)\ln\left(e^{-x+25}-x^2+8x-13\right)-25\ln(3)$	26

input
```
int((-ln(3)*exp(-x+25)+(-2*x+8)*ln(3))/(exp(-x+25)-x^2+8*x-13),x,method=_R
ETURNVERBOSE)
```

output
```
ln(3)*ln(x^2-8*x-exp(-x+25)+13)
```

3.1320.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.61

$$\int \frac{-e^{25-x}\log(3)+(8-2x)\log(3)}{-13+e^{25-x}+8x-x^2}\,dx = \log(3)\log\left(-x^2+8\,x+e^{(-x+25)}-13\right)$$

input
```
integrate((-log(3)*exp(-x+25)+(-2*x+8)*log(3))/(exp(-x+25)-x^2+8*x-13),x,
algorithm=\
```

output
```
log(3)*log(-x^2 + 8*x + e^(-x + 25) - 13)
```

3.1320.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.52

$$\int \frac{-e^{25-x}\log(3)+(8-2x)\log(3)}{-13+e^{25-x}+8x-x^2}\,dx = \log(3)\log\left(-x^2+8x+e^{25-x}-13\right)$$

input
```
integrate((-ln(3)*exp(-x+25)+(-2*x+8)*ln(3))/(exp(-x+25)-x**2+8*x-13),x)
```

output
```
log(3)*log(-x**2 + 8*x + exp(25 - x) - 13)
```

3.1320.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 49 vs. 2(22) = 44.

Time = 0.34 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.48

$$\int \frac{-e^{25-x}\log(3)+(8-2x)\log(3)}{-13+e^{25-x}+8x-x^2}\,dx = -x\log(3)+\log(3)\log\left(x^2-8\,x+13\right) + \log(3)\log\left(\frac{(x^2-8\,x+13)e^x-e^{25}}{x^2-8\,x+13}\right)$$

input
```
integrate((-log(3)*exp(-x+25)+(-2*x+8)*log(3))/(exp(-x+25)-x^2+8*x-13),x,
algorithm=\
```

output
```
-x*log(3) + log(3)*log(x^2 - 8*x + 13) + log(3)*log(((x^2 - 8*x + 13)*e^x
- e^25)/(x^2 - 8*x + 13))
```

3.1320.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.67

$$\int \frac{-e^{25-x}\log(3)+(8-2x)\log(3)}{-13+e^{25-x}+8x-x^2}\,dx = \log(3)\log\left(-(x-25)^2-42\,x+e^{(-x+25)}+612\right)$$

input
```
integrate((-log(3)*exp(-x+25)+(-2*x+8)*log(3))/(exp(-x+25)-x^2+8*x-13),x,
algorithm=\
```

output
```
log(3)*log(-(x - 25)^2 - 42*x + e^(-x + 25) + 612)
```

3.1320.9 Mupad [B] (verification not implemented)

Time = 17.19 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.61

$$\int \frac{-e^{25-x}\log(3)+(8-2x)\log(3)}{-13+e^{25-x}+8x-x^2}\,dx = \ln(3)\,\ln\left(x^2-\mathrm{e}^{25-x}-8\,x+13\right)$$

input
```
int(-(log(3)*(2*x - 8) + exp(25 - x)*log(3))/(8*x + exp(25 - x) - x^2 - 13
),x)
```

output
```
log(3)*log(x^2 - exp(25 - x) - 8*x + 13)
```

3.1321 $\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+\ldots}{(x^2-10x^3+25x^4)\log^3(2\ldots}$

3.1321.1 Optimal result

Integrand size = 88, antiderivative size = 34

$$\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+2x^2-20x^3+50x^4+(-5+\ldots}{(x^2-10x^3+25x^4)\log^3(2x)}$$

$$= 1-\frac{\log(x)}{-\frac{x}{5}+x^2}+\frac{2\left(x-\frac{3}{\log(2x)}\right)^2}{x}$$

output
```
2/x*(x-3/ln(2*x))^2-ln(x)/(x^2-1/5*x)+1
```

3.1321.2 Mathematica [A] (verified)

Time = 0.46 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.09

$$\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+2x^2-20x^3+50x^4+(-5+\ldots}{(x^2-10x^3+25x^4)\log^3(2x)}$$

$$= 2x-\frac{5\log(x)}{x(-1+5x)}+\frac{18}{x\log^2(2x)}-\frac{12}{\log(2x)}$$

input
```
Integrate[(-36 + 360*x - 900*x^2 + (-18 + 192*x - 570*x^2 + 300*x^3)*Log[2
*x] + (5 - 25*x + 2*x^2 - 20*x^3 + 50*x^4 + (-5 + 50*x)*Log[x])*Log[2*x]^3
)/((x^2 - 10*x^3 + 25*x^4)*Log[2*x]^3),x]
```

output
```
2*x - (5*Log[x])/(x*(-1 + 5*x)) + 18/(x*Log[2*x]^2) - 12/Log[2*x]
```

3.1321.
$\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+2x^2-20x^3+50x^4+(-5+50x)\log(x))\log^3(2x)}{(x^2-10x^3+25x^4)\log^3(2x)}\,dx$

3.1321.3 Rubi [A] (verified)

Time = 1.84 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.35, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.057$, Rules used = {2026, 7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-900x^2+(300x^3-570x^2+192x-18)\log(2x)+(50x^4-20x^3+2x^2-25x+(50x-5)\log(x)+5)\log^3(2x)}{(25x^4-10x^3+x^2)\log^3(2x)}$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{-900x^2+(300x^3-570x^2+192x-18)\log(2x)+(50x^4-20x^3+2x^2-25x+(50x-5)\log(x)+5)\log^3(2x)}{x^2(25x^2-10x+1)\log^3(2x)}$$

$$\Big\downarrow \text{7277}$$

$$100\int -\frac{-((50x^4-20x^3+2x^2-25x-5(1-10x)\log(x)+5)\log^3(2x))+6(-50x^3+95x^2-32x+3)\log(2x)+}{100(1-5x)^2x^2\log^3(2x)}$$

$$\Big\downarrow \text{27}$$

$$-\int \frac{-((50x^4-20x^3+2x^2-25x-5(1-10x)\log(x)+5)\log^3(2x))+6(-50x^3+95x^2-32x+3)\log(2x)+90}{(1-5x)^2x^2\log^3(2x)}$$

$$\Big\downarrow \text{7293}$$

$$-\int \left(-\frac{6(2x-3)}{x^2\log^2(2x)}+\frac{-50x^4+20x^3-2x^2-50\log(x)x+25x+5\log(x)-5}{x^2(5x-1)^2}+\frac{36}{x^2\log^3(2x)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2x+\frac{18}{x\log^2(2x)}+\frac{125x\log(x)}{1-5x}+25\log(x)-\frac{12}{\log(2x)}+\frac{5\log(x)}{x}$$

input
```
Int[(-36 + 360*x - 900*x^2 + (-18 + 192*x - 570*x^2 + 300*x^3)*Log[2*x] +
(5 - 25*x + 2*x^2 - 20*x^3 + 50*x^4 + (-5 + 50*x)*Log[x])*Log[2*x]^3)/((x^
2 - 10*x^3 + 25*x^4)*Log[2*x]^3),x]
```

output
```
2*x + 25*Log[x] + (5*Log[x])/x + (125*x*Log[x])/(1 - 5*x) + 18/(x*Log[2*x]
^2) - 12/Log[2*x]
```

3.1321.
$\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+2x^2-20x^3+50x^4+(-5+50x)\log(x))\log^3(2x)}{(x^2-10x^3+25x^4)\log^3(2x)}\,dx$

3.1321.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1321.4 Maple [A] (verified)

Time = 0.64 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.38

method	result
risch	$-\frac{5\ln(x)}{x(5x-1)}+2x-\frac{24(-3+2x\ln(2)+2x\ln(x))}{x(2\ln(2)+2\ln(x))^2}$
parts	$2x+25\ln(x)+\frac{18}{x\ln(2x)^2}-\frac{12}{\ln(2x)}+\frac{5\ln(x)}{x}-\frac{125\ln(x)x}{5x-1}$
parallelrisch	$\frac{-540+2700x-12x\ln(2x)^2-1800x^2\ln(2x)+300x^3\ln(2x)^2+360x\ln(2x)-150\ln(2x)^2\ln(x)}{30x\ln(2x)^2(5x-1)}$
default	$\frac{-18-60x^2\ln(2)+\left(90-\frac{2\ln(2)^2}{5}+12\ln(2)\right)x-\frac{2x\ln(x)^2}{5}-60x^2\ln(x)+\left(-\frac{4\ln(2)}{5}+12\right)\ln(x)x-5\ln(x)^3+10x^3\ln(x)^2+10x^3\ln(2)}{x(5x-1)(\ln(2)+\ln(x))^2}$

input
```
int((((50*x-5)*ln(x)+50*x^4-20*x^3+2*x^2-25*x+5)*ln(2*x)^3+(300*x^3-570*x^
2+192*x-18)*ln(2*x)-900*x^2+360*x-36)/(25*x^4-10*x^3+x^2)/ln(2*x)^3,x,meth
od=_RETURNVERBOSE)
```

3.1321.

$$\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+2x^2-20x^3+50x^4+(-5+50x)\log(x))\log^3(2x)}{(x^2-10x^3+25x^4)\log^3(2x)}\,dx$$

output
```
-5/x/(5*x-1)*ln(x)+2*x-24*(-3+2*x*ln(2)+2*x*ln(x))/x/(2*ln(2)+2*ln(x))^2
```

3.1321.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 143 vs. 2(34) = 68.

Time = 0.27 (sec) , antiderivative size = 143, normalized size of antiderivative = 4.21

$$\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+2x^2-20x^3+50x^4+(-5\cdots}{(x^2-10x^3+25x^4)\log^3(2x)}$$

$$=\frac{2\,(5\,x^3-x^2)\log{(2)}^2+2\,(5\,x^3-x^2-5\,\log{(2)})\log{(x)}^2-5\,\log{(x)}^3-12\,(5\,x^2-x)\log{(2)}-(60\,x^2-4\,(\cdots}{(5\,x^2-x)\log{(2)}^2+2\,(5\,x^2-x)\log{(2)}\log{(x)}+(5\,x^2-x\cdots}$$

input
```
integrate((((50*x-5)*log(x)+50*x^4-20*x^3+2*x^2-25*x+5)*log(2*x)^3+(300*x^
3-570*x^2+192*x-18)*log(2*x)-900*x^2+360*x-36)/(25*x^4-10*x^3+x^2)/log(2*x
)^3,x, algorithm=\
```

output
```
(2*(5*x^3 - x^2)*log(2)^2 + 2*(5*x^3 - x^2 - 5*log(2))*log(x)^2 - 5*log(x)
^3 - 12*(5*x^2 - x)*log(2) - (60*x^2 - 4*(5*x^3 - x^2)*log(2) + 5*log(2)^2
 - 12*x)*log(x) + 90*x - 18)/((5*x^2 - x)*log(2)^2 + 2*(5*x^2 - x)*log(2)*
log(x) + (5*x^2 - x)*log(x)^2)
```

3.1321.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(24) = 48.

Time = 0.16 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.56

$$\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+2x^2-20x^3+50x^4+(-5\cdots}{(x^2-10x^3+25x^4)\log^3(2x)}$$

$$=2x+\frac{-12x\log{(x)}-12x\log{(2)}+18}{x\log{(x)}^2+2x\log{(2)}\log{(x)}+x\log{(2)}^2}-\frac{5\log{(x)}}{5x^2-x}$$

input
```
integrate((((50*x-5)*ln(x)+50*x**4-20*x**3+2*x**2-25*x+5)*ln(2*x)**3+(300*
x**3-570*x**2+192*x-18)*ln(2*x)-900*x**2+360*x-36)/(25*x**4-10*x**3+x**2)/
ln(2*x)**3,x)
```

output
```
2*x + (-12*x*log(x) - 12*x*log(2) + 18)/(x*log(x)**2 + 2*x*log(2)*log(x) +
 x*log(2)**2) - 5*log(x)/(5*x**2 - x)
```

3.1321.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. $2(34) = 68$.

Time = 0.31 (sec) , antiderivative size = 141, normalized size of antiderivative = 4.15

$$\int \frac{-36 + 360x - 900x^2 + (-18 + 192x - 570x^2 + 300x^3)\log(2x) + (5 - 25x + 2x^2 - 20x^3 + 50x^4 + (-5 + 50x)\log(x))\log^3(2x)}{(x^2 - 10x^3 + 25x^4)\log^3(2x)}$$
$$= \frac{10\,x^3\log(2)^2 - 2\left(\log(2)^2 + 30\,\log(2)\right)x^2 + 2\,(5\,x^3 - x^2 - 5\,\log(2))\log(x)^2 - 5\,\log(x)^3 + 6\,x(2\,\log(2) + 15) + \ldots}{5\,x^2\log(2)^2 - x\log(2)^2 + (5\,x^2 - x)\log(x)^2 + 2\,(5\,x^2\log(2) - x\log(2))\log(x)}$$

input
```
integrate((((50*x-5)*log(x)+50*x^4-20*x^3+2*x^2-25*x+5)*log(2*x)^3+(300*x^
3-570*x^2+192*x-18)*log(2*x)-900*x^2+360*x-36)/(25*x^4-10*x^3+x^2)/log(2*x
)^3,x, algorithm=\
```

output
```
(10*x^3*log(2)^2 - 2*(log(2)^2 + 30*log(2))*x^2 + 2*(5*x^3 - x^2 - 5*log(2
))*log(x)^2 - 5*log(x)^3 + 6*x*(2*log(2) + 15) + (20*x^3*log(2) - 4*x^2*(l
og(2) + 15) - 5*log(2)^2 + 12*x)*log(x) - 18)/(5*x^2*log(2)^2 - x*log(2)^2
 + (5*x^2 - x)*log(x)^2 + 2*(5*x^2*log(2) - x*log(2))*log(x))
```

3.1321.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.74

$$\int \frac{-36 + 360x - 900x^2 + (-18 + 192x - 570x^2 + 300x^3)\log(2x) + (5 - 25x + 2x^2 - 20x^3 + 50x^4 + (-5 + 50x)\log(x))\log^3(2x)}{(x^2 - 10x^3 + 25x^4)\log^3(2x)}$$
$$= -5\left(\frac{5}{5\,x - 1} - \frac{1}{x}\right)\log(x) + 2\,x - \frac{6\,(2\,x\log(2) + 2\,x\log(x) - 3)}{x\log(2)^2 + 2\,x\log(2)\log(x) + x\log(x)^2}$$

input
```
integrate((((50*x-5)*log(x)+50*x^4-20*x^3+2*x^2-25*x+5)*log(2*x)^3+(300*x^
3-570*x^2+192*x-18)*log(2*x)-900*x^2+360*x-36)/(25*x^4-10*x^3+x^2)/log(2*x
)^3,x, algorithm=\
```

output
```
-5*(5/(5*x - 1) - 1/x)*log(x) + 2*x - 6*(2*x*log(2) + 2*x*log(x) - 3)/(x*l
og(2)^2 + 2*x*log(2)*log(x) + x*log(x)^2)
```

3.1321.9 Mupad [B] (verification not implemented)

Time = 17.97 (sec) , antiderivative size = 133, normalized size of antiderivative = 3.91

$$\int \frac{-36+360x-900x^2+(-18+192x-570x^2+300x^3)\log(2x)+(5-25x+2x^2-20x^3+50x^4+(-5+50x)\log(x))\log^3(2x)}{(x^2-10x^3+25x^4)\log^3(2x)}\,dx$$
$$= 2x+\frac{\ln(x)}{\frac{x}{5}-x^2}+\frac{\frac{3\,(3\,\ln(2x)-3\,\ln(x)-2x\,(\ln(2x)-\ln(x))+6)}{x}-\frac{3\,\ln(x)\,(2x-3)}{x}}{2\,\ln(x)\,(\ln(2x)-\ln(x))+\ln(x)^2+(\ln(2x)-\ln(x))^2} - \frac{\frac{9\,\ln(x)}{x}+\frac{3\,(2x+3\,\ln(2x)-3\,\ln(x)+3)}{x}}{\ln(2x)}+\frac{9}{x}$$

input
```
int((360*x + log(2*x)*(192*x - 570*x^2 + 300*x^3 - 18) + log(2*x)^3*(log(x
)*(50*x - 5) - 25*x + 2*x^2 - 20*x^3 + 50*x^4 + 5) - 900*x^2 - 36)/(log(2*
x)^3*(x^2 - 10*x^3 + 25*x^4)),x)
```

output
```
2*x + log(x)/(x/5 - x^2) + ((3*(3*log(2*x) - 3*log(x) - 2*x*(log(2*x) - lo
g(x)) + 6))/x - (3*log(x)*(2*x - 3))/x)/(2*log(x)*(log(2*x) - log(x)) + lo
g(x)^2 + (log(2*x) - log(x))^2) - ((9*log(x))/x + (3*(2*x + 3*log(2*x) - 3
*log(x) + 3))/x)/log(2*x) + 9/x
```

3.1322 $\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}\left(-150+120x-24x^2+e^x(\right.}{75-60x+12x^2}$

3.1322.1 Optimal result

Integrand size = 78, antiderivative size = 29

$$\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}\left(-150+120x-24x^2+e^x\left(-40+5x+2x^2\right)\log(5)\right)}{75-60x+12x^2}\,dx$$
$$= e^{-2x+\frac{e^x(5+x)\log(5)}{3(-5+2x)}}-x$$

output
```
exp(1/3*(5+x)*exp(x)/(-5+2*x)*ln(5)-2*x)-x
```

3.1322.2 Mathematica [A] (verified)

Time = 1.80 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}\left(-150+120x-24x^2+e^x\left(-40+5x+2x^2\right)\log(5)\right)}{75-60x+12x^2}\,dx$$
$$= \frac{1}{3}\left(3\ 5^{\frac{e^x(5+x)}{-15+6x}}e^{-2x}-3x\right)$$

input
```
Integrate[(-75 + 60*x - 12*x^2 + E^((30*x - 12*x^2 + E^x*(5 + x)*Log[5])/(
-15 + 6*x))*(-150 + 120*x - 24*x^2 + E^x*(-40 + 5*x + 2*x^2)*Log[5]))/(75
- 60*x + 12*x^2),x]
```

output
```
((3*5^((E^x*(5 + x))/(-15 + 6*x)))/E^(2*x) - 3*x)/3
```

3.1322.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 104 vs. 2(29) = 58.

Time = 2.74 (sec) , antiderivative size = 104, normalized size of antiderivative = 3.59, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.051, Rules used = {7277, 27, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(-24x^2+e^x\left(2x^2+5x-40\right)\log(5)+120x-150\right)\exp\left(\frac{-12x^2+30x+e^x(x+5)\log(5)}{6x-15}\right)-12x^2+60x-75}{12x^2-60x+75}dx$$

$$\Big\downarrow \text{7277}$$

$$48\int -\frac{12x^2-60x+5^{-\frac{e^x(x+5)}{15-6x}}e^{-\frac{2\left(5x-2x^2\right)}{5-2x}}\left(24x^2-120x+e^x\left(-2x^2-5x+40\right)\log(5)+150\right)+75}{144(5-2x)^2}dx$$

$$\Big\downarrow \text{27}$$

$$-\frac{1}{3}\int \frac{12x^2-60x+5^{-\frac{e^x(x+5)}{3(5-2x)}}e^{-\frac{2\left(5x-2x^2\right)}{5-2x}}\left(24x^2-120x+e^x\left(-2x^2-5x+40\right)\log(5)+150\right)+75}{(5-2x)^2}dx$$

$$\Big\downarrow \text{7293}$$

$$-\frac{1}{3}\int \left(3-\frac{5^{\frac{e^x(x+5)}{6x-15}}e^{-2x}\left(2e^x\log(5)x^2-24x^2+5e^x\log(5)x+120x-40e^x\log(5)-150\right)}{(2x-5)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(\frac{3\ 5^{-\frac{e^x(x+5)}{3(5-2x)}}e^{-2x}\left(-2e^xx^2-5e^xx+40e^x\right)}{(5-2x)^2\left(\frac{e^x(x+5)}{5-2x}+\frac{2e^x(x+5)}{(5-2x)^2}+\frac{e^x}{5-2x}\right)}-3x\right)$$

input
```
Int[(-75 + 60*x - 12*x^2 + E^((30*x - 12*x^2 + E^x*(5 + x)*Log[5])/(-15 +
6*x))*(-150 + 120*x - 24*x^2 + E^x*(-40 + 5*x + 2*x^2)*Log[5]))/(75 - 60*x
 + 12*x^2),x]
```

output
```
(-3*x + (3*(40*E^x - 5*E^x*x - 2*E^x*x^2))/(5^((E^x*(5 + x))/(3*(5 - 2*x))
)*E^(2*x)*(5 - 2*x)^2*(E^x/(5 - 2*x) + (2*E^x*(5 + x))/(5 - 2*x)^2 + (E^x*
(5 + x))/(5 - 2*x))))/3
```

3.1322. $\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}\left(-150+120x-24x^2+e^x\left(-40+5x+2x^2\right)\log(5)\right)}{75-60x+12x^2}dx$

3.1322.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7277
```
Int[(u_)*((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.))^(p_.), x_Symbol] :>
 Simp[1/(4^p*c^p)   Int[u*(b + 2*c*x^n)^(2*p), x], x] /; FreeQ[{a, b, c, n}
, x] && EqQ[n2, 2*n] && EqQ[b^2 - 4*a*c, 0] && IntegerQ[p] &&  !AlgebraicFu
nctionQ[u, x]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1322.4 Maple [A] (verified)

Time = 0.53 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.14

method	result	size
parallelrisch	$-x+\mathrm{e}^{\frac{(5+x)\ln(5)\mathrm{e}^{x}-12x^{2}+30x}{6x-15}}-10$	33
risch	$-x+5^{\frac{x\,\mathrm{e}^{x}}{6x-15}}5^{\frac{5\,\mathrm{e}^{x}}{3(-5+2x)}}\mathrm{e}^{-2x}$	37
norman	$\frac{-2x^{2}+2x\,\mathrm{e}^{\frac{(5+x)\ln(5)\mathrm{e}^{x}-12x^{2}+30x}{6x-15}}-5\,\mathrm{e}^{\frac{(5+x)\ln(5)\mathrm{e}^{x}-12x^{2}+30x}{6x-15}}+\frac{25}{2}}{-5+2x}$	73

input
```
int((((2*x^2+5*x-40)*ln(5)*exp(x)-24*x^2+120*x-150)*exp(((5+x)*ln(5)*exp(x
)-12*x^2+30*x)/(6*x-15))-12*x^2+60*x-75)/(12*x^2-60*x+75),x,method=_RETURN
VERBOSE)
```

output
```
-x+exp(1/3/(-5+2*x)*((5+x)*ln(5)*exp(x)-12*x^2+30*x))-10
```

3.1322. $\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}\left(-150+120x-24x^2+e^x\left(-40+5x+2x^2\right)\log(5)\right)}{75-60x+12x^2}\,dx$

3.1322.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.07

$$\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}(-150+120x-24x^2+e^x(-40+5x+2x^2)\log(5))}{75-60x+12x^2}\,dx$$
$$= -x+e^{\left(\frac{(x+5)e^x\log(5)-12\,x^2+30\,x}{3\,(2\,x-5)}\right)}$$

input
```
integrate((((2*x^2+5*x-40)*log(5)*exp(x)-24*x^2+120*x-150)*exp(((5+x)*log(
5)*exp(x)-12*x^2+30*x)/(6*x-15))-12*x^2+60*x-75)/(12*x^2-60*x+75),x, algor
ithm=\
```

output
```
-x + e^(1/3*((x + 5)*e^x*log(5) - 12*x^2 + 30*x)/(2*x - 5))
```

3.1322.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}(-150+120x-24x^2+e^x(-40+5x+2x^2)\log(5))}{75-60x+12x^2}\,dx$$
$$= -x+e^{\frac{-12x^2+30x+(x+5)e^x\log(5)}{6x-15}}$$

input
```
integrate((((2*x**2+5*x-40)*ln(5)*exp(x)-24*x**2+120*x-150)*exp(((5+x)*ln(
5)*exp(x)-12*x**2+30*x)/(6*x-15))-12*x**2+60*x-75)/(12*x**2-60*x+75),x)
```

output
```
-x + exp((-12*x**2 + 30*x + (x + 5)*exp(x)*log(5))/(6*x - 15))
```

3.1322.7 Maxima [F]

$$\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}(-150+120x-24x^2+e^x(-40+5x+2x^2)\log(5))}{75-60x+12x^2}\,dx$$
$$= \int -\frac{12\,x^2-((2\,x^2+5\,x-40)e^x\log(5)-24\,x^2+120\,x-150)e^{\left(\frac{(x+5)e^x\log(5)-12\,x^2+30\,x}{3\,(2\,x-5)}\right)}-60\,x+75}{3\,(4\,x^2-20\,x+25)}\,dx$$

input
```
integrate((((2*x^2+5*x-40)*log(5)*exp(x)-24*x^2+120*x-150)*exp(((5+x)*log(
5)*exp(x)-12*x^2+30*x)/(6*x-15))-12*x^2+60*x-75)/(12*x^2-60*x+75),x, algor
ithm=\
```

output
```
-x + 1/3*integrate(-(24*x^2 - (2*x^2*log(5) + 5*x*log(5) - 40*log(5))*e^x
- 120*x + 150)*e^(1/6*e^x*log(5) - 2*x + 5/2*e^x*log(5)/(2*x - 5))/(4*x^2
- 20*x + 25), x)
```

3.1322.8 Giac [F]

$$\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}\left(-150+120x-24x^2+e^x\left(-40+5x+2x^2\right)\log(5)\right)}{75-60x+12x^2}\,dx$$
$$=\int -\frac{12\,x^2-\left((2\,x^2+5\,x-40)e^x\log\left(5\right)-24\,x^2+120\,x-150\right)e^{\left(\frac{(x+5)e^x\log(5)-12\,x^2+30\,x}{3\,(2\,x-5)}\right)}-60\,x+75}{3\,\left(4\,x^2-20\,x+25\right)}\,dx$$

input
```
integrate((((2*x^2+5*x-40)*log(5)*exp(x)-24*x^2+120*x-150)*exp(((5+x)*log(
5)*exp(x)-12*x^2+30*x)/(6*x-15))-12*x^2+60*x-75)/(12*x^2-60*x+75),x, algor
ithm=\
```

output
```
integrate(-1/3*(12*x^2 - ((2*x^2 + 5*x - 40)*e^x*log(5) - 24*x^2 + 120*x -
 150)*e^(1/3*((x + 5)*e^x*log(5) - 12*x^2 + 30*x)/(2*x - 5)) - 60*x + 75)/
(4*x^2 - 20*x + 25), x)
```

3.1322.9 Mupad [B] (verification not implemented)

Time = 17.52 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.90

$$\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}\left(-150+120x-24x^2+e^x\left(-40+5x+2x^2\right)\log(5)\right)}{75-60x+12x^2}\,dx$$
$$=5^{\frac{5\,e^x}{6\,x-15}}\,5^{\frac{x\,e^x}{6\,x-15}}\,e^{-\frac{12\,x^2}{6\,x-15}}\,e^{\frac{30\,x}{6\,x-15}}-x$$

input
```
int((60*x + exp((30*x - 12*x^2 + exp(x)*log(5)*(x + 5))/(6*x - 15))*(120*x
 - 24*x^2 + exp(x)*log(5)*(5*x + 2*x^2 - 40) - 150) - 12*x^2 - 75)/(12*x^2
 - 60*x + 75),x)
```

output
```
5^((5*exp(x))/(6*x - 15))*5^((x*exp(x))/(6*x - 15))*exp(-(12*x^2)/(6*x - 1
5))*exp((30*x)/(6*x - 15)) - x
```

3.1322. $\int \frac{-75+60x-12x^2+e^{\frac{30x-12x^2+e^x(5+x)\log(5)}{-15+6x}}\left(-150+120x-24x^2+e^x\left(-40+5x+2x^2\right)\log(5)\right)}{75-60x+12x^2}\,dx$

3.1323 $\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x}{-5x^2\log^2(x)+}$

3.1323.1 Optimal result

Integrand size = 109, antiderivative size = 32

$$\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x^2))\log^2(x)+(5+(5-x)}{-5x^2\log^2(x)+x^3\log^3(x)}$$

$$=\frac{1-e^x+x-x^2+\log\left(\frac{1}{2}(-5+x\log(x))\right)}{x\log(x)}$$

output
```
(x-exp(x)+1-x^2+ln(1/2*x*ln(x)-5/2))/ln(x)/x
```

3.1323.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

$$\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x^2))\log^2(x)+(5+(5-x)}{-5x^2\log^2(x)+x^3\log^3(x)}$$

$$=\frac{1-e^x+x-x^2+\log\left(\frac{1}{2}(-5+x\log(x))\right)}{x\log(x)}$$

input
```
Integrate[(5 - 5*E^x + 5*x - 5*x^2 + (5 + 4*x^2 + x^3 + E^x*(-5 + 6*x))*Lo
g[x] + (-x^3 + E^x*(x - x^2))*Log[x]^2 + (5 + (5 - x)*Log[x] - x*Log[x]^2)
*Log[(-5 + x*Log[x])/2])/(-5*x^2*Log[x]^2 + x^3*Log[x]^3),x]
```

output
```
(1 - E^x + x - x^2 + Log[(-5 + x*Log[x])/2])/(x*Log[x])
```

3.1323. $\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x^2))\log^2(x)+(5+(5-x)\log(x)-x\log^2(x))\log\left(\frac{1}{2}(-5+x\log(x))\right)}{-5x^2\log^2(x)+x^3\log^3(x)}\,dx$

3.1323.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{-5x^2+\left(e^x\left(x-x^2\right)-x^3\right)\log^2(x)+\left(x^3+4x^2+e^x(6x-5)+5\right)\log(x)+5x-5e^x+\left(-x\log^2(x)+(5-x)\log\right.}{x^3\log^3(x)-5x^2\log^2(x)}$$

$$\Big\downarrow \text{ 7292}$$

$$\int \frac{5x^2-\left(e^x\left(x-x^2\right)-x^3\right)\log^2(x)-\left(x^3+4x^2+e^x(6x-5)+5\right)\log(x)-5x+5e^x-\left(-x\log^2(x)+(5-x)\log\right.}{x^2\log^2(x)(5-x\log(x))}$$

$$\Big\downarrow \text{ 7293}$$

$$\int \left(-\frac{e^x(x\log(x)-\log(x)-1)}{x^2\log^2(x)}-\frac{(\log(x)+1)\log\left(\frac{1}{2}(x\log(x)-5)\right)}{x^2\log^2(x)}+\frac{5}{x^2\log^2(x)(x\log(x)-5)}+\frac{5}{x^2\log(x)(x\log\right.$$

$$\Big\downarrow \text{ 2009}$$

$$-\int \frac{\log\left(\frac{1}{2}(x\log(x)-5)\right)}{x^2\log^2(x)}dx-\int \frac{\log\left(\frac{1}{2}(x\log(x)-5)\right)}{x^2\log(x)}dx+\frac{1}{5}\int \frac{1}{x\log(x)-5}dx+\int \frac{1}{x(x\log(x)-5)}dx-\frac{x}{\log(x)}-\frac{1}{5}\log(\log(x))+\frac{1}{\log(x)}-\frac{e^x}{x\log(x)}+\frac{1}{x\log(x)}$$

input
```
Int[(5 - 5*E^x + 5*x - 5*x^2 + (5 + 4*x^2 + x^3 + E^x*(-5 + 6*x))*Log[x] +
 (-x^3 + E^x*(x - x^2))*Log[x]^2 + (5 + (5 - x)*Log[x] - x*Log[x]^2)*Log[(
-5 + x*Log[x])/2])/(-5*x^2*Log[x]^2 + x^3*Log[x]^3),x]
```

output
```
$Aborted
```

3.1323.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1323.4 Maple [A] (verified)

Time = 1.35 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.16

method	result	size
risch	$\frac{\ln\left(\frac{x\ln(x)}{2}-\frac{5}{2}\right)}{x\ln(x)}-\frac{x^2-x+e^x-1}{x\ln(x)}$	37
parallelrisch	$\frac{10-10x^2+x\ln(x)+10x-10\,e^x+10\ln\left(\frac{x\ln(x)}{2}-\frac{5}{2}\right)}{10x\ln(x)}$	38

input
```
int(((-x*ln(x)^2+ln(x)*(5-x)+5)*ln(1/2*x*ln(x)-5/2)+((-x^2+x)*exp(x)-x^3)*
ln(x)^2+((6*x-5)*exp(x)+x^3+4*x^2+5)*ln(x)-5*exp(x)-5*x^2+5*x+5)/(x^3*ln(x
)^3-5*x^2*ln(x)^2),x,method=_RETURNVERBOSE)
```

output
```
1/x/ln(x)*ln(1/2*x*ln(x)-5/2)-1/x*(x^2-x+exp(x)-1)/ln(x)
```

3.1323.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.91

$$\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x^2))\log^2(x)+\left(5+(5-x)\right.}{-5x^2\log^2(x)+x^3\log^3(x)}$$
$$=-\frac{x^2-x+e^x-\log\left(\frac{1}{2}\,x\log\left(x\right)-\frac{5}{2}\right)-1}{x\log\left(x\right)}$$

input
```
integrate(((-x*log(x)^2+log(x)*(5-x)+5)*log(1/2*x*log(x)-5/2)+((-x^2+x)*ex
p(x)-x^3)*log(x)^2+((6*x-5)*exp(x)+x^3+4*x^2+5)*log(x)-5*exp(x)-5*x^2+5*x+
5)/(x^3*log(x)^3-5*x^2*log(x)^2),x, algorithm=\
```

output
```
-(x^2 - x + e^x - log(1/2*x*log(x) - 5/2) - 1)/(x*log(x))
```

3.1323.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x^2))\log^2(x)+(5+(5-x)}{-5x^2\log^2(x)+x^3\log^3(x)}$$
= Exception raised: TypeError

input
```
integrate(((-x*ln(x)**2+ln(x)*(5-x)+5)*ln(1/2*x*ln(x)-5/2)+((-x**2+x)*exp(
x)-x**3)*ln(x)**2+((6*x-5)*exp(x)+x**3+4*x**2+5)*ln(x)-5*exp(x)-5*x**2+5*x
+5)/(x**3*ln(x)**3-5*x**2*ln(x)**2),x)
```

output
```
Exception raised: TypeError >> '>' not supported between instances of 'Pol
y' and 'int'
```

3.1323.7 Maxima [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94

$$\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x^2))\log^2(x)+(5+(5-x)}{-5x^2\log^2(x)+x^3\log^3(x)}$$
$$= -\frac{x^2-x+e^x+\log(2)-\log(x\log(x)-5)-1}{x\log(x)}$$

input
```
integrate(((-x*log(x)^2+log(x)*(5-x)+5)*log(1/2*x*log(x)-5/2)+((-x^2+x)*ex
p(x)-x^3)*log(x)^2+((6*x-5)*exp(x)+x^3+4*x^2+5)*log(x)-5*exp(x)-5*x^2+5*x+
5)/(x^3*log(x)^3-5*x^2*log(x)^2),x, algorithm=\
```

output
```
-(x^2 - x + e^x + log(2) - log(x*log(x) - 5) - 1)/(x*log(x))
```

3.1323.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.94

$$\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x^2))\log^2(x)+(5+(5-x)}{-5x^2\log^2(x)+x^3\log^3(x)}$$
$$= -\frac{x^2-x+e^x+\log(2)-\log(x\log(x)-5)-1}{x\log(x)}$$

input
```
integrate(((-x*log(x)^2+log(x)*(5-x)+5)*log(1/2*x*log(x)-5/2)+((-x^2+x)*ex
p(x)-x^3)*log(x)^2+((6*x-5)*exp(x)+x^3+4*x^2+5)*log(x)-5*exp(x)-5*x^2+5*x+
5)/(x^3*log(x)^3-5*x^2*log(x)^2),x, algorithm=\
```

output
```
-(x^2 - x + e^x + log(2) - log(x*log(x) - 5) - 1)/(x*log(x))
```

3.1323.9 Mupad [B] (verification not implemented)

Time = 17.49 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.47

$$\int \frac{5-5e^x+5x-5x^2+(5+4x^2+x^3+e^x(-5+6x))\log(x)+(-x^3+e^x(x-x^2))\log^2(x)+\left(5+(5-x)\right.}{-5x^2\log^2(x)+x^3\log^3(x)}$$

$$= \frac{1}{\ln(x)} - \frac{x}{\ln(x)} + \frac{1}{x\ln(x)} + \frac{\ln\left(\frac{x\ln(x)}{2}-\frac{5}{2}\right)}{x\ln(x)} - \frac{e^x}{x\ln(x)}$$

input
```
int(-(5*x - 5*exp(x) + log(x)*(exp(x)*(6*x - 5) + 4*x^2 + x^3 + 5) - log((
x*log(x))/2 - 5/2)*(log(x)*(x - 5) + x*log(x)^2 - 5) + log(x)^2*(exp(x)*(x
 - x^2) - x^3) - 5*x^2 + 5)/(5*x^2*log(x)^2 - x^3*log(x)^3),x)
```

output
```
1/log(x) - x/log(x) + 1/(x*log(x)) + log((x*log(x))/2 - 5/2)/(x*log(x)) -
exp(x)/(x*log(x))
```

3.1324 $\int \frac{9e^7-x^2+e^2x^2+x^2\log(5)}{x^2\log(5)}\,dx$

3.1324.1 Optimal result

Integrand size = 32, antiderivative size = 28

$$\int \frac{9e^7-x^2+e^2x^2+x^2\log(5)}{x^2\log(5)}\,dx = x+\frac{(9+x)\left(-x+e^2(-e^5+x)\right)}{x\log(5)}$$

output
```
x+(exp(1)^2*(-exp(5)+x)-x)/ln(5)/x*(x+9)
```

3.1324.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.82

$$\int \frac{9e^7-x^2+e^2x^2+x^2\log(5)}{x^2\log(5)}\,dx = \frac{-\frac{9e^7}{x}+x(-1+e^2+\log(5))}{\log(5)}$$

input
```
Integrate[(9*E^7 - x^2 + E^2*x^2 + x^2*Log[5])/(x^2*Log[5]),x]
```

output
```
((-9*E^7)/x + x*(-1 + E^2 + Log[5]))/Log[5]
```

3.1324.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156, Rules used = {6, 6, 27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{e^2x^2-x^2+x^2\log(5)+9e^7}{x^2\log(5)}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{(e^2-1)\,x^2+x^2\log(5)+9e^7}{x^2\log(5)}dx$$

$$\Big\downarrow \text{ 6}$$

$$\int \frac{x^2\left(-1+e^2+\log(5)\right)+9e^7}{x^2\log(5)}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\int \frac{9e^7-x^2\left(1-e^2-\log(5)\right)}{x^2}dx}{\log(5)}$$

$$\Big\downarrow \text{ 244}$$

$$\frac{\int \left(\log(5)+e^2-1+\frac{9e^7}{x^2}\right)dx}{\log(5)}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{-\frac{9e^7}{x}-\left(x\left(1-e^2-\log(5)\right)\right)}{\log(5)}$$

input
```
Int[(9*E^7 - x^2 + E^2*x^2 + x^2*Log[5])/(x^2*Log[5]),x]
```

output
```
((-9*E^7)/x - x*(1 - E^2 - Log[5]))/Log[5]
```

3.1324.3.1 Defintions of rubi rules used

rule 6
```
Int[(u_.)*((v_.) + (a_.)*(Fx_) + (b_.)*(Fx_))^(p_.), x_Symbol] :> Int[u*(v
+ (a + b)*Fx)^p, x] /; FreeQ[{a, b}, x] && !FreeQ[Fx, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] && !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1324.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.89

method	result	size
default	$\frac{e^{2} x+x \ln(5)-x-\frac{9 e^{7}}{x}}{\ln(5)}$	25
risch	$\frac{x e^{2}}{\ln(5)}+x-\frac{x}{\ln(5)}-\frac{9 e^{7}}{\ln(5) x}$	29
norman	$\frac{\frac{\left(e^{2}+\ln(5)-1\right) x^{2}}{\ln(5)}-\frac{9 e^{2} e^{5}}{\ln(5)}}{x}$	34
gosper	$-\frac{-x^{2} e^{2}+9 e^{2} e^{5}-x^{2} \ln(5)+x^{2}}{x \ln(5)}$	38
parallelrisch	$-\frac{-x^{2} e^{2}+9 e^{2} e^{5}-x^{2} \ln(5)+x^{2}}{x \ln(5)}$	38

input
```
int((x^2*ln(5)+9*exp(1)^2*exp(5)+x^2*exp(1)^2-x^2)/x^2/ln(5),x,method=_RET
URNVERBOSE)
```

output
```
1/ln(5)*(exp(2)*x+x*ln(5)-x-9*exp(7)/x)
```

3.1324.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.07

$$\int \frac{9e^7-x^2+e^2x^2+x^2\log(5)}{x^2\log(5)}\,dx=\frac{x^2e^2+x^2\log(5)-x^2-9\,e^7}{x\log(5)}$$

input
```
integrate((x^2*log(5)+9*exp(1)^2*exp(5)+x^2*exp(1)^2-x^2)/x^2/log(5),x, al
gorithm=\
```

output
```
(x^2*e^2 + x^2*log(5) - x^2 - 9*e^7)/(x*log(5))
```

3.1324.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.68

$$\int \frac{9e^7-x^2+e^2x^2+x^2\log(5)}{x^2\log(5)}\,dx=\frac{x(-1+\log(5)+e^2)-\frac{9e^7}{x}}{\log(5)}$$

input
```
integrate((x**2*ln(5)+9*exp(1)**2*exp(5)+x**2*exp(1)**2-x**2)/x**2/ln(5),x
)
```

output
```
(x*(-1 + log(5) + exp(2)) - 9*exp(7)/x)/log(5)
```

3.1324.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.75

$$\int \frac{9e^7-x^2+e^2x^2+x^2\log(5)}{x^2\log(5)}\,dx=\frac{x(e^2+\log(5)-1)-\frac{9\,e^7}{x}}{\log(5)}$$

input
```
integrate((x^2*log(5)+9*exp(1)^2*exp(5)+x^2*exp(1)^2-x^2)/x^2/log(5),x, al
gorithm=\
```

output
```
(x*(e^2 + log(5) - 1) - 9*e^7/x)/log(5)
```

3.1324.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{9e^7 - x^2 + e^2x^2 + x^2\log(5)}{x^2\log(5)}\,dx = \frac{xe^2 + x\log(5) - x - \frac{9e^7}{x}}{\log(5)}$$

input
```
integrate((x^2*log(5)+9*exp(1)^2*exp(5)+x^2*exp(1)^2-x^2)/x^2/log(5),x, al
gorithm=\
```

output
```
(x*e^2 + x*log(5) - x - 9*e^7/x)/log(5)
```

3.1324.9 Mupad [B] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.86

$$\int \frac{9e^7 - x^2 + e^2x^2 + x^2\log(5)}{x^2\log(5)}\,dx = \frac{x\,(e^2 + \ln(5) - 1)}{\ln(5)} - \frac{9\,e^7}{x\,\ln(5)}$$

input
```
int((9*exp(7) + x^2*exp(2) + x^2*log(5) - x^2)/(x^2*log(5)),x)
```

output
```
(x*(exp(2) + log(5) - 1))/log(5) - (9*exp(7))/(x*log(5))
```

3.1325 $\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+(4608x+e\right.}{-5x^6+15x^5\log^2(x)-15x^4}$

3.1325.1 Optimal result

Integrand size = 130, antiderivative size = 25

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+(4608x+e^x(576x-144x^2))\log^4(x)+(-2304+e^x\right.}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}$$
$$=e^{\frac{144(8+e^x)}{5\left(-x+\frac{x^2}{\log^2(x)}\right)^2}}$$

output
```
exp(144/5/(x^2/ln(x)^2-x)^2*(exp(x)+8))
```

3.1325.2 Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+(4608x+e^x(576x-144x^2))\log^4(x)+(-2304+e^x\right.}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}$$
$$=e^{\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}}$$

input
```
Integrate[(E^(((1152 + 144*E^x)*Log[x]^4)/(5*x^4 - 10*x^3*Log[x]^2 + 5*x^2
*Log[x]^4))*((-4608*x - 576*E^x*x)*Log[x]^3 + (4608*x + E^x*(576*x - 144*x
^2))*Log[x]^4 + (-2304 + E^x*(-288 + 144*x))*Log[x]^6))/(-5*x^6 + 15*x^5*L
og[x]^2 - 15*x^4*Log[x]^4 + 5*x^3*Log[x]^6),x]
```

3.1325.

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+(4608x+e^x(576x-144x^2))\log^4(x)+(-2304+e^x(-288+144x))\log^6(x)\right)}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}\,dx$$

output
```
E^((144*(8 + E^x)*Log[x]^4)/(5*x^2*(x - Log[x]^2)^2))
```

3.1325.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(\left(e^x\left(576x-144x^2\right)+4608x\right)\log^4(x)+\left(e^x(144x-288)-2304\right)\log^6(x)+\left(-576e^xx-4608x\right)\log^3(x)\right)\exp\left(\right.}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}$$

$$\Big\downarrow \ 7292$$

$$\int \frac{\left(-\left(e^x\left(576x-144x^2\right)+4608x\right)\log^4(x)-\left(\left(e^x(144x-288)-2304\right)\log^6(x)\right)-\left(-576e^xx-4608x\right)\log^3(x)\right)\text{ex}}{5x^3\left(x-\log^2(x)\right)^3}$$

$$\Big\downarrow \ 27$$

$$\frac{1}{5}\int \frac{144\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\left(\left(e^x(2-x)+16\right)\log^6(x)-\left(32x+e^x\left(4x-x^2\right)\right)\log^4(x)+4\left(e^xx+8x\right)\log^3(x)\right)}{x^3\left(x-\log^2(x)\right)^3}d$$

$$\Big\downarrow \ 27$$

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\left(\left(e^x(2-x)+16\right)\log^6(x)-\left(32x+e^x\left(4x-x^2\right)\right)\log^4(x)+4\left(e^xx+8x\right)\log^3(x)\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

$$\Big\downarrow \ 7293$$

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}+x\right)(-x}{}\right.$$

$$\Big\downarrow \ 7239$$

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^3(x)\left(\left(16-e^x(x-2)\right)\log^3(x)+\left(e^x(x-4)-32\right)x\log(x)+4\left(8+e^x\right)x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

3.1325.

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left(\left(-4608x-576e^xx\right)\log^3(x)+\left(4608x+e^x\left(576x-144x^2\right)\right)\log^4(x)+\left(-2304+e^x(-288+144x)\right)\log^6(x)\right)}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}\,dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{144}{5}\int \left(\frac{16 \exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}\right) \log^6(x)}{x^3 \left(x-\log^2(x)\right)^3}-\frac{32 \exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}\right) \log^4(x)}{x^2 \left(x-\log^2(x)\right)^3}+\frac{\exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}+x\right) (-x \mathrm{l}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\frac{144}{5}\int \frac{\exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}\right) \log^3(x) \left((16-e^x (x-2)) \log^3(x)+(e^x (x-4)-32) x \log(x)+4(8+e^x) x\right)}{x^3 \left(x-\log^2(x)\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{144}{5}\int \left(\frac{16 \exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}\right) \log^6(x)}{x^3 \left(x-\log^2(x)\right)^3}-\frac{32 \exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}\right) \log^4(x)}{x^2 \left(x-\log^2(x)\right)^3}+\frac{\exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}+x\right) (-x \mathrm{l}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\frac{144}{5}\int \frac{\exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}\right) \log^3(x) \left((16-e^x (x-2)) \log^3(x)+(e^x (x-4)-32) x \log(x)+4(8+e^x) x\right)}{x^3 \left(x-\log^2(x)\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{144}{5}\int \left(\frac{16 \exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}\right) \log^6(x)}{x^3 \left(x-\log^2(x)\right)^3}-\frac{32 \exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}\right) \log^4(x)}{x^2 \left(x-\log^2(x)\right)^3}+\frac{\exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}+x\right) (-x \mathrm{l}}{}\right.$$

$$\Big\downarrow \text{7239}$$

$$\frac{144}{5}\int \frac{\exp \left(\frac{144(8+e^x) \log^4(x)}{5x^2 (x-\log^2(x))^2}\right) \log^3(x) \left((16-e^x (x-2)) \log^3(x)+(e^x (x-4)-32) x \log(x)+4(8+e^x) x\right)}{x^3 \left(x-\log^2(x)\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

3.1325.

$$\int \frac{e^{\frac{(1152+144e^x) \log^4(x)}{5x^4-10x^3 \log^2(x)+5x^2 \log^4(x)}} \left((-4608x-576e^x x) \log^3(x)+\left(4608x+e^x \left(576x-144x^2\right)\right) \log^4(x)+(-2304+e^x (-288+144x)) \log^6(x)\right)}{5x^6+15x^5 \log^2(x)-15x^4 \log^4(x)+5x^3 \log^6(x)}\,dx$$

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}+x\right)(-x\log$$

$\downarrow$ 7239

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^3(x)\left((16-e^x(x-2))\log^3(x)+(e^x(x-4)-32)x\log(x)+4(8+e^x)x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

$\downarrow$ 7293

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}+x\right)(-x\log$$

$\downarrow$ 7239

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^3(x)\left((16-e^x(x-2))\log^3(x)+(e^x(x-4)-32)x\log(x)+4(8+e^x)x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

$\downarrow$ 7293

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}+x\right)(-x\log$$

$\downarrow$ 7239

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^3(x)\left((16-e^x(x-2))\log^3(x)+(e^x(x-4)-32)x\log(x)+4(8+e^x)x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

$\downarrow$ 7293

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}+x\right)(-x\log$$

3.1325.

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^xx)\log^3(x)+\left(4608x+e^x\left(576x-144x^2\right)\right)\log^4(x)+(-2304+e^x(-288+144x))\log^6(x)\right)}{5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}\,dx$$

$$\downarrow 7239$$

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^3(x)\left((16-e^x(x-2))\log^3(x)+(e^x(x-4)-32)\,x\log(x)+4(8+e^x)\,x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

$$\downarrow 7293$$

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}+x\right)(-x\,\cdots}{\cdots}\right.$$

$$\downarrow 7239$$

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^3(x)\left((16-e^x(x-2))\log^3(x)+(e^x(x-4)-32)\,x\log(x)+4(8+e^x)\,x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

$$\downarrow 7293$$

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}+x\right)(-x\,\cdots}{\cdots}\right.$$

$$\downarrow 7239$$

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^3(x)\left((16-e^x(x-2))\log^3(x)+(e^x(x-4)-32)\,x\log(x)+4(8+e^x)\,x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

$$\downarrow 7293$$

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}+x\right)(-x\,\cdots}{\cdots}\right.$$

$$\downarrow 7239$$

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2\left(x-\log^2(x)\right)^2}\right)\log^3(x)\left((16-e^x(x-2))\log^3(x)+(e^x(x-4)-32)\,x\log(x)+4(8+e^x)\,x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

3.1325.

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left(\left(-4608x-576e^xx\right)\log^3(x)+\left(4608x+e^x\left(576x-144x^2\right)\right)\log^4(x)+\left(-2304+e^x(-288+144x)\right)\log^6(x)\right)}{5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}\,dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}+x\right)(-x\log$$

$$\Big\downarrow \text{7239}$$

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^3(x)\left((16-e^x(x-2))\log^3(x)+(e^x(x-4)-32)x\log(x)+4(8+e^x)x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}+x\right)(-x\log$$

$$\Big\downarrow \text{7239}$$

$$\frac{144}{5}\int \frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^3(x)\left((16-e^x(x-2))\log^3(x)+(e^x(x-4)-32)x\log(x)+4(8+e^x)x\right)}{x^3\left(x-\log^2(x)\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$\frac{144}{5}\int \left(\frac{16\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^6(x)}{x^3\left(x-\log^2(x)\right)^3}-\frac{32\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}\right)\log^4(x)}{x^2\left(x-\log^2(x)\right)^3}+\frac{\exp\left(\frac{144(8+e^x)\log^4(x)}{5x^2(x-\log^2(x))^2}+x\right)(-x\log$$

input
```
Int[(E^(((1152 + 144*E^x)*Log[x]^4)/(5*x^4 - 10*x^3*Log[x]^2 + 5*x^2*Log[x
]^4))*((-4608*x - 576*E^x*x)*Log[x]^3 + (4608*x + E^x*(576*x - 144*x^2))*L
og[x]^4 + (-2304 + E^x*(-288 + 144*x))*Log[x]^6))/(-5*x^6 + 15*x^5*Log[x]^
2 - 15*x^4*Log[x]^4 + 5*x^3*Log[x]^6),x]
```

output
```
$Aborted
```

3.1325.

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^xx)\log^3(x)+\left(4608x+e^x\left(576x-144x^2\right)\right)\log^4(x)+(-2304+e^x(-288+144x))\log^6(x)\right)}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}dx$$

3.1325.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7292
```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1325.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$e^{\frac{144\left(e^{x}+8\right) \ln\left(x\right)^{4}}{5 x^{2} \left(\ln\left(x\right)^{2}-x\right)^{2}}}$$

input
```
int((((144*x-288)*exp(x)-2304)*ln(x)^6+((-144*x^2+576*x)*exp(x)+4608*x)*ln
(x)^4+(-576*exp(x)*x-4608*x)*ln(x)^3)*exp((144*exp(x)+1152)*ln(x)^4/(5*x^2
*ln(x)^4-10*x^3*ln(x)^2+5*x^4))/(5*x^3*ln(x)^6-15*x^4*ln(x)^4+15*x^5*ln(x)
^2-5*x^6),x)
```

output
```
exp(144/5*(exp(x)+8)*ln(x)^4/x^2/(ln(x)^2-x)^2)
```

3.1325.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.36

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+\left(4608x+e^x(576x-144x^2)\right)\log^4(x)+(-2304+e^x\right.}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}$$
$$= e^{\left(\frac{144\left(e^{x}+8\right) \log\left(x\right)^{4}}{5\left(x^{2} \log\left(x\right)^{4}-2 x^{3} \log\left(x\right)^{2}+x^{4}\right)}\right)}$$

3.1325.

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+\left(4608x+e^x(576x-144x^2)\right)\log^4(x)+(-2304+e^x(-288+144x))\log^6(x)\right)}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}\,dx$$

input
```
integrate((((144*x-288)*exp(x)-2304)*log(x)^6+((-144*x^2+576*x)*exp(x)+460
8*x)*log(x)^4+(-576*exp(x)*x-4608*x)*log(x)^3)*exp((144*exp(x)+1152)*log(x
)^4/(5*x^2*log(x)^4-10*x^3*log(x)^2+5*x^4))/(5*x^3*log(x)^6-15*x^4*log(x)^
4+15*x^5*log(x)^2-5*x^6),x, algorithm=\
```

output
```
e^(144/5*(e^x + 8)*log(x)^4/(x^2*log(x)^4 - 2*x^3*log(x)^2 + x^4))
```

3.1325.6 Sympy [A] (verification not implemented)

Time = 0.86 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.48

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+(4608x+e^x(576x-144x^2))\log^4(x)+(-2304+e^x\right.}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}$$
$$= e^{\frac{(144e^x+1152)\log(x)^4}{5x^4-10x^3\log(x)^2+5x^2\log(x)^4}}$$

input
```
integrate((((144*x-288)*exp(x)-2304)*ln(x)**6+((-144*x**2+576*x)*exp(x)+46
08*x)*ln(x)**4+(-576*exp(x)*x-4608*x)*ln(x)**3)*exp((144*exp(x)+1152)*ln(x
)**4/(5*x**2*ln(x)**4-10*x**3*ln(x)**2+5*x**4))/(5*x**3*ln(x)**6-15*x**4*l
n(x)**4+15*x**5*ln(x)**2-5*x**6),x)
```

output
```
exp((144*exp(x) + 1152)*log(x)**4/(5*x**4 - 10*x**3*log(x)**2 + 5*x**2*log
(x)**4))
```

3.1325.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 108 vs. 2(20) = 40.

Time = 3.51 (sec) , antiderivative size = 108, normalized size of antiderivative = 4.32

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+(4608x+e^x(576x-144x^2))\log^4(x)+(-2304+e^x\right.}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}$$
$$= e^{\left(\frac{288\,e^x}{5\left(\log(x)^4-x\log(x)^2\right)}+\frac{144\,e^x}{5\left(\log(x)^4-2\,x\log(x)^2+x^2\right)}+\frac{2304}{5\left(\log(x)^4-x\log(x)^2\right)}+\frac{1152}{5\left(\log(x)^4-2\,x\log(x)^2+x^2\right)}+\frac{144\,e^x}{5\,x^2}+\frac{1152}{5\,x^2}+\frac{288\,e^x}{5\,x\log(x)^2}+\frac{2304}{5\,x\log(x)^2}\right)}$$

input
```
integrate((((144*x-288)*exp(x)-2304)*log(x)^6+((-144*x^2+576*x)*exp(x)+460
8*x)*log(x)^4+(-576*exp(x)*x-4608*x)*log(x)^3)*exp((144*exp(x)+1152)*log(x
)^4/(5*x^2*log(x)^4-10*x^3*log(x)^2+5*x^4))/(5*x^3*log(x)^6-15*x^4*log(x)^
4+15*x^5*log(x)^2-5*x^6),x, algorithm=\
```


$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+(4608x+e^x(576x-144x^2))\log^4(x)+(-2304+e^x(-288+144x))\log^6(x)\right)}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}\,dx$$

output
```
e^(288/5*e^x/(log(x)^4 - x*log(x)^2) + 144/5*e^x/(log(x)^4 - 2*x*log(x)^2
+ x^2) + 2304/5/(log(x)^4 - x*log(x)^2) + 1152/5/(log(x)^4 - 2*x*log(x)^2
+ x^2) + 144/5*e^x/x^2 + 1152/5/x^2 + 288/5*e^x/(x*log(x)^2) + 2304/5/(x*l
og(x)^2))
```

3.1325.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(20) = 40$.

Time = 0.40 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.48

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+(4608x+e^x(576x-144x^2))\log^4(x)+(-2304+e^x\right.}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}$$
$$= e^{\left(\frac{144\,e^{x}\log(x)^{4}}{5\left(x^{2}\log(x)^{4}-2\,x^{3}\log(x)^{2}+x^{4}\right)}+\frac{1152\,\log(x)^{4}}{5\left(x^{2}\log(x)^{4}-2\,x^{3}\log(x)^{2}+x^{4}\right)}\right)}$$

input
```
integrate((((144*x-288)*exp(x)-2304)*log(x)^6+((-144*x^2+576*x)*exp(x)+460
8*x)*log(x)^4+(-576*exp(x)*x-4608*x)*log(x)^3)*exp((144*exp(x)+1152)*log(x
)^4/(5*x^2*log(x)^4-10*x^3*log(x)^2+5*x^4))/(5*x^3*log(x)^6-15*x^4*log(x)^
4+15*x^5*log(x)^2-5*x^6),x, algorithm=\
```

output
```
e^(144/5*e^x*log(x)^4/(x^2*log(x)^4 - 2*x^3*log(x)^2 + x^4) + 1152/5*log(x
)^4/(x^2*log(x)^4 - 2*x^3*log(x)^2 + x^4))
```

3.1325.9 Mupad [B] (verification not implemented)

Time = 17.81 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.72

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left((-4608x-576e^x x)\log^3(x)+(4608x+e^x(576x-144x^2))\log^4(x)+(-2304+e^x\right.}{-5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}$$
$$= \mathrm{e}^{\frac{1152\ln(x)^4+144\,\mathrm{e}^{x}\ln(x)^4}{5\,x^4-10\,x^3\ln(x)^2+5\,x^2\ln(x)^4}}$$

input
```
int((exp((log(x)^4*(144*exp(x) + 1152))/(5*x^2*log(x)^4 - 10*x^3*log(x)^2
+ 5*x^4))*(log(x)^6*(exp(x)*(144*x - 288) - 2304) + log(x)^4*(4608*x + exp
(x)*(576*x - 144*x^2)) - log(x)^3*(4608*x + 576*x*exp(x))))/(15*x^5*log(x)
^2 - 15*x^4*log(x)^4 + 5*x^3*log(x)^6 - 5*x^6),x)
```

output

```
exp((1152*log(x)^4 + 144*exp(x)*log(x)^4)/(5*x^2*log(x)^4 - 10*x^3*log(x)^
2 + 5*x^4))
```

3.1325.

$$\int \frac{e^{\frac{(1152+144e^x)\log^4(x)}{5x^4-10x^3\log^2(x)+5x^2\log^4(x)}}\left(\left(-4608x-576e^xx\right)\log^3(x)+\left(4608x+e^x\left(576x-144x^2\right)\right)\log^4(x)+\left(-2304+e^x(-288+144x)\right)\log^6(x)\right)}{5x^6+15x^5\log^2(x)-15x^4\log^4(x)+5x^3\log^6(x)}\,dx$$

3.1326 $\int \frac{-1+x+2e^{x^2}x^2}{x}\,dx$

3.1326.1 Optimal result

Integrand size = 17, antiderivative size = 29

$$\int \frac{-1+x+2e^{x^2}x^2}{x}\,dx = 2+e^{x^2}+x-\log(3)-\log(x)-\log\left(\frac{1}{2}(1-\log(2))\right)$$

output
```
2+x-ln(x)-ln(1/2-1/2*ln(2))-ln(3)+exp(x^2)
```

3.1326.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.38

$$\int \frac{-1+x+2e^{x^2}x^2}{x}\,dx = e^{x^2}+x-\log(x)$$

input
```
Integrate[(-1 + x + 2*E^x^2*x^2)/x,x]
```

output
```
E^x^2 + x - Log[x]
```

3.1326.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.38, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2e^{x^2}x^2+x-1}{x}\,dx$$
$$\Big\downarrow \text{2010}$$
$$\int \left(2e^{x^2}x+\frac{x-1}{x}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$e^{x^2}+x-\log(x)$$

input
```
Int[(-1 + x + 2*E^x^2*x^2)/x,x]
```

output
```
E^x^2 + x - Log[x]
```

3.1326.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.1326.4 Maple [A] (verified)

Time = 0.02 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.38

method	result	size
default	$e^{x^2}-\ln(x)+x$	11
norman	$e^{x^2}-\ln(x)+x$	11
risch	$e^{x^2}-\ln(x)+x$	11
parallelrisch	$e^{x^2}-\ln(x)+x$	11
parts	$e^{x^2}-\ln(x)+x$	11

input
```
int((2*x^2*exp(x^2)+x-1)/x,x,method=_RETURNVERBOSE)
```

output
```
exp(x^2)-ln(x)+x
```

3.1326.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.34

$$\int \frac{-1+x+2e^{x^2}x^2}{x}\,dx = x+e^{(x^2)}-\log(x)$$

input
```
integrate((2*x^2*exp(x^2)+x-1)/x,x, algorithm=\
```

output
```
x + e^(x^2) - log(x)
```

3.1326.6 Sympy [A] (verification not implemented)

Time = 0.05 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.28

$$\int \frac{-1+x+2e^{x^2}x^2}{x}\,dx = x+e^{x^2}-\log(x)$$

input
```
integrate((2*x**2*exp(x**2)+x-1)/x,x)
```

output
```
x + exp(x**2) - log(x)
```

3.1326.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.34

$$\int \frac{-1+x+2e^{x^2}x^2}{x}\,dx = x + e^{(x^2)} - \log(x)$$

input
```
integrate((2*x^2*exp(x^2)+x-1)/x,x, algorithm=\
```

output
```
x + e^(x^2) - log(x)
```

3.1326.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.34

$$\int \frac{-1+x+2e^{x^2}x^2}{x}\,dx = x + e^{(x^2)} - \log(x)$$

input
```
integrate((2*x^2*exp(x^2)+x-1)/x,x, algorithm=\
```

output
```
x + e^(x^2) - log(x)
```

3.1326.9 Mupad [B] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.34

$$\int \frac{-1+x+2e^{x^2}x^2}{x}\,dx = x + \mathrm{e}^{x^2} - \ln(x)$$

input
```
int((x + 2*x^2*exp(x^2) - 1)/x,x)
```

output
```
x + exp(x^2) - log(x)
```

3.1327 $\int (3+4x+2\log(\log(3)))\,dx$

3.1327.1 Optimal result

Integrand size = 10, antiderivative size = 19

$$\int (3+4x+2\log(\log(3)))\,dx = 16e^4 + x(3+2x) + 2x\log(\log(3))$$

output
```
x*(3+2*x)+2*ln(ln(3))*x+16*exp(2)^2
```

3.1327.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int (3+4x+2\log(\log(3)))\,dx = 3x + 2x^2 + 2x\log(\log(3))$$

input
```
Integrate[3 + 4*x + 2*Log[Log[3]],x]
```

output
```
3*x + 2*x^2 + 2*x*Log[Log[3]]
```

3.1327.3 Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {17}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (4x+3+2\log(\log(3)))\,dx$$

$$\Big\downarrow \; 17$$

$$\frac{1}{8}(4x+3+2\log(\log(3)))^2$$

input
```
Int[3 + 4*x + 2*Log[Log[3]],x]
```

output
```
(3 + 4*x + 2*Log[Log[3]])^2/8
```

3.1327.3.1 Defintions of rubi rules used

rule 17
```
Int[(c_.)*((a_.) + (b_.)*(x_))^(m_.), x_Symbol] :> Simp[c*((a + b*x)^(m + 1
)/(b*(m + 1))), x] /; FreeQ[{a, b, c, m}, x] && NeQ[m, -1]
```

3.1327.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.84

method	result	size
gosper	$2\ln(\ln(3))\,x+2x^2+3x$	16
default	$2\ln(\ln(3))\,x+2x^2+3x$	16
norman	$2x^2+(2\ln(\ln(3))+3)\,x$	16
risch	$2\ln(\ln(3))\,x+2x^2+3x$	16
parallelrisch	$2x^2+(2\ln(\ln(3))+3)\,x$	16
parts	$2\ln(\ln(3))\,x+2x^2+3x$	16

input
```
int(2*ln(ln(3))+3+4*x,x,method=_RETURNVERBOSE)
```

output
```
2*ln(ln(3))*x+2*x^2+3*x
```

3.1327.5 Fricas [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int (3+4x+2\log(\log(3)))\,dx = 2\,x^2+2\,x\log\left(\log\left(3\right)\right)+3\,x$$

input
```
integrate(2*log(log(3))+3+4*x,x, algorithm=\
```

output
```
2*x^2 + 2*x*log(log(3)) + 3*x
```

3.1327.6 Sympy [A] (verification not implemented)

Time = 0.02 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.74

$$\int (3+4x+2\log(\log(3)))\,dx = 2x^2+x(2\log\left(\log\left(3\right)\right)+3)$$

input
```
integrate(2*ln(ln(3))+3+4*x,x)
```

output
```
2*x**2 + x*(2*log(log(3)) + 3)
```

3.1327.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int (3+4x+2\log(\log(3)))\,dx = 2\,x^2+2\,x\log\left(\log\left(3\right)\right)+3\,x$$

input
```
integrate(2*log(log(3))+3+4*x,x, algorithm=\
```

output
```
2*x^2 + 2*x*log(log(3)) + 3*x
```

3.1327.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int (3+4x+2\log(\log(3)))\,dx = 2\,x^2 + 2\,x\log\left(\log\left(3\right)\right) + 3\,x$$

input
```
integrate(2*log(log(3))+3+4*x,x, algorithm=\
```

output
```
2*x^2 + 2*x*log(log(3)) + 3*x
```

3.1327.9 Mupad [B] (verification not implemented)

Time = 17.58 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.79

$$\int (3+4x+2\log(\log(3)))\,dx = 2\,x^2 + \left(2\,\ln\left(\ln\left(3\right)\right) + 3\right)\,x$$

input
```
int(4*x + 2*log(log(3)) + 3,x)
```

output
```
x*(2*log(log(3)) + 3) + 2*x^2
```

3.1328 $\int e^{-2e^{1-5e^{1-x}+5x}} x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}} \left(1+e^{2e^{1-5e^{1-x}+5x}} x^2\right.$

3.1328.1 Optimal result

Integrand size = 112, antiderivative size = 29

$$\int e^{-2e^{1-5e^{1-x}+5x}} x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}} \left(1+e^{2e^{1-5e^{1-x}+5x}} x^2-2\log(x) + e^{-5e^{1-x}+5x}\left(-10ex-10e^{2-x}x\right)\log(x)\right) dx = x^{1+\frac{e^{-2e^{1+5\left(-e^{1-x}+x\right)}}}{x^2}}$$

output
```
exp(ln(x)/x^2/exp(exp(1)*exp(-5*exp(1-x)+5*x))^2)*x
```

3.1328.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.97

$$\int e^{-2e^{1-5e^{1-x}+5x}} x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}} \left(1+e^{2e^{1-5e^{1-x}+5x}} x^2-2\log(x) + e^{-5e^{1-x}+5x}\left(-10ex-10e^{2-x}x\right)\log(x)\right) dx = x^{1+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}}$$

input
```
Integrate[(x^(-2 + 1/(E^(2*E^(1 - 5*E^(1 - x) + 5*x))*x^2))*(1 + E^(2*E^(1
 - 5*E^(1 - x) + 5*x))*x^2 - 2*Log[x] + E^(-5*E^(1 - x) + 5*x)*(-10*E*x -
10*E^(2 - x)*x)*Log[x]))/E^(2*E^(1 - 5*E^(1 - x) + 5*x)),x]
```

output
```
x^(1 + 1/(E^(2*E^(1 - 5*E^(1 - x) + 5*x))*x^2))
```

3.1328.

$\int e^{-2e^{1-5e^{1-x}+5x}} x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}} \left(1+e^{2e^{1-5e^{1-x}+5x}} x^2-2\log(x)+e^{-5e^{1-x}+5x}\left(-10ex-10e^{2-x}x\right)\log(x)\right) dx$

3.1328.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int e^{-2e^{5x-5e^{1-x}}+1}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-2}\left(e^{2e^{5x-5e^{1-x}}+1}x^2+e^{5x-5e^{1-x}}\left(-10e^{2-x}x-10ex\right)\log(x)-2\log(x)+1\right)dx$$

$$\Big\downarrow \text{7293}$$

$$\int \left(e^{-2e^{5x-5e^{1-x}}+1}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-2}-2e^{-2e^{5x-5e^{1-x}}+1}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-2}\log(x)-10e^{4x-5e^{1-x}-2e^{5x-5e^{1-x}}+1+1}(e^x+\right.$$

$$\Big\downarrow \text{2009}$$

$$\int e^{-2e^{5x-5e^{1-x}}+1}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-2}dx+2\int \frac{\int e^{-2e^{5x-5e^{1-x}}+1}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-2}dx}{x}dx+$$
$$10\int \frac{\int e^{4x-5e^{1-x}-2e^{5x-5e^{1-x}}+1+2}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-1}dx}{x}dx+$$
$$10\int \frac{\int e^{5x-5e^{1-x}-2e^{5x-5e^{1-x}}+1+1}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-1}dx}{x}dx-$$
$$2\log(x)\int e^{-2e^{5x-5e^{1-x}}+1}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-2}dx-$$
$$10\log(x)\int e^{4x-5e^{1-x}-2e^{5x-5e^{1-x}}+1+2}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-1}dx-$$
$$10\log(x)\int e^{5x-5e^{1-x}-2e^{5x-5e^{1-x}}+1+1}x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}-1}dx+\int x^{\frac{e^{-2e^{5x-5e^{1-x}}+1}}{x^2}}dx$$

input
```
Int[(x^(-2 + 1/(E^(2*E^(1 - 5*E^(1 - x) + 5*x))*x^2))*(1 + E^(2*E^(1 - 5*E
^(1 - x) + 5*x))*x^2 - 2*Log[x] + E^(-5*E^(1 - x) + 5*x)*(-10*E*x - 10*E^(
2 - x)*x)*Log[x]))/E^(2*E^(1 - 5*E^(1 - x) + 5*x)),x]
```

output
```
$Aborted
```

3.1328.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1328.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90

$$x^{\frac{{\mathrm e}^{-2 \,{\mathrm e}^{1-5 \,{\mathrm e}^{1-x}+5 x}}}{x^{2}}} x$$

input
```
int((x^2*exp(exp(1)*exp(-5*exp(1-x)+5*x))^2+(-10*x*exp(1)*exp(1-x)-10*x*ex
p(1))*ln(x)*exp(-5*exp(1-x)+5*x)-2*ln(x)+1)*exp(ln(x)/x^2/exp(exp(1)*exp(-
5*exp(1-x)+5*x))^2)/x^2/exp(exp(1)*exp(-5*exp(1-x)+5*x))^2,x)
```

output
```
x^(1/x^2*exp(-2*exp(1-5*exp(1-x)+5*x)))*x
```

3.1328.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.10

$$\int e^{-2e^{1-5e^{1-x}+5x}}x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}}\left(1+e^{2e^{1-5e^{1-x}+5x}}x^2-2\log(x)\right.$$
$$\left.+e^{-5e^{1-x}+5x}\left(-10ex-10e^{2-x}x\right)\log(x)\right)\,dx=xx^{\frac{e^{\left(-2\,e^{\left(\left((5\,x+1)e-5\,e^{(-x+2)}\right)e^{(-1)}\right)}\right)}}{x^2}}$$

input
```
integrate((x^2*exp(exp(1)*exp(-5*exp(1-x)+5*x))^2+(-10*x*exp(1)*exp(1-x)-1
0*x*exp(1))*log(x)*exp(-5*exp(1-x)+5*x)-2*log(x)+1)*exp(log(x)/x^2/exp(exp
(1)*exp(-5*exp(1-x)+5*x))^2)/x^2/exp(exp(1)*exp(-5*exp(1-x)+5*x))^2,x, alg
orithm=\
```

output
```
x*x^(e^(-2*e^(((5*x + 1)*e - 5*e^(-x + 2))*e^(-1)))/x^2)
```

3.1328.6 Sympy [F(-1)]

Timed out.

$$\int e^{-2e^{1-5e^{1-x}+5x}}x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}}\left(1+e^{2e^{1-5e^{1-x}+5x}}x^2-2\log(x)+e^{-5e^{1-x}+5x}\left(-10ex-10e^{2-x}x\right)\log(x)\right)dx=\text{Timed out}$$

input
```
integrate((x**2*exp(exp(1)*exp(-5*exp(1-x)+5*x))**2+(-10*x*exp(1)*exp(1-x)
-10*x*exp(1))*ln(x)*exp(-5*exp(1-x)+5*x)-2*ln(x)+1)*exp(ln(x)/x**2/exp(exp
(1)*exp(-5*exp(1-x)+5*x))**2)/x**2/exp(exp(1)*exp(-5*exp(1-x)+5*x))**2,x)
```

output
```
Timed out
```

3.1328.7 Maxima [F]

$$\int e^{-2e^{1-5e^{1-x}+5x}}x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}}\left(1+e^{2e^{1-5e^{1-x}+5x}}x^2-2\log(x)+e^{-5e^{1-x}+5x}\left(-10ex-10e^{2-x}x\right)\log(x)\right)dx$$
$$=\int\frac{\left(x^2e^{\left(2\,e^{\left(5\,x-5\,e^{(-x+1)}+1\right)}\right)}-10\,\left(xe+xe^{(-x+2)}\right)e^{\left(5\,x-5\,e^{(-x+1)}\right)}\log\left(x\right)-2\,\log\left(x\right)+1\right)x^{\frac{e^{\left(-2\,e^{\left(5\,x-5\,e^{(-x+1)}+1\right)}\right)}}{x^2}}}{x^2}$$

input
```
integrate((x^2*exp(exp(1)*exp(-5*exp(1-x)+5*x))^2+(-10*x*exp(1)*exp(1-x)-1
0*x*exp(1))*log(x)*exp(-5*exp(1-x)+5*x)-2*log(x)+1)*exp(log(x)/x^2/exp(exp
(1)*exp(-5*exp(1-x)+5*x))^2)/x^2/exp(exp(1)*exp(-5*exp(1-x)+5*x))^2,x, alg
orithm=\
```

output
```
integrate((x^2*e^(2*e^(5*x - 5*e^(-x + 1) + 1)) - 10*(x*e + x*e^(-x + 2))*
e^(5*x - 5*e^(-x + 1))*log(x) - 2*log(x) + 1)*x^(e^(-2*e^(5*x - 5*e^(-x +
1) + 1))/x^2 - 2)*e^(-2*e^(5*x - 5*e^(-x + 1) + 1)), x)
```

3.1328.8 Giac [F]

$$\int e^{-2e^{1-5e^{1-x}+5x}}x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}}\left(1+e^{2e^{1-5e^{1-x}+5x}}x^2 -2\log(x)+e^{-5e^{1-x}+5x}\left(-10ex-10e^{2-x}x\right)\log(x)\right)\,dx = \int \frac{\left(x^2e^{\left(2\,e^{\left(5\,x-5\,e^{(-x+1)}+1\right)}\right)}-10\,\left(xe+xe^{(-x+2)}\right)e^{\left(5\,x-5\,e^{(-x+1)}\right)}\log\left(x\right)-2\,\log\left(x\right)+1\right)x^{\frac{e^{\left(-2\,e^{\left(5\,x-5\,e^{(-x+1)}+1\right)}\right)}}{x^2}}}{x^2}$$

input
```
integrate((x^2*exp(exp(1)*exp(-5*exp(1-x)+5*x))^2+(-10*x*exp(1)*exp(1-x)-1
0*x*exp(1))*log(x)*exp(-5*exp(1-x)+5*x)-2*log(x)+1)*exp(log(x)/x^2/exp(exp
(1)*exp(-5*exp(1-x)+5*x))^2)/x^2/exp(exp(1)*exp(-5*exp(1-x)+5*x))^2,x, alg
orithm=\
```

output
```
integrate((x^2*e^(2*e^(5*x - 5*e^(-x + 1) + 1)) - 10*(x*e + x*e^(-x + 2))*
e^(5*x - 5*e^(-x + 1))*log(x) - 2*log(x) + 1)*x^(e^(-2*e^(5*x - 5*e^(-x +
1) + 1))/x^2)*e^(-2*e^(5*x - 5*e^(-x + 1) + 1))/x^2, x)
```

3.1328.9 Mupad [F(-1)]

Timed out.

$$\int e^{-2e^{1-5e^{1-x}+5x}}x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}}\left(1+e^{2e^{1-5e^{1-x}+5x}}x^2 -2\log(x)+e^{-5e^{1-x}+5x}\left(-10ex-10e^{2-x}x\right)\log(x)\right)\,dx = \int -\frac{\mathrm{e}^{\frac{\mathrm{e}^{-2\,\mathrm{e}\,\mathrm{e}^{5\,x-5\,\mathrm{e}^{1-x}}}\,\ln(x)}{x^2}}\,\mathrm{e}^{-2\,\mathrm{e}\,\mathrm{e}^{5\,x-5\,\mathrm{e}^{1-x}}}\,\left(2\,\ln\left(x\right)-x^2\,\mathrm{e}^{2\,\mathrm{e}\,\mathrm{e}^{5\,x-5\,\mathrm{e}^{1-x}}}+\mathrm{e}^{5\,x-5\,\mathrm{e}^{1-x}}\,\ln\left(x\right)\,\left(10\,x\,\mathrm{e}+10\,x\,\mathrm{e}\,\mathrm{e}^{1-x}\right)-1\right)}{x^2}$$

input
```
int(-(exp((exp(-2*exp(1)*exp(5*x - 5*exp(1 - x)))*log(x))/x^2)*exp(-2*exp(
1)*exp(5*x - 5*exp(1 - x)))*(2*log(x) - x^2*exp(2*exp(1)*exp(5*x - 5*exp(1
 - x))) + exp(5*x - 5*exp(1 - x))*log(x)*(10*x*exp(1) + 10*x*exp(1)*exp(1
- x)) - 1))/x^2,x)
```

output
```
int(-(exp((exp(-2*exp(1)*exp(5*x - 5*exp(1 - x)))*log(x))/x^2)*exp(-2*exp(
1)*exp(5*x - 5*exp(1 - x)))*(2*log(x) - x^2*exp(2*exp(1)*exp(5*x - 5*exp(1
 - x))) + exp(5*x - 5*exp(1 - x))*log(x)*(10*x*exp(1) + 10*x*exp(1)*exp(1
- x)) - 1))/x^2, x)
```

3.1328.

$$\int e^{-2e^{1-5e^{1-x}+5x}}x^{-2+\frac{e^{-2e^{1-5e^{1-x}+5x}}}{x^2}}\left(1+e^{2e^{1-5e^{1-x}+5x}}x^2-2\log(x)+e^{-5e^{1-x}+5x}(-10ex-10e^{2-x}x)\log(x)\right)\,dx$$

3.1329 $\int \left(-1+5e^{1+\frac{1}{4}(3+20e^{1+x})+x}\right) dx$

3.1329.1 Optimal result

Integrand size = 22, antiderivative size = 17

$$\int \left(-1+5e^{1+\frac{1}{4}(3+20e^{1+x})+x}\right) dx = e^{\frac{3}{4}+5e^{1+x}}-x$$

output
```
exp(5*exp(1+x)+3/4)-x
```

3.1329.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \left(-1+5e^{1+\frac{1}{4}(3+20e^{1+x})+x}\right) dx = e^{\frac{3}{4}+5e^{1+x}}-x$$

input
```
Integrate[-1 + 5*E^(1 + (3 + 20*E^(1 + x))/4 + x),x]
```

output
```
E^(3/4 + 5*E^(1 + x)) - x
```

3.1329.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(5e^{\frac{1}{4}(20e^{x+1}+3)+x+1}-1\right) dx$$

$$\Big\downarrow \text{2009}$$

$$e^{5e^{x+1}+\frac{3}{4}}-x$$

input
```
Int[-1 + 5*E^(1 + (3 + 20*E^(1 + x))/4 + x),x]
```

output
```
E^(3/4 + 5*E^(1 + x)) - x
```

3.1329.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1329.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

method	result	size
default	$\mathrm{e}^{5\,\mathrm{e}^{1+x}+\frac{3}{4}}-x$	14
norman	$\mathrm{e}^{5\,\mathrm{e}^{1+x}+\frac{3}{4}}-x$	14
risch	$\mathrm{e}^{5\,\mathrm{e}^{1+x}+\frac{3}{4}}-x$	14
parallelrisch	$\mathrm{e}^{5\,\mathrm{e}^{1+x}+\frac{3}{4}}-x$	14
parts	$\mathrm{e}^{5\,\mathrm{e}^{1+x}+\frac{3}{4}}-x$	14
derivativedivides	$\mathrm{e}^{5\,\mathrm{e}^{1+x}+\frac{3}{4}}-\ln\left(20\,\mathrm{e}^{1+x}\right)$	20

input
```
int(5*exp(1+x)*exp(5*exp(1+x)+3/4)-1,x,method=_RETURNVERBOSE)
```

output
```
exp(5*exp(1+x)+3/4)-x
```

3.1329.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 27 vs. 2(13) = 26.

Time = 0.27 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.59

$$\int \left(-1+5e^{1+\frac{1}{4}(3+20e^{1+x})+x}\right)\,dx = -\left(xe^{(x+1)} - e^{\left(x+5\,e^{(x+1)}+\frac{7}{4}\right)}\right)e^{(-x-1)}$$

input
```
integrate(5*exp(1+x)*exp(5*exp(1+x)+3/4)-1,x, algorithm=\
```

output
```
-(x*e^(x + 1) - e^(x + 5*e^(x + 1) + 7/4))*e^(-x - 1)
```

3.1329.6 Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

$$\int \left(-1+5e^{1+\frac{1}{4}(3+20e^{1+x})+x}\right)\,dx = -x+e^{5e^{x+1}+\frac{3}{4}}$$

input
```
integrate(5*exp(1+x)*exp(5*exp(1+x)+3/4)-1,x)
```

output
```
-x + exp(5*exp(x + 1) + 3/4)
```

3.1329.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \left(-1+5e^{1+\frac{1}{4}(3+20e^{1+x})+x}\right)\,dx = -x+e^{\left(5\,e^{(x+1)}+\frac{3}{4}\right)}$$

input
```
integrate(5*exp(1+x)*exp(5*exp(1+x)+3/4)-1,x, algorithm=\
```

output
```
-x + e^(5*e^(x + 1) + 3/4)
```

3.1329.8 Giac [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \left(-1+5e^{1+\frac{1}{4}\left(3+20e^{1+x}\right)+x}\right) dx = -x + e^{\left(5\,e^{(x+1)}+\frac{3}{4}\right)}$$

input
```
integrate(5*exp(1+x)*exp(5*exp(1+x)+3/4)-1,x, algorithm=\
```

output
```
-x + e^(5*e^(x + 1) + 3/4)
```

3.1329.9 Mupad [B] (verification not implemented)

Time = 17.83 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \left(-1+5e^{1+\frac{1}{4}\left(3+20e^{1+x}\right)+x}\right) dx = \mathrm{e}^{5\,\mathrm{e}^{x+1}}\,\mathrm{e}^{3/4} - x$$

input
```
int(5*exp(x + 1)*exp(5*exp(x + 1) + 3/4) - 1,x)
```

output
```
exp(5*exp(x + 1))*exp(3/4) - x
```

3.1330 $\int \frac{2+x+x^2+e^x(-x+x^2)}{-x+x^2}\,dx$

3.1330.1 Optimal result

Integrand size = 27, antiderivative size = 20

$$\int \frac{2+x+x^2+e^x(-x+x^2)}{-x+x^2}\,dx = -8+e^x+x+\log\left(\left(1-\frac{1}{x}\right)^4 x^2\right)$$

output
```
exp(x)-8+x+ln((1-1/x)^4*x^2)
```

3.1330.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{2+x+x^2+e^x(-x+x^2)}{-x+x^2}\,dx = e^x+x+4\log(1-x)-2\log(x)$$

input
```
Integrate[(2 + x + x^2 + E^x*(-x + x^2))/(-x + x^2),x]
```

output
```
E^x + x + 4*Log[1 - x] - 2*Log[x]
```

3.1330.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2026, 7293, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2+e^x(x^2-x)+x+2}{x^2-x}\,dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{x^2+e^x(x^2-x)+x+2}{(x-1)x}dx$$
$$\Big\downarrow \text{7293}$$
$$\int \left(\frac{x^2+x+2}{(x-1)x}+e^x\right)dx$$
$$\Big\downarrow \text{2009}$$
$$x+e^x+4\log(1-x)-2\log(x)$$

input
```
Int[(2 + x + x^2 + E^x*(-x + x^2))/(-x + x^2),x]
```

output
```
E^x + x + 4*Log[1 - x] - 2*Log[x]
```

3.1330.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1330.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

method	result	size
default	$4\ln(-1+x)+x+e^x-2\ln(x)$	15
norman	$4\ln(-1+x)+x+e^x-2\ln(x)$	15
risch	$4\ln(-1+x)+x+e^x-2\ln(x)$	15
parallelrisch	$4\ln(-1+x)+x+e^x-2\ln(x)$	15
parts	$4\ln(-1+x)+x+e^x-2\ln(x)$	15

input
```
int(((x^2-x)*exp(x)+x^2+x+2)/(x^2-x),x,method=_RETURNVERBOSE)
```

output
```
4*ln(-1+x)+x+exp(x)-2*ln(x)
```

3.1330.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{2+x+x^2+e^x(-x+x^2)}{-x+x^2}\,dx = x+e^x+4\,\log(x-1)-2\,\log(x)$$

input
```
integrate(((x^2-x)*exp(x)+x^2+x+2)/(x^2-x),x, algorithm=\
```

output
```
x + e^x + 4*log(x - 1) - 2*log(x)
```

3.1330.6 Sympy [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.75

$$\int \frac{2+x+x^2+e^x(-x+x^2)}{-x+x^2}\,dx = x+e^x-2\log(x)+4\log(x-1)$$

input
```
integrate(((x**2-x)*exp(x)+x**2+x+2)/(x**2-x),x)
```

output
```
x + exp(x) - 2*log(x) + 4*log(x - 1)
```

3.1330.7 Maxima [F]

$$\int \frac{2+x+x^2+e^x(-x+x^2)}{-x+x^2}\,dx = \int \frac{x^2+(x^2-x)e^x+x+2}{x^2-x}\,dx$$

input
```
integrate(((x^2-x)*exp(x)+x^2+x+2)/(x^2-x),x, algorithm=\
```

output
```
e*exp_integral_e(1, -x + 1) + x + x*e^x/(x - 1) + integrate(e^x/(x^2 - 2*x
 + 1), x) + 4*log(x - 1) - 2*log(x)
```

3.1330.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{2+x+x^2+e^x(-x+x^2)}{-x+x^2}\,dx = x+e^x+4\log(x-1)-2\log(x)$$

input
```
integrate(((x^2-x)*exp(x)+x^2+x+2)/(x^2-x),x, algorithm=\
```

output
```
x + e^x + 4*log(x - 1) - 2*log(x)
```

3.1330.9 Mupad [B] (verification not implemented)

Time = 17.42 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.70

$$\int \frac{2+x+x^2+e^x(-x+x^2)}{-x+x^2}\,dx = x+4\ln(x-1)+e^x-2\ln(x)$$

input
```
int(-(x - exp(x)*(x - x^2) + x^2 + 2)/(x - x^2),x)
```

output
```
x + 4*log(x - 1) + exp(x) - 2*log(x)
```

3.1331 $\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx$

3.1331.1 Optimal result

Integrand size = 60, antiderivative size = 24

$$\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx=3e^{e^{\frac{\log^2(10)}{5}}(1+4e^{-x})}$$

output
```
3*exp(exp(1/5*ln(10)^2+ln(4/exp(x)+1)))
```

3.1331.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx=3e^{e^{-x+\frac{\log^2(10)}{5}}(4+e^x)}$$

input
```
Integrate[(-12*E^(E^((Log[10]^2 + 5*Log[(4 + E^x)/E^x])/5) + (Log[10]^2 +
5*Log[(4 + E^x)/E^x])/5))/(4 + E^x),x]
```

output
```
3*E^(E^(-x + Log[10]^2/5)*(4 + E^x))
```

3.1331.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.29, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.050$, Rules used = {27, 2720, 2638}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int -\frac{12\exp\left(\frac{1}{5}\left(5\log\left(e^{-x}(e^x+4)\right)+\log^2(10)\right)+e^{\frac{1}{5}\left(5\log\left(e^{-x}(e^x+4)\right)+\log^2(10)\right)}\right)}{e^x+4}dx$$

$$\Big\downarrow \text{27}$$

$$-12\int \frac{\exp\left(e^{\frac{\log^2(10)}{5}-x}(4+e^x)+\frac{1}{5}\left(5\log\left(e^{-x}(4+e^x)\right)+\log^2(10)\right)\right)}{4+e^x}dx$$

$$\Big\downarrow \text{2720}$$

$$-12\int \exp\left(-2x+4e^{\frac{\log^2(10)}{5}-x}+\frac{1}{5}\left(5e^{\frac{\log^2(10)}{5}}+\log^2(10)\right)\right)de^x$$

$$\Big\downarrow \text{2638}$$

$$3e^{4e^{\frac{\log^2(10)}{5}-x}+e^{\frac{\log^2(10)}{5}}}$$

input
```
Int[(-12*E^(E^((Log[10]^2 + 5*Log[(4 + E^x)/E^x])/5) + (Log[10]^2 + 5*Log[
(4 + E^x)/E^x])/5))/(4 + E^x),x]
```

output
```
3*E^(E^(Log[10]^2/5) + 4*E^(-x + Log[10]^2/5))
```

3.1331.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2638
```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^(n_))*((e_.) + (f_.)*(x_))^(m_
.), x_Symbol] :> Simp[(e + f*x)^n*(F^(a + b*(c + d*x)^n)/(b*f*n*(c + d*x)^n
*Log[F])), x] /; FreeQ[{F, a, b, c, d, e, f, n}, x] && EqQ[m, n - 1] && EqQ
[d*e - c*f, 0]
```

3.1331. $\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx$

rule 2720
```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ
[{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))
*(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

3.1331.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

method	result
norman	$3\,\mathrm{e}^{\mathrm{e}^{\frac{\ln(10)^2}{5}}(\mathrm{e}^x+4)\mathrm{e}^{-x}}$
derivativedivides	$3\,\mathrm{e}^{\mathrm{e}^{\ln\left(\mathrm{e}^{-x}(\mathrm{e}^x+4)\right)+\frac{\ln(10)^2}{5}}}$
default	$3\,\mathrm{e}^{\mathrm{e}^{\ln\left(\mathrm{e}^{-x}(\mathrm{e}^x+4)\right)+\frac{\ln(10)^2}{5}}}$
parallelrisch	$\frac{3\,\mathrm{e}^{2x}\mathrm{e}^{\mathrm{e}^{\ln\left(\mathrm{e}^{-x}(\mathrm{e}^x+4)\right)+\frac{\ln(10)^2}{5}}}+24\,\mathrm{e}^{\mathrm{e}^{\ln\left(\mathrm{e}^{-x}(\mathrm{e}^x+4)\right)+\frac{\ln(10)^2}{5}}}\mathrm{e}^x+48\,\mathrm{e}^{\mathrm{e}^{\ln\left(\mathrm{e}^{-x}(\mathrm{e}^x+4)\right)+\frac{\ln(10)^2}{5}}}}{(\mathrm{e}^x+4)^2}$
risch	$3\,\mathrm{e}^{2^{\frac{2\ln(5)}{5}}(\mathrm{e}^x+4)\mathrm{e}^{-x+\frac{i\pi\,\mathrm{csgn}(i(\mathrm{e}^x+4))\,\mathrm{csgn}\left(i\mathrm{e}^{-x}(\mathrm{e}^x+4)\right)^2}{2}-\frac{i\pi\,\mathrm{csgn}(i(\mathrm{e}^x+4))\,\mathrm{csgn}\left(i\mathrm{e}^{-x}(\mathrm{e}^x+4)\right)\mathrm{csgn}\left(i\mathrm{e}^{-x}\right)}{2}-\frac{i\pi\,\mathrm{csgn}\left(i\mathrm{e}^{-x}\right.}{2}}}$

input
```
int(-12*exp(ln((exp(x)+4)/exp(x))+1/5*ln(10)^2)*exp(exp(ln((exp(x)+4)/exp(
x))+1/5*ln(10)^2))/(exp(x)+4),x,method=_RETURNVERBOSE)
```

output
```
3*exp(exp(1/5*ln(10)^2)*(exp(x)+4)/exp(x))
```

3.1331.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(20) = 40.

Time = 0.28 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.42

$$\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx$$
$$=\frac{3\,e^{\left(\frac{1}{5}\left(e^x\log(10)^2+5\,(e^x+4)e^{\left(\frac{1}{5}\log(10)^2\right)}+5\,e^x\log\left((e^x+4)e^{(-x)}\right)\right)e^{(-x)}-\frac{1}{5}\log(10)^2+x\right)}}{e^x+4}$$

input
```
integrate(-12*exp(log((exp(x)+4)/exp(x))+1/5*log(10)^2)*exp(exp(log((exp(x
)+4)/exp(x))+1/5*log(10)^2))/(exp(x)+4),x, algorithm=\
```

output
```
3*e^(1/5*(e^x*log(10)^2 + 5*(e^x + 4)*e^(1/5*log(10)^2) + 5*e^x*log((e^x +
 4)*e^(-x)))*e^(-x) - 1/5*log(10)^2 + x)/(e^x + 4)
```

3.1331.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx = 3e^{(e^x+4)e^{-x}e^{\frac{\log(10)^2}{5}}}$$

input
```
integrate(-12*exp(ln((exp(x)+4)/exp(x))+1/5*ln(10)**2)*exp(exp(ln((exp(x)+
4)/exp(x))+1/5*ln(10)**2))/(exp(x)+4),x)
```

output
```
3*exp((exp(x) + 4)*exp(-x)*exp(log(10)**2/5))
```

3.1331.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 51 vs. 2(20) = 40.

Time = 0.29 (sec) , antiderivative size = 51, normalized size of antiderivative = 2.12

$$\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx$$
$$= 3\,e^{\left(2^{\frac{2}{5}\log(5)+2}e^{\left(\frac{1}{5}\log(5)^2+\frac{1}{5}\log(2)^2-x\right)}+2^{\frac{2}{5}\log(5)}e^{\left(\frac{1}{5}\log(5)^2+\frac{1}{5}\log(2)^2\right)}\right)}$$

input
```
integrate(-12*exp(log((exp(x)+4)/exp(x))+1/5*log(10)^2)*exp(exp(log((exp(x
)+4)/exp(x))+1/5*log(10)^2))/(exp(x)+4),x, algorithm=\
```

output
```
3*e^(2^(2/5*log(5) + 2)*e^(1/5*log(5)^2 + 1/5*log(2)^2 - x) + 2^(2/5*log(5
))*e^(1/5*log(5)^2 + 1/5*log(2)^2))
```

3.1331.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx = 3\,e^{\left(e^{\left(\frac{1}{5}\log(10)^2\right)}+4\,e^{\left(\frac{1}{5}\log(10)^2-x\right)}\right)}$$

input
```
integrate(-12*exp(log((exp(x)+4)/exp(x))+1/5*log(10)^2)*exp(exp(log((exp(x
)+4)/exp(x))+1/5*log(10)^2))/(exp(x)+4),x, algorithm=\
```

output
```
3*e^(e^(1/5*log(10)^2) + 4*e^(1/5*log(10)^2 - x))
```

3.1331.9 Mupad [B] (verification not implemented)

Time = 17.99 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int -\frac{12e^{e^{\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}+\frac{1}{5}\left(\log^2(10)+5\log\left(e^{-x}(4+e^x)\right)\right)}}{4+e^x}\,dx = 3\,\mathrm{e}^{4\,\mathrm{e}^{-x}\,\mathrm{e}^{\frac{\ln(10)^2}{5}}}\,\mathrm{e}^{\mathrm{e}^{\frac{\ln(10)^2}{5}}}$$

input
```
int(-(12*exp(log(exp(-x)*(exp(x) + 4)) + log(10)^2/5)*exp(exp(log(exp(-x)*
(exp(x) + 4)) + log(10)^2/5)))/(exp(x) + 4),x)
```

output
```
3*exp(4*exp(-x)*exp(log(10)^2/5))*exp(exp(log(10)^2/5))
```

3.1332 $\int \left(5+10 e^{2 x}+10 e^x \log (7)\right) \, dx$

3.1332.1 Optimal result

Integrand size = 16, antiderivative size = 13

$$\int \left(5+10 e^{2 x}+10 e^x \log (7)\right) \, dx=5 \left(-175+x+\left(e^x+\log (7)\right)^2\right)$$

output
```
-875+5*(exp(x)+ln(7))^2+5*x
```

3.1332.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.15

$$\int \left(5+10 e^{2 x}+10 e^x \log (7)\right) \, dx=5 \left(e^{2 x}+x+e^x \log (49)\right)$$

input
```
Integrate[5 + 10*E^(2*x) + 10*E^x*Log[7],x]
```

output
```
5*(E^(2*x) + x + E^x*Log[49])
```

3.1332.3 Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.38, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(10e^{2x}+10e^x\log(7)+5\right)\,dx$$
$$\Big\downarrow \text{2009}$$
$$5x+5e^{2x}+10e^x\log(7)$$

input
```
Int[5 + 10*E^(2*x) + 10*E^x*Log[7],x]
```

output
```
5*E^(2*x) + 5*x + 10*E^x*Log[7]
```

3.1332.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1332.4 Maple [A] (verified)

Time = 0.02 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.31

method	result	size
default	$5\,\mathrm{e}^{2x}+5x+10\ln\left(7\right)\mathrm{e}^{x}$	17
norman	$5\,\mathrm{e}^{2x}+5x+10\ln\left(7\right)\mathrm{e}^{x}$	17
risch	$5\,\mathrm{e}^{2x}+5x+10\ln\left(7\right)\mathrm{e}^{x}$	17
parallelrisch	$5\,\mathrm{e}^{2x}+5x+10\ln\left(7\right)\mathrm{e}^{x}$	17
parts	$5\,\mathrm{e}^{2x}+5x+10\ln\left(7\right)\mathrm{e}^{x}$	17
derivativedivides	$5\,\mathrm{e}^{2x}+10\ln\left(7\right)\mathrm{e}^{x}+5\ln\left(\mathrm{e}^{x}\right)$	19

input
```
int(10*exp(x)^2+10*ln(7)*exp(x)+5,x,method=_RETURNVERBOSE)
```

output
```
5*exp(x)^2+5*x+10*ln(7)*exp(x)
```

3.1332.5 Fricas [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

$$\int \left(5+10e^{2x}+10e^x\log(7)\right)\,dx = 10\,e^{x}\log\left(7\right)+5\,x+5\,e^{\left(2\,x\right)}$$

input
```
integrate(10*exp(x)^2+10*log(7)*exp(x)+5,x, algorithm=\
```

output
```
10*e^x*log(7) + 5*x + 5*e^(2*x)
```

3.1332.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.31

$$\int \left(5+10e^{2x}+10e^x\log(7)\right)\,dx = 5x+5e^{2x}+10e^{x}\log\left(7\right)$$

input
```
integrate(10*exp(x)**2+10*ln(7)*exp(x)+5,x)
```

output
```
5*x + 5*exp(2*x) + 10*exp(x)*log(7)
```

3.1332.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

$$\int \left(5+10e^{2x}+10e^x\log(7)\right)\,dx = 10\,e^{x}\log\left(7\right)+5\,x+5\,e^{\left(2\,x\right)}$$

input
```
integrate(10*exp(x)^2+10*log(7)*exp(x)+5,x, algorithm=\
```

output
```
10*e^x*log(7) + 5*x + 5*e^(2*x)
```

3.1332.8 Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

$$\int \left(5+10e^{2x}+10e^{x}\log(7)\right)\,dx = 10\,e^{x}\log\left(7\right)+5\,x+5\,e^{\left(2\,x\right)}$$

input
```
integrate(10*exp(x)^2+10*log(7)*exp(x)+5,x, algorithm=\
```

output
```
10*e^x*log(7) + 5*x + 5*e^(2*x)
```

3.1332.9 Mupad [B] (verification not implemented)

Time = 18.10 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.23

$$\int \left(5+10e^{2x}+10e^{x}\log(7)\right)\,dx = 5\,x+5\,\mathrm{e}^{2\,x}+10\,\mathrm{e}^{x}\,\ln\left(7\right)$$

input
```
int(10*exp(2*x) + 10*exp(x)*log(7) + 5,x)
```

output
```
5*x + 5*exp(2*x) + 10*exp(x)*log(7)
```

3.1333 $\int \left(1+\log \left(\frac{x+ex(i\pi +\log (5-\log (5)))}{e}\right)\right) \, dx$

3.1333.1 Optimal result

Integrand size = 25, antiderivative size = 23

$$\int \left(1+\log \left(\frac{x+ex(i\pi +\log (5-\log (5)))}{e}\right)\right) \, dx=4+x\log \left(x\left(\frac{1}{e}+i\pi +\log (5-\log (5))\right)\right)$$

output
```
x*ln(x*(exp(-1)+ln(ln(5)-5)))+4
```

3.1333.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \left(1+\log \left(\frac{x+ex(i\pi +\log (5-\log (5)))}{e}\right)\right) \, dx=-x+x\log (x+ex(i\pi +\log (5-\log (5))))$$

input
```
Integrate[1 + Log[(x + E*x*(I*Pi + Log[5 - Log[5]]))/E],x]
```

output
```
-x + x*Log[x + E*x*(I*Pi + Log[5 - Log[5]])]
```

3.1333.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.040$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(1+\log \left(\frac{x+ex(\log (5-\log (5))+i \pi)}{e}\right)\right) \, dx$$

$$\Big\downarrow \text{2009}$$

$$x \log \left(\frac{x (1+e (\log (5-\log (5))+i \pi))}{e}\right)$$

input
```
Int[1 + Log[(x + E*x*(I*Pi + Log[5 - Log[5]]))/E],x]
```

output
```
x*Log[(x*(1 + E*(I*Pi + Log[5 - Log[5]])))/E]
```

3.1333.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.1333.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.78

method	result	size
risch	$x \ln \left(x (\mathrm{e} \ln (\ln (5)-5)+1) \mathrm{e}^{-1}\right)$	18
derivativedivides	$x \ln \left(x (\mathrm{e} \ln (\ln (5)-5)+1) \mathrm{e}^{-1}\right)$	20
norman	$x \ln \left((x \,\mathrm{e} \ln (\ln (5)-5)+x) \mathrm{e}^{-1}\right)$	20
parallelrisch	$x \ln \left(x (\mathrm{e} \ln (\ln (5)-5)+1) \mathrm{e}^{-1}\right)$	20
default	$x+\frac{\mathrm{e}\left(x (\mathrm{e} \ln (\ln (5)-5)+1) \mathrm{e}^{-1} \ln \left(x (\mathrm{e} \ln (\ln (5)-5)+1) \mathrm{e}^{-1}\right)-x (\mathrm{e} \ln (\ln (5)-5)+1) \mathrm{e}^{-1}\right)}{\mathrm{e} \ln (\ln (5)-5)+1}$	69
parts	$x+\frac{\mathrm{e}\left(x (\mathrm{e} \ln (\ln (5)-5)+1) \mathrm{e}^{-1} \ln \left(x (\mathrm{e} \ln (\ln (5)-5)+1) \mathrm{e}^{-1}\right)-x (\mathrm{e} \ln (\ln (5)-5)+1) \mathrm{e}^{-1}\right)}{\mathrm{e} \ln (\ln (5)-5)+1}$	69

input
```
int(ln((x*exp(1)*ln(ln(5)-5)+x)/exp(1))+1,x,method=_RETURNVERBOSE)
```

output
```
x*ln(x*(exp(1)*ln(ln(5)-5)+1)*exp(-1))
```

3.1333.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \left(1+\log \left(\frac{x+ex(i\pi+\log(5-\log(5)))}{e}\right)\right) dx = x\log \left((xe\log \left(\log \left(5\right)-5\right)+x)e^{(-1)}\right)$$

input
```
integrate(log((x*exp(1)*log(log(5)-5)+x)/exp(1))+1,x, algorithm=\
```

output
```
x*log((x*e*log(log(5) - 5) + x)*e^(-1))
```

3.1333.6 Sympy [A] (verification not implemented)

Time = 0.06 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.13

$$\int \left(1+\log \left(\frac{x+ex(i\pi+\log(5-\log(5)))}{e}\right)\right) dx = x\log \left(x+ex\log \left(5-\log \left(5\right)\right)+ei\pi x\right)-x$$

input
```
integrate(ln((x*exp(1)*ln(ln(5)-5)+x)/exp(1))+1,x)
```

output
```
x*log(x + E*x*log(5 - log(5)) + E*I*pi*x) - x
```

3.1333.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(15) = 30.

Time = 0.20 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.70

$$\int \left(1+\log \left(\frac{x+ex(i\pi+\log(5-\log(5)))}{e}\right)\right) dx = x + \frac{((xe\log \left(\log \left(5\right)-5\right)+x)e^{(-1)}\log \left((xe\log \left(\log \left(5\right)-5\right)+x)e^{(-1)}\right)-(xe\log \left(\log \left(5\right)-5\right)+x)e^{(-1)})e}{e\log \left(\log \left(5\right)-5\right)+1}$$

input
```
integrate(log((x*exp(1)*log(log(5)-5)+x)/exp(1))+1,x, algorithm=\
```

output
```
x + ((x*e*log(log(5) - 5) + x)*e^(-1)*log((x*e*log(log(5) - 5) + x)*e^(-1)
) - (x*e*log(log(5) - 5) + x)*e^(-1))*e/(e*log(log(5) - 5) + 1)
```

3.1333.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 62 vs. $2(15) = 30$.

Time = 0.26 (sec) , antiderivative size = 62, normalized size of antiderivative = 2.70

$$\int \left(1+\log\left(\frac{x+ex(i\pi+\log(5-\log(5)))}{e}\right)\right)dx = x + \frac{((xe\log(\log(5)-5)+x)e^{(-1)}\log\left((xe\log(\log(5)-5)+x)e^{(-1)}\right)-(xe\log(\log(5)-5)+x)e^{(-1)})e}{e\log(\log(5)-5)+1}$$

input
```
integrate(log((x*exp(1)*log(log(5)-5)+x)/exp(1))+1,x, algorithm=\
```

output
```
x + ((x*e*log(log(5) - 5) + x)*e^(-1)*log((x*e*log(log(5) - 5) + x)*e^(-1)
) - (x*e*log(log(5) - 5) + x)*e^(-1))*e/(e*log(log(5) - 5) + 1)
```

3.1333.9 Mupad [B] (verification not implemented)

Time = 16.33 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.74

$$\int \left(1+\log\left(\frac{x+ex(i\pi+\log(5-\log(5)))}{e}\right)\right)dx = x\left(\ln\left(x\left(\ln\left(\ln(5)-5\right)\mathrm{e}+1\right)\right)-1\right)$$

input
```
int(log(exp(-1)*(x + x*log(log(5) - 5)*exp(1))) + 1,x)
```

output
```
x*(log(x*(log(log(5) - 5)*exp(1) + 1)) - 1)
```

3.1334 $\int \frac{-3+2x^3+e^{2x}(-3+6x)}{(3x+3e^{2x}x+1876x^2+x^4)\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)}\,dx$

3.1334.1 Optimal result

Integrand size = 63, antiderivative size = 24

$$\int \frac{-3+2x^3+e^{2x}(-3+6x)}{(3x+3e^{2x}x+1876x^2+x^4)\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)}\,dx = \log\left(4\log\left(1+3\left(625+\frac{1+e^{2x}}{x}\right)+x^2\right)\right)$$

output
```
ln(4*ln(1876+x^2+3*(exp(2*x)+1)/x))
```

3.1334.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{-3+2x^3+e^{2x}(-3+6x)}{(3x+3e^{2x}x+1876x^2+x^4)\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)}\,dx = \log\left(\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)\right)$$

input
```
Integrate[(-3 + 2*x^3 + E^(2*x)*(-3 + 6*x))/((3*x + 3*E^(2*x)*x + 1876*x^2
 + x^4)*Log[(3 + 3*E^(2*x) + 1876*x + x^3)/x]),x]
```

output
```
Log[Log[(3 + 3*E^(2*x) + 1876*x + x^3)/x]]
```

3.1334.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.016, Rules used = {7235}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{2x^3+e^{2x}(6x-3)-3}{(x^4+1876x^2+3e^{2x}x+3x)\log\left(\frac{x^3+1876x+3e^{2x}+3}{x}\right)}dx$$

$$\Big\downarrow \text{7235}$$

$$\log\left(\log\left(\frac{x^3+1876x+3e^{2x}+3}{x}\right)\right)$$

input
```
Int[(-3 + 2*x^3 + E^(2*x)*(-3 + 6*x))/((3*x + 3*E^(2*x)*x + 1876*x^2 + x^4
)*Log[(3 + 3*E^(2*x) + 1876*x + x^3)/x]),x]
```

output
```
Log[Log[(3 + 3*E^(2*x) + 1876*x + x^3)/x]]
```

3.1334.3.1 Defintions of rubi rules used

rule 7235
```
Int[(u_)/(y_), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Simp[q*L
og[RemoveContent[y, x]], x] /;  !FalseQ[q]]
```

3.1334.4 Maple [A] (verified)

Time = 0.26 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

method	result
norman	$\ln\left(\ln\left(\frac{3\,e^{2x}+x^3+1876x+3}{x}\right)\right)$
parallelrisch	$\ln\left(\ln\left(\frac{3\,e^{2x}+x^3+1876x+3}{x}\right)\right)$
risch	$\ln\left(\ln\left(3\,e^{2x}+x^3+1876x+3\right)-\frac{i\left(\pi\,\mathrm{csgn}\left(\frac{i}{x}\right)\mathrm{csgn}\left(i\left(3\,e^{2x}+x^3+1876x+3\right)\right)\mathrm{csgn}\left(\frac{i\left(3\,e^{2x}+x^3+1876x+3\right)}{x}\right)-\pi\right.}{}\right.$

input
```
int(((-3+6*x)*exp(2*x)+2*x^3-3)/(3*x*exp(2*x)+x^4+1876*x^2+3*x)/ln((3*exp(
2*x)+x^3+1876*x+3)/x),x,method=_RETURNVERBOSE)
```

output
```
ln(ln((3*exp(2*x)+x^3+1876*x+3)/x))
```

3.1334.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{-3+2x^3+e^{2x}(-3+6x)}{(3x+3e^{2x}x+1876x^2+x^4)\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)}\,dx = \log\left(\log\left(\frac{x^3+1876\,x+3\,e^{(2\,x)}+3}{x}\right)\right)$$

input
```
integrate(((-3+6*x)*exp(2*x)+2*x^3-3)/(3*x*exp(2*x)+x^4+1876*x^2+3*x)/log(
(3*exp(2*x)+x^3+1876*x+3)/x),x, algorithm=\
```

output
```
log(log((x^3 + 1876*x + 3*e^(2*x) + 3)/x))
```

3.1334.6 Sympy [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.79

$$\int \frac{-3+2x^3+e^{2x}(-3+6x)}{(3x+3e^{2x}x+1876x^2+x^4)\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)}\,dx = \log\left(\log\left(\frac{x^3+1876x+3e^{2x}+3}{x}\right)\right)$$

input
```
integrate(((-3+6*x)*exp(2*x)+2*x**3-3)/(3*x*exp(2*x)+x**4+1876*x**2+3*x)/l
n((3*exp(2*x)+x**3+1876*x+3)/x),x)
```

output
```
log(log((x**3 + 1876*x + 3*exp(2*x) + 3)/x))
```

3.1334.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.88

$$\int \frac{-3+2x^3+e^{2x}(-3+6x)}{(3x+3e^{2x}x+1876x^2+x^4)\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)}\,dx = \log\left(\log\left(x^3+1876\,x+3\,e^{(2\,x)}+3\right)-\log\left(x\right)\right)$$

input
```
integrate(((-3+6*x)*exp(2*x)+2*x^3-3)/(3*x*exp(2*x)+x^4+1876*x^2+3*x)/log(
(3*exp(2*x)+x^3+1876*x+3)/x),x, algorithm=\
```

output
```
log(log(x^3 + 1876*x + 3*e^(2*x) + 3) - log(x))
```

3.1334.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{-3+2x^3+e^{2x}(-3+6x)}{(3x+3e^{2x}x+1876x^2+x^4)\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)}\,dx = \log\left(\log\left(\frac{x^3+1876\,x+3\,e^{(2\,x)}+3}{x}\right)\right)$$

input
```
integrate(((-3+6*x)*exp(2*x)+2*x^3-3)/(3*x*exp(2*x)+x^4+1876*x^2+3*x)/log(
(3*exp(2*x)+x^3+1876*x+3)/x),x, algorithm=\
```

output
```
log(log((x^3 + 1876*x + 3*e^(2*x) + 3)/x))
```

3.1334.9 Mupad [B] (verification not implemented)

Time = 17.72 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{-3+2x^3+e^{2x}(-3+6x)}{(3x+3e^{2x}x+1876x^2+x^4)\log\left(\frac{3+3e^{2x}+1876x+x^3}{x}\right)}\,dx = \ln\left(\ln\left(\frac{1876\,x+3\,\mathrm{e}^{2\,x}+x^3+3}{x}\right)\right)$$

input
```
int((exp(2*x)*(6*x - 3) + 2*x^3 - 3)/(log((1876*x + 3*exp(2*x) + x^3 + 3)/
x)*(3*x + 3*x*exp(2*x) + 1876*x^2 + x^4)),x)
```

output
```
log(log((1876*x + 3*exp(2*x) + x^3 + 3)/x))
```

3.1335 $\int \frac{162x^5+9x^6+e^{2e^x}(135x^4-108e^x x^5)}{27e^{6e^x}+216x^3+108x^4+18x^5+x^6+e^{4e^x}(162x+27x^2)+e^{2e^x}(324x^2+\dots}$

3.1335.1 Optimal result

Integrand size = 105, antiderivative size = 31

$$\int \frac{162x^5+9x^6+e^{2e^x}(135x^4-108e^x x^5)}{27e^{6e^x}+216x^3+108x^4+18x^5+x^6+e^{4e^x}(162x+27x^2)+e^{2e^x}(324x^2+108x^3+9x^4)}\,dx = \frac{x^3}{\left(\frac{x}{3}+\left(\frac{e^{2e^x}}{x^2}+\frac{2}{x}\right)x\right)^2}$$

output
```
x^3/(x*(exp(exp(x))^2/x^2+2/x)+1/3*x)^2
```

3.1335.2 Mathematica [A] (verified)

Time = 0.59 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.74

$$\int \frac{162x^5+9x^6+e^{2e^x}(135x^4-108e^x x^5)}{27e^{6e^x}+216x^3+108x^4+18x^5+x^6+e^{4e^x}(162x+27x^2)+e^{2e^x}(324x^2+108x^3+9x^4)}\,dx = \frac{9x^5}{(3e^{2e^x}+6x+x^2)^2}$$

input
```
Integrate[(162*x^5 + 9*x^6 + E^(2*E^x)*(135*x^4 - 108*E^x*x^5))/(27*E^(6*E
^x) + 216*x^3 + 108*x^4 + 18*x^5 + x^6 + E^(4*E^x)*(162*x + 27*x^2) + E^(2
*E^x)*(324*x^2 + 108*x^3 + 9*x^4)),x]
```

output
```
(9*x^5)/(3*E^(2*E^x) + 6*x + x^2)^2
```

3.1335.3 Rubi [F]

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{9x^6+162x^5+e^{2e^x}\left(135x^4-108e^xx^5\right)}{x^6+18x^5+108x^4+216x^3+e^{4e^x}\left(27x^2+162x\right)+e^{2e^x}\left(9x^4+108x^3+324x^2\right)+27e^{6e^x}}dx$$

$$\Big\downarrow \text{7239}$$

$$\int \frac{9x^4\left(-12e^{x+2e^x}x+(x+18)x+15e^{2e^x}\right)}{\left(x(x+6)+3e^{2e^x}\right)^3}dx$$

$$\Big\downarrow \text{27}$$

$$9\int \frac{x^4\left(-12e^{x+2e^x}x+(x+18)x+15e^{2e^x}\right)}{\left(x(x+6)+3e^{2e^x}\right)^3}dx$$

$$\Big\downarrow \text{7293}$$

$$9\int \left(\frac{x^4\left(x^2+18x+15e^{2e^x}\right)}{\left(x^2+6x+3e^{2e^x}\right)^3}-\frac{12e^{x+2e^x}x^5}{\left(x^2+6x+3e^{2e^x}\right)^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$9\left(-4\int \frac{x^6}{\left(x^2+6x+3e^{2e^x}\right)^3}dx-12\int \frac{x^5}{\left(x^2+6x+3e^{2e^x}\right)^3}dx-12\int \frac{e^{x+2e^x}x^5}{\left(x^2+6x+3e^{2e^x}\right)^3}dx+5\int \frac{x^4}{\left(x^2+6x+3e^{2e^x}\right.}\right.$$

input
```
Int[(162*x^5 + 9*x^6 + E^(2*E^x)*(135*x^4 - 108*E^x*x^5))/(27*E^(6*E^x) +
216*x^3 + 108*x^4 + 18*x^5 + x^6 + E^(4*E^x)*(162*x + 27*x^2) + E^(2*E^x)*
(324*x^2 + 108*x^3 + 9*x^4)),x]
```

output
```
$Aborted
```

3.1335.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 7239
```
Int[u_, x_Symbol] :> With[{v = SimplifyIntegrand[u, x]}, Int[v, x] /; Simpl
erIntegrandQ[v, u, x]]
```

rule 7293
```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

3.1335.4 Maple [A] (verified)

Time = 0.60 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.71

method	result	size
risch	$\frac{9x^{5}}{\left(3\,{\mathrm e}^{2\,{\mathrm e}^{x}}+x^{2}+6x\right)^{2}}$	22
parallelrisch	$\frac{9x^{5}}{x^{4}+6\,{\mathrm e}^{2\,{\mathrm e}^{x}} x^{2}+9\,{\mathrm e}^{4\,{\mathrm e}^{x}}+12x^{3}+36\,{\mathrm e}^{2\,{\mathrm e}^{x}} x+36x^{2}}$	47

input
```
int(((-108*x^5*exp(x)+135*x^4)*exp(exp(x))^2+9*x^6+162*x^5)/(27*exp(exp(x)
)^6+(27*x^2+162*x)*exp(exp(x))^4+(9*x^4+108*x^3+324*x^2)*exp(exp(x))^2+x^6
+18*x^5+108*x^4+216*x^3),x,method=_RETURNVERBOSE)
```

output
```
9*x^5/(3*exp(2*exp(x))+x^2+6*x)^2
```

3.1335.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.35

$$\int \frac{162x^5+9x^6+e^{2e^x}(135x^4-108e^xx^5)}{27e^{6e^x}+216x^3+108x^4+18x^5+x^6+e^{4e^x}(162x+27x^2)+e^{2e^x}(324x^2+108x^3+9x^4)}\,dx$$
$$= \frac{9\,x^{5}}{x^{4}+12\,x^{3}+36\,x^{2}+6\,(x^{2}+6\,x)e^{(2\,e^{x})}+9\,e^{(4\,e^{x})}}$$

input
```
integrate(((-108*x^5*exp(x)+135*x^4)*exp(exp(x))^2+9*x^6+162*x^5)/(27*exp(
exp(x))^6+(27*x^2+162*x)*exp(exp(x))^4+(9*x^4+108*x^3+324*x^2)*exp(exp(x))
^2+x^6+18*x^5+108*x^4+216*x^3),x, algorithm=\
```

output
```
9*x^5/(x^4 + 12*x^3 + 36*x^2 + 6*(x^2 + 6*x)*e^(2*e^x) + 9*e^(4*e^x))
```

3.1335.6 Sympy [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.35

$$\int \frac{162x^5+9x^6+e^{2e^x}(135x^4-108e^xx^5)}{27e^{6e^x}+216x^3+108x^4+18x^5+x^6+e^{4e^x}(162x+27x^2)+e^{2e^x}(324x^2+108x^3+9x^4)}\,dx$$
$$=\frac{x^5}{\frac{x^4}{9}+\frac{4x^3}{3}+4x^2+\left(\frac{2x^2}{3}+4x\right)e^{2e^x}+e^{4e^x}}$$

input
```
integrate(((-108*x**5*exp(x)+135*x**4)*exp(exp(x))**2+9*x**6+162*x**5)/(27
*exp(exp(x))**6+(27*x**2+162*x)*exp(exp(x))**4+(9*x**4+108*x**3+324*x**2)*
exp(exp(x))**2+x**6+18*x**5+108*x**4+216*x**3),x)
```

output
```
x**5/(x**4/9 + 4*x**3/3 + 4*x**2 + (2*x**2/3 + 4*x)*exp(2*exp(x)) + exp(4*
exp(x)))
```

3.1335.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.35

$$\int \frac{162x^5+9x^6+e^{2e^x}(135x^4-108e^xx^5)}{27e^{6e^x}+216x^3+108x^4+18x^5+x^6+e^{4e^x}(162x+27x^2)+e^{2e^x}(324x^2+108x^3+9x^4)}\,dx$$
$$=\frac{9\,x^5}{x^4+12\,x^3+36\,x^2+6\,(x^2+6\,x)e^{(2\,e^x)}+9\,e^{(4\,e^x)}}$$

input
```
integrate(((-108*x^5*exp(x)+135*x^4)*exp(exp(x))^2+9*x^6+162*x^5)/(27*exp(
exp(x))^6+(27*x^2+162*x)*exp(exp(x))^4+(9*x^4+108*x^3+324*x^2)*exp(exp(x))
^2+x^6+18*x^5+108*x^4+216*x^3),x, algorithm=\
```

output
```
9*x^5/(x^4 + 12*x^3 + 36*x^2 + 6*(x^2 + 6*x)*e^(2*e^x) + 9*e^(4*e^x))
```

3.1335.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.48

$$\int \frac{162x^5+9x^6+e^{2e^x}(135x^4-108e^x x^5)}{27e^{6e^x}+216x^3+108x^4+18x^5+x^6+e^{4e^x}(162x+27x^2)+e^{2e^x}(324x^2+108x^3+9x^4)}\,dx = \frac{9\,x^5}{x^4+12\,x^3+6\,x^2e^{(2\,e^x)}+36\,x^2+36\,xe^{(2\,e^x)}+9\,e^{(4\,e^x)}}$$

input
```
integrate(((-108*x^5*exp(x)+135*x^4)*exp(exp(x))^2+9*x^6+162*x^5)/(27*exp(
exp(x))^6+(27*x^2+162*x)*exp(exp(x))^4+(9*x^4+108*x^3+324*x^2)*exp(exp(x))
^2+x^6+18*x^5+108*x^4+216*x^3),x, algorithm=\
```

output
```
9*x^5/(x^4 + 12*x^3 + 6*x^2*e^(2*e^x) + 36*x^2 + 36*x*e^(2*e^x) + 9*e^(4*e
^x))
```

3.1335.9 Mupad [F(-1)]

Timed out.

$$\int \frac{162x^5+9x^6+e^{2e^x}(135x^4-108e^x x^5)}{27e^{6e^x}+216x^3+108x^4+18x^5+x^6+e^{4e^x}(162x+27x^2)+e^{2e^x}(324x^2+108x^3+9x^4)}\,dx = \int \frac{162\,x^5-\mathrm{e}^{2\,\mathrm{e}^x}\,(108\,x^5\,\mathrm{e}^x-135\,x^4)+9\,x^6}{27\,\mathrm{e}^{6\,\mathrm{e}^x}+\mathrm{e}^{2\,\mathrm{e}^x}\,(9\,x^4+108\,x^3+324\,x^2)+\mathrm{e}^{4\,\mathrm{e}^x}\,(27\,x^2+162\,x)+216\,x^3+108\,x^4+18\,x^5+x^6}\,dx$$

input
```
int((162*x^5 - exp(2*exp(x))*(108*x^5*exp(x) - 135*x^4) + 9*x^6)/(27*exp(6
*exp(x)) + exp(2*exp(x))*(324*x^2 + 108*x^3 + 9*x^4) + exp(4*exp(x))*(162*
x + 27*x^2) + 216*x^3 + 108*x^4 + 18*x^5 + x^6),x)
```

output
```
int((162*x^5 - exp(2*exp(x))*(108*x^5*exp(x) - 135*x^4) + 9*x^6)/(27*exp(6
*exp(x)) + exp(2*exp(x))*(324*x^2 + 108*x^3 + 9*x^4) + exp(4*exp(x))*(162*
x + 27*x^2) + 216*x^3 + 108*x^4 + 18*x^5 + x^6), x)
```

CHAPTER 4

APPENDIX

4.1 Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

4.1.1 Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* Nasser: April 7,2022. add second output which gives reason for the grade *)
(*                       Small rewrite of logic in main function to make it*)
(*                       match Maple's logic. No change in functionality otherwise*)

(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)



(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*         GradeAntiderivative[result,optimal] returns*)
```

```
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)


GradeAntiderivative[result_,optimal_] := Module[{expnResult,expnOptimal,leafCountResult,leafC
    expnResult  = ExpnType[result];
    expnOptimal = ExpnType[optimal];
    leafCountResult = LeafCount[result];
    leafCountOptimal = LeafCount[optimal];

    (*Print["expnResult=",expnResult," expnOptimal=",expnOptimal];*)
    If[expnResult<=expnOptimal,
        If[Not[FreeQ[result,Complex]], (*result contains complex*)
            If[Not[FreeQ[optimal,Complex]], (*optimal contains complex*)
                If[leafCountResult<=2*leafCountOptimal,
                    finalresult={"A"," "}
                    ,(*ELSE*)
                    finalresult={"B","Both result and optimal contain complex but leaf count
                ]
            ,(*ELSE*)
                finalresult={"C","Result contains complex when optimal does not."}
            ]
        ,(*ELSE*)(*result does not contains complex*)
            If[leafCountResult<=2*leafCountOptimal,
               finalresult={"A"," "}
            ,(*ELSE*)
               finalresult={"B","Leaf count is larger than twice the leaf count of optimal. $
              ]
        ]
    ,(*ELSE*) (*expnResult>expnOptimal*)
        If[FreeQ[result,Integrate] && FreeQ[result,Int],
            finalresult={"C","Result contains higher order function than in optimal. Order "<
            ,
            finalresult={"F","Contains unresolved integral."}
        ]
    ];

    finalresult
]
```

```
(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
(*9 = unknown function*)


ExpnType[expn_] :=
  If[AtomQ[expn],
    1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,
        1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]
```

```
ElementaryFunctionQ[func_] :=
  MemberQ[{
  Exp,Log,
  Sin,Cos,Tan,Cot,Sec,Csc,
  ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
  Sinh,Cosh,Tanh,Coth,Sech,Csch,
  ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]


SpecialFunctionQ[func_] :=
  MemberQ[{
  Erf, Erfc, Erfi,
  FresnelS, FresnelC,
  ExpIntegralE, ExpIntegralEi, LogIntegral,
  SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
  Gamma, LogGamma, PolyGamma,
  Zeta, PolyLog, ProductLog,
  EllipticF, EllipticE, EllipticPi
},func]


HypergeometricFunctionQ[func_] :=
  MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]


AppellFunctionQ[func_] :=
  MemberQ[{AppellF1},func]
```

4.1.2 Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
```

```
#Nasser 12/22/2019  Added debug flag, added 'dilog' to special functions
#                   see problem 156, file Apostol_Problems
#Nasser 4/07/2022   add second output which gives reason for the grade

GradeAntiderivative := proc(result,optimal)
local leaf_count_result,
        leaf_count_optimal,
        ExpnType_result,
        ExpnType_optimal,
        debug:=false;

        leaf_count_result:=leafcount(result);
        #do NOT call ExpnType() if leaf size is too large. Recursion problem
        if leaf_count_result > 500000 then
            return "B","result has leaf size over 500,000. Avoiding possible recursion issues
        fi;

        leaf_count_optimal := leafcount(optimal);
        ExpnType_result  := ExpnType(result);
        ExpnType_optimal := ExpnType(optimal);

        if debug then
            print("ExpnType_result",ExpnType_result," ExpnType_optimal=",ExpnType_optimal);
        fi;

# If result and optimal are mathematical expressions,
#  GradeAntiderivative[result,optimal] returns
#   "F" if the result fails to integrate an expression that
#       is integrable
#   "C" if result involves higher level functions than necessary
#   "B" if result is more than twice the size of the optimal
#       antiderivative
#   "A" if result can be considered optimal

    #This check below actually is not needed, since I only
    #call this grading only for passed integrals. i.e. I check
    #for "F" before calling this. But no harm of keeping it here.
    #just in case.


    if not type(result,freeof('int')) then
        return "F","Result contains unresolved integral";
    fi;
```

```
    if ExpnType_result<=ExpnType_optimal then
        if debug then
             print("ExpnType_result<=ExpnType_optimal");
        fi;
        if is_contains_complex(result) then
            if is_contains_complex(optimal) then
                if debug then
                        print("both result and optimal complex");
                fi;
                if leaf_count_result<=2*leaf_count_optimal then
                    return "A"," ";
                else
                   return "B",cat("Both result and optimal contain complex but leaf count of
                                  convert(leaf_count_result,string)," vs. $2 (",
                                  convert(leaf_count_optimal,string)," ) = ",convert(2*leaf_
                end if
            else #result contains complex but optimal is not
                if debug then
                        print("result contains complex but optimal is not");
                fi;
                return "C","Result contains complex when optimal does not.";
            fi;
        else # result do not contain complex
             # this assumes optimal do not as well. No check is needed here.
            if debug then
                   print("result do not contain complex, this assumes optimal do not as well"
            fi;
            if leaf_count_result<=2*leaf_count_optimal then
                if debug then
                    print("leaf_count_result<=2*leaf_count_optimal");
                fi;
                return "A"," ";
            else
                if debug then
                    print("leaf_count_result>2*leaf_count_optimal");
                fi;
                return "B",cat("Leaf count of result is larger than twice the leaf count of o
                                  convert(leaf_count_result,string),"$ vs. $2(",
                                  convert(leaf_count_optimal,string),")=",convert(2*leaf_cou
            fi;
        fi;
```

```
    else #ExpnType(result) > ExpnType(optimal)
        if debug then
            print("ExpnType(result) > ExpnType(optimal)");
        fi;
        return "C",cat("Result contains higher order function than in optimal. Order ",
                       convert(ExpnType_result,string)," vs. order ",
                       convert(ExpnType_optimal,string),".");
    fi;

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false
#
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

# The following summarizes the type number assigned an expression
# based on the functions it involves
# 1 = rational function
# 2 = algebraic function
# 3 = elementary function
# 4 = special function
# 5 = hyperpergeometric function
# 6 = appell function
# 7 = rootsum function
# 8 = integrate function
# 9 = unknown function

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
       1
    else
       max(2,ExpnType(op(1,expn)))
    end if
```

```
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
         1
      else
         max(2,ExpnType(op(1,expn)))
      end if
    else
         max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
  end if
end proc:


ElementaryFunctionQ := proc(func)
  member(func,[
        exp,log,ln,
        sin,cos,tan,cot,sec,csc,
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
        erf,erfc,erfi,
        FresnelS,FresnelC,
        Ei,Ei,Li,Si,Ci,Shi,Chi,
```

```
        GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:

AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
     op(2,u)
  else
     apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```

4.1.3 Sympy grading function

```python
#Dec 24, 2019. Nasser M. Abbasi:
#              Port of original Maple grading function by
#              Albert Rich to use with Sympy/Python
#Dec 27, 2019  Nasser. Added `RootSum`. See problem 177, Timofeev file
#              added 'exp_polar'
from sympy import *

def leaf_count(expr):
   #sympy do not have leaf count function. This is approximation
   return round(1.7*count_ops(expr))

def is_sqrt(expr):
```

```
    if isinstance(expr,Pow):
        if expr.args[1] == Rational(1,2):
            return True
        else:
            return False
    else:
        return False

def is_elementary_function(func):
    return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
            asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
            asinh,acosh,atanh,acoth,asech,acsch
        ]

def is_special_function(func):
    return func in [ erf,erfc,erfi,
             fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
             gamma,loggamma,digamma,zeta,polylog,LambertW,
             elliptic_f,elliptic_e,elliptic_pi,exp_polar
         ]

def is_hypergeometric_function(func):
    return func in [hyper]

def is_appell_function(func):
    return func in [appellf1]

def is_atom(expn):
    try:
        if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
          return True
        else:
          return False

    except AttributeError as error:
        return False

def expnType(expn):
    debug=False
    if debug:
        print("expn=",expn,"type(expn)=",type(expn))

    if is_atom(expn):
```

```
        return 1
    elif isinstance(expn,list):
        return max(map(expnType, expn))    #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
        else:
            return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
    elif isinstance(expn,Pow):    #type(expn,'`^`')
        if isinstance(expn.args[1],Integer):  #type(op(2,expn),'integer')
            return expnType(expn.args[0])   #ExpnType(op(1,expn))
        elif isinstance(expn.args[1],Rational):  #type(op(2,expn),'rational')
            if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
                return 1
            else:
                return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
        else:
            return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,ExpnType(op(1,expn)),ExpnT
    elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type(expn,'`*`')
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func):  #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0]))  #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1)    #max(4,apply(max,map(ExpnType,[op(expn)])))
    elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(5,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif is_appell_function(expn.func):
        m1 = max(map(expnType, list(expn.args)))
        return max(6,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif isinstance(expn,RootSum):
        m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
        return max(7,m1)
    elif str(expn).find("Integral") != -1:
        m1 = max(map(expnType, list(expn.args)))
        return max(8,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
```

```
def grade_antiderivative(result,optimal):

    #print ("Enter grade_antiderivative for sagemath")
    #print("Enter grade_antiderivative, result=",result," optimal=",optimal)

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    #print("leaf_count_result=",leaf_count_result)
    #print("leaf_count_optimal=",leaf_count_optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        grade = "F"
        grade_annotation =""
    else:
        if expnType_result <= expnType_optimal:
            if result.has(I):
                if optimal.has(I): #both result and optimal complex
                    if leaf_count_result <= 2*leaf_count_optimal:
                        grade = "A"
                        grade_annotation =""
                    else:
                        grade = "B"
                        grade_annotation ="Both result and optimal contain complex but leaf count of result is large
                else: #result contains complex but optimal is not
                    grade = "C"
                    grade_annotation ="Result contains complex when optimal does not."
            else: # result do not contain complex, this assumes optimal do not as well
                if leaf_count_result <= 2*leaf_count_optimal:
                    grade = "A"
                    grade_annotation =""
                else:
                    grade = "B"
                    grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(le
        else:
            grade = "C"
            grade_annotation ="Result contains higher order function than in optimal. Order "+str(ExpnType_


    #print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)
```

```
    return grade, grade_annotation
```

4.1.4 SageMath grading function

```
#Dec 24, 2019. Nasser: Ported original Maple grading function by
#               Albert Rich to use with Sagemath. This is used to
#               grade Fricas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#               'arctan2','floor','abs','log_integral'
#June 4, 2022  Made default grade_annotation "none" instead of "" due
#               issue later when reading the file.
#July 14, 2022. Added ellipticF. This is until they fix sagemath, then remove it.

from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

debug=False;

def tree_size(expr):
    r"""
    Return the tree size of this expression.
    """
    #print("Enter tree_size, expr is ",expr)

    if expr not in SR:
        # deal with lists, tuples, vectors
        return 1 + sum(tree_size(a) for a in expr)
    expr = SR(expr)
    x, aa = expr.operator(), expr.operands()
    if x is None:
        return 1
    else:
        return 1 + sum(tree_size(a) for a in aa)

def is_sqrt(expr):
    if expr.operator() == operator.pow:   #isinstance(expr,Pow):
        if expr.operands()[1]==1/2: #expr.args[1] == Rational(1,2):
            if debug: print ("expr is sqrt")
            return True
        else:
```

```
        return False
    else:
        return False

def is_elementary_function(func):
    #debug=False
    m = func.name() in ['exp','log','ln',
            'sin','cos','tan','cot','sec','csc',
            'arcsin','arccos','arctan','arccot','arcsec','arccsc',
            'sinh','cosh','tanh','coth','sech','csch',
            'arcsinh','arccosh','arctanh','arccoth','arcsech','arccsch','sgn',
        'arctan2','floor','abs'
        ]
    if debug:
        if m:
            print ("func ", func , " is elementary_function")
        else:
            print ("func ", func , " is NOT elementary_function")


    return m

def is_special_function(func):
    #debug=False
    if debug:
        print ("type(func)=", type(func))

    m= func.name() in ['erf','erfc','erfi','fresnel_sin','fresnel_cos','Ei',
          'Ei','Li','Si','sin_integral','Ci','cos_integral','Shi','sinh_integral'
          'Chi','cosh_integral','gamma','log_gamma','psi,zeta',
          'polylog','lambert_w','elliptic_f','elliptic_e','ellipticF',
          'elliptic_pi','exp_integral_e','log_integral']

    if debug:
        print ("m=",m)
        if m:
            print ("func ", func ," is special_function")
        else:
            print ("func ", func ," is NOT special_function")


    return m
```

```
def is_hypergeometric_function(func):
   return func.name() in ['hypergeometric','hypergeometric_M','hypergeometric_U']

def is_appell_function(func):
   return func.name() in ['hypergeometric']   #[appellf1] can't find this in sagemath

def is_atom(expn):

   #debug=False
   if debug:
       print ("Enter is_atom, expn=",expn)

   if not hasattr(expn, 'parent'):
      return False


   #thanks to answer at https://ask.sagemath.org/question/49179/what-is-sagemath-equivalent-to-atomic-
   try:
      if expn.parent() is SR:
         return expn.operator() is None
      if expn.parent() in (ZZ, QQ, AA, QQbar):
         return expn in expn.parent() # Should always return True
      if hasattr(expn.parent(),"base_ring") and hasattr(expn.parent(),"gens"):
         return expn in expn.parent().base_ring() or expn in expn.parent().gens()

      return False

   except AttributeError as error:
      print("Exception,AttributeError in  is_atom")
      print ("cought exception" , type(error).__name__ )
      return False


def expnType(expn):

   if debug:
      print (">>>>>Enter expnType, expn=", expn)
      print (">>>>>is_atom(expn)=", is_atom(expn))

   if is_atom(expn):
      return 1
   elif type(expn)==list:   #isinstance(expn,list):
```

```
        return max(map(expnType, expn))    #apply(max,map(ExpnType,expn))
    elif is_sqrt(expn):
        if type(expn.operands()[0])==Rational: #type(isinstance(expn.args[0],Rational):
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))   #max(2,expnType(expn.args[0]))
    elif expn.operator() == operator.pow:   #isinstance(expn,Pow)
        if type(expn.operands()[1])==Integer:  #isinstance(expn.args[1],Integer)
            return expnType(expn.operands()[0])   #expnType(expn.args[0])
        elif type(expn.operands()[1])==Rational:  #isinstance(expn.args[1],Rational)
            if type(expn.operands()[0])==Rational: #isinstance(expn.args[0],Rational)
                return 1
            else:
                return max(2,expnType(expn.operands()[0]))   #max(2,expnType(expn.args[0]))
        else:
            return max(3,expnType(expn.operands()[0]),expnType(expn.operands()[1])) #max(3,expnType(expn.
    elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #isinstance(expn,Add) or isinst
        m1 = expnType(expn.operands()[0]) #expnType(expn.args[0])
        m2 = expnType(expn.operands()[1:]) #expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.operator()):  #is_elementary_function(expn.func)
        return max(3,expnType(expn.operands()[0]))
    elif is_special_function(expn.operator()): #is_special_function(expn.func)
        m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
        return max(4,m1)   #max(4,m1)
    elif is_hypergeometric_function(expn.operator()): #is_hypergeometric_function(expn.func)
        m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
        return max(5,m1)   #max(5,m1)
    elif is_appell_function(expn.operator()):
        m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
        return max(6,m1)   #max(6,m1)
    elif str(expn).find("Integral") != -1: #this will never happen, since it
                #is checked before calling the grading function that is passed.
                #but kept it here.
        m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
        return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):
```

```
    if debug:
        print ("Enter grade_antiderivative for sagemath")
        print("Enter grade_antiderivative, result=",result)
        print("Enter grade_antiderivative, optimal=",optimal)
        print("type(anti)=",type(result))
        print("type(optimal)=",type(optimal))

    leaf_count_result  = tree_size(result) #leaf_count(result)
    leaf_count_optimal = tree_size(optimal) #leaf_count(optimal)

    #if debug: print ("leaf_count_result=", leaf_count_result, "leaf_count_optimal=",leaf_count_optimal)


    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if debug: print ("expnType_result=", expnType_result, "expnType_optimal=",expnType_optimal)

    if expnType_result <= expnType_optimal:
        if result.has(I):
            if optimal.has(I): #both result and optimal complex
                if leaf_count_result <= 2*leaf_count_optimal:
                    grade = "A"
                    grade_annotation =" "
                else:
                    grade = "B"
                    grade_annotation ="Both result and optimal contain complex but leaf count of result is larger t
            else: #result contains complex but optimal is not
                grade = "C"
                grade_annotation ="Result contains complex when optimal does not."
        else: # result do not contain complex, this assumes optimal do not as well
            if leaf_count_result <= 2*leaf_count_optimal:
                grade = "A"
                grade_annotation =" "
            else:
                grade = "B"
                grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(leaf_
    else:
        grade = "C"
        grade_annotation ="Result contains higher order function than in optimal. Order "+str(expnType_resu


    print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)
```

```
return grade, grade_annotation
```